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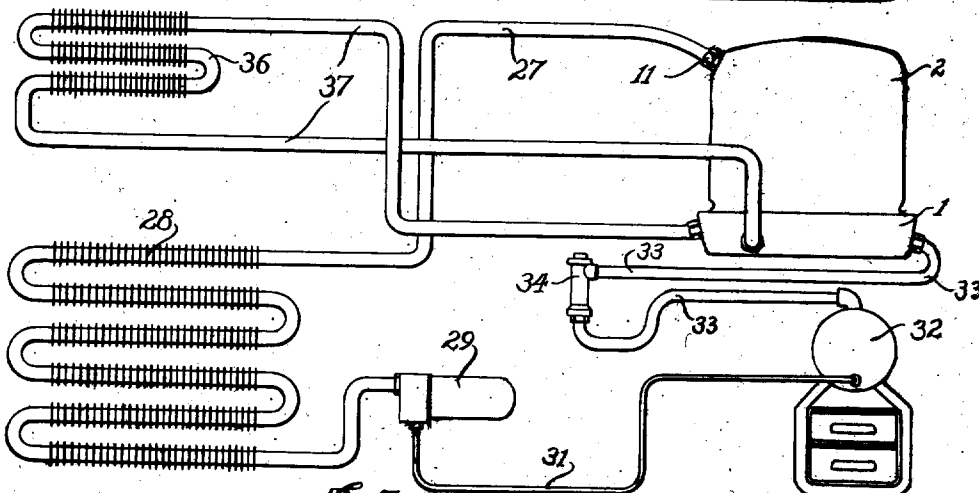
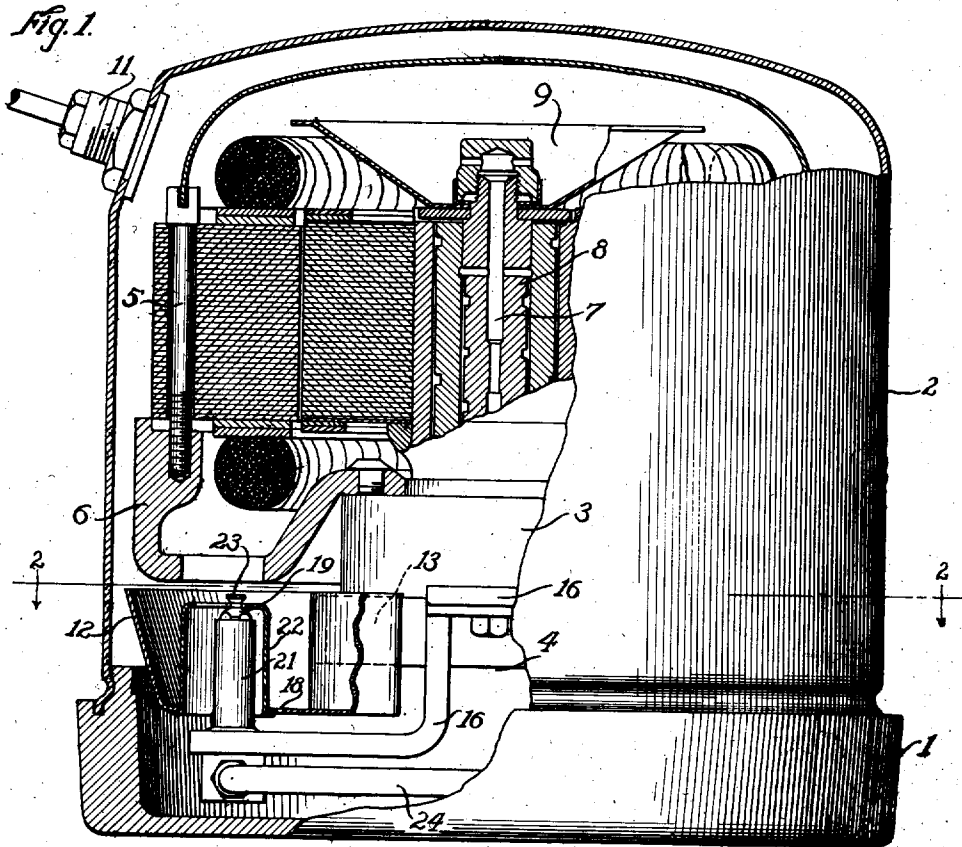
C. E. L. LIPMAN

2,018,917

BUCKET PRESSURE UNLOADER

Filed March 9, 1931

3 Sheets-Sheet 1



Witness:

R. B. Davison.

Fig. 7

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Fig. 2

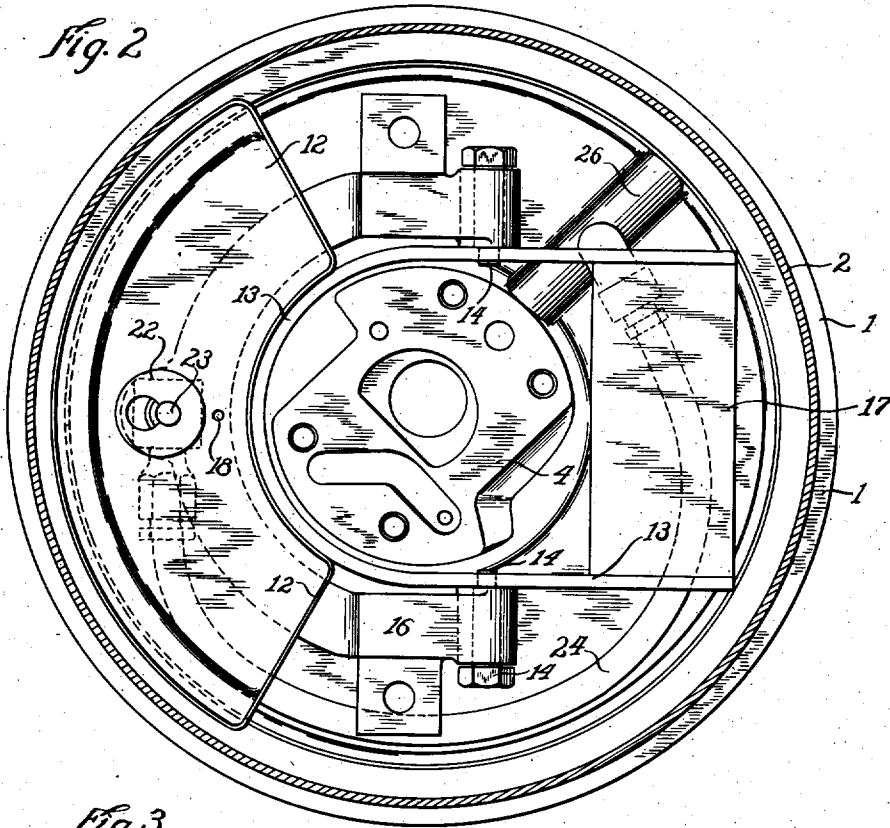
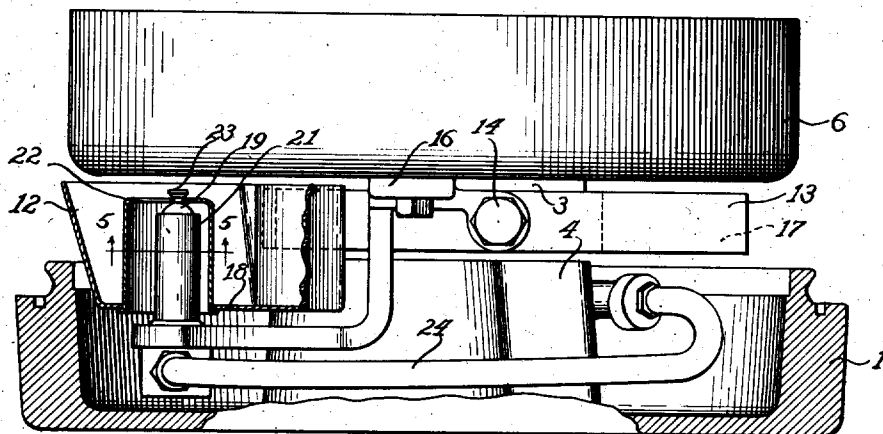


Fig. 3.



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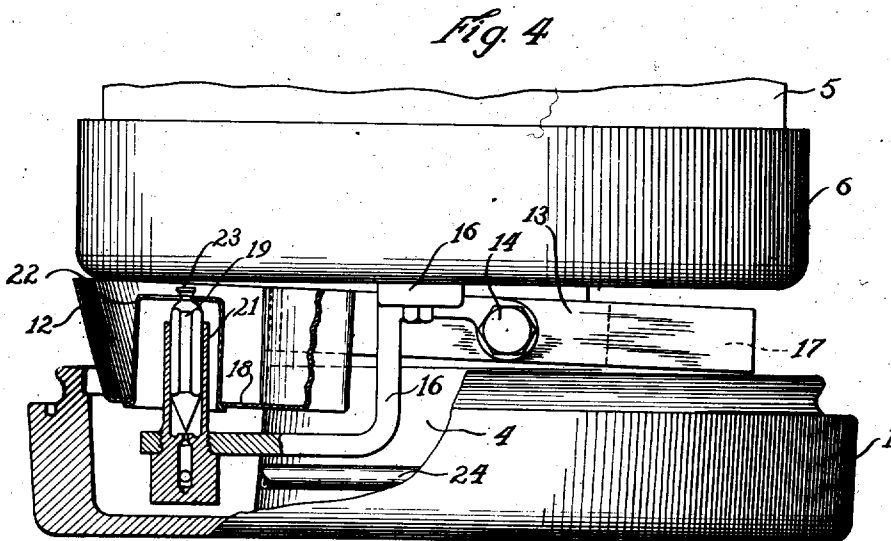
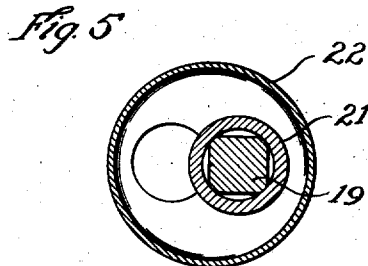
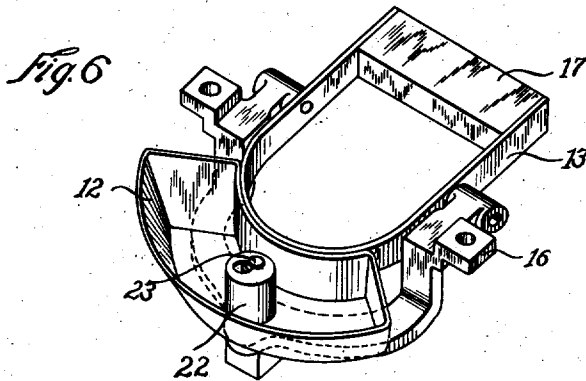
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,018,917

BUCKET PRESSURE UNLOADER

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Application March 9, 1931, Serial No. 521,276

3 Claims. (Cl. 230—24)

This invention relates to refrigerating systems of the compressor condenser evaporator type.

In this type of system, particularly in those applications thereof wherein the motor compressor unit is hermetically sealed within a casing, it is desirable, and often necessary, for the proper and successful operation of the system to reduce the pressure of the high side prior to starting the driving motor, that is, it is necessary to unload the motor at starting if the most efficient motor for the normal working load is to be employed.

This feature is particularly desirable in sealed units wherein it is necessary to use a motor of as low capacity and small size as possible. In reducing the pressure upon the high side of the compressor it is also necessary, of course, to prevent the relatively warm refrigerant from passing back through the suction line into the low side and into the evaporator unit. Otherwise, the reverse flow of refrigerant will transfer heat to the expansion or evaporating element and result in a considerable loss in efficiency.

It is, therefore, an object of this invention to provide an unloading mechanism for use in a refrigerating system which will materially reduce the pressure in the high side of the system prior to starting of the driving motor.

It is also an object of this invention to provide such an unloading device which is actuated through some medium such as the lubricating or seal oil, that is put into operation by operation of the motor compressor and which ceases to function during idle periods of the motor compressor.

It is also an object of this invention to provide an unloading device that is actuated by the circulating lubricating oil for the motor compressor in units where the oil is positively circulated.

It is still a further object of this invention to provide an unloading device of this character which may be incorporated within the sealed container of an hermetically sealed motor compressor unit.

In accordance with this invention, a medium set in operation by the compressor such as the circulating lubricating oil is utilized to actuate a valve which controls a passage between the high and low sides of the compressor for substantially equalizing the pressures therebetween at predetermined periods.

Other and further objects and their resultant advantages will be apparent after this invention becomes better understood from an examination of the specification and claims in connection with the accompanying drawings in which one application of this invention is illustrated in connection

with a sealed motor compressor unit in which at least part of the lubricating oil is positively circulated in combination with the refrigerant.

In the drawings:

Fig. 1 is a side elevation, with certain parts broken away, of a motor compressor unit having an unloading device embodying the principles of this invention incorporated therein.

Fig. 2 is a horizontal transverse section taken on line 2—2 of Fig. 1.

Fig. 3 is a side elevation of the lower portion of the unit, certain parts being broken away, illustrating the unloading mechanism in closed position.

Fig. 4 is a view similar to Fig. 3 illustrating the unloading mechanism in operative position.

Fig. 5 is a fragmentary section on line 5—5 of Fig. 3.

Fig. 6 is a perspective detail of the principal parts of the unloading mechanism, and

Fig. 7 is a diagrammatic illustration of a complete refrigerating system embodying a motor compressor unit having incorporated therein the unloading mechanism embodying the principles of this invention.

With particular reference to Fig. 1, it will be seen that the motor compressor unit is carried by a base 1 and is hermetically sealed by a shell or dome 2. The unit comprises generally a compressor 3 mounted upon a pedestal 4 arising from the center of the base 1 and driven by a motor 5 carried by a spider 6. The particular compressor illustrated is arranged to discharge the refrigerant under pressure into the interior of the dome 2 and the lubricating oil through the central bore 7 of the central shaft 8, from which it is drawn outwardly against the baffle or distributor 9, after which it falls down over the stator of the motor.

Arranged beneath the stator of the motor is an arcuate tray or cup-like member 12 disposed to collect a portion of the oil dripping from the stator. The seal oil customarily circulated with the refrigerant or which may be unavoidably mixed therewith may be utilized instead of the lubricating oil by merely piping it into the tray. The tray is secured to one end of a yoke 13 which straddles the compressor and is pivoted intermediate its length upon a pair of trunnion pins 14 threaded in and projecting through a bracket 50 16, the latter being rigidly secured to the supporting spider 6. The opposite end of yoke 13 is provided with a counter-weight 17 which is of proper weight as to overbalance the bucket 12 when empty, but to be raised by the bucket 12 55

when filled with oil. Bucket 12 is provided with one or more apertures 18 through the bottom thereof which permit of a slow drainage of the oil therefrom. Bucket 12 is attached to actuate a needle valve member 19 slidable in valve housing 21 secured to bracket 16. The operative connection between bucket 12 and valve 19 is made through the medium of an inverted cup 22 which is provided with a large and adjacent small aperture to form a keyhole joint which loosely engages the head 23 and cup 22.

The valve casing is connected to the suction side of the compressor by a by-pass tube 24 tapped into the intake duct 26. The valve member 19 being rectangular and slidable within a circular housing, the valve establishes communication when open between the suction side and the interior of the dome 2. Thus, when the valve is open, pressures between the high and low sides are substantially equalized.

The operation of the unloading mechanism just described is believed to be apparent, but will be summarized briefly. During running periods of the motor compressor unit, oil will be thrown out over the top of the motor and will drain downwardly thereover, some of it falling into bucket 12. When the bucket becomes substantially filled with oil, the weight thereof will overbalance weight 17 and lower valve 19 upon its seat. This will interrupt the communication between the low and high sides of the compressor and allow the pressure on the high side to build up. When the motor compressor unit stops the supply of oil into bucket 12 will, of course, cease and the oil therein will drain out slowly through aperture 18. This will permit the weight 17 to swing the yoke about its pivot and raise bucket 22, thereby raising valve member 19 from its seat. Opening of the valve will establish communication between the high and low sides through tube 24 which will unload the compressor preparatory to the succeeding running periods of the motor compressor.

In Fig. 7 there is illustrated a complete refrigerating system in which the motor compressor unit supplies refrigerant through connection 11 and a discharge line 27 to a refrigerant circulatory system including a condenser 28 for liquefying the refrigerant, a float chamber 29 for controlling the flow of refrigerant through the liquid line 31 to a cooling element such as an evaporator 32. From the evaporator 32 the vaporized refrigerant is withdrawn back to the compressor through a suction line 33 which includes a check valve 34 to prevent reverse flow of refrigerant from the compressor back through the suction line into the evaporator. In the illustrated unit a portion, at least, of the lubricating oil is circulated through an oil cooler 36 through connecting pipes 37.

From the foregoing disclosure it will be apparent that there has been provided an unloading mechanism that is actuated in response to the operating condition of the motor compressor unit through the lubricating oil. The unit is conveniently adapted to be incorporated within the sealing dome of the sealed motor compressor unit, although it is manifest that it may be incorporated externally thereof with some suitable housing if so desired.

It is obvious that minor changes may be made in the details of the construction without departing from the spirit and scope of this invention as defined in the claims.

I claim:

1. A hermetically sealed motor compressor unit having means for circulating lubricating oil therethrough, a by-pass between the high and low pressure sides of the compressor, a valve in said by-pass, a pivoted oil cup disposed beneath a portion of the motor compressor unit and arranged to collect a portion of the oil dripping therefrom, said cup having a restricted drain opening, a counter-balance for said cup and connections between said cup and said valve for actuating the latter to substantially equalize the pressures in the high and low pressure sides of said compressor upon stopping of the latter.

2. A motor compressor unit adapted to be operated intermittently comprising a compressor, means for circulating lubricant, a by-pass connection between the high and low sides of the compressor, a valve for controlling said by-pass, a movably mounted receptacle positioned to collect circulated lubricant and connected to said valve to close the same when weighted by collected lubricant, said receptacle having a restricted delivery opening permitting a delayed drainage of the collected lubricant therefrom, and means for opening said valve upon the drainage of lubricant from said receptacle.

3. A motor compressor adapted to be operated intermittently comprising a refrigerant compressor, a motor for operating the same, means for circulating lubricant, a passage through which communication between the high and low sides of said compressor may be established, a valve for closing said passage, a fulcrumed lever for operating said valve, a receptacle connected to said lever and positioned to collect circulated lubricant, said receptacle being adapted to close said valve when weighted by collected lubricant and having a restricted delivery opening permitting a delayed drainage of the collected lubricant therefrom, and gravity actuated means for operating said lever to open said valve upon drainage of lubricant from said receptacle.

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