Feb. 23, 1932. O. A. STEUER ET AL 1,846,767

REENFORCING CAGE MACHINE

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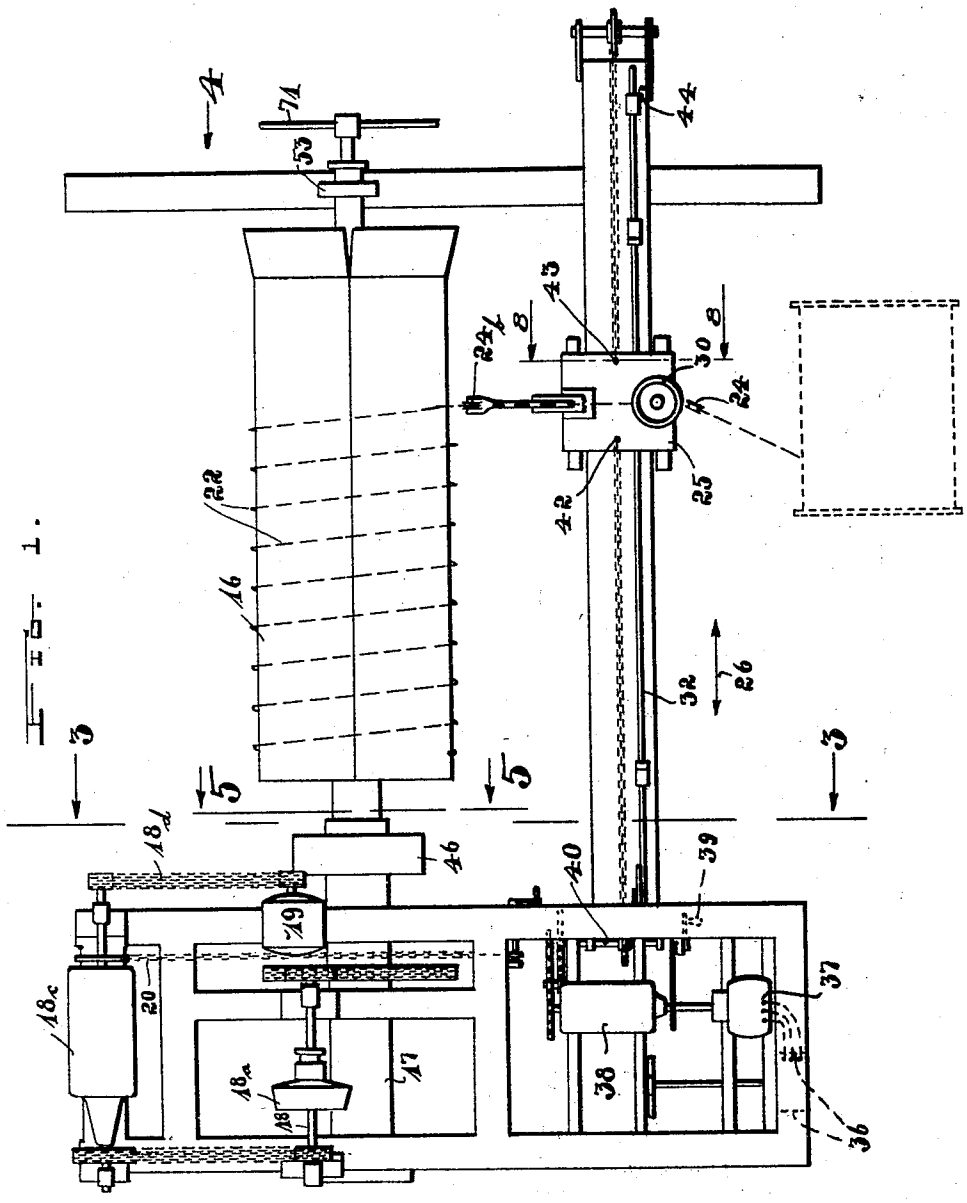


FIG. 1.

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REENFORCING CAGE MACHINE

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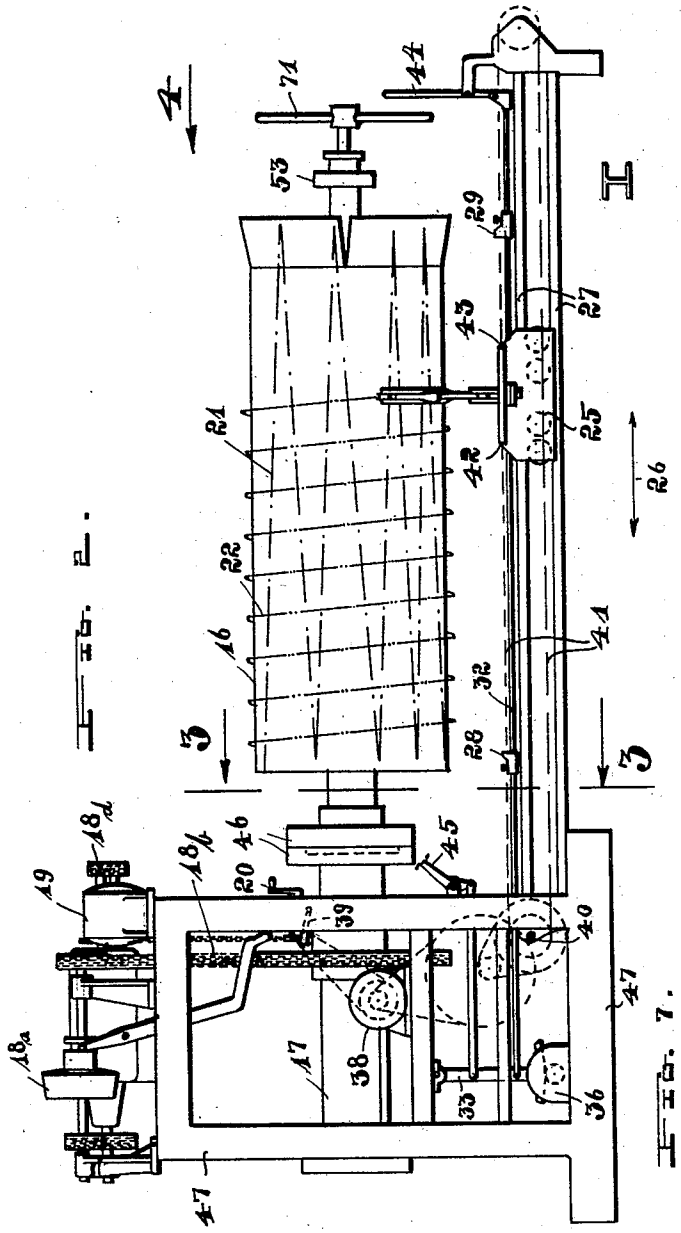


Fig. 1.

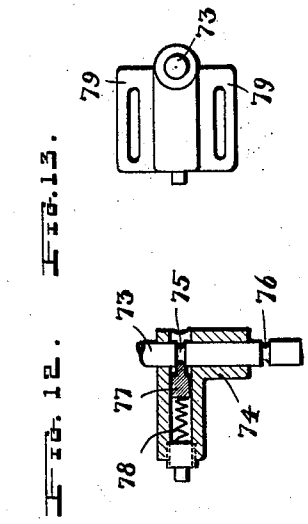


Fig. 12.

Fig. 13.

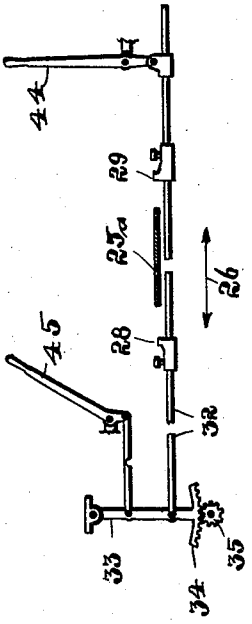


Fig. 7.

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REENFORCING CAGE MACHINE

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FIG. 3.

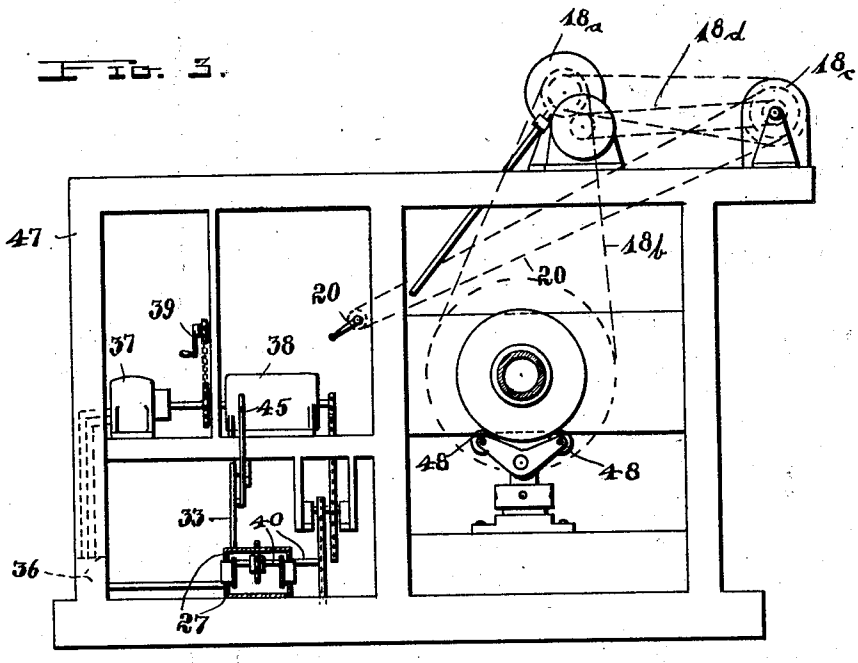
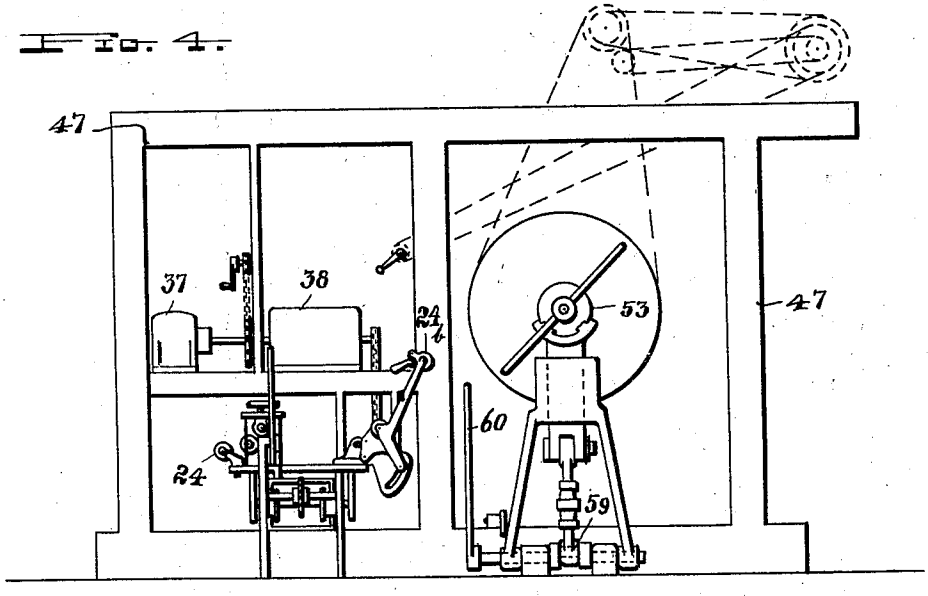


FIG. 4.



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FIG. 8.

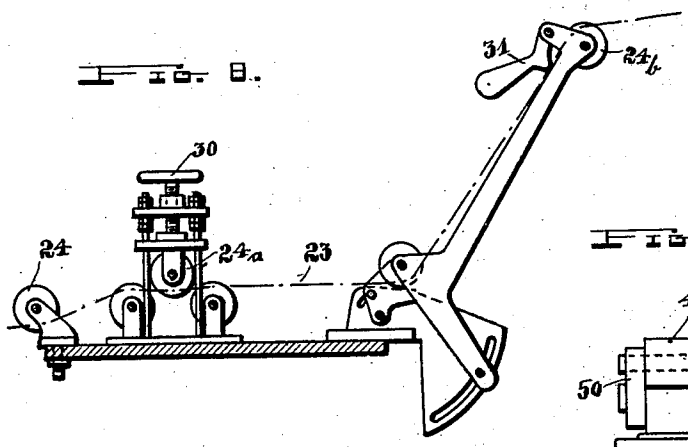


FIG. 6.

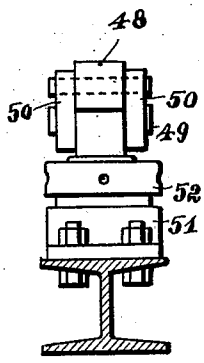


FIG. 5.

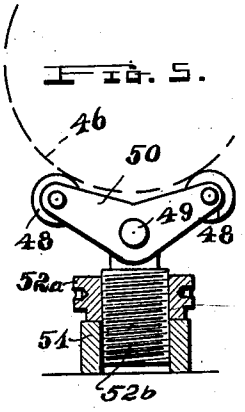


FIG. 10.

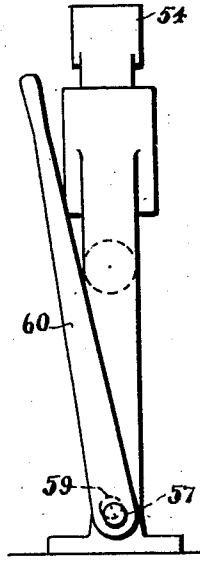
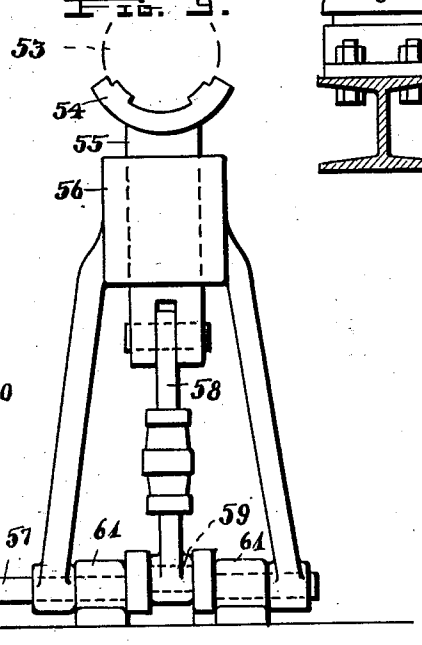


FIG. 9.



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REENFORCING CAGE MACHINE

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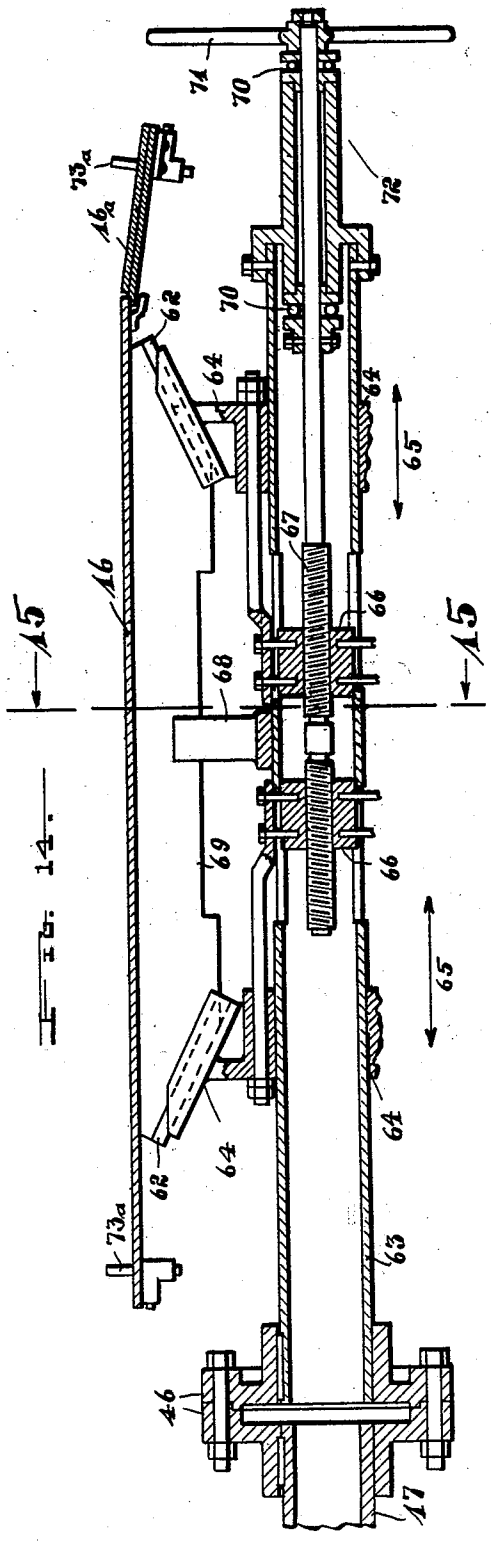


Fig. 14.

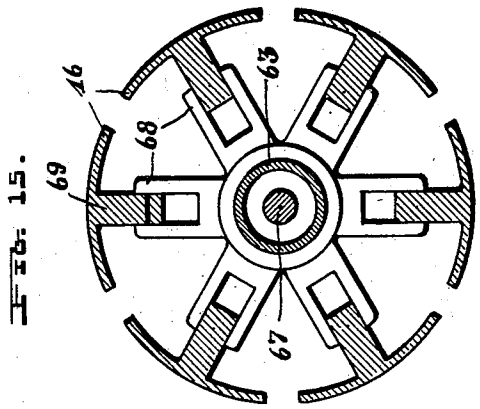


Fig. 15.

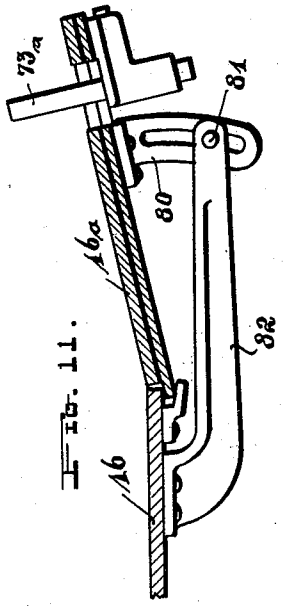


Fig. 11.

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UNITED STATES PATENT OFFICE

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REENFORCING CAGE MACHINE

Application filed September 25, 1928. Serial No. 308,328.

This invention relates to devices used for winding and preparing reenforcements for tubes, especially concrete tubes.

One of the objects of this invention is to provide a machine that can be adjusted to automatically wind reenforcing material in a circular and other manner for cylindrical reenforcements.

Another object is to provide mechanisms for changing the speed during the winding and preparing of reenforcing material when the reenforcing material is tied or wound in a certain direction for a certain length of time so that when, for instance, a circular winding is to be done over a suitable length, the velocity of the machine can be increased to quickly finish a cylindrical winding while, on the other hand, the velocity of the machine may be decreased when the reenforcing material is wound in an irregular manner.

Another object is to provide a feeding mechanism whereby reenforcing material can be guided in a certain spaced manner to produce an evenly prepared stretch of reenforcing material within a whole reenforcement.

Another object is to provide a mechanism for controlling the speed of the feeding mechanism.

Another object is to provide adjusting means whereby larger and smaller diameters can be wound and prepared.

Another object is to provide means whereby different sized drums can be exchangeably mounted.

Another object is to provide automatic reversing mechanisms for guiding reenforcing material back and forth in a certain predetermined manner.

Another object is to provide adjustable supporting means for the various cage-holding drums.

Another object is to provide means facilitating a removal of a finished reenforcing cage.

Other objects will appear from the following description and appended claims as well as from the accompanying drawings, in which—

Fig. 1 is a top plan view of a reenforcing cage winding machine including certain mechanisms according to this invention.

Fig. 2 is a front elevation of the cage winding machine illustrated in Fig. 1.

Fig. 3 is a fragmentary cross-section on line 3—3 of Figs. 1 and 2.

Fig. 4 is a fragmentary end-elevation as seen in the direction of the arrows 4 in Figs. 1 and 2.

Fig. 5 is a fragmentary detail cross-section through the drum-shaft, illustrating the adjustable supporting-means of the drum.

Fig. 6 is a front-elevation of the supporting-means illustrated in Fig. 5.

Fig. 7 is a fragmentary detail front-elevation of the controlling-mechanism for the automatic feeding-device.

Fig. 8 is a side-elevation of the wire-guiding and wire-controlling mechanisms in operative relation to a fragmentary cross-section through the top-plate of the carriage on line 8—8 of Fig. 1, illustrating the diverse details of the mechanisms.

Fig. 9 is a fragmentary detail end-elevation of the supporting-jack for the end of the drum-supporting-shaft.

Fig. 10 is a front-elevation of the supporting-jack illustrated in Fig. 9.

Fig. 11 is a fragmentary detail longitudinal-section through a drum and an adjustable attaching-plate whereby reenforcing material may be wound slightly conical at the end of the drum.

Fig. 12 is a fragmentary detail cross-section through a pin-holder.

Fig. 13 is a top plan view of the pin-holder illustrated in Fig. 12.

Fig. 14 is a fragmentary longitudinal view of the drum and adjusting mechanisms.

Fig. 15 is a cross-section on line 15—15 of the illustration in Fig. 14, supplemented by the several segments of a full circular drum-section.

Large tubes or pipes, such as concrete, drainage and sewer pipes, require an insertion of reenforcing material and such reenforcing material has to be wound in a comparatively regular manner to assure a suitably even, central or desired location of the

reenforcing material within such pipes and tubes.

A reenforcement for a tube or pipe of this type is not only wound in a circular and cylindrical direction but also back and forth from end to end of the reenforcing cage for such a tube and again diagonally through such a net of the reenforcing cage.

It must therefore be understood that during the process of winding or preparing such a reenforcing cage there occur certain stretches of comparatively even winding or even zigzagging.

One of the principal objects of this invention is therefore to provide a machine with changing speed controls by which, for instance, during a circular and cylindrical winding the velocity of the machine can be increased to finish such a section quickly and automatically.

On the other hand, the changeable speed control allows a decreasing of the velocity of the machine where the reenforcing material is to be wound irregular between certain regular layers within a reenforcing cage, so that such a zigzagging or connecting section in the cage can eventually be finished by hand without the automatic control mechanism of the machine, eventually by hand levers controlling the guiding mechanisms, if the reenforcing material is not exactly held or guided by hand.

As illustrated, an exchangeable drum 16 is provided as indicated in Figs. 1 and 2 about which a reenforcing cage can be wound and prepared. This drum is coupled to the main driving shaft 17 of a driving apparatus. This driving shaft is connected by a transmission 18, 18_a, 18_b, 18_c and 18_d to a motor 19. The parts 18_b and 18_d may be gears or sprocket-wheels and chains or any other similar suitable motion-transmitting means. The part 18_a is preferably a clutch whereby the driving motion transmitted from the motor 19 may be interrupted at will. The part 18_c is preferably any variable speed transmission obtainable on the open market, such as a speed transmission manufactured by the Stephens Adamson Manufacturing Company, Aurora, Illinois, though no particular claim to any particular certain type of variable speed transmission is made in this application.

A control for the variable speed transmission is indicated at 20 in Figs. 1 and 3.

With this arrangement the main drum supporting shaft 17 can be variably rotated so that the drum 16 may be rotated comparatively slowly while reenforcing material is being tied somewhat diagonally from end to end over the drum as indicated by

– . – . – . – . – . –

line at 21 in Fig. 2, while the speed may be increased at will whenever the reenforcing material is wound spirally in suitably spaced relation over the whole length of the drum as indicated by – . . – . . – . . – . . line at 22 in Fig. 2.

For winding the reenforcing material evenly spaced in a spiral manner as indicated by the – . . – . . – . . line an automatic feeding mechanism is illustrated in Figs. 1, 2, 3, 4, 7, and 8.

Any reenforcing material, for instance wire, is placed along the line indicated at 23 in Fig. 8 over several rollers 24. These rollers are mounted on a carriage indicated at 25 in Figs. 1 and 2 shiftable in the directions of the arrows 26 on a frame structure 27. The top platform 25_a of this carriage is disposed over the frame structure 27 in such a manner that it will strike certain stops 28 and 29, whereby the movement of the carriage over the frame structure can be reversed in such a manner that the reenforcing material passing over the rollers 24 is guided to wind in a predetermined manner around the drum 16. The roller 24_a is adjustable by the hand-wheel 30 to offer a suitable resistance for the reenforcing material while it passes over the rollers in order to retard the reenforcing material to assure a straight and even winding.

The weighted lever 31 near the upper roller 24_b also serves to retard the passing reenforcing material.

As the top plate 25_a of the carriage comes into contact with either the stop 28 or the stop 29 the shifting rod 32, to which these stops 28 and 29 are adjustably secured, is caused to move in the directions of the arrows 26 so as to correspondingly actuate the lever 33.

The lever 33 is provided with a gear segment 34 meshed with a gear pinion 35. This gear pinion is preferably a part of a reversible apparatus or switch roughly outlined at 36 in Figs. 1 and 2. In case an electric switch is connected to the gear pinion 35, such electric switch, of course, is in operative connection with a reversibly operating motor, as, for instance, indicated at 37.

Reversible motors are made of various types and designs, to be had on the open market, and, of course, cooperating switches must be made of different shapes and forms accordingly, but, inasmuch as switches, too, can be had on the open market in any suitable, desired, or required form and design, no particular switch is meant to be indicated by the showing in the drawings or by any reference in the specification with respect to details in the drawings.

The motor 37 is in operative connection with a variable speed control or variable speed transmission 38 controllable by the lever 39. This variable speed transmission is in operative connection with a driving shaft 40.

The ends of a flexible connection roughly indicated at 41 are connected to the opposite edges of the top plate 25_a of the carriage, as indicated at 42 and 43, so that the carriage will be moved over the frame structure 27 in one direction when the reversible motor 37 is so actuated and again the carriage 25 will be moved in the opposite direction whenever the reversible motor is so actuated.

The reversing mechanism can also be controlled by hand-levers indicated at 44 and 45 near the opposite ends of the frame structure 27 to take care of sudden changes that may be desired during the operation and winding of a reenforcing cage.

The drum 16 is exchangeably connected to the main shaft 17 by the coupling 46.

The main shaft is primarily mounted within the main structure 47, in addition to which supporting rollers are mounted under the coupling, whereby the weight of the drum and eventually of reinforcing material wound around the drum is distributed over these different supports.

This extra roller-support is illustrated in detail in Figs. 5 and 6. The rollers 48 are pivotally mounted at 49 in the bracket 50 which are supported by the base 51 with the adjusting means 52 between the supporting pivot 49 and the base 51, the adjusting means consisting of a screw-collar-ring 52_a disposed on the screw-plunger 52_b within the base 51, so that the support of the coupling 46 can be adjusted suitably in relation to the main bearings in the main structure 47.

The opposite end of the drum is supported by a structure illustrated in detail in Figs. 9 and 10.

The collar-wheel 53 rests in a segmental shoe 54 of a vertically adjustable plunger 55. The plunger is mounted shiftably within the yoke frame 56, which in turn is pivotally supported on the shaft 57. The plunger is furthermore supported by an adjustable connection-rod 58, which is mounted at its lower end on an eccentric 59. The eccentric is a portion of the shaft 57, controllable by the lever 60. The shaft 57 is turnably mounted in the bearing boxes 61.

The connecting-rod 58 with the plunger 56 can be lowered by means of the eccentric 59 and the lever 60. This serves to suitably free the supporting shoe 54 sufficiently from the collar-wheel 53 so that the whole structure can be swung around the shaft 57 by means of the supporting yoke 55, to bring it to a flat resting position on the ground or supporting base, in which condition the drum 16 may be removed in an endwise direction from the whole apparatus, especially in case of an exchange of different sizes of drums.

The main drum 16, illustrated in Figs. 14 and 15, is more specifically and in detail disclosed and referred to in the co-pending divisional application, filed August 4th, 1930, Serial No. 473,036. A number of segments 16 are expansibly mounted by the interengagements 62—64 on the hollow shaft 63, operatively connected to the central spindle 67 by means of the blocks 66 movable within the hollow shaft in the directions of the double arrow 65. Apertures are provided in the drum segments for the tie-pins as illustrated in detail in Figs. 12 and 13, making the tie-pins 73 shiftable within brackets 74 and, by means of the grooves 75 and 76 and the tumbler 77 under the tension of the spring 78, adjustable, with respect to protruding the pin-ends beyond the outer periphery of the drum-segments.

By the slotted flanges 79, the brackets 74 can be adjustably secured to the drum-segments in such a manner that the pins can, either, protrude from the drum for tying operations by means of the interengagement 76—77, bringing the outermost pin-end to protrude from the drum, or disappear by means of the interengagement 75—77, with the whole of the pin within the bracket or at least in disappearing position to such an extent that a finished cage can be removed from the drum over which it had been wound and tied by means of the protruding pins.

A removal of the finished reenforcing cage is furthermore made easy by the fact that the drum segments can be contracted by means of the interengagements 62—64.

One end of each of the drum segments is made adjustable for winding the end of a cage in a taper form. The segment-section 16_a, illustrated in detail in Fig. 11, is provided with the slotted bracket 80, to engage by means of the pin or bolt 81 with the arm 82, whereby the section 16_a can be adjusted to different angular positions with respect to the drum-segment to which the section is attached.

Having thus described our invention, we claim:

1. In a reenforcing-cage winding-machine, an operating apparatus including a driving shaft and a guide-bed for cage-material controlling-mechanisms, a cage-holding drum with one of its ends exchangeably mounted on and operative by the end of said driving shaft, a cage-material guiding-carriage operatively mounted on said bed and in operative connection with said apparatus for guiding and feeding cage-material to the drum by means of the carriage moving parallel to the axis of the drum, means for turnably supporting both ends of the drum independently of the apparatus, and means for tilting the outermost of such supporting means to facilitate an exchange of large drums.

2. In a reenforcing-cage winding-machine, a stationary framework, a main driving-shaft journaled in said framework and having a connection-end protruding from the framework, a guide-bed for cage-material control-

ling-mechanisms sidewise of said framework and parallel to the axis of said shaft, a cage-holding drum with one end exchangeably mounted on and operative by the said connection-end, a cage-material guiding carriage operatively mounted on said bed and exchangeably applied to said connection-end, means for turnably supporting both ends of the drum independently of said framework, means for tilting the outermost of such supporting means to facilitate an exchange of large drums and corresponding large cages wound on the drum, means for turning the drum by means of said main driving shaft, and other means mounted in the framework for operating said carriage.

In testimony that we claim the foregoing as our invention we have signed our names.

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