

March 19, 1946.

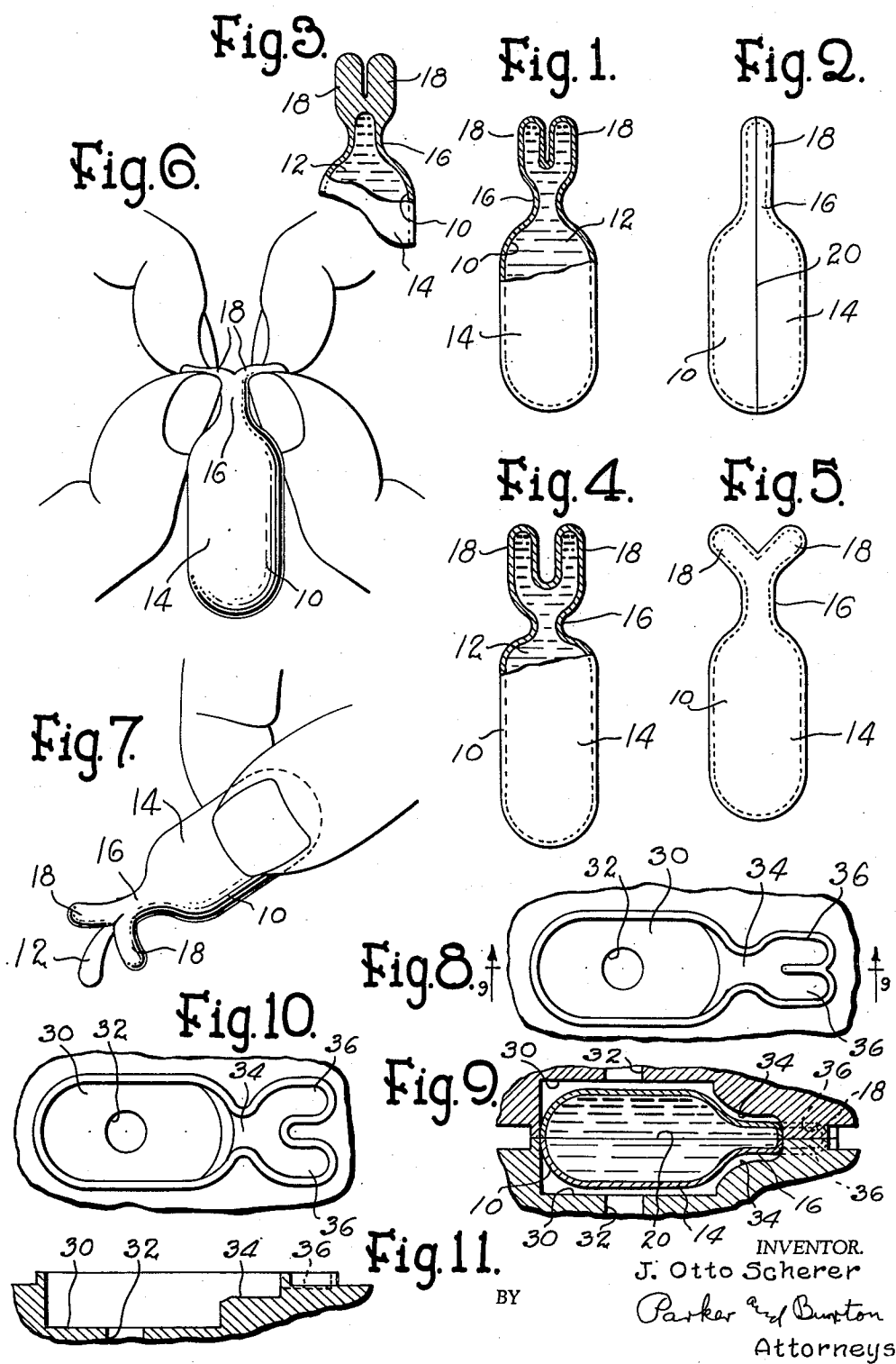
J. O. SCHERER

2,397,051

CAPSULE

Filed Aug. 25, 1941

2 Sheets-Sheet 1



March 19, 1946.

J. O. SCHERER

2,397,051

CAPSULE

Filed Aug. 25, 1941

2 Sheets-Sheet 2

Fig.12.

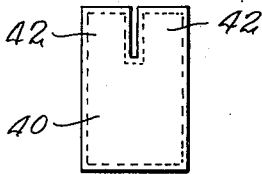


Fig.13.

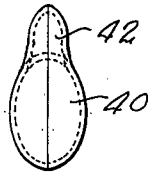


Fig.18.

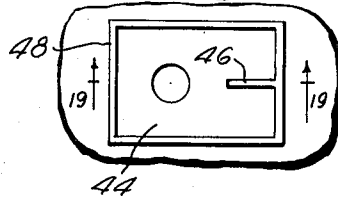


Fig.19.



Fig.14.

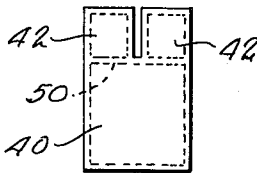


Fig.15.

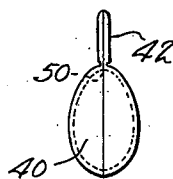


Fig.20.

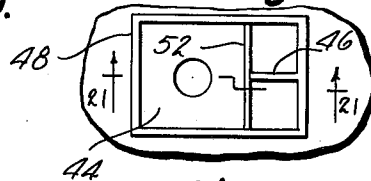


Fig.21.

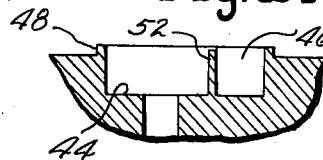


Fig.16.

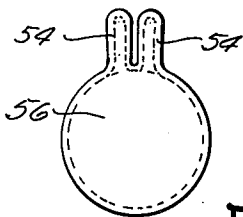


Fig.17.

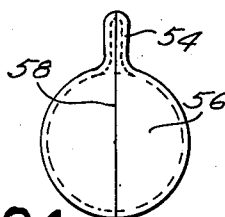


Fig.22.

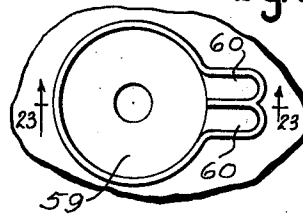


Fig.24.

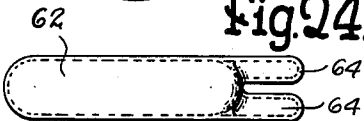


Fig.23.

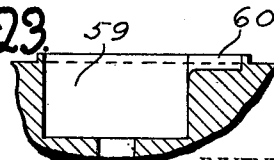


Fig.25.

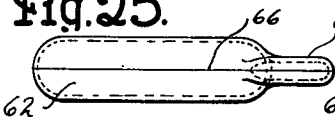


Fig.26.



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UNITED STATES PATENT OFFICE

2,397,051

CAPSULE

John Otto Scherer, Detroit, Mich., assignor, by
mesne assignments, to Gelatin Products Cor-
poration, Detroit, Mich., a corporation of Mich-
igan

Application August 25, 1941, Serial No. 408,222

8 Claims. (Cl. 128—272)

This invention relates to improvements in capsules and especially in an improved dispensing capsule and apparatus for producing the same.

Capsules of the type to which this invention relates have been made in general in round, oval or pear shapes. The shell was formed of dissolvable material such as gelatin and enclosed content material was released when the shell dissolved away. More recently capsules have been made which may be mechanically opened such as by hand or proper tools to release the contents. With these uses in mind the capsules have been changed in appearance and usually involve the provision of a hollow "neck" or projection which may be cut or broken off, or pierced, to create an opening through which the content may be discharged by squeezing the body of the capsule.

Certain difficulties were encountered in capsules of the last mentioned type. Often the opening procedure was rather messy. A portion of the content material would spill upon the hands of the person opening the capsule, resulting in both a disagreeable and wasteful operation. Instruments, such as knives, scissors, pins and the like have been used for opening capsules of this type but in many circumstances these are not available, and, moreover, a suggestion that such instruments be used detracts from the appeal of such an article.

An important object of my invention is to provide an improved capsule of this type which may be conveniently opened by the fingers without the assistance of instruments hereinabove mentioned. My improved capsule is so formed that it may be readily opened without the attendant disagreeable spilling of content material on the fingers or hands and with no or very little waste thereof.

Another object of my invention is to provide a capsule of this character which is leakproof, will resist internal pressure even after the shell has dried and contracted, and at the same time is adapted to simple and economic manufacture. A further object of this invention is to provide an improved capsule and die for manufacturing the same which obviates the need of delicate discriminations in elevations of surfaces on the die and which will give a uniform product without the objectionable features of the types attempted to be made in the past.

Other objects, advantages and meritorious features will become more fully apparent from the following specification, appended claims and accompanying drawings, wherein:

Figs. 1 and 2 are front and side elevations re-

spectively of one form of capsule embodying the invention,

Fig. 3 is a detail sectional view of a modification of the type of capsule in Figs. 1 and 2,

Fig. 4 is a view of a modified capsule design embodying the invention partially broken away to show the interior construction,

Fig. 5 is a front elevation of another modified form of capsule.

Fig. 6 illustrates the procedure for opening a capsule embodying this invention,

Fig. 7 illustrates the procedure for emptying the opened capsule of its content material,

Fig. 8 is a front elevation of a face of a die for forming in cooperation with a complementary die the capsule illustrated in Figs. 1 and 2,

Fig. 9 is a sectional view through two complementary dies showing the same in the act of forming a capsule of the type illustrated in Figs. 1 and 2,

Fig. 10 is a front elevation of a die cavity for forming the capsule of Fig. 4,

Fig. 11 is a longitudinal sectional view through the die cavity of Fig. 10,

Figs. 12 and 13 are front and side elevations respectively of a modified form of capsule,

Figs. 14 and 15 are front and side elevations respectively of a different form of capsule,

Figs. 16 and 17 are front and side elevations respectively of a still further modified type of capsule,

Fig. 18 is a front elevation of a die cavity for forming the capsule of Figs. 12 and 13,

Fig. 19 is a sectional view along line 19—19 of Fig. 18,

Fig. 20 is a front elevation of a die cavity for forming the capsule of Figs. 14 and 15,

Fig. 21 is a sectional view along line 21—21 of Fig. 20,

Fig. 22 is a front elevation of a die cavity for forming the capsules of Figs. 16 and 17,

Fig. 23 is a sectional view along line 23—23 of Fig. 22, and

Figs. 24, 25 and 26 are front, side and end views respectively of a further modified form of capsule embodying the invention.

Capsules embodying my invention herein described may be provided for any purpose wherein it is desired to provide a capsule from which the contents may be readily dispensed. Such capsules form a container or receptacle for small dosages of substances in liquid or plastic form, such as medicaments, ointments, or cosmetics in the form of lotions or creams, in an amount sufficient for a single application. The character of

the contents and the use to which it is put form no part of the invention.

Capsules of this general character are commonly formed of gelatin as this is a suitable material from which to make the capsule shell or wall. It is obvious, however, that other plastic materials might be employed. The capsule may be in any desired shape. Preferably, the capsule has a main body portion enclosing most of the content material. A minor or subsidiary portion of the capsule is shaped in accordance with this invention to provide the desired convenient method of opening the capsule. Both the main and subsidiary portions of the capsules are integrally formed together and hermetically sealed within the same walls.

Throughout the drawings the capsule wall or shell is referred to by reference numeral 10, and the capsule content material enclosed thereby by reference numeral 12.

Different forms of my invention are illustrated in the drawings. In Figs. 1 to 4 there are illustrated three forms which differ slightly from one another. Generally the capsules in these figures have a bottle-shaped configuration and include a main body portion 14, a neck 16 and a bifurcated head portion formed of two projections or lobes 18—18.

Both the neck portion 16 and the lobes 18—18 of the modifications may be hollow or tubular and contain a small amount of the content material 12. However, if desired, the lobes may be made solid or unfilled as illustrated in Fig. 3. The lobes 18—18 are connected to the neck portion adjacent one another and extend generally side-by-side or at a diverging angle as shown in Fig. 5.

As will be more fully understood from the description of Figs. 8 to 11, inclusive, the shell 10 is formed of two complementary half-sections having their margins sealed together. There is thus extending around the capsules a juncture line between the two half-sections. When the capsules are properly and accurately made this sealing line is hardly noticeable. In the drawings, it is referred to as 20. It is evident in Fig. 2. If the modifications in Figs. 3, 4 and 5 are viewed from the side the sealing line would be evident as in Fig. 2. It should be noted that the neck portions 16 and the two lobes are each formed from the complementary half-sections of the capsules. In other words, the sealing line 20 passes around the lobes in their plane rather than between the two lobes perpendicular to their plane. This is an extremely important consideration. The fabrication of the capsule with the seam in the plane of the lobes is at once practical and simple and does not involve complicated dies and additional functions for the capsulating machines as compared to what would be required if the seam ran between the lobes. As a result, a capsule of the character illustrated herein can be formed and filled in one step in contradistinction to any method involving the separate forming of two half-shells, cementing the same together and then filling the interior thereof with material.

An important feature contributing to the strength of the capsule is the provision of the relatively narrow neck 16. The neck portion functions to reduce the strain on the lobe portion of the shell produced by the pressure of the content material exerted on the base of the juncture of the two lobes. This is true at the time of the formation of the capsule as well as afterwards while the shell is drying and contracting.

The provision of the neck 16 and the location of the seam line in the plane of the lobes increases the resistance of the shell to premature bursting, especially in the critical area between the lobes.

Figs. 6 and 7 illustrate the preferred way of opening these capsules. The two projections or lobes are grasped between the fingers of the two hands and a force exerted pulling them apart. This will either cause the capsule to split between the projections or cause one of the projections to tear off. Either occurrence will give a satisfactory opening for discharging the contents of the capsule. If a projection is torn off it may be thrown away. After this operation, the main body portion is gripped between the thumb and forefinger of one hand and squeezed to eject the contents through the opening as shown in Fig. 7. It is not necessary to use an instrument to open the capsule. At no time do the fingers come into contact with the content material. Moreover, since no pressure is exerted in the main body portion 14 during the opening operation, little if any content material will exude from the opening. This is contrary to the previous type of similar capsules where it was necessary to grasp the body of the capsule with the fingers of one hand to open the shell. A messy operation is thereby avoided.

The capsules may be formed and filled according to any conventional practice. They may be formed by the plate process wherein two die members having a plurality of complementary cavities therein are brought into engagement on opposite sides of gelatin sheets between which is deposited filler material and pressed together to form the capsules. Or they may be formed by the continuous rotary die process illustrated in the patent to Robert P. Scherer No. 1,970,396. In either case the individual dies for each capsule are substantially the same, although in the plate process the surface of each die will be flat and in the rotary process the surface will have a curvature, the center of which is the center of rotation of the rotary die.

Figs. 8 and 9 illustrate the process of forming the capsule shown in Figs. 1 and 2. Two complementary dies are used. The main body portion of the capsule is formed in the wide and deep cavity sections 30 of the two dies. A vent 32 opens into each cavity. The depth of the cavity provides room for the lateral dimension of the capsule. The neck and the two lobes are formed by providing a subsidiary cavity 34 leading from the main cavity and terminating in two small cavities 36—36. These correspond in shape to the neck 16 and lobes 18—18 respectively of the capsule illustrated in Figs. 1 and 2. The depth of the subsidiary cavity 34 and the smaller cavities 36—36 may be less than the main body cavity 30 because the reduced width of the die cavities at these points will not allow as much shell material to sag as in the main cavity.

It is to be noted from Fig. 9 that the die cavities do not themselves give the complete finished shape to the capsule. The dies give only a two-dimension outline, not a three dimensional form. Form is given the capsule by inflation while the two half shells of the capsule are held together about their equator. The third dimension of the dies (depth) is a clearance dimension.

The neck 16 as heretofore described serves an important function in reducing the strain on the seam line around the two lobes caused by the internal pressure. The length of the neck may be varied and, if desired, may be reduced to a

negligible amount. In certain instances this is possible without too great sacrifice in the resistance of the shell to internal pressures. Figures 12 to 17 and 24 to 26 inclusive illustrate various types of capsules in which the neck portion has been reduced until the capsule consists of the main body portion and the two projections or lobes separated from one another by little if any constriction of the capsule. As in the previously described modification, the lobes extend generally side-by-side and are used to open the capsule in the manner illustrated in Figs. 6 and 7.

Referring to Figs. 12 to 17, the main body portion of the capsule in Figs. 12 and 13 is indicated at 40. Projecting therefrom are the two lobes 42—42. The lobes are in open communication with the main body portion. From the side view in Fig. 13 it is evident that the lobes have a width from front to back side which is less than the main body portion. There is a slight constriction of the capsule in this figure at the juncture of the lobes with the main body 40 which may be considered as a neck. To open the capsule, the lobes 42—42 are grasped by the fingers of the hands and pulled apart as illustrated in Fig. 6. This will rupture the capsule at the crotch between the lobes. The contents of the capsule may then be dispensed by squeezing the body of the capsule as in Fig. 7.

Figs. 18 and 19 illustrate the form of one of the two complementary dies for making the capsule of Figs. 12 and 13. The cavity 44 of the die is equal in depth throughout, including the lobe sections, although this is not necessarily so. Extending longitudinally in from one end of the cavity of each die is a wall 46. As in the previously described die structures, walls or ledges 48 project above the surface of the die around the cavity. In this instance the inside wall 46 extends to the same height as the ledges 48. It will register with a like element on the mating die cutting through the capsule shell material, resulting in the formation of the two lobes 42—42. As in the forms previously described, the seam or sealing line extends around the lobes in their plane.

Figs. 14 and 15 illustrate a capsule like that shown in Figs. 12 and 13 but modified by the provision of walls 50 which separate the interiors of the two lobes 42—42 from the interior of the main body portion 40 and prevents the filler content material from entering the lobes. As a result of the provision of this wall, the capsule is relatively thin at the point of connection of the lobes 42 to the body 40 in Fig. 15 and the lobes are uninflated as shown. The operation of opening the capsule and emptying its contents is the same as that previously described.

The cooperating die structures for forming the capsules of Figs. 14 and 15 are similar to that illustrated in Figs. 18 and 19 except that a transverse wall 52 is provided which extends across the cavity of each die at the inner end of wall 46. Wall 52 as shown in Fig. 21 does not extend quite as high as the wall 46 and the ledges 48 but high enough to force the content material to one side or the other at the time of the formation of the capsule so that nothing but shell material remains between the walls 52 of the complementary dies. The result is that the two lobes are separated from the main body sections by a wall of shell material which serves to connect the two together.

In Figs. 16 and 17 the lobes 54—54 are connected directly to the main body portion 56 of the cap-

sule. That is to say, there is no thinning of the capsule structure at the juncture of the lobes to the main body to form a neck. The transverse dimensions of the lobes are approximately the same in all directions including their connections to the main body portion. The seal or seam 58 in this capsule, as in all the other embodiments of the invention, extends around the lobes in their plane. The process of opening and dispensing the content material is the same as previously described.

Figs. 22 and 23 illustrate the die structure for making the capsule of Figs. 16 and 17. The main cavity of the dies is indicated at 59. Two small parallel extending cavities 60—60 form the lobes 54—54. They are relatively shallow as indicated in the sectional view in Fig. 23.

The capsule design illustrated in Figs. 24, 25 and 26 is similar to that shown in Figs. 16 and 17 but showing the provision of the lobes to a capsule body of general cylindrical shape. The cylindrical main body is indicated at 62. Projecting from one end thereof are two lobes 64—64. These lobes are shown as hollow and as enclosing content material. They may, however, be solid as in Figure 3. As in the previously described modifications the seam or sealing line extends around the lobes in their plane as is evident in Figs. 25 and 26.

What I claim:

1. A capsule having a shell formed of two complementary half sections joined together along a seam line, said capsule having two integrally formed projections lying in the plane of the seam line extending from the sides of the capsule sufficient distances to be grasped by the fingers of the hands and pulled away from one another.

2. A capsule having a shell formed of two complementary half sections joined together along a seam line, said capsule having two integrally formed hollow lobes lying in the plane of the seam line extending from the sides of the capsule sufficient distances to be grasped by the fingers of the hands and pulled away from one another.

3. A capsule having a shell formed of two complementary half sections joined together along a seam line, said capsule having two integrally formed solid lobes lying in the plane of the seam line extending from the sides of the capsule sufficient distances to be grasped by the fingers of the hands and pulled away from one another.

4. A capsule having a shell formed of two complementary half sections sealed together on a line extending around the capsule, said capsule having two lobes projecting from the capsule in side-by-side relation and in the plane of the sealing line.

5. A capsule having a shell formed of two complementary half sections sealed together on a line extending around the capsule, two lobes projecting from said capsule in side-by-side relationship and capable of readily being pulled apart to form a discharge opening, said lobes lying in the plane of the sealing line with the sealing line extending around each lobe.

6. A capsule body comprising a shell enclosing content material, said shell formed of two complementary half-sections sealed together along a line of juncture, each half-section provided with two projections disposed side-by-side and adapted when joined to a corresponding set of projections on the other half section to form two lobes capable of being pulled apart to expose the contents of the shell.

7. A capsule body comprising a shell formed of material adapted to permit collapsing thereof and enclosing content material, said shell formed

of two complementary half-sections, each half-section including the half-section of the main body portion and a narrow neck portion terminating in a pair of lobes, said complementary half-sections including the neck and body portions having their marginal portions sealed together around content substance.

8. A capsule comprising a shell, content mate-

5 rial enclosed thereby, and two lobes projecting from one side of the capsule in side-by-side relationship, said shell formed of two complementary half-sections having their margins sealed together about the content material, said marginal seal extending around the capsule and around the two lobes in the plane thereof.

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