

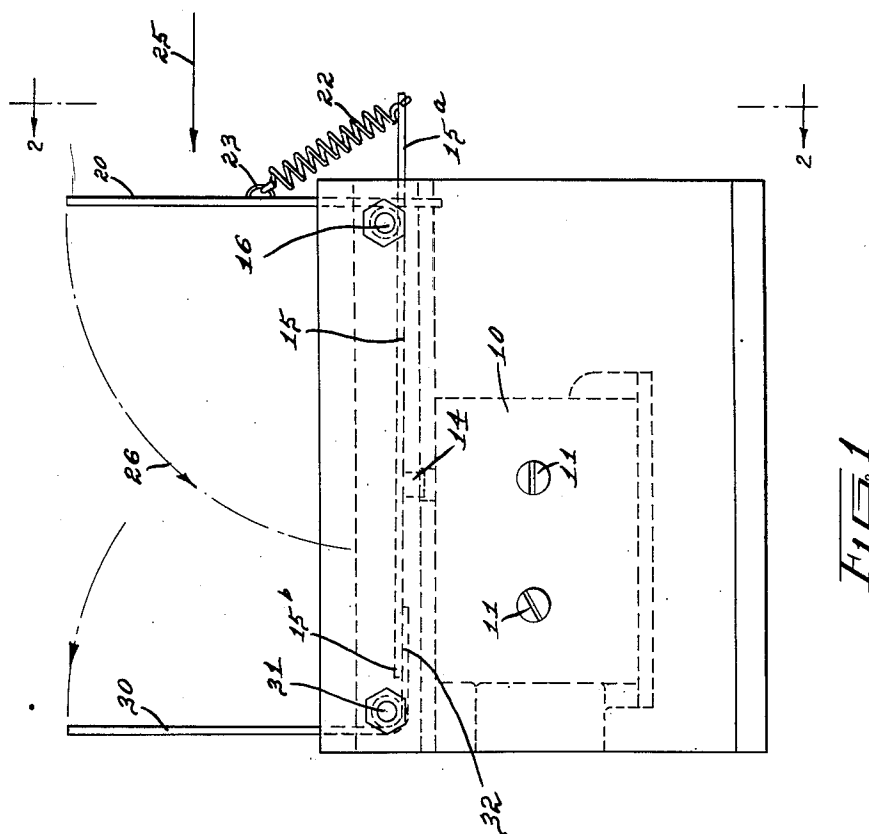
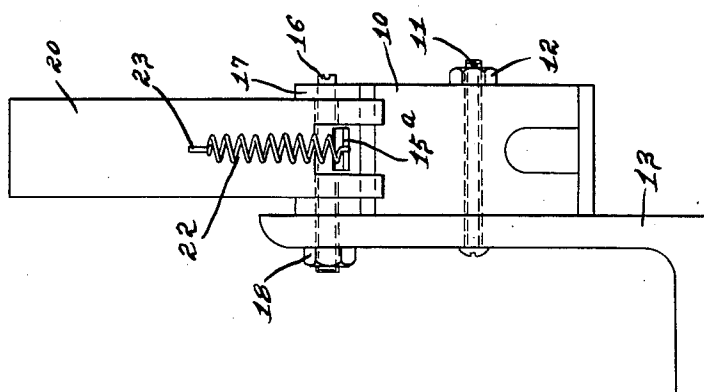
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A. BASCETTA

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TARGET OPERATED SWITCH FOR BOX MAKING MACHINES

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INVENTOR.

ANGELO BASCETTA

BY

Ostrolenk + Faber

ATTORNEYS

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TARGET OPERATED SWITCH FOR BOX-
MAKING MACHINES

Angelo Bascetta, Brooklyn, N. Y., assignor to
S & S Corrugated Paper Machinery Co., Inc.,
Brooklyn, N. Y., a corporation of New York

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My present invention relates to switches and operators therefor and more particularly to a target type switch specifically adapted for use in connection with box making machines in which the movement of a blank in the machine results in the closing and opening of electric circuits. Box making machines of the type disclosed in applications of Charles Hess, Serial Nos. 787,159 and 14,653, filed Nov. 20, 1947 and Mar. 13, 1948, respectively, represent two of the various types of box making machines for which my device is specifically adapted. Still more specifically my invention is adapted to be used as the switch operator for the tape feed-out roller of the taping machine disclosed in the above-mentioned applications, although its adaptation to other switching functions in box making machines will be obvious from the following description.

In the operation of various types of switches, specifically those switches which are to be closed and then opened by a moving element, it has previously been necessary, especially where it was desired to close and then open a circuit rapidly, to use two switches in series with each other, the first of which was normally open and the second of which was normally closed.

In this case, the box blank moving along would then be able to close the first switch to energize the circuit, and the opening of the second switch would de-energize the circuit while the box blank was passing thereover. Since the box blank in such cases left the first switch before it left the second switch, the circuit would remain de-energized.

By this means, therefore, the circuit was energized only for the distance between the two switches.

My invention has for its object the provision of switch operators for utilization in circuit apparatus of this type wherein a single switch may be closed and then opened by the passage of the box blank, thereby simplifying the electrical circuit, reducing the number of switches, and lowering the cost of maintenance, as well as the initial cost of the device.

Essentially, my invention contemplates a pair of vertical members in the path of movement of the box blank and a horizontal member engaging the switch operator. Both of the vertical members are rotatable from a vertical toward a horizontal position.

The horizontal switch operator is preferably rotatable about the same axis as the first of the vertical members and extends on both sides of the first vertical member.

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A tension spring connects the first vertical member with a portion of the horizontal member so that when the first vertical member is moved toward a horizontal position by the movement of the box blank, the tensioning of the spring will result in rotation of the horizontal member toward the switch.

The second vertical member is essentially a bell crank lever, the tail of which fits under an end of the horizontal member. When the second vertical member is moved toward a horizontal position by the box blank, the tail of the second vertical member lifts the horizontal member to de-energize the switch—the tension spring connection between the first vertical member and the horizontal member permitting this to occur.

Thus, the time of energization of the electrical circuit operated by the switch is determined by the distance between the two vertical members and the speed of the box blank as it moves from the first to the second vertical member.

The switch is energized when the box blank strikes the first vertical member, is de-energized when the box blank strikes the second vertical member, and remains de-energized as the box blank passes over both vertical members.

When the box blank leaves the first vertical member, the spring snaps it to the vertical position again and when the box blank leaves the second vertical member the spring acting through the horizontal member on the tail of the second vertical member snaps said second vertical member to vertical position.

By this means, therefore, the switch is prepared for operation by a succeeding box blank immediately after the first box blank clears the switch.

The foregoing and many other objects of my invention will become apparent in the following description and drawings in which:

Figure 1 is a side view of my novel switch operator.

Figure 2 is an end view taken on line 2—2 of Figure 1 of my novel switch operator.

Referring first to Figure 1, the switch 10 is mounted in any suitable manner as by the bolts 11 and nuts 12 on the bracket 13 which may be a portion of the frame of the machine.

The switch 10 is a standard type of switch which may be closed by depressing the button 14 thereof. The horizontal switch operator 15 is pivotally mounted on the bolt 16 passing through the bearing block 17 and carried by the bracket 13, being secured in position by the nut 18.

The vertical switch operator 20 is also pivotally mounted on the bolt 16. The horizontal switch operator 15 has an extension 15a on the side of bolt 16 opposite the switch button 14. A tension spring 22 is connected between the end of the extension 15a and the lug 23, biasing the vertical member 20 to the vertical position.

The downward movement of the button 14 is resisted in any appropriate manner as by a compression spring inside the switch housing 10. The tension spring 22 is so adjusted that with the elements in the position of Figure 1 spring 22 does not exert sufficient force on the horizontal switch operator 15 to depress the button 14.

This may be achieved not only by an appropriate selection of tension spring 22 but also by an appropriate selection of the distances 15a on the one hand and the distance 16-14 on the other hand so that the tension spring acts on the horizontal switch operator through a short lever arm.

When, however, the movement of the box blank as indicated generally by the arrow 25 rotates the vertical member 20 in the direction indicated by the arrow 26, the tension spring 22 is extended imparting a counterclockwise movement to the arm 15 of sufficient force to cause the arm 15 to press down the switch button 14 and close the circuit.

The switch button 14 remains depressed and the circuit remains closed until the box blank reaches the vertical member 30. The vertical member 30 is a bell crank lever pivoted on the bolt 31 and having the tail 32.

The box blank now rotates the vertical member 30 in a counterclockwise direction raising the tail 32 and since the tail 32 extends under the end 15b of the horizontal switch operator 15, this rotation of the bell crank lever 30-32 raises the horizontal member 15 causing it to rotate in a clockwise direction around its pivot 16 and thereby permitting the switch operating button 14 to rise once more. The tension spring 22 permits this to occur even though the vertical member 20 is at the same time being held down by the box blank.

The circuit now remains open while the box blank passes over both vertical members 20 and 30. When the box blank leaves the member 20, the spring 22 snaps the member 20 back to the vertical position. When the box blank leaves the member 30, tension spring 22 acting to depress the arm 15 rotates the bell crank lever 30-32 so that the vertical member 30 moves back to a vertical position.

However, the adjustment of the spring and its mechanical position as above-described is such that with members 20 and 30 in the vertical position the horizontal member 15 is not given enough force to depress the switch operating button 14.

By this means, therefore, a single switch 10 may be utilized to close and then open the circuit in response to the movement of the box blank, the time between the closing and opening of the circuit being determined by the spacing between the vertical members 20 and 30 and the speed and movement of the box blank.

It will also be obvious that the same device may be used to open and then close a normally energized circuit by simply selecting a switch 10 which is normally closed rather than normally open.

In the foregoing I have described my invention solely in connection with specific illustrative

embodiments thereof. Since many variations and modifications of my invention will now be obvious to those skilled in the art, I prefer to be bound not by the specific disclosures herein contained but only by the appended claims.

I claim:

1. A switch operating device adapted to operate a switch in accordance with the movement of a unit relative thereto; said device comprising a switch; a longitudinal operating arm; and a pair of control arms extending substantially normal thereto and in the path of said unit; a first pivot for the operating arm adjacent the first end thereof; said arm being rotatable about its pivot toward and away from the switch; said pivot also rotatably supporting the first of said control arms; and a second pivot for the second control arm adjacent the second end of the operating arm; the said first and second pivots being substantially aligned with the operating arm; the operating arm extending substantially between the first and second pivots but less than the full distance between the said pivots; the first end of the operating arm having an extension beyond the first pivot on the side thereof away from the second pivot; a tension spring between said extension and said first control arm; the second control arm having an angular extension directed toward said operating arm and extending in surface to surface relation therewith on the side thereof opposite that from which the tension spring extends.

2. A switch operating device adapted to operate a switch in accordance with the movement of a unit relative thereto; said device comprising a switch; a longitudinal operating arm; and a pair of control arms extending substantially normal thereto and in the path of said unit; a first pivot for the operating arm adjacent the first end thereof; said arm being rotatable about its pivot toward and away from the switch; said pivot also rotatably supporting the first of said control arms; and a second pivot for the second control arm adjacent the second end of the operating arm; the said first and second pivots being substantially aligned with the operating arm; the operating arm extending substantially between the first and second pivots but less than the full distance between the said pivots; the first end of the operating arm having an extension beyond the first pivot on the side thereof away from the second pivot; a tension spring between said extension and said first control arm; the second control arm having an angular extension directed toward said operating arm and extending in surface to surface relation therewith on the side thereof opposite that from which the tension spring extends; said first control arm when moved in a direction to tension said spring moving said operating arm about its pivot in one direction; said second control arm when moved about its own pivot in the same direction restoring said operating arm to its original position.

3. A mechanical movement adapted to move an operating arm in accordance with the movement of a unit relative thereto; said movement comprising a longitudinal operating arm; and a pair of control arms extending substantially normal thereto and in the path of said unit; a first pivot for the operating arm adjacent the first end thereof; said pivot also rotatably supporting the first of said control arms; and a second pivot for the second control arm adjacent the second end of the operating arm; the said first and second pivots being substantially aligned

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with the operating arm; the operating arm extending substantially between the first and second pivots but less than the full distance between the said pivots; the first end of the operating arm having an extension beyond the first pivot on the side thereof away from the second pivot; a tension spring between said extension and said first control arm; the second control arm having an angular extension directed toward said operating arm and extending in surface to surface relation therewith on the side thereof opposite that from which the tension spring extends; said first control arm when moved in a direction to tension said spring moving said operating arm

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about its pivot in one direction; said second control arm when moved about its own pivot in the same direction restoring said operating arm to its original position.

ANGELO BASCETTA.

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

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