ABSTRACT: A cover for a blending unit comprises a rigid plate, such as metal and plastic or plastic, with a wide, flat, circular groove filled with resilient material, such as neoprene. The width of the groove is sufficient so that it can contact blenders of different shapes, for example a clover-leaf shape, which is found in a common type of blender. The cover has two or more lugs with grooves which receive toggle clamps attached to the main body of the blender. The toggle clamps are of special design, having a projection on the toggle portion which fits into a slot of a removable extension handle, permitting tight clamping without risk of injuring the hands. The blender top also has a central opening which is tapered to receive a conventional rubber stopper through which a tube can be inserted and at least a portion of the blended material removed without having to open the top clamps.
COVER FOR BLENDING UNIT

BACKGROUND OF THE INVENTION

Blenders hitherto used were usually provided with a metal or plastic cap which overlapped the lip of the blender container and may or may not have clamps. Two problems are presented. First of all, the cap is difficult to seal tightly, which is essential because blenders are often run at extremely high speed, for example in the extracting of virus from tissue cultures, and leakage is a serious problem, especially as the material may be definitely infectious.

Another disadvantage lies in the fact that if clamps are provided, for example, the ordinary, conventional, short throw toggle clamps which are often used for luggage, they are sometimes difficult to close and because of the large amount of force required on the short leverage can cause injury to hands of the person using it.

SUMMARY OF THE INVENTION

The present invention avoids both types of problems which were encountered with blender covers used in the past. The first feature is that the cover has a shallow and quite wide annular groove which is filled with resilient or semi-resilient material, such as neoprene rubber or similar material which forms good gasket seal. The wide groove adapts the cover to various types of blender containers and it is not limited to a blender with a circular top; thus the cover-leaf top, which is a common form in a widely used blender, is completely sealed when the cover is clamped down. The cover has two or more ears or lugs with suitable clamp engaging grooves which receive round cross section clamping elements that are attached to the blender either permanently or to mountings thereon. Strictly speaking, the cap or cover for the blender according to the present invention has to be clamped in use to the blender, and in this respect one may consider that the blender and container cooperates with the cover.

The center of the cover preferably has a tapered hole to receive a conventional tapered rubber stopper through which a tube can be inserted so that the liquid contents of the container can be removed without necessitating the removal of the cover. This makes it possible to transfer liquids which can be dangerous, such as those containing infectious virus, without the risk of infection. Of course when the cover is then removed, there is not any significant amount of liquid to spill and the cover and container can be washed out and sterilized in the conventional manner, requiring only the normal precautions which should be used with materials that may present a danger of toxicity or infection.

In a preferred modification of the invention a special type of clamp is used which has its toggle portion provided with a projection or projecting finger that fits into a slotted extension lever which is removable and which permits exerting a great deal of force evenly and uniformly without risk of injury of a person's finger. It is possible, of course, to use the cover of the present invention with conventional toggle clamps having short-three levers, but of course in this case the risk of injury or the danger that a clamp may not be tightly latched still remains. Inasmuch as the preferred form of clamps of the present invention are cheaper and simple, it is preferred to use these clamps with the special cover which constitutes the single most important feature of the invention. However, it is an advantage of the invention that the cover can be used with blenders which have built-in, conventional clamps, and this adds considerable flexibility to its field of use.

The toggle clamps, for example the particular preferred form of clamp which is included as a specific aspect of the invention, may be built in. That is to say, they may be permanently attached to the blender container or, as far as that part of the cover itself, in which case of course the clamp hooks over a suitable hooked projection on the side of the container. When attached clamps are used, it is preferable to have them attached to the container, as there is less risk of their being damaged than if they are attached to the cover and merely hook over projections on the container with the lower U-shaped portion of the clamp. It is also possible to have the clamp completely separate with U-shaped members on both ends which can hook over the projections on the cover and also onto similar projections on the container of the blender.

The particular modification to be used will be chosen in conjunction with the operating conditions, and it is an advantage of the invention that the clamps may be attached in these various ways. The material of the toggle clamps is not critical, but usually they are of metal and preferably of metal which does not rust or otherwise corrode with the liquids used in the blender or with water or other cleaning fluids used in cleaning the equipment. Needless to say, the clamps should be of materials which will permit sterilization, and this excludes certain plastics which soften at too low a temperature. However, because of the strength and rigidity, coupled with reasonable price, metal clamps are preferred, although the invention is not limited thereto.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a bottom plan view of a cover, and FIG. 2 is a vertical cross section through a blender container with the cover in place partly clamped down.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The cover is a plate 1 which may be of metal with a wide annular groove on the bottom side of the plate. The groove is partially filled with a semi-resilient material, such as neoprene rubber, which is shown at 2 and which acts as a seal when the plate is clamped down. The rubber is preferably removable for better sterilization and as it is a circular gasket it is rarely replaced exactly in its previous location. This prevents permanent sets or depressions. The plate is also provided with two ears or lugs 3 provided with grooves 4 on their upper surfaces. The lugs extend from a downwardly extending lip 5 as can be seen in FIG. 2. The rubber annular seal 1 in FIG. 1 is shown as having received a cover-leaf shaped container top. This is indicated by the line 7 FIG. 2 being a section would not show the top peripheral shape of the container, and this is therefore indicated in FIG. 1, although strictly speaking it is not a structural element thereof. However, it can be seen from FIG. 1 that the sealing groove 2 is sufficiently wide so that a tight seal is obtainable with containers having noncircular upper peripheries.

In the center of the plate there is a semi-resilient tapered hole 5 which is shown empty in FIG. 1, but in FIG. 2 a conventional rubber stopper 6 is shown inserted, with a channel 16 which can receive a discharge tube or charging nipple in the customary manner. Sterility during charging can be maintained by flaming. As the insertion of a tube in a rubber stopper is a well-known procedure, it is not shown in FIG. 2 in order not to confuse the drawing. FIG. 2 shows a blender body 8, which may be of coverleaf or round cross section and which is provided with the conventional stirring or blending blades 14, which are driven from below. As this part of the blender is standard, it is shown in FIG. 2 really in semidiagrammatic form.

The cover 1 is clamped down to the blender container 8 as shown in FIG. 2. The clamps are provided with U-shaped members 12 and 10, the former fitting into grooves 4 in the ears of the cover and the latter extending through fastening 9 on the blender. The U-shaped members are pivoted in ends of toggle portion 11 which is provided with an extension finger 17 capable of fitting into a slotted extension handle 13. In order to illustrate the clamp in both positions, FIG. 2 shows the clamp on the left after it has been clamped down and the extension lever 13 has been removed. On the right, however, the extension lever is shown engaged and the clamp just starting to be closed.

In FIG. 2 clamps permanently attached to the fasteners on the blender container are shown, and in this case both the elements 10 and 12 may be U-shaped. If the clamps are attached to the cover, the elements 12 of course pivot in the ears and...
the element 10 can be either U-shaped or L-shaped depending on the nature of the fasteners 9 into which they have to hook. Of course, as has been described above, the clamps may be attached neither to the blender nor to the ears of the cover, in which case the elements 12 will be U-shaped and the elements 10 of the proper shape to hook into the fasteners 9 on the blender.

In the drawings two ears are shown on the plate, but of course there may be more with a correspondingly larger number of clamps. If the plate 1 is not to be hinged to a blender, a plurality of ears are always needed. While a single ear will work if the plate is hinged into the blender, this form is not as desirable as the hinge, represents a more difficult structure for cleaning and as the design shown in the drawings can be used with existing blenders and does not require a specially designed blender. The multiple-ear, multiple-clamp form is, therefore, preferred.

I claim:

1. A combination of a cover and a blending device including a container with a top opening having varying diameters in the same container and a cover plate, the cover plate having a wide, recessed, annular groove on its inner surface filled with semi-rigid sealing material, the inner diameter of the annular groove being less than the minimum inner diameter of the container top opening and the outer diameter of the annular groove being greater than the maximum outer diameter of the container opening, whereby insertion of the top rim of blending devices of various top rim shapes is made possible, and toggle clamping means engaging with at least one ear on the plate.

2. A cover according to claim 1 in which there are a plurality of ears and clamps.

3. A cover according to claim 2 provided with a central tapered hole adapted to receive resilient stopper.

4. A cover according to claim 3 in which the clamps are toggle clamps provided with a cover ear engaging element and an element engaging a fastening on the blender, the toggle portion of the toggle clamp having attached thereto a removable extension handle, said handle being slotted and said toggle clamp having a projection, the attachment of the handle to the clamp being by fitting the projection into a slot on the handle.

5. A blender and plate combination according to claim 4 in which the clamps are permanently fastened into the blender.

6. A blender and plate combination according to claim 1 in which the clamps are permanently fastened into the blender.

7. A blender and plate combination according to claim 2 in which the clamps are permanently fastened into the blender.