

H. H. BUBAR AND C. J. BEUST.

MECHANICAL MIXER AND DRIER.

APPLICATION FILED MAR. 15, 1918. RENEWED MAY 24, 1920.

1,344,675.

Patented June 29, 1920.

FIG 1

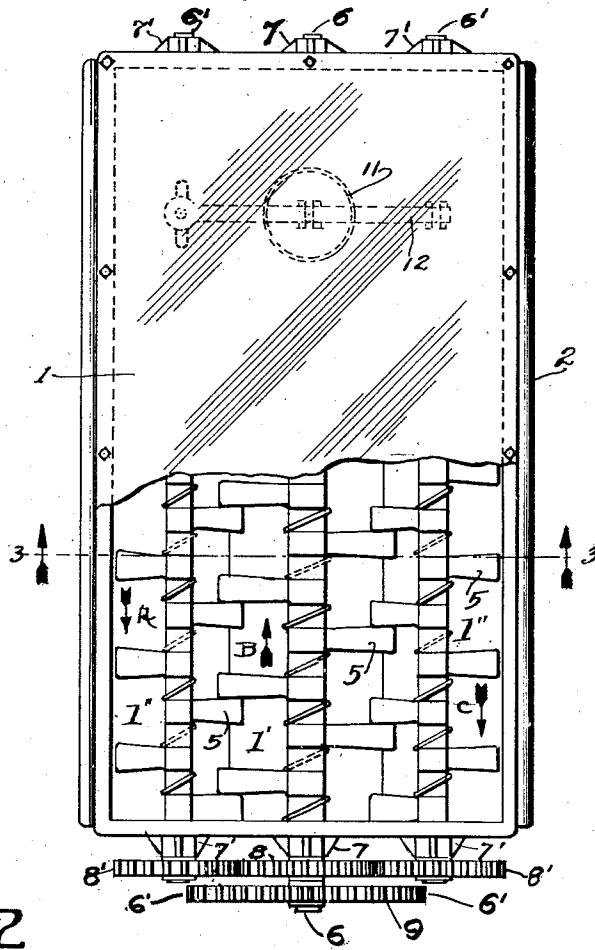
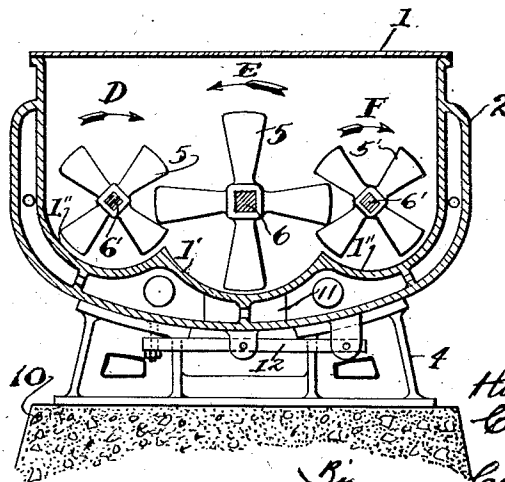


FIG 2



INVENTOR
Hudson H. Bubar
Cecilia J. Beust
By *Carl P. Sogard*
Attorney

UNITED STATES PATENT OFFICE.

HUDSON H. BUBAR AND CECIL J. BEUST, OF BROOKLYN, NEW YORK.

MECHANICAL MIXER AND DRIER.

1,344,675.

Specification of Letters Patent.

Patented June 29, 1920.

Application filed March 15, 1918, Serial No. 222,618. Renewed May 24, 1920. Serial No. 383,927.

To all whom it may concern:

Be it known that we, HUDSON H. BUBAR, a citizen of the United States, and resident of the borough of Brooklyn, in the county of Kings, city and State of New York, and CECIL J. BEUST, a citizen of the United States, and resident of the borough of Brooklyn, in the county of Kings, city and State of New York, have jointly invented certain new and useful Improvements in Mechanical Mixers and Driers, of which the following is a specification.

Our invention relates to apparatus for mixing substances or drying them, or performing both operations at the same time.

The improved apparatus comprises a container with feeding devices located therein, said feeding devices being of novel construction and arrangement and including a central feeder and lateral feeders on each side thereof, said feeding devices being of a type proper for the purpose of the particular operation intended, that is to say, either mixing or drying, or mixing and drying at the same time.

Without desiring to restrict ourselves to the particular embodiment of our invention illustrated, we have shown in the accompanying drawings a form of our invention which is adapted for the simultaneous mixing and drying of the material under treatment.

In said drawings,

Figure 1 is a plan view of the apparatus, with part of the cover broken away, and

Fig. 2 is a cross section on line 3—3 of Fig. 1.

The container or tank in which the material is mixed or dried, or mixed and dried, may be of any suitable shape as long as it conforms to certain characteristics hereinafter pointed out, with reference to the feeding devices. The container shown in the drawings is of substantially rectangular shape in plan view. In some cases the operations are conducted at atmospheric pressure, in which event the interior of the container would communicate with the surrounding air, by leaving the top of the container open. In other cases, it may be desired to conduct the operation under exclusion of air, or under pressure, or under a vacuum, and in such cases the container would be closed to the surrounding air by means of an air tight cover 1 secured removably by bolts or in any other suitable

manner. The container is preferably provided with a jacket 2 having suitable connections for ingress and egress of a suitable fluid for cooling or heating purposes as may be desirable in some cases.

Within the lower portion of the container we arrange the central feeding device 5 and the lateral feeding devices 5', which, in the particular construction shown, consist of blades of the propeller type secured on parallel horizontal shafts 6 and 6' respectively, extending longitudinally within the container and supported in suitable bearings 7 and 7'. Preferably, each of the propellers or feeding devices has only one blade in the same plane of rotation, that is to say, each of its blades in a different plane of rotation. The shafts 6, 6' are geared together at 8, 8', so that the central shaft will rotate in the opposite direction to the lateral shafts, and it will be understood that the blades of the several feeding devices are so located as always to clear each other during the rotation of the feeding devices. The spur gear 8 is of the same diameter as the spur gears 8', so that the shaft 6 rotates at the same speed as the shafts 6'. The feeding devices may be driven by means of gearing (not shown) in mesh with a spur gear 9 secured to the central shaft 6. It will be observed that the diameter of the central feeding device is larger than the diameter of a lateral feeding device, the ratio being preferably such that the area of the circle swept out by one of the blades 5, will be twice the area of the circle swept out by one of the blades 5'. As will be seen in Fig. 2, the inner surface of the container bottom is made with three longitudinal channels 1' and 1'' respectively, forming part of cylindrical surfaces the axes of which coincide with those of the shafts 6 and 6' respectively. During the rotation of the shafts 6, 6', the tips of the blades 5 and 5' pass quite close to the walls of said channels 1', 1''. It will be understood that the area or rather volume of the channel 1' is larger than that of either channel 1'', that is to say, about twice as large, corresponding to the relation between the diameters of the central and lateral feeding devices.

The particular feeding device consisting of a shaft with propeller blades, only one of which is in the same plane of rotation, is especially adapted for the thorough mixing

and simultaneous drying of materials, it being understood that in such cases, the jacket 2 is supplied with a heating agent. We do not, however, wish to restrict ourselves to this particular form of feeding device, and we might in some cases employ conveyer screws of the well known type, or other forms of feeding devices, depending upon the particular operation to be performed, that is to say, certain types of feeding devices would be particularly suitable for the performance of a mixing operation, other types would be especially adapted for drying purposes, while still other types, like the one shown, are adapted for the simultaneous performance of both operations.

The apparatus is supported in any suitable way, for instance, by means of legs or saddles 4 resting on a suitable base 10. For the purpose of removing the material after treatment, we may provide the bottom of the container with a suitable opening normally closed by a plug 11, operated by lever mechanism 12 or in any other suitable manner.

The material to be treated, having been placed within the container, and the latter closed if desired to exclude the surrounding air, the feeding devices are set in motion and if conditions require, a heating or a cooling agent is circulated through the jacket so as to keep the material at the proper consistency. The central feeding device will rotate in one direction, say as indicated by the arrow E in Fig. 2, and the lateral feeding devices will rotate in the opposite direction, as indicated by the arrows D and F. Inasmuch as the pitch of the three feeding devices is in the same direction (see Fig. 1) it follows that the material in the container will be caused to travel lengthwise thereof in one direction by the central feeding device, as indicated by the arrow B in Fig. 1, and in the opposite direction, along the side walls of the container, by the lateral feeding devices, as indicated by the arrows A and C. The material will therefore travel, say, first forward and adjacent to the side walls of the container, in the channels 1'', and then rearward, in and adjacent to the central channel 1', circulating through this path as long as the shafts are rotating, and as long as the outlet is closed. If the outlet is opened and the rotation of the shafts continued, the material will be gradually fed out of the container through the said outlet.

With apparatus of our improved construction, when used as a mixer, we obtain

readily a positive, uniform mixture of the materials under treatment. If the apparatus is used simply for drying a moist substance, or a mixture of moist substances, we obtain a thorough dissipation of the moisture contained in the substance or substances. These two operations may be performed either separately (and successively, if desired), or at the same time, and in either case the interior of the apparatus may be open or closed to the surrounding air, and if closed, it may be under pressure or under a vacuum, as conditions may warrant.

While we have described a preferred and satisfactory embodiment of our invention, it is obvious that changes may be made therein within the spirit and scope thereof, as defined in the appended claims.

We claim:

1. An apparatus of the character described comprising a container having a bottom provided with a central longitudinal arc-shaped channel and channels disposed parallel therewith on opposite sides thereof, a rotary shaft carrying spiral blades disposed over said central channel and rotary shafts carrying spiral blades disposed over said side channels, and means for rotating said central shaft in a direction opposite to the rotation of the said side shafts, the path of the blades of the central shaft interlapping with the paths of the blades of the side shafts.

2. An apparatus of the character described comprising a container having a bottom provided with a central longitudinal arc-shaped channel and smaller channels disposed parallel therewith at a higher elevation on opposite sides thereof, a rotary shaft carrying spiral blades disposed over said central channel and rotary shafts carrying smaller spiral blades disposed over said smaller channels, and means for rotating said central shaft in a direction opposite to the rotation of the said side shafts, the path of the blades of the central shaft interlapping with the paths of the blades of the side shafts.

In testimony that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

HUDSON H. BUBAR.
CECIL J. BEUST.

Witnesses:

CHAS. P. THORNTON,
KATHERINE BUBAR.