June 30, 1964 W. H. AITKEN 3,138,977

TOOL FOR ASSEMBLING AND DISASSEMBLING CHAIN

Filed Dec. 20, 1961

2 Sheets-Sheet 1

Fig. 1.

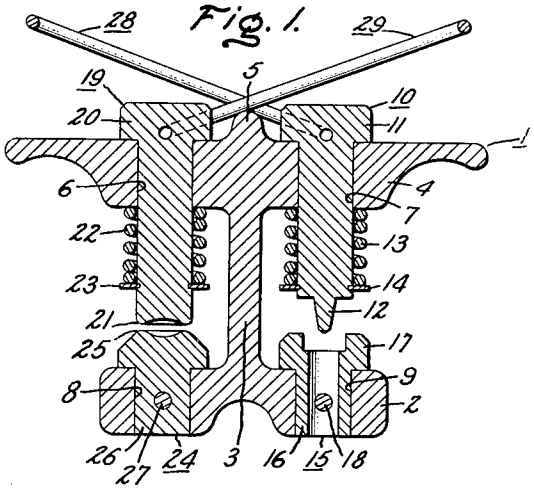
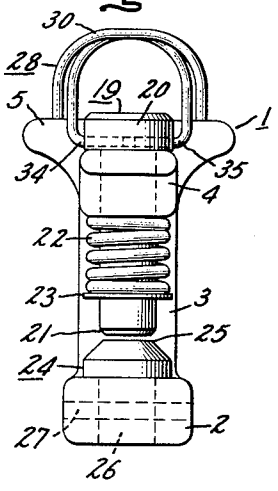


Fig. 2.



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Filed Dec. 20, 1961 2 Sheets-Sheet 2

Fig. 3.

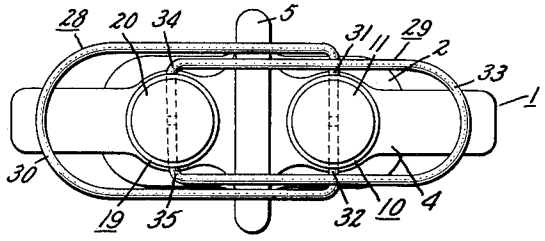


Fig. 4.

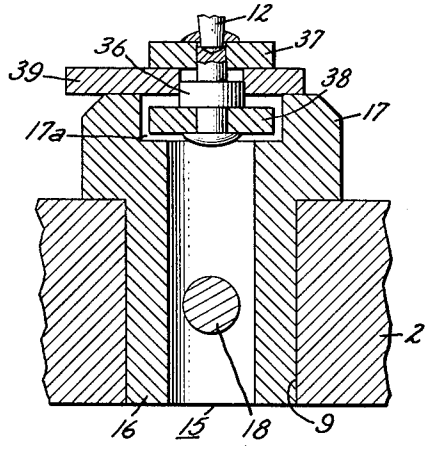
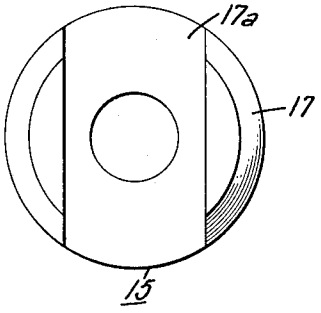


Fig. 5.



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TOOL FOR ASSEMBLING AND DISASSEMBLING CHAIN

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1 Claim. (Cl. 78—46)

This invention relates to a chain breaker and riveter tool which is small enough to be carried in a person's pocket and which can be utilized in the field to repair saw chains.

More specifically, the invention is directed to a small combination tool which includes a breaker punch, a riveter punch, appropriate anvil means, and lever means by which said punches are moved upwardly to permit a saw chain to be placed on the appropriate anvil means. After the saw chain has been properly placed on the appropriate anvil, a hammer or some such tool can be used to strike a blow against the head of the appropriate punch either to punch out a rivet or to form a round head on a new rivet.

A chain saw, having many small link elements which are constantly being subjected to sharp, dynamic shock loads, can be expected to break down occasionally. Since the many link elements are pivotally connected to one another by rivets, unless means are readily available to break the chain, replace the faulty link element, and connect the chain together again, much valuable time can be lost. Thus, it is important that a combination tool be provided which, first of all, will perform the two necessary functions, i.e., punch out rivets and securely attach new rivets. Moreover, these functions must be accomplished quickly and efficiently or else there will be no saving of time effected in the long run. Secondly, such a tool must be compact and easily carried in the field where the majority of chain saws will fail and thus where repairs must be made. Third, the tool must be capable of severe usage such as can be expected in the field. In this respect, it is important that the device does not have any loose parts which can be lost in the field. In the field, a rock will substitute for a hammer. However, a lost punch or anvil will disable the tool.

An object of the present invention is to provide a pocket-type chain breaker and riveter tool which will perform satisfactorily under severe field usage.

Another object of the present invention is to provide a compact combination tool which is adapted to repair various sizes of saw chain.

Another object of the present invention is to provide a compact pocket tool which can be used with a hammer or other blunt tool either to punch out rivets or to rigidly attach new rivets to a saw chain.

Another object of the present invention is to provide a pocket chain breaker and riveter having positive lever means to withdraw the punch means from the workpiece.

Another object of the present invention is to provide a compact chain breaker and riveter having a spring adapted to bias the punches down against the workpiece to hold it in proper position for punching or riveting.

Other objects and advantages of the invention will appear in the following description, the appended claim, and the accompanying drawings in which:

FIGURE 1 is a side view of the device showing the various parts in cross-section.

FIGURE 2 is an end view of the device.

FIGURE 3 is a plan view of the device.

FIGURE 4 is an enlarged sectional view showing the relationship of the punch, breaker anvil, and chain during the punching operation.

FIGURE 5 is an enlarged plan view of the top of the breaker anvil.

Referring to the drawings, base **1** consists of a horizontal lower member **2** having a central vertical support member **3** and an upper member **4** extending parallel to said lower member. A transversely extending lug **5** is located on the top of said upper member **4** at the approximate mid-point thereof. Openings **6** and **7** are provided in the upper member on opposite sides of lug **5** and openings **8** and **9** are provided in the lower member **2** in vertical alignment with openings **6** and **7** respectively. Breaker punch **10** having an enlarged head **11** and a punch element **12** is slidably mounted in opening **7**. Spring **13** bears against a retainer ring **14** which is mounted on punch **10** and the bottom side of upper member **4** to bias said punch **10** downwardly towards said lower member **2**.

A breaker anvil **15** has a hollow stem **16** which fits in opening **9** of lower member **2** and a support head **17** adapted to support a saw chain or other workpiece thereon. Stem **16** is secured to the lower member by a roll pin **18** inserted in apertures in the lower member and the stem. Roll pin **18** is readily removable so that anvil **15** can be removed and another size anvil inserted to adequately support a different size chain. However, it must be realized that ordinarily an individual chain saw operator will be working with only one size or saw chain so that it will not be necessary for him to change anvils very often. In any case, the feature of easy anvil changing is available if and when required.

FIGURE 4 shows an enlarged view of the punching apparatus at a point where the rivet **36** has just broken free of the upper side link **37**. It can be seen that rivet **36** is still securely fastened to lower side link **38** and that the rivet and side link are moving together downwardly into groove **17***a* of anvil **15**. The rest of the chain including the central drive link **39** cannot move downwardly because the drive link engages the upper face of head **17**. Groove or cavity **17***a* is deep enough to permit sufficient movement of the rivet and lower link in order to permit them to clear the upper side link.

A riveter punch **19** having an enlarged head **20** and a lower forming portion **21** is slidably mounted in opening **6**. Spring **22** bears against the underside of upper member **4** and a retainer ring **23** mounted on said riveter punch **19** to bias said riveter punch downwardly towards said lower member. A riveter anvil **24** includes an upper forming portion **25** and a stem **26**, said stem being insertable in opening **8** and secured to said lower member by pin **27**. As can be seen in FIGURE 1, upper and lower forming portions **25** and **21** include concave ends which are utilized to form rounded rivet heads as explained below.

Lever handles **28** and **29** are pivotally connected to heads **11** and **20** so that upon actuation, the levers will fulcrum on lug **5** to move the breaker and riveter punches upwardly away from the anvils and against the spring bias. It is to be understood that levers **28** and **29** act independently of each other. Lever **28** consists of an elongated U-shaped rod or wire means having a bight portion **30** and inwardly bent free end portions **31** and **32**, said portions **31** and **32** being pivotally mounted on head **11** of breaker punch **10**. Lever **29** has a bight portion **33** and inwardly bent free end portions **34** and **35**. Bight portion **33** is of less width than bight **30** in order to permit the levers to move relative to one another in a nesting relationship when the levers are pivoted on fulcrum **5**. (See FIGURES 2 and 3.)

Operation

In the event of chain failure, a breaker anvil **15** of the appropriate size to fit the chain being repaired is in-

serted in opening **9** of the tool. (See FIG. 1.) The end of lever **28** is moved downwardly to pivot on fulcrum **5** and move breaker punch **10** upwardly and thus compress spring **13**. When punch element **12** is raised sufficiently, the chain to be repaired is placed on head **17** of breaker anvil **15** and the rivet to be punched out is aligned with punch element **12**. Lever **28** is then released, spring **13** biases punch **12** against the rivet and holds the chain down. At this stage, head **11** of punch **10** is positioned above the top surface of upper member **4**. A hammer or other blunt object is used to strike a sharp blow against head **11**, thus punching out the rivet **36**, said rivet being attached to lower link **38** of the chain and both moving down into groove **17***a* a sufficient distance to separate the rivet and lower link from the rest of the chain. (See FIGURE 4.)

After the faulty link element is replaced and a new, unfastened rivet inserted, lever **29** is pivoted on fulcrum **5** to raise riveter punch **19** and the chain inserted on riveter anvil **24**. A hammer or other blunt object is again used to strike sharp blows on head **20** so that the concave forming portions **21** and **25** cooperate to round off the rivet shank and fasten the rivet securely on the chain link elements.

It is to be understood that the present invention can be utilized in other environments and is not limited to saw chains. For example, it is obvious that the present invention can be utilized to punch out and set rivets in various other combinations other than saw chains.

What is claimed is:

A chain breaking and riveting device comprising a base, said base consisting of upper and lower horizontal members interconnected by a vertical support member, said vertical member being located approximately in the center of said horizontal members, fulcrum means on the top side of said upper member, first and second punch means slidably mounted on said upper horizontal member on opposite sides of said fulcrum means, means biasing said punch means downwardly towards said lower member, first and second anvil means mounted on said lower horizontal member directly beneath said first and second punch means respectively, and means pivoted on said fulcrum means to move said punch means upwardly against said biasing means, said means to move said punch means upwardly including lever means, said lever means comprising elongated U-shaped rod means having the free ends thereof bent in toward each other, said bent-in portions being pivotally mounted on the upper portions of said punch means, the bight portion of one of said lever means being of less width than the bight portion of the other lever means in order to permit nesting of said lever means while pivoting on said fulcrum means.

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