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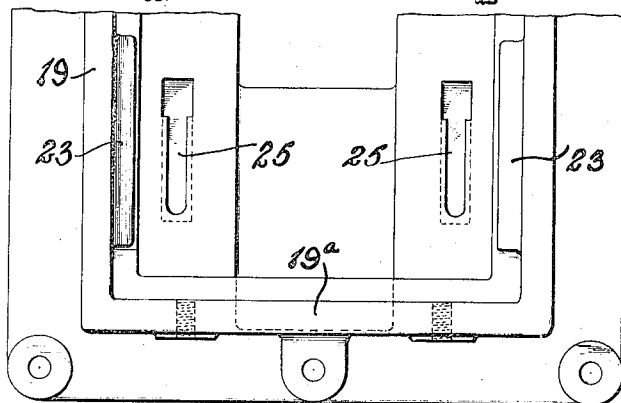
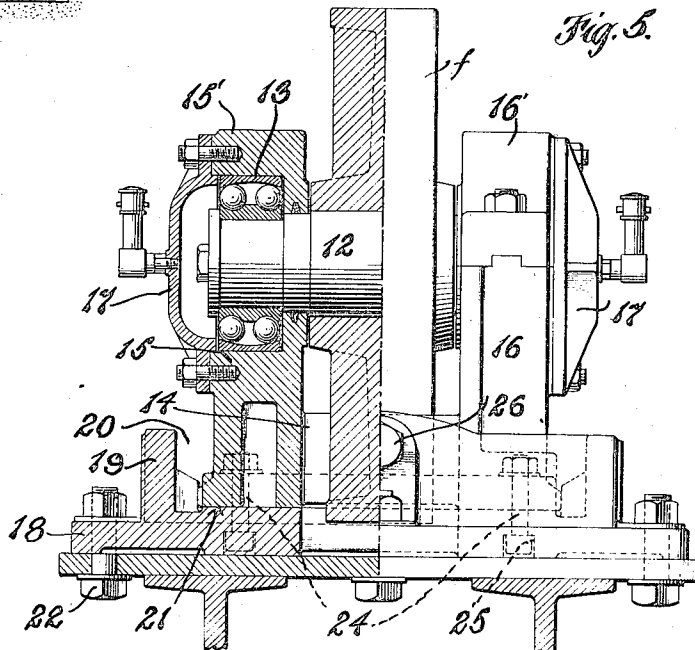
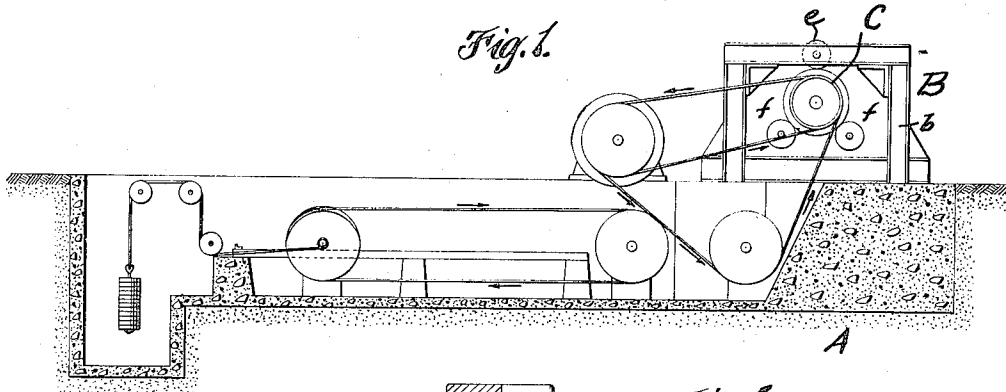
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D. B. HANNA

CENTRIFUGAL POLE MAKING APPARATUS

Filed Aug. 15 1921

7 Sheets-Sheet 1



Inventor
David B. Hanna

By Attorneys
Symonds & Lechner

May 27, 1924.

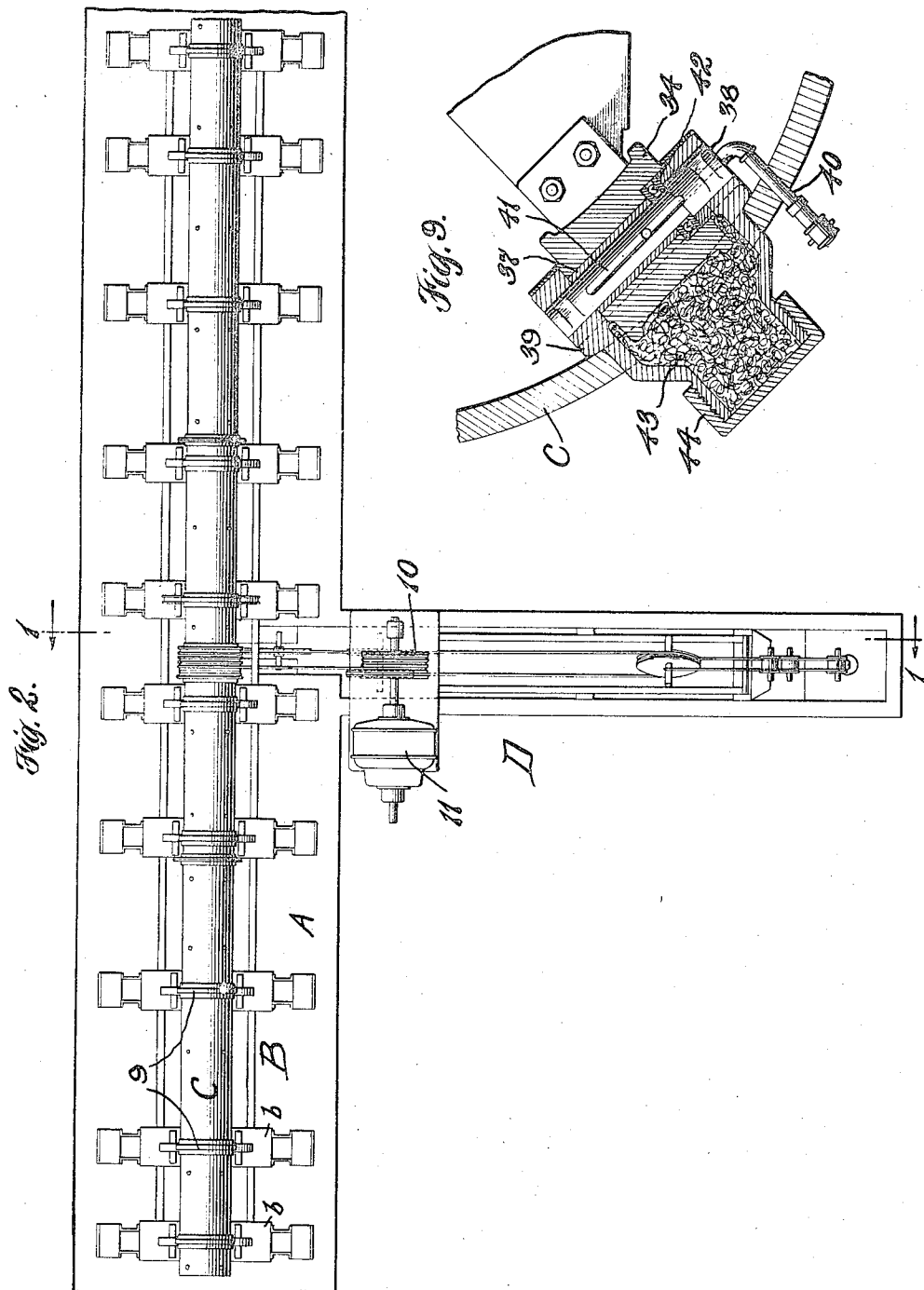
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D. B. HANNA

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7 Sheets-Sheet 2



Inventor.
David B. Hanna
By Attorneys
Symmes Pratt & Lechner

May 27, 1924.

1,495,737

D. B. HANNA

CENTRIFUGAL POLE MAKING APPARATUS

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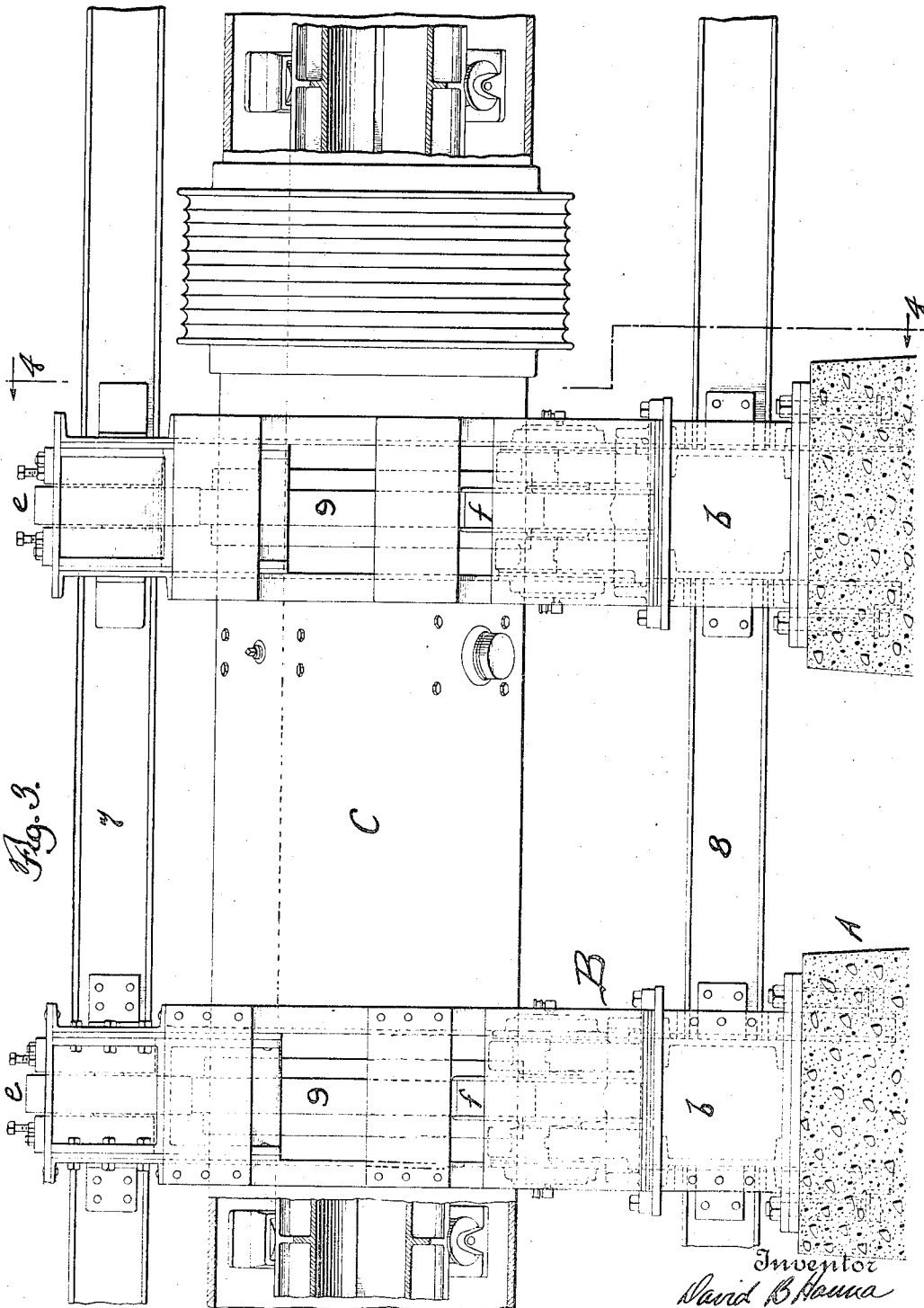


Fig. 3.

By

Attorneys

Inventor
David B. Hanna
Lyons & Leach

May 27, 1924.

1,495,737

D. B. HANNA

CENTRIFUGAL POLE MAKING APPARATUS

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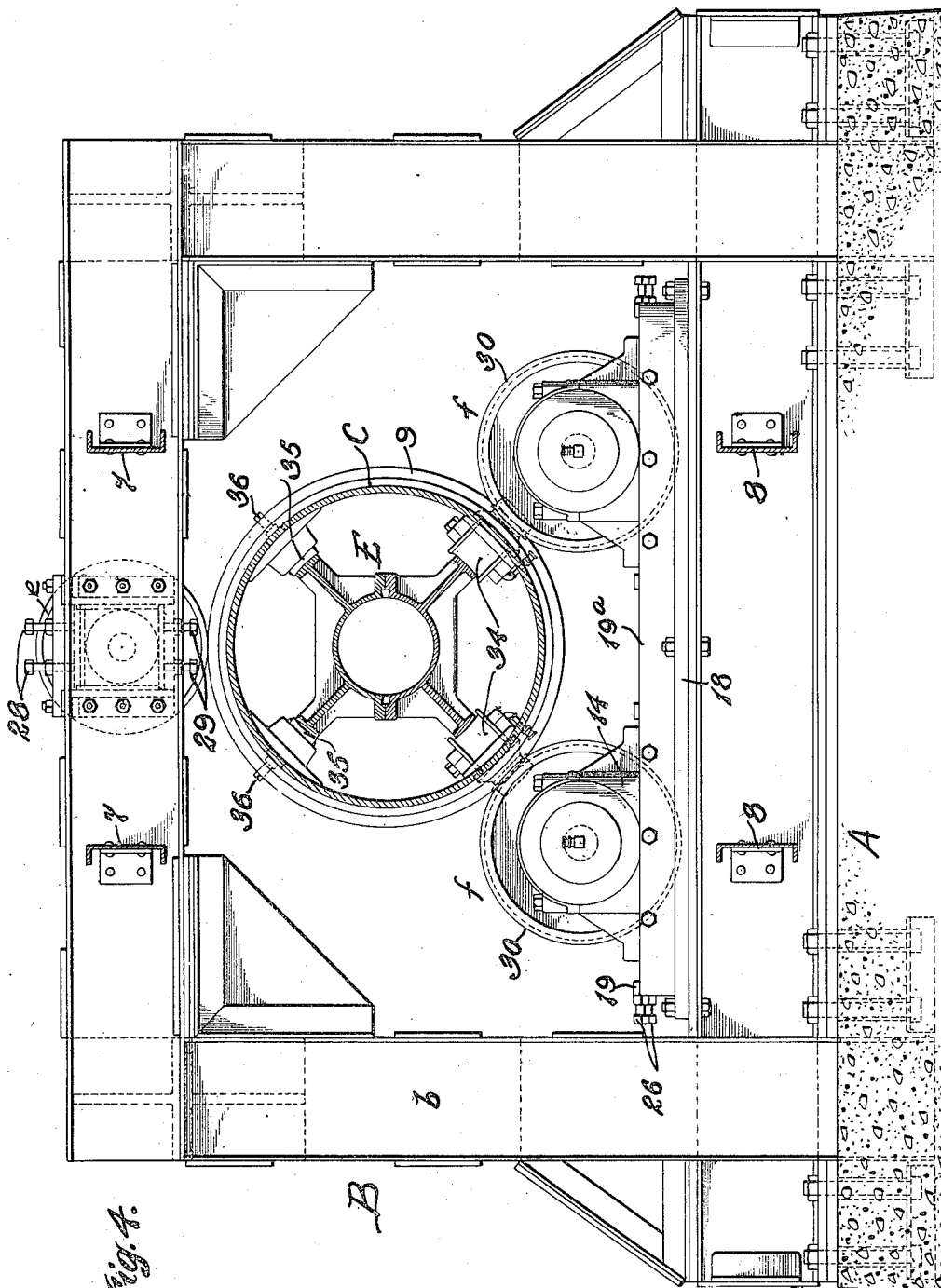


Fig. 4.

Inventor
David B. Hanna

By

Attorneys

Synsott & Lechner

May 27, 1924.

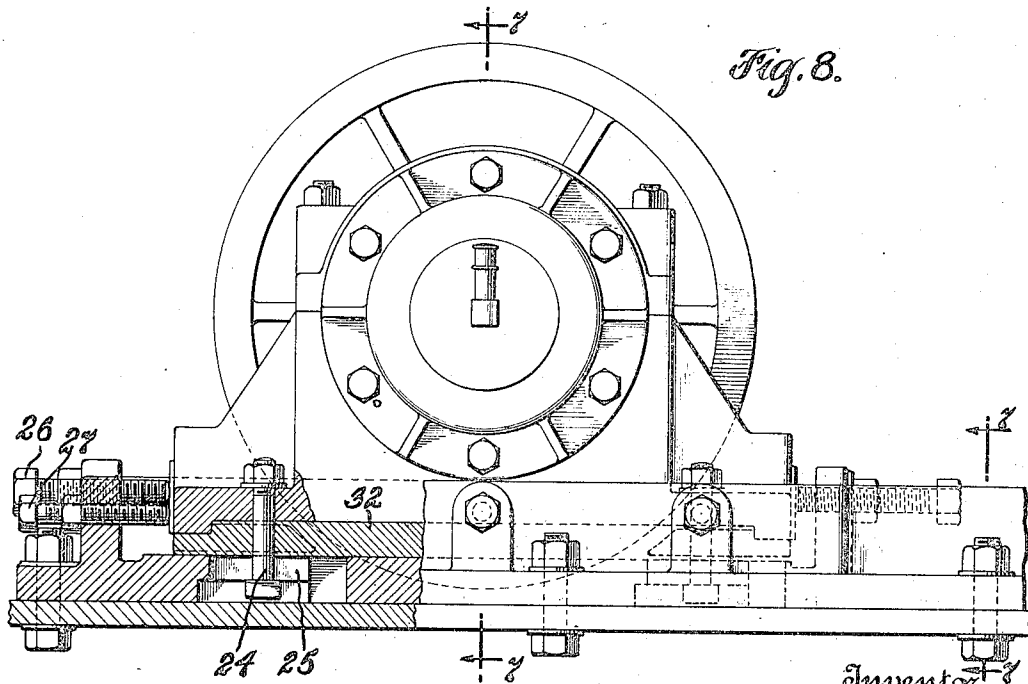
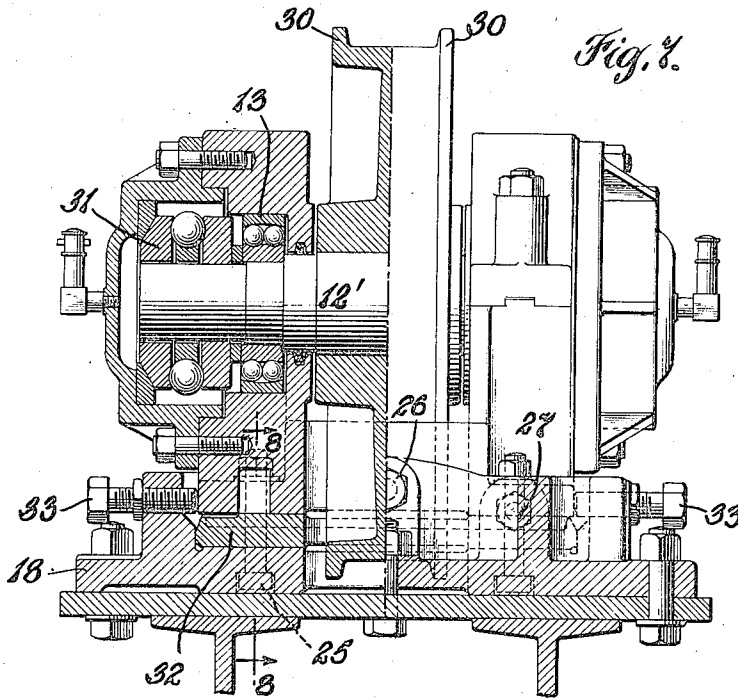
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D. B. HANNA

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Inventor
David B. Hanna

By Attorneys
Symonds & Lechner

May 27, 1924.

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D. B. HANNA

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Fig. 10.

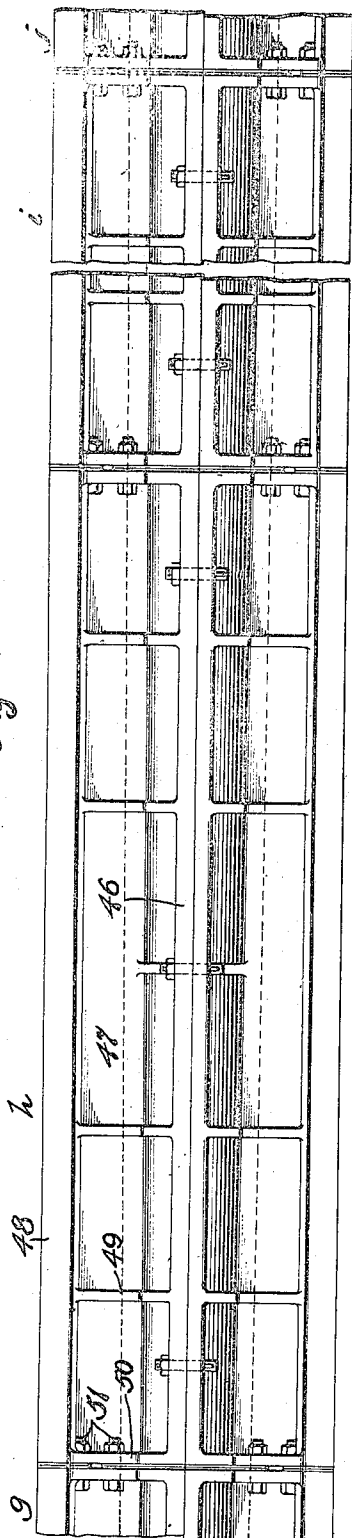
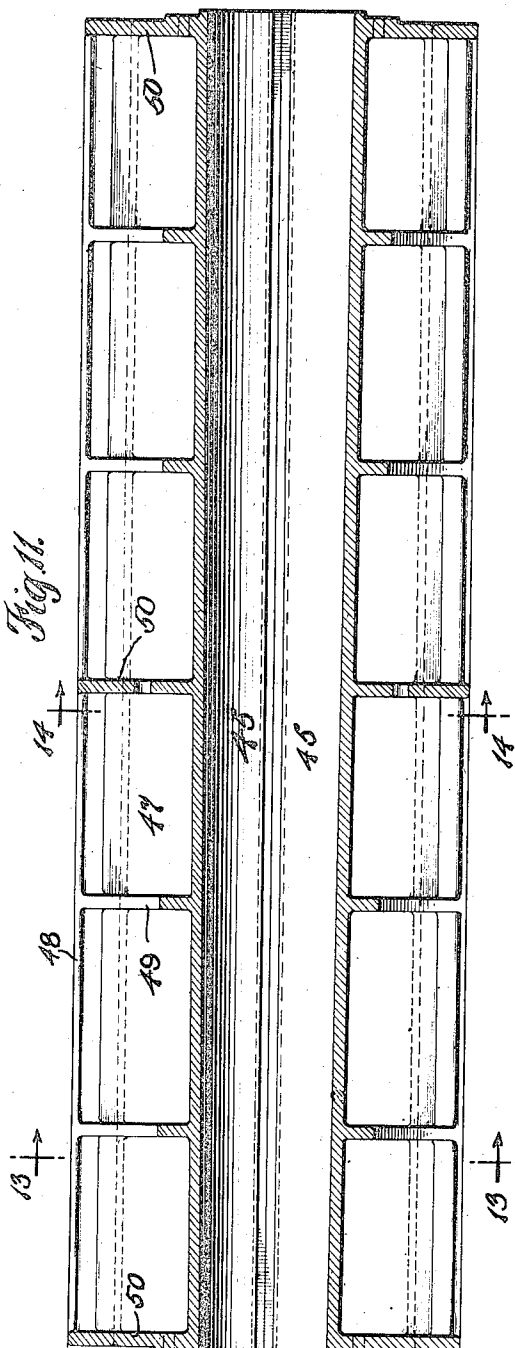


Fig. 11.



Inventor
David B. Hanna

By

Attorneys

Symons & Lechner

May 27, 1924.

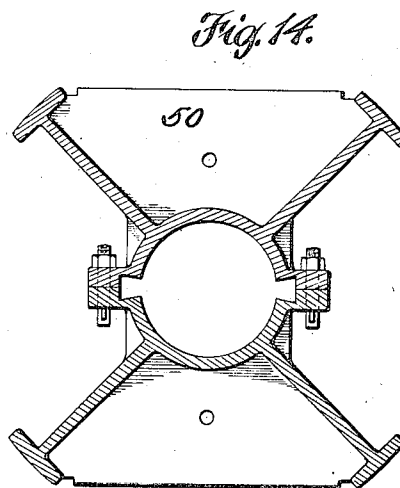
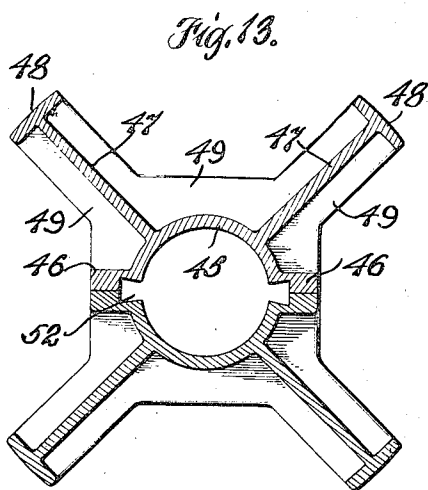
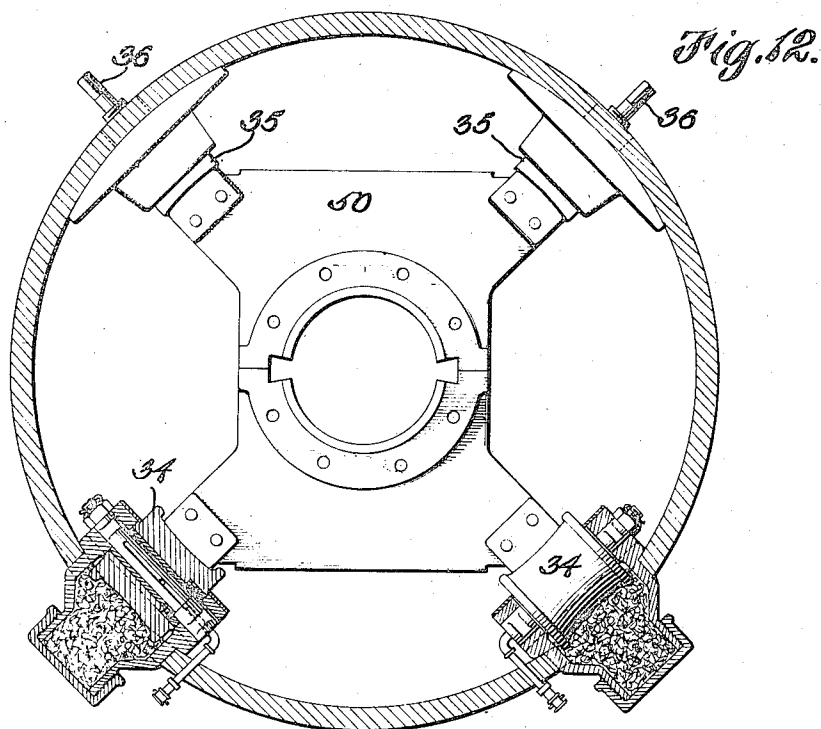
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D. B. HANNA

CENTRIFUGAL POLE MAKING APPARATUS

Filed Aug. 15, 1921

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Inventor
David B. Hanna

By

Attorneys

Symon & Lechner

UNITED STATES PATENT OFFICE.

DAVID B. HANNA, OF CHICAGO, ILLINOIS, ASSIGNOR TO MASSEY CONCRETE PRODUCTS CORPORATION, A CORPORATION OF VIRGINIA.

CENTRIFUGAL POLE-MAKING APPARATUS.

Application filed August 15, 1921. Serial No. 492,212.

To all whom it may concern:

Be it known that I, DAVID B. HANNA, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Centrifugal Pole-Making Apparatus, of which the following is a specification.

This invention relates to centrifugal machines for making hollow concrete poles and the like, and it has for one of its objects the provision of an improved drive for such machines.

Another object of the invention is to provide improved means of simple and effective character whereby the machine may be adjusted to secure proper distribution of the concrete.

Further objects are to provide an improved form of trunnions for revolvably supporting the shell or tube in the frame of the machine; to provide improved rolling devices for conveying the mold into the tube; and to provide a simple and effective means for lubricating said devices.

My invention further contemplates the provision of a simplification and improvement of the mold whereby inter alia, the intermediate case heretofore used in apparatus of this character may be dispensed with.

In general my invention is designed to simplify the construction of parts, render them more accessible, and to extend the life of the apparatus.

The foregoing, together with such other objects as may hereinafter appear, or are incident to my invention, I obtain by means of a construction, the preferred embodiments of which are illustrated in the accompanying drawings, wherein

Fig. 1 is a diagrammatic cross section on the line 1—1 of Fig. 2 illustrating the drive of a machine embodying my improvements; Fig. 2 is a plan view of Fig. 1 with a portion of the frame removed to expose the other parts; Fig. 3 is an enlarged side elevation and partial section of a portion of the machine illustrating the construction of certain of the details of my invention; Fig. 4 is a section on the line 4—4 of Fig. 3; Fig. 5 is an end elevation, partially in section of one form of trunnion rollers and associated parts employed in certain parts of the apparatus; Fig. 6 is a fragmentary plan of a sole plate used with the trunnions of Fig. 5; Fig. 7 is a

side elevation, partly in section, of another trunnion; Fig. 8 is an end elevation of Fig. 7, partly in section on the line 8—8 of such latter figure; Fig. 9 is an enlarged sectional view of a detail of my improvements; Fig. 10 is a broken out plan view of several lengths of a sectional mold made in accordance with my invention; Fig. 11 is a longitudinal section through the mold; Fig. 12 is a cross section showing the mold in place and Figs. 13 and 14 are cross sections illustrating details of the mold construction.

Referring now to Figs. 1 and 2, it will be seen that the machine in general comprises a suitable base A; a frame indicated as a whole by the reference letter B and consisting of a plurality of box frames b, tied together and braced longitudinally by means of upper and lower channel members 7 and 8; the revolvable tube C into which the mold is inserted; and the drive mechanism D. The specific construction of the box frames forms no part of this invention and it will suffice to point out that they are composed of commercial sections suitably secured together. The box frames are provided with a plurality of trunnion wheels to be hereinafter described which serve to revolvably support the tube C in the machine, the tube being provided with a plurality of tires which ride on the wheels.

The driving mechanism D consists of a rope or cable drive which is generally of a type heretofore employed in this art, but in this instance the main or driving sheave has its shaft directly connected with the driving motor 11, as a result of which I am enabled to dispense with the reduction gears heretofore employed and overcome certain disadvantages incident to their use. In this connection, it is to be borne in mind that tube C must be revolved at a very high rate of speed, the peripheral speed, in some instances, reaching a mile a minute in the larger sizes of the machine, from which it will be apparent that the problems encountered in connection with a gear drive are difficult.

Each box frame is provided with three trunnion wheels—an upper wheel e, and two spaced lower wheels f, the disposition of such wheels being clearly shown in Figs. 1 and 4. The trunnion wheels are adjustably supported in a manner to be described for the purpose of raising and lowering the

tube C, i. e., for the purpose of inclining the axis of rotation slightly from the horizontal in order to cause the concrete to properly flow and distribute itself within the mold E which is adapted to be slid into and out of the tube C, and to provide means for taking up wear in the revolving parts and provide means for quick access in replacing broken parts. The angle of inclination varies with the particular work in hand. The means whereby such adjustment is effected will now be described.

Referring to Figs. 4, 5 and 6, it will be seen that the trunnion wheels *f* are mounted on trunnion shafts 12' having ball bearings 13 at the ends, such bearings being carried in a housing comprising a base 14 and two standards 15 and 16, cast in a single piece. The standards 15 and 16 have the usual bearing caps 15' and 16', and the ends of the trunnion shaft and the ball bearings are protected by a closure cap 17, to which lubricant is supplied in the manner illustrated in Fig. 5. The pairs of trunnion wheel housings are slidably fitted into a sole plate 18, such sole plate being provided with flanges or ribs 19 on its upper face, providing channel-like pockets 20, in the bottom of which are seats 21 for the housings. The sole plates 18 are supported in the box frames and extend transversely of the machine, being secured to the lower members of the box frames by bolts 22. The housings slidably fit between the pads 23 at the sides of the pockets 20 and are thus rigidly supported against displacement longitudinally of the machine. The length of the pockets transversely of the machine, however, is such that ample clearance is provided for shifting the housings inward or outward i. e. toward or away from the vertical center line of the tube C, and to permit of such adjustment I secure the housings to the sole plate by means of bolts 24, the heads of which are adapted to be fitted into key hole slots 25 formed in the sole plate.

It will be observed on inspection of Fig. 6 that the key hole slots extend transversely of the machine so that when the bolts 24 are loosened, the housings may be shifted inward or outward as may be desired. To facilitate such adjustment I provide set screws or adjusting screws 26 and 27 (see Figs. 5 and 8) which are threaded in the flange or rib portions 19^a forming the opposing ends of the pockets in the sole plate. With the bolts 24 loosened, it will be seen that by turning up one set of the adjusting screws and loosening the opposite set, the adjustment before mentioned can be readily obtained.

The trunnion wheels *e* are supported in a housing of substantially the same character as previously described, but such housings are slidably fitted for vertical move-

ment between the members constituting the top portion of a box frame, as will be clearly seen on inspection of Figs. 3 and 4. The housings for the wheels *e* are shifted or adjusted vertically by means of the pairs of set or adjusting screws 28 and 29.

The foregoing arrangement provides a very simple and effective means for shifting the axis of rotation of the tube C. If, for example, it is desired to lower the left hand end of the tube and raise the right hand end, all of the trunnion wheels *f* on the left of the middle portion of the tube will be shifted outwardly from the vertical center line of the tube in graduated amounts, which will have the effect of lowering the left hand end of the tube, and the trunnion wheels *e* will be adjusted downward in graduated amounts to secure a firm support of the tube. On the right hand end the trunnion wheels *f* will be shifted inwardly in graduated amounts and the corresponding trunnion wheels *e* will be accordingly adjusted vertically, thus raising that end of the tube. I am thus enabled to secure the desired adjustment without the employment of the more or less complicated wedge mechanism heretofore employed for such purposes, while at the same time the trunnion wheels are more effectively held rigid (which is of great importance in apparatus of this character) than has heretofore been the case. The construction of parts is also such as to greatly reduce the possibility of any breakage and resultant injury to the machine, and to provide means for taking care of decreased diameters of trunnions and tires due to wear.

It will be noted that the trunnion wheels *f* of the type shown in Fig. 5 are flangeless. This is characteristic of most of the trunnion wheels with the exception preferably, of those located at the middle of the machine. These trunnion wheels are provided with flanges 30 as shown in Fig. 7 and also in Fig. 4, which serve to support the machine against longitudinal displacement. The shafts 12' of such trunnion wheels, however, are longer than the shaft for the flangeless trunnion wheels, and are provided with thrust bearings 31 in addition to the radial bearings 13. The housings for such bearings and trunnion shafts are of substantially the same construction as that heretofore described, and this is true also with respect to the sole plates employed. I prefer, however, to introduce a filler plate between the housings and the sole plates, such filler plate being indicated at 32 in Figs. 7 and 8. These filler plates are provided for renewal purposes and to provide means for both longitudinal and transverse adjustment and they and the housings are shaped so as to slidably fit each other, as shown in Fig. 8, so that when the housing is adjusted by

the screws 26 and 27 the filler plate will move therewith. Set screws 33 are also provided in the side pocket walls for supporting the housing against displacement longitudinally of the machine, and to provide means for longitudinal adjustment to take care of wear and irregularities in setting.

Referring now to Figs. 4, 9 and 12, the manner in which the mold E is introduced into and supported within the tube C will now be described. At a plurality of points in its length the tube C is provided in its lower portion with pairs of rollers 34 on which the mold is rolled into and out of the tube. Located in substantially the same vertical plane and in the upper portion of the tube C are corresponding pairs of clamping members 35 which are radially adjustable by means of the adjusting screw 36, in a manner well understood in this art. To insert the mold in the machine, the clamps 35 are retracted so as to clear the mold, the mold is conveyed into place and the clamps 35 tightened to position the mold between the clamp and the roller 34. When the parts are thus clamped the mold will be securely held in position by the flanges of the roller 34, such flanges also serving to properly support the mold during insertion and removal. The rollers 34 are bushed as indicated at 37 and revolve on pins or shafts 38 mounted in a housing 39, the body portion of which is hollow and is adapted to be fitted into an aperture in the tube C. The pins 38 are hollow and lubricant, such as grease, is introduced therein from the exterior of the tube C by means of the pipes 40, the lubricant working into grooves 41 to the working surfaces. A thrust bearing 42 is interposed between the roller and bushing and the lower or shouldered end of the pin 38, such bearing taking the down thrust of the weight of the mold, thus securing easy running of the rollers 34, and extending the life of the parts.

The hollow body portion of the housing 39 is adapted to receive waste 43 or other suitable material, such waste performing the double function of lubricating the rollers and cleaning the surface thereof of drippings from the mold or other dirt that may lodge within the tube.

The waste may be inserted or removed from the exterior by means of the cap 44. It will be seen, therefore, that for both lubricating and cleansing purposes the roller mechanism is accessible from the exterior, which eliminates the necessity of crawling into the tube.

Referring now to Figs. 10 to 14, the construction of the mold will be described. The mold is composed of a plurality of sections *g*, *h*, *i*, etc., the number thereof depending upon the length of pole to be made. Each section is composed of substantially counter-

part halves, each half being cast in a single piece. Each half section comprises a semi-tube 45, tapering toward one end. Extending longitudinally of the section, at the edges of the tubular portion 45 are bolting up flanges 46, such flanges also serving for stiffening purposes. Each half also has two radially disposed, longitudinally extending ribs 47, preferably disposed at an angle of 90° with respect to each other, each of said ribs terminating in a foot portion 48 also extending longitudinally of the mold and having its outer face concentric with the tube portion 45. At intervals throughout the length of the half mold there are transverse strengthening ribs 49 as illustrated in Fig. 13, and at the ends of each half section there are webs 50 by means of which adjacent sections are bolted together as at 51 in Fig. 10. There is a similar web portion 50 in the middle of each section. The bolting up flanges are grooved as indicated in Figs. 12 to 14 so that when a pair of half sections are brought together a mortise shaped groove 52 is formed, such groove extending longitudinally of mold section and providing a space adapted to receive a tongue for forming the holes for the pole steps. This provides a convenient and effective means whereby the tongues may be shifted to secure the desired spacing while at the same time they are securely held in place when the halves are bolted up.

It will be seen that when two of the half molds are brought together, a cross shaped mold results, the feet or legs of which serve as a means for supporting the mold during insertion and removal and also during the revolving of the parts. The construction is strong and rigid, and since the outer faces of the feet 48 are everywhere uniformly distant from the center of the mold, that is to say, of uniform diameter, they fit the tube and I am enabled to eliminate the use of the intermediate steel case heretofore used between the tube and the mold proper, and can directly insert the mold into the tube. It will also be apparent, as previously indicated, that no difficulties will be encountered in connection with the support of the mold in the tube by virtue of the configuration of the mold feet and the rollers 34, this being such as to prevent any accidental displacement or dislodgement of the mold. It will thus be noted that I have reduced the weight of the revolving parts to a minimum.

The foregoing, together with such other objects as may be incident to my invention will be readily understood by those skilled in the art.

What I claim is:

1. In centrifugal pole making apparatus, the combination of a revolving member adapted to receive a mold therein, a roller on the interior of said member, a housing

therefor carried on said member and extending exteriorly thereof, said housing having a cavity adapted to retain waste or the like.

2. In centrifugal pole making apparatus, the combination of a revolving member adapted to receive a mold therein, a roller on the interior of said member, a housing therefor carried on said member and extending exteriorly thereof, said housing having a cavity adapted to retain waste or the like, and a cap closing said cavity.

3. In centrifugal pole making apparatus, the combination of a revolving tube adapted to receive a mold, a roller, a housing therefor adapted to retain waste or the like; and a closure for said housing accessible from the exterior.

4. In centrifugal pole making apparatus, a mold comprising a tapered tubular portion and a plurality of radial positioning ribs the outer edges of which throughout the length of the mold are substantially uniformly distant from the center of the tube.

5. In centrifugal pole making apparatus, a mold comprising a tapered tubular portion and a plurality of radial positioning ribs extending longitudinally thereof the outer edges of which throughout the length of the mold are substantially uniformly dis-

tant from the center of the tube, and transverse or circumferential ribs merging with the radial ribs.

6. In centrifugal pole making apparatus, a mold comprising a tapered tubular portion and radial positioning ribs extending longitudinally thereof the outer ends of which terminate in feet substantially uniformly distant from the center of the tube.

7. In centrifugal pole making apparatus, a mold comprising a tapered tubular portion and radial positioning ribs, extending longitudinally thereof, the outer ends of which terminate in feet substantially uniformly distant from the center of the tube and the outer faces of which are struck from the center of the tube.

8. In centrifugal pole making apparatus, the combination of a revolvable member adapted to receive a mold, and a pair of rollers in said member in the lower portion thereof arranged to the side of the vertical center line thereof, said rollers being flanged and said mold having means fitting between the roller flanges.

In testimony whereof, I have hereunto signed my name.

DAVID B. HANNA.