Dec. 19, 1961 A. E. ERICSON 3,013,456

PLIER WITH LOCKING FEATURE ON PAWL

Filed Sept. 29, 1959

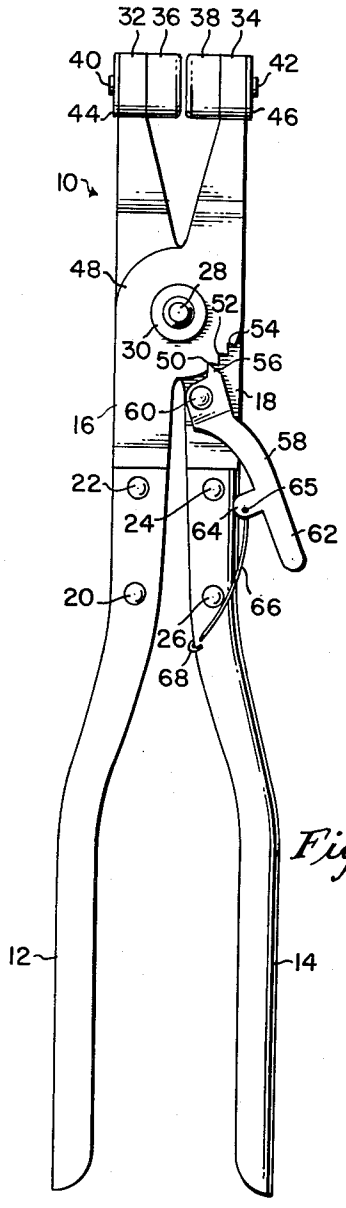

Fig. 1.

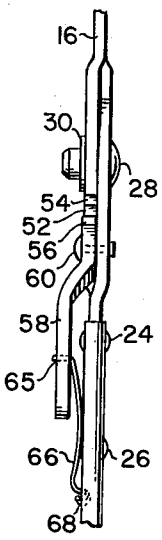

Fig. 2.

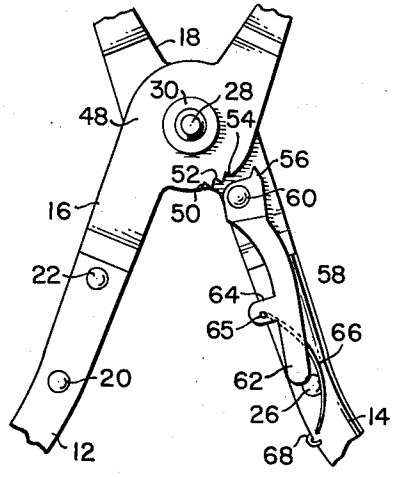

Fig. 3.

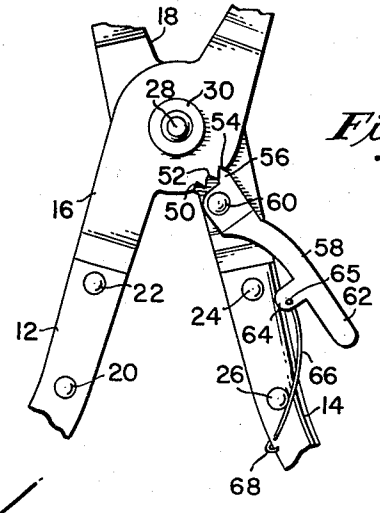

Fig. 4.

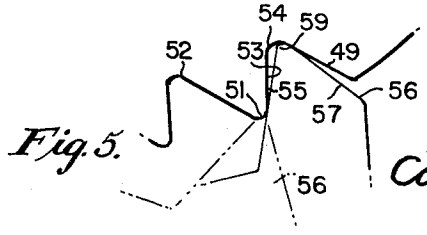

Fig. 5.

INVENTOR.
ALF ERNFERD ERICSON

BY

Caesar and Rivise

ATTORNEYS.

United States Patent Office 3,013,456 Patented Dec. 19, 1961

3,013,456

PLIER WITH LOCKING FEATURE ON PAWL

Alf Ernferd Ericson, 1557 N. Saginaw St., Lapeer, Mich.

Filed Sept. 29, 1959, Ser. No. 843,255
5 Claims. (Cl. 81—338)

This invention relates to a plier assembly having a locking feature which enables the assembly to function either as a plier assembly or as a wrench.

A most desirable characteristic of any tool is its adaptability to varied uses, thereby decreasing the number of tools which must be available to perform a given job. To effect this purpose, tools have heretofore been provided which purport to combine a plurality of functions and thus eliminate the need for specialized tools to perform the individual functions.

However, in all these prior cases, it has been found that one tool function is necessarily emphasized to the detriment of the other tool functions thereby decreasing the efficiency of the other tool functions.

It is an object of the present invention to provide a tool which can function equally well as either pliers or wrench without imparing the efficiency of either operation.

More particularly the present invention has as its objective the provision of a plier assembly having a locking feature thereon which when disengaged enables the assembly to function as a pair of pliers.

A further object of the present invention is to provide a plier assembly having a locking feature thereon which when engaged enables the assembly to function as an adjustable wrench.

Still another object of the present invention is to provide a plier assembly which has a positive locking feature which enables the assembly to function either as a pair of pliers or as an adjustable wrench.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a front elevational view of an embodiment of the present invention wherein the jaws of the plier assembly are closed and the locking feature engaged in a last notch;

FIG. 2 is a fragmentary side elevational view of the pliers of FIG. 1;

FIG. 3 is a fragmentary front elevational view of the pliers of FIG. 1 but showing the plier assembly in open position and the locking feature disengaged;

FIG. 4 is a fragmentary front elevational view of the pliers of FIG. 1 but showing the locking pawl engaged in a first notch thereby converting the assembly to an adjustable wrench; and

FIG.. 5 is an enlarged fragmentary view of FIG. 4 showing the pawl tooth engaged in a first notch.

Specific reference is now made to the drawings wherein like reference characters are used for like elements throughout.

An embodiment of the plier assembly of the present invention is generally shown at **10** in FIG. 1 and includes handles **12** and **14** having plier members **16** and **18** respectively secured thereto via pins or rivets **20**, **22**, **24** and **26**. Plier members **16** and **18** are pivotally connected together by rivet or pin **28** and washer **30**. Jaws **32** and **34** of plier members **16** and **18** have gripping members **36** and **38** to assure an efficient hold secured thereto via rivets **40** and **42** and washers **44** and **46** respectively.

Concentric with rivet **28** and positioned along the lower edge of attaching shoulder **48** of plier member **16** are notches **50**, **52** and **54** which are adapted to receive tooth

56 of locking pawl **58** which is pivotally secured to plier member **18** via rivet or pin **60**.

Pawl **58** possesses a lever member **62** having a tab **64** to which is secured one end **65** of a curved wire spring **66**, the other end **68** of spring **66** being secured to handle **14**. The pawl spring **66** as will be hereinafter discussed is of the "dead center" type and is so constituted that end **65** thereof can assume only a single position to the right of end **68** (as shown in FIGS. 1 and 4) or a single position to the left of end **68** (as shown in FIG. 3) regardless of the particular position of pawl **58** in relation to shoulder **48** of plier member **16**.

In operation, when jaws **32** and **34** are moved from the relatively open position of FIG. 4 towards the closed position of FIG. 1 to grasp an object, the wedging action of side **53** of notch **54** in gliding up side **55** of pawl tooth **56** (FIG. 5) causes said pawl tooth **56** to pivot for a small angle in a clockwise direction about pin **60** as well as urging end **65** of spring **66** in a left hand direction. The gliding of side **53** up side **55** of pawl tooth **56** continues until the entire side **53** including tip **51** thereof (as shown in phantom lines in FIG. 5) has passed tip **59** of pawl tooth **56**. When side **53** has thusly passed tip **59**, pawl tooth **56** immediately snaps into neighboring notch **52** because end **65** of "dead center" spring **66** is still positioned to the right of end **68** thereof and hence end **65** will snap back to its right hand position as soon as the force in the left hand direction is removed. In a similar way pawl tooth **56** can further advance to notch **50** at which time jaws **32** and **34** are substantially closed as shown in FIG. 1.

However, the jaws of the pliers of the present invention can be opened only if pawl tooth **56** is disengaged from notches **50**, **52** and **54** as shown in FIG. 3. Pawl **58** is capable of assuming the open position of FIG. 3 only because end **65** of "dead center" spring **66** is now positioned to the left of end **68** thereof. When pawl tooth **56** is engaged with any of notches **50**, **52** and **54** (FIGS. 1, 4 and 5), jaws **32** and **34** cannot be opened since side **57** of pawl tooth **56** (FIG. 5) will bear directly against side **49** of notch **54**. Moreover, pawl tooth **56** will not pivot in a counterclockwise direction about pin **60** to permit jaws **32** and **34** to open since the line of force causing the bearing of side **49** of notch **54** against side **57** of pawl tooth **56** passes directly through pin **60**. Thus retrograde movement of jaws **32** and **34** is precluded unless and until pawl tooth **56** is disengaged.

It is thus seen that when pawl tooth **56** is engaged with notches **52** or **54** a wrench adjustable towards a closed position is provided; whereas when pawl tooth **56** is disengaged from said notches, the present assembly may be used as a pair of pliers.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed as the invention is:

1. A plier assembly with locking feature on pawl comprising plier members including jaws, and handle members which are pivotally secured together, one of said plier members having a plurality of notches formed therein, a pawl pivotally mounted on said plier assembly having a tooth adapted to engage one of said notches and a spring operatively secured to said pawl and to one of said handle members, said spring having a first stable position and a second stable position such that when said spring is in the first stable position said tooth is resiliently biased into engagement with one of said notches, and when said spring is in said second stable position, said tooth is resiliently biased away from said notches.

2. The plier assembly of claim 1 wherein said notches

each include first and second sides inclined at different angles, said first side being inclined to exert a camming action against said tooth to cause said tooth to pivot for a small angle and thus engage successive notches as said jaws are closed whereas said second side of said notch is inclined to exert a bearing action against said tooth to restrain the pivoting of said tooth thereby precluding the opening of said jaws until said tooth is disengaged from said notches.

3. The plier assembly of claim 1 wherein said notches are formed concentric with the point of said pivotal attachment.

4. In a plier assembly including pivoted handle members and jaws with opposing jaw pieces extending therefrom the improvement comprising providing a plurality of notches on said assembly, pivotally mounting on said assembly a pawl having a tooth adapted to engage one of said notches and providing a spring operatively secured to said pawl and to one of said handle members, said spring having a first stable position and a second stable position such that when said spring is in the first stable position said tooth is resiliently biased into engagement with one of said notches, and when said spring is in said second stable position, said tooth is resiliently biased away from said notches, said notches being formed with sides inclined at different angles to permit said tooth to pivot and engage successive notches as said jaws are closed and to restrain the pivoting of said tooth to preclude the opening of said jaws until said tooth is disengaged from said notches.

5. The plier assemblying of claim 4 wherein said notches are formed on said assembly concentric with the point of said pivotal mounting.

References Cited in the file of this patent

UNITED STATES PATENTS

1,426,553	Cruickshank	Aug. 22, 1922
1,475,834	Kadow	Nov. 27, 1923
2,577,008	Engstrom	Dec. 4, 1951