

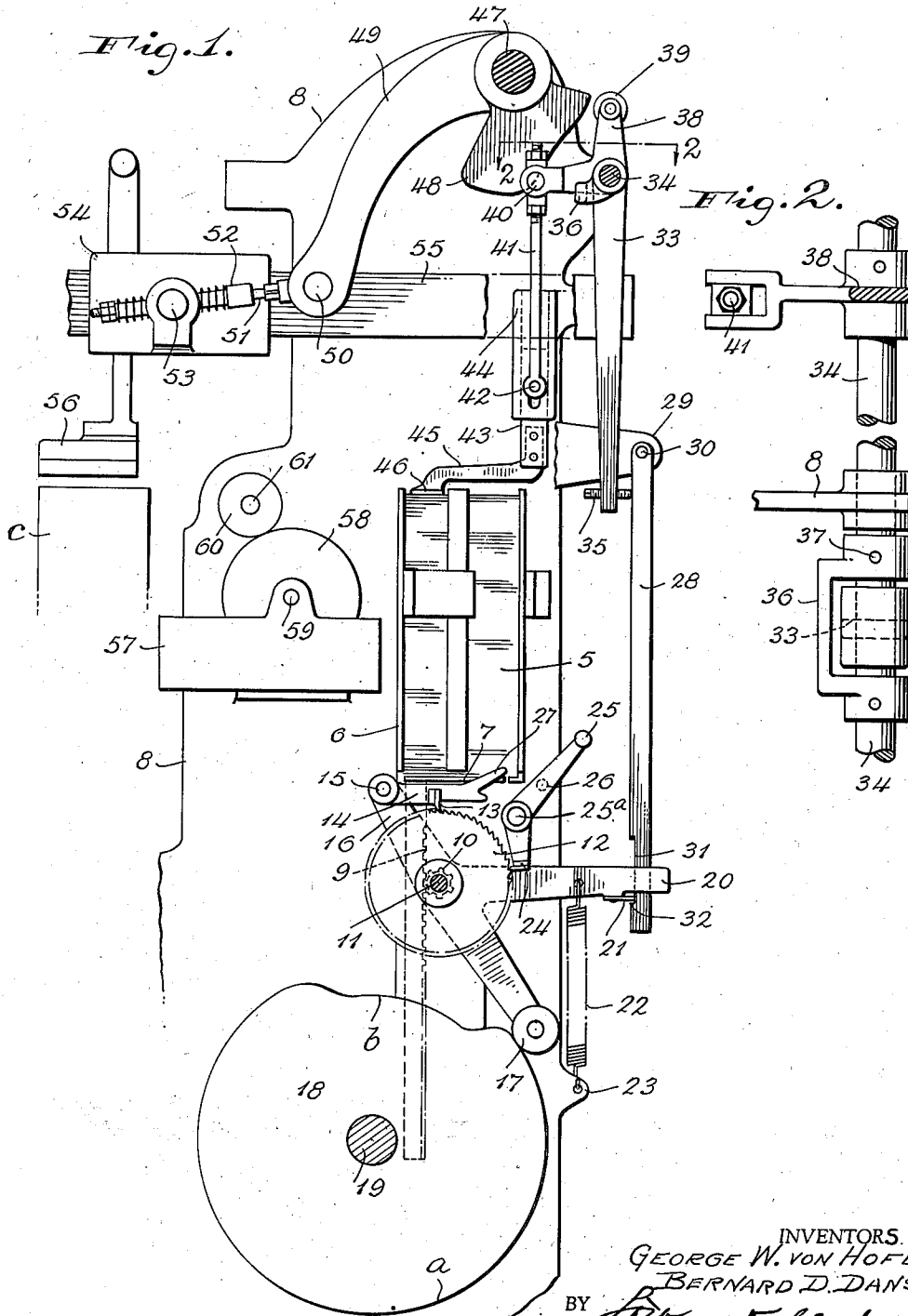
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G. W. VON HOFE ET AL

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ELEVATING MECHANISM

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INVENTORS.
GEORGE W. VON HOFE
BERNARD D. DAVIS
BY *W. A. Kehl*
ATTORNEYS

UNITED STATES PATENT OFFICE

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ELEVATING MECHANISM

George W. von Hofe, Bound Brook, N. J., and
Bernard D. Dans, Brooklyn, N. Y., assignors to
New Jersey Machine Corporation, Hoboken,
N. J., a corporation of New Jersey

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Our invention relates to elevating mechanism and more particularly to mechanism for automatically elevating a table or other support at intervals to meet an operative requirement of the machine in which said mechanism is embodied, as exemplified for instance by the periodic raising of a stack of labels, sheets or the like to periodically restore the upper end of said stack to a predetermined level. The invention has for its object to provide an improved and novel elevating mechanism of simplified construction which is extremely sensitive in action and capable of operating with maximum efficiency at all speeds and particularly at high speeds.

The invention contemplates further the provision of a novel elevating mechanism adapted particularly for incorporation in machines including a suitably operated suction head for removing sheets, labels or the like from said stack in individual succession. Another object of the invention is to provide a novel controlling device or feeler co-operating with the stack to control the operation of the elevating mechanism and itself operated by the means which controls the operative movements of the aforesaid suction head.

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

In the accompanying drawing which illustrates an example of the invention without defining its limits, Fig. 1 is a fragmentary elevation of a machine embodying the novel features, and Fig. 2 is a detail enlarged section on the line 2-2 of Fig. 1.

For the purpose of illustration and description the novel arrangements are incorporated in a labeling machine in which the labels are removed from a stack in individual succession by a suitably operated suction head and transferred to the place of application, said labels receiving a coating of adhesive on one surface during transfer from the stack to the place of application; it is to be distinctly understood that this is in no sense to be construed as defining the limits of the invention which obviously may be embodied, with equal efficiency, in other types of machines.

In the illustrated example of the elevating mechanism an upright stack 5 of labels or their equivalent is contained within a hopper 6 or the like and is carried by a table or other support 7 vertically movable within said hopper 6 in the manner to be more fully described hereinafter. The hopper 6 is conveniently mounted on the frame 8 of the machine as shown for instance in

Fig. 1 and is dimensioned to project upwardly beyond the highest level of the upper end of the stack 5; with this arrangement the labels or their equivalent contained in the stack 5 are confined in said hopper 6 against displacement transversely of said stack. For the purpose of raising or vertically adjusting the table or other support 7, the latter, as shown, may be carried by a depending rack 9 which meshes with a pinion 10 fixed upon a shaft 11 suitably journaled on the frame 8 of the machine. The shaft 11 further carries a ratchet wheel 12 which is arranged to be operated in the manner to be more fully set forth hereinafter by means of an operating pawl 13. The latter is carried by an arm 14 pivoted at 15 upon one end of an actuating member or lever 16 loosely mounted on the shaft 11 so as to be capable of rocking thereon. The mechanism further includes suitable means for operating the actuating member or lever 16, in the manner and for the purpose more fully set forth hereinafter, to periodically restore the upper end of the stack 5 to a predetermined level. In the illustrated example the opposite end of the lever is accordingly provided with a roller 17 arranged for rolling engagement with an operating cam 18 fixed upon a shaft 19 suitably journaled in the frame 8 of the machine and rotatably actuated in properly timed relation with the other parts of the machine in any conventional manner. The cam 18 comprises a main section *a* and a secondary section *b* both of said sections being concentric to the shaft 19, the section *b* however having a smaller radius than the section *a* and constituting the low portion of the cam 18. The lever 16 further includes a member 20 which projects transversely from the lever 16 and near its outer free end portion carries a projection which is illustrated in the form of a plate 21 secured to the member 20 in any suitable manner. A spring 22 has its one end connected to the member 20 and its other end secured to a lug 23 of the frame 8 and serves to maintain the roller 17 in proper operative engagement with the cam 18. To maintain the ratchet wheel 12 against unintentional operation during the movements of recovery of the pawl 13, a stop pawl 24 is provided and is pivoted at 25 upon the frame 8 of the machine; in order to enable the table or other support 7 to be manually adjusted independently of its operating mechanism, the stop pawl 24 may include an operating handle 25 and a pin 26 adapted by engagement with an extension 27 of the arm 14 to disengage the pawl 13 from the ratchet

wheel 12 coincidentally with the disengagement of the stop pawl 24 therefrom.

As the individual labels or other equivalent are removed in succession from the upper end of the stack 5 by being upwardly lifted out of the hopper 6 in the manner to be more fully described hereinafter, the stack 5 will gradually and progressively be reduced in height. As long as the upper end of said stack 5 has not dropped below a predetermined level, the elevating mechanism will remain inactive and the table or other support 7 will not be operatively disturbed. The controlling means whereby this result is accomplished comprises a controlling member 28 depending from a lug 29 fixed upon or forming part of the frame 8 and pivoted to said lug 29 at 30 as shown in Fig. 1; near its lower end the controlling member 28 is provided with a recess 31 forming a shoulder 32 adapted to extend beneath the projection or plate 21 to thereby restrain the member 20 against movement by the action of the spring 22 and thus preventing the roller 17 from dropping to the section b of the cam 18 as the latter rotates. As long as this condition remains, the actuating member or lever 16 will be held in an inoperative stationary position and the operating pawl 13 will not be actuated with the result that the ratchet wheel 12 will also remain stationary so that no elevation of the table or other support 7 takes place.

When however a sufficient number of successive labels have been removed from the stack 5 to bring its upper end below a predetermined level, the controlling member 28 will be pivotally actuated to shift the shoulder 32 from beneath the projection or plate 21 and to thereby permit the spring 22 to swing the member 20 and the actuating member or lever 16 in a direction to shift the roller 17 from the section a of the rotating cam 18 to the section b thereof. As this occurs the lever 16 will be rocked on the shaft 11 in a direction to move the pawl 13 toward the right in Fig. 1 and accordingly will correspondingly rotate the ratchet wheel 12 and the pinion 10 to thereby vertically move the rack 9 and with it the table or other support 7 and stack 5 correspondingly, these operations being repeated until the top of the stack 5 has been restored to a predetermined level. The means whereby these results are effected may, as shown in the illustrated example, comprise a releasing member 33 loosely mounted on a shaft 34 journaled in the frame 8, said member 33 depending from said shaft 34 beyond the pivoted end of the member 28, as shown in Fig. 1; at its lower end the releasing member 33 carries an adjustable projection illustrated in the form of a set screw 35, it being understood that the members 33 and 28 are in registry with each other at their contiguous ends and that the projection or screw 35 is arranged to periodically act upon the member 28 in the manner to be more fully set forth hereinafter. The shaft 34 is further provided with a tripping device illustrated in the form of a yoke 36 secured upon the shaft 34 for instance by pins 37 so as to partake of the movements thereof; the yoke 36 as shown in Fig. 2 projects across the releasing member 33 so as to be capable under certain conditions to be referred to more fully hereinafter, of engaging and swinging the member 33 relatively to the shaft 34. The latter in addition carries a bell crank lever 38, one arm of which is provided with a roller 39 and the other arm of which is pivotally connected at 40 with a rod or pitman 41.

The rod or pitman 41 in turn is pivotally connected at 42 with a slide or the like 43 mounted for vertical reciprocation in a guideway 44 suitably fixed upon the frame 8 of the machine. The slide 43 carries at its lower end a feeler or determinator 45, the free end of which is in the form of a shoe or plate 46 adapted to engage and rest upon the upper end of the stack 5 as shown.

As previously stated, the novel elevating mechanism is adapted particularly for incorporation in machines including a suitably operated suction head for removing the labels or their equivalent from the stack 5 in individual succession. The novel feeler or determinator 45 is adjusted into and out of engagement with the upper end of the stack 5 in synchronism with the operations of the suction head by means which control the operative movements of said suction head; in other words the feeler or determinator 45 is lifted away from the stack 5 to permit the successive terminal labels or their equivalent to be removed from said stack 5 by the suction head. As shown in the illustrated example the machine accordingly may include a shaft 47 suitably journaled in the frame 8 of the machine and carrying a cam 48 adapted to act upon the roller 39 to thereby operate the bell crank lever 38 and its associated elements in a manner to shift the feeler or determinator 45 away from the top of the stack 5 to a temporarily raised and inoperative position to permit the removal of a terminal label from the upper end of the stack 5; the illustrated arrangement is such that the feeler or determinator 45 will drop back to its operative position in engagement with the upper end of the stack 5 by gravity at the proper time. The shaft 47 further carries an arm 49 which is pivotally connected at 50 with a rod 51 operatively combined with a spring controlled coupling 52 pivotally secured at 53 upon a carrier 54. The latter is slidably mounted for horizontal reciprocation upon a guide rail 55 suitably mounted in the machine and extending horizontally in a manner to permit the necessary range of movement of the carrier 54; the latter supports the suction head 56 which may be of any conventional and suitable character and is connected in any customary manner with a source of suction controlled in any well-known way to develop and cut off the suction in the head 56 in proper synchronism with the other operations of the machine. The suction head 56 is further mounted on the carrier 54 so as to be capable of vertical reciprocation relatively thereto, it being understood that any conventional mechanism may be included in the machine for this purpose; as this mechanism forms no part of the invention, it has been deemed unnecessary to illustrate the same. The machine shown in the drawing further includes a receptacle 57 for containing a supply of adhesive and an adhesive transferring roller 58 rotatably mounted at 59 so as to dip into the adhesive in the container 57; the transfer roller 58 is in tangential rolling engagement with an adhesive applying roller 60 carried by a shaft 61 rotatably mounted on the frame 8 in any convenient way.

In the operation of the machine the shaft 47 is rocked on its axis by suitable mechanism to cause the carrier 54 to be slidably reciprocated upon the guide rail 55 to thereby bring the suction head 56 alternately into registry with the stack 5 and with the article c to which a label is to be applied, said article c having previously been brought to the point at which application

of the label is to take place. When the suction head 56 is located in registry with the stack 5 it is automatically connected with the source of suction in the conventional manner, and at the same time is lowered into contact with the upper end of said stack 5 by suitable mechanism and accordingly picks up the terminal label from said stack in the customary manner; when the terminal label has been picked up by the suction head 56 the latter is raised and with the label located thereon is moved to the left to the position illustrated in Fig. 1. During its travel from a point in registry with the stack 5 to the applying position illustrated in Fig. 1, the label carried by the head 56 is passed over the adhesive applying roller 60 in tangential engagement therewith so that the lower surface of said label becomes coated with adhesive prior to the time it reaches the point of application shown in Fig. 1; when this point of application is reached the suction head is again lowered by suitable mechanism to bring it into contact with the article c in a manner to apply the label thereto, it being understood that at the proper time the suction is cut off in the head 56 and the latter again raised to its previous position leaving the label in adhesive connection with the article c. These operations are then repeated throughout a given operative period of the machine.

As the shaft 47 is rocked to develop the operations set forth above, the cam 48 will partake of the rocking movements of said shaft 47 and by acting on the roller 39 will pivotally actuate the bell crank lever 38 in a manner to raise the feeler or determinator 45 from the upper end of the stack 5; this actuation of the feeler or determinator 45 is synchronized with the operative movements of the suction head so that when the latter operates to remove the terminal label from the stack 5, the feeler or determinator will be temporarily raised to an inoperative position so as not to interfere with such removal. As the carrier 54 with the suction head 56 is slidably moved toward the left in Fig. 1, the feeler 45 will gradually return by gravity to its operative position in engagement with the upper end of the stack 5.

As the bell crank lever 38 is actuated in the manner set forth above, the shaft 34 will be rocked on its axis and will correspondingly rock the yoke 36; the extent of the rocking movements of the shaft 34 in a return direction will gradually increase as the extent of downward movement of the feeler 45 increases in accordance with the gradual progressive decrease in the height of the stack 5 due to the removal of successive labels therefrom.

When therefore the stack 5 is in its normal condition, the upper end thereof will be located at such a level that the roller 39 of the bell crank lever 38 will not contact with the cam 48 when the feeler or determinator 45 rests upon said upper end of the stack. As successive labels are removed from the stack, the feeler or determinator 45 will move to a progressively lower level before it comes to rest upon the stack 5 with the result that the roller 39 gradually approaches the cam 48 because of the progressive increase in the return movement of the bell crank lever 38 resulting from the progressively greater downward movement of the feeler 45. During the rocking movements of the bell crank lever 38 the shaft 34 is correspondingly rocked so that the yoke 36 which is carried by the shaft 34 partakes of these rocking movements which grad-

ually increase in extent in one direction as the height of the stack 5 progressively decreases. Prior to the time that the upper end of the stack passes below a predetermined level, the range of movement of the yoke 36 will be insufficient to bring said yoke into engagement with the releasing member 33. Obviously as the height of the stack 5 progressively decreases, this range of movement, as previously stated will gradually increase until finally the yoke 36 will be brought into engagement with the releasing member 33 when the feeler or determinator 45 comes to rest upon the upper end of the stack 5. These operations will continue until eventually the rocking movement of the yoke 36 in a downward direction will be sufficient to swing the releasing member 33 to the right in Fig. 1 to thereby cause the projection or set screw 35 to act on the controlling member 28 and to correspondingly swing the latter to the right on its pivot 30. As the result of such movement of the controlling member 28 the shoulder 32 will be swung to the right in Fig. 1 to a releasing position in which the projection or plate 21 is no longer restrained thereby. At this stage the member 20 is free to be acted upon by the spring 22 and the lever 16 is free to rock upon the shaft 11. It will be understood that during given operative periods of the machine the cam 18 is rotatively actuated by suitable mechanism so that when the projection or plate 21 is released as described above, the roller 17 will periodically pass to the low portion b of said cam; as this occurs the spring 22 by acting on the member 20 will rock the lever 16 on the shaft 11 and cause the pawl 13 to rotate the ratchet wheel 12 and with it the pinion 10. The latter in turn will act on the rack 9 in a manner to raise the latter and to correspondingly raise the table or other support 7 and with it the stack 5. These operations are periodically repeated until the upper end of the stack 5 has been restored to a predetermined level so that when the feeler or determinator 45 comes to rest upon the top thereof, the parts will finally again occupy the position shown in Fig. 1 in which the range of movement of the yoke 36 as determined by the engagement of the feeler 45 with the top of the stack 5 is no longer sufficient to cause a swinging movement of the releasing member 33. The latter will accordingly swing back to its normal position and accordingly permit the controlling member 28 to correspondingly swing back to a position in which the shoulder 32 will again pass beneath the projection or plate 21 to lock the member 20 and with it the lever 16 and associated elements against operation; in other words, to again prevent the roller 17 from passing to the low section b of the cam 18 as the latter rotates. The aforesaid operations are repeated at intervals to periodically restore the upper end of the stack 5 to a predetermined position until the supply of labels in the stack 5 is exhausted. When this stage has been reached, the table or other support 7 may be manually adjusted to its lowermost position for the purpose of receiving a new stack of labels. This manual adjustment of the table or other support 7 is easily made possible by releasing the pawls 24 and 13 through the medium of the handle 25 as will be obvious.

It will be noted that neither the controlling member 28 nor the releasing member 33 partake of any of the operative movements of any parts of the mechanism and that said controlling member 28 and releasing member 33 remains

stationary until such time as they are pivotally actuated as set forth above to permit the operation of the elevating mechanism. Because of this arrangement and due to the fact that the controlling member 28 is normally stationary, there is no danger of unintentional disengagement of the shoulder 32 from the projection or plate 21 because of vibrations set up in the member 28, as is the case in existing arrangements in which a more or less corresponding element moves up and down as the machine operates. It is thus possible to operate the instant machine at any speed including relatively high speeds without effecting the efficiency or the intended operation of the novel elevating mechanism.

It will be noted that the movements of the feeler or determinator 45 are in vertical directions and are controlled by the same means which controls the operation of the suction head. The machine is accordingly very much simplified and avoids the necessity for special mechanism for controlling and operating the feeler; at the same time with the arrangement shown and described the action of the feeler or determinator 45 on the stack 5 is very light and develops no effect tending to compress the stack 5 in the direction of its height. This is of great importance particularly in connection with highly embossed labels which when arranged in a stack are highly elastic and if compressed in said stack even to a slight degree, tend to unduly expand the stack when the pressure is removed and thereby cause the labels or their equivalent in the stack 5 to overflow the hopper 6. With the instant arrangement such overflowing of the stack 5 from the hopper 6 is avoided and inefficient feeding of the labels therefrom is positively prevented.

Various changes in the specific forms shown and described may be made within the scope of the claims without departing from the spirit of the invention.

We claim:

1. The combination of a frame, a vertical hopper supported on said frame, a support for a progressively decreasing stack of sheets or the like vertically movable in said hopper, mechanism including an actuating member and means for operating said member for elevating said support and stack in said hopper, a normally stationary controlling member pivotally suspended on said frame for maintaining the actuating member of said elevating mechanism against operation, a releasing member pivotally suspended on said frame independently of and in operative relation to said controlling member, and means controlled by said stack arranged to pivotally operate said releasing member when said stack has decreased to a predetermined extent to cause said releasing member to develop a pressure upon said controlling member whereby the latter is pivotally actuated to release the actuating member for operation by said operating means to actuate said elevating mechanism and thereby raise said support and stack to periodically restore the upper end thereof to a predetermined level.

2. The combination of a frame, a vertical hopper supported on said frame, a support for a progressively decreasing stack of sheets or the like vertically movable in said hopper, mechanism including an actuating member and means for operating said member for elevating said support and stack in said hopper, a normally stationary controlling member pivotally mounted on said frame for maintaining said elevating mechanism against operation, a shaft journaled

in said frame, a releasing member loosely mounted on and depending from said shaft into operative relation to said controlling member, a yoke fixed on said shaft and extending across said releasing member, a lever fixed on said shaft, and a feeler connected with said lever and arranged to rest upon the upper end of said stack, said feeler and lever rocking said shaft as the stack decreases and causing said yoke to pivotally actuate said releasing member when said stack has decreased to a predetermined extent to thereby pivotally operate said controlling member to release the actuating member for operation by said operating means to actuate said elevating mechanism and permit the latter to raise said support and stack to periodically restore the upper end of the latter to a predetermined level.

3. The combination of a frame, a vertical hopper supported on said frame, a support for a progressively decreasing stack of sheets or the like vertically movable in said hopper, mechanism including an actuating member and means for operating said member for elevating said support and stack in said hopper, a normally stationary controlling member pivotally mounted on said frame for maintaining said elevating mechanism against operation, a shaft journaled in said frame, a releasing member loosely mounted on and depending from said shaft into operative relation to said controlling member, a yoke fixed on said shaft and extending across said releasing member, a lever fixed on said shaft, and a vertically movable feeler connected with said lever and arranged to rest upon the upper end of said stack, said feeler and lever rocking said shaft as the stack decreases and causing said yoke to pivotally actuate said releasing member when said stack has decreased to a predetermined extent to thereby pivotally operate said controlling member to release the actuating member for operation by said operating means to actuate said elevating mechanism and permit the latter to raise said support and stack to periodically restore the upper end thereof to a predetermined level.

4. The combination of a support for a stack of sheets or the like, means for removing individual sheets or the like in succession from the upper end of said stack whereby the height of the latter is progressively reduced, elevating mechanism for raising said support and stack, and a feeler movable vertically into and out of engagement with the upper end of said stack, co-operating means connected with said removing means and feeler respectively whereby the latter is lifted out of engagement with said stack in operative synchronism with said means, said feeler developing a progressively increasing downward movement as the height of the stack is progressively reduced, and means operated by said feeler when the downward movement thereof reaches a predetermined extent to coincidentally bring about an operation of said elevating mechanism whereby the latter periodically restores the upper end of said stack to a predetermined level.

5. The combination of a support for a stack of sheets or the like, a device for lifting and removing individual sheets or the like in succession from the upper end of said stack whereby the height of the latter is progressively reduced, mechanism for operating said device, elevating mechanism for raising said support and stack, a feeler adapted to rest upon the upper end of said stack and movable vertically into and out

of engagement therewith by said mechanism in synchronism with the operation of said device, said feeler developing a progressively increasing downward movement as the height of the stack is progressively reduced, and means operated by said feeler when the downward movement thereof reaches a predetermined extent to coincidentally bring about an operation of said elevating mechanism in a manner to periodically restore the upper end of said stack to a predetermined level.

6. The combination of a support for a stack of sheets or the like, a device for removing individual sheets or the like in succession from the upper end of said stack whereby the height of the latter is progressively reduced, mechanism including a rock-shaft for operating said device, elevating mechanism for raising said support and stack, a feeler adapted to rest upon the upper end of said stack and vertically movable toward and away from the upper end thereof, a pivoted bell-crank lever connected with said feeler, a cam on said rock-shaft acting on said bell-crank lever to vertically move said feeler away from said stack in synchronism with the operation of said device, said feeler moving downwardly by gravity to a progressively increasing degree as the height of said stack is progressively reduced and coincidentally imparting a progressively increasing movement to said bell-crank lever in one direction, and means controlled by said bell-crank lever and said feeler in co-operation with said stack to bring about an operation of said elevating mechanism when the progressively increasing movement of said bell-crank lever reaches a predetermined extent to thereby periodically restore the upper end of said stack to a predetermined level.

7. The combination of a support for a stack of sheets or the like, means for successively removing terminal sheets or the like from the upper end of said stack whereby the latter progressively decreases in height, mechanism for elevating said support to restore the upper end of said stack to a predetermined level, operating means for actuating said elevating means, normally stationary pendent means pivotally suspended for restraining the operating means against operation, a feeler adapted to rest upon the upper end of said stack and operatively movable toward and away from the same in vertical directions in an operative cycle in predetermined synchronism with said sheet removing means, said feeler developing a progressively increasing downward movement as the stack progressively decreases, and means actuated by the vertical movements of said feeler to a progressively increasing extent in

harmony with the progressively increasing downward movements of said feeler, said last named means being ineffective upon said pendent means until the stack has decreased to a predetermined extent and subsequently swinging said pendent means to release said operating means for actuating said elevating mechanism to periodically restore the upper end of said stack to said predetermined level.

8. The combination of a support for a progressively decreasing stack of sheets or the like, a hopper for containing said stack of sheets or the like and projecting upwardly beyond the same to confine said sheets or the like against displacement transversely of said stack, a support for supporting said stack in said hopper, mechanism for elevating said support to restore the upper end of said stack to a predetermined level in said hopper, operating means for actuating said elevating means, means for restraining the operating means against operation, a feeler adapted to rest upon the upper end of said stack and operatively movable in an operative cycle into and out of said hopper in vertical directions toward and away from said upper end of the stack, said feeler developing a progressively increasing downward movement as the stack progressively decreases, and means operated to a progressively increasing extent by the vertical movements of the feeler in harmony with the progressively increasing downward movements thereof to release said restraining means and permit said operating means to actuate said elevating mechanism to periodically restore the upper end of said stack to said predetermined level.

9. The combination of a support for a progressively decreasing stack of sheets or the like, mechanism for elevating said support to restore the upper end of said stack to a predetermined level, operating means for actuating said elevating means, normally stationary pendent means pivotally suspended for restraining the operating means against operation, a pivotally mounted lever, a yoke extending across said pendent means and pivotally movable with said lever, and a feeler connected with said lever and arranged to rest upon the upper end of said stack, said feeler and lever rocking said yoke as the stack decreases, to pivotally actuate said pendent means when said stack has decreased to a predetermined extent to thereby release said operating means for operation of said elevating mechanism to raise said support and stack to periodically restore the upper end of the latter to a predetermined level.

GEORGE W. VON HOFE.
BERNARD D. DANS.