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AUTOMATIC LABELING MACHINE WITH "NO LABEL" AUTOMATIC STOP

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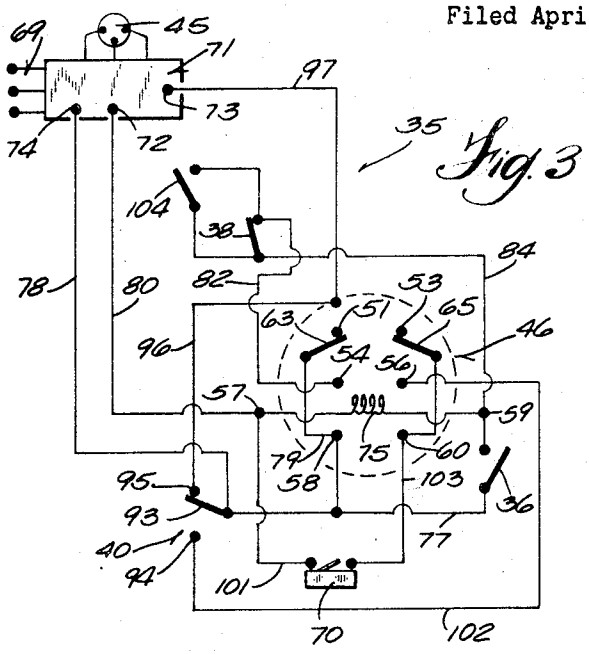


Fig. 3

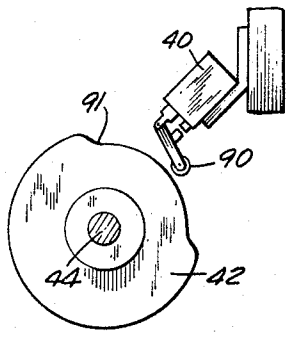


Fig. 4

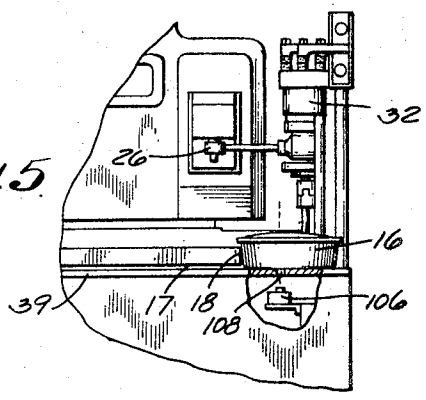


Fig. 5

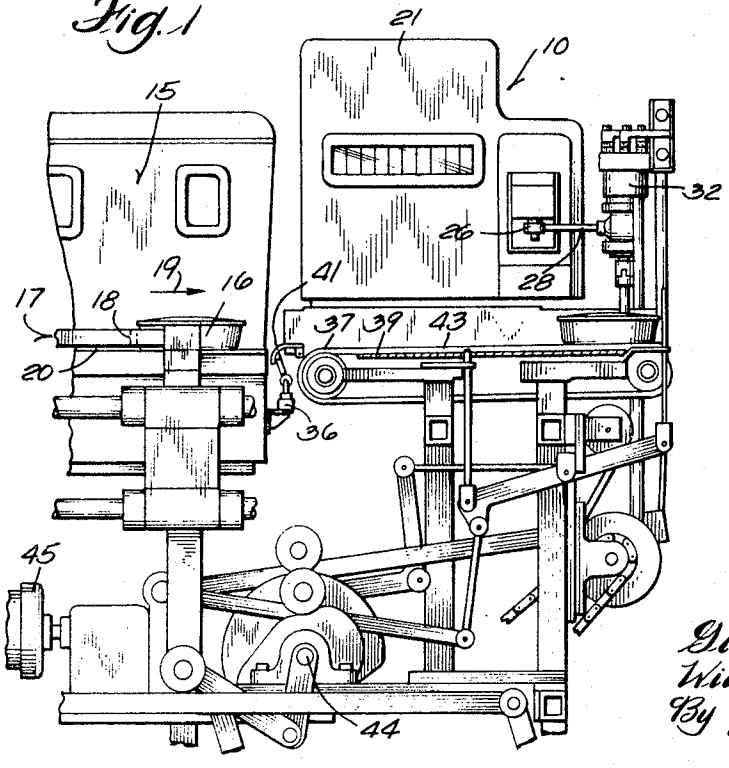


Fig. 1

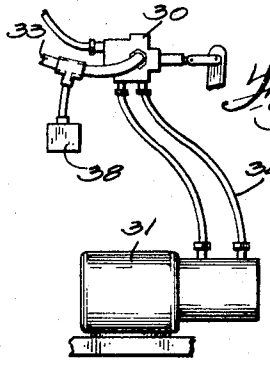


Fig. 2

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AUTOMATIC LABELING MACHINE WITH "NO LABEL" AUTOMATIC STOP

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U.S. Cl. 156—352 6 Claims

ABSTRACT OF THE DISCLOSURE

A device for interrupting movement of packages and stopping operation of an automatic labeling machine includes a vacuum sensing switch in communication with the vacuum actuated label carrying nozzle which carries printed labels in the course of their transfer from the label printer toward the package. The vacuum sensing switch is electrically connected to a circuit which is coupled to the motor which actuates a package conveyor to advance the packages to a label applying station. If because of some malfunctions of the label supply or printer, etc., a label is not present on the label transfer nozzle, and its suction port is thus exposed to atmosphere, instead of being closed off by the label, the machine motor is de-energized.

BACKGROUND OF THE INVENTION

The invention relates to automatic labeling apparatus of the type typified in U.S. Pat. 3,264,161. These machines weight the package and transmit the weight information to a label printer which prints the weight and the appropriate price on the label. The printed label is then automatically transferred by a vacuum nozzle for application to the package. It sometimes happens that the operator of the machine will feed packages to the apparatus unaware of the fact that the label printer has ceased to issue labels. Occasionally, the label magazine runs out of labels. Sometimes a label jams inside the printing mechanism. Other causes of a label failure inclue the operator's failure to reset the tare after a price change. A failure to note the absence of labels being applied to the packages can result in an accumulation of unlabeled packages which must be reprocessed through the machine.

SUMMARY OF INVENTION

To automatically stop the operation of the machine in the event of label failure, the invention provides a vacuum sensor to sense the absence of a label on the vacuum transfer nozzle and stop machine operation and continued advancement of packages to the label application station. Optionally a signal buzzer sounds to alert the operator.

In a preferred embodiment the device includes a package sensor such as a mechanical switch or a photosensitive device located in the path of travel of the packages. The package sensor is actuated by a package as it moves to the label application station and the package sensor energizes a relay which conditions the circuit for subsequent operation. If a label is not transferred by the vacuum nozzle, the vacuum sensor switch remains closed and the relay stays energized until a cam driven by the machine motor completes one revolution and actuates a limit switch associated with the cam to interrupt current flow to the conveyor motor. If a label is transferred, the increase in suction or lack of pressure in the vacuum line connected to the vacuum nozzle causes the vacuum sensor switch to open and interrupt current flow to the coil of the relay. The movable contacts in the relay then return to the normally closed position and maintain a circuit

to the conveyor motor which continues to run even when the cam switch is actuated as the cam completes one cycle.

Further objects, advantages, and features of the invention will become apparent from the following disclosure.

DRAWINGS

FIG. 1 is a fragmentary side elevational view of labeling apparatus embodying the invention.

FIG. 2 is a fragmentary view of the pneumatic apparatus for control of vacuum in the label transfer nozzle and showing the vacuum sensing switch employed in the invention.

FIG. 3 is a schematic circuit diagram of a practical embodiment of the invention.

FIG. 4 is a side view of the cam switch shown in FIG. 3 and the cam which actuates it.

FIG. 5 is a fragmentary side view of a modified embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

In one embodiment the labeling apparatus **10** includes a package weighing scale **15** to which wrapped packages are conveyed by a sweep-arm assembly **17** which includes one or more sweep arms **18** which push the packages in the direction of arrow **19** across the scale platform **20**. The weight of the package is measured by the scale **15** and the information obtained is supplied to a computer which energizes a label issuing machine or printer **21** which issues a label which has printed thereon the weight and price information appropriate for the package. The label is picked up from the printer by a vacuum transfer nozzle **26** carried by a stem or conduit **28** which swings in a horizontal plane. The vacuum nozzle **26** also swings about the axis of stem **28** to enable transfer of the label to the pressure platen **32** of an applicator nozzle which transfers the label to the package. The apparatus thus far described is similar to that disclosed in Pat. 3,264,161.

The present invention provides apparatus for stopping machine operation because of a label failure associated with the printer or label issuing machine **21**. In one embodiment the invention includes a circuit **35** with a package sensing switch **36** (FIGS. 1 and 3), a vacuum sensing switch **38** (FIG. 2) and a switch **40** operated by a cam **42** (FIG. 4). The package sensing switch **36** is located near the upstream end **37** of the platform **39** over which conveyor belts **43** convey the packages toward the label applicator station beneath pressure platen **32**. Switch **36** has a package engaging actuator **41**.

The vacuum sensor switch **38** is connected by a conduit **33** to the vacuum nozzle **26** to sense a lower pressure in the conduit **33** caused by the presence of a label which blocks the port in nozzle **26**. The conduit **33** is connected to a pneumatic valve **30** which is connected to a motor and compressor unit **31** by conduits **34**.

The cam operated switch **40** is a single pole double throw switch as shown in the schematic drawing of FIG. 3 and is operated by the cam **42** which can be located on any appropriate shaft such as shaft **44** which is driven by the motor **45**.

The circuit **35** also includes a relay **46** with fixed contacts or terminals **51**, **53**, **54**, **56**, **57**, **58**, **59**, and **60** and movable contacts **63** and **65**.

The circuit **35** also includes a buzzer **70** which is energized when a label failure occurs as presently de-

scribed. The circuit **35** is connected to a motor control **71** which is connected to the motor **45**. The motor control **71** contains terminals **72**, **73** and **74** and line terminals **69** for connection to line voltage.

In the operation of the device, the circuit **35** is conditioned to operate in co-ordination with the vacuum switch **38** by movement of a package **16** into engagement with the actuator **41** of the package sensing switch **36**. The actuator **41** momentarily closes the normally open switch **36** which energizes the relay **46** by completing the circuit from lead **78** through the lead **77** to switch **36** and to relay terminal **59** which is connected to one side of the relay coil **75**. The other side of the coil **75** is connected to terminal **57** which is connected to terminal **72** in motor control **71** by a lead **80**. Thus the sensing of a package times subsequent operations of the circuit.

When the package switch **36** is thus contacted and energizes the relay **46**, the movable contacts **63** and **65** move from the normally closed position in contact with terminals **51** and **53** into contact with relay terminals or contacts **54** and **56**. With the movable contacts **63**, **65** engaging relay contacts **54**, **56**, a holding circuit is established by which the relay coil remains energized after the package has passed and released the switch **36** which returns to its normally closed position. The circuit to the relay coil **75** is maintained through the relay terminal **58** which is connected to movable contact **63** by a lead **79** and from contact **63** to contact **54** and through lead **82** to normally closed vacuum sensor switch **38** and from the vacuum sensor switch **38** to terminal **59** through lead **84**.

When a label is picked up by the vacuum nozzle **26**, the increase in suction or decrease in pressure in the nozzle **26** is sensed by the vacuum sensor switch **38** which opens to interrupt current flow through lead **84** to the coil **75** and thus de-energize the relay **46**. Movable contacts **63**, **65** thus return to their normally closed positions shown in FIG. 3. Accordingly, when a label is picked up and the relay **46** is thus de-energized, a motor circuit path is completed between terminals **74** and **73** by the movable contact **63** engaging contact **51**. This circuit bypasses the circuit through cam switch **40** and hence the motor **46** is not de-energized when the cam switch **40** operates as presently described for a no-label condition.

Subject to periodic interruption by actions of cam **42**, motor control terminals **73**, **74** are normally connected through contact **93** of switch **40** in the normally closed position shown in FIG. 3 in which contact **93** engages terminal **95** of line **96** which connects through line **97** to terminal **73**. However, in every cycle of package advance when cam follower **90** falls into recess **91** on cam **42**, contact **93** disengages terminal **95** and engages terminal **94**.

If the vacuum nozzle **26** does not pick up a label, the vacuum sensor switch **38** remains closed and the relay **46** stays energized after the package sensor switch **36** opens after the package releases the switch actuator **41**. When the relay is energized, contacts **63**, **65** remain engaged with fixed contacts **54**, **56** and there is no connection between terminals **51** and **58** of the relay. Accordingly, when the cam follower **90** on switch **40** moves into the cam recess **91** of cam **42** and the switch contact member **93** of switch **40** moves to switch terminal **94** (FIG. 3), current flow through line **78**, contact **95** and lines **96** and **97** from terminal **74** to terminal **73** on the motor control **71** is interrupted and the motor **46** is de-energized. In the no-label condition, when the switch contact member **93** contacts terminal **94**, the circuit to the buzzer **70** is completed through the leads **101**, **103** and contacts **56** and **60** in the relay **46**. If package sensing switch **36** is not initially actuated, the relay **46** will not be actuated and cam actuated switch **40** will have no effect on continued operations of the motor **45** and continued running of the conveyor, because the motor circuit is completed through line **79** and normally closed contact **63**.

The circuit **35** is provided with a re-set switch **104** to bypass the vacuum sensor switch **38** and to restart the machine after machine operation has been interrupted.

In another embodiment of the invention a photosensitive device or switch **106** (FIG. 5) can be employed instead of the mechanically actuated package switch **36**, and an aperture or window **108** located in the package platform **39** proximate the label application station beneath the pressure platen **32**. When the package **16** as moved by a belt or an arm **18** covers the window **108**, the decrease in ambient light on the photocell **106** completes the circuit to the terminal **59** for the coil **75**. Locating the photosensitive device **106** close to the pressure platen **32** reduces the time lag between actuation of the package sensor and arrival of the package of the label applicator station. By this time transfer of the label from the printer to the applicator platen **32** has almost been completed. Accordingly, any loss of the label prior to this time will be sensed by the apparatus.

What is claimed is:

1. In labeling apparatus including a label issuer, a label applicator station, a vacuum nozzle for transferring the label from the issuer toward a package at the station and a conveyor for advancing the packages toward said station, the improvement comprising a vacuum sensor in communication with said vacuum nozzle and means responsive to said vacuum sensor to stop the conveyor upon failure of said vacuum nozzle to transfer a label, wherein said conveyor has an electric drive motor and an electric motor control circuit including a relay, a package sensor switch in said circuit and located in the path of travel of the packages to energize said relay when a package moves past said sensor, said vacuum sensor comprising a switch in said circuit operable to de-energize said relay when a label is transferred by said vacuum nozzle, and a cam actuated switch electrically connected to said circuit and a cam operated by said motor, said cam switch being operative to interrupt current flow to said motor when said cam completes a cycle and said relay is energized because of the failure of said nozzle to transfer a label.

2. The improvement of claim **1** in combination with an audible signal which sounds in response to said vacuum sensor.

3. The improvement of claim **1** wherein said package sensor comprises a switch having a switch member in the path of package travel.

4. The improvement of claim **1** wherein said package sensor comprises a photosensitive device in registry with the path of packages toward said label applicator station.

5. The improvement of claim **4** in which said apparatus includes a platform over which the packages travel enroute to the label applicator station, said platform having an aperture aligned with the photosensitive device.

6. In labeling apparatus including a label issuer, a label applicator station, a vacuum transfer nozzle for transferring the label from the issuer toward the label applicator station and a motor for advancing the packages toward the label applicator station, the improvement comprising

a vacuum sensor switch in communication with said vacuum nozzle,

a package switch,

a cam switch,

a cam operated by said motor,

a relay having a coil and a plurality of contacts, and

a circuit connecting said switches to said relay and to said motor to provide a first operational mode caused by the failure of the vacuum nozzle to transfer a label and in which actuation of said package switch causes energization of said relay coil to interrupt one circuit path to said motor and close relay contacts to maintain current flow to said relay coil when said package switch is released, and said cam switch inter-

rupting a second current path to said motor when said relay is energized and upon the completion of one cycle of the cam, and said circuit providing a second operational mode in which a label is transferred by said vacuum nozzle to actuate said vacuum sensor switch and de-energize said relay to complete the first circuit path to said motor so that said motor continues to run when said cam completes a cycle.

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U.S. Cl. X.R.

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