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APPARATUS FOR CUTTING MOVING WEBS

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Fig. 1

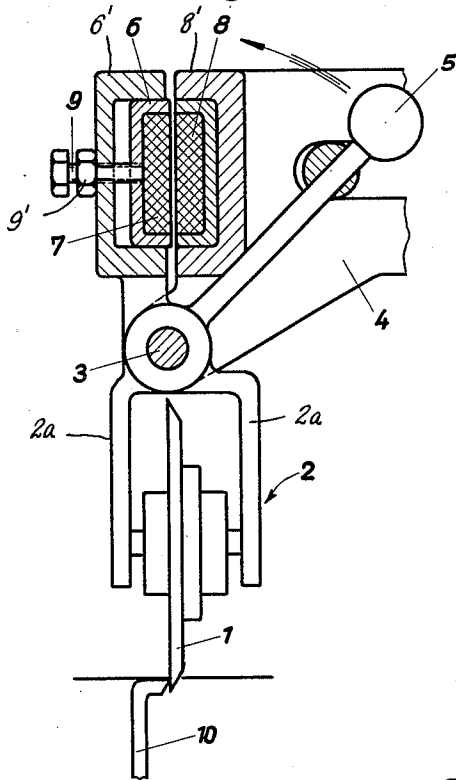


Fig. 2

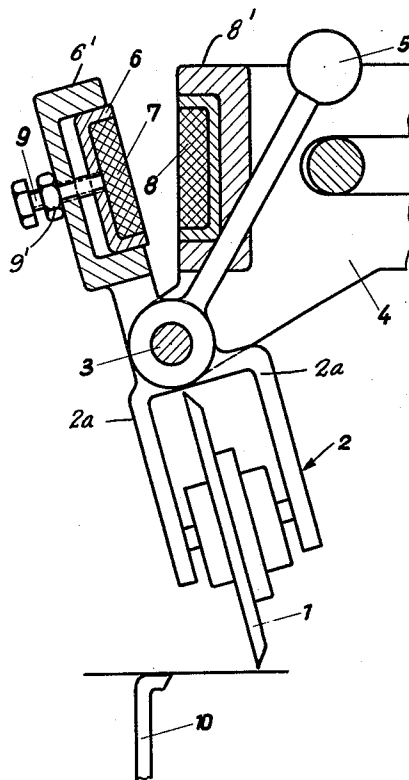
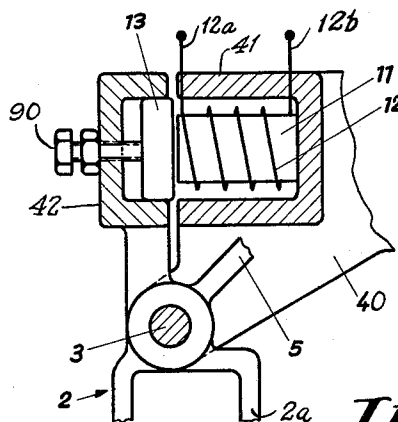


Fig. 3



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APPARATUS FOR CUTTING MOVING WEBS

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3 Claims. (Cl. 83-482)

The present invention relates to apparatus for cutting moving webs of material, such as paper, cardboard, fabrics and kindred items.

More particularly, the invention is directed to apparatus for cutting moving webs wherein the web passes between upper and lower knives and which includes means for regulating the contact pressure between the upper and lower knives.

It was known in the art to regulate the contact pressure of the circular knives by incorporating or building pressure springs in the knife holder, but such springs are objectionable due to the fact that the resiliency of the springs is lessened during use of the apparatus. As a consequence, additional devices were necessary for the subsequent adjustment of the springs, and as such adjustment was effected manually, these adjustments were largely a matter of the individual skill of the operator. Hence, it was not possible with such additional devices to obtain a uniform contact pressure between the cooperating knives and thus this particular arrangement did not solve the problems involved.

Also, it was known to move the swingably mounted circular knives into the zone or region of the counter-knife roller, which roller is grooved or formed of individual knives, by pneumatic or hydraulic means, and to move such knives out of such zone or region by the same means. To accomplish such ends, there was associated with each circular knife, a pressure cylinder means for effecting a shifting of the circular knife and its positioning against the cutting edges of the counter-knife roller under the action of a gaseous or liquid pressure medium controlled centrally, but independently of each other. However, this arrangement possesses the disadvantageous characteristic that, depending on the number of circular knives, a corresponding number of pressure cylinder means is required. In addition to the fact that each circular knife necessitates the use of a cylinder means which increases materially the cost of the apparatus, this "set-up" is space consuming and complex in structural detail due to the conduit system involved for the pressure medium. In addition, the multiple arrangement of the pressure cylinder means requires a relatively wide construction of the circular knives, and such construction does not permit the cutting of webs having a width dimension less than that of the circular knives.

To overcome the foregoing and other objectionable characteristics existing in the art is an important object of this invention.

Broadly, to accomplish the above and other advantageous objects, the invention comprises employing magnetic means, either permanent magnet means or electro-magnet means for creating the contact pressure between the upper and the lower knives of the apparatus. The magnetic means can be associated with the movable knife, the knife holder or a fixed point therefor.

More specifically, a magnetic means can be carried by the holder of the upper knife, which holder is swingable about a fixed pivotal point of a frame member and the frame member supporting a fixed magnetic means so that swinging movement of the holder moves the magnetic means of the holder into close proximity to or in contact with the fixed magnetic means.

In order to regulate the pressure of contact between the upper and lower knives, at least one of the magnetic

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means is adjustable to vary the distance between the poles of the respective magnetic means and preferably the magnetic means carried by the knife holder is the adjustable component.

In view of the relative inexpensiveness of permanent magnets and their ease of installation, these magnets are preferable to electro-magnets. In the event electro-magnets are employed, the voltage in the magnetic coil can be altered.

Further objects and advantages of the invention will become more readily apparent from a study of the following specification and annexed drawings, and in which drawings is illustrated an embodiment of the invention.

In the drawings:

FIG. 1 is an elevational view, partly in cross-section, showing the various components of the invention in the operating position, and

FIG. 2 is a view similar to FIG. 1 showing the components in the inoperative or rest position.

FIG. 3 shows a section of FIG. 1 however here the permanent magnet is replaced by an electro-magnet.

As shown in the drawings, the upper knife comprises a circular knife 1 rotatably mounted in arms 2a of a knife holder 2, and the holder is swingably mounted about a horizontal shaft or pin 3 of a machine stand or frame 4. A hand lever means 5 operably connected to the holder serves to swing or move the holder about the shaft 3.

It will be noted that the upper part of the holder 2 is provided with a substantially U-shaped component 6' in which is located a housing 6 adapted to receive a permanent magnet 7. The stand or frame 4 opposite the component 6' is formed with a U-shaped component 8' in which is fixedly mounted a permanent magnet 8.

The gap or spacing between the magnets 7 and 8 can be adjusted by the manipulation of an adjusting screw means 9 suitably connected to the housing 6 at one end, with the head thereof being located exteriorly of the U-shaped component. Once the desired spacing has been effected, the housing 6 and magnet 7 are maintained in such position by drawing-up a lock nut or the like 9'.

The magnitude of the distance between the magnets 7 and 8 determines the contact pressure between the circular knife 1 and a lower or counter-knife 10. If the upper knife 1 is moved into contact with the lower knife 10 by swinging the holder 2 from the position shown in FIG. 2 into the position illustrated in FIG. 1, such overlapping of the knives constitutes a stopping means and the magnets 7 and 8 attract each other so that a uniformly remaining contact pressure is produced between the circular knife 1 and the counter-knife 10.

FIG. 3 discloses the use of an electro-magnet for the invention. In this embodiment, frame 40 of the knife holder is provided with a U-shaped component 41 carrying metal core 11 and coil 12 having leads 12a and 12b. A U-shaped component 42 supports metal plate 13, and the space between plate 13 and core 11 can be adjusted by screw means 90 similar to the screw means 9.

In all other respects the operation of this design corresponds to the apparatus shown in FIGS. 1 and 2.

What I claim is:

1. An apparatus for cutting moving webs of paper and like material comprising a frame, an upper circular knife and a stationary lower knife between which the web passes, a cutting edge for each knife, a holder for said upper circular knife, means pivotally mounting said holder to said frame to permit said upper knife to be moved so its cutting edge overlaps the cutting edge of said lower knife thereby constituting a stopping means for the movement of the holder relative to the frame, magnetic means carried by said holder and frame respectively above the pivotal mounting of the holder to the frame operative when the holder is moved to allow the cutting

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edge of said upper knife to overlap the cutting edge of the lower knife for producing an axially directed engagement pressure between the cutting edges of said upper and lower knives and means for adjusting the position of said magnetic means relative to each other for varying the distance between said magnetic means.

2. An apparatus for cutting moving webs as claimed in claim 1, wherein said magnetic means is an electro-magnet in which the voltage in the magnetic coil may be varied.

3. An apparatus for cutting moving webs of paper and like material comprising a frame, an upper circular knife and a lower stationary knife between which the web passes, a cutting edge for each knife, a holder for the upper knife, means pivotally mounting said holder to said frame to permit said upper knife to be moved so its cutting edge overlaps the cutting edge of said lower knife thereby constituting a stopping means for the movement of the holder relative to the frame, a permanent magnet mounted in said holder above the pivotal mounting of the holder to the frame, a permanent magnet fixedly mounted in said frame above the pivotal mounting of the holder to the frame with said permanent magnets being operative when the holder is moved to allow the cutting edge of the upper knife overlap the cutting edge of the lower knife for producing an axially directed engagement

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pressure between the cutting edges of said upper and lower knives and adjusting means operably connected to the magnet in the holder for adjusting the position of such magnet relative to the magnet in the frame for varying the distance between said magnets.

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