Aug. 8, 1961 H. E. RITTENHOUSE 2,995,276

DISPENSER SWITCH CONTROL MECHANISM

Original Filed April 9, 1956 6 Sheets-Sheet 1

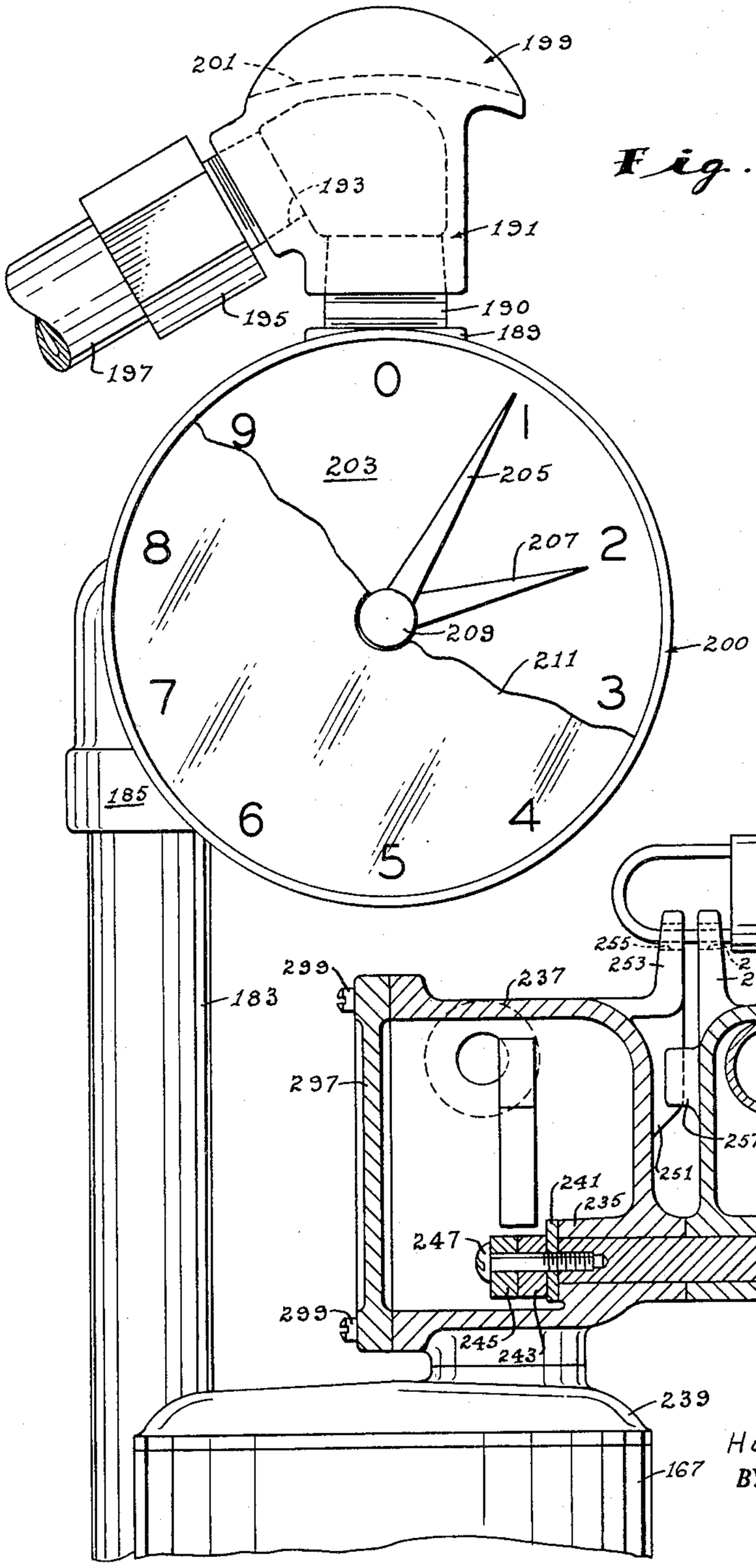

Fig. 1

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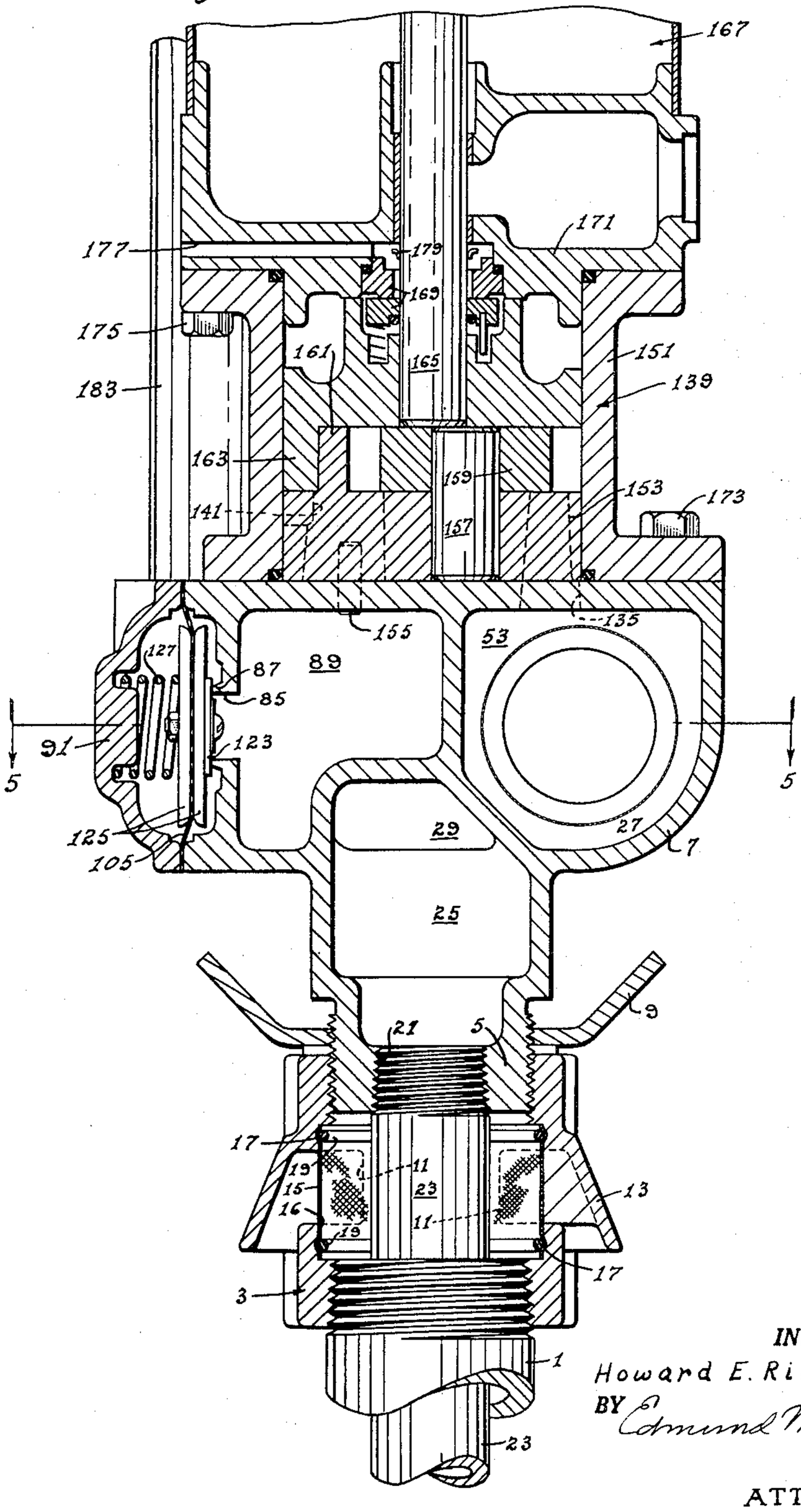
Fig. 2



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DISPENSER SWITCH CONTROL MECHANISM

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Fig. 3

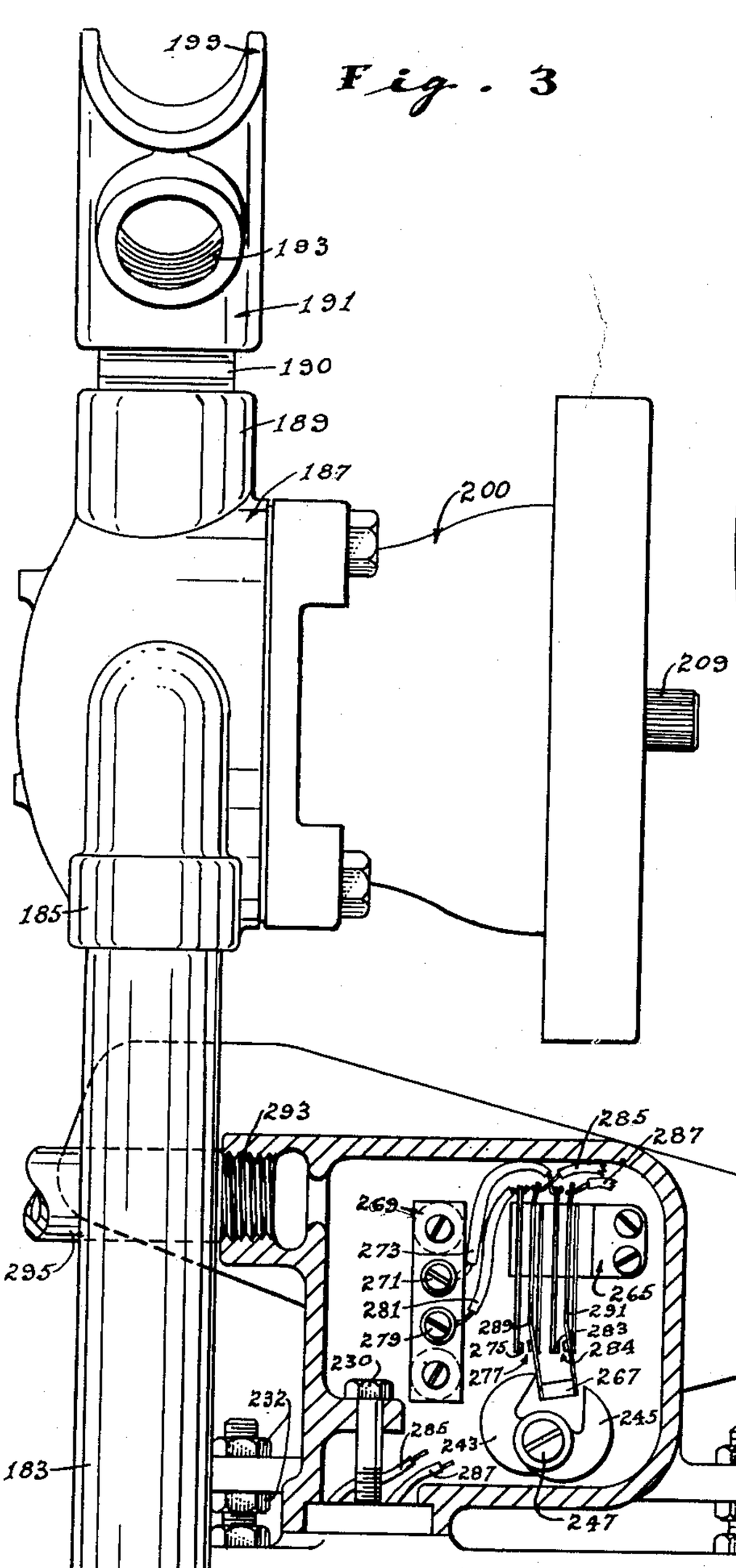
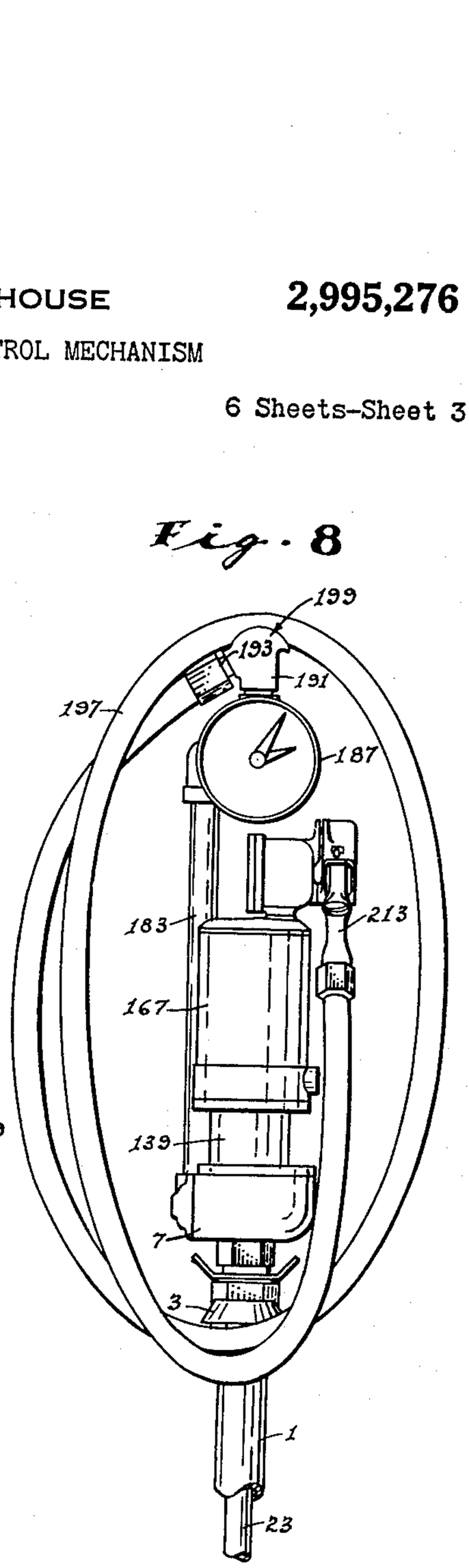


Fig. 8



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DISPENSER SWITCH CONTROL MECHANISM

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Fig. 4

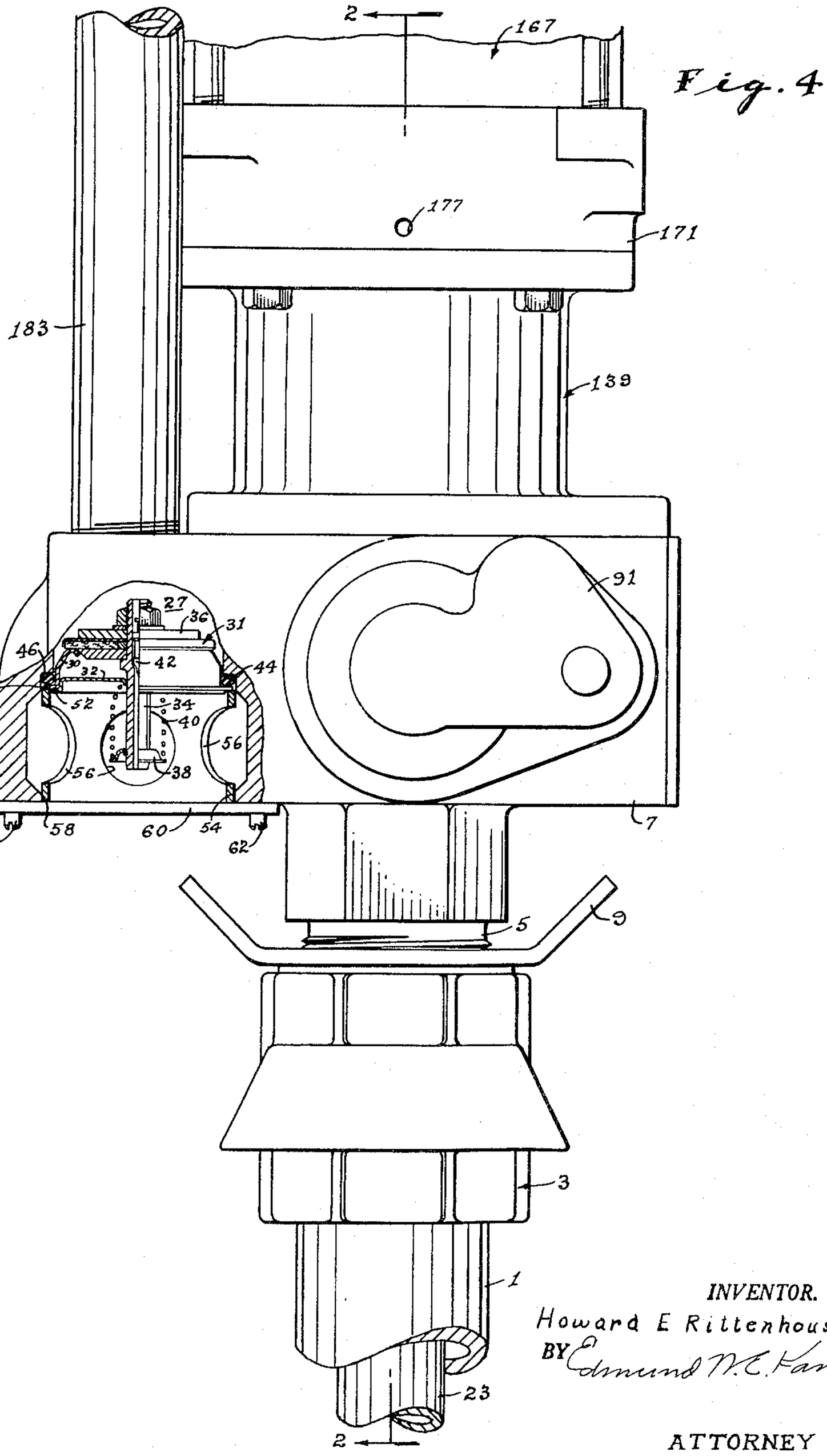

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Fig. 7

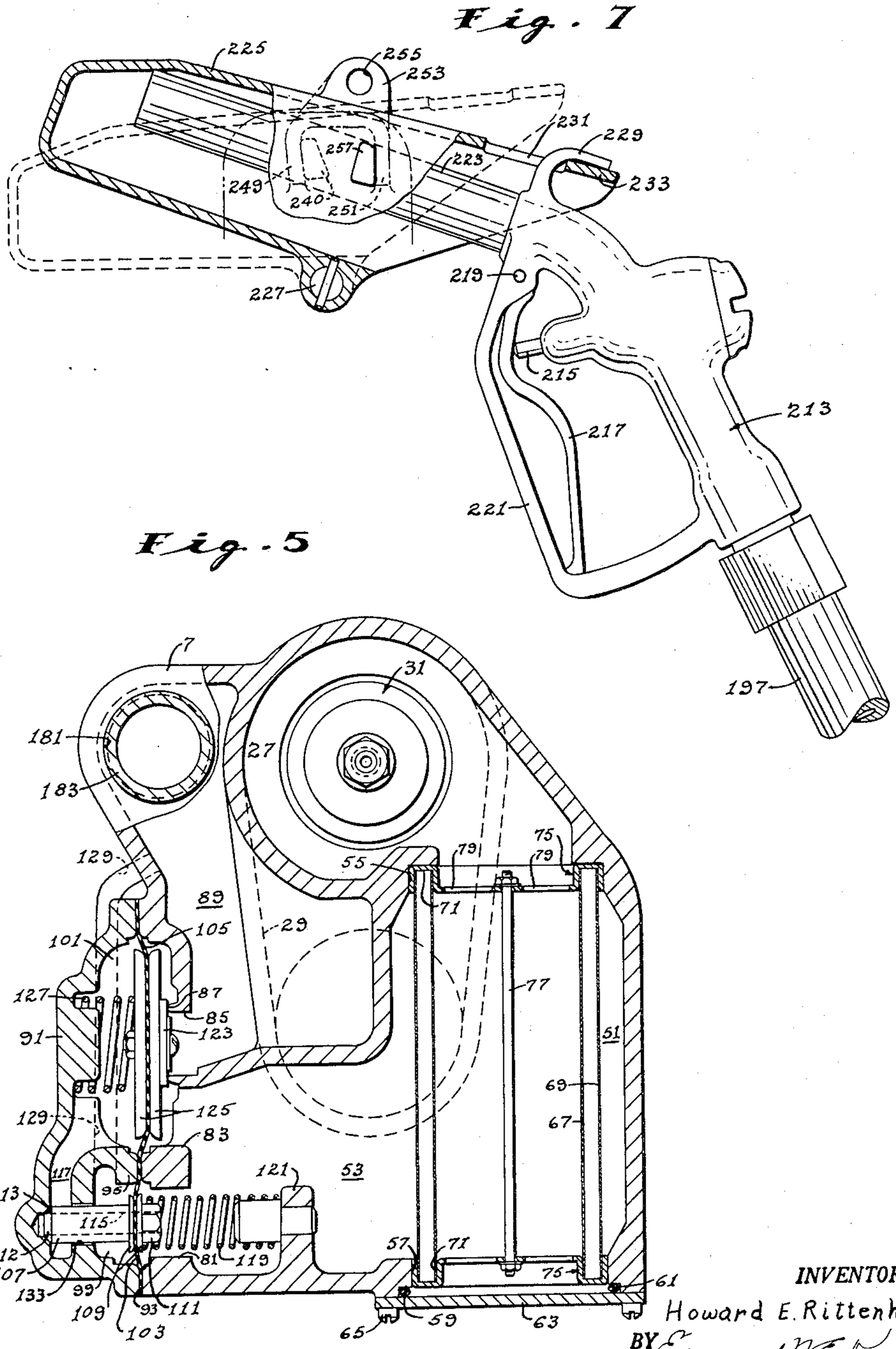

Fig. 5

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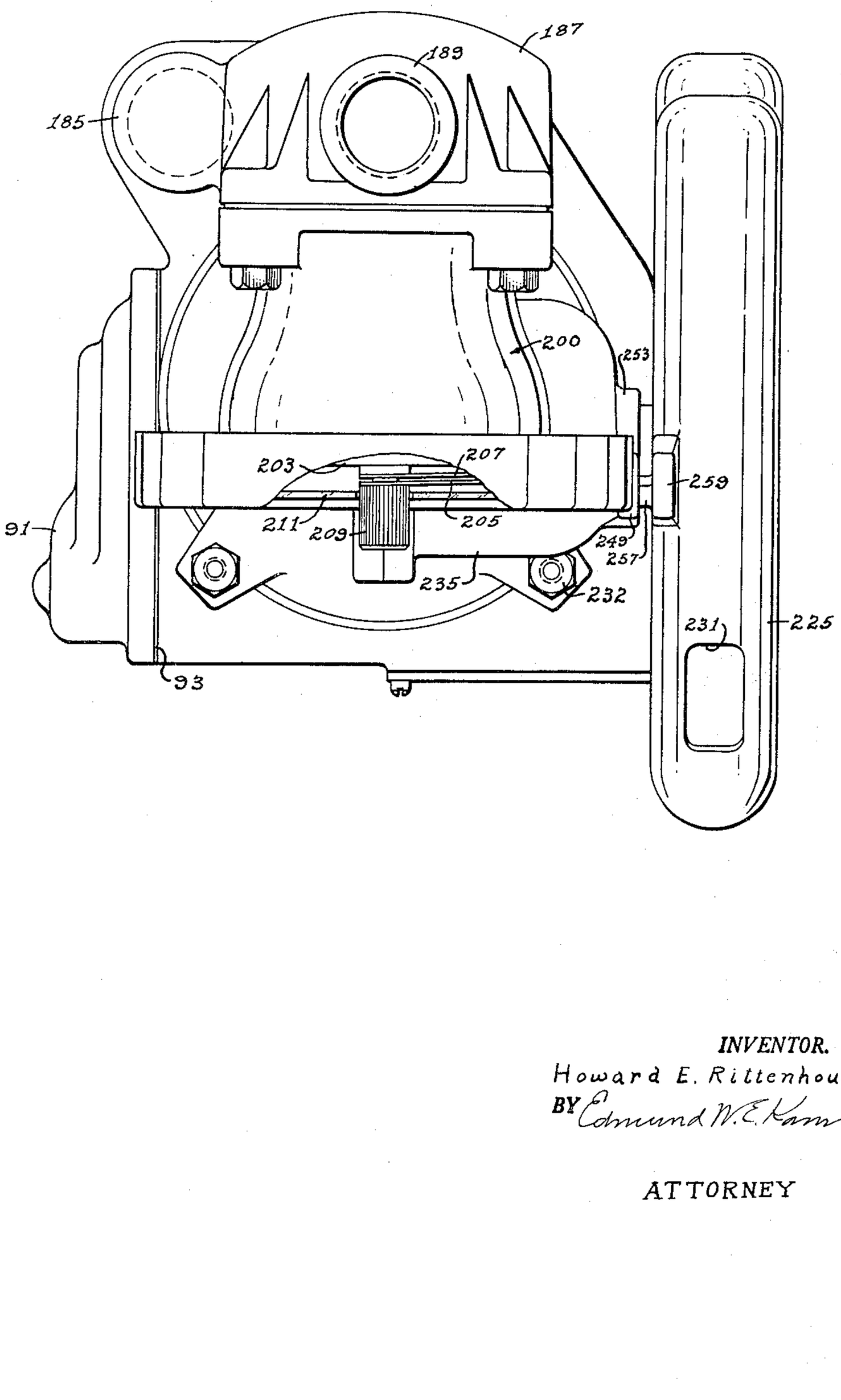
Fig. 6



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DISPENSER SWITCH CONTROL MECHANISM

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Original application Apr. 9, 1956, Ser. No. 576,842, now Patent No. 2,958,291, dated Nov. 1, 1960. Divided and this application Oct. 7, 1958, Ser. No. 766,641

1 Claim. (Cl. 222—75)

This invention relates to a compact, liquid dispenser. More specifically it relates to a liquid dispenser which is especially adapted for use in dispensing fuels for farm use. It is usable either in connection with an underground tank or directly upon the usual steel barrel.

This application is a division of my application serial number 576,842, filed April 9, 1956, now Patent No. 2,958,291, issued November 1, 1960, for Compact Liquid Dispenser.

It is an object of the invention to produce a dispenser of the kind described which is compact and economical to manufacture.

Another object of the invention is to provide a structure which is long lived and of rugged construction.

Yet another object of the invention is to provide a simplified switch control and nozzle support.

Still another object of the invention is to provide a novel hose support and hose arrangement which will enable a relatively long hose to be supported on a relatively low structure.

These and other objects will become apparent after a study of this specification and the drawings which are attached hereto, made a part hereof and in which:

FIGURE 1 is a front elevation of the upper portion of the dispenser with parts shown in section

FIGURE 2 is a sectional view of the lower portion of the dispenser taken substantially on the line 2—2 of FIGURE 4

FIGURE 3 is a side elevation of the device of FIGURE 1 with parts shown in section to expose the switch mechanism

FIGURE 4 is a side elevation of the lower portion of the dispenser viewed from the left of FIGURE 2 and partially sectioned to show the check valve.

FIGURE 5 is a sectional view of the dispenser taken substantially on line 5—5 of FIGURE 2.

FIGURE 6 is a top plan view of the dispenser.

FIGURE 7 is a detailed view of the nozzle support and switch actuator

FIGURE 8 is a front elevation of the dispenser showing the stored arrangement of the hose on the dispenser.

General structure

Referring first to FIGURES 1, 2, 3 and 4, the numeral 1 represents a supporting pipe which may be screwed into a suitable fitting at the top of an underground tank, in a suitable base or which may be set in a cement slab (not shown). An air vent and screen coupling 3 is screwed on the upper end of the pipe and is adapted to receive the threaded boss 5 on the manifold casting 7 which forms a part of the dispenser. The thread on the boss is preferably a straight thread and a wing nut 9 is mounted thereon to act as a jam nut for holding the boss against rotation in the coupling after the dispenser has been rotated to face in the desired direction.

The vent ports 11 in the coupling are shielded by the conical flange or shield 13 and a cylindrical screen 15 is inserted in a recess 16 formed the coupling, in a position to cover the ports. Grooves 17 are formed in the coupling to form seats for the screen which is held expanded and in position by the snap rings 19. The ends of the screen abut the ends of the reecss.

The flange or shield 13 prevents the direct entrance of

water, ice and snow into the pipe 1 and the associated tank while the screen prevents the entrance of dirt, insects and other foreign objects while permitting the entrance of air to replace the liquid withdrawn by the pump or the discharge of air while the tank is being filled.

Boss 5 is also internally threaded at 21 to receive the suction pipe 23 the lower end of which may be provided with a foot valve of any suitable type (not shown).

It should also be noted at this point that the pipe 1 and coupling 3 may be omitted and that the boss 5 carrying pipe 23, may be screwed directly into the bung of a steel barrel containing the fuel.

Pump, motor and manifold structure

The manifold 7 defines an inlet chamber 25 which communicates with the suction pipe and with a check valve chamber 27 through the channel 29 (see also FIGURE 5). A check valve assembly 31 of any suitable design is mounted in the chamber to prevent drainage of liquid from the dispenser.

The check valve assembly comprises a seat 30, a spider guide 32, a hollow valve stem 34 which is reciprocably mounted in the guide and carries a poppet type valve 36 at its upper end and a spring seat 38 at the other. A compression spring 40 is confined between the seat and guide.

A tire valve 42 is mounted in the stem and serves as a relief valve.

A flange 46 on casting 7 extends radially into the chamber 27 and the O-ring 44 rests against the lower side of the flange. The flanges 50 and 52 of the valve seat and guide contact the other side of the O-ring and a cylindrical sleeve 54 having a number of ports 56 rides on the bottom face of the flange 50. The sleeve is guided in a bore 58 in the manifold and a cover plate 60 which is sealingly held on the manifold by screws 62 moves the sleeve, guide and seat upwardly as the screws are drawn up, to compress the gasket and seal the joint at the flange 46.

From the check valve chamber the liquid passes through a strainer chamber 51 into a suction chamber 53.

One end wall of the strainer chamber is formed with a recess 55 adjacent the check valve chamber. A bore 57 which leads to the exterior of the manifold is disposed at the other end of the chamber. A counterbore 59 receives an O-ring gasket 61 which seals between the manifold and a cover plate 63. The plate is held on the manifold by suitable screws 65 which serve to compress the gasket.

The strainer comprises a pair of concentric cylindrical screens 67, 69 which have their ends disposed in U-shaped grooves 71 in the heads 75 which are held compressed on the ends of the screens by a tie rod 77. Ports 79 are formed in the heads to pass liquid to the interior of the inner screen 67. Screen 69 may be of finer mesh than screen 67 if desired or either screen may be used alone.

The peripheral portions of the heads 75 fit closely in the recess 55 and bore 57 to prevent liquid from by-passing the strainer. The strainer is removable as a unit through the bore 57 when the plate 63 has been removed and the strainer is readily taken apart for cleaning or replacement of the screens by merely removing a nut from one end of the tie rod.

By-pass valve structure

As shown particularly in FIGURE 5, the suction chamber 53 has a first opening 81 and a second opening 83 which pass through the wall of the manifold which is also provided with a valve port 85, surrounded by a seat 87, disposed immediately adjacent 83, to serve as the inlet to the discharge chamber 89.

A cover 91 is fixed to the exterior of the manifold so

as to overlie the openings **81**, **83** and **85**. A diaphragm member **93** is clamped to the manifold by the cover.

The cover has partition means **95** which, with the cover defines chambers **99** and **101** and which in effect outline two diaphragms **103** and **105** on the member **93**.

A tubular valve **107** is passed through an opening in diaphragm **103** and is clamped thereto by the washers **109** and nut **111**. The left end **112** of the valve (FIG. 5) seats in a recess **113** in the cover. The valve has a central bore **115** which connects the suction chamber **53** in communication with a branch **117** of chamber **101** when the diaphragm **103** is moved to the right to open the valve. A compression spring **119** is supported at one end on the projection **121** in chamber **53** and at the other end on a washer **109** and serves to urge the valve closed.

A valve disc **123** together with suitable discs **125** are mounted on the diaphragm **105** with disc **123** in a position to sealingly engage seat **87** to close port **85**. A compression spring **127** seats on the cover and on one disc **125** to urge the valve **123** toward its seat **87**.

A channel **129**, shown diagrammatically in FIGURE 5, connects the discharge chamber **89** with the chamber **99**. The opening **133** in the wall of this chamber is slightly larger than the exterior of the valve **107** so that a restricted passage is formed between the valve and the opening **133** which connects chamber **99** in communication with the branch **117** of chamber **101**.

As shown in FIGURE 2, chamber **53** is connected by a channel **135** to the suction chamber of the pump **139** while a channel **141** connects the discharge chamber of the pump with the discharge chamber **89**.

The valves and diaphragms are shown in their normal positions in FIGURE 5, that is, they are shown in the positions they occupy when the pump **139** is idle or delivering liquid through the nozzle at substantially near the maximum rate. When the flow is materially throttled, the pump will tend to deliver the same quantity of liquid per revolution and pressure in the discharge chamber **89** will rise. If no by-pass were provided, the pump and motor would eventually stall and the motor would heat and possibly burn out.

In the disclosed structure, the pressure in chamber **89** is transmitted through channel **129** to chamber **99** and through the restricted passage **133**, branch **117** to chamber **101**. Thus under normal pressure conditions the pressure across diaphragm **105** is balanced. However, when the pressure in chamber **89** is sufficient to displace diaphragm **103** against the resistance of spring **119**, the valve **112** moves away from its seat in recess **113** so that the chamber **101** is connected in communication with the suction chamber **53** through branch **117** and bore **115** of the valve. The pressure in chamber **89** now being substantially greater than that in chamber **101**, the spring **127** will be overcome and valve **123** will leave seat **87** so that liquid may now circulate from the discharge chamber **89** through ports **85**, **83**, chamber **53**, suction channel **135**, pump **139**, and discharge channel **141** to chamber **89**.

Since the opening of valve **123** exposes a considerably greater area of diaphragm **105** to the pressure from chamber **89**, the valve, once it opens, will remain open without fluttering until the pressure condition in chamber **89** drops to a value which can be overcome by spring **119**. When this occurs the pressures in chambers **101** and **89** again equalize and spring **127** will close the valve. Since the effective area of the valve **123** now exposed to the pressure in chamber **89** is small, the valve will have no tendency to flutter. It will stay definitely closed.

It has been found by test that the by-pass wattage of the motor is substantially less than the normal operating wattage. The valve is substantially noiseless and is positive in operation.

Pump and motor

The pump **139** may be of any desirable positive displacement type. The pump shown in the drawings is an internal gear type comprising the pump body **151**, a port plate **153** which is contained within the body, rests on the manifold **7** and is pinned thereto by pin **155**. The plate **153** has the ports **135** and **141**, noted above, formed therein. It is also provided with an eccentrically disposed spindle **157** which rotatably carries the internal pinion **159** of the pump. Further it is also provided with an upwardly directed crescent shaped projection **161** which extends into the clearance space between the pinion **159** and the external gear **163** which is mounted on the shaft **165** of the electric motor **167**.

A rotary seal **169** of any desired style may be disposed between the gear and the end bell **171** of the motor. The pump body is fastened to the manifold and motor by suitable screws **173**, **175**. A drain passage **177** is provided in the end bell and communicates with the rotary seal at one end and is open to atmosphere at the other to permit the escape of any liquid which passes the seal. A slinger ring **179** is provided on the shaft for throwing liquid therefrom. These devices are used to prevent liquid from getting into the motor.

Discharge structure

As shown in FIGURES 2 and 5, the manifold **7** is provided with an upwardly directed outlet **181** from the discharge chamber **89** which is threaded to receive the discharge pipe **183** which has its upper end screwed into the inlet connection **185** of a meter **187** of any desired type. The meter outlet **189** contains a nipple **190** which screws into an outlet and hose supporting fitting **191**. The fitting is tapped at **193** to receive the coupling **195** of a hose **197**. (FIGURES 1 and 3.)

The discharge fitting **191** is provided at its upper side with a cradle **199** to retain a bight of the hose **197**. As seen in FIGURE 3, the walls of the cradle are curved to conform to the periphery of the hose and also curved longitudinally as shown at **201** in FIGURE 1 to conform somewhat to the curvature of the bight of the hose.

The meter **187** is preferably provided with a register **200** having a graduated dial **203** and fast and slow indicators **205**, **207** which are resettable by the knob **209** which extends through the dial glass **211**.

The free end of the hose **197** is provided with a valved nozzle **213** as shown particularly in FIGURE 7. The stem **215** of the valve is actuated by a trigger **217** which is pivotally mounted at **219** on the guard **221**. The nozzle includes a spout **223** which is adapted to enter a boot **225** which is fixed to the end of a rock shaft **227**.

The nozzle is provided with a hook **229** which is adapted to be inserted through an opening **231** formed in the upper, projecting portion **233** of the boot and to engage said projecting portion to support the nozzle.

The shaft **227** (FIG. 1) is rotatably mounted in a suitable boss **235** of the switch box **237** which is supported on the upper end bell **239** of the motor **167** by the bolts **230** and nuts **232** as shown in FIGURE 3. A washer **241** and a pair of curved or hook levers **243**, **245** are fixed to the end of shaft **227** by a screw **247**. This structure holds the shaft in place in the boss.

The switch box is provided, on the side adjacent the boot with a pair of stops **249**, **251**. The lugs merge into a projection **253** which is perforated at **255** to receive the bolt of a padlock **263**.

A stop lug **257** is formed on the boot in a position to be moved into contact with the lugs **249**, **251** as the boot pivots with the rock shaft and thus limits the pivotal motion of the boot.

A locking lug **259** extends upwardly from the boot, parallel to the lug **253** and is perforated at **261**. The holes **255**, **261** are aligned when the stop **257** is in contact with the stop **251**. The lock **263** is received in the holes to lock the boot in the described position.

Referring to FIGURES 1 and 3, a double pole single throw switch mechanism **265** is mounted in the switch box. The switch actuator **267** when moved to the right

in FIGURE 2 opens the switch and closes it when moved to the left.

The switch actuator is moved to the right by lever **243** when the shaft **247** is rotated clockwise (FIGURE 3) and to the left by the lever **245** when the shaft is rocked counter-clockwise.

A terminal strip **269** is mounted in the switch box for convenience in wiring the switch to the main line. The terminal **279** is connected by wire **281** to one blade **275** of the switch **277** while the other terminal **271** is connected by wire **273** to blade **283** of the other switch **284**. Wires **285** and **287** connect the other blades **289**, **291** of the switches **277** and **284** to the motor **167**.

The switch box is provided with an outlet **293** which is adapted to receive a conduit **295** for the power line not shown.

As shown in FIGURE 1, the switch box is provided with a removable cover **297** which is held in sealing relation on the box by screws **299**. Access is thus provided to the interior of the box to facilitate the connecting of the power line to the terminal block.

Operation

Assuming that the pump has been connected with a suitable liquid supply either directly to a suction pipe at the boss **5** or to a supporting pipe such as **1** with the suction pipe **23** immersed in the liquid to be pumped, the operator will first reset the register **200** to zero by rotating knob **209** in the proper direction. He will then grasp the nozzle **213** and disengage hook **229** from the boot **225** by tilting the nozzle slightly in a counterclockwise direction (FIG. 7) and moving it to the left. When the nozzle is free from the boot he may rotate boot **225** counterclockwise to close the motor switch **265**, which closure is effected by the rotation of shaft **227** and arm **245** with the boot. Stops **249**, **257** limit the rotation of the boot to prevent damage to the switch. The boot and switch are held in the positions described by the weight of the closed end of the boot.

It should be noted that the removal of the nozzle and the rotation of the boot may be accomplished simultaneously with one hand if desired.

The pump being driven by the motor draws liquid up through the suction pipe, through the check valve **31**, strainer **67**, **69** and chamber **53** into the pump **139**. The pump then discharges the liquid, under pressure, through chamber **89**, pipe **183**, connection **185**, meter **187**, conduits **189**, **190**, **193** and hose **197** to the nozzle **213**. Since the nozzle valve is usually closed for the period required by the operator to reach the fuel tank, the pressure in chamber **89** will reach a maximum so that the by-pass valve will open to prevent stalling of the motor.

As described above, the discharge pressure will be transmitted to diaphragm **103** by duct **129** and will depress valve **107** against the action of spring **119**. This vents chamber **101** to the suction chamber **53** so that the pressure in chamber **89** may overcome spring **127** and valve **123** will open the by-pass port **85** and allow liquid to circulate to the suction chamber **53** and the pump.

When the nozzle valve is opened, liquid will be discharged to the container and the pressure in chamber **89** will drop. This pressure being insufficient to overcome spring **119**, the pilot valve **107** will be closed. The pressure in chamber **101** will become equal to that in chamber **89** by the leakage through clearance **107—133**. Spring **127** and diaphragm **105** will now overcome the pressure in chamber **89** and close valve **123**.

It will be understood that as the nozzle valve is throttled the pressure in chamber **89** will build up and when the by-pass pressure is reached the by-pass valve will reopen a distance sufficient to prevent the motor from stalling.

In the structure shown in the drawings, the liquid is displaced from the tank by air which enters the ports **11** of coupling **3** and passes between the pipes **1** and **23** to the tank. Incoming air is filtered by the screen **15** and entrance of water, snow, etc., through the ports **11** is prevented by the conical shield **13**.

When the dispensing operation is completed, the nozzle is inserted in the boot and hook **229** is engaged with the boot. The weight of the nozzle will rotate the boot, shaft **227** and arm **243** clockwise (FIGURES 3 and 7) and open switch **265** to stop the pump motor. The rotation of the boot is limited by contact of stops **251** and **257**.

It should be noted that the boot may be manually rotated to the switch-off position and the nozzle may be inserted thereafter.

Further, as shown in FIGURE 8, the hose is draped down from the outlet connection **193** in a loop, is carried over the cradle **199**, thence down in another loop to the nozzle boot. A long hose may thus be used with the apparatus and may be stored out of contact with the ground.

The quantity of liquid dispensed is indicated on the register at the completion of the operation.

It is obvious that various changes may be made in the form, structure and arrangement of parts of the specific embodiments of the invention disclosed herein for purposes of illustration, without departing from the spirit of the invention. Accordingly, applicant does not desire to be limited to such specific embodiments but desires protection falling fairly within the scope of the appended claim.

What is claimed is:

A dispensing apparatus including a pump, an electric motor for driving the pump, a switch, a rock shaft, means on said shaft for opening and closing the switch when the shaft is rocked in opposite directions, a nozzle boot fixed to the shaft for rocking it, said rock shaft being disposed substantially horizontally and said boot being disposed substantially transversely of the shaft in such a manner that the weight of the boot will hold the rock shaft in the switch closed position, whereas the weight of a nozzle in the boot and the attached hose will urge the rock shaft to switch opening position.

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