Jan. 17, 1967 L. O. BUCKE ETAL 3,298,605

NEWSPAPER ACCOUNTING MECHANISM

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FIG. 1

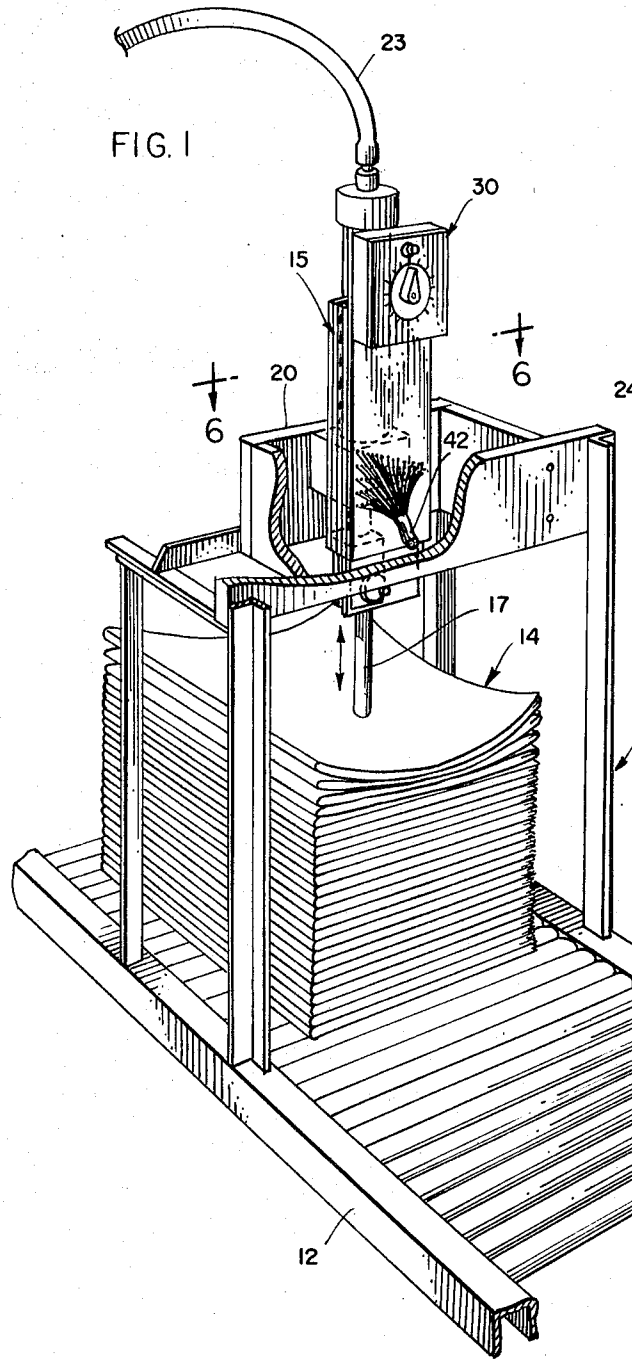
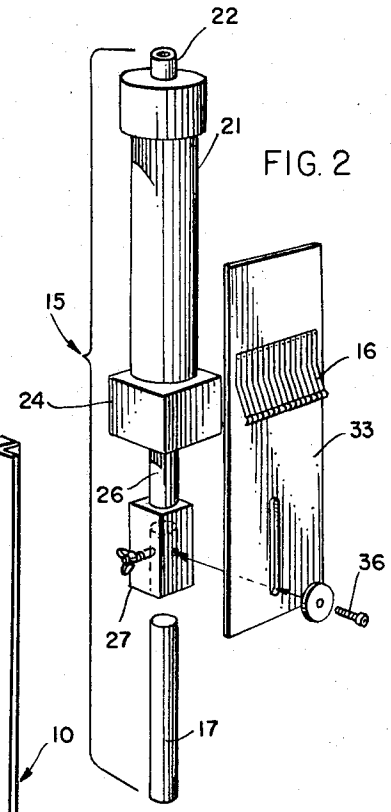


FIG. 2



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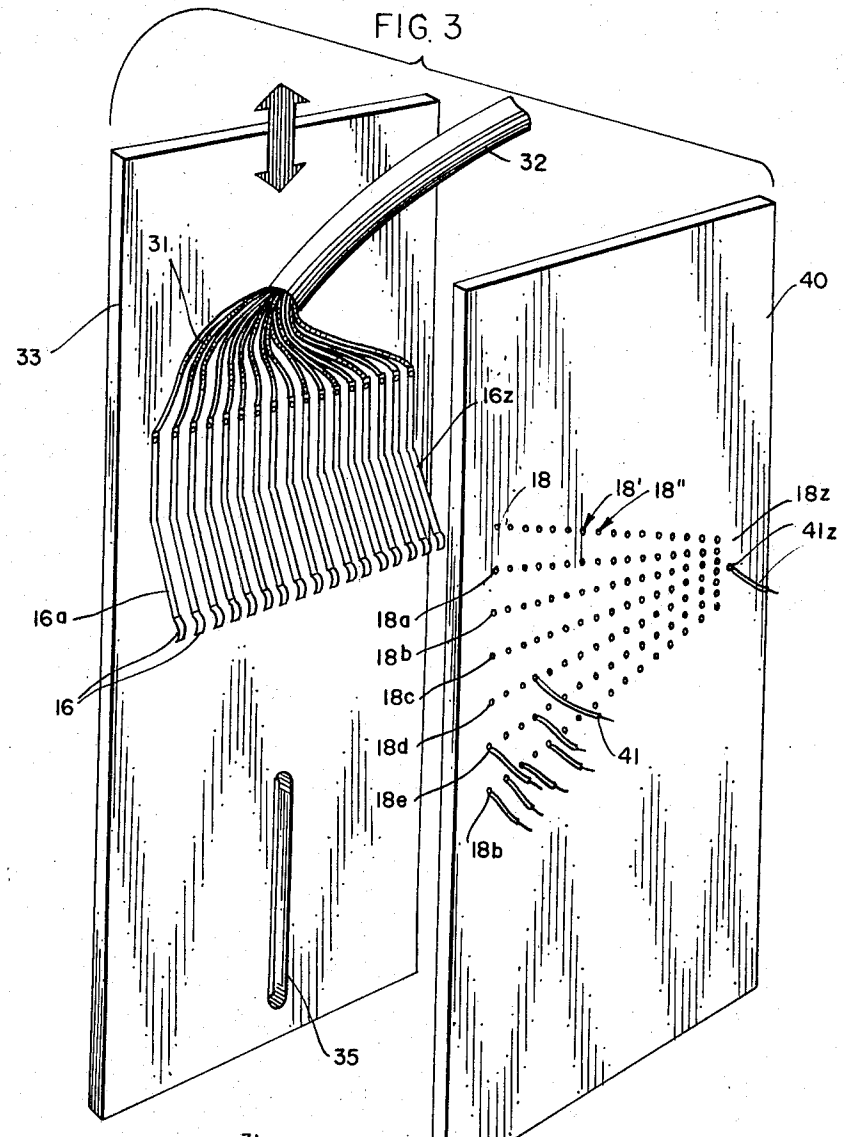
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NEWSPAPER ACCOUNTING MECHANISM

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FIG. 3



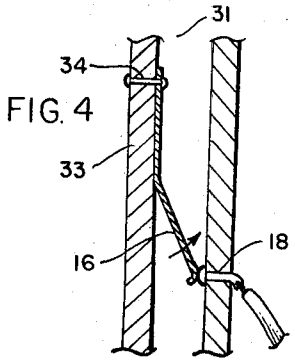


FIG. 4

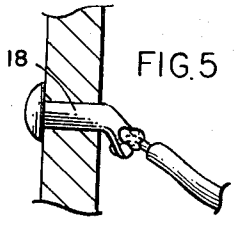


FIG. 5

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NEWSPAPER ACCOUNTING MECHANISM

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FIG. 6

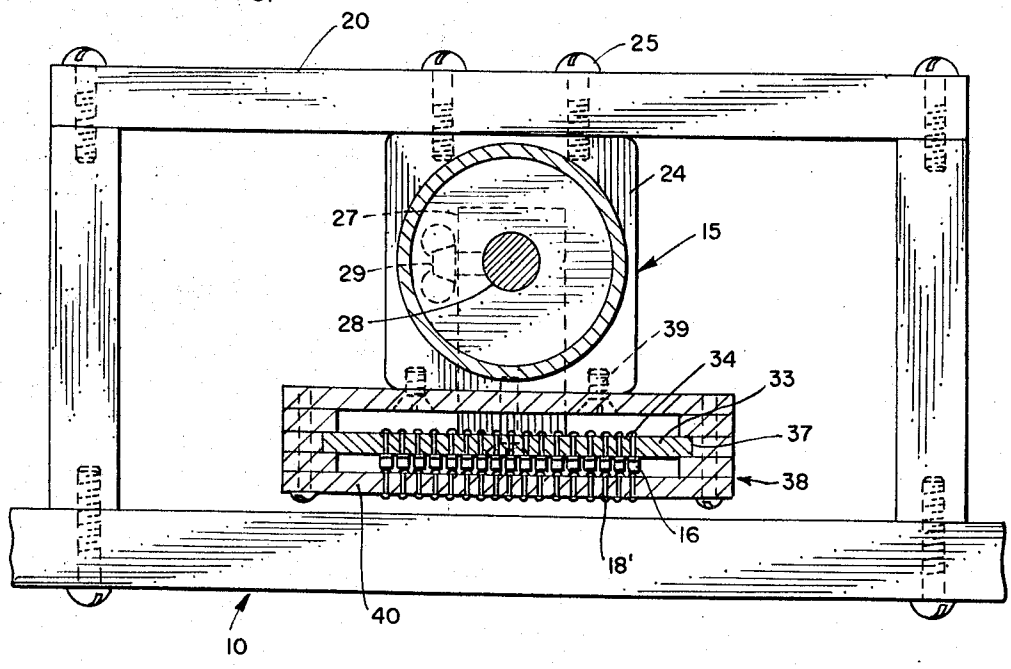
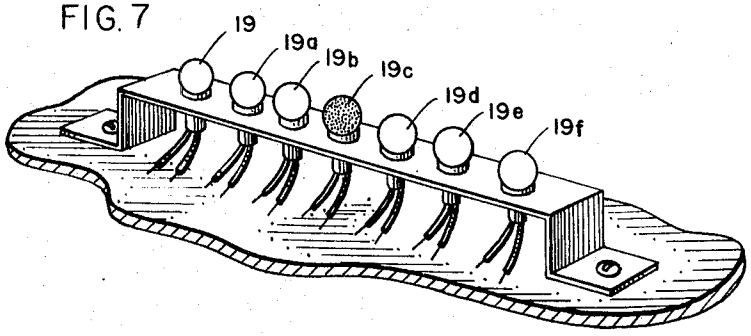


FIG. 7



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FIG. 8

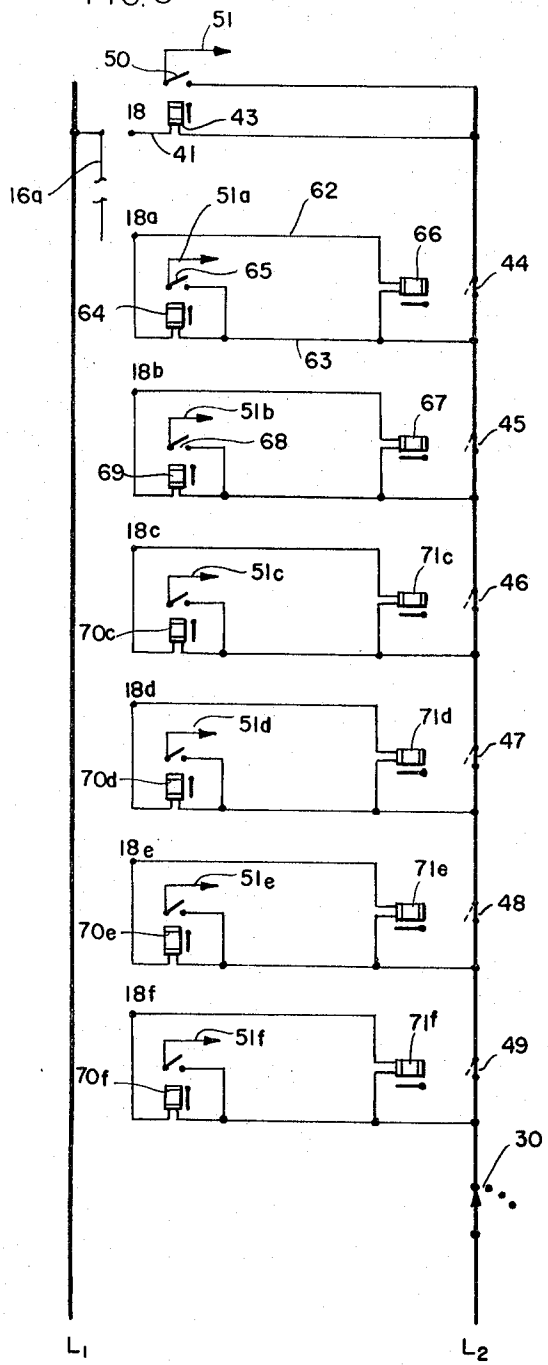
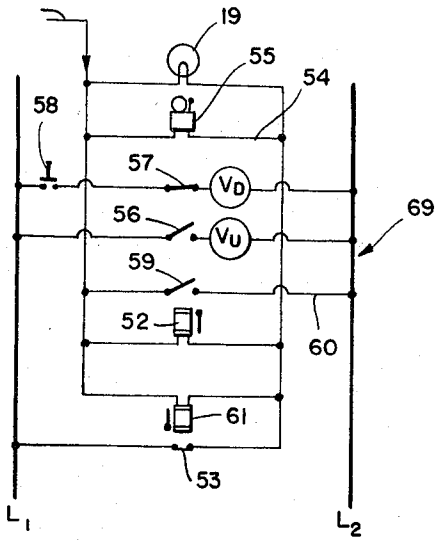


FIG. 9



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3,298,605

NEWSPAPER ACCOUNTING MECHANISM

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Filed June 24, 1965, Ser. No. 466,791
3 Claims. (Cl. 235—98)

This invention relates to a newspaper accounting mechanism and, more particularly, to a mechanism adapted to quickly ascertain the number of folded, aligned newspapers in a bundle as they pass from the stacker to a tieing mechanism.

The handling of newspapers by large metropolitan dailies is well-known. The folded papers move at high speed into a stacker, where stacks ranging from generally about 25 to about 100 papers (depending upon the number of pages of the given edition), are established after which the thus established stacks are bundled, i.e., tied. At this point, they are ready for mailing or truck delivery to various newsstands and vendors. Although expedients have been employed in the past to determine the actual number of newspapers entering the stacker, the continuing complaints of "short counts" in bundles by the drivers and the newsstand operators, makes it imperative to have an exact count of the papers in each bundle at the last possible instant—i.e., just before the bundle is completed—as by tieing At this particular point in the ordinary newspaper operation, bundles are quite sizeable and are being produced at a relatively rapid rate, so that complicated machinery has to be avoided

The instant invention solves the above problem without interferring with the smooth flow of newspaper bundles and the provision of such a mechanism constitutes an important object of the invention. More particularly, it is an object of the invention to provide a mechanism for reporting the number of papers in a bundle or vertical stack so as to warn an operator that deviation from a prescribed norm has occurred and at a time in the production of newspapers where such deviation can be readily and quickly corrected.

Other objects and advantages of the invention may be seen in the details of construction and operation set down in this specification.

The invention is explained in conjunction with an illustrative embodiment in the accompanying drawing, in which—

FIG. 1 is a fragmentary perspective view, partially broken away, of apparatus embodying teachings of this invention and installed in an operating environment;

FIG. 2 is an enlarged fragmentary exploded perspective view of the parts in the central upper portion of FIG. 1;

FIG. 3 is an exploded enlarged fragmentary perspective view of certain components of the mechanism including the contact plate shown at the extreme right in FIG. 2;

FIG. 4 is an enlarged fragmentary sectional view of one of the contacts illustrated in FIG. 3;

FIG. 5 is an enlargement of one of the details of FIG. 4;

FIG. 6 is an enlarged horizontal sectional view such as would be seen along the sight line 6—6 applied to FIG. 1;

FIG. 7 is a fragmentary perspective view of a reporting device associated with the mechanism of FIG. 1;

FIG. 8 is a schematic wiring diagram showing the connections for a given set of contacts associated with one of the plurality of contact elements seen in FIG. 3; and

FIG. 9 is an additional schematic wiring diagram showing a sub-circuit associated with each one of the contacts of FIG. 8.

In the illustration given and with particular reference to FIG. 1, the numeral 10 designates generally a frame which is seen to be a superstructure carried by side channels 11 and 12 of a generally horizontally extending conveyor 13. The conveyor 13 in the illustration given conducts a stack 14 of folded newspapers from a stacking machine (not shown) to a tieing machine (also not shown). Depending upon the particular installation, stacks 14 may be advanced on the powerized conveyor 13 at the rate of about 20 per minute. Thus, any measuring operation to be performed on a stack must occur rather quickly, at least less than 3 seconds. Before going into the details of how the mechanism counts the newspapers, a generalized operational sequence will be given.

Operation in general

The invention makes use of an air loaded ram or plunger generally designated 15 (see FIG. 2) to compress the central portion of the stack. The plunger mechanism 15 carries a plurality of contact elements as at 16 (still referring to FIG. 2). For any given addition, only one particular contact element will be employed such as the element designated 16*a* in FIG. 3. As the contact element 16*a* proceeds downwardly with the plunger 17, it ultimately comes into contact with the uppermost contact 18 of a series of seven vertically aligned contacts. If the plunger 17 stops with the contact element 16*a* and contact with the contact 18 (see FIG. 3), the bulb 19 (see FIG. 7) goes on indicating that the stack has three papers too many. If the plunger stops with the contact element 16*a* in contact with the contact 18*c*, a colored bulb 19*c* (see FIG. 7) goes on indicating that the count is correct. From this, it will be appreciated that contacts 18*a* and 18*b* along with lights 19*a* and 19*b* correspond respectively, to reports of two papers too many and one paper too many while the contacts 18*d*, 18*e*, 18*f* and the associated light bulbs 19*d*, 19*e* and 19*f* represent undersized stacks by 1, 2 and 3 papers, respectively. It will be appreciated that a greater or lesser number of reporting units may be employed, but for practical purposes, it has been found that the stacks seldom, if ever, vary from a predetermined norm by more than three papers.

Ram supporting structure

The details of the ram supporting structure can be seen in FIG. 1 where the frame 10 is positioned astride the path of travel of the stack 14. It will be appreciated the frame 10 may be provided as part of the stacker itself. Inasmuch as compression of the stack is employed to develop a report of the number of papers contained therein, it will be appreciated that a substantial base is indicated. In other words, the deflectability under load of the channels 11 is less than the thickness of a given newspaper. The frame 10 includes a generally U-shaped bracket 20 (see also FIG. 6) which carries the ram 15. The ram 15 is equipped with the usual elongated casing 21 (see FIG. 2) and at its upper end is equipped with a flow fitting for pressure fluid as at 22. Compressed air, for example, can be delivered through the flexible conduit 23 to the fitting 22, so as to expend the plunger 17 into compressive and contracting relation with the top central portion of the stack 14. The casing 21 is equipped with an enlarged head as at 24 (see also FIG. 6) which is boltably secured as at 25 to the bracket 20. The piston rod 26 (see FIG. 2) is equipped with a mounting block 27 in which is mounted the plunger 17.

For this purpose, the block 27 is equipped with a bore 28 (see FIG. 6) into which extends a set screw 29. Thus,

the plunger is replaceable and in the event there is a substantial change in the height of the subsequent stack of papers (corresponding to a different edition), a different length plunger **17** may be readily inserted into the bore **28**. Ordinarily, however, differences in the predetermined height of a stack of the correct number of newspapers can be achieved by utilizing a different set of contacts, i.e., the set of seven contacts generally designated **18'**, **18''**, etc., in FIG. 3. As seen in FIG. 3 and also in FIG. 1, the spacing between adjacent vertically related contacts changes so as to permit measurement of the number of papers in different over-all height stacks. The selection of a particular set of contacts is determined by means of a switching mechanism generally designated **30** (see FIG. 1) and which is schematically represented at **30** in FIG. 8.

Contact element structure

Reference has been made to the various contact elements **16** (see particularly FIG. 2) which are employed to develop a sensible signal corresponding to the number of papers in a given stack **14**. As can be seen in FIG. 3, a plurality of contacts **16** are provided, one for each of the vertically aligned sets of contacts **18'**, **18''**, etc. A conduit **31** for each contact element **16** is provided from a multi-conductor cable **32** (still referring to FIG. 3). Reference to FIG. 8 shows that the contact **16*a*** is coupled to one power line **L1** and is adapted to make successive contact with one of the contacts **18–18*f*** depending upon the size of the stack. The contacts **16** are riveted to an insulating plate **33** by means of rivet **34** (see FIG. 4) and the plate **33** is equipped with an elongated slot **35** which receives a cap screw **36** (see FIG. 2) for anchoring the same against the block **27**. Thus, the plate **33** moves with the plunger **17** and causes a given contact **16** to contact at least one contact **18**. As seen in FIG. 6 the plate **33** is mounted for vertical movement within grooves or ways **37** provided in a bracket generally designated **38** and which is boltably secured as at **39** to the enlarged head **24**. Thus, the bracket **38** is rigid with the superstructure and provides a mounting for the plate **40** (see FIG. 3) which carries the various contacts **18'**, **18''**, etc. Conductors **41** run from the various contacts **18** into multi-conductor cable **42** (see FIG. 1) and after passing through various switches and relays, deliver signal information to one of the various light bulbs **19–19*f*** of FIG. 7. The method in which the sensing of the stack height by the plunger **17** is reported to the light bulbs **19–19*f*** will now be described with reference to FIGS. 8 and 9.

Reporting circuitry

The principle used herein is that there must be a predetermined "dwell" time of contact between the contact element **16*a*** and a given contact **18–18*f*** for a signal to be registered by one of the light bulbs **19–19*f***. In other words, with a correct height stack, only light bulb **19*c*** will become illuminated notwithstanding the fact that the contact element **16*a*** carrying current from line **L1** has been in contact during the downward movement of the plunger **17** with contacts **18**, **18*a***, and **18*b***. Each of these contact times, however, is quite transitory and further, has been erased by virtue of contact with a subsequent contact.

Referring now to FIG. 8, the element designated **16*a*** in the extreme upper lefthand portion corresponds to the contact element **16*a*** which is mounted for vertical movement. Should this element stop in a position where it is in contact only with the contact **18** (the uppermost contact of the set of seven in FIG. 8) current flows from line **L1** to line **L2** through a time delay relay **43**. The circuit from **L1** to **L2** is completed through six different relay contacts **44**, **45**, **46**, **47**, **48** and **49**, each of which is of the normally closed variety. In addition, for current to flow from **L1** to **L2**, it also must flow through the multi-position switch **30**. Here, it will be appreciated that if the switch **30** is positioned other than as shown, it will energize a different set of seven contacts, as at **18'** for which a similar relay-equipped circuit such as that seen in FIG. 8 is provided. In other words, in FIG. 3, there are seventeen different contact elements **16** shown and seventeen sets of contacts **18'**, etc. Of these, sixteen are used for different sized stacks with the remaining set being used for zero adjustment. Thus, there will be sixteen circuits identical to that shown in FIG. 8, one for each of the set of contacts **18'**, etc. The particular circuit used is thus a function of a setting of the switch **30**. The total number of contacts referred to as No. **16** can be increased or decreased depending as to degree of response decided.

After the current has flowed through the relay coil **43**, a discrete time, the time delay relay will result in closing the normally open contact **50** so as to deliver current to the line **51**. The line **51** is also seen in FIG. 9 and when the relay contacts **50** are closed conducts current from **L2** through a relay coil **52** (see FIG. 9) and normally closed relay contacts to **L1**. At the same time, current will flow through the bulb **19** causing the same to light and through the line **54** carrying bell **55** which is arranged in parallel with the lamp **19**. Thus, both an audible and a visual signal is provided. The light **19** indicates to the operator that there are three too many papers in the stack **14**. The energization of the relay coil **52** results in delivering electrical current to a solenoid actuated valve V_U which removes the pressure from the ram **15** causing the plunger **17** to rise. This is done through closing the relay contact **56**. Simultaneously, the relay **52** opens the contacts **57** so as to remove power from the valve V_D responsible for delivering pressure fluid to the plunger **15**. Also shown in the circuit and designated **58** is a momentary pushbutton which may be actuated by the location of the stack **14** to initiate a sensing sequence. The third contact **59** closed by the relay **52** insures a connection between lines **L1** and **L2** via line **60** when the basic connection through contact element **16*a*** is broken. Here, it will be appreciated that the plunger **17** is retracted substantially instantaneously after the time delay relay **43** has closed the contact **50**—by virtue of delivering current to the relay **42** which thereupon closes the contact **56** to the "up valve." For the signal developed in the elements **19** or **55** to be sensible duration, the contact **59** takes over when the contact element **16*a*** is retracted. The signaling persists until a second time delay relay **61** is actuated to open the normally closed contact **53** and thus break the line between **L1** and **L2**.

In the event the stack **14** has, for example, only two more papers than the predetermined number, the contact **16*a*** will not stop at the contact **18** (see FIG. 8) but will pass on for engagement with contact **18*a***. As soon as the contact element **16*a*** engages the contact **18*a***, current from line **L1** flows to line **L2** through a pair of branch lines **62** and **63**. The line **63** has incorporated therein a time delay relay **64** which operates in a fashion similar to the time delay relay **43** already described with reference to the contact **18**. In other words, a discrete time after current has started flowing in the time delay relay **64**, the contact **65** thereof is closed so as to deliver current from line **L2** through line **51*a*** to a sub-circuit identical to that shown in FIG. 9. The circuit in FIG. 9 is the sub-circuit associated with the line **51** which in turn is associated with the time delay relay **43** associated with the uppermost contact **18**. Thus, for each one of the contacts **18–18*f***, there is provided an individual subcircuit of the character found in FIG. 9—one change being introduced into the sub-circuit associated with the contact **18*c***—the "correct count" contact. In such case, there would be no bell **55** provided since no warning signal of an audible nature is indicated when the count is "correct."

Along with the energization of the time delay relay **64**—when contact **18*a*** is engaged by the contact element **16*a***, there is also an energization of relay **66**—this being substantially instantaneous with the engagement of ele-

ments **16***a* and **18***a*. The actuation of relay **66** opens the normally closed contact **44** to the dotted line position shown and this prevents any current flow in the line **51**, notwithstanding the fact that the contact **50** may be closed by energization of the time delay relay **43**. In this fashion, we erase a signal that may be applied to a contact **18** above the contact **18***a* and thus avoid the need for extremely close tolerances in spacing. It will be appreciated that there is some variation in the caliper of the newsprint paper and the provision of a second relay with each one of the time delay relays associated with the contacts **18***a*–**18***f* avoids the need for having to make pin-point contact with any given contact **18***a*–**18***f*.

Carrying the operational description one step further, when the contact element **16***a* engages the contact **18***b*, a relay **67** is energized to open the contacts **45** and thus eliminate the possibility that current from L2 will flow either to line **51** or to line **51***a* while only flowing to line **51***b* by virtue of the closure of contact resulting from the actuation of time delay relays **69**. Again, the line **51***b* leads to a sub-circuit generally of the nature designated **69** (see FIG. 9).

Each one of the contacts **18***c*–**18***f* is seen to be equipped with a time delay relay designated respectively **70***d*, **70***e* and **70***f*. Likewise, each contact **18***c*–**18***f* is equipped with a regular relay as at **71***c*, **71***d*, **71***e*, **71***f* for opening, respectively, the contacts **46**–**49**. The actuation of the time delay relay **70***c*–**70***f* results in current flowing in the respective line associated therewith **51***c*–**51***f*. Thus, in the illustration given, for any given stack, there are seven circuits, one for each of the contacts **18**–**18***f* with each circuit having a sub-circuit **69** associated therewith. In most metropolitan dailies, the stacks fall into one of a variety of sizes. For example, the usual addition may range from 25 to 100 papers. By providing 16 different sets of contacts **18′**, we have provided a sensing system for the most commonly employed stack arrangements. When the stack arrangement changes from say 70 copies of a 40-page paper to 44 copies of a 75-page paper, the operator only needs to change the setting of the switch **30** to the setting designated with the information corresponding to the new edition. For stacks having compressed heights other than those provided for in the sixteen settings referred to, the operator can modify a given setting by the use of a different plunger insert **17**.

As mentioned previously, one of the sets of contacts **18′**, etc., is used for a zeroing adjustment. Thus, when 60 p.s.i. compressed air is used, the plate **33** is adjusted by virtue of loosening and tightening the cap screw **36**, so that when the stack contains the right number of papers, the contact **18***z* (in horizontal line with the contact **18***c*) will be engaged by the contact **16***z*. In fact, all of the contacts between **18***c* and **18***z* (in the horizontal roll seen in FIG. 3) will be contacted by their associated contact element **16**. This can provide a signal through

the line **41***z* to an appropriate reporting device to indicate that the apparatus is properly calibrated.

While in the foregoing specification, a detailed embodiment of the invention has been set down for the purpose of illustration, many variations in the details herein given may be made by those skilled in the art without departing from the spirit and scope of the invention.

We claim:

1. A device for indicating the number of folded newspapers, relative to a predetermined number, which are in a stack of newspapers, comprising: a frame, conveyor means on said frame for advancing a stack of folded newspapers, means on said frame above said conveyor for applying a predetermined pressure on the central top of said stack to compress said stack, and means responsive to said pressure-applying means for indicating the position of said pressure-applying means to report the variance of the number of newspapers in said stack from a predetermined number.

2. The device according to claim **1** in which said pressure-applying means includes a ram having a stationary part and a movable part, a plate on each of said parts with each plate having thereon a plurality of sets of contacts with a plurality of contacts in each set, said plates being arranged and interconnected electrically to give only a single signal to said responsive means for any given height of a compressed stack.

3. A method for indicating the number of folded newspapers, relative to a predetermined number, which are in a stack of newspapers, comprising: advancing said stack to an indicating position, applying a predetermined pressure to the central top of said stack to compress said stack, sensing the thickness of said stack, and reporting the same electrically in terms of a predetermined number of newspapers to ascertain the variance of the number of newspapers therefrom.

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