H. HEENSS.

PNEUMATIC SHEET LIFTING DEVICE FOR AUTOMATIC SHEET FEEDERS OF PRINTING MACHINES.

APPLICATION FILED JUNE 5, 1917.

1,259,622. Patented Mar. 19, 1918.

2 SHEETS—SHEET 1.

Fig. 1

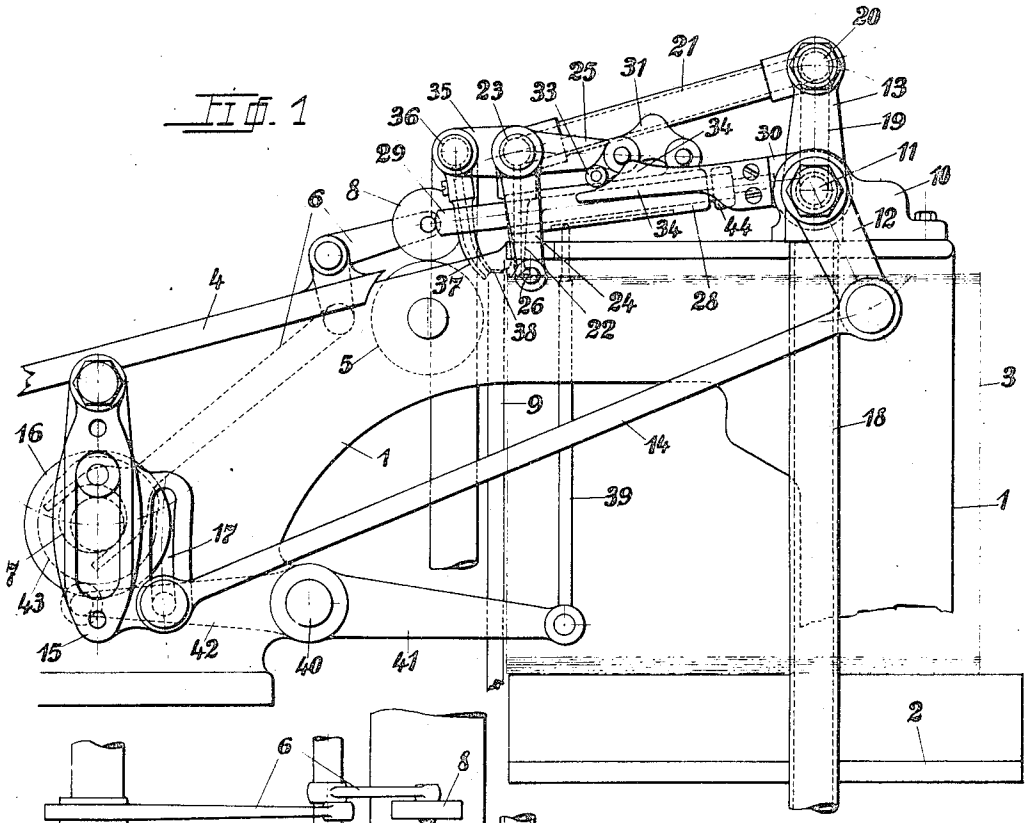
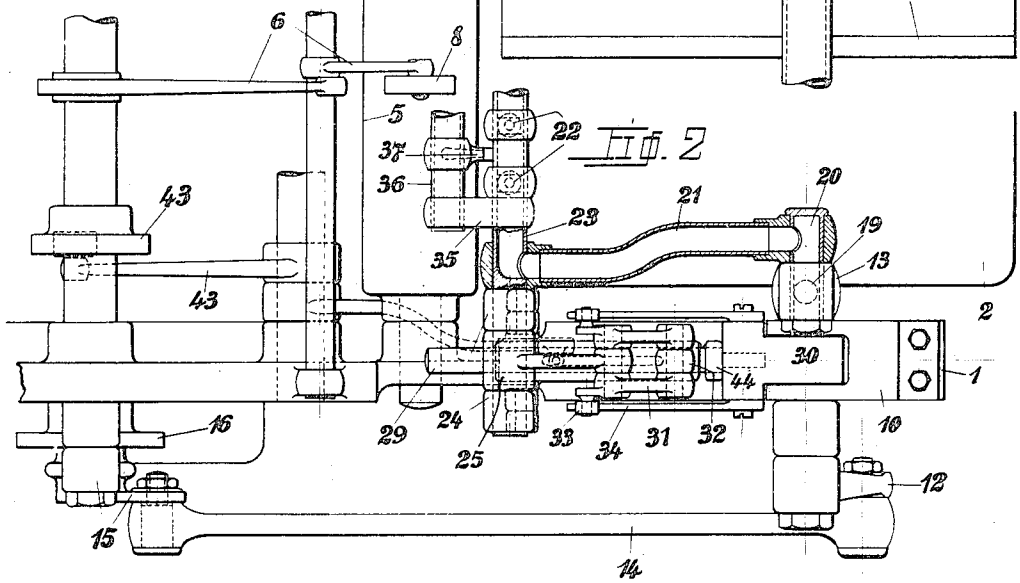


Fig. 2



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Fig. 3

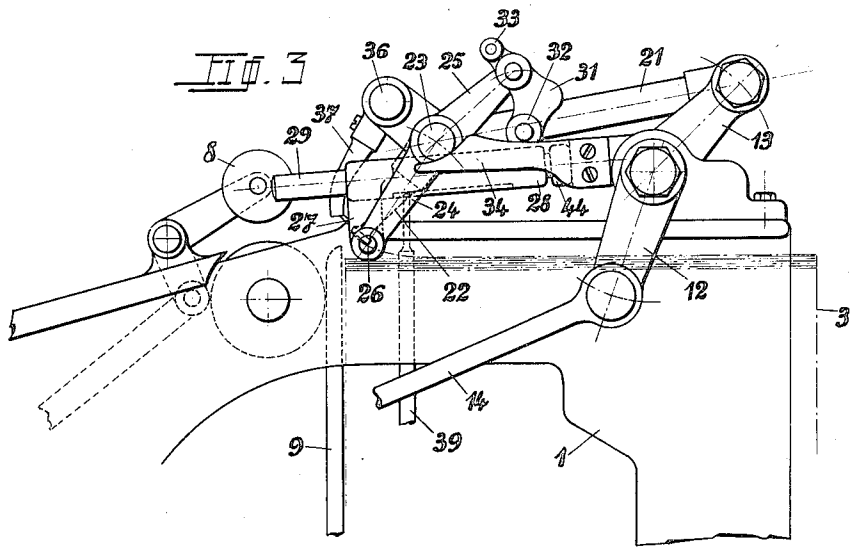


Fig. 5

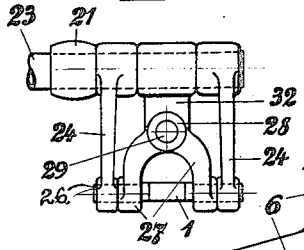


Fig. 4

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UNITED STATES PATENT OFFICE.

HEINRICH HEENSS, OF BERNE, SWITZERLAND.

PNEUMATIC SHEET-LIFTING DEVICE FOR AUTOMATIC SHEET-FEEDERS OF PRINTING-MACHINES.

1,259,622. Specification of Letters Patent. Patented Mar. 19, 1918.

Application filed June 5, 1917. Serial No. 172,920.

To all whom it may concern:

Be it known that I, HEINRICH HEENSS, erector, a citizen of the German Empire, and residing at Berne, Switzerland, have invented certain new and useful Improvements in Pneumatic Sheet-Lifting Devices for Automatic Sheet-Feeders of Printing-Machines, of which the following is a specification.

My invention consists in a pneumatic sheet lifting device which will take up sheets from a pile and will present the same to the sheet feeding device of a printing machine, a folding machine or other apparatus.

The annexed drawing represents one embodiment of my invention as applied to an automatic printing press whereof only the feed table and the paper supporting table have been shown.

Figure 1 is a side elevation of my device in its starting position.

Fig. 2 is a plan of Fig. 1.

Figs. 3 and 4 are side elevations in two different positions and

Fig. 5 is a side elevation of a part of Fig. 4 as seen from the left.

1 designates a side part of the machine frame of an automatic printing press, 2 the paper table located between the two side frames and carrying the pile of sheets 3. 4 is the feed table with its upper end near the usual conveying roller 5 above which a contact roller 8 is moved upward and downward by means of an eccentric 7 and a link and lever device 6. 9 is a head board for the pile of sheets 3. All these parts are old.

A shaft 11 journaled at its center within a bracket 10 fast to the side frame 1 is provided on one side of said bracket with an arm 12 and on the other side with an arm 13. Arm 12 is connected by means of a rod 14 with a slotted lever 15 so as to be rocked to and fro with an unvariable play by a crank disk 16. For the purpose of regulating the play of arm 12 and thereby the rocking movement of the hereinafter described suction-nozzles toward the pile of paper sheets, the lower link-bolt of rod 14 is made adjustable within the slot 17 of lever 15. The shaft 11 is made hollow at that end which carries arm 13. This end is connected with a suction pipe 18 of a pump not shown. From shaft 11 a longitudinal bore 19 leads into a hollow link pin 20 whereonto the one end of a pipe 21 acting as connecting rod is pivoted while its other end leads into a pipe 23 having a number of suction nozzles 22 and carrying at each end an arm 24 directed downward and between these two arms a third arm 25 at an angle relative to arms 24. The arms 24 are pivoted on an axis 26 (Fig. 5) the extended centerline of which exactly coincides with the hind edges of the free ends of the suction-nozzles. The axis 26 is resting within the prongs of a downwardly pointed fork 27 projecting from a slide 28 which is slidable lengthwise on a rod 29. This guide rod 29 ends in a head 30 which is journaled within the bracket 10 on shaft 11. The lengthwise movement of the slide is effected by means of a knee-joint whereof arm 25 forms one part while the double connecting rod 31 which is linked to the arm 25 and to an upwardly projecting lug 32 of slide 28 forms the other part. The lengthwise movement of the slide 28 is caused by the stretching of the said knee-joint, when the suction rod 23 is turned about the axis 26 by connecting rod 21 and lever 13. The bending of the knee-joint 25, 31 is caused by the running-up of a pair of friction-rollers 33 on two curved guiding rails 34 rigidly fast to both sides of head 30 of the guide rod 29, said rollers being provided on lugs cast on to the rods 31 of the knee-joint.

By means of two arms 35 a hollow rod 36 fitted with blowing-nozzles 37 is connected rigidly fast with the suction rod 23. These blowing-nozzles are located between the suction-nozzles 22 and are with their lower ends bent toward the same. The apertures of the blowing-nozzles are at the same height with those of the suction-nozzles and are each provided with a shield 38 flush with the lower ends of the suction-nozzles for preventing the upward escape of the escaping air. In order to lift the suction-nozzles together with aspirated sheet of paper over the upper edge of the head board 9 during the transporting of said sheet toward the feeding table and in order to move the nozzles again onto the pile when returning a pusher, rod 39 which is moved up and down by means of a cam 43 and of a lever 41, 42 pivoted on a pin 40 fast to the frame is bearing against the slide 28 from underneath.

The operation of this sheet lifting device is as follows:

Upon the starting of the device the suction-nozzles are pointing vertically downward at the pile, the knee-joint 25, 31 is almost stretched out and the slide 28 has not yet quite reached the end of its backward movement which is limited by a buffer-ring 44 sleeved on to the guide rod 29. The suction-nozzles in their starting position as shown in Fig. 1 are acting on the top sheet of the pile. At the same time, under the action of the crank disks 16 turning to the left in Fig. 1 and by means of the parts 15, 14, 12, 11, 13, 21 and 24 the suction-nozzles will be swung about the axis 26 backward toward the pile of sheets whereby the front edge of the aspirated sheet will be bent somewhat upward. This will separate the aspirated sheet from the succeeding sheet or will at least start the separation and will render it surer. During this swinging movement the knee-joint 25, 31 will be bent upward into the position of Fig. 3 and the guide rods 29 will be pushed upward by the pusher-rods 39 until the apertures of the suction-nozzles will have arrived above the upper edge of the head board 9. At this moment the blowing-nozzles 37 will begin working and the escaping compressed air will blow against the edge of the aspirated sheet and underneath it while retaining on the pile the succeeding sheet. During the swinging of the suction-nozzles the blowing-nozzles will not change their position relative to the suction-nozzles so that the blowing air will always strike only against the aspirated sheet and onto the succeeding one. While the suction-nozzles 22 are swinging forward, the knee-joint 25, 31 will be stretched out again and when it has done so it will exert a strain on slide 28 owing to the continued forward swinging (to the left) of arm 13. The suction and blowing-nozzles cannot swing farther forward and will therefore be moved forward together with the slide 28 and will take the aspirated sheet along with them (Fig. 4) introducing it between roller 5 and contact roller 8. Now the sucking action of the nozzles 22 is interrupted, while the contact rollers 8 will swing downward and will help to convey the sheet to the feed-table. In the meanwhile the suction and blowing-nozzles will be moved again backward. When they have almost reached their backward end position the pusher-rod 39 will sink again and the suction-nozzles 22 will be lowered unto the new top sheet of the pile that is to their starting position.

The sheet lifting device may of course be arranged to operate in such a way that the sheets are conveyed in an opposite direction. In that case the blowing-nozzles have to be provided on the opposite side of the suction-nozzles and the curved rails 34 causing the bending of the knee-joint have to be arranged so as to cause the rollers 33 to run up the rails in an opposite direction. The crank disks 16 will also have to turn in an opposite direction. Otherwise the other parts will be the same; the device may be employed for all kinds of printing machines with automatic sheet feeders. With such a device a working capacity of from 5000 to 6000 sheets an hour from the thinnest sheet to the thickest pasteboard-like paper may be obtained.

I claim as my invention—

1. A pneumatic sheet lifting device for printing presses and other purposes, comprising in combination with a suction pump a suction conduit, a hollow suction pipe pivotally connected to and in communication with the said suction conduit, suction nozzles arranged on said suction pipe, means for rocking the same to and fro toward and away from a pile of sheets, a second hollow pipe rigidly connected to the said suction pipe, blowing nozzles provided on the said second hollow pipe so as to occupy a definite position relative to the said suction nozzles, a pressure conduit communicating with the said second hollow pipe, pivoted guide rods, slides movable thereon, an axis carried by the said slides, arms connecting the said axis with the said suction pipe, a knee-joint pivoted to the said slides and the suction pipe, means for moving the said slides along the said guide rods, supporting rods bearing against the said slides, and actuating means adapted to alternately lift and lower the said supporting rods, substantially as described.

2. A pneumatic sheet lifting device as set forth in claim 1, in which in connection with the said blowing nozzles shields are provided so as to prevent the upward escape of air.

In testimony whereof, I affix my signature in the presence of two witnesses.

HEINRICH HEENSS.

Witnesses:

HANS RINDERKNECHT,

FRIEDRICH CHONING.