Feb. 6, 1934. H. E. TRACY 1,945,986

GRINDING MACHINE

Filed May 12, 1930 3 Sheets-Sheet 1

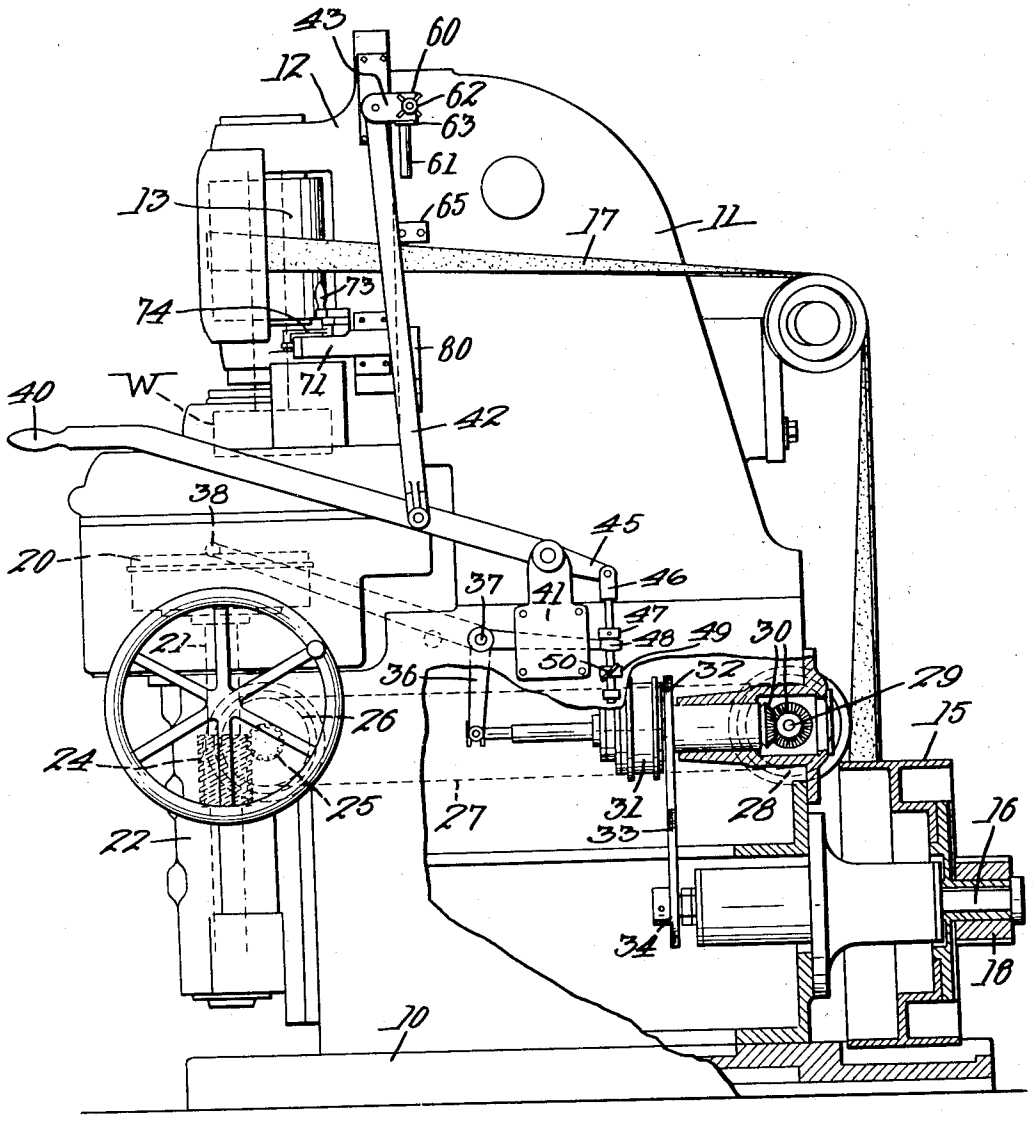


Fig. 1.

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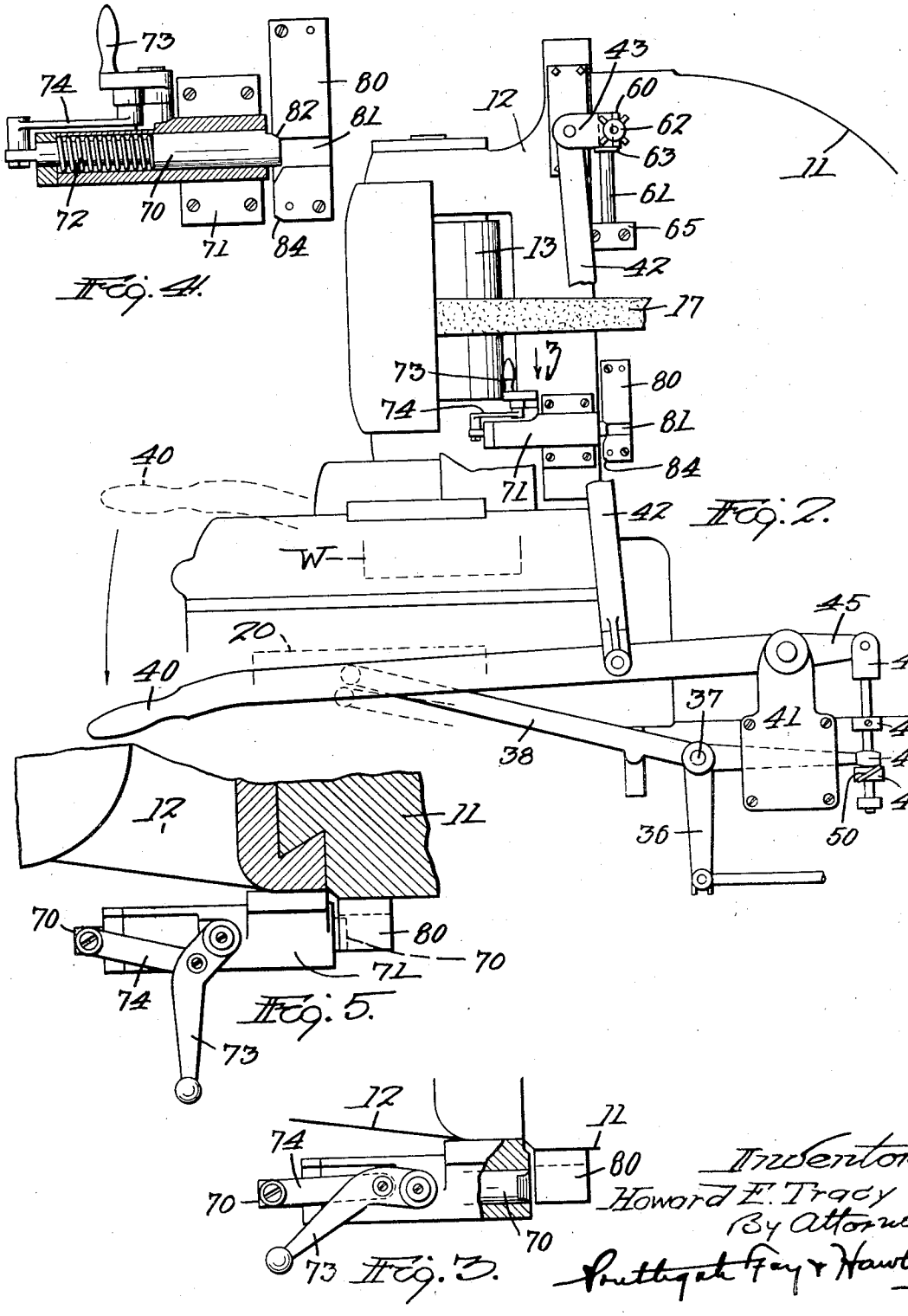


Fig. 4.

Fig. 2.

Fig. 5.

Fig. 3.

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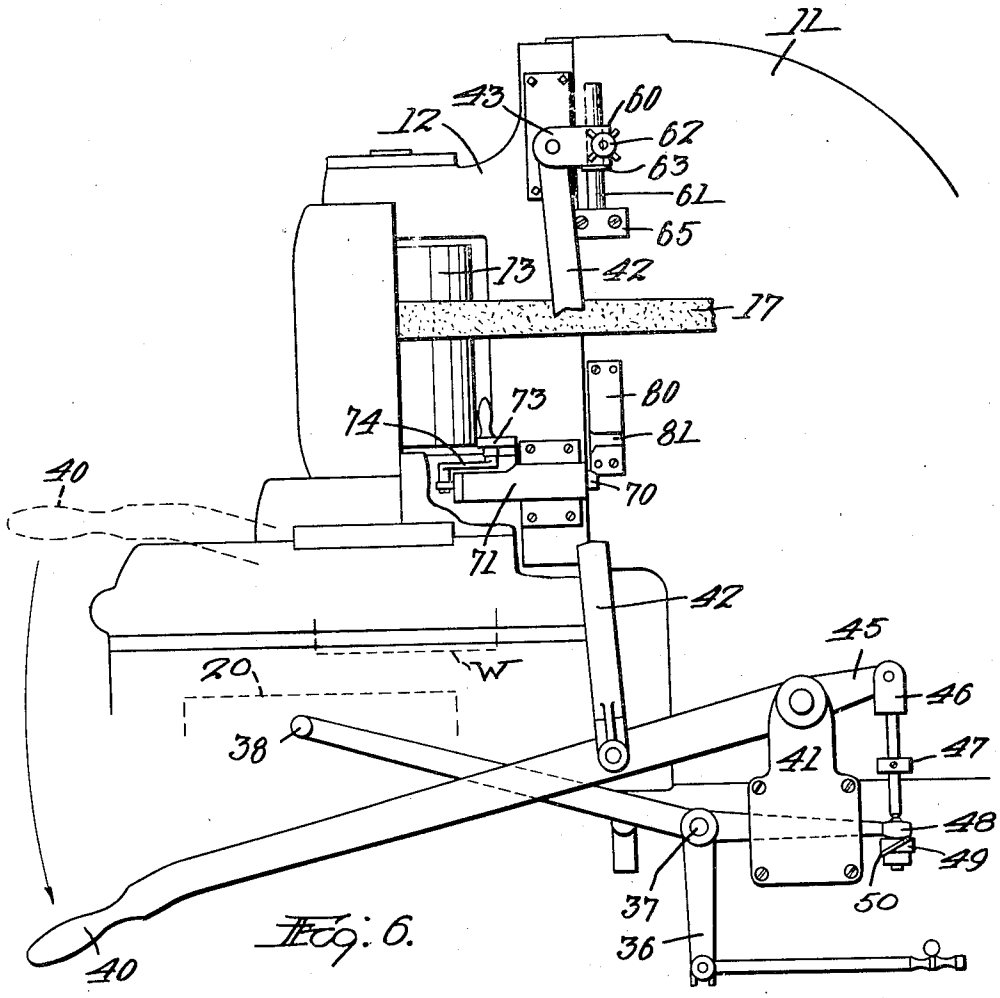


Fig. 6.

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UNITED STATES PATENT OFFICE

1,945,986

GRINDING MACHINE

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Application May 12, 1930. Serial No. 451,536

7 Claims. (Cl. 51—131)

This invention relates to grinding machines of the type in which a grinding wheel is rotatably mounted in a sliding wheel head and is movable axially toward and from the work. The work is commonly mounted on a magnetic chuck or other work supporting member which is preferably rotated at relatively slow speed beneath the grinding wheel.

It is the usual practice in operating such machines to leave the chuck or work supporting member in a selected vertical position during the operation of the machine and to raise the wheel head to separate the wheel and work for unloading and reloading of the chuck. The wheel head is then moved downwardly until the wheel engages the work and the head is thereafter moved gradually downward during the grinding operation until the grinding wheel reaches a predetermined lowermost operative position.

It is one object of my present invention to provide improved devices for raising and lowering the wheel head and for determining the desired position thereof.

I have also provided means by which the wheel head may be definitely located in either one of two selected working positions, and means for controlling the rotation of the work supporting member or chuck in accordance with the position of the wheel head.

My invention further relates to certain arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a side elevation of my improved grinding machine;

Fig. 2 is an enlarged side elevation of certain parts shown in Fig. 1;

Fig. 3 is a plan view, partly in section, of a locating and locking device, looking in the direction of the arrow 3 in Fig. 2;

Fig. 4 is a sectional side elevation of the locking device;

Fig. 5 is a view similar to Fig. 3 but showing the parts in a different relation, and

Fig. 6 is a view similar to Fig. 2 but with the stop member reversed.

Referring to the drawings, I have shown a grinding machine comprising a base 10 having an upwardly extending frame member 11 on which a wheel head 12 is mounted for vertical sliding movement. The grinding wheel W is mounted on a wheel spindle, rotatable in the head 12 and provided with a wide faced pulley 13. A driving pulley 15 on a main shaft 16 is connected with the pulley 13 by a quarter-turn belt 17. The shaft 16 may be provided with a gear 18 to which power may be applied in any convenient manner.

A magnetic or other work supporting chuck 20 is mounted on a spindle 21 rotatable in bearings in a work head 22. The work spindle 21 is connected through spiral gears 24 and 25 to a cross shaft provided with a pulley 26. A belt 27 connects the pulley 26 to a driving pulley 28 on a second cross shaft 29. The shaft 29 is connected by bevel gears 30 and a clutch 31 to a sprocket 32, driven by a chain 33 from a sprocket 34 on the main driving shaft 16. Through these connections the chuck 20 may be continuously rotated at relatively slow speed.

The clutch 31 is controlled through a lever 36 mounted on a cross rod 37. The cross rod 37 extends through the base 10 to the opposite side thereof, where it is provided with a handle 38. By moving the handle the rotation of the work may be stopped at any desired time.

The mechanism thus far described is of the usual type and in itself forms no part of my invention.

The wheel head 12 is carefully counterweighted and is moved easily upward and downward by a hand lever 40 pivoted on a bracket or stand 41 and connected by a link 42 to a bearing member 43 secured to the upper end of the head 12. By movement of the hand lever 40 the head may thus be raised or lowered.

I have also provided a connection by which upward movement of the head will disconnect the clutch 31 through which the chuck 20 is rotated. For this purpose the hand lever 40 is provided with a rearward extension 45 to which a depending rod 46 is pivoted. The rod 46 is provided with a collar 47 engaging the upper side of a yoke arm 48 fixed to the cross rod 37 previously described. A second collar 49 is mounted on the rod 46 and may be secured in adjusted position thereon by a binding screw 50.

As the handle 40 is raised to move the grinding wheel W upward away from the work, the rod 46 moves downward and the collar 47 depresses the yoke arm 48, swinging the clutch arm 36 to the left in Fig. 1 and disconnecting the clutch, thus stopping the rotation of the chuck. As the hand lever 40 is moved in the opposite direction to bring the wheel W into lowered or working position, the collar 49 engages the underside of the yoke arm 48 and moves the clutch arm 36 to the right to engage the clutch and start rotation of the chuck 20. The spacing of the collars 47 and 49 on the rod 46 permits the clutch to be disconnected by the hand lever 38 without raising the head 12.

The bearing member 43 (Fig. 2) on the head 12 has a rearwardly projecting portion 60 having a vertical opening therein to receive a gauge rod or stop 61 which is retained therein by a binding screw 62. The rod 61 has a flange 63 in its middle portion but located substantially nearer one end of the rod. This flange 63 engages the

under side of the projection 60 and determines the vertical position of the gauge rod. As the head 12 is moved downwardly, the lower end of the rod 61 engages an abutment 65 fixed to the side of the frame member 11 and thus determines the extreme downward limit of movement of the head 12.

When the gauge rod 61 is inserted as shown in Figs. 1 and 2, with the short end of the rod uppermost, the head 12 will be stopped in a relatively high position. If greater travel of the head is desired, the gauge rod 61 is reversed as shown in Fig. 6 and substantially increased downward travel of the head is permitted. Such increased travel is often desirable when grinding an end surface at the bottom of a cupped or flanged member.

I have also provided means for holding the head 12 in lowered position after the gauge rod 61 is positively engaged. For this purpose I provide a sliding plunger 70 (Fig. 4) mounted in a bearing member 71 secured to the side of the head 12. A relatively heavy coil spring 72 yieldingly forces the plunger rearward to operative position.

A handle lever 73 is pivoted on the bearing member 71 and is connected by a link 74 to the outer end of the plunger 70. When the handle 73 is moved from the position shown in Fig. 5 to that shown in Fig. 3 the plunger is withdrawn. It should be noted that the handle 73 and link 74 act as toggle members, the pivotal connection of which passes beyond the dead center when moved to the position shown in Fig. 3 and holds the plunger 70 positively in inoperative position.

A contact member 80 is mounted on the frame member 11 for engagement by the plunger 70. The member 80 is recessed or cut away at 81 to provide clearance for the end of the plunger 70 and is provided with a beveled surface 82 adapted to be engaged by a similarly beveled surface on the end of the plunger 70. The lower end of the member 80 is also provided with a second and similar beveled surface 84.

When the short end of the gauge rod 61 is held in the extension 60, the plunger 70, if advanced after the head 12 is lowered, will engage the upper beveled surface 82, preventing upward or yielding movement of the head 12 by pressure against the grinding wheel and holding the stop 61 in engagement with the abutment 65.

When the stop 61 is reversed as shown in Fig. 6, the plunger 70 engages the lower beveled surface 84 at the lower end of the contact member 80.

Having described the details of construction of my improved grinding machine, it is believed that the use and advantages of my improvements will be readily apparent. The handle 40 provides a very convenient and effective means for raising and lowering the wheel head and for disconnecting the drive to the chuck as the wheel head is raised. The plunger 70 affords means for positively locking the head 12 against upward movement and for holding the gauge rod 61 in positive engagement with the abutment 65.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a grinding machine, a frame, a wheel head slidable thereon, a stop to limit downward movement of said head to working position, and a separate locking device additional to said stop and effective to hold said wheel head from upward movement when said head is in working position, said locking device being mounted on said wheel head and having a cam action against a contact member fixed on said frame, by which cam action said head is securely held at its extreme limit of downward travel as determined by said stop.

2. The combination in a grinding machine as set forth in claim 1, in which the locking device comprises a spring-actuated member mounted on said head and yieldingly movable with a cam action into engagement with a fixed contact member on said frame, and in which manual means is provided to withdraw said spring-actuated member.

3. The combiantion in a grinding machine as set forth in claim 1, in which manual means is provided to withdraw the locking device from locking position and to lock said device in withdrawn position.

4. The combiantion in a grinding machine as set forth in claim 1, in which the stop defines two predetermined operative positions and in which the locking device has a cam action against a surface of a fixed contact member by which action said head is moved to and held at its extreme limit of downward travel as determined by said stop, said contact member having two spaced surfaces selectively engageable by said locking device to determine two predetermined positions of said head corresponding to the two operative positions of said stop.

5. In a grinding machine, a frame, a wheel head slidable thereon, a work support, means to rotate said support including a driving clutch, a hand lever pivotally mounted on said frame, a link directly connecting said lever and head and rendering said lever effective to slide said head, and connections comprising an extension on said hand lever beyond the pivot, an actuating rod connected to said extension, and a yoke arm connected to said clutch and located for actuation by said rod, whereby said lever is also rendered effective to disconnect said clutch as said head is moved upward.

6. In a grinding machine, a frame, a wheel head slidable thereon, a work support, means to rotate said support including a driving clutch, a hand lever pivotally mounted on said frame, a link directly connecting said lever and head and rendering said lever effective to slide said head, and connections comprising an extension on said hand lever beyond the pivot, an actuating rod connected to said extension, collars on said actuating rod, and a yoke arm connected to said clutch and located for engagement by said collars, said collars being spaced apart to provide lost motion between said collars and said yoke arm, whereby said hand lever is rendered effective to disconnect said clutch after said head begins to move upward and to connect said clutch after said head begins to move downward.

7. In a grinding machine, a frame, a wheel head slidable thereon, a bearing member fixed on one of said parts, a cooperating abutment fixed on the other of said parts, a stop rod having a flange intermediate its ends and unequally spaced therefrom, said stop rod being slidably insertable in either of two reversed positions in said bearing member, and means to secure said stop rod in said bearing member with either face of said flange in engagement therewith, whereby two predetermined limits of downward movement of said wheel head may be selectively defined.

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