E. L. CRIDGE.

CONCRETE MIXING MACHINE.

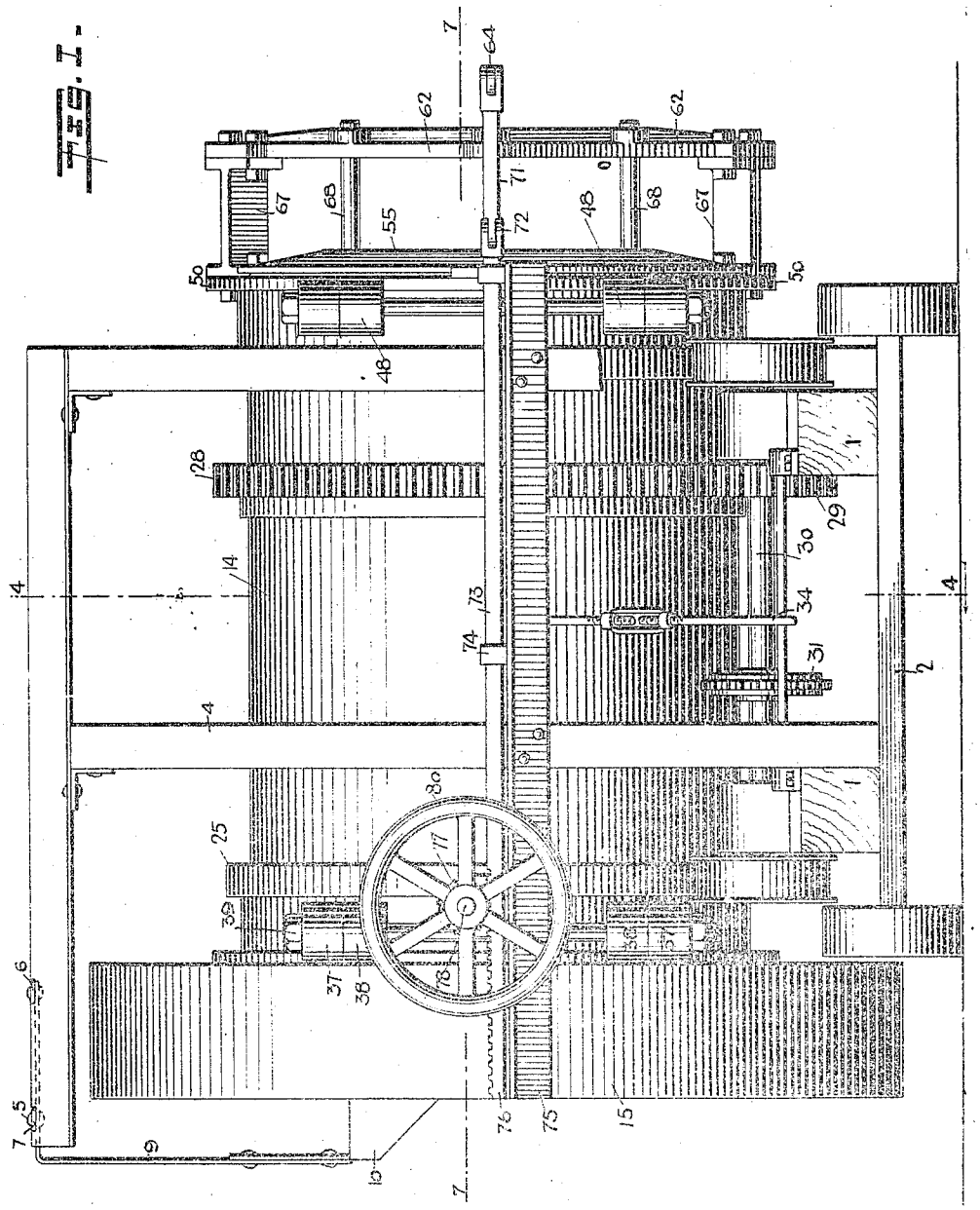
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1,085,548.

Patented Jan. 27, 1914.

6 SHEETS—SHEET 1.

Fig. 1.



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6 SHEETS—SHEET 2.

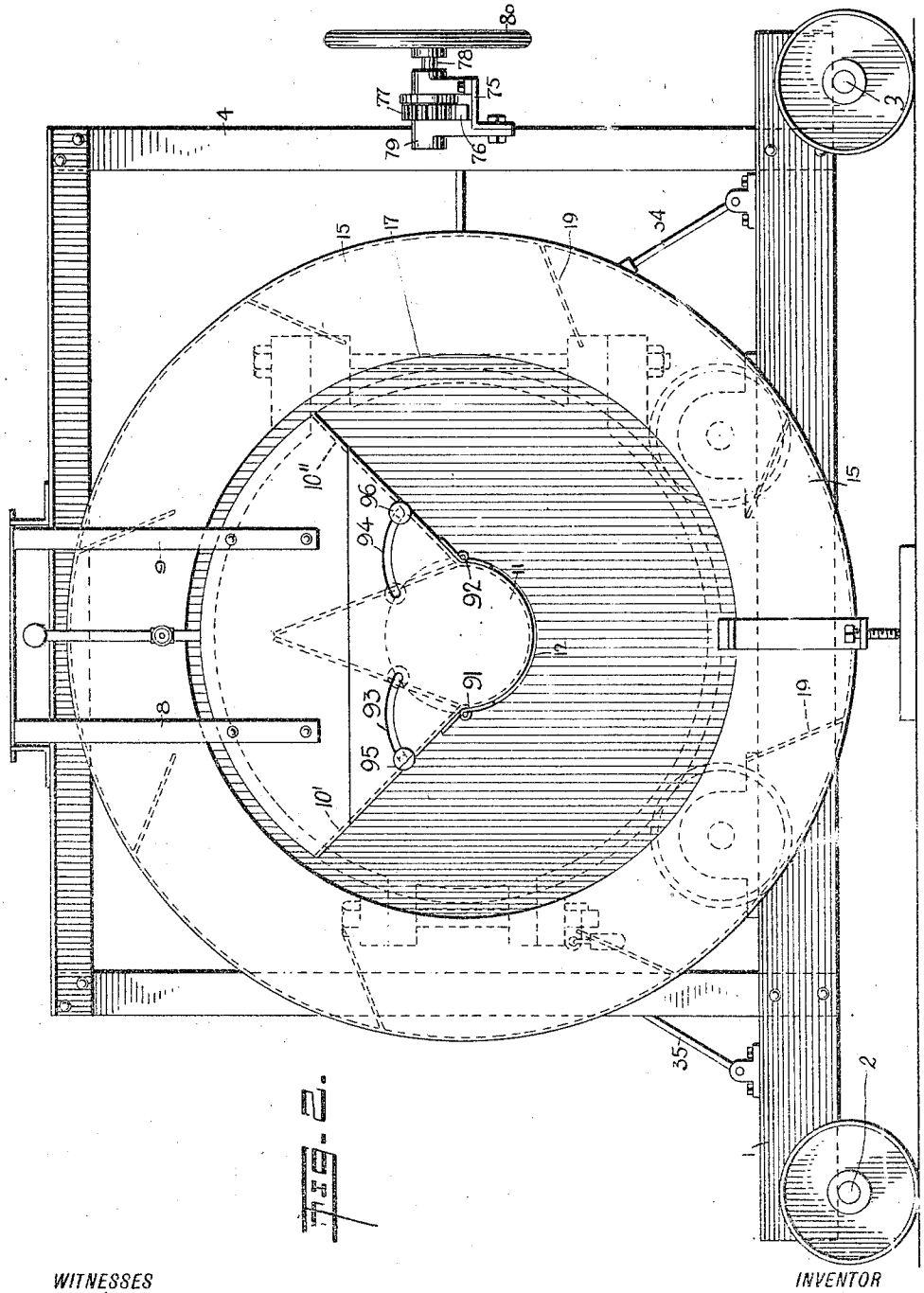


Fig. 2.

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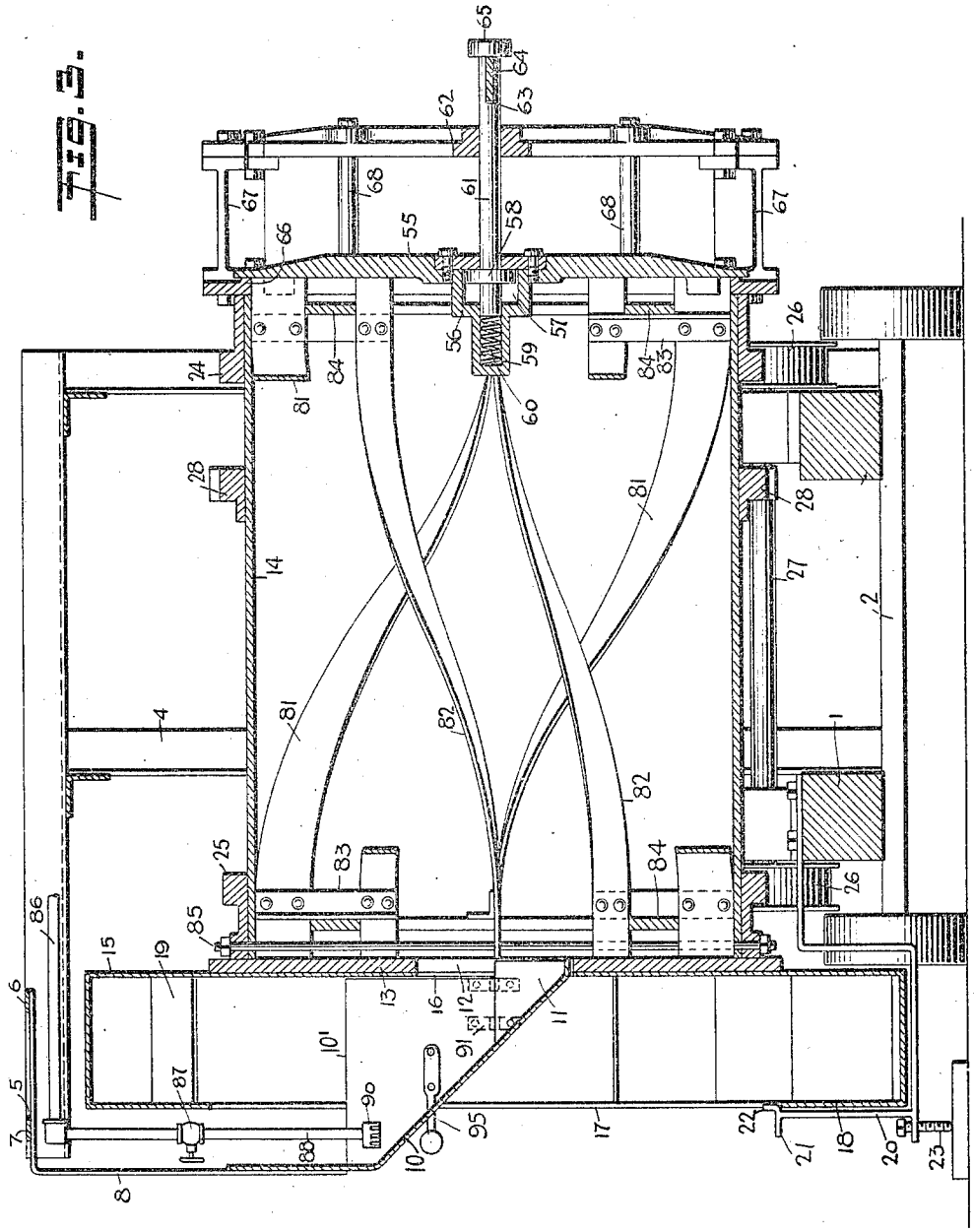
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6 SHEETS—SHEET 3.

Fig. 3.



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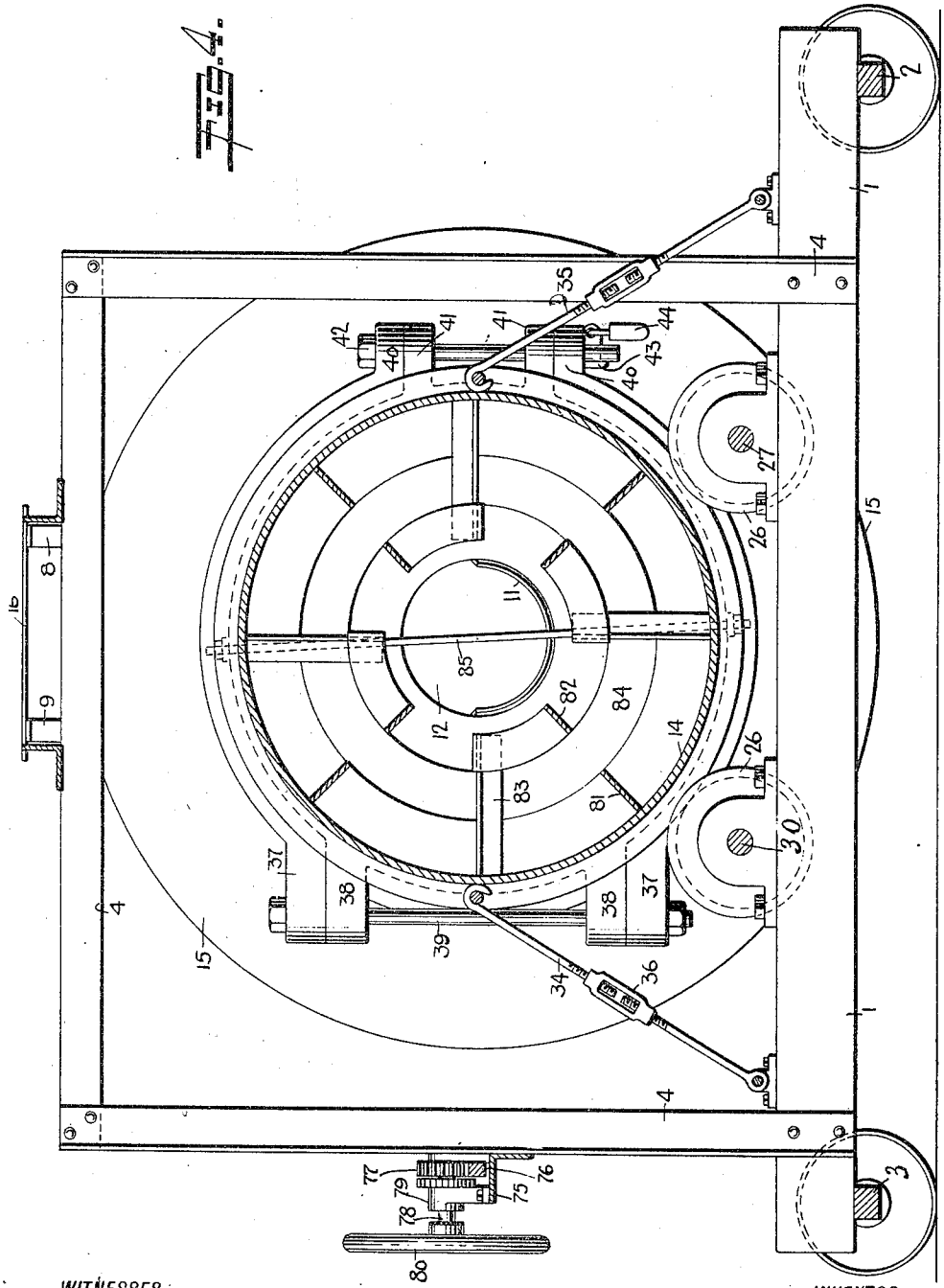
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6 SHEETS—SHEET 4.

Fig. 4.



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6 SHEETS—SHEET 5.

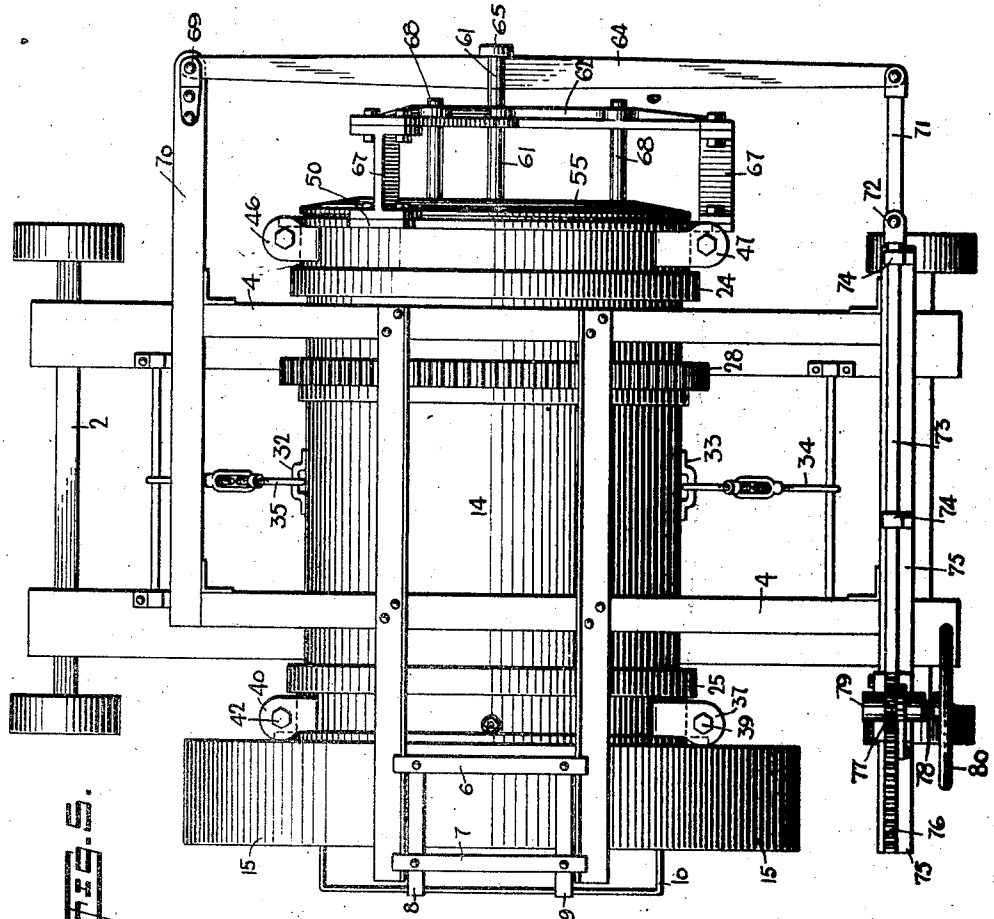


FIG. 5.

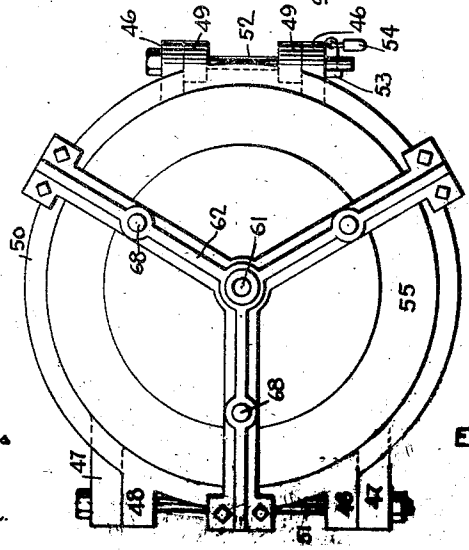


FIG. 6.

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6 SHEETS—SHEET 6.

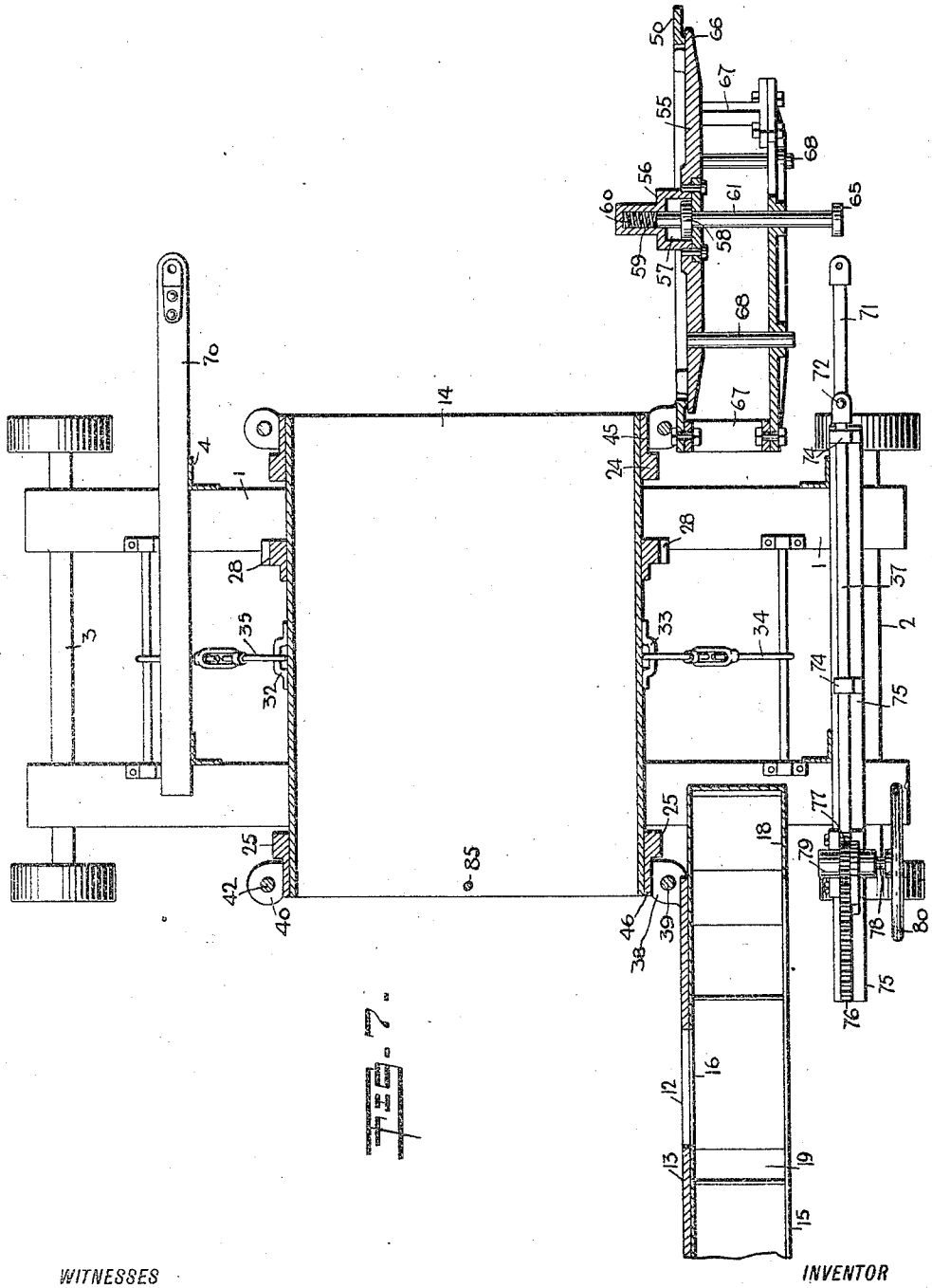


FIG. 7.

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UNITED STATES PATENT OFFICE.

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CONCRETE-MIXING MACHINE.

1,085,548. Specification of Letters Patent. Patented Jan. 27, 1914.

Application filed January 7, 1913. Serial No. 740,586.

To all whom it may concern:

Be it known that I, EDMUND L. CRIDGE, a citizen of the United States, and a resident of Passaic, in the county of Passaic and State of New Jersey, have invented a new and Improved Concrete-Mixing Machine, of which the following is a full, clear, and exact description.

This invention relates to improvements in concrete mixing machines of the revolving type, and has for an object to provide a machine of this type which may be used as a "batch type" so-called, or may be used as a "continuous type" so-called, for mixing the concrete in predetermined quantities, or in a continuous stream, as may be desired for any particular purpose.

A further object of the invention is to provide an improved structure in which the discharge end is provided with a cap or plate, which may be easily applied and removed so as to entirely close the cylinder, or to entirely open the same, whereby either the "batch type" or "continuous type" of machine may be presented.

A still further object of the invention is to provide a machine in which the discharge end has a cap covering the entire end, and a plurality of mixing blades connected together for forming a cylinder construction which may be bodily removed at any time after the cap has been removed, by reason of the fact that the end is entirely open, thus facilitating the repairing of the inner part of the machine and of the cleaning thereof.

In carrying out the objects of the invention, a rotating cylinder is provided, in which a removable mixer is arranged, the ends of the cylinder being formed so as to move pivotally from a position in contact with the cylinder to a position entirely uncovering the end of the cylinder, whereby the mixing blades may be bodily removed, and the cylinder washed or repaired, as desired. The discharge end of the cylinder is adapted to be closed by a cap which entirely covers that end, and which is held in place by a spring-pressed plunger operated or held properly under tension by a suitable lever mechanism, or if desired, by other controlling mechanism. At the front or intake end of the cylinder, is arranged a hopper held stationary by a suitable framework, the hopper projecting through the end of the cylinder for a short distance in order to properly deposit the various materials within the cylinder. Connected to the cylinder at the hopper end, is an elevator or feeding device, formed as an enlarged drum having flights or partitions into which is deposited the various matter to be mixed, and which is elevated and finally dumped or discharged into a chute from which it passes by gravity into the cylinder.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side view of a mixing machine embodying the features of the invention; Fig. 2 is a front view of the structure shown in Fig. 1; Fig. 3 is a longitudinal vertical central section through the structure shown in Fig. 1; Fig. 4 is a transverse section through Fig. 1, approximately on the line 4—4; Fig. 5 is a top plan view of the structure shown in Fig. 1 the same being shown on a slightly reduced scale; Fig. 6 is an elevation of the cap and associated parts at the rear end of the cylinder; and Fig. 7 is a longitudinal horizontal sectional view through Fig. 1, approximately on the line 7—7, with the ends or heads in an open position the showing being on a reduced scale.

Referring to the accompanying drawings, one embodiment of the invention is shown, which may be variously adjusted so as to be used as either a "batch type" or "continuous type" of concrete mixer. When used as either of these types of machine, the mechanism is such as to be readily opened and taken apart so as to easily clean the interior of the cylinder, and to have access to all of the parts of the machine without considerable trouble. The idea of opening up the machine, as shown in Fig. 7, for washing the same out after stopping work, is of considerable importance, as the same is easily cleaned while the cement or concrete mixture is green, but very hard to clean after the mixture has hardened or set.

Referring to the accompanying drawings

by numerals, 1 indicates a base of any desired kind, to which are secured axles 2 and 3, on which are mounted suitable traction wheels. Connected with the base 1, is a framework 4, the same being formed of angle iron, or any other desired material. The upper part of the framework is provided with a plurality of notches 5, in which cross bars 6 and 7 are fitted, the cross bars 6 and 7 having connected therewith supporting arms 8 and 9, to which is rigidly secured a feeding chute 10. This chute is provided with an extension 11 extending into an opening 12 in the end 13 of the cylinder 14, so that the material dumped into chute 10 will naturally gravitate into the interior of cylinder 14, where the same will be mixed as the cylinder rotates. The sides 10′ and 10″ are hinged at 91 and 92 respectively so as to be moved to the dotted position shown in Fig. 2, or to the open position as disclosed in Fig. 3. The outer end of the chute 10 is formed with slots 93 and 94 for accommodating operating arms or members 95 and 96 connected with the sides 10′ and 10″ so that these sides may be moved pivotally to the dotted position shown in Fig. 2, or to an open position, as shown in Fig. 3. By this construction and arrangement material may be allowed to pass through the chute into and through opening 12 in the end 13, or may be prevented from entering this opening. This construction and arrangement is very desirable in connection with the elevator 15 hereinafter fully described, which is adapted to elevate and feed material to the chute.

When it is desired to use the machine as a batch mixer, the sides 10′ and 10″ are opened or moved to the position shown more clearly in Fig. 3, and maintained in the open position until the elevator 15 has discharged into the chute and drum 14 a sufficient quantity to make a complete batch. When this has occurred, the sides 10′ and 10″ are closed, as shown in dotted lines in Fig. 2, and the rotation of cylinder 14 and elevator 15 is continued, whereupon the batch in the cylinder or drum 14 will be thoroughly mixed in a wet condition, water being supplied from a suitable source, as hereinafter fully described, while the new material being elevated by elevator 15 will be discharged against the outside surfaces of the sides 10′ and 10″, which will cause the material to drop down to the lower part of the elevator and thus become mixed while in a dry state thus resulting in a combined wet mixer and dry mixer. After the first batch has been removed from the drum or cylinder 14, the sides 10′ and 10″ are opened and the mixed batch in the elevator is allowed to be discharged into the chute or hopper 10 until the correct amount has been fed into the drum 14. The sides 10′ and 10″ are then closed and the action repeated so that by the use of the pivotally mounted sides 10′ and 10″, a machine is produced which will be simultaneously mixing a wet batch and a dry batch. It will be evident that this will cause a maximum output from a mixer as the dry batch when mixed requires only a short mixing after being placed in drum 14 and supplied with water, as the principal mixing has already taken place. It will also be noted that this construction allows a continuous operation of the machine but a mixing in separate compartments or places of the dry batch or the wet batch.

In order that material may be fed into the hopper 10, an elevator 15 is provided which is rigidly secured by bolts, or any other desired means, to the end plate 13 so as to rotate with the drum 14. The elevator 15 is formed in the shape of a drum, having an opening 16 of substantially the same size as the opening 12 in the head or end 13, and with a second opening 17 of ample size to accommodate the hopper 10, whereby a comparatively low annular flange 18 is provided on the outside surface of the elevator for preventing material from moving laterally therefrom. Arranged on the inner periphery of the elevator 15, are a plurality of flights 19, which are adapted to catch matter dumped into the elevator and raise the same to a point above the hopper 10 and discharge the matter by gravity into the hopper 10. These flights may be set at a tangent, or radially with respect to the periphery of the elevator. In the base 1, preferably at the lowermost point of the elevator 15, is a bracket 20, formed with an extension 21, and a raised flange 22. The extension 21 is adapted to receive the edge of a wheelbarrow of any kind, in order that when the contents of the wheelbarrow are being dumped into the elevator, the flange 22 will prevent the wheelbarrow from slipping into the elevator. If desired, a bracing screw or pin 23, of any kind, may be provided for steadying the bracket 20, the same being driven into the earth, or into a wood foundation, or any other desired structure. From this it will be seen that the elevator may be supplied with material easily and without any complicated system of transportation or guiding chute. The elevator 15 is adapted to rotate with the drum 14 so that after material has been dumped into the elevator, the same is automatically carried upwardly and dumped into the hopper 10, from which it gravitates into the interior of the cylinder 14. By reason of the bracket 20, matter may be easily dumped into the elevator while the same is running, from wheelbarrows and other vehicles.

Connected with the drum 14 are bearing bands or tracks 24 and 25, the same being

rigidly secured to the drum in any desired manner, as for instance by rivets. These bands or tracks rest upon bearing rollers 26, the bearing rollers 26 being preferably connected in pairs by suitable shafts 27 and 30, these shafts being mounted on suitable bearing brackets secured to the base member 1. Rigidly secured to the cylinder 14 by any desired means, as for instance, rivets, is a gear ring 28 designed to mesh with a pinion 29, the pinion 29 being rigidly secured to shaft 30 which carries a sprocket wheel 31, designed to receive power through a suitable chain from any desired source. It will be evident that other means could be connected to shaft 30 for driving the same without departing from the spirit of the invention.

When it is desired to move to an open position the ends of the cylinder, it is also desirable to lock the cylinder against rotation. In order to accomplish this, eyelet members 32 and 33 (Fig. 5), are rigidly secured to the drum 14 by any desired means, as for instance, rivets, so as to receive the hook end of pivotally mounted bars 34 and 35, these bars being pivotally connected with the base 1 in any desired manner. A turnbuckle structure 36 is provided for each of these bars so as to properly adjust the same, in order to rigidly hold the drum against movement, as shown in Fig. 4. This is very necessary as it is desired to swing the ends of the drum to an open position, as shown in Fig. 7, and if the drum was not rigidly held in place, the same would rotate so that the end members would be at the lowermost point, instead of at one side. In connection with the opening of the end members, it will be observed that end 13, to which elevator 15 is connected, is provided with ears 37 which co-act with ears 38 connected by rivets or other suitable means, with the drum 14, a suitable bolt 39 acting as a pintle for connecting these ears together. A second pair of ears are connected with the end 13, namely, ears 40, which co-act with ears 41, connected with the cylinder or drum 14, the ears 40 and 41 accommodating a pintle 42, which preferably has a pin 43 extending therethrough, in which is arranged an aperture for receiving the bolt of a lock 44, so as to positively lock the pin 43 against disengagement and against being removed by an unauthorized person. The ears 40 and 41 and associated devices, are arranged preferably on the opposite side of the cylinder to the ears 37 and 38, so as to lock the end 13 and associated parts in their closed position.

At the rear end, or discharge end of the cylinder 14, is a ring 45, merging into the bearing band or track 24. Connected with the ring 45 are a plurality of ears 46 and 47, the same being arranged on opposite sides of the cylinder in a similar manner to the way the ears at the opposite end of the cylinder are positioned. The ears 46 and 47 co-act with suitable ears 48 and 49, connected with a swinging ring 50. The ears 47 and 48 are connected by a suitable pintle 51 so that the ring 50 may be properly hinged in place, and ears 46 and 49 are connected by a suitable pintle 52 so as to lock ring 50 in a closed position. A slot is provided in the lower end of pintle 52 for receiving a cotter pin 53, the cotter pin 53 having an aperture in the end thereof designed to receive the bolt of a lock 54 so as to lock the cotter pin in place and thus prevent an accidental disengagement of pintle 52, or an unauthorized removal of pintle 52. The pintles 39 and 51 are preferably held in place by suitable nuts, which may, if desired, be locked against removal by having the ends of the pintles upset or riveted.

The ring 50 when unlocked, is adapted to be swung to one side, as shown in Fig. 7, and in this movement the ring carries with it a cap 55 and associated mechanism, which is adapted to hold the cap tightly against ring 50 when the ring 50 is closed. The cap 55 is provided centrally with an opening in which is arranged a socket member 56 having a chamber 57 for the piston 58, and a chamber 59 for a spring 60. A rod 61 is rigidly secured to the piston 58 and extends a short distance therebeyond so as to compress spring 60, when the rod is depressed, the piston 58 acting as a guide.

In order to allow a proper reciprocatory movement of the piston 58, ventholes 56' may be provided in socket member 56, though the irregular connections between the socket member 56 and the piston 58 are usually sufficient to allow the air to escape and enter according to the action of the piston. The rod 61 extends outwardly and through a spider 62, the outer end being formed with an aperture 63 through which the bar or lever 64 passes. Preferably on the end of the rod 61, a head 65 is provided, which may be integral or may be removable.

In connection with holding the cap 55 properly in place, it will be observed that the packing ring 66 is provided for forming a tight joint. This packing ring may be made of leather, a soft metal, or other material, without departing from the spirit of the invention. The spider 62 may be provided with any desired number of legs, three being shown, which are bolted to suitable uprights 67, the uprights 67 being in turn bolted to ring 50 so that the spider 62 will move with the ring. By this construction and arrangement, the cap 55 is resiliently held in place, though mounted to swing with ring 50. In order to properly hold the cap 55 in place, a plurality of studs

68 are rigidly secured to the cap and slidingly fit in suitable apertures in the legs of the spider 62, so that the only independent movement of the cap 55 is either toward or from the spider 62.

In order to properly hold the lever 64 in place, and to cause the same to exert a proper tension against the bar 61, the same is pivotally mounted at 69 (Fig. 5) on bar 70, forming part of the framework 4. The end of bar 64 opposite the pivotal member 69, is pivotally connected with link 71, which in turn is pivotally connected at 72 to a reciprocating rod 73, held properly in place by suitable guides 74, mounted on the longitudinal bar 75, forming part of the framework 4. The end of rod 73 opposite the pivotal point 72, is provided with a rack 76 which may be formed integral with the rod, or may be formed separate, and secured thereto. Meshing with the rack 76 is a pinion 77 carried by a shaft 78 mounted in suitable bearings 79 connected with bar 75. The shaft 78 has rigidly secured thereto a hand wheel 80 which when operated will move the bar 73. When the bar 73 is moved in one direction, the lever 64 is actuated for causing rod 61 to compress spring 60, and thus tightly clamp the cap 55 against the packing ring 66. When the bar 73 is moved in an opposite direction, the spring 60 is released so that the cap 55 may move away from the packing 66 if the releasing of the spring has been of sufficient extent. By reason of the piston 58, a continued movement of bar 73 will cause the lever 64 to pull cap 55 longitudinally away from the drum 14, the extreme movement being the distance between the cap 55 and the spider 62. When it is desired to open the end of the drum 14 with which cap 55 is associated, lever 64 is disconnected from link 71, and the pivotal connection 69 is removed, and then bar 64 removed from contact with rod 61. The pintle 52 is then removed, after which ring 50 and associated parts may be swung to the open position, as shown in Fig. 7. As clearly shown in Fig. 7, when both ends of the cylinder are open, or when one end is open, the cylinder will be overbalanced and would naturally rotate until the ends were in the lowermost position, if means were not provided for preventing such rotation, these means being the members 32 and 33, and the links or rods 34 and 35.

Arranged within the drum 14, are a plurality of mixing blades 81 and 82, the blades 81 acting to work the material in one direction, and the blades 82 acting to work the material in an opposite direction, these two sets of blades being connected at their ends by a plurality of strips 83, riveted or otherwise secured in place. The strips 83 are preferably connected by rivets or otherwise, to rings 84, which properly hold the blades spaced apart in a proper position for acting as mixing blades. In order to cause the blades to rotate with drum 14, a bolt 85 is arranged so as to extend from one side of the cylinder to the other, in the path of movement of the ends of the blades whereby the blades are forced to rotate. As the bolt 85 is positioned near the ends of the blades, and not between the rings 84, the blades may be bodily removed without being taken apart when the ring 50, cap 55, and associated parts are swung to the open position shown in Fig. 7, this removal taking place without molesting the bolt or rod 85.

In using the mixer, it will be evident that the mixture must be wet when mixed either as a "batch" or "continuously." In order to provide a proper quantity of water, a supply pipe 86 is provided, in which a valve 87 is arranged in order to regulate the quantity of water supplied. A pipe 88 extends from the valve 87 into the hopper 10 for any desired distance so as to supply water either to the mixture as the same passes through hopper 10, or to the mixture in cylinder 14. Preferably the end of pipe 88 is provided with a nozzle 89, in which apertures 90 face downward, or at an incline so that the material passing through the hopper 10 from above will not clog up or interfere with the free flowing of the water.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a mixing machine of the class described, a rotatable cylinder, means for feeding material into said cylinder, a plurality of sets of mixing blades arranged in said cylinder, bars rigidly secured to said sets of mixing blades for connecting the same together, a ring arranged near each end of said sets of mixing blades for holding the same properly spaced apart, and properly spaced in said cylinder, and means for loosely connecting said blades with said cylinder.

2. In a mixing machine of the class described, a rotating cylinder, an end hinged to said cylinder, the hinging of said end to said cylinder permitting an opening of said cylinder for its full diameter when said end has been moved to an open position, and an elevator rigidly connected with said hinged end and adapted to be moved therewith.

3. In a mixing machine of the class described, a rotatable cylinder, a ring hinged to the discharge end of said cylinder having an opening therein, a cap for closing the opening in said ring, and means for resiliently holding said cap against said ring.

4. In a mixing machine of the class described, a rotatable cylinder, a cap for clos-

ing the discharge end of said cylinder, means for resiliently holding said cap in place and a pressure member for regulating the action of said means.

5. In a mixing machine of the class described, a rotatable cylinder, a ring hinged to the discharge end thereof, a framework structure rigidly secured to said ring, a cap adapted to close the opening in said ring, means projecting from said cap and engaging said framework for slidingly supporting said cap, and means for causing said cap to resiliently resist a sliding movement in one direction.

6. In a mixing machine of the class described, a rotatable cylinder, a closure hinged to the discharge end of the cylinder, a reciprocating cap arranged in said end closure, and a lever mechanism for moving said cap in either of two directions.

7. In a mixing machine of the class described, a rotatable cylinder, a closure for the discharge end of the cylinder, said closure comprising a ring hinged to said cylinder, a framework rigidly secured to said ring, said framework being formed with a plurality of apertures, a cap adapted to close the opening in said ring, a plurality of guiding studs extending from said cap into certain of the apertures in said framework, an operating rod extending through one of the apertures of said framework and engaging said cap, and a spring co-acting with one end of said rod for resiliently connecting one end of the rod and said cap, and a lever mechanism associated with said rod for actuating the same whereby when said rod is moved in one direction, said cap will be moved away from said ring and when moved in an opposite direction said spring will be pressed and said cap will be resiliently pressed against said ring.

8. In a mixing machine of the class described, a rotatable cylinder, a closure structure for the discharge end of the cylinder, said closure structure including a cap resiliently held in place and a bar for operating said cap, a pivotally mounted lever engaging said bar for actuating the same, and a reciprocating rod connected with said lever for actuating the lever, a rack associated with one end of said bar, a pinion meshing with said rack, and hand actuated means for operating said pinion.

9. In a mixing machine of the class described, a wet batch mixing drum, a dry batch mixing drum, a chute for receiving material from said dry batch mixing drum and guiding the same to said wet batch mixing drum, and means for moving the sides of said chute so as to prevent material passing through the chute.

10. In a mixing machine of the class described, a rotating cylinder or drum, an elevator rigidly secured to said drum and rotatable therewith, a chute having one end extending into said drum and with the body part arranged below part of said elevator so as to receive material from said elevator and guide the same to said cylinder or drum, and means for supplying water to said drum, said chute being formed with a discharge portion for directing material into said cylinder or drum, and a pair of hinged side members adapted to move together for covering said discharge portion in order to prevent material from said elevator entering said cylinder or drum whereby the material in said elevator and the material in said drum will be mixed separately.

11. In a mixing machine of the class described, a wet batch mixing compartment, an elevating and dry batch mixing compartment, a guiding member for guiding material from said second mentioned compartment to said first mentioned compartment, and pivotally mounted covering means for covering said guiding means in order to complete the mixing of the material in said compartments separately.

12. In a mixing machine of the class described, a rotatable cylinder, means for supplying material to said cylinder, and a mixing device loosely fitting said cylinder, said mixing device being formed so as to present a substantially cylindrical structure provided with end supporting members, and a plurality of spirally arranged knives, the knives being arranged in an inner and outer series, the knives of one series being inclined in one direction and the knives of the opposite series being inclined in an opposite direction whereby the material in said cylinder is directed back and forth previous to its discharge.

13. In a mixing machine of the class described, a cylinder, means for feeding material to the cylinder to be mixed, and a mixing device arranged in said cylinder, said mixing device comprising a ring supporting member, and an outer series of spirally arranged blades and an inner series of spirally arranged blades, said blades extending substantially longitudinally of said cylinder and directing the material in the cylinder in opposite directions.

14. In a mixing machine of the class described, a rotatable cylinder, a closure connected to the discharge end of said cylinder and adapted to rotate with the cylinder, and a cap arranged on said closure and adapted to rotate with the closure, a pressure member for causing said cap to engage said closure, said pressure member being adapted to be moved back and forth but prevented from rotating with the rotation of said cap, and means acting on said pressure member for moving the same in either of two directions.

15. In a mixing machine of the class described, a rotatable cylinder, a closure connected to the discharge end of the cylinder, a reciprocating cap arranged in said closure, a lever mechanism for moving said cap in either of two directions, a reciprocating member for moving said lever, the reciprocating member being formed with a rack, and a manually operating gear meshing with said rack for moving the same, whereby said lever is moved back and forth for actuating said cap.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDMUND L. CRIDGE.

Witnesses:
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SARA D. BOFFARD.