No. 726,386. PATENTED APR. 28, 1903.

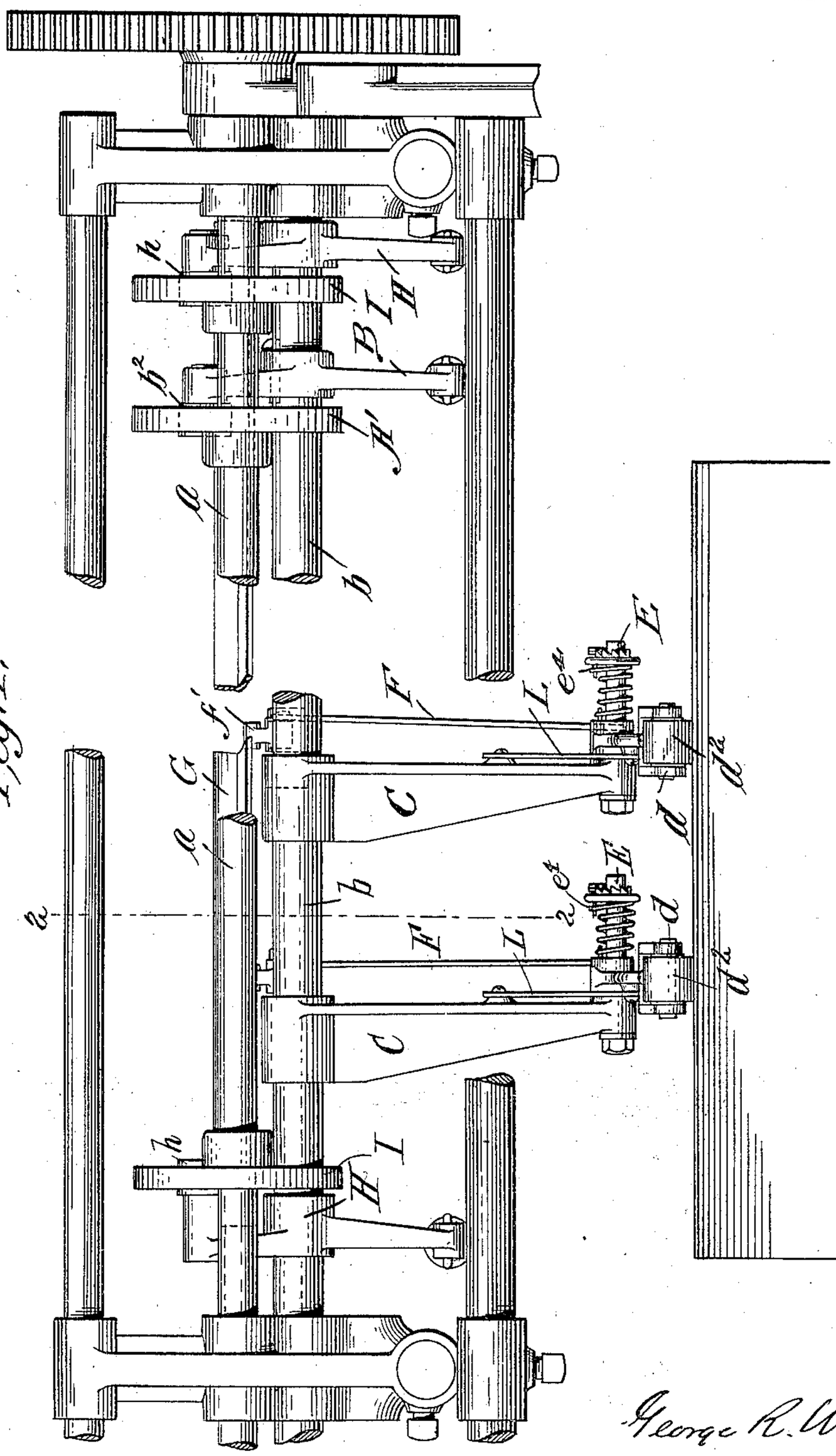
G. R. WILLIAMS.

PAPER FEEDING MACHINE.

APPLICATION FILED JUNE 5, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Henry L. Decke.

F. F. Scherzinger.

George R. Williams

INVENTOR.

BY Wilhelm Bonn

ATTORNEY

No. 726,386. PATENTED APR. 28, 1903.

G. R. WILLIAMS.

PAPER FEEDING MACHINE.

APPLICATION FILED JUNE 5, 1901.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

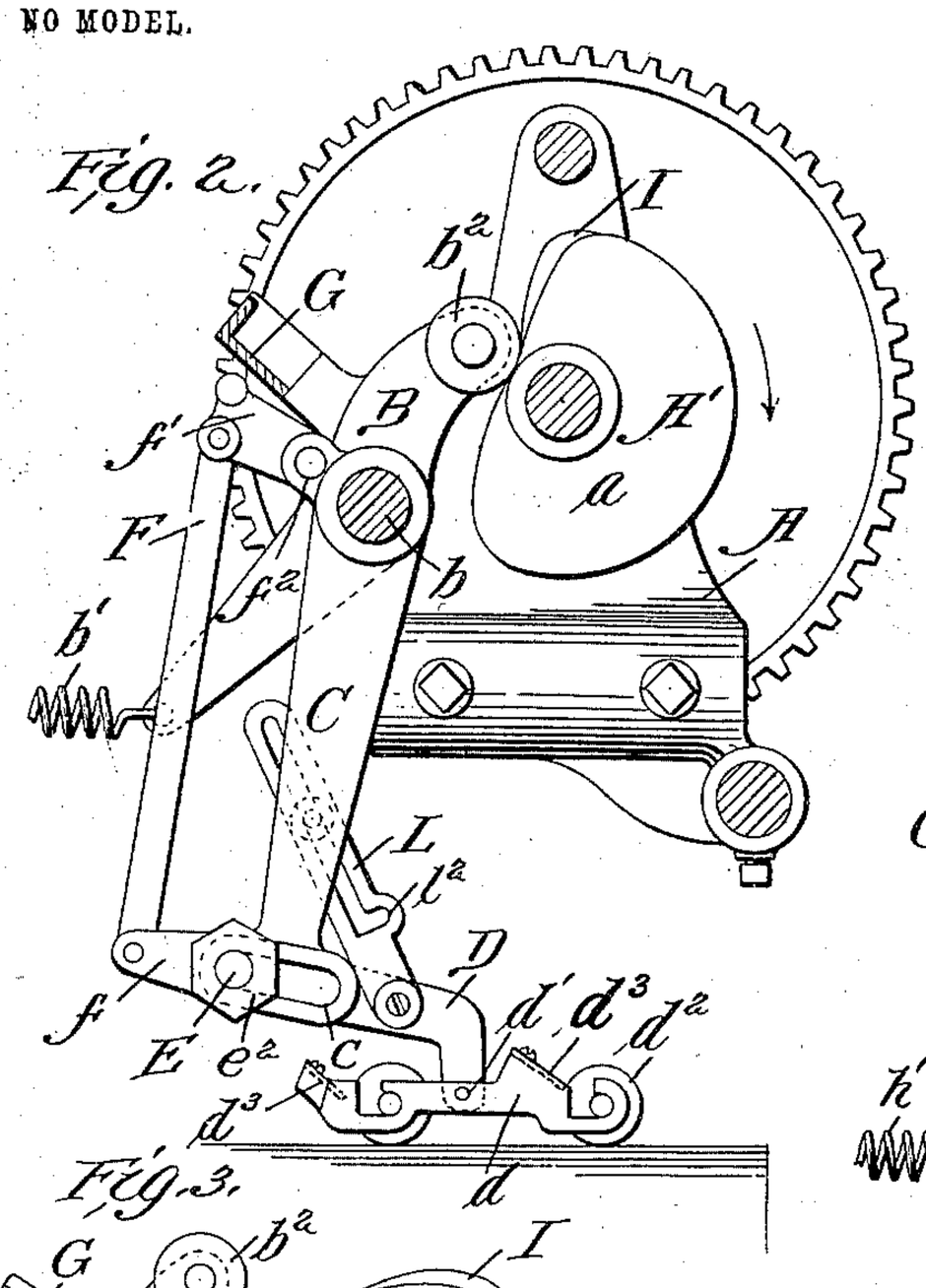


Fig. 5.

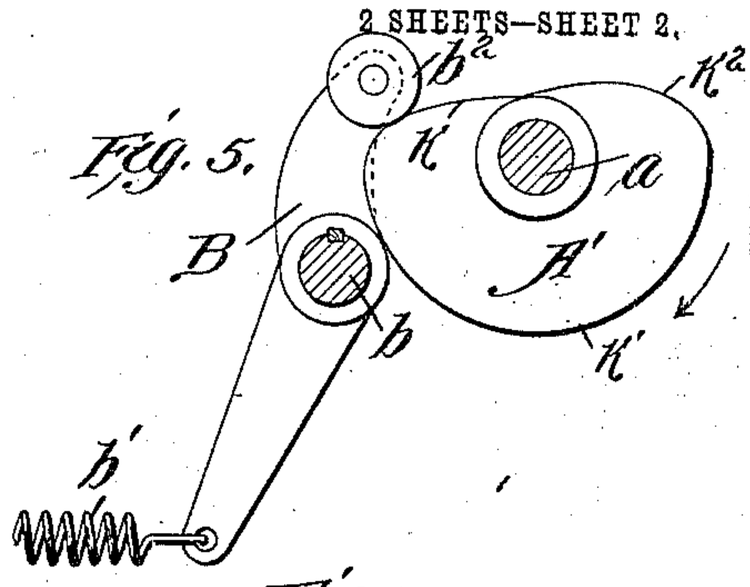


Fig. 6.

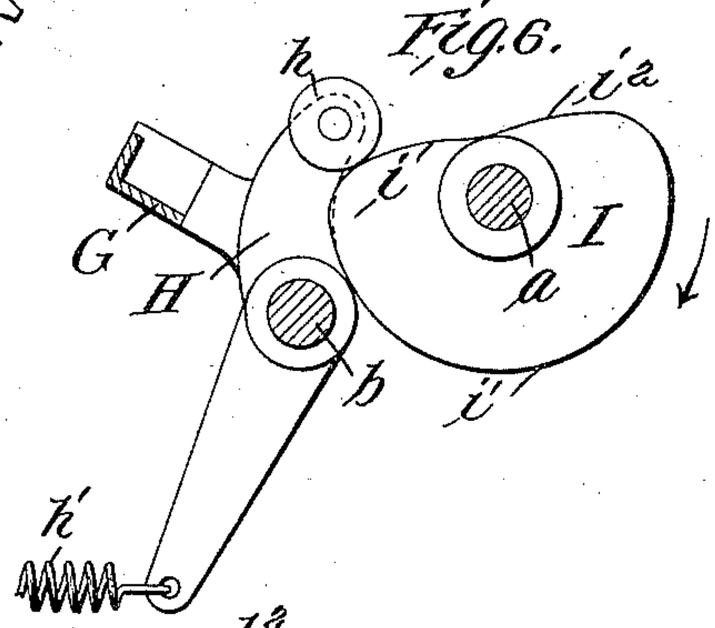


Fig. 3.

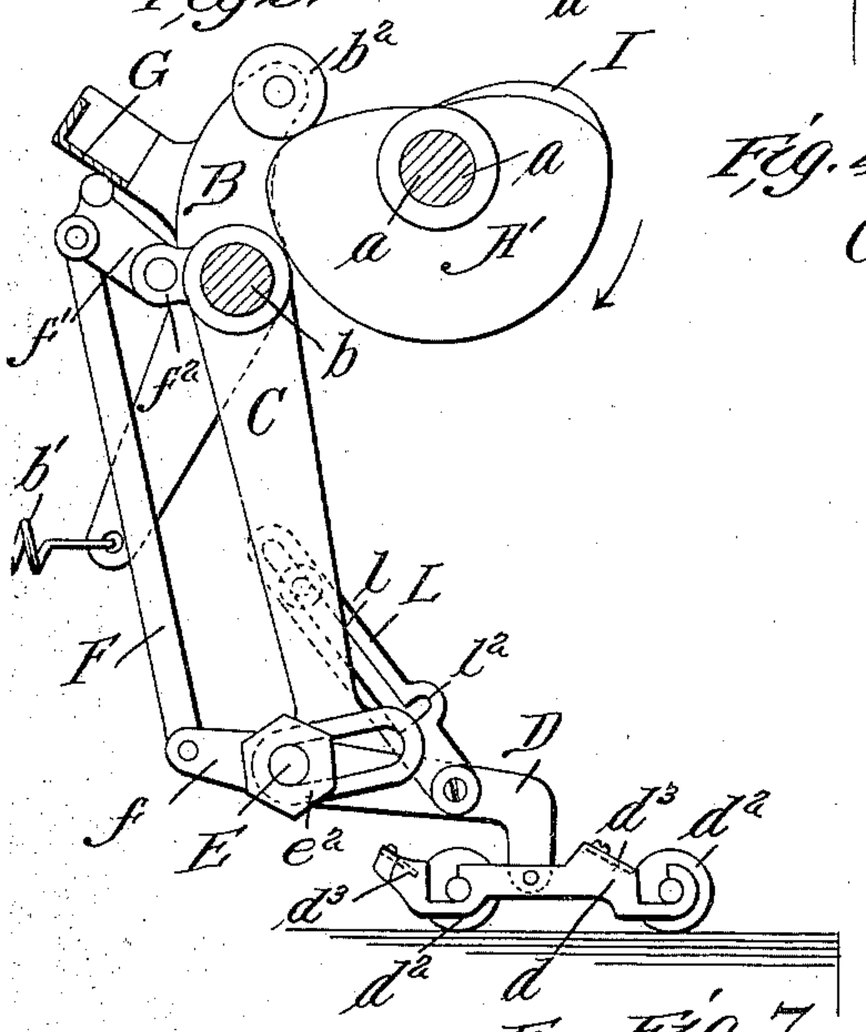


Fig. 4.

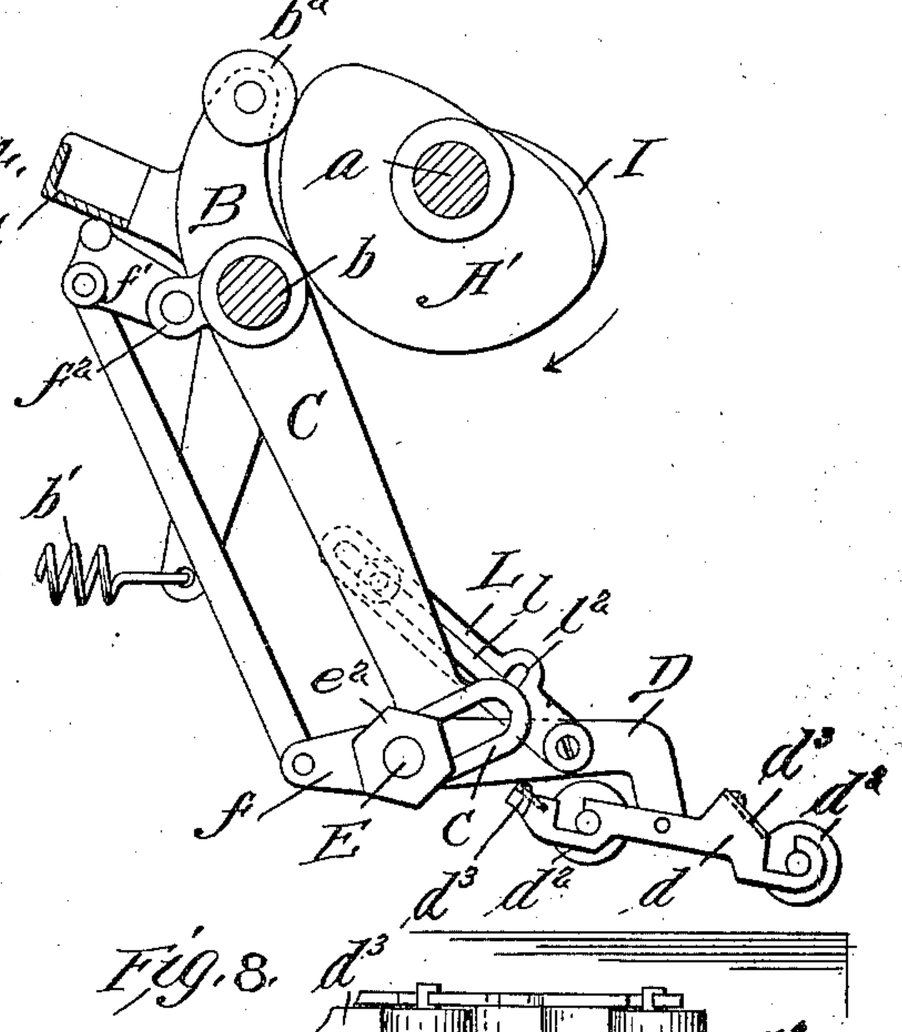


Fig. 7.

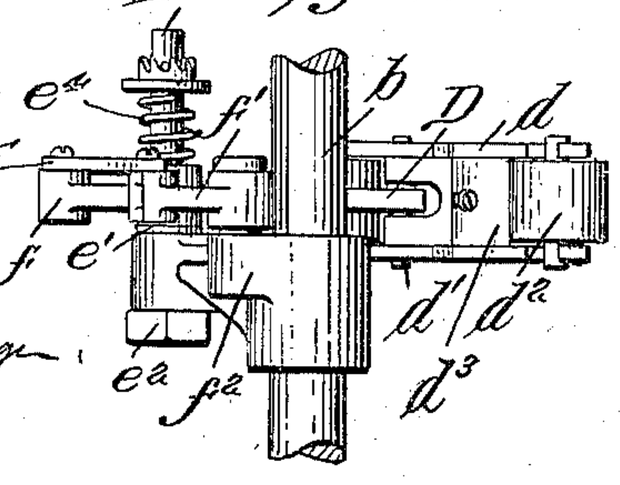


Fig. 8.

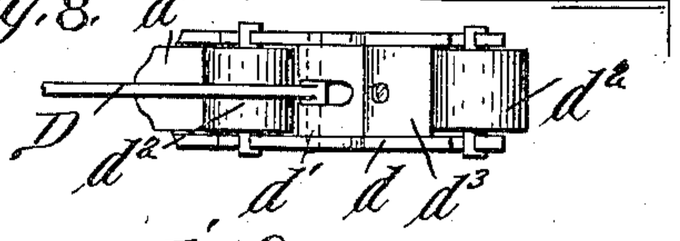


Fig. 9.

Witnesses

Henry L. Decks.

F. F. Schreiner.

Inventor:

Geo. R. Williams.

By Wilkens & Bonner Attorneys.

UNITED STATES PATENT OFFICE.

GEORGE R. WILLIAMS, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE ECONOMIC MACHINE COMPANY, OF NEW YORK, N. Y.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 726,386, dated April 28, 1903.

Application filed June 5, 1901. Serial No. 63,324. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. WILLIAMS, a citizen of the United States, residing at New York, in the borough of Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Paper-Feeding Machines, of which the following is a specification.

This invention relates to that class of paper-feeding machines in which the sheets are fed successively from the top of a pile by reciprocating feeding or push fingers which bear upon the top sheet during the forward stroke and push the top sheet forwardly on the underlying pile and are then raised from the sheet and returned in a raised position.

My invention has for its objects to produce a simple and effective mechanism for raising each feeding-finger at the end of its forward stroke and returning it in its elevated position, to operate a number of such feeding devices which are arranged side by side in a simple and convenient manner, and to render each feeding-finger adjustable toward and from the front edge of the pile in order to change the point at which the finger bears upon the top sheet in pushing it forward.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary front elevation of the upper portion of a paper-feeding machine provided with my improvements. Fig. 2 is a sectional side view in line 2 2, Fig. 1, looking to the right and showing the push-finger in its rearmost position. Fig. 3 is a similar view showing the push-finger at the completion of its forward stroke. Fig. 4 is a similar view showing the push-finger raised from the pile upon the completion of the forward stroke. Fig. 5 is a side view of the rock-lever by which the rock-shaft is actuated from its cam. Fig. 6 is a side view of one of the rock-levers and cams by which the depressing-bar is actuated. Fig. 7 is a top plan view of the push-finger and connecting parts. Fig. 8 is a top plan view of the roller-carriage at the front end of the push-finger. Fig. 9 is a perspective view of the pivot-bolt of the push-finger.

Like letters of reference refer to like parts in the several figures.

A represents the upper portions of the side frames of a paper-feeding machine.

a represents the rotary cam-shaft, which is arranged transversely in the side frames and driven in the usual manner.

b represents the transverse rock-shaft, with which the feeding-fingers are connected and by which the same are moved forward and backward. This rock-shaft is actuated from the cam-shaft *a* in the usual way, as shown in Fig. 5, by a cam A′, secured to the shaft *a*, a rock-lever B, secured to the rock-shaft *b*, and a spring *b*′, which connects the lower arm of the rock-lever with a stationary part of the frame and holds the upper arm of the lever against the cam. This rock-lever is preferably provided with a roller b^2, by which it bears against the cam.

C represents the depending rock-arms, which are secured to the rock-shaft *b* for connection with the push or feeding fingers. Any suitable number of these arms, each having a push-finger attached thereto, may be arranged side by side, the number and arrangement of the arms depending usually upon the size of the machine and the size and character of the sheets which are to be fed off.

D represents the push or feeding fingers, which are pivoted to the lower ends of the rock-arms C. Each of these fingers extends forwardly from its pivot and carries at its front end a suitable device by which it bears upon and takes hold of the top sheet and pushes the latter forwardly on the pile. As shown in the drawings, this device consists of a carriage *d*, which is connected with the front end of the push-finger by a transverse pivot *d*′ and carries in front and in rear of the pivot a push-roller d^2 of well-known construction, which is held against rotary movement on the forward stroke by impinging against a blade d^3, secured on the carriage in the rear of each roller. I prefer to use these push-rollers; but other push devices may be substituted, if desired. These two rollers or push devices arranged transversely, one in front and the other in rear of the pivot-line of the carriage, afford a flat and firm bearing for the push-finger upon the top sheet and enable the finger to take firm hold on the top

sheet, so that the latter can be pushed off with less pressure against the top of the pile than would otherwise be required. The arrangement of the two rollers, one behind the other tandem fashion, allows both rollers to bear upon the blank margin between two bodies of printed matter on the sheet.

E represents the pivot-bolt, by which the finger is connected with the rock-arm C. This bolt is adjustable in the rock-arm in the longitudinal direction of the finger or toward and from the front edge of the pile, so that the push device can be adjusted to a greater or less distance from the rock-arm as may be necessary to cause the device to bear upon the top sheet at the desired distance from the front edge of the pile. The printed matter, particularly color-work, often causes the sheets to adhere and to buckle under the pressure of the finger, which can be avoided by so adjusting the finger that it takes hold nearer the front edge of the pile. For the purpose of effecting this adjustable connection the rock-arm C is provided at its lower end with a slot *c* and the pivot-bolt E with a flat shank *e*, Fig. 9, which is arranged in said slot and capable of adjustment back and forth in the same. The bolt is clamped to the arm by a shoulder e' and nut e^2, bearing against opposite sides of the arm. The pivot portion e^3 of the bolt on which the finger rocks projects beyond the shoulder e'. The front end of the finger is yieldingly held down in a well-known manner by a spring e^4, Fig. 7, coiled around the pivot portion of the bolt. This spring is secured at one end to the arm D and at the other end to a disk e^5, which can be adjusted about the bolt E and is held in its adjusted position thereon by notches e^6, which engage with a pin e^7, secured in the bolt. The finger is provided with a tailpiece *f*, which projects rearwardly from the pivot and which is depressed at the completion of the forward stroke for raising the finger from the sheet and holding the finger in an elevated position during the return stroke. The mechanism by which this is accomplished is constructed as follows:

F represents a rod which extends upwardly from the tailpiece *f* of the push-finger in rear of the rock-arm C. This rod is supported at its upper end near the upper end of the rock-arm in such a way that the rod can move up and down. For that purpose the rod is connected to the free rear end of a short guide-arm f', which is pivoted at its front end to a boss f^2 on the side of the hub of the rock-arm. This guide-arm partakes of the rocking movement of the rock-arm, but is capable of a rocking movement in a vertical plane independent of the rock-arm.

G is a depressing-bar which is arranged above the guide-arm and which depresses the latter, the rod F, and the tailpiece *f* of each finger at the proper time. This bar is supported at its ends by rock-levers H, mounted loosely upon the rock-shaft *b*, Figs. 1 and 6. The bar is actuated by cams I, secured to the shaft *a* and engaging rollers *h* on the upper arms of the rock-levers H, Fig. 6, which levers are held against the cams by springs h', connected with the lower arms of both rock-levers.

The lifting-cams I, Fig. 6, are shaped almost exactly like the push-cam A′, Fig. 5, by which the rock-shaft is actuated to move the push-fingers back and forth. The face of each of these lifting-cams is composed, as shown in Figs. 2, 3, 4, and 6, of a salient face *i*, which extends away from the axis of rotation, a concentric face i', and a return-face i^2. The push-cam A′ has its face composed in like manner, as shown in Figs. 2 to 5, of a salient face *k*, a concentric face k', and a return-face k^2. The push-cam A′ is secured to the cam-shaft *a* near one of the lifting-cams I, Fig. 1, in such manner that the salient faces *k i* of these cams are in line with each other. The concentric face i' of each lifting-cam I is slightly longer circumferentially than the corresponding face k' of the push-cam A′, so that the return-face k^2 of each push-cam stands slightly rearward circumferentially of the return-face i^2 of the lifting-cam, Figs. 2 to 4.

In the rearmost position of the rock-arm C and push-finger (shown in Fig. 2) the actuating rock-arm B of the rock-shaft *b* stands with its roller b^2 at the base of the salient face *k* of the push-cam A′, and the lifting rock-arm H stands with its roller *h* at the base of the salient face *i* of the lifting-cam I. The rock-arm C of the push-finger stands in this position of the parts in rear of a vertical line drawn through the center of its rock-shaft *b*, and the depressing-bar G stands at a short distance above the guide-arm f'. The cams rotate in the direction of the arrows, and their salient faces force the upper arms of the respective rock-levers B and H backward. The action of the salient face *k* of the push-cam A′ swings the rock-arm C forward. The action of the salient faces *i* of the lifting-cams I causes the rock-levers H of the depressing-bar to follow this movement by moving about the rock-shaft *b*. As the front end of the finger is held down upon the pile during its forward movement, the relative position of the rock-arm C and the finger changes as these parts are moved forward, and this change is such that the depressing-bar G gains upon the guide-arm f' to such an extent that when the forward movement of the rock-arm C has been completed the bar has reached the guide-arm f', Fig. 3. The remaining action of the salient face i' of the lifting-cams I now depresses the bar, the guide-arm, the rod, and the tailpiece of each finger and raises the front end of the finger, thereby lifting the roller-carriage from the top sheet, Fig. 4. The parts are held in this elevated position while the concentric faces of the cams move past the rock-levers B and H and while the return-face k^2 of the push-cam A′ allows the rock-

arms C to make their return stroke. In order that the finger shall not be allowed to descend upon the pile while this return stroke is being performed, the return-face i^2 of each lifting-cam is arranged somewhat in rear of the return-face k^2 of the push-cam. When the bottom of both return-faces has been reached, the rock-arm C and finger have been returned to the rearmost position, the depressing-bar has released the guide-arm f', and the finger has been lowered upon the pile.

The concentric faces of the cams hold the finger in an elevated position at the end of the forward stroke for a certain period of time before the return stroke begins. This is, however, not essential, and the cams may in that respect be shaped differently, as the operation of the feeding-machine may require.

The depressing-bar extends over and operates upon the guide-arm f' of each rock-arm C, of which there may be several secured side by side to the rock-shaft b, and this bar may be longer or shorter, as the number and arrangement of the lifting-fingers may render necessary. Each rock-arm C carries a feeding-finger D, a depressing-rod F, a guide-arm f', and the appurtenances of these parts, so that this group of connected parts forms together a complete feeding element. Each of these feeding elements is adjusted in position simply by securing the rock-arm C on the rock-shaft b. The depressing-bar G extends over all these feeding elements and operates the depressing-rods of all of them simultaneously, while nevertheless each of these rods has a limited capacity of individual movement toward and from the depressing-bar G, whereby each depressing-rod and guide-arm is permitted to follow freely the movements of the corresponding feeding-finger D as the latter rises or falls in moving over the uneven surface of the pile of sheets.

L is a slotted link, which is pivoted to the push-finger near the front end thereof and which engages with its slot l over a pin l', projecting from the side of the rock-arm C. The front end of the slot is provided in its upper side with a notch l^2. By raising the front end of the finger and engaging this notch with the pin the finger is suspended in an elevated position when it is not required to be used.

I claim as my invention—

1. In a sheet-feeding mechanism, the combination of feeding elements arranged side by side and each composed of a rock-arm, a push-finger pivoted to the lower end thereof and provided with a rearwardly-projecting tailpiece, a depressing-rod extending upwardly from said tailpiece, and a guide device controlling said depressing-rod, a detached depressing device extending transversely over the depressing-rods of said elements and adapted to actuate all of them simultaneously, and means for actuating said depressing device, substantially as set forth.

2. The combination of a rock-arm, a push-finger pivoted thereto and provided with a projecting tailpiece, a rod extending upwardly from said tailpiece, a guide device for the upper end of said rod, a depressing-bar arranged over said guide device, and a lifting-cam which actuates said bar, substantially as set forth.

3. The combination of a rock-shaft, a depending rock-arm secured thereto, a push-finger pivoted to said rock-arm and provided with a projecting tailpiece, a rotary cam-shaft, a push-cam secured thereto and actuating said rock-shaft, a lifting-cam also secured to said rotary shaft, a rock-lever loosely mounted on said rock-shaft and engaging said lifting-cam, and means carried by said loose rock-lever for depressing said tailpiece and elevating said push-finger on the completion of the forward stroke of the finger, substantially as set forth.

4. The combination of a rock-shaft, a depending rock-arm secured thereto and provided at its lower end with a slot which is elongated in the direction of the movement of said rock-arm, a pivot-bolt which is adjustably secured in said slot, a push-finger which is pivoted on said bolt, and means for raising the push-finger on the completion of the forward stroke by rocking the finger on its pivot, substantially as set forth.

5. The combination of a rock-shaft, a depending rock-arm secured thereto and provided at its lower end with a slot which is elongated in the direction of the movement of said rock-arm, a pivot-bolt which is adjustably secured in said slot, a push-finger which is pivoted on said bolt and provided with a projecting tailpiece, a lifting-cam, and mechanism interposed between said cam and tailpiece for depressing the latter and elevating the finger on the completion of the forward stroke, substantially as set forth.

Witness my hand this 31st day of May, 1901.

GEORGE R. WILLIAMS.

Witnesses:
H. SCANTLEBURY,
GEO. C. KIMBALL.