Dec. 26, 1967 R. T. CORNELIUS 3,359,754

REFRIGERATED BEVERAGE DISPENSING MACHINE

Filed July 13, 1966

Fig. 1

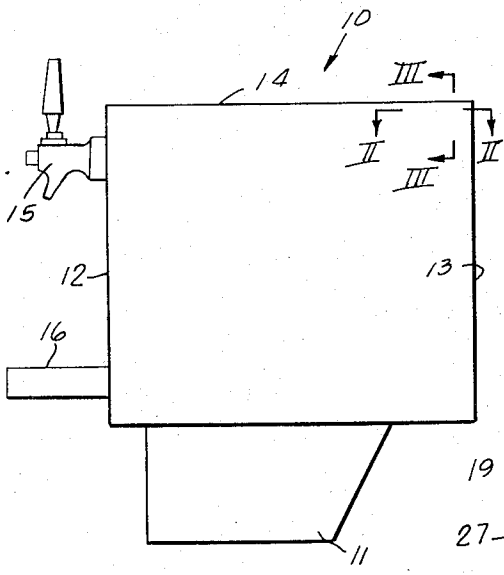
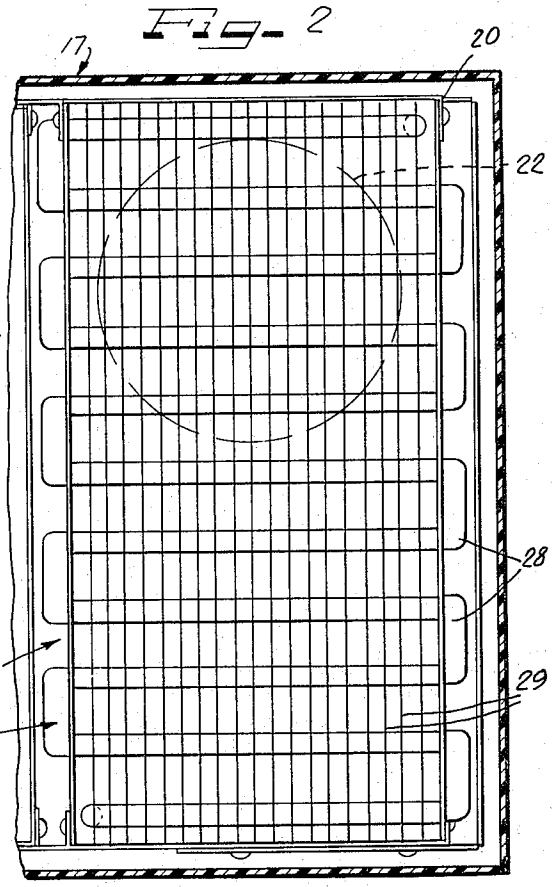


Fig. 2



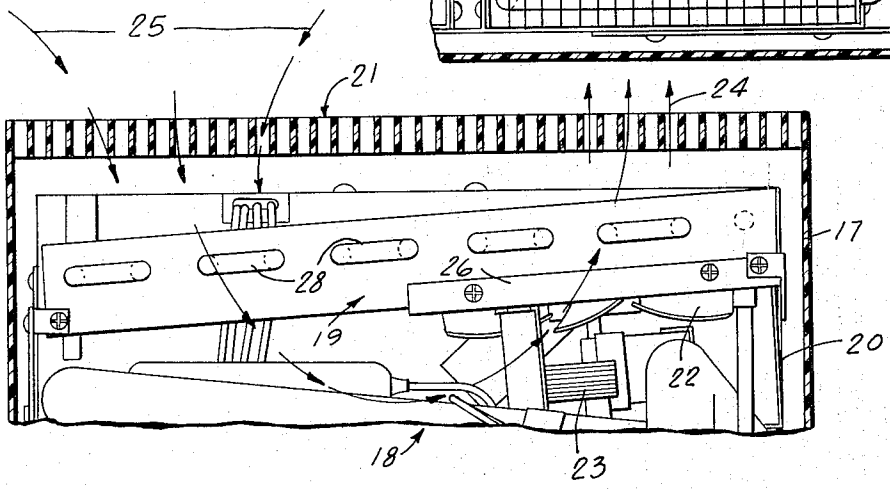


Fig. 3

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REFRIGERATED BEVERAGE DISPENSING MACHINE

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ABSTRACT OF THE DISCLOSURE

A beverage dispenser has a rectilinear cabinet with only one air opening, as in the top side, for cooling an internal adjacent condenser. Air may enter anywhere through this opening except that a fan produces a high velocity exit of air flowing in an opposite direction through a structurally undefined portion of such opening. Both entering and exiting air flows across the condenser.

This invention relates generally to beverage vending machines, and more specifically to an arrangement for the refrigeration means thereof.

Although the principles of the present invention may be included in various beverage dispensing machines of the refrigerated type, a particularly useful application is made in a cabinet or a chest that is constructed to be disposed either above or below a serving counter.

It is customary for machines of this type to have some variety of heat-exchange means between the refrigeration means and the beverage dispensing means so that the beverages are served or vended in a chilled condition. Since mechanical refrigeration means are employed, the heat extracted by such means must be disposed of in some manner. Such heat dumping is effected through a condenser coil. Heretofore, it has been customary to dispose such condenser coil either in a manner that is external to the cabinet, or to dispose such condenser coil within the cabinet, the latter arrangement being provided with two cabinet openings disposed in separate cabinet walls so that cooling air can pass through such cabinet in a more or less straight direction. These arrangements have imposed limitations on the locations or environment within which the apparatus can be installed, and have also imposed mechanical limitation for the industrial designer of such devices.

The present invention contemplates the utilization of a single aperture area in a single external side of the cabinet for admitting and expelling air for cooling the refrigeration means, and associated with such aperture is appropriate air transfer means.

Accordingly, it is an object of the present invention to provide an improved refrigerated dispenser machine for beverages.

Another object of the present invention is to provide a refrigerated beverage dispensing machine principle which can be embodied in such machines of the over-the-counter, such machines of the under-the-counter type, and other beverage vending machines.

A still further object of the present invention is to provide a refrigerated beverage vending machine construction which enables the saving of space required adjacent to such machine.

Yet another object of the present invention is to provide a refrigerated beverage dispensing machine construction wherein the industrial designer is freed of conventional restrictions or impositions.

A still further object of the present invention is to provide a refrigerated beverage dispensing machine wherein cooling-air aperture areas are exposed for cleaning.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheet of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

On the drawings:

FIG. 1 is a side view of a refrigerated beverage dispensing machine provided in accordance with the principles of the present invention;

FIG. 2 is an enlarged fragmentary cross-sectional view taken along line II—II of FIG. 1; and

FIG. 3 is an enlarged cross-sectional view taken along line III—III of FIG. 1.

As shown on the drawings:

The principles of this invention are particularly useful when embodied in a refrigerated beverage dispensing machine such as illustrated in FIG. 1, generally indicated by the numeral **10**. The dispensing machine **10** includes a base **11** which is so disposed as to enable mounting of the machine on the upper surface of a counter. The machine **10** includes a front side **12** and a rear side **13**, as well as a top side **14**. Conventional beverage dispensing means are included within the machine **10**, and in this embodiment, such means includes a faucet **15** accessible from the front side **12**. Beneath the faucet **15** is a drip tray **16**.

The machine **10** includes a cabinet **17**, which may comprise plastic, the cabinet **17** having outer sides that define the various front, rear, top and lateral sides of the machine **10**. The machine **10** includes a mechanical refrigeration means or system generally indicated by the numeral **18** which is disposed within the cabinet **17**, and has a cooling means or portion (not shown) that is disposed in heat transfer relation to the dispensing means **15** in a conventional manner.

The mechanical refrigeration means includes a refrigerant condenser coil **19** shown from above in FIG. 2 and from the rear in FIG. 3. The condenser coil **19** is mounted at its ends to a frame or chassis **20** by which it is fixedly supported in alignment with a grille or aperture area **21** disposed thereabove. The cabinet **17** has but this one aperture area **21** which thus comprises a single aperture area in a single external side **14** of the cabinet **17**.

Means are provided to transfer air through the aperture area **21** and the condenser coil **19**, and the inlet of such air and the outlet of such air is solely through the single aperture area **21**. For this purpose, a fan **22** is carried on the shaft of a motor **23** which operates in such direction as to rotate the fan so as to push interior air outwardly through the condenser coil **19** and through the aperture area **21**, as indicated by the outwardly directed arrows **24**. As the aperture area **21** is the sole area for admitting cooling air to the cabinet **17**, the air that is pushed out of the cabinet by the fan **22** is replaced by other air which comes from a wider area, as explained below, and as indicated by the arrows **25**. Incoming air thus passes through the aperture area **21** and thence through the condenser coil **19**, after which it, in turn, becomes the air that is pushed outwardly by the fan **22**, whereby the air twice passes through the condenser coil **19**.

As refrigerant cools within the condenser coil **19**, it is caused to flow by gravity toward one end of the coil, and such flow is facilitated by the fact that the condenser coil **19** is so installed that it slopes downwardly. The lower end of the condenser coil thus contains the liquid that is the coolest, and that liquid is subjected to the coolest cooling air, thereby effecting some heating of incoming air. The refrigerant that is the warmest is near the upper end of the coil, and the partially heated air is then further heated by being exposed to the upper or warmer end of the condenser coil **19**.

If desired, a suitable fan shroud **26** may be provided in the nature of a baffle to regulate to some extent the air currents within the cabinet **17**.

The condenser coil **19**, as shown in FIG. 2, includes a serpentine section of tubing **27** having end loops such as **28**, the tubing **27** being spanned by a group of transversely extending fins **29** disposed in heat transfer relation to the tubing **27**. The fan **22** is shown schematically in FIG. 2 as a broken circle, which represents a stream of outwardly flowing heated air. The fan imparts considerable velocity to such outwardly flowing air, which because of the mass of the air, has a substantial inertia that propells the heated air in a bullet-like fashion through the immediately adjacent ambient air to mix with non-heated air and to diffuse thoroughly with the same. The reduction of pressure created by the operation of the fan within the cabinet **17** creates a slight negative pressure or suction so that air is drawn in through other or inlet portions of the aperture area. This type of air movement in this type of arrangement imparts very little inertia to the air, particularly since the inlet area is larger than the cross sectional size of the outwardly flowing stream of air.

When the aperture area **21** is disposed in the top side or surface **14** of the device **10**, the discharging air is upwardly directed. It does not blow against the operator, and it does not blow against any customer that may be standing adjacent to the side **13**. Moreover, the structure may be arranged with the side **13** disposed against a wall, and the present structure enables other apparatus to be disposed immediately against both lateral sides of the device **10**. Such an arrangement thereby effects savings in space and is void of any annoying factor. Since there is but one aperture area for the inlet and the outlet, the industrial designer may employ designs embodying this invention which are thus subjected only to this one feature for purposes of refrigeration. Thus there is no external condenser, and there are no lateral grilles or bottom grille in this device.

Moreover, the surface that is apt to become most soiled, namely the aperture area, is disposed at an exposed position, thereby facilitating access thereto for cleaning purposes.

When it is desired to dispose the unit **10** below a counter, the apparatus is rearranged so that the aperture area lies at the front **12** of the device **10**. With this placement, it is adjacent to the means **15** by which the dispenser means is actuated. With such an arrangement, the device can be totally enclosed on all sides except the side

12, thereby obtaining a wide variety of advantages, as enumerated above.

Although various minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon, all such embodiments as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. A machine for dispensing refrigerated beverages comprising in combination:

(a) a cabinet having front, lateral, rear and top sides, all but one of which are imperforate to cooling air movement;

(b) beverage dispensing means at least partially disposed in said cabinet;

(c) mechanical refrigeration means disposed within said cabinet in heat-transfer relation to said beverage dispensing means; and

(d) air transfer means utilizing a single aperture area in said one of said sides of said cabinet for admitting and expelling air for cooling said refrigeration means.

2. A dispensing machine according to claim **1**, including:

(a) a refrigerant condenser coil comprising part of said refrigeration means, and disposed adjacent to said single aperture area; and

(b) a fan comprising part of said air transfer means and arranged to draw ambient air through a portion of said aperture area, thence across said condenser coil into the interior of said cabinet, and thence across said condenser coil a second time to discharge through another portion of said aperture area, said portions of said aperture area being separated solely by the direction in which said fan causes air to move therethrough.

3. A dispensing device according to claim **1** in which said aperture area is part of the top side of said cabinet.

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