J. J. GRUENFELD, JR.

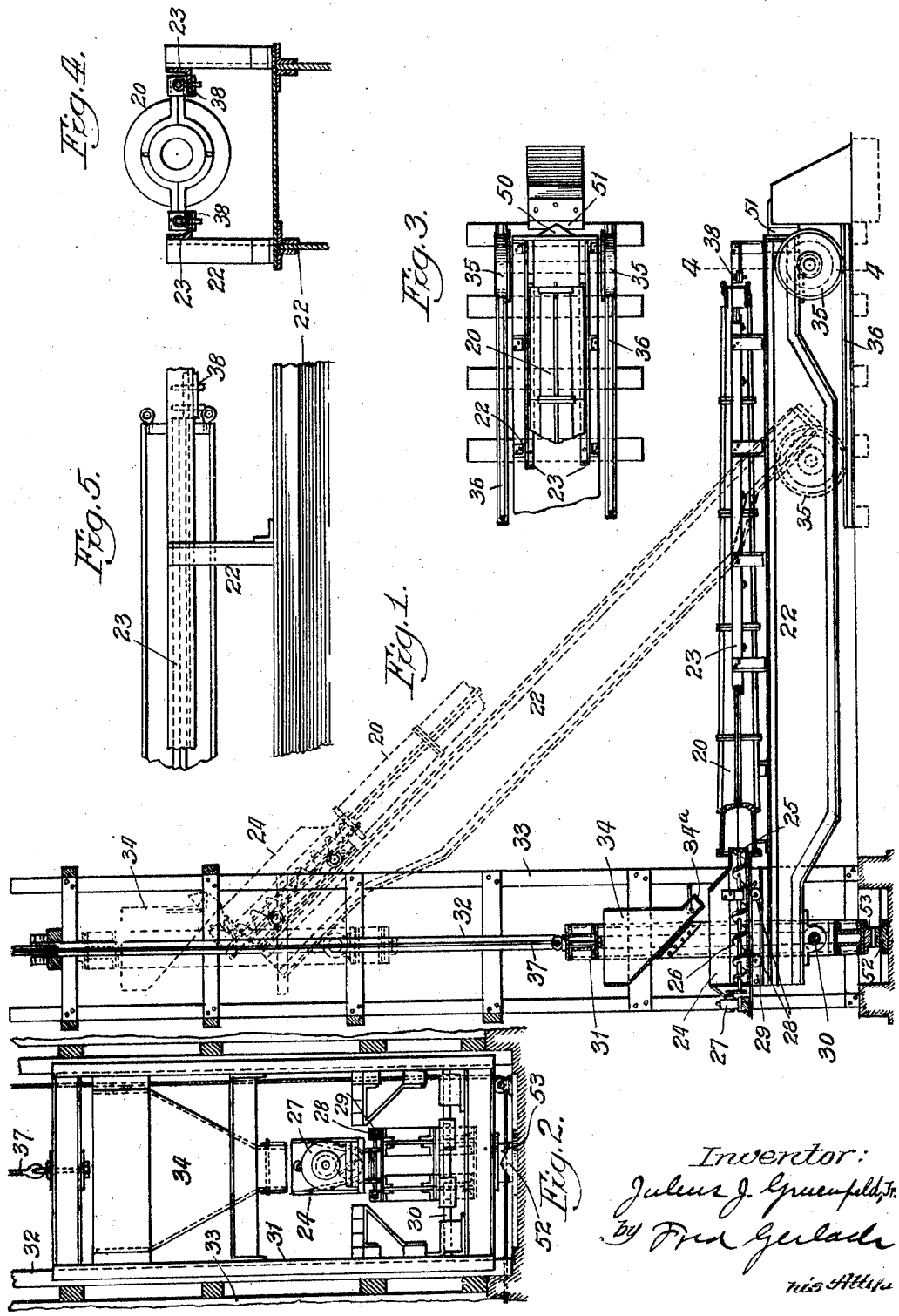
APPARATUS FOR MAKING CONCRETE POLES.

APPLICATION FILED NOV. 3, 1919.

1,403,683.

Patented Jan. 17, 1922.

5 SHEETS—SHEET 1.



J. J. GRUENFELD, JR.

APPARATUS FOR MAKING CONCRETE POLES.

APPLICATION FILED NOV. 3, 1919.

1,403,683.

Patented Jan. 17, 1922.

5 SHEETS—SHEET 2.

Fig. 6.

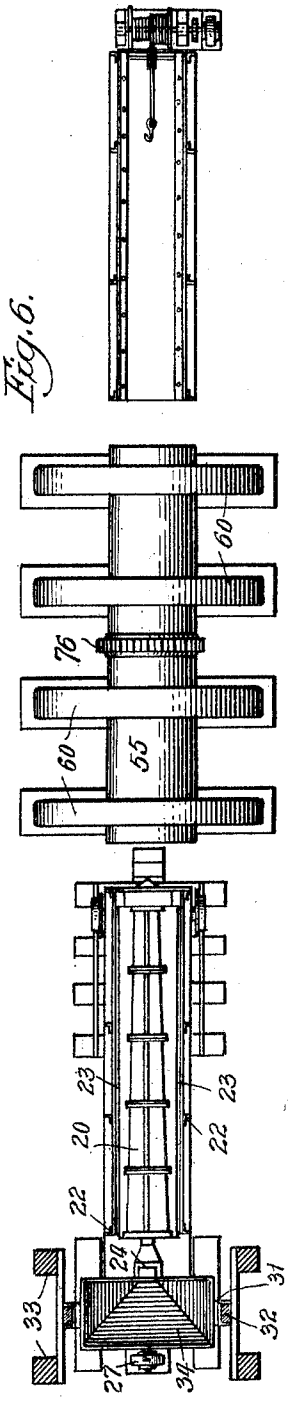


Fig. 6b.

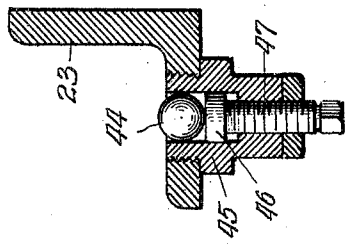


Fig. 6a.

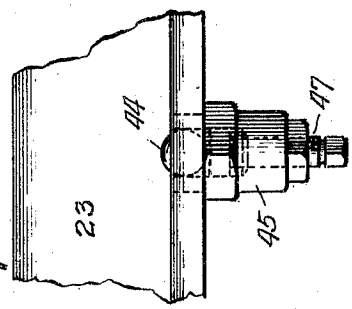


Fig. 6c.

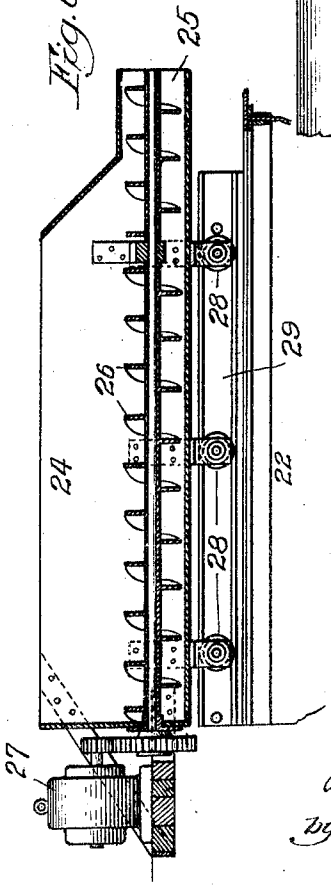
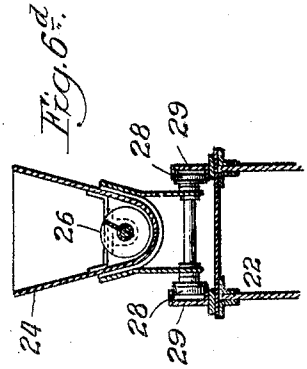


Fig. 6d.



Inventor:
Julius J. Gruenfeld Jr.
by Fred Gulick
his Atty.

J. J. GRUENFELD, JR.

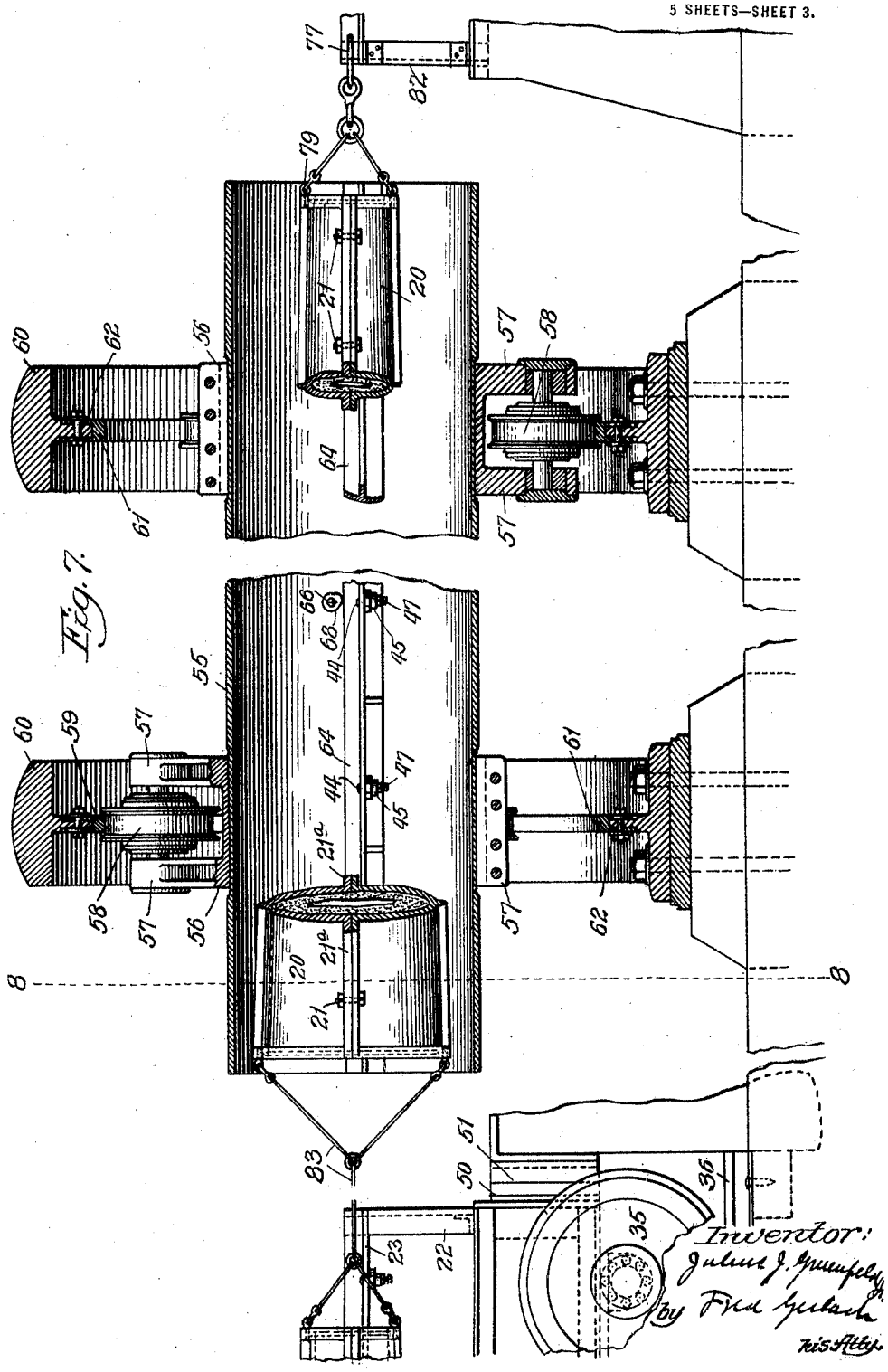
APPARATUS FOR MAKING CONCRETE POLES.

APPLICATION FILED NOV. 3, 1919.

1,403,683.

Patented Jan. 17, 1922.

5 SHEETS—SHEET 3.



Inventor:
Julius J. Gruenfeld
By Fred Gerlach
his Atty.

J. J. GRUENFELD, JR.

APPARATUS FOR MAKING CONCRETE POLES.

APPLICATION FILED NOV. 3, 1919.

1,403,683. Patented Jan. 17, 1922.

5 SHEETS—SHEET 4.

Fig. 8.

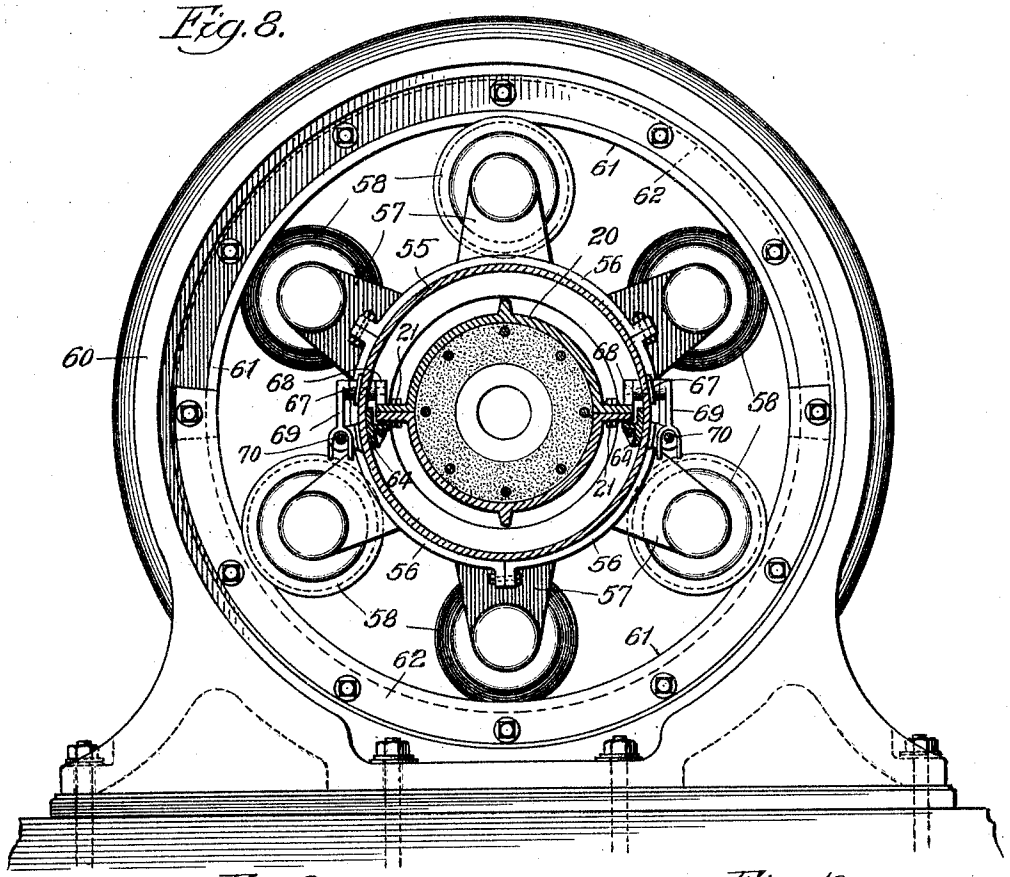


Fig. 9.

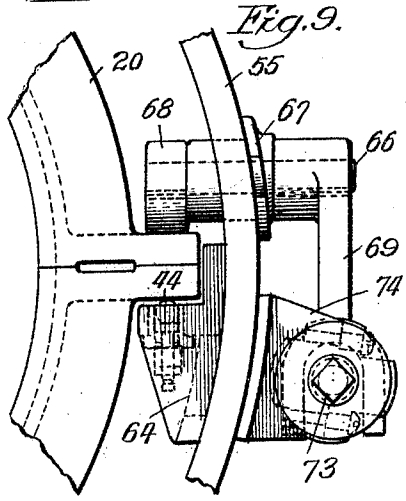
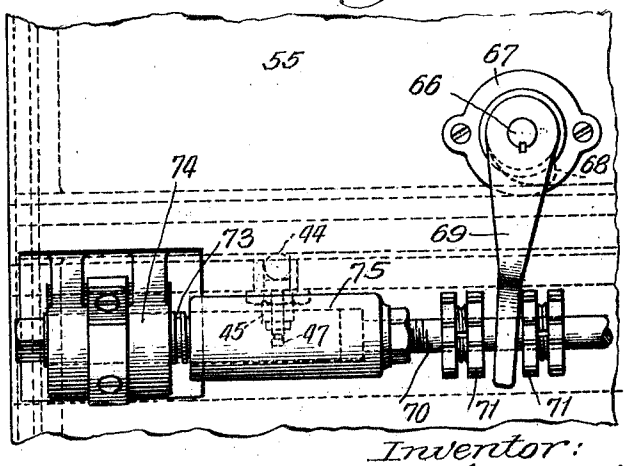


Fig. 10.



Inventor:
Julius J. Gruenfeld Jr.
by Fred Gerlach
his Atty.

J. J. GRUENFELD, JR.

APPARATUS FOR MAKING CONCRETE POLES.

APPLICATION FILED NOV. 3, 1919.

1,403,683. Patented Jan. 17, 1922.

5 SHEETS—SHEET 5.

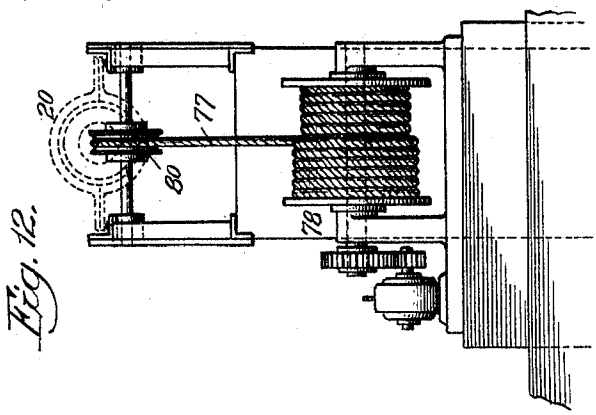


Fig. 12.

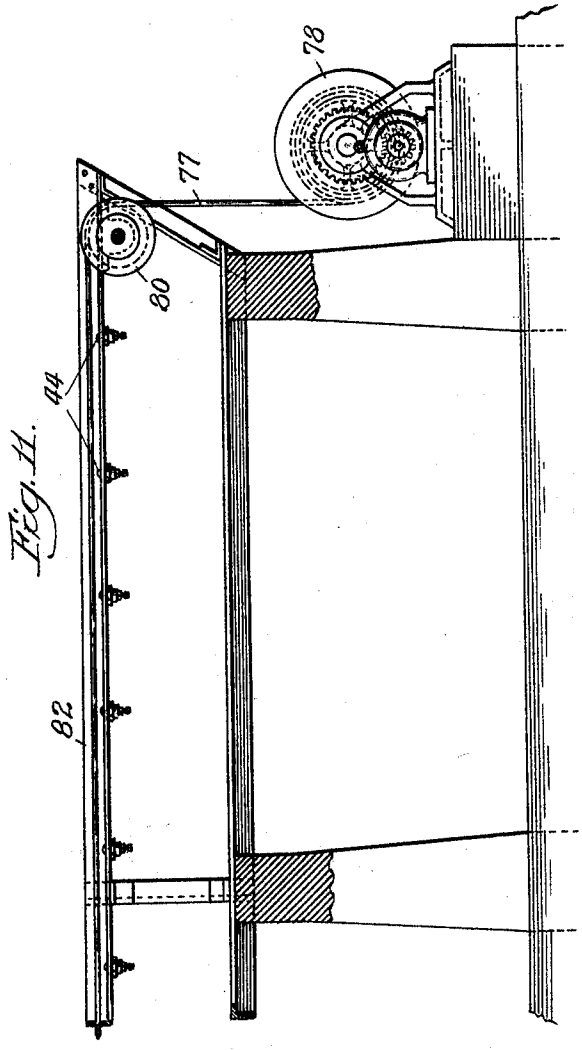


Fig. 11.

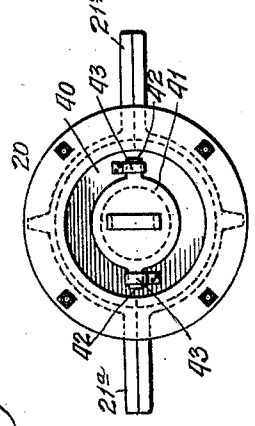


Fig. 14.

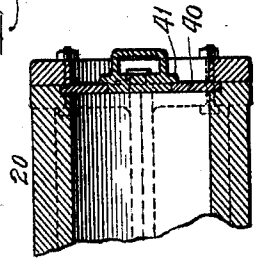


Fig. 13.

Inventor:
Julius J. Gruenfeld Jr.
by Fred Gerlach
his Atty.

UNITED STATES PATENT OFFICE.

JULIUS J. GRUENFELD, JR., OF CHICAGO, ILLINOIS.

APPARATUS FOR MAKING CONCRETE POLES.

1,403,683. Specification of Letters Patent. Patented Jan. 17, 1922.

Application filed November 3, 1919. Serial No. 335,257.

To all whom it may concern:

Be it known that I, JULIUS J. GRUENFELD, Jr., a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Making Concrete Poles, of which the following is a full, clear, and exact description.

The invention relates to apparatus for making concrete poles.

One object of the invention is to provide means for charging the mould. It has heretofore been the practice to tilt the mould to dump a charge of concrete into the upper end thereof while it is tilted. An objection to this practice has been that the concrete was not evenly distributed longitudinally of the mould.

One object of the present invention is to provide improved charging apparatus by which the concrete will be gradually and uniformly delivered into the mould while it is being tilted to effect an even distribution longitudinally of the mould.

Another objection to the apparatus heretofore used was that the mould was mounted so that a pit was necessary below the point on which the mould was pivoted. Another object of the invention is to provide an improved charging apparatus in which the mould will be tilted in such manner that no pit will be necessary.

Another object of the invention is to provide means for insuring the alignment of the mould when it has been charged and restored to its horizontal position, so that it can be fed without difficulty into the apparatus for rotating the mould to pack the concrete.

Another object of the invention is to provide an improved rotatable mount for the mould-case which will cause the case and mould, when revolving the mould and rotating mechanism, to move evenly and without chattering. Heretofore, it has been the practice to provide rollers on stationary axes to support the mould-case and the present invention involves the use of a rigid stationary, circular trap with rollers mounted on the axes rotating with the case.

Another object of the invention is to provide improved means for securing the mould and rotating mechanism in the case. Other objects of the invention will appear from the specification.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a view, partly in section and partly in elevation of the improved charging apparatus. Fig. 2 is a rear elevation of the charging apparatus. Fig. 3 is a plan of a portion of said apparatus. Fig. 4 is a section taken on line 4—4 of Fig. 1. Fig. 5 is a detail side elevation showing the end stop for the mould while it is held in the charging apparatus. Fig. 6 is a plan of the charging apparatus and also the mechanism for rotating the mould and for receiving it after it has been rotated to pack the concrete. Figs. 6^a and 6^b are details of the adjustable bearings used on tracks on which the mould is slidably held. Fig. 6^a is a detail showing one of the ball-bearings on which the mould is supported and Fig. 6^b is a section thereof. Fig. 7 is a longitudinal section of the mould, parts being shown in elevation. Fig. 8 is a section taken on line 8—8 of Fig. 7. Figs. 9 and 10 are details of the mechanism for clamping the mould in the rotating apparatus. Fig. 11 is an elevation, parts being shown in section, of the mould-receiving apparatus. Fig. 12 is an end elevation of said apparatus. Figs. 13 and 14 are details of the end-closure for the mould while it is being tilted and charged.

The invention is illustrated in connection with a mould 20 made up of semi-cylindrical sections which are secured together by bolts 21 and of a length corresponding to the pole to be formed. While the mould is being charged, it is held on a carriage 22 which is provided with angle-iron tracks 23 for supporting the mould. A feed-chute 24 is mounted at the rear end of the carriage 22 and is provided with a spout 25 for discharging concrete into the mould 20. A screw-conveyor 26 is mounted in the chute 24 and is suitably driven from a motor 27 which is mounted to move with the chute. Chute 24 is mounted on rollers 28 which are adapted to run on tracks 29 which are secured to the carriage so that the spout 25 of the chute may be shifted into and withdrawn from one end of the mould 20. The rear end of the carriage 22 is connected to a cross-shaft 30 which is held in an elevator-frame 31 which is guided by tracks 32 of a tower 33. A chute 34, adapted to contain a sufficient quantity of concrete for a complete charge or to fill the mould, is

fixedly secured to the elevator 31. The other end of the carriage 22 is mounted on rollers 35 which are adapted to run on rails 36. The elevator to which the rear end of the carriage 22 and parts sustained thereby is connected, may be raised and lowered by any suitable hoisting device, such as a cable 37 which may be operated by any suitable means. Stops 38 are secured to the rails 23 on the carriage 22 to prevent downward movement of the mould longitudinally of the carriage while the latter is being tilted. The lower front end of the mould 20 is provided with plate 40 having a mould therein which is closed by a cap 41 which is provided with lugs 42 adapted to interlock with clips 43 to removably secure the cap in the plate 40 and close the front end of the mould. This cap prevents the concrete from falling through the lower end of the mould while it is tilted and can be readily removed while the mould is being rotated to pack the concrete therein, as hereinafter more fully set forth. The flanges 21ª on the mould are adapted to rest on bearing-balls 44 (Figs. 6ª and 6ᵇ). Each ball is held in a socket 45 and on a plug 46 which is adjustably sustained by a screw 47. By adjusting these balls 44, the mould will be evenly supported so it can be easily moved.

The operation of the charging apparatus will be as follows: A mould 20 will be deposited upon the carriage 22 by a suitable hoist, as well understood in the art. The chute 24 will then be adjusted so that its spout 25 will discharge concrete into the mould. A charge of concrete will be delivered into the hopper 34, the outlet of which is provided with a valve 34ª by which the discharge from the hopper into the chute 24 may be regulated. The screw-conveyor 26 will be started and the elevator 31 will be gradually raised. As the elevator is raised, the carriage 22 and mould thereon will be gradually tilted and the concrete will be gradually and cumulatively delivered into the mould. This results in evenly filling the mould. After the mould has been tilted approximately to the inclination shown by dotted lines in Fig. 1, the mould will have received the charge of concrete and the elevator will be lowered to restore the mould and the carriage 22 to position. The spout 25 and chute 24 will then be discharged to release the mould so that it can be moved from the carriage 22 into the rotating apparatus. For the purpose of aligning the mould, so that it can be readily shifted without difficulty into the rotating apparatus, the front end of the carriage 22 is provided with a V-shaped block 50 adapted to enter the correspondingly recessed block 51, so that as the carriage is restored to its normal position, this aligning device will cause the carriage to bring the mould into true position for entry into the rotating mechanism. For the same purpose, a V-shaped block 52 is secured to the base of the tower 33 and a recessed member 53 is secured to the elevator, so that as the latter is lowered, the rear end of the carriage will also be truly aligned.

A drum 55, the axis of which is aligned with the axis of the mould held on the carriage 22, is located adjacent one end of said carriage and adapted to receive the mould from the carriage. Drum 55 is secured in annular frames 56, each of which is provided with a series of lugs 57 in which are mounted rollers 58. The latter are grooved and adapted to travel on circular tracks 59. These tracks are each secured in a stationary frame 60. Frames 56 are formed in sections for convenience in applying them to the drum. Each track 59 is formed of semi-circular sections and each section comprises a tread-portion 61 and a flange 62 bolted to the frame. The flanges of the sections are disposed on opposite sides of the frame 60 so that they can be conveniently replaced without removing the frame 60. Guide and supporting rails 64 are secured to the sides of the drum and the horizontal flanges of these rails are provided with ball-bearings, such as are shown in Fig. 9 and in detail in Figs. 6ª and 6ᵇ, so that the flanges 21ª on the mould may be easily moved longitudinally along these rails to bring the mould into and out of the drum. Shafts 66 are mounted in bearings 67 in the drum and the inner ends of these shafts are each provided with a cam 68 adapted to clamp the flanges of the mould against the bearings and to hold the mould against longitudinal movement. An arm 69 is secured to the outer end of each cam-shaft 66. Rods 70 at the outer sides of the drum are provided with adjustable stop-collars 71 which are adapted to engage the forked ends of the arm 69 to operate them to shift the cam 68. Each rod 70 is adapted to be operated by a screw 73 which is held in a lug 74 fixed to the drum, and has a screw-threaded engagement with a socket 75 which is adjustably connected to one end of the rod. By turning the screws 73, rods 70 may be operated to release the cams 68 or to cause them to lock the mould in the drum. A gear 76 is fixed to the drum and may be driven by any suitable mechanism, as well understood in the art.

A cable 77 and a suitable power-operated winding mechanism 78 is guided by a pulley 80 and connected to the front end of the mould, as at 79. From the drum 55, the mould will be pulled by the cable 77 onto stationary tracks 82, from which it will be removed in any suitable manner. A cable 83 is adapted to be connected to the rear end of a mould in the drum 55 and to the front end of a mould in the charging apparatus, so that the charged mould and the mould which

has been finished in the drum 55 may be simultaneously advanced. While the mould is locked in the drum 55, the drum will be rotated to cause the concrete to be packed around the mould and to form a hollow pole, as well understood in the art. While a mould is being rotated, the cap 41 is removed.

The invention thus exemplifies charging apparatus for a mould for making poles, by which the mould will be gradually and evenly filled and in which no pit is necessary to receive any portion of the mould while tilted. Also one in which the charging operation and packing operations of different moulds may be simultaneously performed. Also improved means for locking the mould in the drum.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a pole-making machine, the combination of a carriage adapted to hold a mould, a guide for one end of the carriage, an elevator for the other end of the carriage and means for delivering concrete into a mould on the carriage.

2. In a pole-making machine, the combination of a carriage adapted to hold a mould, a support at one end of the carriage, a track for said support, an elevator to which the other end of the carriage is pivotally connected, and means for delivering concrete into the mould.

3. In a pole making machine, the combination of a tiltable carriage, a mould, means for rigidly securing the mould on the carriage, mechanism for gradually feeding concrete into one end of the mould, and mechanism for hoisting said end of the mould to cause the concrete to gradually gravitate from the hoisted end toward the other end.

4. In a pole making machine, the combination of a tiltable carriage, means for rigidly securing a mould on the carriage, a chute and conveyor disposed outside of and adjacent one end of the mould to deliver concrete into said end, a vertically movable hopper, and mechanism for simultaneously hoisting the hopper in a rectilinear path and tilting the carriage.

5. In a pole making machine, the combination of a tiltable carriage, a chute and conveyor disposed outside of and adjacent one end of the mould to deliver concrete into said end, a vertically movable hopper, a connection between the hopper and the carriage comprising a pivot which permits relative movement of the hopper and the carriage, and mechanism for hoisting the hopper, said pivotal connection serving to tilt the chute when the hopper is shifted.

6. In a pole making machine, the combination of a carriage provided with a longitudinally movable and pivotal support at one end, a mould, means for rigidly securing the mould on the carriage, mechanism for feeding concrete into the other end of the mould, and mechanism for hoisting said latter end of the mould to cause the concrete to gravitate from the hoisted end toward the other end.

7. In a pole-making machine, the combination of a tiltable carriage adapted to hold a mould, means for tilting the carriage, means for delivering concrete into the mould, and means for aligning the carriage when it is lowered.

8. In a pole-making machine, the combination of a drum, means for revolving the drum, a mould consisting of a single shell, and means for locking the mould directly to the drum.

9. In a pole-making machine, the combination of a drum, means for revolving the drum, a mould consisting of a single shell, and means for locking the mould in the drum comprising cams.

10. In a pole-making machine, the combination of a drum, means for revolving the drum, a mould consisting of a single shell, and means for locking the mould in the drum comprising cams and ribs for operating the cams.

11. In a pole-making machine, the combination of a drum, means for holding a mould in the drum, rollers for revolubly supporting the drum, means for supporting the rollers on the drum and stationary tracks for the rollers.

12. In a pole-making machine, the combination of a drum, means for holding a mould in the drum, rollers for revolubly supporting the drum, means for supporting the rollers on the drum, stationary circular tracks for the rollers, said tracks being formed of sections each comprising a tread and a flange, the flanges of the sections being disposed on opposite sides of the frame.

13. In a pole-making machine, the combination of a mould formed of sections and comprising a head at one end having an opening therein, means for charging the mould and a readily removable cap for closing the opening in the head.

14. In a pole-making machine, the combination of a mould, rails for supporting the mould and adjustable ball-bearings in said rails.

15. In a pole-making machine, the combination of a mould, rails for supporting the mould, adjustable ball-bearings in said rails, and means for clamping the mould on the rails.

16. In a pole-making machine, the combi-

nation of a charging apparatus for filling a mould through one end thereof, a mould rotating apparatus, axially aligned with the mould held in the charging apparatus and means for moving the mould axially from the charging apparatus to the rotating apparatus.

17. In a pole-making machine, the combination of a charging apparatus for filling a mould through one end thereof, rotating mechanism for the mould, and a mould-support, said rotating apparatus and support being axially aligned, and means for drawing a mould axially from the charging apparatus into the rotating apparatus and from the latter onto the support.

JULIUS J. GRUENFELD, JR.