

[54] PRUNER

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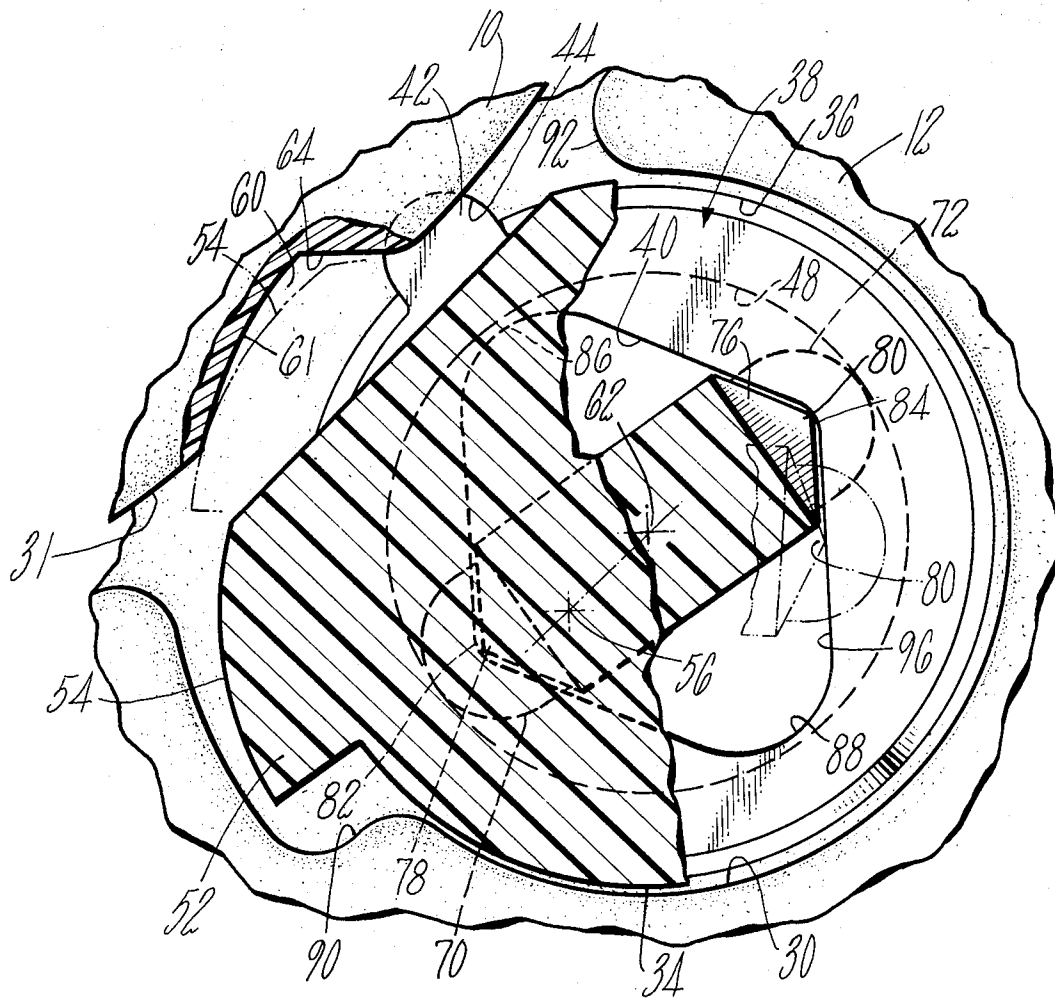
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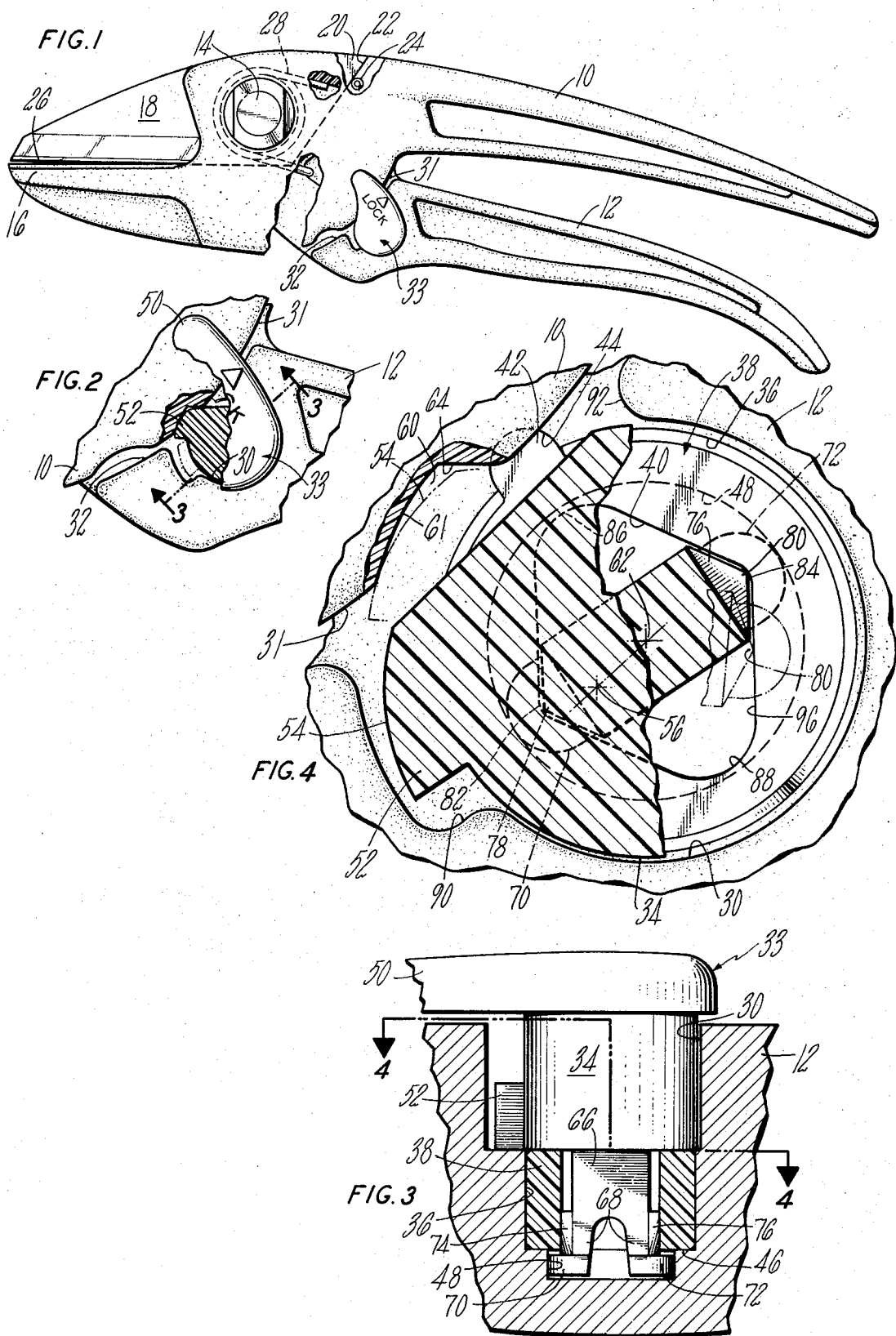
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ABSTRACT

A pruner having a pair of pivoted handles with opposed confronting surfaces. A rotary latch with a latching finger mounted in a transverse opening in one handle engages a recess in the confronting wall of the other. The recess is formed on an arc about axis of latch and the engaging surface of the latch finger is formed on an arc about an axis offset from the latch axis to provide wedging engagement with the recess. Resilient bifurcated legs on the latch pass over center to a latching position and a force urging the handles apart produces a force on a moment arm to two axes to urge the latch through the overcenter position by a snap-action to assume an unlatched position.

6 Claims, 4 Drawing Figures





PRUNER

This invention relates to a pruner and more particularly to a pruner having an improved latch.

An object of this invention is to provide an improved pruner having a latch which prevents the accidental opening of the pruner.

A further object of this invention is to provide a pruner incorporating an accident-free latch which also accommodates the opening of the pruner without the manual actuation of the latch.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

A better understanding of the invention will be obtained from the following detailed description and the accompanying drawing of an illustrative application of the invention.

In the drawing:

FIG. 1 is a side elevation view, partly broken away, of pruner embodying the present invention;

FIG. 2 is an enlarged fragmentary view, partly broken away, of the latch of the present invention;

FIG. 3 is a further enlarged fragmentary cross sectional view taken along the lines of 3—3 of FIG. 2, and

FIG. 4 is a still further enlarged fragmentary view, partly in section, taken along the line 4—4 of FIG. 3.

Referring now to the drawings, there is shown an exemplary pruner illustrative of the present invention, which comprises a pair of handles 10, 12, formed of a molded plastics material, such as reinforced nylon, secured together by a bolt 14 which serves as a pivot for the handles.

Handle 10 is provided with an integral forward extension which provides an anvil 16 for a separable apertured blade 18 mounted by the handle 12 and the pivot 14.

The rearward portion 20 of pivoted blade 18 abuts a shoulder 22 of the handle 12 to prevent relative rotation of the blade 18 relative to handle 12. A resilient roll pin 24, fixedly mounted in a transverse aperture in handle 12 adjacent the shoulder 22, engages the rear edge of blade 18 and supports the compression forces and shock loading when a plant clipping is being severed between the cutting edge 26 of the blade and the anvil 16.

The handles 10, 12 are biased to an open position by a torsion spring 28 positioned around the pivot 14 so that the pruner is automatically reopened upon removal of the closing pressure on the handles.

The handle 12 is provided with a transverse cylindrical recess 30 which is partially open to an arcuate wall 32 of handle 12. The arcuate wall 32 confronts and is adjacent to the arcuate wall 31 of handle 10 which generally describes an arc about the axis of pivot 14 as best shown in FIG. 1.

Mounted in the recess 30 is a latch 33, molded from a plastics material such as delrin, having a cylindrical bearing portion 34 journaled in the cylindrical recess 30. A bushing 38 is press-fit in a cylindrical intermediate portion 36 (FIG. 3) of reduced diameter. Bushing 38 is provided with a generally diamond shaped aperture 40 and with an external protrusion 42 which engages a complementary recess 44 of the handle 12 to index the diamond shaped recess 40 as required in the practice of this invention.

The closed end of the recess 30 is further stepped at 46 to provide a cylindrical bore 48 beyond the end of

the bushing 38 for purposes hereinafter more fully described.

The latch 33 is provided with a lever 50 for the manual rotation of the latch about the axis of the cylindrical bearing surface 34 of the latch. The latch is further provided with a latching finger 52 having an arcuate outer end 54 formed on a radius about the center 56 (FIG. 4).

A recess 60 (FIG. 4) is formed in the wall 31 of the handle 10 and is provided with an arcuate bottom wall 61 which generally describes an arc about the axis 62 of the cylindrical bearing portion 34 of the latch 33. The recess 60 is provided with an end wall 64 to limit the rotation of the finger 52 into the recess under latching conditions.

As best shown in FIGS. 3 and 4, a bifurcated extension 66 is provided at the free end of the latch 33 to provide a pair of legs 68 having depending feet 70, 72 respectively, which are positioned in bore 48 with the ends of the feet engageable with the bushing 38 to maintain the latch assembled with the handle 12. The bifurcated extension 66 is provided with radial projections 74, 76 which are triangular in cross section, to provide pointed tips 78, 80 which are inherently biased into the corresponding recess 82, 84 of bushing 38 when the latch is in its unlatched position. By virtue of the diamond shaped aperture 40 of the bushing 38, it is readily apparent that the latch 33 may be assembled with the handle 12 when the feet 70, 72 of the latch are aligned with the recess 86, 88, respectively, of the bushing due to the inherent resiliency provided by the bifurcated legs 68 of the latch. Once assembled the shoulders 90, 92 of handle 12 serve as stops for the finger 52 to limit the rotation of the latch.

In operation, with the handles in the closed position, the latch 33 may be rotated clockwise from the position shown in FIG. 4 to move the finger 52 to the position shown in FIG. 2. Since the end of the finger 52 has a smaller radius of curvature than wall 61 of the recess 60, the finger 52 of latch 33 may be rotated into the recess with a wedging action to maintain the handles in their fully closed position despite manufacturing variations and tolerances and to assure a tight or interference fit between the finger and the wall 61 of recess 60.

In latching position, the tip 80 is positioned as shown in phantom lines of FIG. 4 so that a line through the axis 62 of the latch 33 and the tip 80 is rotated slightly past a right angle relationship with the surface 96 of the diamond shaped aperture of bushing 38, say 5°, to provide a snap-action latching and to maintain the finger 52 in its latched condition to prevent accidental unlatching upon an involuntary squeezing of the handles 10, 12.

A feature of this invention is that the pruner may be unlatched without manual actuation of the latch by the simple expedient of pulling the handles apart. When the handles are pulled apart the force applied to the arcuate end 54 of the latching finger 52 by the wall 61 of notch 60 by the relative rotation of handle 10 is directed at approximately a 45° angle relative thereto. A line through the centers 56, 62 passes beyond the end of latching finger 52 so that a moment of force is applied to the latch to rotate it counterclockwise about its pivot axis 62. When this force is sufficient to overcome the forces retaining the latch in its latching position, the bifurcated legs 68 of the latch will be moved overcenter and unlatch. Thus, the latch design is one in which the

pruner is held against inadvertent opening upon the squeezing of the handles while at the same time is of a design in which it is possible to override the latch without permanent deformation or damage by pulling the handles apart so that the latch has a long operating life despite the abuse which may be imposed on a pruner latch by the user.

As will be apparent to persons skilled in the art, various modifications, adaptations, and variations of the foregoing specific disclosure can be made without departing from the teachings of the present invention.

I claim:

1. In a tool of a pivoted crossed lever type, first and second handles pivotally connected to one another, said first and second handles having respectively opposed first and second surfaces adjacent the pivot axis therebetween, one of said handles having a recess in said opposed surface thereof and the other of said handles having a rotary latch having a latching finger engageable with said recess, overcenter retaining means for retaining the latch in its latched position, and means associated with said latching finger and said recess to override said retaining means and move said latching finger to its unlatched position upon the application of a manual force on said handles urging them to an open position.

2. The tool of claim 1 wherein the latching finger has a wedge-shaped engaging surface, and the manual opening movement of said handles imposes a force thereon at a small acute angle when the latch is in a latched position.

3. The tool of claim 2 wherein the engaging surface of said latching finger is formed on a radius of curvature having a center which is offset from the pivot axis of the latch.

4. The tool of claim 3 wherein the radius of curvature of the engaging surface of said latching finger is less than its distance from the axis of said latch.

5. The device of claim 3 in which the force applied to said latching finger upon the application of a force urging the handles to an open position is directed at an angle of about 45° thereto and is offset from a line passing through the center of curvature thereof and the axis of said latch.

6. The tool of claim 3 wherein the rotary latch is journaled in an aperture and is provided with resilient depending leg means biased against a non-circular wall of said aperture and the contacting portion of said leg means is rotated slightly past a line which is perpendicular to said non-circular wall and passes through the axis of rotation of said latch.

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