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ONE OF THE TWIN ENGINES OF THE BATTLESHIP MASSACHUSETTS, U. S. N.-[See page 213.]

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a patent attorney firm to be disbarred.
As the result of his investigation into the charges against Wedderburn \& Company, of Washington, D. C., the Commissioner of Patents has recommended that the firm be disbarred. The case has had a lengthy hearing before Assistant Commissioner Greeley, who has decided that Wedderburn \& Company are guilty of ir regular practices, and recommended them for disbarment. The decision has been approved by Commissioner Butterworth and is now before the Secretary of the Interior, Cornelius N. Bliss, for review and approval. Briefly summarized, the charges which have brought this firm under the ban of the Commissioner were as follows: Unprofessional conduct in soliciting busines by giving away medals for inventions ; taking applica tions when there was no chance of a patent being granted ; and making incomplete searches for patents. The following extracts from part of Assistant Commissioner's Greeley's decision will serve to show some of the grounds on which the disbarment is based:
"The various papers sent by the respondents (Wedderburn \& Company) with their first letter to a corre spondent-the "How to Get a Patent," "One Thousand Inventions Wanted," etc.-were calculated and intended to encourage would-be patentees to believe that there was a great demand for the most simple in ventions; that in many fields of invention there were no satisfactory devices; that the public was eagerly a waiting inventions in lines in which, as a matter o fact, there are hundreds of devices already patented The "One Thousand Inventions Wanted," as is evi-
dent to any one experienced in the arts, is little more than a list of old inventions. Certainly very many of the inventions therein stated to be "wanted" are in ventions for which many patents have been granted. Throughout their advertisements and the pamphlets and papers sent out by them, these respondents en deavor to impress upon the public the value of simple inventions. They state in "How to Get a Patent" that small things are most valuable. In "Prizes on Patents" they state that "it is not the great, comple and expensive inventions that bring the best returns to their authors, but the little, simple and cheap ones." In the advertisement, "Wanted, an Idea," they ask "Who can think of some simple thing to patent? In all this there is that half truth that is in its effect worse than a falsehood.
It is true that some small inventions, simple inventions, which have required little thought and little knowledge of the prior art on the part of the inventor, have proved of value. It is equally true, no doubt, that in lotteries some one for a trifling outlay has won a large prize Yet the effect of lotteries is recognized as demoralizing to a degree. To endeavor to impress upon the public the idea that any one without experience in the art,
without knowledge of what is claimed in the art, withwithout knowledge of what is claimed in the art, with out study, and thought, and experiment, can evolve in ventions of value, is as demoralizing as the idea so
strenuously insisted on by lottery agents that any one strenuously insisted on by lottery agents that any one
who buys a ticket may win the great prize. It is as true in inventions as in everything else, that what costs nothing is worth nothing. The valuable inventions are those which are the result of hard work, carefu study, and experiment, oy those who have familiarized real needs in the art. The careful student does not always produce inventions of value, but he is at least not likely to merely reinvent what is already known,
what is already before the public, either adopted by the public or tested and thrown aside as worthless The tyro, ignorant of what has already been done, ig norant of what is practical, what is needed in the art, having before him such meager and misleading infor ventions Wanted," works in the dark, and it is not surprising that he at most merely reinvents what is old. Out of thirty-three thousand inventions on which searches were made by the respondents in two years, over twenty thousand were, even by their searchers, incom petent and inexperienced as many of them were found
to be, at most reinventions of what was already old to be, at most reinventions of what was already old a large proportion of those reached by the respondents advertisements are country people, many of then, a and small knowledge of the arts. To induce such people to believe that these old and well worked fields of invention are new and untried fields in which in ventions of value could be readily made by them is grossly deceptive ; is demoralizing to the same extent and in the same way as the alluring prospects held out by the lottery agent.

It has not always been
on their inventions a once upon receipt of the respondents' first letter with 35 its accompanying pamphlets and papers. When the supposed inventor failed to reply promptly, the re ${ }^{48}$ evidence and as admitted in the stipulation signed by counsel, sent him an undated circular offering to advise him free of charge as to the patentability and salability of any device he might have. Those
who took advantage of this apparently liberal who took advantage of this apparently libera
offer (as, for instance, Nagaye, letter of August

1896,) received in reply a letter containing information which, in so far as it was not positively false and misleading, was such advice as could very well have been given for nothing, for it was worth nothing. Instead of giving substantial advice as to patentability, it merely stated that the invention was of a patentable nature, but stated that to determine its patentability, a search at a cost of $\$ 5$ would have to be made. The respondents, in sending out the letter promising advice free of charge as to patentability were well aware that novelty is an essential, the pri mary essential, of patentability, and no advice as to patentability that would be of any value could be given without determination of the novelty."
We reserve any comments upon the decision until a later issue.

PROPOSED AMENDMENTS TO OUR PATENT LAWS.
It is characteristic of the times that there should be a growing disposition, just now, to inquire into the working of the patent laws of the country. The pro gressive spirit which prompts the inquiry is, on general principles, commendable. At the same time it should be borne in mind that the question of a change in ex isting laws should always be approached in a guarded and conservative spirit, especially when it affects a branch of our laws like that relating to patents, under which such splendid results have been achieved.
We are in receipt of a circular from the National Association of Manufacturers of America, which is being issued with a view of obtaining an expression of opinion on the advisability of certain proposed reforms in our patent laws. The first suggestion is that the government should charge an annuity on patents, in order to invalidate such patents as are not considered by the owners of sufficient value to warrant the payment of the annuity, but which interfere with the working of later and dependent patents. It is sug gested that the annuity would clear the field of worth less patents and furnish an income to the government which "might be used to advantage in the Patent Office.
The chief objection to this proposal is that it is not possible for any one to foretell what is or is not going to become a valuable patent. It sometimes happens that a patent may lie dormant for years and may suddenly become invested with importance owing to some later
discovery or invention. Furthermore, it may take discovery or invention. Furthermore, it may take some years of experimentation in order to get the in ention in such a condition that it possesses com mercial value. In the meantime, and while the in entor, who is generally impecunious, is harassed by adversity and the depression consequent upon his failure to perfect his invention, he is met with the necessity of raising funds to pay a harsh and unneces sary tax into an already overflowing treasury. To the poor inventor it would be an exceptional hardship.
As to the increased income which could be realized by the Patent Office, this institution already has more noney than it can use : the surplus for the past year being over $\$ 300,000$, and the total surplus to its account in the treasury amounting to over $\$ 5,000,000$.
The second suggestion is that, in view of the fact that oreigners are allowed to procure patents in this coun ry and hold the same without further expense or trouble than the first cost, while our citizens are obliged to pay annuities in many foreign countries, often amount ing to hundreds of dollars, and also are in many cases obliged to work their devices at intervals, laws should be passed making annuities and working obligatory on all patents granted to foreigners in this country. In some countries it costs from $\$ 600$ to $\$ 700$ to secure and maintain a patent, as against $\$ 35$ government fees in the United States. It is proposed that if a native of such a country applies for a patent in the United States, he shall be made to pay initial fees and subsequent annui ies of the same amounts as he would have to pay at home. That is to say, the price for a United States patent shall be no longer $\$ 35$ to all the world, but an amount varying according to the nationality of the applicant.
To this absurd proposal we feel it our duty to give our unqualified dissent. It is wrong in principle, and we fail to see that it can be productive of any good results should it be put into effect. Whether it is in tended as such or not, it will carry the appearance of an act of retaliation against the foreign countries affected, and unless some good practical results can be shown as likely to follow from such a measure, we shall be open to a charge of a lack of international fairness and good feeling
It does not properly concern us what the patent fees or requirements of other countries may be provided ou citizens are afforded the same privileges as natives This is the only question which concerns us and we be lieve that there is no nation which, in regard to these matters, has any discriminating laws against foreigners. Such a course as proposed would therefore be wrong in principle and foolish in policy, and would be distinctly retrogressive in spirit.
Additional importance is lent to this circular by a rumor from Washington that there is a movement on foot in that city to draw up amendments to the exist
ing international treaties which will embody similar suggestions, and that these amendments will be presented at the forthcoming meeting of the representatives of the nations concerned, to be held at Brussels next December. One of these amendments would restrict the articles which are patentable in this country, so that no foreigner can patent an article in the United States which he cannot patent in his own country, and all the amendments appear to have more or less of the retaliatory flavor to which we have already referred.
It is to be hoped that the rumor is not well founded, or at least that the subject matter of the amendments is not as reported. There was a time when international discrimination existed in the matter of fees and taxes; but, fortunately, all such agreements were subsequently revoked, and the tendency of later negotiations has been in the direction of throwing open the several patent courts in the most liberal international spirit. It seems to us that the proposed amendments would be a decidedly retrograde step and one entirely at variance with the generous policy which has characterized our Patent Office in the past and has contributed so largely to its success.
We are in thorough accord with the third suggestion of the circular that we should have separate courts for adjudication of patents, with the object of expediting patent litigation.
If amendments are to be offered at the forthcoming conference, they cannot be too seriously considered, and no resolution should be placed on the table that has not received the most widespread and thorough discussion. We are glad to note in this connection that at the meeting of the American Bar Association, at Cleveland, the committee of fifteen was requested to consider such proposed amendments as are intended to be made at Brussels, and make recommendations to the Secretary of State, or head of other proper government department, as to the instructions to be given to the delegates from the United States to this conference.

## THE SEVENTH INTERNATIONAL GEOLOGICAL CONGRESS.

## vonal

About a thousand geologists were in session recently for eight days at St. Petersburg, Russia. They adjourn ed on September 5. The printed official list, in which some changes were afterward made by reason of addi tions and absentees, may be taken as fairly represent ing the make-up of the congress. Russia, of course furnished the largest number of members, 271 in all. Germany stood next with 187 delegates. Then came the United States of America with 113 names. From France came 89 ; from Great Britain, 72 ; from Italy 51 ; from Austria, 76 ; from Switzerland, 23 ; from Bel gium, 24 ; from Sweden and Norway, 14 ; and the remainder from Spain, Holland, Servia, Denmark, Portugal, Roumania, Australia, India, Japan, Transvaal New Zealand, Canada, Mexico and the Argentine Re-public-twenty-four nations in all, and probably more when the final list appears. Amid so many languages some one had to be selected as the official medium of communication and record, and that distinction was unanimously accorded to the French tongue. Yet as not a few who are eminent in science are not equally so
as linguists, much liberty was allowed in the discussion, and a few papers were read in English or German Unfortunately for most of us, the daily reports by the press were in Russian, a language whose intricacies we
have not mastered beyond the requirements of the hotel, the railroad and the street. The immense treas ures of knowledge, especially in the various sciences, that are now locked up in the Russian language ought by translation or otherwise, to be made accessible to the remainder of the civilized world. As we explored the mazes of the great museums of St. Petersburg, Moscow, Kazan, Ekaterineburg and other Russian cities, and found most of the specimens labeled and de-
scribed in Russian, we felt regret that, besides the vernacular, they could not also have given us in French o in Latin the knowledge that we so much desired and generally found it hard to obtain. It should be added, however, that the committee of arrangements gener ously distributed for our benefit guide books (in French) and other helpful literature, as well as numerous maps and other aids, besides the verbal information so freely and patiently given in answer to our myriad questions on every imaginable topic. Especial mention should be made of the voluminous guide book prepared ex-
pressly for the excursions before and after the session of the congress, a thick octavo in thirty-four parts, self-bound, so that any one part or more could be ex tracted for use and easily returned to its place again. We found many citizens in the large places who could speak French or German, and here and there one familiar with English. But in exploring more rural regions, like those along the Volga and amid the Ural Mountains, we found the mass of the people speaking no other than their native tongue, and wondering in their simplicity why we could not speak it as well as they, or at least well enough to answer their civil and perfectly natural inquiries as to our welfare and our
wants. Much of our intercourse with the natives had
to be by pantomime, and it is wonderful how many
ideas can be exchanged by that primitive means o communication.
The president of the Geological Congress, His Imperial Highness the Grand Duke Constantine, who is also the president of the Imperial Academy of Sciences, opened the sessions by a graceful address of welcome, speaking of the attractions and resources of the great country whose honored guests we were, but also recognizing fully the international character of our organization. The display of gold and scarlet and the bril liant uniforms of military officers present at the opening dazzled our republican eyes. The best we could do was to wear our dress suits and make the most of the silver medal with red, white and blue ribbons attached to it, the simple insignia of the Geological Congress its heraldry a hammer and mallet crossed in a wreath of oak leaves, and its motto the Latin words, "Mente et Malleo:" and on its obverse another wreath, en circling the legend, "Rossia, 1897." The acting pre sident was Dr. A. D. Kar pinsky, the director of the geological survey; and the general secretary, Dr. Th N. Tschernyschew, geologist in chief. Dr. James Hall, of Albany, N. Y., was named as the first of the three honorary presidents, the other two being Prof. Cape lini, of Bologna, and Prof. Renevier, of Lausanne. Vice
presidents from the various nationalities represented presidents from the various nationalities represented
were also appointed, forty in all, some one of whom usually presided at the daily sittings of the Congress. Those from the United States were Profs. Marsh, Em erson, Frazer and Emmons. Seven assistant secreta ries were appointed, who found the office no sinecure Mention must also be made of the diligence of the young men from the university, who served on the bu reau of information, and whose patience we taxed in many ways, necessary and sometimes unnecessary.
Early in the meetings of the council Prof. Gaudry of France, extended an invitation from that nation for the eighth meeting of the International Congress, to be held in Paris in A. D. 1900.
The invitation for the ninth meeting, in A. D. 1903 was brought by M. Tietze, on behalf of the Austrian geologists, to be held in Vienna.
Both these invitations were unanimously accepted with applause. While undoubtedly the great majority of those gaining membership in this International Conress are worthy of the distinction, it has been objecte o that a few are enrolled who have either been noted in chemistry, engineering, or some other science not included under the general term "geological," and now
and then some one not known in any branch of science. and then some one not known in any branch of science
To meet this difficulty the American geologists offered through Prof. Emmons, a resolution that, hereafter nembership shall be reserved for those who are ap proved by the principal geological societies or institu tions of the countries to which they belong. Othe ways of meeting the matter were also suggested.
The daily meetings were held in the large hall of the Zoological Museum of the Academy of Sciences, which was beautifully decorated for the occasion.
One of the important questions discussed was as to the best methods of the classification of geologica strata. Every student of geology has found himsel more or less confused as to the terms in which the for mations of different parts of the globe are described There is an imperative need of revising the nomencla ture and much has recently been written on the subject Among those who took part in this discussion were Profs Renevier, Loewinson, Lessing, Frech, Zittel, Bertrand, Karpinsky and Pavlow. The conclusion was in the form of a resolution advising geologists to rest on the ground of the historic method of classification, with th endeavor to make it gradually "more and more natu ral." To this it was added that the council should name a special commission whose duty it should be to study the principles of classification, in the spirit of this resolution." This same subject was more fully discussed in the general session, where highly import ant suggestions were offered, especially by some of the Russian geologists, growing out of their observations of the mineralogical composition and structure of the rocks found amid the Ural Mountains. Lengthy and aluable memoirs were presented to the Congress con cerning various aspects of geological nomenclature, to which more full recognition may be given in some uture communication. The conclu*ion reached seems to be perhaps the best that can be done at present, but there is a strong and growing demand for some thing better than the so-called "historical method," which, as was well remarked by Dr. Karpinsky, is wholly artificial. What is needed is a system natural, practical and uniform.
The business meetings occupied the morning; but he afternoon of each day was given up to the reading of scientific papers and their discussion. The follow ing are the titles of some of the most important: "On
the Glacial Period in North America," by Prof. Upham,
of Minnesota, and "On the Direction of the Flow of Glaciers and the Origin of Moraines," by Prof. H. F. Reid, of Johns Hopkins University. These were followed by two papers by Mr. Lindonall, on "The Cause of the Ice Age," and "How is the Mammoth Frozen in North Siberia?" Mr. Marsden Monson, of California Nffered a paper on "The Evolution of Climates." Papers on "Orography" (or mountain making) were read by Messrs. Meunier, Sacco, and Prinz. Prof Meunier also gave the result of his studies concerning the platinum region of the Ural Mountains. Dr. Tillo gave his views as to the remarkable depression of the center of the Asiatic continent, and also on certain magnetic anomalies of the center of Russia in Europe Dr. Makowsky spoke on the existence of the great nammalia, the mammoth and rhinoceros, the huge bones of which are found in such comparative abundance in Russia, using the superb materials collected to explain his paper. A communication on the fossil rep iles of Perm and Wologda was offered by Mr. Seeley Other papers and addresses were presented, all of which, either in full or by abstract, will be published in the proceedings of the society. The writer is aware that this is an imperfect resume of the proceedings and de liberations that absorbed the attention of some of the most noted geologists of the world, and it is his intention hereafter to review some of them more in detail. He will also give some account of the remarkable geological excursions made in connection with the Congress, ccupying many weeks and covering many thousand f miles. They were planned with great care and nanaged with ability. They gave those who availed themselves of the privilege an opportunity to see prac tically the whoie of Russia in Europe and a small por tion of Russia in Asia, and to get some idea of the mmense territory and vast resources of the empire of the Czar. Everywhere the citizens came out en masse to welcome us, and frequently with music and banners and sumptuous banquets. The respect with which they treated their national guests was uniform, whether hown by prince or peasant. The cities of St. Peters burg and Moscow led the van in their costly and regal hospitality, but did not really exceed what was done by some of the smaller cities less widely known. Th doors of the Summer Palace at Peterhof were thrown wide open for our reception, and the banquet spread in our honor in these imperial halls, amid marvelous fountains and rare paintings and inspiring music, was a feast never to be forgotten. The mayor of St. Peters burg also received us in the City Hall; the Grand Duke gave a reception to a select number at the Marble Palace, and there were numerous more private nanifestations of Russian hospitality.
The public buildings, the Winter Palace, the Ermit age, with its marvelous treasures of art, the Bergaca demie, with its renowned collections of specimens in paleontology and mineralogy, and, indeed, every place of beauty and learning and historical interest, parted its doors for us at the sight of our simple silver badge This also was a talisman permitting the use of the camera without interference or hindrance. As a result hundreds of photographs of rare, curious and interesting objects were taken, and it is safe to say that in no city, from St. Petersburg to Ekaterineburg, could any tray kodaker easily find a roll of films or box of plate remaining, unless the exhausted supply has been re plenished during our stay. The market is swept clean Pictorial fruits will be abundant as soon as they have had time to ripen.
Perhaps the reader may be interested to know how long it takes to go from New York to Moscow when on is in a hurry. A cablegram from Dr. Karpinsky de cided me to join the excursion to the Ural Mountains that was made before the Congress met at St. Peters burg. I sailed by the next steamer, which happened to be the Campania, of the Cunard line; reached Liver pool in six days and London by midnight; took a norning train by the Flushing route, and arrived at Berlin on the morning of the eighth day, where I rested for twelve hours; crossed the Russian frontier at Alex androwo with the usual delay for inspection of baggage and passport ; and by noon of the tenth day the gilded domes of Moscow flashed into view. By the official tables the entire distance from New York to Moscow, by the route taken, extends 5,000 miles; thus making the average rate of daily travel 500 miles for the ten days, including stops for about twenty-four hours en oute. Our flying glimpse of England in harvest time of Holland's luxurious gardens and picturesque cot ages and mansions; of Berlin's ripe yet modernized magnificence, prepared us by way of contrast for what we were to see in the proud and strong Russian empire where the Occident and Orient so strangely and wonderfully commingle.

As France taxes bicycles and tricycles, the number of machines used in the country is known exactly On January 1, 1897, there were 329,814 taxed, an in rease of nearly 74,000 over 1895 , which had shown an ncrease of 53,000 over the preceding year. The re yenue obtained in 1896 was $3,272,339$ francs. Paris de partment, the Seine, heads the list with 62,892 bicycles paying a tax of 626,916 francs.

## High Kite Flying.

The highest recorded altitude ever reached by a kite was obtained on the afternoon of September 20, at the Blue Hill Observatory. The top kite reached the height of 10,016 feet above sea level, or 8,386 feet above the summit of the hill. The ascent began at noon, and the highest point was reached at seventeen minutes past four, when seven Hargrave kites were held by nearly four miles of wire. An instrument for recording the temperature, humidity and pressure was hung about 130 feet below the highest kite. At the highest point reached the temperature was 38 degrees, while at the ground it was 63 degrees. At the height of 4,000 feet the humidity rose rapidly; at 7,000 feet the humidity was almost at the point of saturation ; at 8,000 feet it began to fall, and at the highest point it was extremely low. At the ground level the humidity remained low during the entire ascent. The instruments and kites were brought down at $6: 40 \mathrm{P}$. M., having been more than a mile above the hills for over five hours.

## IMPROVED RAILS AND RAIL FASTENINGS

The accompanying engraving illustrates some improvements in railway rails, fish plates, and means for holding them to the rails, which form the subject of a patent issued to James Johnston, of No. 13 Public Square, Bradford, Pa. The use of these rails involves certain changes from the ordinary method of track making, the rails being anchored to the road bed by their middles. They are held in line by track spikes, and the fish plates are designed to prevent up and down play at the ends of the rails, having no other function. The rail and fish plates are shaped to correspond with one another for this purpose, and the rail is further altered on the margin of its flange for the purpose of making a solid guard rail combination. The inventor claims that with this construction the track will not creep, and the rails will not be subject to the usual principal causes of breakage, as there will be an absence of pounding and clicking at joints, and greater safety in guard rails-all to be had without increased expense, as what is spent on anchors and milled rails will be made up in saving of fish plates, nuts, bolts and labor. Fig. 1 represents the rails tied together by the fish plates and clamps, Figs. 2 and 3 being sectional views, and Fig. 4 representing a section through the guard rails, showing the spacing block and fish plates employed. The fixing of the anchors in the roadbed must be done with absolute accuracy. If thirty foot rails are to be used, and it is expected that they will expand one-fourth of an inch under highest temperature met with, then the anchors will be placed at thirty foot, one-fourth inch centers apart. In ordinary situations a good tie will be a sufficient foundation for an anchor, but on grades, side hills, or other difficult situations, other security, such as piles, drive pipe, crib work, or masonry, must be provided. The rails will be made with an indentation in the flange, in the exact center so that after the anchors are once correctly placed, it will be only common labor to put in the rail and secure it with a soft iron key hammered down flush Being thus laid, the ends of the rails will always move to and from the centers in contraction and expansion. All joints will be equally open, and rails cannot crow


JOHNSTON'S RAILWAY RAILS AND RAIL FASTENINGS
one another; in fact, they should never quite touch. In the design of the rail on section the ordinary pattern is followed, but it is made heavier by the addition of ribs to make the web square with the head and flange, and the outer margin of the flange is raised and made heavier in order that rails placed side by side for guards may have a bearing against one another. The rail is preferably finished in a milling machine, in order to ob-
tain true angles and surfaces, and the band or clamp with which the fish plates are held in place will cost little compared with the cost of bolts, nuts, and nut locks ordinarily used. These combinations are all secured in place by bands, which are passed under the rail and turned up on both sides, and should any of


Fig. 2.-THE OSGOOD FRICTION CLUTCH.
any shock and at ali angular velocities. The throwing out of gear is just as easy, and is instantaneous and complete.
Let us point out another possible utilization. As the elastic cone is provided with lugs, the motion may be transmitted in opposite directions to the shafting to be driven, when the driving shaft is actuated in one direction or the other. Supposing that we have two motors actuating one shaft in common through pulleys provided with couplings having a double motion, it will be possible to render regular the running of these two motors one by the other. The coupling may also be so arranged as to prevent one motor from carrying along the other.
Sometimes it is necessary to have transmissions of variable velocity. Fig. 2 shows us the principal ar rangements of the Osgood system. A shaft, A, which receives motion from the pulleys to the left, carries a disk, $D$, to the left and right of which are placed two friction rollers, R and $\mathrm{R}^{\prime}$, that present bevel faces at their rims. These roilers may be easily shifted by tightening the springs, S and $\mathrm{S}^{\prime}$, more or less by mean of the rod, P. At the sides of the rollers are arranged two other disks, E and $\mathrm{E}^{\prime}$, that actuate the same shaft, $B$, that transmits the motion. The rollers, $R$ and $\mathbf{R}^{\prime}$ rub through one of their faces against the disk, $D$, and through the other face against each of the disks, E and $\mathrm{E}^{\prime}$. These latter are therefore set in motion, but with a much greater angular velocity, and one that varies according to the position occupied by the collers. The velocity is maximum when the rollers are in the center and minimum when they are at the periphery.-La Nature.

A Lesson in Economy.
Consul Germain writes from Zurich, in re gard to a plan recently introduced in the pub lic schools of several European cities. In Brussels, the children attending public schools were requested by their teachers to gather up on their way to and from the school, all such apparently valueless objects as old metallic bottle capsules, tin foil, tin cans, paint tubes refuse metals, etc., and deliver their collections daily to their respective teachers.
In the period from January 1 to October 1 1895 , or within eight months, the following amounts were collected: Tin foil, 875 kilo grammes ( 1,925 pounds) ; old paint tubes, 100 kilogrammes (220 pounds) ; bottle capsules, 2,00 kilogrammes ( 4,415 pounds) ; scraps of metal 555 kilogrammes ( 1,221 pounds) ; total, 3,537 kilogrammes ( 7,781 pounds). This apparent rubbish was disposed of and the proceeds applied so as to com pletely clothe 500 poor children and send 90 sick one to recuperation colonies, and there still remained quite a balance, which was distributed among the poor sick of the city.

## A VEHICLE AXLE IMPROVEMENT.

The construction shown herewith, which forms the subject of a patent recently issued to Simon J. Harry of Washington, D. C., affords novel means for prevent ing the cap nut from turning. Fig. 1 illustrates the application of the improvement, portions of thehub being broken away. The axle, spindle and box may be of or dinary pattern, but the outer end of the spindle is threaded, as shown in Fig. 4, and has a seat for a collar with central opening squared on two sides, as shown in Fig. 2, where the collar is represented in place, having on its outer face a spring pawl. The pawl, shown in Fig

harry's hub attaching device.

3 , fits in a suitable recess in the face of the collar, and its point projects to engage a shoulder forming the end wall of a recess in the inner end of the cap nut, locking the latter from accidentally turning off by jarring or the backing of the vehicle. To release the pawl, a slender od, nail or other suitable implement may be passe through an opening in the nut, by which the poin of the pawl may be pressed back and the nut released

THE ENGINES OF THE BATTLESHIP MASSACHUSETTS.

The Massachusetts is one of three heavily armed and armored first class battleships whose construction was authorized by Congress June 30, 1890. They were to be specially designed for coast defense, but at the same time were to possess sufficient seaworthiness to enable them to engage in offensive operations in distant seas. The construction of this trio was put in hand at once. two, the Indiana and Massachusetts, being built by the William Cramp \& Sons' Ship and Engine Building Company, of Philadelphia; the contract for the third, the Oregon, being obtained by the Union Iron Works, of San Francisco.
The handsome full page engraving which forms the frontispiece of this issue was made from a photograph of one of the twin main engines of the Massachusetts, as they stood completed in the erecting shop at the Cramps' shipyard. There are two vertical, direct acting, triple expansion engines placed in separate watertight compartments, the engines being built exactly in duplicate. The cylinders are carried by inverted cast steel Y frames on one side and by hollow forged steel cylindrical columns on the other, which are bolted to a cast steel bed plate and strongly sway-braced. The sway-braced. The high pressure cylinders are fitted with working liners and the inter-
mediate and low mediate and low pressure cylinders are steam jacketed on the sides and bottom. The diameter of the high pressure cylinder pressure cylinder
is $341 / 2$ inches, of is $341 / 2$ inches, of the intermediate 48 inches, and of the low pressure cylinder 75 inches, the common
stroke $\quad$ being $\quad 42$ inches. The cylinder relief valves are placed on the valve chest casings, on connecings, on connec-
tions between the tions between the steam and exhaust sides of the main valves. Single ported main valves, provided with balance pistons, are used, and of these there are one for the high pressure, two for pressure, two intermediate and four for the and four for the low pressure cyl-
inder. Stephenson inder. Stephenson
valve gear with valve gear with
double bar links is used.
The pistons are dished steel castings, and the piston rods, 7 inches in diameter, are of forged steel, as are also the connecting rods, which are $65 / 8$ inches dia$65 / 8$ inches dia-
meter at the upmeter at the up-
per end and $81 / 2$ per end and $81 / 2$
inches diameter a


ENGINE STARTING GEAR AND ENGINE ROOM BATTLESHIP MASSACHUSETTS. surface is $3,647 \cdot 5$ square feet, the total heating surface of each boiler being 4,310 feet. The closed stokehold system of forced draught is employed, and air is supplied tem of forced draught is em
by ten Sturtevant blowers.

There are two vertical duplex double acting Blake pumps in each feeding fire room of the main boilers and in each fire room of the auxiliary boilers. The main feed pumps draw from the feed tanks, delivering only to the boilers, and the auxiliary feed pumps draw from the feed tanks, sea, bilge, secondary drain pipe and boiler and deliver to the boilers, fire main and overboard. Altogether there are thirty-four pumps of various kinds on the ship. stood when it is borne in mind that, in addition to supplying the main engines of over 10,000 horse power, they must supply steam for 86 auxiliary engines, or a total of 158 cylinders.
The official trial consisted of two runs in opposite firections, over a measured distance of 31 miles, with a inches diameter at the lower end. The crossheads $\mid$ estal carries a composition bearing lined with white $\mid$ head. In the center is seen the starting gear, and we
diameter is 15 feet and the length 18 feet. The tubes are $21 / 2$ inches outside diameter and their total heating

The work that has to be done by the boilers is underconditions. The Massachusetts was 23.79 feet forward and 24.38 feet aft, and her displacement 10 , 65 tons. The verage speed was $16 \cdot 21$ knots. The evolutions per minute were for the starboard en gine $132 \cdot 3$ and fo! the port engine 133.06 . The boil er pressure was 163 pounds and the pressure at the engines $155 \cdot 6$ pounds. The tota indicated horse power was 10 , $402 \cdot 6$, and a maxi mum horse power of 11,440 was indicated during 15 minutes of the run to the south.
The boilers gave great satisfaction and there was no tendency to prime. The main engine ran with out any heating of consequence, and it was neces sary to use but little water. A careful examina tion was made of boilers and boiler and el gines after the trial and all part were found to be in excellent condi tion.
The engraving on this page re presents the inte rior of one of the two engine rooms of the Massachu setts, showing on the right the lon gitudinal bulk are of forged steel and they are provided with man- metal, the cap of the bearing being of cast iron have a glimpse of one of the heavy connecting rods ganese bronze slippers faced with white metal. The eccentrics are of cast iron, the straps of composition and the rods of forged steel. The steam reversing engine, with 14 inch by 20 inch cylinder, is connected to an arm on the reversing shaft, and the hand reversing gear, consisting of wheel, wormshaft, pinion and rack, is also connected to an arm on the reversing shaft. At the forward end of the main engine will be noticed the engine for turning over the main shaft. It is attached to the frame of the high pressure cylinder and has a pair of cylinders 7 inches diameter by 7 inches stroke. It turns a worm on its main shaft, which in turn operates a vertical worm shaft gearing to a large worm wheel on the main shaft, as shown.
The main steam pipe, 13 inches diameter, is of copper, reinforced by steel bands placed 6 inches apart. The exhaust pipe to the intermediate cylinder is $161 / 2$ inches in diameter, that leading to the low pressure is $201 / 2$ inches, and the two leading to the condenser are $181 / 2$ inches in diameter. There are two main condensers in which the circulating water passes through the tubes, which the circulating water passes through the tubes,
the total cooling surface being 12,710 square feet, and
metal, the cap of the bearing being of cast iron
lined with white metal. There are 11 horseshoes, 21 inches diameter, made of a mixture of cast iron and steel, and lined with white metal. The crank shafts are 14 inches diameter, with a 6 inch hole; journals are 14 inches diameter by $173 / 8$ inches long. Crank pins are 15 inches by 17 inches, with a $61 / 2$ inch hole Thrust hafts are 133/ inches diameter, with 6 inch hole, and the line shafts are of the same dimensions.
The propellers are of manganese bronze and are three bladed. The pitch is variable, from 14 feet 3 inches to 16 feet 3 inches. The bosses are secured to the shaft by a feather key and a steel nut which is screwed on and locked in place.
There are six steel boilers, four double-ended main and two single-ended auxiliary, all of the horizontal fire tube type. The former have eight and the latter wo corrugated furnaces. The longitudinal joints are treble riveted, with double butt straps. The joints on the circumference are lapped and treble riveted. The furnaces are fitted with Cone's patent shaking grate bars. The steam pressure is 160 pounds. The shell bars. The steam pressure is 160 pounds. The shell
plating of the main boilers is $1 \frac{1}{6} \frac{9}{4}$ inches thick; the
and the link motion.
We are informed by Mr. George W. Melville, engi neer-in-chief of the navy, that circumstances prevented the carrying out of a trial for coal consumption of sufficient length to give reliable data.

## To Blacken Wood.

M. Koninck suggests the following method of black ening wood, which has the advantage of resisting acid and alkalies:

Cupric chloride...
Sodium chlorate.
Water ......... A.

Aniline hydrochlorate.
Water.... B.
. $.1500{ }^{150}{ }^{2}$
Paint the wood with A and a short time after with 3, and remove with a damp cloth the yellow powder hat forms. Repeat this operation every day till the desired color is obtained, and then rub the wood with vaselin or linseed oil. By using potassium bichromate instead of the soda salt, a good black color is obtained at once.-The British Journal of Photography.

## Over 616 Miles in 24 Hours

M. Cordang, the Dutch long distance rider, has cov ered himself with glory. On the evening of September 15, at the Crystal Palace, London, he started against the 24 hour record. As the result will show, his pace was terrific from the start to the finish. In 19 hours 17 minutes and 28 1-5 seconds he lowered the world's record and had covered 500 miles. He bent to his work in the last four hours, and without slackening his speed raced for a record that will stand for a long time, even in this record breaking age. As he neared the end he gathered himself together and raced like the wind, says the American Wheelman. He finished his race in a grand burst of speed, and at the end of his ride appeared but little the worse for his great race. He covered 616 miles and 340 yards.
Cordang was entered in the recent twenty-four hour race at Paris, but had an accident in the early part, and was compelled to withdraw. He was greatly chagrined at this, as he had confidently expected to beat Huret, who in that race covered over 564 miles in the twenty-four hours. He has been training assiduously ever since, and the record made was an evidence of the good cause he had for confidence in himself. Cordang has not shown ary very remarkable speed heretofore this year, but has always been rated as one of the best long distance riders. In 1895 he won the 100 kilometer championship, and he also holds several of the Dutch records.

## Return of the Peary Party.

Although Lieut. Peary's latest Arctic venture has not been marked with any sensational discoveries, still it has been crowned with great success. There was no attempt made to reach a very high latitude, the idea of the expedition being to establish a principal base of supplies from which the explorers could start next season. when Lieut. Peary with one or two companions will make a dash for the pole. The "Hope" came into Sydney, C. B., on September 20, burning her last ton of coal and with her bulwarks smashed. The vessel was nearly as deep in the water as when she left the port, for the great Cape York meteorite, the largest in the world, was in the hold bedded in tons of ballast. Lieut. Peary found that the Esquimaux of the Smith Sound region were eager to co-operate with him in the work of exploration to the north of Greenland, which will be attempted next year. The party visited Cape Sabine and procured relics of the ill-fated Greely expedition, most of whose members perished of starvation at that point. The various parties which had been left at different points on the way north were taken on as the steamer came southward. The summer in Baffin Bay was marked by almost continuously stormy weather and an unusual scarcity of ice. The Hope will remain at Sydney only long enough to coal and will then proceed to New York to land the meteorite
The meteorite is of great interest, although there has been some talk that it was not really a meteorite. It will make a valuable addition to the Natural History Museum and will be worth all the expense and labor of the voyage. Forty-five years ago, when Inglefield re-
turned to Encland after his explorations along the turned to England after his explorations along the northwest coast of Greenland, he reported that the natives in the neighborhood of Cape York tipped some of their weapons with a metal which was obtained from some big stones on the coast. Inglefield did not find these stones, which were only discovered by Peary on his second visit to northwest Greenland. As was suspected, the rocks he discovered proved to be meteorites of uncommon size, and one of them proved to be by far the largest meteorite known.

The Enchanted Mesa of New Mexico.
A survey has recently been made of the "enchanted mesa" of New Mexico by a party sent out by the Bureau of American Ethnology. For a long time there has been a tradition that the "mesa" was inhabited but that it was abandoned in consequence of the de struction of the pathway leading up one of its precipitous sides, the catastrophe being doubtless due to a cloudburst. The traditional catastrophe was magnified
by repetitions, so that the Indians came to regard the elevated plateau as inaccessible.
Some years ago, Mr. F. W. Hodge, of the Bureau of Ethnology, determined to make the ascent, but he was deterred on account of the sentiment of the Indians, who held the mesa sacred. During the past summer, Prof. William Libbey, of Princeton University, ascended the mesa without finding any evidences of occupancy. Reports of this expedition having reached the neighboring Indians, they finally consented to have
the party sent out by the Bureau of American Ethnology the party sent out by the Bureau of American Ethnology
ascend the height. After measuring the eminence by triangulation, the party ascended along the ancient route and encamped on the summit for the night. Mr. Hodge examined the ground critically and Major Pradt, United States Deputy Surveyor, made a survey of the summit. A. C. Vroman, of Pasadena, Cal., obtained a number of photographs. Several potsherds, two broken stone axes, a fragment of a shell bracelet, and a stone
 pancy found on the crest, but potsherds, etc. were found $\left.\right|_{000}$
in the talus swept down from the summit. The Indian tradition is therefore affirmed. No great difficulty was found in ascending the summit, save for a few feet at the top of the cleft. This chasm was spanned by means of an extension ladder.
Prof. Libbey, who made the ascent in July, reached the summit by throwing a cable over the mound by means of a cannon. The cable once having been secured, the ascent was made by means of tackling arranged for the purpose.

## IMPROVED SASH HOLDING AND REMOVING DEVICES,

A novel form of sectional and removable window bead, which holds a sash to slide vertically, and which may be removed to permit the removal of the sash, is shown in the accompanying illustration, and has been patent d by Richard Bohrisch, of East Las Vegas, New Mexico. The outer bead is a permanent one and the two inner beads are made in sections, the upper sections permanent and their lower ends beveled and transversely apertured, a plate adapted to receive a threaded pin being secured in the window frame under the lower end of each section. The removable section of the inner bead, $A$, has its upper end beveled to cor respond with the bevel at the lower end of the upper section, to which it is removably secured by a thumb nut and threaded pin at the top and a bolt entering a T shaped slot at the bottom. The removable section of the intermediate or parting bead is similarly secured in position at the top, its lower end being inserted in an opening in the base of the window frame. In a re-


BOHRISCH'S SASH HOLDING AND REMOVING WINDOW BEADS
cess in the guideway of each sash is a hook, adapted to engage an eye on the end of the sash cord. when it is desired to disengage the latter from the sash.

## Labor Saving Insects.

That certain flies will steal a ride on the back or wings of some larger insect, and that this labor saving process may be habitual, is indicated by the observations of the Rev. A. E. Eaton, who noticed in Algeria a small fly of the Borborinæ group riding on the backs of big coprophagous beetles. They settle down on the prothorax, and on the base of the wing
"The beetles occasionally throw the
The beeer and ret rid of them by rollines on thei backs to try and get rid of them by rolling; but the flies elude all their efforts to dislodge them, dodging out of harm's way into the joinings of the thorax and
out again, and darting from back to breast and back out again, and darting from back to breast and back
again in a way that drives the beetle nearly mad. In vain she scrapes over them with her legs; in vain does she roll over or delve down among the roots of the herbage ; the flies are as active as monkeys, and there is no shaking them off,"
A somewhat similar case has been reported by Mrs Slosson, says The Independent, who observed at Fran conia a lacewing fly (Chrysopa), which seemed to have a black raised spot upon each wing, and others with but a single spot. She caught other chrysopas, and in the net with one of them was a minute Cecidomyia fly still clinging to the wing of a lacewing fly. It apparently is a tramp fly, stealing a ride on the larger insects, though the lacewinged flies are not rapid fliers, nor do they fly to a great distance.

T'he Westinghouse Electric and Manufacturing Company has received from its European company notice of the award to it by the Metropolitan Electrical Supply Company of the contract for a large electric lighting plant to be installed in London. The apparatus will be of the multiphase type, involving the use of the 'Tesla patents, which are owned in England by the Westinghouse Company. It is understood that the contract amounts to between $\$ 350,000$ and $\$ 400$,

The Prince of Monaco is said to have completed his eason's researches in the Azores.
Two new asteroids have been discovered between Mars and Jupiter by M. Charlois, of Nice, bringing the number discovered by him up to eighty-six. Palisa
The Evelyn Baldwin has arrived at Christiania, from Spitzbergen, whence she sailed northward until stop ped by pack ice. She reached latitude $80^{\circ} 45^{\prime}$ and secured valuable geological and botanical collections for the American colleges.
An English steamship engineer has recently acquired the distinction of being probably the only man ever bitten 'by a West African double-horned viper who has lived to tell of it. The doctor kept him full of brandy and injected iodine into the wound. His temperature rose to $107 \%$.
Further discoveries have been made in the wonderfu ice caverns opened up at the foot of Cow Mountain, Colo. Three chambers have been opened, the walls and ceilings being covered with great masses of ice in grotesque forms. In the center of one of the rooms is a lake $40 \times 65$ feet, with no apparent outlet.
Mr. Harmsworth, who defrayed the expenses of the Jackson expedition in Franz Josef Land, has declared that he will send two ships to the Arctic next season and keep an expedition in the Arctic regions till a complete map can be made of all the accessible parts of the North Polar world. The Jackson expedition has cost him $\$ 200,000$
Hon. Charles D. Wolcott, Director of the United States Geological Survey, left San Francisco on September 11, for the Yosemite Valley. He proposes to make topographical maps on a scale of two miles to the inch of all the forest reserves in California, including recent additions, comprising $6,647,000$ acres. The distribution of forests will be pointed out on this map, showing the commercial and uncommercial timber, agricultural lands, settlements, roads, houses, etc.

An interesting experiment is to be tried in connec tion with the Paris Exhibition of 1900. The authorities intend to establish a workmen's co-operative restaurant for the benefit of the men engaged in erecting the exhibition buildings. Arrangements are being made to supply a good meal at a very moderate price. The workmen will have the greater part of the profits divided among them, as well as the divi dend, which is expected to reach six per cent of the outlay of each man
"M. Marey has contributed to the Paris Academy an account, by MM. V. Tatin and Ch. Richet, of trial of an aeroplane invented by them," says Science. "Their first experiments were made in 1890 , but the machine was wrecked. A new machine was then constructed, with which the first trial was made last year with some success. In a second trial in June last the aeroplane traveled through the air 170 meters [ 558 feet] at the rate of 18 meters [ 59 feet] per second. The ma chine weighed 33 kilogrammes [73 pounds]. The author compare their results with those obtained by Prof Langley, and, while admitting the greater distance traveled by the aerodrome, claim that their machine had the advantage of greater weight and greater speed."
The colors of the different races depend upon the pigment in the epidermis, especially in its deeper strata. M. Breul, a recent French authority, finds according to Science that the coloring matter is in the interior of the pithelial cells, "while even in the negro the intercel ular spaces are white. The pigment itself may be quite black, or of any shade up to a light yellow. It may be confined to the nucleolus or extend over the cell. A close examination shows that it is distributed in patches over the skin, between them the tissue being colorless. This is true even of the black races, although in them the patches are close together and may not be discernible unless the skin be stretched. Thi distribution of the coloring matter is the same in all races, and its actual amount is probably the same, the difference in hue resulting from the darker or lighter character of the pigmentary grains."
The seventh session of the Australian Association for he Advancement of Science will commence on Janu aryl 6,1898 , the place of meeting being Sydney, says the Lancet. The objects of the association are to give a stronger impulse and a more systematic direction to scientific inquiry; to promote the intercourse of those who cultivate science in different parts of the Aus tralian colonies and in other countries, to obtain more general attention to the objects of science, and a remov al of any disadvantages of a public kind which may impede its progress. The president-elect, who also hold the office of permanent honorary secretary, is Prof. A Liversidge, M.A., LL.D., F.R.S. Besides the genera meetings, excursions will be organized to various places of interest in the neighborhood, and this portion of the congress will no doubt be by no means the least appreci ated of the proceedings, for the scenery of the Blue Mountains is as beautiful as any in the world.

## the heavens for october

THE SUN.
The right ascension of the sun on October 1 is 12 h 2 m .14 s . and its declination south 3 deg .28 m .51 s . On October 31 the right ascension of the sun is 14 h. $14 \mathrm{~m} .45 \mathrm{~s} . ;$ and its declination south 14 deg .22 m . 4 s .
Mercury is morning star, and is in perihelion on October 5.
On October 7, at 9 hours, Mercury reaches its greatest elongation west of the sun, 18 deg. 2 m . This would be a favorable time to see Mercury with the naked eye, as well as to observe it with the telescope. On the date of its greatest elongation from the sun Mercury will be about $21 / 2$ deg. north of the celestial equator. On October 12 Mercury crosses the celestial equator, moving south.
On the morning of October 6, at 3 o'clock, there will be an interesting and quite close conjunction of Mercury and Jupiter, when Mercury will be only 12 m . of are north of the giant planet.
This will also afford a splendid opportunity to identify Mercury. On that occasion we shall have the interesting spectacle of the smallest and largest planets of the solar system in the same telescopic field of view. On October 25 , at 7 h .35 m ., Mercury will be in conjunction with the moon, when the planet will be 6 deg. 57 m . north of the moon
The right ascension of Mercury on the fifteenth day of the month is 12 h .35 m .32 s . and its declination south is 1 deg. 39 m .27 s .

Venus is morning star, and is still a very beautiful object in the early dawn. It comes to perihelion, or that part of its orbit which is nearest the sun, on October 15 at 1 hour.
On October 19, at 4 hours, Venus is in conjunction with Jupiter, when Venus will be 28 minutes of arc north of Jupiter. While the conjunction may not be seen, the two planets will be found quite near to each other on the mornings before and after the conjunction.
On October 23, at 11 h .16 m ., Venus is in conjunction with the moon, when the planet is 6 deg . 39 m . north of the moon.
On the first of the month Venus rises at 3 h .14 m . and crosses the meridian at $9 \mathrm{~h} .50 \mathrm{~m} . \mathrm{A}$. M.
On the last of the month Venus rises at 4 h .20 m . and is on the meridian at 10 h .8 m. A. M.
The right ascension of Venus on the fifteenth day of the month is 11 h .41 m .18 s . and its declination north 3 deg .35 m .51 s.

## MARS.

Mars is in the evening sky throughout the month, but too near the sun to be visible.
Its position on the fifteenth day of the month is right ascension 14 h .5 m .47 s . and its declination south 12 deg .35 m .0 s.

## JUPITER.

Jupiter is morning star. The interesting conjunction of this planet with Mercury on the morning of October 6 has been referred to in the section on Mercury.
On October 23 , at 3 h .36 m ., Jupiter is in conjunction with the rooon, when the planet is 5 deg. 55 m . north of the moon.
On the first of the month Jupiter rises at 4 h .50 m ., and crosses the meridian at 11 o'clock A. M. On the last of the month Jupiter rises at 3 h .15 m ., and crosses the meridian at $9 \mathrm{~h} .20 \mathrm{~m} . \mathrm{A}$. M.
The right ascension of Jupiter on the fifteenth day of the month is 11 h .52 m .45 s . and its declination north 1 deg. 57 m .52 s .

## SATURN.

Saturn is evening star, and may still be observed just as soon as it is dusk, low down in the southwestern sky during the first part of the month. Saturn is in con junction with the moon on October 27 at 3 h .31 with the planet 6 deg. 14 m . north of the moon.
On the first of the month Saturn crosses the meridian at 2 h .59 m . and sets at $7 \mathrm{~h} .55 \mathrm{~m} . \mathrm{P} . \mathrm{M}$.
On the last day of the month Saturn crosses the meridian at 1 h .15 m . and sets at $6 \mathrm{~h} .5 \mathrm{~m} . \mathrm{P} . \mathrm{M}$.
The right ascension of Saturn on the fifteenth day of the month is 15 h .47 m .27 s . and its declination south 18 deg. 8 m 2 s .

Uranus is still in the vicinity of Saturn, although Saturn is now moving to the eastward of its celestial neighbor.

The right ascension of Uranus on October 16 is 15 h 39 m .48 s . and its declination south 19 deg .21 m .42 s
Neptune is in the morning sky. Its position hardly changes throughout the month; for October 16 its right ascension is 5 h .27 m .21 s . and its declination north 21 deg. 51 m .16 s .

Minima of the variable star Algol will occur as fol lows, in Greenwich mean time :

| October 6 |  | Hours. | Minu |
| :---: | :---: | :---: | :---: |
|  |  | 6 | 27 |
| " | 12 | 0 | 5 |
| * | 17. | 17 | 43 |
| " | 23. | 11 | 21 |
| " | 29. | 4 | 8 |

Alternate minima are given above; others can be ound by using the period 2 days 20 hours 49 minutes. The mean place of Algol for 1897 is right ascension h. 1 m .28 s ., declination north 40 deg .33 m .31 s . Smith Observatory, Geneva, N. Y., September 20 , 1897.

## the elevator accident at the tract society BUILDING, NEW YORK.

After a somewhat lengthy investigation of the ele vator accident at the Tract Society building, New York (details and illustrations of which were given in dent was "occasioned" by the release of the safety clutches (which, it will be remembered, had been automatically set a short time before the accident); and while they found that no one was criminally responsible for the accident, they recommended that high speed elevators should be at all times in charge of a competent engineer. The latter recommendation was prompted by evidence which showed that " no one who understood the system was in charge at the time. It will be noticed that the jury was carefucasioned"
$\qquad$

SKETCH DIAGRAM OF HYDRAULIC ELEVATOR IN TRACT SOCIETY BUILDING.
the accident, thus leaving the actual first cause of the disaster open to discussion. For, while the finding of the jury was perhaps the only one that could be given on the evidence presented, it leaves untouched the vital question as to what it was that caused the fall of the plunger and the sudden shooting of the car to the top of the shaft. There is every reason to suppose that the disarrangement in the elevator which caused the first rapid ascent of the car, causing it to be stopped by the clutches at the first floor, was the same disarrangement that rushed the car to the top of the shaft the moment the clutches were released. What this disarrangement was is a question which the expert testimony at the inquest seemed very carefully to avoid. At the same time it is a question in which the public is profoundly interested, and upon which it has a right to be well informed. It was stated by one of the witnesses that any attempted explanation would be purely hypothetical ; but it frequently happens that the data upon which a hypothesis is founded are so abundant and convincing as to give the conclusion the appearance of a positive certainty.
The accompanying sketch diagram, which, it will be
features of the hydraulic system in use at the Tract Society building. The car is raised by the dead weight of a massive plunger, working in a cylinder 132 feet high, which extends half way up the shaft. When the car is at the bottom of the shaft, the plunger is at the top of its stroke and vice versa. The plunger weighs 16,000 pounds and is many times heavier than the car. It is raised by a hydraulic pressure of 250 pounds to the square inch. The water is admitted by an inlet valve, worked by the "shipper" rope, which passes through the car. The discharge valve is attached to the same stem as the inlet valve and is operated simultaneously by the shipper. The discharge water is not allowed to run to waste but is led into a closed dis charge tank, in which an air pressure of 60 pounds to the square inch is maintained continuously.

It will thus be seen that the plunger in descending is retarded by a column of water which is forced up against it by air pressure in a tank with which it com municates. The feed for the pressure pumps is drawn from the same tank; as shown in the diagram. This arrangement economizes the water, which is thus circu lated over and over again throughout the whole system; it keeps the cylinder sealed against the air ; and by giving a pressure of 60 pounds on the suction it reduces the actual head pressure against which the steam pistons have to work from 250 to 190 pounds to the square inch. The system is ingenious and economical. We are informed by the chief engineer that during an eight hour Sunday test, in which all the six elevators were kept running continuously, the consumption of coal was 350 pounds per hour and the consumption of water was 28 pounds per horse power hour-a very good performance for this class of work.
It will be seen that the plunger is always resting upon a column of water, the pressure at the base of the column being 250 pounds when it is ascending and 60 pounds duing the descent. It is evident that as long as the 60 pounds pressure is evenly maintained the plunger will force out the water and descend at an even speed, but should the pressure in the tank diminish from any cause, the plunger will fall propor tionately faster. Should the pressure in the tank fall below a point sufficient to maintain the column of water in the cylinder at the level of the bottom of the plunger, and should the plunger meanwhile be held stationary by some means, the water would fall away from the plunger, leaving a clear space beneath it.
The engineer testified at the inquest that the dis charge tank had been leaking for some time, the leak being in the upper joint of the tank, above the water. This was shown by the fact that the air pressure was continually falling, necessitating the use of the ai pump. On the day in question the pressure had fallen at one time as low as 20 pounds to the square inch. Turning to the facts of the accident, we find that the car started from the bottom floor and was clutched (because of too great speed) at the first floor. At the moment the clutches acted, the exhaust valve was open and the plunger was descending above the normal speed. That the speed was above the normal is stong circumstantial evidence that the tank pressure was low. Let us suppose that it was, and that it had fallen to the 20 pounds pressure noticed earlier in th day by the engineer. It took from twenty min utes to half an bour to release the clutches, and during this time the water in the cylinder would fall to a level corresponding to the 20 pounds tank pressure, leaving the 16,000 . pound plunger hung in mid air, held by the clutches of the car. The instant the ill-fated engineer released the clutches the massive plunger would drop in the cylinder, whirling the car to the top of the shaft with a speed just twic its own. That the car shot up with frightful rapidity is proved by the testimony of an eye-witness, and if the car shot up, the plunger must have fallen with at least half the speed. That the plunger fell is proof that the cylinder was all or partially empty, and if the water was not in the cylinder, the pressure must have been lacking in the tank.
This, it seems to us, is the only possible explanation of the accident. It was the unforeseen coincidence of a clutched car, an open discharge valve and a low pressure that brought about the disaster
It will occur to any practical engineer that whether this theory be right or not, the safety of this system would be materially increased by placing the air pump in automatic connection with the discharge tank, so that if the pressure should fall, the pump would be started. The elevator system is a good one, being both fast and economical, and the plant, as a whole, is well built. With the sloght change we have suggested, it would be proof against another such disaster as was "occasioned" by the releasing of the clutches by the ight engineer at a time when the elevator mechanisı was out of order.

Experiments are being made at Portsmouth, Eng land, with cordite as ammunition for quick-firing guns for the purpose of determining the visibility of the flash at night and how far it would guide an enemy's fire. Cordite is said to give a much smaller flash than powder.

A NEW DEVELOPMENT IN MACHINERY FOR ASPHALT PAVING.
Since the asphalt street has come to be generally acknowledged superior, in essentials, to all others, the adoption of asphalt for paving purposes has become the rule in all of the more important more important cities of the United States. The result of competition among contractors for that kind of pavement has been to extend its use, and, at the same time, greatly reduce its cost. Whether or not competition has been largely pre vented in the past, it appears quite certain that at the present time any contractor having the nece-sary experience and capital may include asphalt paving with his other business. Until the preness. Unt he present time, however,
the asphalt paving the asphalt paving
contractor has been contractor has been
compelled to limit the field of his operations to only the cities and larger towns of the country, it being practically out of the question for small towns to for small howns to obtain this pavethe increased price made necessary in order to cover the
are amply protected from rain and sun. At the end of the season's work the plant may be finally closed and locked and may stand fully protected without other cover than is provided in itself.
One of the accompanying illustrations shows the
placed the mixer. This is the machine that mixes the required quantities of hot sand, asphalt and carbonate of lime, that in combination form the cement for pavements. Still higher in this tower is situated a rectangular steel box of considerable size which is called

PORTABLE ASPHALT PLANT READY FOR TRANSPORTATION.
 the hot sand storage bin. Beneath this bin, and suspended just above the mixer, is the measuring box, and it contains, when filled, the requisite amount of sand for one charge of the mixer. This feature is in itself a marked improvement over the old method which still prevails in the great majority of the asphalt plants about the country, whereby the hot sand is shoveled by hand into a wooden box that will hold just the quantity required, and is then transferred to the mixer by means of some sort of a track or trolley.
Within the sand storage bin overhead is a revolving screen or sieve. It is the office of this screen to separate the grave and coarser particles from the sand tha is to be used in the mixer.
The two cars are called, respectively, the melting car and cost of a plant which would have to be erected for $\mid$ plant set up for operation; the other shows it as it ap- $\mid$ the drier car. On one end of the drier car is estabthe purpose of manufacturing the material from pears when packed for transportation. All of the parts lished the power plant, which consists of one steel which the pavement is made. These being the con- that are shown in the second illustration, such as smoke ditions, it naturally follows that a paving plant which could be easily transported from place to place would open at once a vast new field of work in the paving industry. A portable plant, for practical field work, must combine all of the essential features of the regular stationary type of plant with extreme portability and compactness. It must be simple as possible in its mechanism, without the sacrifice of utility. It must be self-contained and operated with at least as few hands as the ordinary stationary plant. It must $\left\lvert\, \begin{array}{ll}\text { in the construction of this plant is the central tower, } & \text { than } 310 \text { degrees. } \\ \text { which is constructed of comparatively light weight } & \text { Upon the melting car are established several large }\end{array}\right.$ be well made and durable, constructed to withstand tubing and steel beams. This tower is situated kettles and a cylindrical tank called the agitator. the movement and jarring of railway transportation without injury. Such a plant, it is claimed is the one which is shown in the accompanying illustrations and which is the invention of Frederick A. Hetherington, of Indianapolis, Ind. It is known as the Hetherington railway asphalt plant. In the invention of this plant it was the aim to produce a traveling apparatus that would be well adapted for operating upon small contracts.

Although the in ventor had only hoped, originally, for a working capacity a working capacity of from 900 to 1,000 square yards of pave ment per day, actua field work this season has demonstrated that, as at pre sent constructed, the capacity is from 1,500 to 1,800 square yards per day, and that, by the modification of certain elements of
certain elements of
the plant, its capacity may be readily increased to any desired amount. The plant is complete in itself. It contains all of the machinery that the paving contractor requires, excepting his steam roller and street tools. There are no sheds or buildings to erect, yet all parts


## PORTABLE ASPHALT PLANT IN OPERATION

entrally between the two cars, which are placed sand heater. The construction and novel features of end to end upon the tracks: it is connected to, or this sand heater cannot at present be described, for rather built upon, the adjacent corners of the cars. At a distance of about nine feet from the ground the tower standards support a platform upon which is

These kettles and the agitator, taken together, will hold, when charged, about eighteen tons of melted asphalt. Proper furnaces are provided for melting the asphalt. About the kettles are broad platforms upon which the workmen stand while at work. The arrangement and construction of these platforms is twofold. While they form the floors for the workmen while the plant is established for service, when it is closed for shipment they fold back over the kettles and make the roof of the car.
Located about centrally of the drier car, and projecting from one side, is the cold sand elevator. This is a link belt elevator carrying metallic buckets. Its office is to deliver the sand from the pile at the side of the car up and into the receiving end of the this sand heater cannot at present be described, for
the reason that they form the subject of another invention, patents for which are still pending.
Operation of the Plant, - Between the adjacent
ends of the two cars, and beneath the mixer, is a passageway through which a team of horses may be driven. The operation of the plant is described as driven.
Sand is shoveled from the supply pile into the buckets of the cold sand elevator; by them it is delivered into the sand heater, from which it emerges, very hot, into the boot of the hot sand elevator. By means of he hot sand elevator, the sand is carried up into the revolving screen, where all gravel and coarse particles are removed, and it then falls into the hot sand storage bin, down through which it finally passes, by means of the measuring box, into the mixer. While this sand operation has been going on the op prator at the melting car has, opened valve in a large pipe which project valcu in alled rom the agitator, and has flled a teel buck asphalt. As the operator at the mixe lets a charge of hot sand fall into the mixer, the melted asphalt is run from che agitator to the mixer on a shor trolley and is poured into the tum bling and tossing mass of hot sand into which has previously been dump ed the required amount of carbonate of lime. The whole batch is then al lowed to mix furiously for a short period of time, and then the operato at the mixer pulls a lever which open a door in the bottom of the mixer and the whole mass, or batch, as it is technically called, falls into a wagon which stands beneath to receive it. This is the substance that may be seen upon the streets wherever an asphalt pavement is being laid.
The cars upon which this railway plant is established are constructed entirely of steel and are of especial design; they are equipped with air brakes as required by law, and also all other fittings and attachments, including automatic couplers, according to master car builders' standards and regulations. As packed for transportation the plant is of ordinary freight car dimensions and weight and passes all bridges and tunnels. Three of these plants have been built during this summer and their success has been so marked that it is expected that many will be in use in different parts of the country within another year. This railway asphalt plant is manufactured by Hetherington \& Berner, of Indianapolis.

## VICTORIA REGIA.

Several attempts have been made at Prospect Park, Brooklyn, to raise the Victoria Regia from the seed, but they have failed. The plant illustrated in the accompanying engraving was procured at Philadelphia. It has grown with great rapidity, and now, with its ten leaves, the blossoms and the buds, nearly fills a large lily pond. Our illustration shows the leaves in different stages of development and decay. Several of the leaves are perfect; one or two have broken down around the edges, and a new one at the left is unfolding by unrolling at the edge. The leaves are upturned at the edges like a pan, and underneath is a strong network joined to the stem five to ten feet long. The leaves are four to five feet in diameter They have been grown to double that size in the Royal Gardens at Kew, where they are grown under glass, and the water in which they are propagated is kept at a tem perature of about $80^{\circ}$
The Prospect Park specimen is growing in one of the out of doo lily ponds which is furnished with heating apparatus concealed from view, and arranged to keep the plant at the required temperature Much anxiety was felt while the bud was developing, lest a chil wind should blast the tender bud but the weather was propitious and the plant and flower have been
seen by admiring thousands.
A few years ago we published an account of the successful raising of this plant at Clifton, N. J., by Mr S. C. Nash. The Victoria Regia is indigenous to in land South America. It was discovered on the Ama zon and taken to England, where it was exhibited at the Crystal Palace. It was named in honor of the Queen. This great lily has been known and exhibited in England for fifty years.

The ancient Greek water supply system showed every modern improvement, such as we have acquired only within the last decade.-Monatschrift für Oeffentlichen Baudienst.


VICTORIA REGIA IN BLOOM.

My first experience with these little creatures was on the slopes of the Sierras between two deep and wellwooded cañons.
In a little garden belonging to one of the sons of John Brown, whose "soul is marching on," many humming birds congregated, flying from bush to bush the whole day long, glistening and gleaming in the sun like living ems.
One day, when strolling through this semitropic garden, I saw a little brown humming bird watching me gravely from the broken stalk of a wild sunflower. As I gradually drew nearer, it merely cocked its head upon one side and gazed at me in a mildly inquisitive manner until I was within two feet of it, when it flew away twenty or thirty feet. Again I approached quietly, and succeeded in obtaining a position within a foot of the little creature, who appeared fascinated and entirely devoid of fear. I now carefully reached out my hand around it. The little head slowly followed until its gaze was. wholly directed from me. Then with the other hand I caught the dainty creature, hoping to keep it as a pet. It was released in a large room, with an abundance of sunlight and flowers, but it became at once so wild and was obviously so unhappy that I gave it its freedom. My next attempt at cultivating a friendship with wings, flew orange grove and the screen with their tiny, delicate claws. Their plaintive squeaking soon attracted the attention of the mother bird, who hovered about the place for several days, en deavoring to reach her imprisoned young, reluctantly fying away whenever one of the household appeared It would be impossible to conceive greater confidence han that displayed by the little captives. They wer absolutely without fear and courted the closest inti macy. At night they slept on the edge of a basket in a closet in our room, and every morning awaizened us by hovering over our faces, uttering sharp little me tallic notes; when successful, alighting upon the ex tended finger, cocking their tiny heads from side to side in an expressive demand for food. At breakfast they frequently flew downstairs, following their mistress, often perching on the sugar bowl or some convenient roost on the table, from which they would watch the proceedings apparently with the greatest interest. The ittle creatures, hovering in the air and feeding from our hands. presented a charming spectacle.
When called, the pet bird would fly from room t room, evidently understanding its name, and was a constant surprise to lady callers, unaware of its pres ence. A humming bird, in the family of a friend of mine, met its death by being taken for a gigantic bee. It flew to the gorgeously decorated hat of a visit or, humming about the artificial flowers and following them up as the guest attempted to escape. The latter, finally, struck it down with a fan, only then discovering, to hel surprise and dismay, that the sup posed insect was a pet humming bird.

Who first conceived the idea of taming so delicate a creature as the humming bird is not known, bu it has frequently been done. Old habitues of Taylor's restaurant, on Broadway, will recall the tame hummers which at one time were exhibited in the window and which attracted the attention of hundreds of passers by. The birds were thoroughly tame, and knew the German who caught them perfect ly. He fed them by using glass flowers, which were filled with sweetened water.
The question as to the food of
humming bird was with two young birds, a nest and eggs having been discovered on a low branch of an loath to de in my garden. The mother bird was very ubmitted to the photographing process, the plate showing the little creature sitting high on the nest, her beak pointed slightly upward. When any one went near the tree the bird did not make the slightest movement, evi dently relying on the protective resemblance which she nd the nest possessed to a remarkable degree
Finally, the two eggs disappeared and two reddish
humming birds is one that has aroused much dis ussion, some authorities stating that they liv entirely upon the sweet exudations of flowers, other believing that insects form part of their food. can state that the California ruby throat cannot, in my experience, live on sweetened water alone It requires minute insects, and, perched upon the fingers of their mistress, our little pets would eagerly hunt for insects on the window pane. Ants they would not notice, but very small gnats and spiders
were very much to their liking. I assume that their
food consists mainly of these and other insects, the sweetened dew and exudations of flowers being their drink-a nectar to be enjoyed, perhaps, when other food is scarce.
While but one humming bird is well known in the East, California has seven or eight, most of the genus Trochilus.
While the humming birds are the most delicate of their kind, their powers of flight are marvelous. A friend informed me that he observed one flying about the vessel that plies between San Pedro and Santa Catalina Island, twelve miles from land. This island is famous for its humming birds, and here and at San Clemente, forty miles offshore, is found the beautiful white-booted racket-tailed humming bird (Steganurus). The art displayed by the humming birds in building their nests is marvelous. The one from which the young birds described were taken was not much larger than an English walnut, formed of the most delicate material, like floss from seeds, and covered on the outside with bits of moss, so that it resembled in texture the branches of the orange tree and was very difficult to see.
At Santa Catalina these birds affect the eucalyptus trees and can be seen about their blossoms in flocks of a remarkable performance. The bird rose rapidly to a height of perhaps thirty feet, then plunged down, forming half a circle, uttering a peculiar whistling sound. This was repeated several times, the noise being remarkable. I conceived it to be a part of the courtship of the bird, as several female humming birds were hovering about the spot.

The Development and Toning of Lantern Slides
Mr. Alfred Stieglitz, of this city, a member of the Camera Club, describes in "Camera Notes" a method of development somewhat unusual. In exposing in the camera the plate is slightly overtimed, then it is developed preferably with the hydroquinone developer until the image totally disappears when examining the plate by transmitted orange light, that is, the image is so dense no light can pass through the plate. It is then rinsed under the tap as usual, and placed in the hypo bath until thoroughly fixed. Upon examining the fixed slide, it will be seen that it is not only so thick that you can hardly recognize the picture, but that it lacks all gradation, in being muddy and flat. But this condition is necessary for future operations, all of which take place in broad daylight. On a table place two white porcelain dishes. The one, which we distinguish by calling it A, should contain a one per cent solution of ferricyanide of potassium and the other, $B$, a very dilute solution of hyposulphite of soda and ferricyanide of potassium, say
l. 10 per cent solution of hyposulphite of soda.
II. 10 per cent solution of ferricyanide of potassium.

For use, take 100 parts of I and 15 drops of II.
These baths must be renewed occasionally, as they deteriorate in the light.
In each dish place a small camel's hair brush and a wad of cotton, which latter may be shaped at will to suit the purpose for which it may be intended. If possible, have the table near running water; otherwise have a pailful at hand, as plenty of water is essential for Local Reduction in Order to Build up Tone Values. Local Reduction in Order to Build up Tone Values.
-As before stated, in examining the fixed slide by transmitted light, very little of the image will be visible. In order to facilitate matters, bring the slide directly from the fixing bath, without previous washing, into dish, A, in which it will be gradually reduced. Stop the reduction as soon as the image is fairly distinct. This is done by plunging the plate into water, thus stopping all chemical action. The slide is still very thick and flat, but it is now in a satisfactory condition for local treatment and the ultimate thinning down to the desired density.

In this state the slide is placed in dish, B, and loca reduction by means of the brush is begun. This process must be very gradual, so that it be in our power to alter our relative tone values or gradation at will. You notice in this local application of the reducing agent we in reality have the reverse of brush develop
ment in platinotype printing, with even a much great er leeway. The process of producing slides by this method is highly interesting for effects not otherwise method is highly interesting, for effects not
possible can, with a little skill, be obtained.

It is by this method that some of those striking snow scenes, shown during the winter, were produced. Origi nally the slides of these were considerably overtimed and overdeveloped, and then reduced in the above described manner. Between every stroke or two of the brush it is well to rinse the plate, so that the strokes do not show in the ultimate result. No brush strokes ought to be visible when the slide is thrown on the screen; if any be detected, the slide is a failure and this method is very simple and safe, and any one having succeeded in mastering it will never resort to any other method of producing slides.
Naturally, it is essential to know something of tone values, as the resulting slide might otherwise be ludi
ous in its effect. This process of developing a slide
is necessarily very slow, forcing being at no stage ad is necessarily very slow, forcing being at
missible, as it would insure certain failure.
The Use of Formalin.-In winter the gelatine is sufficiently tough to withstand this seemingly rough treatment, but in summer it is well to soak the slide before the brush reduction is begun in a very weak solution of formalin for about a minute and then rinse thoroughly. The solution used by me is one thousand parts of water to one part of formalin. Sometimes the resulting color of the slide produced in the above described manner is objectionable and possibly rather uneven. To overcome this defect, the slide must be toned in a suitable bath. Among the many experi ments made by me, the following will interest you most :

Toning. - In many cases it is desirable to color a slide to a pure blue, or perhaps only a suspicion of blue An absolutely reliable method to obtain this color is to use the following bath:

## Blue.

| Sulphocyanide of | 200 gr . |
| :---: | :---: |
| Water. | 32 oz . |
| Carbonate of soda (granular). | 2 gr. |
| Chloride of gold (brown) | 15 g |
| ater | 1 |

For use take 2 ounces of I and 4 drops of II, alway emembering to add II to I, and never reversing the operation. This amount of solution will tone at least one slide to a perfect blue. The toning bath, in order to work satisfactorily, ought to have a temperature of $72^{\circ}$ to $76^{\circ}$ Fah. Using the bath at a lower temperature results in failure, as the toning proceeds too slowly and unsatisfactorily in other respects. A higher tempera unsatisfactorily in other respects. A higher tempera
ture will hasten toning, but the gelatine of the plate is ape will hasten toning, but the gelatine of the
ape attacked in a most disagreeable way.
To judge the process of toning, it is necessary to examine the slide by transmitted light, using daylight if possible. A thoroughly toned slide will have a pure blue color when examined in that way. According to my experience, it is advisable to tone reduced slides after they have been dried, especially in such cases in density of toned slides, let me say that those toned with the above bath do not increase in density percepwith t

In order to obtain a green slide, the following treat ment is best :

| I. Oxalate of iron.......... ............................... 20 gr . |  |
| :---: | :---: |
| Ferricyanide of potassium............................... 15 gr . |  |
| Water. | 32 oz . |
| II. Chromate of potassium.............................. .... 5 gr . |  |
| Water | 6 oz |

Bathe your slide, which in this case must be some what lighter than the desired result, in solution I. In this bath the color will turn to a dark blue. From this it is placed in solution II for a minute and then dried. When dry the slide will be a bright green.

Bartolozzi Red.
Bartolozzi red is obtained by using the following bath :

II. Nitrate of uranium.
sulphocyanide of ammonium............................... 150 gr
Citric acid (crystals.
Citric acid (crystals)......................................... 30 gr gr.
For use, take 1 part of I and 1 part of II, and place your slide, which must be first thoroughly soaked, in this solution. It will quickly assume a beautiful Bar tolozzi red color. In many cases the whites are stained in coloring the slides in this way, and in order to re move the same, dip them into

Carbonate of soda.
Water...........
15 gr.
.32 oz.
for a moment, not longer, and the stain will disappear. After this operation proceed to wash.
Partial Toning.-In using the gold toning bath some beautiful effects of color may be obtained by so-called partial toning. These colors are obtained by dipping the slides into the toning solution for a short time and
then examining them by transmitted light. The combinations of the original ground color of the slide and the partial deposit of the gold, which is blue, give us quite a range of purples, blues, reds, grays, blue-blacks, etc., the color depending upon the ground color and the length oí toning. Many of the snow scenes befor mentioned were treated in this way.
Local Toning with Different Baths.-While experimenting with the above mentioned and many other coloring processes, it struck me to try and color slides by using these baths on one and the same slide locally. In order to succeed, quite a little skill in handling the brush and the various solutions, as well as the water faucet, are essential. And even at that, most slides are apt to be spoiled by the colors running into each other My mode of procedure is as follows: I take a dry slide, dip into water so as to simply moisten the surface of the gelatine, and then apply the gold toning solution with a small or large brush, as the occasion may require, to those portions of the slide which are to be
colored to blue, and shades of the same, and also the colored to blue, and shades of the same, and also the
blue-blacks and purples, all of which are obtained by
the sulphocyanide bath. After these portions of the slide have been colored satisfactorily, an operation which is most trying to one's patience and nerves at times, the other portions are treated successively with the various remaining baths. In most cases the results are exaggerations and also crude; nevertheless such a slide, especially from a chemical point of view, is of reat interest. In certain instances, however, such local coloring or toning is of great effect and beauty, especially if the original ground color of the slide be kept and another color simply suggested in parts Some of the Venetian scenes in which water, sky and a few houses and gondolas make up the picture, treated in this manner, show up beautifully.
As a general rule, the monochrome slide is preferable to those colored by any means whatever, especially for pictorial purposes. Nevertheless, an occasional suggestion of color, if used very discriminately and with understanding, relieves the monotony of an evening's entertainment of slides, always remembering that by colored slides I refer to photographically colored ones, colored slides I refer to photographically colored ones,
and not those tinted by hand with aniline dyes. Those and not those tinted by hand with aniline dyes. Those
can hardly be included within the limits of legitimate photography.

## English Sales of Rare Books.

In the Athenæum, under the title "The Book Sales for 1896," an endeavor is made by Mr. J. H. Slater to for $1896, "$ an endeavor is made by Mr. J. H. Slater to
find out how much a library brings when put up at auction, and how much for each book. By a book is auction, and how much for each book. By a book is
meant a work of merit, distinguishable for its excellence, rarity or binding, or because it happens to be a first edition. Only first class collections are considered From the Book Prices Current the following has been made up as to the year, the number of books, the total amount paid for all of the books, and the aver age per volume

|  | Lots of Books. | Realized. | Average. |
| :---: | :---: | :---: | :---: |
| 1893. | .. 49,671 | £66,470 | £1 6s. 7 d . |
| 1894. | . 51,108 | 72,472 | 18 s . 5 d . |
| 1895. | . 45,431 | 71,229 | $1 \mathrm{1ls}$. 4 d . |
| 1896. | 47,268 | 80,111 | 1 13s. 10d. |

It is noticeable that, with fewer books sold in 1890 than in 1894, the average for the last year was larger by over 5 s . The particularly valuable libraries that were put up at auction may account for this, and with the sale of the Ashburnham collection this year it may be that the average reached will be still higher, because that library contains so many prized volumes.
At the William Stuart sale, in England, of March 1895 , 215 books brought $£ 4,297$, or about $£ 20$ per volume. The Syston Park library brought $£ 14$ per volume and the Beckford collection $£ 8$ per volume In the Stuart library the high price is accounted for by the sale of four manuscripts, which brought $£ 1,700$ and six printed volumes, for which $£ 1,000$ was paid. In 1895 the rate of price might have been less than $£ 111 \mathrm{~s} .4 \mathrm{~d}$. per lot, except for the fad that some firs editions of Chaucer, and imperfect ones at that brought £2,900.
Fashion in regard to first editions seems to have some what passed away in England; that is, so far as it relates to modern writers. First editions of Dickens Thackeray, Lever, and Jeffreys were not worth as much in 1896 as they were in 1895, and Mr. Slater in timates that if they can be had at reasonable price to-day, these first editions are good purchases. They will never be plentiful.
Mr. Slater tells of some rare books sold last year and among them Eliot's Indian Bible. As all book collectors know, a great thing is to get a copy of this Indian Bible with its dedication. When Lord Chan cellor Hardwicke's library was sold, in 1888, a perfect Indian Bible, with the dedication, and in a contem porary binding, brought $£ 580$. For a copy without the dedication $£ 82$ was given this year.

## Devices.

We are informed of the death of D. W. C. Hoover, at Cayuga Island, near Bulfalo, New York, especially wel known among photographers and the photographic trade for his ability as a skillful demonstrator in photographic manipulation and noted for his several in ventions and improvements in photographic apparatus, among which may be mentioned the Hoover shutter and a machine for rapidly exposing prints on bromide paper, besides special machinery for coating and pre paring such paper and films.
At the time of his death he was engaged in perfect ing a special film for use in ribbon photography. His ormula for a pyro and potash developer known as the "Hoover developer "gained for him quite a reputation among photographers; he also invented special de vices for the saving of gold and silver from photographic wastes. His inventive talents were not confined wholly to photography, as in the last year or two he designed a steam yacht of a special model named the Vixen, and had the machinery constructed after his own ideas, with a view to securing greater speed. His practical ay of conducting photographic operations and his readiness to aid photographers striving to learn new readiness to aid photographers striving to
processes were his noteworthy characteristics.

THE HOUSE OF THE VETTII AT POMPEII.
The excavations at Pompeii have for quite a long time been uninteresting; commonplace houses, amphoræ and human remains have been found, but nothing of special note. At last, in 1894, the House of the Vettii was discovered at Pompeii, and the excavations have been continued during the last two y
excavations which led to the discovery of thisimportant house were in what was known as the Sixth Region, at the north of the city It was soon discovered that it was the habitation of a Pompeiian of rank and that the house was one of the greatest importance The removal of the rubbish was conducted with all possible care, and the result was that the house, which was one of the most interesting in Pompeii, has been kept in the most excellent state of preservation. The authorities who have charge of the excava tions made the necessary repairs to the roof and pillars and restored the gardens. Contrary to the usual course, the paintings and statues were not removed to the museum at Naples, but were left in situ. It is a matter of history that the Vettii were among the principal citizens that Pompeii numbered in the year 79 A. D. All the Vettii then occu. pied or aspired to high municipal offices, so that it is little wonder that their house rivals the finest specimens of Roman habitations with which we are acquainted.
The house is a large one, having a ninetyseven foot front. Near the entrance is found the room of the doorkeeper, with two wall paintings in it. There are two atriums, and the dining room was on the second floor. Beyond the tablinum is a great court with eighteen Corinthian columns and at the foot of each column is a statue and fountain, the water being supplied from the street.
There is another small court adjoining this one, and there is also another dining room with many pictures of Cupid and Psyche on the walls. The peristyle, which we show in our engraving, contained many statuettes and fountains and various tables, some of them with hollowed surfaces and some with circular tops supported by griffins. All of these are of white marble. The frescoes on the walls vary greatly. Some of them are among the finest which have ever been obtained from the wonderful buried city, while others are wretched. All of them help, however, to give an stroyed by an earthquake some sixteen years before
as the proper scheme for a decoration, and as such they very valuable memoranda
The entablature in the peristyle is nearly intact and the columns are well preserved. The action of the government in leaving each of the decorative features of the house intact almost doubles the value of the


KITCHEN, HOUSE OF THE VETTII, POMPEII. Branch. life in their house. They would find again in the interior garden of their habitation the groups of flowers which they may have contemplated on the morning of their catastrophe. Most of the houses in Pompeii look so bare and desolate that this house is a great relief.
Our small engraving shows the kitchen, with the bronze kettle on the hearth in the exact position in which it was when it was overwhelmed by the shower of ashes. Some other metal vessels will be noted at the right of the engraving. The large white object in the center is the front of the oven. It is composed of cement.

One reason that the remains which are found at Pomidea of what the Roman painter of the time considered ; the eruption, so that the entire city shows the taste of
one epoch. Pompeii was reallya summer resort, and is comparable to something between Newport and Long

## Robert Edwin Dietz

Mr. Dietz, who died in his ninetieth year at his home Hempstead, Long Island, N. Y., on September 19 was noted for his energy as a manufacture and promoter of improvements in the city of New York. He survived six brothers and three sisters. He began business in a hard ware store and in 1840 started in the manufac ture of lamps, burners, gas fixtures, etc., being a pioneer in this line
When the famous opera singer, Jenny Lind, first appeared in America, the contract was awarded to Dietz Brothers \& Company to illuminate Castle Garden for the opening and when the great showman, P. T. Barnum, opened his first museum, on the southeas corner of Broadway and Ann Street, where the tall St. Paul office building now stands, his firm had the contract to fit it throughou with gas fixtures.
When coal oil, or kerosene, first came into use, he and his brothers, in 1857, invented the first flat wick chimney burner. In 1868 Mr. Dietz took. up the manufacture of a new hand lantern called the tubular, which has argely superseded all other kerosene lanterns and has a world-wide reputation.
The R. E. Dietz Company, of which Mr. R E. Dietz was the founder and former presi dent, are large manufacturers of lamps, lant visitor. The Vettii might also live over again their old (erns, etc, in this city, having branch houses in Chicago


## RECENTLY patented inventions.

 Engineering.Flofating or Submergable Dock. Manuel Guastavino, New York City. This dock is de signed not only for raising sunken vessels, but also fo repairing vessels afloat. It is U-shaped and formed of
a series of watertight compartments, with the base or wider portion downward, valves for the introduc tion of air and expulsion of water from the compartments, and a series of hydraulic lifts for handling the vessel to be raised. Adjustable struts are provided for
supporting the vessel in upright position in the dock, combined with which, also, are screw propellers ope rated by engines driven by compressed air, the whole
construction being designed to reduce the work of handling sunken vessels to simple and positive operations, at
Ditching Machine. - David K. Smith, Pico Heights, Cal. In machines operated by traction engines, and with a plow for forming the ditch this invention provides certain improvements, whereby, as the engine with its equipment is made to pass along
the ditch, the operators standing on the platform may control the plow, the depth of digging being regulated by means of cables and a drum, while, through adjust able end sections, the desired cross sectional form ma be given to the ditch, this being effected by the move ment of the plow transversely in its guides, although
the machine may be operated without the plow guide.

## Rallway Appliances.

Raileoad Rail Chair. - Maurice Lewie. West Grove, Pa. For the efficient connection
of rails with the cross ties, and at the same time afford an of rails with the cross ties, and at the same time afford an
elastic cushion between them, this inventor employs series of superposed metallic sheets or plates as series of each chair a metallic cap piece on which rests the outer ends of the clamping plates, whose inner ends
engage the base of the rail, the whole being held in position by bolts passed down through the tie.
Rail Fastening.-Waliace C. Kemble, Trenton, N. J. To obviate the necessity of driving
spikes into the tie, and yet hold the rail in such manne that it may be readily released, therding to this invention, a plate is made with upwardly projecting lugs, adapted to engage or disengage the rail base by benge
revolved on a pavot, the pivot bar extending through the revolved on a pivot, the pivot bar extending through the
tie, and being engaged by spring catches to hold the ba securely when the top plate is locked to the rail base, and disengage itself when the plate is revolved. A plate carrying the means of engaging and locking the lowe end of the pivot bar is located beneath the tie.
STATION INDICATOR.-George S. Weaver, Albany, N. Y. This is a device arranged in a
suitable casing to be fixed near the end of a car, there being in the casing rollers on which is a belt contanning the names of stations on the route. The conductor, brakeman or driver is enabled to readily move the belt
to bring the names of the stations in order before a suitable opening in the casing, as the car reaches or leaves the several stations, prevent the belt moving backward.
Car Coupling.-Henry G. Harringlink seat which is entirely housed, with an incline depression at the back end of the seat, and a central rigid core. The coupling bar is shouldered, and a depression
block is arranged for vertical movement behind the link block is arranged for vertical movement behnd the link
core, with means for operating it to lift the link and uncouple the cars. The device is adapted to effect the going between the cars, is adapted to couple with car having the ordinary drawhead and pin, and gives the
same ease of movement that is obtained with the oldashioned link and pin.
Tool for Trimming Off Treenails. - Albert Collet, Paris, France. Where externally threadclamps or spikes in rail way sleepers, it being necessary
afterward to cut off the projecting head of the treenail level with the sleeper, this invention provides, as a cut
ting off tool, a kind of circular pare of cast metal having in its lower face a circular flange to take support on the sleeper when the cutting edges are at work, and prevent the cutting edges from penetrating
into the treenail below the surface of the sleeper. The core of the tool has a square head on which fits the operating key, and in its under face is a dovetailed slo
in which fils a knife with a number of cutting edges.

## Electrical.

Conductor.-James Swinburne, London, England. This patent is for a conductor made of
electrically deposited zinc or other metal, which is then compressed to increase its density and tenacity, it being claimed that zinc conductors may thus be made, in many amount of conductivity. It is also claimed that the evil effects of self-induction, or skin effects, are reduces, and
that such conductors are more economical when subject to corrosion by electrolysis.
Electric Trap.-George B. Vaughan, Kirkwood, Mo. This is a trap for nocturnal insects, and
has a platform which is accessible from any direction, but which constitutes one terminal of an open electric circuit, a bait holder constituting the other terminal of
tne circuit, and the arrangement being such that when the body of an insect comes in contact with the bait holder and platform the
body and instantly kill it.
Trolley Wire Hanger.- John F. Faulkner and Royer, Campbell,'San Antonio, Texas. This invention provides a clamp for trolley wires designed to
obviate all danger from broken insulator bolts, and consequent damage to the trolley, the wire, and the span
wires. An upper and a lower or removable jaw are wires. An upper and a lower or removabe jaw are at-
tached to the insulator by means of a screw, and by rotating the screw, when the parts are applied to a wire, The device is easily and quickly adjusted, without calling for special skill in the workman.

## Mechanical.

Shoe Sewing Machine. - Adam H. renzel, Landingville, Pa. Tro patents have hee granted this inventor for inprovements in macnines fo making "turn shoes," or that class of shoes in which
the soles are stitched to the uppers while the shoe is the soles are stitched to the uppers whine the shoe
turned wrong side out, the shoe being afterward turned right side out. The sole is channeled along its edge to form an overhanging lip, against which the edge of the upper and lining are pressed by a breakdown bar, giving
room for the curved needle to enter, when a loope throws a loop of thread around the barbed end of th needle, forming a stitch as the needie is withdrawn. One
of the patents provides improved means for feeding the of the patents provides improved means for feeding th
shoe past the needle, and for bending down the oute edge of the sole to give more room for the curved nee die to penetrate its channeled edge. The machine it
designed to be very simple, durable and economic in it construction.
Skim Press. - Rudolf Ruetschi, Ar gentine, Kansas. To rapidly and properly separate skim dross, or metal alloy, from molten lead or other metal, pressing the skim to remove from it any ainc the molte metal, and then removing and dumping the pressec to and from the kettle by means of a hanger on an over head rail, by which an open work basket or cradle may be moved into andout of the kettle, to reveive the skin
and dross, and which in its upward movement meets fixed platen by which the skim and dross are pressed, the molten metal passing back into the kettle. The quick action of the press, bringisg the efficient.
when hot and soft, proves very

Current Motor - Asa B. Frame, Boyden, lowa. This is a motor designed to be operated
by the current of a stream of water, to run pumps such that the current bears both on the receiving and the discharge side of the wheel. In a suitable frame is supported a vertical shaft from which radiate spokes supporting blades, an eccentric on which is an eccentric
strap surrounding the shaft, and rods connecting the strap surrounding the shaft, and rods connecting the
eccentric strap and the blades. As the wheel turns each gate or blade assumes an angle of about forty-five dereceived, and also at the side where the water is dis charged.

## Agricultural

Hay Rake and Loader.-Samuel M. pick up the hay cleanly and thoroughly from the ground and automatically deliver it to a traveling plat form provided with pickers by which the hay is carried upward and forward to be received by a transverse
conveyer, by which the hay may be delivered at the desired elevation, or to a receptacle at the side of the achine. Therake head is of special nove tonstruction, veyers and the elevator are driven from the driving gear of the rear supporting wheels, and there is but little and
Cotton Picker.-David S. Deader ick, Mammoth Springs, Ark. A wheeled frame adapted o be moved over a field is provided, according to thi invention, with picking devices, preferably in the nature of endless bands arranged to engage the bolls of the for guiding the plants to the pickers and for cleaning the cotton from the pickers and delivering it to distribut ing devices. 'The picking devices are made somewhat yielding to accommodate themselves to various positions
of the plants, and the picked cotton is free from dirt of the plants, and the picked cotton is free from dirt foreign matter, as the picker cloths or aprons do not re
tain such substances, the cloths themselves being pro tected from damage or soiling by contact with earth tected from
stones, etc.

Adding Machine.-Wm. J. Ensworth
337 W. 11th St., Erie, Pa. This invention is for an apparatas the prime object of which is to provide means for cast ing individual sums into an aggregate without the use of complicated movements and such other fixtures as ten attained with great efficiency by the combination of ditferential differential gearing, each element of which gearing im-
parts to the register a characteristic movement. These movements respectively represent the individual amounts that are to be added; and, consequently, as these move ments are applied to the register, the register shows ac-
curately the aggregate of the individual sums. The gears curately the aggregate of the individual sums. The gears
employed are of two divisions : the numbers under ten are struck by pawls carried on key levers and engaging ratchet wheels, and the numbers ten and over are struck which key levers and meshing with pinions the teeth of rich vary according to the numbers which the pimions
represent. Both the ratchet wheels and the pinoons transmit their movement to the register, so that the
total is indicated. The claims cover the two divisions of gearing both separately and combined, so that under th patent the machine may be made with the two division
of gearing combined, or, should it be advantageous, of geariug combined, or, sis
Grain Elevator.-Emile Blanchard, Paris, France. This invention provides a continuously
acting apparatus by which the grain is drawn up from any point in a vessel and delivered on a wharf or elsewhere by pneumatic propellers, which consist of airtight chambers connected with suction and compression air pumps, an automatic distributing apparatus being so applied to the propellers as to assure the communication of each chamber in turn either with the air and grain
suction pipes or with the compressed air and grain de livery pipes. The elevator may also be employed for rery pipes. The elevator may also be employed
transporting grain, etc., from one place to another.
Typewriter Ribbon Feed.-Geory
TYPEWRITER RIBBON FEED.-George
Aeib, New York City. A ribbon feed mechanism deA. Selb, New York City. A ribbon feed mechanism de
vised this inventor is of simple construction and amount of finger pressure required for operating the amount of finger pressure required for operating the
keys. In the step by step movement of the carriage an
actuating plate is moved to draw upon a flexible con
nection whereby a sleeve is rotated to turn one of th nection whereby a sleeve is rotated to turn one of the
ribbon wheels, the movement of the carriage back the ordinary manner causing a spring to rotate th eeve backward.
Paper Box.-Joseph C. Hewitt, Mont clair, N. J. A fastening device for paper boxes, pro-
vided by this invention, is desigued to afford a sumficient rea for securely fastening the flap, making a very nea ox which can be secured with a minimum of labor The invention consists essentially in dividing the tuck
flap into two parts, one of which may be inserted be ap into two parts, one of which may be inserted be outside.
Copy Holder. - Frank Jones, Marion, Kansas. This device comprises a set of feed roller copy, or when the copy is a book or set of sheets fast ened together they will receive berween them a tape or band connected to a guide or rule movable over the sur tace of the copy. The feed rollers are given a step by onnection from a spring-returned rod, provided with key and depressed by hand. The device is designed to facilitate copying all kinds of writing or printed matte whether in books or sheets.
Ship's Form. - Otto Hartwich, Swine unde, Germany. This invention proposes to modify the shape of a vessel's bow so that it will divide the the water being deflected upward and the other down the water line, presenting a horizontal dividing edge and the hull is made with a transversely vaulted concave bottom, the concavity extending forward to the projec
tion. The vessel also has a bottom rudder immediatel behind the bow, occupying part of the keel space, an completely protected by the bottom.
Logging Truck.-John W. Smith Columbia, Fla. Secured by yokes on the upper side of
the metalic axle of this truck is an I-beam, whose we: side is curved to lie snugly against the curved side of the axle, while a chain block rests on the uppe
lange of the I-beam, and has parallel ribs forming ange of the 1-beam, and has parallel ribs forming the front face of the I -beam is a collar in which the rea end of the pole is fitted, the pole being braced on the beam by means of channel irons, and the whole con-
struction is very strong and economical to manufacture
Tanning.-Charles O. Shaw. Cheboy gan, Mich. To facilitate the quick tanning of heavy
tides in a drum or wheel, this inventor provides such rum with a coil of pipe in its lower portion for heatin he tan liquor, which is forced in under pressure, an entrally in the drum is 9 reel on which the hides, con quite close together, thus filling almost the terior of the drum, which is then revolved by powe rom a shaft extending to the outside. The pressure of the liquor in the drum is regulated by weighted valve on the outlet pipe, and the hides while being tanned are held by the reel in a fixed and weil smoothed out posi-
tion. It is preferred to employ a series of connecte tion. It is preferred to employ a series of connected
drums, the first of the series receiving the stronger liquors, which become weakened by parting with their tannin in passing through successive drums.
Vegetable Cutter.-Oscar A Bulette, Chicago, Ill. To facilitate the cutting or slicing of egetables, fruit. etc., this inventor has devised an imcomprising a holder for the blades, whereby the blades and holder will be of unequal contractability when cooling, the blades being tightened by this property of the
holder and preventing any buckling of the blades during holder and preventing any buckling of the blades during
the tempering operation. A subsequent galvanizing or the tempering operation. A subsequent galvanizing or
tinning, in addition to forming a protection for the cutter, operates as a hard solder to firmly unite all the joints of the cutter.
Wagon Step and Chair.-Henry G. Harrington, Magnolia, Ark. This is a combination de vice which can be used as swinging wagon step adapted tep halde the wagon body or adjusted as an ord also foldable to form a convenient seat. The severa parts are simple and inexpensive and
Marble for Relief Printing. John G. Weaver, Salt Lake City, Utah. To prepare onyx marble for use in relief printing, this inventor first
applies the design with an ink composed of gum elemi, mutton tallow, soap, beeswax, lampblack and turpen tine, then dusts over with dragon's blood and groun asphalt, to be incorporated with the ink by flame, then paints the ends and back of the stone with an acid
resisting varnish, and then etches the exposed surface in resisting varnish, and then etches the exposed surface in
bath of water, gum, turpentine, nitric acid and sula bath of water, gum, turpentine, nitric acid and sul-
phuric acid, finally removing the ink off the design and leaning the stone. STOVE.-William S. Nicolson, Salis op and forming a drum chamber with lateral air inlets, there being also in the drum section upper and lower plates, a baffle plate extended within the drum section, through which also lead air flues, while the smoke flue projects from the body of the stove upward into the
drum section, the construction being designed to prodrum section, the construction being designed to promote the strongest possible circulation of heated
Wire Stretcher.-Walter Z. Brannon, Brazos, Texas. This invention provides a simple
and inexpensive tool which may be applied to a wire and supported on a post, or maintained in working position between posts or uprights, to bring the wire under any desired tension in a quick and convenient manner. A to slide on a support. the wire being connected with the draught rod by a clamping arm and keeper, while a
check nut and keeper at the side of the lever are ar ranged to prevent the movement of the draught rod in Net Holder. - Samuel A. Alling Homer, Minn. A holder for a bed, mattress or net, to be used as a life-saving device, according to this invention,
is so constructed that it may be folded to occupy but
small space when not in use and quickly placed in posi-
tion for use when required. The receivng surface tion for use when required. The receivng surface
yields under the falling weight received, but does not rise to cause a rebound of the body, although the net or bed may be readily restored to its upper or norm:
by persons standing at the base of the device.
Adjustable Couch. - William Edeler Brooklyn, N. Y. This couch is made of tubing and fit ings, and has body and end sections adapted for ad ith a head rest at the right or left, or a a bed, pro ision being made for readily securing the mattress in durable and inexpensive, a spring mattress not being durable
Game Apparatus.-Dallas Du Bois, ontclair, N. J. In a cross channel or groove in a turnsufficiated centrally in a tray having a flanged margin of the tray are compartments for other disks, the sever sets of disks being of different colors, but the end con partments having each a blank space. The game con
sists in moving the disks through the spaces in the turn table from one end the the the the the ing one with another until all have been so changed and he disks in the middle spaces of the turntable returne their original position.
Note.-Copies of any of the above patente will be furnished by Munn \& Co. for 10 cents each. Pleze

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TABLE OF CONTENTS.
Plate in colors, also another perspective elevation and floor plans of a residence at Bensonhurst,
L. I., recently erected for Mr Walter Jones ., recenly erected for Mr. Walter Jones. A tecture, with Colonial feeling and classic detail Architect and builder, Mr. Walter Jones.
o. 2. A Colonial residence at Springfield, Mass., re-
cently completed for Mr. N. N. Fowler, at a cost of $\$ 13,000$ complete. Two perspective elevations and floor plans. Mr. Guy Kirkham, architect, Springfield, Mass.
Mr. Thomas R. Brooks. A unique design. wo perspective elevation a and floor pas. Mr. John A. Duckworth, architect, Scranton,
Pa.

Park Methodist Episcopal church and parvatoons and floor plans, also two perspective elevations of the parsonage, with floor plans, New York City.
No. 5. Euglish dwelling at Overbrook, Pa., recently rected for Mr. Smucker. An attractive design
treated in the English style, half timber and treated Perspective elevation and floor plans,
stone. Promen also interior view. Architect, Mr. William L.
Price, Philadelphia, Pa. Cottage at B.nghamton, N. Y., recently erected
for Mr. G. N. North, at a cost of $\$ 3,200$. Two perspective elevations and floor plans. A de-
sign with many excellent features, good eleva tign with many excellent features, good eleva-
tions and well arranged plans. Mr. Elfred Bartoo, architect, Binghamton, N. Y. Modern cottage at Nyack, N. Y, recently erected
for the Rev. Edward Mitchell, at a cost of $\$ 2,500$ complete. Two perspective elevations
and floor plans. A unique design for small and floor plans. A unique design for small
cottage. Mr. George F. Morse, architect, Nyack, N. Y. erected for Messrs. Merriam, Isbenbeck \& Al-
vord A design well treated in the modern American strle with Colonial detail. Two per-
spective elevations and floor plans. Architect, spective elevations and floor plans. Architect,
Mr. J. H. Morse, Boston, Mass.
No. 9. A residence at Binghamton, N. Y., recently erected for Miss Q. M. French. Perspective eleslgn with excellent elevations.
No. 10. An actress' home at Chevy Chase, Md., illustratAng the residence of Miss Annee Lewis. Two perspective elevations and floor plans. Mr.
Louis D. Meline, architect, Chevy Chase, Md. No. 11. Half page design of the New Rathsapotheke in Bremen
No. 12. Pulpit of the Cathedral of Sainte Gudule, Brus13. Miscellaneous Contents : New York as a furniture market.-Advantages of fresh air in apart-
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(7215) E. R. asks: 1. Could you inform me if the eight light dynamo described in Supplement No. 600 can be used as motor? A. Yes. 2. How many
volts shall I use? A. 50 . 3. Have you published any paper in which you describe any motor of say 1 o
2 horse power? All your description I have followed, and I have a fine Holtz machine, a dyuamo, an induction
coil and a small motor. A. The Edison dynamo described in Supplement No. 844 could be enlarged to meet your wantza, and the Scientific american dyna
mo described in Supplement No. 865 could be reduced (7216) E. A. B. writes: 1. I am about to with half dimensions. What number wire should be used on the armature, and how much for drum winding,
A. No. 24 . Use 16 coils, 24 turns in each coil, in 2 layers of 12 turns each. 2. How many wires should be placed be? What would be the amount of wire on the fields A. Put 2 coils on each leg of field magnets, each coil hav
ing 250 turns of No. 22. 3. What would be the voltage and current of this dynamo? A. 50 volts and $1 / 2$ ampere
at 2,500 revolutions per minute.

## NEW BOOKS, ETC.

The Psychology of the Emotions By Th. Ribot, professor at the ColPhilosophique," Leditor of the "Revue Scott Limited, Paternoster Square
New York: Charles Scribner's Sons, New Fork: ${ }^{153}-157$ Fifth Avenue. 1897. Pp. 455. 193-157 Fise $\$ 1.25$.
This work sets forth the present situation of the psy chology of feeling and emotion. It has been the aim of
the author to keep the work within reasonable limits, the author to keep the work within reasonable limits,
and to this end he has refrained from digression and all historical exposition. The first part of the book is occufeeling: pleasure and pan, and then the nature of emoturn. The second part is devoted to the special emotions
The doctrine which the author adopts without restriction connects all states of feeling with biological conditions and considers them as the direct and immediate expres not a superficial manifestation ; they have their root in prehensive work of this kind) is fairly voluminous. The $\underset{\text { Scripture, Ph.D. (Leipzig), director of }}{\text { New }}$ Psychology, the Yale Psycholorical Laboratory With 174 illustrations. Londou Walter Scott, Limited. Paternoster
Square. New York: Charles Scrib. Square. New York: Charles ScribPp. 500. Price $\$ 1.25$.
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ng amateurs to make a motor which might be drive With advantage by a current deriwed from abibetery, and
whhch would have suffient power to operate a foot
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(Continued on page 223)

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