

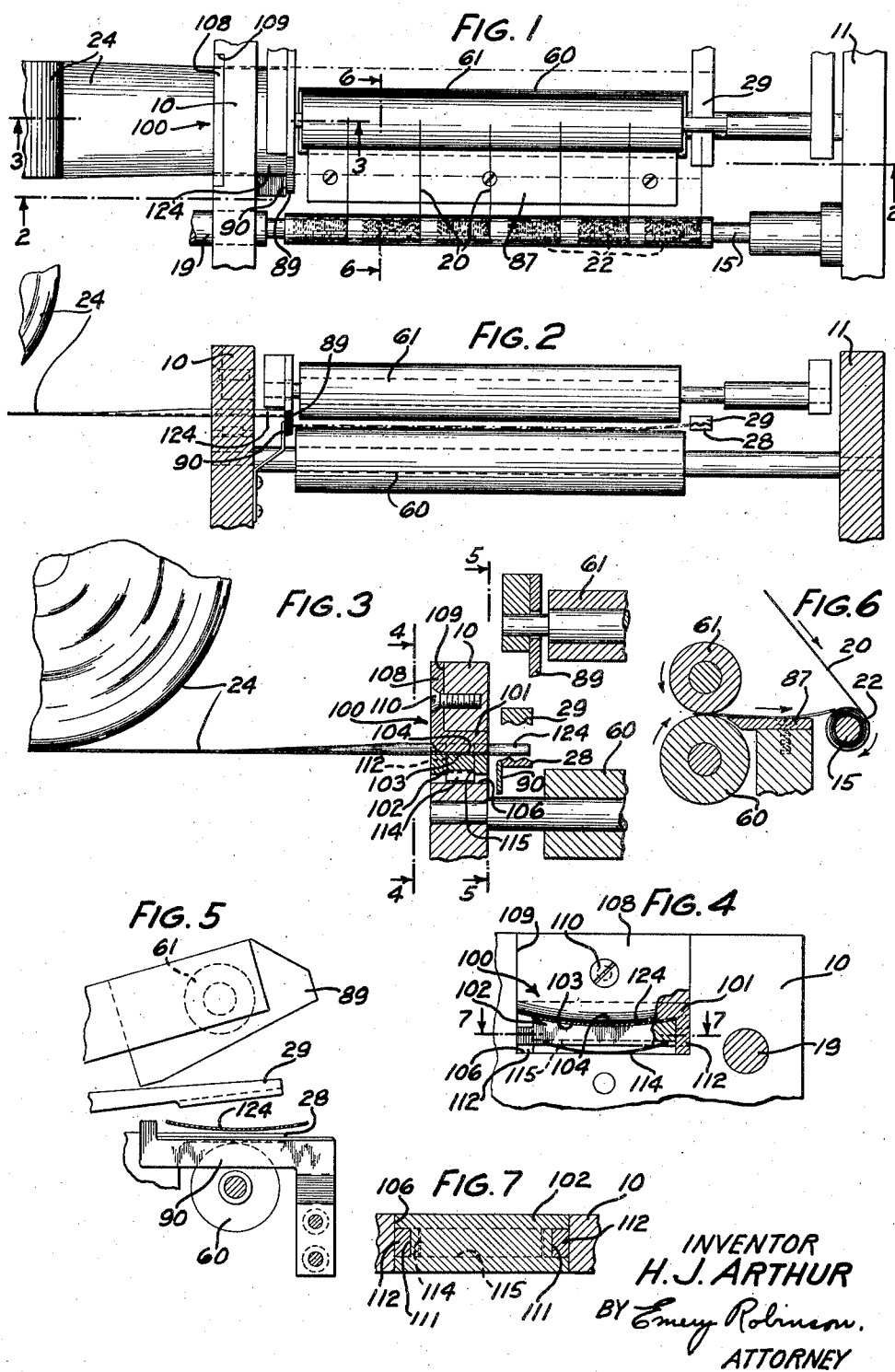
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APPARATUS FOR HANDLING STRIP MATERIAL

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APPARATUS FOR HANDLING STRIP MATERIAL

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This invention relates to apparatus for handling strip material, and more particularly to apparatus for intermittently withdrawing and severing predetermined lengths of strip material from a continuous supply thereof.

An object of the invention is to provide a simple, inexpensive and efficient apparatus for handling strip material.

Although not necessarily limited thereto, the present invention is of the nature of an improvement in the paper strip feeding mechanism disclosed in the copending application of Frank Martindell, Serial No. 130,473, filed March 12, 1937, which mechanism comprises a pair of reciprocatory paper strip gripping and feeding fingers actuated intermittently to withdraw a predetermined length of the paper strip from a supply roll and advance it through a guide and then past a severing device which cuts the advanced portion of the paper strip, leaving an end portion of the supply strip extending from the guide to be grasped by the feed fingers during the next operating cycle thereof.

In accordance with a feature of the present invention, the guide through which the paper strip is drawn by the feed fingers is constructed and arranged so as to provide a transversely curved passage for the paper strip, whereby the end portion of the supply strip extending from the guide toward the feed fingers is flexed or bowed transversely and thereby stiffened so that it is always properly positioned to be readily grasped by the feed fingers during each succeeding operating cycle thereof.

It is believed that a complete understanding of the invention will be had from the following detailed description when read in conjunction with the accompanying drawing, in which

Fig. 1 is a fragmentary plan view of a portion of a coil winding machine equipped with the improved strip material feeding mechanism of the present invention;

Fig. 2 is a fragmentary vertical section on line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary section on line 3—3 of Fig. 1 with several of the parts shown in different positions than in Fig. 1;

Fig. 4 is a fragmentary view taken on line 4—4 of Fig. 3;

Fig. 5 is a fragmentary sectional view taken on line 5—5 of Fig. 3;

Fig. 6 is an enlarged fragmentary sectional view taken on line 6—6 of Fig. 1, but with the rollers inserting a previously severed length of strip material into the coils being wound, and

Fig. 7 is a fragmentary sectional view on line 7—7 of Fig. 4.

The invention is illustrated in the drawing as embodied, for example, in a coil winding machine of the type disclosed in the copending application above referred to. Only such portions of the machine as are necessary to a complete understanding of the present invention are herein illustrated and, for convenience, have been given the same reference characters as in the copending application referred to.

The machine disclosed in the aforementioned copending application and herein illustrated in part comprises a winding arbor 15 mounted for rotation between spaced end walls 10 and 11 of a suitable supporting frame. By means of a driving shaft 19 connected to the winding arbor, the latter is rotated at the desired winding speed for winding simultaneously a series of coils 22, 22, each comprising a plurality of superimposed layers of wires 20, 20 drawn from suitably arranged supply spools (not shown). The machine also comprises a suitable means for rotatably supporting a roll 24 of strip material, such as paper or cellulose acetate, a pair of gripping fingers 28 and 29 for withdrawing the paper strip from the supply roll and for advancing it endwise longitudinally of the winding arbor, cooperating knives 89 and 90 for severing the paper strip into predetermined lengths, and a pair of rollers 60 and 61 for inserting the severed lengths edgewise between adjacent layers of the series of coils while they are being wound.

A detailed disclosure and description of the above referred to parts of the machine may be had, if desired, by reference to the aforementioned copending application. It is believed sufficient, however, for a complete understanding of the present invention to herein state that the fingers 28 and 29 are intermittently reciprocated longitudinally of the winding arbor between the position in which the fingers are shown in Figs. 1 and 2 and the position in which they are shown in Fig. 3. Upon approaching the position in which they are shown in Fig. 3, the fingers are separated or opened to receive therebetween the end portion of the paper strip coming from the supply roll. Before starting their movement toward the right, the fingers are closed to grip the paper strip, whereupon the paper strip is advanced by the fingers longitudinally of the winding arbor and between the rollers 60 and 61, which are now separated, as shown in Fig. 3. After the fingers have reached the position in which they are shown in Figs. 1 and 2, the upper

roller 61 is lowered to clamp the paper strip between it and the lower roller 60. Simultaneously therewith the required length of the paper strip is severed by the downward movement of the upper knife 89, which is mounted for movement with the upper roller. Then, at the proper time, the fingers are separated to release the severed paper strip and the lower roller is rotated to feed it edgewise across the top of a shelf 87 and into the coils being wound, as illustrated in Fig. 6. As soon as the paper strip is grasped by the coils being wound, the upper roller moves upwardly to the intermediate position shown in Fig. 2 to release the paper strip. This completes one cycle of operation of the machine, which cycle is repeated as many times as required and may be said to start with the upward movement of roller 61 from the position in which it is shown in Fig. 2 to the position in which it is shown in Figs. 3 and 5 and thereafter the movement of the fingers 28 and 29 toward the left (Fig. 2) to grasp the previously severed end of the paper strip coming from the supply roll.

The present invention contemplates the provision of means for guiding the paper strip as it is drawn from the supply roll so that the end portion thereof is transversely flexed or bowed and thereby stiffened so that it is always in position to be readily grasped by the feed fingers. A strip guiding means of a preferred construction embodying the invention is illustrated in the drawing, wherein it is designated generally by the reference numeral 100. It comprises a pair of cooperating strip engaging plates or shoes 101 and 102 (Figs. 3 and 4) having opposed complementary transversely convex and concave surfaces 103 and 104, respectively, between which the paper strip is passed on being withdrawn from the supply roll. Conveniently, the guide plates 101 and 102 are suitably mounted in a slot 106 provided for the purpose in the left end wall 10 of the supporting frame.

The upper guide plate 101 has an upstanding flange 108 fitting into a notch 109 in the end wall 10. By means of a screw 110 passing through the flange and threaded into the notched portion of the end wall, the upper guide plate is fixedly secured in place.

The lower guide plate 102 is mounted for limited movement vertically with respect to the upper guide plate 101. Thus, the lower guide plate has notches 111, 111 at opposite ends (Fig. 7) slidably fitting depending portions 112, 112 at opposite ends of the upper guide plate. An arcuate leaf spring 114 serves to yieldably urge the lower guide plate upwardly toward the upper guide plate. As shown in Fig. 4, the leaf spring 114 is disposed between the bottom surface of the slot 106 and the under surface of the lower guide plate, the latter surface being recessed, as indicated at 115, to receive the ends of the leaf spring and thereby prevent displacement of the spring.

Before starting the operation of the apparatus the free end of the paper strip from the supply roll 24 is inserted between the upper and lower guide plates 101 and 102 so that an end portion of the strip extends from the exit side of the guide plates to the upper severing knife 89, as shown in Figs. 1 and 2. The apparatus is now conditioned for operation and during each cycle of operation the upper roller 61 and the upper knife 89 are first elevated and then the feed fingers 28 and 29 are moved toward the left, opening as they approach the end of this movement so as to receive

therebetween the extended end portion of the paper strip. The fingers are then caused to grip the paper strip after which the fingers are moved toward the right, advancing the paper strip endwise, longitudinally of the winding arbor and between the upper and lower rollers 60 and 61. After the feed fingers have reached the end of their movement toward the right, i. e., after they have reached the position in which they are shown in Figs. 1 and 2, the upper knife 89 and the upper roller 61 are lowered to sever the advanced portion of the paper strip and press it against the lower roller 60. The feed fingers are then opened to release the paper strip and thereafter the lower roller 60 is rotated to feed the severed strip edgewise across the top of the shelf 87 and into the coils being wound on the arbor 15, as shown in Fig. 6. This completes one cycle of operation of the apparatus, which cycle may be repeated as many times as desired, it being necessary only to replace the paper strip supply roll 24, when exhausted, with a fresh supply roll.

It will be noted that after each severing operation, the severed end portion of the paper strip coming from the supply is left projecting from the exit side of the guide plates 101 and 102 to be grasped by the feed fingers during the next operating cycle of the apparatus. Due to the transverse curvature of the guide passage provided by the guide plates 101 and 102, the end portion of the paper strip left projecting from the exit side of the guide plates after each severing operation is transversely flexed or bowed, as indicated at 124, and is thereby stiffened sufficiently to insure that it will be properly positioned to be readily grasped by the feed fingers during the next operating cycle thereof. Also, the spring pressed lower guide plate 102 cooperates with the upper guide plate to apply sufficient pressure on the paper strip to properly tension it while being withdrawn from the supply roll, thereby preventing overrunning thereof, and holds the paper strip during the severing operation. Furthermore, the holding pressure provided by the spring pressed lower guide plate prevents the extended end of the paper strip from backing out from between the guide plates.

It is to be understood that the structures herein illustrated and described are merely illustrative of one embodiment of the invention which is capable of other applications within the scope of the appended claims.

What is claimed is:

1. In an apparatus for handling strip material, a supply roll containing a continuous length of strip material, reciprocatory means for intermittently gripping and longitudinally advancing an end portion of the continuous length of strip material along a horizontal path, means for severing the advanced portions, and strip material guiding means comprising a transversely curved guide passage in line with said path through which the material is advanced before being severed, said guiding means being positioned with respect to said severing means so that after each severing operation a transversely curved end portion of the remaining continuous length of strip material extends from said guide passage along said path to be grasped by the said reciprocatory means.

2. In an apparatus for handling strip material, means for gripping and advancing an end portion of a continuous length of strip material, means for severing the advanced end portion, and strip

material guiding means comprising a pair of opposed members between which the strip is advanced before being severed, said members being positioned with respect to the severing means so that after the severing operation an end portion of the remaining continuous length of strip material is left projecting from the said members, and said members having opposed complementary convex and concave strip engaging surfaces, whereby the said projecting end portion of the strip material is transversely flexed and thereby stiffened sufficiently to be readily grasped by the said gripping means.

3. In an apparatus for handling strip material, means for intermittently gripping and longitudinally advancing strip material, an intermittently

operated severing means for severing the advanced portions of the strip material, and strip material guiding means comprising a guide passage through which the material is advanced by said advancing means, said guiding means being positioned with respect to the severing means so that after each severing operation an end portion of the remaining continuous length of strip material is left projecting from said guide passage, and said guide passage being transversely curved, whereby the said projecting end portion of the strip material is transversely flexed and thereby stiffened sufficiently to be readily grasped by the said gripping and advancing means.

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