Aug. 31, 1937. W. W. TRICKEY 2,091,385

APPARATUS FOR FORMING CONCRETE PIPE

Filed Dec. 20, 1934

Fig. 1

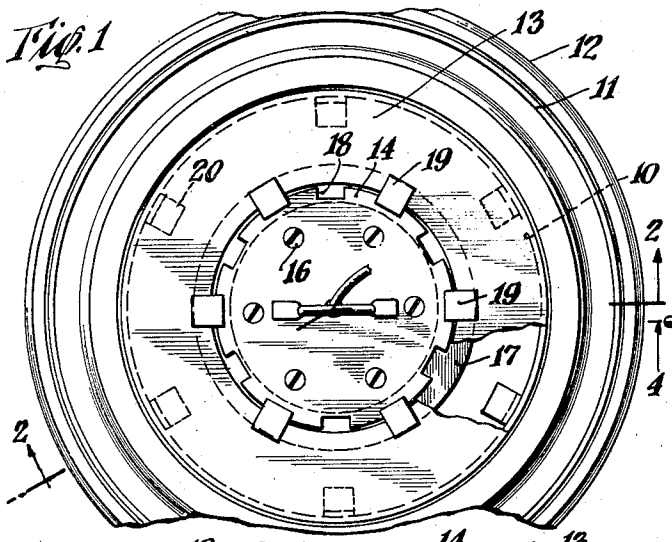


Fig. 3

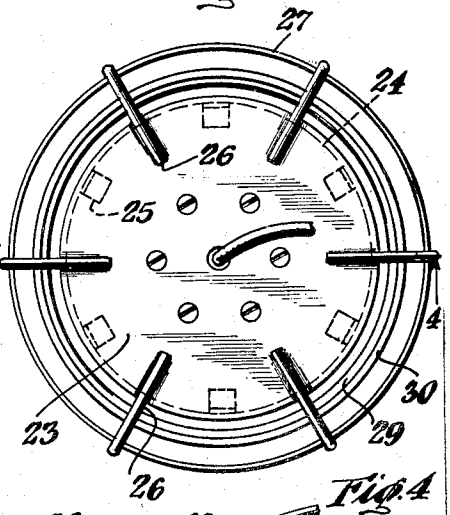


Fig. 2

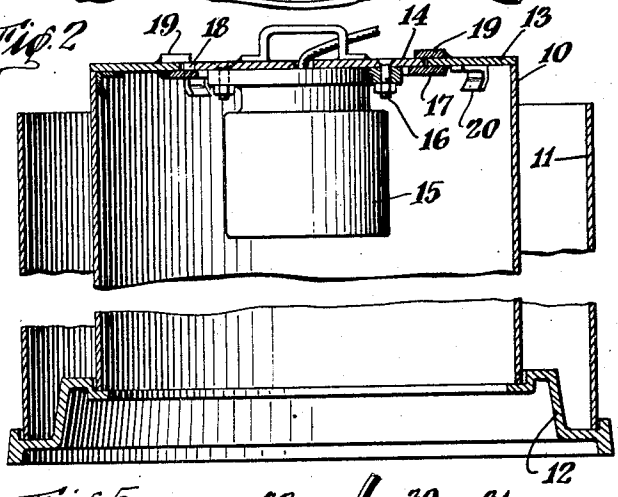


Fig. 4

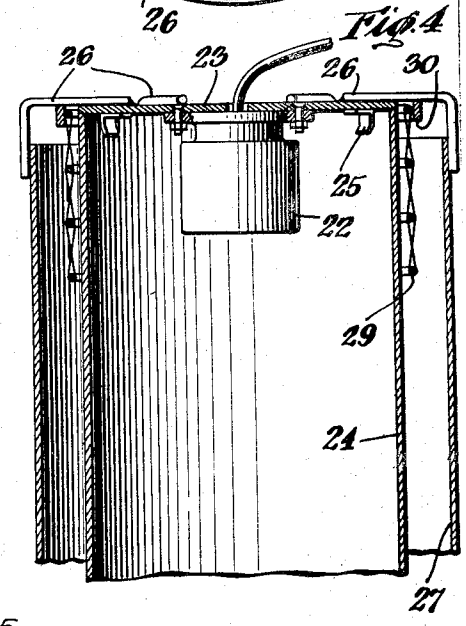
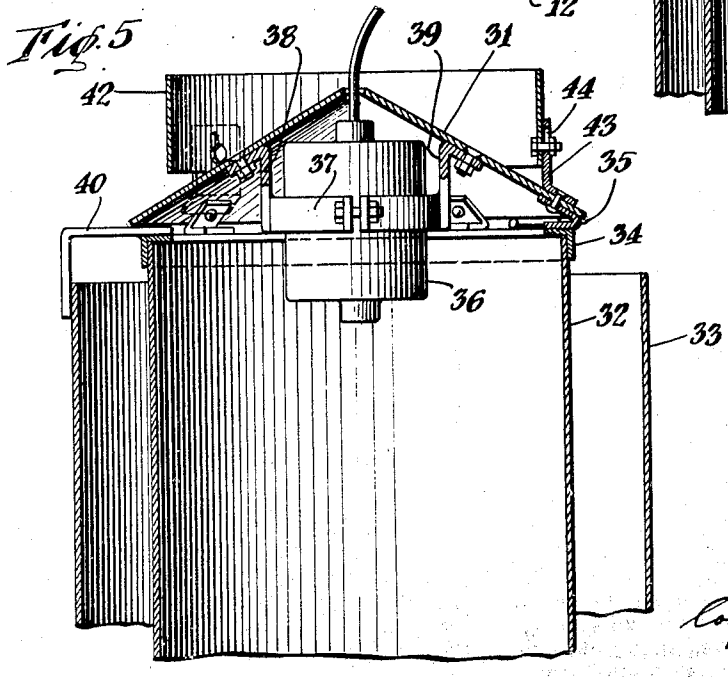


Fig. 5



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APPARATUS FOR FORMING CONCRETE PIPE

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Application December 20, 1934, Serial No. 758,373

2 Claims. (Cl. 25—30)

This invention relates to a method and apparatus for forming and placing concrete. It is among the objects of the invention to produce concrete having uniform characteristics throughout different portions thereof which should possess the same strength and have other uniform physical characteristics.

Another object of the invention is to provide a simple form of apparatus for applying vibration to concrete so that relatively unskilled labor may be employed for mounting the apparatus in place upon a mold and for using the same without incurring the risk of obtaining unsatisfactory results, and at a saving in time and cost.

Another object of the invention is to provide apparatus for obtaining uniform distribution of concrete in all parts of a pipe mold.

Another object of the invention is to provide apparatus whereby the flow of concrete into a pipe mold may be regulated.

Other objects of the invention are to improve concrete pipe by providing apparatus enabling direct vibration of the inside mold wall and of the outside mold wall and of the pipe reinforcing, each alone or in any combination, as desired.

Other objects and advantages of the invention will appear from a detailed description of the same which consists in features of construction and methods pertaining thereto as hereinafter described and claimed.

In accordance with the method of my invention, I apply vibration to a mold into which concrete is being introduced in such a manner that all portions of the mold which are in the same relation in reference to a given point, say, for example, the axis of symmetry of the mold, are vibrated at the same frequency and with equal intensity so that uniform characteristics are obtainable in portions of the formed concrete which have common structural uses. For explaining what I now consider to be the best mode of applying the principle of my invention I have illustrated apparatus by which the principle may be utilized for casting concrete pipe, either reinforced or otherwise, and which is susceptible to modification for meeting limitations as to materials attaching to any particular job and for accomplishing desired results. In casting a concrete pipe, the vibrator is preferably located substantially at the axis of the pipe and vibration is transmitted directly to the sides of the mold so that all portions of the mold and of the formed concrete which are located at the same distance from the vibrator are affected by the same amplitude and force of the vibratory action, with the result that all portions of the circumferential wall of the pipe are given the same physical characteristics. While I have illustrated different forms of apparatus for applying my invention for the forming or molding of concrete pipe, the same principles may be employed for placing concrete in the forming of piles, footings and other concrete structures.

In the drawing, Fig. 1 is a plan of the apparatus in position of use upon a mold for concrete pipe.

Fig. 2 is a vertical section on line 2—2 of Fig. 1.

Fig. 3 is a plan of a modified form of apparatus.

Fig. 4 is a vertical section on line 4—4 of Fig. 3.

Fig. 5 is a vertical section of still another modified form of the apparatus.

Referring to Figs. 1 and 2, the inner shell 10 and the outer shell 11 constitute mold walls and stand vertically upon a base 12 which closes the lower end of the annular space between the two shells. Mounted upon the upper end of the inner shell 10 there is a cover or platform made up of a ring plate 13 and a central plate 14. Preferably, the ring plate is sufficiently large to rest upon the upper end of the inner shell. A vibrator 15 is fastened to the plate 14 by means of bolts 16. This vibrator, which may be of any well-known construction, has an unbalanced weight which is driven at relatively high speeds by a suitable motor. The choice of motor is, of course, dependable upon the source of power available, such as air and electricity, and upon the work to be done. The plate 14 is shown as resting upon a ring 17 which is welded to, or otherwise associated with, the bottom side of ring plate 13. Notches 18 are provided in the periphery of plate 14 so that the plate may be rotated on a vertical axis and removed from its position of use in association with ring plate 13 when the notches 18 are brought into registry with the lugs 19 of the ring plate. This, or any other suitable arrangement, is for the purpose of facilitating removal of the vibrator from the cover and other portions of the apparatus.

Angle brackets 20 are secured to the bottom of ring plate 13 in such a manner as to permit their contact with the interior surface of the inner shell 10. The vibrations which are set up by the vibrator are transmitted directly to the inner shell through the cover and the angle brackets.

As an alternative arrangement the vibrator may be directly attached to the cover and this may be done in the manner illustrated in Figs. 3 and 4, in which the vibrator 22 is bolted directly

to the bottom surface of a cover consisting of a single plate 23. This plate rests upon the upper end of the inner shell 24 of the pipe mold, and brackets 25 are provided for centering the cover and for transmitting the vibration of the cover directly to the inner shell. Attached to the cover 23 there are a number of arms 26 by which vibration of the cover may be transmitted directly to the outer shell 27 of the mold form. These arms are welded or otherwise secured to the cover and their outer ends are so positioned as to bear upon or come into contact with the outer surface of the outer shell when the vibrator is in operation.

In Figs. 3 and 4, I have also illustrated a manner by which the reinforcing 29 within the pipe wall may be vibrated. While arms 26, or like members, may be made to contact directly with the reinforcing, I have provided a ring 30, which is welded or otherwise secured to arms 26, and bears upon the reinforcing in such a manner that the radial vibrations transmitted through the cover are transmitted to the reinforcing in radial directions.

In Fig. 5 I have shown still another manner of applying my invention. In the apparatus there illustrated, the cover 31 is shaped like a cone so that concrete which is deposited thereon will be directed or guided into the space between inner shell 32 and outer shell 33 of the mold. The cover is secured to an annular frame or ring 34 by members such as brackets 35. The ring 34 may be formed of angle iron having a horizontally disposed flange resting upon the upper end of the inner shell and the depending flange just outside of the inner shell so that it forms a rigid frame for carrying the cover and vibrator. The vibrator 36 is detachably secured to the cover 31 by means of a supporting or clamping ring 37 which is split and depends from brackets 38, 39, carried by the cover.

As in the case of the apparatus illustrated in Figs. 3 and 4, arms 40 may be provided for transmitting vibration to the outer shell, to the pipe reinforcing, or to both the outer shell and the reinforcing, as desired, and for this purpose they may be attached to the cover, or to frame 34 as shown.

A collar 42 is mounted above cover 31 so as to provide means for controlling the rate of flow of the concrete to all parts of the mold. An advantage of this is that the collar results in obtaining substantially uniform distribution of concrete to all parts of the mold. The collar is mounted upon a number of brackets 43 which, in conjunction with the collar, are provided with pin and slot connections 44 for enabling adjustment of the height of the collar above the cover and the regulation of the flow of concrete into the pipe mold.

I have disclosed the invention in its particular application to the manufacture of concrete pipe, but it is apparent that it has other applications to the placing of concrete and that it may be applied to other molds desired to be vibrated under uniform vibratory conditions. While the forms of the apparatus shown and described are adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to any feature or combination of features of construction herein disclosed for the same may be utilized in different combinations and in various forms all coming within the scope of the claims which follow.

What is claimed is:—

1. Apparatus for forming concrete pipe comprising a mold having inner and outer shells standing on end, the space between said shells being open at the upper ends of the shells and closed at the lower ends of the shells, a cover supported above the central portion of the mold and carried by the upper end of at least one of said shells, said cover having its edge extending to the mold cavity between the shells, a vibrator carried by said cover, a baffle wall in the form of a collar extending upwardly from said cover so as to form a hopper above the central portion of the cover, and means for adjusting the height of said collar above the cover to enable variation in the spaced relation of the bottom edge of the collar in respect to the cover so that the rate of flow of fresh concrete from the hopper thus formed above the cover can be regulated throughout the open area of the mold cavity.

2. Apparatus for forming concrete pipe comprising a mold having inner and outer shells standing on end, the space between said shells being open at the upper ends of the shells and closed at the lower ends of the shells, a cover supported above the central portion of the mold and carried by the upper end of at least one of said shells, said cover being conic-shaped with its apex extending upwardly and its outer edge overlapping the inner wall of the mold, and a baffle wall mounted upon said cover within its outer edge and with its bottom edge disposed above the sloping surface of the cover a distance which leaves a space between the baffle wall and the cover of less area than the area of the open end of the mold between its inner and outer walls to enable substantially uniform distribution of concrete to all parts of the mold from a mass of fresh concrete contained upon the cover and by said baffle wall.

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