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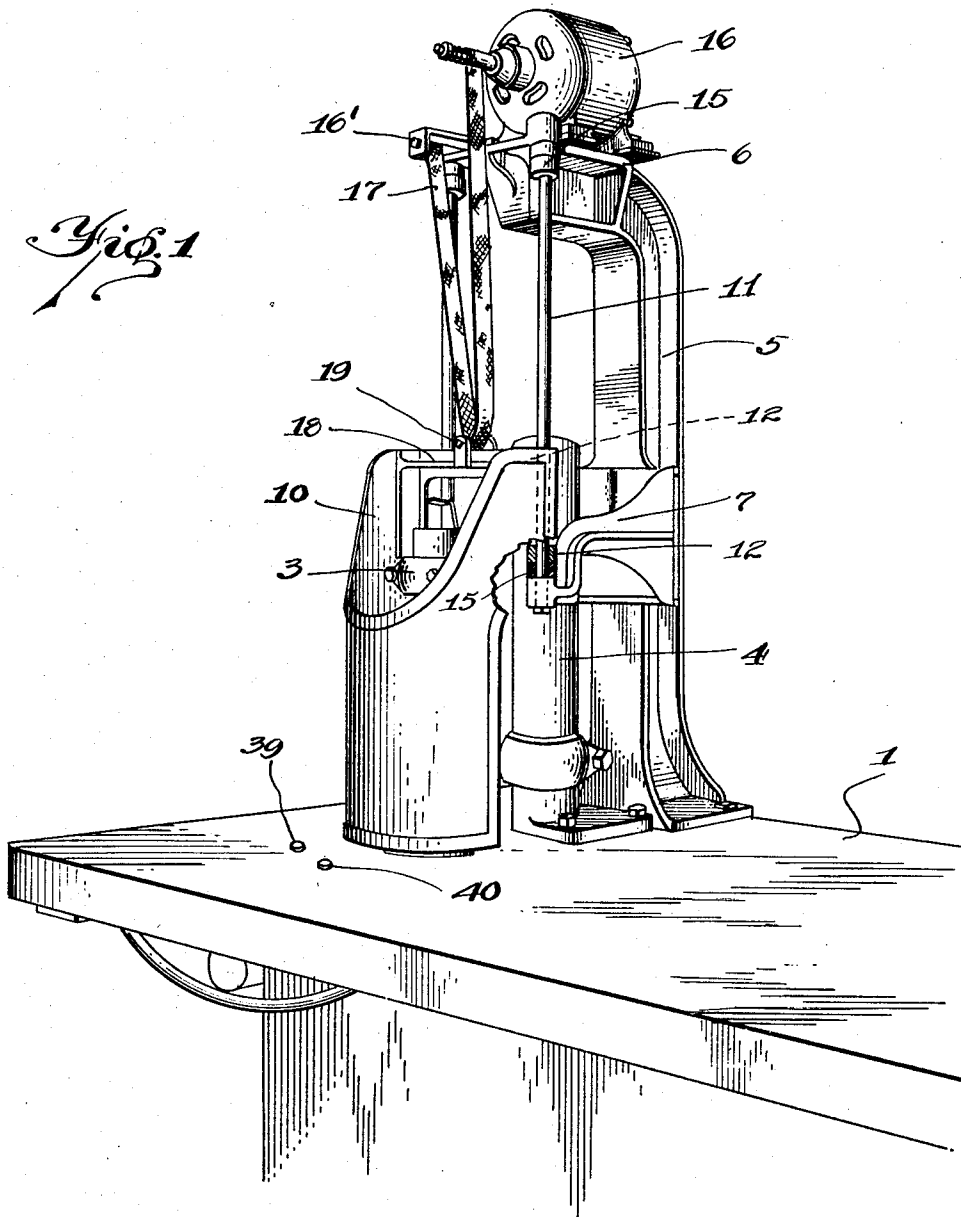
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SHAPER GUARD

Filed May 29, 1929

2 Sheets-Sheet 1



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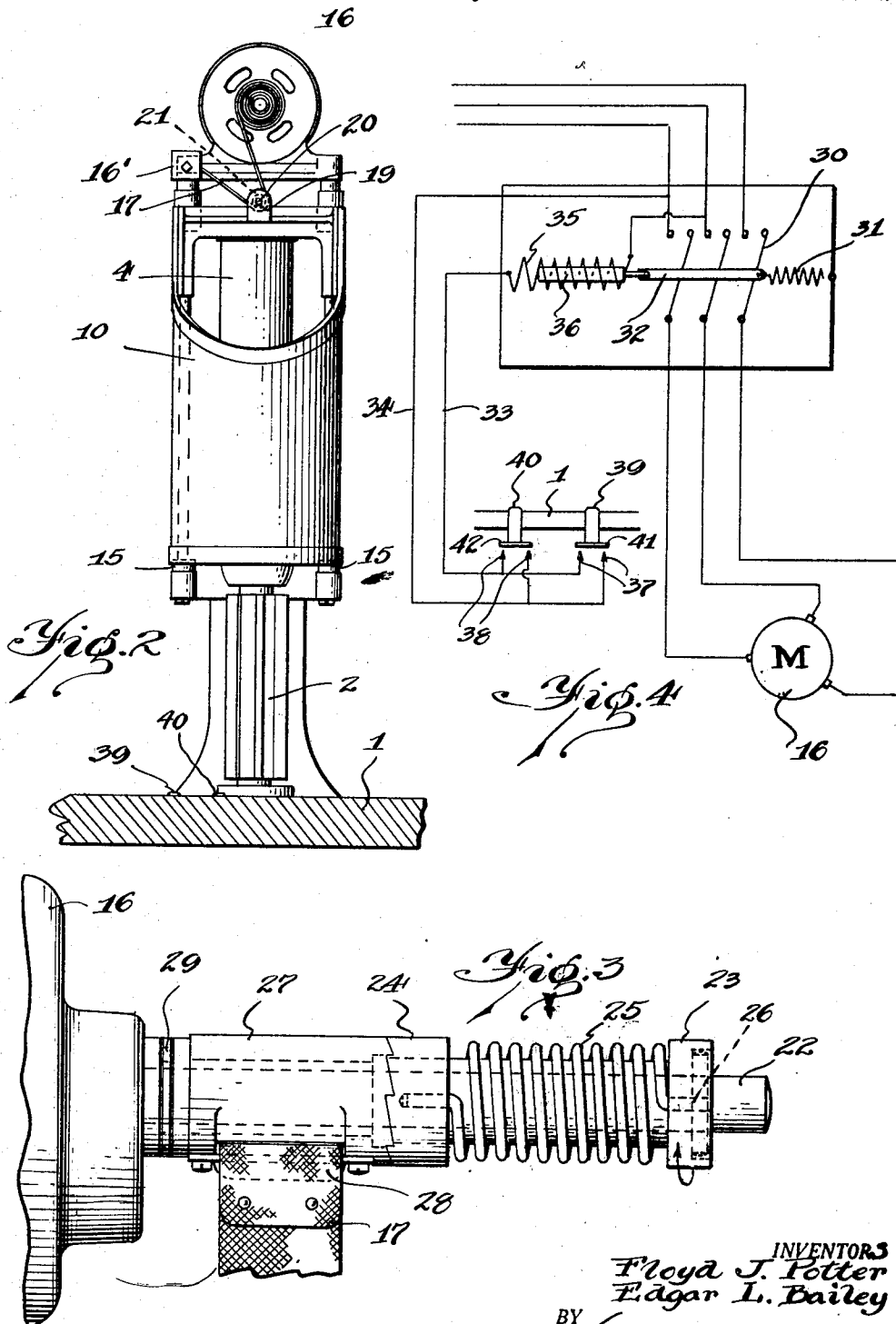
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SHAPER GUARD

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This invention relates to a tool guard and more particularly to a guard for a vertically disposed tool, such as a shaper for shaping lengths of wood or the like.

In accordance with the invention, the guard is arranged to move vertically in a reciprocatory manner to cover the tool in one position and expose the tool in another. Broadly this is not new; however, the present invention embodies certain improvements which make feasible the production of the guard more economically than that heretofore possible, and also a guard construction which can be operated more economically. Accordingly, the invention contemplates the use of an electric motor for actuating the reciprocating guard, and while the motor runs in one direction, yet the construction affords for a reciprocable movement of the guard although the two are at all times operatively connected. Further, the invention contemplates an automatic movement of the guard at the proper time to expose the tool; this is effected by the work in movement toward the tool, and the guard raises as the forward end of the work reaches a given point in advance of the tool; as the work approaches completion, and the rear end of the work reaches this said given point, the guard still is maintained in tool exposing position until the rear end of the work has received its final shaping action by the tool.

In the accompanying drawings:

Fig. 1 is a perspective view illustrating a work table and the guard construction for covering the tool, showing the guard in tool-covering position.

Fig. 2 is a side elevation showing the guard in tool-exposing position.

Fig. 3 is a detail showing the drive construction associated with the motor.

Fig. 4 is a diagrammatic illustration of the wiring system and switch arrangement for operating the guard.

Referring more specifically to the drawings, a work table is shown at 1, and projecting vertically from this table is a rotating shaper tool 2. This tool is rotated by suitable power means which may be disposed underneath the table, and which is not shown.

The upper end of the tool may be stabilized by a bearing 3, supported by the vertical post 4. In the operation of such a machine, a length of wood is moved past the tool along the table, while the tool is rotating and the wood is shaped by the tool. Such shaper tools are old and well understood by those versed in the art, and further and detailed description is unnecessary.

In order to guard the shaper tool, for the purpose of providing a safety factor in the operation of the machine so that the tool is not exposed, except when it is functioning to shape a length of wood or the like, an upright supporting post 5 is provided, and it may be secured to the table as shown. The top of the post projects laterally partially over the table to form a support 6, and it also has a bracket construction 7 projecting so as to partially overlie the table.

The guard proper is illustrated at 10, and it is mounted on vertically extending guide rods 11. These guide rods are supported at the top by the head portion 6 of the post, and at their lower ends by the bracket 7. Suitable bearings, or collars 12 are attached to the guard 10 for slidably mounting the same of these vertically extending guide rods.

At the upper end of each rod, and also at the lower end of each rod, a shock-absorbing element is provided; these shock absorbers may take the form of rubber blocks 15, and they serve to stop the guard 10 in its reciprocable movement.

For the purpose of reciprocating the guard, an electric motor 16 may be employed, and which is mounted on the head 6 of the post. A suitable flexible member in the form of a leather or fabric strap, has one end attached to a bracket 16' and its other end attached to the shaft of the motor. This flexible member, or strap as it is hereinafter termed, is referenced to 17. The guard has a cross member 18, and the strap is fitted between ears 19 of this cross member. A suitable bolt 20 connects these ears, and mounted upon the bolt, preferably, is a roller 21.

The end of the strap which is connected to the motor shaft is not directly connected thereto, but is preferably connected indirectly

through an interposed spring and a ratchet construction, as shown in detail in Fig. 3. In this figure, the shaft of the motor is referenced 22, and pinned to the shaft near its outer end, is a collar 23. Freely rotatable upon the shaft, is a ratchet member 24, and a coil spring 25 operatively connects the collar 23 and ratchet member 24 by reason of the ends of the spring being turned outwardly as at 26, and fitted into suitable apertures in these two members. A second ratchet member 27 is freely rotatable upon the shaft; to this member the strap 17 is connected by means of a connecting member 28. The spring normally exerts an expansion tendency, and accordingly, a thrust bearing 29 is provided to overcome such thrust action.

The mechanical operation of this construction is as follows: The normal position of rest with the circuit of the motor broken, is shown in Fig. 1. When the circuit to the motor is made, it is set into operation and it winds up the strap 17, thus lifting the guard to the position shown in Fig. 2. The spring 25 provides for a resilient drive, inasmuch as the member 27, or spool as it may be termed, is rotated through the spring 25, the direction of rotation being clockwise, viewing Fig. 3 from the right. The upper limit of movement is determined by the rubber stops, and the motor is merely stalled when the guard reaches its uppermost position and it will be held in such position so long as the motor circuit is maintained. When the motor circuit is broken, however, the guard drops by gravity, thus unwinding the strap and turning the motor backwards. The guard is stopped at its lowermost position by the rubber shock absorbers or blocks.

At this point, the function of the two ratchet members 24 and 27 may be brought out; when the guard drops by gravity, its fall is rapid and it stops suddenly by the stops on the guides 11; this brings to a sudden stop the member 27, to which the strap is attached. The motor, however, has attained considerable momentum, rotating with it the shaft 22, collar 23, spring 25, and ratchet member 24. The direction of this backward rotation is counter-clockwise as Fig. 3 is viewed from the right. Accordingly, the member 24 may override member 27 due to the ratchet construction, while the guard rests upon the lower blocks and the ratchet member 27 is held from rotation.

As above pointed out, the circuit to the motor is made and broken at appropriate times by the movement of the work; the manner in which this is accomplished will be understood by reference to Fig. 4. It will be noted that a conventional three-phase circuit may be utilized, which is normally held open by a suitable switch construction 30, which may be held open by spring 31. The several arms of the switch may be joined by a bar 32.

Lead wires 33 and 34 may be taken from the power line, and suitable solenoid 35 is connected in with these lead lines, and the solenoid may be provided with a core 36 connected to the bar 32. These lead lines have switch terminals 37 and switch terminals 38. Suitable push buttons, or plungers 39 and 40 are positioned to project up through the work table and are each arranged when depressed, to bridge terminals 37 and 38 respectively, as by means of bridging members 41 and 42.

By reference to Fig. 1, it will be observed that button 39 is positioned in advance of button 40. Accordingly, when the work is advanced, such as a length of wood, the same strikes button 39 and by reason of its weight, depresses the same, thus bridging terminals 37. This energizes the solenoid, closes switch 30, and the motor operates to lift the guard. Button 39 is positioned far enough in advance of the guard to permit raising of the guard, prior to the forward end of the work reaching the tool. As the work moves on past the tool, switch 40 is closed. Both switches are maintained closed so long as the work rests upon the plungers. The rear end of the work will first move off button 39, thus breaking the circuit across terminals 37; however, the solenoid remains energized until button 40 is released. Accordingly, the motor, by reason of being stalled, holds the guard up until button 40 is released; whereupon the guard drops by gravity, as above described. The button 40 is positioned at a point to the rear of button 39 so that the guard is held raised until the operations upon the work are substantially completed. The relative positions of the two buttons and the shaper tool, is illustrated in Fig. 2.

It has been found that a motor possessing a high torque is desirable in connection with this shaper guard, and accordingly, it is preferable that the motor be wound to provide this high torque.

Claims:

1. The combination with a shaper tool or the like, a guard therefor which is vertically reciprocable to expose and to guard the tool in different positions, a motor having a shaft, a flexible element associated with the guard and shaft, whereby rotation of the shaft winds the flexible element thereon to raise the guard, and a resilient driving connection between the shaft and flexible element.

2. The combination with a shaper tool or the like, a guard for the tool which is vertically reciprocable to expose and to guard the tool in different positions, a motor having a shaft, a flexible element one end of which is fixed and the other end of which is attached to the shaft and adapted to be wound thereon, and means on the guard through which the flexible element is slidably threaded.

3. The combination with a shaper tool or the like, of a guard for the tool reciprocally mounted so as to in one position guard the tool and in another position expose the same, electrical means for moving the guard, a device positioned in advance of the tool and engageable by work as it approaches the tool to close the circuit of the electrical means, and another device positioned rearwardly of the first mentioned device, which is also engageable by the work to maintain the circuit closed after the work has disengaged the first device, and upon disengagement of which the work breaks the electrical circuit.
4. The combination with a shaper tool or the like, of a movable guard for the tool which is adapted to move to and from the guarding position, electrical means for moving the guard comprising a circuit, a switch for closing the circuit, said switch having an operable member positioned in advance of the tool and engageable by the work, a second switch in the said circuit, said second switch having an operable member positioned rearwardly of the first mentioned operable member, said second named operable member being also engageable by the work to hold the circuit closed after disengagement of the first switch and to open said circuit upon disengagement thereof by the work.
5. The combination with a shaper tool or the like, of a vertically reciprocable guard, a motor having a shaft, a sleeve thereon, a flexible element connected to the sleeve and associated with the guard, a one way drive connection operably connecting the sleeve and motor shaft, and means for making an electric circuit for operating the motor whereby the flexible element is wound upon said sleeve, said one way drive connection overriding when the flexible element is unwound from the sleeve.
6. The combination with a shaper tool or the like, a vertically reciprocable guard, an electric motor having a shaft, a sleeve, a flexible element connected to the sleeve and associated with the guard, means for making an electrical circuit to operate the motor and wind the flexible element on the sleeve, means for breaking the circuit, whereby the guard falls by gravity, and a one-way drive connection between the shaft and the sleeve which over-rides when the guard reaches the limit of its downward movement.
7. The combination with a shaper tool or the like, of a guard for the tool vertically reciprocable for exposing and guarding the tool in different positions, and an electric motor, a flexible element operatively associated with the guard, means upon which the flexible element may be wound, and means connecting the motor shaft to said last mentioned means whereby the motor winds the flexible element to raise the guard with said guard falling by gravity upon discontinuance of motor operation.
8. The combination with a shaper tool or the like, of a guard for the tool vertically reciprocable for exposing and guarding the tool in different positions, and an electric motor, a flexible element operatively associated with the guard, means upon which the flexible element may be wound, and means connecting the motor shaft to said last mentioned means whereby the motor winds the flexible element to raise the guard with said guard falling by gravity upon discontinuance of motor operation, said connecting means between the motor shaft and means upon which the flexible element is wound including a one way drive connection which allows the motor to overrun when the guard reaches its lowermost position.
9. The combination with a shaper tool or the like, located on a work table, a post carried by the work table and extending above the shaper tool, vertical guide devices carried by the post, a guard member on said guide devices, a motor on top of the post, and a flexible element connected respectively to the guard and motor which is wound up by motor operation and which is unwound upon discontinuance of motor operation by reason of the guard falling by gravity.
- In testimony whereof we affix our signatures.
- EDGAR L. BAILEY.
FLOYD J. POTTER.

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