No. 634,894. Patented Oct. 17, 1899.

# W. H. LLOYD.

## STAMP MILL.

(Application filed Apr. 11, 1898.)

(No Model.) 2 Sheets—Sheet 1.

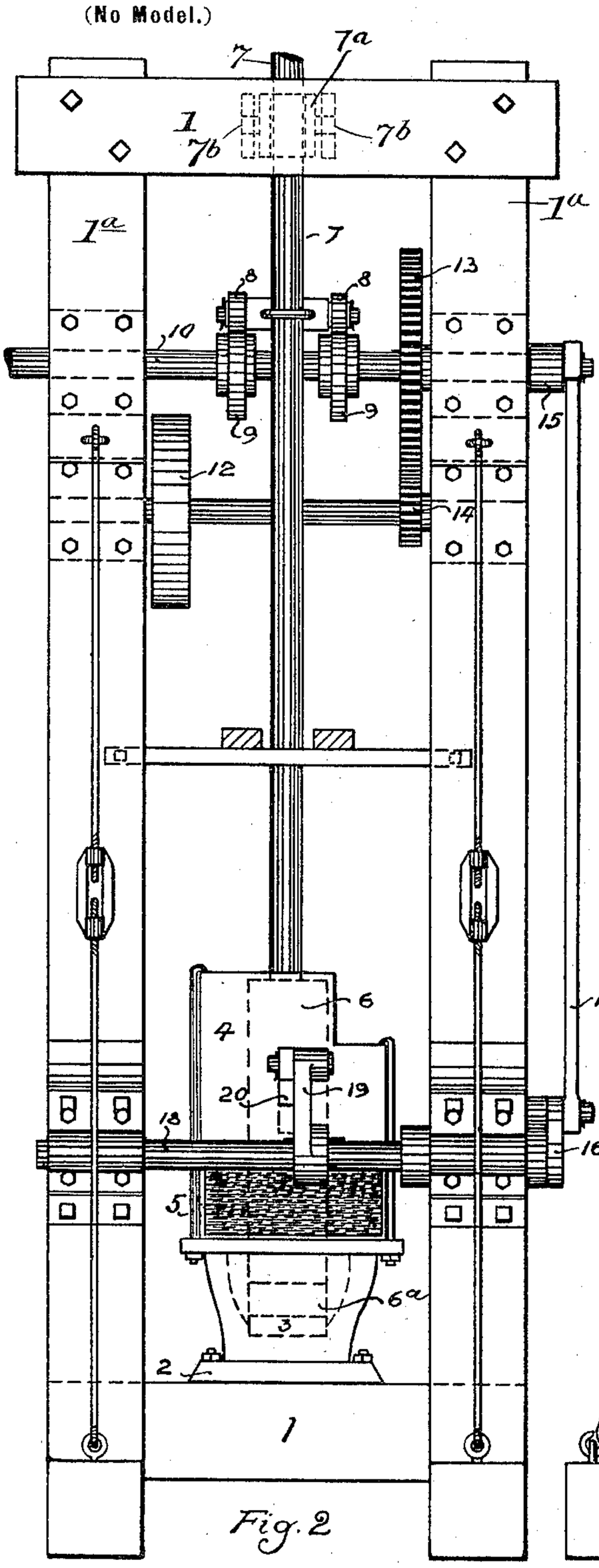


Fig. 2

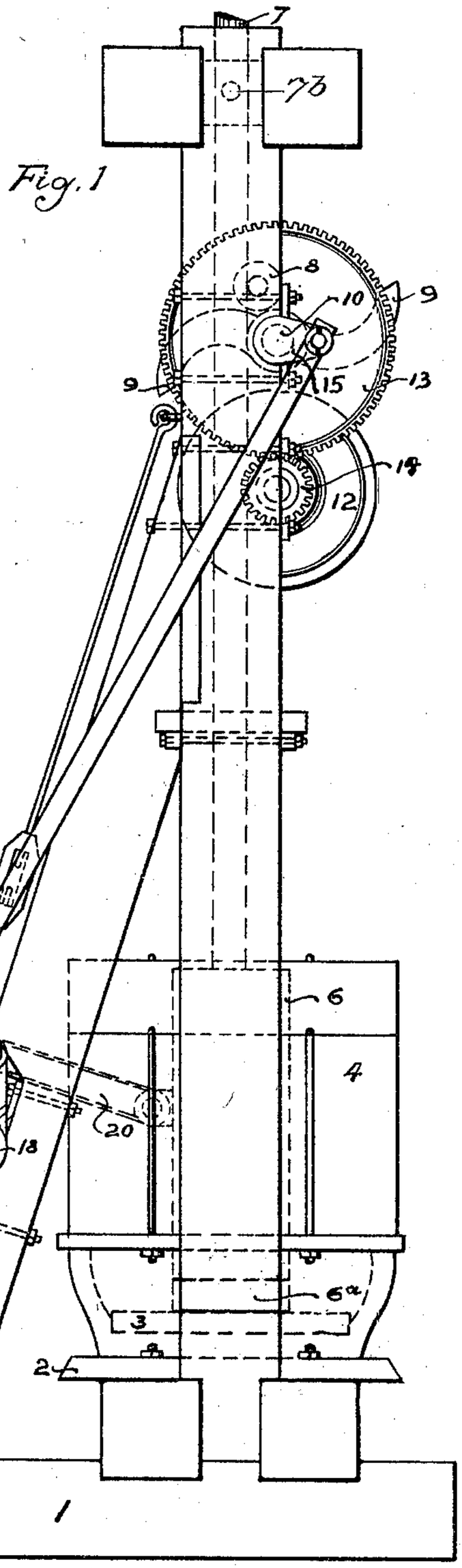


Fig. 1

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Fig. 3

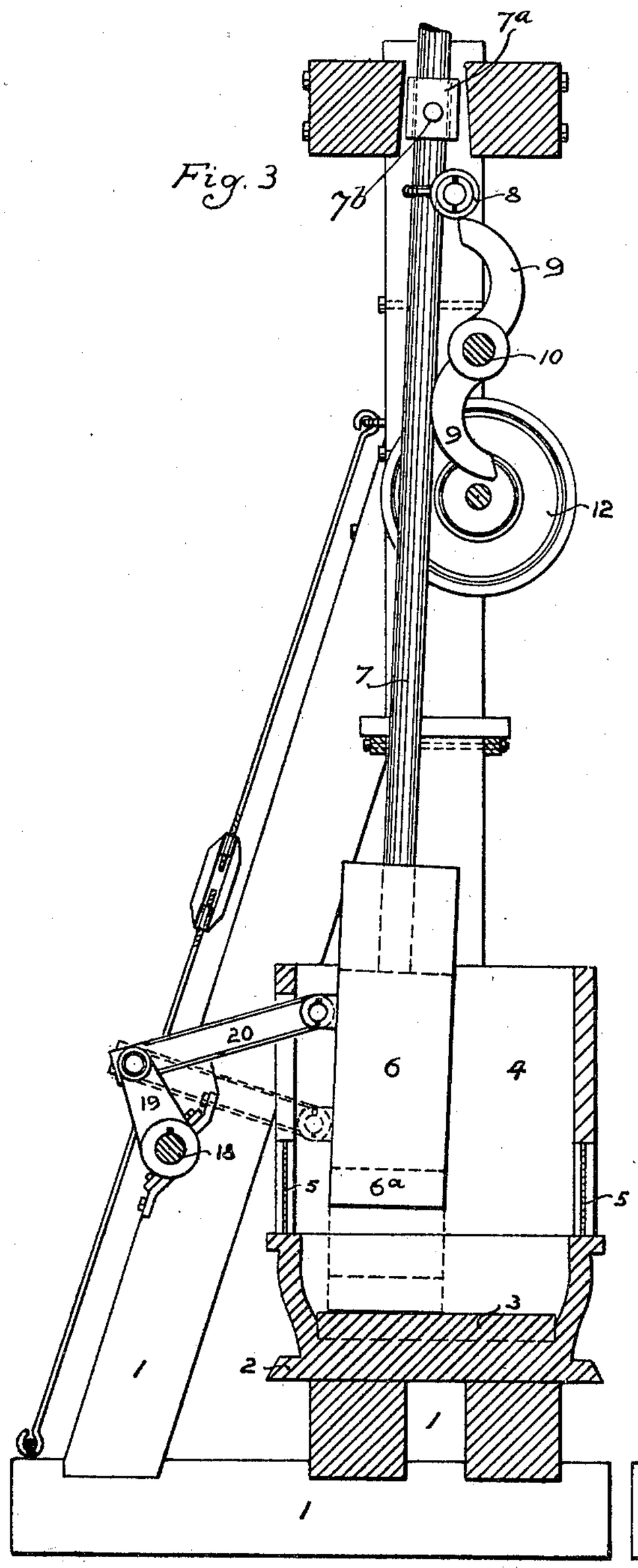
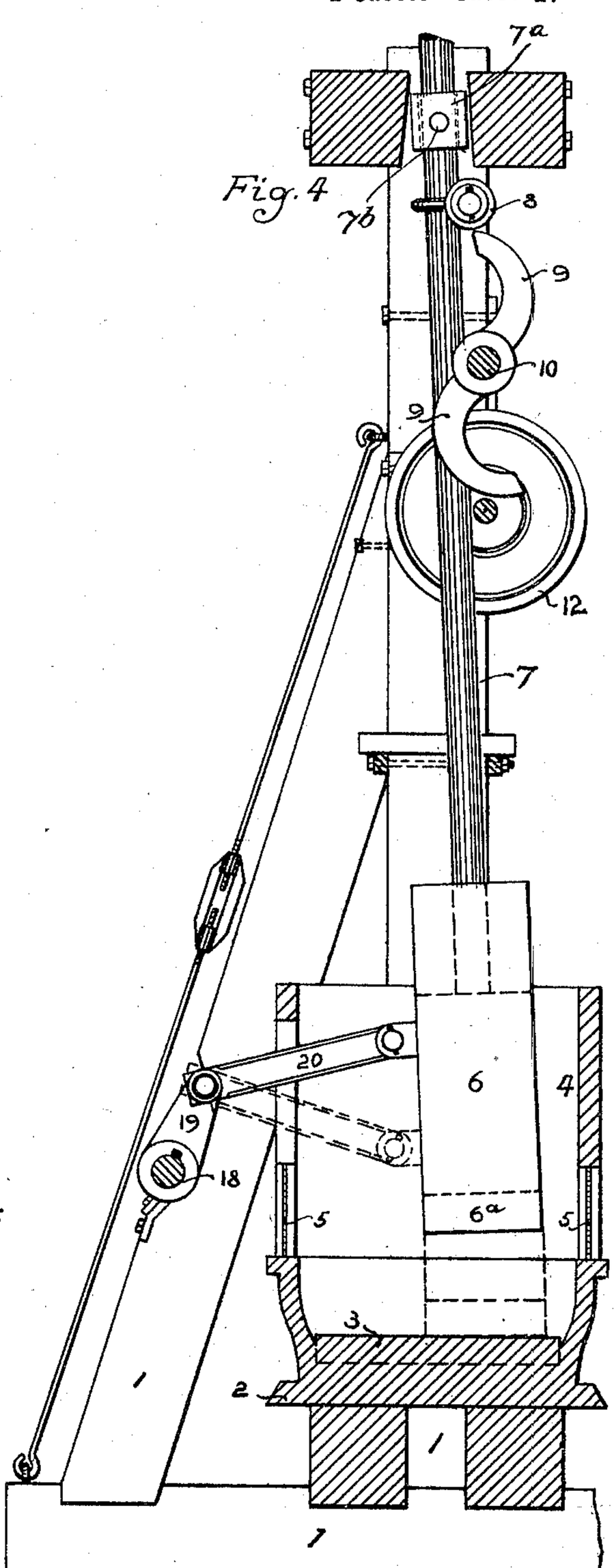



Fig. 4

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# UNITED STATES PATENT OFFICE.

WILLIAM H. LLOYD, OF COLORADO SPRINGS, COLORADO, ASSIGNOR OF ONE-FOURTH TO O. C. TOWNSEND AND WILLIAM P. WIGHT, OF SAME PLACE.

## STAMP-MILL.

SPECIFICATION forming part of Letters Patent No. 634,894, dated October 17, 1899.

Application filed April 11 1898. Serial No. 677,219. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. LLOYD, a citizen of the United States, residing at Colorado Springs, in the county of El Paso and State of Colorado, have invented a new and useful Improvement in Stamp-Mills, of which the following is a specification.

My invention relates to that class of stamp-mills used in crushing and pulverizing rock and ores in which a heavy stamp-head is by means of cams and other suitable mechanism alternately raised vertically and allowed to drop by gravity on the rock or ore contained in a mortar; and the object of my invention is to provide means whereby the stamp-head may be caused to move laterally after dropping and while resting on the ore in the mortar, thus causing a grinding and pulverizing action intermittently with the blows from the drop of the stamp-head, resulting in a more rapid, complete, and uniform pulverization of the ore. I attain these objects by means of the mechanism shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the stamp-mill complete. Fig. 2 is a front elevation. Figs. 3 and 4 are sectional side elevations showing more clearly the construction of the parts and the means whereby the lateral sliding movement of the stamp-head is effected.

Similar reference characters refer to similar parts in each of the views.

The general construction of the machine may be similar to any of the usual forms of stamp-mills, consisting, essentially, of a heavy frame 1, which should rest on a solid foundation. A base-block 2 is secured to the frame and has the die 3 fitted into it. The mortar 4 is secured to this base-block and has screens 5 in its end, which permit the escape of the crushed ore. The stamp-head 6 has a shoe $6^a$ secured to its lower end in the usual way and is secured to the vertical rod 7. This rod has its upper end fitted to slide freely through a collar $7^a$, secured to the upper end of the frame 1. The collar $7^a$ is pivoted at $7^b$, which allows the rod 7 to swing freely to and fro with the lateral movement of the stamp-head without danger of binding in the collar, which would interfere with its free vertical movement. The base-block 2, die 3, and mortar 4 are made of greater diameter than the stamp-head, in order that there may be room therein to give it a reciprocating movement for the purpose of more thoroughly grinding and pulverizing the ore between the die 3 and shoe $6^a$. Two rolls 8 are secured to the rod 7 near its upper end, one on either side, in such position that they will engage the cams 9, which are secured to a shaft 10. Any suitable source of power may be used to operate the stamp and may be applied by means of a belt to the pulley 12, which by means of suitable gear-wheels 13 and 14 causes the rotation of the shaft 10 and cams 9, which thus raises the stamp-head 6 and allows it to drop by gravity in the usual manner, twice with each revolution of the shaft 10. The rock or ore to be crushed is fed into the mortar 4 by hand or any suitable mechanical means.

In crushing and pulverizing ores the best results are attained by the combination of blows to crack or break up the larger pieces and a sliding or rubbing movement of the stamp-head to grind and pulverize the fragments. In stamp-mills of the kind shown this grinding of the ore has been effected heretofore by giving the stamp-head an intermittent rotary movement on its axis or by causing the stamp-head or the mortar to move continuously in one direction. Such a movement is not, however, as effective as a lateral reciprocating movement of the entire stamp-head to and fro across the material on which it rests. I believe I am the first to use such a movement in a stamp-mill of this character, which I shall therefore claim broadly, without limiting myself to any particular means for communicating such lateral movement to the stamp-head, which it is evident may be effected by suitably proportioned and adjusted levers and cranks or cams. The construction preferred, as combining simplicity with direct and positive movement of the parts, is that shown in the drawings and described below. A crank 15 is secured to the shaft 10, which carries the cams 9. A link or rod 17 connects the crank 15 to a second crank or short lever 16, having a longer throw and which is rigidly secured to a shaft

18. Another lever 19 is secured to the shaft 18, to the outer end of which one end of a link 20 is pivoted. The other end of the link 20 is pivoted to the stamp-head, as shown. It will be evident from an inspection of Fig. 1 that the revolution of the shaft 10 and crank 15 will give a lateral movement to the stamp-head, and by properly adjusting the parts relative to each other, substantially as shown, the greater part of this lateral movement will be accomplished while the stamp-head is resting on the material in the bottom of the mortar 4. As may be seen in Figs. 2 and 3, the stamp-head 6 will be released from the cams 9 at its extreme lateral position, so that the blows of the stamp-head will be delivered alternately at opposite ends of the mortar.

It is evident that two or more of the single stamp-mills, as shown, may be connected and operated together in the usual manner.

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

1. In a stamp-mill the combination with a vertically-reciprocating stamp-head of means connected with the continuously-rotating driving-shaft for imparting to the stamp-head a lateral reciprocating movement between its successive blows, the greater part of said lateral reciprocating movement being made while the stamp-head is resting on the material in the mortar.

2. In a stamp-mill the combination with a vertical and laterally-movable stamp-head of a driving-shaft 10, cams 9 and $9^a$ rollers 8, crank 15, connecting-rod 17, levers 16 and 19 link 20 and mortar 4, substantially as specified.

WILLIAM H. LLOYD.

Witnesses:
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W. H. SLAYTON.