Nov. 26, 1940. W. R. HUME 2,222,889

CENTRIFUGAL PIPE MOLDING MACHINE

Filed June 20, 1938

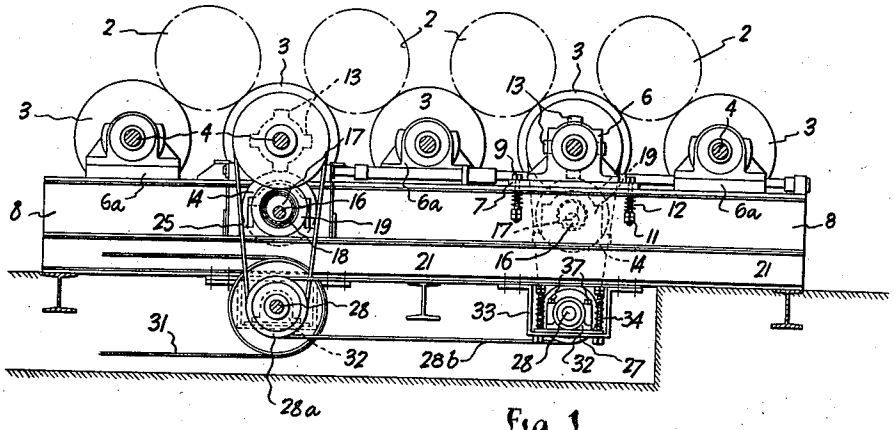

Fig. 1.

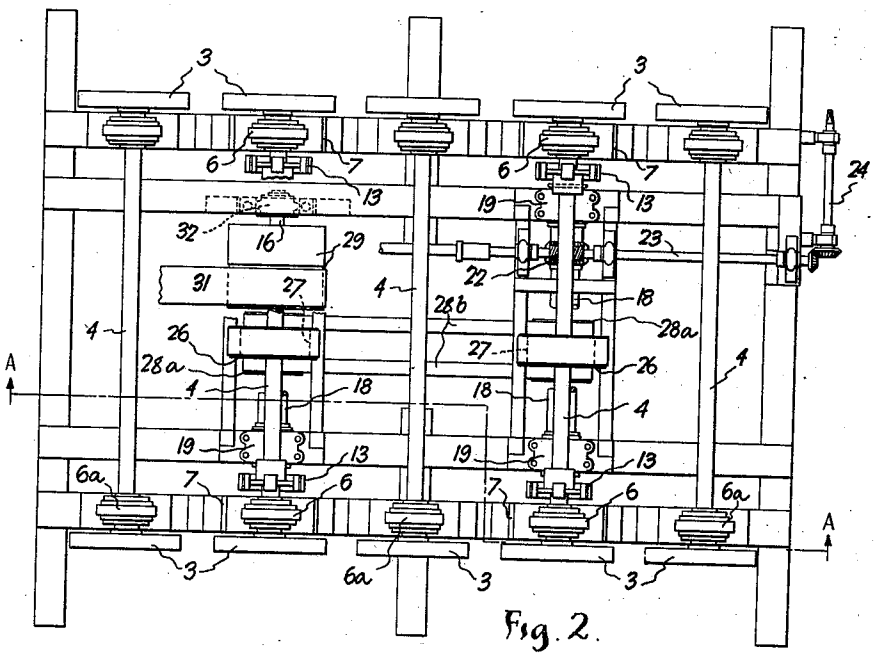

Fig. 2.

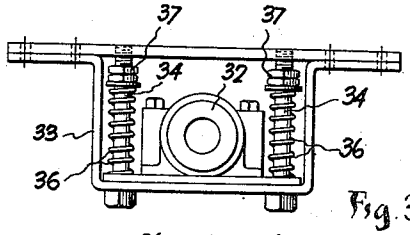

Fig. 3.

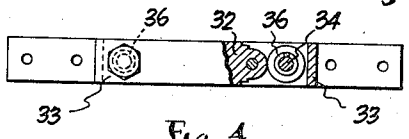

Fig. 4.

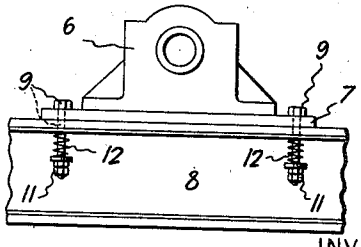

Fig. 5.

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CENTRIFUGAL PIPE MOLDING MACHINE

Walter Reginald Hume, Melbourne, Victoria, Australia

Application June 20, 1938, Serial No. 214,820
In Great Britain June 30, 1937

5 Claims. (Cl. 25—30)

This invention relates to apparatus, as disclosed in United States Patent No. 2,023,381 for the centrifugal molding of concrete articles or the centrifugal lining of articles such as pipes with concrete by rotating a mold about a horizontal axis, and at the same time subjecting it to a jolting and concussional action by projecting it upwardly from its supports and allowing it to return abruptly and forcibly. According to the said prior patent, a mold is supported and rotated by frictional contact with runner wheels while a vertically displaceable jolting device associated with the runner wheels or some of them is brought into action in order to periodically project the rotating mold upwards and allow it to return by gravity. The said jolting device also returns by gravity onto a rigid framework. It has been found that there is sometimes a tendency for the mold to return into contact with the runner wheels before the jolting device returns into contact with the rigid foundation, and as a result, the maximum concussional and jolting action may not be obtained.

According to a feature of the present invention, provision is made for returning the jolting means into effective contact with the foundation before the mold descends gravitationally into contact with its supporting and rotating means in order that the maximum jolting and concussional effect may be obtained.

According to a further feature of the invention for application in cases where the jolting device comprises jolting wheels carried by a shaft supported by vertically displaceable bearings, as disclosed in the aforesaid specification, means are provided for driving the jolting wheels directly, as for example by means of a belt drive, a flexible shaft or the equivalent. Such direct drive avoids any tendency which may otherwise be present for the jolting wheels to lose speed on account of the jolting action.

But in order that this invention may be better understood, reference will now be made to the accompanying drawing, which is to be taken as part of this specification and read herewith:

Figure 1 is a part sectional side elevation of a machine in accordance with the invention, taken on the line A—A of Figure 2.

Figure 2 is a plan of Figure 1.

Figure 3 is an enlarged side view of one of the spring influenced bearings of a lower driving shaft.

Figure 4 is an inverted plan of Figure 3, parts being broken away for convenience of illustration.

Figure 5 is an enlarged side view of one of the spring influenced bearings of an upper driven shaft which carries the jolting wheels or cams.

In one form of the invention, one or more cylindrical molds 2 may rest upon rotary supports such as the runner wheels 3 which are mounted on shafts 4, the axes of which are parallel to the axis of the mold or molds 2, the molds being supported and frictionally driven by said runner wheels, as described in the aforesaid prior specification.

Means are provided for imparting a concussional or jolting motion to the mold or molds through one or more of the rotary supports. Thus, one or more of the shafts 4 carrying the rotary supports may be mounted in bearings 6 which are capable of limited vertical reciprocation. Such a bearing may be provided with a bottom plate 7 which can rest flat on a fixed frame member 8 and may be connected to the said member by means of bolts or guide rods 9 extending at right angles to the plate and sufficiently long to permit of the bearing being lifted up from its stationary support. These bolts may be provided on each side of the bearing as shown and their effective length may be adjustable by means of suitable nuts 11 if desired provided with locking nuts or other locking devices. Suitable springs 12 may be provided, for example, compression springs arranged round the bolts 9 and tending to hold the bearing 6 down on its support.

The shaft or shafts 4 which are thus mounted in the vertically reciprocable bearings 6, may carry coaxial therewith a pair of jolting wheels or cams 13 similar to the jolting wheels described in the aforesaid prior specification. These jolting wheels or cams co-operate with idler friction wheels or rollers 14 mounted below the jolting wheels on shafts 16, which are adjustable vertically towards or away from the jolting wheels 13, for example by being mounted in eccentric bearings 17 which may be fixed within tubular housings or sleeves 18 adapted to be turned in fixed supports or bearing blocks 19 on the frame members 21 by means of worm gear 22 as described in the said prior specification. This worm gear may be manually operated through a shaft 23 geared to another shaft 24 to which a crank handle or the like may be applied.

The shafts 4 which are not fitted with the jolting wheels or cams 13, may be mounted in fixed bearings 6a on the frame member 8.

The shafts 4 which carry the jolting wheels or cams 13 are preferably driven directly or positively, i. e. driven independently of any frictional driving through the pipe molds 2. Such positive driving means may comprise endless driving belts or the like 25 passing around pulleys 26 on the shafts 4 which carry the jolting wheels 13, and also around pulleys 27 on lower driving shafts 28 which are mounted beneath the frame members 21 and are fitted with pulleys 28a connected by belts 28b. One of the shafts 28 may be fitted with fast and loose driving pulleys 29 for engaging

a belt 31 whereby the drive may be transmitted to the machine from a suitable source of power.

The lower driving shafts 28 are mounted in bearings 32 which may be supported in brackets 33 on the frame members 21. Within these brackets the bearings 32 are capable of limited vertical reciprocation on bolts or guide rods 34 which are fitted with springs 36 and adjusting nuts 37 for adjusting the compression of the springs.

It will thus be evident that the lower driving shafts 28 may vertically reciprocate or rise and fall bodily with the shafts 4 carrying the jolting wheels 13 and with the driving connections, such as the endless belts 25, when the friction wheels or rollers 14 are brought into engagement with the jolting wheels 13.

Alternatively, the jolting wheels may be driven through the medium of flexible shafts or other suitable means which may include, for example, splined shafts or gears of suitable width which will permit of the jolting wheels being driven during their vertical reciprocation or up-and-down movement.

With the foregoing construction it may be ensured that the bearings 6 of the shafts carrying the vertically movable rotary supports or runner wheels 3 will be positively urged on to their fixed support or foundation and will reach that position while the mold is still falling. Without the springs the mold and its rotary supports might simply fall together whereby the concussional or jolting action might be reduced. Moreover, it is found that when such vertically movable rotary supports act on two molds as shown there is sometimes a tendency for the mold at one side of the rotary support or runner wheel to be bumped or jolted more than that at the other side thereof. When using springs as above set forth it is found that by adjusting the bolts on one side of the respective bearing relatively to those on the other the bumping or jolting effect on the two molds can be equalised or more nearly equalised.

It will be understood that whilst I have described one embodiment of my invention, various modifications may be made without departing from the scope thereof. Thus, for example, instead of employing compression springs, tension springs may be employed, or leaf springs or other forms of springs. Moreover, the jolting wheel or wheels need not be fitted to the shafts carrying the rotary supports 3 but could act on them from below, or the rotary supports might, in some cases, be dispensed with and the jolting wheels might be carried by the molds themselves or a part attached thereto or might act directly thereon in which case springs might be associated with bearings for the molds.

The term "molding" as employed in the foregoing description and in the appended claims is intended to include the lining of pipes as well as the manufacture of pipes and, similarly, the term "mold" is intended to cover a pipe to be lined.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. Apparatus for the molding of concrete pipes and like bodies by the combined actions of centrifugal force and jolting, comprising in combination a rigid foundation, means for supporting and rotating a pipe mold about a substantially horizontal axis above said foundation, jolting means movable substantially vertically in relation to said foundation in order to jolt the rotating mold by projecting it upwards from its supporting and rotating means and allowing it to return by gravity, and means for returning said jolting means into effective contact with said foundation before the mold descends gravitationally into contact with said supporting and rotating means in order to obtain the maximum jolting or concussional effect.

2. Apparatus for the molding of concrete pipes and like bodies by the combined actions of centrifugal force and jolting, comprising a rigid foundation, bearings fixed to said foundation, a shaft supported in said bearings, to extend horizontally, other bearings retained to said foundation with ability to rise and fall in relation thereto, a shaft supported in said other or vertically displaceable bearings to extend horizontally and parallel with said first mentioned shaft, wheels mounted upon said shafts in order to support and rotate by frictional contact a pipe mold, means for abruptly raising said displaceable bearings and the associated shaft with its wheels to thereby project the rotating mold upwardly from said wheels, and means for returning said displaceable bearings, with the parts supported thereby, into direct contact with said foundation before the mold descends gravitationally into contact with said wheels in order to obtain the maximum jolting or concussional effect.

3. Apparatus according to claim 2 and comprising bolts projecting from said foundation to guide said displaceable bearings, springs associated with said bolts in order to ensure relatively quick return of the vertically displaced bearings into contact with the foundation, and means for adjusting the pressure of said springs.

4. Apparatus according to claim 1 wherein the mold is mounted upon and frictionally driven by contact with runner wheels which are carried by a shaft mounted in bearings which are adapted for vertical reciprocation or displacement in relation to a fixed frame or foundation, said shaft being positively driven through an endless driving belt or the like from a parallel shaft which is also mounted in bearings vertically displaceable in relation to said frame, the jolting means vertically reciprocating or jolting said runner wheels and said shafts, and springs are provided to resist upward movement of said shafts and their bearings, and having means for adjustment.

5. Apparatus for the centrifugal molding of concrete pipes and the like comprising in combination, a fixed frame or foundation, upper and lower bearings mounted for vertical displacement or reciprocation in relation thereto, runner wheels mounted upon an upper shaft carried in said upper bearings, jolting wheels carried by said shaft, idle rollers adapted to be engaged with and disengaged from said jolting wheels whereby said runner wheels may be vertically reciprocated or permitted to rotate without such vertical movement, a second shaft mounted in said lower bearings, means for positively driving said upper shaft from said lower shaft and adjustable springs adapted to resist upward movement of said shafts and bearings.

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