

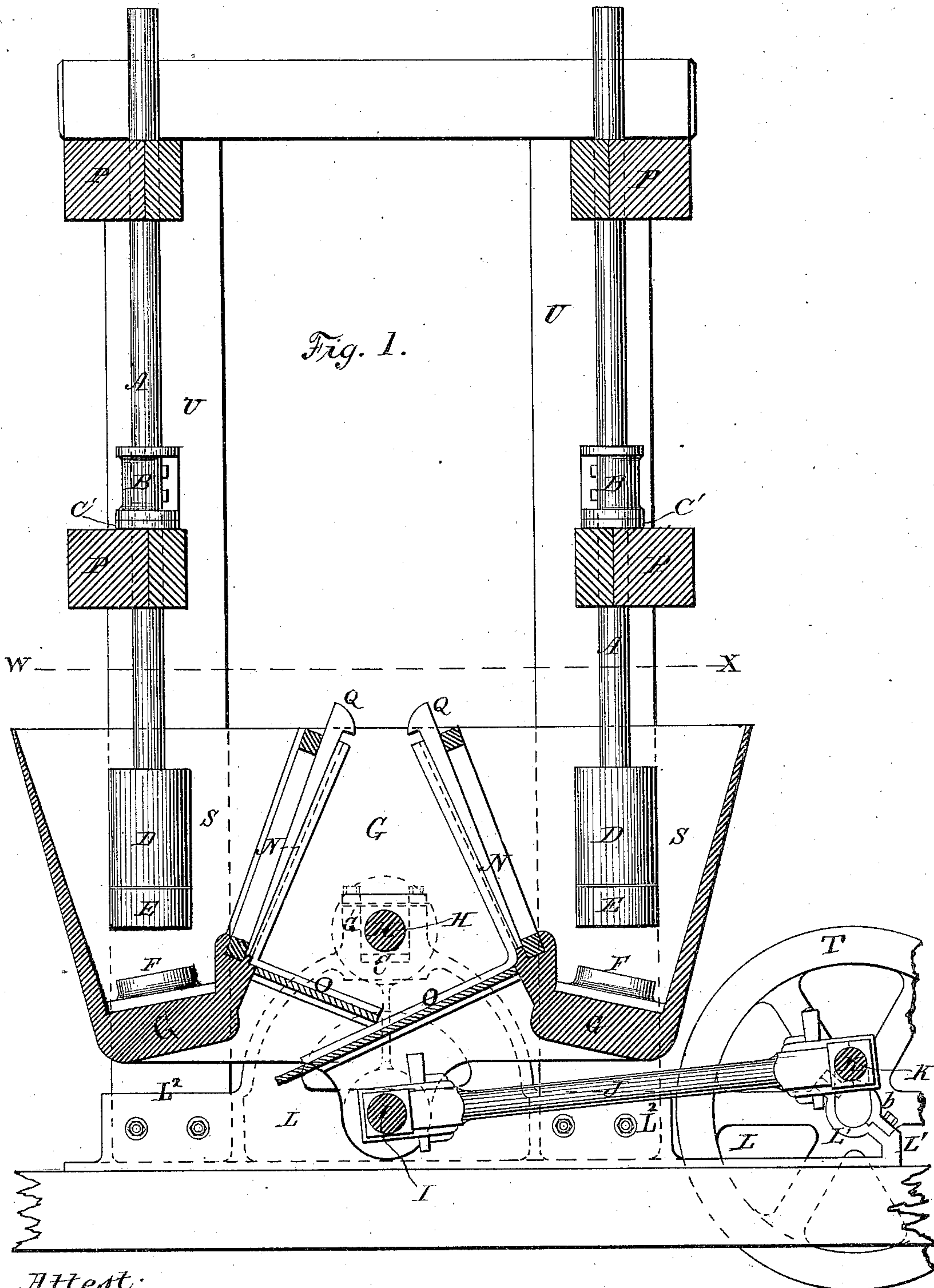
(No Model.)

3 Sheets—Sheet 1.

H. BOLTHOFF.
STAMP MILL.

No. 312,956.

Patented Feb. 24, 1885.



Attest:

Edmond Brodhag
Howell Barthe

Inventor:

Henry Bolthoff
by Johnson and Johnson
Attys

(No Model.)

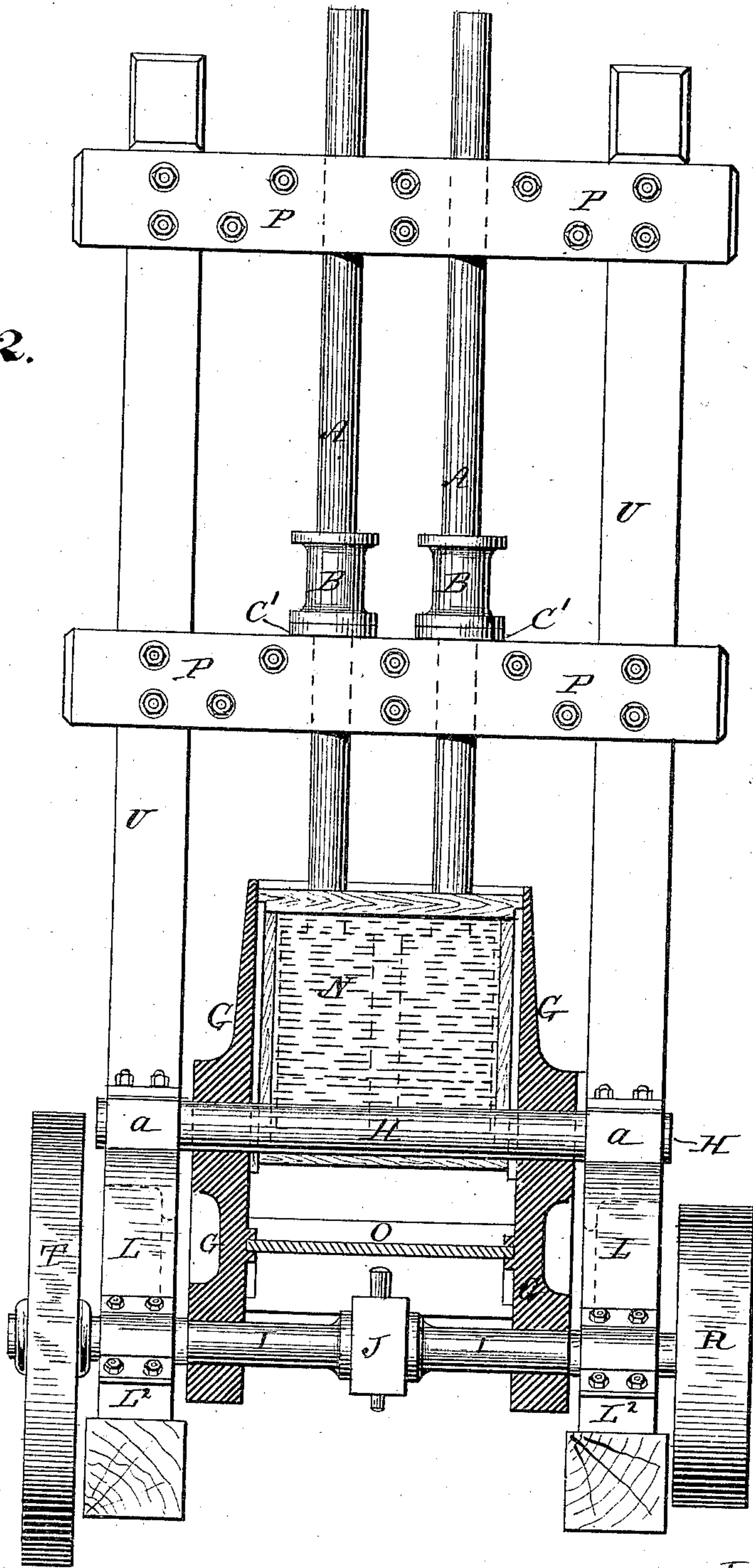
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Fig. 2.



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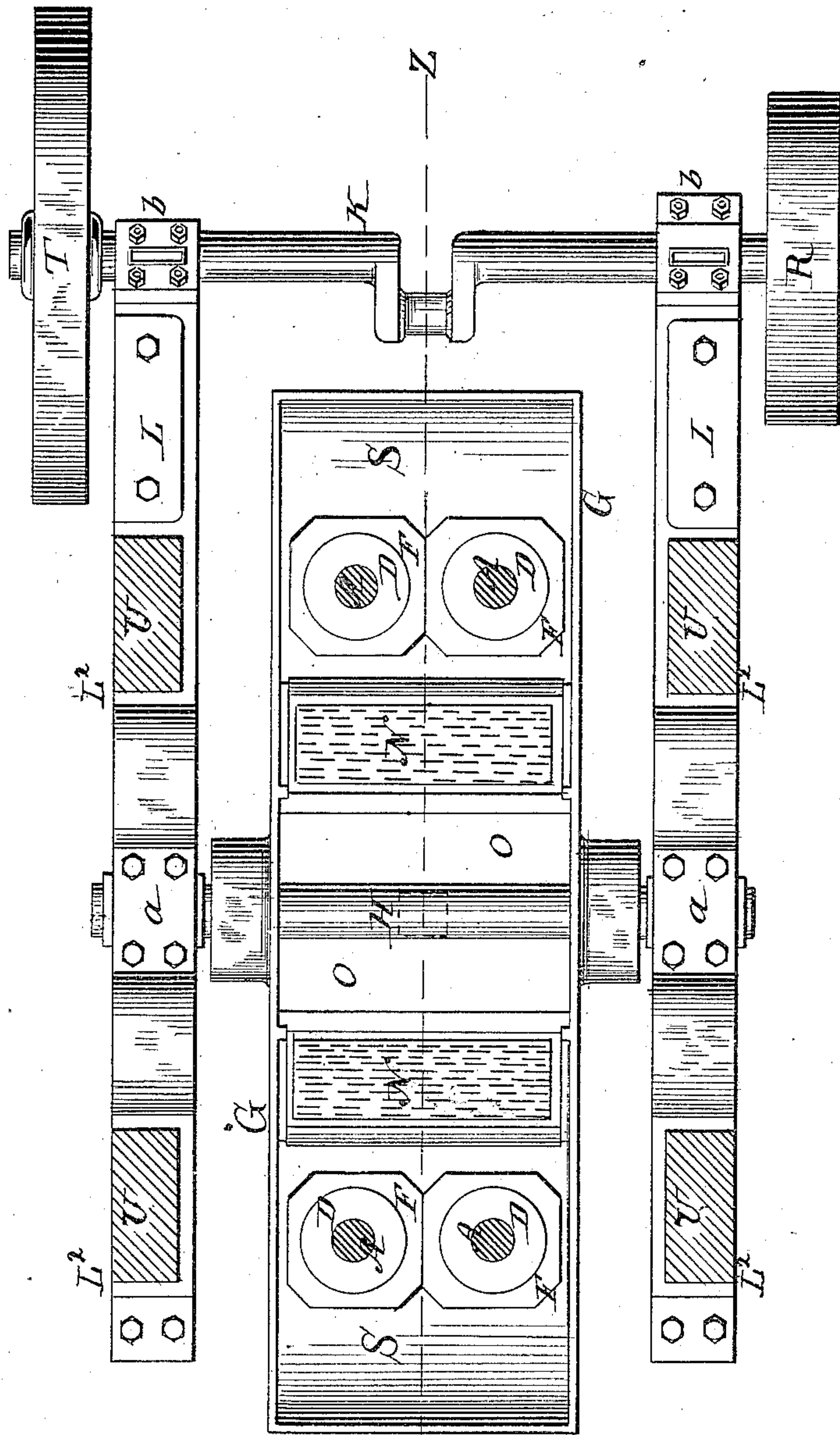
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Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY BOLTHOFF, OF DENVER, COLORADO, ASSIGNOR OF ONE-HALF TO
CHARLES F. HENDRIE, OF SAME PLACE.

STAMP-MILL.

SPECIFICATION forming part of Letters Patent No. 312,956, dated February 24, 1885.

Application filed April 25, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY BOLTHOFF, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented new and useful Improvements in Stamp-Mills, of which the following is a specification.

The invention relates to mills for crushing ore, &c.; and the object of my improvement is to crush the ore in such manner as to greatly increase the crushing and discharging capacity of the mortar. This I effect by means of an oscillating mortar adapted to bring the material to be crushed into contact with stamps suspended above, instead of, as heretofore, using pounding stamps with a stationary mortar.

The construction of mill embodying this invention is hereinafter particularly described and claimed, and is illustrated in the accompanying drawings, to which reference is made, and in which—

Figure 1 represents a vertical longitudinal sectional elevation on line Y Z of Fig. 3 of a stamp-mill showing my improved oscillating mortar at rest. Fig. 2 is an end sectional elevation showing the bearings of the oscillating mortar and the pitman-connection for operating it; and Fig. 3 is a top view of the mortar taken on line W X of Fig. 1.

The oscillating mortar G, divided into two compartments, S S, is oscillated, as will be presently described, upon a shaft, H, (or trunnions,) having its bearings in boxes *a a* of the bed-plates L, in extensions G' thereof, said boxes resting on rubber or elastic seats or cushions C, Fig. 1, to prevent jarring said shaft H and the parts which oscillate the mortar, as will hereinafter be better understood.

Each compartment S is provided with dies F F, as in the common stamp-mills, and replaceable when worn. The stamps—as many as may be desired—are suspended in a frame above the dies by means of collars B B, resting on rubber or elastic cushions C' C' on the girts P P of the frame, said collars being adjustable on the stamp-stems A A to permit upward or downward adjustment of the stamps for increasing or diminishing the force of the blow upon the material to be crushed, and

each stamp-head D having replaceable shoes E, as usual.

Each compartment of the mortar is provided with a screen, N, in a frame on the inside, through which the crushed material is discharged, said screen-frames being fastened by wedges Q Q, so as to be easily removed for repairs or exchange. Below these screens N N aprons O O, of wood or metal, are introduced between the sides of the mortar, over which aprons the crushed material or pulp may pass to bins or spouts below, said aprons also serving to protect the working-joint of the connecting-rod, which oscillates the mortar, from dust or grit.

The sides of the mortar G (see Fig. 2) are extended down to receive the pin or shaft I, which, by means of its connection with the revolving-crank K by the connecting-rod J, gives the oscillating motion to the mortar, the said crank K receiving its motion from a pulley, R, and belt, or by direct connection with the pitman of an engine, as may be desired. The bed-plate supporting the mortar has upward extensions L' L' to receive boxes *b b* for the crank-shaft, and has also sockets L² L² to receive the uprights posts U U of the stamp-frame, or the posts may be secured thereto in any suitable manner.

The ore or material to be crushed is fed through a hopper or ore-feeder, by which it is distributed equally to each compartment of the mortar. As many stamps and dies as are desired may be used. The material is crushed by reason of the oscillation of the mortar bringing it in contact with the heavy stamps suspended above, which latter are thereby forced upward and drop down again into the mortar, the stamps above one compartment rising as that compartment rises, while those above the other fall, the fall being arrested, as before described, by the collars upon the stems meeting the cushioned girts, and at every stroke the oscillation of the mortar distributes the material to be crushed, so that every portion of the mortar's contents receives the pounding action.

For amalgamating gold ores copper plates may be put inside the compartments S S and upon the aprons O O.

It will be understood that the pulverization of the material in the mortars is effected by the force of the blow of the rocking mortar against the suspended stamps, and that the latter are suspended, as described, in order that they may form yielding abutments to receive the impact of the stroke or rocking movement of the mortar. The mortar is centrally mounted upon the shaft H, so as to give a full rocking movement of the mortar against the stamps, and the pitman-connection therewith is preferably at a point centrally below the bottom of the mortar. The adjustment of the stamps is made to suit the stroke of the mortar. The ore will be fed into the mortar through a hopper having two spouts, one into each compartment. This will be fastened inside the frame and feed ore each way into the mortars. A balance-wheel, T, is mounted upon the crank-shaft.

Referring to the object of my invention to greatly increase the crushing and discharging capacity of the mortar, it will be seen by an inspection of Fig. 1 of the drawings that the oscillation of the mortar and its sudden arrest throws the reduced stuff out to one side of a line drawn through the stamp during the reducing operation, and thereby allows the solid matter to be always returned by the sudden return throw of the mortar beneath the stamp. In this operation the discharge of the finer material is automatic, and is caused by giving the mortar an upward throw in the arc of a circle, and suddenly arresting said upward throw at the limit of its movement, thus causing the finer material to be thrown away from the center of the mortar and the coarser material to be returned in position beneath the reducing-stamp. By this construction the discharge is effected at intervals by the upward throw of the mortar and during the reducing-blow, while the return of the coarser material is also effected at intervals by the return throw of the mortar, and in this way the operation of discharging is due entirely to the sudden arrest and stoppage of the movement of the mortar, while the operation of placing the coarser material in position to receive the blow of the stamp is due entirely to the equally sudden return movement of the mortar from the point of arrest.

As shown, I have placed the discharge-openings at the inner sides of the mortar, near the center of oscillation, to get a better discharge of the finer material, as the oscillation of the mortar will throw the material from the centers of the reducing-chambers toward the inner sides thereof, and from the inner sides back to the centers at intervals and in succession, thereby keeping the same in intervals of agitation to and from the screens and stamps.

The invention embraced in the method or process above set forth of automatically discharging the reduced material from the mortar during the reducing operation is not claimed herein, as such invention may be practiced by

a different type of stamp-mill, and forms the subject of a separate and distinct application for a patent filed by me December 19, 1884, Serial No. 150,751.

I claim—

1. In a stamp-mill, an oscillating or vibrating mortar, in combination with suitable means for operating it, and a suitable stamp or stamps, substantially as and for the purpose described.
2. In a stamp-mill, the combination, with suspended stamps, of a mortar adapted to be oscillated to bring its dies upward against the material between them and the shoes of said stamps, substantially as and for the purpose set forth.
3. In a stamp-mill, the combination, with the suspended stamps A D E and a mortar, G, having two compartments, S S, provided with dies F, screens N N, and discharging-aprons O O, of the shaft H, the pin or shaft I, connecting-rod J, and crank K, substantially as and for the purpose set forth.
4. An oscillating mortar for stamp-mills, constructed of two compartments, S S, the screens N N, and the discharge-aprons O O, substantially as and for the purpose set forth.
5. In a stamp-mill, the combination, with the frame and an oscillating mortar, of the stamps provided with collars B, and interposed cushions, C', upon the girt of said frame, substantially as and for the purpose described.
6. In a stamp-mill, the combination, with the frame and an oscillating mortar, of the stamps provided with adjustable collars B B, and interposed cushions C' C' upon the girt of said frame, substantially as and for the purpose described.
7. In a stamp-mill, the combination, with an oscillating mortar and the stamps, of the shaft H, boxes a a, the interposed cushions C C, and the bed-plate extension G', substantially as and for the purpose set forth.
8. In combination with a mortar having a discharge-opening, a stamp, and mechanism for enabling the mortar to be oscillated curvilinearly, whereby the reduced stuff is passed to one side of the mortar for automatic delivery during the reducing operation.
9. In combination with a mortar having a screened discharge, the stamp, and mechanism for enabling the mortar to be operated to pass the reduced stuff to the said screened opening for discharge from the mortar during the reducing operation.
10. A curvilinearly-reciprocating mortar, in combination with a pestle or stamp operating therein.
11. The combination of a stamp, a mortar with a side pivotal support, and a pitman-connection for oscillating the mortar, substantially as described, for the purposes specified.
12. The combination, with a curvilinearly-reciprocating mortar having a discharge at one side of a vertical line passing through the stamp, and a stamp operating therein, of a

receiving-apron for the reception and delivery of the contents of the mortar as discharged therefrom.

13. In a stamp-mill, the combination of an oscillating or vibrating mortar, and a stamp or stamps, with independent power-connections for positively operating said mortar, substantially as described.

14. In a stamp-mill, a vertically-oscillating mortar having a pounding-compartment at each side of its pivot-bearings, each compartment having a side discharge-opening, in com-

bination with a stamp or stamps operating within said compartments at one side of said discharge-opening, and power-connections for positively operating said mortar, substantially as set forth.

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

HENRY BOLTHOFF.

Witnesses:

E. P. WRIGHT,
J. W. COOLIDGE.