Nov. 1, 1966 G. T. TRACY 3,282,476

COMBINATION CAPTIVE CLOSURE AND POURING TUBE

Filed Feb. 8, 1965

Fig. 1

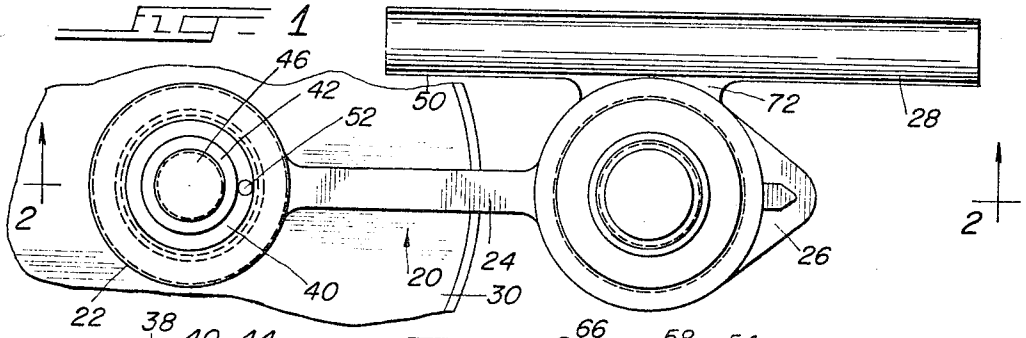


Fig. 2

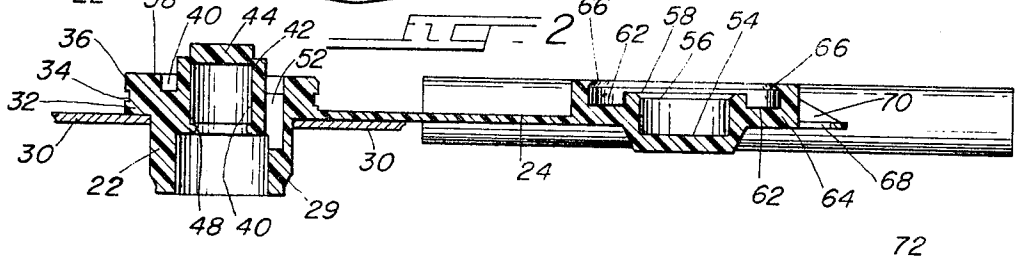


Fig. 3

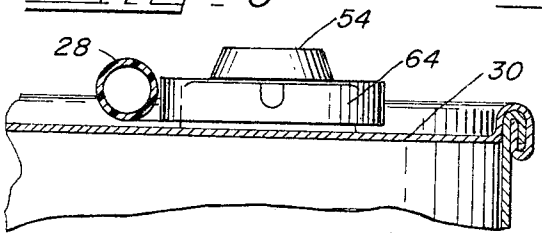


Fig. 5

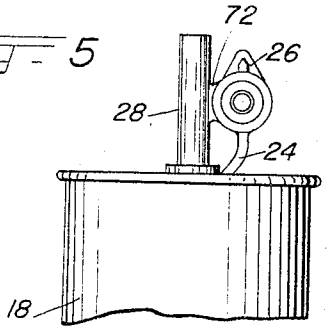
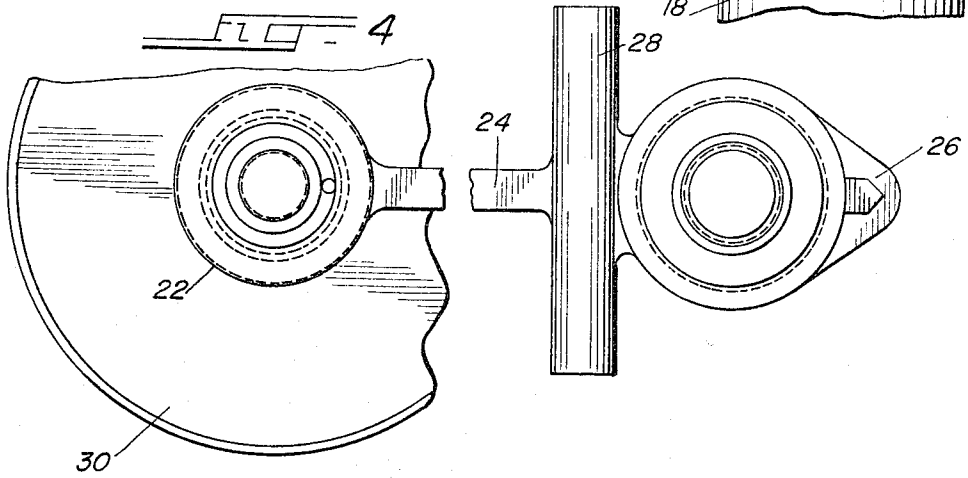


Fig. 4



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COMBINATION CAPTIVE CLOSURE AND POURING TUBE

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The present invention relates to a can closure, and particularly to a combination cap and pouring tube assembly which is designed for use with an ordinary tin can. The invention also provides a combination cap and pouring tube assembly which additionally provides a reclosable cap, an air vent, and a tamper-proof feature to protect the integrity of the container and contents before sale thereof.

There are presently on the market a large variety of products which have greatly diverse handling requirements, and which nonetheless have many handling and storage requirements in common. Thus, for example, the ordinary tin can, which is an extremely common commodity, has a great number of advantages, including those of being able to provide, at a very reasonable cost, an air-tight seal, light-tightness, excellent strength, relative chemical inertness, and ease of packing, storing, and handling. Accordingly, tin cans are greatly preferred for many products which must withstand relatively rugged handling and shipment over great distances or relatively long periods of storage.

There are likewise a number of products which, although ideally suited for storage, protection, and transport in tin cans, are not ideally suited to be dispensed therefrom in an ordinary manner, that is, by pouring the contents from a cut or fracture in the top end thereof.

For example, a product such as automotive or aircraft brake fluid, or like hydraulic fluid, is ideally stored and shipped in tin cans, but is not always most desirably dispensed therefrom, because, when use is made of such brake fluids and like hydraulic fluids, it is of extreme and often critical importance that such fluids or their ultimate containers, such as hydraulic cylinders, be kept clean and free of impurities and contamination during dispensing thereof.

In addition, brake fluid, such as that which is ordinarily sold in service stations and the like, is not usually required for use by the consumer in predictable or evenly measured quantities, inasmuch as it is normally added to a reserve or master cylinder upon demand, to replenish leakage or other loss, for example, and is not changed at regular intervals and supplied in specified and evenly measured quantities, as is motor oil, for example.

In addition, brake fluid is often supplied to reserve or master cylinders which are inaccessibly located, particularly on older model cars and on larger trucks, and other vehicles, such as aircraft, etc.

Furthermore, when a service station or line attendant desires to add brake fluid to a vehicle, it is desirable that the pouring container not contact the ordinarily dirty and contaminated outside surfaces surrounding the cylinder cap, with the likelihood of dislodging such undesirable matter into the brake system, entailing consequent risk of malfunction or ultimate failure of the hydraulic system.

It is also desirable that brake fluid and like hydraulic fluids be dispensed in a relatively small but smooth stream, so that the amount thereof may be relatively carefully regulated.

It is also desirable in dispensing fluids of this type that the dispenser thereof include a closure which will not be readily lost, and that the dispensing device be relatively simple and compact so as to avoid being unwieldy

and clumsy when sought to be manipulated in close quarters.

Accordingly, an ideal container for brake fluids and like hydraulic fluids is a container which has all the advantages of economy and simplicity of the tin can, but which further includes, consistently with such advantages, a captive closure which will not be lost, which affords a tight seal, and preferably a tamper-proof feature or initial seal, and which closure, in use, presents a low profile to facilitate storing and stacking of a plurality of containers having such closures. Additionally, the combination can and closure unit desirably provides a pouring tube or spout of at least moderate length, and of a general configuration such that the tube will reach locations which are relatively inaccessible to a cone top can, for example. Moreover, the combination can and closure is designed so as to be easily manipulated in confined quarters, to allow pouring of a smooth liquid stream therefrom, and to allow ready resealing between uses, but the cost of the entire combination can and closure unit is low enough to allow discarding after use. Such a closure may also readily be permanently inserted in a can end by the use of existing equipment.

The present invention therefore provides a novel and simple combination captive closure and pouring spout unit especially adapted for use with a tin can containing brake fluid and like hydraulic fluids, and has a number of advantages, including those referred to above, and others which are inherent in the invention. These and other advantages of the present invention, including the aforesaid inherent advantages, will become more apparent when considered in conjunction with the description of the preferred embodiments of the invention, as referred to in the specification and claims herein, and as shown in the drawings in which like numerals represent corresponding parts throughout and in which:

FIG. 1 is a top plan view of the combination closure and spout unit of the present invention;

FIG. 2 is a vertical sectional view of the closure and spout unit of the present invention, taken along line 2—2 of FIG. 1;

FIG. 3 is a vertical sectional view taken along line 3—3 of FIG. 1 and showing a front view, of the combination closure of the present invention, in its closed position of use on top of a can;

FIG. 4 is a top plan view similar to FIG. 1, but showing a modified form of the invention.

FIG. 5 is a side elevational view showing the upper portion of a can and the closure unit in one position of use.

Referring now to the drawings in greater detail, there is shown generally in FIG. 1 a combination captive closure and pouring spout unit **20**, including four principal elements, namely a base element **22**, a web element **24**, a cap element **26**, and a pouring tube **28**. The unit **20** is designed to be inserted in a can end **30**.

A beveled or tapered surface **29** is included on the lower end of the base element **22**, to facilitate insertion of the base element **22** into the can end **30**. Downward movement of the base element **22** into the can end **30** is limited by the lower stop element **32**, which comprises a ring or bead. Above this stop element **32** is a cap retainer groove **34** in the form of a ring. Defining the upper surface of this cut **34** are a lower outer sealing surface **36** and an upper sealing surface **38**. These surfaces are adapted to receive complementary mating surfaces on the cap element **26**, in a manner to be described more fully hereinafter.

A further cap seal feature is provided in this embodiment of the present invention in the form of an upper sealing groove **40**, which includes an axially outer top surface **42**. A removable initial or factory seal **44** in the form of an integral plastic cover is shown, as in FIG. 2,

to be provided in this embodiment of the combination unit **20**. This seal **44** is adapted to be readily removed so as to provide access to the contents of the can, and, upon removal thereof, a smooth cylindrical central bore **46** is made accessible so that the pouring spout unit **28** may be received therein. The seal **44** may be much thinner than that shown in FIG. 2 for example, if desired. The central bore **46** may include a stop ring **48** or like member therein to prevent undue downward movement of the lower end **50** of the pouring spout **28**.

In addition to the above elements, the base unit **22** also includes a vent hole **52** disposed near an edge portion thereof. This vent hole **52** communicates with the lower portion of the central bore **46**, as shown in FIG. 2.

A second principal element of the combination unit **20** is the web element **24**, which is disposed between, and serves to connect, the base element **22** and the cap element **26**. As shown in FIGS. 1 and 4, this web element **24** is desirably relatively long, thin, and flexible, in order to allow the cap element **26** to stay clear of the opening **46** in use, and to allow the end **50** of the spout **28** to be readily inserted in the opening **46** when desired.

The cap element **26** is designed to sealingly engage the base element at the top portions thereof, to provide a liquid and vapor seal, and at the lower portions thereof, to mechanically hold the sealing surface engaged with one another. Therefore, surfaces complementary to those provided on the base member **24** are provided in the cap unit **26**, namely, a top seal **54**; a cylindrical inner surface **56**, terminating in a beveled edge **58**; an inner, lower projection **60**, to fit in the sealing groove **40**; an outer groove **62**; an a downwardly projecting flange **64**, terminating in an inwardly directed beveled edge **66**. The lower beveled edge **66** provides, in use, a wedging action in the cap retainer groove **34**, thus serving to urge the cap **26** tightly into engagement with the base **22**.

In addition, the cap element **26** includes a lifting tab **68**, and a stiffening rib **70** therefor, to aid in removal of the cap **26**. Additionally, in the embodiment shown in FIG. 1, the cap **26** includes an offset web **72** which serves to locate the pouring spout **28** and fixedly attach it to the cap **26**.

In the use of the combination captive closure and spout unit, the can or like container having the combination unit **20** placed in the can end **30** is packaged in the closed position, such as that shown in FIG. 3, wherein the cap unit **26** cover the base **22** and the pouring tube **30** lies in a flat position close to the can end **30** with the tube **28** extending about equally to the front and rear. Thus, as sold, shipped, and stored, the closure unit has a low profile, but all the parts are fixedly attached to the can.

When it is desired to use the contents of the container, the cap **26** is opened, such as to a position such as that shown in FIG. 2, and the factory seal **44** is removed therefrom. If this seal is in the form of a very thin membrane, which it may be, depending on the type of product used, and need merely be pierced and not entirely removed. After the seal **44** is removed, the inner or lower end **50** of the pouring tube **28** is inserted into the central bore **46** and pushed downwardly until it contacts the stop ring **48**. This position of use is illustrated in FIG. 5. Thereupon, the container is suited for use in pouring a small but steady stream of the contents thereof into desired location, which may, as stated above, be relatively cramped or confined quarters. It will be noted that the air passage **52** is constructed and arranged so as not to be sealed off by the insertion of the tube **28** into the bore **46**.

When the dispensing operation is completed, the tube **28** is removed from the bore **46** and the cap **26** is replaced over the base **22**. The beveled surfaces **58** help locate the cap in replacing it, and a plurality of sealing surfaces provided enable the cap to develop a tight mechanical sealing action which renders the cap relative impervious to liquid or vapor loss.

Another embodiment of the invention is illustrated in FIG. 4, wherein the pouring tube **28** is disposed perpendicularly to the strap **24**.

In another embodiment of the invention, particularly one similar to that shown in FIG. 4, the attachment of the tube **28** to the closure unit may be by means of heat sealing it to the web **24** rather than fastening it to the cap **26** by means of the web **72** shown in FIG. 1. In this manner, the tube **28** may be kept captively attached to the tap as long as this is desired, but tube **28** may also be more readily removed if it is merely heat healed or otherwise removably attached in use to the web or strap **24**.

The exact length of the tube **28** is not critical, although for liquid with relatively high surface tensions, a relatively longer length of tubing is desired to increase the effective height or "head" above the liquid body to facilitate smooth pouring from the container.

The length of the tube **28** is normally limited to the approximate diameter of the can end, but this is not a strict requirement of the invention.

The materials which are most advantageously used in construction of the combination unit of the present invention are plastics, such as for example a low density polyethylene, or an ethyl vinyl acrylate. If the tube **28** is made separately and designed to be removably attached to the unit, it may be made from nylon or other like plastic material differing from the materials of the other portions of the unit. Although these materials are not critical, their use is preferred because of economy. The exact plastics to be used are indicated in some cases by the chemical inertness or resistance desired depending on the contents of the container.

It will thus be seen that the present invention, as described above and as shown in the drawings, provides a safe, economical, and desirable combination captive closure and pouring tube having desirable advantages and characteristics including those hereinabove pointed out and others which are inherent in the invention. Certain modifications and changes will be apparent to those skilled in the art and I contemplate that such may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A combination captive closure and pouring spout unit for a tin can, comprising, in combination,

(a) a base member, including an axially oriented relatively large liquid passage disposed centrally thereof, and a relatively smaller air vent passage therein, said base member further including can end-receiving means, and a plurality of upper sealing surfaces adapted to sealingly receive a cap member containing complementary sealing surfaces,

(b) a flexible strap member attached to said base member,

(c) a cap member attached to said strap member, said cap member including means for sealing said air passage and said liquid passage and having sealing surfaces complementary to said upper sealing surfaces on said base member, and, attached to said cap member,

(d) a liquid pouring tube member adapted to be removably received in said central opening in said base member.

2. A combination unit as defined in claim **1** wherein said pouring tube is attached to said strap member and disposed transversely thereof.

3. A combination unit as defined in claim **1** wherein said pouring tube is removably attached to said cap member.

4. A combination unit as defined in claim 1 which additionally includes a rupturable seal member disposed over the top of said relatively large liquid passage.

5. A combination unit as defined in claim 1 in which all of said members comprise a stiff but resilient thermoplastic material.

6. A combination can and captive closure and pouring spout unit comprising, in combination, a closure and pouring spout unit as defined in claim 1 and, fixedly attached thereto in liquid-tight relation, a tin can having at least one end unit permanently seamed thereto, said end unit containing said closure and pouring spout unit.

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