Jan. 26, 1932. C. BOOTH 1,843,079

GRINDING MACHINERY

Filed Aug. 6, 1931

Fig. 1

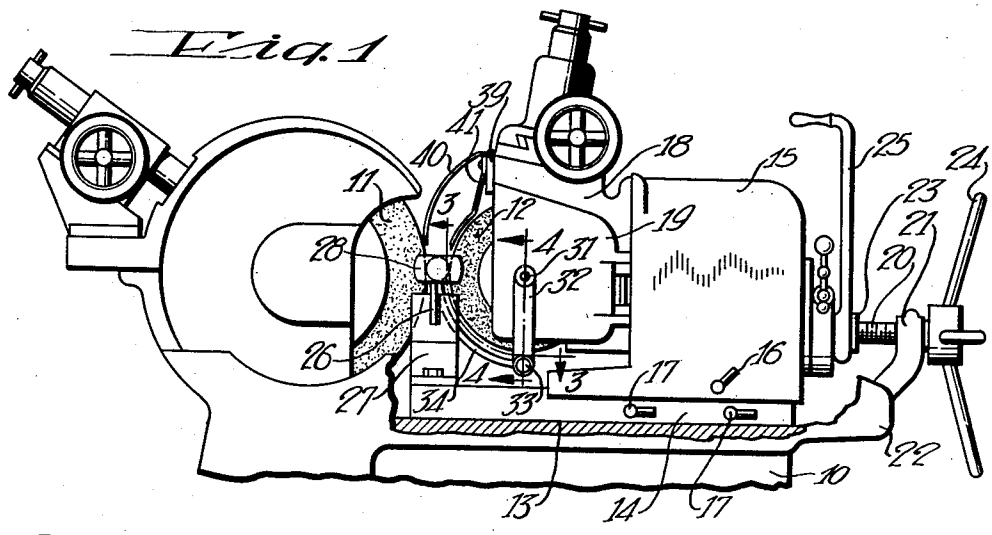


Fig. 2

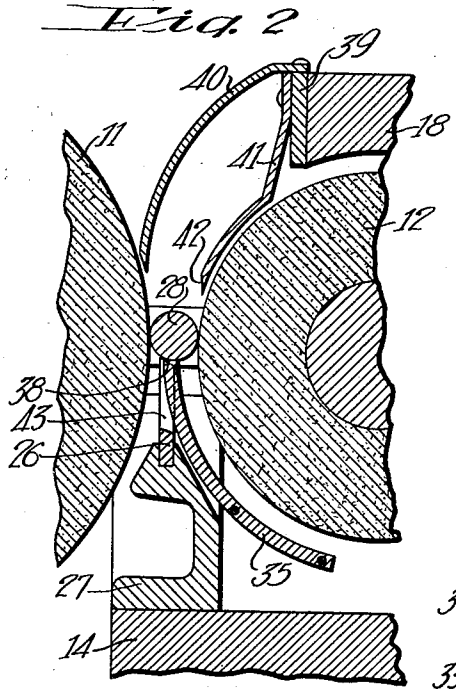


Fig. 3

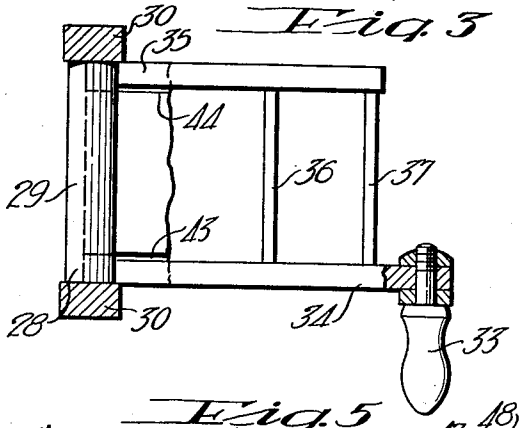


Fig. 5

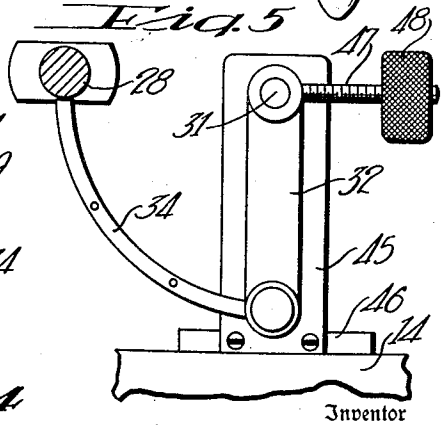
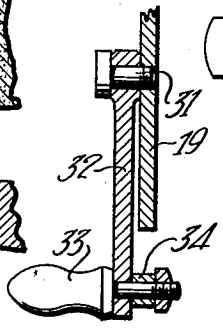


Fig. 4



Inventor

CLEMENT BOOTH

By H. H. Parsons

Attorney

Patented Jan. 26, 1932

1,843,079

UNITED STATES PATENT OFFICE

CLEMENT BOOTH, OF CINCINNATI, OHIO, ASSIGNOR TO CINCINNATI GRINDERS INCORPORATED, OF CINCINNATI, OHIO, A CORPORATION OF OHIO

GRINDING MACHINERY

Application filed August 6, 1931. Serial No. 555,574.

This invention relates to improvements in grinding machines and especially to improvements in centerless grinders.

An object of the invention is the provision of improved means for placing on and removing work pieces from the work rest blade of a centerless grinder.

Another object of the invention is the provision of a simple loading and ejecting mechanism for inserting and removing formed work pieces from the throat of a centerless grinder.

A further object of the invention is the provision of a manually actuable mechanism adapted to be moved substantially upwardly and accurately for inserting or removing formed work pieces from the throat of a centerless grinder which work pieces, because of their peculiar form, straddle the grinding wheel.

Other objects and advantages of the present invention should be readily apparent by reference to the following specification considered in conjunction with the accompanying drawings and it is to be understood that any modifications may be made in the exact structural details there shown and described, within the scope of the appended claims, without departing from or exceeding the spirit of the invention.

In the drawings:

Figure 1 is a fragmentary elevational view of certain parts of a centerless grinder including the device of this invention.

Figure 2 is a longitudinal fragmentary sectional view between the throat of the grinder.

Figure 3 is a plan view of the loading and ejecting mechanism, as seen substantially from line 3—3 of Figure 1.

Figure 4 is a sectional view taken on line 4—4 of Figure 1.

Figure 5 is a fragmentary view illustrating a modified structure embodying the invention.

Throughout the several views of the drawings similar reference characters are employed to denote the same or similar parts.

A device embodying this invention may comprise a bed or support 10 having journaled thereon a spindle for the grinding wheel 11 which is opposed to a regulating wheel 12 and forming therebetween a grinding throat. The bed is further provided on its upper surface with ways 13 for the lower slide 14 movable thereon toward and from the grinding wheel 11. Superimposed on the slide 14 is a second slide 15 movable relative to the slide 14 and adapted to move therewith as a unit. For this purpose clamps 16 and 17 are provided, the former for securing the slides to one another for unitary operation and the latter for securing the lower slide 14 to the bed 10 to permit adjustment of the upper slide relative thereto.

The upper slide 15 has pivotally secured thereto a head 18 in which is journaled the spindle for the regulating wheel 12. The head 18 is provided on its forward end with a door 19 which cooperates with the head to enclose the regulating wheel 12.

In order to shift the slides, as above noted, there is provided an adjusting screw 20 journaled at one end in a bearing or bracket 21 suitably secured to and extending from an extension 22 of the bed. The threaded end of the screw 20 is received in a swiveled nut 23 journaled in the upper slide 15 and the screw 20 has on the end beyond the bearing or bracket 21 a pilot or hand wheel 24 whereby it may be suitably and properly adjusted. For imparting limited in and out movement of the slides 14 and 15 during the grinding operation, the swiveled nut 23 has secured thereto a hand lever 25 oscillatable through an arc of substantially 90° from the vertical position shown in Figure 1.

The work is supported in the grinding throat by a work rest blade 26 adjustably carried by a block 27 secured to the inner end of the lower slide 14. The work is maintained in simultaneous engagement with the grinding wheel 11 which travels at a high grinding rate of speed in a clockwise direction with its surface adjacent the work rest blade travelling downwardly and with the regulating wheel, which is rotatable in a clockwise direction but at a relatively slow work controlling rate of speed so that its surface adjacent the blade travels upwardly.

The grinding wheel effects stock removal from the work while the rotation thereof is controlled by the regulating wheel 12.

As seen in Figure 3, the work piece 28 is provided with a central cylindrical portion 29 and a head portion 30 on each end thereof. This construction necessitates the work straddling the wheel so that the heads 30 are exteriorly of the faces of the wheels.

In order to obtain an efficient production it is desirable that the grinding throat be maintained as near exact size as possible so that an unusual amount of opening is not necessary to insert and remove the work from the throat. For this reason the work is lowered from a position between the wheels where the opposed surfaces thereof are more distantly spaced as compared to the actual grinding throat which is the final size of the work. To accomplish this purpose the door 19 has pivotally secured thereto, as at 31, an arm 32 carrying at its free end a handle 33. Secured to the arm 32 is a finger 34 of arcuate shape, as seen most clearly in Figure 1. A second finger 35 is provided being secured to the finger 34 by spacer pins 36 and 37. The free end of the finger 34 and the corresponding end of the finger 35 are in horizontal alignment and when in the position shown in Figures 1 and 2, are beneath the upper inclined surface 38 of the work rest blade 26 so that the said work is supported solely by the said work rest blade 26. At the conclusion of the grinding operation the operator will grasp the handle 33 and oscillate the loading and ejecting frame about the axis of the bolt 31 to elevate the work from the grinding throat to a point thereabove where it is replaced by an unfinished work piece.

In order to prevent interference between the wheels and the work the head 18 has secured to it a bar 39 from which guard plates 40 and 41 depend. The guard plate 40, as seen in Figures 1 and 2, is bowed outwardly and terminates adjacent the active face of the grinding wheel just above the grinding throat. The guard plate 41 is formed substantially opposite to the plate 40 for a distance and then parallels the active face of the regulating wheel 12 terminating in a substantial point or cam face 42.

The operation of the device is as follows: Through the manipulation of the clamps 16 and 17 and the screw 20, by means of the pilot wheel 24, the grinding and regulating wheels are spaced from one another a distance exactly equal to the final size of the work. The handle 25, which, during this adjustment, is in a position 90° removed from that shown in Figure 1 and turned in a counter clockwise direction, is then raised to the vertical position illustrated in Figure 1. This movement of the handle 25 opens the grinding throat a distance sufficient to permit insertion of a work piece. The handle 33 is now utilized for actuating the work loading and ejecting frame in a clockwise direction about the axis of the pivot bolt 31 which places the ends of the work fingers near the upper end of the space defined by the guard plates 40 and 41. A work piece is now placed on the free ends of the fingers 34 and 35 with the inner surfaces of the heads 30 of the work piece contacting with the outer surfaces of the fingers 34 and 35 to properly position the said work so that, as it is lowered to the grinding throat, the said heads are now engaged by the grinding and regulating wheels. The frame including the fingers 34 and 35, is now actuated in a counter clockwise direction for lowering the work from the position between the guard plates 40 and 41 to the upper surface of the work rest blade 26. The operator now actuates the handle 25 in a counter clockwise direction for effecting a longitudinal movement of the slides 14 and 15 to carry the work piece into the grinding wheel and effect the proper stock removal therefrom. Return of the handle 25 again enlarges the grinding throat so that by manipulating the work loading and ejecting frame, as above described, a finished work piece may be replaced by an unfinished one.

In order to properly actuate the work loading and ejecting frame, the work rest blade is provided on opposite ends with notches 43 and 44, the former providing clearance for the loading finger 34, while the latter provides similar clearance for the finger 35.

The modified structure, illustrated in Figure 5, discloses an adjustable bracket 45 adjustably secured to a tongue or base 46 carried by the lower slide 14. By this construction various adjustments may be made so that additional sizes of work pieces may be ground while using the loading and ejecting mechanism here disclosed. The arm 32 is further provided at its upper end with a screw 47 supporting for adjustment relative thereto a counterweight 48 whereby the weight of the frame and the weight of the work 28 may be suitably compensated so that the operator need only overcome the frictional resistances set up in the mechanism. By this construction the work is readily shifted from the blade to an unloading position, as well as shifted from the loading position to the grinding throat without throwing the entire burden on the operator.

What is claimed is:

1. In a centerless grinder the combination of a pair of opposed grinding and regulating wheels forming a grinding throat therebetween, a work rest blade subtending the grinding throat, a loading and ejecting mechanism for placing on and removing work pieces from the work rest blade comprising a manually shiftable frame pivotally mounted for movement substantially upwardly and

arcuately of the grinding throat, and means for feeding the work and grinding wheel relative to one another during the grinding operation.

2. In a centerless grinder the combination of a grinding wheel, an opposed regulating wheel, the grinding and regulating wheels forming a grinding throat therebetween, a support for the wheels, a work rest blade within the grinding throat, an arm pivotally mounted on the bed, fingers carried by the arm for movement therewith for removing finished work pieces from the work rest blade and placing unfinished work pieces thereon.

3. In a grinding machine the combination of a bed, a grinding wheel rotatably supported thereby, a work rest adjacent the operative face of the wheel for peripherally supporting a work piece in contact therewith, and means for placing the work piece on the blade and removing same therefrom comprising a pivotally mounted frame, work fingers associated with the frame for engagement with the work, and means pivotally mounting the frame whereby it may be swung in an arc in a plane tandem to the grinding wheel for shifting the frame away from the grinding wheel to effect the loading and unloading of the work thereon.

4. In a centerless grinder the combination of a pair of opposed grinding and regulating wheels forming a grinding throat therebetween, a slide for one of the wheels, a work rest blade on the slide subtending the grinding throat for peripherally supporting the work, a bracket on the slide, an arm pivoted on the bracket, work carrying fingers extending from the arm for contact with the work to carry the work from a point remote from the blade to the blade, and manually operable means for actuating the arm about its pivot.

5. In a centerless grinder the combination of a pair of opposed grinding and regulating wheels forming a grinding throat therebetween, a slide for one of the wheels, a work rest blade on the slide subtending the grinding throat for peripherally supporting the work, a bracket on the slide, an arm pivoted on the bracket, work carrying fingers extending from the arm for contact with the work to carry the work from a position remote from the blade to the blade, manually operable means for actuating the arm about its pivot, and an adjustable counterweight associated with the arm for counterbalancing the weight of the arm and parts carried thereby together with the weight of the work carried by the fingers.

6. In a centerless grinder the combination of a pair of opposed grinding and regulating wheels forming a grinding throat therebetween, a slide for one of the wheels, a work rest blade on the slide subtending the grinding throat for peripherally supporting the work, a bracket on the slide, an arm pivoted on the bracket, work carrying fingers extending from the arm for contact with the work to carry the work from a position remote from the blade to the blade, manually operable means for actuating the arm about its pivot, an adjustable counterweight associated with the arm for counterbalancing the weight of the arm and parts carried thereby together with the weight of the work carried by the fingers, and means for effecting adjustment of the bracket relative to the slide toward and from the work rest blade.

7. In a centerless grinder the combination of a pair of opposed grinding and regulating wheels forming a grinding throat therebetween, a slide for one of the wheels, a work rest blade on the slide subtending the grinding throat for peripherally supporting the work, a bracket on the slide, an arm pivoted on the bracket, work carrying fingers extending from the arm for contact with the work to carry the work from a position remote from the blade to the blade manually operable means for actuating the arm about its pivot, an adjustable counterweight associated with the arm for counterbalancing the weight of the arm and parts carried thereby together with the weight of the work carried by the fingers, and means for actuating the slide and parts supported thereby toward the remaining wheel for effecting a stock removal from the work.

8. In a centerless grinder the combination of a bed, a pair of opposed grinding and regulating wheels carried thereby and forming a grinding throat therebetween, a work rest blade subtending the grinding throat, a slide supporting the blade and one of the wheels, a head on the slide and enclosing the said wheel, a work loading and ejecting mechanism comprising a pivotally mounted frame actuable in an arc parallel with one of the wheels for moving work pieces from the blade and placing same thereon, the upper limit of movement of the frame constituting a loading and ejecting station, and means carried by the wheelhead defining the said loading and ejecting station and guarding the work from inadvertent contact with the wheels.

9. In a centerless grinder the combination of a bed, a pair of opposed grinding and regulating wheels carried thereby and forming a grinding throat therebetween, a work rest blade subtending the grinding throat, a slide supporting the blade and one of the wheels, a head on the slide and enclosing the said wheel, a work loading and ejecting mechanism comprising a pivotally mounted frame actuable in an arc parallel with one of the wheels for removing work pieces from the blade and placing same thereon, the upper limit of movement of the frame constituting a loading and ejecting station, and means carried by the wheelhead defining the said loading and ejecting station and guarding

the work from inadvertent contact with the wheels, said means comprising a pair of formed arms one terminating adjacent the grinding wheel just above the grinding throat and the other terminating adjacent the regulating wheel at a point just above the grinding throat.

10. In a centerless grinder the combination of a bed, a pair of opposed grinding and regulating wheels carried thereby and forming a grinding throat therebetween, a work rest blade subtending the grinding throat, a slide supporting the blade and one of the wheels, a head on the slide and enclosing the said wheel, a work loading and ejecting mechanism comprising a pivotally mounted frame actuable in an arc parallel with one of the wheels for removing work pieces from the blade and placing same thereon, the upper limit of movement of the frame constituting a loading and ejecting station, means carried by the wheelhead defining the said loading and ejecting station and guarding the work from inadvertent contact with the wheels, said means comprising a pair of formed arms one terminating adjacent the grinding wheel just above the grinding throat and the other terminating adjacent the regulating wheel at a point just above the grinding throat, and means for actuating the slide and parts carried thereby toward the remaining wheel to effect a stock removed from the work.

I testimony whereof I affix my signature.

CLEMENT BOOTH.