

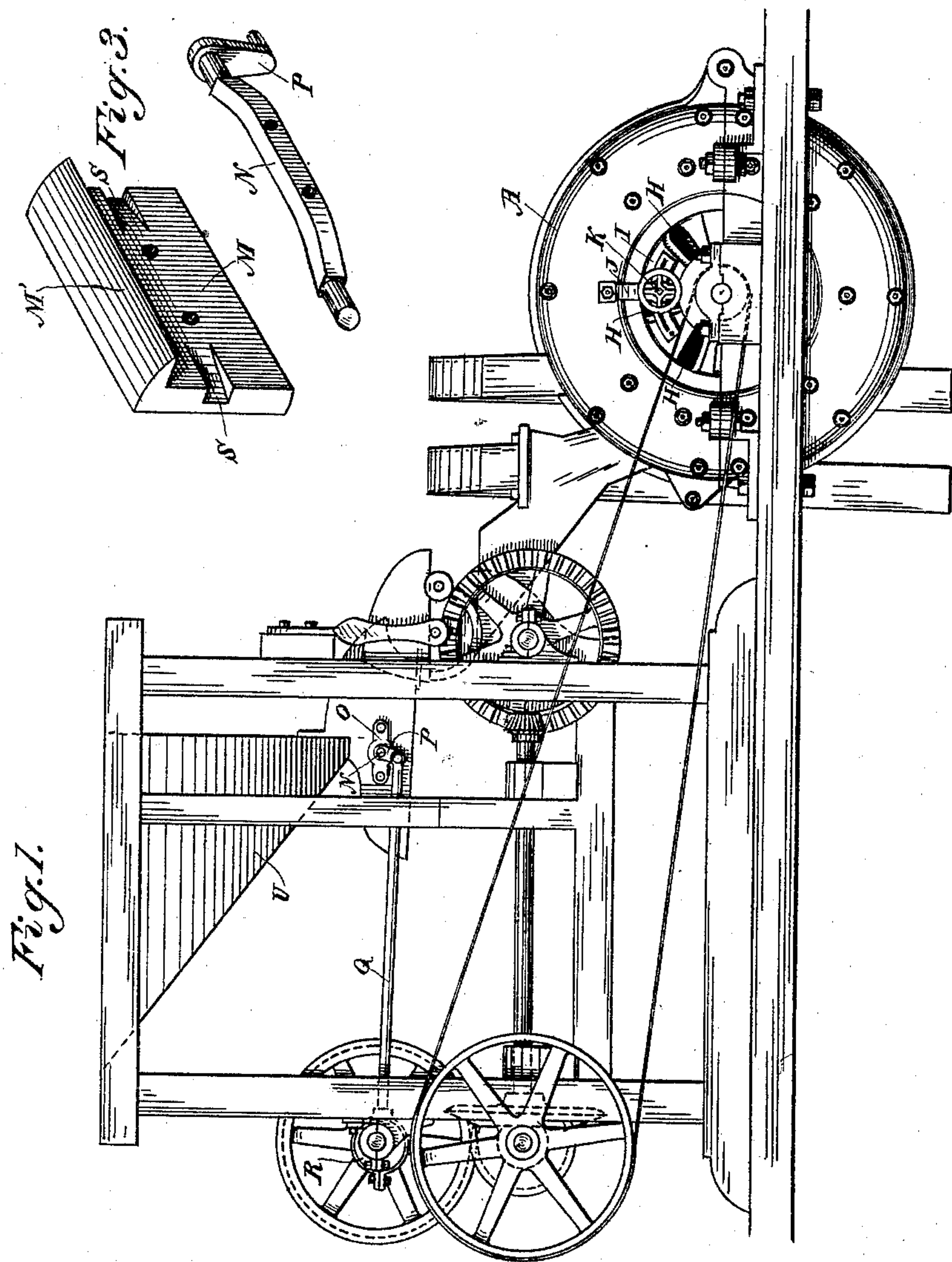
(No Model.)

2 Sheets—Sheet 1.

J. BEHM.  
CENTRIFUGAL PULVERIZER.

No. 422,698.

Patented Mar. 4, 1890.



Witnesses,  
Geo. H. Strong.  
J. H. H. H.

Inventor,  
Joseph Behm  
By Dewey & Co.  
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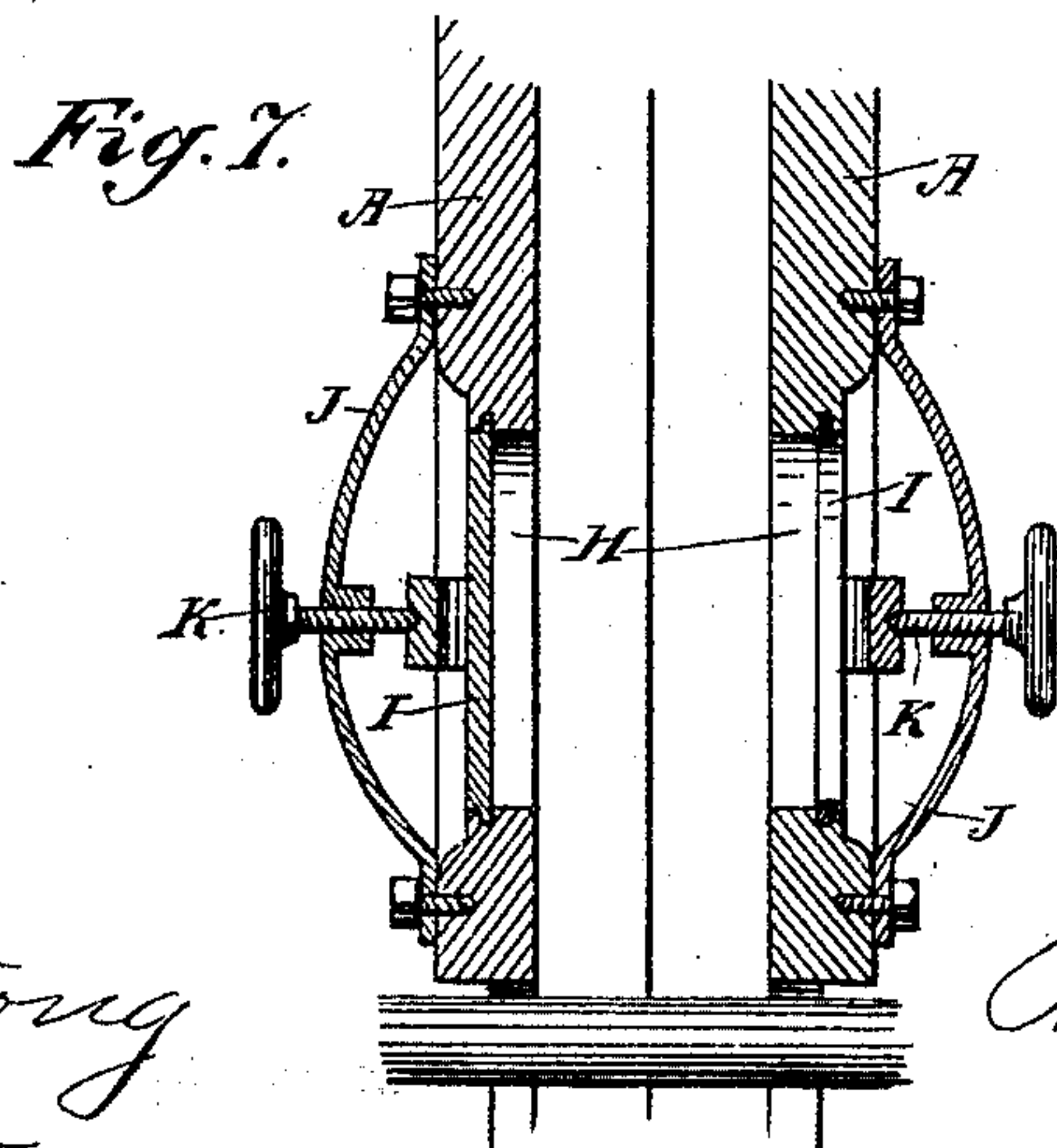
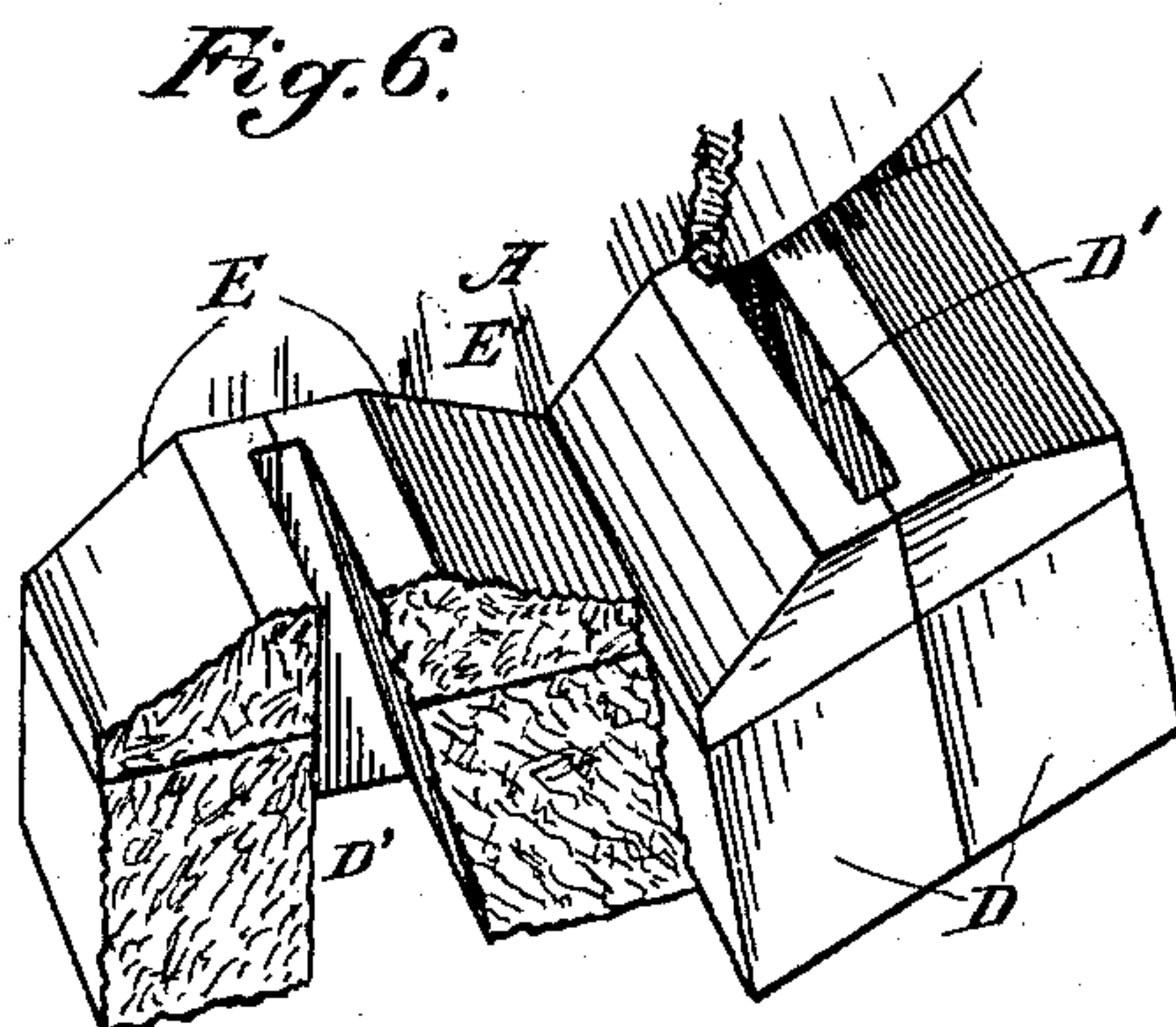
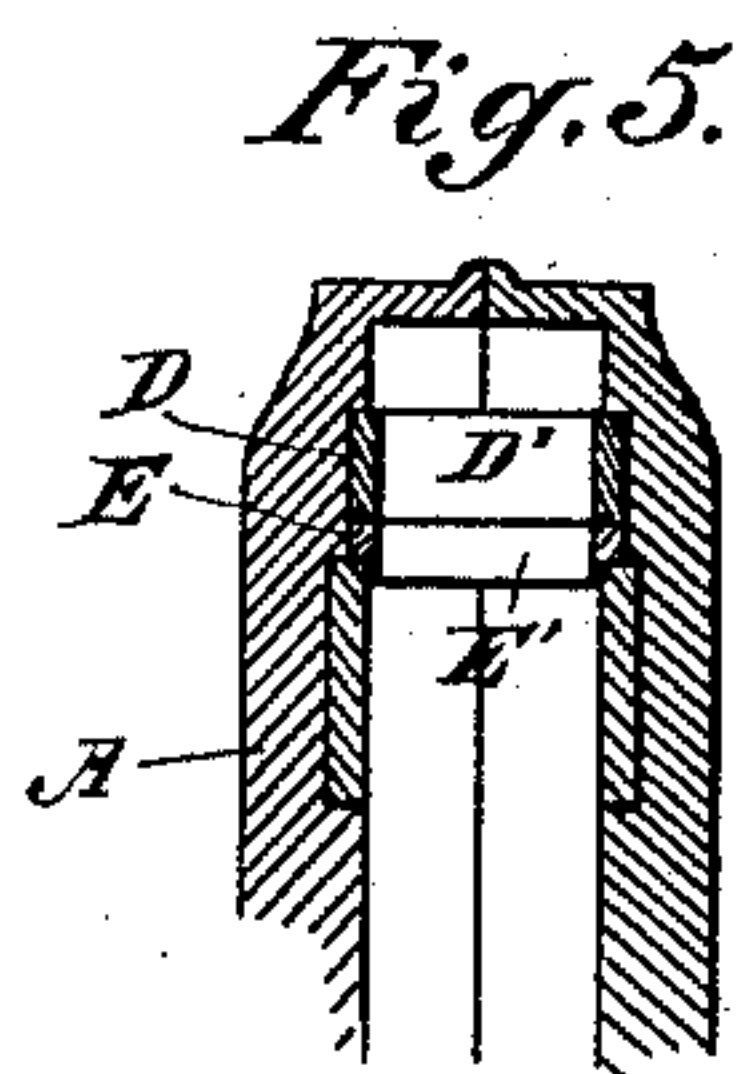
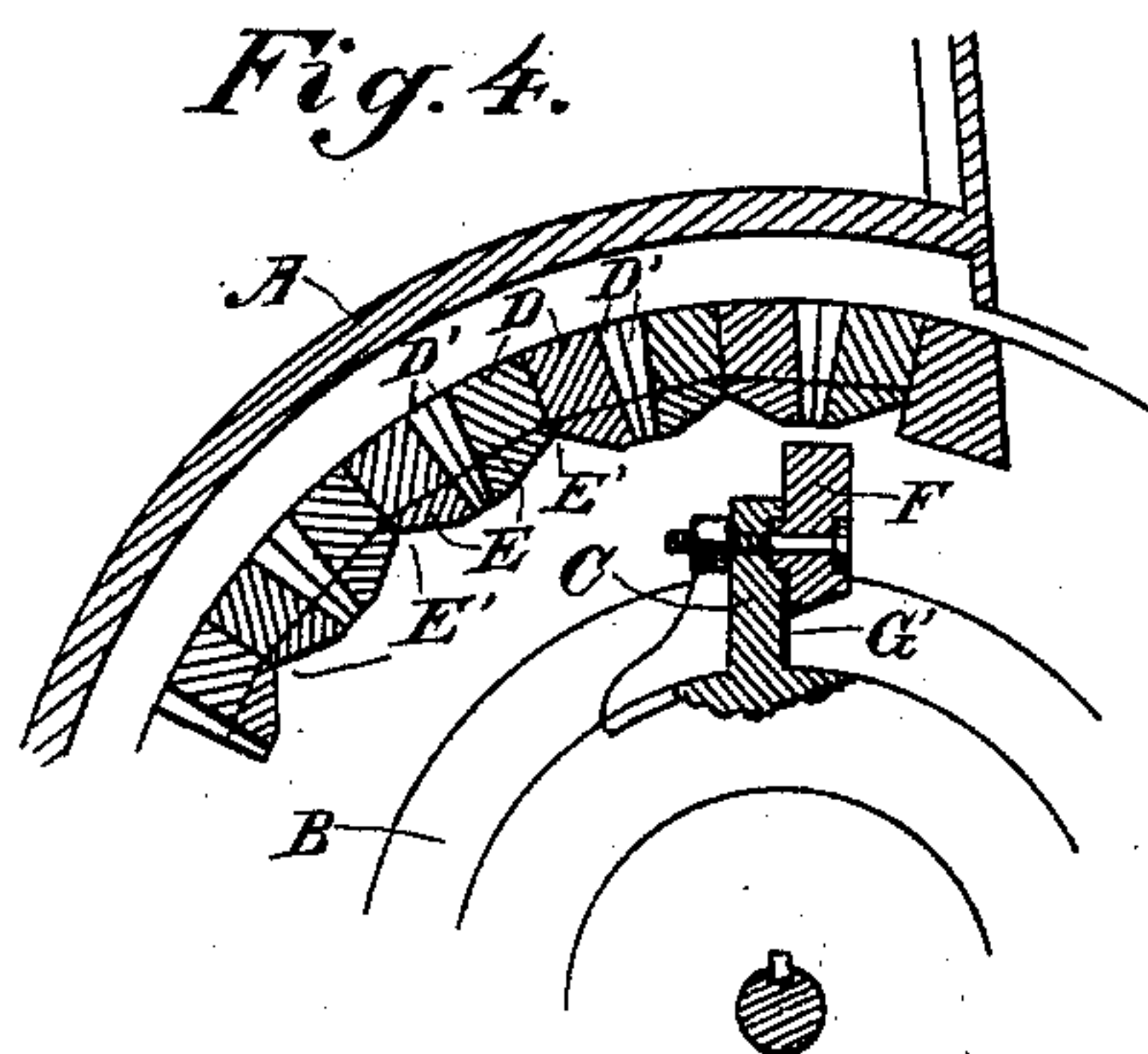
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# UNITED STATES PATENT OFFICE.

JOSEPH BEHM, OF SAN JOSÉ, CALIFORNIA.

## CENTRIFUGAL PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 422,698, dated March 4, 1890.

Application filed August 21, 1889. Serial No. 321,510. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH BEHM, of San José, Santa Clara county, State of California, have invented an Improvement in Centrifugal Pulverizers; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in apparatus for pulverizing ores and other materials; and it consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my machine. Fig. 2 is a section of part of the feed mechanism. Fig. 3 is a perspective view of the oscillating feed-plate and its shaft separated. Fig. 4 is a vertical section of part of the pulverizer transverse to the shaft, showing the slotted shoes and one of the rotary dies. Fig. 5 is a vertical section of the case and dies. Fig. 6 is a perspective view of the dies, partly broken away. Fig. 7 is a section of the case in the plane of the axis, showing the air-inlet and shutters.

My present invention is especially applicable to an apparatus for which Letters Patent were issued to me November 6, 1888, No. 392,488.

The first portion of my invention consists in the improvement in the dies D and E, which are fitted into the exterior case A and held in place between the two sides of the case by means of bolts and nuts, which draw the sides together, so as to clamp these dies in place. In my former patent these dies were made so that each alternate one projected a little above the adjacent one toward the center of the case, and these projecting dies were formed with nearly rectangular sides. No spaces were formed between the dies, so that the ore having once entered the case was carried around by the rotary arms C and shoes F to the point of discharge. In the present case I have shown the dies made with spaces between them, as at D', these spaces being in the form of narrow rectangular slots extending nearly from one side to the other of the dies; but the end of the dies extend toward each other beyond the ends of the slots, so as to meet and thus form a support for each other when they are clamped

within the case in the same manner that they would do if they were made solid from side to side. Those parts of the dies which project the farthest toward the center have their projecting sides beveled instead of standing at right angles, the bevel being shown at E'. The slots D' become wider toward the outer or discharge ends to prevent choking or clogging. By this construction I am enabled to crush the ore and discharge it whenever it arrives at a sufficient fineness to allow it to pass through the slots, whereas in my former construction the ore must all pass around to the final discharge, and for some forms of subsequent treatment it is better that the ore be not crushed so fine as it would be in that case. The present arrangement allows the ore to escape through these slots whenever it has reached a proper state of fineness without any further trituration. By inclining the projecting faces of the dies D the ore is swept along and is subjected to an impact of the particles against each other, and they are pulverized by mutual attrition and better than by contact with the vertical faces of the dies alone.

The second portion of my invention relates to the regulating of the wind-blast which is allowed to enter through the radial openings H in the sides of the case surrounding the center. I have found that the sliding blinds employed in my former patent could not be made to entirely shut off the entrance of air through these spaces. I have therefore constructed the device with the yoke J, which extends over the spaces occupied by the openings H, and the screw K passes through this yoke, so that the point presses upon the shutters I, and thus closes them tightly and holds them against the sides of the case. These shutters may be moved so as to partially or entirely close the inlet-openings H, and when the screw is applied, if the openings are entirely closed, no air will be allowed to pass through them, which is of considerable advantage under certain conditions of work to be done.

In my former patent I showed a chute opening into the casing and discharging the ore which was supplied to the chute by means of a dumping-box actuated by a cam and receiving its supply from a feed-hopper. In



the present case the table or chute T, which supplies the dumping-box, is fixed, the ore being delivered into this chute from the hopper U, as in the former construction. Beneath the lower rear edge of the opening from the hopper U is suspended a plate M, which extends across the full width of the interior of the table T and is supported by a journal-bar N. The ends of this bar extend through the journal-plates O, which are secured to the sides of the table, and upon one end of this shaft outside of the table is fixed a crank P. A connecting-rod Q extends from this crank to an eccentric R, which in this case acts to move the oscillating plate inside of the stationary chute. The journal bar or shaft N is bent so as to extend across the rear face of the plate M, to which it is secured, and at each end it lies in beveled slots S, formed in the plate, so that its journals are exactly in line with the center of the plate. The upper edge of the plate M has a flange projecting to one side, as shown at M', the upper side of the flange being curved upon a radius from its center of motion, and this side of the flange moves beneath the lower rear edge of the hopper, so as to form a joint therewith and prevent the ore from falling behind the plate and the edge of the hopper, and thus binding it so as to prevent its movement. It will be seen that by this construction the ore will be constantly discharged in small quantities from the hopper upon the table or chute T, and will be forced off by the action of the oscillating plate M, falling thence into the case of the pulverizer, as in my former patent.

In place of the wedge-shaped filling pieces or blocks G shown in my former patent, I now employ thin plates of steel G', which are clamped between the arms C and the shoes F and serve to protect the arms from the wearing action of the dust and ore particles without adding undue weight to the revolving parts, the said shoes being adapted to be turned around or reversed when worn.

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

1. A centrifugal crusher comprising the exterior casing, the rotary disk with radial arms or beaters, and the series of dies fixed around the periphery and between the sides of the outer casing, said dies having a space between the inner walls of two adjoining dies and having their alternate edges extending farther into the casing than the intermediate ones, and having the projecting edges inclined or beveled, substantially as described.

2. A centrifugal crusher and pulverizer consisting of an exterior casing with circularly-arranged dies, inlet and discharge openings, a central revolving hub with radial arms, reversible shoes fixed to said arms, and steel protecting-plates G', clamped between the shoes and the arms, so as to protect the arms from wear, substantially as described.

In witness whereof I have hereunto set my hand.

JOSEPH BEHM.

Witnesses:

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