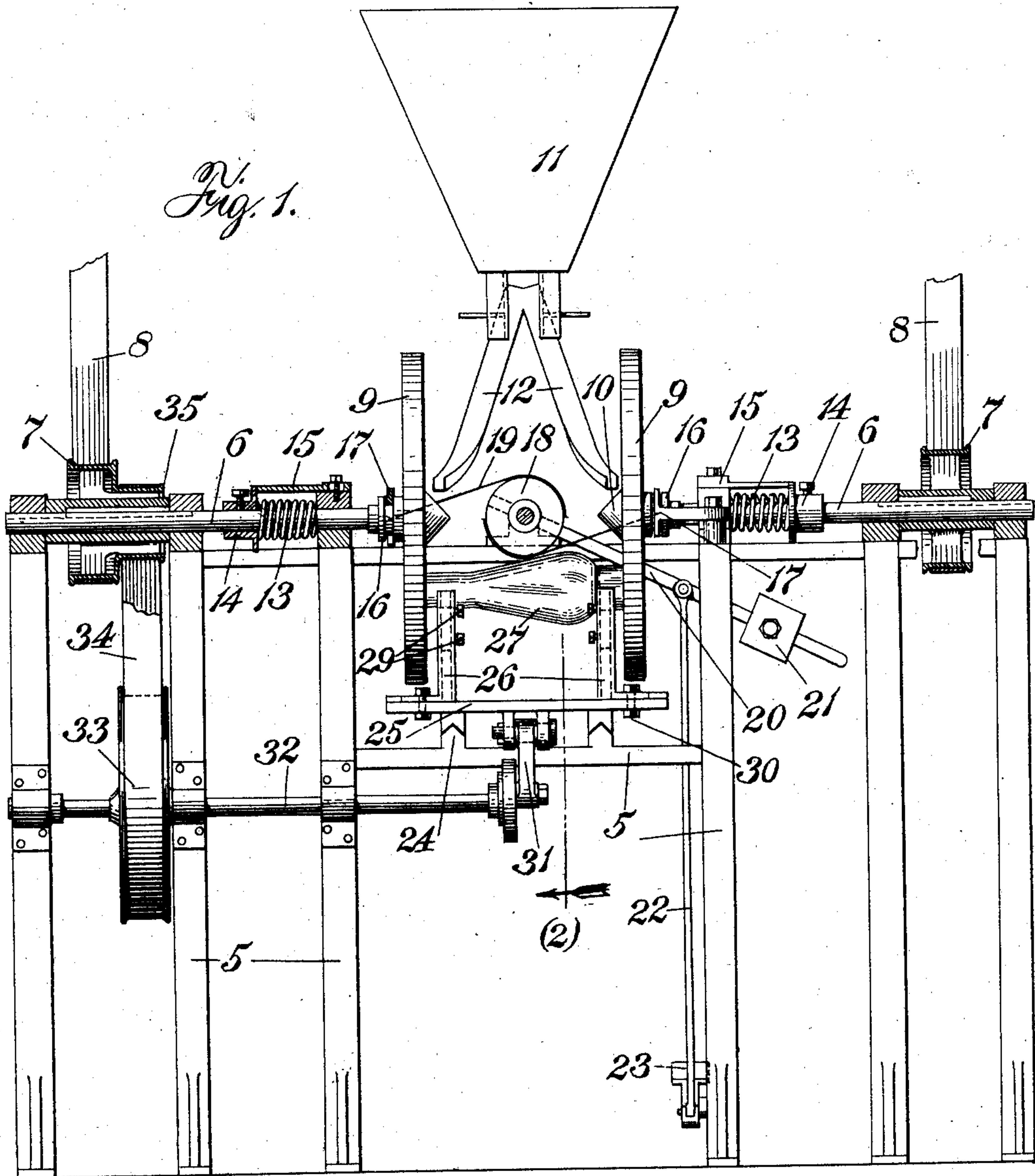


No. 883,163.

PATENTED MAR. 31, 1908.

C. E. BALL.
GRINDING MACHINE.
APPLICATION FILED NOV. 20, 1905.

3 SHEETS—SHEET 1.



WITNESSES

A. E. Gaither
N. L. Lechner

INVENTOR

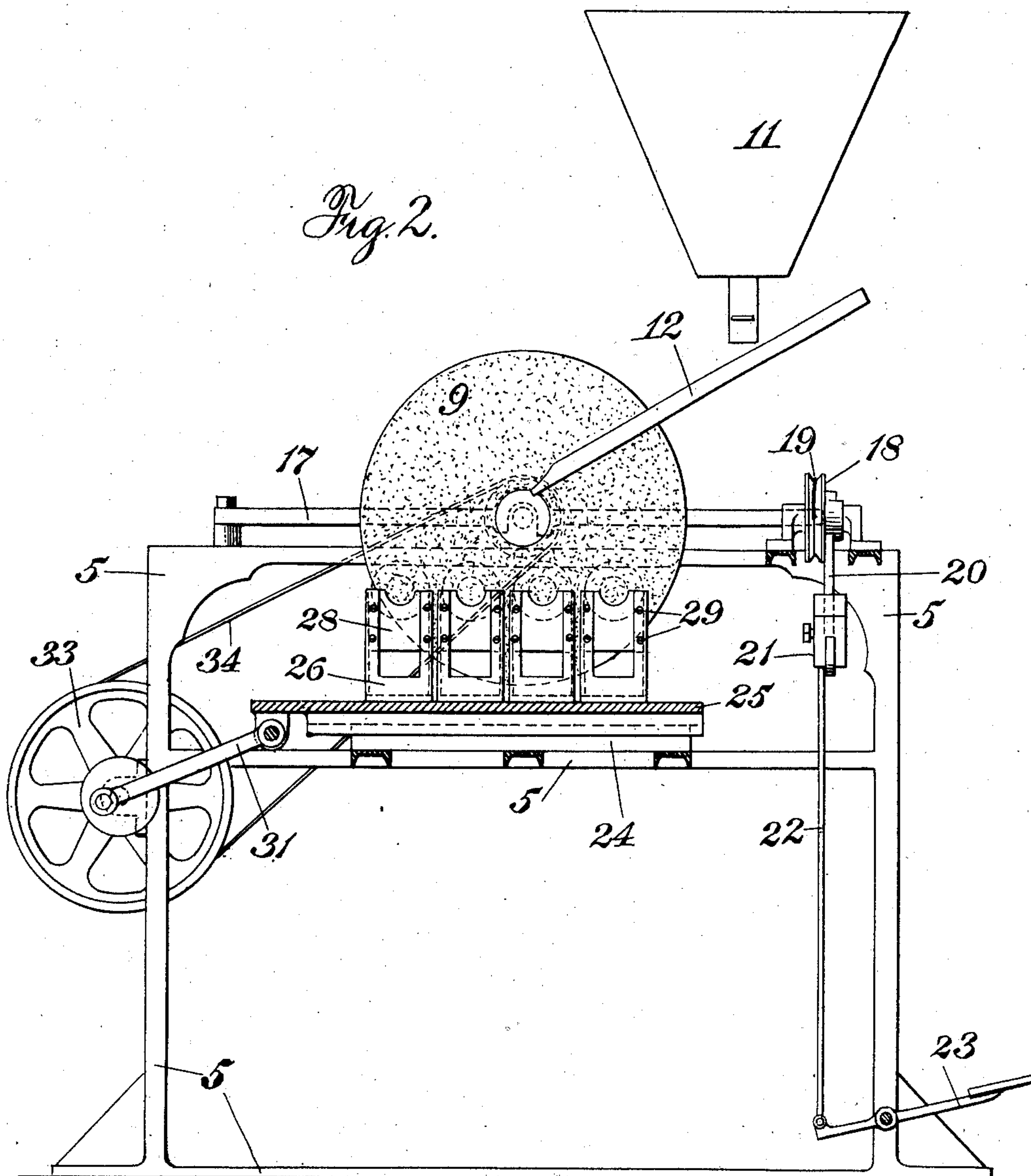
Charles E. Ball
by atty *Paul Gynestvedt*

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3 SHEETS—SHEET 2.



WITNESSES

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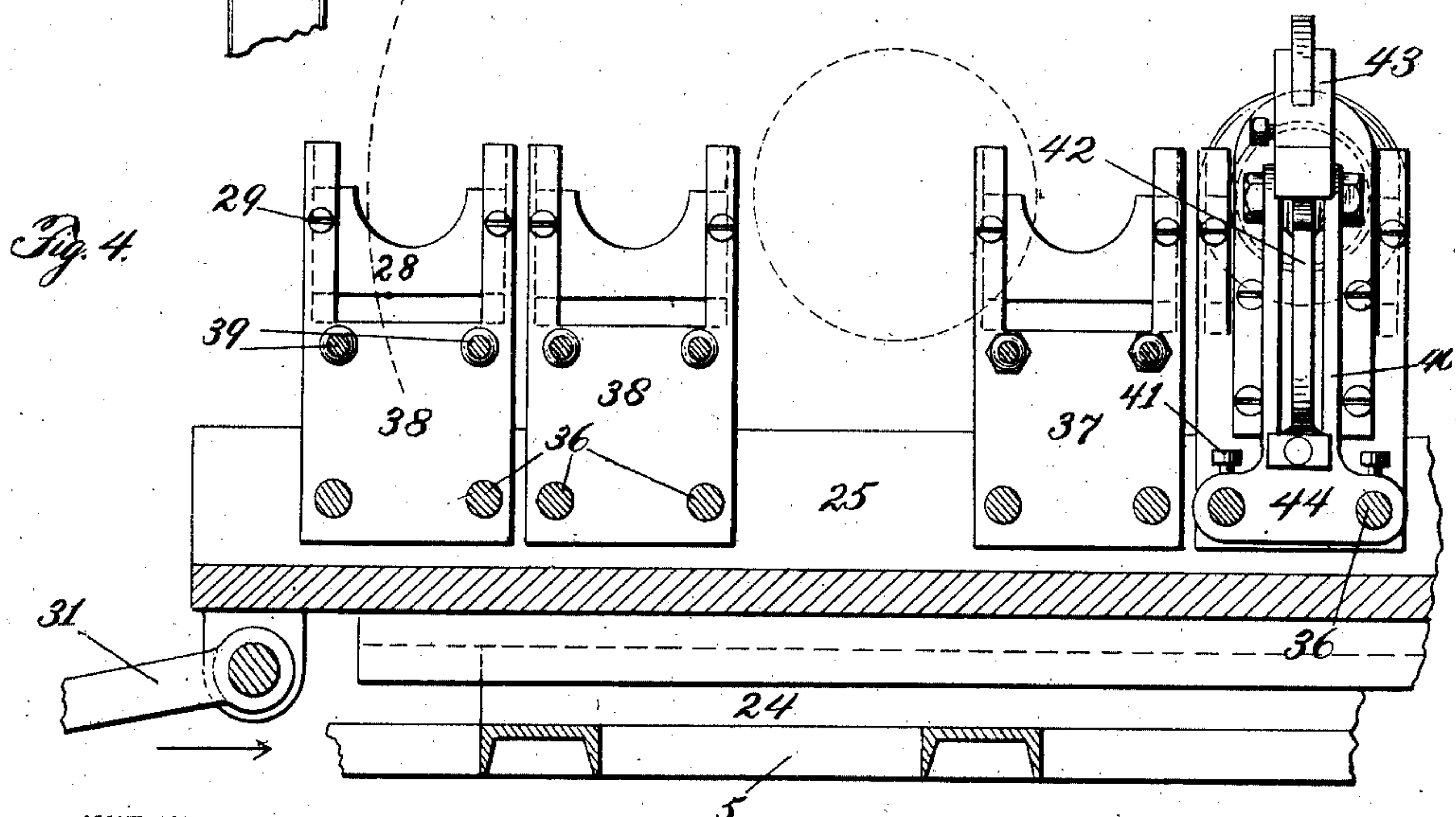
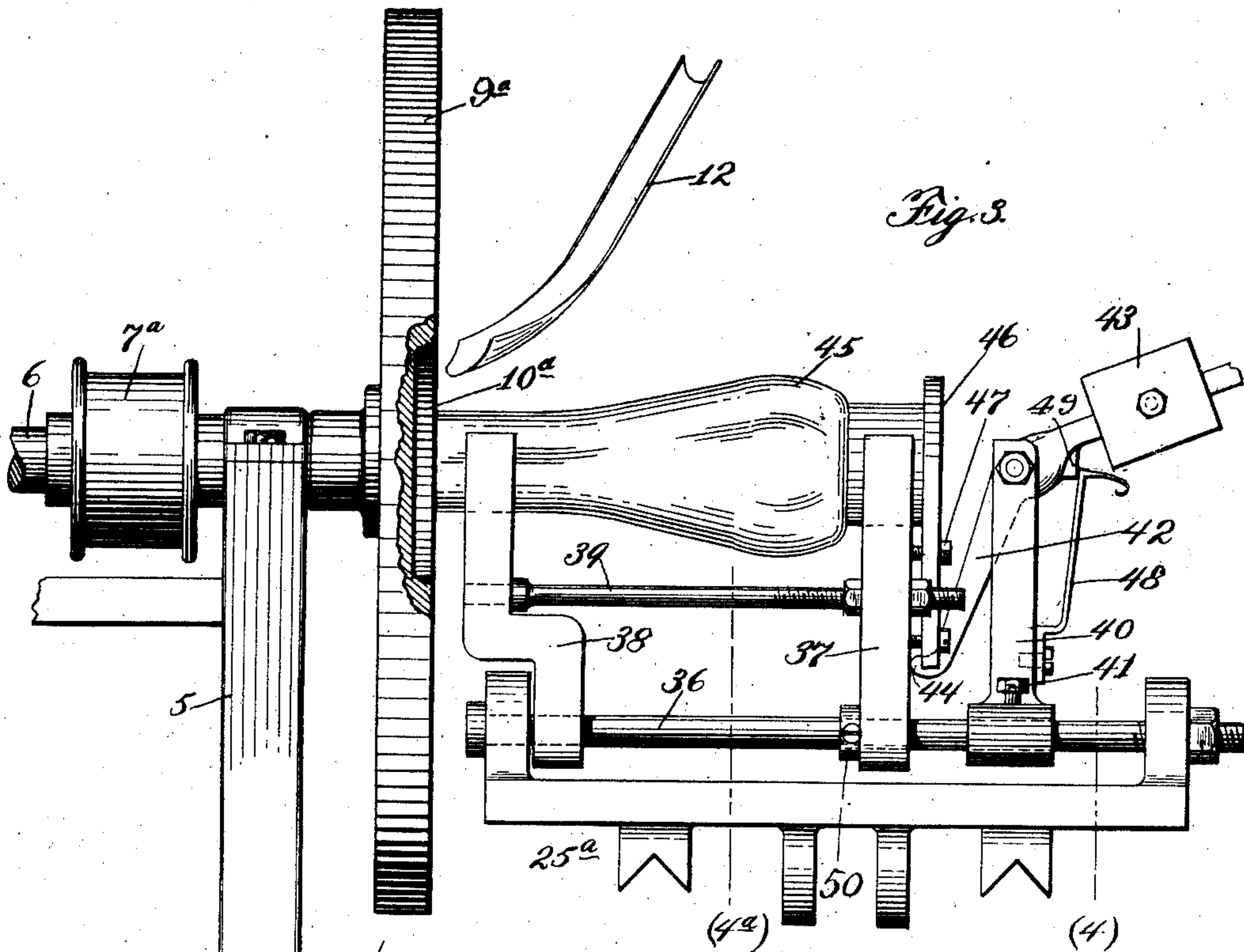
Charles E. Ball.
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3 SHEETS—SHEET 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES E. BALL, OF ALEXANDRIA, INDIANA, ASSIGNOR TO MACBETH-EVANS GLASS COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

GRINDING-MACHINE.

No. 883,163.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed November 20, 1905. Serial No. 288,253.

To all whom it may concern:

Be it known that I, CHARLES E. BALL, a citizen of the United States, residing at Alexandria, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

My invention relates to machines for evenly and automatically grinding the ends of articles such as glass lamp chimneys, etc., and particularly to such machines designed to grind both ends at once and alike, evenly and uniformly. The primary objects of the invention are, to provide a convenient vertical disk machine for grinding the end of an article at a definite and regulable rate and adapted to grind both ends at the same rate when desired, the pressure on the same being regulated automatically; to provide for moving the article over the grinding disk in such a way as to keep the disk true and the end of the article square; to provide improved mechanism for manipulating the grinding disks and for efficiently distributing sand thereon, and to generally improve the construction and operation of such grinding machines. These objects and other advantages which will hereinafter appear I attain by the construction illustrated in two preferred forms in the accompanying drawings, wherein—

Figure 1 is a front elevation, with parts taken in vertical section, showing the machine as grinding two ends of a lamp chimney at once;

Figure 2 is a side elevation of the same machine and a partial section taken along the line (2) in Figure 1, towards the left;

Figure 3 is an enlarged and detached view showing in front elevation a modified form of the machine designed to grind but one end of the article, and

Figure 4 is a side elevation of the holding rack for the articles, shown in Figure 3, the same being partly in section and showing elevations of part of both seats of the holder, the sections being on lines (4) and (4^a).

While the machine of this invention is equally adapted to the grinding of other articles, I have shown it herein as particularly adapted for use in grinding lamp chimneys and the preferred form is designed to grind both ends at once and at the same rate, by automatic means. Referring first to Fig-

ures 1 and 2 it will be seen that I have provided on the frame 5 a pair of horizontal shafts 6, which are driven by pulleys 7 and belts 8. The shafts 6 are splined in the pulleys and are designed to have a small sliding movement in a horizontal direction, and they carry on their free ends a pair of grinding disks 9 provided at the center with distributing cones 10. Sand and water are supplied upon the grinding disks by means of a hopper 11 and troughs 12 or by other means as may be desired, but it is particularly desirable to thus deposit the sand and water at the center and distribute them by centrifugal force.

The two grinding disks 9 are normally held back in a retracted position by means of coil springs 13 provided upon the shaft 6 and abutting against the frame 5 at one end and against an adjustable collar 14 fixed on the shaft at the other end. I also may provide some convenient adjustable stop such as the rod 15 which will prevent the disks moving inward more than a limited distance, so that the chimneys may be all ground exactly the same length. In order to move the disks forward against the article being ground, I have provided upon their hubs circumferentially slotted collars 16 which are loosely engaged by levers 17, in order to push the disks in against the lamp chimneys. One end of each of the levers 17 is pivoted, as indicated in Figure 2, the center of such levers engaging the collars 16. The other end of each lever is connected by a cord 19 (Figure 1) to the pulley 18, the cord being reversely wound on the pulleys as indicated. To turn it the pulley has fixed upon it a lever 20 which has an adjustable weight 21 and normally operates to hold the said cords 19 under a uniform tension, whereby the disks 9 are pressed against the chimney for grinding with uniform pressure. When it is desired to release the chimney after the grinding is finished, the lever 20 is raised by means of a thrust rod 22 operated by a foot treadle 23.

In order to support the articles to be ground, in this case shown as four lamp chimneys, I have provided upon the fixed frame 5 a pair of guide ways 24 upon which operate the slotted portions of a movable table 25. On this table are L-shaped castings 26 which, as appears clearer from Figures 2 and 4, are made with slots to contain

wooden form blocks 28 slid in the slot and adjusted in vertical position by means of set screws 29. These are scalloped out to fit the lamp chimneys and may be interchanged at will, as will be evident. The position of the upright bracket supports 26 can be varied laterally by means of set screws 30, and with this adjustment and the vertical adjustability of the wooden blocks 28 in the brackets the lamp chimney 27 may be accurately adjusted in position so as to be horizontal and to be presented to the grinding disk to make a perfectly true square surface on the end.

In order that the grinding on the disk 9 may not follow a fixed track, I have provided for giving a reciprocating motion to the table 25 by means of a connecting link 31 engaged by a crank on the shaft 32, and this shaft in turn is revolved slowly by a large pulley 33 and belt 34 on the small pulley 35, which latter may be made as an extension of one of the pulleys 7 for driving shaft 6, if desired.

From the above description it will be apparent that in operation the four scalloped blocks 28 having been properly adjusted in place and selected to fit the lamp chimneys being ground, the latter are placed in these supporting brackets and the pressure on the treadle 23 being relieved the weight 21 will cause the falling of the lever 20, and drawing the cords 19, which will thrust the revolving grinding disks 9 against the ends of the lamp chimneys and continue a constant pressure against them, grinding them down to a certain fixed length determined by the position of the stops 15, the sand and water being meanwhile provided by troughs 12 which deposit the material upon the cones 10, whence they are distributed evenly by the revolution of disks 9, as will be understood. When the chimney is properly ground the pressure on the treadle 23 will allow the uncoiling of the cords 19 on the pulley 18 and release the pressure upon the lamp chimneys, when they can be readily removed. It will be observed that no manipulation is necessary other than to place them in the supporting brackets and take them out at leisure, the motions of the machine being entirely automatic; the ends of the chimneys will be perfectly true and squarely ground and all chimneys will be ground to exactly the same length according to any particular adjustment.

In Figures 3 and 4 I have shown a modified form of the machine in which only one grinding disk is used and it is stationary as to horizontal movement, grinding but one end of the articles at a time. This is for use particularly in lamp chimney work where the base edge is fire polished and the top only is desired to be ground. The disk 9^a is mounted in the frame 5 and driven by a pulley 7^a as

before, and the table 25^a and the method of its movement are essentially the same as before, except the table is flanged. On the table and mounted on the flanges are a series of fixed horizontal shafts 36 upon which are mounted horizontally slidable brackets 37 and 38 which are connected together by adjustable threaded rods 39 so as to provide for any length of lamp chimney. These brackets 37 and 38 have the same adjustable wooden form blocks therein, as heretofore described. Also on each pair of the shafts 36 corresponding to a bracket 37 there is a vertical standard 40 which is adjustable but held fixed in place by set screws 41. It has pivoted in its top a bell-crank lever 42 provided with an adjustable weight 43 thereon, and so designed that its free end 44 presses against the supporting bracket 37 in order to automatically push the chimney 45 against the grinding disk 9^a with a constant pressure. When the carriage 37, 38, is pushed back, raising the weight 43, the spring 48 engages a lug 49 on the lever 42 and holds it up until it is released on placing another article in the holder. On the back of the bracket 37 is an adjustable abutment plate 46, attached by screws 47, and engaging the end of the chimney 45. In these Figures 3 and 4 I have shown a modified form of the grinding disk, in which the cone 10 of Figure 1 is replaced by a recess 10^a in which the water and sand from trough 12 is caught and distributed by centrifugal force. As indicated in Figure 4 in dotted lines the parts are here arranged so that the chimneys travel over the whole surface of the disk 9^a and slightly overlap both at the outer and inner edges; this helps to drag out and distribute the sand, as well as to insure even wearing of the disk. Each of the holders may be operated independently, so that the operator can replace a chimney without stopping the machine and the operation is continuous. The grinding in each instance may be interrupted at any desired point by the adjustable stops 50 on the shafts 36. The operation of this form of machine will be clear from the drawing and the foregoing description. It will be understood that other means of supporting the table 25^a may be used when desired, nor is the invention limited to any particular means of actuating the holders 37, 38.

It will be seen from the foregoing constructions that I have provided the great desideratum of a grinding machine with a vertical disk so that it is convenient for placing articles and the pressure may be easily regulated, and the disk has convenient means for distributing sand and water thereon for grinding, and have provided an automatic machine which will grind both ends of the articles at once and which has proper adjustments and motions both for grinding the chimney and wearing the disk with per-

fect evenness. The machine is automatic throughout, except for placing and re-placing the chimneys upon their supports, and is adapted to any form whatever of chimneys or other articles as may be desired. The various advantages of the features will readily occur to those familiar with the art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:

1. The combination of a pair of vertically revolving grinding disks, means including a weighted lever for drawing said disks together, means for automatically reciprocating the article to be ground between and along the surface of said disks and for stopping the grinding at a previously determined point, substantially as described.

2. The combination of a pair of vertically revolving grinding disks having their flat faces opposite and their axes in substantially parallel planes, yielding means for drawing such disks together, means for reciprocating the article to be ground between and along the flat surfaces of said disks, with the axis of such article at substantially right angles to

the plane of the disks and means for stopping the grinding at a previously determined point.

3. In combination in a grinding machine, a pair of opposite vertical grinding disks mounted for movement toward and from each other, a carriage between the disks, means for reciprocating the carriage between the disks, a weight and connections whereby the disks may be fed toward each other, and spring means for returning the disks to their outer position when the weight is raised.

4. A machine for grinding chimneys comprising a rotatable grinding disk, a carrier movable transversely of the disk, means for reciprocating the carrier, means on the carrier for supporting a chimney with its axis at substantially right angles to the disk, and means for securing yielding engagement between the end of the chimney and the disk.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

CHARLES E. BALL.

Witnesses:

BERT BROWN,
J. H. DEAKIN.