Jan. 20, 1925. 1,523,387

F. H. BANBURY

MACHINE FOR KNEADING PLASTIC MATERIAL

Filed Oct. 25, 1923 2 Sheets-Sheet 1

Fig. 3

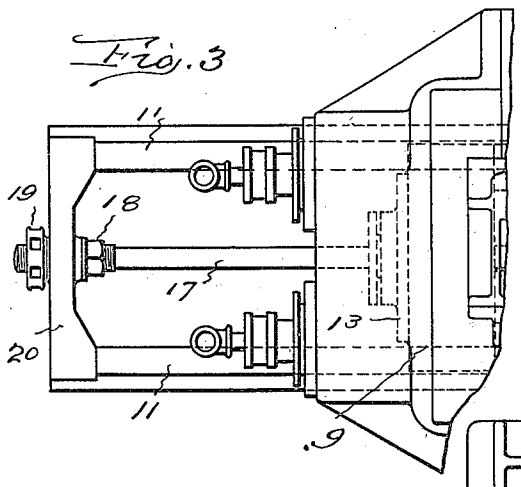


Fig. 1

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Fig. 4

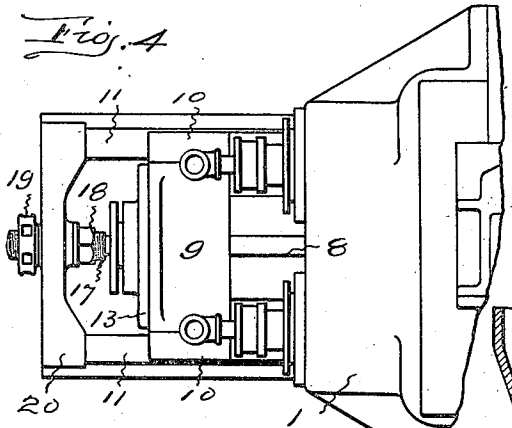


Fig. 2

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UNITED STATES PATENT OFFICE.

FERNLEY H. BANBURY, OF ANSONIA, CONNECTICUT, ASSIGNOR TO THE BIRMINGHAM IRON FOUNDRY, OF DERBY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

MACHINE FOR KNEADING PLASTIC MATERIAL.

Application filed October 25, 1923. Serial No. 670,698.

To all whom it may concern:

Be it known that I, FERNLEY H. BANBURY, a citizen of the United States, residing at Ansonia, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Machines for Kneading Plastic Material, of which the following is a specification.

This invention relates to those machines for treating plastic material which are particularly adapted for kneading rubber and that are of the type which have a casing containing one or more cylindrical chambers in which are one or more rotors designed to, when rotated, break up, crush, knead, and mix the stock fed into the chamber or chambers.

The object of the present invention is to provide for such machines a comparatively simple, compact, powerful, easily operated and quickly manipulated mechanical means for opening and closing the discharge passage from the chamber or chambers and permitting the outflow of material that has been treated therein.

The invention is illustrated and described herein as applied to a duplex kneading or mixing machine of this class; that is, one having two cylindrical chambers arranged side by side and communicating with each other, each of which contains a breaking, crushing, kneading and mixing rotor of the nature of those set forth in Patent No. 1,200,070 granted October 3, 1916.

In such a twin chamber machine the object of the invention is attained by providing the discharge outlet with a longitudinally slidable door beneath and common to both chambers, the top of which door is shaped to form a continuation of the lower sections of the walls of the chambers, while the body of the door contains a cylinder in which is fitted a fixed piston. Means are arranged to admit fluid pressure to the movable cylinder on both sides of the fixed piston so that when pressure is admitted on one side of the piston the cylinder and door are caused to move quickly in one direction and open the discharge outlet at the under side of the machine, and when pressure is admitted to the other side of the piston the cylinder is powerfully moved so as to cause the door to close the discharge outlet, the connections being made in such manner that should the fluid pressure fail the combined cylinder and door may be moved manually.

In the accompanying drawings Figure 1 shows an elevation of a part of a machine of the class mentioned with a section cut away to show the relation of the door, cylinder and piston when the discharge outlet from the mixing chambers is closed by the door. Figure 2 shows a vertical transverse section of the machine with the door closing the discharge outlet. Figure 3 is a plan of an end of the machine with the cylinder and door in. Figure 4 is a plan of the same end with the cylinder and door drawn out.

The water jacketed casing 1 of the machine shown has a pair of cylindrical chambers 2, arranged side by side and communicating with each other, in which are rotarily mounted the water cooled kneading rotors 3. Stock is fed to the kneading chambers, in order that it may be treated by the action of the rotors, from the hopper 4 through the neck 5, and is held down by the weight 6, in the usual manner of operating these machines.

Movably fitting in an opening 7, that is common to the bottom of both chambers and extends longitudinally therewith, is a door 8 which is desirably made so it may be water cooled. The upper surface of this door is shaped to form a continuation of the cylindrical walls of the mixing chambers. This door is formed as a part of and is preferably integral with a cylinder 9. The side walls of the door fit the side walls of the discharge opening and the cylinder 9 has flanges 10 that slidably rest upon ways 11 formed on and extending beyond one side of the machine bed 12. At each end of the door cylinder is a head 13 and opening through each head is a port 14 to which is connected a duct 15 leading from a source of fluid, desirably air, under pressure.

Fitted in the door cylinder is a piston 16 that is secured to a piston rod 17 which is fastened at its outer end by nuts 18 and 19 to a cross bar 20 bolted to the outer ends of the ways upon which the cylinder and door slide.

When fluid pressure is admitted to one end of the door cylinder that cylinder and the door which it carries are forced in one direction so that the door will close the discharge outlet from the mixing chambers. When fluid pressure is admitted to the other end of the door cylinder, the cylinder

and door are forced in the opposite direction and the door carried so as to open the discharge outlet from the mixing chambers. In case the fluid pressure fails with the door closed, by slackening the nut 18 on the inside of the cross bar and screwing up on the nut 19 on the outside of the cross bar the cylinder may be drawn out by the piston. After the outside nut has been turned the full length of the threaded part of the rod, the outside nut may be slackened and a distance block placed between the nut and the cross bar and the nut again turned up. This may be repeated until the piston draws the door cylinder out as far as necessary to permit the discharge of the stock from the mixing chambers.

With the construction described the discharge outlet from the mixing chmbers can be opened easily under a heavy and sticky load and closed quickly and powerfully. With the door and cylinder built as one part and operating together, the structure may be made compact so that the floor space occupied by the machine will be considerably reduced over what otherwise would be necessary if the cylinder were fixed and the piston moved to open and close the door.

The invention claimed is:

1. A machine for kneading plastic material, comprising a casing containing a mixing chamber having a discharge outlet, a rotor in said chmber, a cylinder slidably supported adjacent to the chamber and having a section adapted to open and close said discharge outlet, a stationary piston within the cylinder, and means for admitting fluid pressure to the cylinder on both sides of the piston.

2. A machine for kneading plastic material, comprising a casing containing a mixing chamber having a longitudinally extending discharge outlet in its lower side; a rotor in said chamber, a cylinder slidabe longitudinally below said chmber and having a section adapted to open and close said discharge outlet, a stationary piston within the cylinder, and means for admitting fluid pressure to said cylinder on both sides of the piston.

3. A machine for kneading plastic material, comprising a casing containing a pair of cylindrical mixing chambers, said chambers having a common longitudinally extending discharge outlet in their lower sides, rotors in said chambers, a cylinder slidable longitudinally below said mixing chambers and having a section adapted to open and close said discharge outlet, a stationary piston within the cylinder, and means for admitting fluid pressure to the cylinder on both sides of the piston.

4. A machine for kneading plastic material, comprising a casing containing a mixing chamber having a discharge outlet in its lower side, a door adapted to open and close said discharge outlet, a cylinder slidably mounted below said mixing chamber and carrying said door, a stationary piston within said cylinder, and means for admitting fluid pressure to the cylinder on both sides of the piston.

5. A machine for kneading plastic material, comprising a casing containing a pair of cylindrical mixing chambers having a common discharge outlet in their lower sides, a door adapted to open and close said discharge outlet, the upper surface of said door conforming to the walls of the mixing chambers, a longitudinally movable cylinder fixed to said door, a stationary piston within said cylinder, and means for admitting fluid pressure to the cylinder on both sides of the piston.

6. A machine for kneading plastic material, comprising a casing containing a pair of cylindrical mixing chambers having a common discharge outlet in their lower sides, a slidable door adapted to open and close said discharge outlet, the upper part of said door conforming to and forming sections of the curved walls of said mixing chambers and the lower part of said door containing a cylinder, a stationary piston within said cylinder, and means for admitting fluid pressure to the cylinder on both sides of the piston.

7. A machine for kneading plastic material, comprising a casing containing a mixing chamber having a longitudinally extending discharge outlet, a longitudinally movable cylinder carrying a door adapted to open and close said discharge outlet, a stationary piston within said cylinder, and means for admitting fluid pressure to said cylinder on both sides of the piston.

8. A machine for kneading plastic material, comprising a casing containing a pair of cylindrical mixing chambers, with an opening from the bottom side of each of said chambers, a cylinder mounted to be moved longitudinally adjacent to the mixing chambers, means carried by the movable cylinder for opening and closing said openings from the mixing chambers, a stationary piston within the cylinder, and means for admitting fluid pressure to the cylinder on both sides of the piston.

FERNLEY H. BANBURY.