

rim, which contains a row of apertures, is designed for fastening the object to the danseuse's head dress. This jewel projects white, red, green, etc., lights in four directions, but, were it necessary, it could be constructed so as to project them in five, six, seven, or eight. No. 6 is a large diamond designed for the necklace of a danseuse. The effects obtained from these ornaments are wonderful.

The pile, Fig. 3, consists of elements of zinc and charcoal within a case of gutta-percha hermetically sealed. This pile only acts when it lies horizontally. When vertical, the liquid does not occupy half the height of the case, and the pile ceases to act. It is therefore only necessary to turn over the pile in the pocket to cause the latter to act or to cease its action.

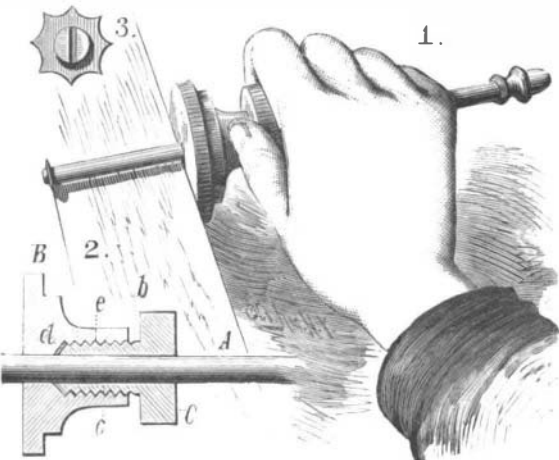
As an accessory to the ballet this has been most successfully used in the dance of the Faradole, at the Grand Opera at Paris. We give an illustration of a danseuse as she appears when adorned with this glowing electric jewelry.

THE London *Engineer* gives quite an amusing account of the rush at the Patent Office on the first day of January, when the new English patent act came into operation. It says:

One enthusiastic inventor, hailing from north of the Tweed, took up his station outside of the door soon after midnight, and his patience was rewarded by the honor of appearing as "No. 1" under the new law. Toward four o'clock he was joined by two others, and when the hour for opening had arrived a small crowd of about fifty eager applicants had assembled; but when they had been disposed of, business became slack. There was, however, a steady influx, and at four o'clock it was found that 266 applications had been recorded. This is by far the largest number ever received in one day. The 1st of October, 1852, when the Patent Law Amendment Act—the statute which has just expired—came into operation, was a busy day, 146 applications having been sent in. On the last day of last year one person, who wished to have the last patent under the 1852 Act, after waiting about some time, handed in a specification at the last minute, satisfied that he had secured the peculiar pleasure he sought. Half a minute to four o'clock a small boy, from a dark corner in the office, sprung himself upon the astonished occupants and handed in two specifications. The man who thought he had got the last was heard to mutter something about that artful little boy, but what it was he muttered does not seem to be a matter of importance to history, as similar remarks have been made before. Contrary to general expectation, the falling off in the work of the office during last year, consequent on the superior advantages offered by Mr. Chamberlain's Act, has not been very great. In 1882 the applications reached 6,241, the largest number ever known, while in 1883 they amounted to 5,993, or a decrease of 249. The diminution first manifested itself in the week ending September 22, just a month after the passing of the act, when there was a deficiency of three, as compared with the corresponding period of 1882. From that time the number of applications fell off steadily, with the result above stated.

SCRATCH GAUGE.

The gauge represented in the engraving can be used by carpenters and others for scratching or scribing. The rod and other details of the device are preferably made of circular form, so that it may be used without restriction to any particular side being uppermost. Upon the rod, A, is fitted a slide, B, forming the head of the gauge, and also a sliding thumb piece or clamp, C, having projecting from one side a screw, b, which is constructed with three longitudinal slits extending inward from the outer end of the screw.



SHERMAN'S SCRATCH GAUGE.

The end of the screw is tapered in order to bear against a taper socket, d, at the inner end of a threaded portion in the slide, B, so that when the thumb piece is screwed up, the split hollow screw will clamp the rod, holding the slide at its proper position. If preferred, this construction of the thumb piece and slide may be reversed. The marker is a many pointed circular disk, Fig. 3, that may be screwed to the working end of the bar. By the circular construction of the gauge the marker is made more durable, since the different points may be used.

This useful device has been recently patented by Mr. John E. Sherman, of North Attleborough, Mass.

Ocean Signal Stations.

Our weather bureau is of great value to the public, but its usefulness might be greatly increased. The greater the number of stations and the more they are extended over the surface of the globe, the greater the advantage to be derived from them; and stations at sea are as valuable as stations on land, for without a connecting link between land

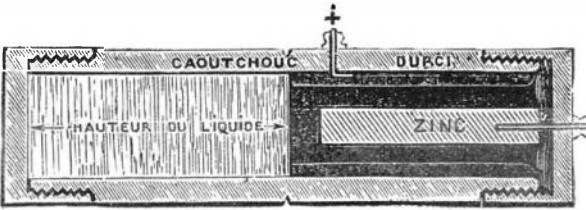


Fig. 3.

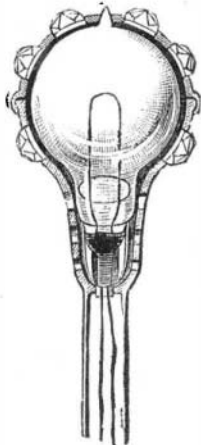


Fig. 2.

TROUVE'S ELECTRIC JEWELS

and land there is a void which prevents the perfection of the whole. The present stations were established when the system was new, before it had developed, and thus it comes that some of them are perhaps not as advantageously situated as they would be were a new arrangement, with the light of the present, to be now ordered.

One important thing we have discovered, and that is, storm centers travel on *general lines* from the west toward the east, and in belts encircle the earth. Sometimes they travel for a thousand or fifteen hundred miles due north, and not unfrequently in crossing the country advance from the northwest to the southeast, and they occasionally for a short distance travel toward the west. But their *general* course is from the west to the east. This being the case on this continent, the more stations in the west, from Mexico to the British Possessions, the better. Then, as these storm centers sometimes travel a great distance from the south to the north, it is also necessary, in order to be prepared for those of an erratic course, to have stations well to the south, along the Gulf of Mexico.

As all storms, or nearly all, enter the territory of the United States from the west, it will be readily seen that the people on the Pacific slope cannot at present receive any forewarning, as there are no stations to the west of them to give the information.

Not only does the Pacific slope suffer from this, but the whole country, for the sooner the whole country receives information of an approaching storm the better. Again, in order to more effectually protect ourselves from the south we need one or more stations in the Gulf Mexico; say three stations from the east coast of Mexico to the west coast of Florida, on a line about midway north and south. On the Pacific slope we should have a row of stations, three hundred to five hundred miles apart and from five hundred to a thousand miles from the western shores, reaching from Lower California to Puget Sound. It is quite evident that there is a demand for these sea stations. If not at present generally acknowledged by sufficient numbers to give it vital support it is nevertheless most desirable, and remains on the docket for action so soon as the public can be fully aroused to the importance of the step.

These stations in the Pacific and Gulf will be of great value to the United States; and as the storm centers, after passing off the coast of the United States, travel toward the east, stations from five hundred to a thousand miles to the west of the eastern shores of Europe would be of inestimable value to the people of the Old World.

The interest in these stations is not confined to any locality; the whole world is interested in them, and the time will undoubtedly come when there will be lines of them from shore to shore.

One of the first plans to suggest itself is to have steam vessels to sail within small circuits, but in stormy and cloudy weather it would be exceedingly difficult to keep them at their posts, and also it would be difficult for a moving vessel to maintain telegraphic communication with the shore, to say nothing of the supply of coal, etc.; so, on the whole, the most practical plan would be to trust to anchorage, either a vessel similar to the "light ships" off the coast, or to have a floating tower so constructed as to offer the least resistance to wind and waves and to maintain the most stability. A number of plans suggest themselves for the towers. They may either be very deep and loaded, so that their base may be a good distance below the surface of the water and the action of the waves, or so contrived as to have a very wide

base and with such construction as to offer the least possible surface for the force of the waves, or a combination of these plans might prove the most practical.

But if we can only succeed in anchoring a vessel of any shape and suitable size and construction to accomplish our purpose, I do not think we need fear but what we can manage the rest, and be able to construct such a vessel or tower as will answer the various purposes of light house, signal station, etc., combining means of communication and the giving of information to passing vessels.

From our present knowledge of the depth of water in which this anchorage would be, and the weight of chain required, it would seem impractical to attempt common anchorage such as practiced aboard of vessels, and anything short of a firm hold on to the bottom or bed of the ocean would also seem to be impractical and wanting in the power to hold a vessel firm at the position established; and for such stations it is necessary that the position of the vessel remain fixed at one point, at least as much so as a light-ship. The most, and it would seem that the only, practical plan of anchorage in such deep water as the great oceans would be by a system of cable intersections with buoys at intervals, say of a hundred fathoms, or from five to six hundred feet. The depth of the ocean where such anchorages would be desired is from ten thousand to fifteen thousand feet; five hundred feet for a section would make an average of twenty to thirty sections in the deepest places. As these anchorages, when once put down, would be quite permanent and would not require, as aboard of a vessel, to be frequently taken up, cable, such as is used on our large derricks, would be better than chains.

It may be asked, how are we to get these buoys, all strung, as it were, on this cable, into position? Let the cable be constructed with the buoys all attached at their regular intervals, and in this manner towed to their respective grounds. Soundings should be taken in advance, in order to determine the necessary length of cable, and allowance be made for the angle at which it would lie in the water. When this has been accomplished, secure the anchor and let go, and like any other anchor there would be no trouble in its finding its way to the bottom and taking hold. Care, however, should be taken to have the connection with the vessel or tower in such a manner as not to interfere with passing vessels; but this would not be difficult to arrange.

When located these buoys or stations should be manned much after the manner of light ships and life saving and signal stations, with lights, signals, stores, telegraph operators, etc. Rightly constructed, located, and managed, they would be a great benefit and blessing to the world. Then the western borders of continents could be forewarned of the storm some days in advance, and in this respect have the advantage at present enjoyed by the people of the eastern half of the United States.

ISAAC P. NOYES.

Washington, D. C., Jan. 12, 1884.

PIPE TONGS.

The pipe tongs for which letters patent were recently granted to Mr. James L. Strait, of Thomas, Missouri, are adapted to grasping pipes of various sizes, without adjustment, and may be used as nippers and as a hammer. The main head is made hollow, or with a passage through it, and is made integral with one of the handles, B. It is curved out to form the jaws, b c d, the grasping surfaces of which are serrated to form teeth; the head is also formed with a hammer head and with a cutting edge at b.



STRAIT'S PIPE TONGS.

In the passage in the head is pivoted the second head, which is made integral with the handle, D, and is also curved out to form the jaws, f g h, which correspond with the jaws in the first head and are also serrated. Below the heads the handles are curved out to form the jaws, i j. The second head is provided with a cutting edge at f, which coincides with the cutting edge on the other jaw; these constitute the nippers of the tool. The jaws, b f, are larger than e g, which are larger than h d, which in turn are larger than i j, so that the tool is adapted for grasping four different sizes of pipes. This construction makes a tool that is very convenient and adapted for quick and easy use.

Treatment of Balky Horses.

Any one observing the inhuman treatment often bestowed upon balky horses, will indorse the following persuasive measure recommended by the *German town Telegraph*. To these remedies others may be added, but the ground is sufficiently covered by these hints to meet all ordinary cases of the sulks in horses:

As long as we can remember, this singular fit of obstinacy in the horse has been discussed, and all sorts of plans given for overcoming it. It must be remembered that what will prove a remedy for one horse will not for another. The original cause of it is, doubtless, neglect and ill treatment of the colt, or after it has been broken to harness. Sometimes stopping a few moments will be sufficient to start the animal again of its own accord. Kind words, patting, a handful of hay or grass, an apple, or a little black pepper put upon the tongue, will induce it to go ahead as if nothing had been the matter. Whipping, at all times, and especially in this case, is the worst resort. We have ourselves induced balky horses to quietly start by some of these means, and one was entirely cured of it by letting it stand until it went on again of its own will. Sometimes the mere turning of the head and letting the animal look in a different direction, or rubbing the nose, has answered; so has tying a string around the foreleg below the knee and drawing it rather tight. Various resorts of this kind should be adopted, but never force.

Beet Sugar.

In these days of tariff discussion, reciprocity treaties, and contests between rival sugar producers and refiners, the public is naturally led to regard the production of cane sugar as its only hope for a supply of the saccharine substance. This, however, is not the case, and it is not putting it too strongly to assert that the world could be supplied with sugar if not another pound of sugar cane were grown. In such an event a substitute could readily be found in the sugar beet, the growth of which, and its manufacture into sugar, is an industry which has already achieved proportions of which few are aware. Already the English market is supplied with beet sugar, to the exclusion of the cane sugar of her own colonies. This is supplied by Germany and France, which have over a thousand beet sugar refineries, all successfully competing with the cane sugar on the European continent.

The manufacture of beet sugar in California has had many set backs, and for a long time it was regarded as a problem of very doubtful solution. But the errors and misfortunes which were the natural effects of inexperience have been gradually overcome, until to-day the industry is in every respect a success. The Standard Sugar Refinery at Alvarado commenced the manufacture of beet sugar in 1879. In the "campaign" of 1879-80 its production of refined sugar was 1,231,966 pounds; in 1880-81, 1,391,688 pounds; in 1881-82, 1,391,680 pounds; in 1882-83, 1,990,583 pounds, while this year it will be about 1,500,000 pounds; making a total of the five years of about 7,596,000 pounds. We are indebted to E. H. Dyer, its General Superintendent, for the following statement of the business of the refinery for the month of October last, which is interesting as going to show the items of expense entailed in the manufacture of beet sugar, and the gratifying outcome.

STATEMENT OF STANDARD SUGAR REFINERY FOR OCTOBER, 1883.

Acid.....	\$300 60
Barrels and packing materials.....	842 00
Coke	45 10
Bone coal.....	620 00
Drayage.....	67 94
Coal (for bone kiln).....	523 20
Filter cloth.....	144 04
Freight (on sugar to San Francisco).....	185 40
Incidentals.....	39 00
Insurance.....	310 00
Interest.....	28 62
Lime.....	308 85
Light.....	201 00
Oil, tallow, and waste	72 00
Petroleum	4,650 00
Running repairs.....	174 80
Supplies.....	344 67
Sales expenses	133 52
Storage on sugar in San Francisco	3 20
Pay roll.....	3,872 45
Beet account (2,406.88 tons, at \$4 60).....	11,071 64
Total.....	\$33,938 03
Sugar produced (341,016 pounds).....	\$34,894 17
Pulp (722 tons, at \$1).....	722 00
Total.....	\$35,616 17
Expenses as above.....	\$33,938 03
Profit for October	11,678 14
Total.....	\$35,616 17

It will be seen by this statement that pure white sugar made from beets costs about seven cents a pound laid down in San Francisco, but little more than duty free Hawaiian refined grades of cane sugar. Raw sugar could be produced for refining purposes for less than five cents a pound, in sufficient quantities to supply all of the refineries on this coast, with a smaller expenditure of capital than has been invested in the Hawaiian sugar industries by American citizens. Our climate and soil are as well adapted to the production of sugar beets as those of any country where beets have been cultivated for sugar, and are as rich in saccharine, and yield as many tons per acre, the average being about fifteen. There are thousands of acres of the best quality of land on

this coast for the production of sugar beets, extending from California to British Columbia, which can be made to produce more sugar per acre than the average cane lands.

On the continent of Europe great improvements have been made in machinery and technical skill in the manufacture of beet sugar, and the percentage of the saccharine properties of the beet is greatly increased by intelligent cultivation. More has been accomplished in the improvement of machinery, quality of the beet, and the technical management of the business in the last two years than during the ten years preceding. Still, the consumption of sugar increases faster than the production, and we shall soon be forced to resort to the sugar beet to meet the increasing demand. The United States ought to produce sufficient sugar for her own needs, and there is sufficient land on the Pacific coast adapted to the purpose to accomplish this.—*Sacramento Union*.

Fire Extinguishing Apparatus for Small Mills.

Some time ago we called the attention of our manufacturers and others to the importance of a more general adoption on all the floors of manufacturing establishments of water buckets, axes, and other hand appliances which might be useful in combating fire.

The *Manufacturer*, published at Toledo, Ohio, takes the subject up, and gives some figures as to the cost of supplying factories with simple means for self-protection against fire.

Among mills and factories where the capital invested is too small to admit of the outlay for pumps, hose, and sprinklers, usually provided in larger establishments, says the writer, a large proportion remain without any means of suppressing any fire that may break out in the premises, though the ravages of the element in this class would indicate some preventive measures as an absolute necessity.

Forty-five dollars is a liberal estimate for the cost of casks, buckets, and auxiliary apparatus, in an ordinary four story mill. The apparatus will last for many years, and may be the means of saving the property at any moment. A suitable arrangement for such a mill would be as follows:

For each floor two good water casks, with covers to exclude dust, four pails, two axes, two crowbars, and one saw. For water casks, empty oil barrels are as good as any, if not the best. These should be fitted with covers like cheese box covers, setting loosely over the casks, and having handles on top to lift them off by. All the salt that the water will dissolve should be put into the casks, both for its effect on fire and as a preventive of freezing. One cask on each floor should be placed near the stairs and the other as remote from the first as practicable; over and about each should be hung two pails, an ax, and bar, for reaching quickly such fire as may lodge in any concealed space, and by the cask on each floor nearest the stairs, a medium sized hand saw. Wooden pails are unfit for this use, owing to their liability to warp, shrink, and fall to pieces when handled at a critical moment. Fire pails should either be of leather, paper, or metal, well galvanized or otherwise protected, preferably the latter two, which neither shrink, crack, nor deteriorate with age.

The cost of such an equipment for such a mill would be about as follows:

8 casks at \$1.00 each	\$8.00
Covers for same at 25c. each	2.00
16 paper pails at \$4.80 per dozen	6.40
8 axes at \$1.25 each	10.00
8 bars at \$1.00 each	8.00
4 saws at \$1.50 each	6.00
Salt60
Painting and placing in position	2.00
Total	\$43.00

These figures are sufficiently liberal to cover all freights and other charges, and are for goods of the best quality. Every article should be marked in large letters, "Not to be removed except in case of fire," and instant discharge should be the penalty for disobedience of this rule. Somebody should be charged with the duty of examining the casks at stated intervals, keeping them full, and seeing that the other articles are in their places. With these precautions and light expenditures, provision is made for extinguishing any fire discovered in season, with apparatus easily understood and requiring no previous drill for its application, and which has proved adequate in a vast multitude of cases.

Fireproof Starch.

The *Clothier and Finisher* gives the following mode of preparing a starch for rendering fabrics coated with it incombustible, which the writer says has been successfully tested in practice. Cover ten parts of pulverized bone ash with fifty parts of hot water, and add gradually six parts of sulphuric acid. Stir the mixture thoroughly, and stand aside in a warm place for two days, with occasional stirring. Then dilute with a hundred parts of distilled water, and filter. To the clear liquid add five parts of sulphate of magnesium (Epsom salts) dissolved in fifteen parts of distilled water, and stir in ammonia until the liquid smells distinctly of it. A white precipitate will be formed, which is to be pressed in a linen cloth, dried in a moderately warm place, and then finely powdered.

Two parts of the powder (which is a phosphate of ammonia—magnesia) should now be ultimately incorporated with one part of tungstate of sodium and six parts of wheat starch, with enough of indigo to impart a very faint bluish tint. In preparing this starch composition, care must be taken that

no iron is introduced in any part of the operation, as this would cause the production of an ugly yellowish tinge or of yellowish spots on the fabrics treated with it. The powder resulting from the above described procedure forms "incombustible starch." For use, it should be stirred in about double the quantity (by volume) of cold water, and enough boiling water should be added, with continued stirring, to produce a viscous liquid, into which the fabric must be dipped, or treated as usual in using ordinary starch in the laundry.

Patent Bills Recently Passed by the House of Representatives, and now Before the Senate.

The following bill (H. R. 3925) was passed in the House of Representatives, Jan. 21, under a suspension of the rules: *Be it enacted, etc.*, That in any suit hereafter brought in any court having jurisdiction in patent cases for an alleged use or infringement of any patented article, device, process, invention, or discovery, where it shall appear that the defendant in such suit purchased the same in good faith for his own personal use from the manufacturer thereof, or from a person or firm engaged in the open sale or practical application thereof, and applied the same for and to his own use, and did not purchase or hold the same for sale, or to be used in or for any manufacturing process, if the plaintiff shall not recover the sum of \$20 or over, he shall recover no costs, unless it shall also appear that the defendant, at the time of such purchase or practical application, had actual knowledge or notice of the existence of such patent, or unless the defendant puts in issue the plaintiff's right to recover anything in the suit. *Provided*, That nothing herein contained shall apply to articles manufactured outside of the United States: *And provided further*, That said purchaser or user upon request by the owner of the letters patent alleged to be infringed by him shall make known the vendor, and time, and place of purchase of the article or articles for the use of which complaint is made.

SEC. 2. That in all suits hereafter brought as aforesaid against a defendant other than a manufacturer or seller of such patented article, device, process, invention, or discovery, the plaintiff shall, at the commencement of such suit, give a bond, to the approval of the clerk, with sufficient surety, to be conditioned that the plaintiff will pay all costs and attorneys' fees that may be adjudged against him; and if the defendant shall finally prevail in such suit, the court shall allow costs, and a reasonable sum, not exceeding \$50, for counsel fees to the defendant, which shall be recoverable by suit, in the name of the clerk, upon said bond, or by fee-bill on execution. A failure by the plaintiff to give such bond shall, on motion, be ground for the dismissal of the suit.

The following bill (H. R. 3934) was passed by the House of Representatives Jan. 22 by a vote of 114 yeas to 6 nays:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That no damage or profits shall be recovered either in law or equity from any defendant for the infringement of a patent, when it shall appear upon the trial that he was a mere user for his own benefit, and not in the manufacture of an article for sale, of any article or device purchased for a valuable consideration in open market, without notice, and the same was subject to the patent sued on; but in all such cases the manufacturer or vendor only shall be liable for damages or profits; *Provided*, That any such user shall be liable for damages and profits for infringement of such patent from and after the time he shall have received notice that the article was subject to such patent if he continue to use the same.

SEC. 2. That when in any case the use complained of was an article or device made by the defendant or his employee for his own use and benefit, and not in the manufacture of an article for sale, the measure of recovery shall be a license fee. If in such cases a license fee shall not have been established under the patent or patents sued on, then in any action at law the jury, and in any action in equity the court, shall ascertain what, under all the circumstances of the case, would be a reasonable license fee: *Provided*, That nothing herein contained shall apply to articles manufactured outside of the United States: *Provided further*, That nothing herein contained shall apply to machinery held for sale or to be used for any manufacturing process whatever.

The report of the committee was read, as follows:

The Committee on Patents, to whom was referred sundry bills numbered 419, 1134, 311, 1956, 1250, report the following bill as a substitute for all:

Much complaint has grown up in the country from the practice of persons owing patents, or pretending to own them, allowing the use of an article, sometimes for years, and then sending an agent around and demanding damages from the holders of the article. Great annoyance has been the result. The committee have drawn the substitute so as to protect the innocent of a patented article, purchased in good faith in the open market, from such annoyance. The manufacturer and seller of a patented implement is the party that ought to be held liable, and not the user of the article who bought and used it innocently, or in other words who did not know he was infringing a patent.

The committee recommend the passage of the substitute.

Many of the members were absent at the time of the passage of both of the above bills, and not a single voice appears to have been raised in protest against these ruthless attacks upon the industries of the country.