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APPARATUS FOR CUTTING AND COILING WEBS

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2 Sheets-Sheet 1

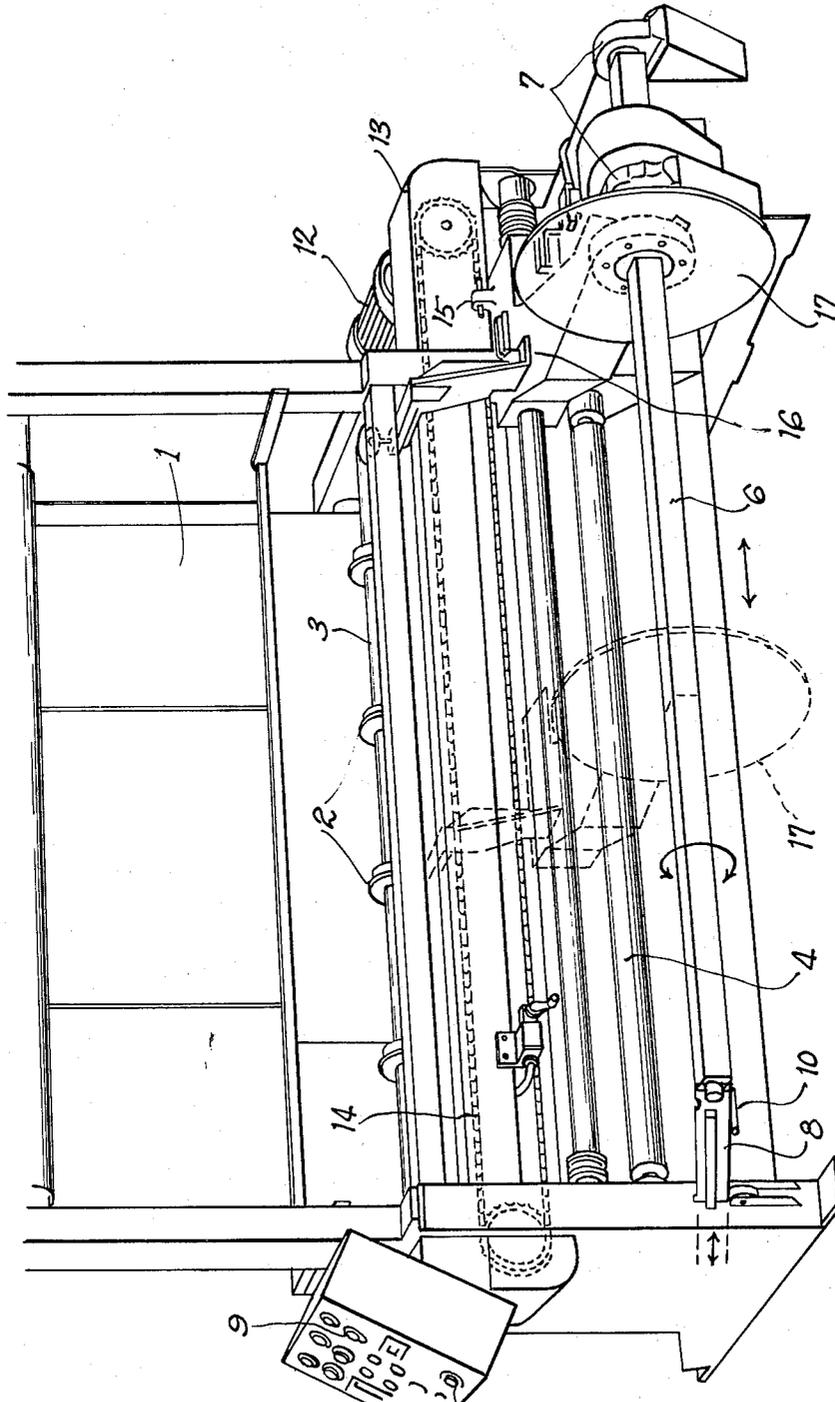


FIG. 1

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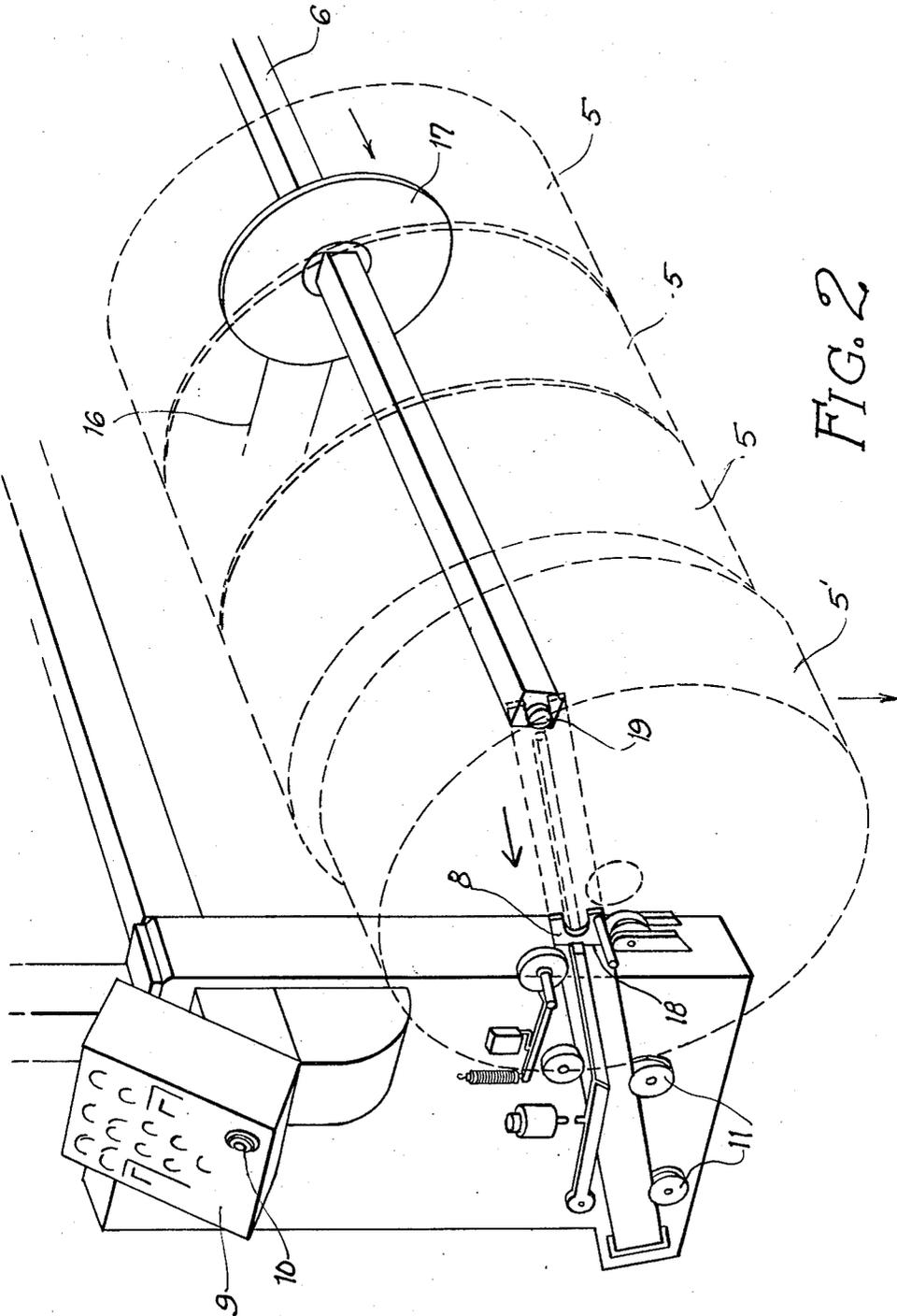
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**APPARATUS FOR CUTTING AND COILING WEBS**

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6 Claims

**ABSTRACT OF THE DISCLOSURE**

An apparatus for cutting and for coiling webs of paper, corrugated cardboard and the like comprising a coiling bar in the form of a shaft which is actuated at one end and mounted at the other end in a removable bearing which makes use of a mechanical movable arrangement along the winding bar which is operating to slide the reels down the winding bar including a plate displaceable axially along the winding bar, the plate being moved by an angular power transmission portion extending along an adjacent guide bar to effect displacement from the bearing and removal of the reels from the winding bar while being supported.

This invention relates to an apparatus for coiling webs, preferably webs of paper, unilaterally covered cardboard or undulated paper or the like into reels with a shaft forming a coiling bar which is driven at one end while the other end is maintained in a removable bearing.

Coiling means heretofore employed, particularly for cardboard, are so designed that the paper web extends from the supply bridge of the undulated (corrugated) cardboard machine via reversing or braking rollers through a pair of cutting shafts to a coiling bar.

The coiling bar, comprised primarily of a quadrangular tube, is suspended in two bearings and connected by a jaw-like clutch to the driven portion. After a coil has been divided into any desired number of webs or after in its entirety it has reached the desired diameter, the machine must be shut down, the cardboard web is cut and glued. The winding bar is lifted with the reel from the bearings of the machine, requiring at least two persons, and placed on the oor or tape-like support. Large forces must be mustered in order to withdraw the winding bar from the reel and the bar is then inserted into the machine before another winding operation may commence.

Such operations are subject to a number of disadvantages in that several operating personnel are needed to effect the exchange, shutdown of the operations takes considerable time. This is in addition to the limitations on the reeled length or the diameter of the rollers, because in view of the operating personnel, their weights may not exceed 200 kilograms. However, reels having weights up to 600 kilograms are desired.

Another disadvantage of the prior art apparatus resides in the fact that it requires considerable space and winding speed is somewhat irregular because the drive of the winding bar is by way of a friction roller. The larger the roll or reel, the higher the speed of the cardboard.

It is an object of this invention to design a machine which obviates all of these disadvantages and which executes the ejection of the completed reel from the winding bar automatically and in a very short period of time and it is a related object to produce a machine of the type described which is of compact design.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration, but not of limitation, an embodiment of the

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invention is shown in the accompanying drawings in which—

FIG. 1 is a perspective view of the apparatus embodying the features of this invention; and

5 FIG. 2 is a perspective view showing the manner of operation of the removable support bearing on one side of the shaft forming the winding bar and of the ejection means of the reels from the winding bar.

10 According to the present invention, a mechanically movable arrangement is provided along the winding bar in order to slide the reels down from the winding bar. Any number of reels can be pushed down from the bar advantageously at any desired speed, requiring no operating help except for central control.

15 Another advantage consists in the fact that the mobile arrangement comprises a plate movable against the winding bar, said plate being moved via an angular power transmission portion extending along a guide bar, said plate being advantageously adjusted to the outer lateral surfaces of the rolls and has a diameter corresponding to the average or maximum diameter of the reels to be produced.

20 In a further desirable improvement of the invention, the drive of the power transmission portion may be formed of an electrical motor and a chain applied along the angular bar. In this way, a large force can be transmitted in a very simple manner to the plate which slides the reels off the bar.

25 A particular advantage, according to the invention, also resides in the fact that removable bearings at the one end of the propeller shaft forming an angle bar comprises a rail mounted on rollers and/or friction bearings, so displaceable in its longitudinal direction that the outer end, when in extended position, firmly engages via a recess into the connecting element of the shaft. The advantage of this rail for the removable bearing consists in the fact that, as a result of the stable design of the rail, very large tensions which possibly occur during winding can be actuated uniformly by both sides of the shaft. After removing the rail from one end of the shaft, which removal may be accomplished automatically, the shaft is self-supporting. Consequently, it is possible to leave the machine during its operation partially unattended because, upon reaching the desired diameter of the rollers, a meter counter set to the desired length disconnects the winding operation. After separation and pasting of the web, preferably a cardboard web, the rail forming the unilateral support bearing is removed by operating a pressure key or push button and, after it has reached its bottommost position, the ejection apparatus is automatically started. This movement terminates when the reels have been pushed off the winding bar and the ejection apparatus has returned to its starting position.

30 Additional advantages of the winding machine are shown in individual embodiments, such as the use of two reversing rollers precision-adjustable by belt brakes which take care of the hard or soft winding of the belt-like material. Likewise, adjustable lateral guides may be provided on the machine of this invention. The independent drive of two hard chrome plated knife shafts assures a neat cut, said shafts being provided with knife bodies or supports and circular knives elastically fastened thereon. The knives can be replaced quickly without removal of the shafts and adjustments can be effected simply by loosening a screw. Infinitely variable constant angle speeds with electronic control assure precise adjustment of the speed of the machine to be operated. An electric pre-select meter assures precise maintenance of the desired reel length.

35 40 45 50 55 60 65 70 The machine according to the invention furthermore embodies the advantage that, by welding, various parts

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of the machine can be adjusted to the most diverse operating widths. The commercial advantage of the machine of this invention consists in the one man operation of the machine, yet the performance is higher than that of any known apparatus of the prior art.

Referring now to the drawings, the tape-like material (undulated cardboard) **1** moves from the supply bridge of the undulated cardboard machine (not shown) via laterally spaced apart knife bodies **2** applied to hard chrome plated knife shafts **3** on the front side and applied symmetrically to the rear side of the paper web (not shown), and then forwardly below the shaft after which it is rolled into reels **5**. These reels are supported by a shaft forming a winding bar **6** of quadrangular cross-section. On the right side, the winding bar is, via bearing **7**, fixedly mounted on the machine housing, and on the left side, the winding bar is supported by a removable support bearing (rail) **8**. As shown, while bar **6** extends over the width of the apparatus, it is generally preferred that about three-fourths of the length of the shaft **6** have a rectangular cross section. When the reels **5** have reached the desired diameter, the operation is automatically stopped by a meter counter (not shown) operating on the cardboard web. By operating the key **10**, the rail **8** which has been used as a supporting bearing of the winding bar (shown by broken lines in FIG. 2) and maintained via roller bearings **11** is introduced rearwardly by conventional means not shown into the leg of the machine, so that the winding bar **6** becomes self-supporting. The electric motor, which is barely visible in FIG. 1 on the right side behind the machine, propels through a gear wheel a chain **14** which extends over the entire length of the winding machine, a power transmission portion **16** of angular design being fastened to the nipple **15**. The angular portion **16** which is supported by guide bar **4** along which chain **14** extends pushes a plate **17**, fastened to the power transmission portion, to the left toward the open end of the winding bar **6**. As shown in FIG. 2, the plate **17** pushes the reels **5** ahead of it, thereby ejecting one reel **5'** after the other from the winding bar. A central portion of the plate is shown in broken lines in FIG. 1. In the preferred embodiment, plate **17** has a diameter which is at least five times the diameter of winding bar **6**. As previously mentioned, the sliding (ejection) of the reels on the bar may be accomplished automatically in a few seconds. Within as short a time, the plate is moved back by the electric motor **12** to its starting position, the rail **8** (supporting bearing), displaceable in its longitudinal axis, extends and engages with its recess **18** around a ball bearing **19** located on a shaft on the left side of the winding bar, so that a rigid connection exists between the machine housing and the winding bar, so that the winding bar can rotate clockwise or counterclockwise, as shown in FIG. 1, in the direction of the arrow.

While a new winding operation is being carried out, the operator can make the finished rolls ready for removal.

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It will be apparent from the foregoing that I have provided a new and improved cutting and winding machine for coiling webs of paper, corrugated cardboard and the like material.

I claim:

1. In an apparatus for cutting and coiling webs of paper material into reels, a coiling bar in the form of a shaft, means operatively engaging said shaft at one end thereof for actuation of the shaft in rotational movement, a movable bearing rotatably supporting the other end of said shaft, said movable bearing comprising a rail and anti-friction members supporting said rail, means for radially displacing said rail relative to said shaft, plate means in a position to engage said reels for axial displacement of said reels on said shaft for removal over the bearing supported end, and chain means in operative engagement with said plate means for actuation of said plate means.
2. Apparatus as claimed in claim 1 in which said plate means is a plate having a diameter which is at least five times the diameter of the winding bar.
3. Apparatus as claimed in claim 1 in which said chain means comprises a chain extending over the entire width of the apparatus, means operatively engaging the chain and said plate means, motor means, and means operatively engaging said motor means and said chain for actuation of the chain.
4. Apparatus as claimed in claim 1 in which the shaft extends over the width of the apparatus and is divided into portions including a winding bar portion of rectangular cross-section which extends over three-fourths of the length of the shaft.
5. Apparatus as claimed in claim 2 in which the plate is adapted to move in contact with the winding bar and which includes a guide bar said chain means engaging the plate for movement thereof along said guide bar.
6. Apparatus as claimed in claim 5 in which the chain means comprises a power source and a chain operative along the angular guide bar.

#### References Cited

##### UNITED STATES PATENTS

1,172,955	2/1916	Derringer	242—81
2,306,466	12/1942	Patterson	242—67.1
2,594,800	4/1952	Ranney	242—81 XR
2,675,186	4/1954	Piper et al.	242—81 XR
2,836,372	5/1958	Roberts et al.	242—55
2,877,960	3/1959	Schmidt et al.	242—81 XR
2,971,719	2/1961	Cochrane et al.	242—81

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