

FIG. 1.

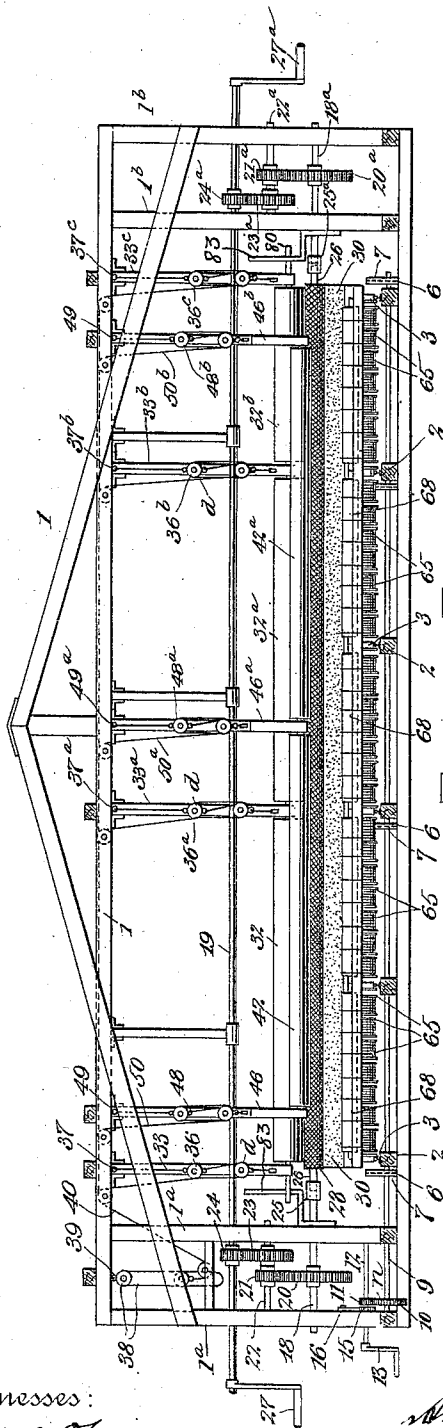


FIG. 2.

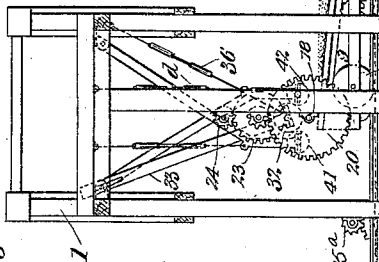
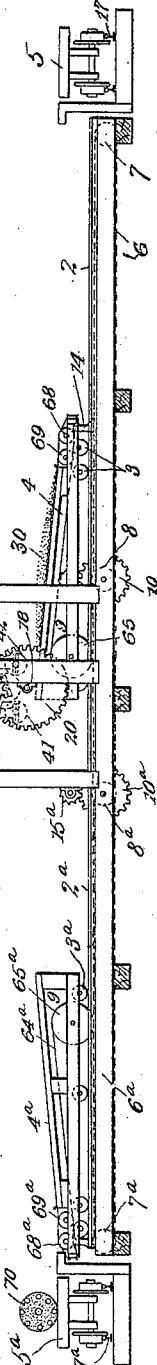
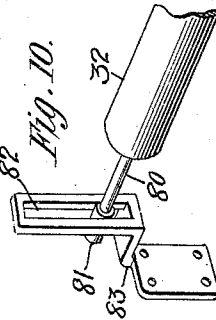


FIG. 10.



Witnesses:
 James Ober
 A. M. Hayes

Alfred A. Crawford Inventor
 By *his Attorney*
Robert M. Moore

A. C. CHENOWETH.

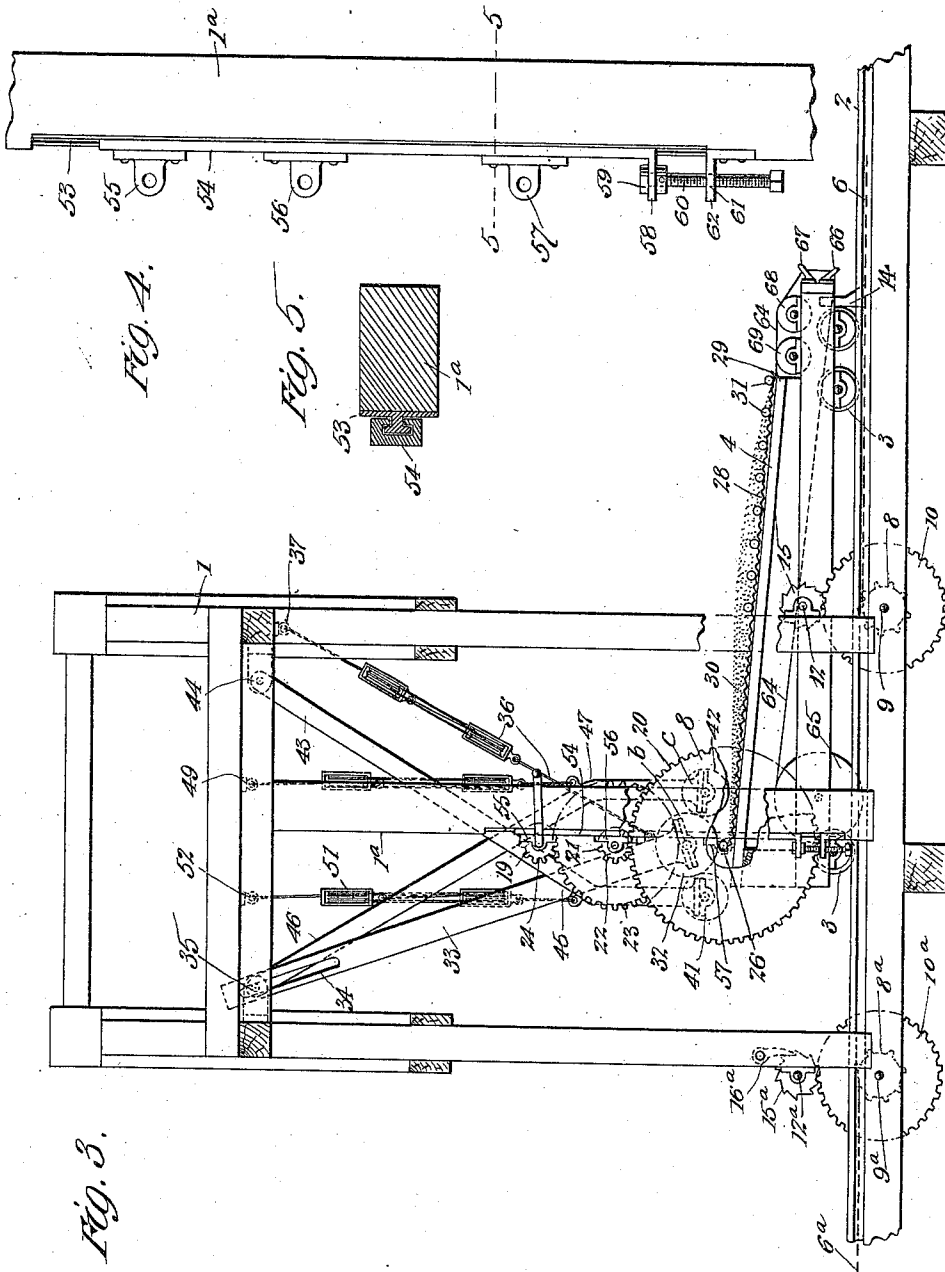
MACHINE FOR MAKING REINFORCED CONCRETE PILES, COLUMNS, AND THE LIKE.

APPLICATION FILED DEC. 20, 1907.

984,747.

Patented Feb. 21, 1911.

3 SHEETS—SHEET 2.



Witnesses:
James O. ...
A. M. Hayes

Alfred Chenoweth Inventor

By *Attorney* *John H. Moore*

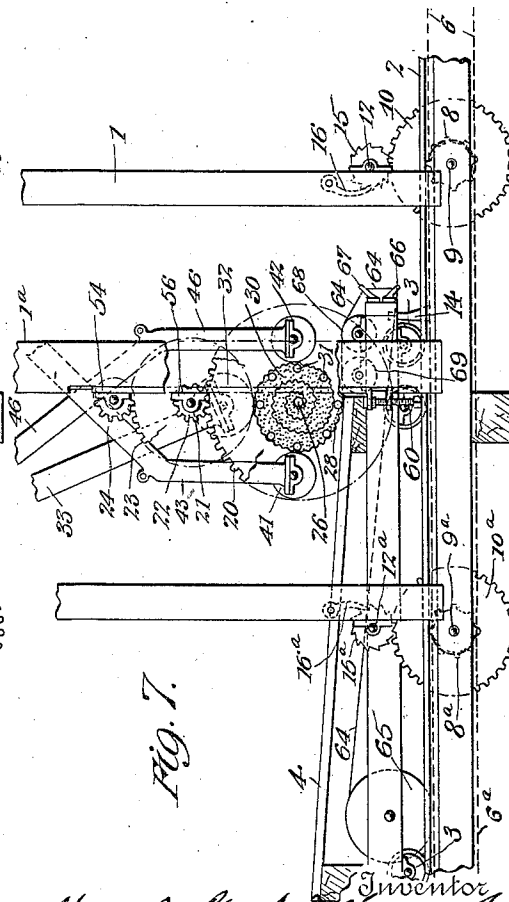
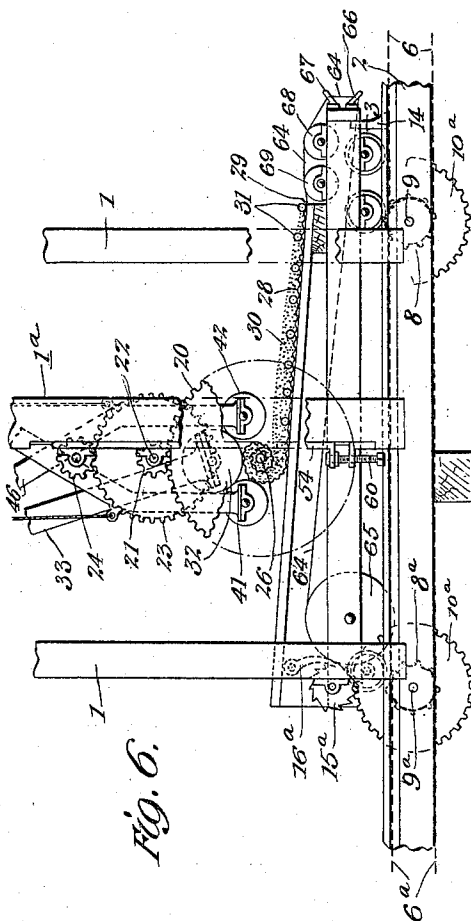
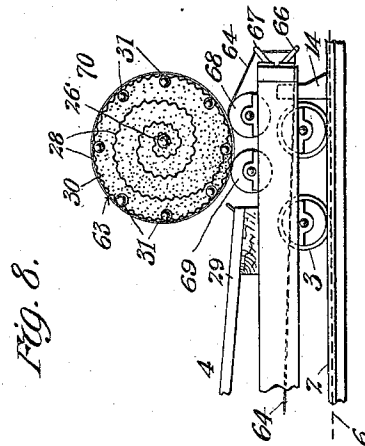
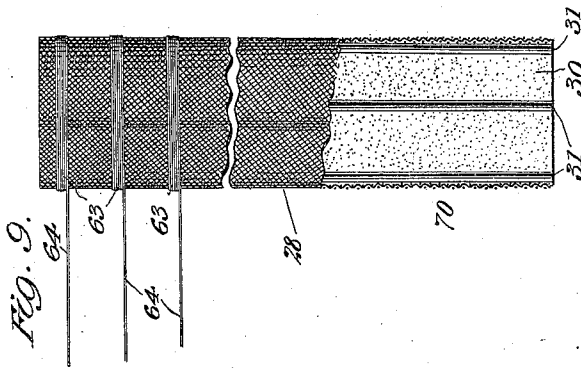
A. C. CHENOWETH.
MACHINE FOR MAKING REINFORCED CONCRETE PILES, COLUMNS, AND THE LIKE.

984,747.

APPLICATION FILED DEC. 20, 1907.

Patented Feb. 21, 1911.

3 SHEETS—SHEET 3.



Witnesses:
Hans Ober
A. M. Hayes

Alexander Chenoweth
By his Attorney
Robert M. Jones

UNITED STATES PATENT OFFICE.

ALEXANDER CRAWFORD CHENOWETH, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF
TO JOHN McNAMEE, OF BROOKLYN, NEW YORK.

MACHINE FOR MAKING REINFORCED-CONCRETE PILES, COLUMNS, AND THE LIKE.

984,747.

Specification of Letters Patent.

Patented Feb. 21, 1911.

Application filed December 20, 1907. Serial No. 407,276.

To all whom it may concern:

Be it known that I, ALEXANDER CRAWFORD CHENOWETH, a citizen of the United States, residing in the borough of Manhattan, New York city, county and State of New York, have invented certain new and useful Improvements in Machines for Making Reinforced-Concrete Piles, Columns, and the Like, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a machine for making a reinforced pile, column or the like by rolling a reinforced sheet of material, such as a sheet of concrete, into a compact body and finishing the same ready for use. In U. S. Letters Patent No. 791,076 and No. 797,556 granted to me May 30th, 1905 and August 22d, 1905, respectively, will be found inventions pertaining to this class of subject matter, and reference is made to the same in connection with the present invention.

The invention consists in the various novel combinations and arrangements of the several different parts of the apparatus, all as hereinafter fully described and then pointed out in the claims.

I have illustrated a type of my invention in both the article and machine, in the accompanying drawings, wherein;—

Figure 1 is a side view of my improved machine looking in a direction toward the outer or rear end of one of the movable platforms and shows a partially rolled reinforced concrete pile in the process of manufacture in the machine. Fig. 2 is an end view of the apparatus shown in Fig. 1, both of these views being on a reduced scale compared with the remaining views. Fig. 3 is an end view of the central portion of the machine, showing the details thereof and with parts of the apparatus broken away. Fig. 4 is an enlarged side view of the vertically adjustable bracket carrying the bearings for three different parts, as hereinafter described. Fig. 5 is an enlarged view showing a cross section on a line 5—5, Fig. 4. Fig. 6 is an end view of some of the parts shown in Fig. 3 but with the relative positions thereof changed and showing the partially formed reinforced pile or column.

Fig. 7 is a similar view to that shown in Fig. 6 and of substantially the same parts but with their relative positions changed and with the pile shown as about completed and ready to have the wire bands wound about the same. Fig. 8 is a side view of the rear end of the movable platform carrying the completely rolled reinforced concrete pile and shows the wire bands as being wound about the same. Fig. 9 is a side view of a portion of a practically completed reinforced concrete pile made in accordance with my invention. Fig. 10 is an enlarged perspective view showing one end of the upper roll with the adjacent guide bracket thereof.

Referring to the drawings in which like numbers of reference designate like parts throughout, 1 designates a suitable framework which is braced and trussed in a manner suitable for sustaining the various operating parts of the machine. Beneath the frame 1 and extending transversely of the length of the frame are arranged truck rails 2 on which travel the wheels 3 of the movable platform or table 4, the upper surface of which inclines downwardly from its forward end to the rear end thereof. A second movable platform 4^a, which is similar in all respects to the movable platform 4, is mounted to travel back and forth on the rails 2 but at the opposite side of the machine, the rails being extended similarly on each side of the machine to accommodate both of the platforms. These platforms 4 and 4^a are reversed in their arrangement, that is to say, the high end of each is directed toward the other and they are adapted to operate in reverse directions so that as the platform 4 is being used within the machine for the formation of the concrete pile, the other platform 4^a may stand at the outer end of the rails upon its side of the machine where it has delivered a completed pile onto a car 5^a, and be in position to be supplied with the concrete and metallic reinforcing netting or wire, as indicated in Fig. 2. The movable platform 4 is moved by sprocket chains 6 mounted on sprocket wheels 7 and 8, the latter being driven by a shaft 9 which extends beneath the apparatus and which in turn is actuated by a gear wheel 10, meshing with a pinion 11 on the shaft 12, which is operated by a hand-crank 13, whenever it is desired to move the plat-

form by hand, the platform being connected with each sprocket chain by means of an arm 14, carried by each sprocket chain and connected with the movable platform. The operating shaft 12 is provided with a ratchet wheel 15 having a pawl 16 engaging the same for preventing the backward rotation of the gearing whenever that is to be guarded against. By releasing the pawl 16, the parts may be reversed in their rotation in order to move the platform as desired. In describing these two oppositely arranged movable platforms 4 and 4^a the similar parts of one of the platforms are designated by the same reference numeral, with the addition thereto of the letter *a*, the parts thereof reading 4^a, 5^a etc. At the outer end of the rails 2 on which the platform 4 travels, there is arranged a car 5 moving on tracks 17 which run at right angles to the rails 2 and this car is for the purpose of receiving the completed concrete pile or column from the rear end of the movable platform, when the latter has been moved to its outer limit of movement, and which relative position is shown in Fig. 2 in connection with the movable platform 4^a and the car 5^a.

At opposite ends of the machine and centrally thereof are arranged the axles or drive shafts 18 and 18^a. The shaft or axle 18 is connected with and driven by means of intermediate gearing comprising gear wheel 20, pinion 21, shaft 22, gear wheel 23 and the pinion 24 fixed on the drive-shaft 19. In a similar manner the axle 18^a, at the other end of the machine receives its motion from the drive shaft 19 through means of gearing 20^a to 24^a, inclusive. The axles 18 and 18^a are provided respectively with couplings or chucks 25, 25^a by means of which the tube or bar 26 may be secured fast to the axles in alinement therewith so as to be rotated by the axles when the same are driven through means of the drive-shaft 19, the ends of which are provided with hand cranks 27 and 27^a, respectively.

Each movable platform 4 and 4^a is to be operated in turn in conjunction with the driving axles 18 and 18^a and the tube 26 carried thereby and to which latter the forward end of the reinforcing wire netting 28 is attached while the rear end of such netting is temporarily secured to a series of small pins 29 at the rear end of the platform.

In making the reinforced pile or column from concrete and wire netting, the netting 28 is secured in the position stated and as shown in Figs. 2 and 3, and then a layer of concrete 30 is spread over the netting so as to completely cover and coat it, the set of strengthening metallic rods 31 being first placed at suitable and equal distances apart and parallel with the axis of the pile or column and in such positions that they lie near

the inner face of the wire netting which is finally wrapped about the periphery of the body, so that these rods are disposed substantially on a circle, the center of which is coincident with the center of the body or pile. As the tube or shaft 26 is rotated in the direction in which the hands of a clock move, in the various views shown, the metallic netting 28 with its coating of concrete 30, which forms the reinforced sheet of material, is gradually wound around the tube 26, and this operation serves to gradually move the platform 4 beneath the winding tube 26, by virtue of the wire netting 28 being attached to the rear end of such platform. The turning of the tube 26 gradually increases the number of convolutions of the metallic netting and the concrete covering the same and accordingly increases the diameter of the pile, and this is compensated for by the downward incline in the platform by virtue of which the distance between the upper face of the platform and the winding tube 26 gradually increases.

Above the winding tube or shaft 26 is mounted a set of compression winding rolls 32, 32^a, 32^b which are arranged end to end in alinement with each other and virtually constitute one long revolving roll. These compression rolls have considerable weight and are so mounted as to act by gravity directly upon the upper part of the body as it is being wound continuously through such winding process. These compression rolls act to squeeze and compress the concrete eliminating voids and producing dense concrete intimately joined to the reinforcing parts or members during the winding process. These compression rolls 32, 32^a and 32^b are mounted in a depending frame comprising members 33, 33^a, 33^b and 33^c, the upper end of each one of which is provided with a longitudinal slot 34 (see Fig. 3) which slides over a pivot pin 35 secured to the frame-work 1, the pins 35 being located a considerable distance to one side of the vertical plane containing the winding tube 26. The full weight of these compression rolls may thus be thrown directly upon the wound body and may be gradually raised by the wound body as it increases in diameter. This peculiar mounting of the compression rolls enables the same to be maintained directly above the cylindrical body as it is wound, the tendency of the revolving body beneath the rolls being to carry the roll somewhat forward of the center line. The depending arms 33, 33^a, 33^b and 33^c which support the compression rolls are each provided with a block and tackle 36, 36^a, 36^b and 36^c, respectively, the same being attached between each of said arms and a fixed point on the frame-work at 37, 37^a, 37^b, and 37^c. These various blocks and tackle are under the control of the differential pulley and tackle 38 located

at one end of the machine and attached to a fixed point 39 thereon, and by means of which all of the compression rolls may be raised or lowered simultaneously. The rope
 5 or cable 40 which is connected with the differential pulley 38 serves to connect the same with each of the block and tackle devices 36 to 36^c. These blocks and tackle 36 to 36^c, serve to raise the compression rolls
 10 out of operative position. The extreme outer end of the compression roll is provided with an arbor 80 having an anti-friction roll 81 which travels in a vertical guide 82, on a bracket 83 which is secured in suitable
 15 position upon the frame work 1 of the machine. As the wound body increases sufficiently in diameter to raise the compression roll a distance that causes considerable slackening in the supporting tackle, the
 20 same is tautened, and this may be repeated as often as desired during the process of forming the body. When the pile or column has been completely rolled or wound, the compression rolls may be quickly raised
 25 out of contact with the body and held in such position by operating the differential pulley 38.

Upon opposite sides of the compression rolls 32 are arranged guide and holding
 30 rolls 41, 41^a upon one side and 42, 42^a upon the other. Guide rolls 41 and 41^a upon one side are mounted so as to turn freely in a set of swinging arms 43, 43^a, 43^b which are pivoted at 44 to the upper part of the machine
 35 frame and off to one side, these arms being bent at 45 to clear the compression roll 32, as indicated in the drawings. The other guide rolls 42, 42^a upon the opposite side of the compression roll are supported by similar
 40 depending pivoted arms 46, 46^a, 46^b, they being likewise bent at 47 to clear the compression roll. The supporting frame or arms of these guide rolls being pivoted in a vertical plane which lies upon the side of the
 45 wound body opposite to that upon which the guide roll acts, the tendency of the rolls is to swing toward the body, and they accordingly act by gravity against the same and they remain in constant engagement
 50 with the body after the same has reached a considerable size in its formation. Of course, a single guide roll may be used upon either side instead of two of the same as I have shown, but as the rolled body is of a
 55 very great length, it is more practical to have two such rolls upon each side and to mount them in alinement, making virtually one long roll substantially on the order of the compression roll.

60 The set of swinging arms 46, 46^a, 46^b which support the guide rolls 42, 42^a upon one side are provided with blocks and tackle 48, 48^a, 48^b which are each secured to points 49, 49^a, 49^b on the machine frame and have
 65 their respective ropes 50, 50^a, 50^b, passed

over suitable guide pulleys and connected with and controlled by a differential pulley block and tackle, similar to the differential pulley and tackle 38, as hereinbefore referred
 70 to and located at the same end of the machine for convenient access. By operating the block and tackle 48, 48^a, 48^b, the guide rolls 42, 42^a may be swung outwardly and upwardly and raised clear of the rolled
 75 body or pile after the same is formed. The guide rolls 41 upon the opposite side from the rolls 42 are likewise controlled by means of block and tackle 51 which is secured to a point 52 on the machine frame.

As it is necessary to have the winding
 80 axles 18 and 18^a as well as the drive-shaft 19 and the gearing intermediate between these parts, vertically adjustable relatively to the movable platform 4, I provide the following
 85 construction. On each of a pair of fixed uprights 1^a at one end of the machine I mount the vertical guide 53, having a T-shaped part on which is adjustably mounted a slide 54 formed with a groove which fits
 90 the T-part of the guide, as indicated in Figs. 4 and 5. This slide 54 is provided with bearings 55, 56 and 57, for drive-shaft 19, intermediate shaft 22 and the axle 18, respectively. The lower end of the slide 54 is
 95 provided with a bracket 58 in which turns a piece 59 to which is secured an adjusting screw 60 which works in a screw-threaded perforation 61 in a bracket 62 secured on the upright 1^a. By operating the screw 60,
 100 the slide 54 with its several bearings for the gearing may be raised or lowered as desired. This construction is duplicated at the opposite end of the machine where the up-
 105 rights 1^b are arranged, so that the other end of the drive-shaft 19, likewise the intermediate shaft 22^a and the axle 18^a are given the same capacity of vertical adjustment.

In making a reinforced concrete pile or column which is rolled in the manner described, I find it a great advantage to ar-
 110 range the strengthening rods 31 so that they each lie against the inner face of the wire netting 28 and that they are finally disposed on a circle concentric with the axis of the cylindrical body or pile 70 and sub-
 115 stantially equal distances apart. This arrangement enables the strain or stress on the pile to be more uniformly taken up by these rods in handling or using the pile or column.

120 In order to further increase the strength of the reinforced pile and particularly to prevent the column or pile from giving away and expanding laterally, I provide the same with a series of hoops or bands placed
 125 about the exterior of the body at regular intervals, thus producing a hooped column action. These circumferential bands are indicated at 63 and are particularly shown in Fig. 9. These bands are formed from wind- 130

ings of wire 64 in the following manner: Beneath the traveling platform 4 is suitably mounted a set of reels or bobbins 65 each of which is provided with wire 64, which
 5 is passed along beneath the platform and is led through guides 66, 67, on the rear end of the platform passing thence forwardly across the upper surfaces of a pair of loosely mounted receiving rolls 68, 69 which are
 10 mounted at the rear end of the movable platform and travel the same. The ends of the wires 64 are secured to the outer end of the reinforcing metal netting 28. When the pile or column has been completely wound
 15 and the end of the metal netting 28 has been reached, the cylindrical body is then shifted onto the receiving rolls 68 and 69 and the driving-mechanism is then operated to rotate the body by means of the axles 18 and
 20 18^a and the connected tube or shaft 26. The wires 64 being suitably spaced from each other, the pile or column is rotated until a sufficient number of turns of wire have been formed about the body, a suitable tension
 25 being kept on the wire 64 during the winding of the wire. The wires are then cut and the end secured in any suitable permanent manner to the completed pile or column 70.

The construction of concrete piles or
 30 columns and the like may be produced by the above described means in any desired lengths and of any desired diameters. As the article is reinforced with rods and interlaced wire mesh wound in convolutions
 35 about a central steel tube, in union with a mixture of concrete, and the whole is under compression, bound about the exterior at regular intervals, thus producing a hooped column action, a close connection of con-
 40 crete and steel is brought about, whereby the two materials act as a composite body, and a simultaneous working of the two materials is obtained. The piles or other articles thus made are enabled to resist the
 45 roughest treatment in handling, such as driving etc.

In the above description of the mechanism, all of the various duplicated parts have not been specifically referred to, but
 50 as such duplicate parts each bear a reference numeral similar to the described part, with the addition of the letter *a*, the description of the one will, of course, serve for the other.

Having thus described my invention, what
 55 I claim and desire to secure by Letters Patent is:—

1. In a machine for making reinforced concrete piles, columns and the like, the combination of a movable platform on which
 60 a reinforced sheet of material is rolled into a compact body, means for rolling the sheet into a body, reels or bobbins for receiving wire adapted to be attached to the outer end of the reinforcing part of said sheet of ma-
 65 terial, whereby when the body has been

rolled into form the continued revolution of the said body serves to wind the said wires upon the exterior of the same.

2. In a machine for making reinforced concrete piles, columns and the like, the combination of a movable platform on which a reinforced sheet of material is rolled into a compact body, means for rolling the sheet into a body, reels or bobbins for receiving
 70 wires adapted to be attached to the outer end of the reinforcing part of said sheet of material, a set of supporting rolls at the end of said platform for receiving the rolled body and the said wires passing across said receiving rolls, whereby when the body has been
 75 rolled into form the continued revolution of the said body serves to wind the said wires upon the exterior of the same.

3. In a machine for making reinforced concrete piles, columns and the like, the combination of a movable platform on which a reinforced sheet of material is rolled into a compact body, means for rolling the sheet into a body, reels or bobbins for receiving wire,
 85 guides on the rear end of said movable platform for said wires and the said wires being adapted to pass around the end of the car and be connected with the outer end of the reinforcing part of said sheet of material, and means for revolving the said body when
 90 the same has been rolled into shape.

4. In a machine for making reinforced concrete piles, columns and the like, the combination of a movable platform on which a reinforced sheet of material is rolled into
 100 a compact body, means for rolling the sheet into a body, reels or bobbins mounted upon said movable platform for receiving wires adapted to be attached to the outer end of the reinforcing part of said sheet of material, whereby when the body has been
 105 rolled into form the continued revolution of the said body serves to wind the said wires upon the exterior of the same.

5. In a machine for making reinforced concrete piles, columns and the like, the combination of mechanism for rolling a reinforced sheet of material horizontally into a compact body, a gravity roller acting upon
 110 each of the two opposite sides of the rolled body, and a swinging support for each of the said rollers pivoted above the rolled body and upon the opposite side thereof from where its respective roller acts on the
 115 rolled body.

6. In a machine for making reinforced concrete piles, columns and the like, the combination of a horizontal winding shaft or rod around which the sheet of reinforced material is rolled into a compact body, means
 120 for rotating said shaft or rod to roll the body, a traveling platform mounted at each side of said winding shaft, each of said platforms being adapted to be moved its length beneath said winding shaft and
 130

thence back again when the rolled body is completed and to a point a considerable distance beyond the shaft for the removal of the rolled body, the said platforms being adapted to be operated alternately to form one of the bodies thereon, endless sprocket chains mounted beneath the traveling platforms and driving means therefor adapted to drive the chains in one direction or the other as desired, means for detachably connecting one platform at a time with said sprocket chains to move the platform back and forth beneath said shaft.

7. In a machine for making reinforced concrete piles, columns and the like, the combination of a platform, a suitable winding member around which the sheet of reinforced material is rolled into a compact body, a shaft at each end of said winding member mounted in alinement therewith and means for coupling each of said shafts to said member, a drive shaft mounted above said winding member, a train of gears intermediate said drive shaft and each of the other said shafts, the bearings of each of said three shafts and the trains of gears being simultaneously adjustable vertically.

8. In a machine for making reinforced concrete piles, columns and the like, the combination of mechanism for rolling a reinforced sheet of material into a compact body, reels or bobbins for receiving wire adapted to be wound about the rolled body after it is completed, means for rotating the said body to wind the wire thereon, and a set of rolls adapted to receive said body after it is rolled and on which the rolled body is supported when the wire is being wound thereon.

9. In a machine for making reinforced concrete piles, columns and the like, the combination of mechanism for rolling a reinforced sheet of material into a compact body, reels or bobbins for receiving wire adapted to be wound about the rolled body after it is completed, means for rotating the said body to wind the wire thereon, and a set of rolls adapted to receive said body after it is rolled and on which the rolled body is supported when the wire is being wound

thereon, the said wire being led on to said body at a point between the body and said rolls.

10. In a machine for making reinforced concrete piles, columns and the like, the combination of a platform upon which a reinforced sheet of material is rolled into a compact body, means for rolling the sheet into a body, reels or bobbins for receiving wire adapted to be wound about said body after it is rolled, and a set of rolls mounted at the end of the platform toward which the body is rolled for receiving the said body after it has been rolled into form.

11. In a machine for making reinforced concrete piles, columns and the like, the combination of a traveling platform upon which a reinforced sheet of material is rolled into a compact body, means for rolling the sheet into a body, reels or bobbins for receiving wire adapted to be wound about said body after it is rolled, and a set of rolls mounted on the traveling platform at the end thereof toward which said body is rolled for receiving the said body after it has been rolled into form.

12. In a machine for making reinforced concrete piles, columns and the like, the combination of a horizontally traveling platform adapted to sustain a sheet of reinforced material, means for rolling the sheet into a compact body and comprising a winding shaft or rod about which the sheet is rolled, driving means for actuating said shaft or rod, the said winding shaft and its driving means being vertically adjustable, a vertically adjustable compression roll mounted above said winding shaft and means for maintaining it in position on the top of the wound body, and swinging presser rolls engaging the opposite sides of the rolled body and having capacity of vertical adjustment.

In testimony whereof, I have hereunto set my hand in the presence of the two subscribing witnesses.

ALEXANDER CRAWFORD CHENOWETH.

Witnesses:

R. G. MONROE,
A. M. HAYES.