A LUGGAGE CARRIER FOR BICYCLES.

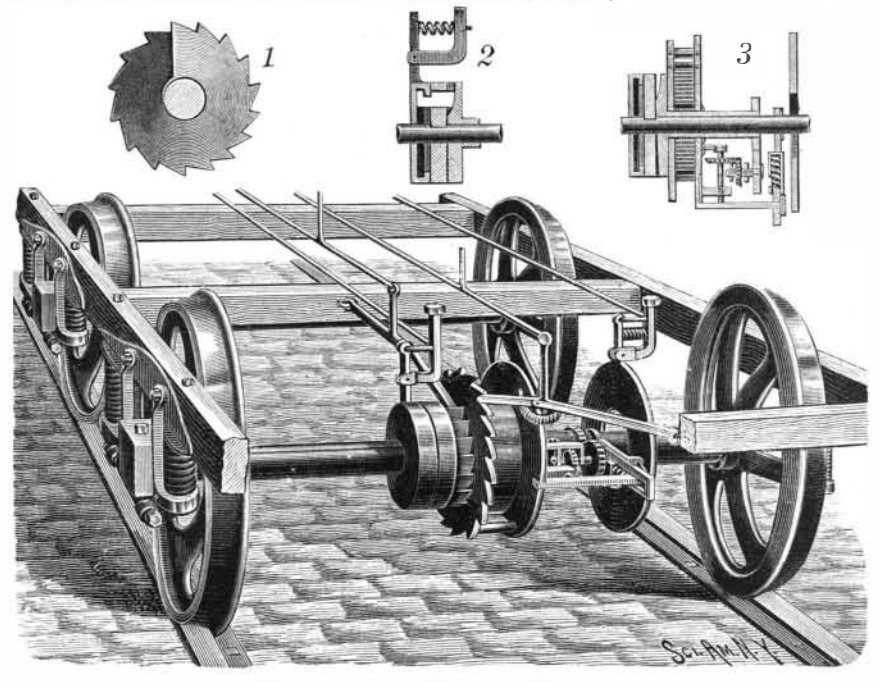
A simple device for attachment to the head of a bicycle, to facilitate the carrying of bundles or packages, and which will form a convenient hand carrier when detached, is illustrated herewith, and has been patented

CREDLEBAUGH'S LUGGAGE CARRIER FOR BICYCLES.

by Mr. Henry S. Credlebaugh, of New Carlisle, Ohio. It is made of a stout spring-wire body, the side arms and cross bar of which are formed of a single piece of wire, adapted to be sprung in place upon the head and handle bars of the machine, as shown in the sectional view. The outer ends of the arms have eyes, in which are held the cross bar of a depending or bracket portion, also formed of a single piece of wire, and carrying a handle block having a notch adapted to fit upon the flat arm of the brake spoon, preventing lateral movement of the carrier, and holding it steadily. The construction of the carrier admits of simple modifications, to adapt it to different styles of bicycles.

AN IMPROVED CAR-STARTER.

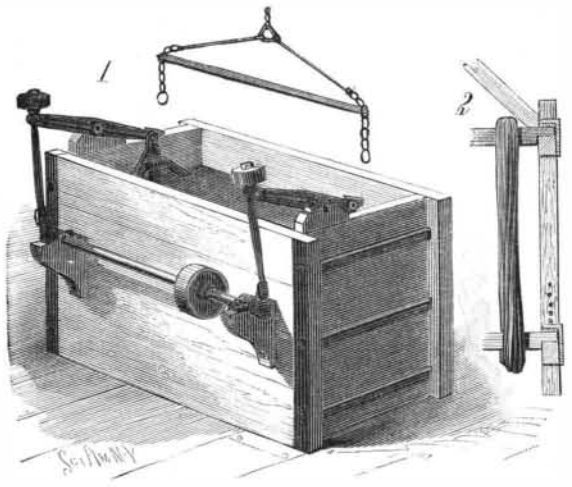
A device adapted for use with all kinds of cars and vehicles, and designed to store power when not required for their propulsion, as in going down hill, and at other times, and give it out when most needed, as in ascending grades, etc., is illustrated herewith, and has been patented by Messrs. William P. Akers and John C. Lindsey, Jr., of Jacksborough, Texas. On one of the car axles is loosely held a sleeve having a ratchet wheel engaged by a pawl fulcrumed to the car, and pivotally connected by a link to a lever operated by the driver or conductor. On the front face of the ratchet wheel is a spiral cam, as shown in Fig. 1, on which operates a block held to slide transversely in a wheel secured to the axle of the car, the outer end of the block having a shoulder engaged by an annular flange formed on a lever fulcrumed on a bracket attached to the car, a spring holding the block in its innermost position, and a rod or rope, secured to the lever, extending to a brake-staff on the car. To the other end of the sleeve is secured a gear wheel meshing into a gear wheel on a shaft rotating in suitable bearings on the inner face of a disk rotating loosely on the sleeve, the disk having a ratchet wheel with its bearing on the sleeve, while between this ratchet wheel and the disk is held a coiled spring, fastened by one end to the disk and by its other end to the sleeve. This ratchet wheel is engaged by a pawl pivotally connected with an arm fulcrumed on the car, a semicircular arm being pivoted on the pawl, which passes through another arm connected by a link to a lever fulcrumed on the car, whereby the operator may disengage the pawl from the ratchet wheel when desired. Figs. 2 and 3 illustrate details of the construction, which provide for the winding up of the coiled spring, by the revolutions of the car axle, as the car goes either backward or forward, such work being always under the immediate control of the conductor or brakeman, who can also at any time cause the spring to give out its stored power to revolve the axle. This device may be fitted to a number of axles, or be duplicated, the power stored in the different springs to be utilized successively or simultaneously, as may be desired.



AKERS & LINDSEY'S CAR-STARTER.

AN IMPROVED DYEING MACHINE

A machine designed to thoroughly dye yarns, etc., without breaking or matting them, is illustrated herewith, and has been patented by Mr. Thomas Wolstenholme, of No. 730 Walnut Street, Camden, N. J. The tank containing the dyestuff has a driving shaft at one side, from each end of which extends a crank arm pivotally connected with beams mounted to swing on top of the tank, the inner ends of the beams supporting a yarnstick frame in the tank in such manner that the frame can be easily attached to or detached from the beams. The frame is also adapted to be connected to a support held on a tackle, which may be mounted to travel in a beam extending above the tank, and whereby the operator can raise or lower the frame. The frame is preferably rectangular in shape, and has at its upper end opposite longitudinal beams supporting yarnsticks, which rest in suitable notches, beams being also held to slide vertically in the lower part of the frame and support yarnsticks, the latter beams being held adjustably by pins passed through apertures in the side beams, as shown in Fig. 2. The frame, filled with strands of yarn, is moved over and let down into the tank, when it is connected with the beams, and the driving shaft imparts to it an up and down swinging motion, whereby all parts of the yarn are thoroughly dyed, the yarn being held on



WOLSTENHOLME'S DYEING MACHINE.

the locked sticks in an even position, which prevents breaking and matting of the strands.

Thirteen-mile Guns.

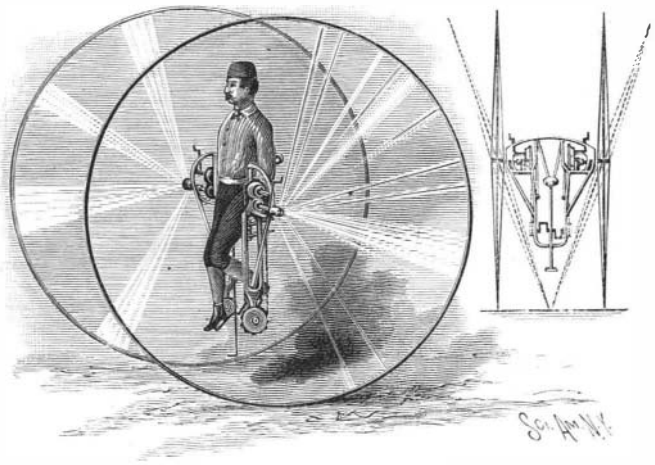
Two monster Russian guns were sent recently to Sebastopol, says the London *Times*, for the purpose of being placed in the new ironclad Sinope, and although some of the details must be inaccurate, the official description is too interesting to be ignored. They are 12 inch pieces, weighing 50 tons, and throwing projectiles of nearly half a ton. The powder charge is 270 pounds, and the initial velocity 3,000 meters, while the distance of the cannons' ranges is said to be 20 versts, or over 13 miles. As a consequence, the fire of the guns can only be directed by the map, the object fired at being out of sight. Two men, however, suffice for each gun, as they are worked by hydraulic machinery.

Tidal Action in the Flow of a Gas Well.

A strange phenomenon is reported in connection with the natural gas supply at Montpelier, Ind. For six hours, it is said, the flow declines in pressure to a minimum, then rising for six hours to a maximum throughout the day. The movement is constant as the ocean tides; but whether or not the same influences are the cause is a matter of conjecture, as no comparisons of time and tide, nor the exact variation in pressure, have as yet been made. The amount of variation as yet known is derived from the operation of the main valve, which is nearly closed at the maximum and wide open at the minimum, in order to preserve a constant supply pressure.

AN IMPROVED VELOCIPEDE.

The accompanying illustration represents a vehicle with means for inclining the wheels at the pleasure of the rider, so that the lower parts of each wheel may be

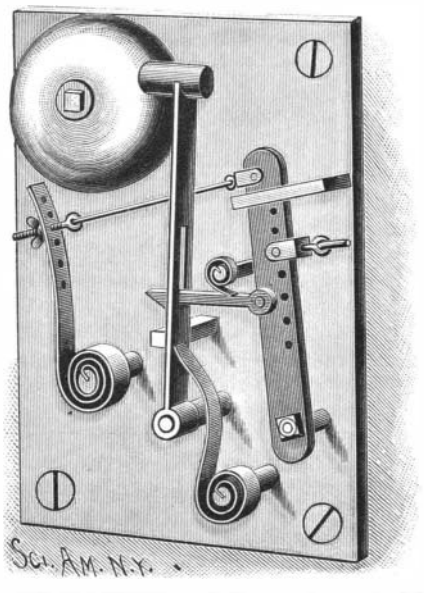


BOWEN'S VELOCIPEDE.

moved inward to run on a narrow path, the machine also having a brake and means for steering. It has been patented by Mr. Richard E. Bowen, of St. James City, Lee County, Fla. The frame has a bow top, with loop brackets extending downward, from which are converging arms, to a bottom cross piece of which is fixed a straight bar also fixed to the under side of the seat. A rod bent to form a double reverse crank treadle is journaled in the sides of the frame, each end of the rod having a sprocket wheel with chains for rotating a shaft journaled in a sleeve bearing and sliding block of the frame, and also carrying a friction wheel. The main wheels are fixed on two short shafts connected by a universal joint, and journaled in sliding blocks, said shafts each carrying a friction wheel, operated by the friction wheel connected with the crank treadle. By screwing down a threaded rod upon the sliding block, the main wheels are inclined as shown in the sectional view, the wheels returning to their normal position when the screws are raised. The machine is steered by raising one of the friction wheels out of contact with its companion wheel on one side of the machine.

AN IMPROVED SIGNAL BELL.

The accompanying illustration represents an easily adjustable apparatus for striking a signal bell, patented by Mr. Engelbrecht Olsen, of Walkerville, Montana Ter. The bell is secured to a post on the base plate to which the parts are attached, the striking lever being pivoted to the base plate so that its movement will be controlled by a stop and a pressure spring. Just above its pivoted end the striking lever has a slot in which works a trip lever, with a hooked head, this trip lever being held in engagement with the striking lever by a spring, and being itself secured to a lever whose lower end is pivoted to the base plate and whose upper end works in a keeper. A tension rod is adjustably attached to the free end of the latter lever, whereby the weight of the pull cord may be balanced when the device is used for mines and the rope runs down the shaft. The pull cord may be connected directly with the lever to which the trip lever is secured, when the rope runs horizontally, as in case of its use on railroad cars, or such connection may be made by means of an elbow lever placed at the mouth of a shaft, the two levers having perforations set to the same scale for regulating the pull of the tension rod.



OLSEN'S SIGNAL BELL FOR MINES, ETC.

Electrical Consolidations.

The incorporation, under the laws of New Jersey, of the Edison General Electric Company, with a capital stock of $12,000,000, marks the consummation of the negotiations which were the basis of the rumors and newspaper gossip current a few weeks ago.

The new company takes over the plant and business of the several Edison manufacturing companies, namely: The Edison Machine Works, Schenectady, N. Y., the Edison Lamp Co., East Newark, N. J., and Bergmann & Co., New York. It also acquires the property and business of the parent organization, the Edison Electric Light Company, and supplants the Edison United Manufacturing Company in the trade in isolated plants. A large amount of new capital has been put into the new company, furnished, it is understood, by a syndicate through Mr. Henry Villard, whose part in the transaction attracted so much notice by the daily press a month ago.

The Edison General Electric Company will thus own and manage the entire Edison interests in electrical distribution and lighting. It is further announced that branch offices will be established in all the leading cities, and that the erection and operation of local central station lighting plants will be a prominent feature in the business of the new company.

The large accession of capital and the more compact organization attending these changes, together with the considerably improved position of some of the Edison patents resulting from the recent decision of the United States Supreme Court in the Bate refrigerator case, add material strength to the position of the Edison interests in the competition with their energetic rivals in the business of electric lighting.

The arrangement between the Westinghouse Electric Company and the United States Electric Lighting Company, announced a few days since, proves to be to all intents and purposes a consolidation of the two interests under the control and management of the first named organization.

The United States is one of the oldest and best known electric light companies in the country. It has always done a large business, but has been seriously handicapped by the unfortunate necessity incident to many pioneer enterprises of expending large sums of money not only in experimenting and in litigation, but in the reconstruction of its early plants in order to keep pace with the rapid progress and development of invention. It has, moreover, borne a large share of the costly burden of educating a skeptical public to appreciate the manifold advantages of electric illumination and of overcoming the endless legal and other obstructions due to ignorance and prejudice, labors which while necessary and unavoidable are by no means pecuniarily profitable.

The value of the service thus rendered by the United States Company to electric interests has been but scantily appreciated, even by those who are profiting most largely by it at the present day. The union of its fortunes with those of a strong and energetic concern, like the Westinghouse Company, will enable the United States stockholders to reap something like a fair share of the results of their own labors and sacrifices.

This consolidation is but another proof of the inevitable tendency of events, which we have frequently pointed out, toward an ultimate union of the important electric light companies under a common executive management. Practically, the present consolidation leaves but four strong orgaizations in the field, if we except the Western Electric Company, which, of late, manifests indications of an intention to increase the scope of its great general electric business, by taking a larger part than heretofore in the field of electric light and power at some future and not very distant day. The electric lighting business, on the whole, appears to be rapidly getting down to a business basis.—*Electrical Engineer.*

A Plumber's Trick.

The *Sanitary News* describes a new plumbers' trick, which has been first discovered in Milwaukee, but may be known elsewhere, so that architects and inspectors will do well to be on their guard against it. In Milwaukee, as in many other cities, all soil pipes put up in dwelling houses must be tested by filling them with water. A certain firm, knowing that a defective pipe had been used, contrived to plug it with clay, so that the water applied for testing it did not enter the pipe at all. It is not stated how the inspector happened to find out this ingenious deception, but he did, and the offending firm was reported, and punished by having its license revoked until the defective pipe should be replaced by a new one. Most persons will say that the revocation of the licenese ought to have been made permanent.

Cost of Great Guns.

The following are the costs to the British government of a few large guns:

100 ton Armstrong gun	$83,715
80 ton muzzle-loader	47,055
63 ton 13½ in. gun	54,295
38 ton muzzle-loader	15,995

Ten Years' Progress on the Congo.

It is ten years in November since Stanley, returning from his great journey down the Congo, was met at Marseilles by two representatives of the King of the Belgians, who was anxious to enlist the services of the distinguished explorer in furthering his plans for establishing a new African state. Since that date much has been done to carry out King Leopold's great enterprise, and the result of the ten years' labor has been thus summed up by an officer of the state. The Lower Congo has been opened up to navigation by large vessels as far as Boma, soundings have been made and the course marked out by buoys, a cadastral survey of the Lower Congo has been made as a step toward the preparation of a general map of the entire region, justice is regularly administered in the Lower Congo, and a trustworthy and cheap postal service has been established. In addition, registries of births, deaths, and marriages have been established for the non-native population, and it is expected that soon the natives near the stations will also be brought within the scope of the registrar's returns. At Banana, Boma, and Leopoldville medical establishments under the direction of Belgian doctors have been founded, and a considerable armed force of blacks, officered by Europeans, has been called into existence.

The caravan route between Matadi and Leopoldville is as free from danger as a European road, and a complete service of porterage by natives has been established. A railway has been projected and the route almost entirely surveyed. The state has established herds of cattle at various stations, and in the very heart of Africa, on the waters of the Upper Congo, there is a fleet of steamers every year increasing in number. A loan of 150,000,000f. has been authorized, and the first issue subscribed. Many of the more intelligent natives from the country drained by the Upper Congo have taken service with the state, and numerous trading factories have been established as far up the river as Bangala and Louebo. In addition, several private companies have been formed for developing the country, and, finally, geographical discoveries of the greatest importance have been made, either by the officers of the state or by travelers who received great assistance in their work from the state.

The Waste of Natural Gas.

Considerable comment has been occasioned by a circular recently sent by the Philadelphia company to the manufacturers who use gas, requesting them to prevent, so far as possible, the waste of fuel at their works. The request, the circular suggests, can best be carried out by the managers of the various plants instructing watchmen, furnacemen, and other employes to shut off the gas from all furnaces or other parts of the mills when the latter are not running. It has been asserted that the circular referred to is proof that the natural gas supply is fast failing, that Pittsburg's mills and manufactories must soon return to the use of coal, and that even private consumers will, before long, find the gas inadequate.

The fact is, the circular mentioned is similar to that issued every year since the use of the natural fuel became general, and is intended merely to urge the manufacturers to a more economical use of the supply. For over a year past the Philadelphia company officials have been measuring the consumption of gas, making tests on improved furnace appliances and otherwise investigating the fuel waste in the various mills. From the investigations in this district, figures have been deduced showing what a large proportion of the natural gas is wasted here. As an illustration, we append the following figures, given by the Philadelphia company, showing by exact measurement the amount of gas required and the amount used to make a ton of iron in a puddling furnace of the ordinary style:

Gas consumed in actual work.	Gas consumed through whole time.
48,264′	65,234′
38,996′	53,850′
38,264′	55,892′
34,583′	48,144′
27,372′	40,811′

This record was taken in five of Pittsburg's leading mills. The figures in the right hand column show the waste occasioned by burning the gas too high between heats, excessive use of the gas in keeping furnaces hot between turns, and the thousand and one ways in which careless employes waste the fuel because it comes into the mill without hauling. When the Philadelphia company saw the loss occasioned, an effort was made to introduce furnace improvement, with the idea of economizing in the use of gas. In one mill great care in handling the gas had brought the consumption down to 21,535′ in making a ton of iron; improvements further reduced the consumption to 15,952′. The best result yet attained was when a ton of puddled iron was produced in an improved furnace with an expenditure of 12,100′ of gas.

The companies further complain that gas is expended in the most unwarrantable manner. At one mill, and that not a large one, where measurement was taken, it was found that 3,000,000′ of gas had been used between Saturday evening and Monday morning in merely keeping the furnaces warm. When coal was the only fuel, mill furnaces were allowed to become comparatively cool from the time that one turn finished work until another came on, but with the gas everything is kept at a white heat whether in operation or not.

Representatives of the gas companies say they have visited glass factories when no one was at work, yet the gas was burning at a full head, because in many instances "the watchman forgot to turn it down."

On the whole, it is estimated that at least 50 per cent of the gas now used in the Pittsburg mills is lost through ineffective methods and bad management.—*American Manufacturer.*

A Large Meteor.

A correspondent residing at Haddonfield, N. J., writes as follows:

This afternoon, February 7, at 5:20 o'clock, I heard a very loud noise like the report of a tremendous explosion, as if it might be a long distance away, at least as far as Philadelphia, which is six miles from this place. Soon after the explosion, my son, who had been skating on the lake, came home and gave the following account of his experience. He said that while skating he noticed a bright light, and looking heavenward he saw a ball of fire—about as bright as an electric light and of the size of a small football—traveling rapidly through the air from south to north. The fire seemed a great distance above him, and continued to burn until it was far toward the north, when it suddenly broke into fragments, and in its place he saw a great number of seemingly large sparks shoot in all directions, and in a moment came the loud report.

The phenomenon is thus described by John Ingram, of Landing Station, Lake Hopatcong, Morris County, N. J.:

"It was, as near as I can tell, ten or twelve minutes of six, as the whistle at the powder mill blew for six soon after the meteor appeared and exploded. My son William and I were busy stowing ice, when suddenly the heavens were lit up with an intense glare. We looked up, and from the southeast saw a ball of fire, apparently not more than 100 feet from the earth. It resembled the headlight of a locomotive, and was followed by a long, funnel-shaped trail of greenish-blue fire. It seemed to be descending at an angle of about 30 or 35 degrees. After crossing the lake, it suddenly changed in hue to an intense red and threw off myriads of sparks. It came directly athwart the wind, which was blowing at the time a moderate gale from the east northeast. The display lasted, as near as I can calculate, about ten seconds, when there was a terrific explosion, and myriads of sparks flew in every direction and the meteor disappeared. One large fragment seemed to strike the ground not more than 500 feet from my ice house. I visited the place later and found that the ground had been disturbed and some fragments of what may be meteoric stones were scattered about, but the country hereabout is so covered with iron ore that it will be hard to determine whether the fragments are aerolites or not. I intend to make a further search."

A Danger Peculiar to Residence in Flats.

The *Lancet* (London) raises its voice of warning to apartment house occupants, which is worth considering. An ordinary householder has access to every portion of the building in which he lives, and should he suspect a defect, he can ascertain how far his suspicion is correct, and remedy it. But in the case of flats, while the actual apartments rented may be free from all risk of evil, the tenant is, in point of health, almost entirely at the mercy of his landlord and of the occupiers of the basement, in so far as the main drainage of the premises is concerned. If this latter be wrong, the whole mansion is apt to be filled with foul air from below upward. A number of cases have come under our notice in which very serious ill health has been thus induced, and in which tenants have only been too glad to pay what was demanded of them in order to get out of the premises with the least possible delay. While no one should take a residence without skilled advice as to its sanitary state, this precaution is more than ever necessary in the case of flats, where the entire premises, including, above all things, the basement, should be thoroughly overhauled.

Dyeing of Garments.

Pure colors upon garments can be obtained only when the material is first perfectly cleaned. For this purpose brush the stains with a lukewarm strong solution of soda, then work for half an hour in a solution of medium concentration, rinse well, and lay down for several hours, preferably overnight, in warm water. For bright colors, such as red, bordeaux, etc., boil the goods in water, in order to remove any trace of alkali from them, which is necessary for a good dye. To neutralize any remaining lye by acids is an erroneous notion, because it dulls the colors and shows the fades after dyeing. The less acid is used in dyeing, the better are the fades covered.—*Textile Colorist.*

Modern Guns.

It is probable that the explosion of the 34 cm. gun of the Admiral Duperre is a fortuitous accident, deplorable since it caused death, but which should in nowise cast doubt upon the efficiency of our armament.

The doubtful pieces should be replaced by those which have been re-enforced, and themselves strengthened, as they can be rapidly. Even with the improved pieces it seems wise to diminish the service charges to those originally adopted, without regard to the improved quality of the powder. This will reduce the pressure with but 30 meters loss of velocity. Competent persons have asked whether the accident was not due to the powder itself; this is hard to decide, for the true cause of the unbreeching it is impossible to determine.

The modern navy, with the splendid engines it employs, is very difficult to manage. In time of peace, to keep in order its valuable, complicated material, the machine must be mounted with such care, and used with so much caution, that one may well ask whether mechanical science has not passed the limits of what may be demanded of it for ships of war. In case of war, a conflict between two squadrons, serious injuries for all the combatants, victor and vanquished alike, would reduce the ships to helplessness for a long time. The empire of the sea will then belong to the one who can put in action a reserve fleet, even if it should be composed of mediocre vessels, all old-fashioned. And that will not be the least curious phenomenon; the nations which have not kept these reserves will be astonished that their fleets cannot again go to sea without extended repairs in the dockyard. Besides, the wounds of the combatants will make them unserviceable for months, if not for years.

The remedy is to establish an armament of spare stores; but it is expensive. And then every four or five years some progress would be made, and without absolutely condemning the entire past, would arouse regret that so much had been spent upon engines of war which were far distanced by the productions of the day. Since 1875, we have adopted two models superior to our first steel artillery. Artillerists have learned to appreciate that metal, metallurgists to work it in such a way as to give every satisfaction to the demands, as legitimate as they are severe, of the markets for which they work. A revolution has overturned the manufacture of powders and explosives. In 1875 we had already replaced the fine, quick-burning powders by the large-grained slow powders; these have given way to chocolate powders, which now are disappearing in their turn before the white powders. Each improvement has diminished the pressure, that is, the fatigue, of guns and increased their usefulness.

Progress often costs very dear, but to fail to recognize it is to be destroyed. The cannon of 1875 were adopted in spite of the opposition of many artillerists; but may it not be said that if their opposition had prevented action, we should still be fitted out with cast guns, hooped and tubed, instead of the splendid steel artillery manufactured during the past ten years?—*The Yacht.*

Watertight Match Box Wanted.

Bishop, who made a thousand-mile voyage in a paper canoe, says that R. B. Forbes, of Boston, once gave him a watertight pocket match box, that he lost it, and was never able to find another. Thousands of hunters, canoeists, and others have hunted and longed for a match box that would be watertight—one that would preserve its contents dry even though the owner was compelled to take a swim with the box in the pocket of his pants, and the pants on the swimmer. An upset in the wilderness or on the coast, away from dwellings, often destroys every match a man has with him, and places him in a position of great danger.

Though match boxes are made in innumerable styles, we have never been able to find one which was suitable for carrying matches in the pocket and would at the same time protect them from water. There are some difficulties in the way of inventing such an article, because when carried in the pocket the air within the box is rarefied by the heat of the body. When the box is plunged into cold water a partial vacuum is formed, and this aids in forcing water through the joints.

Trees with Large Leaves.

Trees of the palm family have larger leaves than any others. The Inaja palm, which grows on the banks of the Amazon, has leaves which reach a length of from thirty to fifty feet and are ten or twelve feet in breadth. Specimens of the leaves of the Talipot palm, a native of Ceylon, have been met with that were twenty feet long and eighteen feet broad. These leaves are used by the natives to make tents, and form very efficient shelters from the rain. The leaves of the double cocoanut palm are often thirty feet long and several feet wide. When the wind is strong they clash together with a noise that may be heard at a great distance. Only one leaf is produced each year, and they are so firmly attached to the stem of the tree, and so strong in themselves, that a man may sit on the end of one and rock to and fro in perfect safety.

Pipe Stoppers or Plugs.

The iron lines of all plumbing work done in New York City are tested under pressure before the work is passed. The amount required varies under different forms of test. The lowest is about 10 pounds air pressure, while the highest may be as high as 40 or 50. The latter figures are obtained when a water test is employed. A pressing need is felt for a good plug or stopper, which can be used to close the ends of the pipes. The objections to those in the market are that they are rather expensive, do not make tight joints if the pipe is rough, and are not durable. Some become almost useless after having been used but once or twice.

The following are some of the requirements: When put in place, the plug must be tight under water or air pressure up to 40 pounds per square inch. It must be quickly put in and removed. It must work as well on rough pipe as on smooth. Must be easily applied. Must cost no more than those now in use. Must be durable. Must be arranged so that a gauge or pump can be easily applied by means of a nipple. Plaster of Paris is much used for the purpose of closing pipes. It takes some time to set, leaks air when old, and will not hold water for more than twenty-four hours. It would answer fairly well if some preparation could be added to it that would make it really waterproof, and at the same time prevent it from leaking air. A cheap cement for holding a cap in the end of a pipe would also be valuable. It ought not to be too hard, or the pipe is liable to be split in removing it.

Still another problem is found in stopping the house drain. It is to make a plug which shall enter a 4 inch hole, or branch, and, turning at right angles, stop a 5 inch pipe. Another size needed should go into a 4 inch hole and, turning at right angles, stop a 6 inch main pipe. This field is promising, because up to the present time nothing that is satisfactory, or that meets any considerable number of the more important requirements, has yet been produced.

Recent Trials of the Divining Rod.

Among the letters of inquiry frequently received, the divining rod periodically appears as the subject of a question. Some correspondent writes asking where he can procure a "metal rod," or an apparatus for discovering hidden metal. Now it happens that there are two genuine methods of detecting hidden metals and ore. One depends upon the induction balance, applicable to metals only, which has had a very limited application in locating bullets in the body of a person who had been shot. It has often been used with much success even for this minor application, while for work in the field it is entirely unsuited. The other method is applicable to some varieties of iron ore only, and involves the use of the magnetic needle, generally the dipping compass. Although the divining rod is absurd and ineffective, and is frequently fraudulently produced, a full and unlimited negative answer cannot be given to these queries in the light of the induction balance and dipping compass.

The divining rod consists of a forked twig with arms six inches or a foot long. If the end of each prong is held, one in the right and the other in the left hand, and the two ends are bent outward, it will be found that the least movement of rotation of the hands will cause the rod to swing violently upward or downward according to the direction of rotation. These motions are directly produced by the operator, yet they are attributed to and used as the indicator of buried treasure or of hidden springs of water. This is the true explanation of the action of the rod, one which appeared many years ago, and which can be found in Hutton's Recreations in Mathematics, a work now out of print and difficult to find.

Within the last six months several accounts of the use of the divining rod have been published in English journals. The rod was there subjected to serious trials, and from the reports it appears that many people have full faith in it. The accounts give the names of the supposed mediums, and other details of the performances, and in several instances it is perfectly evident that the absurd operations were fully believed in by the observers. The London *Truth*, in a recent issue, gives an account of a meeting held to test the efficiency of the divining rod, and not to utilize its powers directly. A number of professors of the occult art were present. One of them was somewhat noted as having been retained by the Tiverton Town Council to advise where wells should be sunk for the water supply of that borough. This extraordinary fact puts the credulity of one of the English local governing bodies in strong light. Four diviners tried their rods in a garden in the environs of London, in all cases with negative results, or with success easily accounted for by powers of the most ordinary observation. Thus, a hydrant and a tank being discernible, one medium located water on the line between them, just where it was evident that the communicating pipe should be. Among those present was Mr. Frank Podmore, an officer of the Psychical Research Society. With two other gentlemen as a committee he arranged a special metal test. Five sovereigns were hidden in one of five books placed upon a billiard table. The rod indicated metal in several places, among others in the neighborhood of the sovereigns and over the corners of the table where some one had remarked that the brass of the pockets was situated. Eventually the rod indicated metal in a book which was examined and found to contain none. A purse was laid upon the table, over which the signs of metal appeared when the rod was held over it, but on investigation the purse proved to be empty and without a particle of metal about it. The unsuccessful operator it is stated disappeared after his fiasco. This individual had his meed of fame, derived from previous exhibitions of his alleged power, which some two months before he had given at Lisburn, at a meeting of the North of Ireland Association of Gas Managers. For them he had located the gas and water mains. But when put to the trial above detailed, as well as others of a similar nature which it is not necessary to repeat, he failed ignominiously.

The Psychical Society have also been investigating the matter. A diviner was set to work in a certain field. He was made to locate two spots, one where water would be found, another where it would be useless to dig for it. The society accordingly had two wells dug, one in each spot, and water was found in both.

Last December the guardians of Hastings in England were engaged in sinking a well under the directions of a diviner, thus emulating the Tiverton authorities in credulity. It is quite possible that if they dig deep enough, they will find water. Sixty or seventy feet was given as the probable depth, but from an English journal of January 22 we hear that a depth of one hundred feet was reached without finding any.

[FOR THE SCIENTIFIC AMERICAN.]

How to Save Ceilings when Cracked, Sagging, and Ready to Fall.

The ceiling must be first pressed back firmly into place. To do this take two pieces of scantling, long enough to reach over the defective part. Nail upon them laths about two or three inches apart. Place this framework, lath side up, against the plastering above them. With other pieces of scantling, reaching from this framework to the floor, support and lift it up against the ceiling, driving wedges under the floor end of the supporting scantling, which will bring the ceiling in place and keep it there.

To prepare the nails: Put them in a vise. With a hack saw, saw slots in their heads like a screw (only slightly, but so that a sharp screwdriver will hold in the groove), then with the screwdriver turn the nail to the right and then to the left, gently pushing it, first through the plastering, then into the lath above, still pushing and gently turning. The head of the nail can be screwed into the plaster flush, so as to make a neat job, and hardly be noticeable on the floor beneath. The nails hold very firmly. Once in every 6, 8, or 10 inches square for a nail is usually sufficient. If the plaster is very porous and shaky, small copper washers may be used on the nails, but it must be very far gone to need them. Driving nails in with a hammer would destroy the whole fabric. Take down your lath framework, and there you have your piece of ceiling as firm and nice as ever it was. JOHN A. WHIPPLE.

40 State Street, Boston.

Natural Gas in Indiana.

Some idea of the vast importance of the natural gas interests of Indiana may be gained from a study of the report recently made by the State geologist. He has been collecting all the information he could possibly get concerning the subject, and from the results of his investigations we learn that the gas area of Indiana is 165 miles in length by 65 miles in width; altogether there are 381 paying wells in the district. The entire flow of gas is placed at 600,000,000 feet, of which, it is calculated, something like 1,000,000 feet go to waste. The average flow of gas from each well is stated as being about 150,000 feet. The report further mentions the fact that during the past two years seventy-nine manufactories have located in Indiana, simply and solely because of the fact that they could obtain this fuel. Their combined capital is stated, in *Fire and Water*, as reaching $4,500,000, and it is said that they will employ 5,800 men.

Blowing Wells.

A correspondent writes from Eckley, Washington County, Colorado, stating that they have a 6 inch bored well over 200 feet deep—the first 5 or 6 feet through a stratum called native lime, the balance being clay soil and gravel—water being found in quicksand. The well seems to act as a barometer, before a storm blowing pure-smelling cool air with a force that is heard in a house 30 yards away; as the storm passes, it sucks the air down with an equal force.

The country is very level, or what is there called a flat, having sand creeks or gravelly waterways, where water can be had at a few feet below the surface, while at a quarter of a mile each way it is only found at a depth of 200 feet. There are several of these blowing wells in that vicinity.