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WEB CUTTING MECHANISM

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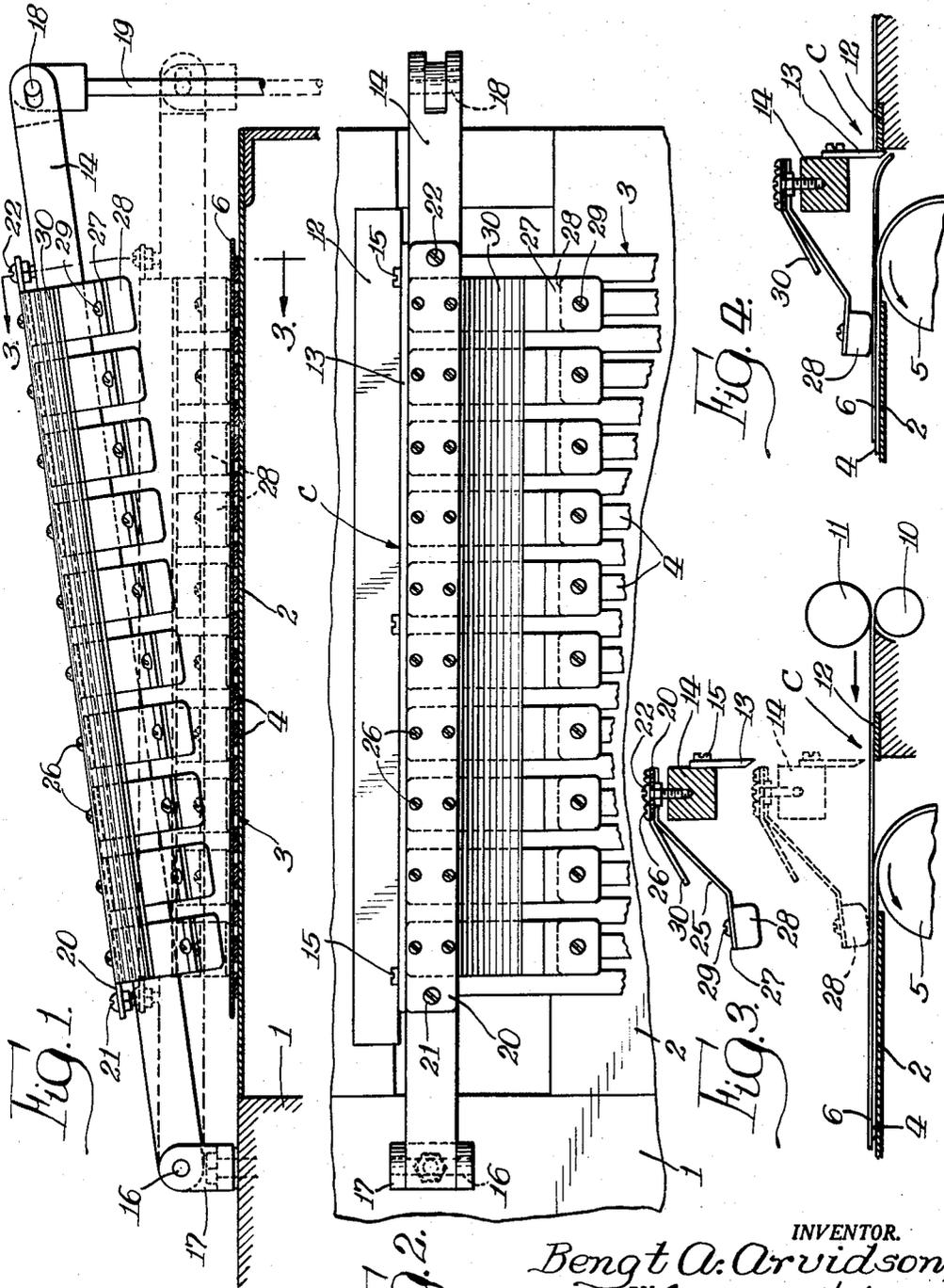


Fig. 2.

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WEB CUTTING MECHANISM

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4 Claims. (Cl. 83—155)

This invention relates to mechanism for cutting elongated material into sheets and more particularly to a cutting mechanism having means for holding a web of material against retrograde movement during cutting and in addition placing the web under tension prior to cutting.

In the past, difficulty has often been experienced in cutting certain materials by means of cutter blades or scissors because of a tendency of such materials to fold about and follow the cutter rather than to be cut. This problem has been particularly encountered in connection with material which is known in the wrapping art as "limp film" which is now commonly used for wrapping articles. Polyethylene and polyvinyl films are examples of such limp films.

An object of this invention is to provide mechanism for cutting elongated material into sheets including means for holding the material against movement as it is cut.

Another object of this invention is to provide mechanism for cutting an elongated sheet of material including a knife for cutting the material and means operable in timed relation with the knife to hold the material against retrograde movement as the knife cuts the material.

A further object of the invention is to provide mechanism for cutting limp film material including a conveyor for supporting and intermittently advancing the material, a movable knife for cutting the material, and a plurality of fingers, each formed of spring material and extending downwardly beneath the level of the movable knife so as to engage the material against the conveyor and tension the material prior to cutting thereof by the knife.

An additional object of the invention is to provide a web cutting mechanism comprising, in combination, a base, a cutter including a knife bar movably mounted on the base and adapted to carry a knife, means for supporting and intermittently advancing the web including a plurality of laterally spaced belts, a finger mounting plate adjustably mounted on the knife bar, a plurality of laterally spaced fingers mounted on the mounting plate and extending to positions overlying the conveyor belt, each of said fingers comprising a leaf spring having a downwardly angled mid-section and a free end extending generally parallel to the conveyor belt, and a pressure pad carried on the free end of the leaf spring positioned normally at a level beneath the lower edge of the movable knife for engagement with the web prior to said movable knife, whereby movement of the knife bar causes said fingers to engage the web and place the web under tension prior to the cutting of the web by the movable knife.

The objects of the invention generally set forth together with other ancillary advantages are attained by the construction and arrangement shown by way of illustration in the accompanying drawing in which:

Fig. 1 is a vertical view in elevation of the cutting mechanism with the knife and associated mechanism shown in broken lines in their cutting position and with the base and web advancing mechanism shown in section; Fig. 2 is a plan view of the mechanism shown in Fig. 1

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with the base and web advancing mechanism broken away;

Fig. 3 is a fragmentary side elevation of the mechanism with parts broken away and showing in broken line the fingers in initial engagement with the web; and

Fig. 4 is a view similar to Fig. 3 showing the position of the parts after the movable knife has severed the web.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail an illustrative embodiment of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

As shown in the drawings, a base 1 supports a belt table 2 over which may extend a belt conveyor, indicated generally at 3, and which may be composed of a plurality of narrow, laterally spaced, endless, parallel belts 4. The belts 4 travel around a pair of spaced rollers mounted on the base 1, one of these rollers being indicated at 5 which may be intermittently driven to intermittently move the belt conveyor 3. As shown in Fig. 3, additional means for advancing the material 6 and for holding the material during cutting comprises a feed roller 10 and a pressure roller 11 mounted on the base 1, each of which may be a continuous roller extending transversely of the base or may be formed of a plurality of rollers. The material 6 for purposes of description may be referred to as a web of material although the disclosed mechanism may be used with sheet material which is to be cut into smaller sheets.

The belt conveyor 3 and feed and pressure roller mechanism may be of the type disclosed in Patent No. 2,687,604 to Corley et al., dated August 31, 1954, and more particularly may be as shown in Figs. 5 and 6 of the patent. The belt conveyor rollers and feed and pressure rollers may be intermittently rotated to intermittently advance the web of material a desired distance by a mechanism such as that shown in Patent No. 2,687,604.

A cutting station, indicated generally at C, is located between the belt conveyor 3 and the feed roller 10 and the pressure roller 11. A cutter is located at the cutting station and includes a fixed, bottom knife 12 and a movable knife 13 mounted for movement toward and away from the fixed knife. As shown in the drawings, the knife 13 may be mounted on a knife bar 14 by means of screws 15, and the knife bar 14 may be pivotally mounted at one end by a pin 16 to a bracket 17 carried on the base 1. The opposite end of the knife bar 14 may, by a pin 18, be connected to a vertical rod 19 which may be actuated by the knife actuator, shown in Patent No. 2,687,604, to cause the movable knife to descend in a cutting operation when the web feed mechanism is stationary.

A finger mounting plate 20 overlies the knife bar 14 for a major part of the length of the knife bar and is secured thereto by means, such as bolts 21 and 22, threadably secured in the knife bar to provide for adjustment of the finger mounting plate and the mechanism carried thereby with respect to the movable knife 13.

A plurality of laterally spaced fingers 25 are secured to the finger mounting plate 20 by suitable means, such as screws 26. Each finger is in the form of a leaf spring made of spring steel and has a downwardly angled mid-section 26 and a free end 27 on which a pressure pad of rubber 28 may be mounted by suitable means, such as screws 29. A continuous guard 30 overlies the mid-section 26 of each of the fingers to limit the deflection of the fingers, and this guard may be formed as an integral part of the finger mounting plate 20.

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As shown in Figs. 1 and 2, the fingers 25 and the pressure pads 28 carried thereby are so arranged on the finger mounting plate 20 so as to each be centered over a belt 4 when in engagement with the web.

In operation of the mechanism with the knife bar 14 and movable knife 13 in elevated position, as shown in full lines in Fig. 3, the belt conveyor 3 and feed coupling formed by rollers 10 and 11 may be actuated to advance the web of material past the cutting station. Upon completion of web movement, the vertical rod 19 is pulled down to lower the knife bar 14 and knife 13 carried thereby. This movement also results in lowering the fingers 25 and prior to cutting of the web the parts will take the position shown in broken lines in Fig. 3. In the broken line position of Fig. 3, the pressure pads 28 on the fingers 25 have made contact with the web to hold the web while the knife 13 has not as yet made contact with the web. Continued downward movement of the knife bar 14 will cause flexing of the fingers 25 from their broken line position in Fig. 3 to the position shown in Fig. 4 to impart tension to the web prior to cutting thereof by knives 12 and 13.

This flexing of the fingers increases the distance between the knife 13 and the pressure pads 28 so as to produce tension in the web as well as remove any wrinkles that may be present.

I claim:

1. A web cutting mechanism comprising, in combination, a base, a scissors-type cutter supported on said base including a fixed knife and a knife bar pivotally mounted at one end on the base adapted to carry a cooperating knife, means located forwardly of and beyond the cutter for supporting and intermittently advancing said web including a belt conveyor beyond the cutter having a plurality of laterally spaced belts, a finger mounting plate adjustably mounted on said knife bar, and a plurality of laterally spaced fingers mounted on said mounting plate and extending rearwardly to positions overlying the belt conveyor, each of said fingers comprising a leaf spring having a downwardly angled mid-section and a free end extending generally parallel to the belt conveyor and away from the knife bar, and a pressure pad carried on the free end of each leaf spring normally at a level beneath the lower edge of the movable knife for engagement with the web on said support means prior to the movable knife, whereby movement of the knife bar causes said fingers to engage the web and place the web under tension prior to the cutting of the web by the movable knife.

2. A mechanism for cutting limp film material comprising, in combination, a base, a cutter supported on said base including a fixed knife and a movably mounted knife bar adapted to carry a cooperating knife at opposite sides of the material path, means beyond the cutter at the same level as the fixed knife for supporting and intermittently advancing said material, a finger mounting plate adjustably mounted on said knife bar, and a plurality of laterally spaced fingers mounted on said mounting plate and extending rearwardly to positions overlying said means, each of said fingers comprising a leaf spring having a downwardly angled mid-section and a free end extending generally parallel to said means, and a pressure

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pad carried on the free end of the leaf spring normally at a level beneath the lower edge of the movable knife for engagement with the material on said means prior to the movable knife, whereby movement of the knife bar causes said fingers to engage the material and place the web under tension prior to the cutting of the material by the movable knife.

3. A web cutting mechanism comprising, in combination, a base, a cutter supported on said base including a fixed knife and a knife bar movably mounted on the base adapted to carry a cooperating knife, means for supporting and intermittently advancing a web including a conveyor, a mounting plate adjustably mounted on said knife bar, flexible straight leaf spring means mounted on said mounting plate and extending rearwardly and downwardly to overlie the conveyor at a level beneath the lower edge of the movable knife for engagement with the web prior to the movable knife, whereby movement of the knife bar causes said flexible means to engage the web and be flexed to place the web under tension prior to the cutting of the web by the movable knife.

4. A web cutting mechanism comprising, in combination, a support, means for feeding material onto said support, a base, a cutter supported on said base between the support and the feed means including a fixed knife and a movably mounted knife bar adapted to carry a cooperating knife at opposite sides of a web path, a finger mounting plate mounted for movement relative to the base and in timed relation to the knife bar and at the same side of the web path as the knife bar, and a plurality of laterally spaced fingers mounted on said mounting plate and extending in a direction away from the cutter to overlie the support, each of said fingers comprising a leaf spring having a downwardly angled mid-section and a free end normally at a level beneath the lower edge of the movable knife for engagement with material on the support prior to cutting thereof by the movable knife, whereby the free ends of the fingers engage the material prior to engagement of the material by the movable knife and the fingers then flex to place the material under tension prior to the cutting of the material by the movable knife.

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