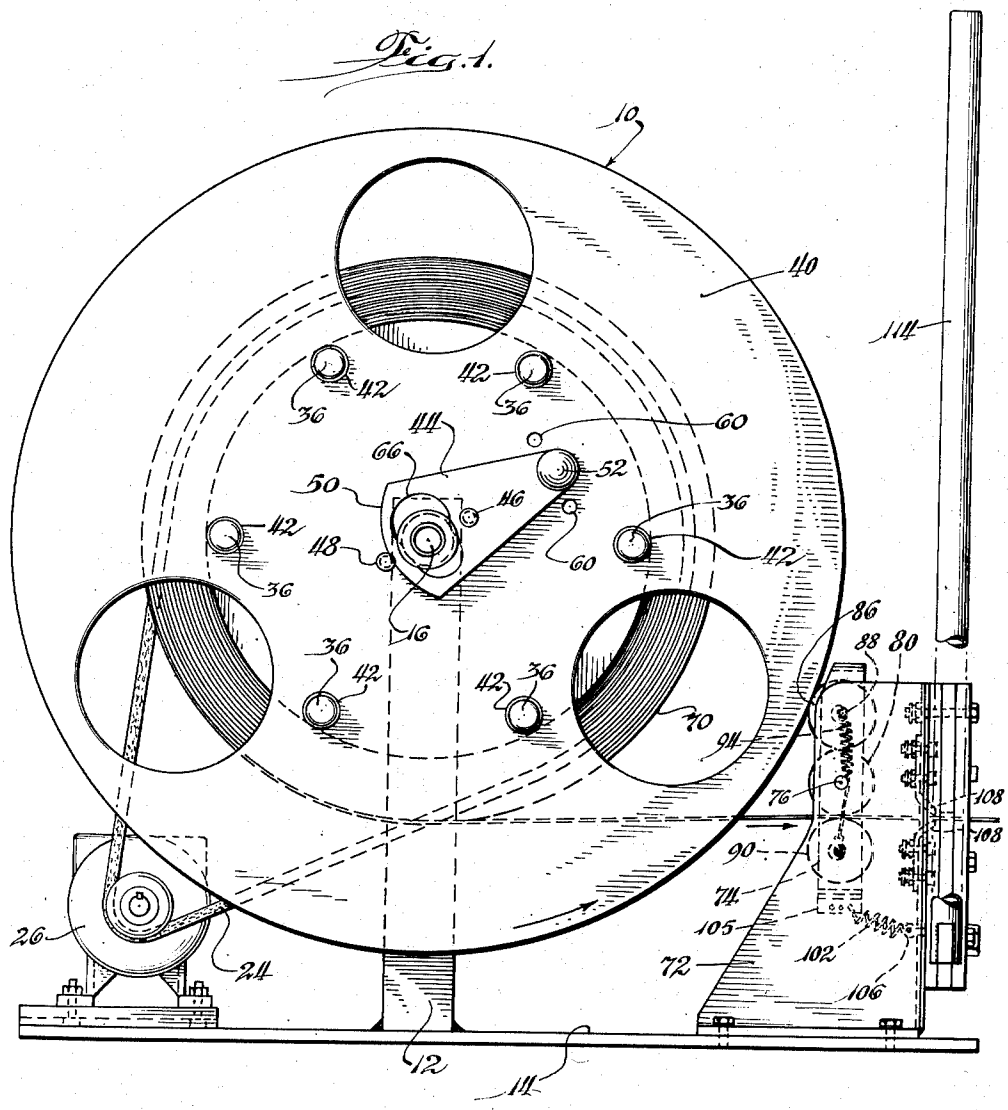
April 13, 1954 W. C. CHILDRESS 2,675,187

DISPENSER FOR BINDER STRAP

Filed Feb. 9, 1951

2 Sheets-Sheet 1

Fig. 1.



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DISPENSER FOR BINDER STRAP

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2 Sheets-Sheet 2

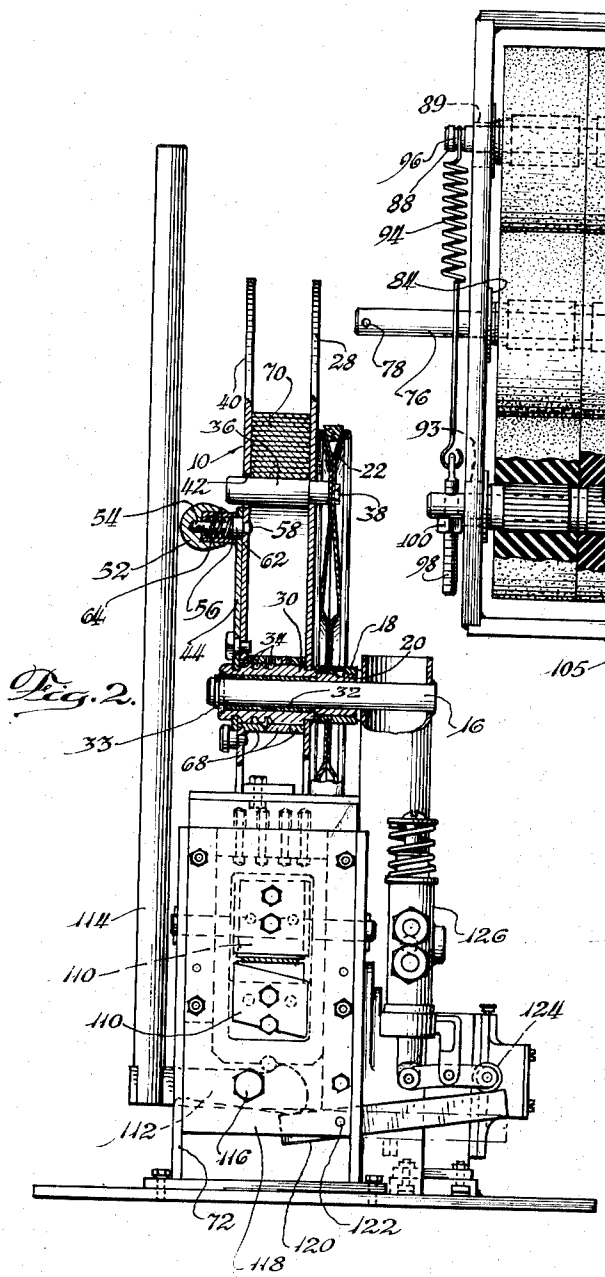


Fig. 2.

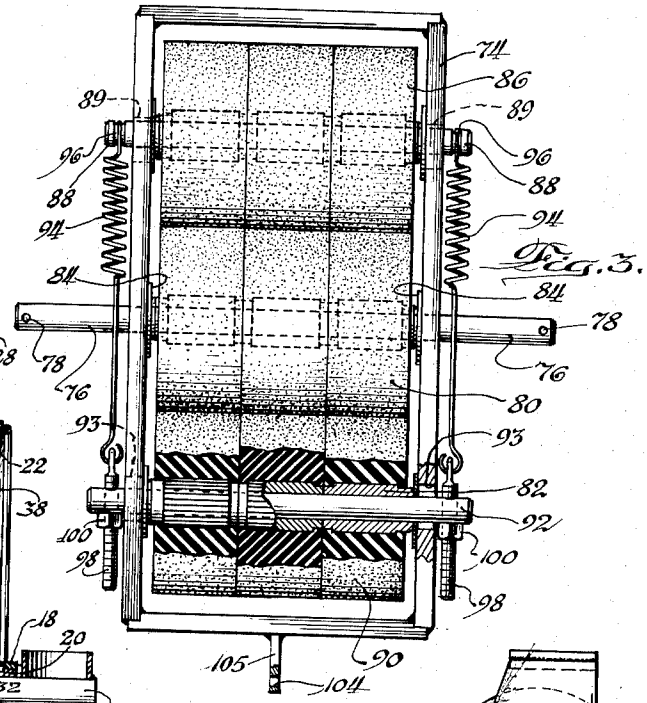


Fig. 3.

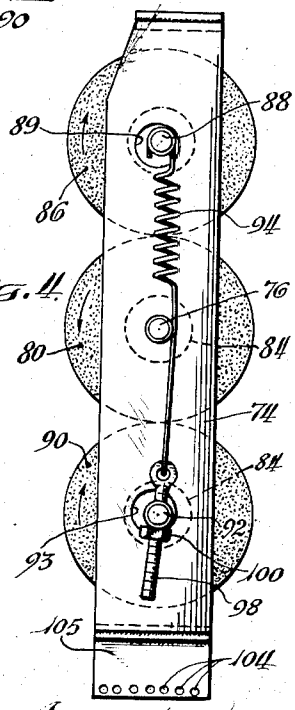


Fig. 4.

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UNITED STATES PATENT OFFICE

2,675,187

DISPENSER FOR BINDER STRAP

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6 Claims. (Cl. 242—55)

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The present invention relates to dispensers for binder strap, wire and similar material, and particularly those of the reel type which have mechanism to prevent tangling of the strapping or the like on the reel if the reel overruns.

Steel strapping material, wire or the like, is normally supplied in a coil which is placed upon a reel and then pulled from the reel as needed. There is, of course, considerable rotational inertia in the reel and coil system such that if the end of the strapping is pulled sharply outwardly the reel will continue to turn and may cause some tangling on the reel. Also, for some applications it is desirable to have the reel turned directly by a power means such as an electric or compressed air motor, for instance, so as to speed up the operation and reduce the work to be performed by the operator, but this of course will cause tangling unless special means are used to prevent it.

In view of the above, it is one of the objects of the present invention to provide a novel dispensing reel assembly which will dispense continuous material such as strap when needed under sufficient control to prevent there being any possibility of the material tangling upon the reel.

Yet another object is to accomplish the above in an extremely simple and reliable fashion.

Still another object is to accomplish the above by mechanism which does not add appreciably to the friction in the system and which does not wear rapidly.

It is an additional object of this invention to provide an improved dispensing reel assembly which is well adapted for either manual or power operation without extensive changes.

Other objects and advantages will become apparent from the following description of a preferred embodiment of my invention which is illustrated in the accompanying drawings.

In the drawings, in which similar characters of reference refer to similar parts throughout the several views:

Fig. 1 is a front view of a strap dispensing and cut-off assembly constructed according to the present invention;

Fig. 2 is a front end view thereof with a portion of the reel and associated mechanism broken away so as better to disclose the structure;

Fig. 3 is a front end view of a subassembly which is a portion of the mechanism used for keeping the strapping tightly coiled upon the reel; and

Fig. 4 is a side view of the subassembly shown in Fig. 3.

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By referring to Fig. 1 of the drawings, it will be seen that a reel, indicated generally by the numeral 10 is mounted upon a horizontal axle which is supported upon a pedestal 12 fixed to a base 14. The base can be a frame of any suitable type or simply a flat steel plate as shown. The pedestal 12 consists of a steel tube welded to the base 14 and of appropriate height. Near its upper end the pedestal is drilled transversely and a round rod 16 is inserted at one end and welded in place so as to form a horizontal axle for the reel 10 with this axle extending transversely of the base 14.

A steel sleeve 18 internally fitted with a bearing bushing 20 rotates upon the axle 16 and carries a V-belt pulley 22 driven by a belt 24 which leads to a prime mover 26 mounted upon the base 14. The prime mover shown is a compressed air motor but an electric motor may be substituted if desired.

An inner disc shaped reel flange 28 is secured at its center to a steel sleeve 30 fitted over a bushing 32 of bearing metal which is journaled to rotate upon the axle 16 in a position outward of the pulley bushing 20. This sleeve 30 is retained against endwise outward movement by a snap ring 33 fitted to a circumferential groove in the outer end of the axle 16. The sleeve 30 has several circumferential grooves 34 cut therein, three being shown, which, as will be explained presently, adapt the reel to take coils of strapping of different width.

A plurality of horizontal pins 36 are equally spaced around a circle and define the internal diameter of the coil of strapping material to be dispensed from the reel; that is, the circle defined by these pins should normally be slightly less than the internal diameter of the coil of strapping material as it is delivered to the user so that the coil may be easily slid in an endwise direction over these pins. The pins are welded to the surface of the rear reel plate 28 and extend therethrough and are secured at their opposite ends by nuts 38 to the pulley 22 so that as the pulley is rotated, the reel plate 28 and pins 36 rotate therewith.

The front reel plate indicated by the numeral 40 is formed as a steel disc having the same diameter as the rear plate 28 with a circular opening at the center large enough to slide over the sleeve 30 in an endwise direction. This front plate also has a plurality of holes 42 spaced about a circle and adapted to fit over the ends of the pins 36. A latching lever 44, which is generally triangular in form and cut from steel plate, is

pivoted at approximately its midpoint to a pin or bolt 46 located just to one side of the central opening through the front plate 10. At the opposite side of this opening a headed pin 48 is also secured to the front reel disc 10 and this end of the latching lever 44 is formed to have an arcuate contour as indicated at 50, the radius of this arc being approximately the distance between the pivot pin 46 and the portion of the headed pin 48 beneath its shoulder. The latching lever 44, therefore, can be swung from side to side about the pin 46 and will be held in face-to-face contact with the front plate 40 by the heads on the pivot pin 46 and the pin 48.

At the end remote from the axis of rotation of the reel, the lever 44 is provided with a handle 52 which is used to swing the lever from side to side. This handle is attached to a pin 54 which passes through a sleeve 56 welded to the end of the lever 44 and at its extreme inner end has a detent extension 58 which projects into either of two holes 60 formed in the face of the front plate 40. The pin 54 also is provided with a portion 62 of larger diameter fitted to the sleeve 56 which bears against one end of a coil spring 64, the opposite end of which bears against a shoulder at the outward end of the tubular sleeve 56. The portion of the latching lever 44 in alignment with the sleeve 30 is cut away to provide an arcuate slot 66, one end of which is slightly larger than the outside diameter of the sleeve 30, while the opposite end has a width about equal to the diameter of the sleeve at the bottoms of the circumferential grooves 34. The slot 66 has such a length and is so oriented that when the handle 52 is pulled outwardly against the pressure of the spring 64 so as to release the detent 58 and is then swung so that the detent snaps into the hole 60 in one direction, the large end of the slot 66 will be in alignment with the central opening through the front plate 40, thereby permitting the front plate to be moved on or off the sleeve 30. The front plate 40 can be pushed over the sleeve 30 and latched in place by pulling the knob 52 outwardly and swinging the lever 44 so that the detent 58 snaps into the other hole 60 with the lever caught in any one of the three grooves 34. If desired of course more or less grooves 34 can be provided so as to fit the thicknesses of the coils of strapping material normally intended to be used with the device. In order to insure the cover plate 40 being latched in the proper position, and to give additional stiffness to the assembly, it is worthwhile to provide a group of spacing sleeves indicated at 68. These sleeves have an internal diameter such that they slide easily over the sleeve 30 and have a length such that one, two or all three are used, depending upon which of the circumferential grooves 34 is to be used in latching the cover plate 40 in place.

As shown in Fig. 1 the coil of strapping material indicated at 70 is normally placed upon the reel with the free end passing outwardly to the right from the bottom of the coil. It passes between a pair of vertical bracket side plates 72 secured to the base plate 14 and spaced apart a distance sufficient to accommodate the frame shown in Fig. 3.

In Fig. 3 I have shown a rectangular frame indicated by the numeral 74 which is constructed of side, top and bottom members notched and welded together at their ends to provide a rigid structure. An axle member 76 passes through the frame at approximately its midpoint and has an extension at each side which also passes

through openings in the bracket plate 72, the axle 76 being retained in place in the brackets by means of cotter pins passed through holes 78 at the ends of the axle. The frame 74 is, therefore, fixed in place in the bracket 72 but can rock about the axle 76. Within the frame the axle carries one or more, three being shown, rollers 80, preferably formed of rubber or the like, which are fitted at their centers to bearing sleeves 82 which turn upon the axle 76. The group of three rollers is, in the example shown, spaced from the inner faces of the side members of the frame 74 by washers 84. A similar set of rollers 86 is mounted upon a short axle 88 in a position above the rollers 80, with the axle 88 extending through openings 89 at the sides of the frame 74. These openings are of considerably larger diameter than the axle 88 so that the rolls 86 are free to rotate and also to move upwardly and downwardly to a limited extent relative to the frame 74. A third set of rollers 90 are similarly mounted upon an axle 92 passing through large diameter holes 93 in the frame 74 in a position below the centrally disposed rollers 80.

The two outward sets of rollers are kept in contact with the central group by means of a pair of coil springs 94, the upper ends of which are hooked into grooves 96 formed around the upper shaft 88 while their lower ends are connected to adjustment screws 98 which pass through transverse openings near the ends of the lower axle 92. The lower ends of these screws are fitted with nuts 100 which can be turned to move the screws 98 upwardly or downwardly so as to vary the tension in the springs 94 and, therefore, the pressure with which the outer set of rolls are brought against the central set. It will be seen further that this arrangement automatically compensates for wear upon the rolls in that they are gradually moved toward each other as the surface is eroded away.

When the frame 74 is in an approximately vertical position the upper rolls 86 bear against the rims of the steel discs 28 and 40 which comprise the reel faces. As the reel rotates, therefore, the rollers 86 will also be rotated since they are swung into contact with the reel edges by a coil spring 102 hooked through any of several holes 104 at the lower edge of a downwardly extending tab 105 welded to the lower member of the frame 74. The opposite end of this spring is attached to a fitting 106 positioned to the right of the frame 74. Inasmuch as the sets of rolls 86, 80 and 90 are in contact with each other in that order, rotation of the rolls 86 will drive the rolls 80 which in turn rotate the rolls 90.

The end of the strapping 70 is passed from the coil upon the reel to the right and between the intermediate roll 80 and the lower roll 90 and is held firmly between these pinch rolls because of the tension in the springs 94. Now if it is assumed that the end of the strapping is grasped by an operator and pulled outwardly, it will be seen that the reel 10 will be caused to rotate. It is also apparent that since the outer diameter of the reel side plates 28 and 40 is larger than the outer diameter of the coil of strapping material 70, the peripheral velocity of the reel rim will be greater than the velocity of movement of the strap 70 being payed from the reel. Also, since the peripheral velocity, assuming no slip, of the three rolls 86, 80 and 90 is the same as that of the outer rim of the reel 10, it becomes apparent that the pinch rolls 80 and 90 which grip the

strapping tend to pull the strapping outwardly faster than it leaves the reel 10. The result is that the portion of the strapping between the pinch rolls 80 and 90 and the reel will be under some tension. As this tension assumes a value greater than the force in the opposite direction produced by the spring 102, the lower end of the frame will move slightly to the left thereby reducing the friction between the roll 86 and the rims of the reel 10. The reel, therefore, slips relative to the roll 86 but does so under conditions which do not produce any considerable degree of wear either upon the rims of the reel 10 or the rolls 86. Conversely, any tendency for the tension in the portion of the strap between the pinch rolls 80 and 90 and the reel 10 to become less, results in the driving roll 86 being urged more tightly against the reel rim 10 thereby increasing the velocity of movement of the strapping between the rolls 80 and 90 with the result that the slack is quickly taken up.

If it is assumed that the dispenser is power-driven as by the motor 26, the same action takes place because any movement of the reel 10 tending to pay out strap will be accompanied by rotation of the rolls 86 with the result that the velocity of movement of the strapping between the rolls 80 and 90 tends to be greater than that at which the reel can feed it until the tension in the portion of the strapping between the rolls 80 and 90 and the reel assumes a value sufficient to tilt the frame 74 and reduce the frictional driving contact between the rolls 86 and the rims of the reel 10.

Although it forms no part of the present invention and, therefore, needs no specific discussion, it is a convenience if the strapping passes from the pinch rolls 80 and 90, between a pair of angularly disposed guide plates 108, and then between cutter blades 110. One of these cutting blades is fixed in a position above the plane of the strapping while the lower blade 110 is movable from beneath the strapping into a position overlapping the upper cutter blade 110 so as to sever the strap. The lower blade 110 is moved upwardly in tracks by a transversely disposed rocking member 112, the outer end of which is secured to an upwardly extending lever 114. It is pivoted at a midpoint to a bolt 116 which passes through cross plates 118 attached to the side bracket plates 72, and at its inner end bears against the upper edge of a second rocking arm 120. This arm is pivoted at 122 with its opposite end bearing against a roller 124 which operates a valve mechanism 126 connected to deliver air to the compressed air motor 26. The linkage is such that when the upper end of the lever 114 is moved inwardly slightly by the operator, the air valve will open to deliver compressed air to the motor 26 thereby driving the reel 10 and dispensing the strapping. When the lever is in a neutral position the machine is at rest, whereas when the lever is pulled outwardly the strapping will be cut off, thereby preparing the device to deliver an additional length of strapping.

From the above description of a preferred embodiment of my invention it will be seen that strapping can be dispensed under power from a reel while under complete control and without appreciable wear upon the mechanism by an arrangement which can be provided at extremely low cost. It is further apparent that the identical arrangement can also be used if the device is of the type in which strapping is pulled out by hand, or in which the reel is rotated by hand to

push out the strapping, since the machine shown is adapted for this mode of operation if the belt 24 is simply removed from the pulley 22. Of course, as a matter of fact, if the machine is intended for manual operation solely, certain of the parts shown obviously may be omitted from the structure.

While I have shown and described a preferred embodiment of my invention, it will be apparent that numerous variations and modifications thereof may be made without departing from the underlying principles of the invention. I, therefore, desire, by the following claims, to include within the scope of the invention all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. In a device for feeding continuous material from a coil, a rotatable reel to hold said coil, a pair of rotatable pinch rolls for gripping said material between them and paying out said material as said rolls rotate, a rotatable drive member connected for driving said rolls, means mounting said drive member, pivot means mounting said mounting means for swinging said drive member into frictional engagement with said reel and away therefrom, resilient means connected to urge said drive member into engagement with said reel, said drive member when in engagement with said reel tending to drive said pinch rolls at a higher peripheral velocity than said coil so as to develop tension in the portion of said material between said pinch rolls and said coil, and said pivot means being so located that said tension opposes said resilient means and tends to move said drive member away from said reel to cause slip between said drive member and said reel to reduce the drive to said pinch rolls.

2. In a device for feeding continuous material from a coil, a rotatable reel to hold said coil, a pair of rotatable pinch rolls for gripping said material between them and paying out said material as said rolls rotate, a rotatable drive member connected for driving said rolls, means mounting said drive member, means including a pivot mounting said last named means for swinging said drive member into frictional engagement with said reel and away therefrom, resilient means connected to urge said drive member into engagement with said reel, said drive member when in engagement with said reel tending to drive said pinch rolls at a higher peripheral velocity than said coil so as to develop tension in the portion of said material between said pinch rolls and said coil, said pivot being so located that said tension opposes said resilient means and tends to move said drive member away from said reel to cause slip between said drive member and said reel to reduce the drive to said pinch rolls, and power means for rotating said reel.

3. In a device for feeding continuous material from a coil, a rotatable reel to hold said coil, a pair of rotatable pinch rolls for gripping said material between them and paying out said material as said rolls rotate, a rotatable drive member connected for driving said rolls, a frame for journaling said rolls and said drive member, means mounting said frame for pivoting movement to swing said drive member into frictional engagement with said reel and away therefrom, resilient means connected to urge said frame in one direction to bring said drive member into engagement with said reel, said drive member when in en-

gagement with said reel tending to drive said pinch rolls at a higher peripheral velocity than said coil so as to develop tension in the portion of said material between said pinch rolls and said coil, and said pivot means being located on said frame between the point of contact on said drive member with said reel and the point of tangency of said pinch rolls with said material so that said tension on said pinch rolls tends to swing said frame in the other direction away from said reel to cause slip between said drive member and said reel to reduce the drive to said pinch rolls.

4. In a device for feeding continuous material from a coil, a rotatable reel to hold said coil, a pair of rotatable pinch rolls for gripping said material between them and paying out said material as said rolls rotate, a rotatable drive member connected for driving said rolls, means mounting said drive member and said pinch rolls, means including a pivot mounting said last named means for swinging said drive member toward and into frictional engagement with said reel and away therefrom, said mounting means moving said pinch rolls away from said reel when said drive member is moved toward said reel, resilient means connected to urge said drive member into engagement with said reel and said pinch rolls away from said reel, said drive member when in engagement with said reel tending to drive said pinch rolls at a higher peripheral velocity than said coil so as to develop tension in the portion of said material between said pinch rolls and said coil, and said pivot being so located that said tension opposes said resilient means and tends to move said pinch rolls toward said reel and said drive member away from said reel to cause slip between said drive member and said reel to reduce the drive to said pinch rolls.

5. In a device for feeding continuous material from a coil, a rotatable reel to hold said coil, a pair of rotatable pinch rolls for gripping said material between them and paying out said material as said rolls rotate, a friction drive member connected when in a certain position to drive said rolls from said reel, means mounting said

drive member, means including a pivot mounting said last named means for swinging said drive member into said certain position and away therefrom, resilient means connected to urge said drive member into said certain position, said drive member when in said certain position tending to drive said pinch rolls at a higher peripheral velocity than said coil so as to develop tension in the portion of said material between said pinch rolls and said coil, and said pivot being so located that said tension opposes said resilient means and tends to move said drive member away from said certain position to cause slip between said drive member and said reel to reduce the drive to said pinch rolls.

6. In a device for feeding continuous material from a coil, a rotatable reel to hold said coil, a pair of rotatable pinch rolls for gripping said material between them and paying out said material as said rolls rotate, a drive member rotatably mounted on an axis other than the axes of said pinch rolls, a frame mounting said pinch rolls and said drive member, means pivotally mounting said frame on an axis of rotation of one of said pinch rolls for swinging said drive member into frictional engagement with said reel and away therefrom, resilient means connected to said frame to swing said drive member into engagement with said reel, said drive member when in engagement with said reel tending to drive said pinch rolls at a higher peripheral velocity than said coil so as to develop a tension in the portion of said material between said pinch rolls and said coil, and said tension opposing said resilient means and tending to swing said drive member away from said reel to cause slip between said drive member and said reel to reduce the drive to said pinch rolls.

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