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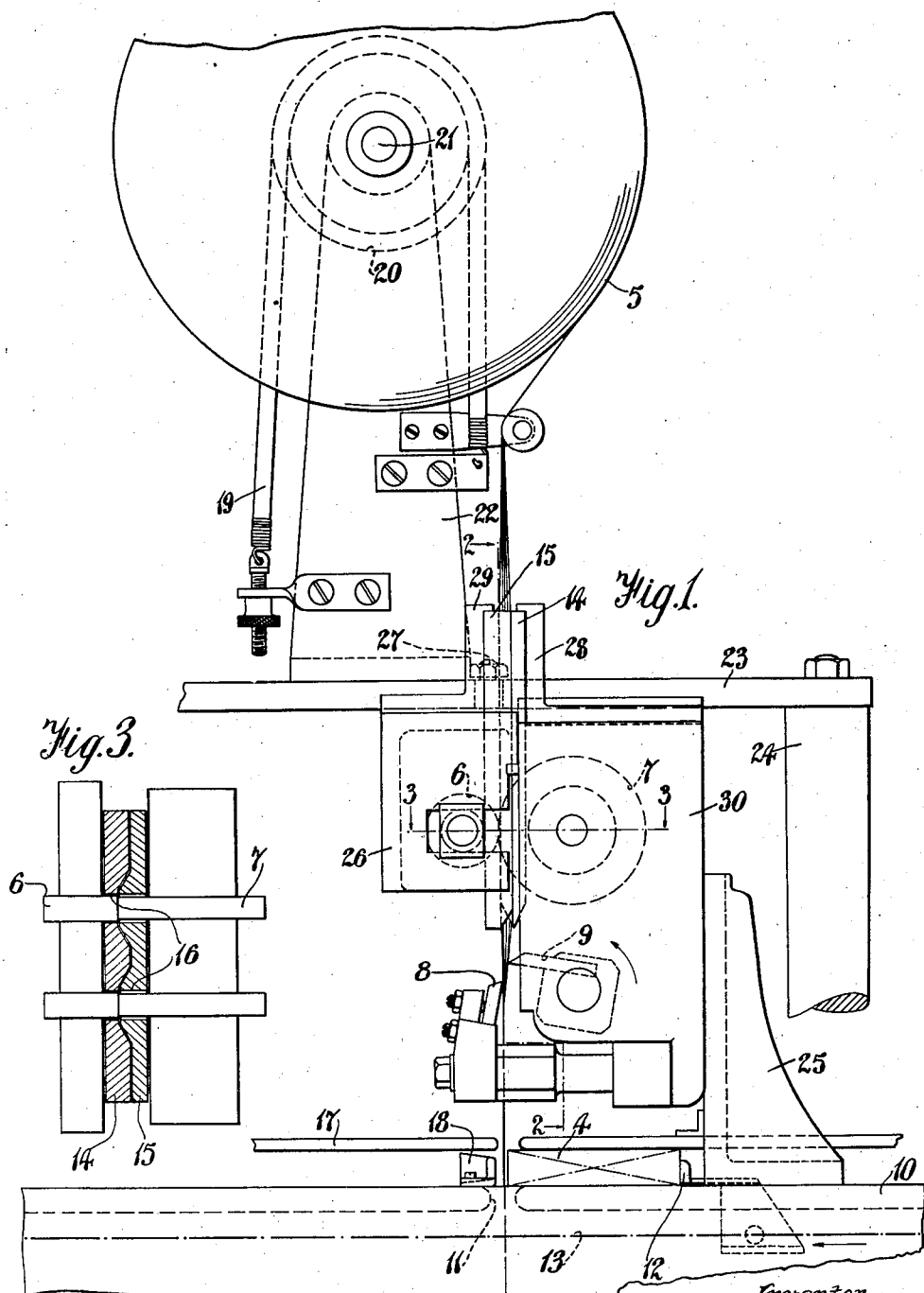
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2,266,362

APPARATUS FOR FEEDING AND SEVERING WEBS OF PAPER OR SIMILAR THIN MATERIAL

Filed Nov. 2, 1939

2 Sheets-Sheet 1



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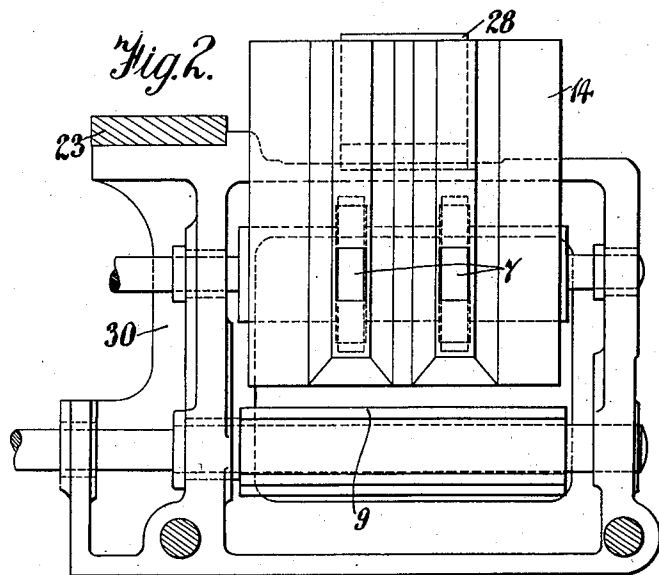
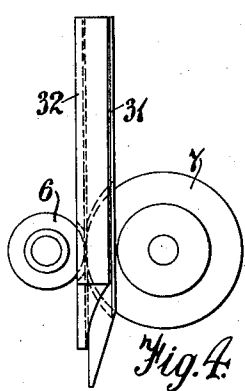
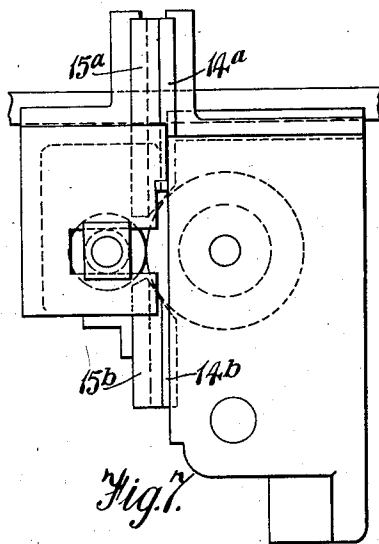
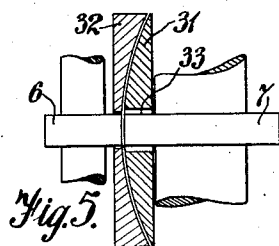
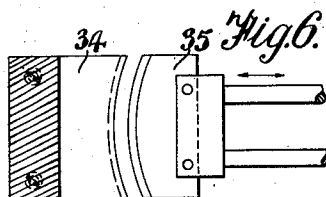
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APPARATUS FOR FEEDING AND SEVERING WEBS OF PAPER OR SIMILAR THIN MATERIAL

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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APPARATUS FOR FEEDING AND SEVERING
WEBS OF PAPER OR SIMILAR THIN MA-
TERIALLeslie Gordon Forster, Deptford, London, Eng-
land, assignor to Molins Machine Company
Limited, Deptford, London, EnglandApplication November 2, 1939, Serial No. 302,616
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4 Claims. (Cl. 271-2.3)

This invention is for improvements in or relating to apparatus for feeding and severing webs of paper or similar thin material, for example, webs formed from a cellulose derivative, the apparatus comprising a web severing device and co-operating feeding elements (e. g. a pair of rollers) operative to draw a web from a reel and to feed the web to the severing device.

It has previously been customary when using apparatus of the kind above described, particularly for use with webs formed from a cellulose derivative, to employ, in conjunction with the web feeding device, mechanism to corrugate the web transversely to its length in order to facilitate the feeding of the web to the severing device.

In the known constructions the web corrugating mechanism is disposed between the feeding elements and the severing device, so that the web is drawn towards and is moved between the feeding elements in a flat condition. It is well known that with the forms of corrugating devices heretofore employed the setting of the corrugating devices is an extremely delicate operation, and machine operators differ in their opinions as to the extent of the depth of the corrugations which shall be employed.

It is the object of the present invention to improve the feeding of thin webs of material.

According to one form of the invention there is provided in or for apparatus of the kind described means to bend the web transversely of its length to increase its stiffness lengthwise while the part of the web so bent is under tension lengthwise.

According to another form of the invention there is provided in or for apparatus of the kind described means adapted to be positioned on each side of the feeding elements, considered in the direction of movement of the web by the feeding elements, to bend or to bow or to corrugate the web transversely of its length prior to engagement of the web by the feeding elements and to maintain the bowing of the web during the feeding thereof by the feeding elements and during the movement of the web between the feeding elements and the web severing device.

Further, according to the invention there is provided apparatus of the kind described wherein means is provided to bend or to bow the web transversely of its length while the web is under lengthwise tension (e. g. the bowing means is operative prior to engagement of the web by the feeding elements), and wherein said means maintains the bending or bowing of the web

during engagement thereof by the feeding elements and during the movement of the web between the feeding elements and the web severing device.

5 The means to bend the web may be arranged to provide a plurality of bends in the web (e. g. to corrugate the web).

Various ways of carrying the invention into effect will be described by way of example with reference to the accompanying drawings, in which—

10 Figure 1 is a front elevation of a portion of a packing machine with the invention applied thereto.

15 Figure 2 is a section of Figure 1 on the line 2-2.

Figure 3 is a section of Figure 1 on the line 3-3, but with the feeding rollers shown in full.

20 Figures 4 and 5 show modifications wherein the web is bowed instead of being corrugated.

Figure 6 shows a cutting device whereby a bowed (or corrugated) web may be severed without flattening the web.

25 Figure 7 shows a portion of the machine shown in Figure 1 and illustrates a modification.

Like reference numerals refer to like parts throughout the specification and drawings.

Referring to Figures 1 to 3, the web feeding apparatus is shown applied to a wrapping machine for wrapping articles 4 (for example cigarette packages 4), in wrappers formed from a cellulose derivative. The wrapping material is provided on a reel 5 and is drawn lengthwise

30 from the reel by co-operating rollers 6 and 7. The web is moved by the rollers 6 and 7 to a position at which a wrapper blank is severed from the leading end of the web of material. The severing device may be of any suitable known construction, but the construction shown comprises a stationary knife 8 with which co-operates a rotatable knife 9. The web feeding apparatus and the severing device are disposed above the bed 10 of the machine, and the feeding rollers feed the wrapping material so that the leading end of the wrapping material passes through a slot 11 in the bed of the machine and is thereby located in the path of the article 4 which is to be wrapped. The article, which is moved along the bed by a pusher 12 carried by an endless conveyor 13, is preferably moved into engagement with the wrapping material just prior to the instant when the severing device operates to sever a wrapper from the web. By this means the wrapper after being severed

from the web is held in the desired position relatively to the article to be wrapped.

In order to facilitate the feeding of the web, a pair of corrugated guides 14 and 15 are provided between which the web is passed. The corrugated guides are disposed as closely together as possible, see Figure 3, while permitting the web to pass between the guides, and the web is corrugated transversely of its length by the guides 14 and 15. The feeding rollers do not extend across the full width of the web but engage with the middle portion of the web, and the corrugated guides are provided with apertures 16 through which the co-operating feeding rollers protrude to perform the feeding operation. By this means the corrugated guides 14, 15 engage the web and corrugate it before the feeding rollers engage the web, and the corrugated formation of the web is maintained during the feeding thereof by the feeding rollers and thereafter during its movement towards the severing device.

As stated above, the rollers feed the web so that the leading end of the web projects through a slot 11 in the bed of the machine, and the extent of the corrugation imparted to the web by the guides 14 and 15 is such that the corrugation is maintained in the web even after the latter has passed beyond the guides 14 and 15 and beyond the position at which the web is to be severed. It will of course be appreciated that when the knives of the severing device co-operate to sever the web, the web is flattened along the line of severance, but this is of no consequence since at the time of severing the portion of the web which is to be severed from the web is already engaged by the article about which the severed portion is to be wrapped.

After a strip of wrapping material is severed from the web the movement of the article 4 bends it into a U about the article as the latter moves beneath a top plate 17. At the same time narrow tucks are made in the base of the U by folders 18 and the material is thereafter completely folded around the article in the known manner.

The necessary tension is imparted to the web by an adjustable brake band 19 which passes around the hub 20 which carries the reel 5 and rotates on a spindle 21 fixed to a support bracket 22. The whole feeding and cutting device is fixed to a bridge 23 supported by pillars 24 fixed to the bed 10 and further support is given by a bracket 25. The frame 26 in which the roller 6 is rotatably mounted is pivoted at 27 to the bridge 23 and the rollers 6 and 7 are forced together by spring devices, not shown. The guides 14 and 15 are supported by angle brackets 28 and 29 which are respectively fixed to the frame 30 in which the roller 7 is rotatably mounted and the frame 26.

In Figures 4 and 5 the arrangement is generally similar to that described with reference to Figures 1 and 3, but the device is constructed to bow the web instead of corrugating it. A convex guide 31 co-operates with a concave guide 32 for this purpose, and the feed rollers 6 and 7 have only a single flange instead of two as before. The rollers engage through slots 33 in the guides 31 and 32.

It will also be appreciated that if desired the severing device may be so constructed, e. g. by suitably shaping the knives, that the web is not flattened during a severing operation.

Such a device is shown in Figure 6 where a

fixed concave knife 34 co-operates with a reciprocating convex knife 35. If the wrapping machine is of the kind wherein the web is intermittently fed this device as shown is suitable, but if the machine is provided with a continuous web feed it is easy to construct the knives to move downwards with the web during the cutting operation. A similar device will sever the corrugated web if the edges of the knives are shaped to suit the web cross-section.

The guides 14, 15 and 31, 32 preferably extend from the feeding rollers to a position located as closely as possible to the point at which the severing of the web is effected.

It will be appreciated that if desired instead of the guides 14, 15 and 31, 32 being provided with apertures through which the feeding rollers protrude, two sets of guides may be provided, one set of guides being disposed in advance of the point at which the feeding rollers engage the web, while the other pair of guides is located between the feeding rollers and the severing device. Such a device is shown in Figure 7, where the upper and lower guides are marked 14a, 15a and 14b, 15b respectively. By reason of the fact that the guides engage and bow or corrugate the web while it is in a state of tension between the reel and the feeding rollers, it is possible to effect the desired bowing or bending of the web with less likelihood of the web being damaged by buckling or otherwise, as is the case when corrugating apparatus of the kind heretofore used is employed and through which the web is pushed. In this latter case the corrugating must of necessity be effected upon that portion of the web which is not tensioned lengthwise and which, therefore, unless the corrugating devices are adjusted with extreme delicacy, tends to buckle and thereby to interrupt the continuous feeding of the web.

In one suitable construction in accordance with the invention it has been found that with a web the width of which is approximately 110 millimetres a suitable depth for the bow is approximately 11 millimetres. These dimensions are, however, arbitrary and it has been found that by providing the web transversely of its length with two bows greater rigidity of the web is obtained and that the depth of the bowing need be only approximately one half the depth employed when the web is bowed transversely of its length in the form of a single bow.

The advantage obtained by reason of the invention is obtained mainly due to the fact that the web is bowed or bent while the web is in tension lengthwise, that is to say, the web is bowed before it is engaged by the feeding rollers.

If the web is corrugated it will be appreciated that the bends should be spaced apart sufficiently far to enable the pulling rollers to engage and pull the corrugated web through the guides without materially upsetting the corrugations so as to interfere with the feeding of the web.

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

1. In web feeding apparatus, a support for a reel from which a web is fed, cooperating feeding elements to draw a web from a reel on said support, means to tension a web moving towards the feeding elements, and opposed male and female guides located between the feeding elements and said support and disposed on opposite sides of the path of a web, said guides having their opposed surfaces correspondingly shaped

to match one another so as to bend a web transversely of its length, said feeding elements being arranged to protrude beyond the opposed surfaces of said guides.

2. In web feeding apparatus, a support for a reel from which a web is fed, cooperating feeding elements to draw a web from a reel on said support, means to tension a web moving towards the feeding elements, and opposed slotted male and female guides located between the feeding elements and said support and disposed on opposite sides of the path of a web, said guides having their opposed surfaces correspondingly shaped to match one another so as to bend a web transversely of its length, said feeding elements being arranged to protrude through the slots in said guides.

3. In web feeding apparatus, a support for a reel from which a web is fed, cooperating feeding elements to draw a web from a reel on said support, means to tension a web moving towards the feeding elements, a first set of opposed male and female guides located between the feeding elements and the support and disposed on op-

posite sides of the path of a web, said guides having their opposed surfaces correspondingly shaped to match one another so as to bend a web transversely of its length, and a second set of guides similar to said first set to retain the bend in a web after the latter has passed the feeding elements, said feeding elements being arranged to protrude beyond the opposed surfaces of the guides.

4. In web feeding apparatus, a support for a reel from which a web is fed, cooperating feeding elements to draw a web from a reel on said support, means to tension a web moving towards the feeding elements, and opposed male and female guides located between the feeding elements and said support and disposed on opposite sides of the path of a web, said guides having their opposed surfaces correspondingly arched to match one another so as to bend a web transversely of its length, said feeding elements being arranged to protrude beyond the opposed surfaces of said guides.

LESLIE GORDON FORSTER.