Sept. 14, 1937. J. C. OLSEN 2,093,022

CUTTING TOOL

Filed June 26, 1936

Fig. 1

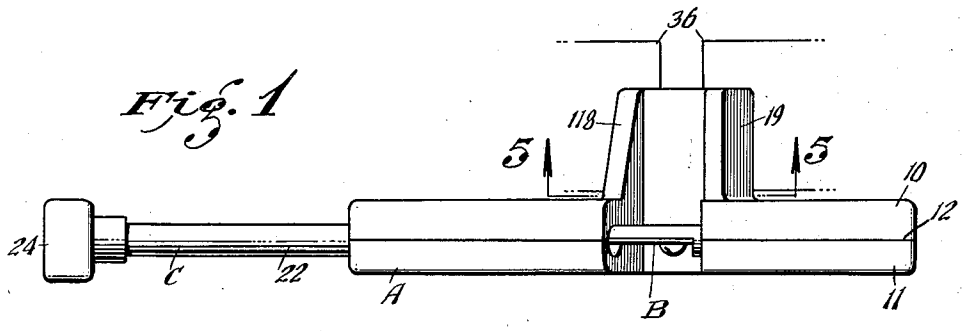



Fig. 2

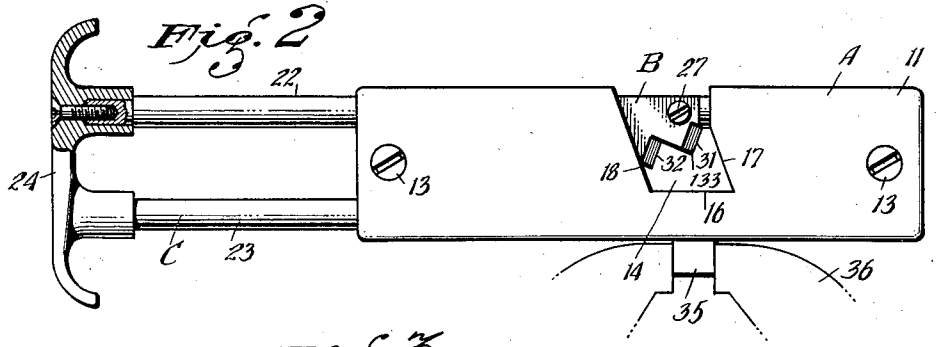



Fig. 3

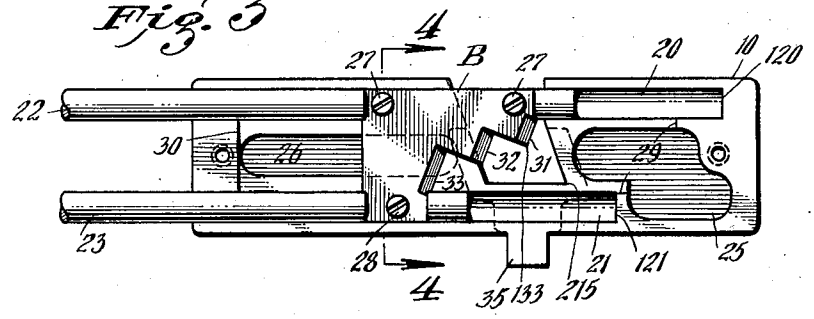



Fig. 4

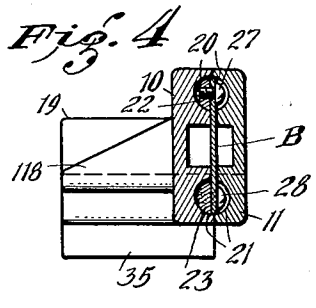
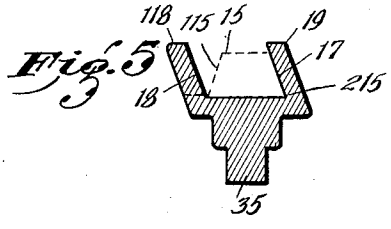



Fig. 5




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# UNITED STATES PATENT OFFICE

2,093,022

## CUTTING TOOL

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Application June 26, 1936, Serial No. 87,496

5 Claims. (Cl. 164—47)

This invention relates to improvements in cutting tool and more specifically but not exclusively, a manually operated cutting tool for V-belts.

One object of the invention is to provide a simple and efficient tool for cutting and trimming belts and the like, and more particularly a cutting tool designed for cutting or squaring up the ends of V-belts and the like which are usually composed of fabric or cords combined with a resilient material such as rubber.

Many of the V or side driving belts now in service are of the continuous molded type and in certain industrial uses, it is often difficult to remove said belts from their pulleys whenever it becomes necessary to cut and shorten the same by introducing a fastener for the cut ends. In other instances where the V or side driving belts are not of the continuous molded type but have ends united by a fastener, it is also sometimes difficult to obtain access to the belt to release the fastener when it becomes necessary to take the belt off the pulleys for the purpose of shortening the same by the introduction of another fastener. Another object of the invention therefore, is to provide a portable and manually operable cutting tool such that, when it becomes necessary to cut the belt, particularly V or side driving belts, the tool can be readily placed in position for cutting the belt while the latter is still in operative position on its pulleys to thereby save time and labor in repairing the belt.

A specific object of the invention is to provide an improved form of knife proper especially adapted for effecting an easy, perfectly clean and true transverse cut of a belt, particularly a belt having a rubber or other resilient composition that might otherwise be distorted if cut with an ordinary type of knife.

Still another object of the invention is to provide a cutting tool of the character indicated in the preceding paragraphs so constructed that the maximum protection to the user against accidental injury from the knife, is afforded by maintaining the knife covered or enclosed except for such portions which are at any particular moment being actually employed in severing the belt or other article being cut.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawing forming a part of this specification, Figure 1 is a top plan view of a cutting tool embodying the improvements. Figure 2 is a side elevation of the device shown in Figure 1. Figure 3 is an elevational view of the interior of the cutting tool, one of the parts of the main body portion having been removed, the view being taken in the same direction as that in Figure 2. And Figures 4 and 5 are detail transverse sectional views corresponding respectively with the section lines 4—4 of Figure 3 and 5—5 of Figure 1.

In said drawing, the improved tool is shown as comprising, broadly, a main body portion A; a cutting knife B; and a manually operable carrier assembly for the knife at C.

The main body portion A, comprised of any suitable material such as brass, aluminum or the like, preferably comprises two sections 10 and 11 with an approximately central line of vertical partition as indicated at 12 in Figure 1. The two parts 10 and 11 are adapted to be held rigidly united by any suitable means such as the machine screws 13—13.

The two body sections 10 and 11, when united, define an abutment guide or recess 14 which, in the instance shown, is adapted to receive a V-belt of the cross section indicated by dotted lines at 15 in Figure 5. Said guide is defined by a bottom horizontal wall 16 and two parallelly extending walls 17 and 18, the same being inclined from the vertical to correspond with the slope of one of the side driving faces of the belt 15, as best shown in Figure 5. Said recess 14 is made of extended length preferably by providing an integral extension 19 on the body part or section 10, as shown best in Figure 1. To facilitate the application of the tool to a belt in operative position, hereinafter described, one of the walls 118 of said extension which defines the guide wall 18, is beveled downwardly toward the outer end of the extension 19 as shown in Figure 1.

On the inside abutting faces of the body parts 10 and 11, the same are provided with complemental longitudinally extending bores or guiding grooves 20 and 21, as best shown in Figure 3, the inner ends of which, indicated at 120 and 121 respectively, form abutments or limiting stops for the inward movement of the cutter as hereinafter described. Said bores 20 and 21, vertically separated as shown in Figure 3, are open at their left hand ends as viewed in said figure and are adapted to receive and guide two circular rods 22 and 23 to the outer ends of which is secured a handle 24 of suitable shape to comfortably accommodate the palm of the user's hand thereover when operating the tool. To lessen the weight and amount of material required in the body parts 10 and 11, the latter may be par-

tially cored or routed out as indicated at 25 and 26.

The knife proper B is of special design as shown. The same consists of a plate of suitably treated steel, the same being fastened to the upper guide rod 22 as by the set screws 27—27 and to the lower guide rod 23 by the set screw 28. To accommodate the knife B on the rods 22 and 23, the latter are partially cut away where the knife plate is secured thereto, as clearly shown in Figures 3 and 4 and, as will be understood, the body parts 10 and 11 will be sufficiently cut back on their adjacent faces in the area defined by the lines 29 and 30 to allow of the movement of the knife B transversely of the guide 14. The shoulder formed on the body parts 10 and 11 as indicated by the line 30 further serves as a limiting stop for the outward or retractable movement of the knife. With the construction of operating carrier for the knife and that of the body A above described, it will be seen that not only is the knife very firmly supported and guided so as to eliminate any displacement from its true line of movement, but also that the knife is practically entirely enclosed or concealed at any point in its movement with the exception only of such portions thereof as may be positioned within the abutment guide at any particular moment. It will further be observed that the knife B including the extended end of the longer upper guide rod 23 may be retracted to such position toward the left as viewed in Figure 3 as to entirely clear the guide 14 and thus leave the latter entirely free and clear to enable the tool to be positioned over a belt which may be in place on its pulleys.

The cutting edges of the knife B are of special construction, the same, as shown, comprising a series of three cutting edges proper 31, 32 and 33 stepped successively downwardly and also stepped rearwardly from the advance edge of the cutter. Each cutting edge 31 is also inclined at an angle to the vertical corresponding approximately to the inclination of the driving side 115 of the belt indicated in Figure 5. Furthermore, the lower corner of each cutting edge as indicated at 133 for the edge 31, is positioned slightly below the upper corner of the next adjacent stepped edge, as for instance, edge 32. In actual practice, each cutting edge 31—32—33 will be preferably double beveled, but preferably of somewhat different angles on the opposite sides.

With the stepped form of cutting edges described, it will be evident that the advance and uppermost cutting edge 31 will first engage the material of the belt or other article being cut and will effect a cut extending only partially downwardly from the top of the belt. As it advances through the material, the second cutting edge 32 will thereafter engage the material and likewise effect a partial cutting of the belt but at a lower level. In this connection it will be seen that the cut produced by the first knife edge 31 will leave a slit in the material to facilitate the admission of the uppermost portion of the next cutting edge 32. Similarly, the cutting edge 32 will be followed by the cutting edge 33 with a similar action, the cutting edge 33 completing the severance of the material. With this arrangement of successive cuts at different levels, the material of the belt, usually of resilient character in V-belts, will be subjected to the minimum amount of compression at any particular instant, and hence result in minimization of distortion of the belt during the cutting thereof or trimming off of an end. As will be clear from Figures 3 and 5, the pressure from the cutting edges is substantially in a downwardly inclined direction toward the corner of the abutment guide indicated at 215 formed between the bottom of the guide and the abutment 17. Because of the action of the knife just described, combined with the fact that the belt is thereby always pressed snugly into the angle formed by the converging surfaces of the abutment guide, the belt is positively held against turning or twisting during the cutting action, thus insuring a perfectly true cut at right angles to the length of the belt, the cut being obtained without any ragged or offset edge portions. In this connection it will be noted that the action and result described are obtained without the necessity of any hold-downs or clamping devices.

While the tool is especially adapted for positioning on belts in operative position on pulleys, as hereinbefore described, obviously the tool can be used on the bench for preparing belts which have been removed from their pulleys. To facilitate this use of the tool, the body of the latter may be provided with a downwardly extended heavy lug 35 of square cross section to adapt the tool to be clamped in the jaws of a vise as diagrammatically indicated by the vise jaws 36 in Figures 1 and 2.

Although there has herein been shown and described what is now considered the preferred manner of carrying out the invention, the same is merely illustrative and all changes and modifications are contemplated that come within the scope of the claims appended hereto.

What is claimed is:

1. A cutting tool for V-belts and the like comprising: a main body having an abutment guide to receive the belt therein, two of the walls of the guide being disposed at an angle to each other corresponding to the angle between a driving side and adjacent surface of a V-belt, said guide being open on one side; and a knife and carrier therefor mounted within the main body and slidable transversely across said guide, the knife being at all times entirely enclosed by the body except only such portions thereof as may be moving across the guide at any particular instant.

2. A cutting tool for belts and the like comprising: a main body having an abutment guide completely open on one of its sides; a knife carrier slidably mounted in said main body in a direction transverse of the guide, said carrier comprising spaced guide rods; a knife rigidly secured to both of said guide rods; and cooperable shoulders on the main body and knife carrier assembly to limit the movement of the knife in both directions, certain of said limiting stops being so located that the knife and carrier assembly may be retracted to a position entirely clear of the guide.

3. A cutting tool for V-belts and the like comprising: a main body of generally elongated form and provided with an abutment guide disposed transversely of the length of the body, said abutment guide having a bottom wall and two side walls, one of said side walls being disposed at an angle to the bottom wall corresponding to the angle between a side driving surface and adjacent surface of a V-belt, said guide being open at its top to permit the positioning of the main body over a belt while in position on its pulleys; guide rods slidably mounted within the main body transversely of the guide; a knife secured to said guide rods and also housed within the main body, said knife and guide rods being retractable to a position entirely clear of the guide.

4. A cutting tool for V-belts and the like comprising: a main body having an abutment guide to receive the belt therein, the bottom wall and a side wall of the guide being disposed at an angle to each other corresponding to the angle between the driving side and adjacent surface of a V-belt, said guide being open on one side; and a knife and carrier therefor mounted on the main body and slidable transversely across said guide, said knife, during a cutting movement, being movable in a direction toward said side wall of the guide and the knife having a cutting edge inclined to said bottom wall of the guide oppositely to the inclination of said side wall of the guide whereby, during a cutting action, the pressure from the knife is in a general direction such as to force the material being cut into the angle of the guide formed by said bottom and side walls thereof.

5. A knife for a cutting tool having a series of separated cutting edges, said cutting edges being stepped successively rearwardly from the advance edge of the cutter and also stepped transversely of the line of cutting movement of the cutter, each cutting edge being inclined at an angle to the line of cutting movement and the outer corner of one cutting edge being extended slightly beyond the inner corner of a next adjacent stepped cutting edge whereby to produce successive lines of cut at different levels with the line of cut of one cutting edge slightly overlapping the line of cut of the next rearwardly stepped cutting edge.

JOHN C. OLSEN.