

(No Model.)

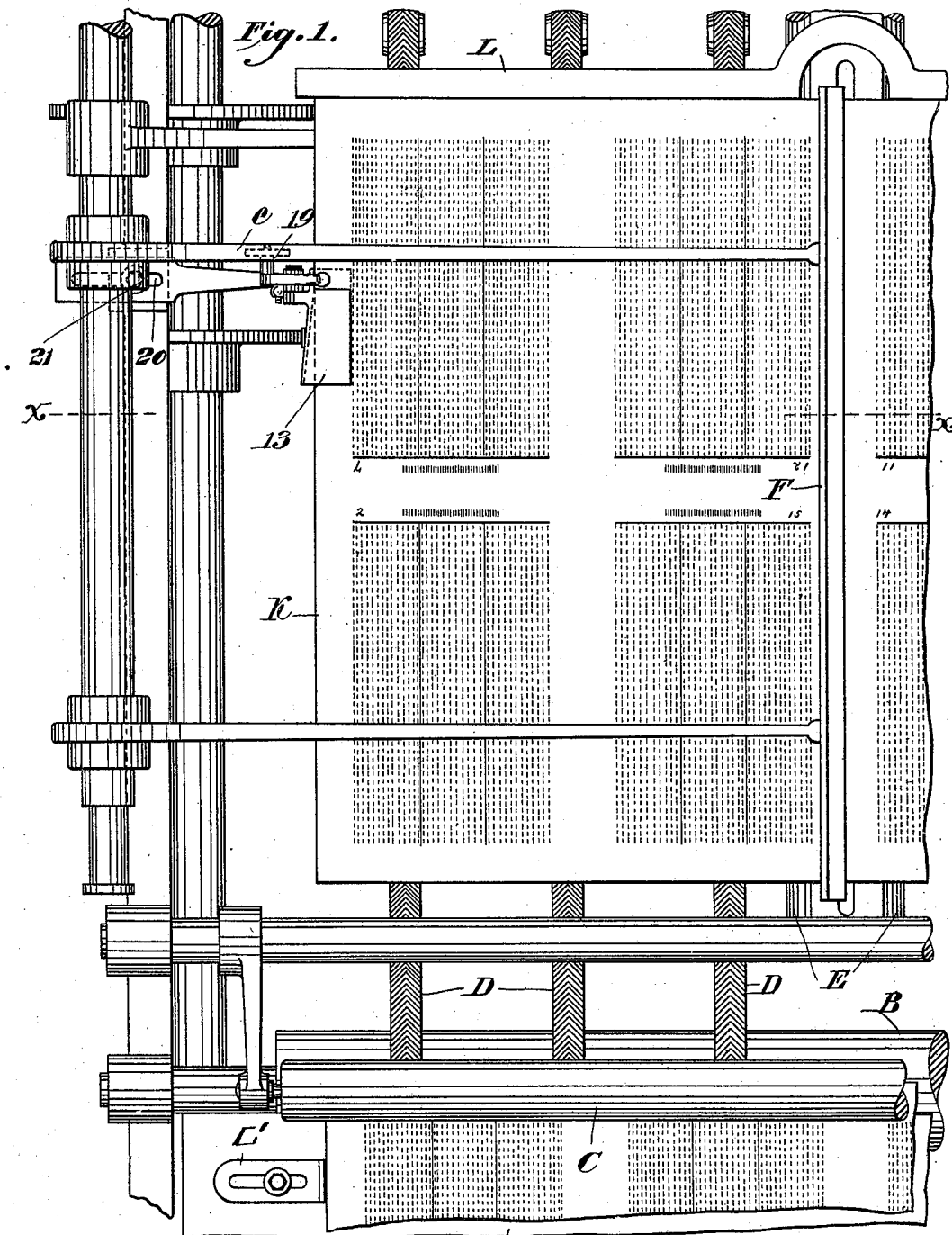
4 Sheets—Sheet 1.

H. K. KING.

SHEET ADJUSTING DEVICE FOR PAPER FOLDING MACHINES.

No. 574,153.

Patented Dec. 29, 1896.



Witnesses:

John P. Moran
Thomson Buck

Inventor

Howard H. King,
per Joshua Dusey,
Attorney.

H. K. KING.

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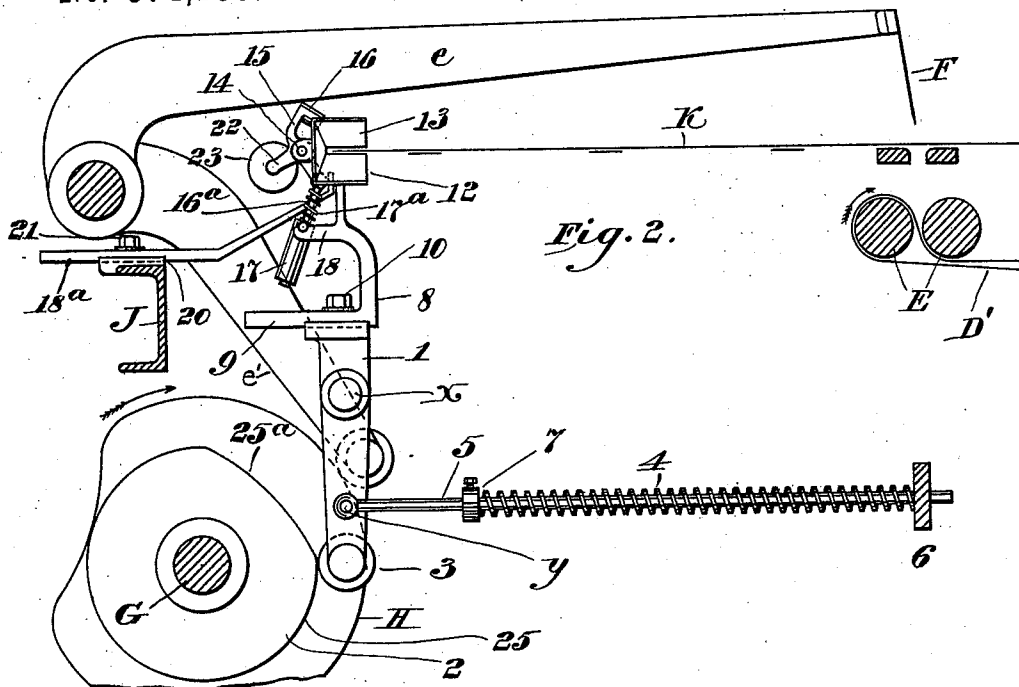


Fig. 2.

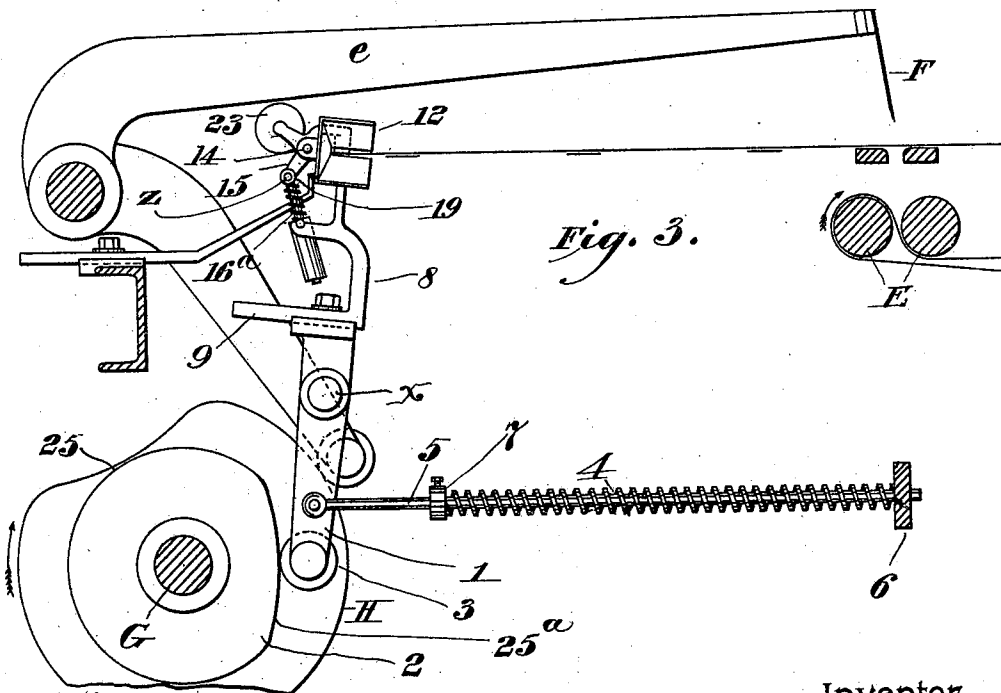


Fig. 3.

Witnesses:

John P. Nelson
Charles B. Beck

Inventor

Howard H. King
per Joshua Pusey
Attorney.

(No Model.)

4 Sheets—Sheet 3.

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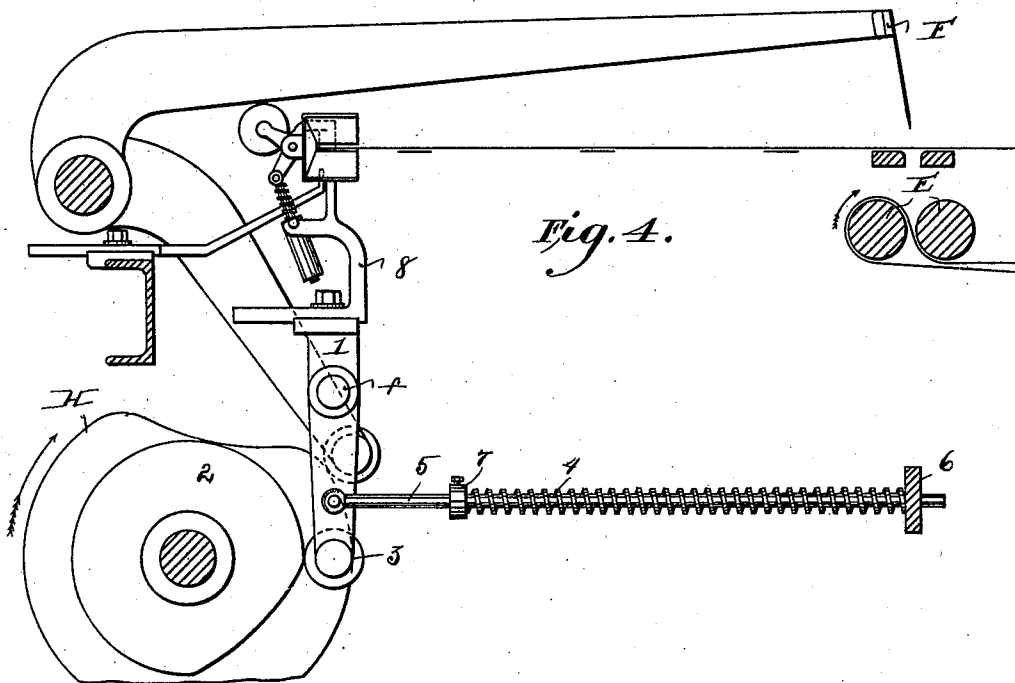


Fig. 4.

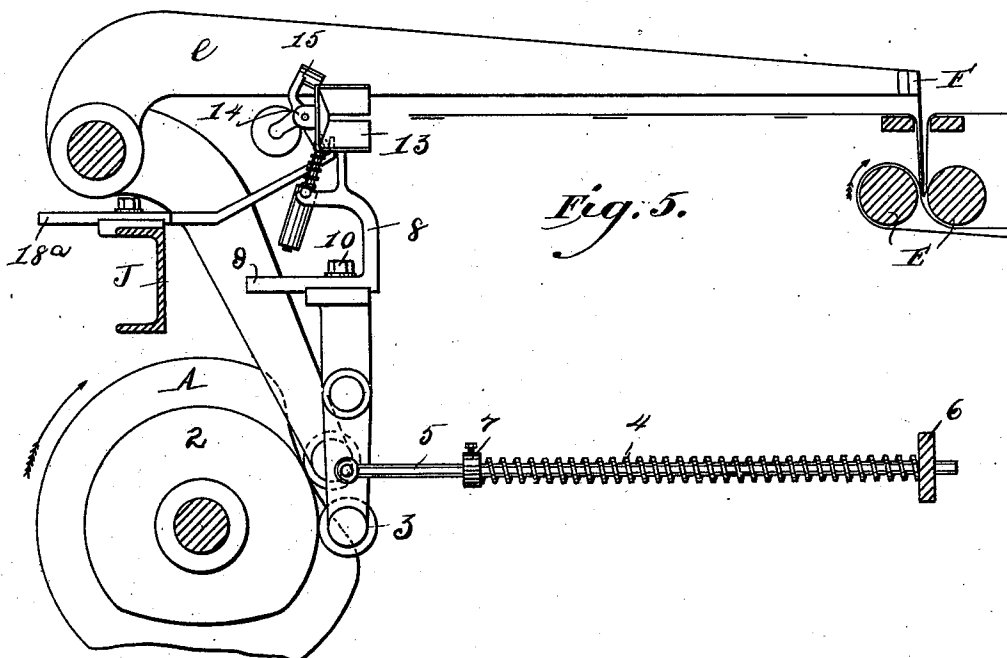


Fig. 5.

Witnesses:

John P. Nolan.
Thomas Beck

Inventor

Howard H. King
per Joshua Pusey,
Attorney.

(No Model.)

4 Sheets—Sheet 4.

H. K. KING.

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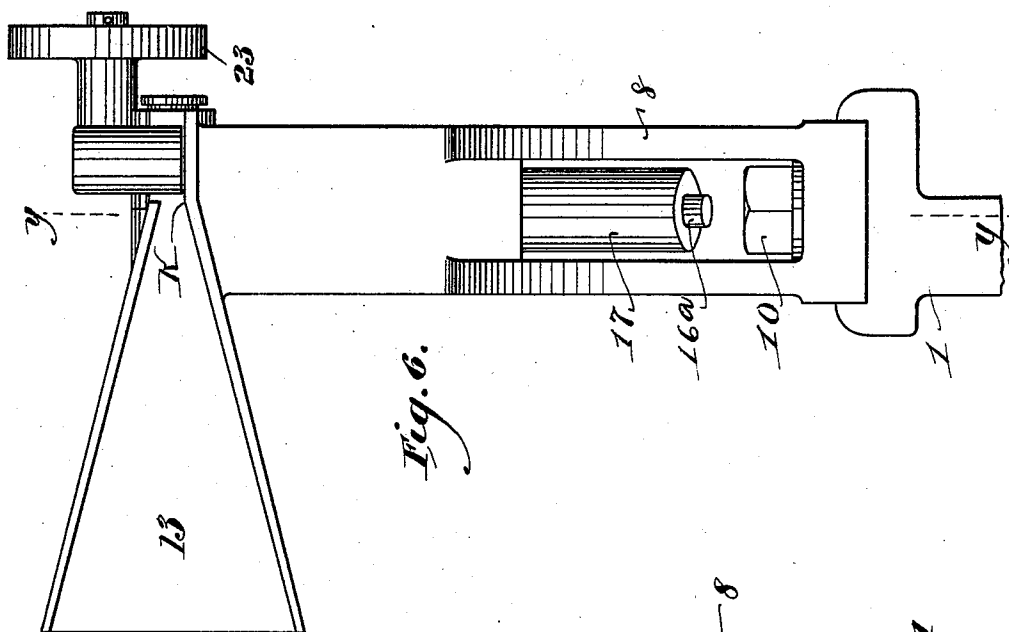


Fig. 6.

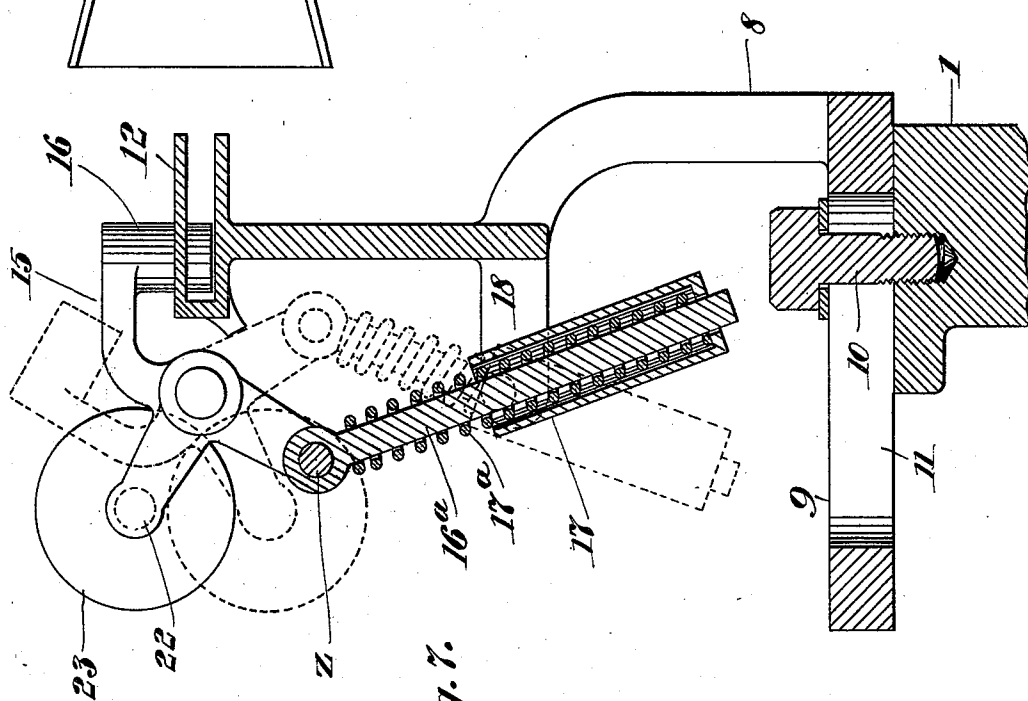


Fig. 7.

Witnesses:

John P. McLean.
Estimilow Buck.

Inventor

Howard K. King
per Joshua Pease,
Attorney.

UNITED STATES PATENT OFFICE.

HOWARD K. KING, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE CHAMBERS BROTHERS COMPANY, OF SAME PLACE.

SHEET-ADJUSTING DEVICE FOR PAPER-FOLDING MACHINES.

SPECIFICATION forming part of Letters Patent No. 574,153, dated December 29, 1896.

Application filed October 28, 1891. Serial No. 410,124. (No model.)

To all whom it may concern:

Be it known that I, HOWARD K. KING, a citizen of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Sheet-Adjusting Devices for Paper-Folding Machines, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1 is a plan view of my device in connection with so much of a paper-folding machine as is necessary to illustrate the invention. Fig. 2 is a transverse vertical section, as on the line *xx*, Fig. 1. Figs. 3, 4, and 5 are similar sections showing the parts in the several positions which they are successively caused to assume. Fig. 6 is an end view of the bracket upon which the guide devices are supported. Fig. 7 is a vertical section, as on the line *yy*, Fig. 6, the clamp devices being represented in their active and idle positions by the full and broken lines, respectively.

This invention is designed for use in connection with paper-folding and analogous mechanisms, its object being to provide a simple and efficient means whereby the sheets shall be automatically set or adjusted in proper position to be acted upon by said mechanisms when fed thereto.

The invention is applicable, more especially, to that well-known class of paper-folders in which the sheets are successively forced into the bite or grip of contiguous folding-rollers by means of a vibrating blade, the construction, arrangement, and operation of the invention being such that it will automatically engage each sheet fed to the machine and will then bring the sheet laterally into a predetermined position, so that the proper line of crease or fold of the sheet will be directly opposite the bite or grip of the folding-rollers. Hence the correct and uniform folding of the sheet will be insured.

The invention comprises novel features of construction which will be hereinafter described in detail and then duly claimed.

Referring to the annexed drawings, A represents a section of the feed-board of a Chambers folding-machine; B, the carrying-drum; C, the drop-roller; D, the sheet-carrying tapes;

E, the first folding-rollers, and F the cam-actuated folding-blade. As the general organization and operation of these parts are well understood by those familiar with the art, detailed description thereof is thought unnecessary.

The papers to be folded are banked upon the feed-board of the machine. They are then successively fed between the drop-roller and the revolving drum B, around which pass the carrying-tapes, each sheet being thereupon drawn by the latter into the machine in respect to the position in which the sheet is to be acted upon by the folding-blade to be tucked thereby between the rollers E. The position of the sheet should be such that the prescribed line of creasing or folding thereof is directly above the bite or grip of the two contiguous rollers.

To insure the feeding of the successive sheets uniformly into accurate position relative to these rollers, I have devised the following mechanism:

The numeral 1 represents an upright rock-arm which is suitably pivoted, as at *x*, on that side of the machine in which is mounted the rotatable shaft G, that carries the blade-actuating cam H. Upon this shaft is also mounted a cam 2, the function of which will be hereinafter set out. The rock-arm is provided on its lower end with a friction-roller 3, that is forced normally against the periphery of the cam 2 by the action of a spring 4. This spring is mounted upon a slide-rod 5, which is pivoted at one of its ends to the rock-arm at *y* and is guided at its other end in a perforated rail or bar 6, forming part of the framework of the machine, said spring bearing against this bar and acting upon a head or stop 7, affixed to the rod. Upon the upper end of the rock-arm is adjustably supported a peculiarly-constructed bracket 8, which is practically a continuation of said arm. The lower end of the bracket is provided with a slotted horizontal extension 9, which is fitted to a groove in the end of the rock-arm and is secured therein by means of a set-screw 10, that is passed through the slot 11 in the extension into a tapped hole in the rock-arm, as seen most clearly in Fig. 7.

By properly manipulating the screw the

bracket may be nicely adjusted horizontally upon the rock-arm. The upper-end of the bracket is equipped with a horizontally recessed or slotted head 12, which is arranged with near relation to one of the supporting-arms *e* of the folding-blade, as shown. The forward end of this head is extended outward and expanded to form the flaring box or trough shaped portion 13. The interior of the latter communicates with the recess or slot in the forward part of the head 12 and opens outward on the inner side of the box, as represented. On the outer or closed side of the head is a lug 14, upon which is horizontally pivoted a small bell-crank lever 15, the upper arm of which is provided with a lower boss or jaw 16, that is adapted to enter the recess in the head 12 when the said arm is depressed. The lower arm of the lever is pivoted at *z* to the upper end of a rod 16^a, which extends through a cylinder or tube 17, that is pivoted between lugs 18, formed on the outer side of the bracket. The rod 16^a is guided in an orifice in the bottom of the cylinder or tube, as seen, and is maintained in an elevated position by means of a strong spiral spring 17^a, which acts against the bottom of said cylinder and the head of the rod. It will be observed that these parts constitute in effect a toggle, and, therefore, that if the lever be elevated or depressed sufficiently to throw the joint *z* beyond the vertical said lever and adjuncts will be maintained in the respective positions by the action of the spring 17^a. (See Fig. 7.)

To the side rail J of the main supporting-frame is secured an arm 18^a, the inner portion of which is bent upward in a manner to extend to the rear of the pivot-joint *z* and is provided with an up-projecting lip, which is directly in the path of the boss 19, through which the pivot-pin extends. This arm is horizontally adjustable, being mounted in a guide-groove in the rail J and provided with a slot 20 and screw 21, similarly to the lower extension of the bracket 8. The lever 15 is provided with an outward extension 22, from which projects, under the adjacent arm *e* of the folding-blade, a lateral stud, upon which, directly beneath said arm, is mounted a friction-roller 23.

The foregoing is a general description of the construction of my improvement. Its operation is briefly as follows, assuming the parts to be in the relative positions shown in Figs. 1 and 2: When the sheet K is fed into the machine and carried forward by the tapes, its lateral edge passes into the open or recessed guide-head, which is at this juncture maintained in a horizontal position in the path of the sheet by reason of the rock-arm roller riding upon the concentric portion 25 of the cam 2. The mouth of this guide-head is expanded or flared, as indicated in Fig. 1, so as to insure the entrance of the advancing sheet thereto. As the sheet is carried onward by the tapes its forward edge abuts

against the usual transversely-disposed stoppage L and is squared thereby, whereupon the cam portion 25 clears the roller and the latter is forced by the action of spring 4 to bear upon the eccentric portion 25^a of the cam, the upper end of the rock-arm and the bracket perforce being projected inward, as illustrated in Fig. 3. During this inward movement of the bracket the inner side of the head 12 comes in contact with the lateral edge of the sheet and imparts a corresponding movement thereto, and at the same time the boss 19 strikes against the opposed lip on the arm 18^a and the toggle-joint is projected beyond its center, whereupon the jaw 16 on the upper arm of the lever is forced down into the recess in the head, so as to bear upon and clamp the edge of the said sheet while in contact with the inner side of the head. When the paper is thus clamped within the guide-head, the concentric portion of the cam 2 is again brought in contact with the roller on the rock-arm, and the latter, with its bracket, is thereby returned to its first or vertical position, the paper as a matter of course being retracted therewith. The sheet is now in the required position, namely, that wherein the prescribed line of creasing or folding is directly above the bite or grip of the folding-rollers.

During the above-recited actions the folding-blade is maintained in its up or idle position by the depending arm *e'* of the rock-shaft being in constant engagement with the concentric portion of the cam H; but the moment the sheet is adjusted the said arm enters the depressed portion of the cam and the folding-blade is thereupon caused to descend. The supporting-arm *e* in its descent bears upon the roller 23, depresses the same, and throws the toggle inward beyond its center, thereby raising the clamping-jaw 16 from the paper and permitting the blade to tuck the freed sheet in between the folding-rollers. (See Figs. 4 and 5.)

In virtue of the clamp-jaw closing upon the paper while the bracket is moving inward against the edge of the latter in the manner above stated, it is obvious that there is effected a perfect adjustment of the sheet when the bracket is drawn back and the sheet released. This coacting feature of the clamp and bracket is an important one, for if the bracket were stationary during the closing of the clamping-jaw the paper would sag more or less from its position against the shoulder of the slot, and thereby affect the accuracy of the register. Again, the paper being clamped while its edge is acted upon by the guide-head, there is no liability of the sheet being projected by its momentum slightly beyond the prescribed limit. Around one of the folding-rollers pass the off-carrying tapes D' in the usual manner. The concentric portion of the cam H will act upon the arm *e'* at the proper time to raise the folding-blade, as formerly.

It will be observed that when the sheet is released from the recessed head by the descent of the arm *e*, as described, the said head and adjuncts assume the same relative position that they occupied at the outset of the operation. Hence when the folding-blade has been raised and the sheet has been drawn between the rollers the mechanism is in condition for a succeeding operation.

In view of the adjustability of the bracket 8 the guide-head thereon may be nicely set to meet special requirements, it being understood, of course, that any variation, however slight, in the position of this head will accordingly vary the position of the sheet to be acted upon by the folding-blade.

The gage or stop *L'* on the feed-board is adjustable, it being set or adjusted in respect to the guide-head in such manner that the sheets will be disposed in the path of the head.

Although I have herein specifically described what I believe to be the best and most practicable form of my invention, yet I do not restrict myself thereto, as changes within the spirit of the invention will readily suggest themselves to the mechanic; nor do I limit myself to its use in conjunction with a paper-folder, as with slight variation within the range of mechanical skill the invention may be advantageously applied to other machines which are adapted to act upon sheets of paper. I may say in this connection that in certain claims following I have mentioned the device upon which the guide-head is supported as a "rock-arm," but of course any other suitable means to the same end will be considered to be the equivalent of the rock-arm.

Having thus described my invention, I claim—

1. In a paper-folding machine, the combination with the sheet-carrying tapes, the folding-rollers, and the folding-blade, of a guide-head adjacent to the folding-blade, a coacting clamp device therefor, means for laterally reciprocating the head and clamp device in the path traversed by the edge of the sheet as it is fed to the machine, means to close the clamp during the inward movement of the head and maintain it closed until the head is retracted, and means whereby the folding-blade in its descent opens the clamp, substantially as described.

2. The combination with the rock-arm, the shaft and the cam thereon adapted to operate said arm, of the guide-head supported upon said arm, the spring-controlled toggle mechanism arranged with close relation to said guide-head, and provided with the clamping-jaw adapted to operate upon the latter, and with the friction-roller disposed in the path of a vibrating arm, together with a trip-bar mounted in the path of the toggle-joint, substantially as described.

3. The combination with the rock-arm, the shaft and the cam thereon adapted to operate said arm, of the bracket supported upon the latter, the flaring guide-head upon said bracket, the clamping-lever, the spring-controlled rod pivotally connected therewith, the pivoted cylinder within which said rod is guided, and the friction-roller upon said lever, together with the vibrating arm and the fixed trip-lever, substantially as described.

In testimony whereof I have hereunto affixed my signature this 3d day of August, A.D. 1891.

HOWARD K. KING.

Witnesses:

JOHN N. COBB,
E. C. WALTON.