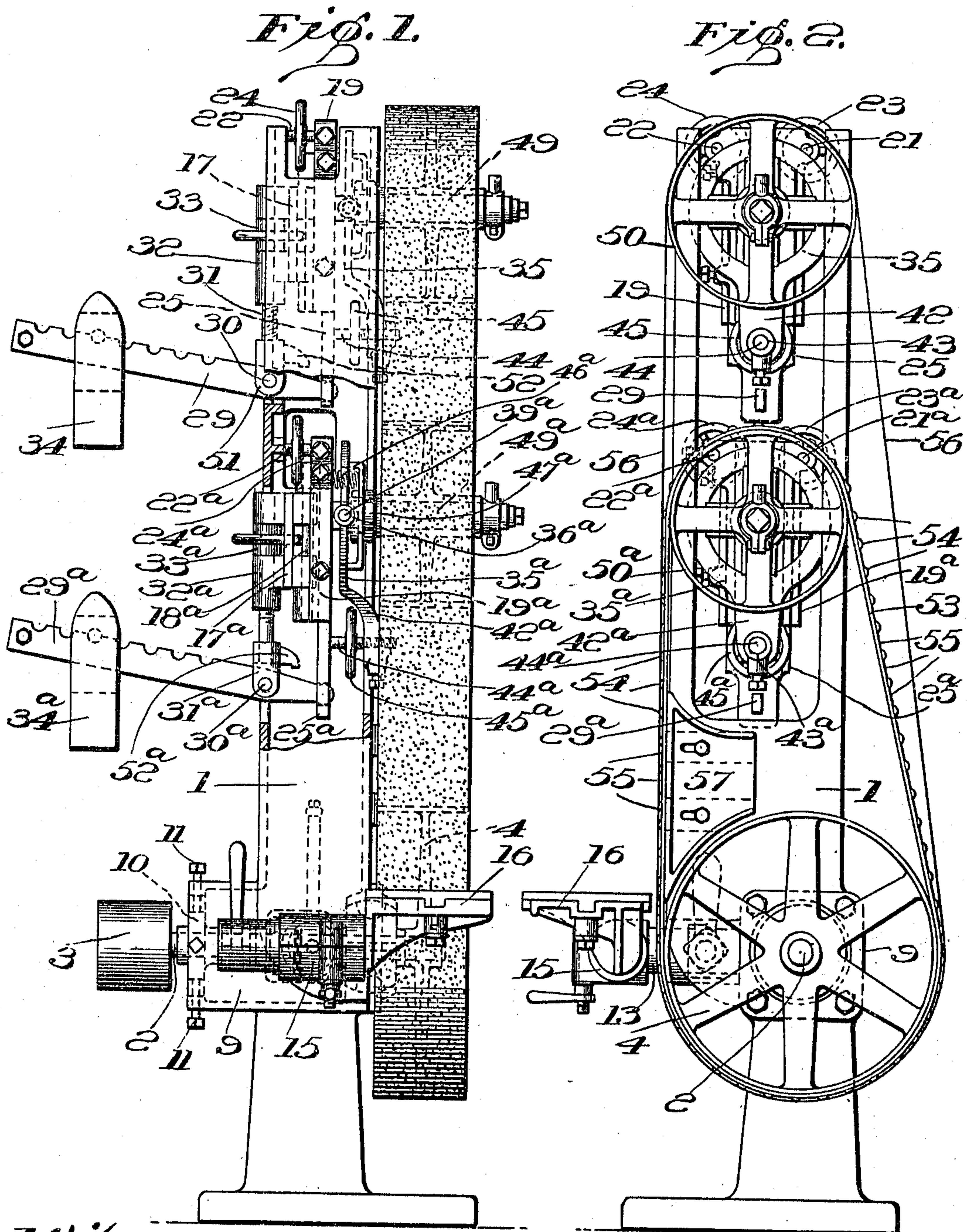


J. HAUSMAN & J. C. BLEVNEY.
GRINDING AND POLISHING MACHINE.
APPLICATION FILED MAY 31, 1907.

953,031.

Patented Mar. 29, 1910.
3 SHEETS—SHEET 1.



Witnesses:
Allan H. Gossel.
H. Richards

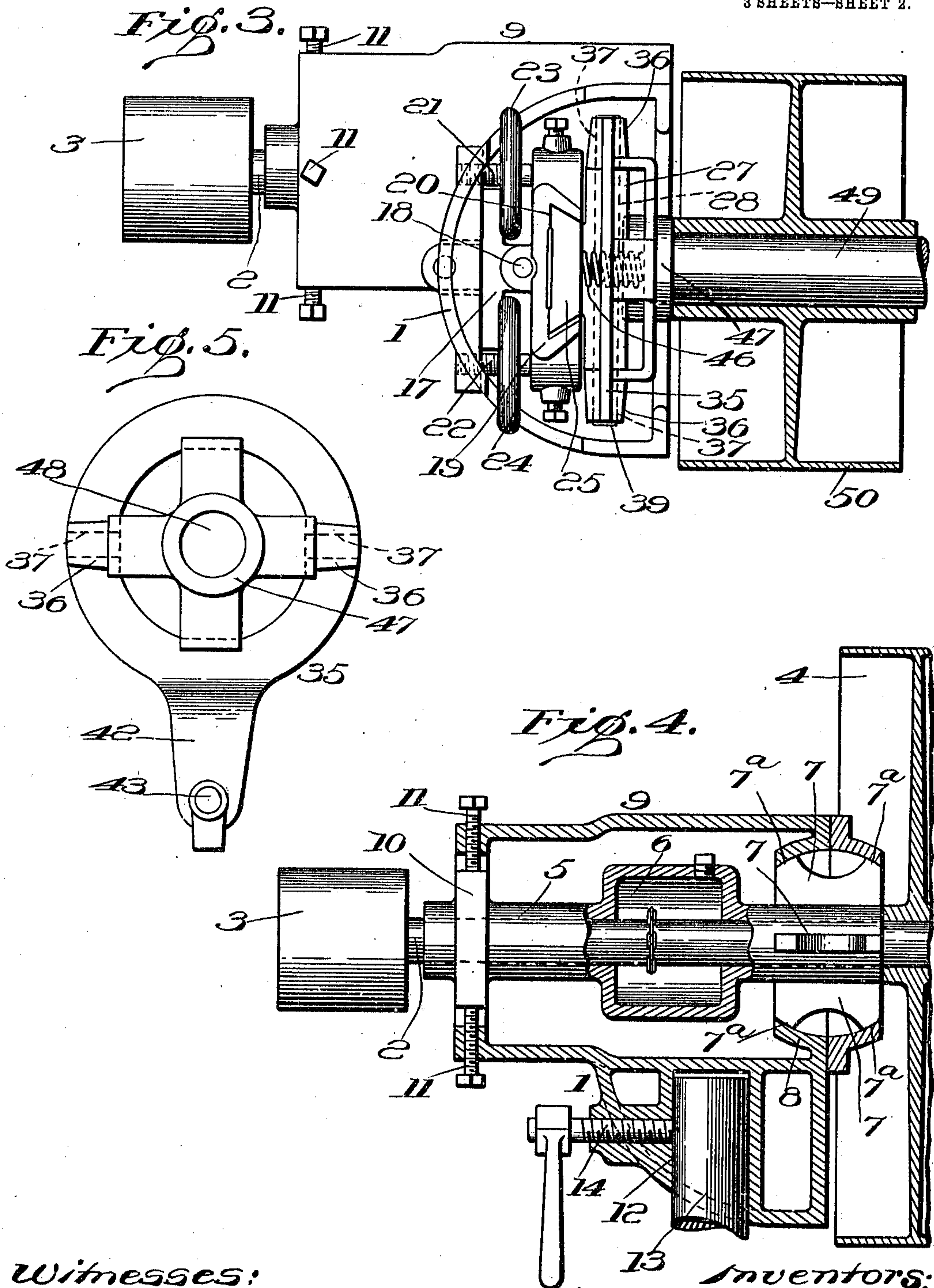
Inventors:
J. Hausman and J. C. Blevney
By Mark A. McGrath
Attorney.

J. HAUSMAN & J. C. BLEVNEY.
GRINDING AND POLISHING MACHINE.
APPLICATION FILED MAY 31, 1907.

953,031.

Patented Mar. 29, 1910.

3 SHEETS—SHEET 2.



Witnesses:
Allan H. Cross.
J. Richards.

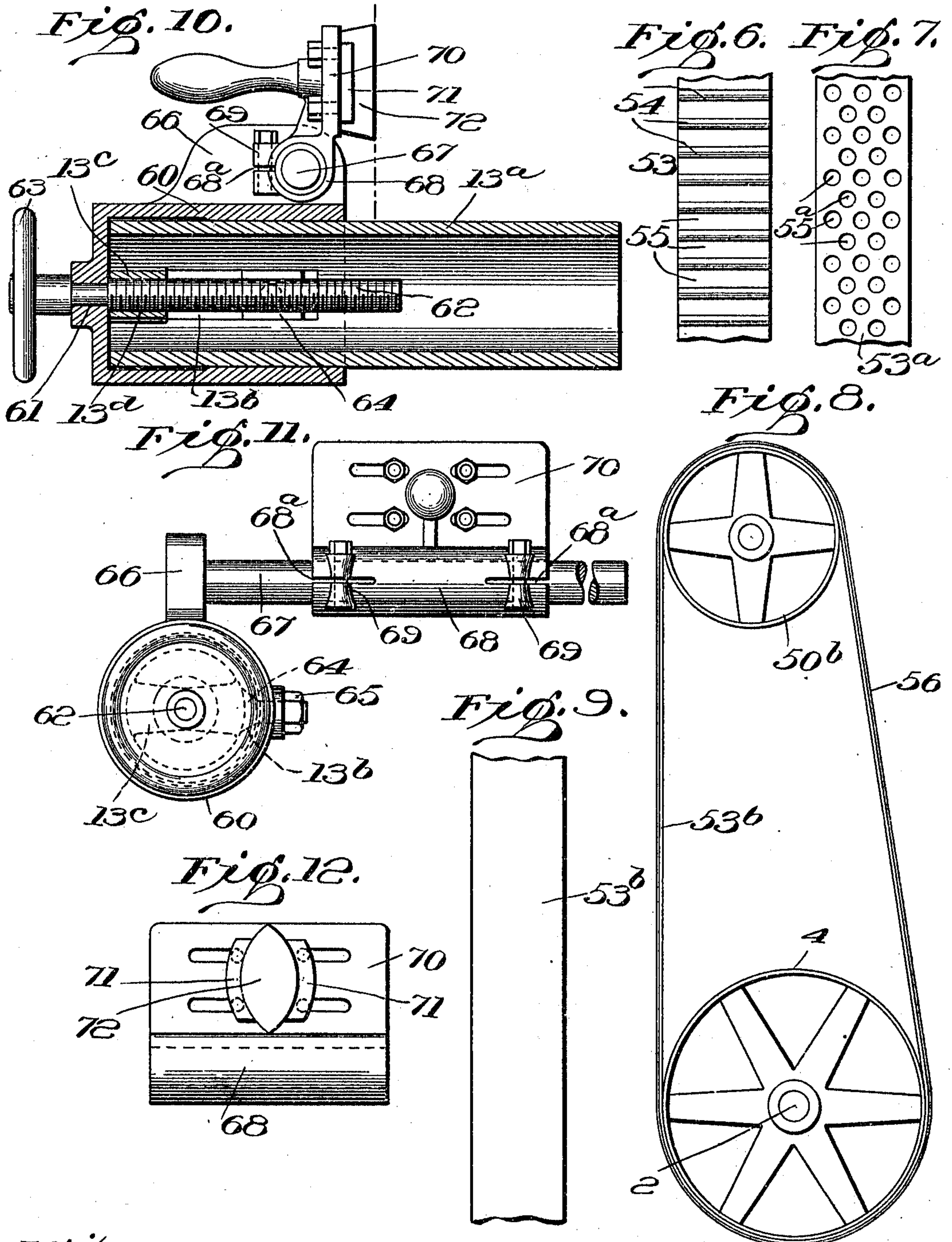
Inventors:
J. Hausman and J. C. Blevney
By *W. A. Megath*
Attorney.

J. HAUSMAN & J. C. BLEVNEY.
GRINDING AND POLISHING MACHINE.
APPLICATION FILED MAY 31, 1907.

953,031.

Patented Mar. 29, 1910.

3 SHEETS—SHEET 3.



Witnesses:
Allan H. Croel.
S. Richards

Inventors:
J. Hausman and J. C. Blevney
By Mark A. McGrath
Attorney.

UNITED STATES PATENT OFFICE.

JOHN HAUSMAN AND JOHN C. BLEVNEY, OF NEWARK, NEW JERSEY, ASSIGNORS TO
THE ATHA TOOL COMPANY, A CORPORATION OF NEW JERSEY.

GRINDING AND POLISHING MACHINE.

953,031.

Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed May 31, 1907. Serial No. 376,591.

To all whom it may concern:

Be it known that we, JOHN HAUSMAN and JOHN C. BLEVNEY, citizens of the United States, and residents of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Grinding and Polishing Machines, of which the following is a specification.

Our invention relates to grinding machines and the objects thereof will be fully understood from the following description taken in connection with the accompanying drawing, which forms part of this application, and in the different views of which the same reference character indicates the same part.

Referring to the drawings, Figure 1 is a front view of the machine with certain parts broken away. Fig. 2 is a side elevation. Fig. 3 is a top plan view on an enlarged scale with certain parts omitted and with the upper guide pulley in section. Fig. 4 is a sectional view showing the means for adjusting the driving pulley. Fig. 5 is a front view of the adjusting spider or frame on which one of the guide pulleys is mounted. Fig. 6 is a front face view of a portion of the under belt shown in Figs. 1 and 2. Fig. 7 is a view of a portion of a modified form of belt. Fig. 8 is a diagrammatic view of a modification in which the under belt is plain. Fig. 9 is a view showing a portion of said under belt. Fig. 10 is a view, partly in section, of a modified construction of work holder. Fig. 11 is a rear view of the same. Fig. 12 is a front view.

The part marked 1 on the drawing represents the frame of the machine. 2 is the main driving shaft supported in adjustable bearings in the lower portion of said frame. To one end of this shaft is secured a pulley 3, around which a belt, not shown, passes to drive the machine. 4 is a driving pulley secured to the other end of the shaft. This shaft is mounted in a sleeve 5, the middle portion of which is enlarged at 6 to form an oil chamber. That end of the sleeve next to the driving pulley 4 is provided with ribs 7, the outer faces 7^a of which are circular. These ribs are fitted in a spherical shaped bearing 8 formed on the inner portion of the shaft bearing 9. At the other end of the sleeve 5 there is formed a rectangular bearing 10, against the

faces of which bear the adjusting screws 11. This construction, it is seen, permits the pulley 4 carried by the shaft 2 to be adjusted in either a horizontal or vertical direction by the movement of the adjusting screws 11.

The lower end of the frame 1 is provided with a recess 12 into which projects the inner end of a stud 13. This stud can be moved in and out of said recess and clamped in a fixed position by the clamping screw 14. To the front end of this stud is secured an adjustable sleeve 15 carrying an adjustable work table 16 on which the work to be operated is secured.

At the upper end of the frame of the machine is a plate 17. Pivoted to this plate at 18 is a vertical guide 19 having a dovetailed groove 20 in the face thereof. Threaded in the recess at this end of the machine are two screws 21 and 22 to which are secured hand wheels 23 and 24. The inner ends of these screws bear against the rear of the pivoted guide 19.

25 is a head or slide having a dovetailed portion which fits into and moves vertically in the dovetailed recess 20 of the guide 19. On the front of this vertically moving guide is a lug 27 having a circular opening 28 therein. To the lower end of this slide is connected a lever 29, said lever being pivoted at 30 to a screwthreaded rod 31. This rod projects into the bearings 32 and carries between the bearings the screwthreaded nut 33 by which the said rod 31 is adjusted vertically, and the point of pivot of the lever 29 is raised or lowered. Carried by this lever is a counterbalance weight 34 which may be placed at different positions on the lever to exert more or less force thereon.

35 is a frame or spider having lugs 36 thereon with openings 37 therein. This spider is pivoted to the lug 27 of the vertical slide 25 by a pivot pin or rod 39 passing through the openings 28 and 37 respectively, in the lugs 27, 36 of the spider 35. This spider has a downwardly projecting arm 42 in the lower end of which is an opening 43 into which fits one end of the adjusting screw 44, the other end of the screw bearing against the face of the downwardly projecting portion of the slide 25. This screw is turned by a hand wheel or nut 45 to rock the spider on its pivot.

46 is a spring, one end of which bears against the upper portion of the slide 25 and the other end against the upper portion of the spider 35 above the pivot pin and tends to normally force the upper portion of the spider away from the slide 25. The spider has a hub 47 with an opening 48 therein, into which is secured one end of the stud or shaft 49 on which is loosely journaled the guide pulley 50. By this construction the guide pulley may be adjusted as follows: vertically by turning the adjusting wheel 33 to raise and lower the rod 31. The weight 34 on the lever 29 normally forces the vertical slide 25 upwardly and keeps the shaft 49 and the pulley carried thereby in a raised position. Secured to the pivoted lug 51 of the rod 31 is a stop 52 against which the short arm of the lever strikes and limits the upward movement of the vertical slide 25. By turning the nuts or hand wheels 23 and 24, the adjusting screws 21 and 22 are moved to rock the guide 19 laterally on its pivot 18 to adjust the shaft and pulley laterally or horizontally. By operating the hand wheel 45 the screw 44 is moved to turn the spider 35 on its pivot and adjust the shaft 49 and the pulley 50 in a vertical position.

In the preferred construction of our apparatus we place between the pulley 4 and the pulley 50, another pulley 50^a mounted on a shaft 49^a, said shaft being secured to adjusting apparatus of the same construction as the shaft 49, the said adjusting apparatus operating in the same manner as the adjusting apparatus heretofore described to adjust the said shaft 49^a and pulley 50^a. It is therefore unnecessary to redescribe these parts. For clearness they are indicated by the same reference characters as the adjusting means already described, except that there has been added to each reference character the letter "a".

53 is a belt passing around the pulleys 4 and 50^a. This belt may be made of leather or any other suitable material, and on the surface thereof is a series of transverse, raised portions or projections 54 with a series of depressions 55 between. These projections may be separate pieces secured to the belt, or the belt may be recessed at 55 to leave the projections thereon. Extending around the pulley 50 and around the pulley 4 outside the belt 53 is another belt 56. This latter belt is made of fabric, preferably cloth or webbing. The outer surface of said belt is covered with a suitable abrading or polishing material, preferably emery.

Assuming that the pulleys 4, 50 and 50^a are properly adjusted and a piece of work is secured to the work table 16, the operation of the machine is as follows: Power is applied to the driving pulley 3, whereupon rotary motion is transmitted to the pulley 4 and the belts 53 and 56 are driven. The material or

work to be ground is brought against the face of the emery belt 56 and this belt quickly and accurately grinds the work.

The object of placing the belt 53 underneath or inside the belt 56 is to produce a most satisfactory grinding of the work. When an emery belt alone is used the emery on the face of the belt, in some cases and in some classes of work, becomes detached from the face of the belt during the grinding process and said particles of emery "roll up", become lumpy and cause the work to be ground unevenly. By making the under face of the belt 53 with raised portions and depressions this is avoided, for the reason that the raised portions form elements which support the grinding or polishing belt at a series of separated places and the depressed portions form spaces into which contiguous portions of the grinding or polishing belt may enter when the abrasive material thereof is lumpy or rolls up. These disadvantages are also avoided by placing one belt within the other and causing them to move at substantially the same speed. Secured to the frame of the machine is an adjustable plate, table or guide 57 for the purpose of keeping the belts to their work and preventing them from swaying or sagging. It is understood that in this grinding operation the levers 29 and 29^a are used and are connected to the vertical slides 25 and 25^a to keep the proper tension on the belts during the operation of grinding. In some constructions it is not necessary to provide the belt with raised projections or portions 54, and we may use instead of a leather belt a metal belt 53^a, Fig. 7 of the drawing, which has a series of openings 55^a therein. This metal belt acts and accomplishes the same purpose as the leather belt 53 in grinding certain classes of material, the solid portions of the belt forming the separated supports for the grinding or polishing belt and the openings forming the spaces for the portions of the grinding or polishing having the rolled or lumpy abrasive. Also, in some other classes of work we may use a plain belt 53^b, Figs. 8 and 9, which may be of leather, fabric or any other suitable material.

In some constructions of our apparatus instead of using separate guide pulleys 50 and 50^a we may use only one guide pulley 50^b and cause both belts to pass over said pulley.

It is to be understood that in some types of belt that we use, said belt acts as a cushion to the grinding belt and this cushioning surface causes more perfect grinding by the emery belt.

It is understood that we do not confine ourselves to endless belts, as any continuous moving surface, whether in belt or other form, will accomplish the result.

Instead of using such a work table as we have already described, we may use such a

work table or holder as shown in Figs. 10, 11 and 12 of the drawing. In this construction of holder, 13^a is a tube which fits into the recess or socket 12 in the frame of the machine and is clamped in place by the screw 14. One side of the tube is provided with an under cut slit or channel 13^b, and extending across the outer end of this tube is a bar 13^c having a screwthreaded opening 13^a therein. Fitted on the outside of this tube is a closed-in sleeve 60 having an opening 61 therein. 62 is a screwthreaded rod journaled in the opening 61 and threaded through the screwthreaded opening 13^a. The end of this screwthreaded rod has a hand wheel 63 by which it may be turned to move the sleeve laterally on the tube 13^a. Carried by this sleeve is a dovetail shaped bolt 64 which fits in the under-cut or dovetail shaped opening 13^b in the tube 13^a, and by which the sleeve 60 is secured in its adjustable position by turning the nut 65 on the bolt 64. 66 is a lug projecting upwardly from the sleeve 60. Surrounding this rod and adjustable laterally thereon is the sleeve 68, the ends of which are split at 68^a, and at these ends are lugs having bolts 69 by which the sleeve can be placed in any position on said rod 67. Secured to this sleeve is a work holder 70 having clamps 71 for holding the work 72 to be ground. In operating this work holder the nut 65 is loosened and the hand wheel 63 is turned to move the sleeve carrying the work holder 70 to the proper position in front of the emery belt 56. When in the desired position the nut 65 is tightened to hold the sleeve 68 in a fixed position. The work holder is then turned to a horizontal position, as shown in Fig. 12, the work is secured on the holder and then the holder is raised to a vertical position, as shown in Figs. 10 and 11, to bring the piece of work in proximity to the emery belt for grinding. The work holder is provided with a suitable handle 73 for raising and lowering the same. The sleeve 68 is provided with the slit 68^a and bolts 69 to clamp the sleeve securely on the rod 67 or to take up the wear. The work holder being sleeved onto the rod 67 can not only be raised and lowered as just described, but it may be moved horizontally of the rod to cause the work to move across the face of the belt during the operation of grinding or polishing.

While we have shown the preferred and simplest type of our invention, yet it is to be understood that what is illustrated and described here is merely typical, as various changes may be made without departing from the spirit of our invention.

We desire it also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention here described and all statements of the scope of the inven-

tion, which, as a matter of language, might be said to fall therebetween.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In combination with a grinding or polishing belt, means moving therewith for cushioning the same, having a series of belt-engaging elements separated from each other by spaces for the reception of contiguous portions of the belt under predetermined conditions, for the purpose specified.

2. In combination with a grinding or polishing belt, a cushioning belt therefor moving therewith and having elements engaging the same at a series of separated places, and spaces between said elements which are normally free from contact with the grinding or polishing belt and serve to receive contiguous portions of the latter under predetermined conditions.

3. In combination with a grinding or polishing belt, a cushioning belt therefor, having elements engaging the same at a series of separated places and spaces between said elements which are normally free from contact with the grinding or polishing belt and serve to receive contiguous portions of the latter under predetermined conditions, and means for moving the belts at substantially the same speed.

4. In a machine of the class described, a driving pulley, a guide pulley, an endless grinding or polishing belt passing around said pulleys, another guide pulley, and an endless belt passing around the driving pulley and the last mentioned guide pulley inside the first mentioned belt and having its outer surface provided with projections and depressions forming supporting elements and pockets respectively for the outer belt.

5. In a machine of the class described, a driving pulley, an adjustable guide pulley, an endless grinding or polishing belt passing around said pulleys, another adjustable guide pulley, and an endless belt passing around the driving pulley and the last mentioned guide pulley inside the first mentioned belt and having its outer surface provided with projections and depressions forming supporting elements and pockets respectively for the outer belt.

6. In a machine of the class described, a driving pulley, a guide pulley, an endless grinding or polishing belt passing around said pulleys, another guide pulley, and an endless belt passing around the driving pulley and the last mentioned guide pulley inside the first mentioned belt and having its outer surface provided with transverse projections and depressions forming supporting elements and pockets respectively for the outer belt, a frame carrying the pulleys and a work holder secured to the frame and adjustable toward the first mentioned belt.

7. In a machine of the class described, a driving pulley, a guide pulley, an endless grinding or polishing belt passing around said pulleys, a second guide pulley, an endless belt passing around the driving pulley and the second guide pulley inside the grinding or polishing belt and having a series of elements which engage the latter and spaces between said elements into which contiguous portions of the grinding or polishing belt may enter, means whereby said belts are adjustable relatively to each other, and means for holding the work to the outer belt.

8. In a machine of the class described, a shaft bearing, said bearing having a spherical bearing or seat therein, a shaft, a sleeve on said shaft having a spherical bearing mating with the spherical seat in the shaft bearing, means for adjusting the shaft in its bearings, and a driving pulley on the shaft.

9. In a machine of the class described, a shaft bearing, said bearing having a spherical bearing or seat therein, a shaft, a sleeve on said shaft having a spherical bearing mating with the spherical seat in the shaft bearing, means for adjusting the shaft in its bearings, a driving pulley on the shaft, a guide pulley, means for adjusting said guide pulley, an endless belt passing around said pulleys, and an endless grinding or polishing belt on the outside of the first mentioned belt.

10. In a machine of the class described, a driving pulley, a guide pulley, means for adjusting the guide pulley consisting of a pivoted guide, means for moving the guide on its pivot, a slide in the guide, a spider pivoted to the slide, means for moving the spider on its pivot, a shaft on which the guide pulley turns, said shaft being secured to the spider, and an endless belt passing over the driving pulley and the guide pulley.

11. In a machine of the class described, a driving pulley and a guide pulley, means for adjusting the guide pulley transversely and vertically consisting of a guide pivoted to the frame of the machine, an adjusting screw on each side of the pivot of the guide, a slide movable in said guide, a counterbalance lever connected to the slide, a spider pivoted to the slide, a spring and a screw connected to the guide to move it on its pivot, a shaft on which the guide pulley turns, said shaft being secured to the spider, and a belt passing over the pulleys.

12. In a machine of the class described, a grinding or polishing belt, means for driving the same, including a pulley engaged by the belt, supporting means for the pulley and separate devices for adjusting the supporting means vertically and laterally.

13. In a machine of the class described, a grinding or polishing belt, means for driving the same, including a pulley engaged by

the belt, a pivoted guide, a slide carried thereby and connections between the slide and pulley.

14. In a machine of the class described, a grinding or polishing belt, means for driving the same, including a pulley engaged by the belt, a pivoted guide, a slide carried thereby, a counterweighted lever having connection with the slide, adjustable means upon which the lever is fulcrumed and connections between the slide and pulley.

15. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys and means for supporting one of said pulleys, comprising a plurality of members and connections between the same adapted to permit relative adjustment of the members in a plurality of planes.

16. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys, and means for adjusting one of the pulleys laterally and vertically comprising an element for supporting the shaft of said pulleys, a bodily-movable guided adjustable support for said element, and means whereby said element is adjustable pivotally with reference to its support.

17. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys and means for supporting one of said pulleys comprising a plurality of members, one of which supports the other, said members being relatively adjustable pivotally, and the supporting member being also mounted for adjustment in planes at an angle with each other.

18. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys and means for supporting one of said pulleys comprising a slidable member, a pivoted support therefor, and connections between said member and the pulley.

19. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys and means for supporting one of said pulleys comprising a slidable member, a pivoted support therefor, and connections between said member and the pulley, said connections including a shaft supporting member, having pivotal connection with the slidable member.

20. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys and means for supporting one of said pulleys comprising a slidable member, a lever connected thereto, an adjustable support upon which the lever is fulcrumed, and a counterbalancing means for the lever.

21. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys and means for supporting one of said pulleys comprising a pivoted guide, a slide carried thereby, means acting

on the guide for adjusting the slide pivotally, means for adjusting the slide bodily with reference to the guide, and connections between the slide and the pulley.

5 22. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys and means for supporting one of said pulleys comprising a pivoted guide, a slide carried thereby, means acting
10 on the guide for adjusting the slide pivotally, means for adjusting the slide bodily with reference to the guide, and connections between the slide and the pulley including an element for carrying the pulley-
15 shaft, having pivotal connection with the slide.

23. In a machine of the class described, a driving pulley, a guide pulley, a belt engaging the pulleys and means for supporting
20 one of said pulleys comprising a pivoted guide, a slide carried thereby, means acting on the guide for adjusting the slide pivotally, means for adjusting the slide bodily with reference to the guide, and connections
25 between the slide and the pulley including a spring-pressed pivoted element connecting the pulley with the slide, and an adjusting means for said element.

24. In a machine of the class described, a
30 driving pulley, a guide pulley, their shafts, a belt passing over the pulleys, a slide with which the shaft of one pulley is connected, and means for moving the slide to keep the belt under tension, comprising a lever con-
35 nected with the slide and a counterweight adjustably mounted on the lever.

25. In a machine of the class described, a driving pulley, a guide pulley, their shafts,
40 a belt passing over the pulleys, a slide with which the shaft of one pulley is connected, and means for moving the slide to keep the belt under tension, comprising a lever connected with the slide, a counterweight ad-
45 justably mounted on the lever, means upon which the lever is fulcrumed and devices whereby said means are adjustable to raise or lower the fulcrum of the lever.

26. In a machine of the class described, a driving pulley, a guide pulley, their shafts,
50 a belt passing over the pulleys, a slide with

which the shaft of one pulley is connected, a lever connected with the slide, means acting on the lever and tending to force the slide in one direction, and means whereby the fulcrum of the lever is adjustable. 55

27. In a machine of the class described, a driving pulley, a guide pulley, their shafts, a belt passing over the pulleys, a slide with which the shaft of one pulley is connected, a lever connected with the slide, means act-
60 ing on the lever and tending to force the slide in one direction, and means whereby the fulcrum of the lever is adjustable, comprising a threaded rod having a device upon which the lever is fulcrumed and a threaded
65 device for raising or lowering the rod.

28. In a machine of the class described, a grinding or polishing device, an adjustable work holder consisting of a shaft or tube secured to the machine, an adjustable sleeve
70 over the tube, a rod connected to the said sleeve and work holder, a sleeve connected to the work holder, said sleeve being carried by and adapted to be turned on the rod whereby the work holder may be turned in
75 one direction while the work is being secured thereto and turned in another direction to bring the work into contact with a grinding or polishing device.

29. In a machine of the class described, a
80 continuously moving grinding or polishing belt, a tube secured to the machine, an adjustable sleeve on the tube, a rod connected to the sleeve, a work holder, a sleeve secured to the work holder, said sleeve being
85 carried by and adapted to be turned on the rod whereby the work holder may be turned in one position so that the work can be secured thereto and turned in another position to bring the work into contact with the
90 grinding or polishing belt.

In witness whereof we have hereunto set our hands at Newark county of Essex and State of New Jersey this twenty-ninth day of May, 1907.

JOHN HAUSMAN.
JOHN C. BLEVNEY.

In presence of:

OTTO KUHN,
WM. O. SCHRAFT.