Aug. 8, 1939. H. A. DAMKROGER 2,168,395

FUNNEL CONSTRUCTION

Filed Feb. 16, 1938

FIG. 1

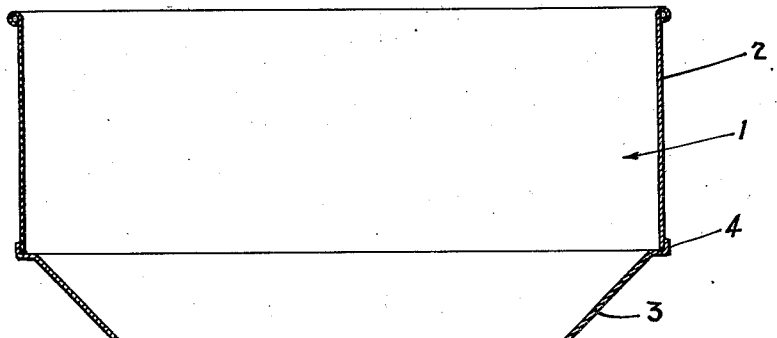
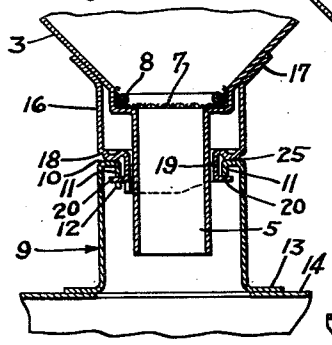
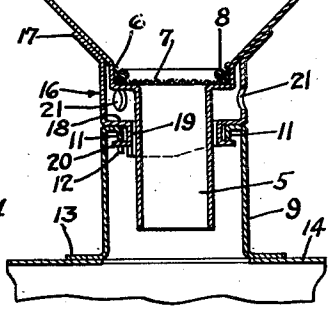


FIG. 2





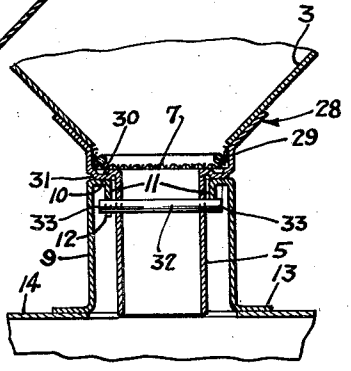


FIG. 5

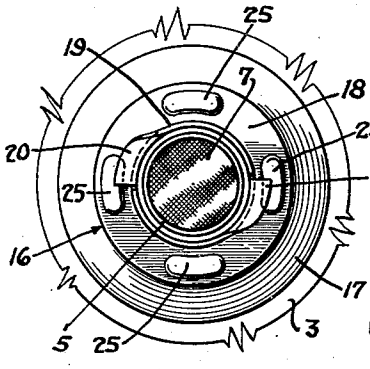


FIG. 3

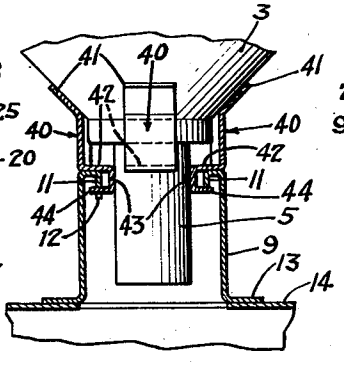


FIG. 6

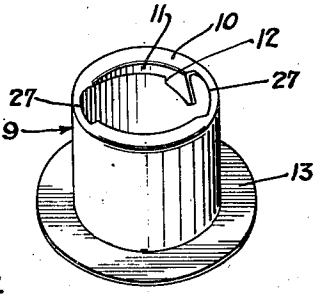


FIG. 7

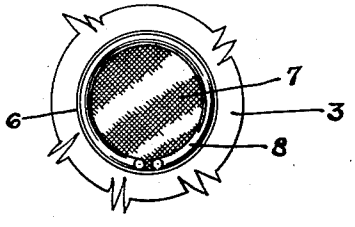


FIG. 4

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FUNNEL CONSTRUCTION

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3 Claims. (Cl. 226—31)

This invention relates to funnels and has for an object the provision of a construction by which the funnel may be rigidly attached to the vessel with which it is used. The funnels herein illustrated are designed to be used with vessels having removable cap closures such as automobile and tractor fuel tanks and the like.

In many motor vehicles, such as tractors and portable power units, the fuel tanks are located adjacent or above the motor. The filling of the fuel tanks of such units is hazardous because any spilled fuel falls upon the motor where it is likely to be ignited by the heat of the motor or the exhaust manifold. The hazard is increased when the filling is done in the field since fuel is usually transferred by pails or cans which must be balanced in an elevated position while the fuel is poured into the fuel tank of the motor unit. Wind, unsteady conditions, the weight of the cans or pails, and insecure funnels contribute to the hazard.

It is, therefore, an object of the present invention to obviate these difficulties by providing a strong, heavily made funnel of minimum height, which is constructed so as to be readily and quickly attached to the fuel tank with which it is used. By such a construction all of the dangers due to an insecure funnel are obviated, and tank filling is facilitated by the fact that the weight of the filling can or pail may be placed upon the edge of the funnel.

It is also an object of the invention to provide a funnel construction which may be attached to the tank with which it is used, by turning through a part of one revolution.

It is a further object of the invention to provide a funnel construction which will remain fixed in place when attached, with the funnel spout opening centered with respect to the filler opening of the tank with which it is used.

It is also an object of the invention to provide a vent passage which is exterior to the funnel spout so as to segregate the down flow of liquid and the up flow of vapor.

It is a further object of the invention to provide a construction in which the funnel is supported in fixed spaced relation with respect to the vessel with which it is used so as to provide a vent space and passageway.

It is also an object of the invention to provide a funnel construction which may be used with non-vertical filler necks on tanks and which will remain in fixed relation with respect to the filler neck when attached to such nonvertical filler neck.

It is also an object of the present invention to provide a construction in which the funnel spout is of a diameter only slightly less than that of the filler neck with which it is used, and at the same time provide a free exit for vapors so that fluids will drain freely into the tank with which said funnel is used.

It is a further object of the invention to provide a funnel construction in which the weight of the funnel is supported independently of the funnel spout so as to protect this spout and contribute to the strength of the construction.

It is a further object of the invention to provide a funnel which is provided with a filtering screen so as to insure the delivery of fluid free from debris.

It is also an object of the invention to provide a removable filter screen which may be inserted or removed or replaced at will.

Other objects and features of the invention are those inherent and suggested by the drawing, and those inherent and suggested by the embodiments of the invention described hereinafter.

In the description hereinafter given, reference is had to the accompanying drawing in which like characters represent corresponding parts in all views and in which

Figure 1 is an elevation view in section of a preferred embodiment of the invention shown attached to a filler neck of a vessel neck with which the funnel is used.

Figure 2 is a fragmentary view in section of a modification of the invention shown attached to a filler neck with which the funnel is used.

Figure 3 is a slightly enlarged fragmentary bottom plan view of the modification shown in Figure 2, showing the funnel spout and supporting sleeve.

Figure 4 is a slightly enlarged fragmentary top view of the screening member of the modification shown in Figure 1 or 2.

Figure 5 is a fragmentary view in section of a second modification of the invention shown attached to a filler neck with which the funnel is used.

Figure 6 is a fragmentary view partly in section and partly in elevation of another modification, showing the funnel attached to the filler neck with which it is used.

Figure 7 is an isometric view of the filler neck construction with which the illustrated embodiments of the invention are used.

A preferred form of the invention shown in Figure 1 consists of a funnel generally designated 1, comprising a cylindrical section 2 and

a frustro-conical section 3 which are attached together. The cylindrical section 2 is beaded to present a smooth top edge, and the upper edge 4 of the frustro-conical section 3 is flanged so as to receive the base of the cylindrical section 2 to which it is affixed by spot welding, rolling or soldering. The funnel construction is provided with a spout 5 which may be formed integrally with the frustro-conical section 3, or separately, as desired. The junction of the spout 5, and the frustro-conical section comprises a recessed shoulder 6 which receives a wire cloth screening member 7 which is held in place by means of snap ring 8, as shown in Figure 4.

The several embodiments of the invention illustrated herein are shown as being adapted for use with a vessel filler neck generally designated 9, such as that illustrated in Figure 7. This type of filler neck consists of a cylindrical portion having an inwardly turned top flange 10. The flange 10 is formed with reentrant surfaces 11, having stop shoulders 12 thereon. The surfaces 11 and stop shoulders 12 constitute locking elements with which protruding lugs on a cap closure cooperate to close and seal the filler neck. The filler neck is usually provided with a base flange 13 by which it is attached to the vessel 14 with which it is used.

According to the present invention the funnel is provided with a supporting surface which cooperates with the top surface 10 of filler neck 9 and locking elements which cooperate with surfaces 11 and stop 12 of the filler neck so as to position the funnel rigidly in locked relation with respect to the filler neck when the funnel is being used.

In the embodiments shown in Figure 1, the supporting element is a sleeve generally designated 16, which is formed with a conical flange 17 at its upper end, by which the sleeve is attached to the frustro-conical section 3 of the funnel. The sleeve also includes an inwardly turned flange 18 which seats upon top surface 10 of the filler neck 9 when the funnel is being used. A cylindrical extension 19 from the inner diameter of flange 18 is provided with outwardly extending locking surfaces 20. These locking surfaces cooperate with the surface 18 of locking elements 11 of the filler neck to draw the surface 18 into tight contact with the top surface 10 of the filler neck when the funnel is rotated as a unit on the filler neck.

It will be noted that cylindrical portion 19 of the sleeve 16 is slightly larger than the external diameter of spout 5 so as to form an annular vent passage for vapors which are driven from the vessel as it is filled. The vapors are carried off through openings 21 in the outer surface of the sleeve 16. It is to be understood that the locking elements 20 may be formed separately from the sleeve 16, if desired, the criterion being to provide a locking element in spaced relationship from supporting surface 18 of the supporting sleeve by which the supporting sleeve, and consequently the funnel structure, is positioned in fixed relationship with respect to the funnel neck with which it is used.

The modification shown in Figure 2 is similar to the modification shown in Figure 1, except that the supporting sleeve, generally designated 16, is not apertured for the passage of vapors, but instead is provided with a plurality of embossed surfaces 25 which are circumferentially spaced about the supporting surface 18. The embossed areas 25 serve to raise the supporting surface from the top surface 10 of the filler neck and accordingly provide radial passageways for the flow of vapors.

In this modification the flow of vapors from the tank, as the tank is filled, is upwardly between the cylindrical surface 19 and the reentrant locking surface 11 of the filler neck, and thence radially outward between the embossed surfaces 25, to atmosphere. As shown in Figure 7 the filler neck is cut away at points 27 so as to receive elements 20 of the funnel, and these cut-away portions accordingly enhance the venting function since they provide a free passage of vapors directly upward to the surface 18, whence the vapors flow radially outward between embossed areas 25—25. It will be noted that the embossed areas 25—25 are located relative to elements 20 so that the areas lie on either side of cut-away portions 27 when the element 20 is rotated against shoulder 12 of the filler neck 9.

In the modification shown in Figure 5 the support of the funnel is derived from an especially formed spout, generally designated 28, which is attached to the frustro-conical section 3. The spout 28 combines the functions of the outer cylindrical sleeve 16 and spout 5 of the modifications illustrated in Figures 1 and 2, and is formed with a recessed portion 29 so as to receive screening element 7. Spout 28 accordingly serves in the capacity of the outer cylindrical sleeve 16 of the modification shown in Figures 1 and 2, and also serves as a spout. The bottom surface 30 of the recessed shoulder 29 is provided with a plurality of circumferentially spaced embossed areas 31 similar to the surface 25 in the modification shown in Figure 2. The embossed areas 31 serve to hold the surface 30 in spaced relationship to the top surface 10 of the filler neck and thereby form vent passageways for the escape of vapors from the tank. In this modification the locking element of the funnel comprises a bar 32 which transversely pierces the spout 5 and protrudes therefrom so as to form a pair of locking elements 33 which cooperate with locking surfaces 11 and shoulders 12 of the filler neck. A pair of protruding rivets may be substituted for bar 32 or a pair of lugs welded onto the cylindrical portion 5 of the spout 28.

In the modification shown in Figure 6 the funnel construction is provided with a plurality of members generally designated 40. It will be noted that the cross section of elements 40 of Figure 6 correspond closely to the cross section of element 16 of Figure 1, and elements 40 may accordingly be considered as portions of the cylindrical element 16 of Figure 1. As illustrated, the members 40 are bent outwardly, as shown at 41, and are attached to the conical section 3 of the funnel. Members 40 are bent inwardly at 42 so as to form a supporting ledge for the funnel. The inwardly extending portions 42 are preferably of such a length as to contact with the outer surface of spout 5 so as to provide additional support. A plurality of members 40 may be provided at spaced intervals about the periphery of the junction between the frustro-conical section 3 and spout 5. Several of the members are provided with a downwardly extending portion 43 and an outwardly extending ear 44 which in this modification serves the purpose of a locking element for cooperation with the surfaces 11 and shoulders 12 of the filler neck. In this modification venting is provided by the circumferential space between the elements 40.

In operation the cap closure of the filler neck

is removed and the funnel inserted with the locking elements in line with cut-away portions 27 of the filler neck. The funnel is then given a ninety degree turn, which has the effect of drawing the supporting surface into tight contact with the top surface 10 of the filler neck. The funnel is then in locked position and a can or pail may be rested upon the upper edge without danger of the funnel wobbling. The funnel will remain in locked relationship until rotated in the opposite direction and withdrawn from the filler neck. The locking arrangement shown here may obviously be modified, if desired, to accommodate for variations in design of filler necks with which the funnel is intended to be used, and such variations in design are intended to be within the scope of the present invention.

Having thus described the present invention, I claim:

1. A funnel construction comprising a conical section joined with a spout section, an external sleeve overlying said sections adjacent their junction, said sleeve being formed with a transverse bearing surface having a plurality of spaced areas embossed thereon, and a plurality of outwardly protruding locking fingers on said funnel in a plane spaced from the plane of said bearing surface.

2. A load sustaining funnel structure, for use upon a cylindrical fluid receiving tube which has a load sustaining end surface at right angles to the axis of the tube and internal cam edges for normally receiving a cap closure, comprising a conical section, a spout attached thereto for delivering fluids from the conical section and means for supporting said conical section in load sustaining relation on the fluid receiving tube comprising a cylindrical member mounted on the conical section in a position to circumscribe the spout, said member being provided with a load supporting end surface in a plane at right angles to the axis of the spout, and means on the funnel for cooperative engagement with the internal cam edges of the tube when the funnel structure is placed thereon, for drawing the load supporting surface of the cylindrical member into contact with the load supporting surface of the tube.

3. A load sustaining funnel structure, for use upon a cylindrical fluid receiving tube which has a load sustaining end surface at right angles to the axis of the tube and internal cam edges for normally receiving a cap closure, comprising a conical section, a spout attached thereto for delivering fluids from the conical section and means for supporting said conical section in load sustaining relation on the fluid receiving tube comprising a cylindrical member mounted on the conical section in a position to circumscribe the spout, said member being provided with a load supporting end surface in a plane at right angles to the axis of the spout, and means on the funnel for cooperative engagement with the internal cam edges of the tube when the funnel structure is placed thereon, for drawing the load supporting surface of the cylindrical member into contact with the load supporting surface of the tube, said cylindrical member being formed with vent openings.

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