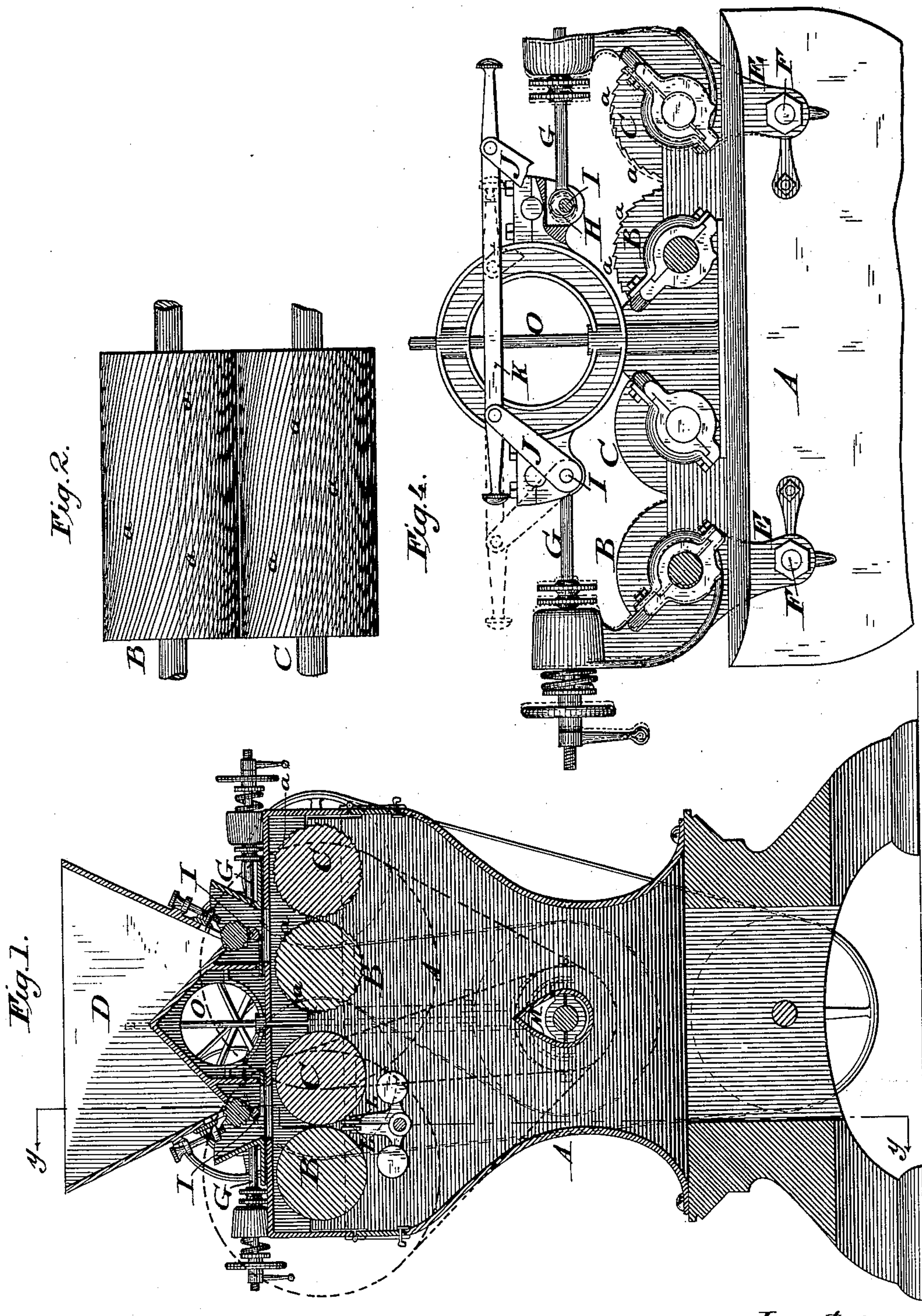


(No Model.)

2 Sheets—Sheet 1.

W. D. GRAY.
Roller Mill for Grinding Grain.
No. 238,677.
Patented March 8, 1881.



Attest.
Sidney P. Hollingsworth
William W. Dodge.

Inventor.
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By Dodge & Co.
Attys.

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Fig. 5.

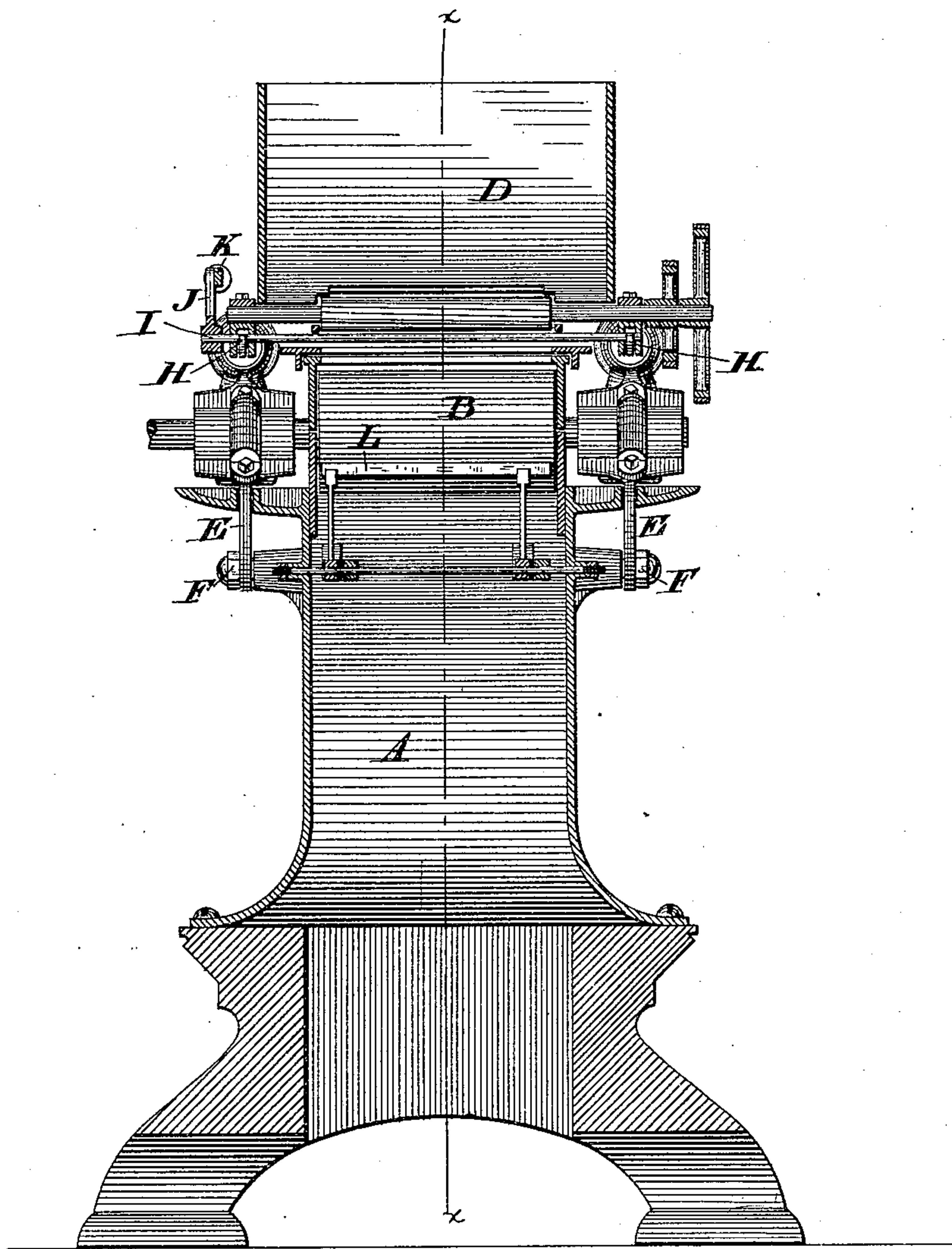
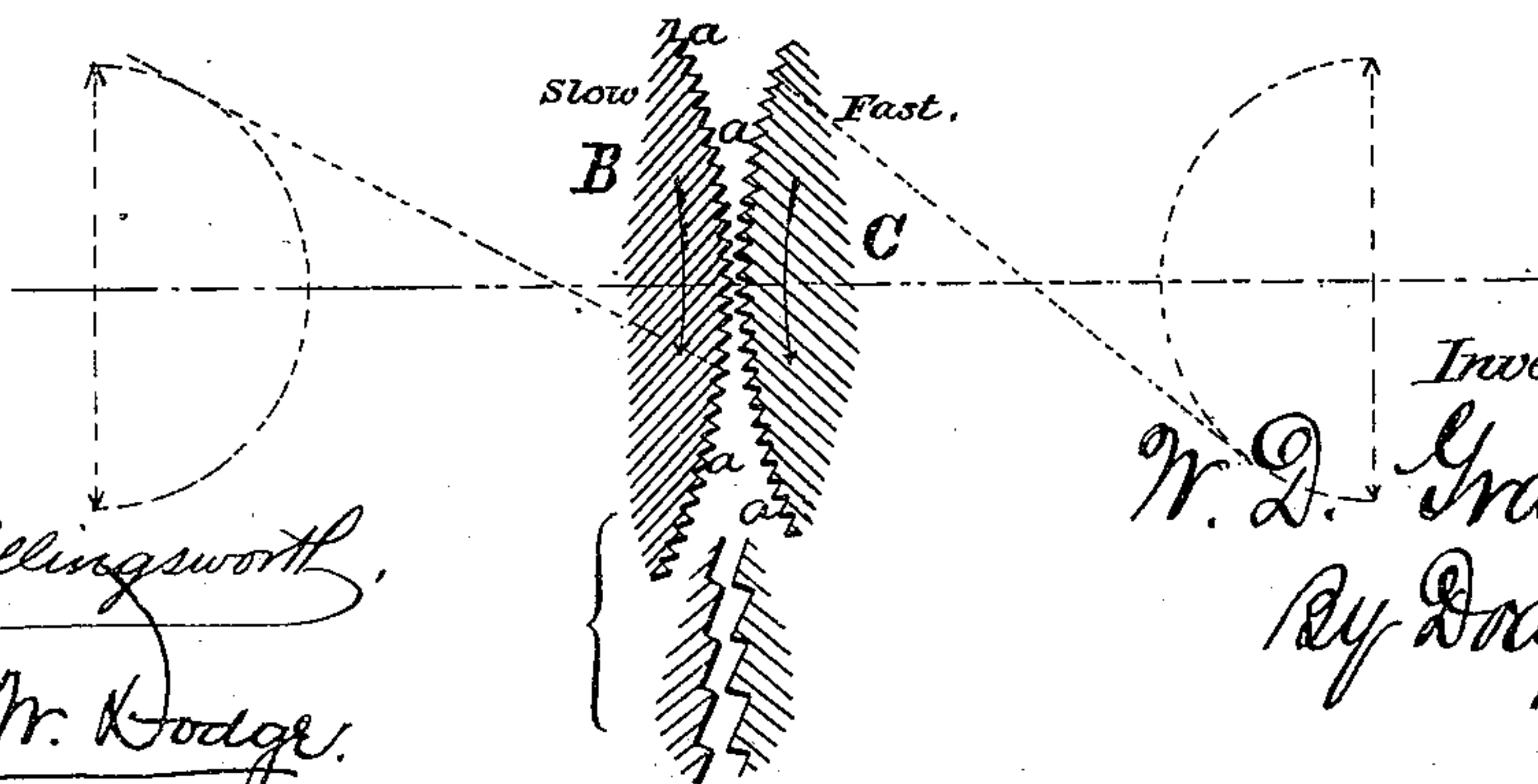


Fig. 3.



Attest.

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UNITED STATES PATENT OFFICE.

WILLIAM D. GRAY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO EDWARD
P. ALLIS, OF SAME PLACE.

ROLLER-MILL FOR GRINDING GRAIN.

SPECIFICATION forming part of Letters Patent No. 238,677, dated March 8, 1881.

Application filed December 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. GRAY, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain Improvements in Roller Grinding-Mills, of which the following is a specification.

My invention consists in the combination of two rolls arranged to turn at different speeds toward each other, and provided with spiral ribs or teeth of peculiar form of construction, all running in one and the same direction around the rolls.

The invention also consists in various details of minor importance hereinafter described.

Figure 1 represents a vertical central section through my mill at right angles to the axis of the rolls; Fig. 2, a top-plan view of one pair of the rolls; Fig. 3, a cross-section, on an enlarged scale, illustrating the form of the teeth; Fig. 4, side elevation of the upper part of the machine; Fig. 5, a vertical cross-section of the machine on the line *y y*, Fig. 1.

A represents the main frame, made in a hollow box-like form. B C represent the grinding-rolls, of which two pairs are shown; and D represents the feed-hopper by which the material to be treated is delivered to the rolls. Both rolls of each pair are provided with spiral ribs or teeth *a*, of uniform size, and all curved in one and the same direction. Each tooth or rib is made of a height equal to about one-half its width, which latter will vary from one-sixth to one-fortieth of an inch, according to the character of the material to be treated. One side or face of each tooth or rib is inclined, while the other side is nearly upright, the upright side standing in a plane tangential to a central circle of from one to three inches diameter, as indicated in Fig. 3. One roll, B, of each pair has the upright faces of its teeth on the rear side, while the companion roll, C, has the upright faces of its teeth or ribs on the front side, as shown in Fig. 3.

In operation the rolls B and C are turned toward each other, but the latter driven at a higher speed than the other. When thus driven the upright faces of the teeth or ribs of roll B serve to detain and hold the material while it is acted upon by the passing teeth or ribs of

roll C. The relative speeds may vary from one against one and a half to one against twenty.

The spiral ribs may be made at a greater or less angle to the axis of the roll; but in order that the grain may not be caused to travel lengthwise of the ribs without being cut or ground it is advisable not to have the inclination considerably exceed twenty degrees to the longitudinal axis.

My rolls may be made of chilled iron, steel, porcelain, or other suitable material, and may be mounted and actuated in any suitable manner.

The drawings represent mechanism substantially such as shown in the applications hitherto filed by me, and no claim is made thereon except as to the features hereinafter specified.

The rolls B are each mounted in fixed bearings on the frame, and the rolls C each sustained in the upper ends of arms E, which swing upon pivots F at their lower ends. Each arm is drawn inward to force the roll against its companion by means of a rod G, provided with a spring and adjusting-nuts, in the same manner as in the patent granted to me December 23, 1879. The rods G have their inner ends mounted on eccentrics H, which are carried by transverse shafts I, mounted on the frame; and the ends of the two shafts are provided with crank-arms J, and connected by a rod, K, pivoted to said arms, as shown in Figs. 4 and 5. By moving the rod K, which may be done from either side of the machine, all the eccentrics are operated simultaneously and the movable rolls thrown instantly into or out of an operative position, and this without destroying the adjustment of the parts which control the exact position of the rolls when they are in action. As a means of keeping the rolls clean I make use of scrapers L, mounted on elbow-levers, the ends of which latter are weighted, as shown in Fig. 1. The two scrapers for each pair of rolls are mounted on one and the same supporting rod or shaft, as shown.

The arrangement for transmitting motion to the rolls is essentially the same as that shown in the application filed by me on the 26th day of April, 1879, a counter-shaft, M, carrying pulleys of different sizes, from which belts are

extended to pulleys on the respective rolls, as indicated by the dotted lines in Fig. 1. The counter-shaft is mounted, as in my former machine, in vertically-adjustable bearings, and is depressed in order to tighten the driving-belt. As a means of depressing the bearings two screw-rods, O, are extended down through the sides of the frame, which is tapped to receive them, and seated upon the bearings as shown. These rods extending to the top of the machine form a very simple and convenient means of adjusting the parts.

I am aware that grinding-rolls have been provided with ribs and teeth of many forms, and that two rolls have been provided with teeth extending spirally in the same direction, said teeth differing, however, in their sectional form from those used on my roll; and I am aware also that rolls of different styles have been driven at differential speeds, and therefore I lay no claim to spiral teeth or to differential speeds separately considered; nor do I claim in this application the combination of two rolls turning toward one another at differential speeds, and provided with spiral ribs running in the same direction, except when the ribs are of the peculiar form or construction hereinbefore set forth.

By this peculiar system I am enabled to secure highly-improved results as compared with other systems, the relation subsisting between the particular form of the ribs, their position with reference to each other, and their relative

speeds, being such that the grain is acted upon with great advantage.

Having thus described my invention, what I claim, is—

1. The combination, in a grinding-mill, of two parallel rolls geared to run toward each other at different speeds, said rolls being both provided with continuous spiral ribs running in one and the same direction, the ribs of the fast roll having substantially upright faces on the front sides, and the ribs of the slow roll having substantially upright faces on the rear sides.

2. In combination with the swinging roll-supports E and the rods G connected thereto, the eccentrics H, shafts I, and rod K.

3. In combination with the movable roll-supports E and the rods G adjustably connected thereto, a transverse shaft, I, provided with two eccentrics connected to the rods G at opposite ends of one roll, whereby the roll may be thrown into and out of action instantly without changing the adjusting devices.

4. The combination of two rolls, a single intermediate rod below the rolls, and two independent rocking scrapers arranged to bear against the respective rolls, and both constructed and arranged to pivot upon the single rod, as shown.

WILLIAM D. GRAY.

Witnesses:

EDW. P. ALLIS, Jr.,

T. F. WAMBOLD.