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REFRIGERATING STRUCTURE FOR VENDING MACHINES

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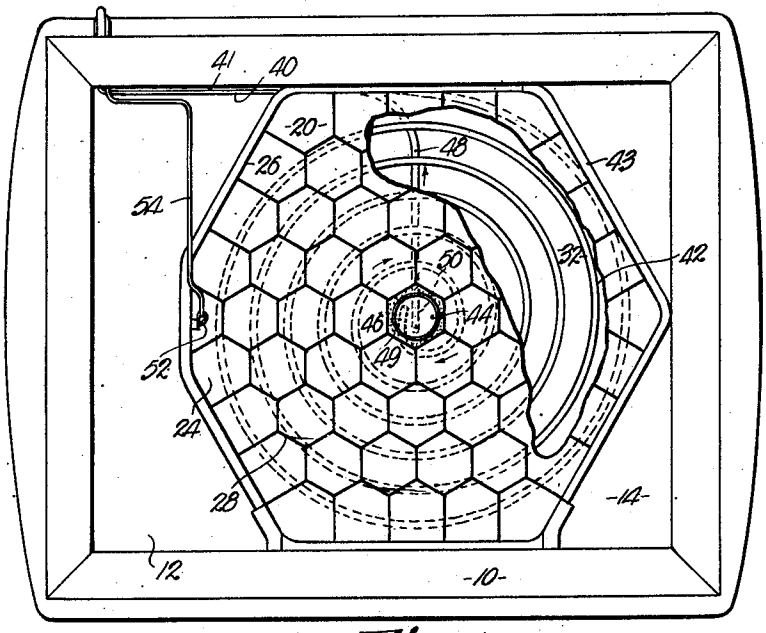


Fig. 1.

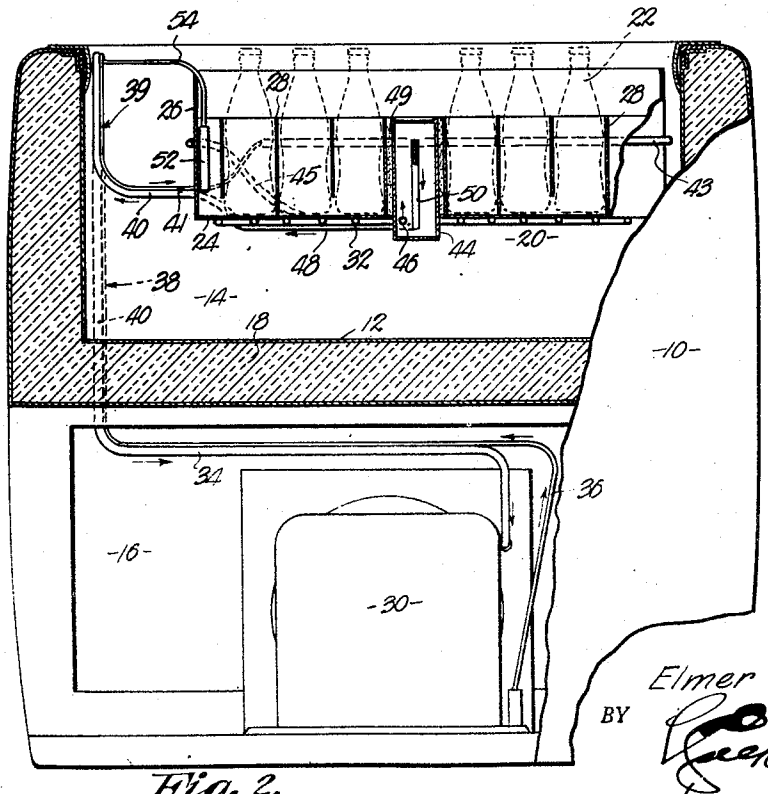


Fig. 2.

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REFRIGERATING STRUCTURE FOR VENDING MACHINES

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3 Claims. (Cl. 62—99)

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This invention has to do broadly with the field of vending machines for bottled goods and more specifically to refrigerating structure for such machines adapted to permit normal operation of the vending machine itself and also capable of keeping the bottles stored within the machine at a proper predetermined temperature.

One of the most difficult problems in the field of vending machines for bottled goods is that of maintaining the bottles to be vended at a proper temperature whereby the contents thereof will be palatable when purchased by the consuming public. To be entirely satisfactory, the refrigerating means must be quick acting since the bottles may be used immediately after loading the machine with a plurality of warm bottles and also capable of absorbing the heat from such bottles evenly and with minimum expense to the retailer. The problem is enhanced because of the fact that in most vending machines on the market today, the bottles must be disposed in a predetermined fashion in order to render the machine operable and when so disposed, such bottles are difficult to cool. This difficulty arises not only because of the complicated supporting structure usually needed and further, because of the fact that the machine itself cannot be made small and compact if a large and bulky refrigerating unit is incorporated in the machine.

The most important object of this invention therefore, is the provision of a vending machine for bottled goods having unique structure for supporting the bottles in the form of a partitioned body to present a plurality of stalls for each of the bottles, said body being made entirely from material having high heat conducting properties to the end that an efficient heat exchange between the refrigerating unit forming a part of the machine, is presented when such refrigerating means is disposed in heat absorbing relationship to the bottle support and to the bottles themselves.

Other objects of this invention include many details of construction to render the above objects and advantages possible, all of which will be made clear during the course of the following specification, reference being had to the accompanying drawing, wherein:

Fig. 1 is a top plan view of a vending machine for bottled goods, the vending cover therefor being entirely removed and parts being broken away to reveal details of construction; and

Fig. 2 is a side elevational view thereof, parts being broken away and in section for clearness.

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The vending machine chosen for illustration and contemplated to be refrigerated by the structure about to be described, includes a cabinet broadly designated by the numeral 10. This cabinet 10 is hollow and divided by a partition 12 into an upper compartment 14 and a lower compartment 16. The walls of the compartment 14 including partition 12 are provided with insulation 18 in the usual manner.

A body broadly designated by the numeral 20 for supporting a plurality of bottles 22, is mounted in any suitable manner within the compartment 14. This body 20 is formed to dispose all of the bottles 22 in an upstanding position to render the same accessible to the customer after operating by coin control means or otherwise, mechanism that overlies and closes compartment 14 but not illustrated in the drawings. Such mechanism is shown and described in U. S. Letters Patent 2,250,816, dated July 29, 1941, and operates to render the bottles 22 accessible to the customer individually upon insertion of a coin or like medium.

The body 20 is hollow and includes a solid bottom wall 24 having an upstanding side wall 26 circumscribing the bottles 22 resting upon the bottom wall 24. A plurality of partitions 28 arranged in honeycomb fashion as clearly illustrated in Fig. 1, separate the bottles 22 and present individual stalls for such bottles 22. These partitions 28 are all interconnected and all joined to the innermost faces of all of these side walls 26 of body 20. A number of the partitions 28 are also connected to bottom wall 24 as seen in Fig. 2.

A refrigerating unit 30 of any of the well known types, is mounted within the compartment 16 of body 10. This refrigerating unit 30 includes coils 32 and 43 disposed within the compartment 14 of body 10 and lengths 34, 36, 38 and 40 interconnecting coils 32 and 43 and the unit 30 within the compartment 16. The length 38 is rebent upon itself to project downwardly into the compartment 14 as at 39 and then extends laterally as at 41 to wind at least once around the side wall 26 of body 20 in the form of the coil 43. The tube forming coil 43 extends downwardly as at 45 to join convolutions 42 of coil 32 underlying the bottom wall 24 of body 20. The innermost of these convolutions 42 of the coil 32 communicates with a closed accumulator tank 44 and extends thereinto as at 46 near the bottom of tank 44. Obviously, this coil 32 including its convolutions 42, lengths 34 and 36 and portions 38 and 40 are tubular.

An outlet pipe 48 also forming a part of the entire coil unit 32 extends from within the accumulator tank 44 from a short length 50 having an open end near the top of the tank 44 and projects transversely with respect to the convolutions 42 and therebelow to join with the extension 40. Thus, there is a continuous tubular member extending from the unit 30 into the compartment 14, around the body 20 and thence back into compartment 16 to join with the unit 30. The bottom wall 24, the side walls 26 and all of the partitions 28 of the body 20, are formed of material preferably of metallic nature having high heat-conducting characteristics.

The convolutions 42, the loop 43 and the accumulator tank 44 are all in contacting relationship with their respective parts of the body 20. In other words, all of the convolutions 42 are in contacting and preferably joined relationship with the outermost face of the wall 24 of body 20 and the coil 43 is in contacting, joined relationship with the walls 26 of body 20.

The accumulator tank 44 constitutes an elongated, closed metallic cylinder disposed at the axis of the body 20 within the partition structure 28 with its longitudinal axis substantially parallel to the axes of bottles 22. As illustrated in Fig. 2, a portion of this accumulator tank 44 extends downwardly through an opening within the wall 24 of body 20 for receiving the coil 32 within which it is interposed. A suitable refrigerant is placed within the accumulator tank 44 and if such refrigerant is in a liquid form, the provision of the outlet opening for pipe 48 within the tank 44 above the level of liquid therein, prevents the latter from entering the coil 32. The temperature of the unit is held constant by a suitable thermostat not shown, having connection with its bulb 52 disposed within the body 20 by a line 54. This bulb 52 is shown mounted directly upon the side wall 26 of the body 20 but may be positioned anywhere within this body 20 as desired.

It is clear from the foregoing that the heat absorbing unit of the refrigerator 30 is disposed within the compartment 14 of body 10 in heat absorbing and heat exchange relationship with all of the bottles 22. The fact that for the most part the coil 32 is in direct contacting relationship with portions of the body 20 and particularly the bottom 24 and side wall 26 thereof, creates a heat exchange between the coil 32 and the bottles 22. Since the body 20, including its partition 28, is entirely made from material having high heat conducting properties, the heat of the bottles 22 and their contents will be absorbed quickly and easily by the coil 32 of the refrigerating structure 30. Obviously, all of the bottles 22 are in direct contacting relationship with the relatively thin bottom wall 24 of body 20 because these bottles rest thereon and furthermore, for the most part, the bottles 22 will be in contacting relationship with the walls forming partitions 28. In any event these bottles 22 are relatively close to such partition structure 28 and the heat emanating from bottles 22 will be quickly absorbed by partitions 28, walls 26 and the bottom wall 24 for final absorption by the coil structure 32. The accumulator tank 44 affords additional and quick refrigeration because of its disposition among the bottles 22 and further, because of the fact that this accumulator tank 44 is also made from heat conducting material and joins with the bottom wall 24.

As illustrated particularly in Fig. 1, this accumulator tank 44 forms the central stall and, therefore, not only comes into contact with certain of the bottles 22 through partition structure 28 but through bottom wall 24. The space between tank 44 and the adjacent portion of the partition structure is filled with material 49 such as metal or plastic shavings having high conductivity of heat.

The diameter of the length of tube 36 extending from compressor unit 30 to its point of connection with loop 43 is relatively small with respect to coils 32 and 43 and when liquid under pressure reaches coils 43 and 32, a fall of pressure occurs due to expansion. Through such construction, no expansion valve or analogous port is needed.

It is apparent from the foregoing that the structure just defined provides refrigerating means for a bottle vending machine that is quick acting, easily installed and efficient in its operation. A relatively small amount of energy is necessary to cool the bottles 22 and maintain the same at a desired temperature since the heat exchange is direct, by means of material having high heat conductivity, between the coils 32 and 43 and the bottles 22 with their contents.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In apparatus of the kind described, article supporting structure including an open top receptacle having a bottom wall, side walls and a plurality of interconnected partitions joined directly to the side walls and the bottom wall, setting off a plurality of substantially identical article receiving stalls, said receptacle being formed entirely from a relatively thin material having high heat conductive properties, the articles all engaging said bottom walls and that portion of the partitions forming their corresponding stalls, certain of the articles engaging proximal side walls of the receptacle; and refrigerating mechanism having evaporator tubing coiled tightly about and attached to the outer face of said side walls and convoluted beneath said bottom wall in direct, joined contact therewith.

2. In apparatus of the kind described, article supporting structure including an open top receptacle having a bottom wall, side walls and a plurality of interconnected partitions joined directly to the side walls and the bottom wall, setting off a plurality of substantially identical article receiving stalls, said receptacle being formed entirely from a relatively thin material having high heat conductive properties, the articles all engaging said bottom walls and that portion of the partitions forming their corresponding stalls, certain of the articles engaging proximal side walls of the receptacle; and refrigerating mechanism having evaporator tubing coiled tightly about and attached to the outer face of said side walls and convoluted beneath said bottom wall in direct, joined contact therewith, there being an accumulator tank interposed in said evaporator tubing made from a relatively thin, heat conducting material, extending upwardly into one of said stalls from a point of engagement with said bottom wall near the center thereof, and approximating said one stall in volume capacity.

3. In apparatus of the kind described, article supporting structure including an open top receptacle having a bottom wall, side walls and a plurality of interconnected partitions joined directly to the side walls and the bottom wall, setting off a plurality of substantially identical article receiving stalls, said receptacle being formed entirely from a relatively thin material having

high heat conductive properties, the articles all engaging said bottom walls and that portion of the partitions forming their corresponding stalls, certain of the articles engaging proximal side walls of the receptacle; refrigerating mechanism having evaporator tubing coiled tightly about and attached to the outer face of said side walls and convoluted beneath said bottom wall in direct, joined contact therewith, there being an accumulator tank interposed in said evaporator tubing made from a relatively thin, heat conducting material, extending upwardly into one of said stalls from a point of engagement with said bottom wall near the center thereof, and approximating said one stall in volume capacity; and a filling of a heat conducting substance in surrounding engagement with said accumulator

tank and contacting proximal partitions and said bottom wall.

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