

C. McCORMICK.
BALL AND DRUM PULVERIZING MILL.
APPLICATION FILED FEB. 9, 1911.

1,057,649.

Patented Apr. 1, 1913.

2 SHEETS-SHEET 1.

Fig. 1.

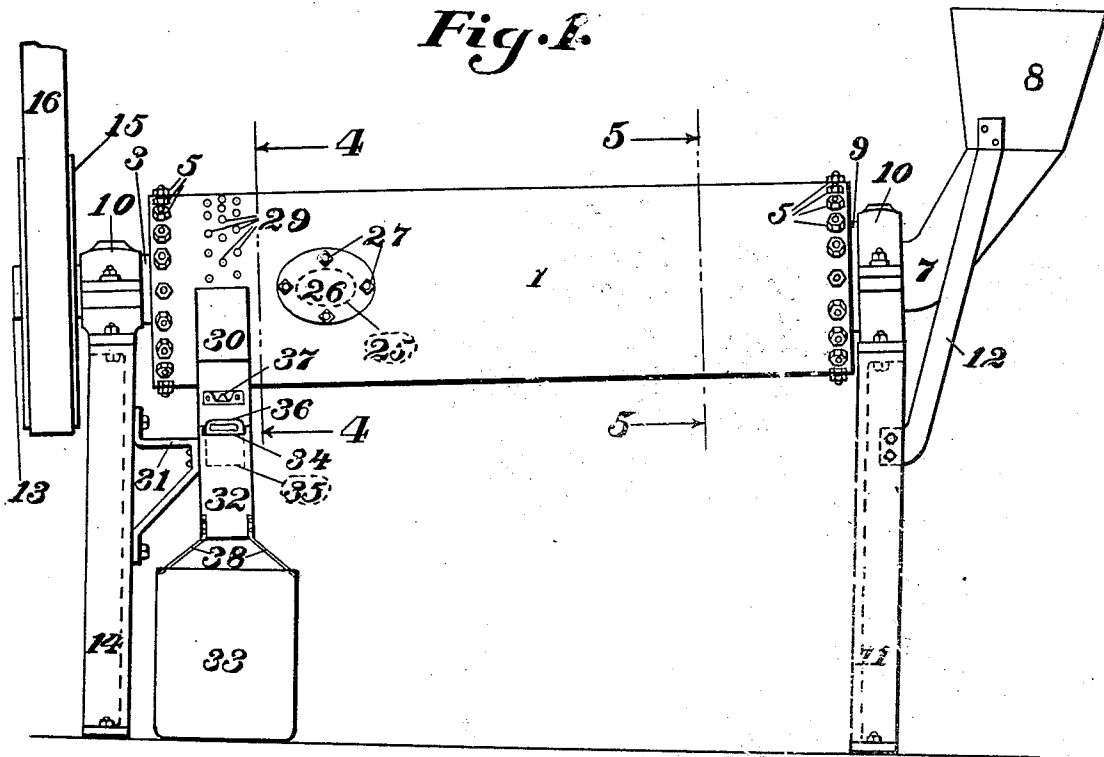
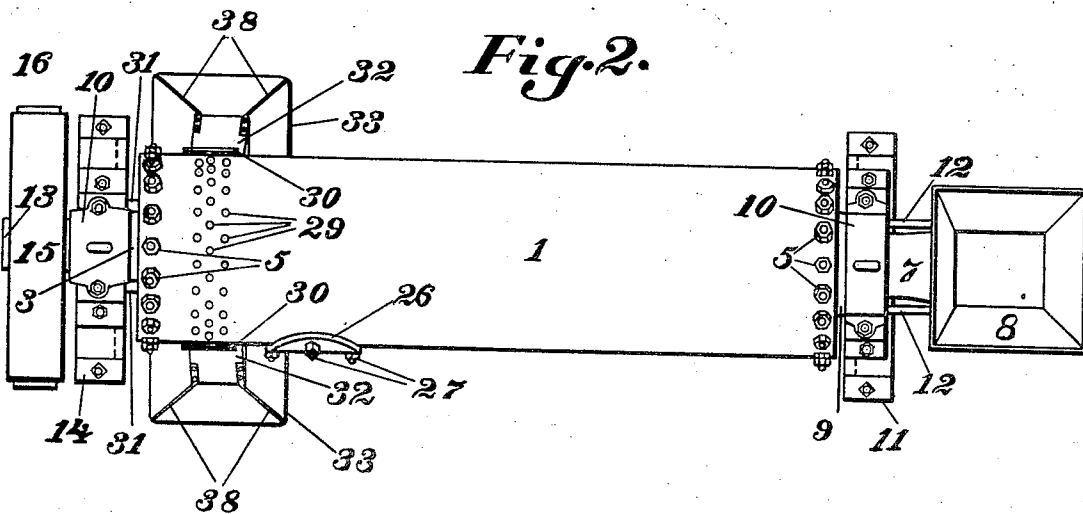


Fig. 2.



Witnesses:

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Harry H. Peiss.

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2 SHEETS—SHEET 2.

Fig. 3.

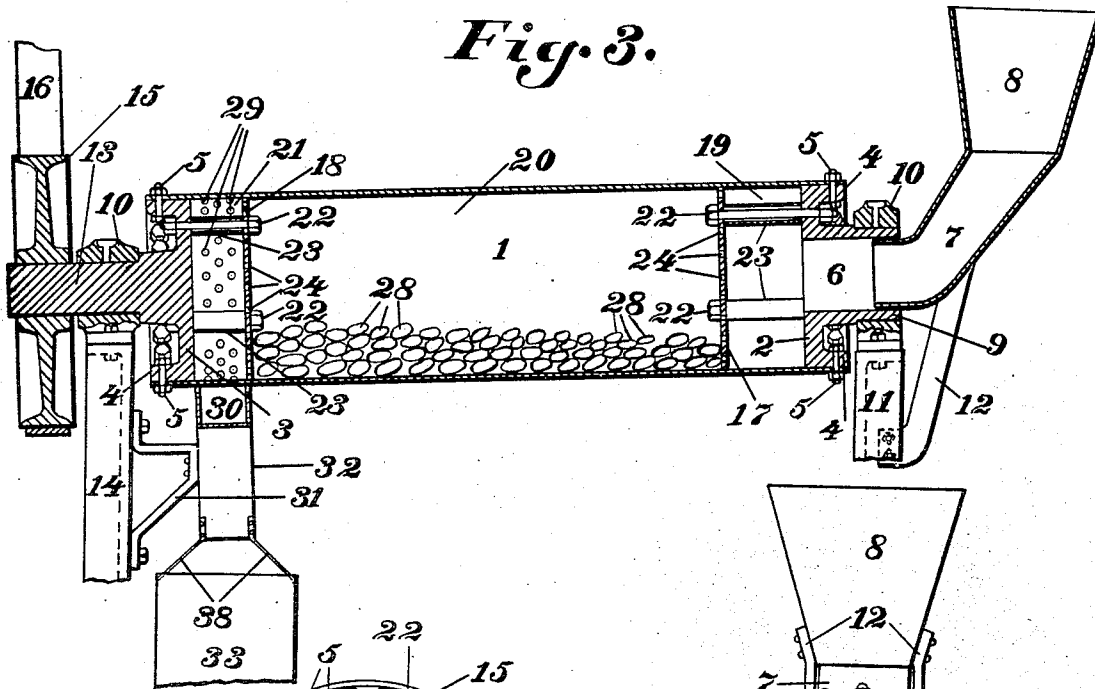


Fig. 4.

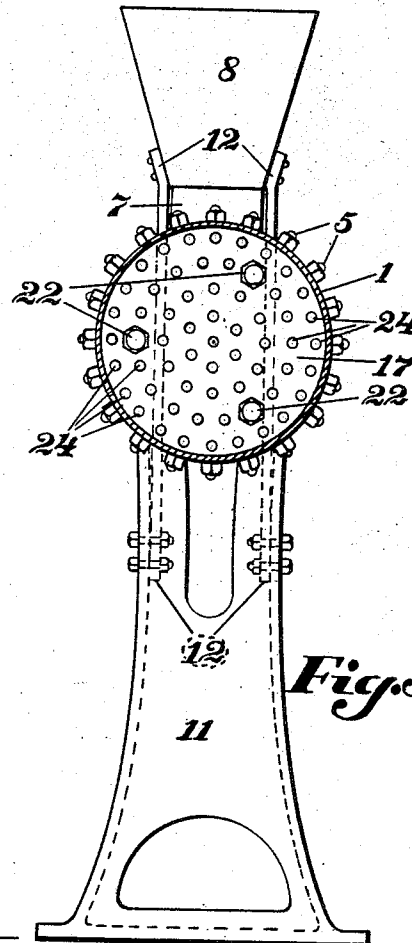
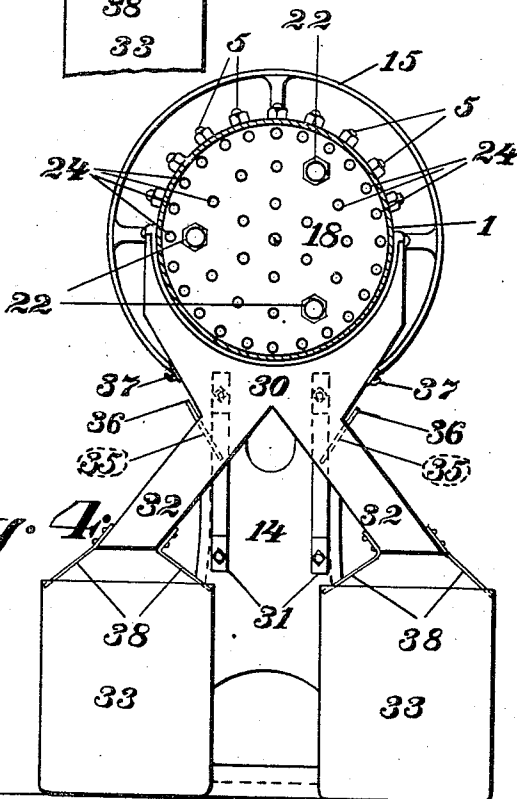


Fig. 5.

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UNITED STATES PATENT OFFICE.

CHARLES McCORMICK, OF ST. LOUIS, MISSOURI.

BALL-AND-DRUM PULVERIZING-MILL.

1,057,649.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed February 9, 1911. Serial No. 607,564.

To all whom it may concern:

Be it known that I, CHARLES McCORMICK, a citizen of the United States, residing in the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Ball-and-Drum Pulverizing-Mills, of which the following is a specification.

This invention relates to cement-mixing machinery, and has for its object to provide an improved machine of this character that is primarily intended for use in mixing the ingredients of the waterproof Portland cement disclosed in my United States Patent No. 931,884, issued August 24, 1909, though adapted, of course, for use in mixing the ingredients of other compounds.

In the accompanying drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur, Figure 1 is a side elevation of a mixer embodying this invention; Fig. 2 is a top plan view of same; Fig. 3 is a longitudinal sectional view of Fig. 2; Fig. 4 is a sectional view, on an enlarged scale, on the line 4-4, Fig. 1; and Fig. 5 is a sectional view, on an enlarged scale, on the line 5-5, Fig. 1.

Throughout the specification, wherever the word compound is used, same is intended to mean not only the waterproof Portland cement hereinabove referred to, but any other compound.

The machine comprises a hollow drum or cylinder 1 the receiving and discharging ends of which are closed by means of heads 2 and 3, respectively, each of said heads having an annular flange 4 which is fastened to said drum by bolts 5 or other suitable means. The head 2 contains an opening 6 through which the ingredients of the compound to be mixed are fed into said drum from spout 7 of a hopper 8 and bears a hub 9, which is journaled in a journal-box 10, supported on a suitable standard 11, said hopper being supported by means of braces 12 that are bolted or otherwise secured to said standard. A shaft 13 is preferably formed integrally with head 3 and is likewise journaled in another journal-box 10, supported on standard 14. A pulley 15 is rigidly mounted on shaft 13 and is driven by belt 16, which receives its power from any suitable source, or, if desired, a handle (not shown) may be attached to said pulley, in order to afford a means by which same can be rotated by hand. The standard 11 is of greater height,

than the standard 14 and holds the receiving end of drum 1 higher than the discharging end thereof, so that the axis of rotation slopes downwardly from standard 11 to standard 14. By this arrangement, while the compound is being mixed by the rotary movement of the drum 1, as hereinafter described, gravity causes the same to travel from head 2 to head 3. The slope of the drum 1, however, is preferably slight, so that the compound travels slowly there-through, with the result that the compound is subjected to the rotary movement of said drum sufficiently to cause the ingredients of same to become thoroughly mixed.

The drum 1 is, by means of diaphragms 17 and 18, divided into three compartments, viz., a receiving compartment 19 located between head 2 and diaphragm 17, a mixing compartment 20 located between the diaphragms 17 and 18, and a discharging compartment 21 located between the head 3 and diaphragm 18, the capacity of the receiving compartment being preferably larger than the capacity of the discharging compartment, and the mixing compartment being considerably larger than either the receiving or the discharging compartment. The diaphragms 17 and 18 are connected to the heads 2 and 3, respectively, by means of bolts 22 and are spaced the desired distances therefrom by sleeves 23, through which said bolts pass, or by any other suitable means. Said diaphragms contain a plurality of perforations 24 through which the ingredients of the compound that enters the receiving compartment 19, as hereinabove described, pass into the mixing compartment 20 and then, after same are mixed in said compartment 20, the compound passes into the discharging compartment 21. The diaphragm 17 preferably contains a greater number of perforations 24 than the diaphragm 18, so as to allow the ingredients of the compound to pass from the receiving compartment 19 into the mixing compartment 20 faster than what the compound passes from the mixing compartment 20 into the discharging compartment 21. The result of this construction is that the compound is prevented from feeding too rapidly from the mixing compartment 20 and is retained therein sufficiently to allow the ingredients of same to become thoroughly mixed.

A hand-hole 25 is formed in drum 1 and

is preferably located near the diaphragm 18, so as to communicate with the lower end of the mixing compartment 20, being closed by a plate 26 that is fastened to said drum by means of bolts 27, or the like. When the plate 26 is removed, the hand-hole 25 affords an access to the mixing compartment 20, so as to permit same to be cleaned or to allow the pebbles or stones 28 or similar hard and weighty objects to be inserted into said compartment or removed therefrom. A quantity of pebbles or stones 28 that is preferably sufficient to fill the bottom part of the mixing compartment 20 is placed within same, and the hand-hole 25 is then closed by means of the plate 26. As the drum 1 rotates, the pebbles 28 roll over and over and tumble about with the ingredients of the compound within the mixing chamber and thereby not only breaks up any lumps of the ingredients, but thoroughly mixes the ingredients before the compound passes from said mixing compartment into the discharging compartment 21 in the manner hereinabove described.

Perforations 29 are formed in the periphery of the particular part of the drum that forms the wall of the discharging compartment 21, and allows the compound to discharge from said compartment. A suitable hopper or receptacle 30 underlies the discharging compartment 21, in order to receive the compound that discharges from perforations 29, and is supported by means of a bracket or brackets 31 bolted or otherwise secured to standard 14. Said hopper bears a discharge spout or spouts 32 from which the compound discharges into sacks or bags 33 or any other suitable receptacle or receptacles that may be supported upon the floor or other support. Each spout 32 is provided with a slot 34 through which a plate or gate 35 extends for the purpose of controlling the passage of the compound through said spout. Plate 35 bears a handle 36 by means of which same can be moved inwardly and outwardly through slot 34 in order to close and open the passage through spout 32. When the plate 35 is drawn outwardly to open the spout 32, its handle 36 can be hooked over a hook 37, or the like, borne by hopper 29 and thereby be held in position to allow the compound to discharge through said spout into a sack or bag 33. Springs 38 are fastened to spout 32 by any suitable means and are arranged to hold the mouth of a sack 32 open beneath the mouth of said spout, so as to hold said sack in the correct position to receive the compound that discharges from said spout. Whenever it is desired to place a sack 33 in position to receive the compound that is allowed to discharge from a spout 32, the springs 38 borne by said spout are sprung inwardly in order to fit into the mouth of said sack and then

are released to hold the mouth of the sack open. The plate 35 which controls the passage of the compound through spout 32 is drawn outwardly to allow the compound to discharge into the sack. After the desired amount of compound has discharged into the sack, the flow thereof is cut off by moving the plate 33 inwardly to close the spout 32, after which the springs 38 are sprung inwardly so that the filled sack can be removed and an empty one put in its place to be filled as hereinabove described.

The operation of the machine is evident from the above description, but may be summarized as follows: The drum 1 is rotated either by the application of power from any suitable source to belt 16 or by rotating pulley 15 by hand, the direction of rotation being immaterial. The ingredients of the compound to be mixed are placed or fed in their proper proportions into hopper 8 from which they discharge through spout 7 into the receiving compartment 19. The ingredients that enter the receiving compartment 19 are agitated by the rotary movement of the drum and, due to the fact that the drum slopes downwardly from the receiving compartment, the ingredients are caused to pass through the perforations 24 in diaphragm 17 into the mixing compartment 20. The ingredients gravitate slowly through the mixing compartment, while, at the same time, the rolling and tumbling of the pebbles 28 in said mixing compartment churn and mix the ingredients, with the result that the mixture of the ingredients in their proper proportions is uniformly disseminated throughout the mass of cement or compound. The mixed cement or compound gravities through the perforations 24 in diaphragm 18 into the discharging compartment 21 and then discharges through the perforations 29 into the hopper 30, from which same passes ready for use into the sacks 33, as hereinabove described.

I claim:

In a cement mixer, an inclined drum, an imperforate head at one end of the drum, a perforated diaphragm in the drum spaced from said head to form a discharging chamber in conjunction therewith, the drum being formed with peripheral perforations in the space between said head and diaphragm, a head at the opposite end of the drum having an inlet opening, a perforated diaphragm in the drum located in spaced relation to the last named head to form a receiving chamber, said diaphragms being of similar structure and the perforations thereof being of the same diameter, the first named diaphragm having a less number of perforations than the second named one, the diaphragm of the receiving chamber being located at a greater distance from the head having the inlet opening than the distance

between the imperforate head and the first
named diaphragm to provide a receiving
chamber that is larger than the discharging
chamber, and a series of balls or the like be-
5 tween the diaphragms, there being, due to
the inclination of the drum, a greater quan-
tity of said balls in engagement with the
diaphragm of the discharging chamber than

are in engagement with the diaphragm of
the receiving chamber.

In testimony whereof I hereunto affix my
signature in the presence of two witnesses.

CHARLES McCORMICK.

Witnesses:

GLADYS WALTON,
GEORGE G. ANDERSON.

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