Aug. 20, 1929. F. PAVLIK 1,725,100

SMOKE CLEANING DEVICE

Filed June 7, 1926

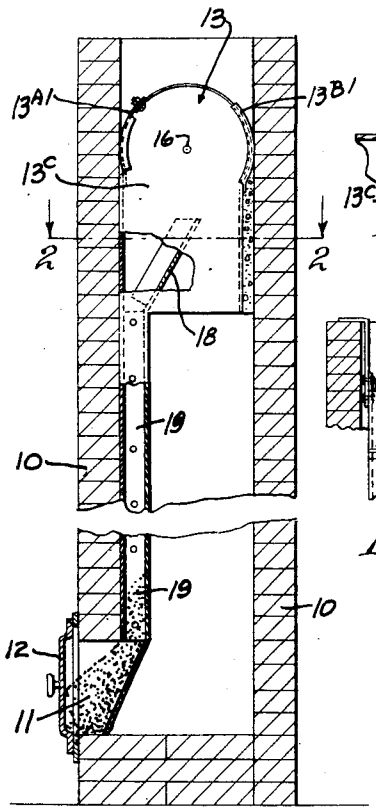


Fig. 1

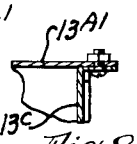


Fig. 8

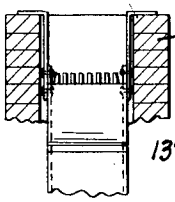


Fig. 9

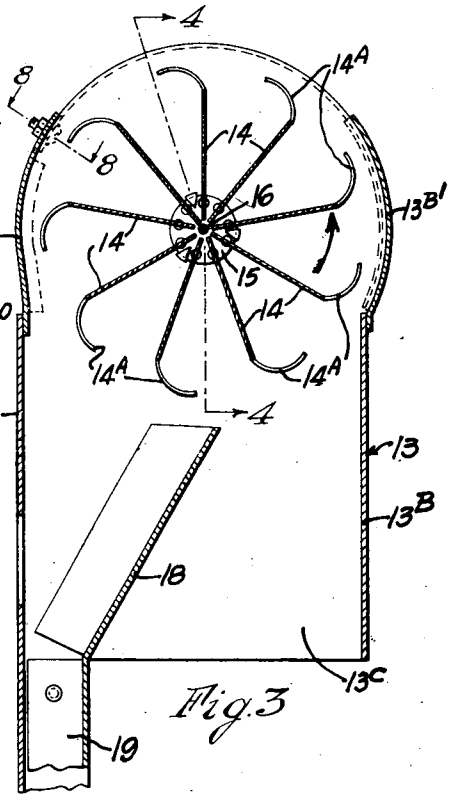


Fig. 3

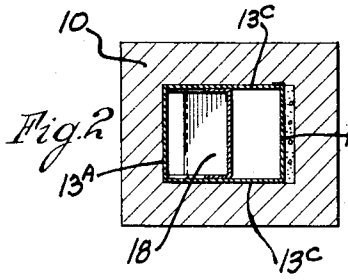


Fig. 2

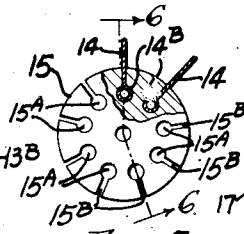


Fig. 5.

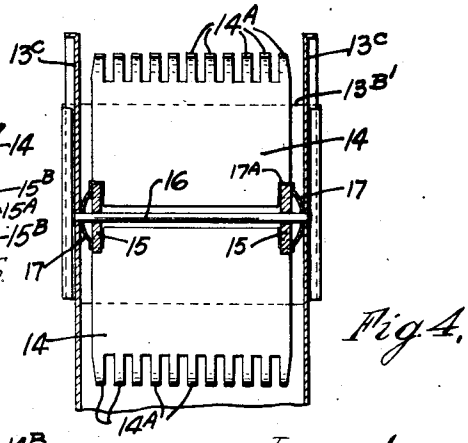


Fig. 4.

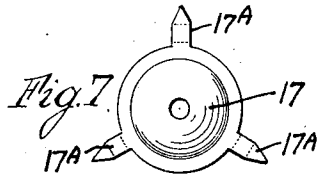


Fig. 7

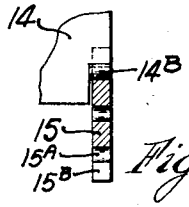


Fig. 6.

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Patented Aug. 20, 1929. 1,725,101

UNITED STATES PATENT OFFICE.

ABRAHAM PODEL, OF BRONX, NEW YORK, ASSIGNOR TO ANCHOR CAP & CLOSURE CORPORATION, OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW YORK.

HERMETICALLY-SEALED PACKAGE.

Application filed December 31, 1926. Serial No. 158,157.

The present invention relates to the art of sealing packages and more particularly to an improved closure cap for forming a hermetically sealed package.

One of the difficulties encountered in forming hermetically sealed packages with metallic closure caps and glass containers, is the trapping of air in the upper part of the containers. Where packages are sealed under a vacuum, it is difficult to exhaust the air completely with a closure cap having a gasket therein resting upon the mouth of the container and an insufficient vacuum may occasion discoloration and deterioration of the products. The trapping of air is probably most pronounced when the seal is formed on the side wall of the container by pressing a closure cap downwardly to seal the container. Theoretically, the air pressure increases inversely as the head space is decreased, the temperature remaining constant. For example, if the head space is two cubic inches with the cap resting on the container and one cubic inch when the cover is pressed down, the head space is halved and the pressure doubled. Thus, where no exhausting means is used the pressure in the container is twice the atmospheric pressure, or approximately thirty pounds per square inch.

The unbalanced pressure of fifteen pounds per square inch tends to force the cover off at all times. If a package sealed under these conditions is placed in a display window, where the sun may raise its temperature considerably, the internal pressure increases still more and the caps on many of the packages are blown off. Further, it is desirable to subject many products to a sterilizing heat which likewise raises the pressure in the containers, and if an unbalanced pressure already exists in these, they cannot be subjected to high temperatures subsequent to the sealing operation.

Another difficulty encountered with closures sealed by downward pressure without reformation of the skirt of the cap is the excessive pressure required to apply the caps to commercial containers. Ordinary glass containers vary from a standard size within permissible ranges. Caps have to be capable of sealing tightly on a minimum size container and of going over a maximum size container without creating undue strains in the glass. Defects in glass containers are most likely to occur at the edge thereof. Heretofore, the gaskets have been relied upon to take up the variations in size of containers and a combined edge and partial side seal were formed adjacent the mouth of the receptacle at the junction of the skirt and cover portion of the cap. Such a seal is difficult to apply due to the fact that the upper edge of the gasket tends to slide over the edge of the container and to prevent the cap from being seated properly on the container. Pressure on the skirt of the cap is at the junction of the skirt and cover portion and any stretching of the metal must necessarily be slight because of the reinforcing cover portion.

The present invention overcomes the above difficulties by providing a closure cap adapted to rest upon the mouth of a container and at the same time to leave passageways for exhausting air therefrom prior to the sealing operation. These passageways are not closed until the closure cap is pressed substantially the full distance downwardly over the container. The means for accomplishing this is preferably a closure cap having a gasket supported at the bottom of the skirt and a concave sealing bead in the central part of the skirt adapted to engage the gasket and form an effective seal on the side wall of the container. By providing a sealing bead centrally of the skirt of the cap, the seal is made mainly on the said wall of the container below the rim thereof. The sealing bead presents a narrow band of metal for engagement with the gasket which is adapted to stretch slightly during application to a container and thereby co-operate with the gasket to accommodate a wide range of variations in the size of containers with less sealing effort. At the same time the pressure applied to the gasket by the cap, being on a relatively narrow zone, is concentrated over a small area to form a tight seal. This facilitates application of the cap to a container and increases the effectiveness of the seal. The part of the skirt above the bead permits the upper part of the gasket to be imbedded therein and prevents it from extending over the rim of the receptacle and from interfering with the proper application of the cap. The gasket is preferably, but not necessarily, formed with a plurality of portions projecting inwardly to engage the mouth of the con-

brought to rest in the space between the vanes and thereafter discharged onto the floor 18. The arcuate fingers 14^A permit the passage of the gases through the slots between them and also act as partial separating means.

I claim:

1. In a device of the kind described, and in combination, a housing, a shaft supported in said housing, a pair of disks loosely mounted on said shaft, said disks having a plurality of apertures therein, a plurality of vanes having integral portions seated in said apertures for retaining said vanes in spaced relation to each other on said disks, said vanes being radially disposed from said shaft and having integral spaced fingers on their outer edges to permit the passage of gases therethrough, and a deflector for deflecting the gases to one side of said shaft and vanes whereby said vanes will be rotated with said disks about said shaft for arresting the movement of the heavier particles in said gases to separate said particles from the issuing gases.

2. A device as embodied in claim 1, and including a separator between each of said disks and the walls of said housing, said separators comprising a circular dished member having integral arms bent over the periphery of said disks for rotation therewith.

In witness whereof I affix my signature.

FRANK PAVLIK.

ment, the indentations may be conveniently formed by punching operations and each is effective to facilitate the escape of air.

The preferred form of gasket may be conveniently formed by providing depressions in the mandrels now used as forms about which a rubber tube is telescoped for the vulcanizing operation. The mandrel and rubber tube may be wrapped with suitable sheeting to make the rubber tube conform to the irregular contour of the mandrel during vulcanization. The resulting vulcanized rubber tube from which the gaskets are cut will have a series of longitudinal channels, and when the gaskets are cut, these channels will form the depressed portions 11.

The cap and gasket are constructed to facilitate the mechanical assembling thereof, and to permit shipment in the assembled state so that they may be placed in automatic machines and applied to containers automatically. The sealing operation may be effected manually by pressing the cap on the container or it may be effected by suitable automatic machines. The inwardly disposed concave bead 7 being resilient and slightly smaller than the other portions of the skirt of the cap, forms a very effective seal on the side wall of the container and also securely holds the cap in its sealed position to form a seal by means of the portion of the gasket pressed against the upper portion of the skirt.

It will be seen that the present invention provides a cap which may be applied to a container without the use of expensive machinery, and that its construction is such that all air may be exhausted from the container prior to the sealing operation, and, in the event no exhaust is used, any tendency to compress the air in the head space of the container will be relieved through the passageways formed by the irregularities in the gasket and cap. Both the cap and the gasket may be readily and inexpensively manufactured by slight modifications of existing machines, and the packages formed thereby are adapted to withstand the rough usage and the excessive temperature to which they may be subjected.

As various changes may be made in the above embodiment without departing from the spirit of the invention, it is to be understood that all matter herein set forth is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. As an article of manufacture, a closure cap having a depending skirt comprising an upper portion, a substantially continuous concave sealing bead extending inwardly from said upper portion adapted to press a gasket, aligned with the sealing bead, intermediate the bead and container, tightly against a container, an outwardly flared lower portion to facilitate application to a container, and an inturned flange at the lower edge of said skirt.

2. As an article of manufacture, a closure cap having a depending skirt comprising an upper portion, a concave sealing bead extending inwardly from said upper portion, an outwardly flared lower portion to facilitate application to a container, an inturned flange at the lower edge of said skirt, and a gasket mounted in said skirt and supported in alignment with said bead by said flange, said bead being adapted to press said gasket firmly against a container.

3. As an article of manufacture, a closure cap having a depending skirt comprising an upper portion, a concave sealing bead extending inwardly from said upper portion, an outwardly flared lower portion to facilitate application to a container, and a gasket mounted in said skirt in line with said bead to seal the cap on a container, said gasket being deformed to permit the air to be withdrawn from a container when said cap rests thereon.

4. As an article of manufacture, a closure cap having a depending skirt comprising an upper portion, a sealing bead extending inwardly from said upper portion, an outwardly flared lower portion extending outwardly from said bead substantially into line with the upper portion of the skirt to facilitate application to a container, and a gasket mounted in said skirt to seal the cap on a container, the variations in size of the container being taken up by said gasket and said bead.

5. As an article of manufacture, a closure cap comprising a cover portion, a depending skirt, and a gasket mounted in said skirt, said gasket having inwardly extending portions adapted to engage the container and support the cap in spaced relation thereto so that the air may be withdrawn from the container prior to the sealing operation.

6. As an article of manufacture, a closure cap comprising a cover portion, a depending skirt and a gasket mounted in said skirt, said gasket having a plurality of kinks formed therein during the vulcanization thereof adapted to provide passageways between the cap and the container, whereby air may be withdrawn prior to the sealing operation.

7. As an article of manufacture, a closure cap comprising a cover portion, a depending skirt and a gasket mounted in said skirt, said gasket having a plurality of projections formed therein adapted to provide passageways between the cap and the container, whereby air may be withdrawn prior to the sealing operation, and a plurality of channels in the cover portion of the cap to facilitate entry of the air into said passageways.

8. As an article of manufacture, a closure cap comprising a cover portion, a depending skirt, and a gasket mounted in said skirt, said gasket having a plurality of inwardly

extending projections adapted to engage a container and support the cap in spaced relation therewith.

9. As an article of manufacture, a closure cap comprising a cover portion, a depending skirt of substantially uniform thickness, and a gasket mounted in said skirt, said gasket having a plurality of projections adapted to support the cap in spaced relation with a container so that the air may be readily withdrawn therefrom.

10. As an article of manufacture, a sealing gasket having a plurality of inwardly extending projections adapted to support a closure cap in spaced relation to a container.

11. As an article of manufacture, a sealing gasket of substantially uniform thickness having a plurality of projections adapted to support a closure cap in spaced relation to a container.

12. As an article of manufacture, a sealing gasket having a plurality of kinks formed therein during the vulcanizing operation, said kinks being adapted to facilitate escape of air from a container during the sealing operation.

13. A sealed package comprising a container and a closure cap, said closure cap having a depending skirt comprising a centrally disposed annular concave sealing bead extending inwardly from said skirt, an outwardly flared lower portion to facilitate application to a container, and a gasket mounted in said skirt in line with said bead, whereby pressure is applied to the gasket through the intermediation of the bead to accommodate a greater range in size variation of the containers.

14. A sealed package comprising a container and a closure cap, said closure cap having a skirt comprising a substantially cylindrical upper part, a concave sealing bead extending inwardly from said cylindrical part, an inturned flange at the lower edge of the skirt, and a gasket supported by said flange and in line with said bead, whereby the sealing is effected through the intermediation of said bead on the sidewall of the container below the upper edge thereof.

15. A closure cap comprising a cover portion and a depending skirt, said skirt having a centrally disposed smooth sealing bead extending inwardly therefrom, the lower edge of said skirt being turned inwardly to support a gasket and a gasket in said skirt, said gasket extending upwardly over said bead to be pressed against the container by said bead.

16. A closure cap comprising a cover portion, a depending skirt, a sealing bead in the skirt of the cap spaced from the junction of the skirt and cover portion, the upper portion of the skirt being curved outwardly and the lower part of the skirt being flared outwardly, and a gasket of vulcanized rubber in said skirt whereby said bead forms a seal on the side wall of the container below the upper edge thereof.

17. A closure cap comprising a cover portion and a depending skirt, said skirt having a sealing bead extending inwardly therefrom at a distance below the junction of the skirt and cover portion, the annular recess formed in the upper part of the skirt by said inwardly extending bead serving to accommodate the upper edge of the gasket, the flare below the bead being adapted to facilitate application of the cap to a container, the lower edge of said skirt being turned inwardly and the gasket resting on said inturned portion and extending upwardly above said bead.

ABRAHAM PODEL.