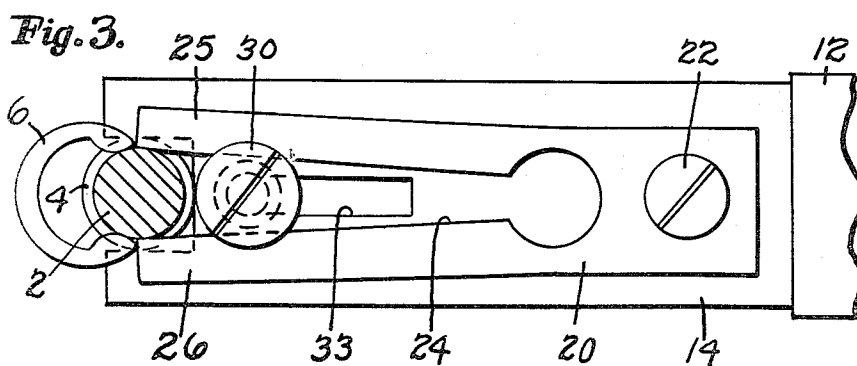
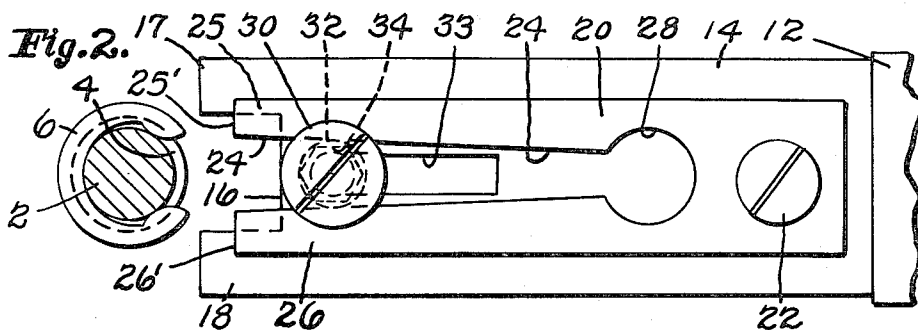
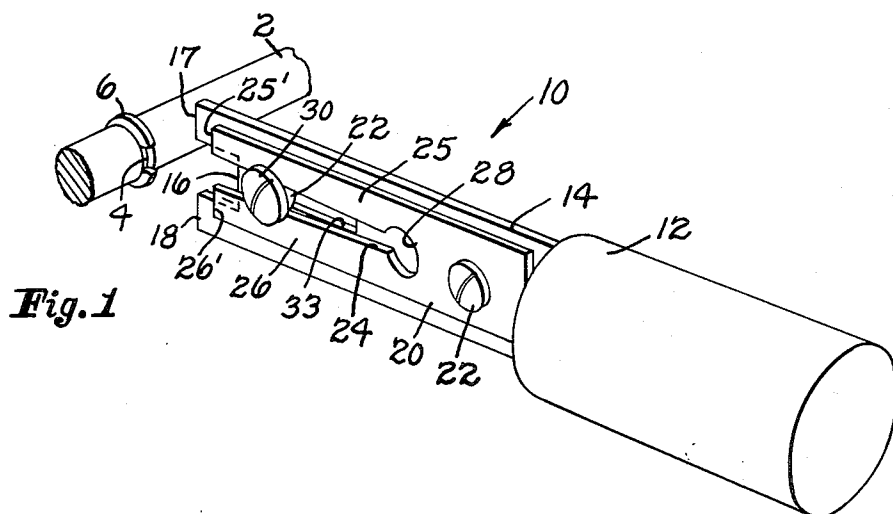


E. D. TULLER

TOOL FOR REMOVING RETAINING RINGS AND THE LIKE

Filed Feb. 1, 1962



INVENTOR.

ELRY D. TULLER

**BY**

BY  
*Bernard J. Rensch*  
ATTORNEY

ATTORNEY

1

3,173,197

TOOL FOR REMOVING RETAINING RINGS  
AND THE LIKE

Elroy D. Tuller, Detroit, Mich., assignor to Burroughs Corporation, Detroit, Mich., a corporation of Michigan  
Filed Feb. 1, 1962, Ser. No. 170,352  
2 Claims. (Cl. 29—229)

This invention relates to a tool for removing open or split retaining rings and the like from shafts, pins, etc.

An object of the invention is to provide an improved tool which can be used for quickly and efficiently removing open retaining rings from shafts, pins and the like.

A further object is to provide a small, portable hand tool for this purpose which is simple in construction and positive in operation.

A further object of the invention is to provide a small hand tool for the foregoing purpose which is constructed of a small number of parts that can be inexpensively produced and assembled.

These and other objects of the invention will be readily apparent from the following description and drawings illustrating a preferred embodiment of the invention in the form of a portable hand tool. In the drawings:

FIG. 1 is a perspective view of the hand tool;

FIG. 2 is a top plan view of the hand tool before it is applied to the shaft or pin carrying the open retaining ring to be removed; and

FIG. 3 is a top plan view of the tool as it engages the shaft or pin during removal of the open retaining ring.

Referring first to FIG. 1, there is disclosed a shaft or pin 2 formed with an annular groove 4 in which is seated an open or split retaining ring 6. Such retaining rings are used for locating or retaining parts assembled on a shaft such as 2, and frequently must be removed for repair purposes.

The tool for removing ring 6 is generally designated as 10 in the drawings, and comprises a handle 12 and a generally rectangular member 14. Member 14 serves as a guide bar. It is secured at one end to handle 12 in any suitable manner, and at its opposite end it is formed with a notch 16 defining two spaced legs 17 and 18. Guide bar 14 is preferably made of relatively rigid material, such as metal or plastic so that its legs 17 and 18 are relatively non-yieldable.

A generally rectangular spring member 20 of somewhat smaller dimensions is secured to guide bar 14 by means of a screw 22 or the like passing through the end of spring member 20 and guide bar 14 proximate to the handle 12. The opposite end of spring member 20 is bifurcated, that is to say it is formed with a longitudinally extending slot 24 defining a pair of spaced arms 25 and 26 juxtapositionally aligned with the notched end 16 of the guide bar 14. Arms 25 and 26 terminate slightly short of the legs 17 and 18 of guide bar 14 and are formed with flat tips 25' and 26'. The inner surfaces of these arms preferably are slightly tapered outwardly from a central opening 28 formed in member 20.

Member 29 is made of spring metal or other material such that its arms 25 and 26 will yield somewhat when they are subjected to a force tending to spread them apart.

The distance the ends or tips 25' and 26' of arms 25 and 26 are spaced apart is determined by a screw 30 or the like having a shoulder 32 bearing against the inner surfaces of arms 25 and 26. Screw 30 passes through slot 24 of member 20 and through a slot 33 in guide bar 14, screw 30 being fixed in a predetermined position by a nut 34 or other fastener attached to the screw at the underside of guide bar 14. It is thus seen that the spacing between the ends of arms 25 and 26 may

2

be varied by adjusting screw 30 in slots 24 and 33, this screw engaging the tapered surfaces of arms 25 and 26 to force them apart as the screw is moved toward the aperture 28.

The tool may be used for quickly and efficiently removing the open retaining ring 6 from the shaft 2 in the following manner:

The tool is applied to the shaft with the notched end 16 of the guide bar 14 engaging the shaft so that the end legs 17 and 18 straddle the shaft. The tool is then moved longitudinally of the shaft until the end legs 17 and 18 engage the side of retaining ring 6. This positively locates the tips 25' and 26' of the ends of arms 25 and 26 in alignment with the open ends of the retaining ring 6. The tool is then pushed transversely of the shaft until the tips of arms 25 and 26 bear against the open ends of the retaining ring 6, forcing the ring to be moved transversely of the shaft in a detaching direction. As the ends of arms 25 and 26 engage the shaft itself, they are cammed apart while still bearing against the open ends of the retaining ring, and they continue to move the ring until they complete its ejection from the shaft.

It is thus seen that the tool can be quickly and efficiently used to remove open retaining rings and the like by merely applying it to the shaft carrying the ring, moving it longitudinally until legs 17 and 18 of the guide bar contact the side of the ring, which thereby positively positions the ends of the spring arms 25 and 26 in alignment with the open ends of the ring, and then pushing the tool transversely of the shaft until the ring is ejected.

The provision of the screw 30 and the tapered inner surfaces of arms 25 and 26 permits the spacing of the arms to be quickly and conveniently adjusted so that the tool can be used for different size shafts.

It is further seen that the tool is extremely simple in construction and positive in operation, and can be built from a small number of parts which can be inexpensively produced and assembled.

While there has been described a preferred embodiment of the invention, it is to be understood that this embodiment is merely illustrative and not limiting, and that many variations, modifications and applications of the invention can be made without departing from its true spirit and scope as defined in the following claims.

I claim:

1. A tool for removing split rings from shafts comprising, in combination, a handle; a relatively flat rectangularly shaped guide bar having one end thereof rigidly secured to said handle and forming an extension thereof, said guide bar being formed with a notch at the opposite end thereof to define a pair of non-yielding legs spaced apart sufficiently to straddle closely a shaft immediately adjacent to a split ring thereon; a spring member having one end thereof rigidly secured to the guide bar adjacent to the handle and having the opposite end thereof proximate to the notched end of the guide bar and unsecured thereto, said spring member having an elongated slot therein diverging in width in the direction of the unsecured end thereof to form a pair of arms capable of being resistingly spread apart from one another; said pair of arms so dimensionally shaped that their outer ends terminate within the area embraced by the notch of the guide bar and short of the extremities of the spaced legs of the guide bar; said guide bar having a longitudinally extending slot registering with the slot of the spring member; a screw-like element extending through the registering slots of the guide bar and the spring member and adapted to be tightened for releasably locking the same at selected positions in the slot of the guide bar, said element hav-

3

ing a shoulder engageable with the confronting edges of said pair of arms and operable when adjusted in the slot of the guide bar to vary the spacing of the arms from one another to accommodate split rings of different dimensions, said arms having relatively pointed tips at their extremities within the notched area of the guide bar for engaging the separated ends of the split ring on a shaft and operable upon movement of the tool toward the shaft to spread the split ends of the ring apart sufficiently to remove the ring from the shaft.

2. A tool for removing split rings from shafts including, in combination, a relatively flat rectangularly shaped guide bar having a notch in one end thereof forming a pair of non-yielding legs spaced apart sufficiently to straddle closely a shaft immediately adjacent to a split ring thereon; a spring member having one end thereof rigidly secured to the guide bar at a location remote to the notched end thereof and having the opposite end thereof proximate to the notched end of the guide bar and unsecured thereto, said spring member having an elongated slot therein diverging in width in the direction of the unsecured end of the spring member and opening thereout to form a pair of arms capable of being resistingly spread apart from one another; said pair of arms being so dimensionally shaped that their outer ends

4

terminate with relatively pointed tips within the area embraced by the notch of the guide bar and short of the ends of the spaced legs of the guide bar; said guide bar having a longitudinally extending slot registering with the slot of the spring member; and an element extending through the registering slots of the guide bar and the spring member and adapted to be releasably locked at selected positions in the slot of the guide bar, said element being engageable with the confronting edges of said pair of arms and operable when adjusted in the slot of the guide bar to vary the spacing of the pointed tips of the arms from one another to accommodate split rings of different dimensions, the pointed tips of said pair of arms being operable upon movement of the tool toward the shaft to spread the separated ends of the split ring apart sufficiently to remove the ring from the shaft.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

|           |                      |               |
|-----------|----------------------|---------------|
| 1,456,007 | Hartson et al. ----- | May 22, 1923  |
| 1,596,678 | Miller -----         | Aug. 17, 1926 |
| 1,851,681 | Muzzy et al. -----   | Mar. 29, 1932 |
| 2,201,091 | Hehir -----          | May 14, 1940  |