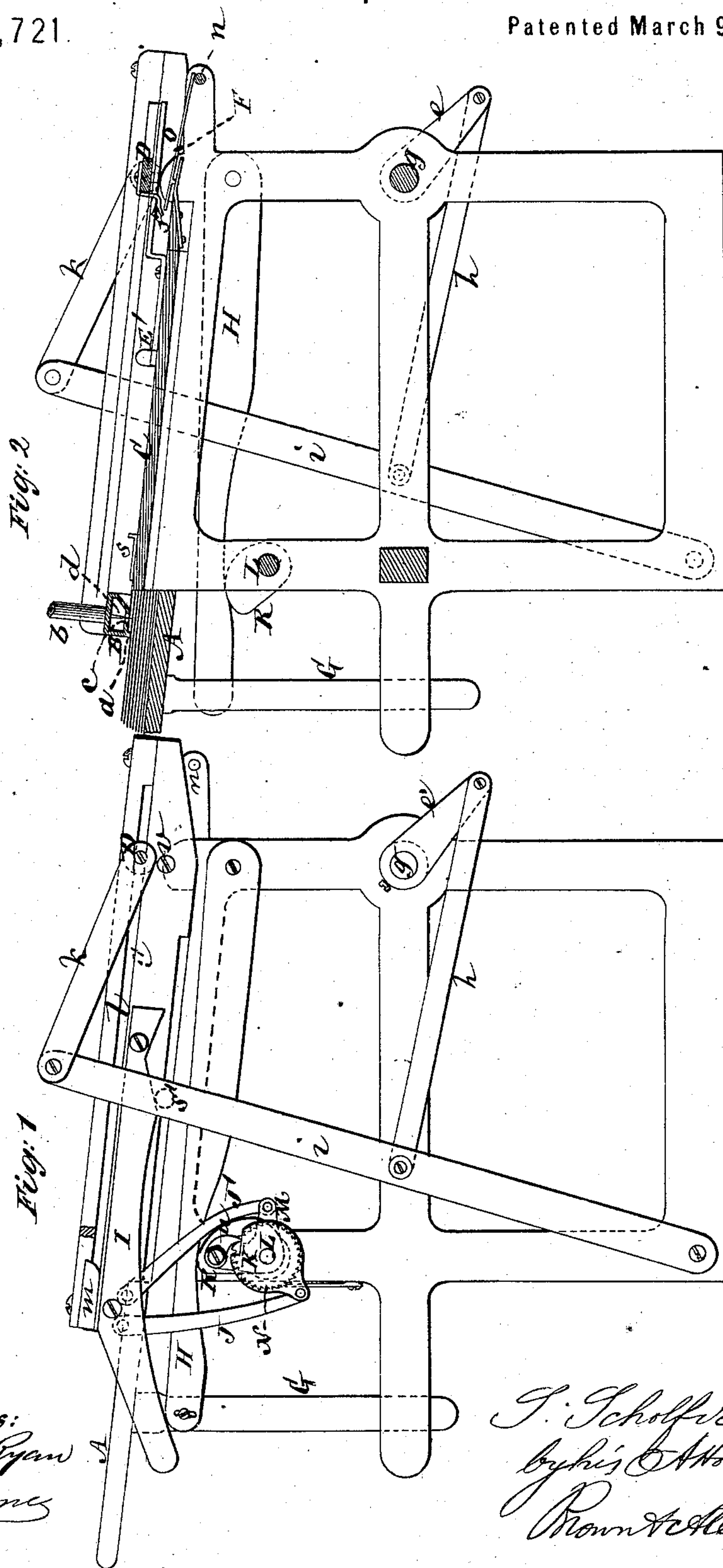


S. SCHOLFIELD.
Pneumatic Paper-Feeder.

No. 160,721.

Patented March 9, 1875.



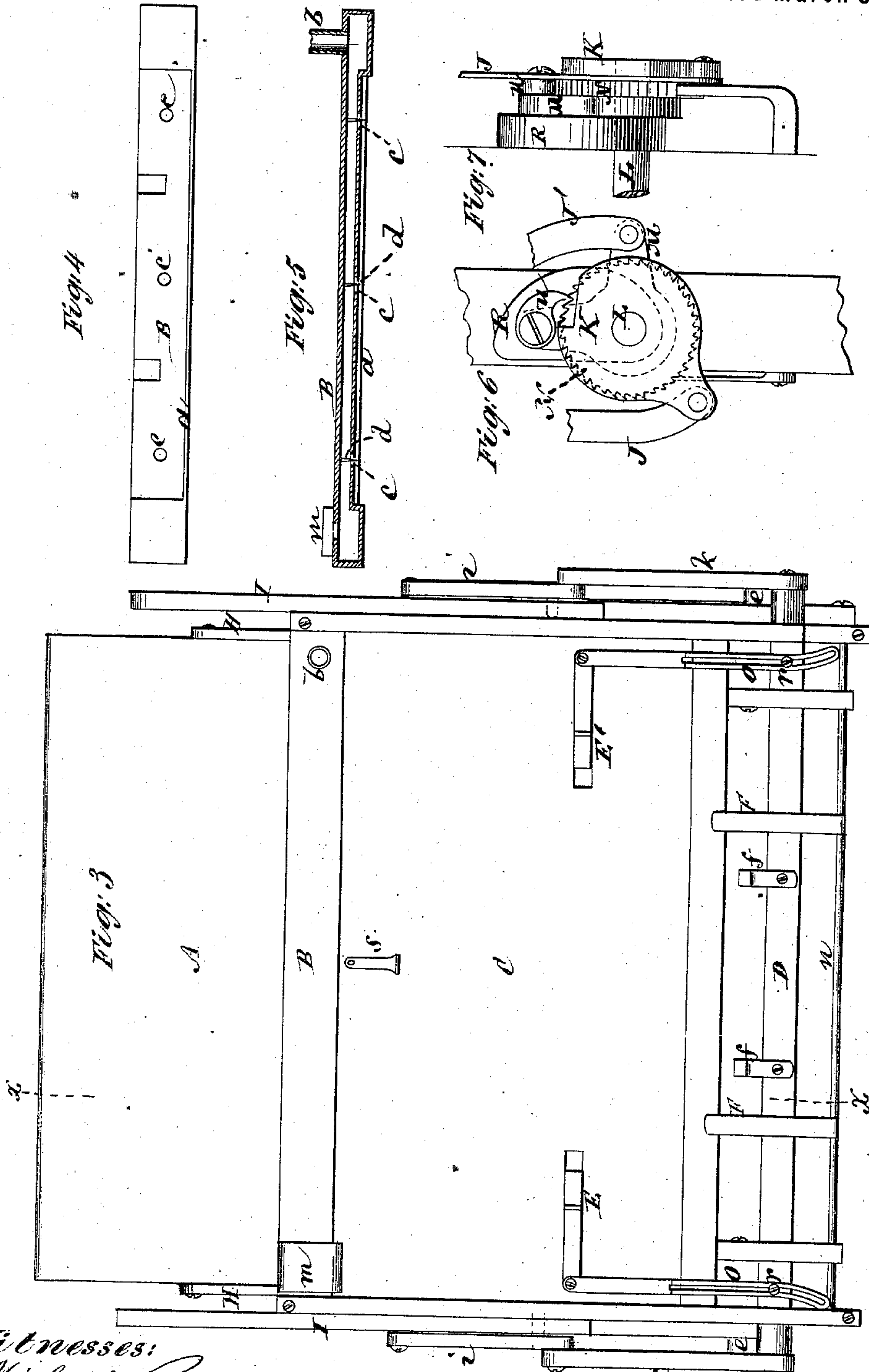
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UNITED STATES PATENT OFFICE.

SOCRATES SCHOLFIELD, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN PNEUMATIC PAPER-FEEDERS.

Specification forming part of Letters Patent No. **160,721**, dated March 9, 1875; application filed September 3, 1874.

To all whom it may concern:

Be it known that I, SOCRATES SCHOLFIELD, of Providence, in the county of Providence and State of Rhode Island, have invented certain Improvements in Pneumatic Paper-Feeders for Printing-Presses and other purposes, of which the following is a specification:

The invention consists in a certain combination of a paper-perforating pin or pins with a suction bar, disk, or plate, whereby, on the suction-bar being connected with a pump or any suitable mechanism for exhausting the air, and the same being brought to a slight elevation above and near the edge of a pile of sheets or bank of paper, the partial exhaustion of the air above the top sheet under the suction bar or disk will cause the edge of the top sheet to be drawn from the pile of paper onto the pin, free from the adhesion of the edge of the next under sheet, by reason of the pin not penetrating the latter, but simply pressing on it, and holding it back, in order to admit air between said sheets, whereby, upon the subsequent elevation of the suction bar or disk, the lifting and withdrawal of one sheet only is insured.

The invention also consists in the combination of the paper-lifting devices with a registering-table, whereby both are caused to rise and fall together.

The invention further consists in a paper-lifting device and a griper-carriage, in combination with a pivoted registering-table and devices for regulating the height of the feeding-table.

In the accompanying drawing, Figure 1 represents a side elevation of a pneumatic paper-feeder constructed in accordance with my invention. Fig. 2 is a longitudinal vertical section on the line *xx* in Fig. 3, which is a plan of the apparatus. Fig. 4 is an inverted plan of the suction-bar. Fig. 5 is a longitudinal vertical section thereof. Fig. 6 is a side view of certain mechanical means for regulating the height of the feeding-table, and Fig. 7 is an edge view of the same.

In describing the invention it will here be premised that the same is applied to a cylinder printing-press.

A is the feeding-table, on which the bank of paper or sheets, in a pile, is arranged. B is the hollow suction bar, plate, disk, or surface, connected by a branch, *b*, with a pump or other mechanism for exhausting the air from the interior of the bar, which is provided with any number of suction orifices or openings *c* on its under side. This suction-bar has an up-and-down movement over the front edge or portion of the bank of paper on the table A; and when brought down to or held at a slight elevation above the pile of sheets on the table A, the exhaustion of air from the bar B causes the edge of the top sheet to be suddenly drawn from the pile of paper onto a pin or pins, *d*, arranged to project from within the orifices *c*, or below the under surface of the bar B beyond said orifices, but within the limit of the vacuum produced on the under side of the bar or disk by the exhaustion of air from or through the orifices *c*. The lower surface of the bar B, when sucking up the sheet, should rest at a slight elevation above the surface of the pile of paper; and in order to secure this position a rib or projection, *a*, is secured to the back edge of the bar B, and this rib may even extend below the pins *d*, so that the said pins will at no time rest upon the pile, but will receive the top sheet thereon as its edge flies upward toward the disk or suction-surface of the bar, and at the same time cause its separation from the corresponding edge of the lower sheet; or the lower end of the pin *d* and the projecting rib *a*, or equivalent supporting projections, may be upon the same plane with reference to the pile of paper, so that the pin *d* will rest upon the top sheet with a slight pressure, if preferred. But it is not necessary to the proper and efficient action of this apparatus that either the bar B or pin *d* should actually touch the pile, as the inward draft of air toward the suction-orifices *c* will cause the edge of the top sheet to be brought from an appreciable distance and suddenly impaled upon the pin *d*.

This invention is unlike anything which has been heretofore attempted by means of holding or forcing off pins for separating the top sheet from the one immediately below

the same, for the reason that heretofore, when the device through which the primary attachment to the top sheet was effected, has been held stationary, then the pin has necessarily been made movable in order to effect the separation of the sheets; and when the pin has been held stationary, then the attaching device has been moved in order to draw the top sheet upon the pin, which serves to hold back the lower sheet. But in this invention both the pin and the attaching devices may be held stationary at the instant of the separation of the sheets, which operation may even be performed without absolute contact with the original pile, as hereinbefore explained.

The sheets of paper are thus primarily separated, not by the employment of a mechanical movement, as heretofore, when operating with a pin, but by the simple act of suction, which is the distinguishing feature of my invention.

After the edge of the sheet has been raised to its extreme height from the pile of paper, and is about to be seized by the carrying-grippers *f f*, the valve *m* may be opened, so that the suction of the orifices *c* may be destroyed; and the lower jaws of the grippers *f f* may be placed on such a level that the downward stroke of the upper jaw will cause the sheet of paper to be removed from the pin *d*; or, if preferred, the pin *d* may have an up-and-down movement, being drawn up at the proper time by any suitable means, to be again thrust forward after the sheet has been removed, or when the bar *B* has been again dropped to the pile.

C is a table, set inclining downward from above the pile-holding table *A* toward the printing-cylinder. This table *C* has connected with its upper or back end the suction-bar *B*, both having an up-and-down movement together on pivots *v* as a center of motion. *D* is a griper carriage or bar, provided with grippers *f f*, to take the sheet from the suction-bar *B* and convey it to the printing-cylinder. This griper-carriage is operated by cranks *e* on a shaft, *g*, pitman *h*, levers *i*, and connecting-rods *k*. Said griper-carriage travels along slots *l* in either or opposite side pieces of the pivoted table *C*, and, as it is reciprocated over said table, takes hold of the sheet lifted by the suction-bar *B*, and in its back motion transfers it over or between fixed and movable guides or gages *E E'* on the registering-table *C*, to or under lever-stops or rests *F F*, attached to a vibrating shaft, *n*, and which are lifted when the nippers of the printing-cylinder take hold of the sheet.

A back-stop, *s*, may be applied to the registering-table *C*, to retain the sheet from moving back after it has been fed over said table.

The guides or gages *E E'*, on opposite sides of the registering-table *C*, are made the one of them stationary, and the other movable to and from its fellow, to register the sheet on

said table after it has been fed forward by the griper-carriage.

When it is required to print on both sides of the sheet successively, then the action of the gages *E E'* is reversed, as regards the one of them being stationary and the other movable, so as to register from the same edge of the sheet in both cases. To thus operate either gage, *E* or *E'*, the same are provided with curved slotted levers *o o*, within which one or other of two pins, *r r*, attached to the griper-carriage *D*, are adjusted to enter, according to which gage is required to be moved, and which causes the moving gage to be moved toward the stationary gage, to register the sheet as required, and afterward to open or move back again.

The feeding-table *A*, on which the bank of paper is arranged, is fitted with a vertical slide, *G*, on either side, connected with a lever or levers, *H*, and is lifted at intervals to regulate the height of said table relatively to the registering-table *C* or suction-bar *B*, for the purpose of insuring the proper action of the suction-bar on the sheets. This is or may be accomplished by the following means. Thus either side of the registering-table *C* is fitted with a cam, *I*, against or under which each lever *i*, by means of a stud, *s'*, operates to give the vibrating table *C* its upward movement. Connected with the one of these cams *I*, or upper portion of the vibrating table *C*, of which said cams form a part, are rods *J J'*, the one *J* of which is connected with a notched disk, *K*, loose on a cross-shaft, *L*, and the other of which is connected with a pawl-lever, *M*, also loose on said shaft, and carrying a pawl, *u*, which gears at intervals with a ratchet-wheel, *N*, fast on the shaft *L*, the whole being arranged so that the pawl *u*, when the table *A* is at a proper height relatively to the suction-bar *B*, travels over and is supported by the smooth portion of the edge of the notched disk *K*, and so is prevented from gearing with the ratchet *N*; but when the pile of sheets on the table *A* is so far reduced as to require said table to be lifted to secure a proper action of the suction-bar, then, the rod *J* having been lowered by the gradual settling down of the suction-bar to the diminishing pile of sheets to an extent which brings the notch in the disk *K* beneath the pawl *u*, the latter drops, so as to gear with the ratchet *N*, and thereby cause said pawl to feed the ratchet, and with it turn the shaft *L*, that has cams *R* on it, which are operated to lift the table *A* as required, and hold it in position till a further lift is required. In this way the pivoted registering-table *C*, carrying the suction-bar, automatically regulates the height of the feeding-table *A*.

I claim—

1. The combination of an exhausting device with a holding-pin, substantially as described, for separating sheets of paper by and through the simple act of suction.

2. The rising and falling registering-table C, provided at its upper or back end with the suction-bar or paper-lifting device B, for operation in common, substantially as specified.

3. The combination, substantially as herein specified, of a paper-lifting device and a griper-carriage with a pivoted registering-table and a pile-carrying table, having its height automatically increased or regulated at intervals by the action of the said registering-table.

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