## a Weekly fournal 0f practical information, art, science, mechanics, Chemistry and manufactures.

 Not long ayo we tilling ATTACHMENT FOR LATHEs. it intermediate in the woods, sometimes on the ground, more To make my atcry intelligib e, I would firet alate that am lathes, the dovico of Mr. William P. Hopkins, of Lawrence, frequently in the lower branches of trees. Theg accumulate partial owner of some proptrly on the Oregon coast, on

Mass. The same inventor bas also produced another attach. ment for the same machine, the object of which is to cut gears. The work is operated upon by a cutter turning upon the centers of the lathe, and is held and governed by the means represented in the illustrations'and described below.
$A$ is the arbor box, in which freely turne a hollow spindle, B. Through the latter passes a tapered arbor, C, on the upper and larger extremity of which the gear wheel to be cut is secared. Fastened to the hollow spindle by means of a set screw, and hence rotating with it, is the index pulley, D. Attached to the arbor box is an arm in a slot, in which travels an index point, E, connected with a suit. able epring, which holds its extremity in any of the orifices on the pulley, $D$, to which it may be adjusted. Several rows of different numbers of these apertures around the pulley, D, provide various graduations; and from the pointer, E, traveling frutly along its slot, it may be rtadily placed over any desired row. When one groove or space is cut in the work, the pointeris lifted from the orifice, and the pulley turned, carrying with it the arbor spindle aud its attachments until he next hole is met and entered by the ildex poirt. The number of bol-s in each row is marked upou the face of the alide clasp, F, directly over each serits of apertures. The clasp slides entirtly around the circumference of the index pulley, and can be used to matk the number of holes passed uuder the index point, serving the pur common gear cutting machines.

The device may be attached
as represented, or boltt $d$ on top of the tool post block, when the point shaft box alides down below the angle iron frame. By means of the worm and segment, shown in Fig. 2, the pivot sbaft may be rotated, so setting the attachment at any angle for cutting any variety of araight or bevel gear. The long set screw, $G$, serves to adjust the elevation of the device, and the remaining adjustments are obtained upon the ordinary luthe ments are obtained upon the ordinary lathe rlow indle upon which tro indez pulla is hollow spindle upon which trie index pulley is fastened can be removed, and a solid one sub. is fixed. The latter may be used for a variety of purposes with convenience and advantage.
The index pulley has 28 different graduations, and with two pullys any graduation under 100, axd all even numbers up to 130, can be cut. A emall level cn top of the irdex pulley indicates the proper adjustment for straight or epur gears. The construction of the device, we are informed, is of the most caretul descripion, well calculated to insure durability and $\epsilon$ fficiency
The apparatus may be seen at this office, and fur her particulars may be ohtained by addreasing the inventor as above. Patented September 30, 1873.

The California Wood Rat.
In a recent number of the American Journal is an extract of a letter from Mr. A. W. Chase, U. S. Cuast Sarvey, concerning the habits of the so-called California wood rat. It is a little larger than an ordinary Norway rat, dark brown in colcr, with large lustrous eyes, and a tail covered with thin hairs. I should call


HOPKINS' GEAR CUTTING ATTACHMENT FOR LATHES. Whicha saw mill had been placed but which, owing to varions cauces, has never been in opera tion. On this property was a dwelling house for the hands, in which, on work being oiscon. tinued, were stored a quantity of stuff, toole, packing for the en gine, fix or seven kegs of large epkes; in the closets, kDives, forks, epoons, etc. A large cook ing stove was left in one of the rooms.

This house was left uninhab. ited for two years, and, being at some distance from the little settlement, it was frequently broken into by tramps who fought a shelter for the nigbt. Wben I entered this house I was aston. ished to see an immense rat's nest on the expty soove On examining this uest, which about five fect in hight ar upied the in hight and stove (a large whols top of the the outside $\begin{gathered}\text { ravge). I found }\end{gathered}$ the outside to be cimposid en tirely of spikes, all laid with aymmetry so as to present the points of the nails outward. In the centre of this mass was the nest, composed of inely divided fibers of the hemp packing. In terlaced with the spikes, we found the following: About three dozen knives, forks, ard Three dall the buther, ar epoonf, all the butcher kdives, three in number, a large carving knite, fork, and ster ; several large pluge of tobacco; the out side casing of a silver watch was disposed of in one part of the pile, the glase of the trme watch in another, and the works in still auother; an old purse containing some silver, matches, and tobacco; nearly all the smal tools from the tool closete, amon them several large augers. Altogether, it was a very curious mixture of different articles, all of which must bave been trinsported some distanco, as they were originally bered in different parts of tbe houre.
'i'he ingenuity and akill displayed in the construction of this nest and the curious taste for articles of iron. many of
 them heavy, for com ponent parte, struck me with surprise. The articles of value were, I thiuk, stolen from the men who bad breken into the house for temporary lodging. I have preserved a aketch of this ironclad nest, which I think unique in natural history.
Mary curious facts have since been ralated me, concerning the habits of this little creature. A miner told mo the following: He once, during the mining excitement in Sekyiou coun'y, became in California parlanco "dead broke," and applied for and obtained employment in a mining camp, where he one all in these me Shortly afer his arrival amall articles commenced or if a o disappear, if a whe plog or tobacco were left on the table, it would be gone in the morsing. Finally a bag, contairing one hundred ur more dollars in gold dust, was taken from a small table at the head of a "buck," in which one of the proprietors of the claim elept. Suspicion fell on the new comer, and he would perbeps have fared haidly; for, with those rough mintra, punisbment is short ard sharp; but, just in time, a large rat's nest was discovered in the garret of the cabin, and in it was found the mipsing moner, as we'l as the tobacio and other articles supposed to have been stolen.

Steam on our canals ceems to be an accomplished fact. Six boats are now plsing on the Erie cadal and twelve others will ehort y ba adda, all capable of makiog the trip from $N$ w Yosk to Butia!o in five oays. It is belif ved that tbe graintrede of the fall will be considerably affected by the increased cheapnees of transportation.

## Sricntifir Ammriran.

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ANOTHER GREAT FIRE IN CHICAGO, AND THE MATE
RIALS ACCUMULATING FOR ONE IN NEW YOEK.
Chicago was visited, on the 14th ult., by a second great fire, which deraetated about eigateen boocks of buildinge and eutailed a loss estimated in the neighborhood of two millions of dollars Tooug, falling far short of the confla gra ion of 1871 in ite dinastroas effects, this visitation ba bean the means of revdring thnueands of people homeless Uul $k+$ ite pr-decessor, which destroyed some of the faires portions of tue city, ic was mainly coufined to rookeries and dens, in $\|$ e obliteration of which the community is rathe the gainer; but, as is the cule in such quarters, the popula tion was dease, and consequently the numhers deprived of shelter are greater than would be the case had other parts of the town been burned.
Tuere is evidence of mismanagement of the fire depart ment, to whic: is probably owing the non extinguisbment of the fire at an earlier period. Etgites were posted bebind the flames instead of in their path, and attempts at blowing up buildings were miserably unsuccessful, owing to lack of powder, a state of a.fairs difficult to comprebend. To one good substantial fireproof building, the safety of almcst the ontire city is due. The blaze lapped it all around, tut ite marble walls stood graidly; aod tuen, as the fire attempted to crawl over it, the flames grew weaker and were beaten back by the ficemen on the oth r r side One honeet atructure was the savior of millions of property; and the builders of the metropolis may well take the fact to heart.
N w York, at this moment, farrly invites the fate of Bos ton, Portland, and Chicago. Buildings are beiog run up to bights to which water by the fire engines cannot be thrown There are wooden structures ia close proximity to some o the grandest edifices; there are blocks upon blocks of tene mente filled with swarms of poople, the majority of whom, from poverty, use kerosene in place of gas, and in which a great fire, once started, would work terrible ravages. In ur up-town streets, houses shoot up half a dozen at a time ogether, a mass of the thinnest possible walls and kindlin wood beams and fittinge, built to sell and to realize a big in terest on capital, without any regard to the simplest precau tions in favor of safety. We bave an admirable fire depart ment, to the prompt exertions of which our immunity thus far is mainly due; but if circumetances combine to engender a great fire, as in both cases in Chicago, it will be througb the mercy of Providence, and not through our own foresight if we escape a terrible visitation.

## CHOLERA AND ITS TREATMENT

In view of the general uneasiness which reports of appe ent cases of Asiatic cholera, as they recur, will tend to engender, a little volume before us is of timely interest, inasmuch as it not only gives valuable information regarding the origin, symptoms, and nature of the disease, but also points
out. probably, the most efficarious metbods for its cure. The book, which is entitled "Observations on the Pathology and Treatment of Cboler a" (G. P. Putnam's Sons, New York), has been written very recently by Dr. John Murray, Inspec tor General of Hospitals in Eg gland, and late of Bengal; and it aims to give the result of the author's forty years' experience during a residence in a country crdinarily considered as the hotbed of the direase.
Cholera is caused, we are told, by the presence of the poifon in the system, and until this is removed health cannot be regained. The first etage of the disease, malaise, is frequently unnoticed by the patient, and it may be produced by many causes independent of cholera poison, such as overexcitement, fatigue, depression from misfortune, and similar physical or mental conditions. Hence, while such symptoms, under ordinary circumstances, need excite no especial apprehension, still, if the patient has been in contact with cholera cases, or in the neighborhood of an infected region, they should be regarded as the signal of approaching danger and carefully treated. The system should be relieved, and the blood purified without causing diarrhœea.
Improper food, over fatigue, and purgative medicine, the last especially, tend to develop the second stage, which varies in duration from two or three hours to two or three

The evacuations become watery and colorless, and the effect is to predispose to collapse. The great danger is from the purging increasing and becoming uncontrollable. The remedy which the author prescribes is cymposed of opium one part, black pepper two parts, and assafertida three parts, divided into five grain pills, and given with a little cold water after every evacuation. These pills are used all over India and distributed to the troops. Astringents Dr. Murray condemns as useless, if not injurious, and he adds that chalk mixture, infusion of capsicum, camphor in alcohol, and simi lar compounds are not to be relied upon. It should be rememoered that it is at this stage of the disease that the infection is communicated, and hence disinfectants should be freely used with the evacuations. The diet should admit of no solid food unless farinaceous, such as bread, arrowrooand sago. Exercise in fresh air is desirable, but fatigue is angerous.
The following stage is collapse ; and as, when the disease is thus far advanced, danger is imminent, treatment becomes most difficult. It would be impossible, with the space here at our command, to follow the author through the varinus aymptoms laid down and the remedies advised. He
describes the stages generally under three heads: The first incipient collapse, where there is a great prostration of trength; but the voluntary life of the body is active, and te involuntary life only partially suppend.d. The treat ment bere recommended is in great measure expectant, to eain time to allow Nature to eliminate the po'son through the indioidual secretnry organs. In the second or confimed degree of collapse, voluntary life is impaired and involun tary life 18 flickering. The treatment advocated consists in aaliative cold dinks, he saline enemata, and strong mus $f$ a small quantity of quinine to the water adminintered is aeful, and the apperace bla in the ovacuaion is the first sign of hope. In thẹ laet form of collapse, the powers of voluntary life are very low and thone of involuntary life re paralyzed. The bope of recovery is very faint, and ther no remedy on which reliance can be surely placed.
Dr. Marray devotes the larger portion of his work to the consideration of collapse, and also to the discussion of the after effects of the disease during convaleacence. In refer ring to hospitala, he says that those best suited to the dis ase are small buildings on open ground, well drained, and in the vicinity of trees, if possible. Huts may be used with rrat advantage, and should be located in the center of the pfected district. In conclusion, the necessity of deciding on the best course to pursue before an epidemic actually occurs is urged upon local health authorities, as, when the disease app are, excitement ensues, and often confusion, amounting to panic.

THE INSPECTION AND INSURANCE OF STEAM BOILERS
The recent amendment of our. $S$ :ate law of boiler inspection making the certificate of inspection iesurd by any company authorized to insure steam bjilers equivalent to an official certificate gives occasion for more than a pasping interes in the management of this department of the insurance busi Dess.
What is the basis of the business? How is the work car ried on? And why should the parties engaged in it be ac cepted as trustworthy agents of public safety within the scope of their business operations?
In response to inquiries of this sort, the Hartford Steam Boiler Inspection and Insurance Company, the leading as well as pioneer corporation of the kind in this country, have courteously laid before us, for the information of our reader full details as to the methcd, purpose, and practical results $f$ their work.
That the use of steam power is fraught with danger is only too well known; the extent of the danger, however, as ndicated by the number of explosions every year and the loss of life and property entailed, is but vaguely appreciated by the public at large. No offcial record is kept of such ac cidents, and only those of exceptional interest are reported in the newspapers; neveri heless the number so reported and brought to the notice of a aingle individual during the past five years is but a little short of six hundred, causing the death of 1,329 persons, and the wounding of upwards of 1,500 more! The amount of property desiroyed cannot be told: any one knowing the destructive character of boiler
explosions will understand that it could not have been mall.
Against losses of this character, ordinary insurance offers no indemnity, since the destroying element is neither fire nor water, though both have something to do with it. The need of a special system of insurance to cover these particular risks was early appreciated by steam users in England; in this country it remained unmet until 1866 , when the company above named went into operation.
Unlike other forms of insurance, this does not undertake merely to indemnify the policy holder for losses of the special nature embraced in its plan of operation, but to prevent such losses by a watchful care of the property ingured. Its endency is therafore quite the reverse of ordinary insurance in that it lessens instead of increases the likelihood of "ac. cident."
Boilers do not explode without cause, which cause, in the great majority of cases, may be detected in its incipiency by proper inspection, and the risk removed by timely repairs. It is in this department of its work that the company becomes an unofficial guardian of public safety: a prime condition of every policy of insurance being that the company's inspectors shall at all reasonable times have access to the property insured, and be afforded every facility for a case defects are discovered at any time, in any way affecting the safety of the boiler, the assured is bound to correct the re ail at once, or the policy dies. Skould the owner chcose to assume his own risk and refuse to make the needed repairs, the company's inspector is required to notify the otficial inpector for the district, who alone has power to compel the disuse of the dangerous boiler if in his judgment its condemnation be just. This, however, is a purely imaginary case,no instance having thus far occurred of a policy holder slight. ing an ingpector's suggestions, or declining to correc! defects to which his attention had been called.
A brief statement of the work done by the company's thirty inspectors during the past year, with the number and kind of defects discovered and corrected, will give a rough idea of the character and usefulness of its work
The number of inspections made was within two of twen. ty five tbousand, more than a third of which were thorough internal inspections, including external examinations of tubes, flues, and fire sheets, internal and external of the bracing and staying, and the condition of all bailer attach ments. The number of defects discovered was 11,988 , of which 2,892 were regarded as dangerous, that is, of such a character that an accident was liable to occar at any moment. In 178 cases boilers were condemned outrigbt, as so com pletely worn out or injured by carelessness as to be beyond repair.
In detail the defects may be classed as follows: Furnaces out of shape, with sheets contorted and buckled, 599, dan gerous, 124 ; fractures, 1003 , dangerous, 459 ; burned plates, 682, dangerous, 291; b istered platef, 1,737, dangerous, 298 cases of deposits of sediment, 2,263, dangerous, 227; of in rustation or scale 2,180, dangerous, 205; of external corro ion 818, dang-rous, 163 ; of ioternal cortosion 333. danger oup, 93 ; iutertal grooving 206, dangeroup, 47 ; defective water rages 561 , da ogerous, 96 ; defective blow out apparatus 253 angerous, 83 ; overloaded or defective safety valves 321 , iangerous, 1 C 7 ; defeciive pressure gagee 1,470, dangerous 280 , the extremes of varia'ion from a standard gage being from minus 57 to plus 50 ; boilers without gages 682, dan erous, $6 \cdot$; deficiency of water 113 cases, dangerous 69 ; case f loos-and broken braces and stays and insulficient brac ing 465, dangerous, 230
Who can estimate the amount of peril to life and property obviated by the discovery and timely correction of theee welve thousand defects and deficiencies?
The fidtlity and skill with which the inspectinns were made during this and preceding years, as well as the correct ers of the theory on which they were bast d-a theory which gives small space to the mysterious in accounting for boile expence of serious accidente in contection with the thousen of boilere of all sorts and conditions that are or bave been in the company's care. In two cases only has life been loet by the explosion of such boilers, the victim in one being the driver of a locomotive, in the other the engineer in charge of a stationary boiler which exploded for some cause that baf led detection.
Of course it is impossible to say that any others would cer tainly have exploded if left in the condition of the uninsured and less frequently inspected: still a glance at the museum of boiler defects collected by the company's inspectors would convince the firmest believer in protecting providence that without their intervention, nothing short of perpetual mira cle could have kept some of the diseased subjects from sud den and violent ends.
Further evidence of the value of the company's inspections is given by the increasing appreciation of them by steam users. To a very large extent the inspection and ap proval of the Hartford Steam Boiler and Insurance Company is made a condition without which a boiler will not be ac cepted; while many leading boiler makers have all their work thus iospected, the company's certificate going with each boileras a guarantes of its soundness and proper contruction.
So far the business affects only boiler makers and boiler users The late legislative enactment makes the community at large a party also, in that it practically entrusts the public safety within certain limits to the care of the insuranoe companies. It is but right and natural that the public hould ask why and wherefore
The amendment was passed in response to a petition very
numerously signed by the leading manufacturing firms of tificate. In Pruspia, the patent officials manage to interpose the State, the reaeon offered ther for b-ing substantially that the conditions of infurance implied a full compliance with the spirit of the law, the sole object of which was to lessen the danger of boiler explosions, by periodic inspections and the restriction of pressure within safe limits. To this extent the object of the Hartford Steam Boiler Inspection and Insurance Company is the same. The end and aim of the law being thus attained, it was urged that the insured might, under proper restrictions, be justly and saf. ly exempt from the charges and delays incident to official inspections. The legislature wisely saw the point and the amendment was adopted.
Wesay wisely, since, without impugning in the least the honesty and ability of the inspectors appointed by the government, it stands to reason that the supervision of parties having a pecuniary interest in preventing explosions, and restrained by no care for the cost of making doubtful property safe and sound, will be quiteas rigid and exacting as that o the goverement, which assumes no such liability. Equally reasonable is it to expect that the agents of an insurance company, directly responsibla in the premises, will be quite as carefully selected for integrity and special fitness for the work as the appointees of that transitory and irresponsible thing we call the government; and the inspectors so chosen will also be quite as likely to be free from corruption or favoritism in fixing the limit of pressure or in overlooking defects, the inspector's personal liability for damage by ex plosions being the same in one case as in the other.

We have referred incidentally to a feature of the work of the Hartford Steam Boiler Inspection and Insurance Company which, though not a necessary element of their scheme, is one which bids fair to prove of great benefit to steam users, and consequently merits a somewhat fuller notice. It is the study theofficersare making of what maybe termed the pathology of steam boilers. Every application for insurance is accompanied by an inspector's report describing the boiler and its attachments in detail, and giving full particulars as to the setting and construction of the boiler, its age and maker' name, the kind of fuel used, the source and quality of the water supply, in short everything affecting in any way the durability and safety of the property. These facts are en tered in a record book, and supplemented by the facts sup plied by the monthly inspection reporteso that the history of every boiler with its attachments can be ascertained in a moment. In this way boilers are taken as they are used, the practices which obtain in different parts of the country are compared, the effects of different kinds of fuel and wate are studied, together with the various safeguards and correc tives employed ; the working of different gages is observed under all sorts of circumstances, in fact all the fruits of widely extended and thoroughly aysteratized observation are brought to bear on the question why boilers explode, and on the practical problem of preventing explosion. It is impos sible that such an accumulation of knowledge in regard to the wear and tear, the weakness and dangers of boilers should not ultimately lead to practical results of the highest utility.

## PATENT OFFICE JUSTICE.

In the matter of the interferenç case batween H. H. Bige low and S W. Baldwin, before the Patent Ofice, the Com mispioner of Patents, acting as it appears illegally, refused to permit the case to go before the Examiner in Iotirferences, who is the special officer desigaated by law for the hearing of such mattera, thus preventing a fiual decision as to the question in dispute. Mr Bigelow thereupon applied to the Suprem ${ }^{\text {Court }}$ of the District of Columbia, for a mandamus to compel the Commissioner to do his duty. Judge Carter, after a full hearing of the case and of the excuses of the Commissioner, concluded that a mandamus muet issue. The Court decided that the examiner in charge of interferences in the Patent Office is exclusively authoriz ${ }^{\circ}$ d by law to $\in \mathrm{x}$ amine all cases of interference, whether between two pend patent and an unexpired patent, and primarily to determine the question of priority of invention involved in either class of said applications; and that the Commissioner of Patents is bound by law to direct said examiner in charge of inter ferences to proceed to determine the said question of priority in invention.
Applicants for patents will necessarily be subject to delays, expenses and troubles, so leng as the Patent Office, with its battalion of examining officials and assistants, four hundred in all, are permitted to act as inquisitors of inventors. Questions about the novelty of inventions and rights of priority between claimants must, under the American system, be entora to so many troubles at the Patent Office, before they can reach the courts. The Bigelow case is only one of many others. Had this applicant been a poor man, as the majority of inventors are, he probably would have been unable to lose time upon the case or spend money to pay lawyers in arguing for this mandamus; and the adverse whim of a Patent Office official would have stood as a permanent bar to his suit. What is needed is, to eliminate all such objections from the patent laws, and make it the simple duty of the Patent Offics to issue a patent to every applicant who chooses to ask there for, on presentation of suitable documents in proper form, leaving all questions relaling to the validity of patents to the courts of law for settlement. This is the common practice in nearly all other countries in the world, and is found to work well. But in Prussia and the United States, the inventor is obliged to submit to the costs and annor ances of official inquests before he can obtain the patent cer


#### Abstract

so many preliminary objections that nearly all applications


 for patents are rrjected, while the government retains the money paid. In this country we grant more patents, but we nevertheless inflict upon inventors an immense amoun of useless trouble, before issuing the certificate. Our Patent Office officials would consider their occupations gone and themselves of no account in the world if they were not privi leged to hunt up objections to excite and harrass the appli cants for patents.
## POLITICS IN THE BEEHIVE.

The ilyllic picture of divinely appointed harmony, drawn by naturalists of the old school in describing the social eco nomy of bees, is sadly disturbed by the prying observation of modern students. Instead of being models of industry and virtue, each and all, some of them, at least, prove to be no better than the rest of us, given to political dissensions liable to bully royalty itself, and-tell it not to Watts-pre ferring theft to honest labor
Lubbock has cast a grave doubt over their vaunted wis dom, and now Fritz Müller discovers that their virtue is as dom, and now Fritz Muller discovers that their virtue is as
little to be depended on as that of our most pious statesmen. Happily they are not our bees that misbehave so badly, and it is only for Brazilian bees that the poet's verses will have to
be amended so as to read: be amended so as to read

How doth the naughty little bee
Improve the
Improve the shintng hour?
And never seeksor every da
something to that effect.
There is one species (trigona liomâo), as Mr. Müller writes to Charles Darwin from the province of Santa Catharina, Bra zil, which never appears to collect honey or pollen from the towers. "It robs other species of their provisions and some times takes possession of their nests, killing or expelling their owners. The hives in my garden have often been in vaded and two of them destroyed by these robbers; and have seen in the forest several nests, formerly inhabited by other species, occupied by them "
Mr. Müller is making extended observations on the severa pecies of these stingless honey bees, and expects, after a few vears of study, to be able to give a tolerably complete ac count of them. The observations he has already reported hough briefly, give cause for expecting valuable as well a ateresting results at his hands. On one occasion, for in stance, he "assisted" at a curious contest well worth report-
ing, for the light it throws on the intellectual faculties and he political or social habits of the bses. It occurred between the queen and the worker bees in one of his hives of trigo a minim whose peculiar custom it is to construct the cells in which the young are raised around the circumference of the two or thre uppermost combs; when the cells are fin ished and filled with food for the grubs, the queen laya an gg in each, whereupon it is immediately shut. A set o rty-seven cells had been filled, eight $n \mathrm{n}$ a near, comple'e omb, thirty-five on the following, and four around the firt ell of a new comb. "When the queen had laid eggs in al heir whether she bas not forgotten any cell), and then prepared to retreat into the lower part of the breeding room. But a he had overlooked the four cells of the new comb, the work ers ran impatiently from this part to the queen, pusbing her in an odd manner with their heads, as they did also othe workrrs they met with. In cons quencs the queen began gain to go around on the two older combs, but as she did not and any cell wanting an egg she tried to dercend; but every where she was pushed back by the workers. This contest astel for a rather long while, till at last the queen escaped knew how to advise the queen that something was as yet to be done, but they knew not how to show her where it had to be done.'
Possibly the queen had some glimmering notions of royal prerogative, and did not choose to be quite so forcibly ad vised by her subjects, who appear to have been a turbulent
lot at best, since it was in this hive tbat Mr. Müller found ot at best, since it was in thịs hive tbat Mr. Müller found two diesenting parties among the workers quarreling about
the construction of the combs, and even going so far as to destroy each other's work.

## THE LOCUST IN MINNESOTA

The visitation of locusts in Minnesota has proved a seriou calamity. The total damage, thus far done, consists in loss of about one twelfth the usual crop, or about the same as if the average yield throughout the State were diminished lagueerthals bushels below the cultivated area of the State, and involves about one thirteenth of the population. The insects, we notice, are universally styled "grasshop pers," which is incorrect, although the mistake, owing to the confusion of names, is a natural one. The principal points of difference between the locust and the grasshopper con sist in that the latter is usually of a green color and is more active by night than by day. Graeshoppers, moreover, do not associate together nor migrate in large numbers, while their flight is short and unsteady as compared to that of the locusts, beside being noiseless. The locusts which have ap peared in Minnesota are, when full grown, of aboutan inch and a quarter in length, and of a dusky grayish color, the heads being reddish and the under winge, when spread, of a coppery hue. The eggs are gray,ovate,and about as large as a wheat corn, and are deposited in clusters in the ground and under the grass and stubble. When hatched, the insects seeking other pastures. A Minnesot sen rise in vast clouds,
ered severely from their ravages, in writing to the Minnfapo is Tribune deseribes a throrg of the locusts as resembling a huge snow cloud, often completely obiiteraing the sun The lower ineects fly at a hight of about forty feet from the ground, and the others fill the air above as far as the eye ca reach. When they settle on a field of grain, every stalk is covered, so that the entire field reams to have suddenly turced brown. They do not eat the grain but bite into the tender stock and juicy kernel, and suck out the vital sap, leaving every particle of vegetation dead, so that within a day or two the entire crop becomes dry and withered. Their appetite seems especially directed toward garden stuff and grain, but frequently the voracity is such that every living reenthing is devoured before they rise.
Minnesota farmers assert that there is no remedy. Fall fires do no good and water and frost are without effect. fires do no good and water and frost are without effect.
Plowing up the ground where the egge are deposited or Plowing up the ground where the eggs are deposited or
burning over the grass where they are laid during the burning over the grass where they are laid during the
spring, it is believed, are the best known preventives. The worst enemy of the locust, however, eeems to be a little red arasite, which gets under its wings and gnaws into the ver itals of the insect. Dead locusts are found covered with hese worms. Various portions of Eirrope and the north coast of Africa have suffered greatly from the plague both recently and in the past. In France, during May and June, when the insects first appearin the fields, all the women and children turn out to hunt them. Four persons grasp the corners of a sheet, two in advance holding their ends close to the ground and the couple in rear elevating their corners, eo that the sheet is held at an angle of $45^{\circ}$. In this position, the cloth is carried over a field several times,the in sects being forced to rise, when theyfall upon the shee and thence are tumbled into bags. Some idea of the im mense numbers of the locusts which may thus be destroyed may be gained from the fact that a single peasant, with a entomologist's small net, has befn known to capture 100 pounds of insects in a day, equal to about 89,000 egga de atroyed.
The Arabs driveoff locusts by making great bonfires, producing large quantities of smoke In Algiers, the most effective plan is said to be spreading large nets over the inects early in the morning after they have become gorged and inert through feeding, and then collecting them in bag and bury them in lime. Leaving the dead bodies on the round is apt to breed infection Harrowing over the fields where the females lay the eggs, seems, however, to be widely followed plan of destruction, as, if the egge be scat ered, the sun soon dries them up. Birds and toads are ex ellent auxiliaries in disposing of the eggs after a field ha thus been gone over.

## FOUR HUNDRED AND FORTY-FOUR MILES, AT OVE

FORTY MILES PER HOUR, AND THREE STOPS
An evident improvemont in the direction and appoint ments of the principal American railways is in progress, an xample of which is eeen in that porticn of the Pennsylva ia Railway between New York and Pitteburgh. The road is provided with 60 lbs. steel raile, oak ties, broken stone ballast, and the best splice joints. Tue bridge work is of the most substancial cbaracter, the superstructure is amooth and olid, the carsand locomotives superior in construction, a the latest appliances for safety being likewise supplied, such as Westinghouse air brakes, safety platforms, switches, block elegraph signale, etc.
The run of 444 miles from Pittsburgh to New York is made in eleven hours, with only three stops, being an ave rage rate of over 40 miles an hour, as follows: Pittsburgh to Altoona, 117 miles, stop 5 minutes; to Harrisburgb, 132 miles, stop 20 minutes; to Philadelphia, 105 miles, ftop minutes; thence to New York. 90 miles. The locomotive dip up water from side troughs at certain stations witbout stoppage. The trains are comprised of maynificent Pullman parlor cars. It wou'd be difficult to name any stretch of railway in the world, of equal length, where passengers ca be more expeditiously and luxurionsly carried.
The railroad mileage of the United States now exceeds the combined mileage nf all Europe, although the population of Europe, 282,000,000, is seven times greater than that of this country. Every year adds to the improvement as well as the length of American roads. How to make our railway better and safer is the constant study of the legion of en gineers, inventors, and managers who are connected with them. The practical results of their labors will be naturally manifested in gradual changes for the better in all branches of railway service.

The Annual College Regatta.
The annual regatta of the principal colleges took place this ear on Saratoga Lake, N. Y., July 18. The winning boat was that of Columbia College, New York, which came in two boat lengths ahead. Time 16 m .42 sec . Distance bree miles. Wesleyan was second, and Harvard third The colleges which contended were Trinity, Princeton, Cor ell, Yale, Harvard, Wealeyan, Columbia, Dartmouth, and Williams. The attendance of spectators was very large, and much enthusiasm prevailed.
Phosphorus Bronze.-Some of the brands will bear a con siderably greater breaking strain than steel itself. It ap ears, also, to be auitable for sheathing ships, since, whe mmersed in sea water, it loses scarcely more than one third as much as is lost by the best sheet copper.
Mineral oil may be detected by ite property of imparting fuorescence to animal or vegetable oils, and by its aromatic by its giving a d by the pure oil.

THE MEZZANA-CORTI BRIDGE OVER THE RIVER PO. tice has any tendency to shorten life, although as the diver there are rare instances of men who are able to stay below We extract from L'Illustrazione the annexed engraving of approaches forty he is less able to compote with his younger eighty seconds. The diver (naked of course), with an open an iron railway bridge, which extends across the river Po, and more vigorous brother. The time during which a Sy- net around his waist for the reception of his prizes, seizes near Mezzana-Corti, Italy. It was constructed for the South rian diver can remain under water depends, of course, on his with both hands an oblong white stone, to which is attached ern Railway Company of Italy, by Mesars. Gouin \& Co., of age and training. Sixty seconds is reckoned good work, but a rope, and plunges overboard. On arriving at the bottom Paris, and its total length i ,310 106.2 feet teach spans of $196 \cdot 2$ feet each, sup ported on nine piers and two abutments in masonry. It is constructed for a double line and the upper part of the iron girders supports a carriage way 8.8 feet in width. It is calcu lated to support a load of $11 \frac{1}{2}$ tuns per 32 fett running, be sides its own weight. The total quantity of iron employed was about $\overline{5}, 706$ tuns.
The foundations for the piers and abutments were sunk by the aid of wrought iron caissons closed at the top and charged with compressed air. In putting in the foundations, the excava. tions had to be carried down some 67 feet tlirough the gravel, and even more, below the level low water, so that the work was necessarily prosecuted under very considerable pressure. The caissons were eventually filled with concrete, and they remain as permanent portions of the work.
The superstructure consists of lattice girders connected at their tops and bot:oms by plate iron girders, the lower series of the latter supporting the double line of rails, and the upper series carrying an ordinary roadway, having foot ways on each side formed over the flanges of the main girders. The two main girders of each span are $24 \cdot 6$ feet deep between top and bottom flanges, and they are placed at a distance apart, transversely to the line of the bridge, of $27 \cdot 26$ feet from center to center. The lower cross girders are connected by short intermediate longitudinal girders extending between them, under the timbers on which the rails are placed. The crose girders forming the upper series have a sligltty arched form on their upper sider, and they are connected by longitudinal timbers on which the planking forming the road way is laid. The clear hight from the rail level to the under sides of the upper cross girders is 17.8 feet, and the latter are well connected to the main girders by strong gusset stays. The bridge was completed in 1866

The Syrian Sponge Divers.
The English Vice Consul at Beyrout, in a report to bis govornment, gives some interesting particulars regarding the sponge tisheries. The industry, as prosecuted upon the Syrian coast, yields sponges to the value of $\$ 100,000$ annually, and employs about 300 boats and $1,500 \mathrm{men}$. Although they vary much in quality and size sponges may quality and size, sponges may fine white bell sbaped sponge, fine white bell sbaped eponge,
known as the toilet sponge. 2. known as the toilet sponge. 2.
The large reddish varity, known The large reddish varitty, known
as sponge de Venise, or bath sponges. 3. The coarse, red sponge, used for household purposes and cleaning. Two tbirds of the produce of the Syrian coast are purchased by the na tive merchants, who send it to Europe for sale, while the remainder is purchased on the spot by French agents, who annually visit Syria for the purpose France takes the bulk of the finest qualities, while the red dish and common sponges are sent to (Fermany and England Diving is practised from a very early age up to forty years, beyond which few are able to continue the pursuit It does not appear, however that the prec
the stone is deposited at his feet, and, keeping hold of the the stone is deposited at his feet, and, keeping hold of the
rope with one hand, the diver grasps and tears off the sponges rope with one hand, the diver grasps and tears ofrt the sponges
within reach, which he deposits in his net. He then, by a series of jerks to the rope, gives the signal to those above, and is drawn up.
gOLLING BRIDGE BETWEEN ST. SERVAN AND ST. MALO The towns of St. Servan and St. Malo, in France, are situ ated on either side of the river Ronce, or, more strictly, of the arm of the sea into which that river empties. The tide is here subject to great fluctuations, retreating so that the bed of the estuary may be crossed on foot, and again rising to a hight of several yards. The mode of crossing the stream, until the construction of the curious bridge repre stream, until the construction
sented in our engraving, con. sented in our engraving, con-
sisted in taking a wide détour sisted in taking a wide détour
to a point where an ordinary bridge spanned the river, o else in using boats. To avoid such inconverience as we have referred to, M. Leroyer, town survegor of St. Malo and ar chitect to St. Servan, designed and had constructed the bridge we illustrate. It consists of a platform supported on wheels, which run on rails laid on the bottom of the estuary. The platform is supplied with ac platform is supplied with ac commodation for horses and vehicles at either side, anu two
classes are provided for passenclasses are provided for passen-
gers, the fares being one and two cents respectively. The platform stands level with the quay at each side, so that nothing is more easy than access to it ; and, as our illustrations (from L'Illustration) show, it is worked at all states of the tide with perfect fafety. One of the engravings represents the bridgetraveling on its ways a low tide, and the other, crossing theriverwhen the water is high rhe bridge appears to be ex
ceedingly popular with the inhabitants of St. Malo ard St Servan. It is novel in design, and reflects no small credit on M. Leroyer.

## THE DEGERFORS IRON WORKS, SWEDEN.

There is a marked contrast between the relations of em ployer and employed in Sweden end the similar relations existing in England and the United States. In both Eng-lish-speaking countries strikes and lockouts are rather the rule than the exception. Master and man are arrayed on opposite sides, each seeking to get the better of the other, and neither attempting in any very appreciable degree to lessen the existing antagonism. In Sweden, exactly the reverse is the case. The practice so earnestly advocated and followed in the past by the man most prominent in the de velopment of the iron industry of the country, of regarding his workmen as living fellow beings, and not as mere machines from whom the utmost labor possible must at all


ROLLING BRIDGE AT ST. MALO, FRANCE, AT LOW TIDE.
by a large turbine of 800 horse power; two shearing ma by a large turbine of 800 horse power; two shearing ma-
chines for plates and bars, to be worked by steam power; chines for plates and bars, to be worked by steam power;
and a 4 tun steam hammer; with additional founderies and and a 4 tun steam hammer; with additional founderies and
repairing shops, etc. Since the union of the two works, the repairing shops, etc. Since the union of the two works, the
upper and lower Degerfors, under one administration, both upper and lower Degerfors, under one administration, both
the waterfalls have been united, by the construction of a canal, giving a combined total fall of 25 feet, and producing a water power of 1,400 effective horse power, utilized in the operations of the works; this, however, is estimated to be only about one third of the total effective hydraulic power of the river Leth elfven, which exceeds 5,000 horse powera truly magnificent prime motor and basis for industrial operations.
The finished products of the works for the last year of operations, 1873, amounted io operations, 1873, amounted it
5,000 tuns; but of this total 5,000 tuns; but of this total
quantity about 2,000 tuns were rolled for and on behalf of other ironworks, as yet unprovided with rolling mills of their own. Of the remaining 3000 tuns the bulk was converted principally into nail rods and wire rode, a amall quantity being rolled into bars of various sizes, some also being used up for axles, piston rods, etc. It is confidently anticipated that, owing to the increased facilities offered as re. gards the transport of ore and raw materiale, the proportionate make of iron will largely increase during this and subsequent years.
There are 156 skilled hands constantly employed at the iron works; these men are mostly married, and live, rent free, in convenient and substantial cottagedwellings, provided for them by the propristors. None of the women of the families are ployed at the families are employed at the works, but several boys are provided with constant employment, these, however, are engaged in work for a limited
works, the "Degefors Aktie Bolag," for the details of which we are indebted to Iron:
These works are most eligibly situated at the souchern extremity of the Lake Möckeln, in the parish of Carlekoga, and province of Wermland. It is only of recent years that they have attained their present rank among Swedish industries. At the present time the works comprise, in addition to the residential premises, the following structures and plant: One blast furnace; one calcining furnace; seven Lancashire furnaces, which are coustructed according to the patented system of Messrs. Lagerhjelm and Nanfelt, these having been found by experience to yield iron in greater quantities for the same period of time, and throughout more homogeneous in quality, than those of the usual form; two guide mills, worked by two large turbines, of 150 horse power each; one newly erected 18 inch rolling train for blooms and iron of large size, say up to 5 inch round, etc. with all needful fitting and repairing shops. These are in
period only, their attendance at school daily, for a specified
time, being compulsory, until they have attained the age of time, being compulsory, until they have attained the age of
sixteen years. In addition to the foregoing, about 200 daily sixteen years. In addition to the foregoing, about 200 daily
laborers are regularly employed at Degerfors; and about the same number of hands are engaged in the pursuits of char coal burning and the work connected therewith, and in agricultural occupations, on the proprietors' estate at Lassona.
All the male and female adults of the little community can read and write, without exception; all the children, except as above named, are kept at school until they are fifteen or ixteen years of age, when they are examined and confirmed y the vicar of the parish. Thereafter they are freed from compulsory school attendance. The school buildings are provided by the company, and maintained by them under the management of two teachers.
All the men employed at the works in any capacity are ongaged by the year; but they are paid in various ways, engaged by the year; bat they are paid in various ways,
according to the nature and conditions of the work, some of


## ROLLING BRIDGE AT ST. MALO, FRANCE, AT HIGH TIDE.

hazards be ground for the least pay, holds in the great establishments of the present. The example of Samuel 0 wen was a grand one. In lieu of unions, draining upon the earnings of the industrious for the support of the lazy, flourioh aick and beaefit clubs and cöoperative societieswhile we read besides of yearly engagements, dwellings and land provided free for the workman by the employer, free fuel, free medical attendance and medicines, and free and
operation, but they do not give the full measure of the faure productive capacity of the works, for there are other important extensions which are now last approaching com pletion. They comprise a complete set of cupolas, convert. ors, and all the requisite plant for the manufacture of Bease. mer steel ; also another blast furnace and a calcining furnace one 22 inch rolling train, for rolling boiler plates; one 22 inch rolling train for puddled bars; both these trains to be driven
them, for example, such as the rollers and all assistants employed at the rolis, blast furnace men, and those employed at the charcoal burning furnaces, are paid at apecified rates per tun, by agreement; othere, such as sbinglers, weighing machine men, and the like, are paid by the day, and earn from 50 cents to 75 cents and $\$ 1$ per day of $10 \frac{1}{y}$ hours. The piece work men work in shifts or turns of eight hours, and may earn from 75 cents to $\$ 2$ per day, according to circum.
atances. The wages are paid fortnightly. In estimating their position, it must be borne in mind, as before stated that, over and above their wages, all the hands employed a the works are provided with houses and fuel free, and hav medical attendance, with medicinee, aleo free ; their children are freely educated at the schools of the works, and for themselves a sick club has been established and maintained at the works.
These facts, in reference to the Degerfors Iron Works and their administration, are sufficient by their simple enumera tion to prove the value of the enlightened policy on which they have bocu established and are maintained : commen they have buta established and
thereon would by superogatory.

## Cutrespondeuce.

## Hardening and Tempering Tools

To the E'ditor of the Scientific American:
I have read with some interest the several articles in the recant issues of your journal by Mr. Joshua Rose. Practi cal information, such as he seeks to impart, is of grea value to the artizan, and especially to the young mechanic or apprenticc. He has entered upon a field which, if well cul tivated, must be productive of great good. In that parthof
aricle No. 4 which relates to the above subject, he, like aricle No. 4 which relates to the above subject, he, like
almost all who hare written apon it, overlooks some of the most important points in the problem
The following, taken principally from a series of lectures delivered by me to the classes in engineering, while Instruc tor at the Naval Academy at Annapolis in 1868, will elucidate the points I refer to, and will, I think, add to the interest with which your readers must have perused Mr. Rose' articles:

It is safe to say that a cutting tool cannot be too hard for any purpose whatever, so long as the edge will not crumble or break up; in other words, to make any cutting tool the most efficient, it siould be made as hard as it can be made to perform its work without fracture. With many forms used for cutting metal, the solid angle required for the cutting edgo is so great as to give sufficient strength, without resort ing to what is known as drawing the temper. In a large majority of cases, however, the latter operat'on must be resort-
ed to in some degree. The difference in the degree of hard ed to in some degree. The difference in the degree of hard
ness to lo obtained simp. y by the difforent temperatures at ness to bs obtained simp.y by the difforent temperatures at
which the tool has been originally dipped has been experimentally proved to be very elight, and results only in vary ing the strength or tenacity of the metal. That is to say: A tool dipped at a high temperature, as at nearly a white beat will be more brittle and poseess less strength than if dipped at a low red heat, but will not be truly barder to any sensible degree. A tool, then, dipped at a high temperature will re quire to be drawn more-that is, rebeated to a higher tem perature-than one dipped at a lower heat, in order that it shall withetand the required strains without fracture of the edge; and it will be, in consequence, really softer, wien ready for use, than the low dipped tool.
In some experiments conducted by the writer, a sbort bar of good tool steel was so heated that in its length it had every gradation of temperature, from a white heat at one
end to that which could be borne by the hand at the other, end to that which could be borne by the hand at the other, and in this condition it was immersed in its entire lengtb It was found that, by the most careful manipu ation, smal from the highly heated end, could not be made to scratch or mark, in the slightest degree, any piece taken nearer to the cold end, except beyond the very decided line, which will al ways be found in such a case, beyond which no sensible hardening had taken place. If, therefore, a tool be dipped at the lowest temperature at which it will harden at all, it
will be harder when ready for use than it dipped at any will be harder when ready for use than if dipped at any
higher temperature, if required to be drawn in temper at all It is, however, in the final operation of drawing the tem per that Mr. Rose makes his greatest oversights. To give simply the certain color to which a certain tool must be drawn is to give the least of what is actually required to be known or observed. It is well known that the color pro duced upon the polished surfaces of steel or other metale, as their temperature is elevated, is due to the formation of a film of oxide, and the variations from the light yellow to the blue, as on steel or iron, is the effect of the increasing thickness of the film. For the formation of this film two things are necessary, oxygen and elevation of temperature while to lower the temperature of or partially soften a tool, elevation a certain temperature, and that alone, is required. The film of oxide is taken as a convenient high grade ther-
mometer simply; and if the very necessary precaution is mometer simply; and if the very necessary precaution is
takes to observe and take into account all the conditions, it serves as a very good one indeed: but to take account of the color of the film alone is to throw out terms of the problem which will render the results of no value. The ele ment of time and the greater or less facility for access of the oxygen of the air to the polished surface are as important to be observed and taken into account as the coor produced. For instance, a tool in reheating may be raised to the temperature at which a yellow color begins to form; and if simply maintained at that temperature, it will in time as sume the full blue color, and its assumption of that color without furtwer elevallon the blue would, without taking into
time only account the time of its formation, be taken to measure a much higher temperature. A piece of polished steel, once raised to the temperature at which oxidation is in visible
progress, will continue to oxidize without further heating until the film has become thick enough to assume the blue
color. Of course it takes a much longer time than when pro duced by the aid of continually increasing temperature Again, the temper of tools is very often drawn over a coa Mr. Rose adrises in muffle open at one or both ends, or, a Mr. Rose adviees in the case of dies, by laying them upon a piece of heated iron, turning them over often to insure an equal distribution of the hea. But in either of these pro cesses the perfect operation of our color thermometer is in erfered with by the partial exclusion of the air, and conse quently of the oxygen from the surface upon which the colo is to appear. Over a fire of any kind the air is constantly and very much diluted with the products of combustion,and the same may be said of the muffe, while the piece lying upon the hot iron has the surface in contact with the iron in some measure excluded from the air. If the formation of he film is thus retarded, it will easily be understood that tool so treated will be softer, when the required color is ob ained, than was intended, unless this condition be taken nto account. To temper an ordinary cold chisel, for in stance: in the initial dipping, it may in one case beimmersed a sufficient depth and length of time to require the lapse of but a few seconds for the heat to be conducted from the ody of the chisel so as to bring the edge to the wished.for lue, while in another case it may have been cooled so hat two or three minutes would be required. In the latter case the operative, tired of waiting for the color to appear a he edge of the chisel, will endeavor to hasten it by holding it over the clear coals; bat he is surprised to find how strongly the color comes, and finally wonders, when he comes to use the chisel, how it could possibly have become so soft with such a perfect colorarrived at. If he is patient and allows the color to form without the assistance of the fire, he hen wonders how it can be so hard with the prescribed lue upon it, to a shade. And this is an everyday experience in shops: an unprofitable experience, wherein proper infor mation diseminated through so widely circulated a medium your valuable journal-read as it is now-a-days in almos very workshop in the country-will go far to save
In drawing the temper of such a tool, the operative should be taught to be as careful as possible to dip it about far nough, and a sufficient length of time to require a moder ate time only to bring the proper color: not too quick, as that would defeat his object by causing the gradation of oftness from the cutting edge upward, which must necessa rily be the result in this method, to be very sudden, and wil eave an extremely small fraction of the chisel's length suffi ciently hard for his purpose. If, however, he has mis udged in his dipping and he finds the color coming too lowly, let him be sure, in whatever means he takes to baste it, not to interfere with the free circulation of the sir around If the color comes slowly, but not sufficiently so as to re quire additional beat, he must still take into consideration te time it really occupies, and produce a deeper color if the me is unusually long; while, if very quickly brought, the color should not be allowed to arrive at so deep a point be fore the final cooling. An intelligent observation of all hese points must be had in order that correct results ma e arrived at.

John T. Hawhins.
62 Cannon atreet, New York city. <br> \section*{Kaiding Mnts. <br> \section*{Kaiding Mnts. <br> To the Editor of the Scientific American}

I never, in reading the natural history of insects, came Cross a description of the ant which I designate as the "raid ing ant" (I know no other or a better name); I do not know hether this little guerilla is known to naturalists; at any te I have never met with an account of it anywhere. It is one of the most daring of all tide ant tribe, but its honesty nd humanity cancot be boasted of. It is about half an inch in length, of a dark brown color; in shape and in movement, closely resembles the common large black ant, known in nearly ail the Weatern States, and called the "black colony ant"; but the raiding ant differs from all others in his war like disposition toward his neighbors. He is a merciless urderer and robber.
I have seen these ants in Northwestern Arkansas, but never in any other country. They are the most notorious marauders in all the insect world. They send out spies; and on a favorable report being received by the authorilies, an expedition is set on foot, for the capture of a neighboring colony, and carrying off cheir store and their young as booty n one occasion, I discovered a large force of these diminu ve marauders on the march. There seemed to be many nndreds, all moving rapidly in the same direction, every one keeping in his place with the greatest exactness, and all very close together, in fact so close that the ground could scarcely be seen in the middle of the column. The column was near wenty feet in length and about ten inches wide. In front the main body moved three or four who seemed to be eaders of the troop, never falling back to the main column, except to give orders, as it were. On either side of the column moved about twelve or fifteen others, who kept continually about one foot a way from and a little in advance of the main column. I supposed that they were removing from one locality to another for the purpose of taking up their abode in a new or more advantageous position. I followed them for about two hundred yards, when they all came to a halt at the command of one of the leaders. The halt was only for a moment. Those who had moved on either side of the column did not stop as the others did, but moved rapidly around a stone, about six inches in diameter, when they
turned their heads toward the place whence they had come, turned their heads toward the place whence they had come,
and stopped. This seemed to be a signal, for the main column instantly rushed toward the stone, on one side of which was plainly to be seen the opening of an ant colony.
These maurauders surrounded the stone on all sides, and
ushed into the hole as fast as they could gain admittance till all were in, except about fifty, who seemed inclined to
stand aloof from taking any part in this wholesale murde stand alonf from taking any part in this wholesale murder
and robbery; but it was not long before they proved them and robbery; but it was not long before they proved them
selves full brotherp, for soon a poor, frightened fugi iv selves full brothers, for soon a poor, frightened fugi ive
came rushing from his home, and ran a short distance and ook refuge under his home, and ran a short distance and f these fellows a friendly leaf. He had been seen byin lace; and then with all the firceness of ayvages, they rushed pon him and literally dragged him from under the leaf and killed him almost instantly. Several others came moving rom the hole, having escaped death inside, to meet it surely outside.
Very few who came from the hole escaped being killed Soon these raiders began to emerge from the hole, each one arrying something in his mouth, generally the larvæ be onging to the colony they had murdered and robbed. They instantly set out on the march for their own home, not halt ing until they had reached their own abode, distant about hree hundred yards. They seemed kind to the members o heir own tribe, carrying back their killed and wounded (four or five), but none of the dead or wounded of thei nemies. After pursuing the raiders home, I returned to o the stone and iurned it up, and found numbers of dead and wounded, and but few left to tell the dreadful story. I have seen several of these raiding parties in Northwest rn Arkansas, but never elsewhere
Mount Vernon, Mo.
J. S. D.

## The Fireless Locomotive Accident

To thic Editor of the Scientific American
I regret that a paper so ably conducted as the Scientifi merican should have given space to such a tissue of mis atements as those over the signature of Edwin Baker, 24 tlantic avenue, Brooklyn, in your issue of July 4, page 5 ntitled "Explosion of the Fireless Locomotive."
He asserts that, " on May 22, a large party of editors and re porters were invited to attend the trial trip," which is simply an untruth. He says that "none of the reporters presen published an account in any paper." There were no repor ters present, and it required a man like Mr. Baker, who ould draw on his imagination ad libitum, to make such mis tatements as he las done
The facts were these: The small half inch glass tube at taches outside the stationary boiler to indicate the wate line, cracked; and some steam escaped from the glass until he valves could be closed. This was the extent of the cal amity so drtadfully described by Mr. Eiwin Baker. Instead of the fireless locomotive having exploded, as alleged by him, she left within a few minutes, without a speck of in jury, for Canarsie Bay, and returned after making seven mile a a satisfactory trip.
It is a fact that the fireless locomotive was not injured in the least, and that she performs her accustomed trips from East New York to Canarsie Bay. It is a pity that your val able scientific paper should have become the medium of publishing all over the world the misstatements of Baker thus aiding him in his well known spite against the fireles locomotive, which he has indulged in for the past eighteen months. Is it asking too much that you make the necessary correction by showing that the cracking of a glass water gag on a stationary boiler was a very different thing from the ex plosion of the fircless locomotive, as alleged by him?
East New York. John M. Gibson
Superintendent Fireless Engine Compary

## New Remedy for Hay Feve

Dr. Horace Dobell, Senior Physician to the Royal Hospita for Diseases of the Chest, London, has suggested a contrivance and a prescription, by the combined use of which immens comfort may be given to many sufferers from hay fever and neezing.
The prescription is as tollows: Chloral hydrate and cam phor (of each) 16 grains, carbolic acid 20 grains, pure morphia 2 grains, oleic acid (enough to dissolve the morphia) 20 grain castor oil (the clearest and finest) 7 drachms. Rub well to ether to make a lotion.
The contrivance is for the efficient application of the above remedy, and consists of a miniature bottle, contained in a little boxwood case so that it can be carried easily in the pocket. To the lid of the box is attached the cork of the bot le, and to the cork, in the same fashion as the spoon of a cay nne pepper cruet, is fixed a little club shaped rod of polished vory, long enough to reach to the bottom of the bottle, and lso to the upper extremity of the nostril. The little bottle $i$ kept half full of the: lotion above prescribed, and the little rod immersed in it. Directly the patient feels the rickle o other signal of a coming sneeze, he uncorks his bottle, with draws the ivory cluk, wet with the oleaginous lotion, and pushes it up the nostril till it reaches the seat of the sneez signal : there it should be gently pressed so as to apply the lotion to the part. After this the club is withdrawn and re turned to its little bottle of fluid, where it becomes at once charged for a fresh application. As often as the sneeze threatens, the operation should be repeated. Very often one application will keep off a threatened fit of sneezing altogeth er, even though its first effect may be to excite a sneeze.

Professor King and two companions recently made balloon voyage, from Buffalo to Salem, in the southern par of New Jersey. The route was roundabout, the balloonift passing over parts of the States of New York, Penneylvan Dolaware, Maryland, and New Jersey. Starting at 6 P. I. July 4, the final landing was made the next morning at 7 . Distance 400 miles. Time 11 hours.

## PRACTICAL MECHANISM.

Number V.
by Joshua rose.
case hardening iron.
Iron may be case-hardened, that is, the surface converted into steel and hardened, as follows: First, by the co:amon prussiate of potash process, which is as follows; Crush the potash to a powder, being careful that there are no lumps left in it, then heat the iron as hot as possible without causing it to scale; and with a piece of rod iron, spoon shaped at the end, apply the prussiate of potash to the surface of the iron, rub it with the spoon end of the rod until it fuses and runsall over the : rticle, which must then be placed in the fire again and slightly reheated, and then plunged into water, observing the rules given for immersing steel so as not to warp the article.
Another method is to place the pieces to be hardened in an iron bos, made airtight by having all its seams covered well with fire clay, filling the box in with bone dust closely packed around the articles, or (what is better) with leather and hoofs cut into pieces about an inch in size, adding thin layers of salt in the proportion of about 4 lbs. salt to 20 lbs. of learber aud 15 lbs. of hoofs. In packing the articles in the box, be careful to so place them that when the hoofs, leather, etc, are burned away, and the pieces of iron in the box re ceive the weight of those above them, they will not be like ly to bend from the pressure. When the articles are packed and the box ready to be closed with the lid, pour into it one gal on of urine to the above quantities of leather, etc. ; then fasten down the lid and seal the seams outside well with clay. The box is then placed in a furnace and allowed to remain there for about 12 hours, when the articles are taken out and quickly immersed in water, care being taken to put them in the water endways to avoid warping them.

Articies to be case hardened in the above manner should have pieces of sheet iron fitted in them in all parts where they are required to fit well and are difficult to bend when cold. Suppose, for instance. it is a quadrant for a lixk motion: fit into the slot where the die works a piece of sheet irun (eay $d$ thick) at each end of the elot,and two other pieces at equidistant places in the slot, leaving on the pieces a prijection to prevent them from falling through the slot. In packing the quadrart in the box, placeit so that the shee iron pieces will have their projections upp ${ }^{\circ}$ rmost; then, in taking the quadrant cut of the box, handle it carefully, and the pieces of iron will remain where they were placed and prevent the quadrant from warping in cooling or while in the box (from the pressure of the pieces of work placed above it).

It is obvious, from what has been already said, that the heavier pieces of work should be placed in the bottom of the box.

## CUTTING SPEED and Feed.

The term "cutting speed, " as app ied to machine tools means the rumber of feet of cutting purformed by the tool edge, in a given time, or (what is the same thing) the num. ber of feet the shaving, cut by thetool in a given time, would measure if extended in a stiaight line. The term "feed," as applied to a machine tool, means the thicinness of the cut or shaving taken by the tool.
Planing machines being constructed so that their tables run at a given and uncbangeable epeed, their cutting apeed is fixed; and t'le operator bas only, therefore, to considier the question of the amount of feed to be given to the tool at a cut, which may be placed at a maximum by keeping the too as stout as possible in proportion to its work, making it a hard as its strength will allow, and fastening it co that its cutting a dge will be as close to the tool post as circumstances will permit. In all cases. however, cast iron may be cut in a planer with a coarser feed than is possible with wrought iron. Milling machines should have their cutters revolve so that the cutting speed of the largeat diameter of the cutter does not exceed 18 feet per minute, at which opeed the cut taken $m$ iy be made (without injury to the cutter) as deep a the machine will drive.

It is only when we treat of lathe work that the questions of feed and speed assume their real importance, for there is no part of the turner's art in which so great a variation of practice exists or is possible, no part of his art so intricate and deceptive, and none requiring so much judgment, perception and watchfulness, not only because the nature of the work to be performed may render peculiar conditions of speed and feed necessary, but also because a tool may appear, to the
unpracticed or even to the experienced eye, to be doing ex unpracticed or even to the experienced eye, to be doing ex
cellent duty, when it is really falling far sbort of the duty it is capable of performing. For all work which is so sligb as to be very liable to spring from the force of the cut, for work to perform which a tool slight in body must be used and in cases where the tool has to take out a sweep or round a corner which has a break in it, a light or fine feed must b employed; and it is therefore advisable to let the cutting speed be as fast as the tool will stand; but under all ordina ry circumstances, a maximum of tool feed rather than of lathe speed will perform the greatest quantity of work in given time. A keen tool, used with a quick speed and fine feed, will cut off a thin shaving with a rapidity very pleas ing to the eye, but equally as deceptiveto the judgment ; for under such a high rate of cutting speed, the tool will no stand either a deep cut or a coarse feed; and the increase in the depth of cutand in the feed of the tool, obtainable by the employment of a slower lathe speed, more than compen sate for the reduction of lathe speed necessary to their at tainment, as the tollowing remarks will disclose.
Wrought iron, of about two inches in diameter, is not un commonly turned with a tool feed of one inch of tcol travel
to 40 revolutions of the lathe. With a tool feed so fineas
this, it is possible, on work of this size, to employ a cutting
epeed as high as 27 feet per minute, providing the depth of apeed as high as 27 feet per minute, providing the depth of
the cut does not exceed one eighth of an inch, reducing the the cut does not exceed one eighth of an inch, reducing the
diameter of the work to $1 \frac{8}{4}$ inches. The length of shaft or diameter of the work to $1 \frac{8}{4}$ inches. The length of shatt or minute, since the lathe speed (necessary to give the tool a cutting speed of 27 feet per minute) would require to be about 51 revolutions per minute; and as each revolution of the lathe moved the tool forward $\frac{1}{40}$ of an inch, the duty performed is $\frac{51}{40}$ of an inch, or $1 \frac{9}{32}$ inches of shaft turned per minute, as before stated, If, however, we turn the same rod or shaft of two inch iron, with a lathe speed of 36 revo utions per minute, and a tool travel of one inch to 24 revo tions per methe $\frac{3}{2} \frac{6}{4}$ incher, or $1 \frac{1}{2}$ inches of shaft turned per minute. Here, then, 44
we haver a gain of about 17 per cent in favor of the employment we have a gain of about 17 per cent in favor of the employment
of the slow speed and quick feed Nor is this all, for we of the slow speed and quick feed Nor is this all, for we
have reduced the cutting speed to 19 feet, instead of 27 feet per minute, and the tool will, in consequence, stand the cu much longer and cut cleaner.
Pursuing our investigations still further, we find from ac fual te日t that, cutting at the rate of 27 feet per minute, the tool will not stand a cut deeper than one eighth of an inch whereas under the cutting speed of 19 feet per minute, it will take a cut of one quarter of an inch in depth, thas con siderably more than doubling the duty performed by the tool, in consequence of the decreased cutting speed and in creased feed or tool travel.
Lathe work of about three quarters of an inch in diameter may, if there is no break in the cut, be turned at a cutting peed of as much as 36 feet per minute, the feed being one inch of tool travel to about 25 revolutions of the lathe. The revolu ions per minute of the lathe, necersary to give such a rate of cutting speed, will be about 183 ; the duty performed will therefore $\frac{183}{25}$, or $7 \frac{5}{16}$ inches of three quarter inch iron turned per minute. A feed of one inch of tool travel to 25 revolutions of the lathe is greater than is generally em ployed upon work of so amall a diameter as three quarter inch, but is not too great for the generality of work of such asize; for the tool will stand either a roughing or amoothing cut at that speed, unless in the exceptional case of the work being so long as to cause it to spring a way from the tool. un der which circumetances the feed may be reduced to one inch tool travel to 30 or 40 revolations of the lathe accordin the length and depth of the cut.
It will be observed that the cutting speed given, for work of three quarter inch diameter, is nearly double that given a the most advantageous for work of two inches diameter while the feed or tocl travel is nearly the same in both cases the reason of this is that the tool can be ground much keener for the smaller sized tban it could for the larger sized work, and, furthermore, because the metal, being cut off the small ar work, is not so well suppo ted by the metal behind itas is he metal being cut off the larger work, and, in consequence aces lars strain upon the tool point, as illustrated in Figs. 26 and 27.


B is a shalt, and C is the tool in both cases. The dotted line, $a$, in Fig. 26, does not, it will be observed, pass throu $k$ o much of the metal of the shaft, B. as does the dotted line $a$, of the shaft, B, in Fig. 27. The metal in sontact with the point of the tool in Fig. 26, is not, therefore. so well sup ported by the metal behind it as is the metal in contact witb he point of the tool in Fig. 27, the result being that the tool aking a cut on the smaller shalt equal in depth to tha taken by the tool on the larger one, may have a highar rate of cutting speed without sustaining any more force from the ut, the diffurence in th 3 resistance of the metal to the tool being equalized by the increased speed of the smaller shaft. These conditions are reversed in the case of boring, th

metal, being cut in a small hole being better supportei by
he metal behind it than is the case in a larger hole or bore

This is overcome by placing the cuting edge of the tool be ow the c nter of the work, as shown in Fige. 28 and 29 he circular lines, $a$ and B , representing the cut, C being the ool in both cases. But in a large bore, the +ffect is not so seriously encountered, because of the nearer approach of the circle to the straight line, as shown in Fig. 30. The circular lines, $a$ and B, represent the cut,

## Fig.30. and C is the tool.

On heavy work it is specially desirable to have the tool stand a long time with out being taken out to grind, for the fol owing reasons: 1. It takes longer to atop and start the lathe, and to take ou and replace the tool. 2. It takes longe to readjust the tool to its cut. 3. It take more time to put the feed motion into cear again. 4. The feed motion is very slow to travel the tuol up and into its cut, and to take up its play or lost mo tion. 5. Lastly, the tool should take a great many more feet of cut, at one grinding, than is the case with a tool for small work
A tool used on work 5 inches diameter (the latbe making 0 revolutions to feed the tool one inch) would perform 314 fee f cutting in traveling a foot, the lathe having, of course performed 240 revolutions; while one used on work 10 fee in diameter (with the same ratio of ppeed) will have per formed 314 feet of cutting when the tool has traveled half an inch, and the lathe made 10 revolutions only. In prac ce, however, the feed for larger work is increased in a fa reater ratio than the cutting speed is diminished, as com pared with small work; bui in all cases the old axiom and poetical couplet holds good

## "A quick reed

as the most expeditious for cutting off a quantity of metal, and, in the care of cast iron, for finishing it also.
A positive or constant rate of cutting speed for large work cannot be given, because the hardness of the metal he liability of the work to spring in consequence of its hape, the distance of the point of the tool from the tool post, and other causes already explained, may rcnder a de iation necessary, but the following are the approximat peeds and feeds
Wrought iron of about 12 inches diameter: Heavy roughng cuts, 18 feet of cut per minute; and feed, 27 revolution of lathe per inch of tool travel. Finishing cuts, 20 feet per minute. Feed, 00 revolutions per inch of 100 trave .
Cast iron of about 12 inches diameter: Heavy roughing cuts, 25 feet per minute. Feed, 22 revolutions $p \in r$ inch of tool travel. Finiphing cuta, 25 feet per minute. Feed, 8 re olutions per inch of tool travel.
Cast iron, 10 feet diameter: Roughing cuts, 15 feet pe minute. Ferd, 20 revolutions prrinch of tool travel Finish ing cute, 19 feet per minute. Fced, 4 revolutions per inch of tool travel.
But these data in no wise apply to thols held far out from he tool post, nor to cutting toolsused in a boring bar, con cerning which latter too much depends upon the relative siz of the bar to the bole to be bored, and upon the solidi'y of the lathe or machine driving the bar, to permit of any dat being given.
Brass of small diameter may be turned at a cutting speed 420 feet prr minute, with a feed of 25 revolutions of the athe per inch of tool traverl, and work of 18 incbes dismete at a cutting spoed of 150 feet per minute, with a fred of 36 revolutions of the lathe to an inch of tool travel. The dis crefancy in the feet of cut per minute arises from the causes explained in Figs. 26 and 27.

## Telegraphic Crows.

At a recent session of the Asiatic Society, Mr. L. Schwen der showed a crow's nest, made of pieces of telegraph wire wisted together in a most ingenious and knowing manner. He said that lately such nests had been frequently found and that the crows often selected telegrapb posts, between which and the telegraph wires they built those wire neats, causing what are known as "earth " and "contact," and in terfering with communication. Crows, bowever, were by no means the oniy animals interfering, by their domestic ar rangements, with overland telfgrapby. Wasps build thei mudneats in the porcelain insulators, causing, in rain and dew, leakage from the wire to the ground. Birds of prey frequently dropped dead fish and otber offal upon the wires, causing contact. These were all frequent cources of tempo rary interference with telegraphic communication upon over and lines, and they, combined with many other facts not necessary to mention, seemed to show that it would be a f overland lines.

Pasigraphy.-Pasigraphy is the name of a new syatem of writing by numbers, which, it is asserted, may be used univerally, and thus obviate the dfficulty of communica tion between nations of different languages. Dr. Inton Bachmaier, of Munich, is the inventor. A conference of entlemen of various nationalities was held in London, no long ago, to promote the undertaking, and the result is said to have been of an encouraging character

The St Louis Bridge has a total length of 4,462 feet, a 30 fee From Third street to the building lio 2107 feet hence to commencement of the eastern approach on the dyke, 1,425 feet. This approach is 2,000 feet in length.

IMPROVED SEWING MAOHINE MOTOR.
Domfstic motors, unless they present the three elementa of safety, simplicity, and cheapnese, stand littls chance of gaining popular favor. We are inclined to believe the same is true of apparatus which, apparently filling the abovecon ditions, is nevertbeless of a natureintrinsically against which prejadice exists. Thua, we doubt if any woman would $c^{\prime}$ 'sarge herself with the care of a boiler and steam engine bowerer emall its dimensions, or would undertake to manage the battery of an electro magnetic machine; the one she has connected in her mind with explosions and similar ca sualtips, while of the other the average fe male if, as a rule, totally ignorant, and hence timorous. Every woman, however, has some idea of clock work-knows that it ruus when idea of clock ork is wound up, aod is not lable treak in the way of burating and giving dieagreea-
ble ahocks; a ble shocks; a she can drive ber machine for some time by
turning an $\epsilon$ xaggeratsd clock key a few revoturning an exaggeratsd clock key a few revolutions, the chauces are that she will do so rather than tire herself over the treadle. aimply becruse, in the case of clock work she is familiar with the powershedrals with, while in the case of stram or electricity ehe is rot. The inventor of the device jlluscrated in the annexed engravings has produced an ar ravgement of spring mechanism for actuating sewing marhines, which, judging from a recont inspection of its operation, is capable of giving excellent reaults. Every one, it is preeumed, is reasonably familiar with the general principles of such spparatur, and beoce an allusion to them is not needed, nor is it deemed neceseary here to enter minute ly into the ir ter-r ngagement of the various transmitting wheeld. Suffice it to state that the cronection between the parts is rimple, and readily understoud from a glance at the device itself. The points to which a tention is especially directed are the mode of insuring an equal ard uniform power during the en'ire period that the spring is unwinding, and the brake mechanism by which the mo tion is controlled.

To infure the best application of power throughou', the inventor has recourse to an arrangem-nt very similar to the oroinary fuzee. Oo the spring sbaft, A, Fig. 3. is a cy linder to the periphery of which a chain is at.ached. The latter is also secured to the larger portion of the ppirally grooved drum, B, so that the motion thereby tranrmitted to said drum rota'es the large cug wheel, C, and theoce passes to the other mechanism, and finally, to the belt pulley of the machine. The winding is done by a winch applied to the shaf', D, Fig. 1, with the pinion on which and also wilh the main wheel, $C$, an idle whetl, E, may be alipped into and out of gear (by a longitudical motion of $i^{\prime}$ s sbaft in its (by a longitudical motion of is ebaft in its
bearings) at will. By this means not only is bearings) at will. By this means not only is
the powerful coiled spring, representid at the the powerful coiled spring, representid at the
rig'it of Fig 1, wound, but the cbain tightly wrapord in the groover of the drum, B, Fig. 3. It will be noticed that, during the first tu -ns of the winding, which require but little power, the chain winds about the larger portion of the drum, B, between which and the diameter of the driving wheel, C, there is less difference of leverage; but toward the end, when much more power is needed to finish the work, a greater leverage is af forded tbrough the d-crease in diameter of the portion of the drum on which the chain then wirds. When the spring be gins to unwind, and su to dive the mechanism, the exact converse of the above takes place. The power, at first strong is applied to the smaller portion of the driving drum, and then, as it dimiuiehes, its po'nt of application gradually changes so as to work with proportionally increased lever aye. Toe drum being properly shaped, the result is to caure atrong power to act upon short leverp, and light power on long levers, effecting a uniform transmission of force. The same end may be reached by replacing the cylinder with anotber conical drum.
The brate mechanism is represented in Fig. 2. Fis a fla elastic bar, to which is attacbed a cusbion, G, which acts as a brake eboe against the fly whetl, H. To the outer end of the bar, $F$, is escured a rod which passes up through the ta ble, and ends abjve in a button, I. By raieing the latter, the cushion is remored from the fly wheel and the works allowed to opera'e ; by lowering the button, the brakeisagain applied and etoppare resulta $A$ brake at Jresses upon the bit and sloppage ind in in Wheel rhat, and her of the faot upon tha bar, K , under the table. By increasing the pressure, and consfquently the friction of brake. J, the
machine is caused to travel more slowly; and by relaxing the machine is caused to travel more slowly;
same altogether, full speed is permitted.
Suticient b:iog now said to convey an idea of the con straction of the device, we may atate that its general appearan :e is excellently shown in Fig. 1. It may be app'ied toany machine, r-quiriog no other modification of the latter than the replacing of the table, if of ordinary size, by a larger onf. Fight turos of the crank-which, owing to the inter position of the idle wheel, are mede in direction from the oparation at full epeed, estlmated at about 770 atitches per


YOUNG'S SEWING MACHINE MOTOR.
The invention appears to us to be a successful applicatio of simple and, certainly, not expensive meshaniem, to a much nteded end. Women's work upon the treadle is none o the lightest, and, while always tem porarily fatiguing, some imes results in permanent pbysical suffering. This, added to the fact that the sewing machine is one of the most im

portant, if not the first, of modern housebold gods, should beepeak caroful examination for the dovice.
Patented by Mr. William Youag. Jaly 8, 1873. For fur ther partiealare address C. T. Crawford, 42 Franklin street Baltimore, Md

Music by Telegraph.
Mr. Elisha Gray, of Chicago, a gentleman well known as an inventor and manufasturer of telegraphic apparatue, bas perfected an instrument by which, says the Journal of the Telegraph, sounds prcduced at one end of a wire can be Telegraph, sounds prcduced at one end of a wire can be
convejed to the other end by electricity, over circcits of convejed to the other end by electricity, over circcits of
great length. It has, says the Journal, already been tested great length. It has, says the Joun wires of the Western Uuion Telegraph Compan overa circuit of 2,400 miles, with the mo satisfactory results. Tunes, played upon th keyboard of the tranemitting portion of the apparatue, were distinctly audible and un mistakably reproduced, note for note, at the distant end of this long circuit.
The apparatus bas been named by Mr. Gray the telephone. The transmitting ap paratus consists of a keyboard having a number of electro-magnets correeponding with the number of ieys on the board, to which are attached vibrating tongues or reeds, tuned to a musical scale. Any one of these tongues can be separately set in motion by depressing the key corresponding to it. T'o this transmitting instrument the conducting wire is attached, the otber end being attached to the rectiving apparatus, which may be anytbing that is sonorous a long as it is in some degree a conductor o electricity. A violin, with a thin strip of metal stretched between the strings at point where the bridge of the inatrument is ordinarily placed, will, on receiving the sound transmitted through the corducting wire from the piano, give out a tune very similar in quadity to that of an ordinary $v i$ olin.

Preservation of Iron Ships.
A few weeks ago ( 22 d of May) we sum marized the instructions issued by the Ad miralty relative to the preservation of bil ers by the placing of unelaked lime in those boilers which could be kept empty, and, in those cases where they were liable to lesk age from the sea, by filing them with a so lution of lime in sea water. The result of the experimental application of the solution of lime has been so satiefactory that its use is to be extended to iron and composite ships, under the circumatances deecribed in the following circular, No. 36 of 1874, lately issued by the Admiralty: "Experiments having shown tbat the destructive action of bilge water on the iron frames, etc., of iron and of composite vereels may be reduced or altogether obviated by the use of lime my Lords Commissioners of the Admiralty are pleased to direct that in all cases wher it may be found impossible to diy out com pletely any of tho compartmente, bilges, o winge, in order to coat them with composi tion paint, or cempnt, as prescribed by cir culars 28 of 1872, 22 of 1873 , and 31 o 1874, lime well slaked is to be placed in the water contained in such places. As un slaked lime would injare coatirge of com position, paint, or cement, care is to be ta position, paint, or cement, care is to be ta ken that the limg used is thoroughly slaked."-Engineering.

The Russians have lately adopted a new sbell which, according to recent experiments, acems to be a formidable projectile. It is well known that with the ordinary elonga ted bolt a ricochet fire cannot be maintained; and as thi species of firing is very effective against masses of trocpe the lose is a matter of considerable moment. The eczaroch, for such is the name of the new proj-ctile, is either a per cussion or timeshell and a shot,the latter of which ricachets beyond the point of explosion of the bursting charge. The bell portion is a simple iron cylinder, to one end of whic is secured, by a thin sheet of lead, a spherical shot.
On leaving the gun the combined projectile acts like an ordinary elongated ahell; but as soon as the explosion of the charge takes place, the cylinder of course flies in pieces, while the shot,impelled by the additional velocity and by reason of its form, ricochets for bundreds of feet abead. In firing at batteries, the double cffect of this proj-ctile comes into excellent use, as the shell might be exploded among the gans, cellent use, as the shell might be exploded among the gans,
while the ball would atrike far in the rear among the re while the ball would atrike far in the rear among the re-
serve troops; or while the shell might burat in the front serve troops; or while the shell might burst in the fron
rank of an advancing column, the ball would continue plow ing its way through several surceeding ranks.

## Another Dam Disaster.

The bursting of the Mill River reservoir has been very closely followed by the breaking of another dam in Masea chusetts, thirty miles noribwest of Springfield and on the line of the Boston and Albavy Raiload. Twelve bridges, four manufactories, and several dwellings, valued at about half a million dollarp, were deptroyed, beeide the vegetation in the path of the flood being generally devastated. Happily no lives were lost, warding being given in time.
From all accounte, the casualty was due to the imperfict construction of the reservoirs, which appear to have been mere mud banks built some forty years ago. The recent heary rains probably proved too much for the sustaining power of the soll, and hence the barriers gave way.

THE SONDRIDGE PARK OONSERVATORY, ENGLAND
THE SUNDRIDGE PARK OONSERVATORY, ENGLAND.
Our illustration represents one of the most beautiful of English conservatories, that of Sundridge Park, Kent. The house is 100 feet in length by nearly 40 feet wide, and 35 feet in hight, and is constructed almost entirely of iron and glase having perpendicular sides and a curvilinear lanthornohaped roof, of pieasing proportions, supported on light iron work pillars, which also serve as supports for rare graceful climbers. The present engraving, asys the Garden, bequtiful as it is, gives bat a very faint idea of the interior, which would require at least hall a dozen such views to do it full justice.
The cantral portion of the house is laid out in beds, in which palms, ferns, cy. cads, camelias, and othor rare exotics luxuriate with eomething of their native vigor. Around the sides, sub stantial stone benches have been erected for smaller decorative plants in pote, and beneath these the hot water pipes are placed and concealed from view by a neat and or namental cast iron grating. The hot water apparatus is of the la apparatus is of the lakind, while the kind, while the genial temperature main. tained is amply suffi cient for the choice blooming orchids and stove plants, which are grown for the purpose of decoration in ranges of p'ant houses to the rear of the conservatory. A notable feature is a pair of lean-to cur. vilinear roofed houses behind the conservato ry, and connected with that structure by doors opening into an alcove very tastefully decorated with virgin cork, and planted with or chids, filmy ferns, and other choice exotics, the effect of which is considerably hightened by a large mirror wh ich extends the whole length of the alcove behind. These very agreeable adjuncts to agreeable adjuncts to the coneervatory are very tastefully and systematically arranged in the natural style and planted out with ferns, orchids, and choice foliage plants, all of which luxuriate in the most vigorous manner possible. The doorways are fringed with masses of virgin cork, over which lygodiums, ficus stipulata diums, ficus stipulata, fresh green selaginellas, begonias, and bright verod eranthe mums ramble in rich profusion, and with a vigor only attainable by planting them out in good fresh soil with ample room to extend themselves in all directions. Conservatories, arranged in the natural
atyle, and baving the finest apecimens planted out, are ape cially to be recommended, as they are not only effective, bu much less trouble is entailed on the gardener than when pots or tubs are employed.

THE BRITISH INTERNATIONAL EXHIBITIONS
The series of eplendid International Exhibitions inaugu rated by the British Government, and carried out with so much effect in London by Her Majesty's Commissioners, are to be brought to a close with the termination of the presen year. These exhibitions were intended to extend over a period of several years, a new exhibition being opened each year with some special characteristic to render it prominent or attractivo. But the world appears to have become sur feited with exhibitions, and even the Britieh Covernment is unable to induce the people to attend or take interest in them. This mey in part explain the apathy of our own peo ple in respect to the approaching Ceatennial Exhibition a Philadslphis. The people are tired of such shows ; they are regarded in the popalar mind as tame, insipid, and nothing
but advertisements after all. This is a very incorrect nobut advertisements after all. This is a very incorrect noand in some respects wonderful collections of industries and objects that have been brought together at there British International Exhibitions. We have heretofore described some of the branches of the present exbibition, and now give the Iollowing from The Engineer:
If there is a lively place in the whole exhibition, it is the French annexe. If anything could have turned the acale in favor of the exhibition, it would have been the foreign element, especially the French. India, which is part of our own empire, is worth a good deal; but France is especially valu oble for exhibition purpoes Whaterer

Sommerard is the inepector-general. In the arcede near th French garden are shown some fine specimens of ornamenta screenwork cut out of metal by the steam sawing machin at the mills of Delong \& Cumpany
The ingenuity of the French is shown in the mechanical singing birds of M. Bontems and the marvelous watches of M. Haas. Some of these watches wind up by the mere process of opening and shutting the outer case. One watch gives the day of the week and the date, besides showing the phases of the moon, striking the hours and quarters, and marking time to the sixth of a second. Another watc strikes hours, quarters, and minutes. In the mechanica section of the exhibition the Siebe Gorman diving apparatus was brought into working order a few weeks back, and the operations of the diver in the raised tank with its glass panels are of genera interest. Close a hand Messrs. Chanc Brothers \& Co., of Birmingham, have erected their dioptric holophotal revolving light-of the first or der-a splendid ex ample of mechanica engineering. As we have before stated this is intended for the South Stack Lighthouse, Holy head, and has only just been made
Cut short at the ond of its first Olym piad, the exbibition sees its programme shorn of its fair proportions. In 1875 we were to have woven spun, and felted fab rics, in relation to printing and dyeing. At the same time we were to have had a display of norological instrumentr, braes and copper manufac tures, and all that relates to water sup ply. In 1876 there was to have been a collection of works in precious metals and their imitations, to gether with philoso phical instruments and agricultural m chinery. The plan for 1877 was poo consisting of furni ture and upholstery "health manufac tures," and machine tools. The list for 1878 looked better. including glass, tapestry, military eng neering, naval archi tecture, and lighting by all methods. Iron was to be the lesding was to be the leading 1830 ess to 1830 was to be famous for chemistry and a ticles of clothing supplemented by sew ing machines and railway plant-a droll assortment, confounding our ideas of the druggist and the dra. per with the general
touches he seems to adorn. Going into the French annexe, we are struck with the beanty of the engineering models The very sewage apparatus has an air of elegance. The wood is polished beech. the metal is the finest brass, and everything has the finish of decorative work. There may be a lack of faithfulness and reality in all this brilliancy, but doubtless the construction is correct. These, and other mod els, are sent by the Municipal Council of Paris, and are further elucidated by admirable photographs and drawings suepended on the adjacent walls. Models of waterworke, bridges, and other structures, are all very good. There is kowise a steam rollor and a diagonal aweoping machine. In another division of the annexe we meet with some splen. did models of educational institutions, so parfect that nothog is wanting bat the actual "flesh and blood." The rooms re there;all duly fitted up, and everything laid open to Fiew by the substitution of glass for woodwork and masonry. Up stairs in the art gallery of the exhibition we meet with rchitectural drawings lent by the Commission which has charge of historical monuments in France, of whieh M. du
per wivh tbe general
iveliness of a railway station. Many persons still think that there is something in this annual International Exhibition scheme which ought to be taken up and carried out. We are not, we confess, of the number. We trust that the present failure may be looked upon as final, and that, if we have not seen the last of International Exhibitions else where, they may at least be regarded as defunct at South Kensington.

Rallway up the Volcanc of Vesuvius.
The plans of the line which is to ascend Mount Veruvius re now complete. The route will be 161 miles in length. Tbe grades are 20 and 35 per hundred, and the road termirates at a few feet from the crater. There will be one sta on, protected by a sort of break lava, which will divert the low, in case of eruption, away from the building and rails. The road is so laid out as to be naturally shelterod at every point, except for a distance of about 60 feot.
Tins Redue Industrielle atates that apples may be pre served in perfect condition by packing them in dry plaster.

HYDROPHOBIA-PRACTICAL SUGGESTIONS FOR"ITS PREVENTION AND CORE
At a recent meeting of the New York Neurological Society, which was largely attended by prominent physicians and surgeons of this city, Dr. Hammond made an address in which many intereating facts and experiences pertaining to the dreadful malady of hydrophobia were presented. He also produced diagrams of highly magnified sections of the brain, spinal cord, and pneumogastric and other nerves, of McCormick, the expressman, taken soon after his death here from this disease. All of the parts exhibited showed a deficiency of cell suructure, and it was evident thai a ptriking change from the normal condition had taken place. The gray watter had passed into a state of fatty degeneration, mainly in the form of oilglobules. 'rhis discovery was considered important, as indicating the particular members of the aystem that were affected and the changes therein, congestion of some of the parts being especially shown as a primary condition. The knowledge gained might aseist the physician in future treatment of the disease.
Among preventives, Dr. Hammond thinks that the cutting out of the wounded parts is the best, and thatit will be of fectual if done at any time prior to the development of the symptoms of the disease, although the sooner it is done af ter the bite the better. He had performed this operation of excision some thirty or fer:y times, upon persons supposed to bave been bitten by mad dcge, and in no case has hydrophobia ensued.
"In regard to the treatment," Dr. Hammond observes, "there is not much to say; but I have one or two ideas about it which I would like to mention to the Society. I am inclined to think that the most effectuai method of treatment would be the persistent applization of the primary galvanic current. I would put one pole to the patient's head and the other to his foot, and make the current flow continuously all the time while the dieerse lasted. In one case reported by Mr. Schivadi, he by that means maintained the life of the patient for seven days, a very long time for the disease to last, and then the patient died without any hydrophobic symptoms, seeming to die purely from exbaustion. Recollect that means has not been used successfully in but two cases. Schivadi used it in some former case, but there was such a neglect about the application of it that it was not effectually carried out, and so that patient died with hydrophobia fully developed. There are dozens of ways in which galvanism can be applied; but which one will be more effec ual than others or what the effect will be, we cannot definitely say until we have

filing the teeth of the dog.
more experience upon the subject. There is some ground, likewise, for thinking that, in the application of the primary galvanic current in that manner, we have one of the most if not the most effectual means of treating disease known to up. And then, in addition, I would apply ice to the spinal cord and to the whole length of the spine, and keep the patient immersed in it, you may say, the whole time. I have used ice quite extensively in the trearment of tetanus four times in this city. In one case in particular, in which I was in consultation with Dr. Lewis Smith, the ice was kept at the spinal cord during the whole course of the disease, and the patient got well. Another case, induced by a wound, like wise in this city, in the person of an eminent masician, I treated in the same way-with ice-and he recovered. And I am inclined to tuink that in ice we have another very effec tual means of treating hydrophobia, which I would feel dis posed to rely upon; but I should say galvanism more than anything else. As regards the administration of internal remedies, I have nothing to say. Those cases in which they are reported as being successfully used, rely upon it are not authentic cases of hydrophobia.'
Dr. Hammond then presented resolutions, which were adopted by the Society, against the muzzling of dogs, in favor f killing all vagrant dogs, and aleo the following:
Resolved : That in the opinion of this Society the most effec tual means of preventing the origination and spread of hydrophobia is by the imposition of a tar upon all dogs kept for use or pleasure; requiring the canine teeth or fange and the incisor teeth to be blunted, as proposed and effected by Bourrel, and the destruction, under proper regulations and by dily authorized persons, of all doge not licensed, or which may be found with the teeth unblunted.
In the absence of any legal enactment, the New York Neurological Society recommends to all owners of doge to have the teeth of the animals blanted in the following man-
ner, as detailed by Fleming in his "Treatise on Rabies and Hydrophobia": "The operation is a simple one. For a large
dog, twe assistants are necessery ; for a small animal, only dog, twe assistants are necessery; for a small animal, only
one. The creature is aeated on a table, 2 gag is fixed in the one. The creature is seated on a table, a gag is fixed in the
mouth bet ween the molar teeth by a band passed behind the neck; another band or piece of wide tape fastened around the muzzie at the back of the gag prevents any movement of the jaws. To blunt the incisor teeth a file is used, and to expedite the operation the longer canine teeth or fangs are shortened by sharp nippers and then smoothly round $\cdot \mathrm{d}$ by the file. The gag, of course, must be proportioned in thickness and length to the size of the animal."
Dr. Hammond then placed a dog in view of the audience Dr. Hammond then piaced a dog in view of the audience
on which the operation of blunting the teeth had been peron which the operation of blunting the teeth had been per-
formed. The Doctor said: "You will see how impossible it formed. The Doctor said: "You will see how impossible it
is for him to bite so as to break the skin even-it is utterly is for him to bite so as to break the skin even-it is utterly
out of the question. This is the manner in which it is done: Place this stick between the molar teeth of the dog, and keep the stick in position by a cord attached to both ends of it. Then while the stick is in his mouth, and a cord placed so as to prevent his opening his mouth any wider, this operation could be done within eight minutes. When the operation of filing is performed he cannot inte, and he is not injured in the siightest degree for any purposes. He can do just as well as ever. He does not use his canine teeth to tear his food, and there is no reason why the operation should not be performed upon him, and it makes him altogether a more useful portion of society. We have performed various operations on animals to make them subservient to our uses, and there is no reason why this operation should not be made obligatory upon all owners of doge."

There are 5,000 miles of telegraph line in Mexico, accord ing to the latest official returns. Of the total, the govern mentowns about half, and the balance is in course of con struction or is controlled by States and private companies.

A correspondent, Mr. D. B. Snow, of South Lancaster Mass., reports the appearance of a perfect lunar rainbow a that place on the evening of June 29. Naturally the colors were not so vivid as those of a solar rainbow, but the arc was complete.
The St. Louis Underground Railway Tunnel is 4,800 feet in length, and extends frum the great bridge to Poplar street.

A large portion of the rails on the Great Western Rail way, England, were lately reduced from the broad to the narrow gage, of 4 feet $8_{\frac{1}{2}}$ incher. Two thousand men did it in eighteen hours.
M. F. de Candolles has been elected Associate Member of the French Acudemy of 8 siences in place of Profeseor Agassiz. M. Caudolles is a $\mathbf{I}$ wid naturaliat of considerabl repulation.
Theret is to be an Intornational Geographical Congres hold in Paris in the spring of 1875. A committee is now at work, arranging details and classifying the various subject to be considered

The Chicago Railway Revielo appears in a now dress, en larged in size, and full of interesting railway information It is one of the best periodicals in the country.

## HOW SHALL I INTRODUCE MY INVENTION?

This inquiry cemes to us from all over the land. Our answer is: Adopt suchmeans as every good business man uses in selling his merchandise o sesses any merit, somebody will want it. Advertise what you have for sale in such papers as circulate among the largest class of persons likely to be Interested in the article. Send illustrated circulars describing the merit article, all over the country. The names and addresses of persons in dif ferent trades may be obtained from State directories or commerclal registers. If the invention is meritorious, and if with its atility it possessee purchand is attractive to the eye, so mach the more inkely it is to find a machines, implements, and contrivances of novelty can have their inventhons illustrated and described in the columns of the Soirmitifio Amerioas. Olvil and mechanical engineering enterprises, such as bridges, docks, foundries, rolling mills, arahtecture, and new industrial enterprises of al kinds possessing interest can and a place in these columns. The pablishing art, for this to execute Mustrations, in the best style of the engrav or well executed drawings, and artists will be sent to any part of the country to make the necessary sketches. The furnishing of photographs rawings, or models is the least expensive, and we recommend that course as preferable. The examination of elther enables us to determine if it is a subject we would like to pubilsh, and to state the cost of engraving in advance of tis execution, so that partles may decline the conditions without incurring much expense. The advantage to manufacturers, patentees, and contractors of having their machines, inventions, or engineering works mustrated in a paper or such large circulation as the Scientifio ambrican is obvious. Every lesue now exceeds 42,000 and will soon reach 50,000 , and the extent of its circulation is limited by no boundary. Tuere is not a country or a large clty onthe face of the globe where the paper does not clrculate. We have the best anthority for stating that some of come to our manufacturers throagh the medium of the Soievtifio Ampricas, the parties ordering having seen the article illustrated or advertised in these columne. Addrese

## IUNN \& CW.,

37 Park Row, N. Y.

| United States Circuit Court-a-Southern District of <br> patent watchman's time detector.-Jacob e. bereri $r$ c. william <br> Woodruff, Circuit Judge: imhauser et al. <br> I have re-examined the decision herptofore made by me in Buerk 08. alentine (9 Blatchf...479), so far as it bears upon the contest in this suit In that case, the patents ald pstented devices, including the patent for the infrlugement of which this suit is brougbi, are fully described. The ad ditional evidence here introduced does not alrer my conviction that the iof June 5 , 1865, was not anticipated by any of the devices to Which the evtdence relates; nor by John Buerk, upon whose invention that of the eromplainant wasan improvement <br> Is the defendants' detector an infringement? I think it 18. The only ing prence between it and the complainant's detertoris that instead of ricc- ing upward to perforate, ine defendants force upon and to recerve an impresion from stationary projections from the suriace below. Bothindent the dial upward. onemakes a perforation, the other an upward indentation. I do not think an inventor can beionhed of the frutis of his invention by such a variation, when the whole structure Without deeming it neceseary to discuss the subject more minutely or fully, my conclusion is that the complainant's patent is valid, and that Iet a decree be entered for the complainant awarding an mjunction, lJ Var Sorntroord, for complatnant. Keller $\&$ Blake, for defendants.] |  |
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apparatus.
v. nEwTon et al.

Dectded June 10, 1874.
LIn equity.-Be
latchford, Judge


## zectut americau aud forcign zatents.

Medical Compound for the Cure of Coughs, Colds, etc.
Henry M. Hoyt, Knight's Landing, Cal.-This invention consists in a mpound made of ingredients whose properties are pecullarly adapted to each the seat of disease in throat and lung complaints. In cases of cold
hat had setuled on the lungs, this compound has given reller in a few days, loosening the matter and, in cuses of consumption, the tubercle from the lungs. It is stlmulating and healing, enabling matter to be thrown of without severe fits of coughtng or unasual exertion. More over, it is entirely without optum or other stupefying ingreditents, which mereiy deaden the sensations and temporarily relleve
Improved Railway Car.
John Coyne, Baltimore, Md.-This invention relates to modes of coninside and outside, and consists in sheets of metal jointed together and re-Inforced at the bottom.
Moriz Nowak, Jeffersonville, N. Y.-This invention relates to impreve ments in velocipedes which are propelled bv the action of the occupants,
and it consists of a carnage body or frame placed on wheells. and driven by means of a plvoted foot board or treadle, which communicates motion by a fy wheel, belts, and pulleys to the hind axle, while the front wheels serve for steering the vehicle. Sultable devices for ritarding and arresting the notion of the venicle are applied in condetiou with the same

Improved Revolving Horse Hay Rake.
Clarense E. Peckham, Columbla Cross Roads, Pa.-Levers are connected
by a crose bar, and to a platform is attached a loup to recelve the opera. tor's foot, so that he can ralse the sald platform by lifting with one foot while he presses agalnst the cross bar with the other. By this constructhon, by ratelng the platform above a horizontal position, bars will be pressed cown apon the rear ends of the pins, so as to ralse the points of the teeth; and by pressing the platform below a horizontal poation, the
bars will be pressed down upon the forward ends of the pins, and the bars will be ralsed from the rear ends of cald pins, causing the forward endry the rake teeth to catch upon the ground, revolving the rake and discharkng the collected hay.

Improved Tumbler for Permutation Locke,
Henry W. Covert, New York city, aselgnor to Marvin's safe

 with one or more revolving comblnation wheels. The changeable pln bas
a stem and $\mathrm{two} j \mathrm{jws}$, with an open slot between the jaws, which recelves

 Wheels, the first wheel will be revolved by a stationary tin tin the driving
wheel, which plin will strike one of the jaws. The opposite jaw of this pln Wheel, which pln will strike one of the jaws. The opposite jaw of this pln
th the firiet wheel will trike the pla in the next wheel, and revolve that, and
 siots, and the combination 18 altered by such change. By maklig these
pins with Jaws projecting on each side of the comblaation wheels, those wheels may be reversed, and by making the plins changeable the numbe of combinations 18 greatly tncreased. The same is effected po changing
the plin from one sios to another, and by reveraing the

 the edge of $a$ hoop, and tin the shans is formed $s$ hole to recelve $a$ screw
which is 8 swiveled to sald hook, and its end 18 squared cff to recelve $a$ bey
 bracket.t.t.e outer part of which projects apward at right angles to extend
allong and rest agsingt the ecrem. The tnner end of the bracket passes in Along and rest agsinst the ecrew. The tnner end of the bracket passes tin
through the shell of the drum, and 18 sillghtly bent to take hold of the edge of the lining, so as to be firmly supp crted. By this construction, by turning
the screw in one or the other directon, the drum may be stralned to ang the screw in one or the other direction, the drum
destred extent, or slackened, as may be destred.

Improved Cultivator and Marker.
, Nebraska Cly, Neb.-The tongue is attach
die parto of a curved bar, the end parts of which are horizontal, and carr coupling blocks. The latter are secured tin place by the end of a curve prace. Small whels revolve upon the fournals of the axies, which are bent
twice at right angles, and the ends of whlch pass up through the forward parts of the connectung blocks, and are squared of to reetive the lever
blocks, the formard parts of whlch recelve hooks formed upon the forward
 ends of rods. The rods have ho jks upon therr rear ends, which enter hole
formed to the plow beame, so that the movement of the plow Deams mas control the wheels. By Bu, statacle construction, by detaching the plow beams Improved Plow.
ward, and is curved upward to form the landside handtended to the rear 8 the standard, the lower end of whlch tis attached to the head. The for
ward end of the head tits Warc end or the head nt
 cheek of the share, which holds it in place, prevents the sald potnt from
 standard, and its rear part Inclllnes apward, and 1s bolted to the handle.
The rear part of the heel has a lug formed upon tt, whlch to boited to the rear end of the head. The moldooard ts secured in place by braces. One
brace is curred outward, and to tits midele part brace 18 curved outward, and to to middle part is bolted the moldhoard the moldoberd, and its It Iner part to the molaboard handle. The forward end of the haude tis bolted to the thandard and head by the same bolt trat secures sald parts to each other.
Berman Schater, Chtcago, ill.-This invention ree apparatus for use mith blast and other furnaces in conden an mproved
 warer. so that a tank is alled with steam or rapor, which condenses the fine
 edge of partitlons before they can enter the eceapep pipe; and as they are ler, bs whitch anyparticles that may have paseed beneath the partltiona are removed and caused to drop tito the lower part of the tank. In some cou
ventent part of the later is formed a door, turough which the solld par cles from the bottom may be raked out.
Improved fay Loader.
George $W$. Kidwell, Elwood, Ind.-A sultable carriage is made to recelve
the lower end of a post, to the upper part of which a lever ts plvoted the lower end of a post, to the upper part of which a lever is plvoted
The rear part of the latter is branched, and to the rear ends of its branches is The rear part of the latter is branched, and to the rear ends of tis branches is
hingea a shaft, to which are attached the curved rake teeth. $\Delta$ base is secured to the rake bead and booked to the post to sustain the draft when
collecting the hay. By sultaple arrangement, by turning a crank and wind ing a rope upon a shatt, the forward end of the lever will be drawn down raisting its rear end and the losded fork attached to it . When the loaded ork has been raised to the proper hight,the poet is turned to oring the load
ed fork cver the wagon at the side of the machine, upon which the hay is dropped. The loaded fork may be held in any position into which it may
be ratsed while the post is belng turned to bring it over the wagon. There are also devices for turning the rake to discharge the hay and for pushing the latter off the teeth

## Improved Alarm Attachment for Measuring Cans.

 Ed ward A. Temple, Chariton, Iowa.- This is an improved alarm attach-ment for the automatic measuring can described in letters patent issued o C. M. Bridges, September 19, 1871, to give notice when the desired amount of liquid has been drawn from the can. A float in the can is connected
with a ratchet disk by sultable meshanism. To.a rock shaft is attached the end of a bell hammer, so that, each time a pawl drops into a notch of the has flowed from the float. tuoe of the can.
mproved Currycomb.
Benjamin F. Willams, Federalsburgh, Md. -This is a durable and convenent comb for cleaning horses, having a comb for the mane comblned
theremith, and it consists of a frame of malleable cast tron, to which are therewith, and it consists of a frame of malloable cast iron, to which are
attaohed wire teeth. These teeth are formed by bending, , on serpentine of holes in the latter, and turning over the ends. Four of these corrugated wires may thus be attached to the frame, each forming five teeth. The
mane comb is formed of one or more pleces of wire attached to the sides the frame in the same or stmillar manner to the other wires. The wire for this cumb is doubled at intervals, each tooth betng formed of two atte side from the other teeth. These teeth are long, so as to penetrate the mane.

Improved $\underset{N}{\text { Hemmer. }}$
Improved Hemmer.
James M. Terry, Willamsburgh, N. Y., and Enos Waterbury, Stamford
Conn.-There is a sapporting plate, a congue over which the cloth is folded; Conn.-There is a sapporting adjustable gulde for regulating the width of the hem, a curved gulde for urning the edge of the cloth down, and a flanged wheel for folding it under the tongue. This wheel turns with the cloth, and the fold of the hem runs
in the groove of the roller. The roller and curved gulde are mounted on a swing plate which can be swung away to the left for conventence in intro-
ducling the cloth. It has a catch stud for holding it back and a spring for holding it in the working position and to regulate the roller and turning
plate to the irregularities of the cloth. As the supporting plate extends ander the presser foot, it is provided with a atud rising a ilttle higher than the plate, and on this the presser foot rests. The supporting plate is connected
to the removable silde plate by a spring, which allows it to rise and fall with the feed, and also to rise from the table when pasaing over seams.
Means for Connecting Soldering Irons to Gas Pipes.
Thomas R. Ganuon, New York clty. - This invention is so contrived that simply placing the soldering tool upon a pipe with its lower ond resting
upon a collar will open the valve, and allow the gas to escape and be ig. upon a collar will open the valve, and allow the gas to escape and be ig.
nited, hating the tool in a very short time. As the tool it removed, the nited, heating the tool in a very short time. As the tool is removed, the
escape of the gas is stopped by the upward movement of the plpe,caused by

Improved Millk Cooler.
Kossuth E. Bunnell and Albert R. Brown, Gullford. N. Y. -This is an mproved milk cooler by which the milk 18 rapidly cooled, betng surrounded ge by a watertight pipe jolat passing from the bottom of the milk pan aroagh the bottom of the waler tank to the outside. The mill pan an or preventing the lifting off of the pan from the tank by the water.
Peter H . Carey, Improved Scraper.
Peter H . Carey, New York city.-To operate the machine the scraper
Owere, by a hand crank and gearing, eLough for it to scrape up a load b
epressing the front end and ratsing epressing the front end and ralsing the rear. Then it is rassed sufflictently high to be transported to the place for discharging; the frame is discon-
nected from the tongue, the back end board 1s unfastened, and both the
frame and box are tilted down behind,. which allows the load to escape.

Improved Turpentine Tool.
Walter Watson, Fayetteville, N. C.-This is a conventent tool for gathe g turpentine from trees, having two blades, one for a scraping or dow motion and one for pushing or upward motion.

## Improved Cultivator.

John McGee, David W. McGee, and Willam J. McGee, Farley, Iowa. here are outalde and Inside plow beams. To the forward ends of the ou le attached to the front cross bar of the frame. To the inner stide of the outside beams are attached braces which incline inward, project forward and have eyes to recelve the staple, so as to hold the outer plows vertical. To the forward end of the inner beams are plvoted Iron straps having eyes
to recetive the inner vertical arms of the staples. Upon the rear end of the to recetve the inner vertical arms of the staples. Upon the rear end of the
straps are formed curved straps, the upper ends of which are plvoted to nner arms of the staples. To the rear ends of the beams are attached th Improved Roller Skate.
John H. Fenton, Indianapolis, Ind.-a bracket with $t$ wo rollers is piaced each other, and fastened to the sole in the ame manner. The bracke ansists of a plate having four pendent arms, through which the splndie lvots, one on each slde and opposite to each other. A spring of rubber placed between the plate and the sole. The brackets are placed trans-
ersely across the sole, and the boxes on the plvots are so formed that the earing or weight of the person skating is recelved by the springs, the ela icity of which springs gives a flexibillty which allows the foot to turn in
lmproved Hood for Smelting Furnace Chimneys. John R. Egar, Corinne, Utah Ter.-The object of this invention ts to pro cape a simple and improved means for saving the mineral which now es
capor the furnaces for smelting silver and other valuable ores ; and it onsists in a hood to be placed on the furnace chimney, which arrests the
whole products of combustion. The smoke and gases will escapeand as hole products of combustion. The smoke and gases will escape and as nd, while the dust, some twenty or thirty per cent of which is minera
rops down and is caught in a space, from whence it is discharged throug

Improved Folding and Rocking Crib. er, and the rockers fold up alongside when the ise. The device consists chiefy in plvoting the uprights together at the top, and arranging end pleces to hold them apart when the crib is in use
Folded in this manner, the crib takes up but little room, and may be trans olded in this manner, the crib takes up but inttle room, and may be tran
orted or atored away when not in use.
Improved Governor Valve for Steam Engines. Elijah K. Eversol, springaed, Mo., assignor of one half his right t ontal partition having flat valve seats. The valvesaremade with flat pro jecting heads which close over the valve seats at both sides of the part1. tion and are connected by a guide part. The valve stems are plvoted to
over, which is attached to a regulating apring, and the steam supply ad over, which is attached to a regulating spring, and the ateam supply ad
jucted by means of the same together mitn sllding welghts. The welghted jucted by means of the same together wita siding weights. The welt
spring lever is further connected with the governor of the englne, so tha e balanced valves indicate instantly the changes of speed, ding of the limit of speed is reached by the governor
Improved Sewing Machine.
plate is connected to the free end of a long lever, which is pivoted to a tud prolecting downward from the cloth plate. Motion is communicate to sald lever and feed plate, for throwiog it forward, by a lever which 18 nected, at the other end, to an eccentric rod worked by the matn shaft The return motion of the feed plate is effected by a spring. The lever acte
on the long lever through a block, wnich ts arranged between them, and connected the slot of the plate of the machine, near the back end, for shifting sald block along b
at any point.

## Improved Type Setting Machine.

 achines which rangement for dotng the same which enables an operator to set type by asimple manipnlation of keys as rapidly and much in the same mauner that aperformer on a musical instrument reads nis notes and renders the mustc upon the keyboard, the printer'a copy corresponding to the musiclan's
notes, and the keys of the machine to the keyboard of the inatrument. It consistsin an arrangement of type (including letters, ig ures,spaces,and ref erence and punctuation marks) in vertical cases, which vary in number
and hight,according to the number, varlety, and demand for aald different classes of type. said cases have cateral openings at cheir lower extremi-
thea, correaponding in size to the different sized type. Through these corresponding sectional metallic belt revolving around pulley. To said belt is attached an arm which glldes along the surface of the table, carrying the type with
it to a slot in sald table, down which it falls with its lettered end up, passit to a slot in said table, down which it falis with its iettered end up, pass-
ing down a curved chute into a recess, whence it is forced laterally by a then into the composing stick. The line which has thus been set up 1 operation of levers, cams, and pins. The operation of this machlue is thus reduced to in ve mechanical motions: 1st. Taking the type from the cases
2d. Carrylng it along the table. 3d. Dropping it down the chute. 4. Puah2d. Carrying it along the table. 8d. Dropping it down the c
ing it laterally into 1 ine. 5. Siling the line into column.
Improved Machine for Splitting and Dressiug Hoops.
David Marray and John Lamont, Annawan, Ill. David Murray and John Lamont, Annawan, Ill.-The splitting knife is
set with its edge parallel with the line on which the two splitting rolls meet, and sald rolls are provided with several grooves of different stzes and provided with springs to allow it to shift to the inequalities of the poles to be spilt. While the hoop is confined by the feed roll in advance
of the shaving knife, it presses down on the guide so as to throw the shavof the shaving knife, it presses down on the guide so as to throw the shav-
Ing knives out of action; but when it escapes, so as not to press down on the gulde, the frame is drawn down at the wother end so as to cause the employed, hoop sufficlently to force it along. The shaving knife is nrovided with
adjusting screws to regulate the knife for shaving off the requisite adjusting
amount.

Improved :Tobacco Packing Pross.
Marcollus J. Farmer, Lynchburgh, Va.-This invention consists in a nove lieans for compressing tobscco or other articles into bags and then re
liter and.mold holder.
J. H. Gould, Rutlandroved Carriage Spring
lasses of vehicles, and possessing superior qualities of elastictty, dur ility, etc. It consists of a fertes of spring plates or leaves, tapered from enters to ends and of equal thickness longitudinally. They are placed at ither applled to recessed and bolted central blocks, or run through from ither applied to recessed and bolted central blocks, or run through from
ocket to socket with intermediate separatiug plece 3 . Some of the springs re made detachable, and the ends of all are supported on separated pins in the sockets and lubricated in suitable manner.

## Improved Rein Terret.

John J. Wightwick, Brooklyn, N. Y.-This terret is made of a single plece of metal, having one or more reln orifices or openings, according to
the number of horsea in the team. In the bottom is a swivel pin which passes through a bed plece. The latter is screwed or riveted to the heac trap of the bridie. The terret may, therefore, turn in either direction,
and prevent the lines from tangillg, beaides supporting their weight and endering it much less laborious to drive four or more horses or pairs

Improved Ferrule and Hook tor Whiffletrees.
William Starltng, La Prairie, chl.-Upon the forward side of the ferrule is ald lug by a pin. The part of the lug in front of the pin hole, and upon tis inner side, may be made thin. When used in plowing, the tron pin may be
replaced with a wooden one, so that, should the plow strike an obstacle pestd $w$ a wode 10 bat

## Improved Sausage Meat Cutter. Columblana, Ohlo.-In the lower part

Jacob Knopp, Columblana, Ohto.-In the lower part of the case are ormed inclinedsits, in which are securcd notched or slotted plates. The other eads, so as to overlap each other and leave spaces at their alternate ends for the passage of the meat. The rear plate extends entirely across
ene case, and its upper end terminates a ittle above the discharge orifice The toothed plates thus form a zlgzag inclined plane, along which the meat apon by the knives fastened to the orlfice, being all the time operate riangular form have stralght cutting edges, so that they can be readily harpened. They can also be readlly reversed when dull, so as to present new cuttingedges, and thus avold delay and loss of time from having to
wait so of cen while the kaivesare betng sharpened. They canalso be cut trom plate of shee Improved Treadle
Joseph Lee, West Chester, Pa.-Thts is a centrally ptvoted rock lever, at its ends in the fanges of the treadles. Elther heel or toe may be employed
at

Improved Derrick for Pumping and Boring Oit Wells.
John Schellcopf, Tidioute, Pa.-The object of this invention ts to con-
struct, for boring and pumping oll wells, an improved rig, which is made up of lighter timber, dispensing with the use of the heavy timber required present for the band wheel blocks, Samson's post, and walking beam admitting that the rig may be taken apart, put up, and transported
rom place to place, with greater facllity aud a saviug of timber, time and labor.
Improved Gas Purifier.
Marte Eugene Paul adoutn and Eugene Phllippe Pélouze, of Paris, rance.-The object of this invention is to ellminate, by a new and in proved process, the ifqueflable matter held in suspension by gases and
vapors. The mode of action of this apparatus 18 as follows: The gas coming from the generator through the pipe enters the top of a casement, and oves laterally to the next set of perforations. passes through them an rikes the next plate, and so on through an entire serles of plates. The oles betng so numerous and smail bring the volurie of gas into a finely Vlded serles of jets, which. by striking repeatedly against the opposing ondensation and liquefaction, it betng partly effected by cold, and partly ys the mechanical motion of the particles in suspenston on thetr passag through the apparstus. The liqueated portlons drip down, and are forced
through the apertures lato the tar well below. The gas next passes into a recetver through the perforations, with opposing plates in an in garding this invention, see page 292, Vo xily. of the Scientifio amebican.
Improved Windmill.
George A. Myers, Schoolcraff, Mich. -The vanes are connected in group of four to short cross bars. The outer cross bar is plvoted to a wheel arm,
and the inner bar is yoked to sald arm, so that the section can swing around out of the wiod when the force of the wind rises above the limitt which it is governed by a welghted lever, whose offle 1 he vanes in the wind. Eich section 18 connected br a double-cranked
od, with a sliding hub or collar on the crank shaft. The latter is mounted an the top of a hollow casting, which rests at the shoulder on the top of cast metal socket plece, and has a tubular extension itting in eald socket
plece. and secured against belng lifted out by the wind, so as to allow the casting to turn freely. The casting has a cap fitting on it above the crank shaft, to exclude snow and rain from the tubular part of the casting.
Improved Egg Beater.
William $\mathbf{0}$. Crocker, Turner's Falls, Moss.-This egg beater conststs of a rages with a pinion. The pinton revolves on a spindle, and a rotary beate is attached thereto. The tationary frame is rigidly attached to the spln
de, and 1 p prevented from turning. The egg beater rests on bows on the e, and is prevented from turning. The egg beaterfests on bows on th beater are readlly removed from the stock for cleantng or for other purpester are readily removed from the stock for cleaning or for other pur-
poses. The frame purrounds the rotary beater, and serves to cut the egg
as the beater revolves within 1 t, and greatly to facilitate the operation of as the beater r
beating eggs.

Improved Foundery Molding Machine.
Gavin R.McGregor and Edgar Penney, Newburgh, N.Y.-In thts machine d-forked lifters extend up throngh alots in the power is applied to lift the flask when the same is to be turned.
Improved Harness Saddle.
Edward Edwards, Hawkinsville, Ga.-The check hook and terrets are attached to plates, which are each bent or formed with a recess, which ad-
mits the back strap, and is fastened to the top of the saddle by means of rivets through their ends. This arrangement allows the back strap to放der or sllde on the top of the saddle, as it is kept securely in position b strap is made round. By this construction, the bearing of the thills
equalized on the sadde, as elther one of the thills can rise or fall. They e also self-adjusting independently of each other.

## Improved Mechanical Movement.

Emanuel Swartzwelder, Chaneyville, Pa.-This invention relates to
nechanical movement. by which a continuous rotary motion of the shat 18.pioduced from the rocking motion of a lever plvoted loose'y to the by intermediate gear wheels and alternately acting, toothed friction ring
bither Fith a central double cog wheel, keyed to the shaft, so that by the strokes us rotation of the shatt is
Improved Sound Insulating Attachment for Pianos, etc.
William R. Miller, Baltimore, Md.-This invention relates to that clas of attachments for musical instruments which are used for insulating the sound vibrations, and rendertng the same more clear and full by causing them to react instead of allowing them to be conducted a way and dead-
ened upon the fioor. It consists in a core of glass or other similar subatance for arresting sound vibrations, placed in a nicely fitting cavity in center a socket to recelve the revolving plate of a sultable caster.

## Tusimess aud tetyomat.



 qualty and amo
larar free. welg
Wayne Co.,Ind.
Electric Bells for Dwellings, Hotels, \&c.-
Elo
 Flour \& Pork Burrel Machinery-Manufac English Agency-Manu facturers or wholeane ancy, in London, may fad the right opportunly
 Dickinson's Patent Shaped Diamond Carbon
 Wheel Harrow-The best farm invention
out Manter No Manu facturtr will use a Key or Set-Screw
Palley atter trying the Taper-Sleeve fastenlug. Iligheat waros at the Mechanices' Ins 'tute, Buffilu, and Penn on trial. Address, or Price lists, A.B.Cook \& Co.,Erle.Pa Wanted-The Manufacture of "Specialties"
 per squure Orders eolleted Address Abram Reese Plttsburge, Pa.
The Pickering Governor, Portland, Conn.

 tro-plating. Chromtum negative plates for batteries,
tbree ceuts per square inch, and batteries furall pur-

 The Easkins Machine Co. Boilers are all
tested and insured by the Hartiord steam Boller InspecBabbitt Metals-For the very best, , end to to
Conard \& Murray, Iron and brass Founders, soth and Mechanical Expert tin Patent Cases. T. D.
stetson, 23 Mur ray st.. Ne干 York. Gas and Water Pipe, Wrought Iron. Send
for price list to Batles, Farrell $\&$ Co., Plttsourgh, Pa. Forges-(Fan Blast), Portable and StationP Woitaon, 12 and Entift., New Yos, York. Taft's Portable Baths. $\begin{gathered}\text { Address } \\ \text { Bath Co., } 156 \text { South Street, New }\end{gathered}$ Yortable For Surface Plynerg, small size, and for
Box Corner Groorlig Machnes, send to A. Davis, Low. For economical Vertical Steam Fngines,
to the Hasking Macnine Co.. 46 Cortlandt St.. Sew Torks. The "Scientific American" Offiee, New York, touching ilttle butlons on the desss of the managers,
signals are sent to peroona in the various departmente

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vertisement. Addreess
Union Iron Mills, Pittsburgh, Pa., or lithograpp, tetc.
Hydraulic Presses and Jacks, new and sec-
ond hand. Peck's Patent Drop Press. For circulars,
addiess sill. Peck $\&$ Co., Small Tools and Gear Whee, for Models.
List tree. Goodnow $\&$ Wighman,23 cornnill, Boston,Me. The French Files of Limet \& CO. are pro-
nounced superior to all other brands by ail who nee them. Decided excellence and moditarate cosot tave made
these goods popular. Homer Foot $A$ Co., Sole Agents Mining, Wrecking, Pumping, Drainage, or
Irrigating Machtnery, tor sale or reat.

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Btiched. $\mathbf{c}$ W. $\Delta$ rny. Manutacturer, $301 \& 303$ Cherry Temples \& Oilcans. Draperr, Hopedale, Mass Dean's Steam Pumps, for all purposes; Engines, Bonera, Lron and Food Working Machnery ot
all deseriptiona.
W. L. Chase Btreet. New York.
Buy Boult's Paneling, M Mulding, and Dove
alling Machine. Send for gircular and pauple or work. B. C. Mach'y Co.,., Battle Creekk, Mlch .. Boo $22 \pi$.

Mngines, Boilers, Pumps, Portable Engines For best Presses, Dies and Fruit Can Tools,
Blise Iron Roofing-Scott \& Co.,Cincinnati, Ohio. Price only three dollarg-The Tom Thumb
Electric Telegraph. $\Delta$ compact working Telegraph 2 DD
 Oan be pat in operation by any lad. Includet batters.



A. C. L. will find a good recipe for cement makting skeleton leaves on p . 123 , vol. 29 . The questio
 ron for soldering by ysting sulphurle acid mucn dituted

 -J. F. G. 18 Informed that Körtug and Morton are tw
 te process describec on $p .10$, vol. 30
 at regular pertods? For what length of tlme does it year? At what dat: s have the changes taken place as
faras knowa? A. The needle moves trregularly. The oscllations to the ease tand weest of the true mertala
 west till 184, when It reached $22^{\circ}$ S4/ W .




 Sinch. Cut paper to proper size. hold it by the two
corners, bend in a curved form (convexity downards so as to touch ta mlddele Arst; and gradually lower the
corners. Letit rest on the bath 1 s minutes, then take

 ame way as before ; allow 3 minutes contact for thin paper and 4 to 5 minutes for thtck. Ratse the paper
With tweezers tipped with sealling wax, hang up to dry, and protect from the 11pht.
I. S. D. asks: How can beessax be dis.
solved in ether? spartog'y. that is, alarze body of ether ts required to
 nee 18 it chteff employed? $A$. Grape sugar 18 largely
 ployed In wine making and in the brewing of beer. That
its use is extensive mas be gathered from the fact that
 ig liquore and vinegar brown, asd in making rum and cognac, beer and wines. 2. Is there a atreatise on grape
sugar manutacture published? A. We know of no
 to a ponnd of fowers? A. We know of no method ot
 ers? A. The essential very small quantitles, are bees obtalned,by digestiog
 placed in alternate 1 a yers with the cotton sat urated in
 cotton 1s pressed to extrude the oll. The essentlal 0 ol
ma be recovered from the sweet oil by agitation with trong and highly rectulied alcohol.
W. H. M. L. .asks:
cream rise on milik, to get ail the cream there ti in the milk A . There tis no better was than the old - fashoned
one of getung the cream 1 om milk by letting it tand In winter you migham set the pans in warm water.
 akking a plass tube and dividing it into 100 equal parts, then allling it and let stand 24 hours. The cream,
milk ts pure, will rise and occap 111 to 18 diveltone the tube. 3 . How do they tell the speed of vesele at
sea? $A$. The speed of vessels at sea is determined by
 Fhich is divlded Into equan space, the latter keeps it rombeng graven forward, and the speed of theshtp te $\underset{f}{\text { F. W. W. R. asks: What is the }}$ best method
 arate it from the liquid, wash and dry it and mix with
ingeed oll. The addition of disoolved Indid
nuber to he ofl improves the paint.
E. B. says: It may not be generally known Oollows a different law from cast tron, in that, as the Wab arat called to thas by the foreman of a foundery.
Woo tound that til ks, set around the bub of a pattern as anchor to illt the eand, soon became too mall and
ad to be sent to the black smith tor enlaree mil
 tice, and bave reduced the size of ar ring ubout one thr tieth of si tich by heating and cooling four times.
The ring was one fourth by one tnch, with one toch internal diameter. The process does not seer to to In ure the iron, as the rings were dramn abont one inch in ten
and were such purposes. A. That wrought iron shrin ks bsbbetiog heated and quenched 14 a mell known fact. which has
been empioyed for years to storten the lepgth of rods. te., requiring to be very exact. But if the heailing
 ing and coollne 18 not known. and is, to sas the least,
 tng). If heated and cooled in one place at one ume,
sid in another place at another time, your gradual ex:

J. M. C. asks: What will be the pressure
on the staves at bottom, midele, and top ot a tub $9 \underset{K}{2}$ feet in dlameter and 9 feet digh,bolding a liquid weigh
 at bottom will be 5.6 ibs. per square inch, at
281 bs per square inch, and at top nothing.
 or nearly 80 . A. The egg welighed about one eighth of
 suppositlon that the e,g is a fresh one is tincorrect, it aving been latd month8 betore and become dry by
heat. The shell of the egg when inrst formed is soft and adheres closely to the solld contents ; consequen that egg conld not have been iald in hot condtito
that found it in. The egg was almost tempty no white of the egg being present, which shows concla
ively that ta ws an old one.
 W quice tanaing by the use of alcohol.
W. S. J. asks: How can I soften common
machine stel lio that I can cut it off easily with the
 ier 8.16 Inch thtck. I bave made It blood red, and let it
cool of tin lime and charcoal ; snd the steel ls so hard
 4. There 18 no procees to soften steel which will pive
ou any practical beneft over the lime and charcel you any practical benefit over the hime and charcoal
proceess. Your trouble probably lies in the parting tool, whith should be made of the best steel, about $\% /$ Inch hics, and given plenty of clearance at the pornt;
hould be hardened right out, and placed to cut at the conter. One minute 18 suffclent time to make such g ill with the partung tool it may assist it.
 oarnot having a sllding head (che cyllinder betng fed up
by the lathe carriage) it the bar tis not true or parallel Fill the ways of the la the? He contends that the bor that the bore will betrue, whether the bar ts true with the ehears or not. The only result ot the bar betpg out
of true is that the cylinder will be thinner at opposite ends on opposte estaes. Ithink that, with a 1 Ittle con
 Where the cutter head feeds longitudinally upon the
bar, but not for the case where the cylnder feeds up to he cutter. In the latter case, if the oas were not par.
 cle deseribed by the cutter does not change in its rela Hee poltion to the ways, consequentiy the cyllider would not be thinner on opposte sides at opposite ends of the catter woula not be upon the same plane as the
diameter or the cyllinder, bat at an angle with ti, consequently the traysurse dilameter of a cyllider, bore lesa tban the perpending in such a direction, would be itition uf the circle of catter to diameter of cyllider night be sbown by placing a riog Libside a true cylinder
 Fard he other end. Witha cutter running at a consia-

 inder to be
tnis page.
J. W. says: You state that the cylinder
will be borect trae but not paral Whis be the case, will the enals of the cyltrder be taced oft truly with the central line of the bore, or with the ootetide of cyllider, supposing it to be done with the
same tool? A . The end face of the cyllinder will be same
rue with the center Inne of the bore, that tis, at a true
F. D. asks: What are the dimensions and
detaila of Grame's electric mactine? A. Itis imoos sible to answer thit questlon, as there are tone of these
machines $a s$ yet in this conntry, the one ordered for the stevens Institate hasing not yet arrived. When it doe
A. B. E. L. asks: How can butter be kept ing the butter in a cool place in a receptacie, alrtigh
 salt. Put a Inen cloto over the top, and then at on J. J. K. asks: 1. How can I get the greatof wire shonid the electro-magnet be wound with? A. By tonchlog tit with your electro-magnet as near the
base or curre as possible, and grad ally dra
and Lwards tLe poles; ree eat the operation several time axing care not to reverse the poles. 2. I have a ba
tery of is palra of Grove cups and an electromat made oat of $\$$ tioch fron, wound with abont 200 yards of
silk-covered copper wire of No. 20 gaze ; all the powr I Ian Impart to a magnet of steel ( 9 Inches lon
 same. A. Yoar electromagnet, it properiy construct ed, ought to answer the parpose. The trouble mas be
due to poor a aully of steel of which your borseehoe die to poor quailty or orel of which your horseehoe
in made. 3 . Was the Euglsh man of war sunk at Helt


L. B. asks: What is a cone pendulum, such
sis sadd to be used tor regulating the preat teleescope at Washington? A. A contrivance rasembiling one arm
of a steam engine governor. It tis divicen by a turbine antached to toe clockwork, and a brake is appled electricity, whenerer the tendency is to revolve too
F. A. S. asks: What is the correct propor
Hon of the French meter to the United States toot? A. The metor= $=32808992$ feet
 the different colors? A. See p. 50, vol. 30. 2. Doee
R. A. B. asks: 1 . How. is blood albumen
oren
driak blood, as soon as drawn from the ox or atter
has been stirred sad the clot remored, as done for man
utaeturing parposes? 1 . It to customary to ase the
blood directly after it to drawn, though the remedy to
G. B. D. asks: 1 . How near does the best
electromagnetic motor approset the beest steam motor
 carriage and propelled it through the streets of Was ngton by means of electrictity? A. Yes. 3. In angwer
o H. L. C., p. 346 , vol. . 30 , you say the coll should not xxceed an inch and m halif th dlametrer; are your readers

 it cost at the present day to use electrictity? A. It has
been varionaly estmated from fre to ten tlmes in 1 a or or
R. L. . ayss: $I$ am constructing an astrono.
mical accoromatic telescope, but wish io make a terres. rial telescope tnstead. The achromatlic object glass 18 enian eyeplece is of a half an Inch focus. What aloula ve the dimensions of the other two lenses to make thls
nto a terreatrial telescope, and where sbould they be
 er, one tnch focus and onvex stides facling each other, ss to the Ramat ten o
 ny obectlon to 1 t.
nverted? A . No.
G. T. W. asks: I. Can you tell me whether
 tt property of crystallizing. This prejudicial altera ton 18 effectec still more rapldy by the addi ton to the
sugar of $1-20$ of 1 ts welght of osall, citric, mallc, or any of the etronger actds. 2. How is printer's gold size



W. M. K. says: 1. There ii a difference beTween a degree of iongitude and latitude at the poles; he cifterence at $10^{\circ}$ from the poles? A. Longltade is
 is no such thtog as longltude at the poles. Lattude 18
he distance north or south of the equator; and as the
 degree of longitude is sias of the earth's circumference at he equator, and constantly decreases as we go towards the
poles. At 10 o rom the
 $=1378$ miles. ( $3970=$ radius of earth appos $431 \times s=12.04$ miles, or the length of a degree longitude . What is the best proof that the earth revolves on itb
axie? A . There are sereral ways of proving that the arth revoives onits axis. Perhaps the simplest way 18 the stars cross the fild of view. Or elve place your-
gelf behind a pole or other ixed object and doutce the self behnd a pole or other fixed obect and nothe the
stars as they seem to pass bealnd the object and re-ap pear on the other stde. 3. At what place is the Missigapp river the broadest? A. At the mouth. 4. Why
 equator, over every polnt of which, respectively, the sun tn Its dally coorse passes vertcally on the 212t of udes are about $23^{\circ} 23^{\prime \prime}$, respectively north and south. The arctice are t wo small clrcleso or parallele a o of latitude
zsoz8 from the polee. They Indicate the limit or toon dary of that region about each pole where the sun 18
above the horizon during the entite day
(24 hours) once in a year. 5. Can there be thunder and llgbtring wittout a clond tin the sky? $A$. There may be thunder and
Hghtulog from clonds which are not seen. In that case we see simply the refection of the lifhtntng apon the oom or dwelling to pronote health and commort? $A$
 Whitelead palnt out of carpet or clothting without in.
juring the $\begin{aligned} & \text { tabric? } \\ & \text { A. Benzine or turpentine will re. }\end{aligned}$ move whtte palnt stains.
 and Iod of an inch in diameter, by the electric current. I am familar with the heating effect of the hattery curwire by a rictilonal machine operated by hand? A.Not sides, the yare never free from and anger. 2.AB I wish to be ablc to heat the wire to a few moments at any time, I
hink a magneto 0 electric machne would be the thmg
 it developtog the current will occupy the lesst pace? A. Tou might use a magneto-electric mactine, but we

 y hand wlll answer the ourpose? A. About two tee and an armatarec eontatinng about Afty yards or wire
of course the temperature of the wire wouid depend apon tre numb
the armature.
R. W. C. asks: 1 . What size are toy bal: ounds will one that contaling one coblc foot of bydro

 Which is the cheapest way of prepartoe pure hydro
gon , and what ts the proportionate yleld? A. From zinc and dilute oll of vitriol. sisty-बve
should y feld two pounds of hydrogen.
O. O. O. asks: : How can I make ordinary
xploding powder to hise or burn Alowly? A. Mix pow.
C. T. asks: How can I clarify beer? A.
Take titioglase, in inely shredded, 11 b, , boirbeer, cider,or
 has been used. Stratin and further dillute. A pound of plants Anlogs 18 enougil to clear a barrel of beer.
W. N. J. says: : A certain philosopher states
that " the moon has elther no atmosphere at all, or one
 for any liauld on its surface would long since have beem
 atmospheric pressure to check craporation. If there
were any water on the surface of the mon, clouds would certainly be obser red at timesdimming its face.,"

1. $I$ ask for Information through the ScIINTIIIC A ARE. ICAN. Supposing water th the shape of lakes to exist on the surace of the moon, how could evaporation take
place, and clouds float, to dim the moon's surface, it through which vapor could rise and form clouds? The elastic force of a vapor which saturates a space contatinng atr or gas is the same as in a vacuum. Does evaporation check by atmospherlc pressure, or
does thts pressure assist evaporation? If the moon does this pressure assist evaporation? If the moon amount, it would certainly not be dissipated, but
heaped up mountain high by the expansion of partcles during a day of three hundred hours of intense solar anght, and of courze again during the followlog long observers. A. The rapldity of evaporation is inversely
as the pressure upon the surface of the evaporating P. R.-B.'s chesp telescope, described in esting experiment. You objective, if you can aftord it ; if uot, save your eye.
sight and money.

Fasks : 1.0 O what diameter ought a double cting force pump to be for 2 inch supply pipe? A.
Four Inches. 2. Should the discharge plpe be of the same dlameter as the supply plpe? A. Yes. 3. Must the air
damoer of pumo stand uprigat if the pump be placed
E. P. F. asks: 1. If a globe made of eetal, 10 reept in dimmeter, welghs when full of air 1,000 108 , how much less would it weigh after exhausting the
air so to forma perfect vacuum? A. About 40 lbs. 2 . Ir so to form a perfect vacuum ? A. About 40 lbs. ${ }^{2}$, alr was exisusted? A. $14 \cdot 7$ 108. per square inch of snr-
L. D. says: 1. The balls we have been
using tia ball mill are of cast fron, and welgh on an average at libs. esch, diameter belng $5 \%$ inches. What size? A. About 241 lbs. 2.18 there any difierence in the welghts ot steel and cast fron oalls of the same dimenslons? A. The steel ball would be about 2 1bs. heaverer.
8. Is a life of Robert Fulton published in the United States? A. Tbereare several works on this subject.
S. R. asks: How car I cut window glass to an oval shape? I have a glass cutter, bat ind ic will wot
cut without several fallures, breaking plenty :of glass. A. Use a good dlamend.
D. asks: What will be the volume of steam at atmospheric pressure, evolved in the converston of
any oxyren and bydrogen at same pressure, evolved in the
decomposition of the sameq quantity of water? A.Supdecomposition of the same quantity of water? A.Sup-
posing that a cublc foot of distilled water at $212^{\circ}$ Fah. posing that a cubic foot or distiled water at
is converted into steam. and also decomposed into its
 cubtc feet ; the volume of oxyg
J. E. asks: I saw in your journal a descripto make one, using an opera glass objective of about 7
Inches focus and 13 Inches focus and 13 inches diameter for a lens, and an argand gas burner. It will throw upon the screen an
ordinary card photograph of about 3 feet high pretty falrly, but the thage is not distinct enough. What kind
of lens and or what size and focus should $I$ ase to ob tain the best results withan argand gas burner? Will uch a burner give light enough, with a proper lens, to high ${ }^{+}$P. Lantern or jectives and condensing lenses
are dercribed in back numbers of the Scientific AyErICAN. Place a number of burners in a stralght
behind the other, as flame is nearly trangarent.
S. N. M. asks: What astronomers have obof 600 milles a second? When were such observations
made? I suppose that 166 milles a second (Professor C. A. Young's statement) is the greatest observed voloctty. A. The obseivations of Professor C. A. Young,
September T, , 187 I , indicate more than this velocity. At September $\boldsymbol{i}, 1871$. Indicate more than this velocity. At
each explosion we see an eruption of hydrogen. Masses of other metals may precede or accompany 1 t , in a semi-
Hiquid or gaseous condition. They are not seen in the liquid or gaseous conditlon. They are not seen in the
spectroscope whlle we look at one of the hydogen lines spectroscope while
with a wide slit.
$\underset{\text { telescope of } 18 \text { inches focua; and with the Hurgatic }}{\text { A. F. }}$
 will it stand, and bow must I construct the eyeplece?
A. Probably 200 . Then 48 inches $+200=0.24$ inch $=$ equivalent focus of eyeplece. Focus of filld lens will betwice
this, or 0.48 inch. Focus of eye lens will be one thitd this, or 0.48 inch. Focus of eye lens will be one third of
focus of feld lens, or 0.16 inch, and the two plano-confocus of field lens, or $0 \cdot 16 \mathrm{inch}$, and the tw
vex lenses will be $0 \cdot 48-0 \cdot 16=0.32$ inch apart.
$\underset{\text { Ject glase } 2 \text { inches in }}{\text { In }}$. Itameter and 36 inches focus. 0 What focus and what distance apart should the eye
lenses be to obtain the strongest power compatible with lenses be to obtan the strongest power compatible with
dist nct viston for a celestial eyeplece? A Field lens. an inch focus. Distance apart, two fifths of an tnch Equivalent focus, three tenths of an inch. Power, 120 . 2. What additional lenses, and what distance apart
would it be necessary to add to make a terrestrial eyeplece? A. Two Huyghenian eyepleces make a Rood terrestrial one. The lowest power is placed about twice
the sum of the equivalent foct of the two eyepleces in front of the other. S. In your answer to N. B. in
your issue of May 9 , sou mention the two eye lenses as
betog respetively own tocal distance within the focus of the other, and furi ber say tney wlll be ys inch apart. Is this an error or ehould the measureme $u t$ be from the glass instead of
the focus? A. In ourreal to N. the focus? A. In ourreply to N. B. May 9 , we should
have written "eye lens, 14 inch focus," as is evident from the context.
A. P. W. asks: 1. Can the
onl be condensed by cold water?
A. The vapors of of coal oin can be condenged by pasing them through a tabe
sirrounded by cold water. 2 . What kind of gases are nsed in gas engines? A. Common illuminating gas mixed with alr bas been used In gas englnes. The mix-
ture 18 gnited by au electric opark. Some of the hydco
 the gases and drives a platon.
 such a manner as to make the surface appear white when
I revolve it fast. Wuat proportion of each color must Luse? How shall 1 divide the disk ta a proper manner A. Dlvide the clrcumference of your disk tnto 6 equal
parts. Then draw radal lines from the center to each orne 6 polats. In the center of the diak, palina
round Dlack ppot about 3 or 4 tnches in diameter ; also paint a narro $\begin{gathered}\text { Dlack rim on the edge of the disk. In }\end{gathered}$ each or the eil spaces formed by the radian ine, pinit
 occupled by the colors will have the following relation: oilet $4 \cdot 16$, tndifgo $2 \cdot 40$, blue 25, D.I.F. asks: 1 . What is best to kill the
effecis of nitric acid on the teeth,
so as not to nurt the enamel? I bavebeen using sald acta on my tonguc.
A. Wnen the enamell 18 gone, the den tine ta A. When the enamel 18 gone, the den tine 18 raplaly at-
teted by the secretions of the mouth, eepecelally
when
 hang with a soft bruash and a harmies deniffrice like
prect pltated chalk would be better.
2. How can I de. eet clder which is not made hoom apples? $\Delta$. It may be
barlum.
B. M. K. Jr. says: 1. I constructed a tele-
 eter and $3 \%$ feet in focus. The eye plase is a plamo.
 bject. There is a great deal of prismatic color, and
 not ache properly ifured; bestides, your objective te
 ensis? A. A daphragm which cuts cif any part of the aperture of an object glass reduces the amount of llght
pasting through ti. s . Can you tell me tow to pollsh a lens that has become scratched? A. To polish 2 hens,
turn a wooden disk witu broad bandle to the proper curvature: pasint the disk with a mixture of pitch and
rosina just deate
 squares with dae dananal grooves across the squares.
Warm, and press quick|y on the lens with a plece Warm, and dreess quick|y on the lens with a plece of
paper between them. Wast of adherling paper it neces. siry. Then coat with motstrouge and rub the lens mith. t. Five minutes rubbing will sufflee to destroy the Ag. are of any object plass. Herr stetnhell showed us a scratch on a two tnch lens whtch he sald mould take the
workman half an hour to pollish out. 4. Will the so. called furniture polish spoll the rarnlsh on a plan otorte?
C. K. asks: 1. Of what could I make a box,
 clicic gravity of a plece of elmwood welghng 2 ounce with a plece of lead attached to it weighing 4 ounces,
and how can I fod the specific gravty? A. The specific gravity of your plece of elmmood can be found by the Iowing equation: Specific gravity $=\frac{2}{6+(x+36)}$, where x equala the sum of the welghts of the wood and lead
10 water. g . Why 1 s 1 t that some lenees show objecta upside down? A. Because their action on 11 hht 18 to


S. T. asks: How can I bore a a journal box
 oxx. and one angle true with the other? Are there any spectal machnes for such purposes? Having only a
compound rest lathe, the box must be chucked twice

 purpose by the following method: Set the head of the
compound rest to the required angle and bore out the tont end of the journal box. round to the right and bore the back bali of the oox trom the right hand stde of the box (that 18, the oppo.
site eide from which the front end was bored), by whic site side from which the front end was bored), by which
method of procedure the box will only reaure one metucking and dis certain to be quite true. Anotber
conethod 18 to turn the tool upside down without cross.
 tool more liable to spring and Jar; the itrst meth od tis therefore preterable, but the rest requarres in elthe case no alteration of its angle to perform the duty on
 smelling princlpally of cedar, IIxed with stale or stag nant emells. What shail 1 do to renovate e it? A . We
have seen the following recommended: Sprinkle a ia. bespoonful of powdered alum In a hogsiead of water
sturring the water at the same time, then let the wate strring the water at the esme time, then let the water
stand fora few hours. If, upon trial, tuis should not and a method sulted to the requirements of this case will be recommended.
J. A. asks: Can you tell me of any prepar
tion (except bismuth and rose water) that can oe used or whiteninga clown's face, and which will not be in jurlous?
as well.
C. P. says: I am a manufacturer of paper
zoods and use many aifferent kntres.
Can youtavor me with a rectpe for a mixture that I can apply to the them freely,
 use nothng for this pur.
some practical chemist.
 steel pen? $A$. One part wurratic acla and twenty parts
tarch water. vers dllate oxalc actd mat . How are rubber hand stamps made? A. A number ot manufacturers have been visted, ani they all de cline to explatin theit proceseses.
O. C. K. asks: Can you give me a recipe for
wash, to be applied externally to the skin, to keep mosquitoes amay? A. Make an extract of pengyroyal, IIte, and when cool sdd a smanll quantity or glycerrin.
We do not kno We do notknow of anything that will remove tattoo
W. F. asks: How can I make the adhesive
R. K. asks: Can you give me a good shape temper them? A. Make a brick furnace somewhat
Ongerthan the spring plates, with the blast entering at the bottom, and the chlmney harling communicatio WIth each end of the furnace. Make coke (for use in
the furnace) by banklig up coal on a blacksmith's Are and burnng the gas out of it, which coke will give you
clear fire in your furnace. The top of the furnac clear Are th your furnace. The top of the furnace
mave may we made trinemove, bo
onl tor tempering the plates.
J. S. H. asks: 1. What is a cheap, simple manure? A . The following plan has been suggested
mathe
 barrel of bones. Cover with water and boll. After Wentr-four hours, nearly all the bones will be boft
enough to be pulverized by hand. The reat may hore to be bolled ten or twelve hours longer. When palver1zed they will de in the form of paste, and sultable to mix with other manure. 2. What ts a good process for
convertug molasee into vinegaro
A. Vinegar mas be made by mix'ng 16 parts of pure wair, 1 part of
 atmosphere from ten to thirty dags. A. Attele old rlutegar
added on the eecond or thrd day will ald the process
C. J. M. asks: What will make and keep
rain water sweet in a clean wooden clitern? 1 put one bubbel ot charcoal in each chistern, but it does not sweeten the water. It charcoal 18 good, how much and how
often should it be renewed? A.li your clitern is lese
 the wod of the clistern. If you uee charcoal to purity Alum to a more fifectanal agent the water larough it A drachm of pounded alum to a gallon of water 1 s aufl clent. After twenty-four hours the water will be
cleansed. All wooden veselis to hold water should be charred Inside.

 ton, $c$ a hollow pieton rod, $d$ a sildang rod for bolding stopper ea atopper, $f$ a botlle, $g$ a
rup tor
rup rup for withdrawing piston, $h \mathrm{a}$
discharge cock, $i$ a cap which scharge cock, $i$ a ap which
sere mb on to the cylliner. The moo oneration 18 as follows:
Removet he cap,, , and fll the the cyllader with water, replace
the cap (whlch should be packed the cap (which should be packed
with rubber) and, while in this position, witharaw the pliston unt11 water 3ppears all around
it on the opposice side; alto it on the opposite slde; alko
open the cock, $h$, and allow all air to escacke. $h$, and allow apparal
should then be reversed, and placedupon a bracket for con.
venience in operation and
 tue mat then be negled and the
totopper droppea in and pressed tight enouph to keep pre place
nhen reversed. The When reversed. The stopper
should be ground, as alio the the botte, is then tnseetcd in the cyllnder, expelling the surplas
 rimly set, the stopper may be withdrawn by the sllatng piston may be withdrawn as quichly as convenent, thg
cock, $h$, belng opened until the water has, all lett the oottle, when the estopper mas be inserted by the rod, $d$,

 acyot the operator, as the alrmust be expelled from the
water and care in mantpulating mast $;$ otherwise keep water,
it out."
H. writes to corroborate I. F. B.'s statement
oncerning the water in tre Hamboidt and other val. leya of Nerada beting of a uniform level at various Dirats in the valles, and that, it the streams were
stralgtened and the level lowered by draliage, the rrost and damp and chilly nights would disappear, and served the same fact in erery portion of Nerada and in soone parts of Californna ; while here in MMontana, we
ond tbat the water la never found lower than our streame, risting and falling with them, and in no mont oi the year can we be sure that we will not have frost. $\mathrm{n} m \mathrm{~m}$ very materlally as to the cause and use of different means for the protection of vegetable life. I clatm that the ari 18 too dry. It allows the heat from the land to radiate into space with very lithle or no resitance,
It think that I. F. B . will bearme outin this, that we are more llable to have severe frosts, after a hot, dry day
than after a cold and damp one, and more llable in a than after a cold and damp one, and more llable tn a
clear, still night than a cloudy or windy one. I bave suffered Intensely from heat two boars before sundown
 very dry, allowntin the heat of the sun to pass through it withen when the supply was cut of 1 would return hot and when the supply was cut off, it would return with
equal raplity over the same iree rosd. 1 think this is in accordance with Professor Tyudall's thorongh


 have frequently saved over garden frace frost when
nere that under clrcumstances that cannot all beaccounted or In any other way than that the vapor rising forma a mantle or cover ng, preventing rapld radiation and thus saving the plants. There are many of sour western
eaders that are deeply interested in this question. Ag. iculture in the mountains is fast becoming an impor. ant industry, and our great banes are early and late
frosts. Perbaps some other readers could throw add1rosts. Perbaps some other
S. P. says, in answer to S. C. H., who wisharnlah the surface: Paste the drawing on the backgreund. Flour paste is as good as any; and when it is
dry, stze the surface with a solution of gum arabic or white glue. When that is dry, use any varnish you
please. For a dellcate pleture or drawlog, dammar varnish is the best ; but it musc be applied rapldily to se.
M. R. H. asks: How can I render hard, and Fbjected to 12 hours dry heat at a temperature of $290^{\circ}$ ment, In a few months become dry and almost charred
the edgea break off and they are undt for use.-c. L asks: What is the best way to can green corn and green eas?-H. J asks: In antmal life vistble, by the use of
the microscope, in the water from hot ppringsas wel as incold water?-A. E. R asks: 1. How can I cover the
Rlazing on potter's ware with silver or mercury, zo as omakelt a reflector of light? 2 Of what is the ash Which renalns after lead has been heated above melt
ing point for about twelve hours. composed $\%$-H D. asks: How can I apply paratfin to make canvas water-
proot? What shall I put in the paraffin to make it of dark color? - - C. H. asks: How can I prepare mocking m?-w E, A.J.asks: How can I make in aquari. oo prevent rust in the water?-G. O. C. asks: How can
remove the blue color from polifhed steel ?-H. D. M. asks: How can I clean petruleum barrels, soas to make

## COMMUNICATIONS RECEIVED.

The Editor of the Scientific American cknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:
On Feathered Arrow Heads. By F. E. M
On Aerial Navigation. By G. W. M.
ing:
o. D. o.-E. T.-M.P.-C. S.-G.J.-W. C.L. G.-J.M
G. B.A.-E. P. W.-A.W. G.-O.S -J. B.

HINTS TO CORRESPONDENTS.
Correspondents whose inquiries fail to ap pear should repeat them. If not then pub lished, they may conclude that, for good rea sons, the Editor declines them. The address of the writer should always be given.
Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are siven, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail if the writer's address is given.
Hundreds of enquiries analogous to the following are sent: "Please to inform me where I can buy sheet lead, and the price? Where can I purchase a good brick machine? Whose steam engine and boiler would you recommend? Which churn is considered the best? Who makes the best mucilage? Where can I buy the best stgle of windmills?" All such personal enquiries are printed,as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge men.ioned at the head of that column. Almost any desired nformation can in this way be expeditiously obtained.

## Index of Inventions

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## and kace bearing fiat date,



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Planter, corn, $G$. H. Hume.. Planter, cotton seed, J. Dana
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$5 \begin{aligned} & \text { Planter, hand corn, J. c. } L \\ & \text { Plate rack, } J .\end{aligned}$
Plow, E. Wlard (r)...............................
Plow and cultivator point, o. F. Philips


Pocket book, A. M. Le Vino.
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Sewiog machiue, Dinsmore \& C


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Stove, base buruling, E. Bu............
Sove, cookling, Cawthou $\&$ Ez
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tione plpe damper. J. J. M. Horto
Stove pipe damper. J. M. Horton..
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swich lockling aparatus, Dikema
Ticket clasp, ciay $\&$ Dorr .........
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Tobsco. preparing, w. s. Klmb
Tool handie, w. J. Thomson.
Toy, A. \&
Toy, G. Yu
Toy, mustal, B. Gade.
Tov widd wh
Toy, wind wheel, w. Gorton.
Trap, anImal, w. s.
Irap, fy, H . Carter
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Venicle seat ,J. A. Curtis

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Ventlator cap, G. Kavanaugh.
Ventilo
Ventilator or screen, antomatic. I. A. Salmon..
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Washng machine, H. Grandean...
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Water wheel, J. w. Ross.

Whip socket, W., W. Richard
Window screen, E. B. Lake.
 Wood- preserving compound, J. A. Draper

applications $\overline{\text { FOR }}$ EXTENSIONS.
Appllcations hav, b ben duly nied andare now pending tngs upon the respective applications are appolnted for the days herel natter mentloned

ley. September 23
EXTENAIONS GRANTED

DESIGNS PATENTED.




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 7,519- RANQE. - J. Martho, Philadelpha, Pa.
 TRADE MAR $\overline{\mathrm{KS}}$ REGISTERED





bchedule of patent fees.
on each Trade Mark
on flling each applcation ior a Patent (17 yeara)
On appeal to Examiners--1n-Chiet
on avplication tor Reisana...........t.
In application for Extension of Patent on flling a Disclalmer
mn an application for Deesign ( $3 \times$ y y
mapplication for Destgn ( 7 years)
CANADIAN PATENTS
Jibt of Patents Granted
July 6 тo 8, 1874.
3,590.-J. Corbett, Hartford, Hartord county, Conn. called "Corbett's Improved Registerting Tlicket Punch " July 6,1877
$3,551-$ A. Jeft


Ainélorations aux étabis de ménulsters, dit "Etabl

## July 6,187

.553.-RR. B. Underhill, Corinth, Alcorn county, M188, tee, called "Uneventill's Inproved Coffee Extractor
July 6.1874.
3594-,
3594-J. Young, Goderich townahip. Huron county, or stafts of threshnting machines and other maehtine called "Young's Safety coupl'ng." July 6 , 1874 .
3,599.-J. E. Sanders, New Bed ord, Britol cou
3.595. -J. E. Sanders, New Bedrord, Bristol count
Mase, U. S. Improvement in flower pots, calle "sinders' Improved Flower Pit.", July 6, 1874 .
3,596. J. Davis, St. Paul, Ramsey county, Minn.,






3,600-F. R. Smt h, Bennington, Bennington county, Vt.

3,601.-J. Brooks and A. Bourasea, Coat icook, Stanstea countr, P. Q. Washnp machine, called " Brooks
Bourasa Lightning washng Macctue,



3.603.-J. H. Went worth, Boston, Suffolk county,Mass,
U.S. Improvement In stoves, called "Wentworth's U.S. Improvement in stoves, called ".
Improvements In to toves." July $6,1844$.

H. R. Tracy's Sewtng Machne Cabinet." July $6,1874$.
3,b05.-D. Ashbury and E. A. Obborne, Charlotte,
 "A shbury's \& Osborne's Apparatus and Process for
Bleachtng, Wasilig. Mak'ng Extract. etc." July 6



o.,U. S. Improvements on clothes wringing machines and benches therefor, called "Mas's Wringing an
Wash Bench." July 6,1874


bined Reaptng and Mowting Machntee," July 6, 1874.
3,609.-W. N. Whiteley, spring fild, Cliark county, U. S. Improvenents on machnes for reaping an
mowlog, called "rhe Champlon Harvester." July
$\stackrel{1874}{10}{ }^{1810}$.
.60.-J. W. Cathbertson, Brantlord, Brant county, Oat. etc.. callea "Cuthbertson's self Wringing Mop." July $8,1874$.
3,611-A. Burbank and H.E. Shafter, Rochester, Monro
county, N. Y. Improvements on lamps, called "Bur bank's Kerosene and Atr Light." July 8. 187.1
3,612. J. Hughes, Bloomtngton, Mclean Cound
U. s . Improve , iont in machnnes for re county, Ill
U.S. Improvemente In machnnes for reparirng bonle
nues, called "Hughes' Machne for Reparing Bolle

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