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2,788,038

ROTOR

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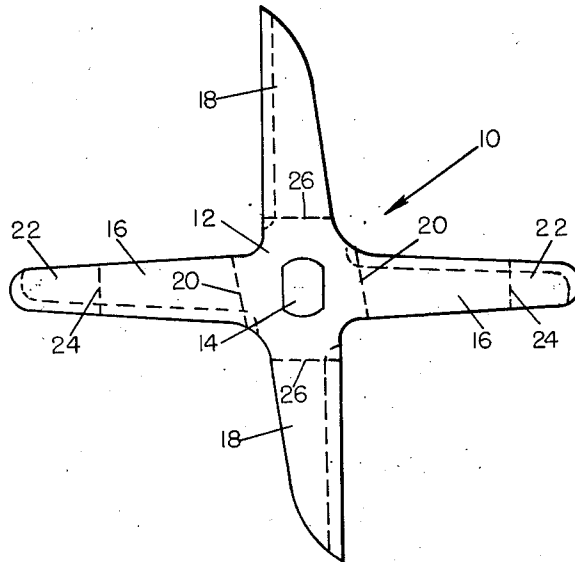


Fig. 1.

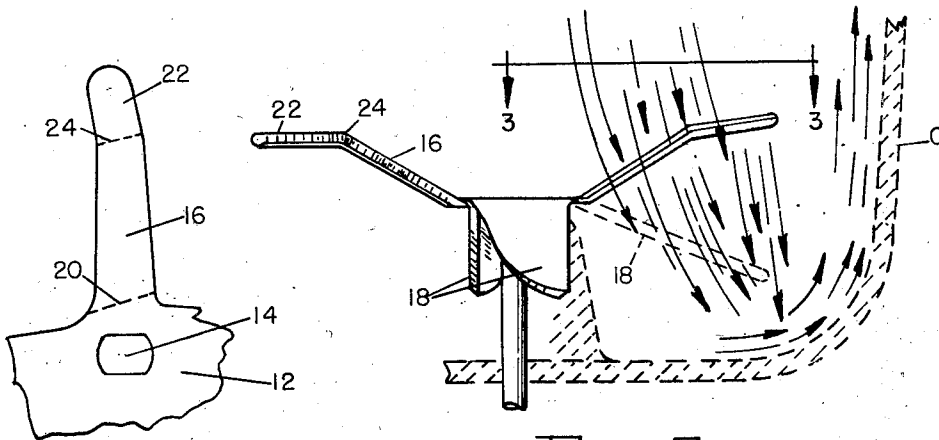


Fig. 2.

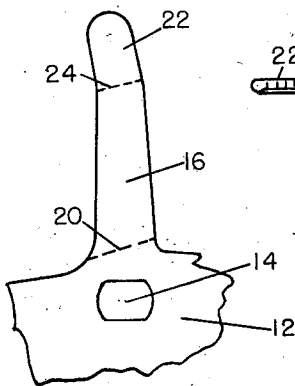


Fig. 3.

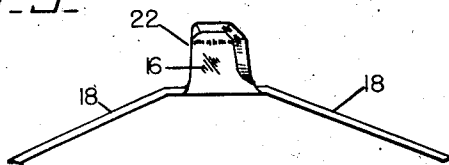


Fig. 4.

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ROTOR

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1 Claim. (Cl. 146—68)

This invention relates to improvements in rotors and is concerned particularly with rotors of the character adapted for mounting in the bottom portion of a container to be driven at relatively high speed for the blending of fluids, the comminuting of solid materials or the comminuting and blending of various material mixtures in general. The rotor of the present invention is particularly adapted for use with blender containers such as shown in U. S. Patent No. 2,109,501 but is also capable of very efficient use with containers of other types as well.

The principal object of the invention is to provide an improved rotor for acting upon materials in a container in such a manner as to create a vortex in the central area of the container by drawing the material downwardly and forcing the same outwardly and upwardly in a continuous cycle for quick and efficient blending and mixing.

A further object of the invention is to provide an improved rotor having a comminuting or disintegrating action wherein the central vortex forming blades draw the material downwardly into the path of the cutting blades from whence the chopped material passes outwardly and upwardly of the sides of the container in a recycling path.

Another object of the invention is to provide an improved comminuting and blending rotor which in use is adapted to generate pressure beneath the same in the bottom of the container such as to maintain the material in constant motion and to prevent the retention of any static or unmixed material within the container.

Another object of the invention is to provide a comminuting and/or blending rotor having any or all of the above and other utilitarian characteristics which may be formed from a single piece of metal or other suitable material and in which the various parts thereof may be integral with one another.

A general object of the invention is to provide a comminuting and/or blending rotor of generally improved construction and operation which is durable and efficient in operation and relatively inexpensive in cost of production.

Other objects and advantages will be apparent from the following detailed explanation taken in conjunction with the accompanying drawings wherein a preferred embodiment of the principles of the present invention has been selected for exemplification.

In the drawings:

Fig. 1 is a plan view of a blank from which a rotor constructed in accordance with the present invention is adapted to be formed;

Fig. 2 is a side elevational view of the formed rotor shown rotatably secured in the bottom of a blending container indicated in fragment and illustrating by the arrows the action of the rotor blades and the path of the material being treated;

Fig. 3 is a fragmentary plan view of the rotor showing one of the blades, it being understood that its opposed blade is of the same relative configuration; and

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Fig. 4 is a side elevational view of the rotor taken at a right angle from the direction of the view of Fig. 2.

Referring more particularly to the drawings, wherein like numerals refer to like parts, the blank indicated in its entirety at 10 in Fig. 1 is formed of any suitable relatively hard material, preferably stainless steel. A flat section 12 centrally of the blank is apertured at 14 for the reception of the driving shaft of an electric motor and integral with the central section 12 are opposed arms in the pairs 16 and 18 having their center lines perpendicular to each other as shown. The opposed arms 16 and 18 are sharpened at their leading edges, preferably at the under side thereof only, to form the rotor blades. The arms or blades 16, as shown, are preferably provided with a moderate and symmetrical taper from their roots to their tips and the arms or blades 18, as shown, are preferably provided with straight leading edges and trailing edges which are tapered sharply forward to form a point at the tips of the blades.

In forming the completed rotor from the blank 10, the arms or blades 16 are bent upwardly approximately thirty degrees from the horizontal along the diagonal lines indicated at 20 to impart a positive pitch to the blades, the bend lines 20 in one particularly efficient embodiment of the invention generating an angle from the leading edges of the blades 16 about twelve degrees from the perpendicular. The outer extremities 22 of the blades 16 are bent along the lines 24 perpendicularly to the axis of the blades downwardly slightly short of the horizontal or about twenty-five degrees relative to the first bend section for a purpose hereinafter explained. It will be noted, as best indicated in Fig. 3, that the center line of the blades 16 becomes altered when the blades are completely formed.

The arms or blades 18 are downwardly bent approximately thirty degrees from the horizontal along the perpendicular axis of lines 26. In a preferred form of the invention, as best shown in Fig. 1, the leading edges of the blades 18 are set forward of the center point of the blades 16 a suitable distance which may be about seventeen percent of the length of one of the blades 16.

The operation of the rotor as herein illustrated and above described will be apparent from Fig. 2. Herein the rotor is shown mounted for relatively high speed rotation in the bottom portion of a blender container indicated in fragment at C. The upwardly extended blades 16 contact the material undergoing treatment before the downwardly extended blades 18 and the positive pitch imparted to the blades 16 draws the material downwardly of the axis of the rotor, deflects the same downwardly and outwardly into the path of the blades 18 and thence upwardly of the inner wall of the container C as indicated by the arrows. The laterally extended tips 22 of the blades 16, as further indicated by the arrows, direct the material downwardly and in a more nearly vertical direction whereby to prevent excessive radical spraying of the material and to tend to arrest cyclic return of the material upwardly of the container. The pitch of the blades 16 generates pressure beneath the blades in the bottom of the container C which prevents the retention of any static or unmixed material in this area, an expedient particularly useful when grinding solid materials, coffee or nuts for example. The laterally extended tips 22 of the blades 16 have the further effect of increasing the amount of pressure generated at the bottom of the container.

The comminuting or grinding action of the rotor is further enhanced by the position of the leading cutting edges of the downwardly extended blades 18 which is forward of the center point of the blades 16 so that these cutting edges engage the deflected material for maximum

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cutting and blending efficiency. Thus, the various elements of the rotor of the present invention coact with one another all to the end of producing a remarkably rapid and effective cyclic comminuting and blending operation upon a great variety of fluid or solid materials. 5

It will be understood that the present invention is not confined to the precise construction and arrangement of parts herein illustrated and described which represent merely one preferred embodiment but embraces within its purview all such modifications thereof as are within 10 the scope of the following claim.

I claim:

In a mixing and comminuting container, a single plate having formed in its periphery two pairs of radially extending cutting and mixing blades, a first pair of said 15 blades being bent upwardly at approximately a 30° angle and having their outer ends bent downwardly at approximately a 25° angle relative to the upwardly ex-

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tending portion, a second pair of said blades bent downwardly of said central portion at approximately a 30° angle and trailing the blades of the first pair, said upwardly extending blades having a pitch of approximately a 12° angle to direct the material into the path of the downwardly extending blades, the leading edges of said blades being sharpened to form cutting edges, the lower blades having a width greater than that of the upper blades and terminating in sharp ends, the upper blades gradually tapering from the plate to their extremities.

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