Sept. 1, 1953 A. J. SCHAEFER 2,650,805

ROTARY BLENDER

Filed Nov. 7, 1951 2 Sheets-Sheet 1

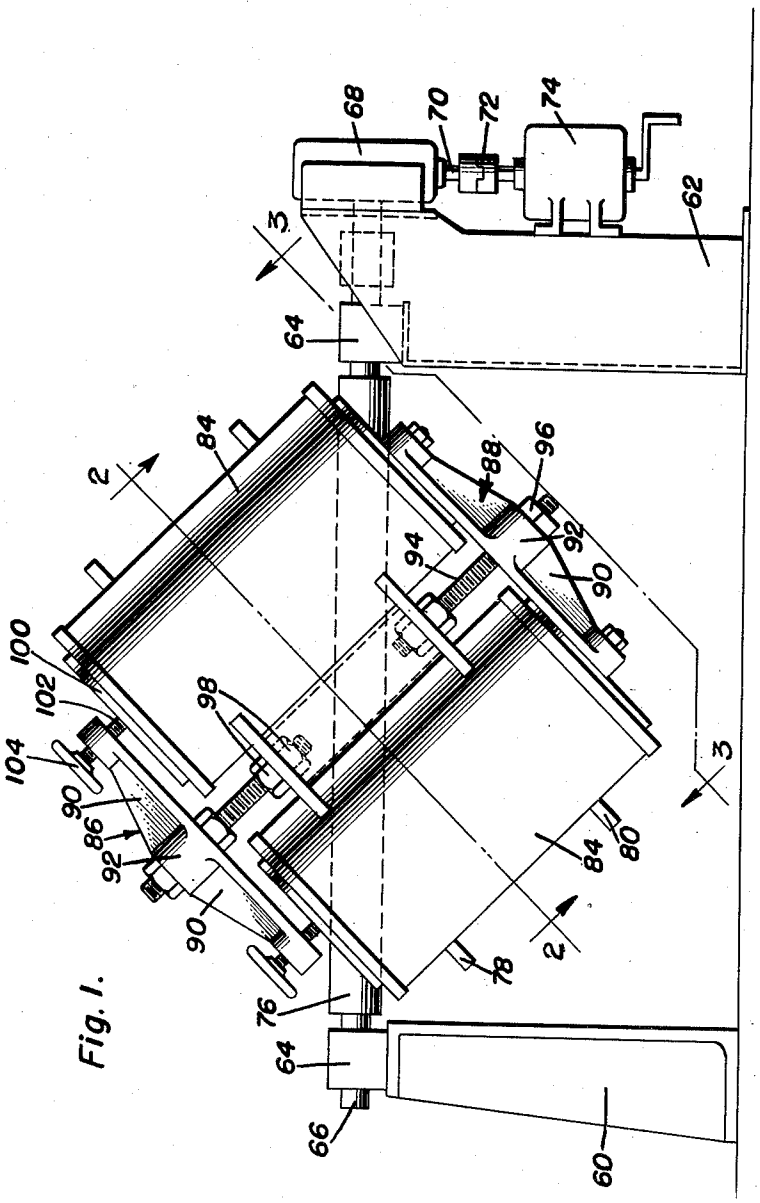


Fig. 1.

Alfred J. Schaefer
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

Sept. 1, 1953 A. J. SCHAEFER 2,650,805

ROTARY BLENDER

Filed Nov. 7, 1951 2 Sheets-Sheet 2

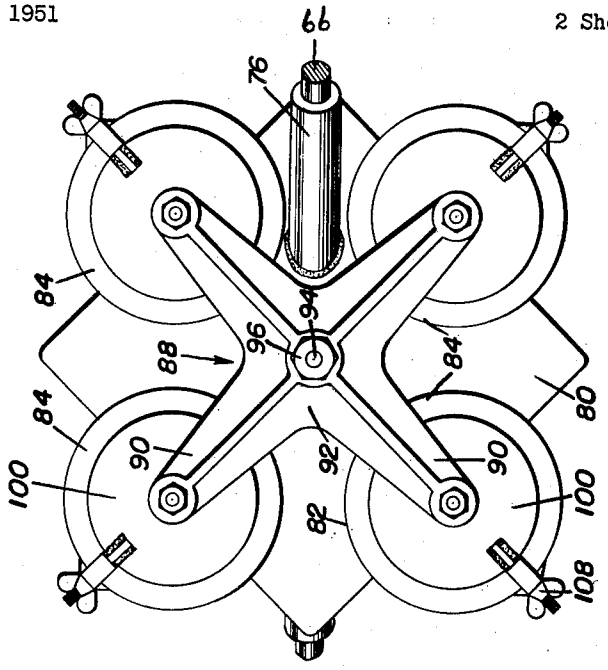


Fig. 3.

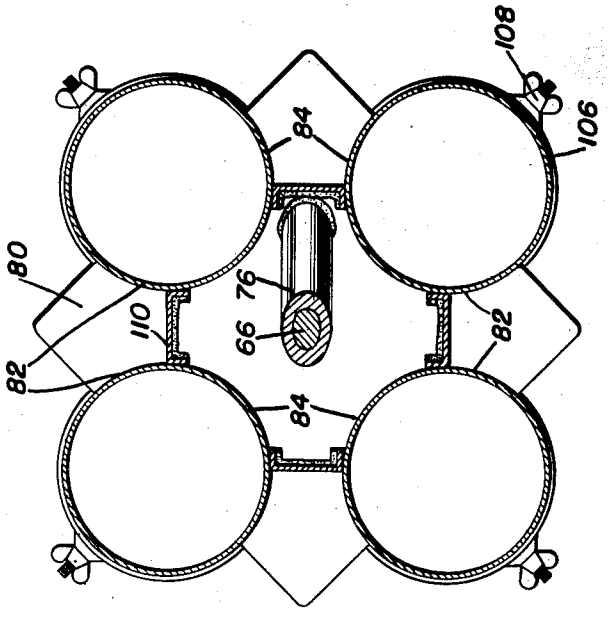


Fig. 2

Alfred J. Schaefer
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

Patented Sept. 1, 1953

2,650,805

UNITED STATES PATENT OFFICE

2,650,805

ROTARY BLENDER

Alfred J. Schaefer, Stroudsburg, Pa.

Application November 7, 1951, Serial No. 255,248

6 Claims. (Cl. 259—57)

1

This invention comprises novel and useful improvements in a rotary blender and more specifically pertains to an improved construction of rotary tumbling mill.

The primary object of this invention is to provide an improved rotary tumbling mill in which the power required to effect rotation of the tumbling barrel or container shall be reduced to a minimum.

A further object of the invention is to provide a rotary tumbling mill in which the weight of the container and its contents are counterbalanced during the tumbling operation.

Yet another object of this invention is to provide a rotary tumbling mill in which the geometric center of the container or containers is offset from the axis of rotation together with means for counterbalancing the offset center of gravity of the container and its contents.

A still further object of the invention is to provide a rotary tumbling mill in conformity with the preceding object wherein the counterbalancing means may be effected wholly or in part by mounting a plurality of containers in pairs on opposite sides of the axis of rotation to provide balanced couples for rotation.

A still further important object of the invention is to provide a rotary tumbling mill wherein a plurality of containers are mounted for rotation about an axis of rotation and wherein the longitudinal axes of the containers are inclined with respect to that axis, and wherein the geometric centers of the containers are displaced from that axis.

A still further important object of the invention is to provide a rotary tumbling mill which shall include novel means for conveniently mounting a plurality of containers upon a supporting carriage whereby the containers are disposed in couples about the axis of rotation and in parallel relation to each other.

These, together with various ancillary features and objects of the invention, which will later become apparent as the following description proceeds, are attained by the present invention, preferred embodiments of which have been illustrated, by way of example only, in the accompanying drawings, wherein:

Figure 1 is a side elevational view of a third embodiment of the invention disclosing the manner in which a plurality of containers may be mounted upon a single carriage for rotation about a single axis of rotation, and wherein the longitudinal axes of the containers are parallel to each other and are inclined with respect to the axis of rotation;

2

Figure 2 is a transverse sectional view taken substantially on the plane indicated by the section line 2—2 of Figure 1; and

Figure 3 is a transverse sectional view taken substantially upon the plane indicated by the section line 3—3 of Figure 1 and showing the right end of the carriage and containers mounted thereon in end view.

Referring now more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, attention is directed first to the embodiment of Figures 1 and 2 which disclose a very simple application of the principles of this invention to a tumbling mill comprising a single container.

The conventional tumbling mill comprises a container which is mounted for rotation about an axis extending through the geometrical center of the container. Consequently, when the container is partially loaded and rotated, the revolving mass within the container is necessarily disposed to one side of the geometric center and the axis of rotation, thereby producing by centrifugal force an unbalanced moment about the axis of rotation. This unbalanced moment results in the creation of very considerable vibrational stresses in the tumbling mill, and necessitates the application of considerable power for maintaining rotation.

It is the fundamental principle of this invention to displace the axis of rotation from the geometrical center of the container.

It will be apparent that this displacing of the center of rotation from the geometrical center, and consequently from the center of gravity from the container when loaded, will maintain a resultant unbalanced force or moment disposed always at the same side of the axis of rotation with respect to the geometrical center and the center of gravity of the container and its contents.

A preferred embodiment of the invention is illustrated in Figures 1–3, wherein a pair of standards 60 and 62 are provided with journal bearings 64 within which is journaled a shaft 66.

As shown, the shaft 66 extends into a gear casing 68 of any desired character for driving the same, and the power input shaft 70 of this casing is connected, as by a clutch or coupling 72, with the electric motor 74 for rotating the shaft.

Fixedly secured upon the shaft between the journal bearings, in any desired manner, is a sleeve 76 which forms part of a carriage supporting a plurality of containers. This sleeve, as shown in Figures 2 and 3, is welded or otherwise fixedly secured to a pair of parallel plates 78

and 80 which may be of any desired polygonal shape, such as a square or the like, depending upon the number of containers which it is desired to mount upon the carriage.

It will be observed from Figure 1 that the plates are inclined with respect to the axis of the shaft.

In the sides of the plates there are provided arcuate notches as indicated at 82 in Figures 2 and 3, these notches forming seats upon the periphery of the plates for receiving a plurality of containers 84 which may conveniently comprise steel barrels, drums or other containers of a similar nature such as are commonly employed in industry.

The containers are disposed with their longitudinal axes parallel to each other and parallel to the central longitudinal axis of the spaced plates 78 and 80 of the carriage, and inclined with respect to the axis of the shaft 66.

This inclination of the axes of the containers with respect to the axis of rotation serves to further facilitate the mixing or tumbling of the contents of the containers.

Means are provided for removably securing the containers to their seats in the carriage. This means may conveniently comprise crossed arms indicated generally by the numerals 86 and 88 and disposed at the upper and lower ends of the carriage. Where the carriage provides means for mounting four containers, these crossed arms are conveniently of cruciform shape as shown in Figure 3, each of the four arms being indicated at 90. The hub portion 92 of each cross arm is internally bored to receive a stud 94 and is retained thereon as by a fastening nut 96. The stud, in turn, is adjustably secured to one of the plates 78 or 80 as by adjusting nuts 98 disposed on opposite sides of those plates.

It will thus be apparent that the cross arms may be individually adjusted to cause the same to accommodate different sizes of containers therebetween, and to appropriately position the containers with respect to the longitudinal axis of the carriage.

Each container is engaged at each end by a pressure plate 100 carried by an adjusting screw 102 which is screw threaded through a boss at the outer end of each of the arms 90 and is provided with an adjusting wheel 104.

To further retain the containers in their seating notches 82, clamps 106 are secured to the edges of each of the plates and are provided with adjusting screws 108 for embracing the containers and clamping the same to their seats.

By reference to Figure 2, it will be apparent that a plurality of channel members 110 are secured between the plates in position between adjacent containers for assisting in supporting the same.

In this embodiment of the invention, four containers have been illustrated, although it will be apparent that any desired number may be provided. For different numbers of containers, it is of course apparent that the plates 78 and 80 will require a different number of channels or seats for receiving the containers.

However, in accordance with the fundamental principles of this invention, the containers of the embodiment of Figures 1–3 are disposed in pairs, each container having its center of gravity and its geometrical center displaced from the axis of rotation and the containers of each pair forming a couple about that axis.

Having described the invention, what is claimed as new is:

1. A rotary tumbling mill comprising a rotatable shaft, a carriage diagonally mounted on said shaft, seats on said carriage, a plurality of containers mounted on said seats with the geometric centers of said containers each displaced from the axis of said shaft, said containers being disposed in pairs about said shaft forming couples.

2. A rotary tumbling mill comprising a rotatable shaft, a carriage mounted on said shaft, seats on said carriage, a plurality of containers mounted on said seats with the geometric centers of said containers each displaced from the axis of said shaft, said containers being disposed in pairs about said shaft forming couples, said carriage including spaced parallel plates mounted on said shaft, cross-arms adjustably carried by said plates, members on said cross-arms engaging the ends of said containers, said plates having notched edges constituting said seats.

3. The combination of claim 2 including clamps embracing said containers.

4. A rotary tumbling mill comprising a rotatable shaft, a carriage mounted on said shaft, seats on said carriage, containers mounted on said seats, said carriage including spaced parallel plates mounted on said shaft, said plates being inclined with respect to the axis of said shaft, said plates having arcuately notched edges, said notched edges constituting said seats, cross-arms adjustably carried by said plates, members on said cross-arms engaging the ends of said containers.

5. A rotary tumbling mill comprising a rotatable shaft, a carriage mounted on said shaft, seats on said carriage and containers mounted on said seats, said carriage including a pair of spaced parallel plates, a sleeve extending diagonally between and interconnecting said plates, said sleeve concentrically surrounding and being fixed to said shaft, cross-arms adjustably carried by said plates, members on said cross-arms engaging the ends of said containers, said plates having arcuately notched edges constituting said seats.

6. A rotary tumbling mill comprising a rotatable shaft, a carriage mounted on said shaft, seats on said carriage and containers mounted on said seats, said carriage including a pair of spaced parallel plates, a sleeve extending diagonally between and interconnecting said plates, said sleeve concentrically surrounding and being fixed to said shaft, cross-arms adjustably carried by said plates, members on said cross-arms engaging the ends of said containers, said last members comprising threaded elements threaded through the ends of said cross-arms, pressure plates secured to the ends of said elements, said plates having arcuately notched edges constituting said seats.

ALFRED J. SCHAEFER.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
349,936	Getchell	Sept. 28, 1886
447,654	Bew	Mar. 3, 1891
699,101	Carson	Apr. 29, 1902
1,602,967	Ensslin	Oct. 12, 1926
1,997,935	Johnson	Apr. 16, 1935
2,021,261	Moore	Nov. 19, 1935
2,288,440	Evans	June 30, 1942