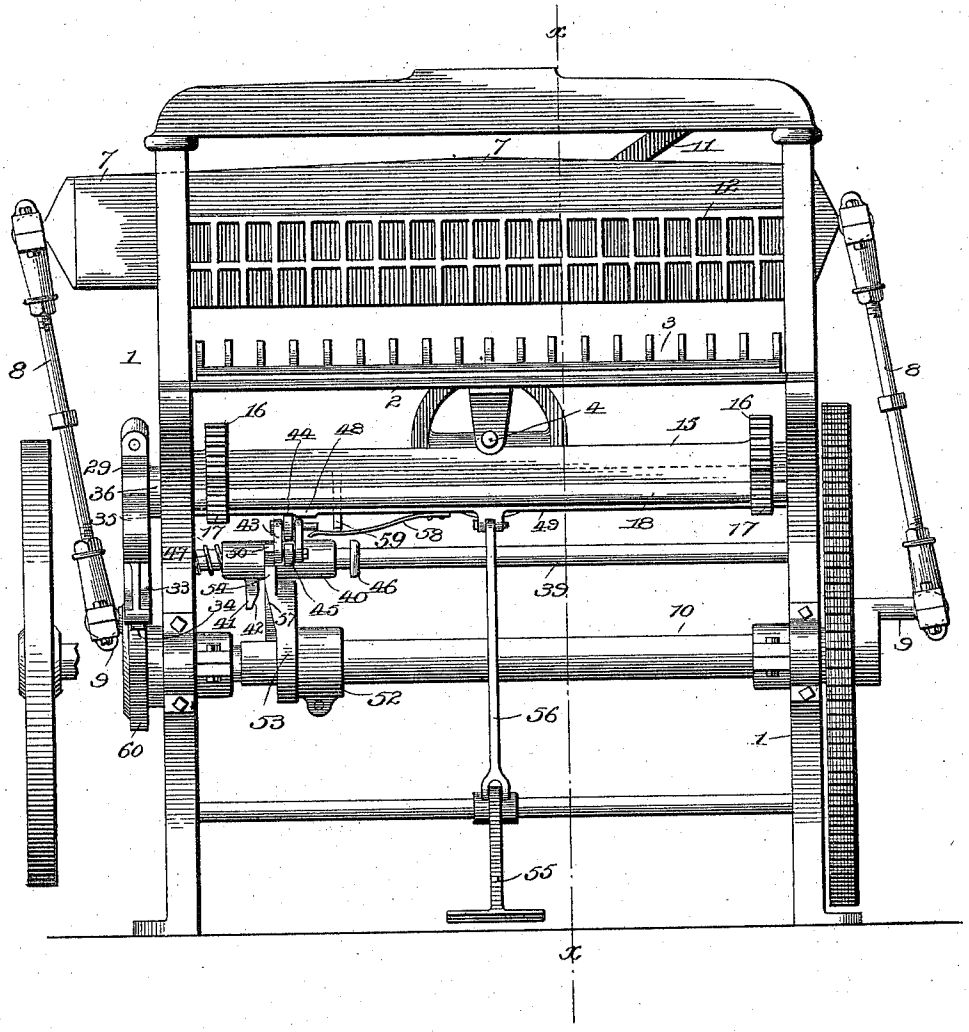
(No Model.) 4 Sheets—Sheet 1.

E. J. ARMSTRONG.

PAPER CUTTING MACHINE.

No. 575,291. Patented Jan. 12, 1897.

Fig. 1.



WITNESSES:

Harry D. Robinson
J. F. Beale

INVENTOR

Edwin J. Armstrong,
BY
W. A. Redmond
ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

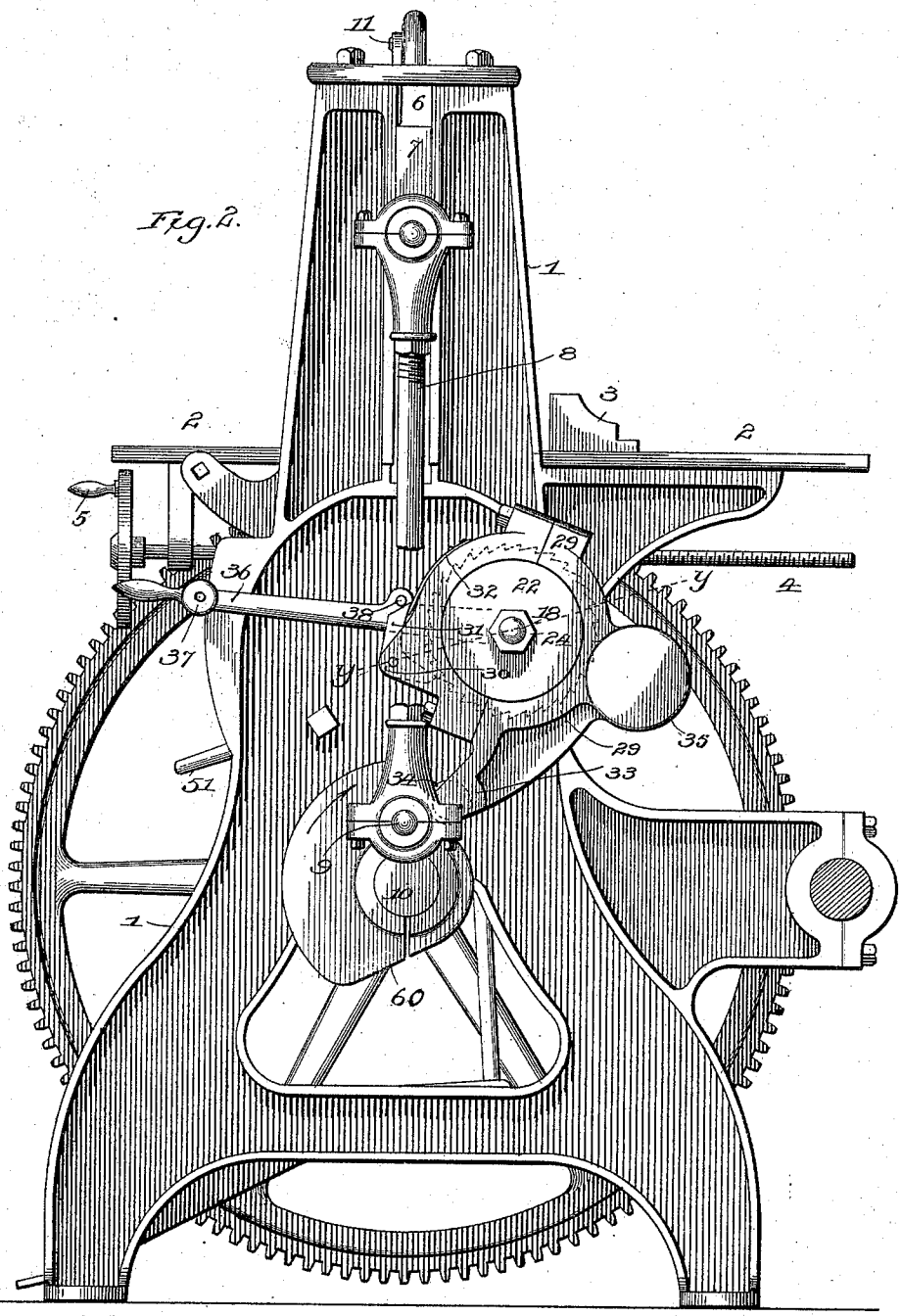
4 Sheets—Sheet 2.

E. J. ARMSTRONG.

PAPER CUTTING MACHINE.

No. 575,291. Patented Jan. 12, 1897.

Fig. 2.



WITNESSES:

Harry E. Robur.

J. F. Beale.

INVENTOR

Edwin J. Armstrong,

BY

W. A. Redmond

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

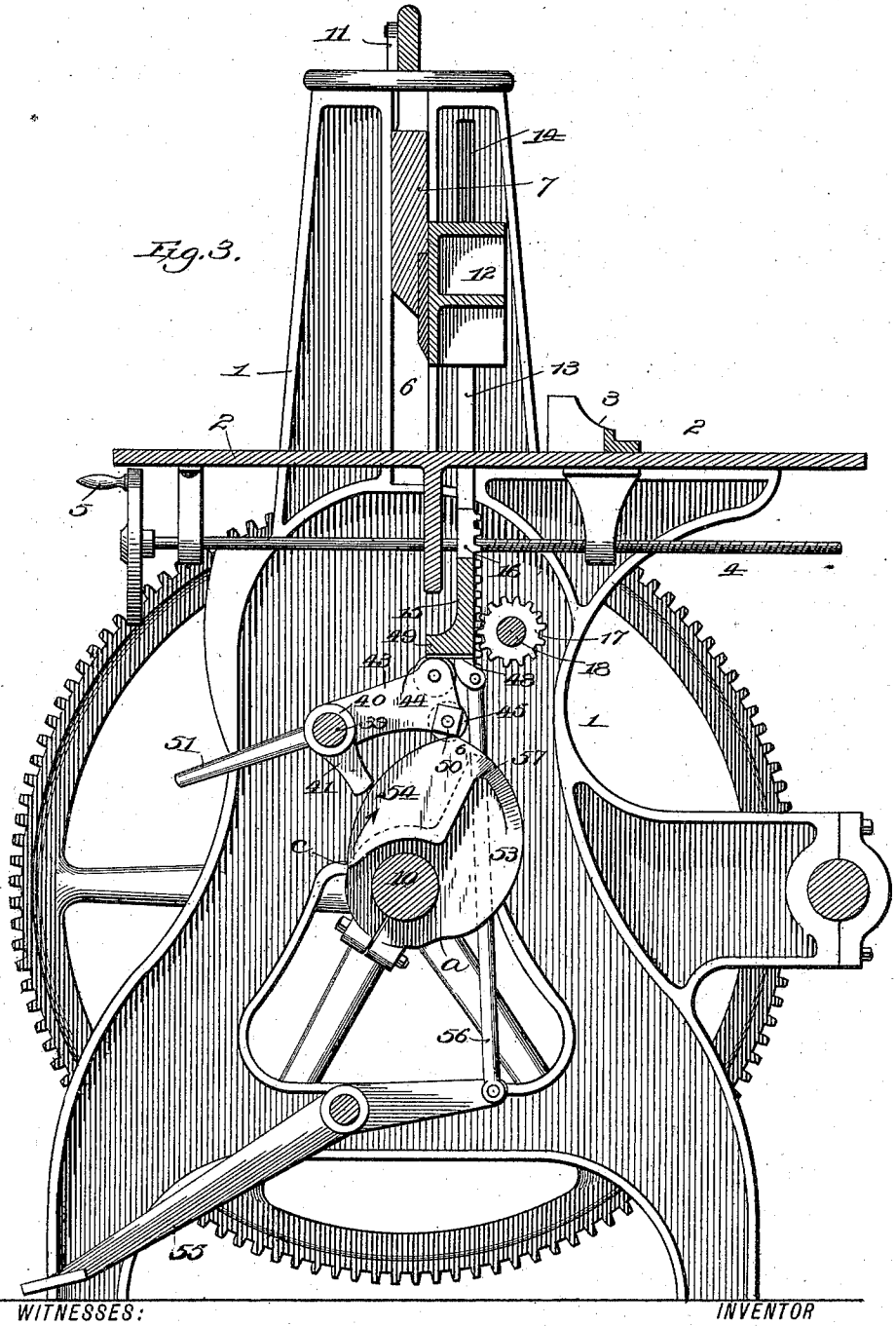
(No Model.) 4 Sheets—Sheet 3.

E. J. ARMSTRONG.

PAPER CUTTING MACHINE.

No. 575,291. Patented Jan. 12, 1897.

Fig. 3.



WITNESSES:

Harry E. Robins.

J. F. Beale.

INVENTOR

Edwin J. Armstrong,

BY

W. A. Redmond

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

4 Sheets—Sheet 4.

E. J. ARMSTRONG.

PAPER CUTTING MACHINE.

No. 575,291. Patented Jan. 12, 1897.

Fig. 4.

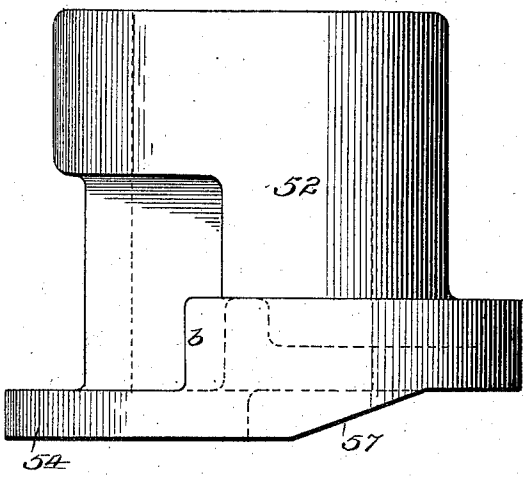


Fig. 5.

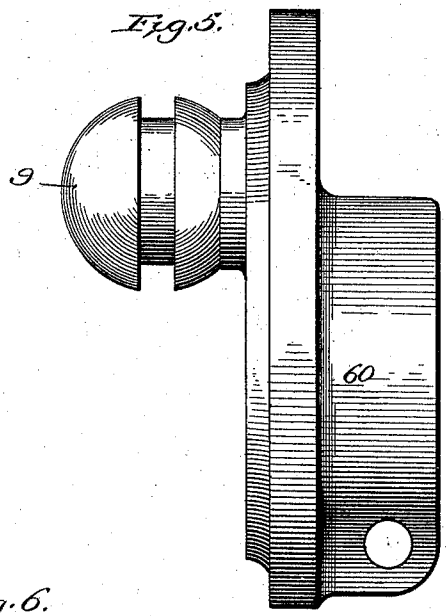
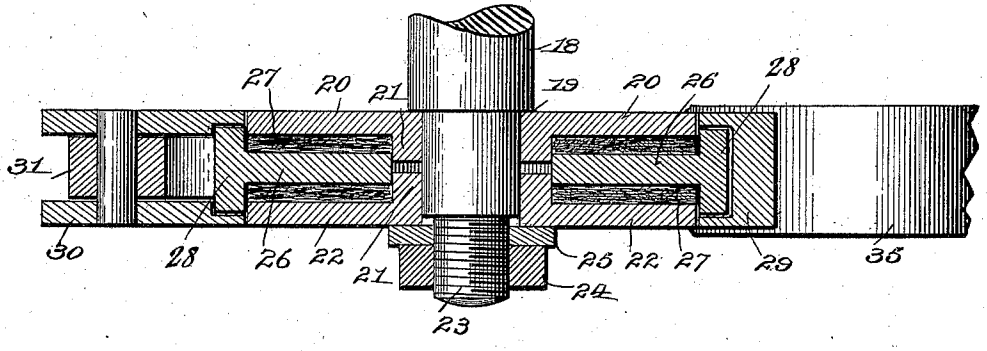


Fig. 6.



WITNESSES:

Harry B. Ashmun

J. F. Beale

INVENTOR

Edwin J. Armstrong.

BY

W. A. Redmond

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWIN J. ARMSTRONG, OF OSWEGO, NEW YORK, ASSIGNOR TO THE OSWEGO MACHINE WORKS, OF SAME PLACE.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 575,291, dated January 12, 1897.

Application filed November 13, 1895. Serial No. 568,747. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. ARMSTRONG, a citizen of the United States, residing at Oswego, in the county of Oswego and State of New York, have invented certain new and useful Improvements in Paper-Cutting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates generally to paper-cutting machines, and particularly to the clamping devices thereof; and it has for its object to provide means for automatically lowering the clamp to the paper to be cut and to provide means for automatically applying pressure to said clamp after it has been lowered to the paper, which pressure is maintained till the paper is severed and then automatically released, and also to provide means whereby the clamp-lifting devices may be disengaged automatically therefrom and the clamp manually operated to lower the same; and it consists in the parts and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a rear elevation of paper-cutting machine embodying my invention; Fig. 2, an end elevation of the same; Fig. 3, a transverse vertical section on the line *x x*, Fig. 1; Fig. 4, a detail view of one of the operating-cams; Fig. 5, a detail view of the other cam; and Fig. 6, a detail horizontal section on the line *y y*, Fig. 2.

Similar letters and numerals indicate similar parts throughout all the views.

As this invention relates specifically to the clamping mechanism of paper-cutting machines and is applicable generally to that type of such machines which operate to cause a draw or oblique cutting action of the knife only such parts of the cutting and driving mechanism of such machines as is necessary to render clear the construction and operation of my invention will be illustrated in the drawings and hereinafter described.

Referring to the drawings, the numeral 1 indicates the frame of the machine, and 2 the horizontal bed thereof, on which the paper is placed to be cut. On the bed a gage 3, operated from the front of the machine by a screw-shaft 4 and crank-handle 5, is arranged in the usual or any desired manner. The end pieces of the frame are formed with slots 6, through which the ends of the knife-stock 7 extend for connection with the pitman-rods 8, which, through their connection with the cranks 9 at the ends of a shaft 10, having its bearings in the frame, operate to impart a vertical movement to the knife, to which at the same time an oblique movement is imparted by a toggle or swinging arm 11, having one end pivotally attached to the side of the head or cross-piece of the frame near one end thereof and the other end to the knife-stock at or near its center. Thus the compound downward and longitudinal motion imparted to the knife-stock by the means described insures the gliding cut essential to the perfect working of a machine of this character.

The presser-bar or clamp 12 is secured at each end to bars 13, which work in grooves 14, formed in the adjacent faces of the end pieces of the frame, and said bars 13 are connected at their lower ends by a bar 15, to which is secured the racks 16, which engage the pinions 17, mounted on a shaft 18, having its bearings in the end pieces of the frame, and at one end extends through one of said end pieces.

The projecting end of the shaft 18 is reduced, as shown in Fig. 6, so as to provide a shoulder 19 thereon, against which a disk 20, keyed on the reduced portion of the said shaft 18, abuts. The disk 20 is formed with a short hub 21 on one side, and a similar disk 22 is also keyed on said shaft 18, with its hub projecting inwardly. The shaft 18 is preferably further reduced, as at 23, and screw-threaded to receive thereon a nut 24, between which and the disk 22 a collar 25 is arranged.

Between the disks 20 and 22 a ratchet-wheel 26 is arranged on the hubs 21, and between the adjacent faces of the disks and the body of the ratchet-wheel washers 27, of some suitable frictional material, such as, for instance, vulcanized fiber, are arranged. Thus it will be observed that the tightening of the nut 24 will force the disk 22 along the shaft toward disk 20, and thus clamp the ratchet-wheel 26 between the washers 27. The use of

the washers 27 is desirable, but is not necessary to the operation of the device, as it is evident the ratchet-wheel might be held between the disks without the interposition of the washers by leaving off the hubs of the disks.

The periphery of the wheel 26 is enlarged or flanged, as at 28, so as to extend partly over the peripheries of the disks 20 22, and over the whole a casing 29 is arranged. The casing 29 is made in two parts and bolted together, and an opening is formed therein between two projecting lugs 30, which are cast on said casing and between which is pivoted a dog 31, the toothed end of which extends into said opening and is forced to normally engage the teeth of ratchet-wheel 26 by a spring 32, having one end secured to the casing and the other pressing on the outer or free end of the dog. The casing is also formed with a downwardly and forwardly extending lug 33, in which is journaled a friction-roller 34, and at the rear side of the casing a weight 35 is attached or formed in any desired manner for a purpose to be described.

An arm 36 is adjustably secured or clamped to the edge of one of the end pieces of the frame by means of a bent bolt engaging the end piece and passing through the arm and fastened or secured by a milled nut 37, run thereon. The inner end of the arm 36 is loosely mounted on the shaft 18 between the disk 20 and the end piece of the frame, and a pin 38 projects laterally therefrom in position to be engaged or struck by the free end of the dog 31 for a purpose to be described.

At a suitable point below the shaft 18, but not in the same vertical plane, the shaft 10 is journaled, and on this latter shaft a peculiarly-formed cam is securely mounted, which is adapted to engage and swing or vibrate a rocker-arm whose hub is loosely mounted on a horizontal rod 39, secured in the end pieces of the frame. The rocker-arm consists of a hub 40, from which extends the projection 41, the end of which is beveled, as at 42, and the lugs 43, projecting rearwardly from said hub at an acute angle to said projection 41 and having journaled between them the rollers 44 and 45.

A collar 46 is secured on the rod 39 to limit the longitudinal movement thereon of the rocker-arm, and a spring 47 is arranged on said rod, so as to normally force the rocker-arm toward said collar 46, but which movement is prevented by a stop 48, cast or formed on the horizontal flange 49 of the cross-bar 15 of the presser-bar or clamp, against which the side of the roller 44 abuts, and also by the frictional contact between the square head 50 of the bolt on which the lower roller 45 is journaled and the cam caused by the weight of the clamp, which rests on the roller 44. The cam engages the bolt-head 50 during its throw in order to impart a swinging movement to the rocker-arm, and thereby, through the roller 44, which is in engagement with the horizontal flange 49 of the bar 15, lifts or raises the presser-bar or clamp off the paper after the knife has severed the same. When the clamp has been thus raised to the position shown in Fig. 1, the projection 41 stands clear of the cam, thus permitting the spring 47 to move the rocker-arm longitudinally on its shaft or rod 39, when the clamp is further raised, by means hereinafter described, so as to carry the stop 48 out of the path of the roller 44.

A handle 51 is attached to or formed on the hub of the rocker-arm, whereby the latter may be moved on the rod 39, when desired. The cam for operating the rocker-arm is formed with a hub 52 and is split, so as to be easily bolted on the shaft 10. The disk 53 of the cam is eccentric in shape and at the beginning of its upward movement engages the roller 45 at the point *a*, Fig. 3, and remains in engagement therewith, lifting or raising the same to the point *b*, at which latter point the cam is cut away on one side from its periphery toward its hub, as indicated in dotted lines, Fig. 3, and the roller leaves the cam as the projecting edge 54 of the cam engages the bolt-head 50. The operation of the machine stops automatically (as is common in all machines of this type when the clamp is raised) when the roller 45 passes off the cam and the latter engages the square bolt-head 50, which latter supports the clamp in its elevated position. Upon starting the machine again the bolt-head 50 rides on the edge of the cam till the point *c* is reached in the throw of the cam, thus gradually and automatically lowering the clamp to the paper.

If it is desired to lower the clamp to the paper before starting the machine, it may be done by means of a treadle 55, which is pivoted to a bar secured in the frame and the short arm of which is connected to a rod 56, which is connected to the cross-bar 15 of the presser-bar or clamp. Upon pressing down the long arm of the treadle the presser-bar or clamp is raised and the stop 48 disengaged from the roller 44, thus permitting the spring 47 to move the rocker-arm out of engagement with the cam and permitting the clamp to be lowered to any desired position by the treadle.

The longitudinal movement of the rocker-arm, caused by the spring 47, carries the projection 41 into the path of the inclined portion 57 of the cam, so that the beveled end 42 of said projection may be engaged thereby to move the rocker-arm back to its normal position on its rod 39 and during the same revolution of the cam raise the clamp to its upper or raised position.

In order to support the rocker-arm in the proper position when disengaged from the cam, I attach a flat spring 58 at one end to the cross-bar 15 of the clamp, so that its free end may extend under and in contact with the elongated bolt on which roller 44 is journaled, and to a stationary part of the machine I secure a short bar 59, which extends to and in line with said spring, whereby it is pre-

vented rising with the clamp when the latter is raised by the treadle.

The crank 9 at the end of the shaft 10 is carried by a cam 60, the periphery of which engages the roller 34, carried by the lug 33 of the casing 29, said roller, when the clamp is in its raised position, occupying a depression in the edge of the cam, as shown in Fig. 2.

With the parts in the position described the revolution of the cam will throw or move the lug 33, and of course the casing 29, outward or toward the rear. The dog 31, being pivoted in the lug 30 of the casing and held in engagement with the ratchet-wheel 26 by the spring 32, moves with said casing, and, through the frictional contact of said wheel therewith, the disks 20 22 are moved, thereby rotating shaft 18. The pinions 17 on said shaft operate through the rack-bars 16 to tighten or press the clamp down on the paper till the pressure thereof is sufficiently great to overcome the frictional contact between the disks and wheel 26, when the latter, owing to its connection through the dog with the casing, will slip or rotate between the disks during the further outward or rearward movement of the casing and hold the clamp on the paper with the greatest pressure obtainable, that is, with the pressure which was sufficient to overcome the frictional contact of the disks on the wheel. The frictional contact of the disks and wheel are maintained during the slipping of the wheel, but the shaft 18 is not carried or rotated therewith, and the clamp is, through said frictional contact, prevented raising or its pressure on the paper being reduced till the knife has severed the paper, the parts being so timed that when this occurs the roller 34 enters upon the inclined edge 62 of the cam, and the casing is swung back gradually to its starting position by the weight 35. The casing is loosely mounted over the disks, and as soon as the cam 62 releases the same the weight 35 at once brings it back to starting position, the dog 31 slipping over the ratchet-teeth until the dog strikes the pin 38, which limits its movement and disengages the dog from the ratchet-wheel. The parts are so timed that when the dog is disengaged the cam 53 on shaft 10 engages the rocker-arm and lifts the clamp. The disks and ratchet-wheel revolve freely in the casing with shaft 18, which is revolved through the racks 16 during this movement of the clamp, as well as when the clamp is being lowered to the paper, but when the clamp reaches the paper the cam 62 engages the roller 34 of the casing and swings the latter backwardly, and the dog engages the ratchet-wheel and through the disks further rotates the shaft 18, which, through pinions 17 and racks 16, draw the clamp down on the paper until the resistance thereof is sufficient to overcome the frictional contact between the disks and the ratchet-wheel, when the latter will continue to rotate, slipping between the disks, but the movement of shaft 18 will cease.

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

1. The combination, in a paper-cutting machine, of a presser-bar or clamp, means for automatically lowering said clamp to the paper, a shaft provided with means for engaging said clamp, said shaft being independent of said lowering means, a friction device, consisting of disks and a ratchet-wheel, mounted on said shaft, mechanism adapted to impart motion to said friction device after the clamp has reached the paper, a cam for imparting motion to said mechanism in one direction, and means for returning said mechanism to its normal position, substantially as described.

2. The combination, in a paper-cutting machine, of a presser-bar or clamp, means for supporting said clamp in its raised position and adapted to permit the same to gravitate to the paper, a shaft, independent of said supporting means, connected to said clamp, and a friction device, consisting of disks and a ratchet-wheel, mounted on said shaft, for imparting motion to said shaft after the clamp has reached the paper, substantially as described.

3. The combination, in a paper-cutting machine, of a presser-bar or clamp, a shaft provided with means for operating said shaft after it has reached the paper, disks keyed to said shaft, a ratchet-wheel frictionally held between said disks, a dog engaging said ratchet-wheel, means for imparting motion to said dog whereby said shaft may be revolved, and means for automatically returning said dog and disengaging it from the ratchet-wheel, substantially as described.

4. The combination, with the presser-bar or clamp of a paper-cutting machine, of the shaft, disks keyed to said shaft, a ratchet-wheel frictionally held between said disks, a dog for engaging said wheel, a cam for vibrating said dog in one direction, a weight for returning said dog to its starting position, and means for disengaging said dog from said wheel, substantially as described.

5. The combination, with the presser-bar or clamp of a paper-cutting machine, of a lifting-cam, a connecting device interposed between said cam and clamp adapted to elevate the clamp, and means for automatically moving said device out of engagement with said cam, substantially as described.

6. The combination, with the presser-bar or clamp of a paper-cutting machine, of a rocker-arm, a cam for rocking said arm, and means for automatically shifting said rocker-arm to disengage it from said clamp, substantially as described.

7. The combination, with the presser-bar or clamp of a paper-cutting machine, of a rocker-arm normally engaging said clamp, a cam engaging said rocker-arm, means for raising said

clamp out of engagement with said rocker-arm, and means for shifting said rocker-arm bodily out of engagement with said cam upon the release of said rocker-arm from said clamp, whereby the clamp may be moved vertically independently of said rocker-arm, substantially as described.

8. The combination, with the presser-bar or clamp of a paper-cutting machine, of a shaft for applying pressure to said clamp, disks keyed to said shaft, a ratchet-wheel frictionally held by said disks, a case surrounding said wheel and disks, a dog carried by said case for engaging said wheel, a stop for disengaging said dog, and a cam for imparting vibratory movement to said case, substantially as described.

9. The combination, with the presser-bar or clamp of a longitudinally-movable rocker-arm for lifting said clamp, a cam for rocking said rocker-arm, and means for raising and lowering said clamp independent of said rocker-arm, substantially as described.

10. The combination, with the presser-bar or clamp of a paper-cutting machine, of a rocker-arm normally engaging said clamp, a cam normally engaging said rocker-arm, means for automatically shifting said rocker-arm out of engagement with the clamp, and means for automatically shifting said rocker-arm into engagement with the clamp, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN J. ARMSTRONG.

Witnesses:
S. J. HARRIS,
T. L. BRADFORD.