Nov. 20, 1951 O. A. BROUER 2,575,939

REFRIGERATOR TRUCK SAFETY DEVICE

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Fig. 1

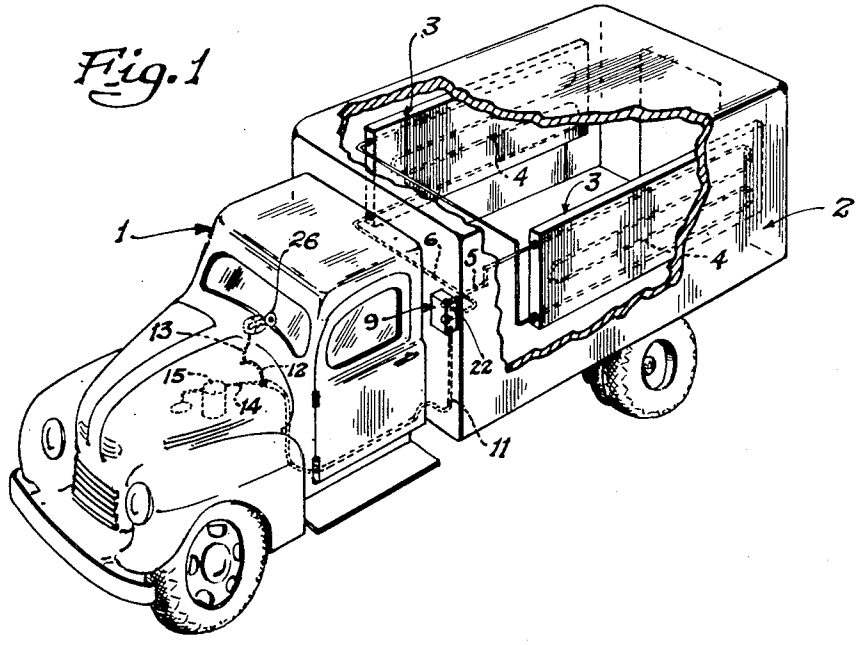
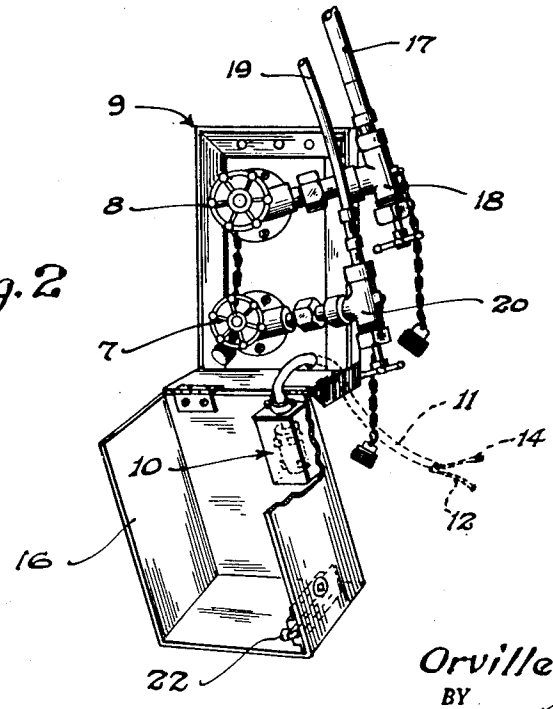


Fig. 2



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REFRIGERATOR TRUCK SAFETY DEVICE

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4 Claims. (Cl. 62—117)

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This invention relates to a safety device for refrigerator vehicles and more particularly to a safety device for refrigerator trucks having the expansion coils of a refrigerating system mounted therein.

Refrigerator vehicles, such as motor trucks and the like, today play a large part in the delivery of meats and other perishable items from one location to another. The widespread use of such vehicles makes possible the delivery of perishable items, such as sea food, to points far inland where it is received in palatable and wholesome condition. It is to meet a problem connected primarily with the safe operation of the numerous fleets of refrigerator vehicles that this invention is directed.

One of the most commonly used types of refrigerator vehicles is that which utilizes so-called "hold-over" plates mounted along each side wall of the body near the ceiling to maintain the low temperatures desired in transit. These "hold-over" plates are generally rectangular in shape, typical dimensions, for example, being 120 inches long by 24 inches deep by 1½ to 2⅝ inches thick. The shape and dimensions may vary considerably according to requirements and the standards of the plate manufacturer. These plates are filled with a suitable eutectic solution which is usually a brine solution of varying density according to the requirements. The usual practice for meat delivery trucks is to use a brine that freezes at 26° F. For ice cream or frozen food products, a brine freezing at —6° F. is used. The eutectic solution is frozen at the plant where the vehicle loads up and then acts to absorb heat from the interior of the refrigerated body during the transportation of the perishable cargo to its destination.

The conventional and most widely used system for freezing the eutectic solutions contained in the "hold-over" plates of refrigerator vehicles is to utilize the ammonia refrigeration system of the plant from which the truck loads out. This is generally accomplished by providing ammonia headers at the truck loading platform. The conventional header usually comprises the combination of an overhead mounting connected with the plant refrigerating system through liquid and suction lines, flexible hoses or the like permanently connected to the header and adapted to be hooked up to the trucks and valves mounted on the free ends of these flexible hoses to control the flow of refrigerant therethrough. The flexible hose from the liquid line is connected to one end of a closed coil mounted inside the "hold-over" plates located along the interior of the truck body through a set of make and break valves located on the outside of the truck body. The ammonia passes from the liquid line through an expansion valve in the header into the flexible hose and thence into the coils mounted inside the "hold-over" plates. The ammonia expands through the said coil, freezing the surrounding eutectic solution, and returns to the plant system via the suction line of the header which is, in a manner similar to the liquid line, connected to the other end of the said coil through another set of make and break valves located on the outside of the truck body. This process of freezing the eutectic solution requires approximately five to eight hours time, depending on the size of the plates, the ambient temperature, the size and amount of insulation in the walls, roof, and floor of the truck body, and the size and temperature of the load.

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Other means than the plant refrigerating system may obviously be used to furnish the refrigeration necessary to freeze the eutectic solutions, such as separate compressors and condensing units for this purpose only, utilizing other refrigerants, such as Freon, methyl chloride, or the like.

The biggest problem encountered in the ordinary loading dock system described above is to prevent the trucks from being moved during the time that the ammonia or other refrigerant lines are connected by means of the flexible hoses or otherwise to the make and break valves on the outside of the truck body. Should the truck be moved and the lines attached thereto break, there would be a dangerous possibility of exposing persons in the immediate vicinity to fumes and possible burns.

It is therefore an object of the present invention to provide a means for preventing the motor of a refrigerator vehicle from being started until connections between the vehicle and external refrigerant-supply lines are broken.

It is a further object of this invention to provide a means whereby the ignition circuit of a refrigerated motor vehicle is broken when the said vehicle is connected to outside refrigerant lines.

Additional objects, if not specifically set forth herein, will be apparent to one skilled in the art from the following detailed description.

In the drawings:

Figure 1 is a diagrammatical view of the safety switch of this invention mounted in the preferred position on a refrigerator truck body.

Figure 2 is a pictorial view of the safety switch box of the present invention showing the said box at a time when the outside refrigerant lines are connected to the truck through the make and break valves.

Briefly, the present invention comprises a safety device so mounted in the ignition system of a refrigerator truck that when the outside refrigerant lines are hooked up to valves located on the exterior of the truck body the truck motor cannot be started.

More specifically, the invention comprises a switch box or housing mounted on the exterior of a refrigerator truck body so as to completely enclose the valves through which connection may be made with an exterior refrigerant source. The said switch box has a hingedly-mounted side thereon adapted to be swung downwardly to permit access to the interior of the box and the valves contained therein. Mounted on the said hingedly-mounted side is a mercury two-electrode switch. The said mercury switch is connected through one electrical conductor to one of the conventional leads from the ignition key in the truck cab, and through a second electrical conductor to the point where the lead from the ignition key was formerly connected into the ignition circuit, usually on the positive side of the coil. When the hinged side of the box is in closed position, the mercury within the switch covers the electrodes and the circuit is complete, i. e., when the ignition key is turned to the "on" position, the truck motor can be started. When the box is in the open position, the mercury switch is in an upside-down condition, the mercury does not cover the electrodes, and, consequently, the ignition circuit is broken so that even with the ignition key in the "on" position the truck motor cannot be started.

Referring to Figure 1 of the drawings, 1 represents a truck having a refrigerated body 2, the said refrigerated body having eutectic-containing "hold-over" plates 3 mounted therein. The said "hold-over" plates have a refrigerant coil 4 mounted therein, the ends of which are connected by suction line 5 and liquid line 6, respectively, to a pair of make and break valves 7 and 8 located exteriorly of the truck body and preferably mounted as illustrated in Figure 1 on the front outside panel of the body, just back of and slightly to the left of the left cab door. The valves 7 and 8 are completely enclosed by a housing 9 mounted on the truck body. The said housing has one side thereof 16 hingedly-mounted to swing downwardly and outwardly to permit access to the said valves. Mounted in the lower portion of this hinged side is a two-electrode mercury switch 10. A conduit 11 is illustrated as running from the said housing to a point beneath the hood of the truck. Contained within this housing are two electrical conductors 12 and 14 each connected to one of the two electrodes of the mercury switch 10. The other end of conductor 12 is connected to lead 13 of the truck ignition key illustrated at 26. The other end of conductor 14 is shown as being connected to the positive side of ignition coil 15, although obviously it could be connected elsewhere in the ignition circuit and still serve the purpose for which it is intended as was disclosed in the earlier discussion of the operation of this invention. A lock 22 is provided to insure the housing remaining in the closed position.

Referring to Figure 2 of the drawings, the switch box is illustrated in its open or operating position. The hinged side 16 has been swung outwardly and downwardly, and as a consequence the mercury in switch 10 no longer covers the electrodes and the ignition circuit of the vehicle is broken. Suction line 17 from the loading dock header is shown connected to valve 8 and liquid line 19 from the said header is shown connected to valve 7. Valves 18 and 20 are conventionally provided on the said suction and liquid lines, respectively, to permit the cutting off of the flow of refrigerant through the lines when connecting or disconnecting the said lines from the truck.

It will be seen from the drawings, and especially from Figure 2, that with the refrigerant lines from the loading dock header connected to the valves 7 and 8 of the truck, the hinged side 16 of the housing 9 cannot be closed without first disconnecting the said lines from the truck. This makes movement of the truck by starting the motor thereof impossible since, as has been pointed out above, the ignition circuit is broken at all times when the hinged side of the housing is in the down or open position.

In order to insure that no unauthorized persons, especially children, tamper with the make and break valves while the truck is parked and unattended, a lock 22 is provided as illustrated in Figure 1. This lock also prevents the hinged side of the housing from accidentally jarring open while the truck is in transit and cutting off the motor.

A secondary function of the mercury switch which is not considered to form a novel part of the present invention is to automatically cut off the engine in case the truck should be involved in an accident and tip over or incline to the extent of a 45° angle. This function of a mercury switch is old in the art, and a large number of devices have been interposed in the ignition systems of vehicles to accomplish this result.

Although the foregoing description has been directed chiefly to the preferred form of the present invention, it is obvious that the said form may be modified in many ways without departing from the spirit of this invention. For example, while the preferred form illustrates a hingedly-mounted side on the housing, it is possible to have the entire housing movable in a similar manner or to cause at least a part thereof to be movable to actuate the ignition-breaking means. Likewise, other types of mercury switches may be used in place of the preferred two-electrode mercury switch. It is believed that the present invention constitutes a definite advancement in the field of refrigerator vehicles and obviates a considerable hazard to those engaged in the loading and operation of such vehicles in commercial usage.

I claim:

1. In a refrigerator vehicle safety device, the combination of a motor-driven vehicle having a body containing the expansion coils of a refrigerating system, valves for connecting the ends of the said expansion coils of the said refrigerating system to an external refrigerant-supply source, a housing so mounted on the said vehicle body as to completely enclose the said valves, a movable closure member on the said housing adapted to be swung open to permit the connection of said valves to said external refrigerant-supply source, said valves when connected to said refrigerant-supply source providing an obstruction to the closure of said movable member, and an ignition-breaking means so mounted as to be actuated by the movement of the

said movable member of the said housing whereby the ignition system of the said vehicle is broken when the said movable member is in an open position.

2. In a refrigerator vehicle safety device, the combination of a motor-driven vehicle having a body containing expansion coils for a refrigerating system, means connecting the ends of the said expansion coils with the exterior of the said vehicle, valves on the exterior ends of the aforesaid means, a housing so mounted on the vehicle as to completely enclose the said valves and having at least a portion thereof movable, and ignition-breaking means so mounted on the said movable portion of the said housing as to prevent the motor of the said vehicle from being started when the movable portion of the said housing is displaced from its closed position.

3. A safety device for refrigerated vehicles having internally-mounted expansion coils adapted to be connected to an external refrigerant-supply source through valves mounted on the vehicle body comprising: a housing mounted on the said vehicle body completely enclosing the said valves, a movable member on the said housing so positioned as to be swung open to permit access to the said valves contained within the said housing and as to be incapable of closure when the said valves are connected to an external refrigerant-supply source, a mercury switch mounted on the said movable member of the said housing and connected into the ignition circuit of the said vehicle in such a manner that with the housing closed the ignition circuit is

complete and with the housing open the ignition circuit in broken.

4. A safety device for refrigerator vehicles having internally-mounted expansion coils adapted to be connected to an external refrigerant-supply source through valves mounted on the vehicle body comprising: a housing so mounted on the said vehicle body as to completely enclose the said valves, a movable member on the said housing adapted to be swung open to permit access to the said valves and incapable of being closed when the said valves are connected to an external refrigerant-supply source, means to keep the said movable member from being accidentally opened, a mercury switch connected into the ignition circuit of the said vehicle and so mounted on the said movable member of the said housing as to cause the said ignition circuit to be broken when the said movable member is in the open position and to be complete when the said movable member is in the closed position.

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