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COLLAPSIBLE HAND AXE

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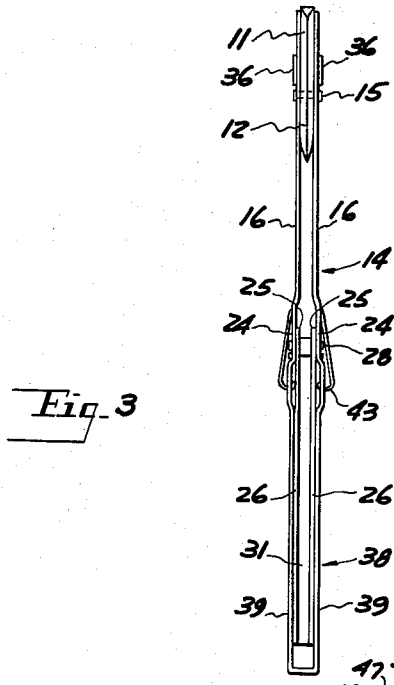

Fig. 3

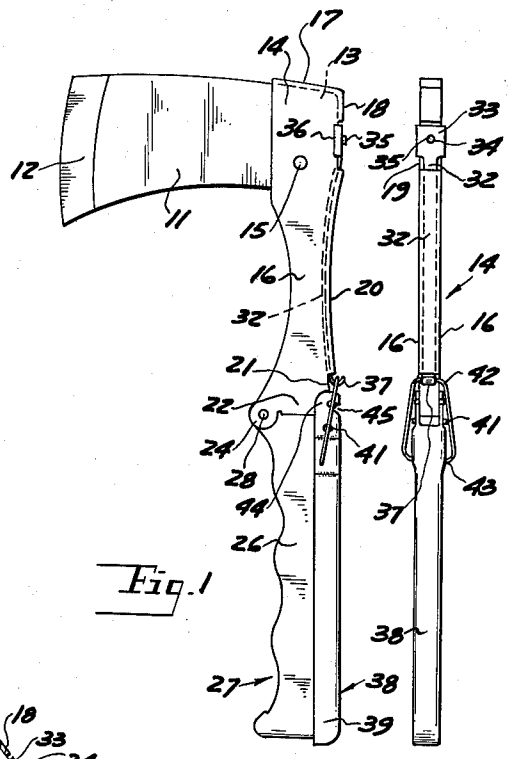

Fig. 1

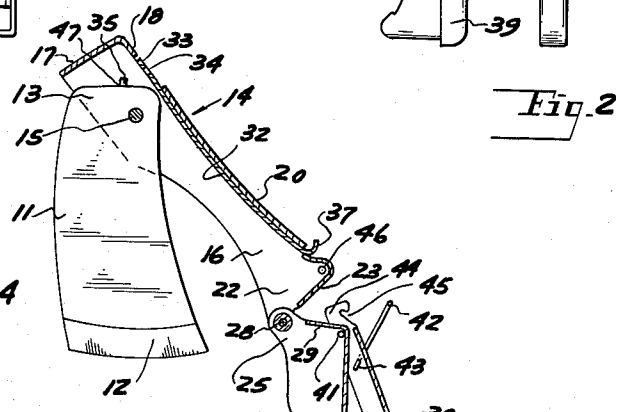

Fig. 2

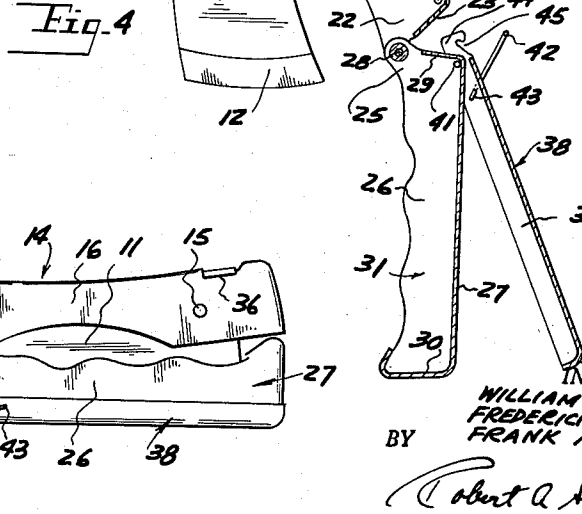

Fig. 4

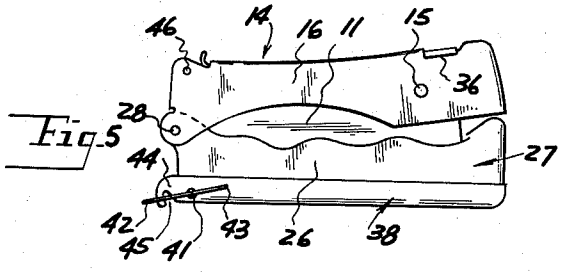

Fig. 5

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COLLAPSIBLE HAND AXE

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This invention relates to a collapsible hand axe and more particularly to a portable axe which may be folded so as to occupy a very small space.

It is the object of the present invention to provide a novel form of collapsible hand axe construction which includes a channel shaped holder within which is pivotally mounted an axe blade adjacent one end thereof and with a channel type handle pivotally mounted upon the other end of the holder and wherein the axe blade may be pivoted into registry within the holder and wherein the handle may be pivoted into cooperative opposing registry with the holder and with the axe blade.

It is a further object of the present invention to provide a novel form of collapsible handle axe construction wherein the axe blade pivotally mounted within the holder is fixedly secured therein when in use against accidental rotation relative to the holder, and wherein a handle is normally in alignment with the holder together with means for fixedly retaining the aligned relation when in use.

It is a further object of the present invention to provide a clamping mechanism upon the foldable handle of the collapsible axe, adapted for cooperation with the axe blade holder in longitudinal alignment when the axe is in use, but which is easily releasable to permit folding and collapsing of the respective parts into a compact unit.

These and other objects will be seen from the following specification and claims, in conjunction with the appended drawing, in which:

FIG. 1 is a side elevational view of the present axe when opened in use position.

FIG. 2 is a right side elevational view thereof.

FIG. 3 is a left side elevational view thereof.

FIG. 4 is a longitudinal section of the present axe showing the parts folded into an intermediate position.

FIG. 5 is a side elevational view of the fully collapsed and folded hand axe.

It will be understood that the above drawing illustrates merely a preferred embodiment of the invention and that other embodiments are contemplated within the scope of the claims hereinafter set forth.

Referring to the drawing, the present collapsible hand axe includes a formed axe blade **11** with transverse sharpened edge **12** and including an upper end portion **13**, which is snugly projected into the outer end of the channel shaped holder **14** to which it is pivotally connected by the rivet **15**.

The holder **14** includes parallel spaced side flanges **16** and the transverse front end wall **17** against which the axe blade **11** snugly registers when in the fully opened position shown in FIG. 1. Accordingly, the holder **14** and particularly its end wall **17** retains the blade **11** against pivotal movement in one direction, though in the present construction the blade **11** is free to pivot about the axis **15** in a counterclockwise direction, when released. The axe blade holder **14** also includes an elongated top wall **18** having a transverse rectangular slot **19** formed therethrough and therebeyond a slightly concave elongated wall **20**.

The said top wall of the holder has an additional cutaway slot **21** adjacent its end and adjacent the end portions **22** of the said holder and the transverse wall **23**

therebetween. The holder includes adjacent end wall **23** and therebelow a pair of spaced depending ears **24** which are transversely apertured to receive the pivot pin **28** by which the handle **27** is pivotally connected to the rear end of the said axe blade holder.

The channel shaped elongated handle **27** includes the parallel spaced flanges **26**, which include at their forward ends the forwardly extending spaced apertured ears **25**, which are projected between the ears **24** of holder **14** and pivotally connected therewith by the pivot **28** above referred to.

Bridging the flanges **26** at the forward end of the handle **27** is the transverse wall **29**, which in normal operation of the axe is adapted for cooperative registry with the corresponding transverse rear wall **23** of holder **14**. Handle **27** also includes the transverse rear wall **30**, the said handle being open at its undersurface as generally indicated at **31**, FIG. 4.

An elongated leaf spring **32** is positioned within holder **14** and underlies the top wall thereof as best illustrated in FIG. 4 and at its forward end projects out through the cutaway solt **19** in said holder and terminates in the enlarged head **33** which overlies the said holder and includes depending flanges **36** which cooperatively bear against outer surface portions of the side walls **16** of the holder **14**, as best shown in FIGS. 1 and 5.

The head **33** has an aperture **34** therethrough adapted to cooperatively and retainingly receive the upright locking pin **35**, which forms a part of and which projects upwardly from the head end of the axe blade **11**, as best shown in FIG. 4 and which in the fully open position of FIG. 1, retainingly extends into the aperture **34** formed through the head of the leaf spring **32**. As shown at **47** in FIG. 4, the forward edge of the pin **35** is slightly undercut to improve the innerlock between said pin and the said leaf spring.

The rear end of spring **32** projects outwardly through the second cutaway slot **21** in the top wall of holder **14** and is reverse curved at **37** for a purpose hereafter explained.

The handle **27** has a clamp mechanism pivotally mounted thereon, generally indicated at **38**, which is in the nature of an elongated channel member with depending side flanges **39** and a downturned end wall **40**. Forward portions adjacent the ends of flanges **39** of the said channel **38** overlie corresponding forward portions of the handle **27** and are pivotally connected thereto by the transverse rivet **41**.

The above described clamp **38** also includes the U-shaped wire, including a bight **42** and with the free ends **43** of the wire curved inwardly and retainingly positioned through apertures in the side walls **39** of the channeled member **38**. This thus provides a pivot mounting for the securing loop **42—43** and the lock between the handle **27** and holder **14**. There are included a pair of parallel spaced extensions **44** at the forward ends of the side flanges **39** of the clamp channel **38** which have upwardly opening notches **45** therethrough adapted for cooperative retaining registry with the transverse pins **46** which project outwardly from upper rear portions of the holder **14**, to thus achieve a positive interlock between the clamp **38** and the holder **14** when the handle **27** has been pivoted into longitudinal alignment with the said holder with the corresponding end walls **29** and **23** respectively in operative abutment.

In operation in the unfolding of the collapsible hand axe from the position shown in FIG. 5, the parts would assume the intermediate position shown in FIG. 4. At this point the axe blade **11** is rotated in a clockwise direction about its pivot **15** so that its head end **13** snugly nests within the holder, and projects at substantially right angles thereto as shown in FIG. 1. At that

point the retaining pin **35** has snapped into registry within the aperture **34** formed in the head **33** of the leaf spring **32** for cooperative retaining engagement therewith.

As a next step with the handle and clamp **38** in the relative position shown in FIG. 4, the end wall **29** of the handle is moved into abutting relation with the end wall **23** of the holder so that the projections **44** of the clamp underlie the respective laterally extending pins **46**. At this point also, the bight **42** cooperatively overlies and in turn engages with a hook **37** on the free end of the leaf spring **32**. Thereafter the channel element **38** of the clamp is rotated about its pivot **41** towards and into cooperative overlying engagement with the top wall of the handle, completing the assembly as shown in FIG. 1.

At that point, it is seen that there is substantially a toggle action in the sense that the locking pins **46** are in a line on dead center with the connection with the hook **42** with the spring **32** and the pivot mounting **41** of the channel **38** forming a part of the clamp member. Accordingly, the handle is fixedly locked with respect to holder **14** with the walls **29** and **23** in operative abutment to thus prevent accidental folding of the holder and handle towards each other. At the same time, the clamp element **42** applies a longitudinal force along the leaf spring **32** to the hook **37**, applying longitudinal pressure to the interlocked upwardly extending pin **35** on the axe head to further fixedly retain the said axe blade **11** in the assembled use position, shown in FIG. 1.

Thus there is introduced into the present invention a safety feature by which the handle and holder are retained in longitudinal alignment against accidental folding and at the same time the axe blade **11** is fixedly retained against folding from the position shown in FIG. 1.

Accordingly the relationship of the axe head **11** as pivotally mounted within the holder **14** is such that the end wall **17** retains the axe head **11** against pivotal movement in one direction from the position shown in FIG. 1. Accordingly the axe head **11** can only rotate if released in a counterclockwise direction from the relationship of the parts shown in FIG. 1. By the same token, upon release of the clamp **38** between the handle **27** and holder **14**, the said handle may be rotated substantially 180 degrees into opposing registry with the said holder, as shown in FIG. 5. In this position, it is noted that the axe blade **11** has been pivoted 90 degrees substantially so as to nest within the channel holder **14**.

In order to permit this pivotal movement of the axe blade **11** the head **33** of the leaf spring **32** must be manually disengaged from the pin **35**. This is accomplished by merely grasping the flanges **36** from the head **33** and lifting the same so that the said head is disengaged from pin **35**. After this has been done, the axe blade **11** may be freely rotated through the position shown in FIG. 4 to the final storage position shown in FIG. 5.

This provides an additional safety feature for the hand axe and prevents accidental tipping of the axe blade **11** from the fixed position shown in FIG. 1. On the other hand, when the axe blade **11** is rotated to the use position shown in FIG. 1 from the position shown in FIG. 4, for illustration, the pin **35** actually snaps into registry within the aperture **34** in the head **33** forming a part of the leaf spring.

In the finally collapsed position of the parts, after the axe blade **11** has been folded to the position shown in FIG. 5, the handle which has been previously released by upward tilting of the clamp channel **38** to the position shown in FIG. 4, is now free to rotate 180 degrees to the position shown in FIG. 5. At that point it is seen that the channel of the said handle cooperatively receives the projecting portion of the axe blade **11** to complete the finished assembly of the collapsible hand axe when folded.

The present device is thus very compact and when so folded occupies a small space and is thus easily portable.

It will be noted that pivot **15** is offset with respect to the central axis of blade **11**. Thus striking a blow has the tendency to lock the blade in the holder.

Having described our invention, reference should now be had to the following claims.

We claim:

1. In a collapsible hand axe, an elongated channel shaped holder, an axe blade snugly positioned within and against one end of the holder, pivotally mounted thereon and projecting normally thereof in its operative position, said holder retaining said blade against pivotal movement in one direction, said blade adapted to pivotally nest longitudinally within said holder, a channel shaped handle pivotally connected at one end to and, in one position, abutting the other end of the holder in longitudinal alignment therewith, said handle adapted to pivot in one direction into parallel opposed relation with the holder to receive a portion of the blade when nested in said holder, resilient means mounted on said holder fixedly, yet releasably, securing said blade against pivotal movement from said operative position, and a clamp on said handle releasably interlocking with said holder to maintain said holder and said handle in said one position in rigid alignment with each other.

2. In the collapsible hand axe of claim 1, said resilient means including an elongated leaf spring nested within said holder, a portion of said holder being slotted, a retainer pin projecting from said blade into the slotted portion of the holder, one end of said leaf spring extending into said slotted portion normally of said pin and apertured to receive said pin, said clamp releasably engaging the other end of said leaf spring in tension.

3. In the collapsible hand axe of claim 1, the interlock between said clamp and holder including a pair of spaced hooks extending forwardly of said clamp and pins projecting outwardly from end portions of said holder interlocked with said hooks.

4. In the collapsible hand axe of claim 1, said resilient means including an elongated leaf spring nested within said holder, a portion of said holder being slotted, a retainer pin projecting from said blade into the slotted portion of the holder, one end of said leaf spring extending into said slotted portion normally of said pin and apertured to receive said pin, said clamp releasably engaging the other end of said spring in tension, the engagement of said clamp with said leaf spring including a hook on the other end of said leaf spring, and a wire loop at its ends pivotally mounted on said clamp with the bight of the loop interlocked with said hook.

5. In the collapsible hand axe of claim 1, said resilient means including an elongated leaf spring nested within said holder, a portion of said holder being slotted, a retainer pin projecting from said blade into the slotted portion of the holder, one end of said leaf spring extending into said slotted portion normally of said pin and apertured to receive said pin, said clamp releasably engaging the other end of said leaf spring in tension, the interlock between said clamp and holder, including a pair of spaced hooks extending forwardly of said clamp and pins projecting outwardly from end portions of said holder interlocked with said hooks, the engagement of said clamp with said leaf spring including a hook on the other end of said leaf spring, and a wire loop at its ends pivotally mounted on said clamp with the bight of the loop interlocked with said hook.

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