June 19, 1934. E. M. SAWTELLE 1,963,101

CONTAINER AND SPRING CLAMP THEREFOR

Filed May 24, 1929

Fig. 1

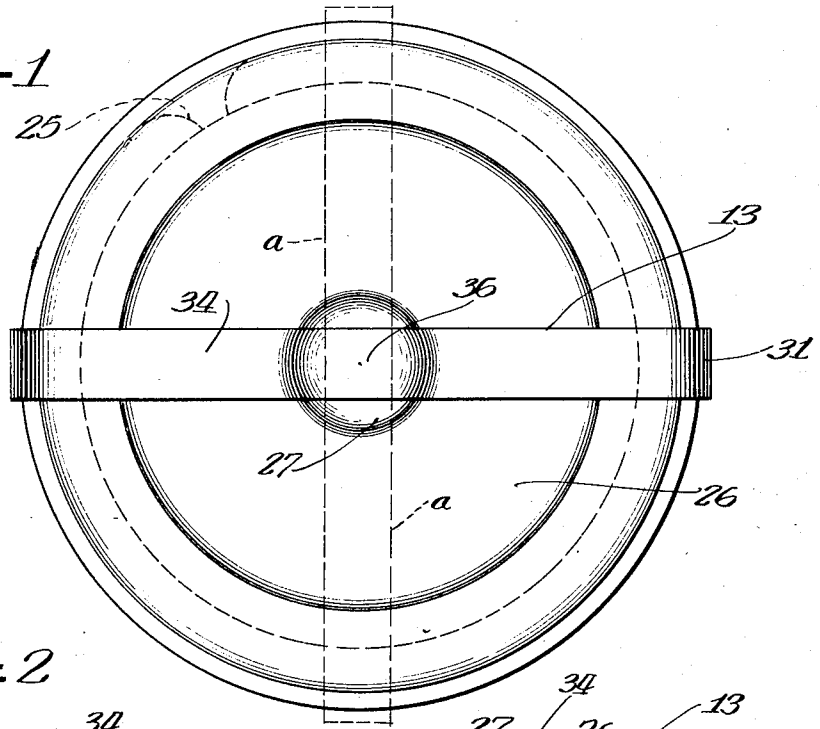


Fig. 2

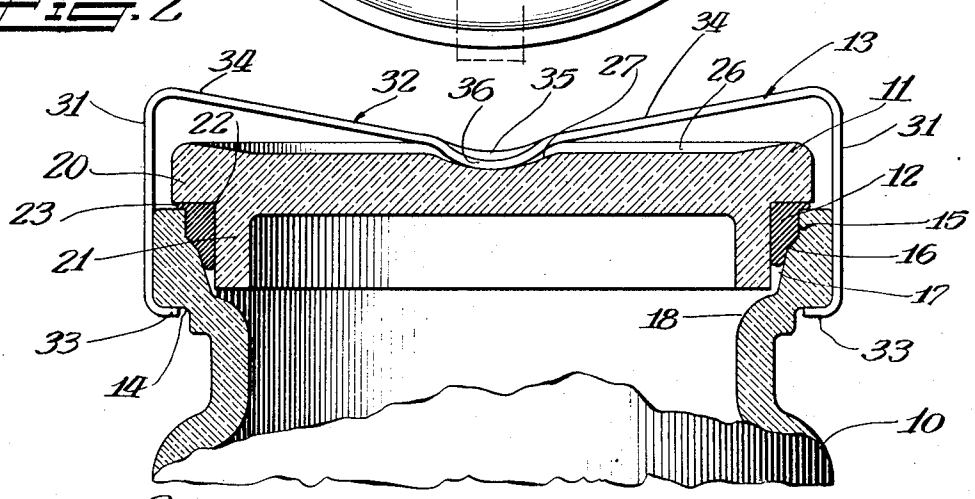
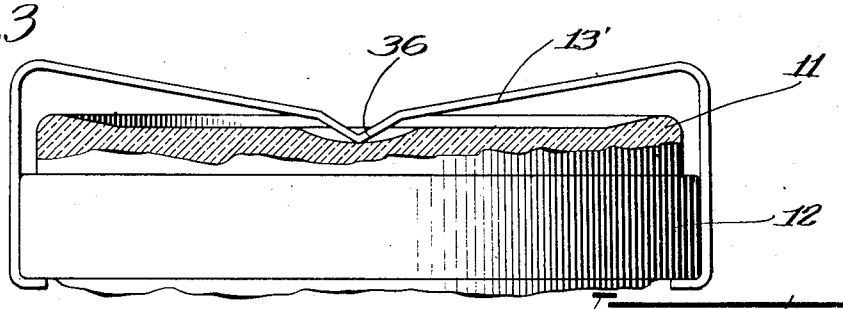


Fig. 3



Inventor:
Edmund Monroe Sawtelle.
By: Charles W. Hills
Atty.

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CONTAINER AND SPRING CLAMP THEREFOR

Edmund Munroe Sawtelle, New York, N. Y., assignor to Vacuum Seal Company, Inc., a corporation of New York

Application May 24, 1929, Serial No. 365,604

2 Claims. (Cl. 215—91)

The present invention relates to a vacuum jar construction and to a method of sealing the cover on the jar or container. More specifically, my invention relates to the provision of a novel spring clamp for connecting the cover to the jar or container and for aiding in the sealing of the cover to the container.

An object of the invention is to hold the cover of the jar in proper relation to the jar under all conditions.

Another object of the invention is to hold the cover of a vacuum jar in proper relation to its seat during the sealing of the cover to the jar.

A further object of the invention is to provide an improved vacuum jar construction including means for connecting the cover to the jar and for aiding in the sealing of the cover to the jar.

Still another object of the invention resides in the provision of a simple and inexpensive spring clamp for holding the cover in cooperation with the jar and for aiding in the sealing of the cover to the jar.

A still further object of the invention is to provide an improved spring clamp for holding a cover in place on a container and for permitting a limited amount of movement of the cover in relation to the container so that it will enable the cover to act as a valve against a predetermined pressure.

Another and further object of the invention is to provide a resilient universal joint connection between the center of the top surface of the cover and the side of the container whereby outward movement of the cover away from its seat is limited.

A still further object of the invention is to provide a vacuum jar construction wherein the upward movement of the cover away from its seat during the sealing operation is utilized to apply an increasing downward pressure on only the center of the cover whereby its movement will be limited.

A further object of the invention is to provide a spring clamp for use in connection with a vacuum seal jar formed to engage only the center of the cover so as to enable the cover to raise evenly all around its outer circumference during the sealing operation and adapted to permit the cover to seat evenly all around its outer circumference on the jar when the sealing operation has been completed.

Another and further object of the invention is to provide an improved method of sealing covers to jars or containers wherein the movement of the cover away from its seat on the container is utilized to apply a constantly increasing pressure to only the center of the top surface of the cover for enabling the cover to have a universal movement and for limiting its movement.

In accordance with the general features of the invention there is provided a spring clamp for connecting a cover to a container comprising a strip of metal formed into a substantially U-shaped clip and having in its central portion a projection constituting the sole point of contact between the clamp and the cover on the container.

Another feature of the invention has to do with the provision of a spring clamp for connecting a cover to a container comprising a U-shaped strip of metal the spaced legs of which are adapted to cooperate with the side of the container and the central or connecting element between said legs being spaced at its ends from the top of the cover and having a central depressed portion for cooperation with the center of the top surface of the cover on the container.

It is thought that my novel method of sealing a cover to a container will be fully understood from a description of the construction by which this method may be practiced.

On the drawing:

Figure 1 is a plan view of a vacuum seal jar provided with a spring clamp of my invention.

Figure 2 is a fragmentary vertical sectional view taken through the upper end of the vacuum seal jar shown in Figure 1.

Figure 3 is a fragmentary sectional view similar to Figure 2 illustrating a modified form of spring clamp.

As shown on the drawing:

The reference character 10 designates generally a jar or container which may be made of any suitable material such for example as glass. Positioned over the open end of the jar 10 is a glass cover or top 11 which is designed to rest on a gasket 12 made of a resilient substance, such as rubber. It is to be noted that although the vacuum jar construction illustrated in Figure 2 is of the internal seal type, my invention is not to be limited to this type of jar for it may be used with equal advantage in connection with a vacuum jar of the outside seal type.

The cover 11 is shown as being connected to the jar 10 by means of a spring clamp 13 embodying the features of my invention and which will be more fully described hereinafter.

The upper open end of the jar or container 10 is provided with an annular exterior shoulder 14

for cooperation with the spring clamp 13. The jar at its upper end has formed on its interior a relatively short vertical interior surface 15 which terminates at its lower end in an annular inclined surface 16. This annular inclined surface 16 in turn terminates at its lower end in a differently inclined surface 17. The two inclined surfaces 16 and 17 are disposed at an angle to each other. These three internal surfaces 15, 16 and 17 cooperate to define a seat for the gasket 12 on the upper end of the jar 10. The lowermost end of the inclined surface 17 terminates in an inwardly curved annular surface 18 which serves to direct the fluid escaping from the jar 10 during the sealing operation to the surfaces 16 and 17 so that the fluid may rapidly escape from the jar.

The cover 11 comprises an annular top flange 20 and a depending annular reduced portion 21 adapted to extend into the upper end of the jar when the cover is positioned thereon. The flange 20 cooperates with the reduced portion 21 to define an annular shoulder 22 for receiving the ring-like gasket 12.

The shoulder 22 of the cover 11 serves to compress the gasket 12 upon the inclined surfaces 16 and 17 during the sealing operation so that the gasket is forced to assume a wedge-like shape as is clearly shown in Figure 2. This means that the more the gasket 12 is compressed, the more it will be distorted down along the lower inclined surface 17. Also the compression of the gasket 12 results in a portion of it bulging between the lower edge of the flange 20 and the upper edge of the jar or container 10 as indicated at 23. This annular bulging portion 23 serves to augment the seal established between the cover 11 of the jar 10 and also serves as a cushion for the edge of the flange 20 resting on the upper end of the jar.

The inclined annular surfaces 16 and 17 are advantageous in several respects. In the first place they tend to augment the seal established between the jar and the cover. In the second place, after the cover has been sealed to the jar these surfaces 15, 16 and 17 minimize the possibility of the leakage of any fluid into or out of the container 10 due to the fact that in order for fluid to leak into or out of the container, it is necessary for such fluid or seepages to follow a tortuous path defined by the three cooperating surfaces 15, 16 and 17.

As best shown in Figure 1, the lower edge of the flange 20 of the cover 11 is provided with an undercut slot or recess 25 through which a pin or other analogous instrumentality may be inserted for the purpose of breaking the seal between the gasket and the upper end of the jar.

The top of the cover 11 is recessed as indicated at 26 in Figure 2 and is provided with a central semi-spherical depression 27 for cooperation with the spring clamp 13 which will now be described in detail.

The clamp 13 comprises a U-shaped construction including parallel spaced legs 31—31 and a connecting element 32 between these two legs 31—31. The free end of each of the legs 31 is bent inwardly and laterally at right angles to the leg proper as indicated at 33. These lateral portions 33 of the legs 31 serve to engage the shoulder 14 on the jar 10 when the clamp is in position. The connecting element 32 of the clamp comprises two oppositely and downwardly inclined portions 34—34 terminating in a central semi-spherical depression 35 which defines a projection 36 for engaging in the semi-spherical recess or depression 27 of the top of the cover 11.

In general, the spring clamp 13 may be made of any suitable metallic material, such for example as steel or bronze strip. Of course it is to be understood that the pressure exerted by the spring on the cover can be predetermined and altered by the shape of the spring, the material used, and the thickness or width of the band.

From the illustration in Figure 2 it will be evident that the upper ends of the legs 31 of this spring clamp are spaced from the top of the cover 11 so as to afford clearance for the movement of the cover away from the top of the jar 10 during the sealing operation. Inasmuch as there is no contact between the clamp and the cover except at the center of the cover and with the jar except at each end of the legs 31 of the clamp, the cover has a free movement during the sealing operation except as limited by the pressure exerted by the spring on the center of the cover until displacement of the cover is sufficiently great to bring it into contact with the portions 34—34. This displacement can of course be regulated by varying the size or length of the parallel legs 31—31 or in other words, by varying the amount of clearance between the slanting portions 34—34 of the clamp and the top of the cover 1..

Also, it is to be understood that it is immaterial whether a positive attachment of the cover to the jar is desired for the purpose of preventing the spilling of the contents of the jar or a limiting movement of the cover, when it is acting as a valve during the sealing operation, is desired, since the clamp of my invention may be used to accomplish either or both purposes. Obviously, as far as the operation of the clamp during the sealing operation is concerned, it is immaterial whether the movement of the cover to be checked is due to internal pressure from the container or to a release of pressure from the outside as for example where the jar is sealed in a retort from which retort air is being exhausted.

It is contemplated that in some instances two spring clamps, such as the clamp 13, may be used placed at 90° from each other. In Figure 1 I have illustrated by the dotted lines *a*—*a* a position in which the clamp 13 could be rotated or moved or in which another spring clamp could be located at right angles to the spring clamp shown in full lines. The clamp 13 may be readily removed from the container or jar by manually depressing one of the portions 34—34 and thereafter moving the associated leg 31 clear of the shoulder 14.

The semi-spherical portion 36 of the spring clamp 13 in engaging the top of the cover at the semi-spherical depression or socket in reality establishes a universal joint connection between the spring clamp and the cover 11. This means that the cover 11 in moving away from the upper end of the jar 10 during the sealing operation can not only flex the spring clamp 13, but can also pivot about the semi-spherical projection 36.

Furthermore, it will be noted that due to the fact that the spring clamp engaging the cover at only a single and central point, the cover in being moved away from the jar will tend to raise evenly all around its outer circumference. It therefore follows that when the cover is moved back to its seat on the top of the jar under the resilient effect or pressure of the spring clamp, as well as the pressure of the atmosphere, it will tend to seat evenly all around its outer circumference and in that way will result in the form-

ing of a much better seal between the cover and jar.

It is not to be assumed that the spring clamp 13 is only of use in connection with the sealing of the cover to the jar, for it is contemplated that it may be used to hold the cover in proper relation to the jar during the handling of the empty jar with or without the sealing ring or gasket 12 in position; to hold the cover in proper relation to the container for handling or shifting in filled condition before the vacuumizing operation; to hold the cover in place on the jar after the sealing operation and before or during and after transportation and to hold the cover in place on the jar after the jar has been opened and part of the contents have been removed therefrom.

Another very important advantage of the spring clamp 13 is that as the cover 11 is moved away from the upper end of the jar 10 during the sealing operation, this clamp 13 will apply an increasing pressure to the top of the cover. That is to say the continued flexing of the spring clamp results in a constantly increasing amount of pressure being exerted on the cover 11 by the clamp due to the inherent construction of the clamp.

It is also to be understood that the spring clamp 13 does not necessarily have to have the semi-spherical projection 36 but may be provided with a convex wedge-shaped or pointed projection 36' such as that shown in Figure 3 in connection with the spring clamp 13'. The spring clamp 13' with the exception of the pointed projection 36 is identical to the spring clamp 13 and functions to connect the cover 11 to the jar 12 shown in Figure 3 in exactly the same way as the spring clamp 13 does with the vacuum jar construction shown in Figure 2. For this reason it is thought that no further description of the modification shown in Figure 3 is required for an understanding of the operation of this modification.

It is also to be understood that although I have illustrated and described in detail the preferred embodiment of my invention, the invention is not to be thus limited but only in so far as defined by the scope and spirit of the appended claims.

I claim as my invention:

1. In a container structure of the known type in which the container is formed with an internal seat adjacent its open top of substantial extent in the direction of the container axis and comprising an upper conical portion merging at its base into an annular portion less sharply inclined to said axis than said conical portion and a cover comprising a rigid body formed with a depending portion and a yielding annular gasket surrounding said plug portion and compressed between the latter and both of said portions, the combination with a container having a narrow upper portion of larger diameter than the subjacent surface portion shaped to provide an approximately radial shoulder portion extending inwardly from the first mentioned portion, a rigid cover member formed with a central concavity in its upper surface and a resilient clamp for detachably securing said cover in place, said clamp consisting of a strip of resilient metal which is of a width many times its thickness, and which is shaped to provide a cross-bar above the cover and depending legs at the ends of said cross-bar, said legs being spaced apart by a distance greater than the diameter of said cover member and each terminating at its lower end in an inturned portion parallel to, and having an extended surface portion in contact with a corresponding extended surface portion of said radial shoulder, said cross-bar being formed with a central portion convex at its underside and entering said cavity whereby said clamp and cover are centered relatively to one another and have a ball and socket joint connection permitting practically universal lifting movement of the cover to relieve excess pressure in the container, the portions of said cross-bar connecting the central portion of the latter to said legs and being inclined away from the cover to clear the latter as it lifts in its normal pressure relieving movements.

2. In a container structure of the known type in which the container is formed with an internal seat adjacent its open top of substantial extent in the direction of the container axis and comprising an upper conical portion merging at its base into an annular portion less sharply inclined to said axis than said conical portion and a cover comprising a rigid body formed with a depending portion and a yielding annular gasket surrounding said plug portion and compressed between the latter and both of said portions, the combination with a container having a narrow upper portion of larger diameter than the subjacent surface portion shaped to provide an approximately radial shoulder portion extending inwardly from the first mentioned portion, a rigid cover member formed with a central concavity in its upper surface, a resilient clamp for detachably securing said cover in place, said clamp consisting of a strip of resilient metal which is of a width many times its thickness, and which is shaped to provide a cross-bar above the cover and depending legs at the ends of said cross-bar, said legs being spaced apart by a distance greater than the diameter of said cover member and each terminating at its lower end in an inturned portion parallel to, and having an extended surface portion in contact with a correspondingly extended surface portion of said radial shoulder, said cross-bar being formed with a central dished portion convex at its underside and entering said cavity whereby said clamp and cover are centered relatively to one another and have a ball and socket joint connection permitting practically universal lifting movement of the cover to relieve excess pressure in the container, the portions of said cross-bar connecting the central portion of the latter to said legs being inclined away from the cover to clear the latter as it lifts in its normal pressure relieving movements, and a second clamp similar to the first mentioned clamp and transverse to the latter and having its dished portion in nesting relation with the dished portion of the first mentioned clamp.

EDMUND MUNROE SAWTELLE.