

No. 642,915.

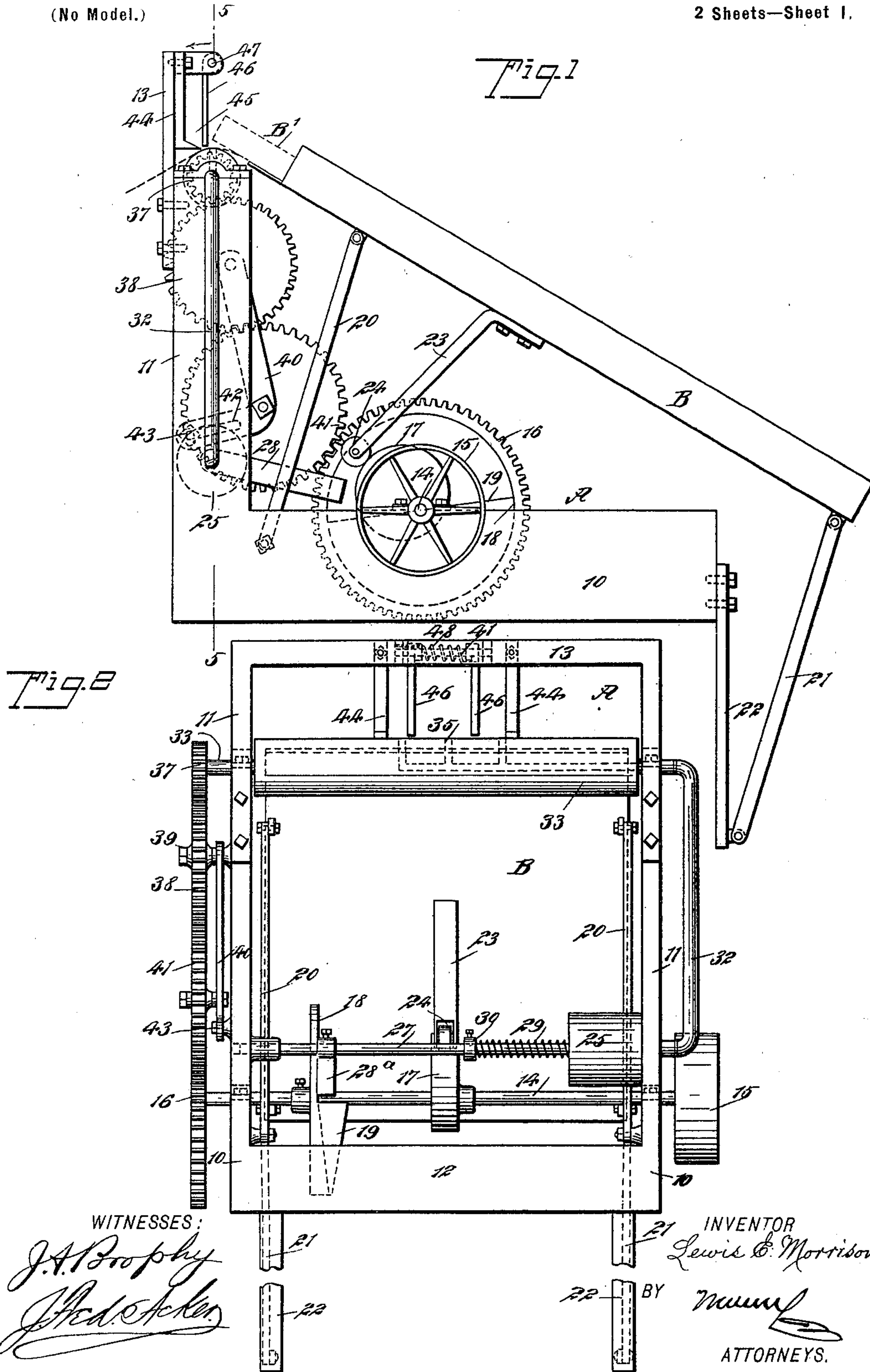
Patented Feb. 6, 1900.

L. E. MORRISON.  
SHEET FEEDING MACHINE.

(Application filed Apr. 26, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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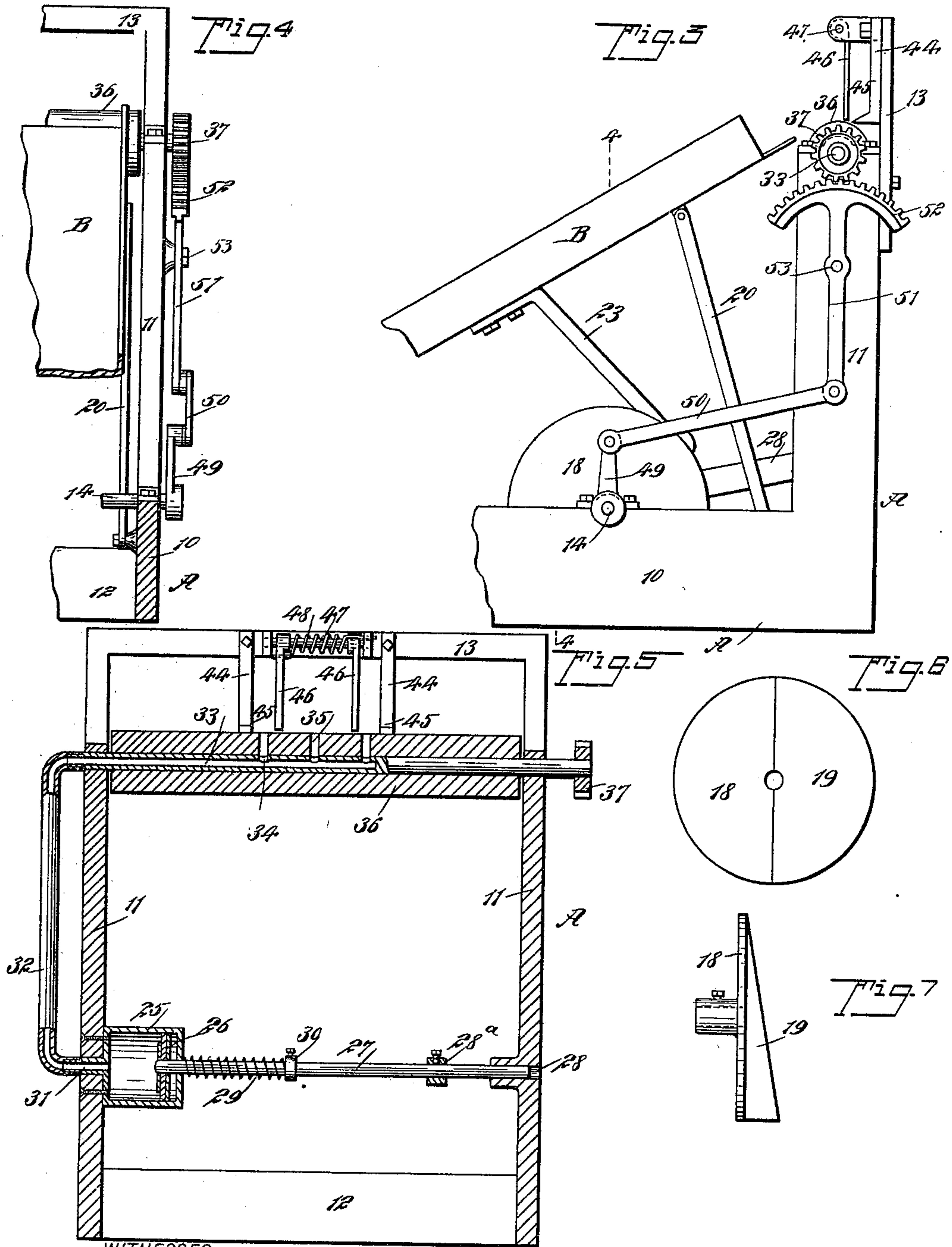
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(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

LEWIS E. MORRISON, OF KENSINGTON, CONNECTICUT.

## SHEET-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 642,915, dated February 6, 1900.

Application filed April 26, 1899. Serial No. 714,551. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS E. MORRISON, of Kensington, township of Berlin, in the county of Hartford and State of Connecticut, have invented a new and Improved Automatic Sheet-Separating Attachment for Paper-Receiving Machines, of which the following is a full, clear, and exact description.

One object of the invention is to provide a simple form of suction separating mechanism adapted to be located between a reciprocating table or platform adapted to carry paper to the separating mechanism and the feed of the machine to which the attachment is applied.

A further object of the invention is to provide a mechanism that will automatically attract and separate the lowermost sheet from a pile of paper and direct the selected sheet to any machine, device, or receptacle adapted to receive it and to effect such separation and delivery in a manner that will not buckle or subject the paper to undue strain or pressure.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improved machine. Fig. 2 is a rear elevation of the same. Fig. 3 is a side elevation of a portion of the machine, showing a slight modification in the driving mechanism. Fig. 4 is a vertical section taken practically on the line 4 4 of Fig. 3. Fig. 5 is a vertical section taken substantially on the line 5 5 of Fig. 1. Fig. 6 is a plan view of the actuating-disk for the pump-piston, and Fig. 7 is an edge view of the disk shown in Fig. 6.

A represents a frame, the side pieces whereof comprise usually a vertical lower member 10 and an upright rear member 11, and the two sides are connected at their rear bottom portions by a cross-bar 12 and at the top by an extension-frame 13. A driving-shaft 14 is mounted to revolve in suitable bearings located upon the vertical members of the side pieces of the frame, and said shaft carries at

one end a driving-pulley 15 and at the other end a gear 16, while at about the central portion of the shaft 14 a cam 17 is secured, and between said cam and the end of the shaft provided with the gear 16 a disk 18 is secured, one-half of which disk is provided on one face with an inclined plane 19, and said disk is adapted to force forward the piston of a pump-cylinder, to be hereinafter described.

A platform or table B is located above the driving-shaft 14, and this platform or table is provided with side flanges and with ordinary paper guides at its forward end, the rear end being open or without a flange. The table is supported by links 20, attached to its bottom portion near its rear end and pivotally attached to the horizontal members of the sides of the frame, and links 21, pivotally attached to the forward end of said table or platform, also at its bottom, and to downward extensions 22 at the front of the frame. These downward extensions 22 are provided in order to impart to the table or platform an inclined position, as illustrated in Figs. 1 and 3. The table is reciprocated through the medium of an arm 23, which is attached to the central portion of its bottom surface, and said arm carries a roller 24, that is in engagement with the periphery of the cam 17, as shown in Figs. 1 and 2.

A pump-cylinder 25 is secured to the upright member of one of the side pieces of the frame, and said cylinder is provided with a suitable piston 26, attached to one end of a rod 27, the other end of the rod being held to slide freely in an opening 28 in the upright member of the opposing side of the frame. A spring 29 is coiled around the piston-rod 27, having bearing against the cylinder and against an adjustable collar 30, secured to said rod, and the spring 29 acts to normally hold the piston away from the outlet of said cylinder, the outlet of the cylinder being in the form of a tube 31, that is carried through a side of the frame. The piston-rod 27 is likewise provided with a finger 28<sup>a</sup>, and this finger is adapted to engage with the inclined plane 19 of the actuating-disk 18, and as the finger enters upon said inclined plane the piston 26 is forced in direction of the outlet of the pump-cylinder, and the moment that the finger 28<sup>a</sup> reaches the plain portion of the



actuating-disk the spring 29 acts to draw the piston rearward and creates suction at the outlet 31. It will be understood that the piston-rod may be operated by the cam in any well-known mechanical manner.

The outlet 31 is attached to a pipe 32, that extends toward the top portion of the machine, and a tubular shaft 33, journaled in the upper portion of the frame, is connected with the pipe 32 by a slip-joint or by any means that will enable such shaft to revolve without exhausting or spilling air. The shaft 33 need not necessarily be tubular throughout its length, as a part thereof may be solid, as shown in Fig. 5. Said shaft at its tubular portion is provided with apertures 34, and these apertures register with openings 35, made in the peripheral surface of a roller 36, that is secured upon the shaft 33, as is also best shown in Fig. 5. A pinion 37 is secured to one end of the shaft 33, and this pinion is adapted to mesh with a gear 38, mounted to turn upon a spud-axle 39, secured to the frame, as shown in Fig. 2. An angle-arm 40 is pivoted on the spud-axle 39, and at the junction of the members of said arm 40 a spindle is located, carrying a gear 41, adapted to mesh with the upper gear 38 and the gear 16 on the drive-shaft 14. The gear 41 is thus mounted in order that it may be carried into or out of mesh with the driving-gear, and to that end the lower or horizontal portion of the angle-arm 40 has a slot 42 made therein, and a set-screw 43 is passed through the slot and into the frame of the machine. The shaft 33 may, however, be omitted, and the trunnions of the roller 36 may be made to extend through bearings in the frame, one trunnion of said roller having a pinion 37 formed thereon, and when the roller is thus employed it is provided with a longitudinal bore commencing at the opposite trunnion to that carrying the pinion. Therefore only the apertures 35 shown will be needed. The trunnion having the bore therein will be connected directly with the pipe 32.

The openings 35 are made in the central portion of the roller 36, and each side of said openings a conductor 44 is projected downward from the extension-frame 13, and each conductor is in the form of a bar or plate, provided with a downwardly and forwardly inclined finger 45 at its bottom, the fingers extending quite close to the surface of the roller 36, as shown in Fig. 1; but the lower forward edges of the fingers are below the plane of the top surface of the suction-roller 36, and instead of two conductors being used, as illustrated, a single conductor may be employed, extending over the apertured portion of the suction-roller 36. Arms 46 are pivoted upon a spindle 47, fast in suitable bearings located on the extension-frame between the supporting-arms, as shown in Fig. 5, and these arms are normally held in a perpendicular position by means of a suitably-placed spring 48. These arms 46 are adapted to act as cush-

ions to receive the upper end of a package of paper placed on the table or platform B when said table or platform is carried rearward, keeping the ends of the package of paper in proper relation to each other, and, furthermore, said arms 46 serve in a measure to assist the platform or table in its return movement.

In Figs. 3 and 4 I have illustrated a driving mechanism that may be employed as a substitute for the gearing illustrated in Figs. 1 and 2. This substitute driving mechanism consists of a crank-arm 49, secured to an end of the drive-shaft 14, which crank-arm is pivotally connected with a link 50, and said link extends rearward, being pivotally attached to a stem 51, connected with a toothed segment 52, arranged to mesh with the pinion 37. Said stem 51 is pivoted about centrally between its ends by a pin 53, secured to the frame.

In the operation of this machine when the platform or table B, carrying a package of paper B', returns forward the undermost sheet of paper will have been separated therefrom and held temporarily by suction on the roller 36, and when the said platform or table moves to the front the finger 28<sup>a</sup> on the piston-rod 27 will engage with the inclined plane on the adjusting-disk and the piston will be forced outward. As the table moves rearward and about the time the lowermost sheet of paper strikes the roller 36 and is separated from its fellows by the suction applied to the roller the bulk of the paper will ride up the front surface of the conductor and the lowermost or separated sheet will pass beneath the conductor, which serves to retain it in position to be grasped by any mechanism belonging to the machine to which the attachment is applied.

It will be understood that the paper is released from suction as soon as it is beneath the conductor by reason of the apertures in the suction-roller being quickly carried away from the sheet, due to the rotation of said suction-roller. I desire it to be further understood that the feed-table is at a slight elevation above the upper surface of the suction-roller.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an automatic sheet-separating attachment for paper-receiving machines, a separating suction-roller mounted to revolve, a stationary conductor arranged to guide the separated sheet, means for feeding paper to the separating suction-roller and a cushion for the upper end of the package of paper, substantially as described.

2. In an automatic sheet-separating attachment for paper-receiving machines, a reciprocating table adapted to carry a package of paper, a separating suction-roller mounted to revolve a stationary conductor at the rear of said roller to guide the separated sheet and spring-pressed arms serving as cushions for



the upper end of the package of paper when the table is carried rearward, substantially as described.

3. In an automatic sheet-separating attachment for paper-receiving machines, a frame, a table adapted to carry paper and connected by links with the frame, an arm projecting downward from the table between its ends and carrying a roller, a drive-shaft, a cam carried by said drive-shaft and adapted for engagement with said roller, a separating suction-roller in the path of said table, a suction-pump connected with the said separating suction-roller, means for operating the plunger of the pump by the movement of the said drive-shaft, and a stationary conductor located at the rear of the separating suction-roller, substantially as described.

4. In an automatic sheet-separating attachment for paper-receiving machines, a reciprocating table adapted to carry paper, a hollow roller provided with openings in its periphery, means for mounting said roller, said roller being in the path of the table at one of its ends, a conductor located adjacent to the rear of the suction-roller a pump connected with the inner chamber of the said roller, a piston for the pump, the operation whereof is spring-controlled in one direction, the piston-rod being provided with a projection, a drive-shaft, a disk carried by said drive-shaft and provided with an inclined plane adapted to be engaged by the projection from the pis-

ton-rod to move the piston in the opposite direction, and a reciprocating connection between the drive-shaft and said table, as set forth.

5. In an automatic sheet-separating attachment for paper-receiving machines, the combination, with a frame, a table or platform adapted to receive paper, having a link connection with the frame and provided with an arm between its ends, a drive-shaft, a cam carried by the drive-shaft and adapted for engagement with said arm carried by the table or platform, and a disk secured upon the said drive-shaft, having a portion of its space provided with an inclined plane, of a roller mounted to turn in the said frame, said roller being provided with a longitudinal bore and with peripheral apertures connecting with said bore, a pump, a tubular connection between the pump and the bore of the said roller, a piston-rod having guided movement in the frame and provided with a spring acting normally to draw the piston inward and create suction, and a projection from the said shaft, arranged for engagement with the inclined plane of said disk, such contact serving to force the piston of the pump in direction of the outlet of the pump, as described.

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