Feb. 17, 1959 J. P. DELPIERRE 2,873,460

MULTI-PURPOSE CONVERTIBLE HAND TOOL

Filed Dec. 28, 1956

2 Sheets-Sheet 1

Fig-1

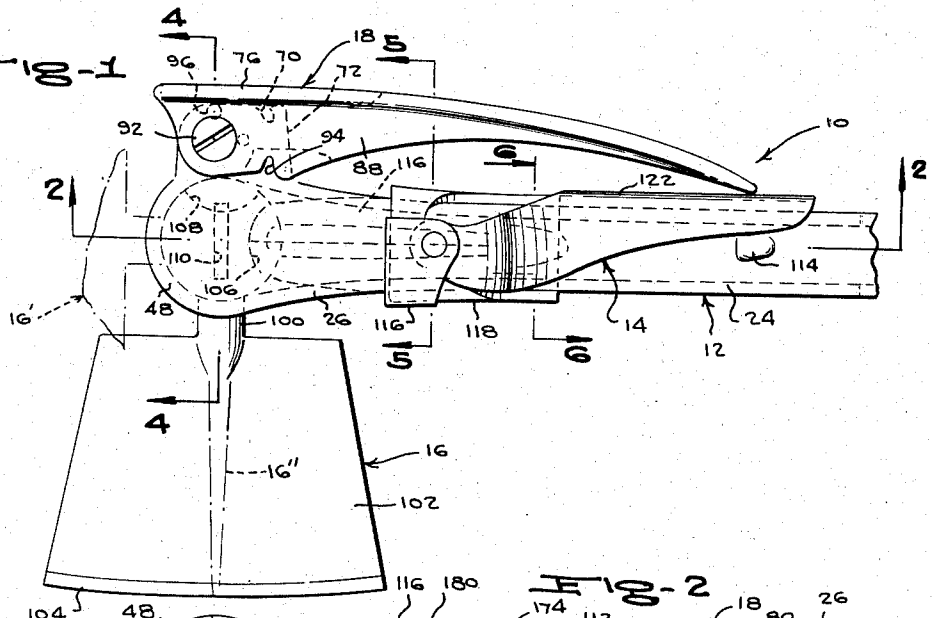


Fig-2

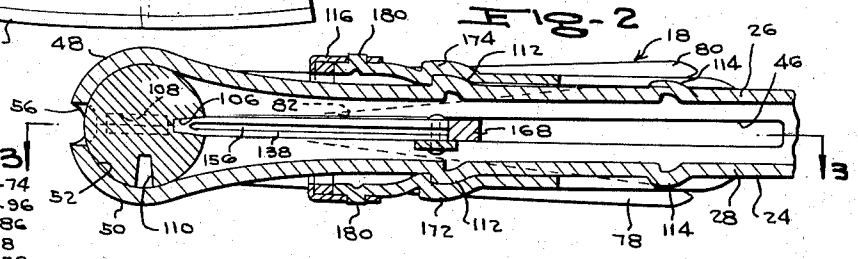


Fig-4

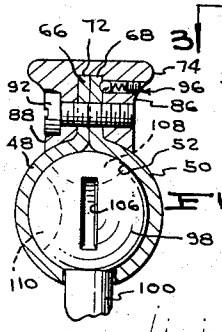


Fig-5

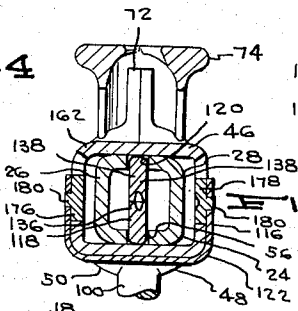


Fig-6

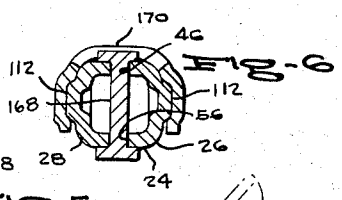
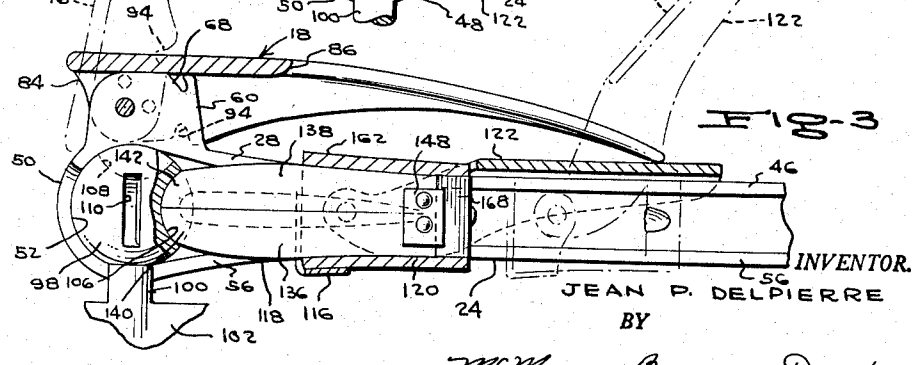


Fig-3



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Fig-7

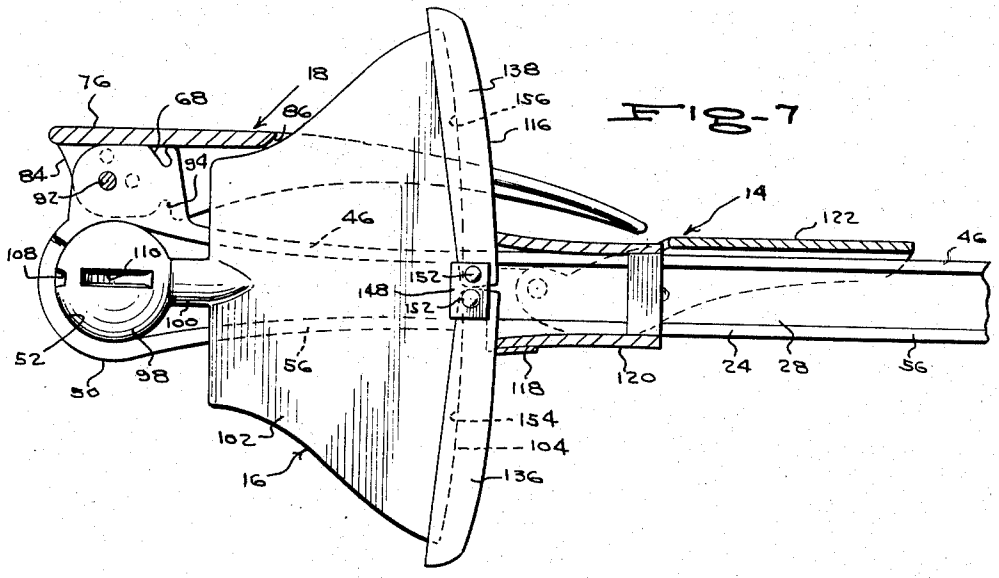
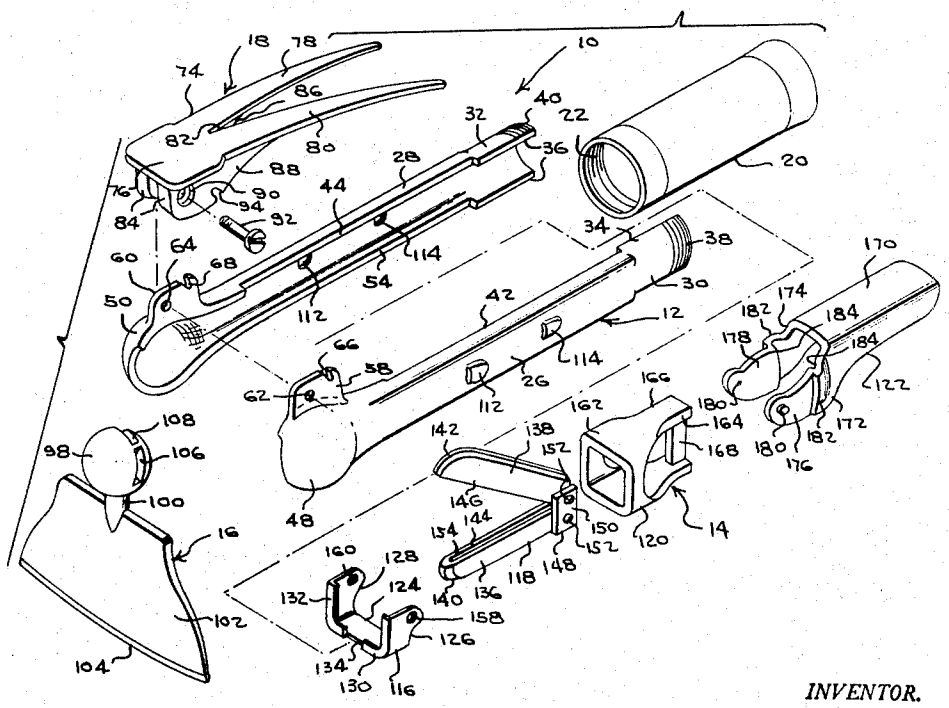


Fig-8



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MULTI-PURPOSE CONVERTIBLE HAND TOOL

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2 Claims. (Cl. 7—14.55)

This invention relates generally to hand tools and is more particularly concerned with a novel multi-purpose hand tool providing a plurality of useful tools for different purposes.

A primary object of invention is to provide a novel multi-purpose convertible hand tool including a handle assembly having a hand grip and shank portion, the shank portion having adjustably secured thereon means which may be disposed to a relatively fixed position to provide a plurality of tools such as an ax, hammer, nail puller, adz, hoe, spade, pick and wire cutter.

Another object of invention in conformance with that set forth is to provide a novel hand tool of the character involved which includes means whereby the shank portion of the tool adjustably supports a blade member for both pivotal and rotational movement on a terminal end portion thereof, further adjustably supporting a member utilized as a pick, nail puller and wire cutter, and further including means utilized for retaining the blade member in a relatively fixed position and cooperating with said blade member for storing the same with the sharpened edge thereof in a protected position.

Other objects of invention in conformance with that set forth reside in improved retaining means for a tool of the character involved for adjustably retaining the adjustable blade and pick members of the tool in various positions of use.

And yet a further object of invention in conformance with that set forth is to provide a novel multi-purpose convertible hand tool of the character involved which is readily manufactured, easily used, and highly practical and serviceable for the purpose intended.

These together with other objects and advantages which will subsequently become apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawing forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a fragmentary side elevation of the novel multi-purpose tool, a portion of the handle being broken away, showing the same in solid lines in a position of use as an ax, and further showing by means of phantom lines alternate positions of the blade member for use as a spade and adz;

Figure 2 is a fragmentary section taken substantially on the plane of line 2—2 of Figure 1;

Figure 3 is a fragmentary section taken substantially on the plane of line 3—3 of Figure 2, showing by means of phantom lines the manner in which the pick member thereof can be used as a wire cutter, and showing displaceable lock means which may be manipulated in order to adjust the blade member of the tool;

Figure 4 is a fragmentary section taken substantially on the plane of line 4—4 of Figure 1;

Figure 5 is a fragmentary section taken substantially on the plane of line 5—5 of Figure 1;

Figure 6 is a fragmentary section taken substantially on the plane of line 6—6 of Figure 1;

Figure 7 is a sectional view similar to Figure 3, showing the manner in which the multi-purpose tool may be disposed in a "stored" position for ready transport; and

Figure 8 is an exploded perspective view of the novel multi-purpose tool.

Referring to the drawing in detail, a novel multi-purpose convertible hand tool is indicated generally at 10, said tool including a handle assembly 12, a retaining assembly 14, a blade member 16 and a tool member 18. The tool may be constructed of any suitable material.

The handle assembly 12 is of a substantially tubular character comprising a suitably conformed cylindrical handle 20, see Figure 8, incorporating an internally threaded open end portion 22. The handle assembly 12 further includes a shank portion 24 comprised of a pair of elongated complementary shell members 26 and 28, see Figure 8. The shell members 26 and 28 are substantially identical including a rear semi-cylindrical end portion 30 and 32, respectively, longitudinal edge portions 34 and 36, respectively, being juxtaposed when the handle assembly is assembled. The semi-cylindrical portions 30 and 32 include externally cooperating threaded portions 38 and 40 received within the internally threaded end 22 of the handle 20.

The shell members 26 and 28 include complementary elongated offset notch portions 42 and 44 which combine to form an elongated longitudinally extending slot 46 in the upper surface of the shank 24 of the handle assembly, see Figures 2, 5 and 6, for example. The shell members 26 and 28 incorporate integral therewith on the ends opposite semi-cylindrical portions 30 and 32, semi-spherical portions 48 and 50, respectively, forming an internal spherical rocket 52. Extending longitudinally of the shell members 26 and 28 and about the lower portion of the semi-spherical portions 48 and 50 are under cut notch portions 54, one of which being shown in Figure 8, which cooperate to define an elongated longitudinal slot 56 in co-planar relationship with the slot 46 extending through the upper surface of the shank portion of the handle assembly. Integral with the semi-spherical cooperating sockets 48 and 50 and extending laterally therefrom are juxtaposable abutment or support plates 58 and 60, inner surfaces being juxtaposed when the handle assembly is assembled, said abutment plates incorporating transverse alignable apertures 62 and 64, respectively, therethrough, and including in their upper edges a pair of alignable upwardly opening transverse notch portions 66 and 68, respectively, for receiving thereacross a wire to be cut when the tool is utilized as a wire cutter. When the abutment plates 58 and 60 are disposed in assembled relationship they will have formed therein by means of the aligned notches 66 and 68 an upwardly opening notch conveniently defined by reference character 70 in Figure 1, and forming a single integral laterally extending abutment plate conveniently identified at 72 in Figure 1.

The tool member 18 comprises a body member 74 having a substantially planar upper surface 76 providing a hammer-head when disposed in the position shown in Figure 1, for example, said hammer-head continuing integral with a pair of co-planar diverging and tapered blade elements 78 and 80 forming a V-shaped notch therebetween indicated at 82 utilized for the purpose of pulling nails, for example. The tool member 18 may be utilized as either a pick or nail puller when disposed in the position shown by means of phantom lines in Figure 3, the forward end portion 84 of the body member

74 conforming to the forward surface of the semi-cylindrical combined sockets 48 and 50. Each of the blade elements 78 and 80 have extending normal to the under surface thereof integral solid mutually parallel rib portions 86 and 88, respectively, which have extending transversely through a forward end aligned apertures 90 disposable on opposite sides of the abutment plate identified at 72, and being in alignment with the apertures 60 and 62 of the abutment plates 58 and 60, and a suitable retaining screw 92 extends through said aligned apertures defining a transverse axis of rotation for the tool member 18. The blade elements 78 and 80 incorporate a longitudinal arcuate surface facilitating the pulling of nails by the tool member 18. The rib elements 86 and 88 have extending transversely across an intermediate portion thereof downwardly opening notch portions 94 alignable with the notch portion identified at 70 on the abutment plates 58 and 60, and accordingly the blade elements 78 and 80 will provide a suitable handle for pivoting the tool member 18 from the phantom line position shown in Figure 3 toward longitudinal alignment with the shank portion 24 of the handle assembly accordingly severing a wire disposed transversely in the notch portion 70.

In order to substantially retain the tool member 18 in either the phantom line position or solid line position shown in Figure 3, a suitable detent assembly indicated generally at 96, see Figure 4, extends transversely through the rib 86, including a suitable spring urged ball element engageable in suitable recesses in the abutment plate 60, said recesses being disposed in radially extending aligned relationship for engagement with the spring urged ball element.

The blade member 16 incorporates a spherical solid ball member 98 rotatably and pivotally received in the socket 52 of the shank portion 24. The ball 98 has extending laterally from one side thereof an integral support shaft 100 continuing in a transverse blade 102 suitably sharpened at its lower edge 104. Opening into the outer periphery of the spherical ball 98 in co-planar relationship relative to the general plane of the blade 102 are tapered notch portions or slots 106 and 108. And in right angular relationship relative thereto i. e. normal to the general plane of the blade 102 and the plane defined by the notches 106 and 108 is an outwardly opening notch portion 110. When the notch portion 106 is disposed in substantially co-planar relationship with the overlying grooves 46 and 56 of the shank portion 24, the blade member 102 will be disposed in the solid line position shown in Figure 1, accordingly providing an ax. By pivoting the blade member 16 to the position shown fragmentarily at 16' by phantom lines, see Figure 1, the notch portion 108 will be in substantially co-planar relationship with the plane defined by the overlying slots 46 and 56, accordingly providing a simulated spade. By rotating the blade member 16 to the position indicated by phantom lines at 16'', the notch portion 110 will be disposed in substantially co-planar relationship with the aforementioned slots 46 and 56, and when the blade is disposed in this position the tool may be utilized as an adz. The blade may also be rotated to the position shown in Figure 7, this being defined as the "stored" position, wherein the blade extends longitudinally of the shank portion 24 of the handle assembly, in substantially co-planar relationship relative to the plane defined by the overlying slots 46 and 56. The means utilized for retaining the blade member 16 in the various positions of adjustment for use as a spade, ax and adz, is also utilized for retaining the blade member in the stored position shown in Figure 7 as will subsequently be described in detail.

The shank portion 24 defined by the cooperating shell members 26 and 28 has a substantially rectangular cross section as most clearly seen in Figures 5 and 6.

The shell members 26 and 28 have extending in longitudinally spaced relationship from the outer surface thereof oppositely disposed abutment or spur elements 112 and 114 which cooperate with the retaining means indicated generally at 14. The retaining means 14 includes a support bracket element 116, a pivotal tongue assembly 118, a slidable sleeve retainer 120 and a pivotal retaining lever 122. As most clearly seen in Figure 8, for example, the support bracket element 116 has a U-shaped configuration, as viewed in plan, comprising a lower transverse portion 124 including integral mutually parallel side plate portions 126 and 128. Integral with the forward edge of the portion 124 and plates 126 and 128 is an inwardly directed flange portion 130 and 132, comprising oppositely facing L-shaped portions, the lower legs of which i. e. those on the portion 124, being interrupted in the center as indicated at 134. The pivotal tongue assembly comprises a pair of complementary elongated tongue elements 136 and 138 forward end portions 140 and 142, respectively, thereof being conformed to be received within the notches 106 through 110 when the inner longitudinal edges 144 and 146, respectively, thereof are in juxtaposition as seen in Figure 3, for example. The tongue elements 136 and 138 have extending transversely through rear end portions thereof overlying transverse apertures, and will have juxtaposed on one side a rectangular shaped mounting plate 148. The rectangular plate 148 extends slightly beyond the rear end portion of the tongue elements 136 and 138 as indicated at 150. The plate 148 has a pair of spaced apertures extending therethrough for alignment with the apertures through the rear end portions of the tongue elements 136 and 138, and extending in suitably secured relationship through the aligned apertures are suitable pivot pin elements 152. The outer edges of the tongue elements 136 and 138 will be slidably and pivotally received within the overlying co-planar slots 46 and 56. The tongue elements 136 and 138, see Figure 7, for example, have extending longitudinally on the inner edges 144 and 146, respectively, elongated slots 154 and 156, respectively, for receiving therein the sharpened edge 104 of the blade 102, this being the stored position of the blade.

The support bracket element 116 has extending transversely through the sides 126 and 128 axially aligned apertures 158 and 160, for a purpose to subsequently be described. The slidable sleeve retainer 120 is slidably disposed on the shank portion 24 and the retaining lever 122 is positioned longitudinally behind the sleeve retainer 120 and is slidably disposed on the shank portion 24, the lever 122 being connected to the sleeve retainer 120 for movement from the longitudinal position to a position at an angle to the longitudinal position. The slidable sleeve retainer 120 incorporates a substantially rectangular collar portion 162 terminating in U-shaped cut out portions 164 and 166 on opposite sides thereof, and extending vertically between opposite inner surface portions is an integral guide rib 168 which will be slidably received within the overlying slots 46 and 56, the collar portion 162 of the sleeve retainer being circumposed about the tubular shank formed by the shell members 26 and 28. The pivotal retaining lever 122 comprises an elongated flat lever portion 170 which will overlie the upper surface of the shank portion 24 of the handle assembly, opposite side portions 172 and 174 of which extend on opposite sides of the shank portion 24. A forward end portion of the lever 122 terminates in a pair of oppositely disposed substantially parallel mounting plate portions 176 and 178, which have extending laterally in co-axial relationship integral trunnion elements 180. The trunnion elements 180 will be received within the apertures 158 and 160 of the bracket element 116 when the retaining assembly 14 is assembled and connect the lever 122 to the sleeve re-

tainer 120 for movement of the lever 122 from the longitudinal position shown in full lines in Figure 1 to the position at an angle to the longitudinal position shown in phantom lines in Figure 3. Extending transversely of an intermediate portion of the lever 122 in opposed relationship are laterally extending rib portions 182, defining arcuate grooves 184 conforming to and receiving therein a spur or abutment element 112 or 114.

The retaining assembly 14 is assembled as follows: The tongue elements 136 and 138 are disposed in juxtaposed relationship in the manner shown in Figure 3, for example, the collar portion 162 of the slideable sleeve retainer 120 is disposed on a rear end thereof, the support bracket element 116 is disposed about the lower forward edge of the collar 162, and interposed between the inner surface of the sides 126 and 128 of the bracket element 116 within the U-shaped cut out portions 164 and 166 of the sleeve retainer 120 will be the end portions of mutually parallel sides 176 and 178 of the lever 122. The trunnion elements 180 will be received in the aligned apertures 158 and 160 of the bracket element 116 as previously mentioned. The grooves 184 of the lever 122 will either be aligned with the oppositely disposed abutment elements 112 or 114 of the shell members 26 and 28, and when disposed on the abutment elements 112 will retain the blade member 16 in the various positions of adjustment as previously mentioned. When moving the lever to the phantom line position shown in Figure 3, the retaining assembly 14 may be slid rearwardly as shown by the phantom lines in Figure 3, at which time the tongue elements 136 and 138 may be disposed in substantially longitudinally extending aligned relationship for receiving the cutting edge of the blade member 16 therein, whereafter the retaining assembly 14 may be disposed in the position shown in Figure 7, retaining the blade member in a stored position facilitating ready transport of the same. When the blade member is disposed in the stored position, the tool member 18 may still be utilized for the purposes previously mentioned. When the collar 162 is disposed on opposite sides of the outer edges of the tongue elements 136 and 138 they will be retained in juxtaposition against relative pivotal movement, and the positioning of the lever 122 with the grooves 184 on the spurs 112 will prevent rearward movement of the retaining assembly 14 to the position shown by means of phantom lines in Figure 3 and solid lines in Figure 7. The upper edges of the tongue elements converge toward their pivoted ends at a slight angle, and it will be noted that the collar 162 of the sleeve retainer 120 is flared forwardly to ride on the angular edges of the tongue elements 136 and 138 to more or less wedgedly engage the pivotal tongue assembly 118 against rearward movement during retention of the blade member 16 in the various operative positions for use as a spade, ax and adz. Also, the rib 168 on the sleeve retainer 120 is engaged by the tongue elements 136 and 138 when the juxtaposed end portions of the tongue elements extend into the notches 106 and 108 of the mounting ball portion 98 of the blade member 16 for holding the tongue elements in position in the notches.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A multiple purpose convertible hand tool comprising an elongated handle assembly including a longitudinally aligned shank and hand-grip portion, and a tool blade member supported in rotational and pivotal relationship on a terminal end of the shank portion, said shank portion including thereon adjustable retaining means engageable between the shank portion and tool blade member providing a plurality of different tools depending in adjusted relationship and permitting storage of the blade member in longitudinal alignment extending through the shank portion of the handle assembly, said shank portion including an internal cylindrical socket portion on the terminal end thereof, a longitudinal slot extending through the shank portion in communication with one side of the cylindrical socket portion, the blade member including a lower cutting edge and an upper spherical mounting ball, said mounting ball being rotatably and pivotally received in the socket portion of the shank portion, said cylindrical ball portion including a plurality of peripheral notches for determining the various adjusted positions of the blade member, the adjustable retaining means comprising a pair of elongated tongue elements pivotally supported in the shank portion in laterally and longitudinally extendable relationship relative to the slot portion through said shank portion, said tongue elements being pivotal toward each other along the longitudinal axis of said shank portion with juxtaposed end portions thereof extending into the notches of the mounting ball portion of the blade member for retaining the blade member in adjusted positions, a sleeve retainer slidably disposed on the shank portion and in engagement with the tongue element, and a retaining lever positioned longitudinally behind the sleeve retainer and slidably disposed on the shank portion and connected to the sleeve retainer for movement from the longitudinal position to a position at an angle to the longitudinal position, said lever when in the longitudinal position maintaining the blade member in an operative position, and said lever upon being moved to the angular position permitting the blade member to be moved from an operative position to a stored position between the shank portion and maintaining said blade member in the stored position upon return of said lever to the longitudinal position.

2. The hand tool according to claim 1 which includes in addition a guide rib on the sleeve retainer engageable with the tongue elements when the juxtaposed end portions of the tongue elements extend into the notches of the mounting ball portion of the blade member for holding the tongue elements in position in the notches.

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