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MAILING PIECE SEPARATOR

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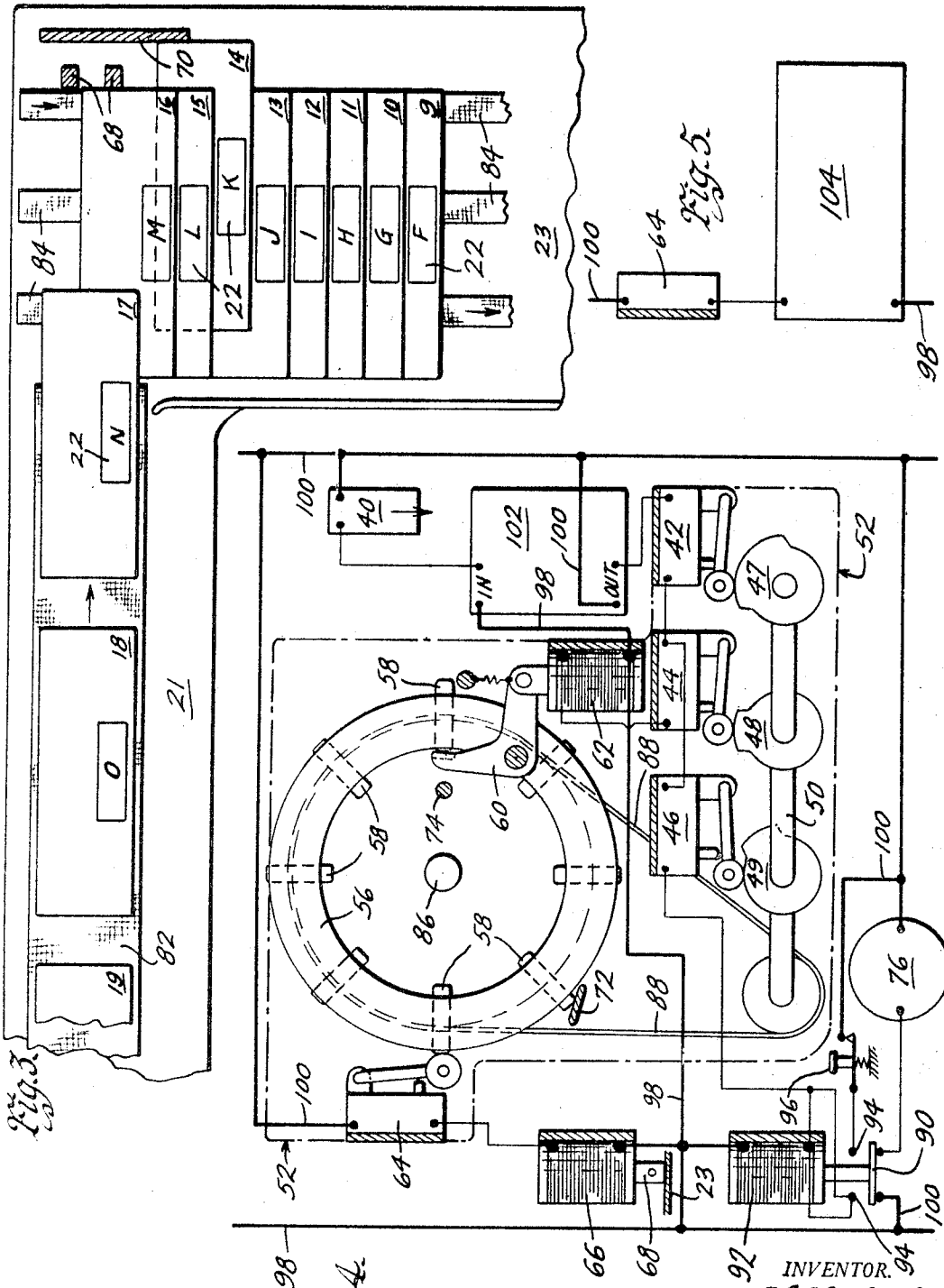


Fig. 4.

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MAILING PIECE SEPARATOR

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8 Claims

ABSTRACT OF THE DISCLOSURE

A mailing piece separator having a first conveyor for advancing normally aligned mailing pieces to a second conveyor where a predetermined mailing piece is offset with respect to the others by a stop.

This invention relates to a mailing piece separator designed for use in connection with a labeling machine such as one of the general type shown in the copending application of Harry V. Kirk and James E. Doane, Ser. No. 505,930, filed Nov. 1, 1965.

One object of the invention is to provide a mailing piece separator which separates mailing pieces (as to towns or states for instance) by offsetting the first mailing piece of a given town or state with respect to a series of mailing pieces "shingled" on a conveyor so that the operator, without having to scan the addresses, knows when mailing pieces for a different town or state are coming up on the conveyor and can accordingly separate them into individual bundles, such as third class bulk mail which is now required by postal regulations to be separated according to towns or states.

Another object is to provide means for offsetting from normal alignment a mailing piece having a predetermined label comprising means for sensing a mark on such predetermined label, a normal stop for the mailing pieces as they are delivered by the labeling machine onto the conveyor and a secondary stop on the conveyor beyond the normal stop, the sensing means being operable to render the normal stop inoperative.

Still another object is to provide a mailing piece separator wherein electrically operated means is responsive to the sensing means and is energized by the sensing means when it senses a mark on a label, whereupon it removes the normal stop from the path of a mailing piece and the mailing piece passes the normal stop and engages the secondary stop.

A further object is to provide sensing means located a predetermined number of labels ahead of a mailing piece having a predetermined label when that particular mailing piece reaches the normal stop and a memory unit responsive to the sensing means and operable to render the normal stop inoperative such predetermined number of labels later than the operation of the sensing means.

Still a further object is to provide a memory unit comprising a rotor, displaceable switch actuating elements carried thereby, a displacement actuator for the elements, the displacement actuator being responsive to the sensing means, a switch actuable by a displaced actuator, electrically operated means actuated by the switch to effect the rendering of the normal stop inoperative and means for driving the rotor in such timed relation to the cycling of the labeling machine that a displaceable actuator passes the displacement actuator each such cycle.

An additional object is to provide the sensing means responsive to a mark on a label which is in a different position than the first referred to mark and which is operable to stop the labeling machine for the purpose of changing imprint plates or the like such as for groups

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of mailing pieces imprinted with different dealer's names. Another additional object is to provide for manual restarting of the labeling machine once the imprint plate has been changed.

With these and other objects in view, our invention consists in the construction, arrangement and combination of the various parts of our mailing piece separator, whereby the objects above contemplated are attained, as hereinafter more fully set forth, pointed out in our claims and illustrated in detail on the accompanying drawings, wherein:

FIG. 1 is a plan view of a label strip, and associated therewith for timing comparison are diagrams of three switches with respect to their circuit-controlling positions;

FIG. 2 is a diagrammatic view of a labeling machine and certain elements of our mailing piece separator associated therewith;

FIG. 3 is a plan view, partially in section, of a portion of FIG. 2 as indicated by the line 3—3 thereon;

FIG. 4 is a diagrammatic view of a memory unit and electrical elements and circuits for our mailing piece separator, and

FIG. 5 is a diagrammatic view of a modified portion of FIG. 4.

On the accompanying drawings we have used the reference numerals 9 to 19, inclusive, to indicate a plurality of mailing pieces such as magazines, advertising brochures or the like, the same being labeled in a mailing machine 21 with which our mailing piece separator is associated and showing one of the mailing pieces (14 in FIG. 3) offset from the mailing pieces 10 to 13, 15 and 16 for a purpose which will hereinafter appear.

FIG. 2 illustrates a label strip 20 being fed from a roll 20^a thereof into the labeling machine 21 and a plan view of a portion of this strip is shown in FIG. 1. Individual labels are indicated 22 separated by parting lines indicated at 24, the labeling machine shearing the successive labels at the parting lines from the label strip 20 by means of a knife roll 26 having a knife 27 coating with an anvil roll 28 in the usual manner whereupon the individual labels 22 are carried by a labeling drum 30 and deposited on the mailing pieces such as 19 and 18, one label (identified O) having already been applied to the mailing piece 18 whereas the next label (identified P) is about to be applied to the mailing piece 19. A back-up drum 32 opposes the labeling drum 30 in the usual manner to accomplish the labeling operation. When we refer to "labeling" we are using the term generically as the actual labels 22 may be glued or otherwise adhesively secured to the mailing pieces 18, 19, etc., or wax impressions on the labels may be transferred by heat directly to the mailing pieces and the labels discarded or reused as "stick-on" labels, or impressions on the label strip 20 may be otherwise transferred from the individual labels to the individual mailing pieces.

Referring to FIG. 1 a plurality of address areas 34 are shown on the label strip 20 and are identified by letters K, L, M, N, O and P on the successive labels 22. The K address area 34 has thereadjacent a first mark identified 36 and the N address area 34 has thereadjacent a second mark 38. The relative positions of these marks are shown adjacent the L address area 34. These marks are adapted to be sensed by a sensing means 40 shown in FIG. 2 such as an "electric eye" or photoelectric cell. The sensing means electrically cooperates with a gating switch 42, a first mark switch 44 and a second mark switch 46 in the manner shown in FIG. 4 which switches are controlled by cams 47, 48 and 49, respectively. The three cams are on a cam shaft 50 located in a memory unit 52 (shown also in FIG. 2). The gating switch 42 is closed during the time that the marks 36 and 38 pass the sensing means 40

(shown dotted at the left end of FIG. 1) so as to ready the circuit for operation by either of the switches 44 or 46. When the mark 36 pass the sensing means 40 as shown in FIG. 1, the switch 44 is "ON" but is "OFF" at all other times. When the second mark 38 passes the sensing means 40 the second mark switch 46 is "ON" as illustrated in this figure but is "OFF" at all other times. The L address block 34 illustrates by dotted lines the relative positions of the first and second marks 36 and 38 in a rectangular area 54 (FIG. 1) the length of which corresponds to the "CLOSED" condition of the gating switch 42.

The memory unit 52 includes a rotor 56 carrying a plurality of displaceable switch-actuating elements 58 and a displacement actuator 60 adapted to be rendered operative by a solenoid 62. The actuating elements 58 are radially slidable in the rotor 56 and held in either their inner or outer positions by suitable friction or detent means exerting sufficient forces to permit any actuating element in its outer position to actuate a stop switch 64 which in turn is operable to energize a solenoid 66. A normal stop element 68 occupies the position illustrated in FIG. 2 when the solenoid 66 is de-energized, and rises sufficiently when the solenoid is energized to let the mailing piece 16 pass under it and engage a secondary stop element 70 which will stop the mailing piece in an offset position such as shown for the mailing piece 14 in FIG. 3. As shown in FIG. 3 the conveyor belt 82 projects the mailing pieces onto the conveyor belts 84 which travel at a constant speed and the mailing pieces are thus "shingled" onto the belts 84.

In FIG. 4 the solenoid 62 is shown energized by reason of the cam 48 having closed the switch 44 (42, 44, 46 and 64 all being normally open) and therefore has slid the actuating element with which the displacement actuator 60 cooperates to an outer position. Accordingly, this actuating element at four position later will close the switch 64 in an obvious manner. Any actuating element that is thus pushed outwardly will again be pushed inwardly to condition it for the next operation whenever that may occur by stationary actuating element return member 72. The displacement actuator 60 normally occupies a position against a stop pin 74 when the solenoid 62 is de-energized.

The labeling machine 21 is driven by a motor 76 through a speed-reducer 78 terminating in an output pulley 80 or the like which is operatively connected by means of timing belts, gears or the like to a belt conveyor 81, to the knife roll 26 and the anvil roll 28 (usually geared together), to the labeling drum 30 and the back-up drum 32 (usually geared together), to a belt conveyor 82 for conveying the mailing pieces from the drums 30 and 32 to a belt conveyor 84, to the shaft 85 of the belt conveyor 84, and to the cam shaft 50 as shown by six dotted-line arrows in FIG. 2. The rotor 56 of the memory unit 52 is mounted on a shaft 86 which may be driven by a timing belt 88 as shown in FIG. 4 from the cam shaft 50. The rolls 26 and 28, the drum 30 and 32 and the cam shaft 50 are designed to rotate once each cycle of operation of the labeling machine 21 and the actuating elements 58 to advance one station (8 being shown) each cycle of operation.

A motor switch 90 of latching relay type is provided having a solenoid 92 under control of the second mark switch 46 and is provided with holding contacts 94 to retain the motor switch 90 in open circuit position once it is moved to that position by energization of the solenoid 92 regardless of opening of the second mark switch 46 thereafter. A start switch 96 is provided to break the holding circuit so that the motor switch recloses at the will of the operator.

FIG. 4 illustrates current supply wires 98 and 100 for the electric eye 40, the switches 42, 44, 46, 64, 90, 94 and 96 for the solenoids 62, 66 and 92 and for an amplifier 102 of usual type for the electric eye 40. Heavy wires

show the supply of current from the current supply wires 98 and 100 to the various components mentioned and light wires show the interconnections between the components. It will be noted the electric eye 40 is connected to the input of the amplifier 102 whereas the output from the amplifier is connected to the gating switch 42. The output from the gating switch 42 is supplied to both switches 44 and 46 so that when either or both of them is closed while the gating switch 42 is closed, their respective solenoid 62 or 92 will be energized in response to both the closure of these three switches by their cams 47, 48 and 49 in accordance with the "CLOSED-OPEN" and "ON-OFF" circuit conditions illustrated in the three graph lines for the switches 42, 44 and 46 at the bottom of FIG. 1. Accordingly, the gating switch 42 will permit operation of the switches 44 and/or 46 only during the timing represented by the area 54 in FIG. 1 as the address areas 34 may have markings extending into the path of the electric eye 40 which are not desirable for the electric eye to sense. Actuation of the solenoids 62 and/or 66 occurs only if a mark 36 and/or 38 is sensed by the sensing means 40.

Practical operation

In the operation of our mailing piece separator it is desirable to indicate to the operator collecting shingled mailing pieces from the conveyor 84 to have a means to separate groups of mailing pieces such as those going to different town whereupon they may be bundled for mailing to that town in accordance with present day mailing practices. The first mark 36 may be used for this purpose.

By way of example, the K address block 34 has a first mark 36 which is scanned adjacent the rolls 26 and 28 in FIG. 2 but this particular label does not reach the normal stop 68 until four cycles later. Accordingly, the memory unit 52 is required, set for four cycles as between actuation of an actuating element 58 by the displacement actuator 60 and actuation of the stop switch 64 by that particular actuating element, whereupon the stop 68 is elevated by energization of the solenoid 62 and the mailing piece 14 bearing the K address label is accordingly allowing to be projected by the conveyor 82 on past the stop 68 to engage the secondary stop element 70 as illustrated in FIG. 3. Therefore, the operator knows that the mailing pieces 9, 10, 11, 12 and 13 go to one town and those from 14 on (until another mailing piece is offset) go to another town.

There are other circumstances which require stoppage of the labeling machine 21 as by de-energization of the motor 76 for the purpose of changing an imprint plate or the like, such as one for a different dealer (which may or may not be coincident with a change in town). For instance, one dealer may desire mailing pieces to go to several towns. This is accomplished by the second mark 38 having a different position than the first mark 36 as shown on the L label 22 in FIG. 1 and properly operable by the coaction of the cams 47 and 49 with the switches 42 and 46 coupled with a signal from the electric eye 40 as above described. Thereupon the motor switch 90 opens the circuit to the motor 76 and the labeling machine 21 is stopped until the next dealer's imprint plate replaces the former plate whereupon the machine can be energized for further operation by opening the starting switch 96 to break the holding circuit for the solenoid 92.

In some installations where a binding machine is operatively associated with the conveyor 84 of the labeling machine 21, it is desirable to initiate energization of the binding machine rather than stop operation of the labeling machine. FIG. 5 illustrates diagrammatically a binding machine 104 which is substituted in the circuit in place of the normal stop solenoid 66. The machine 104 is thus under control of the switch 64 which in turn is under control of the solenoid 62 and the first mark switch 44. Accordingly, instead of the mailing piece 14 for example being offset, the binding machine 104 would operate to automatically bind the mailing pieces through No.

13 without any attention from the operator and without the necessity of the offset operation.

From the foregoing specification it will be obvious that we have provided a mailing piece separator in which marks on address forms signal the first address of each town, state or the like. Of course, the marks must be positioned on the labels 22 within the specified areas 54 to be effective, and the cam actuated switches 42, 44 and 46 must be actuated coincident with the passages of the areas 54 with respect to the sensing means 40 so that other markings on the label such as parts of the address do not interfere with the mark sensing apparatus. The mechanism disclosed is readily designed as an attachment for an existing labeling machine to accomplish either or both operations described as a result of sensing the respective first and second marks 36 and 38.

The operator, by using our mailing piece separator, may readily bundle separated pieces for delivery to the post office. There is no costly hand separating as normally required which would consist of scanning the towns on the labels 22 and spotting a change in town. These labeling machines operate up to 20,000 mailing pieces per hour and it is therefore evident that scanning the addresses is a considerable job fraught with possible inaccuracies. Our mailing piece separator speeds handling of mailing pieces from the conveyor permitting increased labeling or addressing volume by reason of our "kick out" feature which throws a desired mailing piece out of line with the others (such as the mailing piece 14 in FIG. 3).

A simplified electric circuit is shown in FIG. 4 using the usual photoelectric cell at 40 and a suitable amplifier for the signal generated at the sensing element so that the output from the amplifier can actuate solenoids and the like. In some instances, small signal currents might be used to actuate power relays such as usual in the design of labeling machines and the like, and even hydraulic and/or pneumatic circuits might be added but since this is common practice in the art we have not gone into detail with respect to such circuits where used.

Since the inherent design of a labeling machine dictates the location of the sensing unit several cycles displaced from the point of control for offsetting a mailing piece, the memory unit 52 provides a simple means of justification for this difference and results in accurately offsetting the desired mailing piece to indicate a change of towns or the like. The second mark 38 results in stoppage of the labeling machine so that a multigraph plate or the like can be changed for any desired purpose such as a different dealer.

Some changes may be made in the construction and arrangement of the parts of our mailing piece separator without departing from the real spirit and purpose of our invention, and it is our intention to cover by our claims any modified forms of structure or use of mechanical equivalents which may reasonably be included within their scope.

We claim as our invention:

1. In a mailing piece separator, the combination with a labeling machine which labels individual mailing pieces and aligns them in a normal formation on a conveyor, of means for offsetting from such normal alignment a mailing piece having a predetermined label comprising means for sensing a mark associated with said predetermined label, a normal stop for said mailing pieces as they are delivered by said labeling machine to said conveyor, a secondary stop on said conveyor beyond said normal stop, and means responsive to said sensing means for rendering said normal stop inoperative said sensing means being located a predetermined number of labels ahead of said mailing piece having a predetermined label when it reaches said normal stop and a memory unit is provided responsive to said sensing means and operable to render said normal stop inoperative said predetermined number of labels later than the operation of said sensing means.

2. A mailing piece separator according to claim 1 wherein said memory unit comprises a rotor, displaceable switch actuating elements carried thereby, a displacement actuator for said elements, said displacement actuator being responsive to said sensing means, a switch actuated by a displaced actuator, electrically operated means controlled by said switch to effect the rendering of said normal stop inoperative and means for driving said rotor in such timed relation to the cycling of said labeling machine that a displaceable actuator passes said displacement actuator each such cycle.

3. A mailing piece separator according to claim 2 wherein means is provided for returning any displaced actuator to non-displaced position after it actuates said switch and before it returns to a position for actuation by said displacement actuator.

4. A mailing piece separator according to claim 1 wherein the labeling machine is motor operated, said sensing means senses a second mark associated with said mailing piece, a motor switch is provided for the motor of the labeling machine, and means is provided responsive to actuation of said sensing means by such second mark to open said motor switch.

5. A mailing piece separator according to claim 4 wherein a holding circuit is provided for said motor switch in its open position, and a starting switch is provided to break the holding circuit.

6. A mailing piece separator according to claim 4 wherein a gating switch, a first mark switch and a second mark switch are provided to cooperate with said sensing means in the control of said normal stop and said motor switch, said gating switch controlling the circuit to said first mark switch and said second mark switch and being cam-operated to limit the operation of said sensing means to a portion only of each label.

7. A mailing piece separator according to claim 6 wherein said first mark switch and said second mark switch are cam-operated to select the response of said sensing means to said first mark for operation of said normal stop to non-stop position only and said second mark for operation of said motor switch only.

8. A mailing piece separator, including a first conveyor whereby mailing pieces are conveyed in a normally aligned formation

a second conveyor mounted adjacent said first conveyor, said separator including means to offset from such normal alignment a mailing piece having a predetermined mark associated therewith comprising means for sensing the mark,

a normal stop for said mailing pieces as they are delivered from said first conveyor to said second conveyor,

a secondary stop on said second conveyor and offset from said normal stop,

and means responsive to said sensing means for rendering said normal stop inoperative whereby each mailing piece having a predetermined mark associated therewith is offset with respect to said normally aligned formation.

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