Dec. 9, 1958 I. A. KIRCHNER 2,863,206

APPARATUS FOR PRESTRESSING REINFORCING WIRES FOR REINFORCED CONCRETE PARTS IN MASS PRODUCTION

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Fig. 1

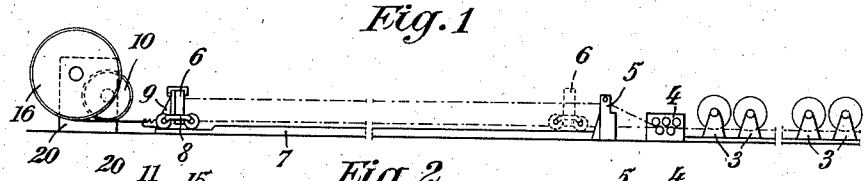


Fig. 2

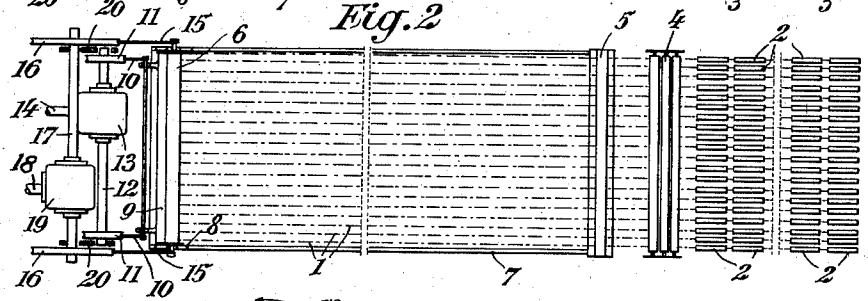


Fig. 3

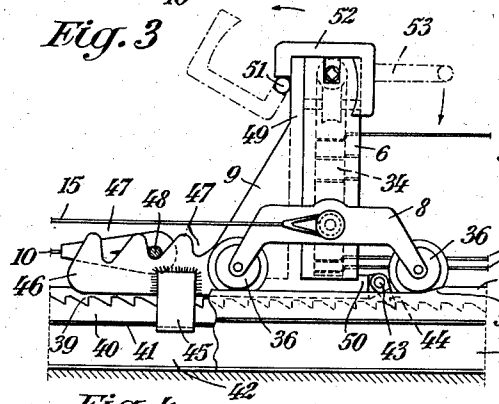


Fig. 5

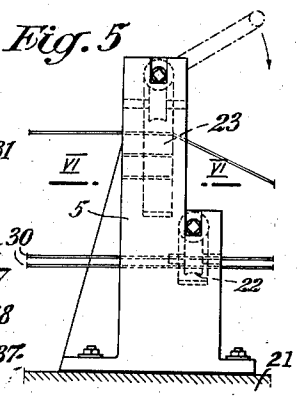


Fig. 4

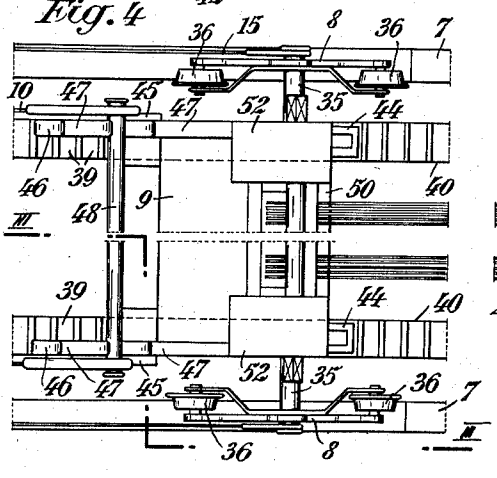
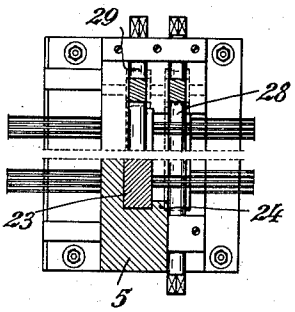


Fig. 6



INVENTOR.
IGNATZ ADOLF KIRCHNER

BY

Attorney

Dec. 9, 1958 I. A. KIRCHNER 2,863,206

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Fig. 7

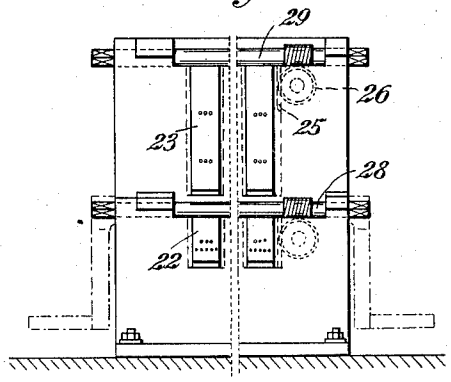


Fig. 8

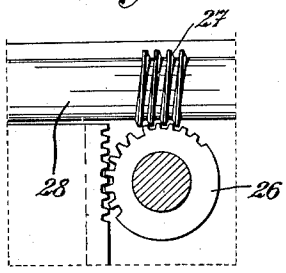


Fig. 12

Fig. 9

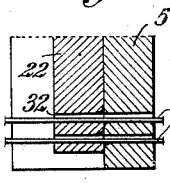


Fig. 10

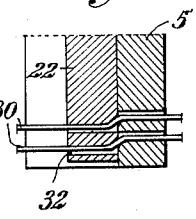


Fig. 11

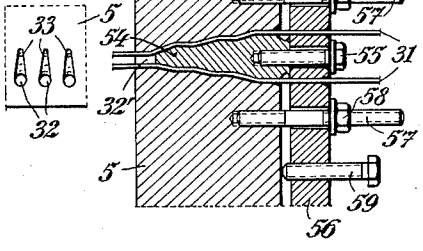


Fig. 13

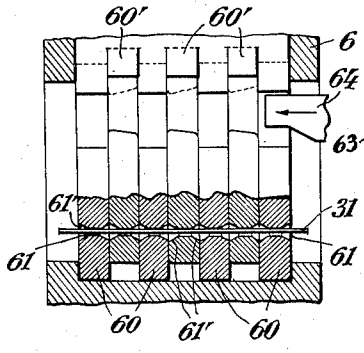


Fig. 15

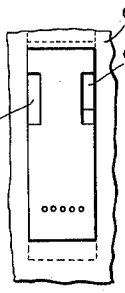
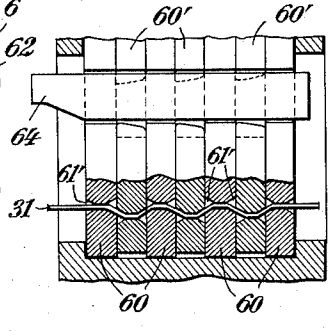


Fig. 14



INVENTOR.
IGNATZ ADOLF KIRCHNER

BY

Attorney

Dec. 9, 1958 I. A. KIRCHNER 2,863,206

APPARATUS FOR PRESTRESSING REINFORCING WIRES FOR REINFORCED CONCRETE PARTS IN MASS PRODUCTION

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Fig. 16

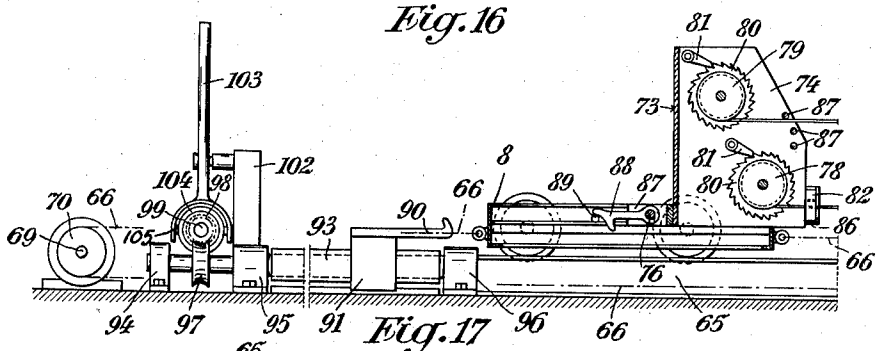


Fig. 17

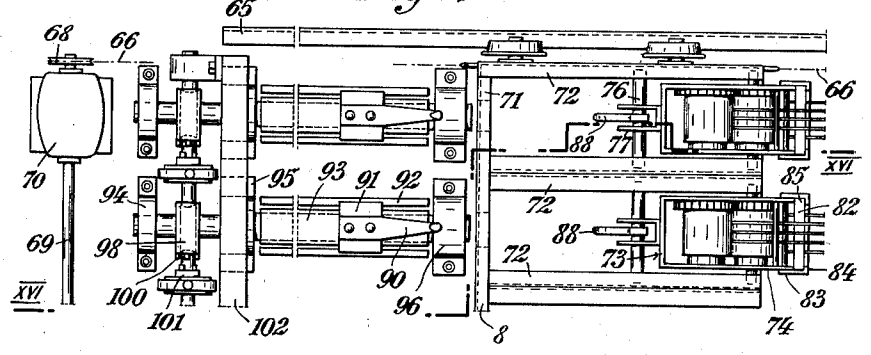


Fig. 19

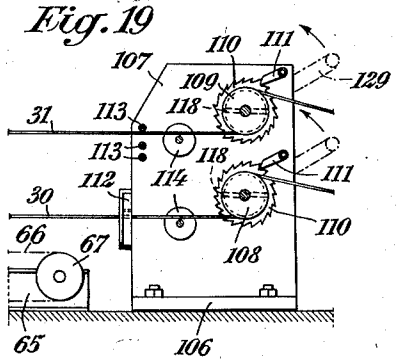
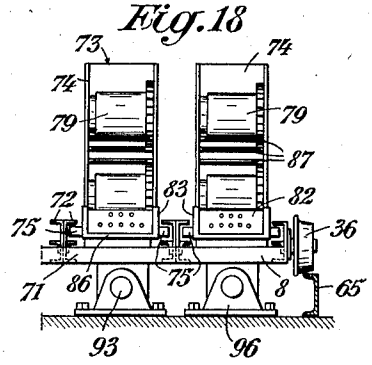


Fig. 18



INVENTOR.
IGNATZ ADOLF KIRCHNER

BY

Attorney

Dec. 9, 1958 I. A. KIRCHNER 2,863,206

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Fig. 20

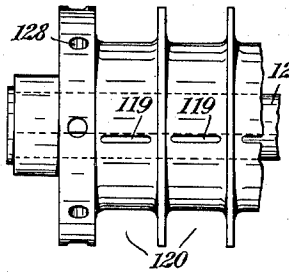


Fig. 21

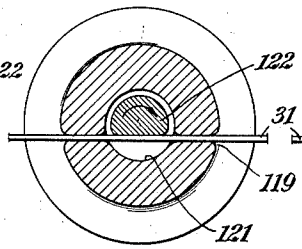


Fig. 22

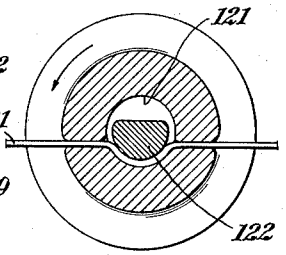


Fig. 23

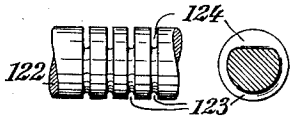


Fig. 24

Fig. 25

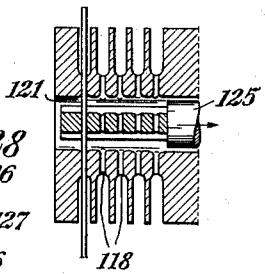


Fig. 26

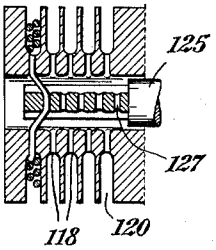


Fig. 27

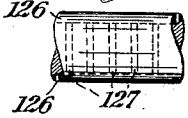


Fig. 28

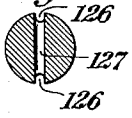


Fig. 29

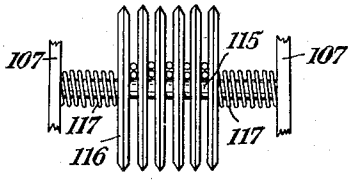
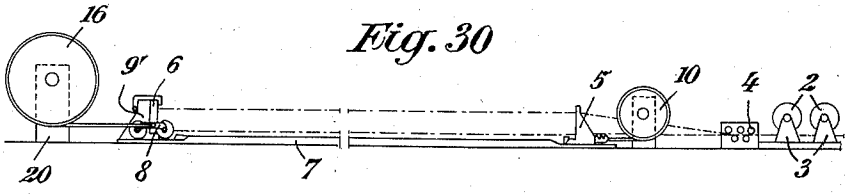


Fig. 30



INVENTOR.
IGNATZ ADOLF KIRCHNER
BY
Attorney

United States Patent Office 2,863,206 Patented Dec. 9, 1958

2,863,206

APPARATUS FOR PRESTRESSING REINFORCING WIRES FOR REINFORCED CONCRETE PARTS IN MASS PRODUCTION

Ignatz Adolf Kirchner, Vienna, Austria

Application March 11, 1953, Serial No. 341,712

Claims priority, application Austria August 27, 1952

4 Claims. (Cl. 25—118)

My invention relates to an apparatus for prestressing reinforcing wires for workpieces of reinforced concrete preferably arranged in several parallel rows.

According to a known process the reinforcing wires are pulled individually from a supply roll, threaded through stationary end walls provided at the end of each row of moulds, and clamped each in a grip. Thereafter a tensioning device, for tensioning the wires, is connected successively to the grips situated at the beginning of the rows and to which the grip is anchored. After the concrete has set, the tensioning device is again connected to each of said grips, the anchorage is removed and the tension is discontinued, the prestressing of the wires being imparted to the concrete.

My invention has as its object to improve the process described and to offer the possibility of prestressing the wires for a number of rows of moulds as is essential for mass production.

Further objects of my invention are preferred constructions of the apparatus to perform the process, in particular as regards the construction of the means for clamping the wires.

In the drawing the apparatus according to the invention is shown in several embodiments by way of example.

Figs. 1 and 2 show the entire plant schematically in elevation and top plan.

Figs. 3, 4, and 5, 6, 7, 8 show the movable abutment and the fixed abutment, respectively, of one type, the former being shown in conjunction with a slide bed, Fig. 3 being an elevation and sectional view taken along line III—III of Fig. 4, Fig. 4 being a top plan view, Fig. 5 a side view, and Fig. 6 partly a top plan view and partly a sectional view taken along line VI—VI of Fig. 5. Fig. 7 shows an end view of the fixed abutment, and Fig. 8 a detail on a larger scale.

Figs. 9, 10, and 11 show on a larger scale the appertaining clamping means in cross section, in two positions, and the end view of a slide, Fig. 12 is a sectional view of another type of clamping means.

Further, Figs. 13–15 show another type of clamping means in a partially sectional side view, open and closed, and in an end view, open.

Fig. 16 illustrates a longitudinal section through a third embodiment of the invention, according to which a movable wire support is provided for the wires pertaining to each row of molds, said section being taken along the line XVI—XVI of Fig. 17.

Fig. 17 is a top view of Fig. 16.

Fig. 18 is an end view of Fig. 16.

Fig. 19 shows the appertaining wire support with the first side plate removed.

Moreover, Figs. 20–24 and Figs. 25–28, respectively, illustrate two devices for holding the wire ends in the drum of the means according to Figs. 16–18, partly in longitudinal or cross section, partly in elevation. Finally,

Fig. 29 shows a brake for the wire pulling means and

Fig. 30 is a schematical elevation of another mould bed.

A mould bed (Figs. 1, 2), which may be 100 metres long and which in the present case comprises 20 parallel rows of moulds 1, has arranged at one end thereof for each row wire supply rolls 2 spaced one behind the other in a number equal to the number of wires to be provided in the part to be moulded. The rolls which are at the same distance from the mould track are carried in stands 3 on a common shaft. Owing to the small scale of Figs. 1 and 2, all wires appertaining to a row of forms are indicated by a single dot-dash line. The free end of each wire is passed between grooved straight-guiding rolls of a straightening device 4 and is pushed through bores in a stationary wall 5 and a movable wall 6 (Fig. 1). As may be seen from the end view of the walls 5 (Fig. 7), eight wires are provided in each row for the tension reinforcement, and three wires for the transport reinforcement, the latter at two different levels according to moulded parts e. g., beams, of two different heights. The mould bed has arranged on either side thereof rails 7 for a carriage 8 which carries the movable wall 6 and which can be moved to the other end of the mould bed into the position shown in solid lines, into which it has been moved on a slide bed 9, to which it can be firmly connected. The ends of ropes 10, which are wound on drums 11 driven on a common shaft 12 in a usual manner through a back gearing 13 and the shaft 14 by a motor (not shown), are connected to the slide bed 9 which is movable in the longitudinal direction of the plant. The movable wall 6 has connected thereto the ends of ropes 15, which are wound on drums 16 driven on a common shaft 17 by a motor (not shown) in the manner known through a shaft 18 and a back gearing 19. The shafts 12 and 17 are carried in side plates 20.

The stationary wall 5 (Figs. 5, 6, 7) anchored on the foundation 21, is of stepped cross-sectional shape and has in its wider lower part a slide 22, and in its narrower upper part a slide 23, for each row of moulds. The slides are vertically movable and situated at the side remote from the bed of moulds; they adjoin the wall 5, their edges being embraced and guided by projection wall parts 24 (Fig. 6). Each slide carries a rack 25 meshing with the toothing of a wheel 26 (Fig. 8), which is formed as a worm wheel in another part of its periphery and in mesh with a worm 27 in a shaft 28 or 29 extending throughout the width of the wall and carried thereby, said shaft being formed with squares at its ends protruding from the wall, for the attachment of cranks. Thus all slides at the same level can be moved together with the shaft 28 or 29. The tension reinforcement wires 30 and the transport reinforcement wires 31, which latter are passed through the bores provided at half the height of the slide 23, may be clamped by lowering the slides from the position of Fig. 9 into the position of Fig. 10. To make this clamping reliable, the bores 32 of the slide are continued at their ends facing the wall 5 by wedge-shaped grooves 33 which extend and taper oppositively to the direction of movement of the slide, i. e. upwardly (Fig. 11). Thus wires of different gauge may be clamped effectively.

The movable wall has similar clamping means, but comprises for each row of moulds only one slide 34, which extends throughout the height of the wall and is passed through by all reinforcing wires. Consequently only one shaft for driving the slides is provided. The wall 6 is fixedly mounted on the crossbeam 35 (Fig. 4) of the wheelframe 8, the wheels 36 of which run on rails 7 carried on beams 37.

At the end of the mould bed the rails 7 have an elevation 38 with a slight incline. This elevation acting as a ramp is adjacent to the carriage bed 9 (Figs. 3, 4), which

is slidable on flat rails 40 which have a ratch toothing 39 and are fixed on the top flange 41 of I-beams 42. Locking pawls 44 pivoted on pins 43 are adapted to engage with the toothing 39 of the rails 40. At the side opposite to the pawls the slide bed 9 has sliding jaws 45 embracing the flange 41 of the beams 42 from below. Arms 46 of the slide bed have notches 47 into which a bar 48 may be placed to which the traction ropes 10 for tensioning the wires are connected. The notches 47 of each arm are at different levels so that the bar 48 may be carried at different levels. The slide bed 9 has a superstructure 49 consisting of a vertical wall, against which the wall 6 may apply. In that case it lies with its lower front edge behind a low crossledge 50 of the slide bed to be secured against sliding on the same. The ramp 38 is so high that the carriage running up is lifted by a distance sufficient to permit of the wall 6 passing over the ledge 50. The superstructure 49 has hooked latches 52 pivoted on pins 51 and embracing the wall 6.

Tensioning the wires is effected as follows:

After all wires have been threaded through the bores in the walls 5, 6 or the slides 22, 23, and 34 situated at said walls, all wires are clamped in the wall 6 by some turns of the crank 53 and the resulting lowering of the slide 34. Then the carriage with all wires is pulled by means of the driven drums 16 to the other end of the mould bed, the wires running from the rolls 2 through the fixed wall 5. After the carriage 8 has reached the ramp 38, the wall 6 is locked behind the ledge 50 in the slide bed 9 and is anchored to the slide bed by pivotally moving the latches 52. Thereafter the 120 tension reinforcement wires are clamped simultaneously in the wall 5 by lowering the slides 22 and are now ready for tensioning. By winding the ropes 10 on the drums 11 the tension reinforcement wires are pretensioned, whereupon the 60 upper wires are clamped in the wall 5 by a simultaneous lowering of the slides 23, whereas the tensioning is continued as described until the lower wires have been prestressed to the tension desired. After the pawls 44 have fallen into the toothing 39 of the rails 40, the ropes 10 may be relaxed. The tilting moment exercised on the slide bed by the pretensioned reinforcing wires is transmitted by the jaws 45 to the beam 42 and thus to the foundation.

Now concrete may be poured into the moulds and when it has set the wires may be cut at both ends of the mould bed. Lifting of the slides 34 will unclamp the wires at the movable wall 6. When the bends of the wires have been straightened, the scrap wire can be removed. Now the moulds and the moulded parts are removed and thereafter the latches 52 and the pawls 44 are turned back whereas the carriage 8 with the wall 6, as well as the slide bed 9 are jointly pulled towards the mould bed, the ropes 10 and 15 running down from the drums 11 and 16. Overcoming the elevation 38, the carriage 8 while leaving the slide bed 9 behind will lift out of the same and will move back to its initial position, the ropes 15 running from the drum 16. The wires clamped in the wall 5 are unclamped as described and are then ready again for being threaded into the movable wall 6. The operation of stretching the wires may be repeated now. In all subsequent tensioning operations, the threading of the wires through the rolls of the straightening device 4 and the wall 5 will be superfluous so many times, as the wire length required for one tensioning operation is contained in a wire supply roll.

The resultant of the individual tension forces of the wires will be at a level which depends on the arrangement of the reinforcing wires. In order to place the point of application of the pulling force effecting the tensioning always in the direction of that resultant, the bar 48 is placed into the corresponding notch 47.

The process according to the invention involves a considerable simplification of the known process and only by its application the economy in steel consumption possible in steel-string concrete and amounting to about 90%, is rendered fully effective, owing to the reduced manufacturing cost. Where several of the plants described are juxtaposed, the delays unavoidable in operating a single mould bed owing to the setting of the concrete may be used for preparing the concrete pouring operation, pouring the concrete, and removing the moulded parts in the other mould beds.

The clamping device illustrated in Fig. 12 is suitable for reinforcing wires of a nature unsuitable for being clamped as described hereinbefore with a sharp bend. Slots 32' extending throughout the width of the parts to be moulded and widening towards the side remote of the mould bed are provided in the wall 5 at the level of the lower reinforcing wires and according to the levels of the upper reinforcing wires. The widening of the slots is combined with an alternate inclination of the slot wall. A wedge 54 adapted to the shape of the slot is inserted in each slot and fixed to a gripping plate 56 by means of a screw 55. The reinforcing wires, designated with 31 in Fig. 12, pass along the two flanks of the wedge 54, preferably in grooves, and are pulled through bores in the gripping plate 56. The plate 56 has additional bores receiving stud screws 57 fixedly screwed into the wall 5. Tightening the nuts 58 associated with those stud screws will approach the plate 56 to the wall 5 and force the wedge 54 more deeply into the slot 32', to clamp the reinforcing wires between the flanks of the wedge and the wall of the slot. Where the flank angle of the wedge and the slot is smaller than the limiting angle of resistance, tensioning the reinforcing wires will pull the wedge 54 more deeply into the slot to ensure safe clamping of the reinforcing wires. To loosen the wedge, screws are screwed into the plate 56 and bear with their tips on the wall 5. Tightening the screws will force the plate 56 from the wall 5 and pull the wedge 54 from the slot 32' to unclamp the reinforcing wires, which may now be pulled through for the next tensioning operation.

It is desirable to pretension the tension reinforcement wires as highly as possible, e. g., to 12,000 kg. per sq. cm. That high initial tension requires a larger gripping length of the reinforcing wires. A clamping device suitable for high initial tension is illustrated in Figs. 13–15. It consists of a larger number of series-arranged steel plates 60, 60', every second of which is vertically slidable. They are bored through according to the reinforcement pattern of the parts to be moulded, the bore 61 of each plate flaring on both ends. Each plate has two lateral grooves 62 and 63, which are at the same level in the stationary plates 60 and are somewhat staggered from each other in the movable plates so that when the bores of all plates are in register the grooves 63 will be in alignment whereas the grooves 62 of the movable plates 60' will be staggered from the grooves of the stationary plates 60. After the reinforcing wire 31 has been pulled through, a wedge 64 is driven into the duct formed by the grooves 62 to move the movable plates 60' successively until the grooves 62 are in alignment. Thus the reinforcing wire 31 has been kinked several times, as shown in Fig. 14.

The number of kinks can be increased as desired by selecting a corresponding number of plates 60, 60'. If the wire is deflected at each kink by 30–60 deg., the total of the deflections in the clamping device shown in Figs. 13–15 will correspond to an angle of contact of 180–360 deg. so that in addition to the clamping effect a force of friction is effective which is caused by the several deflections of the wire.

To unclamp the wire, the wedge 64 is withdrawn, turned through 180 deg., and introduced into and driven through the duct formed by the grooves 63 to move the movable plates 60' upwardly in succession to bring the bores 61 into register.

Different-gauge reinforing wires will necessitate different displacements of the movable plate 60'. These may

be chosen in any desired size by the use of wedges 64 of different height.

The strength of the reinforcing wires increasing as the diameter decreases, the initial tension may be increased substantially by the use of steel strings as compared with thicker wires. However, this requires very high gripping forces which in many cases cause deformation and damage to the strings at the gripping points and rupture of individual strings. For this reason the strings are preferably held by being wound on a roll, as in musical instruments, because in that case the tension in the string increases gradually and continuously.

In Figs. 16 to 29 apparatus for carrying out the process according to the invention is shown, which is provided with rolls or drums for gripping steel strings.

The mould bed has arranged lateral beams or rails 65 forming a track on which the carriage 8 runs with its wheels 36. A closed pulling rope assembly is provided for its movement. The pulling ropes 66 are fixed to the front and rear of the carriage 8 on both sides of the mould bed, and pass around a guide pulley 67 (Fig. 19) adjacent to the stationary wire support, and a drive pulley 68 arranged at the end of the mould bed. The drive pulleys 68 are driven by the motor 70 through a shaft 69. The carriage 8 has a grate-like superstructure consisting of channels 71, 72 (Fig. 18), the individual bars of the grate forming guides for slides 73. Preferably one slide is provided for each row of moulds but alternatively the arrangement may be such that several rows of moulds are associated with each slide. The slides 73 comprise a channel-section superstructure 74 and are guided in the channels 72 by two pins 75 and a shaft 76 fixed in a forked extension 77 of the superstructure 74. The flanges of the superstructure 74 have rotatably mounted between them two drums 78, 79, the construction of which will be described with more detail hereinafter. Each drum is fixedly connected to a ratched 80 (Fig. 16), with which a locking pawl 81 may engage. In front of the drum 78 the flanges of the superstructure 74 have detachably fixed thereto a hole plate 82 with bores arranged corresponding to the reinforcement pattern for the parts to be moulded. Said hole plate is preferably guided like a slide by the flanges of the superstructure 74, as shown in Figs. 16, 17 and 18. Here angle straps 83 extend at both ends beyond the flanges of the superstructure 74, to provide between the short strap arms 84 and the edge faces of the flanges a groove 85 into which the hole plate 82 may be inserted from above. An angle stop 86 secures the plate in position for use. When the reinformement pattern is altered, the hole plate may be exchanged against another in a simple manner.

In correspondence with the different heights of the parts to be moulded, bars 87 are provided for the upper reinforcing wires at the corresponding levels. These bars may be replaced by tubes which are preferably mounted rotatably in the flanges of the superstructure 74.

The shaft 76 has pivoted thereon a hook 88, which is secured in its lower position by a stop 89. The hook 88 may be caused to interlock with a second hook 90, which is fixed in a slide 91 movable in guides 92. The guides 92 are anchored in the foundation. The slide 91 forms a nut for the screw spindle 93, which is carried safe against flexion in bearings 94, 95, 96, also anchored in the foundation. The spindle 93 carries between bearings 94 and 95 (Fig. 16) a worm gear 97 in mesh with a worm 98 freely rotatable but axially fast on the shaft 99. The worm 98 has claws 100 (Fig. 17) for engagement with a claw collar 101. The collar 101 is axially slidable but non-rotatable on the shaft 99 and may be moved on the shaft 99 by means of a lever 103 pivoted to the wall 102. The collar 101 has a conventional recess into which a bipartite ring 104 is freely rotatably fitted; said ring is pivoted in the fork of lever 103 by pins 105.

The stationary wire support is formed by a frame 106 (Fig. 19) consisting of a series of plates 107 between which drums 108, 109 are rotatably mounted. These drums are similar to the drums 78, 79 of the movable wire support, they are also fixedly connected to ratchet wheels 110 to be engaged by locking pawls 111. In the manner described the drum 108 has associated therewith a hole plate 112 and bars 113 are preferably provided between the plates 107 for setting the level of the transport reinforcement wires.

Brakes 114 are provided between the hole plate 112 or the bars 113 and the drums 108, 109. As shown in Fig. 29 these brakes are formed by a large number of flat discs 116 freely rotatable on a shaft 115 and subjected to the action of compression springs 117. The discs have scarved rims to facilitate the insertion of the strings.

The drums have diametral or chordal bores 118 (Figs. 25 and 26) or slots 119 (Fig. 20) the diameter or height of which corresponds to the wires or strings to be used. Moreover, the drums are preferably provided with grooves 120. The drums 78, 79 of the movable wire support or equipped with clamping means for the ends of the strings to be wound up. A particularly favourable construction is obtained when the drums are hollow and the clamping means are arranged inside the drum. Examples of clamping means are shown in Figs. 20 to 28. The drum has rotatably mounted in the bore 121 a pin 122 provided with grooves 123 and notches 124. The width of the grooves and notches agree with the diameter of the bores 118 and the width of the slots 119. Likewise, the spacing of the grooves and notches, respectively, corresponds to the spacing between the bores 118 or slots 119. The depth of the grooves 123 equals the diameter of the steel strings used. The bottom of the notch 124 is spaced from the axis of the pin 122 by a distance equal to the distance between the bores 118 or slots 119 from the axis of the drum so that when the pin 122 is in the position of Fig. 21 the notches will be flush with the bores or slots 119 to permit of threading the strings 31.

When all strings to be wound on a drum, e. g., the strings for the tension reinforcement of a row of moulds have been threaded through the bores 118 or slots 119 of the drum, the pin 122 is turned through 180 deg. to bend or kink the strings adjacent to the bore 121 sufficiently to prevent unintended slippage of the strings. It is not necessary to clamp the strings by the pin 122.

Another method of holding threaded wires is shown in Figs. 25–28. The pin 125 fitted in the bore 121 of the drum has at mutually opposite points two longitudinal grooves 126 and a series of bores 127 which connect the grooves and the diameter of which agrees with that of the bores 118 whereas their spacing agrees with the spacing of the bores 118. In the position of the pin 125 shown in Fig. 25 the bores 118 are aligned with the bores 127 to permit of threading the strings without difficult. When all strings of a drum have been threaded, the pin 125 is moved axially in the sense of the arrow to bend each string and thus to achieve sufficient adhesion (Fig. 26).

The drums have bores 128, gripping faces, or the like, to enable the fitting of a wrench for turning the drums. The drums 108, of the stationary wire support may be mounted on a common shaft, and so may the drums 109, the shafts being adapted to receive at their ends cranks 129 operable to turn all drums of a shaft.

At the beginning of the pretensioning operation steel strings are pulled from their rolls as has been described hereinbefore and if necessary are passed through the aforedescribed straightening device. They are threaded through the bores 118 or slots 119 of the drums 108, 109 of the stationary will support, inserted between the discs of the brakes 114, threaded through the bores of the hole plate 112, and stuck with their ends into the bores 118 or slots 119 of the drums 78, 79 of the mov-

able abutment. Then these ends are held fast by turning the pin 122 or shifting the pin 125, and the drum 78 or 79 is turned by the wrench in clockwise direction until the necessary number of turns of the strings on the drums has been achieved. Then the locking pawls 81 are brought into mesh with the ratchet wheels 80 and the carriage 8 is pulled to the end of the mould bed 1 until the hook 88 has passed beyond the hook 90. At the same time the strings will move through the bores 118 or slots 119 of the drums 108, 109 of the stationary wire support. The slides 73 then are at the extreme right of the carriage 8 and the hooks 88 are in the position shown. Now the drums 108, 109 of the stationary wire support are turned in counterclockwise direction until the necessary number of turns of strings has been obtained on the drums, while allowing for the fact that the steel strings winding twice half the number of turns as in the movable wire support is sufficient. Thus the slides 73 with the carriage 8 are pulled to the right until the hooks 88 are engaged by the hooks 90. Thus the hooks 90 delimit the operation of winding the steel strings on the drums 108, 109 of the stationary abutment. Now the locking pawls 111 are brought into engagement with the ratchet wheels 110, whereupon the pretensioning proper may commence. The worms 98 are successively coupled with the shaft 99, by turning the lever 103. Thus the appertaining spindles 93 are rotated and the slide 91 with hooks 90 and slides 73 is pulled to the left until the steel strings are under the necessary tension.

The invention is not restricted to the embodiments shown and described. E. g., individual steps of the process may be omitted or performed in a different order, or individual elements of different types of the apparatus may be composed to provide a new type. E. g., Fig. 30 shows a mould bed in which the aforedescribed stationary abutment constitutes the tensioning slide and may be moved as described before to tension the reinforcing wires, whereas the movable abutment, as in the apparatus of Fig. 1, may be pulled throughout the length of the track and located at a wall 9' anchored in the foundation. Moreover, known auxiliaries may be used for indicating the tension in the reinforcing wires, and the like. The drive of the carriage 8 and of the tensioning device may be effected in a different manner or may be adapted to serve several mould beds. Finally it may be mentioned that the shape of the drums may be modified too and that external clamping elements may be used for clamping the wires.

I claim:

1. A device for pretensioning reinforcing wires for incorporation in a concrete mold, said device comprising a plurality of wire containers at a first end of said mold and each holding a continuous length of wire, a fixed wire-guiding member between said containers and the first end of said mold for guiding the individual wires to said mold, said wire guiding member having adjustable clamping means for rigidly and immovably clamping simultaneously the wires to be subjected to the same tensioning, a carriage movable along the mold and having means for clamping the free ends of the wires, said carriage being movable from the fixed wire-guiding member to the second end of the mold to draw the wires from the containers through said wire-guiding member and through the length of said mold, a carriage-receiving member at the second end of said mold, said carriage-receiving member having releasable means for locking the carriage thereto, and means for moving the carriage-receiving member and the locked carriage in a direction away from the fixed wire-guiding member, whereby the wires clamped to said carriage are tensioned when the clamping means of said fixed wire-guiding member is adjusted to clamp the wires therein.

2. A device for pretensioning reinforcing wires for incorporation in a concrete mold, said device comprising a plurality of wire rolls at a first end of said mold, each roll having a continuous length of wire, a fixed wire-receiving member between said rolls and the first end of said mold and adapted to permit the passage of the individual wires of said rolls therethrough, said wire-receiving member having adjustable clamping means for simultaneously clamping rigidly therein the wires to be subjected to the same tensioning, a carriage movable along the mold on tracks bordering the sides of said mold, said carriage having means for clamping the free ends of said wires passing through the wire-receiving member, motor-driven means for driving the carriage along the mold from the fixed wire-receiving member to the second end of the mold whereby the wires are drawn from the containers through the wire-receiving member and are extended through the length of the mold, a carriage-receiving member at the second end of said mold, said carriage receiving member having releasable means for locking the carriage thereto, and motor-driven means for moving the carriage-receiving member and the locked carriage in a direction away from the fixed wire-receiving member, whereby the wires clamped to said carriage are tensioned when the clamping means of said fixed wire-receiving member is adjusted to clamp therein the wires fed from the rolls.

3. A device for pretensioning reinforcing wires for incorporation in a plurality of concrete molds arranged in parallel rows, said device comprising a plurality of wire containers for each mold disposed at a first end of said parallel rows of molds, each container being adapted to feed a continuous length of wire, a fixed wire-receiving member between said containers and the first end of said mold rows and adapted to permit the passage of the individual wires of said containers therethrough, said wire-receiving member having adjustable clamping means for simultaneously clamping rigidly therein the wires to be subjected to the same tensioning, a carriage movable along the mold rows and having means for clamping and holding the free ends of the wires, said carriage being movable from the fixed wire-receiving member to the second end of the mold rows to draw the wires from the containers through the wire-receiving members and extend them through the length of the respective molds, a carriage-receiving member at the second end of said mold rows, said carriage-receiving member having releasable means for locking the carriage thereto, and means for moving the carriage-receiving member and the locked carriage in a direction away from the fixed wire-receiving member, whereby the wires clamped to said carriage are tensioned when the clamping means of said fixed-receiving member is adjusted to clamp the wires therein.

4. A device for pretensioning reinforcing wires for incorporation in concrete means to be poured in a row, which comprises in combination: a stationarily mounted wire support provided with means arranged to allow the passing of wires therethrough for incorporation in said concrete means; a movable wire support arranged to move from said stationarily mounted wire support along said row over a distance nearly equalling the length of said row, a first plurality of rotatable holding means associated with said stationarily mounted wire support and arranged respectively to be passed around by said wires, a second plurality of rotatable holding means associated with said movable wire support and arranged respectively to be passed around by said wires, arresting means arranged for cooperation with said first and second plurality of rotatable holding means for arresting the same in their respective positions, means for further spacing said movable wire support from said stationary wire support to thereby effect pretensioning of said wires, said rotatable holding means being provided with an axial bore and with passages extending from said axial bore toward the outside of said rotatable holding means, each of said rotatable holding means comprising a member

movably mounted in said axial bore and movable relative to said rotatable holding means for selectively firmly holding wires passing through said passages.

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