

No. 776,159.

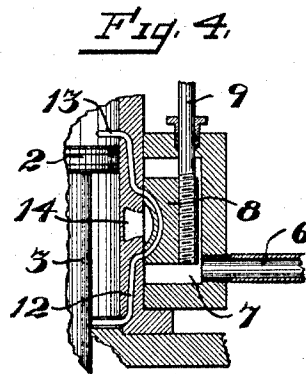
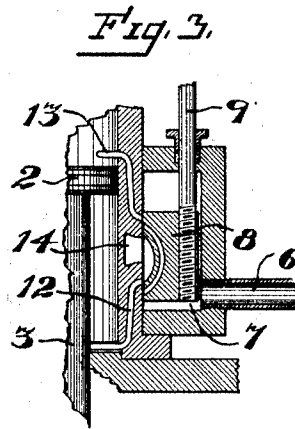
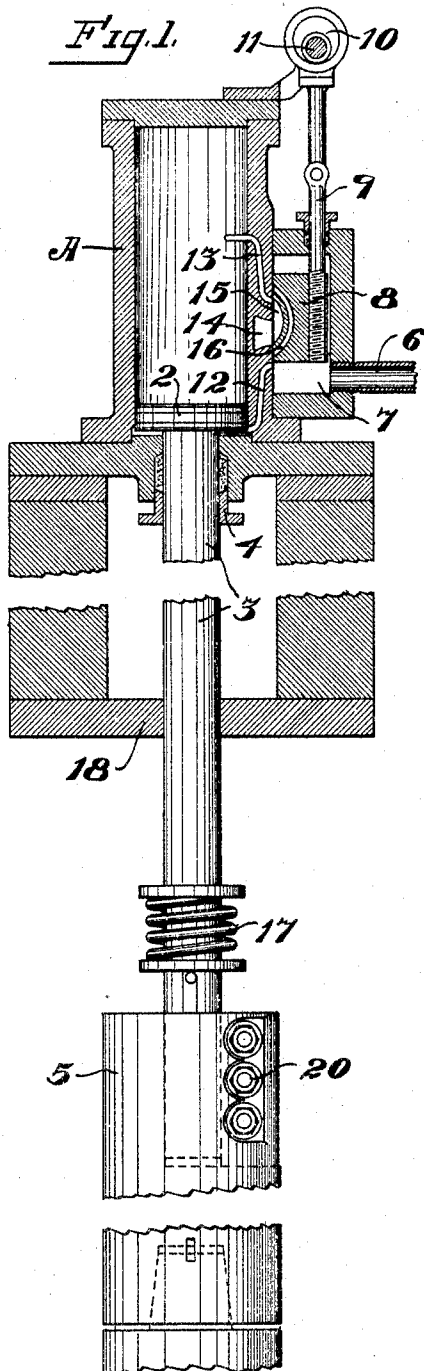
PATENTED NOV. 29, 1904.

D. I. WHITESIDE.
STAMP MILL.

APPLICATION FILED OCT. 13, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses,
J. H. Nurse
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Inventor,
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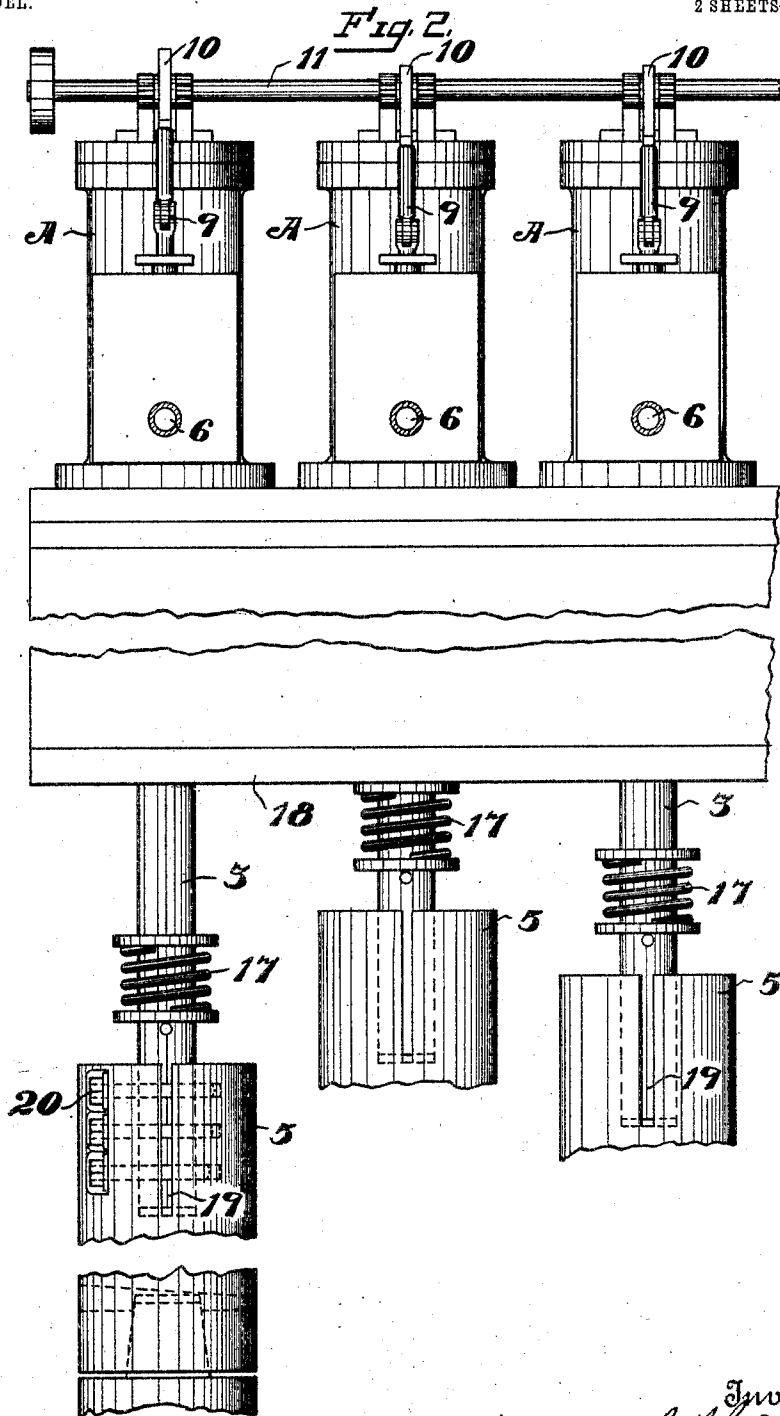
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NO MODEL.

2 SHEETS—SHEET 2.



Witnesses,

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UNITED STATES PATENT OFFICE.

DONALD I. WHITESIDE, OF SAN FRANCISCO, CALIFORNIA.

STAMP-MILL.

SPECIFICATION forming part of Letters Patent No. 776,159, dated November 29, 1904.

Application filed October 13, 1903. Serial No. 176,820. (No model.)

To all whom it may concern:

Be it known that I, DONALD I. WHITESIDE, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Stamp-Mills, of which the following is a specification.

My invention relates to an apparatus for the operation of crushing-stamps and like reciprocating mechanism by the direct connection of a cylinder with the reciprocating stem of the apparatus; and it consists in a novel arrangement of ports connecting with each end of the cylinder and an exhaust-passage and a valve and means for operating said valve, so that fluid under pressure may be admitted to one end of the cylinder to move the piston in one direction, then transferred to the opposite end of the cylinder to move the piston in the opposite direction.

It also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical central section of cylinder and steam-chest. Fig. 2 is a side elevation of stamp-battery. Fig. 3 is a portion of cylinder and steam-chest with valve down. Fig. 4 is a portion of cylinder and steam-chest with valve connecting opposite ends.

In the present illustration I have shown my invention as applicable to a stamp-mill; but it will be manifest that it may be employed in conjunction with any apparatus where a reciprocating motion is required.

As shown in the accompanying drawings, A is a cylinder having a piston 2, adapted to reciprocate therein.

3 is a piston-rod extending outwardly through a stuffing-box, as at 4, and in the present case it is connected with a head 5, which is adapted to carry a stamp for crushing ore. This construction necessitates a vertical arrangement of the cylinder A and connected parts. The medium under pressure, as steam, compressed air, or the like, is admitted through a pipe, as at 6, into a valve-chamber 7. Within this chamber is a valve 8, having a stem 9, which is suitably connected with an eccentric or equivalent means 10, by

which the requisite reciprocation of the valve may be effected. This operating device may be placed in any suitable or convenient relation with the apparatus, and its position will depend upon what work is to be done.

In the present case, as operating for driving a stamp-mill, I may arrange a series of stamps side by side in a battery in the usual manner of such mills, and each stem will have its own cylinder, valve-chamber, and valve. A single shaft, as at 11, may be suitably journaled with relation to the apparatus, and the eccentrics 10 may be so fixed upon the shaft as to produce the proper relative succession of blows given by the stamps. The eccentric-shaft may be driven independently from any suitable motor and its speed regulated, so as to produce any desired number of reciprocations of the piston and the mechanism actuated thereby, the whole battery or apparatus being controlled from a single motor. The valve 8 is here shown as a slide-valve, movable upon a suitable face in the valve-chamber, and this valve-face has a port 12, connecting with the cylinder below the piston 2, a port 13, connecting with the cylinder at a point above the highest position of the piston, and an exhaust-port 14 intermediate between the ports 12 and 13.

The valve 8 has a recess 15 in its lower face of such size as to connect the ports 12 and 13 alternately with the exhaust-port 14, and exterior to the recess 15 is a curved port 16, extending around the recess 15 and connecting with the valve-face at each end, this port serving to connect the ports 12 and 13 at the proper time to allow the fluid under pressure to pass from the end of the cylinder, to which it is first admitted through the connected ports, to the opposite end of the cylinder, where it is expanded and an equal pressure produced at opposite sides of the piston. A further movement of the valve connects the ports 12, which in this case is the lower one, with the exhaust-port 14, thus allowing the fluid to escape from this end of the cylinder, and the expansion of the fluid still remaining at the opposite end of the cylinder moves the piston to the opposite end of its stroke. A further movement of the valve then takes place, and communication is

opened between the port 13 and the exhaust-port 14, and the fluid is then exhausted from the upper end of the cylinder, the piston having completed its downward stroke and
 5 reached the lower end of the cylinder, when the valve is again placed so as to admit steam through the port 12 to the lower end of the cylinder and continue its operation. By this construction the initial pressure of the elastic
 10 fluid acts to move the piston and its connected parts in one direction. Connection is then made between the opposite ends of the cylinder through the valve, as previously described, and the fluid passes through the connection
 15 and is practically balanced in the two ends of the cylinder at a reduced pressure, which for purposes of illustration may be considered as being one-half the initial pressure. The next movement of the valve temporarily closes the
 20 ends of the port 16 in such position with relation to the valve-face that communication with the cylinder is cut off; but continuing its motion the valve immediately afterward opens communication between the port 12 and the exhaust-port 14, which allows the fluid to escape
 25 from the lower part of the cylinder, and the expansion of the fluid in the upper part of the cylinder then gives an impulse which returns the piston to the lower part of the cylinder. As this stroke is being completed the
 30 valve will have moved into such position as to connect the port 13 with the exhaust-port 14, thus exhausting the fluid from the upper part of the cylinder, and at the same time the valve
 35 will have again opened communication between the valve-chamber and the lower end of the cylinder, and the fluid will be again admitted to move the piston, as previously described.
 40 In the present case the application is shown to a stamp or crushing mill. I have shown a stout spring 17, fixed to the stamp-stem in such position that it will strike against the frame timbers 18 or any suitable equivalent
 45 stop to prevent the piston from moving too far under conditions which would otherwise enable it to do so.

In order to properly adjust the stamp-head 5 with relation to the engine-piston to compensate for wear, the stamp-stem enters a cylindrical bore in the upper end of the stamp-head.

The stamp-head is slotted on one side, as shown at 19, so as to allow a certain amount
 55 of spring to the sides of the opening of the bore into which the stamp-stem extends.

On one side and crossing this slide 19 are fixed the screw-bolts 20, these bolts being either threaded into one side of the slot 19 or
 60 fixed therein and having nuts turnable upon the outer ends, so that the sides of the slot

may be compressed and the stem 3 gripped tightly in the bore. By loosening these nuts the stamp-head may be moved downwardly upon the stem as the stamp shoes and dies
 65 wear, and the proper position of the piston within the cylinder will be maintained.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a reciprocating stamp or like stem, of a cylinder axially in line therewith and having a valve-face provided with inlet and exhaust ports, a piston fitting the cylinder, to which piston the stamp-stem is secured, a valve-chamber, a valve, means for reciprocating the valve, rotatable means for imparting a reciprocatory movement to the valve said valve having a recess in its lower face and a curved port extending
 75 around said recess and adapted to bridge the space between the first-named ports, said first-named ports connecting above and below the piston and one of said ports entering the cylinder near the middle thereof to provide a
 80 relative large chamber into which expansion from the opposite end of the cylinder may take place, said valve adapted to first admit the elastic medium to the cylinder to impel the piston in one direction, then a portion
 85 transferred to the opposite end of the cylinder and the portion remaining in the first-named portion of the cylinder exhausted to enable the transferred portion to return the cylinder to its first position.

2. The combination of a stamp or like reciprocating stem, a piston fixed to said stem; a cylinder within which the piston reciprocates; a valve-chamber and valve said valve-chamber having a valve-face with a port connecting with one end of the cylinder at one side of the piston and a second port connecting with the cylinder near the middle thereof at the opposite side of the piston whereby a relative large chamber is formed in one end
 100 of the cylinder into which expansion from the opposite end of said cylinder takes place, a stamp-head on said stem and provided with a longitudinal slot, screw-bolts extending across the slot and threaded into one wall thereof
 105 whereby the stamp-head may be adjusted upon the stem to compensate for wear, and rotatory means for imparting reciprocating movement to the valve.

In testimony whereof I have hereunto set
 115 my hand in presence of two subscribing witnesses.

DONALD I. WHITESIDE.

Witnesses:

HENRY P. TRICOU,
 S. H. NOURSE.