April 7, 1925. 1,532,407

J. S. HOBSON

CONCRETE MOLDING APPARATUS

Filed Jan. 4, 1924 2 Sheets-Sheet 1

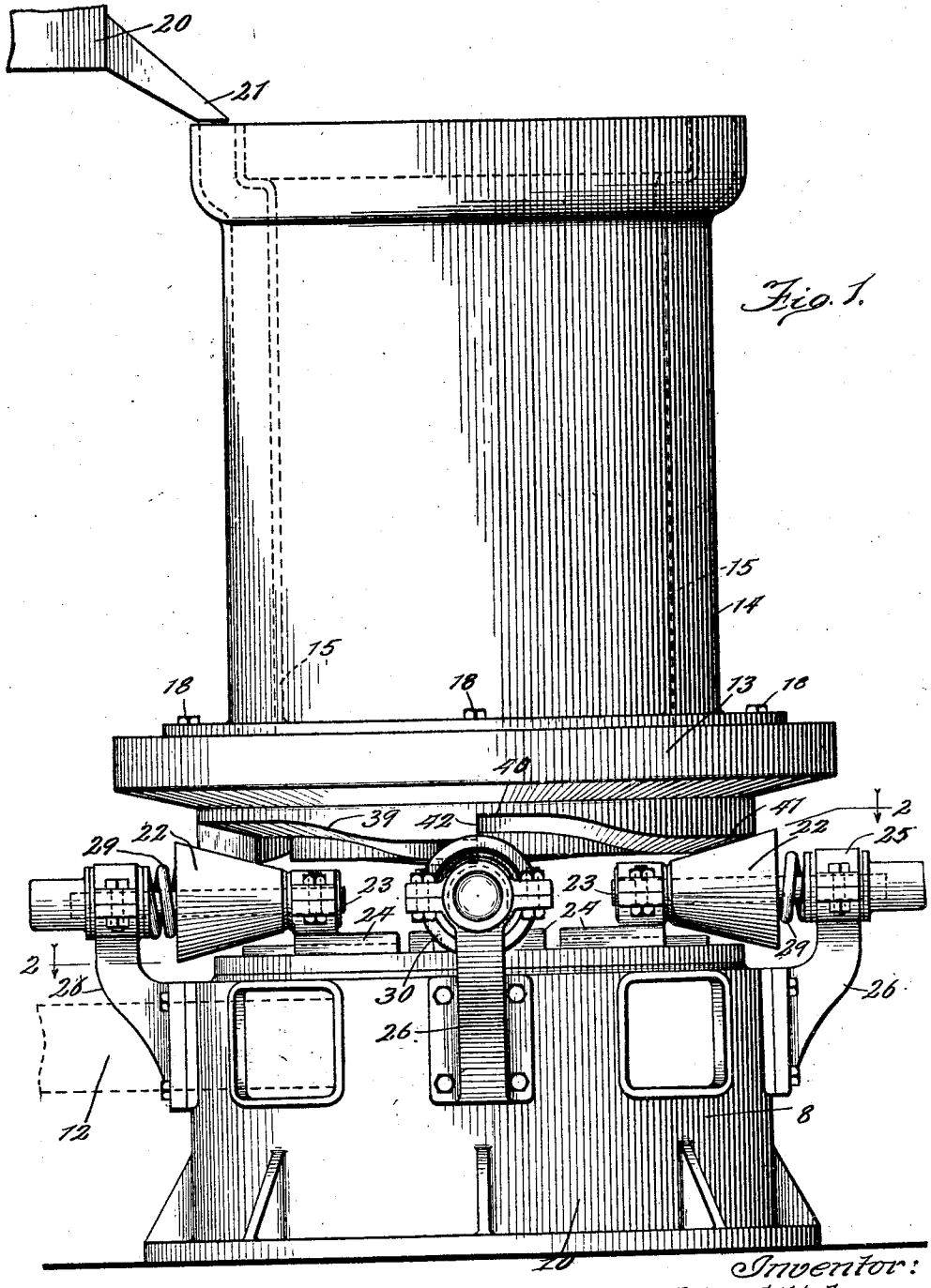

Fig. 1.

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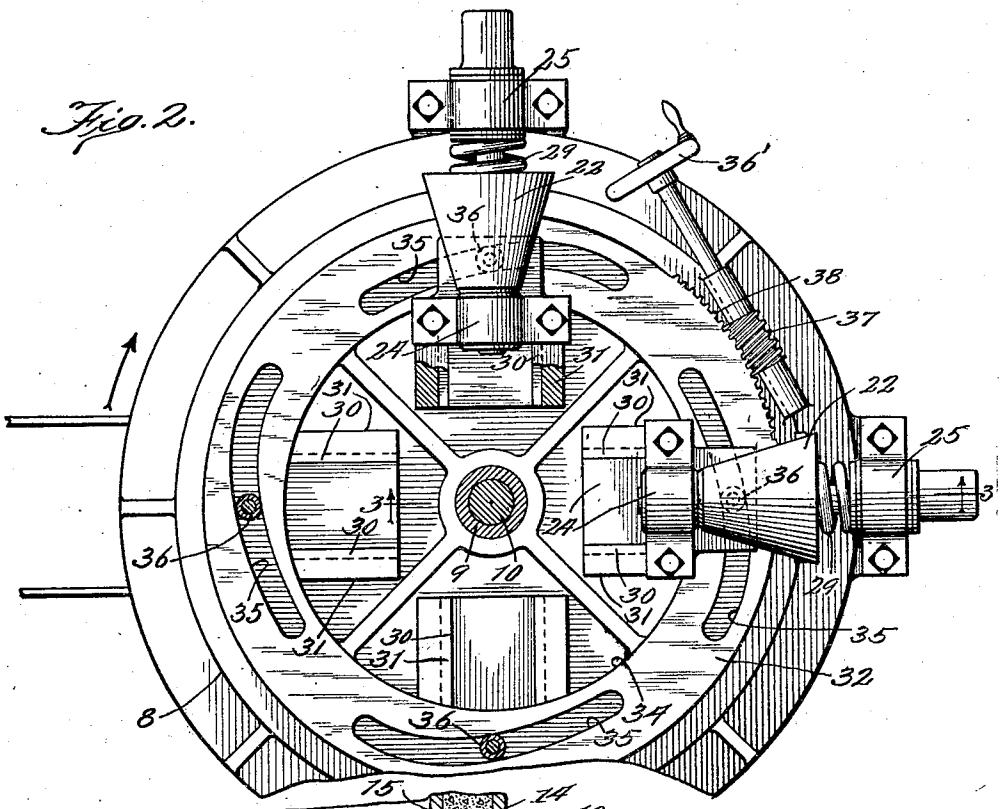
Fig. 2.



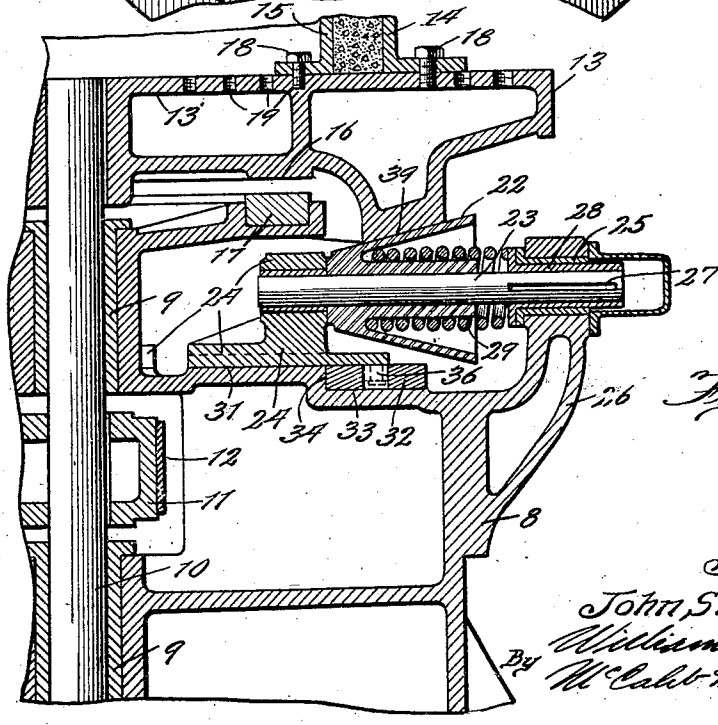


Fig. 3.

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Patented Apr. 7, 1925.

1,532,407

UNITED STATES PATENT OFFICE.

JOHN S. HOBSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO MASSEY CONCRETE PRODUCTS CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF VIRGINIA.

CONCRETE-MOLDING APPARATUS.

Application filed January 4, 1924. Serial No. 684,326.

To all whom it may concern:

Be it known that I, JOHN S. HOBSON, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Concrete-Molding Apparatus, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to concrete molding apparatus and is more especially intended for, although not necessarily restricted to, use in the formation of the larger sizes of concrete pipes. I contemplate a combined centrifugal mold and jolting table whereby the concrete is packed both longitudinally and transversely as the pipe is built up.

Another object of my invention is to provide an apparatus which will cause the plastic concrete within the mold to pack itself before setting by alternately raising and lowering the mold in an abrupt manner to impart a jolting movement to the concrete. This movement, being characterized by a more or less distinct lift and drop rather than a frequent vertical vibration or jiggle, is more properly termed "jolting."

I provide also means whereby the jolting feature may be put on or off at will, so that, for instance, an amount of concrete introduced into the mold may be packed centrifugally at high speed and then jolted down.

A further object of my invention is to provide such a jolting table wherein the force of the fall of the heavy mold is not borne by the raising and lowering means, but by an independent support which is better adapted to receive the shock.

A still further object of my invention is to provide means whereby the amount of rise and fall given the mold may readily be varied, and especially in those constructions wherein it is necessary to adjust a plurality of elements to effect this adjustment, the elements may be adjusted simultaneously.

The other objects and advantages of my invention will best be understood from the following description of a specific embodiment thereof, and from the accompanying drawings therein referred to.

In the drawings,

Figure 1 is an elevation of the device of my invention;

Figure 2 is a plan section thereof taken on the irregular line 2—2 of Figure 1, certain of the rollers and their journals being omitted to reveal the parts therebeneath; and

Figure 3 is a detail longitudinal section taken on the line 3—3 of Figure 2.

Similar characters of reference will be used to refer to similar parts throughout the several views.

An annularly configured base 8 carries at its center a pair of vertically spaced bushings 9, within which is rotatably and reciprocably journalled a shaft 10, which carries a pulley 11 whereby the shaft may be driven by a belt 12. At its upper end the shaft is keyed to a flat topped circular table 13.

A pipe mold is carried on this table, the mold comprising an outer jacket 14 and an inner jacket 15, the upper ends of which are of enlarged diameter to provide the usual pipe joint bell. The bottom of each of the jackets is provided with a flange secured to the table by means of cap screws 18. It will be noted that the table is provided with a plurality of tapped holes 19 at varying radii from the shaft 10, whereby the table may accommodate pipe molds of a plurality of different sizes. As the table is rotated, carrying with it the pipe mold, concrete may be fed into the annular mold from a suitable hopper 20 which need have but a single discharge spout 21. In this way, the concrete is fed into the mold evenly and in uniform layers.

The under-side of the table 13 is provided with an annular bearing surface 16, which is adapted to bear upon a bearing ring 17 carried by the base 8. When thus allowed to rest upon the bearing ring 17, the mold and table may be rotated without any jolting movement. Thus, when an amount of concrete is first fed into the mold, the latter may be spun to pack the concrete transversely under centrifugal force at high speed. This centrifugal action also effects the formation of a desirable fine textured inner surface for the pipe. The jolting mechanism next described is

then put into use, preferably at a lower speed, to pack the newly added concrete vertically in the mold.

A plurality of cone rollers 22 are provided beneath the table 13, each cone being pressed upon a shaft 23. The shafts 23 all lie in the same horizontal plane and are so disposed that their axis form radii from the center shaft 10. The inner end of each shaft 23 is borne in a slidable journal 24, while the outer end is borne in a stationary journal 25 in the end of a bracket 26 rising from the base 8. Each shaft is feathered as at 27 at its outer end to a flanged sleeve 28. Each cone roller 22 is hollowed out from its large end to provide a recess, between the inner end of which and the flange of the sleeve 28 is inserted a heavy compression spring 29, which serves to push the roller inwardly toward the slidable journal 24. Each shaft 23, it will be understood, may be reciprocated longitudinally within its sleeve 28, while the journalling of the outer end of the shaft occurs between the sleeve 28 and the journal 25.

Each slidable journal 24 is dove-tailed by means of overhanging flanges 30 to a radially disposed guideway 31 in the base 8. A ring 32 is disposed beneath the rollers 22 and rests upon an annular track surface 33 provided on the base 8, the ring being held concentric with the center shaft 10 by means of a shoulder 34. The ring 32 is provided with a plurality of cam slots 35, into each of which projects a roller 36 depending from a slidable journal 24. It will be seen from Figure 2 that when the ring 32 is moved clockwise, the slots 35 will co-operate with the rollers 36 to move the cone rollers 22 inwardly toward the center shaft 10, while a counter-clockwise movement of the ring will move the cone rollers outwardly. Such a rotation of the ring 32 may be accomplished by the turning of a hand wheel 36′, which causes its associated worm 37 to progress a rack 38 provided on the periphery of the ring 32.

The under-side of the table 13 is provided, over the cone rollers 22, with an inverted annular track 39, which is divided arcuately into as many cams as there are rollers. Each of these cams comprises a high portion 40 which descends in an easy curve to a low portion 41, followed by a vertical shoulder 42 to give an abrupt drop to the table.

As shown in the drawings, the several parts are so positioned that when the table is rotated clockwise (Figure 2), the low points 41 of the cams will ride up on the rollers 22, thus lifting the table 13 off the bearing ring 17. When the shoulders 42 of the cams are reached, the table will be allowed to drop, but will fall upon the bearing ring 17 and not contact the high points 40 of the cams. In this way, the jar of the fall does not come upon the cone rollers 22, nor upon their shafts or journals, but are carried directly upon the base through the bearing ring 17. It is obvious that this bearing ring is much better adapted to receive such a shock, and that the more easily worn elements of the raising and lowering mechanism will have longer life by being relieved of these continual shocks.

It will be noted that the faces of the cam track 39 are conically inclined to mate the conical surfaces of the cone rollers 22, as is clearly shown in Figure 3. It will thus be understood that when the cam ring 32 is rotated to move the several rollers 22 inwardly, they will elevate the table to a greater height when the low points 41 ride up on the rollers, and hence a longer drop will be provided for the table before it hits the bearing ring 17. Conversely, the ring 32 may be turned to move the several cone rollers 22 outwardly until the drop is reduced to a minimum or, if desired, can be moved outwardly still further, so that there will be no drop, the table at all times sliding upon the bearing ring 17 in its rotation, while the cams do not ride onto the rollers at any point.

While the force of the compression springs 29 is not sufficient to push the rollers inwardly, and thus elevate the table while the table is raised upon the rollers, it will be apparent that as soon as the high points 40 of the cam come over the rollers, the rollers will be free from a load and the springs may then push them inwardly against their respective slidable journals 24.

Although in showing this specific embodiment of my invention, I have been able to show only one specific construction of the device of my invention, it is to be understood, of course, that many changes and departures may be made from the apparatus here shown without departing from the scope or spirit of my invention.

I claim:

1. A concrete molding apparatus comprising a vertically mounted centrifugal mold, vertical jolting mechanism therefor, and means for adjusting the degree of jolting movement secured by said mechanism.

2. A concrete molding apparatus comprising a vertically mounted centrifugal mold, a jolting mechanism therefor, and means for bringing said mechanism into and out of function with said mold to permit rotation of said mold with or without jolting,

3. A concrete molding apparatus comprising a frame, a mold mounted vertically thereon, a smooth support for said mold upon said frame, means for rotating said mold on said support, a jolting mechanism operable by rotation of said mold for lifting said mold and dropping it on said track

at intervals, and means for bringing said mechanism into and out of cooperation with said mold whereby said mold may be rotated with or without the jolting imparted thereto by said mechanism.

4. The combination of a pipe mold, a table therefor, a base, a vertically disposed shaft reciprocably journalled in said base, means for rotating said shaft, and means for vertically reciprocating said shaft, said last-mentioned means comprising a plurality of conical rollers on said base having their axes disposed radially of said shaft, and a plurality of interrupted cams on said table for alternately lifting and dropping said table in its rotation.

5. The combination of a mold for concrete, a base for said mold, means for rotating said mold on said base, said mold being vertically reciprocable with reference to said base, a cam carried by said mold, a roller on said base for cooperating with said cam in the rotation of said mold to elevate and drop said mold for the purpose of causing said concrete to tamp itself in said mold, and adjustable means for shifting said roller.

6. The combination of a mold for concrete mounted to rotate about a vertical axis, a plurality of rollers for carrying said mold, said mold being provided with cammed surfaces for cooperating with said rollers, said cammed surfaces being formed gradually to raise and abruptly to lower said mold to cause the concrete in said mold to pack itself, and independent means to receive the impact of said mold when it is lowered.

7. The combination of a vertically reciprocable mold for concrete, a base for said mold, and cooperating cam means on said base and said mold alternately to elevate and drop said mold for causing the concrete in said mold to pack itself, said cam means comprising a plurality of conical rollers and a radially sloped cam track for said rollers.

8. The combination of a reciprocable mold for concrete, a support, jolting mechanism between said mold and said support comprising a plurality of conical rollers and a cooperating cam surface, and spring means pressing said conical rollers against said cam surface.

9. The combination of a vertically reciprocable mold for concrete, means for rotating said mold to pack the concrete centrifugally, means for alternately raising and dropping said mold for allowing the concrete in said mold to pack itself by gravity, and means to vary the amount of said drop.

10. The combination of a mold for concrete, jolting mechanism therefor comprising a roller and a cooperating cam surface, supporting means for said roller permitting translational motion thereof, and spring means urging said roller in one direction.

11. The combination of a mold for concrete, a base member for supporting said mold, said mold being supported by a plurality of radially journalled conical rollers, annular conically faced cams cooperating with said rollers to raise and drop said form, and means for moving said rollers in and out to vary the amount of said drop.

12. The combination of a mold for concrete, a base member for supporting said mold, said mold being supported by a plurality of radially journalled conical rollers, annular conically faced cams cooperating with said rollers to raise and drop said form, and means for moving said rollers in and out to vary the amount of said drop, said means comprising members for radially reciprocating said rollers, a ring movable concentrically with the radiation of said rollers, cam means between said ring and said members for reciprocating said rollers when said ring is rotated, and means to rotate said ring.

13. A jiggling table for a concrete mold, comprising in combination with said table means for rotating said table about a vertical axis, a base, a plurality of conical rollers disposed radially of said axis, a plurality of cams carried by said table and cooperating with said rollers to raise and lower said table during the rotation of the latter, radially slidable journals for said rollers, and a cam ring rotatable about said axis for sliding said journals to vary the raising and lowering of said table.

14. The combination of a mold for concrete, a base member for supporting said mold, said mold being supported by a plurality of radially journalled conical rollers, annular conically faced cams co-operating with said rollers to raise and drop said form, and means for moving said rollers in and out to vary the amount of said drop down to a zero amount.

15. A jiggling table for a concrete mold, comprising in combination with said table means for rotating said table about a vertical axis, a base, a plurality of conical rollers disposed radially of said axis, a plurality of cams carried by said table and cooperating with said rollers to raise and lower said table during the rotation of the latter, radially slidable journals for said rollers, and a cam ring rotatable about said axis for sliding said journals to vary to the point of elimination, the rise and lowering of said table.

16. The herein described method of making concrete pipes which comprises as one step rotating the mold at a relatively high speed and without endwise reciprocation to pack the concrete centrifugally, and as a separate step causing endwise reciprocation of the mold to pack the concrete longitudinally.

17. The method of making concrete pipes

which consists in pouring an amount of plastic concrete into a mold, rotating said mold at a high speed centrifugally to pack said concrete transversely and jolting said mold to pack the concrete longitudinally.

18. The method of building up a concrete pipe which consists in pouring successive amounts of plastic concrete into a mold, spinning said mold without vertical jolting to pack each such amount by centrifugal force, and subsequently jolting the mold to pack such successive amounts longitudinally.

19. A vertically journalled jiggling table for a mold for concrete comprising a base, said table and base having co-operating rollers and cams, and a non-cammed bearing surface for said table on said base, said cams alternately raising said table from and then dropping it upon said surface in the rotation of said table.

20. A vertically reciprocable jiggling table for a mold for concrete pipes, comprising an annularly smooth bearing surface on said base for supporting said table, and co-operating means between said base and said table operated by relative rotation therebetween for alternately lifting said table from, and then dropping said table upon, said bearing surface.

21. The combination of a support, a table journalled on said support for rotation, a mold on said table comprising inner and outer jackets, flanges on the lower ends of said jackets, fastening means for securing said flanges to the table, said table having different series of holes at different spacings for receiving said fastening means when different sizes of molds are employed, and means for imparting endwise reciprocation to said table.

In witness whereof, I hereunto subscribe my name this 22 day of December, 1923.

JOHN S. HOBSON.

Witnesses:
B. X. FORDSON,
D. B. HANNA.