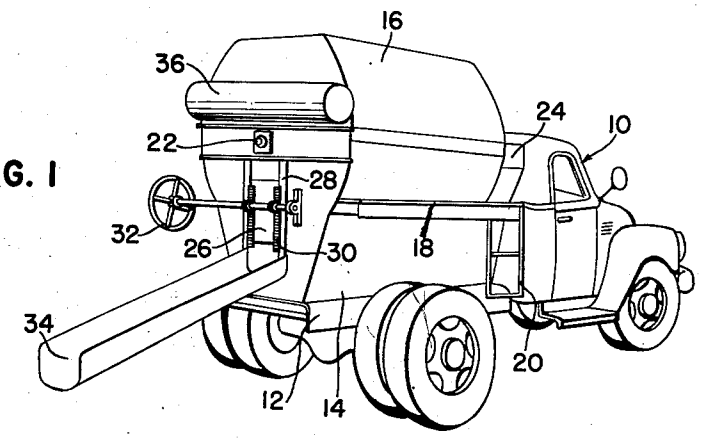
Jan. 4, 1955 V. R. McCOY 2,698,742

CONCRETE MIXER

Filed June 20, 1952 2 Sheets-Sheet 1

FIG. 1



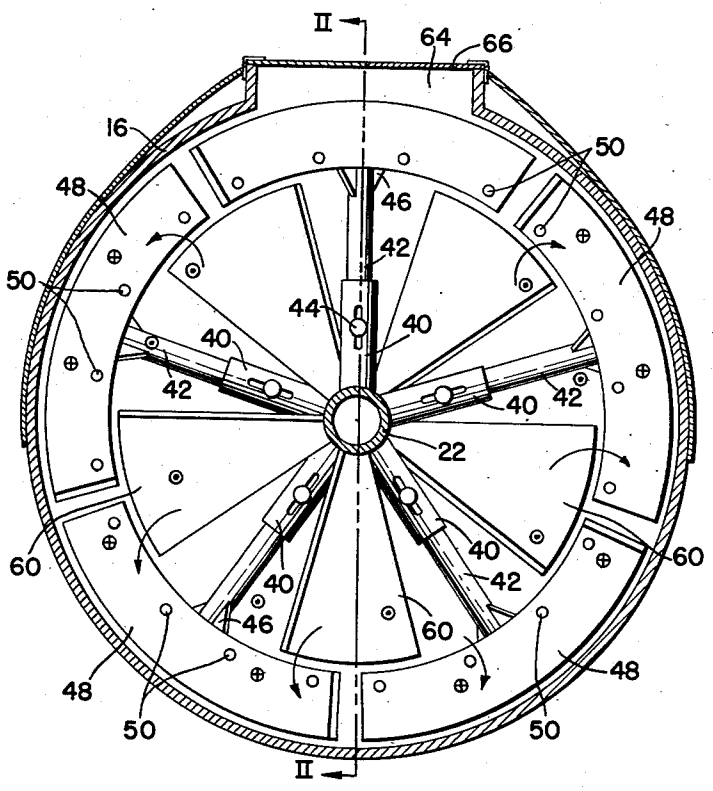




FIG. 3

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Jan. 4, 1955 V. R. McCOY 2,698,742

CONCRETE MIXER

Filed June 20, 1952 2 Sheets-Sheet 2

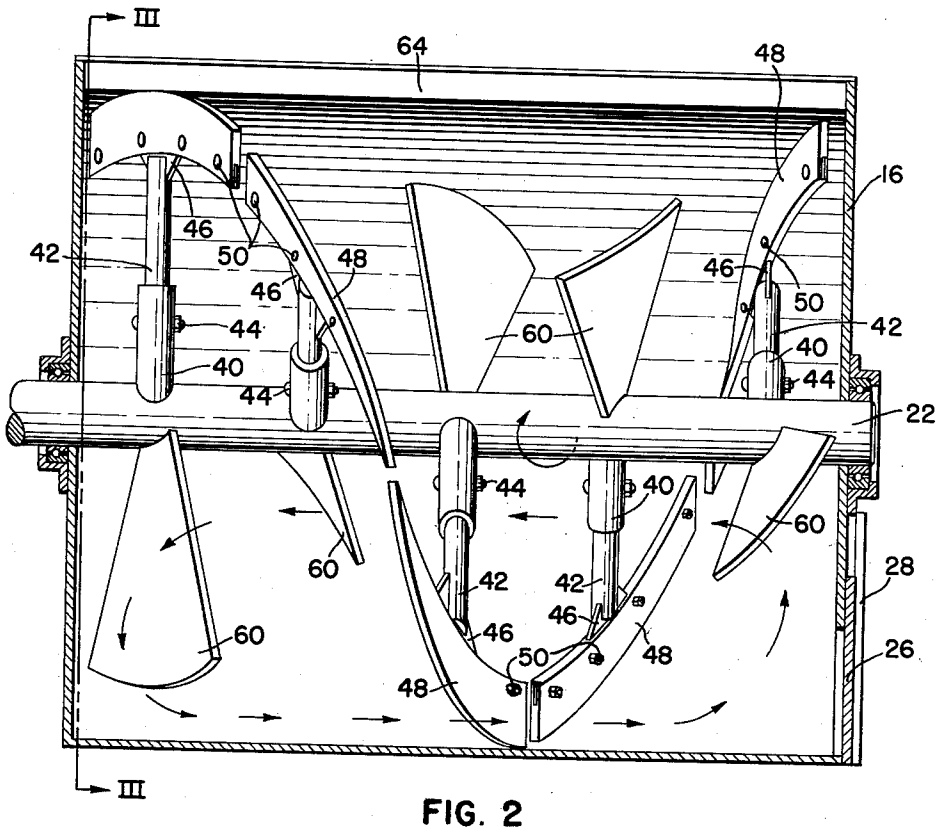



FIG. 2

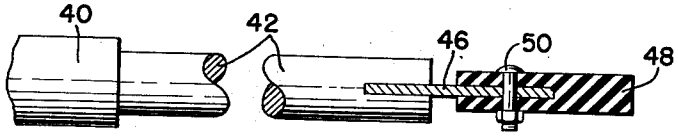



FIG. 4

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United States Patent Office

2,698,742

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2,698,742

# CONCRETE MIXER

Vinton R. McCoy, Cuyahoga Falls, Ohio

Application June 20, 1952, Serial No. 294,542

4 Claims. (Cl. 259—178)

This invention relates to concrete mixers, for example, of the type mounted on a truck for facilitating mixing of the concrete as it is delivered to the location where the concrete is to be poured.

It is the general object of my invention to provide a relatively inexpensive and highly efficient concrete mixer particularly of the type to be associated with a delivery truck.

Another object of my invention is the provision of a concrete mixer in which oppositely directed axial flows of the concrete are established at radially different areas in a mixing drum by paddles of opposite pitch mounted upon a single shaft.

Another object of my invention is the provision of a concrete mixing apparatus of the character described wherein a hydraulic lift can be utilized for depositing materials in the drum and without requiring an overhead discharge bin.

Another object of my invention is to provide a concrete mixing apparatus including flexible edge paddles characterized by long wear and a wiping against the concrete substantially in contact with the inner periphery of the drum to thereby effect a particularly beneficial mixing action.

The foregoing objects of my invention, and other objects which will become apparent as the description proceeds are achieved by providing in combination, a concrete mixing drum, two sets of paddles in the drum, one set of paddles moving substantially a core of concrete in one direction in the drum, the second set of paddles moving a radially thick, substantially cylindrically-shaped shell of radially outermost concrete in the opposite direction to effect a continuous circulation and mixing of the concrete, the paddles being preferably mounted on a common shaft. One set of the paddles, usually the radially outermost set, are normally provided with rubber covers to achieve flexible wiping edges of substantially continuous helical shape. The top of the drum is provided with an opening along substantially the full length of the drum and of considerable width to facilitate loading of materials into the drum by other means than an overhead bin, for example, as by a hydraulic scoop lift truck.

For a better understanding of my invention reference should be had to the accompanying drawings wherein:

Figure 1 which is a perspective view of a concrete mixing truck incorporating the principles of my invention;

Figure 2 is a longitudinal sectional view of the mixing drum and associated paddles, as taken substantially on line II—II of Figure 3;

Figure 3 is a transverse vertical sectional view, taken substantially on line III—III of Figure 2 and illustrating further details of the mixing drum and paddles; and

Figure 4 is an enlarged fragmentary view of one of the radially outermost mixing paddles of the apparatus of the invention.

In the drawings, the numeral **10** indicates generally a truck including a bed **12** having upwardly diverging sides **14** supporting a mixing drum or tank **16** in a substantially horizontal position with the longitudinal axis of the drum extending longitudinally of the truck. Horizontally extending cat-walks **18** are provided at each side of the drum **16** near the sides **14**, with steps **20** providing access to the cat-walks from the running boards of the truck.

The drum **16** is substantially cylindrical and a shaft **22** is journalled substantially on the axis of the drum, the shaft **22** being adapted to be driven by a chain and



through gears contained in a cover **24** at the front end of the drum **16** by a power take-off and gear reducer from the engine of the truck, for example, as fully disclosed and claimed in my co-pending patent application Serial No. 200,596 filed December 13, 1950, and entitled Vehicle-Carried Concrete Mixer or the Like and Auxiliary Drive Therefor, now abandoned.

A gate **26** is provided at the back end of the drum **16**, the gate being vertically slidable in appropriate guides **28**, and being adapted to be moved by rack and pinion means **30** operated by a gate hand wheel **32**. Any concrete flowing out under the gate from the drum **16** is caught in a chute **34** and is fed directly to the desired position by gravity, the chute being adjustable to swing laterally or vertically. With the gate **26** closed and the chute **34** not in use, the chute can be slid in under the drum **16** between the upwardly diverging sides **14** of the assembly.

A water tank **36** is mounted in association with the drum **16**, for example, at the back end of the drum, the water tank having associated valve means which can be opened to supply additional water to the concrete mix at any time if this is found desirable.

An important part of my inventive concept is the provision of a double set of paddles on the shaft **22**, and the construction and arrangement of these paddles is best illustrated in Figures 2, 3, and 4. As seen in these figures, the shaft **22** may conveniently be made hollow, and may have welded to it at helically spaced points hollow radially directed sockets **40**, for example, five in number, and adjustably receiving shafts or spokes **42**. Bolts **44** extending through the spokes **42** and carried in slots in the sockets **40** allow for radial adjustment of the spokes **42** to bring the paddle carried by each spoke substantially into engagement with the inner surface of the drum **16**.

Each shaft or spoke **42**, as noted, carries a metal plate **46**, substantially of paddle shape, the plate **46** being fastened to the shaft **42** as by slotting the end of the shaft and welding the plate in the slot.

Having particular reference to Figure 4, each plate **46** is adapted to be covered by a relatively thick molded rubber body **48** which actually forms the body of the paddle. The rubber body **48**, as evident in Figure 4, extends at least several inches radially beyond the plate **46** to provide a flexible radially outermost portion or edge on the paddle to give a wiping action against the concrete and substantially in engagement with the inner periphery of the drum **16**. It will be seen, also, from Figure 4 that the rubber body **48** is slotted and fits down over the plate **46**, being secured to the plate **46** in any suitable manner, as by bolts **50**.

It will be understood that the shafts or spokes **42** are adjusted in the sockets **44** so as to position the rubber paddle bodies substantially in contact with the inner surface of the drum **16**. As also illustrated in Figures 2 and 3, in particular, the paddles **46—48** are radially some six to ten inches in dimension, and usually about eight inches, but are substantially continuous in a helical direction being normally separated from each other only by gaps of several inches.

Rotation of the shaft **22** in the direction shown by the arrow results in the paddles **46—48** moving or throwing the concrete in the drum toward the right or rear of Figure 2, the rear of the drum being provided with the vertically slidable gate **26** carried in guides **28**.

Also mounted on the shaft **22** is a second set of paddles **60**, these paddles being of fan shape, for example, and made from curved flat plates. The paddles **60** are radially shorter than the paddles **46—48**, extending preferably radially outwardly of the shaft **22** a distance from six to ten inches short of the inner periphery of the drum, and usually about 8 inches short of the drum so that these paddles terminate in a radial outward direction substantially at the point that the paddles **46—48** terminate in a radial inward direction. The paddles **60** are positioned helically along the shaft **22**, and conveniently on the extension of the axes of the sockets **40**, the paddles **60** being fastened to the shaft **22** in any suitable way, as by welding.

It is to be particularly noted that the paddles **60** are positioned to have a pitch or throw opposite to that created by the paddles **46—48** so that during the rotation

of the shaft 22 in the direction shown by the arrow the paddles 60 cause a flow of concrete toward the left or front end of the mixing drum 16. There is thus established in the mixing drum a flow of the concrete towards one end of the drum by the paddles 60 and an opposite flow of the concrete towards the other end of the drum by the paddles 46—48. Or stated another way, there is establisned in the mixing drum opposite axial flows of the concrete at different radial distances from the shaft 22. It might also be said the paddles 60 cause a flow of a core of concrete towards one end of the mixing drum while the paddles 46—48 cause a flow of a relatively thick radial cylindrical shell of concrete towards the opposite end of the drum.

I have found that a particularly advantageous mixing of the concrete is established by the continuous circulating concrete flow as described, and that the rubber covered paddles working in near association to the inner surface of the mixing drum having a wiping and blending action which destroys and breaks up any lumps of improperly mixed material but without objectionably severe wear on either the paddles or the drum.

The circulating and mixing flows of the concrete in the drum 16 is illustrated by arrows in Figure 2, and by small circles in Figure 3 with dots and crosses in the circles, it being understood in conjunction with the showing in Figure 3 that the circles with the dots and crosses are used in analogy to the representation of electric current flowing in wires, namely, a circle with a dot in it represents motion toward the observer and a circle with a cross in it represents motion of material away from the observer. Particularly from Figure 3 it becomes evident that the oppositely moving core and radially thick shell of concrete effects a particularly efficacious blending of the mix.

Figures 2 and 3 also best illustrate another feature of my invention, specifically, providing an opening 64 along substantially the full length of the drum 16, and to an appreciable width, for example, a width of 30 inches. The opening 64 is closed by a two part cover or lid 66 secured by hinges to the edges of the opening. A large opening, such as the opening 64 in the top of the mixing drum allows my drum to have the material to be mixed fed thereto by means of a scoop type hydraulic lift truck so that an overhead bin, and the attendant expense thereof, can be eliminated. Sand, cement, gravel, water, and other ingredients, if any, can be scooped up on a lift truck and the scoop can be raised high enough to discharge the material through the opening 64.

It will be recognized that the various objects of my invention have been achieved by provision of a relatively simple and inexpensive concrete mixing apparatus characterized by a novel arrangement of mixing paddles which insures a circulation and a thorough mixing of the materials in the drum. There is an attendant breaking up of any lumps and a wiping of the contents of the lumps into the mix, all without objectionable wear on the mixing paddles or drums. Loading without requiring an overhead loading bin is facilitated, and discharge of the mixture is simply and conveniently obtained.

While in accord with the patent statutes I have particularly illustrated and described one best known embodiment of my invention, it is to be particularly understood that I am not to be limited thereto or thereby, but that the scope of my invention is defined in the appended claims.

I claim:

1. In a concrete mixer, a substantially cylindrical and substantially horizontal drum, said drum having a substantially full-length relatively wide opening in its top, a closure for the opening, a shaft journalled axially of the drum, one set of fan-shaped paddles positioned helically of the shaft and having a pitch in one direction and terminating short of the inner periphery of the drum, a second set of paddles mounted on the shaft, each paddle including a tube secured radially to the shaft opposite to a fan-shaped paddle, a post adjustably secured in the tube, a curved blade fastened to the post, each blade having a radially dimension substantially equal to the distance between the outer ends of the fan-shaped paddles and the inner periphery of the drum, the ends of the curved blades being separated only a few inches in a helical direction to form in effect a continuous radially outer mixer blade, and the blades forming the second set of paddles being set to a pitch opposite to the pitch of the fan-shaped paddles.

2. In a concrete mixer, a substantially cylindrical and substantially horizontal drum, a shaft journalled axially of the drum, one set of fan-shaped paddles directly carried by and positioned helically of the shaft and having a pitch in one direction and terminating short of the inner periphery of the drum, a second set of paddles mounted on the shaft and being spaced radially from the first set of paddles, each paddle including a tube secured radially to the shaft opposite to a fan-shaped paddle, a post adjustably secured in the tube, a curved blade fastened to the post, each blade having a radially dimension substantially equal to the distance between the outer ends of the fan-shaped paddles and the inner periphery of the drum, the blades of the several paddles being separated only a few inches in a helical direction, and the blades forming the second set of paddles being set to a pitch opposite to the pitch of the fan-shaped paddles whereby materials at different radial zones of the mixer are moved in opposite axial directions and the entire contents of the mixer are constantly positively agitated.

3. In a concrete mixer, a substantially cylindrical and substantially horizontal drum, said drum having a substantially full-length relatively wide opening in its top, a closure for the opening, a shaft journalled axially of the drum, one set of fan-shaped paddles positioned helically of the shaft and having a pitch in one direction and terminating short of the inner periphery of the drum, a second set of paddles mounted on the shaft, each paddle including a post secured radially to the shaft opposite to a fan-shaped paddle, a curved blade fastened to the post, each blade having a radially dimension substantially equal to the distance between the outer ends of the fan-shaped paddles and the inner periphery of the drum and being radially spaced from the first set of paddles, the blades of the several paddles being separated only a few inches in a helical direction, and the blades forming the second set of paddles being set to a pitch opposite to the pitch of the fan-shaped paddles, the fan shaped paddles extending radially outwardly from the shaft.

4. In a concrete mixer, a substantially cylindrical and substantially horizontal drum, a shaft journalled axially of the drum, one set of fan-shaped paddles positioned helically of the shaft and having a pitch in one direction and terminating short of the inner periphery of the drum, a second set of paddles mounted on the shaft, each paddle including a post secured radially to the shaft opposite to a fan-shaped paddle, a curved blade fastened to the post, each blade having a radially dimension substantially equal to the distance between the outer ends of the fan-shaped paddles and the inner periphery of the drum and being radially spaced from the fan shaped paddles, the blades of the several paddles being separated only a few inches in a helical direction, and the blades forming the second set of paddles being set to a pitch opposite to the pitch of the fan-shaped paddles, the fan shaped paddles extending radially outwardly from the shaft.

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