W. L. MILLER.

SAFETY CRANK FOR SHAFTS.

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1,189,606. Patented July 4, 1916.

Fig. 5.

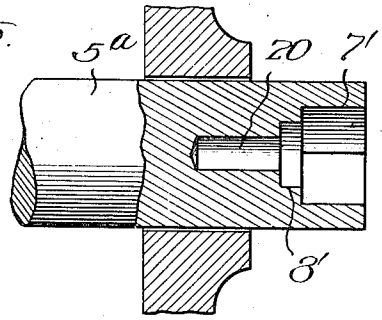


Fig. 1

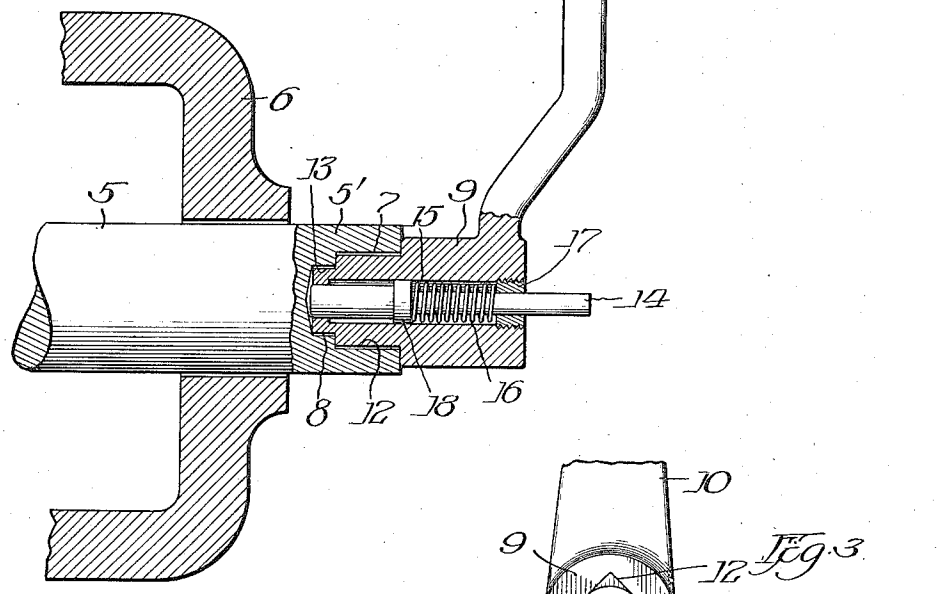


Fig. 3

Fig. 2

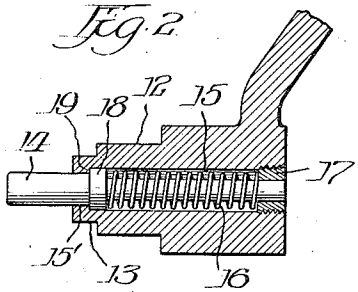
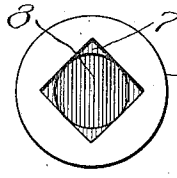


Fig. 4



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SAFETY-CRANK FOR SHAFTS.

1,189,606. Specification of Letters Patent. Patented July 4, 1916.

Application filed June 9, 1915. Serial No. 33,025.

To all whom it may concern:

Be it known that I, WILLIAM L. MILLER, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Safety-Cranks for Shafts, of which the following is a specification.

This invention relates to manual shaft-turning devices, and, in its principal intended application, has reference to a device in the nature of a safety crank for application to the projecting ends of continuously revolving shafts when a manual turning of the shaft may be required. In many types of lathes and other machine tools shafts are employed which are in continuous rotation when the machine is in operation, but which are required to be turned manually in setting up the machine. Hence, one or both ends of such shafts are commonly projected through the wall or walls of the housing and are provided with a squared end for the application of a crank having a square socket in its hub to effect such manual turning of the shaft. These square projecting shaft ends which are continuously revolving during the operation of the machine present an element of danger to the operatives in their liability to catch and wind up the clothing of the operative resulting in damage to the clothing and sometimes injury to the operative.

The object of my present invention is to provide a manually operable device for effecting the turning of such shafts in setting up the machine, which shall entirely eliminate the objectionable and dangerous character of such shafts as at present employed.

The device of my invention, its mode of use, and the advantages attendant upon the same will all be readily understood from a consideration of the accompanying drawing taken in connection with the following detailed description.

In the drawing—Figure 1 is an elevational view, partly in axial longitudinal section, of a shaft end and shaft turning device therefore embodying my present invention; Fig. 2 is an axial longitudinal section through the hub portion of the crank, the same being removed from the socket of the shaft; Fig. 3 is an end elevation of the parts shown in Fig. 2 as viewed from the left of the latter figure; Fig. 4 is an end elevation of the socketed end of the shaft; Fig. 5 is an elevation view of the end of a non-rotating shaft so formed as to be capable of adjustment by the same device that effects adjustments of rotating shafts.

Referring to Figs. 1 to 4 of the drawing, 5 designates the shaft, which may be assumed to be a continuously rotating shaft of a lathe, said shaft having an end portion 5′ projecting beyond its bearing 6 in a side wall of the lathe. In the projecting end 5′ of the shaft is formed a socket comprising an outer square portion 7 and an inner round portion 8. Preferably, and as herein shown, the round inner portion 8 of the socket has a diameter equal to one of the sides of the outer square portion 7, as clearly shown in Fig. 4. 9 designates the hub, 10 the arm, and 11 the handle of a manually operable crank for turning the shaft 5 in setting up the machine or whenever otherwise required. The hub 9 is formed with a squared portion 12, and, beyond the latter, with a round portion 13; these squared and round portions of the hub being adapted to a sliding fit in the squared and round portions 7 and 8 of the shaft socket, respectively.

It is evident that if a workman, having applied the crank and turned the shaft to the required extent, were to forget to remove the crank and leave the same in place, after the machine was started the revolving crank would be quite as dangerous as, or more so than, a continuously revolving squared end. To safeguard against such a contingency I provide means for automatically disconnecting the crank from the socket of a revolving shaft as soon as the workman releases his hold on the former, such means as herein shown comprising a pin 14 slidably mounted in and axially of the hub 9, said hub having an axial bore 15 to accommodate said shaft and a pin-actuating spring 16. The pin 14 has a sliding bearing in a reduced portion 15′ of the bore 15 at one end of the hub and in a concentrically bored nut 17 tapped into the other end of the hub. The spring 16 is confined between the nut 17 and a collar or integral annular enlargement 18 of the pin 14, said collar 18 in turn abutting against an annular shoulder 19 of the reduced end wall of the hub. The normal tendency of the

spring 16 therefore, is to maintain the pin 14 in the position shown in Fig. 2.

When the crank is applied to the socketed end of the shaft 5, the projecting end of the pin 14 strikes the bottom of the socket, and as the hub of the crank is entered into the socket, the pin is compressed and the pin is forced in the opposite direction relatively to the hub, as illustrated in Fig. 1. In turning the crank a slight inward pressure (toward the shaft) on the part of the operative maintains the crank in operative engagement with the shaft; but the moment the crank is released the expansion of the spring 16, acting through the pin 14, disengages the hub of the crank from the socket in an obvious manner.

Many lathes and other machines are provided not only with shafts that rotate continuously during the operation of the machine but also with other shafts that oscillate or are stationary while the machine is running, and also require adjustment in the settling up of the machine. To avoid the necessity of a separate shaft-setting device for such non-rotating shafts, and render the above described shaft-turning device applicable thereto, I provide the shaft end formation illustrated in Fig. 5, wherein 5^a designates the end portion of a non-rotating shaft, which is structurally identical with the end portion 5′ of a rotating shaft, except that it is provided with a hole or socket 20 extending inwardly of the square and round crank-engaging sockets 7′ and 8′ to accommodate the projecting portion of the pin 14, so that the crank, when applied to shaft 5^a will not be thrown off automatically when the workman releases his hold thereon.

The round portions of the socket and crank hub are not indispensable, but are preferably employed for the reason that the forward round portion of the hub facilitates the application of the crank to the shaft, since such forward round portion can obviously be entered into the square outer portion of the socket at any angle at which the hub and crank arm may be presented; and when thus entered it is necessary only to turn the crank with a slight inward pressure until the squared portions come into registration with each other; the round portions of the hub and socket thus acting as a sort of guide or centering device in effecting the easy and quick application of the crank to the shaft.

While I have illustrated a preferred mechanical embodiment of the invention, it is manifest that the same may be varied in minor details within the purview of the invention as defined in the appended claims.

I claim:

1. The combination with a shaft having a centrally socketed end, of a crank for turning the same having a hub provided with a rigid portion non-rotatably fitting within the socketed end of said shaft, and means operative to force said crank hub out of engagement with said shaft when the crank is released.

2. The combination with a shaft having in an end thereof a socket the inner portion of which is round and the outer portion polygonal in cross-section, of a crank for turning said shaft having a hub provided with a socket-engaging member the outer portion of which is round and the inner portion polygonal in cross-section to fit the inner and outer portions respectively of said socket.

3. The combination with a shaft having a centrally socketed end, of a crank for turning the same having a hub provided with a rigid portion non-rotatably fitting within the socketed end of said shaft, and spring-actuated means within said hub operative to disengage the latter from said shaft when the crank is released.

4. The combination with a shaft having in an end thereof a socket the inner portion of which is round and the outer portion polygonal in cross-section, of a crank for turning said shaft having a hub provided with a socket-engaging member the outer portion of which is round and the inner portion polygonal in cross-section to fit the inner and outer portions respectively of said socket, and a spring-actuated rod slidably mounted in said hub and adapted through engagement with the bottom of said socket to tend to force the socket-engaging portions of said hub out of engagement with said socket.

WILLIAM L. MILLER.