Dec. 8, 1942. K. BRATRING 2,304,676

METHOD OF PRODUCING COMPARATIVELY RIGID CONTAINERS BY THE REPEATED IMMERSION OF A CORE IN FILM-PRODUCING SUBSTANCES

Filed Nov. 18, 1937

Fig. 1

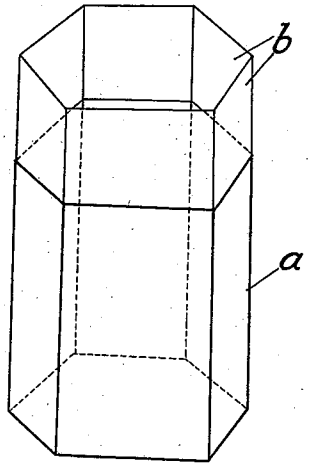


Fig. 2

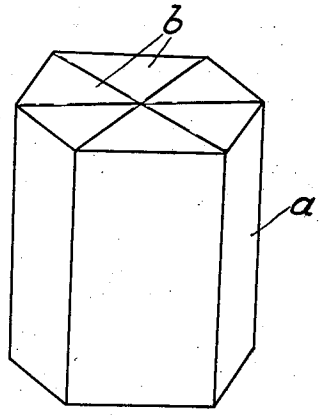


Fig. 3

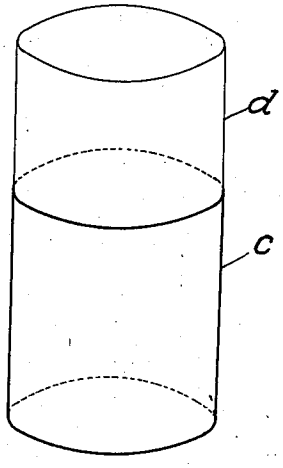


Fig. 4

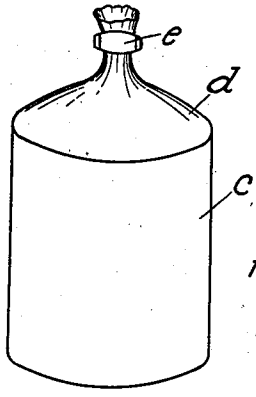
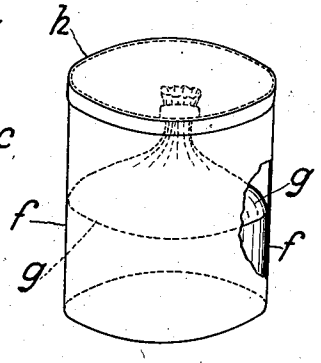


Fig. 5



Inventor

Kurt Bratring

By Watson & Coleman, Attys

Patented Dec. 8, 1942

2,304,676

UNITED STATES PATENT OFFICE

2,304,676

METHOD OF PRODUCING COMPARATIVELY RIGID CONTAINERS BY THE REPEATED IMMERSION OF A CORE IN FILM-PRODUCING SUBSTANCES

Kurt Bratring, Dahlem, Berlin, Germany, assignor, by mesne assignments, to Neocell Products Corporation, a corporation of Delaware

Application November 18, 1937, Serial No. 175,346
In Germany December 3, 1936

3 Claims. (Cl. 229—4.5)

This invention relates to a method of producing comparatively rigid containers for packing purposes.

Rigid containers composed of sheet metal or cardboard have already been proposed having a lining or bag of paper or cellulose hydrate material loosely fitted therein. These packings are employed more particularly for pulverulent substances, but have the disadvantage that the pulverulent substance tends to penetrate between the rigid outer container and the inner bag or lining, so that the intended protection of the contents of the container is to a certain extent again annulled.

Seamless containers consisting of a transparent cellulose material and having a thin and rigid wall have also been proposed for packing medicaments, foodstuffs and other commodities of the most different kinds. These containers are formed by the repeated immersion of cores or moulds in a film-producing substance, such as a solution of acetyl cellulose in acetone, layer by layer until the desired thickness has been attained, whereupon the containers are dried and then removed from the cores. To furnish these containers with a lid or top it is necessary to produce the container proper and the lid or top on two separate cores having slightly different diameters, which are so adapted to each other that the finished lid will fit over the finished container.

It is the object of the invention to produce in one operation by the immerision process a container which is capable of being closed or sealed and possesses a comparatively rigid main portion sufficient to accommodate the contents of the container and a thin-walled upper portion which can be formed into a seal by folding, bending over or twisting together in the manner of a bag. The upper portion must naturally be so thin that it is capable of being folded or otherwise varied in its form.

In accomplishment of this object the invention accordingly comprises a method of producing comparatively rigid containers, which consists in immersing a core in a film-producing substance, such as acetyl cellulose, and repeating such immersion until a film has been produced on the said core of a certain limited thickness which still permits of a variation in the form of the said film, and thereupon continuing the immersion of the said core, but to a depth which is less than before, such continued immersion being repeated until a comparatively rigid wall has been formed corresponding in extent to the reduced depth of immersion. In this manner there is obtained by immersion in one single operation a seamless container which possesses a comparatively thick wall up to a height which may be made dependent on the quantity of material to be introduced therein, and from that point a comparatively thin film-like wall of such thickness that it is capable of being folded or otherwise varied in its form so as to seal off the container against the outside.

The number of immersions necessary for producing the comparatively rigid lower portion and the thin upper portion will depend on the nature of the film-producing substance.

The method according to the invention may be utilised for the production of round, elliptical, square or polygonal containers of desired size. It may also be modified in such fashion that there is first produced by immersion the lower rigid wall portion, whereupon the thin-walled upper portion is formed by continued immersion to a greater depth. If desired, the thin upper portion may have a greater diameter than the rigid lower portion.

In certain instances it may be desirable to employ for the thin upper portion a solution of a different composition to that employed for the rigid lower portion. Containers of this kind consisting of two different materials can also be produced quite readily in one operation, and it is merely necessary to provide two separate immersion tanks. For example, there may be employed for the formation of the thin upper portion a solution of acetyl cellulose in acetone containing a comparatively large proportion of softening agent in order to make the thin-walled upper portion particularly capable of being varied in form, and water-repelling additions may also be incorporated in this portion, whilst for the rigid lower portion there may be employed another cellulose product, such as benzyl cellulose. In certain instances the difference between the two solutions employed may consist merely in the addition of different dyestuffs, so that the thin upper portion capable of being varied in its form is rendered distinguishable by its different colour. If desired, these colour additions may also be opacity producing pigments, such as titanium oxide.

When using different substances for producing the container it is also quite possible to weld the two parts of the container together if in the substance for producing the rigid wall portion solvents are employed which are capable of dissolving the substance from which the other portion of the container is produced. Thus, for example, it is quite readily possible to employ with

advantage for the production of an inner layer, which is highly impervious a solution of caoutchouc, caoutchouc chloride or a polyvinyl compound in a suitable solvent if for the rigid outer layer there is used, for example, a solution of acetyl cellulose in methylene chloride with the addition of methanol, phthalic ethyl ester or other suitable substances.

A container which is particularly suitable for packing purposes is obtained if a layer of a polyvinyl chloride in methylene chloride is first allowed to form on a core for the purpose of producing a thin waterproof inner film, and then a second solution is employed, which consists of acetyl cellulose dissolved in acetone. After removal from the core a transparent container is obtained having an upper portion which is readily capable of being folded or otherwise varied in its form for the purpose of sealing the contents of the container against the outside, but the inner portion of which container can be readily detached as necessity arises step by step from the rigid outer portion merely by a pulling action thereon. The advantage of this form of container consists in the fact that as the contents of the container are removed the inner film can always be pressed down tightly against the remaining contents, for example in the case of a pulverulent material, tea or the like.

Possible embodiments of containers produced according to the invention are illustrated in the accompanying drawing.

Figs. 1 and 2 are perspective views of one embodiment of container according to the invention in the open and closed condition respectively.

Figs. 3 and 4 are similar views of a cylindrical container.

Fig. 5 illustrates in perspective view a modified form of cylindrical container.

In Figs. 1 and 2 the container possesses a hexagonal cross-section. The container proper *a*, the height of which depends on the quantity of material to be introduced therein, continues beyond the upper edge of the actual wall in the form of a comparatively thin portion *b*, which is capable of being folded or otherwise varied in form, and when folded can be made to rest against the contents of the container *a* in the manner shown in Fig. 2.

In Figs. 3 and 4 the container *c* is cylindrical. Fig. 4 shows the manner in which the thin upper portion *d* can be twisted together over the comparatively rigid wall portion *c* and secured by means of a clip *e*.

Fig. 5 shows a container which is set together and composed of different substances, and the inner film-like portion *g* of which may be detached from the rigid outer portion *f* by a pulling action thereon, so that the thin and impervious inner portion *g* may always be reduced in size more and more to agree with the remaining contents of the container. A container of this kind can also be furnished with a conventional lid *h*.

In carrying out the method according to the invention the procedure, for example in the production of a container according to Fig. 1, is such that on a core of hexagonal cross-section and having, for example, a maximum diameter of 60 mm. there is produced by single or twofold immersion to a height of, say, 90 mm. a wall having a thickness of, say, .05 mm. When this layer is dry the immersion is continued, but the depth of immersion is decreased to, say, 60 mm. This continued immersion is repeated so many times until the lower portion of the container, in a height of 60 mm., is coated with a layer of .3 mm. in thickness. When the container has sufficiently dried on the core it can be detached.

It will be understood that no limitation is made to the particular embodiments illustrated in the drawing, and that numerous modifications are quite possible within the meaning of the above description and the annexed claims without departing from the spirit of the invention.

What I claim as new and desire to secure by Letters Patent is:

1. A container comprising a relatively thick rigid portion of cellulosic material shaped to form the bottom and upstanding side walls of said container, and a relatively thin pliable layer of the same material positioned adjacent the entire inner surface of said rigid layer and bonded thereto to form a homogeneous layer and extending above the upper edge of said rigid layer as a flexible closure element of substantially uniform thickness, the bond between said rigid layer and said flexible layer being effected without added adhesive.

2. A container comprising an upper portion adapted to be formed into a closure, said upper portion consisting of a relatively thin pliable layer of a synthetic plastic material of substantially uniform thickness, and a lower portion adapted to form the body of said container, said lower portion comprising an integral extension of said thin flexible upper portion and an outer substantially rigid layer to which said extension is bonded, said outer layer comprising synthetic plastic material and forming the bottom and side walls of said container, said inner layer being bonded to substantially the entire inner surface of said outer layer, the bond between said layers being an autogenous bond.

3. A container comprising an upper portion adapted to be formed into a closure, said upper portion consisting of a relatively thin pliable layer of a synthetic plastic material of substantially uniform thickness, and a lower portion adapted to form the body of said container, said lower portion comprising an integral extension of said thin flexible upper portion and an outer substantially rigid layer to which said extension is bonded, said outer layer comprising synthetic plastic material and forming the bottom and side walls of said container, said inner layer being bonded to substantially the entire inner surface of said outer layer, the bond between said layers being an autogenous bond, both of said layers being of the same plastic material.

KURT BRATRING.