Oct. 16, 1934. A. LUNDQUIST 1,977,283

CUTTING MECHANISM FOR PRINTING MACHINES

Filed June 23, 1931 2 Sheets-Sheet 1

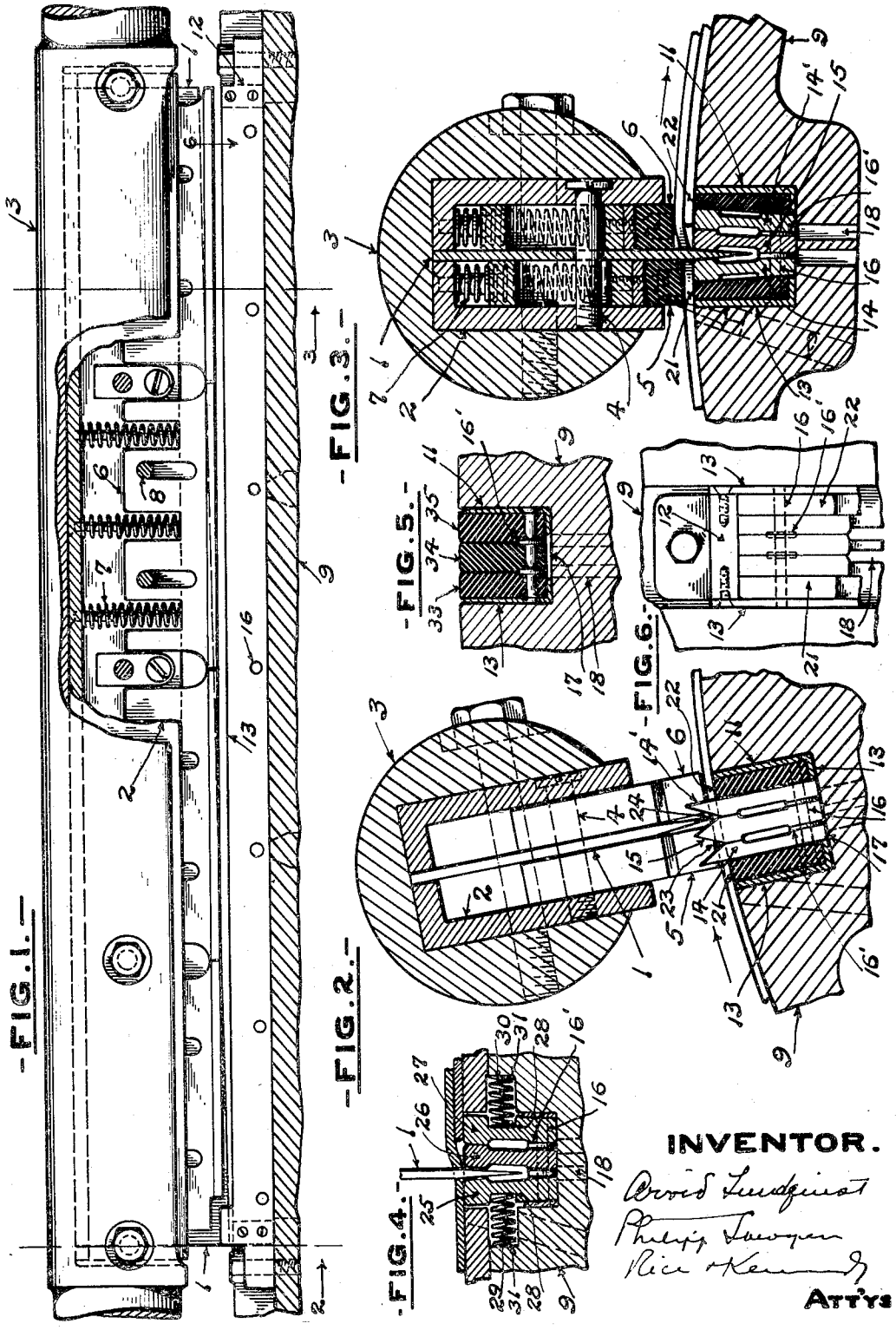


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

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CUTTING MECHANISM FOR PRINTING MACHINES

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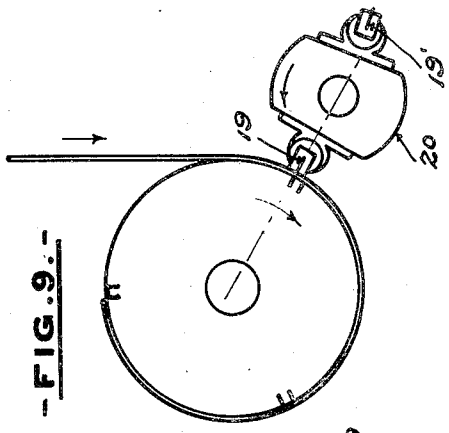


FIG. 9.

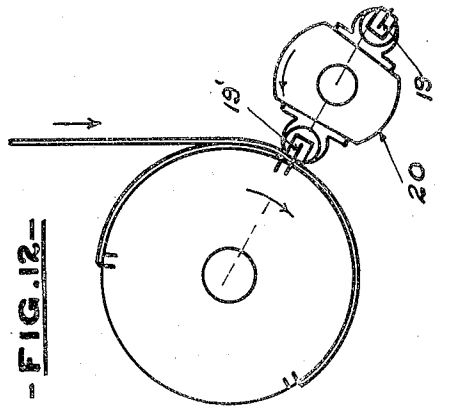


FIG. 12.

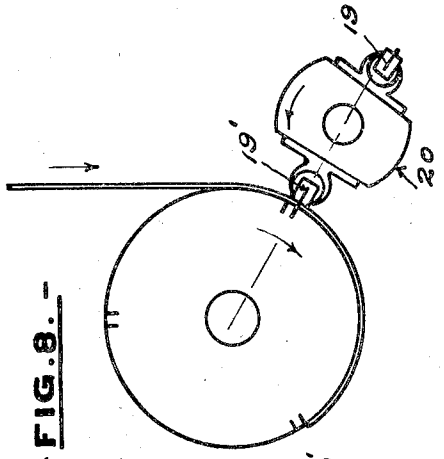


FIG. 8.

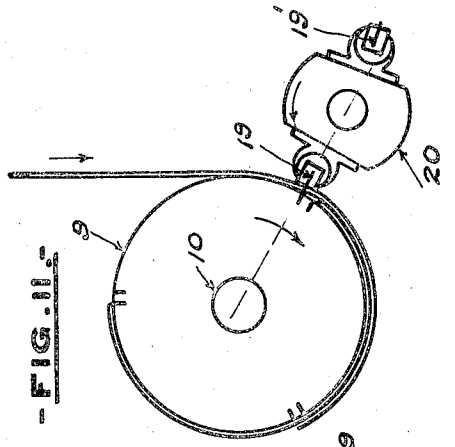


FIG. 11.

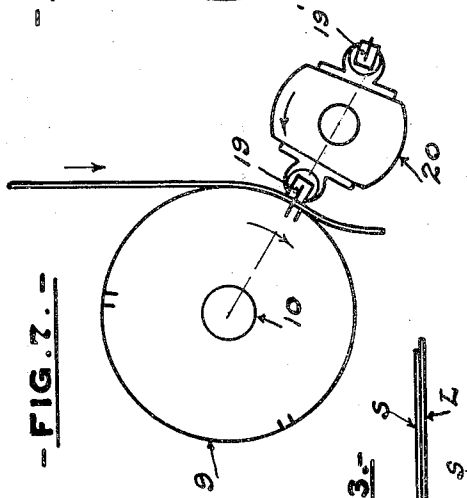


FIG. 7.

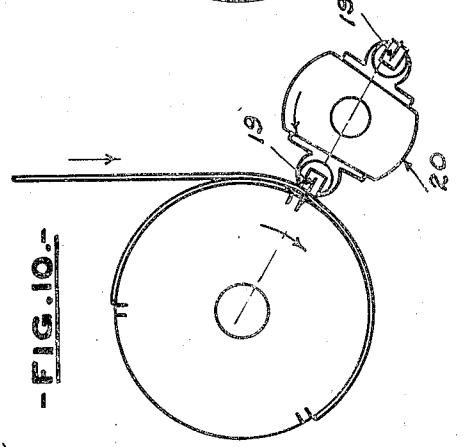


FIG. 10.

FIG. 13.

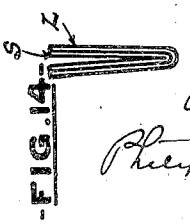


FIG. 14.

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Patented Oct. 16, 1934

1,977,283

UNITED STATES PATENT OFFICE

1,977,283

CUTTING MECHANISM FOR PRINTING MACHINES

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Application June 23, 1931, Serial No. 546,241

9 Claims. (Cl. 164—70)

This invention relates to certain improvements in cutting mechanisms and has been designed particularly for use in cutting associated or thick products in the folder of a printing machine.

In these cutting mechanisms for use with folders, there is provided a cutting knife carrier which cooperates with an abutment, this abutment being usually formed on the folding and collecting cylinder. In the ordinary constructions, these abutments are in the form of boxes or other suitable holders in which is positioned a plug or block of rubber, and the knife in the cutting operation passes through the product and into this rubber abutment. After this has been used for some time, the point at which the knife enters the rubber abutment becomes clogged with paper dust and the like, and the abutment has to be cleaned out or otherwise freed of this undesirable waste material.

Furthermore, in these cutting mechanisms where thick products were to be cut and associated, that is, one thick product associated with another thick product, the two associated products being folded off the folding cylinder, where the products were cut of the same length, the edges of the inner folded product would extend beyond those of the outer product, making a product of undesirable appearance and, furthermore, with such constructions there was apt to be a double cutting of the first product when the second product was associated therewith and then cut, this double cutting producing ribbons of paper which were apt to clog the mechanism and which were objectionable for other reasons.

Furthermore, in some types of cutting mechanism, the knife is given a longer entering or cutting movement into and through the product, so that with the ordinary cutting abutments difficulty has been experienced, in that sufficient room for the knife is not provided. Again, to effect the long and short cut, one cutting knife is spaced slightly less than 180° from the first knife, and this arrangement of knives makes it difficult, if not impossible, to use the ordinary forms of cutting abutment used in ordinary rotary newspaper machines.

A special object of the present invention is to produce an improved cutting abutment for the cutting knives and which will be self cleaning, that is, an abutment so constructed that the action of the cutting knife will push paper dirt, etc. through the abutment so that it can readily be removed from inside the cylinder in any suitable way.

A further object of the invention is to produce a cutting abutment for producing what is known as the long and short cut before referred to, that is, in which long and short products which are to be associated and folded are successively cut so that the edges of the product opposite the fold line are even when the product is folded.

A further object of the invention is to produce an abutment of simple form and of few parts which can readily be assembled and disassembled if required for replacement of parts and repairs.

With these and other objects not specifically referred to in view, the invention consists of certain novel parts, arrangements and combinations which will be described in connection with the accompanying drawings and the novel features pointed out in the claims hereunto annexed.

In these drawings,—

Figure 1 is a longitudinal view, partly broken away and partly in section, of a cutting knife and a cutting knife carrier and cooperating abutment;

Figure 2 is a sectional view showing the cutting knife and one form of cooperating abutment embodying the invention, the view being taken on line 2—2 of Figure 1 looking in the direction of arrow 2 of that figure;

Figure 3 is a similar cross-sectional view showing in detail the mounting of the cutting knife, the view being taken on line 3—3 of Figure 1 in the direction of arrow 3 of that figure;

Figure 4 is a detail sectional view showing a modified form of abutment;

Figure 5 is a detail sectional view showing a still further modification of the cutting abutment;

Figure 6 is a plan view showing the end portion of the cutting abutment as viewed in the direction of arrow 6 of Figure 1;

Figures 7 to 12, inclusive, are diagrammatic views showing the operation of the cutting knife and the various positions assumed by the cutting knives employed when used in making the long and short cut;

Figure 13 is an edge view of a long and short product associated, and

Figure 14 is an edge view showing the associated long and short products folded.

Referring now to these drawings, which illustrate the invention in its preferred form, there is illustrated a cutting knife 1, the cutting edge of which is, as shown, slightly diagonal, this type of knife acting to produce a shear cut. If desired, however, other forms of cutting knives than that shown may be employed. This knife is mounted in a box 2 supported in a rotary cut-

ting knife carrier 3 driven in any suitable manner, not shown. This knife is secured in the box in any convenient manner, as by screw bolts 4, and on each side of the knife are cheeks 5, 6, which are spring-seated on springs 7, so that they can be pushed back to expose the knife as these cheeks come into contact with the product, as shown in Figure 3, a pin and slot arrangement 8 being provided to permit this, this arrangement being an ordinary one, except that the knife is arranged so as to have a longer cutting stroke during the cutting operation than that with cutting mechanisms as ordinarily constructed.

In accordance with the invention, there is provided a new arrangement of a cutting abutment, and an arrangement of cutting knives cooperating with this abutment to produce successive products of different lengths. The particular construction of this abutment may be varied, and several modifications may be employed which embody the invention. The abutment will, however, be self clearing, and will be provided with a plurality of openings for receiving the cutting knives, this being preferably effected by making a multi-part block, the sections of which are resiliently mounted or made of resilient material. This arrangement will accommodate the cutting mechanism used for producing the long and short cut diagrammatically illustrated in Figures 7 to 12. Referring to these figures, two cutting knives 19, 19' are shown supported on a rotary knife carrier 20, this being rotated in any suitable manner, not shown. These knives are arranged in such manner that the knife 19' is spaced from the knife 19 slightly less than 180°. The cut sheets are associated as shown in Figure 13, with the short sheet S above the long sheet L, so that when these sheets are folded off the cylinder the product of Figure 14 is produced.

Referring first to the construction shown in Figure 2, the abutment is carried in a suitable support, such as a collecting cylinder 9 mounted in any suitable way, as on a shaft 10 (Figure 7). This cylinder is provided with a longitudinal recess adapted to receive a cutting abutment holder 11 having end members 12, one of which is shown, and side members 13. The side members are extended partly across the bottom of the holders but an open longitudinal slot is left where they do not meet. The abutment is a multi-part one and comprises three metal strips 14, 14' and 15, which are pierced to receive pins 16, by means of which they are secured to the side members 13. Washers 16' are placed between the metal strips to space them apart, and form vents 17 in alignment with openings 18 through the cylinder wall.

The two outside strips 14 and 14' abut against two resilient strips 21, 22, which in the present instance are made of sponge rubber. The ends of these strips extend slightly above the periphery of the cylinder 9, and the ends of the outside strips 14 and 14' are inwardly beveled toward each other, and the center strip 15 is beveled on each side toward the outer strips. This produces a pair of throats 23, 24, between which the left hand end of the cutting blade shown in Figure 1 is guided into cutting position.

These throats are spaced apart the distance of the difference between the position of the cutting knives on the cutting cylinder, one of the knives 19, 19' entering one of the throats 23, 24, the other knife entering the other throat, thus coming into cutting relation with the collecting cylinder a proper cutting abutment for its reception is provided.

As the cutting knife or blade is forced down between the strips, as shown in Figure 3, the rubber cushions are compressed, forming an opening for the blade. It will be observed that the cutting knife has a long stroke, thus effecting an efficient cutting action, and at the same time clearing the abutment by pushing out any dirt or scraps of paper through the vents 17 and openings 18 into the body of the cylinder, from which they can be removed in any suitable way.

The construction so far described is a thoroughly effective one for its intended purpose, but, of course, capable of various modifications, and two such modifications are shown.

Referring first to Figure 4, three metal abutment strips are shown, marked 25, 26, and 27. The outer strips 25 and 27 are recessed at 28 to form seats for coiled springs 29, 30, the other ends of the springs seating in recesses 31, 32 formed in the cylinder wall. The action of this construction is the same as in Figures 2 and 3, spaces being formed between the center and end strips through which the cutting knife may pass to effect the cut, it being observed, as shown in Figure 4, that the springs 29, 30 may permit the said center and end strips to move or tilt bodily as the knife passes between the center strip and either of the adjacent end strips. This form is also self clearing, as in the construction of Figures 2 and 3, the vents 17 and orifices 18 being provided.

In Figure 5, a further modification is illustrated. In this form the three strips 33, 34, 35 are made of rubber instead of metal, as shown in the preceding forms. These strips in all the forms are separated by washers 16' located below the point of entry of the cutting knife. In this form also the vents 17 are provided so that the knife can clear the abutment.

It will be observed that with the constructions shown and described a simple and efficient self-clearing abutment has been provided which will permit the use of cutting blades coming into cutting position at different points, which cannot be done with the usual cutting abutments as ordinarily constructed, and also provides a self clearing cutting abutment for the cutting knives as ordinarily used on the folders of newspaper presses.

While the invention has been described in its preferred forms, it will be understood that other changes and variations may be made in the construction and arrangement of the parts without departing from the invention as defined in the appended claims.

What I claim is:

1. In a folder, the combination of a cutting knife carrier, a cutting knife carried thereby, and a multi-part cutting block having resilient sides which are arranged to move sidewise or circumferentially of the carrier as the knife enters between them, and a vent through which the knife forces paper dust and the like to keep the block clear.

2. In a folder, the combination of a cutting block having a recess and a plurality of metal strips in the recess, the outer strips being resiliently seated to permit a cutting blade to pass between the strips.

3. In a folder, the combination of a cutting block having a recess and a plurality of metal strips in the recess, and rubber strips engaging

the outer strips to permit a cutting blade to pass between the strips.

4. In a folder, the combination of a cutting knife carrier, two cutting blades mounted thereon, one being slightly less than 180° behind the other to successively cut products of different lengths, a multi-part cutting block having two blade openings, and means for resiliently seating the lateral portions of the block to permit the blades to pass through the openings.

5. In a folder, the combination of a rotary cutting knife carrier, a cutting knife carried thereby, and a multi-part cutting block formed of resiliently pressed members which are arranged to move bodily sidewise or circumferentially of the carrier as the knife enters between them during the cutting operation.

6. In a folder, the combination of a cutting knife carrier, two cutting knives mounted thereon, one being slightly less than 180° behind the other to successively cut long and short sheets, a multi-part cutting block having two spaced blade openings, one for each of the knives, and resilient members forming the sides of the block and arranged to move sidewise or circumferentially of the carrier as the knives enter between them.

7. In a folder, the combination of a cutting block having a recess and a plurality of abutment members yieldingly mounted therein for bodily lateral movement to permit the cutting blade to pass therebetween.

8. In a folder, the combination of a cutting block having a recess and a plurality of abutment members yieldingly mounted therein for bodily lateral movement to permit the cutting blade to pass therebetween, and means coacting with a portion of the cutting blade to separate the abutment members to permit the blade to enter therebetween.

9. In a folder, the combination of a cutting block having a recess and a plurality of abutment members yieldingly mounted therein for bodily lateral movement, guides carried by the abutment members and coacting with a portion of the cutting blade to initially separate the abutment members to permit the blade to enter therebetween, the blade further separating the abutment members as it passes further therebetween.

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