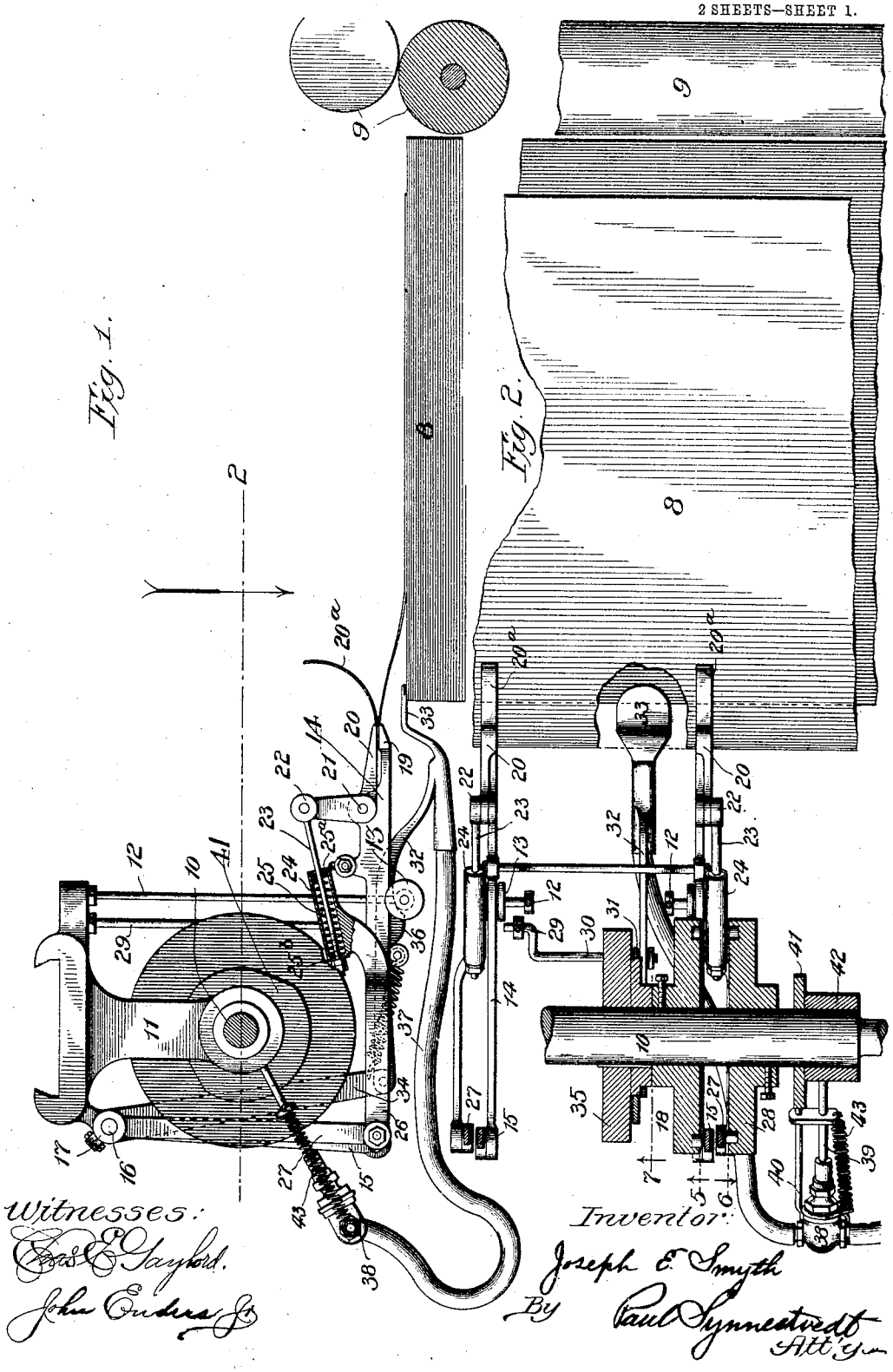
No. 779,975. PATENTED JAN. 10, 1905.

J. E. SMYTH.

SHEET FEEDING MACHINE.

APPLICATION FILED NOV. 14, 1901.

2 SHEETS—SHEET 1.



Witnesses:
Chas. E. Gaylord.
John Enders Jr.

Inventor:
Joseph E. Smyth
By Paul Synnestvedt
Att'y.

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2 SHEETS—SHEET 2.

Fig. 3.

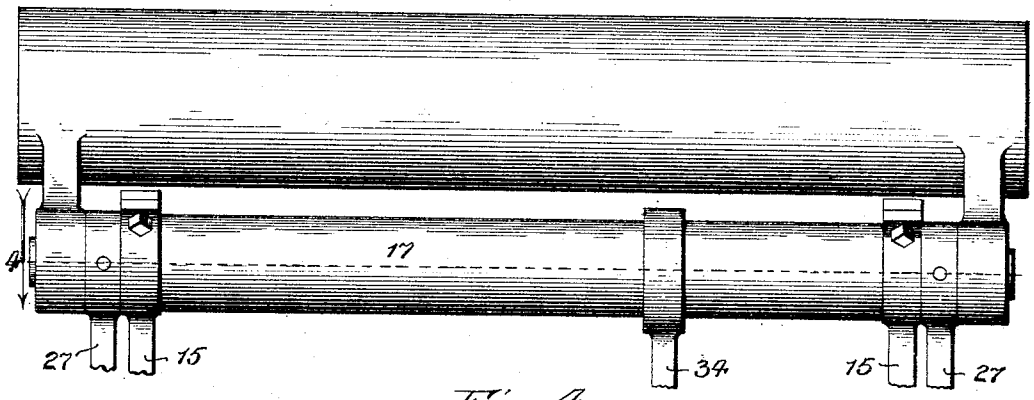


Fig. 4.

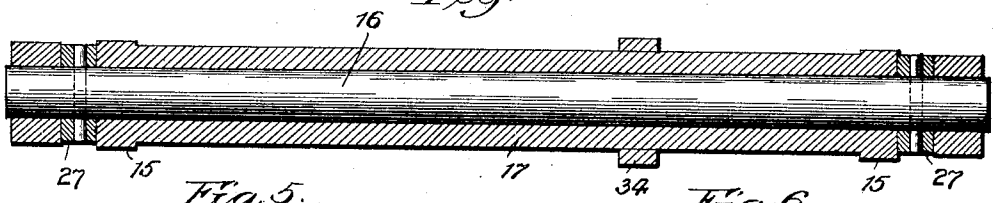


Fig. 5. Fig. 6.

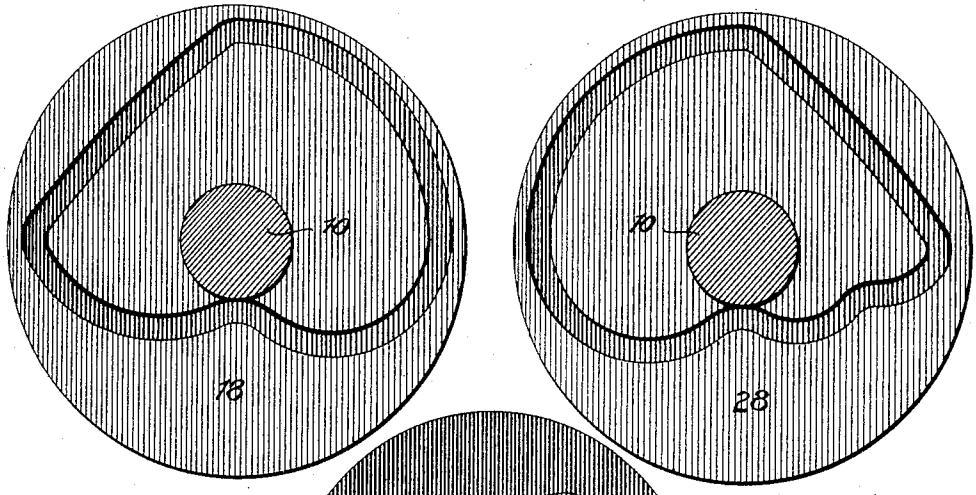
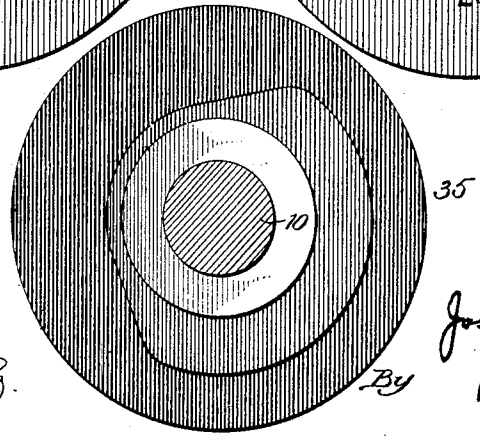


Fig. 7.



Witnesses:
Chas. E. Gaylord.
John Endure Jr.

Inventor:
Joseph E. Smyth
By Paul Symmestedt
Atty.

PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 779,975. Patented January 10, 1905.

UNITED STATES PATENT OFFICE.

JOSEPH E. SMYTH, OF CHICAGO, ILLINOIS.

SHEET-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 779,975, dated January 10, 1905.

Application filed November 14, 1901. Serial No. 82,201.

To all whom it may concern:

Be it known that I, JOSEPH E. SMYTH, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Feeding Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention has reference to machines for feeding sheets of paper from a pile. The primary object of the invention is to construct a machine of this class which will be reliable, rapid, and efficient in its operation, and which will handle paper of all kinds and sizes, as well as paper of a large range of thicknesses, with equal facility.

Another object of my invention is to provide novel mechanism which will successfully feed the paper by taking hold thereof at the rear edge, that is, the edge from which it is to be fed, and pushing the same off the pile until it is engaged by suitable means for carrying it forward, such as a pair of rollers or other equivalent device.

Another object of my invention is the provision of means for inserting a blast of air between the upper sheet of a pile and the remainder thereof, whereby to cause the adhesion between the sheets to be destroyed, and to cause the upper sheet to float as it were upon a film of air, so that it may be readily pushed from the rear edge to start it on its way toward the feeding rollers at its forward edge.

Another object of my invention is to provide mechanism which will take hold of the rear edge of a sheet after it has been raised to separate it from the edge of the next adjacent sheet, which will then pull the sheet backward a short distance, and then push it forward in feeding it toward the front of the pile.

The above, as well as such other objects as may hereinafter appear, I attain by means of a construction which I have illustrated in preferred form in the accompanying drawings, in which

Figure 1 represents a side elevation of my improvement,

Figure 2 is a plan view thereof, with parts of the apparatus in section,

Figure 3 is an enlarged view of a detail of the mechanism,

Figure 4 is a sectional view taken on the line 4 of Figure 3,

Figure 5 is an elevation of one of the cams, being the one used for advancing and retracting the grippers which take hold of the sheet,

Figure 6 is an elevation of the cam which I employ for actuating the mechanism which opens and closes the gripper jaws, and

Figure 7 is an elevation of the cam which I employ for moving the air nozzle into and out of position so as to introduce the jet of air between the topmost sheet and the one immediately below it, in order to separate the same, and cause it to readily slide when it is pushed.

Referring now more particularly to Figures 1 and 2, it will be seen that at the front edge of a pile of papers 8, is arranged a pair of feeding rollers 9, which may be of any preferred construction, and that at the rear end of said pile of papers I have mounted my improved mechanism, which has a driving shaft 10, carried by means of brackets 11, from some convenient part of a frame, the bracket 11 at the base thereof being provided with a plurality of supporting rods, one of which, 12, carries a roller 13, adapted to support an arm 14, which is reciprocated by means of a lever 15, which is pivotally mounted about a counter shaft 16, carried in a bracket 17, cast integral with the base of the bracket 11. The lever 15 receives its movement through the cam 18, shown in elevation in Figure 5. The forward end of the arm 14 is formed into a lower jaw 19 for the gripper, the upper jaw 20 of which is pivotally mounted at 21 upon the arm 14, and provided with a bell-crank extension 22, which by means of a rod 23 has connection with a spring socket 24, within which is a spring 25, the spring socket 24 being in the end of an arm 26, which receives a reciprocating movement from a lever 27, the upper end whereof is mounted about the shaft 16, such reciprocative movement of the arm 26 being imparted by means of the cam 28, shown in elevation in Figure 6. The spring

25 is arranged to bear between the shoulders 25^a and 25^b, so that if the jaw in closing encounters a very thick piece of paper it will yield slightly, and still allow a perfect grip of the paper to be had. In other words, by means of the presence and position of the spring 25 the grippers are adapted to fit different thicknesses of paper.

Depending from the base part of the bracket 11 there is another suspension rod 29, carrying a bar 30 which supports a roller 31, upon which is mounted, so as to reciprocate longitudinally relative thereto, an arm 32, which at its forward end, carries an air nozzle 33, and at its other end has pivotal connection with the lever 34, which is attached at the upper end to the shaft 16, and receives movement by means of the cam 35, shown in elevation in Figure 7. The rod 32 has a downwardly extending cam or projection 36, with inclines on either side thereof, adapted to ride up and over the roller 31 as the arm 32 is reciprocated, in order to procure a raising and lowering movement of the nozzle 33 as the same is moved forward and back.

The nozzle 33 receives its supply of fluid-pressure through the hose-connection 37, the same being controlled by a suitable valve 38, which is automatically actuated by means of a number of devices, comprising a valve-rod 39, and a valve body rod 40, the latter receiving a reciprocating movement from the cam 41, while the valve-rod 39 is held relatively stationary by being pressed against the collar 42, through the instrumentality of the spring 43.

The operation of my invention is as follows.

The upper edge of the topmost sheet of the pile having been raised, either by hand, or by some suitable machinery, into proper position, the grippers formed of the jaws 19 and 20 are automatically opened by the rotation of the cams actuating the same, and being advanced by a longitudinal movement forward, take hold of the sheet, the guard 20^a attached to the jaw 20, serving to guide the sheet in between the jaws. The sheet is then grasped by the closure of the jaws upon it, through the action of the cam, and then pulled backward by the backward reciprocative movement of the gripper, to the position shown in Figure 1, the nozzle 33 being at the same time projected or introduced between the sheet on top of the pile and the balance of the pile, and caused to deliver a blast of air between the same, by means of the automatic opening of the valve 38, through the instrumentality of the cam 41. The sheet, by means of the air blast, is freed from contact or adhesion to the sheet below, the attractive force being destroyed by the action of the air blast, and rides upon the air in a way which will permit it to be pushed by the return forward movement of the grippers, until the forward edge of the sheet engages the feed rolls 9, which then take it and carry it off the pile. Thus the sheet is gripped at the rear edge, pulled backward over a blast of air, and then pushed forward until it is engaged by the feed mechanism which carries it from the pile. The air of the blast blowing toward the front of the pile facilitates this operation.

The nozzle 33 is raised and lowered by the cam 36, and moved back and forth by means of the movement of the arm 32 and lever 34 already referred to, the latter receiving its motion from the cam 35 shown in elevation in Figure 7, and these movements thus produced by the conjoint action of the cam 35 and of the cam projection 36, cause the nozzle to be projected between the top sheet and the sheet immediately below, and to descend upon the lower sheet at the time that the air is released and caused to flow between the two. By this means a much more efficient action of the air blast is secured than is possible where air is delivered directly against the edge of the sheet from a nozzle located outside thereof, as has been heretofore done.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A sheet feeding machine comprising the combination of devices for gripping the sheet at its rear edge and mechanism including said gripping devices for first raising and retracting the sheet to thereby move the whole sheet, and then advancing said gripping devices to slide the whole sheet forward upon the pile, substantially as described.

2. A sheet feeding machine comprising the combination of devices for gripping a sheet at its rear edge, mechanism for retracting and then advancing said gripping devices, to draw the whole sheet backward and then push it forward, and means for introducing a blast of air directly under the rear edge of said sheet, substantially as described.

3. A machine for feeding sheets from the top of a pile, comprising the combination of devices for gripping the uppermost sheet of the pile at its rear edge, mechanism for retracting and then advancing said gripping devices, to draw the whole sheet backward and then push it forward, and means for introducing a blast of air between the topmost sheet and the balance of the pile at the rear edge, whereby to cause the said topmost sheet to ride upon said air, and separate said sheet from the balance of the pile, substantially as described.

4. In a sheet feeding machine, the combination of devices for gripping the rear edge of the topmost sheet, means for first retracting and then thrusting it forward, and devices adapted to introduce a blast of air directly between the topmost sheet and the balance of the pile and deliver said blast in the direction the sheet is being thrust, substantially as described.

5. A sheet feeding machine comprising a

nozzle, mechanism for introducing said nozzle between the topmost sheet of a pile and the balance of the pile, and means for intermittently introducing a blast of air in the direction in which the sheet is moved, in order to separate the top sheet from the balance of the pile, and means for first drawing back the sheet and then shoving it forward upon the pile, substantially as described.

6. A sheet feeding machine comprising the combination of devices for gripping a sheet at its rear edge, means for introducing a blast of air beneath said sheet, said means being arranged to deliver said blast in a direction away from said rear edge, mechanism for retracting and then advancing said gripping devices, whereby to draw the whole sheet backward against said air blast, and then push it forward, riding upon the air blast, substantially as described.

7. A sheet feeding machine comprising the combination of devices for gripping a sheet at its rear edge, comprising oppositely disposed jaws arranged to grip the sheet on its opposite sides, and mechanism for retracting and then advancing said gripping devices, whereby to draw the whole sheet backward and then push it forward, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH E. SMYTH.

In presence of—
PAUL SYNNESTVEDT,
PAUL CARPENTER.