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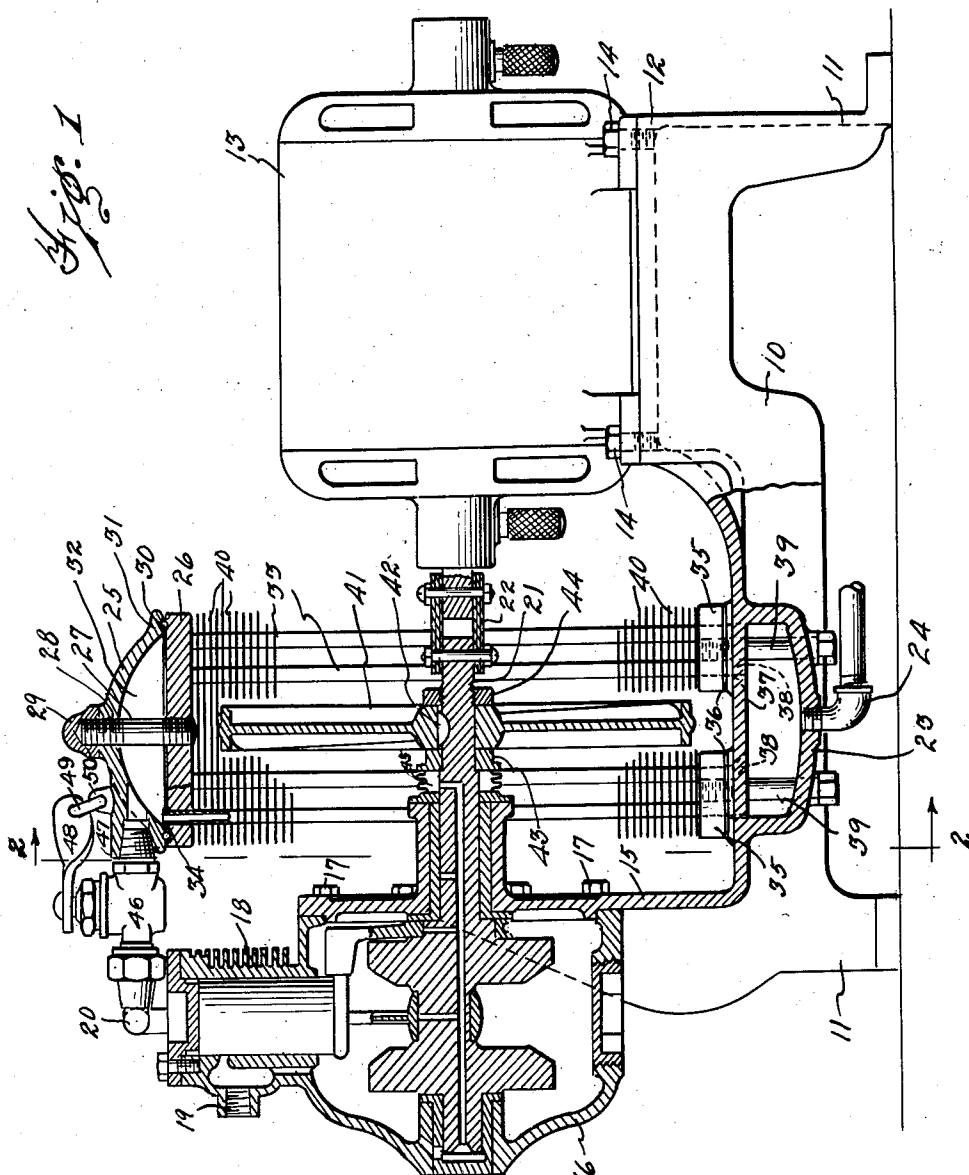
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T. F. RAINSFORD ET AL

CONDENSER FOR REFRIGERATING APPARATUS

Filed May 18, 1925

2 Sheets-Sheet 1



Thomas F. Rainsford INVENTORS
THOMAS C. WHITEHEAD

BY *Whittemore Halliburton*
Whittemore & Belknap
ATTORNEY.

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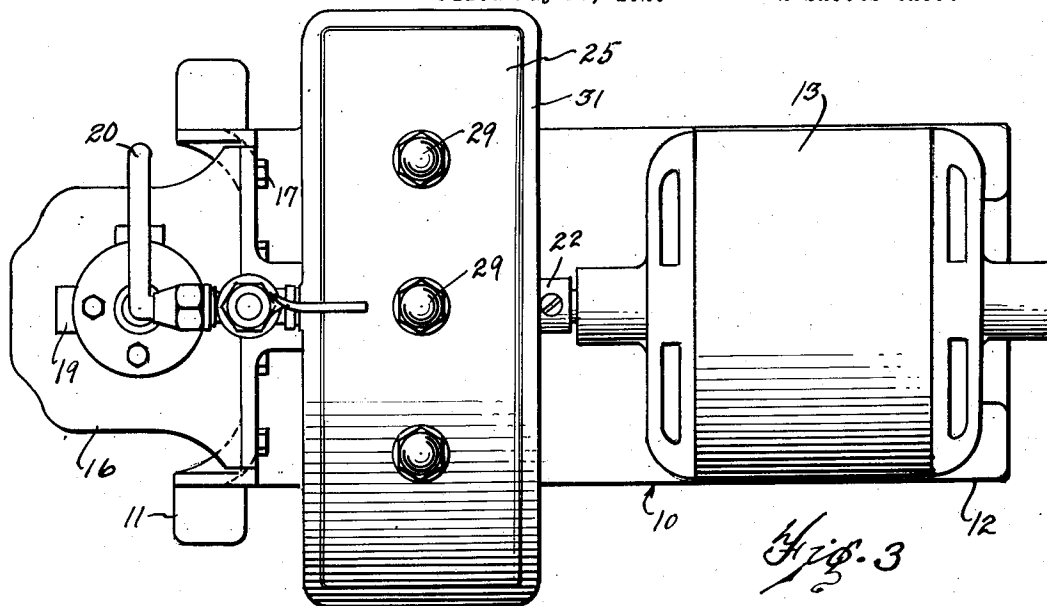
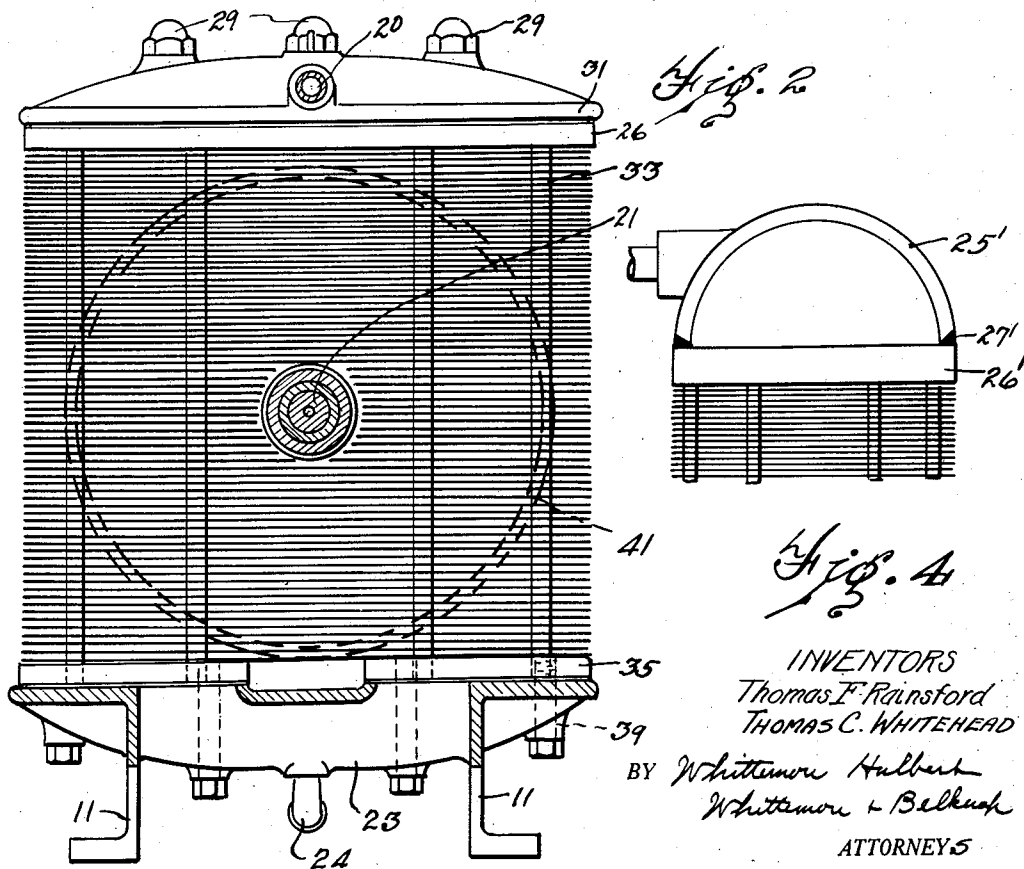
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UNITED STATES PATENT OFFICE.

THOMAS F. RAINSFORD AND THOMAS C. WHITEHEAD, OF DETROIT, MICHIGAN; SAID RAINSFORD ASSIGNOR TO SAID WHITEHEAD.

CONDENSER FOR REFRIGERATING APPARATUS.

Application filed May 18, 1925. Serial No. 31,151.

The invention relates to refrigerating apparatus and more particularly to improvements in certain parts thereof.

The invention relates more particularly to improvements in the construction of the condenser whereby its manufacture is simplified and cheapened, its assembling facilitated, and the resulting structure rendered more durable. The invention further contemplates improvements in the manner of associating the fan with the condenser whereby more efficient and satisfactory results are obtainable during operation and whereby a measure of protection against exterior contact, and consequently a measure of safety, is obtainable.

The invention has also as an object to simplify, render more efficient, and improve generally apparatus of this character, and the means for attaining all of the aforesaid objects as well as other advantages, and the details of the construction of one illustrative example of the invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a view partly in vertical section and partly in elevation of a refrigerating apparatus constructed in accordance with our invention,

Figure 2 is a vertical sectional view taken substantially on a plane indicated by the line 3—3 in Figure 1,

Figure 3 is a top plan view of the apparatus, and

Figure 4 is a fragmentary sectional view of a modified form of construction.

Referring now particularly to the drawings wherein like reference characters indicate like parts, it will be noted that the apparatus consists essentially of a base 10 formed preferably with a plurality of depending legs or feet 11 and with a raised table or pedestal 12, to which an electric motor 13, used in operating the apparatus, may be secured by means of bolts 14 threaded into pedestal 12.

Base 10 is formed with an upright extension 15 to which a housing 16 is secured, preferably by means of bolts 17. Housing 16 is preferably formed with an extension 18 constituting the cylinder of a compressor to which the refrigerating medium is conducted through an inlet 19, this refrigerat-

ing medium being then compressed and expelled therefrom through a conduit 20 to a radiator yet to be described.

Journaled within suitable bearings formed in the extension 15 of the base and in casing 16 is a shaft 21, which shaft extends centrally through the condenser of the apparatus and is connected to the motor 13 preferably by means of a flexible coupling 22. Shaft 21 is rotated by motor 13 and the piston (not shown) of the compressor is suitably connected to the shaft so as to be reciprocated thereby.

The condenser comprises a lower header 23 formed preferably, although not necessarily, integrally with base 10. A conduit 24 having a threaded connection with header 23, leads to the brine tanks (not shown), whereby the refrigerating medium, after passing through the condenser, may be conducted to these brine tanks.

The upper header consists essentially of a cap plate 25 substantially bowed or semi-circular in transverse cross section which is cooperatively associated with a top header plate 26. This latter plate is provided with a plurality, here shown as three, threaded apertures for the reception of the threaded lower ends of tie-bolts or rods 27 which project upwardly from plate 26, passing through apertures 28 in cap plate 25 and having threaded ends for the reception of cap nuts 29. The upper face of plate 26 is peripherally grooved for the reception of a sealing wire 30 adapted to rest therein and to be engaged by an annular horizontal flange 31 formed on cap plate 25. Consequently when cap nuts 29 are tightened cap plate 25 is forced tightly against sealing wire 31 and a water tight compartment or header 32 is formed.

In Figure 4 the cap plate 25' is shown as welded to header plate 26' at its periphery as shown at 27'. In this construction the bolts 27 are eliminated.

Upper header 32 is connected to lower header 23 by a plurality of vertically extending water tubes 33, the upper ends of which extend through suitably arranged apertures in plate 26 and are anchored thereto as by flaring the ends of the tubes as indicated at 34. The lower ends of these tubes pass through and are anchored in anchor plates 35, preferably in the same manner as the upper ends of the tubes, these

plates 35 resting on upstanding bosses 36 formed on wall 37 of the lower header. These are centrally apertured as shown at 38 for affording communication between the tubes 33 and header 23, the plates being rigidly mounted upon bosses 36 by means of bolts 39 passing upwardly through the headers and threadedly engaging the said anchor plates.

Associated with the water tubes 33 is a plurality of horizontally arranged spaced fin or heat radiating plates 40, which plates preferably extend entirely transversely and longitudinally of the condenser. Arranged centrally of the condenser in a space provided by properly arranging water tubes 33 and by interrupting certain of the fin plates 40, as clearly shown in Figure 1, is a fan 41. Fan 41 is keyed as at 42 to shaft 21 and is prevented from longitudinal displacement on this shaft by means of a fixed collar 43 on one end and an adjustable collar 44 on the other, which latter element constitutes a part of an expansible chamber 45 surrounding shaft 21 and constituting a seal therefor. Liquid for this seal is supplied through a passageway formed in shaft 21 which communicates with the interior of casing 16 which contains a supply of lubricant. By keying fan 41 to shaft 21 it is operated by motor 13 when shaft 21 is rotated. The tubes and fin plates are also spaced and arranged to provide a transverse passage through which said shaft 21 extends.

The fan 41 is arranged substantially centrally of the assembled condenser, it being centered both laterally and longitudinally of the condenser so that it is entirely surrounded by the fin plates 40 thereof and by the water tubes 33.

In operation, air will consequently be drawn from one vertical face of the condenser and expelled out through the other vertical face thereof so that an efficient agitation of the air with reference to the condenser is obtained. This efficiency of operation is further assured by reason of the diameter of the fan which is so chosen as to nearly approximate the longitudinal dimension of the condenser. In addition to this advantage is the added advantage of the protection afforded the fan, that is its protection against exterior interference such as moving objects or the clothing or person of the operator. In constructions involving a fan or the like rotating at a relatively high speed there is always an element of danger owing to the possibility of contact

with the fan of some object or of the person of the operator. With this present construction the fan is entirely encased or surrounded by the condenser construction and the above noted objections are entirely eliminated.

As mentioned above, during operation, the refrigerating medium is compressed by the compressor 18 and is forced through conduit 20 which is preferably connected to a valve 46, which in turn is connected to an interiorly threaded laterally extended boss 47 formed on cap plate 25. Hence the refrigerating medium enters header 32 and expands therein and within the tubes 33 of the condenser, flowing downwardly there-through into lower header 23 from whence it is conducted by conduit 24 to the brine tanks. During its passage through the tubes 33 it is subjected to the cooling air drawn and forced between fin plates 40 by the fan 41. The valve 46 may be operated by handle 48 which if desired may be apertured to receive a seal 49 which also engages an eye 50 formed on cap plate 25.

With the herein described construction the condenser may be quickly and easily manufactured and assembled with facility owing to its simplicity and the accessibility of the connections. Furthermore worn or damaged parts may also be readily replaced.

While one specific embodiment of the invention has been shown and described somewhat in detail, it is not intended that the invention should be unnecessarily limited, as various rearrangements and modifications of the specific construction shown may be made as found necessary or desirable without departing from the spirit and scope of the invention, and to this end reservation is made to make such changes as may come within the purview of the accompanying claim.

What we claim as our invention is:

In a condenser construction, upper and lower headers, vertical water tubes connecting said headers, horizontal fin plates associated with said tubes, said tubes and fin plates being arranged to form a recess substantially centrally of the condenser structure for receiving a cooling fan, and spaced anchor plates for said tubes secured to the lower header upon opposite sides of the recess aforesaid and having apertures therein communicating with said lower header.

In testimony whereof we affix our signatures.

THOMAS F. RAINSFORD.
THOMAS C. WHITEHEAD.