

May 25, 1954

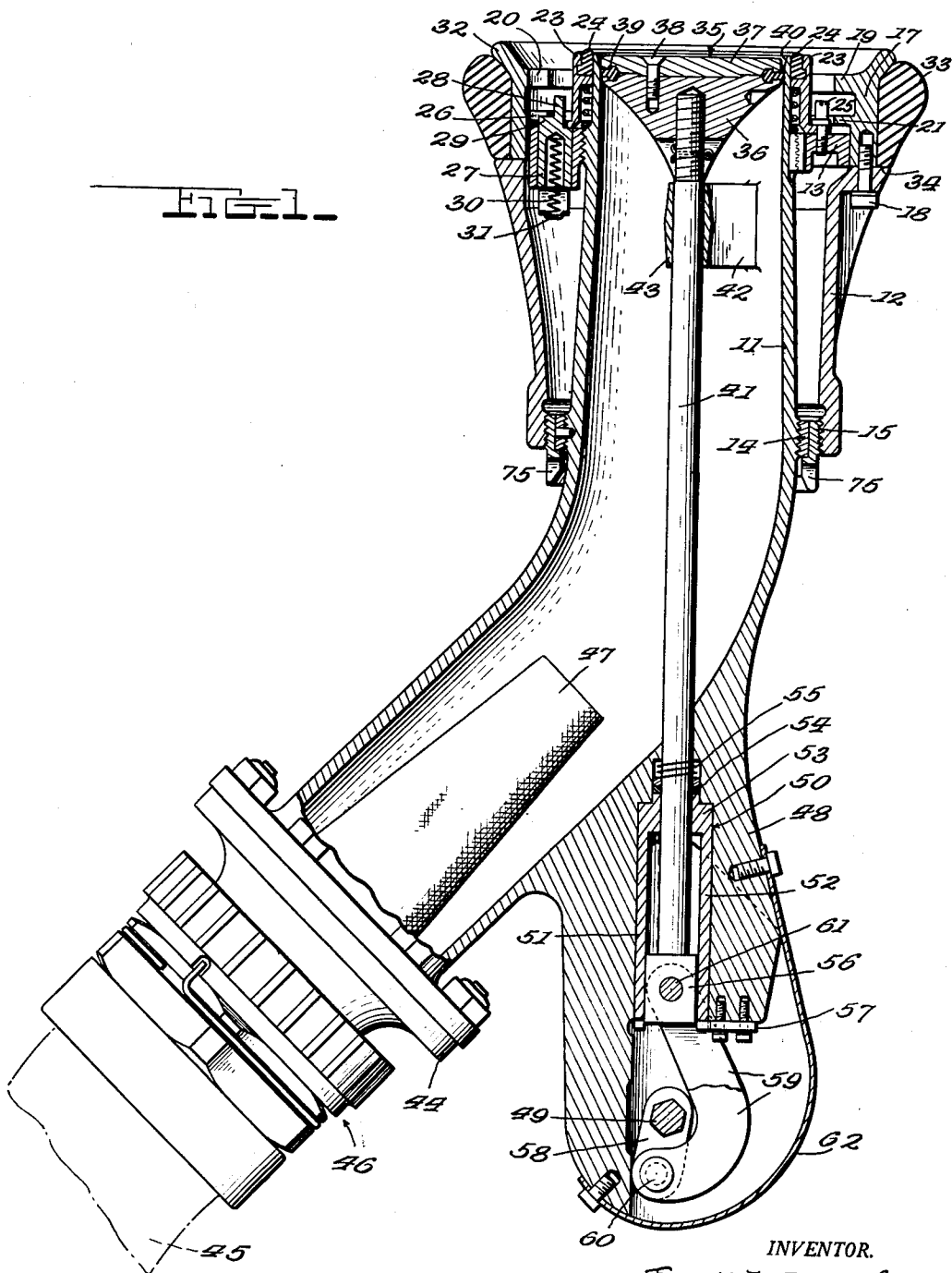
E. H. BADGER, JR

2,679,407

NOZZLE FOR FILLING AND DRAINING TANKS

Filed Aug. 10, 1950

4 Sheets-Sheet 1



INVENTOR.

BY *Corbett H. Badger Jr.*

Macon, Porter, Diller & Stewart

attys.

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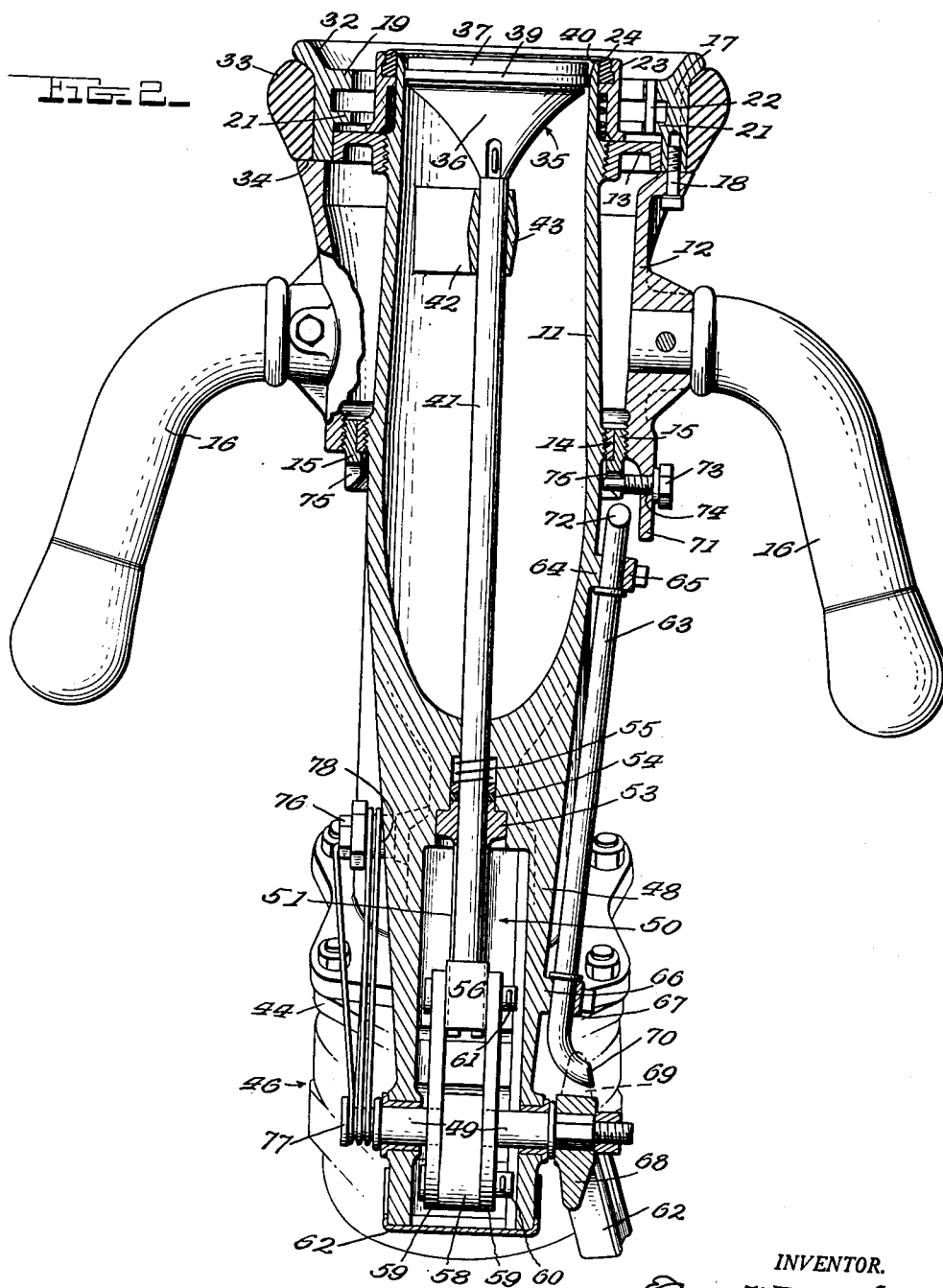
E. H. BADGER, JR

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NOZZLE FOR FILLING AND DRAINING TANKS

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4 Sheets-Sheet 2



INVENTOR.

BY *Ernest H. Badger Jr.*

Mason, Porter, Siller & Stewart

Attys.

May 25, 1954

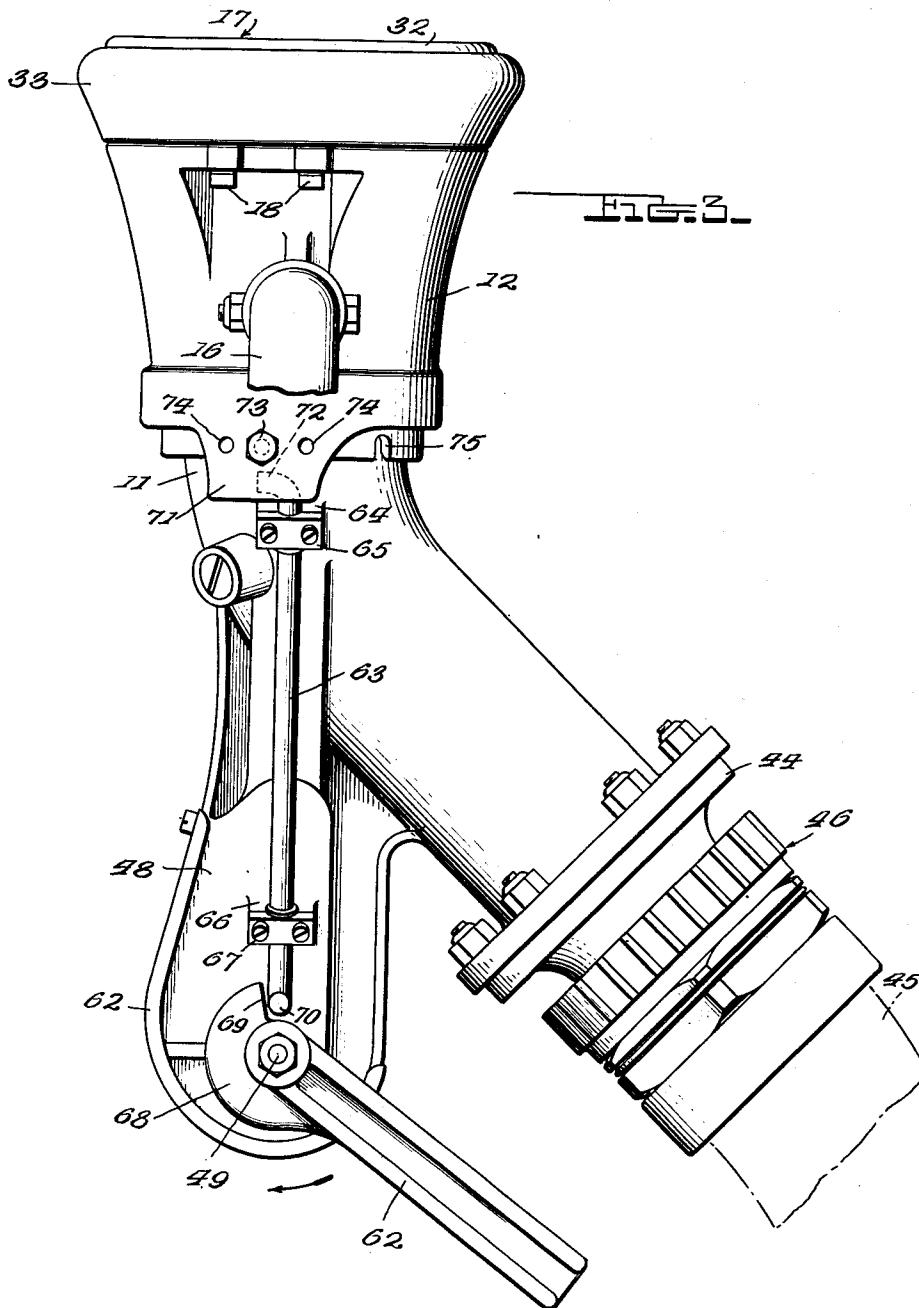
E. H. BADGER, JR

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NOZZLE FOR FILLING AND DRAINING TANKS

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4 Sheets-Sheet 3



INVENTOR.

Errett H. Badger, Jr.

BY

Marion, Porter, Diller & Stewart

attys.

May 25, 1954

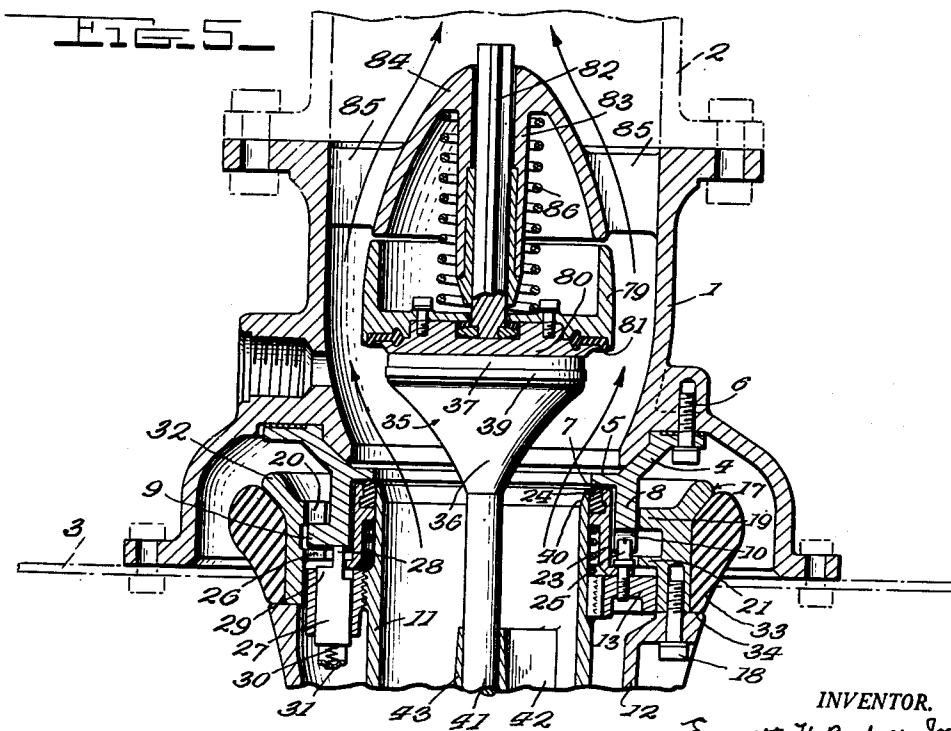
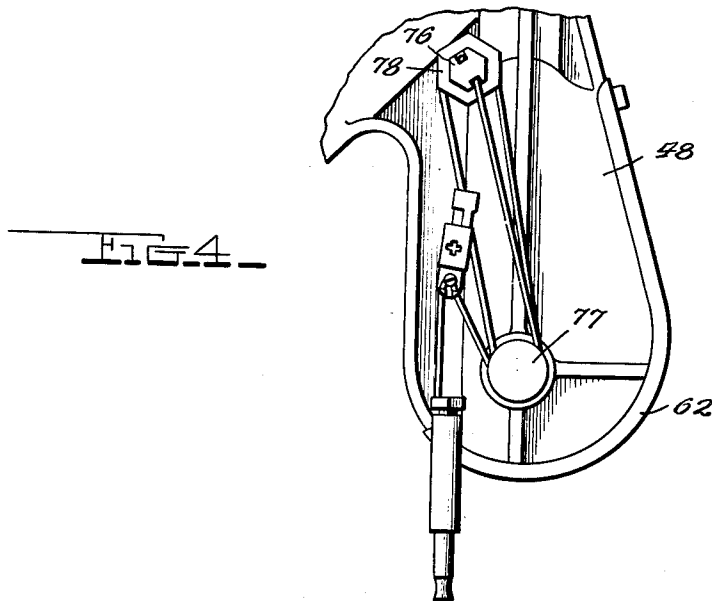
E. H. BADGER, JR

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NOZZLE FOR FILLING AND DRAINING TANKS

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4 Sheets-Sheet 4



INVENTOR.

Ernest H. Badger Jr.

BY

Marion Porter Diller Stewart

attys.

UNITED STATES PATENT OFFICE

2,679,407

NOZZLE FOR FILLING AND DRAINING
TANKS

Everett H. Badger, Jr., Euclid, Ohio, assignor to
The Parker Appliance Company, Cleveland,
Ohio, a corporation of Ohio

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4 Claims. (Cl. 284-18)

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The invention relates to new and useful improvements in a fuel nozzle for supplying fuel to or removing fuel from a fueling system.

An object of the invention is to provide a fueling nozzle of the above type having therein a valve for controlling the flow of fuel through the nozzle and manually actuated devices for opening and closing the valve disposed outside of the nozzle and connected to the valve so as to provide a substantially free flow passage through the nozzle for the fuel.

A further object of the invention is to provide a fueling nozzle of the above type wherein a valve stem for supporting and operating the nozzle valve extends through the wall of the nozzle and actuating devices disposed outside of the nozzle are connected to the stem for opening and closing the valve.

A further object of the invention is to provide a fueling nozzle of the above type wherein said nozzle is curved so as to facilitate the passing of the valve stem through the wall thereof.

A still further object of the invention is to provide a fueling nozzle of the above type with locking means for preventing the opening of the valve until the attachment of the nozzle to the fueling system is completed and for preventing the disconnection of the valve from the fueling system until the nozzle valve is fully closed.

Another object of the invention is to provide a filler unit and a nozzle wherein the head of the nozzle valve, the filler valve and the filler valve support, when the valves are in open position, are so shaped as to provide a substantially continuous streamline surface for the flow path through the nozzle and filler unit.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings:

Figure 1 is a longitudinal sectional view through a portion of the nozzle, said view being taken at right angles to the axis of the shaft for operating the valve;

Figure 2 is a longitudinal sectional view through the nozzle taken in a plane intersecting the longitudinal axis of the actuating shaft for the valve;

Figure 3 is a view in side elevation showing the improved nozzle, the actuating mechanism for the valve and the attachment of the nozzle to the supply hose;

Figure 4 is a side elevation of the projecting portion of the nozzle taken from the opposite side of that shown in Figure 3 and showing a method of storing a grounding cable; and

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Figure 5 is a longitudinal sectional view through a portion of the nozzle, the filler unit housing to which the nozzle is attached, and through the filler unit valve with the nozzle valve in open position.

The improved nozzle is particularly adapted for use in connection with a filler valve in a single point fueling system, the filler valve housing for the filler valve is mounted on a manifold pipe system which in turn has branch lines leading to the various tanks of the fueling system. The nozzle may, however, be used in connection with the filler valve housing of a tank and fuel supplied directly to the tank.

As shown in Figure 5 of the drawings, the nozzle is attached to the filler housing 1, which in turn might be attached to a manifold pipe 2 having branch lines leading to a plurality of storage tanks. This filler housing 1 may likewise be attached to the wall 3 of the tank so that fuel may be supplied directly to the tank. The filler housing includes a ring 4 having an opening therethrough surrounded by a valve seat 5. This ring is secured to the filler housing 1 by bolts 6. The valve seat 5 is on the upper side of an inwardly projecting member carried by a ring 4 and on the underside of this ring is a seat 7 for a nozzle gasket. This ring has a depending flange 8 provided at spaced intervals with projecting locking lugs 9. Said depending flange also has a series of recesses 10 formed therein.

The nozzle includes a body portion or inner sleeve 11 and an outer sleeve 12 turnable on the inner sleeve for attaching the nozzle to the filler housing; said body or inner sleeve has a ring 13 threadedly connected to the body adjacent the outer end thereof. The outer face of this ring 13 contacts the sleeve 12 and serves as a supporting means therefor. A bearing ring 14 is threadably connected to the body or inner sleeve of the nozzle in the region of the lower end of the sleeve 12. The outer face of this bearing ring 14 contacts with an adjusting ring 15 attached to the sleeve 12. This outer sleeve 12 has a limited turning movement on the rings 13 and 14. Handles 16, 16 are rigidly attached to this outer sleeve and serve as a means for handling the nozzle and also for rotating this outer sleeve for attachment of the nozzle to the filler housing.

The outer sleeve has attached thereto a connector 17, said connector is secured to the outer end of the sleeve by means of bolts 18. The inner face of the lower portion of this connector 17 provides the bearing contact with the ring 13. Said connector 17 has an inwardly projecting rib 19 which is provided at intervals with notches

cut therethrough, one of which is indicated at 20. These notches are adapted to receive the lugs 9 on the filler housing and after the lugs have passed through the notches then the connector is turned so that the lugs pass underneath the rib and thus secure the nozzle to the filler housing. A slight distance below the inwardly projecting rib is a second rib 21. A pin 22 is mounted in these inwardly projecting ribs 19 and 21 and serves as a stop for limiting turning of the nozzle sleeve on depending flange 8.

Mounted on the body of the nozzle at the extreme inner end thereof is a collar 23. This collar carries a gasket 24 which engages the seat 7 for making a fluid tight joint between the nozzle and the filler housing. When the nozzle is placed within the depending flange 8 and the gasket brought into contact with the seat a stud 25 passes into the recess 10. There are a series of these recesses and they are shaped so that the stud will prevent the inner sleeve or body of the nozzle from turning after the nozzle has been placed in the manner described.

The rib 21 is provided with a notch 26. The body or inner sleeve 11 is provided with a sliding stop lug 27. This stop lug is mounted in the ring 13 attached to the inner sleeve. The stop lug has an upwardly projecting finger 28 and a shoulder 29 which shoulder is adapted to enter the notch 26 and thus lock the outer sleeve to the inner sleeve when the outer sleeve has been turned to a position for releasing the nozzle from the filler housing. A spring 30 extends into a recess in the stop lug as shown in Figure 1 and bears against the inner end of the recess. It also bears against the fixed bracket 31 and thus the spring raises the lug into the notch and locks the outer sleeve to the inner sleeve or body of the nozzle when the nozzle is detached.

When the nozzle is placed against the housing for attachment a depending sleeve 3 contacts the finger 28 and moves the stop lug downward out of the notch 26. This frees the outer sleeve so it may turn for locking the nozzle to the housing. This attaching means for securing the nozzle to the housing per se forms no part of the present invention, but is shown and described in the application of Robert H. Davies, Serial No. 754,302, filed June 12, 1947, now Patent No. 2,519,358.

As noted above the outer sleeve 12 has bolted thereto a connector 17. The upper portion of the connector flares outwardly as indicated at 32. A ring scuff 33 is disposed between this outwardly flared portion 32 and the shoulder 34 at the upper end of the outer sleeve 12.

A valve 35 is provided for controlling the flow of fuel through the nozzle. This valve includes a body portion 36 and an outer plate 37 which is secured thereto by suitable screws 38. Mounted in suitable recesses between the plate 37 and the body 36 of the valve is a gasket 39 which projects beyond the periphery of the valve. The outer end of the body or inner sleeve 11 is provided with a flaring mouth 40. When the valve is moved to its closed position as shown in Figure 1 the gasket 39 enters this flaring mouth and bears against the inner surface of the sleeve or body, thus making a tight sealed connection between the valve and the body of the nozzle. The valve is carried by a valve stem 41. Secured to the body of the nozzle on the inner face thereof is a relatively narrow bracket 42 carrying a relatively small sleeve 43 in which the valve stem 41 is guided.

The body 11 of the nozzle is a one-piece struc-

ture and from the lower end of the collar 12 is bodily curved laterally away from the axial center line of the upper portion of the nozzle as shown in Figure 1. Attached to the lower end of this laterally curved portion is an attaching means 44 to which a hose 45 is detachably connected by the usual form of coupling 46. Mounted in the nozzle is a strainer 47.

In the Davies application, supra, the valve is opened and closed by the oscillation of a shaft extending transversely through the nozzle and across the flow path. A crank and linkage between the shaft and valve stem are likewise located in the flow path. This location of the operating means for the valve in the flow stream reduces the pressure drop and retards the flow of fluid through the nozzle.

One of the novel features of the present nozzle is the location of this operating means for the valve outside of the flow path. The body of the nozzle 11 just below the curved portion therein has a projecting portion 48. Mounted in this projecting portion 48 is an actuating shaft 49. The valve stem 41 extends through an opening in the wall of the body 11 and into a recess or chamber 50 within the projecting portion 48.

Mounted in the chamber 50 are parallel guide members 51 and 52. These guide members are formed integral with a head 53 and this head 53 serves as a bearing for the valve stem 41. In order to close fluid tight the opening through which the valve stem passes into the chamber 50, packings 54, with which is associated a spring 55, are provided.

Mounted on the lower end of the valve stem 41 is a head 56 rectangular in cross section which slides between the guides 51 and 52. The guides prevent the head and valve stem from turning. These guides are held in place by means of a plate 57 bolted to the projecting portion of the nozzle and overlapping the lower end of the guide 52. Mounted on the shaft 49 is a crank arm 58. A pair of links 59 are pivotally connected to a pin 60 at the outer end of the crank arm 58. These links are also pivotally connected at 61 with the head 56. The shaft 49 is mounted in suitable bearings in the body of the nozzle. Attached to one end of the shaft is a handle 62. This handle serves as a means for turning the shaft for opening and closing the valve. As shown in Figure 1, the valve is in closed position. At this time the pin 60 joining the links 59 to the crank arm 58 passes slightly a line through the center of the shaft 49 and the center of the connection of the links to the head 56 and this serves to hold the valve in closed position. A cover plate 62 is attached to the projection 48 and closes the chamber in which the actuating devices are located for operating the valve.

It is very essential that the valve should not be opened until the attachment of the nozzle to the filler housing is completed and the sealed joint is provided between the nozzle and housing. It is equally desirable that the valve be moved to a closed position before the nozzle can be detached from said housing. For accomplishing these purposes a rod 63 is attached to the outer surface of the nozzle and projecting portion thereof. On the nozzle is a projecting lug 64 with which is associated a cover plate 65 and the upper end of the rod 63 is journaled in this lug for limited rotation. There is also a projecting lug 66 carried by the projecting portion of the nozzle and a cover plate 67 is associated therewith. This lug serves as a mounting for the rod

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63. The handle 62 is provided with a projecting rib 68. This projecting rib 68 terminates in a radial shoulder 69. The lower end of the rod 63 is bent laterally as indicated at 70. This lateral portion of the rod 63 lies in the path of movement of the shoulder 69. The handle is rotated in the direction of the arrow when opening the valve. If this projecting portion 70 of the rod lies in the path of movement of the shoulder 69 as shown in Figure 3, then the handle cannot be moved for opening the valve. The outer sleeve 12 has a depending skirt 71. The upper end of the rod 63 is bent laterally as indicated at 72. (See Figure 3.) When the rod is in the position shown in Figure 3 then this bent end portion 72 lies behind the depending skirt 71 of the outer sleeve. Any effort to turn the rod by moving the handle will cause this bent end portion 72 to contact with the skirt 71 and this will prevent the rod from rotating and the turning of the handle. When the outer sleeve 12 has been rotated to a position so that the attachment of the nozzle to the housing is completed this skirt 71 will move away from the bent end 72 so that it is free from restraint and the handle can be turned for opening the valve.

When the handle is turned the bent end 70 of the rod 63 will move in behind the rib 68 and this will hold the rod from turning back to the position shown in Figure 3. The skirt 71 is of sufficient length so that the bent end of the rod 63 lies right close to the skirt but in the path thereof when the sleeve is turned for attaching the nozzle to the housing. Any attempt to turn the sleeve to detach the housing is prevented by the skirt contacting with the bent end 72. When, however, the valve is turned to closed position, that is, the position shown in Figure 3, then the rod is released so that it may be turned by the turning of the sleeve and the nozzle may be thus detached from the housing.

In order that a tightly sealed joint may be obtained between the gasket 24 and the seat 7 on the housing, the adjusting ring 15 may be released and turned so as to shift the position of the outer sleeve on the inner sleeve or body of the nozzle. This adjusting ring is held from rotation by means of a bolt 73, which is inserted in one of the openings 74 in the sleeve 12 and the inner end of the bolt enters one of the notches 75 in the adjusting ring 15. By removing the bolt the adjusting sleeve can be turned for bringing about the shifting of the outer sleeve on the inner sleeve.

It is desirable to provide a ground cable which shall be associated with the nozzle so that it may be employed for grounding the nozzle before it is attached to the tank. In order that this grounding cable shall be readily accessible for use it is stored on the nozzle. The cable is connected to the nozzle at 76 (see Fig. 4). The cable is then passed around a stud 77 spaced from the connection and also a stud 78 at the connection. This storing of the grounding cable on the nozzle forms no part of the present invention.

Located within the filler housing 1 is a valve 79. Attached to the valve body is a plate 80 and between the plate and the valve is a recess in which is located a gasket 81 which engages the valve seat 5 when this filler valve is closed. The valve is provided with a stem 82 of irregular shape which reciprocates in a sleeve 83 carried by a valve supporting member 84 which in turn is carried by radial webs 85 extending inwardly from the housing 1. A spring 86 is mounted on

this sleeve 83 and normally moves the valve 79 to closed position.

When the nozzle valve is open it engages this filler valve and moves it to open position as shown in Figure 5. When the nozzle valve is closed then the spring will move the filler valve to closed position. Inasmuch as this filler valve cannot be closed until the nozzle valve is closed and the nozzle cannot be detached until the nozzle valve is closed, there is no chance of the nozzle being detached before the filler valve is fully closed.

The head of the nozzle valve is conically shaped. (See Figure 5.) The outer face of the filler valve 79, when in open position merges into the conically shaped support for the filler valve so that the nozzle valve, the filler valve, and support for the filler valve, present a substantially continuous stream line surface for the flow path which reduces the pressure drop in the flowing stream to a minimum. This, together with the locating of the actuating devices for opening and closing the nozzle valve outside of the flow stream greatly facilitates the rapid supply of fuel to a fueling system. While the nozzle has been described with the filling of a fueling system, it will be understood that the nozzle may be used under certain conditions for defueling.

It is obvious that many changes in the details of construction may be made without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A nozzle for fueling systems comprising a one-piece body portion having a flow passage for fuel, a valve seat at the outer end of said body portion, a valve in said passage adapted to engage said seat for controlling the flow of fluid there-through, a valve stem movably mounted in said passage on which said valve is mounted, said body portion being bodily curved laterally between the ends thereof away from said valve stem so that the valve stem disposed centrally and longitudinally thereof at the outer end of the body portion will pass through the wall of the body portion at a point remote from the valve, said body wall having an integral projecting portion in alignment with the valve stem, a fluid tight bearing disposed in said projecting portion through which said valve stem extends, parallel guiding members disposed in said projecting portion, said stem having a head with flat sides slidably engaging said guide members for guiding and preventing rotation of said stem, an actuating shaft mounted in bearings carried by said projecting portion, the axis of said shaft being disposed in a plane containing the longitudinal axis of said stem, a crank arm carried by said shaft and links interposed between said crank arm and said head, pivot means connecting the links to said head, the axis of said pivotal means being disposed in said plane, pivotal means connecting the crank arm to said links, the axis of said last named pivotal means passing said plane when the valve is in closed position.

2. A nozzle for fueling systems comprising a body portion having a flow passage for fuel, a sleeve mounted on said body portion at the outer end thereof for limited rotation thereon, means carried by the sleeve adapted to connect said nozzle to a place of use, said body portion having a valve seat at the outer end thereof, a valve in said passage adapted to engage said seat, a valve stem movably mounted in said passage and connected to said valve, an actuating shaft mounted on said body portion outside of said passage,

means actuated by said shaft and connected to said valve stem for operating the same, a handle disposed outside of said body portion and connected to said actuating shaft, a rod mounted on said nozzle body for oscillation about its longitudinal axis and extending from the handle to the lower end of the sleeve, said rod having at each end thereof means cooperating with means on said sleeve and means on said handle whereby said handle is locked from movement until attachment of the nozzle by the sleeve is completed and whereby the sleeve is locked against rotation for detaching said nozzle until the valve is closed.

3. A nozzle for fueling systems comprising a body portion having a flow passage for fuel, a sleeve mounted on said body portion at the outer end thereof for limited rotation thereon, means carried by the sleeve adapted to connect said nozzle to a place of use, said nozzle body having a valve seat at the outer end thereof, a valve stem movably mounted in said passage and connected to said valve, an actuating shaft mounted on said body portion, means actuated by said shaft and connected to said valve stem for operating the same, a handle disposed outside of said body portion and connected to said actuating shaft, said handle having a projecting rib provided with a stop shoulder, said sleeve having a depending skirt provided with a stop shoulder, a rod mounted on said body portion at one side of said skirt and said rib for oscillations about its longitudinal axis, said rod having at one end means cooperating with said depending skirt and stop shoulder carried thereby, and means at the other end of the rod cooperating with said rib and stop shoulder whereby when said rod is in one position said sleeve is free to move and the handle is held from movement by the stop shoulder on the rib and when in another position said handle is free to move and the skirt is held from movement by the stop shoulder on the skirt.

4. A nozzle for fueling systems comprising a body portion having a flow passage for fuel, a sleeve mounted on said body portion at the outer end thereof for limited rotation thereon, means

carried by the sleeve adapted to connect said nozzle to a place of use, said nozzle body having a valve seat at the outer end thereof, a valve in said passage adapted to engage said seat, a valve stem movably mounted in said passage and connected to said valve, an actuating shaft mounted on said body portion, means actuated by said shaft and connected to said valve stem for operating the same, a handle disposed outside of said body portion and connected to said actuating shaft, said handle having a projecting rib provided with a stop shoulder, said sleeve having a depending skirt provided with a stop shoulder, a rod mounted on said body portion at one side of said skirt and said rib for oscillations about its longitudinal axis, said rod having the ends thereof bent at right angles to each other and to the axis of oscillation of the rod, one of said bent ends being adapted to cooperate with the depending skirt and stop shoulder carried thereby and the other end of said rod being adapted to cooperate with said rib and stop shoulder associated therewith whereby when the rod is in one position said sleeve is free to move and a handle is held from movement by the stop shoulder on the rib and when said rod is in another position said handle is free to move and the skirt is held from movement by the stop shoulder on the skirt.

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