Jan. 17, 1950 T. E. HAYES 2,494,615

SWITCH ARRANGEMENT FOR MONEY COUNTING MACHINES

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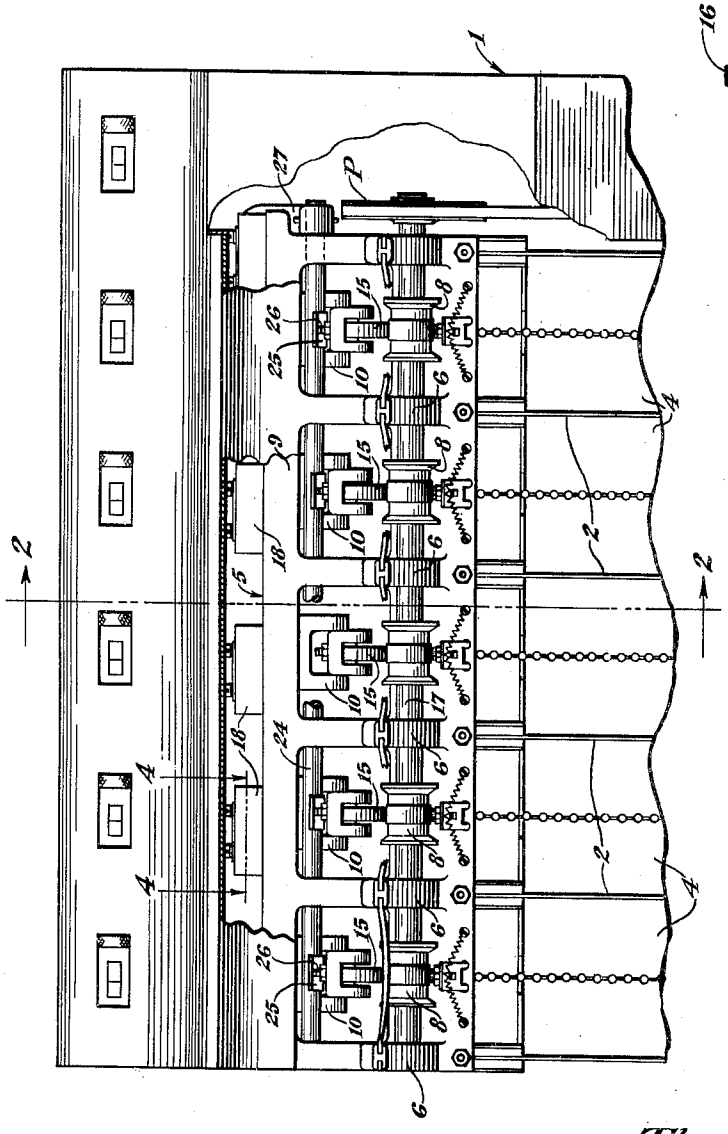


Fig. 1

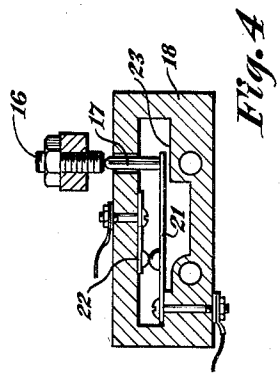


Fig. 4

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Fig. 3

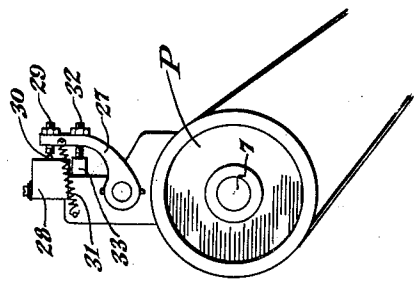



Fig. 5

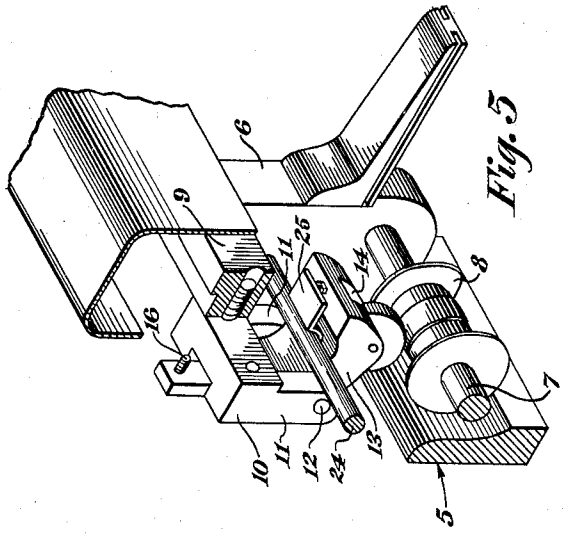
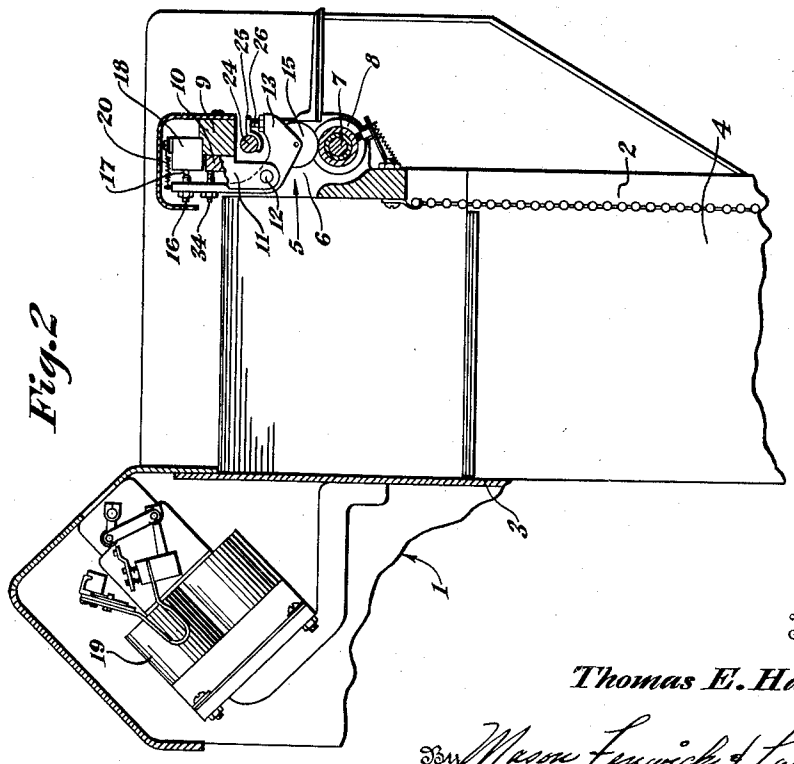



Fig. 2




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Patented Jan. 17, 1950

2,494,615

# UNITED STATES PATENT OFFICE

2,494,615

## SWITCH ARRANGEMENT FOR MONEY COUNTING MACHINES

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Application June 19, 1946, Serial No. 677,859

8 Claims. (Cl. 200—52)

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This invention relates to paper money counting machines of the general type shown in my Patent No. 2,429,159, issued October 14, 1947, and more particularly to an improved bill-calipering mechanism.

Prior machines, as shown in the above mentioned application, comprise a plurality of pairs of rollers between which the bills are fed. The rollers are constantly in contact, one being power driven, and the other being driven by contact with the first. Bills passing between the rollers separate them, lifting the upper roller a predetermined amount and causing the actuation of a switch to operate counter mechanism. Excessive lifting of the upper roller, as when two bills are simultaneously fed to the rollers, operates a double bill mechanism to stop the machine.

Constant contact between the rollers causes rapid wear and considerable noise. Lifting of the upper roller beyond the predetermined amount, caused by the insertion of a single bill, puts additional pressure upon the counter switch, resulting in excessive strain which shortens the life of the switch.

In these prior machines the calipering and switch operating mechanism can be adjusted only by a delicate operation requiring the use of gauges, and the adjustment can be made only by a skilled mechanic.

The object of the present invention is to provide improved calipering means in which the rollers are out of contact and the upper roller rotates only when a bill is inserted between the rollers.

It is also an object to provide such mechanism in which the parts are so arranged that excessive lifting of the upper roller will not be transmitted to the counter switch.

Another object of the invention is the provision of calipering mechanism which is simple to adjust, and may be adjusted without the aid of gauges.

It is a further object of the invention to provide improved mechanism for controlling the operation of a switch to stop the machine in the event two or more bills which may be stuck together are inserted between the rollers simultaneously.

Other objects and advantages will be apparent from the following detailed description of the device taken in conjunction with the drawings which accompany and form a part of this specification.

In the drawings:

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Figure 1 is a partial front elevation of a money counting machine incorporating the improved mechanism;

Figure 2 is a vertical section taken on the line 2—2 of Figure 1;

Figure 3 is an end elevational view showing part of the double bill mechanism;

Figure 4 is a horizontal section through one of the micro-switches used in the device, and

Figure 5 is a perspective view with parts broken away, showing one pair of calipering rollers and associated parts.

Referring in detail to the several figures of the drawing, the reference character 1 designates in general a cabinet in which a plurality of vertical partitions 2 are arranged in parallel relation against the back wall 3, forming a series of compartments 4, the horizontal cross-section of said compartments being of approximately the same size and shape as a bill, and adapted for the accumulation of stacks of bills.

Extending completely across the machine at the upper forward end of the compartments is a casting 5 forming a front plate for the machine. The casting is provided with a plurality of forwardly projecting ribs 6, the ribs being coextensive with the partitions 2 of the cabinet.

Journaled in the ribs 6 and extending the full length of the front plate is a shaft 7 upon which is mounted a plurality of rollers 8, one roller being mounted between each two ribs to provide a roller for each compartment. At one end, the shaft 7 is provided with a pulley P driven by means of a belt from a suitable source of power, not shown. The front plate 5 is so cast as to form a sill 9 along its upper edge, to which are attached support brackets 10, one bracket being mounted directly above each of the driven rollers 8. Each bracket 10 is of inverted U-form, having a pair of spaced depending ears 11 between which is pivotally mounted, as at 12, a roller supporting arm 13. The roller arm is in the form of a bell crank having a recess 14 in the lower face of one arm thereof to receive an idler roller 15 which is journaled in the side walls of the lever arm. The other arm of the bell crank extends vertically from the bell crank pivot, and carries near its upper end an adjusting screw 16 normally in abutment with the operating plunger 17 of a micro-switch 18 which controls the operation of a piece counter 19. The electrical circuit from the micro-switch to the counter is not shown herein, as it forms no part in the present invention. A circuit such as is shown in my above-mentioned Patent No. 2,429,159, is one ex-

ample of how the connection may be made. Roller arm 13 is biased by means of a spring 20 having one end anchored to the micro-switch case and its opposite end connected to the roller arm so that the arm will tend to bring roller 15 toward contact with roller 8, and adjusting screw 16 into contact with plunger 17.

The operating plunger 17 of the micro-switch is connected to a contact 21, which contact is of greater length than its companion contact 22. Contact 21 is normally urged toward circuit closing position with contact 22, and a stop 23 is provided to limit the opening movement of contact 21.

When the mechanism is to be adjusted for operation, the adjusting screw 16 on the end of the roller arm is moved inward, depressing operating plunger 17 and separating contacts 21 and 22, the adjusting movement being continued until contact 21 strikes the stop 23. As this arrests the movement of contact 21, further inward adjustment of screw 16 will cause roller arm 13 to rock about its pivot 12, lifting roller 15 from contact with driven roller 8. Proper adjustment is had when roller 15 is raised from roller 8 just sufficiently to prevent contact. This adjustment may be made without the use of gauges, and by unskilled labor.

When a bill is inserted between the rollers, roller 15 will be lifted, causing the roller arm to rock about its pivot in a counter-clockwise direction, as viewed in Figure 2 of the drawing, carrying the adjusting screw 16 away from the micro-switch plunger 17, permitting contacts 21 and 22 to close to actuate the counter. It will be noted that if two bills are inadvertently fed to the rollers, the additional lifting of the roller 15 will result in greater arcuate movement of the arm and adjusting screw, taking the adjusting screw further from the micro-switch operating plunger. This is in contradistinction to the mechanism of the old machines, and results in longer life for the switches.

Mounted directly above the roller 15 and its supporting arm, is a rock shaft 24 extending the full length of the front plate and journaled in the ribs 6. Intermediate the ribs 6, and in vertical alignment with the roller arms 13, are abutment fingers 25 attached to the rock shaft 24. The lower horizontal arm of the roller supporting lever 13 is provided with an adjusting screw 26 to strike the abutment finger 25 when the roller 15 is lifted an excessive amount, as when two or more bills are simultaneously inserted between the rollers. Screw 26 is adjusted so that the normal lift of the roller 15, when a single bill is inserted, will not cause the screw 26 to strike the abutment finger 25.

Rock shaft 24 carries at one end a switch operating lever 27, the lever being fixed to the shaft to rock therewith. A micro-switch 28, similar to micro-switch 18, is positioned upon the sill 9 so that an adjusting screw 29 carried by the operating lever 27 will contact and operate switch plunger 30. Operating lever 27 is normally held in switch plunger contacting position by means of a spring 31. A second adjusting screw 32 is carried by the operating lever 27 and cooperates with a stop 33 fixed to the sill to determine the normal position of rest of the rock shaft 24 and the abutment fingers 25.

It will be obvious that when the roller 15 is lifted sufficiently to cause adjusting screw 26 to strike abutment finger 25, rock shaft 24 and operating lever 27 will be caused to move in a clockwise direction as seen in Figure 3, permitting micro-switch 28 to close to stop the machine. The connection of the micro-switch 28 to the operating mechanism of the machine is fully disclosed in my Patent No. 2,429,159.



Roller arm 13 is provided with another adjusting screw, as shown at 34, just below screw 16. Screw 34 abuts the horizontal cross member of support bracket 10, and may be used to limit the movement of roller arm 13 in contacting plunger 17. Screw 34 may be used to adjust the position of rest of arm 13 and roller 15, and, after this position is determined, screw 16 may be adjusted to determine the position of contact 21 of micro-switch 18 when the calipering mechanism is at rest.

While I have in the above disclosed what is believed to be a preferred and practical embodiment of the invention, it is to be understood that the invention may take other forms within the scope of the appended claims.

Having thus described my invention, I claim:

1. In a machine for counting paper money, a support, a pair of feed rollers, a circuit closer mounted on said support and having contacts normally urged toward circuit closed position, a limit stop associated with said contacts to limit the opening movement thereof, one of said rollers journaled in said support and power driven, an arm pivoted intermediate its ends to said support and carrying said other roller journaled near one end thereof, the other end of said arm being normally urged toward said circuit closer and carrying an adjustment screw abutting said circuit closer whereby adjustment of said screw will move one of said contacts to circuit-open position against said limit stop, and further adjustment of said screw will determine the relative proximity of said rollers.

2. In a device as claimed in claim 1, a spring attached to said arm and biased to yieldably hold said arm and adjustment screw in normally abutting relationship with said contact.

3. In a machine for counting paper money, a support, a pair of feed rollers, a circuit closer mounted on said support and having contacts normally urged toward circuit closed position, one of said rollers journaled in said support, movable means mounted on said support and carrying said other roller, said movable means normally urged into abutting relation with said circuit closer to hold said contacts in circuit-open position, a second circuit closer having contacts normally urged toward circuit-closed position, and means to releasably hold the contacts of said second circuit closer in circuit-open position, said means being in the path of movement of said movable means and adapted to be struck thereby.

4. In a machine for counting paper money, a support, a pair of feed rollers, a circuit closer mounted on said support and having contacts normally urged toward circuit closed position, one of said rollers journaled in said support, an arm pivoted intermediate its ends to said support and carrying said other roller journaled near one end thereof, the other end of said arm normally urged into abutting relation with said circuit closer to hold said contacts in circuit open position, and a stop associated with said contacts to limit the opening movement thereof, and adjusting means on said pivoted arm at its point of abutment with said circuit closer.

5. In a machine for counting paper money, a support, a pair of feed rollers, a circuit closer

mounted on said support and having contacts normally urged toward circuit closed position, one of said rollers journaled in said support, an arm pivoted intermediate its ends to said support and carrying said other roller journaled near one end thereof, the other end of said arm normally urged into abutting relation with said circuit closer to hold said contacts in circuit-open position, a stop associated with said contacts to limit the opening movement thereof, adjusting means on said pivoted arm at its point of abutment with said circuit closer, and a spring to urge said arm toward normally abutting relation with said circuit closer.

6. In a machine for counting paper money, a support, a pair of feed rollers, a circuit closer mounted on said support and having contacts normally urged toward circuit closed position, one of said rollers journaled in said support, movable means mounted on said support and carrying said other roller, said movable means normally urged into abutting relation with said circuit-closer to hold said contacts in circuit-open position, a rock shaft, an abutment on said rock shaft, said abutment being in the path of movement of said movable means, an arm fixed to said rock shaft, a second circuit-closer having contacts normally urged toward circuit-closed position, and means urging said arm into abutment with said second circuit-closer to hold said contacts in circuit-open position.

7. In a machine for counting paper money, a support, a pair of feed rollers, a circuit-closer mounted on said support and having contacts normally urged toward circuit-closed position, one of said rollers journaled in said support, movable means mounted on said support and carrying said other roller, said movable means normally urged into abutting relation with said circuit-closer to hold said contacts in circuit-open position, a rock shaft, an abutment on said rock shaft, said abutment being in the path of movement of said movable means, an arm fixed to said rock shaft, a second circuit-closer having contacts normally urged toward circuit-closed position, and means urging said arm into abutment with said second circuit-closer to hold said contacts in circuit-open position, and an adjustment on said arm at its point of contact with said circuit-closer.



8. In a machine for counting paper money, a support, a pair of feed rollers, a circuit closer mounted on said support and having contacts normally urged toward circuit-closed position, one of said rollers journaled in said support, movable means mounted on said support and carrying said other roller, said movable means normally urged into abutting relation with said circuit-closer to hold said contacts in circuit-open position, a rock shaft, an abutment on said rock shaft, said abutment being in the path of movement of said movable means, an arm fixed to said rock shaft, a second circuit-closer having contacts normally urged toward circuit-closed position, and means urging said arm into abutment with said second circuit-closer to hold said contacts in circuit-open position, said abutment being spaced from said movable means a distance greater than the extent of movement of said movable means when a paper bill is inserted between said rollers.

THOMAS E. HAYES.


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