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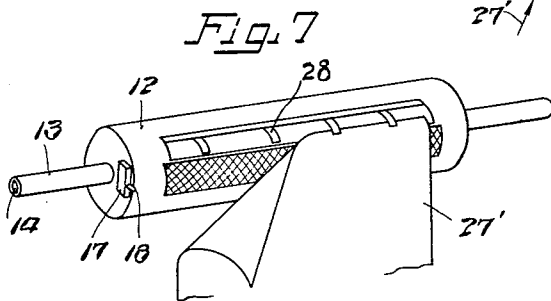
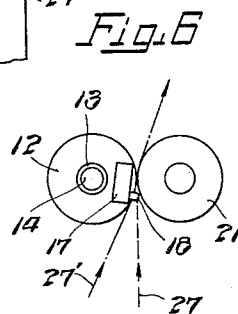
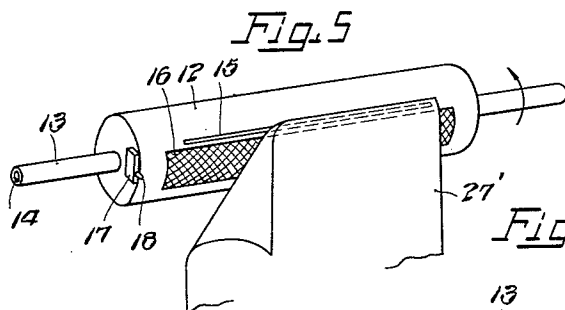
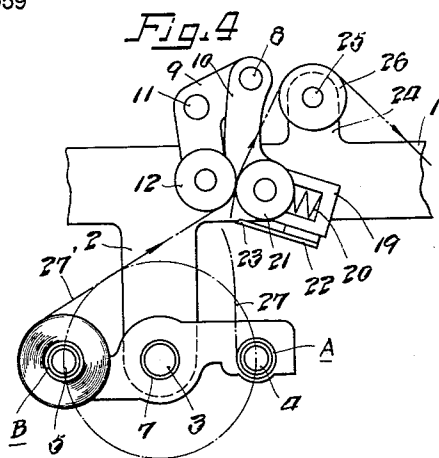
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AUTOMATIC JOINING DEVICE FOR REELED BAND MATERIALS

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2 Sheets-Sheet 2



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AUTOMATIC JOINING DEVICE FOR REELED BAND MATERIALS

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5 Claims. (Cl. 242—56)

This invention relates in general to web feeding devices and in particular to a new and useful device for joining a sheet of web material arranged on a new reel thereof to the trailing portion of a web which is being fed from a reel which is being depleted.

The present invention has particular application in machines such as those employed for feeding webs of paper, metal foil, etc., in which it is desired to permit uninterrupted operation of the machine when it is necessary to feed from a new reel of the web material after the old reel which is in an operative position has been used up. The present invention provides a device of this nature in which the feeding may be carried on continuously and when the new reel is placed into an operative position there is no slowing down or interruption of the feeding of the material.

In previous devices of this nature it was necessary to halt operation of the machine in some instances in order to place the new reel in a predetermined position and thereafter secure it to the trailing end of the web of the depleted reel before the operation could be resumed. In some instances automatic feeding machines of this nature have been provided which include means for pasting or adhesively securing the web of the new reel to the trailing portion of the web from the reel which is being used up. Such devices have the disadvantage of requiring additional means for feeding adhesive to the location of the joining of the materials and in most instances must be operated intermittently in order to insure that a proper joint is effected.

In accordance with the present invention, there is provided a rotatable double arm lever rotatably supporting at least two reels, one of which is arranged to feed web material over a guide roller to apparatus for operating on this web material. The invention includes a rotatable receiving roller having means for holding the forward edge of web material from a new reel mounted on one position of the double arm lever.

A pressure backing roller is connected to the double arm lever and arranged on the opposite side of the web being fed from the old reel, the arrangement being such that the new web may be positioned onto the web being fed and pressure-joined thereto by forcing the receiving roller against the backing roller to effect feeding of the new web along with the old web. Further means are included adjacent the backing roller to sever the web material being fed from the old reel. The old reel spool is thereupon removed and a new reel is placed in position to permit a similar operation after the reel which has just been placed in operation is depleted.

A feature of the inventive arrangement is that the receiving roller includes means for holding the forward ends which are actuated upon contact with the pressure roller to release the forward edge of the web for joining to the web which is being fed through the apparatus. Joining is accomplished by pressure contact which may advantageously be accomplished by indentations or engravings on the receiving roller which effectively cause crushing of the material of this new web to the material of the old web to permit feeding of the new web through the machinery and severing of the remaining lengths of the old web.

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Accordingly, it is an object of this invention to provide an improved mechanism for the continuous feeding of web material from a plurality of reels of such material after each reel in succession is depleted.

A further object of the invention is to provide a web feeding mechanism including means for supporting a reel for rotatably feeding the web material therefrom and means adjacent thereof to the old reel when the first reel is becoming depleted of web material and including co-operating rollers for directing the new web material into contact with the web material being fed from the first reel and thereafter securing such material thereto by pressure contact to permit feeding from the second reel.

Another object of the invention is to provide a device for facilitating the feeding of web material from a first reel and for thereafter joining the leading edge of the web material of a second reel to the trailing portion of the first reel web material as it is being unwound from the first reel, and including pressure roller means on one side of said first reel web material located adjacent the path of feed of such web material, and receiving roller means on the opposite side of the web material of said first reel including means for holding the forward edge of the web material of said second reel, said receiving roller being displaceable into contact with said pressure roller to force the web material fed from said second reel into contact and pressure engagement with the material being fed from said first reel, and means for severing the web material being fed from said first reel after the material being fed from said second reel is joined thereto.

A further object of the invention is to provide a mechanism for facilitating the continuous feeding of web material from a series of reels in succession by joining the web material of a new reel to the trailing portion of the web material of the depleted reel by pressure contact.

A further object is to provide a web feeding device which is simple in design, rugged in construction, and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

In the drawings:

FIGS. 1, 2, 3 and 4 are partial side elevations of a web material unwinding device constructed in accordance with the invention indicating the apparatus in the various stages of shifting the feeding of web material from one reel to another;

FIG. 5 is a perspective view of the receiving roller;

FIG. 6 is an end elevation of the receiving roller and pressure or pusher roller in engagement therewith; and

FIG. 7 is a perspective view of another embodiment of receiving roller.

Referring to the drawings in particular, the invention embodied therein includes an apparatus for feeding web material from a reel thereof including spaced end frame members 1 (one of which is indicated in the drawings) which include a downwardly extending leg piece 2 which supports, along with another laterally spaced leg piece (not shown), a spindle 3 upon which is mounted a double arm reel supporting member 6.

The reel supporting member 6 includes an opening 7 through which the spindle 3 is passed. Each end of the double arm lever 6 includes a spindle 4 and 5, respectively, upon which are mounted a first reel A of web material and a second reel B of web material, respectively.

The reel A includes web material 27 which is fed over a guide roller 26 which is rotatably supported on an up-

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standing arm piece or member 24 on a spindle 25. The web 27 is directed to apparatus (not shown) for operating upon the web as desired.

In accordance with the invention when the web material 27 feeds off the reel A to a point at which it gets down near the central core thereof it is necessary to join a sheet of material 27' from the reel B thereto, without stopping the operation of the machine. For this purpose the invention includes means for directing the forward edge of the web 27' into pressure contact with the remaining portion of the web 27 to effect pressure-joining thereof and thereafter includes means for severing the web 27 and permitting the feeding of the web 27'.

The mechanism to effect the above includes a spindle 11 which is supported by extensions of the frame 1—1 (not shown) and which is connected to mechanism (not shown) such, for example, as a hand-operated lever, gear means driving through a motor, or other motor or hand-operated means to rotate the latter. A double arm rod 9 is pivoted on spindle 8 and carries a cross member 11 which is displaced to rotate rod 9 about pivot 8. The rod 9 carries at one end a receiving roller 12. The spindle 8 which is pivotally connected to the opposite end of rod 9 provides an axle for the independent rotation of an arm member 10. The arm member 10 carries at its free end a support 19 carrying a cylinder 40 having a compression spring 20 therein which biases a spindle 41 in a direction toward the receiving cylinder 12. The spindle 41 carries a pusher or pressure roller 21. A knife member 22 is also affixed to the lower end of the supporting member 19 and includes a pointed knife blade 23 which extends in a direction toward the web 27.

In accordance with the invention, the receiving roller as indicated particularly in FIG. 5 includes an axially elongated slot 15 defined in its outer periphery which communicates internally through a hollow passage 14 to a source of suction or vacuum (not shown). The cylinder 12 includes axle projections 13 which rotatably support it at each end on a set of double arm crank levers 9 (one of which is shown).

In accordance with the invention the web material 27' is positioned over the slot 15 and the vacuum therein holds the edge of the sheet to the roller. The roller 12 advantageously includes a raised, embossed, or roughened surface immediately adjacent the slot 15 and which normally is in engagement with the web 27' in the position it assumes when it is to be joined to the web 27.

The web 27' is brought into contact with the web 27 by rotating the arm 9 such as by mechanism engaging cross member 11, such as by hand, or a motor control, to swing the receiving roller 12 into engagement with the web 27 and to press it inwardly against the pressure roller 21 against the force of its biasing spring 20. Sufficient pressure is brought to bear acting through the shaft 11 to cause the embossed portion 16 of the receiving roller to imbed portions of the web 27' into the web 27 and cause a firm joining theretogether.

A microswitch 17 is arranged adjacent one side of the roller 12 and this includes a button 18 which projects in the manner illustrated in FIG. 6 sufficiently so that it is contacted by the pressure roller 21 only after the two rollers 12 and 21 have been brought into pressure engagement.

This contact of the button 18 causes the switch to shut off the vacuum control to the hollow portion 14 and the slot 15 and frees the edge of the web 27' to cause it to be fed along with the web 27. In this position as indicated in FIG. 3, the knife point 23 approaches the web 27 and further movement of the shaft 11 deflects the web 27 against the knife 23 to cause the severance thereof.

It should be appreciated that since the lever 10 is pivoted at 8, the supporting member 19 may move to the position indicated in FIG. 3 from the position of rest indicated in FIGS. 1 and 2. In some instances it is ad-

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vantageous to employ a tension spring 10' to cause the lever 10 and the shaft 11 to move back to an at rest position. The lever 10 is articulated such as by a member connected thereto (not shown) to rotate it about its pivot axis or rod 8 and lever 10 carries the supporting member 19. Spring 10' biases the arm 10 against a stop 10' to the initial rest positions indicated in FIGS. 1 and 2.

An alternate embodiment of the invention is indicated in FIG. 7 in which there is employed a holding device 28 comprising a series of pivotal holding members 42 which rotate inwardly and outwardly from the periphery of the drum in order to clasp the end of the web 27' firmly thereto. The movement of the clasp members 42 is controlled by the microswitch 17 much the same as the vacuum was in the previous embodiment.

Thus the invention provides means for easily joining the forward end of a fresh web material to the trailing end of web material which is fed from a previous reel. The mechanism permits joining of the web from the new reel without any adhesive or other joining material. In some instances, however, it is advantageous to employ means for directing plastic or other heat sealable materials out through the receiving drum 12 or in the neighborhood thereof and for heating this material so that the heat sealing is made upon contact of the receiving drum 12 with the pressure roller 21 forcing the web 27' into heat sealing engagement with the web 27.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

We claim:

1. A web feeding device comprising a web material supply mounting arm, means mounting said mounting arm for rotation about a central pivotal location, means on said mounting arm for supporting first and second reels of web material, guiding roller means for guiding the web for feeding along a prescribed feed path, a first arm pivotally mounted at one end, pressure roller means on the free end of said first arm disposed adjacent one side of the web being fed from said first reel of web material including a roller biased in a direction towards said web material being fed from said first reel, a second arm pivotally mounted at one end on the same pivot as said first arm, web receiver roller means on said second arm disposed on the opposite side of the web being fed from said first reel of web material, means on said web receiver roller means for holding the end of the web from said second reel of web material, pivot means mounting said first and second arms for independent rotative movement about said pivot means, said web receiver roller means being movable by rotating said second arm to bring the web from the second reel thereon through a path intersecting the line of feed of the web being fed from said first reel supply of said web material, said pressure roller means including said roller biased in a direction towards the web being fed from said first reel, said roller being movable by rotation of said first arm through a path intersecting the web being fed from said first reel into pressure contact with said receiver roller means, said receiver roller means including a roughened area defined thereon at the location of pressure contact with said pressure roller means, said roughened area being effective to press the web material from said second reel into contact with the web material being fed from said first reel to press and embed the material of the second reel onto the web material of the first reel to cause combined feeding therewith, and a knife carried by said first arm movable through a path to intersect the web material being fed from said reel and to sever the latter after said pressure roller means has been moved by said first arm against said biasing means upon pressure contact with said receiver roller means.
2. A web feeding device according to claim 1, wherein

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said pressure roller means includes a roller member adjacent the feed path from said first reel of web material and spring means to bias said roller in a direction toward said feed path.

3. A web feeding device according to claim 1, wherein said receiver roller includes mechanical means for clamping the end of the web on said roller.

4. A web feeding device according to claim 1, wherein said receiver roller means includes pressure means holding the end of the web to said receiver roller.

5. A web feeding device according to claim 1, wherein said receiver roller means is a hollow drum including passage means extending to the periphery thereof for

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directing vacuum thereto for holding the end of the web material from said second reel.

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