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JEWELERS BORING TOOL
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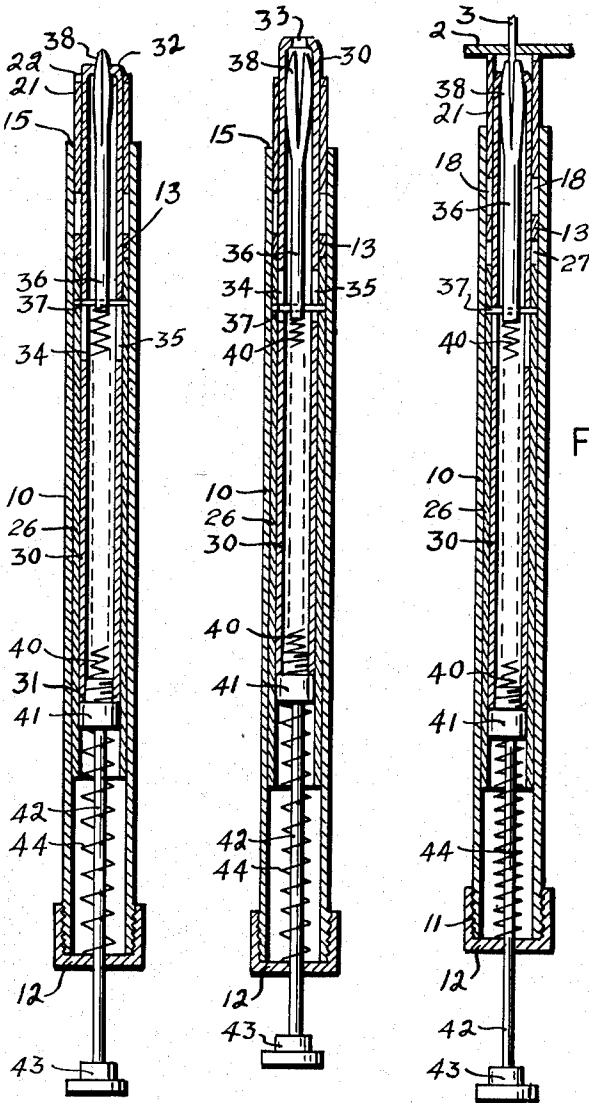
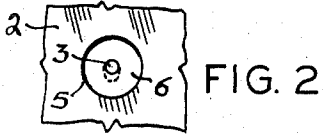
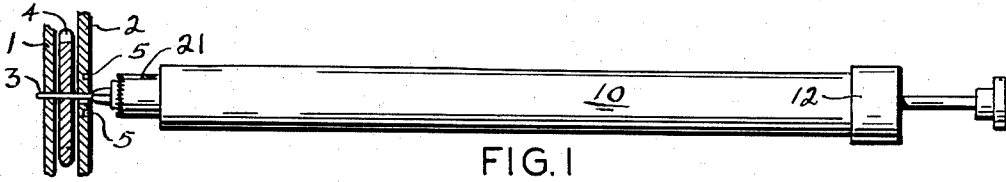


FIG. 3

FIG. 4

FIG. 5

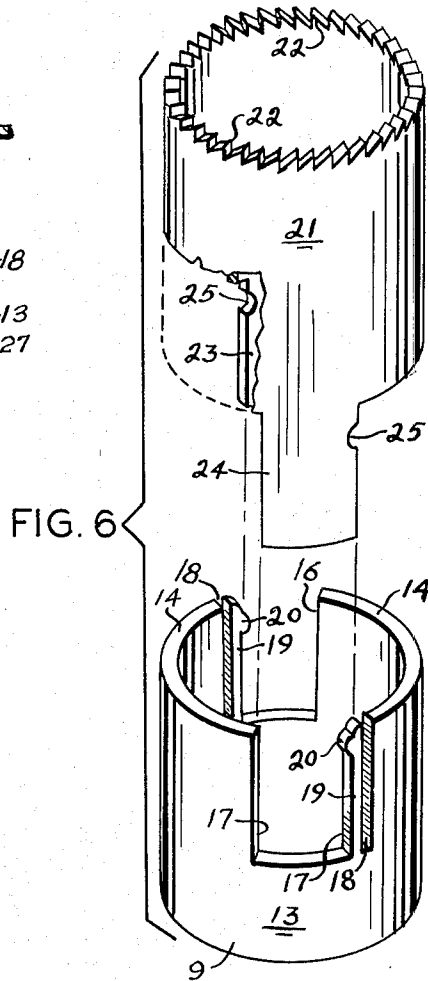


FIG. 6

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4 Claims. (Cl. 81—6)

The present invention relates to the art of repairing watches and/or clocks, and more particularly to a hand tool to be utilized in making such repairs.

More specifically, the tool of the present invention is designed to bore holes through the mounting plates of clock-works gear trains, so that new bearings for pinions may be installed.

Many mechanical failures of present day clock-works are occasioned by mounting plate wear around gear-bearing pinions, such wear taking place at the plate perforations within which the pinions are journaled for rotation. When such pinion-journaling perforations become worn, the pinion is not properly journaled, which in turn allows the gears to become mis-aligned, thereby causing failure in the operation of the whole clock-works. In order to repair such worn mounting plates, it is now common practice to bore out the worn plate to make an enlarged truly circular perforation, and to then install a pinion-journaling bearing in the re-bored perforation. One difficulty occasioned by such a re-boring repair operation, is that the mounting plate must be removed from the clock-works in order to get the pinion out of the worn perforation. A second difficulty then arises in properly centering a drill bit to re-bore the worn perforation. Since the original perforation is now oval in form, it is difficult and sometimes impossible, to make the larger re-bored perforation perfectly concentric with the original perforation.

The tool of the present invention is designed to overcome both of the above mentioned difficulties, and to make it possible to properly re-bore the original perforation without removing the gear pinion therefrom, and without removing the mounting plate from the clock-works.

The present tool not only re-bores the worn perforation with perfect concentricity, but utilizes the gear-pinion therein as a means for centering the tool to properly accomplish the re-boring operation.

It is therefore the principal object of the present invention, to provide a hand tool which will quickly and accurately accomplish the re-boring of a worn pinion-journaling perforation in the mounting plate of a clock-works.

Another object is to provide a hand tool of this class which is easy and simple to operate.

A further object is to provide a tool of the class described which is comparatively cheap to manufacture.

Other objects will be apparent from the following description when taken in conjunction with the accompanying single sheet of drawings, wherein:

Figure 1 is a fragmentary vertical sectional view through two parallel mounting plates of a clock-works, and showing a conventional gear and gear-pinion carried by the plates, the tool of the present invention being shown in a lateral position in clamping engagement with said pinion;

Figure 2 is a fragmentary elevational view looking at the right hand face of the right hand mounting plate of

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Fig. 1, showing a re-bored perforation therein, the dotted lines diagrammatically illustrating the shape and location of the original worn pinion-journaling perforation;

Figures 3, 4 and 5 are longitudinal sectional views through the tools, and showing its parts in various operational positions; and,

Figure 6 is an enlarged exploded side elevational view of the drill-bit and the bit retaining socket of the device.

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numerals 1 and 2 indicate, respectively, the conventional left and right hand mounting plates of a usual clock-works. The plates 1 and 2 are rigidly positioned in spaced parallel relation to each other, and are alignedly perforated transversely to journal the opposite end portions of a conventional gear supporting pinion 3, with a conventional gear 4 being rigidly mounted on the pinion 3 between the plates 1 and 2. The reference numerals 5 indicate an annular groove which has been partially bored through the right hand face of the plate 2 by the tool of the present invention. The tool of the present invention is designed to cut the groove 5 and to continue the same through the plate 2, until a through perforation 6 is obtained. The tool is so constructed that the perforation 6 may be bored without removing the gear 4 or pinion 3 from between the plates.

The tool, per se, of the present invention consists substantially of an outside tubate body 10, preferably of metal, having one end entirely open, and having its other end portion provided with threads 11 for receiving a tubular cap 12 which is adapted to substantially close said body end.

Within the body 10 is provided a comparatively short tubular drill bit receiving and actuating socket member 13 the outer end portion 14 of which terminates short of the open end 15 of the body 10. The member 13 is suitably anchored in the body 10 in any desired manner, preferably a friction fit and adjacent the end 14, the member 13 is provided with two oppositely disposed longitudinal rectangular notches or slots 16 and 17. One side of each of the slots 16 and 17 has a longitudinal slot 18 which forms a spring tongue 19. The two spring tongues 19 each have a rounded protuberance 20 which faces toward the slots 16 or 17, for a purpose more fully described hereinbelow (Fig. 6).

A tubate drill-bit 21 is provided on its outer annular end edge with metal-cutting teeth 22, and the inner end portion of the bit 21 is provided with two oppositely disposed longitudinally projecting rectangular legs 23 and 24 which are adapted to be introduced into the slots 16 and 17 in the socket member 13. The edges of said legs 23 and 24 are provided with rounded notches 25 adapted to seat the protuberances 20 of the spring tongues 19 of the member 13, when the bit 21 is passed a sufficient distance into the open end 15 of the body 10.

Slidably disposed within the body 10 is an open ended tubate chuck support member 26, having one end disposed adjacent the inner end 9 of the socket member 13 and its opposite end terminating a selected distance spaced from the closed end 12 of the body 10.

Slidably disposed within the chuck support member 26, is an elongated tubate clamp or chuck actuating element 30 having its inner end 31 fully open, and having its outer end 32 partially reduced in inside diameter to provide a smaller axial bore 33. The element 30 is longitudinally slidable within the member 26, and at a point spaced inwardly from its outer end 32, the wall of the element 30 is provided with two oppositely disposed longitudinally extending guide slots 34 and 35.

Within the element 30 there is provided an elongated

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metal rod 36 having its inner end laterally pierced to receive a transverse guide pin 37 the opposite ends of which pass through the two guide slots 34 and 35 of the element 30, and the pin ends are anchored in suitable bores in the wall of the support member 26. The outer end portion of the rod 36 is plurally split longitudinally to provide a plurality of segmental gripping or clamping fingers 38 which are inherently resilient, and which are so formed that they normally remain open or spread apart as illustrated in Fig. 4. The rod 36 together with its clamping fingers is of a length sufficient to cause the outer end portions of the fingers to at all times project slightly beyond the outer toothed end of the bit 21, when the bit is installed in the slotted end portion of the member 13. The chuck actuating element 30 may be moved longitudinally within the stationary member 13 and the support member 26 the length of the slots 34 and 35, and this permitted longitudinal movement is sufficient to cause the reduced bore 33 thereof to forcibly close the fingers 38 together, as is illustrated in Fig. 3.

A coiled expansion spring 40 is introduced into the axial bore of the element 30 with its inner end seated upon the transverse guide pin 37. The outer end of the spring 40 normally would extend beyond the end of the element 30, due to its length, but the spring is compressed into the element 30 by a cylindrical head 41 which is threadedly engaged within the adjacent end of the element 30 and is rigidly connected to the inner end of a push-rod 42, which passes slidably through an axial perforation in the cap 12. The push-rod 42 extends outwardly beyond the cap 12, and its outer end is equipped with a knob 43. A second coiled compression spring 44 is mounted around the push-rod 42 between the head 41 and the inner surface of the cap 12.

Operation

With the parts of the device assembled as above described, the various movable elements will normally assume the relative positions illustrated in Fig. 3.

The push-rod 42 will first be pressed inwardly by thumb pressure on the knob 43, and this movement of the rod acts to move the element 30 in a similar direction due to the head 41. Such longitudinal movement of the element 30 moves the perforation 33 in the end 32 out of engagement with the chuck fingers 38, thus releasing the fingers to spring apart as is illustrated in Fig. 4 of the drawings.

The chuck fingers 38 are then placed around the projecting end of the gear spindle 3 by inserting the spindle through the perforation 33. The thumb pressure on the knob 43 is then released, so that the spring 40 can urge the element 30 toward its normal position of repose, thus causing the perforation 32 to again close the fingers 38 toward each other. The fingers 38 are then firmly gripping the spindle 3.

The operator thereafter grasps the outside of the body or barrel 10 and presses it toward the plate 2 of the clock-works, thus bringing the teeth 22 of the annular bit 21 into engagement with the plate face which separates the end 9 of the socket member 13 from engagement with the adjacent end of the chuck support member 26, as shown by the space 27 (Fig. 5). Thereafter, the body 10 is manually rotated around the support member 26 while longitudinal pressure is maintained to force the bit teeth against the plate 2. The perforation 6 is thus cut through the plate 2, with the spindle 3 acting as a means to maintain the bit in concentric relation to the original perforation in the plate 2. This cutting action through the plate 2 is accomplished by the rotation of the body and the bit 21 around the support member 26. This allows the chuck and the support member 26 to remain stationary with the spindle, thus preventing the necessity of disassembling the connecting gears with which the spindle 3 might be engaged.

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After the perforation 6 has thus been cut in the plate 2, the spindle 3 is released by again moving the thrust-rod 42 inwardly to cause the fingers 38 to separate.

Obviously the invention is susceptible to some change or alteration without defeating its practicability, and I therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein, further than I am limited by the scope of the appended claims.

I claim:

1. A hand tool for boring a hole in a flat plate around the projecting end of a shaft extending therethrough, including: a tubular open ended barrel having bit receiving means adjacent said open end; a tubular bit removably mounted at one end by said bit receiving means permitting unitary rotation of said bit and said barrel, said bit having a free toothed end projecting from said barrel; a segmental shaft gripping chuck within said barrel adapted for projecting beyond the toothed end of said bit; slidable means within said barrel for compressing said chuck into shaft gripping position; and a thrust-rod projecting beyond the other end of said barrel having its inner end removably engaged with said slidable means.

2. A hand tool for boring a hole in a flat plate around the projecting end of a shaft extending therethrough, including: a tubular open ended barrel having bit mounting means adjacent said open end; a tubular bit having one end removably mounted by said bit mounting means permitting unitary rotation of said bit and said barrel, said bit having a free toothed end projecting from said open end of said barrel; a segmental shaft gripping chuck within said barrel adapted for projecting beyond the toothed end of said bit; a tubular element slidable within said barrel having a reduced bore at one of its ends for moving said chuck into gripping position; and a thrust-rod projecting beyond the other end of said barrel having its inner end removably engaged with the other end of said tubular element for manually moving the same.

3. A hand tool for boring a hole in a flat plate around the projecting end of a shaft journaled therein, including: a tubular open ended barrel having bit mounting means adjacent said open end; a tubular bit having one end removably mounted by said bit mounting means permitting unitary rotation of the two, said bit having a free toothed end projecting from said open end of said barrel; a segmental shaft gripping chuck within said barrel adapted for projecting beyond the toothed end of said bit; a tubular support concentrically disposed within said barrel; a transverse guide pin connecting said chuck with said support; a tubular element slidable within said support having a reduced bore at one of its ends for moving said chuck into gripping position, said element having opposing longitudinal slots in its wall for slidably receiving said pin; and a thrust-rod projecting beyond the other end of said barrel having its inner end removably engaged with the other end of said tubular element for manually moving the same.

4. A hand tool for boring a hole in a flat plate around the projecting end of a shaft journaled therein, including: a tubular open ended barrel having a slotted bit-mount adjacent said open end; a tubular bit having one end removably received by said mount, permitting unitary rotation of said bit and said barrel, said bit having a free toothed end projecting from the barrel; a segmental shaft gripping chuck within said barrel adapted for projecting beyond the toothed end of said bit; a tubular support concentrically disposed within said barrel; a transverse guide pin connecting said chuck to said support; a tubular element slidable within said support having a reduced bore at one of its ends for moving the chuck into gripping position, said element having opposing longitudinal slots in its wall for slidably receiving said pin; a coiled expansion spring longitudinally disposed within said tubular element for moving the same into engagement with

said chuck; and a thrust-rod projecting beyond the other end of said barrel having its inner end removably engaged with the other end of said tubular element for manually moving the same against the tension of said spring.

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