Sept. 20, 1938. F. F. RUAU 2,130,473

CUTTING DEVICE

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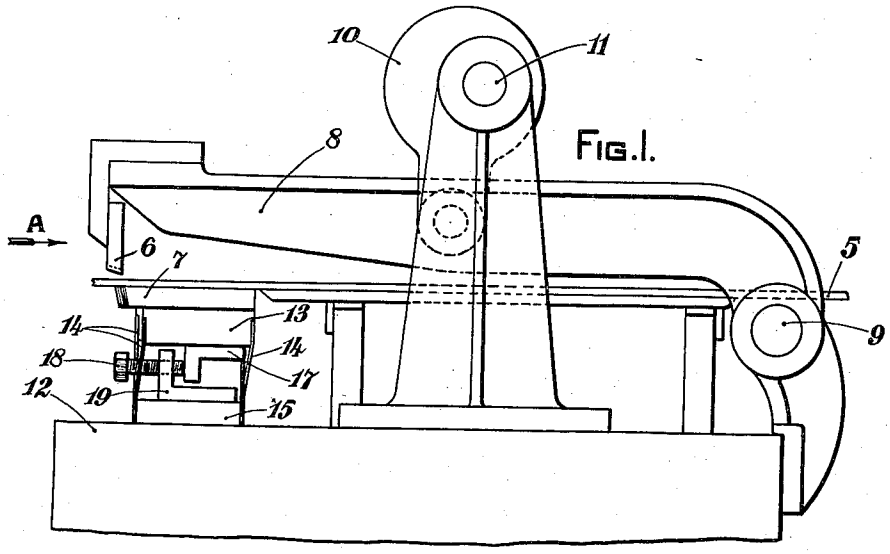


FIG. 1.

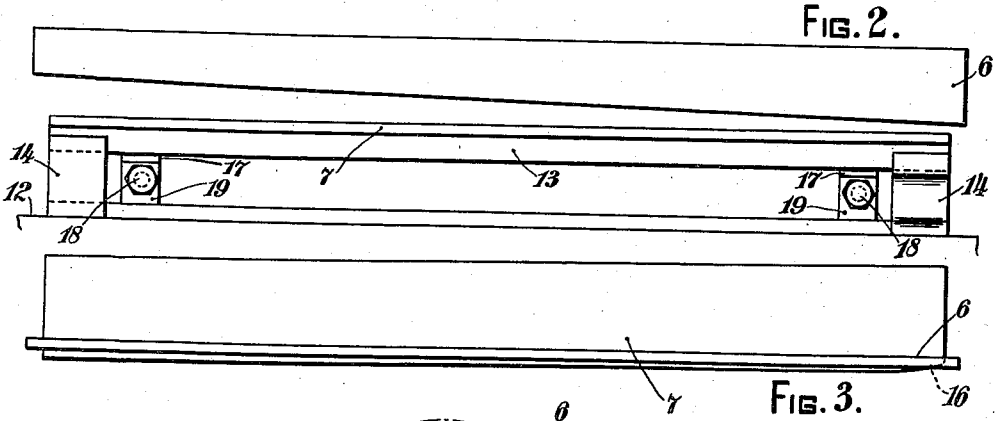


FIG. 2.

FIG. 3.

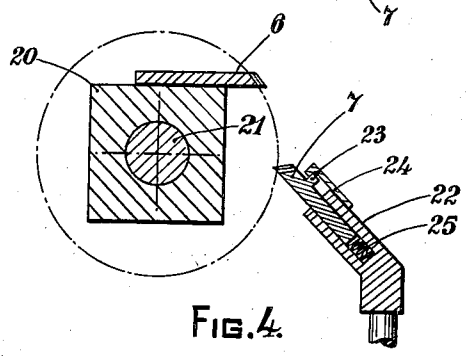


FIG. 4.

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CUTTING DEVICE

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8 Claims. (Cl. 164—43)

This invention is for improvements in or relating to cutting devices of the type in which a pair of cutting elements are arranged to cooperate with each other during the cutting operation.

It is customary to use cutting devices, for example, when cutting webs of paper consisting of a pair of co-operating cutting elements one of which is rigidly mounted whilst the other is rotated or reciprocating into or out of engagement with the fixed cutting element.

With cutting devices of this type it is usual in order to compensate the knives for wear to provide means by which the relative positions of the cutting elements may be manually adjusted. It is an object of the present invention to provide means whereby the relative position of the cutting elements is automatically maintained.

According to the present invention there is provided a cutting device of the type described wherein at least one of the cutting elements is arranged to yield under pressure exerted by said other element at the point of co-operation of the cutting elements. The yieldable element may be connected with resilient members which members are connected to a rigid member or members.

The invention will be described by way of example with reference to the accompanying drawing in which—

Fig. 1 is a side elevation of one form of cutting device;

Fig. 2 is a view looking in the direction of the arrow "A" Fig. 1.

Fig. 3 is a plan of Fig. 2.

Fig. 4 is a sectional elevation of a further form of cutting device.

Like references refer to like parts throughout the specification and drawing.

Referring to Fig. 1 the material which is to be cut is fed as a web 5 from a reel of material (not shown). The web 5 of material is in the construction shown in Fig. 1, fed intermittently to the cutting device, any suitable feeding means being provided to move the web in the direction of its length towards the cutting elements. The cutting device comprises a movable knife 6 and a fixed knife 7. The knife 6 is movable in the cutting plane, whereas the cutting edge of the knife 7 is normally disposed substantially in the cutting plane. The knife 6 is carried by an arm 8 pivoted at 9 and oscillated by an eccentric strap (10) secured to a shaft 11 which is driven from the main drive of the machine. The knife 7 is secured to the bed or frame 12 of the machine by a resilient connection described below.

The cutting edges of the knives 6 and 7 are arranged as shown in Fig. 2, so that one edge of the web 5 is first cut by the cooperating knives and the cut gradually extends across the web until a strip or length of material has been severed therefrom, the cutting action of the knives being similar to that of a pair of scissors. The knife 7 is mounted on a block 13 which is fixed to flat spring plates 14, two of such spring plates being attached to each end of the block and extending lengthwise of the cutting edge of the knife 7, as can be clearly seen from Figs. 1 and 2. The spring plates 14 are fixed at their lower ends to rigid members shown as blocks 15, the blocks 15 being secured to the bed or frame 12 of the machine.

Those portions of the knives 6 and 7 which first cooperate with each other are provided with a lead or chamfer, the lead on the knife 7 being indicated at 16 whilst the knife 6 is also provided with a suitable lead to cooperate with the lead 16. The lead 16 is provided so that the knives may be moved past each other and not tend to jam at the commencement of the cutting operation, as they would do if such provision were not made.

The knives 6 and 7 are angularly inclined or askew to one another, as shown in Fig. 3, so that when the moveable knife 6 is moved into engagement with the yieldably mounted knife 7 the cutting edge of the knife 6 engages with the edge of the knife 7 and gradually causes the knife 7 to move to the right, as viewed in Fig. 1. That end of the knife 7 which is first engaged by the knife 6 first moves to the right, as viewed in Fig. 1, the other parts of the knife 7 moving as they are in turn engaged by the knife 6.

When setting the apparatus the forward pair of spring plates 14, that is, the plates which are secured to that end of the knife 7 which is first engaged by the knife 6 are given an initial tension, as shown in Fig. 1. The spring plates urge the knife 7 towards the knife 6 so that the cooperating edges of the knives are automatically maintained in correct relationship with respect to each other during the cutting operation.

In order to provide the initial tension in the forward pair of springs 14, that is the pair of springs shown in tension in Fig. 1, angle pieces 17 are secured to the block 13. Adjusting screws 18 fitted in further angle pieces 19 which are fixed to the blocks 15 are operable to move the angle pieces 17 and to thereby effect the required adjustment. If desired an adjusting mechanism may be provided at each end of the knife 7, as

shown in Fig. 2, and an initial tension may be given to each pair of spring plates **14**.

Referring to Fig. 4, the knife **6** shown therein is movable whilst the knife **7** is fixed to the bed of the machine, but in this construction the movable knife **6** is carried by a block **20** which is mounted for rotation with a shaft **21**. The knife **7** is slidable in a holder **22** which holder **22** guides the knife and is fixed to the bed of the machine. A projection **23** fixed to the knife **7** is arranged to engage with a stop or abutment **24**, which stop limits the extent of movement of the knife **7** towards the movable knife **6**. The knife **7** is urged towards the knife **6** by a spring or series of springs **25** which are contained in the holder **22**, as shown in Fig. 4. The operation of the cutting device shown in Fig. 4 is similar to the operation of the device described with reference to Figs. 1 to 3, and need not therefore be given in detail. In the construction shown in Fig. 4 the web **5** may, if desired, be fed continuously to the cutting device.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A cutting device comprising in combination, a frame, a cutting element, the cutting edge of which is normally disposed substantially in the cutting plane, a further cutting element movable in the cutting plane to cooperate with the other said cutting element, and a yielding support for the first said cutting element, said support being secured to the frame and carrying the cutting element in a manner such that the cutting element so supported yields under pressure exerted by said other cutting element when the two cutting elements are in operative engagement with each other.

2. A cutting device comprising in combination, a frame, a cutting element, the cutting edge of which is normally disposed substantially in the cutting plane, a further cutting element movable in the cutting plane to cooperate with the other said cutting element, and a resilient support for the first said cutting element, said support being secured to the frame and carrying the cutting element in a manner such that the cutting element so supported yields under pressure exerted by said other cutting element when the two cutting elements are in operative engagement with each other.

3. A cutting device comprising in combination, a frame, two cutting elements and flat spring plates to support one of the cutting elements, said spring plates carrying the cutting element and being secured to said frame in a manner such that the cutting element so supported yields in a direction transverse to the cutting plane under pressure exerted by said other cutting element when the two cutting elements are in operative engagement with each other.

4. A cutting device comprising in combination, a frame, two cutting elements and opposed flat spring plates disposed at each end of one of the cutting elements to support such element, said spring plates carrying the cutting element and being secured to said frame in a manner such that the cutting element so supported yields under pressure exerted by said other cutting element when the two cutting elements are in operative engagement with each other.

5. A cutting device comprising in combination, a frame, two cutting elements, flat spring plates to support one of the cutting elements, said spring plates being secured to said frame and to the cutting element in a manner such that the cutting element so supported yields under pressure exerted by said other cutting element when the two cutting elements are in operative engagement with each other, and means to provide an initial tension in the spring plates.

6. A cutting device comprising in combination, a frame, two cutting elements, opposed flat spring plates disposed at each end of one of the cutting elements to support such element, said spring plates carrying the cutting element and being secured to said frame in a manner such that the cutting element so supported yields under pressure exerted by said other cutting element when the two cutting elements are in operative engagement with each other, and means to provide an initial tension in the spring plates.

7. A cutting device comprising in combination, a frame, two cutting elements, flat spring plates to support one of the cutting elements, said spring plates being secured to said frame and to the cutting element in a manner such that the cutting element so supported yields under pressure exerted by said other cutting element when the two cutting elements are in operative engagement with each other, and a screw supported for movement towards and away from the spring plates to provide an initial tension in the spring plates.

8. A cutting device comprising in combination, a frame, two cutting elements, opposed flat spring plates disposed at each end of one of the cutting elements to support such element, said spring plates carrying the cutting element and being secured to said frame in a manner such that the cutting element so supported yields under pressure exerted by said other cutting element when the two cutting elements are in operative engagement with each other, and a screw supported for movement towards and away from the spring plates to provide an initial tension in the spring plates.

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