

July 10, 1951

F. J. WENGER

2,560,318

TOOL

Filed July 6, 1948

2 Sheets-Sheet 1

Fig. 1.

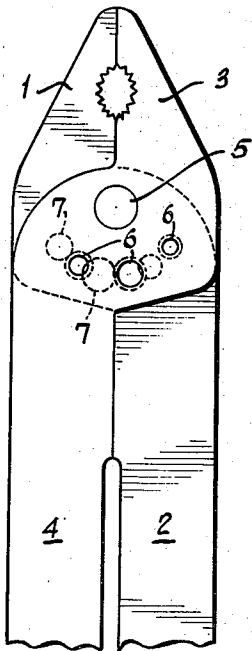


Fig. 2.

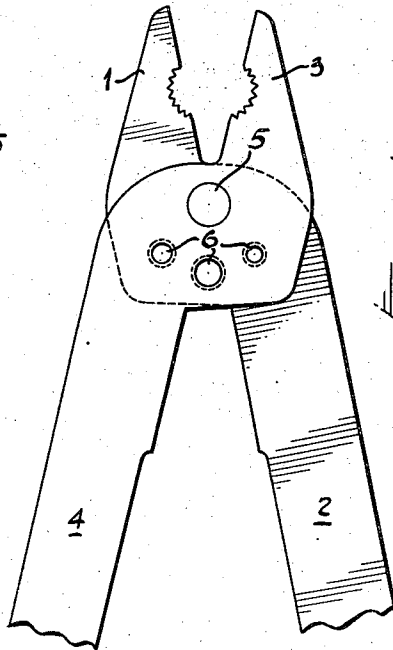


Fig. 3.

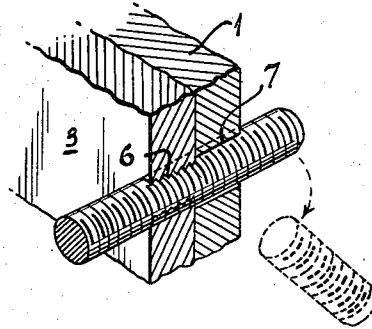


Fig. 4.

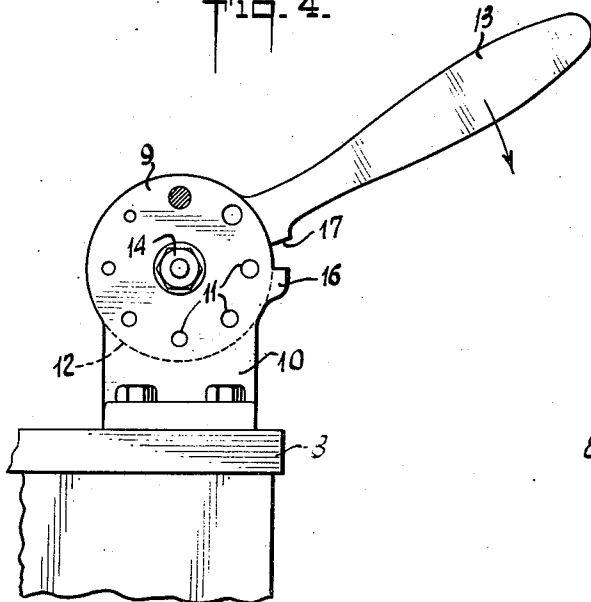
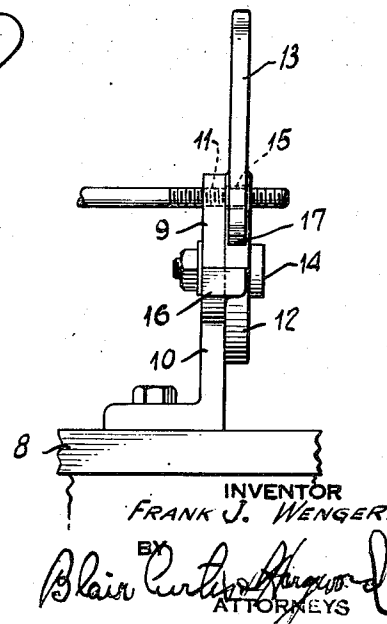


Fig. 5.



INVENTOR
FRANK J. WENGER.

BY
Blair Curtis
ATTORNEYS

July 10, 1951

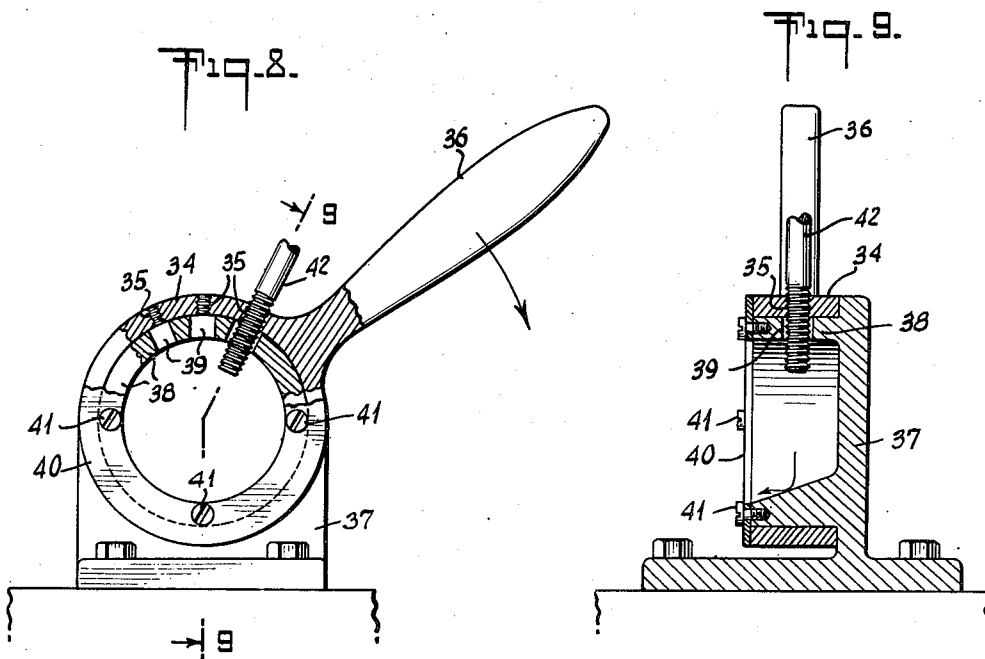
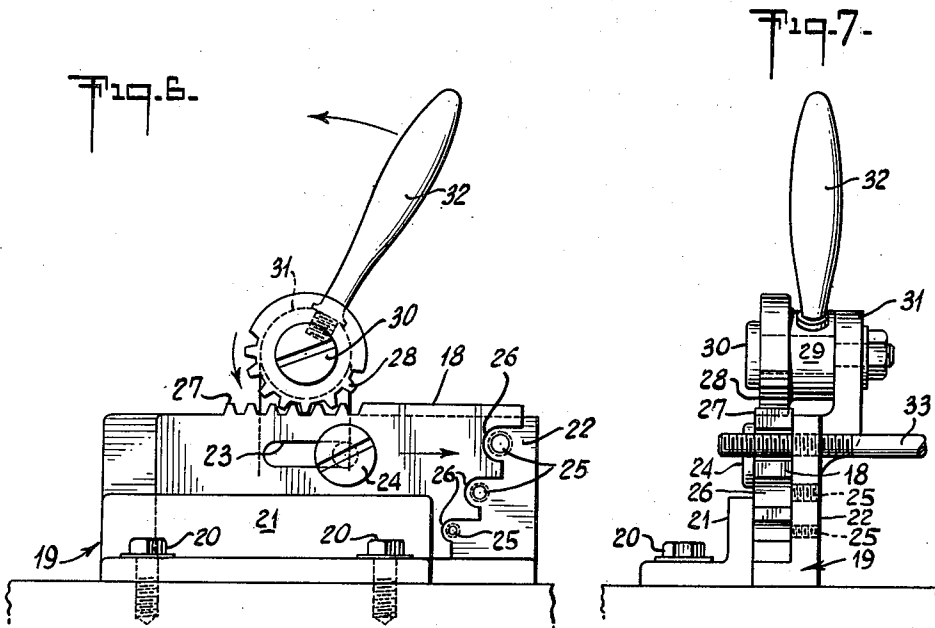
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2 Sheets-Sheet 2



INVENTOR
FRANK J. WENGER.
BY *Blair Carter Haynes*
ATTORNEY

UNITED STATES PATENT OFFICE

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TOOL

Frank Joseph Wenger, Washington, D. C., assignor to Electronic Distributors Inc., Washington, D. C., a corporation of Delaware

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5 Claims. (Cl. 30—226)

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The present invention relates to bolt cutters. One object thereof has been to provide a bolt cutting device whereby the threaded end of a bolt, stud, or the like, may be shortened by cutting off a portion thereof without injury to the remaining threads so that the bolt or stud need not be rethreaded before use. In using known types of cutters the bolts are so jammed in shearing as to blunt or deform the threads, or some of them, and frequently a burr or deformation is produced at the end of the bolt. These undesirable results impair the usefulness of the bolt unless time is taken to remove the burr or repair the threads. It is contemplated that the improved shearing device as herein described and claimed may conveniently be incorporated in a hand tool as well as in other forms such as bench devices operated by hand or by power.

A bolt cutter according to the present invention comprises a shearing member and bolt holding member provided with a threaded opening in which a threaded portion of the bolt is retained in such position that the part to be removed projects into the path of the shearing member and is sheared by relative movement between said members.

In this specification and the accompanying drawings I have shown and described a preferred embodiment of my invention and suggested various modifications thereof; but it is to be understood that these are not intended to be exhaustive nor limiting of the invention but, on the contrary, are given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

Figure 1 is a side elevation of a hand tool having the general form of a pair of pliers with the bolt cutting features incorporated in the head portion thereof, the pliers being shown in closed or gripping position;

Figure 2, a similar view showing the pliers in open position and with the bolt cutting elements in position to receive the threaded end of a bolt;

Figure 3, a fragmentary view in perspective and partly in cross-section, illustrating the position of a bolt engaged with the pliers for shearing and indicating the manner in which the sheared or cut off end of the bolt is separated from the remainder thereof as a result of the shearing operation;

Figure 4, a side elevation of a modified form of

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bolt cutter adapted to be mounted on a bench, or the like, and operable by means of a handle;

Figure 5, an end elevation of the structure illustrated in Figure 4;

Figure 6, a further modification wherein the bolt holding member is adapted to be secured to a bench, or the like, and the shearing member is actuated by a handle and rack and pinion connection;

Figure 7, an end figure of the structure illustrated in Figure 6;

Figure 8, a further modification wherein the bolt to be shortened is engaged with a threaded opening in a cylindrical bolt holder cooperating with a cylindrical shearing member, said parts being shown partly in side elevation and partly in vertical section; and

Figure 9, a view in transverse vertical section on the line 9—9 of Figure 8.

As shown in Figures 1 and 2, a pair of pliers, or similar hand tool, includes a jaw member 1 forming an extension of a handle 2 and a jaw member 3 forming an extension of a handle 4, said jaws being pivotally connected at 5. A portion of jaw member 3 adjacent to the pivot 5 is extended in area to form in effect a bolt holding plate provided with threaded bolt receiving openings 6, preferably of different radial dimensions. A portion of the jaw 1 is also extended in area and is provided with plain or unthreaded holes 7 of different radial dimensions. The opposed faces of said extended area jaw portions are held in close sliding contact by pivot 5.

As seen in Figure 2, the threaded holes 6 in jaw 3 and the unthreaded holes 7 in jaw 1 are so arranged that similarly positioned holes in said two jaws come into register when said jaws are held apart as illustrated. The unthreaded holes 7 in this embodiment are of diameters respectively to receive the bolts which fit the threads of the registering holes 6 with very little clearance. With the parts in this position a bolt, stud, or the like, is screwed into an appropriately sized threaded opening, with the threaded end of the bolt extending beyond the threaded opening and into the unthreaded opening of jaw 1, as indicated in Figure 3. If the handles 2 and 4 are now pressed together to close jaws 1 and 3, the resulting relative movement between said jaws causes the desired length of bolt end to be sheared off substantially in the plane between the contiguous surface planes of the jaws. The shortened bolt is then unscrewed from the threaded opening 6 and is in condition to be applied to its normal and intended use without re-

pairing its threads or refinishing its end surface. In case a slight burr should be formed as a result of the shearing operation, said burr is formed to the thread as the bolt is withdrawn from the threaded opening 6.

It is contemplated that the openings provided in a tool such as that illustrated in Figures 1 and 2 will be of appropriate dimensions to receive bolts of sizes which can be cut by hand pressure on the handles 2 and 4, such for example as bolts of a diameter up to $\frac{3}{8}$ of an inch.

Under circumstances where bolts of larger size are to be cut or reduced in length in a convenient and satisfactory manner, the apparatus may be of a type mountable upon a bench, or the like, as 8 in Figure 4. Thus a bolt holding member, here shown in the form of a fixed plate 9, is supported by a bracket 10 on bench 8. Said plate 9 is provided with concentrically arranged threaded openings 11 extending therethrough. A rotatable shearing member in the form of a plate 12 provided with a handle 13 is pivotally secured to plate 9 by a pin 14, said plates 9 and 12 being arranged with their opposed surfaces in sliding contact. Plate 12 is provided with plain or unthreaded openings 15, each of which is of a size corresponding with one of the openings 11 in plate 9 and positioned to come into coaxial alignment at one angular position of the plate 12.

With the parts in this position a bolt corresponding in size to the threaded opening is secured therein with its end portion extending into the adjacent registering unthreaded opening of the plate 12. By rotating handle 13 the bolt end is sheared off in the plane between the contiguous surfaces of plates 9 and 12. Plate 9 is also provided with a transversely arranged stop 16, a portion of which extends into the path of movement of handle 13 and is engaged by a shoulder 17 formed thereon. This arrangement serves to limit the extent of movement of the handle in the direction of Figure 4. It will be understood that the location of the threaded openings in the fixed plate and the unthreaded hole in the rotatable plate, rather than vice versa, is not essential to the invention.

Figures 6 and 7 illustrate a further modification wherein a shearing member or plate 18 is mounted on a stationary block 19 which may be attached to a bench, or the like, by bolts 20. Said slidable shearing member 18 is arranged between guide walls 21 and 22 extending upwardly from base 19. Shearing plate 18 is provided with a longitudinally extending slot 23 through which extends the enlarged shank of a set screw 24 adapted to hold said plate 18 in close contact with a face of wall 22. Said wall 22 is provided with a plurality of threaded openings 25, preferably of different radial dimensions, adapted to receive threaded end portions of bolts of corresponding dimensions. Said threaded openings 25 are so positioned in wall 22 that when a bolt is assembled in one of said openings with its end projecting through the inner surface of wall 22, said extending end projects into the path of movement of the slidable shearing member 18, end portions of which provide appropriate shearing edges. In the illustrated embodiment, the shearing edge of plate 18 is irregular, forming a series of recesses 26, one for each of the openings 25.

Shearing plate 18 is provided with a rack 27 engaging a pinion segment 28, forming part of a hub 29 rotatably mounted on a stud bolt 30 which is supported in a bracket 31 extending up-

wardly from plate 22. A handle 32 has one end secured to the hub 29.

In operation, a bolt, as 33, Figure 7, is screwed through one of the threaded holes 25 when the parts are in such position that the end portion to be cut off can extend through plate 22 and across the path of movement of slidable shearing plate 18. With a bolt so arranged in the apparatus, an end piece thereof can be cut off by thrusting the handle 32 in the direction of the arrow as shown in Figure 6. It is contemplated that the shearing or cutting edge of plate 18 may have one or more cutting portions of any usual or appropriate shear contour. Here again it is not essential that the fixed plate 22 be selected for the threaded holes or that the movable plate 18 have unthreaded shear edges.

Figures 8 and 9 illustrate a still further modification wherein a bolt carrier 34 of hollow cylindrical shape is provided with threaded holes 35 arranged radially and extending through said holder from its outer to its inner cylindrical surfaces, said holes being preferably of different diametrical dimensions. The cylindrical bolt carrier or ring 34 is provided with an operating handle 36 and is rotatably mounted on a base 37 provided with a hollow cylindrical shearing member 38, the outer cylindrical surface of which supports and closely engages the inner cylindrical surface of the ring or bolt carrier 34. The cylindrical shearing member 38 is also provided with a plurality of radially arranged holes 39 each of which corresponds in over-all diametrical dimension with one of the threaded holes 35 in the bolt carrying ring 34. The ring bolt carrier 34 is retained in operative position on the shearing member 39 by means of a clamping ring 40 secured to said shearing member by screws 41.

In operation, a bolt, as 42, is arranged with a threaded end portion thereof engaging one of the threaded openings 35 and with the part to be cut off extending into one of the unthreaded holes 39 in shearing member 38. By actuating the handle 36 in the direction of the arrow as shown in Figure 8, the desired shearing or cutting of bolt 42 is accomplished.

As various embodiments may be made of the above invention and as changes might be made in the embodiments above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A bolt cutter comprising a pair of pivotally connected jaws each having an operating handle, a portion of one jaw overlapping a portion of the other, one of said jaws having a threaded opening through its said overlapping portion, spaced radially from the pivot, arranged and adapted to receive and hold a threaded portion of a bolt and the other of said jaws having, at like radial distance from the pivot, and in an overlapping portion of said jaw, a bolt-end-receiving opening which, in one operating position of said handles, comes opposite said bolt-holding opening in the first mentioned jaw.

2. A bolt cutter comprising a pair of pivotally connected jaws each having an operating handle, a portion of one jaw overlapping a portion of the other, one of said jaws having a plurality of threaded openings therethrough of different diameters, each arranged and adapted to receive

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and hold the threaded portion of a bolt of predetermined corresponding diameter, and the other of said jaws having a plurality of bolt-end-receiving openings each of which, in an extended position of said handles, comes opposite one of said bolt-holding openings in the first mentioned jaw.

3. A bolt cutter comprising a bolt-holding member, a shearing member, means arranged and adapted to retain said members in cooperative relation and movable one in relation to the other, said bolt-holding member having a threaded opening extending therethrough and arranged and adapted to receive and hold a threaded portion of a bolt, and said shearing member having a bolt-end-receiving opening which, in one relative position of said members comes opposite said bolt-holding opening in the bolt holding member, and means for effecting relative shearing movement between said members.

4. A bolt cutter comprising a bolt-holding member, a shearing member, means arranged and adapted to retain said members in sliding relation face-to-face and movable one in relation to the other, said bolt-holding member having a threaded opening extending therethrough in a portion thereof which is alternately covered and exposed by said shearing member when so moved, whereby to receive and hold a threaded portion of a bolt, and said shearing member having a bolt-end-receiving opening which, in one relative position of said members comes opposite said bolt-holding opening in the bolt-holding member, and means for effecting said relative movement

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between said members to bring said openings alternately into and away from said opposite relation.

5. A bolt cutter comprising a bolt-holding member, a shearing member, means arranged and adapted to retain said members in opposed sliding relation and movable one in relation to the other, said bolt-holding member having a threaded opening extending therethrough in a portion thereof which is alternately covered and exposed by said shearing member when so moved, whereby to receive and hold a threaded portion of a bolt, and to expose an end portion thereof in position to be engaged and sheared by said shearing member upon movement of one of said members in relation to the other.

FRANK JOSEPH WENGER.

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