

(No Model.)

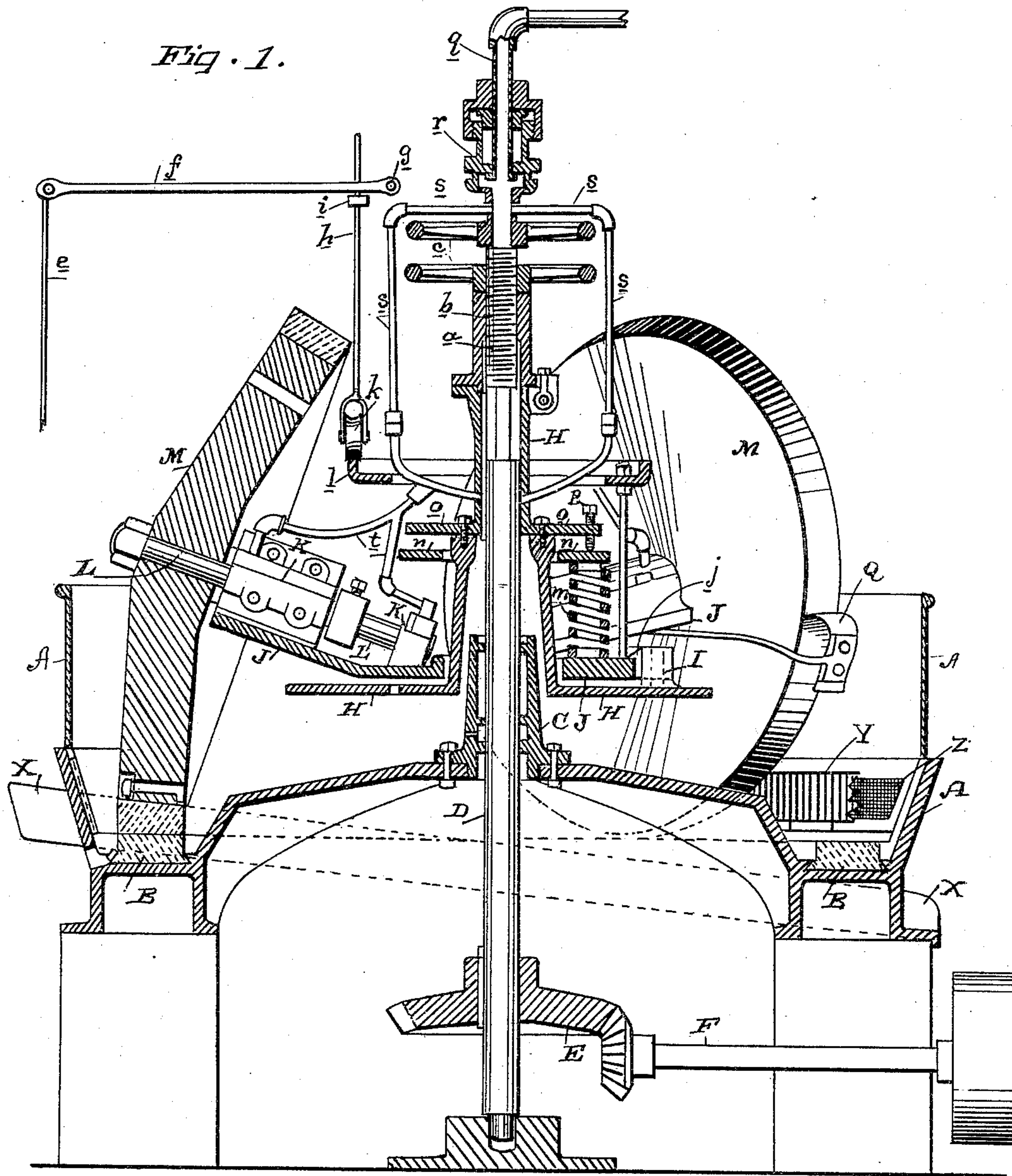
2 Sheets—Sheet 1.

C. B. BINGHAM

CRUSHING MILL.

No. 430,602.

Patented June 17, 1890.



Witnesses,  
J. H. Hulse  
H. C. Lee.

Inventor,  
Cullen B. Bingham  
By Devereux &  
Attw

(No Model.)

2 Sheets—Sheet 2.

C. B. BINGHAM.

CRUSHING MILL.

No. 430,602.

Patented June 17, 1890.

Fig. 2.

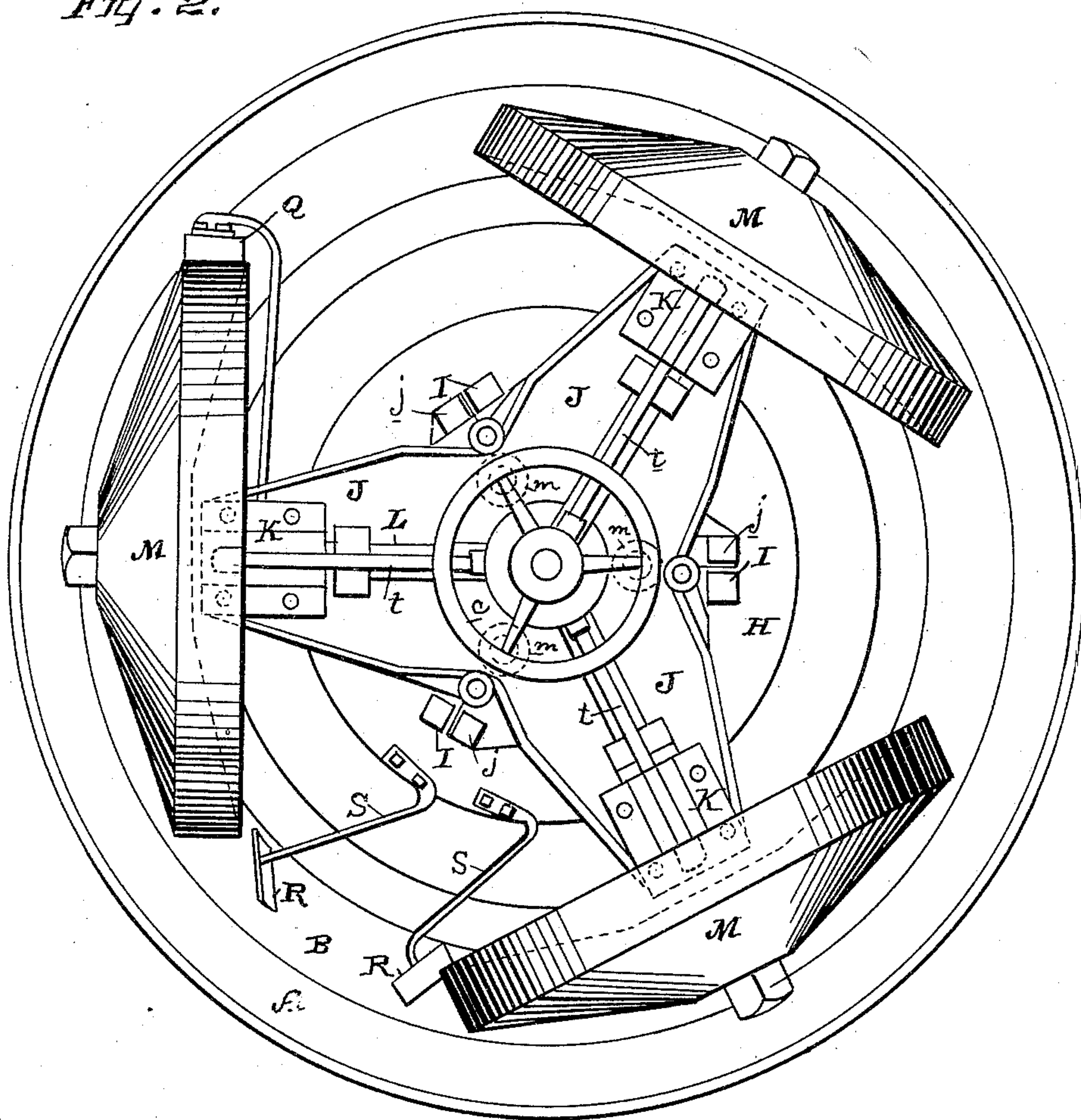
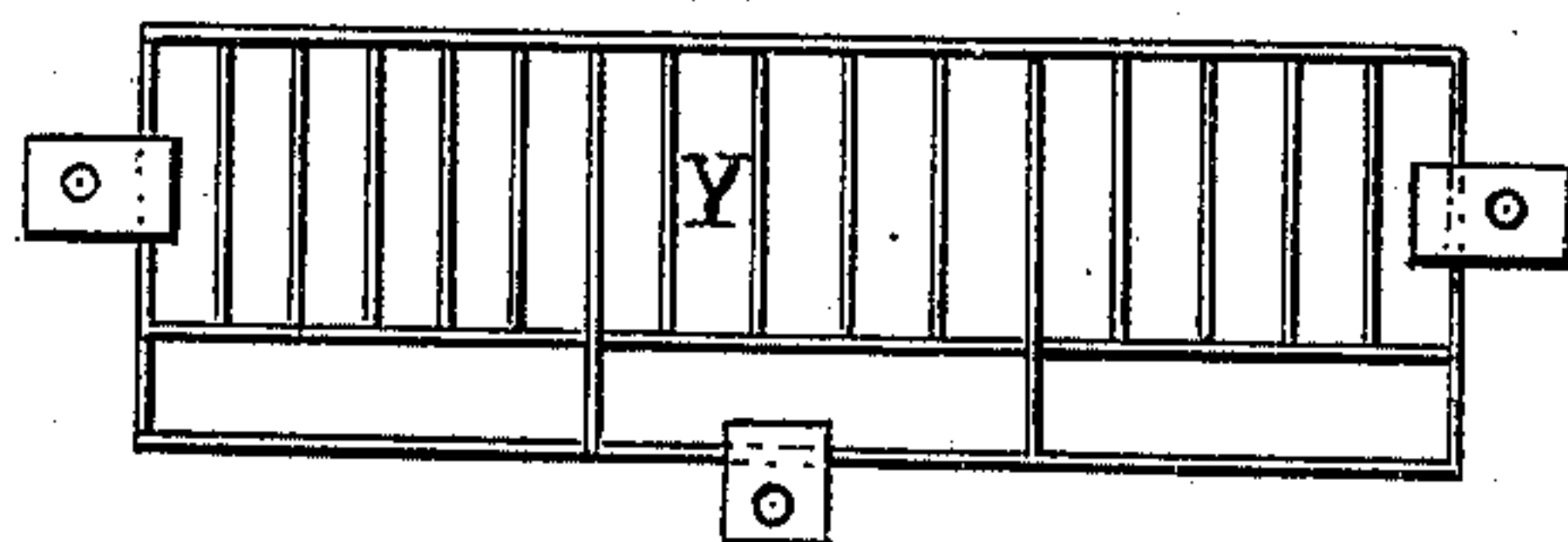


Fig. 3.



Witnesses,  
J. H. House  
H. C. Lee.

Inventor,  
Cullen B. Bingham  
By Devey & Co  
Attys



# UNITED STATES PATENT OFFICE.

CULLEN B. BINGHAM, OF VOLCANO, CALIFORNIA.

## CRUSHING-MILL.

SPECIFICATION forming part of Letters Patent No. 430,602, dated June 17, 1890.

Application filed October 11, 1889. Serial No. 326,728. (No model.)

*To all whom it may concern:*

Be it known that I, CULLEN B. BINGHAM, a citizen of the United States, residing at Volcano, Amador county, State of California, have invented an Improvement in Crushing-Mills; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improvement in crushing-mills of that class in which wheels or rollers are caused to travel around the center and upon a die or dies which are concentric with said center, so that the material is crushed between the rollers and the dies.

The object of my invention is to provide certain improvements in this apparatus, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of my machine. Fig. 2 is a plan view. Fig. 3 is an elevation of the screen-guard Y.

A A is a pan or tub of any suitable or desired depth, having a circular ring die or dies B fitted around its periphery. The central portion of the pan extends upward in the form of a cone, as shown at C, and through this vertical cone passes the driving-shaft D, which is impelled by a beveled gear E and a horizontal shaft F in the usual manner. Near the top of the shaft D are feathers or wings which engage with slots in the interior of the driver H. This driver extends downwardly outside of the cone C, and at its lower end are lugs I, which come in contact with corresponding lugs or projections j upon the frame J. This frame, which is more fully shown in Fig. 2, consists of radial arms extending outwardly toward the periphery of the pan, and carrying upon them journal-boxes K, within which turn the axles L. These axles extend radially from the center toward the periphery of the pan, and upon the outer ends of these axles are keyed the heavy wheels or rollers M. In the present case I have shown these rollers as made very dishing in the center, and the axles L are suitably keyed into their hubs, so as to drive them and cause them to travel around upon the dies B when power is applied to rotate the frame which carries the axles of these wheels. In addition to making these wheels very dishing, I have also shown the axles L inclining upwardly from the center to the hubs of the wheels which they drive, and the peripheries of these wheels are

made correspondingly beveled toward the center, so that they will roll flat upon the dies B, and by reason of their beveled form will travel more easily in a circle and without a tendency to run toward the outside. Heavy tires or shoes are fitted upon the wheels, and are renewable, like the dies in the bottom of the pan, when worn out. Suitable washers are fitted upon the shafts between the hubs of the wheels and the boxes, and upon the axles are collars and set-screws, by which they may be set out or in, as desired.

The vertical shaft D passes up through the usual bearing in the central cone C. The part b of the driver has screw-threads cut in its interior corresponding with those upon the screw a, and a hand-wheel c is keyed to the upper part of the screw and serves to turn it within the sleeve b. It will be manifest that by turning this screw the driver will be raised or depressed, as may be desired.

e is a rod which controls the amount of ore admitted into the pan and beneath the rotating-wheels. The feeder may be of any well-known or desired description, and is not here shown.

f is a lever, the inner end of which is fulcrumed at g, so that it may be raised or depressed about this fulcrum, and this may have the rod e and the gate or feed-controlling device to which it is connected.

h is a vertical rod, having near its upper end a collar i, which engages the lever f when the rod h is raised. This raises the rod e, so as to shut off the feed. At the lower end of the rod h is journaled a roller k, which travels upon a flange or rim l. This flange or rim is suitably supported from the driving-frame J and moves in conjunction with it. It will be seen from this construction that when the amount of ore beneath the wheels M is sufficient to raise the wheels and the frame J it will correspondingly raise the ring or flange l, and through the rod h, lever f, and connecting-rod e will act to close the feed-opening, and when the amount of ore has again become reduced, so that the wheels and frame again settle down, the reverse movement of the parts will open the gate and allow more ore to enter the pan.

m are tension-springs, the upper ends of which abut against the disk or plate n. Above the disk n is another disk o, which is fixed to the driver, and the screws p, passing through



this second disk, press upon the disk *n* with any desired degree of force, and the springs *m* may thus be compressed as much as may be desired to give the proper pressure upon the driver J. This elastic pressure, acting in conjunction with the weight of the rollers, makes a more effective crushing of the ore which passes beneath them. In order to lubricate the bearings K, I prefer to employ water, which is brought to a point in line above the driving-shaft D through a pipe *q*. The lower end of this pipe has any suitable form of revolving joint *r*, by which it is connected with the rotary portions of the machine from the bottom or moving part of this joint. The pipes *s* extend outwardly, and the vertical portions of these pipes extend down to a point sufficiently above the wheel-carrying frames J, and branch pipes *t* or hose lead from them to the journals K of the axles L. One branch of these pipes leads into the interior of the driver H, and a slot is made so that water may pass down this slot and lubricate the bearing in the cone C in the same manner.

I do not make any especial claim on the particular form of joint *r*, it only being necessary to make such a coupling as will allow the pipes *s* to revolve in unison with the revolving parts of the machine, where the feed-pipe *q* is allowed to remain stationary.

Q are scrapers, which are fitted to follow each of the wheels, bearing against the rear portion, so as to keep them from carrying up pulp and material which is being crushed, and R are plows, which are supported upon the arms S from the driver, and following behind the wheels, serve to throw up the pulp, keep it from packing, and throw it from the outside in upon the dies, so that the rollers will pass over it continuously until it is as fine as may be desired.

The pan is provided with suitable screens Z, located as usual. They are on the outer surface of the pan-rim, and on its inner surface and opposite each screen-opening is a screen-guard Y. This consists of a wire frame composed of horizontal wires and vertical wires. The horizontal wires are three in number, the lower two being nearer together. The vertical wires connect the upper and next horizontal wire, while at intervals one vertical wire is longer than the other and runs down to and supports the lowermost wire. These guards are held in place by suitable plates bolted to the pan-casting. The object is to prevent the larger rocks from coming in contact with and injuring the screens, while presenting no impediment to the passage of the pulp.

X is a trough about the exterior of the pan to receive and carry away the pulp discharged by the screens.

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

1. In a horizontal rotary crusher, the wheels or rollers traveling upon the horizontal annular dies within the periphery of the pan, said rollers being made conical or dishing and having the inclined axles L, to which they are keyed, said axles being journaled in boxes upon a frame, a vertical driving-shaft extending up through the center of the pan, having a driver connected with it, and contact-lugs on the wheel-frame and driver, whereby the frame is rotated, substantially as herein described.

2. In a rotary crusher, a pan having an annular die, a central driving-shaft and a driver keyed thereto, wheels or rollers traveling upon the annular die having the inclined axles journaled upon a frame which is driven by the driver, a horizontal disk fixed to the driver above the wheel-frame, and tension-springs disposed between the disk and the wheel-frame, so as to press upon the latter, and adjusting-screws *p*, whereby the tension of the springs may be regulated, substantially as herein described.

3. In a rotary crusher, the pan having the annular dies, the central driving-shaft and the driver connected with said shaft, a wheel-frame operated by said driver, having journal-boxes in which the axles of the crushing-wheels turn, and a track or flange connected with the wheel-frame so as to rise and fall with it, in combination with the rod *h*, having the roller *k*, which travels upon the edge of the flange or track, the lever *f*, and the connecting-rod *e*, whereby the latter is raised or depressed by the rise and fall of the wheel-frame, substantially as herein described.

4. In a rotary crusher, the pan having the horizontal annular die, the central vertical driving-shaft and the driver connected therewith, a rotary frame operated by said driver, and rollers traveling upon the annular die and having their axles journaled upon the wheel-frame, in combination with water-pipes connecting with the journal-boxes, a stationary supply-pipe opening vertically above the center of the driving-shaft, and a loose or revoluble coupling, whereby the supply-pipe is connected with the rotary pipes, substantially as herein described.

5. A rotary crusher consisting of a pan having the horizontal ring or die, the vertical central driving-shaft, the driver connected therewith, a screw whereby said driver may be raised or depressed, a wheel-frame rotated by the driver, and wheels traveling upon the annular die and having their axles journaled so as to turn in boxes upon the wheel-frame, substantially as herein described.

In witness whereof I have hereunto set my hand.

CULLEN B. BINGHAM.

Witnesses:

S. H. NOURSE,  
H. C. LEE.