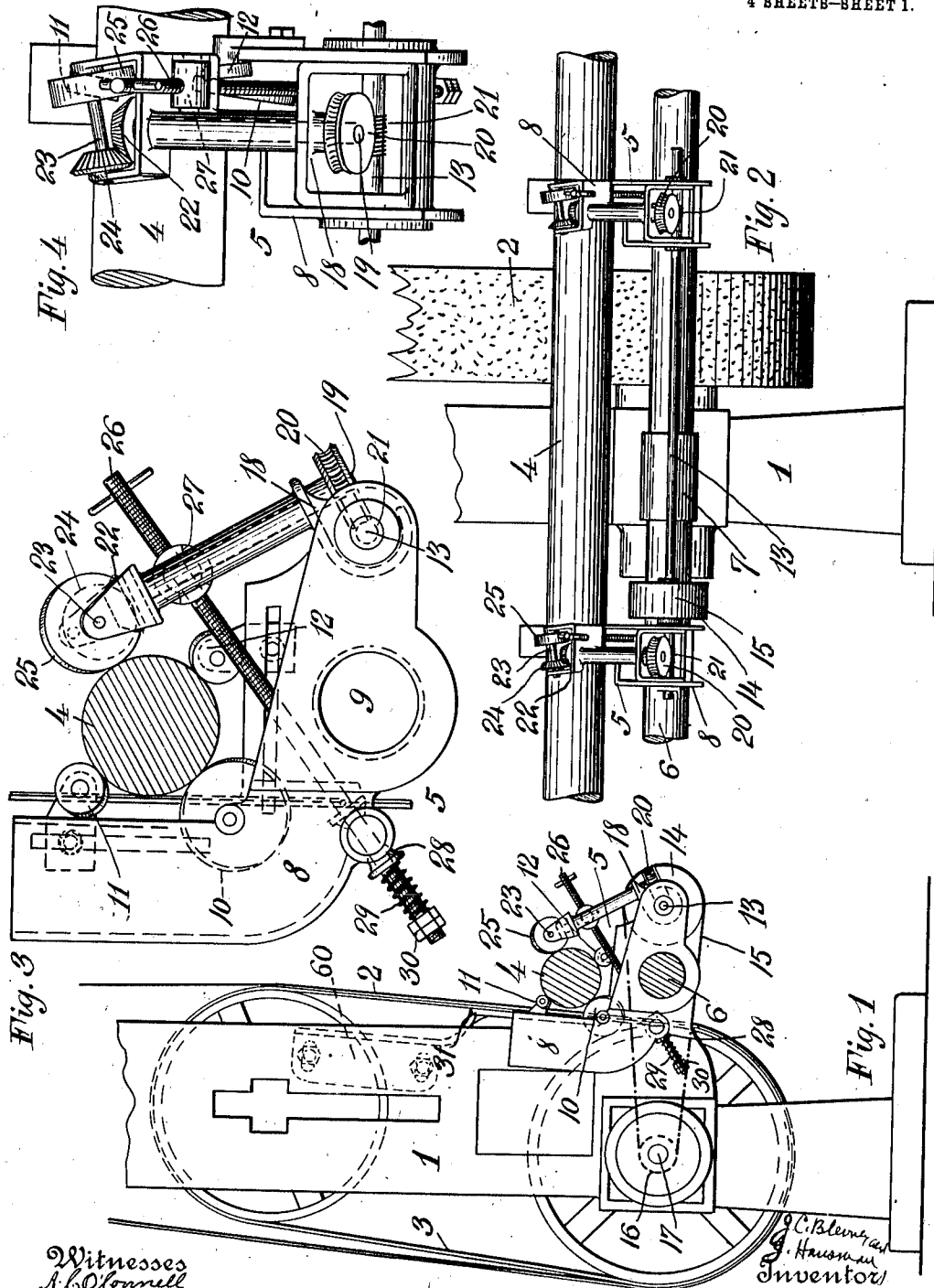


J. C. BLEVNEY & J. HAUSMAN.
GRINDING AND POLISHING MACHINE.
APPLICATION FILED MAY 20, 1909.

980,052.

Patented Dec. 27, 1910.

4 SHEETS-SHEET 1.



Witnesses
A. C. O'Connell
L. P. Richards

By their Attorney, *Wm. A. McGrath*

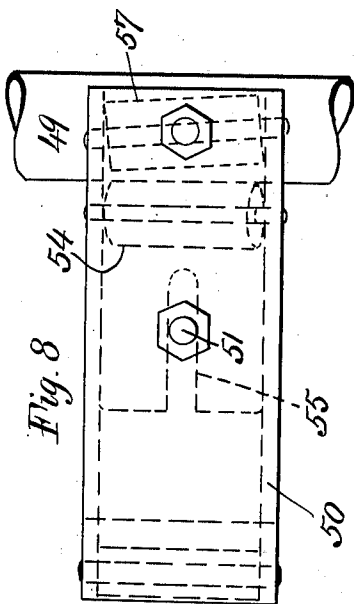
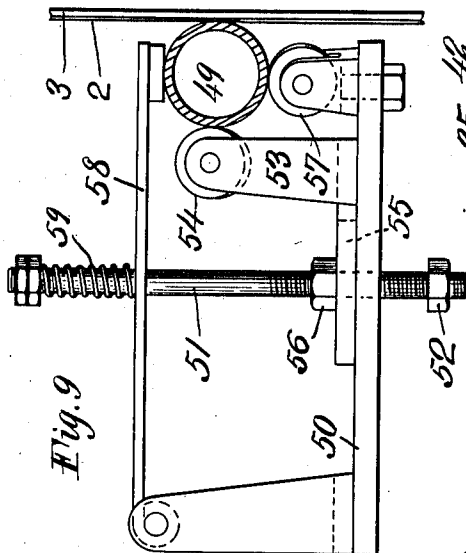
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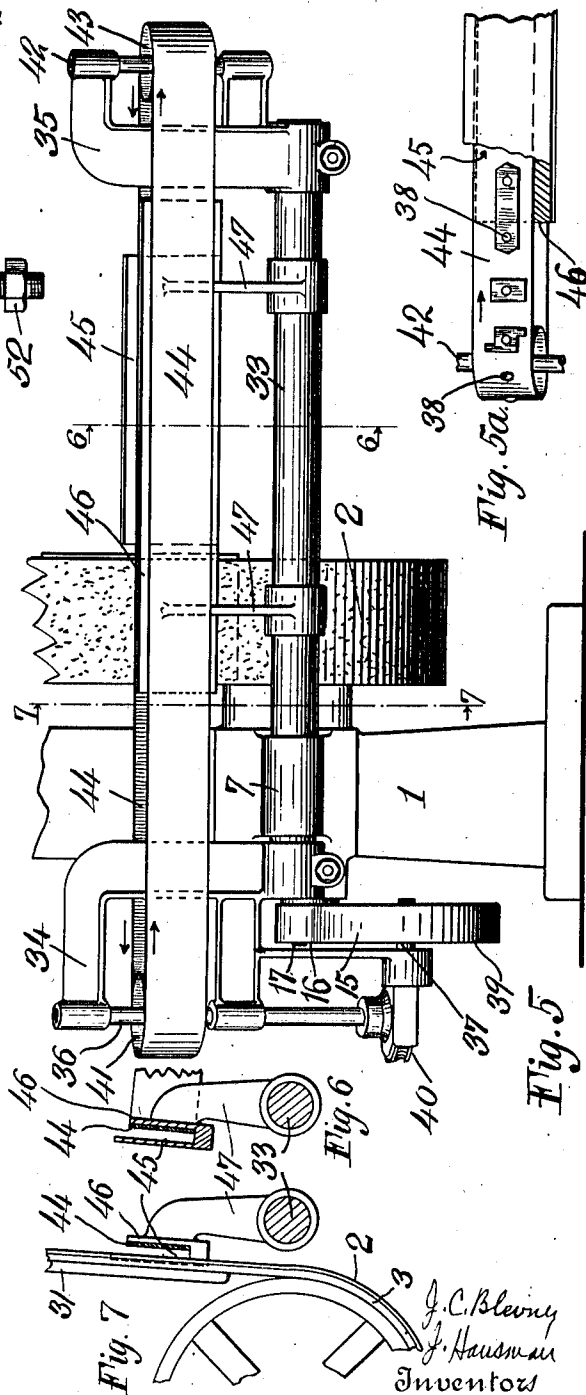
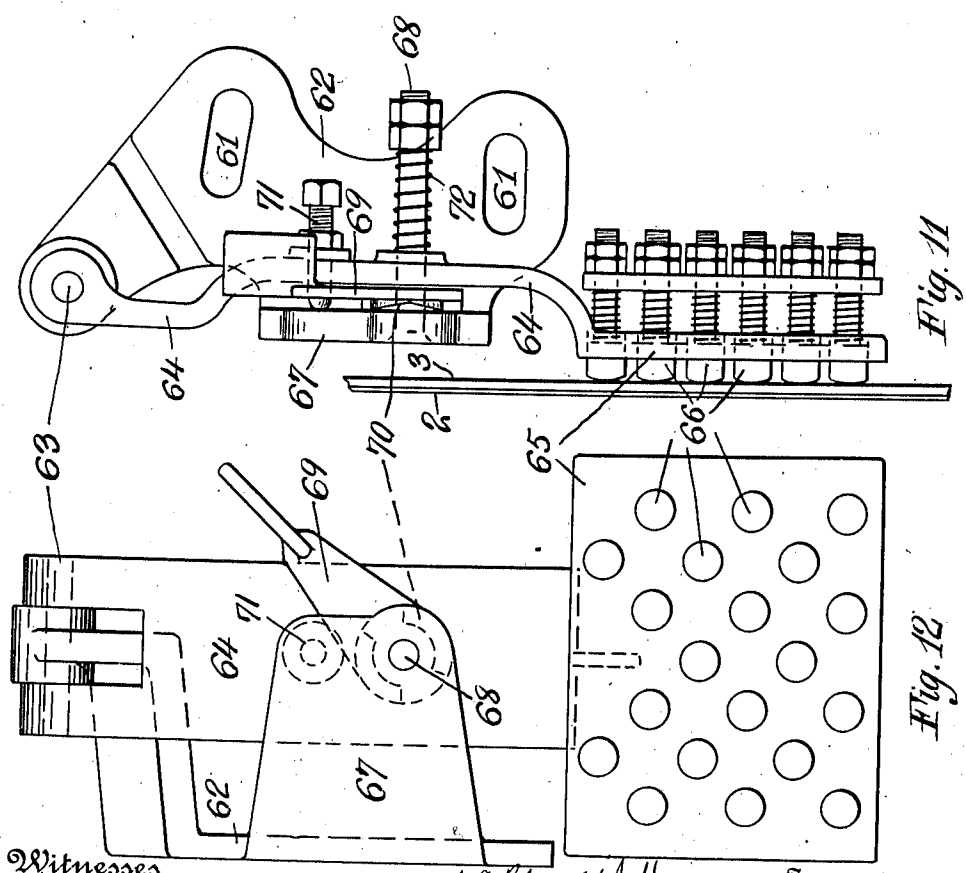
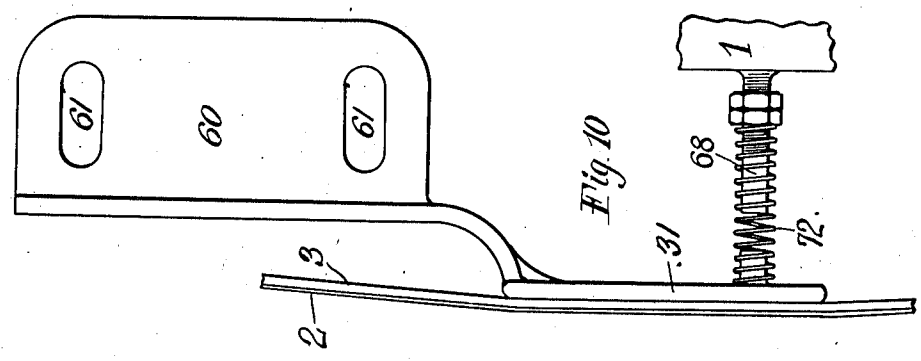


Fig. 7
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4 SHEETS—SHEET 3.



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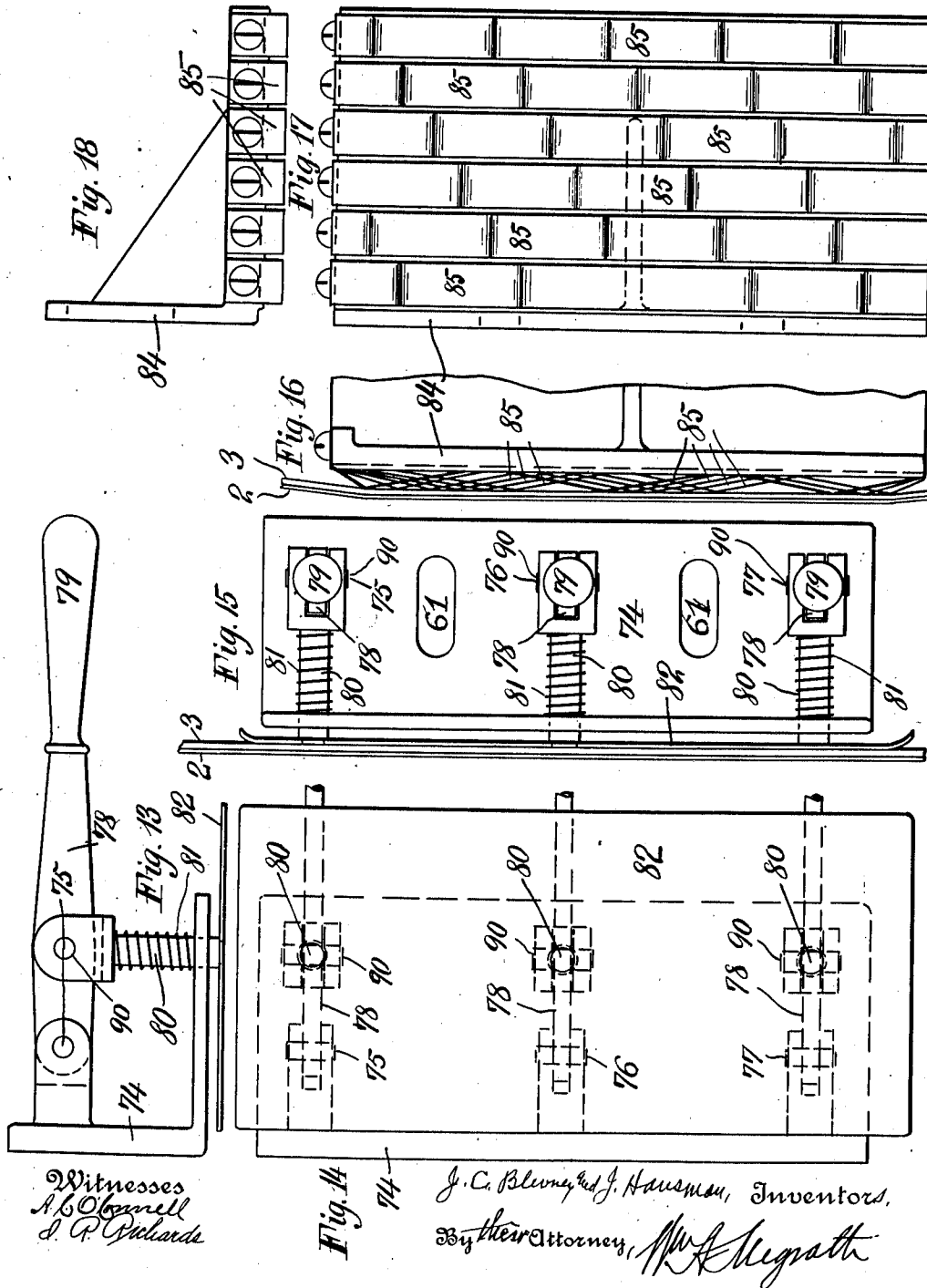
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JOHN C. BLEVNEY AND JOHN HAUSMAN, OF NEWARK, NEW JERSEY.

GRINDING AND POLISHING MACHINE.

980,052.

Specification of Letters Patent. Patented Dec. 27, 1910.

Application filed May 20, 1909. Serial No. 497,331.

To all whom it may concern:

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

This invention relates to improvements in grinding and polishing machines.

The construction of the machine and the objects thereof are fully set forth in the hereinafter description.

The invention is illustrated in the accompanying drawings which form part of this application, but these illustrations are examples only and they are not to be understood as illustrating the only forms of my invention.

Referring to the drawings, in which the same reference character indicates the same part in the several views: Figure 1 is a side view of a portion of a polishing machine equipped with a work-holder for supporting shafts or rods; Fig. 2 is a front view of the apparatus shown in Fig. 1; Fig. 3 is a side view on an enlarged scale of the work-holder shown in Fig. 1; Fig. 4 is a front view of the same; Fig. 5 is a front view of a portion of a polishing machine equipped with a work-holding device for small articles; Fig. 5^a is a detail view of one end of the work holding belt viewed from the rear of the machine; Fig. 6 is a detail view on line 6 of Fig. 5; Fig. 7 is a detail view on line 7 of Fig. 5; Fig. 8 is a plan view of a work holder for light articles, such as a pipe; Fig. 9 is a side view of the same; Fig. 10 is a detail view of a backing to be used behind the abrasive belt of the polishing machine; Fig. 11 is a side view of a modified form of backing to be used when the work to be polished has a prominent irregular surface; Fig. 12 is a front view of the same; Fig. 13 is an end view of a form of a hand operated backing; Fig. 14 is a front or plan view of the same; Fig. 15 is a side view of the same; Fig. 16 is a side view of another modification of backing; Fig. 17 is a front view of the same; Fig. 18 is an end view thereof.

Referring more particularly to Figs. 1, 2, 3 and 4 of the drawings, the reference character 1 represents the frame of the polishing machine of a type in which an abrasive belt 2 is driven over a backing or cushioning belt 3 by means of a pulley or in any other

suitable manner. 4 represents a rod to be polished and 5 is the work holder, of which a sufficient number is employed, depending upon the length of the rod or bar to be polished. In the present instance we have shown two work holders mounted upon a stationary shaft 6 which is carried by a bracket 7 secured to the frame of the machine. The ends of the shaft 6 may be supported in ordinary bearings, not shown, provided with feet and resting in the floor, or by any other suitable means.

Each work holder consists of a bracket 8 having an aperture 9 through which the shaft 6 extends. Mounted in this bracket is a fixed skew roll 10 and two additional skew rolls 11 and 12 which are adjustable in the bracket by means of slots and bolts as shown. A shaft 13 passes through the brackets 8 and secured to it is a pulley 14 by means of which said shaft is driven by a belt 15 from a pulley 16 secured to the shaft 17. Pivoted on the shaft 13 at the outer end of the bracket 8 is a bearing 18. 19 is a shaft carried by said bearing and has at one end thereof a worm wheel 20 which is driven by a worm 21 on the shaft 13. The opposite end of this shaft 19 has secured thereto a bevel gear 22. The upper end of the bearing 18 is bifurcated and supports a shaft 23 which has a bevel gear 24 thereon which meshes with and is driven by the bevel gear 22.

Secured to the shaft 23 is a skew roller 25. The bearing 18 may be adjusted at an angle to the bracket 8 so as to bring the skew roller 25 to rest upon the rod 4 being polished. The skew roller 25 is held under spring pressure against the rod 4 and the amount of tension is adjustable by the following means. A threaded rod 26 passes through a nut 27 pivoted in the bearing 18. This rod also extends through the pivoted nut 28 in the bracket 8. By rotating the rod 26 the bearing 18 is moved toward or from the bracket and the skew roll 25 is adjusted to suit the size of the rod or shaft 4 to be polished. An expansion spring 29 is located between the nut 28 and the lock nuts 30 which pulls the bearing 18 toward the work and keeps the skew roll 25 in frictional contact with the rod being polished.

The operation may be briefly stated thus: After the work holders are mounted on the shaft 6 the rod 4 to be polished is placed on the skew rollers 10 and 12. Said rollers 11

and 12 are adjusted until the rod 4 comes in proper contact with the abrasive belt 2 behind which is the backing 31 which backing is shown more clearly in detail in Fig. 10, although any other suitable form of backing may be used. The pivoted bearing 18 is now adjusted by means of the threaded rod 26 until the skew roll 25 rests on the rod 4. When the machine is started the abrasive belt rubs against the rod 4; and the frictional contact between the belt and rod not only polishes the rod but rotates the same. As the abrasive belt is driven the skew roller 25 is rotated through the train of mechanism described from the shaft 17. The position of this skew roller, as well as the rollers 10, 11 and 12, is such that the rod 14 is driven or moved longitudinally, and preferably the driving mechanism is so proportioned that the speed of the longitudinal movement is low. By this mechanism the rod 14 is automatically rotated and moved longitudinally so that its entire surface is brought in contact with the abrasive belt 2 to automatically grind and polish the same.

In Figs. 8 and 9 I have shown a simple form of work holder for light shafts or tubes. In this construction the tube is marked 49. 50 is the base plate which may be clamped on or near the frame of the machine 1 by the bolt 51 and nut 52. A bearing 53 is secured to the base plate and carries a skew roller 54 and may be adjusted by the slot 55 of the nut 56 to bring the skew roller in contact with the tube being ground or polished. This tube rests upon a skew roller 57 and is held down thereon by the pivoted plate 58 under pressure of the spring 59 on the rod 51. In this instance the work being comparatively light the tube 41 is rotated by the abrasive belt 2, and the skew rollers 54 and 57 being in contact therewith will be rotated by the tube 49 and they are so positioned that they will move or drive the tube 49 longitudinally and transversely of the belt to grind and polish the entire surface thereof. The tension of the spring 59 causes the tube 49 to be held in frictional contact with the skew rollers.

In Figs. 5 to 7 inclusive I have illustrated a work holder where a number of small articles, such as plates, nuts or the like, may be polished. In this construction a shaft 33 is mounted in the bracket 8 carried by the frame of the machine and at each end of this shaft are secured pulley supports 34 and 35. In the support 34 is mounted a vertical shaft 36 and a horizontal shaft 37. The latter shaft is driven from the shaft 17 by the belt 15 passing over the pulleys 16 and 39 and through bevel gears 40 on the shafts 36 and 37 the shaft 36 is driven. Secured to the shaft 36 is a pulley 41. The pulley support 35 carries the vertical shaft 42 on which

is secured the pulley 43. A carrying belt 44 runs over the pulleys 41 and 43. This belt is provided with any suitable number of pins or studs or other means 38 for supporting and carrying the work to be operated on.

In order to hold the articles on the carrying belt while being moved to the abrasive belt we provide a channel 45 in which the carrying belt runs. One side 46 of this channel extends longitudinally beyond the other and in front of the abrasive belt, thus furnishing a backing for the belt 44 at the point of work, as more clearly shown in Figs. 6 and 7. This channel is supported by arms 47 secured to the shaft 33.

The operation is as follows: The operator stands at the end of the channel near the support 35 and on the far side of the machine, as shown in Fig. 5 of the drawing. As the belt 44 passes in front of him he sticks or hangs onto the studs 38 the articles to be polished. These are then carried through the channel 45 and pass the abrasive belt 2, that side 46 of the channel 45 in front of the abrasive belt holding the carrying belt to its work. After the articles pass beyond the abrasive belt they are removed therefrom, or in some instances they are caused to automatically drop from the belt, or they may be removed by any automatic means. Behind the abrasive belt 2 I may use either such a backing as shown by Fig. 10 of the drawing or any of the backings shown in the other figures, or any other suitable backing.

Fig. 10 shows the bracket 31 to be used behind the abrasive belt 2. Preferably it is in the form of a plate depending from the bracket 60 which is provided with slots 61 so that it may be adjustably fastened on the frame 1 of the machine by a suitable bolt or nut.

In Figs. 11 and 12 is illustrated another form of backing where it is desired to have the abrasive belt 2 yieldingly pressed at different points to grind and polish uneven or irregular work. In this construction the backing comprises a bracket 62 by which the backing is secured to the machine. Pivoted at 63 on the bracket is a depending arm or plate 64 which carries a perforated plate 65 through which project a plurality of spring controlled fingers or studs 66. The bracket 62 is provided with an extension 67 which carries a bolt 68 which passes through an opening in the arm 64. On said bolt is pivoted a lever 69 provided with a cam surface 70 between the arm 64 and the extension 67. A bolt 71 is threaded with the arm 64 and abuts against the extension 67. A spring 72 on the bolt 68 presses the arm against the cam surface 70, the pressure being regulated by the bolt 71.

When the work is in place ready to be operated on the lever 69 is turned to allow

the arm 64 to be operated on by the influence of the spring 72 which then presses the said arm toward the abrasive belt 2. As the work passes in front of and against the abrasive belt 2 the studs or fingers 66 press the belt to the work, but permit it to yield to any unevenness in the work. The result of this is an instantaneous yielding of the grinding pressure at a given moment by means of a highly efficient and adjustable mechanism.

Where it is desired to exert a stronger pressure by hand on a certain part of the work we may use such a backing as illustrated in Figs. 12, 13 and 14 of the drawings. In this construction a bracket 74 is provided to which is pivoted at 75, 76 and 77 the levers 78 having a handle 79. To each of these levers at 90 is pivoted a rod or bolt 80 around which is a coil spring 81. Secured to these bolts is a plate 82. The spring 81 normally holds the said plate back, so that there is no pressure against the abrasive belt. If the work being operated on has, for example, a defective spot or depression therein, this part can be ground and polished without cutting away the whole surface, by pressing forward one or more of the levers, so that the abrasive belt is pressed forward and pressure is exerted on the work at this defective spot, and more or less pressure can be exerted by hand, depending upon the extent of the depression or defect.

In Figs. 16, 17 and 18 we have shown another belt for use when an irregular surface of prominent depressions is being worked on. In this construction we provide a supporting bracket 84 which carries a number of corrugated spring members 85, the corrugations of which do not lie in the same plane. These spring members furnish a yielding or cushioning action immediately behind the abrasive belt and the high points of the corrugations yield readily to the difference in the surface of the work operated on.

It might be well to state that it is to be understood that when the backing plates hereinabove described are used, they are placed back of the cushioning belt 3; that is, the belt 3 runs between the abrasive belt and the backing plates.

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

1. In a machine of the class described, the combination of an abrasive belt, means for driving the same, a bracket mounted adjacent to the belt, workholders carried by the bracket, including skew-rolls independently adjustable relatively to each other on said bracket, and means for rotating one of the adjustable rolls.

2. In a machine of the class described, an abrasive belt, means for driving the same, backing-means adapted yieldably to press

the abrasive belt to the work, and workholders, comprising a guide-roll, a second guide-roll adjustable relatively thereto, and means for yieldably holding the article against the guide-rolls.

3. In a machine of the class described, the combination of an abrasive belt and means for holding the work in operative relation thereto, comprising three rolls, two of which are mounted on different sides of the third and adjustable relatively thereto, and a fourth roll yieldably held and adjustable with relation to said third roll.

4. In a machine of the class described, the combination with an abrasive belt and means for driving the same, of work-holding means, comprising a guide-roll, additional guide-rolls adjustably mounted to move toward and away from the first guide-roll, and a spring-pressed skew-roll adjustable angularly to the guide-rolls, and means for driving said skew-roll.

5. In a machine of the class described, the combination with an abrasive belt and means for driving the same, of work-holding means comprising a bracket having horizontal and vertical arms, a guide-roll mounted at the junction of said arms, an additional guide-roll mounted on each of said arms, and a skew-roll angularly adjustable with relation to the guide-rolls.

6. In a machine of the kind described, an abrasive element yieldably pressed to the work combined with means for feeding and holding the work adjacent to the abrasive element, comprising a rotative element and an element having means for pressing it yieldably to the work, the last named element and the abrasive element being independently yieldable in opposite directions.

7. In a machine of the kind described, an abrasive element combined with rollers disposed to feed the work adjacent thereto, means for adjusting one of said rollers relatively to another and holding it yieldably in its adjusted position, and means for adjusting the supporting means for positively driving said roller.

8. In a machine of the kind described, an abrasive element combined with a series of relatively adjustable skew rollers, means for positively driving one of said rollers, a threaded adjusting rod for the latter, and a spring acting upon said rod to hold the roller yieldably against the work.

9. In a machine of the kind described, the combination with an abrasive element of a backing therefor, comprising a movable plate, and adjustable means acting on said plate to yieldably press the abrasive element to its work.

10. In a machine of the kind described, the combination with a flexible abrasive element of means for holding the work adjacent thereto, and a backing means adapted

to engage the abrasive element, having a plurality of supplemental independently movable yieldable elements for pressing the abrasive element against the work.

- 5 11. In a machine of the kind described, the combination of a flexible abrasive element, means for feeding the same, backing means therefor, comprising a plate provided with means for pressing it yieldably toward
10 the abrading element and having a plurality of independently movable yieldable elements for engaging the abrading element.

12. In a machine of the kind described, the combination of a flexible abrasive element, means for feeding the same, backing
15 means therefor, comprising a plate and spring yieldably pressing the plate toward the abrading element and a plurality of independently movable yieldable elements carried by the plate and engaging the abrasive
20 element, and means for holding the work and feeding the same in a plane transverse to that of the movement of the abrasive element.

- 25 13. In a machine of the kind described, the combination of a flexible abrasive element, a pivotally supported backing plate for said element, means for pressing the plate yieldably toward said element, and a
30 plurality of independently movable yieldable elements carried by the plate and projecting therefrom toward the abrasive element.

- 35 14. In a machine of the kind described, the combination of a flexible abrasive element, a pivotally-mounted backing plate therefor, a spring pressing the backing plate toward the abrasive element, means for fixing the plate against the action of the spring,

and a plurality of independently movable 40 yieldable elements carried by the plate and projecting therefrom toward the abrasive element.

15. In a machine of the kind described, the combination of a flexible abrasive element, a pivotally-mounted backing plate 45 therefor, a spring pressing the backing plate toward the abrasive element, means for fixing the plate against the action of the spring, adjustable means for regulating the movement of the plate toward the abrasive element, and a plurality of independently movable yieldable elements carried by the plate and projecting therefrom toward the abra-
50 sive element.

16. In a machine of the kind described, the combination of a flexible abrasive element, a bracket having an extension, a backing plate pivotally connected to said bracket, a bolt connected to said extension and having 60 a spring which presses the backing plate yieldably toward the abrasive element, a lever pivoted to said bolt and having a cam surface mounted between the extension and backing, an adjustable stop for determining 65 the movement of the backing, and a plurality of independently-movable yieldable elements carried by the plate and projecting therefrom toward the abrasive element.

In witness whereof we have hereunto set 70 our hands at New York, county of New York, and State of New York, this 6th day of May, 1909.

JOHN C. BLEVNEY.
JOHN HAUSMAN.

In presence of—
JOHN J. RANAGAN,
ISABEL R. RICHARDS.