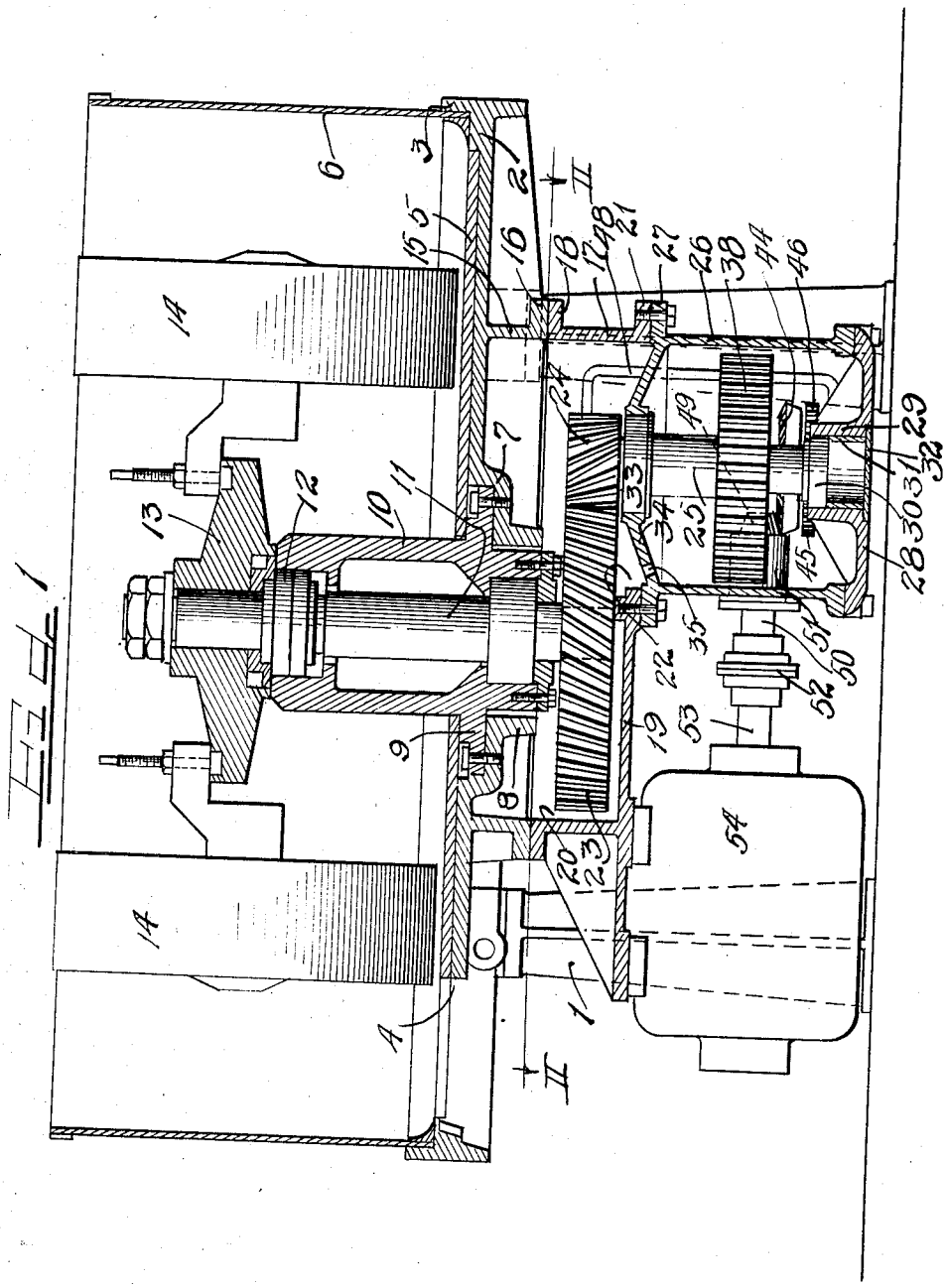
Oct. 17, 1939. A. C. CHRISTENSEN 2,176,207

UNIT DRIVE MIXING MACHINE

Filed March 5, 1938 2 Sheets-Sheet 1



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Fig. 2

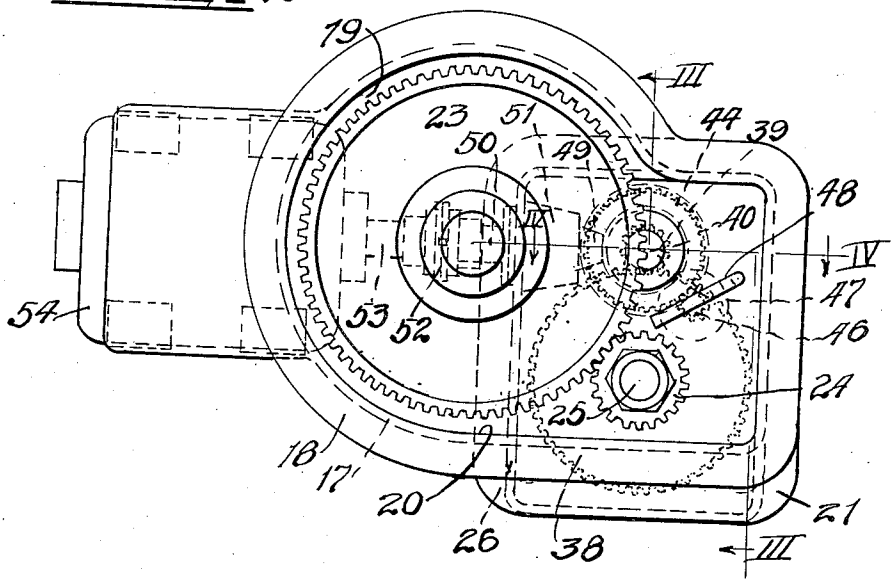


Fig. 3

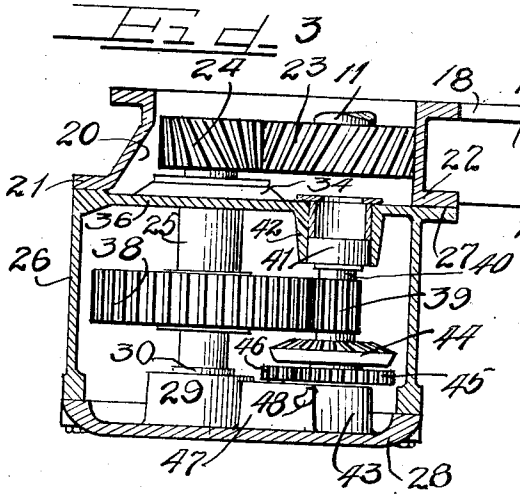
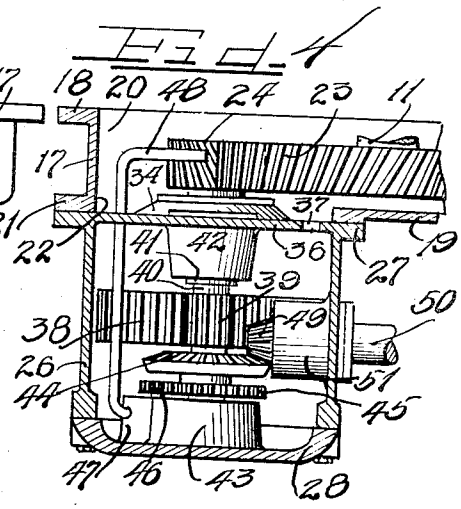


Fig. 4



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UNIT DRIVE MIXING MACHINE

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3 Claims. (Cl. 74—606)

This invention relates to a mixer for use in foundry practice and the like for mixing new and old molding sands for properly mulling and kneading the sands to form the required mixture. In old types of sand mixers the driving and operating mechanisms for the mullers and plows are generally exposed so that they are subject to the foundry dust and dirt and have been furthermore arranged so that when repairs are needed to one or more of the parts it becomes necessary to disassemble substantially the entire machine before access can be had to the parts requiring replacement.

In the present invention, a mixing machine has been devised wherein the mixing and mulling members within the container or mixing box are adapted to be operated by means of an improved drive unit consisting of a plurality of connected housing units for enclosing the driving gear mechanisms and so arranged that the gear mechanisms in the various housing sections are adapted to be readily accessible for replacement or repairs without necessitating the dismemberment of substantially the whole machine.

It is an object of this invention to provide an improved foundry mixing machine wherein the mulling and kneading mechanisms within the container or mixing box are connected to be driven by a unit drive connected between a driving motor and a driving shaft for the mechanism within the container or mixing box.

It is also an object of this invention to provide an improved type of foundry mixer with a unit drive of the encased type wherein the housing is arranged in connected sections for enclosing various groups of driving members affording an arrangement whereby the driving members may be readily repaired or replaced by simply opening or removing one or more of the housing sections.

It is furthermore an object of this invention to provide a foundry mixer with an easily accessible and remountable unit drive connected between the main vertical shaft and the source of driving power of the mixer.

It is an important object of this invention to provide an improved and simplified form of foundry mixer by providing a unit drive between the main driving shaft and the driving shaft of the mixing mechanism, said unit drive including an easily disassembled section or housing enclosing a lubricant pump and speed reducing gear sets which are completely enclosed and protected against dust and dirt and are furthermore readily accessible for replacement or repairs without necessitating dismemberment of substantially the entire mixer.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a vertical section of a foundry mixer embodying the principles of this invention and illustrating the operating parts in elevation.

Figure 2 is a top plan view of the unit drive and motor taken on line II—II of Figure 1 with the supporting pedestals of the mixer omitted.

Figure 3 is a vertical detail section through the unit drive taken substantially on line III—III of Figure 2.

Figure 4 is another vertical detail section through the unit drive taken substantially on line IV—IV of Figure 2 with the interior mechanisms shown in elevation.

As shown on the drawings:

The foundry machine comprises a plurality of pedestals or upright posts 1 having rigidly supported on the tops thereof a bed plate or bottom 2 provided with an integral marginal flange or rim 3. The bed plate 2 is provided with a discharge opening 4 adapted to be closed by means of a door, which is omitted. The top surface of the bed plate 2 is recessed, and has rigidly seated therein a steel plate 5. Positioned upon the bed plate 2 adjacent the inner side of the upper portion of the flange 3 is a mixing box or container 6 for receiving the new and old molding sands which are to be mulled and mixed. Integrally formed in the middle portion of the bed plate 2 and projecting downwardly therefrom is a seat 7 which terminates in a downwardly projecting neck or collar 8.

Engaged in the bed plate seat 7 is a flange portion 9 of a bearing turret 10 in which a main vertical mixing shaft 11 is journalled. Engaged in a recess in the upper end of the turret 10 is a thrust bearing 12 through which the upper end of the main shaft 11 projects. Supported on the upper projecting end of the vertical main shaft 11 is a cross head or spider 13 which carries the mullers 14 and the mixing plows usually provided in standard foundry sand mixers.

Integrally formed on the bottom of the bed plate 2 is a downwardly projecting top housing section 15 provided with an integral outwardly projecting horizontal supporting flange 16, to which the casing or housing of the unit drive

mechanism is adapted to be rigidly but removably secured.

The unit drive mechanisms for operating the main mixer shaft 11 at a required speed comprises an upper housing section 17 provided with an upper flange 18 which seats tightly against the bottom of the bed plate flange 16 and is removably secured thereto by means of bolts or other suitable securing devices. The upper casing or housing section 17 has the bottom thereof partially closed by means of a bottom plate 19 providing an upper gear receiving chamber 20 within the upper housing section 17. A lower flange 21 is integrally provided on the upper housing section 17. An opening 22 is provided in the bottom of the upper housing section 17.

Disposed within the chamber 20 of the upper housing section 17 is large helical gear 23 which is secured on the lower projecting end of the main vertical mixing shaft 11. The large helical gear 23 meshes with a small helical gear or helical pinion 24. The helical pinion 24 is mounted on the upper end of an auxiliary vertical shaft 25 forming part of a lower speed reduction unit mounted within a lower housing section 26. The lower housing section 26 encloses a lower set of speed reduction gears and a pump mechanism. Integrally formed on the upper end of the lower auxiliary housing section 26 is a flange 27 which is removably secured by bolts or other suitable fastening means to the lower flange 21 of the upper housing section 17. The lower housing section 26 has the bottom thereof closed by means of a removable bottom or base 28 which is retained in place by means of screw bolts or other suitable fastening means. Integrally formed on the inner surface of the bottom 28 is a bearing sleeve 29 in which a thrust bearing 30 for the lower end of the auxiliary shaft 25 is mounted. A removable inner sleeve 31 and a closure plate 32 (Figure 1) are engaged in the lower end of the bearing sleeve 29 to hold the thrust bearing 30 in place. Engaged around the upper portion of the auxiliary shaft 25 is an upper thrust bearing 33 which, in turn, is supported in place in a conical closure or cover 34 forming an integral part of a top closure plate 36 of the lower housing section 26. The conical cover portion 34 is provided with a drain opening or aperture 35 to permit oil from the upper chamber 20 to drain back into the lower housing section 26. As illustrated in Figure 4, the top 36 of the lower housing section 26 is, also, provided with an oil return aperture or opening at 37.

Keyed or otherwise secured on the lower auxiliary shaft 25 within the housing section 26 is a large gear 38 which forms a part of a lower speed reduction gear group. The gear 38 meshes with a pinion 39 which is keyed or otherwise secured on a vertical shaft 40, the upper end of which is journalled in a thrust bearing 41 mounted within a bearing sleeve 42 projecting downwardly from the top or cover 36 of the lower housing section 26, as clearly illustrated in Figure 3. The lower end of the vertical shaft 40 is journalled within a suitable thrust bearing mounted within a bearing housing or sleeve 43 formed on the inner face of the bottom 28 of the auxiliary housing section 26. Also keyed or secured on the shaft 40 below the pinion 39 is a bevel gear 44. Mounted on the shaft 40 beneath the bevel gear 44 is a gear 45.

The gear 45 is in mesh with and drives a small gear 46 which is mounted on the upper projecting end of a shaft forming part of an oil pump 47. The lower end of an oil distributing tube or pipe 48 is connected with the oil pump 47, and said tube 48 projects upwardly through the top 36 of the housing section 26 and into the chamber 20 of the upper housing section, with the upper end of the oil tube 48 positioned adjacent the helical gear or pinion 24 to spray oil thereon to lubricate the upper set of speed reduction gears within the housing section 17.

The sets of gear mechanisms in the unit drive are operated from a beveled pinion 49 which is mounted on the inner end of a shaft section 50 journalled in a suitable bearing 51 supported in one of the walls of the auxiliary housing section 26. The auxiliary driving shaft 50 is connected by means of a coupling 52 to the shaft 53 of an electric driving motor 54.

With the provision of a completely enclosed unit drive mechanism between the driving motor 54 and the mulling and kneading mechanisms within the mixing box 6, an improved foundry mixing machine is provided in which the pump mechanism and the gear reduction groups provided in the sections of the demountable housings of the unit drive are readily accessible for replacement or repairs due to the novel arrangement of the sectional housing. The sectional housing of the unit drive also serves as a protecting means for the pump and gear mechanisms to keep the same clean and free from the dust and dirt which usually circulates around mixing machines in foundries and the like.

It will, of course, be understood that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In a mixing machine having a centrally located vertical axle, a bed-plate having an integrally formed depending annular flange, a first casing removably secured to and depending from said flange and forming therewith a housing for gear wheels cooperating with the axle, said casing having a closure member partially closing its lower end and extending outwardly therefrom to provide a bracket adapted to support a prime mover, a second annular casing removably secured to and depending from said first casing, said second casing cooperating with said closure member to completely close the lower end of said first casing.

2. In a mixing machine having a centrally located vertical axle, a bed-plate, a first casing removably secured to and depending from said bed-plate and adapted to house a horizontally disposed gear attached to the axle, said first casing being arranged to have a prime mover secured to and depending therefrom, a second casing removably secured to and depending from said first casing and disposed to one side of the vertical axis of said axle, said second casing having a closure member at its upper end arranged to carry a journal, and cooperable with the other closure means on said first casing to close the lower end of said first casing, a closure member removably secured to the lower end of said first casing and arranged to carry a bearing for a vertical shaft having gear means thereon for connection with said motor in said second casing revolvable in the upper and lower closure members of said second casing.

3. In a mixing machine having a centrally located vertical axle mounted in a thrust bearing on a bed-plate, a first annular casing removably

secured to and depending from said bed-plate and forming a housing for a horizontally disposed gear wheel connected with the axle, a second casing removably secured to and depending from said first casing and disposed on one side of the vertical axis of the axle, said second casing being arranged to have a prime mover secured thereto and depending therefrom on the opposite side of the vertical axis of the axle, means forming a closure for the lower end of said first casing and including a closure member on the upper end of said second casing formed integral with said second casing and carrying a journal, means forming a closure member removably secured to the lower end of said second casing and carrying a journal, said second casing being adapted to have a vertical shaft revolvably mounted in the upper and lower closure members of said second casing and which carries gear means connected with said prime mover and with said axle.

ALFRED C. CHRISTENSEN.