(No Model.)

J. H. DAY & C. KRUMHOLZ.

MIXING MACHINE.

No. 560,259. Patented May 19, 1896.

Fig. 1.

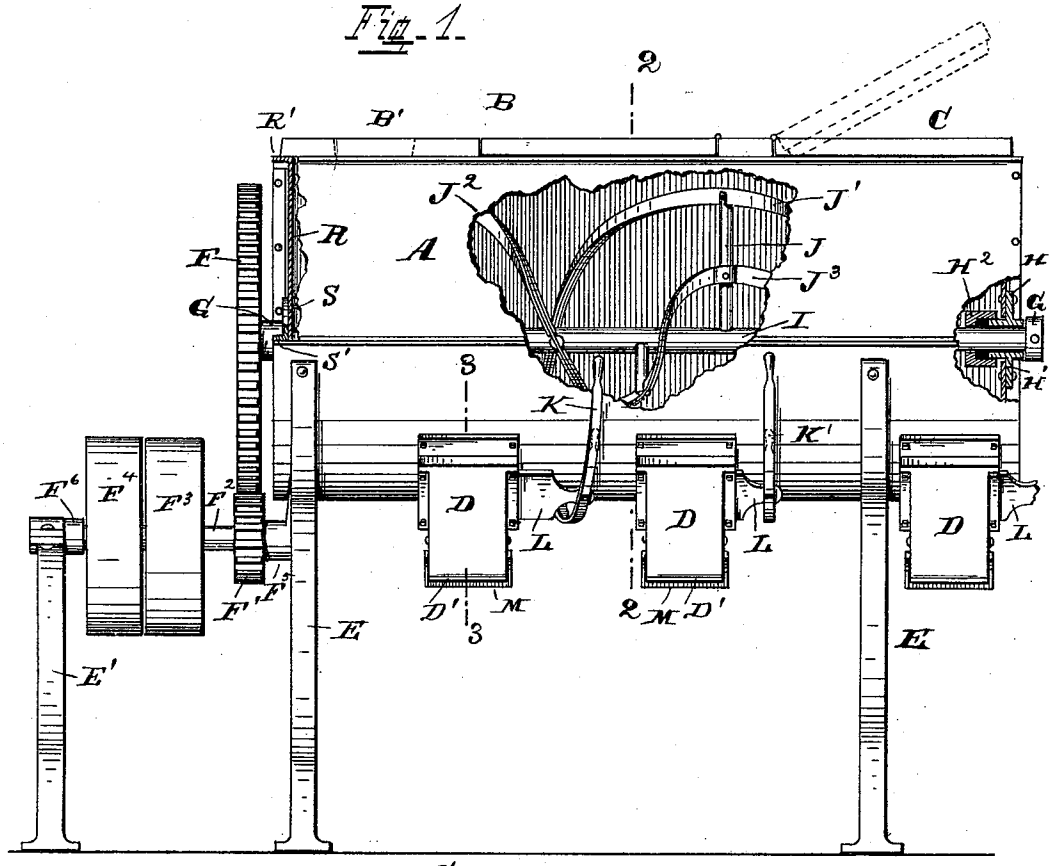
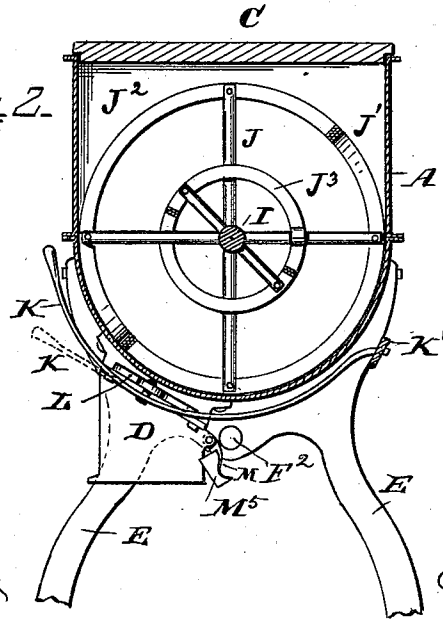


Fig. 2.



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MIXING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 560,259, dated May 19, 1896.

Application filed January 14, 1890. Serial No. 336,860. (No model.)

To all whom it may concern:

Be it known that we, JOHN H. DAY and CHARLES KRUMHOLZ, citizens of the United States, and residents of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Mixing-Machines, of which the following is a specification.

The various features of our invention and the several advantages resulting from their use, conjointly or otherwise, will be apparent from the following description and claims.

In the accompanying drawings, making a part of the specification, Figure 1 is a side elevation of a mixing-machine embodying our invention, a part of the adjacent side being broken away near the center to disclose the rotating device which operates in mixing. Fig. 2 is a vertical cross-section taken in the plane of the dotted line 2 2 of Fig. 1, and looking from right to left.

A indicates the casing or box constituting the vessel in which the operation of mixing is conducted. The lower portion of this vessel is interiorly in cross-section of a semicircular form, while the upper portion has preferably straight sides.

B is the top of the vessel.

One or more openings into the mixing vessel for the admission therein of the articles to be mixed are present. Such an opening is shown at B′ by dotted lines in Fig. 1. Openings are also present for reaching the interior of the machine, and for cleansing the latter when it is desired to use the machine for mixing articles different from those previously mixed therein. These openings are preferably in the uppermost part of the vessel, and two of such inlet-openings are here shown in the top B, each opening being closed by a lid C, hinged to a stationary portion of the top. In Fig. 1 the dotted lines on the right hand at the top of the mixing vessel show one of these lids C when partly lifted.

The interior of the mixer is occupied by a rotatable mechanism for carrying on the operation of mixing the material which has been introduced into the casing. A valuable kind of such mechanism consists of the devices herein shown, and which are as follows: A rotary shaft I extends horizontally within the casing A, and in a direction substantially parallel to the longitudinal axis of said casing. Radial arms J project at intervals from said shaft I. To these arms are attached strips or blades of suitable material. Each of these blades describes a spiral, and the axis of each spiral is coincident with the longitudinal axis of the shaft I. The convolutions of the exterior spirals J' J^2 (there are preferably two of these) run in the same direction while the convolutions of the inner spiral J^3 run in a direction the opposite of that in which said spirals J' and J^2 run. The effect of this arrangement of spirals is to carry the material the entire length of the casing, and while a part of the material is being carried in one direction by spirals J' and J^2 another portion is being carried in the opposite direction by the spiral J^3, and in this way the whole contents of the casing are rapidly and intimately mixed.

The shaft I is suitably supported in journal-bearings. In the mixers we have heretofore made the material therein to be mixed has entered these journal-bearings and thus caused friction between the shaft and said bearings and has caused the shaft to bind. In this way the shaft would, at the bearings, be more rapidly worn down and sooner be rendered unfit for use. Furthermore, the speed of revolution of the shaft was retarded. Thus valuable power was wasted and the character of the product of the machine was injured. To obviate these undesirable results, we have provided devices constructed and arranged as follows, viz: At each end of the casing A, where the shaft passes through the latter, is a bearing H, secured to the casing preferably by an annular flange H′, extending out from the bearing and bolted to the adjacent portion of the casing. That inner portion of the periphery of the bearing which is inside of the casing is provided with a screw-thread. Upon this end of the bearing H is screwed a cap H^2. Through a close-fitting opening in the inner end of this cap passes the shaft I. The space between the cap and the inner end of the bearing is filled with a suitable packing. The cap is then screwed forward on this bearing H, and the packing is thereby compacted and pressed upon the shaft I, thoroughly preventing the

egress of any portion of the material being mixed in the mixer. Such a construction of bearing and cap with packing is present around the shaft I at each end of the casing and renders the casing dust-tight at these bearings.

Another feature of construction which we have devised is as follows: The upper half R of each end of the casing—viz., all that part above shaft I—is made removable. This end plate or head R is preferably united to the remainder of the casing by L-flanged pieces S. One of these pieces is secured to the outside of the head R, at the bottom edge of the latter, and to the outer face of each side edge of this head another of these pieces S is secured. These pieces S are bolted to flanges S′, formed on or secured to the inner faces of the sides of the casing at its end, and also to the outwardly-extending flange S′ of the upper edge of the lower half of the end of the casing. This construction enables the upper half or head R to be readily unbolted and lifted away from the casing and from the flanges of the bearing H, carrying with it the L-flanges S attached to it.

The bearings H can be readily unbolted from their adjacent lower halves of the ends of the casing, and the shaft I with said bearings is readily lifted out for repair when necessary.

The shaft I is prevented from slipping longitudinally in its bearings by suitable checks. In the present instance these checks consist as follows, viz: A collar G is fixed to the shaft outside of the bearing H, at the right-hand end of the casing, and the hub of the gear-wheel F is present outside of the bearing at the other end of the casing. The shaft is rotated by mechanism of any suitable description. In the present instance it is rotated by the well-known gear, consisting of toothed wheel F on the shaft I and pinion F′ on shaft F^2. This latter shaft also carries the loose pulley F^4 and tight pulley F^3, whereby power is communicated to said shaft F^2. Shaft F^2 is supported in journal-bearings, the latter in the present instance being located as follows, viz: the one bearing in leg or frame E, supporting the adjacent end of casing A, and the other in the leg E′.

F^6 is a collar fixed on the shaft F^2 to prevent the latter from slipping toward leg E′ and through the journal of the latter.

The various features of our invention are effective in operation. While they are all preferably employed together, one or more of them may be used without the remainder, and, in so far as applicable, one or more of said features may be used in mixing-machines other than the one herein specifically set forth.

What we claim as new and of our invention, and desire to secure by Letters Patent, is—

1. In a mixing-machine, a reel embodying a horizontal shaft provided with concentric spiral blades of opposite convolutions and a casing through the sides of which passes the said shaft, the bearings of the shaft at said sides being provided with stuffing-boxes, the caps of which are arranged to screw on or off in the inside of the mixer, thus preventing the material that is in the mixer from getting into the said bearings, substantially as specified.

2. In a mixing-machine, the casing containing the shaft carrying the spiral blades, the bearings of the shafts being provided with annular flanges bolted to the end of the casing, and extending within the casing and there carrying a screw-thread and the screw-cap located on the shaft within the casing and engaging the screw-thread of said bearings, substantially as and for the purposes specified.

3. In a mixing-machine, a reel embodying a horizontal shaft provided with concentric spiral blades of opposite convolutions, and a casing having discharge-chutes located in the upper portion of the circular bottom of the casing on the bottom.

4. In a mixing-machine, the casing containing the horizontal shaft having concentric spiral blades of opposite convolutions, and the casing being provided with removable ends above the shaft, these ends having L-flanged pieces S secured thereto, the lower half of each end having at its upper edge the flange S′, for juncture with one of said L-flanged pieces, substantially as and for the purposes specified.

5. In a mixing-machine, the reel having a horizontal shaft carrying concentric spiral blades of opposite convolutions, and having at the inside of the casing stuffing-boxes, the ends of the casing above said shaft being provided with L-flanged pieces whereby the said ends are removably secured to the casing, and the upper portion of the casing being provided with the door C and discharge-chutes, substantially as and for the purposes specified.

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