Feb. 11, 1969 B. STEGEMAN 3,426,923

AUTOMATIC STACKER POCKET UNLOADING DEVICE

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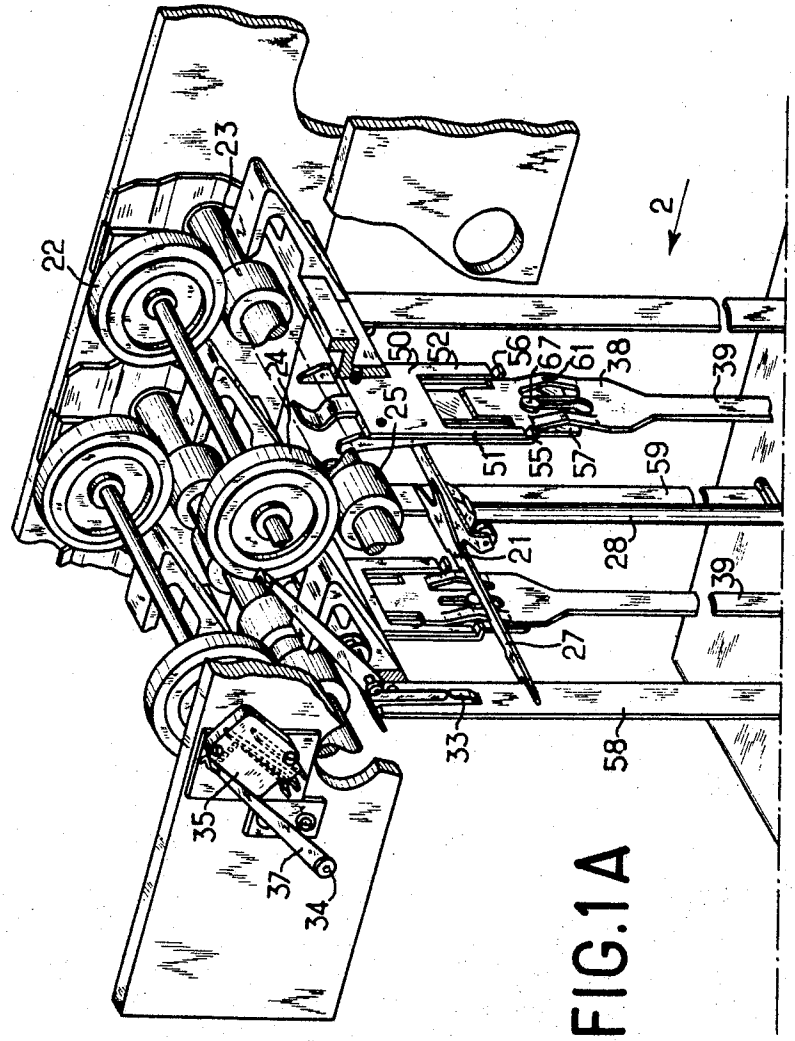


FIG. 1A

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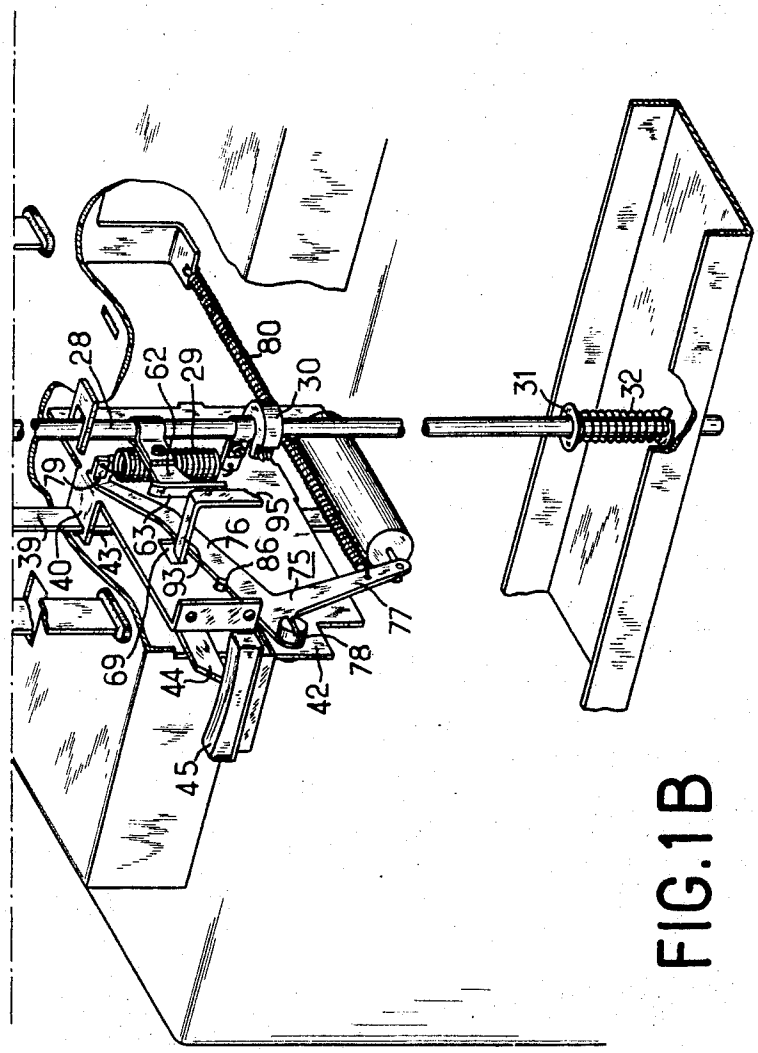


FIG.1B

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AUTOMATIC STACKER POCKET UNLOADING DEVICE

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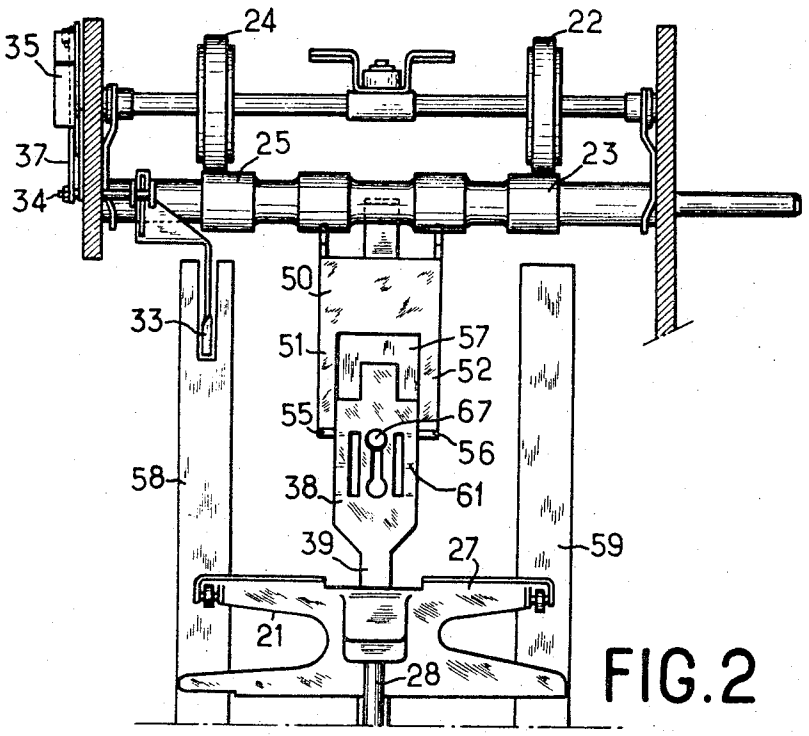


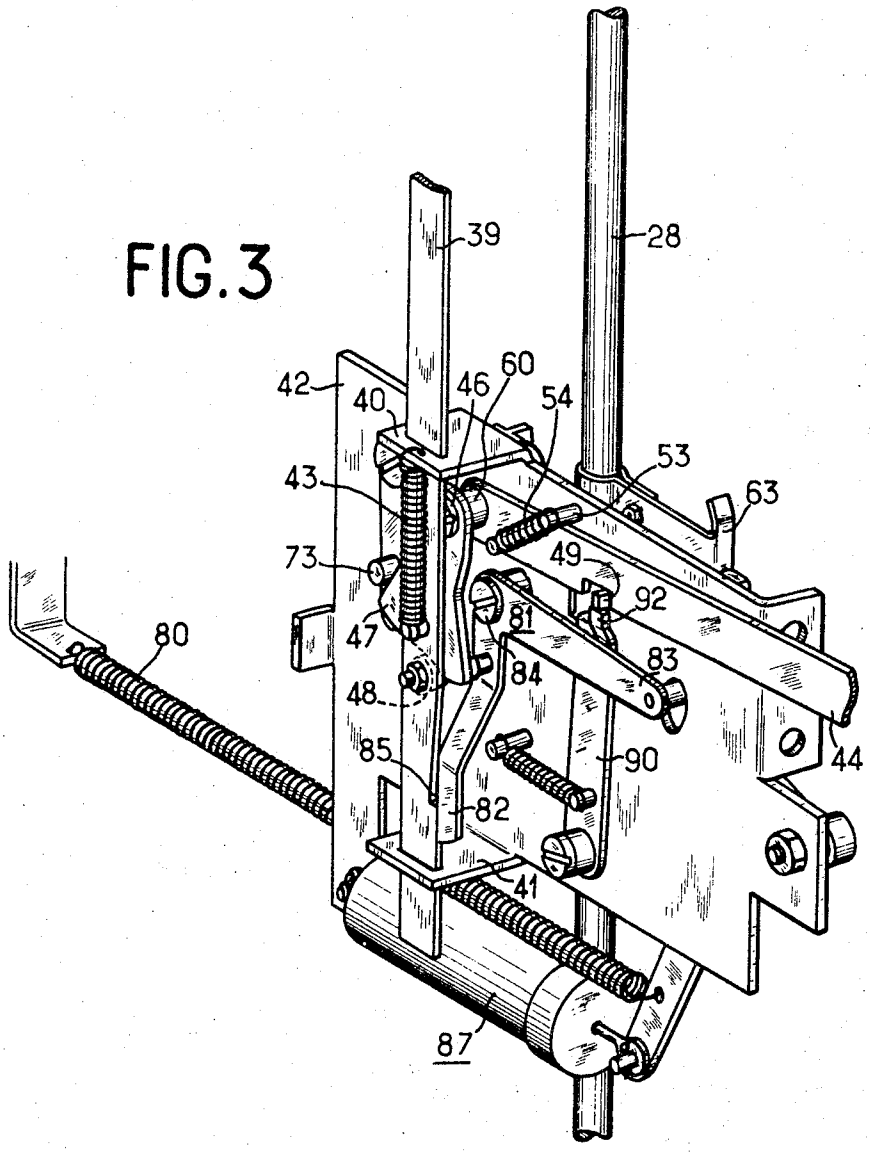
FIG.2

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AUTOMATIC STACKER POCKET UNLOADING DEVICE

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FIG. 3

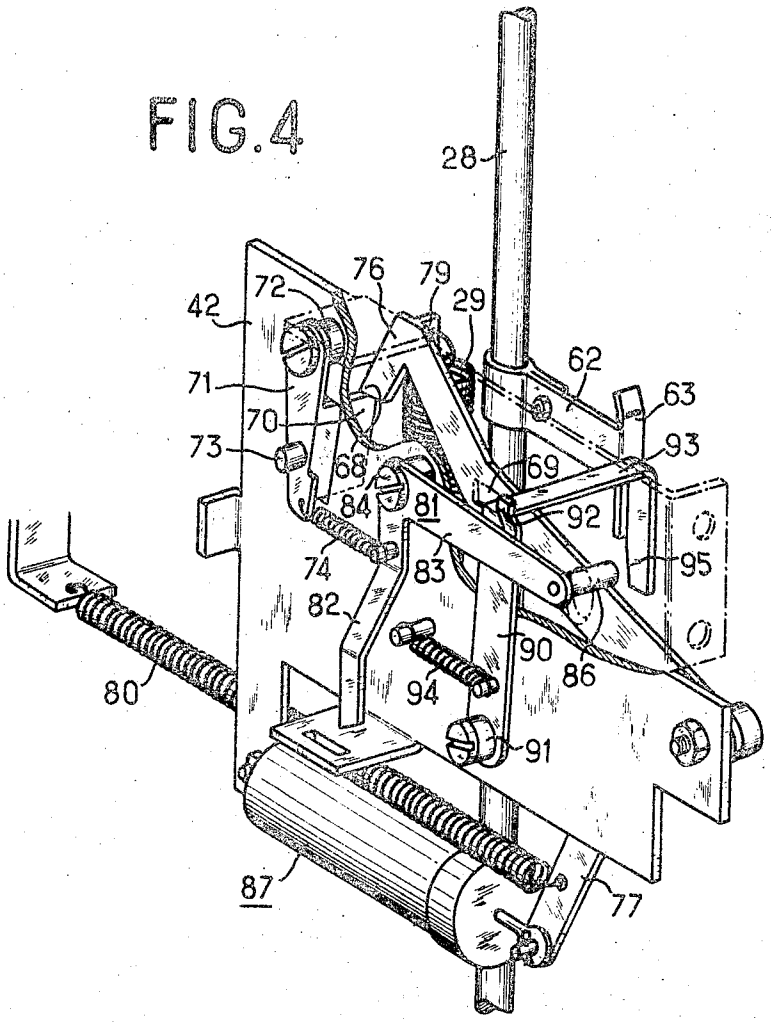


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FIG. 4

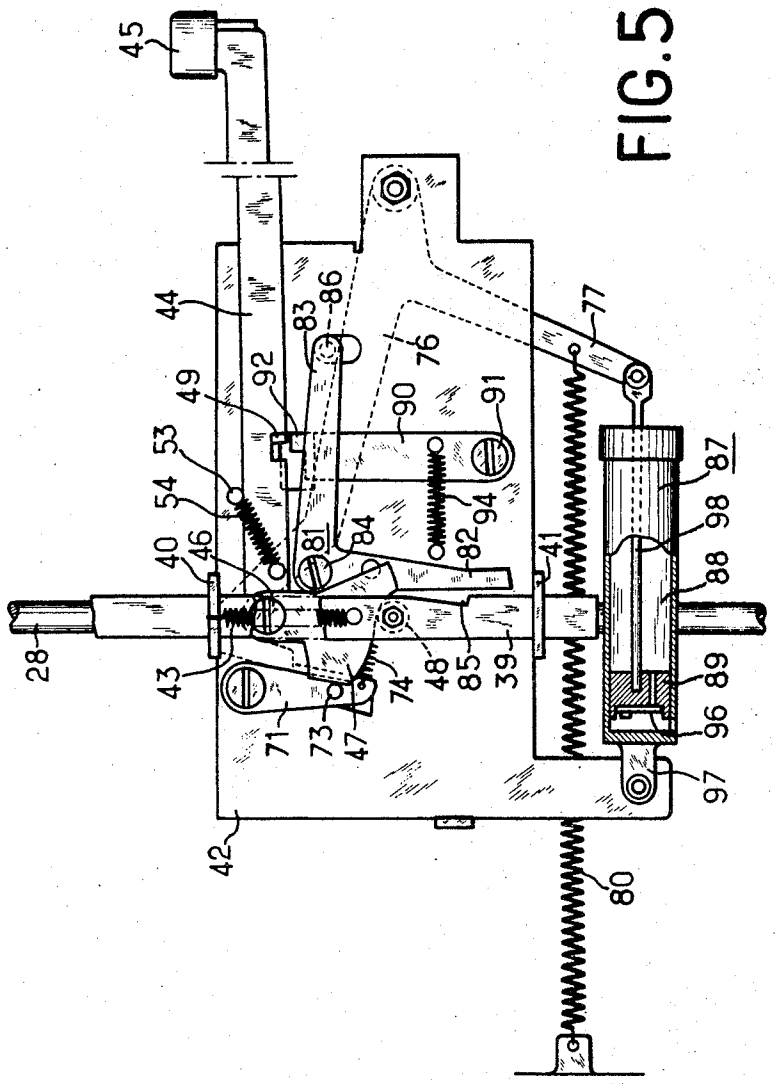


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FIG. 5



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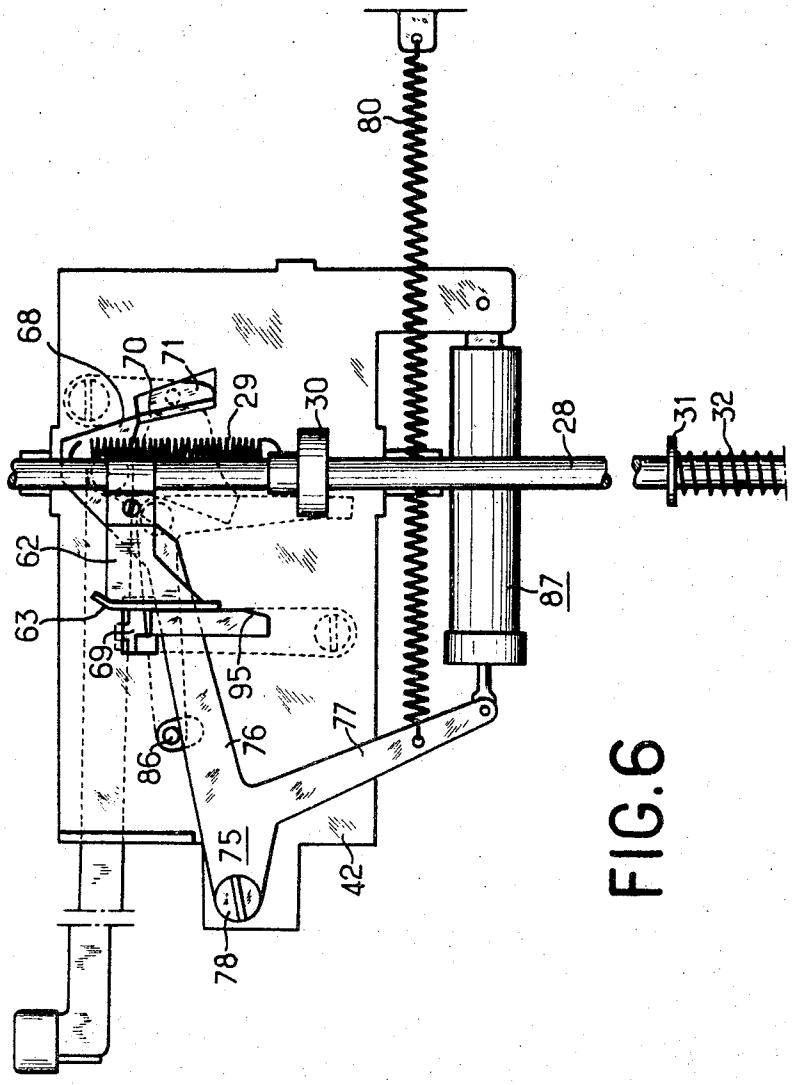


FIG. 6

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AUTOMATIC STACKER POCKET UNLOADING DEVICE

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FIG. 8

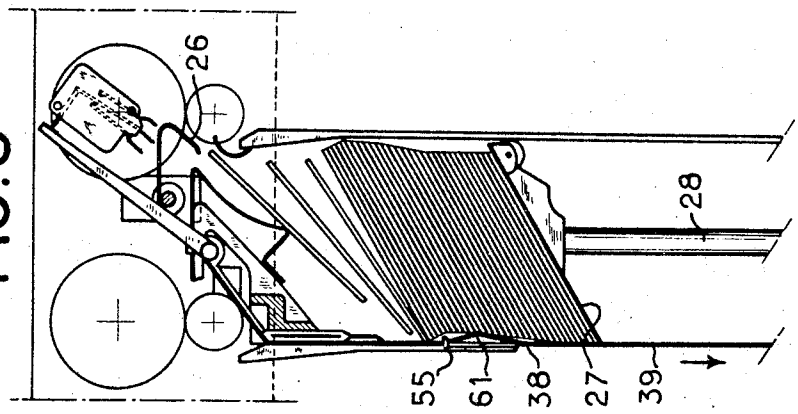
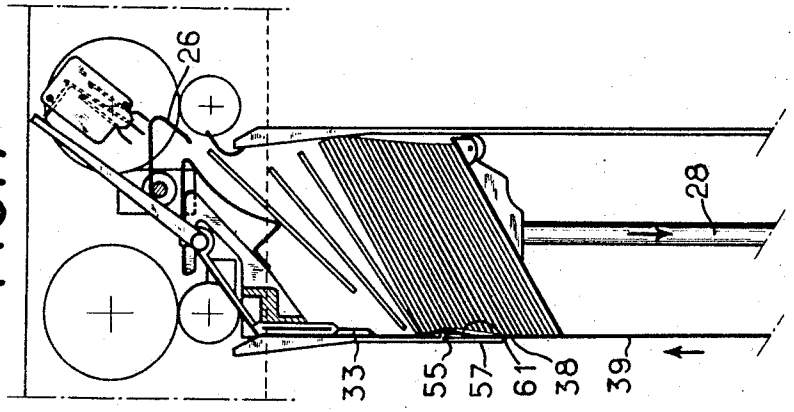


FIG. 7



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FIG.10

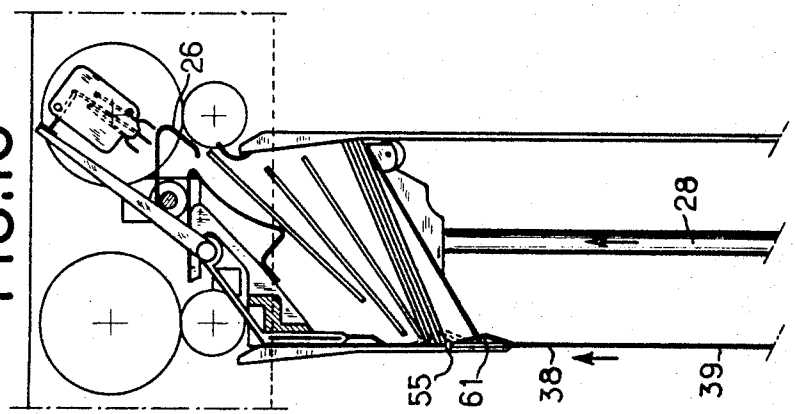
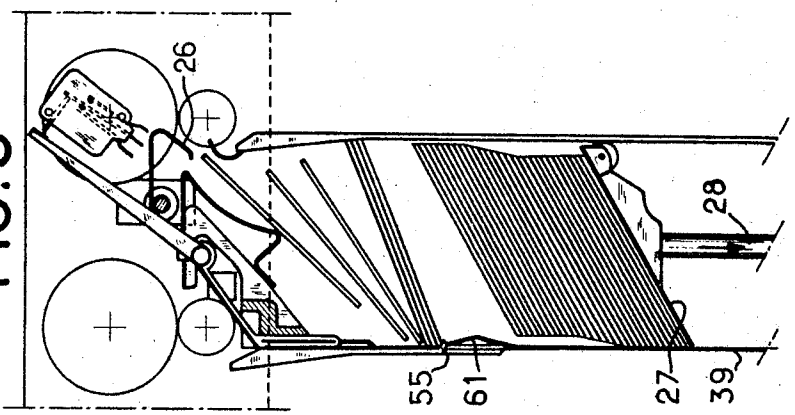


FIG.9



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AUTOMATIC STACKER POCKET UNLOADING DEVICE

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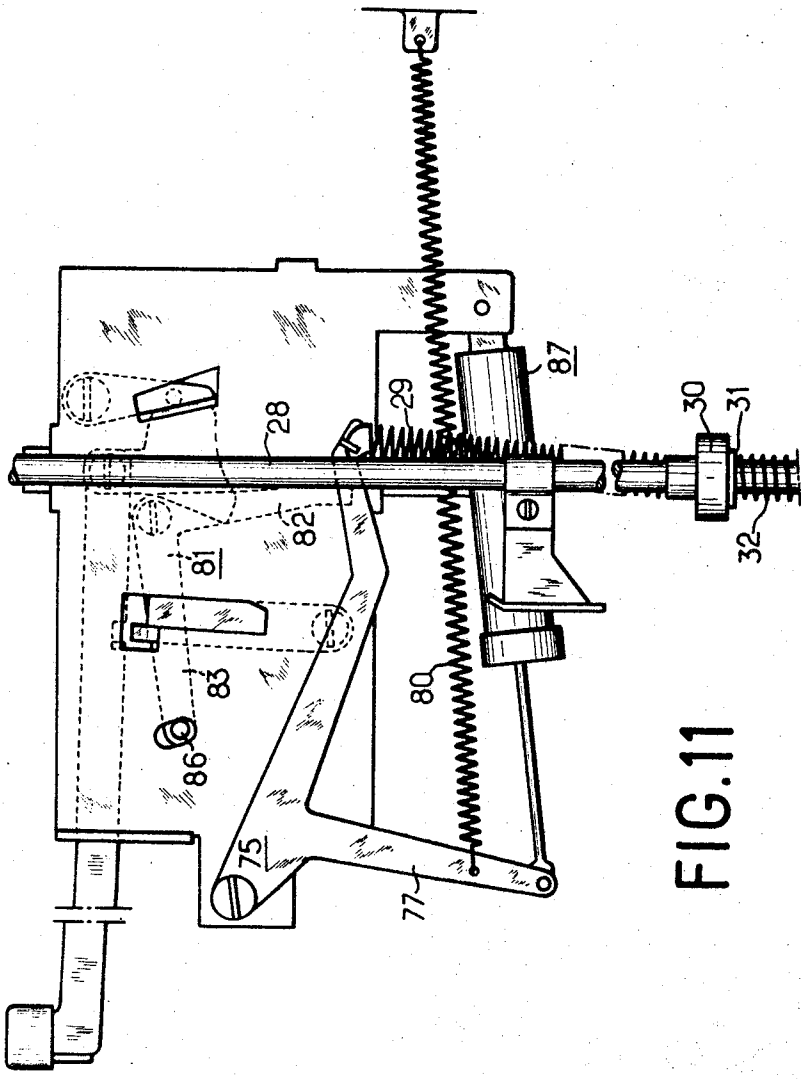


FIG. 11

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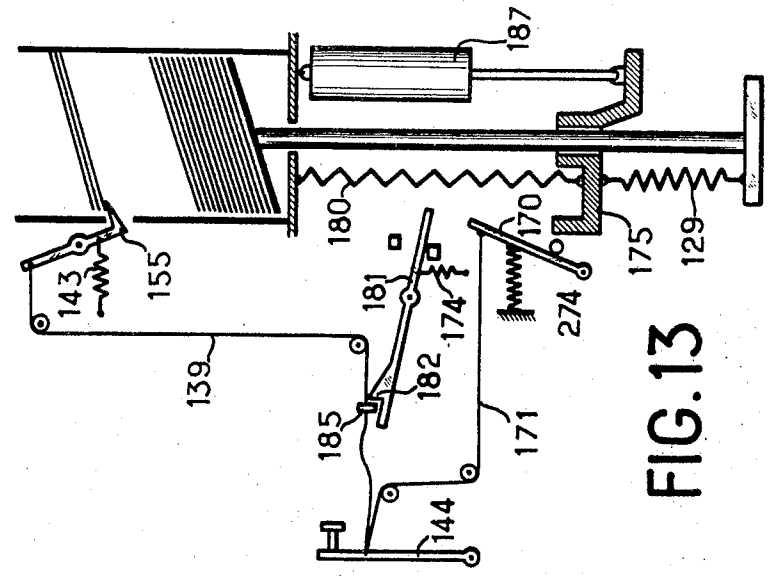


FIG. 13

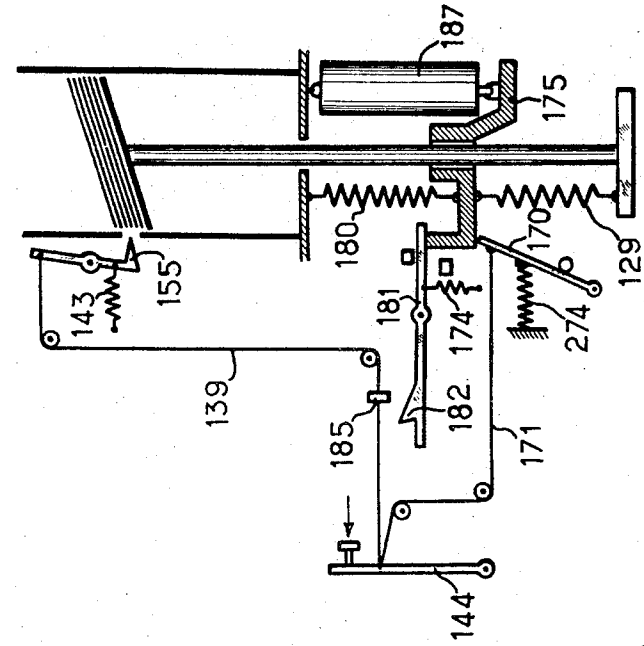


FIG. 12

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United States Patent Office 3,426,923 Patented Feb. 11, 1969

3,426,923

AUTOMATIC STACKER POCKET UNLOADING DEVICE

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Filed Nov. 6, 1967, Ser. No. 680,931
Claims priority, application France, Nov. 18, 1966, 84,084
U.S. Cl. 214—6 9 Claims
Int. Cl. B65g 57/00; B65h 31/34

ABSTRACT OF THE DISCLOSURE

The invention concerns a device which permits the unloading of a card reception compartment in a machine for dealing with record cards, without it being necessary to stop the machine. The device controls simultaneously the descent of the card-supporting tray and the bringing into action of a device for retaining cards which is arranged at the upper portion of the compartment so as to retain the cards which arrive in the compartment between the instant when the tray is lowered and the instant when the tray, discharged by the operator, has returned upwards to its highest position.

The present invention relates to improvements in card stacker pockets in machines dealing with record cards.

In machines dealing with record cards, such as sorters, collators, tabulators etc., after the cards have been treated in the machine they are advanced by means of driving devices constituted by rotary driving rollers, along a card track below which reception compartments are arranged. Above each compartment, a deflector can be actuated to deflect some of the cards which are advanced along the track, and to make them fall into the said compartment. The cards which fall into a compartment generally accumulate on a mobile tray fast with a rod held by a spring. Under the effect of the weight of the pile constituted by the cards which fall into the compartment, this tray is gradually lowered, balanced by its spring, until a position is reached corresponding to a limited capacity, which can be selected to be about 500 to 600 cards. The capacity of the reception compartments being limited, devices for indicating when a compartment is full are provided, some of these devices being even arranged so that when a compartment is full they control the stopping of the supply of cards by the machine.

In machines for dealing with record cards of this type, the controls are normally arranged near the card supply magazine or magazines, that is to say at the end of the machine opposite from that where the reception compartments furthest from the supply magazine are situated. Consequently, if it is desired to withdraw manually, whilst the machine is operating, the cards accumulated in a reception compartment before the maximum capacity of this compartment is reached, the operator has to use the controls of the machine to stop the machine, then go and withdraw the cards and then return to the controls to re-start the machine. Naturally, it is necessary to stop the machine before withdrawing cards, since the unloading of a compartment during continuous supply, in other words without the machine stopping, can cause a blockage of the inlet of the compartment by an arriving card. There is also a risk that this card may turn over and fall upside-down, or even fall into an incorrect position and remain on its edge instead of resting flat on the accumulated cards. However, going and coming between the controls of the machine and the reception compartments not only causes physical fatigue to the operator but also results in a considerable loss of working time as far as the machine is concerned.

To overcome these disadvantages, it has been proposed to provide the machine with an apparatus constructed and arranged in such a manner that the operation of the machine is automatically interrupted by the hand of the operator advancing to take hold of the cards on the tray, and automatically resumed the instant when the said hand is withdrawn. However, this kind of arrangement, if it limits the times when the machine is stopped to a strictly minimum amount, nevertheless requires the stopping of the machine when the cards are withdrawn and thus does not eliminate the loss of time which results therefrom. In these machines also, when it is desired to withdraw the cards from a full compartment or even an incompletely full compartment, it is often necessary to move the tray downwards by a sufficient amount to be able to free the pile of cards which not only requires an additional effort from the operator, but also increases the time when the machine is immobilised.

An object of the present invention is to obviate these disadvantages, and to provide a machine for dealing with record cards wherein the cards can be withdrawn from the reception compartments without it being necessary to stop the machine.

According to the invention, in a machine for dealing with record cards which comprises a plurality of card containers, these containers each comprising a card-supporting tray normally suspended by a balancing spring, which is designed to keep the top of the pile of cards received at a substantially constant level, there is provided for each container an arrangement of mechanical means permitting the unloading of the cards of a container without stopping the operation of the machine, the said arrangement comprising a balancing spring for the card-supporting tray suspended on a suspension lever normally locked in a first position, a card retaining device normally inoperative at the upper portion of a wall of the container, and a manual actuation device which is situated below the container and is adapted to bring about, when it is actuated, through intermediate means and concomitantly the unlocking of the suspension lever so that the card-supporting tray can move downwards to a lower end unloading position, and the bringing into action of the card retaining device for intercepting the cards which are situated or arrive above.

For a better understanding of the invention and to show how it may be carried into effect, the same will now be described, by way of example, with reference to the accompanying drawings, wherein:

FIGURE 1A shows a diagrammatic view in perspective of the upper portion of a reception compartment, according to a preferred embodiment of the invention,

FIGURE 1B shows a diagrammatic perspective view of the lower portion of the reception compartment which is partly illustrated in FIGURE 1A.

FIGURE 2 is a side view of the upper portion of the compartment shown in FIGURE 1A,

FIGURE 3 shows a perspective view of the control mechanism whereby the reception compartment shown in FIGURES 1A and 1B can be unloaded during operation of the machine,

FIGURE 4 shows a perspective view of the mechanism of FIGURE 3 with parts broken away so as to show some constructional details,

FIGURE 5 shows a rear view of the mechanism of FIGURE 3,

FIGURE 6 shows a front view of the mechanism of FIGURE 3, the said mechanism being in the rest position,

FIGURES 7 and 10 views showing different positions occupied by the card retaining device of the reception

compartment shown in FIGURES 1A and 1B, during operation,

FIGURE 11 is a plan view of the mechanism shown in FIGURE 3 illustrating the position of the various parts of the mechanism after its actuation by the operator,

FIGURE 12 is a diagrammatic view and intended to show the main features of a reception compartment constructed according to the invention, the said compartment being shown in a first working state, and

FIGURE 13 is a view of the compartment illustrated in FIGURE 12, shown in a second working state.

In FIGURES 1A and 1B, jointed together along the dot-dash line, there has been illustrated a portion of a machine for dealing with record cards, showing a reception compartment arranged in accordance with a preferred form of embodiment of the invention so that it can be unloaded without it being necessary to stop the machine. In the figures thus jointed together only one reception compartment has been illustrated fully, but it will be understood that the machine generally comprises several such compartments and that the number of compartments may vary in accordance with the type of machine in question. FIGURE 2 is a diagrammatic side view taken in the direction of the arrow designated as **2** in FIGURE 1A of the upper portion of this compartment.

In a known manner, the cards coming from a supply magazine (not shown) are advanced along a card track by means of sets of driving rollers such as the set of rollers **22**, **23**, **24** and **25** which are shown in FIGURE 1A. Cards are made to fall into the reception compartments by flaps arranged so as to deflect the cards advanced by the driving rollers. One of these flaps, bearing the reference numeral **26**, is shown in FIGURES 7 to 10. In FIGURES 1A and 2, the flaps have been deliberately omitted in order to show some constructional details more clearly. The cards which, deflected by the flap **26**, fall into the reception compartment, accumulate on a tray **27**. This tray is fast with a rod **28** which can slide vertically. A balancing spring **29** fixed at one of its ends to the collar **30** fast with the rod **28**, permits the tray to move gradually downwards towards the bottom of the compartment under the action of the weight of the cards in proportion as these fall into the compartment and accumulate on the tray. The spring **29** is constructed so as to balance the weight of the assembly constituted by the tray, the rod and the accumulated cards so that the upper level of the stack of cards remains substantially constant whatever the number of cards accumulated. If the compartment is not unloaded sufficiently soon, the downward movement of the tray **27** under the action of the weight of the stack of cards is stopped by the collar **30** which, when the tray **27** has reached a predetermined maximum depth, comes into contact with a ring **31** held by a spring **32**. If from this instant onwards cards continue to arrive in the compartment, the upper level of the stack is raised until the last cards accumulated push a lever **33** known as the full-compartment lever, which is mounted to be pivotable about a pin **34**. A control arm **37** fixed on the pin **34** is then driven to actuate an electrical contact **35**. In the present case this electrical contact is used to control the stopping of the machine when the compartment is full, but it would be possible to adapt it to control the sending into another compartment of the cards which were intended for the full compartment.

FIGURES 1A and 7 to 10 also show that the tray **27** is inclined relatively to the horizontal in order to permit the cards which fall into the compartment to accumulate in an oblique stack and to align themselves on two vertical guide bars **58** and **59** shown in FIGURES 1A and 2. During the downward movement of the tray, the accumulated cards slide along the guide bars, remaining in bearing contact against them owing to their inclination and the vibrations of the machine. In order to facilitate the withdrawal of a stack of cards from the tray **27** the latter is

provided, as FIGURES 1A and 2 show, with an opening **21**.

To permit the operator to unload the compartment without it being necessary to stop the machine, devices have been provided which will now be described with reference to the accompanying drawings. For this purpose, each reception compartment comprises a card interception device which is arranged at the upper portion of the compartment to retain the cards which fall into the compartment when the operator is in the process of unloading it. In the example described, this interception device comprises, as FIGURES 1A and 2 show, a plate **50** provided with two vertical arms **51** and **52** whose lower ends are bent to form two retaining noses **55** and **56**. The plate **50** is fixed and is arranged so that the retaining noses are both situated at the same height and at a slightly higher level than the rear edge of the tray **27** when the latter is in its highest position (FIGURES 1A and 10). A slideway **57** fixed on the plate **50** between the arms **51** and **52** serves as a guide for a deflector plate **38** which can slide vertically between an upper position and a lower position. The deflector plate is extended downwardly by the deflector rod **39**. The plate **50**, the arms **51** and **52**, the deflector plate **38** and the deflector rods **39** are situated substantially in the plane which passes through the guide bars **58** and **59**, but outside the path followed by the cards which move downwards in the compartment, whilst the retaining noses **55** and **56** project, slightly relatively to this plane towards the interior of the compartment as FIGURE 10 shows. In this way the cards accumulated on the tray which move downwards sliding along the guide bars are retained when passing at the level of the retaining noses. However, in order to avoid the cards from being retained by the said noses during the normal filling of the compartment, the deflector plate **38** is provided with a boss **61** whose profile has been designed so that, when the deflector plate is in the upper position, the boss **61** is level with the retaining noses **55** and **56**, as FIGURE 7 shows, and permits the cards which move downwards to slide along the boss and move away sufficiently to pass alongside the noses without being retained by them. When the deflector plate is in the lower position, the boss **61** is situated below the level of the retaining noses, so that the noses then retain the cards which are situated above them when the said cards pass downwards. FIGURES 1A and 2 show that the deflector plate **38** is held against the slideway **57** by means of a rivet **67** which passes through a vertical slot formed in the deflector plate and which is fixed on the slideway **57**. This rivet also acts as a stop to limit the travel of the plate **38** and the rod **39** when these are in the lower position. In the upper position, the deflector plate **38** comes to abut against the plate **50**.

FIGURES 1B, 3 and 5 show that the rod **39** which supports the deflector plate **38** is guided at its lower portion by slots in two lugs **40** and **41** which enable it to slide vertically and which are fast with a supporting plate **42** fixed to the frame of the machine below the reception compartment. The rod **39** is normally urged upwards by a draw spring **43** tensioned between a stud of the control rod **39** and the lug **40**.

In FIGURE 1B there has been shown an unloading lever **44** provided with a key **45**, which permits the operator to trigger simultaneously the descent of the tray and the bringing of the retaining device into the interception position. As can be seen in FIGURES 3 and 5, this unloading lever is mounted to be pivotable about a horizontal pin **46** fixed on the supporting plate **42**. In the rest position, this lever comes into contact with an abutment stud **53** under the action of a spring **54**. The unloading lever **44** is fast with a cam plate **47** by means of a sleeve **60** which can pivot about the pin **46**. The deflector rod **39** is provided with a roller **48** which is in contact with the cam of the plate **47**. The profile of the cam **47** is such that when the operator presses on the key **45** the cam **47**,

driven by the unloading lever **44**, pushes the roller **48** and causes the deflector rod **39** to descend to the lower position.

FIGURE 4 shows that a latch **70** is provided which is fast with a lever **71**, which is mounted to be pivotable about a pin **72** fixed on the supporting plate **42**. The lever **71** is provided with a stud **73** which, as FIGURES 3 and 5 show, is applied against the left-hand portion of the cam plate **47** under the action of a draw spring **74** which can be seen in FIGURES 4 and 5. FIGURES 1B and 6 show that the supporting plate **42** supports a suspension lever which comprises two substantially perpendicular arms **76** and **77** and is mounted to be pivotable about a pin **78** fixed on the front face of the supporting plate **42**. FIGURES 1B and 4 show that the end of the arm **76** of this lever is provided with a bent lug **79** to which there is fixed by one of its ends the balancing spring **29**, the other end of which is fixed to the collar **30** fast with the rod **28**. A return spring **80** attached to a fixed point on the machine at one of its ends, is fixed at its other end to the arm **77** of the suspension lever. This spring, which is a long one, has the function of supplying the necessary force for the return of the tray **27** upwards into the upper position when the latter, after having been lowered owing to the actuation of the unloading lever **44** by the operator, is relieved of the cards which had accumulated on it. For this purpose the preload of the return spring **80** is so arranged as to balance by means of the suspension lever **75** the weight of the assembly constituted by the rod **28** and the tray **27** charged with a number of cards in the vicinity of a hundred. In this way, if the tray **27** is empty, the preload of the return spring **80** is sufficient to urge the arm **76** upwards and return the empty tray and the rod into the upper position whereas, if the number of cards accumulated on the tray **27** is of the order of several hundreds, the preload of the return spring **80** is insufficient to hold the arm **76** upwards, so that the suspension lever **75** rocks downwards, as FIGURE 11 shows, and the tray **27** descends to the bottom of the reception compartment.

At the normal filling of the compartment, the suspension lever **75** is held in the locked position owing to the fact that the end of the arm **76** is normally retained by its nose **68** bearing on the latch **70**, as FIGURES 4 and 6 show, so that the lug **79** on which the balancing spring **29** is suspended remains fixed. Under these conditions, the spring **29** is subjected to preload to balance the weight of the assembly constituted by the rod **28**, the tray **27** and the accumulated cards so that the upper level of the stack of cards remains substantially constant.

FIGURES 3, 4 and 5 show that the supporting plate **42** supports at its rear face a locking lever **81** comprising two substantially perpendicular arms **82** and **83**, which is mounted to be pivotable about a pin **84** fixed on the supporting plate. The spring **74**, one of whose ends is fixed to the lever **71** is fixed at its other end to the arm **82** so as to urge the end of the said arm to apply it against the deflector rod **39**. For reasons of clarity in the drawings, the deflector rod **39** has not been shown in FIGURE 4. The end of the arm **82** is profiled in such a manner as to constitute a latch which, when the deflector rod is brought into the lower position, engages in a notch **85** formed in the said rod, under the action of the spring **74**, and thus effects the locking of this rod, holding it in the lower position when it is being urged upwards by the spring **43**. FIGURES 4, 5 and 6 show that the end of the arm **83** of the lever **81** is provided with a stud **86** which is applied against the upper edge of the arm **76** when the latter is retained by the latch **70**, to hold the latch of the arm **82** out of the notch **85** and thus to permit the upward return movement of the deflector rod **39**.

As FIGURES 1B, 3, 4, 5, 6 and 11 show, the arm **77** of the suspension lever **75** is coupled to a pneumatic damping device **87** which is intended to brake the ascending movement of the tray **27** when the latter, after having been relieved of the cards which it carried, moves upwards again under the action of the return spring **80** by means of the suspension lever **75**. As FIGURE 5 shows, this damping device is of known type and is constituted by a cylinder **88** fast with a fixing element **97** pivotably connected to the supporting plate **42**. Slidable within the cylinder **88** is a piston **89** provided with a valve **96** and fast with a rod **98** articulated to the arm **77**. The value **96** is arranged in such a manner that the damping device presents substantially no resistance when the arm **76** is drawn downwards whereas, when this arm moves upwards again under the action of the return spring **80**, the damping device offers a resistance which brakes the re-ascent of the said arm.

FIGURES 4 and 5 also show a blocking catch **90** the function of which will be defined shortly, which is arranged vertically and is mounted to be pivotable about a pin **91** fixed on the rear face of the supporting plate **42**. As FIGURE 4 shows, this blocking catch is provided with an abutment dog **92** and is extended at its upper portion by an arm **93** bent to be perpendicular to the plane of the supporting plate to pass through an aperture **69** formed in the said plate. In the unblocking position the arm **93** is urged towards one of the edges of this aperture under the action of a spring **94** which is fixed on the one hand to the blocking catch **90** and on the other hand to the supporting plate **42**. FIGURES 1B, 4 and 6 show that the rod **28** is provided with an arm **62** at the end of which there is fixed a runner **63** provided with an inclined entry surface. The arm **62** is positioned on the rod **28** in such a manner that, when the tray **27** is in the upper position, the runner **63** is in contact with a ramp **95** fast with the arm **93** and moves the arm **93** away to put it into its blocking position. When the arm **93** is thus put into place, the abutment dog **92** of the blocking catch **90** is situated just below a bent lug **49** fast with the unloading lever **44**, as FIGURES 3 and 5 show, and prevents the operation of the said lever by the operator. When, on the contrary, the tray **27** has moved downwards sufficiently for the runner **63** to cease holding the arm **93** in its blocking position, the arm **93** returns into the unblocking position under the action of the spring **94** and, the abutment dog **92** of the blocking catch **90** being displaced sufficiently for the lug **49** to be unable any longer to abut against the dog **92**, the unloading lever **44** can then be operated by the operator. The blocking device of the lever **44** which has just been described is arranged in such a manner that the runner **63** which descends in proportion as the cards accumulate on the tray, allows the arm **93** to return to its unblocking position only when the tray **27**, which moves downwards in proportion as the cards accumulate, carries a load greater than a minimum of about 200 cards. The blocking device for the lever **44** can also be coupled to an indicating device such as a light signal device, which indicates to the operator the instant from which the key **45** can be depressed to cause the downward movement of the tray.

If the load on the tray is sufficient to permit the operation of the unloading lever **44**, the operator can, by pressing on the key **45**, lower the said lever so that the cam **47** which is drawn by this lever repels the roller **48** downwards and causes the deflector rod **39** to move into the lower position. Consequently, as explained hereinbefore, the deflector plate **38** which is fast with the rod **39** descends also and its boss **61** frees the retaining noses **55** and **56**, as FIGURE 8 shows. Simultaneously but slightly later the cam **47** acting as a push member pushes the stud **73** which causes the lever **71** to pivot about the pin **72**. The latch **70** is drawn by the displacement of the lever **71** and then releases the end of the arm **76** of the suspension lever. Since the load on the tray **27** is then greater than 200 cards, the preload of the return spring **80** is insufficient to retain, by means of the suspension lever **75**, the assembly constituted by the balancing spring **29**, the rod **28**, the

tray **27**, and the accumulated cards. This assembly, which is no longer retained owing to the release of the arm **76** by the latch **70** then falls and is finally arrested by the collar **30** which comes into contact with the ring **31**. The shock is damped by the spring **32**. FIGURE 9 shows that since the retaining noses **55** and **56** are released by the boss **61**, the cards of the stack which are situated above said noses are retained by them when the tray descends so that the retained cards, which bear on the retaining noses on the one hand and against the guide bars of the adjoining compartment on the other hand, are then separated from the remainder of the stack which moves downwards at the same time as the tray. Owing to the fact that the suspension lever **75** is rocked downwardly as shown in FIGURE 11, the stud **86** of the lever **81** is released. The lever **81**, urged by its spring **74**, is then drawn and engages its latch in the notch **85** of the deflector rod **39** which has been brought into the lower position as explained hereinbefore. From this instant, the rod **39** is locked and cannot return to the upper position, under the action of the spring **43**, even when the operator ceases to press on the key **45**. The operator can then take hold of the cards which have remained accumulated on the tray **27** and withdraw them all at the same time whilst the machine continues to operate, to permit other cards to arrive in the compartment and place themselves on the retained cards. It is advantageous to point out that, with the retaining device shown in the figures, the cards which arrive in the compartment come to rest on the retained cards under the same conditions as when normal filling of the compartment is taking place. However, this device could be replaced by any other retaining device operating under similar conditions to those which have just been described. As soon as the accumulated cards on the tray are withdrawn by the operator, the preload of the return spring **80** is sufficient to return the assembly constituted by the balancing spring **29**, the rod **28** and the empty tray **27** into the upper position by means of the suspension lever **75**. This assembly moves upwards slowly owing to the braking effect exerted by the damping device **87**. Following the release of the key **45** by the operator, the emptying lever **44** has returned to the normal position under the action of the spring **54**. The end of the arm **76** which moves upwards again under the action of the return spring thus encounters the latch **70** and repels it to allow itself to pass. After this, the latch **70** returns to the position of rest to retain the end of the arm **76** and hold the suspension lever **75** in the normal position.

During the return upward movement of the assembly, the runner **63** of the arm **62** encounters the ramp **95** of the arm **93**. The arm **93** is then moved out of its unblocking position by the said runner, so that the abutment dog **92** is then displaced and prevents the operator from again actuating the emptying lever **44**.

Shortly before the suspension lever **75** has completed its upward travel, the arm **76** of this lever encounters the stud **86** of the lever **81** and lifts it. The latch of the arm **82**, drawn by the displacement of the lever **81**, is then released from the notch **85** of the deflector rod **39**. The rod **39**, released, moves upwards again under the action of the spring **43**, so that the boss **61** of the deflector plate moves upwards as far as the level of the retaining noses **55** and **56**. It should be pointed out here that the re-ascent of the deflector plate is effected when the tray **27** has almost completed its return upward travel, as can be seen in FIGURE 10. In this way, the retained cards which were bearing on the one hand against the retaining noses and on the other hand against the guide bars of the neighboring compartment, are lifted by the tray **27**. The damping device **87** which brakes the re-ascent of the tray permits the latter to come into contact with the retained cards without projecting them up into the air. In this way these cards, which are released when the boss **61** moves them away from the retaining noses, come to rest against the tray **27**, thus permitting the compartment to re-fill in normal manner.

FIGURES 12 and 13 are diagrammatic views of a simplified embodiment which are intended to show the main features of the invention. These figures, compared with those which relate to the example of embodiment described previously, show that some elements forming part of the said embodiment have been replaced in FIGURES 12 and 13 by elements which fulfil similar functions and which, for this reason, have been given the same reference numeral but preceded by the FIGURE 1 or 2. Thus, the suspension lever **75** has been replaced by an intermediate element **175** which can be locked by a latch **170**. Similarly the deflector rod **39** has been replaced by a cable **139** which, when the unloading lever **144** is actuated in the direction indicated by the arrow, draws the interception device so that the nose **155** penetrates into the stack of cards to retain the upper portion of this stack. The locking of the said device in the interception position is effected by means of a catch **185** which is retained by a latch **182**, only when the intermediate element **175**, released by the latch **170** which is actuated by means of the lever **144** and the cable **171**, is drawn downwards under the action of the weight of the cards accumulated on the tray. It will be considered that in this case the action of the weight of the cards which are not retained by the interception device is greater than that of the return spring **180**. When the tray has been discharged, the intermediate element **175** moves upwards again under the action of the spring **180** and successively repels the latch **170** and the lever **181** before being finally locked by this latch. The lever **181**, driven by the intermediate element, rocks and the latch **182** releases the catch **185**, which enables the interception nose to return to the position of rest under the action of the spring **143**, and to release the retained cards which then come to rest on the tray which has moved upwards to its highest position.

It should be pointed out that the simplified embodiment represented diagrammatically in FIGURES 12 and 13 is intended only to show the main features of the invention. The example of embodiment which was described previously in a more detailed manner is in fact a much more rigid construction than that which is illustrated in a simplified manner in FIGURES 12 and 13. Consequently, it is much more reliable in operation. Furthermore it has the advantage, since the interception noses are fixed, of not damaging the edge of the cards at the places which are intended to pass below the chutes of feed devices. Finally, the control of the key **45** can be effected by the back of the operator's hand which is ready to receive the cards at the instant when the tray moves downwards which, to a certain extent, is less tiring to the operator and enables him to withdraw the cards from the tray more quickly.

The characteristic feature of the invention will be brought out more clearly in the following claims.

What is claimed is:

1. In a machine for dealing with record cards comprising a plurality of reception compartments, each compartment comprising a card-supporting tray fixed to the upper end of a vertical guide rod, said tray being normally suspended by a balancing spring adapted to maintain at a substantially constant level the upper surface of the stack constituted by the cards accumulated on the tray, a device permitting the unloading of the cards of a compartment without stopping the operation of the machine, the said device comprising a suspension lever normally locked in a position known as the locking position and adapted to suspend the said balancing spring, a card retaining device, normally inoperative, arranged at the upper portion of one wall of the compartment, a manual actuation device arranged below the compartment, and intermediate elements coupled on the one hand to the said manual actuation device and on the other hand to the suspension lever and to the retaining device so that when the manual actuation device is operated the suspen-

sion lever is unlocked to permit the tray to descend to a lower end position called the unloading position, and simultaneously the retaining device is put into an active position to retain the cards which arrive in the compartment or which are situated above the said retaining device.

2. A device according to claim 1, wherein the said manual action device is a key-operated unloading lever and wherein the said intermediate elements comprise a first latch arranged to serve normally as a support for a nose of the said suspension lever and a cam plate fast with the said unloading lever, the said plate being adapted to repel the said latch at the actuation of the unloading lever so as to release the suspension lever to permit the card-supporting tray to descend to the unloading position.

3. A device according to claim 2, wherein a return spring fast with a fixed point is fixed to the suspension lever, the preload of the said return spring being arranged so as to return the tray to the card reception position by means of the balancing spring immediately after a stack of cards has been removed from the said tray.

4. A device according to claim 3, wherein the said unloading lever comprises an extension, and wherein a blocking catch is coupled with mechanical means fast with the guide rod of the said tray, the said catch being arranged so as to occupy either a first position in which it engages the said extension, or a second or rest position, the said mechanical means being arranged so as to maintain the said catch in the first position and prevent the displacement of the unloading lever as long as the tray has not descended at least over a predetermined distance corresponding to the action of the weight of a predetermined approximate number of cards.

5. A device according to claim 2, wherein the retaining device comprises fixed retaining noses projecting beyond the wall of the compartment in the inward direction, and a deflector plate provided with a boss and prolonged downwardly by a deflector rod, the said deflector plate being guided so as to be able to occupy an upper retracted position and a lower retaining position, the said boss being formed so as to serve as a guide for one edge of the cards when the deflector plate is in the upper position, thus preventing the cards which fall into the compartment from being retained by the retaining noses.

6. A device according to claim 5, wherein the said intermediate elements comprise also a roller fixed to the deflector rod and a spring arranged to maintain the said roller in contact with the cam of the unloading lever, the said cam being formed to act on the said lever so as to bring the deflector plate into its lower retaining position when the unloading lever is actuated.

7. A device according to claim 5, comprising also a blocking lever mounted to be pivotable about a fixed pivot and comprising a substantially vertical arm and a substantially horizontal arm, the said vertical arm being provided with a second latch adapted to be engaged in a notch of the deflector rod when the latter is in the lower position, the said horizontal arm being arranged on the path of the suspension lever so as to be actuated to release the second latch from the notch of the deflector rod during the very last part of the return upward movement of the tray.

8. A device according to claim 4, wherein the said mechanical means are constituted by an arm fast with the guide rod of the tray and provided with a runner arranged so as to displace the blocking catch at the return upward movement of the tray, to re-lock the unloading lever.

9. A device according to claim 7, wherein a single-acting damping device is coupled with the suspension lever to limit the speed of the return upward movement of the card-supporting tray and the balancing spring.

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