

No. 629,098.

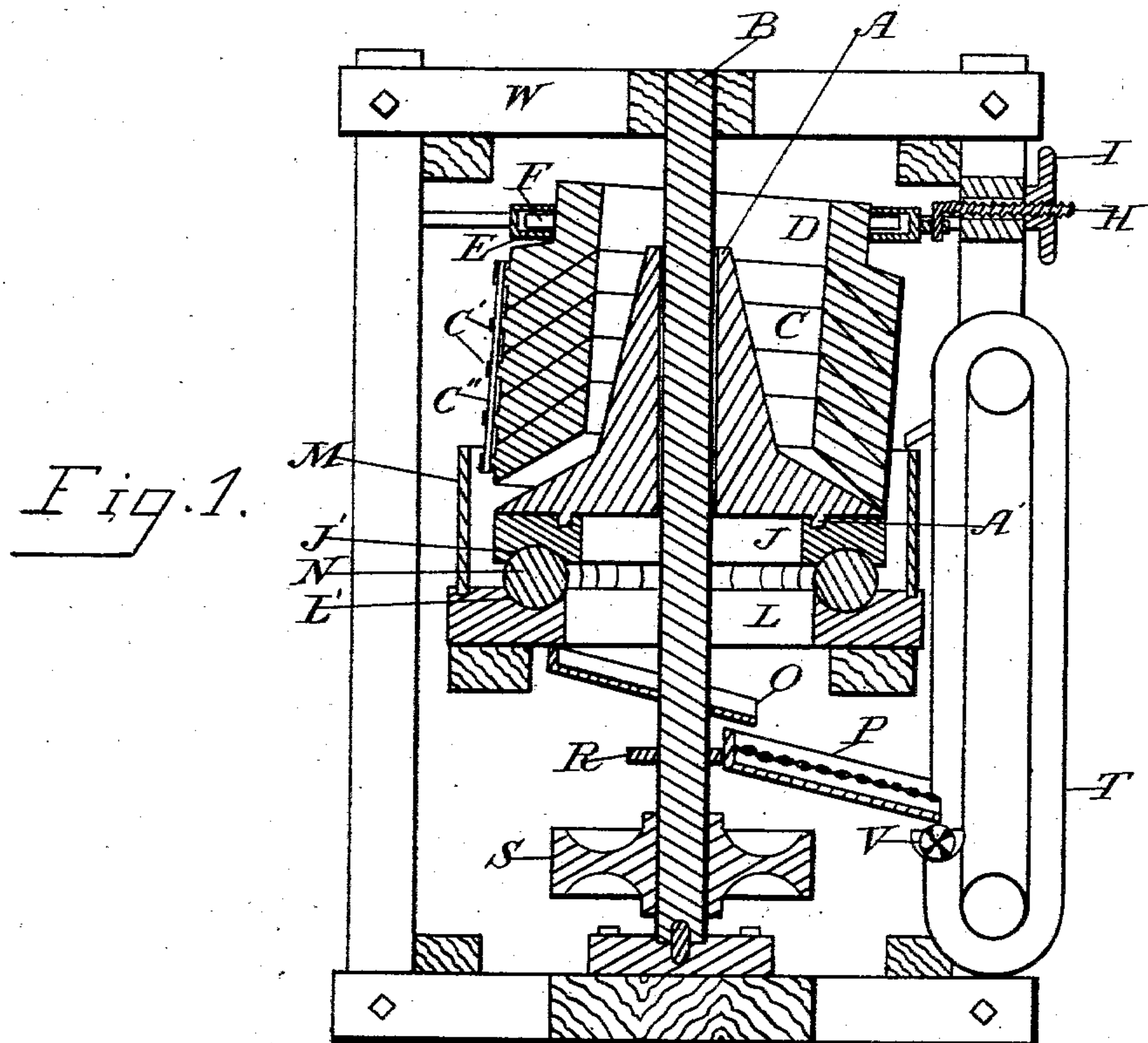
Patented July 18, 1899.

B. I. TURMAN & T. J. HAMPTON.  
ORE CRUSHER.

(No Model.)

(Application filed Oct. 17, 1898.)

2 Sheets—Sheet 1.



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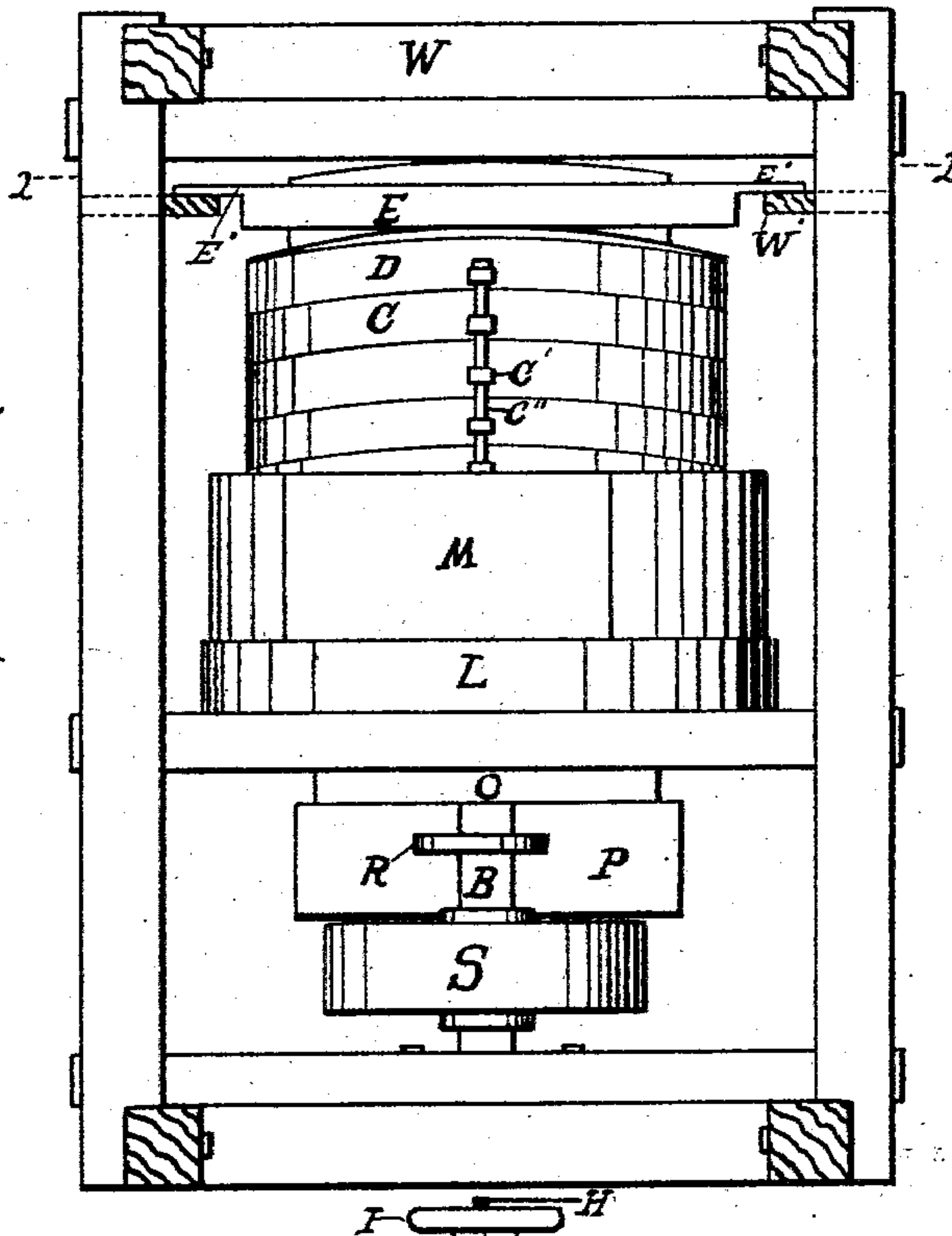
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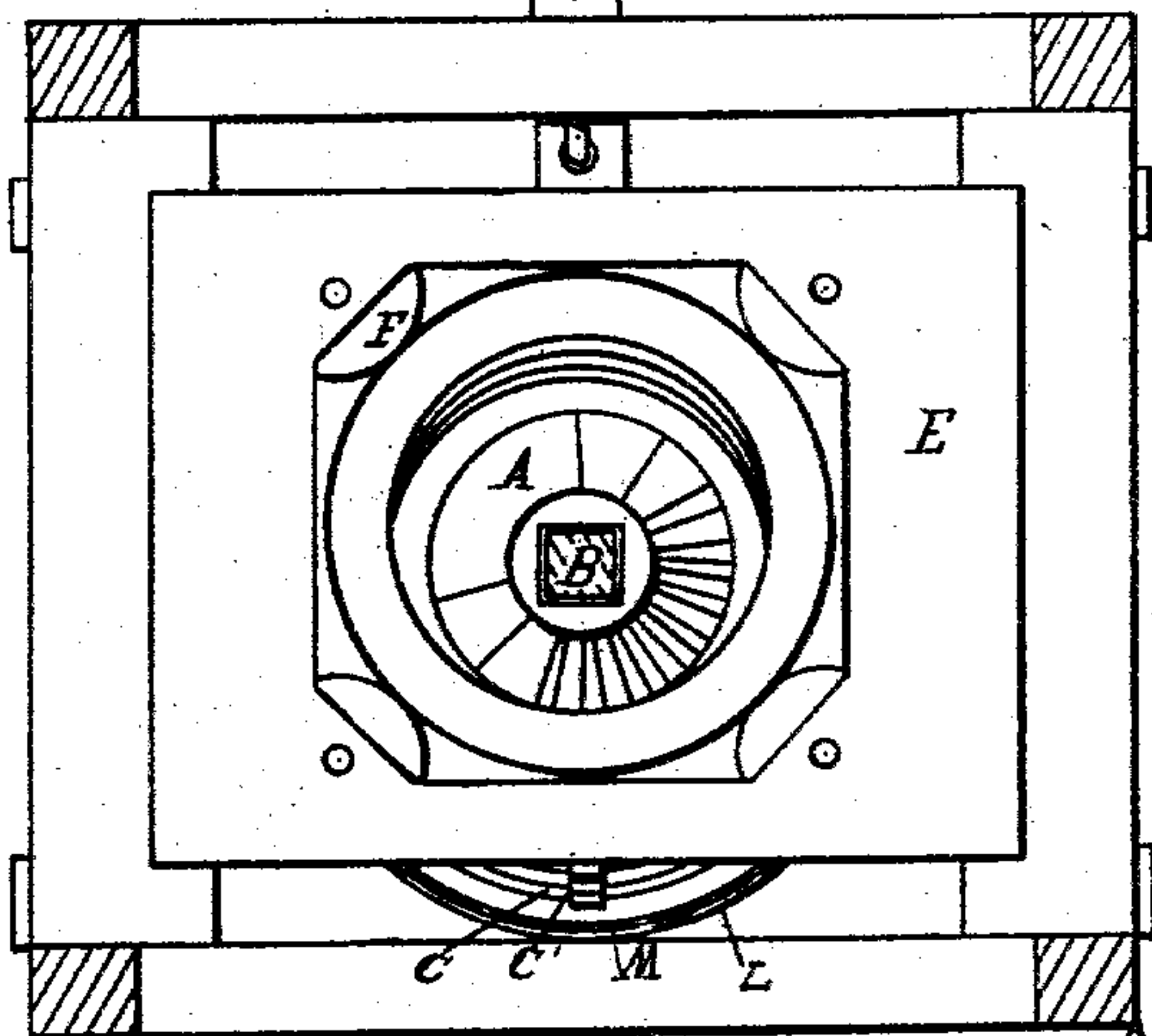
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*Fig. 3.*



*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

BYRON I. TURMAN AND THOMAS J. HAMPTON, OF LOS ANGELES,  
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## ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 629,098, dated July 18, 1899.

Application filed October 17, 1898. Serial No. 693,801. (No model.)

*To all whom it may concern:*

Be it known that we, BYRON I. TURMAN and THOMAS J. HAMPTON, citizens of the United States, residing at Los Angeles, in the county of Los Angeles, in the State of California, have invented a new and useful Ore-Crusher, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which—

Figure 1 is a central vertical section of our machine. Fig. 2 is a plan view taken on the line 2 2 of Fig. 3, and Fig. 3 is an elevation of our machine.

In the drawings, A is a frusto-conical metallic runner or grinding-cone (the upper portion being a frustum of a cone and the lower portion a larger flaring frustum) slidably mounted on the central vertical shaft B and rotating with the shaft, which may be square except in the bearings. Surrounding the runner A is a cylindrical shell C, preferably made of cast-iron in rings of the same shape, so that when the bottom ring becomes worn too much it can be easily removed and a new one put in. These rings are provided with lugs C', through which bolts C'' pass to bolt them together and to the collar D. Instead of making the shell C and collar D of separate rings they may be cast in one piece. The shell C is sufficiently strong to resist any strain that may be put on it, and it rests on the runner A, the bottom having the same pitch as that part of the runner upon which it rests. The collar D forms a part of shell C and is surrounded by the frame E, in which are mounted four antifriction-rolls F, which bear against the neck of the collar D. This frame has projecting flanges E' on two sides, which rest on cross-timbers W' of the main frame W, and its position is controlled by the threaded bolt H, which passes through a slot in the main frame and is operated by threaded hand-wheel I. These timbers W' are fastened to the upright timbers of the main frame, and the frame E rests loosely upon them and has a sliding motion thereon when the hand-wheel I is operated.

J is a cylindrical ring (preferably made of cast-iron) and has an annular race or groove J' in the under surface thereof. This ring is rotated with the runner A, the lugs A' of the

runner engaging therewith. The ring J may be made integral with and form a part of the runner A; but we prefer to make it separate, as considerably more wear comes on it than on the runner and when it wears out it can be easily replaced with a new one.

L is a stationary annular bed-plate (preferably made of cast-iron) having an annular groove or race L' formed in the upper face thereof.

M is a peripheral casing or curb surrounding the bed-plate and extending above the base of the conical portion of the runner A and may be made of sheet-iron.

N are the pulverizing-balls, which fit in the race in the bed-plate L and ring J.

O is an apron or chute below the central opening of the bed-plate L to receive the ore and convey it upon the shaking-screen P, which separates the thoroughly-pulverized portions from the overtail or coarse portions. The overtail is carried to the return-elevator T by the endless screw V and is delivered by the elevator inside the casing or curb M. The screen P has a shaking motion imparted to it by the wiper-wheel R, mounted on the shaft B.

S is a driving-pulley mounted on the shaft B, around which the power-belt passes to impart motion to the machine.

It will be observed that as the runner A is slidably mounted on the shaft B the whole weight of the runner A, shell C, and ring J comes on the pulverizing-balls N, thereby making them very effective in pulverizing ore.

Our machine is operated as follows: The shell C is drawn out of the perpendicular, as shown in Fig. 1. Power is applied to rotate the shaft and ore is fed into the shell around the runner A. The shell C rests upon the runner A and rotates with it. This is caused partly by its weight and consequent friction and principally by the fact that the ore wedges between the shell and runner and binds them together. The top of the shell C is held in an unchanging position eccentric to the shaft B, and thereby the ore which is between the runner and the shell is broken into small pieces. These small pieces pass down under the bottom of the shell C, where they are still further crushed, and then into the casing M, where they are fed under the pulverizing-



balls N. After the ore has been operated upon by the pulverizing-balls it works to the opening in the center of bed-plate L and drops upon the chute or apron O, which carries it to the shaking-screen P, which separates the thoroughly-pulverized ore from the overtail or coarse portions. The overtail is carried by the screw V to the elevator T, by which it is carried up into the casing M and is again subjected to the action of the pulverizing-balls N.

Having described our invention, what we claim is—

1. In an ore-crusher the combination of a rotating shaft, a frusto-conical metallic runner slidably mounted on a squared portion thereof, a cylindrical shell surrounding said runner and supported thereby, means for holding and guiding the upper portion of the shell in a position eccentric to the shaft, a ring surrounding the shaft immediately below and engaging and supporting the runner, and having an annular race or groove in the under surface thereof, a stationary annular bed-plate having an annular groove or race formed in the upper face thereof, pulverizing-balls adapted to fit between said groove and the annular race in the under face of the ring which carries the runner, a peripheral casing or curb extending up from the bed-plate, a chute or apron below the central opening in the bed-plate and adapted to receive the ore therefrom, a screen receiving the ore from the chute, and adapted to separate the thoroughly-pulverized portion from the coarser, a wiper-wheel mounted on the shaft and communicating motion to the screen, and a return-elevator receiving the coarse overtail from the screen and redelivering it inside the casing to the pulverizing-balls, substantially as and for the purposes set forth.

2. In an ore-crusher the combination of a central shaft having a squared or non-circular portion, a runner mounted upon said shaft to rotate therewith, but free to rise and fall thereon; said runner comprising a conical upper portion, a larger flaring conical central portion, and an annular portion engaging and

supporting the conical portions and having an annular race or groove in its lower face, a stationary annular bed-plate having a groove or race in its upper face, pulverizing-balls fitting in said race and groove, a peripheral casing or curb surrounding said bed-plate and extending above the base of the conical portions of the runner, a cylindrical shell surrounding the conical portions of this runner and having an internal conical bottom surface of substantially the same pitch as that of the lower conical portion of the runner, and means for holding the upper portion of the shell in a position eccentric to the shaft, substantially as set forth.

3. In an ore-crusher the combination of the central vertical operating-shaft B, runner A slidably mounted on said shaft, shell C surrounding said runner having collar D, frame E having antifriction-rollers F surrounding collar D, threaded bolt H having hand-wheel I, ring J having an annular race J' in its lower face, immediately below and engaging with runner A, annular bed-plate L having a groove L' in its upper face, pulverizing-balls N fitting in said race J' and groove L', casing M surrounding bed-plate L and extending above the base of the runner A, chute O below the central opening in the bed-plate and adapted to receive the ore therefrom, screen P adapted to receive the ore from chute O and separate the thoroughly-pulverized portion thereof from the overtail, wiper-wheel R mounted on shaft B and adapted to impart a shaking motion to screen P, screw V adapted to convey the overtail to elevator T, and elevator T adapted to convey the overtail into casing M all constructed and operated substantially as described herein.

In witness that we claim the foregoing we have hereunto subscribed our names, this 10th day of October, 1898, at Los Angeles, California.

BYRON I. TURMAN.  
THOMAS J. HAMPTON.

Witnesses:

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