

(No Model.)

R. HARTMANN.
MIXING MACHINE.

No. 517,158.

Patented Mar. 27, 1894.

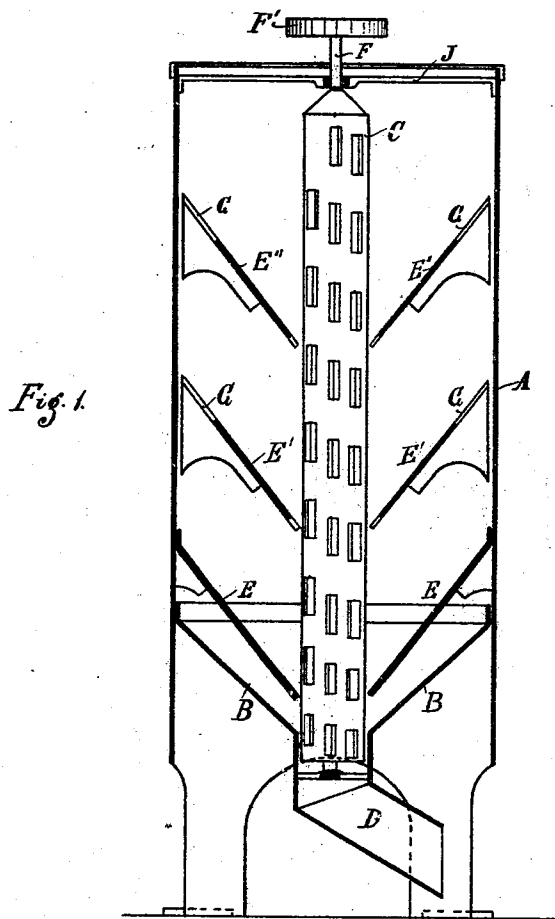
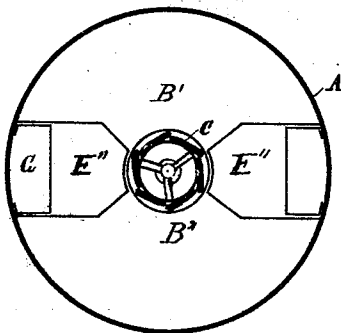


Fig. 2.



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MIXING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 517,158, dated March 27, 1894.

Application filed June 16, 1893. Serial No. 477,887. (No model.)

To all whom it may concern:

Be it known that I, ROBERT HARTMANN, a subject of the King of Prussia, residing at Kerb'sche Hühle, near Dingelstädt, Prussia, Germany, have invented new and useful Improvements in Mixing-Machines for Grist of Any Kind, of which the following is a specification.

This invention relates to a machine for mixing pulverulent substances of all kinds and will be understood by reference to the accompanying drawings and the following description.

The machine is represented in Figure 1 in vertical section and in Fig. 2 in plan the cover being removed.

The apparatus is exceedingly simple; it consists of a stationary cylindrical vessel A with a conical bottom B to the lower part of which is secured the outlet pipe D.

In the center of the vessel A a cylindrical tube or hollow shaft C is arranged, which extends the whole length of the apparatus and terminates at its lower end in the opening in the bottom B. This tube or hollow shaft C is provided with openings which are formed by cutting and bending outward the shell, and is mounted in a suitable manner on a shaft F by which it is rotated by means of a pulley F'.

Above the conical bottom B of the vessel A and parallel or nearly parallel to this bottom at a certain distance therefrom inclined shelves E are arranged between which are left openings B' and B² in the manner shown in Fig. 2. The vessel A is closed by a cover T which for the purpose of charging the materials to be mixed is provided with an inlet or may be arranged to open in a suitable manner. If the shelves E are dispensed with the machine works as follows: The pulverulent materials which are to be mixed having been charged in any suitable succession into the vessel A and the hollow shaft C having been rotated, the parts of C which are cut and bent outward operate like cutters and remove particles of the material and allow them to fall mixed with each other through C to the outlet D. After a short time however this operation stops, as only the particles of the material which rest directly against the periphery of C, are seized while the other part remains in

the shape of a tube. To prevent this and to effect a continuous operation of the machine the shelves E are provided. These shelves allow the materials to be mixed to pass only through the two openings B' and B². If the pulverulent materials were of greater stability than they are in reality, the space between the two shelves E and the bottom B would remain empty; notwithstanding this, flour, &c., when treated in this apparatus enters that space, but it cannot become compacted above the bottom B as it is quickly discharged by means of very large apertures in the tube or hollow shaft C. By the shelves E the whole mass of the material is divided into four columns two of which (the columns which stand on the bottom B) are discharged more quickly by the lower part of the tube or hollow shaft C than the others, which stand on the shelves E. In consequence of this the mass that forms the first columns slides down quicker than that forming the second columns; a differential motion arises in the mass of the materials and a necessary consequence of this is that as particles are discharged by the tube or hollow shaft C, the rest of the mass slides downward to the center of the vessel A so that constantly new particles of the material can be seized or removed by the tube or hollow shaft C. To maintain or to increase this difference in the speed of the two columns throughout the whole apparatus several shelves E' E'' are inserted at certain distances apart and parallel to the shelves E. These shelves E' E'' must be arranged exactly vertically above the shelves E and must have similar openings B' and B² between them.

In order to reduce the dead space in the machine to a minimum the shelves E' E'', &c., are provided at their outer parts adjacent to wall A with apertures G. By these last described means the upper portion of the mass by its pressure on the lower portions increases the motion toward the center of the vessel. In consequence of the different speeds at which the two pairs of columns of the material descend considerable friction arises between the surfaces at which they touch each other which tends to draw the material downward and by reason of the inclination of the bottom B, to the tube or hollow shaft C the

material is constantly conducted under pressure to C so that the material energetically enters C. In consequence of the pressure which the upper layers give to the lower layers the latter are more strongly pressed against C than the former. If therefore the apertures in C were everywhere the same the apertures in the lower part of the tube would discharge greater quantities than the upper apertures, and the flour or other material under treatment would become unequally mixed. To prevent this and to compensate for the greater discharge from below the shelves E, narrow apertures in the tube C are provided just above the shelves E. The size of these apertures is gradually increased toward the upper part of the apparatus where the pressure of the mass is lowest. In this manner an always proportionate entering of the material from all layers is attained.

In most of the modern mixing machines chambers or compartments one beside another are necessary, which must be filled before the mixing process takes place. This arrangement requires considerable mechanism, great attention and much time. In the present machine the material may be charged unsorted and when the machine is in full operation it is simply introduced into the vessel A. It is quite immaterial in what succession the materials to be mixed are charged into the machine and the effect of the machine is the same whether equal or unequal parts of the materials to be mixed are charged after each other or mixed with each other. The tube or hollow shaft C seizes the surrounding flour everywhere proportionately so that it is mixed intimately and in the desired proportion while sliding down C.

The machine is of the simplest construction and by its use a considerable saving of power is obtained, and as an immediate and unprepared filling up, even during the operation

of the machine can take place, the machine works more satisfactorily than other machines. It is obvious that the machine may be manufactured in various sizes and for any quantity of flour or other material to be mixed.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A mixing machine consisting of a suitable receptacle, a central hollow tube with openings therein and a series of shelves within said receptacle, substantially as described.

2. A mixing machine consisting of a receptacle having an inclined bottom, a rotating hollow tube therein having openings in its walls, and a series of inclined shelves arranged on different sides of said tube, substantially as described.

3. In combination with the receptacle, a rotating hollow tube having tongues formed in portions of its shell and bent outward to form openings and a discharge pipe in connection with said tube, substantially as described.

4. In combination in a mixing machine, the casing, the central perforated mixing tube with operating means therefor and the inclined supports for the material extending inwardly to the central tube, substantially as described.

5. In combination, the casing, the mixing tube therein with means for moving the same and the inclined supports with spaces between them to divide the material into separate columns and to direct said material to the central tube, substantially as described.

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

ROBERT HARTMANN.

Witnesses:—

EDWARD PEITZ,
GUSTAV HÜLSMANN.