MACHINE FOR THE MANUFACTURE OF PIPES

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4 Sheets-Sheet 4

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This invention has for its object a machine designed for applying a metal safety reinforcement to pipes. This invention is an improvement on the machine described in the French Patent No. 677,365 dated Oct. 22, 1928.

This invention will now be described, reference being had to the drawings appended hereto wherein:

Figure 1 is a front view of one embodiment of the machine, the mandrel over which the pipe is made being shown in cross section.

Figure 2 is a side view of the machine of Figure 1.

Figures 3 and 4 relate to an improved embodiment of the invention.

Figure 3 shows a modification of the structure shown in Figure 1, wherein the means for reinforcing pipes contains a tensioning device.

Figure 4 is a side view of Figure 3.

The present invention is particularly useful in the reinforcing of tubes or in the manufacture of reinforcing elements for concrete tubes and will be described in connection with a machine for making reinforced concrete tubes.

As shown in Fig. 1, a mandrel 5, having removable metal ends 6 provided with deep grooves 7 and protrusions 8, is mounted for rotation. Mandrel 5 provides a support for the concrete coating 3. The ends 6 support the longitudinal reinforcing rods 1 which are retained in place by nuts 9. Upon tightening nuts 9 the ends of rods 1 are bent as shown at 11. After securing one end of a rod 1, the other end is drawn by a tool 10 provided with rod-gripping means to tighten the same, and while in a tightened condition the other nut 8 is secured to maintain the rod fast.

Steel wire 2 is then passed between the jaws of the winding device 4. One of the jaws 12 is stationary on the device while the other jaw 13 is movable about a bolt 14 provided with a spring 15 under the nut 16. As the said nut 16 is adjusted, the jaw 13 will exert a greater or less pressure on the steel wire 2 so as to put the same under desired tension as it is wound about the longitudinal rods or bars 1.

The pitch or spacing of the helices is obtained automatically by means of a distance ruler 17 (Fig. 2) provided with a steel spring bearing at 18 under the pipe in formation against the helix formed previously; the steel wire under tension as coiled comes into engagement with the said ruler, the thickness of which defines the spacing of the helices. The steel ruler 17 is tightly pressed against the pipe by means of a turnbuckle 19 adjustable at will. The winding device 4 is pushed by the said ruler by means of a bolt 19 passing therethrough. The ruler 17 thus guided by the preceding helix operating like the thread of a lead-screw adjusts the pitch of the helix being formed by pushing the winding device 4. In order to allow the said device to move in response to the thrust from the ruler, it is provided with a suitable number of rollers 20 or ball-supported wheels, etc., running on the solid or hollow cylinders 21. A hook 22 prevents the device from getting out of its races.

The mandrel and the straining device are operated by means of the motor 23 which through a belt 24 drives a pulley 25 (Fig. 2) keyed on a 15 shaft 26 rigid with a worm spindle 27. The spindle 27 is adapted to drive a worm wheel 28 secured through a part 29 (Fig. 1) at the extremity of the removable end of the mandrel.

Obviously, the mandrel instead of comprising removable ends may be provided with collars located at the extremities thereof and fitted with the same tensioning and securing means for the longitudinal rods.

In the embodiment shown in Figs. 3 and 4, 25 means are provided for tensioning the longitudinal rods or straight bars and the metal guides or turns and for making the machine available for the manufacture of reinforced concrete pipes.

For that purpose (Fig. 3) metal discs 31 are associated with the machine and can be caused to slide on rods 32 by means of screws 33 operated by means of hand wheels 34. The first tube 35 is positioned in the usual manner between the discs 31. The outer surface of the said first tube is corrugated on a certain length at the ends thereof or on the whole length so that when the helices are wound under tension they will force the bars or longitudinal rods which generally are made of thin strap iron down to the bottom of the corrugations, thus considerably increasing the tension on account of the lengthening of the said longitudinal rods resulting from their being received in the bottoms of the corrugations. The latter may be replaced by a wire wound as coarse-pitch turns on the said first pipe where the latter is made perfectly plain outwards.

In order that the said first tube may not break under the tension exerted by the straining device 4 in Fig. 1, a follower 36 (Fig. 4) is associated with the said device, which is secured by means of a curved bracket 37 bolted on the same. This follower rolls on the first interior tube. When the inner tube is of appreciable length and there is
considerable tension on the wire being wound on the tube, there is a tendency for the tube to be deflected toward the direction from which the wire is fed. Under certain conditions, this deflection may be sufficient to break the tube. To avoid this deflection the follower 35 is provided. Associated with the winding device is also a lever provided with a counterweight 37b (Figs. 3 and 4) to measure the tension to be given to the wire of the spirals.

As the wire passes between the jaws 12 and 13, there is a tendency for them to be pulled along with the wire due to the friction between the wire and the jaws. Since the jaws are fixed to the arm carrying weight 37a, there is a tendency for this arm to raise when the jaws move toward the tube. Now there will be a definite relation between the tension of the wire and the weight 37b raised by the arm and the weight 37b will be a measure of the tension in the wire.

In order that the winding device 4 in Fig. 1 may be pushed easily by the spacing ruler 17, a small diameter cable 40 is secured to the winding device 4 and runs over sheaves 41 and 42. Attached to the end of the cable are weights 43 so adjusted as to exert a sufficient pull on the device in order that the spacing ruler shall have but an insignificant resistance to overcome for moving the device, without danger that the helix shifting the ruler be drawn backwards by the latter, which would decrease the spacing or pitch of the helices.

The iron straps for the longitudinal rods may be corrugated before-hand to be secured in the corrugations in the first pipe, which is necessary chiefly in the manufacture of corrugated pipes.

I claim:

An apparatus for applying wrapped wire armor on the cylindrical surface of tubes, comprising means for supporting and rotating a tube, a track parallel to the axis of the tube, a carriage movably mounted on said track, means on said carriage for guiding a wire onto the rotating tube, a distance ruler formed of spring material fulcrumed on the carriage and having one end bearing on the tube and engaging the last winding of the wrapping on the tube so that rotation of the tube, due to the pitch of the winding in engagement with the ruler, will effect a movement of the carriage axially of the tube, and means associated with the other end of the distance ruler for adjusting the pressure of the ruler on the tube.