May 30, 1939. H. G. PROCUNIER 2,160,674

DRILL PRESS FOR TAPPING ATTACHMENT

Filed March 11, 1937

Fig. 1

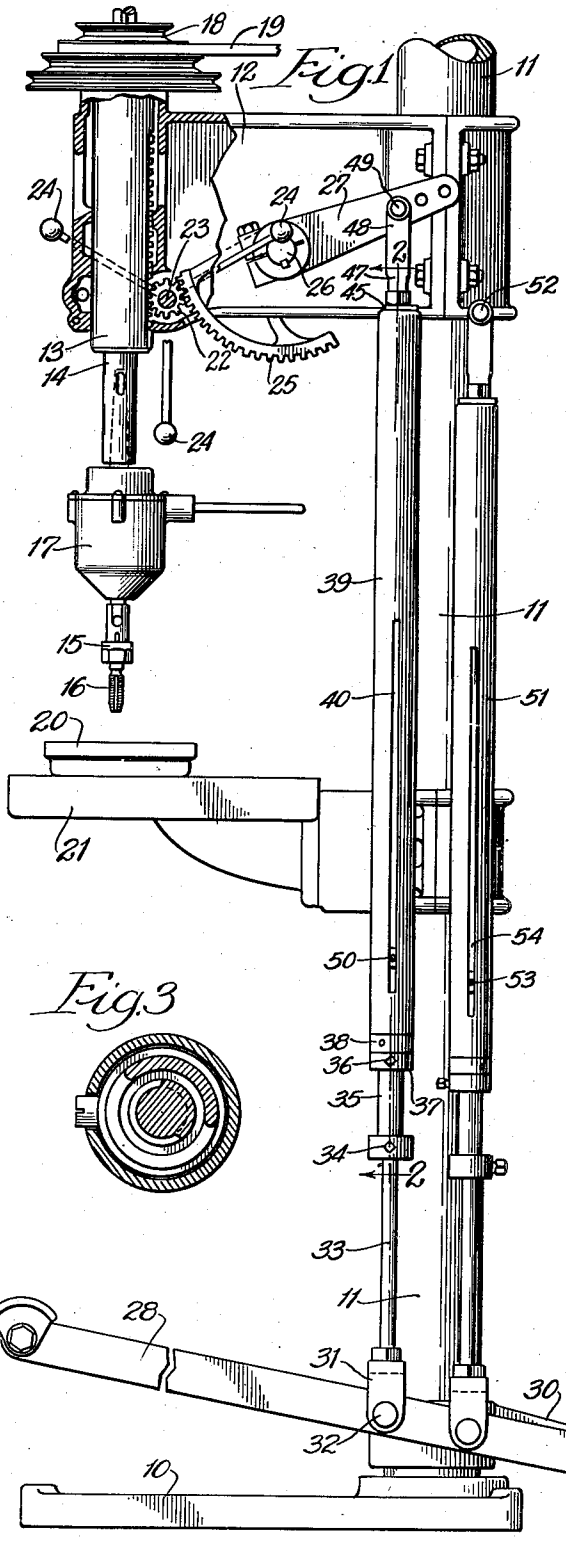


Fig. 2

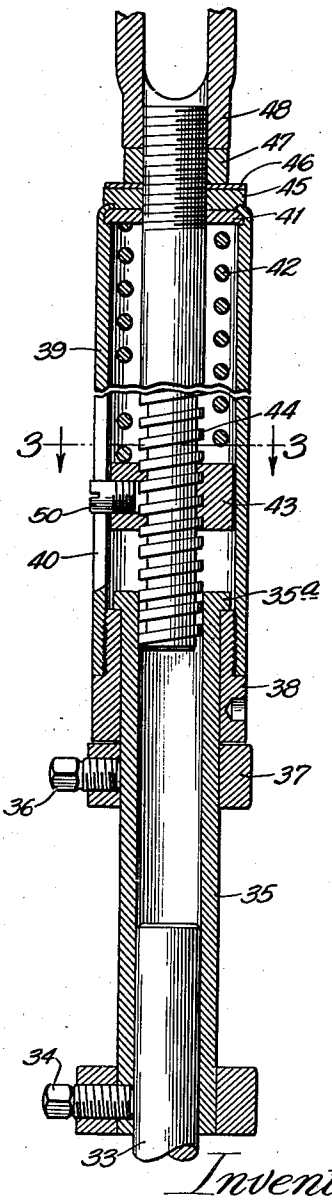


Fig. 3

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DRILL PRESS FOR TAPPING ATTACHMENT

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11 Claims. (Cl. 10—105)

An object of this invention is to provide an improved feed mechanism for a drill press and particularly one for use with a tapping attachment.

Another object is to provide a drill press having a foot lever for operating the same wherein the maximum pressure exerted by the press can be predetermined and adjusted.

Still another object is to provide means for graduating and adjusting the force exerted on the tapping attachment for backing it out of the work, particularly at the instant of starting return.

These and other objects as will hereinafter appear are accomplished by this invention which is fully described in the following specification and shown in the accompanying drawing in which:

Figure 1 is a partial side elevation of a drill press embodying the invention showing the parts thereof in vertical section;

Fig. 2 is a partial enlarged section on the line 2—2 of Fig. 1; and

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2.

The embodiment illustrated comprises a drill press having a base 10 adapted to rest on the floor with a cylindrical column 11 extending therefrom and carrying a bracket 12 which is vertically adjustable thereon. This bracket carries a housing 13 which is vertically slidable therein and which carries a shaft 14 which is adapted to drive a chuck or the like 15 which carries a tap 16. The shaft drives the tap through a tapping attachment 17 which is preferably of the type shown and described in my United States Letters Patent No. 1,781,192, granted November 11, 1930.

The shaft 14 is driven at various speeds in a well known manner as from a stepped pulley 18 and a V belt 19 from a motor, not shown, but which is carried by the bracket 12. The details of drive through the housing 13 to the shaft 14 are not shown for the reason that they are well known in the art and form no part of the present invention.

The work to be tapped 20 is supported in any well known manner on a table 21 which is also adjustably carried on the column 11.

The housing 13 has teeth formed along one side forming a rack which meshes with a pinion 22 on a shaft 23 which is suitably journaled in the bracket 12. A number of operating arms preferably ending in balls 24 are secured to one end of the shaft 23 so as to permit the shaft 14 to be raised and lowered by hand.

A foot pedal for lowering and raising the shaft 14 through the pinion 22 which with adjustable spring means forms the subject matter of the present invention will now be described. A fragmentary gear 25 is carried on a shaft 26 which is suitably journaled in the bracket 12 and carries a lever 27. This lever is lowered by means of a foot lever 28 which is pivotally mounted at 29 on a bracket 30 adjustably carried near the bottom of the column 11.

A yoke 31 is pivotally connected by means of a pin 32 to the foot lever and is attached to a rod 33 which is adjustably attached by means of a set screw 34 to a bushing 35 which in turn is connected by means of a screw 36 to a collar 37. The upper end 35a of the bushing 35 is enlarged and a bushing 38 is rotatable on the bushing 35 between the end 35a and the collar 37. The bushing 38 has a reduced screw-threaded portion which is threaded into the lower end of a sleeve 39 which is provided with a longitudinal slot 40. This sleeve is thus rotatably secured to the rod 33.

The upper end of the sleeve 39 is closed by a disk 41 which carries a compression spring 42 the lower end of the spring resting upon a rotatable cylindrical nut 43 which is rotatable upon a screw 44, the upper end of which extends through a washer 45 of leather, rubber, felt or the like, thence through a steel washer 46, a lock-nut 47 and a threaded yoke 48, the latter being pivotally connected by means of a pin 49 with the lever 27. The nut 43 caries a set screw 50 which extends through the slot 40.

Thus it will be seen that the sleeve 39 is freely rotatable about the screw 44 and that as the sleeve rotates, it rotates the nut 43 with the result that it is fed up or down on the screw 44 depending upon the direction of rotation of the sleeve, thereby increasing or decreasing the initial compression on the spring 42. This spring normally holds the sleeve 39 up in contact with the washer 45 but the application of force to the sleeve in lowering the shaft 14, when the latter meets with resistance, will cause the sleeve to pull away from the washer 45 thereby compressing the spring.

Another sleeve 51 similar to the sleeve 39 is similarly connected to the lever 28 at the bottom and through a pin 52 at the top to the bracket 12. The sleeve 51 has parts similar to those shown in Fig. 2 including a set screw 53 similar to the screw 50 which operates in a slot

54 in the sleeve 51. As the foot-lever is pressed down the spring in the sleeve 51 is compressed and tends to raise the foot-lever.

By turning the sleeve 51 so as to raise the screw 53, the initial compression on the spring contained within the sleeve 51 will be increased and the force required to lower the lever 28 will be increased. Correspondingly, turning the sleeve 51 in the opposite direction so as to lower the screw 53 will decrease the amount of force required to lower the lever 28.

Likewise, turning the sleeve 39 so as to raise the set screw 50 will increase the force applied to the lever 27 and hence to the tap 16 for a given amount of depression of the foot lever 28. Ordinarily this foot lever will be lowered to a predetermined point such as where it strikes a portion of the base 10.

Thus, a yieldable means is interposed between the foot lever 28 and the tap 16 so that if the operator steps on the lever suddenly, the force applied to the tap is a resilient one rather than a blow, and the spring 42 will gradually apply pressure to the tap which will then be driven to the depth for which it is set.

The return or backing out operation of the tap will now be described. It is essential that the force applied to the tap at the instant of starting to back it out of the work shall be a yieldable one and shall be proportional to the force which drives the tap into the work. This is accomplished by means of the yieldable return of the foot lever 28 by means of the adjustable spring contained within the sleeve 51.

A little experience on the part of the operator will enable him to perfectly set the initial compression on the spring 42 and the corresponding return spring (not shown) as indicated by the position of the screws 50 and 53 so as to provide just enough force to yieldably drive the tap into the work to the desired point, after which the clutch in the tapping attachment will slip while the tap comes to rest. On release of the foot lever the tap will be withdrawn from the work. Actual experience with a tapping attachment on this drill press shows that the work can be done better, at a faster rate, with less tap breakage, with greater accuracy in tapped holes and with less effort on the part of the operator than with the methods heretofore used.

The operator can manipulate both the sleeves 39 and 51 to adjust the compression in the springs contained therein without moving from the position he normally occupies while operating the machine. Thus he can quickly and easily correct for any variations in the operation of the tap by making the necessary adjustment while he observes the operation of the tapping attachment.

I claim:

1. In a tapping machine, a shaft, means for rotating the shaft, means operably connected to the shaft for raising and lowering the same, said last-named means including a foot-lever and a yieldable means between the lever and shaft, said yieldable means including an elongated screw member, a helical compression spring about the screw member, a nut on the screw member, a casing surrounding the spring and nut, said casing being rotatable with respect to the screw member so as to turn the nut and to adjust the compression of the spring, and spring means for raising the shaft.

2. In a tapping machine, a shaft, means for rotating the shaft, means operably connected to the shaft for raising and lowering the same, said last-named means including a foot-lever and a yieldable means between the lever and shaft, said yieldable means including an elongated screw member, a helical compression spring about the screw member, a nut on the screw member, a casing surrounding the spring and nut, said casing being operably connected to the nut so as to adjust the compression of the spring, and spring means for raising the shaft.

3. In a tapping machine, a shaft, means for rotating the shaft, means operably connected to the shaft for raising and lowering the same, said last-named means including a foot-lever and a yieldable means between the lever and shaft, said yieldable means including an elongated screw member, a helical compression spring about the screw member, a nut on the screw member, a casing surrounding the spring and nut, said casing and nut being rotatable with respect to the screw member so as to adjust the compression of the spring, spring means between the lever and frame of the tapping machine similar to the spring means between the lever and shaft for raising the shaft, and means for visually indicating to the operator the setting of the two helical compression springs.

4. In a tapping machine, a shaft, means for rotating the shaft, a foot lever, a screw surrounded by a helical spring operably connected to the shaft and foot-lever for yieldably raising and lowering the same, a nut on the screw carrying one end of the spring, a casing surrounding the spring and carrying the other end of the spring, the nut and casing being rotatable with respect to the screw, whereby adjustment of the compression on the spring is made by rotating the casing, and spring means for raising the foot lever.

5. In a tapping machine, a shaft, means for rotating the shaft, a foot lever, a screw surrounded by a helical spring operably connected to the shaft and foot-lever for raising and lowering the same, a nut on the screw carrying one end of the spring, a casing surrounding the spring and carrying the other end of the spring, the nut and casing having interengaging portions so as to rotate together and being rotatable with respect to the screw, whereby adjustment of the compression on the spring is made by rotating the casing, and spring means for raising the foot lever.

6. In a tapping machine, a shaft, means for rotating the shaft, a foot lever, a screw surrounded by a helical spring operably connected to the shaft and foot-lever for raising and lowering the same, a nut on the screw carrying one end of the spring, a casing surrounding the spring and carrying the other end of the spring, the nut and casing being rotatable with respect to the screw, whereby adjustment of the compression on the spring is made by rotating the casing, adjustable spring means similarly mounted in a casing and connecting the foot lever and the frame of the machine for raising the foot lever, and means for visually indicating to the operator the setting of the two helical compression springs.

7. In a tapping machine, a shaft, means for rotating the shaft, means operably connected to the shaft for raising or lowering the same, said last-named means including a foot-lever and a spring between the lever and shaft, a second spring operably connected to the lever for raising the latter, and means operable by the operator while operating the machine for individually

adjusting the force exerted by either of said springs.

8. In a tapping machine, a shaft, means for rotating the shaft, means operably connected to the shaft for raising and lowering the same, said last-named means including a foot-lever and a yieldable means between the lever and shaft, said yieldable means including an elongated screw member, a helical compression spring about the screw member, a nut on the screw member, an element operably connected at one end to the spring and at the other to the lever and having means for rotating the nut to adjust the compression of the spring, and spring means for raising the lever.

9. In a tapping machine, a shaft, means for rotating the shaft, means operably connected to the shaft for raising and lowering the same, said last-named means including a foot-lever and a yieldable means between the lever and shaft, said yieldable means including an elongated screw member, a helical compression spring about the screw member, a nut on the screw member, an element operably connected at one end to the spring and at the other to the lever and having means for rotating the nut to adjust the compression of the spring, and adjustable spring means between the lever and frame of the tapping machine similar to the spring means between the lever and shaft for raising the lever.

10. In a tapping machine, a shaft, means for rotating the shaft, means operably connected to the shaft for raising and lowering the same, said last-named means including a foot-lever and a yieldable means between the lever and shaft, said yieldable means including an elongated screw member, a helical spring about the screw member, a nut on the screw member, an element operably connected at one end to the spring and at the other to the lever and having means for rotating the nut to adjust the force exerted by the spring, and adjustable spring means between the lever and frame of the tapping machine similar to the spring means between the lever and shaft for raising the lever, said elements being individually adjustable by an operator while operating the machine.

11. In a tapping machine, a shaft, means for rotating the shaft, means operably connected to the shaft for raising and lowering the same, said last-named means including a foot-lever and a yieldable means between the lever and shaft, said yieldable means including an elongated screw member, a helical spring about the screw member, a nut on the screw member, an element operably connected at one end to the spring and at the other to the lever and having means for rotating the nut to adjust the force exerted by the spring, adjustable spring means between the lever and frame of the tapping machine similar to the spring means between the lever and shaft for raising the lever, said elements being individually adjustable by an operator while operating the machine, and means for visually indicating to an operator from his normal operating position the setting of the two helical springs.

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