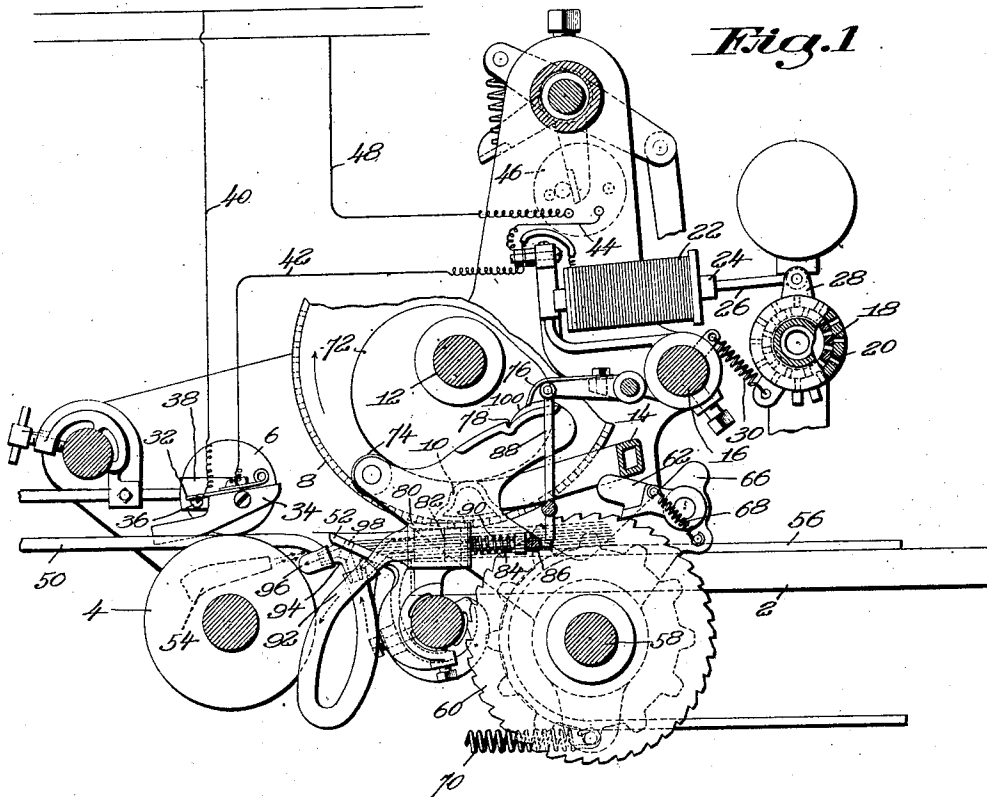
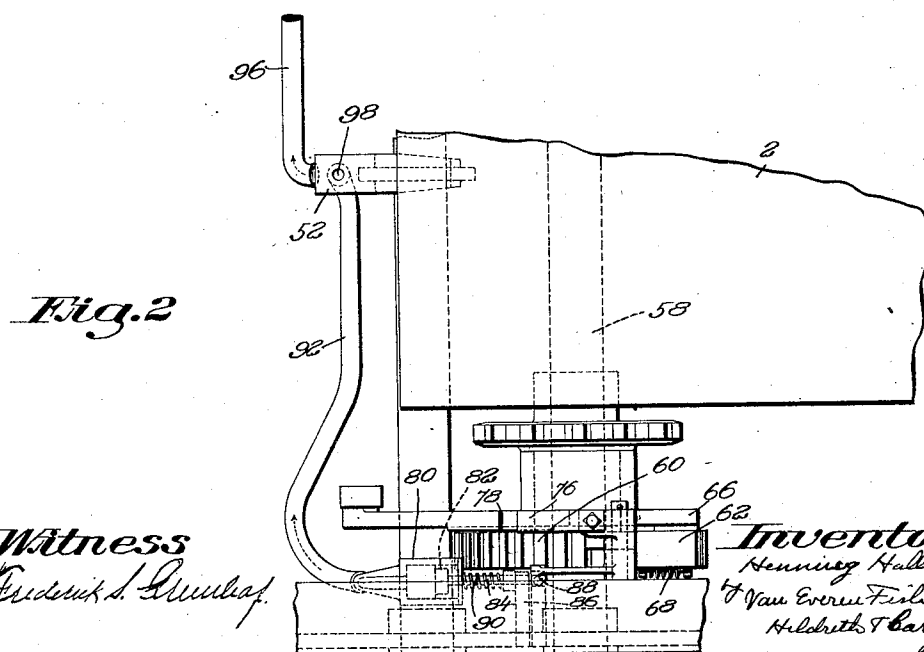


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**H. HALLSTREAM**  
PAPER FEEDING MACHINE

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*Witness*  
*Frederick S. Grunbaf.*

*Inventor*  
*Henning Hallstrom*  
*& Van Everen Fish*  
*Hildreth & Cary* atty

## UNITED STATES PATENT OFFICE

HENNING HALLSTREAM, OF BRAINTREE, MASSACHUSETTS, ASSIGNOR TO CROSS PAPER FEEDER COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

## PAPER-FEEDING MACHINE

Application filed October 3, 1924. Serial No. 741,363.

The invention relates to paper feeding machines which separate individual sheets from a bank and forward them in succession to a mechanism or machine for operating thereon.

5 The object of the invention is to provide a simple and efficient means for so regulating the feed of a feathered bank of sheets that the front end of the bank will be maintained in a substantially uniform position with relation to the devices acting thereon, and a means which is well adapted for application to a machine in which the sheets are separated from the front end of a continuous bank by a suction feed wheel arranged over the front  
10 end of the bank. To this end, the invention comprises the features of construction and combinations of parts hereinafter described and referred to in the claims.

In the drawings Figure 1 is an elevation, partly in section, showing so much of a continuous paper feeding machine as is necessary to illustrate the application of the present invention thereto, and Figure 2 is a detail plan view of parts shown in Figure 1.

25 The invention is shown embodied in a paper feeder of the continuous type in which a bank of feathered or fanned-out sheets is fed from an upper delivery table through a reversing throat and onto a lower feed table, the forward end of which is indicated at 2. The individual sheets are separated from the front end of the bank and presented to the continuously acting delivery devices comprising the lower continuously rotating rolls 4  
30 and the upper rolls 6 which are continuously pressed against the lower rolls.

The means for separating individual sheets from the forward end of the bank and feeding them to the delivery rolls comprises a suction feed wheel 8 having its rim perforated to co-operate with an internal suction nozzle 10 in creating a suction through the rim for feeding forward the top sheet. The suction nozzle is in the form of a box adapted to fit snugly against the inner surface of the wheel and provided with a series of portholes adapted to register with the rows of perforations in the periphery of the ring. The suction wheel is secured to a continuously rotating shaft 12 so mounted that the rim of the wheel is slight-

ly above the forward end of the bank and the nozzle is carried on the end of a hollow arm 14 suitably supported from the transverse bar 16. The arm is connected through suitable piping with a cut-out valve casing 18 which is in turn connected through suitable piping with a suction producing device. The suction through the feed wheel is controlled by a cut-out valve comprising the inner casing 18 and a rocking sleeve valve 20 which is provided with slots adapted to be moved by rocking movement of the sleeve into and out of register with a corresponding series of slots formed in that part of the valve casing which is surrounded by the sleeve. The cut-out valve is operated through a solenoid 22, the armature 24 of which is connected by a link 26 with an arm 28 projecting upward from the valve sleeve. When the magnet is energized the valve is rocked into position to shut off communication between the valve casing and the atmosphere, so that a suction is produced through the suction nozzle and feed wheel. When the magnet is deenergized the valve sleeve is moved by a spring 30 into position to open communication between the valve casing and the atmosphere, thus cutting out or destroying the suction through the nozzle and feed wheel.

The operation of the magnet and cut-out valve is controlled by a sheet operated trip comprising a contact strip 32 carried by a trip finger 34 and a contact pin 36 carried by a block 38 on which the finger is pivoted. The contact pin and strip are connected in the magnet circuit through wires 40 and 42, one of which leads from the source of the electric current and the other of which leads to the binding screw forming one terminal of the magnet. The other terminal of the magnet is connected by a wire 44 with one of the terminals of a switch 46, the other terminal of which is connected by a wire 48 with the source of current supply.

When no sheet is passing under the trip finger 34 it swings down below the plane of the guide wires 50, closing the magnet circuit so that the cut-out valve is closed and a suction produced through the suction wheel. When the front edge of the sheet fed for-

ward by the feed wheel passes between the delivery rolls, it engages and raises the trip finger, thus breaking the magnet circuit so that the suction through the feed wheel is broken or cut off. As the sheet is delivered, the trip finger rides on the top sheet until the rear end of the sheet passes from beneath it when it again drops down completing the circuit through the magnet and re-starting the suction through the feed wheel.

The front edges of the sheets at the forward end of the bank rest against and are supported by upwardly inclined guide fingers 52 and the upper sheet is raised into engagement with the rim of the feed wheel by the action of air blasts directed by the blower nozzles 54 in an upwardly inclined direction against the front edge of the bank. The bank of sheets is fed forward over the feed table by the usual feed tapes 56 passing over pulleys carried by the shaft 58 and actuated by mechanism which is adapted to maintain the front end of the bank in proper relation to the feed wheel and blast nozzles. As thus far described the machine is the same in construction as that shown and described in application No. 713,233, filed May 14, 1924.

In applying the present invention to the machine above described, the feed of the bank is pneumatically controlled from its front end so that the front end is maintained in proper relation to the feed wheel and blast nozzles to secure a uniformly reliable separation of the sheets. The pneumatic means shown comprises a suction device which determines the action of the bank feeding mechanism and which is controlled through a port arranged to be closed by the front end of the bank when in proper position.

The bank feeding mechanism comprises a ratchet wheel 60 secured to the shaft 58 and a feed pawl 62 which is given a feeding stroke only when the front end of the bank is back of the port which controls the suction device. The feed pawl is carried on a lever 66 and is held in engagement with the ratchet wheel by a spring 68. The pawl carrying lever is connected with a spring 70 which acts to retract the pawl when permitted to do so. Whenever the pawl is retracted it is advanced to feed forward the bank of sheets by a cam 72 secured to the shaft 12 and arranged to act on a roll 74 on the lever 66. The retracting movement of the pawl is normally prevented by a pivoted stop pawl 76 which is arranged to engage a stop notch 78 on the lever 66 when the cam roll rides off the high part of the cam and registers with the low part.

The engagement of the stop pawl with the stop notch is controlled through a pneumatic suction device comprising a cylinder 80 and a piston 82 fitting within the cylinder. The piston is connected to the forward end

of a rod 84, the rear end of which passes through a guide pin 86 and is so arranged that it may pass under the lower end of a rod 88, the upper end of which is pivotally connected to the stop pawl 76.

The piston rod is forced in a direction to carry its rear end under the end of the rod 88 by a spring 90 interposed between a bar at the end of the cylinder 80 and a collar secured to the piston rod. The chamber within the cylinder in front of the piston is connected by a flexible pipe 92 with a pipe or conduit 94 carried by one of the guide fingers 52 which underlie the front end of the bank. The conduit is also connected by a pipe 96 with a suction device and is also provided with a port 98 through the upper surface of the guide finger which is arranged to be covered by the sheet or sheets at the front end of the bank when the bank is in proper relation to the sheet separating devices.

When the port 98 is covered, the cylinder 80 is in communication with the suction device and a partial vacuum is formed therein so that the piston 82 is retracted against the pressure of the spring 90 and the rear end of the piston rod is withdrawn from beneath the rod 88. With the parts in this position each time the roll 74 passes onto the high part of the cam the pawl 76 is lifted out of the notch 78 by the cam surface 100 on the lever 66 and the lower end of the rod 88 is lifted above the end of the piston rod 84. As the cam roll rides off the high part of the cam, the stop pawl will ride down into the notch 78 and prevent the retraction of the pawl carrying lever 66. This action will continue so long as the front end of the bank closes the port 98. As soon as the removal of the successive sheets causes the port 98 to be uncovered, the suction through the pipe 92 and in the cylinder 80 is relieved or broken so that the spring 90 may move the piston to project the piston rod under the end of the rod 88 when the stop pawl 76 is next lifted. When this occurs, the engagement of the pawl with the notch 78 is prevented and the feeding pawl 62 is retracted so that the pawl is given a feeding movement by the cam 72. This action will continue until the port 98 is again covered by the front end of the bank when the feed will be interrupted until the port is again uncovered by the removal of the successive sheets. A sensitive and efficiently operating means is thus provided for maintaining the forward end of the bank in position to be properly operated upon by the suction wheel and blast nozzles.

What is claimed is:

1. A paper feeding machine having, in combination, a table, means for feeding a feathered bank of sheets to the table, and pneumatic means cooperating with the front end of the bank for controlling the feed of the

bank to maintain its front end in substantially uniform position.

2. A paper feeding machine having, in combination, a feed table, means for feeding a feathered bank of sheets over the table, a suction device for controlling the bank feeding mechanism, and means for controlling the suction by the front end of the bank.

3. In a paper feeding machine having separating devices, the combination of a feed table, means for feeding a feathered bank of sheets over the table, a port arranged to be covered by the front end of the bank, and pneumatic means controlled by the opening and closing of the port and independently of the separating devices to render the bank feeding means active and inactive.

4. A paper feeding machine having, in combination, a feed table, means for feeding a feathered bank of sheets over the table, a port arranged under the front end of the bank, and a suction device controlled by the opening and closing of the port to render the bank feeding mechanism active and inactive.

5. A paper feeding machine having, in combination, a feed table, means for feeding a feathered bank of sheets over the table, a suction feed wheel over the front end of the bank, blast nozzles for directing a blast of air against the front end of the bank, a port arranged to be covered by the front end of the bank when in proper relation to the wheel and nozzles, and a suction device connected with the port for controlling the bank feeding mechanism.

6. A paper feeding machine having, in combination, a feed table, bank feeding mechanism, guide fingers adapted to be engaged by the front end of the bank, one of the guide fingers having a port and a suction device controlled by the opening and closing of the port by the front end of the bank to render the bank feeding mechanism active and inactive.

7. In a paper feeding machine having, sheet separating devices, the combination of, means for feeding a feathered bank of sheets to the separating device, and pneumatic means cooperating with the front end of the bank and adapted to be controlled by sheets other than the top sheet of the bank for controlling the operation of the feeding means.

8. A paper feeding machine having, in combination, a feed table, means for feeding a feathered bank of sheets over the table, means at the front of the table against which the bank is adapted to engage and having a port arranged to be covered by the front end of the bank, and suction means connected with the port for rendering the bank feeding means operative when the port is uncovered.

In testimony whereof I have signed my name to this specification.

HENNING HALLSTREAM.