June 5, 1956 E. HAAS 2,749,414

CLUTCH RELEASE CONTROL FOR CLICKING MACHINE

Filed Aug. 12, 1952

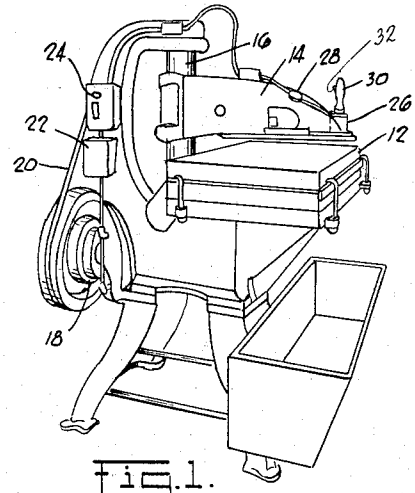

Fig. 1.

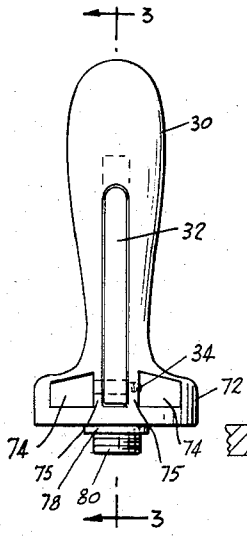

Fig. 2.

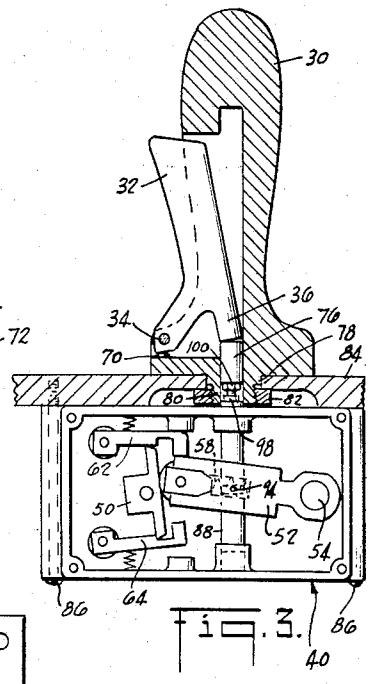

Fig. 3.

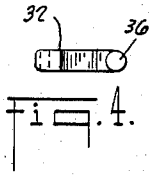

Fig. 4.

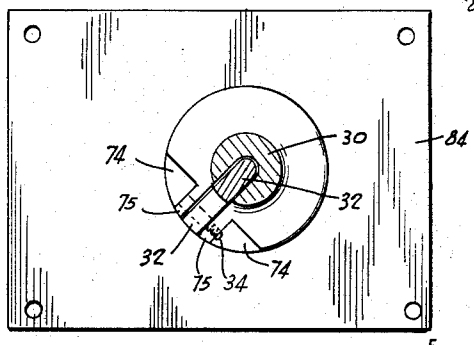

Fig. 5.

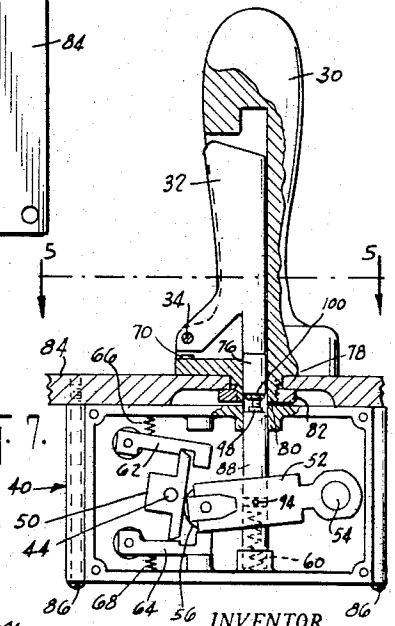

Fig. 7.

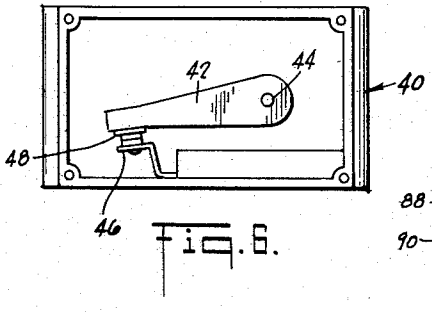

Fig. 6.

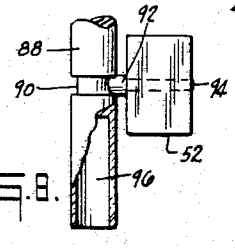

Fig. 8.

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CLUTCH RELEASE CONTROL FOR CLICKING MACHINE

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8 Claims. (Cl. 200—157)

This invention relates to clicking machines, and more particularly to a clutch release control for the same.

Most clicking machines have a mechanical release. The handle is usually an upright handle which is round in horizontal section to facilitate swinging the cutting beam from side to side. The operator may throw the beam fully aside while re-arranging the leather or other material on the cutting block, and then recapture the beam by seizing the handle. Often the cutting operation is performed on the rebound, that is, the beam is moved forcibly away, and the die shifted on the material so fast that as the beam comes back the operator is ready for the next cut. The work is usually piecework performed at high speed, and the operator therefore prefers an upright round handle which is openly accessible from all directions.

Most clicking machines have a mechanical release, and the handle is pushed down to release a one-revolution clutch for a single cutting stroke. It has also been proposed to use an electrical release in which a solenoid pulls the release of the single revolution clutch. Such electrical controls are shown in U. S. Patents 1,376,537 and 2,250,655. The first patent shows a pushbutton at the top of the handle, but this is not good because the operator may simply push downward with the palm of his hand, and then as the beam moves down it tends to leave his hand, thus permitting the button to release and again close as the beam rises, thus causing an accidental and undesired repeat cutting operation. In the second patent the switch contacts are operated by a vertical movement of the handle relative to the beam, and this also has led to difficulty on occasion, when the operator fails to follow the downward movement of the beam with the handle.

The primary object of the present invention is to overcome the foregoing difficulties, and to provide a clutch release control which provides a handle which is upright and openly accessible to permit high speed operation, much as in the case with a conventional handle, and yet which provides electrical control without the danger of unintended repeat operation resulting from downward movement of the beam.

Ancillary objects are to provide a handle which may be mounted in the usual place on the beam, and which is adjusted for use with most if not all conventional clicker machines.

A further object of the invention is to provide a control which is actuated by the entire hand, and which is accordingly less tiring to operate than would be the case with a button operated by a single finger. Still another object is to provide a control which combines with the handle a switch which prevents a change in switch position in either direction until near the end of the range of movement of the control. This again serves to prevent unintended repeat operation of the clicking machine.

Still another object of the invention is to provide a safety switch arranged in series with the main switch, said safety switch being in the form of a large-area depressible knob or button mounted on the beam, and intended to be hit or pressed with the left hand while the main handle is held in the right hand, thus insuring that both hands have been removed from beneath the beam at the time of the cutting operation.

To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, my invention resides in the clutch release control elements, and their relation one to another, as are hereinafter more particularly described in the following specification. The specification is accompanied by a drawing, in which:

Fig. 1 is a perspective view of a typical clicking machine embodying the clutch release control of my invention;

Fig. 2 is a rear elevation of a preferred form of control handle;

Fig. 3 is a transverse section taken through the handle approximately in the plane of the line 3—3 of Fig. 2, and shows the handle combined with the switch actuated thereby, the side plate of the latter being removed;

Fig. 4 is a bottom view of the control lever of the handle;

Fig. 5 is a partially sectioned plan view, the section being taken through the waist portion of the handle, and with the handle at an angle;

Fig. 6 is a rear elevation of the switch with its side plate removed;

Fig. 7 is a section similar to Fig. 3, but showing the changed position of the parts after actuation of the switch; and

Fig. 8 is a detail of the switch plunger.

Referring to the drawing, and more particularly to Fig. 1, I there show a generally conventional clicking machine comprising a wood cutting block or work table **12** mounted beneath a vertically reciprocable clicking or cutting beam **14**. The beam may be manually swung from side to side about the vertical column **16**, and is moved up and down under power in response to operation of a main drive shaft through a single revolution clutch located at **18**, the machine being driven by a motor, not shown, through a belt **20**, which runs continuously. The clutch is released by a solenoid housed at **22**, and the power supply includes not only a master switch **24** but series connected control switches at **26** and **28**, the latter being an optionally useable safety switch. The beam is swung by a handle **30** which is also arranged to control the switch in box **26**.

Referring now to Figs. 2, 3 and 7 of the drawing, the handle **30** is an upright handle of generally conventional type. It is round in horizontal section, and is comparable to conventional handles in being openly accessible to receive a full-hand grip. It is located in conventional fashion at the free end of the beam.

However, the handle differs from the usual handle in having a clutch control lever **32** projecting radially therefrom, and movable into or out of the body of the handle **30**. The lever **32** is preferably a plate-like member, and in the present case is pivoted at **34**. Because this pivot is at the lower end and near the rim of the handle, the lever functions as an angle lever, and provides a vertical movement at the heel **36**. This vertical movement is used to actuate a switch therebelow, generally designated **40**. By comparing Figs. 3 and 7 it will be seen that when the lever **32** is squeezed inward it is received almost fully within the handle. The natural grip resulting from this encourages the operator to hold the lever in its inward position during the clicking operation, and thus avoids any tendency toward accidental repeat operation.

To further guard against repeat operation the switch **40** is preferably of a special type. Referring to Fig. 6, the switch comprises a movable element **42** pivoted at **44** and having movable contacts which engage stationary

contacts 46. The arm 42 may be made of insulation. These are two spaced contacts at 46, which are bridged by mating contacts 48.

Referring now to Figs. 3 and 7, the pivot or pin 44 of Fig. 6 extends through a partition wall in the switch housing, and on the opposite side carries a tumbler 50. This tumbler may be tilted one way or the other by means of an actuator 52 which is pivoted at 54, and the movable end of which carries a cam roller 56 which is spring pressed by means of a compression spring 58 (Fig. 3). It will be evident by comparison of Figs. 3 and 7 that movement of the actuator 52 from one position to the other tilts the tumbler 50, the actuator being normally raised by a vertical compression spring 60 (Fig. 7).

However, the tumbler additionally cooperates with upper and lower detents 62 and 64 which are themselves urged toward one another by small compression springs 66 and 68. When the tumbler is in the position shown in Fig. 3 it is locked there by the lower detent 64. When actuator 52 is pushed downward it cannot turn the tumbler, and instead the cam roller 56 moves to the right and compresses the spring 58 (Fig. 3). However, when the actuator 52 is moved to nearly its lowermost position it engages the end of the detent 64 and moves it downward somewhat, thereby unlocking the tumbler and permitting the tumbler to abruptly change from the position of Fig. 3 to the position of Fig. 7. At this time the upper detent 62 descends and engages the upper end of the tumbler, thereby locking it against return movement until after the actuator is moved all the way up to the position shown in Fig. 3.

With this arrangement the switch will change only in response to a substantially complete movement of the operating lever 31, which must be moved almost all the way in to the flush position shown in Fig. 7 before the switch is closed, and which must be released for movement almost all the way out to its limiting outward position shown in Fig. 3 before the switch is again opened. It will be evident that with this arrangement the danger of accidental repeat operation of the machine is minimized.

The outward movement of lever 32 may be limited in any desired fashion. This may be done by letting the toe bear against the subjacent horizontal surface of the handle. In the present case I provide an adjustable stop screw 70, which has the advantage that wear can be taken up. The flared base 72 of the handle is preferably recessed or cut away, as shown at 74 in Figs. 2 and 5, to provide bearings 75 which facilitate mounting of the pivot pin 34 of lever 32. This pin 34 is threaded at one end, and one of the bearings 75 is matingly threaded to receive the threaded end of the pin.

The vertical movement at the heel 36 of the lever may be transmitted to the actuator 52 by means of a cylindical plunger 75. This plunger is preferably located on the axis of the handle. It passes through a boss 78 (Figs. 2 and 3) having a threaded end 80. This receives a nut 82 (Figs. 3 and 7) for securing the handle tightly to the top wall 84 of the outer switch box. It will be understood that an outside metal box, only a part of which is shown at 84, may be provided to protectively house the inner insulation switch box 40, and to fixedly and strongly carry the handle 30. The inner switch box 40 is secured to top wall 84 by two long screws 86, which pass upwardly into metal top wall 84.

The switch mechanism itself includes a vertical plunger 88 which is disposed on the inner side of the actuator arm 52. This plunger 88 has a circumferential groove 90, best shown in Fig. 8, and the said groove receives the head 92 of a pin 94 passing through the actuator. It will thus be seen that vertical movement of plunger 88 is accompanied by oscillation of the actuator 52. The lower end of plunger 88 is preferably hollowed as shown at 96 to receive and house the vertical compression spring 60 previously referred to.

The handle 30 is so related to the switch 40 that the handle, its plunger 76, and the plunger 88 of the switch are all in axial alignment. For convenience the intermediate plunger 76 is preferably made adjustable in length. For this purpose it may be provided at one end with a large flat-headed screw 98, the adjustment of which may be locked by means of a lock nut 100. Plungers 76 and 88 may be combined into one, if desired, in which case the screw 98 is located at the top.

The important advantage of the coaxial arrangement here used is that the orientation of the handle may be changed without affecting the switch operation. More specifically, the direction of the lever 32, when viewed in plan, may be changed to suit the convenience or whim of the operator of the machine. Thus in Fig. 5 it will be seen that the lever 32 is disposed at an angle relative to the top plate 84 of the switch box. In general the lever 32 is disposed away from the operator toward the remote end of the beam, but a right-handed operator will usually prefer that the lever be turned somewhat toward the left, and a left-handed operator will usually prefer that the lever be turned somewhat toward the right. This helps avoid premature operation of the lever when reaching for and swinging back the beam of the clicking machine after it has been swung away.

To change the orientation of the lever it is merely necessary to remove four screws at the four corners of the top plate 84 (Fig. 5), thus permitting removal of the assembly from the protective box 26 (Fig. 1), following which the two long screws 86 may be released to permit separation of the top plate 84 from the switch. This gives full access to the large nut 82 which locks the handle on the cover plate, and by slightly loosening the nut the handle may be turned to any desired angle, following which the nut is again tightened, and the parts reassembled. Regardless of the angle of the lever the operation of the switch remains unchanged.

Indeed I have constructed this control in one form in which the handle is frictionally instead of positively secured, so that the angle may be changed manually from the outside, but I prefer the present arrangement in which the handle is first adjusted to desired position, and then locked in that position.

In Figs. 2, 3 and 7 it will be noted that the upright lever 32 is shorter than the handle 30. In practice I prefer to make the lever 32 long enough to receive a full-hand grip, but I additionally prefer to somewhat lengthen or prolong the handle 30 to provide a handle portion of appreciable length above the upper end of the lever. This is for the convenience of those operators who may prefer to initially seize the upper end only of the handle when swinging the beam, and to later change their grip to a lower position when operating the switch lever.

Reverting now to Fig. 1, the safety switch 28 may function, electrically, like an ordinary pushbutton, for only momentary energization of the clutch solenoid is needed to trip the clutch 18. The switch 28 is preferably connected in series with the switch 40, so that both switches must be closed simultaneously for at least an instant in order to trip the clutch. Switch 28 is not essential but is desirable for safety purposes, for in operation it becomes necessary to press or hit switch 28 while still holding the handle 30 to close the switch in box 26, thereby insuring that both hands have been removed from beneath the cutting beam. For this purpose the button or actuator of switch 28 is preferably a large, convexly shaped knob which is readily and quickly hit with the left hand, without excessively interfering with the normal work procedure of the operator. The cutting response of the machine is so immediate and instantaneous that there is no possibility of moving the left hand back beneath the beam before or during the ensuing cutting operation.

It is believed that the construction and operation of my improved clutch release control for clicking machines, as well as the many advantages thereof, will be apparent from the foregoing detailed description. It will also be apparent that while I have shown and described my invention in a preferred form, changes may be made in the structure shown without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. A clutch release control for the swinging cutting beam of a clicking machine, said control comprising an upwardly projecting generally upright handle which is round in horizontal section and comparable to conventional clicking machine handles in being openly accessible from above to receive a full-hand grip, said handle having a generally upright clutch control lever projecting radially therefrom and movable into or out of the body of the handle, said lever being pivoted at its lower end near the rim of the handle and functioning as an angle lever to provide a vertical movement axially of the handle beneath the handle, and an electrical switch disposed beneath the handle for operation by the resulting vertical movement.

2. A clutch release control for a clicking machine, said control comprising a generally upright handle which is round in horizontal section and comparable to conventional handles in being openly accessible to receive a full-hand grip, said handle having a generally upright clutch control lever projecting radially therefrom and movable into or out of the body of the handle, said lever being pivoted at its lower end near the rim of the handle and functioning as an angle lever to provide a vertical movement axially of the handle beneath the handle, and an electrical switch disposed beneath the handle for operation by the resulting vertical movement, the lower end of said handle having a concentric bushing slidably receiving a vertical plunger on the axis of the handle, said angle lever being somewhat boot shaped with the pivot at the toe of the boot, and with the heel over the upper end of said plunger, the lower end of said plunger serving to operate the switch, the arrangement being such that the handle may be oriented about its vertical axis to direct the lever in a desired direction convenient to the operator, without affecting the operation of the switch.

3. A clutch release control for a clicking machine, said control comprising a generally upright handle of generally conventional type mounted on the free end of the clicker beam in generally conventional location, and an electrical switch arranged to be operated by said handle, said switch comprising a pivoted movable switch element and snap lock mechanism including a tumbler movable with said element, an actuator between said handle and said tumbler, and a spaced pair of detent levers for holding said tumbler against movement until after the actuator has been moved almost all of its stroke, at which time the actuator releases the detent and thereby permits abrupt movement of the tumbler and movable switch element.

4. A clutch release control for a clicking machine, said control comprising a generally upright handle which is round in horizontal section and comparable to conventional handles in being openly accessible to receive a full-hand grip, said handle having a generally upright clutch control lever projecting radially therefrom and movable into or out of the body of the handle, and an electrical switch disposed for operation by the resulting movement of the lever, said switch comprising a pivoted movable switch element and snap lock mechanism including a tumbler movable with said element, an actuator between said lever and said tumbler, and a spaced pair of detent levers for holding said tumbler against movement until after the actuator has been moved almost all of its stroke, at which time the actuator releases the detent and thereby permits abrupt movement of the tumbler and movable switch element.

5. A clutch release control for the swinging cutting beam of a clicking machine, said control comprising an upwardly projecting generally upright handle which is round in horizontal section and comparable to conventional clicking machine handles in being openly accessible from above to receive a full-hand grip, said handle having a generally upright clutch control lever projecting radially therefrom and movable into or out of the body of the handle, said lever being substantial in length but terminating at is upper end a substantial distance below the top of the handle, and an electrical switch disposed beneath the handle for operation by the resulting movement, said switch comprising a pivoted movable switch element and snap lock mechanism including a tumbler movable with said element, an actuator between said lever and said tumbler, and a spaced pair of detent levers for holding said tumbler against movement until after the actuator has been moved almost all of its stroke, at which time the actuator releases the detent and thereby permits abrupt movement of the tumbler and movable switch element.

6. A clutch release control for a clicking machine, said control comprising a generally upright handle which is round in horizontal section and comparable to conventional handles in being openly accessible to receive a full-hand grip, said handle having a generally upright clutch control lever projecting radially therefrom and movable into or out of the body of the handle, said lever being pivoted at its lower end near the rim of the handle and functioning as an angle lever to provide a vertical movement axially of the handle beneath the handle, and an electrical switch disposed beneath the handle for operation by the resulting vertical movement, said switch comprising a pivoted movable switch element and snap lock mechanism including a tumbler movable with said element, an actuator between said lever and said tumbler, and a spaced pair of detent levers for holding said tumbler against movement until after the actuator has been moved almost all of its stroke, at which time the actuator releases the detent and thereby permits abrupt movement of the tumbler and movable switch element.

7. A clutch release control for a clicking machine, said control comprising a generally upright handle which is round in horizontal section and comparable to conventional handles in being openly accessible to receive a full-hand grip, said handle having a generally upright clutch control lever projecting radially therefrom and movable into or out of the body of the handle, said lever being pivoted at its lower end near the rim of the handle and functioning as an angle lever to provide a vertical movement axially of the handle beneath the handle, and an electrical switch disposed beneath the handle for operation by the resulting vertical movement, said switch comprising a pivoted movable switch element and snap lock mechanism including a tumbler movable with said element, an actuator between said lever and said tumbler, and a spaced pair of detent levers for holding said tumbler against movement until after the actuator has been moved almost all of its stroke, at which time the actuator releases the detent and thereby permits abrupt movement of the tumbler and movable switch element, the lower end of said handle having a concentric bushing slidably receiving a vertical plunger on the axis of the handle, said angle lever being somewhat boot shaped with the pivot at the toe of the boot, and with the heel over the upper end of said plunger, the lower end of said plunger serving to operate the switch, the arrangement being such that the handle may be oriented about its vertical axis to direct the lever in a desired direction convenient to the operator, without affecting the operation of the switch.

8. A clutch release control for the swinging cutting beam of a clicking machine, said control comprising an upwardly projecting generally upright handle which is round in horizontal section and comparable to conven-

tional clicking machine handles in being openly accessible from above to receive a full-hand grip, said handle having a generally upright clutch control lever projecting radially therefrom and being movable into or out of the body of the handle, said lever being substantial in length but terminating at its upper end so far below the top of the handle as to provide a useable handle portion above the upper end of the lever which may be grasped above the lever to swing the cutting beam without operating the lever, and an electrical switch disposed beneath the handle for operation by movement of the clutch control lever.

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