

mentions a fact of any kind which had not come under his own experience, without giving the authority for it. Thus many of his writings are marvels of copious reference. He persisted in doing everything with this extraordinary amount of labor and care up to the last, notwithstanding that he suffered for many years from a very painful heart disease. His scientific work ceased only with his death. So long as he could sustain even an hour's intellectual effort during the day, that was devoted to the arrangement of his stores of facts and observations. Scarcely one of his cherished objects in this respect remains unfulfilled.

In personal character Mr. Henwood won the high regard of all who knew him intimately. His acquaintance with men and manners was so great and varied, his memory so retentive, and his conversational style so simple and lucid, that to talk with him was one of the most delightful and instructive of intellectual recreations. His estimate of his own labors and merits was unaffectedly modest, although he would resist, if possible, any unfair representation of his work.

In the spring of the present year the Murchison Medal of the Geological Society was awarded to Mr. Henwood.—*Nature*.

Edible Birds' Nests.

Edible birds' nests are found for the most part in the Southern Archipelago. The chief region of supply is that comprising Java, Borneo, Celebes, and the Sulu Islands. The bird which produces the nests is a little swallow, *Hirundo esculenta*. This salangan swallow, as it is called, is slightly bigger than a blue tit; it has a brown back; but the under surface of its body, as also the extremities of the feathers in its forked tail, are white. It flies with wonderful speed and precision; and on the Java coast, where the surge breaks wildly against the precipitous and caverned walls of rock, the little birds may be seen in swarms darting hither and thither through the spray. They probably feed on fragments of molluscs and other small animals which abound on those coasts. As you watch the surface of the water rising and falling, you notice how the holes in the rock are now concealed, now open again; and the little creatures, watching their opportunity, dart in and out with lightning speed. Their nests are fixed to the arched roof of these caverns.

What sort of a thing, then, is the edible bird's nest that ministers to the taste of the luxurious Chinese? It is that portion of the fabric which serves as a sort of bracket on which the nest itself (made of grass, seaweed, fibers, small leaves, etc.) is built. There are two forms of this support, one flat like an oyster shell, the other deep and spoon-shaped. It is a transparent mass, somewhat like isinglass, mother-of-pearl, or white horn, and is of animal origin. It was formerly supposed that this gelatin-like mass might be prepared in the bird's crop, from seaweed and other marine plants. This, however, is a mistake. If one opens the animal's stomach about the time of building, it is found to contain insects, but no vegetable matter; moreover, in all species of the family of swifts, the crop is wanting. Dr. Bernstein has found that at that season the salivary glands under the tongue are enormously developed. On opening the bill, they are seen as two large swellings, one on either side, and these chiefly supply the material in question. They secrete a viscid mucous substance, like a concentrated solution of gum arabic, which can be drawn out of the mouth in long threads; and in the air, it soon dries, and is found to be the same (even microscopically) as the bracket material.

When one of the little birds wishes to begin building, it flies repeatedly against the selected spot, pressing each time a little saliva against the rock with the tip of its tongue. This it will do from ten to twenty times, moving away not more than a few yards in the intervals. It then alights, and arranges the material in semicircular or horseshoe form on the rock, continuing to add saliva; and by the motions of its body from side to side, the yet soft saliva is forced out over the harder parts, producing those peculiar undulatory bands which give the nest a stratified appearance. It is thought not unlikely that part of the secretion used by the bird comes from the largely developed glands in its stomach; also, that gelatinous matters picked up in the surge are employed in the construction of its nest. The salangan never uses the same nest more than once, and that for only a month; and after the young brood is flown, the nest soon decays and falls to pieces.

We have now to consider the adventurous work of gathering the nests. The plucker, with nothing on but a cloth round his loins, and with a knife and a netted bag at his side, takes his place on a stage (of two crossbars) fastened to the end of a rope, and is let down against the face of the precipitous rock. With the left hand he grasps the rope; in the right, he has a rod, with which he holds himself as far as possible from the rock. Thus he descends, often several hundred feet, amid the roar of the breakers and the swarming of innumerable birds. When he has come opposite a salangan hole, he makes a signal, and the lowering is stopped. He now sets himself swinging—and here follows the most dangerous part of the operation—gradually increasing his width of swing, till he thinks he will be able to leap off into the hole, and find foothold on a part of the rock which he has previously noted. Should the venture fail, death is certain. The man has generally a thin cord fastened round his body, and connected with the rope, so as to enable him to pull the stage to himself again. Sometimes, though rarely, this breaks, and then there is nothing for it but to make a bold spring out towards the dangling stage. But so fearless and practised are the men that they generally accomplish this fearful leap successfully, even when laden with their booty. When the plucker has got safely into the

hole, he cuts off the nests with his knife, and puts them in his bag; for those high up, he uss the rod with the knife fixed to the end of it. The operation demands great address; the slippery rock, perhaps, hardly affords standing ground, and the man will cling with hand and feet to the little cracks or projections; while the alarmed birds flit to and fro in the gloom, and the tumultuous water beneath flashes with phosphorescence. The plucker, however, knows his work; and when he is sufficiently laden, he draws the stage towards himself, mounts it, and is pulled up by his companions. Thereupon, another repeats the operation.

As the method just described is both a dangerous and a slow one, the natives adopt, when possible, another, which consists in fixing a rope ladder from the top of the rock down to the cavern, and also a sort of hanging bridge of rope within the cavern, either running round the wall or passing across. The internal surface of the cavern is often greatly pitted by the action of the weather, presenting a spongy appearance, so that it is not difficult to find points for attachment of the ropes. All the young birds and eggs found are cruelly thrown into the sea. The best harvest is in the months of July and August; the next best, in November and December; the worst, in April and May. The collected nests are cleaned and assorted; they are first packed in bags of bamboo fiber or palm bast, and the merchants again pack them for the market (after a second assortment) in cases containing a half picul, or seventy pounds.

China is the only considerable recipient of these cases; the few cases which are brought as a curiosity to Europe and America are hardly worth mention. The greatest trade in birds' nests is done with Canton, the entire import there being reckoned at 168,000 lbs. We may reckon on fifty nests to the pound, so that altogether 8,400,000 nests, or, from three pluckings, the products of 2,800,000 pair of birds, are annually introduced into China. There are, principally, two kinds of nests distinguished in Canton—the mandarin nests, and the ordinary; of the former or perfectly white kind, each pound costs in China twenty to thirty dollars, a quite exorbitant price, compared with that which the salangan pluckers themselves receive for the dangerous work, and which is, at the most, only ten to twelve per cent of the market value. The second quality of nests are sold at half that price. The nests are dissolved in water or broth, and so taken as soup. It is highly spiced with minor substances. This forms an *entrée* which is rarely wanting on the tables of the wealthy Chinese, and never from that of the imperial court of Peking. The Chinese set a high value upon it, considering it one of the best stimulants; but for this opinion there seems to be little or no ground. The most recent analysis of the nests we owe to Professor Troschel of Bonn. He finds that the material does not consist of specially nourishing or stimulating substances, but is quite similar in constitution to any animal saliva. Thus the Chinese pay dearly for what has really no intrinsic value.—*Chambers' Journal*.

The Water Shell.

A correspondent writing from Okehampton, England, where some artillery experiments have recently been made, states that the trials have been successful in proving the great value of the new water shell, which will at once be adopted as a service weapon. The effects of this novel instrument of warfare surpass in destructive power the renowned Shrapnel shell; and in one experiment when a battery of the Royal Horse Artillery was in action, as many as fifty-one hits were recorded with the new shell, against twenty-eight made by the Shrapnel, fitted with time fuses. The wooden dummies, which represented the enemy drawn up in loose order, one pace apart, in the manner of an advancing army, were struck again and again by the minute fragments of the water shells, which, according to our correspondent, inflicted wounds of a far more dangerous nature than those made by the Shrapnel or common shell.

The nature of the water shell may be explained in a few words. It is not a projectile of special construction, but simply a common shell or cast iron cylinder filled with water, into which is fitted a small cylinder containing a quarter or, at the most, half an ounce of gun cotton; it is then hermetically sealed; a few grains of fulminate of mercury is placed between the gun cotton and the fuse, and, as soon as the latter is fitted, the shell is ready firing.

The charge of gunpowder used in the same sized shell is sixteen ounces, the explosion of which breaks the shell up into 3 or 4 pieces, whereas the one charged with half an ounce of gun cotton flies into a hundred or more fragments. The reason is this: The gunpowder explodes comparatively slowly, and breaks up the shell at its weak points, while the gun cotton detonates with a sudden and terrible force, which, being communicated to a non-compressible body (water), bursts the shell instantly into minute fragments, the energy being exerted equally on all sides. So rapid and terrible is the force generated by the gun cotton that the iron shell is sometimes pulverized, the fragments of metal being so minute as scarcely to be visible.

The idea of this terrible shell is due to Professor Abel, the scientific referee of the English war department, who is also the patentee of a process to manufacture gun cotton, by which process, it appears from our correspondent's letter, the gun cotton is rendered the safest as well as one of the most powerful of all known explosives; being kept always in a wet state, preventing accident without diminishing its efficiency. The English, German, and French governments have adopted this new form of gun cotton for torpedoes and shells, as well as for military engineering and submarine mining.

Appreciation.

The following are samples of letters frequently received at this office. It would occupy too much space to publish a small fraction of them, but we occasionally, as an acknowledgment to the writers of all such letters that we are not unmindful of their good words, make public one or two of these unsolicited expressions of appreciation. They are mementoes treasured by the recipients, and act as a lubricant to machinery, smoothing the way, and making light the work incident to active professional pursuits:

MESSRS. MUNN & CO.—

GENTLEMEN: Letters patent have been received for our tyre tightener. Allow us to return our thanks for the able manner in which you have conducted our business, in securing our letters patent. And in the future we will remember you to others who may need assistance in securing patents.

Very truly yours, HORTON & HAYES.
McKinney, Texas, August 27, 1875.

RESULT OF AN ADVERTISEMENT.

On the day that the above was received at this office, the following letter, from Senator Randolph, of New Jersey, came to hand:

O. D. MUNN, ESQ.:

It is due to you to say that, of over 300 enquiries about the Ditcher since June, 75 per cent refer to the advertisement of it in the SCIENTIFIC AMERICAN. We have advertised largely in other directions with little success. The single advertisement in the SCIENTIFIC AMERICAN has brought us applications from every State and Territory of the United States, and from Canada, England, France, Belgium, Australia, Brazil, and Buenos Ayres. These are hard, dull times; and I cannot present you with a Ditcher, but can make you feel that, despite the times, people read and heed your good paper.

Yours truly, THEO. F. RANDOLPH.
New York, September 3, 1875.

Opening of the American Institute Fair.

The annual exhibition of the American Institute of this city is now open, and presents a most interesting and attractive display of industrial productions. We shall take occasion to report whatever is new and of interest in the exhibition when order reigns within the building.

The Chinese alloy called *pakfong* is made by fusing together 10 parts copper shavings and 4 parts arsenic, arranged in alternate layers in a covered crucible, with a layer of common salt on the mixture.

DECISIONS OF THE COURTS.

United States Circuit Court.—Northern District of New York.

THE GOULDS MANUFACTURING COMPANY vs. JOHN P. COWING *et al.*—PATENT PUMP.

[In equity.—Before Mr. Justice HUNT.—July, 1874.]
This was a suit in equity, brought upon letters patent for an "improvement in gas pumps," granted to the complainants on the 8th day of August, 1871, as the assignees of William H. Pollard, the inventor. The case came up on exceptions to the master's report, to whom under a previous decree had been sent for an accounting.

The rule is settled that, when the patent is for an improvement upon a machine, the damages for the infringement of such patent are confined to the profits made by the use of the improvement only, and not by the manufacture of the whole instrument.

The complainants, at the accounting, proved the expenses of making and selling the infringing pumps; that they were prepared and ready to fill the orders taken by the defendants, and the prices at which the pumps were sold by the defendants, and the master took the difference between such expenses and such prices (being \$17.71 on each pump) as the measure of damages. Held, that as the patent invention was merely an improvement in pumps, being only a special construction of the side chamber, whereby the same is adapted to use with the valve casings bolted on the outside, and constituting but a small part of the aggregate mechanism, this rule was erroneous, and that the damages could not exceed the profits upon such improvement.

The burden of proof, to show the amount of damages or profits, is upon the plaintiff. Where he fails to show the profits or damages arising from the use of the patented improvement, as distinguished from the profits on the entire machine, nominal damages only can be recovered.

[J. B. Perkins, for complainants.
Elisha Foote, for defendants.]

Supreme Court of the District of Columbia.

[In General Term.]

FREDERICK G. AND WILLIAM F. NIEDRINGHAUS.—APPEAL.—WHAT CONSTITUTES A DESIGN PATENT.

In the matter of the application of Frederick G. and William F. Niedringhaus for a patent for a "Design for Ornament for Enameled Iron Ware," filed June 3, 1874.—Appeal from the Decision of the Commissioner of Patents.]

A beautiful appearance is not of itself entitled to a design patent. The design must also be new and original, and the result of invention and genius.

Mere exhibition of skill on the part of workers in enamel, in giving beautiful forms and colors to their productions, when they are the common efforts of persons ordinarily skilled in the art, is not the invention which is protected by the law.

The use of an old design is clearly excluded from patent by the statute, and mere change or "double use" cannot receive its protection.

The same degree of originality is required in both design and functional patents—that is, the claim must not comprehend what is already in existence.

A design consisting in a mere mottled appearance to be given to enameled iron ware is not patentable.

Mr. Justice McARTHUR delivered the opinion of the court:

This is an appeal from the decision of the Commissioner of Patents refusing a design patent in enameled iron ware to Frederick G. Niedringhaus and William F. Niedringhaus. The statute in regard to design patents reads as follows:

"Any person who, by his own industry, genius, efforts, and expense, has invented and produced any new and original design for a manufacture, bust, statue, alto-relievo, or bas-relief; any new and original design for the printing of woollen, silk, cotton, or other fabrics; any new and original impression, ornament, pattern, print, or picture to be printed, painted, cast, or otherwise placed on or worked into any article of manufacture; or any new, useful, and original shape or configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, or patented or described in any printed publication, may, upon payment of the fee prescribed, and other due proceedings had the same as in cases of inventions and discoveries, obtain a patent therefor." (Sec. 4929 United States Revised Statutes.)

In their specification, the applicants claim to have invented and produced a new and original design of ornament or pattern, to be printed, painted, or otherwise placed on, or marked into, the various articles of enameled iron ware which they make and sell. A photograph is annexed to illustrate the outline. They also say that "the article itself, however, when complete, presents to the eye a beautifully mottled appearance, resembling granite in color, which the illustration fails to exhibit. It is this peculiar mottled appearance which constitutes the chief merit of our design, and it is on this we place most importance."

The Primary Examiner, the Examiners-in-Chief, and the Commissioner have all concurred in refusing the application for the patent. The Commissioner, in his decision, says:

"I concur in the opinion of the Examiners-in-Chief, so far as want of patentability in the general subject matter embraced by the application is concerned. The so-called design is effected by printing, painting, or in any other way placing upon iron ware a peculiarly mixed color. The enameling of iron ware in various colors is an art well known. If applicant has achieved anything new, it is to be found in the mixing of colors, by which he produces a mottled appearance having the effect of granite coloring. If he has in this way obtained a new paint, it may or may not be patentable; but the application of such a paint in an ordinary way does not constitute the subject matter of a design patent, even under the most liberal construction of the statute."

The court are unanimously of the opinion that the decision of the Commissioner ought to be affirmed. The art of enameling has been practised for many centuries, and the different kinds of enamel have been produced in every variety of shade and color. The materials used for the purpose of

Recent American and Foreign Patents.

coloring, and the process by which they are fused, have been known so long that to change them, requires only the taste and skill of one engaged in the business. The appellants, of course, do not mean to claim any exclusive title to what is so well known. But their specification certainly seems to suggest that the change of color "resembling granite" imparts great value to their invention. They say "the mottled appearance which constitutes the chief merit of our design, and it is on this we place the most importance." The specimen of enamel from ware exhibited by counsel on the argument was of a color resembling granite, and was marked by spots of different shades darker than granite. The enamel and coloring substances are manifestly liquefied by intense heat, such as enameled ware use, until they are completely fused, and they are laid upon the iron ware while in this condition. The spots are then formed at random in larger and smaller patches, without regard to regularity or design of any kind. No two of the articles are alike, except in color and general appearance. It is undoubtedly an ornamental to the article, and has a pleasing effect on the eye. This is equally true of the hundreds of objects upon which this art is employed. Ornamental work in great variety, and paintings that never lose their freshness, are executed in enamel. Indeed, the primary object of this art is to impart greater luster and beauty to every article of luxury or utility to which it is applied. A beautiful appearance is not in itself patentable. The design must be new and original, and the work of invention and genius. The ingenuity and taste of workers in enamel are quite wonderful to all but those employed in it; but no one would imagine that these exhibitions of skill, in giving beautiful forms or colors to their productions, was the kind of invention to be protected by the law. They are the common efforts of persons ordinarily skilled in the art. The appellants contend in their brief that "it matters not if the design has been previously used, if now combined with an 'object' with which it has not been hitherto combined; and if, as a result of such association, a new and distinctive aspect is given to such object, the law is complied with," and refers to former decisions by the Commissioner of Patents as cases in point. We cannot concur in this view. The thing provided for in the law is, in express language, "any new and original design for a manufacture;" "any new and original design for printing;" "any new and original impression;" "any new, useful, and original shape;" "the same not having been known or used by others before his invention or production thereof." The use of an old design upon an old object is clearly excluded by the statute, and mere changes or "double uses" cannot receive its protection.

Besides, it is now well understood that the same degree of originality is required in both design and functional patents. That is, the claim must not be for a copy or imitation of what is already in existence. If, for instance, the applicants should manufacture their ware with a figure of the statue of the Three Graces, it might improve the appearance of the article, but would scarcely entitle them to the benefits of a patent. To manufacture it with enamel, a change of the same kind, or the same thing has been performed on metals from time immemorial. To give the enamel any particular color is a matter of ordinary skill and taste. The coloring substances have always been fused with the enamel in the heat of the furnace. We can, therefore, observe nothing in the present specification to which the term invention can be applied.

I am aware that the Supreme Court of the United States, in *Gorham Company v. White*, 14 Wall. 524, have said, in regard to design patents, that "they contemplate not so much utility as appearance, and that not an abstract impression, but an aspect given to those objects mentioned in the act."

That was an action brought for the infringement of a design patent for the handles of table spoons and forks. The design consisted in the configuration of the spoon and the ornamentation of the handle. The outlines of all the details of the design were new, and invariable in each spoon alike. No question was discussed as to the originality of the patent, for it had never been known before, and the court decided that the article manufactured and sold by the defendant did not differ substantially from plaintiff's, and that it was therefore an infringement. But the whole tenor of the decision is to the effect that the appearance or aspect of the object must be of a design that is new and original. Indeed, no other view is admissible, for such is the express requirement of the law.

The decision of the Commissioner is affirmed.
[Charles M. Moody, for appellant.
Wm. H. Doolittle, for the Commissioner.]

United States Circuit Court—District of Massachusetts.

PATENT BOTTLE FASTENER.—HENRY W. PUTNAM vs. E. D. WEATHERBEE et al.
 [In equity.—Before Shepley, J.—May, 1875.]

Where a patent has been a long time in existence, has been renewed by the Patent Office after the expiration of the original term and in the face of opposition, and has been sustained by the adjudications of several of the federal courts, the patentee is entitled to protection by a preliminary injunction, at least until the adjudication of some tribunal shall decide the patent invalid.

Where a motion for an injunction was heard outside the district where the suit was pending, the order withheld until the court should be sitting within the district.

The bottle stopper fastener covered by the Putnam reissue of January 19, 1861, which consists of a piece of wire of U-form with the ends returned and connected to the bottle (in order that the pressure on the cork or stopper may cause the fastener to hold more securely), is not anticipated by the sheet metal U-shaped yoke of the Allender fastener of 1855.

The wire embeds in the cork, under pressure from within, and thus prevents the fastener from slipping. It also presents a change of form which permits the fastener to be pressed off without injury to the thumbs of the operator or to the cork.

Consideration given to the fact that the Commissioner of Patents, in both granting and extending the patent, was aware of the nature of the Allender device, but held that the Putnam fastener contained something more than the mere substitution of a wire U-shaped yoke for a sheet metal U-shaped yoke.

[This was a suit in equity brought for an alleged infringement of reissued letters patent granted to Henry W. Putnam, January 19, 1861, for an "Improvement in Bottle Stopper Fasteners." The invention will be found illustrated in the reported case of Putnam vs. Hickey (5 Fisher, 334).
[W. H. Clifford and Thomas H. Dodge, for complainants.
Ben. J. Thurston, for defendants.]

NEW BOOKS AND PUBLICATIONS.

THE SHOE AND LEATHER REPORTER, devoted to the Trade in Leather, Boots and Shoes, Findings, Hides, Skins, Wool, Furs, Tanning Materials, etc. Edited and Published by Isaac H. Bailey. New York city: 17 Spruce street.

This paper, which is devoted to the shoe and leather interests of not only this city but of the whole country, has changed proprietorship. Isaac H. Bailey, Esq., a gentleman well known to the leather trade in this city, has become its owner. Mr. Bailey was for many years a merchant, and has an extensive acquaintance among our business men, both in the "Swamp" and out of it; and if there is any writer that can make the subjects of leather and boots and shoes interesting to the public, that man is the present editor and proprietor of the *Shoe and Leather Reporter*. Published weekly. Price, including postage, \$3.50 a year.

THE MECHANIC'S FRIEND, a Collection of Receipts and Practical Suggestions. By William E. A. Axon, M. R. S. L. With 300 Illustrations. 12mo, cloth. Price \$1.50. Copies sent free by mail on receipt of price. New York: D. Van Nostrand, 23 Murray and 27 Warren streets.

This work consists of extracts from the pages of *The English Mechanic*, the nature and scope of which periodical are well known to our readers. The ideas and suggestions are practical and, in many cases, original; and artisans of every class will find much that is useful in its pages.

NATIONAL HYMN AND TUNE BOOK, FOR CONGREGATIONS, SCHOOLS, AND THE HOME. Price 40 cents. Boston, Mass.: Ditson & Co.

The music in this work is that with which every young person should become familiar, since it includes the tunes, old and new, that will be used during the next life-time in public assemblies. The arrangement into four simple parts has an educational value, and either one, two, three, or four parts may be practised and sung. There are more than 200 tunes, with 340 accompanying hymns.

Inventions Patented in England by Americans.

[Compiled from the Commissioners' Patents' Journal.]
 From July 7 to August 23, 1875, inclusive.

- BREECH-LOADING FIRE ARM.—N. King, Hartford, Conn.
- CASTING METALS.—C. Grasser, Somerville, Mass.
- CHAIN CABLE.—C. A. Chamberlin, Camden, N. J.
- COMPRESSING FLUIDS.—T. S. Diston, Philadelphia, Pa.
- DENTAL PLATES.—V. Smith, Schenectady, N. Y.
- DISCHARGING GRAIN, ETC.—C. W. Mills, Montclair, N. J.
- ELECTRO-MAGNET.—W. L. Powelson, San Francisco, Cal.
- FULLING MILL.—W. B. Lodge, Danbury, Conn.
- LIQUID METER.—E. Marsland, Sing Sing, N. Y.
- LOCOM.—J. Fish, New York city.
- MAKING BUTTON HOLES.—A. H. Cramp (of New York city), London, Eng.
- MOTOR.—J. G. Lane, Millbrook, N. Y.
- OVER-SEWING MACHINE.—J. L. Boone et al., San Francisco, Cal.
- PLAYING CARDS.—I. Levy (of New York city), London, England.
- PRINTING PRESS FEED.—F. Deming, Waterbury, Conn.
- REVOLVING PISTOL.—E. Remington & Sons, Iliou, N. Y.
- SPINNING RING, ETC.—H. A. Chapin, Springfield, Mass.
- STEAM ENGINE.—G. B. Dixwell, Mass.
- UMBRELLA FRAME.—J. Horton et al., New York city.
- WINDING UP LIFTS, ETC.—V. W. Mason, Providence R. I.

Improved Dust Brush.
 Henry B. Conant, Geneva Lake, Wis.—The brush portion of the duster, which may be made of feathers, hair, silk, or any suitable material, is attached to springs in bunches, and the springs are connected together so as to form a mutual support for each other, and keep the brush in place.

Improved Claw Bar.
 Andrew Shaw, Petroleum, W. Va.—This is a bar for drawing spikes from railroad ties, and for drawing spikes or nails in other places, so made as to allow the clutch jaw to be raised and the leverage obtained, diminished after the spike has been partly extracted, so as to draw the spike clear out.

Improved Car Brake.
 Alfred T. Riley, Halleck, Mo.—A lateral band spring of suitable power is seated in side supports near the central bottom part of the car frame, and connected by a rod to the brake-operating lever that is connected to the front drawhead, and to the brake wheel on the tender or locomotive. The drawhead or spring controls jointly the operations of the brakes of all the wheels. When the car is in a state of rest, so that no strain is exerted on the spring and front drawhead, the brakes are all, by the action of the spring on the lever and brake rods, tightly applied to the wheels; but when the cars are coupled and drawn forward, the front drawhead slides forward and releases the brakes by the strain on the spring.

Improved Ironing Board.
 Orlando S. Pride, Yonkers, N. Y., assignor to himself and John E. Woodruff, same place.—In using the device, the board is passed into the shirt, and the neck band is turned down into a notch. Portion of a frame is then placed in the said notch to confine the said neck band, and the rear part of the board is raised, and its rear edge is placed against the inner edge of a rear cross bar. The shirt bosom is then drawn straight and smooth, and the frame and the rear part of the board arc pressed down. In this way the shirt bosom will be held straight, smooth, and firmly, so that it can be quickly ironed.

Improved Grain Separator.
 William E. Torley, Milwaukee, Wis.—The cockle and small wheat pass off from a fine screen to the indented concave sides of a drum for the cockle to fall into the indentations, which will not hold the wheat, because of the elongated form of the grains, so that the wheat will pass off first when the sides turn down with the drum. At the point where the wheat will naturally slide off the plates is a chute, to receive and conduct it into the hopper. A brush in front of the drum brushes back any of the cockle on the front edge of the indented sides liable to slide off with the wheat and throw it back into the pockets.

Improved Corn Sheller.
 Solomon Williams, Tehuacana, Tex.—This is an attachment for corn shellers, consisting of a block having a conical cavity with ribs or teeth on the inside, and arranged upon the extended end of a cylinder journal. Its object is to remove the small kernels from the end of the ear, or nub it, before it is put into the sheller.

Improved Horseshoe.
 Arthur C. Snowden, South Norwalk, Conn.—This horse overshoe consists of two plates of metal, which are hinged together near the toe, so that the shoe will open and close. The interior plates cover the under part of the foot, but not the frog, for which they are shaped to leave space, and are lapped or shut past each other. Hook flanges on each plate fasten the overshoe to the shoe on the horse. The hinged parts are spread by means of a screw, so that the hooks on the plates will tightly embrace and hold the overshoe to the shoe on the horse.

Improved Welding Compound.
 John Scott, Jr., and Amos S. Scott, Coatesville, Pa.—This is an improved welding compound, to be used in the manufacture of iron and steel, and it consists of a mixture of kaolin and sand.

Improved Hat and Coat Hook.
 Charles Schoenbein, Brooklyn, N. Y.—This invention consist of a horizontal supporting arm with forked levers pivoted thereto, of which the upper one is weighted at the rear end to bear on the lower lever and open the front ends, which close like jaws on the coat or other article suspended from the lower lever. When the coat is removed, the jaws open instantly by the action of the weighted lever, and are ready for repeated use.

Improved Sharpening Machine.
 Andrus S. Weaver, Joy, N. Y.—A reaper knife is fastened to the adjustable table by a cam lever. The table is adjusted by the two eccentric levers and by a spring. The grinding stone is moved back and forth on the knife by a bar and rack and pinion to grind the teeth to the proper level after the knife table has been properly adjusted. A crane is hinged to the plate on which the bar rests, so as to readily move forward and back. The forearm is hinged to the top of the crane. The grinding stone, as well as the reaper knife, may be adjusted to almost any position.

Improved Wind Wheel.
 Horace J. Brimbhall, Jr., of Millington, Ill., assignor to himself and Samuel E. Foster, same place.—This invention consists of fans shaped like the arc of a circle, and pivoted at the middle of the top and bottom to horizontal arms projecting from the shaft, so that they may swing into radial, or nearly radial, positions to take the wind, and into a circle to close, so that the wheel will not be turned by the wind. The buckets are connected to a slider on the shaft, which is moved by a lever to open and close them for starting and stopping the machine.

Improved Safety Center Pinion for Watches.
 Charles R. Bacon and Leuthold C. Brown, San Francisco, Cal., assignors to Cornell Watch Company, same place.—This consists of a center wheel with detachable pinion, having projecting teeth that inclose a spring secured by a spring stone end to a perforation of the center wheel, while the opposite free end of the spring binds pinion and center wheel to revolve in the usual manner, while it turns freely without the center wheel in opposite direction.

Improved Ice Breaker.
 Joseph T. Martin, Newark, N. J.—This ice breaker consists of a shaft carrying radial arms. Said arms are rigidly secured to said shaft, and are provided at their outer ends with ax or wedge shaped heads. The whole is mounted in a suitable frame, adapted to be secured to a vessel, and operated so as to cut a passage before the vessel through ice.

Improved Hose Nozzle.
 Charles Oyston, Little Falls, N. Y.—This is a hose nozzle for extinguishing fires, so constructed as to divide up the stream of water into a fine spray. A plate, in which are formed a number of annular openings, is connected with three arms, the outer ends of which are connected with the flaring middle part of the shell of the nozzle. A series of concentric ring wedges also are connected together by three arms, and in the outer surface of the outer ring is cut a screw thread to screw into the shell. The ring wedges and arms are cast in one piece, and the said ring wedges are so arranged that their edges may be directly opposite the annular openings in the plate, so as to divide up the ring sheets of water.

Improved Glazier's Diamond.
 Philip Sinz, Baltimore, Md.—The object of this invention is to obviate the difficulty experienced by unskilled persons in securing the right inclination of a glazier's diamond to produce the best cutting effect. It consists in a broad-faced instrument, having at one end a diamond and at the other a guide roller, which latter forms with the diamond the supports of the instrument upon the glass, and keeps the sharp angle of the diamond in proper position for cutting. In between the guide roller and the diamond are different sized notches, which are cut into the face of the metal for the purpose of breaking off the cut portion of the glass.

Improved Steam Boiler.
 John E. Jerrold, Meadville, Pa.—The ends of the boiler tubes are flared or spread outward into grooves, and the inwardly projecting edge of the metal around the opening (in the tube sheet) is bent or turned down over the end of said tube, thereby clamping or confining it in place and forming a tight joint, and preventing rapid injury from heat.

Improved Boot and Shoe Calk.
 Rufus D. Guilford, St. Charles, Mich.—This calk is formed from a rectangular piece of sheet steel, struck up in suitable dies, whereby its corners are bent or turned down to form spurs.

Improved Indicator for Steam Engines.
 Joseph W. Thompson, Salem, Ohio.—The indicator is designed to register the relative amounts of steam pressure exerted on the piston at each portion of its stroke. It is in part an improvement upon the automatic recording indicator for which letters patent of the United States were granted to C. B. Richards, March 24, 1863. The object of the invention is chiefly to reduce the number and weight of the parts composing the recording mechanism proper, and thus correspondingly reduce their momentum when in action, to the end of securing a more perfect record of the several steam pressures existing in the engine cylinder during a given stroke or strokes of the piston.

Improved Injector.
 Samuel Fowden, Philadelphia, Pa.—The steam is admitted through an annular opening formed by a water tube and a mixing tube, while the water is admitted through a central tube, the opening through which is regulated by an adjustable spindle. The apparatus for lifting the water consists of valves with hollow stem, steam pipe, and jet.

Improved Middlings Purifier.
 Richard W. Gunter, Carrollton, Mo.—The invention comprises a series of flat inclined laterally and longitudinally shaking sieves, placed one above another, with a fan blowing into and through the space under each, to carry off the light matters. Valves are provided to regulate the blasts, and a conveyor is placed under the bottom sieve. There are inclined close bottoms to the sieves, descending toward the fans to carry the middlings back. These have openings at certain intervals for discharging to the fans below. In front are wind breakers to prevent the wind from blowing the middlings back up the bottoms.

Improved Sugar Cooling and Draining Apparatus.
 Joseph H. Hynson, Alexandria, La.—This consists of an oblong cooling vessel, with bottom inclined from both sides toward the center, where a longitudinal slot connects with a slotted revolving draining tube, fitting tightly to the under side of the central bottom part of the vessel. When, after the striking is finished, the sugar in the cooler has sufficiently granulated, the process of drainage is commenced by turning the crank until the slotted part of the tube opens gradually toward the bottom slot of the cooler. If the sugar is still warm, the molasses drains rapidly through the narrow crevice without allowing any of the grains of sugar to pass; but if the sugar has cooled and become firmer, the opening between tube and bottom slot may be opened wider for the readier draining of the molasses which has collected by granulation at the central bottom part of the cooler. The molasses may in this manner be drained off more or less rapidly, according to the degree of heat in the sugar.

Improved Car Starter.
 Anthony A. Jones, Utica, N. Y.—A ratchet wheel is fixed on the front axle of the car, and a long pawl lever is arranged to operate it. When it is desired to start the car, the front (free) end of the lever is depressed by the driver applying his weight thereto (through the medium of a rod projecting up through the platform) which causes the ratchet wheel to revolve the front axle and thereby the car wheels.

Improved Cotton Sweep.
 Manfred Call, Richmond, Va.—The invention consists in a cotton sweep with sharp cutting wings on both sides of a nose or point, inclined with their lower edges in advance, and attached by bolts to the standard as well as the nose flange.

Improved Vehicle Spring.
 Henry Jeffrey, Seymour, Ind.—V-shaped bearing springs are interposed between the ends of the flat top and bottom tension springs. Both the flat tension and V-shaped bearing springs are made of semi-elliptical shape, and joined at the outer ends by being bent around the bolts of the clips, to which they are connected. The clips are set into casings of the carriage body and frame. The bearing springs are seated against a solid central shoe part, and retained by crosspins connected by outer links passing sideways.

Improved Shingle Machine.
 John J. Kendall, Greensborough, N. C.—The reciprocating driving heads carry two knives and work alongside of stationary heads, against each side of which a bolt is to be held on the table by an attendant. Spring clamps behind the cutters receive the blanks cut off from the bolts between them and the side of the head, to hold them ready for the feeders, which consist of the swinging dogs placed on vertical oscillating shafts. The feeders catch in the sides of the blanks by thin notched and pointed ends, and push them along stationary guides, between shaving cutters, so that when they pass off from the riving heads they drop in front of their ends, to be pushed by them through the shaving cutters. These cutters are open when the blanks are pushed in by the feeders; one closes on the blank just before it begins to be pushed along, and continues to move it toward the other cutter. An eccentric opens the cutters again just before the feeder works, ready for receiving another blank; and immediately after the feeder works, the riving head comes against the blank fed into the cutters, and pushes it forward. The throw of the eccentric may be changed to open and close the shaving cutters more or less, according to the required thickness of the shingles.

Improved Shot Charger for Shot Pouches.
 John S. Long, Elkville, Ill.—This is a steel cutting valve with a cleaning ring at the lower end, working through a chamber, which is enlarged on one side of the valve, so as to give clearance to the shot as they are divided without pinching on the blade. Also a series of slots in the upper portion of the barrel, for gaging different charges, are arranged radially to the pivot hole of the lever, to which the valve is connected.

Improved Butt Hinge.
 A. H. Isham, Avon, N. Y.—This invention consists in providing each wing with an inclined notch near the upper end and the rising spindle with a doubly inclined lug, so that the spindle will always be drawn down by the action of the wing.