Jan. 29, 1929. 1,700,306

W. A. BERNARD

HAND TOOL

Filed March 14, 1925

Fig. 1.

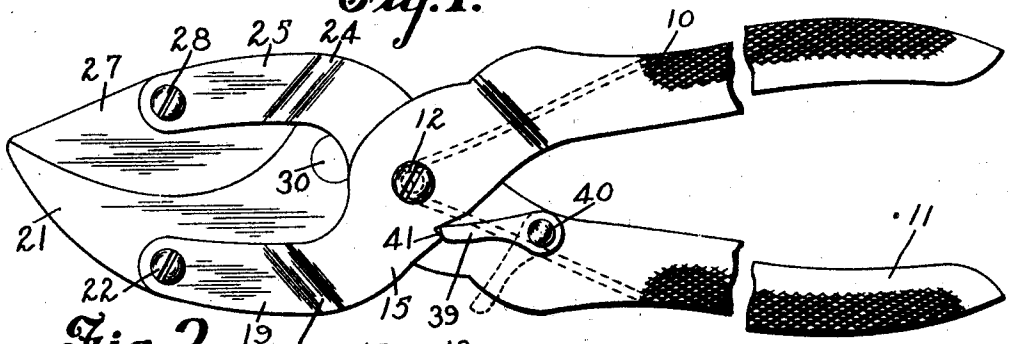


Fig. 2.

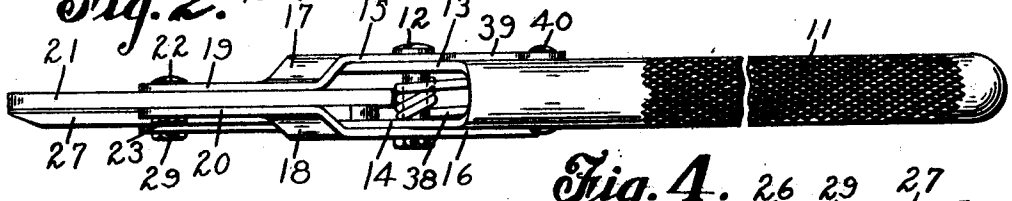


Fig. 3.

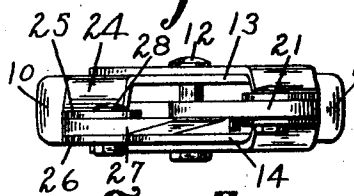


Fig. 4.

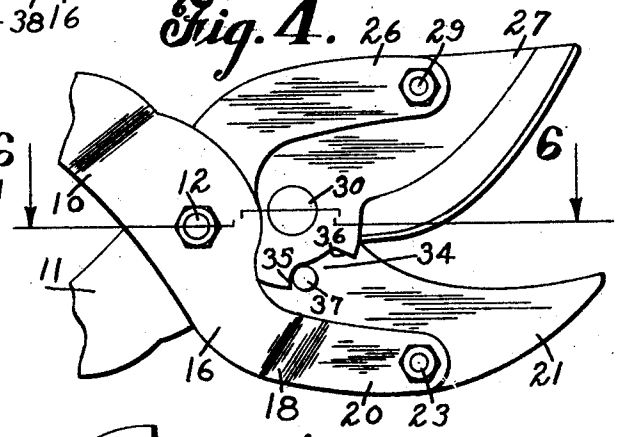


Fig. 5.

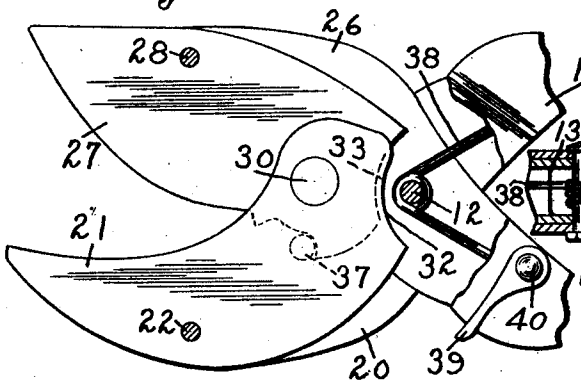
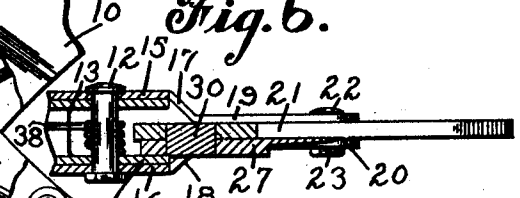


Fig. 6.



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UNITED STATES PATENT OFFICE.

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HAND TOOL.

Application filed March 14, 1925. Serial No. 15,521.

This application relates to hand tools, and more especially to a tool of this character designed for use in horticultural work, to which the name "pruning shears" is commonly applied, although it will be understood that while the jaws of the tool shown are particularly adapted for the work specified, the novel principles embodied in the invention may be applied to hand tools provided with working jaws of a different character and adapted for other work. That is to say, the broad principles of my invention may be embodied in such hand tools, for example, as pliers, tinners' shears, wire cutters or the like, as well as pruning shears.

One object of the invention is to provide a tool of this character whereby a considerable leverage may be brought to bear upon the jaws of the tool to perform the required work, and at the same time, the jaws of the tool are so arranged that the maximum opening of these jaws is obtained upon a relatively small opening movement of the handles. That is, notwithstanding the fact that the jaws have a relatively wide spread when in open position, the handles are not moved apart to such an extent that they may not be easily accommodated within the hand of the operator and operated by the fingers of one hand.

Another object of the invention is to provide a tool of this character which shall be simple in construction, efficient in operation, and as economical to manufacture as is consistent with the quality of the tool and the character of the work required thereof.

A still further object of the invention is the provision of a tool of this character, constructed in such a manner that the blades may be readily removed from the tool for the purpose of being sharpened.

Still another object of the invention is to provide an improved type of spring for a tool of this character which shall be mounted so that it will not interfere with any of the operating parts of the tool and will, at the same time, exert sufficient force to normally urge the handles to extended or open position.

Still another object of the invention is to provide a new and improved locking means to hold the tool in closed position against the tension of the spring.

To these and other ends the invention consists in the novel features and combination of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevational view of a preferred embodiment of my invention;

Fig. 2 is an edge or plan view of the same;

Fig. 3 is a front view looking directly at the point of the jaws;

Fig. 4 is a side elevational view of the jaws in open position;

Fig. 5 is a view similar to Fig. 4, from the opposite side of the tool, with some of the parts omitted from the sake of clearness, and

Fig. 6 is a sectional view on line 6—6 of Fig. 4.

The preferred embodiment of my invention which I have selected to illustrate and describe, comprises a pair of handles 10 and 11, generally U-shaped in cross section and pivoted upon the pin 12 for the usual opening and closing movements. Adjacent the pivot, the web portion of each of the U-shaped handles is cut away so that the forward end of each of these members comprises a pair of spaced arms through which the pivot pin 12 passes, the arms 13 and 14 of the handle member 11 being boxed between the arms 15 and 16 of the member 10. As shown in Fig. 2, outer members 15 and 16 are offset forwardly of the pivot point, as shown at 17 and 18 so that the forward ends 19 and 20 of these arms will lie closely together and closely adjacent to the side faces of one of the operating jaws 21, which is the form of my invention shown in the drawing, is the shearing jaw and is pivoted to these arms at 22.

As shown in Figs. 2 and 3, the forwardly projecting arm 14 of the handle member 11 is substantially straight, while its cooperating member 13 is offset at 24 so that the forward ends 25 and 26 of these members lie closely adjacent to the cooperating or cutting blade 27, the adjacent surfaces of this blade and the shearing blade 21 lying closely together.

The blade 27 is pivoted to the members 25 and 26 by the pivot pin 28, this pin and the pin 22 preferably being threaded to receive the nuts 23 and 29 so that when these nuts are removed the pins may be withdrawn and the jaws removed from the tool.

The jaws are pivoted together adjacent their rear ends by means of the pin 30, which is secured in the jaw 27 and rotatably received in an opening in the jaw 21, the ends of the pin being substantially flush with the jaws of the tool, as shown in Fig. 6, so that there will be no interference between this pin and the handle members during the operation of the tool.

The rear ends of the jaws are slightly recessed, as shown at 32 and 33, in Fig. 5, so as to clear the pivot pin 12. A recess 34 is provided in one of the jaws or blades of the tool and terminates in shoulders 35 and 36 with which cooperate a stop screw 37, set in the other jaw, to limit the opening and closing movements of the jaws.

A spring 38 is wound about the pivot pin 12, the ends of the spring, as shown in dotted lines in Fig. 1, bearing against the web portions of the handles. On account of the fact that the jaws clear the pin 12 and are not pivoted upon this pin, the entire pin may be given up to the accommodation of the spring, if necessary, so that a comparatively large and strong spring may be used. A pawl 39 is pivoted at 40 upon the handle member 11, to be received in a recess 41 provided in an edge of one of the forwardly extending members upon the other handle to hold the tool in closed position when not in use.

It will be noted that the handles and blades are not coincidentally pivoted, the former moving about the pin 12 while the latter are pivoted about a pin 30. It will, of course, be obvious that as the jaws move from the position in Fig. 4 to the position in Fig. 1, the pivot pin 30 moves rearwardly to a slight extent, the rear ends of the jaw members approaching the pivot pin 12. The pin 30 is, however, positioned slightly off center with respect to the pivots 12, 22 and 28, as shown more particularly in Fig. 1. This pin 30 is set closer to the pivot 28 than to the pivot 22, so that the jaw 27 moves about a shorter radius than the jaw 21 and consequently is moved through a greater angle than the jaw 21 during a movement of the handle members, the pin 30 moving rearwardly during a closing movement of the jaws and also laterally with respect to the pin 12. The result is that the cutting jaw 27 is given a drawing or knife movement along the shearing jaw 21, in addition to the shearing or closing movement of the jaws. This uneven or differential movement of the jaws produces a more efficient cutting action than would be produced were the pin 30 set symmetrically with respect to the pins 22 and 28, so as to produce a like or equal movement of the parts of the tool.

Moreover, the connection of the handle members to the jaws, as shown at 22 and 28, being disposed at a point intermediate the length of the jaws, enables the latter members to be opened to a considerable extent without requiring an excessively great opening movement of the handles by reason of which the latter may always be held in and manipulated by one hand of the operator. Further, the connection of the handles with the jaws is disposed at the point where the greatest pressure is likely to be needed during the operation of the tool, so that this pressure may be exerted directly opposite the greatest resistance, and therefore, shearing action upon the various pivot pins will be, as far as possible, avoided.

As shown in Fig. 3, the shearing blade 21 is provided with a substantially flat upper surface, while the cutting blade 27 is provided with a beveled or sharpened cutting edge to cooperate with the adjacent edge of the upper face of the shearing blade to accomplish the required work.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to the details shown but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. In a hand tool, a pair of pivoted handles and a pair of operating blades pivoted together and also pivoted to said handles, the point at which said blades are pivoted together being unequally distant from the respective points at which the blades are pivoted to the handles.

2. In a hand tool, a pair of pivoted handle members, an operating jaw pivoted to each of said handle members intermediate the length of the former, said jaws being pivoted together at their rear ends at a point unequally distant from the points at which they are pivoted to the handle members.

3. In a hand tool, a pair of operating jaws, said jaws being pivoted together adjacent their rear ends, and a pair of handle members pivoted together and pivoted respectively to said jaws intermediate the length of the latter and forwardly of the point of pivot therebetween, the pivotal connection between the jaws and handle members being unequally distant from the pivotal connection between the two jaws.

4. In a hand tool, a cutting jaw, a shearing jaw, a pair of pivoted handles having their ends pivoted respectively to said jaws intermediate the length of the latter, and means pivoting said jaws together so that the movement of said handle members effects a greater movement of the cutting jaw than of the shearing jaw.

5. In a hand tool, a pair of pivoted handles, a pair of operating jaws pivoted together and also pivoted respectively to said handles, said jaws overlapping each other adjacent their rear ends, and the overlapping ends of said

jaws being provided with cooperating means to limit relative movement about the pivotal connection therebetween.

6. In a hand tool, a pair of pivoted handles, a pair of operating jaws pivoted together and also pivoted respectively to said handles, said jaws overlapping each other adjacent their rear ends, and the overlapping ends of said jaws being provided respectively with a stop and a recess to limit the movement thereof about their pivotal connection.

In witness whereof, I have hereunto set my hand this 12th day of March, 1925.

WILLIAM A. BERNARD.