

No. 756,302.

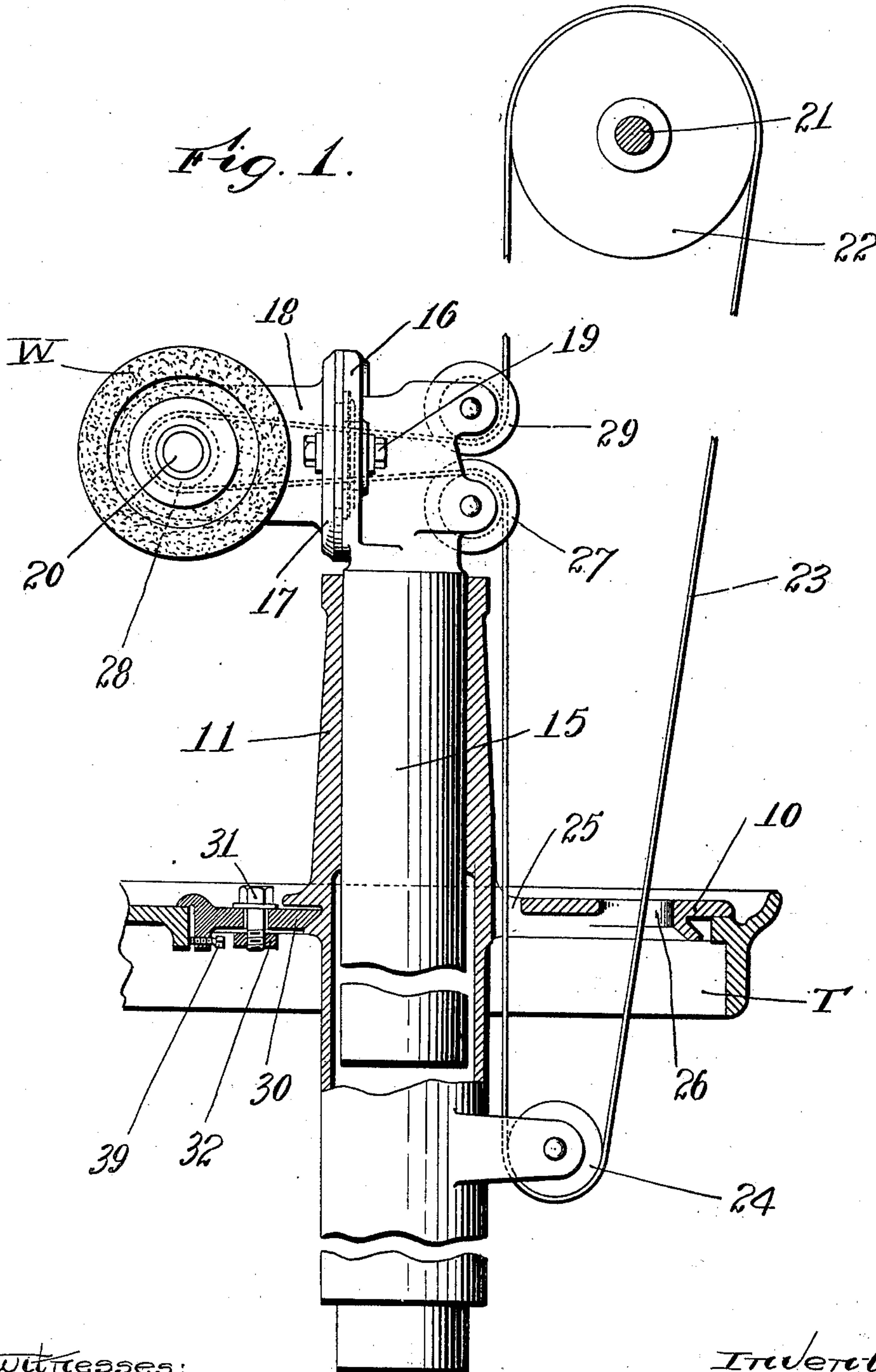
PATENTED APR. 5, 1904.

O. S. WALKER.  
GRINDING MACHINE.

APPLICATION FILED AUG. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

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A. M. Goodland.

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By his Attorneys

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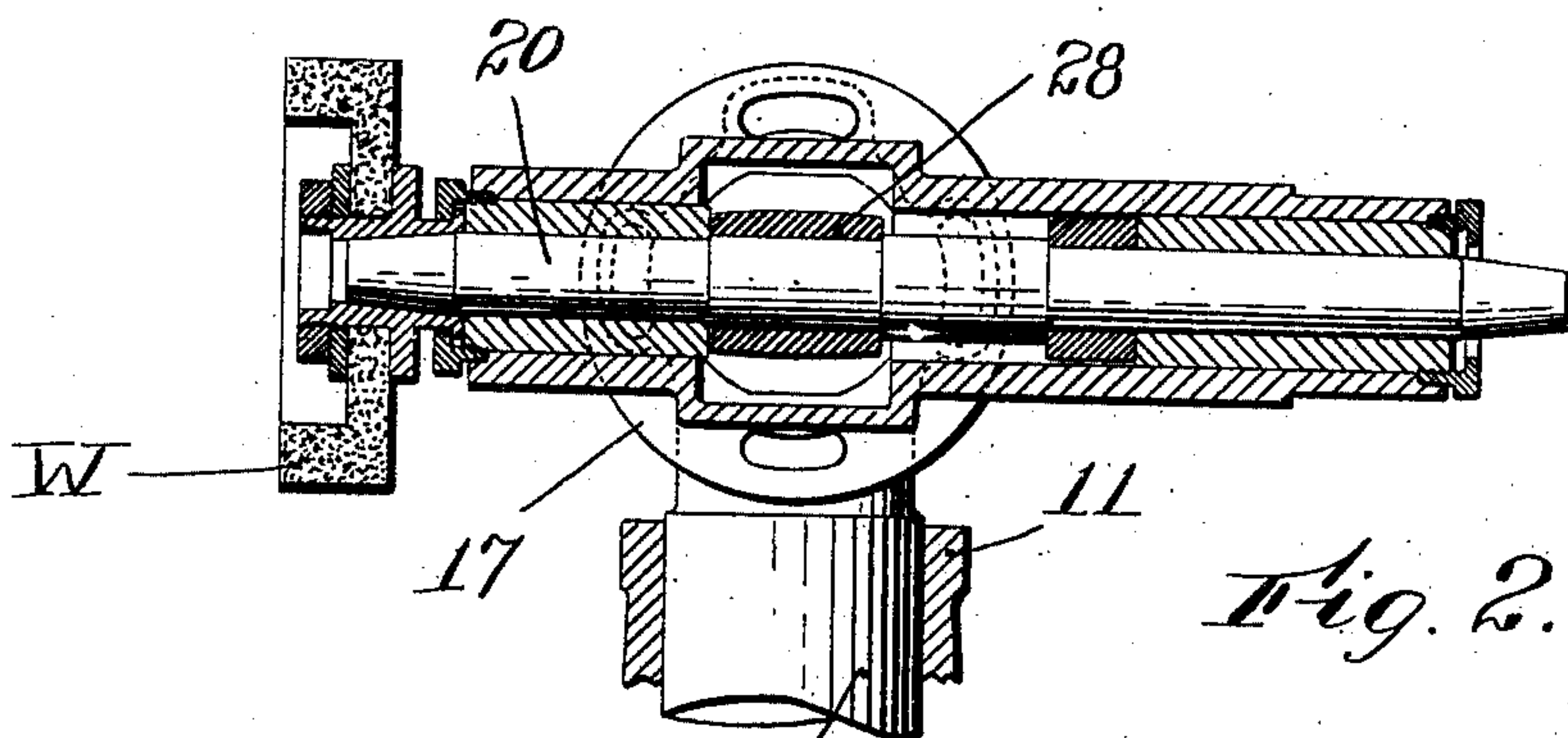


Fig. 2.

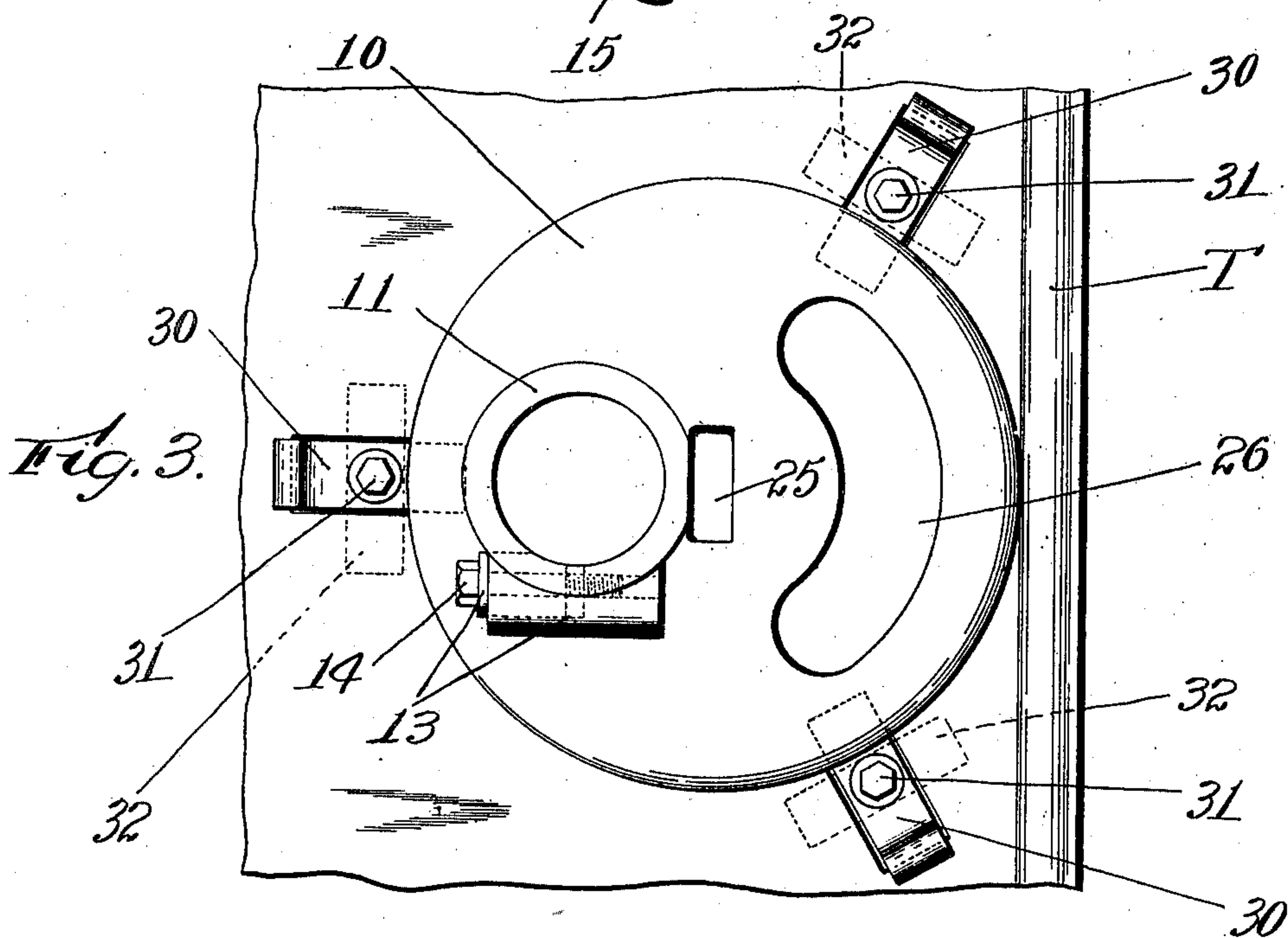


Fig. 3.

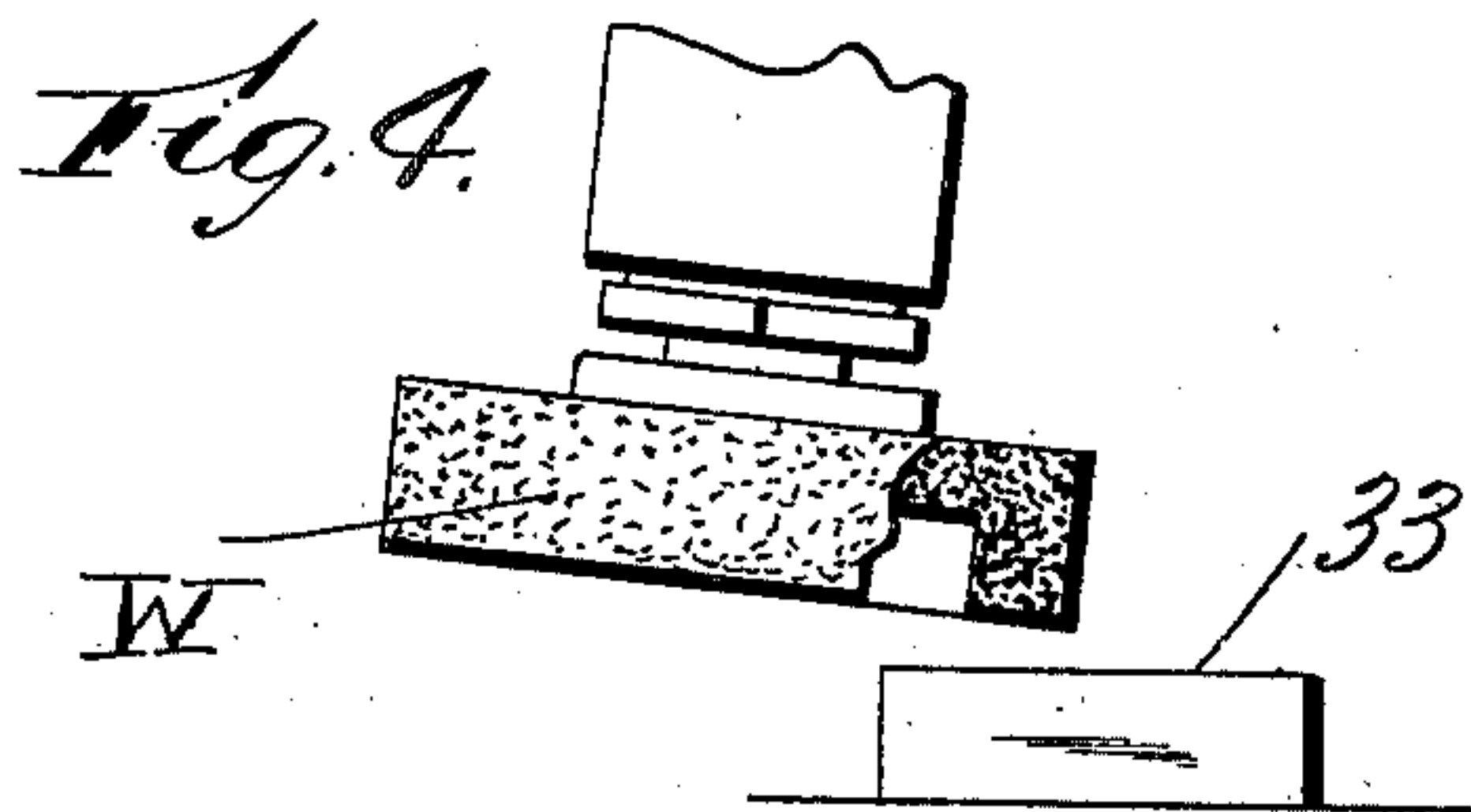


Fig. 4.

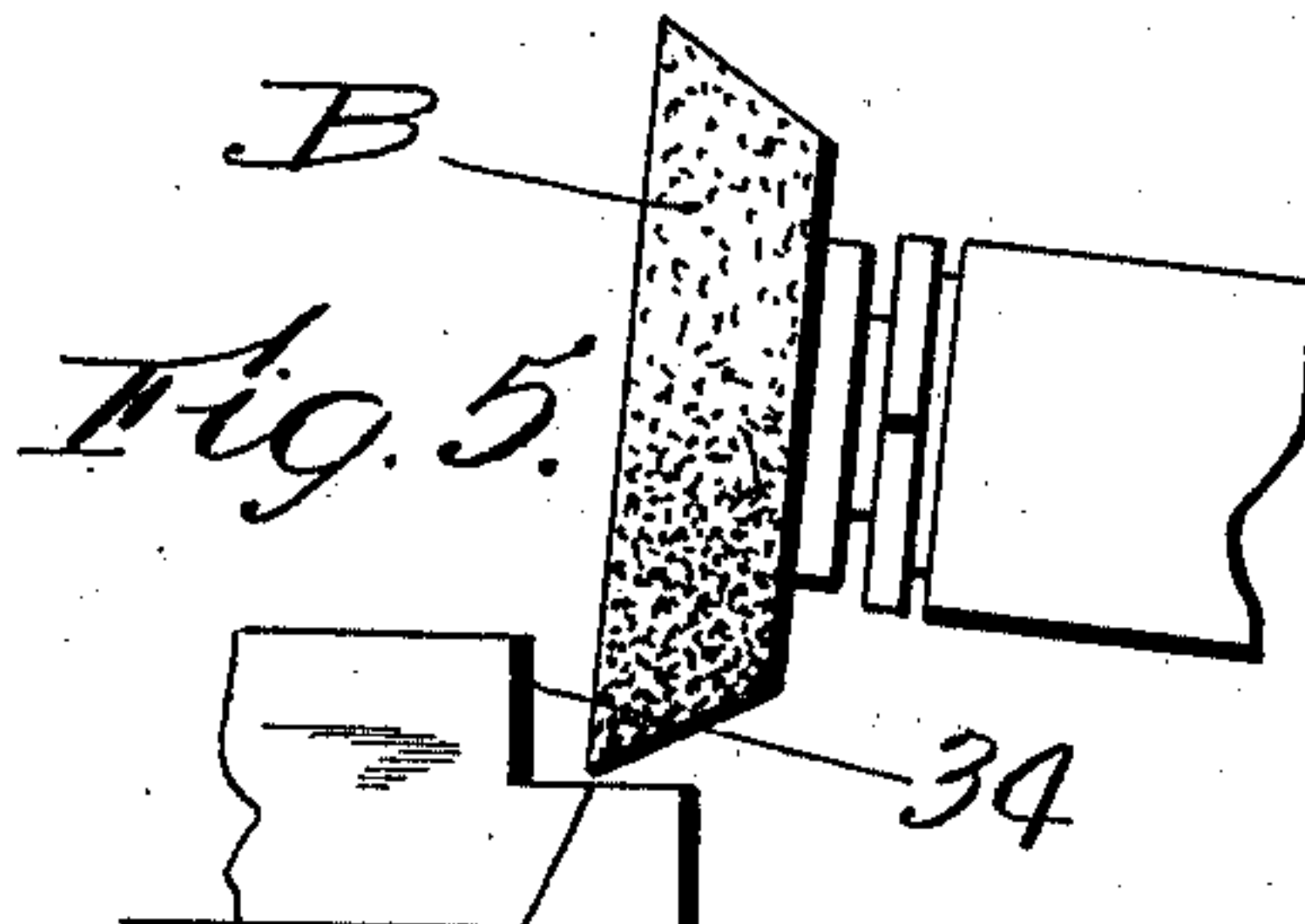


Fig. 5.

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# UNITED STATES PATENT OFFICE.

OAKLEY S. WALKER, OF WORCESTER, MASSACHUSETTS.

## GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 756,302, dated April 5, 1904.

Application filed August 24, 1903. Serial No. 170,616. (No model.)

*To all whom it may concern:*

Be it known that I, OAKLEY S. WALKER, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Grinding-Machine, of which the following is a specification.

This invention relates to that class of grinding-machines which are employed for tool and cutter grinding or which may be employed for surface-work.

The especial object of this present invention is to increase the capacity of grinding-machines of this class by providing for an adjustment which will permit the grinding-arbor to be tipped or tilted from horizontal position and to arrange a driving-belt so that it will serve to properly turn the grinding-arbor in its different adjusted positions.

To these ends this invention consists of the parts and combinations of parts, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying two sheets of drawings, Figure 1 is a side view, partly broken away, of sufficient parts of a grinding-machine to illustrate the application of my invention thereto. Fig. 2 is a transverse sectional view. Fig. 3 is a fragmentary plan view with the grinding-standard removed, and Figs. 4 and 5 are diagrammatic views illustrating classes of work for which my grinding-machine is adapted.

In that class of grinding-machines to which this invention relates the grinding-wheels have heretofore been mounted upon horizontal shafts or arbors, and the work has fed up to and presented to the grinding-wheels by different forms of carriages or work-holding devices.

In a grinding-machine constructed according to this invention the grinding shaft or arbor is capable of an additional adjustment—that is to say, it can be tipped and tilted from horizontal position when required for certain classes of work—and the grinding-arbor is driven by means of a looped driving-belt which is combined with a driving-standard in such manner as to permit the grinding-arbor to be moved up or to be swung in a horizon-

tal plane and also to be tipped or tilted for special work.

Referring to the drawings for a detail description of a grinding-machine embodying this invention, T designates the bed-plate or table of the machine, which may be of the ordinary or approved construction and which may have mounted thereon any of the ordinary work-holding devices or carriages, which need not be herein shown or described at length. Fitting into and adapted to turn in the table T is a circular plate or lid 10. A sleeve or vertical bearing 11 is arranged eccentrically in the plate 10. Mounted in the sleeve 11 is the grinding-standard 15, which may be moved up or down to different elevations.

To hold the grinding-standard 15 in different adjusted positions, as shown in Fig. 3, I provide a clamp-piece 13, which fits loosely into a transverse boss or enlargement on the sleeve 11 and which may be clamped into engagement with the grinding-standard 15 by the bolt 14. At this upper end, as shown in Fig. 1, the grinding-standard 15 is provided with the face-plate 16. Fitting against the face-plate 16 is a face-plate 17, carrying a bearing-box 18, in which the grinding-arbor 20 is journaled. The face-plates 16 and 17 have cooperating adjusting-slots and may be clamped together in different adjusted positions by the bolts 19.

Power for the grinding-arbor is furnished from a counter-shaft 21, secured on which is a driving-pulley 22. A driving-belt 23 passes down from the pulley 22 around a flanged guide-pulley 27, around pulley 28 on the grinding-arbor, around a second flanged guide-pulley 29, and thence down to a bottom idler-pulley 24, arranged on the bearing-piece 11. From the pulley 24 the belt passes up back to the driving-pulley 22. The disk 10 is provided with a slot 25 to allow the belt to pass down to the idler-pulley 24 and with a slot 26 to allow the belt to pass up therefrom to the driving-pulley 22.

As shown most clearly in Fig. 3, it will be seen that the belt-slot 25 for the driving side of the belt is substantially at the center of the plate or lid 10 and that the belt-slot 26 is



formed on a curve about the belt-slot 25 as a center, so that by means of this construction the plate or disk 10 can be turned to different positions without cramping the driving-belt 5 23, while the horizontally-projecting loop of the driving-belt around the grinding-arbor permits the grinding-arbor to be moved up and down and also to be tipped or tilted from horizontal position, the line of belt passing down 10 from the driving-pulley 22 to the idler-pulley 24 being substantially parallel to the axis of the standard 15.

To hold the plate or lid 10 in its adjusted position, I have provided a special arrangement of fastening-clips, which is shown most 15 clearly in Figs. 1 and 3. As illustrated in these figures, the table or bed-plate T is provided with three slots or sockets, and dropped into these slots or sockets are the bevel-ended clamping-pieces 30, having inner ends fitted 20 into a dovetailed groove in the under side of the plate 10 and having their outer ends resting on the table T. The outer ends of the clamping-pieces 30 are also preferably provided with small set-screws 39 for insuring 25 the proper bearing of each clamp-piece.

Each of the clamp-pieces 30 is held down by a bolt 31, threaded into a cross-piece 32, so that by means of this construction the plate 30 or disk 10 will be rigidly clamped in place on the table T.

The manner in which a machine constructed according to this invention may be used is most clearly illustrated in Figs. 4 and 5. As 35 shown in Fig. 4, the grinding-arbor is turned or set to an almost vertical position, and by means of this adjustment the front face of a cupped wheel W may be used for finishing the upper surface 33 of a piece of work. This 40 adjustment is desirable, as it permits the more rapid dressing-off or surface-grinding than when the edge of a wheel is used. In Fig. 5 I have shown a beveled grinding-wheel B on the grinding-arbor and the grinding-arbor set 45 to a slight angle from the horizontal, so that the surfaces 34 and 35 may be dressed off and brought to a sharp corner. Other adjustments of my grinding-machine will permit it to be used for still other purposes which cannot be 50 accomplished in ordinary types of grinding-machines as heretofore constructed—such, for example, as grinding special clearances on tools and cutters, &c.

I am aware that numerous changes may be 55 made in practicing my invention by those who are skilled in the art without departing from the scope thereof as expressed in the claims.

I am also aware that in that class of grinding-machines to which this invention relates 60 it has already been proposed to loop the driving-belt around the grinding-arbor and to provide means for adjustably clamping the grinding-arbor in different positions, the loop of the driving-belt permitting the grinding arbor 65 to be raised or lowered and also permit-

ting the grinding-arbor to be turned about a vertical axis coincident with one leg of the driving-belt. A construction of this kind is shown, described, and claimed in United States Letters Patent No. 693,471, granted to me 70 February 18, 1902. In all machines of this class, however, with which I am familiar no provision has been made for tilting the grinding-arbor from horizontal position, whereas 75 in a grinding-machine constructed according to this invention three adjustments of the grinding-arbor are provided for—first, the grinding-arbor may be raised or lowered, which causes the raising or lowering of the loop of the driving-belt; secondly, the grind- 80 ing-arbor may be swung about a vertical axis, turning the loop of the driving-belt about an axis substantially coincident with the driving-leg of the belt, and, thirdly, the grinding-arbor may be tilted from horizontal position, 85 causing a twisting of the loop of the driving-belt. I do not wish, therefore, to be limited to the construction I have herein shown and described; but

What I do claim, and desire to secure by 90 Letters Patent of the United States, is—

1. In a grinding-machine, the combination of a grinding-arbor mounted so that it may tip or swing from horizontal position, means for clamping the grinding-arbor in its adjust- 95 ed positions, and a driving-belt having a loop, the length of which extends at right angles to the grinding-arbor, whereby the belt will be twisted when the grinding-arbor is tipped from horizontal position. 100

2. In a grinding-machine, the combination of a grinding-standard, a bearing-piece, a grinding-arbor journaled therein, means for clamping the bearing-piece to the standard 105 with the grinding-arbor tipped or turned from horizontal position, and a driving-belt looped around the grinding-arbor, the length of the loop extending at right angles to the grinding-arbor, whereby the belt will be twisted when the arbor is tipped. 110

3. In a grinding-machine, the combination of a machine-frame, a support vertically adjustable in the machine-frame, a bearing-piece pivoted on the support, a grinding-arbor journaled in the bearing-piece, means for fasten- 115 ing the bearing-piece to hold the grinding-arbor in tipped or tilted positions, and a driving-belt having a horizontal loop passed around the grinding-arbor and extending at right angles therefrom, the loop of the driving-belt 120 being raised or lowered when the grinding-arbor is moved to different elevations, and the loop of the driving-belt being twisted when the grinding-arbor is tipped or tilted.

4. In a grinding-machine, the combination 125 of a machine-frame, a vertically-adjustable support pivoted in the machine-frame, a bearing-piece pivoted on the support, a grinding-arbor journaled in the bearing-piece, means for clamping the bearing-piece to hold the 130



grinding-arbor in tipped or tilted positions, a driving-belt having one leg extending down substantially in line with the axis of the support, and guide-pulleys around which the driving-belt passes to form a loop around the grinding-arbor, the said loop being raised or lowered when the grinding-arbor is moved to different positions, which is swung horizontally when the support is turned, and which loop is twisted when the grinding-arbor is tilted.

5. In a grinding-machine, the combination of a grinding-arbor, a driving-belt and means for supporting the grinding-arbor so that the loop in the driving-belt will be shifted when the grinding-arbor is raised or lowered so that said loop will be given a partial turn when the grinding-arbor is tipped from its horizontal position and so that the loop in the driving-belt will be swung to one side when the grinding-arbor is turned in a horizontal plane.

6. In a grinding-machine, the combination of a grinding-arbor, a driving-belt having its driving side substantially vertical with a horizontal loop extending therefrom to drive the grinding-arbor, and means for supporting the

grinding-arbor whereby the loop will be shifted when the grinding-arbor is raised or lowered, the loop will be twisted when the grinding-arbor is tipped from horizontal position, and the loop will be swung when the grinding-arbor is turned in a horizontal plane.

7. In a grinding-machine, the combination of a base or table, a plate or disk mounted therein, clamping-pieces engaging a groove in the plate, and nuts for tightening the clamping-pieces.

8. In a grinding-machine, the combination of a base-plate or table, a disk mounted therein, clamping-pieces for said disk with their inner ends engaging a groove in the plate, with their outer ends resting on the table, a set-screw for each clamp-piece to hold the same in proper relation, and a tightening-belt and cross-piece for each clamp-piece.

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

OAKLEY S. WALKER.

Witnesses:

LOUIS W. SOUTHGATE,  
MARY E. REGAN.