(No Model.)

2 Sheets—Sheet 1.

G. E. WOODBURY.

ORE FEEDER.

No. 353,727. Patented Dec. 7, 1886.

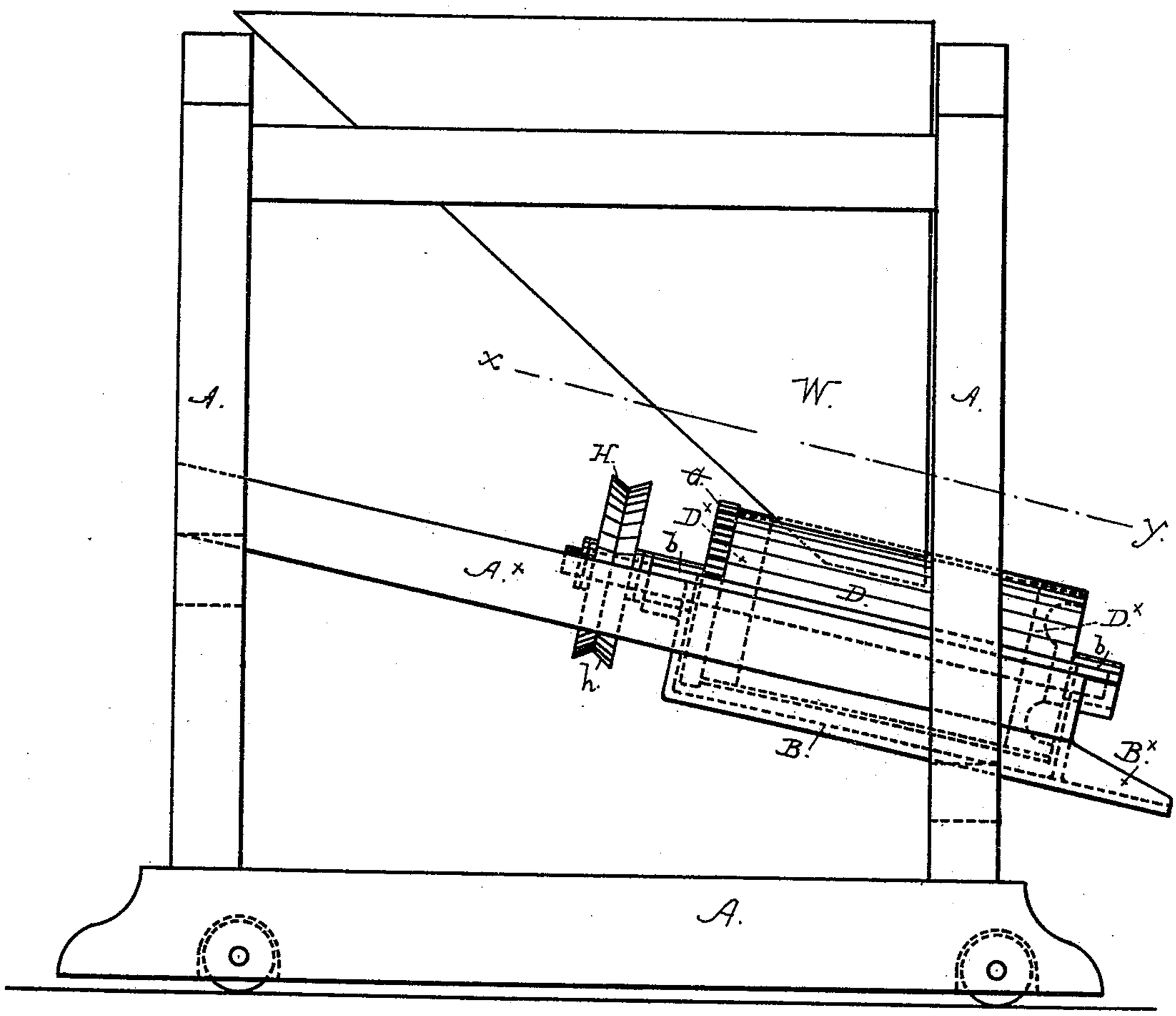
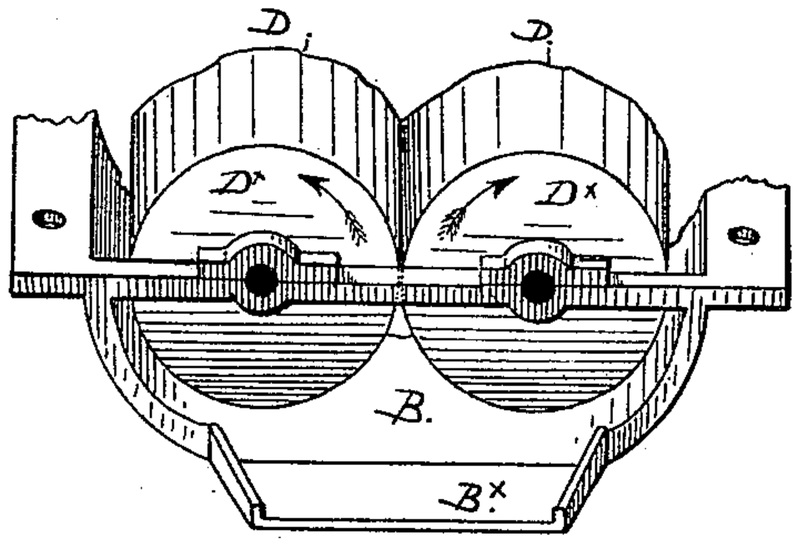


Fig. 1.

Fig. 2.



Witnesses:

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Inventor:

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(No Model.) 2 Sheets—Sheet 2.

G. E. WOODBURY.

ORE FEEDER.

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Fig. 3.

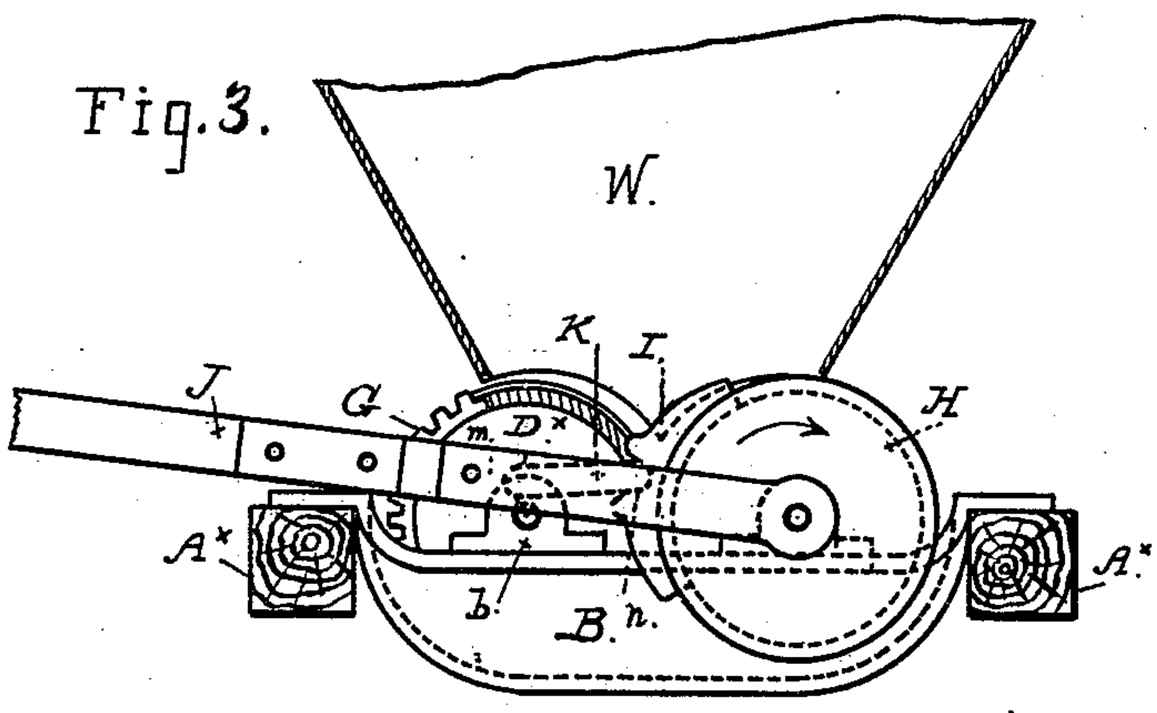
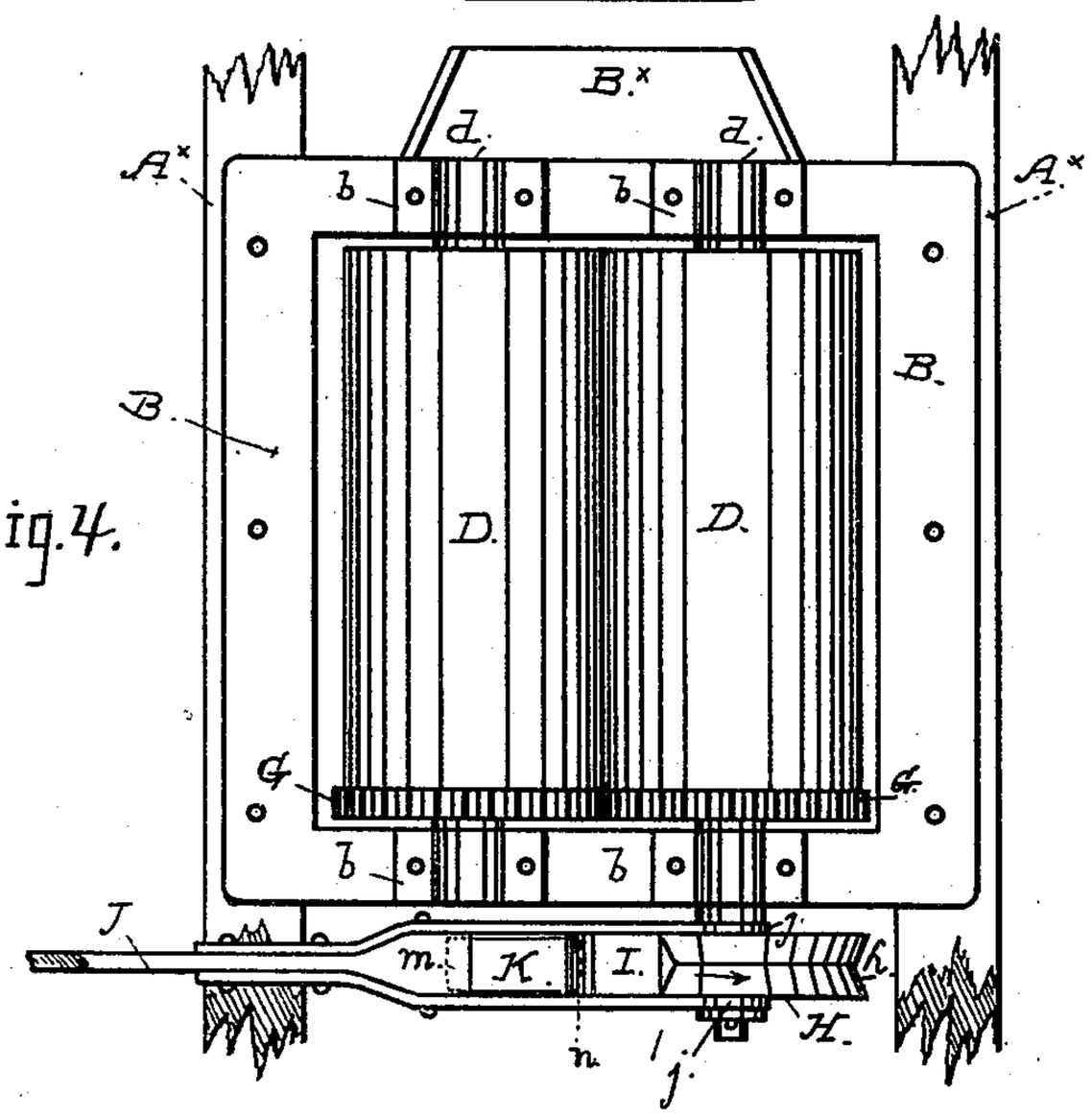


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE E. WOODBURY, OF SAN FRANCISCO, CALIFORNIA.

ORE-FEEDER.

SPECIFICATION forming part of Letters Patent No. 353,727, dated December 7, 1886.

Application filed December 5, 1885. Serial No. 184,799. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. WOODBURY, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Ore-Feeders; and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had to the accompanying drawings.

My invention in ore-feeders relates, first, to the construction of an improved feeding-chute or inclined feeding-surface from a pair of rollers or cylinders, and, second, to the production of an improved ore-feeder by combining such a roller-chute or feeding-surface and a hopper, and mechanism to operate the rollers, as hereinafter described, and pointed out in the claims.

Referring to the drawings that form part of this specification, Figure 1 is a side elevation of an ore-feeder constructed in accordance with my invention. Fig. 2 is a view of the discharge end of the device, showing a portion of the bed-plate and feeding-rollers. Fig. 3 is a partly sectional view of the rear ends of the rollers and hopper, and showing more particularly the means for producing intermittent rotation of the rollers with uniform movement from the vibrations of a lever, which is adapted to be connected with the adjacent mill or pulverizer in the usual way. This view is taken in a plane perpendicular to the axes of the rollers. Fig. 4 is a top view taken in a plane parallel with the axes of the rollers, as at *x y*, Fig. 1, and showing the rollers and their supporting-frame in plan.

A A are timbers forming a stout framework to carry the hopper W, and furnishing supports $A^{\times}$ for the frame or bed-plate B with an open center. On the front and rear ends of this frame are boxes *b b* for the shafts of a pair of rollers, D D. These rollers are of equal length and diameter and of such length that they shall extend beyond the hopper-mouth, under which they are placed, and thus constitute a chute or conducting-surface from the hopper-mouth forward. For this purpose they are set with more or less inclination from the horizontal and in contact for their full length, so that no opening is left between them.

The shafts *d d* are set in the same plane, and the distance between their centers is equal to the diameter of one roller, or such as is sufficient to bring the rollers in contact without material pressure against each other when in rotation. The adjacent faces of the rollers above this line of contact constitute a chute or inclined way with raised sides, like a trough, and motion is given to the rollers in opposite direction outward, so that the sides of this chute are continually traveling upward and outward. This action, in connection with the downward inclination, is calulated to carry the ore or material regularly forward from beneath the hopper, and prevent it from choking and sticking in the mouth of the hopper, while the peculiar form of the feeding-surface keeps the material under control in such manner as to secure uniform feed, and makes the feed at all times proportionate to the length of the intermittent rotating movement given to the rollers. In this construction the rollers are formed of cast-metal heads $D^{\times}$ $D^{\times}$ and sheet-metal bodies. The heads are fixed to the shafts *d*, that pass through them and project at the ends to form journals.

On the rear heads are spur-gears G G, of equal size, to run together, and one shaft is prolonged beyond the bearing at one end to receive the wheel H, which is part of a friction-gripping mechanism by which intermittent and variable rotation of the rollers is produced from the vibrations of a lever. This mechanism, while giving the same step-by-step movement as the pawl and ratchet, is employed in place of it as being much more delicate in its action and as giving greater range of variation in the length of the feeding movement of the rollers; but the ordinary pawl and ratchet-wheel can be used instead of this friction device, if desired.

The wheel H has a grooved rim, *h*, with a shoe, I, of corresponding shape and degree of curvature to fit it, and a lever, J, forked to embrace the wheel and shoe, has eyes *j* in the ends of the forks to fit loosely upon the spindle or turned-off portion of the shaft on which the wheel is fixed. The toggle K is a straight bar with rounded ends set into the space between the forks of lever J, with one end resting in a recess in a fixed block, *m*, in said lever and the other end in a socket, *n*, on the back of

the shoe. The position of this toggle-bar is such that the upward movement of the lever tends to bring it into line radially from the center of movement; but as the bar is longer than the distance between the two points *m* and *n* the result is to press the shoe tightly against the wheel, while on the downward movement of the lever the point *m* drops and the shoe no longer bites upon the rim.

Connection of the outer end of the lever J is made with some suitably-moving part of the mill or machine into which the material is being fed, and in such manner, for the purpose of producing automatically the desired variation in the quantity being fed, as will secure such variation from the difference in the movement or action of the grinding mechanism as is caused to take place by the accumulation of the material, or by its discharge from under the grinding-surfaces when reduced. Such automatic regulation of the feed, to make the supply of material proportionate to the rapidity of the grinding, is in general use in ore-feeders of all kinds, both for the ordinary stamp-mill and for rotary grinding-mills.

The frame or bed-plate B has flanges along the sides, with bolt-holes to fix it to the supporting-timbers, and the required pitch or inclination is secured for the rollers by setting the timbers at the required angle. The front of the frame has a projecting spout, $B^{\times}$, to catch the material as it is discharged from the ends of the rollers and direct it into the receptacle or conductor placed to receive it from the feeder. The bottom of this spout is flat and the sides are raised and are set in toward each other, as seen in Fig. 2.

The front of the hopper is shaped to fit over and between the rollers, and the sides are brought down close to their top faces, but the lower edge of the front is cut away to give suitable clearance for the material.

The feeding chute or surface thus produced operates upon the material to move it regularly forward and discharge it from the hopper-mouth in greater or less quantities, according to the degree and the frequency of the rotating movement given to the rollers.

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

1. In an ore-feeder, the combination, with the hopper W, of the feeding-surface consisting of the smooth-faced inclined rollers D D, having their axes in the same plane and their faces in rolling contact, and mechanism connected with said rollers, whereby rotation in opposite directions outward is imparted to them, substantially as described.

2. The combination, in a suitable frame, of the ore-hopper W, inclined rollers D D, supporting-frame B, and the roller-actuating mechanism, consisting of the spur-gears G G, friction-wheel H, lever J, shoe I, and toggle-bar K, substantially as herein described.

3. In an ore-feeder, the combination of a hopper, W, the inclined rollers D D, geared together and having on the shaft of one of them a wheel, H, the vibrating lever J, and mechanism connecting it with such wheel, whereby the rollers receive intermittent rotation proportionate to the length of vibration of the lever, substantially as herein described.

GEORGE E. WOODBURY.

Witnesses:
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