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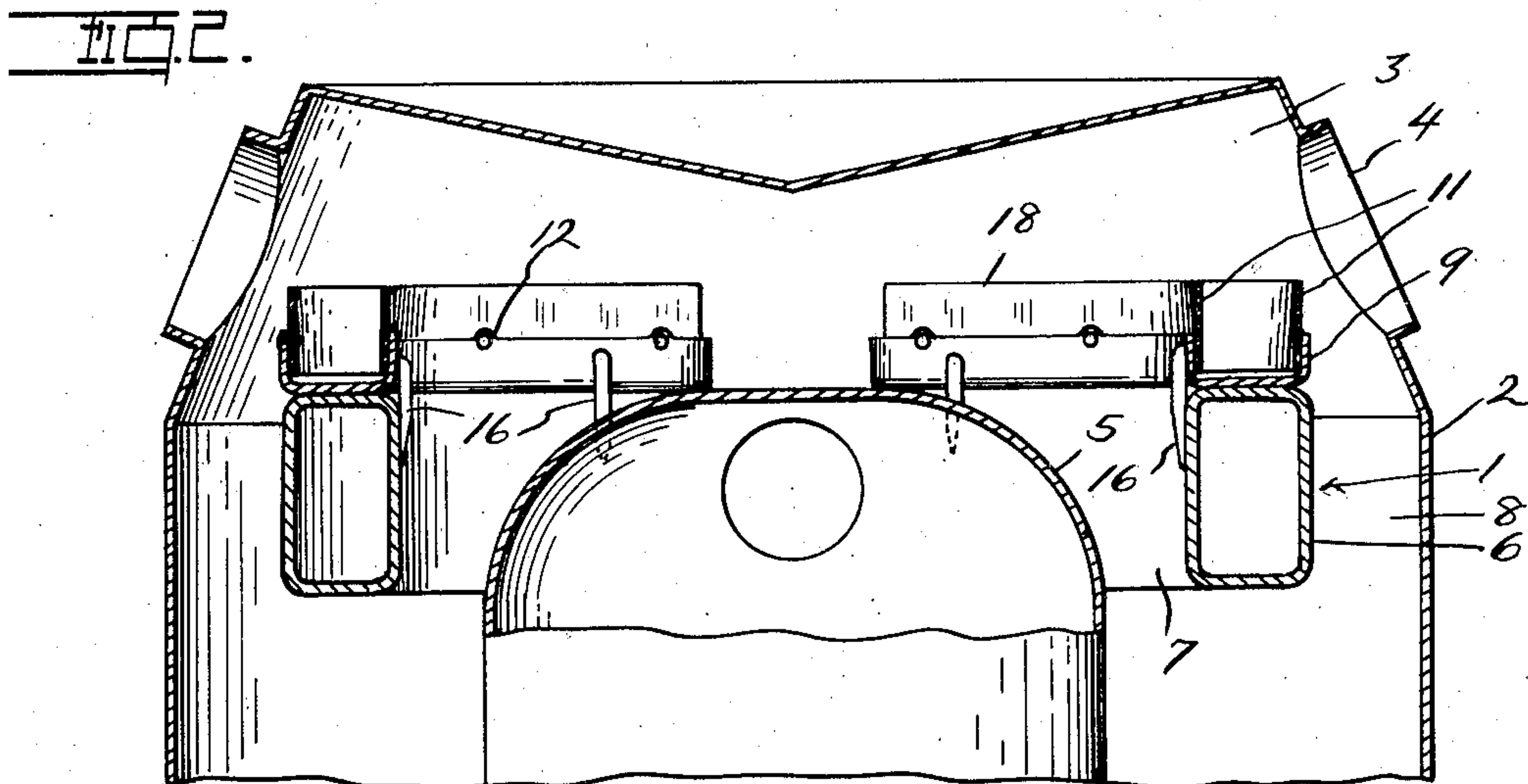
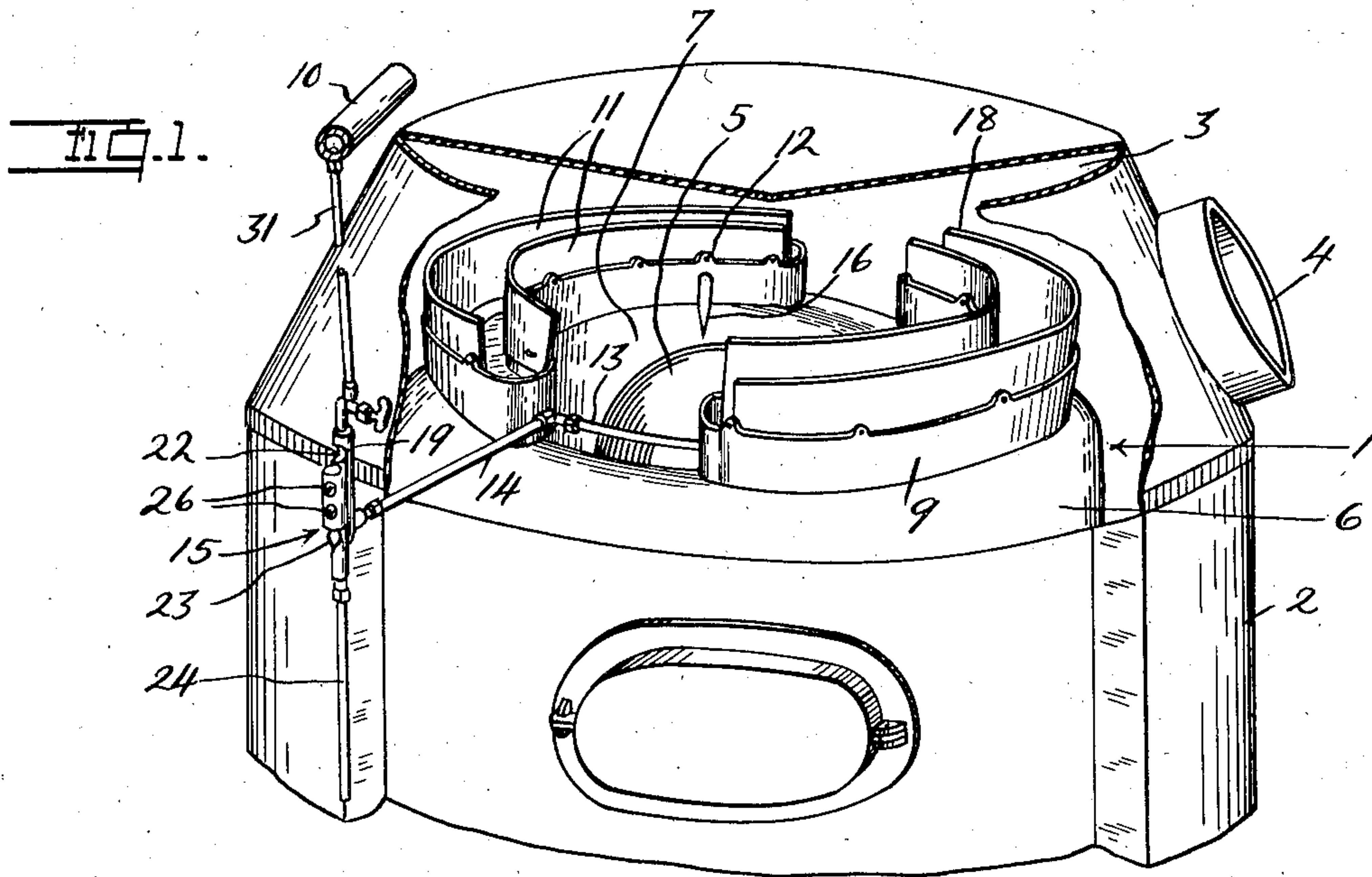
P. A. WEYL

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HUMIDIFIER

Filed Sept. 25, 1933

2 Sheets-Sheet 1



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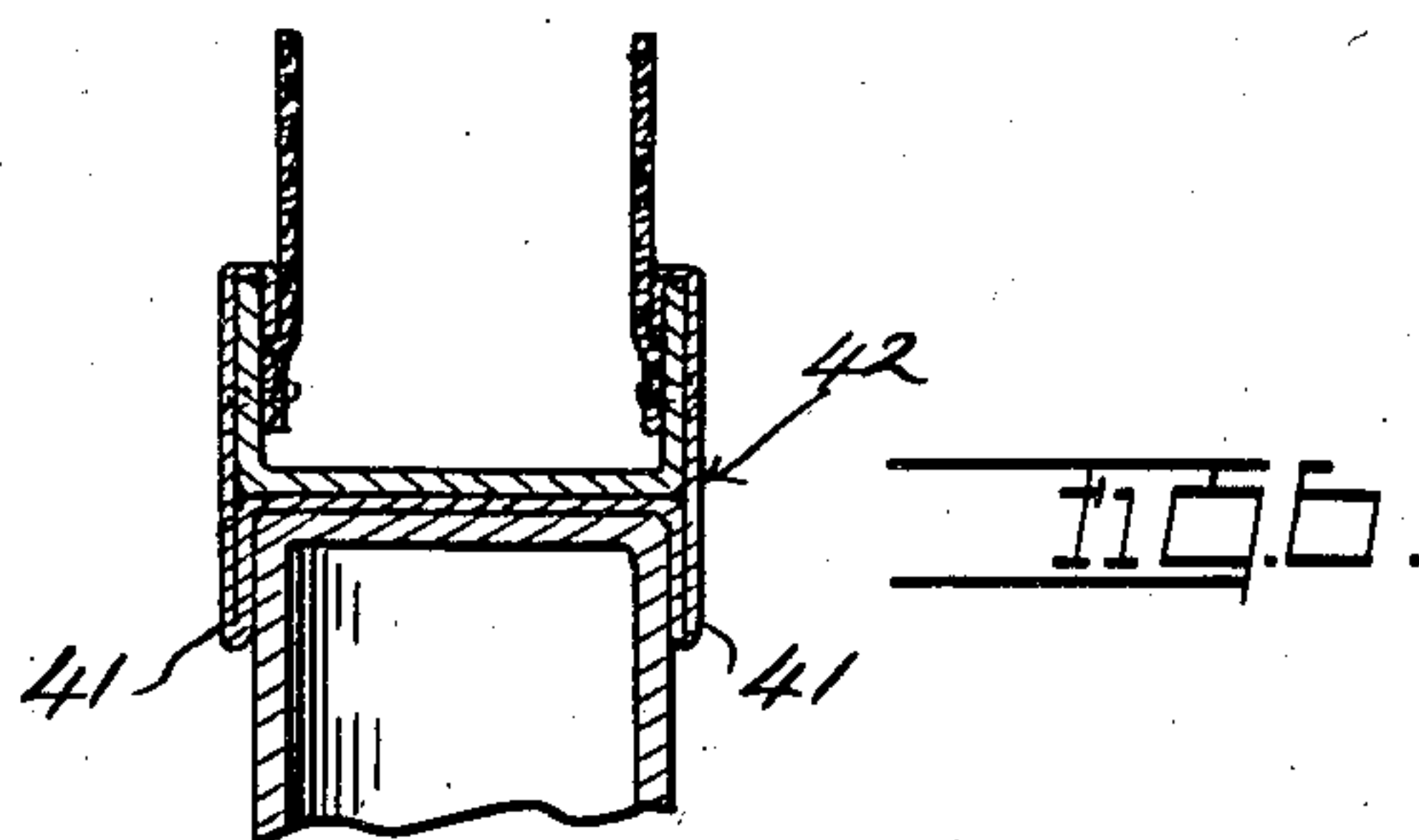
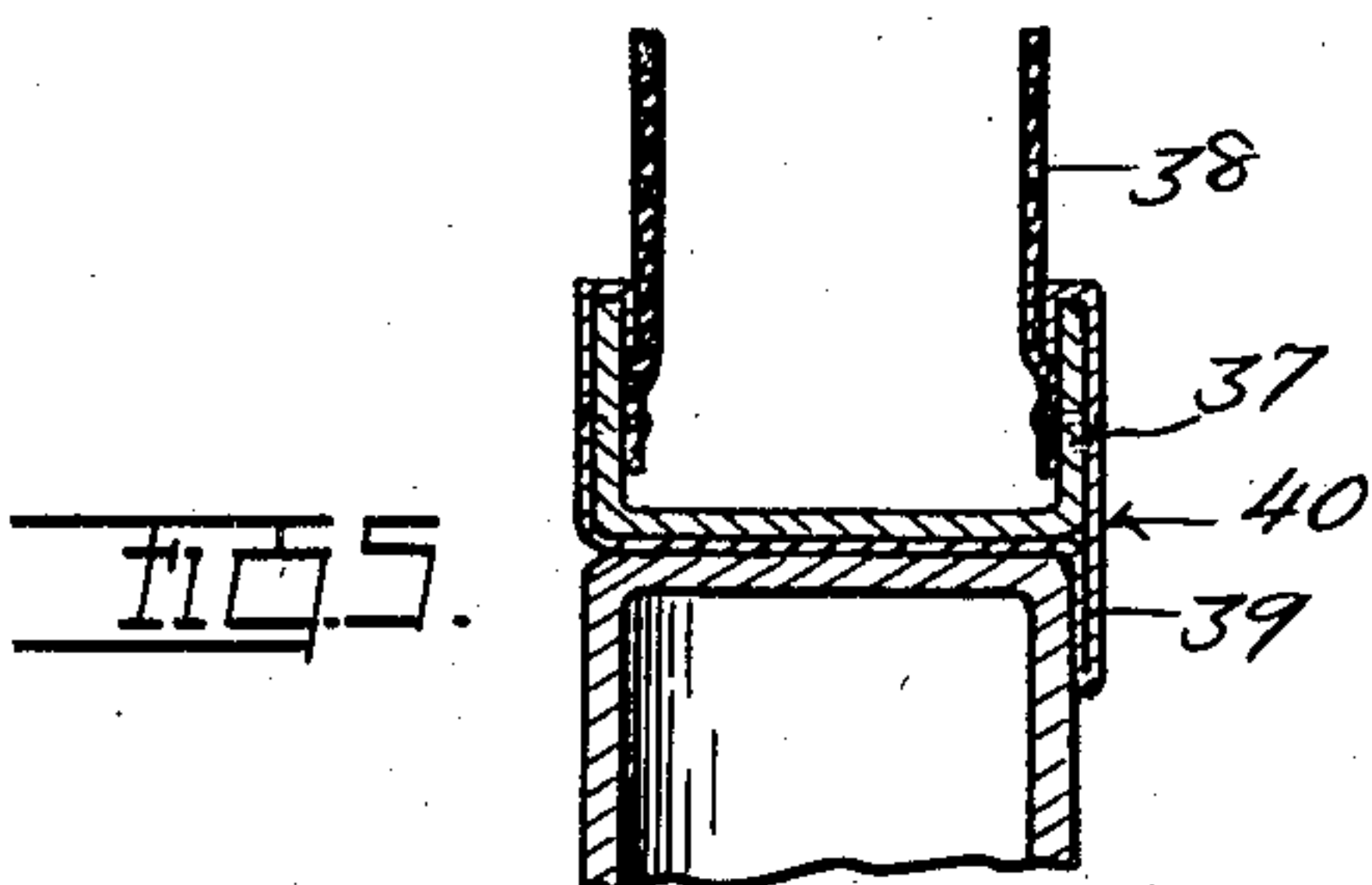
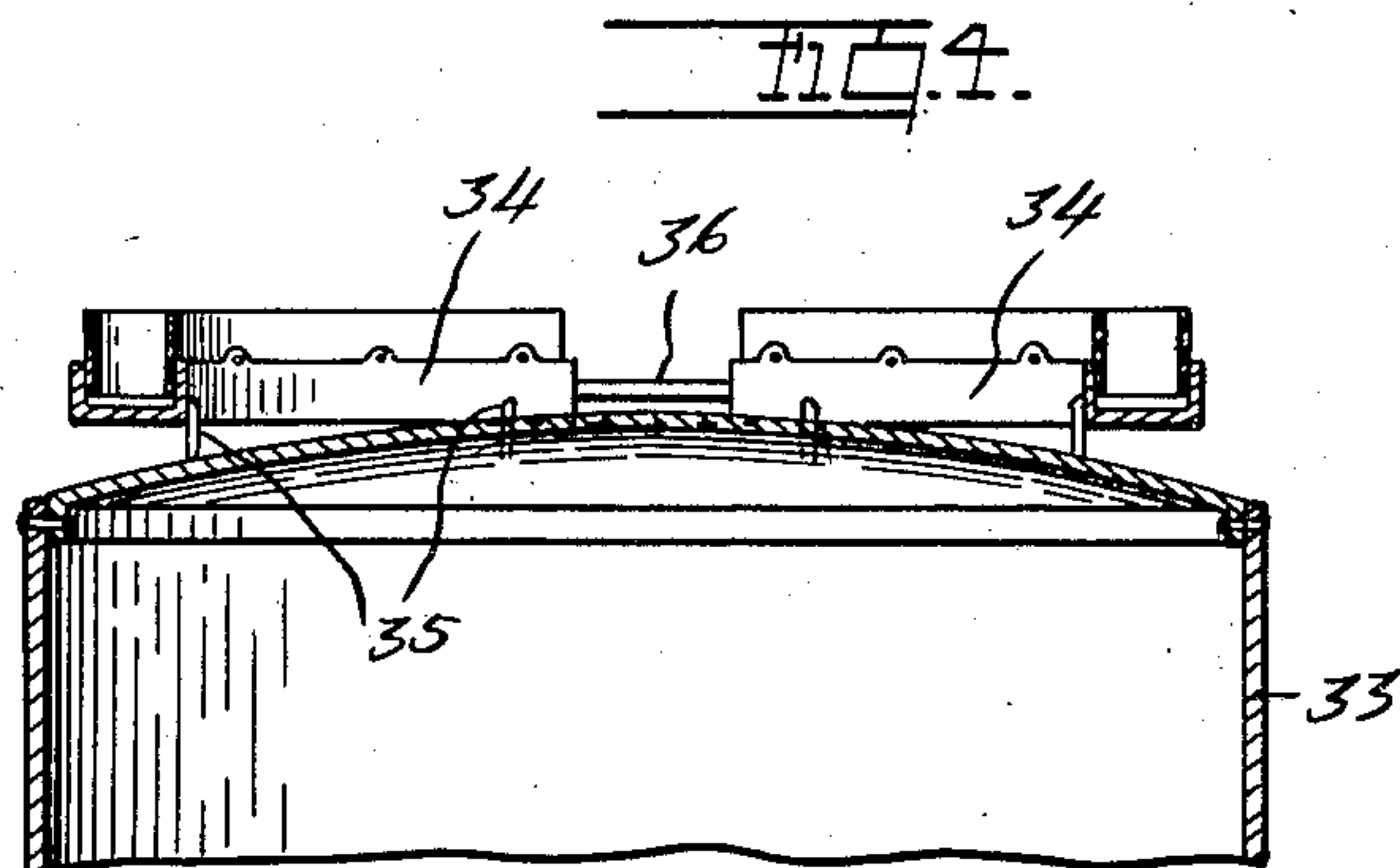
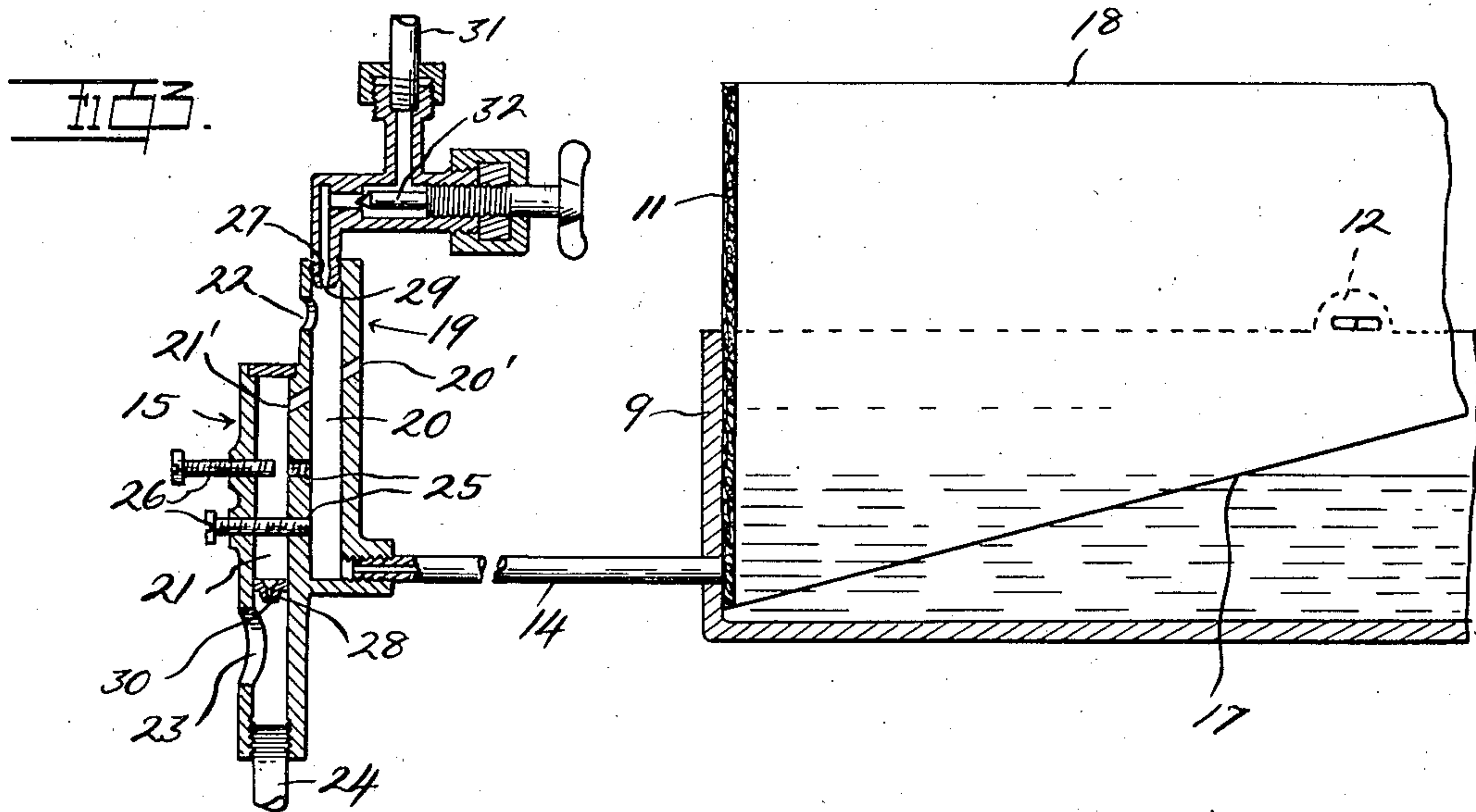
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HUMIDIFIER

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2 Sheets-Sheet 2



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2,022,394

HUMIDIFIER

Pierce A. Weyl, Dearborn, Mich.

Application September 25, 1933, Serial No. 690,891

8 Claims. (Cl. 126—113)

The invention relates to humidifiers and refers more particularly to humidifiers for use with warm air furnaces.

The invention has for one of its objects to provide a construction of humidifier which allows the free flow of the warm air through the warm air furnace and which is efficient in operation. Another object is to provide a construction of humidifier which may be readily installed in a warm air furnace. A further object is to provide improved means for controlling the operation of the humidifier to thereby secure proper relative humidity in the room or rooms heated by the furnace.

These and other objects of the invention will become apparent from the following description, taken in connection with the accompanying drawings, in which

Figure 1 is a perspective view, partly broken away, showing a humidifier embodying my invention and installed in a warm air furnace;

Figure 2 is a vertical section therethrough;

Figure 3 is also a vertical section illustrating the means for controlling the operation of the humidifiers;

Figure 4 is a view similar to Figure 2, showing another embodiment of my invention;

Figures 5 and 6 are sectional views showing other embodiments of my invention.

Referring to Figures 1, 2, and 3, the humidifier showing an embodiment of my invention is installed in a warm air furnace having the combustion chamber 1, the casing 2, the warm air chamber 3 enclosed between the casing and the top of the combustion chamber, and suitable ducts or outlets 4 communicating with the warm air chamber and adapted to conduct the warm air therefrom. The combustion chamber 1 comprises the dome 5 and the annulus 6 encircling and spaced from the dome and forming therebetween the vertical warm air passageway 7. The annulus is also spaced from the casing to form the second vertical warm air passageway 8.

The humidifier comprises the upwardly opening reservoirs 9 which are preferably channel-shaped and which are adapted to receive liquid, such as water, from the supply main 10. The humidifier also comprises the wicks 11 which are preferably formed of suitable material, such as asbestos, which is constructed so that the liquid moves upwardly therethrough by reason of capillary attraction, but does not appreciably spread or move longitudinally therethrough. There is a pair of wicks extending within and above each reservoir with a wick substantially co-extensive

with and secured to each side wall of the reservoir. As shown, each wick is secured to a side wall by providing the latter with upstanding apertured lugs 12 through which and the adjacent wick suitable clips are passed. 13 is a pipe between adjacent ends of the reservoirs and communicating with the reservoirs and 14 is a pipe connecting into the pipe 13 and extending through an opening in the casing 2 to the valve 15 which controls the passage of the liquid through these pipes to the reservoirs.

The reservoirs 9 are arcuate or semi-circular and the cross sectional dimensions of the reservoirs and the wicks secured thereto are such that they may be readily installed within the warm air furnace by inserting the same through one of the ducts 4, after which the pipe 13 may be coupled to the reservoirs and then the pipe 14 may be coupled to the pipe 13. These reservoirs are preferably formed of cast metal, such as aluminum, and they are provided with the depending legs 16 at their inner sides which are adapted to engage the inner side wall of the annulus 6 to thereby position the reservoirs in proper relation upon and more particularly in registration with the annulus. It will be noted that the humidifier allows the free flow of the warm air through the passageways 7 and 8 and that the columns of warm air contact with both of the wicks of each reservoir to pick up the liquid prior to passage of the warm air from the warm air chamber.

For the purpose of controlling the operation of the humidifier to thereby secure the desired relative humidity in the room or rooms heated by the furnace, I preferably form each wick so that its lower edge 17 is variably spaced from the bottom of the reservoir and I also make the valve 15 adjustable to maintain the liquid in the reservoir at one of a number of different predetermined heights. As shown, each wick is tapered and has its upper edge 18 extending substantially parallel to the bottom of the reservoir and its lower edge 17 from one end to the other increasingly spaced from the bottom of the reservoir. By making the valve 15 so that it will maintain the liquid in the reservoir at one of a number of different predetermined heights, it is apparent that the wick action is varied.

The valve 15 comprises the body 19 having the vertical inlet chamber 20 and the adjacent vertical outlet chamber 21. The inlet chamber 20 communicates at its lower end with the pipe 14 and it is provided in its upper portion with the sight feed opening 22. The outlet chamber is

provided in its lower portion with the sight feed opening 23 below which a suitable drain pipe 24 connects into the outlet chamber. 25 are vertically spaced horizontal passageways between the inlet and outlet chambers and 26 are suitable valves for controlling these passageways, these valves being independently operable to control the height of the liquid in the inlet chamber at which it will overflow into the outlet chamber. As a consequence, these valves control the height of the liquid in the reservoirs 9. 20', and 21' are open passageways, which are inclined to the horizontal with the passageway 20' at a higher level than the passageway 21' and the uppermost portion of the passageway 20' located slightly below the upper edges of the reservoirs 9. The passageway 20' is located in the outer wall of the inlet chamber 20 and communicates with the air, while the passageway 21' is located in the wall between the inlet chamber 20 and the outlet chamber 21. By reason of these open passageways the water may, in the event that the passageways 25 are clogged up, first overflow through the passageway 21' into the outlet chamber 21, or, in the event that this passageway 21' is also clogged, overflow through the passageway 20', thereby avoiding overflowing the reservoirs 9. The passageway 21' is located above the upper passageway 25, so that in normal operation the two passageways 25 and the passageway 21' control the height of the liquid in the reservoirs to secure the desired wick action. 27 and 28 are drip fittings respectively in the inlet and outlet chambers and above the sight openings of these chambers. These drip fittings have downwardly tapered lower ends and are formed with the restricted axial passageways 29 and 30, respectively, the construction of each fitting being such that the liquid passing there-through passes axially through and clears the chambers and may be readily seen through the sight openings. 31 is the pipe leading from the main 10 to the valve and 32 is a needle valve which controls the flow of the liquid and which may be adjusted so that the proper predetermined level of liquid may be maintained in the reservoirs 9 and at the same time the overflow of the liquid into the outlet chamber may be maintained very small.

In the modification shown in Figure 4, the warm air furnace has the sheet metal combustion chamber 36 between which and the casing is located the vertical warm air passageway. In this construction the reservoirs 34, which are formed in the same manner as the reservoirs 9, are supported upon the top of the combustion chamber by the legs 35 corresponding to the legs 16. These legs have relatively small areas of contact with the top of the combustion chamber, so that objectionable heat transmission from the latter is avoided. For the purpose of maintaining the reservoirs upright in this construction, another pipe 36 is added extending between and connecting into the ends of the reservoirs opposite the inlet pipe.

Figures 5 and 6 show modifications in which the legs of the reservoirs, instead of being integral therewith, are formed separately therefrom and secured thereto.

Referring to Figure 5, 37 is the reservoir formed in the same manner as a reservoir 9 and 38 are the wicks secured to the side walls of this reservoir in the same manner as the wicks 11. The legs 39 are formed separately from the reservoir and secured thereto, the leg, as shown,

being an integral part of the sheet metal strip 40. This strip has its edges crimped over the upper edges of the reservoir intermediate the points of attachment of the wicks to the side walls of the reservoir and embraces the reservoir and is provided with the return-bent extension forming the leg.

Referring to Figure 6, the pair of spaced legs 41 is provided. Both of these legs are integral with the sheet metal strip 42 having its edges crimped over the upper edges of the reservoir intermediate the points of attachment of the wicks to the reservoir. The legs are formed of return-bent extensions of the strip and these legs may be spaced a sufficient distance apart to embrace the annulus of the combustion chamber.

What I claim as my invention is:

1. The combination with the warm air chamber and combustion chamber of a warm air furnace, of a humidifier comprising a liquid receiving reservoir within said warm air chamber and upon said combustion chamber, a wick extending within said reservoir and having its lower edge variably spaced from the bottom of said reservoir, and means for selectively maintaining the liquid in said reservoir at one of a number of different heights.

2. The combination with the warm air chamber, combustion chamber and warm air passageway at a side of the combustion chamber of a warm air furnace, of a humidifier comprising arcuate liquid receiving reservoirs within said warm air chamber and upon said combustion chamber, wicks extending within said reservoirs and having portions of their lower edges spaced at different distances from the bottoms of said reservoirs, and means for selectively maintaining the liquid in said reservoirs at one of a number of different heights.

3. The combination with the warm air chamber and combustion chamber of a warm air furnace, of a humidifier comprising a liquid receiving reservoir within said warm air chamber and upon said combustion chamber, a wick extending within said reservoir and having its lower edge from one end to the other increasingly spaced from the bottom of said reservoir, and adjustable means for selectively maintaining the liquid in said reservoir at one of a number of different heights.

4. The combination with the warm air chamber and combustion chamber of a warm air furnace, of a humidifier comprising a reservoir within said warm air chamber and upon said combustion chamber, and a vertically tapered wick extending within said reservoir and having its lower edge from one end to the other increasingly spaced from the bottom of said reservoir, and regulating means having an inlet chamber communicating with the lower portion of said reservoir, an outlet chamber, and vertically spaced valve controlled passageways between said chambers, and means forming the communication between said inlet chamber and reservoir, said means opening into said inlet chamber and reservoir at substantially the same level and said passageways being above said level and below the upper edge of said reservoir.

5. The combination with a warm air passageway of a warm air furnace, of a humidifier comprising a liquid receiving reservoir, a wick extending within said reservoir and positioned for contact by the warm air passing through said passageway, said wick having its lower edge variably spaced from the bottom of said reservoir,

and regulating means having an inlet chamber, a liquid conducting means communicating with said reservoir near its bottom and with said inlet chamber at substantially the level of communication with said reservoir, vertically spaced passageways opening into said inlet chamber, said passageways being above said level and below the upper edge of said reservoir, and means for selectively closing said passageways.

6. The combination with a warm air passageway of a warm air furnace, of a humidifier comprising a liquid receiving reservoir, a wick extending within said reservoir and positioned for contact by the warm air passing through said passageways and having its lower edge variably spaced from the bottom of said reservoir, regulating means having an inlet chamber formed with a sight opening in its upper portion, liquid conducting means communicating with said reservoir near its bottom and with said inlet chamber at substantially the same level as the communication with said reservoir, an outlet chamber formed with a sight opening in its lower portion, vertically spaced valve controlled passageways between said chambers, said passageways being above said level and below the upper edge of said reservoir, and means controlling the flow of the liquid into said inlet chamber above its sight opening.

7. The combination with a warm air passage-

way of a warm air furnace, of a humidifier comprising a liquid receiving reservoir, a wick extending within said reservoir and positioned for contact by the warm air passing through said passageway, said wick having its lower edge variably spaced from the bottom of said reservoir, and regulating means having an inlet chamber, liquid conducting means communicating with said reservoir near its bottom and with said inlet chamber at substantially the same level as the communication with said reservoir, vertically spaced valve controlled passageways opening into said inlet chamber, and an open overflow passageway above said first mentioned passageways and opening into said inlet chamber, all of said passageways being adapted for the passage of liquid from said inlet chamber and being located above said level and below the upper edge of said reservoir.

8. The combination with a warm air passageway of a warm air furnace, of a humidifier comprising a liquid receiving reservoir, a wick extending within said reservoir and positioned for contact by the warm air passing through said passageway, said wick having its lower edge variably spaced from the bottom of said reservoir, and means for selectively maintaining the liquid in said reservoir at one of a plurality of different heights.

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