

SILENT BLENDER

FIELD OF THE INVENTION

This invention regards to a blender whose operation presents a sound level lower than that of similar equipment available in the market. This effect is
5 reached by the combination of constructive details that associated, result in a differential set. The first constructive detail is the drawing of the blender jar that makes easy the motion of the content when the equipment is working. The second is presented in the absorption of chocks along the transmission of the engine motion until the crushing blades, minimizing the vibration of the set. And the third constructive detail is the engine connection
10 system to the transmission axis motion to the crushing blades that also help to diminish the vibration of the equipment.

History of the Invention

The electrical appliances for blending and crushing of food, also called
15 blenders, are traditionally presented as noisy equipments, as its operation is base don the high rotation of an engine that drives an axis for driving blades that crush and blend the food placed in the blending jar. The entire set vibrates with the operation of the engine, contributing to increase the sound level of the apparatus operation. Additionally, the forced circulation of the
20 cooling air, by means of the fan coupled to the engine of the equipment, also contributes to the generation of the operation noise.

Thus, the use of several associate constructive details allows the significant diminution of the sound level produced by the operation of a blender, supplying an electrical appliance of known use operation, but with a significant
25 differential of lower noise generation during its operation, contributing, thus, to the domestic comfort.

The device for conditioning of the food to be blended or crushed, called cup or jar, is placed on the upper part of the electrical appliance, coupled to

the base by means of fits or threads, fixing them to the operation of the apparatus. It may be comprise of any rigid material, preferably transparent and washable material, like glass or plastic. Its size is essentially tubular or trunk-conic, with variations of the straight section, from circular to polygonal. It may present internal flanges or housings, essentially perpendicular to the vertical wall, whose purpose is promoting a bigger churning of the blending under stirring, when the apparatus is working. Also its shape, particularly the straight section of the jar, has influence on the churning, giving a better blending of the mass under stirring. As consequence of the churning, there is a generation of noise that may be minimized due to a geometric size of the jar that balances the churning and the sound level during the operation.

Nevertheless, the bigger noise source is the operation of the equipment engine that works in high revolution to give enough power to the blades so that they may perform their role of blending and crushing the food placed in the jar. This operation requires a cooling that is provided by the forced displacement of air from a fan coupled to the engine axis, and this air flow generates a considerable noise in its passing by the equipment. Several initiatives search solving this issue, specifically the damping systems constituted by the enclosing of the engine that minimizes the sound level by the disposition of the cooling air flow that is driven by the fan coupled to the engine, preventing the dispersion of the cooling air flow and make possible its direction along the engine in operation.

Besides the noise damping, it can also be made the speed operation control of the equipment engine, entailing it to the operation demand, according to the kind of blending being processed in the jar. Traditionally, this control is made by hand, by the selection of a power or speed of operation according to keys or buttons placed on the blender body, making possible the choice

of operation of the equipment according to the user's criteria. Thus, when a given button is pressed, a corresponding energizing acts on the engine, getting the desired effect in revolution speed of the blending and crushing blades, until the equipment is turned off or other speed option is selected. Another alternative is employing an electronic controller to manage the power delivered to the equipment, by a demand required to the operation generated by the kind of material being processed. That is, the electronic device perceives the demand necessary to the operation of the equipment and controls the minimal power required for the operation, energizing the engine according to the attention to the identified demand.

The vibration of the electrical appliance during the operation is another additional noise source, as the shaking causes the chock between the comprising parts. Thus, measures that minimize this vibration become important tools for the contention of the sound level generated by the operation of the blender. One of the alternatives is the damping of the vibration along the transmission of the motion generated by the engine until the blending and crushing blades under stirring in the upper jar. A series of flexible joints, placed on the interfaces along the transmission axis of the engine motion until the crushing blades comprise a damping system able to substantially reduce the sound level of the equipment in operation. Such joints may comprise several resistant and flexible materials, like silicon, natural or synthetic rubber, EVA or others that give an equivalent effect, of absorption of impacts between the parts in the interfaces.

Still in the belt of the minimization of the vibration, it is identified the fit between the upper jar and the blender base as source of significant vibrations. Normally this fit is provided with a groove and tongue kind coupling, in which the parts are coupled and the transmission of the motion is given by flanges or a set of projections and recessions essentially vertical that

couple and touch themselves by means of their vertical faces, allowing that the coupling directly driven by the engine move the corresponding coupling coupled to the jar, occasioning the revolution of the jar blades. The existence of looseness between the flanges of the groove and tongue coupling causes the vibration and, consequently, the generation of noise due to the operation of the appliance.

Analysis of the technique status – state of art

The document MU8303337-8 indicates the improving introduced in a blender with filter, constituted by driving unit, drive button and control of the blender functions. It exposes a coupling system with the upper cup by means of coupling or joint means with complementing coupling, practiced in the side out face of the drive unit. The document shows a blender without mentioning any characteristic directed to the minimization of the sound level of its operation.

The document MU8102356-1 explains a coupling for blender, with a base shaped as a cylindrical cup that has inside a flexible part with rigid material bush, with an axial hole of polygonal section, in which is fit a square bar. This bar is fixed at the end of the axis of the crusher existing in the bottom of the blender cup, while the base is fixed on the engine shaft. Such characteristics, notwithstanding the presence of flexible material in the coupling between the blender parts, do not expose the characteristic of similar coupling to that of the present invention.

The patent MU7701948-2 refers to a blender with cup integrated to the base of the blades and cleaning system that drives specific revolution without need to be dismounted. It does not address any action for the minimization of the noise when the equipment is operating.

The document US6680551B2 foresees a noise damping system for electric engine, incorporated to the casing of an electric engine to increase the air

flow by the engine and to reduce the noise that escapes from the casing. It does not foresee the actions of damping and flexible coupling to the blender, deviating from the present invention.

The document US5273358 proposes a noiseless and efficient arrangement for engine refrigeration fan applied to a blender that includes a jar arrangement, an engine and casing arrangement and a refrigeration fan and noise damper arrangement. The document explains an electric engine noise damper characterized for promoting an ordained air flow in the apparatus casing, lowering the noise generated by the engine operation. But, it does not foresee the damping and flexible coupling systems to minimize the noise, such like in the present invention.

The document US6523993 exposes a coupling for a blender, comprising of a first and a second coupling. The first one, connected to an engine, is adapted to be driven rotationally. The second one is connected to the rotating cutter set inside the blending jar. Both couplings comprise, each one, a plurality of teeth, each tooth comprises a driving face that has a corresponding on the other coupling. It draws away from the present invention for not foreseeing the flexibility of coupling and the limitation to only two coupling elements.

Brief description of the invention

The blender described in this invention comprises a series of inventive aspects that, in combination, result in a synergistic effect of the reduction of the noise level when the operation of equipment.

Thus, the combination of a jar of essentially triangular profile, which helps in the ordering of turbulence, a system of transmission-are provided with flexible joints, which absorb the impact of vibration of the engine, and a system to connect the engine with the axis able to minimize the generation of vibration, which generates an electrical operation presents a low noise

level when compared with similar market.

Description of Figures

The Figure 1 shows a view in perspective of a blender fitted with a jar (1) with the blades (2) allocated on the basis (3) of the unit.

- 5 The Figure 2 shows an exploded view of the base (3) of the blender, showing schematically the system of transmission of motion of the motor (5) until the blades of grinding (2), which has the joints (4) Flexible smoothing of shocks.

- The Figure 3 shows a view in perspective of the connection system of the
10 engine (5) with the axis of transmission of movement to the blades (2) of grinding, see where the tabs (7) for attaching the connection system. The Figure 4 shows a view in perspective of the connection system of the engine (5) with the axis of transmission of movement to the blades (2) of grinding, see where the plug (8) of the connection system, the connected
15 the motor (5).

Detailed Description of the Invention

- This invention describes a blender for food processing, configured to provide a silent operation, when compared to those available in the market. This differential is reached by the adoption of a set of combined solutions,
20 whose synergy results in the marked minimization of the sound level during the operation of the appliance.

- Firstly, in order to lower the vibration of the apparatus during its crushing operation of blending of food placed in the jar(1), it is provided a damping system along the transmission of the motion caused by the electric engine
25 (5) of the appliance base, as shown in the figure (2). This damping system is comprised by flexible joints (4) placed in the coupling interfaces present during the motion transmission. These flexible joints (4) may be comprised by different kinds of material able to absorb the impacts resulting from the

engine operation (5) and that cause the vibration of the apparatus, such like natural rubber, synthetic rubber, silicon, EVA or any other materials able to provide the same effect of minimizing the chocks on the coupling interface zones.

5 Additionally, and also with the purpose of minimizing the apparatus vibration when in operation, it is provided a connection system that lowers the differences of coupling between the appliance base (3), where is located the engine (5), and the jar (1), where are placed the crushing blades (2) and blend to be driven by the engine (5). Such connection, figures 3 and 4, is
10 constituted by only two corresponding coupling flanges (7), in each one of the coupled parts, preferably those connected to the crushing blades (2). Such flanges (7), essentially vertical, are driven by mean of the vertical faces, where the flanges (8) connected to the engine (5) promote the rotational impulsion of the flanges (7) connected to the blades (2) of the jar (1),
15 generating their revolution. The fact of being only two flanges (7) in each coupled part, that is, the jar and the base, minimizes the eventual difference of coupling between the parts and, consequently, sensibly lowering the vibration of the set when in operation.

Associated to the previous features, the blender jar (1) has a design that
20 promotes the optimization of the whirling of the food being stirred inside. This is characterized by the shape essentially tubular, in trunk-conic form of triangular straight section, rounded corners. This disposition allows that the stirring mass is displaced in order to blend during the stirring, running the walls from the thrust generated by the crushing blades (2) and blend
25 and returning to them by gravity. The absence of internal flanges and projections facilitate the sliding by the walls and minimize both the generated noise as the vibration of the set. Such jar (1) may be comprised by the most different rigid materials, and, preferably, the walls are transparent, to facili-

tate the visualization of the contents, and easy to wash, avoiding the accumulation of residues. In a preferential configuration, the jar (1) is formed by transparent plastic material, such like propylene, polypropylene, styrene, polystyrene terephthalate and similar. In an additional configuration, the jar
5 (1) is made of glass and may be polished or decorated.

This innovation is not limited to the representations commentated or illustrated here, and must be understood in its broad scope. Many modifications and other representations of the invention shall come to mind in those versed in the technique to which this invention belongs, having the benefit of
10 the teaching presented in the previous descriptions and enclosed drawings. Besides, it is to be understood that the invention is not limited to the disclosed specific form, and that modifications and other forms are understood as included within the scope of the enclosed claims. Although specific terms are employed here, they are used only in a generic and descriptive
15 way and not as limitation purpose.

CLAIMS

SILENT BLENDER

1. Silent Blender characterized by a lower noise level of operation due to the use of an associated transmission system of the movement of the motor
5 (5) the blades (2) the milling and mixing, a system of docking between the base (3) and jar (1) and a jar (1) whose profile of trunk-conic section line is essentially triangular.
2. Silent Blender as to claim 1, characterized by the system fit between the base (3) and jar (1) have a coupling with only two flaps (7) correspond-
10 ing to the contact part of the plug.
3. Silent Blender as to claim 1, characterized by the jar (1) above for preparation of food have profile trunk-conic section of line essentially triangular, with rounded corners.
4. Silent Blender as to claim 1, characterized by the transmission system
15 of the movement of the motor (5) to the blades (2) of grinding and mixing together have (4) flexible able to absorb the shocks embedded between the parties, caused by the operation of the appliance.
5. Silent Blender as to claim 1, characterized by the system fit between the base (3) and jar (1) has tabs (7) of contact essentially vertical, with corre-
20 spondence with the docking system (8).