No. 740,534. PATENTED OCT. 6, 1903.

E. T. CLEATHERO.

LIFTER FOR PNEUMATIC SHEET FEEDING APPARATUS.

APPLICATION FILED JAN. 19, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

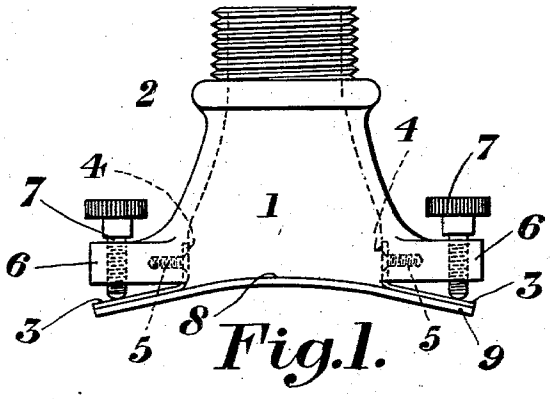


Fig.1.

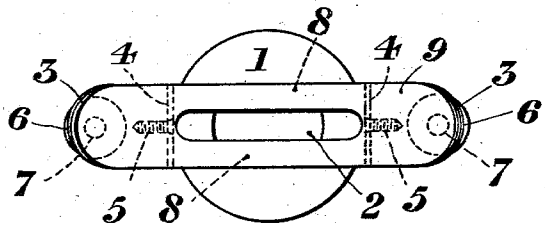


Fig.2.

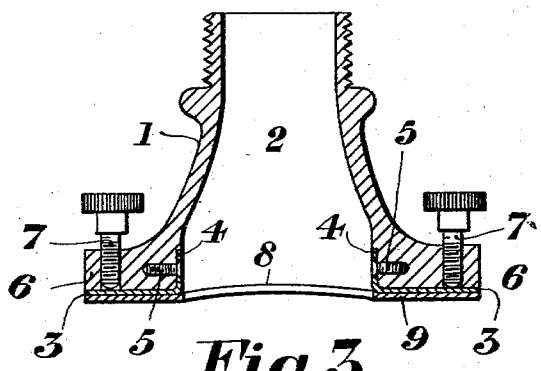


Fig.3.

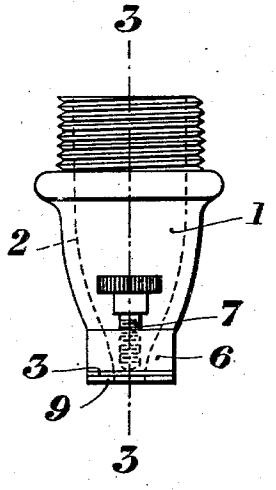


Fig.4.

Witnesses.
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NO MODEL. 4 SHEETS—SHEET 2.

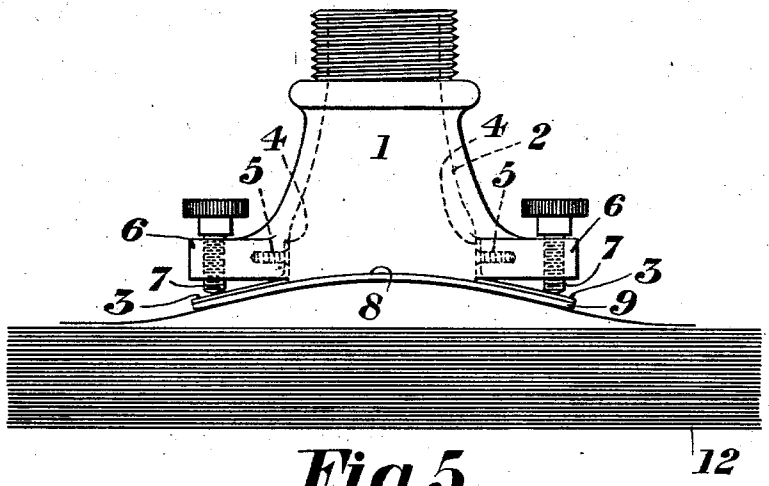


Fig. 5.

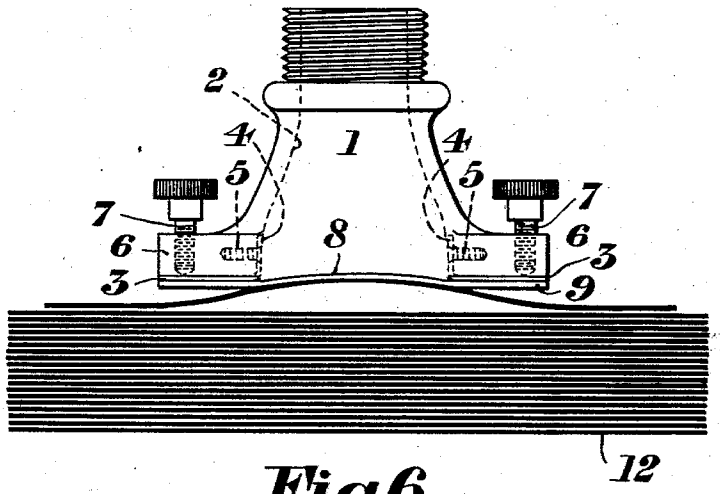


Fig. 6.

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NO MODEL. 4 SHEETS—SHEET 3.

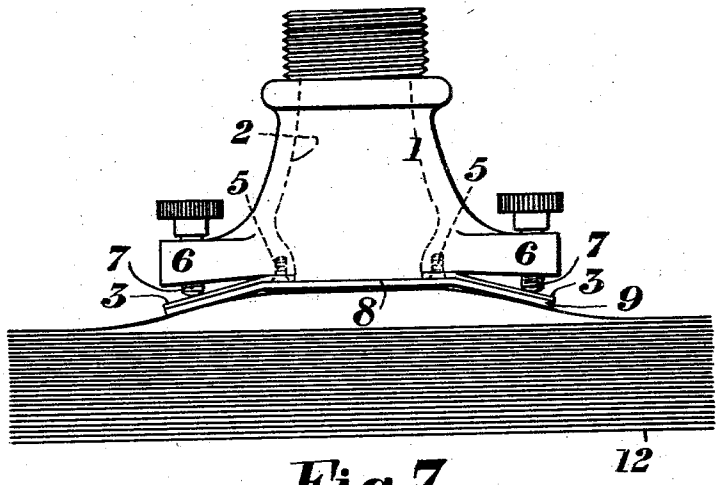


Fig. 7.

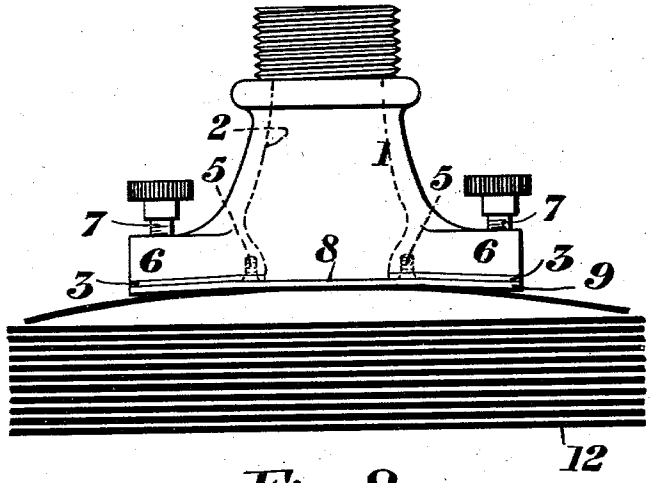


Fig. 8.

Witnesses
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No. 740,534. PATENTED OCT. 6, 1903.

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APPLICATION FILED JAN. 19, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

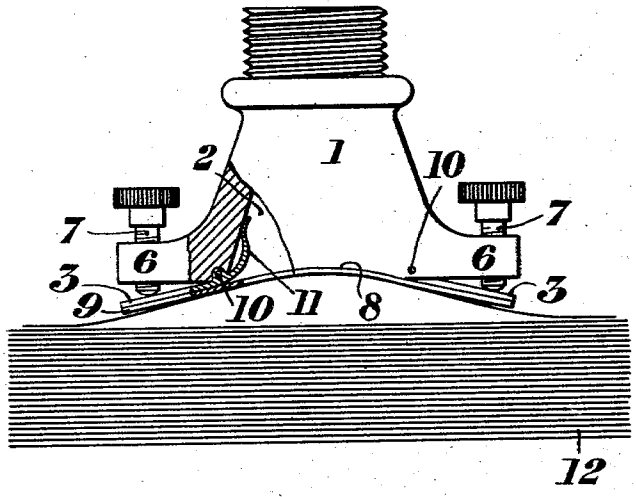


Fig. 9.

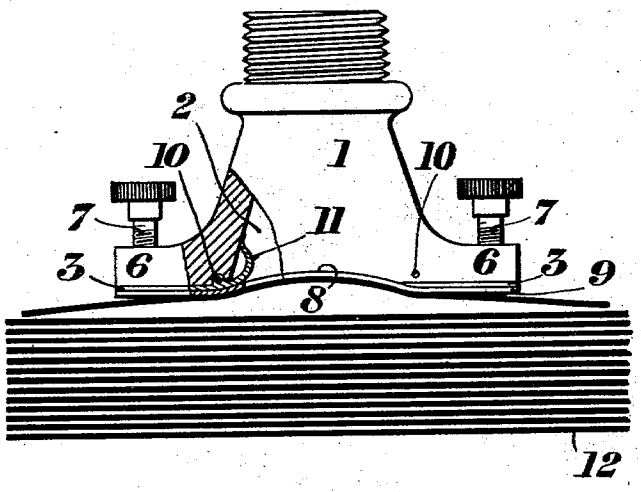


Fig. 10.

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No. 740,534. Patented October 6, 1903.

UNITED STATES PATENT OFFICE.

EDWARD THOMAS CLEATHERO, OF ALTRINCHAM, ENGLAND.

LIFTER FOR PNEUMATIC SHEET-FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 740,534, dated October 6, 1903.

Application filed January 19, 1903. Serial No. 139,679. (No model.)

To all whom it may concern:

Be it known that I, EDWARD THOMAS CLEATHERO, of The Hollies, Barrington road, Altrincham, in the county of Chester, England, have invented certain new and useful Improvements in the Lifters of Pneumatic Sheet-Feeding Apparatus, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in the lifters of pneumatic apparatus for feeding flexible sheets, such as paper, to printing and other machines dealing with such sheets. The natural tendency of these sheets to stick together presents a serious obstacle to the efficient working of the above-named lifters, and to overcome this difficulty means have been employed whereby the top sheet is bent or buckled in order to facilitate its separation from the sheet next below it. To reduce to a minimum the possibility of this sticking together of the sheets, the bend or buckle must in all cases be as pronounced as possible; but as the thick sheets present greater resistance to bending than the thinner ones it has not hitherto in pneumatic apparatus been found practicable to bend them to the same extent as the thin ones, and consequently a lifter adapted to deal with thin sheets was not suitable for dealing with thick sheets. In view of this it has been usual to employ different lifters for sheets of different thicknesses, each lifter being specially shaped to give a particular bend or buckle, according to the particular thickness of sheet acted upon.

The object of the present invention is to provide a lifter which is capable of dealing equally with thin and thick sheets; and the said invention consists, essentially, in providing the lifter at its ends with flat plates or fingers which are capable of being adjusted in a vertical plane, so that they may be either rendered ineffective or caused to assume one of their many effective positions, in which they give to the sheets a deeper or shallower bend or buckle, according to particular requirements.

In the accompanying drawings, which are to be taken as part of this specification and read therewith, Figure 1 is a front elevation of one form of lifter constructed according to the present invention; Fig. 2, a plan of the under side of Fig. 1; Fig. 3, a vertical section on the line 3 3 of Fig. 4; Fig. 4, an end elevation of the same device; Fig. 5, a front elevation showing the device employed in dealing with thin paper; Fig. 6, a front elevation showing the device employed in dealing with thick paper; Fig. 7, a front elevation of a modified form of the device employed in dealing with thin paper; Fig. 8, a front elevation showing the same device as that illustrated in Fig. 7, but represented as employed in dealing with thick paper; Fig. 9, a front elevation, partly in section, of a further modified form of the device employed in dealing with thin paper; and Fig. 10, a front elevation, partly in section, showing the same device as that illustrated in Fig. 9, but represented as employed in dealing with thick paper.

In carrying out the present invention the lifter 1, of the usual fan shape and provided with the ordinary suction-cavity 2, has secured to its ends two flat plates or fingers 3 3, so arranged as to be capable of vertical adjustment, whereby they are either rendered ineffective or caused to assume one or other of their many possible effective positions.

In the arrangement represented in Figs. 1 to 6 each of the plates or fingers 3 3 is formed of resilient metal and has an upstanding lug or projection 4, by which it is fastened to the lifter 1, this lug passing into the cavity 2 and being secured to the lifter by a screw 5. The normal positions of the plates or fingers 3 3 are those in which they are shown in Figs. 3, 4, and 6. On each end of the lifter 1 is a lug 6, extending over the adjacent plate 3 and having adjustable therethrough a screw 7, whose lower end is adapted to bear upon the said plate 3. When the screws 7 7 are in their highest position, the resilience of the plates 3 3 causes the said plates to assume and remain in their normal or inoperative positions, as shown in Figs. 3, 4, and 6, and when the said screws are lowered their lower ends bear upon the plates 3 3 and depress them into their effective positions, as shown in Figs. 1, 2, and 5.

In the before-described example the under sides of the lips 8 8 of the lifter-mouth are

formed concave, and these surfaces and the under sides of the two plates 3 3 are faced with india-rubber or equivalent material 9 to improve the contact between the lifter and the paper 12.

The lifter is connected with an air-exhauster or suction-pump in the ordinary manner, and when it is used for lifting thin sheets the screws 7 7 are lowered, so as to depress the plates 3 3, which are thereby caused, conjointly with the lips 8 8, to present to the paper a somewhat deeply-recessed lifter-surface, which when the paper is drawn to it gives to the paper a deep bend or buckle, as shown in Fig. 5.

If it were possible to lift thicker sheets with a lifter which, in effect, would present the same shaped under surface as that shown in Figs. 1 and 5, it would be very desirable that it should be done, as it would render the simultaneous lifting of two sheets practically impossible. As, however, the suction has hitherto been found incapable of overcoming the greater resistance to bending which the said thicker sheets present, the lifter must present a flatter mouth to admit of it approaching nearer to the sheets, so as to enable the suction to overcome the above-named increased resistance. For this purpose the screws 7 7 are raised and the plates 3 3 by their own resilience approach the lugs 6 6, the extent of such adjustment depending upon the thickness of paper for which the said adjustment is being made. In Fig. 6 this adjustment is represented as having been made for sheets of the maximum thickness.

In the condition of adjustment in which the lifter is shown in Figs. 1 and 5 the plates 3 3 substantially form continuations of the curve of the lips 8 8; but it is obvious that for sheets of intermediate thickness the plates 3 3 will be adjusted to positions intermediate of those represented in Figs. 5 and 6, respectively.

Figs. 7 and 8 show the present improvements applied to a lifter having a straight mouth. As in this arrangement the plates 3 3 in conjunction with the lifter-mouth form angular recesses into which the paper would not fit sufficiently close to insure the necessary closing of the ends of the said mouth, these plates are secured to the under side of the lifter in such position that the above-named angular recesses are situated beyond the ends of the lifter-mouth. By these means the paper will become attached to the straight mouth in the ordinary way and be deflected or bent beyond the attached part by the downwardly-inclining plates 3 3, the extent of such deflection being determined by adjusting the screws 7 7 to suit the particular thickness of the sheets dealt with. The last-described device is represented in Fig. 7 as adjusted for sheets of the minimum thickness and in Fig. 8 as adjusted for sheets of the maximum thickness. In respects other than those particularized the devices shown in Figs. 7 and 8 are alike.

In the modification represented in Figs. 9 and 10 the plates 3 3 instead of being screwed to the lifter, as in the previously-described examples, are hinged theteto at 10 10 and provided with springs 11 11, which by acting against the inside of the lifter-mouth 1 raise the plates 3 3 against the under side of the lugs 6 6, when the screws 7 7 are raised. Fig. 9 shows the plates 3 3 in the position of adjustment appropriate to the handling of thin sheets, and Fig. 10 shows the said plates in the position of adjustment appropriate to the handling of thicker sheets. In respects other than those specified the device represented in Figs. 9 and 10 corresponds with that shown in Figs. 1 to 6.

I claim—

1. In a lifter for pneumatic sheet-feeding apparatus the combination with the mouth thereof, of plates adjustable on the lifter at the ends of the mouth, and making angles with the said mouth, and adjusting devices for varying the said angles.

2. In a lifter for pneumatic sheet-feeding apparatus the combination with the mouth thereof, of resilient plates adjustable on the lifter at the ends of the mouth, the resilience of the said plates tending to retain them in their normal positions, and adjusting devices for the plates adapted to move the said plates away from their normal positions.

3. In a lifter for pneumatic sheet-feeding apparatus the combination with the mouth thereof, of resilient plates adjustable on the lifter at the ends of the mouth, upstanding ends on the plates, screws passing through the said ends into the lifter, and adjusting devices for the plates.

4. In a lifter for pneumatic sheet-feeding apparatus having an incurved mouth, the combination with the said mouth, of resilient plates adjustable on the lifter at the ends of the mouth, the resilience of the said plates tending to retain them in and return them to their normal positions, and screws adjustable in the lifter bearing on the adjustable plates.

5. In a lifter for pneumatic sheet-feeding apparatus having an incurved mouth, the combination with the said mouth, of resilient plates adjustable on the lifter at the ends of the mouth, the resilience of the said plates tending to retain them in and return them to their normal positions, screws adjustable in the lifter bearing on the adjustable plates, and a facing of india-rubber on the mouth and plates.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

EDWARD THOMAS CLEATHERO.

Witnesses:
WARWICK HY. WILLIAMS,
WALTER J. SKERTEN.