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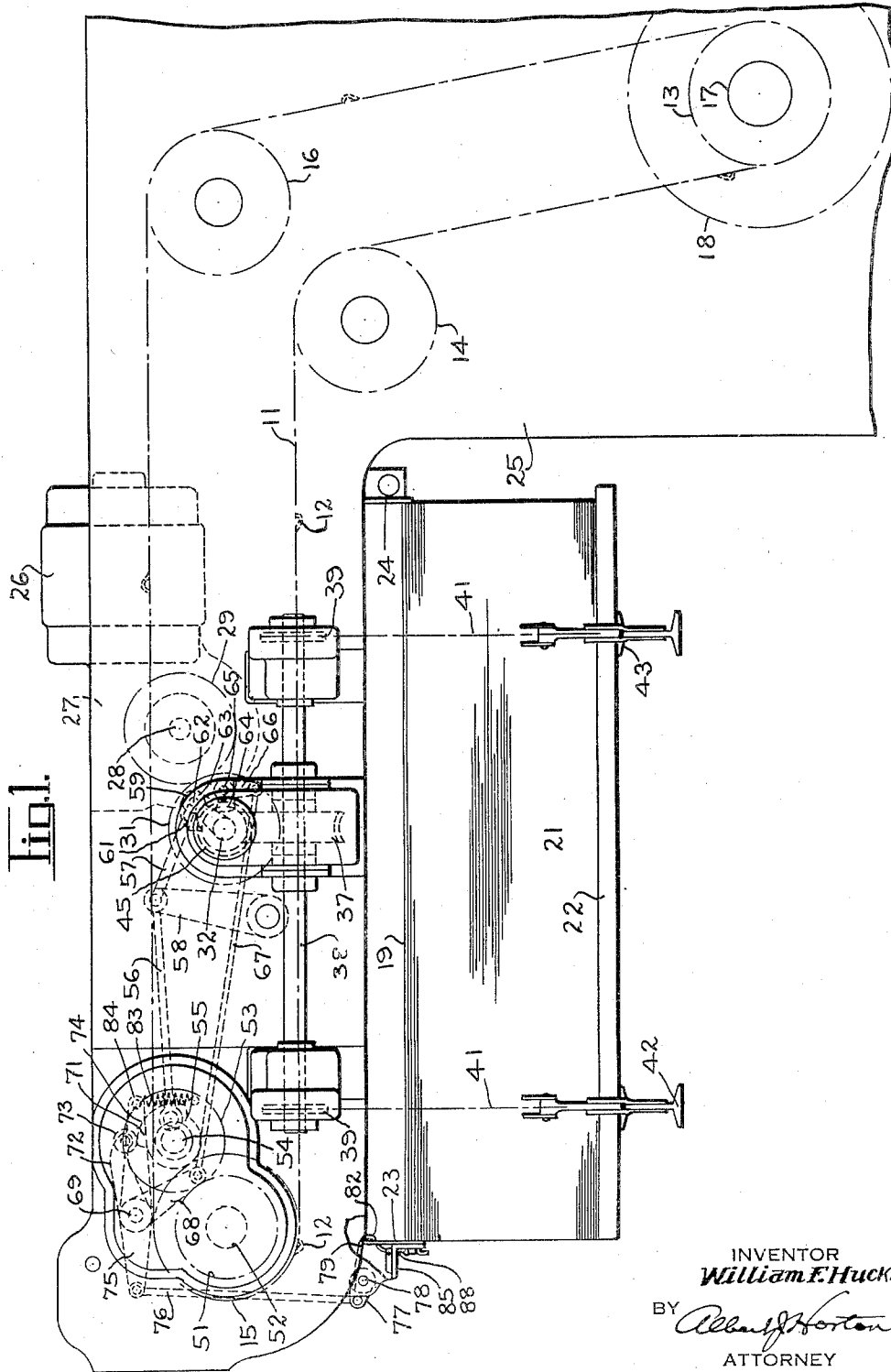
W. F. HUCK

2,262,236

PRINTING MACHINE

Filed Oct. 18, 1938

2 Sheets-Sheet 1



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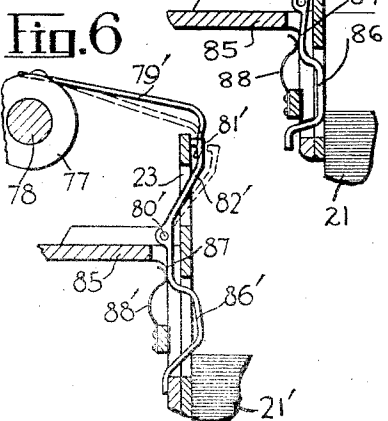
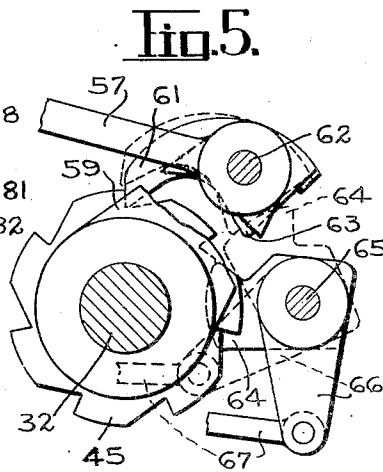
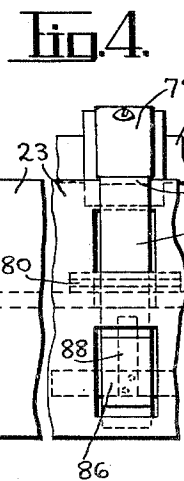
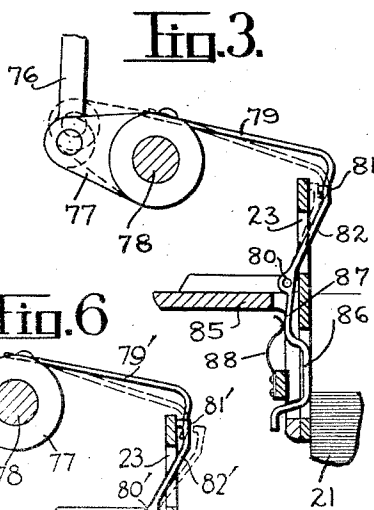
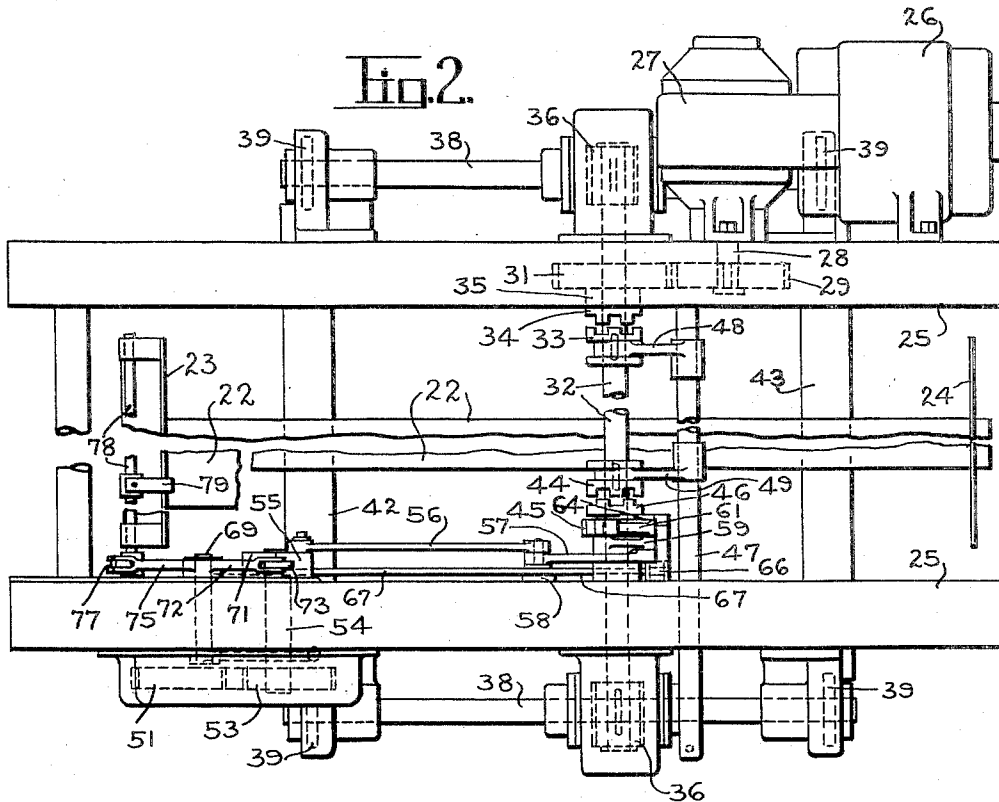
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PRINTING MACHINE

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2 Sheets-Sheet 2



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2,262,236

PRINTING MACHINE

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8 Claims. (Cl. 271—88)

This invention relates to a pile elevator or sheet handling mechanism and more particularly to a detector device for such mechanism, which is adapted to be actuated by the sheets, to control the vertical movement of the elevator to maintain the top of the pile of sheets at a predetermined level.

The invention is particularly adapted for use with sheet delivery mechanisms associated with printing machines wherein printed sheets are delivered to and deposited on a pile of sheets supported on a suitable platform that is automatically lowered as the height of the pile of sheets increases, and the invention is also adapted for use with sheet feeding mechanisms for printing machines wherein printed sheets are removed from a pile of sheets supported on a platform which is automatically elevated as the height of the pile decreases.

It has been the practice in the past to provide a mechanism to control the pile elevator by a detector device including a finger or like sheet engaging member, arranged to intermittently engage the upper surface of the topmost sheet of the pile. It has been found undesirable in many instances, to have anything touch the upper surface of a printed sheet, due to possible interference with a sheet being delivered to the pile, blurring of moist ink on the printed sheet, wrinkling of the sheet, or damage to the surface finish thereof when it is engaged by such a member.

One of the objects of this invention is to provide an improved detector device for a sheet delivery or a sheet feeding mechanism.

Another object is to provide a detector device for a sheet delivery or sheet feeding mechanism, which is adapted to be engaged and actuated by the edges of the sheets present on the pile, to control the pile raising or lowering mechanism.

A further object is to provide an improved detector device for a sheet delivery or sheet feeding mechanism, which includes a member positioned to be engaged by the edges of the sheets on a pile carried on a movable support or elevator, and which is movable by the edges of said sheets to control means to raise or lower the elevator.

It is also an object of this invention to provide a detector device for a sheet delivery or sheet feeding mechanism, of generally improved construction, whereby the same will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein dis-

closed may be made within the scope of what is claimed without departing from the spirit of the invention.

Preferred embodiments of the invention are illustrated in the accompanying drawings, wherein:

Figure 1 is a side view of a sheet delivery mechanism embodying the features and principles of this invention and from which unessential details of structure have been omitted for the sake of clearness;

Figure 2 is a top plan view of the parts shown in Figure 1;

Figure 3 is an enlarged view showing the improved detector device of the invention as applied to a sheet delivery mechanism;

Figure 4 is a face view of the detector device looking in the direction of arrow 4 in Figure 2;

Figure 5 is an enlarged side view of the pile elevator mechanism and the parts controlled by the detecting device of this invention; and

Figure 6 illustrates an arrangement of the detector for use when the invention is applied to a sheet feeding mechanism.

The delivery mechanism selected to illustrate the features and principles of this invention is of the well-known type in which a sheet carrying element in the form of a chain 11, illustrated for the sake of clearness in the drawings, by a dot and dash line (see Figure 1), and having sheet gripping means 12 thereon, is led over sprockets 13, 14, 15 and 16, also illustrated by dot and dash lines. The chain 11 is driven by the sprocket 13, the shaft 17 of which is driven through a gear 18 from any suitable source such as an electric motor (not shown) or a rotating part of the printing machine with which the delivery mechanism is associated. The chain 11, by means of the sheet gripping members 12, carries sheets 19 to a pile 21 thereof supported on and carried by a movable sheet supporting or receiving platform 22, the sheets 19 being released from the members 12 in the usual manner and laid upon the pile 21 between opposing sheet edge guiding plates 23 and 24 which act in the usual manner to jog the sheets into alignment. The sprockets 13, 14, 15 and 16 are supported by and are disposed between a pair of spaced apart machine frames 25.

The pile elevator or platform 22 is arranged to be raised and lowered by an electric motor 26 through suitable speed reduction gearing associated with the motor 26 and disposed in a gear box 27. A shaft 28 driven by the motor 26 through the gears in the gear box 27 has a gear 29 secured thereon which is in constant mesh with the gear 31 loosely mounted on a cross shaft 32. A movable motor drive clutch part 33 keyed to the shaft 32 (see Figure 2) is arranged to be moved into clutching engagement with a corresponding clutch part 34 formed on the hub 35

of the gear 31. The shaft 32 extends between and beyond each of the frames 25 and has a worm gear 36 on each end thereof. Each worm gear 36 is in mesh with a worm wheel 37 (see Figure 1) secured on a shaft 38 which extends along the outside of the adjacent frame 25. Each shaft 38 has a sprocket 39 secured thereto at each end thereof over which a chain 41, indicated by a dot and dash line, is led and is connected to one end of each of a pair of bars 42 and 43 which carry the platform 22, whereby operation of the motor 26 will raise or lower the platform 22 when the clutch parts 33 and 34 are engaged.

A movable machine drive clutch part 44 is keyed to the shaft 32 adjacent a toothed ratchet wheel 45 (see Figure 2) loosely mounted on the shaft 32, and is adapted to be moved into clutching engagement with a corresponding clutch part 46 formed on the opposing face of the ratchet wheel 45 whereby the shaft 32 will be rotated to lower the table 22 when the ratchet is rotated, due to engagement of the clutch parts 44 and 46. The motor drive clutch parts 33 and 44 are arranged to be moved by a rod 47 extending between and slidably supported by the frames 25, by being connected to the rod by arms 48 and 49. The arrangement is such that either pair of corresponding clutch parts may be clutched together when the other pair is in unclutched position or both pairs may be in neutral position, as shown.

The platform carrying the pile of sheets can thus be raised or lowered by means of the motor, and in the use of the device, with a delivery mechanism, the pile to which the sheets are delivered may be lowered by the operation of the machine. Similarly, in the use of the device with a sheet feeding mechanism, the pile of sheets may be raised by operation of the machine when the height of the pile is reduced by the removal of the sheets.

The ratchet wheel 45 is adapted to be rotated in synchronism with the printing machine from the sprocket 15, which is driven through the chain 11 from the driven gear 18. A gear 51 secured on a shaft 52 of the sprocket 15 is in mesh with a gear 53 secured on a crank shaft 54 which has a crank arm 55 secured thereto. A link 56 is connected to the arm 55 and to a link 57 at the end of a swingable arm 58, used also for other purposes. The link 57 is connected to an arm 59 mounted on the cross shaft 32 and which carries a pawl 61 (see Figures 1 and 5) adapted to engage the teeth of the ratchet wheel 45. The pawl 61 is swingably mounted on a stud 62 and is provided with a rearwardly extending lug 63 which is adapted to be engaged by the end of a catch-arm 64 to hold the pawl 61 out of operable engagement with the teeth of the ratchet wheel 45 when it is swung into position through the intermediary of the crank arm 55 and disposed in the path of movement of the lug 63, on the pawl 61.

The catch-arm 64 is swingably mounted on a stud shaft 65 and has an arm 66 extending therefrom, which arm 66 is connected by a rod 67 to the end of an arm 68 (see Figure 1) secured on a rock shaft 69. The shaft 69 is arranged to be rocked once every revolution of the crank shaft 54 by means of a cam 71, secured on and rotating with the shaft 54, through an arm 72 secured on the shaft 69 and having a roller 73 at its end in position to be engaged by a high cam surface 74 on the cam 71. Action of the cam 71 on the

catch-arm 64 swings it out of the path of the lug 63 whereby the pawl 61 may rotate the ratchet wheel 45.

The rock shaft 69 also has an arm 75 secured thereto and which is connected by a rod 76 to an arm 77 pivoted adjacent the sheet guide plate 23. The arm 77 is swingably mounted on a shaft 78 and has a finger 79 secured thereto extending toward and over the plate 23. Rocking movement of the finger 79 is caused by the rocking movement of the arm 75 by the rock shaft 69 which in turn is rocked by the cam 71. Such movement will swing the finger 79 past the upper end 81 of a pivoted lever 82 if the latter is not in the path of the finger, but if as shown in Figure 3, the end 81 is in the path of the finger 79 they will engage and the finger will be prevented from swinging. A coiled spring 83 (see Figure 1) secured at one end to the adjacent frame 25 and at its other end to an arm 84 secured to and extending from the rock shaft 69 constantly acts to urge the roller 73 toward the cam 71 and to maintain the catch-arm 64 in position to engage the lug 63 and prevent the pawl 61 from engaging and rotating the ratchet wheel 45. When the finger 79 is prevented from swinging, and is held upwardly by the end 81 of the lever 82, the rod 67 does not operate to swing the catch-arm 64 into the path of the lug 63 and the pawl 61 is thus permitted to rotate the ratchet wheel 45. The cross-shaft 32 is thereby rotated and the table 22 will be lowered due to rotation of the shafts 38.

The lever 82 (see Figure 3) is pivoted on a pin 80 to a cross-frame member 85 and has a flat portion 86, formed on an arm 87 which extends through an opening in the sheet guide plate 23, that is secured to the frame member 85. The arm portion 86 is engaged by the adjacent edges of sheets 19 on the platform 22. A light leaf spring 88 secured at one end to the frame member 85 engages the arm 87 to constantly urge it inwardly into sheet edge engaging position. When sufficient sheets 19 have been delivered upon the pile 21 to raise the level of the top of the pile to a point where the sheets engage the arm portion 86 and exert sufficient pressure to overcome the tension of the spring 88 and thereby press the arm portion 86 outwardly, the end 81 of the lever 82 is disposed in the path of movement of the finger 79 and the catch-arm 64 is moved out of the path of movement of the lug 63 whereby the pawl 61 will engage the ratchet wheel 45 and the pile 21 will be lowered to make room for more sheets 19. As soon as the pile 21 is lowered sufficiently to permit the sheet edge engaging portion 86 of the arm 87 to be disengaged from the adjacent sheet edges, the lever 82 will be swung under the urge of the spring 88 and the end 81 will be moved from position to engage the finger 79, whereby the spring 83 will act to swing the catch-arm 64 into position to prevent the pawl 61 from rotating the ratchet wheel 45 and the lowering of the pile will be prevented.

The detector device of this invention, as herein shown as being constituted by the lever 82 and associated parts is adapted to control the pile elevator by being actuated by the side edges of the sheets 19 being delivered upon a pile 21 and no part or parts are permitted to engage the upper or printed surface of the sheets 19 nor be in the path of the sheets being delivered. No blurring or smudging of the ink on the printed

sheets is therefore possible and the finish on the surface of the sheets is not damaged.

The invention as applied to a sheet delivery mechanism is shown in Figures 1 to 5 of the drawings, but those versed in the art will understand that it is equally applicable to a sheet feeding mechanism by a slight rearrangement of parts, as shown in Figure 6. In the case of a sheet delivery mechanism, the pile elevator mechanism acts to lower the pile as sheets are deposited thereon and thus maintain the top of the pile at a substantially constant level, while in a sheet feeder, the pile elevator operates to raise the pile as sheets are removed therefrom and thus maintain the top of the pile at a substantially constant level. The only difference in the mechanism is that for a sheet delivery, the arm 82, as shown in Figure 3, engages the finger 79 when it has been moved to the position shown, by sheets 21, whereas for a sheet feeding mechanism, as shown in Figure 6, the arm 82' is moved to the position shown by the spring 88', so that its end 81' will engage the finger 79' in the absence of sheets 21' in a position to engage the arm portion 86'.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, and it will be further understood that each and every novel feature and combination present in or possessed by the mechanism herein disclosed forms a part of the invention included in this application.

What I claim is:

1. In a sheet delivery mechanism, a sheet receiving member, means to move said member in a vertical plane, and means to control said member moving means including a rockable finger in control of said member moving means, and a swingable lever having a portion disposed in the path of movement of edges of the sheets as they are delivered to the receiving member to be swung thereby into the path of the rocking movement of said rockable finger.

2. A detector device for controlling the movement of a sheet receiving platform in a vertical plane including a swingable lever having end portions and being pivoted intermediate said end portions, one of said end portions being adapted to be engaged and acted upon by edges of sheets delivered to said platform to swing said lever and the other end portion being adapted to be moved into position to be engaged by a platform moving control part when said lever is swung.

3. In a sheet delivery mechanism, the combination of a sheet receiving platform, means to move said platform in a vertical plane, means to control the actuation of said platform moving means including a finger rockable in one direction to prevent actuation of said platform moving means, and a lever positioned adjacent the side edges of sheets disposed in a pile on said platform, said lever having a part adapted to be moved by the side edges of sheets of the pile into position to interfere with the rocking movement of said finger to stop it and thereby permit actuation of said platform moving means.

4. In a sheet delivery mechanism, a sheet support, means to move said support in a vertical plane, means to control the actuation of said

support moving means, comprising a pair of co-operating levers, a first one of said levers being swingable to control said support moving means and the second one of said levers having an end portion engaged by the side edges of sheets on said support to be swung thereby to move its other end into cooperating engagement with the first lever to connect said first lever with the side edges of said sheets, for control thereby.

5. In a mechanism for controlling the movement of a pile of sheets, a support to hold the pile, a mechanism to move the support vertically as the number of sheets thereon varies, means to control the actuation of the said mechanism including a pair of cooperating pivotally supported levers, the first one of said levers being swingable to control the said mechanism and the second one of said levers having a portion engaged by the side edges of the sheets on the support to position a part of the lever in the path of the first lever and interrupt its swinging movement, while the said portion of the second lever is engaged by the side edges of the sheets, whereby the said mechanism will operate to move the support while the levers are so engaged.

6. In a mechanism for controlling the movement of a pile of sheets, a support to hold the pile, a mechanism to move the support vertically as the number of sheets thereon varies, means to control the actuation of said mechanism including a pair of co-operating pivotally supported levers, the first one of said levers being swingable to control the said mechanism and the second one of said levers having a portion engageable by the side edges of sheets on the support and a part normally in the path of the first lever and arranged to interrupt its swinging movement, the said part of the second lever being movable out of the path of the first lever by engagement of the sheets, whereby the said mechanism will then operate to move the support.

7. In combination, a supporting member for a pile of sheets, means to move the supporting member vertically, and means for controlling vertical movements of the supporting member as the number of sheets thereon varies, including a first pivoted member having an arm in contact with side edges of sheets on the supporting member, a second pivoted member connected to the said controlling means to actuate the same, the said first pivoted member cooperating with the second pivoted member to actuate the control means and thereby move the supporting member vertically when the first pivoted member is moved relatively to the said second pivoted member by variation in the number of sheets on the supporting member.

8. In combination, a supporting member for a pile of sheets, means to move the supporting member vertically, and means for controlling vertical movements of the supporting member as the number of sheets thereon varies, including a first pivoted lever having an end adapted to swing in a substantially vertical plane to control the actuation of the controlling means, and a second pivoted member adapted to have its swinging movement controlled by the side edges of the upper sheets on the supporting member and having an end arranged to swing into the path of the vertically swinging end of the first pivoted lever to interrupt its swinging movement in one direction.

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