July 5, 1955

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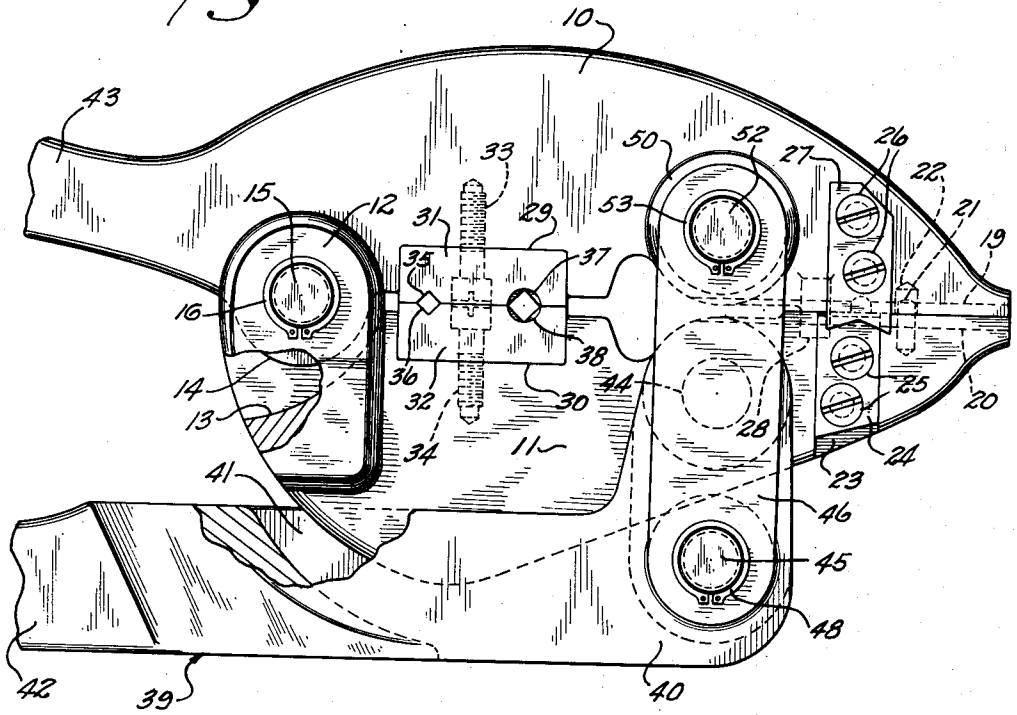
2,712,253

FORMING AND SHEARING TOOLS

Filed Jan. 2, 1953

2 Sheets-Sheet 1

Fig. 1.



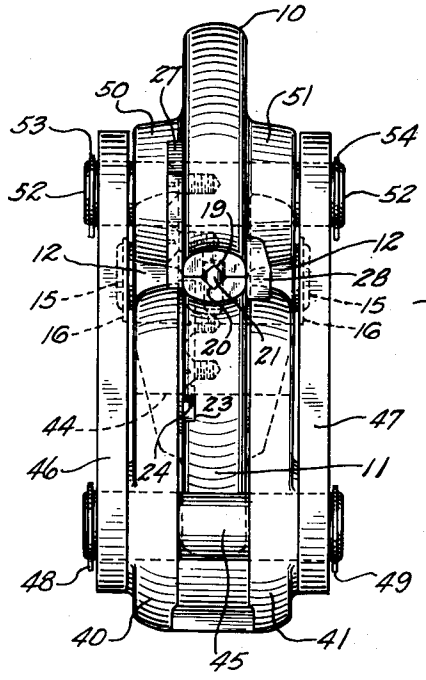


Fig. 2.

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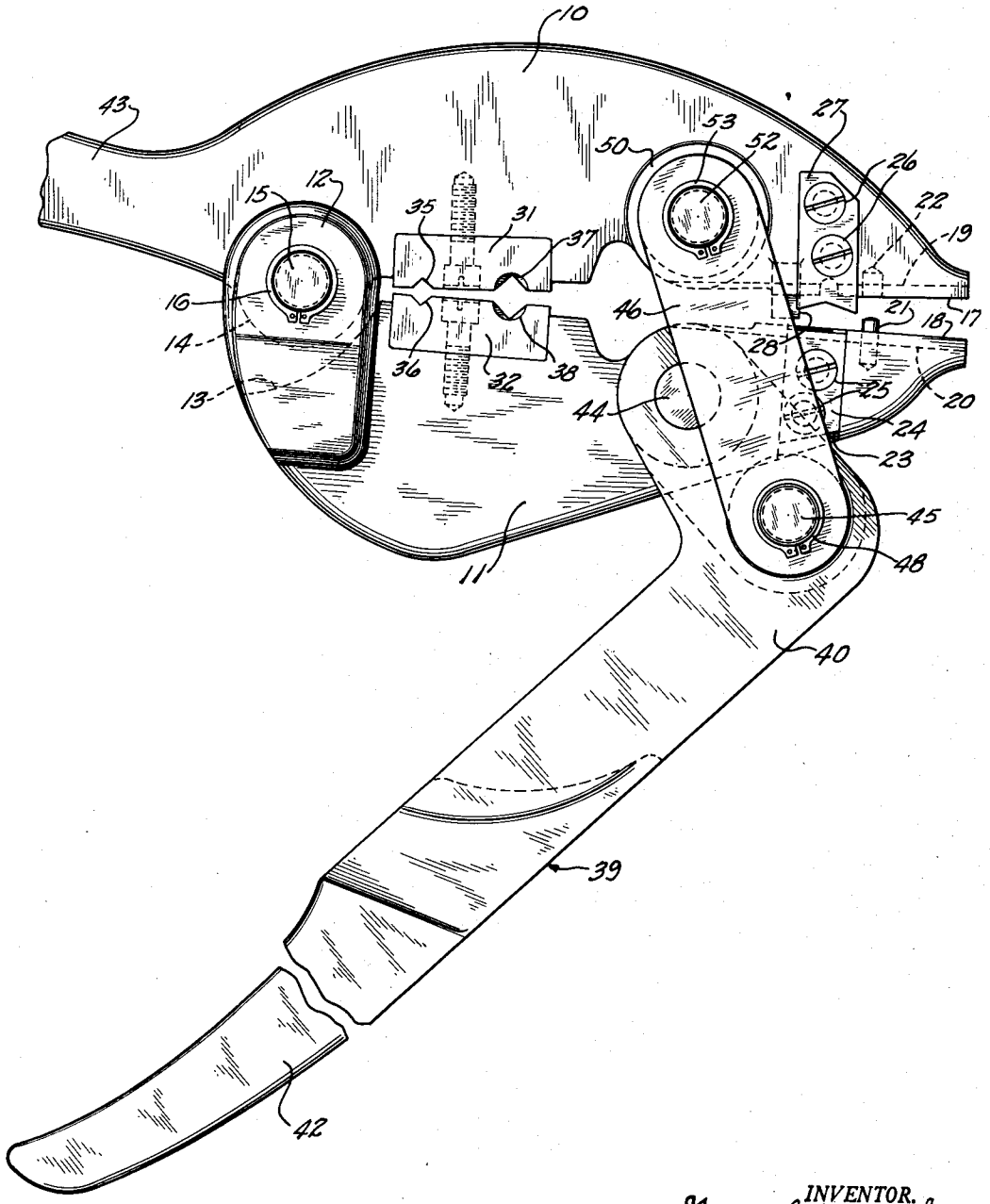
Fig. 3.



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FORMING AND SHEARING TOOLS

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1 Claim. (Cl. 81—15)

This invention relates to improvements in forming and shearing tools, and more particularly to tools for cutting and forming speedometer cables and attaching ferrules thereto.

Speedometer cable ends are ordinarily square in cross-sectional shape to afford a driving connection with rotatable members having square cable receiving recesses therein. Speedometer cables for different makes of cars and trucks vary in length, and theretofore it has been necessary for a garage man to keep a relatively large stock of speedometer cables on hand in order to service all makes of cars. Speedometer cable is available in bulk rolls, but heretofore there has been no satisfactory tool with which a garage man could square the ends of a selected length of cable after it has been cut from a roll.

Certain types of speedometer cables are equipped near their ends, with ferrules which are crimped on. This further complicates the problem of providing replacement speedometer cable from bulk cable rolls, and heretofore there has been no satisfactory tool for fixing such ferrules to a selected length of cable.

With the above in mind, it is a general object of the present invention to provide an improved tool having a pair of forming jaws and having a manually operable actuating linkage capable of exerting sufficient force on said jaws to cause the latter to form a portion of cable positioned between said jaws to a selected shape.

A more specific object of the invention is to provide an improved tool of the class described wherein the jaws are formed with a pair of complementary, open-ended, rectangular, V-shaped forming grooves.

A further specific object of the invention is to provide an improved tool of the class described, which is provided with a pair of shearing blades adapted to cut speedometer cable, said tool also having means for preventing relative transverse movement of said blades during a shearing operation.

Another specific object of the invention is to provide an improved tool of the class described having a pair of removable complementary forming dies which are adapted to square the cable and crimp fittings thereon.

A further object of the invention is to provide an improved tool of the class described having additional means for crimping fittings on a speedometer cable and having a gauging shoulder for accurately positioning a fitting on the cable during a crimping operation.

A further object of the invention is to provide an improved tool of the class described which is portable, durable, simple in construction, efficient in operation, and otherwise well adapted for the purposes described.

In the drawings accompanying and forming a part of this specification, in which one complete embodiment of the preferred form of the invention is shown, and in which like characters of reference indicate the same parts in all of the views:

Fig. 1 is a fragmentary side elevational view of the improved tool with the jaws thereof in closed position;

Fig. 2 is an end elevational view of the improved tool as viewed from the right in Fig. 1; and

Fig. 3 is a fragmentary side elevational view of the improved tool showing the jaws thereof in open position.

Referring more particularly to the drawings, the numerals **10** and **11** indicate a pair of cooperable, flat, generally semi-oval shaped jaws. One end of the jaw **11** is formed on each side with an upstanding transversely apertured lug **12**, said jaw also being formed with a recess **13** between said lugs. The jaw **10** is formed with a downwardly projecting apertured lug **14** which is positioned in the recess **13**. The jaws **10** and **11** are pivotally connected by a pin **15** positioned in the apertures of the lugs **12** and **14**, as shown. The end portions of the pin **15** are formed with suitable circumferential grooves to receive snap retainer rings **16** outwardly of the lugs **12**.

The jaws **10** and **11** are formed at the end opposite their pivotal connection with flat longitudinally extending surfaces **17** and **18** (Fig. 3) which abut in coplanar relationship when the jaws are closed as shown in Fig. 1. The surfaces **17** and **18** are formed respectively with longitudinally extending complementary rectangular V-shaped forming or crimping grooves **19** and **20**. As shown in Fig. 2, the grooves **19** and **20** form a cavity which is square in cross-section when the surfaces **17** and **18** abut.

The jaw **11** is provided with a gauging shoulder in the form of an upstanding pin **21** (Figs. 2 and 3) which is positioned in the groove **20**. The jaw **10** is formed with a recess **22** in which a portion of the pin **21** is received when the jaws **10** and **11** are closed, as shown in Fig. 1. The jaw **11** is also formed in one side with a transverse rectangular groove **23**, and a flat shearing blade **24** is fixed in said groove by countersunk screws **25** threaded into the jaw **11**. The blade **24** preferably has a thickness substantially equal to the depth of the groove **23** so that the outer surface of said blade is flush with the adjacent surface of the jaw **11**.

Fixed to the side of the jaw **10**, as by countersunk screws **26**, is a flat shearing blade **27** which is positioned to slidably overlap the shearing blade **24**. The upper edge of the blade **24** is preferably flat, whereas the cooperating lower edge of the blade **27** is of inverted V-shape, as shown. The jaw **10** is formed with a lug **28** on the side opposite the blade **27**. The lug **28** projects toward the jaw **11** and slidably engages the adjacent side wall of said jaw. The slidable engagement of the lug **28** with the side of the jaw **11** prevents lateral movement of the jaw **11** to the right (in Fig. 2) relative to the jaw **10**, during a shearing operation.

Adjacent the lugs **12**, the jaws **10** and **11** are provided with rectangular cut away portions **29** and **30** to receive a pair of rectangular complementary forming dies **31** and **32**. The dies **31** and **32** are removably held in operative position in cutouts **29** and **30** by cap screws **33** and **34** extending therethrough and threaded into the jaws **10** and **11** respectively. The dies **31** and **32** are formed with complementary forming grooves **35** and **36**, as well as grooves **37** and **38**. The grooves **35** and **36** are of rectangular V-shape and form a cavity which is square in transverse cross-section when closed. The grooves **37** and **38** preferably each have a V-shaped portion and a semi-cylindrical portion as shown. The dies **31** and **32** are so positioned that the grooved surfaces thereof abut in coplanar relationship when the jaws are in the closed position shown in Fig. 1.

A bifurcated toggle lever **39** has a pair of spaced L-shaped arms **40** and **41**, and it also has an elongated handle **42**. The jaw **10** has an integral elongated handle **43** projecting longitudinally from the end of said jaw adjacent the lug **14**. The handles **42** and **43** extend in the same general direction when the jaws **10** and **11** are

closed. The arms **40** and **41** are positioned on opposite sides of the jaw **11**, as shown in Fig. 1, and as shown most clearly in Fig. 3, said jaw and the end portions of said arms are apertured to receive a pivot pin **44**, pivotally connecting the lever **39** to said jaw.

The arms **40** and **41** of lever **39** are formed with alined transverse apertures in the corner portion thereof to receive a pivot pin **45**. A pair of substantially identical toggle links **46** and **47**, are apertured at both ends, said links being positioned adjacent the outer surfaces of the arms **40** and **41** with the pivot pin **45** extending through one of the apertures of each of said links. The pin **45** is formed at each end with a circumferential groove to receive snap retaining rings **48** and **49**.

The jaw **10** is formed with a pair of transversely alined circular bosses **50** and **51**, said bosses and jaw being bored to receive a pivot pin **52**. The pin **52** is received in the apertures at the other ends of the links **46** and **47** and has its ends formed with circumferential grooves to receive retaining snap rings **53** and **54**. It will be noted in Fig. 1, that when the jaws **10** and **11** are closed, the pivot pin **44** is between and substantially alined with the pivot pins **45** and **52** in dead-center relationship.

The toggle action of the improved tool is apparent from a comparison of Figs. 1 and 3. As the handle **42** is swung away from the handle **43**, the links **46** and **47** are swung on the pivot pin **52**, and the pivot pin **44** is moved out of dead-center relationship with respect to pins **45** and **52** as the jaw **11** is simultaneously swung away from the jaw **10** on pivot pin **15**.

A selected length of speedometer cable can be cut by placing said cable transversely between the shearing blades **24** and **27** and moving the handle **42** toward the handle **43**. To square an end portion of an extent of cable said end portion is placed longitudinally in the forming groove **36**. Swinging the handle **42** toward the handle **43** causes the jaws **10** and **11** to exert compressive stresses of a very high order on the portion of cable in the groove **36**, with the result that the cable assumes the squared contour of grooves **36** and **37**.

If it is desired to attach one or more ferrules or fittings to a section of cable, the ferrules are slipped onto said cable and the ferrule to be crimped is then placed in a selected groove **20** or **38** when the jaws **10** and **11** are opened. When the groove **20** is used, the end of the extent is positioned in abutment with the pin **21** and the fitting is moved into abutment with the end of the jaw **11**, thus accurately positioning the fitting on the cable. By swinging the handle **42** toward handle **43**, the fitting is crimped onto the cable with a squaring action.

The improved tool is strong and durable, simple in construction, and is portable and convenient to operate. It is obvious that if desired the tool can be permanently mounted by fixing the jaw **10** to a suitable support if portability is not required. The improved tool is efficient in operation and can be quickly disassembled and reassembled.

Various changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated, as may come within the scope of the claim.

What I claim is:

In a forming tool: a first jaw having an outer end portion and a handle portion remote from said outer end portion; a second jaw having an outer end portion; means pivotally connecting the second jaw to the first jaw intermediate the handle and outer end portion of the latter; a toggle lever pivotally connected to a portion of said second jaw inwardly of the outer end of said jaw, said lever having an elongated handle portion cooperative with the handle portion of the first jaw for manipulation of the tool; a toggle link pivotally connected to a portion of the first jaw inwardly of the outer end portion thereof and to said toggle lever at a point spaced from the pivotal connection of said lever with said second jaw, the pivotal connection of said toggle lever with said jaw being located between the two pivots of said toggle link when the outer end portions of the jaws are in substantial abutment, intermediate adjacent portions of said jaws, and complementary forming dies between the pivotal connection of the jaws and the pivot of the toggle lever on the second jaw.

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