

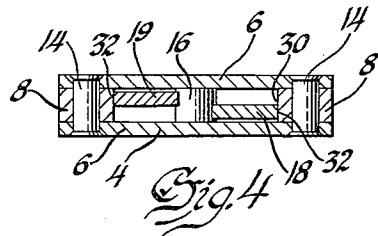
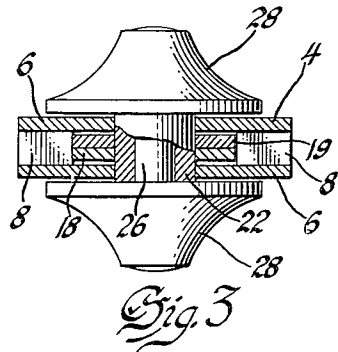
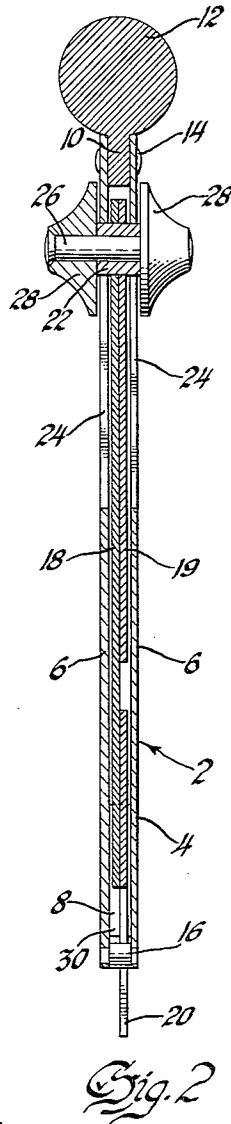
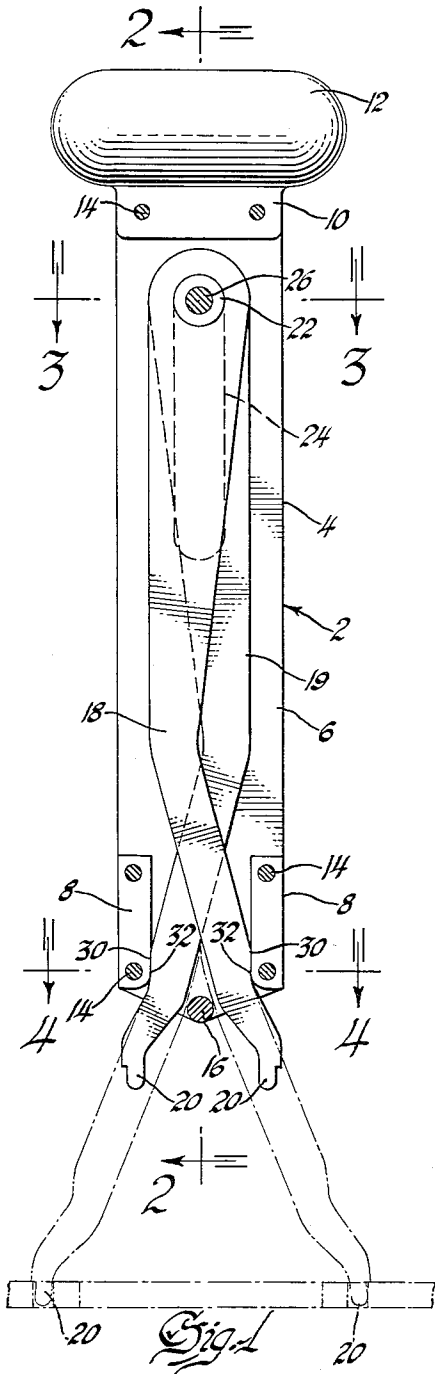
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SNAP RING TOOL

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## SNAP RING TOOL

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This invention relates generally to assembly and dis-  
assembly tools and more particularly to sliding pincer  
tools used to apply and remove open ended snap retain-  
ing rings.

In the various assemblies of manufacture the use of  
snap rings has become very extensive and today one may  
find snap rings in a variety of sizes and shapes. In fact,  
the only apparent limiting factor on even further in-  
creases in the use of such rings appears to be in the  
problem of applying these rings to their assemblies.  
Naturally, as larger size snap rings having stronger re-  
taining characteristics are used, greater forces are needed  
to contract them. These greater forces usually mean  
increasing the size of the tool which applies and removes  
the snap rings. It readily can be seen that the maximum  
size snap ring that may be used will depend almost wholly  
on the size tool necessary to apply that ring. In other  
words, if the tool is so large that its operator finds it  
awkward and unwieldy to handle, it becomes impractical  
to use that tool and the size of snap ring it was made to  
handle.

Related to the above problem, a further difficulty  
experienced by operators of snap ring tools has been  
maintaining the snap ring compressed for the period  
between compression and application. In other words  
while the operator may have sufficient strength to com-  
press the ring a correct amount, he does not possess  
enough strength to maintain the ring in its compressed  
condition until it can be applied. In an attempt to  
circumvent this difficulty, certain tools have been pro-  
vided with locking devices which must be set manually  
by the operator after the ring has been compressed.  
However, if the operator is applying maximum force to  
the snap ring through the use of both hands on the  
tool, obviously any attempt on his part to set manually  
a locking device will result ultimately in no application  
of the ring.

It, therefore, becomes an object of this invention to  
provide a snap ring tool which due to its unique con-  
struction will compress snap rings of much greater size  
and strength than other tools of comparable weight and  
size.

It is another object of this invention to provide a snap  
ring tool having a unique lock which is automatically  
applied when the snap ring is compressed a correct  
amount and which maintains the ring compressed dur-  
ing the period between the culmination of the act of  
compression and application.

It is a further object of this invention to provide a  
tool having a minimum of parts which is simple to oper-  
ate and inexpensive to manufacture.

In the drawings:

Figure 1 is a front view of the new improved tool with  
one side removed showing ring engaging fingers in both  
an extended and retracted position.

Figure 2 is a section taken along the line 2—2 of Fig-  
ure 1.

Figure 3 is a partial section taken along the line 3—3

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showing the details of the thumb knob used to extend  
and retract the engaging fingers.

Figure 4 is a section taken along the line 4—4 and  
shows the locking means for holding the snap ring in  
its compressed condition.

Referring to Figure 1, the snap ring tool is shown  
generally by 2. The snap ring tool comprises a hous-  
ing 4 which includes two sides 6 separated at one end  
by spacers 8 and at the other end by the spacing por-  
tion 10 of a handle 12. The two sides 6, the spacers 8  
and the handle 12 with the spacing portion 10, are all  
fastened together by peened rivets 14. A spreader pin  
16 is located at one end of the housing 4 and extends  
between the sides 6.

Located within the housing 4 are a pair of pivotally  
connected fingers 18 and 19. These fingers 18 and 19  
extend outside the housing at one end thereof on opposite  
sides of the spreader pin 16. On the end of each finger,  
extending outside of the housing 4, are located work  
engaging pins 20. These work engaging pins 20 are  
adapted to fit in apertures provided in the snap ring itself.

Referring now to Figures 1, 2 and 3, the sliding and  
pivoting assembly for operating the tool is shown. This  
assembly includes a bushing 22 adapted to slide in longi-  
tudinal slots 24 located in each side plate 6 and a fasten-  
ing pin 26 contained within the bushing 22, which main-  
tains serrated thumb knobs 28 on opposite sides of the  
housing 4. The bushing 22 also serves as the pivotal  
connection for the fingers 18 and 19.

The locking mechanism of the tool is more clearly  
illustrated in Figures 1 and 4. Figure 1 shows the slide  
bars 8 having inner surfaces 30 extending longitudinally  
along the tool. Adapted to mate with the surfaces on  
the slide bar 8 are surfaces 32 also extending longitu-  
dinally of the tool when the fingers 18 and 19 are in the  
retracted position. The forces created by the compressed  
retaining ring and obtained between these two sets of  
surfaces serve to hold the tool in its retracted position  
and the retaining ring in its compressed condition.

The operation of the tool is as follows: The thumb  
knobs 28 are pushed along the slots 24 to the bottom  
position therein. This will position the work engaging  
pins 20 as shown by the dotted lines in Figure 1. These  
work engaging pins are placed in the retaining ring aper-  
tures with the retaining ring in its uncompressed con-  
dition. The thumb knobs 28 are then drawn upwardly  
along the slots 24 or else the handle 12 is pushed down-  
wardly toward the retaining ring so that the thumb knobs  
28 move upward along the slots 24 to the topmost po-  
sition. At this point the surfaces 30 and 32 engage with  
each other to lock the tool with the retaining ring in its  
compressed condition. The ring then may be inserted  
in an internal groove at which time the thumb knobs are  
pushed downwardly again, releasing the retaining ring  
into its retaining groove.

I claim:

1. A tool for expanding and contracting retaining rings  
comprising an elongated housing having oppositely dis-  
posed slots running longitudinally therealong, a pair of  
parallel pins extending laterally through said housing and  
spaced longitudinally along said housing from each other,  
one of said pins riding in said slots and pivotally connect-  
ing a pair of rigid fingers located within said housing,  
said fingers having work engaging ends extending without  
said housing on opposite sides of the other of said pins,  
and means provided outside of said housing and on the  
one of said pins for moving the one of said pins and  
said connected fingers longitudinally with respect to said  
housing to retracted and extended positions, and means  
for retaining said fingers in said retracted position when  
compressing a retaining ring between said work engag-  
ing ends, said means including a pair of oppositely dis-

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posed spacers located within said housing and having surfaces normal to the direction of forces exerted on said ends by said retaining ring compressed therebetween, and surfaces on said fingers parallel to the surfaces on said spacers and engageable therewith when said fingers are in said retracted position.

2. A tool for contracting and expanding retaining rings comprising a housing having oppositely disposed slots, a pair of parallel pins extending laterally through said housing and spaced from each other, one of said pins riding in said slots and pivotally connecting a pair of rigid fingers located within said housing, said fingers having work engaging ends extending without said housing on opposite sides of the other of said pins, means for moving said fingers with respect to said housing to extended and retracted positions, and means for restraining movement of said fingers with respect to said housing when in said retracted position, said last means including a surface in said housing normal to the direction of the forces exerted between said ends by retaining rings engageable therebetween, and an adjacent surface on one of said fingers parallel to the surface on said housing and engageable therewith when said fingers are in said retracted position.

3. A tool for expanding and contracting retaining rings and the like comprising a member, a pair of intersecting rigid fingers, said fingers being supported by said member and connected together where they intersect by means movable relative to said member, a finger spreading element on said member spaced from said means, said fingers extending past and engageable with said element on opposite sides thereof, finger camming means on said member spaced from said means and engageable with said fingers to reduce the amount of spread between said fingers, said fingers having work engaging portions operable to expand and contract retaining rings and the like in response to movement of said means in different directions thereby causing said fingers to move past said element and said finger camming means, and parallel engageable surfaces on said finger camming means and said member for restraining movement of said fingers relative to said member otherwise caused by forces exerted between said fingers and said finger camming means by retaining rings and the like compressed between said work engaging portions, said surfaces being normal to the

forces exerted therebetween by retaining rings and the like compressed between said work engaging portions.

4. A tool for expanding and contracting retaining rings and the like comprising an elongated housing having oppositely disposed slots running longitudinally therealong, a handle on one end of said housing, a pin extending laterally through said housing and guidable in said slots, a pair of intersecting fingers located within said housing and pivotally connected together at their intersection by said pin, a finger spreading element on said member extending laterally through said housing and spaced longitudinally along said housing from said slots, said fingers defining a variable angle therebetween intermediate said pin and said element, said fingers extending past and engageable with said element on opposite sides thereof, said fingers having retaining ring engaging portions extending out of said housing on opposite sides of said finger spreading element, a pair of spacers on either side of said element defining guide openings therewith through which said fingers extend, said spacers having surfaces normal to the direction of forces exerted on said portions by a retaining ring compressed therebetween, manually actuable thumb knobs provided outside of said housing and on said pin for moving said pin back and forth in said slots and said connected fingers through said guide openings to alternately spread said fingers and reduce the amount of spread between said fingers, said fingers being movable into said housing into a predetermined retracted position, and surfaces on said fingers parallel to the surfaces on said spacers and engageable therewith when said fingers are in said predetermined retracted position, said surfaces co-acting to restrain movement of said fingers relative to said housing which might otherwise be caused by forces exerted between said fingers and said spacers by retaining rings and the like compressed between said work engaging portions.

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