May 23, 1944. W. W. TRICKEY 2,349,476

APPARATUS FOR CHARGING CONCRETE MOLDS

Filed Feb. 26, 1941

Fig. 1

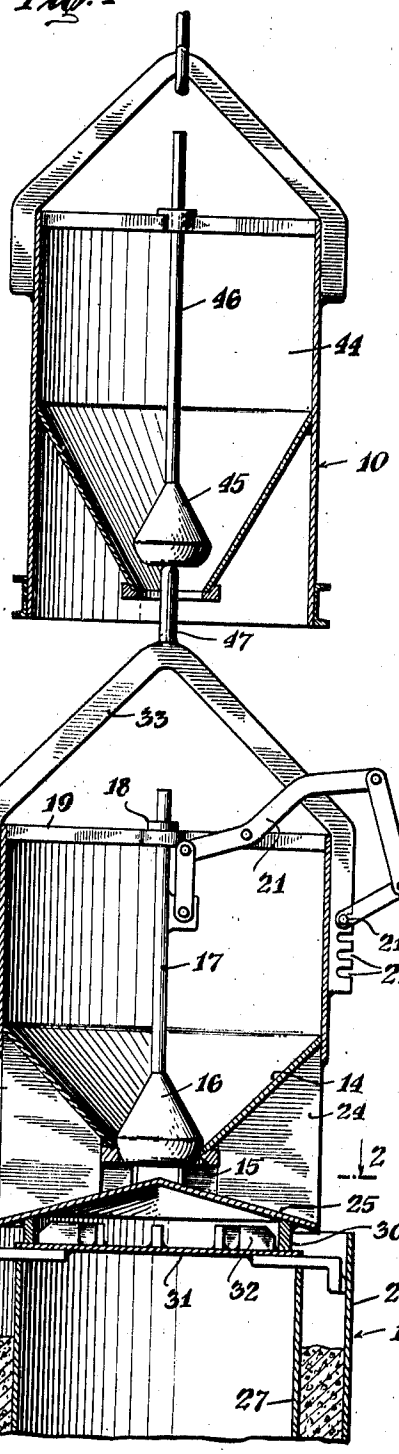


Fig. 2

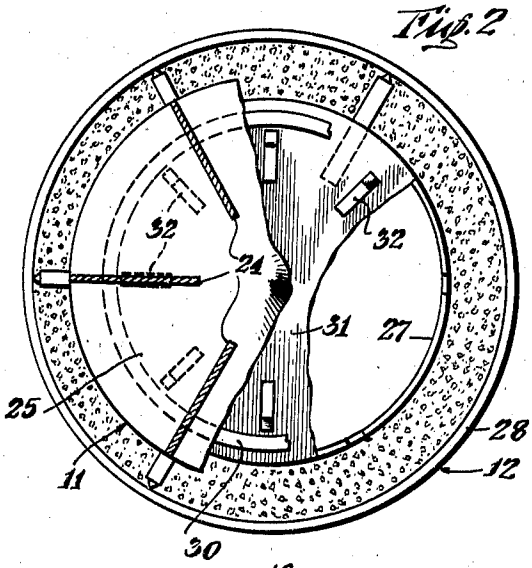
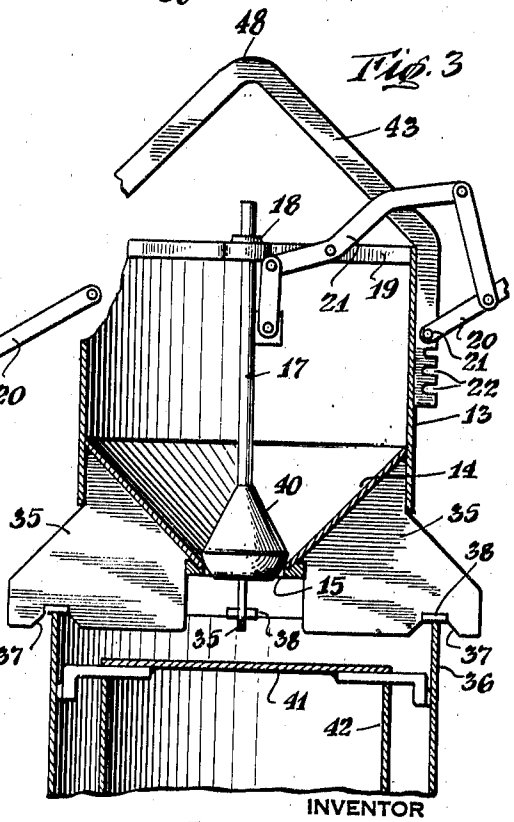


Fig. 3



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APPARATUS FOR CHARGING CONCRETE MOLDS

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This invention relates to apparatus for transporting concrete and charging a mold therewith, and more particularly to the charging of molds with concrete by the employment of cranes or other bucket-carrying apparatus to transport concrete to the molds. It has been a common practice to carry concrete to a mold by the use of a bucket suspended from a travelling crane, derrick or other carrying apparatus, and to use such apparatus for emptying the bucket and dumping the concrete directly into a mold. With improvements in technique of placing concrete, the use of vibration and machine-operated tampers, it became necessary to slow up on the pouring rate. Owing to this much crane time was lost holding a loaded bucket suspended over a mold until its contents had been poured. The method and apparatus of the present invention attain the object of extending the amount of use of a crane and transporting bucket by making them available for a greater number of trips between the concrete mixer and molds and thereby avoiding loss of time which would otherwise result from holding a bucket over a mold until it is emptied.

Another object of the invention is to provide an auxiliary or charging bucket for enabling regulation of mold charging operations at the will of a mold attendant and independently of the apparatus by which the concrete is conveyed from the mixture to the mold.

Another object of the invention is to provide a charging bucket which may be applied to a mold and remain associated therewith for receiving successive quantities of concrete in bulk and for making the concrete received thereby continuously available beyond its own capacity.

Another object of the invention is to provide devices whereby a concrete transporting bucket will automatically discharge its contents into a stationary charging bucket as the transporting bucket is lowered and brought into discharging relationship with the charging bucket.

Other objects of the present invention will be hereinafter set forth in the accompanying specification and claims and demonstrated by the drawing which show by way of illustration preferred embodiments and the principle of my invention and what is now considered the best mode for applying that principle. Other embodiments of the invention employing the same principles may be used and structural changes made as desired by those skilled in the art within the spirit of the appended claims and without departing from the present invention.

In the drawing,

Fig. 1 shows a vertical section through a pipe mold, charging bucket and transporting bucket, associated together and illustrating the automatic dumping of the transporting bucket.

Fig. 2 is a section through line 2—2 of Fig. 1, illustrating details of the charging bucket.

Fig. 3 is a sectional elevation of a modified form of charging bucket particularly suitable for pouring concrete into molds for smaller pipe.

Employment of the apparatus of this invention results in great improvement in the quality of concrete and in manufacturing economy. This is effected by enabling the concrete to be available above a mold for pouring into the mold at such a regulated rate as is desired for the best results in the quality of concrete. Meanwhile the transporting apparatus and bucket can be maintained in continuous use for keeping other charging buckets supplied with concrete. In Fig. 1 I have shown a transporting bucket 10 immediately above a charging bucket 11 which is supported upon a pipe mold 12.

The charging bucket illustrated has a cylindrical body portion 13 and a conical bottom 14 with a valve opening at its center which is provided with a valve seat 15. A ball valve 16 is fashioned to engage the valve seat 15 and close the valve opening. Stem 17 is attached to the ball valve and its upper end is guided in a bushing 18 at the center of a bracket 19.

The valve may be operated by manually operable lever 20 having a link and lever connection 21 with the valve stem. As illustrated in the drawing, the fulcrumed end of the lever 20 may be provided with a fulcrum pin 21 adapted to engage any one of several notches 22 in a bracket which is attached to the outer wall of the bucket. These various notches provide for adjustability of the position of the fulcrum, and hence of the mechanical advantage of the lever operating means.

The charging bucket has six radially extending brackets 24 welded or otherwise secured to the conical bottom 14. These brackets are preferably in the form of plates which serve as supports or legs for the bucket by which the bottom of the bucket and the discharge opening are spaced from the top of a mold. The arrangement and number of such supports is dependent upon the strength and stability required, but it is important that they do not interfere with the flow of concrete to the annular mold cavity. By this it is meant that sufficient space be provided beneath the hopper or concrete containing portion of the

bucket for the passage of concrete from the discharge opening irrespective of the particular configuration or size of hopper.

It is desirable in some cases, and particularly for charging molds for making large size pipes, to secure the hopper to a plate which is capable of assisting the horizontal and radial distribution of concrete after it has descended from the discharge opening. In Fig. 1 I have shown such a plate as a part of the distributing bucket, but in the modification shown in Fig. 3 the distributing bucket is complete without such plate, and a part of the mold is utilized for directing the concrete to the mold cavity.

Referring again to Fig. 1, the support or footing for the hopper, comprising the brackets **24**, engages a convex plate **25** having its convex surface uppermost, and to which the brackets are secured at their lower edges. A flat cone with its apex below the discharge port is a suitable arrangement. The outer edge of the plate **25** extends beyond the inner wall **27** of the mold, but not beyond the outer wall **28**. It serves uniformly to distribute the concrete descending thereon about the mold.

A ring **30** is secured to the underside of the conical plate **25** by welding or otherwise. Together with the brackets and underlying plate this ring serves as a base for the hopper and also centers the discharge opening with respect to the mold. When in use the bucket rests upon a mold top plate **31** to which a plurality of cleats **32** are attached. The cleats are to engage and guide the ring into proper position upon plate **31** when the bucket is being placed upon the mold.

The charging bucket is placed in its position upon the top plate **31** by means of a crane or other hoisting device (not shown). A bail **33** is provided for this purpose. The form of the bail is important with reference to its use in the practice of the mold charging process hereinafter described. It is intended that the charging bucket remain in place upon the mold until the pouring of the concrete is completed. The form of charging bucket illustrated in Fig. 1 has proved to be particularly efficacious for pouring concrete for making large pipes.

In Fig. 3 I have shown another form of charging bucket which is well suited for forming concrete pipes of small diameter. The hopper of this bucket is similar to the hopper of bucket **11** which has been described. Inasmuch as this bucket is primarily for use in pouring small diameter pipe, it need not have, as a unitary part thereof, provision for distributing concrete to the annular cavity of the mold. The bucket is provided with a footing in the form of a plurality of brackets **35**, in this instance four in number, by which the bucket may be directly supported upon a wall of the mold. Each bracket **35** preferably has a notch **37** with sloping edges for use in centralizing the bucket over the mold. A pad **38** is welded to each bracket to provide a broad base for the bracket on the mold wall. According to this construction the bucket is preferably supported upon the outer wall **36** of the mold in the interest of stability. When the ball valve **40** is raised, the concrete descends upon plate **41** and, upon overflowing the plate and inner wall **42**, enters the mold cavity.

Bail **43** is rigidly attached to the bucket. It has such form as will enable it to cooperate with the valve of a transporting bucket for displacing the same in the manner hereinafter described.

In practicing the improved method a charging bucket is mounted upon a mold. This charging bucket serves as an always available reservoir of concrete and remains in place until the pipe is finished. Concrete is maintained in the charging bucket and is poured into the mold at the will of an operator who regulates its flow by controlling the opening of the ball valve at its bottom.

While the operator is attending to charging the mold with concrete, in accordance with the pouring rate that a particular job requires, the crane operator maintains concrete always available in the charging bucket. For this purpose any type of transporting bucket may be used, such, for example, as the one illustrated in Fig. 1. This transporting bucket consists of a container **44** and a ball valve **45** which may be operated by the use of a hoist rope or lever attached to the stem **46** of the ball valve. The transporting bucket supplements in bulk measures the supply of concrete in the reservoir formed by the charging bucket.

It is immediately apparent that the crane operator may maintain his crane and transporting bucket in continuous operation for transporting concrete in bulk from a mixer to various molds which are provided with charging buckets. The transporting bucket need not be held over a particular mold to await slow pouring procedure, but is dumped immediately into a charging bucket and carried back to the mixer for a further supply of concrete without any loss of time. Because of mixing and transporting operations, concrete can be left in a charging bucket as long as is desired. It follows that by this procedure concrete which is quite dry can be economically poured because the operator may regulate the flow of concrete into the mold at as slow a rate as is desirable for producing the strongest concrete product without compelling the idleness of other workmen and hoisting apparatus on account of a reduced pouring rate.

The concrete pouring process embodies dispensing with independent manual control of the valve of the transporting bucket. To this end provision is made for automatically opening the valve when the transporting bucket is brought into cooperating relationship with the charging bucket, as illustrated, for example, in Fig. 1.

In some instances it may be necessary or desirable to provide an upstanding projection such as the pin **47** (Fig. 1), but ordinarily a bail may be selected from available constructions which is so formed as to itself provide sufficient projection to raise the valve of the transporting bucket when the same is lowered towards the bail. The bail shown in Fig. 3 is intended to illustrate a bail having an upstanding mid-portion or loop **48** which is so proportioned as to accomplish the same function as that of pin **47**. In this connection it is to be observed that the thickness of the bail is much less than its width and that the bail does not obstruct the flow of concrete. When the bail is non-rigid or pivoted, or when grappling chains are employed to lift the charging bucket, supplementing means other than a lifting bail may be secured to the bucket for operating the valve of the transporting bucket. With any of such arrangements, auxiliary instrumentalities for the manual control of the valve **45** are eliminated and it is necessary only that the transporting bucket be lowered to a dumping position over the charging bucket to void the contents of the transporting bucket.

What is claimed is:

1. A portable concrete charging bucket comprising a hopper for containing concrete, said hopper having a bottom wall and a port therein for discharging concrete, valve means for closing said port, a plurality of brackets secured to the underside of said bottom wall and extending downwardly below said hopper, and a plate spaced from said port and valve and underlying the same and engaging the lower edges of said brackets, said brackets being substantially radially disposed so as to provide unobstructed passage for concrete flowing from said port and along the upper surface of said plate to points beyond the outer edge thereof.

2. A concrete charging bucket comprising a hopper for containing concrete, said hopper having a bottom with walls sloping downwardly and centrally of the bottom towards a discharge opening, valve means for opening and closing said discharge opening, a plurality of brackets fastened to the underside of said hopper and extending from the discharge opening to the outer edge of said hopper, a plate secured to the lower edges of said brackets and providing a convex surface sloping upwardly towards said discharge opening, and means secured to the underside of said plate for engaging with a portion of a mold for centralizing the hopper with respect to the mold.

3. Concrete charging apparatus comprising, in combination, a hopper for containing concrete, said hopper having a discharge port, valve means for closing said discharge port, a portable hopper for transporting concrete to said first-named hopper, said portable hopper having a discharge port and a gravity-acting, self-closing valve for closing said discharge port, means carried by said portable hopper for slidably guiding the opening and closing movements of translation of said valve, means carried by said first-named hopper for displacing said valve from the discharge port of said portable hopper to cause the discharge of concrete from said portable hopper to said first-named hopper, and other means for opening the valve of said first-named hopper.

4. A charging bucket for charging concrete into a mold comprising, a bucket having a containing wall surrounding a space which is open above said wall for receiving concrete and tapers downward to an outlet port at the lower portion of the space defined by said wall, means extending below said wall for supporting said bucket in upright position, valve means for closing said port, means carried by said bucket for enabling operation of said valve means at will, and a bail fixedly attached to said bucket whereby said bucket may be carried, said bail extending above said containing wall and having means upstanding therefrom and within the area defined by said containing wall for lifting a valve of another bucket.

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