J. DUVALL.

PNEUMATIC PRESS FEEDING MEANS.

APPLICATION FILED MAR. 16, 1916.

1,217,161.

Patented Feb. 27, 1917.

2 SHEETS—SHEET 1.

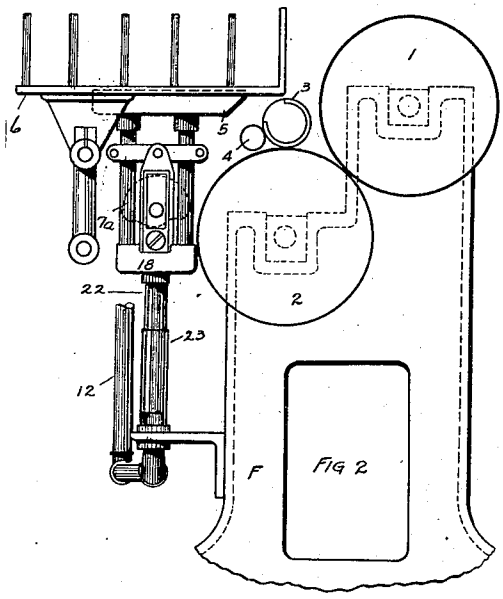


FIG 2

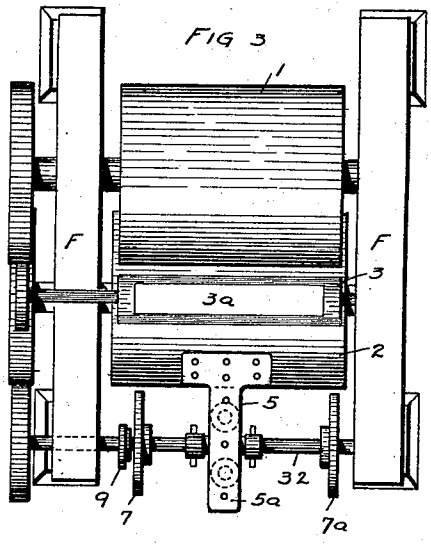


FIG 3

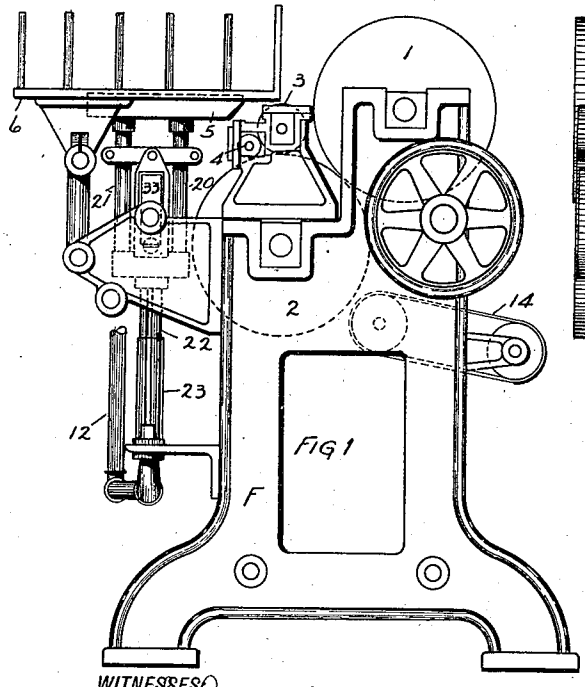


FIG 1

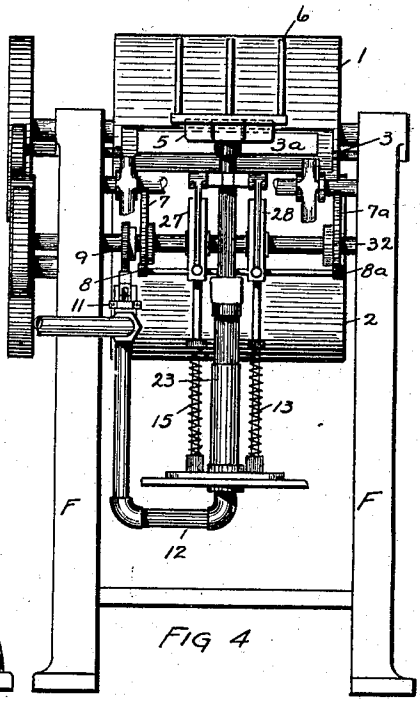


FIG 4

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PNEUMATIC PRESS FEEDING MEANS.

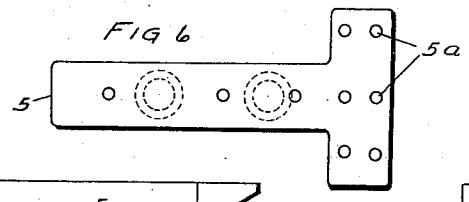
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2 SHEETS—SHEET 2.

FIG 6



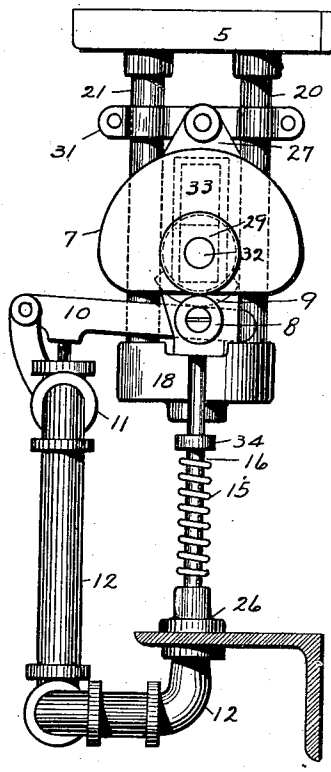


FIG 5

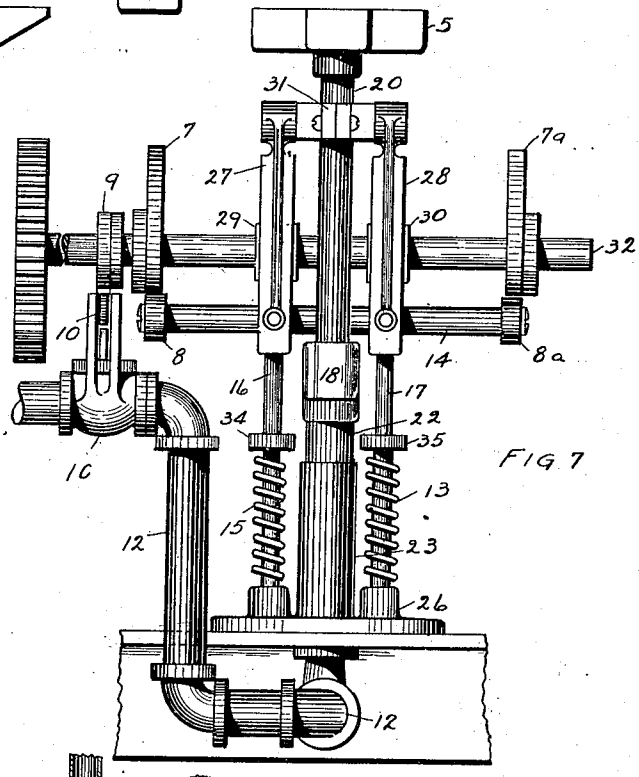


FIG 7

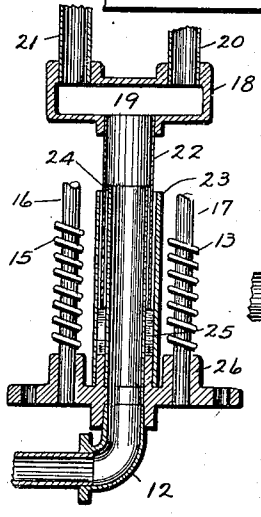
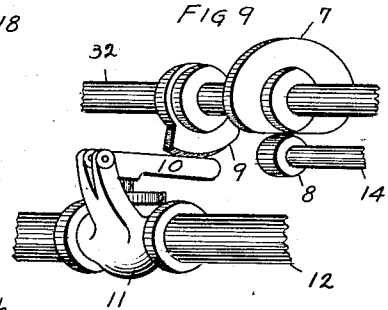


FIG 8

FIG 9



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UNITED STATES PATENT OFFICE.

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PNEUMATIC PRESS-FEEDING MEANS.

1,217,161. Specification of Letters Patent. Patented Feb. 27, 1917.

Application filed March 16, 1916. Serial No. 84,547.

To all whom it may concern:

Be it known that I, JAMES DUVALL, a citizen of the United States, and a resident of Camas, county of Clarke, and State of Washington, have invented a new and useful Improvement in Pneumatic Press-Feeding Means, of which the following is a specification.

My invention relates to mechanism which automatically and by means of air suction feeds the undermost sheet, envelop, bag or the like, from a pile or vertical stack of material to other means for operating thereon, and more particularly relates to the feeding of all sizes of bags to a bag printing press. It is an improvement upon the press feeding means disclosed in my patent granted December 5, 1916, Number 1,207,149, and has in combination the hollow, slotted feed roll therein described, which has greatly simplified this type of press feeding mechanism.

Its principal object is to draw the bottom unit of stacked material from the adjustable rack in which it is held in a horizontal plane, the front end and the back end of such unit being moved downward at the same time, so that the whole unit, when its front end is brought into engagement with the feed rolls is substantially parallel with the bottom of the rack. This adjustable rack is substantially the same as the one described very fully in my patent dated December 14, 1915, Number 1,164,585, lines 90 to 103 inclusive, with the exception that the adjustable plate *g* is somewhat shorter and allows the suction element to engage the lowermost unit close to its back edge. In my former suction feed devices of this type, the front end only of the bottom unit is depressed and enters the feed rolls at an angle, with the weight of the stacked material resting on the portion not withdrawn from the rack. In handling large units this friction becomes very noticeable and interferes with the rapid manipulation of the press. In the mechanism described herein, and illustrated by the drawings of a bag printing press of common form, this defect is entirely overcome, and the whole bag is withdrawn from the feed rack with one movement and when the feed rolls take it there is no friction from the above cause to overcome whatsoever, which enables the press to be run much more rapidly and with a certainty of result not heretofore attainable. All carrier belts and nipper devices are done away with.

Figure 1 is a side elevation, showing reciprocating suction box or header 5 directly underneath the rack 6 which holds the stacked material. Fig. 2 is same view, but with the frame F removed, showing more plainly the relation between type and impression cylinders 1 and 2, feed rolls 3 and 4, and the suction element 5. Fig. 3 is a plan, with the feed rack 6 removed, showing top of suction box 5 and openings 3^a in the hollow, slotted feeder roll 3. Fig. 4 is an end elevation looking at the press from the suction or feed end. Fig. 5 is a side elevation of reciprocating suction part, showing yoke 31 attached to the suction pipes 20 and 21, and opening in guide 27 (same for 28), allowing freedom of movement when suction element is pressed down by the cams 7 and 7^a. Fig. 6 is a plan of the suction box 5, showing orifices 5^a. Fig. 7 is an end elevation of reciprocating suction part, showing details of actuating mechanism. Fig. 8 is a sectional elevation of suction well 23, header 18 and suction pipes 20 and 21, showing how suction pipe 22 can be raised and lowered, with its lower and open end sealed by a fluid at 25; for the sake of clearness, the header 18 has been given a quarter turn so as to show both the suction pipes 20 and 21. Fig. 9 is a perspective of cut-off air valve 11, showing relation of cams 7 and 9; when lever 10 is pressed down by cam 9 the suction is active and cam 7 is at its period of least throw, allowing the suction box 5 to reach its highest point against the bottom unit in the feed rack 6.

Figs. 1 and 2 show diagrammatically a bag printing press with type cylinder 1 and impression cylinder 2 and two feeder rolls 3 and 4 just forward of the pinch between the type and impression cylinders. Roll 3 is a hollow, slotted feeder roll, with a longitudinal opening therein, 3^a, about ninety degrees wide, as shown in Fig. 3. This roll is in contact with the impression cylinder 2 and is located just under the forward end of the bottom of feed rack 6. The idler roll 4 is in contact with the hollow feeder roll 3, but there is a clearance between it and the impression roll. The material to be operated upon is stacked in the feed rack 6 one unit on top of the other, and the bottom of the rack is so constructed that the undermost unit of the vertical stack can be removed therefrom downwardly. To accomplish this I employ a suction element that re-

ciprocates up and down, toward and away from the bottom unit of the material stacked in the feed rack. The top of the suction box 5 is shaped like a T, as in Fig. 6, with the head of the T under the forward end of the rack and the long part extending toward the back. Several openings or orifices, 5ª, are made in the top of the suction box, so that when the suction is active the back as well as the front of the bottom unit will be firmly engaged by the suction box. Two suction pipes 20 and 21 connect the suction box 5 with a hollow header 18, Fig. 8, and a single pipe 22, attached thereto, slips over extension 24 of the main suction pipe 12 and inside of pipe 23. Pipe 23 is firmly affixed to its base 26, as is also pipe 24 and the pipe 22 is movable up and down in the annular space between these two pipes 23 and 24. Oil is poured into the pipe 23, sufficient in quantity to effectually seal the open end of pipe 22 and thus the suction is not impaired when the pipe moves up and down in its reciprocating action. Air is drawn from the suction box 5 through pipes 20 and 21, the header 18, pipes 22, 24 and the main pipe 12. Figs. 5 and 7 illustrate very plainly how the up and down movement is imparted to the suction element. A yoke 31 is firmly affixed to the pipes 20 and 21, carrying suction header or box 5. To this yoke guides 27 and 28 are attached and at their lower ends they carry the pusher arm 14, rigidly clamped thereto. Rods 16 and 17, with shoulders 34, 35 and provided with springs 13 and 15, form the bottom part of guides 27 and 28 and the lower ends of the rods are free to move up and down in the openings in the base 26 in which they are placed. Guide boxes 29 and 30, through which the cam shaft 32 passes, keep the suction element in vertical alinement. On cam shaft 32 are mounted cams 7 and 7ª, which engage respectively the rollers 8 and 8ª on push arm 14. A cam 9 is also placed on cam shaft 32 which engages lever 10 of air cut-off valve 11. As cam shaft 32 revolves, the cams 7 and 7ª push the arm 14 downward and thus the suction box 5 is lowered. The open coil springs 13 and 15 are thus compressed, pushing upward on rods 16 and 17 and keeping rollers 8 and 8ª in close contact with cams 7 and 7ª at all times. As the cams approach their period of least throw the tension of the springs raises the suction box 5 to its upward limit. At the proper time the lever 10 of air valve 11 is depressed by cam 9 and the suction becomes active.

In the operation of the press feeding means thus described, the adjustable rack 6 is filled with the material to be operated upon, one unit stacked on top of the other in a vertical pile and the undermost unit held in such manner that it can be drawn from the bottom of the stack. The suction box 5 is shown at its highest point in Figs. 1 and 2, with its top surface in contact with the under surface of the bottom unit. The relation of the cams on cam shaft 32 when the mechanism is in this position is shown in Fig. 9; the cams 7 and also 7ª, (not shown), are at their period of least throw and the lever 10 of air valve 11 has been pressed down by cam 9 to open suction pipe 12, and thus the bottom unit of the stack is firmly held by the suction box 5. As the cam shaft 32 revolves, the cams 7 and 7ª push on arm 14 and the suction box 5, with the bottom unit firmly held thereby, draws the whole unit from under the stack. As the suction box reaches its lowest point, the forward end of the unit which it has withdrawn from the pile in the rack is deflected by the hollow, slotted feeder roll 3 until it enters the pinch between it and the idler roll 4 and just at this moment the suction is shut off by the cam 9 releasing lever 10 of the air valve 11 and the unit, in this case a paper bag, is rapidly drawn off the suction box and between the feed rolls 3 and 4 and thence passed between the type and impression cylinders and dropped on to the conveyer 14. As the cams revolve and cease to push against arm 14, the springs raise the suction box once more into contact with the bottom unit in the rack, the cam 9 causes suction to become active and the movements above described are repeated until all of the units of material have been operated upon as desired.

I claim,

1. In a pneumatic feed for presses of the type described, with an adjustable feed rack which holds vertical stack of material and allows the bottom unit to be drawn downwardly therefrom, a suction box directly underneath said rack so proportioned that it will engage both the front and the back portions of the under surface of the bottom unit, withdrawing same from the rack in a substantially horizontal plane free from contact with any superimposed unit, means for imparting an up and down movement to the suction box and means for controlling the suction at predetermined intervals.

2. In a pneumatic feed for presses of the type described, with an adjustable feed rack which holds vertically stacked material and allows the bottom unit to be drawn downwardly therefrom, a suction box underneath said rack so proportioned that it will engage both the front and the back portions of the under surface of the bottom unit withdrawing same from the rack in substantially a horizontal plane free from contact with any superimposed unit, a hollow, longitudinally slotted feeder roll which is in contact with the impression roll and which engages the entire forward edge of

the bottom unit, means for moving the suction box up and down and means for controlling the suction at predetermined intervals.

3. In a pneumatic feed for presses of the type described, with an adjustable feed rack which holds vertically stacked material and allows the bottom unit to be drawn downwardly therefrom, a suction box underneath said rack so proportioned that it will engage both the front and back portions of the under surface of the bottom unit withdrawing same from the rack in substantially a horizontal plane free from contact with any superimposed unit, a hollow, longitudinally slotted feeder roll which is in contact with the impression roll and which engages the entire forward edge of the bottom unit, an idler feed roll in contact with the slotted feed roll, means for moving the suction box up and down and means for controlling the suction at predetermined intervals.

4. In a pneumatic feed for presses of the type described, with an adjustable feed rack which holds vertically stacked material and allows the bottom unit to be drawn downwardly therefrom, a suction box underneath said rack so proportioned that it will engage both the front and the back portions of the under surface of the bottom unit withdrawing same from the rack in substantially a horizontal plane free from contact with any superimposed unit, cam actuated means to reciprocate the suction element up and down and cam actuated means for controlling the suction at predetermined intervals in relation to the reciprocating movement of the suction element.

5. In a pneumatic feed for presses of the type described, with an adjustable feed rack which holds vertically stacked material and allows the bottom unit to be drawn downwardly therefrom, a suction box underneath said rack so proportioned that it will engage both the front and back portions of the under surface of the bottom unit, vertical suction pipes leading from the suction box, a header with a central chamber which receives the lower ends of the vertical suction pipes, a central vertical suction pipe connected with the bottom of this chamber in the header, an outer pipe which incloses the lower part of this vertical suction pipe, an inner vertical suction pipe concentric with said vertical suction pipe from the header, two vertical guide arms attached to the suction pipes leading from the suction box, a cross-bar attached to the lower end of said guide arms, a small roller at each end of the cross-bar, a vertical extension rod affixed to the lower end of each guide arm, an open coil spring on each rod, cams to engage respectively the rollers on the cross bar, an air valve on the main suction pipe, a cam to engage the lever of the air valve at predetermined intervals, a hollow, longitudinally slotted feed roll in contact with the impression roll and an idler feed roll in contact with the slotted roll.

6. The method of feeding vertically stacked units to a press which consists of drawing by suction means a single unit downward from the bottom of the stack in substantially a horizontal plane so that its entire forward end will come into engagement with the feed rolls and no part of the material in the stack will rest on the unit so withdrawn at the time of its engagement with said feed rolls.

7. The method of feeding vertically stacked units of material to a press which consists of drawing by suction means a single unit downward from the bottom of the stack in substantially a horizontal plane so that its entire forward end will come into engagement with the mechanism that conveys it to the printing cylinders and no part of the material in the stack will rest on the unit so withdrawn at the time of its engagement with the subsequent feed mechanism.

8. In a pneumatic feed for presses of the type described, a movable suction element having a bottom vertical suction pipe, an inner concentric stationary suction pipe therein, means for sealing the slip joint between the movable and stationary parts of the suction pipe and means for reciprocating the movable suction element.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."