United States Patent [19]

Keymer

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[54] **HACKSAW FRAME**

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[73] Assignee: **Malco Products, Inc.,** Annandale, Minn.

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[52] **U.S. Cl.** ..... **145/33 A,** 145/35 E, 145/108 R

[51] **Int. Cl.** **B27b 21/00**

[58] **Field of Search** .... 145/33 R, 33 A, 34 R, 35 E, 145/108 R, 31 R

[56] **References Cited**

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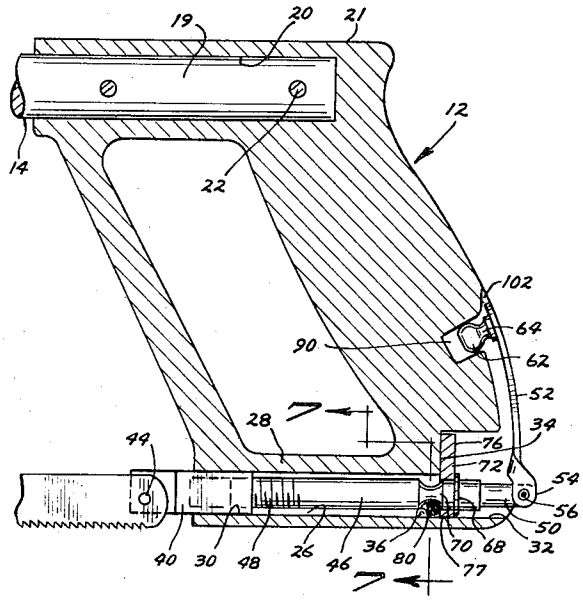
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Primary Examiner—Al Lawrence Smith
Assistant Examiner—J. T. Zatarga
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[57] **ABSTRACT**

A hacksaw frame for a blade, the handle portion of which has a socket extending from front to rear therethrough, a take-up pin rotatably mounted in the socket and restrained from axial movement therein, an external crank for rotating the take-up pin, and a blade connector block axially but non-rotatably mounted in the forward end of the socket. The take-up pin is threaded at its forward end to the blade connector block so that cranking of the handle draws the connector block rearwardly in the socket, thus tightening the hacksaw blade.

8 Claims, 7 Drawing Figures



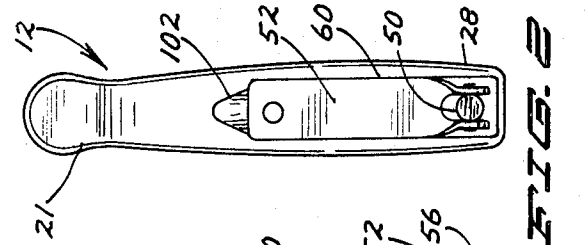


FIG. 2

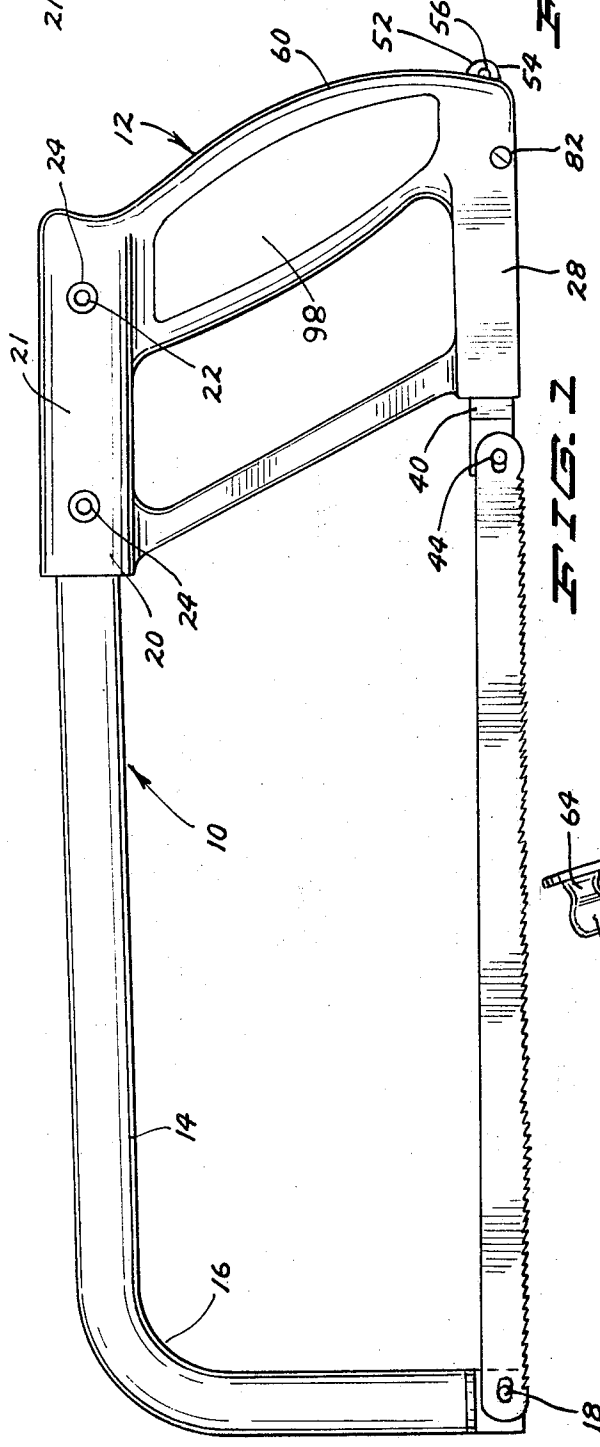


FIG. 1

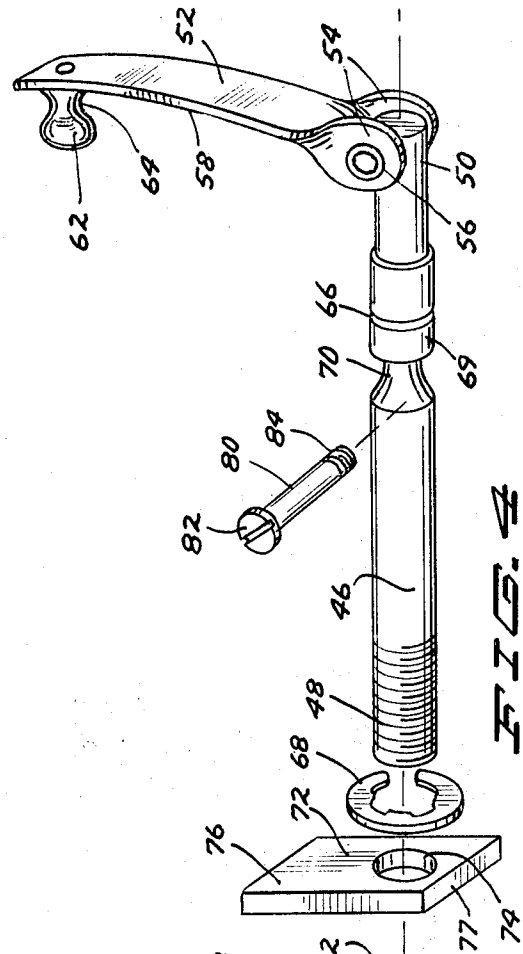


FIG. 4

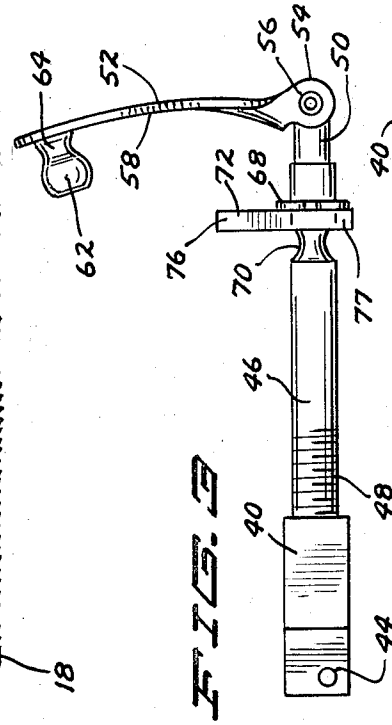
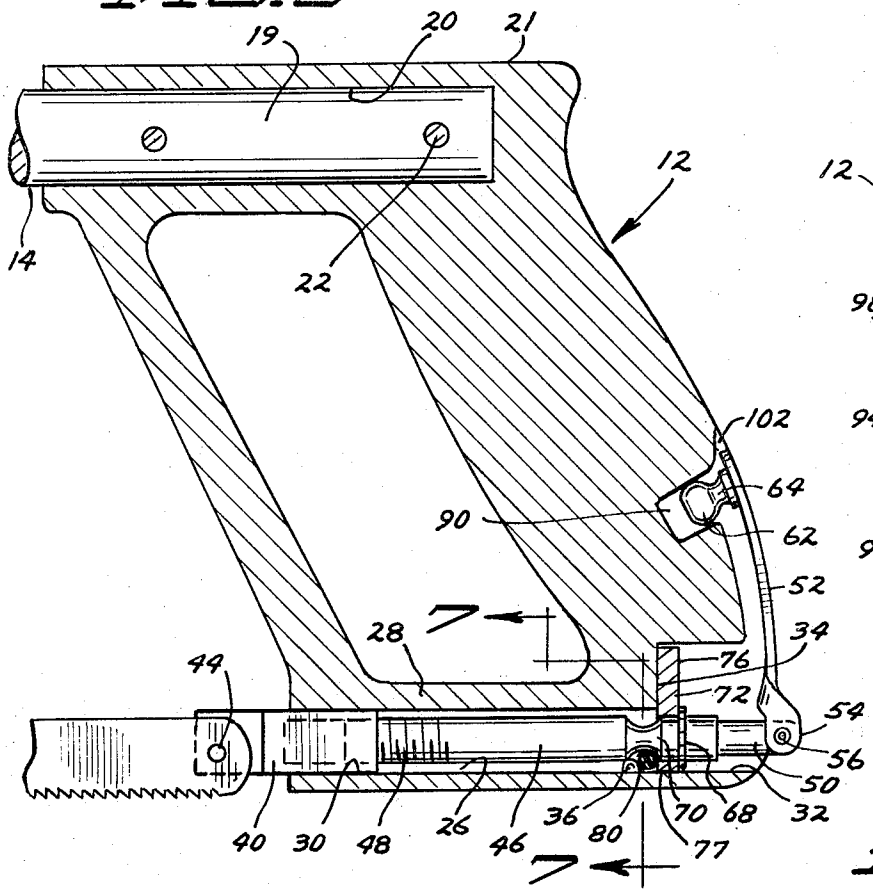


FIG. 3

FIG. 5



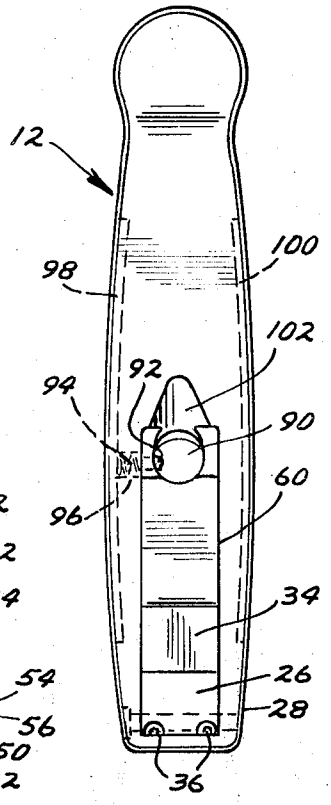


FIG. 6

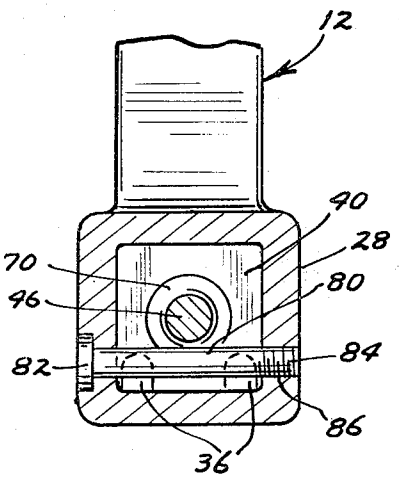


FIG. 7

HACKSAW FRAME

BACKGROUND OF THE INVENTION

The present invention relates to hacksaw frames, and particularly those with manually graspable handles.

Hand-operated hacksaws of the type commonly used to saw metal are ordinarily provided with blade-tightening devices at or near their handle portions. Hacksaw blades generally are not over about one-half inch in height, and if they are not connected very rigidly in a hacksaw frame, they tend to bend slightly in torsion in the cutting operation, resulting in inaccurate cuts. It is desired that the blade-tightening apparatus, which is located at or near the handle of the hacksaw frame, not be exteriorly bulky so as to interfere with the comfortable and proper grasping of the hacksaw handle, nor provide outwardly-jutting sharp edges to cause injury to the operator.

BRIEF DESCRIPTION OF THE INVENTION

Briefly stated, the invention relates to a hacksaw frame for a blade comprising a handle having upper and lower portions, the lower portion having a socket therein extending therethrough from front to rear, which socket is of non-circular cross section adjacent its forward end. A frame arm is rigidly mounted at one end thereof in the upper portion of the handle and extends forwardly thereof, and the other end of the frame arm has a connector thereon for connection to one end of the hacksaw blade. A blade connector block is mounted in the socket solely for axial movement therein and is removable forwardly therefrom. The block has a longitudinal threaded orifice opening rearwardly thereof and has a connector thereon for connection thereto of the other end of the hacksaw blade. A take-up pin having a threaded forward end is threaded into the orifice in the connector block, and the take-up pin extends rearwardly in the socket and terminates adjacent the rearward end thereof. A crank is pivotally attached to the rearward end of the take-up pin to rotate about the pivotal attachment in a plane substantially normal to the socket axis and to the rear of the handle to cause the pin to rotate about its axis. The crank is configured to be stored closely against the rearward surface of the handle. Means are provided to prevent axial movement of the take-up pin. Thus, as the crank is rotated, the take-up pin is threaded into the connector block, drawing the latter rearwardly in the socket and tightening the blade in the hacksaw frame.

BRIEF DESCRIPTION OF THE DRAWING

FIGS. **1** and **2** respectively are side and rear views of the hacksaw frame of the invention;

FIG. **3** is a side view of a connector block-take-up pin assembly employed in the invention;

FIG. **4** is an exploded, detailed view of the connector block-take-up pin assembly shown in FIG. **3**;

FIG. **5** is a side view, broken away and in partial cross section, of a handle of the hacksaw frame of the invention;

FIG. **6** is a rear view of the handle portion of the hacksaw frame of the invention shown with the connector block-take-up pin assembly removed; and

FIG. **7** is a cross-sectional view taken along lines **7–7** of FIG. **5**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, a hacksaw frame designated generally as **10** is provided with a handle **12** and a forwardly extending, tubular metal frame **14** having a downward bend **16** therein spaced from the handle and terminating in a hacksaw blade connector **18** which may be a short metal post adapted to be inserted in the orificed end of a hacksaw blade. The other end **19** of the frame arm **14** is rigidly mounted in a tubular receptacle **20** in the upper portion **21** of the handle, and secured therein by means of spring-loaded detent knobs **22** extending outwardly from the frame arm end **19** for reception in orifices **24** in the walls of the receptacle **20.**

A socket **26** is provided in the lower portion **28** of the handle and extends therethrough from front to rear. The socket is of non-circular cross section at least adjacent its forward end **30,** and preferably has a rectangular cross section throughout the majority of its length from front to rear. Adjacent its rear-most end **32,** the socket is recessed to define an upwardly extending, rearwardly facing shelf **34,** and the lower surface of the socket is provided with one or more upwardly extending projections **36** positioned forwardly of the shelf, the purpose of which will be subsequently explained.

A blade connector block **40,** which preferably is of a rectangular cross section adapted to fit the rectangular socket, is slidably mounted in the forward end **30** of the socket so as to be removable forwardly therefrom. The non-circular cross section of the socket, at least adjacent its forward portion **30,** is adapted to prevent the blade connector block from rotating therein. The blade connector block is provided with a longitudinal, rearwardly-facing threaded orifice **42** (FIG. **4**), and a forwardly positioned connector **44** thereon which may be identical to connector **18** and which is adapted for connection to the block of the other end of the hacksaw blade.

A take-up pin **46** is rotatably carried in the socket **26** rearwardly of the block **40,** the adjacent end **48** of the take-up pin being threaded for engagment with the threaded orifice **42** of the blade connector block **40.** The end **50** of the take-up pin extends to a point adjacent the rearward end **32** of the socket, and has a crank **52** with a bifurcated lower end **54** pivotally connected thereto by pivot pin **56** such that rotation of the crank in a plane normal to the axis of the take-up pin causes the take-up pin to rotate within the socket **26.** The crank has a flat, gently curved midsection **58** adapted to lay flat against the rearward surface **60** of the handle, and has inwardly extending, manually graspable knob **62** thereon, the end of the knob being generally spherical in shape and being connected to the crank **52** by means of a connecting piece **64** of lesser diameter than the spherical knob end.

Adjacent its end **50,** the take-up pin **46** is provided with a small circumferential notch **66** (FIG. **4**) onto which is snapped a spring retainer **68.** A circumferential groove **70** is formed in the take-up pin **46** forwardly of the retaining spring **68,** and onto the section **69** of the take-up pin between the circumferential groove **70** and the retaining spring **68** is rotatably mounted an upwardly extending flange such as generally rectangular bearing plate **72.** The bearing plate has a bearing aperture **74** adjacent its lower end and through which the

take-up pin passes and has an upper portion **76** adapted to fit in the recess in the rearward end **32** of the socket and to bear against the rearwardly facing, upwardly extending ledge **34**. The retaining spring **68** prevents the bearing plate **72** from moving rearwardly on the take-up pin **46**. The bottom edge of the bearing plate rests on the bottom surface of the socket, and the top and sides of the plate rest against the top and side walls of the recess defining the shelf **34**, so that the bearing plate cannot move up and down or side to side within the socket. Thus, the bearing aperture **74** serves to position the take-up pin within the handle socket, and prevents wobbling of the take-up pin in the socket when the crank **52** is cranked.

Extending transversly of the socket and adjacent the bottom surface thereof is a dowel, or screw, **80** having a flat-headed end **82** with an external slot therein for engagment by a screwdriver, and a threaded end **84** adapted to thread into one wall **86** of the socket. The screw **80** is positioned to ride in the groove **70** in the take-up pin **46**, below the axis of the latter, and the screw **80** bears forwardly upon the projections **36** arising from the bottom surface of the socket. As such, the screw **80** provides a bearing surface upon which the lower portion **77** of the bearing plate **72** may bear, the screw **80** being prevented from bending forwardly under the pressure of the bearing plate by upwardly arising projections **36**. Thus, the rearward-most surface of the screw **80** is preferably in vertical alignment with the upwardly extending, rearwardly facing ledge **34** so that the bearing plate is maintained in proper vertical alignment in the socket.

The rear surface **60** of the handle **12** is provided with a rearwardly facing orifice **90** adapted in size and position for insertion therein of the knob **62** of the crank **52**, as best shown in FIG. **5**. Protruding from one edge of the aperture **90** is a detent knob **92** which is urged inwardly of the orifice by spring **94** contained in aperture **96** in one wall of the handle (FIG. **6**). The handle **12** may be provided with opposed plastic inserts **98** and **100** along the sides thereof, and insert **98** may serve to bear against the left-most end of spring **94**, as shown in FIG. **6**. The detent knob **92** operates to releasably retain in the orifice **90** the projecting knob mounted at the end of the crank **52** when the crank is in its stored position against the rearward surface **60** of the handle. An indentation **102** is formed in the rearward wall **60** of the handle above and closely adjacent the orifice **90** therein to permit an operator to engage the uppermost edge of the crank **52** with a fingernail and dislodge the knob **62** from the orifice **90**.

To disassemble the hacksaw frame of the invention for cleaning or replacement of worn parts if needed, the crank is rotated so as to cause the forward end **48** of the take-up pin to threadingly disengage the blade connector block **40**. The block may then be removed by sliding it forward and out of the socket **26**. The transverse screw **80** is then removed, and the take-up pin **46**, the bearing plate **72**, the retainer **68** and the crank **52** may be removed rearwardly from the socket as a single piece. The frame arm **14** may be withdrawn from the handle **12** by pressing the detent knobs **22** and sliding the arm forwardly out of the handle receptacle. The process is reversed for reassembling the hacksaw frame.

In use, a hacksaw blade is connected to the connectors **18** and **44** on the frame arm **14** and connector block **40**, respectively. To tighten the blade, the crank **52** is rotated to cause the take-up pin to thread continuously more deeply into the threaded orifice **42** of the connector block **40**, thus drawing the connector block rearwardly and tightening the blade. The take-up pin is restrained from forward axial movement by upwardly extending ledge **34** and transverse screw **80** bearing against the bearing block **72** which in turn is prevented from rearward movement with respect to the pin by retainer **68**. The threading of the orifice **42** and take-up pin end **48** is such that a single revolution of the take-up pin will advance the connector block onto the pin by not more than about one thirty-second of an inch. By virtue of the mechanical advantage offered by the crank **52**, the hacksaw blade may be very tautly retained between the connecting posts **18** and **44**. When the desired degree of tautness of the hacksaw blade has been obtained, the crank is positioned such that the knob **62** thereof is in line with the orifice **90** in the rear of the handle, and the knob is then snapped into the orifice past the detent knob **92**. Only a portion of the bifurcated end **54** of the crank projects exteriorly of the handle **12**, thus not only providing the handle with a neat appearance, but also avoiding the presence of bulky blade-tightening apparatus or projections with sharp edges, such as threaded projections, exteriorly of the handle. Because the take-up pin is restrained from axial movement by means of the bearing block **72**, as aforesaid, and the transverse screw or dowel **80**, the pivot pin **56** joining the crank **52** to the end **50** of the take-up pin is always constantly positioned axially of the socket **26** so that the crank may be folded neatly against the rear surface **60** of the handle. Only the connector block **40** is free to move axially with respect to the socket **26** in the handle. Thus, the moving bearing surfaces upon which force is applied during tightening of the hacksaw blade (the threaded orifice of the blade connector block, the threaded end of the take-up pin, the bearing plate **72**, retainer **68**, and dowel **80**) are safely enclosed within the socket **26**. No axial tension is imparted to the end **50** of the take-up pin, nor to the crank **52**.

Manifestly, I have provided a hacksaw frame for a blade which enables great force to be applied to the blade for tautly retaining it in the frame, wherein the moving, bearing surfaces of the blade-tightening apparatus are contained safely within the handle, and wherein the handle is substantially free of exteriorly extending blade-tightening apparatus or sharp edges likely to cause injury or interfere with comfortable use of the hacksaw.

While I have described a preferred embodiment of the present invention, it should be understood that various changes, adaptations and modifications may be made therein without departing from the spirit of the invention and the scope of the appended claims.

What I claim is:

1. Hacksaw frame for a blade comprising a handle having upper and lower portions, the lower portion having a socket extending therethrough from front to rear, which socket is of non-circular cross section adjacent its forward end, a frame arm rigidly mounted at one end in the upper portion of the handle and extending forwardly thereof, the other end of the frame arm having a connector for connection to one end of the hacksaw blade, a blade connector block mounted in the socket solely for axial movement therein, the block

having a longitudinal threaded orifice opening rearwardly thereof and having a connector for connection thereto of the other end of the hacksaw blade, a take-up pin having a threaded forward end threaded into the orifice in the connector block, the take-up pin extending rearwardly in the socket and terminating adjacent the rearward end thereof, a crank pivotally attached to the rearward end of the take-up pin to rotate about the pivotal attachment in a plane substantially normal to the socket axis and to the rear of the handle to cause the pin to rotate about its axis, said crank being configured to fit closely against the rearward surface of the handle, and means preventing axial movement of the take-up pin, whereby, as the crank is rotated, the take-up pin is threaded into the connector block, drawing the latter rearwardly in the socket and tightening the blade in the hacksaw frame.

2. The hacksaw frame of claim **1** wherein said crank has a graspable projection thereon spaced from its pivotal connection to the take-up pin to facilitate manual cranking thereof, and wherein the handle has a rear surface with an orifice therein adapted to receive the graspable projection of the crank, the orifice having a spring-loaded detent knob projecting inwardly from its periphery to releasably retain the graspable projection in the orifice.

3. The hacksaw frame of claim **1** wherein said socket has internal, rearwardly-facing surfaces at a point along its axis and wherein the take-up pin has a flange rotatably mounted thereon but prevented from rearward axial movement with respect to the take-up pin, the flange contacting the rearwardly facing surfaces of the socket to thereby prevent forward axial movement of the take-up pin.

4. The hacksaw frame of claim **3** including a retainer rigidly mounted on the take-up pin rearwardly of said flange to prevent rearward movement of the flange on the take-up pin.

5. The hacksaw frame of claim **3** wherein said take-up pin has a circumferential groove therein at a point along its axis, and wherein said handle has a removable dowel mounted therein transversly of the socket and passing through the circumferential groove, whereby forward and rearward axial movement of the take-up pin is restrained.

6. The hacksaw frame of claim **5** wherein the socket has a rearwardly facing, upwardly extending shelf internally thereof and a projection rising internally from its lower surface forwardly of, and in contact with, said transverse dowel, whereby the flange rotatably mounted upon the take-up pin bears upon the upwardly extending shelf and against the transverse dowel to restrain forward axial movement of the take-up pin.

7. A hacksaw frame for a blade comprising:

a handle having upper and lower portions, the lower portion having a non-circular socket extending therethrough axially from front to rear, the socket having a rearwardly facing, upwardly extending ledge therein, the handle having an orifice therein opening rearwardly thereof intermediate its height;

a frame arm, one end of which is mounted in the upper portion of the handle and extends forwardly thereof, and the other end of which is adapted to connect to one end of the hacksaw blade;

a blade connector block mounted slidably but not rotatably in the socket and removable forwardly therefrom, the connector block having a connecting member thereon for attachment of a hacksaw blade thereto, and having a threaded orifice opening rearwardly thereof;

a take-up pin, one end of which threadingly engages the orifice in the blade connector block, and the other end of which extends rearwardly in the socket, the take-up pin having a circumferential groove therein intermediate its length and having a retaining clip rigidly mounted thereon rearwardly of the circumferential groove;

a crank pivotally attached at one end to the rearward end of the take-up pin and adapted to be cranked in a plane substantially normal to the socket axis rearwardly of the handle, the crank having a graspable projection extending from its other end adapted to enter the orifice in the handle and to be releasably retained therein;

a dowel extending transversly of the socket adjacent the bottom surface of the socket and in substantial alignment with the upwardly extending, rearwardly facing ledge therein, the dowel engaging the circumferential groove in the take-up pin to restrain axial movement thereof in the socket;

a bearing plate rotatably mounted on the take-up pin rearwardly of the circumferential groove therein but forwardly of the retaining clip thereon, the bearing plate contacting the transverse dowel and upwardly extending ledge in the socket to prevent forward movement of the take-up pin in the socket;

whereby, as the crank is cranked, the take-up pin is threaded into the connector block, drawing the latter rearwardly in the socket and tightening the blade in the hacksaw frame, and whereby the crank may be brought to rest against the rearward surface of the handle, the projection on the crank being releasably retained in the orifice in the handle.

8. The hacksaw frame of claim **7** wherein the socket has a bottom surface having a projection arising therefrom and positioned fowardly of, and in supportive contact with, the transverse dowel.

* * * * *