March 24, 1959 K. F. NEWELL 2,879,063

WEB SUPPLY MEANS

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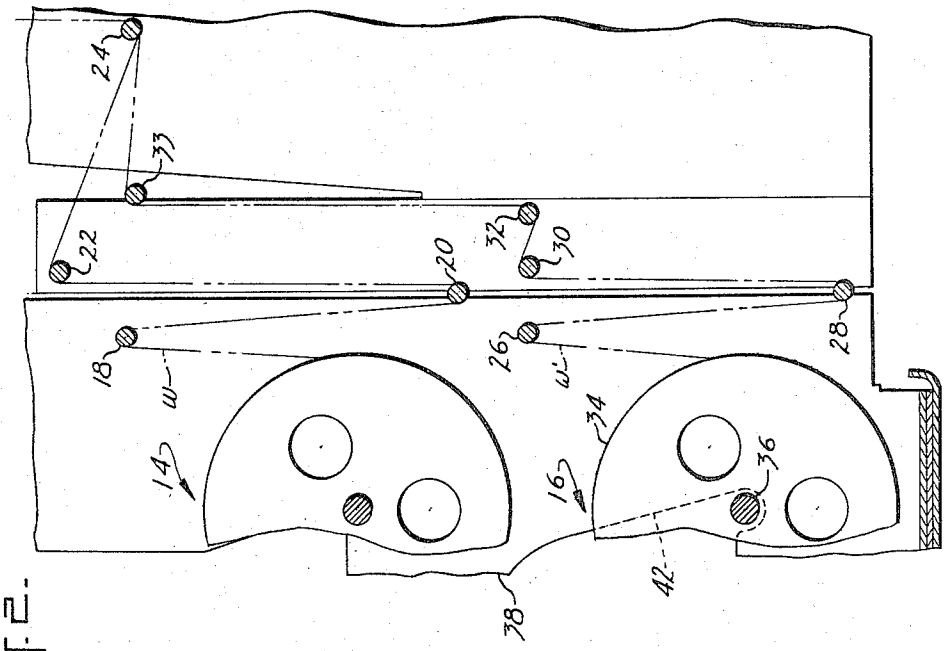


Fig. 2.

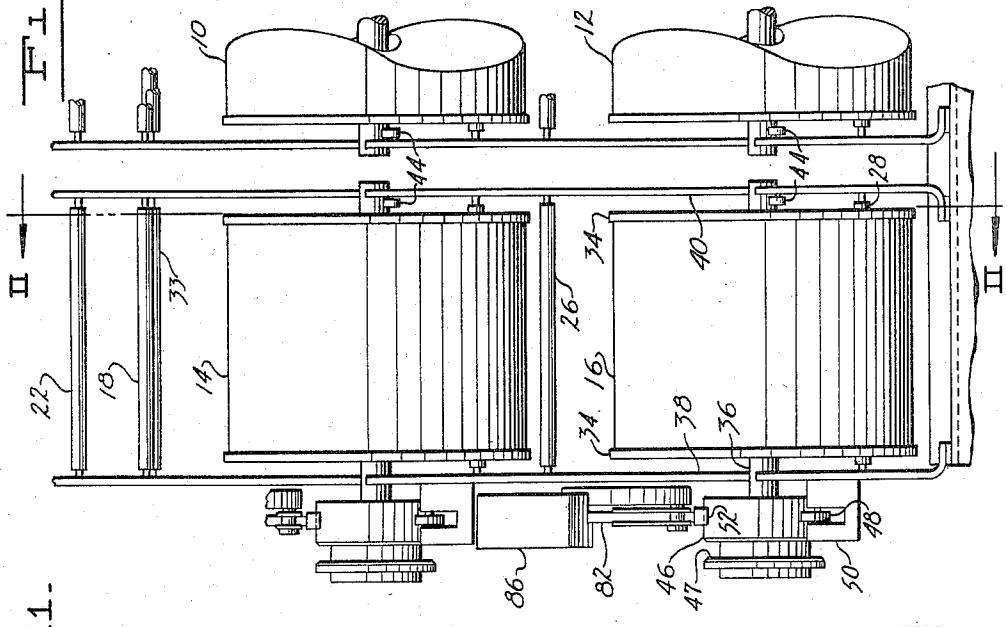


Fig. 1.

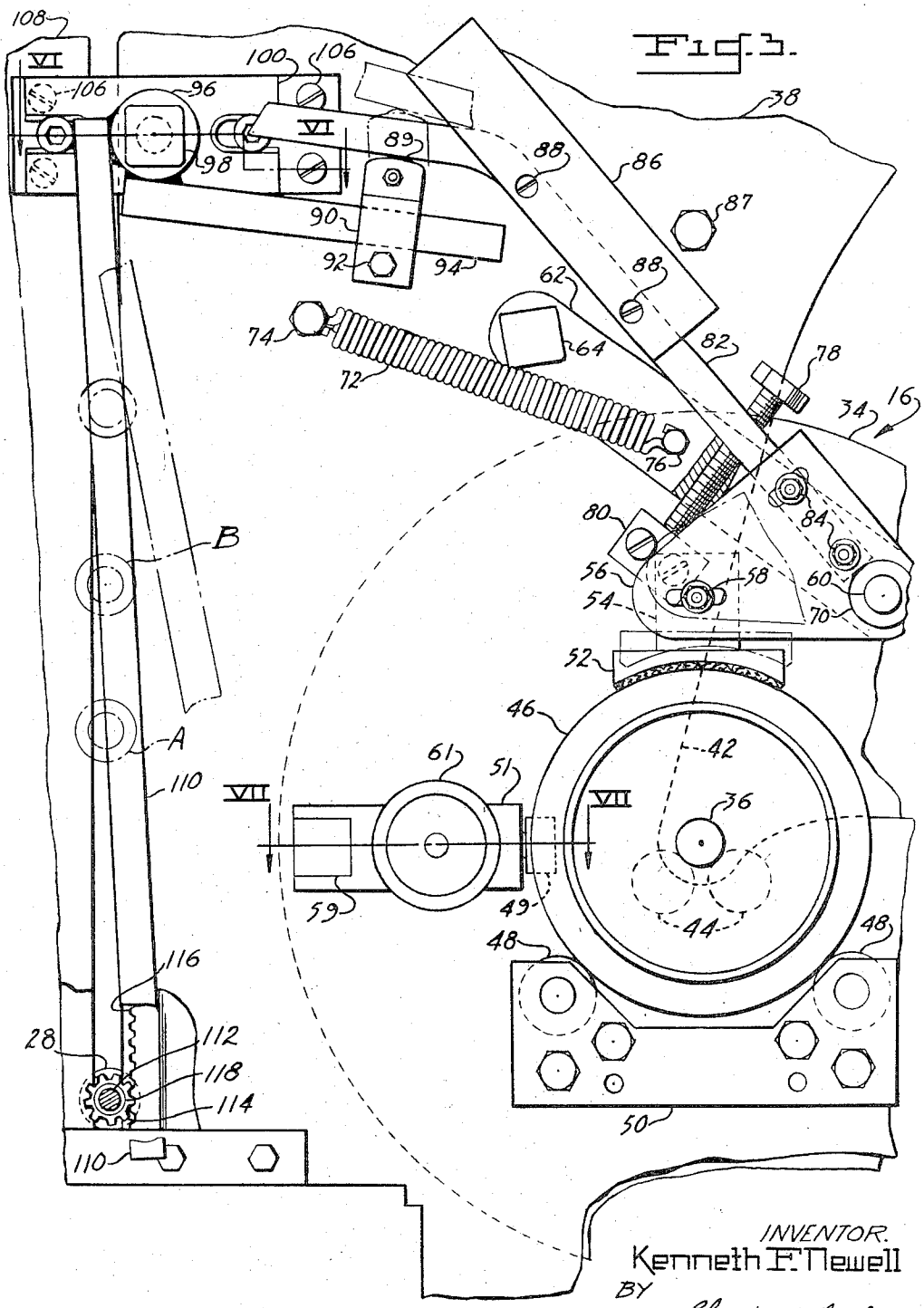
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Fig. 3.



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Fig. 4.

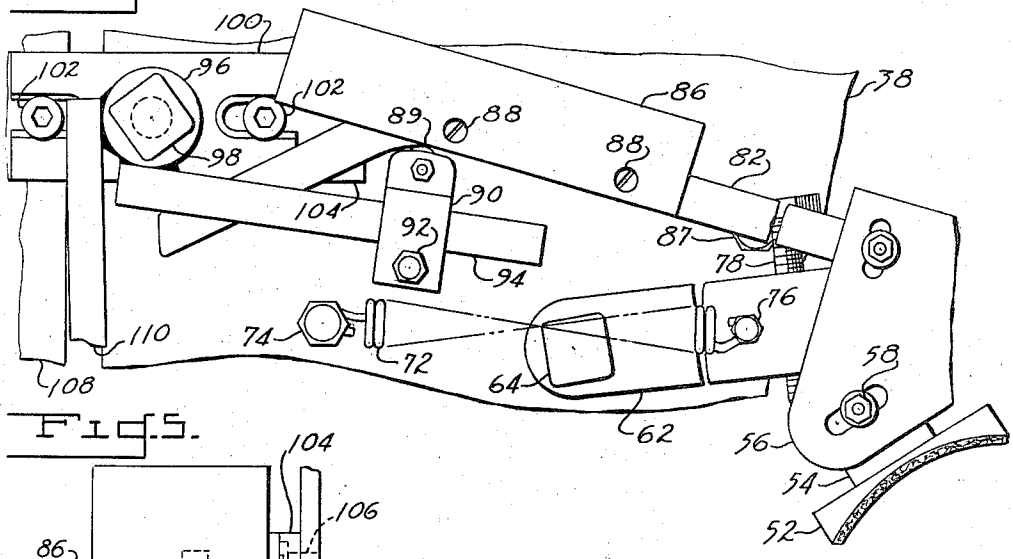


Fig. 5.

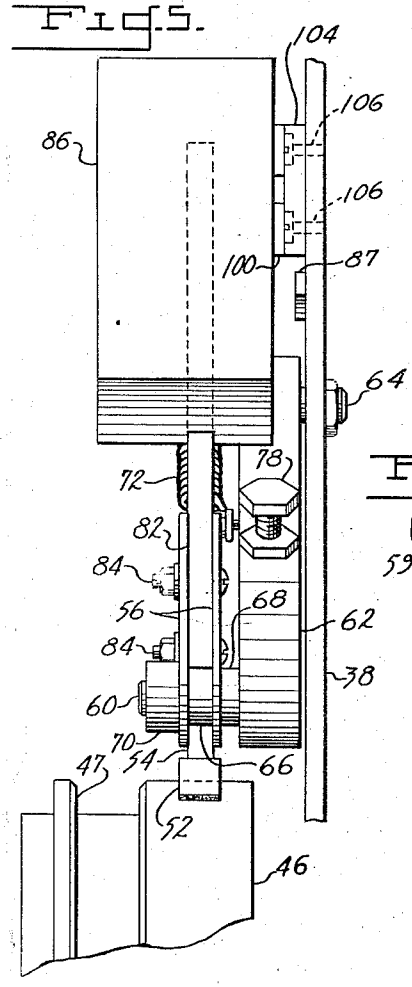


Fig. 6.

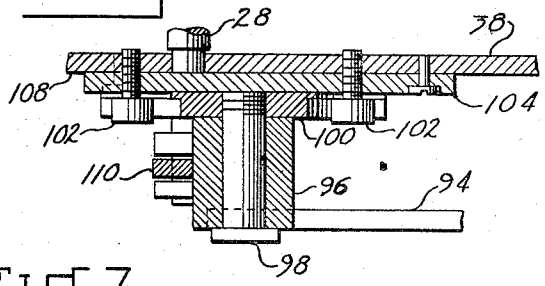
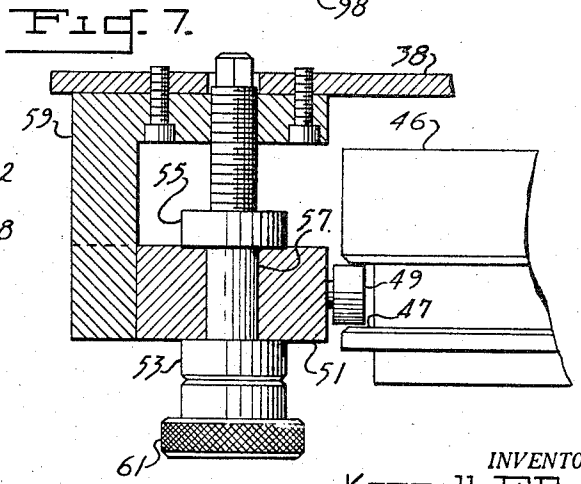


Fig. 7.



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WEB SUPPLY MEANS

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Application August 30, 1957, Serial No. 681,246

6 Claims. (Cl. 271—2.3)

The present invention relates to the handling and control of sheet material webs, with particular relation to the supply roll from which the web is drawn.

One object of the invention is to control the rate of rotation of a supply in accordance with variations in web feed in order that the web may at all times be maintained tight against any element over which it is trained.

A further object of the invention is to provide improved means for transversely positioning a web through control of the supply roll from which it is drawn.

The above and other related objects as well as the novel constructional features of the invention will be apparent from a reading of the following description of the disclosure found in the accompanying drawings and the particular novelty thereof pointed out in the appended claims.

In the drawings:

Fig. 1 is a rear elevation of a web feeding system embodying the present invention;

Fig. 2 is a section taken on the line II—II in Fig. 1;

Fig. 3 is a side elevation, on an enlarged scale, of the lower portion of the system seen in Fig. 1;

Fig. 4 is a fragmentary view showing an alternate relationship of certain parts seen in Fig. 3;

Fig. 5 is a fragmentary view, on an enlarged scale, of a portion of Fig. 1;

Fig. 6 is a section taken on line VI—VI in Fig. 3; and

Fig. 7 is a section taken on line VII—VII in Fig. 3.

For the convenience of persons acquainted with the wrapping machine art the present invention is herein disclosed in a form which has been found suitable for wrapping machines of the type disclosed in U.S. Patent No. 1,986,422 and commonly known by the trademark, Transwrap, under which they are sold. However, it will be understood that this is in no way a limitation on the use of the invention which is of general utility in the field of web supplying devices.

A common arrangement of supply rolls for wrapping machines of this type is illustrated in Fig. 1. The arrangement seen therein is for a dual unit machine having two package forming mechanisms, one supplied with wrapping material from the rolls **10**, **12** and the other from the rolls **14**, **16**. The use of two rolls for each package forming mechanism provides a two ply bag, highly desirable in packaging many materials.

For purposes of the present invention it will only be necessary to deal with the rolls **14** and **16** supplying one of the package forming mechanisms and then detailed consideration will be given only to the novel braking means provided for roll **16**, such braking means being duplicated for the other rolls **10**, **12** and **14**.

A web W is drawn from the roll **14** by draw bars common to the type of wrapping machine referred to and well shown in the aforesaid patent. The web W passes over an idler roll **18**, under a vertically reciprocable tightener roll **20**, over an idler roll **22** and then under a further idler roll **24**. A web W′ is drawn, by the same draw bars, from the supply roll **16** over an idler

roll **26**, under a vertically reciprocable tightener roll **28**, around idler rolls **30**, **32**, over idler roll **33** and then under idler **24**, at which point the two webs W, W′ are superposed. The superposed webs are drawn upwardly from the idler roll **24**, in a pulsating or intermittent manner by the aforementioned draw bars.

Since the pull on each web W, W′ is intermittent, the rolls **14** and **16** will be accelerated to supply the webs and then have a natural tendency to continue rotating when no wrapping material is being drawn into the wrapping machine. Accordingly, the present invention provides improved braking means for controlling the rotation of the supply rolls where a web is intermittently drawn therefrom.

A detailed description of the braking mechanism associated with supply roll **16** will now be given and can best be understood by reference to Figs. 1, 3 and 5. The same braking mechanism can be partially seen in Fig. 1 but is not described in detail. The supply roll **16** is mounted between flanges **34** on a shaft **36** which extends between vertical frame members **38**, **40**. These frame members are recessed as at **42** (Figs. 1 and 3) to receive the shaft **36**. The right hand end (Fig. 1) of this shaft is rotatably mounted on a pair of ball bearings **44** carried on the inner wall of frame member **40**. A brake drum **46** is secured to the other end of the shaft **36** and is received by a pair of roller bearings **48** mounted in a block **50** secured to the outer wall of frame member **38**. The shaft **36** and supply roll **16** are thus freely rotatable.

The brake drum **46** is provided with a peripheral groove **47** which receives a protruding member in the form of roll **49** (Figs. 3 and 7). This roll is mounted on a block **51**, which block is captured between flanges **53**, **55** on a rotatable jack screw **57**. The jack screw is threaded into an L-shaped member **59** which is secured to the frame member **38**. The block **51** is bifurcated to receive the outstanding portion of the L-shaped member to prevent rotation of said block when the jack screw **57** is rotated by its hand knob **61**.

Thus since the shaft **36** is free to slide axially of its mounting means the knob **61** may be rotated to obtain a correct positioning of the supply roll **16** in order to obtain proper transverse positioning of the web W′ and proper tracking thereof over the various rolls and elements around which it is trained.

A brake shoe **52** is disposed above the drum **46** and provided with a suitable friction material lining on its undersurface. The brake shoe has an upstanding portion **54** (Figs. 3 and 5) extending between a pair of plates **56** and captured therebetween by a bolt **58** which passes through a slotted self-centering arrangement in said plates. These plates **56** are pivotally mounted on a pin **60** extending from a bar **62** and not the frame member **38** (see Fig. 5). The bar **62** is pivotally mounted on the frame **38** by a screw **64** threaded therein. Spacing collars **66**, **68** facilitate the pivotal mounting of the plates **56** and a locking collar **70** retains them on the pin **60**.

In normal operation of this braking device the pin **60** serves as a fixed center for pivotal movement of the plates **56**. This is by reason of a spring **72** extending between a screw **74** threaded into the frame **38** and a screw **76** on the bar **62** and urging said bar in a downward or counterclockwise direction. The position of bar **62** (and pin **60**) is adjustably established by a screw **78** threaded through bar **62** and engaging a block **80** secured to the outer wall of frame member **38**.

Also secured between the plates **56** is a bar **82** by means of screws **84**. It will be noticed that the upper screws **84** pass through slots in the plates **56** to enable angular adjustment of the bar **82**. The angularly disposed portion of bar **82** carries a weight **86** which is

slotted to overlie said bar **82** and provided with screws **88** for clamping said weight thereon.

The above-described mounting means for the brake shoe **52** are particularly adapted to swing clear of the brake drum **46** to facilitate replacement of the supply roll **16**. The spring **72** has an over-the-center relationship by means of which it maintains the bar **62** in the operative position seen in Fig. 3. Said over-the-center relationship also permits the bar **62** to be swung about the screw **64** and maintained in an upper position illustrated in Fig. 4 with the spring **72** holding said bar **62** against a stop screw **87** threaded into the frame **38**. The brake shoe **52** and all parts associated with the plates **56** may thus be maintained free and clear of the brake drum **46**, permitting said drum and the shaft **36** to be removed from the machine in order to mount a new supply roll thereon. After the supply roll is replaced it is a simple matter to swing the bar **62** into its lower position and return the brake shoe **52** to its operative position.

The upper end of bar **82** is bent to overlie a roll **89** which is journaled at the upper end of a slotted bracket **90**. A screw **92** clamps the bracket **90** at a desired point along the length of a bar **94** which extends through the slotted undersurface of said bracket. It will be noted that the bracket **90** offsets the roll **89** from the bar **94**. The bar **94** is welded to a hub **96** which is pivotally mounted about a screw **98** threaded into a plate **100** (Fig. 6). The plate **100** is provided with horizontal slots which receive screws **102** for adjustably securing said plate to a strap **104**. Screws **106** secure the strap **104** to the frame member **38** and to a further spaced, vertical frame member **108**. The spacing between the frame members **38, 108** provides a guideway for purposes to be described shortly.

A bar or actuating lever **110** is welded to the hub **96** and extends downwardly therefrom. This lever is responsive to movement of the roll **28** known as the tightener roll which is mounted as follows. The roller **28** (Fig. 3) is in the form of a sleeve rotatably received by a shaft **112**. At either end of the shaft **112** are pinned matching gears **114** which mesh with matching racks **116** secured to the frame members **38, 40**. A collar **118** is provided on the outer end shaft **112** and enters between the guideway provided by the spaced frame members **38** and **108**. A similar guiding arrangement (not shown) is provided at the other end of the shaft **112** between the frame member **40** and still another vertical frame member.

As will be seen from Fig. 3, when roll **28** is in its lowermost position the lever **110** bears against the collar **118** and is in an extreme clockwise direction. This is an extreme position shown for illustrative purposes and not a normal operating position as will later appear. Under this condition the bar **94** is in its lowermost position and the roll **89** will be slightly spaced beneath the bar **82**. The bar **82** is thus in an extreme counterclockwise position allowing full effect of the weight **86** in applying a braking force, by way of the shoe **52**, on the drum **46**.

When the web W' is drawn into the wrapping machine the roll **28** will be raised and as it is so raised the lever **110** will be moved in a counterclockwise direction with respect to the pivot screw **98** and could assume the position shown in phantom where there was a quick pull on the web W'. The bar **94** will be raised to the extreme position illustrated in phantom, lifting the bar **82** and with it the shoe **52** entirely away from the drum **46**, so that the roll **16** is free to rotate and deliver the web therefrom at a maximum rate. The phantom position illustrated, again is not a position which would normally occur as will be brought out below.

The extreme positions of Fig. 3 have been shown to give a clearer picture of the manner in which the brake actuating means operates. However, in normal operation the tightener roll **28** rides between a position one third and one half way up the guideway between the spaced plates. In the lower of these positions the shoe **52** applies a full braking force to the drum **46**, and in the upper no, or substantially no braking force is applied to the drum **46**. Thus as the web W' is intermittently drawn into the wrapping machine the tightener roll reciprocates each time between the above named positions. In so doing the web W' is maintained taut and firm against the various rolls **26, 30, 32, 33** and **24**. It has been found that in the case of a definite intermittent web feed where for a given cycle the web is fed only 50% of the time, that the supply roll should rotate for approximately the same portion of the cycle but in lagging timed relation to the pull on the web. This condition is exemplified in machines of the type of the said Zwoyer patent.

Thus in normal operation the roll **28** drops to the "A" position after each pull on the web W' and in this position the brake shoe **52** positively stops rotation of the supply roll **16**. Thereafter, when the web W' is drawn into the wrapping machine, the roll **28** is gradually raised to the "B" position (which can vary with the inertia of the roll **16**) and the brake shoe **52** gradually raised. This raising of the brake shoe **52** is more after the fashion of gradually releasing the braking pressure than a sudden release of all braking action. This gradual releasing action is obtained by the reverse leverage arrangement including both the low angle between the lever **110** and the path of travel of the roll **28** and also the further reduction in resultant displacement provided by the lever arm distances about the centers at the screws **98** and **60**.

This great reduction means that a fairly large movement of the roll **28** can be translated into delicate and sensitive gradations of the braking effect of the shoe **52**.

Thus, when the wrapping machine pulls on the web W' the roll **28** raises and the roll **16** will gradually begin to rotate. When the roll **28** reaches its upper "B" position it is preferable that some braking force is applied so that at all times there is controlled rotation of the supply roll **16**. As the rate of the web W' decreases the roll **28** drops and the braking force is increased. Thus shortly after the wrapping machine ceases to pull and draw said web, a complete braking force is applied to the drum **46** and rotation of the supply roll **16** is stopped until the web W' is again drawn into the wrapping machine.

Having thus described the invention, what is novel and desired to protect by Letters Patent of the United States is:

1. In a device for supplying a web of sheet material in an intermittent manner, spaced vertical frame members, a shaft extending between said frame members and on which is mounted a supply roll from which the web is drawn, a brake drum at one end of the shaft, an upwardly open anti-friction bearing journal on each frame member, one for receiving the brake drum and the other for receiving the other end of said shaft, a brake shoe disposed above said drum, reverse leverage linkage mechanism comprising a pivotal member having self-centering means for mounting said brake shoe, a weighted lever extending from said pivotal member and overlying said brake shoe and tending to produce a braking force, and a pivotally mounted bell crank having one arm disposed beneath and engageable with said weighted lever and a second arm or actuating lever extending downwardly with a face at a low angle to the vertical, a pair of fixed idler rolls, a tightener roll therebeneath and vertically reciprocable in a plane intersecting the angularly disposed face of the actuating lever, said web being trained over the last three named rolls to form a loop, and means movable with said roll for engaging said actuating lever face to displace said lever in a direction causing said one bell crank arm to raise said weighted lever upon upward movement of said tightener roll and to allow said actuating

lever to move in a direction permitting the weighted lever to impart full force to said brake shoe upon the tightener roll reaching a lower limit of downward movement whereby full braking pressure will be applied to said brake drum to bring the supply roll to a complete stop.

2. In a device as in claim 1, wherein the said pivotal member is mounted on an arm which is in turn pivotally mounted on the adjacent frame and fixed stops are provided above and below said bar and an over-the-center spring arrangement is provided to maintain the bar against the lower stop with the pivotal member in the described operative position or against the upper stop with the pivotal member and brake shoe in a raised position permitting removal of the brake drum and shaft.

3. In a device as in claim 1, wherein the said pivotal member is mounted on an arm which is in turn pivotally mounted on the adjacent frame member, a fixed stop is provided beneath the arm and means are provided to adjust the position of the arm relative to the stop and thus obtain a desired relation between the brake shoe and brake drum.

4. In a device for supplying a web of sheet material at a variable rate, a shaft for mounting a supply roll from which the web is drawn, means for rotatably mounting said shaft, a brake drum secured to one end of said shaft, a brake shoe disposed above said drum, reverse leverage linkage mechanism comprising a pivotal member on which the brake shoe is mounted, a weighted lever extending from said pivotal member and overlying said brake shoe, a pivotally mounted bell crank having one arm disposed beneath and engageable with said weighted lever and a second arm or actuating lever extending downwardly with a face at a low angle to the vertical, a pair of fixed idler rolls, a tightener roll therebeneath and vertically reciprocable in a plane intersecting the angularly disposed face of the actuating lever, said web being trained over the last three named rolls to form a loop, and means movable with said roll for engaging said actuating lever face to displace said lever in a direction causing said one bell crank arm to raise said weighted lever, upon upward movement of said tightener roll and to allow said actuating lever to move in a direction permitting the weighted lever to impart increased force to said brake shoe upon downward movement of said tightener roll.

5. In a device for supplying a web of sheet material at a variable rate, a shaft for mounting a supply roll from which the web is drawn, means for rotatably mounting said shaft, a brake drum secured to said shaft, a brake shoe disposed above said drum, reverse leverage linkage comprising a pivotal member on which the brake shoe is mounted, a weighted lever extending from said pivotal member and overying said brake shoe and normally tending to produce a braking force, and a pivotally mounted bell crank having one arm disposed beneath and engageable with said weighted lever, means for forming a loop in said web including a movable tightener roll, said bell crank having a second relatively long arm and means for guiding said tightener roll for reciprocable rectilinear movement in a plane at a low angle to said second bell crank arm, said bell crank being pivotal in response to movement of said roll to raise said weight lever upon movement of said roll reflecting a shortening of the loop formed therearound, said bell crank being pivotal in reverse direction to permit the weighted lever to impart full force to said brake shoe upon movement of said roll reflecting a shortening of the loop formed therearound.

6. In a device for supplying a web of sheet material at a variable rate, a shaft for mounting a supply roll from which the web is drawn, means for rotatably mounting said shaft, a brake drum secured to said shaft, a brake shoe engageable therewith, said brake shoe normally being held in braking engagement with said brake drum, a loop forming roll over which the web is trained, means for guiding said loop forming roll along a given path, a bell crank having one arm disposed at a low angle to the path of movement of said loop forming roll and displaceable in response to movement thereof, said bell crank having a second arm arranged to move said brake shoe away from normal braking engagement with said brake drum in response to movement of said roll towards a position reflecting a shortening of the loop of web material formed therearound.

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