

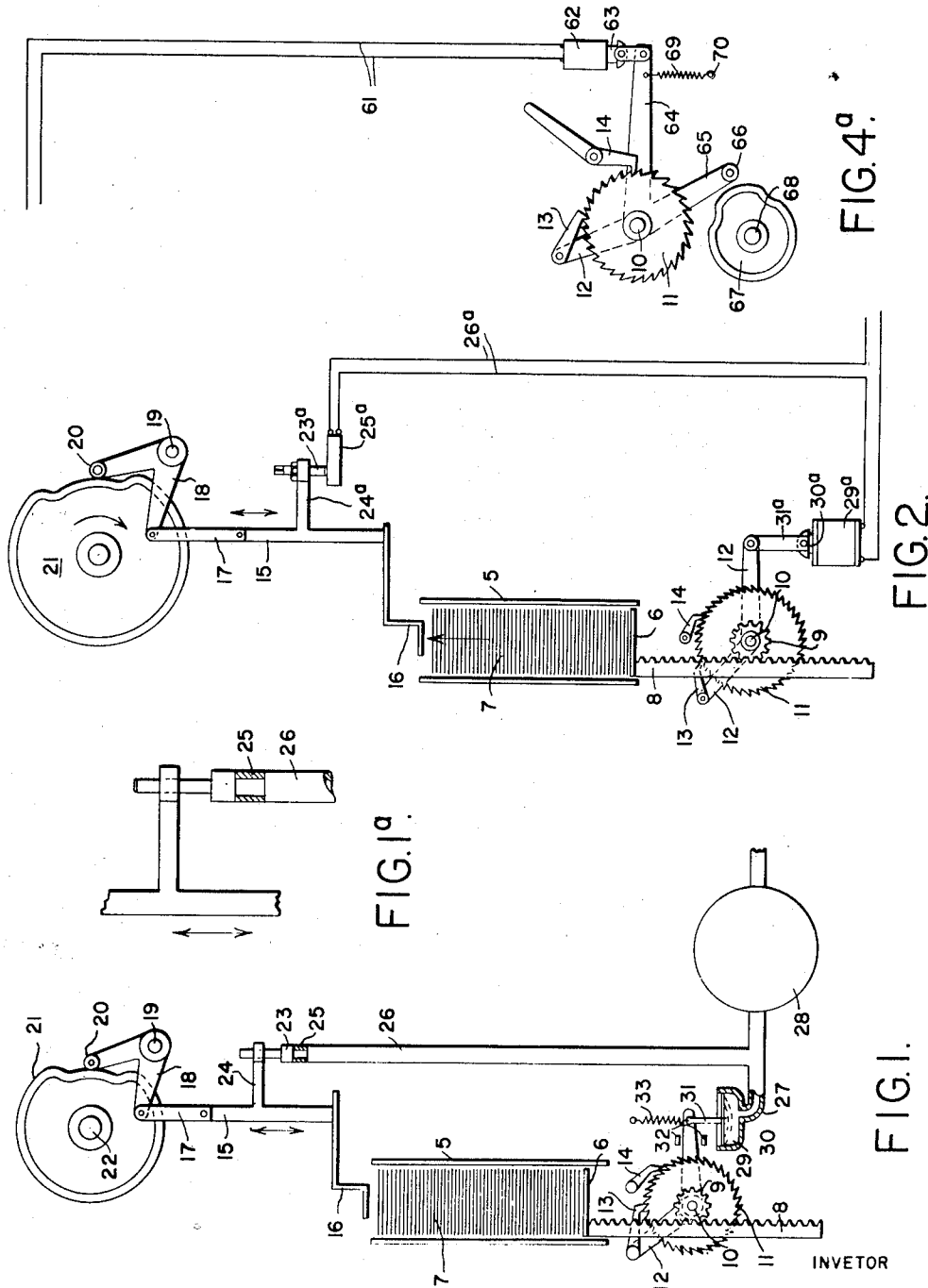
Nov. 21, 1950

G. W. VON HOFE
LABEL FEEDING MACHINE

2,530,670

Filed June 20, 1945

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

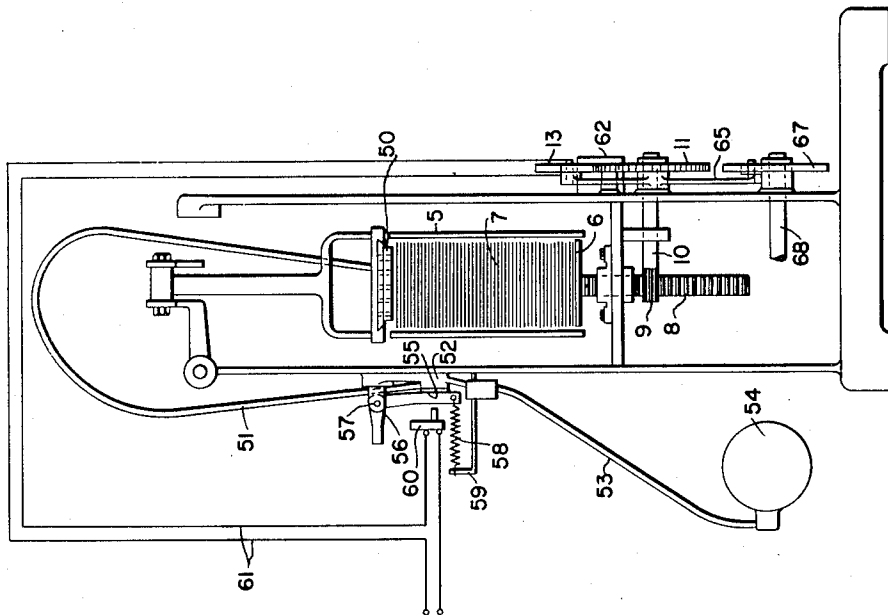


FIG. 4.

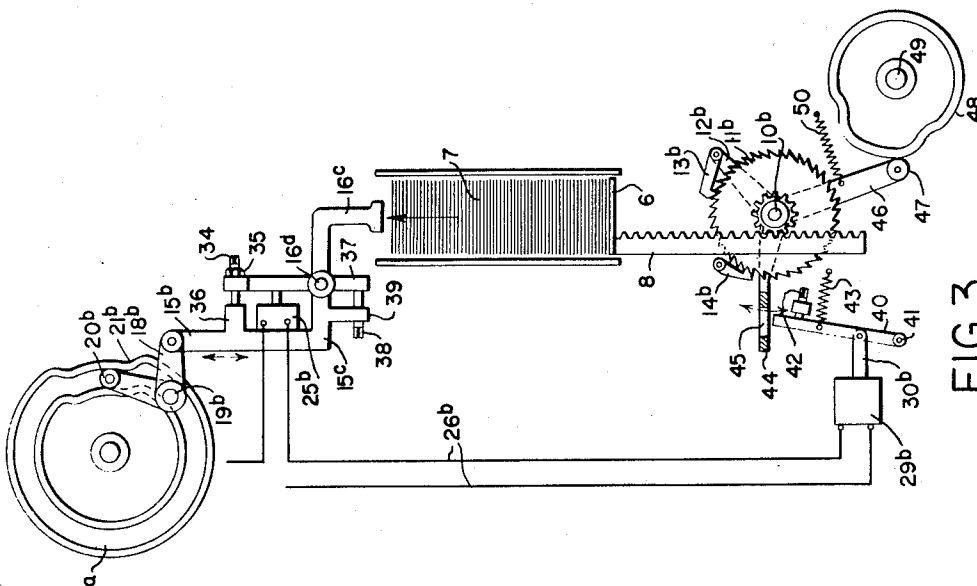


FIG. 3.

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LABEL FEEDING MACHINE

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6 Claims. (Cl. 271—31)

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The invention relates to labeling machines and more particularly to that type of such machines which includes a supply of labels from which labels are removed for application to the articles for which said labels are designed.

In many such machines, the supply of labels is arranged in the form of an upright stack from which, during an operative period of the machine, successive terminal labels are removed to thereby deplete the stack or, in other words, progressively reduce its dimensions as exemplified, for instance, by the height of said stack.

Consequently, successive terminal labels in said stack are located at different points as exemplified by lower levels. As efficient operation of the machine requires the terminal label to be positioned at approximately a given point or level, it becomes necessary to periodically restore the supply of labels to its normal position, or, specifically, to periodically elevate an upright stack in order to maintain successive terminal labels at the proper level.

The object of the invention is to provide a simple restoring means whereby the aforesaid results are automatically attained in an efficient manner.

The invention contemplates further the provision of simple means for automatically elevating the supply stack at periodic intervals to thereby maintain successive terminal labels thereof at a substantially constant level for efficient cooperation with associated elements of the labeling machine.

Other objects will appear from the description hereinafter, and the features of novelty will be pointed out in the claims.

In the accompanying drawings, which illustrate examples of the invention without defining its limits,

Fig. 1 is a fragmentary elevation of the novel mechanism in one form;

Fig. 1-a is an enlarged detail view of parts of Fig. 1;

Fig. 2 is a similar view of another arrangement of the novel mechanism;

Fig. 3 is a corresponding view of still another form of the novel mechanism;

Fig. 4 is a diagrammatic elevation illustrating a further form of the novel mechanism, and

Fig. 4-a is a detail face view of the feeding means included in this further form.

The labeling machine, in which the novel mechanism is embodied per se, may be of any conventional construction, for instance, as shown in my patent, No. 2,227,816, of January 7, 1941, and as shown therein, includes a container 5

suitably mounted in the machine at the desired location. The container 5 is provided with an adjustable bottom 6 which supports an upright supply stack of labels 7 which are removed individually in succession from the upper end of said stack by suitable means such as the suction head and associated elements shown in my patent, No. 2,227,816. As a result of this, the supply stack of labels 7 is progressively depleted and is gradually reduced in height with the removal of each succeeding terminal label 7 being effected at a lower level. Consequently, unless provision is made to overcome this condition, the upper end of the stack and the terminal label 7 thereat finally will be at a level beyond the range of operation of the aforesaid suction head or its equivalent.

The bottom 6 which supports the stack of labels 7 is, therefore, arranged to be upwardly adjustable in the container 5 by means of the novel mechanisms illustrated in the drawings, to thereby elevate the stack and restore its upper end and the terminal label 7 thereat to the initial level within proper operative range of said suction head or its equivalent. This elevation of the stack of labels 7 is repeated automatically at such intervals as may be necessary to maintain an efficient operative relation between the stack of labels 7 and the suction head or the like.

In the illustrated examples, the bottom 6, accordingly, is carried by a vertically adjustable rack 8 which is mounted in the machine in any convenient manner as shown, for instance, in my patent above identified. In the form illustrated, the operating means for the rack 8 comprises a pinion 9 meshing therewith and fixed upon a suitably journaled shaft 10 which also carries a ratchet wheel 11 arranged to rotate with said pinion 9. The operating means further may include a bell-crank or similar lever 12 loosely mounted on the shaft 10 to rock thereon, and having its one member provided with a pivotally-mounted operating-pawl 13 in engagement with the ratchet wheel 11. A cooperating stop-pawl 14, properly mounted in place, engages the ratchet wheel 11 to prevent undesired return movement thereof and to maintain the bottom 6 and the stack of labels 7 carried thereby in an adjusted elevated position.

In order that the elevating mechanism may be automatically controlled in accordance with the developed conditions with particular respect to the progressive depletion of the supply stack of labels 7 as the successive labels are removed therefrom, the mechanism includes elevating

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control means which, in cooperation with the stack itself, brings about the periodic adjustment of said stack to always maintain the terminal label in proper cooperative relation with the previously-mentioned suction head or equivalent label pick-up means.

The elevating control means, shown in Fig. 1, comprises a vertically reciprocable member 15 suitably guided and carrying a feeler 16 at its lower end movable in registry with the stack of labels 7, the member 15 having its upper end connected by means of a link 17 with one arm of a bell-crank lever 18. The latter is pivoted at 19 in the machine, and on its other arm is provided with a roller 20 arranged in rolling engagement with a cam 21 fixed upon a rock-shaft 22 conveniently journaled in suitable bearings and operatively rocked in any convenient manner, for instance, as shown in my previously-mentioned patent, No. 2,227,816. The range of reciprocatory movement of the member 15 is such that the feeler 16 will contact the upper end of the stack of labels 7 during each downward movement of said member 15, until said stack is depleted to a point beyond said range of movement. At this stage, it is necessary to elevate said stack of labels 7, in order to restore the top thereof to the initial level to again bring the terminal label within range of the feeler 16 and within pick-up relation with the suction head or equivalent pick-up means.

The elevating control means further comprises a pilot member 23 which is in the nature of a valve, and adjustably depends from a bracket 24 mounted on the member 15, so that said pilot member 23 partakes of the reciprocable movements thereof.

The pilot member or valve 23 moves in registry with and toward and away from a vacuum vent 25 connected by means of a tube 26 with a branch tube 27 extending to a source of suction such as an air pump 28 and to a pneumatic motor 29. The latter includes an internal diaphragm 30 connected by means of a link 31 with the second member of the bell-crank or similar lever 12, which is movable between stationary-spaced stops 32. A spring 33 is provided for restoring the lever 12 and its associated elements to normal position.

The vacuum vent 25 is so located that as long as the stack of labels 7 is contacted by the feeler 16, the downward movements of the pilot member or valve 23 will be insufficient to close the vacuum vent 25. Thus, the tube 26 and the branch tube 27 will be open to the atmosphere, and the suction developed by the pump 28 will have no effect to actuate the pneumatic motor 29.

When, however, the stack of labels 7 is depleted to a point beyond the effective range of the downward movement of the feeler 16, the pilot member or valve 23 will engage and close the vacuum vent 25. At this stage, the vent 25 will be cut off from the atmosphere so that the suction developed by the pump 28 will create a vacuum in the pneumatic motor 29 beneath the diaphragm 30. The latter, accordingly, will be depressed, as indicated by dotted lines in Fig. 1, and will exert a pull upon the link 31 and, thereby, pivotally actuate the lever 12 in a direction to cause the pawl 13 to rotate the ratchet wheel 11. The pinion 9 will be concurrently rotated in a direction to move the rack 8 upwardly and, thereby, raise the bottom 6 and elevate the stack of labels 7. The arrangement

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and operation is such that the stack is elevated sufficiently to restore the upper end thereof to the initial level within the range of downward movement of the feeler 16. The vacuum vent 25 is thereby again opened to the atmosphere to arrest the operation of the control means and the elevating mechanism. When the stack of labels 7 is again sufficiently depleted, the aforesaid elevation of the stack will be repeated, such operations taking place at appropriate intervals as may be required.

In the form shown in Fig. 2, the construction and arrangement, generally speaking, corresponds to that of Fig. 1, with the exception of the elevating control means, which is specifically different.

The elevator control means, illustrated in Fig. 2, comprises a pilot member 23—a adjustably mounted in a bracket 24—a carried by the member 15, so that said pilot member, as in the form first described, partakes of the movements thereof.

The pilot member 23—a, which is in the nature of an adjustable stud or screw, moves in registry with and toward and away from the controlling member of a conventional switch 25—a of suitable type. The latter is located in an electrical circuit with a solenoid 29—a, which circuit comprises wires 26—a leading to a conventional source of electricity; the armature 30—a of said solenoid 29—a is connected by means of a link 31—a with the one arm of the bell-crank or other lever 12.

The controlling member of the conventional switch 25—a is so located that as long as the stack of labels 7 is contacted by the feeler 16, the downward movements of the pilot member 23—a will be insufficient to engage and operate the controlling member of said switch 25—a. As a result, the adjustment of the latter is such that the electric circuit 26—a is open, and the solenoid 29—a remains inactive. The mechanism whereby the supporting member 6 is elevated consequently remains in the stationary position, and the stack of labels 7 simply is gradually depleted in height as successive labels are removed from the upper end thereof.

When this depletion of the stack of labels 7 reduces the height of said stack of labels 7 to a point beyond the effective range of the downward movements of the feeler 16, the pilot member 23—a will engage and operate the controlling member of the switch 25—a and, thereby, will close the electric circuit 26—a. This causes an electric energizing of the solenoid 29—a whereupon the armature 30—a is drawn downwardly to exert a pull upon the link 31—a and, thereby, pivotally actuates the bell-crank or other lever 12 in a direction to cause the pawl 13 to rotatably actuate the ratchet wheel 11. This brings about a simultaneous rotation of the pinion 9 which operates the rack 8 in an upward direction to, thereby, raise the adjustable bottom 6 and with it, the stack of labels 7 to an extent to restore the upper end of said stack of labels 7 to the initial level.

As the operations continue, the feeler 16 will contact the upper end of the stack of labels 7, and the pilot member 23—a will not operate the controlling member of the switch 25—a until the stack of labels 7 has been again depleted to a predetermined point whereupon the operations of restoring said stack of labels 7 upwardly are repeated.

As shown in Fig. 3, the novel arrangement is

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designed particularly for high-speed operation, and, accordingly, includes a member 15-b which is vertically reciprocated by means of a bell-crank lever 18-b pivoted at 19-b in a suitable manner in the machine of which the control means forms a part. The bell-crank lever 18-b carries a roller 20-b which, in this form of the apparatus, is located in the cam groove *a* of an operating cam 21-b suitably mounted in a machine, for instance, as previously described herein. The member 15-b is provided at its lower end with a transverse projection 15-c on which a feeler 16-c is pivotally mounted at 16-d. The feeler 16-c is mounted for reciprocation with the member 15-b in registry with the stack of labels 7 which, as in the previous forms, is carried by a vertically movable bottom 6 carried by a vertically-adjustable rack 8 suitably mounted in the machine in any convenient manner as shown, for instance, in my patent hereinbefore identified. The feeler 16-c is in the form of a bell-crank lever, the upright arm of which is located in registry with the controlling member of a conventional switch 25-b suitably mounted upon and movable with the member 15-b. The upright member of the feeler 16-c is further provided with a preferably adjustable abutment in the form of a screw 34 fixed in adjusted position by one or more nuts 35 and located in registry with a lug 36 forming part of and projecting from the member 15-b. The feeler 16-c further includes a downwardly projecting member 37 located in registry with a preferably adjustable stop, for instance, in the form of a screw 38 threaded in a lug 39 depending from the transverse member 15-c of the member 15-b.

The switch 25-b is located in an electrical circuit 26-b which includes a solenoid 29-b, the armature 30-b of which is connected with a locking or control member 40 pivoted at 41 upon a suitable fixed portion of the apparatus. The control member 40 is maintained in its normal position against a stationary stop 42 by means of a spring 43, and, in this position, is out of registry with a lug 44 carried by an arm 45. The latter is movable with a lever 12-b carrying an operating pawl 13-b located in operative association with the ratchet wheel 11-b carried by a shaft 10-b suitably journaled in the machine. A third arm 46 is movable with the arm 45 and lever 12-b and, at its lower end, carries the roller 47 in rolling engagement with a cam 48 fixed upon a shaft 49 suitably journaled in the machine. A spring 50 maintains the roller 47 in engagement with the cam 48 which is operated in any conventional manner. The arrangement further includes a stop pawl 14-b cooperating with the ratchet wheel 11-b in the manner to prevent unintentional return movement thereof.

During an operative period of the mechanism, the cam 21-b, by acting on the roller 20-b pivotally rocks the bell-crank lever 18-b and thereby vertically reciprocates the member 15-b and with it, the switch 25-b and the feeler 16-c. During each downward movement of the member 15-b and its associated elements, the feeler 16-c will engage the upper end of the stack of labels 7 until the latter has been depleted beyond a certain point because of the removal of successive terminal labels 7 from said stack. Each time the feeler 16-c engages the stack, said feeler is rocked in a direction to cause its upright member to exert a pressure on the con-

trolling member of the switch 25-b whereby the electric circuit 26-b is closed and the solenoid 29-b is electrically energized. As a result, the armature 30-b will be shifted to its inward position, and the controlling member 40 will be moved into the path of the projection 44 of the member 45. Consequently, the combined arm 45, lever 12-b, and member 46 are held in a stationary position so that the pawl 13-b has no actuating effect upon the ratchet wheel 11-b.

As soon, however, as the stack of labels 7 has been depleted, beyond the point at which the feeler 16-c contacts therewith, said feeler 16-c will rock by gravity upon the pivot 16-d in the opposite direction and thereby will be shifted away from the controlling member of the switch 25-b. The latter will thereby keep open the circuit 26-b to de-energize the solenoid 29-b and permit the spring 43 to pivotally shift the member 40 out of the path of the projection 44. The arm 45, lever 12-b, and member 46 will thereby be free to be operated by the cam 48 with the result that the pawl 13-b will actuate the ratchet wheel 11-b and its associated pinion to raise the rack 8 and supporting member 6 and with them, the stack of labels 7 to restore the upper end of the latter to the initial level at which the feeler 16-c contacts therewith. The aforesaid operations are again repeated.

In labeling machines of the specific type under construction, successive terminal labels 7 are removed from the supply stack by means of a suction head 50 and transported to the applying station of the machine for application to the articles for which said labels are designed. The suction in the head 50 is automatically controlled in harmony with the operative cycle of the machine, for instance, as disclosed in my patent, No. 2,227,816. In this operative cycle, the suction head 50 has a vertical range of movement which reaches the stack of labels until the latter has been depleted beyond such range by the removal of successive terminal labels from said stack. At this stage, the stack of labels is required to be elevated to restore its upper end to the initial level as in the forms previously described. In the form shown in Fig. 4, this restoration is controlled automatically by the suction head or mouthpiece 50, itself.

The latter, accordingly, is connected by means of a tube 51 with a casing 52 which itself is in communication by means of a tube 53 with a vacuum pump 54 or other source of suction of conventional type. The casing 52 includes an air vent open to the atmosphere and controlled by a valve 55 pivoted at 56 on a suitable bracket 57 fixed in the machine in any conventional manner. A spring 58 is connected with the valve 55 and a bracket 59 and exerts a tension tending to shift the valve 55 to an inoperative position in which the air vent of the casing 52 is open to the atmosphere. The valve 55 is movable in registry with a normally closed switch 60 which is in a normally closed electric circuit 61 with a solenoid 62—the armature 63 of which is connected with an arm 64 forming part of or secured to the lever 12 and a member 65. The latter carries a roller 66 suitably maintained out of engagement with an operating cam 67 fixed on a shaft 68 journaled in the machine in any conventional manner. A spring 69 is connected with the arm 64 and with a fixed stud 70 to shift the roller 66 into engagement with said cam 67 when the normally closed

switch 60 is opened as will be more fully set forth hereinafter.

In the operation of the machine, the suction head 50 is caused to pick up successive terminal labels 7 from the supply stack for application to the articles for which said labels are intended. As successive labels 7 are thus removed, the supply stack thereof is progressively reduced in height. When the label stack is depleted to the extent that the suction head 50 does not pick up a label therefrom, the suction line 51, 53, is open to the atmosphere, and the valve 55, consequently, swings to its open position and opens the normally closed switch 60. This opens the circuit 61 and deenergizes the solenoid 62 and, accordingly, permits the spring 69 to rock the member 65 and shift the roller 66 into contact with the cam 67. As the latter is operated, the member 65 and its associated elements will be rocked on the shaft 10 in a direction to cause the pawl to rotate the ratchet wheel 11 and with it the pinion 9 in a direction to cause said pinion 9 to move the rack 8 upwardly and with it the adjustable bottom 6 to thereby restore the upper end of the stack of labels 7 to the initial level. At this stage, the suction head 50 again picks up the terminal label 7 and causes the valve 55 to close the suction line 51, 53, to the atmosphere and, at the same time, permits the switch 60 to return to its normally closed position in which the solenoid 62 is again energized. This causes the arm 64 and its associated elements to be rocked on the shaft 10 in a direction to shift the roller 66 out of engagement with the cam 67. These operations are periodically repeated as required.

The arrangement is such, when the suction head 50 fails to pick up a label 7 from the stack, that the air valve 55 is swung further open than it is subsequently to the deposit of a label on an article when the suction head is opened to the atmosphere, for instance, as shown in my patent previously referred to herein. It will be understood that each time a label is so deposited, the suction in the head 50 is controlled to release said label at the proper time. The relatively lesser movement of the valve 55, referred to herein, is insufficient to operate the valve 60 while the relatively greater movement of said valve which results when the suction head 50 fails to pick up a label 7 is great enough to engage and operate said valve 60 as hereinbefore described.

All of the illustrated examples of the mechanism are simple in construction and efficient in operation for automatically controlling the supply stack of labels 7 and to periodically restore the same as may be required during an operative cycle of the particular mechanism.

The form shown in Fig. 3 is particularly designed for high-speed operation which is made possible by the use of the grooved cam 21—b in association with the roller 20—b.

Although the present invention has been described in conjunction with a preferred embodiment, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such variations and modifications are considered to be within the purview and scope of the claims.

I claim:

1. In a labeling machine including a movable support for a supply stack of labels, means for removing successive terminal labels from said stack whereby the latter is progressively depleted, and

normally inactive actuating mechanism operatively associated with said movable support, that improvement which comprises a reciprocating member, a stationary solenoid operatively associated with said actuating mechanism, a switch carried by and movable with said reciprocating member in circuit with said solenoid, a locking member operatively associated with said solenoid to normally maintain said actuating mechanism inactive, and a control member carried by said reciprocating member and cooperating with said supply stack to operate said switch and solenoid when said stack reaches a predetermined degree of depletion to initiate operation of said actuating mechanism whereby said movable support is adjusted to restore said stack to normal position.

2. In a labeling machine including a movable support for a supply stack of labels, means for removing successive terminal labels from said stack whereby the latter is progressively depleted, and normally inactive actuating mechanism operatively associated with said movable support, that improvement which comprises a grooved cam, means for operating said cam, a bell-crank lever operated by said cam, a reciprocating member connected with said bell-crank lever and reciprocated thereby, a switch carried by said reciprocating member, a solenoid in circuit with said switch, a locking member operatively associated with said solenoid to normally maintain said actuating mechanism inactive, and a feeler member pivotally mounted on said reciprocating member in controlling relation to said switch and movable with said reciprocating member into engagement with the terminal end of said supply stack and pivotally movable relatively to said reciprocating member and switch when said stack reaches a predetermined degree of depletion to operate said locking member and thereby initiate operation of said actuating mechanism when said predetermined degree of depletion is reached whereby said movable support is adjusted to restore said stack to normal position.

3. In a labeling machine including a movable support for a stack of labels, means for successively removing labels from the top of said stack whereby the latter is progressively depleted and actuating mechanism operatively associated with said movable support, the combination of mechanism for controlling the operation of said actuating mechanism, a self-contained means for controlling the operation of said control mechanism, a member adapted to periodically engage the uppermost label on said support, supporting means for said self-contained control means and said member and adapted to impart simultaneous, reciprocal movement to the latter in the operation of the machine, said member and a portion of said control means being pivotally mounted on said reciprocal supporting means and controlling the operativeness of said control means with said control mechanism.

4. In a labeling machine including a movable support for a stack of labels, means for successively removing labels from the top of said stack whereby the latter is progressively depleted and actuating mechanism operatively associated with said movable support, the combination of means periodically movable in a vertical direction in the region of said support during the operation of the machine, a member carried by said movable means and adapted to normally engage the uppermost label on said support on the downstroke of said movable means, self-contained control

means mounted on said movable means for trans-
latory movement in a vertical direction with the
latter, said label engaging member and a portion
at least of said self-contained control means be-
ing pivotally mounted on said movable means
and control means for normally maintaining said
actuating mechanism inoperative to move said
movable support, said control means being
adapted to cooperate with said control mecha-
nism to render said actuating mechanism op-
erable, said member controlling the cooperative-
ness of said control means with said control
mechanism.

5. In a labeling machine, including a movable
support for a stack of labels, means for succes-
sively removing labels from the top of said stack
whereby the latter is progressively depleted and
actuating mechanism operatively associated with
said movable support, the combination of means
for controlling the operation of said actuating
mechanism, means periodically movable in a ver-
tical direction in the region of said support dur-
ing the operation of the machine, a control ele-
ment for said control means and a label feeler
member both pivotally mounted for limited free
pivotal movement on said movable means, where-
by said element and member are both pivotable
and reciprocable in the operation of said movable
means, said feeler member cooperating with the
stack of labels to control the pivotal movement of
said control element and operative to cause the
latter to cooperate with said control means and
thereby render said actuating mechanism op-
erable to move said movable support.

6. In a labeling machine, the combination of a
movable support for a stack of labels, actuating
mechanism operatively associated with said mov-

able support and operable to raise said support,
means for controlling the operation of said actu-
ating mechanism, means periodically movable in
a vertical direction in the region of said support
and adapted to engage the uppermost label in the
stack in its downward movements, self-contained
means connected to said label engaging means so
as to partake of the periodic vertical movements
of said label engaging means and controlled by
the relation of the latter with the uppermost
label in the stack at the end of the downward
stroke of said label engaging means, said label
engaging means and at least a portion of said
self-contained means being mounted for piv-
otable movement about a point contained in the
line of vertical movement of such means, and
means controlled by said self-contained means
for controlling the operation of said control
means.

GEORGE W. VON HOFE.

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