

[54] **REVERSIBLE PLIERS**

[72] Inventor: **James Leland Pool**, Clarinda, Iowa

[73] Assignee: **Lisle Corporation**

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81/300, 385, 344, 395, 428, 43, 5.1 R;
29/220, 223; 7/3, 4, 5; 294/97, 93

[56] **References Cited**

UNITED STATES PATENTS

2,483,383	9/1949	Heimann et al.....	81/302 X
2,546,616	3/1951	Schaaff.....	81/302 X

FOREIGN PATENTS OR APPLICATIONS

903,088 1/1945 France.....29/223

Primary Examiner—Robert C. Riordon

Assistant Examiner—Roscoe V. Parker, Jr.

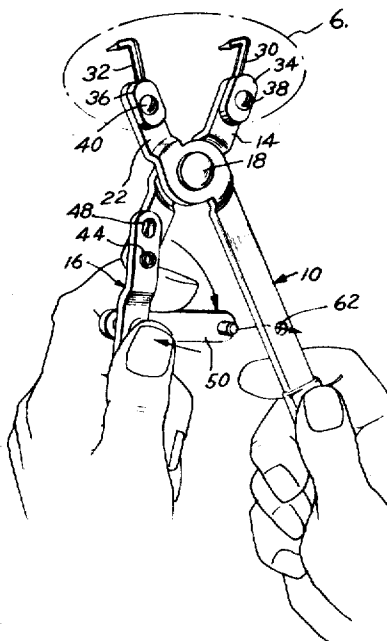
Attorney—Molinare, Allegetti, Newitt & Witcoff

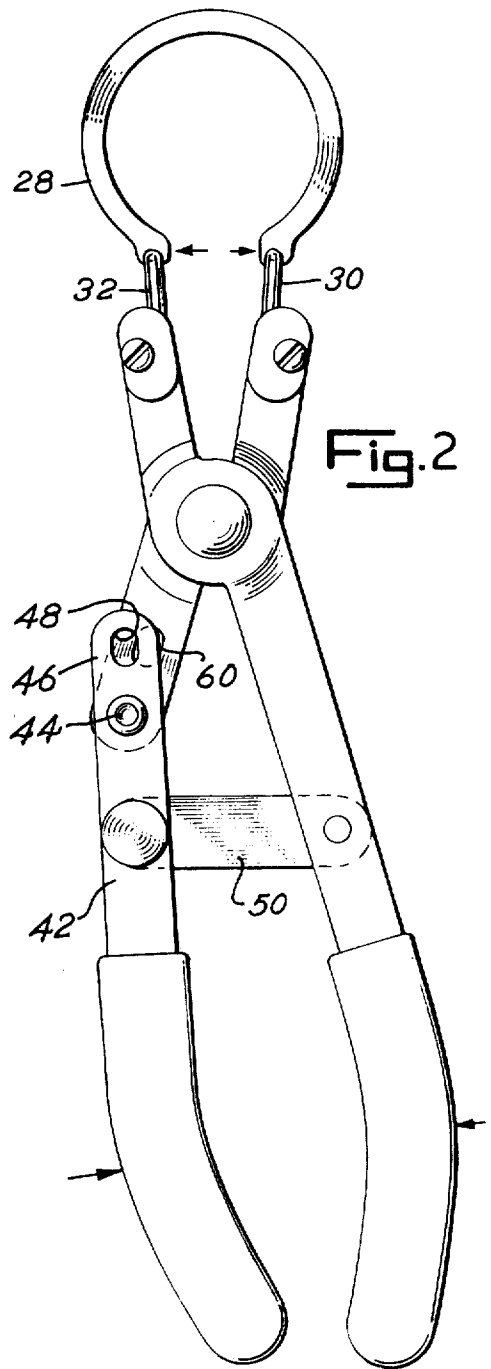
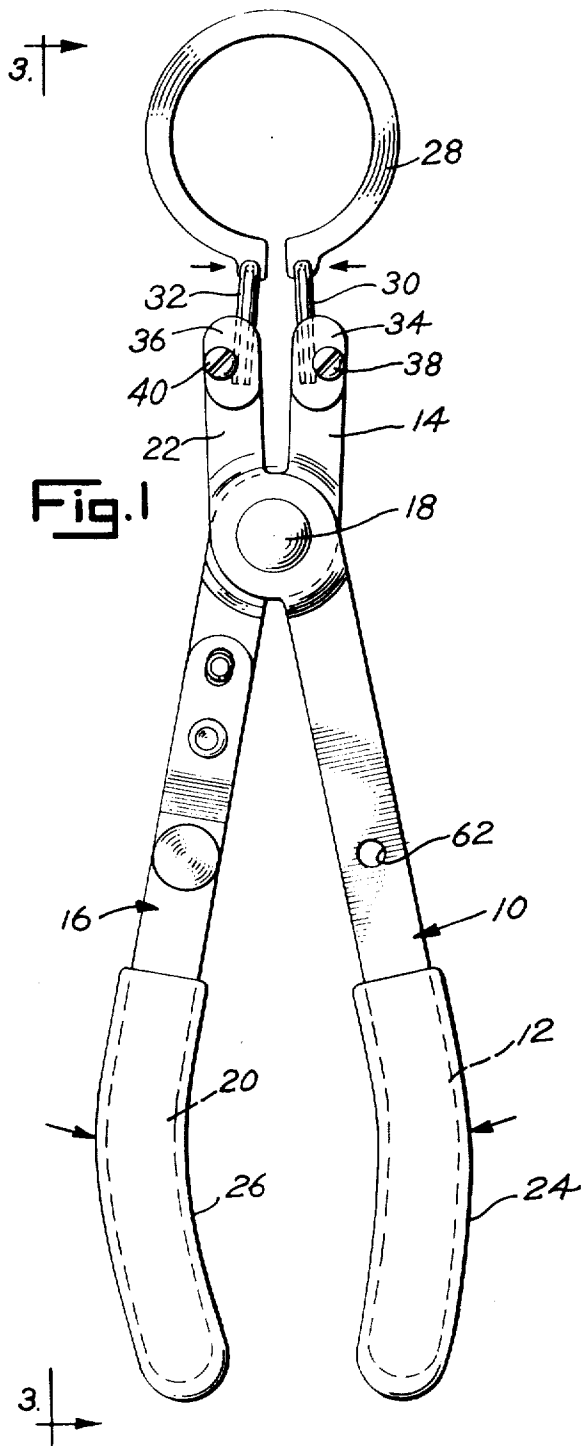
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ABSTRACT

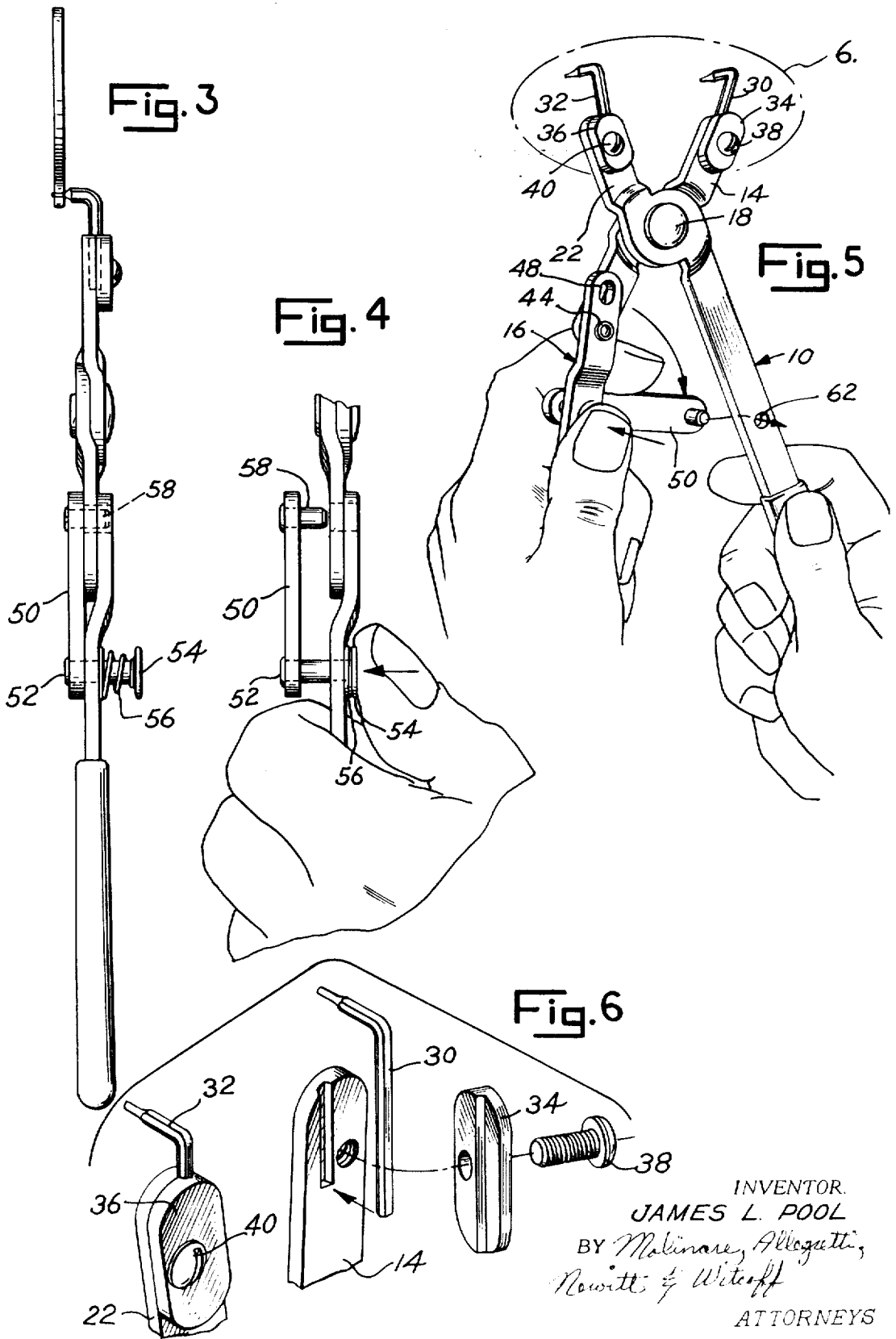
A reversible hand pliers provides for movement of the jaws of the pliers in the same sense as the movement of the hand grip. By pivoting a linkage which locks two segments comprising one member of the pliers, the segments are unlocked. The linkage is then connected with the other member of the pliers to provide for a reversal of the movement of the jaws relative to the movement of the hand grip of the pliers.

4 Claims, 6 Drawing Figures





INVENTOR
 JAMES L. POOL
 BY *Mohr, Allogretti,
 Newitt & Witeoff*
 ATTORNEYS



INVENTOR
JAMES L. POOL
 BY *Makinare, Allegretti,
 Newitt & Witcoff*
 ATTORNEYS

REVERSIBLE PLIERS

BACKGROUND OF THE INVENTION

This invention relates to an improved pliers construction and, more particularly, to a pliers construction wherein the sense of movement of the jaws of the pliers relative to the hand grip is reversible.

Snap rings are quite often used, inter alia, to lock a bearing or a shaft into position in a mechanical device. If the bearing or shaft is removed or replaced, it is first necessary to remove the snap ring. To remove the snap ring, a snap ring pliers is commonly utilized.

Such a pliers typically has specially constructed end pieces which engage the snap ring and either expand or compress the snap ring depending upon the requirements. That is, in some cases the snap ring must be compressed by drawing the ends of the ring toward each other and then removing the ring from its position. In other cases, for example, when used about a shaft, the ends of the snap ring must be expanded to remove the ring from the shaft.

In the past, the expansion and compression of the ends of a snap ring have been effected by separate tools. Additionally, some have suggested utilization of a single tool to effect removal of snap rings which must be compressed or expanded. Schaffe in U.S. Pat. No. 2,546,616 and Heimann et al. in U.S. Pat. No. 2,483,383 both disclose such unitary tool configurations capable of reversible operation.

The present invention provides an improved unitary tool in the form of a pliers which is reversible in operation.

SUMMARY OF THE INVENTION

In a principal aspect, the present invention comprises a reversible pliers which includes first and second members connected together at a first pivot point intermediate the ends of the respective members. One of the members includes an outer segment pivotally connected to and comprising part of the member. Also, means for locking the segment to the member is provided. A linkage is included for connecting the segment to the other member in order to effect reversal of plier operation.

It is thus an object of the present invention to provide an improved reversible pliers construction.

It is a further object of the present invention to provide a reversible pliers construction wherein the means for effecting reversal of operation requires a minimum of modification of the pliers to effect reversal of operation.

It is still another object of the present invention to provide a reversible pliers construction of rugged and economic construction which is easy to operate and requires a minimum of adjustment.

These and other objects, advantages and features of the present invention will be set forth in greater detail in the description which follows.

BRIEF DESCRIPTION OF THE DRAWINGS

In the detailed description which follows, reference will be made to the drawing comprised of the following figures:

FIG. 1 is a plan view of the improved reversible pliers wherein the hand grip end and jaw end move in the same sense;

FIG. 2 is a second plan view of the improved reversible pliers wherein the hand grip end and jaw end are operative to move in opposite senses;

FIG. 3 is a side view of the pliers taken substantially along the line 3—3 in FIG. 1;

FIG. 4 is a partial side view of the pliers shown in FIG. 3 illustrating the operation of the pliers;

FIG. 5 is a perspective view of the improved pliers further illustrating the manner of manipulation of the structure comprising the pliers; and

FIG. 6 is an enlarged, perspective view of the jaw end of the pliers shown in FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the detailed description which follows, like numbers will be used on like components in all of the figures. Referring to the figures, the improved pliers of the present invention is comprised of a first longitudinal member 10 having a hand grip end 12 and a jaw end 14. A second longitudinal member 16 is pivotally connected by means of a first rivet or first pivot means 18. The second longitudinal member 16 also includes a hand grip end 20 and a jaw end 22. The hand grip ends 12 and 20 include a suitable grip portion 24 and 26, respectively, of plastic material or the like.

The jaw ends 14 and 22 in the embodiment shown are adapted for utilization with snap rings as at 28. That is, the jaws 14 and 22 each include pins 30 and 32 respectively attached thereto by means of plates 34 and 36 respectively. Plates 34, 36 are held in position by means of screws 38 and 40 respectively. This is illustrated in greater detail in FIG. 6.

Referring again to FIG. 1, the longitudinal members 10 and 16 are substantially rigid and thus pivot about the first pivot 18 so that the hand grip ends 12 and 20 move in the same sense as the jaw ends 14 and 22. This is illustrated by the arrows in FIG. 1 which indicate that the hand grip ends 12 and 20 move toward each other in the same manner as the jaw ends 14 and 22 move toward each other. Thus, when the pins 30 and 32 are inserted in appropriate openings defined in a snap ring 28, the ends of the snap ring 28 are moved toward each other to thereby compress the ring 28.

Referring now to FIG. 2, the second member 16 includes an outer segment 42. Outer segment 42 is pivotally attached by means of a second pivot or second rivet 44 to the longitudinal member 16. The outer segment 42 includes an extension 46 which extends beyond the second pivot 44. Extension 46 includes an opening 48.

Also attached to the outer segment 42 is a pivotal link 50. As illustrated in FIGS. 3 and 4, the link 50 is attached to a pin or rod 52 which extends through an opening in the segment 42. A thumb button 54 cooperates with a spring 56 to bias the link 50 into position against the segment 42.

At the opposite end of the link 50 is a second pin or rod 58. Rod 58 may extend through an opening 60 in the member 16 and also through the opening 48 in segment 42. Thus, the link 50, and particularly the rod 58, serves to lock the second pivot 44 in a fixed, rigid position and thereby maintain the pliers in the configuration shown in FIG. 1.

By manipulation of the button 54 against the biasing force of spring 56, link 50 is transposed away from seg-

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ment 42. This causes rod 58 to withdraw from openings 48 and 60. Link 50 is then pivoted as shown in FIGS. 4 and 5 and the rod 58 is inserted into an opening 62 in the first segment 10. Thus, the link 50 connects the first member 10 with the segment 42. This connection provides for a reversal of the sense of operation of the jaws 14 and 22 with respect to the hand grip ends 12 and 20.

Thus, as illustrated in FIG. 2 as the hand grip ends 12 and 20 are moved toward each other, the jaw ends 14 and 22 move away from each other. The end portions of a snap ring 28 are thus separated.

It should be noted that while the description of the preferred embodiment has disclosed positioning a second pivot on the hand grip side of the first pivot 18, it is possible to position such a pivot and link construction on the jaw end of a member. Such positioning would still provide for reversal of operation of the pliers as previously described. Thus, it is to be understood that the scope of the invention is to be limited only by the following claims and their equivalents.

What is claimed is:

1. A reversible pliers comprising, in combination: first and second members, each member having a hand grip end and a jaw end, means for connecting said first

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and second members including a first pivot intermediate said ends such that movement of said hand grip ends toward each other similarly moves said jaw ends toward each other, one of said members including an outer segment defined by a second pivot intermediate said first pivot and said end of said member, means for locking said second pivot in a fixed position and means for connecting said segment with said other member to provide reversal of jaw end movement whenever said second pivot is unlocked.

2. The pliers of claim 1 wherein said means for connecting said segment with said other member and said means for locking comprise a pivotal link attached to said segment and pivotal to a first position for locking said second pivot and also pivotal to a second position for connection of said segment with said other member.

3. The pliers of claim 1 wherein said segment includes an extension from said end beyond said second pivot and wherein said means for locking said second pivot includes fastening means for fastening said extension to said member.

4. The pliers of claim 1 wherein said second pivot is intermediate said first pivot and said hand grip end.

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