

Jan. 4, 1938.

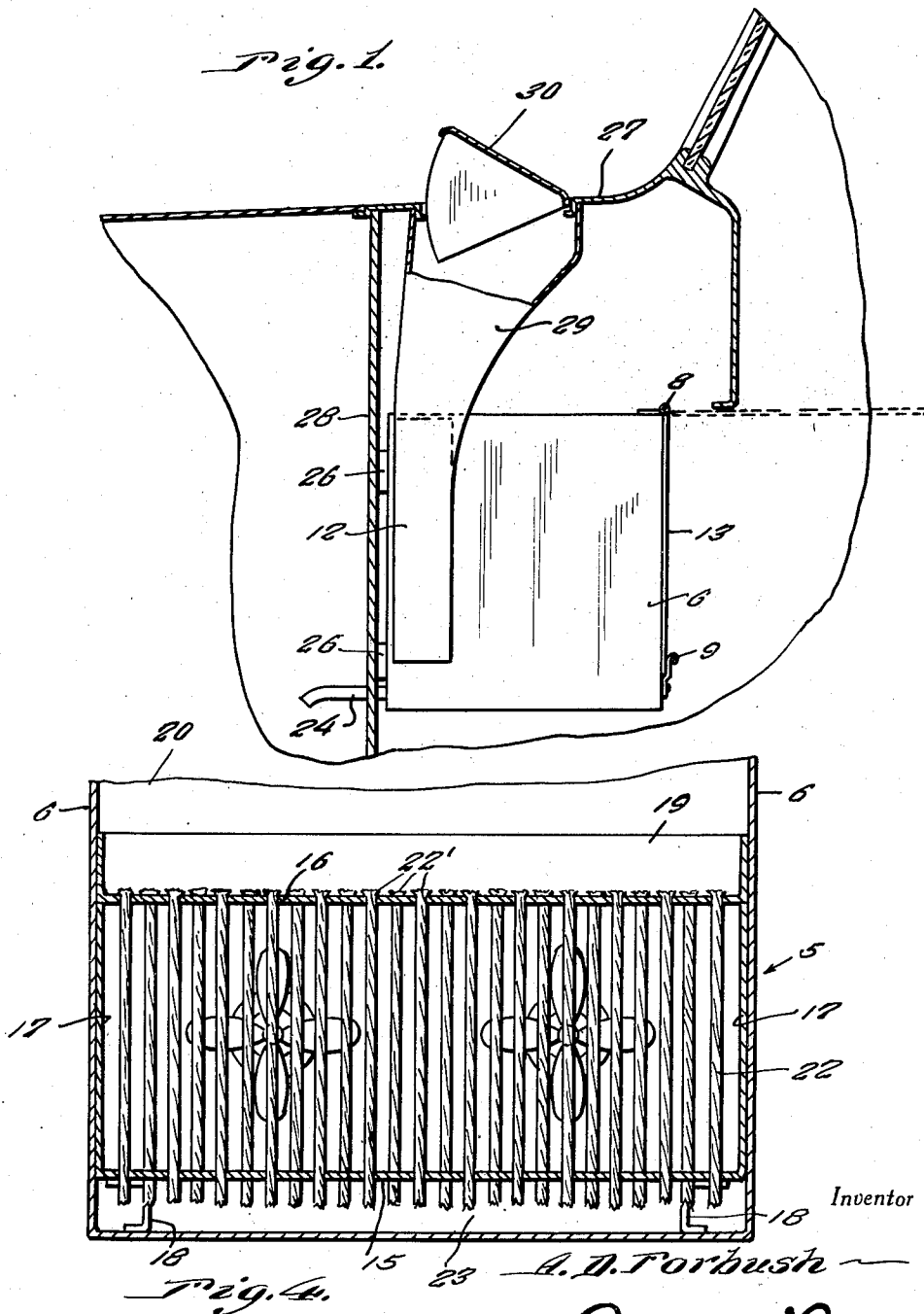
A. D. FORBUSH

2,104,119

AIR COOLER

Filed April 24, 1936

2 Sheets-Sheet 1



By *Clarence A. O'Brien*
Hyman Berman
Attorneys

Jan. 4, 1938.

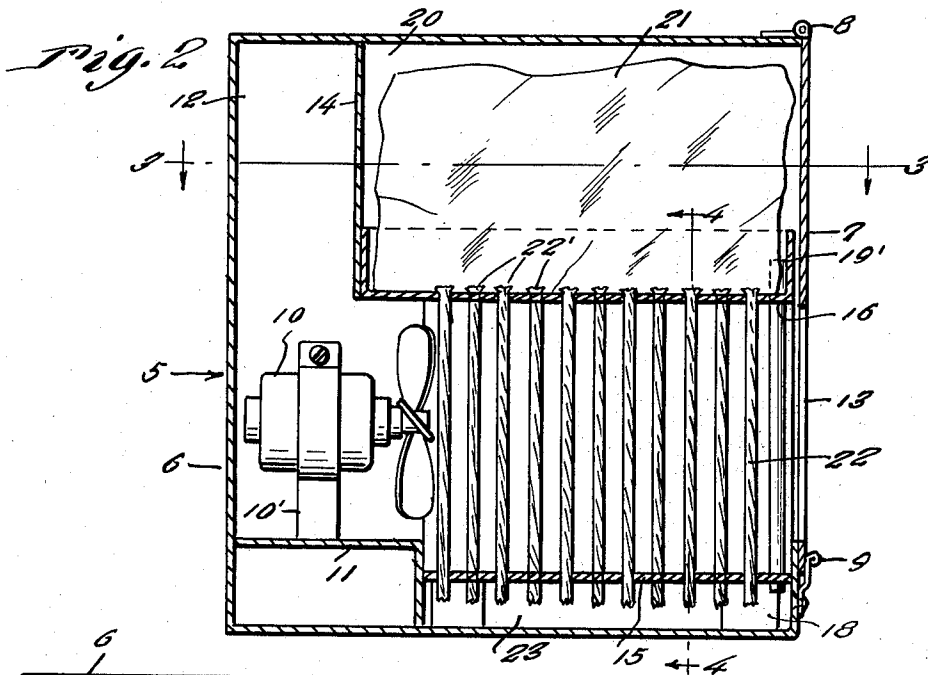
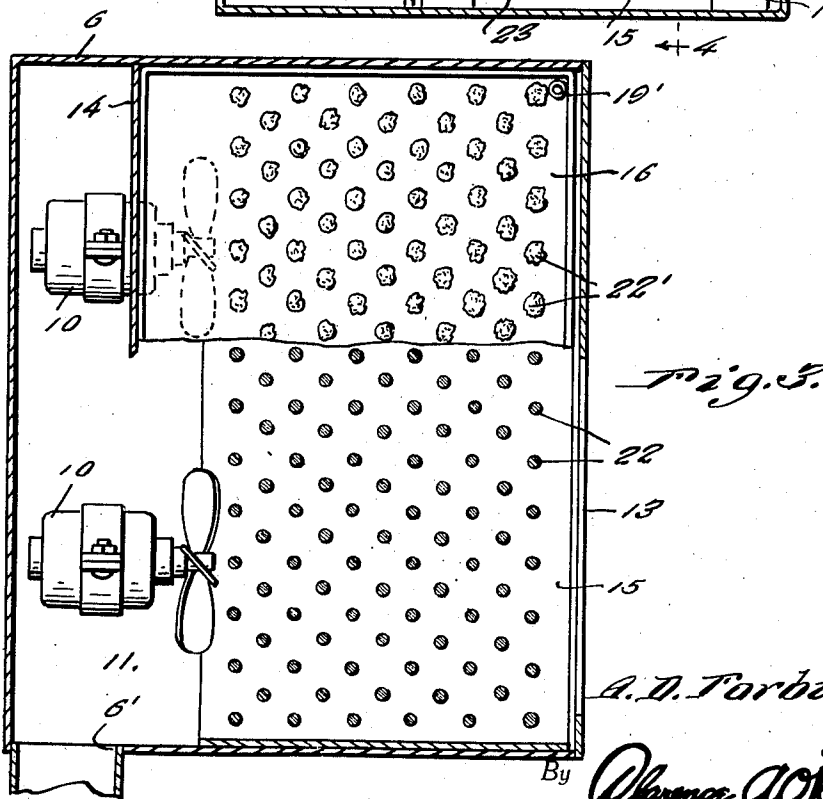
A. D. FORBUSH

2,104,119

AIR COOLER

Filed April 24, 1936

2 Sheets-Sheet 2



Inventor

A. D. Forbush

By

Clarence A. O'Brien
Hyman Berman

Attorneys

UNITED STATES PATENT OFFICE

2,104,119

AIR COOLER

Augustus D. Forbush, Pueblo, Colo.

Application April 24, 1936, Serial No. 76,226

2 Claims. (C. 261—103)

My invention relates to an improvement in air coolers, and in particular to an air cooler which is adapted to be installed in a vehicle for the purpose of supplying cool air within said vehicle.

5 The principal object of my invention is to provide an air cooler by which cool pure air is continuously supplied to the interior of the vehicle.

Another object is to provide an air cooler which is compact in character and which, when installed in an automobile, occupies very little space.

A further object is to provide a cooling device by which the cooling effect is produced by evaporation and by cool water.

15 Other objects of the invention will be apparent from the following description of the present preferred form thereof, taken in connection with the accompanying drawings wherein:

Figure 1 is a view of the air cooler installed under the cowl of an automobile;

Figure 2 is a vertical sectional view of the air cooler;

Figure 3 is a cross-sectional view taken on line 3—3 of Figure 2, a portion of the pan being broken away.

25 Figure 4 is a sectional view taken on line 4—4 of Figure 2.

In the accompanying drawings where for the purpose of illustration is shown a preferred embodiment of my invention, the cooling unit is generally denoted by the numeral 5. This unit is provided with an outer casing 6, which has its front wall hinged as at 8 to the top wall to form a door 7 to permit access to the interior of the casing. A suitable fastening means 9 is secured to the lower portion of the front wall to detachably engage the lower extremity of the door for the purpose of retaining the door in closed position. An intake opening 6' is provided in the side wall of the casing to emit air through the passageway 12 into the interior of the casing.

A pair of fans 10 are supported by brackets 10' on the platform 11 within the casing, and are positioned in the rear portion thereof. These fans drive the air, which is received through the passageway 12, from the interior of the casing through the opening 13 in the door 7. In this manner there is produced a continuous circulation of air within the casing, said circulation of air consisting of air entering the casing through the passageway 12 and leaving through the opening 13 in the door.

Mounted above the fans 10 is a partition 14, which is secured to the top wall of the casing,

and which extends from one side wall of the casing to the other side wall. Within that area defined between the lower portion of the partition 14, the door 7, and the platform 11, there is removably mounted an integrally formed box-like frame, which consists of a pair of spaced wick-carrying plates 15 and 16, and a pair of side walls 17, each of which extend from the plate 15 to the plate 16 to integrally join the same. A pair of legs 18 are provided on the under side of the plate 15 and rest against the bottom of the casing to support the frame in said casing. The plate 16 is provided with side flanges to form with said plate an ice-carrying pan 19, which supports a cake of ice 21. An overflow pipe 19' is provided to relieve the pan of any excess water. The partition 14, the door 7, and the top wall of the casing and the plate 16 define a storage compartment 20 for the cake of ice 21, and it is apparent that ice can be supplied to this compartment or removed therefrom when the door 7 is in raised position.

The plates 15 and 16 are provided with aligned perforations, through which are threaded rows of wicks 22 arranged in staggered relation to one another. The wicks are made of suitable wick material and have their ends 22' extending from and beyond the plate 16 through the plate 15 to the pan 23, formed between the plate 15 and the bottom of the casing. These ends 22' of the wicks are flattened to rest on the upper side of the plate 16. This box-like frame may be removed as a unit from the casing through the opening formed by raising the door 7.

When ice is in the storage compartment 20, the cold water, which results from the melting of said ice, is absorbed by the wicks 22 and saturates the same. The pan 23 receives the water from the lower ends of the wicks, and when the level of the water in the pan 23 is above said lower ends of the wicks, the wicks absorb the water from the pan 23 as well as from the water in the ice-carrying pan 19. An outlet pipe 24 is provided in the pan 23 to prevent the water from rising to the level of the plate 15. The air, which is received from the passageway 12, is rapidly driven by the fans 10 through the wet wicks 22. This air is cooled by the rapid evaporation of the cool water, which evaporation is effected by the rushing of air through the wicks, said wicks being kept saturated with the melted ice water in the pan 19. It is apparent that cooled air is driven through the opening 13 in the door 7, thereby supplying cool air to the area adjoining the opening.

When the air entering the passageway 12 is comparatively dry, said air is humidified as it is driven into contact with the wicks 22 by absorbing moisture from said wicks, which are continuously supplied with moisture from the melted ice water in the pan 19. When the air entering the passageway 12 is warm and heavily laden with moisture, the excess moisture in the air is condensed as dew and deposited on the cold wet wicks, and then carried off in the form of water to the pan below, from which the water passes through the outlet pipe 24. In this manner the air cooler functions as a dehumidifier.

The storage compartment 20 entirely surrounds the cake of ice 21, thereby conserving the ice by preventing the circulated air from coming in contact with said ice. The economy of operation is apparent by reason of the vast amount of air that is capable of being either cooled and humidified, or dehumidified with a consumption of a minimum amount of ice.

While in the drawings there is illustrated a cake of ice 21 for the purpose of supplying the wicks 22 with cold water, the source of supply of said water is immaterial, since the cooling operation of the unit does not depend on the melting of the ice in the storage compartment. The cake of ice 21 merely acts as a reservoir for cool water, and there may be substituted therefor mechanical refrigeration or other suitable means for providing a reservoir of cool water in the storage compartment 20.

Although the air cooler above described is adapted to be used to cool the interior of a room, it is particularly adapted to supply cool air to the interior of an automobile. When so used, the cooling unit 5 is mounted by suitable brackets 26 beneath the conventional cowl 27 of an automobile with the rear wall of the casing abutting the cowl partition 28. The door 7 faces the interior of the automobile. The passageway 12 of the casing communicates with a suitable air duct 29, which leads to the ventilator 30 of the vehicle. It is obvious that movement of the vehicle forces fresh air into the ventilator and through the air duct 29 and passageway 12. The air is then driven by the fans 10 through the wicks 22, which are saturated with cool water received from the pan 19. The air, after coming in contact with the wicks, becomes cooled, and passes in this cooled condition through the opening 13 into the interior of the vehicle. In this

manner the interior of the vehicle is continuously supplied with fresh and pure air, which enters the vehicle through the ventilator 29 and leaves the vehicle through the windows thereof.

In view of the above description it is apparent that the air cooler is entirely automatic, and requires only the turning of the switches (not shown) attached to the fans and the occasional supplying of a small piece of ice to the storage compartment.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred embodiment of the same, and that various changes in the shape, size, and arrangement of parts may be made, without departing from the spirit of my invention, or the scope of the appended claims.

Having thus described my invention, what is claimed is:

1. In an automobile, in combination with the cowl thereof and a ventilator formed therein, an air cooler positioned below said cowl, said air cooler comprising a casing having an outlet opening in the wall thereof, a storage compartment formed within said casing, a fluid cooling medium enclosed by said compartment, absorbing means cooled by the cooling medium, an air duct leading from the ventilator of the automobile to the interior of the casing, and directing the air received through the ventilator into direct contact with the cooled moist absorbing means and thence through the opening in wall into the passenger compartment of the automobile which is to be cooled.

2. An air cooler comprising a casing having an air duct therethrough, a removable unitary frame supported in said casing comprising upper and lower plates connected by side members, the upper plate having flanges thereon to provide a pan for ice and having spaced openings therein, the lower plate having openings therein aligned with the openings in the upper plate, wicks extending from the upper to the lower plate and having their ends secured in said openings whereby ice water will be absorbed thereby, said removable frame when in position in the casing disposing the wicks across the air duct, and a door for said casing for holding the frame therein, said door having an opening therein registering with the air duct.

AUGUSTUS D. FORBUSH.