

March 19, 1940.

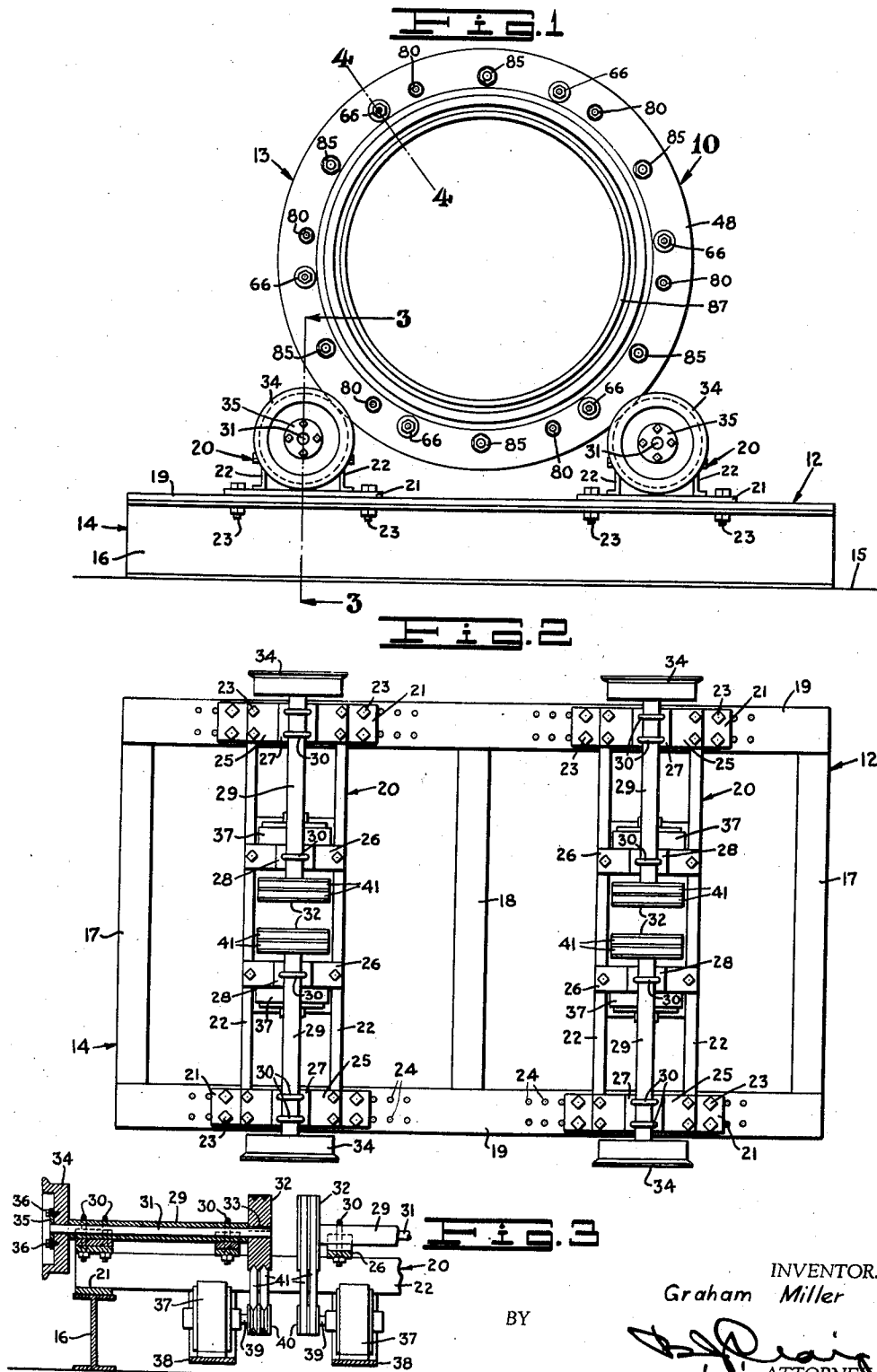
G. MILLER

2,194,028

CONCRETE PIPE APPARATUS

Filed Oct. 2, 1937

3 Sheets-Sheet 1



INVENTOR.
Graham Miller

BY
[Signature]
ATTORNEY

March 19, 1940.

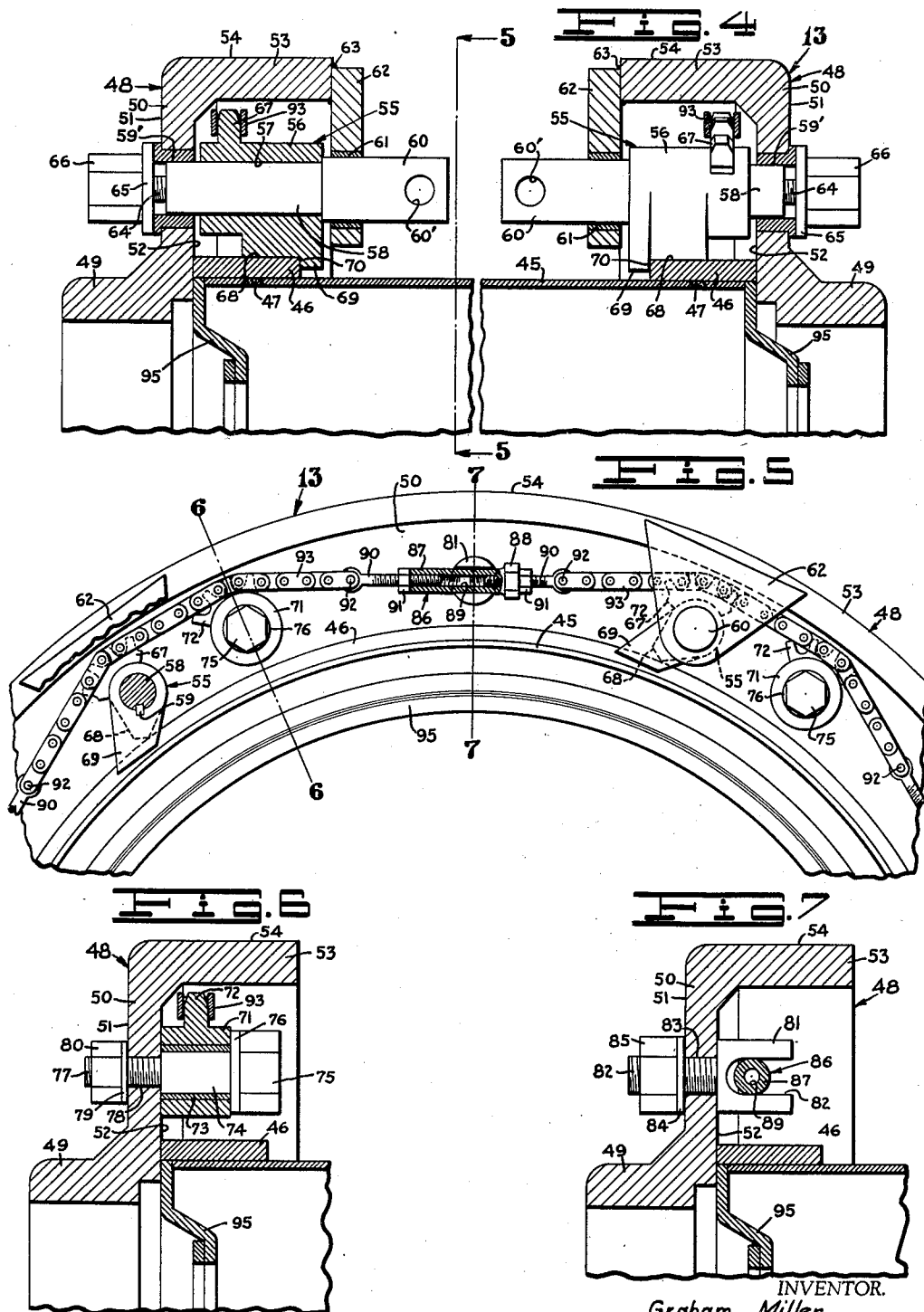
G. MILLER

2,194,028

CONCRETE PIPE APPARATUS

Filed Oct. 2, 1937

3 Sheets-Sheet 2



BY

INVENTOR.
Graham Miller.
ATTORNEY.

March 19, 1940.

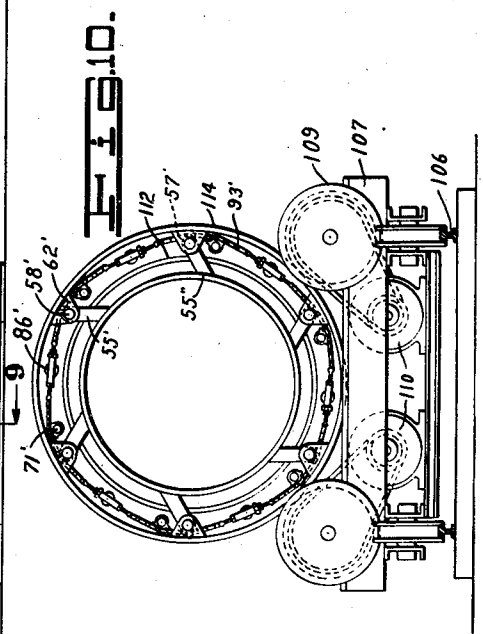
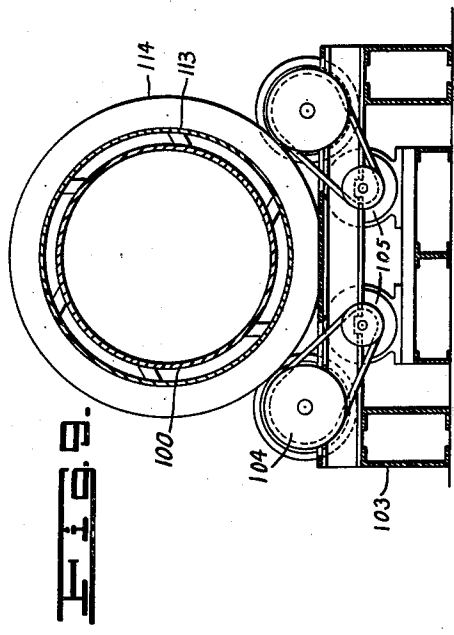
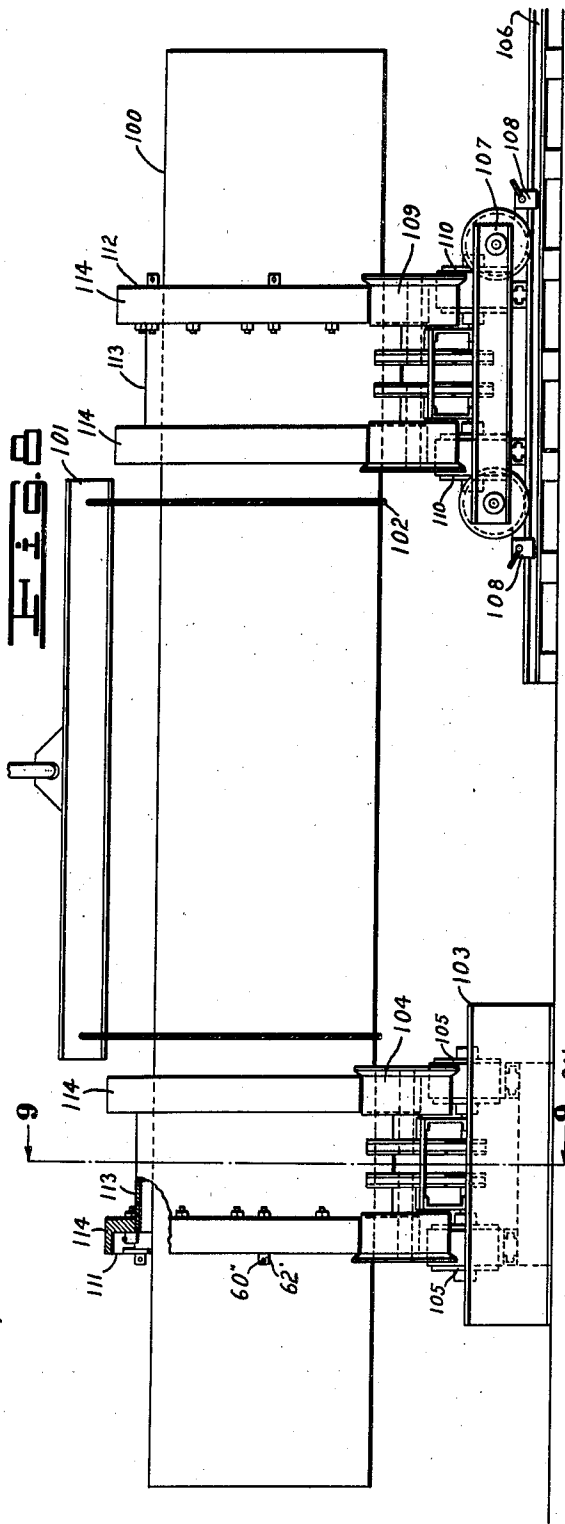
G. MILLER

2,194,028

CONCRETE PIPE APPARATUS

Filed Oct. 2, 1937

3 Sheets-Sheet 3



BY

INVENTOR.
Graham Miller
G. Miller
ATTORNEY.

UNITED STATES PATENT OFFICE

2,194,028

CONCRETE PIPE APPARATUS

Graham Miller, Los Angeles, Calif.

Application October 2, 1937, Serial No. 166,989

9 Claims. (Cl. 25—30)

This invention relates to improvements in apparatus for making pipes or similar objects from concrete or other plastics.

The general object of the invention is to provide an improved apparatus for centrifugally casting concrete pipe.

Another object of the invention is to provide an improved concrete making machine which includes a spinning table and a pipe mold wherein the pipe mold is supported on a plurality of wheels on the spinning table and wherein the mold supporting wheels are independently driven.

A further object of the invention is to provide an improved pipe mold which has a plurality of tires thereon which engage the wheels of the spinning table and which are removable from the pipe mold.

Another object of the invention is to provide an apparatus for lining an elongated metal or other shell with plastic wherein a plurality of spaced shell supporting members are provided.

Other objects and advantages of this invention will be apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is an end view showing my improved pipe making apparatus;

Fig. 2 is a top plan view of the spinning table shown in Fig. 1 with the mold member removed;

Fig. 3 is a fragmentary section taken on line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary section taken on line 4—4 of Fig. 1;

Fig. 5 is a fragmentary section of the mold taken on line 5—5 of Fig. 4 on a reduced scale;

Fig. 6 is an enlarged fragmentary section taken on line 6—6 of Fig. 5; and

Fig. 7 is an enlarged fragmentary section taken on line 7—7 of Fig. 5.

Fig. 8 is a side elevation, partly in section, showing a modification of my invention;

Fig. 9 is a section taken on line 9—9 Fig. 8; and

Fig. 10 is an end view of the modification showing the truck end of the apparatus.

Referring to the drawings by reference characters I have indicated my improved apparatus generally at 10. As shown the apparatus 10 includes a spinning table indicated generally at 12 and a pipe mold member indicated generally at 13.

The spinning table 12 includes a base frame portion 14 which is mounted on a suitable foundation 15 which is preferably of concrete. The frame 14 includes spaced end I beam members 16 connected by spaced side members 17 and a

center member 18. Each of the end members 16 has a plate 19 thereon on which wheel frames 20 are mounted one at each side of the center member 18.

Each of the wheel frames 20 includes spaced end plates 21 which are connected by a pair of spaced channel members 22. The wheel frame plates 21 are secured to the base plates 19 by a plurality of bolts and nuts 23, the bolts extending through a plurality of apertures 24 in the base plates 19 and the top flanges of the I beam members 16. A plurality of sets of the apertures 24 are provided adjacent each of the wheel frames 20 so that the wheel frames may be secured to the base at various distances to secure desired adjustment for various mold sizes.

Positioned on the channel members 22 adjacent each end thereof I provide transverse plates 25 and intermediate the plates 25 I provide a pair of spaced plates 26. Mounted on each of the end plates 25 I provide a bearing member 27 and on each of the intermediate plates 26 I provide a bearing member 28.

Positioned in each of the sets of bearing members 27 and 28 I provide a tubular sleeve member 29. The lower portions of the sleeves 29 are shown as engaged by the bearings 28 and are rigidly secured thereto by U bolts 30. The sleeves 29 extend beyond the end members 16 and beyond the bearings 28 with the inner ends of the sleeves spaced apart. Positioned in each of the sleeves 29 I provide a shaft 31. On one end of the shaft 31 I mount a grooved pulley 32 which is secured to the shaft by a key 33.

The opposite end of the shaft 29 has a flanged wheel 34 mounted thereon and has a plate 35 secured thereto as by welding. The shaft plate 35 is secured to the wheel 34 by a plurality of bolts 36. Positioned below each of the sleeve members 29 I provide an electric motor 37. Each motor is supported by a stirrup member 38 depending from the channel members 22.

Mounted on each of the armature shafts 39 of each of the motors 37 I provide a grooved pulley 40 which is connected to its associated pulley 32 by belts 41. From the foregoing it will be apparent that each of the mold spinning wheels 34 is independently driven.

The mold member 13 includes a cylindrical metal shell portion 45 having enlarged metal rings 46 thereon at each end which are shown as secured to the shell 45 as by welding through an aperture as at 47.

Positioned at each end of the shell 45 I provide a tire ring indicated generally at 48. As

shown each of the tire rings includes a body portion 49 having an outwardly extending flange 50 thereon which includes an outer face 51 and an inner face 52. The flange 50 has an integral inwardly extending flange ring 53 thereon which is spaced from the shell 45 and includes a peripheral working surface 54 which engages the spinning wheels 34.

Mounted on the ring 48 I provide a plurality of clamp members 55. As shown each of the clamp members 55 includes a body portion 56 having an aperture 57 therein. Positioned in the aperture 57 I provide a shaft 58 which is secured to the body 56 by a key 59. (See Fig. 5.) Furthermore, the shaft 58 is positioned in a bushed aperture 59' in the ring flange 50 and at the opposite end includes an enlarged portion 60 which is positioned in a bushed aperture 61 of a bracket 62 depending from the peripheral ring 53. The bracket 62 is shown as secured to the ring 53 as by welding it thereto as indicated at 63. Opposite the enlarged portion 60 the shaft 58 includes a reduced threaded portion 64 which extends beyond the flange 50 and has a washer 65 and cap nut 66 thereon.

The body 56 of the clamp 55 includes an integral segmental portion 67 having a plurality of sprocket teeth which are directed outwardly from the shell 45. Furthermore, the body 56 includes an integral clamp portion 68 and an integral retainer portion 69. As shown the clamp portion 68 extends towards the shell 45 and is adapted to engage the outer periphery of the ring 46. Likewise the retainer portion 69 extends towards the shell 45 and includes an inner face 70 which is adapted to engage the inner side of the ring 46.

Mounted adjacent each of the clamp members 55 I provide an idler member 71 having a plurality of sprocket teeth 72 thereon which are directed outward from the shell 45. As shown in Fig. 6 each of the idler members 71 has a bushed aperture 73 therein in which a stud 74 is positioned. At one end the stud 74 includes an enlarged head 75 and has a washer 76 thereon which engages the idler 71. Opposite the head 75 the stud includes a reduced threaded portion 77 which extends through an aperture 78 in the flange 50 of the tire ring 48 and has a washer 79 and nut 80 thereon to securely clamp the stud to the flange 50.

Intermediate each of the idler members 71 of one group and the clamp members 55 of the adjacent group I provide a support member 81 each of which has a slot 82 therein. The support member 81 includes a reduced threaded portion 82 which extends through an aperture 83 in the tire ring flange 50 and has a washer 84 and nut 85 thereon to securely clamp the support member to the flange 50.

Positioned in each of the support members 81 I provide a turn buckle 86 which includes a cylindrical body portion 87 having an enlarged head 88 thereon at one end. The body 87 has an aperture 89 therethrough which at one end includes left hand threads and at the opposite end right hand threads. Extending into the aperture 89 from each end I provide a threaded bolt member 90 having a lock nut 91 thereon.

Connected to each of the bolt members 90 as at 92 I provide a sprocket chain 93. The sprocket chain 93 extends over the sprocket teeth 72 of the idler members 71 and over the sprocket teeth 67 of the clamp members 55.

In operation when it is desired to put one of

the tire rings 48 on the mold shell 45 all the nuts 66 are loosened. The operator then places a bar (not shown) in the aperture 60' of one of the shaft portions 60 and rotates the shaft to swing the cam portion 68 and the retainer portion 69 of the clamp member 55 outward. As the one clamp member 55 is thus rotated it moves the sprocket chain 93 which in turn rotates all the clamp members 55 to similar positions. Before placing the tire ring 48 on the shell 45 the usual end rings 95 consisting of a bell and a spigot forming member are positioned in place at the ends of the shell within the ring 46. The tire ring 48 is then placed over the end of the mold shell 45 with the inner face 52 of the tire flange 50 engaging the adjacent end ring 46, and engaging the bell or spigot forming ring 95 to retain it in position.

The operator then rotates the shaft 58 in a reverse direction until the cam portion 68 engages the ring 46 in which position the retainer portion 69 swings inward below the outer surface of the ring 46. The operator then removes the bar from the aperture 60 and tightens all the nuts 66. As the nuts 66 are tightened they move the shafts 58 towards the flange 50 thus forcing the faces 70 of the retainer portions 69 into tight engagement with the ring 46 thereby securely fastening the tire ring 48 to the mold shell 45.

After a tire ring 48 has been positioned on each end of the mold shell 45 the assembled mold is placed on the spinning table 12 with the tire ring faces 54 engaging the spinning wheels 34 and held in place by the flanges therein.

Thereafter the motors 37 are started to drive the wheels 34 which in turn rotate the mold 13 whereupon the mold 13 is ready to receive concrete to form centrifugally cast pipe. After a pipe has been formed in the mold 13 the mold is removed from the spinning table 12 and the tire rings 48 are removed from the shell 45. Thereafter the shell 45 containing a formed pipe is placed in the usual curing ovens. After curing the shell and pipe are removed from the ovens and thereafter the pipe is removed from the shell by any of the usual methods.

Due to the fact that large rings such as the tire rings 48 cannot be formed to a perfect cylinder without prohibitive expense of grinding when a mold is placed on the wheels of the usual spinning table the irregularities of the mold tires set up a vibration in the mold shell which is detrimental. With my improved spinning table 12 wherein each of the spinning wheels 34 is independently driven irregularities in the diameter of the tires with consequent variations in circumference is compensated for by the slippage present.

In Figs. 8, 9 and 10 I show a modification of my invention wherein the apparatus is adapted to line an elongated member such as a metal mold tube 100 with a lining of plastic material such as concrete. This apparatus as shown includes a lifting member 101 having cables or other portions 102 thereon forming a sling by means of which the tube 100 may be lifted.

As shown the apparatus includes a rigid base member 103 on which wheels 104 are mounted. These wheels are arranged in opposed pairs and each of the four wheels is driven by an independent motor 105 in the manner previously described. At the other end of the apparatus I employ a track 106 on which a truck 107 is movably mounted and which is held in place by suitable block members 108. The truck is provided

with two pairs of opposed wheels 109 each of the wheels being independently driven by motors 110.

Mounted on the wheels 104 I show a drum 111 and mounted on the wheels 109 I show a drum 112. These drums are alike in construction and but one will be described. Each drum includes a cylindrical portion 113 having tires 114 at each end thereof. Each outer or end tire as shown is provided with a plurality of brackets 62' which are similar to the brackets 62 previously described and on these brackets I mount shafts 58' on which clamp members 55' are pivoted. These clamp members include inner end portions 55'' which engage the outer periphery of the tube 100. At their outer ends the clamp members are provided with segmental teeth 57' thereon which are engaged by a chain 93'. Suitable tightening members 86' similar to the tightening members 86 previously described are employed. The shafts 62' include projecting portions having apertures 60'' through which suitable operating members may be passed. The modification also includes spaced idler members 71' similar to the members 71 previously described.

In operation the member 101 is suitably supported and moved to engage a tube 100. The tube is then moved so that one end thereof enters the drum 111 and is moved to suitable position. The truck 108 is then moved to a position substantially as shown. The members 102 are then released and the operating shafts are turned thus causing the chain to move the clamp members 55' to operative position. The separate motors are then independently operated and the concrete or other material which has been placed in the pipe is centrifugally packed in position.

From the foregoing description it will be apparent that I have provided an improved pipe making machine which is simple in construction and highly efficient in use.

Having thus described my invention, I claim:

1. In a concrete pipe apparatus, a base member, a pair of spaced support members on said base, adjustable means to secure said support members to said base, a pair of coaxial sleeves on each of said support members, the inner ends of said sleeves being spaced apart, a shaft in each of said sleeves, a flanged wheel secured adjacent the outer ends of each of said shafts, means secured on said shafts adjacent the opposite ends to drive said shafts, and independent driving means engaging each of said shaft drive means to independently rotate said shafts.

2. In a concrete pipe mold, a cylindrical metal shell having external rings thereon adjacent each end, a tire ring encircling each end of said shell, a plurality of clamp members pivotally supported on each tire ring, each of said clamp members including a segment of outwardly directed sprocket teeth and an inwardly directed retainer portion adapted to engage its associated external ring and an endless sprocket chain engaging said teeth of all of said clamp members on each tire ring.

3. In a concrete pipe mold, a cylindrical metal shell having external rings thereon adjacent each end, an end ring at each end of the shell, a tire ring on each end of said shell, each of said tire rings having a face adapted to engage an end ring, a plurality of clamp members pivotally supported on said tire rings, each of said clamp members including a portion movable to engage the associated external ring and means to simultaneously move all of said movable portions.

4. In a concrete pipe mold, a cylindrical metal

shell having an external ring thereon at one end, a tire member encircling said shell, a plurality of clamp members pivotally supported on said tire member, each of said clamp members including an inwardly directed cam portion and an inwardly directed retainer portion, each of said cam portions in one position being adapted to engage the periphery of its associated external ring and each of said retainer portions being adapted to engage the inner face of its associated external ring and means to simultaneously shift all of said clamp members about their pivots to engaged position.

5. In a concrete pipe mold, a cylindrical metal shell having external rings thereon adjacent each end, a tire ring encircling each end of said shell, a plurality of clamp members pivotally supported on said tire rings, each of said clamp members including a segment of outwardly directed sprocket teeth, an inwardly directed cam portion and an inwardly directed retainer portion, said cam portion in one position being adapted to engage the periphery of its associated external ring and said retainer portion being adapted to engage the inner face of said associated external ring and an endless sprocket chain engaging said teeth of all of said clamp members on each tire ring.

6. In a concrete pipe mold, a cylindrical metal shell having external rings thereon adjacent each end, an end ring at each end of the shell, a tire ring encircling each end of said shell, each of said tire rings having a face engaging an end ring and the outer end of the adjacent external ring, a plurality of clamp members pivotally supported on said tire rings, each of said clamp members including a segment of outwardly directed sprocket teeth, an inwardly directed portion adapted to engage the associated external ring, an endless sprocket chain engaging said teeth of all of said clamp members on each tire ring and means to longitudinally shift said chain.

7. In a concrete pipe mold, a cylindrical metal shell having external rings thereon adjacent each end, an end ring at each end of the shell, a tire ring encircling each end of said shell, each of said tire rings having a face engaging an end ring and the outer end of the adjacent external ring, a plurality of clamp members pivotally supported on each tire ring, each of said clamp members including a segment of outwardly directed sprocket teeth, an inwardly directed cam portion and an inwardly directed retainer portion, said cam portion in one position being adapted to engage the periphery of its associated external ring and said retainer portion being adapted to engage the inner face of the associated external ring, an endless sprocket chain engaging said teeth of all of said clamp members on each tire ring, means to longitudinally shift said chains and means interposed in said chains to tighten said chains, means on said tire rings to support said tightening means and a plurality of idler sprocket toothed means mounted on each tire ring to support portions of said chains intermediate said clamp members.

8. In a concrete pipe apparatus a fixed base, a track adjacent said base, a truck on said track and movable towards and from the base, said base and said truck having sets of wheels thereon, a pair of aligned drums each including a tubular portion having a pair of tires thereon, the axes of said wheels being co-planar and parallel to the axis of the drums, the tires of one

of said drums being engaged and supported by said base set of wheels and the tires of the other drum being engaged and supported by the truck set of wheels, a cylindrical mold, said drums
5 encircling said mold, means on each one of said pairs of tires adapted to engage said mold, said engaging means including a plurality of pivoted members movable towards and from the tube, each of said members having gear teeth thereon
10 and a chain connecting said gear teeth.

9. In a concrete pipe mold, a cylindrical metal shell having tire ring engaging means thereon,

a pair of spaced tire rings on said shell and engaging said means, wheels engaging and supporting said tire rings, means to drive said wheels, a plurality of clamp members pivotally
5 mounted on each tire ring, each of said clamp members including a portion adapted to engage said first mentioned means and a flexible member engaging said clamp members and extending about said tire rings for simultaneously shifting the clamp members.

GRAHAM MILLER.