

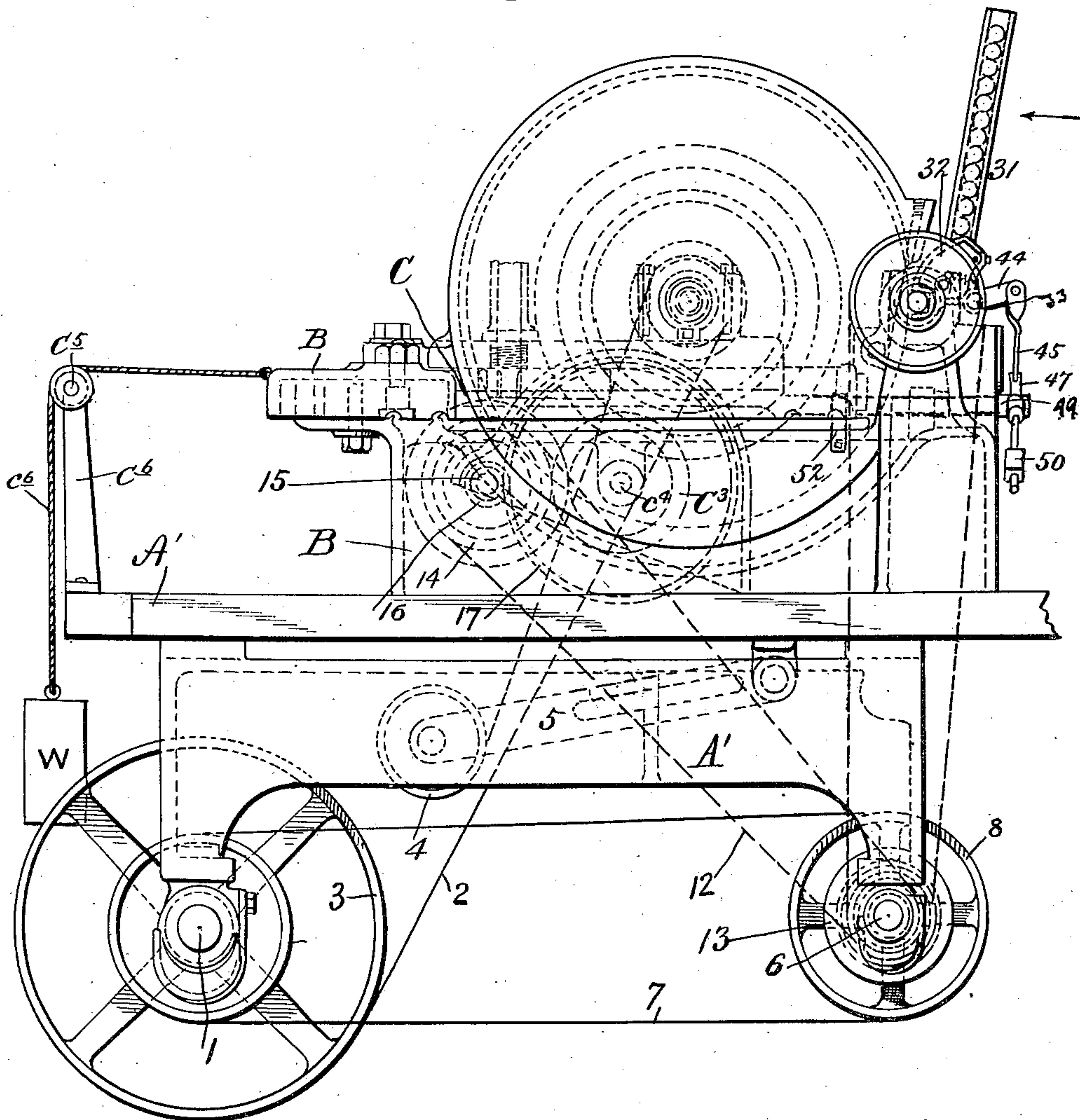
A. B. LANDIS.  
GRINDING MACHINE.  
APPLICATION FILED MAR. 29, 1906.

921,717.

Patented May 18, 1909.

4 SHEETS—SHEET 1.

Fig. 1.

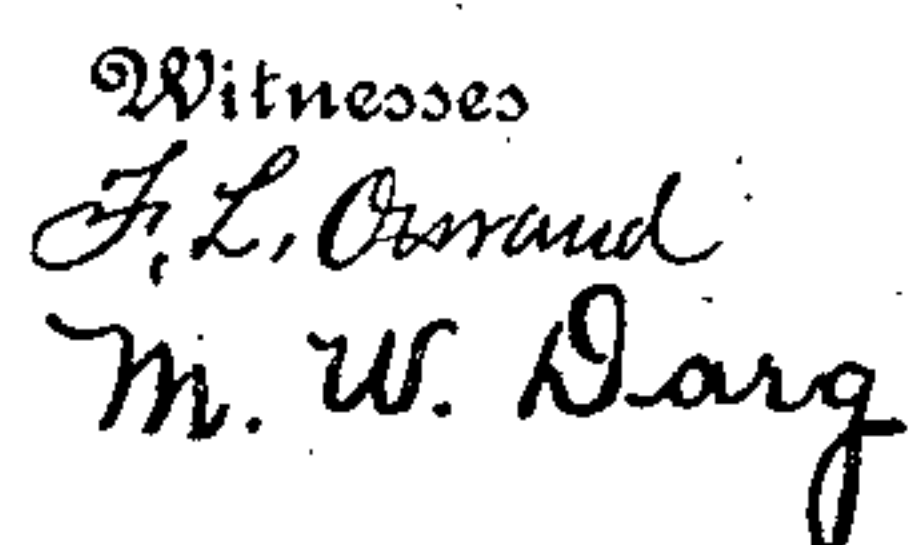


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4 SHEETS—SHEET 2.



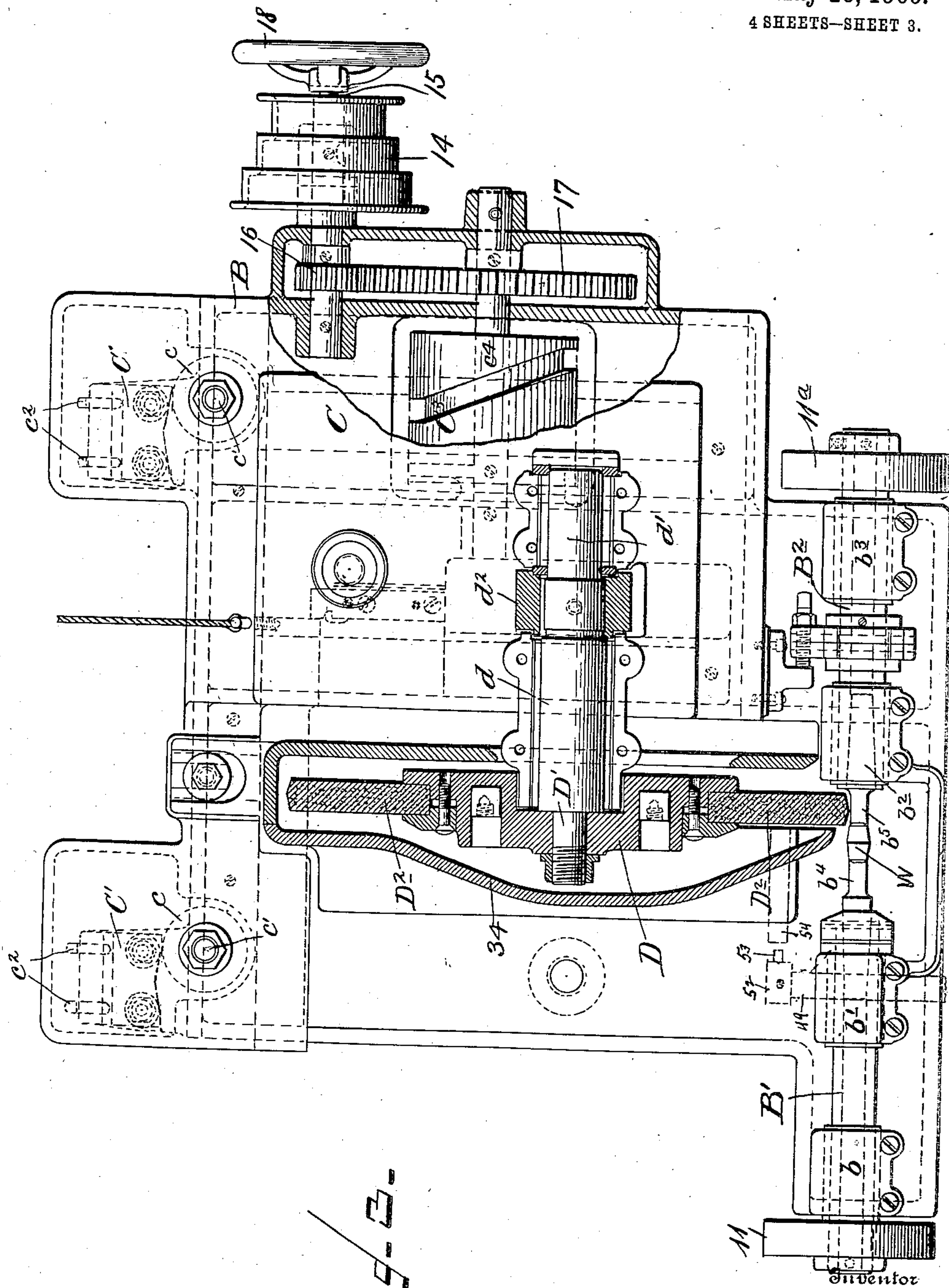
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Fig. 3.

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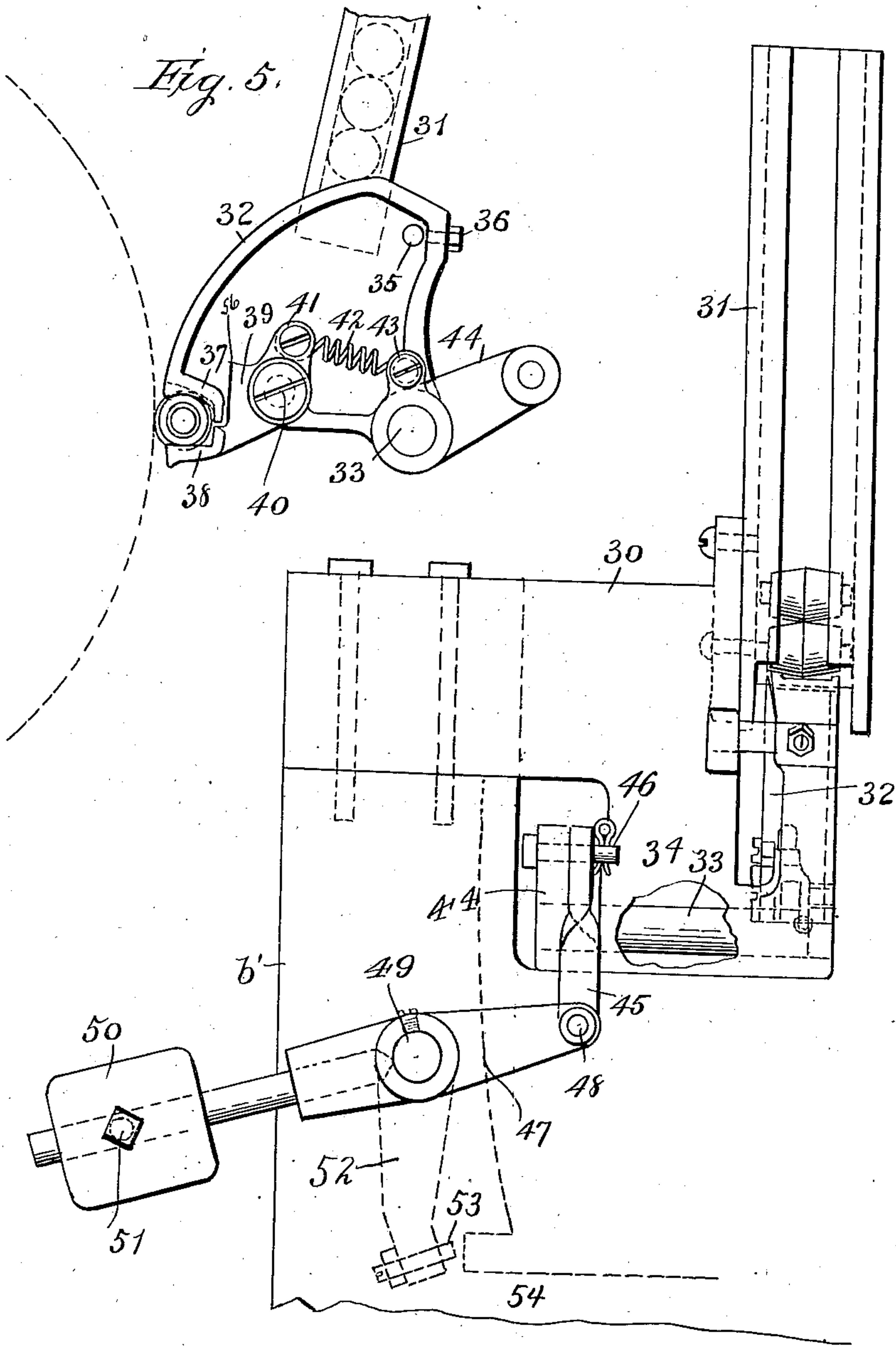


Fig. 4

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# UNITED STATES PATENT OFFICE.

ABRAHAM B. LANDIS, OF WAYNESBORO, PENNSYLVANIA.

## GRINDING-MACHINE.

No. 921,717.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed March 29, 1906. Serial No. 308,732.

*To all whom it may concern:*

Be it known that I, ABRAHAM B. LANDIS, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

In the use of glass stoppers in bottles designed for containing liquids charged with gas, it is essential that the seat for the stopper in the neck of the bottle shall be perfectly true and smooth and also that the stopper shall have a correspondingly smooth surface, perfectly true to fit therein, in order to prevent any leakage of the gas and consequent impairment of the liquid.

The object of my said invention is, therefore, to provide machinery for the purpose of grinding the seat for the stopper in the neck of the bottle and also to grind the stopper so that it will fit perfectly in said seat.

The subject matter of the present application relates to a machine for grinding the stoppers for the bottles; the machine for grinding the bottle necks being the subject matter of a separate application.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is an end elevation of a machine of the character above mentioned, Fig. 2 a front elevation thereof, Fig. 3 a top or plan view partly in section, Fig. 4 a detail front elevation of the automatic feeding mechanism on an enlarged scale, and Fig. 5 a side elevation of the same.

In said drawings the portions marked A represent the table of the machine, B the bed on which the mechanism is mounted, C the grinding wheel carriage, and D the grinding wheel.

The table A is of any suitable material and form and is mounted upon suitable supports. Depending brackets A' are mounted on its under side extending transversely thereof near each end for supporting the bearings for the several shafts of the operating mechanism.

The bed B is mounted upon said table A and is preferably a hollow casting of suitable form to contain the bearings and supports for the various parts of the mechanism to be carried thereon. The head-stock B' and foot-stock B<sup>2</sup> are mounted on spindles in suitable bearings in the tops of standards

b, b', b<sup>2</sup> and b<sup>3</sup> extending up from one edge of said bed B. Said parts are of a suitable construction for the purpose, having work-holding clamps b<sup>4</sup> and b<sup>5</sup> with cup-shaped depressions in their adjacent ends to receive the ends of the work, or stopper W.

The grinding wheel carriage C is a casting of suitable form mounted upon the bed B to slide back and forth transversely in suitable ways and has appropriately arranged bearings for the spindle of the grinding wheel. At one edge it is provided with rollers c journaled upon vertical shafts c', which rollers are adapted to bear against cam-track-blocks C' mounted in suitable supports on one side of the bed B. Said track-blocks are horizontally adjustable by means of set-screws c<sup>2</sup> mounted in screw-threaded holes in bed B behind said blocks and bearing against them at their front ends. The front face of each of said blocks is formed with a double taper or cam, as shown most plainly in Fig. 3, to impart an angular movement to the grinding wheel carriage, back and forth, as it traverses over the work. Said carriage C is held back with its rollers c closely against the track-blocks C', at all times, by means of a weight W' attached to the rear edge of said carriage by a cable c<sup>6</sup> running over a pulley C<sup>5</sup> on a standard C<sup>6</sup>. Said grinding wheel carriage C is provided with a roller c<sup>3</sup> on its underside which engages with a cam groove c<sup>5</sup> in the roller C<sup>3</sup>, mounted upon a shaft c<sup>4</sup> in the bed B.

The grinding wheel D consists of a suitable central casting mounted upon a spindle D' and having an emery wheel D<sup>2</sup> clamped in an annular groove in its periphery. Said spindle D' is journaled in suitable bearings d and d' on the top of the carriage C and is provided with a pulley d<sup>2</sup> by which it is belted to the driving shaft.

The main driving shaft 1 is journaled in bearings on one side of the brackets A', on the underside of table A, and is driven from any convenient power in the usual manner. A belt 2 runs from a pulley 3 on said shaft 1 over pulley d<sup>2</sup> on the grinding wheel spindle and affords the means for imparting rotation to the grinding wheel. Said belt 2 is loose and passes under an idler pulley 4 on the outer end of a pivoted frame 5 which serves to maintain the tension of said belt and permit the necessary movement of the carriage. A counter shaft 6 is mounted in suitable bearings on the opposite sides of said brack-



ets A' and is geared by a belt 7 to a pulley 8 on said shaft 1. Two pulleys 9 and 9<sup>a</sup> are mounted one on each end of said shaft 6 and are geared by belts 10 and 10<sup>a</sup> to pulleys 11 and 11<sup>a</sup> on the outer end of the respective spindles carrying the head-stock B' and the foot-stock B<sup>2</sup>, thus driving both said head-stock and foot-stock positively and uniformly. A belt 12 runs from a pulley 13 on said shaft 6 to a pulley 14 on a stud-shaft 15 mounted on the outer end of bed B. Said shaft 15 is provided with a small gear 16 which meshes with a large gear 17 on the outer end of the shaft c<sup>4</sup> on which is mounted the cam roller C<sup>3</sup>. By this means motion is imparted to said roller and the carriage C is traversed back and forth to move the grinding wheel across the work, as desired. A hand wheel 18 is mounted on the outer end of shaft 15 by which the adjustment of the mechanism may be effected by hand, when desired.

While the stoppers may be fed to the machine by hand, as will be readily understood, yet an automatic device for the purpose is desirable and I have provided such a device, which may be used, or removed when not needed. Said device is best shown in Figs. 4 and 5 and consists of a base block 30 adapted to be secured on the top of bearing standard b' and project over the work, having a magazine 31 secured on its inner end in position to feed the stoppers to the work holding devices. Said magazine is of a form in cross section to hold the stoppers lying therein as indicated in the drawings, having an open front side that the number of stoppers therein may be readily observed and an open bottom to permit them to fall through into the feeding device. Said device comprises a frame 32 mounted on an oscillating shaft 33, which shaft is mounted in a bearing in the lower end of an arm 34 depending from block 30. The top bar of said frame is of a width to serve as a bottom closure to magazine 31 and it is formed as a segment of a circle, the center of which is the axis of shaft 33. A stop pin 35 is mounted in the end of block 30 to extend within said frame in position to stop its forward movement at the point where the work is to be delivered to the holding devices, and an adjustable screw 36 is mounted in said frame in position to contact with said stop, thus providing for limiting said movement to the exact point desired. The lower end of said frame 32 is formed with a concave face extending in a substantially radial direction and forming one jaw 37 of a clamp for handling the stoppers. The other jaw 38 is formed on the outer end of a plate 39 mounted on a pivot 40 which is mounted on an adjacent part of the frame 32 to bring said jaw 38 into position to cooperate with said jaw 37. An arm 41 extends out from plate 39 behind pivot 40 and is connected by a

spring 42 with a fixed part 43 on frame 32. By this means said jaws are normally held closed to hold and clamp the stoppers, or other work, therein. Shaft 33 is provided with a crank-arm 44 on its opposite end which is pivoted to a link 45 by a pivot 46 and said link 45 is pivoted to the inner end of an arm 47 by a pivot 48. Said arm 47 is mounted on a rock-shaft 49 mounted in a bearing in the standard b' and has a weight 50 adjustably secured on its opposite end by a set-screw 51. Said weight will normally operate through the connections just described to hold frame 32 in position shown in Fig. 5 with stop screw 36 against stop 35. A depending arm 52 is mounted on the inner end of shaft 49 with an adjustable strike screw 53 in its lower end in position to strike the lower edge 54 of the shield 55 covering the grinding wheel when the grinding wheel carriage shall reach the limit of its forward movement. The operation of this automatic feed mechanism is as follows: The parts being in position shown in Fig. 5, the stopper or other blank is in position to be received by the work holding clamps b<sup>4</sup> and b<sup>5</sup>. When the carriage reaches the proper point the lower edge of shield 55 strikes the point of set screw 53, rocks shaft 49 and through link 45 pulls arm 44 of shaft 33 down, swinging frame 32 upward until the point 56 on the arm 39 of jaw 38 strikes stop pin 35 and opens the clamp to receive a blank or stopper from the bottom of the magazine. As the carriage moves back on its return movement weight 50 through the pivoted arm 49 and connections operates to swing frame 32 downward on its pivot 33 until it rests upon the work being ground, and when said work is finished and falls from the work holding clamps said frame falls until set-screw 36 strikes stop 35 when the cup-shaped clamping devices b<sup>4</sup> and b<sup>5</sup> engage the ends of the blank in said jaws and start it rotating and the grinding operation proceeds. Spring 42 is of only sufficient tension to hold jaw 38 so that it will carry the blanks and offers very slight resistance to the upward movement of frame 32, permitting said jaw to easily open to pass over the work in the clamps b<sup>4</sup> and b<sup>5</sup>, and resisting to no appreciable degree the rotation of the work in said clamps.

The operation of the machine as a whole is as follows: The work W, such as a bottle stopper, which is preferably of the form shown in Fig. 3, having a double taper from the center toward each end, being mounted in the holding devices of the head-stock and the foot-stock and the parts being in the position shown in Fig. 3, and the mechanism being put in operation, the work is driven at a suitable speed and the grinding wheel is also rotated while the carriage C is traversed back and forth a distance which will carry the faces of said grinding



wheel from one end of the work to the other. As will be noticed by reference to Fig. 3, the face of said grinding wheel is formed tapered from its center toward each side, so that the grinding upon one end of the stopper will be by one side of the face of said grinding wheel while the grinding on the opposite side will be by the other face, the carriage moving back and forth toward and from the work, as well as lengthwise of the work, by means of the cam-tracks in the blocks C', which are made to correspond with the shape of the surface of the work being ground. The magazine 31 being filled with blanks or stoppers, the feeding thereof is done automatically, as above described and the work proceeds with little attention and great rapidity.

It is obvious that while this machine as here shown and described is particularly adapted for grinding glass bottle stoppers, it can be used for a large variety of work such as small spindles, roller bearing rollers, pins, whether straight or single or double taper, and the like, without departing from the spirit of my invention.

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

1. In a grinding machine, the combination, of the bed, the work holding devices thereon, means for rotating the work held in said devices, the grinding wheel carriage mounted upon said bed, the grinding wheel on said carriage, means for driving said grinding wheel, means for traversing said carriage lengthwise of the work, and means for moving said carriage toward and from said work comprising cam tracks mounted on the bed and arranged to bear against suitable parts on the rear edge of said carriage, substantially as set forth.

2. In a grinding machine, the combination of the frame, the bed supporting the operating mechanism, the grinding wheel devices mounted thereon, the grinding wheel, the grinding wheel carriage mounted to slide upon said bed in both directions, and gearing connecting the grinding wheel, the traversing mechanism and the work holding devices with the main driving shaft, whereby all are driven from a single shaft, substantially as set forth.

3. In a grinding machine, the combina-

tion of the bed, the work holding devices thereon, the grinding wheel mounted on a carriage, said carriage mounted on said bed, a roller mounted on a suitable shaft in said bed and formed with a cam groove adapted to engage with a projection on said carriage, means for driving said roller, and means for imparting to said carriage a movement toward and from the work at the same time it traverses across said work, substantially as set forth.

4. In a grinding machine, the combination, of the grinding mechanism, means for driving the same, and an automatic feeding mechanism for the work comprising a magazine, a rocking frame mounted to close the bottom of said magazine and carrying an opening-and-closing clamp to receive the work from the magazine and deliver to the work holding devices, means for rocking said frame and means for limiting its movement to the points desired, substantially as set forth.

5. In a grinding machine, the combination, of the frame, the grinding wheel mounted on a frame, means for simultaneously moving said wheel across and toward and from the axis of the work, the work holding devices, and an automatic feeding mechanism for feeding the blanks to said work holding devices, substantially as set forth.

6. In a grinding machine for grinding cylindrical parts, the combination, of the grinding mechanism, comprising work holding devices, the traversing grinding wheel and means for operating them, and an automatic feeding mechanism comprising a magazine mounted above the grinding point, a rocking frame mounted to close the lower end of said magazine and carrying a clamp to receive the work from the magazine and deliver it to the work holding devices, and means for operating the several parts, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Washington D. C. this 28th day of March, A. D. nineteen hundred and six.

ABRAHAM B. LANDIS. [L. s.]

Witnesses:

A. M. PARKINS,  
E. W. BRADFORD.