

United States Patent

Priest

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[54] SHEAR STOP

[72] Inventor: Edward D. Priest, Southboro, Mass.

[73] Assignee: Parker Manufacturing Company,
Worcester, Mass.

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30/271, 193, 252, 254; 81/416; 287/101

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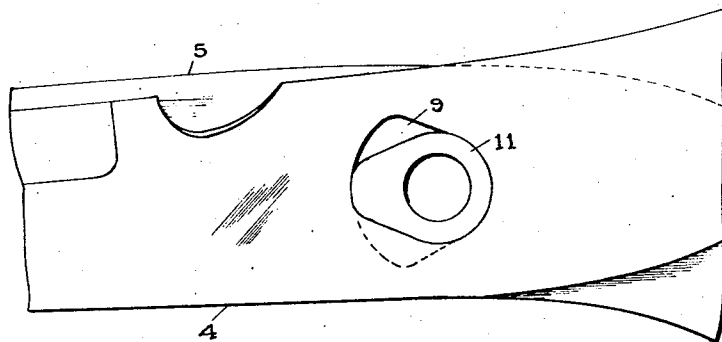
Primary Examiner—Theron E. Condon
Attorney—Norman S. Blodgett

[57]

ABSTRACT

Means are provided in a shear mechanism to limit the travel of one blade relative to the other. The limiting means are located at the pivot point of the blades and are coaxial with the pivot pin.

3 Claims, 4 Drawing Figures



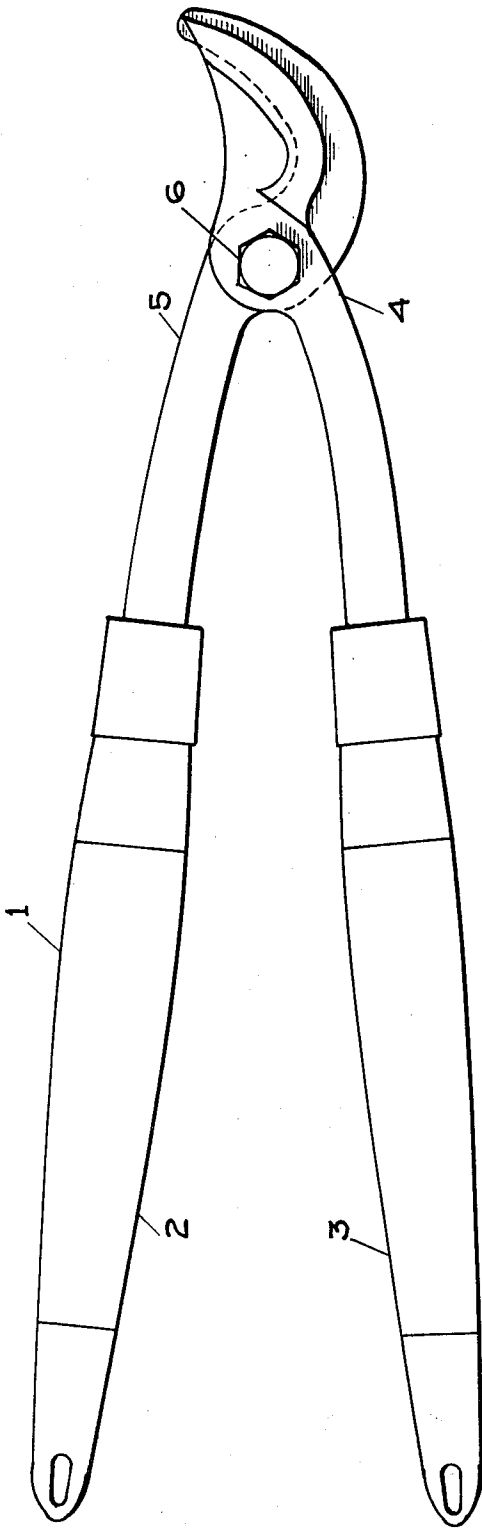


Fig. 1.

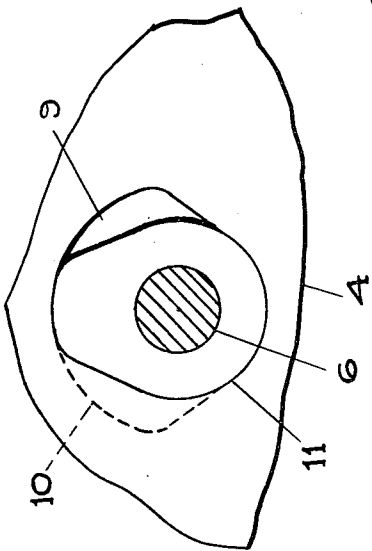
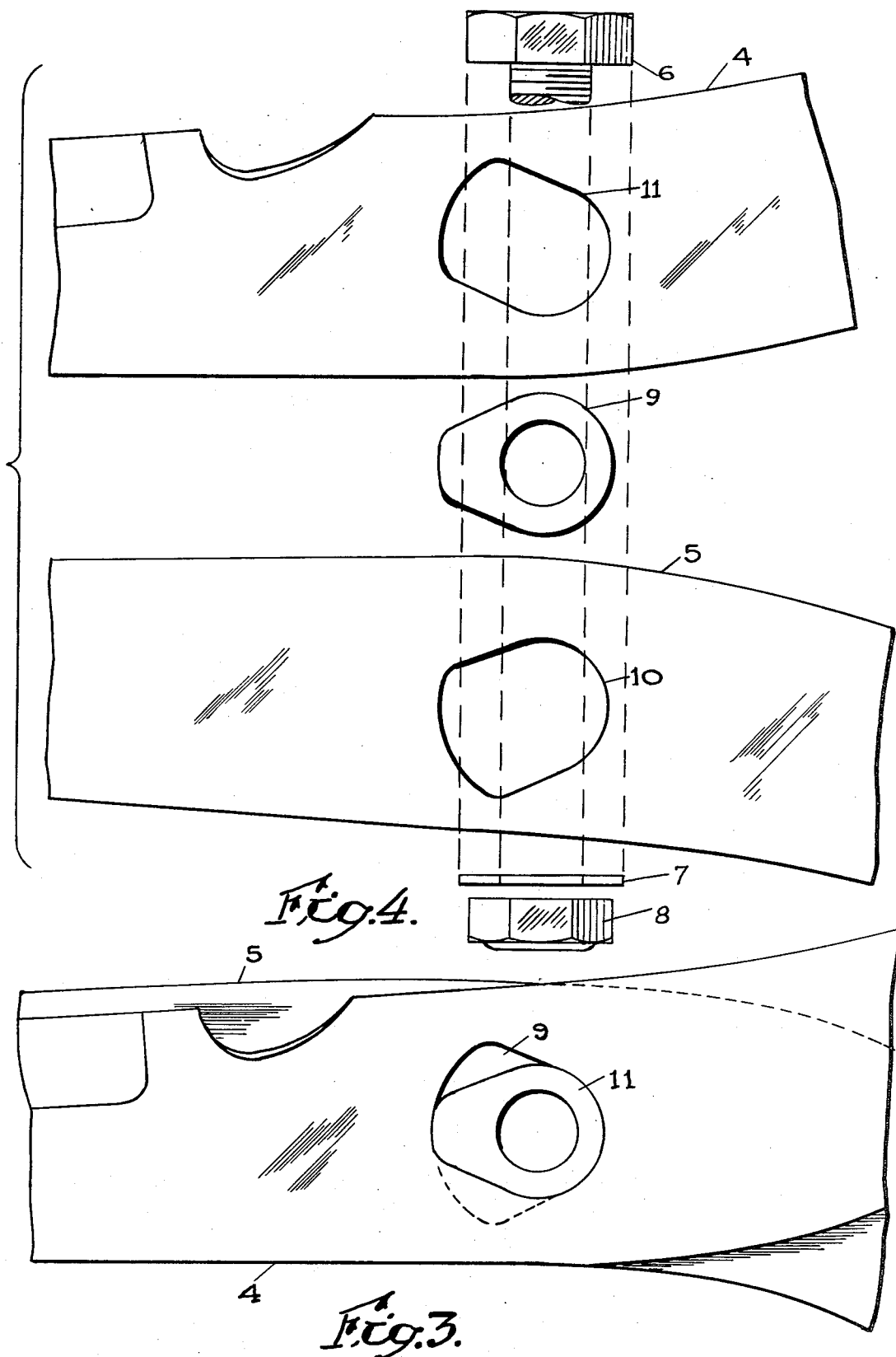


Fig. 2.

Inventor: Edward D. Priest
BY *Harold S. Blodgett*
ATTORNEY



SHEAR STOP

BACKGROUND OF THE INVENTION

This invention relates to the field of cutting implements and, more specifically, to shears in which two interconnected blades coact to sever material. More particularly, the invention relates to novel means to limit the arc of travel of the blades relative to each other thereby permitting free movement without unwanted frictional interference between the blades. The limiting means are positioned in such a manner as to minimize the possibility of injury to the user due to pinching.

Heretofore, shears have been permitted to travel a wide arc thereby reducing their efficiency or else cumbersome or potentially dangerous means have been employed to limit the relative travel of the blades.

Optimally, the arc of travel of the blades of a shear should be no larger than that necessary to encompass the material to be cut plus sufficient clearance to permit ready positioning of the shear in cutting position. If the shear blades open too wide, it will be necessary to partially close them before cutting can be effected. Heretofore, stops have been used to limit the arc described by the blades when passing from closed to open position. Such stops have been placed external to the shear and are cumbersome and interfere with proper use of the device.

Another common means of limiting the blade travel is to machine each blade in such a manner that when the desired limit of travel to the closed position is reached a surface of the first blade will engage a surface of the second blade. One or both of these same surfaces are used to limit the relative travel of the blade in open position by being positioned so that a portion of one blade strikes the corresponding machined surface of the other blade. This has a disadvantage in the tendency of the blades to bind in the open position, the permissible travel is too great and because of the location of the surfaces with respect to the hand of the user, pinching often occurs if one does not exercise proper care.

SUMMARY OF THE INVENTION

The present invention limits the relative travel of shear blades without the disadvantages found in the prior art devices. This is accomplished by providing stop means located internally of the blade assembly. The stop means of the present invention positively limits the relative travel of the blades without the possibility of friction or binding. The location of the stop means is such that the device is easy to use without any cumbersome projections, and also because of its location the possibility of injury to the user is lessened.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and features of the invention will become more apparent by reference to the accompanying drawings of which:

FIG. 1 is a top view of a shear employing the stop means of the present invention,

FIG. 2 is a fragmentary top view, partly in section, taken along the lines II—II of FIG. 1, with the head of the bolt removed to show the stop means,

FIG. 3 is a fragmentary view, partly in section, of a shear blade assembly employing a second embodiment of the invention, and

FIG. 4 is an exploded view of the parts of the assembly of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a lopping shear 1 having handle portions 2,3. Each handle portion 2,3 has a blade portion 4,5 disposed at the end thereof. The two blade portions 4,5 are connected at a common point by a bolt 6 and secured by a washer 7 and a nut 8. Each of the blade portions 4,5 has an opening 9,10 through the flat surface thereof. The openings 9, 10 may be described as having a border consisting of a semi-circular portion on one end and an arcuate portion of larger radius on the other end and joining side portions such that the centers of curvature of the arcuate and semi-circular portions coincide. The openings 9,10 are positioned in each blade portion 4,5 in such a manner that the elongated arcuate portions thereof overlap, while the semi-circular portions are in axial alignment with each other and the pivotal axis of the blades.

A stop device 11 having a shape corresponding to that of the openings 9,10 in the blade portions 4,5, with the exception that the arc of the elongated arcuate portion is reduced is also provided. The stop device 11 has a hole therethrough at the axis of the portion corresponding to the semi-circular portion of the opening to permit the mounting of the stop device 11 on the bolt 6. The blade portions 4,5 are mounted over the bolt 6 and with their openings 9,10 aligned with the stop device 11. The washer 7 and the nut 8 effect the assembly. It will be seen that the stop device 11 is enclosed within the openings 9,10 of the blade portions 4,5 and covered by the head of the bolt 6, and the washer 7 and nut 8. The relative travel of the blade portions 4,5 is limited by the difference in the length of the elongated arcuate portion of the openings 9, 10 and that of the stop device 11. When in closed position, the handle side of the opening 9 of one blade portion 4 engages the stop device 11 together with the opposite side of the opening 10 of the blade portion 5. When in open position, the handle side of the opening 10 of one blade portion 5 engages the stop device 11 together with the opposite side of the opening 9 of the blade portion 4. It will be apparent that the relative travel of the blades is dependent upon the relative lengths of the elongated arcuate portions of the blade openings and that of the stop device.

In the embodiment illustrated in FIGS. 3 and 4, like numbers represent like parts as in FIGS. 1 and 2, and it is shown that the orientation of the openings 9,10 of the blade portions 4,5 and of the stop device 11 can be changed to best suit the required strength of the device while maintaining the desired function.

It will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broadest aspects and, therefore, the aim of the appended claims is to cover all such changes and modifications as in the true spirit and scope of this invention.

I claim:

1. In a cutting instrument,

a. a pair of opposed blades adapted to overlie one another, each of said blades having a cutting surface and an actuating handle appended thereto,

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- b. an opening in each blade, said opening having a border and said border consisting of an arcuate portion of larger radius, an arcuate portion of smaller radius, and side portions positioned so that the centers of curvature of the two arcuate portions coincide,
- c. stop means positioned within said openings and effective to limit the relative travel of the opposed blades,
- d. means assembling said blades and said stopping means and allowing them to rotate relative to one another about a common axis which corresponds to the center of curvature of the arcuate portions of the openings.

2. The cutting instrument of claim 1, in which the stop means has an arcuate border portion of radius slightly less than that of the arcuate border portion of smaller radius of the openings, has an elongated border portion which extends from the center of curvature of the arcuate border portion of the stopping means slightly less than the radius of the arcuate border portion of larger radius of the openings, and is rotatable about the center of curvature of its arcuate boarder portion and about said common axis.

3. The cutting instrument of claim 2, in which the assembling means overlies and encloses the stop means.

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