(No Model.) 2 Sheets—Sheet 1.

J. W. MARSHALL.

ORE STAMP.

No. 493,385. Patented Mar. 14, 1893.

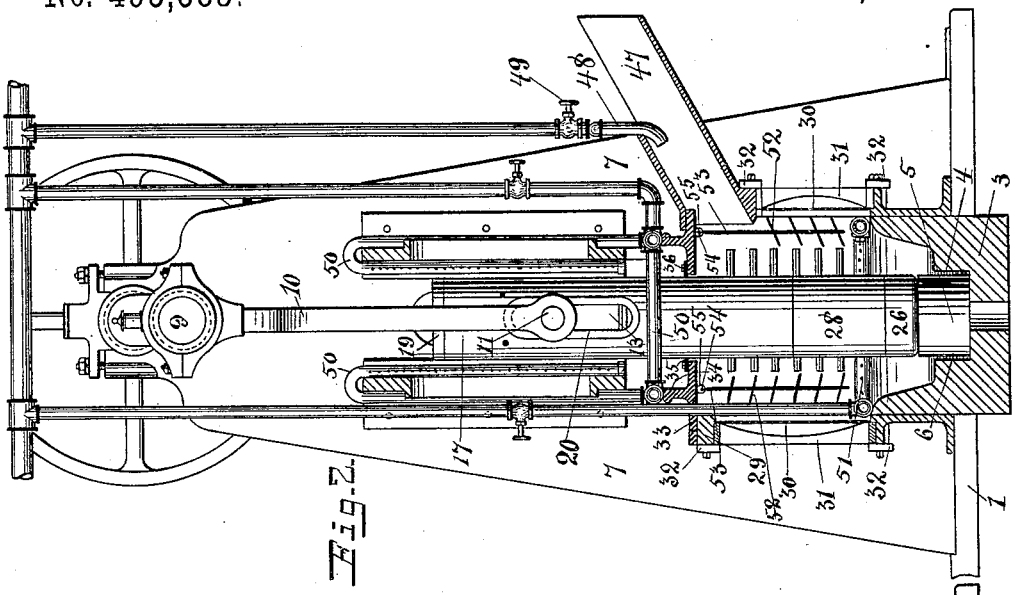

Fig. 2.

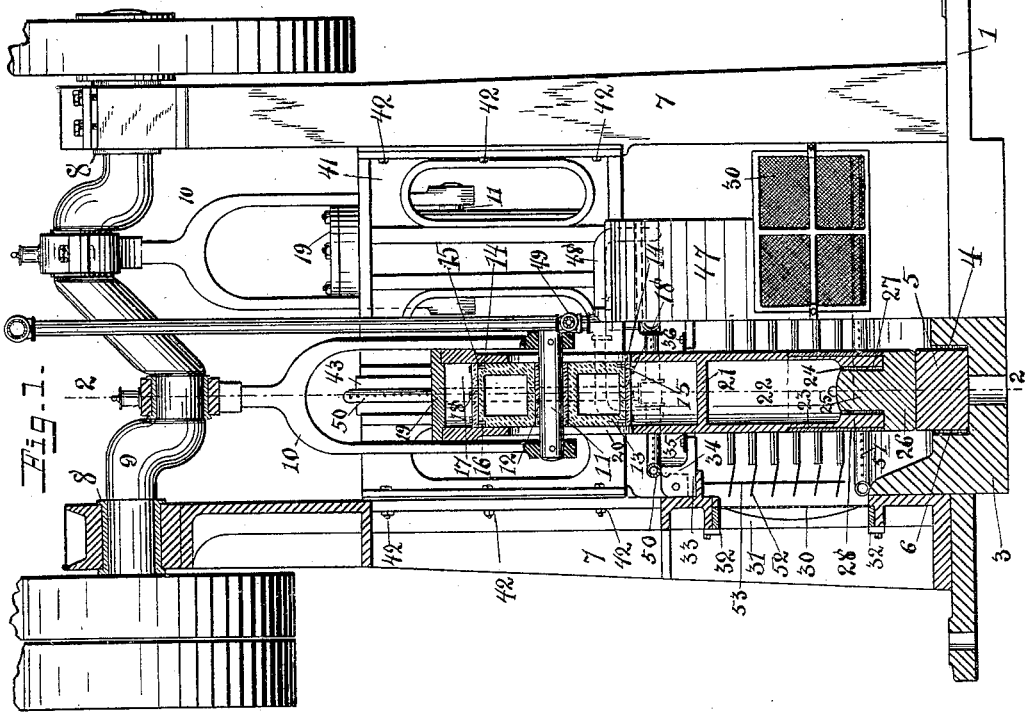

Fig. 1.

WITNESSES:

Chas. W. Parker

J. S. Barker.

INVENTOR

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H. N. Low

ATTORNEY

(No Model.) 2 Sheets—Sheet 2.

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Fig. 12.

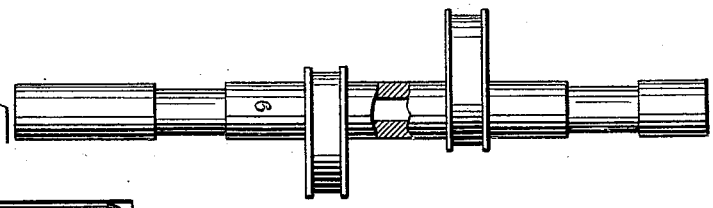


Fig. 4.

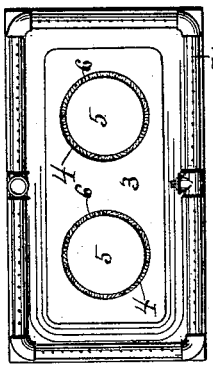


Fig. 9.

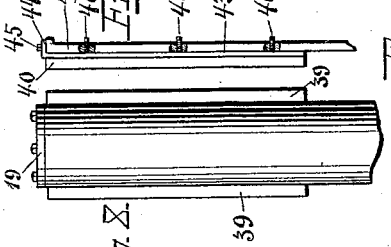


Fig. 10.

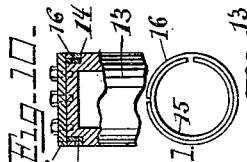


Fig. 11.

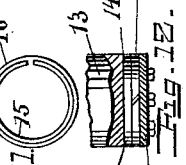


Fig. 12.

Fig. 7.

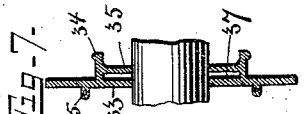


Fig. 2.

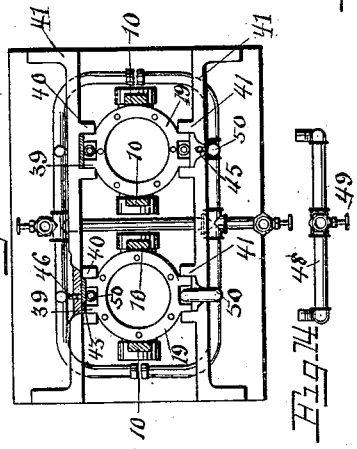


Fig. 14.

Fig. 5.

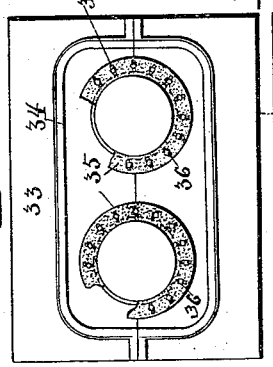


Fig. 6.

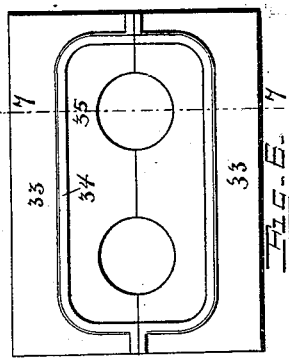
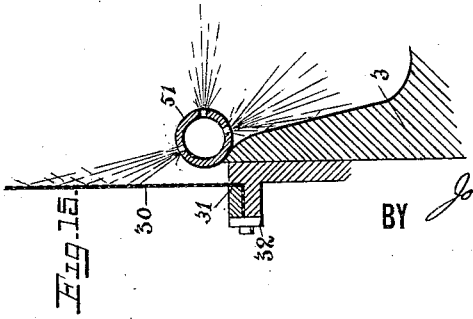


Fig. 15.



WITNESSES:

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INVENTOR

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ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN W. MARSHALL, OF BROOKLYN, NEW YORK.

ORE-STAMP.

SPECIFICATION forming part of Letters Patent No. 493,385, dated March 14, 1893.

Application filed October 6, 1892. Serial No. 448,037. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. MARSHALL, a citizen of the United States, residing at Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Ore-Stamps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the operation of ore stamps, such for instance as those of the type patented to me May 19, 1885, No. 318,193, as the original invention of Charles Sholl, serious difficulties have been encountered, which it is the object of my present improvements to obviate. Where screens have been employed around the coffer of the stamp in order to prevent the exit of any but the finely and perfectly stamped pulp, the banking of the partly stamped material in the inside of the coffer against the inner surface of the screens has left open only the upper portions of the screens and so greatly retarded the operation of the machine as to be a great practical objection to its introduction into successful use. According to my present improvement I employ in combination with the coffer and screen, a spray pipe so situated as to clear the lower portion of the screen, in consequence of which the upper portion will be kept clear by gravity and the whole surface of the screen left at all times free to permit the exit of the finished pulp. It has heretofore been attempted to collect within the coffer and before the pulp has escaped into the outside trough a portion of the precious metals contained in it, but this has not been performed efficiently or with any great amount of success. By my improvements, I have arrested the precious metals at such points in the coffer and in such manner as to collect from the pulp, before it has left the hopper, about one-half of all the gold or silver which it bears. This I accomplish, first by providing the body of the stamp coffer at such distance above the shoe and below the top of the coffer as to encounter the least amount of friction and wear, with a sleeve of copper or other suitable material provided on its exterior face with a silver plating on which I produce an amalgam for the arrest of such portion of the precious metals as are in proximity to the center of the coffer. Second, by providing in front of the screens through which the pulp finds its exit grilles or slatted frames the slats of which are similarly provided on both sides with silvered and amalgamated surfaces, and are reversible and preferably adapted to swing or be agitated by the impact of the material being crushed, to the end that a greater amount of the precious metal and the amalgamating surfaces are brought in contact with each other and the particles of the rock caused to fall away and leave the collecting surfaces and the screens unobstructed. I furthermore combine in the coffer of a double alternating stamp mill, two anvils which are perfectly cylindrical, as distinguished from being square or having angles, in consequence of which I obtain a more perfect circulation of the pulp, both ground and partly ground, around said anvils and over their upper faces as the stamps rise, with the final result that all of the material is more quickly and finely ground to the desired degree of fineness. I furthermore make these anvils flat upon their under side and reversible in the coffer so as to work as well one side up, as the other side up, and enable them to be inverted whenever the top surface is worn so as to render its grinding action imperfect.

It will be understood that the improvements above mentioned, may be applied to other forms of stamp than the precise one illustrated in the Sholl patent, above referred to. In the use of the Sholl machine however, I have encountered other serious difficulties which I have obviated by improvements adapted especially to pneumatic stamps of the character designed by Sholl or of some other analogous construction. In the use of such pneumatic stamps in which the upper portion of the stamp proper is formed with or attached to a pneumatic cylinder, a great amount of sand and small pieces of rock are caused by the descent of the stamp to fly upward along its sides and enter the ports of the pneumatic cylinder, and I have found this to occur to such a degree as very soon to cut out the cylinder or the piston and render the pneumatic action of the stamp exceedingly imperfect, and in some instances, to entirely destroy it. According to my improvement in

this part of the machine, the cover of the coffer is provided, in addition to the usual plate which surrounds the stamp, but which is inefficient to prevent the upward passage of the small particles of ore as aforesaid, with a supplemental flange or plate of any suitable material. The particles of ore which pass the main plate, I find, will have their velocity so much impaired, or their direction of motion so changed that they will not pass the second plate or supplemental flange. Such supplemental plate may consist of a leather or rubber annulus bolted to the main plate of the coffer cover and closely surrounding by its inner free edge, the body of the stamp, or said supplemental flange may consist of a metallic web preferably cast with the main plate of the coffer and situated at a small distance above it, leaving between it and the said main plate a space in which the particles driven upward by the force of the blow of the stamp will collect, and from which they will fall back, when they have accumulated in a sufficient amount, into the coffer. When the body or shank of the stamp has by use, lost its true central position in the coffer and in the space in the coffer cover through which it passes, openings are left permitting the aforesaid objectionable passage of particles of ore to the pneumatic cylinder, and to obviate this difficulty I have provided the stamp body with vertical slide bearings in which are situated adjustable gibs adapted to be set up from either side against the stamp in such manner as to bring it back to its accurate central position.

My invention further consists in certain parts and combinations thereof, hereinafter particularly set forth and claimed.

In order to make my improvements more clearly understood, I have shown in the accompanying drawings means for carrying them into practical effect, without however, limiting the invention in its useful application to the particular construction which, for the sake of illustration, is delineated.

In said drawings—Figure 1 is a front view, one-half in elevation and the other half in section, of a double pneumatic ore stamp embodying my improvements. Fig. 2 is a transverse vertical sectional view of the same on line 2—2 Fig. 1, the stamp proper and anvil being shown in elevation. Fig. 3 is a plan view, the upper portion of the machine being removed, as well as the side plates, and the top plates of the pneumatic cylinders being also shown removed. Fig. 4 is a plan view of the coffer and anvils, with the lower spray-pipe. Fig. 5 is a plan view of the coffer cover provided with supplemental flanges of flexible material surrounding the stamp openings. Fig. 6 is a similar view of another form of coffer plate in which the supplemental flange is formed integrally with said plate. Fig. 7 is a sectional view of the same on line 7—7 Fig. 6. Fig. 8 is a side view of the upper portion of one of the stamps, the said portion constituting the pneumatic cylinder. Fig. 9 is an elevation of one of the guides for said cylinder, provided with its adjustable gib. Figs. 10, 11 and 12 illustrate by sectional and plan views the mode of applying the split rings to the pneumatic cylinder. Fig. 13 is a plan view partly in section of another form of shaft for actuating the stamps, the shaft being made hollow and straight, and eccentrics being provided in place of cranks, in order to facilitate transportation and repair in mountainous and unfrequented districts. Fig. 14 is a plan view of the main water supply pipe for the ore chutes. Fig. 15 is a sectional view showing a portion of the coffer and one of the screens together with the spray pipe which operates to prevent banking of the material against the screen.

Referring to the drawings 1 indicates a metallic base-plate adapted to be secured upon any suitable foundation of wood, brick or stone and surrounding the coffer 3 adapted to hold the ore which is to be pulverized. The coffer is formed with two cylindrical seats or recesses 4 (Figs. 1, 2 and 4) in which are mounted cylindrical anvils 5 similarly shaped upon the top and bottom and adapted to be inverted when worn. These anvils are securely wedged in place by wooden packings 6. The circular shape of each of the anvils permits the free circular movement of the ore in the coffer and greatly promotes the rapidity of reduction.

7 indicates metallic side frames situated, one at each end of the coffer, mounted on the base 1, and provided at their upper ends with bearings 8 in which is mounted a crank or eccentric shaft 9 provided with suitable fly and belt wheels or pulleys. From the cranks of said shaft are suspended yokes 10, each of which carries at its lower end a transverse pin 11 which fits in a bearing 12 formed in the pneumatic piston 13. The latter is provided at each end with a peripheral rabbet 14 (Figs. 10 and 12) in which fits a split ring 15 of substantially the width of the rabbet and of half the thickness of it. On the ring 15 are mounted two independent split-rings 16 which are adapted to fit tightly within the bore of the pneumatic cylinder 17. Plates 18 bolted to each end of the pneumatic piston confine the said rings loosely in place.

The cylinder 17 has a cover 19 on its upper end, slots 20 through which the pin 11 passes, a bottom head or diaphagm 21, a lower hollow portion 22 provided with an external cylindrical rabbet 23, and a bearing 24 in which fits the shank 25 of a stamp shoe 26. Said shank is wedged in place by a wooden packing 27.

28 is a hollow cylindrical plate of copper fitting in the said rabbet 23 of the stamp, supported by the shoe 26, and having a silvered surface on which may be formed an amalgam for arresting the precious metals of the pulp at the center of the coffer.

The coffer is inclosed at its sides by open

frames 29 which are secured to the frames 7. In each of the frames 7 and 29 fit screens 30 of reticulated material which are held in place by removable frames 31. The latter are secured by buttons 32. The said frames and screens form an inclosed space above the upper edge of the coffer from which the ore-pulp works gradually through the reticulations of the screens into any suitable exterior receptacle surrounding the base of the machine and which forms no part of my present invention. The coffer is covered by plates 33 formed with suitable openings for the stamps proper and with a flange 34 surrounding said openings.

In order to prevent the escape from the coffer of sand and particles of ore which have been of great injury to the pneumatic cylinder of such stamps, I surround the said openings in the coffer cover with supplemental flanges 35 which may be separate from the coffer cover, formed of soft material such as leather, and secured in place by bolts 36 as indicated in Fig. 5, or may be of iron cast integrally with the cover as in Figs. 6 and 7 leaving between them and the main portion of the cover spaces 37 in which mineral particles escaping from the coffer, will be arrested. The flanges 35 shown in Fig. 5 are formed with slots 38 for the bolts 36 and may be adjusted inward to closely fit the body of the stamp as occasion may require.

The stamps are properly guided in their vertical movement by ribs 39 (Figs. 3 and 8) which fit in guides 40 formed on the inner faces of plates 41, the latter being bolted at 42 to the end frames 7. In order to provide for accurately centering the stamps in the coffer and its cover, gibs 43 are placed between the guides in position to engage the ribs 39. Said gibs are provided at their upper ends with horizontal flanges 44 which are slotted to receive bolts 45 screwing into the plates 41. Each gib is also engaged along its outer side by set-screws 46 which serve to set it up accurately against the ribs 39 of the stamp.

The ore is fed to the coffer by a chute 47 (Fig. 2) together with streams of water from the pipes 48 controlled by a valve 49.

The pneumatic cylinder is prevented from becoming over-heated by friction and compression of the air, by water spray-pipes 50.

The banking of ground and partly ground ore in the coffer against the inner sides of the screens 30, which has been the great source of difficulty in the use of ore stamps having such screens, I obviate by a spray pipe 51 (Figs. 2, 4 and 15) having jet orifices adapted to direct streams of water into and upon the material in such manner that the screens are always kept clear and ready for the passage of such pulp as has been completely ground.

The crank shaft 9 as ordinarily made is very heavy and difficult of transportation. It is also difficult to make or repair. I have provided for use with this ore stamp an actuating shaft of improved form indicated in Fig. 13. This shaft is hollow and straight with solid ends and is provided with actuating eccentrics which are separate from the shaft and may be attached thereto by any machinist or blacksmith, so that accidents may be repaired with much less trouble and cost than with the ordinary form of crank shaft.

In order to collect and save a considerable portion of the gold or silver, or both, within the coffer I provide silvered and amalgamated collecting plates or grilles situated within the space inclosed by the screens 30 and across the path which the pulp must take in finding its exit from the machine. These plates are indicated at 52 are silvered on both sides and are secured upon vertical rods 53 so as to be reversible, as more particularly set forth in my application Serial No. 432,954, filed May 14, 1892. The latter are pivotally suspended at 54 from ears 55 on the under side of the coffer cover or other suitable part of the frame of the machine. Said plates are also in proximity to the spray pipe 51, the streams from which aid the agitation of the grilles in keeping them clear of undesirable material, and free to act to the best advantage in arresting the metallic particles of the ore.

Having thus described my invention, what I claim is—

1. In an ore stamp, the combination with the coffer, and the upright screens which surround the coffer in immediate proximity to the stamp for regulating the passage of the ore-pulp from the coffer, of a pipe having spray orifices directed toward the bases of said screens and adapted to keep the latter clear and ready for the passage of the pulp by washing the material which will not pass the screen back into the coffer and thereby preventing said material from banking against the screens, substantially as set forth.

2. In an ore stamp the combination with the coffer, and screens for regulating the passage of the ore pulp therefrom, of a spray-pipe within the coffer and adapted to act on the material banked against the screens and keep said screens clear and ready for the passage of the pulp, substantially as set forth.

3. The combination in an ore stamp, with the coffer, and the screens 30, of the spray pipe 51 situated within the ore receptacle at the base of said screens, substantially as set forth.

4. In an ore stamp the combination with the stamp proper, of a sleeve having an amalgamated surface and mounted on the stamp above the shoe, substantially as set forth.

5. The combination with the stamp proper having the recess or rabbet 23, of the amalgamated plate or sleeve 28 and the shoe 26, substantially as set forth.

6. In an ore stamp the combination with the coffer and the stamp proper, of a pneumatic cylinder and piston connected with the upper end of the stamp, a coffer-cover surrounding the stamp, and a supplemental flange on said cover and around the stamp

and adjustable on said cover toward the stamp and operating to prevent particles of ore from the coffer from passing upward at the sides of the stamp to said pneumatic devices, substantially as set forth.

7. The combination in an ore stamp with the coffer and the stamp proper, of the coffer covers surrounding the stamp, guides for the latter, and adjustable gibs 43 in said guides, and having the slotted flanges 44 and bolts 45 substantially as set forth.

8. The amalgamated plates 52 combined with the coffer and the screens 30 and situated within the space inclosed by said screens and in the path of the pulp as it passes to and through said screens, and the spray pipes 51 in proximity to said screens and plates, and adapted to clear the same substantially as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN W. MARSHALL.

Witnesses:
H. N. LOW,
J. S. BARKER.