Dec. 18, 1934. H. H. TALBOT ET AL 1,984,776

MULTIPLE WINDING REEL

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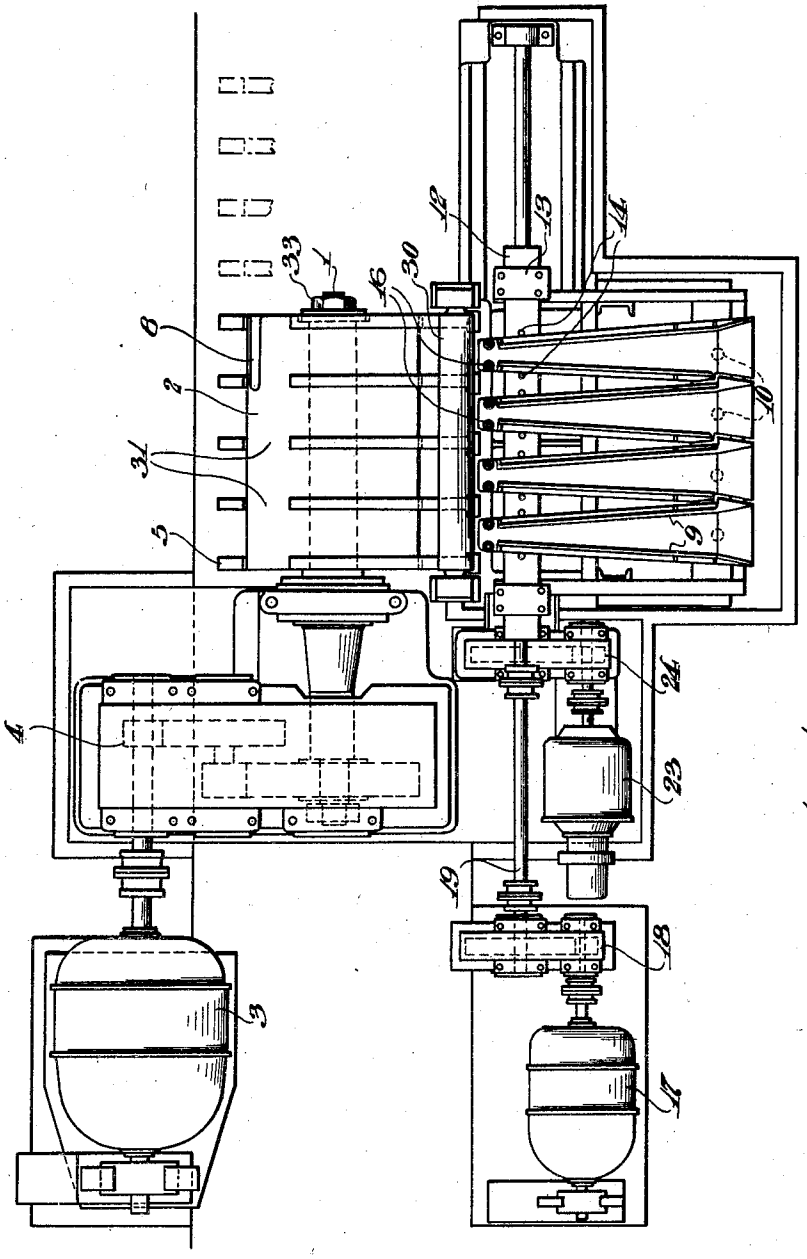


Fig. 1

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MULTIPLE WINDING REEL

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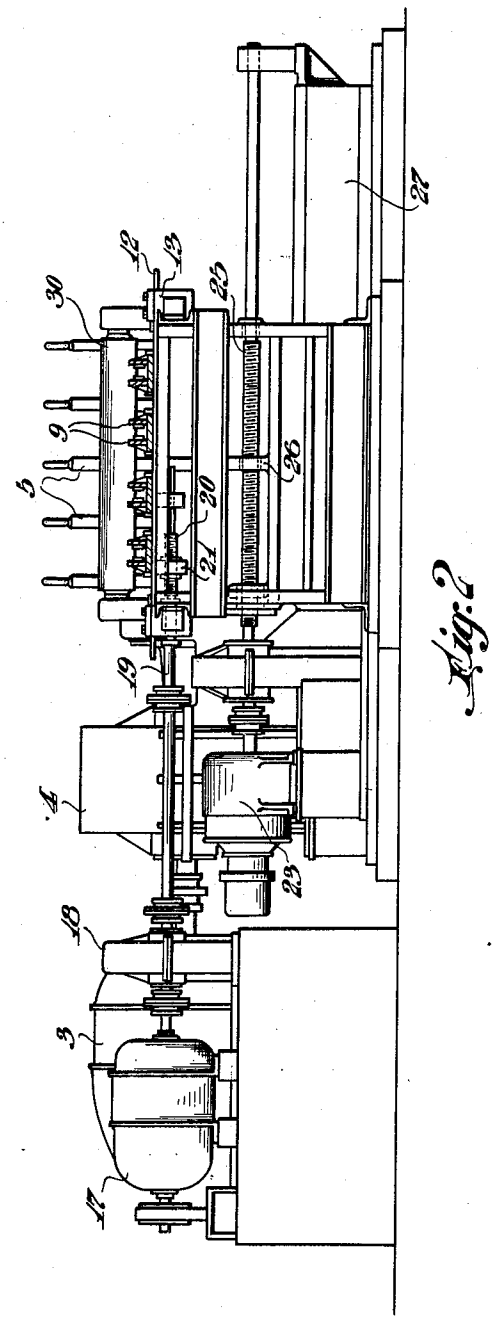


Fig. 2

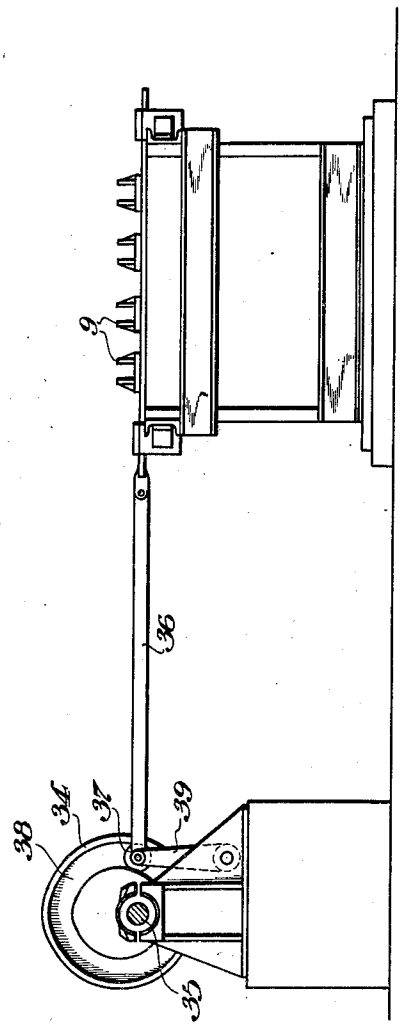


Fig. 3

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MULTIPLE WINDING REEL

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Fig. 4

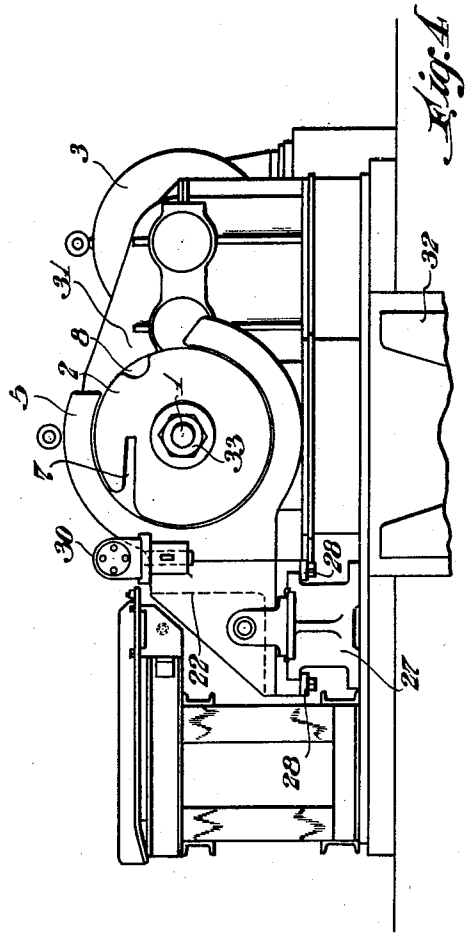
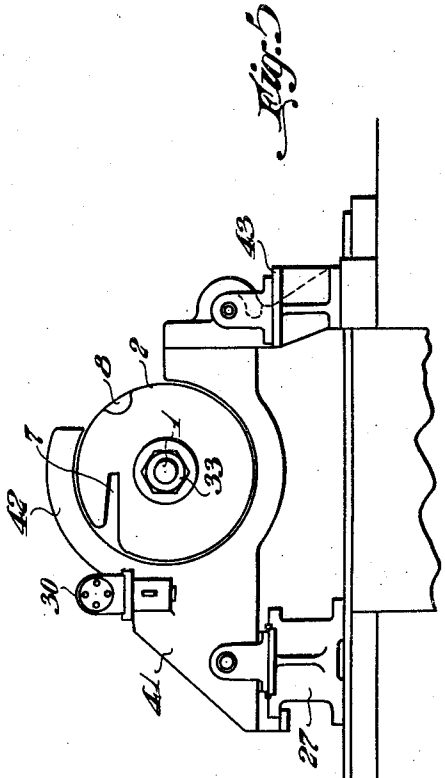


Fig. 5



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MULTIPLE WINDING REEL

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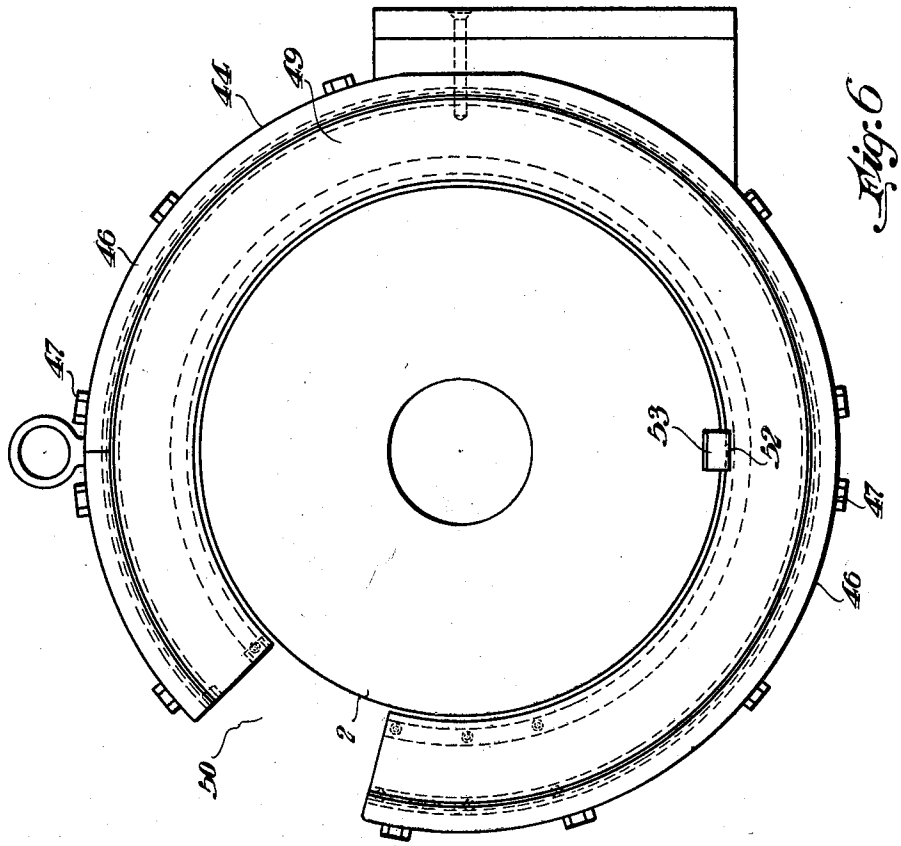


Fig. 6

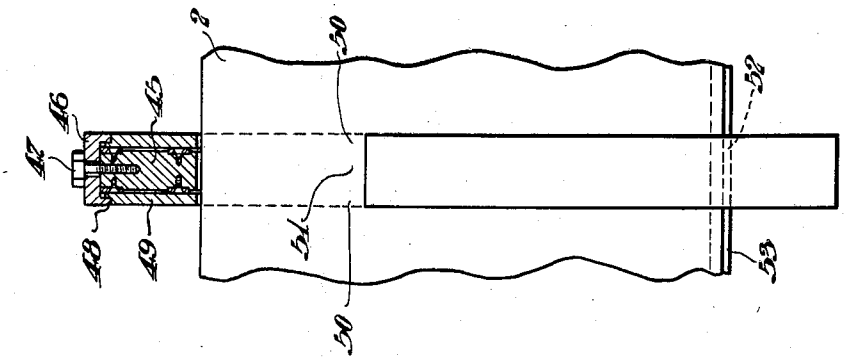


Fig. 7

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MULTIPLE WINDING REEL

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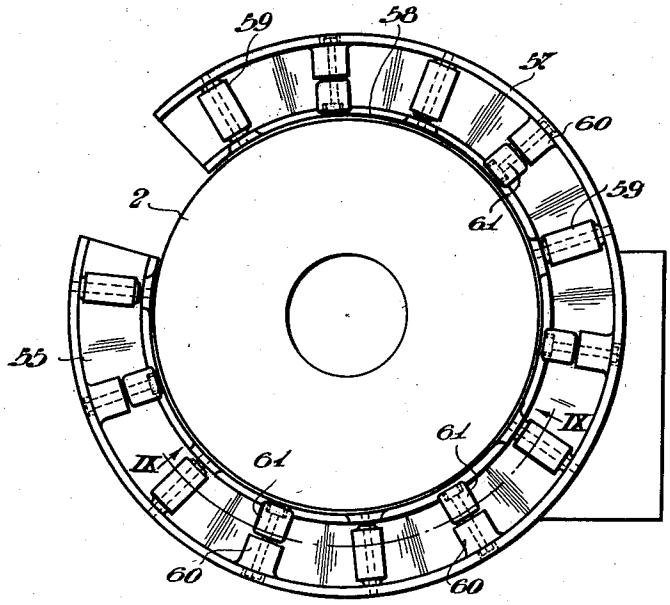


Fig. 8

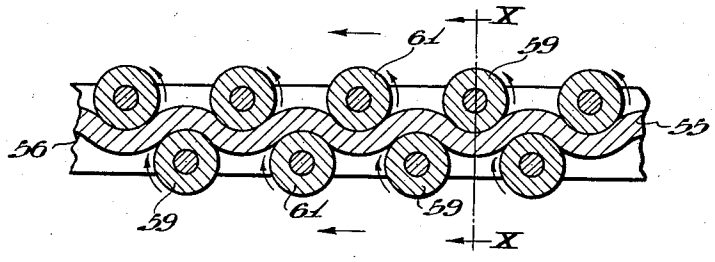


Fig. 9

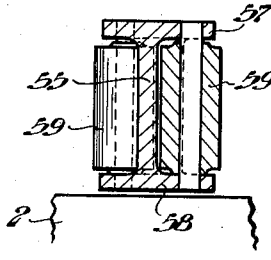


Fig. 10

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Patented Dec. 18, 1934 1,984,776

UNITED STATES PATENT OFFICE

1,984,776

MULTIPLE WINDING REEL

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Application July 22, 1932, Serial No. 624,010

12 Claims. (Cl. 242—78)

Our invention relates to winding reels and particularly to reels of the multiple type for coiling metal rods or bars.

An object of our invention is to provide a multiple winding reel by means of which a plurality of coils of metal rods or bars may be formed simultaneously and which may be easily removed from the winding drum.

A further object of our invention is to provide a multiple winding reel having means for efficiently distributing the material for a plurality of coils over the respective spaces therefor on the winding drum.

The multiple winding reel of our invention consists essentially of a removable or replaceable winding drum the winding space of which is divided by suitable means into spaces corresponding to the number of coils to be formed. The distribution of the rods or bars over the respective spaces or coils is controlled by automatic traversing guides. The completed coils are removed or stripped from the winding drum by the members for dividing the winding space on the drum.

The details of our invention will be described in connection with the accompanying drawings, in which Fig. 1 is a plan view of a multiple winding reel constructed in accordance with our invention; Fig. 2 a side elevational view of the reel of Fig. 1; Fig. 3 an elevational view of a modified arrangement for operating the traversing guides; Fig. 4 an end view in elevation of the reel of Fig. 1; Fig. 5 a view, similar to Fig. 4, of a modified arrangement for supporting the annular guards or stripper members; Fig. 6 a side elevational view of a modified construction of annular guard or stripper member; Fig. 7 a view, partially in elevation and partially in radial section, of the guard member of Fig. 6; Fig. 8 a view in side elevation of a further modified guard structure; Fig. 9 a developed sectional view taken on line IX—IX of Fig. 8; and Fig. 10 a transverse sectional view taken on line X—X of Fig. 9.

Referring particularly to Figs. 1, 2 and 4, the multiple winding reel of our invention comprises a horizontal rotatable shaft or arbor 1, upon which is removably mounted a winding drum 2. The shaft 1 and the drum 2 carried thereby are driven by means of an electric motor 3 that is connected to the shaft 1 by suitable reduction gear mechanism, indicated generally at 4. The drum 2 is surrounded by five substantially annular guard members 5 that are non-rotatable and are spaced to divide the winding space of the drum into four substantially equal parts for the winding of four coils. This number may, of course, be varied if desired.

As best shown in Fig. 4, the drum 2 is provided with a recess 7 that is adapted, when in the position shown in Fig. 4, to receive the ends of bars or rods to be coiled upon the drum. The drum is also provided with a relatively short concave recess 8 for use in tying or securing the completed coils, as will be later described.

The rods or bars, upon entering the reel, are controlled by pairs of converging guides 9, each pair being pivoted by a pin 10 near its outer and wider ends. The guides 9 are adapted to be oscillated at their inner ends by means of a plate 12 slidably mounted in guide blocks 13 and having pins 14 thereon for maintaining the spacing of the guides 9. The latter are provided with guide rollers 16 at their inner ends.

The plate 12 is adapted to be reciprocated by an electric motor 17 that is connected by means of reduction gear mechanism 18 to a shaft 19. The latter is provided, at its outer end, with screw threads 20 upon which operates a travelling nut 21 that is rigidly connected to the plate 12. The operation of the motor 17 is reversed at suitable intervals as by means of usual and well-known limit switches (not shown).

The annular guards 5 or strippers are secured to and supported by a frame 22 that is adapted to be moved axially of the drum 2 by means of an electric motor 23, reduction gear mechanism 24 and a screw-threaded shaft 25, upon which is mounted a travelling nut 26 that is secured to the frame 22. The latter is slidably mounted upon a flanged base 27. Flange plates 28 connected to the frame 22 cooperate with the top flanges of the base 27 to maintain the horizontal positions of the guard members 5.

In the operation of our improved winding reel, the forward ends of any desired number of bars or rods, from one to four, are supplied to the relatively wide spaces at the outer ends of the inclined guides 9, and the ends of the rods are thus guided to the openings and guide rollers 16 at the inner ends of the guides and beneath a relatively heavy roller 30 into the recess 7 of the drum 2. The motor 3 is then operated to rotate the drum 2 in a clockwise direction, as viewed in Fig. 4, to wind the several coils simultaneously.

Also, the motor 17 and the plate 12 are operated to oscillate the traversing guides 9 about their pivot pins 10, and the latter distribute the

rods or bars evenly over the several spaces provided for the respective coils. The speed of the motor 17 and the resultant oscillations of the traversing guides 9 are adapted to correspond to the speed at which the winding drum 2 is operated.

When the winding of the coils is completed, the drum 2 is brought to rest at its initial position, as illustrated in Fig. 4, with the recess 8 in registry with a gap 31 in each of the guard members 5. The guides 9 are also brought to rest. The completed coil on the outer end of the drum may then be tied by wire or other suitable securing means by utilizing the recess 8 for inserting the securing material.

When the outer coil has been secured, the motor 23 is operated to cause the travelling nut 26 to actuate the guards 5 and the frame 22 connected thereto to the right, as viewed in Figs. 1 and 2, until the coil on the outer end of the drum has been stripped therefrom. The coil falls into a coil car 32 which is in position to receive it.

The removal of the first coil on the right has moved the remaining coils into the positions occupied by the respective coils on the right thereof and the second coil is now in the position formerly occupied by the first coil. In like manner, it is tied by utilizing the recess 8 in the drum 2 and its removal occurs in the manner described in connection with the first coil. The other coils are successively moved into tying position and then stripped from the drum in a similar manner.

When all of the coils have been removed, the outer four guards 5 occupy the positions indicated in dotted lines, Fig. 1. The frame 22 and the guard members 5 are then returned by the motor 23 to their normal position, as illustrated in Figs. 1 and 2, and the reel is again in position for the succeeding operation.

The drum 2 is removable from the shaft 1, it being secured thereon by a nut 33. A drum of different diameter and guards 5 of corresponding dimensions may be substituted for the purpose of winding coils of different diameters, if desired.

A modified arrangement for operating the traversing guides is shown in Fig. 3. Instead of a reversible motor and limit switches for effecting its reversal, we may substitute therefor a cam 34 of substantially heart shape that is mounted on a shaft 35 and cooperates with a follower or crank arm 36 having a roller 37 for cooperating with a grove 38 in the cam. The end of the crank 36 adjacent the cam 34 is connected to a rocker arm 39. The crank 36 operates to oscillate the guides 9 with substantially uniform horizontal movements. The provision of this construction enables the use of a continuously rotating motor that operates in a single direction and avoids the use of limit switches.

The arrangement shown in Fig. 5 differs from that of Fig. 4 substantially only in that the cuter end of a frame 41 for supporting guard members 42 integral therewith is slidingly supported upon a block 43 instead of being suspended from a single support, as in Fig. 4. The operation of this form of our invention is in every other respect similar to that of the arrangement shown in Fig. 4.

Referring particularly to Figs. 6 and 7, a modified construction of guard members is illustrated therein. Instead of these members being non-rotatable, as in the preferred form of our invention, the guards 44 may be provided with a non-rotatable annular portion 45 that is secured to an outer ring 46 by means of stud bolts 47. The ring 46 is provided on its sides with inwardly extending flanges 48 for retaining in position rings 49 each having a gap 50 therein which corresponds to a gap 51 in each of the non-rotatable members 45.

The rings 49 are each provided with a notch 52 for receiving a key 53, by means of which they are secured to the drum 2 for rotation therewith. The rings 49 are preferably bevelled at the forward edges of the continuous portions in order that they may rotate with the drum and at the same time enter the spaces provided for them when the forward ends of the rings cross the gaps 51 in the stationary rings 45.

In the operation of a reel embodying the guards 44 of Figs. 6 and 7, the gaps 50 and 51 between the stationary and the movable portions of the guards will be in registry with each other and with the recess 8 in the stationary position of the drum at the completion of the winding operation since the rings 49 rotate with the drum. The operation is otherwise no different from that previously described in connection with the stationary guards 5.

The advantages of the modified form of guards are that the wear on the guards, by reason of the abrasive action of the bars or rods being wound, is considerably less because the wear plates or rings of the guards rotate with the material being wound. Furthermore, in case of excessive wear, the rings 35 may easily be replaced without dismantling the entire guard structure.

A further modification of the guard structure is illustrated in Figs. 8, 9 and 10. A stationary web 55 is provided with radial corrugations or recesses 56 and peripheral flanges 57 and 58. Rollers 59 are mounted in alternate corrugations or recesses 56 on each side of the web 55 and have bearings in the flanges 57 and 58.

In order to prevent wedging of the bars or rods being coiled between the inner ends of the rollers 59 and the drum 2, the other recesses 56 on each side of the web 55 are occupied by bosses 60 secured to the flange 57 and upon which are pivoted relatively short rollers 61 which project closely adjacent to the surface of the drum. The flange 58 is cut away for this purpose.

The advantages of the second modified guard structure are that it combines the provision of parts movable with the rods or bars to facilitate their coiling with the feature that no members cross the gaps in the guards. The rollers 59 and 61 are sufficiently rugged to withstand the shocks of operation.

The multiple winding reel constructed in accordance with our invention possesses the advantages that it may operate automatically to simultaneously form a plurality of coils of metal rods or bars and the coils may be secured before they are removed from the winding drum. The stripping mechanism may be operated step-by-step to remove each coil after it has been tied or otherwise secured.

The foregoing and other advantages will be apparent to those skilled in the art relating to winding reels.

We claim as our invention:

1. A multiple winding reel comprising a rotatable shaft, a winding drum thereon, annular guards for dividing the winding space on said drum and separating the coils formed thereon, traversing winding guides for the material being

wound, and means for actuating said guards axially of said drum for removing coils therefrom.

2. A multiple winding reel for metal rods or bars comprising a rotatable winding drum, annular guards for dividing the winding space on said drum to provide for a plurality of coils separated by said guards, laterally movable guides for distributing the coils over the respective spaces therefor, means for rotating said drum, means for actuating said guides, and means for actuating said guards axially of said drum to remove completed coils therefrom.

3. A multiple winding reel for metal bars comprising a horizontal winding drum, stationary annular guards for dividing the winding space of said drum for a plurality of coils, horizontally traversing guides for distributing the bars being wound over their respective spaces, and power-operated means for rotating said drum, oscillating said guides and reciprocating said annular guards axially of said drum to strip completed coils therefrom.

4. A multiple winding reel comprising a horizontal winding drum that is recessed to receive the ends of material to be coiled, annular members for dividing the winding space on said drum for a plurality of coils separated by said members, horizontally oscillatable guides for distributing the material being wound over the spaces for the respective coils, and power devices for rotating said drum to wind said coils, for oscillating said guides and for actuating said annular members axially of said drum.

5. A multiple winding reel comprising a winding drum for simultaneously winding a plurality of coils, axially movable guard members at the sides of each of said coils, means for simultaneously actuating said guard members to successively remove the completed coils from said drum, and means for receiving the coils thus removed.

6. A multiple winding reel for metal bars comprising a winding drum having spaces thereon for a plurality of coils, said drum being adapted to receive the ends of said bars, axially movable non-rotatable guard members between the several coils, means for controlling the distribution of the bars over their respective coil spaces and the level winding of the coils, said means comprising guides for the respective bars, means for actuating the guard members to remove completed coils from the drum, and means for oscillating said guides transversely of the paths of movement of the bars.

7. A multiple winding reel for metal bars comprising a winding drum having spaces thereon for a plurality of coils, said drum being adapted to receive the ends of said bars, axially movable non-rotatable guard members between the several coils, means for controlling the distribution of the bars over their respective coil spaces and the level winding of the coils, said means comprising guides for the respective bars, a motor, and translating means for connecting said motor to said guides for imparting substantially uniform movements of said guides transversely of the paths of movement of the bars, and means for actuating said guard members axially to remove completed coils from said drum.

8. A multiple winding reel for metal bars comprising a winding drum having spaces thereon for a plurality of coils, said drum being adapted to receive the ends of said bars, means for controlling the distribution of the bars over their respective coil spaces and the level winding of the coils, said means comprising horizontal guides pivoted adjacent their outer ends and oscillatable at their inner ends, and means comprising a reciprocable bar having means for spacing said guides by permitting relative angular movement thereof for oscillating said guides about their pivots transversely of the paths of movement of said bars.

9. A multiple winding reel for metal bars comprising a winding drum having spaces thereon for a plurality of coils, said drum being adapted to receive the ends of said bars, means for controlling the distribution of the bars over their respective coil spaces and the level winding of the coils, said means comprising horizontal guides pivoted adjacent their outer ends and oscillatable at their inner ends, and means comprising a reciprocable bar having spacing pins thereon and actuated by a screw-thread and nut mechanism for oscillating said guides about their pivots in a plane parallel to the axis of said drum.

10. A multiple winding reel for metal bars comprising a winding drum having spaces thereon for a plurality of coils, said drum being adapted to receive the ends of said bars, means for controlling the removal of completed coils from said drum, said means comprising a plurality of members for separating said coils and movable axially of said drum, and means for actuating the separating members axially of the drum to successively remove the coils therefrom.

11. A multiple winding reel for metal rods comprising a drum for simultaneously winding a plurality of coils and having an axially-extending recess in the periphery thereof, a plurality of members adjacent said drum for separating said coils and having gaps therein, and means for rotating said drum for winding said coils and for bringing said drum to rest with said recess in registry with said gaps whereby a coil surrounding said recess may be secured by the insertion of securing material through said recess and certain of said gaps.

12. A multiple winding reel for metal bars or rods comprising a horizontal winding drum recessed to receive the ends of the material being wound and having also a recess in its periphery and parallel to its axis, annular guard members for dividing the winding space of said drum for a plurality of coils, said guard members having gaps therein, means for controlling the directions of the material being wound on said drum, means for rotating said drum for forming coils thereon and for bringing said drum to rest with said recess in registry with said gaps in said guard members, and means for actuating said guard members axially of said drum to strip the several coils therefrom successively.

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