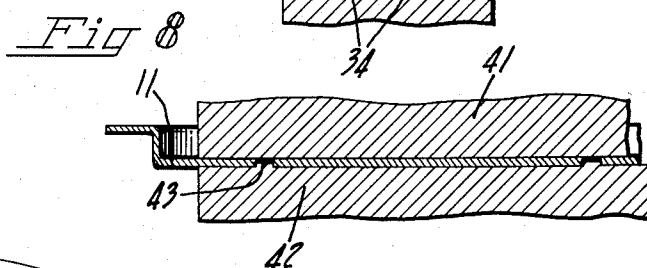
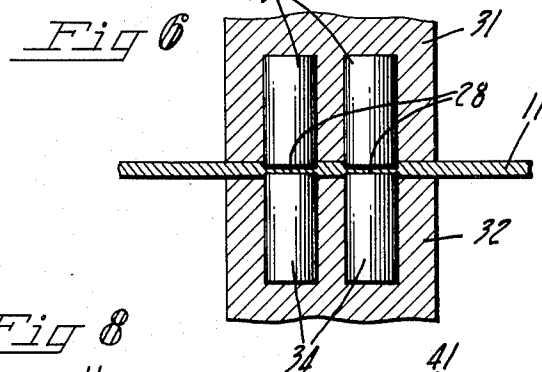
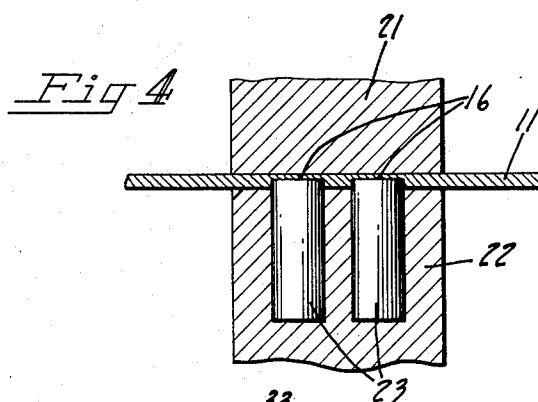
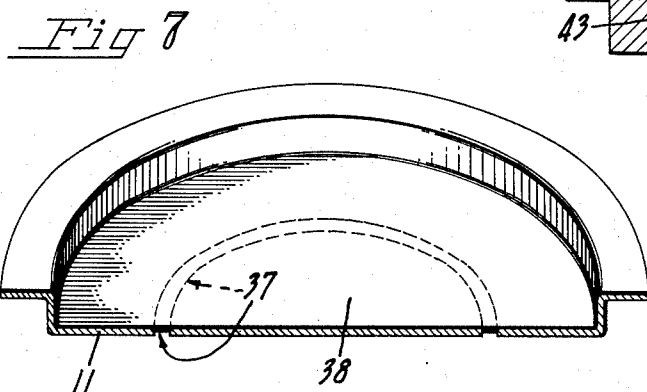
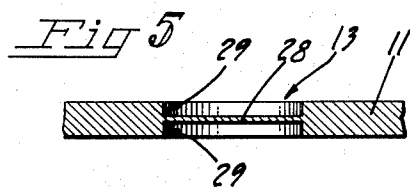
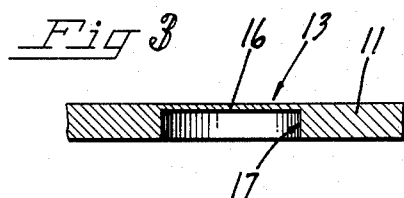
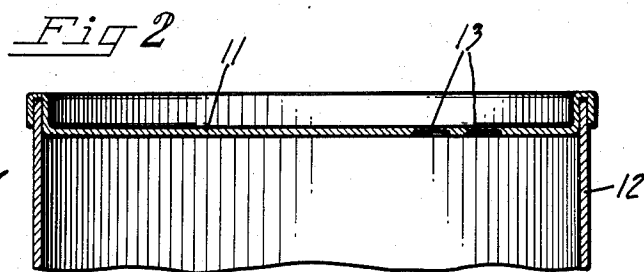
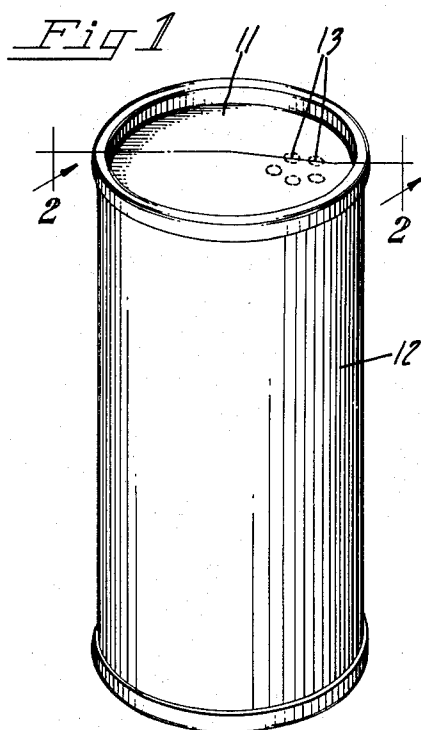


Dec. 4, 1945.

R. G. BEATON
METHOD OF PRODUCING POTENTIAL OPENINGS IN FIBER
CONTAINERS OR OTHER FIBER ARTICLES
Filed March 18, 1944

2,390,072



INVENTOR.

Robert G. Beaton
BY Ivan D. Thornburgh
Charles H. Eune
ATTORNEYS

UNITED STATES PATENT OFFICE

2,390,072

METHOD OF PRODUCING A POTENTIAL
OPENING IN A FIBER CONTAINER OR
OTHER FIBER ARTICLESRobert G. Beaton, Brooklyn, N. Y., assignor to
American Can Company, New York, N. Y., a
corporation of New Jersey

Application March 18, 1944, Serial No. 527,114

4 Claims. (Cl. 164—125)

The present invention relates to a method of producing a potential opening in a fiber container or other fiber article and has particular reference to compacting a localized portion of the article to produce a weakened area which is readily broken to provide an opening in the article.

There are many types of containers and other articles made of fibrous material in which it is desirable to provide means for producing a dispensing or other opening in the article by a mere puncturing or pressing inwardly of a wall portion of the article. By way of example, such an article may be a sifter top container. In such a container it is desirable to produce a potential opening or group of openings which will prevent the inadvertent sifting of the container contents. Such a container is especially adapted for finely divided granular material such as talcum powder and the like.

The instant invention contemplates a method of producing such potential openings in articles made of fibrous material.

An object of the invention is the provision of a method of producing a potential opening in fibrous articles wherein a localized portion of the material of the article is compacted to produce a weakened area which may be readily broken through by pressure applied thereto to provide an opening in the article which may serve as a dispensing or other form of opening.

Another object is the provision of such a method of producing potential openings in fibrous articles wherein the fibrous structure of a portion of the material of the article is broken down and altered by the application of high pressure to produce a weakened area which may be easily punctured to provide an opening in the article.

Another object is the provision of a method of this character of producing potential openings in fibrous articles wherein the breaking down of the fibrous structure of the material of the article in a localized portion thereof renders the material brittle so that it will readily disintegrate when punctured and will fall away from the opening leaving a clean cut edge surrounding the opening, the edge being free of burrs or fuzz which usually cause clogging of openings in sifter top containers adapted to dispense finely divided granular material such as talcum powder and the like.

Another object is the provision of such a method of producing potential openings in fibrous material wherein the weakened area has

a continuous unbroken connection with adjacent unweakened portions of the material which makes such a potential opening particularly suitable for sifter top containers since inadvertent sifting of finely divided material such as talcum powder and the like is readily prevented from taking place through such an imperforate weakened area.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a perspective view of a container including weakened dispensing areas formed by the instant method invention;

Fig. 2 is an enlarged sectional view of the upper end of the container and taken substantially along a plane indicated by the lines 2—2 in Fig. 1;

Fig. 3 is a greatly enlarged sectional detail showing one form of weakened area in the container;

Fig. 4 is a sectional view of one form of apparatus for forming the weakened areas in accordance with the instant method invention, the view showing a container top in place;

Fig. 5 is a view similar to Fig. 3 and showing a modified form of weakened area;

Fig. 6 is a sectional view similar to Fig. 4 and showing one form of apparatus for producing the modified form of weakened area disclosed in Fig. 5;

Fig. 7 is an enlarged sectional perspective view of a container top showing another modified form of weakened area; and

Fig. 8 is a sectional view of one form of apparatus for producing the modified form of weakened area shown in Fig. 7, with a container top in place in the apparatus.

As a preferred embodiment of the invention the drawing discloses a method of producing potential dispensing openings in an imperforate wall section of a fiber top closure member 11 (Figs. 1 and 2) of a sifter container 12 for finely divided granular material such as talcum powder. The potential dispensing openings are in the form of weakened areas 13 which are puncturable to open the container. Figure 1 shows a group of five of these weakened areas grouped in a circle formed in the container top, although the invention is equally well adapted to any other arrangement or number of such weakened areas.

Each weakened area 13 comprises a thinned or greatly reduced section of brittle wall portion 16 (Fig. 3) of the material of the container top 11, having a continuous unbroken connection with the adjacent material of the container top. This thinned wall portion is disposed in a plane coextensive with a surface of the container top and bridges a recess 17 formed in the material of the container top.

In accordance with the instant method invention, the thinned wall portion 16 comprising the weakened area 13 is formed by compressing a localized portion of the material of the container top 11 under high localized pressure. It is this compression of the material that forms the recess 17. This pressure breaks down the fibrous structure of the material in the localized area and compacts the broken down material so tightly that its fibrous structure is changed and displaced.

Originally the structure of a fibrous material from which containers and the like are made is made up of numerous fibers which are tubular in form and which are interlocked or matted in such a manner as to hold the material together to form a sheet or web. The thickness of the material depends to some extent upon the number of fibers present.

During the manufacture of a web of such fibrous material exceedingly high pressures are used as the material passes through calender rolls and the like to press the fibers together in the interlocked condition as above explained. However, these pressures are distributed over the entire width of the web and at no time are sufficient to crush the fibers.

In the instant method the compression of the material is effected over a small localized area and hence a tremendously high pressure is exerted against the material. This pressure crushes the tubular fibers in the localized area and thus breaks down the fiber structure into a hard, brittle integral mass providing a seal susceptible of disintegration. This seal is strong enough, however, to resist ordinary handling and to provide a continuous unbroken connection with the adjoining unweakened material of the container top and thus provides a barrier against dispensing of the contents of the container until opened by the consumer. By way of example, it has been found that very satisfactory results have been obtained by compressing material which is twenty-five one-thousandths of an inch thick to a reduced thickness of approximately three one-thousandths of an inch. This is a ratio of about 8 to 1.

To open the container it is merely necessary to puncture the weakened areas 13 with any suitable sharp instrument such as a lead pencil, stylus or the like. During the forming of the weakened areas considerable discoloration of the areas takes place so that the exact location of the same may be determined without difficulty, and therefore the proper positioning of the puncturing instrument presents no problem. When punctured, the hard, brittle material of the weakened areas readily disintegrates and almost completely disappears in the form of pulverized fibers. This breaking away from the adjacent material of the container top results in a sifter opening having a clean cut surrounding edge free of burrs or fuzz so that clogging of the opening by the collection of powder which would cling to such burrs or fuzz during the powder dispensing operation, is prevented.

One form of apparatus for carrying out the method of forming the weakened areas 13 in the container top 11 is disclosed in Fig. 4. Such an apparatus may be a part of a more elaborate machine of the type of a punch press or the like and includes an upper movable anvil 21 and a lower stationary die 22 between which the container top is interposed. The lower face of the anvil is preferably straight and smooth. The lower die 22 carries a plurality of piercing pins 23 which project above the upper surface of the die.

In operation the anvil 21 presses the container top 11 down against the pins 23 in the lower die 22 and creates a tremendous pressure against the material of the container top in a localized area at the outer ends of the pins. The pins partially pierce the material to sever some of the fibers from the material adjacent the localized area and compress and compact the severed fibers with the unsevered fibers within the localized area to bring about the break-down of the fibrous structure of the material as described above.

Figure 5 discloses a modified form of the weakened area 13 in which the material of the container top is compressed from both sides. This method of compressing the material forms a compacted brittle wall section 28 in a plane intermediate the outer surfaces of the material and leaves adjoining recesses 29 on each side of the weakened area. The structure of the weakened wall section 28 is broken down and the fibers changed and displaced similarly to the weakened areas 13 of the preferred form. This type of weakened area is desirable in certain kinds of containers or other articles.

One form of apparatus for forming a weakened area of this modified form is illustrated in Fig. 6. This apparatus is similar to that shown in Fig. 4 and comprises a movable upper anvil 31 and a stationary lower die 32. Both the anvil and the die carry sets of aligned piercing and compacting pins 33, 34 between the inner ends of which the container top 11 is interposed for the forming operation.

When the anvil 31 moves down, the inner ends of its piercing and compacting pins 33 force the material of the container top 11 against the inner ends of the piercing pins 34 of the die 32 and thus compress and compact the material in localized areas at the ends of the pins. It is this compression that breaks down the fibrous structure of the material in these localized areas and thus results in the brittle weakened wall sections 28.

A still further modified form of the invention is disclosed in Fig. 7. In this modified form the weakened area is a narrow continuous annular ring 37 which is formed in the container top 11 or other article and which sets off a removable wall section 38. The ring is made by compacting a portion of the material of the container top in a manner similar to that in forming the sifter opening weakened areas 13. However, when pressure is applied to the encircled portion 38 of the container top the brittle ring section 37 readily breaks and thus releases the encircled portion so that it may be lifted out of the resulting opening. With this modified form of weakened area an opening of greater dimension than that of a sifter opening may be produced.

Such a weakened ring section 37 of the modified form shown in Fig. 7 may be produced by one form of apparatus as illustrated in Fig. 8. This apparatus preferably includes a movable upper anvil 41 and a stationary lower die 42 be-

tween which the container top 11 is interposed. The lower surface of the anvil 41 preferably is straight and smooth while the upper face of the die 42 is formed with an annular upwardly projecting forming ring 43.

When the anvil 41 moves down toward the die 42 it forces the material of the container top down against the forming ring 43 of the die and thus compresses and compacts the material in a localized area at the upper edge of the forming ring. This compression breaks down the fiber structure of the material in a manner similar to that hereinbefore described and thus produces an annular brittle weakened area similar to that formed in the sifter opening weakened areas 13.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the steps of the process described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the process hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A method of forming a potential opening in an imperforate wall section of a fiber article, which comprises subjecting a localized area of said wall section to high pressure to compress and compact the material within the localized area so as to break down and displace the fibrous structure of the material into a weakened reduced thickness area of hard brittle substance capable of disintegrating into a granular condition when punctured to thereby provide an opening having a clean cut edge in said wall section of said article.

2. A method of forming a potential opening in an imperforate wall section of a fiber article,

which comprises subjecting a localized area of said wall section to high pressure to compress and compact the material within the localized area so as to break down and displace the fibrous structure of the material into a weakened reduced thickness area of hard brittle substance having a continuous unbroken connection with the uncompressed material adjacent said weakened area to preserve the imperforate condition of said wall section, said weakened area being readily puncturable to produce an opening having a clean cut edge free of burrs or fuzz.

3. A method of forming a potential opening in an imperforate wall section of a fiber article, which comprises subjecting a localized area of said wall section to high pressure to compress and compact the material within the localized area into a plane coextensive with a surface of said wall section so as to break down and displace the fibrous structure of the material into a weakened reduced thickness area of hard brittle substance capable of disintegrating into a granular condition when punctured to thereby provide an opening having a clean cut edge in said wall section of said article.

4. A method of forming a potential opening in an imperforate wall section of a fiber article, which comprises subjecting a localized area of said wall section to high pressure to compress and compact the material within the localized area into a plane disposed intermediate the planes of the opposite surfaces of said wall section so as to break down and displace the fibrous structure of the material into a weakened reduced thickness area of hard brittle substance capable of disintegrating into a granular condition when punctured to thereby provide an opening having a clean cut edge in said wall section of said article.

ROBERT G. BEATON.