

Dec. 24, 1940.

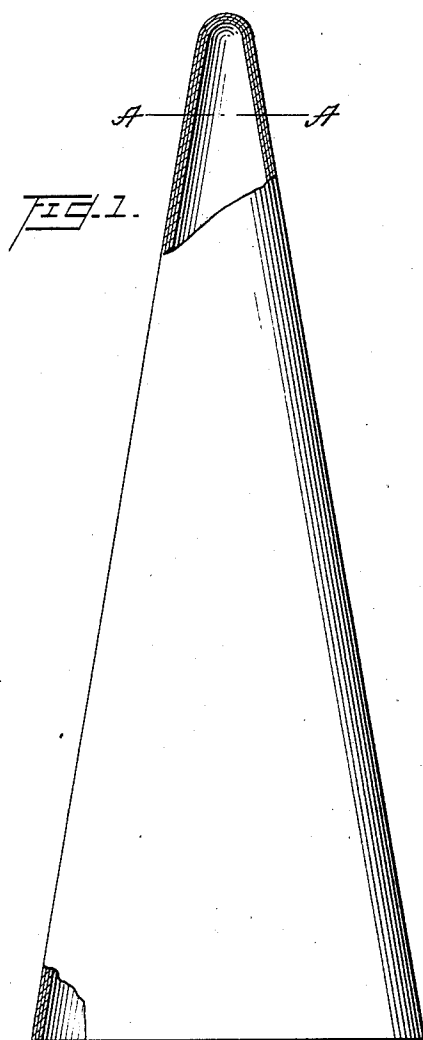
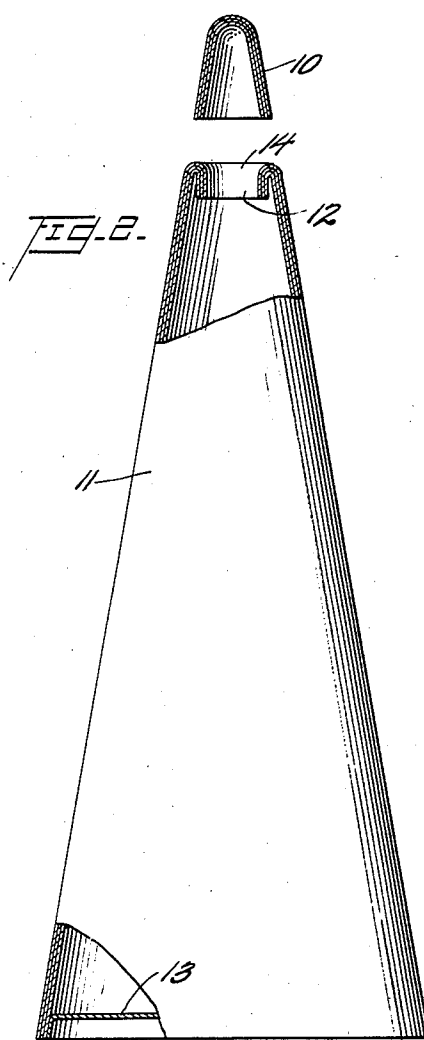
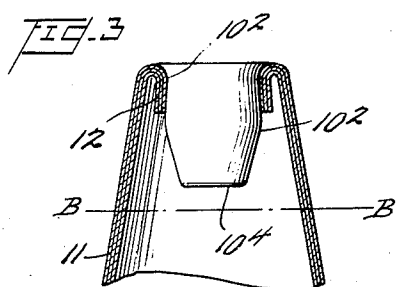
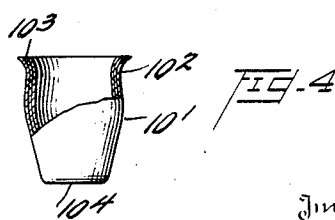
C. K. DUNLAP

2,225,624

CONTAINER

Filed June 3, 1938

2 Sheets-Sheet 1



Inventor

Charles K. Dunlap,

San Mateo, Cal., Grindle & Watson

Attorney

Dec. 24, 1940.

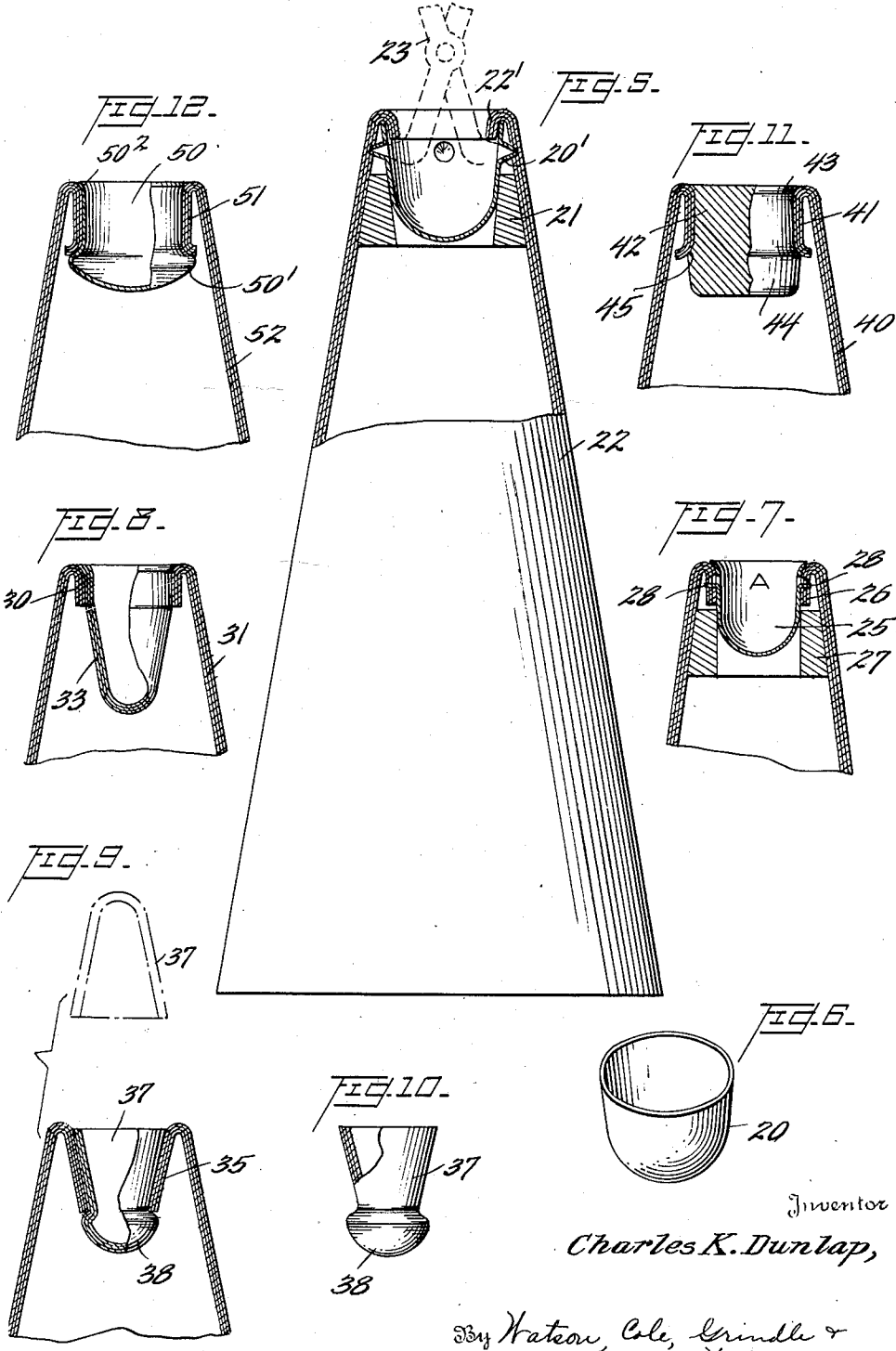
C. K. DUNLAP

2,225,624

CONTAINER

Filed June 3, 1938

2 Sheets-Sheet 2



Inventor
Charles K. Dunlap,

By Watson, Cole, Grindle &
Watson
Attorney

UNITED STATES PATENT OFFICE

2,225,624

CONTAINER

Charles K. Dunlap, Hartsville, S. C., assignor to
Sonoco Products Company, Hartsville, S. C., a
corporation of South Carolina

Application June 3, 1938, Serial No. 211,686

4 Claims. (Cl. 229—5.5)

This invention relates to containers, and its purpose is to provide a simple, durable, and inexpensive container of the conical type fabricated wholly of paper and well adapted for the economical packaging, transportation, and dispensing of commodities of many varieties, more especially, liquids, such for instance as lubricating oils.

It has heretofore been suggested that containers for liquids and plastics might advantageously be made conical in form so that the container itself, after its small end or apex is opened, comprises a pouring funnel by means of which its contents may be conveniently discharged. It has likewise been proposed that containers of the conical type may be fabricated of paper. Nevertheless, conical paper containers have not heretofore been widely used, and liquid commodities such as lubricating oils are now commonly packaged in metal cans or dispensed in glass bottles of various kinds. One difficulty heretofore met with in the manufacture of conical paper containers has been to provide a satisfactory apex or small end construction sufficiently durable to withstand mechanical shock and abrasion, such for instance as when the container is dropped so that this end strikes a solid object, and which will not permit leakage to occur at any point despite rough handling or storage for long periods of time. Prior containers of the specified type have generally been so constructed that bottom charging is necessary, the apex or small end being wholly closed and, inasmuch as it is less convenient to charge a conical container through its larger end and thereafter to affix to the container body a relatively large bottom member than it is to charge the container through its small end, this has further tended to lessen the popularity of the conical paper container.

In accordance with the present invention, a conical paper container is provided which is so designed and constructed that the charging aperture is located at its apex or small end, the bottom closure being affixed prior to charging. This is made possible by the use of novel means for effecting an inexpensive but wholly liquid-tight sealing of the small end of the container, after charging. The invention contemplates various forms of such seals, all of which will be hereinafter described, and are illustrated in the accompanying drawings.

It may be stated, however, that in the preferred form of the invention the container comprises but three portions, the frusto-conical body

with charging opening at its apex or small end, a stopper or plug for said opening, and a bottom closure, and further that all of these parts are fabricated of paper. In fact, in this preferred form the plug or stopper comprises the extreme tip or apex of the cone from which the container body is fabricated, this tip being severed after the initial formation of the conical body and thereafter shaped so as to form a stopper which is more especially suited for its intended use. The bottom may comprise a simple flanged circular disc. In other embodiments of the invention a wooden or metallic plug or stopper may be made use of, but it is preferred, as has previously been pointed out, that the stopper shall be of paper and furthermore that it shall be fabricated from the tip of the original cone in order that the cost of production shall be minimized.

In the drawings,

Figure 1 shows in side elevation, with portions broken away, a paper cone to be subsequently fabricated into the frusto-conical body portion of the container and the stopper therefor;

Figure 2 shows in side elevation, partially broken away, the container body after formation of the charging opening and after application of the bottom, the severed tip of the cone being shown in axial section in this figure;

Figure 3 shows partially in elevation and partially broken away the severed tip of the cone after it has been shaped so that it will be more suitable for use as a plug or stopper;

Figure 4 is an axial section through the nose or small end of the completed container showing the plug or stopper in position;

Figure 5 is a view, partially in elevation and partially in section, through a conical paper container with a different type of seal at its small end;

Figure 6 is a perspective view of the principal sealing member which is employed in a sealing construction such as shown in Figure 5;

Figures 7, 8, and 9 are axial sections through the apices of conical containers of the general type shown in Figures 1, 2 and 5, but in which further forms of sealing means are employed, respectively;

Figure 10 shows in side elevation, partially broken away, the plug or stopper member illustrated in Figure 9; and

Figures 11 and 12 are additional sections through the apices of conical containers disclosing additional types or forms of plugs or stoppers.

As an initial operation in the manufacture of the container, and quite regardless of the spe-

cific type of seal which is to be made use of as a closure for its charging aperture, a paper cone is first formed, such for instance as that which is illustrated in Figure 1 of the drawings. This cone is formed by winding upon a conical mandrel a blank of such length and shape that the wall of the resultant cone is two or more plies in thickness, these plies or thicknesses of paper being firmly held together by an adhesive which is applied to the blank just prior to the winding operation. Subsequent to the winding operation, the conical paper member is removed from the winding mandrel and its nose or apex pressed against a rapidly rotating die, the effect of which is to inwardly deflect the annular edge of the cone at its small end and to round and close this end and polish its exterior surface, the cone shown in Figure 2 having had its small end completely closed in the manner and by the means just described.

The tip of the cone is then severed from the remainder thereof, by a cutting operation, preferably while the cone is on a supporting mandrel, the cutting tool acting in a plane normal to the axis of the cone, for instance a plane including the line A—A of Figure 1. The severed tip is indicated at 10 in Figure 2 and the body of the cone at 11, this body after the performance of only one further operation thereon, comprising the body of the completed container. This further operation consists in inwardly deflecting the frusto-conical edge of the cone at its small end so as to form from this edge the intumed cylindrical flange 12. This operation may be carried out in various ways, but I prefer to press the small end of the cone, after severance of the tip 10, against a rapidly rotating die which is so shaped that the inturning operation is effected gradually as the cone body is moved axially against the die. The bottom, indicated at 13, may be of any suitable type and may include one or more bottom members applied at any time, that is, either before or after the formation of flange 12. Conveniently it comprises a flanged disc, the peripheral flange of which closely engages the conical inner surface of the container body 11 and is secured thereto by a suitable adhesive.

The cylindrical inner surface of the flange 12 comprises a seating surface for the stopper or plug and at its upper end this cylindrical surface merges with a surface which is circularly curved in all planes including the axis of the container, this polished, curved surface, which is indicated at 14, comprising the upper end surface of the completed container. Prior to the insertion of the tip 10 into the opening defined by the flange 12, however, this top is subjected to a moderate shaping operation, the primary purpose of which is to diametrically enlarge it at an intermediate point so as to form what may be designated an enlarged intermediate portion or gently curved rib such as indicated at 10' in Figure 3. Forwardly of the enlarged section 10', the tip tapers slightly as shown in Figure 3, and upwardly or rearwardly of this section of enlarged diameter the tip is slightly grooved, as indicated at 10². The extreme upper or rearward end of the tip is outwardly flaring, as indicated at 10³ and its closed end is preferably flattened as indicated at 10⁴. All this may be done at one operation by placing the tip upon a suitably shaped mandrel, rotating the mandrel rapidly, and pressing against the exterior surface of the tip suitable shaping tools. The operation, however, is not sufficiently

severe to substantially detract from the strength of the tip although it is rendered, by this working operation, somewhat more pliable, in fact is so shaped and so treated that its enlarged intermediate section 10' may be radially compressed to a minor extent.

After the completion of this tip shaping operation, it may be used as a stopper or plug for the container, being thrust into the opening in the top of the container, after the container has been charged, so as to occupy the position in which it is shown in Figure 4. As it passes into this charging opening, its enlarged intermediate section 10' will be slightly diametrically compressed so that after this portion of the stopper has passed the stopper seat flange 12, it may thereafter slightly expand. The effect is to maintain the outer surface of the stopper in close engagement with the inner surface of the stopper seat flange so that there will be no tendency for the stopper to separate from the flange or become loose.

Naturally the container body 11, bottom 13, and stopper or plug member 10 are suitably coated with a liquid-proofing substance prior to the time that the container is charged with a liquid, and preferably this liquid-proofing substance is of adhesive nature so that, if the stopper 10 is carefully coated with such substance just prior to insertion, it will be tightly secured in position by the coating substance after such substance has dried. Thereafter the stopper may not be removed unless it is destroyed. In order to open the container to permit discharge of its contents, the stopper may actually be destroyed by the insertion of a tool into and through its hollow interior, but preferably the entire small end of the container is removed by a cutting operation, for instance along the line B—B, Figure 4. After this has been done, its contents may be freely poured and the container body will serve as a funnel whereby the liquid may be poured into a restricted aperture.

Other sealing means for the charging opening may be employed if desired, and in Figures 5 to 10 various such other seals are illustrated. In Figure 6 a cup-shaped sealing member of ductile metal is indicated at 20. This member is inserted into the small end of a container after the tip of the container has been removed and the container charged, the outer surface of member 20 closely engaging the frusto-conical inner surface of a supporting ring 21, preferably formed of compressed paper and suitably secured, as by an adhesive, to the inner surface of the container body 22. After the introduction of the sealing member 20, the upper edge of the container wall is inwardly and downwardly turned, as indicated at 22' in Figure 5, so as to engage and closely confine the upper edge of the sealing member. Thereafter a suitable tool, such as indicated diagrammatically at 23, may be inserted and so operated as to deflect outwardly portions, such as indicated at 20', of the sealing member 20. Portions 20' may be in the nature of pointed projections which may penetrate into the body 22 of the container, as shown in Figure 5, thus serving to anchor the sealing member firmly to the container.

In the form of the invention shown in Figure 7 a similar sealing member 25 of ductile metal is inserted after the upper margin or edge of the container body has been inwardly deflected to the position indicated at 26 so that the outer surface of the sealing member 25 closely engages the

inner surface of this inturned flange. The outer surface of the sealing member 25 likewise seats against a compressed paper ring 27, secured to the inner wall of the container adjacent its small end by a suitable adhesive. Finally, by means of a suitable tool, small portions of the sealing member 25, such as portions 28, may be outwardly deflected and pressed into the inturned flange 26, thus securely anchoring the sealing member in position.

In Figure 8, a form of container seal is illustrated in which the stopper or plug comprises the severed tip of the container substantially in its original form, the outer surface of this tip closely engaging the inner surface of the inturned flange 30 of the body 31. Its larger end, however, is rolled into substantially cylindrical shape and a terminal flange formed thereon prior to assembly with the container body. It will be understood that both the body 31 and the tip 33, which comprises the stopper or plug, are suitably coated with a liquid-proofing substance and that the tip and flange are secured together either by this substance, an additional adhesive, or by mechanical means.

A generally similar form of the invention is indicated in Figure 9, but in this case the inturned flange 35 of the container 36 is not cylindrical, but in fact frusto-conical. Likewise, the paper tip 37 is acted upon prior to insertion by suitable shaping tools so that an enlarged head 38 is formed thereon. This head portion 38 is slightly compressible laterally and the inwardly deflected flange 35 is slightly expansible by reason of the working which it receives by the tool which turns it inwardly, so that the tip may be readily forced into the position in which it is shown, and thereafter the flange 35 will contract and the head 38 of the stopper expand, the parts thus assuming the positions in which they are shown in Figure 9 and being positively locked together.

In the form of the invention shown in Figure 11, the paper body 40 of the container is acted upon by a suitable die and its upper margin or edge inwardly deflected to form the generally cylindrical flange 41. A wooden plug 42 comprises a stopper, this plug having an annular rib 43 projecting outwardly at one end and an enlarged tapered portion 44 at its other end, the inner end of which portion in reality comprises a shoulder or rib 45. As the plug is inserted the generally cylindrical flange 41 of the container is expanded by the leading end 44 of the plug and thereafter contracts to engage the surface of the plug intermediate the ribs 43 and 45. In this case, likewise, a suitable adhesive substance is employed to secure, when dry, the outer surface of the closure plug to the inner surface of the generally cylindrical flange 41.

In the form of the invention shown in Figure 12, a metallic sealing member 50 is employed, which, prior to insertion into the opening defined by the flange 51 of the container body 52, is of generally cylindrical shape with a rounded end, having substantially the same shape as the sealing member illustrated in Figure 6 of the draw-

ings. After insertion into the container, however, its inner or closed end is acted upon by means of a suitable tool and outwardly expanded so as to form the annular rib portion 50', which underlies the lower end of the flange 51 of the container and hence prevents removal of the sealing member. Its upper edge or margin, indicated at 50², is likewise outwardly deflected before or after insertion, as by a spinning operation, to closely engage the flange 51 at its outwardly curved upper end so that the sealing member 50 is held against movement into the container.

In all forms of the invention a seal is provided which effectively prevents leakage of liquid and which may not be tampered with or removed without either injury to the seal or injury to the container wall or container flange. Hence removal of the seal for the purpose of unauthorized substitution for the original contents of the containers of a liquid of inferior quality cannot be accomplished without detection.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A paper container comprising a frusto-conical paper body having an axial aperture at its small end, a substantially vertical inner seating area adjacent said aperture, and a ductile metal cup-shaped sealing member closing said aperture and engaging said seating area, the substantially vertical walls of said container body being provided adjacent the aperture with an inwardly and downwardly turned flange which overlies and confines the upper edge of the sealing member.

2. A paper container comprising a frusto-conical paper body having an axial aperture at its small end, a seating ring secured within the container adjacent said aperture, a ductile metal cup-shaped sealing member closing said aperture and engaging said seating ring, radially projecting portions on said sealing member interlocking with the body adjacent said aperture and thereby preventing dislodgement of said member.

3. A paper container comprising a frusto-conical paper body having an axial aperture at its small end, a seating area adjacent said aperture, and a ductile metal cup-shaped sealing member closing said aperture and engaging said seating area, discontinuous, radially projecting, burr-like portions struck from said metal closure member and penetrating the surface of the body adjacent said aperture to prevent dislodgement of said closure member.

4. The method of fabricating a paper container which comprises, forming a paper cone having an axial charging aperture at its small end, inserting a cup-shaped sealing member of ductile material into said aperture, forming an in-turned flange on said cone adjacent said aperture, striking a plurality of burrs from the interior of said member outwardly to penetrate the material of said cone to prevent withdrawal of said member without destruction of the member or said cone.

CHARLES K. DUNLAP.