

**J. T. ASHLEY.**

## PNEUMATIC PAPER FEEDER.

No. 175,638.

Patented April 4, 1876.

Fig. 1

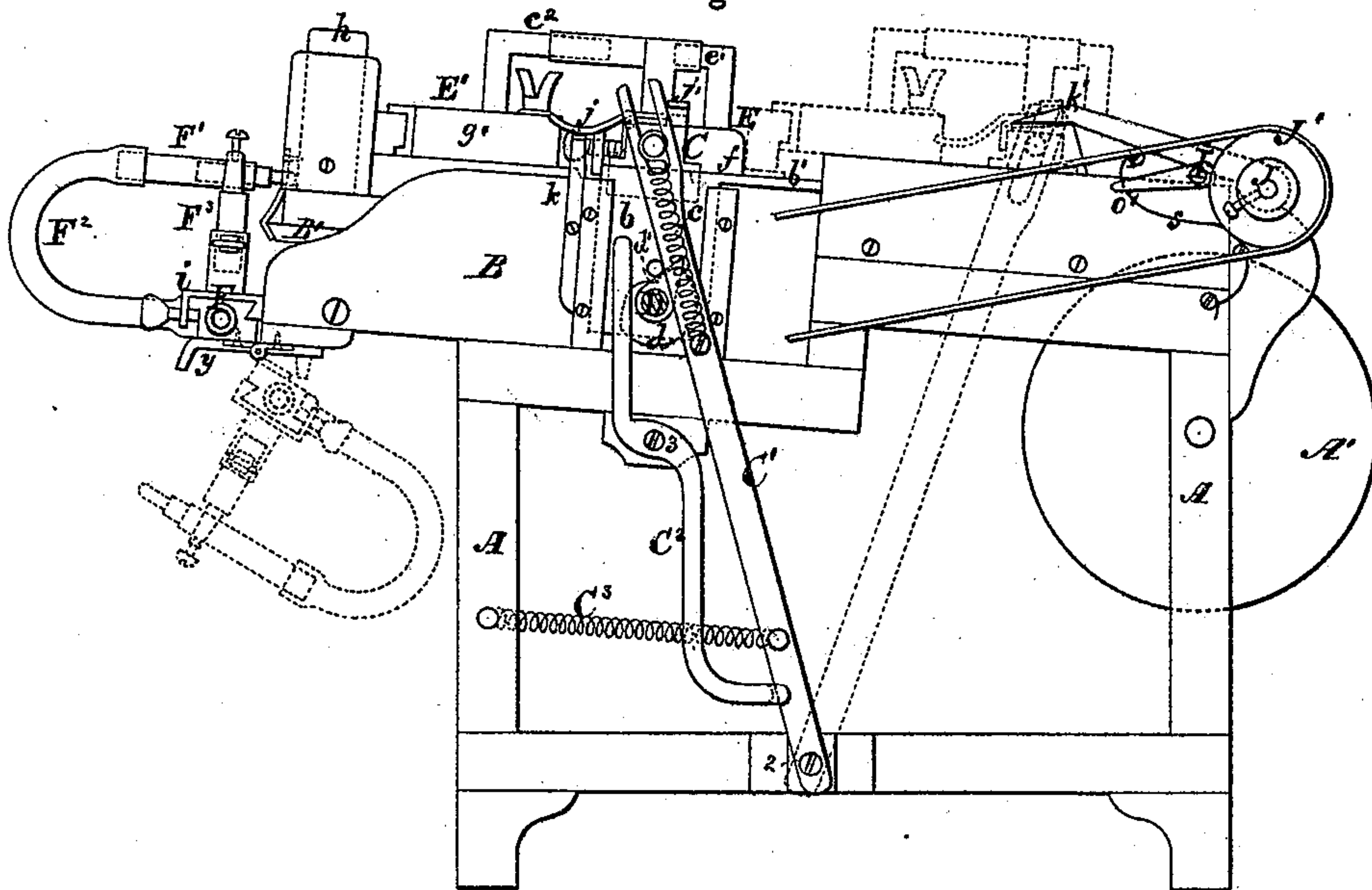
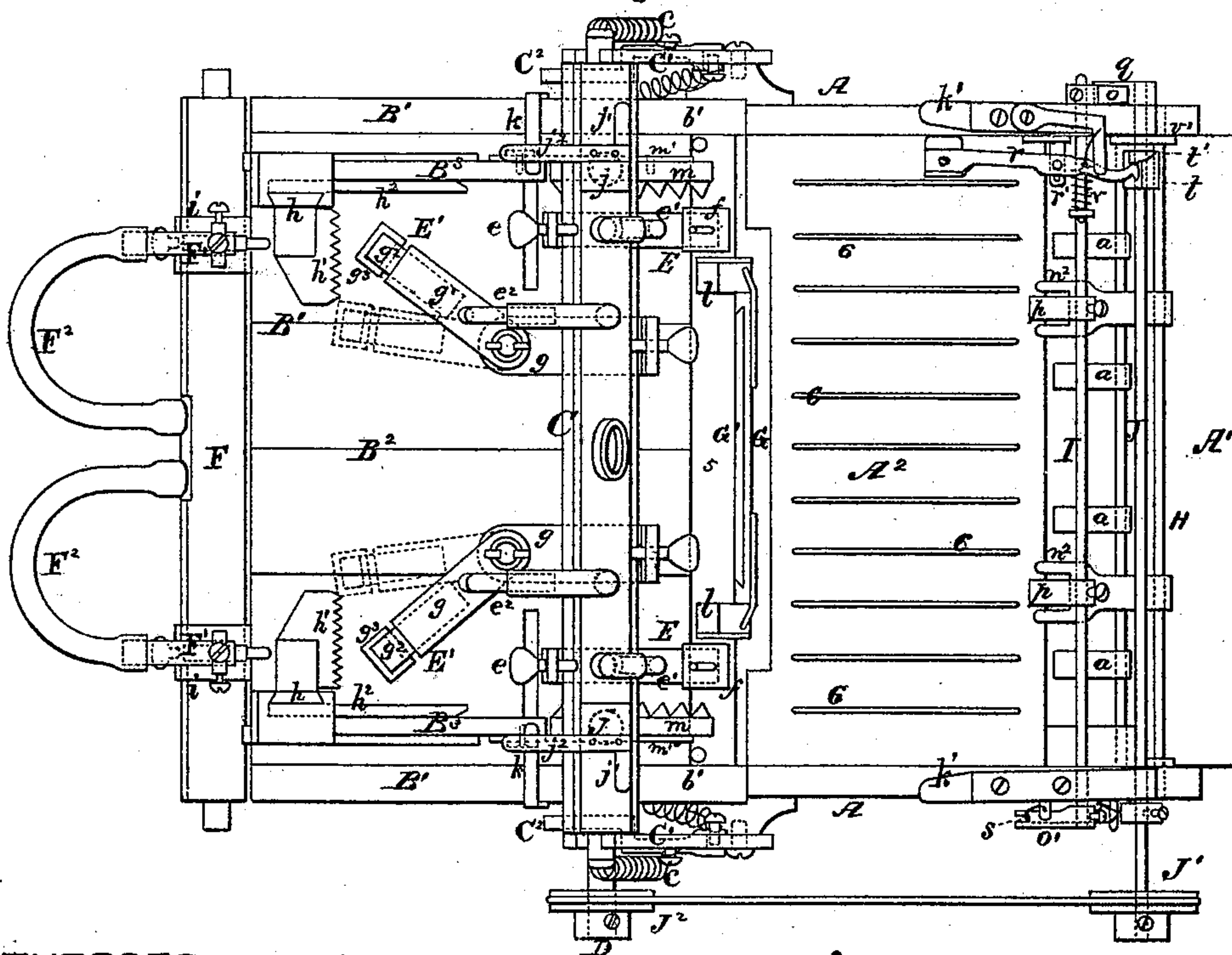


Fig. 2



WITNESSES.

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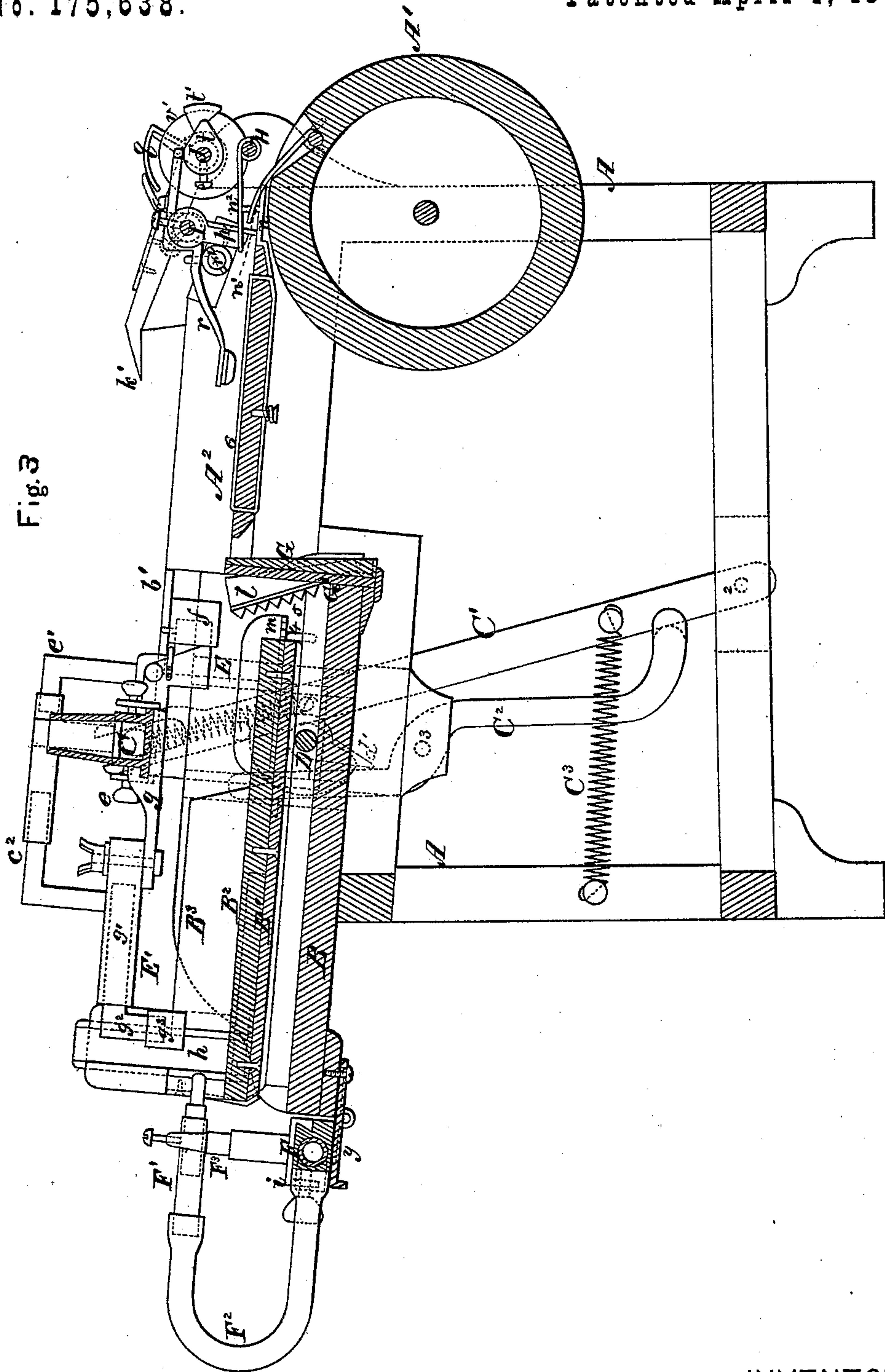
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Fig. 4

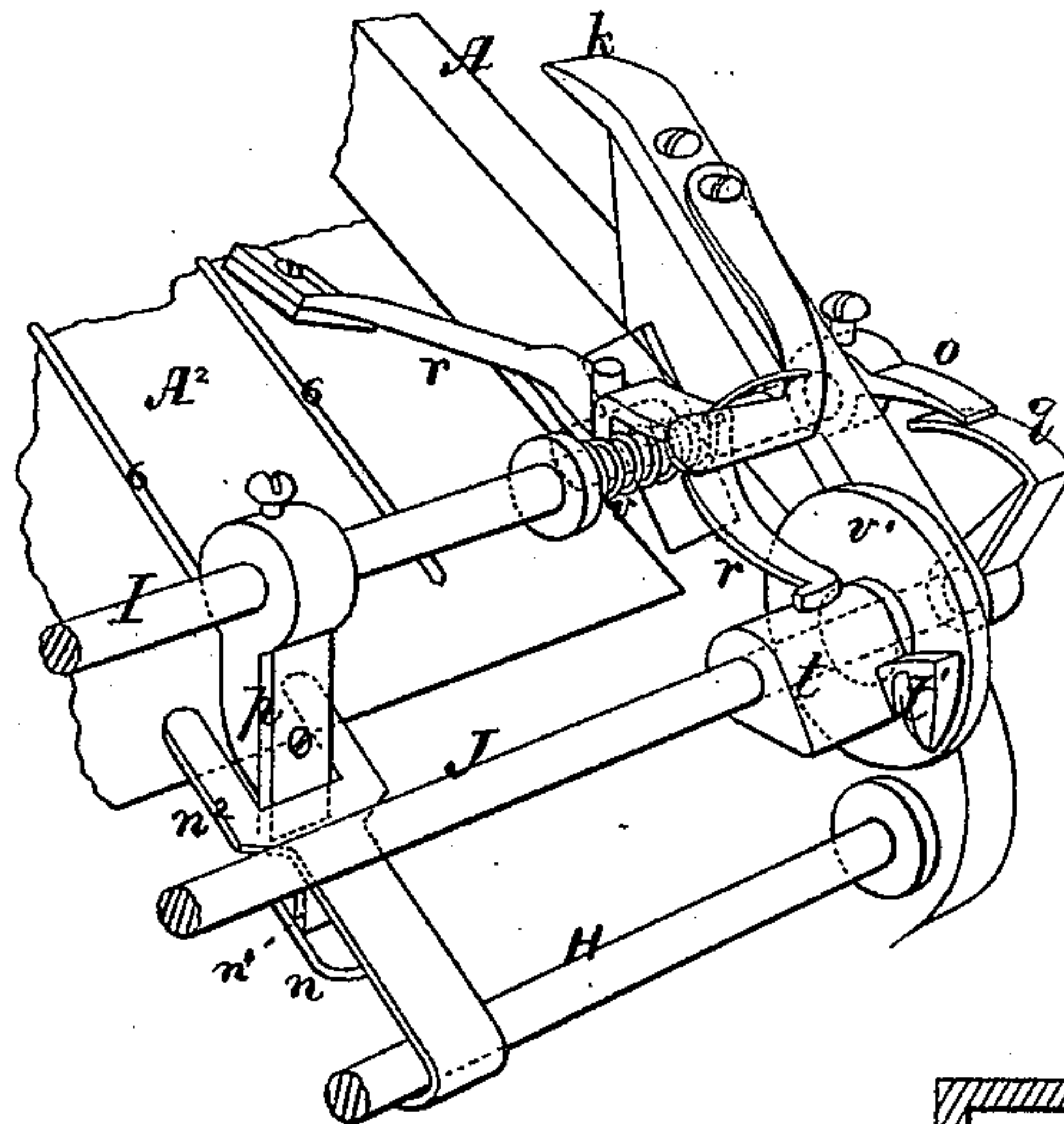


Fig. 5

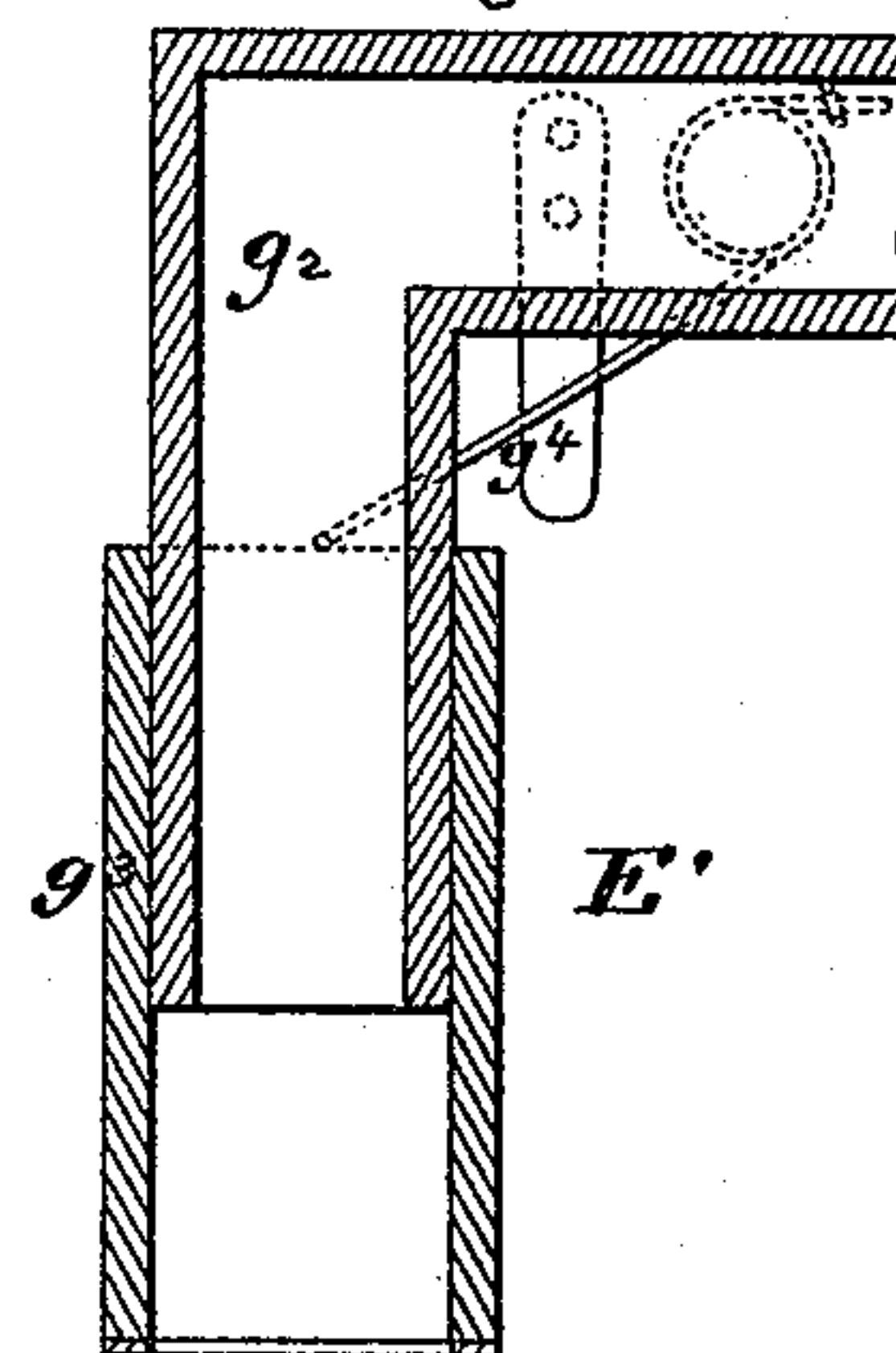


Fig. 6.

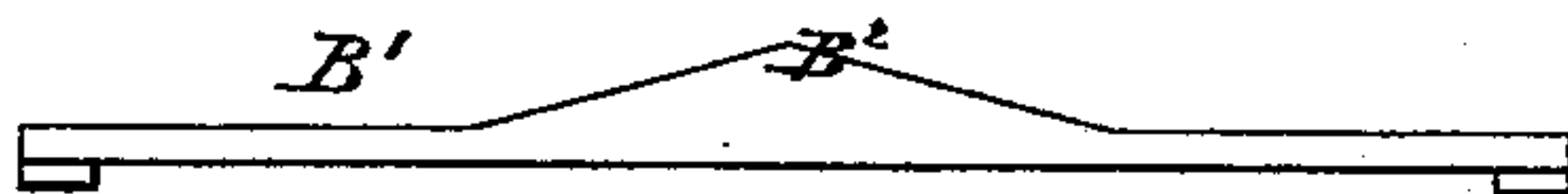
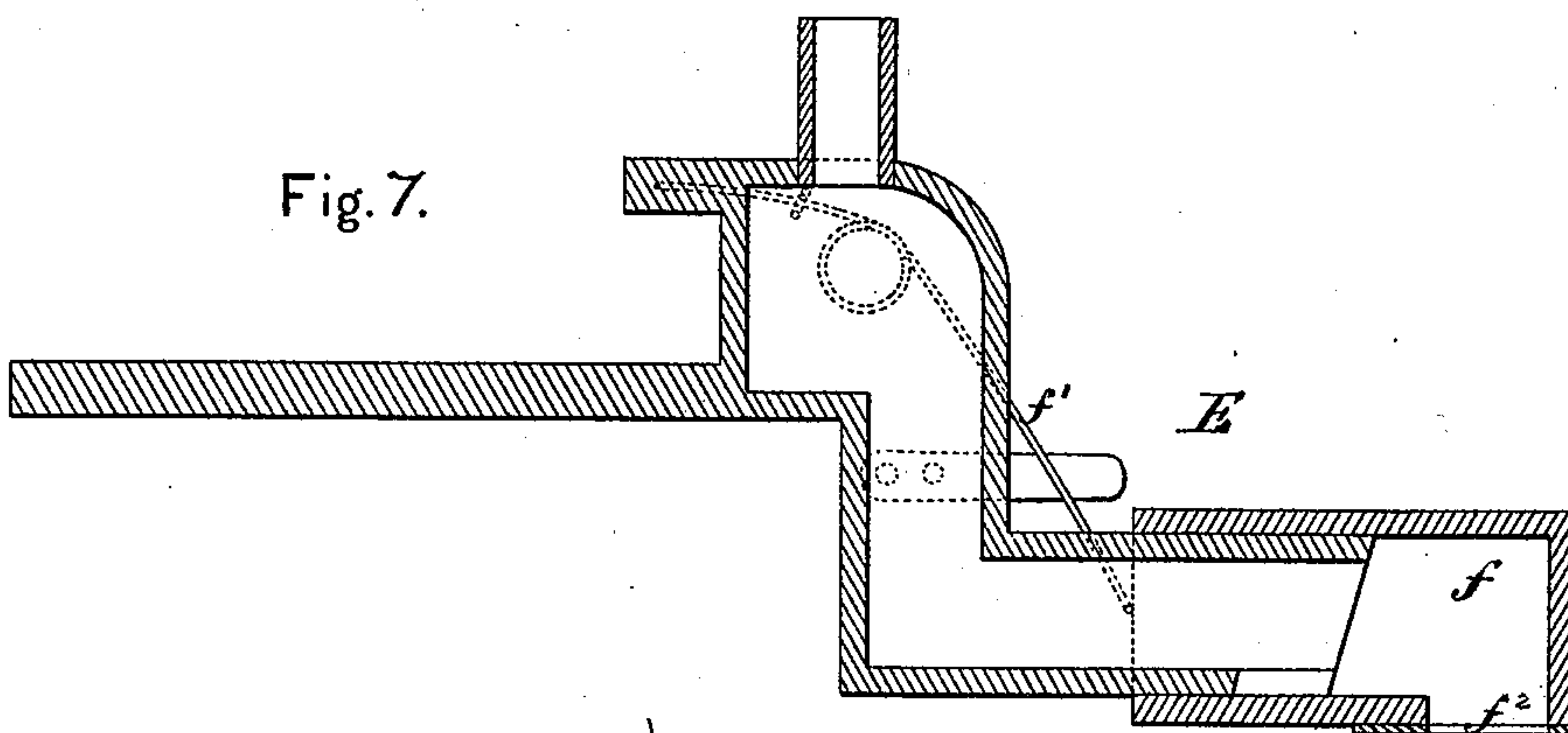


Fig. 7.



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# UNITED STATES PATENT OFFICE

JOHN T. ASHLEY, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN PNEUMATIC PAPER-FEEDERS.

Specification forming part of Letters Patent No. **175,638**, dated April 4, 1876; application filed October 25, 1873.

*To all whom it may concern:*

Be it known that I, JOHN T. ASHLEY, of Brooklyn, in the county of Kings and State of New York, have invented a new and valuable Improvement in Pneumatic Feeders for Paper for Printing-Presses; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawing is a representation of a side view of my pneumatic paper-feeder for printing-presses, &c. Fig. 2 is a plan view of the same. Fig. 3 is a sectional view, and Figs. 4, 5, 6, and 7 detail views, of the same.

This invention relates to improvements on pneumatic paper-feeding machinery wherein it is necessary to feed sheets of paper consecutively and with certainty to printing-presses, ruling-machines, bag and envelope machines, and various other kinds of machinery requiring to be fed with paper, one sheet at a time.

The nature of my invention consists, first, in adjustable reciprocating suction-fingers, which will pick up sheets of paper from a pile, table, or tray, and carry them, one at a time, over a feed-board, and deliver them in such relation to front guides and front and side registering-fingers that the latter will adjust the side and front edge of each sheet squarely against said front and side guides, and in a proper position to be taken hold of by grippers or other taking-off devices, as will be hereinafter explained; second, in the arrangement, on opposite sides of the supporting-frame, of compound levers, which are actuated by cams on a driving-shaft, and which give forward and backward strokes to the picking-up devices and the trunk to which they are applied, and allow the same to rise and descend at the proper times, as will be hereinafter explained; third, in the employment of telescopic pipes in combination with adjustable picking-up fingers and a movable suction-trunk, as will be hereinafter described; fourth, in vertically self-adjusting telescopic fingers for lifting the sheets and allowing them to be freed from the pile by directing blasts of air beneath them

preparatory to moving them off the pile, as will be hereinafter explained; fifth, in the employment of adjustable back-corner fingers which will pick up the sheets by their corners, and which are adjustable for sheets of different sizes, as will be hereinafter explained; sixth, in the employment of fingers which will pick up the sheets by their edges, and at the same time move the edges backward, so as to free them from the pile, as will be hereinafter explained; seventh, in the employment, on the reciprocating suction-trunk, of valves for breaking and restoring vacuum, which are constructed so as to be opened and shut with a quick positive movement by stationary fingers on the supporting frame, as will be hereinafter explained; eighth, in the construction of the pile-tray with a centrally-raised surface, which will break up the piles of sheets laid upon it, and loosen each sheet so as to facilitate its separation and removal, as will be hereinafter explained; ninth, in making the rear blast pipe or pipes adjustable, so that they can be moved out of the way to allow the introduction and removal of the pile-tray, as will be hereinafter explained; tenth, in the employment of vertically-adjustable and horizontally-arranged stripping devices for the purpose of aiding the separation of the sheets from the pile, as will be hereinafter explained; eleventh, in arranging vertically adjustable and vibrating sheet-strippers in front of the pile of paper, for the purpose of freeing one sheet from the other while the fingers are in the act of picking up the sheets, as will be hereinafter explained; twelfth, in combining with the rear flexible fingers rigid strippers, which will hold down the sides of the sheets and allow the top sheet only to be drawn from beneath them, as will be hereinafter explained; thirteenth, in the application of wires or raised ribs to the top surface of the feed-board for the purpose of preventing a too close contact of the sheets with such surface while being drawn over it, as will be hereinafter explained; fourteenth, in the employment of depressing fingers projecting over the faces of the front guides or stops and registering-stops, with the front guide-rests, for the purpose of preventing the front edges of the sheets, when brought into position to be taken up by the



grippers, from cockling, as will be hereinafter explained; fifteenth, in a front registering device, which moves the paper to the front guides or stops, and then remains stationary until the sheet is taken by the carrying-off grippers, as will be hereinafter explained; sixteenth, in a laterally-vibrating registering-arm, which will register one side of a sheet just before the front registering device registers the front edge of the sheet against the front-guides, as will be hereinafter explained.

The following description of my improvements will enable others skilled in the art to understand the same.

In the annexed drawings, A represents the frame of a printing-press, to one end of which is applied an impression-cylinder, A', provided with grippers *a*, and on the opposite depressed end are supported the frames B of the feeding devices. B' is the pile-tray, between which and the impression-cylinder A' is an inclined feed-board, A<sup>2</sup>, over which the sheets are carried one at a time and delivered to certain registering devices hereinafter explained. C is a horizontal suction trunk, which communicates, by means of a flexible pipe, with a suitable exhausting engine, and which is held down upon two sashes, *b*, by means of springs *c* connected to vibrating levers C<sup>1</sup>. The sashes receive vertical movements from cams *d* on a horizontal transverse driving-shaft, D, and, when the sashes are raised to their full height, the trunk C is moved over the feed-table A<sup>2</sup> to the position indicated by dotted lines in Fig. 1. This bodily movement of the trunk C over the feed-table A<sup>2</sup> and back again to its position on the sashes is effected by means of the levers C<sup>1</sup>, which are pivoted at 2 to the frame A, and which receive into their upper forked ends the rounded extremities of the said trunk. C<sup>2</sup> are levers, which are pivoted at 3 to frame A, and which are bent so that while their lower ends bear against the levers C<sup>1</sup> their upper ends will be acted on by single-throw cams *d'* on shaft D once during each revolution thereof. The return-strokes of the trunk C are given to it by means of springs C<sup>3</sup> attached to levers C<sup>1</sup> and frame A. For the purpose of conducting the trunk C from a position for picking up sheets from a pile on the tray B<sup>1</sup> to the cheeks of frame A, extended ways *b'* are formed on the sashes *b*, which ways are brought in the same horizontal plane as the upper edges of said cheeks when the sashes are fully raised. The trunk C is provided with two front picking-up fingers, E E, and two rear picking-up fingers, E' E'. The front picking-up fingers E E are laterally adjustable, and are secured by set-screws *e e* to the trunk C, and the interior of each finger communicates with this trunk by means of a rectangular telescopic pipe, *e'*, which allows lateral adjustment of the finger without breaking the connection. The picking-up portions *f* of the fingers E are allowed to receive free endwise movements, and are held out by springs *f*<sup>1</sup>, as shown clearly in Fig. 6. When air is

exhausted from the trunk C and this trunk is depressed so that the opening *f*<sup>2</sup> of section *f* touches the top sheet of a pile of paper, this section will be brought suddenly back, carrying with it the edge of said top sheet. This takes place just previous to the upward movement of the fingers with the trunk. The rear fingers E' are pivoted to clamps *g*, which are laterally adjustable on the suction-trunk C, so that the rear ends of these fingers can be vibrated laterally, and, by means of set-screws on the pivots, they can be fixed rigidly to the clamps *g* at any desired point. Each finger E' consists of three sections, *g*<sup>1</sup>, *g*<sup>2</sup>, and *g*<sup>3</sup>. The tubular section *g*<sup>1</sup> is horizontal, and communicates with the interior of the trunk C by means of rectangular telescopic tubes *c*<sup>2</sup>. Into the rear end of each tube *g*<sup>1</sup> an adjustable rectangular tube, *g*<sup>2</sup>, is applied, on the vertical portion of which is applied an endwise-movable picking-up tube, *g*<sup>3</sup>, the lower end of which is open, as shown in Fig. 5. This latter tube *g*<sup>3</sup> is held down by means of a light spring, *g*<sup>4</sup>, which will allow it to rise suddenly while picking up the rear portion of a sheet.

The pile-tray B<sup>1</sup> has a ridge or raised surface, B<sup>2</sup>, extending from its front to its rear end, the object of which is to raise the pile of paper in the center, and to allow its sides to stop, thus breaking up the pile by loosening the sheets, so that they can be more readily separated one from the other by the picking-up and stripping devices. B<sup>3</sup> B<sup>3</sup> are the side-boards of the tray, which are laterally adjustable for sheets of different widths. Near the rear end of each side-board is a vertical slide, *h*, which is allowed free up-and-down play, and to the lower end of which a flexible stripper, *h*<sup>1</sup>, and a rigid stripper, *h*<sup>2</sup>, are applied. The flexible stripper may be made of rubber or other suitable material, which will separate the rear edge of every top sheet from the succeeding lower sheet during the act of lifting the top sheet, and the rigid stripper acts as a pressure device at the side edge of the top sheet to keep the same down while being drawn or stripped from under it. These devices will follow the sheets down as the height of the pile diminishes, and prevent more than one sheet being lifted at a time. F represents a trunk or hollow bar, which is connected, by hinges, to the rear end of frame B, and which is arranged horizontally across the same. The ends of this trunk are tubular for the purpose of having connected to them flexible pipes, which communicate with a suitable blast-engine. F<sup>1</sup> F<sup>1</sup> are horizontal nozzles, which communicate with the interior of trunk F by means of flexible pipes F<sup>2</sup>, and which are endwise adjustable through eyes on standards F<sup>3</sup>. The standards F<sup>3</sup> are vertically adjustable, and are secured, by means of clamps *i*, to the trunk F. The clamps *i* are adjustable in a direction with the length of the trunk F for the purpose of setting the nozzles nearer together or farther apart.

When the blast-pipes are arranged in front



of the paper-feeders the sheet will often be blown from the picking-up fingers, which is very objectionable, whereas, by this improvement, the objection is removed by placing the blast-pipe in rear of the feeder. The sheets of paper will be kept pressed up in front of the pipe-tray, and in their relative position for the picking-up fingers.

Near each end of the reciprocating suction-trunk C holes are made through it, which are covered by valves  $j$ , and held open or shut by friction in the hinges. These hinged valves have extensions  $j^1$   $j^2$  formed on their outer sides and rear ends. The rear extensions  $j^2$  are struck by tongues  $k$  on frame B, when the trunk C descends at the terminus of its rear stroke, and valves  $j$  are suddenly shut, and the extensions  $j^1$  are struck by beveled tongues  $k'$  on the cheeks of frame A at the termination of the forward stroke of trunk C, and the valves  $j$  suddenly opened. Between the rear end of the feed-board  $A^2$  and the front end of the pile-tray  $B^1$ , when the tray is in its place against stops 4, is a vertically-adjustable board, G, which is guided up and down by a fixed board, G'. At the ends of the movable board G, and pivoted to it, are two tapered fingers,  $l$ , which present flexible teeth to the front edges of the pile of paper on the tray  $B^1$ , and incline against and hang over the same, so as to operate as self-adjusting strippers, and allow only one sheet at a time to be lifted from the pile at the front end thereof. Light springs may be applied behind the pivoted strippers, above their pivots, for the purpose of gently pressing their flexible teeth against the front edges of the paper pile. I also employ, in addition to the inclined front edge strippers  $l$  and the rear corner strippers  $h^1$   $h^2$ , two side strippers,  $m$ , which are connected, by pivoted arms  $m'$ , indicated by dots in Fig. 3, to the side-boards  $B^3$  of the tray  $B^1$ . These side edge strippers rest upon the paper by their own gravity, and are vertically self-adjusting. They have serrated flexible edges (shown in Fig. 2) applied to their bottoms, which strip the edges of the top sheet from the succeeding sheet while the sheet is being lifted from the pile.

By reference to Fig. 3, it will be seen that I have a space, 5, between the pile-tray and feed-board, the object of which is to allow the front edges of the pile of paper on the tray to drop somewhat, and thus facilitate their separation singly. The feed-board  $A^2$  has applied to its upper surface a number of longitudinal ridges, 6, which will prevent the sheets from adhering to this table in consequence of friction or electrical attraction. These ridges may be of wire, and they may be connected together and made to communicate with the earth, for the purpose of conducting off any electricity which may be excited by moving sheets of paper rapidly over said table. At the front edge of the feed-board  $A^2$  are the front guides or stops  $n$ , with the depressing-fingers overhanging the faces of the same, for

the purpose of keeping the paper from cockling when brought to bear against said faces. These guides are actuated by suitable mechanism (not shown in the drawing.) These stops are applied on the lower sides of forked holding-down fingers  $n^2$ , which are secured to a rock-shaft, H, actuated by a cam or its equivalent, (not shown in the drawings) so as to raise the stops  $n^1$  at the proper time to allow the grippers  $a$  to take a sheet and carry it off. In front of the shaft H, and arranged above it, is a shaft, I, which has a toe,  $o$ , on one end, and an arm,  $o'$ , acted on by a spring,  $s$ , on the other end. On this shaft I are applied flexible registering-fingers  $p$ , which work between the ends of forked fingers  $n^2$ , and against the guides  $n$ , and adjust the front edges of the sheets squarely against the stops  $n^1$ , and hold them there until taken by the grippers  $a$ . The rocking movements are imparted to the shaft I by means of the springs  $s$  and a curved concentric lifter,  $g$  on one end of a shaft, J. The length of the lifter  $g$  is such that it will cause the fingers  $p$  to hold the edge of the sheet against stops  $n^1$  long enough for the grippers  $a$  to take it. On the left-hand side of the feed-table  $A^2$  I employ a device for registering one side of the sheet previous to registering the front edges thereof. Sometimes I register the front first and the end last. This device consists of a lever,  $r$ , with a friction-finger on one end, which lever is pivoted to a collar that plays loosely on a horizontal stud,  $r'$ . The lever  $r$  is thus allowed to receive lateral and vertical vibration, which it receives from cams  $t$   $t'$  on the shaft J, and a spring,  $v$ , on the shaft I. The spring  $v$  presses the front hooked end of the lever  $r$  toward the left, and against a circular plate,  $v'$ , and keeps it in a position to be acted on by the two cams  $t$   $t'$ . The shaft J has a belt-wheel,  $J^1$ , keyed on one end, around which a belt passes, which is also applied around a belt-wheel,  $J^2$ , and the driving-shaft D.

I am well aware that the patent granted to J. T. and F. Ashley, dated October 21, 1873, No. 143,740, shows a feed-board composed of adjustable sections with raised edges, which I do not claim, as I use the ordinary feed-board or table provided with raised ribs or wires, for purposes above set forth.

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

1. The reciprocating trunk  $c$ , carrying adjustable picking-up fingers, in combination with a feed-board,  $A^2$ , said board being arranged on the press-frame, substantially as described.

2. The vibrating arms  $c^1$   $c^2$ , in combination with trunk  $c$ , arms  $d'$ , and spring  $c^3$ , substantially as described.

3. The telescopic pipes combined with picking-up fingers adjustable on trunk C, substantially as described.

4. The telescopic picking-up fingers, substantially as described.



5. The combination, with the air-trunk C, of the picking-up fingers  $e'$ , adjustably connected by means of pivoted joints, substantially as and for the purpose set forth.

6. The air-valves  $j$  on reciprocating trunk, with extensions  $j^1 j^2$ , in combination with the tripping devices  $k k'$ , substantially as described.

7. The pile-tray B, having the raised surface or ridge  $B^2$ , for the purpose of bending the pile of paper into an uneven surface, thereby facilitating the separation of the sheets, as described.

8. The hinged trunk F, carrying the blast-pipes  $F'$ , in combination with the frame-board B, substantially as and for the purpose described.

9. The self-adjusting vertically-stripping devices  $h^1 h^2$ , in combination with picking-up fingers, substantially as described.

10. The vertically-adjustable and vibrating strippers  $l l$ , operating substantially as specified, and for the purpose set forth.

11. The combination, with picking-up fingers, of the self-adjusting stripping devices

$l l m m$ , substantially as and for the purpose set forth.

12. In a machine for feeding paper, the ordinary feed board or table provided with the raised wires  $b$ , as and for the purpose set forth.

13. The depressing-fingers  $n^2$ , combined with the front guides  $n$  and front registering-fingers  $p p$ , substantially as and for the purpose set forth.

14. The vibrating registering-fingers  $p p$ , combined with the guides or stops  $n^1 n^1$ , substantially as and for the purpose described.

15. In a paper-feeding machine, the vertically and laterally moving registering-arm  $r$ , pivoted to a collar that plays loosely on a horizontal stud,  $r'$ , in combination with the cams  $t t'$  on shaft J, and a spring,  $v$ , substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN T. ASHLEY.

Witnesses:

PHIL. C. MASI,  
JOS. B. LOOMIS.