Sept. 20, 1932. S. C. WINGER 1,878,053

CLUTCHING DEVICE

Filed Dec. 26, 1929

Fig. 1

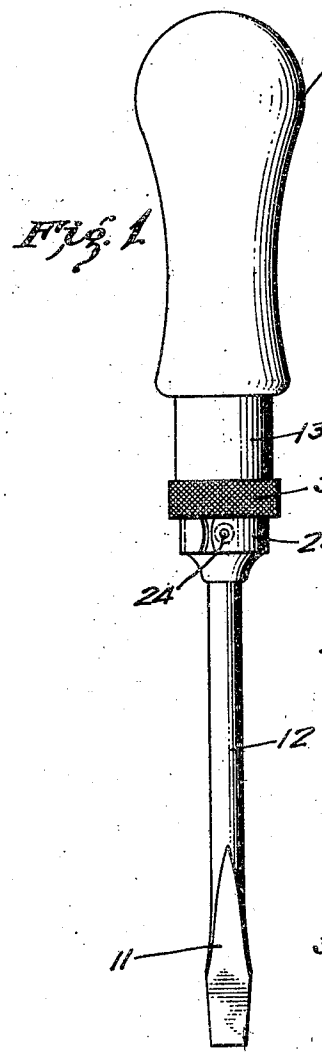


Fig. 3

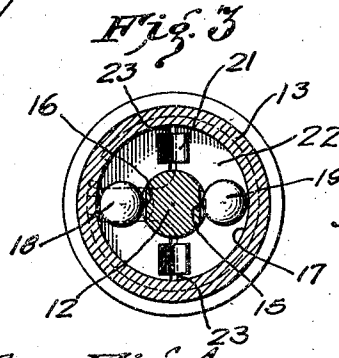


Fig. 4

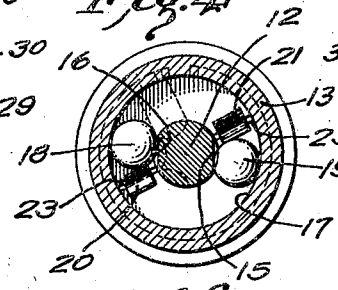


Fig. 6

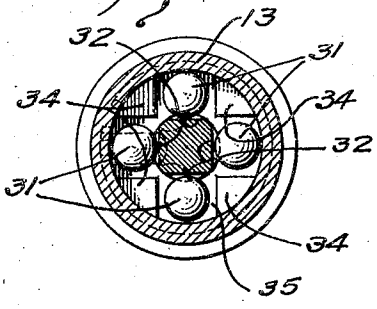


Fig. 2

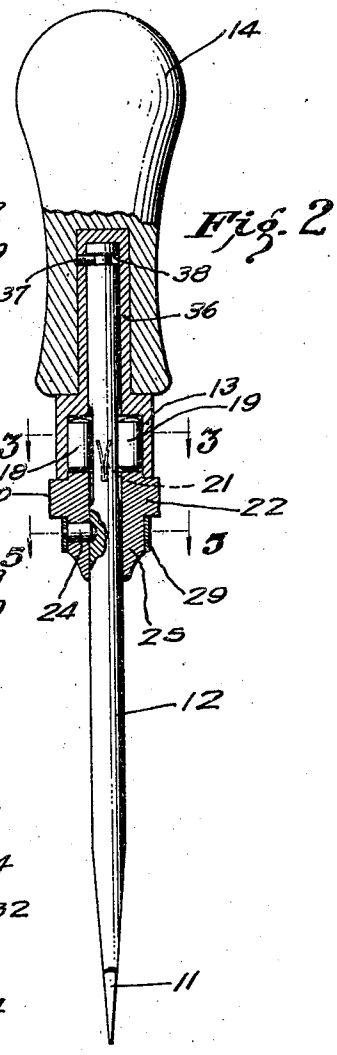
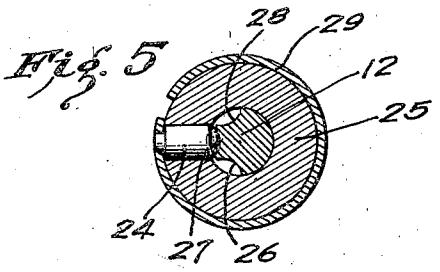


Fig. 5



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UNITED STATES PATENT OFFICE

STOVER C. WINGER, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF FORTY PER CENT TO HENRY COE LANPHER, OF BEVERLY HILLS, CALIFORNIA, AND TWENTY PER CENT TO BRUCE E. ROBERTS, OF LOS ANGELES, CALIFORNIA

CLUTCHING DEVICE

Application filed December 26, 1929. Serial No. 416,417.

This invention relates to a device for clutching two parts together. Especially my device relates to such that are especially adapted to be incorporated in hand tools.

For example, it is now common to provide screw drivers having a blade and a handle, as well as an adjustable mechanism interposed between the blade and the handle, whereby rotation of the handle in either of the two directions only will impart rotation to the blade. At will, the mechanism can be set to cause the blade to advance in either of these two directions, or to be advanced for both directions of movement of the handle. Such devices in general are now well-known and present obvious advantages, not only in connection with screw drivers, but also in connection with other tools, such as wrenches, drill braces, or the like. Once the article upon which the tool is operating is engaged by the tool, a one-way drive such as referred to makes it unnecessary to shift the position of the hand with respect to the handle, as the tool operation proceeds.

It is one of the objects of my invention to provide a device of this general character which is very simple and inexpensive, and yet sturdy and reliable in use.

Although the mechanism can be applied to other types of hand tools, a screw driver will be specifically described herein. In my device, it is possible to engage a screw with the blade, to hold the handle steady with the palm of the hand, and to start the screw simply by manual rotation of the blade with the thumb and forefinger. As soon as a good start is made, the handle can be manipulated as in the usual form of ratchet or friction drives.

My invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideraaion of several embodiments of my invention. For this purpose I have shown a few forms in the drawing accompanying and forming part of the present specification. I shall now proceed to describe these forms in detail, which illustrate the general principles of my invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of my invention is best defined by the appended claim.

Referring to the drawing:

Figure 1 is an elevation of a screw driver embodying my invention;

Fig. 2 is a sectional view thereof;

Fig. 3 is a detail enlarged section, taken along plane 3—3 of Fig. 2;

Fig. 4 is a view similar to Fig. 3, but showing the mechanism in a different position;

Fig. 5 is a detail enlarged sectional view, taken along plane 5—5 of Fig. 2; and

Fig. 6 is a view similar to Fig. 3, of a slightly modified form of construction.

In general, the tool in connection with which I describe my invention, has an operating member 11, such as a screw driver blade, having a shank 12. This shank is shown as free to rotate in a metal member 13, to which is fastened, in any appropriate manner, as by friction, a handle 14. The member 13 has a tubular extension 36 in which shank 12 is rotatable, and in which it is retained against axial movement, as by a key 37 and a groove 38.

The member has a cylindrical cup portion through which shank 12 extends, and which carries the clutching elements now to be described.

As shown most clearly in Figs. 2 and 3, a portion of shank 12 is flattened slightly, at several places, thus providing surfaces 15, 16 that are further from the inner surface 17 of cup 13, than the other portions of the shank surface. It thus happens that friction rollers or the like 18, 19, can be placed between these surfaces 15, 16 and the inner surface of cup 17, and there is a very slight clearance provided for these rollers.

Let us assume, however, that handle 14 is turned in either direction; for example, clockwise as viewed in Fig. 3. Under such circumstances, rollers 18, 19 will be carried by friction in a clockwise direction, and will become wedged between the shank 12 and cup 17, as shown in Fig. 4. Since the space between the round part of shank 12 and surface 17 is purposely made slightly smaller than the diameter of rollers 18, 19, it is apparent that this wedging action will cause a positive con-

nection to be made between the handle 14 and shank 12. Of course, it is preferred to provide hardened surfaces on those parts subjected to this wedging action, in order to reduce wear.

It is also apparent that a rotation of handle 14 in a counterclockwise direction will cause the rollers to wedge as before, the arrangement being symmetrical. Thus, if no further provisions were made, the device would operate as any screw driver, the blade 11 being advanced for either direction of rotation of handle 14.

In order to make the connection operate at will in either of the two directions, I provide means for preventing the rollers 18, 19 from wedging, whenever it is desired to provide a slipping connection for either direction. Thus as shown in Fig. 4, I may provide obstructions 20, 21 in the path of the rollers 18, 19 when these rollers tend to move in a definite direction, as for example, counterclockwise. In the position shown in Fig. 4, and assuming that the obstructions 20, 21 are in fixed relation to the shank 12, any counterclockwise motion of cup 13 cannot provide any clutching effect, because these obstructions will effectively prevent rollers 18, 19 from wedging action with respect to the shank. On the contrary, this wedging action is permitted for clockwise movement.

Thus it is apparent that the proper one-way connection can be secured by proper positioning of abutments 20, 21. To provide a slipping connection for a clockwise rotation, obstruction 21 is moved to a position where it will prevent roller 18 from wedging at the upper edge of surface 16; and similarly, obstruction 20 is moved to a position where it will prevent roller 19 from wedging at the lower edge of surface 15. When these obstructions are in the intermediate position of Fig. 3, they are inactive to prevent the wedging actions, and therefore the tool is operated just as if no clutching device were included.

In the present instance, the obstructions 20, 21 are shown as formed of resilient material. Each can be made from a pair of flat springs, as indicated in Fig. 2, held at one end in a ring 22 encircling shank 12. These ends are fastened in as by slots 23 in ring 22, and the slots can be closed as by upsetting the metal adjacent the slots.

The free ends are spaced apart slightly. The resilience is provided for taking up any inequality or inaccuracy in the parts, as it is apparent that close fits are essential to enable the device to operate effectively.

The angular position of obstructions 20, 21, with respect to the flats 15, 16 can be adjusted by angularly adjusting ring 22 on shank 12. To hold this ring in any of its desired adjusted positions, I provide a snap catch such as a blunt nosed pin 24 (Figs. 2 and 5). This catch 24 is disposed in a radial aperture in the collar 25 formed as a part of ring 22. Its nose is arranged to cooperate with any one of three depressions 26, 27, 28 in shank 12, corresponding to the three positions of obstructions 20, 21 with respect to shank 12. A ring spring 29 encircles collar 25 and one end engages a shoulder on pin 24 to urge it resiliently inwardly.

Ring 22 preferably carries a knurl 30 on its outer surface, to facilitate this angular adjustment. It is also useful in making it possible to start a screw by rotating this collar by the fingers without moving handle 14. Thus assume that the blade 11 is to be rotated in a clockwise direction only, as is rendered possible by the position of Fig. 4. Ring 22 can be freely rotated because there is no tendency for rollers 18, 19 to wedge in either position. After the screw is started, the tool can be operated in the usual manner.

In Fig. 6 I show a slightly modified form of construction. In this instance four balls 31 are shown as cooperating with four flat surfaces 32 on the shank 31′ which corresponds to shank 12, but obstruction members 34 are wedge shaped and can be formed integrally with the ring 35 which corresponds with the ring 22 of the first form described. The operation, however, is substantially the same, except that the adjustment of the obstruction members 34 is limited to a comparatively smaller angle, as there are in this instance four friction rollers 31 instead of the two friction rollers 18.

I claim:

In a clutching device, a shaft, means forming a smooth concentric surface with the periphery of the shaft and spaced therefrom, said shaft having a flat surface at spaced places, a wedging rolling member disposed between each flat surface and the concentric surface, and obstructions alternating with the rolling members about the shaft to prevent said rollers from wedging, said obstructions being carried by the shaft and being capable of adjustment so as to be centrally positioned with respect to the flat surfaces, or alternately to be disposed near the flat surfaces.

In testimony whereof I have hereunto set my hand.

STOVER C. WINGER.