United States Patent

Lord

[15] **3,655,168**

[45] **Apr. 11, 1972**

[54] PORTABLE CEMENT MIXER

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[22] Filed: **Aug. 20, 1970**

[21] Appl. No.: **65,395**

[52] **U.S. Cl.** **259/177**

[51] **Int. Cl.** **B28c 5/18**

[58] **Field of Search** ..... 259/173, 175, 176, 177, 81 R, 259/57, 3, 14, 30

[56] **References Cited**

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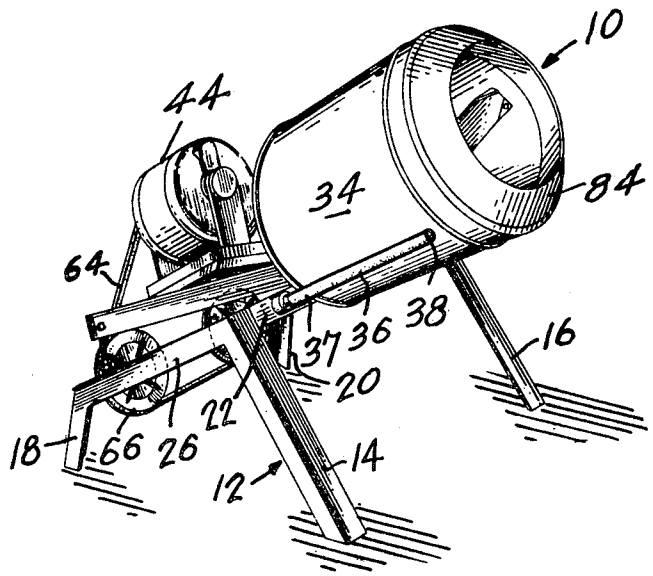
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Primary Examiner—Robert W. Jenkins
Attorney—Alan Swabey

[57] **ABSTRACT**

A cement mixer having a frame with a pair of spaced rotating supporting rods projecting upward therefrom and adapted to support a container in which cement is to be mixed and a bearing wheel positioned between the two supporting rods and adapted to engage the bottom of a container to support same from sliding down the rods into contact with the frame.

10 Claims, 9 Drawing Figures



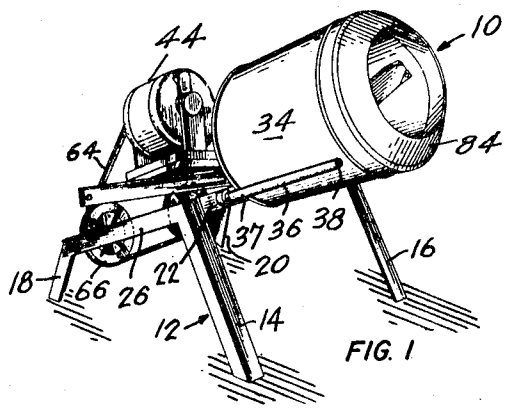


FIG. 1

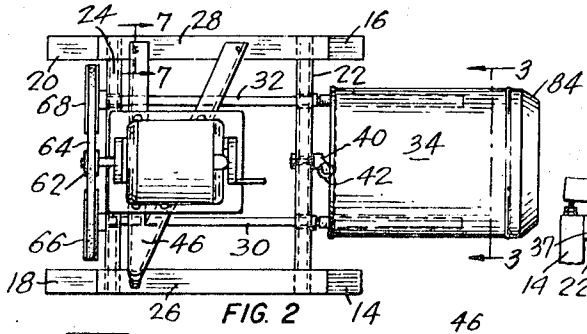


FIG. 2

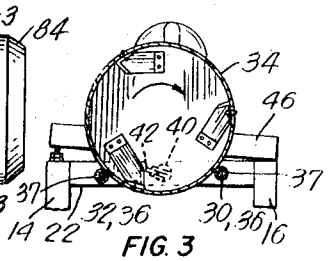


FIG. 3

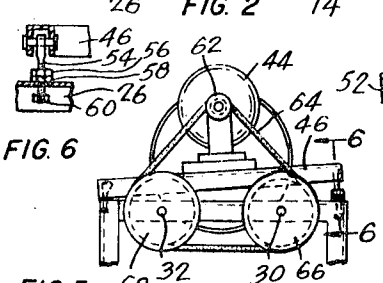


FIG. 6

FIG. 5

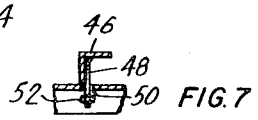


FIG. 7

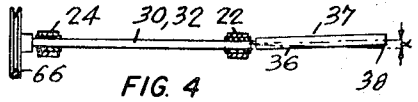


FIG. 4

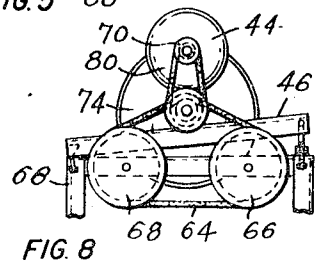


FIG. 8

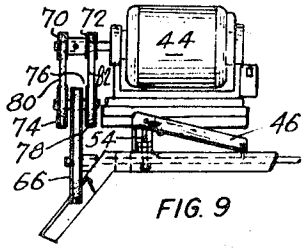


FIG. 9

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PORTABLE CEMENT MIXER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a mixer. More particularly, the present invention relates to a small cement mixer especially adapted for the handiman.

2. Description of Prior Art

It has heretofore been proposed to provide cement mixers suitable for handimen, however, the majority of such mixers have been simply miniature versions of the conventional cement mixers but were still of relatively large size and were expensive.

Other small mixers have been proposed but for one reason or another it is believed these mixers were not commercially successful. One mixer is shown in U.S. Pat. No. 2,813,705 issued Nov. 19, 1957 to Parish. This patent teaches the use of two pair of spaced rollers and a fifth supporting roller, all of which are contained within a frame and one of which may be rotated to rotate a container removably received thereon. This arrangement may be satisfactory for the small capacity mixer intended, i.e. when the container is a 12 inch diameter paint can but is generally not satisfactory for any higher capacities such as those intended for use with the present invention.

Substantially all of the heretofore proposed mixing devices utilized the conventional rotational mixing action to tumble the cement in the container. Such an action obviously is satisfactory, however, the present invention also teaches an apparatus that improves on the mixing operation.

SUMMARY OF INVENTION

It is thus the main object of the present invention to provide an improved mixer that is economical to manufacture and yet easy to operate while having a reasonable capacity.

It is a further object of the present invention to provide a mixer having an improved mixing action.

Broadly, the present invention relates to a mixer having a frame with a pair of spaced rods rotatably mounted in the frame and projecting from the frame in cantilever fashion, a bearing wheel mounted on the frame, said rods being adapted to rotatably support a mixing container having its substantially cylindrical surfaces resting thereon and said bearing wheel being adapted to be positioned closer to one of said rods than to the other whereby said wheel engages the bottom of said container adjacent its periphery on its up moving side.

BRIEF DESCRIPTION OF DRAWINGS

Further features, objects and advantages will be evident from the following detailed description of a preferred embodiment of the present invention taken in conjunction with the accompanying drawings in which:

FIG. 1 is an isometric view of a preferred form of the present invention;

FIG. 2 is a plan view of the mixer of FIG. 1;

FIG. 3 is a section along the line 3—3 of FIG. 2;

FIG. 4 is a partial side view illustrating one of the mounting rods of the mixer;

FIG. 5 is a rear view illustrating one form of drive for the mixer;

FIGS. 6 and 7 are detailed views taken along the lines 6—6 and 7—7 of FIGS. 5 and 2 respectively;

FIG. 8 is a rear view similar to FIG. 5 but showing another form of the drive; and

FIG. 9 is a side elevation illustrating the drive of FIG. 8.

DESCRIPTION OF PREFERRED EMBODIMENTS

The mixer 10 includes a frame 12 having a pair of front legs 14 and 16 and a pair of rear legs 18 and 20 interconnected by suitable front, rear and side framing members 22, 24, 26 and 28 respectively. The front legs 14 and 16 are longer than the rear legs 18 and 20 so that the frame formed by the members 22, 24, 26 and 28 extends at an acute angle to the horizontal with the front frame member 22 higher than the rear frame member 24.

A pair of spaced bearing rods 30 and 32 are rotatably mounted in suitable bearings in spaced apart relationship in the front and rear members 22 and 24. The rods 30 and 32 project forward on the front frame member 22 to form cantilevered supporting sections 36 which extend upwardly at an acute angle to the horizontal. These supporting sections 36 project upwardly at substantially the same angle as the plane formed by the members 22, 24, 26 and 28. The spacing of the support sections 36 is such that they engage and stably support the substantially cylindrical mixing container 34 which will be described in more detail hereinbelow.

As shown in detail in FIG. 4, each of the supporting sections 36 is bent slightly from the rotational axes of the rods 30 and 32 by an angle α which will be in the range of up to about 3° and preferably will not exceed about 1°. If this angle is too large, there will be too much deflection of the free ends 38 of the sections 36 and these will slap against the container too vigorously. Preferably, the offset free ends 38 as formed by the angle α on the rods 30 and 32 will be oriented so that these ends 38 do not contact the container 34 at the same time.

The cantilever supporting sections 36 of the rods 30 and 32 are each covered with a suitable friction gripping material such as a rubber sleeve 37 to facilitate driving of the container 34.

Also mounted on the frame 12 on the front frame member 22 between the two rods 30 and 32 is a caster 40. In the illustrated arrangement wherein the machine is adapted to be driven by a motor rotating either clockwise or anti-clockwise and to utilize containers of 3, 5 or 10 gallon capacity, the caster 40 is mounted centrally between the rods 30 and 32 for bodily rotation on an axis substantially parallel to the axis of rotation of the rods 30 and 32 and the caster wheel 42 is mounted in offset position for rotation on an axis substantially perpendicular to the axis of bodily rotation of the caster. The wheel 42 projects forward of the frame member 22 to a position between the two supporting sections 36 whereby it engages and prevents a container 34 supported on the supporting sections 36 from sliding down into contact with the frame member 22. The offset of the wheel 42 relative to the axis of bodily rotation of the caster locates this wheel 42 on the up moving side of the container 34 when the container is in operative position and thus this wheel 42 is located on the load bearing side of the container and automatically is positioned to counteract the weight of the container. If a fixed container size and direction of rotation is provided, the wheel 42 may simply be positioned in the proper location and at the proper angle to rotatably engage and support a loaded container 34.

Each of the rods 30 and 32 is driven. In the illustrated arrangement, the rods 30 and 32 are driven by means of an electric motor 44 or other suitable power means. The motor is mounted on a V-shaped frame 46, which in turn is pivotably secured to the frame member 28 by bolts 48 welded or otherwise secured to the frame 46 and projecting through the holes 50 in the frame member 28 (see FIG. 6). A nut 52 loosely threaded on the bolt 48 prevents separation of the frame 46 and member 28 while permitting pivoting of the frame 46. The point of the V of the frame 46 is adjustably supported above the frame 26 by means of a bolt 54 pivotably mounted in the frame 46 and projecting through a hole in the frame member 26. A pair of nuts 56 and 58 lock the frame 46 in position and a nut 60 loosely threaded around the end of the bolt 54 prevents complete withdrawal and separation of the frame from the frame member 26 (see FIG. 7).

The motor 44 drives a pulley 62 which receives and drives a belt 64 which in turn is received on and drives pulley 66 and 68 connected to the rods 30 and 32 respectively. The tension of the belt 64 is adjusted by adjusting the position of the frame 46 by means of the bolt 54 and nuts 56 and 58.

When the speed of the motor is too fast, it must be reduced if proper mixing is to be obtained. One suitable manner of reducing the speed is shown in FIGS. 8 and 9. In this arrange-

ment, the pulley **62** is replaced by a pair of spaced pulleys **70** and **72** which support and drive a set of three interconnected pulleys **74**, **76** and **78** by a pair of belts **80** and **82** which engage and drive the outside pulleys **74** and **78** of the set. A third belt **84** embraces the pulley **76** and pulleys **66** and **68** to drive the rods **30** and **32**. By changing the relative size of the pulleys **70**, **72**, and **74**, **78** and **76** the speed of the container **34** may be suitably adjusted. Also, the size of the pulleys **66** and **68** has a bearing on this and the diameter of the driving and supporting sections **36** will ultimately govern the speed of rotation of the container. The use of a rod or shaft as the supporting and driving means for the container provides a very large reduction in the speed of the container without requiring elaborate gear reducing means as normally would be required with a conventional electric motor.

The container **34** may be of any suitable size, but generally it is preferred not to exceed about 10 gallons and preferably a 5 gallon pail provided with a suitable lip **34** formed by a flange welded to the container will be used. Suitable baffles **86** may be secured within the container **34**.

In operation, the motor **44** is started and the rods **30** and **32** rotated thereby. A container filled or preferably empty and filled in position on the mixer is placed on the supporting section **36** of the rods **30** and **32** and is rotated thereby. The container **34** automatically positions itself against the caster wheel **44** which in turn, due to its caster mounting, moves to its proper orientation and position relative to the container **34**. As the container **34** slides down the rods **30** and **32**, i.e. on this support section **36** it is stopped by engagement with the wheel **44**. This engagement with the wheel **44** pulls the wheel due to the rotational movement of the container **34** to the proper supporting position which will be offset toward the up moving side of the container and, therefore, behind the heavily loaded side of the container **34**.

The slight angle α of the supporting sections **36** of the rods **30** and **32** result in alternately lifting and lowering tilting action of opposite sides of the container and a slapping action of the free ends **38** of the sections **36** against the container thereby to provide additional movement of the container and improve the mixing operation.

After the material has been mixed, the container **34** may be lifted from the rods **30** and **32**. The cantilever mounting of the support sections **36** of these rods **30** or **32** facilitates lifting of the container **34** from the mixer by a hand since the lifter may place his feet beneath the container.

If desired, a plurality of containers **34** may be used so that one is being mixed while the other is being poured.

Modifications may be made without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. A mixer comprising a frame, a pair of spaced substantially parallel rods rotatably mounted in said frame for rotation on axes of rotation, a supporting section of each of said rods projecting from said frame in cantilever fashion at an angle to a supporting surface on which the frame may be mounted and adapted to support and rotate a container substantially along its entire length, a bearing wheel mounted on said frame and projecting therefrom between said pair of supporting sections.

2. A mixer as defined in claim **1**, wherein said bearing wheel is adapted to engage and support a container that may be mounted on and rotated by said supporting section, said wheel being positioned between said supporting sections closer to one of said sections than the other whereby said wheel contacts said container on its upwardly moving side as said container is rotated by said supporting sections.

3. A mixer as defined in claim **2**, wherein one of said support sections extends at an angle to said axis of rotation sufficient to cause said container to vibrate by the eccentricity of said one of said supporting sections bearing against said container.

4. A mixer as defined in claim **2**, wherein both of said supporting sections are at an angle of about 1° to 3° to said axes of rotation whereby said container is vibrated by the eccentricity of said sections relative to said axis of rotation.

5. A mixer as defined in claim **2**, further comprising means to rotate said rods, driving both of said rods and thereby both of said supporting sections.

6. A mixer as defined in claim **5**, wherein said supporting sections of said rods are covered with a friction sleeve adapted to engage and drive said container.

7. A mixer as defined in claim **6**, wherein said wheel is mounted for rotation on a caster body which is rotatable on an axis parallel to said axes of rotation.

8. A mixer as defined in claim **6**, wherein one of said support sections extends at an angle of about 1° to 3° to said axis of rotation whereby said container is vibrated by the eccentricity of said one of said supporting sections.

9. A mixer as defined in claim **6**, wherein both of said supporting sections are at a slight angle to said axes of rotation whereby said container is vibrated by the eccentricity of said sections relative to said axis of rotation.

10. A mixer as defined in claim **1**, wherein both of said supporting sections are at an angle of about 1° to 3° to said axes of rotation whereby said container is vibrated by the eccentricity of said sections relative to said axis of rotation.

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