April 15, 1930. J. E. JOHNSON 1,754,362

PAPER CUTTING DEVICE

Filed Jan. 24, 1923 3 Sheets-Sheet 1

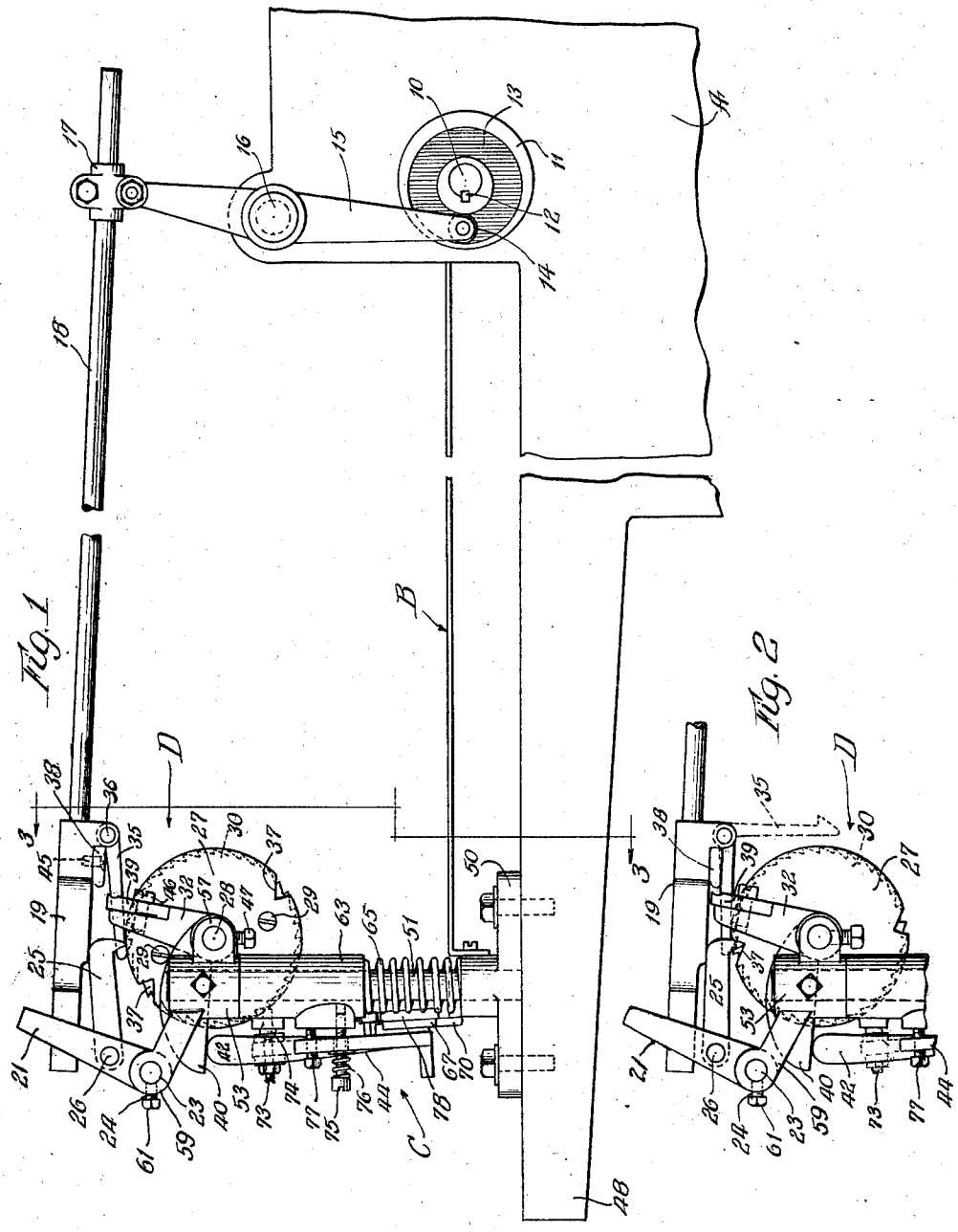


Fig. 1

Fig. 2

Witness:
P. S. Haselton

Inventor:
John E. Johnson

By: Jones, Addington, Ames & Seibold
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PAPER CUTTING DEVICE

Filed Jan. 24, 1923 3 Sheets-Sheet 2

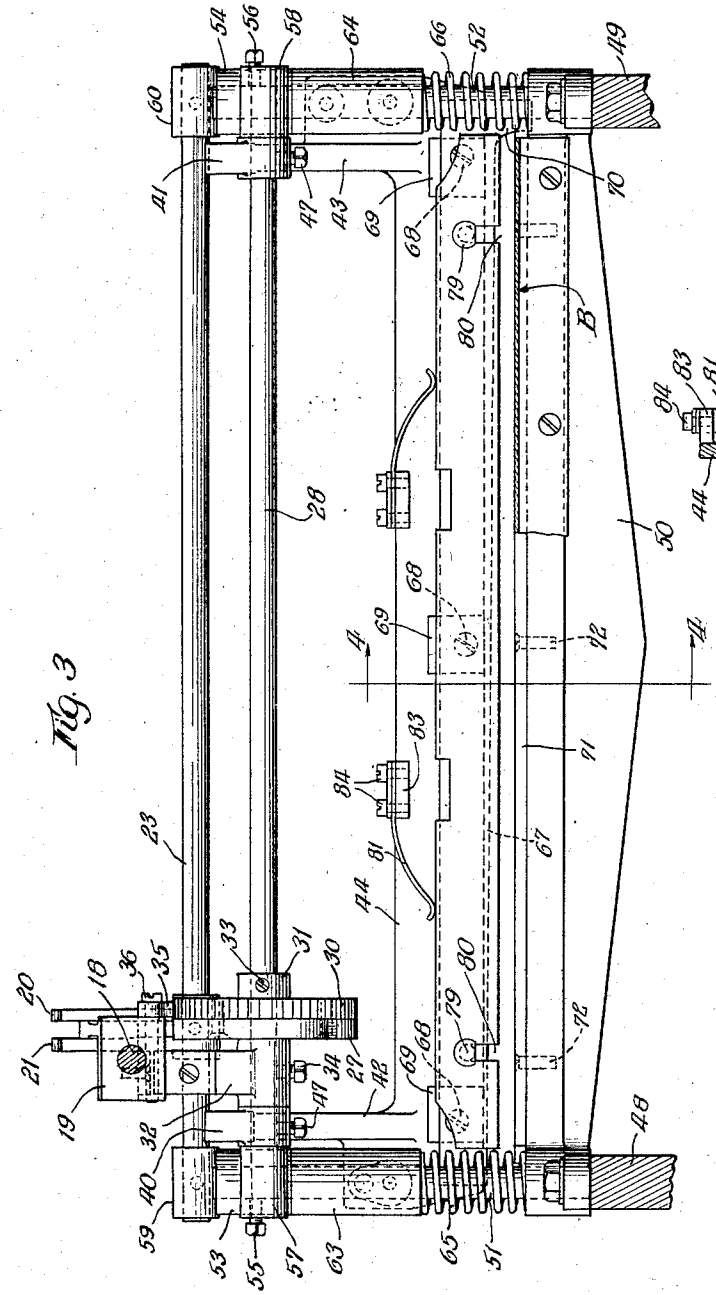


Fig. 3

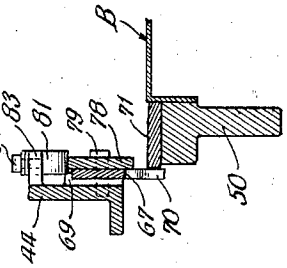


Fig. 4

Witness:
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PAPER CUTTING DEVICE

Filed Jan. 24, 1923 3 Sheets-Sheet 3

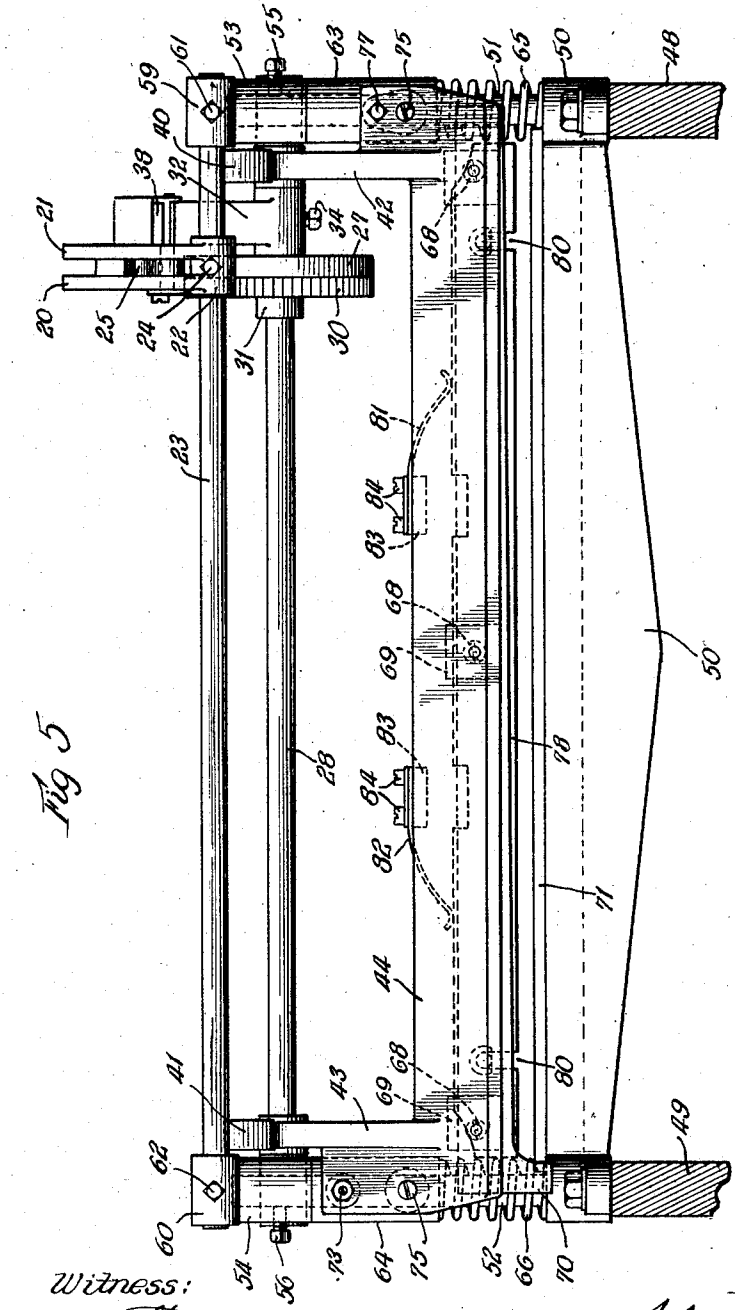


Fig 5

Witness:
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Patented Apr. 15, 1930 1,754,362

UNITED STATES PATENT OFFICE

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PAPER-CUTTING DEVICE

Application filed January 24, 1923. Serial No. 614,509.

The subject matter of this invention relates to paper cutting devices and more particularly to devices for automatically cutting paper or similar material which is supplied in a continuous band, into short lengths.

One of the objects of this invention is to provide an automatically operated mechanism for cutting into separate sheets, the product of such mechanisms as wrapper machines, label machines or other machines that produce their product from a continuous strip of paper or other material.

Another object of this invention is to provide an automatically operated cutting mechanism of the above indicated character which may be adjusted to cut the paper into any desired predetermined lengths.

A further object is to provide such a machine which may be operated by and in connection with a printing machine and which may be adjusted to cut the product of the printing machine into short lengths at various rates of speed in respect to the operating speed of the printing machine.

A further object is to provide a machine of the above indicated character which will produce a straight clean cut in the paper stock, and which will be simple in construction and dependable in operation.

Further objects will appear upon reference to the following specification and appended claims, together with the accompanying drawings in which—

Figure 1 is a side elevation view of a form of the invention showing a method of operating the device from a rotating shaft of the machine in connection with which it is used;

Fig. 2 is a side elevation of a portion of Fig. 1, showing the mechanism in a changed position;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 shows a vertical cross section taken on the line 4—4 of Fig. 3; and,

Fig. 5 is a front elevation view of the device.

A preferred form of the invention as shown in the drawings includes a printing machine —A— in connection with which the device is used, a paper stock guide —B— over which the paper to be cut is fed to knife mechanism —C—. The mechanism —C— is actuated by the ratchet and pawl mechanism —D—.

The machine —A— may be of any usual and suitable type of printing machine having among its operating parts a constantly rotating shaft 10 journaled in the side frames of the machine and having a cam 11 fixed thereto by a key 12.

The cam 11 may be formed in the shape of a circular disc having an eccentrically disposed annular slot 13 therein for engaging a roller 14, which is in turn rotatably mounted at the lower end of a lever 15. The lever 15 may be pivotally mounted at 16 to the frame of the machine —A— and is also pivotally connected at its upper end to a sleeve 17 which surrounds and is fixed to a connecting rod 18. The connecting rod 18 serves to transmit power from the machine —A— to the cutting device and as will readily be understood is given a reciprocating motion by the action of the cam 11.

Attached to the end of the rod 18 is a bracket 19 which slides back and forth between guide fingers 20 and 21 formed on a bracket 22 which is fixed to a cross rod 23 by a set screw 24. The bracket 19 is supported between the fingers 20 and 21 upon a pawl 25 which is pivoted at 26 to the fingers 20 and 21. The pawl 25 normally rests upon the periphery of a disc 27. The disc 27 is mounted to freely rotate upon a shaft 28 and is fixed by screws 29 to a ratchet disc 30 which is also rotatably mounted upon the shaft 28. The discs 27 and 30 are retained in their proper position along the shaft 28 between a collar 31 and the hub of a cam lever 32 to be hereinafter described. The collar 31 and the cam lever 32 are fixed on the shaft 28 by set screws 33 and 34, respectively.

A pawl 35 may be pivoted at 36 to the bracket 19 and engages and revolves the ratchet disc 30 by an amount equivalent to the spacing of two teeth with each reciprocation of the connecting rod 18. The attached disc 27 consequently is revolved also. The disc 27 is provided with a plurality of spaced notches 37 at its periphery, each of which when turned to a position under the

pawl 25 permits the pawl to drop a short distance. The bracket 19 which rests upon the pawl 25 is consequently also lowered. The bracket 19 has secured to its under side a block 38 which upon the lowering of the bracket 19 makes contact with an end piece 39 fixed to the cam lever 32.

When the connecting rod 18 is reciprocated and travels to the left, (in Fig. 1), the block 38 pushing against the end piece 39 serves to turn the cam lever 32 and the shaft 28 a small amount. The shaft 28 has fixed thereto a pair of cutter depression levers 40 and 41, which turn with the shaft and press downwardly on lugs 42 and 43 formed upon a knife bracket 44.

It will be noted that as shown, the block 38 and the end piece 39 are fixed in position by screws 45 and 46, respectively, and hence may be replaced if they become worn after long use.

The disc 27 may be provided with two or more notches 37, depending upon the frequency with which it is desired to operate the cutter. This disc may also be removed if desired and replaced by another having a different number of notches providing for cutting a different length of paper units.

The relative angular positions of the cam lever 32 and of the cutter depression levers 40 and 41 upon the shaft 28 may be adjusted by loosening the set screws 34 and 47, respectively, in order to actuate the knife bracket 44 with the proper length of stroke.

The machine —A— may be provided with side frames having extensions 48 and 49 upon which a base member 50 is mounted. The base member 50 has fixed therein at its ends a pair of upright posts 51 and 52. The upper ends of these posts serve to support a pair of brackets 53 and 54 fixed thereto respectively, by set screws 55 and 56. The brackets 53 and 54 are provided with bearings 57 and 58, respectively, for the shaft 28 and with lugs 59 and 60, respectively, for supporting the cross rod 23, the rod being fixed in these lugs by set screws 61 and 62, respectively. By loosening the set screws 55 and 56 above described, the entire operating mechanism may be adjusted to the desired height upon the upright posts 51 and 52.

The knife bracket 44 may be adjustably mounted upon sliding blocks 63 and 64, which slide upon the posts 51 and 52, respectively, and are normally retained in the up position as shown by coil springs 65 and 66, which surround the posts 51 and 52, respectively. The springs 65 and 66 are interposed between the lower ends of the blocks 63 and 64 and the base member 50.

As best shown in Figs. 3 and 4, a knife blade 67 is mounted upon the knife bracket 44 by screws 68. The raised portions or bosses 69 formed on the knife bracket 44 provide accurate and rigid bearing surfaces for the knife blade 67 upon the surface of the knife bracket 44. The knife blade 67 is provided at one end with an extension 70 which serves to always lap over the edge of a fixed blade 71, which is attached to the base member 50 by screws 72. The extension 70 prevents the possibility of jamming between the moving knife blade 67 and the fixed blade 71. It will be noted that the blade 67 is tapered slightly or inclined upwardly from the extension 70 in order to obtain a shearing effect.

In the mounting of the knife bracket 44 upon the blocks 63 and 64, the screw 73 provides a locating means for adjusting the relative positions of the fixed and moving blades. The screw 73 engages the block 64 by a ball and socket seat at 74, as shown in Fig. 1. Screws 75 surrounded by coil springs 76 serve to press the knife blade into cutting engagement with the fixed blade 71 while a screw 77 provides a fulcrum point upon the block 63 and should be adjusted to correspond with the adjustment of the screw 73.

The paper to be cut is fed from the machine —A— over the guide plate —B— and the fixed blade 71 and under the sliding knife blade 67.

In order to insure a clean, straight cut, the paper is held stationary while the actual cutting takes place by means of a bar 78 which is slidably mounted upon the inner face of the knife blade 67 by pins 79. Slots 80 are provided in the bar 78 which permit the bar to slide upon the pins 79. The bar is normally retained in the position illustrated by a pair of flat springs 81 and 82 fixed to the bracket 44 at lugs 83 by screws 84. As the knife blade 67 is lowered the bar 78 contacts with the paper and presses it firmly into contact with the fixed blade 71, where it is firmly held during the cutting operation by the springs 81 and 82. It will be noted that the slots 80 allow the knife blade 67 to pass on beyond the edge of the fixed blade while the bar 78 is stopped by the fixed blade.

The mechanism thus far described permits actual cutting of the paper only when the pawl 25 is permitted to remain in one of the notches 37 and is advantageously used when a plurality of printed items are desired on each sheet which is cut off. Assuming that the machine —A— prints one item during each reciprocation of the connecting rod 18 then the number of items on each sheet will correspond to the number of teeth on the ratchet disc 30 between each of the notches 37 on the disc 27. As shown, the ratchet disc is formed with thirty six teeth, eighteen between each of the notches 37 on the disc 27. Therefore, each sheet as cut would contain eighteen printed items as produced by the machine —A—. This number may be varied to suit individual requirements by simply altering

the number of teeth on the ratchet or the disc or both.

In order to cut off a sheet for every reciprocation of the rod 18, as is usually required with wrapper or label printing machines, the ratchet disc 30 and disc 27 are revolved until the pawl 25 rests in one of the notches 37, and then the pawl 35 is disengaged from the ratchet disc 30 by being revolved on its pivot at 36 to the position indicated by dotted lines in Fig. 2, thereby permitting the disc 27 to remain stationary and keeping the bracket 19 lowered sufficiently to permit engagement between the block 25 and the end piece 39 with each reciprocation of the rod 18.

Although the use of the invention in connection with the cutting of strips of paper stock has been herein described, it is also understood that the invention is suitable for use in cutting other forms of materials, such for example, as fibres and fabrics in the form of flat strips or otherwise.

While I have described one form of my invention, it is understood that I do not desire to have any limitation imposed thereupon except as specifically set forth in the appended claims, or required by the prior art, since mechanical expedients or equivalents of the various elements may be evolved which come within the scope of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent in the United States is:

1. In a device of the type described, a knife element, mechanism for operating said knife element at predetermined intervals of time comprising a reciprocating member, a shaft, an arm fixed to said shaft, means for supporting and for periodically dropping said reciprocating member into operative engagement with said arm, a pawl and ratchet for operating said means from said reciprocating member and a second arm fixed on said shaft for depressing said knife element.

2. In a device of the type described, a knife element, mechanism for operating said knife element at predetermined intervals of time comprising a reciprocating member, a shaft, an arm fixed to said shaft, means for supporting and for periodically dropping said reciprocating member into operative engagement with said arm, a pawl and ratchet for operating said means from said reciprocating member and a second arm fixed on said shaft for depressing said knife element, said means being adjustable for permitting said reciprocating member to remain in lowered position for engagement with said first named arm at each reciprocation when desired.

3. In a cutting device, a reciprocating member, a shaft, a disc and a ratchet fixed in relation to each other but rotatably mounted on said shaft, a pawl on said reciprocating member for turning said ratchet together with said disc, a second pawl pivotally mounted and resting upon the periphery of said disc, said reciprocating member being supported upon said second pawl, a knife blade, and mechanism for operating said blade, said disc being provided with a plurality of notches at its periphery for receiving said second pawl at intervals and for permitting said reciprocating member to be lowered at intervals into operative engagement with said mechanism.

4. In a cutting device, a reciprocating member, a shaft, a disc and a ratchet fixed in relation to each other but rotatably mounted on said shaft, a pawl on said reciprocating member for turning said ratchet together with said disc, a second pawl pivotally mounted and resting upon the periphery of said disc, said reciprocating member being supported upon said second pawl, a knife blade, and mechanism for operating said blade, said disc being provided with a plurality of notches at its periphery for receiving said second pawl at intervals and for permitting said reciprocating member to be lowered at intervals into operative engagement with said mechanism, said first named pawl being adjustable for disengagement from said ratchet when desired for permitting said reciprocating member to remain in lowered position.

5. In a cutting device, a reciprocating member, a rotatable disc, means operated from said reciprocating member for turning said disc, a pawl riding upon the periphery of said disc, said reciprocating member riding upon said pawl, a knife blade, and mechanism for operating said blade, said disc being provided with a plurality of notches at its periphery for receiving said pawl at intervals and for permitting said reciprocating member to be lowered at intervals into operative engagement with said mechanism.

6. In a paper cutting device, a fixed blade member, a slidable blade having horizontal adjustment with said fixed blade, means for mounting said slidable blade in a manner to slide past the edge of said fixed blade for cutting action therewith, a clamping bar slidably mounted upon and against the surface of said slidable blade, and spring means urging said bar against said fixed blade member during the coaction of said blades for clamping the paper in close proximity of the cutting line.

7. In a cutting device, a base member, a plurality of spaced parallel posts mounted on said member, a knife blade slidably mounted upon said posts, slidably adjustable brackets mounted upon said posts, and means mounted upon said brackets for operating said knife blade.

8. In a cutting device, a base member, a plurality of spaced parallel posts mounted on said member, a knife blade slidably mounted upon said posts, slidably adjustable brackets mounted upon said posts, springs adjacent

each of said posts for urging said blade in one direction, and means mounted upon said brackets for operating said knife blade against the force of said springs.

9. In a cutting device, a base member, a plurality of spaced parallel posts mounted on said member, a knife blade slidably mounted upon said posts, slidably adjustable brackets mounted upon said posts, coiled springs surrounding said posts for normally urging said blade in the direction of said brackets, and means mounted upon said brackets for operating said knife blade against the force of said springs.

10. In a paper cutting device, a knife blade, a knife bracket, a plurality of slidable blocks, means for attaching said bracket to said blocks comprising adjustable screws, coil compression springs surrounding said screws between the heads of said screws and said bracket, and a fulcrum for said bracket adjustably fixed therein and resting against one of said blocks.

11. In a paper cutting device, a knife blade, a knife bracket, a plurality of slidable blocks, yieldable means for attaching said bracket to said blocks, and means comprising a ball and socket seat at one of said blocks for locating said bracket.

12. In a paper cutting device, a fixed blade member, a slidable blade member, means for mounting said slidable blade member to slide past the edge of said fixed blade member for cutting action therewith, a clamping bar slidably mounted upon and against one face of said slidable blade member, means urging said bar against said fixed blade member during the co-action of said blades, an actuating member for the slidable blade member, and means operated by said actuating member for moving said slidable blade member periodically with a predetermined frequency less than that of the frequency of movement of said actuating member.

13. In a paper cutting device, a fixed blade member, a slidable blade, means for mounting said slidable blade in a manner to slide past the edge of said fixed blade for cutting action therewith, a clamping bar slidably mounted upon and against the surface of said slidable blade, spring means urging said bar against said fixed blade member during the co-action of said blades for clamping the paper in close proximity of the cutting line, and spring means for pressing said slidable blade into cutting engagement with said fixed blade.

14. In a paper cutting device, a fixed blade member, a slidable blade, means for mounting said slidable blade in a manner to slide past the edge of said fixed blade for cutting action therewith, a clamping bar slidably mounted upon and against the surface of said slidable blade, and spring means urging said bar against said fixed blade member during the coaction of said blades for clamping the paper in close proximity of the cutting line, said slidable blade having an extension thereon for continuous engagement with the edge of said fixed blade for preventing jamming between said slidable blade and said fixed blade member.

15. In a machine of the character described having a periodically operating actuating member, the combination comprising a sliding knife element, a knife actuator operated by and in synchronism with the periodically operating actuating member for causing said knife to operate with the frequency of said actuating member and means for adjusting said actuator so that said knife will be actuated at a frequency less than that of the actuating member.

16. In a machine of the character described having a periodically operating actuating member, the combination comprising a sliding knife element, a knife actuator operated by and in synchronism with the periodically operating actuating member for causing said knife to operate periodically, and means whereby said actuator may be arranged to that said knife may be operated either at the frequency of said actuating member or at a frequency which is a simple fraction of the frequency of the actuating member.

In witness whereof, I have hereunto subscribed my name.

JOHN E. JOHNSON.