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R. M. TEMPLE

MIXING APPARATUS

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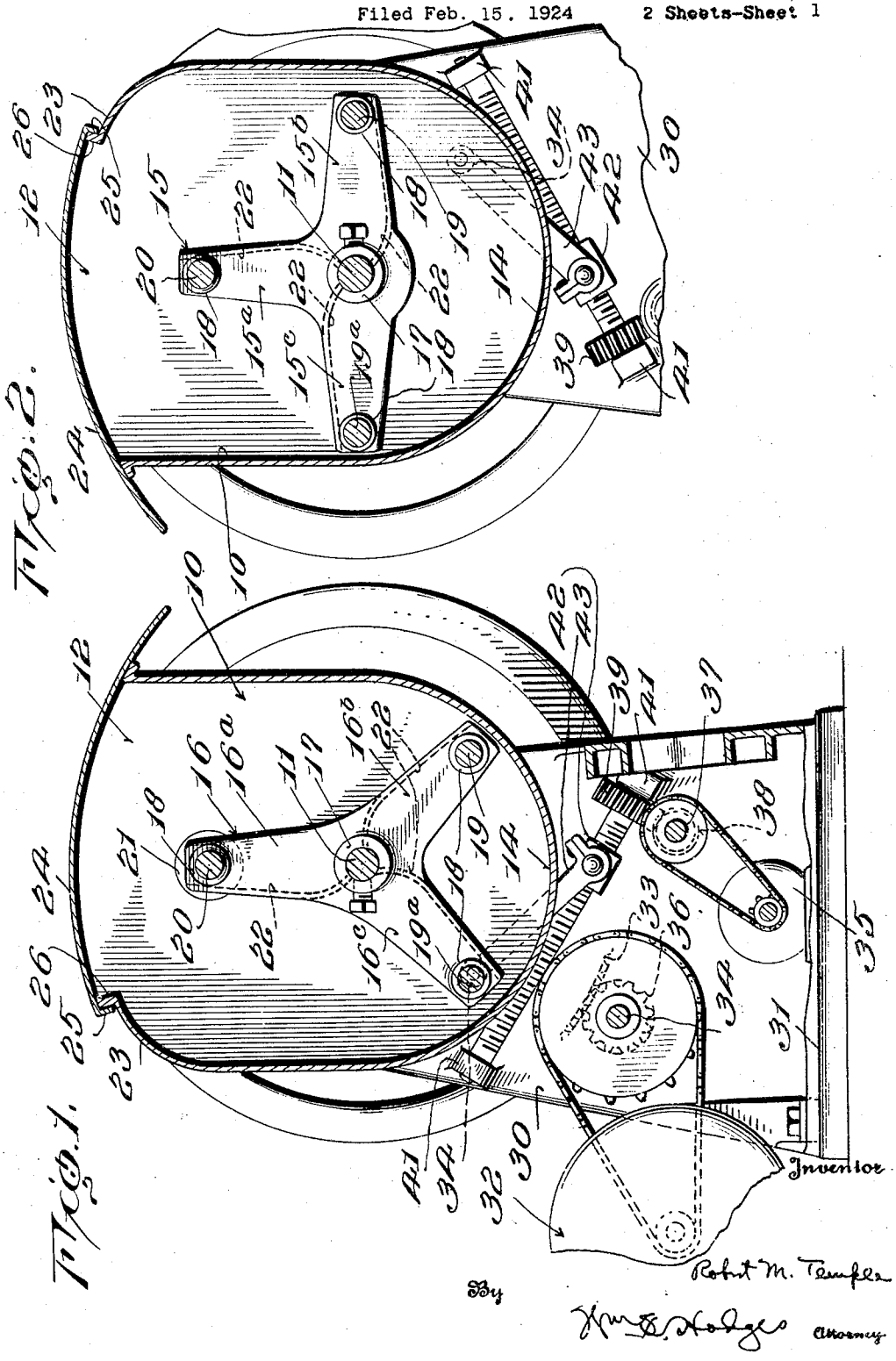


Fig. 2.

Fig. 1.

Inventor

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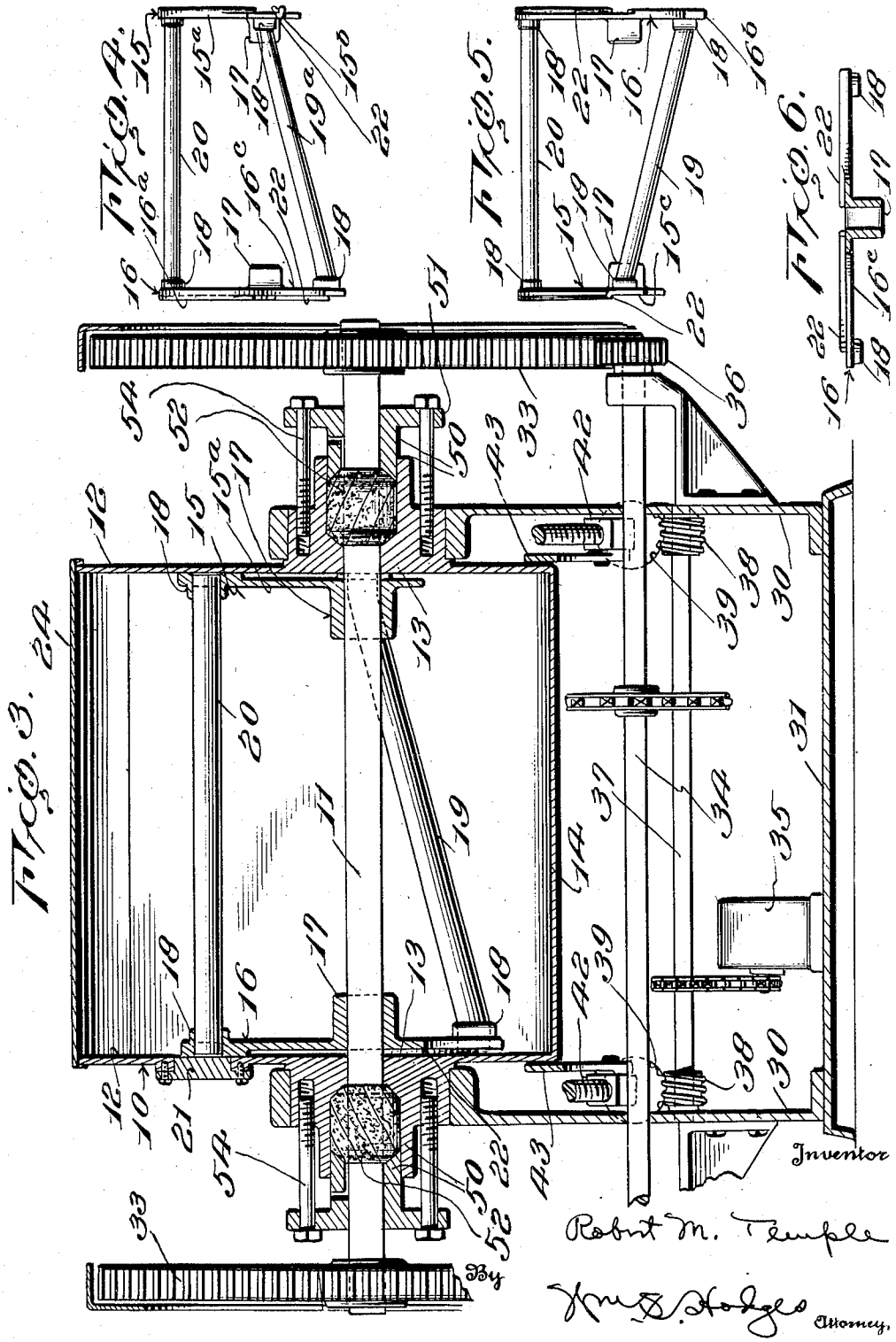
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UNITED STATES PATENT OFFICE.

ROBERT M. TEMPLE, OF PHILADELPHIA, PENNSYLVANIA.

MIXING APPARATUS.

Application filed February 15, 1924. Serial No. 692,981.

To all whom it may concern:

Be it known that I, ROBERT M. TEMPLE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Mixing Apparatus, of which the following is a specification.

This invention is a mixer of the type employed for mixing bread, cake and similar doughs, though not limited to such use.

One of the objects of the invention is to provide a mixing receptacle, so constructed as to impart a loop-like motion to its contents during agitation, so as to direct said contents into engagement with the agitator elements. A further object is to provide a mixing receptacle having means constructed to resist any tendency of the end walls to be drawn together during operation of the agitator elements. A further object is to provide an agitator member having means for carrying the mixable ingredients first to one end of the receptacle, and then to the other end, and to follow this reciprocating movement by equalizing the distribution of said ingredients before another reciprocation takes place. A further object is to provide mixing elements so arranged as to have a direct sweep and rubbing tendency from one extreme of the receptacle to the other. A further object is to provide means for preventing accumulation of the mixable materials around the shaft bearings contiguous to the ends of the receptacle, thereby insuring more sanitary conditions and adding to the life of the parts. A further object is to provide a cover constructed to prevent the contents from being thrown out while the mixing element is in operation, and particularly during the period that the receptacle is being moved to dumping position. A further object is to provide a mixing receptacle having a stuffing box constructed to prevent leakage around the agitator.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings:—

Figures 1 and 2 are transverse sectional views, viewed in opposite directions illustrating a mixer constructed in accordance with the invention. Figure 3 is a longitudinal sectional view. Figures 4 and 5 are side views of the beater taken at right angles to each other. Figure 6 is a sectional view of one of the spider arms.

Referring to the drawing, 10 designates the casing or mixing receptacle constructed to receive the ingredients to be mixed, and 11 is a shaft extending longitudinally through the receptacle, and having its ends projecting through the end walls 12, said shaft being rotatably mounted in suitable bearings 13. It will be noted that the bottom 14 of the casing is approximately semi-circular in cross-section, and merges into the front and back walls of the receptacles. The bearings 13 are so disposed that the axis of the shaft 11 is eccentrically located with respect to the center of the arc of curvature of the bottom, said shaft being thus closer to the front than to the back.

Keyed or otherwise secured to the shaft 11 are spiders 15, 16, each of which is provided with a suitable hub 17. The spider 15 is of approximately T-shape and the spider 16 is of approximately Y-shape, the two spiders being so mounted upon the shaft that the arms 15^a and 16^a lie opposite each other while the arms 15^b and 16^b, and the arms 15^c and 16^c are staggered with respect to each other, as will be more particularly noted from the drawings. The outer ends of the arms 15^b, 15^c, 16^b, and 16^c are provided with suitable bosses 18, to receive the ends of the beater rods, one beater rod 19 connecting the arms 15^b and 16^b and the other beater rod 19^a connecting the arms 15^c and 16^c. Thus it will be observed that the beater rods are in an inclined position relative to the axis of the shaft, and also with respect to the longitudinal walls of the casing. Rotatably mounted in the ends of the arms 15^a and 16^a is a rubber rod 20, said rod extending parallel with the shaft 11. One end wall of the case is provided with an opening normally closed by a plug 21, which may be removed to permit removal and replacement of the rubber bar 20, when occasion requires.

Each arm of the several spiders 15 and 16 is provided with a scraper 22, which consists of a lip extending from the forward edge of the arm to the contiguous end wall of the casing, and curved inwardly contiguous to the hub 17. The function of the scraper is to keep the end walls clean and clear of the mixable materials which might otherwise adhere thereto, so that said mate-

rials cannot work down into the bearings where they will ferment and discolor, and eventually eat away the metal parts of the tank or casing and other contiguous parts of the mixer. The scrapers also tend to reduce friction because the end motion of the agitator against the walls of the tank is reduced to a minimum, and yet the device has the same cleaning and scraping tendency as though the thickness of the entire spider equalled that of the spider and scraper.

The end walls of the tank or casing are curved at their upper edges as indicated in the drawing, a portion of the rear wall being also curved at 23 to gradually merge into the curvature of the top edges. Thus the rear wall is provided with somewhat of an overhang at its upper edge. Slidably supported by the top of the receptacle is a cover 24, conforming to the curvature of the end walls, said cover being somewhat wider than the top opening of the casing. The forward movement of the cover is limited by a lip 25 carried thereby, engaging an abutment strip 26 carried by the overhanging top edge of the rear wall. When in closed position a substantial portion of the cover overhangs the front wall of the casing.

The casing may be mounted in any of the ways well-known in the art. For example, the bearings of the shaft may be supported by standards 30 extending upwardly from a base 31, rotation being imparted to the shaft by means of a motor 32, geared to the drive wheels 33, which are secured to the shaft 11. The drive shaft 34 is driven by a sprocket gearing and through an intermediate gearing 35, operates the drive pinions 36, which mesh with the wheels 33.

The receptacle may be tilted in any suitable or well-known manner. For purposes of illustration the dumping apparatus may consist of a counter shaft 37, provided with worm sections 38, which mesh with worm pinions 39, screwed to the hub 40 and mounted to rotate in suitable bearings 41. Working on the threaded portions of the respective shafts 39 are travelers 42, to each of which is pivotally connected one end of a link 43, the other end of each link being pivotally connected to a suitable lug 34, secured to the case of the receptacle. The counter shaft is driven by an independent motor 45, the action of which is controlled by a reversible motor switch 46, automatically operated by the action of the tank at either extreme point of its movement. Devices of this kind are well known and no attempt is made to illustrate the detail structure thereof, it being considered sufficient to indicate the same diagrammatically.

To prevent leakage around the agitator shaft a novel stuffing box is employed. The ends of the shaft 11 extend through stuffing boxes each formed of two separated sleeves 50, encircling the shaft, and having a flange 51. The contiguous ends of the sleeves are separated, and in the space between them is laid a plurality of helically disposed strips of packing 52, which contact with the shaft. Compression is brought against the ends of the packing by means of adjustable clamp rods 54, engaging the flanges 51. A suitable oil opening for lubrication purposes, as indicated at 55, is provided.

In operation, the ingredients to be mixed are placed in the tank 10 in the usual and ordinary way. It will be assumed for instance that a batch has been introduced for mixing bread dough. As the shaft rotates, the respective beater rods and the rubber rod approach closer to the front wall than to the rear wall by reason of the eccentric mounting of the shaft. A forward rotation is imparted to the shaft by the motor. As the shaft rotates, the beater rod 19, engaging the contents of the receptacle will carry the mixable ingredients toward the right hand end of the casing, and this action is followed immediately by the action of the beater rod 19^a which tends to move the contents in the other direction. This reciprocable movement is followed immediately by the action of the rubber rod 20, which functions as an equalizer, tending to spread the ingredients evenly and acting somewhat to roll or spread out the ingredients lying between it and the rear wall of the casing.

The rotation of the actuator first works the various ingredients into a uniform granular condition and then by their continued rotation in a centrifugal horizontal position will rub the mass right, left, and straight, bringing about a thoroughly incorporated glutinous highly developed mass, with friction reduced to such an extent that it eliminates the necessity of using cold air blasts or refrigeration appliances. This is made possible by the agitating bars taking hold of the mass in large portions and rubbing it or drawing it from thick portions to thin portions with proper spacing without creating undue friction. A considerable portion of the mass is caused to rotate with the beaters, and the overhanging portion of the back wall guides the mass to a position where it will drop back into engagement with the agitator. During operation of the heater the scrapers 22 will remove any of the ingredients which tend to adhere to the end walls, keeping said walls substantially clean and preventing an accumulation of dough or other ingredients. Thus the ingredients which would ordinarily produce an unsanitary condition, if left adhering to the wall are prevented from accumulating, and deterioration of the parts is therefore prevented.

When the mixing operation is complete and it becomes necessary to dump the contents of the casing, the latter may be tilted by the mechanism described for the purpose, the cover moving with the receptacle so that it is suspended from the abutment strip. Thus the receptacle will remain closed, so that the beaters may not throw the contents of the receptacle out of the top during the dumping operation, as often happens when the dumping movement has been initiated before arresting movement of the beater shaft. The top may then be moved back so as to expose the contents and permit completion of the dumping operation.

With respect to the stuffing box, experience has demonstrated that stuffing boxes of the type commonly used on mixing machines are very unsatisfactory. By means of the stuffing box herein described, with the packing disposed helically around the shaft, either right or left hand according to which end of the shaft it is on, the rotation of the shaft serves to carry the lubricant around so as to maintain a contact with the packing and prevent it from becoming hard. At the same time it prevents the liquid contents of the mixer from coming out around the shaft. By tightening the rods 54 to bring the sleeves 50 toward each other, the packing strips are forced into close engagement with the shaft, maintaining a tight joint.

Having thus explained the nature of the invention and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what is claimed is:—

1. In a mixer of the character described a rotatably mounted actuator having beater means for imparting alternate reciprocating movement to the mixable materials, and also having means independent of the beater means for applying a flattening pressure to said materials in a plane parallel with the axis of the actuator.

2. In a mixer of the character described a rotatably mounted actuator having beater means for imparting movement to the mixable materials in one direction, and then movement in the other direction, and also having means independent of the beater means for subsequently applying a flattening pressure to said materials in a plane parallel with the axis of the actuator.

3. In a mixer of the character described a rotatable shaft, spiders carried by said shaft, inclined beater bars connecting said spiders and a rubber bar having its ends mounted in said spiders independently of the beater bars.

4. In a mixer of the character described a shaft, beater bars inclined with respect to said shaft and a rubber bar parallel with said shaft and mounted independently of the beater bars.

5. In a mixer of the character described, a shaft, rigidly secured beater bars rotatable with said shaft and inclined with respect thereto and a rubber bar loosely mounted independently of said beater bars and also rotatable with said shaft and lying parallel therewith.

6. In a mixer of the character described, a shaft, spiders secured thereto and provided with radiating arms, one arm of each spider being positioned opposite an arm of the other spider, the remaining arms of the respective spiders being staggered with respect to each other, beater bars connecting the said arms, and a rubber bar carried by the oppositely disposed arms.

7. In a mixer of the character described, a shaft, a T shaped spider on one end of said shaft, a Y-shaped spider at the other end of said shaft, the dependent ends of the respective spiders being disposed opposite to each other, a rubber bar carried by the oppositely disposed arms, and inclined beater bars connecting the ends of the other arms of the respective spiders.

8. In a mixer of the character described, a shaft, a T shaped spider secured to one end of the shaft, a Y-shaped spider secured to the other end of the shaft, the main stems of said spiders being disposed opposite to each other, a rubber bar loosely mounted in said main stems, and inclined beater bars connecting the other arms of the spiders.

9. In a mixer of the character described a shaft, spiders having radiating arms, one arm of each spider being positioned opposite to an arm of the other spider, the remaining arms of the spider being staggered, bars connecting the staggered arms to the respective spiders, a rubber bar carried by the oppositely disposed arms, and scrapers carried by the forward edge of each spider arm.

10. In a mixer of the character described a rotatably mounted actuator having beater means for imparting alternate reciprocating movement to the mixable materials, and also having means independent of the beater means for applying a flattening pressure to said materials in a plane parallel with the axis of the actuator, and scrapers carried by the ends of the actuator.

11. A mixer of the character described comprising a casing having a bottom of semicircular form in cross section, a rotatably mounted actuator located within the casing and disposed eccentrically with respect to said bottom, said actuator having beater means for imparting reciprocations to the mixable materials within the casing, and also having means independent of the beater means for applying a flattening pressure to said materials in a plane parallel with the axis of the actuator.

12. A mixer of the character described comprising a casing having a rear wall provided with an upwardly curved portion, and an actuator rotatably mounted within said casing and having means for imparting reciprocating movements to the mixable materials within said casing, and also having means independent of the beater means for applying a flattening pressure to said materials in a plane parallel with the axis of the actuator, a curved portion of the rear wall of the casing being positioned to overhang the actuator.

13. A mixer of the character described comprising a casing, a shaft rotatably mounted within said casing, spiders secured to said shaft and having angularly bent edges forming scrapers contacting with the end walls of the casing and agitating means carried by said spiders.

14. A mixer of the character described comprising a tiltable casing having curved supporting means, a curved cover slidably resting upon said supporting means, means limiting the forward movement of said cover during tilting movement of the casing and a beater located within said casing.

15. A mixer of the character described comprising a casing having curved supporting means, a curved cover slidably mounted in said supporting means, means limiting the forward movement of said cover, a beater located within said casing, said cover being of sufficient width to provide a substantial portion overhanging the front wall of the casing when in closed position.

16. A mixer of the character described comprising a tiltable casing, a curved cover slidably resting on said casing and provided with a flange at its rear edge and an abutment strip on said casing complemental to said flange and cooperated therewith to form a stop to prevent sliding movement of the cover during tilting movement of the casing.

In testimony whereof I have hereunto set my hand.

ROBERT M. TEMPLE.