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HAND TOOL

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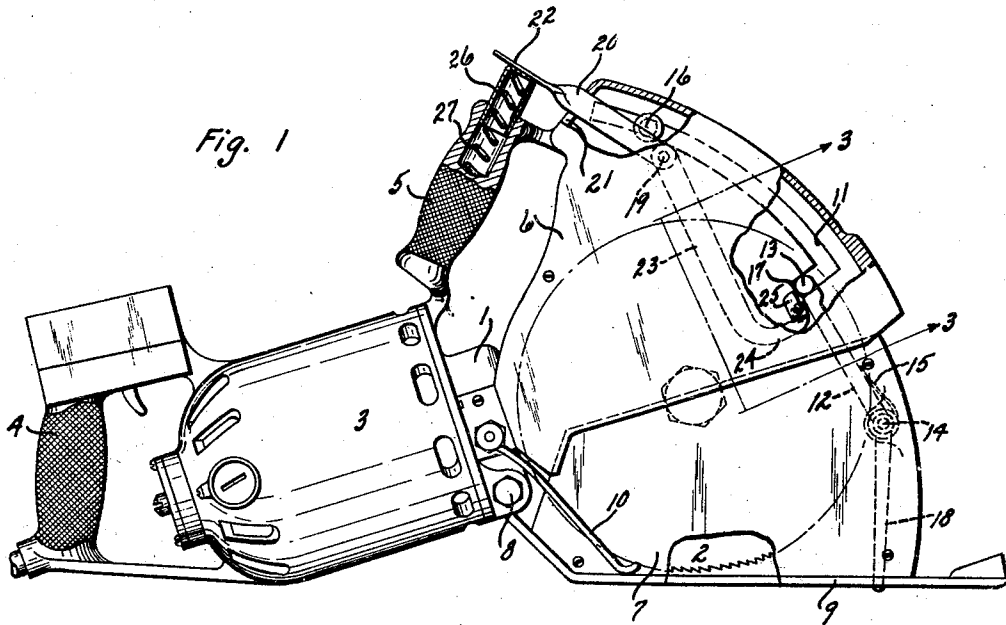


Fig. 1

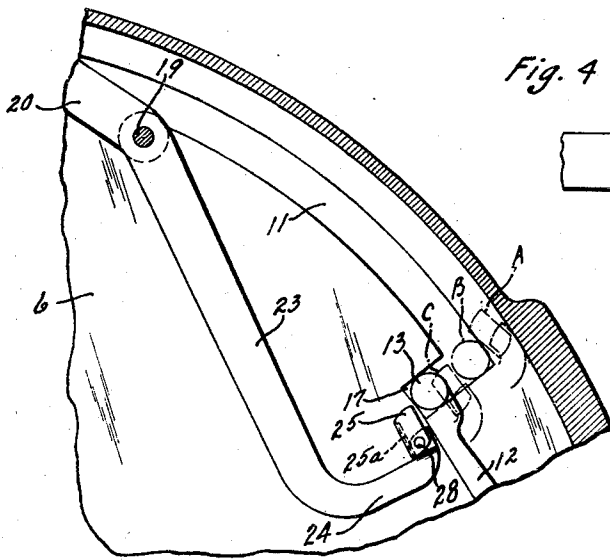


Fig. 2

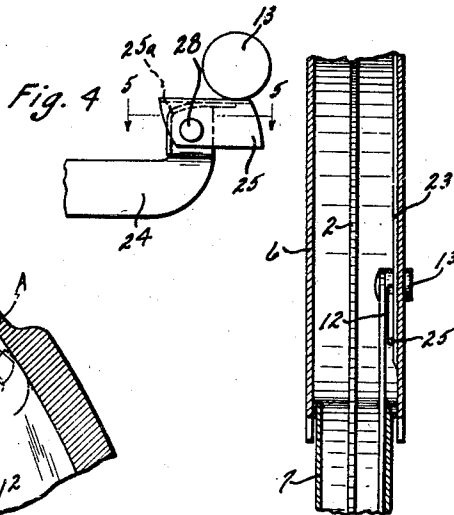


Fig. 3

Fig. 4

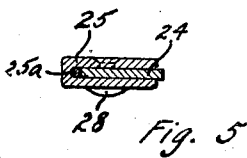


Fig. 5

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HAND TOOL

Application filed August 21, 1930. Serial No. 476,758.

This invention relates to portable power-driven hand tools adapted to be applied bodily to the work and moved therealong by the operator. A saw is an example of such a tool, wherein it will be apparent that guarding means for the moving blade is essential to the safety of the operator.

There has been developed for the purpose in the art a type of guard movable on the frame which carries the blade, to advance or recede to guard or expose a cutting portion of the blade, together with means tending to advance the guard, and latch means for automatically securing the guard in full guarding position. In addition, there has been associated with these parts means for releasing the latch at the will of the operator.

The latch release means may be arranged for actuation either by engagement of the tool with the work, or by direct operator effort. Such a tool and such structure as has been described is set forth more in detail in my copending application, Serial No. 438,474, filed March 24, 1930, and this invention comprises generally improvements thereupon. Therein appears a latch release for the guard, arranged for actuation by the thumb of the operator's hand which grasps one of the tool handles.

In practice, however, when the guard has just been released by the operator, should a mishap befall him, such as by slippage, losing his balance or by fall from a support for overhead work, the operator would naturally retain his grasp of the handle and probably also inadvertently maintain the latch released; so that although the guard would be returned to full guarding position about the moving blade yet the latch would be inoperative to so retain the guard, and an accident would result were the guard thereafter depressed as against the operator's body, to expose the blade thereagainst.

Particularly it is the object of this invention to provide against such possibility, and more in detail to so arrange the operator-operated latch release as to allow relatching of the guard in full guarding position; at any time subsequent to its unguarding movement following unlatching, and regardless of any

manipulation or inadvertent setting of the latch release means possible under the circumstances.

The exact nature of this invention together with further objects and advantages thereof will be apparent from the following description taken in connection with the accompanying drawings, in which Fig. 1 shows a motor-driven saw in which is incorporated an arrangement embodying this invention, parts being broken away to show details of construction; Fig. 2 is an enlarged detail of the same wherein broken lines are arranged to indicate the alternate positions of the parts; Fig. 3 is a detail section as in the plane indicated line 3—3, Fig. 1; Fig. 4 is a detail illustrating the action of the trip employed; and Fig. 5 is a detail view in section showing the manner of mounting the trip and taken as in the plane of line 5—5, Fig. 4, but indicating the trip as in normal or upright position.

With reference now to the drawings, the principal parts of the tool comprise a frame 1 having a rotary cutting blade 2 operatively mounted thereon, a motor 3 arranged to drive the blade, a pair of handles 4, 5, and guarding means for the blade. The guarding means comprises two principal members, a fixed guard 6, in reality part of the frame extended to enclose the upper half of the blade, and a movable guard member 7 with which we are here primarily concerned and which has pivotal connection with the frame as at 8 to move upwardly within the fixed guard portion 6 of the frame in telescoping relation therewith, to uncover the working portion of the blade. The guard 7 has a work-engaging runner portion 9 which is longitudinally slotted in the usual manner to clear the blade 2 and is yieldably urged to the full guarding position indicated Fig. 1 by a spring 10. It will be apparent that when the runner 9 is resting upon the work the operator by depressing the forward handle 5 and raising the rearward handle 4 may move the frame 1 and parts carried thereby, about the pivot 8 to lower the blade 2 through the runner 9 and into the work, and thereafter the tool may be advanced along the work to complete the cut; and when the tool is raised

from the work the spring 10 will return or advance the guard 7 to its original and illustrated full guarding position.

For the purpose of limiting this advancing movement of the guard the fixed guard 6 is provided with a slot 11 arcuate about the axis 8; and the movable guard 7 is provided with a lever 12 carrying at its free end a roller 13 projecting into the slot 11. The length of the slot 11 is such that the roller 13 will reach the lower end of the slot as the guard 7 attains full guarding position about the blade. A stop 16 may be adjustable along the slot 11 to limit swinging of the guard 7 in the opposite direction and thus limit the depth of cut of the blade.

In order that the guard 7 be automatically and positively retained or latched immediately upon reaching its full guarding position, the slot 11 is extended at its lower end by an offset 17 and the lever 12 is urged in the direction of this offset about its pivot point 14 by a spring 15; so that the roller 13 will immediately and automatically enter the offset to latch the guard 7 whenever the guard attains full guarding position.

In order that the guard may be unlatched by engagement of the tool with the work, the lever 12 is provided with a downwardly extending portion 18 the tip of which projects through a slot in the face plate 9 and therebeyond; so that with the parts in the position shown Fig. 1, the tool may be presented to an edge of the work and advanced thereagainst and the lever 12 will be moved by its portion 18 to unlatch the guard 7.

What has thus far been described is not new but will be found set forth in substance in my Patent No. 1,644,326, issued October 4, 1927.

In order that the operator may directly unlatch the guard 7, I mount a lever at 19 on the fixed guard 6, the lever having one end 20 projecting through an opening 21, and therebeyond terminating in a thumb piece 22 adjacent the end of the handle 5. The other end 23 of the lever extends downwardly within the fixed guard 6 and terminates in a hook formation as at 24 carrying at its end a trip 25. Within the handle 5 is a plunger 26 bearing against the thumb piece 22 and yieldably urged outwardly of the handle by the spring 27 to maintain the latch release parts in the position indicated Fig. 1, and in full lines Fig. 2, motion of the lever arm 20 being limited for the purpose by the end of the opening 21.

The trip 25 is pivotally mounted on its end of the hooked lever arm 23 to move in clockwise direction upon the lever as from the position indicated Figs. 1 and 2, to one about 90° therefrom against the action of the spring 25a; but the trip cannot move in the counterclockwise direction from the position indicated in these figures. The loca-

tions of the pivotal connection 28 of the trip 25 and the actual end of the lever arm 23 are both below the roller 13 when the roller is in the slot offset 17; so that when the trip is moved to the right Figs. 1, 2 and 3, relative to the roller, the roller will be moved by the trip, yet when the trip is moved to the left relative to the roller the trip will simply be tilted by the roller until it progresses therebeyond. To this end the member 23 may be simply a sheet metal stamping as indicated in the drawings, the trip member 25 may likewise be a piece of sheet metal folded about the end of the hook member as shown Fig. 5, and the spring 25a may be welded to the end of the hook member with its free end extending into the trip member.

The proportions of the hook member are such that when the lever arm 23 is moved to the extreme right-hand position indicated by broken lines as at A Fig. 2, the path of the roller 13 between its broken line position B at the end of the slot 11 and its full line position Fig. 2 at the end of the offset 17 will be free. In other words, the curve of the hook passes below the offset 17.

Operation will be as follows, beginning with the parts in the position indicated Fig. 1 and in full lines Fig. 2. When the operator wishes to release the latch to allow the movable guard 7 to recede and expose the blade 2, he may depress the thumb piece 22 against the action of the spring 27. This moves the lever arms 23 counterclockwise about the pivot 19. By this lever motion the roller 13 moves from the offset or notch 17 into a position at the end of the slot 11 against the action of the spring 15.

With reference to Fig. 2, movement of the arm 23 will be from the full line position to the intermediate broken line position C and that of the roller 13 from full line position to broken line position B. Thereupon the movable guard 7 is free to swing upwardly and the blade 2 may be projected into the work by relative motion of the parts about the axis 8, the roller 13 progressing along the slot 11. Thereafter the thumb piece 22 should be released whereupon the lever 20-23 will be returned by the spring 27 to its full line position Fig. 2; so that whenever the tool is withdrawn from the work the movable guard 7 will be snapped to full guarding position by the spring 10 and will be there latched by the roller 13 under the action of the spring 15.

Suppose, however, the operator inadvertently retains pressure upon the thumb piece 22. As the roller 13 moves upwardly along the slot 11, as soon as the roller clears the end of the hook member or rather the trip 25 thereof, the arm 23 will progress from its C position to its A position Fig. 2 so that thereafter the roller may still return to latching position as before but now within the curve

of the hook member. After latching of the guard 7 so takes places and the thumb piece 22 is then released, the trip 25 will still allow return of the arm 23 to full line position Fig. 2 by swinging on the hook as indicated Fig. 4.

It will be observed that in effect the trip member 25 provides on the end of the hook of the latch-release lever, a roller-engaging nose yieldable in one direction but immovable in the opposite direction.

It will also be observed that the end of the trip 25 is chamfered off so that in effect the hook member nose terminates on a diagonal. By this arrangement, should by any possibility the nose be held by the operator in registry with the slot 11 after release of the roller 13 thereinto, so that return motion of the roller under the action of the spring 10 would cause engagement of the roller with the end of the trip member; then a camming engagement of these two parts would take place, moving the hook member counter-clock-wise Figs. 1 and 2, to allow the roller to enter the notch 17.

What I claim is:

1. In a portable power-driven hand tool adapted to be applied bodily to the work and moved along the same by the operator, a frame, a cutting blade operatively mounted thereon, blade-driving means, a guard movably mounted on said frame to advance or recede to guard or expose a cutting portion of said blade, means tending to advance said guard, latch means for automatically securing said guard in full guarding position, operator-operated means associated with said latch to release said guard therefrom and arranged to be ineffective to prevent relatching of the guard following the guard-releasing operation and recession of the guard.

2. In a portable power-driven hand tool adapted to be applied bodily to the work and moved along the same by the operator, a frame, a cutting blade operatively mounted thereon, blade-driving means, a guard movably mounted on said frame to advance or recede to guard or expose a cutting portion of said blade, means tending to advance said guard, latch means for automatically securing said guard in full guarding position, and release means for said guard arranged for guard-unlatching movement by the operator, and for further movement therebeyond to a position ineffective to prevent relatching of said guard.

3. In a portable power-driven hand tool adapted to be applied bodily to the work and moved along the same by the operator, a frame, a cutting blade operatively mounted thereon, blade-driving means, a guard movably mounted on said frame to advance or recede to guard or expose a cutting portion of said blade, means tending to advance said guard, latch means for automatically securing said guard in full guarding position, and

release means for said guard arranged for guard-unlatching movement by the operator and, dependent upon recession of said guard, for further movement therebeyond to a position ineffective to prevent relatching of said guard.

4. In a portable power-driven hand tool adapted to be applied bodily to the work and moved along the same by the operator, a frame, a cutting blade operatively mounted thereon, blade-driving means, a guard movably mounted on said frame to advance or recede to guard or expose a cutting portion of said blade, means tending to advance said guard, latch means for automatically securing said guard in full guarding position, operator-operated means associated with said latch to release said guard therefrom and arranged to be ineffective to prevent relatching of the guard.

5. In a portable tool, a frame, a cutting blade operatively mounted thereon, means for operating said blade, guarding means adapted to advance or retreat to guard or expose a cutting portion of said blade, means tending to advance said guarding means, means for securing said guarding means against accidental retreat, means adapted for actuation by engagement with the work for releasing said guarding means to allow the same to retreat, a handle for said tool, and operator-operated means associated with said handle and with said securing means to release said guard, and arranged to be ineffective to prevent resecuring of the guard.

In testimony whereof I hereby affix my signature.

JOHN M. CROWE.