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MACHINE FOR MIXING FLOUR AND OTHER MATERIALS.

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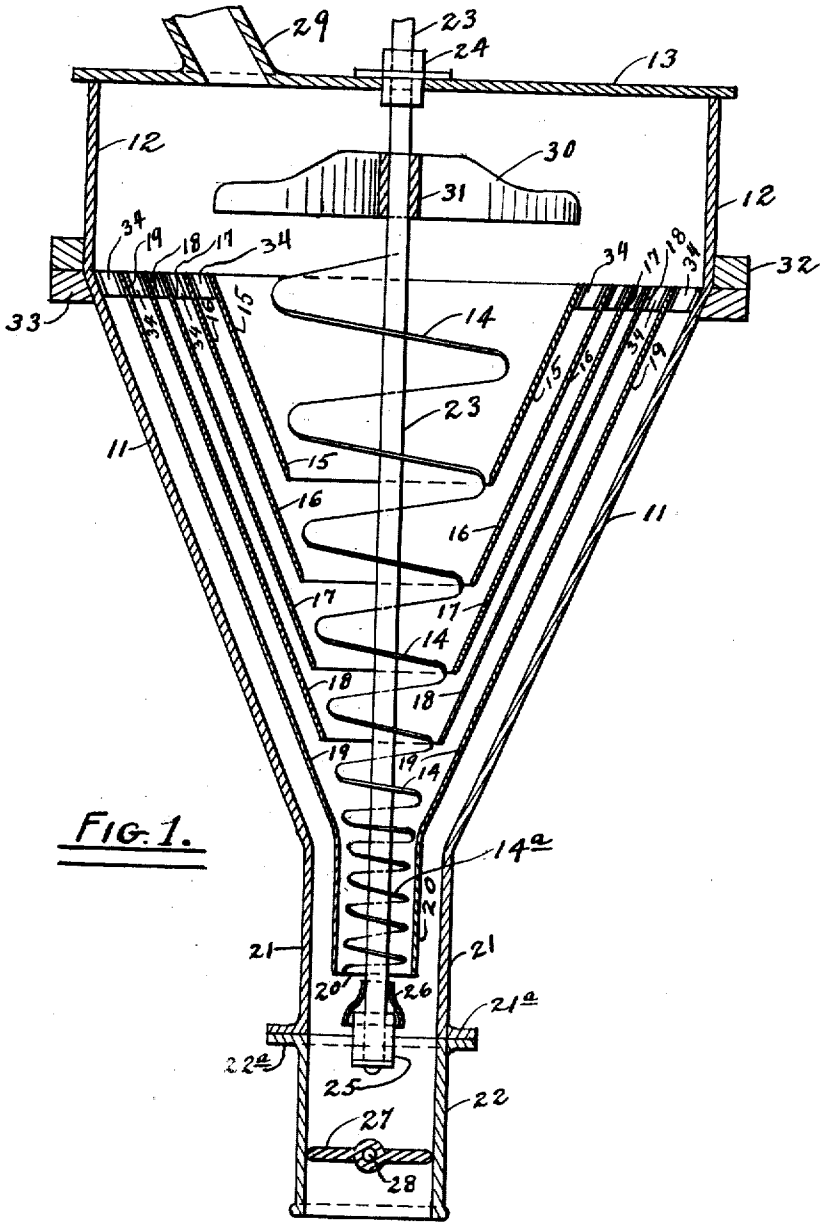


FIG. 1.

Inventor

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MACHINE FOR MIXING FLOUR AND OTHER MATERIALS.

1,268,813. Specification of Letters Patent. Patented June 11, 1918.

Application filed December 5, 1917. Serial No. 206,202.

To all whom it may concern:

Be it known that I, ISRAEL BENJAMINS, a citizen of the United States, residing at Bathbeach, in the county of Kings and State of New York, have invented a new and useful Machine for Mixing Flour and other Materials, of which the following is a specification.

My invention is an improvement upon the machine for mixing flour and other materials described in the application of Albert A. Strauss, filed February 9th, 1916, Serial No. 77,130, in which application a tapered mixing screw is employed in a casing, which is mainly cylindrical in shape and with a conical lower portion; and the objects of my improvement are:

First: To prevent the jamming or choking of the flour or other materials which are being mixed.

Second: To eliminate the excess of friction of the mixing screw, which is due to said jamming or choking of the flour or other material which is being mixed.

Third: To improve the operation of mixing by providing a means for systematically circulating the materials which are being mixed during the operation of said mixing screw.

Fourth: To provide a means for spreading out the mixed material from the center of the upper part of the casing, where it is heaped up by the mixing screw, toward the periphery of the casing, thereby reducing the height of the casing employed, and thereby aiding the said circulation of the material in the machine.

Fifth: To have said machine simple, durable and comparatively inexpensive.

I attain these objects by the mechanism illustrated in the accompanying drawings or by any mechanical equivalent or reasonably obvious modification of the same.

In the drawings, Figure 1 is a vertical section of my mixing machine, showing the screw and sundry bearings thereof in elevation.

The casing of my machine for mixing flour and other materials consist of two parts: the lower conical casing 11 and the upper cylindrical casing 12, which is shown as closed by the cover 13, which is shown as containing the inlet chute 29 for the admission of material to be mixed.

The conical casing 11 is shown as terminating at its lower end in the cylindrical spout 21, to which the cylindrical discharge mouth 22 is connected by means of the flanges 21^a.

The fastenings of said flanges are not shown in the drawings.

Said discharge mouth 22 is shown as inclosing the gate 27, which is adapted to be rotated on a spindle 28, and may be actuated by any suitable operating devices of standard or special design.

The mixing screw 14—14^a is shown as connected to the vertical shaft 23 and as having its lower end 14^a in the form of an Archimedean screw, while the greater part of its length 14 is tapering upward, the pitch and diameter of the blade or thread of the screw increasing progressively upward.

The shaft 23 is shown as supported at its lower end by the step bearing 25 and at its upper end by the bearing or bushing 24.

The shaft 23 carries at its lower end the hood 26 which may be fastened to the shaft 23 so as to revolve therewith and to protect the step bearing 26 from the stream of flour or other materials which is being mixed.

To prevent the jamming or choking of the mixed materials and to produce the circulation of the same, I provide the series of coaxial conical guides 15, 16, 17, 18 and 19, which may be secured to the casing 11 in any suitable manner, as by the spacing plates 34, 34.

The elements of said guides 15, 16, 17, 18 and 19 are shown as parallel to those of said casing 11, and said guide 19 is shown as terminating at its lower end in the cylindrical spout 20, which is coaxial with said spout 21.

Said spout 20 is shown as inclosing the part 14^a of the mixing screw 14—14^a, and the spaces between the successive guides 15, 16, 17, 18 and 19 terminate at their lower ends opposite the portion 14 of said screw 14—14^a.

It is evident that any material when gliding down the inclined space between any two of said guides, will, when passing the lower end of said space, impinge upon the part of the blade of said mixing screw 14—14^a which is opposite to said space.

As the spaces between said guides are isolated from each other, jamming or choking of the materials in any part of the space

inside the casing 11, will be prevented; and as the material is being raised by the screw 14—14ª and discharged over the upper ends of said guides 15, 16, 17, 18 and 19, it will enter the spaces between said guides and continue to circulate with great regularity of motion; and the mixing operation will thereby be greatly improved. The inclination of the elements of said guides 15, 16, 17, 18 and 19 is such as to prevent the lodgement of the mixed material thereon.

As to the advantages of said tapered screw 14, they are fully described in the above application of Albert A. Strauss.

The material which enters the space between said guide 19 and the inside of said casing 11, is directed downwardly through the annular space between the outside of said spout 20, and the inside of the spout 21, to the lower end of said spout 21 from which the material is raised by the part 14ª of the screw 14—14ª inside the spout 20, and propelled upward, receiving increments of material from the spaces between said guides as it is made to pass over the blade of the portion 14 of said screw 14—14ª.

The absence of jamming or choking of the material, naturally eliminates unnecessary friction of said mixing screw, and the systematic circulation of material improves the operation of mixing in general.

Instead of allowing the material to be heaped up in the center of the upper part of the casing 12, and then to glide down sidewise by gravity at an angle exceeding the angle of repose of the material, as described in the above application of Albert A. Strauss, I provide the impeller 30, which is shown as connected to the shaft 23 by means of the hub 31, which may be fastened to said shaft by suitable set screws or keys; the said impeller is similar in shape to the impellers of centrifugal pumps, and I prefer to have the blades curved rearwardly, so as to act on the material not only by means of the centrifugal force, but also to have a component of its motion tending to propel the material radially outward from the center of the machine.

The said impeller 30 may be made to run at a different angular speed than that of the shaft 23, if desired, by permitting said hub 31 to slide on said shaft 23 and actuating said impeller 30 by means of suitable gearing not shown in the drawings.

It is evident that the mixed material will be spread out laterally by said impeller 30 as fast as it is heaped up by the screw 14—14ª and propelled over the upper ends of said guides 15, 16, 17, 18 and 19, causing it to enter the spaces between said guides and to circulate as above described.

The height of the casing 12 may, therefore, be reduced considerably, as is evident from the drawing in this application as compared with that of the above application of the said Albert A. Strauss.

The hood 26 is shown as curved in outline, thereby offering the least resistance to the passage of mixed material from the annular space inclosed between the inside of said spout 21 and the outside of said spout 20 toward the discharge mouth 22.

The action of the gate 27 is the same as described in the above application of said Albert A. Strauss; so is the method of charging the mixing machine and of recharging the same, if necessary.

Many changes could be made in the details of the above mixing machine within the scope of my invention.

I do not therefore restrict myself to the details as shown in the drawings, but I intend to include also all mechanical equivalents and reasonably obvious modifications of the same.

What I claim as my invention and desire to secure by Letters Patent, is:

1. In a machine for mixing flour and other materials, an outer casing, a mixing screw and one or more guides adapted to direct the mixed material from the discharge end of said screw to a point or points of the working surface of said screw.

2. In a machine for mixing flour and other materials, an outer casing, a mixing screw and one or more guides coaxial with said screw, said guides being adapted to direct the mixed material from the discharge end of said screw to a point or points of the working surface of said screw.

3. In a machine for mixing flour and other materials, an outer casing, a mixing screw and one or more guides coaxial with said screw, said guides being adapted to direct the mixed material from the discharge end of said screw to a point or points of the working surface of said screw, said screw comprising a tapered portion near the discharge end thereof and a portion having the form of an Archimedean screw near the intake end thereof, one of said guides having a spout adapted to encompass said Archimedean screw and said outer casing having an end adapted to encompass said spout, thereby directing the material passing between the said outer casing and said guide to the end of said spout, which is also the intake of said screw.

4. In a machine for mixing flour and other materials, an outer casing, a mixing screw on a vertical shaft and one or more guides coaxial with said screw, said guides being adapted to direct the mixed material from the discharge end of said screw to a point or points of the working surface of said screw, combined with an impeller operatively connected to said screw, and

situated at the discharge end thereof, said impeller being adapted to spread out the material in the upper end of the casing as it is being heaped up by the screw, thereby reducing the height of the heap.

5. In a machine for mixing flour and other materials, an outer casing, a mixing screw and a plurality of guides coaxial with said screw, said guides being adapted to direct the mixed material from the discharge end of said screw to a point or points of the working surface of said screw, combined with means for spacing said guides with relation to each other and to said casing, thereby keeping the same in a position coaxially with said screw.

ISRAEL BENJAMINS.