

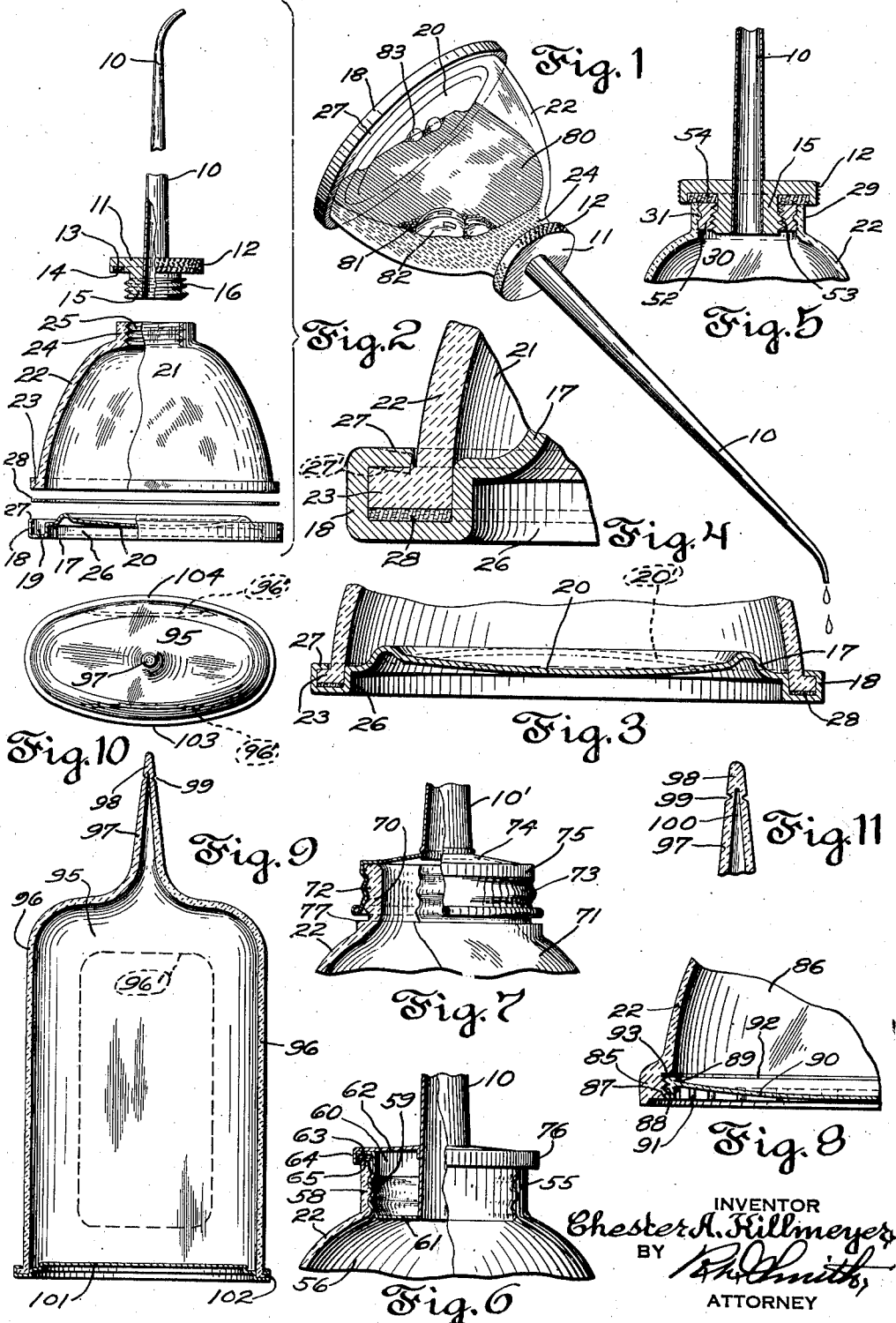
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HAND OILER FOR TESTING VISIBLE CONTENTS

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HAND OILER FOR TESTING VISIBLE
CONTENTS

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This invention relates to hand oilers or like portable dispensers of liquids designed to be held in the hand of the user and maneuvered into position for discharging controlled amounts of its contents at a desired point of application. The oil or other liquid is usually expelled through a spout in a succession of discharges caused by thumb or finger pressure against some part of the oiler. The invention further relates to transparent structure forming one or more parts of the oiler as an article of manufacture.

The hollow oil containing body of such devices has commonly been constructed with walls of thin opaque sheet metal. Such walls are easily dented and it is difficult to form a fluid tight assemblage thereof which can prevent outward seepage of the oil between the connected metal surfaces. A serious disadvantage of all metal hand oilers is the inability to see the contents.

Lubricating oils and other liquids commonly dispensed by hand oilers are of different grades and kinds. The inability to distinguish what color, grade or viscosity of liquid is contained in a particular oiler where several like oilers are in use at the same time, results in great loss of time and inconvenience, in that the spout of the oiler must be removed or a quantity of the oil must be expelled in order to know anything about the contents. By neither of these unsatisfactory methods of inspection can the desired facts concerning the contents be fully known. Color, for instance, cannot accurately be discerned except by rays of light shining through a body of the oil, while viscosity cannot be known except by some test such as observing the speed with which trapped air will rise as a bubble through some substantial height of liquid body.

To guard against damage such as would be caused by applying a cutting oil where a lubricating oil is needed, as for instance in lubricating a bearing, it is not sufficient to know the color alone, as the same color may exist in oils of greatly differing viscosity and viscosity may be the same in oils of widely differing color. These variables in the important characteristics of different oils in common use have for the most part been indistinguishable after the oil has been placed in a hand oiler, or so called "oil can", of the types heretofore known.

Further disadvantages in the use of all-metal hand oilers include the inability to know how nearly empty the oiler may be when it is to be carried to a job inconveniently distant from any supply for refilling it. The shake-and-guess

method must be resorted to, or else the spout must be removed for inspection.

These dangers and inconveniences have long been suffered in the use of hand oilers in part because of problems peculiar to this kind of device which have made it useless or unfeasible, prior to this invention, to introduce transparent material into its structure. Because of being brittle instead of tough at ordinary temperatures and because of being difficult to join in fluid tight contact with metal surfaces, glass does not lend itself desirably to this use. Glass will easily chip and break when an oiler is dropped or accidentally banged against some part of a machine or other hard object and it has many other disadvantages in the structure of a hand oiler. Also glass is not well adapted to withstand without breaking the strains resulting from metal bending assembly operations in which a body of glass is involved.

My present improvements in hand oilers provide a highly successful way of introducing transparency into the structure of the oiler and at the same time succeed both in strengthening the structure as a whole and reducing its cost to manufacture, while for the first time providing the kind of visibility of the contents of the oiler required to make possible an accurate knowledge of the color and viscosity. Also there may always be known by a mere glance at my improved oiler whether or not its contents need replenishing for whatever job of lubrication the oiler is to be used.

Contributing to these main objectives, the present improvements have as a further object the provision of a hand oiler with transparent structure, which consists of no greater number of parts and involves no more complexity than the common forms of all metal hand oilers known as "oil cans".

A further important object is to provide a hollow body having transparent walls of material which is so tough and resilient that it will not chip or break under the circumstances that glass would chip or break and to incorporate this body in a hand oiler so that said walls will encompass the chamber containing the oil in order that the effect of light rays shining through the whole body of contained oil may be clearly observed, and also in order that the speed of rise of trapped bubbles of air through the contained body of oil may be clearly observed. Related to the advantages of this ability of inspection is the ability to observe through the transparent walls the wave reaction, surface tension, sluggishness of flow and other physical behavior of the contained oil or

liquid as it responds to repeated disturbances of its body by a flexible diaphragm or other suitable means provided for expelling the oil from the oil-er.

5 A further object is to provide such hollow body in the form of an inverted cup-like shell of transparent material having thin walls suitably thickened and configured in certain portions to accommodate the assemblage therewith of a detach-
10 able oiler spout which may be of material similar to or different from that of the cup-like shell, and also suitably thickened and configured in other portions for accommodating the fluid tight assemblage therewith of a fixed or removable
15 floor wall which may be of material similar to or different from that of the cup-like shell. The floor wall and/or some wall of the cup-like shell may incorporate a resilient diaphragm portion which can repeatedly be flexed for expressing the contents of the oiler through the discharge spout.

20 A further object is to incorporate the principles of this invention in a form of hand oiler which may be merchandised with a sealed spout opening, requiring breakage of the original structure at some point before the oiler can be used
25 and thus providing in effect a "non-refillable" hand oiler.

30 Examples of different details of structure and parts in which the present invention may be embodied, and the foregoing and other advantages attained, are pointed out in the following description in which reference is had to the accompanying drawing, wherein:

35 Fig. 1 is a perspective view of a hand oiler with the spout directed downwardly for expelling oil, incorporating structure embodying one form of the present invention.

40 Fig. 2 is an exploded view of the separate parts of the hand oiler of Fig. 1 showing the spout broken away to contract its length, and the parts partly in central vertical section.

45 Fig. 3 is a fragmentary view in central vertical section showing the lower three parts of Fig. 2 assembled and drawn to a larger scale.

Fig. 4 is a still further enlarged fragmentary view in central vertical section of the parts appearing in Fig. 3 explanative of the assembly operation.

50 Fig. 5 shows a modification of the neck portion of the transparent body of Fig. 2 and its assemblage to the spout, the parts being shown in central vertical section.

55 Fig. 6 shows partly in central vertical section on an enlarged scale a still further modification of the upper neck portion of the transparent body assembled with a different form of spout.

60 Fig. 7 shows partly in central vertical section on a scale corresponding with Fig. 6 a still different modification of the upper neck portion of the transparent body assembled with a still different form of spout.

65 Fig. 8 shows in central vertical section on a scale similar to Fig. 3 a modified construction in which the floor diaphragm of the hand oiler is removably assembled with the transparent body forming the oil chamber and of like material.

Fig. 9 shows a central vertical section through a modified form of non-refillable hand oiler embodying the present improvements.

70 Fig. 10 is a plan view looking downwardly upon the complete form of modified oiler of Fig. 9.

Fig. 11 is an enlarged fragmentary detail of the breakable tip of the spout in the modified hand oiler of Figs. 9 and 10.

75 In Figs. 1 to 4 inclusive, a conventional form

of spout is composed of the tapered hollow spout tube 10 sweated or otherwise secured in a corresponding opening in the mounting cap 11 here shown as having the knurled periphery 12, an annular groove 13 for holding a ring gasket 14, and the plug extension 15 carrying external threads 16.

A suitable floor wall for the hand oiler is afforded by the part 17 which may be spun or formed in a drawing die from thin and preferably resilient sheet metal or tempered to make it resilient after it is formed. Part 17 may be circular, oval, or of other shape in plan view, its peripheral rim 18 bordering and helping to form the peripherally continuous groove 19 of continuous annular extent, centrally of which is located the resilient, flexible diaphragm 20 of circular or other suitably shaped area, which by finger pressure may be distorted to its broken line position 20' in Fig. 3 without exceeding its elastic limit so that upon release, it will automatically restore itself to the full line position.

The inverted cup-like body 21 is made of transparent material. In the preferred form of my invention, it is molded and composed of cellulose acetate composition of great toughness and strength in resistance to impact. Preferably a molding composition is chosen which contains a combination of cellulose with acetic acid which, while resulting in an amorphous substance when molded, is far less brittle than glass at corresponding temperatures. One such material at present available is commercially known as Tenite. Other thermoplastics may be employed including phenol and urear plastics. The preferred material in addition to being transparent will have a horn-like toughness, uniform texture, and high luster in addition to its physical characteristics before mentioned. It will also have a degree of resilience for purposes hereinafter explained. While I do not exclude glass from the possibilities of use for embodying some of the principles of these improvements, their fuller advantages require the use of a transparent material differing from glass in one or more of the aspects described.

The body 21 includes space encompassing walls 22 which I find it feasible to make as thin as one-sixteenth of an inch but which may be made thicker at will. At the bottom open end of body 21 the walls 22 are thickened to provide the peripheral flange 23 which may be circular, oval, or of other encompassing shape to accord with the groove 19 and of a size to fit snugly therein. At the top of body 21 the walls 22 preferably converge toward a central point to form a dome-like roof and are thereat thickened to provide the projecting neck 24 having the threaded aperture 25 adapted to receive the plug threads 16 of the mounting cap 11.

In assembling the parts which are shown separated in Fig. 2, the floor wall 17 may be seated in a suitable holding form (not shown) which for better support may have a projection fitting and occupying the shallow recess 26 of the floor wall under the diaphragm 20, while an annular flange setting tool is forced down against the uppermost lip 27 of the sheet metal rim 18 in a manner to bend this lip inwardly as at 27 in Figs. 3 and 4. Here the bent over portion 27 of rim 18 is seen to be pressed into firm contact with the upper surface of the flange 23 of the transparent molded body 21. In Fig. 4 the broken lines 27' indicate a step in this assembly process wherein the inwardly bent edge portion 27 of rim 18 is 75

forced downwardly so hard against the molded material of the transparent body 21 that the latter material is actually compressed, as permitted by its tough resilient nature. This permits the slight spring-back of the lip 27 when released by retraction of the setting tool to be followed by the return of body 21 automatically to its original shape after being so compressed. From these combined qualities and actions of the materials of which parts 17 and 21 are made, there results a permanent positive and fluid tight contact therebetween. The metal of the floor wall 17 within whose groove 19 the body flange 23 is thereby pocketed, is thus joined with the transparent material of body 21 in a manner to entirely prevent leakage and seepage of oil from the interior of the resulting container. While a gasket 28 which may be of material harder or softer than the transparent material of body 21 may be introduced between these parts at the bottom of groove 19, such if desired, may be omitted. When used I prefer to make it of hard fibre or of some impervious material.

In place of or in addition to the gasket 28 any suitable plastic filler or form of cement may be introduced at any point between the contiguous surfaces of the parts 17 and 21 within or near the groove 19 to act as a filler or seal to further insure the fluid tightness of the joints at this part of the structure. In ordinary circumstances such will not be required.

Fig. 5 shows a construction which I may introduce at the neck portion 29 of a modified form of transparent hollow body 30, otherwise similar to the body 21 of Figs. 1 to 4 inclusive, for strengthening this neck portion and making more durable the threads carried thereby. The sectional shapes shown in Fig. 5 are circularly continuous showing that the neck 29 is molded to provide an inside circumferential bead 31 having locking engagement with a corresponding peripheral groove in a brass ring 52 internally threaded at 53 to correspond with the threads 25 in Fig. 2. The ring 52 may be held as an insert in the molding die which produces the shape of the neck 29 so that no separate assembly of these two parts is necessary. For use with this modified construction of the neck portion of the oiler no modification of the spout tube 10 and mounting cap 11 of Fig. 2 is necessary although I may preferably increase the annular width of gasket 54 as compared with gasket 14 in order to provide a liquid sealing contact of greater area. The metal to metal contact of threads 16 and threads 53 will reduce any likelihood of "cross-threading" and destruction of the relatively fine threads in hurried or careless attempts to screw the plug 15 into the neck of the transparent container body.

Fig. 6 shows a further modification of the neck portion 55 of a transparent hollow body 56, otherwise similar to part 21 in Fig. 2, in which internal threads having round tops and bottoms take the place of sharp cornered machine screw types of threads shown in Figs. 2 and 5. The transparent material forming these threads 58 preferably produces a thickening of the wall of the neck portion 55 in comparison with the thickness of the space encompassing walls 22 of the transparent body 56 and is adapted for threaded engagement with rolled metallic threads 59 formed in a hollow shell 60 having the base wall 61 and the cover disc 62 both soldered or otherwise secured in fluid tight and fast relationship to the spout tube 10 so that liquid cannot enter

the closed space of annular shape within the shell 60 bordered by the threads 59, base wall 61, cover disc 62 and spout 10. A relatively soft gasket 63 may be retained within an annular seat or pocket formed by the rim 64 at the periphery of disc 62 to bear against the top edge 65 of the neck 55 of transparent material and this top edge may be slightly rounded for firm seating against the gasket 63.

Fig. 7 shows a still further modified construction in the neck portion 70 of a hollow body 71 of transparent material which may otherwise be similar to part 21 in Fig. 2. Here, threads having round bottoms and tops as indicated at 72 are formed around the outside peripheral surface of the neck 70 to receive the corresponding rolled threads 73 formed in the surrounding wall of a sheet metal cap 74 made fast in fluid tight relation to the spout tube 10 which in this case is crimped at its bottom end for making it mechanically fast to the cap 74. The periphery of cap 74 may be roughened at 75 for better finger grasp. The periphery of rim 64 in Fig. 6 may be correspondingly roughened for finger grasp at 76.

Referring particularly to Fig. 1, there is represented on the top surface of the oil or other liquid 80 small and large bubbles 81 and 82, respectively, from the appearance and action of which by the aid of light rays shining through the transparent walls 22 and through the body of liquid 80, itself, much can be known concerning the true color and viscosity characteristics of the contained body of oil or liquid. Additional bubbles are represented at 83 at a point where the surface of the liquid is in contact with the flexible diaphragm 20, which when operated by finger pressure will disturb the body of liquid at this point enabling the reactive performance thereof to be observed through the transparent walls 22. From observance of this reaction of the oil or liquid much can be known of its surface tension and sluggishness or liveliness of flow. All of these characteristics of the contained body of liquid are thus rendered visible both in static condition and while moving in response to mechanical disturbance, with the aid of light rays penetrating the body of liquid from all sides.

In Fig. 8 a modification of the bottom portion of the hand oiler of Figs. 1 to 4 inclusive is shown, whereby light may also be admitted to illuminate the body of liquid through the floor wall of the hand oiler. Here the flange 85 of a modified hollow transparent body 86, which may otherwise be like any of the forms of transparent body 21, 56, 71, or 30, is internally threaded at 87 to receive the external threads 88 on a removable ring 89 integral with a resilient, flexible diaphragm 90. Both the ring 89 and the diaphragm 90 may be made of the same material as the hollow body 86, which material has hereinbefore been explained to be tough and resilient and is thereby well suited to forming a transparent diaphragm capable of functioning as does the diaphragm 20 of Fig. 3. Also the parts 89 and 90 and/or the hollow body 86 may be made of metal and separably assembled by screw threads.

To afford grasp for a wrench or for fingers in screwing ring 89 into or out of the threads 87, spaced inwardly projecting lugs 91 may be formed about the inside of the ring 89. If desired a fluid sealing gasket 92 may be interposed between the

ring 89 and a shoulder 93 formed on the transparent body 86.

Figs. 9, 10 and 11 represent a form of my invention in which the hollow transparent body 95 has its space enclosing transparent walls 96 converging at the top and extending to form a tapering transparent spout 97 whose tip end 98 is closed as most plainly shown in Fig. 11 and notched at 99 to determine the point at which the tip end 98 may be broken off readily by the fingers of the user to open the dead end orifice 100 and provide an outlet passage for oil or liquid contained in the body 95. While I may cover the bottom or open end of the transparent body 95 with a floor wall incorporating a resilient metallic or transparent diaphragm such as parts 20 and 90 hereinbefore described, I prefer to provide a non-flexing floor wall 101 formed of sheet metal in a manner to assemble with the bottom edge flange 102 of the transparent walls 96 in the way parts 17 and 21 are assembled in Figs. 3 and 4. When a non-flexing floor wall is thus applied to the transparent body 95 the latter may be squeezed by thumb and finger pressure applied respectively at the points 103 and 104 in Fig. 10 which will have the effect of reducing the cubical capacity of the oiler and cause a portion of its contents to be expelled through the spout 97 after the tip end 98 has been broken off. This form of the invention becomes possible through the toughness and resilience of the transparent molded material which has been described and produces in effect a nonrefillable hand oiler. The flexing areas of walls 96 are roughly indicated by broken lines at 96' in Figs. 9 and 10.

In factory practice the hollow transparent body 95 may be filled while held in inverted position and before the floor wall 101 is applied. After filling and assembling with this floor wall, the contents can be dispensed from the oiler only by breaking off the spout tip 98. The break-off notch 99 must not so weaken the material of this tip as to render it liable to accidental breakage in factory handling or shipment, but should weaken it sufficiently to readily yield to purposeful finger pressure. As the only outlet from the oiler then becomes the minute orifice 100, and as it is difficult or impossible to cause liquid to enter the oiler through such a small opening for lack of opportunity for the confined air simultaneously to escape, the hand oiler of this form of my invention becomes virtually non-refillable except by altering its structure in some way that would destroy its ability to function as a hand oiler.

Further details of construction may be noted in the ability of the smoothly rounded top edge of neck 70 in the construction shown in Fig. 7 to form a liquid tight seat at its point of bearing against the under surface of cap 74 without the use of a gasket at this point. Also in Fig. 7 the transparent molded body 71 is provided with a sharp shoulder at 77 to coincide with a plane upon which diametrically retractable core dies (not shown) for molding threads 72 may slide in contact with the fixed mold walls (not shown) which impart the vertically unobstructive shape to the exterior of the hollow body 71 below this plane.

The shape of any of the transparent molded bodies 21, 30, 56, 71, 86 or 95, may be other than that shown, bell shapes and annularly terraced or shouldered shapes being common in the art of hand oilers, and in the larger sizes thereof helping to afford a convenient grasp for the hand of the user. In the actual sizes and shapes herein

shown, my improved form of oiler may easily be grasped by applying the index and second fingers of the hand to the converging sides of the transparent body in straddling relation to its neck portion and by applying the thumb against the floor diaphragm.

Many other departures from the exact forms and constructions herein shown may be resorted to for embodying the principles of this invention as taught by this disclosure and I therefore intend the language of the appended claims to include all fair equivalents of the materials, structures and combinations recited therein.

I claim:

1. A hand-oiler, comprising: a bottom-wall member formed of flexible sheet metal having a marginal outer portion thereof provided with a peripheral groove with radially-spaced inner and outer peripheral wall portions integrally united by an annular base-wall portion and having a central flexible diaphragm integrally formed with the inner peripheral wall portion of said groove at the upper edge thereof; and a body-side-wall member constructed of transparent resilient material having a markedly-lower modulus of volume elasticity than the sheet metal composing the bottom-wall member; the said body-side-wall member being provided with a peripheral flange constructed and arranged to snugly interfit with the inner, outer, and annular base-wall portions of the peripheral groove; the said marginal outer portion of the bottom-wall member having an intumed annular wall portion integrally formed with the outer peripheral wall portion of said groove at the top which is permanently set in depressed relation to the normal upper surface of said peripheral flange under a setting pressure applied to oppositely-disposed wall portions of said bottom-wall member.

2. A hand-oiler, comprising in combination: a body-side-wall member composed of transparent indurated pre-molded plastic material having a markedly-higher degree of resilience and compressibility than glass and provided at the bottom edge thereof with an outwardly-projecting peripheral flange; and a bottom-wall member constructed of resilient sheet metal and comprising a central flexible diaphragm provided around its outer edge with an integrally-formed vertical abutment-wall in circumferential engagement with the inner surface of the said body-side-wall member within and substantially coextensive with the vertical dimension of said peripheral flange and with a marginal outer portion extending outwardly from the bottom edge of said peripheral abutment-wall at the bottom of said peripheral flange; the said marginal outer portion of the bottom-wall member being folded upwardly into compressing engagement with the outer circumferential edge of the peripheral flange and flexed inwardly into compressing engagement with the top surface; the metal in and around the folds formed in the bottom-wall member being stressed beyond its elastic limit to impart a permanent set thereto in opposition to the stress-energy of the said peripheral flange.

3. A hand-oiler, comprising: a body-side-wall member constructed of transparent resiliently compressible synthetic resin and provided at the bottom edge thereof with an outwardly-presented peripheral flange; and a bottom-wall member integrally constructed of resilient sheet metal and comprising a central flexibly-resilient diaphragm provided with a seal-forming marginal portion having an inner peripheral wall portion in cir-

cumferential abutment with the inner surface of the body-side-wall member, an annular base-wall portion extending below and substantially coextensive with the said peripheral flange of the body-side-wall member, an outer peripheral rim extending around and in closely-contacting engagement with the outer periphery of said peripheral flange, and an inturned annular lip in engagement with the top surface of said peripheral flange; the said inturned annular lip being depressed into compressing relation to and below the top surface of the peripheral flange of the body-side-wall member around and adjacent to the exterior surface of the body-side-wall member to effect a permanently-set attachment of the seal-forming marginal portion of the bottom-wall member to the said peripheral flange.

4. A hand-oiler, comprising in combination: a body-side-wall member composed of transparent indurated pre-molded plastic material having a markedly-higher degree of compressibility within its elastic limit than glass and provided at the bottom edge thereof with an outwardly-projecting peripheral flange; and a bottom-wall member constructed of resilient sheet metal and having an outer marginal portion folded about the said peripheral flange in intimate circumferential engagement with the inner surface of the said body-side-wall member downwardly from the plane of the upper surface of said peripheral flange; with the bottom surface of said peripheral flange; with the outer circumferential edge of the peripheral flange; and with the top surface thereof around the outer surface of the said body-side-wall member; the said outer marginal portion of the bottom-wall member having the metal at and near the peripheral bends formed therein, permanently set under a pressure producing compression of the peripheral flange within its elastic limit to set up stress-energy tending to expand said flange within the folded marginal portion of the bottom-wall member.

5. A hand-oiler, comprising: a bottom-wall member constructed of resilient sheet metal pro-

viding a central flexible diaphragm and having an outer marginal portion folded to provide an upwardly-presented peripheral groove; and a body-side-wall member constructed of transparent compressible indurated plastic material having a bottom outwardly-presented peripheral flange snugly-interfitted with the walls of the said peripheral groove; the said members being united together with an oil-tight seal formed by a cold-working operation performed on the outer marginal portion of the bottom-wall member to compress the peripheral flange of the body-side-wall member within its elastic limit between oppositely-arranged wall portions of the bottom-wall member.

6. A hand-oiler, comprising in combination: a body-side-wall member composed of a transparent resinoid substance of relatively-higher compressibility and provided exteriorly at the bottom thereof with an outwardly-projecting flange; and a bottom-wall member constructed of resilient sheet material of relatively-lower compressibility and substantially infrangible under a cold-working operation imparting a permanent set to folds formed therein, said bottom-wall member comprising a central flexible diaphragm disposed above and provided with a peripheral abutment-wall in circumferential engagement with a portion of the inner surface of said body-side-wall member vertically coextensive with said outwardly-projecting flange; the said bottom-wall member being provided with a seal-forming marginal portion including said peripheral abutment-wall folded about and substantially enclosing the said outwardly-projecting flange; the said body-side-wall and bottom-wall members being united together by a cold-working operation to effect the compression of the outwardly-projecting flange within the outer marginal portion of the bottom-wall member in situ upon the said flange and a permanent set to the folds formed in the said outer marginal portion of the bottom-wall member.

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