

March 27, 1928.

1,663,830

L. EIRICH ET AL

DISCHARGING CLOSURE FOR MIXING MACHINES

Filed July 8, 1926

3 Sheets-Sheet 1

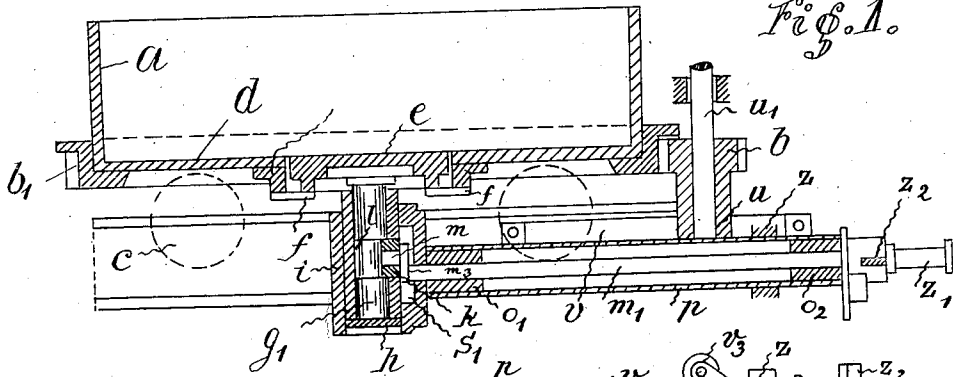


Fig. 1.

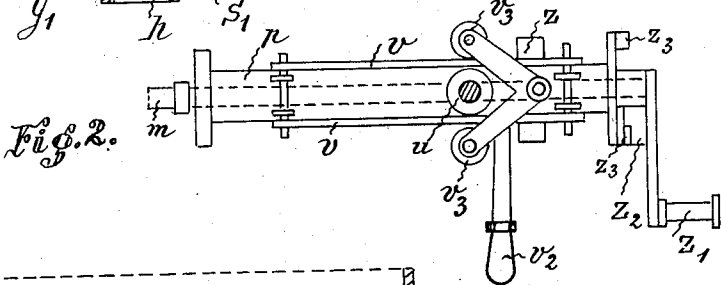


Fig. 2.

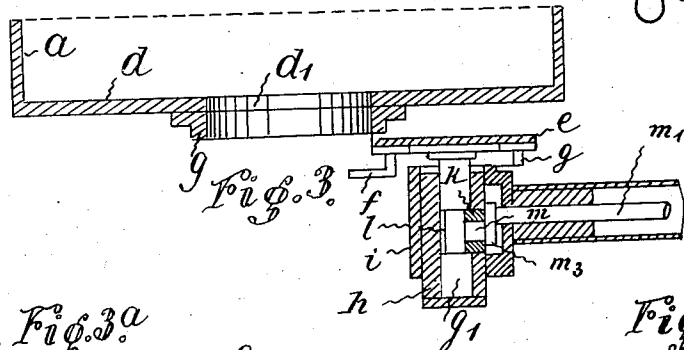


Fig. 3.

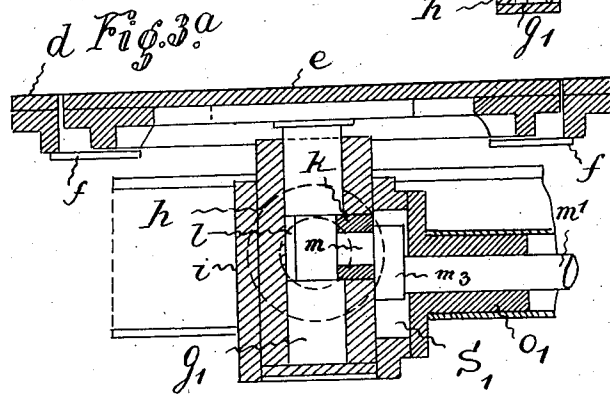


Fig. 3a.

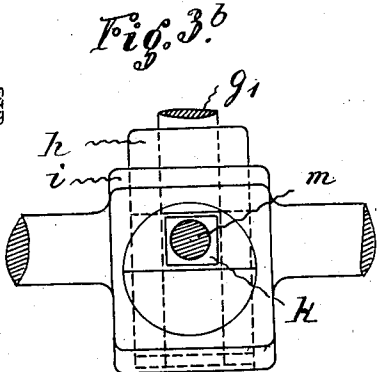


Fig. 3b.

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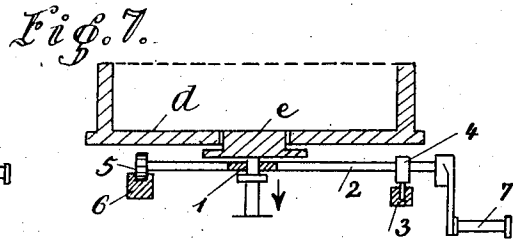
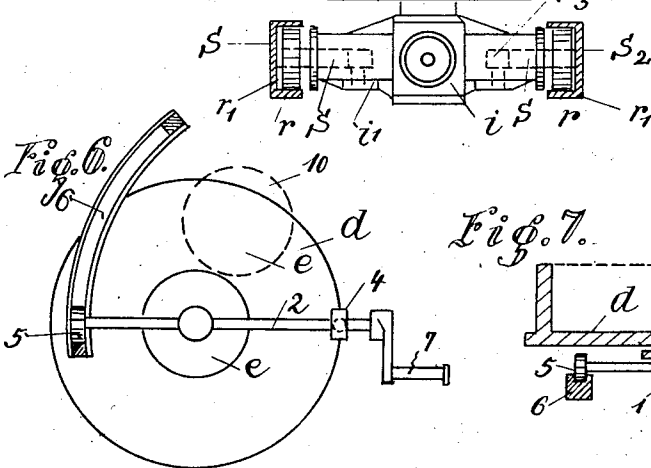
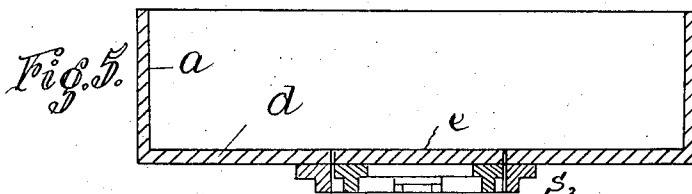
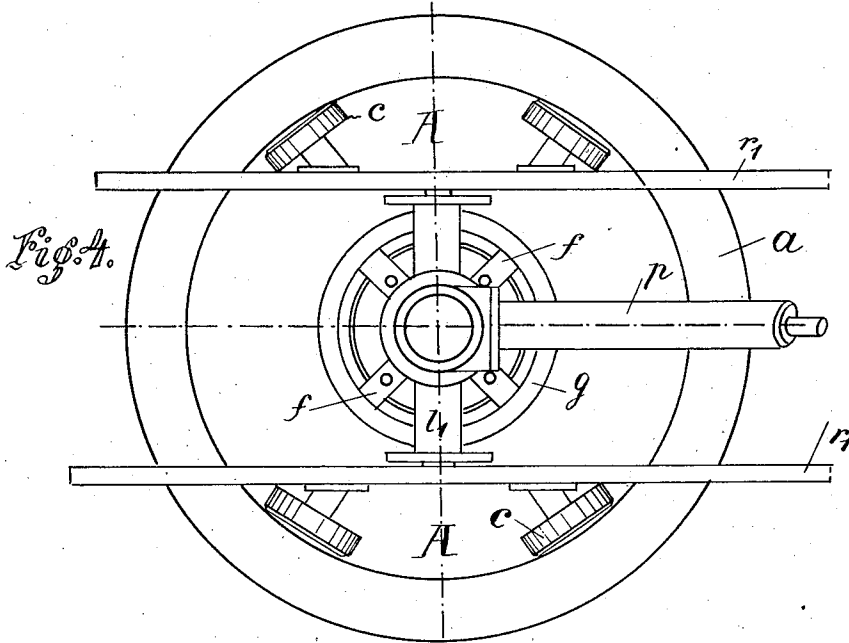
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DISCHARGING CLOSURE FOR MIXING MACHINES

Filed July 8, 1926

3 Sheets-Sheet 2



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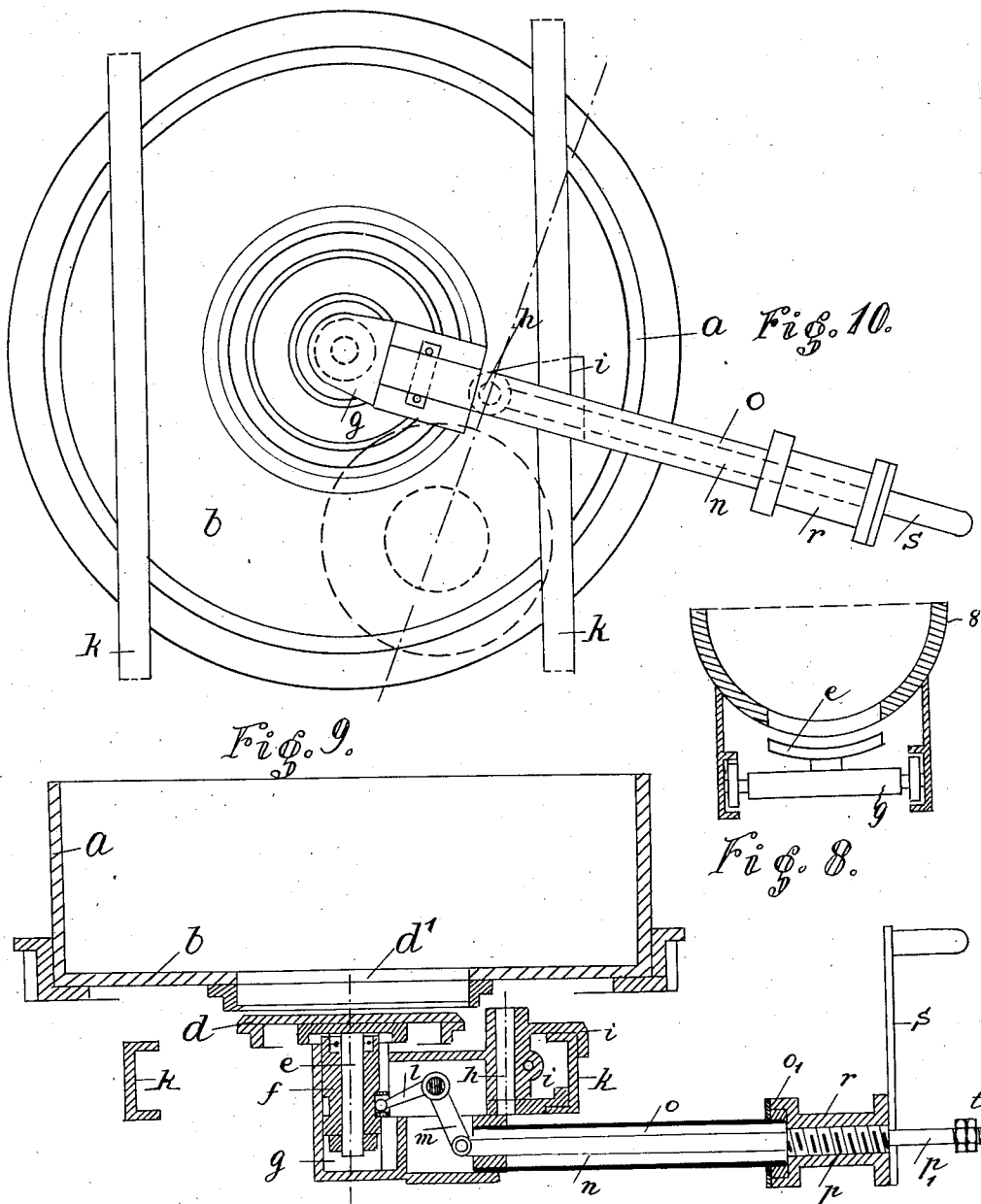
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DISCHARGING CLOSURE FOR MIXING MACHINES

Filed July 8, 1926

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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DISCHARGING CLOSURE FOR MIXING MACHINES.

Application filed July 8, 1926, Serial No. 121,181, and in Germany November 13, 1924.

This invention relates to an automatic discharging closure on mixers, stirring machines, mortar mills, slowly rotating cylinders and the like for masses of any kind, especially for ceramic masses, in which in the bottom of the mixing drum an aperture is arranged in which a closing piece moved like a slide or a closing piece moved like a slide and adapted to be raised and lowered is mounted. Stirring devices which move directly over the plate-like bottom push the material towards the aperture in the bottom through which it drops into a truck placed underneath.

The closing cover adapted to be raised and lowered may be arranged upon a carriage which, after the lowering, can be run out at the side, but it might be arranged to be oscillated from under the mixing drum in lateral direction. The closing cover is hinged to a rod oscillatable around a pin and running by means of a roller upon an arc-shaped bar.

The closing cover together with a mechanism for adjusting in vertical directions might further be arranged in a casing suspended on a pivot pin underneath the mixing drum so that it can be oscillated in horizontal direction. The oscillatable arm has means and arrangements which permit of rapidly moving the closing cover upward and downward by one single manipulation and to bring the whole by a lateral pressure out of the area of the discharging aperture.

The material resting upon the closing cover is, at the lateral movement, stripped off by a projecting rim on the lower side of the mixing plate or by one or several ribs or the like mounted radially or obliquely upon the lower surface of the mixing plate. The discharging aperture may be of any shape. It may, for instance, be circular, oval or cornered.

The closing piece might further, instead of being in horizontal position, as in mixers, be inclined at any angle or arranged vertically, on other machines, if the conditions make this necessary.

In mixers with rotary or stationary mixing trough the discharging aperture is arranged at the centre of the bottom plate and the closing cover is arranged on a carriage adapted to be pulled out in lateral direction from under the bottom plate so that said closing cover can be raised and lowered.

The ascending and descending movement

of the closing cover may be controlled by a lever-mechanism, rack or by means of screw spindles or the like.

The rotation of the crank shaft for raising and lowering the closing cover is effected by hand. The reciprocating movement of the carriage for removing the cover in lateral direction may be effected by hand or mechanically, for instance from the driving shaft of the mixing plate by means of friction roller.

Several forms of construction of the machine are shown, by way of example, in the accompanying drawing, in which:

The Figs. 1 to 10 show various forms of construction of mixers with automatic emptying closure in the bottom of the mixing plate.

Fig. 1 is a vertical section through the mixer with closing cover in the emptying aperture and friction driving gear of the carriage.

Fig. 2 shows in plan view the friction gear for driving the carriage.

Fig. 3 shows the closing cover in the open position.

Figs. 3^a and 3^b show in section and in side elevation respectively the closing cover adapted to be raised and lowered and on larger scale.

Fig. 4 shows in plan view seen from below the mixing trough.

Fig. 5 is a section on line A—A of Fig. 3.

Figs. 6 and 7 show diagrammatically the oscillatable closing cover in plan view seen from below and in section respectively.

Fig. 8 shows the closing device on rotating cylinders or the like.

Fig. 9 is a vertical longitudinal section through the device with oscillatable arm.

Fig. 10 shows in plan view seen from below the device shown in Fig. 9.

The mixing trough *a* runs on rollers *c* and it is rotated by a toothed wheel *b* meshing with a toothed crown *b*₁. At the center of the bottom plate *d* a discharging device *d*₁ (see Fig. 3) is arranged in which a closing cover *e* is mounted which is adapted to be raised and lowered and to be shifted to the side. To better guide the closing cover *e* this cover and the aperture are fitted with rings *g* of angular cross section. In the closing position the closing cover *e* bears by means of abutments *f* onto the ring *g* of angular cross section of the aperture.

On the lower surface of the closing cover

a guide stud g_1 is mounted at the center and is rotatably guided in a step bearing h . The step bearing is mounted in a sleeve i on the axle bushing i_1 of the carriage (Fig. 4).
 5 This axle bushing has an aperture in which a slide block k is located which engages further with a groove l in the stud g_1 and is operated by a crank pin m on the crank shaft m_1 which in its turn is rotated by the crank handle z_1 . A crank arm m_3 rotates at this occasion in a cut-out portion s_1 of a sleeve i on the axle bushing i_1 . By a half-rotation of the crank handle z_1 , and of the crank shaft m_1 , the stud g_1 with the closing cover e are raised and lowered by the crank pin m and the slide block k in the rotating sleeve i which is adapted to execute a reciprocating movement in vertical direction. By an abutment z_2 on the crank handle z_1 , and by two adjustable stops z_3 (see Figs. 1 and 2) on the flange of the carriage the stroke of the carriage is limited. The bearings o_1 and o_2 of the crank shaft m_1 are connected the one with the other by a tube p . The bearing o_1 forms one piece with the sleeve i of the axle bushing i_1 . The tube p , which forms the guide rod of the carriage, is enclosed at the other end by a stationary bearing z in which it slides to and fro if the carriage is pulled out in lateral direction, the closing cover being lowered.

The two carriage wheels r runs on flanges of U-irons r_1 of the machine frame (see Fig. 5) and they are rigidly connected with their journals s rotating in the axle bushing i_1 . The carriage is guided in lateral direction by the end faces of the journal axles s being guided on the webs s_2 of the U-irons r_1 . In order to ensure accurate lateral adjusting of the closing cover e with regard to the discharging aperture d_1 the journals are shiftable in axial direction. They are held in the actual position by means of spacing blocks s_3 clamped by means of pressure screws. The arrangement may be such that the carriage wheels rotate around the journals which are shiftable mounted on the axle bushing and so that they can be secured in the adjusted position. In the longitudinal direction the carriage wheels r butt against adjustable stops.

If emptying of the mixing trough a has to take place the closing cover e is first, by a half-rotation of the crank handle z_1 , lowered in vertical direction until its upper surface is flush with the lower surface of the ring g of angular cross section on the bottom of the plate. The carriage is then pulled out to such a distance that the carriage wheels butt against a stop, the material resting upon the closing cover e being stripped off and cleaned at this occasion by the ring g or by ribs. The discharging aperture d_1 is then quite free and the rotating mixing tools, which are not shown in the

drawing, push the material towards the discharging aperture d_1 . After the emptying has been completed the carriage is pushed back and the crank handle z_1 is brought into the opposite position whereby the cover is pressed into the discharging-aperture d_1 of the plate and closes the same.

In the form of construction shown in Figs. 1 and 2 an arrangement for mechanical displacement of the carriage by a friction roller u is further illustrated, said friction roller being mounted on the driving shaft v_1 of the mixing trough a . Two bars v are fixed, one at each side of this roller u , on the tube p . A hand-lever v_2 operates an elbow lever a pressure roller v_3 is mounted, one or the other of these pressure rollers being pressed against the corresponding bar v if the hand lever v_2 is moved in the one or other direction, said roller v_3 being thus brought into contact with the friction roller u . The carriage is consequently drawn along and shifted in the one or other direction. The crank handle z_1 for lowering or raising the closing cover is operated by hand.

In the forms of construction shown in Figs. 6 and 7 the closing cover e is shown as adapted to be oscillated in lateral direction. The closing cover e , together with the mechanism for oscillating the same, is first lowered with the aid of a mechanism as hereinbefore described and subsequently oscillated in lateral direction. With this object in view the closing cover is hingedly connected by a bolt 1 to a rod 2. This rod is mounted in a bearing 4 adapted to be rotated around a stud 3, the other end of rod 1 carrying a roller 5, which rests upon a curved bar 6. After the closing cover has been lowered a crank handle 7 is rotated whereby the closing cover e is brought into the position indicated in dash lines in Fig. 6.

This mechanism may be constructed so that no lowering of the closing cover is necessary. In this case the closing cover e consists of a smooth disk which closes the apertures in the bottom of the mixing plate.

Fig. 8 shows the closing cover e with carriage, mounted on a slowly rotating cylinder 8. In this arrangement the carriage 9, designed to make the closing cover e oscillate in lateral direction, rotates also. The mechanism comprising an oscillatable arm, as shown in Figs. 9 and 10, is constructed as follows:—The rotatable mixing drum a has at the center of its bottom plate b a discharging aperture a_1 . In Fig. 9 the closing cover d is shown in the extreme lower position, from which it can be oscillated in lateral direction.

The closing cover d is mounted, by means of a stud e , in a bearing sleeve f which is arranged in a casing g . The casing g is oscillatably mounted on an axle h which is connected by a connecting element i to a

U-iron k fixed underneath the mixing machine. The lowering and raising of the closing cover d is effected through the intermediary of an elbow lever pivotally mounted in the casing g , the ball-shaped end of the upper arm l of said elbow lever engaging with a cavity of the bearing f , a connecting rod n being hingedly connected to the end of the other arm m of said elbow lever. This connecting rod n is mounted in a tube o which is fixed in a casing in which the elbow-lever is enclosed. The other end of the connecting rod o merges into a screw spindle p which is screwed into an internally threaded sleeve r . This sleeve r is rotatably mounted on the flange o_1 of tube o and it has a crank handle s . From this screw spindle p extends a rod p_1 on the end of which two nuts t are screwed which serve as stop for the crank handle, the other stop for said handle being formed by the end of the screw spindle p . If the crank handle s is turned in the one or other direction the rod n is either shifted to the left or right. The arm l of the elbow lever is thus made to raise or lower the sleeve f with the closing cover d which is thus rapidly and in a simple manner brought into the desired position. If the closing cover d is in the extreme position the mechanism and the closing cover can be rotated around the stud h to liberate the aperture d_1 so that the material can drop out of the same.

We claim:

1. A discharging closure for mixing machines, stirring machines, mortar mills or the like for masses of any kind, consisting of a closing cover rotating with the machine and slidably mounted underneath the discharging aperture in the bottom plate of the machine and adapted to be raised into or lowered from said aperture, a ring-shaped rim on the lower surface of the bottom plate of said machine, and a carriage underneath said discharging aperture and carrying said closing cover and which does not partake of the movement of the receptacle.

2. A discharging closure for mixing machines, stirring machines, mortar mills or the like for masses of any kind, consisting of a closing cover slidably mounted underneath the discharging aperture in the bottom plate of the machine and adapted to be raised into or lowered from said aperture, a ring-shaped rim on the lower surface of the bottom plate of said machine, a guide stud on the lower surface of said closing cover and having a groove, a carriage underneath said discharging aperture, a step bearing on said carriage in which said guide stud is journaled, a crank shaft in said carriage, a crank pin on said crank shaft, a slide block engaging with said groove of said guide stud and operated by said crank pin, and adjustable abutments on said crank shaft for limiting the stroke of said crank pin.

3. A discharging closure for mixing machines, stirring machines, mortar mills or the like for masses of any kind, consisting of a closing cover slidably mounted underneath the discharging aperture in the bottom plate of the machine and adapted to be raised into or lowered from said aperture, a ring-shaped rim on the lower surface of the bottom plate of said machine, a guide stud on the lower surface of said closing cover and having a groove, a carriage underneath said discharging aperture, a step bearing on said carriage in which said guide stud is journaled, a crank shaft in said carriage, a crank pin on said crank shaft, a slide block engaging with said groove of said guide stud and operated by said crank pin, adjustable abutments on said crank shaft for limiting the stroke of said crank pin, and means for mechanically operating said carriage, said means consisting of two bars on said carriage, a friction roller rotatably mounted between said bars, an elbow lever over said bars, a roller at the end of each arm of said elbow lever, and a hand lever for oscillating said elbow lever in the one or other direction so that the corresponding roller of said lever is brought into contact with said friction roller.

4. A discharging closure for mixing machines stirring machines, mortar mills or the like for masses of any kind, consisting of a closing cover slidably mounted underneath the discharging aperture in the bottom plate of the machine and adapted to be raised into or lowered from said aperture, a ring-shaped rim on the lower surface of the bottom plate of said machine, a guide stud on the lower surface of said closing cover and having a groove, a carriage underneath said discharging aperture, a step bearing on said carriage in which said guide stud is journaled, a crank shaft in said carriage, a crank pin on said crank shaft, a slide block engaging with said groove of said guide stud and operated by said crank pin, adjustable abutments on said crank shaft for limiting the stroke of said crank pin, and means for mechanically operating said carriage, said means consisting of two bars on said carriage, a friction roller rotatably mounted between said bars, an elbow lever over said bars, a roller at the end of each arm of said elbow lever, a hand lever for oscillating said elbow lever in the one or other direction so that the corresponding roller of said lever is brought into contact with said friction roller, wheels of said carriage, journals of said wheels, and means for adjusting said journals and for securing the same in the adjusted position.

5. The combination with a rotatable receptacle of a rotatably mounted closure therefor, rotatable with the receptacle means to withdraw the closure from the receptacle and means to move the closure out of the

path of the material issuing from the receptacle.

6. The combination with a rotatable receptacle having a bottom discharge opening; of a closure for said opening, means for rotatably mounting the closure to permit to rotate in unison with the receptacle, means to vertically move the closure so as to clear the bottom of the receptacle, and means stationary relatively to the receptacle to withdraw the closure from below the receptacle.

7. The combination with a rotatable receptacle, having a discharge opening and means to rotate the same, of a friction roller driven by said rotating means, a carriage mounted

beneath the receptacle and independent thereof, a closure for the receptacle and mounted to move therewith, mechanism to move the closure to and from the opening means on the carriage moved into engagement with said friction roller to operate said carriage to withdraw the closure out of the path of the material issuing from said opening and to return it into position thereover, preparatory to closing the opening by said mechanism.

In testimony that we claim the foregoing as our invention, we have signed our names.
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