

itself to the valve seat. It also consists in a peculiar mode of connecting the face of the valve to its stock or shank, whereby it can be removed therefrom and again replaced, merely by laying off the spring which holds it against its seat. George Woods, of Cambridge, Mass., is the inventor.

Machine for Tapering Spoke Tenons.—The object of this invention is to obtain a simple, economical and efficient device for expeditiously tapering the tenons at the inner ends of spokes, whereby the proper dish is given the wheel. The invention consists in the employment of a reciprocating cutter, working or moving in a right line in connection with an adjustable gage, to which the spokes are applied when their tenons are tapered; the above parts are used in connection with stops, and all are so arranged that the desired work may be expeditiously and accurately performed—far more so than can be done by the hitherto exclusive manual process or mode. Junius Foster, of Long Branch, N. J., is the inventor.



Cotton-picking Machines.

MESSEES. EDITORS:—In your last issue you call attention to the importance of an invention for picking or harvesting cotton. I have had some experience in cotton culture, and from my own observation and the information gathered from others, I am firmly of the opinion that an economical machine which, with the same running expense, will perform four times the labor that can be done by hand, would be the most important invention that could be made at this time. Slaves were averse to using agricultural machinery, in fact, studied, "from the cradle to the grave, how not to do it."

But a new era has dawned. Slavery, with its snailish conveniences, is gone forever. And thousands of the hands that have heretofore picked the cotton in its season, and did little or nothing the balance of the year, will not be available hereafter. For if the negro is really free, he has the same right that any other freeman has to support his wife and children, without their being compelled to work in the field. Thus, gradually, the old source of extra hands for picking will be withdrawn. Now, in Illinois, three men, with six mules or horses, can cultivate 100 acres of corn; they commence plowing in April, and lay by their corn in July, doing the work in three months. Then the same force ought to be able to cultivate an equal area in cotton, with the same labor-saving appliances, in six or seven months—as they can break cotton ground in December or January, and lay it by in July. It is computed that one person will pick, by hand, from 6 to 10 bales of cotton. The average yield on the bottom lands of the Mississippi is one bale, of 400 lbs., per acre. Then, if three men can cultivate 100 acres, there must be some labor-saving invention to enable them to pick 100 acres, or here is a check on the expansive energies of our nation. If the country must support three or four times the number of inhabitants that are required to till the soil, simply in order to have the necessary force at hand to harvest the crop, then truly there is one spot where labor-saving agricultural implements are at a discount, because it would be better to have all the inhabitants constantly employed than loafing around while improved machinery did the work they could do in the old-fashioned way, quite as well as they could pick the crop. Therefore, in my opinion, for the quickening of the enterprise of the cotton region, and the general advantage of the people thereof, and the certainty of an independent fortune to the inventor, there is no invention so much wanted as a practical cotton picker. It would add at least one-half to the producing force of the cotton country.

CARROLL.

New York, Aug. 3, 1865.

A Huge Boiler of Platinum.

MESSEES. EDITORS:—I notice on page 82, current volume of the SCIENTIFIC AMERICAN, a paragraph stating that the new apparatus of Messrs. Crosse & Blackwell, London, for boiling vinegar, is "adami-

num;" I think it was intended for "platinum." I have the pleasure of inclosing you a sheet giving a few items in reference to the apparatus. It may interest our pickle men. As a matter of interest to another trade, I may mention the use of platinum crucibles instead of clay, at the great glass factory of St. Gobain, France, by M. Pelouze, in order to obtain the purest possible glass, free from the yellow tinge which has been so difficult to banish from clear flint glass. He uses amorphous and pulverulent phosphorus, in place of charcoal, in the mixture.

H. M. RAYNOR.

No. 748 Broadway, New York, Aug. 5, 1865.

[The platinum steam coil referred to in the above letter, is made of pure platinum tubing, proved at steam pressure of 60 lbs. per square inch. Its value is £800, or \$4,000; and was manufactured for Messrs. Crosse & Blackwell, and used by them for boiling their pickling vinegar. The coil is the first of the kind that has been made; it boils 325 gallons of vinegar—the capacity of the vat—in an hour and a quarter, with steam at 30 lbs. pressure. It is made of pure platinum, autogenously soldered. The length of tubing (an inch and a half in diameter) consumed being 32 feet, and was manufactured by Messrs. Johnson Matthey & Co., England.—Eds.]

Breech-loaders Triumphant!

MESSEES. EDITORS:—When I began my crusade in favor of the adoption of breech loading fire-arms, in 1861-2, you will recollect that the subject not only met with the serious opposition of men in authority, but that it was absolutely treated with contempt by many, and my efforts were denounced as fanatical and in bad taste.

Well, since then the French Government has adopted them for its entire army; the English Government has advertised for proposals for changing all its guns to breech-loaders; our own Government has adopted them; and herewith I send you the circular of the Swiss Consul-General, inviting breech-loaders for trial, in order to secure the best for its army. So the world *does* move in spite of the old "fogies." Whose turn is it to laugh now?

It may not be generally known, but is a fact, that several, if not all the European governments have agents in this country looking up our improvements in fire-arms and other warlike implements. The recent war has opened the eyes of other parties besides John Bull, and the sequel is one of which our inventors may well feel proud, for all this is the direct result of their skill. The bravery of American soldiers and the skill of American inventors have secured for us a character among the nations of the earth which politicians and so-called statesmen could never have secured. It is a national compliment that our sister Republic should come here to select the best arms for her army, and one of which our inventors have a special right to feel proud.

W. C. DODGE.

Washington, D. C., August 1, 1865.

Patent Sale Agency.

MESSEES. EDITORS:—I saw in a recent issue of your journal an article entitled the "Defense of Patent Sale Agents," written by Mr. J. H. Beardsley, who, I must confess, takes the part of the agent very much like a man of sense, and I am very much obliged to him for his kindness in so doing; for he, in doing so, vindicates my cause as well as his. I saw the article he refers to and felt somewhat indignant at the spirit in which it was written. If the gentleman who wrote the first article will come to my office I will show him that patent agents are not all dishonest. I consider his article a slander not only upon Mr. Beardsley's business but upon mine, and every one who has anything to do with the sale of patent rights. He should be more careful and inquire into the business before he passes his opinion in such sweeping and public terms. If any man comes to me, and if, after full explanation of my terms, is not satisfied, he can go his way and I'll go mine. I have had no complaint yet, and do not anticipate any.

J. C. DAVIS.

Newark, N. J., July 23, 1861.

Lee's Fire-arms Company

MESSEES. MUNN & Co.:—My subscription to your valuable paper having expired, I asked some of my

workmen if they wanted to benefit themselves \$25 per annum (and they are careless readers that can't do that), myself \$500, and another party about \$10. I admit the motive a selfish one, but, knowing your generous disposition, you will overlook that. I only wish manufacturers would look at it even in a dollars and cents light. In response, I send draft for ten copies of your paper from the beginning of the present volume, to be addressed to this office. Being the only establishment of the kind in the West, it is a pleasure for me to say that the rifle we are making was patented in 1862 through your very successful Agency. Our sporting rifle is much thought of by Western hunters, and they are a fastidious class. We are also finishing a contract for Government of carbines.

JAMES LEE.

Milwaukee, Wis., July 31, 1865.

[We thank Mr. Lee for his generous appreciation of the value of our journal. We take this occasion, also, to thank our patrons for their efforts to increase our circulation. At the beginning of the present volume, with a view to encourage our readers to organize clubs, we decided to reduce our terms of subscription to \$2 50 per annum for all clubs of ten or more names; this reduction has resulted in bringing us a large number of clubs. There is, however, room for more, and we hope there are hundreds of others who will now avail themselves of our liberal clubbing terms.—Eds.]

Why Plated Goods Tarnish.

MESSEES. EDITORS:—In No. 2, present volume of the SCIENTIFIC AMERICAN, a correspondent inquires why electro-plated wares tarnish sooner under the same circumstances than solid silver articles. You answer him by stating, "It doubtless arises from imperfect cleaning of the electro-plated articles," and also state, "it is well known that the solution adheres, and cannot be removed by mere washing." Your explanation is correct to a certain extent. Careless and slovenly platers do leave some of the solution remaining in the pores of the metal—a very little of which does mischief. But good first-class platers remove all the solution, so there is seldom if ever any trouble from this source in really first-class goods.

The real and principal cause is this, viz.: In electro-plating pure silver is deposited on the article plated, and when removed from the solution the silver is in a soft, porous state. Passing the finger over the surface it feels like velvet. The microscope shows the spongy texture perfectly. If there is a thick deposit it is very difficult to compress and solidify the silver in burnishing, which leaves the silver more or less spongy. This is especially the case with goods plated on soft or britannia metal, as the metal under the silver yields under the pressure of the burnisher and fails to produce so solid and compact a surface as can be obtained on hard metal goods or solid silver. Now it is well known that a polished surface of pure silver is one of the most sensitive metals known, to the action of the various gases, moisture, etc., which prevail at almost all times and places; hence if these articles with pure silver surfaces, and those surfaces soft and more or less spongy, are exposed to the atmosphere for any considerable length of time they will be promptly acted upon by these agents, and tarnish. Solid silver articles have the advantage of at least ten per cent alloy—a very great protection against tarnishing; besides, these articles are drawn under the hammer and are as hard as the silver can be worked, having often to be annealed while in process of making. The surface is made very smooth, after which it is carefully burnished by a strong hand, which leaves the surface as smooth, hard and compact as is possible, which, with the alloy, is the great secret why it is less susceptible to tarnish than plated wares. Some of the finest qualities of goods, plated on fine German silver, can be finished so as to keep their color nearly as well as solid silver. The above is the result of ten years' experience and observation in the manufacture of plated wares.

If you think it would interest your readers I could give the best modes of preventing and removing tarnish on plated and solid silver wares.

E. W. C.

New York, Aug. 2, 1865.

[We should be pleased to receive the directions.—Eds.]

Important to Manufacturers of Fire-arms.

The following circular is addressed to manufacturers of breech-loading guns, and will explain itself on perusal:—

CONSULATE-GENERAL OF SWITZERLAND,
WASHINGTON, D. C., July 26, 1865.

SIR:—Your attention is invited to the inclosed circular of the Honorable War Department of Switzerland inviting competition in breech-loading fire-arms suitable for infantry service. As a considerable portion of the circular is devoted to technical points, intelligible only to those familiar with the fire-arms now in use in Switzerland, I would here extract from the circular in question the essential points of interest for the manufacturer of arms in the United States. The main object of the prize offered by the military authorities of Switzerland appears to be to secure the best system of breech-loading arms which could be adapted for the use of infantry. It is stipulated that metallic percussion cartridges are to be used, and the barrel of the arm is to be connected securely with the stock, and not require to be moved when loading. The further stipulations named in the circular are as follows:—

9. The outward shape of the arm shall not present any obstacles which might prevent its easy handling.

10. The ignition of the charge shall be perfectly regular and sure.

11. The arm shall possess all the important advantages of a breech-loading weapon, such as simplicity, durability, solidity and strength of mechanism, facility of handling it after long-continuous firing, and to be easily cleansed and kept in good order, especially as to the complete and durable closing of the breech.

12. The War Department of Switzerland invites manufacturers of arms, and inventors who may be disposed to submit models of arms which will comply with the required conditions, to make their proposals at the earliest date.

13. The time appointed for the delivery of the arms to be tried ends October 1, 1865.

14. A special officially selected commission will examine the various models, experiment with them, and ascertain their efficiency.

15. The Government of Switzerland has decided to award to the inventor of a system or style of breech-loading fire-arm which can be introduced and adopted into the Swiss army, a premium of 20,000 francs.

16. In case that no model should be submitted which answer all the requirements mentioned, the Government reserves the privilege to divide, wholly or partially, the stated amount among those who have forwarded the most effective models of the arm.

Should you desire to compete for the prize offered, and thereby perhaps succeed in introducing your system of breech-loading fire-arms into the Swiss service, it will secure to your arm a most enviable reputation; for no manufacturers of arms on the continent of Europe are more expert than the Swiss, and no government is known to devote more zealous and discriminative attention to the introduction of the best fire-arms into the military service.

Arms intended for competition should be well packed, and provided with at least one thousand rounds of cartridges. They must be sent to this Consulate by the 1st of September, and all expenses of shipment from Washington to Switzerland will be borne by the undersigned. If desired, after trial, the unsuccessful arms will be returned free of charge, or purchased, if a price can be agreed upon. Full description of each arm should accompany it, and also the price at which the arms could be furnished per piece or by the quantity.

JOHN HIRTZ,
Consul-General of Switzerland.

The First Defect in the Cable, and How it was Repaired.

The following interesting account of the first accident to the Atlantic cable is given by a correspondent of the *London Times*, writing from Valentia, July 27, 1865:—

At last the mystery of the breakdown of the cable is known in all its details. The master of the *Hawk*, which returned here this evening, having left the great ship last night, brings full particulars, both of the extraordinary nature of the accident and the still

more curious manner in which it was discovered, its place ascertained, the cable hauled in and the piece cut out. When about eighty miles off land, with dead calm weather, the ship going six knots, and the cable, we are told, running out as softly as a "silk rope," the usual test signals were being sent through, when suddenly both those to and from the shore gave most serious indications of faulty insulation. The utmost alarm was felt on this discovery. The connections of the instruments were carefully re-examined and the most rigid exactness observed in the final tests. All gave the same result, and what was a still more certain and ominous proof, the return currents from Valentia showed an equal loss. Notice was instantly given to Mr. Canning and Captain Anderson, and the speed of the *Great Eastern*, which was then in 300 fathoms, was reduced almost to a standstill. It must be remembered that all these signals were sent and received through the whole length of 2,300 nautical miles, or about 2,700 statute miles of wire.

LOCALIZING THE DEFECTIVE POINT.

Valentia was instantly communicated with, and the whole electrical staff under Mr. De Sauty set to work to ascertain by resistance tests whether the fault was in the ship or in the eighty miles that had been paid out. Trials of so delicate a nature and of such vital importance to the success of the undertaking were, of course, conducted with the most vigilant caution, and the calculations based upon their data made and re-made to insure certainty. The result of all was a unanimous decision that the fault was not on board, but in the eighty miles of submerged wire. When this decision had been arrived at, the cable was at once cut on board the *Great Eastern*, and the length under water tested by Mr. Saunders. With wonderful skill his tests at once "localized" the spot where the fault existed—eleven miles from the stern of the ship, and within a quarter of a mile from where it actually was.

WINDING IN THE CABLE.

Instantly preparations were made for getting the *Great Eastern* round and employing the winding-in apparatus fixed forward specially to be used in case of such mishaps. It was hoped, of course, that its use would never be required, and very many believed that, whether required or not, it would never accomplish what it was intended to achieve. The result proved the fallacy of both hopes and fears. The severed portion of the cable was passed into this machine, and, the *Great Eastern* steaming back over the rope's course, the work of reeling-in at once began. The cable came up with singular ease. The strain on the dynamometer of the machine never exceeded eighteen hundred, which was nothing to a cable guaranteed not to break under seven tons, and equal, from its specific gravity, to support eleven miles of its weight in water, or through a deeper sea than soundings have ever yet been found in the world. As we have said, within a quarter of a mile of the spot indicated by Mr. Saunders the fault was found; and nothing can more strongly indicate the endless perils with which successful submarine telegraphy is beset than the trivial and almost unavoidable accident which had caused it.

THE ORIGIN AND NATURE OF THE DEFECT.

As the lengths of wire of one hundred or one hundred and fifty miles were manufactured at Messrs. Glass & Elliot's, they were taken down in barges and coiled away in the tanks on board the *Great Eastern*. Each as it arrived was, of course, spliced up to that which had preceded it, and this was often done in the tanks themselves. The operation of splicing not only means joining the conductor, but also joining the outside wires, the junction of the latter being made at different lengths—the bits of wire cut out being thrown away. It seems, however, that one of these atoms of wire, about two inches long, and as thick as a stout darning needle, fell on the coil unnoticed, as, indeed, who would notice it, or for a moment think of the consequences which this disregarded presence in such a spot might surely occasion? The weight of the layers of cable laid above this fragment—as insignificant as a shaving in a carpenter's shop—pressed it firmly into the tarred hemp which forms the outside coverings of the cable. To this it adhered. While in the tank it did no harm, but when this portion came to be paid out the small diameter of the eight leading wheels which give access to the paying-out machine, and the

weight of the jockey pulleys over those which keep the rope in its place, bent the stout iron wire so sharply that it passed between the hemp, pierced the gutta-percha through at least two or three of its four folds, and there remained. In this state it was found, and instantly recognized as a piece of wire from a splice joint.

HOW IT WAS REPAIRED.

A short length of cable was at once cut out, a new splice made, vigilantly tested, and gradually sunk. When on the bottom it was again retested for some hours, and the signals were shown to be absolutely perfect.

HOW THE "GREAT EASTERN" BEHAVED DURING THE TIME.

During all this time the *Great Eastern* remained quietly hove to. The sea was calm, and even the throbbing swell of the Atlantic had died away into the mere undulations of a wave. The motion in her, therefore, was barely perceptible to the feeling, and could certainly not be detected by the sight, save by watching the little arc of a circle which her top-masts now and then described. The whole accident caused a delay of nearly twenty-four hours, during which the drift of the vessel was almost nothing.

SPECIAL NOTICES.

Jacob Constant, administrator of the estate of Isaac Constant, deceased, of Dawson, Ill., has petitioned for the extension of a patent granted to him on the 4th day of November, 1851, for an improvement in cultivators.

Parties wishing to oppose the above extension must appear and show cause on the 23d day of October next, at 12 o'clock, M., when the petition will be heard.

Thos. J. Sloan, of New York City, has petitioned for the extension of a patent granted to him on the 21st of October, 1851, for an improvement in machinery for shaving, nicking, and re-shaving wood screws.

Parties wishing to oppose the above extension must appear and show cause on the 2d day of October next, at 12 o'clock, M., when the petition will be heard.

Wm. Kenyon, of Steubenville, Ohio, has petitioned for the extension of a patent granted to him on the 14th of October, 1851, for an improvement in machines for making nuts, washers, etc.

Parties wishing to oppose the above extension must appear and show cause on the 25th of September next, at 12 o'clock, M., when the petition will be heard.

Louis S. Robbins, New York City, has petitioned for the extension of a patent granted to him on the 4th day of November, 1851, for an improvement in lubricating oil from rosins.

Louis S. Robbins, New York City, has petitioned for the extension of a patent granted to him on the 4th day of November, 1851, for an improvement in distilling acid and naphtha from rosins.

Louis S. Robbins, New York City, has petitioned for the extension of a patent granted to him on the 4th day of November, 1851, for an improvement in tanner's oil from rosins.

Newton Foster, Gilbert Jessup, Hiram L. Brown and Calvin P. Brown, of Palmyra, Chapinsville, and Shortsville, N. Y., have petitioned for the extension of a patent granted to them on the 4th day of November, 1851, for an improvement in seed planter.

Parties wishing to oppose the above extensions must appear and show cause on the 23d day of October next, at 12 o'clock, M., when the petition will be heard.

THE New England Agricultural Society will hold its second annual fair at Concord, N. H., on the 5th, 6th, 7th and 8th days of September next. The society offer the large sum of eight thousand dollars in premiums. Among the novelties to be exhibited will be a locomotive steam plow, invented by a New England mechanic.

MISS MARIA MITCHELL, of Nantucket, Mass., is to be Professor of Astronomy at the Vassar College, Poughkeepsie, N. Y., which is to be opened in September. Miss Mitchell has a world-wide reputation among astronomers.