May 26, 1936. M. J. MILMOE 2,042,269

CIRCULAR FEEDING MECHANISM

Filed July 11, 1933 3 Sheets-Sheet 1

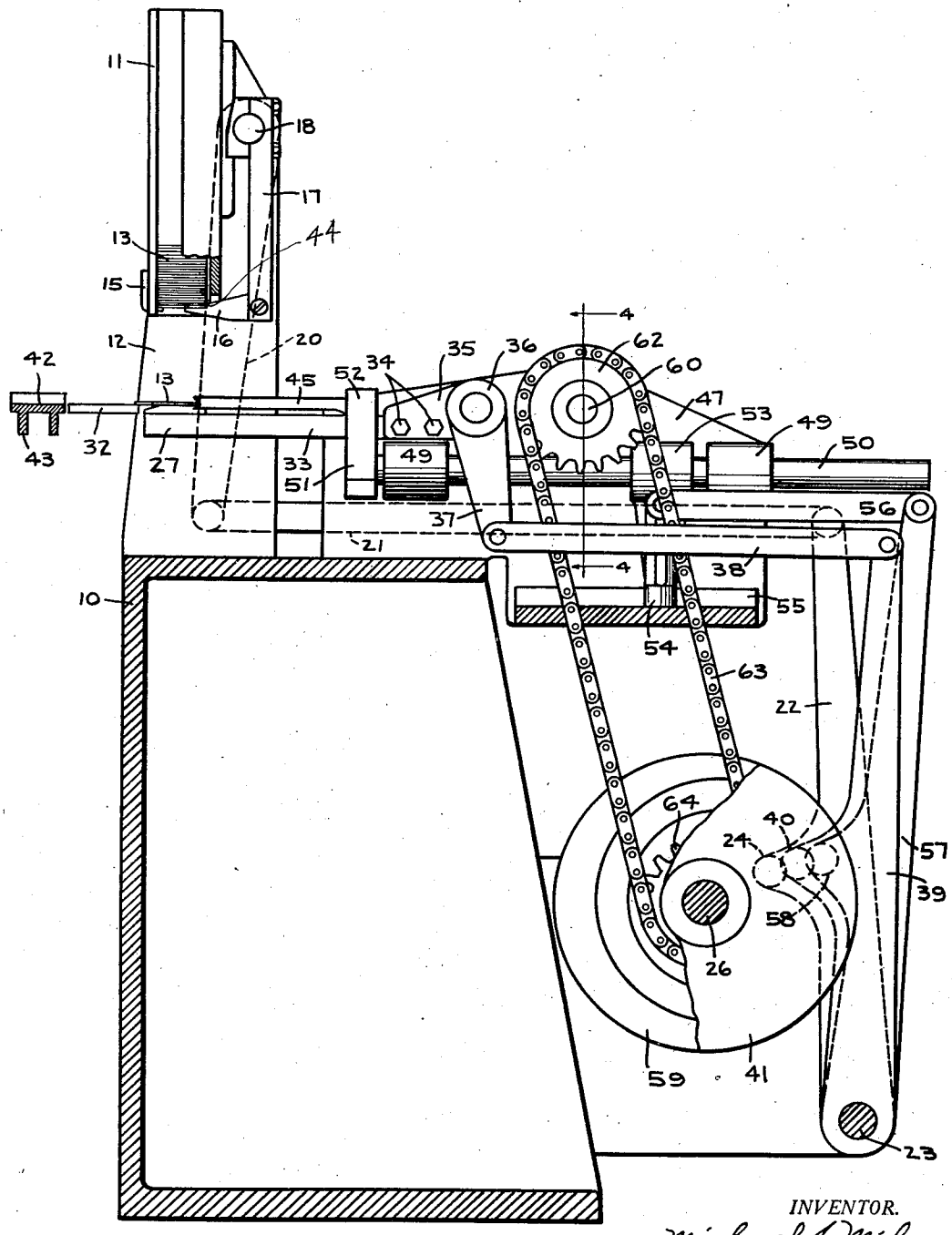


FIG. 1

INVENTOR.
Michael J. Milmoe
BY Cox & Moore
ATTORNEYS.

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CIRCULAR FEEDING MECHANISM

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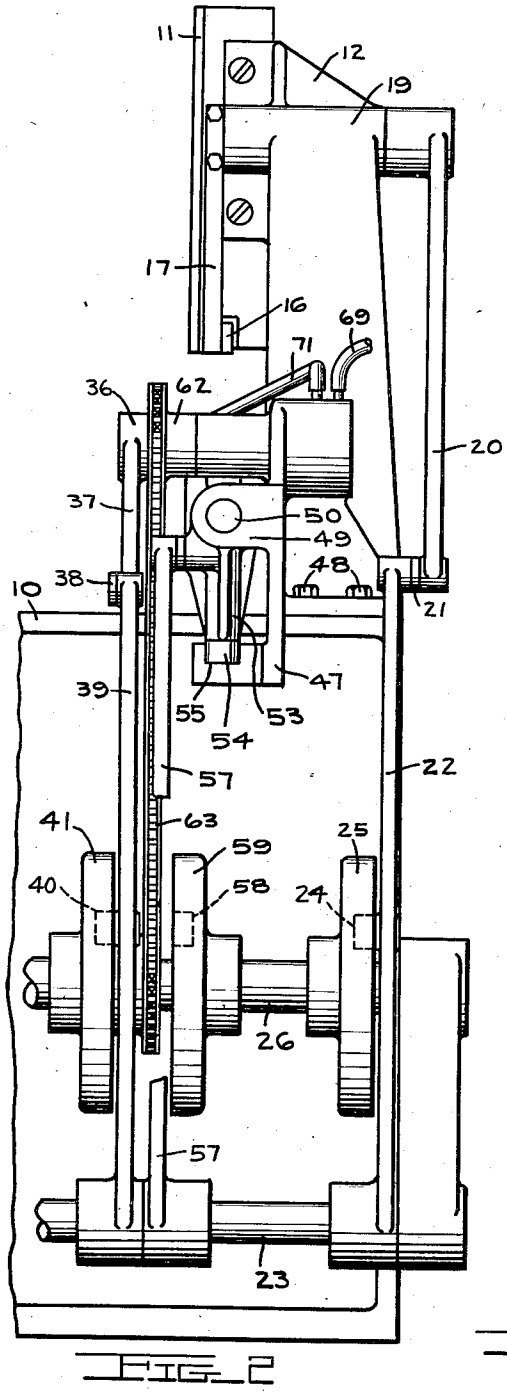


FIG. 2

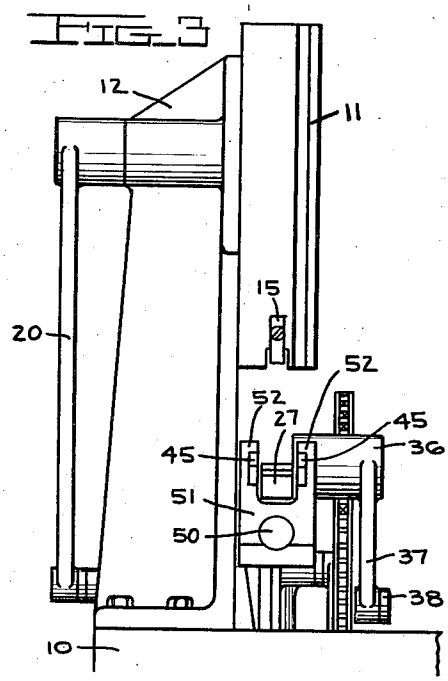


FIG. 3

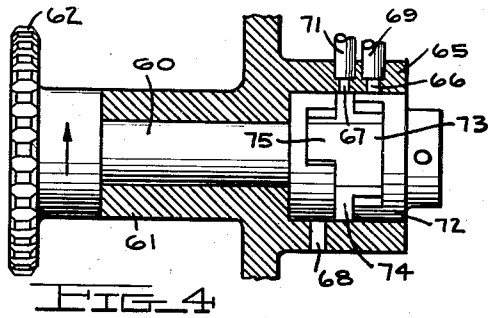


FIG. 4

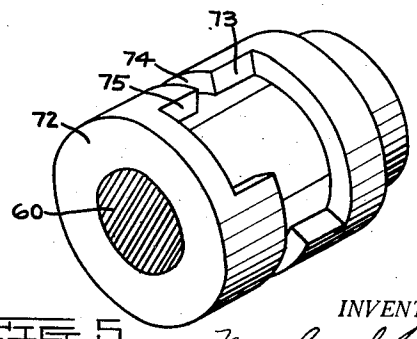


FIG. 5

INVENTOR.
Michael J. Milmoe
BY Cox & Moore
ATTORNEYS.

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CIRCULAR FEEDING MECHANISM

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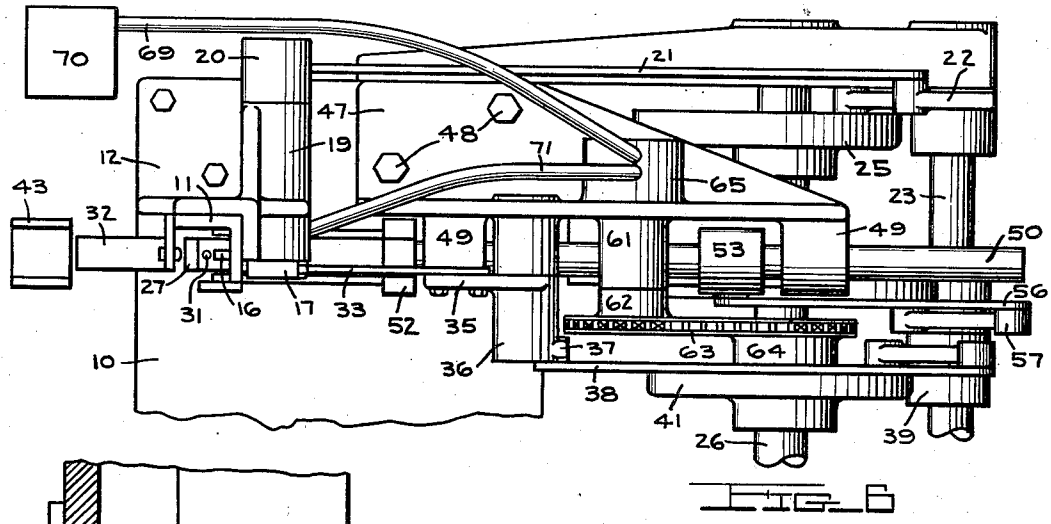


FIG. 6

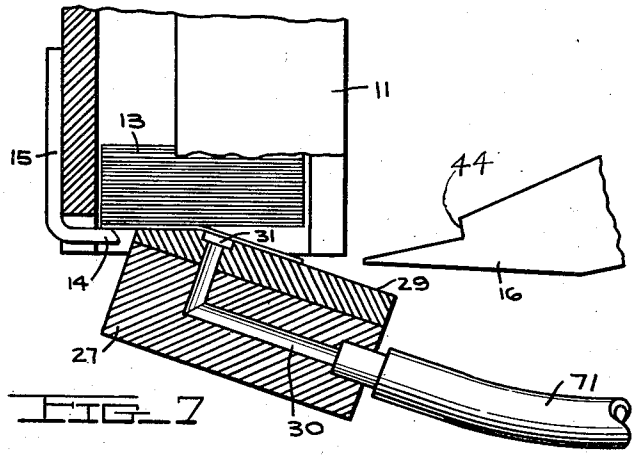


FIG. 7

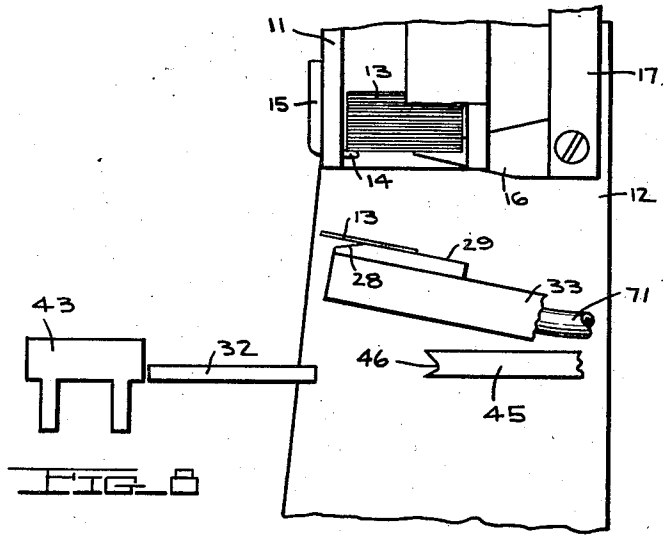


FIG. 8

INVENTOR.
Michael J. Milmoe
BY Cox & Moore
ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,042,269

CIRCULAR FEEDING MECHANISM

Michael J. Milmoe, Glen Ellyn, Ill., assignor to F. B. Redington Co., Chicago, Ill., a corporation of Illinois

Application July 11, 1933, Serial No. 679,877

18 Claims. (Cl. 271—14)

The present invention relates to wrapping machines and particularly to that part of a wrapping machine which is used to feed a circular or label to a given position.

A particular object of my invention is to insure that only a single circular will be delivered to a given position and that additional circulars will not adhere thereto while the same is being moved from a stack of circulars to that given position.

A further object of this invention is to provide an efficient means for withdrawing circulars from a hopper in one direction and then changing the direction of movement of the circular so that it moves in a direction at a substantial angle to the direction in which it was first moving when being removed from the hopper.

Another object of this invention is to provide means for withdrawing a circular from the hopper or from a stack of circulars in one direction to a given position, and thereafter moving it at a substantial angle to another position, while the means for withdrawing the circulars from the hopper or stack returns to withdraw a succeeding circular therefrom in order to speed up production.

Another object of this invention is to provide a means as set forth above which is compactly arranged, simple in its operation, and which efficiently performs its intended function.

In the drawings:

Fig. 1 represents a front elevational view partly in section showing one embodiment of my invention;

Fig. 2 is a side elevation looking from the right in Fig. 1;

Fig. 3 is a side elevation looking from the left in Fig. 1 with parts thereof removed for the sake of clearness;

Fig. 4 is a cross-section taken substantially along the line 4—4 of Fig. 1 showing the valve construction for controlling the vacuum head used in withdrawing the circulars from the hopper;

Fig. 5 is a perspective view of the valve;

Fig. 6 is a plan view of the device shown in Fig. 1;

Fig. 7 is an enlarged vertical cross-sectional view through the suction head and hopper; and

Fig. 8 is a fragmentary elevational view similar to Fig. 1 with the parts shown in a different position of adjustment.

In the drawings, the reference numeral 10 indicates the frame or base of the machine upon which the operative parts thereof are mounted. A hopper 11 of any desired construction open at the bottom is mounted on a bracket 12 supported on the frame 10 and in this hopper, the circulars 13 are arranged one on top of the other to form a stack. The lowermost circular in the stack rests on a rigid projection 14 of the bracket 15 secured to the side of the hopper, and a movable projection 16 carried by an arm 17 secured to the shaft 18 rotatably mounted in bearing 19 on the bracket 12. Also secured to the shaft 18 at the rear end thereof is an arm 20 pivotally connected at its lower end to a link 21 which in turn is pivotally connected to an arm 22 rotatably mounted on a shaft 23 for rocking movement thereabout. This arm 22 carries a roller 24 (see Fig. 2) which travels in a cam groove in the cam 25 secured to the driven shaft 26, which shaft is driven in any well known manner from a power means. The cam groove is such as to cause oscillation of the arm 22 and consequently cause movement of the projection 16 back and forth between the positions illustrated in Fig. 1 and Fig. 7. In the latter position the same does not support the circulars but is entirely to one side of the stack.

In order to withdraw circulars from the stack, I provide a suction head 27 shaped as best illustrated in Fig. 7 with an upper surface having the two angular faces 28 and 29. The face 28 is adapted to engage the lowermost circular in the stack adjacent the projection 14 and be pressed thereagainst when the suction head is in its uppermost position as shown in Fig 7. The suction head is provided with an opening 30 therethrough terminating in an outlet 31 in the face 29 and opposed to that part of the circular which is not engaging the face 28. The suction created in the opening 30 draws the right hand side of the circular downwardly against the face 29 as is clearly indicated in Fig. 7, permitting the air to enter between the circular which is being withdrawn and the next circular in the stack prior to withdrawal of the circular from the hopper and entire separation of the same from the stack. With this arrangement, the second circular from the bottom of the stack is prevented from being withdrawn with the circular at the bottom of the stack. As the suction head is moved away from the stack of circulars, the left hand end of the circular is pulled out from between the projection 14 and the remaining circulars in the stack and assumes, due to the natural resiliency of the circular, the position illustrated in Fig. 8, which is a flat position parallel with the face 29. The lowermost position of the suction head is illus-

trated in Fig. 1, in which position the circular occupies a position substantially co-planar with the upper surface of a support 32 which is narrower than the circular itself in a direction at right angles to the surface of the drawings in Fig. 1. The suction head 27 is carried by or formed integral with the end of the arm 33 which in turn is secured by bolts 34 to one arm 35 of the bell crank lever 36, the other arm 37 of which is pivotally connected by horizontally extending link 38 which in turn is pivotally connected to the arm 39 also pivoted on the shaft 23 for rocking movement thereabout. The arm 39 carries a roller 40 which operates in a cam groove in the cam 41 secured to the driven shaft 26 and the cam groove is shaped to give a rocking movement to the arm 39 as the shaft 26 rotates. The rocking movement of the arm 39 causes a corresponding rocking movement to be imparted to the bell crank and consequently to the suction head 27 which moves to and from the positions illustrated in Figs. 7 and 1.

It will be noted that the upper surface of the suction head, namely the surface 29 forms a continuation of the upper surface of the support 32 and these surfaces are in alignment with the bottom of a pocket 42 in an endless conveyer 43 so that a circular 13 may be slid along the surface 29 and support 32 into the pocket 42. The endless conveyer is of a conventional type and is trained over sprockets. A complete conveyer is not shown in the drawings as it forms no part of the present invention, but merely is shown to illustrate the position to which the circular is to be moved.

In order to advance the circular into the pocket 42, I provide a U-shaped pusher 51 having two arms 45 secured to the arms 52 of the U-shaped pusher extending parallel to each other and straddling the arm 33 which carries the suction head and each of the arms 45 has a notch 46 at the forward edge thereof. When pusher 51 is moved to the left in Fig. 1, the ends of the arms 45 engage the edge of the circular 13 and advance the same over the surface 29 and support 32 into the pocket. The edge of the circular contacts with the bottom of the V-shaped notches 46 in the arms 45. The pusher is guided and reciprocated in the following manner.

The frame 10 is provided with a bracket 47 secured by bolts 48 to the upper surface thereof and this bracket has bearings 49 which slidably receive a shaft 50 having the substantially U-shaped pusher 51 secured to the left hand end thereof as viewed in Fig. 1. The upwardly extending arms 52 of the U-shaped bracket 51 straddle the sides of the arm 33 which carries the suction head. Therefore, the motion of the suction head does not interfere with the motion of the pusher. In order to prevent the rotation of the shaft 50 about its axis, I secure an arm 53 to the shaft 50 between the bearings 49 and rotatably support a roller 54 on the end of this arm which roller slides within a channel 55 formed in the bracket 47. See Figs. 1 and 2. Pivotally connected to the arm 53 is a link 56 which extends in a substantially horizontal direction and is pivoted at its other end to an arm 57 rotatably mounted on the shaft 23. The arm 57 carries a roller 58 operating in a suitable cam groove in the cam 59, the cam groove causing rocking movement of the arm 57 in a well-known manner. The cams 25 and 41 and 59 each are arranged in such a manner that the parts operated thereby move in the proper timed relation with respect to each other. This timed relation is such that as the suction head moves into proximity with the lower end of the stack, the movable projection 16 is swung about the pivot in a counterclockwise direction from the position viewed in Fig. 1 to a position illustrated in Fig. 7 so as to permit the circular to be withdrawn from the stack in the manner previously described. At approximately the instant the suction head moves away from the stack with a circular, the projection 16 again moves into the position illustrated in Fig. 1 or Fig. 8 to support the stack, and an abutment 44 on the projection 16 moves against the edges of the circulars in the stack (see Fig. 1) and prevents lateral shifting movement of the same, whereby more than one circular will not be withdrawn at one time. Also the projection 16 raises the stack slightly and relieves the pressure between the stack and projection 14 whereby the circular being withdrawn may be more readily withdrawn.

Substantially at the time of the arrival of the suction head at the position shown in Fig. 1, the pusher 51 starts its advancing movement toward the circular and this advancing movement continues until the circular is arranged within the pocket 42 after which the pusher has its motion reversed and returns to its original position. As soon as the pusher 51 moves the circular 13 off the suction head 27, the suction head starts its movement toward the stack of circulars in the hopper and the pusher returns to its original position again before the suction head moves into the position shown in Fig. 1, so that it will not be struck by the circular as the suction head moves into the position shown in Fig. 1.

The suction created within the suction head must be so controlled that as the suction head moves into engagement with a circular in the hopper, the suction will be created within the suction head and destroyed at the time that the suction head assumes the position shown in Fig. 1 so that the suction will not prevent the pusher from moving the circular off the suction head. In order to control the suction in the suction head, I provide the following mechanism which is best illustrated in Figs. 1, 2, 4, 5, and 6.

A shaft 60 is rotatably mounted within a bearing 61 on the bracket 47, substantially parallel to the shaft 26 and this shaft carries a sprocket 62 which is driven by means of a chain 63 from the shaft 26 which shaft is provided with a sprocket 64 secured rigidly thereto, and over which the chain is trained. The shaft 60 and shaft 26 rotate in 1—1 relation with respect to each other. The bearing 61 has an enlarged cylindrical boss 65 which has three ports 66, 67, and 68. The port 68 is in direct communication with the atmosphere. The port 66 has a hose 69 communicating directly therewith and with a suction pump 70 of any desired construction or with any suitable source of suction producing mechanism. The port 67 has a hose 71 connected therewith and with the opening 30 in the suction head. Therefore, when the ports 66 and 67 are thrown into communication with each other by means of the valve 72 rotatably mounted within the boss 65, a suction is created within the opening 30.

The valve 72 is secured rigidly to the shaft 60 and has the peripheral surface thereof interrupted by recesses therein which communicate directly with each other but extend different amounts about the periphery of the valve as is clearly illustrated in Figs. 4 and 5. I have designated the recesses by the reference characters 73, 74, and 75, and these communicate respec-

tively with the ports 66, 67, and 68 respectively when the valve is at the proper angular position during its rotation. Due to the fact that some of the recesses extend a greater peripheral distance than the others about the periphery of the valve, some of the ports are in communication with their respective recesses for a longer period of time than others so as to get the proper control of the suction for the suction head. In the drawings, the port 67 is shown as being in communication with its respective recess and consequently also with the other recesses since they are all in communication with each other, and as the valve rotates in the direction indicted by the arrow in Fig. 4, the port 66 will soon communicate with the recess 73 and form a direct communication between ports 66 and 67, and consequently establish connection between the opening in the suction head and the suction pump, whereby a suction is created in the suction pump The rotation of the valve continues and the port 66 is first cut off from communication with its recess 73, and shortly thereafter, the recess 75 communicates with the port 68, whereby the port 67, which is at all times in communication with its recess, is thrown into communication with the port 68 and this allows the atmosphere to enter the valve 72 and relieve the suction in the suction head 27 at substantially the instant the suction head arrives at the position shown in Fig. 1. This communication is shortly thereafter cut off due to the fact that the recess 75 does not extend very far peripherally about the valve 72. The recess 74 extends about the entire periphery of the valve and therefore it is constantly in communication with the port 67.

Obviously those skilled in the art to which this invention pertains may make various changes in the construction and arrangement of parts without departing from the spirit of this invention, and therefore I do not wish to be limited except as hereinafter set forth in the appended claims.

Having thus fully described my invention, what I claim as new and desire to obtain by Letters Patent is:

1. In a wrapping machine, the combination with a hopper, for receiving a stack of circulars, a pivoted suction head movable to and from a position closely adjacent the endmost one of the circulars in said stack and having a face thereof which is at an appreciable angle with respect to the adjacent circular when said suction head is adjacent said circular, and suction creating means for creating a suction in said head for drawing the portion of said circular which is opposed to said face against said face, whereby air may enter between the edges of the circular to be withdrawn and the next adjacent circular.

2. In a wrapping machine, the combination with a hopper, of a pair of members for supporting a stack of circulars within said hopper, and movable relative toward and from each other to permit circulars to be withdrawn from between said members and away from said stack, a suction head movable to and from a position adjacent the endmost circular in said stack, said head having a face thereon lying closely adjacent to but spaced from said stack when said suction head is adjacent the circular to be withdrawn, an opening communicating with suction creating means, means for operating said suction creating means whereby to draw the opposed portion of the circular to be withdrawn toward said face, and means for moving said members relatively away from each other to permit the circular to be withdrawn from said stack and for thereafter moving said members toward each other to again fully support the stack of circulars within said hopper, one of said members having means operable to hold the circulars in engagement with the other of said members when said members are moved relatively toward each other.

3. In a feeding means for feeding circulars to a given position, the combination with a hopper, a plurality of projections extending across one end of said hopper for supporting a stack of circulars therein, one of said projections being movable to and from its operable stack supporting position, a suction head movable into engagement with the endmost circular in said stack, means for creating a suction in said suction head to draw a circular against said suction head, and means for moving said suction head away from said stack after the circular has been drawn into engagement therewith, said movable projection being movable back into stack supporting position after said circular has been moved toward said suction head, and having means operable in this position to hold the circulars against the other projection.

4. In a wrapping machine, the combination with a hopper having an upwardly extending opening therein for receiving a stack of circulars, means associated with said hopper for supporting the stack of circulars within said opening comprising a plurality of projections extending inwardly from the edges of said opening toward the center thereof, one of said projections being movable laterally and vertically into and out of stack supporting position, means for moving said projection into and out of said position, means movable to and from a position adjacent the lowermost circular in said stack for withdrawing said circular from said stack while said movable projection is in inoperative position, and said means for moving said projection into operative position being operable for that purpose as said withdrawing means commences its movement away from the stack of circulars within said hopper.

5. A device as set forth in claim 4, which includes in addition, pusher means movable into engagement with an edge of said circular after it has been moved away from said stack for pushing said circular substantially in the direction of its own plane toward a desired position.

6. In a circular feeding mechanism, the combination with a hopper, of a pivoted arm having a suction head thereon movable to and from the end of a stack of circulars in said hopper to withdraw circulars from said hopper and move them to a given position, means for rocking said pivoted arm in the manner set forth, a pair of arms lying on opposite sides of the path of movement of said pivoted arm and between which said pivoted arm moves during its movement to and from said hopper, and means for moving the ends of said arms against the edge of said circular when said suction head arrives at a predetermined position with said circular adjacent the ends of said arms for moving the circular off said suction head toward a desired position and for permitting said suction head to return to said stack of circulars to withdraw another circular therefrom, said means for moving said pivoted arm being operable to move said pivoted arm in a direction to move said suction head toward the circulars in said hopper before said arms have moved said circular to its desired position but after said circular has cleared said suction head.

7. In a circular feeding mechanism, the combination with a hopper, of a pivoted arm having a suction head thereon movable to and from the end of a stack of circulars in said hopper to withdraw circulars from said hopper and move them to a given position, means for rocking said pivoted arm in the manner set forth, a pair of arms lying on opposite sides of the path of movement of said pivoted arm and between which said pivoted arm moves during its movement to and from said hopper, and means for moving the ends of said arms against the edge of said circular when said suction head arrives at a predetermined position with said circular adjacent the ends of said arms for moving the circular off said suction head toward a desired position and for permitting said suction head to return to said stack of circulars to withdraw another circular therefrom, said arms having the ends thereof which engage the edge of said circular notched to receive the edge of said circular and prevent lateral movement thereof.

8. In a circular feeding mechanism for wrapping machines and the like, the combination with a hopper for circulars, means for supporting circulars within said hopper including a movable projection, means for moving said projection into and out of circular supporting position, a suction head movable to and from the end of the stack of circulars within said hopper which contacts with the circular supporting means, means for moving said suction head to and from said position, means for moving said movable projection out of circular supporting position when said suction head is adjacent said stack, means for creating a suction within said suction head when adjacent said stack for drawing a circular against said suction head, said means for moving said suction head being thereafter operable to move said suction head to a position away from said hopper, a pair of arms adjacent said last mentioned position for engaging the edge of the circular when it arrives adjacent said last position for moving said circular in a direction substantially in its own plane onto a support and out of the path of movement of said suction head, said suction head moving means being thereafter operable to move said suction head toward said stack, and means for moving said movable projection into stack supporting position after said suction head has separated a portion of said circular from said stack.

9. In a circular feeding mechanism for wrapping machines and the like, the combination with a hopper for circulars, means for supporting circulars within said hopper including a movable projection, means for moving said projection into and out of circular supporting position, a suction head movable to and from the end of the stack of circulars within said hopper which contacts with the circular supporting means, means for moving said suction head to and from said position, means for moving said movable projection out of circular supporting position when said suction head is adjacent said stack, means for creating a suction within said suction head when adjacent said stack for drawing a circular against said suction head, said means for moving said suction head being thereafter operable to move said suction head to a position away from said hopper, a pair of arms adjacent said last mentioned position for engaging the edge of the circular when it arrives adjacent said last position for moving said circular in a direction substantially in its own plane onto a support and out of the path of movement of said suction head, said suction head moving means being thereafter operable to move said suction head toward said stack, and means for moving said movable projection into stack supporting position after said suction head has separated a portion of said circular from said stack, said suction head having a face thereon arranged at an angle to the circular to be removed from said stack when said suction head is in a position to receive said circular and withdraw it from said stack, whereby the suction within said suction head draws said circular in a direction angularly away from the adjacent circulars in said stack to permit air to enter adjacent one edge thereof to prevent adjacent circulars from being removed with the circular intended to be withdrawn.

10. In a sheet feeding device, means for holding a plurality of sheets in superimposed relation, a member having two sheet engaging faces movable from a position adjacent the said holding means to a position away from said means for withdrawing sheets one at a time from said means, one of said faces being at an angle with respect to the sheet to be withdrawn when the member is in its first-named position, said face being movable to a different angular position as said member reaches its second-named position.

11. In a sheet feeding device, means for holding a plurality of sheets in superimposed relation, a member having two sheet engaging faces movable from a position adjacent the said holding means to a position away from said means for withdrawing sheets one at a time from said means, one of said faces being at an angle with respect to the sheet to be withdrawn when the member is in its first-named position, said face being movable to a different angular position as said member reaches its second-named position, said face having suction means thereon for drawing the sheet against the face.

12. In a sheet feeding device, means for holding a plurality of sheets in superimposed relation and in a predetermined angular position, a member having two sheet engaging faces movable from a position adjacent said holding means to a position away from said means for withdrawing sheets one at a time from said means, one of said faces being at an angle to the sheets in the holding means when the member is in its first-named position, said face being movable to a position parallel to said sheets when the member is in its second-named position.

13. In a sheet feeding device, means for holding a plurality of sheets in superimposed relation and in a predetermined angular position, a member having two sheet engaging faces movable from a position adjacent said holding means to a position away from said means for withdrawing sheets one at a time from said means, one of said faces being at an angle to the sheets in the holding means when the member is in its first-named position, said face being movable to a position parallel to said sheets when the member is in its second-named position, suction means for holding the sheet against said face, and means for ejecting a sheet from said face as the member reaches its second-named position.

14. In a sheet feeding device, means for holding a plurality of sheets in superimposed relation and in a predetermined angular position, a feeding member having a pair of sheet engaging faces angularly disposed with respect to each other, said member being movable from a position adja-

cent said holding means to a position away from said means for withdrawing sheets one at a time from said means, the first face of said member being at an angle to the sheets in the holding means and the other face being parallel with the sheets in the holding means when the member is in its first named position, and means movable in the plane in which said first face lies when the member is in its second position for feeding the sheets from said member.

15. In a sheet feeding device, means for holding a plurality of sheets in superimposed relation and in a predetermined angular position, a feeding member having a pair of sheet engaging faces angularly disposed with respect to each other in fixed relation, said member being movable from a position adjacent said holding means to a position away from said means for withdrawing sheets one at a time from said means, the first face of said member being at an angle to the sheets in the holding means and the other face being parallel with the sheets in the holding means when the member is in its first named position, said first face having sheet gripping means associated therewith and said faces while remaining fixed with respect to each other being movable to different angular positions relative to those assumed by the faces when the member is in its first-named position as the member moves away from said holding means, and means movable in the plane to which the first face is moved for feeding the sheets from said member.

16. In a sheet feeding device, a hopper for holding a plurality of sheets in superimposed relation and in predetermined angular position, a feeding member having two sheet engaging faces movable from a position adjacent said hopper to a position away from said hopper for withdrawing sheets one at a time therefrom, one of said faces being at an angle to the sheets in the hopper and the other of said faces being parallel to the sheets therein when the member is in its first named position, sheet gripping means associated with the angularly disposed face, a fixed abutment at the bottom of the hopper adjacent the parallelly disposed face for supporting one part of the hopper sheets, and a movable abutment at the bottom of the hopper adjacent the angularly disposed face for supporting another part of the hopper sheets, said movable abutment being movable from sheet supporting to inoperative position as the sheet gripping means is operated.

17. In a sheet feeding device, means for holding a plurality of sheets in superimposed relation, a feeding member movable from a position adjacent said holding means to a position away from said means for withdrawing sheets one at a time therefrom and having a pair of relatively angularly disposed sheet engaging faces in fixed relation thereon, the first face being at an angle with respect to the sheet to be withdrawn and the second face being parallel to the sheet when the member is in its first named position, said faces while remaining fixed with respect to each other being movable to different angular positions relative to those assumed by the faces when the member is in its first named position as the member reaches its second named position.

18. In a sheet feeding device, means for holding a plurality of sheets in superimposed relation, a feeding member movable from a position adjacent said holding means to a position away from said means for withdrawing sheets one at a time therefrom and having a pair of relatively angularly disposed sheet engaging faces in fixed relation thereon, the first face being at an angle with respect to the sheet to be withdrawn and the second face being parallel to the sheet when the member is in its first named position, said faces while remaining fixed with respect to each other being movable to different angular positions relative to those assumed by the faces when the member is in its first named position as the member reaches its second named position, and sheet gripping means on the first face of said member for clamping the sheet thereagainst.

MICHAEL J. MILMOE.