Aug. 12, 1952 F. COLLURA 2,606,585

HACKSAW FRAME

Filed Dec. 15, 1945

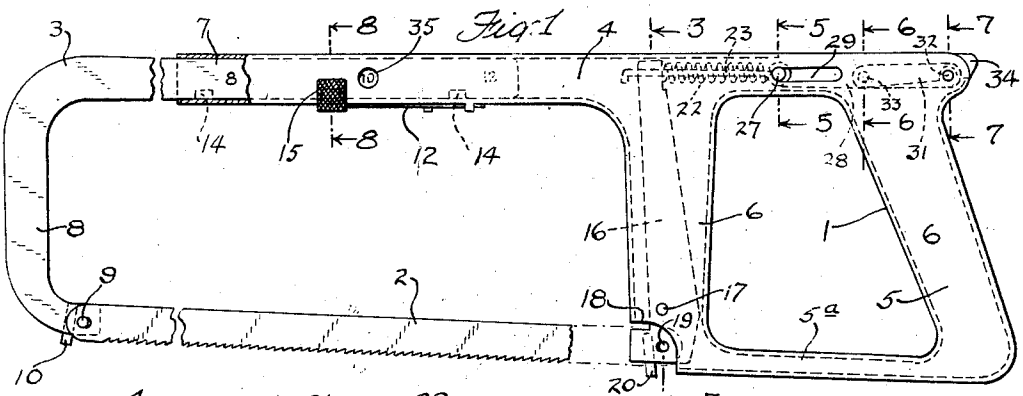

Fig. 1

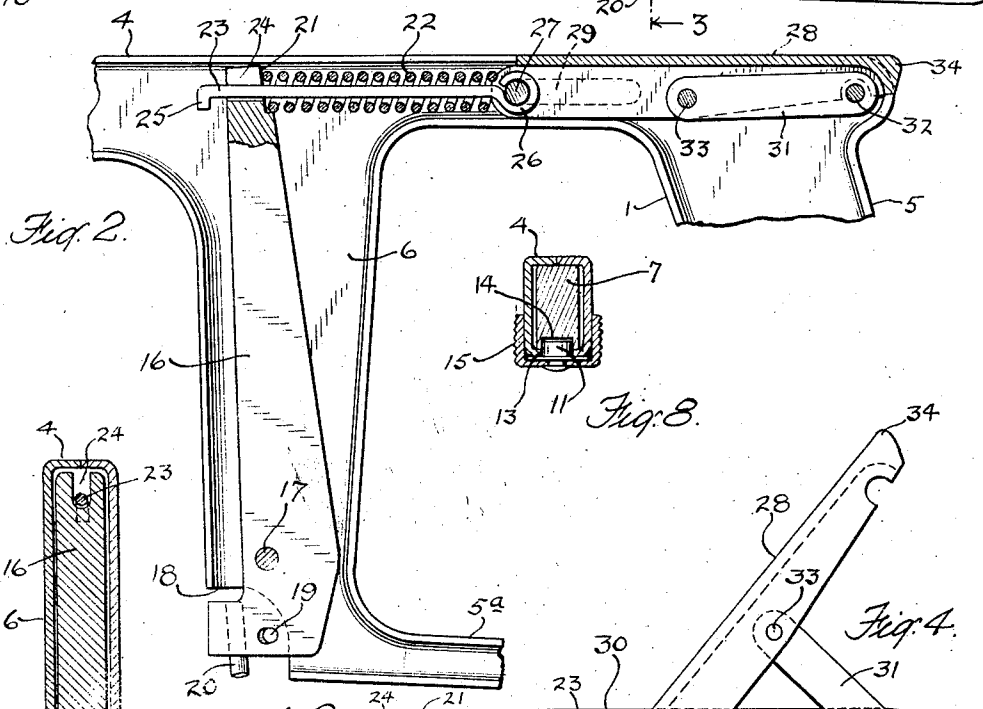

Fig. 2.

Fig. 8.

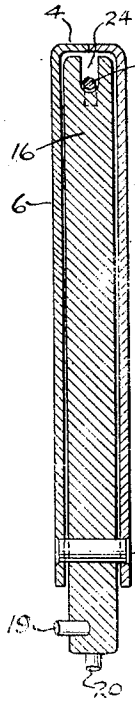

Fig. 3.

Fig. 4.

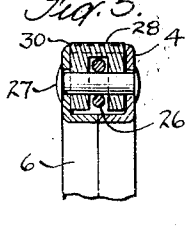

Fig. 5.

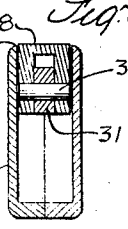

Fig. 6.

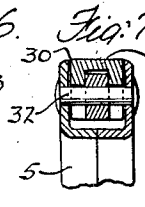

Fig. 7.

INVENTOR
FRANCESCO COLLURA
BY Robert Harding Jr.
ATTORNEY

Patented Aug. 12, 1952

2,606,585

UNITED STATES PATENT OFFICE

2,606,585

HACKSAW FRAME

Francesco Collura, New York, N. Y.

Application December 15, 1945, Serial No. 635,230

5 Claims. (Cl. 145—34)

1

This invention relates to hacksaw frames.

It has been found that the life of a hacksaw blade can be materially increased if the tension on the blade is maintained at a predetermined value when in used and torsional and side strains and stresses can be kept at a minimum.

Many hacksaw frames now in use fail completely to maintain a proper tension on the blade, and although the tension may be adjusted, there is no way to tell when the proper tension is obtained. In addition the tension is usually maintained by the resiliency of the frame itself. In such a case the very means of keeping the blade under tension may permit sidewise distortions of the frame which may contribute materially to failure of the blade.

Accordingly it is one of the principal objects of the present invention to provide a hacksaw frame which will eliminate these and other disadvantages found in frames of the prior art.

Another object of the invention is to provide a hacksaw frame which will maintain a substantially predetermined tension on the saw blade at all times.

Still another object of the invention is to provide a rigid hacksaw frame in which separate means is provided for maintaining a predetermined tension on the blade.

Another object of the invention is to provide a rigid hacksaw frame with means for instantly releasing the blade.

Another object of the invention is to provide a hacksaw frame as in the above paragraph in which the means for instantly releasing the blade may be controlled by a flick of the thumb without releasing the grip on the handle of the frame.

Another object of the invention is to provide a hacksaw frame which is adjustable for blades of different lengths and in which the adjustment may be made by the manual release of the adjustable parts of the frame and the moving of those parts to a new position in which when reached the parts will automatically lock.

Another object of the invention is to provide an adjustable two-part hacksaw frame in which the length to which the frame is adjusted is automatically indicated in a window or opening provided in one of the parts.

Still other objects and advantages of the invention will be apparent as the description of the invention proceeds.

One embodiment of the invention has been illustrated in the appended drawings which form a part of this specification and in which:

Figure 1 is a side elevational view of a hacksaw frame shown with the blade under tension ready for use;

2

Figure 2 is an enlarged side elevational view of a portion of the handle end of the frame with one side of the frame removed showing the mechanism for maintaining the blade under tension;

Figure 3 is an enlarged vertical sectional view through the frame on the line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary view similar to that of Figure 2 but showing the tensioning mechanism in released position; and

Figures 5, 6, 7, and 8 are enlarged vertical sectional views through portions of the frame and taken on lines 5—5, 6—6, 7—7, and 8—8, respectively, of Figure 1.

Referring now to Figure 1, the hacksaw frame of the invention is preferably made of cold rolled steel and comprises two parts: a handle member 1, which supports one end of the saw blade 2, and a cooperating member 3 which supports the other end. The handle member 1 is preferably tubular in cross-section and comprises an elongated body portion 4, a hand-grip portion 5 extending at an angle thereto, and an extended portion 6 substantially at right angles to the main body portion 4 and in the same plane with the hand-grip portion 5. The end of the hand-grip portion 5 may be connected to the end of the portion 6 by a member 5a to increase the rigidity of the structure.

For convenience in manufacture and also to facilitate enclosing the moving parts within the tubular structure of the handle, I preferably provide the handle portion in two sections which are joined together in a plane through the center of the frame as by welding or in any other desired manner.

The other member 3 of the frame may comprise a bar of steel having an elongated portion 7, which has a sliding fit within the main body portion 4 of the handle member 1, and having the outer end 8 thereof curved to form an offset portion for supporting the saw blade. Pins 9 and 10, substantially at right angles to each other, may be provided for alternatively engaging the hole in the end of the saw blade so as to support the blade either in the plane of the frame or at right angles thereto.

The elongated portion 7 may be locked in any one of a plurality of different positions by means of a pin 11 (Figure 8), which is mounted on one end of a flat spring member 12 arranged normally to lie flush against the inner side of the frame portion 4 and attached to the frame portion 4 at its other end in any desired manner.

The pin is adapted to pass through a hole 13 in the wall of the frame member 4 and into one of a plurality of holes 14 in the member 7, as shown in Figures 1 and 8. A knurled U-shaped member 15 may be attached to the pin 11 and spring 12 and is arranged to hug a portion of the frame 4 when the pin is pressed into the holes by the normal action of the spring.

As will be seen this locks the portions 1 and 4 together in a desired position, and the parts may be released by manually moving the knurled member 15 away from the frame, whereupon the parts may be moved to another position when the pin will automatically snap into the holes and lock the parts together.

The manner in which the saw blade is mounted on the handle end of the frame constitutes an important feature of the invention. The mounting mechanism comprises a lever 16 which is mounted within the extended portion 6 and pivoted thereto at a point adjacent the end of the extension away from the main body portion 4 of the frame. The pivot 17 extends through the side walls of the tubular extension, as shown in Figure 3, and passes through the lever 16 at a point near the end thereof. The end of the lever adjacent the pivot 17 passes through an opening 18 in the end of the extension 6 and is offset somewhat in the direction of the other end of the frame. This end of the lever carries the two pins 19 and 20 which cooperate, respectively, with pins 9 and 10 in the frame portion 8 for supporting the other end of the saw blade. The opening 18 is curved to facilitate applying the saw blade and may be designed so that the tip of the blade will pass into the tubular extension 6 which will thus help in holding the blade on the engaging pin.

The other end of the lever 16 extends through the extended portion 6 to a point adjacent the outer wall of the body portion 4. This end is provided with a flat surface 21 which forms a bearing surface for a compression spring 22 which is mounted within the body portion 4 of the frame handle member. The end of the lever is slightly less in width at the bearing surface 21 so that a shoulder is formed to engage the end of the spring.

The spring 22 is held in operative position by a rod 23 which extends through a slot 24 in the end of the lever 16 and through the spring. The end 25 of the rod which extends through the lever is bent over to prevent the rod from pulling out of the slot in the lever and the other end of the rod which protrudes from the spring is formed into an eye 26 which encompasses a pin 27 which forms a pivot for a toggle member 28 and is slidable longitudinally of the frame in longitudinal slots 29 provided in alignment in opposite side walls of the body portion 4 of the frame. When the pin 27 is moved towards the left end of the slot 29, as viewed in Figures 1 and 2, the spring 22 is forced against the end of the lever 16 to urge it in a counter-clockwise direction, as viewed in the several figures, so as to urge the pins 19 and 20 at the other end of the lever in a direction to apply tension to the saw blade 2.

The toggle member 28 is preferably U-shaped in cross section and is arranged to fit into a slot 30 in the handle portion 1, so that, when in the closed or normal position of Figures 1 and 2, the outer surface of the toggle member will lie flush with the outer surface of the handle member and fill up the slot.

The toggle action is provided by another lever 31 which is mounted in the slot 30 of the handle member and has one end pivoted at 32 at the top of the hand-grip portion 5 at the extreme right, as viewed in Figures 1, 2, and 4, and the other end pivoted at 33 to about the mid-point of the toggle member 28. The hand-grip portion is rounded out above where the hand engages it and adjacent the pivot 32 and the end of the toggle member 28 extends slightly beyond the frame so as to form a thumb engaging nub 34, as clearly shown in Figures 1 and 2.

With the toggle member 28 in its closed or normal position the pin 27 will be substantially at the left end of the slot 29, as viewed in Figures 1 and 2, and the pin 33 will be slightly below its dead center position, so that the spring 22 will tend to keep the toggle member in that position. By moving the toggle member 28 upwardly, into the position shown in Figure 4, the pin 33 will pass through dead center and the pin 27 will be moved in its slot 29 to the right, thus moving the spring 22 and the upper end of the lever 16 to the right and swinging the lever 16 about the pivot 17 to move the other end of the lever to the left and thus release the saw blade 2.

Attention is drawn to the fact that the frame parts are made as rigid as possible and that when the blade is under tension, all of the tension is supplied by the compression spring. Such a spring may be designed to supply any desired pressure against the lever and when properly designed will always maintain that same pressure when compressed a predetermined amount.

Attention is also drawn to the fact that the ratio of the amount of movement of the spring end of the lever 16 to that of the other end of the lever may be high. This ratio is six to one in the frame illustrated. Because of this fact any force applied to the end of the lever 16 by the spring 22 will apply six times that force to the end of the blade which will appear as tension on the blade. This ratio permits very accurate tensioning of the blades of saws manufactured in accordance with the invention to be maintained within the manufacturing tolerances of the frames, blades, and springs.

Also, because of the power ratio of the lever 16 and the use of the toggle member 28 and associated parts, it will be seen that a very slight pressure on the end 34 of the toggle member will cause it to swing to its open position and the blade may therefore be released while still gripping the hand-grip portion 5 by a slight movement of the thumb against the nub 34. This last mentioned fact is a distinct advantage over frames of the prior art which require considerable effort and time on the part of the operator to adjust the parts for changing a blade.

The frame may be designed to receive blades of several different lengths, such as eight inches, ten inches, and twelve inches, and the locking arrangement for securing the parts in the several positions has already been described. However, the particular adjustment may be indicated by a window 35 in the side wall of the elongated portion 4 of the handle portion of the frame and cooperating indicia on the elongated portion of the other member 3. For instance the numbers "8," "10," and "12" are stamped on the member 3 to align with the window 35 when the frame is adjusted in length for the corresponding length saw blade. In the position shown in Figure 1 the frame is adjusted for a ten-inch blade with the number "10" appearing in the window 35.

It will be seen from the above that I have provided a rigid hacksaw frame which will maintain

a predetermined tension on the saw blade and thus greatly increase the life of the blade while at the same time the blade may be instantly released with very little effort. Because of the rigid frame construction, side and torsional strains on the blade are reduced to a minimum which also tends to increase the life of the blade. The moving parts of the frame are enclosed and thus protected from dirt and damage and the whole arrangement provides a smooth, easily handled tool which is free from sharp edges, save for the saw blade itself, and which, in addition, is pleasing in appearance.

While I have disclosed a hand hacksaw in order to illustrate my invention the features thereof are also applicable to power driven saws.

I prefer to make the saw frame substantially rigid and to apply the tension to the blade by means of the coil spring 22. However, it may be desirable under certain conditions to eliminate the coil spring and connect the lever 16 to the pin 27 by an unyielding link. In such a case the tension on the blade may be obtained by making a portion of the frame resilient, or the lever 16 may have sufficient resiliency in it to accomplish the desired result.

What is claimed is:

1. A hacksaw frame comprising a member having a main portion and depending end portions displaced from said main portion in the same plane to support a saw blade therebetween, means on one end portion for engaging one end of a saw blade, a lever pivotally mounted on the other end portion of said frame adjacent the other end of said saw blade and on an axis perpendicular to the plane of said member, one end of said lever extending toward the main portion of said member, means on the other end of said lever to engage said other end of said saw blade, the pivot point of said lever being adjacent said other end, a handle attached to said frame adjacent the end having said lever, a toggle mechanism having a portion pivotally mounted on said handle at one end thereof so as to lie close to the end of said handle when in a first position and to extend out from said handle when in a second position without interfering with the grip of the hand of the user thereof in the normal use of the hacksaw, and a compression spring between the other end of said lever and said toggle mechanism, whereby when said toggle mechanism is in said first position said spring will urge said lever to rotate about its pivot in a direction to place said saw blade under tension and the tension of said blade will be determined by said spring, and when said toggle mechanism is in said second position said spring will permit said lever to move in a direction to release said saw blade, and whereby, because of the position of the pivot point of said lever, the portion of said toggle mechanism may be easily moved to release said saw blade.

2. The hacksaw frame as defined in claim 1 in which the end portion of the frame carrying the lever is hollow and the lever is contained therein.

3. The hacksaw frame as defined in claim 1 in which the end portion of the frame carrying the lever and the handle is integral with the handle and hollow and the lever is mounted within the hollow end of the frame and the spring is within a portion of the frame adjacent the handle.

4. A hacksaw frame comprising a rigid tubular handle member having an elongated tubular body portion forming the main body of said frame, a tubular extension formed integral with said handle member, a second rigid member having an elongated portion arranged to have a sliding fit within said elongated body portion of said handle member and an offset portion forming the support for one end of said hacksaw blade, a pin extending outwardly from said offset portion adjacent the end thereof to engage the hole in said one end of said blade, means for releasably securing together said body portion of said handle member and said elongated portion of said second member, a lever pivotally mounted within said tubular extension at a point near one end of said lever and near the end of said extension and on an axis perpendicular to a plane including said elongated body portion and said tubular extension, said extension being open at its free end to permit said one end of said lever to protrude therefrom, a pin extending outwardly from the protruded end of said lever to engage the hole in the other end of said saw-blade, the other end of said lever terminating at a point within said elongated tubular body portion, a compression spring within said tubular body portion and abutting against the said other end of said lever, said elongated tubular body portion having a slot in the side away from said extension, a hand operated toggle member mounted in said slot and arranged to fit substantially flush with the outer surface of said member, said elongated tubular body portion having oppositely disposed longitudinal slots in the sides thereof, a spindle extending through said slots and secured to one end of said toggle member, said last-mentioned end abutting the other end of said compression spring, the other end of said toggle member lying adjacent the handle member at a point near the thumb of the user when the handle member is grasped by the user in the normal operation of the hacksaw, and a toggle lever within said elongated tubular body portion and having one end pivoted to said toggle member and the other end pivoted to said elongated tubular body portion, whereby said toggle member will be caused to move said spring in a direction to place said saw blade under tension when said toggle member is pushed into a position flush with the outer surface of said handle member and in a direction to release said blade when said toggle member is moved into a position extending outwardly from said handle member.

5. A hacksaw frame comprising a member having two spaced portions, means on one portion for engaging one end of a hacksaw blade, means mounted on said other portion for engaging the other end of said hacksaw blade, manually operable means mounted on said last-mentioned portion and movable between fixed predetermined limits for shifting said last-mentioned blade engaging means with respect to said portion on which it is mounted in one direction when said manually operable means is moved towards one limit of movement, so as to release said blade, and in the other direction, so as automatically to apply a predetermined tension to said blade when said manually operable means is moved to its other limit of movement, said manually operable means including a lever pivotally mounted adjacent one end thereof on the associated portion of the frame and spring means between the other end of said lever and the manually operable means for urging the lever about its pivot, so as to apply the predetermined

tension to said blade, and a handle attached to said portion carrying said lever, said manually operable means being mounted on said portion so as to be operable with the thumb of the user's hand grasping said handle in the normal operation of the hacksaw without releasing said handle.

FRANCESCO COLLURA.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
589,719	Griffin	Sept. 7, 1897
695,661	Theibault	Mar. 18, 1902
858,357	McIntire	June 25, 1907
1,094,169	Shoenborn	Apr. 21, 1914
1,113,591	Wood	Oct. 13, 1914
1,161,765	Dunbar	Nov. 23, 1915
2,103,074	Gardner	Dec. 21, 1937
2,109,625	Schaefer	Mar. 1, 1938
2,194,494	Carroll	Mar. 26, 1940
2,320,511	Curry	June 1, 1943
2,388,655	Lenk	Nov. 6, 1945

FOREIGN PATENTS

Number	Country	Date
58,957	Switzerland	Feb. 23, 1912
191,105	Great Britain	Jan. 1, 1923