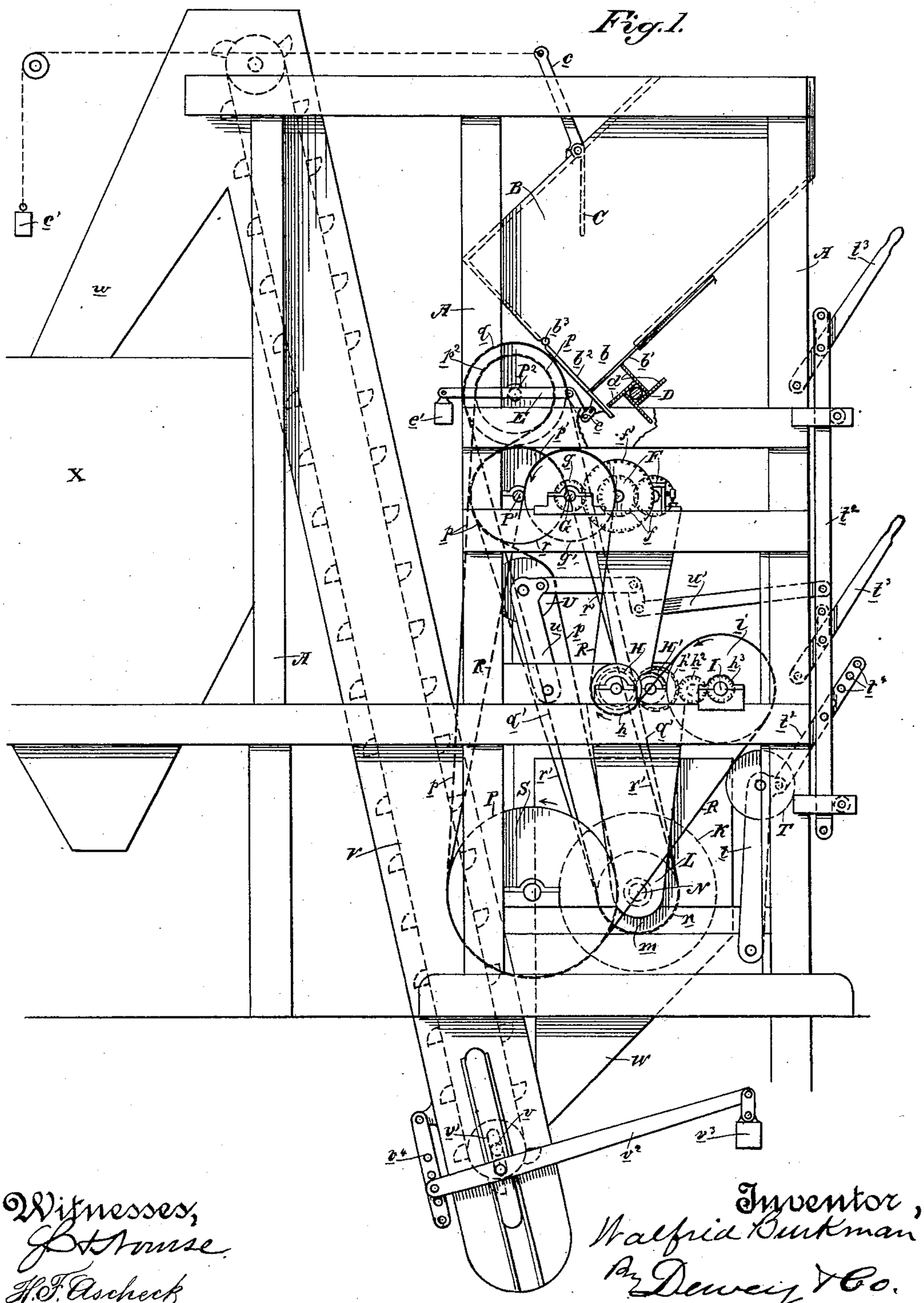
(No Model.) 3 Sheets—Sheet 1.

W. BURKMAN.

CLAY REDUCER.

No. 475,483. Patented May 24, 1892.

Fig. 1.



Witnesses,
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H. F. Ascheck

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By Dewey & Co.
attys

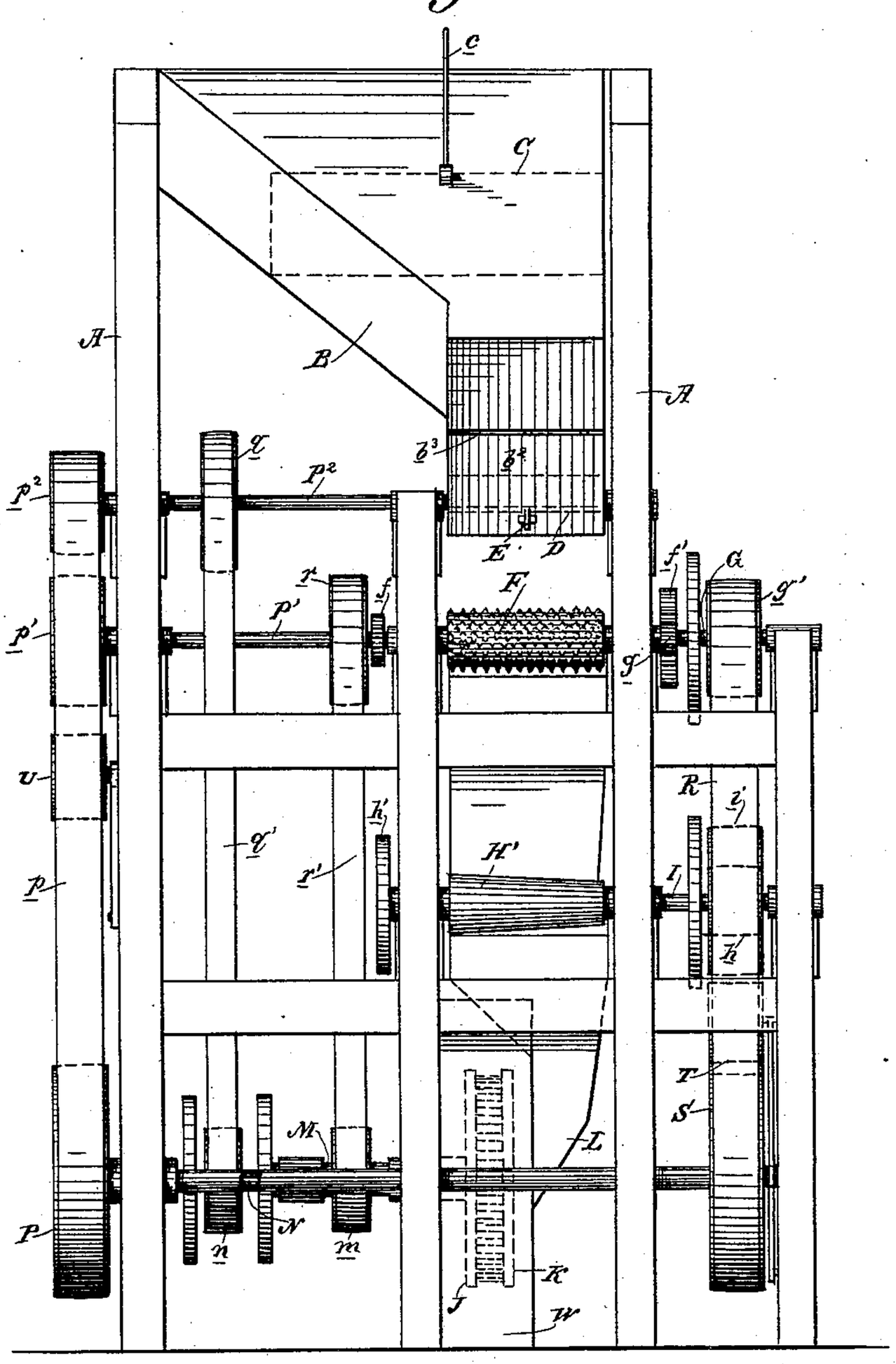
(No Model.) 3 Sheets—Sheet 2.

W. BURKMAN.

CLAY REDUCER.

No. 475,483. Patented May 24, 1892.

Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

W. BURKMAN.

CLAY REDUCER.

No. 475,483. Patented May 24, 1892.

Fig. 3.

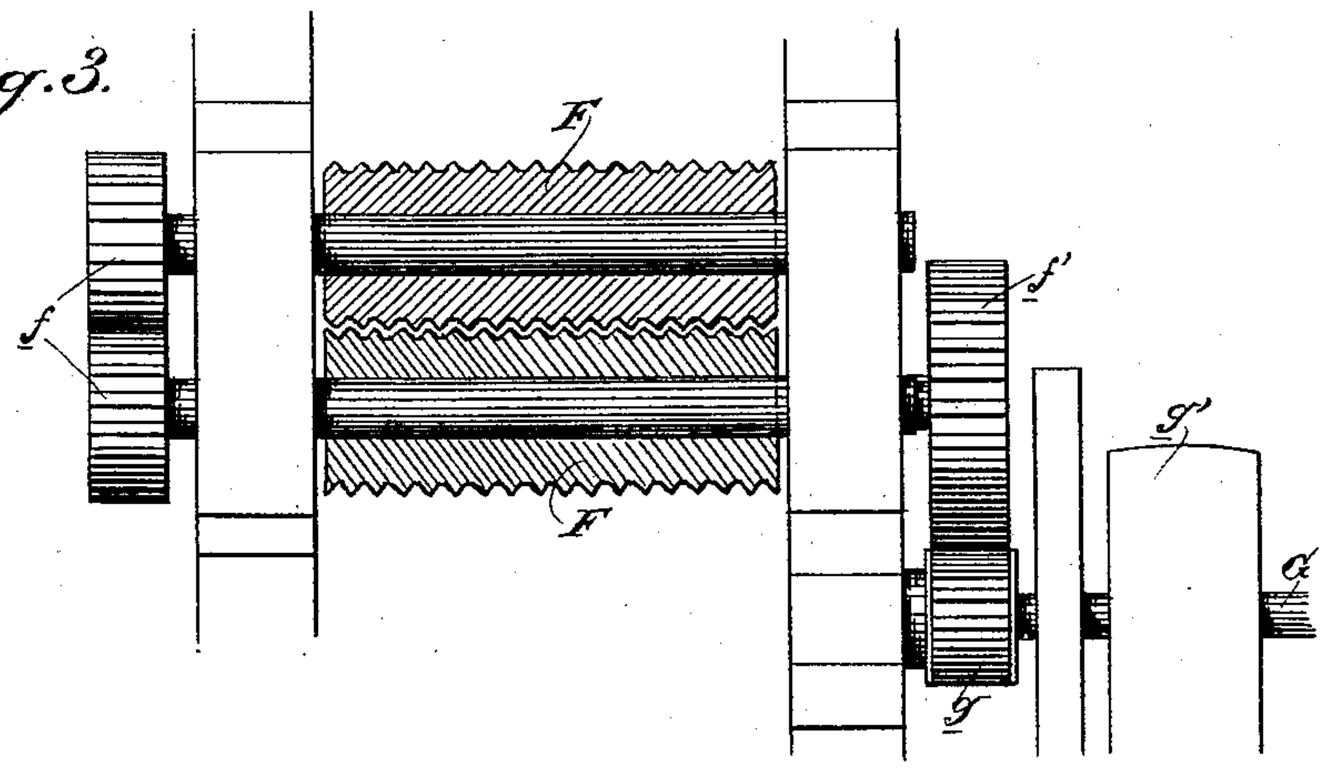


Fig. 4.

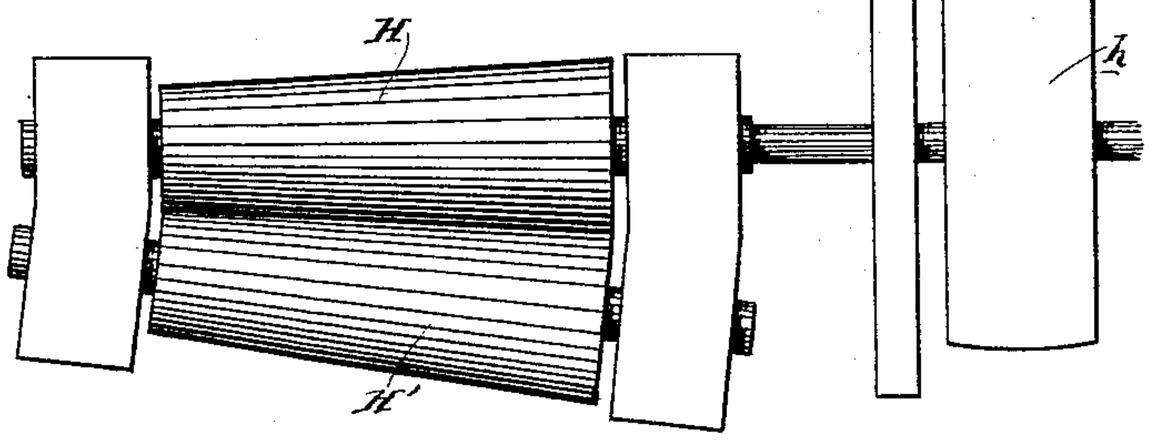


Fig. 5.

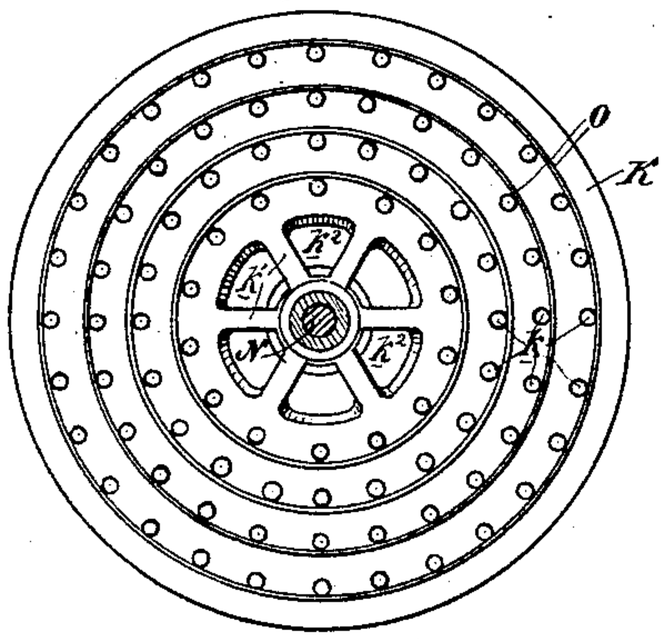
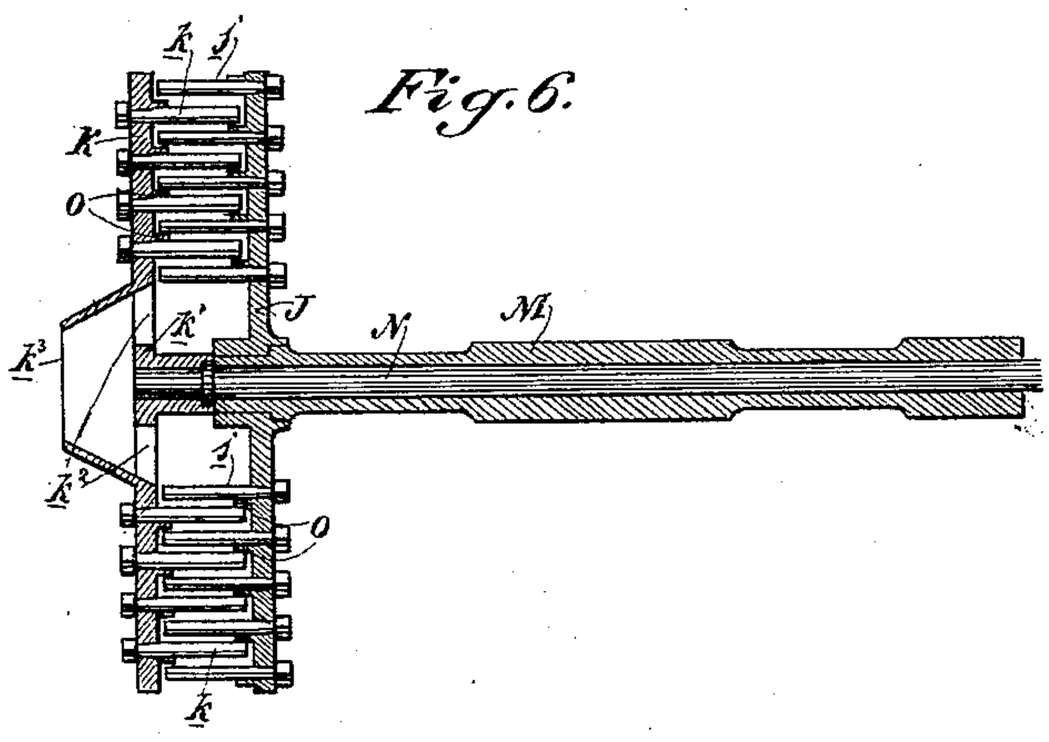
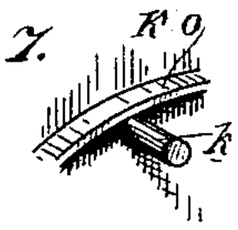


Fig. 6.



Witnesses,
B. L. Crowe
H. F. Aschenbach

Fig. 7.



Inventor,
Wolfgang Burkman
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UNITED STATES PATENT OFFICE.

WALFRID BURKMAN, OF SAN FRANCISCO, CALIFORNIA.

CLAY-REDUCER.

SPECIFICATION forming part of Letters Patent No. 475,483, dated May 24, 1892.

Application filed June 4, 1891. Serial No. 395,104. (No model.)

To all whom it may concern:

Be it known that I, WALFRID BURKMAN, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Clay-Reducers; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the general class of machines for reducing and disintegrating clay, feldspar, and other similar materials in a dry or semi-dry condition.

My invention consists in the novel constructions, arrangements, and combinations of the several parts of the machine hereinafter fully described, and specifically pointed out in the claims.

The object of my invention is to provide a complete and efficient machine adapted to receive the material in its crude shape and deliver it in any condition of fineness required, combining in its operation that of crusher and reducer, the material passing through it constantly and automatically and having a storage sufficient to keep it steadily working while new supplies are being brought.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a front elevation of my machine. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view of the crushing-rollers. Fig. 4 is a plan view of the conical rollers. Fig. 5 is an inside view of the outer pin-plate. Fig. 6 is a cross-section through the reducing mechanism. Fig. 7 is a detail view of one of the pins and its concentric ring flange.

A represents the frame of the machine. In the upper portion of this frame is the storage-hopper B. Within the hopper and extending downwardly from its upper side is an indicator-plate C, which is hinged at its upper end and is attached to an arm *c*, the upper end of said arm being connected with a suspended weight *c'*. This weight forces the lower part of the swinging indicator-plate C toward the inlet of the hopper, and as the material lies and is constantly bearing on said plate it will be swung under the weight of the material, thereby raising the weight *c'* and indicating accurately the supply which is in the hopper. The bottom part of the hopper has a feed-aperture *b*, which is controlled by a gate *b'* in order to shut off the feed of material, when desired. Below the feed-aperture is a feeder D, consisting of a revolving shaft having arms or paddles *d*, extending from it the whole length of the hopper. Feeder D is supported in journals and caused to revolve by any suitable mechanism. The position of this feeder is such that when the gate of the hopper is opened the weight of the material will rest only on one side or on one of the blades or paddles of the feeder, and will thereby be caused to be fed by the rotation of said feeder. One portion b^2 of the lower side of the hopper is hinged at b^3 and is held close to the paddles or arms of the feeder by means of a lever E, connected with it by a link *e* and having a weight *e'*. This yielding portion b^2 of the hopper-wall is to provide for the passage of any large or hard lumps without any danger or tendency to break the hopper-wall of the feeder.

Below the feeder are mounted two horizontal parallel rollers F, the surface of which is provided with teeth. These rollers have intermeshing gears *f*, by which one is driven from the other, and one of said rollers has a gear *f'*, which engages with a pinion *g* on a shaft G in line with the rollers, said shaft being driven by a pulley *g'* upon it. Below these rollers are two plain-surfaced conical-shaped rollers H and H'. These are mounted in suitable bearings, and the roller H is driven by means of a pulley *h* directly upon its shaft and has a faster revolution than the roller H', which is driven by means of a gear *h'* on its shaft, which engages with an idler-pinion h^2, which said idler-pinion engages with another pinion h^3 on a shaft I, which is driven by a pulley *i*, the relative sizes of parts being such that the roller H' revolves at a much slower rate than the roller H. Below these conical rollers is the final reducing or pulverizing mechanism. This consists of a plate or disk J, provided with concentric rows of pins *j*. Opposing this disk is a second plate or disk K, provided with concentric rows of pins *k*, which extend toward and overlap the planes of the pins of the opposing plate or disk. The outer plate K has a hub *k'*, provided with holes or apertures k^2 around it communicating with the space between the two plates or disks and which the pins occupy, and a di-

recting-chute L from the conical rollers above communicates with these holes by means of a funnel k^3 on plate K. The plate J is upon a hollow shaft M and the plate K is upon a shaft N within shaft M, each shaft having its own pulley m and n, respectively, whereby the plates are driven in opposite directions. The pins of the two plates extend each set toward the opposite plate, but without touching said plate, and in order to prevent the material from finding a free passage down past the ends of the pins and between them and the plates I have secured to each plate about the base of each row of pins the concentric ring flanges O, which overlap the spaces between the ends of the pins and the plates and prevent the material from working down through these spaces, compelling it to pass between the oppositely-moving pins.

The driving mechanism for the several parts is as follows: P is the main driving-pulley. In the upper portion of the machine are two counter-shafts P′ and P^2. Upon the shaft P′ is a pulley p' and upon the shaft P^2 is a pulley p^2. A belt p extends from the main driving-pulley P up directly around the upper pulley p^2 and down between said pulley and pulley p' and on the opposite side of p', and thence down around the main driving-pulley. The upper shaft P^2 has upon it a pulley q, from which a belt q' extends downwardly to the pulley n of shaft N of the pin-plate K below, whereby said pin-plate is driven in one direction. The shaft P′ has a pulley r upon it, from which a belt r' extends downwardly to the pulley m, which drives the shaft M of the other pin-plate or disk J, whereby said plate or disk is driven in the opposite direction, because the shafts P′ and P^2 revolve in opposite directions.

Both sets of crushing-rollers are driven by a single belt R, the course of which is as follows: It passes from a pulley S on the main driving-shaft up around the pulley i, heretofore described, thence down around the pulley h on the faster-running conical roller H, thence up to and around the pulley g', which drives the shaft G, and thence downwardly around the pulley S to the point of beginning. Now in order to stop and start the operation of the crushing-rolls I have the tightener-pulley T, which is mounted upon a swinging bearing t and is adapted to bear against the belt R at a point just below the pulley i. This tightener-pulley is operated by means of a lever t', and in order to provide for its operation at different heights I connect this lever by a bar t^2 with a vertical series of levers t^3. The connection with this bar of lever t' may be an adjustable one, as shown by the series of holes t^4 made in said lever.

In order to stop and start the pin-plates of the reducing or pulverizing mechanism, I have the tightener-pulley U mounted upon a swinging arm or support u and adapted to be thrown into and out of contact with the belt p by suitable connections—such as u'—with a bar similar to bar t^2.

V is the elevator consisting of an endless traveling band or bands provided with receiving-cups, as shown, the lower end of said elevator being in position to receive the material from the reducing-plate by means of a directing-chute W. This elevator extends upwardly and is adapted to discharge its contents through a chute w into the receiving-box X, from which it is to be delivered to the brick-machine. The elevator is automatically kept taut by having its lower shaft v mounted in a sliding bearing v' and having connected with it a lever v^2, one end of which has a weight v^3 and the other end is adjustably connected in a suitable manner, as by a swinging link v^4. This weighted lever bearing down on the shaft of the elevator keeps it at its lowest position and the belt constantly taut.

The operation of the machine is as follows: The clay or other material is fed to the hopper B, and from it is passed by the feeder D between the rolls F, which break it up. From these rolls it passes through the conical rolls H and H′, by which it is further reduced. These rolls are made conical for the purpose of allowing any hard material which refuses to pass between them to work off to one end. From these rolls the material drops through the directing-chute L and is passed through the apertures k^2 into the space between the tin plates, by which it is reduced to any degree of fineness. Dropping from these tin plates through the chute W it reaches the elevator and by it is carried up and suitably discharged. It may be brought over a screen before entering the hopper over the press, and any clay not fine enough will be carried back to the storage over the toothed rollers.

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

1. In a clay-reducer, the combination of the toothed rolls F F, having intermeshing gears f, the conical rolls H H′, the shaft G, with pulley g', the pinions g and f', by which the power of shaft G is transmitted to one of the rolls F, the shaft I, having pulley i, the pinion h^3, idler h^2, and gear h', connecting shaft I with conical roll H′, whereby said roll is driven at one rate of speed, the pulley h on the other conical roll H, the driving-pulley S below, and the single belt R, passing around pulleys i, h, and g', whereby all the rolls are driven and the conical roll H has imparted to it a higher speed than that given the conical roll H′, substantially as herein described.

2. In a clay-reducer, the opposing plates J K, with intermediate overlapping pins, said plate K having the hub with feed-apertures around it, the crushing-rollers, a funnel projecting outwardly from the plate K, and a chute leading from the rolls to the funnel and directing the material to the apertures, substantially as herein described.

3. In a clay-reducer, the opposing plates J K, with intermediate overlapping pins, the plate K, having the hub provided with feed-apertures around it, the concentric shafts upon which the plates are separately mounted, said shafts having pulleys, and the means for driving said shafts in opposite directions, consisting of the independent counter-shafts above, the belt *p*, driving said shafts in opposite directions, and the belts *q'* and *r'* from said shafts to the pulleys of the concentric shafts, substantially as herein described.

4. In a clay-reducer, the combination of the crushing-rollers, the direction-chute therefrom, the opposing plates J and K, provided with concentric rows of overlapping pins, and each plate having upon its inner surface concentric rows of flanges, which overlap the spaces between the ends of the pins and the plates to prevent the escape of the material at these points, and a funnel projecting from the plate K and communicating with apertures therein, substantially as herein described.

5. In a clay-reducer, the combination of the elevator having its lower shaft mounted in sliding bearings, the tightening-lever connected with said shaft, and the swinging link adjustably connecting one end of the lever and the weight on its other end, substantially as herein described.

In witness whereof I have hereunto set my hand.

WALFRID BURKMAN.

Witnesses:
S. H. NOURSE,
J. A. BAYLESS.