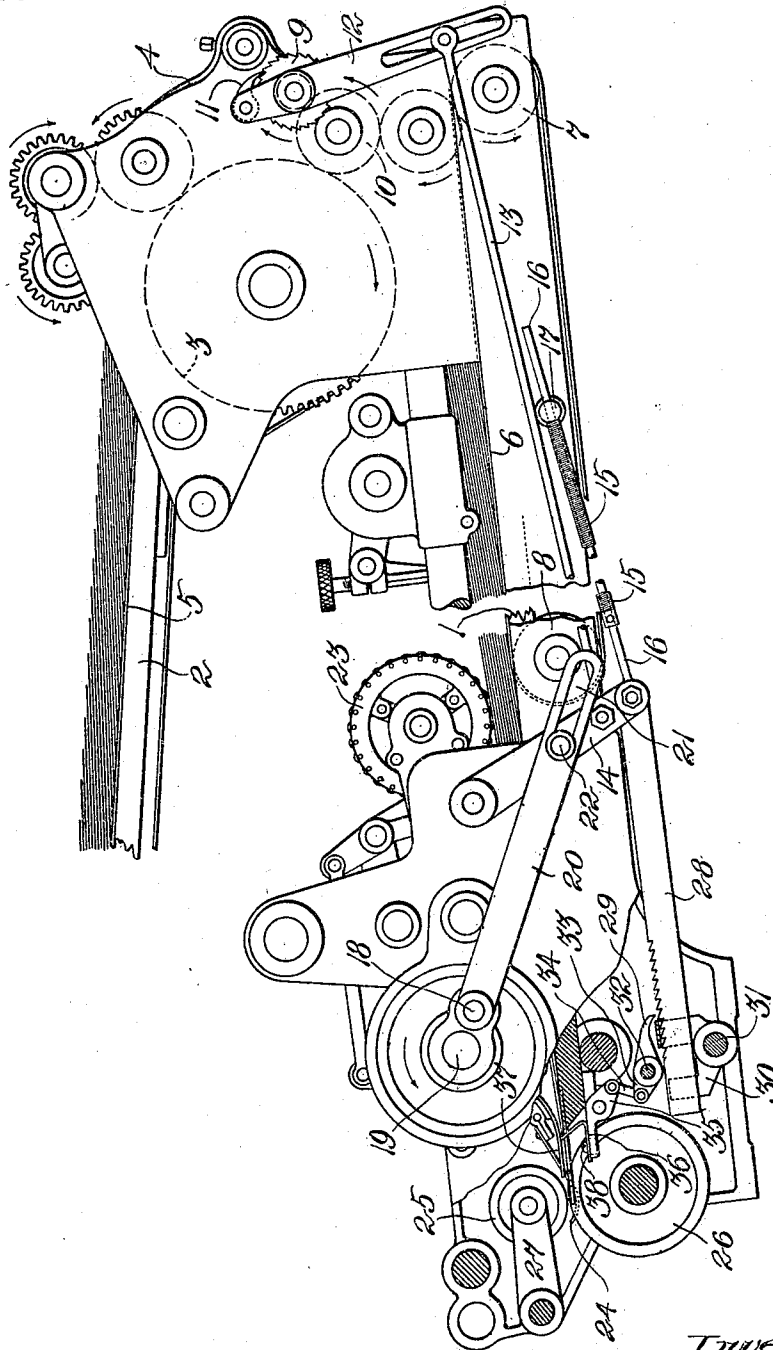


F. L. CROSS.
SHEET FEEDING MACHINE.
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982,256.



Witnesses:
M. L. Gilman.
W. D. McPhail

Inventor
Frank L. Cross
by
Phillips Van Orman & Fish
Attorneys

UNITED STATES PATENT OFFICE.

FRANK L. CROSS, OF WOLLASTON, MASSACHUSETTS, ASSIGNOR TO CROSS PAPER FEEDER COMPANY, A CORPORATION OF MAINE.

SHEET-FEEDING MACHINE.

982,256.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK L. CROSS, a citizen of the United States, residing at Wollaston, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Sheet-Feeding Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to that class of paper feeding machines in which a bank of feathered or fanned out sheets is presented to devices which separate individual sheets from the front of the bank so that they may be removed and presented to machines or devices for further manipulating or acting on them.

In order that the separating devices may operate properly upon the front of the bank of sheets in this class of machines, and may properly separate the individual sheets, the bank of sheets should be so fed to the separating devices that the front edge of the bank will be maintained at a substantially uniform point. So long as the front edge of the bank of sheets is at this point or in advance of it, there should be no feed of the bank, but as soon as the removal of successive sheets from the front of the bank carries the front edge of the bank back of this point, there should be a feed of the bank, and the feed should continue until the front edge of the bank is brought up to the proper point.

It is the object of the present invention to provide a new and improved mechanism for feeding the bank of feathered sheets which will automatically act to maintain the front edge of the bank at a substantially uniform point during the separation and removal of the individual sheets from the front of the bank.

In accordance with one feature of the invention, the mechanism for feeding forward the bank of feathered sheets is automatically controlled to maintain the front edge of the bank at a substantially uniform point by a controlling device which is arranged to be covered by the front of the bank when the bank is in proper position for the effective separation of the sheets, and to be uncovered when the front edge of the bank is back of the proper point. The controlling device,

and the means by which it causes feeding movements of the bank to be effected when uncovered, and prevents such feeding movements when covered, may be of any suitable and desirable form and arrangement, and may be varied to suit the form of construction of the sheet separating devices or of the other parts of the bank feeding mechanism with which they are combined.

While the invention may be embodied with advantage in machines provided with any of the various forms of sheet separating devices, it is, in its preferred form, especially designed to meet the requirements of an efficient bank feed in machines in which combing rolls are employed as the sheet separating means. The invention has accordingly been illustrated as embodied in a machine in which the sheet separating devices consist of combing rolls operated and controlled by mechanism similar to the mechanism illustrated and described in Patent No. 812,260, dated February 13, 1906.

The various features of the invention will be readily understood from an inspection of the accompanying drawing, in which the figure is a side elevation partly in section showing a machine similar to that illustrated in the patent above referred to provided with the present invention in its preferred form.

As shown in the drawing, the bank of feathered sheets is fed to the feed table 1 from a supply table 2, the front end of which is arranged over the rear end of the feed table. The bank of sheets passes from the supply table to the feed table through a curved throat formed between the drum 3 and curved guides 4. The bank upon the supply table rests upon feed tapes 5 which pass around the drum 3, and the bank of sheets upon the feed table rests upon the feed tapes 6 which pass over the pulleys 7 and 8. The feed tapes 6 and drum 3 are operated at proper intervals to advance or feed forward the bank of feathered sheets through a ratchet wheel 9 which is connected through suitable gearing 10 with the drum 3 and pulley 7 over which the tapes 6 pass. The ratchet wheel is operated by means of a feed pawl 11 pivoted to the upper end of a pawl carrying lever 12. The lower end of the pawl carrying lever is connected by means of a link 13 with a lever 14 through which feeding movements are imparted to the pawl carrying lever and pawl 11. The lever 14 is forced toward the

left, or in a direction to impart a feeding movement to the pawl 11, by the action of a spring 15 which surrounds a rod 16 pivoted to the end of the lever 14, and mounted to slide through a pin 17. The lever 14 is moved toward the right, or in a direction to retract the feed pawl 11, by means of a crank pin 18 carried on the end of the cam shaft 19, and connected with the lever by a link 20. The link 20 is connected with the lever 14 through a slot 21 formed in the end of the lever and arranged to ride over a pin 22 carried by the lever.

When the lever 14 is free to move toward the left, the pin 22 will bear against the left-hand end of the slot 21 as the link 20 is reciprocated by the rotation of the crank pin 18, and the lever 14 will be moved toward the left by the spring 15 to give the feed pawl a feeding movement, and will be moved toward the right to retract the pawl by the engagement of the end of the slot 21 with the pin 22. If the movement of the lever 14 toward the left is prevented during the movement of the link 20 toward the left, the link 20 will reciprocate idly back and forth, the slot 21 playing back and forth over the pin 22. If the movement of the lever 14 toward the left is arrested during the movement of the link 20 toward the left, the pin 22 will continue in engagement with the left-hand end of the slot 21 until the lever is arrested, and thereafter the link 20 will move idly toward the left. On the return stroke of the link 20 the left-hand end of the slot 21 will reengage the pin 22 and return the lever 14 to its retracted position. The action of the bank feeding mechanism may therefore be prevented by preventing the movement of the lever 14, or the feeding movement of the bank may be arrested at any time during the feeding movement of the bank feeding mechanism, by arresting the movement of the lever 14. The movement of the lever 14 is prevented or arrested during the operation of the machine to secure the proper feeding of the bank of sheets by controlling mechanism which will be hereinafter described. The sheets at the front end of the bank of sheets upon the feed table 1 are acted upon by two combing rolls, one of which is indicated at 23. These rolls are located on each side of the feed table, and are independently controlled by devices which are fully illustrated and described in the patent above referred to. The combing rolls are so controlled that the roll at each side of the center line of the sheet acts until the edge of the sheet at that side has been advanced into proper position to be seized and removed, and is then thrown out of action. The top sheet is advanced by the combing rolls until the front edge of the sheet acts upon the controlling trips 24, when the combing action ceases. The trips

24 are so located that the front edge of the sheet is brought between the delivery rolls 25 and 26 by the action of the combing rolls. The delivery rolls 25 are carried in arms 27, and are lowered immediately after the combing rolls are thrown out of action, so that the top sheet, which has been separated and fed forward by the combing rolls, is carried away by the delivery rolls. After the top sheet has been thus removed, and the rear edge of the sheet has passed the delivery rolls, the roll 25 is raised, and the combing rolls are again thrown into action.

In order that the sheets may be properly separated by the combing rolls, and individual sheets presented to the delivery rolls, the front edge of the bank of sheets should be such a distance back of the trips 24 that the combing rolls will effect the proper separation of the sheets in advancing the top sheet into position to be seized by the delivery rolls. At the same time the front edge of the bank of sheets should not be so great a distance back of the trips 24 that the combing devices will not advance the top sheet sufficiently to bring it into position to be seized by the delivery rolls. The front edge of the bank of sheets should therefore be maintained at a substantially fixed distance from the tripping devices 24, which distance will depend upon the separation effected by the combing rolls during the time which they may remain in action.

In the construction shown, the action of the bank feeding mechanism is controlled to maintain the front edge of the bank at a substantially uniform distance from the tripping devices by controlling the feeding movements of the lever 14 through which feeding movements are imparted to the bank. The devices for controlling the feeding movement of the bank consist of a ratchet bar 28 and a pawl 29 adapted to be moved into and out of engagement with the ratchet teeth on the bar. One end of the ratchet bar is pivoted to the lower end of the lever 14, and the other end is supported in a block 30 which is pivotally supported upon a rod 31. The pawl 29 is secured to a rock shaft 32 which is connected through an arm 33 and link 34 with one end of a lever 35. The lever 35 is pivoted below the forward end of the feed table 1, and carries a controlling finger 36 which projects up through the feed table near its center. The weight of the parts is such that the lever 35 tends to swing into the position indicated in the drawing, with the controlling finger projecting up above the surface of the feed table. With the parts in this position, the pawl 29 is raised out of engagement with the teeth of the ratchet bar 28, so that the lever 14 is free to move and to impart feeding movements to the bank feeding mechanism. Guide fingers 37 are provided, which over-

lie the front edge of the bank of sheets, and hold it down in position to depress the controlling finger 36, and thus hold the lever 35 in position to retain the pawl 29 in engagement with the teeth of the ratchet bar 28. When the pawl 29 is thus held in engagement with the teeth of the ratchet bar 28, movement of the lever 14 toward the left is prevented, and thus the action of the bank feeding mechanism is prevented or arrested.

When the front end of the bank of sheets covers the controlling finger 36, the controlling finger will be depressed and maintained in position to hold the pawl 29 in engagement with the ratchet teeth on the bar 28, and thus prevent the action of the bank feeding mechanism. When the removal of successive sheets from the front of the bank carries the front edge of the bank back of the controlling finger 36, so that the controlling finger is uncovered, the lever 35 will be free to swing into position to lift the pawl 29 and hold it above the ratchet teeth in the bar 28. The bank feeding mechanism will now advance the bank of sheets, until the front edge of the bank rides over the controlling finger 36, thus covering and depressing the finger and swinging the pawl 29 into engagement with the ratchet teeth on the bar 28. Whenever the front edge of the bank of sheets is behind the controlling finger 36, a forward feeding movement will therefore be imparted to the bank of sheets, and this movement, or successive feeding movements will continue until the front edge of the bank rides over the controlling finger, and thus arrests the feeding movement, or prevents subsequent feeding movements of the bank.

In order that the position of the front edge of the pawl may be adjusted in accordance with the character of the paper being operated upon by the combing rolls, the controlling finger 36 is adjustably secured to the lever 35 by means of a screw 38 passing through a slot formed in the base of the controlling finger.

Having set forth the nature and object of the invention, and specifically described one form of apparatus in which it may be embodied, what I claim is:—

1. A sheet feeding machine, having, in combination, sheet separating means, a controller for controlling the separating means by the sheet, mechanism for feeding a bank of feathered sheets, and a controlling device connected and arranged to render the feeding mechanism inactive when covered by the front of the bank and to render the feeding mechanism active when uncovered thereby, substantially as described.

2. A sheet feeding machine, having, in combination, a combing roll, a sheet operated controlling trip for throwing the combing roll out of action, mechanism for feeding a bank of feathered sheets to the combing roll, a controller mounted to extend across the front edge of the bank, and means rendered active upon the movement of the controller by the bank for arresting the feeding action of the bank feeding mechanism, substantially as described.

3. A sheet feeding machine, having, in combination, a combing roll, mechanism controlled by the sheet for throwing the combing roll out of action, mechanism for feeding a bank of feathered sheets to the combing roll, a pawl and ratchet connected to control the feeding movements of the feeding mechanism, a controller, and connections for engaging the pawl with the ratchet when the controller is in engagement with the bank, substantially as described.

4. A sheet feeding machine, having, in combination, sheet separating means, a controller for controlling the separating means by the sheet, mechanism for feeding a bank of feathered sheets to the separating means, a pawl and ratchet connected to control the feeding movements of the feeding mechanism, a second controller, and connections for engaging the pawl with the ratchet when the second controller is in engagement with the bank, substantially as described.

5. A sheet feeding machine, having, in combination, a combing roll, mechanism controlled by the sheet for throwing the combing roll out of action, mechanism for feeding a bank of feathered sheets, and a controlling device connected and arranged to render the feeding mechanism inactive when covered by the front of the bank and to render the feeding mechanism active when uncovered thereby, substantially as described.

6. A sheet feeding machine, having, in combination, sheet separating means, mechanism for feeding a bank of feathered sheets, a ratchet connected to move with the feeding mechanism, a pawl for engaging and arresting the feeding movement of the ratchet, and a controller cooperating with the front edge of the bank after the sheet acted on by the separating means has been removed to control the engagement of the pawl with the ratchet, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

FRANK L. CROSS.

Witnesses:

ANNIE C. RICHARDSON,
N. D. McPHAIL.