Dec. 18, 1962 B. V. FEJMERT 3,069,145

MACHINE FOR MIXING DIFFERENT KINDS OF MATERIALS

Filed Oct. 26, 1959

2 Sheets-Sheet 1

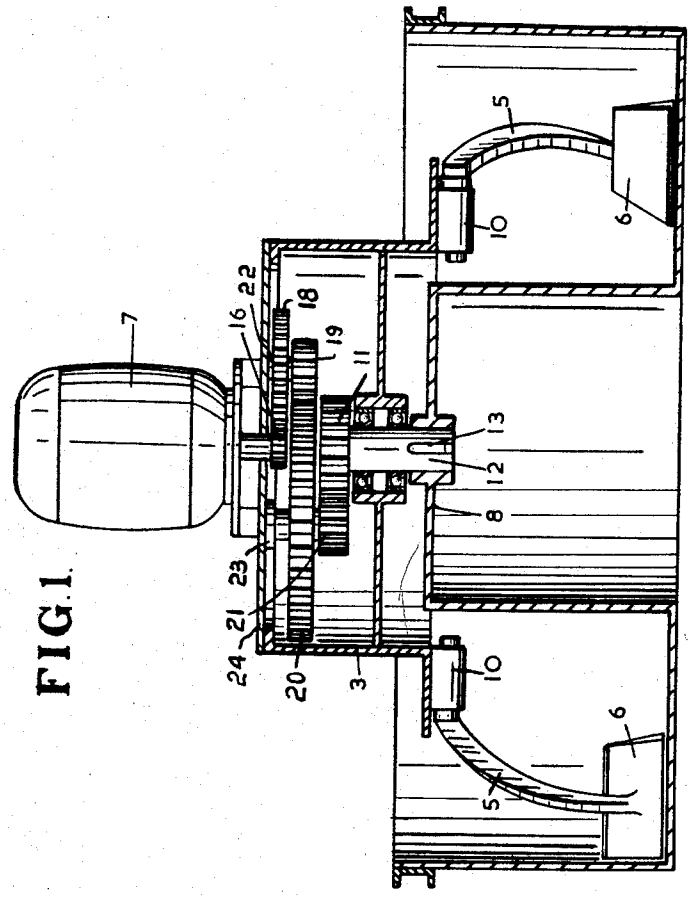


FIG. 1.

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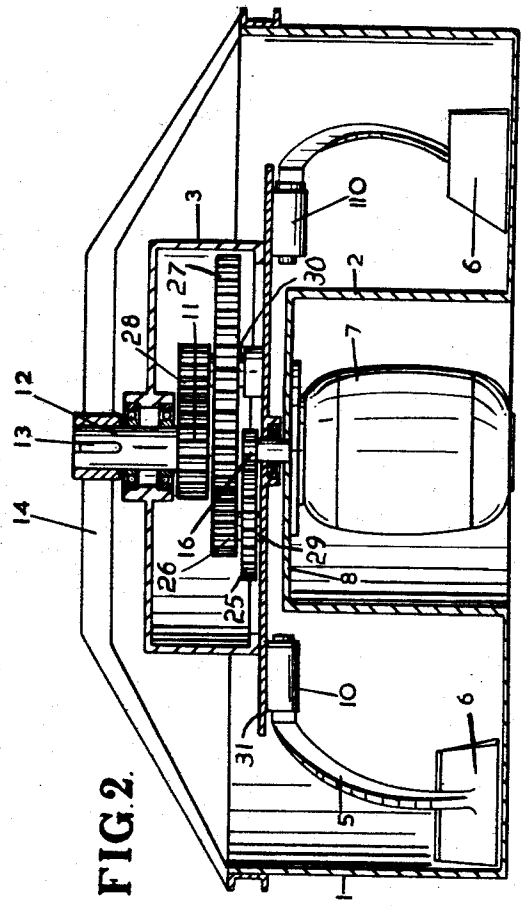


FIG.2.

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MACHINE FOR MIXING DIFFERENT KINDS OF MATERIALS

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This invention refers to a machine, for mixing different kinds of materials (e.g., for the purpose of producing concrete, mortar or the like), of the kind including a stationary, circular tank in the centre of which is arranged a vertical, circular inner wall which defines with the outer wall of the tank an annular mixing space in which are arranged a number of shovels which form part of a mixing device and are rotated about the axis of the annular space for throwing the materials in suitable directions for obtaining an effective mix.

In prior mixing machines of this kind the shovels have been supported from a thimble-like member having a depending skirt surrounding, with working clearance, a stationary cylindrical casing secured coaxially to the stationary inner wall of the tank, the casing containing a simple reduction gearing through which the thimble-like member has been driven. However, there is a risk that unequal loading of the shovels in use may cause the skirt of the driven, thimble-like member to foul the exterior of the stationary casing.

The object of the invention is to provide a simple and effective direct drive from a driving device to the mixing device, and thereby to obtain a simpler and cheaper construction of machine than hitherto without the above-mentioned disadvantage being present.

According to the invention the inner wall is provided with a stationary cover from which is supported a driving motor and a bearing arrangement for a rotatable, closed casing carrying the shovels and containing gearing through which the casing is driven from the motor.

According to a further feature the motor is mounted on top of the casing so as to rotate with it and the motor drives the casing through gearing contained in the casing and terminating in a gear wheel fast with the output shaft of the motor which, in turn, is fast with a stationary part of the machine.

According to an alternative further feature the motor is mounted from the underside of the stationary cover and the motor shaft extends through the cover to drive the casing through planetary gearing contained in the casing and terminating in a gear wheel fast with a stationary part of the machine.

In either case, the terminal gear wheel is preferably held fast with the stationary part of the machine by a shaft of the terminal gear wheel being held in a hub of the stationary part by a diametrically-extending wedge engaging slots in both.

The shovels are preferably fitted at the lower end of arms which are pivoted in bearings supported from casing.

The cover on the top of the inner wall serves as a foundation for the axial and radial bearing arrangements which support the rotatable casing with the mixing device.

In the accompanying drawings two different embodiments of the invention are shown:

FIGURE 1 is a cross-section through a mixing machine with the driving motor fitted on top of the casing; and

FIGURE 2 is a cross-section through a machine with the driving motor fitted to the underside of the cover on the top of the inner wall.

In the drawings, 1 is a stationary, circular mixing tank

around the centre of which is arranged a stationary, circular inner wall 2 having a cover 8. A closed rotary casing 3 contains a planetary reduction gear train 11 and has on the outside of its periphery bearings 10 for pivotally supporting arms 5 provided at their lower ends with shovels 6 for mixing the mass.

The driving power is derived from an electric motor 7 which, in FIGURE 1, is shown having its body mounted on the top of the rotary casing 3, and in FIGURE 2 as being mounted on the underside of the stationary cover 8 of the inner wall 2. This cover also serves as a support for the axial and radial bearings, which make it possible for the casing 3 to rotate.

Referring in greater detail to FIGURE 1 the shaft 12 of the terminal gear wheel 11 of the reduction gearing is furnished with a wedge 13 which prevents the shaft 12 from rotating and thereby causes the casing 3 to rotate. This is effected through a planetary gearing including two coaxial pairs of gear wheels 18, 19, and 20, 21 journalled on respective shafts 22, 23 fast with the top wall 24 of the casing 3. Thus, with the body of the motor fast with the said wall 24, and with a gear wheel 16, fast on the motor shaft, meshing gear wheel 18, the latter drives gear wheel 19 which, in turn, drives gear wheel 20. Gear wheel 21 is driven by gear wheel 20 and reacts on stationary gear wheel 11. As shafts 22 and 23 are carried by casing 3, the latter is thus caused to rotate.

In the case of FIGURE 2 the motor body is fast with the stationary cover 8 of wall 2, and the shaft 12 is fast with a stationary frame 14 supported from the outer wall of the mixing tank. In this case the motor shaft gear wheel 16 drives a planetary gearing comprising two pairs of coaxial gear wheels 25, 26, and 27, 28, respectively journalled on shafts 29, 30 fast with the bottom plate 31 of the rotary casing, and the drive is from pinion 16 to gear wheel 25, and from gear wheel 26 to gear wheel 27, which latter rotates gear wheel 28 to react on stationary gear wheel 11. As shafts 29 and 30 are supported from casing 3 the latter is caused to rotate.

In both constructions the planetary gearing is completely enclosed by the rotary casing 3 and is protected from particles of the mass to be mixed which may become airborne.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. A mixing machine, for producing concrete, comprising a stationary circular tank, a stationary circular inner wall coaxially within said tank and defining with it an annular mixing space, a cover fast at the top of said inner wall, a closed casing coaxially above said inner wall, said casing provided with a circular arrangement of bearings having their axes directed radially of said tank, respective arms pivotally supported from said bearings so as to depend into the annular mixing space, respective mixing shovels at the feet of said arms, said casing rotatively supported from said cover, a driving motor supported from said cover, and gearing within said casing, said gearing comprising an input element driven from said motor and an output element connected to said casing whereby said casing is rotatively driven from said motor.

2. A mixing machine, for producing concrete, comprising a stationary circular tank, a stationary circular inner wall coaxially within said tank and defining with it an annular mixing space, a cover fast at the top of said inner wall, a closed casing coaxially above said inner wall, said casing provided with a circular arrangement of bearings having their axes directed radially of said tank, respective arms pivotally supported from said bearings so as to depend into the annular mixing space,

respective mixing shovels at the feet of said arms, said casing rotatively supported from said cover, a driving motor mounted on the top of said casing so as to rotate therewith, said driving motor thereby being supported from said cover, transmission gearing within said casing, said driving motor having a shaft connected to drive an input gear wheel of said transmission gearing, and said transmission gearing having an output gear wheel journalled eccentrically from said casing, and a stationary gear wheel coaxial with said input gear wheel and acting as a sun wheel, said output gear wheel meshing said stationary gear wheel and acting as a planet wheel whereby said motor will rotate said casing.

3. A mixing machine, for producing concrete, comprising a stationary circular tank, a stationary circular inner wall coaxially within said tank and defining with it an annular mixing space, a cover fast at the top of said inner wall, a closed casing coaxially above said inner wall, said casing provided with a circular arrangement of bearings having their axes directed radially of said tank, respective arms pivotally supported from said bearings so as to depend into the annular mixing space, respective mixing shovels at the feet of said arms, said casing rotatively supported from said cover, a driving motor mounted to the underside of said cover, said cover thereby holding said driving motor stationary, transmission gearing within said casing, said driving motor having a shaft extending through said cover and connected to drive an input gear wheel of said transmission gearing, and said transmission gearing having an output gear wheel journalled eccentrically from said casing, and a stationary gear wheel coaxial with said input gear wheel and acting as a sun wheel, said output gear wheel meshing said stationary gear wheel and acting as a planet wheel whereby said motor will rotate said casing.

4. A mixing machine, for producing concrete, comprising a stationary circular tank, a stationary circular inner wall coaxially within said tank and defining with it an annular mixing space, a cover fast at the top of said inner wall, a closed casing coaxially above said inner wall, said casing provided with a circular arrangement of bearings having their axes directed raidially of said tank, respective arms pivotally supported from said bearings so as to depend into the annular mixing space, respective mixing shovels at the feet of said arms, said casing rotatively supported from said cover, a driving motor supported from said cover, transmission gearing within said casing, said driving motor connected to drive an input gear wheel of said transmission gearing, and said transmission gearing including an output gear wheel eccentrically journalled from said casing, and a stationary gear wheel coaxial with said input gear wheel and acting as a sun wheel, said output gear wheel meshing said stationary gear wheel and acting as a planet wheel whereby said driving motor is adapted to drive said casing.

5. A mixing machine, according to claim 4, in which the stationary gear wheel has a shaft which is held nonrotatively in a hub of a stationary part by a wedge means.

6. A mixing machine, for producing concrete, comprising a stationary circular tank, a stationary circular inner wall coaxially within said tank and defining with it an annular mixing space, a cover fast at the top of said inner wall, a closed casing coaxially above said inner wall, said casing provided with a circular arrangement of bearings having their axes directed radially of said tank, respective arms pivotally supported from said bearings so as to depend into the annular mixing space, respective mixing shovels at the feet of said arms, said casing rotatively supported from said cover, a driving motor mounted on the top of said casing so as to rotate therewith, said driving motor thereby being supported from said cover, transmission gearing within said casing, said driving motor having a shaft connected to drive an input gear wheel of said transmission gearing, said transmission gearing including first and second planet gearings journalled eccentrically from said casing, said first and second planet gearings each comprising two coaxial planet gear wheels fast with each other and of unequal diameters, and a stationary sun gear wheel supported from said cover of said inner wall, said input gear wheel meshing the larger diameter gear wheel of said first planet gearing, the smaller diameter gear wheel of said first planet gearing meshing the larger diameter gear wheel of said second planet gearing, and the smaller diameter gear wheel of said second planet gearing meshing said sun gear wheel whereby said driving motor will rotate said casing.

7. A mixing machine, for producing concrete, comprising a stationary circular tank, a stationary circular inner wall coaxially within said tank and defining with it an annular mixing space, a cover fast at the top of said inner wall, a closed casing coaxially above said inner wall, said casing provided with a circular arrangement of bearings having their axes directed radially of said tank, respective arms pivotally supported from said bearings so as to depend into the annular mixing space, respective mixing shovels at the feet of said arms, said casing rotatively supported from said cover, a driving motor mounted to the underside of said cover, said cover thereby holding said driving motor stationary, transmission gearing within said casing, said driving motor having a shaft extending through said cover and connected to drive an input gear wheel of said transmission gearing, said transmission gearing including first and second planet gearings journalled eccentrically from said casing, said first and second planet gearings each comprising two coaxial planet gear wheels fast with each other and of unequal diameters, and a sun gear wheel coaxially fast with said casing, said input gear wheel meshing the larger diameter gear wheel of said first planet gearing, the smaller diameter gear wheel of said first planet gearing meshing the larger diameter gear wheel of said second planet gearing and the smaller diameter gear wheel of said second planet gearing meshing said sun gear wheel whereby said driving motor will rotate said casing.

8. A mixing machine, for producing concrete, comprising a stationary circular tank, a stationary circular inner wall coaxially within said tank and defining with it an annular mixing space, a cover fast at the top of said inner wall, a closed casing coaxially above said inner wall, said casing provided with a circular arrangement of bearings having their axes directed radially of said tank, respective arms pivotally supported from said bearings so as to depend into the annular mixing space, respective mixing shovels at the feet of said arms, said casing rotatively supported from said cover, a driving motor supported from said cover, planetary transmission gearing within said casing, said planetary transmission gearing including two sun wheels, said sun wheels coaxial with each other but axially spaced from each other, stationary structure, one of said sun wheels fast with said stationary structure, the other of said sun wheels driven by said driving motor, said planetary transmission gearing also including first and second planet gearings journalled eccentrically from said casing, said first and second planet gearings each comprising two coaxial planet gear wheels fast with each other and of unequal diameters, the larger diameter gear wheel of one of said planet gearings meshing the smaller diameter gear wheel of the other said planet gearings, and the other gear wheels of said planet gearings respectively meshing said sun wheels whereby said driving motor is adapted to drive said casing.

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