April 29, 1930. M. TUTTLE 1,756,710

GRINDING APPARATUS

Filed March 12, 1928

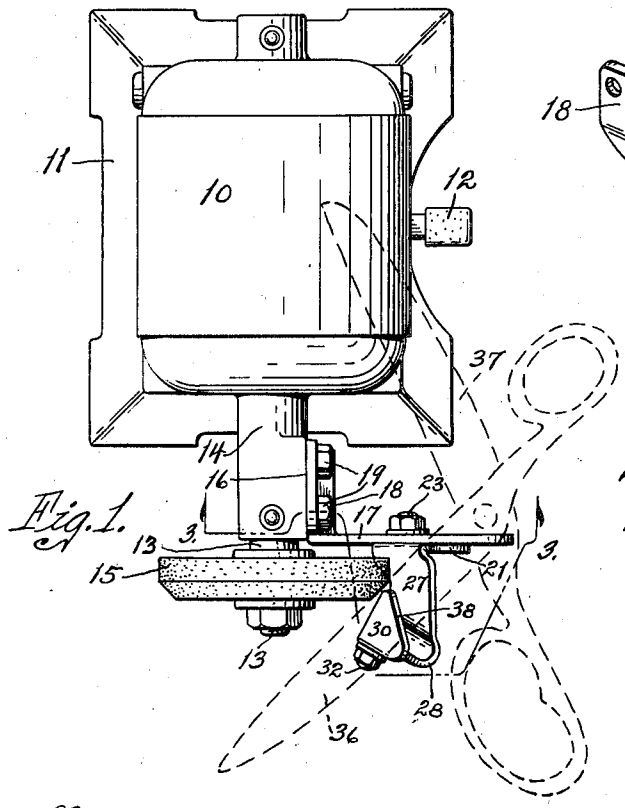


Fig. 1.

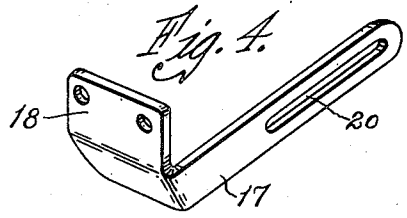


Fig. 4.

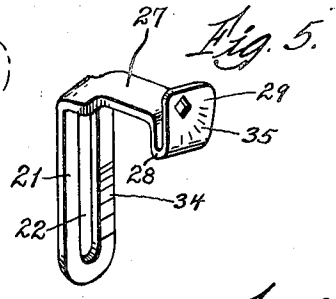


Fig. 5.

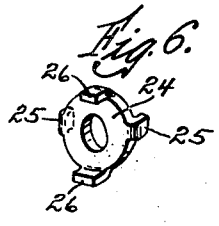


Fig. 6.

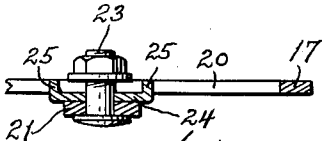


Fig. 9

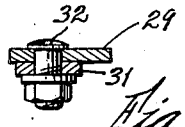


Fig. 8.

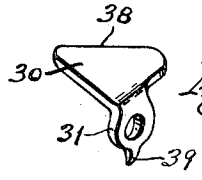


Fig. 7.

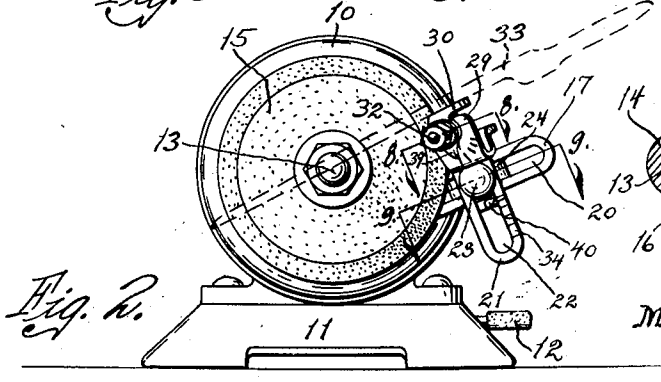


Fig. 2.

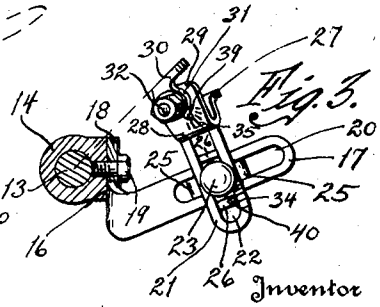


Fig. 3.

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UNITED STATES PATENT OFFICE

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GRINDING APPARATUS

Application filed March 12, 1928. Serial No. 261,147.

The object of this invention is to provide an improved construction for a grinding apparatus to be used in conjunction with an electric motor and particularly an improved work supporting attachment to be mounted on the motor for supporting an object in the desired relation to a grinding wheel carried by the armature shaft of the motor.

A further object of the invention is to provide an improved work support for a grinding apparatus so arranged that the cutting edge of the object being ground is arranged in a plane which passes through the axis of the grinding wheel so that the bevel produced on said object is maintained constantly uniform regardless of the diameter of the grinding stone.

A further object is to provide a grinding attachment including a stationary bracket arranged at an angle parallel with a line passing through the axis of the grinding wheel and through the point of contact of the work object with the periphery of the wheel and also including a movable bracket adjustably mounted on the fixed bracket and carrying a work support which is also adjustably mounted and adapted to be adjusted to a position to compensate for the adjustment of the movable bracket relative to the fixed bracket.

A further object of the invention is to provide a work support which is so shaped that it may be employed for grinding a pair of shears without detaching the shear blades from each other.

With these and other objects in view, my invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in the claim and indicated by the accompanying drawing in which—

Fig. 1 is a plan view of my improved grinding apparatus illustrating how a pair of shears may be ground without detaching the blades.

Fig. 2 is an end view of the device illustrating a single shear blade in position for grinding.

Fig. 3 is a cross-section on the line 3—3 of Fig. 1 and illustrating particularly, the brackets and work support.

Fig. 4 is a perspective view of the fixed bracket detached from the motor.

Fig. 5 is a perspective view of the movable bracket detached from the other elements.

Fig. 6 is a perspective view of a special lock washer employed in mounting the movable bracket on the fixed bracket.

Fig. 7 is a perspective view of the work support detached from the other elements.

Fig. 8 is a detail section on the line 8—8 of Fig. 2 and illustrating the mounting of the work support on the movable bracket.

Fig. 9 is a detail section on the line 9—9 of Fig. 2 and illustrating the mounting of the movable bracket on the fixed bracket.

In the drawings I have illustrated more or less conventionally, an electric motor including a motor case 10 on a base 11 and provided with a switch 12. The armature shaft 13 of the motor projects a material distance at one end from the case and is inclosed in a neck 14 which forms a continuation of the case. The armature shaft 13 projects beyond the neck and carries a grinding wheel 15, preferably beveled at the outer portion of its periphery for contact with the cutting edge of a work object.

The neck 14 is formed at one side with a flattened face 16. A fixed bracket 17 is provided and said bracket is formed at one end with a base or foot 18 which is adapted to contact with the flattened face 16 of the neck and be secured thereto by cap screws 19 or the like. The base 18 of the fixed bracket extends downwardly below the horizontal plane of the shaft 13 and from this downwardly extending portion the bracket 17 extends laterally in a plane perpendicular to the shaft 13, and said bracket also extends upwardly on an angle which intersects the horizontal plane of said shaft. The bracket 17 is formed with a longitudinal slot 20. A movable bracket 21 is adapted to be arranged in contact with and at right angles to the bracket 17 and said bracket 21 is formed with a longitudinal slot 22. A bolt 23 extends through the slots 20 and 22 of the brackets and serves to secure the movable bracket 21 adjustably

to the fixed bracket 17. A special washer 24, shown particularly in Fig. 6, is mounted on the bolt 23 between the two brackets and said washer is formed on its periphery with a pair of lugs 25 extending laterally in one direction into the slot 20 and also is formed with a pair of peripheral lugs 26 extending laterally in the opposite direction into the slot 22. By this means, the bracket 21 is held against torsional movement on the bolt and its perpendicular relation to the fixed bracket 17 is maintained. At its upper end the movable bracket 21 is formed with a laterally extending member 27 which extends across the vertical plane of the grinding wheel 15 and said laterally extending member may be so shaped that the movable bracket may be adjusted to a position quite close to the wheel without contacting therewith. At its outer end the laterally extending member 27 drops downwardly in a U-shaped bend 28 which terminates in an upwardly extending flange 29 which preferably extends above the plane of the member 27.

Adjustably mounted on the upwardly extending flange 29 is a work support comprising a table 30 formed near one corner with a downwardly extending apertured ear 31 which contacts with the outer face of said flange. A bolt 32 extends through the flange 29 and through the ear 31 and serves to adjustably mount the work support on the movable bracket. The shelf 30 of the work support extends into a position adjacent the periphery of the grinding wheel 15 and is arranged at an inclined angle so that the cutting edge of an object supported on said shelf may be caused to contact with the periphery of the wheel at a point above the horizontal plane passing through the shaft 13. The inclination of the shelf 30 is such that it falls substantially in a plane passing through the axis of the shaft 13. Because of this arrangement, the bevel which is formed on any work object such as a shear blade 33, is always maintained constant regardless of the diameter of the wheel 15, it being understood that changes in diameter of the wheel may be due to substitution of different wheels and also to wear of a given wheel in use. By arranging the fixed bracket 17, and particularly the slot 20 thereof, at an angle parallel to the plane extending through the axis of the shaft 13 and through the point of contact of the work object with the periphery of the wheel, the adjustment of the movable bracket toward or away from the grinding wheel does not change the angle at which the work object meets the wheel, so long as the adjustment of the work support is maintained constant. It will be understood that to compensate for differences in the diameter of the grinding wheel, the bolt 23 may be loosened and the movable bracket 21 and members carried thereby may be adjusted by causing the lugs 25 to slide in the slot 20 of the fixed bracket, thus moving the work support toward or away from the periphery of the wheel.

At times it may be desirable to adjust the movable bracket 21 vertically on the bolt 23, which may be done by loosening said bolt and causing the slot 22 to slide on the lugs 26. This adjustment will change the point at which an object on the shelf 30 contacts with the periphery of the wheel and to compensate for such difference and keep the shelf 30 in the desired plane of inclination, the bolt 32 is loosened and the work support is adjust torsionally on said bolt to the desired angle, namely, such that the upper face of said shelf will fall in a plane passing through the axis of the shaft 13. To guide the operator in making this last adjustment, I have provided vertical graduations 34 on the outer face of the movable bracket 21 and corresponding arcuate graduations 35 on the outer face of the flange 29. The graduations 34 and 35 may be provided with suitable corresponding indicia, whereby a vertical adjustment of the bracket 21 may be accompanied by a corresponding arcuate adjustment of the work support. It will be understood that the arcuate graduations 35 are so correlated with the vertical graduations 34 that the position of the work support may readily be adjusted to compensate for any change of the cutting point on the wheel by the vertical adjustment of the bracket 21, so that the shelf 30 may continue to be in the plane passing through the axis of the grinding wheel.

In grinding shears, the better practice is to detach the shear blades from each other and grind each blade separately by drawing it across the work support from hilt to tip with the cutting edge in contact with the beveled periphery of the wheel 15 as the wheel is rotated by operation of the motor. At times, however, it will be found inconvenient or impossible to detach the shear blades and in that event, it will be necessary to grind each blade while it is attached to its mate. Under such circumstances the shears may be opened to the position indicated by dotted lines in Fig. 1, the respective shear blades being designated by the numerals 36 and 37. To permit the blades to be brought into contact with the stone at points near their hilts or the angle between the pivoted blades, I have shown the shelf 30 of the work support cut away on its rear side on an inclined line 38, which line forms an angle of approximately 45 degrees with a vertical plane passing through the flange 29. This cutting away of the shelf provides room for the blade which is not being ground (the blade 37 in Fig. 1) so that the other blade, such as 36, may be brought into the desired relation with the stone without interference by its mate.

The apertured ear 31 of the work support preferably is formed with an indicating point or finger 39 on its lower side directed toward the graduations 35. An indicating means also is provided for the graduations 34 and in this instance I have shown a finger or point 40 formed on the washer 24 in such position that it may be placed adjacent any desired portion of the said graduations as shown in Figs. 2 and 3.

I claim as my invention:

In a grinding apparatus including a motor having a grinding wheel mounted on its armature shaft, an attachment comprising a bracket rigidly fixed to the motor and extending laterally therefrom, a movable bracket extending across said fixed bracket and adjustable longitudinally thereof, means for maintaining said movable bracket in a position at right angles to the fixed bracket, a support for a work object carried by the upper end of the movable bracket, the line of adjustment of the movable bracket relative to the fixed bracket being parallel with a line through the axis of the grinding wheel and through the point of contact of a work object on said support with the periphery of said wheel, whereby a constant bevel may be maintained on the edge of the work object being ground, said movable bracket also being adjustable transversely of said movable bracket and the work support being correspondingly pivotally adjustable on the movable bracket, whereby a work object on the support may be caused to engage a different point on the periphery of the wheel without changing its angular relation to a line drawn through the point of contact and through the axis of the wheel, together with graduations to guide in making corresponding adjustments of the movable bracket transversely and of the work support pivotally.

MARTIN TUTTLE.