(No Model.)

A. L. FISH.

MACHINE FOR PULVERIZING ORES, &c.

No. 287,653. Patented Oct. 30, 1883.

Fig. 1.

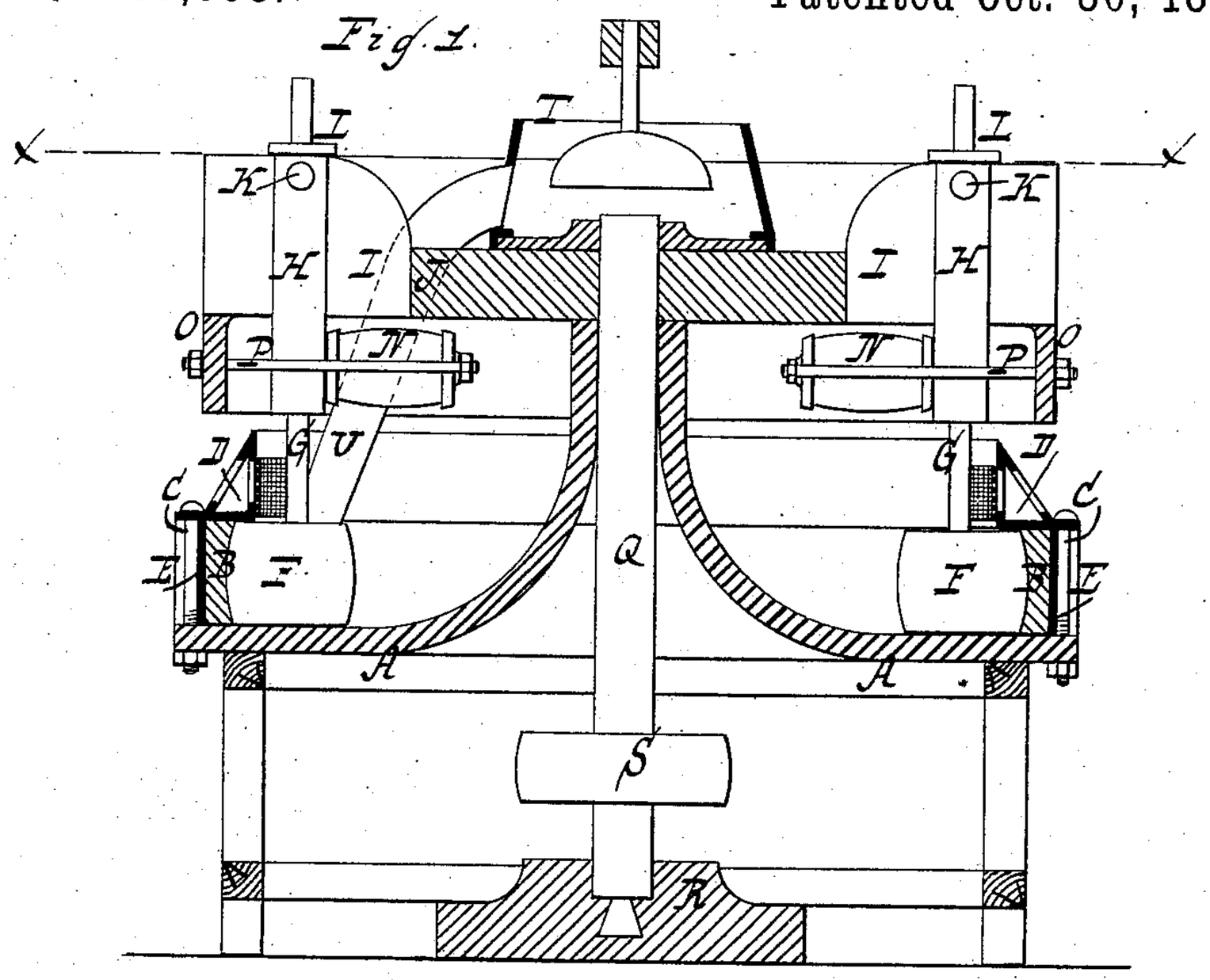


Fig. 2.

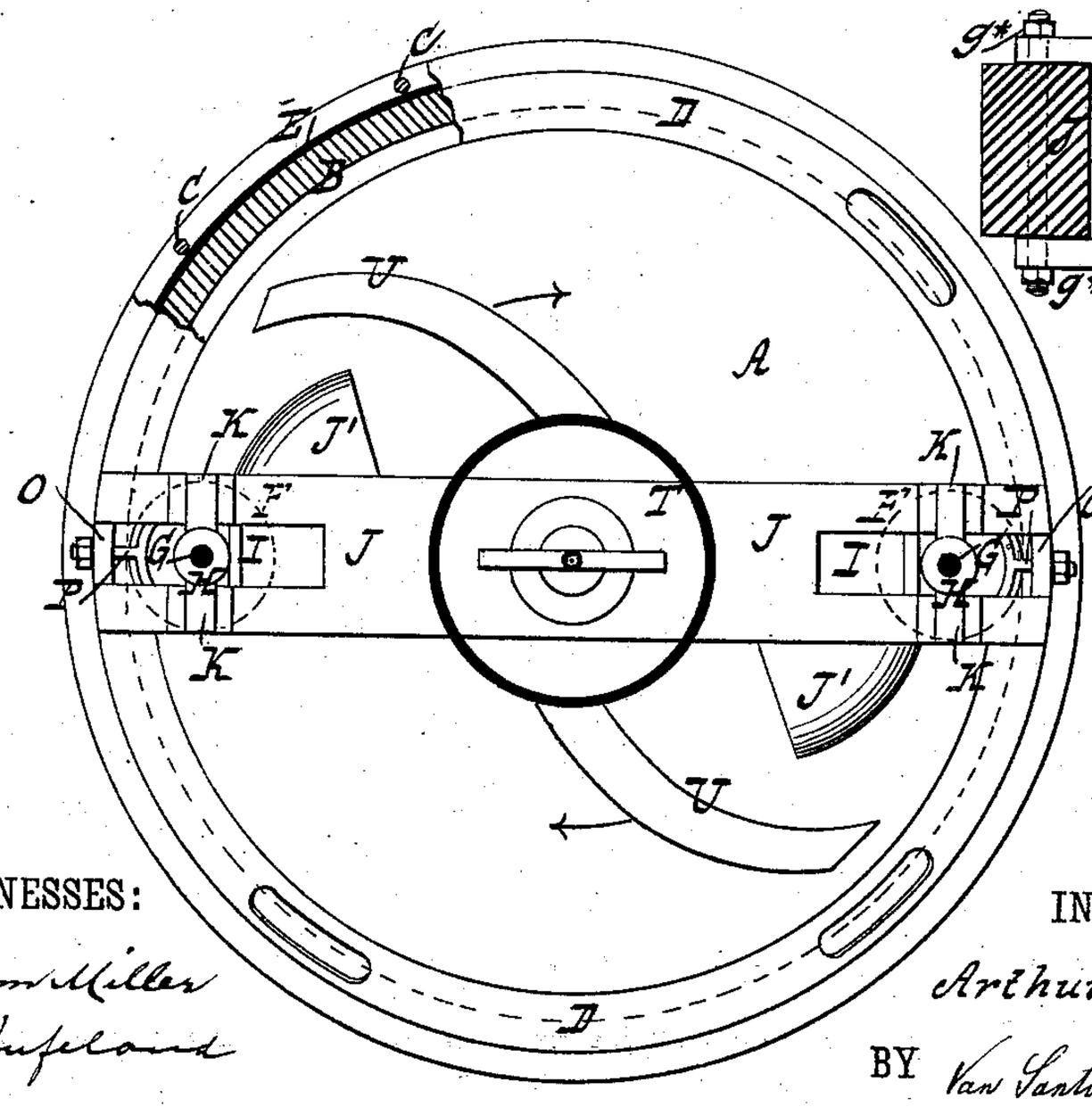
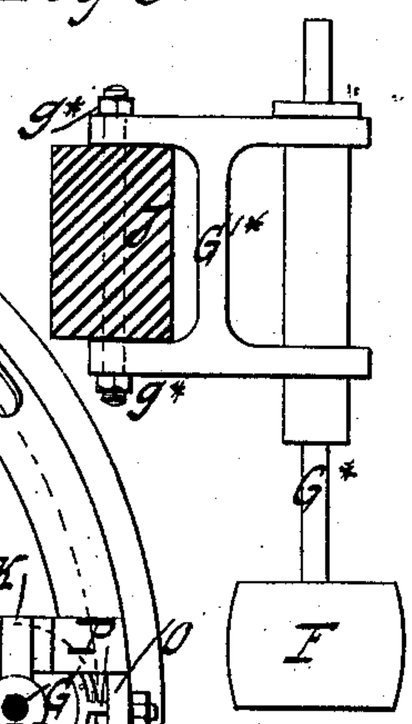


Fig. 3.



WITNESSES:

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ARTHUR L. FISH, OF SAN FRANCISCO, CALIFORNIA.

MACHINE FOR PULVERIZING ORES, &c.

SPECIFICATION forming part of Letters Patent No. 287,653, dated October 30, 1883.

Application filed April 28, 1883. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR L. FISH, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Machines for Pulverizing Ores, &c., of which the following is a specification.

This invention relates to that class of pulverizing-machines for which Letters Patent of the United States were granted to me June 13, 1882, No. 259,375; and it consists in the novel construction and combination of parts hereinafter described, whereby the effect of the crushing-rollers is increased; also, in the combination, in connection with other parts, hereinafter specified, of a feeder adapted to deposit the ore or other material in the path of the crushing-rollers, as hereinafter described, and then specifically defined by the claims.

This invention is illustrated in the accompanying drawings, in which Figure 1 represents a vertical central section. Fig. 2 is a sectional plan or top view, the line *x x*, Fig. 1, indicating the plane of section. Fig. 3 is a modification.

Similar letters indicate corresponding parts.

The letter A designates a bed-plate of circular form, resting on suitable legs, and supporting, near the outer edge, a circular die, B, which I term the "ring-die." This die is clamped to the bed-plate by means of bolts C, which are arranged exterior of the die, they passing through the bed-plate and through a ring, D, on the top of the die. Surrounding the die is a metallic band, E, which is held in place by the clamping-bolts C. The ring-die, together with the bed-plate, forms the pan.

The letters F denote crushing-rollers—in this example two in number—which are arranged in superficial contact with the ring-die B, these rollers and the die being, respectively, convex and concave.

G are the shafts of the crushing-rollers, arranged vertically in boxes H, which extend through slots I in a carrier, J, and are hung to this carrier by means of trunnions K, the plane of which is such that the boxes, together with the shafts and rollers, are adapted to swing in a radial direction. The roller-shafts G are supported vertically in said trunnion-boxes H by means of collars L thereon, and each of the boxes is exposed to the action of a spring or buffer, N, having a tendency to force the same outward, thereby keeping the crushing-rollers in contact with the die. Said buffers N are arranged to press against the boxes H, as shown, from the interior of the machine, and are connected to depending flanges O on the carrier J by rods P; but it is obvious that they may be made to bear against the exterior of the flanges, with the rods P encircling and bearing against the sides of the boxes next to the vertical shaft Q. The carrier J is fixed to a vertical central shaft, Q, which is stepped in a block, R, and provided with a pulley, S, or other means for imparting thereto a revolving motion, so that a similar motion may be given to the carrier and the crushing-rollers, which latter revolve on their own axes and around the axis of the carrier-shaft. It will be seen that in the operation of the crushing-rollers they have a tendency to fly outward by centrifugal force, and by this means, together with the action of the buffers N, the crushing effect of the rollers is materially increased.

On the upper surface of the carrier J, and in the center thereof, is fastened a feeder, T, from which project hollow arms or conveyers U, terminating in front of the crushing-rollers, respectively, these arms being curved in the proper manner. Said feeder T shares the motion of the carrier J, and when the ore or other material to be pulverized is placed therein it is deposited in the path of the rollers by the hollow curved arms U, especially if the material be in a dry state; and it is obvious that the operation of the machine is thereby materially improved.

On the carrier J are secured scrapers J′, which extend nearly to the bottom of the pan, and which serve to carry the material into the path of the crushing-rollers.

If the material is wet, it can be fed into the machine without the feeder, and it is carried into the path of the crushing-rollers by the water.

If desired, the springs or buffers N may be omitted.

Instead of mounting the crushing-rollers in boxes H, supported by trunnions K, as shown in Figs. 1 and 2, said rollers may be mounted

on shafts G*, which have their bearings in frames G'*, which swing on bolts *g**, extending through the carrier J.

If desired, spring-buffers may be applied to the frame G'*.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as herein-before set forth, of the bed-plate, the ring-die, the crushing-rollers bearing against the inner face of the ring-die, the trunnion-boxes and vertical roller-shafts, adapted to swing in a radial direction, the buffers, the slotted carrier for supporting the roller-shafts, and the vertical central shaft for revolving the carrier, for the purpose set forth.

2. The combination, substantially as herein set forth, of the bed-plate, the ring-die, the crushing-rollers bearing against the inner face of the ring-die, the trunnion-boxes and vertical roller-shafts, adapted to swing in a radial direction, the buffers, the slotted carrier for supporting the roller-shafts, the feeder and hollow curved arms terminating in front of the rollers, and the central shaft for revolving both the feeder and the carrier supporting the roller-shafts.

3. The combination, substantially as herein-before described, of the pan, the crushing-rollers, the vertical roller-shafts, the movable bearings which allow the crushing-rollers to follow the centrifugal force, the buffers, and the vertical central shaft.

4. The combination, substantially as here-inbefore set forth, of the pan, the crushing-rollers, their vertical shafts, the buffers, the movable bearings which allow the crushing-rollers to follow the centrifugal force, the scrapers, and the carrier supporting both the vertical shafts and scrapers.

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

ARTHUR L. FISH. [L. S.]

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.