a WeEkly Journal 0f Practical information, art, science, mechanics, CHEMISTRY, and Manufactures.

## Vol, XXVIII.--No. 11 -]

## IMPROVED HOT-PRESSING MACHINE

We illustrate herewith a new device designed for the quicker and better pressing of seams of cloth garments, and also for use in laundries for ironing purposes. It affords a means of workins with a regular and continuous heat which cannot be obtained by ordinary hand pressing.
In our engraving, A is a metal cylinder which is heated by means of a perforated gas tube inside, the gas being supplied through the pipe, $F$. B is the sleeve board, which fits on a rest, C, which is fit ted on the rolling table. The sleeve board may be raised or lowered by actuating the lever and connecting rod, $\mathrm{B}^{\prime}$. By rotating the hand wheel, $G$, in the direction of the arrow, the cylinder, $A$, is lowered and the pressure applied. The garment is placed in suitable position on the sleeve board ; motion is then impart ed to the wheel, E , by the treadle, and is communicated to the gearing, 1. By this means the cylinder, A, is revolved, and simultaneously the table and sleeve board are carried along by the same gearing at the same speed. As the soam come under the cylinder it is the seam opener $H$ Thepen by is thus pressed, $H$. The seam only is thus pressed, and it is simply necessary to raise the lever, $\mathbf{B}^{\prime}$, to release both garment and sleeve board without interfering with or altering the position of the cylin der.
For pressing the seams of cuffs or other circular work, a small rolleri used which takes the place of the sleeve board, and is quickly at tached under the ironing roller. For kinds of work broader than sleeve or, trowser legs, a lapelle board re or, places the sleeve board; and as these board brackets on the rolling table, they are easily

## exchanged

The advantages claimed for the machine are that it will do the work of six competent pressers, or even of double that number if a man be stationed at its either end, passing garments through both ways. It is also stated to effect a great saving of time, to render the seams better pressed, and to obviate all danger of the accidental burning of clothes by too hot irons. The heat is uni form and safe. It is believed tha form and safe. It is believed that by using this invention, will save its cost in a short time.


## HOT-PRESSING MACHINE

hibition almost surpasses that displayed inside. To the north of the ground extends the People's Park, while to th west of it, along the main avenue of the Prater, extends that of the " Upper." All those hundreds of booths, gardens, inns and show places of the former have been transformed as if by magic. Most of them have been entirely rebuilt on a more pretentious scale, while the rest have been so renovated that you can scarcely recognize the old, homely, but rather dingy places. The grandest effect is, however, that of the fashionable café, No. 3, the last alō̈gside the main venue. A hall is in process of construction to contai 5,000 people. There are to be two rows of boxes, a theater , orcherical enibition It will require all those millions of heatrical exhion. It wil requir Cl visitors on the for the whe reckons to pay for all these outlays; but, if they do come,
they will have no reason to say that great preparations have they will have no reason to say
not been made to receive them.

At a meeting of the stock-holders of the Williamstown cheese factory, a dividend of 10 per cent was declared. Th report showed a net production of 78,000 pounds for the year. The cheese manufactured at this establishment com mands as high a price as any made in the country. Nearly half the amount produced was exported.

Practical experience shows that paper mills may be run by steam power with more certainty and economy than by water power. The exhaust steam from the engines may be used to heat dryers and calenderingrolls.
which rather spoils the effect of the central building. The minaret imitations, which are of the best models, are, in deed, graceful additions; but the mosque is a decided fail . Behind this group is to be a complete Egyptian farm or hatching eggs.
If anything, private energy and industry outside the Ex

## The Vienna Exposition.

As at the Paris Exhibition of 1867, so at that of Vienna the Sultan of Turkey and the Khedive of Egypt are likely to shine above all others. The former will present a com plete Turkish dwelling house, with harem and selamlik. It is finished outside, and is a close imitation of one of those thousands of gaily painted wooden structures which you see along the Bosphorus. Close by you see some dozen Greeks and Bulgarians at work running up the lath and plaster structure, which will be a bazaar and coffee house This speedy and original mode of building created quite a sensation at first among the workpeople, especially the talians, who, quick at learning, soon appripred som show buildings of the Turkish Exhibition will, however, be a close copy of the famous fountain of ihe Sultan Ahmed, standing between St. Sophia and the entrance gate of the old Seraglio, and the building in which the so much talked of Turkish Imperial treasure of jewels will be exhibited.
As for the Khedive, his buildings will cover a space of no less than 5,500 square meters, nearly half an acre, and present illustrations of all Egyptian styles of building from the Pharaohs downward. There will be an imitation of the tombs of Beni Hassan. Then there is to be a dwelling hous in the best Arabian style of the caliphs, the shell of which is already finished, and which even in its unfinished state place, only it is in presimity with a mosque on one side and a gallery leading to a tall minaret of 250 feet on the other,

A New and Useful Photo Improvement.
A new method of enlarging photo negatives, by which any photographer, without the use of solar camera or othe apparatus, may successfully produce large prints from smal original negatives, is thus described in the British Journa of Piotography. Collodio-bromide collodion, that is, a col lodion emulsion containing nitrate of silver, is employed formulas for which have been sev eral times given in the Scientific American. The method is as fol lows:

Let an enlarged transparency be aken on a collodio-bromide plate by means of any of the copying came ras, magic lanterns, or other meth ods of producing enlarged images now so well known to photographers Then develope the image by alkadin pyro., taking care, of course, not to use any silver. Continue the de velopment until every detail is wel out, then wash the surface and pour over it some slightly diluted nitri acid. Presto! the transparency in stantly becomes a negative, which after being slightly intensified and varnished, may be used for the pro duction of pictures on either carbon paper or albumenized silver paper This is the whole process, and we shall now make one or two comment upon it.
First of all, no large silver bath is required. This is a somewhat se rious matter when only one or two pictures are required of the dimen sions of perhaps 25 by 20 inches. All that is necessary is to coat th plate with emulsified collodion which can now be so made that will keep, and be always ready fo use, for a leugthened period of time This done, the plate is then im mersed in a dish of water, the dish being composed of wood, gutta per cha, porcelain, varnished paste board, or even japanned iron. Whe the water flows evenly over the sur face, the plate is then to be lifted up and placed upon its support in the darkened room, or in its frame if large camera be used. The image having been previously focussed up on another plate, is now allowed to fall upon the sensitive film for few seconds, or even minutes if th light be bad; at any rate, for suc an exposure as would be given to a ordinary bromo-iodized collodion film sensitized in a silver bath and exposed while wet. The light is then stopped, the plate levelled, and

# Srientifir Ammican. 

MUNN \& CO., Editors and Proprietors published weekly $A T$
NO. 37 PARK ROW. NEW YORK

O. D. MUNN

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## TMTMM <br> ne copy, six month <br> 

VOL. XXVIII., No. 11. [New Series.] Toenty-eighth Year
NEW YORK, SATURDAY, MARCH 15, 1873.

poigonous air in schools and factories,
The City Sanitary Inspector of New York has recently published a report relative to the bad ventilating arrange ments of numerous public schools and manufactories within the corporate limits.

We find it stated that the analysis of samples of air from two factories gave 0.14 to $0 \cdot 16$ of 1 per cent of carbonic acid In the public schools, the quantity of the deleterious ga varied from 0.09 to 0.35 . An examination of the air in one of the class rooms provided with a ventilating flue was made while a window was open, yielding $0 \cdot 17$ of 1 per cent of car bonic acid. The window was then closed, and after a lapse of ten minutes the proportion had increased to $0 \cdot 32$. The trial then became so oppressive to the inmates of the room that it was discontinued, though the opinion is given that had the experiment continued for an hour, no less than 1. per cent of carbonic acid would have accumulated. The magnitude of the above percentage of the deadly gas may be es timated from the fact that Dr. Parkes and other high au thorities consider 6 parts of carbonic acid in 10,000 parts of air, or 0.06 of 1 per cent, should be the greatest permissible impurity

Although the above details indicate the deleterious nature of the atmosphere of a crowded and ill ventilated schoo room to no small extent, they exhibit but a portion of its noxious properties. Not only is the air vitiated by carbonic acid, but by effete organic matter, to which is due the ciose smell of such apartments. The Inspector, it seems to us, omits an important portion of his investigation when he fails to state the percentage of oxygen, as shown in the samples of impure air which were subjected to his analyses. Gra ham and Liebig show that the mean amount of oxygen in the atmosphere is 20.9 volumes per cent. Dr. Angus Smith considers that air containing a less percentage than 20.7 is very unwholesome, but adds that the average might be re duced far below that found in circumstances of daily life without occasioning great discomfort, thus proving the se ductive and insidious nature of exhaled air. The same authority in the course of experiment noticed nothing more than a slight feeling of closeness when the percentage of oxygen was diminished to $17 \cdot 45$. The small proportion ate quantities of carbonic acid are less easily determined than the larger variations in the amount of oxygen, while the ab sence of the latter is fully as deleterious to health as the pre sence of the former. Experiment has further shown that an atmosphere containing 18.8 per cent of oxygen and 2.28 per cent of carbonic acid will fail to support the combustion of a candle flame, and yet may be breathed without great discom fort. According to the instance cited above, a room full of people found air, that contained not one half the proportion ate amount of carbonic acid just given, verpesso. It evident that the closeness of the atmosphere was not due to the deficiency in oxygen; and to the accurate determination of this deficiency, attention should have been especially directed.

The subject of proper ventilation has been so thoroughly discussed of late that it would be useless repetition to agai urge its importance. Workmen in badly ventilated factorie should take the matter in their own hands and decline to la bor in buildings where no means are provided for changing the foul and noxious air, while parents would act wisely in removing their children from the schools specified in the Inspector's report, until they are satisfied that proper sani tary precautions are taken.

## PRACTICAL RESULTS OF THE EIGHT HOUR PLAN

The evil resuits of the eighi hour movement of last sum mer, which for nearly eleven weeks paralyzed the industrie of this city, have during the present winter been severel felt. The oxhibit of our Commissioners of charities and Corrections shows that the number of industrious and unem ployed poor craving the benefit of public charities has been unusually large, while such statistics as have been gathere indicate serious losses both to employers and workmen i many branches of trade.
It will be remembered that among the builders the strik first began, and that although a certain proportion of th employers having unfulfilled contracts on hand were coerced into acquiescence with the demands of their operatives, many preferred to incur the penalties of their agreements rather than yield; while others succeeded in temporizing with their hands until after the failure of the movement was assured It is probable therefore that this trade, being the first af fected, suffered with even greater severity, and indeed bor a larger share of the loss, than any other industry involved in the unfortunate struggle. This view we think may be safely based upon a comparison of the records of the building trade for corresponding periods in 1871 and 1872, the tabulated sta tistics of which we find in a pamphlet signed "Practica Builder" recently received. From May 27th to Novembe 30th in the first mentioned year, 1,333 edifices were erected and alterations made in 310 more. Of these 528 were firs class structures of an average cost of $\$ 18,000$ : 53 , factorie and workshops averaging $\$ 8,000$, and 33 , hotels, public buildings, and churches averaging $\$ 200,000$ each. The ag gregate sum invested in all for the twenty-seven weeks was of first class edifices but 107, of factories 29, hotels etc., 16 and altogether but 707 buildings and 287 alterations wer completed at an aggregate cost of $\$ 12,821,000$. Deducting this total for 1872 from the total for 1871, we have a result of $\$ 12,851,000$, which indicates the dead loss to city improvements in the twenty-seven weeks.
It cannot be urged that the year would have been a dul one in any event for the trade, as the spring opened with an excellent prospect for a busy fall. During September (the principal month for making contracts), 1871, 108 first clas structures were begun: in the same period in 1872, but 9 one twelfth as many, were undertaken. Here then is nearly thirteen millions of dollars forced out of the building trade and into other channels. Estimating labor at one half the cost gives $\$ 6,425,000$, as a dead loss, not to capitealists who can save themselves by other investments, but to the work ing men who have no other support. Almost six and a hal millions in twenty-seven weeks- $\$ 39,663$ per day-is the sum these men paid for their strike, and if we should add hereto the outside expenses incurred, of which the money borrowed, for support during its continuance, from the vari ous trade associations in other coies, forms no inconsidera ple portion, we should doubtless arrive at a total far in ex ess of the largest estimates.
We find it stated that at the present time there is but one fifth the amount, of first class work in this city to be carried over into spring, of that done last year, and that to em ploy the same number of men and they to average the same quantity of labor as they did in 1872 , there is not $4 \frac{1}{2}$ hour work per day this season, for each man employed in th uilding trade.
Let us add that we notice that recent daily journals chron icle the fact that the International Society has made its head quarters in New York, and is seeking to instil into the minds of our workmen the baleful and communistic principles of its organization. It may be well for the men to consider uch facts as those above stated before joining an association the only object of which is to lead them into further strife productive of no results, save misery to themselves and heir fumilies.

## FOUL AIR SIGNAL

We abound in inventions to warn us of fire and to alarm the household of the approach of a burgler ; but there is an insid ous foe who enters everywhere, in every apartment of private houses, and riots unmolested in all public places, of hose presence we are not warned in time to make good ou escape. We refer to bad air. It is perfectly notorious that no public or private buildings are adequately supplied with entilation, and the consequences are more injurious than we are apt to believe. In default of suitable ventilation, it would be well to have some kind of a signal to warn us of the dan ger, or a contrivance to automatically open a door or window The presence of fire damp in mines is made known by the explosion of the small volume of air in the Davy safety amp. When this explosion takes place in the narrow com retreat until the dangerous gas can be blown out. Unfortunately the gases of close rooms are not of this explosive char cter; if they were, we should not suffer so much from bad ventilation as we now do, as no one would run the risk of
being blown up for the pleasure of being suffocated. The being blown up for the pleasure of being suffocated. The
gas which leaks through stoves and furnaces and arises from mperfect combustion, known as carbonic oxide, can be ab sorbed in a way to betray its presence by the following in enious invention: The apparatus consists of a small gal anic battery with a bell attached, and an open test tube containing liquid chloride of palladium. The chloride of palladium is extremely sensitive to the presence of carboni oxide gas; it absorbs the gas and precipitates metallic palla dium ; the deposition of the metal in the bottom of the tube ang the conection of the galvanic cur

The invention is found to work admirably for carbonic oxide gas, and the next thing is to devise a plan for disclosing th resence of carbonic acid gas. It is possible that this could be done by putting in a carefully counterpoised balance som caustic baryta or lime which, by the absorption of the car bonic acid of the air, would sink and cause the current to $b$ bonic acid of the air, would sink and cause the current to b
closed in a battery and the bell to be rung. The same con rivance could be made to open and close a shutter just as the draft of a stove is regulated by the rise of mercury in a ther mometer connected with a battery. It would be a novel ex perience on any public occasion to have the proceedingsinter upted by the ringing of bells until equilibrium was restored by proper ventilation. We should all take kindly to the nterruption and be thankful for a whiff of pure air. Let us all means have a palladium ventilating company organ zed, for the benefit of gasping humanity

## INVERTEBRATE MEN

When a young man, more than ordinarily useless to him elf and friends, had no other occupation, he used to sit dow and write a letter to Horace Greeley, pretending that he wanted work, would do anything to get it, and that, if soc ety in general had not turned against him, he would be abl to prove himself capable of great things. To beg he wa ashamed, and dig he could not, because it made his back ache; so he sat down and emptied all his woes on Mr. Gree ey's head, and really felt that he had achieved some distinc ion if Mr. Greeley replied and told him to go out West. It is needless to say that he never went, although he should have gone, in common with thousands of his congeners who herd in cities, lie in wait for the hapless advertiser, and pre cipitate themselves, not as individuals but as a horde, upo ny one who dares seek assistance in the columns of the daily papers. For, be it known, the young man of the period is as useless as he is ubiquitous. He cannot longer stand on treet corners, for that is against the statute, but he can liv on his father, his widowed mother, possibly even his school eaching sisters, pretending the while that he is always seek ing employment, always laboring in the vineyard in one form or another
This jeremiad against a useless class of non-producers is rought out by the result of three or four months advertising varicus periods for a young man to fill a certain post re quiring an ordinarily facile pen, a knowledge of simple com mercial forms of expression, and familiarity with busines routine; yet it will hardly be credited that, out of hundreds who applied and were examined, scarcely ten could be found who gave even a promise of succeeding. Vague, uncertain ndirect, willing to work for anything and at anything, hav ing no especial fitness or adaptation for any particular line they formed the rank and file of the noble army of incompe ents who hew the wood and draw the water for their betters And yet the advertisement in question was specially worded to exclude this very class! Knowing that there we:re ten ncapables in the world for one expert, it called for an ex eptional man, and the very class who rushed in were thos who are said to rush in where angels fear to tread
The question presents itself to every thinking man: Wher o all these young men come from? In what school hav hey acquired their aimless, uncertain, vague ideas of duty work, of application, of achievement? What do they ex pect to do in the race of life before them? Do they mean to be entry clerks all their life long? Do they mean to be book keepers at $\$ 1,000$ or $\$ 2,000$ a year forever? Will the stand and wait upon the ringing of a bell, and answer some great man's nod and beck? Will they, pending an engage ment for even their superfluous ability, continue to wring he hearts of aged parents, hardworking sisters and relative s poor as they? These are questions hard to answer, but afe to answer in the affirmative. The riddle, never solved "What shall be done with them" is a serious one. If Satan finds business for idle hands in this city, he must do a thriv ing trade, judging from the applications received for a clerk ship.
It is a sad and solemn question, not to be lightly dismissed a a moment's reflection, a question reaching further tha mere technical or professional education. Schools may abound in the land and colleges shoulder each other in a lin across the continent; but the aimless, uncertain, purposeles man will still exist unless, from his youth up, his parent exhort him to stand on his own feet, to rely on his own arm, to think for himself, to follow some one line and make him elf perfect therein. Then shall a sturdier manhood be ap parent, a nobler race spring up; and if one seeks assistanc nd casts forth his drag net, he shall find it filled with appli ations that give some cvidence on the face of them of the writer's ability to perform his undertakings. It matters lit e whether a man be a hewer of wood or a drawer of water the whether a man be a hewer of wood or a drawer of water
there must be such; but it matters greatly whether a man be competent or not for the line he assumes.

## THE KNOWLEDGE OF THE TRUTH

The ancients had no knowledge of the sciences which a present form the domain of the most important and influen tial of all human pursuits, namely, the investigation of Na ture, the explanation of its phenomena, and the application of the wisdom thus obtained for educational training and prac tical useful purposes. Their philosophical systems were only maginary cosmologies, basedon a few hypothetical principles. The great philosophers, often so boastfully referred to by those whose knowledge is exclusively confined to the philologi cal branches: Thales, Pythagoras, Democritus, etc. : produced only speculations concerning Nature; and, notwithstanding that they sometimes hit the truth, their ideas were largely mixed up with metaphysical notions, and they only occa mixed up with metaphysical notions, and they only occa
sionally brought forward conclusions, and these were based
on ill observed natural phenomena. Even Aristotle, without doubt the first physicist and philosopher of antiquity, is himself the best proof that the ancients did not know anything worth mentioning about the physical sciences. As a specimen of the ideas of the most advanced minds of Roman anmen of the ideas of the we will give here a literal translation of a passage from T. Lucretius Carus, a very esteemed Latin author who from T. Lucretius Carus, a very esteemed Latin author who
flourished about the year 50 B . C. The writer, in his celeflourished about the year 50 B . C. The writer, in his cele-
brated work, De Rerum Natura (on the Nature of Things), thus speaks:
"The elements, out of which our earth is composed, have, after the first chaotic confusion, flown together, and, by reason of their own weight, occupied the lowest space; the more those heavier matters were condensed, the more they squeezed out the thinner lighter ones, which then composed the sea, the stars, the sun and moon, and the limits of the universe. Because all these objects are composed out of much smoother, rounder, and smaller seeds than the earth: for this reason the heavenly vault has first gone up, carrying with it many luminous little flames burst through crevices out of the component elements of the earth, nearly in the same manner as happens when, in the early morning, we same manner as happens when, in the early morning, we
see the golden sunbeams radiating on the leaves covered with fresh dew which has been evaporated from rivers and swamps as fog and vapor; we see then sometimes even smokeascending from the earth," etc. A little further on we read as follows: " After the heaven had obtained its shape, the elements of sun and moon succeeded, which neither heaven nor earth could appropriate, as they were not heavy enough to take the lowest place, nor light enough to occupy the highest, and to assist in the formation of the highest regions. The sun and moon are thus placed between heaven and earth, moving themselves as if they were living bodies, constituting the principal parts of the whole world, in the same way as some parts of our bodies may remain motionless, while other members can move themselves," etc.
These are only samples of the rest, which is not in the least better; and incredible as it seems, it is a fact that the literary savants of civilized Europe, of only one century ago, called this very book of Lucretius Carus "an clegant explanation of natural philosophy, based on intelligent and easily understood principles." Out of respect for the ancients, we would rather be inclined to accept the theory of Hardouin, who attempts to prove, by critical considerations, that this and other works attributed to old Roman authors are the product of some monks of the 13th century. He only makes
an exception in regard to Cicero and a few others, concerning an exception in regard to Cicero and a few others, conce
the authenticity of which nobody can have any doubt.

Notwithstanding that there has been a great deal of ini genuity wasted in trying to prove that the world is retrograding, and that there are such things as "the lost arts" of the ancients, and notwithstanding that we justly confess our admiration for many products of antiquity, as well of the mental as of the material kind, it cannot be denied, if we are not wilfully blind to the progress of our times, that the ancients knew scarcely anything practically useful at all. To what did they know of electricity and magnetism? They even ignored the existence and weight of the atmosphere; and of the nature of light and heat, they could not form the remotest conception. Even the Greeks, who left us such precious models of eloquence, poetry, sculpture, and architecture, were, in regard to the clear conception of natural phe nomena, not further advanced than our American Indian savages. As soon as observation was substituted for mere speculation, progress began; in other words, as soon as man commenced to abandon his bad habit of indulging in the full scope of his own imagination, and in place thereof acknow ledged Nature as a teacher, he commenced to learn something.
The whole human race of the period of antiquity had the defect which may still daily be noticed in certain individuals, old as well as young, who have not yet attained the docility of mind necessary to absorb knowledge from without. Such persons, instead of listening to what others may communi cate to them, have the bad habit of hindering their instruc tors with accounts of their own suppositions and theories, which are often utterly absurd. Who has not met persons who love to hear themselves talk? These people have the very worst prospect in regard to their further mental pro-
gress, and are the very opposite of the far superior class who gress, and are the very opposite of the far superior class who
are able to listen patiently to what others have to say, and to gather knowledge from exterior sources, in place of from within, from their own conceited imaginations, which as ex perience should have taught them, over and over again, are ut terly worthless.
It is especially the investigator of Nature's secrets who must train himself to mind with docility her teachings, who must patiently and carefully watch all the phenomena, du ring an observation or an experiment, and especially foste mo previously conceived theories; but, above all things, he attain: The Knowledge of the Truth.
COLBURN'S THEORY AND THE BOILER EXPLOSION AT PITTSBDRGH.
One of our Pittsburgh subscribers sends us two extracts from the Evening Chronicle of that city, in which are considered the causes of explosions, with particular reference to the terrible disaster at the American Iron Works, of which we published a description in the Scientific American of
February 22 , on page 112 . He asks us what we think of the February 22 , on page 112 . He asks us what we think of the
views of the writer of the article on the subject of the intensity of explosive force by the sudden evaporation of large masses of water relieved from pressure.
The writer says:-"Now suppose a rupture to have taken
place in any one of these four boilers, above the water line before the steam, rushing out at initial velocity of two thousan feet per second, was exhausted from the steam space, it would, being liberated from the water contained in the water space, rush from the water along with a portion of the water itsel and strike with immense velocity upon the upper part of the boiler, rending it in a manner to produce the most startling results. Supposing 1,066 cubic feet of water in each boiler was converted into steam ; upon the liberation of steam con tained therein, this would make 30,000 cubic feet of steam at the pressure of the atmosphere); and this, acting expan sively upon fragments of the boiler already hurled into the or large portions being carried one hundred rods or more for large portions being carried one hundred rods or more rom the scene of the explosion. Here were 120,000 cubic eet, or more than two tuns, of vapor in the atmosphere sur rounding the boilers; sufficient force and sufficient gas in all conscience to account for the destructiveness and the 'blue gas' without resort to the superheated steam, or the burning of an explosive gas within the boilers." The views here expressed are, by leading authorities, generally believed to be well founded. We believe that this theory, which is known to engineers as "Colburn's Theory," was first given its present form by our late talented fellow countryman, Zerah Colburn. The extraordinary violence with which explosions frequently occur are good evidence of its probable correctness n many instances.
It is by no means certain, however, that the effect of this sudden liberation of immense volumes of steam is, in all cases, to appreciably intensify the disastrous effects succeeding the explosion. The only experiments which have ever been made on a scale sufficiently large to permit us to make reliable and unexceptional deductions are those of the United Railroad Companies of New Jersey, which were conducted by Mr. F. B. Stevens. One of these allowed of quite reliable estimates of the intensity of this effect, It was sluwn by Professor Thurston (Journal of Franklin Institute, March, 1872), in an examination of this experiment, that "the energy of this explosion and all of its tremendous effects were principally due to the simple expansion of a mass of steam suddenly liberated at a moderate pressure, by the general disruption of a steam boiler of very uniform but feeble disruption of a steam boiler of very uniorm but feeble
strength," and that "in this case, the liberation of steam strength," and that "in this case, the liberation of steam
throughout the mass of water contained in the boiler, and throughout the mass of water contained in the boiler, and
which resulted in setting free nearly 70.000 cubic feet of steam, would not seem to have taken place promptly enough to greatly intensify the effects of this explosion."
We have no evidence which enables us to form a decided pinion in regard to the cause of the boiler explosion to which our correspondent refers. We can only say that the almost invariable, and possibly absolutely invariable, inference, which we draw when we read of an explosion, is that there has been either ignorance, carelessness, or recklessness somewhere, for which some one is responsible, and of which some one should be made to suffer the just consequences.

## SCIENTIFIC AND PRACTICAL INFORMATION

the effects of super-oxygenated air.
A correspondent, L. G. F., of Las Vegas, New Mexico speaks of the extremely exhilarating air of his locality, and states that it is very invigorating, and any stimulant is doubly
injurious in such a climate. Sometimes a visitor will come injurious in such a climate. Sometimes a visitor will come
in, with glasslike eyes starting from his head and incoher in, with glasslike eyes starting from his head and incoher near a fire; but L. G. F. finds the best treatment to be to keep them far from the stoves, and to administer food and hot coffee to stimulate the stomach into action to replace the carbon lost by super-oxygenation of the blood. Riders on horseback are not thus affected; probably the vapor from the horse's body uses up a large proportion of the oxygen near him. L. G. F. recummends phosphorus in small doses,
as, in addition to its well known stimulant effect on the brain, it will appropriate the superfluous oxygen of the air, and stop the exhaustion of the carbon in the system, which and stop the exhaustion of the carbon in the system, whic
would otherwise become too rapid for the patient's health.
the fuenta de sangre in honduras.
Our correspondent, O. L., of N. Y., has in his possession The liquid runs down the walls from a cave in the earth The place is called by the natives the fuente de sangre or pring of blood, and was, for centuries, considered to b Caused by a Divine miracle. Dr. A. Habel, who traveled in question, and added a little alcohol to prevent decomposition. The fluid, when observed by the help of a micros cope, exhibits some colorless rhombic crystals and also some reddish brown amorphous particles, as well as organic fibers
and cells. To the smell, ammonia is distinctly present in it, and cells. To the smell, ammonia is distinctly present in it
and the odor becomes intensified by the addition of caustic and the odor becomes intensified by the addition of caustid
soda. The ammonia was volatilized by heat, and the red brown residue wasimperfectly soluble in water. The salts fluid, and the deposit was found to be completely soluble in alkalies.
This precipitate evolved, on heating, the odor of burn horn, and a considerable quantity of carbon was found in the residue; after perfect incineration, only a small amoun and red color; nitric acid oxidized it, at moderate heat, to a yel red color; nitric acid oxidized it, at moderate he
low mass, in which picric acid was recognized.
"It has occurred to me," says our correspondent, "that this ed color may be due to the coloring principle of the krame ria triandra, the plant yielding the rhatany extract, which
occurs in tropical climates in great abundance. In compar-
ing the rhatany extract with the fuente de sarigre, I was struck with the identity of all the reactions, so that I be came convinced that this spring is a more or less decom posed aqueous extract of the roots of the above named tree.
These roots contain a nitrogenous body: and Wittstein, of These roots contain a nitrogenous body: and Wittstein, of needles, showing almost all reactions for tyrosine. Ruge, in 1862, determined its formula to be $\mathrm{C}_{10} \mathrm{H}_{13} \mathrm{NO}_{3}$; he calls it rhatanine. It is analogous to tyrosene and yields, by oxidation, dark red products. This theory accounts for the presence of ammonia as well as for the red color of the fuente de sangre.'
distinguishing fibers in mixed goods.
A correspondent writes to know if there is any way in which to distinguish vegetable fibers such as cotton, flax, tow or jute, in woolen and silk goods. In addition to the information on this subject published on pages 131 and 150 of our current volume, we give a method somewhat different to any we have yet published, proposed by Professor Emil Kopp: If the goods be boiled in a ten per cent caustic soda lye, wool and silk are dissolved, but the vegetable fiber will not be acted upon. The addition of sugar of lead to the alnot be acted upon. The addition of sugar of lead to the al-
kaline solution will occasion a black precipitate if wool be kaline solution will occasion a black precipitate if wool be
present. The undissolved fiber ought to be bleached in present. The undissolved fiber ought to be bleached in
chlorine water if it is colored, and it can then be decomposed chlorine water if it is colored, and it can then be decomposed
by cupro-ammonia, which dissolves cellulose. Where the by cupro-ammonia, which dissolves cellulose. Where the
goods are highly colored, it is well to treat them with a mixture of 2 volumes concentrated oil of vitriol and 1 volume nitric acid. Wool, silk, and coloring minior will be destroyed, while the cellulose will 've converted into gun cotton and can be recognized iog its explosive properties. When the goods are white, a solution of fuchsin can be used as a test, which uyes silk and wool, but not vegetable fiber. The siziny must be removed before applying this test, which is best accomplished by washing in a weak solution of carbonate of soda and in soap, and applying the fuchsin mixed hot with some carbonate of soda. To detect wool in silk, a hot with some carbonate of soda. To detect wool in silk, a
solution of oxide of lead in caustic soda can be employed, which turns woolen goods black owing to the sulphur of the wool combining with the lead. Silk in wool is shown by its solubility in a cold solution of cupro-ammonia-from this solution acids precipitate the silk in flocculi. Wool is only soluble in cupro-ammonia by aid of heat. Concentrated acids, such as sulphuric, nitric, or preferably hydrochloric, act in the cold upon silk but not on wool. The solvent properties of cupro-ammonia, Schweitzer's test, make it one of the most useful reagents we have in the laboratory. It is prepared by suspending strips of copper in concentrated ammonia in a large flask, lightly corked, and occasionally shaking so as to bring the metal in contact with the oxygen of the air. A good plan is to transfer the contents from one flask to another. By degrees a tolerably concentrated solution of oxide of copper in ammonia is obtained, which is one of the best solvents of cellulose known.

SPRING WATER in the vicinity of cemeteries.
The Annales de la Société de Gand contain a very interesting analysis by Lefort of the water of St. Didier, which illus trates the influence of cemeteries on the spring water around them. The water had a sweetish taste and produced no desire or vomiting, but left a disagreeable fetid taste on the ongue. A gray, thick sediment remained after evaporation which turned, by continued heating, to a dark brown, emit ng an empyreumatic smell. One part of this residue wa reated with diluted muriatic acid, producing carbonic aci and a strong smell of glue; another part was treated with hydrate of lime and showed a considerable amount of am moniacal salt. The presence of organic substances in this water shows that, even at a distance of 300 feet, water may tainted by a cemetery. No cemetery should be laid out un less it is clearly shown that no filtration of water from the burial ground can take place into that used for human con sumption. It is also a necessary sanitary measure to draw off all the water in the vicinity of established cemeteries or other places used for the interment of animal bodies, and it is matter of hygienic importance to analyze from time to time the water used in the neighborhood for drinking, so that any substances dissolved therein, which may be delete rious to health, may be clearly discovered. This is especially necessary in localities with but a limited supply of water.

## filtering strong acids.

James St. Clair Gray recommends she use of a bundle of pun glass threads in a funnel, with glass powder spread over it. Before use, this filter can be washed with hot wa ter, dried, and then washed with pure acid.

## PARCHMENT SOLUTION.

A Berlin chemist (De Souwageon) has introduced a solution of gutta percha in ether for the purpose of giving maps, pic tures, globes, etc., a clear, thin coating for protecting them against dust and dirt. Objects so covered can easily be cleaned by the application of a moistened rag. Drawirgs executed with charcoal, pencil, or crayon may be permanently fixed by the application of the dilute solution to their surfaces. The ether evaporates, leaving the gutta percha in a thin but sufficiently protecting covering on the drawings.

## Burnt Boller Plates.

A correspondent, J. H. T., of Ky., states that, in his opinion, a frequent cause of burnt boiler plates is the too clos proximity of flues to the shell of the boiler, owing generally
to the flues being too large. Thus there is but little water to the flues being too large. Thus there is but little water between the flues and the shell, and evaporation cannot take place, in so narrow limits, rapidly enough to prevent burning the plates. Owners of boilers thus troubled should reduce the diameters of their flues.
tye king penguin and the australian bustard. lection of the Zoölogical Society of London, kept in the wel The birds invariably form the most interesting class of known gardens at the north end of Regent's Park specimens in any zoölogical collection. As they are, almost without exception, perfectly harmless, and possess the friendly disposition which generally belongs to the weaker creatures, they are universal favorites with the juveniles; and their plumage is as strangely varied as their voices, ranging from the plain russet brown and liquid melody of the nightingale to the brilliant colors and shrill scream of the macaw. Wegive the brilliant colors and shrill scream of the macaw. We give
herewith representations of two recent additions to the col

The King Penguins were brought from the Falkland isl ands, and are shown in the engraving in company with two penguins from the Cape of Good Hope. The former are young birds, only 30 inches in hight, and are as yet covered with a downy fur which will, in time, give place to feathers. The two species are friendly to each other, the nimble little Cape birds, being fond of running about, an exercise in which

The Australian bustards are of the order gralle, or waders of the genus gallinacece. They have long necks and legs, but eir wings are short, and they use them, as ostriches use eirs, more as assistants in running than for purposes of ght. They are singularly timid birds; they live on grain erbs, or worms, and never perch. The male bird has, a the case with most other birds, the more luxuriant plu mage, and possesses the additional distinction of a pouch in the upper part of the neck, which it inflates when it desire to attract attention, as the peacock spreads his tail. The


THE KING PENGUIN

neck swells and the feathers droop, the tail is shot upwards and bent over the back; the pouch swings as the bird wad dles rather than walks about. The bird has a habit of mak ing this display chiefly in the mornings and evenings during May and June of each year.

## PHOSPHOR-BRONZE TWEERS.

Every practical blast furnace engineer knows the incon venience, labor, and often seriously disadvantageous conse quences which are connected with the removing of a damaged water tweer. For the purpose of obtaining a satisfactory form of tweer, I have, since 1859, carried out at the Neusser Iron Works a series of experiments with variously constructed water tweers. The tweers mostly used in Eng land, and made of helical iron tubes, either placed simply in loam or, as is more usual, surrounded by cast iron, I found to give the least satisfactory results. These heavy and unmanageable lumps cannot resist the contact with the fluid iron and iron-containing slag; they are soon worn off by.any contact with the fluid mass of metal, become leaky, and occasion accumulations which become so intimately connected with the mouths of the tweers that often great portions of the wall of the hearth have to be broken away in order to get them out.
I next tried wrought iron tweers with welded seams. These gave better results, but they also could not withstand the contact with the molten metal, and became united to the latter, though the tweers were not so easily damaged as those of the first mentioned construction
When these tweers had to be removed, the same difficulties were met with as with those previously described. It is also difficult to ascertain beforehand the perfect soundness of the weld. Some of these tweers were often not many days in the furnace when leaky seams were discovered at the mouth, thus necessitating their being taken out, and this would happen notwithstanding the perfectly satisfactory testing of the tweers with a water pressure of from 10 to 12 atmospheres. The best mode of testing such tweers consists in filling them with water and, after driving wooden plugs into the inlet and exhaust openings, placing the tweers perpendicularly with the mouth upon the fire, until the wooden plugs are thrown out by the pressure of steam. If the tweer withstand this test without leaking, the welded seams are then generally trustworthy
I obtained better and, in fact, thoroughly good results with bronze tweers, and have used them for ten years. The bronze tweers form less easily a conncction with the fluid metal than the iron ones, and withstand the contact with the molten iron very well. Of course they sometimes ge cracked; but in that case they are easily taken out, because the bronze, even if connected with the products of the fur nace, may always be removed from them with a smal amount of force. We may presume that such a tweers, will sustain perhaps ten times the exposure to contact with metal and fluid slag that would be endured by an iron tweer. I use tweers of the pattern shown in the annexed sketch, and have found it the best after many experiments. If made too long and the fire is allowed without consideration to ex tend, the walls of the hearth suffer; if kept short, say, twenty inches, it becomes necessary, with the increasing action of the fire, to renew the ramming in, and the walls of the furnace are preserved. These tweers are not easily dam aged if well made, and if the precaution is taken to conduct the current of water (supplied through a $\frac{3}{4}$ inch pipe with a least a pressure of from 30 feet to 40 feet, and more if pos sible) directly to the front of the tweer, in order to preven incrustation, though that end is notentirely obtained by thi arrangement. Such a tweer has to be removed every six
months, in order to get the incrustation out either by means of hammering, or by drying the tweer and making it slight ly red hot at the mouth, in which state cold water is poured into it, when the incrustation becomes converted to dust and is washed away by the water; the tweer may also b boiled with half diluted hydrochloric acid.

The water is introduced through $\frac{3}{4}$ inch wrought iron tubes (gas pipes) screwed into the bottom of the tweer, a that I consider to bed sketch,

Besides the advantages men

tioned above, the bronze tweer are more durable, are more easily manageable, and ar more uniformly circular than the iron tweers, which latte
property is always an advan property is always an advan
tage for the furnace. Moreover, if more expensive in thei application, they are, neverthe less, much cheaper in their use than the other tweers, as the founder will always accept the old metal in lieu of part pay ment.
The bronze tweers are there fore certainly the cheapest in their application, but it appears to be no easy matter to have them cast, as it is not every
brassfounder who can do it satisfactorily, success depend ing much upon the selection of the metal and the skill of the founder; in fact the casting of tweers is an art, like that of casting bells. I have found that intelligent brassfounders could not succeed, and even large establishments, with al their resources, have tried in vain to obtain satisfactory re
sults. But even the bronze tweers were not perfect; they of ten became cracked in a manner quite inexplicable, and, if they came into contact with the bed of metal from below, would tear or melt. A few years ago my attention was called to the so-called phosphor-bronze of Montefiore Levy, and every thing said about it in private and public reports, and the re sults obtained from the trials with this metal for artillery purposes, about which a great deal has also been published in England, convinced me that the properties of this metal must offer the same advantages for tweers as for guns. It appeared, in fact, to offer greatly increased toughness and density, and, therefore, great resistance against change o temperature and the influence of molten masses. I ordered consequently, several tweers of this metal, according to ex atly the same pattern as that for the ordinary bronze tweers. These tweers have given me the fullest satisfaction; they have the advantage of being more tough than the tweers of ordinary bronze, and in cases where other tweers would cer tainly have burst, they sustained the shock without any damage being done to them. I ascertained further that this metal does not take up so readily or so firmly the incrusta tions produced by the contact with the water, and, what is of great importance, the oxidation of phosphor-bronze is much more slow than that of the ordinary bronze. I have found after a year's use that a tweer of phosphor-bronze, when wiped with a piece of rag, appears quite smooth, and has a bright metallic surface, and that it had remained entirely without incrustation. The extra preliminary expense for phosphor bronze appears almost insignificant in view of the advantages mentioned above, and, the expense of re-casting this metal being the same as for ordinary bronze, the highe value is in the metal itself.

## ELASTIC WASHER

We present herewith perspective and sectional views of a new elastic washer in which the packing is so inclosed as to be protected from injury by reason of the torsional action o he nut.


A is the flanged disk or socket, $B$ the packing of rubbe or other suitable material, and $C$ the metallic follower or face plate. In each of these is formed a central aperture of suitable size to receive the bolt. In one piece with the face plate, C , is made a tube, D , so as to form a prolongation of he orifice. This tube passes through the packing and the base of the flanged disk, $A$, which is arched to leave suffi cient space for the tube to work freely without coming in contact with the fish plate of the rail, as shown, or othe mearing surface of the washer. The packing and follower
move freely within the socket. The latter with the follower is made in oval form so as to prevent the movement of the socket upon the packing.
It is clear from the above that, when the nut is screwed home, it will follow the face plate, C , into the socket, and thus project a correspondingly less distance beyond the lat er than it otherwise would. It is consequently less expose o injury. The socket has incidentally also a broader bear ing surface, and hence will not turn with the nut when made mooth or when oil or other lubricant has been accidentally applied to it.
The inventor claims that a shorter screw bolt may be used with safety in connection with this washer than with others of like thickness. The device appears strongly con tructed and of simple though efficient form. It is doubtless durable, and, we should judge, not costly to manufacture. Patented through the Scientific American Patent Agency July 2, 1872. For further particulars address the patente Mr. Caspar Dittman, Leacock P. O., Lancaster Co., Pa.

## Hot Air Furnaces.

It has been proved by careful experiments, in this country nd in England and France, that carbonic oxide and carbonic cid gases will freely pass through cast iron when under the influence of heat. This metal should therefore be discarded in the construction of hot air furnaces, and wrought iron sub stituted. The latter does not permit these deadly gases to pass through.

Friction in Rolling Mills.-In a large rolling mill, calculation shows that about 40 per cent of the power is ab sorbed in friction. It is evident that great economies ma be effected in this direction.

## Xylol.

We read the following in a contemporary:
Baltimore, Md., January 15, 1872
The Superintendent of Police, St. Louis, Mo.:
"SIR: I would most respectfully call your attention to the new medical compound known as 'xylol,' which is now being used in this city for purposes of robbing and murder. " The mode of application is by mixing it with the feather in a pillow; and when the warmth of the head is applied to it, it gives off vapor similar in effect to the fumes of charcoal and the person using it is found dead in the morning, which gives the monsters who apply the drug ample opportunity to possess themselves of the property of their victims and therwise dispose of their remains.
"The drug was tried upon myself here some time ago by German Jew, who invited me to stop in his house. I es caped his foul designs, and obtained a knowledge of his in entions and manner of proceeding by trifling circumstances, he details of which I will not weary you with.
" But as I had lately read accounts of several personsbeing missing in this and other cities, I felt in duty bound to invest gate the matter for the benefit of society at large. Conse quently I have devoted my leisure hours to it forthe last two years, and have now acquired a perfect knowledge of the rug used; and I lose no time in communicating its name to you, that you may cause the officers under your control to put themselves in communication with the druggists, and keep a system of surveillance over those who purchase it. Hoping that you will also cause a notice of the hidden qual ities of the drug to be sent to the police authorities in all the principal cities in the State of Missouri, I remain, Sir, yours very respectfully
M. W alshe, M. D"

Remaris bythe Editor.-Xylol, called also xylene and di-methyl benzole, is one of the coal tar products, and is nalogous to benzole and toluol. It was first found in wood pirit by Cahours, who gave it its name from the Greek word xulon, wood. The series is: Benzole, $\mathrm{C}_{6} \mathrm{H}_{6}$; toluol, $\mathrm{C}_{7} \mathrm{H}_{8}$ sylol, $\mathrm{C}_{8} \mathrm{H}_{10}$. Xylol can be prepared from coal naphtha by fractional distillation. As soon as a product is obtained hav ing a specific gravity of 0.866 and a boiling point of $140^{\circ} \mathrm{C}$. it is mixed with sulphuric acid, which dissolves the xylol and relds xylol-sulphuric acid. The acid product is decompose dry distillation and further purified. It is colorless has a faint odor resembling benzole, but differs from the latter in boiling point and specific gravity. A good deal wa aid about it at one time as a remedy forsmall pox. Ten fiteen drops a day were prescribed as a precaution in add tion to vaccination. The theory was that it destroyed the poison in the blood. Raspberry sirup was given to mask the disagreeable taste, particularly when prescribed for children The dose is three to five drops for children and ten to fiftee drops for adults, but it should not be taken without th advice of a physician. The paragraph copied above from the St. Louis Democrat is decidedly of a sensational character Any one with the smell of benzole, ether or chloroform in his pillow would not be likely to lay down to pleasant dreams, but would open wide the casement, and if he were staying at a hotel would loudly call for another room. A somewha similar story went the rounds of the papers in reference to the hydrate of chloral, which it was said was administered for the commission of crime. It is not probable that any of hese re-agents are employed for such purposes, but no harm can result from the publication of them in order to put al persons on their guard.

## SECTIONAL LIFE BOAT

Mr. Christopher Pond, of Philadelphia, Pa., is the invent of the novel form of life boat represented in our illustra tions. The device consists in two metal tubes made in sec ons and screwed together to form two continuous floats. ach section constituting a water-tight compartment. At proper distances, at each side of the center of the floats, ris tandards which are coupled by stretchers or bars. The lat er are hollow, fit over the standards, as shown in the sec tional view, Fig. 2, and serve to retain the floats in position, reventing them from rolling independent of each other. T the stretchers are attached straps, to which is secured a seat
made of netting or other suitable material. When it is desired to remove the boat from the water for storage or trans

Fig. 7


Fig. 2

portation, it may be readily taken apart and packed in com pact form
If the occupant of the boat is thrown out by any accident, he may grasp the floats and buoy himself thereon, as the latter will not sink, even if the boat is on its side or com pletely overturned.

## Contrgumafuct.

## The Ignition of Wood by Superheated Steam

## To the Editor of the Scientific American:

In your issue under date of February 8, I notice an article on the ignition of wood by the heat of steam; and if I understand your remarks correctly, you take the ground that the heat from steam at any ordinary pressure will not ignite wood. The inference would be that wooden supports for steam pipes, used in heating buildings, would be safe. Per haps you are right; but if such is your opinion, I must differ from you. I formerly held the same opinion, and I will state what it was that led me to change it.
A few years since I worked in a factory which was heated by steam pipes, running round the rooms, and passing through the partition walls from one room to another. The pipes had been laid several years, when a fire occurred near by, which brought the insurance officers to the neighborhood and caused them to make an examination of the condition of other buildings and of the factory in which I worked. The result was all the wooden supports were ordered to be removed, and the passages through the partition walls to be made larger, and the pipes kept from contact with wood. In making the changes, I found that, in some places where the pipes came in contact with wood, especially in positions where no air could circulate, the wood was in some instances burnt to charcoal, particularly the soft pine, and in one instance a chestnut stick was similarly affected. We removed the pipes from contact with wood, in all places as we supposed, but there was one place, through a partition wall, that was overlooked. Sometime after, I think it was the next winter, we were alarmed at the smell of scorching wood and, upon making search, we found the place which I have said was overlooked, and the wood was smoking. Enough smoke had been made to give a blue look to the air in the passage adjoining. I found the wood next the pipe for one eighth or one quarter of an inch turned to charcoal; and it was turned brown for a considerably greater depth. The charcoal made by such low temperature long continued is very loose and becomes dust by slight rubbing with the finger. I have no doubt that, if the place had not been at tended to, it would at some time, and perhaps that very morning, have originated a fire. The place was about thirty feet from the boiler, an upright tubular that carried eighty pounds of steam at the highest, but not usually over sixty pounds.
$\mathrm{I}_{3}$ s there anything unreasonab'e in the supposition that charcoal, made at a very low temperature and finely divided, will ignite by the heat imparted by a steam pipe carrying eighty pounds of steam, if in long continued contact? In your issue of January 25, I find a table which shows that charcoal made at a low temperature will ignite more easily than that made at a high temperature. Observation of the facts which I have stated above led me to the conclusion that wood may be ignited by the heat of steam pipes carry ing a pressure of not more than eighty pounds to the square inch. Certain I am that charcoal may be produced by such a heat, and by still less, even that from sixty pounds of
steam; but it takes several years to do it, for wood, in ansteam; but it takes several years to do it, for wood, in an-
other instance, that had been in contact only one year was other instance, that had been in contact only one year was
scarcely brown, while that which had been exposed five or six years was in some cases turned to charcoal. I will say that, in the cases I have mentioned, I think there could have been no oil to play a part
M. M.

Franklin, Mass.

## The Ignition of Wood by Superheated Steam.

 To the Editor of the Scientific American:As there appears to exist considerable doubt as to the pos sibility of superheated steam igniting wood, I give two facts which will speak for themselves:
During the early part of the spring of 1872, I had occasion to take indicator diagrams from a 20 by 48 Corliss engine, of which I have charge. From the ceiling I suspended a lever of white pine $1 \frac{1}{4}$ inches by 3 inches, and about 8 feet long, with an open slot in the lower end to receive a pin screwed in the crosshead; after use, I raised the lever up over and let it rest on the bare steam pipe. Finding from the diagrams that the engine was not doing work equivalent to the amoun of fuel consumed, and that the boiler (of the Howard section al style) was working great quantities of water over, I con nected a superheater of 3 inch wrought iron pipe therewith,
having also a 3 inch pipe from top of drum to main steam pipe, with valve to regulate any desired amount of saturated steam. One day, some two or three months after, I saw sparks and smoke coming from between the pipe and lever; on lifting it, I found a hole burnt in the edge of the wood conforming to the shape of the pipe, an inch deep and full of sparks. Steam in the boiler was at 100 pounds pressure. The same lever now lays in the same position as when I found it smok ing, with the addition of felting underneath, saturated and superheated steam being mixed in equal quantities.
The second instance was brought on by the contact of a 1 inches live steam pipe (superheated) with small blocks of black walnut, mingled with fine dry sawdust. The fire brought out the fire engines but did little damage, as the watchman put it out with a $\frac{1}{2}$ inch hose specially laid for
such accidents, he being within twenty feet and looking to such accidents, he being within twenty feet and looking to-
ward the fire when it broke out. I would add that the stop ward the fire when it broke out. I would add that the stop
valve, although closed, leaked badly all night at the time of valve, although closed, leaked badly all night at the time of
the fire, and now every morning, when it is opened, we get a number of electric sparks from the neck of the valve.
I hope you will give this space in your valuable journal, that it may be the means of inducing others having charge
of steam and steam boilers to keep all easily inflammable matter from live steam pipes. E. R. Dingley New York city.

## The million Dollar Telescope. <br> To the Editor of the Scientific American:

In regard to the big telescope, you truly say that "some of our correspondents are determined to push this matter." Let me propose one or two ideas to serve as a basis for a company.
Let the company be known as the American Telescope Company, the capital stock to consist of 100,000 shares of $\$ 10$ each. A board of 25 directors should be appointed to manage the affairs of the company, and should consist of five eminent astronomers, five eminent mathematicians, five eminent mechanics, selecting those especially interested in his class of work, and five eminent public benefactors, such as Messrs. Peter Cooper, Cornell, and others, and five emi-
nent business men, a portion being manufacturers who, being familiar with the details of great enterprises shall, with the preceding five, constitute a business committee to push the thing along. These may elect a President and other officers. Immediately establish a bureau of information, and set about collecting all that is known of telescopes or similar instruments. Let notice be given that any communications relative to the subject as well as models and specimens will be received and placed on file. Also let a suitable compensation be offered for a design for mechanism for mounting and operating the instrument. These will naturally call in numbers of communications from which, at intervals, a digest may be prepared and published (in the Scientific American, of course, Mr. Editor.)
Should any novel plans be presented, the directors may ause experiments to be instituted to test them; but no com pensation shall be given to the designer unless his plan is adopted, and then only his actual expenses; but he shall, if his plan is adopted, have precedence over others in looking through the instrument, at times when it is open to the public. Upon the organization of the company, let a prospectus be prepared and sent to all colleges and libraries throughout the land, setting forth the purposes and plans of the company and soliciting subscriptions and donations, and also sent to the local press of the country with a request that they will give extended notice of it.
And now, thatthe enterprise may be speedily inaugurated, let us, with your permission, nominate you a committee to receive and place on file the names of all who will send to you and agree to attend a meeting, for organization, to be held in New York city at some time during the present year. in New York city at some time during the present year.
When a sufficient number have responded, let a call be pubWhen a sufficient number have responded, let a call be pub-
lished, time and place being named, and a meeting held that lished, time and place being named, and a meeting held that
will do honor to a subject of such great importance. The will do honor to a subject of such great importance. The
achievement will make America famous above all the earth
F. H. R.

## The Million Dollar Telescope.

To the Editor of the Scientific American:
I am glad to see the subject of the million dollar telescope agitated by you and your correspondents; and whilst I believe that the government has appropriated many millions for far less worthy purposes, I am opposed to its paying for this instrument. I prefer private subscription, and although I am hardly able to make a living, I am willing to pay something for this purpose.
Could not the governor of each State call for voluntary subscriptions, to be collected through some collecting officer already on duty, without commission for collecting? The money should be paid into the State treasury, to await the completion of the instrument, or be disbursed to the contracting party upon such terms as all the governors might settle during the building of the instrument, or after its comple tion. The amount of such subscriptions, or the receipt for the same, should stand good for so much State taxes or be refunded should the instrument not be completed.
Should a subscription be started and the public be satisfied that it would be honestly appropriated towards the building of the telescope, I think the amount would bequickly raised. When the instrument should be furnished, Congress would ceerfully build a house and have it mounted. All who sub cribe should have the privilege
hould not be open to the public.
Let this subject be discussed; I think the " times are ripe" or such an undertaking. Let the whole world be called on or the largest glass that art can make. Dispose of this let Nashville, Tent agitate the subject.
Nashville, Tenn.

## An Improvement in Berrding Glass Tubes.

To the Editor of the Scientific American:
If the glass tube be filled with sand and each end stopped to prevent its escape, on heating over a Bunsen burner it may be quite doubled if de sired, a perfect curve being produced. In this way bends of any desired size may be accurately produced in tubes of any bore, without any previous killin working glass. Obviously the principle depends on a uniform distribution, by the sand, of the pressure exerted A similar plan is resorted to by metal workers in bending
tubes of lead, etc. A. H. Gallatin.

## Retrograde or Direct Motion of the Sun <br> To the Editor of the Scientific American:

As I have no instruments whereby to test and find out the fact, and as I have no better way of ascertaining the truth than through your scientific journal, will you publish the following?
In each of the astronomic books I have read, in speaking precession, the author says, substantially, that a "vernal quinox day is shorter than a sidereal day by an amoun qual to one day in about 25,868 years." If that is true, my theory of solar retrograde motion is knocked on the head or if the sun really moves retrogressively, laim, then a vernal equinox day must be shorter than a sidereal day by an amount equal
and to one year in 25,868 years.
nd to one year in 25,868 years.
This last I believe to be the truth; for the equinox, and f course the whole seasons of the year, fall back on the ecliptic $50 \cdot 25^{\prime \prime}$ annually : a space which the earth takes 20 minutes and about 23 seconds of time to pass by. This 20 minutes and 23 seconds amounts to a whole year in less time than 25,868 years. So I conclude that a solar day is longer than a sidereal day by an amount equal to 20 minutes and 23 secondsless than one day every year; and that an equinoctia day is shorter than a sidereal day by one day in 25,868 days, or by one year in the same number of years. If I am correct, then the sun moves retrogressively as sure as light flows from him. If I am not correct, that is to say, if the time is one day instead of one year (as I say), then my theory is at an end. If I am correct, as doubtless I am, the sun annually carries the earth as it were back in her orbit $50.25^{\prime \prime}$ or about 28,500 miles ; and it requires the earth 20 minutes and about 23 seconds to pass through that space in her orbit.
This retrograde motion of the sun does not in the least nterfere with the so called $18,200,000$ years orbit of the sun and the $117,000,000$ of other suns and solar systems, recog nized by popular astronomy. To suppose that the movement of such a host of celestials represents the orbit of our sun is a poor astronomical idea. As well might we suppose the Gulf Stream to represent the orbit of all the fishes in it. The movement of such a host of celestials around Alcyone in direct movement towards Hercuies, may be a "drift motion" in celestial space; and there may be many thousands of other suns besides our sun moving retrogressively, while the vast multitude is moving directly.
Gloucester, N. J.
John Hepburn.

## Water Supply for Fire Purposes.

To the Editor of the Scientific American:
New York city seems anxious to obtain a water supply for fire purposes that shall be both economical and practical. Binghamton was so once, and has been very successful in attaining the end desired. We have a constant supply of water for fire and domestic purposes, with a head changeable at will from 1 to 120 feet pressure, under the control of an automatic governor located at the pump house, regulated by the opening and closing of a hydrant; and all this without either a reservoir or stand pipe, both of which are needless as well as expensive, as has been demonstrated over and over again in our city
Our works h twenty miles of service pipes, and have nearly done away with the old fire department, depending upon the hose com panies for the suppression of fires. All that is needed is to attach the hose to a hydrant, turn on the water, and, in three minutes time, there is a full head at every hydrant in the city, which, if needed, can be confined to the immediate preincts of the fire.
The system is scientific and intensely practical. The power consists of suitable boilers and engines, located near the Susquehanna river. The water is forced directly into the main pipe, and distributed thence through the service pipes. The pumps used are rotary, the inflow being without the thud that follows the stroke of a direct acting piston pump, thus relieving the pipes from the intermitting blows so destructive to pipes and joints. Our pipes are stovepipes (rolled iron with riveted joints) lined with the best water cement, and are very durable. The pressure is regulated at will, as stated before, by the demand made for water, and is under absolute control from this source. Alfred C. Pope.
Binghamton, N. Y.

## Why Bollers Explode

To the Editor of the Scientific American:
From the number of explosions throughout the country during the past year, one would suppose the epizoötic had at tacked the boilers. But I think that a majority of these explosions have been caused by negligence and incompetency. A short time since I stepped into a flouring mill here; and the first thing I heard was the lower gage cock open and no water. The proprietor informed me that the water had been down below the lower gage cock about one hour and a half They had stopped the supply pump for repairs, and kept the mill running. When I went in the engine room, the presure gage showed eighty pounds and the furnace was full of wood and coal. The plates of every ring of the boiler wer prung out of shape; the fire line of this boiler was at the econd gage cock. I remarked to the proprietor that I would not like to have such a hot fire and then to pump cold wate nto the boiler. His answer was: "It doesn'thurt it." This man has a negro to attend the engine; and as he can stop and start, he is considered entirely competent to take charge. Last summer I saw two engines ready to go out on a threshing tour; both had their crown sheets badly burnt, and on e the crown sheet had gone down six inches; and some o the stays were broken in both. Yet both were pronounced
perfectly safe. And now I contend that these boilers are not safe, because they have been so weakened that they are liable to explode under a moderate head of steam and " plenty of water," which latter is generally the verdict in most of these accidents. Perhaps it is true at the time, but nothing is said about the previous treatment which weakens the boiler; and then the maker is blamed. Engineer.

## Extinguishing Fires by Steam.

## To the Editor of the Scientific American.

The extinguishing of fires by steam has been mentioned in your paper as a new German discovery. I do not believe it to be new, as I have before seen propositions to admit steam into the rooms of burning buildings to extinguish flame; and
if it could be confined, it would be very effectual. As an evidence of its effectiveness under very trying circumstances, I will give a case which occurred in my own experience: While engaged, during the year 1859, in making oil from cannel coal in the Kanawha Valley, at Charleston, W. V., a cast iron still cracked, while nearly filled with oil, and a small strenm of the heated oil fell on the fire below it. This was probably caused by the watchman and fireman getting asleep, letting the fire go down, and then, on awaking, endeavoring to make up the amount of oil that should have come over by heavier firing; and as the bottom of the still was very thick, it was cracked by the unequal expansion.
Sleeping in my office, not far distant, I heard the alarm and Sleeping in my office, not far distant, I heard the alarm and
hurried to the factory, accompanied by several of the workhurried to the factory, accompanied by several of the work-
men. An iron chimney, about 18 inches in diameter, was men. An iron chimney, about 18 inches in diameter, was
attached to this still, reaching about 12 to 15 feet above the roof. This chimney was white hot, and was pouring out an apparently solid flame, ten feet high, and large quantities of unconsumed soot were falling on the roof. On going in the
building, I found the men throwing water under the still and building, I found the men throwing water under the still and on the blazing coke under it, but with no effect, as the oil
kept the fire on the grate up; the burning oil was floating on the water which fell through. The fire was getting hotter, and there was great danger of the crack enlarging. I direct ed the men to close the doors of the furnaces as tight as possible to exclude the air, and then to attach a steam hose ily it was in the winter time, so we had to keep up some steam in the boiler to keep the pipes from freezing. We steam in the boiler to keep the pipes from freezing. We
soon got up our steam, put the nozzle of the hose under the soon got up our steam, put the nozzle of the hose under the
still door, and let on all the steam we could. In less than still door, and let on all the steam we could. In less than
five minutes the fire was out, and the chimney cooled off; and, strange to say, the still did not leak any more. The bot tom, however, was taken out, as we did not dare to trust it any longer over the fire. This was a very narrow escape.
The fire had got consiclerable head before the steam was The fire had got consiclerable head before the steam was
applied, and oue who has not seen such a fire can hardly applied, and oue who has not seen such a fire can hardly
imagine its fierceness. Afterwards a crack occurred in anoth er still, , hut the men, knowing how to manage it, applied steam at once and put it out without much trouble.
We also had a fire occur under a 2,000 gallon boileriron still, caused by the springing of a rivet. This occurred in the day time and was soon extinguished in the same manner.
Either of these fires would certainly have burnt up the factory if it had not been for the steam. So much for wha I know about steam as a fire extinguisher. Let others give their experience under other circumstances and something of value may be elicited.
Dayton, 0 .

## Bursting stralins of Bonlers.

To the Editor of the Scientific American:
I would suggest the following plan for ascertaining the pressure necessary to burst a cylinder; it will put the matter at rest by a practical test.
Take a number of cylinders of uniform size, face the ends true and grind them to a fit, in the same way as we fit a set
of rings to a piston. Have the heads separated, so as to ad of rings to a piston. Have the heads separated, so as to admit water all around, and apply pressure by a force pump eral trials. Then try with a testing machine the same ma terial, uniform in size with the first, but straight. This would give a fair comparative test with cast iron, for instance; it could be cheaply done by any one having the machinery and to me would be more satisfactory than the theore
demonstrations that have appeared from time to time. demonstrations that have appeared from time to time. Ihave believed in the "semi-circumference" theory from
the first, but there may be some things brought tolight which would give us a new idea.
The same result could be obtained with a system of levers bearing on each inch of the inner circumference of the ring, each lever weighted equally until the breaking strain was
reached.
E. BURROUGHS.
E. Burroughs.
uburn, $\mathbf{N .}$.
T. Windle obtained a patent for a giass monument Apri 21,1860 , and the drawing furnished to the Patent Office with the application has the following inscription:
Here lies Windle,
Ali Inventor by trad
All inventor by trade,
This monument, you see,
This monument, you see,
Is an inventlon he made.
It has sometim
That he made it whlle living,
But enjoys it while dead.'

The Mechanics' and Agricultural Association of Louisiana announces its seventh Grand State fair, to take place during seven days commencing April 23, 1873 . Diplomas, medals and other prizes are offered for excellence in all branches of
agriculture and handicrafts, domestic economy, and the fine agriculture and handicrafts, domestic economy, and the fine

## ODD MATERIALS FOR PAPER MAKING.

It is said that far more money and time is annually wasted ruitless, than novel investigations, which in the end prove ually become is expended in peefecting ideas which eventthe world. Probably, in no case is this assertion more true than in that of paper. Numerous patents have been procured fo: its manufacture from articles which have been experimented upon and thrown aside as useless years and sometimes centuries ago; and not only this, but expensive machinery has been devised and works established to carry out plans to which their originators would not have given a moment's consideration had they previously acquired a moment's consideration had they previously acquired a
knowledge of what had already been done in the same line. Of late years, the utilization of waste or hitherto valueless Of late years, the utilization of waste or hitherto valueles,
products has attracted no small share of public attention, and the making of paper from such substances is becoming a favorite object for the researches of inventors. The brief resumé which we give below, of the efforts which have been made to put in use new material for paper stock, will therefore, we think, prove timely, both as pointing out how frequently the same invention is made by different parties, and also as suggesting, to those who may be interested in the subject, an idea of what has been heretofore accomplished. The records of the United States Patent Omice show tha thirty-four patents have been granted during the presen century for the use of special components in the manufacture of paper. In making the historical researches requisite to obtain the facts below given, we ourselves have found records of no less than forty-two different applications of
wood, twenty-five of straw, and about a dozen each of wood, twenty-five of straw, and about a dozen each of
leather and corn stalks, being introduced in the world since leather and corn stalks, being introduced in the world since
the invention of paper, and there is little doubt but that more extended investigation would materially increase these numbers
The first vegetable material used was, probably, in prehistoric ages, the Egyptian papyrus. In the year 95 A . D., a Chinese mandarin is said to have discovered that paper could be made from the bark of trees and rags of silk and hemp. The first records of cotton paper show that it was used, in A. D. 900, for the papal bulls; and history tells us that, at intervals of a couple of hundred years apart thereafBrueckmann published, in were invented. In 1727, one Dr. copies of which were printed on leaves made irom the fibers of asbestos. The use of this material has since been discovered (if we may use the term) twice. E. Maniere obtained, in 1854, a patent in England for asbestos paper, made by mixing the finely ground stone with rag pulp; and in 1871, a United States patent was granted covering the use of
pulverized and ground asbestos. In 1765, a book appeared in pulverized and ground asbestos. In 1765, a book appeared in
Bavaria interleaved with specimens of paper made from hor nets' nests, sawdust, moss, beech, willow, aspen, mulberry, clematis and pine, hop vines, peelings of grape vines, hemp,
leaves of aloes and lilies of the valley, arroche, mothwort, leaves of aloes and inies of the valley, armps, thistle stalks, burdock, con ferva, wheat straw, broom corn and Bavarian peat. The volume is entitled Sammtliche Papierversuche, and a copy, we believe, is to be found in the library of the Smith sonian Institute at Washington.
Prper was first made from " maize or Turkish wheat" in Italy, in 1772. Four years later, a book was published in France on paper obtained from bass wood, and it contained, like the work above mentioned, a large number of specimens. Such literary ventures must have met with popular favor, for, in 1786, still another volume appeared, this time printed on marshmallow paper, and containing samples nade from nettles, hops, moss, reeds, 3 species of conferva, couch grass,
spindle tree, wayfaring tree, elm, lime, yellow willow, sallow willow, poplar, oak, burdock and coltsfoot. During the succeeding decade, patents were granted in England for paper made from leather cuttings, and also from sawdust, sub stances which have since been applied to the purpose, it would seem, in almost every conceivable manner. About as queer a material as could be well devised was that experimented upon by Labigarre, a Frenchman, during the first year of the present century. How he same to pitch upon such stuff as frog-spittle, it is difficult to imagine, unless,
following the proverbial taste of his nationality, the idea flashed across his mind while hunting the batrachian delicacy. flashed across his mind while hunting the batrachian delicacy.
At all events, an old volume of the Historical Magazine says At all events, an old volume of the Historical Magazine says
that he brought a bag of the substance to the paper mill at Catskill, N. Y., and had it made into a poor kind of paper and that several persons became very much interested in it and thought it a great discovery. Frog-spittle, by the way, is not the saliva of the frog, but the larva of an insect called the frog hopper, which are found on leaves enclosed in a kind of frothy liquid.
During the year 1800, paper was first, successfully made from straw by Burton of London; in 1802, corn husks were again experimented upon, and a patent was granted in this country for their use. In Italy, paper was exhibited made of the papus of seratula ervensis, the carduus nutans, and the London, Conn, obtained a patent for paper from sea weed. Eleven years after, the Danish government granted similar protection, for a term of five years, for a re-discovery of the same idea; and in 1828, another United States patent was 1821, Janbeaurt of of urseill marina, also a sea weed. In 1821, Janbeaurt of Marseilles devised a process of pape manufacture from licorice wood and hemp. In 1827, a
Parisian inventor employed the same wood, mixed with Parisian inventor employed the same wood, mixed with
pasteboard scraps. Within this decade, 1820-1830, we find processes for the employment of hop vines, moss, Mexican maguey, pine shavings, and the bullen of certain plants, de-
cayed wood, an animal substance called "aporentype," hay,
straw, and blue grass, besides several new methods of use of leather cuttings and corn stalks. In 1830, a coarse paper was made from the pine tree; and a journal called the Craw ford Messsenger, in this country, was published on pages made of lime tree and aspen wood. Binders' boards were obtained from three kinds of salt grass. A French inventorwe suppose he was a cook-produced paper from asparagus, and a Swedish confrère followed his example by publishing a book the leaves of which were of paper obtained from the beet root. The latter invention has been repeated in this country, for we find a patent, dated 1857 , in which the claim covers the employment of the refuse of all species of the beet genus, left after the sugar making processes. Bonana beet genus, left after the sugar-making processes. Banana fiber
was introduced in France first in 1845, and again in 1851, in was introduced in France first in 1845, and again in 1851, in connection with aloe and alfa fiber. In the former year, paper made from gutta percha attracted considerable atten tion in London. From 1850 to 1860, paper was produced from the dwarf pear tree of Algiers, a plant called the water broom, white pine shavings, southern cane, tow, horseradish leaves and fiber, vegatable remains of manure, the common hollyhock, undressed flax, wood shavings with bran, the "everlasting" plant or gnaphale, and plants of the sparganium family, marble dust (invented by a Glasgow stonecut ter), Scotch ferns, bark of cotton stalks boiled with coal tar (an odd mixture), moss from the Lake Superior region (said to make excellent paper), and ivory, mixed with pulp.
Among the new materials introduced and in use during the next decade, we find "trash" or refuse of the sugar cane, swamp flag or cat tails, and sedge. Munsell's work on paper making says that, in 1867 , the following substance were in actual employment: Manilla hemp, agave of Cuba cultivated hemp, white hemp of Hayti, India hemp, acacia cotton, fibers of aloes, jute, Spanish broom, hops, silk weed, down of date tree, flax, Chinese hemp, mallows, mulberry Chinese nettle, New Zealand flax, esparto grass, linden, yucca, bamboo and cane.
It is related that, during the war, a New York merchant oaded a ship at Alexandria, Egypt, with mummies from the catacombs. On the arrival of the vessel in this country, the argo was sold to a New England paper manufacturer, who reduced it to pulp, bones, bitumen and all. The fact was well announced by a clergyman in Boston, who, during the course of a sermon, astonished his congregation by remarking that the paper on which his discourse was written might once have been a portion of the Egyptian masters of the Israelites whose sojourn in that land he had just described. Unfortunately for the freshness of our story, this case is also a repetition. At the time, 1866 , mummy paper was not new ; for, ten years previously, a jou :nal published in Syracuse N. Y., greatly plumed itself on the circumstance that it ssue of a certain date was made from the "ancient habi ants of the land of the Pharaohs.
In 1869, tule, a product of the swamp lands of California, was tested and found to make a fair quality of paper. The Annals of Scientific Discovery for 1870 state that, during the preceding year, the following Asiatic plants were used for paper manufacture: the tchuma of Assam; the ramee of
Malay-identical with the ramic plant now largely cultivated Malay-identical with the ramie plant now largely cultivated in the South-and the jeetec, moorva and pineapple of India. During 1870-1871, patents were granted in this country for he use of wild and cultivated rice, potato pomace mixed with pulp, the vine and tuber of the potato, the bark of coniferous trees from which the resin has been extracted talks and fibers of cord grass, the plant abutilon Avicenine ndian rice or water oats and agrosits litoralis. In 1871, the Mobile Register was printed on paper made from okra During the year lately closed, but two patents were ob tained, one for the use of tule, and the other for that of plants of the typha family.

## India Rubber Varnish.

There are many substances, among them nitrate of silver pon which pure india rubber has no deleterious effect Now, as india rubber dissolves with readiness in chloroform sulphuric ether, bisulphide of carbon, and caoutchoucine, and as these solvents, when evaporated, leave the rubber firm and unaltered, it is evident that we have in a varnish so composed a means of applying a coating of pure rubber of any degree of thickness to the inside of any vessel, such as a photo bath composed of either ebonite, gutta percha, wood, or any other material of a similar description. From experiments made in this direction, using bisulphide of carbon as the solvent, a coating of rubber of a good quality has been obtained, which will answer most effectively for preventing all contact between the silver solution and the material of which the bath itself is formed.

The Detroit River Tunnel.-The small test or drainage tunnel, preliminary to the construction of the large railway tunnel between Canada and the United States, under the Detroit river at Detroit, Mich., is progressing. The drift has been carried out 1,200 feet from the American shore; the remaining portion from Canada has been carried only 400 . It will, however, be completed and the junction made during the present year.
Lens Troubles.-If any photo reader be in trouble with a lens-whether a single one or a combination-that gives concentrated flare, let him extemporize a stop of blackened card board and try the effect of changing its position with respect to the back lens; for a position will probably be found at last in which the evil will be greatly diminished. As regards diffused flare, due precaution must be taken to have both the edges of the lenses, as well as every internal portion, properly coated with dead black varnish, black ve!vet being a most excellent material with which to line the inside of the tube.

## IMPROVED GRAIN CLEANER

The invention herewith illustrated is known as the Cali fornia Smutter and Separator, and serves to thoroughly cleanse grain, delivering it in proper condition to feed or grind.
A riddle made of perforated zinc, of dimensions propor tionate to the size of the machine, is vibrated by a belt connected with the fan shaft, and serves to remove sticks, stones, long straws, etc., causing them to pass off at the end of the apparatus. The grain, after leaving this appliance, is conducted into an air chamber up which a current of air drawn by the fan, blowing away smut balls, loose dirt, and similar refuse. The scouring cylinder into which the grain next passes is open at one end, and has a perforated case along the whole length of its under side. The fan draws in a current at the end of this re ceptacle and through the slots in the case which carries off all adhesive dirt or smut as soon as loosened from the kernel, besides preventing any further contact of the wheat with the offal. After passing to the other extrem ity of the scouring cylinder the grain is thrown out of the top side into another air chamber and again blown, this process completing the operation. The balance of the refuse passe down a lattice work in the receptacle, and es capes clean ond free from dust from the hop capes per under the scourer, the dust being drawn through the lat
out of the mill.
The machine has a valve in its rear side to graduate the current in the air chambers for heavy or light grain. Opening the valve les sens the suction, and closing it increases the samé, thus taking out more cheat and smal wheat. The fan case, wings, shafts, and pul leys are made of iron and can be removed and replaced without marring the machine. The scouring cylinder and its surrounding case are made of heavy iron. The bearings to shafts are supplied with composition boxe and will, it is claimed, run constantly with out heating Toaffordfurthersecurity again out the contible material produced by fire, the combustible mated produced by the latter can be placed in an open room. By the latter can be placed in an open room. By
attaching a spout to the mouth of the fan attaching a spout to the mouth of the fan
case, the dirt can be conveyed to any conve nient place of deposit.
It is claimed that this apparatus is much wider than others, and that the riddles or shoes are larger than usual, covering the entire top. The latter being constructed of per forated zinc instead of wire cloth are said to be much more durable and effective. The grain is conducted on the From the time of its entering the machine the grain is spread over a wide surface, so that it is prevented from bunching and better separation is insured. It varies in capacity ac cording to size, from 15 to 100 bushels per hour, and re quires but little attention when in operation.
For further information address the manufacturers, Messrs. M. Deal \& Co., Bucyrus, Ohio.

## STEAM REAPER AND MOWER.

We are-indebted to Iron for details relative to the new steam reaper and mower, recently patented by Mr. Edwar Hayes, of London, England, which we illustrate herewith.
The implement consists of a boiler and steam engine, erected on a ligh wrought iron girder frame, the whole being carried on four wheels, of which the two hind wheels are utilized for propulaion and the two fore whelsfor propulsion and for carroing the putti steerage and for carrying the cutting apparatus from off the ground. The
boiler and engine ar6 specially designed to develope a maximum of power with a minimum of weight; and the steam is used at a pressure of 120 lbs. to the square inch in the boiler. The piston speed is high, and is applied by suitable intervening mechanism to the double motions of actuating the cutter bar and propelling the implements by means of the driving wheels. With the object of not overloading the frame and machine, the storage room for fuel and water is very limited, and arrance ments must be made for supplying the ments must be made for supplying the lenderition requin localities. The machine ts worked by two hands, a man to steer and a boy to
attend the fire.

This entirely novel invention is selfpropelling, and altogether its weight does not exceed that of the combined reaper and mower in every day use. It will be recognized by practical men as a great gain, inasmuch as the horses are exposed to injury and laming in drawing ordinary machines, and this class of work is undoubtedly the most trying to them in the hot weather of harvest time. The farmer will, by the use of this appara tus, not only be enabled to reserve his horses for more ad-
vantageous labor, but he will have the means of acting promptly and expeditiously when occasion serves and re quires, without reference to the antagonistic influences of weather or man, so far as it is humanly possible.

Remarkable Photographs from India
At a recent meeting of the Society of Arts in London, a magic lantern display of transparencies from Captain Lyon's Indian negatives was made The photographic views include every temple of note in the great empire, and may be considered veritable works of art, upon the production of


## GRADN CLEANER

hich much scientific labor and patience must have been be towed. With the intense heat and glaring light, it is not ways easy to obtain a satisfactory outdoor photograph in India; and the difficulty of procuring a good perspective in he long corridors of the temples-one of which exceeds seven hundred feet in length-is even greater. One of these tem ples, near Trichinopoly, is inhabited with 8,000 Brahmins, nd is embellished with some of the most wonderful car ing in granite that is to be seen. The Mundapum at Madura which cost five million dollars to build, and of which the galleries are formed of carved pillars, each being solid rock of granite fifteen feet high and of the most exquisite workmanship, is represented with marvelous delicacy of outline which conveys a very clear idea of the immense time


## STEAM REAPER AND MOWER

patience and skilled labor that must have been bestowed upon its erection. The great Juggernaut car, too, con structed out of several smaller ones and carved out of the finest ebony, was presented in several aspects. The Adavea Covill, a temple, the stone of which cannot be chiseled with our present tools: the Tanjore, with its magnificent tower, and the Bull of Shiva, weighing eighty tuns, and brought
from a distance of 500 miles, no one knows by what means tho seven pagodas, with their numerous, unintelligible, and unfinished carvings: and the fakirs, in all their strange and revolting halits: are represented with the clearness of reality and speak of a religious life so intense and universal, with such a wealth of idealism and apparently so little of the sublime, that the mind is lost in wonder. Although India is he most magnificent portion of the British Imperial posses sions, comparatively little is known of it

## Dyeing Kid Gloves

The dye solutions are brushed over a glove drawn smoothly over a wooden hand. In order to dye black, the glove is brushed afte washing it with alcohol, dried and brushed with a decoction of logwood, left for ten minutes, and brushed over once more with log wood. After ten minutes the glove is dipped into a solution of sulphate of iron, and brushed afterwards with warm water. If the color is not dark enough, add a little fustic or de coction of quercitron in the logwood bath. In place of the sulphate of iron, the nitrate may be better employed. When the glove begin to dry, it is rubbed with a little Provence oi and talcum, laid between flannel and pressed It is then rubbed again with oil and talcum, and drawn on a wooden hand. The glove and drawn on a wooden hand. The glov must not get black on the inside, consequent ly none of the dye fluid should reach the in side of the glove. Brown is dyed by brushin on a decoction of fustic, red, and logwood with a little alum. The quantities of dye stuf to be used are regulated according to thetints For darkening the color a small quantity of solution of sulphate of iron is used. Morocco red is produced by brushing on a decoction o cochineal, to which a little salt of tin and ox alic acid is added. The tint is easily made darker by adding a little logwood. Gray i produced by brushing on a decoction of su mach, and subsequent treatment with a weak solution of sulphate of iron; greenish gray by the addition of fustic and logwood, also fustic and indigo carmine, to the decoction of sumach. The aniline colors all fix themselves without any further addition by brushing their solu any further addition by brushing their sulu tions on the glove. In place of the brush
sponge may be used where it seems suitable sponge may be used where it seems suitable
In order to give black a pleasing bluish ap In order to give black a pleasing bluish appearance, after the dyeing it may be washed
with a little sal ammoniac. Should the seams with a little sal ammoniac. Should the seams
in the gloves remain white after dyeing, the $y$ are coated with a paste in which a little fat i put.

## The Spectrum of the Aurora and of the Zodiaca

J. R Capron has collected and compared the spectral re sults given by many of the principal observers, among whom are Schmidt, Barker, Proctor, Smyth, Zöllner, Clark, Lindsay, Herschel and Backhouse, and from these observations he deduces the following remarks, given in Nature

1. That the full spectrum of the aurora consists of seven bright lines or bands and a faint diffused spectrum.
2. That two (perhaps three) of these lines are sharp and 2. That two (perhaps three) of these lines are sharp
well defined, while the others are more or less nebulous. well defined, while the others are more or less nebulous.
3. That the red line (which seems to have been actual 3. That the red line (which seems to have been actually
positioned by two observers only) is not found to coincide with the spectrum of any known sub stance or gas.
4. That the yellow green aurora line, and perhaps two other lines, according to one observer, coincide with lines of oxygen; while two lines, according to other observers, either fall very nea to, or actually coincide with, $F$ and $G$ hydrogen, and that to this extent the axiom of Zöllner, that the spectrum of the aurora does not agree with any of the known spectra of the gases of our atmosphere, is challenged.
5. That Zöllner's theory, of the line or bands in the blue being remains of continuous spectrum broken up by dark absorption bands, is hardly supported by the other observers.
6. That the aurora spectrum is prob ably a mixed one, and that the red and yellow greenlines are independent spec tra; as also may possibly be the coro na line and the continuous spectrum crossed with the fainter lines.
7. That the discrepancies in the ob servations recorded are considerable, and that all the lines (except, perhaps, Ang ström's), and specially the red one, re quire further examination to confirm their positions.

The Westinghouse Pneumatic Car Brake has just been itted upon a complete train of the London Underground Railway (Metropolitan District Railway) and operates with admirable efficiency. The locomotive superintendent, Mr speck, states that it is the best brake ever used on that line and will pay its first cost within a year,

## The St. Gothard Tunnel

The machine piercing of the Swiss tunnel through the Alps commenced last month. The cost of the preliminary arrangements, plant, etc., is estimated at about $\$ 400,000$. The compression of the air for the rock-boring machines and the machine work of the shops will be effected by hydraulic motors of a combined power of 500 horses. At the northern extremity of the tunnel, there is an available fall of water of about 95 feet, close to the entrance, which will be utilized for turbines. At the southern end the waters of the Tremola, with an available fall of 984 feet, will be turned to account with turbines or by a hydraulic machine with vertical column of water. It is expected that upwards of 100 yards at each end of the tunnel will be driven each month, or considerably over a mile by the end of the year.
The Swiss Times says: The first monthly report with reference to the state of the works of the St. Gothard line has just been published. This report, which has already been communicated to the governments interested, shows that on the 31st of December the tunnel at the Göschenen end has been pierced 60 feet, at the Airolo end 336 feet, or nearly 400 feet altogether. At Airolo 43 feet of the masonry of the arch has been completed. The average number of workmen employed during the month of December was 272-171 at Airolo, and 101 at Göschenen. In addition to the work already executed on the tunnel proper, about 60 feet of the cutting at the opening of the tunnel have been completed. At this side the boring has hitherto been entirely through hard granite. At Airslo, although softer descriptions of stone have been met with, operations have been carried on with extreme difficulty, on account of the water filtering very abundantly through the rocks. Strata of dolomite and mica-schist, with veins of quartz, have been met with.

## BRIDGE OVER THE MISSOURI KIVER, NEAR LEAVENWORTH,; KANSAS.

There is no branch of engineering in which the native ge nius of America is more effectively displayed than the construction of bridges. The almost illimitable West presents, in its rivers, gorges, and mountain sides, localities difficult enough to trouble the ingenuity and numerous enough to weary the patience of any ordinary mortal. But these things are to our engineers merely opportunities to display their skill and perseverance, and the clever devices and fertile inven-
tion of our railroad constructors have always been equal to the occasion, and have elicited the admiration of the civil engineers of the old world. Our present instance is a bridge for both railroad and highway traffic, erected over the river Missouri at a distance of $1 \frac{8}{8}$ miles north of Leavenworth, Kansas. It is entirely of iron, and very substantial ; and it presents a fine appearance. The funds required to construct presents a fine appearance. The funds required to construct
it were principally raised by bonds, which nearly all the proit were principally raised by bonds, which nearly all the pro-
minent citizens personally pledged themselves to redeem, and which were thus negotiated in New York.

Work on the approach was commenced on July 20, 1869, but the piers were not started until October following. On October 20 the first column was placed in position, and on July 1, 1871, the whole substructure was completed. The bridge would have been completed fully twelve months
earlier, had not many vexatious delays occurred. The total weight of wrought iron in the bridge is $2,093.300 \mathrm{lbs}$., and of cast iron $700,417 \mathrm{lbs}$., making a weight of iron per lineal foot of $2,812 \mathrm{lbs}$., exclusive of the floor. The bridge consists of three spans, the western and middle being each 340 feet, and the eastern, 314. Being intended for both railway ard highway traffic, a single railway track is laid in the middle of the roadway, and the top course of floor planks is laid even with the top of the iron rails, so that wagons can pass freely from one side to the other. The western railroad approach may be considered as extending from the end of the bridge to a point where any railroad desiring can connect with it. This point is about 1,500 feet from the bridge, and is reached by a cutting through a hill, with a maximum depth of 50 feet. by a cutting through a hill, with a maximum depth of 50 feet.
The eastern railroad approach commences at the bridge, with a substantial wooden trestle 50 feet high, decreasing in hight to 35 feet in a distance of 1,600 feet; it is then continued by an earth embankment 2,400 feet further, to a point where the grade is but 10 feet above the natural surface, and where all desired railroad connections can be easily made.
The most remarkable feature about the bridge, and theone which, by its comparative cheapness and peculiar adaptation to the conditions of the Missouri river, enabled the work to be undertaken and completed, is the use of pneumatic iron columns for piers. In no case had this principle been carried to such a depth or to so great a hight. How successful the experiment has proved is best seen and appreciated by an inspection of these graceful and substantial piers.
The total cost of the bridge was $\$ 800,000$. The whole work was planned by the engineer in chief, General $W$. W Wright, under whose personal supervision it has been executed.

## Rather Foggy.

There often appears in Europe and in some parts of America, a peculiar kind of dry fog which is visible during the early morning of summer days, and is regarded as a presage of fine and warm weather. It is of a reddish ting nd is hardly risible except through distances of severa miles, when it appears near or above the horizon in propor-
tion as the dryness and heat of the atmosphere are less or tion as the dryne
more augmented
In explanation of this phenomenon, M. Collas, in Les Mondes, advances the theory that it is due to the combustion of aerolites or shooting stars. These bodies, coming within the sphere of attraction of the earth, are precipitated to its surface at a speed which is considered to exceed twelve miles per second. By this great rapidity, they are heated, inflamed, and finally volatilized. The vapor thus produced is rapidly condensed into particles so extremely small that
they may be regarded as the last limit of the divisibility of solid matter. These descend to the earth with great slowness on account of their tenuity, and are scattered, by the winds, to various quarters where they appear as the dry fogs.

## Ruins of the Boston Fire.

Although it is some months since the great fire, the rain and snows of winter have not succeeded in entirely quench
ing it. In many parts of the burnt district, dense columns of smoke are still ascending, and bright flames dart out from beneath piles of brick and granite. The influence of heat upon various kinds of merchandise found among the ruins has afforded, says the Boston Journal of Chemistry, examples of metamorphosis interesting and curious in a high degree. Huge piles of leather in some cases were precipitated into cellars, and so covered with débris as to undergo a kind of dry distillation or fusing, out of contact with air. The resultant mass resembles a dry gum, with a clean vitreous sulant mass resembles a dry gum, with a clean vitreous
fracture, upon the surfaces of which are seen the lines between the hides, like thin strata in a mass of silt. We have a lump of coke, produced from clover seed, which closely re sembles cannel coal. It came from a mass of two thousand bushels which tumbled into a cellar, and was subjected to dry distillation under the bricks and mortar. Many other substances have undergone curious changes, and we may allude to some of them at a future time.

The Bar at the Mouth of the Mississippi.
A correspondent, E. B. B., of Cal., refers to the report of Mr. C. W. Howell, U. S. engineer, on the value of the screw dredging machines employed. He states that between December, 1868 and May, 1869, a channel originally 12 feet in depth was dug down to 17 feet at mean low tide, and nearly to 18 feet at high tide; and to show the efficiency of this apparatus, he mentions that the channel began to fill up when the screw ceased working. In another instance 22,400 cubic yards of earth was dug out in $28 \frac{1}{4}$ hours; a channel was cut to a depth of 19 feet and another to 18 feet 10 inches. The work was done so thoroughly that, during one year, all vessels drawing not more than 19 feet wate went over the bar, and one ship of 20 feet draft passed over; and he avers that there has been a depth of from 17 to 19 feet on the bar for three years and more, for proof of which he refers to the official reports of the government engineers He quotes these facts to show that Mr. Stewart's state ment that costly dredge boats cau hardly keep a channel open to a depth of 14 feet is erroneous. The work which he describes was done with Bishop's submarine screw, with spiral boiler-iron scrapers.

## Novel Life Preserving Apparatus

M. Tellier, in Les Mondes, proposes a new method for saving shipwrecked persons. His apparatus consists in a life preserving vest, a balloon of a few cubic yards capacity attached to the belt of the swimmer, and a receptacle for holding liquefied ammoniacal gas which is fastened to the life preserver. When the vessel strands, the person to be saved turns a cock which allows the gas to flow through a long rubber tube and distend the balloon. As the latte rises, he jumps overboard. He is then buoyed up by his life-preserving waistcoat and also by the balloon which, being acted upon by the wind, tows him to the shore. By this means, it is suggested that a person might carry a line from the wrecked vessel to the beach, or an apparatus might be devised to contain several individuals who could thus be drawn ashore in safety.


## Glycerin in Bollers.

At the last séance of the Society of Civil Engineers, Paris, M. E. Asselin recommended the use of glycerin to prevent ncrustation in steam boilers.
G'ycerin, soluble in water in every proportion, increases the solubility of combinations of lime, and especially of the sulphate; it appears, besides, to form with these combinations soluble compounds. When the quantity of lime becomes so great that it can no longer be dissolved, nor form with the glycerin soluble combinations, it is deposited in a gelatinou substance, which never adheres to the surface of the ion plates. Moreover, the gelatinous substances thus formed ar
not carried with the steam into the cylinder of the engine.
M. Asselin advises the employment of one pound of glycerin for every 300 or 400 pounds of coal burnt, fifteen days supply being introduced at once. From trials made with
boilers fed with bad water, it was proved that the glycerin boilers fed with bad water, it was proved that the glycerin
combined with all the salts, and left the plates perfectly clean.

## Sewing Machine Sales.

The sales of sewing machines in 1872, just reported, show says the New York Sun, the following remarkable results:

Singer Manufacturing Company sold.
Wheeler \& Wilson Manufacturing Company sold. Howe Machine Company (estimated) sold.
Grover \& Baker Sewing Machine Company sold.
Domestic Sewing Machine Company sold
Domestic Sewing Machine Company so
Weed Sewing Machine Company sold. .
Willcox \& Gibbs Sewing Machine Company sold
Wilson Sewing Machine Company sold
Amer. B. H. O. \& Sewing Machine sold.
Gold Medal Sewing Machine Company sold
Florence Sewing Machine Company sold. .
B. P. Howe Sewing Machine Company sold

Victor Sewing Machine Company sold
Davis Sewing Machine Company scld
Blees Sewing Machine Company sold.
Remington Empire Sewing Machine Company sold J. E. Braunsdorff \& Co. sold.

Keystone Sewing Machine Company sold.
Bartlett Reversible Sewing Machine Company sold
$\underset{\text { Becor Sewing Machine Company sold. }}{\substack{\text { Bartram } \\ \text { S Fanton Man }}}$
During the recent session of the National Academy of Science, at Cambridge, Mass., Professor Mayer gave some in teresting information regarding the effect of magnetism on iron: He states that he has discovered, by means of the
Saxton comparator, that rods of iron suffered a permanent elongation by magnetization of one hundred and fifty millionths of an inch. English refined iron gave the maximum of elongation, scrap iron, the minimum. Whether the current was gradually increased in intensity, or whether it was sent full charge at once, it produced the same degree of elongation. With one cell the elongation took place in six tenths of a second; with 25 cells it took place in two tenths of a second. Professor Pierce thought if the elongation of iron under magnetization were true, it might make its effect on the earth in an appreciable difference in the length of the the day of seven hundredths of a second would be perfectly the day of seven hund
easy to discover now.

A correspondent, C. B. of Newark, N. J., thinks, when he pays a few cents for a copy of our journal (which, he says, is worth ten times its price), that he can lighten our labors by sending us information occasionally. He states that our recent article on the experimental canal boats has caused an excitement in Newark, where it is stated that the Baxter is the only boat that has fulfilled the legal requirement, having made three full trips each way, with a cargo in excess of the stipulated tunnage, at a rate of overthreemiles an hour through the canal. The Newarkers claim the prize for her. He also states that Mr. H. M. Paine has returned machines. and is engaged on an electo-mant of the reinvention of the engine with its cylinders curved longitudinally, a form applied on the U. S. frigate Princeton, thirty years ago. A Newark firm has constructed such an engine to order, and is patiently waiting for the "inventor" to fetch to order,

Rose Cuttings.-The most certain way of rooting rose cuttings is by bending the shoots and inserting both ends into the ground, leaving a single bud uncovered at the middle and on the surface of the ground. The cuttings are about ten inches long, and are bent over a stick laid flat on
the ground, holes being dug on each side of the stick for the reception of the ends of the shoot. The roots form only at the lower end of the shoot, but the other end, being buried, prevents evaporation and drying up.

The London Times says that the recent transmission of the Queen's speech throughout England evidenced some very rapid telegraphing. The document contained 858 words, and reached York, a distance of about 200 miles, in six minutes and a half. Wheatstone's automatic instruments were used. The above is at the speed of 132 words per minute.

The Atlantic cable companies and also the Wastern Union Telegraph company have, we learn, consented to the free transmission of dispatches relative to astronomical discoveries to and from the Smithsonian Institute in Washington. The object of telegraphic communication is to avoid the difficulties which might supervene from the change of position of the observed bodies during the interval required for postal correspondence

A number of very severe tests were recently applied in Eng land, to dynamite with a view of showing that it could be safely transported on one of the principal railroad lines. It is stated that no explosion occurred when a box containing five hundred weight of sand was dropped from a hight of orty feet upon a mass of cartridges, although the latter were badly crushed and broken. It was also proved that a fire in railway train containing dynamite need not cause any more nxiety than would be experienced from a conflagration of rdinary timber or similar material. A fifty pound box flame for two or three minutes, but no explosion took place. Loose cartridges laid upon rails exploded when run over by cars, but loose dynamite sprinkled near them was unaffected.

The John Leland cheese factory, at Cheshire, used up $\mathbf{0 4 6 , 2 1 0}$ pounds of milk, last year, producing 104,976 pounds of cheese, or a pound of cheese for each $9 \frac{9}{10}$ pound of milk. The receipts were $\$ 12,786$, and the stock pays 9 per cent in dividends.

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Inventions Patented in England by American
        Compiled from the Commis8loners of Patents' Journal.l
Fire ARM.-H. Berdan, New York city
Hat Dibtributor.-D. Shedd, New York city
Hos.-M. Ceokerly, Baxter Springs, Kan
L_
Prnoil and Eraber.-J. Reckendorfer, New York city
Prebs, ftC.-B. G. Martin, New York city.
Skiding Ratbing.-C. Dixon, New York city
burgh, Pa.
Treadle Motion.-G. B. Kitkham, New York
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## NEW BOOKS AND PUBLICATIONs.

The Illustrated annual of Phrenology and Physi-
ology for 1873 . By S. R. Wells, Publisher of the "Phrenological Journal" and the "Science of Health" 25 cents. New York: Samuel R. Wells, 389 Broadway A neat ilttle book,
Bread-and-Cheese and Kisses. By B. L. Fargeon. Illustrated. Harper \& Brothers, Franklin Square, New York A pleasant story, beautifully told. The publishers have
tice to its merits, as the fllustrations are simply execrable.

## 

## Improved Sillitam C. A. Frerichs, Tottenville, N. for Railroads W. The invent

 anneling snow ram for rallroads. The forward end of the consists in Wnneling snow ram for railiroads. The forward end of the ram 18 madewedge-shaped, and the top 1s curved and extends up to or a ittle above the top of the body of the ram. The sides of the hood project so that the sald ood may form a tunnel larger than the body of the ram. In the rear par part of the body are placed two furnaces into the upper parts of which the lower is introduced, to be heated and dr rounded by an alr-tight space Into which the blast from the other fan blower
is introduced. This air circulates around the furnaces, becomes heated and is introduced. This aifr rifculates around the furnaces, becomes heated and
is destgned to keep the outer surface of the hood sufflectently heated to pre is destgned to keep the outer surface of the hood suffletently heated to pre-
vent the snow from sticking to it, and to cause the sinow to pack. The vent the snow from sticking to tt , and to cause the snow to pack. The
smoke stacks are hinged so that when the ram is at work they may be smined down out of the way. The bodies of the cars readily pass through the tunnel formed by sald ram. To the sldes of the car bodies are attached plates which project down nearly to the track to guard against any snow
side passingin beneath the cars and clogging them. The spaces between the platiforms of the adjacent cars, at the sides and top, are shut in by plates over apping each other, and connected with each other and with the cars by
springs, to give them the necessary elasticlty for passingaround curves, etc.

Improved Car Starter.
James J. Wheeler, Grinnell, Iowa.-This invention consists of a small
rame of two legs, connected together by sultable cross bars. Each leg has clamping foot adapted for clamping the head of a rall-one acting when forced downward, and the other when ralsed upward. On sald frame is a
drum and crank, with a rope or chain for hitching to the car, which is thus drum and crank, with a rope or chain for hitching to the car, which is thus
moved by winding the chain or rope on the drum. The frame is conflned on the rall by the clamps, which are caused to hold fast to the rall by the one next to the car being forced down on the rall by the strain upon
or chain, and the other by belng forced upward by the iald strain.

Improved Truck Barrow.
Marion, s. C. - This invention
James J. Richardson, Marion, s. C. -This invention relates to an improve ment in barrows or trucks of the class in which the wheels are arranged an
der the body of the truck and it consitas in the arrangement of a cross der the body of the truck; and it consists in the arrangement of a cross
bar to scrape the wheels of the barrow and connect its sides. The wheels are arranged to revolve on a stationary shaft secnred on the under side of are arranged to revolve on a stationary shart secnred on the under side of
handle ralls. The front posts mortised into the apturned ends of the handle ralls support the removable front boards and the for ward ends of
the side boards. A cross plece standing edgewise is provided by which the bottom ends of rangementraises the bottom and allows the weight or load on the barrow
or truck to rest directly over the wheels. This allows the barrow to be used as a truck, the load in elther case belng discharged over the front end when desired. In handing cotton bales and other heavy articles the side board are removed, and such articles are loaded and discharged as when a truck is
used. Braces and straps of fron are applied wherever necessary to streng. then the connections, and add to the durability of the combined articles. Thin pleces of sheet metal are attached to the forward cross plece opposite
the wheels, the design of which is to scrape the tires or peripheries of the the wheels, the design of which is to scrape the tires or peripheries of the

## Improved Bottle Stopper.

Herman F. Retner, Blairsville, $P$ farnish a stopper for bottles which shall be so constructed that the influx
reflux of liquids is rendered possible without the removal of the stopper rom the bottle. The invention consists in the employment of a stopper composed of a metallic tapering tube which is provided with a horizontal centraifiange and with a bayonet slot for recelving and securing the vert1cal stem of a conical disk valve, by the movement of which stem the Spring Attachment to Car Windows.
George Cornwall, Brooklyn, N. Y.-This invenion relates to a spring sashes as are let down into boxes of the car frame when opened. The invention consists in the appilication to each upper end of the sash of one or
more U-shaped inverted springs, whose ends are fastened to the faces of more U-shaped inverted springs, whose ends are fastened to the faces of
the sash, while their upper rounded parts project above the sash and come the sash, while their upper rounded parts project above the sash and come


Improved Cultivator. sists of a triangular cultivator with an adjustable device for varylng the depth of the furrows by shifting and maintaining it at different hights on a truck of troo wheels at the rear, and a caster wheel at the front; for raising Improved Sewing Machine Cover Hook.
joying a hook fastening to the cover of a sewing machine table, so that if the wood of the cover or ta ble should shrink or warp the fastening may be readlly adjusted to the change. It consists in making the hook adjustale in a recess of the table, and in comblning it with a slotted plate, where by it is held in place. The shank of this hook is made in the form of a flat rectangular plate, to fit a mortise in the table, wherein it has back ward and
formard play. A plate is fitted to the table as a cover to this mortise, and is fastened by screws so that it bears upon the shank. The hook proper pro jects througha slot of this plate When the desired position has been as
signed to the hook, the plate is firmly screwed down, and bears upon the slgned to the hook, the plate is firmly screwed down, and bears upon the hank so as to hold the hook in place. If the table or cover should shrink
so as to require the read justment of the hook, it is only necessary to silght. loosen the plate, reset the hook, and then refasten 1t. This invention also makes it conventent to fit covers to tables when pither is not of the exact size required.

## Improved Dish Washing Machine. West Albany, N . Y.-This invention has

Joseph Usher, West Albany, N. Y.-This invention has for its object to
Curnish an furnish an improved machine for washing dishes, which shall be so con-
tructed as to wash the dishes quickly and thoroughly. In using the chucted as to wash the dishes quickly and thoroughly. In using the ma placed in a metal case which rests on gudgeons which pass through holes and revolve in bearings in an outer box. A quantity of water, or soap and water, is then placed in the case and the door is closed and secured. The case and its contents are then revolved a few times-first in one direction
and then in the other-which quickly cleans the dishes. The door is then nd then in the other-which quickly cleans the dishes. The door is then tity of clean water is then poured into the case and the dishes are rinsed in the same manner as they were washed, after: which the rinsing water is emptied out in the same manner as washing water, and the frame and the dishes are removed and placed in a drawer beneath. When the dishes are
to be used they are removed from the frame and wiped with a clean cloth. Improved Wood Pavement.
Mary H. Alexander, Newark, N. J.-This invention consists in making a pavement of a series of wedge shaped blocks, flat on top, notched across one of the upper ends, anc driven Into the soll at right angles to each other, so
that each one may be supported by another, braced lengthwise agalnst each of its opposite ends. The object of the corner notch is to bring the filling paces in small zigzags or right angled triangles, and thus afford good foot he filling. This would seem to be an important improvement and advance in wood pavements.
Improved Paper Box.
Moses W. Dillingham, Amsterdam, N. Y. - The object of this invention is to provide con ventent and effictent means for holding the covers to paper boxes without tylng them, and it consists in pleces of pasteboard or other opposite sides of the box, or on one or two of the corners and one of the opposite sides ore the box, or on one or two of the corners and one of the
ends or sides, are attached strips of pasteboard at or near the upper edge. On the Inside of the cover are also attached slmilar pleces, arranged to correspond in position with the pleces on the box and so that there shall be a recess for each plece on the box, and so that any two of such pleces-one on
the box and one on the cover-shall engage with each other, and thereby the box and one on the cover-shal
hold the cover securely to the box.

Improved Horse Power
Pe invention conststs in a new mode of applying the levers to horse powers so that the length of power
arm tothat of welght arm can be increased without requiring any greater space for the sweeps, thereby giving greatheverage and enabling one palr horses to do easily what heretofore two have done with diffculty. This in
vention affords a very convenient and smoothly working horse power, which has been practically tested and recelved by the public with great favor.
John Twproved Corn Coverer.
John Tweedy, Vernon, Ind.-The invention consists in combining a clod
mover with a leveler and pair of covering plows, and in the means of attach Ing and holding it in position. The plows are inclined in ward so as to throw
the soll into the furrow and cover the corn. The end parts of a semtciccular the soll into the furrow and cover the corn. The end parts of a semicircular
or arched mold board are attached to the lower parts of the standards, and or arched mold board are attached to the lower parts of the standards, an the corn from being carried off by the crows, and to prevent the foll from oefng washed away by the rain. The ood mover or leveler is formed by at tachng two side plates, at their upper edges, to the side edges of a small tr angular top plate, whichmeet in a sharp inclinededge, so that the sald device
may be $V$-shaped in its horizontal section. The clod mover may be adjusted forward br hed ints hatian section. The clod mover may be adjuste and pushes off the clods, sods, and other obstructions that might imped the corn in coming up, and thus leaves the top of the ridge in proper cond the cor
tion.
Improved Sugar Cane Cultivator.
Alctde Trouard, New Orleans, La.-A wood or metal cylinder is provided or set with teeth having sharp or curved arrow-shaped polnts. The cyllinder
revolves around an axle, which is mounted or journaled in levers that are ivoted at their forward ends to the frame bars, and are adjustable vert cally at their rear ends. The bars with the cross bars, constitute the frame proper of the machine, which is supported on runners made in the form of ordinary sled runners. Horizontal bars or rods are provided for cleaning the teeth of the cyllider. Before the machine can be used the stubble 18
barred offby running a plow on each side of the row. A shaver on slides ti then run in the furrows to shave or slice off the stubble to an even length This machine is then run in the same furrows, and the hook teeth of the cyllinder enter between the stubble stalks and grub or plck out the earth.
The cylinder ts adjusted vertically to correspond to the condtion of the The cylinder is
soll or stubble.

## Improved Glove.

Edwin V. Whitaker, Gloversville, N. Y.-The invention relates to gloves made with leather palim and cloth backs, and consists in cutting a glove
with the thumb and all the forgets, except for middle finger, in the same with the thumb and all the forgets, except for middle finger, in the same
plece with the palm. The purpose is to economise the material, give the exact relative quantity of leather to each, and make the forgets seamless a the points between the fingers. A much smoother and more accurate fit

## Improved Meat Chopper.

Jesse Battey, Manchester, N.J. This invention consists of a novel con trivance of pawls and a shifting device with a ratchet bar having two
sets of ratchet teeth, reversed as to each other, for moving the chopping box and reversing it from one direction to the other. The invention also con sists of an intermittingly reciprocating square chopping box, combined that the box can be turned a quarter of a revolution, and thereby be pre sented to the blade so that the meat will be chopped crosswise.

James B. Thurston and Frank M. West, New York city.-The invention relates to an improvement in the class of inkstands or holders in which two or more receptacles are arranged to be revolved around a central axis to
bring them successively or at pleasure under an opening in a cover; and it bring them successively or at pleasure under an opening in a cover; and it
cons:sts in suspending the ink receptacles by their upper edges from a per forated disk or plate adapted to revolve in contact with the under side o the cover of the inkstand, and in the arrangement of a spring and lug or projection of the cover for locking the revolving disk

## Improved Paper File.

Emanuel Motz, Woodward, Pa.- This invention relates to an improve bination of a rod wewspapers or other papers filed, and consists in the com the rigld back for the papers fled, whlle the string ties the papera together and to the flle, the pin holding the string in proper tension.

Improved Binders' Table for Harvesters.
$\begin{gathered}\text { James H. Smith, Orford, Iowa..This invention consist in converting the } \\ \text { tables combined with a binding trough and platform for a harvester a tach }\end{gathered}$ ables combined with a binding trough and platform for a harvester attachment for binding grain into a bundle-carrying and dumping attachment,the levers peculiarly arranged, whereby the bnndles may be dumped upon the
ground by the driverwhen a quantity sufflelent for a shock has accumulated. ground by the driverwhen a quantity suffclent for a ahock has accumulated.
The tables for receivingand carrying the bundles are made much larger than des and tilted to dupp them they can be used to hold and carry the bunto an extension of the frame above the carrier by rods. This extension of to an extension of the frame above the carrier by rods. This extension or
the frame is arranged by the side of the seat where the lever, whith is pro-
vided with a handle, can be conveniently reached by the driver to tilt the vided with a handle, can be conveniently reached by the driver to tilt the
tables. Said levers are connected together by a pin in one and a slot in the thel, so that both are actuated by one and the so the tables back after belng tilted. The tables have numerous stud pins projecting upward to hold the bundles, so that they will not be shaken off while betng carried to accumu-
late a sufficlent quantity for a shock. By this contrivance the labor of


Improved Chromatic Printing Press Attachment.
ward A. Howitt, Whitcwatcr, Wis.-This invention relates to prin presses with morable inking disks; and consists in the application to the Device for Device for Producing Pearl Finish on Metallic Surfaces.
Bernhard D. Beiderhase and Charles Witteck, New York city. ${ }^{\text {The object }}$ of this invention is to provide means for producling what is known as "pearl
finish" on metaliic surfaces; and it consists in a head with one or more finish" on metalic surfaces; and it consists in a head with one or more
projecting clusters of wire therein, the device being more espectally designed
for the inside of silver or other metallic vessels, but applicable to the outforde also.
Device for Producing Satin Finish on Metallic Surfaces. tion relates to the finishing of metallic surfaces, whether the outside or inside surfaces of vessels or flat or irregularly formed plates; and it consist In one or more clusters of wire connected with screw eyes or loops attached
to a head which is screwed to the end of a revolving mandrel, the esald cluster of wire being connected with the sald screw eyes by means of loose plate will fly out radially by centrifugal force, and present a series of metallic
points, which, when in contact with a metallic surface, will make slight in-
Improved Blackboard Eraser.
Winfleld S. Read, Oakland, Cal. The object of this inve
Winfleld S. Read, Oakland, Cal.-The object of this invention is to furnish in school rooms and similar places; and it consists in a pad formed witt: wooden back and a corduroy or ribbed face. The advantage of this cordu-
roy or ribbed covering is that the chalk dust will be detached from the blackboard by the ribs and will find a lodgment in the grooves betwee Improved Combined Tobacco Box and Match Box.
Charles Lemhof, Brooklyn, E. D., N. Y.-The Invention consists of a Charles Lemhof, Brooklyn, E. D., N. Y.-The invention consists of a com reception of a match drawer, sald drawer having a retaining ch
the ribs, hinged sides of the box being braced by sald partition.
Improved Plow.
Joseph w. Reed, Careyville, Mo.-This invention has for its object to fur nish an improved plow for breaking up prairie sod, which shall be so con-
structed as to be of easicr draft than plows as heretofore constructed, while 0 that two horses may do with ease the work land side handle is bolted to the rear end of the plow beam and its
lower end is bolted to the rear part of the landside. The mold board handle is connected with the handle by rounds, and the lower end of it is bolted t the rear part of the mold board. The upper end of the standard is bolte
to the beam and its lower end is bolted to the land side. The bed plate i made wide, so that it may recelve and support the rear part of the share to the land side, so that it may be close down to the bottom of the furrow
and its outer cnd projects to the outer part of the share nort its outer end projects to the outer part of the share so as to fully sup. port it. The land side is made long, so that the share may project forward
about six inches further than an ordinary plow. This enables the share and motd board to be made with such a gradual rise that they may pass the standard about thrce inches lower than in an ordinary plow.
Improved Rotary Churn.

Improved Rotary Churn.
Wilson McClure, Sinking Spring, O. - This invention has for its object to
furnish an improved churn, eimple in construction, eonvenient in use, effective in operation, and not liable to get out of order; and it consists in a bo
which rests upon legs which are so formed that their upper parts, whe Which rests upon legs which are so formed that their upper parts, whe
left free, may siand out from the sides of the box. Rods are placed so as press the sides against the end edges of the ends from the bottom to the
ton of the box, by which construction the shrinking and swelling of the wood. will not tend to open the seams of the box, but will only vary its
hight. The upper rod moves up and down with the swelling and shrinking of the wood without affecting the tenston of the rods or allowing the joints to open. To the dasher shaft are attached four pairs of radial arma distance apart; aad to the other pairs of arms is attached a round bar, in
such a position asto be opposite the space between the round bars of the other pairs of arins. The part of the round bars between the arms is made milk harder and heavier and to give it a steadier motion, adapting the serve as a fly wheel. In one end of the dasher shaft is inserted a plvot,
which is held out by a eofled spring inserted in a recess in the end of sald Which is held out by a eofled spring inserted in a receess in the end of sald
shaft. In the other end of the shaft is formed a square socket to recelve the squared inner end of the plvot which rests against the inner surface of
the side of the box against which it is gently pressed by the action of the spring plvot to assist In preventing the escape of milk through the hole in which sald pivot works. By sultable construction, as the box swells and
shrinks, by loosening a screw the drive wheel may be adjusted to alway gear properly into the gear wheel.

## lmproved Hose Bridge.

Gllbert J. Orr and Charle thon has for its object to furnish an improved device for enabling street
cars to readily pass over hose stretched across the street, so that the cars and passengers need not be detalned. The middle part of the body of the bridge is made parallel or nearly parallel with the rail, and its end parts in-
cline downward to said rail upon which they rest. The upper surface of the bridge may be made simply with an upwardly projecting part for the
tread of the car wheels to run upon, and for the flange of said wheels to bear against. The ends of the bridge must be made to correspond with and to closely upon the rail so that the car wheels may pass readily from and
to the sald rall bridge. Upon the lower surface of the end parts of the
bridge are formed projections to serve as guldes in adjusting said bridge bridge are formed projections to serve as guldes in adjusting said bridge
upon the said rall. Upon the lower surface of the end parts of the said bridge are formed, or to it are attached, lugs to bear against the flange of the rall and sustain the side pressure. The central part of the bridge is left
open to enable one, two, or more hose to be passed through. To the mid-
die part of the bridge is rigidly attached a downward proil such a length that tits lower end may rest upon the flange of the rail, and
surd upon said lower end is formed a jaw to rest against the inner side of the
sald rail. Directly opposite the arm is formed a lug, to which is hinged nother arm which is made of such a length that its lower end may rest
upon the outer part of the rail, and which lower end has a jaw formed upon It to rest agarnst the outer side of the rall. The jaws are made of steel, and
their faces are roughened to enable them to take a frm hold upon the sides of the rail. .By sultable construction, when the bridge has been adjusted upon the rall, by one or two turns of a screw it will be clamped securely to
said rall, so that it will not be moved by the car wheefs as they run upon and from it. The iron part or rall of the brfage may meem as they run upon
hollow or and from
tubular, if
strength.

David M. Cumings, Newburyport, Mass. T-Th1s invivention relates to an Improved device for rastenng stoppers in bottles. The stopper is made of
suitable materral fastened to a metallic center pin, and its shape is cylindrical, with an enlarged upper end. An elastic collar or covering
surrounds the entire stopper on all sides except the bottom. The pin has a lange which reste on top of the clastic collar. The lower end of the pin yoke is hinged to a ring which embraces the neck of the bottle and is con
nected with the pin and stopper. To another ring that embraces the neck of the bottle, is hinged a lever which has a projecting arm. When the stop per has been inserted within the mouth of the bottle the lever is swung up,
and Its arm crowded over the horizontal end of the yoke. It thereby tends to force the yoke, with its appendages, down, while the lever itself and ring are drawn up. In this way the stopper is forced into the bottle and
held theretn. The lever being locked in the yoke, the enlarged outer part of the collar is forced out or up within the mouth of the bottle, and thereby

Improved Car Coupling Attachment.
William G. Brown and James W. Jedkine, Monmouth, Maine.-This inrenthe operation of coupling the cars may be slmple, easy, and perfectly safe In the outer end of the draw bar is formed the cavity to receive the co:pling
innk. through which the coupling pin passes in the ordinary manner link, through which the coupling pin passes in the ordinary manner
Theends of a ball are pivoted to the opposite sides of the draw head. This ball is made of such a length that it may move up and down in front of the
bumper head, and to tts arms are secured downwardly projecting arns, to the lower ends of which are plvoted the forward ends of the connecting bars, the rear ends of which are plvoted to the lowerend of the levers which
connect with a shaft and operating lever. A spring is colled around the connect with a shaft and operating lever. A spring is colled around the
shaft and one of itsends is secured to said shaft. The other end of the spring is secured to the car frame so as to hold the sald shaft securely, ex formed levers which are curved downward, rearward, and upward, so that when the baill is lowered they may be entirely out of the way, and may be
conventently grasped to raise the bail, and thus ralse the ling so that it will surely enter the bumper head of the adjacent car. To the forward part or
bow of the bail are attached or upon it are formed $t w o$ arms, which project orward and downward so that, as the cars are run together, should the a may not be struck and injure the arms and push the ball down so that it mat
by the bumper heads as they come together.

## Improved Cotton Planter. Darlington Court House, S. C.

William E. Rhodes, Darlington Court House, S. C.-This invention con sists in improving cotton planters so that they may be more practical in
operation. The dropping wheel is made of such a size that its upper side
俍 operation. The dropping wheel is made of such a size that its upper side
may project into the hopper to take out the seed. In the face of the drophopper. These notches, when the seed is to be dropped in drills, are con-
tnued all around the wheel. When the seed is to be dropped in hills on or more notches are made in the wheel, according to the required distanc apart of the hills. To the upper slde beam is attached a slotted plate, to
prevent the beam from belng worn by the wheel, and to prevent any seed hrough which the seed is carried out is regulated by an adjustable slid The hopper to receive the seed is attached to the rear end of the beam, so
that the ssid beam may serve as a bottom to the hopper. A spout is attached hat the ssid beam may serve as a bottom to the hopper. A spout is attache
to the lower side of the beam to recelve the seed from the wheel and gutd it into the channel made by the drill opener, which may be readilly adjusted pener are attached wings to push back clods, coarse manure, and othe substances that might impede the proper operation of the machine. To the middle part of the upper side of the covering block is attached the lowe ny desired force upon the round, or raised from be adjusted to bear wit sired. To the axle at one side of the hopper is attached a gearing which re volves a shaft in bearings in the sides of the hopper, and to which, within ward, keep the seed in the lower part of the hopper stirred up so that may be carried out by the wheel uniformly. In the rear side of the hoppe a formed a hole closed by a sllde, wholly or partially left open by a pin
fhich passes through holes. The slide Is designed for use in regulating the mount of seed sown, so that the machine may be adjuste
less seed, as may be desired, without stopplng the horse.

Improved Sewing Machine Chair.
Franklin Chichester, Milwaukee, Wis.-This invention has for its object to furnish an improved sewing machine chair which shall be provided with
a ylelding back, and so constructed that it may be adjusted in hight or ina ylelding back, and so constructed that it may be adjusted in hight or in-
clination as the convenience of the operator may require. The pedestal may be of any desired form. per end of the screw is formed upon a cross bar, to the ends of which is
plvoted the seat frame. By sultable mechanism the chair seat may le tilld or adjusted at any desired inclination or lin horizontal position, as ma e desired. To se as to tend to till the seat frame back. The chair may bed used as a spring rocker. The lower part of the back is so arranged as to Iways adjust itself to and support the back of the operator.
Improved Earth Closet.
$\begin{aligned} & \text { John L. Young, New York clty.-This invention consists in spouts for } \\ & \text { distributing earth, in operating the ring sofl carriers by means of rack and }\end{aligned}$ awl connected with cover, and in operating sald carriers in reverse direcions. The distributing spouts are directly above the bucket, and rest on
the top of the chest. These spouts are cut from a sheet metal plate which Corms the bottom of the reservoir, the center of the plate betng cut awaj.
The dry earth is introduced into the hollow back, the base of which is connection with the space above the chest from the reservor. To carry
the earth contained in the reservoir to the spouts two rings are employed, re operated by the cover, ratchet notches being cut in the top edges of each of the rnggs. The lower edges of these rings are cut and bent to form
buckets for carrying the earth toward the center as they are revolved.

Improved Harvester.
Christopher Lidren, La Fayette, Ind., assignor to himself and R. Jackson,
f same place.-This invention consists of a pair of grab of same place.-This invention consists of a pair of grab and carrying rakes
suspended from a crane which is mounted on the platform of a two suspended from a crane which is mounted on the platform of a two wheeled
machine hinged to the truck frame. The crane may be any shaft arranged o swing it forward and back, and so adjusted as to hold the grab rakes durng the time they are gathering the grain into a gavel, and also while they
are detaning it. The rakes are so arranged, and have rakes to actuate graln on the platiform at efther end of the latter; they are then dropped ngn so that the ends of the fingers project below the grain through open-
ing in the platform ; then brought together at the middle, moving parallel or nearly so, to the plane of the platform, raking the grain together in a gavel and securing it. They are next ralsed and swung around to the rear,
and lowered and opened to dscharge the gavel, after whtch they are thrown out of gear and allowed to remain until grain enough for another gavel has allen on the platform, when they are put in gear again, ralsed, swung for
ward over the grain, and presented for taking another gavel, as before The swinging of the crane is effected and the mechanism for raising, lowering, opening, and closing the rakes is so contrived and actuated by cams of
pecullar construction on the axle that the whole is exceedingly simple in construction, and the operation is in no way impaired or hindered by the oscillations of the platform and the truck relatively to each other
Improved Street Car.
William T. Jenks, Toledo, Ohlo.-The object of this invertion is to ersed without the use of a turntable and without detaching the horses A wheel is rigidly attached to the top of the frame of the truck, in the cen-
ter of which is the king bolt. This wheel is made in two parts, or with projecting flange on its rim. On the bottom of the car is a wheel of cor
responding diameter. Hooks are attached to the bottom of the car, which
hook over the projecting flange and hold the two wheels in contact, the
wheel being the foundation upon which the body rests, and the king bolt the center upon which it turns. A spring lever is arranged on the front platform of the car, having a foot plece at its front end and a stop pin at the back end. A spring, which bears upward against the forward end of
the lever with a constant pressure, throws the pin down, so that it engages the lever with a constant pressure, throws the pin down, so that it engage
with holes in the wheel when efther end of the body is in proper position. To reverse the car, all the driver has to do is to bear with his foot upon the foot plece while he turns his horse round half a revolu'ton to the other end of the truck. This action reverses the car, the team or horse befng at tached to the end of a draft bar, which is fast to the bottom of the car. The brake lever is connected to the king bolt as a fulcrum. The advantage
over the ordinary street car are that the driver always occuples the same platform and the same position in regard to the fare box, and the heavy ex pense of a turntable is avoided.
Mathas Hofmann, Darilngton, Wis.-This invention relates to a new con struction of extension table. The table top is connected by toggle joint
with the extension frames that constitute the table frame. Legs, in sults ble number, support the table frame at proper hight. Each of the two framessupports, near its outer end, a piate, which, when the table is con-
tracted, is directly under the top. When, however, the two frames are and ona level with the contract the extended table, the top must frest table top. In order to contract the extended table, the top must frrst be raised to enable the
plates to pass under it. When the table is contracted, the leaves may be
doubled, being jointed for that purpose, so that their outer sectionsare doubled, being jointed for that purpose, so that their outer sections are doublea, br
placed hor
thereof.

## Improved Milk Cooler. Frank S. Oakes, Cataraugus, N. Y. - This invention

ratus for cooling the milk of which the cream is to be used for churning consists in so arranging waterconductingpipes that the warmest milk and coolest water, and vice versa, wimalways be in the same or approximately he same plane or locality. The milk chamber or vessel in which the milk to be ner flange. The discharge plpe projects from the bottom of the vessel ruber plate. A plug closes the discharge pipe. The bottom of the vessel is, at or near the middle, carried up to form a sort of partition. The partl-
tion is double, and contains two horizontal water condults. The cold wa ter is poured into the upper pipe through an inclined spout, and flows alon the same, thence down into the water space within the water chamber. The coldest water, betng first applied to the upper part of the elevated bot-
The tom, affects thus the upper stratum of milk. The warm part of the water partition is perforated, so that the milk can circulate from one side to the ther of the vessel. In large dairies several of these devices are place one vessel flow into the other untll its temperature is nearly equal to that of the milk, and then be discharged.

## Improved Paper Bag Machine.

Truman Hotchkiss, Stratfor, provement of paper bag machines. The paper of which the bags are to be
made, being of the right width for the size of the bags when folded lengthwise, is wound in a large roll on a roller which is placed in the machine undera table, immediately behind the feed rollers and the shears, from which
said roller the paper is to be fed at Intervals through the shears to the foldsin roparatus by the princtpal feed roller, which will be moved exactly the
ing aper ame number of turns each time in order to feed off the exact length of paon the plates on either side of a rectasgular recess in the table, one edge coming under a spring and the other edge under a bar, which falls upon it to keep it down smooth and hold it so as to be drawn into the recess mostly off the length of paper to be folded. After the paper has been so dellvered part of the end next to the cutters are pasted by bars, which till then rest in a paste trough. These betng suspended by arms are at the projer time caused to swing over the paper and deliver the paste along the margins, and hen to return back into the trough again. The paper being thus pasted nd lying above the recess, is then pressed down inc sald recess forssa, pended above it, which comes down on the paper, carryingit to the bottom of the recess and folding it between its sides and the walls of the recess. folded over upon the top of the former, and pasted together. This com. ng recess to dedtion of the bag, and 18 fermer by the ratsing of the former itself, to admitt another piece of paper below for the next bag to be made. The discharger carries off the bag, along the table, till the bittom comes in contact with the endless belt carrier, which conveys it to the front
of the folding roller above where a folding blade comes down upon the upper side of the bag, just behind the upper edge of the bottom, to break lower edge of the bottom will be drawn in between the rollers,in such man. ner that the cylindrical part of the bag will be folded down flat, and the
stiff bottom will be folded over on a portion of the part above in passing enween sald rollers; at the same time the bag is delivered from the machine on the chute, and the upper portion is then wrapped around the bottom by
hand, miking a compact flat package that can be packed in boxes or bales without injury to the bottom. The folding cavity, former, pasting apparatus for the frrst pasting operation, the folding devices used in the con-
struction of the bag, and the discharger, are all arranged in duplicate on two opposite sides of a frame or table, independent of the frame carrying the feeding and cutting apparatus, and the apparatus for folding and dis-
charging the completed bag; and the devices for operating the sald parts, so far as they are operative, apply to both in such mannerthat a double machinecan be provided with less cost and
would be required for two single machines.

Improved Movement for Converting Motion.
Jefferson Peabody, Bangor, Me.-The object of thisinvention is to con-
vert the osclllating motion of a beam, treadle, or lever into the rotary moin of a wheel or pulley, for use on a sewing machine or other instrument
to be turned. The invention consists, princlpally, in connecting both end
of the orcllating lever or beam, by cords, chalns, or belts, with the same die of the pulley to be revolved, so that whichever end of the lever may be depressed, it willdraw the pulley around in the direction in which the string
is betng pulled, thus producing constant rotation of the sald wheel or pulImproved Folding Cradle or Crib.
Michael McNamara, Philadelphia, Pa. -This invention hat解 may be very compactly folded for storage and transportation. To the ends which are fastened the rockers when used. The side boards of the cradle or crib are each made in four sections. The outer ends of the end sections are each hinged to a post, so that all of said end sections may fold inward. The inner ends of the two middle sections are hinged to each other,
so that their inner sides may fold together. The outer ends of the said midrack bottom of the cradle or crib, which is mide in two parts, restsupon rabbets formed upon cleats. The outer ends of the parts of the bottom ar folded against thc end boards. The varlous parts of the cradte or crib,
when opened out for use, are secured in place by sultable fastentng con. When opened out for use, are secured in place by sultable fastenings con
necting the middle sections to the bottom. A plece of cloth or netting necting the middle sections to the bottom. A plece of cloth or netting is
detachably connected with the upper parts of the end boards, to form summer bed or hammock to allow the air to circulate freely around the that The cradle or crib is nade wider at the top than at the bottom, so that when folded there will be an open space bet ween the folds or sections
of the side boards, Into which the bedding may be packed. By this conoccupy but ittle more ppace than, and may be carrled as easily as, a carpe
por

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sition, 188, tor " " Beat Telegraph Instrument for private


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F.H. Q. asks: How can I harden steel fo C. asks: How many 12 inch bastard files can
good workman cutin an hour by the oll method? J. L. S. says: How can I make soft water
מard? Has hard water less solvent power than soft?
 $\begin{aligned} & \text { set and } 18 \\ & \text { lampe etc. }\end{aligned}$
E. B. asks: Will an achromatic telescope,
with 1x inches object glass, and 23 inches
Iong when ex with 13 Inches object glase, and 23 Inches long whene
tended, answer tor the telescoptc portion of a apectro J. M. asks: What method is employed by
mechanice to trace a spiral on an octagonal or round
 J. L. S. says: Moths have goo into my rep
covered furnture and are grad ually eating it They appear to be fin the interior among the hatr. Can
you tell me how I can deatroy them without having the arniture re-uphointerea
W. F. D. would like to know of the wherenext meeting takeet place, who are the oftcersand where
they restie, and if they offer they resdde, and if they offer a premium. of 825 for the
best plan for remorving siow from ralliond tracks. If he could invent a platu that would do it succecsefuly, would
S. wants a good white preservative for
wood work on build dings which are exposed to sulphuretted hydrogen from gewers. Whte lead turns yellow
In a very short trime, and zlic is not much better. No
 rected on plies on river sldes and are exposed to the
shocks of boats. A. O. asks: Why is it that the water in a
kitcenen bollier will not beoce the when there 18 aleak In the supply plpe $P$ I had such a case a few days since,
where the botler had not been hot for a number of weeks. If ound that the valve or a water closet in the
yarr was ieaking; as soon as ripearired tit the water in
the ooller beca J. K. W. asks if some correspondent will
iform him as

 to crumbe or break ofir ith cheap,
and it does not gum like other olls."
W. A. S. says: I have a house that was put In stoves to dry it. I drove the fres so hard that the
walls are colored in some places with the smoke or gas. can some one tinform me of a whitewash that I can ap.
 peen or thys that it will lo to to to paper before the plus-
ter is thoroughty dry. What had I better do?
 up. The otints are made by, screws. AA the joltats oust
be tight, the scerews turn outward In operating it. For
 edy this. The best 1 have done 1 t $t$ to use fate head d ccrews
with tallow on the shank ond head But even then the with tallow on the shank and head. But even then the
gerewa
nill turn when driven up quite tight RIvets are screws wirl turn when driven up quite tight. Riveta are
not deasrable. If any one knows of a better way, I
should be giad to erg W. C. asks: Is there anything with which
I can fiasten leather to iron that Is consantiy 1 mmersed In water? II there any metal of which I chan make a
ring that will expand whlle belng put on and contract tin contact with pressure, so as to form a watertightjoint? I have 10 rams packed with leather; they work very well
for two or three days, but then commence leaking. The
 W. V. J. says: I have a sectional boat, com-
posed or zinc with a wooden bottom and end boards. In trangportlng It to the country y y became so stralned as
to makett leak bady. The zinc is fastened to the wood with galvanized nalis and white lead. I used pitch on
the seams but tit wore off ton the eeams but tit wore off too quickly, and did not stop
the leaks. The boat scraped on bottom of river on go. ing over ritts. Would enamelled cloth put on with ma. rine glue stop the leaks? Would tit stick to the patint on
the boat, or should $I$ use asphaltum, melted and put on
 the heator the sun? Is there any other cement or pre
paration I could use? What are the constituents of maparation
rine glue?

## 

M. says: I want to know if a 6 inch double
belt will drive as much power as a 12 tinch single belt, on asmooth sur race. Will not a 12 Inch single belt do three
tmea as much work as a 6 Inch double belt?
Does
 ace tse best for getting the most power, mamogany leather, pollshed fron, or rough iron? Answer: We
should expect rather the beast result from the double
 tilon, snd properly laced or riveted. Leather covered
pulleys are best. Conault the papers of Mr. J. H. Coop.
 wo year
C. F. S. says: A A rain of 100 cars must ass
cend a grade too heavy for one engine, and a second one s called on. Now where should the engines be to ac and one in rear, or one in front and one in the midate, or
 Owing and $v i c e ~ e v e r s a . ~ I ~ I ~ c l a l m ~ t h a t ~ t h e y ~ w i l l ~ w o r k ~ b e e s ~$
 pace both eugfines together, so that the engliners ma communicate with each other and work together. On
curve, it would be better to give each a half of the traln,


 thls for six months, put ting the quantity named once tin
every two weeks in the boller, and I fnd it both cheap and cffectlve. It should be put in after the boller ha
been thoroughly cleaned"
 brazed together. The ends of the boller are convex out. wardy; and haring brazed dn one head, how can Iput the
other in? Ate there any rules applicable to find the dimenstons for small bonlers to sult engnes? Answer
There are no rules applicabile to very mmall bollers. The
 In the head, put t a a steady pln, or acrew or solder on a
silp of tin or a handele by which to to steady the head. Then
ATT. B. says: What size cylinders (for What is thic beat style and dize of ocrew tom to ke ten mille
per hour?
Inave 3\% bore; will it do? Auswer: See answer to $A$. \& $\mathbf{Y}$.
page 75 , current volume of the Sciswurn
 of engine would be required.
screw" as the boat will take.
Y. C. E. says: I wish to know a formula by
which I I can calculate the number of gallons per minute of discharge of a fre engine with an 8 tnch cyllinder and
the nozzle of the discharge pipe
oof an inch dimeter
 We should be obliged to any manufacturers of steam
are englines who will give us usenul statistics and rule or propertioning them.
G. D. asks: 1 . How much water does an
ordinary canal boat draw, and what
 and there ter a intocharge plpe from the cylinder, 2 inches
and n diameter. If a force of 40 los. 18 applied to the platon,
Fith what force shall $I$ discharge win what force shall I discharge the water from the
plpe, whlch tis only $\%$ the dameter of the pump? If pos. sithe, , would ulise to know what pressure en pounds per
square tnch the water exerts in its exit from the pipe. square tnch the water exerts in its extit from the pipe.
Answers: 1. Canal boats are of dffferent sizee. A large boat draws $5 \%$ teet loaded, and 18100 feet long, 17 or 18 or 80 tung, and carries from 175 to 200 tuns of coal. 2.
The pressure will be somewhere about 2 pound anerine, asa na A. H. G. says: To calculate the lap of a
sild valve, iet A Be se stroke of piston, and $B$, path or the platon must travel before steam is cut off (in this
tis dagram, at \% stroke). At this polnt, erect the perpen.

 strikng platon line at H and crank path at A. Now as-
certaln the travel of the ralve, take hali 1 t, and with the
 datagnal $F$. The pace from $\mathbf{H}$ to $F$ is the required lap;
from $F$ to E , the openting of port. Angwer: The con. G. W. M. says:
plate with ag am livancic battery. My bating to to electro
 wrires are olined together; but when these are tmmerred
in the gold or sill ree solution, the battery power seems lution, when the negative recelves only a slight coating. Can you tell me a rememy for the defect? Answer: All
netala are electropoedtre metala are electro-positive, and are attracted from their
solutions to the zinc or negative pole of the battery, solutions to the $z$ Inc or negative pole of the battery,
and whaterer subbancece they may be in combination
 with sllver, Fou must solder or other wise fasten to the
wire leadng from the poittive pole wrire leadng from the positive pole of the battery a
sheet of sillver, about three e inches square ; hang this
 suspend it tin the oselution about three quarters of an
tinch from the sheet or plate. Inch from the gheet or plate. In most electroplating the
plate fastened to the poostive pole must be of the same
 plate or sheet 18 gradually consemed ot ot keep up the
strength of the solution but it has also another impor strength of the goulton, but tit has aliso another impor.
tant use as an electrode. Although metal solutlons are

Bood cond metars ore
with the met mes ; and the plate serven pared electrode to conduct the battery current to many parte
of tre Ity to eolution at once; thereby enabling more electric-
Ity to telegraph companies connect therr earth wire with the Water pIpes, on the same princlple, and it is here where
you fall; connect your positive wire with a sheet of
 W. W. The rules formerly in use were dent, upon the diameter of cyllinder, and were about
 was very ingited. In fact, however, the majority o such rules are not based onany true laws of proportion,
Accurate rules are given for the princlpal parts of en gines by the authorities noted at page 106 of present vol ume of the SCIENTIFIC Amprican. Our editorial col mns weply to our correspondent. He and his shopmate lgebra, rder to be prepared to study those treaises.
Baltimore. We have received a communica
tion with the above signature, without date, and unac companied by the name and address of the writer. Whe
chall be pleased to reply to the question asked when ent us in proper form. O. A. asks: How many screws of one foot diameter, at a speed of one hundred revolutions per
minute, would a keel boat 16 feet long $x 4$ feet wide $\times 2 \% / 2$ leet high, use, to run the boat, when empty, at a spee
of a mile in 15 minutes? Answer: See page 75, curren olume, Scientific Amerionn, answer to A. \& Y. Two crews are sometimes used; never more than two.
A. H. S. asks: What is your method of comtiply the area of piston, average pressure upon it per
square inch throughout the stroke, the length of stroke, and twice the number of revolutions per minute, togeth
er; then divide by 33,000 to obtain the actual horse - J. H. B. says: Is steam in a boiler under pressure a conductor of electrictity? What is the con
ducting power of water as compared to iron? Answer Steam is not a conductor of electrictty. Water is usual ly considered a conductor, but the metale are all infl-
itely superior to it. C. I. says: I would like to know what por
tion of the power of the engine is usually used to carr Con of the power of the engine is usually used to carry
the piston and connecting rods, or how much power is feet stroke, making two revolutions per second? Answer: As an average, the pressure on the piston required
to move the englne itself varles, from 3 or 4 pounds per to move the engine itself varies, from 3 or 4 pounds pe
square inch in smallengines down to from 1 to 2 pounds
J. H. asks if the "steam man" has ever "I refer to the steam man first exhbittedin New York city nd afterwards through the United States. Isit possible for it to walk or run with the feet upon the ground, as
constructed and exhbitited?" Answer: Yes; we believe can and does
Chronicle contays: The San Francisco Sunday Chronicle contains an article purporting to be a repo
rom the United Statoe Consul at Bruges, Belgum, $t$. our Secretary of state, from which it appears that a a cei tain "International Board of Subterranean Exploration"
have been boring into the earth for many y ears, and have at length reached the depth of 37,810 feet, at a place
called Dudzeele in Belgium. Among other importan discoveries was one which. Among other impor fo namely, the annihliation of some of the party by the
molten earth, which was pouring up through the perfo rated shell and which, according to one savan, would
contlnue to flow forever; according to another, it would only flow suffciently long to inundate Holland, Belgium up the North Sea with lava and connecting England with the main land, etc. These ideas are slightly novel,
but I have seen no mention made of them in the Scren TIFIo AMRRIOAN, my oracle in such things. I feel a lit the skeptical at present ; but if you are posted and will
endorse the a bove, I suppose I must button my faith to it. Answer: We are flattered by the expressions of con-
idence from our correspondent, but we decline to endit
dorse the statement of the California wournal. It is not probable that the earth's crust could be pierced, not
only to a depth of 7 miles but entirely through to the reglon of frre, and the matter be kept a profound secret
from all the sclentific world, except the Sunday Chron. J. A. L. sends us a stone, hoping that it is
a diamond, and asks what it is. Auswer: We are sorry to say the specimens prove to be water-worn fragments
of liquild quartz. In hardness and gravity they fall far below the diamond.
W. M. asks for directions for kalsomining. to prevent it ? Will Spanish whiting do as well as Paris
white for Ealsomining?" Answer: Put on several coats White for kalsomining?" Answer: Put on several coats
of the kalsomine wank, "etting each dry before applying thing. See page 551 of our volume XXIV.
F. D. asks: What kind of engine is used time since, and how much power did it use? How many cells are there in the battery used as motive power?
How much would the engine and battery weigh to make half a horse power? Answer: See page 385 of our volJ. M. asks: Is there any work in English,
French or German, that glves practical instructions for laying out the teeth of wheels in actual construction? treatise on the teeth of wheels. If a copy of the "Eng1-
neer's and Machinist's Assistant" is accessible, read the neers and Machinist's Assistant" is accessible, read the general purposes, published. An excellent abstract of Mechances."
J. B. sends us some mineral specimens, and
requests an opinton as to their value. Answer: All the specimens are only varieties of chalcedonic quartz. The
one (wetghing about 10 grol one (weighing about 10 grains) which is dark red and translucent is the variety called carnellan, and is the
only one which a lapidary would want. But gmall carnellansare of iltle value. The cutting gives the chief
T. B. wants a recipe for making bronzed
lacquer for gas ixtures, and asks if there are any works on lacquers and bronzes? ? Answer: Read Byrnes' "Prac.
tical Metal Worker's Assistant,""

March 15, i873.]
S. B. asks: Is it necessary to have a venti-
tor on the top of an tcenouse?
The tcenouse 18 entre. out of the ground, and I was told that, unless I put ion of ice, ventllation is unnecessary.
T. B. asks how to calculate the capacity of
square and round tanks. Answer: The capacity of a
 Into each other. The capacity of a round tank 19 the depth, the square of the diam

- 7854 multiplied Into each other.
S. A. says: We have two boilers 14 feet
long, 5 feet dameter, with 107 three inch tubes in each boller. The bricklay, bullt the bridges 5 niches from the bottom of bollers, and gradually sloped the brick
to within two tinches of the boller at back end. He like. wise bullt the bricks close to the bollers along the sides,
 Wrich causes a very strong draft. Question: Are the gain more heatilng surface on the sldese, , by having the
brick work close to the bollers nearer water line? We burn fourteen cords of wood per day; we think t 1 t t too
nuch. Answer: The brick work at back end should ap. proach the boller closely, unless it checks the draft. As we are not told how much work 18 done by the 14 cords amount is extravagant or not. The heating surfaces of
the boller should be uncovered by brickwork nearly up the boller should be uncovered by brickwork nearly up
to the water line. S. L. C. asks: What is the most economical
method of using steam in a rotary engine? Would it be dyisable to admit the steam twice during each revolutlon, and, at eazh admission, use its expansive power to
drive the pliton through one quarter of the clicle? Would llike to purchase the right of a good rotary steam
engline. Have any of your patrons such a one to sell? nswer: There are many rotary englines in the market,
nd the number patented is very great.
some of them are probably effcclent, but we know of none which have been tegted, by rellable and skilliful engineers, with re
sults that have fustifled publlcation. There were sever al exhluted at the Falr of the Amerrcan Institute last
fall, whlch attracted some attention. The same natural laws govern the action of steam In a rotary as in a rectp rocating engine.
J. B. asks our opinion on feeding a flue
boller 18 feet long by bringing the feed bolier 18 feet long by bringing the feed plpe throang the
boiller head near the bottom in the usual way, and run-
 shell. He further says: Why not feed there as well as at difference, and would there be any danger in so dotng the sald boller beling overa pudaling furnace? Answer: Feeding there will do as well. Keep the discharge open-
ing well under the water line, however, to avold inject. ing the feed water in
should be carried low.
W. R. asks: Will a pendulum vibrating in
vacuum, free from friction at the potnt of suspenilon, ever cease to move? If too pendulums of the same
length, metal and datitern, one welghling 10 pounds and
the other
 A pendulum viratang in vacuo, on a riction enes arbor,
would never stop. In alr,the heavier the pendulum, the Chat decarbonized steells, and how it tis is made? How do it and laminated steel compare for use in gun bar-
rels? Answer: The terms are not recogntzed by metal-
 ontaining about one half of one per cent carbon, and
free fram impurity, is the best material known to englneers for purposes requiring both strength and toughJ. S. . B., of Mich. The mineral you send is
Iron prites of no value. Write idrectly too the party H. W. U. asks: Why are there not more there any at all? Answer: Because the water of the the
Misestipl pl 1 seriously laden with earthy matters ; be cause the shallowness of that river, and of its tributarles, makes it necessary to adopt the lightest possiblo condensing engine, with plain cylindrical bollers, appar rently best fulfils the requisites of successful engineering there. With surface condensation it seems to us not at $\underset{\text { pressure }(o n \text { a check valve for } \boldsymbol{x} \text { inch pipe, the steam }}{\text { C. M. N. }}$ ressing upward on the mound-llke face of said valve) face like a watch crystal. Some time last summer or fall, sald valve, acting as a safety valve, would not work on
account of the stem, which had suddenly become too never had any trouble with it before. Ithink it tis and ting as bad as ever. Please explain. Answer: 1. The pressure per square inch is the same as for a valve with flat face. 2. Examine the valve and stem and you will f trouble. That is what we should find it necessary to do before we could reply to the question asked.
H. P. I. asks: 1. How much water will be discharged per minute by a pipe 41/ Inches diameter from
a source $11 / 2$ miles distant with a fall of 75 feet; and to what hight will water be thrown at the point of delivery be discharged by such a plpe under same circumstances into a distributing reservoir sixty feet high, that is, fifteen feet lower than source? Answers: 1. About 30
cubic feet. 2. About 12 or 15 cublc feet.
H. J. D. says: 1. What is the difference bebollers? 2. Is there any danger in covering steam pipes oll kept from the felting? 3. Is there any danger of spontaneous combustion to be apprehended from waste filled with the petroleum olls, parafln, etc.? Answers: 1. There is no difference in the amount of pressure ex-
erted. Hot water expands the metal of the boller, and closes up sllight leaks, and thus places the boller under
conditions more clesely approaching those of every day use, under steam. 2. No. 3. We are not certain that there would be absolutely no danger. There would cer-
tainly not be nearly as much as if the olls were animal tainly not be
or vegetable.
J. P. asks: With what force will water
falling in a vacuum, from a hight of twenty feet, strike upon every square inch of surface at the bottom? An.
swer: It is generally found to be equal to twice the pres-
sure due to the hight of fall.

 oxygen, $3 \cdot 12$, nitrogen, 1 185, slltcon, $2 \cdot 22$, ash, $8 \cdot 94 ;$ Pen yivanian btuminous coal glves: Carbon, 6882 , volatil S. S
 nche egtieerr, with a usual pressure of 6 libs. When
the engine runs at about 200, the boiler shakes to a fear. ful extent. What makes it shake? Is there more dan. ger or explosion when a botiler shabes than when it
gtand steady? $A$ mawer: 17 as as we presume, the bollter oundation, the boller is probably shaken by the engine the rectprocating parts of which are not balanced for so high a speed. A boller already too severely stralnee
might be exploded by a gevere " " were thrie of those at Pttteburgh, the other day, by the explosion of the fourth.
J. P. N. says: I would like to have an ex-
planation of the sun dogs. In the summer of 1831, In the arternoon, sun about an hour and a half high,, saw two
one on each
alde and on remember to have seen the upper one, nor anything like circle, and the two were not very bright. This morning, February 13, at half past 8 , I observed, for some ten minutes, two bright ones, one on each side of the suz tween them and below was formed nearly a complet circle of pale white light stmplar to a a crrcle around the
che moon. The colors were yellow and orange. Answer
The halo around the sun, called parhella, and the The halo around the sun, called parhella, and the mock
suns are due to the refraction of light occastoned loating solld particles of tee in the alr. Such, at least
M. asks: Is it necessary to keep quicksilver
rom the arr? In connanng it In one of the hollow gle tubes used on steam bollers for water gages, what could
I Beal the ends wtth ?
What tis the red 1 quid used in up th stoppered bottles to keep out the drrt and preven the formation of a fllm of oxide on the surface in warm handed with cure. Where mercury ts employed about
hand le glycerln, $T$ te well to protect tes surface with a 1 lit icohol tinctured with an anlline color.
M. D. asks: What is the best wine made
and its value; and tis it made in Germany or France Please state which is the best produced in the sald coun-
tries, and its value, and the quantity grown tn eacily ountry and France. Champagne 18 a true grape wine, and it
chienty made in France. The statititce of production w an
W. M. asks: In what volume and number ng coliodion published? Answer: it ts easier to give ap beot process for preparing collodion than to hund
ap an old reference. Dr. Van Monckhoven recommend the following: Dissolve 10 drams prroxillin (of no mat
ter what qualty) ti 1 guart each of alcohol pour the liquild tinto a vesel holding 10 quarts of wate pand shake well. The resulting prectpltated pyroxillt
and Is placed upon a filter of musiln, washed and dried, and
is ound to welgh from 5 to 9 drams. This product ts only feebly tinfammable, almost totally soluble tin alco nol, and, even ir obained rom the most inferior gun cot
on, It will produce ery supertor collodion. No matter In what manner the collodion to todized, 1 , 1 consigtency
will remain the same. Iodide of cadmium does not thicken 1, ,as 18 the case ewth ordinary collodion. Nelthe
do lodides of sodum and ammontum make it thiner.
T. L. sends a sample of boiler deposit and
asks how to treat it.
will a a large 1 liter remove it, it bolled before filering? Which shall1 ilter through, har or sort wood shavinge? How shall I remove the scale
from boller, which 18 small? What tis the deposit? Will tadhereto wood? What shalli apply to a ahingle root tomare it less liable to burn in case of tre? Answer:
The tncrustation 18 chleny sulphate of lime with organtc The tncrustation 18 chenty sulphate of lume wth organic
matter. Tannate of soda, to be obtalned of wholesale matter. Tanate or sooa, to be obianned of whiest formation of deposits in bonlers.
C. says: Please tell me the best ingredient
oo make faded halra nice dark brown, without injury to hair or scalp. Answer: We have seen tt stated in German journal that the following hatr dye is entirel armalese, but do not recommend anyone to use this or
any other preparation. Mis 10 parts of the subatitrate of bemuth and 150 parts of g lycerin, and heat In a water bath; gradually add caustic potash solution under contant strring untila clear Hquild is obtained, and the olution or citric acld. K added to make the whole 11quid welgh 300 parts. small quantity of a $a$ solution of an anilline color
can then be put in to complete the preparation. A. L. asks whether the mineral enclosed in Alter is of any vaiue, and of what it is composed S. B. D. says: Please examine the enclosed our peccimens ol minerais and tell me what they are
and of what vulue. Answer: The fragments are too small for satisfactory determination. No. 1 18 calclte;
No. 2 appears to be zlic blende; No. 3 is ferruglinous No. 2 appears to be zlinc blende; No. 3 .
quartz and No. 4 resembles red hematite.
G. E. B. asks how to temper steel shanks
 B. W. C. asks how to find the length of the

F. S. says, in answer to T.C. C. who asked ow to remove eccale aiready formed on the internal sur n your boller to remove scale if it be eniphate or 11me. I perfectiy clean by the constant uise of the sal soda soluR. B. M. says, in answer to D. M.'s question ce on the solder, which contracts with cold and expands rom the tee when it melta. Yourroof ti sereral degree warmer at the apex than at the eave, and hence the snow
from the apex warmed by the tuterna from the apex, warmed by the internal heat, meits; it
congeals agaln at the eave, thus forming an tee dam which opens the soldar and from which the water sets bact an d deaks throughthecrevice. Apply artufclal heat to the eave, or artifcial cold to the apex, so as to have
the eave warmer than the apex. See Patent No. 115,30
dited
J. B. .H. says that H. C. D. Who asked if the
on in feed water (Introduced in exhaust team) will injure a boller, is answered well; " "but I would say tha water and injected will not cause foammag; and if enough is used all the steam will be greas, and the en.
gine will work very nicely with It. I have used $1 t$, nad know a case of fan ola boner, constaerec dangerous fo ell off from all smooth places, but all the crevices and eaks are well illed with hard su
he oil does not soften the scale.


## COMMUNICATIONS RECEIVED

The Editor of the Scientific American acknowledges, with much pleasure, the recipt of original papers and contribution pon the following subjects:
On Boiler Strains. By J. C
On the Nebular Theory and on Kepler's tarmonic Law. By E. H.P.
On the Causes of Boiler Explosions. By . W. M.
On the Transplayting of Trees By M. A.
On the Influence of the Earth's Centra Fires. By H. P.
On the Chemical Constituents of the Hon duras Blood Spring. By O. L.
On the Use of Phosphorus in Medicine By L. J. F.
On Iron Clad Ships of War. By G. J. R.
[OFFICIAL.]
Index of Inventions
FOR which
Letters Patent of the United State February 11, 1873 nd each bearing that date. [Those marked (r) are retssued patents.]

## Bale the,P. K. Dedertck....

## Bed bottom, T. L. Odell \& Hudso

 Bed bottom, Ogborn \& Kendrick Bed bottom, R. Rakestraw Bedstead, sota J. B. H Bell, call, H. Stratton. Bilge water, discharging, J. A. Mille Boller feeder, automatic, s. Cook Boller feed apparatus, R. Berryman Boller fire plate, E. Bolleau. Bonnet frame stiffener, P.C. Ritchle Boot and shoe pegglng machine, E. Woodward Boring machine, I. Cory Box, lunch,, E Box fastening,Bridge, J
Brldge, fron, Hammond, Adler \& Abbot
Bridge, plvot, Clarke, Bonzano \& Griffe Briage, plvot, Clarke, Bonzano \& Griffe
Brush machine, M. Dillon
Brush, paint, M. Dillon
Buckle, harness tug, C. W. Adams.
Bung hole facer, Prosser \& Glllette
Burner, petroleum, J. Law
Bustle, J. H. Hall
Bustle, J. H. Hall.,
Button for garments, A. C. Wilhelm Can, cotton, H. W. Shepard
Can, cotton, H W. Shepard
Csn handle, H. W. Shepard
Candying machine, F. W.
Car coupling, C. S. Bigler.
Car coupling, w. J. Chaplin.
Car coupling, Kennedy \& Diss
Car couphng, Truxell \& Willams
Car coupling, L. B. Wilson
Car, hand, H. L. Brown
Car spring, G. Franklin...
Car wheel, w. Wilmingto
Car brake. S. \& W. W. Balkwill
Car, frelght, B. P. Lamason......
Car, safety truck, B. P. Lamason
Card, हhow, A. H. Diso
Carriage, child's, R. G. Britto
Carrlage step, G. A. Keene.
Carriage dash rall, Noyes \& Stratto
Churn, Borton \& Hartley.
Cloth measure, C. V. Hemenway
cooler, beer, J. Chandless
Corn husker, P. Phlllp
Corn husker, P. Phllp
Corltivator, W. T. Yarker...
Culttivator, $\mathbf{W}$. Taylor
Culttvator, B. Witter
Cultivator, rotary, C. N. Poundston
Derrick, Donald \& Newton.........
Dttching machine, w, T. Hoskins.
Drain, G. R. Moore..................
Earth closet, B. L. Ken
Elevator, steam water, A. D. Brock
EngIne, reciprocating. Simpson \& Gardne
Engine, bed plate for rag
Engine, valve gear, R. McC. Fryer.
Engine cut-ofr, etc., R. McC. Fryer.
Envelope, Kuhn \& Atkinson............
Fence, extension, A. W. Overholser...
Fretilizer, I. M. Reames.......
Files, handle for, H. K. Austin.
Fire Kindler, M. Gernsey.......
Fire extingulsher, O. F. Burton

Fre amm, breech loading, C. M. Spencer Fower stand, A. C. Dakin..............
ruit basket, W. D. Trissler.
Furnace, boller, c. D. Wlllia Furnace, puddiling, E. Lloyd
Furnace, regenerator, H. Frank
Furnace grate bar, R. C. Graves
Furnace, hot alr, H. L. Palmer.
Furnace, metallurglc gas, H. Frank
Furnace, heatIng, S. P. M. Tasker.
Furnace, feeding, D. Morey.
Gas ire log, A. H. Mershon, (1)....
Gas, J. Rigby
Grain blder, S. D. Locke....
Grain cleaner, G. E. Throop
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23,996.-Surgical Splint.-I). Ahl. April 30.
21,034.-Rallroad Frog.-D. D. Lewis. April 30. 24,428.-TRIP HAMMER.-B. Hotchkiss. May 28. 24,451.-Attaching Handle to Pali.-T.Evans. June
21,688.-Boring Machine.-L. Worcester. June 18.

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## 22,812.-Rolling horseshoe iron.-W. W. Lewis.

22,941--Car Spring.-A. b. Davis.
23,01.-WATER Wherl.-N. F. Burnham.
23,02\%.-Molding Cover for Stove.-G. W. Gardncr.
23,032.-Steam Pressure Gage.-T. W. Lanc.
 23,031.-Fire Plug.-J. L. Lowry.

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23,035.-Pressure Gage.-T. W.

DESIGNS PATENTED. 6,885.-LAMP.-D. Ashworth, Kenton county, Ky.
6,386.-CARPET.-J. H. Bromley, Philadelph1a, Pa.
6,387to6,409-SEAWLS.-F. Wink, Philadelphia, Pa 6,387 to 6,409.-SHAWLs.-F. Wink, Philadelphia, Pa.
6,410.-LANDAU SLeig.--J. C. Goold, Albany, N. Y. 6,410.-LANDAU Sleigh.-J. C. Goold, Albany, N
6,t11.-FENCE.-J. I. Healey, Brooklyn, N. Y.

TRADE MARKS REGISTERED 1,123.-Dress Pattern.-W. Cornwell, Philadelphia, Pa.
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 AMERICAN Turbine Water Wheel



## WATER WHEEL


[^0]:    Diefe grobe und tgätige ©laffe unfrer $\mathfrak{B e}^{2}$ bblferung madjen wir befonbers barau aufmertiam, bás unire §firma bura ibre Ber
    
    
     bietet.
    Seder ©rfinder, gleidyiel meldfer $\mathfrak{R a t i o n a f i - ~}$ tät angeğ̈rig, ift burđ bie liberalen $\mathfrak{B a t e n t g e - ~}$ fese ber Bereinigten ©taaten zum ßatentifauk für Erfindungen bereatigt. $\mathfrak{u n i r e}$ Firma if bereit, gefitikt auf 26 jäabrige ©rfajarung, beutifde Erfinber jeber 马eit zu berathen und zu mäßigen
    
    Die Deutide Section ift in ben நäbben fähiger beut ${ }^{\text {dider }}$ Sngenieure, tielide in ber Dffice periöntid mit Erfinberu vertehren merben
    Der „,Scientifc American" wirb in feinen Spalten bie bebeutenberen Erfinbungen be.
    preden.
    Gorrefponbenz erbeten und prompt beant wortet. ßamphlete in beutider ভprade wer. ben auf Berlangen franco zugefanot.

    ## Morefire

    zanul \& ${ }^{\text {© }}$
    "Scientific American" Patent Agentur, 37 part Row,
    ${ }^{\text {Now }}$ York Citr.

[^1]:    T HE Prontily
    
     O MOTHHOUSAND DOLLARSPER
    

