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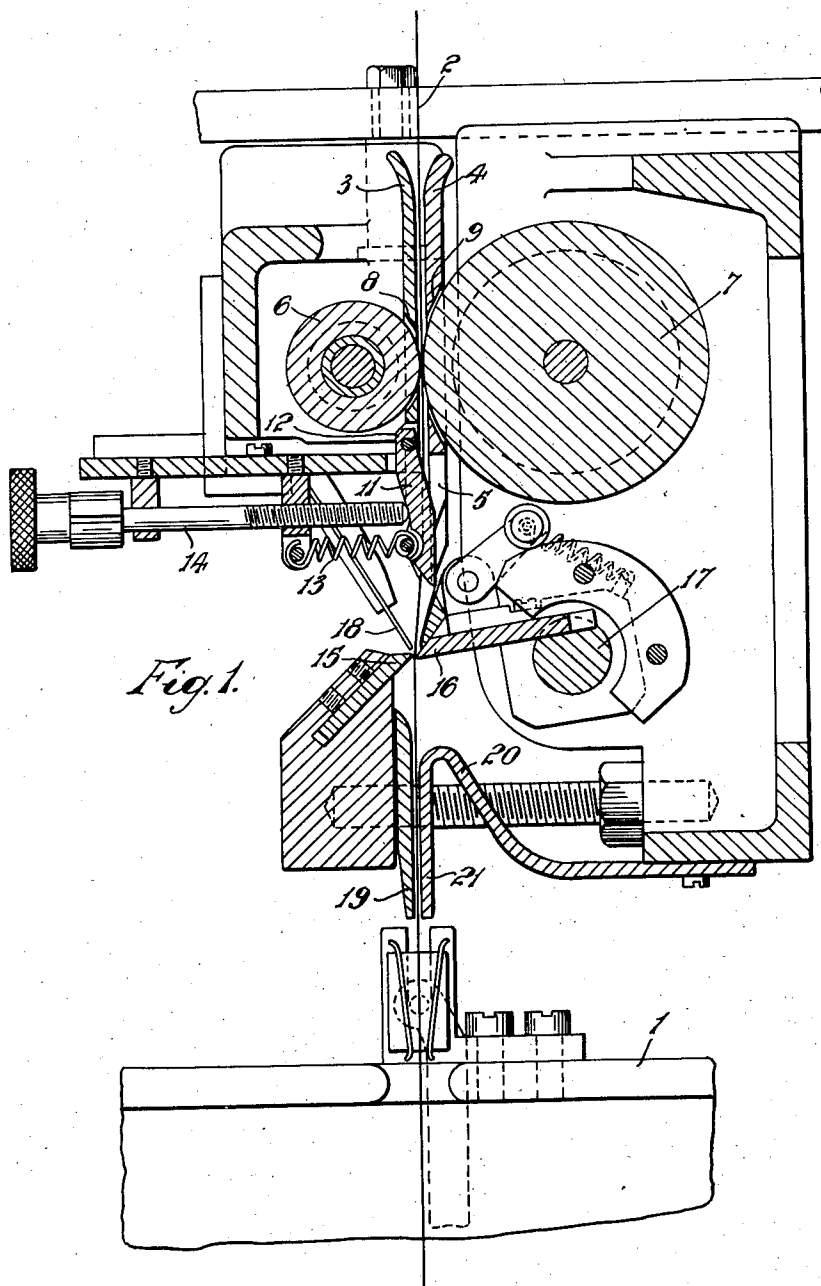
T. G. JACKSON

2,037,330

APPARATUS FOR FEEDING AND SEVERING WEBS

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2 Sheets-Sheet 1



INVENTOR
T. G. Jackson
By *Watson, Coit, Moore & Gaudin*
ATTYS.

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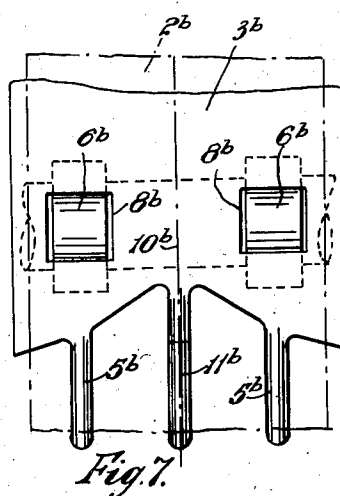
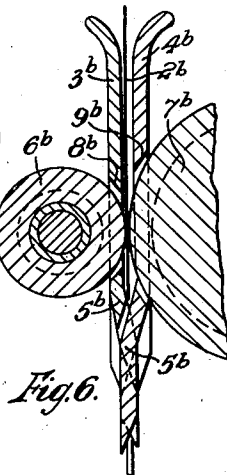
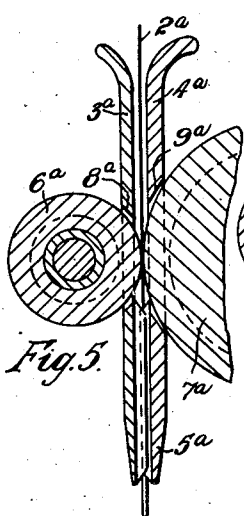
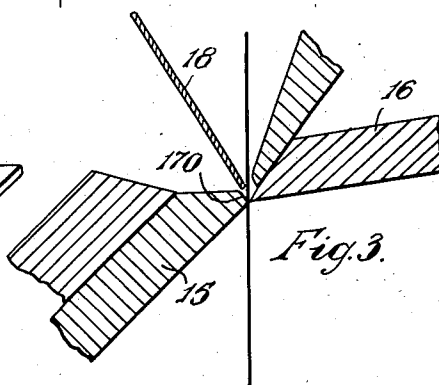
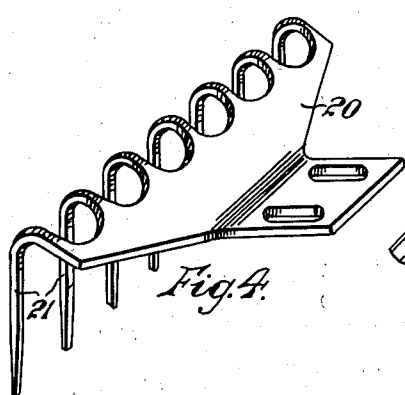
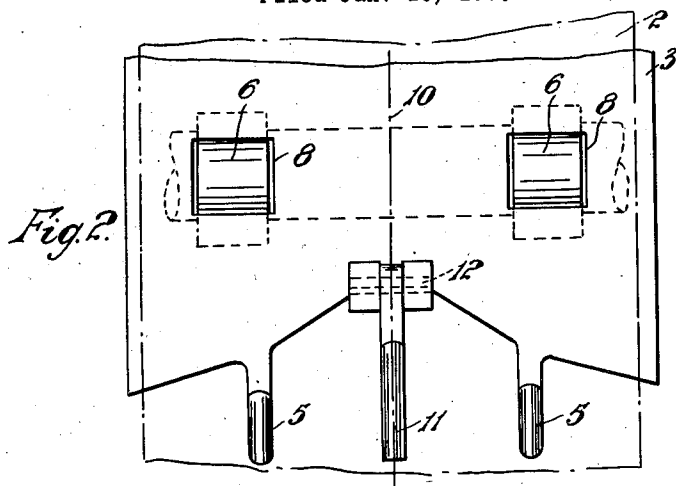
T. G. JACKSON

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APPARATUS FOR FEEDING AND SEVERING WEBS

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2 Sheets-Sheet 2



INVENTOR
T. G. Jackson,
BY *Nelson, Cord, Moore & Gundle,*
ATTYS.

UNITED STATES PATENT OFFICE

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APPARATUS FOR FEEDING AND
SEVERING WEBSThomas Grayland Jackson, Deptford, London,
EnglandApplication January 18, 1935, Serial No. 2,431
In Great Britain January 26, 1934

2 Claims. (Cl. 164—66)

This invention is for improvements in or relating to apparatus for feeding and severing webs, and is particularly applicable to packing or wrapping machines wherein a web of cellulose material is to be fed and severed for wrapping around articles being fed through the machine.

In apparatus for feeding a continuous web, it has previously been proposed to feed the web from a reel between two co-operating rollers, and to strip the leading edge of the web from the surface of the rollers by means of fixed plates located in close proximity to the surfaces of the rollers on the opposite side to the point of contact of the rollers to that at which the reel of material is located. These fixed plates have been provided with elements arranged to provide longitudinal corrugations in the web to assist the feeding thereof.

It has been customary also to arrange the rollers of substantially the same width as, or wider than, the web, and it is found that when webs of a particular material are to be fed, such for example, as a web of cellulose material, a charge of static electricity is generated on the surface of the rollers and the paper, thus causing the cellulose material to cling to the surface of the roller and pass round the latter between the fixed stripping plate and the surface of the roller.

It is customary in such web feeding apparatus to sever the web after it has passed through the cooperating feeding rollers, by means of a rotating knife which nips the web against a fixed knife blade, the edges of both the knives being arranged transversely to the direction of feed of the web, and the axis of the rotatable knife arranged parallel to the knife edge.

In such constructions it has been customary to arrange the edge of the fixed knife in such a manner that the surface of the edge which faces in the direction of the reel is substantially at an angle of 80° to 90° to the plane of the web.

It is found that this arrangement of knife edge is objectionable, particularly when the material to be severed consists of a cellulose derivative, because the latter, probably due in this case also to the charge of static electricity, clings to the surface of the knife facing the reel, and after one portion of web has been severed, the leading portion will not readily move past the knife edge, thus causing the web to buckle at this point.

It is an object of the present invention to overcome the foregoing objections, and in one form according to the present invention, there is provided web feeding apparatus (e. g., in or for a packing or wrapping machine) in which the web

is fed between a pair of co-operating feeding elements (e. g., a pair of rollers), wherein there is provided a pair of guide plates for the web, said plates having apertures through which the co-operating surfaces of the feeding elements project.

Each co-operating element may be of a width which is less than the width of the web, in order to reduce the surface which can be electrostatically charged, and each feeding element may comprise a plurality of rollers spaced apart from each other in an axial direction, apertures being provided in the guide plates for each of the rollers. The adjacent faces of the guide plates may be provided with elements projecting therefrom and extending lengthwise from the direction of travel of the web, the elements on the respective plates being intercalated to form longitudinal corrugations in the web. The projecting elements may project from the plane of the face on which they are located, and may extend beyond the plane of the face of the opposed plate. One or more of the intercalated elements may be adjustable towards and away from the opposed elements, and the adjustable element may be pivotally mounted on a guide plate and arranged to be adjusted by a screw operating against the action of the spring. The intercalated elements may be operative to corrugate the web longitudinally the corrugation being formed progressively outwardly towards the edges of the web, commencing from a point substantially in the centre of the web, and the intercalated elements may be arranged transversely of the web and separated from each other by free spaces.

In another form of the invention there is provided web feeding apparatus in which a length of material is severed from a web by means of a moving (e. g. rotatable) knife which is arranged to co-operate with a fixed knife, wherein the edge of the fixed knife is provided with a lead, said lead being arranged to form an acute angle with the plane of the web to guide the leading portion of the latter to the knife edge. A deflecting element or elements (e. g., resilient plates) may be provided to co-operate with the fixed knife to deflect the leading edge of the web past the knife.

The invention will be more particularly described with reference to the accompanying drawings, in which:—

Figure 1 is a sectional side elevation of web feeding and severing apparatus having the invention applied thereto.

Figure 2 is a detail of Figure 1.

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Figure 3 is a detail drawn to an enlarged scale, showing the arrangement of the cutting knives illustrated in Figure 1.

Figure 4 is a perspective view of a detail of Figure 1.

Figure 5 is a sectional side elevation illustrating a modified form of the invention.

Figure 6 is a sectional side elevation showing a further modified form of the invention.

Figure 7 is a view illustrating a portion of Figure 6.

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

Referring to Figures 1 to 4, the web feeding and severing device is mounted above the bed 1 of a packing or wrapping machine, and a web 2 of cellulose acetate or other similar material is fed from a reel (not shown) and is led between a pair of guide plates 3 and 4. The guide plates 3 and 4 are arranged in close proximity to each other as illustrated in the drawings, and are provided with elements in the form of ridges 5 which extend lengthwise in the direction of travel of the web. The ridges are intercalated so that the web, as it passes between the guide plates 3 and 4, is longitudinally corrugated to facilitate the feeding of the web.

The web is pulled between the guide plates by a pair of rollers 6, 7, which protrude through apertures 8 and 9 in the plates 3 and 4 respectively. The axes of the rollers 6 and 7 are arranged at right angles to the direction of feeding of the web, and the length of the rollers projecting through the guide plates, considered in the direction of the axis of the rollers, is less than the width of the web. This can be clearly seen from Figure 2 of the drawings, in which the roller 6 is shown protruding from the apertures 8 in the plate 3. The roller 6 is formed in two parts, as illustrated in Figure 2, although it will be understood that if desired, the roller may be in one length, in which case it will be arranged symmetrically on either side of the centre lines 10 of the guide plate 3. The purpose of making the rollers 6 and 7 of a width which is less than the width of the web is to reduce the area of the web which is engaged thereby, and so to reduce the electrostatic charge which is produced by friction between the web and rollers. If desired, one of the rollers may be provided with a steel surface and the other with a rubber surface.

Owing to the fact that the web is guided by the guide plates 3 and 4, and to the fact that the rollers project through apertures in the guide plates, the web is positively stripped from the rollers and does not tend to be carried round the latter, as is frequently the case when the web is removed from the rollers by means of stripping plates, that is to say, plates which engage the surfaces of the rollers and tend to strip the web if the latter has a tendency to adhere to the surface of the rollers.

The ridges 5 of the plates 3 and 4 are arranged so that the central ridge 11 is the first ridge to engage the web in order to commence forming the longitudinal corrugations thereon, and the remaining ridges 5 are arranged at a lower level on the plates, so that the corrugations are formed progressively outwardly towards the edges of the web from the centre thereof and draw the edges of the web towards the centre thereof. By corrugating the web in this manner, the process is greatly facilitated without undue strain being imposed suddenly upon the web.

In the form of the invention being described, the ridge 11 is pivotally mounted on a pin 12

arranged in bearings on the guide plate 3. The ridge 11 is urged away from the web by the spring 13, and an adjustable stop 14 in the form of a screw is provided to set the finger in the desired position. By this arrangement, the depth of the corrugations formed in the web may be adjusted according to the requirements of different materials, or according to the different thicknesses of material, of which the web is composed. The ridges 5 on the respective plates 3 and 4 are formed as intercalated fingers as seen clearly in Figure 1, and in this manner the web is corrugated to the required degree. The ridges on one plate extend beyond the plane of the face of the opposite plate, thus enabling deeper corrugations to be obtained than if the plates were not cut away between the ridges. Further, if the ridges do not project beyond the plane of the opposite plate as mentioned above, the effect of having spaces between the ridges will be to reduce the friction upon the web as it passes between the guide plates 3 and 4, since the latter cannot be pressed or otherwise engaged by a relatively large area on the plates.

After passing the guide plates 3 and 4 and the ridges 5, the web 2 is carried past a severing device, which consists of a fixed knife 15 having its cutting edge lying transversely to the direction of movement of the web and in substantially the same plane as the latter, and a moving knife 16, the edge of which is arranged parallel to the edge of the fixed knife, and which is rotatable about a spindle 17. The moving knife is adapted to nip the web 2 between itself and the fixed knife, and thus to sever the web. In the case of a web of cellulose acetate, the leading edge of the latter tends to cling to the surface of the fixed knife 15, which is directed towards the side from which the web is fed. In order to overcome this tendency, the surface of the fixed knife is provided with a lead 170, which is arranged at an acute angle to the plane of the web. A suitable angle for the lead is found to be from 40° to 45° with the plane of the web, but the angle is not necessarily limited to this range.

In addition to the lead 170 provided on the knife 15, a deflector 18 may be provided, and this deflector may comprise a number of spring fingers which project beyond the edge of a fixed knife, and the lowermost extremities of the fingers are arranged in close proximity to the lead 17. The arrangement of the fingers 18 is such that as the rotatable knife 16 moves to perform the severing operation, the fingers 18 are pressed away from the point of severance by the moving knife, and as soon as the knife 16 moves past the fingers 18, these latter spring into the path of the web and move the leading edge of the web clear of the fixed knife. By the co-operation of the fingers 18 with the lead 170 on the fixed knife, the leading edge of the web is prevented from clinging to the knife edge.

After the web has been severed, the severed portion thereof moves downwardly between guides 19 and 20, and the guide 20 is formed, as shown in Figure 4, with a number of downwardly projecting fingers 21, the reason for this being that whereas in previous constructions the guides 19 and 20 have been formed as smooth plates between which the severed portion of the web passes, owing to the construction of the guide 20, the friction between the web and the guides is reduced, since there is less surface on the guide 20 to be engaged by the web. If desired, the guide 19 may be formed in a similar manner to the guide 20.

Referring to the modified form of the invention illustrated in Figure 5, the web 2a is fed between the guide plates 3a and 4a by rollers 6a and 7a, which operate through apertures 8a and 9a in the manner above described. In this case however, the ridges 5a are provided upon the faces of the plates 3a and 4a, and no free space is left between the ridges on the respective plates.

Referring to Figure 6, the web 2b is again fed between the plates 3b and 4b, as previously described, and the ridges 5b in this case formed as fingers are intercalated as illustrated in Figure 6, in order to corrugate the web in a longitudinal direction.

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

1. In apparatus of the class described, the combination with means for engaging and feeding a web in the direction of the length thereof, of means for engaging the web thus fed to form longitudinally extending corrugations therein, said last named means comprising a pair of stationary plates disposed on either side of the web,

said plates having opposed faces between which the web is fed, said plates having intercalated projections engaging the moving web to corrugate the latter, at least one projection on each plate extending from the face of the plate and beyond the plane generally defined by the opposed face of the other plate, at least one of said projections being movably supported for adjustment toward or from the path of movement of the web.

2. In apparatus of the class described, the combination with means for engaging and feeding a web in the direction of the length thereof, of means for engaging the web thus fed to form longitudinally extending corrugations therein, said last named means comprising intercalated elements disposed on either side of the web, the elements at opposite sides of the web extending beyond a common intermediate plane, and means supporting one of said elements for adjustment toward or from the web, whereby the depth of the corrugations may be varied.

THOMAS GRAYLAND JACKSON.