Sept. 19, 1933. B. FASSMANN 1,927,015

PRINTING MACHINE

Filed April 17, 1931 2 Sheets-Sheet 1

Fig. 1.

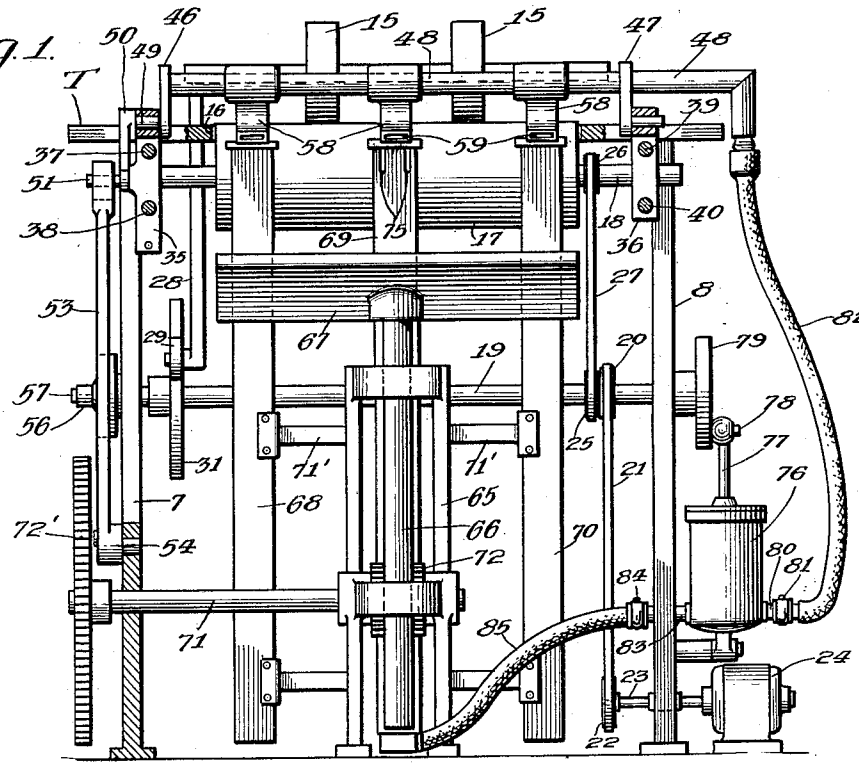
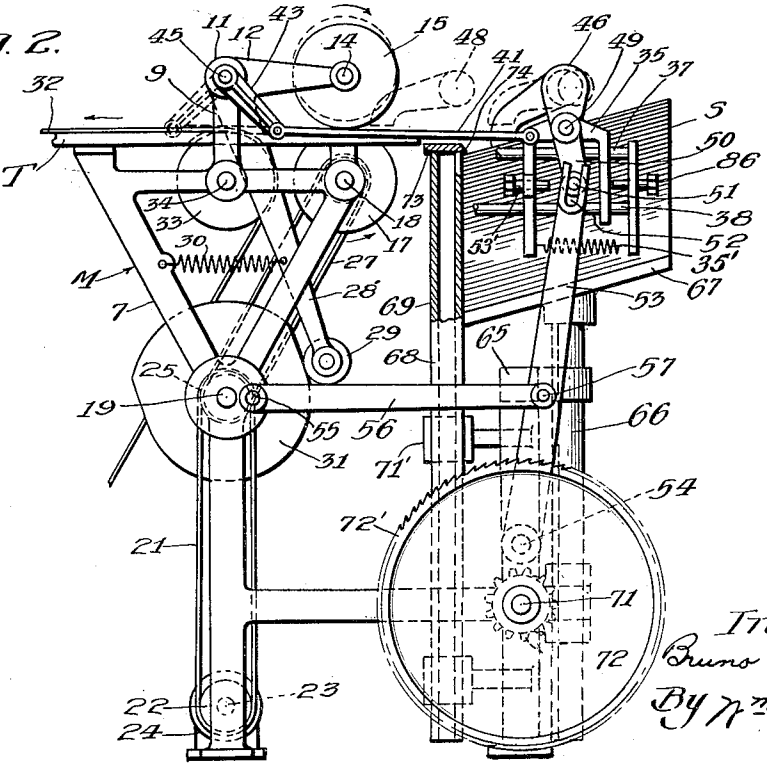


Fig. 2.



Inventor:
Bruno Fassmann
By Wm. H. Bell
Atty.

Sept. 19, 1933. B. FASSMANN 1,927,015

PRINTING MACHINE

Filed April 17, 1931 2 Sheets-Sheet 2

Fig. 3.

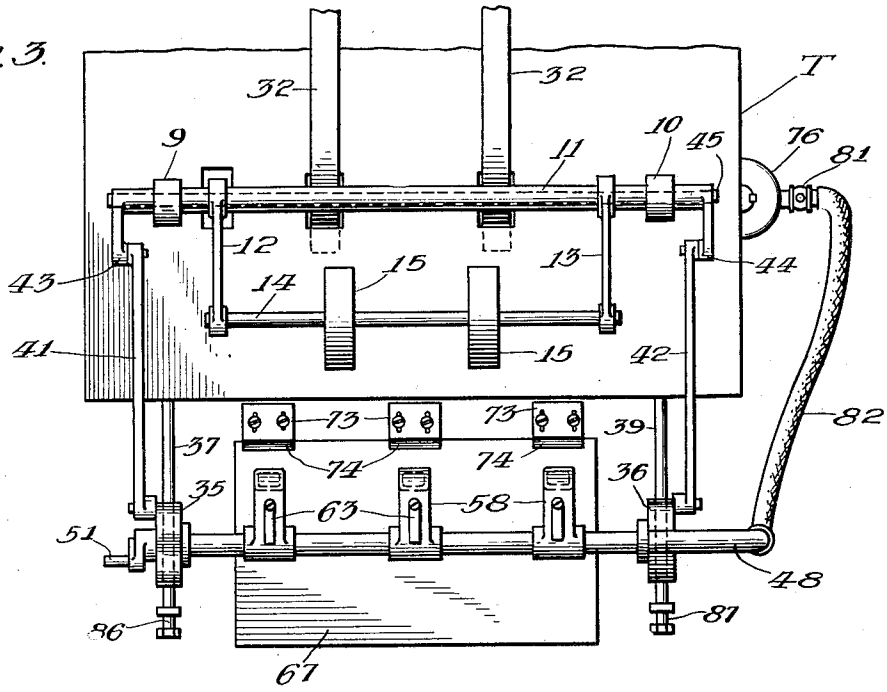


Fig. 4.

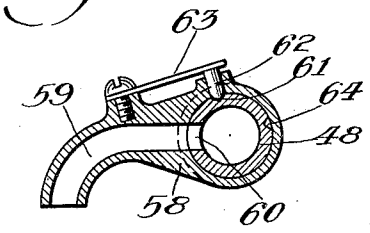


Fig. 5.

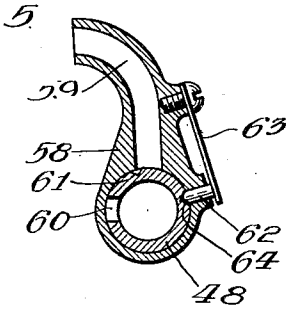
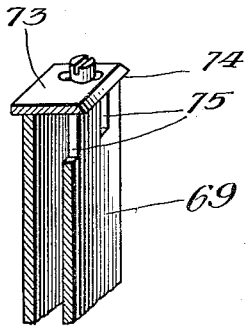


Fig. 6.



Inventor:
Bruno Fassmann
By Wm. O. Belt Atty:

Patented Sept. 19, 1933 1,927,015

UNITED STATES PATENT OFFICE

1,927,015

PRINTING MACHINE

Bruno Fassmann, Tempelhof, Berlin, Germany, assignor to Addressograph Company, Wilmington, Del., a corporation of Delaware

Application April 17, 1931, Serial No. 530,759, and in Germany April 24, 1930

10 Claims. (Cl. 271—28)

This invention relates to printing machines and more particularly to the feeding of sheets, envelopes, or the like thereinto.

The salient object is to feed sheets, which term is used in the generic sense herein, into a printing machine by a continuously operating mechanism having a dual motion whereby a sheet is picked up from a stack and then carried into the machine.

Another object is to so support the sheets that the uppermost thereof is so engaged by the devices for moving the same that delivery thereof is insured. An object, ancillary to the foregoing, is to insure separation of the uppermost sheet by blowing air between the sheets.

Further objects of the invention are to pick up the sheets by suction and to break the suction when the sheet has been delivered into the machine; to provide suction nozzles for picking up the sheets which may be held in operative or inoperative positions so that only as many nozzles as required to pick up a particular sheet function during operation; and to so support the sheets that registration thereof in the machine is insured.

In the selected embodiment of the invention illustrated in the accompanying drawings

Fig. 1 is an elevation looking in the direction in which the sheets are to be fed;

Fig. 2 is a side elevation;

Fig. 3 is a top plan;

Fig. 4 is a sectional detail view of one of the pick-up nozzles, said nozzle being shown in operative position;

Fig. 5 is a view, similar to Fig. 4, wherein the nozzle is shown in inoperative position; and

Fig. 6 is a perspective detail view of the upper end of one of the guide bars.

In the drawings M generally indicates the frame of a printing machine of the type used for addressing purposes or the like and which is but fragmentally illustrated since the particular construction thereof forms no part of my invention. The machine includes a work table T across which the sheets are fed to have printing operations performed thereon. The machine also includes side frame members 7 and 8, the lower ends of which are rested on the floor or other suitable support and at the upper end of the frame members are brackets 9 and 10 in which the hollow shaft 11 is journaled. On the shaft 11 are arms 12 and 13 carrying at the outer end thereof a shaft 14 on which the pressure rollers 15 are rotatably mounted. In the work table T a slot is formed through which the upper portion of the periphery of an elongated roller 17 extends. The roller 17 is fast on a shaft 18 journaled in the frame members. The rollers 15 may be lowered into cooperation with the roller 17 to clamp a sheet to thus insure movement thereof into the machine. Journaled in the frame members is the main drive shaft 19 having a pulley 20 fast thereon about which a belt is directed, said belt also being directed about pulley 22 on the shaft 23 of an electric motor 24 or other suitable source of power. Fast on the drive shaft 19 is a pulley 25 aligned with a pulley 26 fast on the shaft 18 and a belt 27 is directed about these pulleys. When the shaft 19 is rotated, movement is imparted to the shaft 18 to rotate the roller 17 in the direction indicated by the arrow on Fig. 2. Unitary with arm 12 is an arm 28 having a roller 29 at the lower end thereof that is held in engagement, by a spring 30, with the periphery of the cam 31 fast on the shaft 19. Movement is imparted to the arm 28 from the cam 31 to rock the shaft 11 and consequently the arms 12 and 13 to thereby move the rollers 15 to and from cooperation with the roller 17, the alternate positions of these rollers being shown in full and dotted lines in Fig. 2. Sheets are picked up from the stack thereof arranged at the end of the machine and are moved between the rollers 15 and the roller 17, during the time the rollers 15 are in the upper dotted-line position. Thus, when the rollers 15 are lowered the sheet is clamped by the rollers 15 against the roller 17 to move the sheet forwardly onto the conveyor belts 32 directed about the pulleys 33 fast on the shaft 34, which belts travel in the direction of the arrow on Fig. 2 to thereby carry the sheet across the work table T to receive impressions thereon.

The means for moving the sheets from the supply thereof into the machine includes the slides 35 and 36 movable on the parallel guide rods 37 and 38 and 39 and 40 arranged on opposite sides of the machine and respectively supported by the frame members 7 and 8. To insure parallel movement of the slides, links 41 and 42 are pivotally connected thereto. These links are also pivotally connected to the cranks 43 and 44 fast on the shaft 45 journaled in the hollow shaft 11. Pivotally mounted on the slides 35 and 36 are arms 46 and 47 supporting a tube 48. The pintle 49 of the arm 46 extends through the slide 35 and fast thereon is an arm 50 carrying a pin 51 extending into the bifurcation 52 in the upper end of the lever 53 pivotally mounted at 54 on a bracket on the frame member 7. On the shaft

19 is a crank disc 55 having a link 56 pivotally connected thereto, which link is connected at 57 to the lever 53 between the pivotal mounting 54 thereof and the bifurcation 52 therein. Thus, when the shaft 19 is rotated the lever 53 is rocked until the bifurcated end thereof engages the adjustable stop pin 53' on the slide 35. Further, movement of the lever 53 after engagement of the end thereof with the stop pin 53' reciprocates the slides 35 and 36 along the parallel rods on which they are mounted to thereby move the tube 48 from the full-line position of Fig. 2 into the dotted-line position of said figure. The tube is moved from the dotted-line position of Fig. 2 back into its full-line position by the action of the spring 35' extending between an arm on the slide 35 and a plate at the rear end of the guide rods 37 and 38. The lever 53 lags this spring during this latter movement, which is toward the right as viewed in Fig. 2 and therefore the nozzles are held in their upper position as will be explained.

At spaced intervals on the tube 48 the suction nozzles 58 are mounted. Each of these nozzles have an air passage 59 therein which may be aligned with a port 60 in the tube 48, it being understood that a port 60 is provided at each point whereat a nozzle 58 is arranged. In order to insure alignment of the passage 59 and the port 60, a notch 61 is formed in the periphery of the tube 48. A pin 62 is slidably mounted in a boss on the nozzle 58 and a leaf spring 53 carried by the nozzle bears against the end of this pin to force it toward the notch 61. When, however, it is desired to render one of the nozzles 58 inoperative the same may be turned about the tube 48 until the pin 62 seats in the notch 64 in the periphery of the tube 48 and therefore the passage 59 is moved out of communication with the port 60 and the nozzle is held in this inoperative position, illustrated in Fig. 5, by the seating of the pin 62 in the notch 64.

At the rear of the machine is a supporting frame 65 in which a standard 66 is slidably mounted. At the upper end of the standard 66 is a forwardly inclined plate or shelf 67, the forward edge of which rests against the guide rods or columns 68, 69 and 70 carried by brackets 71' from the supporting frame 65. The sheets S are stacked on the shelf 67 and the forward edges thereof engage one or more of the columns 68. A shaft 71 is journaled in the supporting frame 65 and a bracket on the frame 7 and fast thereon is a pinion 72 meshing with a rack 73 on the standard 66. A ratchet 72', or analogous device, is fast on the shaft 71 and when a ratchet is provided a pawl will be associated therewith, which will be operated in timed relation with the machine to impart a step-by-step movement to the ratchet to thereby rotate the shaft 71 and the pinion 72, and this intermittent movement will be imparted to the standard 66 to move the same upwardly as sheets are withdrawn from the shelf 67 to thus insure proper positioning of the uppermost of the pile of sheets on the shelf.

Adjustably mounted at the upper ends of the columns 68, 69 and 70, as illustrated in Fig. 6, are plates 73 having knife edges 74 thereon projecting beyond the face of the columns against which the sheets on the shelf 67 abut, and therefore the uppermost of the sheets may be engaged with these knife edges. To insure separation of the sheets, the column 69 is preferably hollow and has slots 75 at the upper end thereof below the plate 73. Air under pressure is forced through the column 69 and out through the slots 75 between the uppermost of the sheets S to thereby insure separation thereof.

Supported from the frame member 8 is a pump 76 including a pitman 77 eccentrically connected at 78 to a disc 79 fast on the shaft 19. The pump includes an inlet 80 having a check valve 81 therein and a flexible connection 82 extends between the check valve 81 and one end of the tube 48. The pump also includes an outlet 83 having a check valve 84 therein and a flexible connection 85 extends between this check valve and the column 69. On the up-stroke of the pitman 77 the check valve 84 is closed while the check valve 81 is open and therefore air is drawn through the flexible connection 82 to thereby create a suction in the tube 48. On the down-stroke of the pitman 77 the check valve 81 is closed while the check valve 84 is open and therefore air is forced through the flexible connection 85 to the columns 69, and this air is discharged through the slots 75 to separate the sheets as described.

In use, the belt conveyor of the printing machine is set in operation and the sheets S are stacked on the shelf 67, which is so positioned that the forward edge of the uppermost of the sheets is engaging the knife edges 74. At this time the lever 53 is in rearwardmost position and the nozzles 58 are engaging the uppermost sheet. Subsequent to this time the pitman 77 is moved upwardly, thus creating a suction in the tube 48 and the top sheet is clamped against the nozzles by the suction. The lever 53 moves forwardly and rocks the arm 50 to thereby first move the tube 48 and consequently the nozzles 58 upwardly, and therefore the top sheet is stripped past the knife edges 74 and the nozzles 58 are turned from the full-line position of Fig. 2 to the dotted-line position slightly above the full line position as shown in Fig. 2. This movement occurs immediately after the start of the movement of the lever 53 and continues until the end of the lever 53 engages stop pin 53' and after this engagement and as said lever 53 continues to move toward the printing machine the sheet picked up by the nozzles is carried forwardly and passed between the rollers 15 and the roller 17 and as soon as the sheet has passed thereby the rollers 15 are lowered to thereby clamp the sheet and therefore it is fed forwardly to the conveyor belt 32 since at this time the pitman 77 starts to move downwardly, thus interrupting the suction in the tube 48. As soon as this operation has been completed the lever 53 again moves rearwardly but the spring 35' acts to urge the slides toward the right as viewed in Fig. 2 and therefore the end of the lever 53 remains in engagement with the pin 53' during this rearward movement. However, when the slides 35 and 36 engage the stops 86 and 87 at the ends of the parallel guide rods the lever 53 acts to pivot the nozzles downwardly into engagement with the topmost sheet and the parts are in position to repeat the above described operation. During this rearward movement of the lever 53 air is blown through the sheets to insure separation when the nozzles 58 again function as above described.

While I have illustrated and described a selected embodiment of my invention it is to be understood that this is capable of variation and modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall

within the spirit and scope of the following claims.

I claim:

1. In a printing machine which has means for receiving and carrying a sheet therethrough, clamping rollers for feeding a sheet to said receiving and carrying means, and means for separating said clamping rollers to permit the insertion of a sheet therebetween, the combination of means supporting a stack of sheets at one end of said machine, rigid guide means, slides reciprocable along said guide means, a tube carried by said slides, suction nozzles on said tube, and means for turning said tube to raise and lower said nozzles in timed relation with the reciprocation of said slides, said nozzles being lowered into engagement with the topmost sheet of said stack at the end of movement of said slides in one direction to pick up a sheet to carry it to said clamping rollers.

2. In a printing machine which has means for receiving and carrying a sheet therethrough, clamping rollers for feeding a sheet to said receiving and carrying means, and means for separating said clamping rollers to permit the insertion of a sheet therebetween, the combination of means supporting a stack of sheets at one end of said machine, rigid guide means, slides reciprocable along said guide means, a tube carried by said slides, suction nozzles on said tube, means for turning said tube to raise said nozzles timed relation with the reciprocation of said slides, said nozzles being lowered into engagement with the topmost sheet of said stack at the end of movement of said slides in one direction to pick up said sheet to carry it to said clamping rollers, and means for creating a suction in said tube and nozzles during the raising movement of said nozzles and for blowing air between the sheets in said stack during the lowering movement of said nozzles.

3. A printing machine which has means for receiving and carrying a sheet through the machine, clamping rollers for feeding a sheet to said receiving and carrying means, and means for separating the clamping rollers to permit the insertion of a sheet therebetween, the combination of means supporting a stack of sheets at one end of said machine, a suction tube, nozzles on said suction tube, a pair of slides, arms pivotally connecting said suction tube to said slides, rigid guide means supporting the slides for movement between the stack of sheets and said clamping rollers, operating means for reciprocating said slides along said guide means, and means cooperating with said operating means for pivoting said arms at the end of the movement of said slides in one direction to engage said nozzles with the topmost sheet and for limiting pivoting of said arms as effected by said operating means to move said nozzles in the opposite direction to raise said topmost sheet as said slides move in the opposite direction.

4. In a printing machine which has means for receiving and carrying a sheet through the machine, clamping rollers for feeding a sheet to said receiving and carrying means, and operating means for engaging and disengaging said clamping rollers to permit insertion of a sheet therebetween, the combination of means supporting a stack of sheets at one end of the machine, a suction tube, nozzles on said suction tube, a pair of slides, arms pivotally connecting the suction tube to the slides, rigid guide means for supporting the slides for movement between the stack of sheets and said clamping rollers, moving means operable with the operating means for said clamping rollers for reciprocating said slides along said guide means, and means cooperating with said moving means for pivoting said arms at the end of movement of said slides in one direction to engage said nozzles with the topmost sheet and for limiting pivoting of said arms as effected by said moving means to move said nozzles in the opposite direction to raise said topmost sheet as the slides move in the opposite direction to carry and insert said sheet between the separated clamping rollers whereby as said slides start to move toward said stack said clamping rollers will engage said sheet to move said sheet onto the receiving and carrying means.

5. In a sheet separating and feeding means for printing machines and the like, a suction tube having nozzles mounted at spaced intervals therealong, said tube having ports therein at the places whereat said nozzles are mounted, said nozzles having passages therein adapted to be aligned with said ports, means for holding said nozzles in positions whereat the passages therein are aligned with said ports, and means for holding said nozzles in positions whereat the passages therein are out of alignment with said ports.

6. In a sheet separating and feeding apparatus for printing machines and the like, a plate for supporting a stack of sheets, guide bars associated with said plate whereby one or more of said guide bars is engaged by sheets mounted on said plate to support said sheets on said plate, a suction tube, nozzles rotatably mounted on said suction tube at spaced intervals and adapted to engage the topmost sheet of a stack of sheets on said plate to effect separation of the topmost sheet, said tube having ports therein at the places whereat said nozzles are mounted, said nozzles having passages therein, and means for holding said nozzles against rotative movement on said tube whereby said nozzles may be held in a position whereat the passages therein are aligned with said ports in the tube or whereat said passages are out of alignment with said ports.

7. In a sheet feeding device, means supporting a stack of sheets, a carrying bar, sheet pick-up means on said carrying bar engageable with the topmost sheet in said stack, guide means for said carrying bar, means urging said carrying bar in one direction, means for moving the carrying bar against the action of said urging means and adapted to turn said carrying bar at the start of movement thereof, and means for turning said carrying bar at the end of movement imparted thereto by said urging means.

8. In a sheet feeding device, means supporting a stack of sheets, a supporting bar, suction nozzles on said supporting bar and engageable with the topmost sheet in said stack, carrying means for said supporting bar, means urging said carrying means in one direction, operating means for moving said carrying means against the action of said urging means, means cooperating with said operating means to limit turning of said supporting bar at the start of movement thereof against the action of said urging means whereby said suction nozzles are moved away from said stack of sheets, and means for turning said supporting bar at the end of movement imparted to said carrying means by said urging means to engage said nozzles with said topmost sheet.

9. In a sheet feeding device, means supporting a stack of sheets, a suction bar, nozzles on said bar and engageable with the topmost sheet in

said stack, slide means, means connecting said suction bar to said slide means, means urging said slide means into a predetermined position, operating means for moving said slide means from said predetermined position, means cooperating with said operating means for limiting turning of said suction bar by said operating means which moves said nozzles away from said stack of sheets, and means at said predetermined position for effecting movement of said suction bar to engage said nozzles with said topmost sheet.

10. In a sheet feeding device, means supporting a stack of sheets, a suction bar, nozzles on said bar and engageable with the topmost sheet in said stack, guide means, slides mounted on said guide means, means connecting said suction bar to said slides for movement relative to said slides, means urging said slides into a predetermined position on said guide means, operating means for moving said slides along said guide means from said predetermined position and adapted to turn said suction bar at the start of said movement to move said nozzles away from said stack of sheets, and means for moving said nozzles into engagement with the topmost sheet upon return of said slides to said predetermined position by said urging means.

BRUNO FASSMANN.