F. W. VICKERY.

MACHINE FOR FEEDING OR SEPARATING SHEETS OF PAPER AND THE LIKE.

APPLICATION FILED DEC. 28, 1909.

997,025. Patented July 4, 1911.

5 SHEETS—SHEET 1.

Fig. 1.

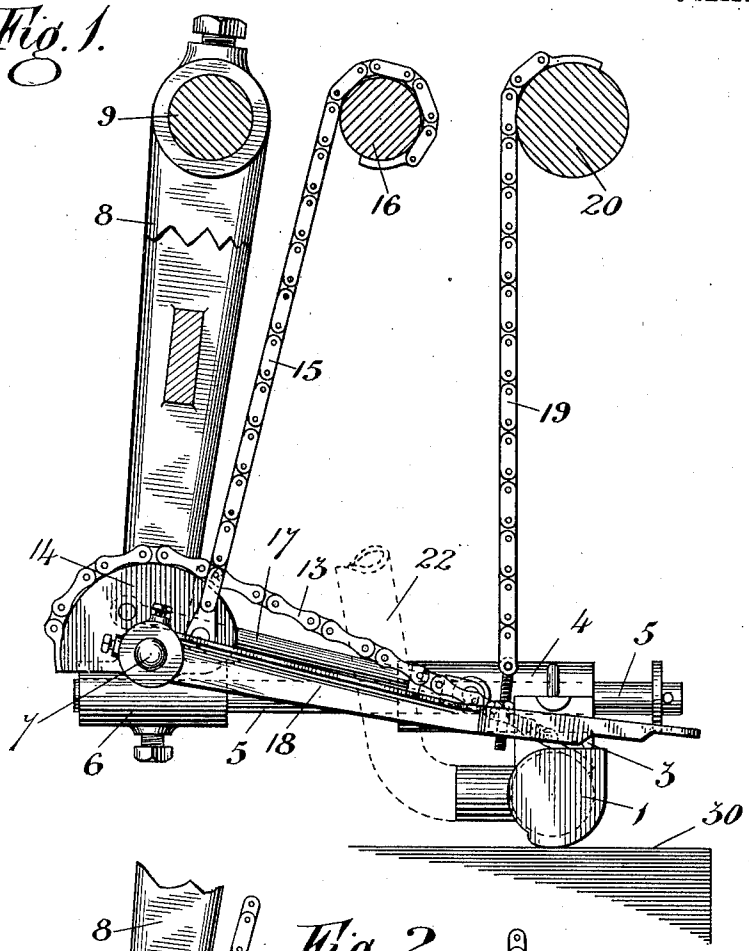
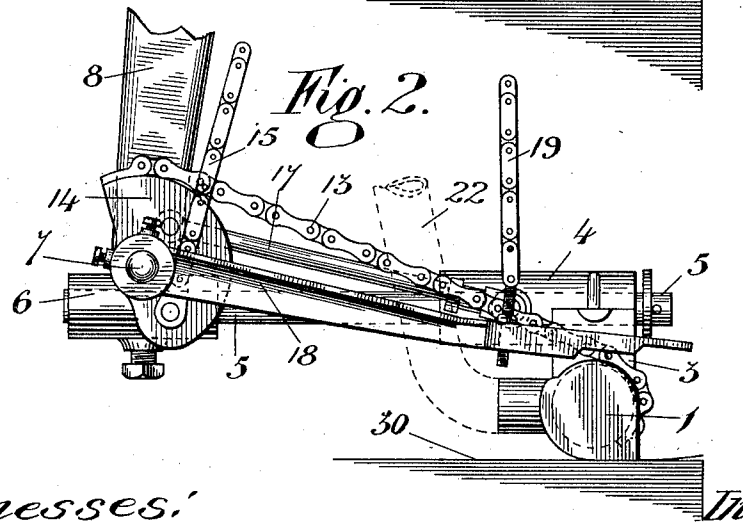


Fig. 2.



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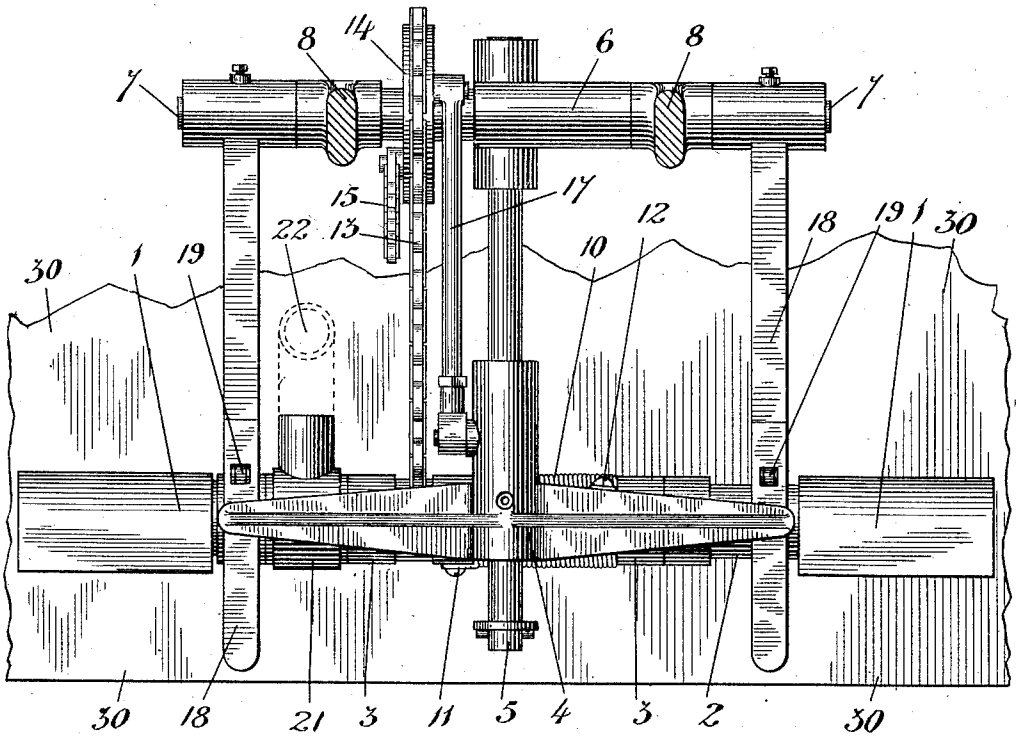
5 SHEETS—SHEET 2.

Fig. 3.



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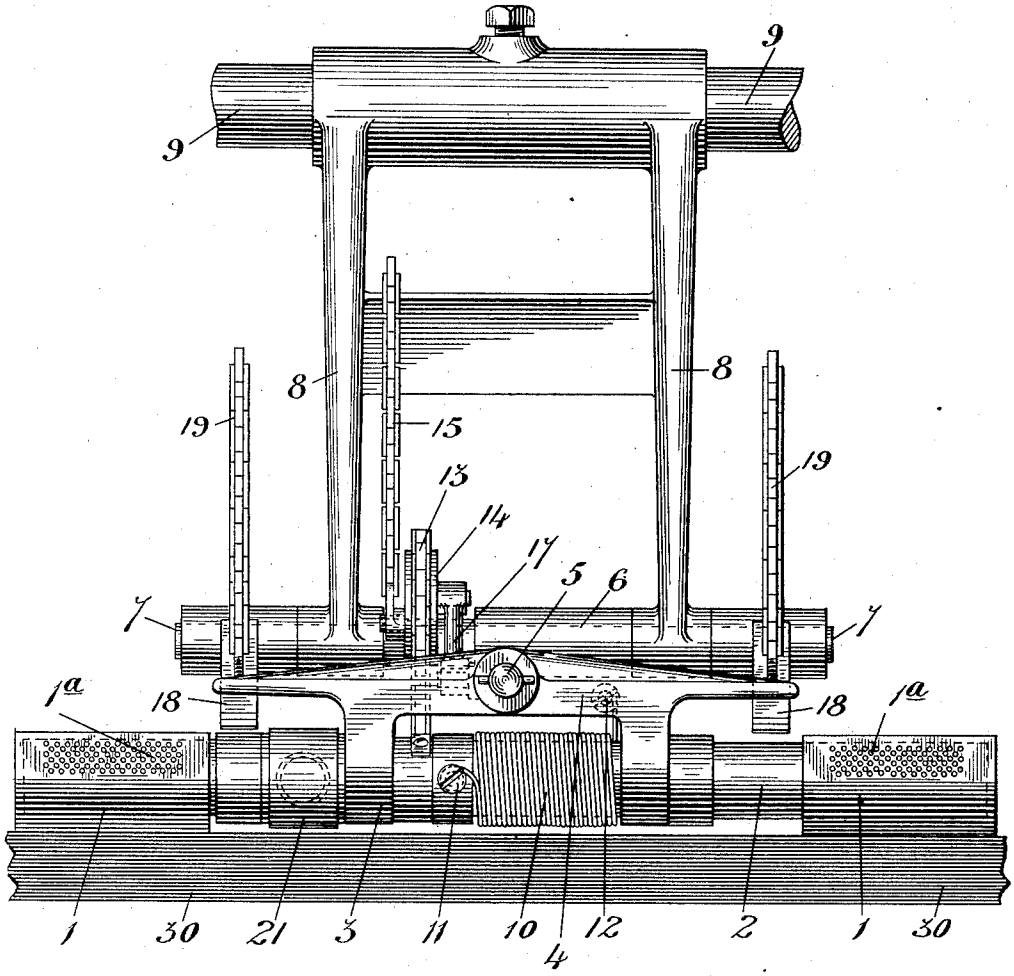
5 SHEETS—SHEET 3.

Fig. 4.



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5 SHEETS—SHEET 4.

Fig. 5.

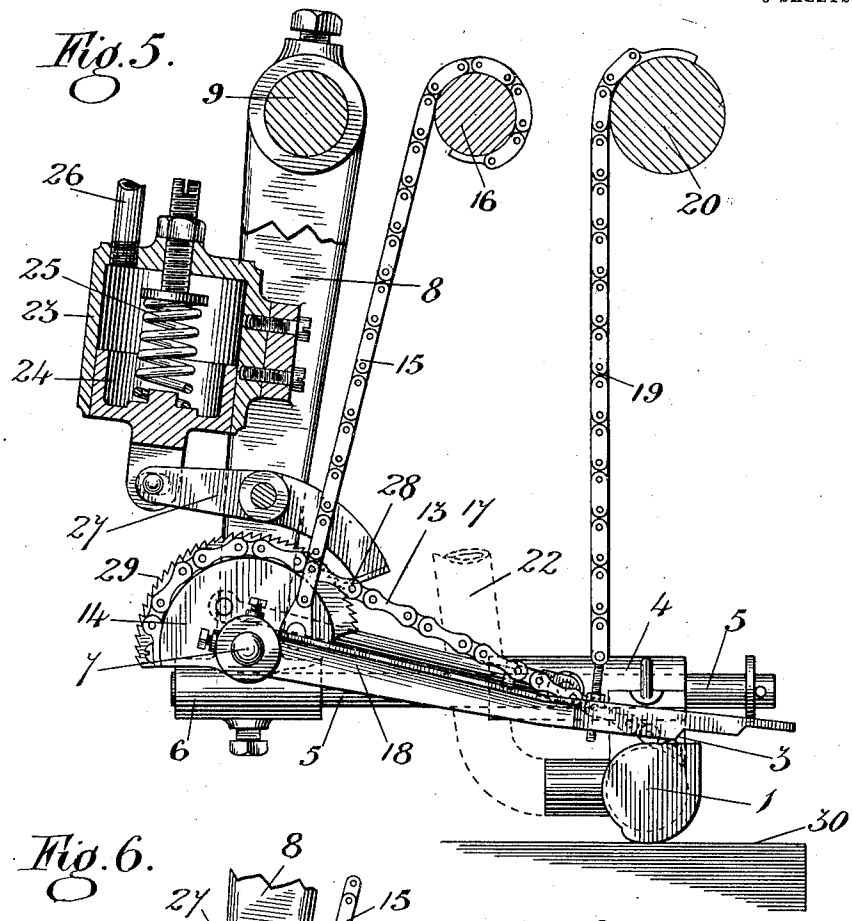
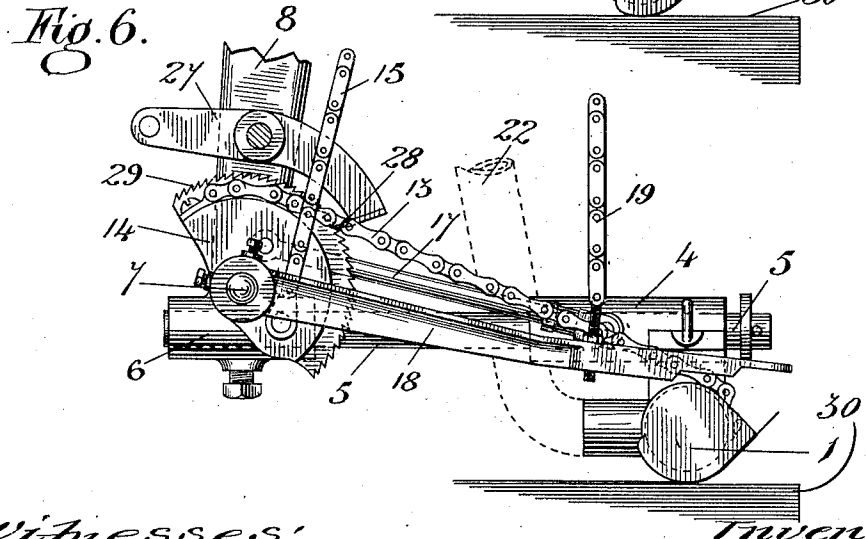


Fig. 6.



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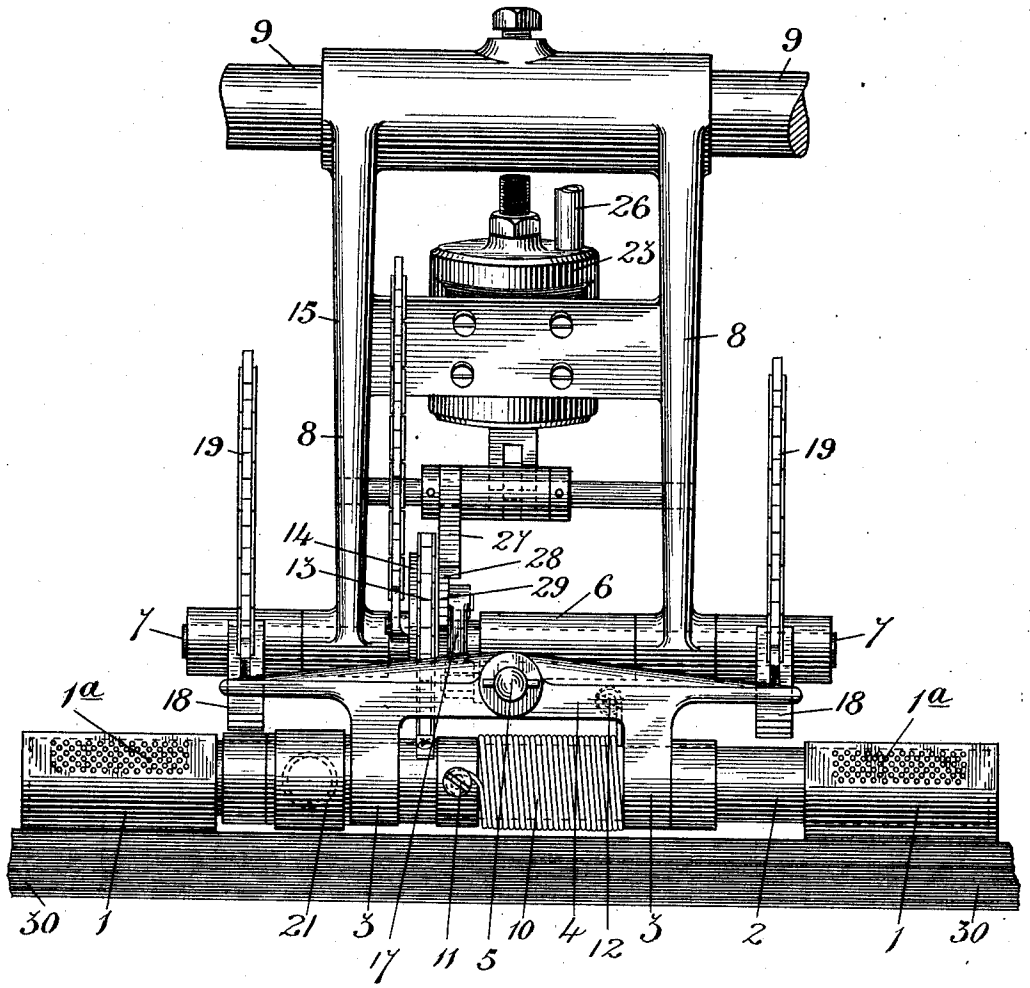
MACHINE FOR FEEDING OR SEPARATING SHEETS OF PAPER AND THE LIKE.

APPLICATION FILED DEC. 28, 1909.

997,025. **Patented July 4, 1911.**

5 SHEETS—SHEET 5.

Fig. 1.



Witnesses:

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UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM VICKERY, OF LONDON, ENGLAND.

MACHINE FOR FEEDING OR SEPARATING SHEETS OF PAPER AND THE LIKE.

997,025. Specification of Letters Patent. Patented July 4, 1911.

Application filed December 28, 1909. Serial No. 535,374.

To all whom it may concern:

Be it known that I, FREDERICK WILLIAM VICKERY, a subject of the King of Great Britain, residing at 10 Devonshire Grove, London, England, have invented certain new and useful Improvements in or Connected with Machines for Feeding or Separating Sheets of Paper and the Like, of which the following is a specification.

My present invention relates to that class of suction devices used for lifting and separating the top sheet from a pile of paper, cardboard, or the like, and in which the mouths or orifices of the nozzle or nozzles is or are placed at an angle to the top sheet of the pile of paper, the angle of the mouth pieces or orifices of the nozzle being determined in accordance with the thickness of the paper, the thicker the paper the narrower the angle. In all such appliances the angle of the mouthpiece of the nozzle with regard to the paper has had to be fixed or adjusted before the apparatus is started working and in many cases the work is inefficiently performed because of the inequality of the sheets of paper and the varying conditions of a pile of paper. Now the object of my invention is to overcome these difficulties of working by causing the nozzle to automatically adapt itself to any variations in the thickness or condition of the sheets of paper or of the pile without necessitating previous adjustment, and this is effected by first placing the nozzle on the pile of paper with its mouthpiece or orifice in such position or angle that it is not true or capable of engaging the top sheets and then rolling or moving the nozzle over the pile of paper until its mouthpiece or orifice has reached an angle or position with regard to the top sheet of the pile to allow of the air rushing into the mouthpiece due to the action of the suction pump to attract the top sheet of the pile, the attracted portion of which flies up to the mouth piece or orifice of the nozzle and closes same, this action immediately creating a vacuum in the nozzle pipe and holding the sheet to the nozzle.

The movement of the nozzle may be continued until it is flat upon the paper and this makes no difference as the movement of the portion of the sheet to the nozzle has allowed air to come between the portion of the attracted sheet and the second sheet on the pile and any pressure of the nozzle on the pile of paper will only cause the air between the two sheets to form a thin film which prevents the two sheets holding together when the nozzle is lifted to carry the sheet of paper to the grippers, tapes, rollers, or other conveying device or devices.

When it is not desired to continue the movement of the nozzle after the top sheet has been attracted and the vacuum created, I may employ means whereby such movement can be arrested at the desired moment. Any number of nozzles may be employed but I preferably employ two.

The annexed drawings illustrate two means for carrying my invention into effect and such invention will be readily understood from said drawings and the following description.

Figure 1 is a side elevation of nozzle carrying mechanism with the nozzle resting on the paper. Fig. 2 is a similar view to Fig. 1 with the nozzle orifice or mouth positioned on the pile of paper. Fig. 3 is a plan of Fig. 1. Fig. 4 is a front elevation of Fig. 1. In all these figures the suction nozzles move on to the pile after the top sheet has been attracted and the vacuum created. Fig. 5 is a side elevation of nozzle carrying mechanism with the nozzle resting on the pile of paper and in which the movement of the nozzle is arrested immediately the top sheet is attracted and the vacuum created. Fig. 6 is a similar view to Fig. 5 with the nozzle in the arrested position and with a portion of the top sheet attracted to the nozzle and the vacuum created. Fig. 7 is a front elevation of Fig. 5.

The nozzles 1, 1, are secured to a tube 2 which may be a telescopic tube so that the nozzles may be positioned on the pile of paper according to the width of such pile. This tube 2 is journaled in bearings 3, 3, of frame 4 rocking and slidable on a shaft 5 secured to bracket 6 mounted on a shaft 7 carried by a frame 8, which is actuated by a shaft 9 from some part of the machine, and by any known mechanism to carry the nozzles 1, 1, forward to the grippers, rollers, tapes or other conveying devices.

The frame 4 is pivoted to the shaft 5 to allow the nozzles to properly position themselves on the pile of paper irrespective of the condition of the pile so as to insure perfect attraction of the top sheet to the nozzles irrespective of any inequality of the paper or condition of the pile.

The tube 2 is encircled by a spring 10, one end of which is secured at 11 to the tube 2, the other end being secured at 12 to the frame 4. To this tube I connect a chain or cord 13, this chain being also connected to a quadrant 14, or it may be a lever loosely mounted on the shaft 7, said quadrant 14 having a chain or rope or rod 15 connected with a shaft 16 or it may be a cam or other device operated through known devices from some part of the machine to or in connection with which the illustrated appliance may be fitted. The quadrant 14 also pivotally carries a connecting rod 17 this being connected to the frame 4 for moving the frame and the nozzles backward and forward.

The shaft 7 has fixed at each end an arm 18, the forward end of each arm being positioned under the adjacent end of the frame 4 and such arms are also connected to the lower ends of chains or ropes 19, 19, which are connected at their upper ends to a shaft 20 operable in a similar manner to the shaft 16.

The tube 2 is provided with a branch 21 by which it can be connected with a suction pump (not shown) by a pipe 22.

When it is desired to arrest the movement of the nozzles on the top sheet being attracted and the vacuum thereby created, I employ all the foregoing mechanisms and I connect to the frame 8, a suction device, the valve 24 of which is controlled in one direction by a spring 25, while the casing 23 is connected with the suction pipe 22 by a pipe 26. To the frame 8 I pivot a rocking lever 27 one end of which is connected to the valve 24, the other end being provided with a tooth 28 which is adapted to engage ratchet teeth 29, formed on the edge of the quadrant 14, the object being that the moment the vacuum is created the valve 24 will be drawn in, thereby rocking the lever 27 and causing its tooth 28 to engage the ratchet teeth 29 on the quadrant 14, so as to stop the rolling movement of the nozzles as hereafter explained.

With regard to Figs. 1, 2, 3 and 4, the action is as follows:—Supposing the appliances are in position ready for action, and the frame 4 has been lowered by the paying out of the chains 19, 19, until the nozzles 1, 1, are resting upon the pile of paper as seen in Fig. 1, the orifices or mouths 1^a of the nozzles being in such position with regard to the pile that the air being sucked into the nozzle has no effect on the pile of paper. In this position the spring 10 is in a torsional condition around the tube 2 by reason of the tube 2 having been previously revolved by the chain 13 and quadrant 14. The shaft 16 is now actuated by any known mechanism for paying out the chain 15 and this allows the spring 10 to revolve the nozzles 1, 1, at the same time the rod 17 is pushing the frame 4 along the shaft 5, and this combined action of the spring 10 and the rod 17 causes the nozzles to roll or move over the top sheet of the pile without moving the sheet edge on, and when the mouthpieces or orifices 1^a of the nozzles have been so positioned that the inrushing air has acted upon the pile, the top sheet is attracted and a portion is drawn against the mouthpieces or orifices of the nozzles as will be understood from Fig. 6, and a suction created by such closing of the nozzles, but the spring 10 and rod 17 keep on revolving or moving the nozzles until the orifices or mouthpieces are positioned on the pile of paper 30, as seen in Fig. 2, the top sheet being still held to the nozzles by the suction. The shaft 20 then reverses and lifts the frame 4. At the same time the shaft 9 is operated and the whole appliances are moved forward to carry the lifted edge of the top sheet to the grippers, rollers, carrying tapes or other conveying devices and the sheet is removed from the nozzles and carried away in any well known manner, and upon the return stroke of frame 8 the shaft 16 reverses, and its chain 15 moves the quadrant 14 back; this movement of the quadrant, through the medium of the chain 13 revolves the tube 2 and nozzles 1 and winds up the spring 10, and at the same time the rod 17 draws back the frame 4. If the nozzles are revolved back before the appliances are moved toward the grippers or other devices, the edge of the paper is curved around the nozzles and this curving will prevent the ends of the front edge of the sheet dropping, and this allows of the nozzles being positioned close together. To arrest the movement of the nozzles after the sheet has been attracted and the vacuum created, as will be understood from Figs. 5, 6 and 7, the vacuum will also operate the valve 24 and this will effect the engagement of the toothed end 28 of the rocking lever 27 with the ratchet teeth 29 of the quadrant 14 and thus the action of the spring 10 will be arrested and also the movement of the tube 2 and nozzles 1; otherwise the operation is the same as with the other figures.

What I do claim as my invention, and desire to secure by Letters Patent is:—

1. In a paper feeding machine, in combination, a support; a member slidable thereon; a pneumatic picker carried by said member; means connected to said member for advancing and retracting the same on said support; and a resilient connection between said member and picker, for rotating the latter at such time.

2. In a paper feeding machine, in combination, a support; a member slidable thereon; a pneumatic picker carried by said member; means connected to said member for advancing the same; means for rotating said

picker during such movement; and suction operated means for automatically arresting such movement.

3. In a paper feeding machine, in combination, a support; a member slidable thereon; a pneumatic picker carried by said member; means connected to said member for advancing the same and said picker; a resilient connection between said member and picker for rotating the latter during such movement; and means for automatically arresting such movement.

4. In a paper feeding machine, in combination, a support; a member slidable thereon; a pneumatic picker carried by said member; means for advancing and retracting said member on said support; means for bodily raising and lowering said support; and additional means for bodily advancing and retracting said support.

5. In a paper feeding machine, in combination, a support; a member slidable thereon; a pneumatic picker carried by said member; means for advancing said member on said support; means for automatically arresting such movement; means for bodily raising said support; and means for subsequently advancing said support.

6. In a paper feeding machine, in combination, a support; a member slidable thereon; a pneumatic picker carried by said member; a rock shaft; means for actuating the same; a connection between said shaft and said member for advancing and retracting the latter when said shaft is actuated; and a connection between said member and picker for rotating the picker at such time.

7. In a paper feeding machine, in combination, a rotary tube provided with a suction nozzle arranged to rest upon a pile of sheets with its mouth in inoperative position with relation thereto; a member by which said tube is carried; means for advancing said member; and a resilient connection between said member and tube for rotating the latter over said pile during such advance, to bring the mouth of said nozzle into position to attract the topmost sheet.

8. In a paper feeding machine, in combination, a rotary tube provided with a suction nozzle arranged to rest upon a pile of sheets with its mouth in inoperative position with relation thereto; a member by which said tube is carried; means for advancing said member; means for rotating said tube over said pile during such advance, to bring the mouth of said nozzle into position to attract the topmost sheet; and means for subsequently automatically arresting such rotation.

9. In a paper feeding machine, in combination, a rotary tube provided with a suction nozzle arranged to rest upon a pile of sheets with its mouth in inoperative position with relation thereto; a member by which said tube is carried; means for advancing said member; means for rotating said tube over said pile during such advance, to bring the mouth of said nozzle into position to attract the topmost sheet; and suction operated means associated with said tube for subsequently automatically arresting such rotation.

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

FREDERICK WILLIAM VICKERY.

Witnesses:
H. MAYKELS,
WM. O. BROWN.