

Feb. 14, 1933.

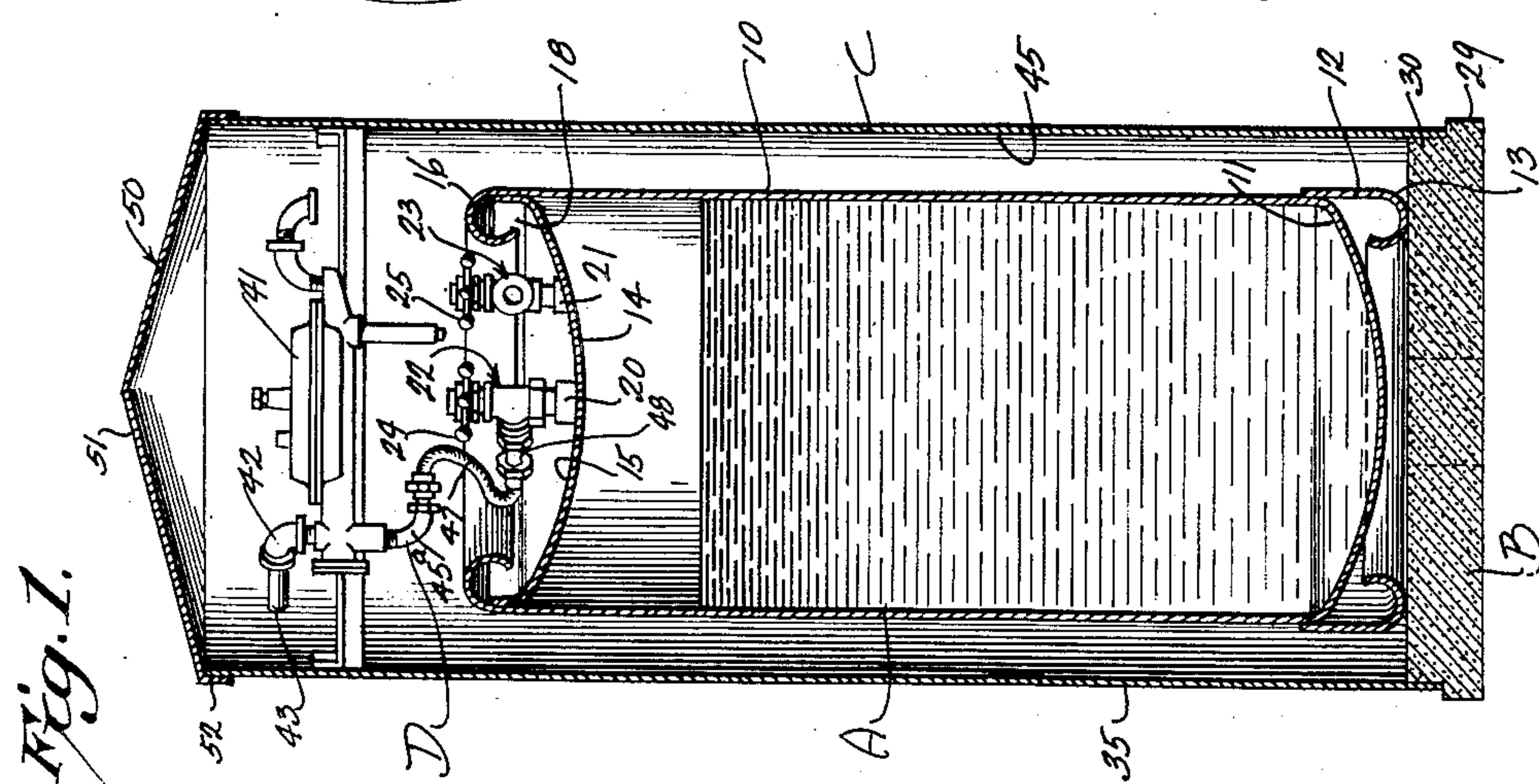
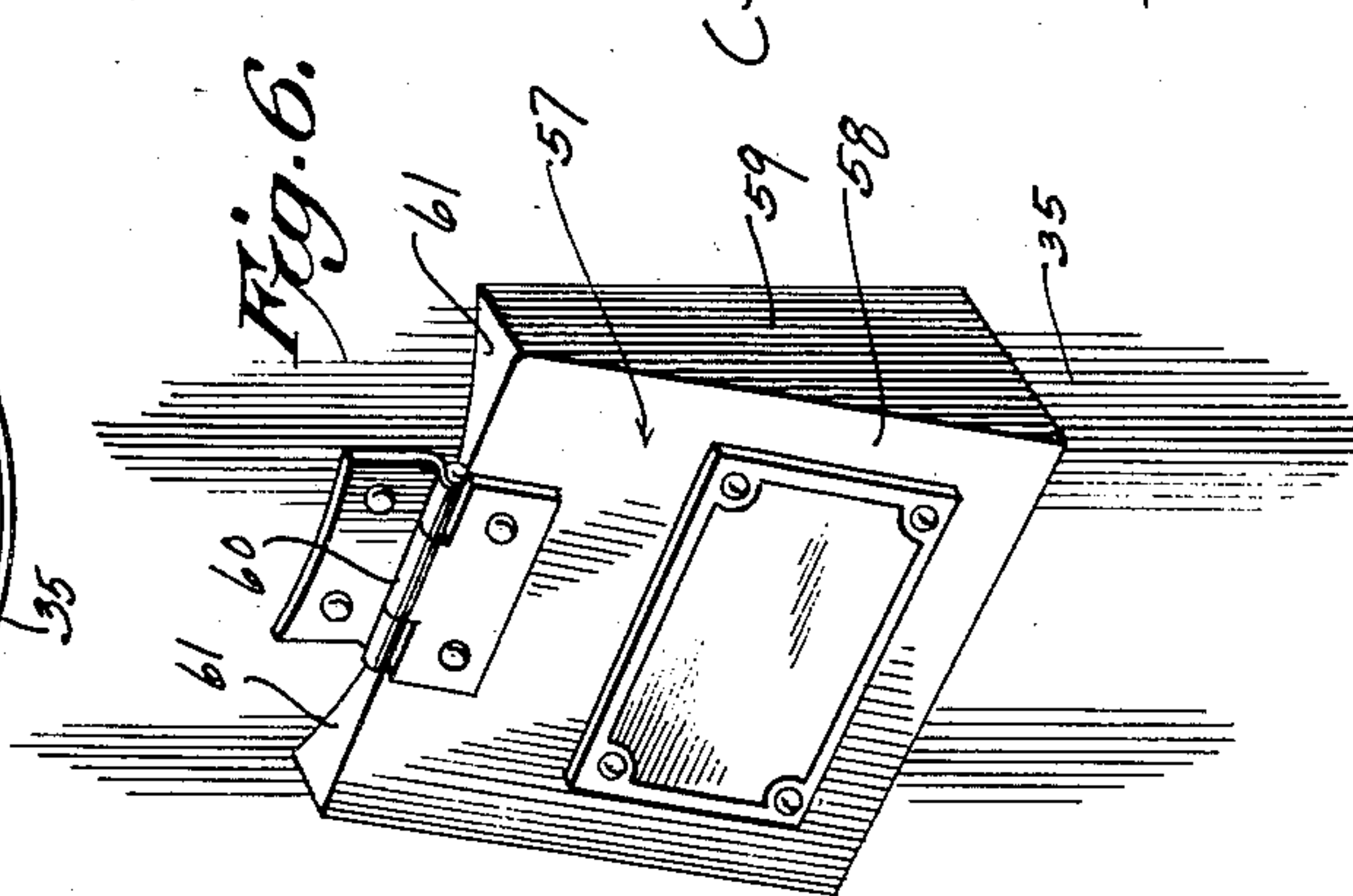
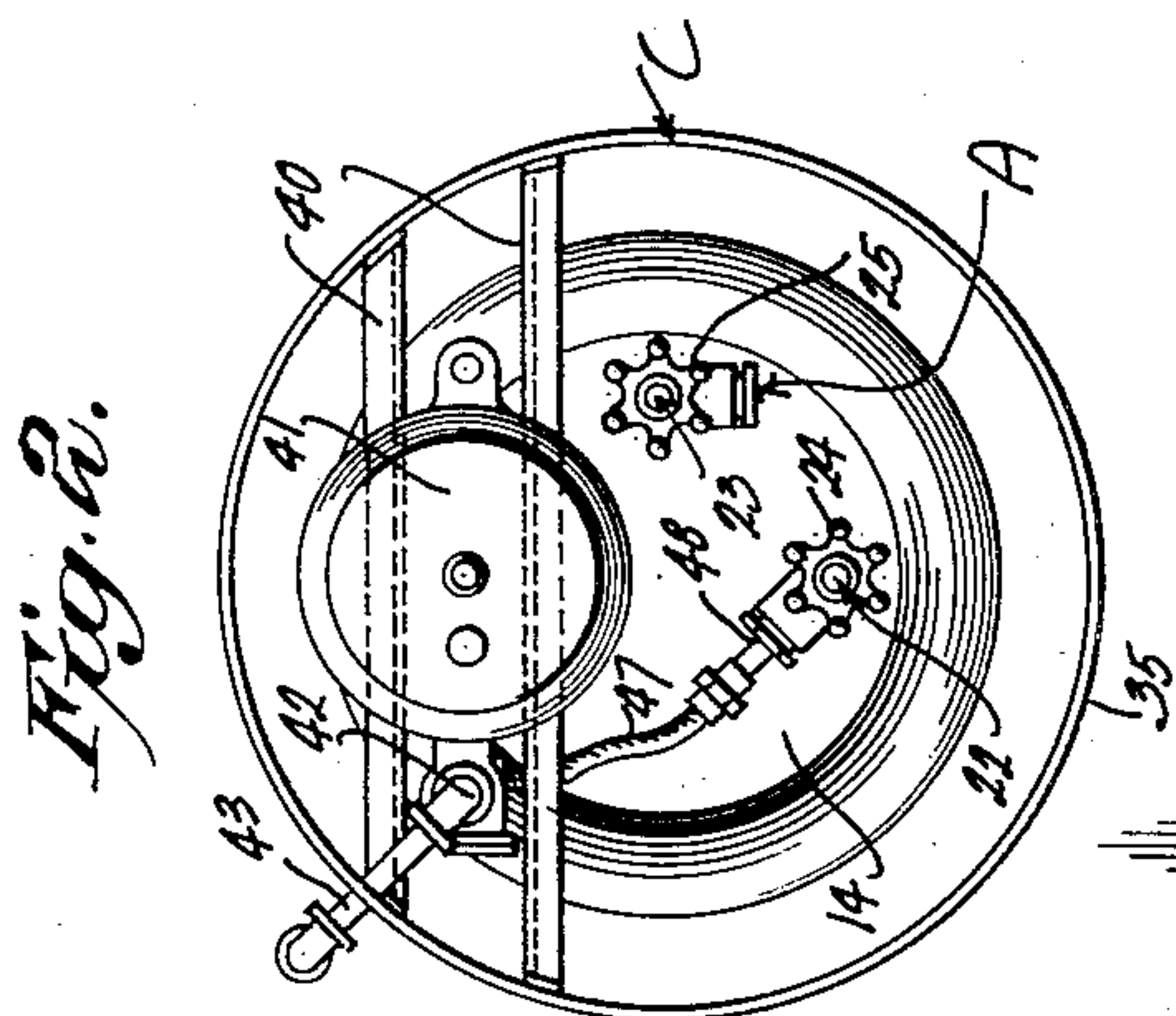
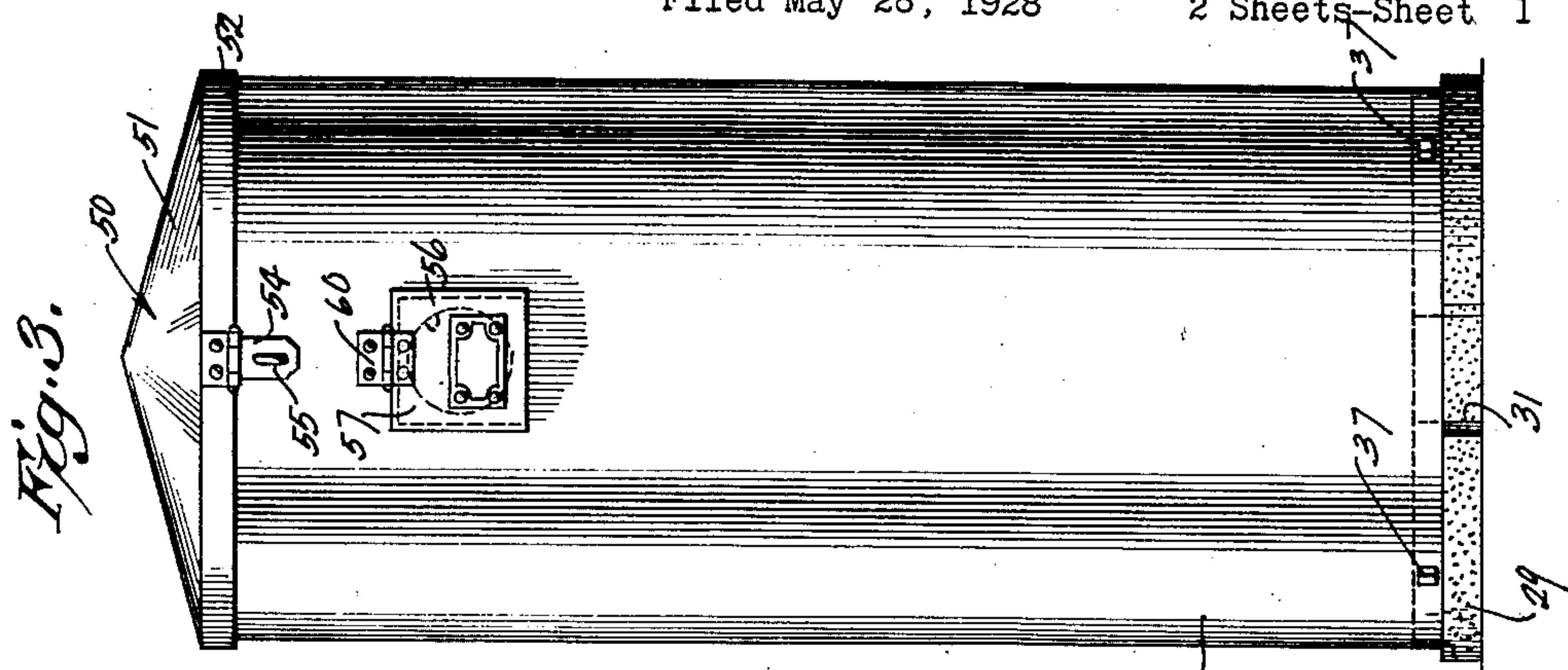
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1,897,160

CUSTOMER'S APPARATUS FOR STORING AND DISPENSING LIQUID GAS

Filed May 26, 1928

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

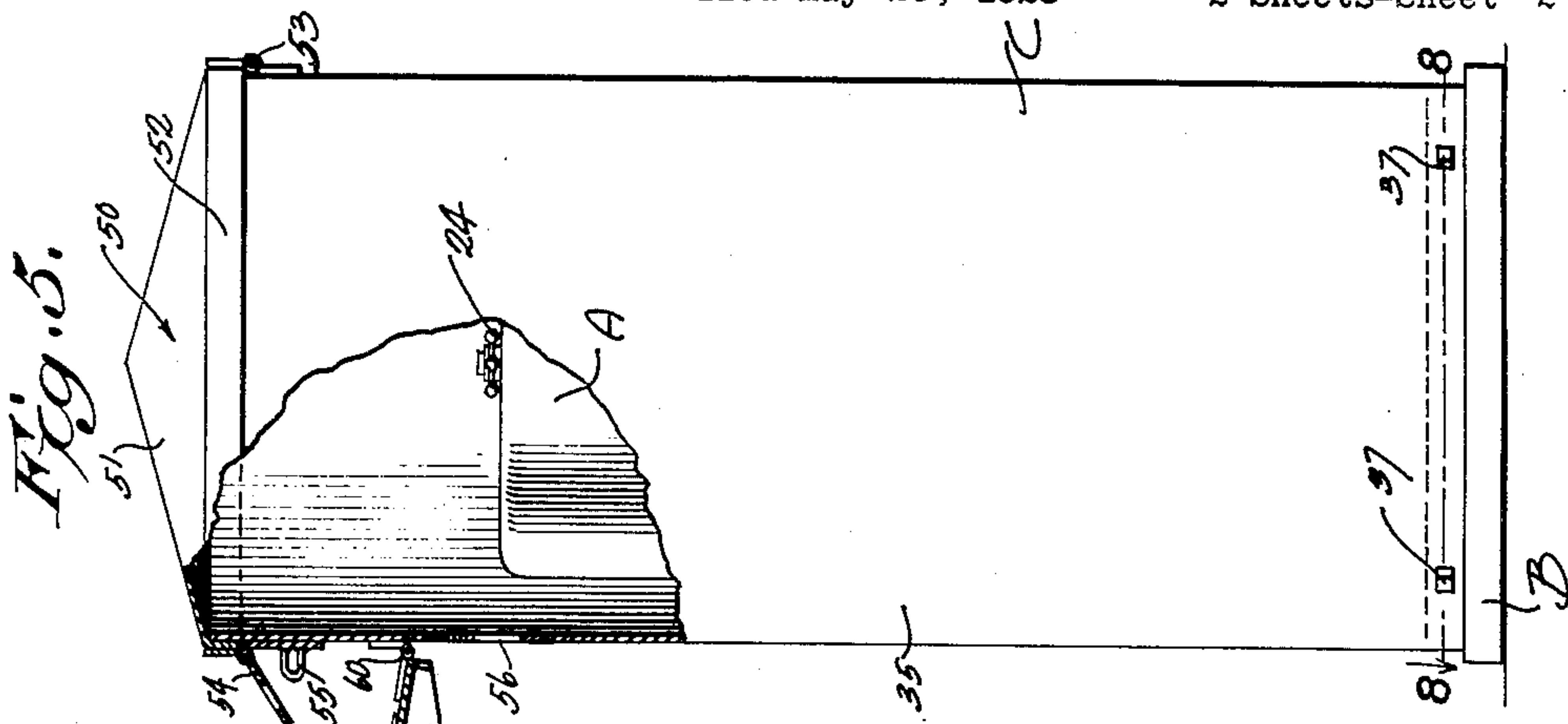


Fig. 7.

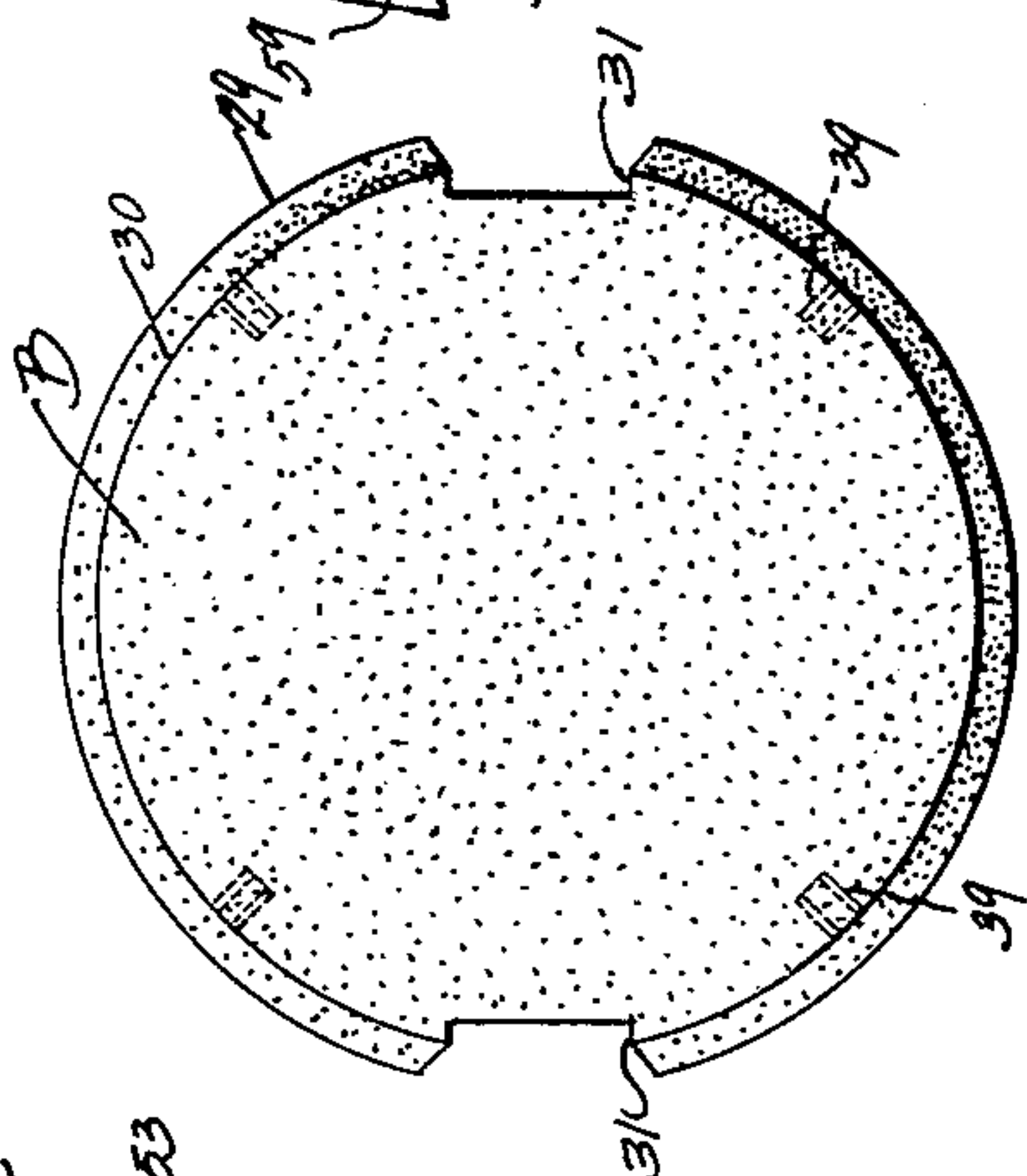


Fig. 8.

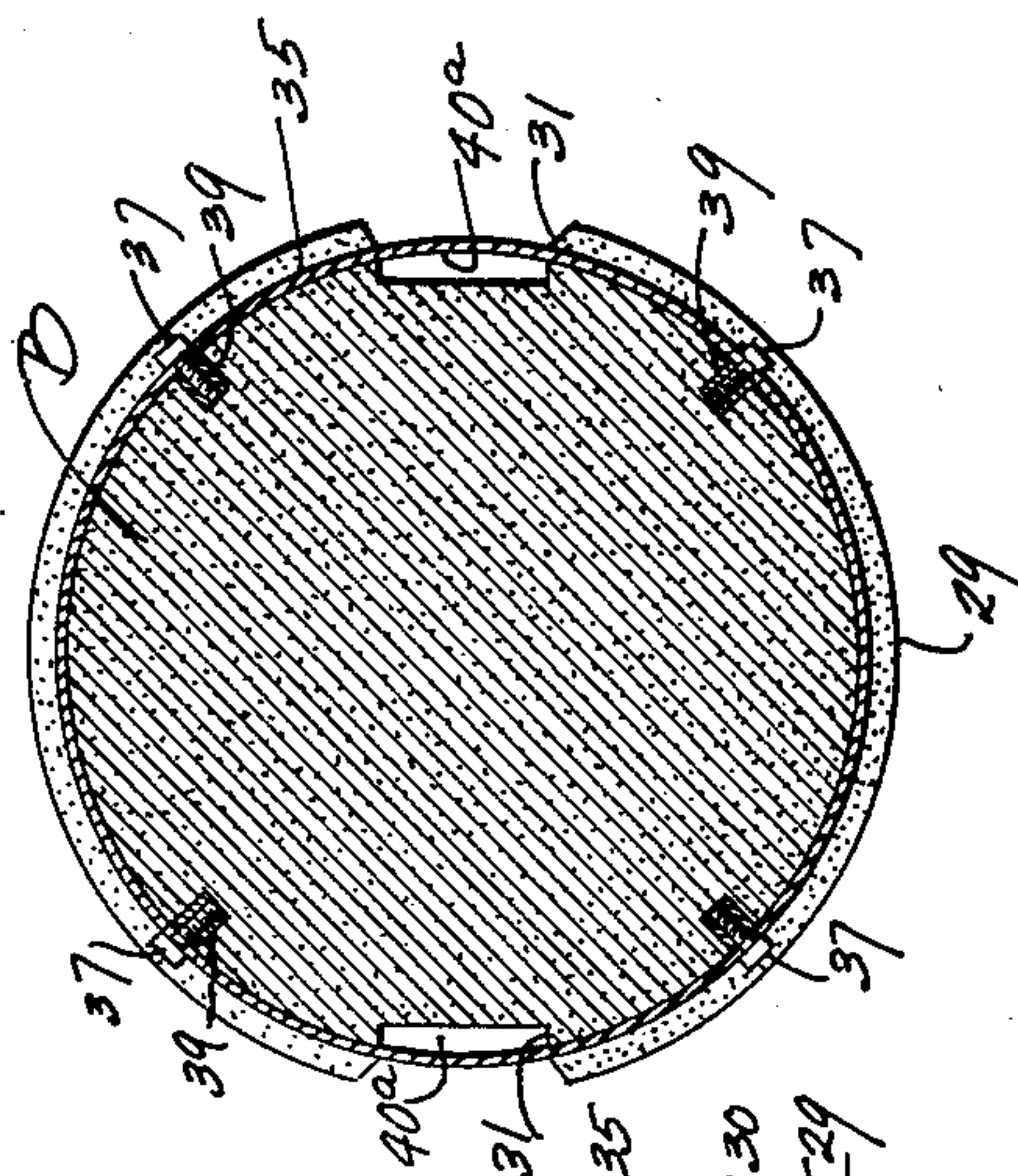
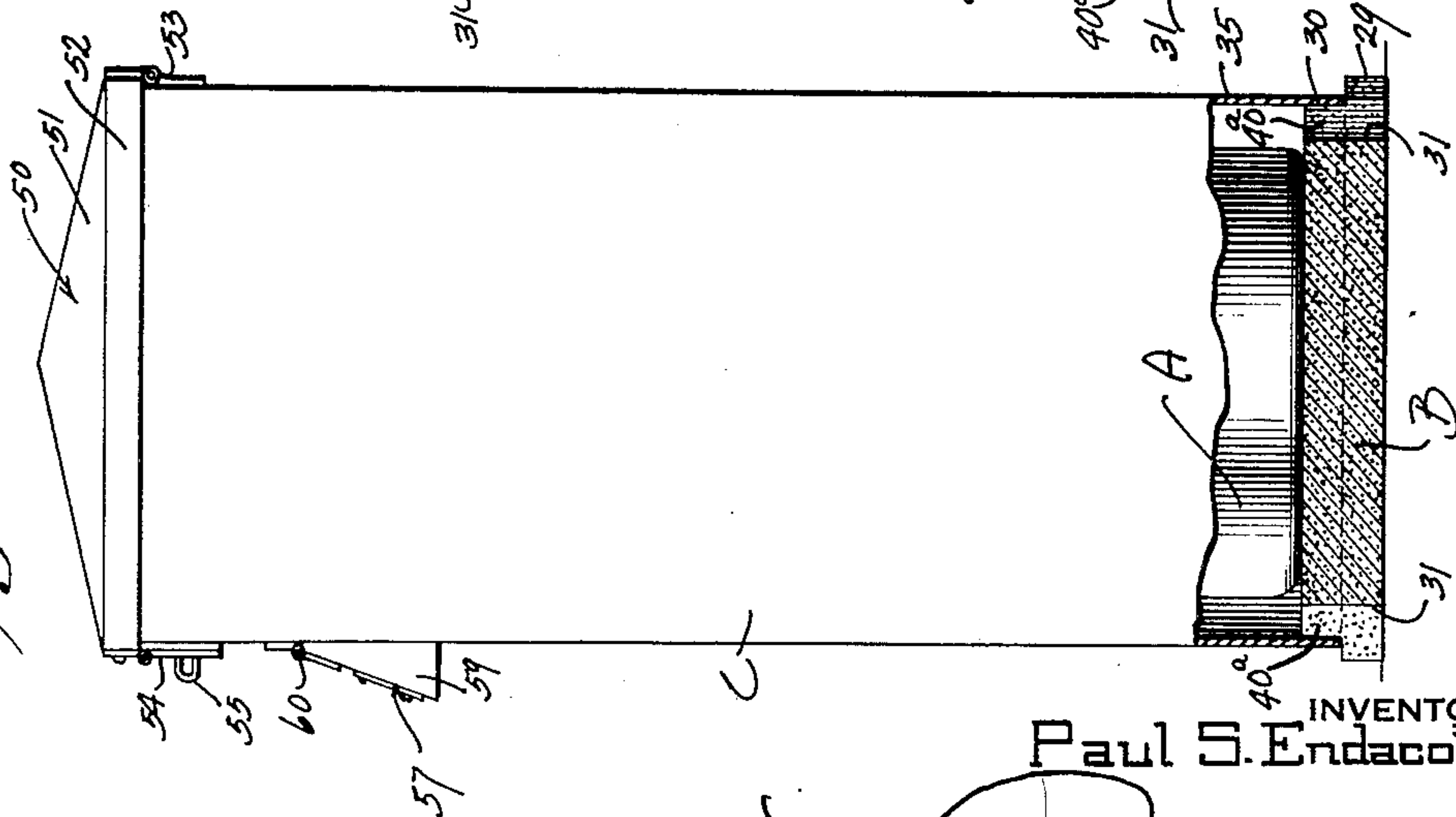


Fig. 4.



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UNITED STATES PATENT OFFICE

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CUSTOMER'S APPARATUS FOR STORING AND DISPENSING LIQUID GAS

Application filed May 26, 1928. Serial No. 280,745.

This invention relates to improved apparatus and equipment adapted to be installed on a customer's premises for storing and dispensing liquid gas, such as compressed natural gas in the liquid state.

The primary object of the invention is to provide customers' equipment which will render it economically possible to vend liquid gas to consumers, with substantially the same efficient service that is rendered by public utility concerns, such as those dealing in artificial or natural gas; the improved apparatus notably differing in character from apparatus presently used for distributing liquid gas in that the customer's tank when once installed on the customer's premises is never removed for replenishing the liquid gas, but is refilled after a novel distribution method and with apparatus more particularly set forth in my co-pending application, Serial No. 280,746 filed May 26, 1928.

Liquid gas is at present distributed and vended to customers after a method and with equipment which places a great deal of responsibility upon the customer, and which does not permit of an economical distribution. With present methods a pair of containers are detachably connected with the service line of the consumer, and one of these containers is valve opened to the service line, with the other container having an auxiliary supply of liquid gas, which is used when the liquid gas of the first container is exhausted. The customer is notified when the first container is exhausted, only by the extinguishing of the lights or burners in his house or plant, and this necessitates that the customer go to the location of liquid fuel storage and turn off the exhausted tank from the service line and open the valve to the auxiliary tank. The customer must look after the placement of a new auxiliary tank on his service connection, and of course the distributor must make irregular and special trips to the customer's house, and cannot serve a route in regular manner. It is thus apparent that with present methods of distributing liquid gas the responsibility placed upon the customer is great, with a lessening of the safety factor, and the distributor must handle the

large liquid gas containers, at every installation or replenishment of fuel, and cannot economically distribute the product along a route.

With the present invention the customer's equipment is such that the customer is relieved of all responsibility for replenishing his supply of liquid gas, inasmuch as he is provided with but one container which is serviced entirely by the distributor, who vends the liquid gas and discharges the liquid gas directly into the customer's tank, in a manner more particularly set forth in my co-pending application above referred to. Thus, the customer is relieved of responsibility for taking care of his supply of liquid gas, and the dealer may make regular trips along a defined route.

A further object of the invention is the provision of improved customer's equipment for the dispensing of liquid gas to the customer's premises, which includes the provision of a guarded liquid gas container, having permanent service connection with the customer's service line in a relation which will enable the distributor to determine the amount of liquid gas dispensed into the container at regular intervals.

A further object of this invention is the provision of customers' equipment for receiving and dispensing liquid gas, having a high safety factor by reason of the novel construction and guarded condition thereof.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawings, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a vertical sectional view taken through the customer's liquid gas tank or container as installed on the customer's premises within a suitable protecting housing.

Figure 2 is a plan view of the apparatus of Figure 1, with the closure removed.

Figure 3 is a side elevation of the customer's equipment, showing more particularly the details of the tank housing and mounting thereof.

Figure 4 is a side elevation of the customer's equipment, partly in section, and showing more particularly the housing and mounting thereof.

5 Figure 5 is a fragmentary sectional view of the customer's equipment, showing the housing broken away and with an emergency closure lifted to disclose a hand opening which may be used for shutting off the flow
10 of gas from the liquid gas container to the service line, under emergency circumstances.

Figure 6 is a fragmentary perspective view of the closure or lid illustrated in Figure 5.

15 Figure 7 is a plan view of a foundation upon which the housing for the liquid tank is mounted.

Figure 8 is a sectional view taken substantially on the line 8—8 of Figure 5, thru the supporting base or foundation and the lower
20 end of the housing mounted thereon.

In the drawings, wherein for the purpose of illustration is shown only a preferred embodiment of the customer's equipment, the letter A may generally designate the liquid
25 gas receiving tank or container, which is mounted upon a foundation or base B and suitably housed within a cabinet, housing or casing C; the said container or tank A having a novel service connection D to the service
30 line in the customer's premises.

The liquid gas container A preferably comprises the tank body 10, of cylindrical formation, having a bottom outwardly bulged convex wall 11, from which peripherally depends an annular supporting ring or skirt 12, having a rolled lower supporting margin 13 adapted to rest upon the base or foundation. An inwardly concaved cylinder head or top wall 14 is provided, and it is to
35 be noted that the walls of the cylinder are welded, or they may be seamless drawn. The upper surface 15 of the top wall or cylinder head is concaved inwardly, and peripherally about the top of the tank is an upwardly and
40 inwardly bulged segmental margin 16 providing a peripheral socket or pocket 18 therebelow, in which the jaws of gripping tongs may engage, to facilitate the weighing operation of the tank and its contents, in manner
45 more specifically detailed in my copending application above mentioned. Outlet and inlet fittings 20 and 21 respectively are provided on the top wall 14, having valves 22
50 and 23 respectively connected therewith, with suitable openings thereto, to which couplings may be connected. Hand wheels 24 and 25 are respectively provided for the valves 22 and 23, as shown in the drawings.

60 The base B is preferably detachable, insofar as any ground anchorage is concerned, and it is adapted to set upon a suitable level support or a firm ground foundation. It comprises a cylindrical body portion 29, having a reduced upwardly extending cylindrical

portion 30, adapted to be fitted into the lower part of the housing or cabinet C, in a relation to be subsequently described. At diametrically opposed sides the foundation is notched, as shown at 31 in Figure 7 of the
70 drawings, transversely into the body 29, and a short distance into the reduced portion 30, and these notches or recesses 31 enable ventilation openings to be provided in the bottom of the cabinet C as will be subsequently
75 described.

The cabinet C comprises a cylindrical shaped body portion 35, open at the lower end thereof and into which open end the reduced portion 30 of the base B snugly fits. The
80 lower marginal portion of the cabinet body 35 is transversely provided with openings, through which bolts 37 extend; the base reduced portion 30 being provided with radial sockets having filler pieces 39, in a secured relation therein, and into which the bolts 37
85 screw, to enable a firm connection of the lower part of the cabinet body upon the base B. When in this position the cabinet has openings 40^a in the bottom thereof, by reason of the recesses 31, which are open to the atmosphere as shown in Figure 4 of the drawings,
90 and permit the interior of the cabinet to be ventilated.

The customer's liquid gas tank 10, of course,
95 rests upon the base B and within the housing or cabinet C. The compartment 45 in the cabinet is of such a diameter that the tank 10 rests in spaced relation therein, and the cabinet body 35 extends considerably above
100 the top of the tank 10. Parallel angle beams 40 are connected at the ends thereof to the opposite sides of the body 35, above the tank 10, as more particularly shown in Figures 1 and 2 of the drawings. These beams 40 are
105 disposed to one side of the central axis of the body 35, so as not to obstruct access to the valves 22 and 23 from the open top of the cabinet body 35. On the rails or beams 40 a pressure regulator 41, of any approved type,
110 is supported, which may be provided with a mercury seal. The pressure regulator 41 has a fitting 42 connected to the service line 43, which extends radially into the tank thru the housing C; it being understood that the service connection 43 is suitably connected to the
115 service line which feeds the gas to the customer's premises for any desired purpose. Below the fitting 42 is a connection 45^a, to which a flexible high pressure resistant conduit 47 is connected; the conduit 47 being
120 suitably connected to the nozzle 48 of the valve 22, for the obvious purpose of feeding the gas therethrough into the service line.

The top of the housing body 35 is open
125 above the pressure regulator 41. A closure 50 is provided for this open top of the body 35, comprising a suitable lid portion 51 having a peripheral flange 52 adapted to fit about the upper margin of the body 35. This flange
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52 of the closure is hinged at 53, to the body 35, so that the closure may be swung entirely out of the way of the top of the body 35, to enable the placement of supporting scales thereon, in accordance with that feature of my invention set forth in my co-pending application above referred to, so that the scales may be made to support the weight of the tank and its contents within the housing, for the purpose of weighing the same. The closure 50 at the side opposite the hinge 53 is provided with a hasp 54, which cooperates with a suitable staple 55, the latter of which may receive a padlock therethrough to prevent the customer from tampering with the contents in the top of the casing or housing C; it is being understood that the key to the padlock is not retained by the customer.

Below the hasp connection of the closure, on the body 35, the latter is provided with a circular hand inserting opening 56, thru which an operator may insert his hand to grasp the hand wheel 24 of the valve 22 and shut off the latter in case emergency demands that the flow of gas to the customer's premises be shut off. This is the only responsibility that the customer has, that is, that of closing the valve 22 where circumstances, such as a fire, demand the gas flow be cut off. A novel flap 57 is provided to close the opening 56 from direct admission of the hand or arm thru the opening 56. This flap, as shown in the drawings, consists of a front plate 58 having side flanges 59 which flare in increasing width from the top of the lid to the bottom thereof, and which are adapted to abut against the outer surface of the body 35. The flap 57 is hinged at 60 to the body 35, at a location above the opening 56, and the flanges or side portions 59 engage the body 35 at opposite sides of the opening 56. Fillet flanges 61 may be provided at the top edges of the flap plate 58 and flanges 59, as shown in Figure 6. There is no bottom flange for the flap, so that an opening is provided in a downwardly facing relation at the bottom of the flap, by means of which air may circulate therethrough and through the hand inserting opening 56, to clear the top of the cabinet of gas vapors.

It is understood that the flexible connection 47 is provided in order that the liquid gas tank A may be elevated and lowered off and upon the base B when weighing the same, as described in my co-pending application above referred to, and to prevent injury to the connections should the tank be lifted or moved for any other purpose. This is a very important feature of the customer's service equipment, since it permits the uninterrupted flow of gas to the customer's premises during a replenishing of the liquid gas in the tank A.

From the foregoing description it is apparent that a customer's service equipment has been provided for use in connection with

the distribution of liquid gas for household use, which embodies an arrangement which permits of an economical distribution of liquid gas, in contradistinction to the multiple tank customers' unit now in use in some sections of the United States. The tank is never dislodged from its housing C, but the liquid fuel is replenished by suitable means set forth in my co-pending application above referred to, connected to the valve 23. The customer is not charged with responsibility for maintaining an adequate supply of liquid gas, and the distribution of liquid gas to customers is simplified and rendered practical, primarily because of a difference of the present invention over the multi-tank or container unit now used by dispensing liquid gas to customers.

Various changes in the shape, size, and arrangement of parts may be made to the form of invention herein shown and described, without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In customers' service equipment for dispensing liquid gas the combination of a tank for containing liquid gas, said tank having gas outlet and liquid gas filling connections on the top thereof, housing means enclosing said tank and its connections, a customer's service line extending through the housing means being coupled to the gas outlet connection of the tank, said coupling means including a loosely hung length of flexible tubing thru which the gas passes to the service line, which will permit the tank to be raised and lowered within the housing means, and a pressure regulator supported by the housing means above the tank and disposed in said coupling means and thru which the gas passes to the service line.

2. In customers' equipment for liquefied gas service a liquid gas container, a housing enclosing the liquid gas container in a protecting relation, a service line to the customer's premises extending into the housing and having a coupled connection with the upper portion of the liquid gas container for receiving gas therefrom, a shut-off valve on the container in the upper part of the housing for regulating flow of gas to the service line, said housing having a hand inserting opening in the upper part thereof which may be used to insert a hand to close said valve, said opening being small in size and insufficient to permit removal of the gas container from the housing, said housing having openings in the lower part thereof to enable a draft circulation to take place through the housing between the lower openings and the upper hand inserting opening.

3. In customers' service equipment for dispensing liquid gas the combination of a housing, a liquefied gas containing tank in the housing, enclosed thereby, a support in the

housing above the tank, a pressure regulator upon said support above the tank, a service line entering the housing and connected with the pressure regulator, a gas outlet connection on the top of the tank, and a coupling connected with the gas outlet connection and with the pressure regulator for supplying gas from the tank to the latter and the service line connection, said coupling including a connection permitting vertical lifting movement of the tank in the housing without disrupting service flow of gas.

4. In customers' service equipment for dispensing liquid gas the combination of a housing, a liquefied gas containing tank in the housing enclosed thereby a support in the housing above the tank, a pressure regulator upon said support above the tank, a service line entering the housing and connected with the pressure regulator, a gas outlet connection on the top of the tank, and a coupling connected with the gas outlet connection and with the pressure regulator for supplying gas from the tank to the latter and the service line connection, said coupling including a flexible loosely arranged high pressure resisting tube.

5. In customers' service equipment for dispensing liquid gas to a customer's premises the combination of a cabinet, a liquid gas tank enclosed in the cabinet, said cabinet in the upper portion thereof having a small opening, and a closure flap on the cabinet spaced over said small opening, said closure flap having a lower facing opening to which access may be had thru the opening in the cabinet, the cabinet in the lower part thereof having openings thru which a circulation of air may take place with respect to the opening in the upper part of the tank.

6. In service equipment for dispensing liquid gas the combination of a concrete base, a metal shell mounted on the concrete base and therewith providing a cabinet having openings at its lower portion, a closure on the top of the cabinet for exposing the interior of the cabinet, said cabinet laterally therein at the top thereof having a small hand inserting opening, a flap closing said last mentioned opening from direct exposure from the side of the cabinet, a liquid gas tank in the cabinet, and a service line extending thru the cabinet and having connection with the liquid gas tank for receiving gas therefrom.

7. In equipment of the class described a vertically elongated cabinet having a small opening in the upper portion thereof facing laterally of the cabinet, a closure flap hinged at the top thereof above said opening, and including a body and side protecting flanges for holding the flap at the lower part thereof spaced from the cabinet to provide a downwardly facing opening below the small opening in the cabinet.

8. In equipment of the class described a

substantially circular base having a reduced upper portion, the base having lateral recesses therein extending into the reduced upper portion, a cylindrical shaped housing body receiving the reduced upper portion of the base therein, means connecting the housing body at the lower part thereof to the reduced upper portion of the base, said housing body when assembled on the base providing openings from the interior thereof thru the recesses of the base to exterior of the housing body, and means providing a top ventilating opening in said housing body adapted to receive air for circulation through the tank and through the lower openings in said base.

9. In equipment for the dispensing of gas, a substantially circular base having a reduced upper portion, the base having lateral recesses therein extending through the thickness thereof, a cylindrical shaped housing body receiving the upper reduced portion of the base therein, means connecting the housing body at its lower end to the reduced upper portion of the base, said housing body when assembled on the base having said recesses of the base opening thereinto, and a top opening for the housing body having closure means therefor.

10. Customers' equipment for dispensing liquid gas, comprising a tank of a nature suitable for receiving in its liquid phase a superatmospheric pressure liquefied gas, said tank having means thereon to enable the supply of liquid fuel to be fed thereinto, and means connecting the tank with the service line to the customer's premises including a stationary pressure reducing valve rigidly connected to the line leading to the customer's premises, and a loosely disposed length of high pressure resisting flexible tubing connected between the pressure reducing valve and tank through which gas passes from the tank to the pressure reducing valve and service line and which will enable the tank to be lifted for weighing without disrupting service flow of gas from the tank to the service line.

11. Customers' equipment for dispensing liquid gas which comprises a tank of a nature suitable for receiving superatmospheric pressure liquefied gas, a housing for enclosing said tank, said tank terminating short of the top of said housing to provide a space, inlet filler and outlet valves on the top of the tank in said space, a service line entering said housing and connected with the outlet valve, said connection including a flexible length of tubing enabling the tank to be lifted upwardly through the space within said housing, and a closure on top of the housing for access to said valves.

12. In customers' service equipment for dispensing liquid gas, the combination of a supporting base, a tank normally resting on the

base and containing liquid gas, said tank having gas outlet and liquid gas filling connections on the top thereof, a housing enclosing and surrounding said tank and its connections, a customer's service line extending through and fixedly connected with the housing and projecting thereinto, and a loosely hung length of flexible tubing connected between the end of the service line in the housing and the gas outlet connection for transfer of gas from the tank into the service line, said flexible tubing permitting the tank to be raised and lowered within the housing.

13. In equipment for dispensing liquefied gas, a base having a reduced upper portion, the base having lateral recesses therein extending through the thickness thereof, and a housing body receiving the upper reduced portion of the base therein, said housing body having a top ventilating opening and when assembled on the base having said recesses of the base opening thereinto for ventilation at the bottom of the housing body.

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