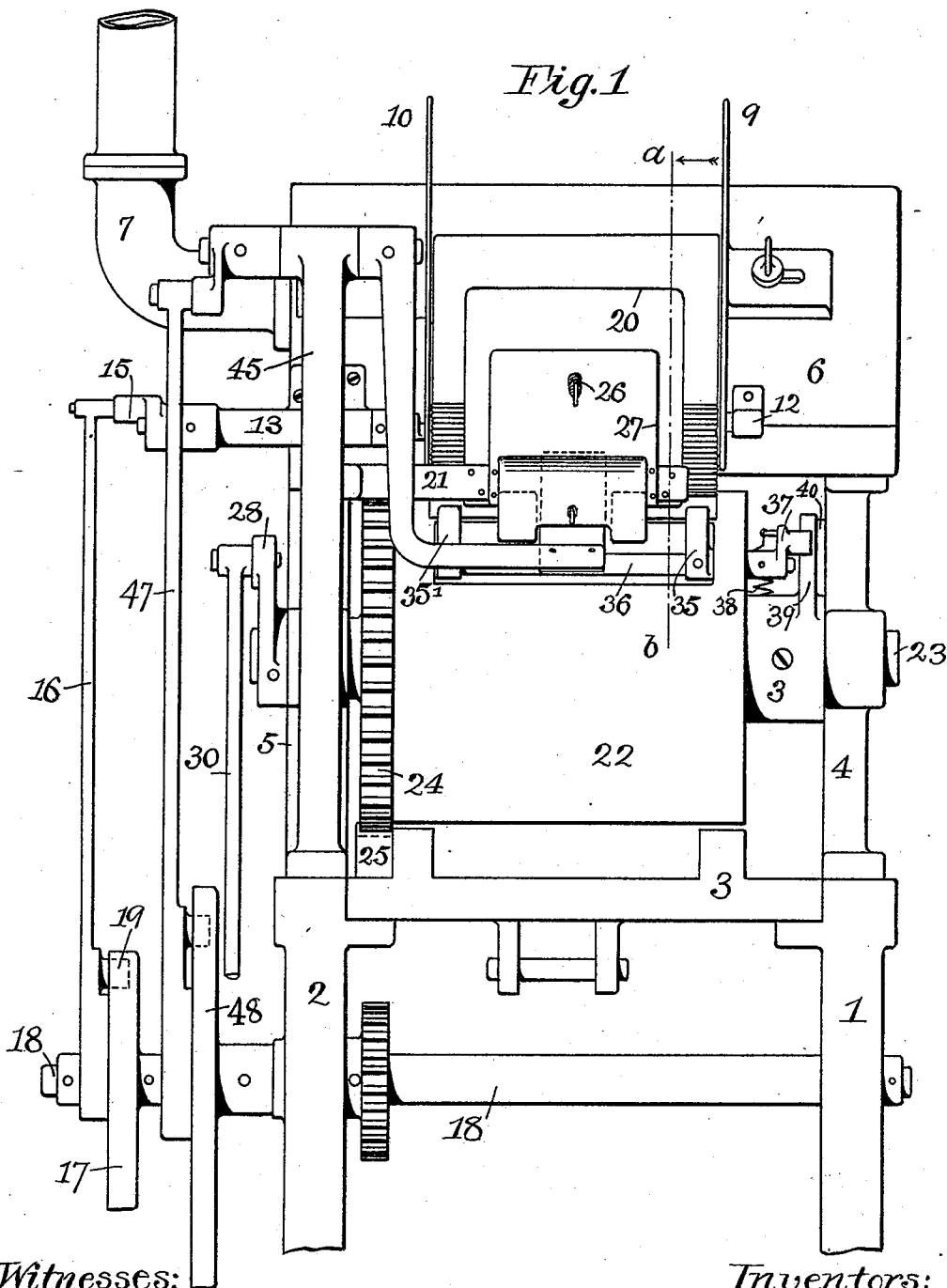


4 Sheets—Sheet 1.

SHEET SEPARATING MACHINE.

Patented Oct. 27, 1896.



Inventors:

William A. Lorenz
Casper Ruessing

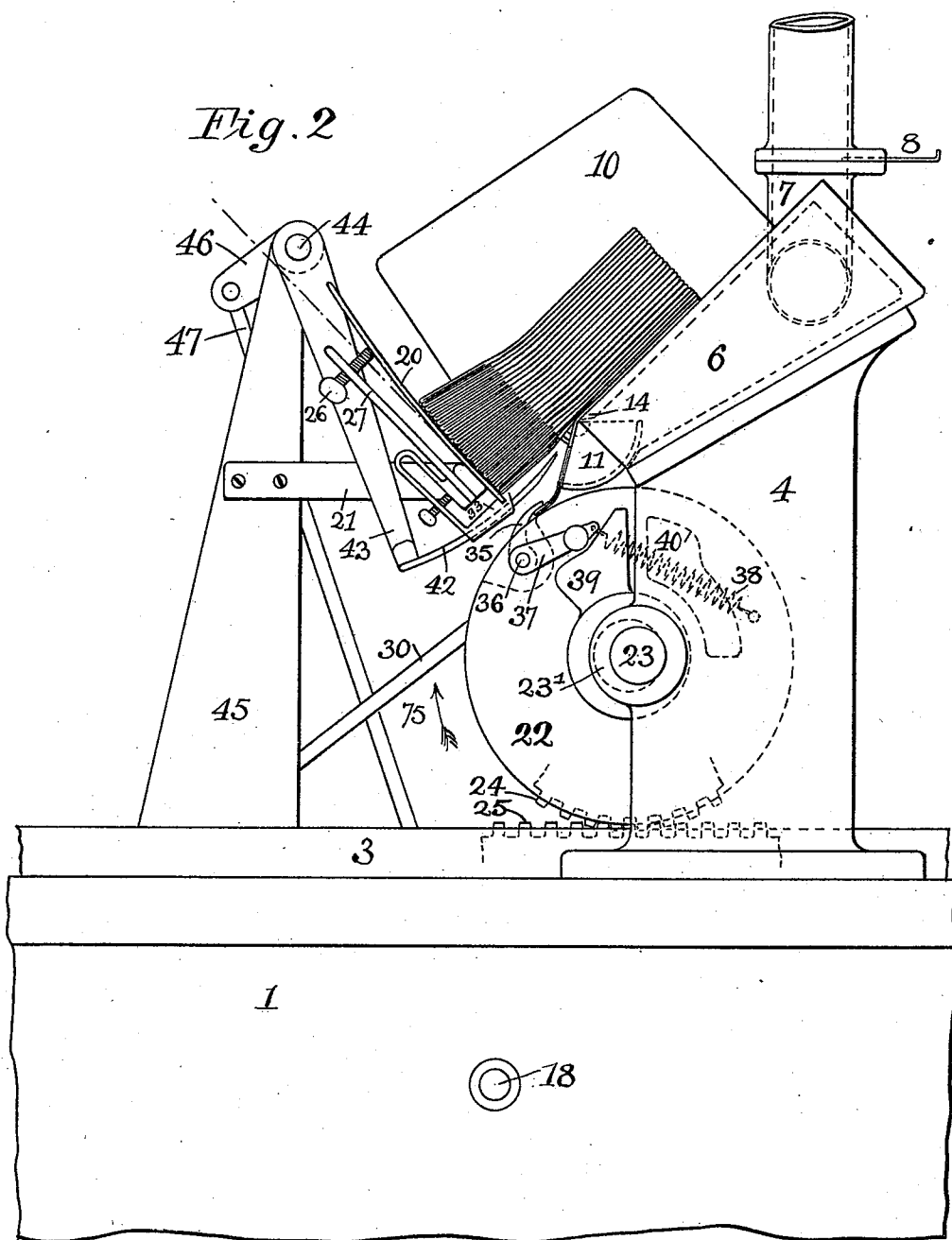
(No Model.)

4 Sheets—Sheet 2.

W. A. LORENZ & C. REISING.
SHEET SEPARATING MACHINE.

No. 570,176.

Patented Oct. 27, 1896.



Witnesses:

Edward E. Claussen
W. H. Honiss

Inventors:

William A. Lorenz
Casper Reising

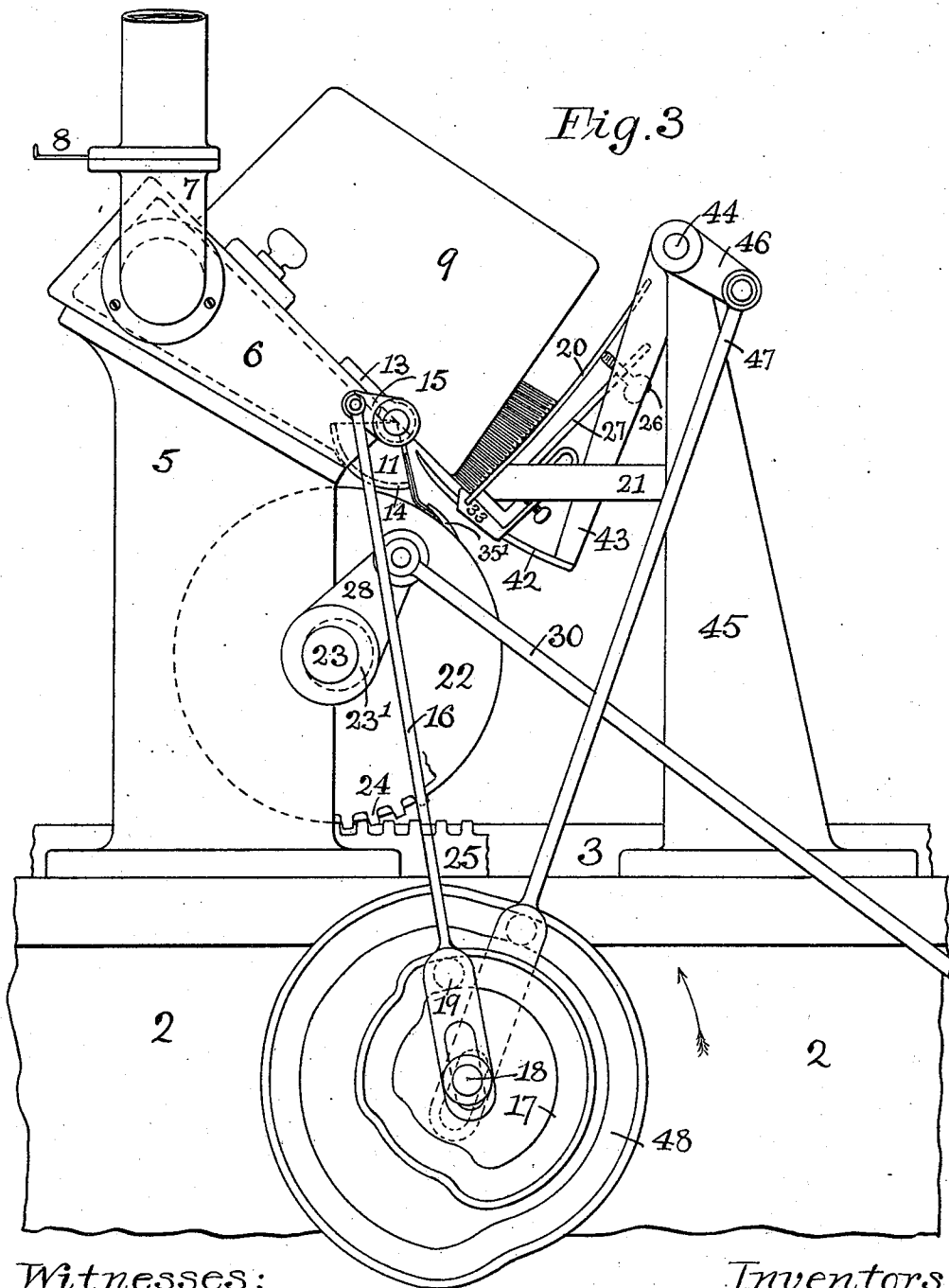
(No Model.)

4 Sheets—Sheet 3.

W. A. LORENZ & C. REISING.
SHEET SEPARATING MACHINE.

No. 570,176.

Patented Oct. 27, 1896.



Witnesses:

Edward E. Claussen

W. H. Honiss

Inventors:

William A. Lorenz

Casper Reising

(No Model.)

4 Sheets—Sheet 4.

W. A. LORENZ & C. REISING.
SHEET SEPARATING MACHINE.

No. 570,176.

Patented Oct. 27, 1896.

Fig. 4

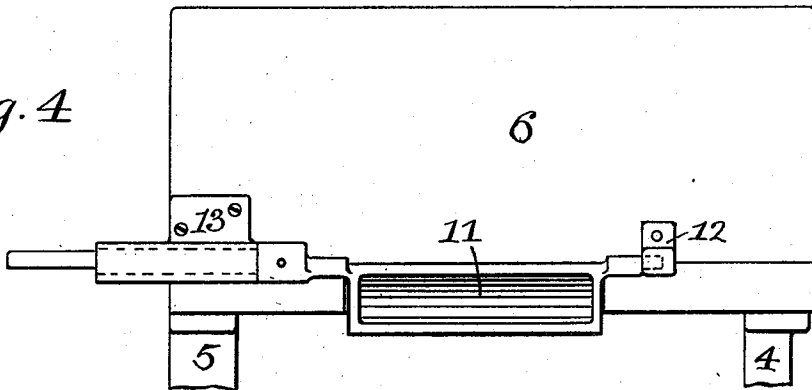


Fig. 5

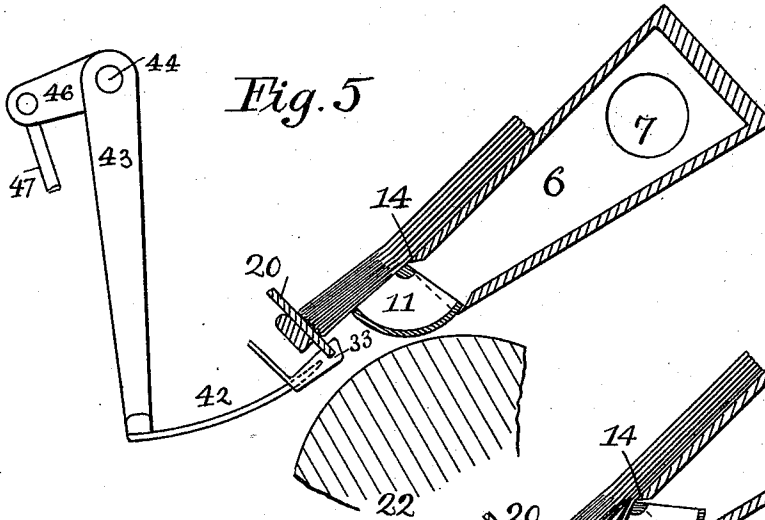
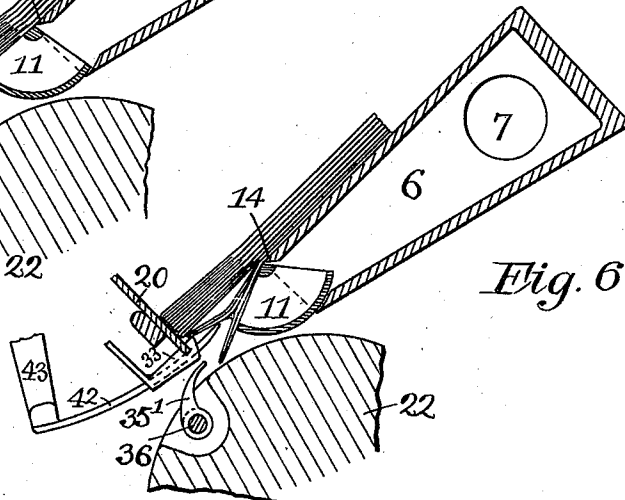


Fig. 6



Witnesses:

Edward S. Claussen
W. H. Honiss.

Inventors:

William A. Lorenz
Casper Reising

UNITED STATES PATENT OFFICE.

WILLIAM A. LORENZ, OF HARTFORD, AND CASPER REISING, OF SOUTHTON, CONNECTICUT, ASSIGNORS TO THE CONSOLIDATED S. O. S. BAG COMPANY, OF NEW YORK, N. Y.

SHEET-SEPARATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 570,176, dated October 27, 1896.

Application filed January 28, 1895. Serial No. 536,410. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM A. LORENZ, residing at Hartford, and CASPER REISING, residing at Southington, in the county of Hartford and State of Connecticut, citizens of the United States, have invented certain new and useful Improvements in Sheet-Separating Machines, of which the following is a full, clear, and exact specification.

The object of this invention is to provide positive means for automatically separating paper bags, envelops, sheets of paper, or similar objects from a pile for the purpose of delivering them singly to various kinds of machinery adapted to print, stamp, fold, paste, or otherwise operate upon them.

The arrangement of our invention described herein and shown in the accompanying drawings is one which adapts it to the printing of bags upon a machine of the general form shown and described in Letters Patent No. 525,999, of September 11, 1894, to Casper Reising.

Figure 1 of the drawings is a front view of a machine embodying our invention. Fig. 2 is a view looking from the right-hand side of Fig. 1, and Fig. 3 is a view looking from the left-hand side of Fig. 1. In these three views enough is shown of the frames and bed of the printing-press to enable the relation of our invention thereto to be understood. Fig. 4 is a front view of the suction-box, showing the construction and relation thereto of the moving suction-plate. Figs. 5 and 6 are side views in section, taken on the line *ab* of Fig. 1, showing the parts in two different positions.

The numerals 1 and 2 indicate portions of the principal frames of a printing-machine, having mounted upon them the reciprocating type-bed 3. The construction and mode of operation of these parts and of the rack 25, the gear 24, the cylinder 22, the eccentric shaft 23, the arm 28, the rod 30, the gripper 35, its shaft 36, arm 37, spring 38, and cams 39 and 40 are similar to the correspondingly-numbered parts of the machine shown and described in the Reising patent above referred to, with the exception that the gripper 35 is herein shown to be at one side of the cylinder, with a similar gripper 35' at the opposite side thereof.

The cylinder-shaft 23 is journaled in the brackets 4 and 5, which also form supports for the vacuum-box 6. That box is provided with a pipe 7, communicating with any suitable exhausting mechanism, (not shown,) by means of which a partial vacuum may be maintained within the box. A gate 8 may be employed to control the degree of vacuum. The upper wall of the box is adapted to support a portion of the under side of a pile of sheets to be separated and fed and is preferably somewhat steeply inclined in order that the sheets may readily slide down against their guide-plate 20. The sides 9 and 10 are adjustably mounted on the box, so as to be adapted to the various sizes of sheets within the capacity of the machine.

The lower end of the box adjacent to the cylinder is open and has mounted thereon an oscillating suction-feeder 11, which is journaled or pivoted in bearings 12 and 13 on the suction-box, as shown in Fig. 4, with its axis of oscillation substantially coincident with the lower edge 14 of the suction-box. The end of the stem of the suction-feeder has fixed upon it the arm 15, which is connected by the rod 16 to the cam 17, fixed on the shaft 18. The lower end of the rod is provided with a slot fitting over the shaft 18, by which it is guided, while a projection 19 of the rod engages with the cam 17. The shaft 18 is journaled in the frames 1 and 2 and is connected with the motive power of the machine by spur-gears (not shown) so proportioned as to cause the shaft 18 to make one revolution for each complete reciprocation of the bed and cylinder. The cam 17 is so formed as to cause the feeder to oscillate from the position shown in Fig. 5 to that shown in Fig. 2. A sector-like projection of the feeder is adapted to pass into and fill the opening in the end of the vacuum-box at all positions of the feeder. This sector portion of the feeder has an air-passage through it, communicating with the interior of the vacuum-box, so that the suction operates directly upon the lower sheet when the feeder is brought against it.

A flexible guide-plate 20 is fixed at one end to the arm 21 and is adapted to be sprung into a curve by the thumb-screw 26 on the arm 27. The object of curving this plate is to suitably

guide the bottom or gaging ends of the pile of sheets as they are allowed to settle down in the box by the repeated withdrawal of the undermost sheet. This is especially desirable when the bags to be fed are of the form known as square or satchel bottomed, wherein the folded bottoms are thicker than their body portions, and where they consequently form a pile considerably thicker at the end on which the bottoms are, as shown in Fig. 2. The upper bags of such a pile are considerably curved and shortened by reason of the differing thickness, and it is to suit this increased curving and shortening toward the top of the pile that the plate 20 is adapted to be bent, so that the bags as they settle down may straighten out without requiring to be pushed back upon each other, with the attendant liability of getting out of register.

A stop-finger 33 is secured to the arm 21 and is similar in form and function to the stop-finger 72 of the Reising patent above referred to, excepting that the finger 33 of the present machine is shown to be somewhat wider than that of the Reising machine. It is similarly constructed with a spring and set-screw for adjusting it to its most effective position.

The separator-blade 42 is fixed upon its arm 43, which is fixed on one end of the shaft 44. That shaft is journaled in the standard 45, and has fixed on its other end the arm 46, which is connected by means of the rod 47 with the cam 48, fixed on the shaft 18. That cam is so formed as to communicate a suitable movement to the separator-blade for the purpose hereinafter explained.

The mode of operation of this machine is as follows: The impression mechanism being "made ready," the bags are placed in a pile on the vacuum-box and the box sides are adjusted so as to hold the pile in suitable registering relation to the type. The machine being set in motion, the bed and the cylinder are caused to reciprocate, as shown and described in the Reising patent referred to, and the devices of our present invention are caused to move in a suitable time and relation to the motion of the cylinder. The suction-feeder is brought up against the undermost bag, as shown in Fig. 5. The "suction" communicated from the vacuum-box operates to carry that undermost bag along with the feeder on its return stroke toward the position shown in Fig. 2, drawing the bag away from the stop-finger and allowing the succeeding bag to drop down upon that finger. The movement of the separator 42 is now so timed as to carry it over the undermost bag as it is drawn down by the feeder, so as to separate that bag from the one next to it in case they should cohere, as shown in Fig. 6. These movements of the feeder and of the separator are continued until they reach the position shown in Fig. 2, in which the lower end of the separated bag is carried down upon

the cylinder in time to be seized by the grippers 35 35', as they come to the position shown in the latter figure, which is the limit of their oscillation in the direction of the arrow 75. The cylinder then oscillates in the opposite direction, drawing the separated bag away from the pile, when the feeder and the separator return to their positions shown in Fig. 5 and operate upon the succeeding bag.

An important and valuable feature of this invention is that of the separator, inasmuch as in the manufacture of paper bags it frequently happens that they are stuck together by the paste or become matted together by the pressure employed in packing them into bundles. The bags remain pressed together in these bundles sometimes for weeks, and when untied for the purpose of printing they are often so closely matted together as to be difficult of separation by ordinary methods. In the operation of feeding such a pile of cohering bags with the devices of my present invention the tendency of the feeder is to draw down with the undermost bag all those above it which thus cohere, but the resistance of the bags to this tendency also serves to separate the bottom edges of the bags, so as to allow the point of the separator 42 to enter between them, and the movement of that point is so timed with relation to the stroke of the feeder as to enter just above the undermost bag, cleaving it from those above it, as shown in Fig. 6. It often happens that in spite of this operation of the separator, and sometimes as the result of that operation, two or more of the bags above the separator are drawn off from the stop-finger, and, after the separator is withdrawn, fall down toward the feeder. If there were but one of these bags thus detached from the finger, it would be carried away at the next stroke of the feeder without difficulty, but when there are two or more they usually require the services of the separator to part them, and in order to enable them to be presented properly to the action of the separator the cam or other means for moving the feeder is adapted to carry the feeder and the bags at each upward stroke well above the level of the finger 33, as shown in Fig. 5. Upon the succeeding downward stroke of the feeder the finger 33 is thus enabled to operate upon the edges of the bags as a reader's finger or thumb operates in running over the leaves of a book, opening them sufficiently for the separator to enter above the undermost bag, as above described.

An important feature of this invention is the arrangement whereby a large surface area of the sheet may be subjected to the operation of the suction devices. Nearly if not quite all of the devices of this class employ "suckers" or pipes having small areas of opening. Consequently their effect upon the sheet is insufficient for the purpose. As the force exerted upon the sheet by the suction is proportional to the square of the opening

which is brought in contact with the sheet, the advantage will be seen of having these openings as large as possible. By the arrangement herein shown we are enabled to exert the influence of the vacuum over an area of surface sufficiently large to separate the sheets with a high degree of certainty, and we are also enabled to bring the vacuum box or reservoir into close communication with the sheet, thus avoiding the necessity of conducting the air through long, narrow, or tortuous passages. The single sliding or telescoping joint required to retain the connection between the vacuum-box and the oscillating feeder is easily fitted and kept tight, and is, in our opinion, a more desirable connection for the purpose than those employing connections made of rubber or other flexible material.

We claim as our invention—

1. A sheet separating and feeding device, consisting of a table adapted to support a portion of the under surface of a pile of sheets, and provided with a vacuum-chamber, and of an oscillating suction-feeder hinged upon the table adjacent to the unsupported portion of the pile, provided with an air-passage through its operating-surface, communicating with the vacuum within the chamber, substantially as described.

2. In a sheet separating and feeding machine, the combination of a table adapted to support a portion of the under surface of a pile of sheets, having an interior chamber in which a partial vacuum is maintained, with an oscillating suction-feeder located thereon, having a sector-shaped portion forming a telescoping extension of the vacuum-chamber to and through the operating-surface of the feeder, substantially as described.

3. In a sheet separating and feeding machine, the combination of a table adapted to support a portion of the under surface of a pile of sheets, having an interior chamber in which a partial vacuum is maintained, a stop-finger adapted to support an edge of the remaining portion of the pile, and an oscillating suction-feeder hinged upon the table, and having a sector-shaped portion forming a telescoping extension of the vacuum-chamber to

and through the operating-surface of the feeder, substantially as described.

4. In a sheet separating and feeding machine, the combination of a table adapted to support a portion of the under surface of a pile of sheets, having an interior chamber in which a partial vacuum is maintained, with an oscillating suction-feeder located thereon, having a sector-shaped portion forming a telescoping extension of the vacuum-chamber to and through the operating-surface of the feeder, with a reciprocating separator adapted to pass above the operating-surface of the feeder, substantially as described.

5. In a sheet separating and feeding machine, the combination of a table adapted to support a portion of the under surface of a pile of sheets, having an interior chamber in which a partial vacuum is maintained, a stop-finger adapted to support an edge of the remaining portion of the pile, and an oscillating suction-feeder hinged upon the table, and having a sector-shaped portion forming a telescoping extension of the vacuum-chamber to and through the operating-surface of the feeder, with a reciprocating separator adapted to pass between the suction-feeder and the stop-finger, substantially as described.

6. In a sheet separating and feeding machine, the combination of a table adapted to support a portion of the under surface of a pile of sheets, having an interior chamber in which a partial vacuum is maintained, a stop-finger adapted to support an edge of the remaining portion of the pile, and an oscillating suction-feeder hinged upon the table, and having a sector-shaped portion forming a telescoping extension of the vacuum-chamber to and through the operating-surface of the feeder, and a reciprocating separator adapted to pass between the suction-feeder and the stop-finger with operating means adapted to impart to the feeder and to the separator suitable relative movements, substantially as described.

WILLIAM A. LORENZ.
CASPER REISING.

Witnesses:

W. H. HONISS,
A. MUTTER.