## Correspondence.

### Electricity in Printing Presses.

*To the Editor of the Scientific American:*

I have considerable trouble with electricity, which gets into the paper as it passes through my cylinder printing press. If I have a small quantity of highly calendered sheets to be printed on both sides, when I run the blank sheets through there is no electricity in them; but as they pass through, the cylinder—I judge—generates the electricity and imparts it to the sheet being printed, and when the sheet comes out it is sometimes so charged that it adheres to the other sheets, causing an "off-set;" and the electricity does not leave the sheets for some time, thereby interfering with the feeding of the sheet the second time through.

Several plans have been tried in this and other printing offices, such as oiling and chalking the tympan, running a copper wire underneath the paper and into a pail of water, and numerous other ways have been resorted to, to remove the difficulty, but with no success. Can you suggest a plan whereby the electricity can entirely be removed?

Chicago.

[ANSWER.—The same difficulty that our correspondent speaks of is experienced in many other printing offices. In a dry atmosphere, in buildings where the floors are insulated by dry timbers, electricity will be abundantly generated when non-conductors such as belts or sheets of paper are put in motion. The most effective remedy is to produce a damp atmosphere in the room or shop.

This may be done by thoroughly wetting the floor with water. In the printing rooms of the SCIENTIFIC AMERICAN it is found that sponges saturated with water and placed on the fly table serve a good purpose; and our printer has proposed to use pans of water having perforated covers, for the same purpose. In damp weather the electricity does not make its appearance.]

### The Loon.

*To the Editor of the Scientific American:*

While on Lake George last summer, I observed an interesting trait in the loon, which may be set down to the credit of the species.

Returning one evening to our camp in the "Narrows," and threading the islands which add so much to the beauty and attraction of that part of the Horicon, we suddenly reached an open space where, immediately ahead, I observed a family of loons disporting themselves in the water. They had evidently sighted us first, and for a short time appeared to be discussing the situation, but their resolve was quickly made and speedily executed. My companion had followed a suggestion to measure our paddles with *theirs*, although we knew that to pursue them in a boat, if not a wild goose chase, was something even more hopeless, and expected they would dive and make off in the usual manner. Their tactics were, however, somewhat different on this occasion, as they had their young to look out for.

When we were well on their track all disappeared simultaneously, and shortly after the mother-loon came up with her young in the middle of the lake, and began sculling rapidly to the opposite shore, but, wholly to our surprise, paterfamilias rose to the surface in his former position, and there awaited our approach.

On the impulse of the moment I sent a few shot after him when about a dozen rods off, but fortunately they only ruffled the water where he had disappeared, and in a moment he was up again uninjured. Instead of retiring at this signal, as might have been expected, he rather assumed the offensive, and appeared to challenge assault by coming nearer and occasionally giving an ironical laugh.

He continued about our boat, sometimes within oar's reach, for several minutes, diving spasmodically and immediately returning to the surface as if he had made some mistake. Whenever he balked us successfully, he celebrated the event by uttering a peculiar and unearthly sort of howl, more like the deliberate yell of some wild beast than the cry of any bird.

He was evidently sacrificing himself for the safety and preservation of his young and mate, as he must have known, if his ruse worked, it would be at extreme personal risks. While keenly watching us, I noticed that he had also an eye to his little family, which was evidently the object of his chiefest solicitation, and was now nearing the western shore.

The two young presented an interesting sight, swimming side by side in front of the old bird, and probably also at her direction. As was somewhat singular, we did not get a glimpse of them, after they first disappeared, until they were well over to the opposite side. By what chicanery they were concealed I do not know: when well out of harm's way there was a reunion, and loud and long was the laughter of the whole family.

This strong instinct, which prompts a bird to preserve its offspring at all hazards to itself, is always admirable. In such cases, birds which are the slyest under ordinary circumstances become frequently the boldest and most venturesome.

The loon in the water plays a similar *role* to that of the partridge on land, yet in the case of the latter there is less display of bravado and daring. When the ruffed grouse sometimes spins around before you, mewing and trailing her wings in such *deshabille* that you have to pause for an instant to make out what sort of a creature it is, she usually exposes herself but a few moments in the attempt to bewilder you, while her chicks seek the leaves, and then retires to a safer distance.

I have seen the wild duck whirr off and leave her brood, in a small stream, to their own resources, but they disappeared as if a whirlwind had swept them away, finding a cover amid the grass on the banks. The young loon seems to look to his seniors not only for instructions but for actual protection.

Scarcely any bird has learned to avoid man more successfully than this, and few better appreciate the meaning of the gun. Shy of the shore, which he seldom approaches except in the gray of the morning, he maintains himself at a safe distance at all other times. When surprised near the land, he instantly dives and speeds his way under water, like a fish, to the widest and deepest parts of the lake, now and then lifting his black head above the surface to take his bearings. If pursued thither, he maneuvers with great skill, even passing under the boat of his adversary, but always outwitting him in the end.

Before reaching the island where we had encamped, a rain came up which lasted through the night and the two following days. I mention this fact, because on the night before (July 3) the loons had been unusually boisterous. Their wild, demoniac laughter was doubly interesting at this point, where the echoes were several times repeated. The hills and mountains seemed alive with demons.

Wilson, in describing this bird (v. Ornith., *Colymbus glacialis*, L.), says they are particularly restless before a storm, and mentions a shipmaster of his acquaintance who always knew when a tempest was a-brewing by the cry of these birds, which at such times was unusually shrill. He had also noted this himself, and the present instance would serve either to confirm the observation, or to show a curious coincidence at least.

F. H. HERRICK.

Burlington, Vt., April 5, 1883.

[THE ELECTRICIAN.]

### The Inventor of the Telephone.

SIR: As your editorial note of p. 374 invites me to give the references that I have indicated in evidence of Reis' claim to be the inventor of the telephone, which he designed for the express object of transmitting human speech and other sounds of all kinds, I have much pleasure in giving you the very same references which I have myself obtained from the published writings of Graham Bell ("Researches in Telephony," *Journal of Society Telegraph Engineers*, 1877) and of Edison (see Prescott's "Speaking Telephone," p. 218).

The following are a few of Bell's references:

(1) "Telephonie," *Dingler's Polytechnisches Journal*, clxviii., p. 185, extracted from the *Jahresbericht des Physikalischen Vereins zu Frankfurt am Main*, 1860–61, pp. 57–64.

This is a scientific memoir by Philipp Reis, having for title "On Telephony by the Galvanic Current." On p. 58 he says his endeavor was to find an instrument which should reproduce the total action of all the organs set in action in human *speech* (menschlichen Spräche), and that he took the human ear as model, because the tympanum of the ear could respond to all sounds. After discussing the problem of representing the pressures of the air in sound waves by a "curve," he says that if it is possible at any place to reproduce vibrations having a similar "curve," the very tones will be reproduced. He then says that, taking his stand on the principles laid down, he has succeeded in reproducing the tones of various instruments, and to a certain degree the human *voice* (die menschliche Stimme). After describing his instrument—the well known combination of a tympanum in imitation of that of the human ear, with an electric current regulator, consisting of an interrupting apparatus, which embodied the loose-contact principle of the microphone, and which is in many respects exactly like the interrupter in the Blake transmitter—he says (p. 62): "I give to my instrument the name 'Telephon.'" Later on he says that the reproduction of human speech which he has attained is not so clear as to satisfy everybody, and that though the consonants are transmitted distinctly enough, the vowels are not equally so, and he proceeds to discuss why this is the case.

(2) *Brix's Zeitschrift des deutsch-oesterreichischen Telegraphen Vereins*, 1862, vol. ix., p. 125. This article is also reprinted in *Dingler's Polytechnisches Journal*, 1863, vol. clxix., p. 23.

This is a report by Inspector Von Legat on Reis' telephone in its developed form. Inspector Von Legat says that this instrument was able to reproduce single words uttered as in reading and speaking, though not so distinctly as it reproduced chords and melodies, which latter it transmitted with marvelous fidelity. He even added that the inflections of the voice, the modulations of interrogation, exclamation, wonder, and command attained distinct expression!

So much for Bell's references; Edison's reference is the same as No. 2 of the preceding.

As to the publicity of these documents, permit me to refer you to the shelves of the British Museum and other public libraries.

I do not say that there is not plenty of further evidence, were such needed. But here I am quite content to accept the references given by such unimpeachable authorities as Bell and Edison. When they refer me to papers wherein Reis says in substance, "I am the inventor of the telephone. My instrument is intended to transmit human speech and all other kinds of sounds that a human ear can hear, and it succeeds in doing so, though I find to my disappointment that it is not quite yet perfect, because, though single words and consonants come through all right, the vowels are not clear," I am bound to believe, on the authority of Bell and Edison, who give me these references, that Reis' modest claim is just. And I am bound to this belief still more strongly because I find, when I make careful trial of Reis' own telephones, that they will do exactly what he said they were intended to do—namely, transmit human speech to a distance by the agency of the galvanic current.

You have, Mr. Editor, most aptly said that the question is, What was *the kind of success aimed at* and attained by Philipp Reis? and I entirely agree with you that this question is not in the least degree affected by whether Philipp Reis is dead or alive. Though himself be dead, and the task of defending his memory from outrage fall to others, his words still live to testify in the most unmistakable manner to the aim which he set before himself, and to the measure of success which he attained in his invention of the telephone.

Yours, etc.,

Bristol, March 4, 1883. SILVANUS P. THOMPSON.

### Waste Products Utilized.

We all know something of what is doing in the way of utilizing materials which have commonly been regarded as useless. With the growth of the world and the steadily increasing and remorseless demand upon the long established sources of supply comes the urgent need of something to make up for this depletion. In response to this need we have paper made from wood instead of from rags, colors made from the refuse of the gas house instead of from natural products, and so on. These are hints at the more commonly known forms of substitution.

There was a time when in wire factories the dilute sulphuric acid, formerly used to clean the wire, was allowed to run into the sewer when it had become so charged with the iron scale as to cease to "bite," and large quantities of refuse wire were employed only to fill up hollows in grading, or thrown into a heap. All this waste material is now, however, converted into articles of commercial value. The first product is copperas. Even the waste of this product from waste is utilized. The settlings of the boiling tank—oxide of iron—together with the waste copperas, an alkali, and an inexpensive substance to give "body," are roasted, ground, and converted into a pigment quite equal to imported Venetian red.

It is well known that heaps of refuse, or "tailings," as they are technically termed, accumulate where mining operations are carried on. The sludge which is emptied from the puddling mills in Australia contains a considerable quantity of fine gold. Much of this is now recovered, and the yield of gold from these exceeds three hundredweight per ton. After a large gold coinage at the Royal Mint, there is always a great deficiency in waste and sweep. The sweep is composed of cinders or dust from the forge, the sweepings of the workshops, broken crucibles, the dross which adheres to the ingots of metal after fusion, and of every waste which can possibly contain minute particles of the metal. This is generally sold. The silver and gold from photographers' waste is also now carefully collected, and form a considerable item in economy. A method of utilizing the waste of gold leaf used in printing and the arts is by converting it into what is called fleece gold. The composition is used like the ordinary bronze, except that rather more copal is mixed with it. It is used for all fancy papers for which gold leaf and bronze have hitherto been used.

A lecturer before the famous Society of Arts refers to still other movements in this same direction. The waste of the glass furnaces, such as pieces of broken glass, flaw glass, the hearth droppings, and the glass remaining adherent to the blower's pipe, is utilized again, serving a purpose in the manufacture of glass similar to rags in paper making. Agate glass is made by melting waste pieces of colored glass. Broken bottles are now collected and utilized. Broken "wines" and broken "sodas" are converted to many useful purposes, the latter especially. The broken bottles are utilized for the manufacture of cheap jewelry, chimney ornaments, and inferior household glass for the manufacturing districts. They are also used for the manufacture of emery powder, glass paper, etc.

There can be little doubt that the people of the future will live and thrive and grow rich by putting to practical use the things which the people of the present throw away.

To the above, compiled from various sources by one of our contemporaries, might be added many other products which modern chemistry and invention have produced from heretofore useless dirt heaps. One of the latest of these savings is the treatment by naphtha of iron filings and the cotton waste of machine shops, by which the oil is separated and sold, and the cotton waste is cleaned and restored for use again.

### The Usefulness of the Scientific American.

A valued correspondent sends in his usual subscription, and writes us as follows:

I have been a regular subscriber for the SCIENTIFIC AMERICAN from vol. iv., old series, and have the whole, bound and on file unbound, except first volume, old series; and, although I am now on the last quarter of the sixty-ninth year of my age, I still consider it interesting and profitable to peruse the pages of "*Old Sci.*" It has truly been an educator to me, and, no doubt, the same to many others. Long may it live and prosper, and in the future, as in the past, contribute its due share in the enlightenment and improvement of mankind.

G. W.

Hamburg, Erie Co., N. Y.

### A Compressed Air Locomotive.

What is undoubtedly the first practical attempt to use compressed air as an underground motor in a coal mine in this country is meeting with success at the Old Eagle pits of W. H. Brown Sons, 27 miles up the Monongahela above Pittsburg. The new motor was built at the Baldwin Locomotive Works, and is a most singular looking affair. The available height above the pit rails being only 5 feet 10 inches, the air locomotive had to conform thereto. The air receivers are 27 feet long and 38 inches in diameter, and made of sheet steel. These are filled with air compressed to 400 pounds per square inch, forming the actuating power of the machine. These air receivers rest on four wheels, driven by a pair of locomotive cylinders, gearing, etc., just as in a railway engine, the air taking the place of steam. The originator of this idea, Capt. Harry Brown, expressed himself as more than satisfied with this locomotive. It does the work of a score of mules, requires the attention of only one man—who also operates the air compressing machinery—and can haul 55 loaded cars (60 tons) up a gradient of 100 feet to the mile.—*Coal Trade Journal.*

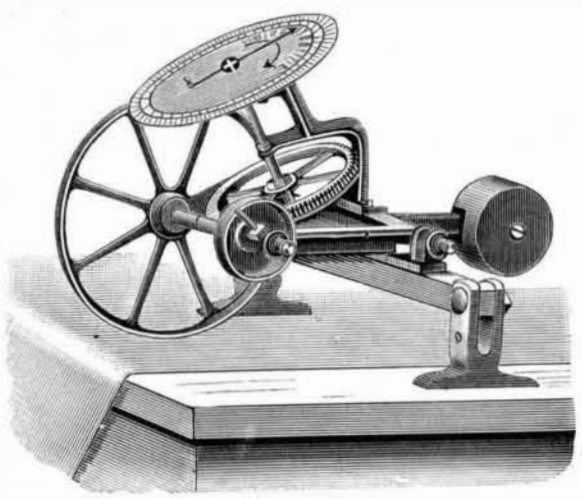
### New Method of Printing a Positive from a Positive.

MM. Cros and Vergeraud have worked out a process for obtaining images so as to have a positive impression from a positive plate, and a negative print from a negative original. The process is based on the following circumstances: The easy reduction of soluble bichromates mixed with certain organic substances, and the relative insolubility of bichromate of silver. Suitable paper is covered with a solution of two grammes of bichromate of ammonia, and fifteen grammes grape sugar, dissolved in 100 of water; when dry, it is exposed to light under a positive. As soon as the yellow paper becomes gray, it is removed, and immersed in a one per cent silver bath, to which ten per cent of acetic acid has been added. The image will immediately appear of a ruddy hue, due to the bichromate of silver. The print, on being washed, retains the red impression of the insoluble bichromate, which becomes dark brown on exposure to sunlight. On submitting the print when dry to the fumes of sulphureted hydrogen, or dipping in a solution of sulphite of copper and potash, it becomes black. The latter process is preferable.—*Photo. News.*

### MACHINE FOR MEASURING TEXTILE FABRICS.

To measure textile fabrics correctly by a machine is far more difficult than many people would suppose. The difference may be unimportant in the case of calico or other equally unelastic goods, but where woolen goods are concerned, which can be pulled out considerably by a slight stretching, the difference between the measurement of one person and another is sometimes serious. For this reason it is also customary to measure all goods with an elastic selvage down the middle, even when they are not doubled, as naturally the selvages stretch more than the body of the cloth.

In mills where large quantities of goods have to be measured, this is nowadays generally done by machinery. Very often the measuring arrangement is in conjunction with a plaiting or rigging machine, and the number of plaits or layers is registered, the division of a whole plait being thus roughly taken from an index, or the goods pass over a roller covered with cloth or baize, which is in connection with a dial, and is turned by contact with the passing cloth. But even here the measurement is not always correct, because in order to secure adhesion to the roller there must be a certain drag, and this means, of course, a stretching of the cloth.



MACHINE FOR MEASURING TEXTILE FABRICS.

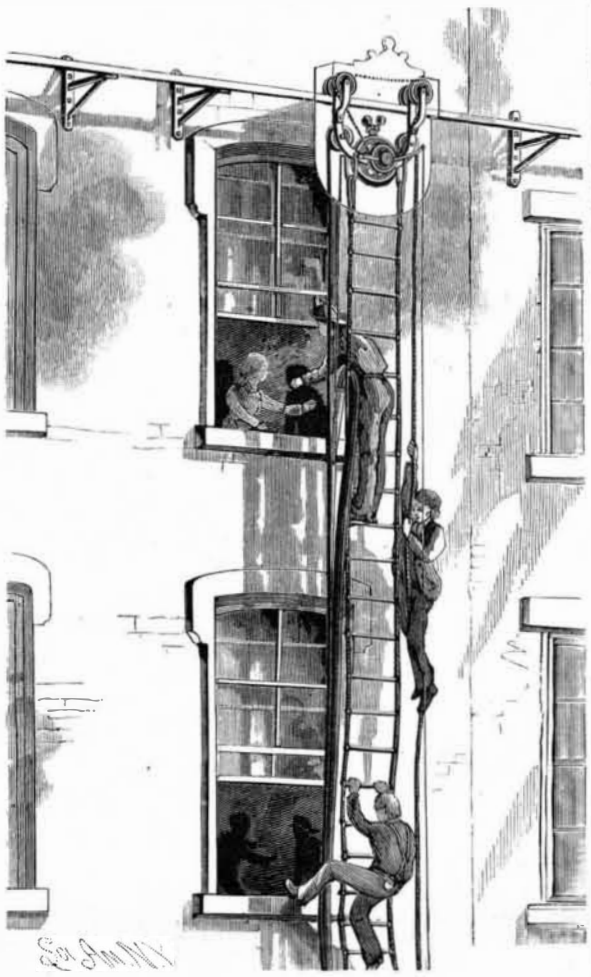
Smaller quantities of goods, especially of the more valuable ones, can be measured more correctly in other ways, and our illustration shows an appliance for the purpose.

Here the cloth does not pass over a roller, or has to drag a heavy cylinder, but is simply drawn by hand or by power over a table. This can be done without exerting any drag upon the cloth. A light iron pulley runs over it, and is turned by the passage of the cloth. This pulley, whose axle runs in two small standards placed upon the table, is connected in the usual manner with a dial, upon which the number of revolutions or yards, or any other standard measure, is registered, while the subdivisions of the same are indicated by a finger and small pulley, the latter of which is keyed direct upon the shaft of the larger pulley. In order to obviate the least drag of the cloth upon the pulley, the latter is counterbalanced by a weight, which can be shifted according to the adhesiveness required. The little machine appears simple, and will no doubt measure correctly if well made.—*Textile Manufacturer.*

### IMPROVED FIRE ESCAPE.

The engraving shows a fire escape in which a carriage is arranged to run upon a track near the top of the house. It is provided with a pendent ladder, and may be moved along the track by an endless rope and chain and chain pulleys in one direction or the other, for the purpose of bringing the ladder opposite a window, door, or other place of escape.

A horizontal rail is attached to the building beneath the



COPELAND'S FIRE ESCAPE.

cornice, and supports a carriage, which consists of a U-shaped frame mounted on grooved or flanged wheels, that travel on the rail.

An endless rope passes over grooved pulleys journaled in the frame, and an intermediate pulley which is journaled in the lowest part of frame.

A chain pulley is mounted loose on the projecting axis of the lower rope pulley, and may be locked thereto by means of the spring clutch, which is fixed on the axis, and operated by a lever and hand rope extending to the ground.

An endless chain connects the lower chain pulley with the upper pulleys, which are fixed on the same axis as the flanged transporting wheels.

By pulling the hand rope the lower chain pulley and rope pulley will be locked together; then, by pulling the endless rope in one direction or the other, the carriage will be propelled on the rail in a corresponding direction. It is within the power of any person, stationed on the ladder hanging from the carriage, or on the ground, to propel the carriage and its attachments along the rail to any desired point, and thereby render the ladder available for convenient and immediate use. The ladder furnishes the chief means of escape, but a clamp, which is attached to the endless rope, can also be used as means of escape.

To render the movement of the endless rope uniform during the descent of a person on the endless rope, and at the same time automatic, an automatic governor is provided, which retards the descent and renders it uniform.

The entire fire escape apparatus, with the exception of the rail, which is a fixture, may be inclosed in a suitable box or casing on the rear side of the building, where it will be out of observation and protected from the weather, as well as from access of thieves or burglars designing to enter the building.

By constructing the box or casing with a door properly arranged, the carriage, ladder, and other attachments may be moved out at once when required for use, and guided to the desired point.

To allow the escape to travel around a corner to a different side of the building, the supporting rail is curved, and the flanged supporting wheels are made with a tread wide enough to accommodate the curve.

Further particulars may be obtained by addressing Mr. F. A. Copeland, La Crosse, Wis.

THE Commissioner of Patents has recently decided that in interference cases before the Patent Office, to determine who is the prior inventor, the wife of either contestant may appear as a competent witness.

### Oil of Wintergreen in the Treatment of Acute Rheumatism.

Dr. F. P. Kinnicutt draws the following conclusions from the results obtained in twelve cases of acute rheumatism, treated by oil of wintergreen:

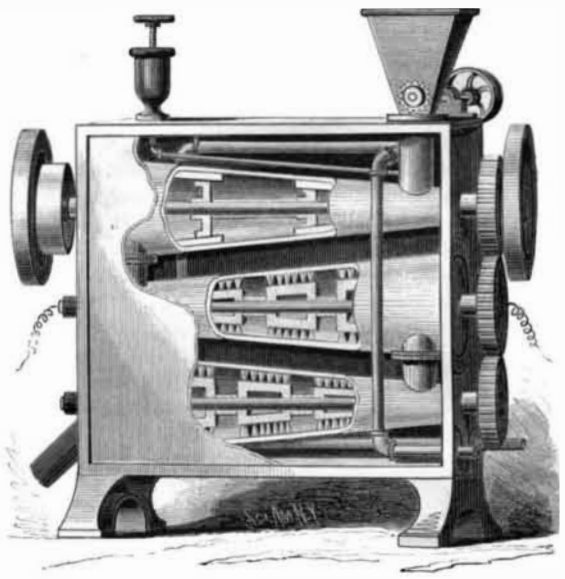
1. In the oil of wintergreen we possess a most efficient salicylate in the treatment of rheumatism. 2. In its efficiency in controlling the pyrexia, the joint pains, and the disease, it at least ranks with any of the salicyl compounds. 3. The best method of its administration is in frequently repeated doses, continued in diminished doses throughout the convalescence. 4. Its use possesses the advantages of being unattended with the occasional toxic effects, the frequent gastric disturbance produced by the acid or its sodium salt, even when prepared from the oil of wintergreen; that its agreeable taste, and finally its comparative cheapness, are further recommendations in favor of its employment.

### ELECTRO PULVERIZER AND AMALGAMATOR.

The Manes electro pulverizer and amalgamating machine, shown in the cut, is designed for saving the rusty and fine gold, also the quicksilver, that has been lost in hydraulic washing for gold on the coast of California ever since the commencement of hydraulic washing in the summer of 1852. It is said that the loss has been at the rate of from 20 to 35 per cent of the precious metals and mercury, which, if saved, would amount to hundreds of millions of dollars.

Notwithstanding all the modern improvements in mining machinery, immense quantities of the precious metals are constantly washed away and irrecoverably lost. The value of this lost portion, according to various estimates, is very nearly if not quite as great as that of the metal secured. A great deal of engineering skill and inventive genius have been engaged in trying to devise means of preventing this great loss. This has generally resulted in placing various devices in the sluices to catch and retain the stray particles of gold or sulphuret. Some of these inventions have been more or less successful, but none of them have saved anything like a reasonable proportion of the valuable part of the metals.

The electro amalgamator, it is claimed, will save from 50 to 75 per cent of all the gold and quicksilver that passes through the machine, as the rusty gold will be perfectly scoured and electroplated with quicksilver, and thoroughly amalgamated by the rapid action of the electrical steel brushes and steel mullers that revolve inside of the series of steel cylinders in the machine, placed one above the other, and made cone shape, and connected with spouts; the large end of one cylinder is placed under the bottom of the small end of the next one and so on, forming inclined planes for the sand or crushed ore to run down by its own gravity, which is assisted by streams of water and quicksilver, constantly fed into the machine from a hopper on the upper part of the machine; and the powerful current of electricity is constantly passing through the sands or ore, as it passes from one cylinder to another, and as it is thoroughly mixed at the same time with the quicksilver by the steel brushes, no gold escapes without having been thoroughly amalgamated. The material passes through a movable iron spout into settling tanks, where the cleaning up is done. The machine does not stop except when repairs are needed; the waste water of the sluice boxes is used for driving the machines, and but one



MANES' ELECTRO PULVERIZER AND AMALGAMATOR.

man is required to attend to each machine. The fine sands will be conveyed into the machines through screens of the proper size. This apparatus can be used in stamp mills for amalgamating purposes, and will surpass the old process of treating gold and silver ores. The inventor, Mr. James Manes, is now engaged at the new chemical works in Morrison, Jefferson County, Colo., for the Colorado Paint and Chemical Company, as chemist and metallurgist. Mr. Manes, as an inventor of mining machinery, is well known in this and other countries. The first one of the electro amalgamating machines has just been completed at the extensive shops of the Colorado Iron Works, Denver, Colo., and the models and complete drawings are exhibited at the office, 5 Windsor Block, Denver, Colo.