May 7, 1929. C. C. SPREEN 1,711,702

CONDENSER ASSEMBLY

Filed April 11, 1927

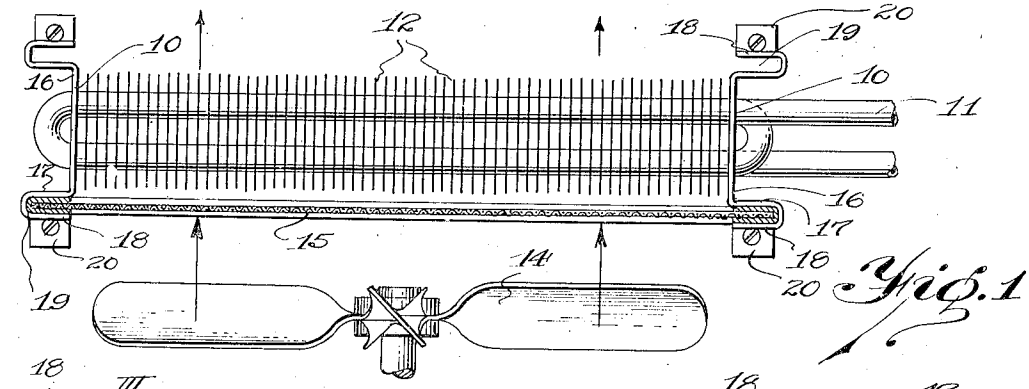


Fig. 1

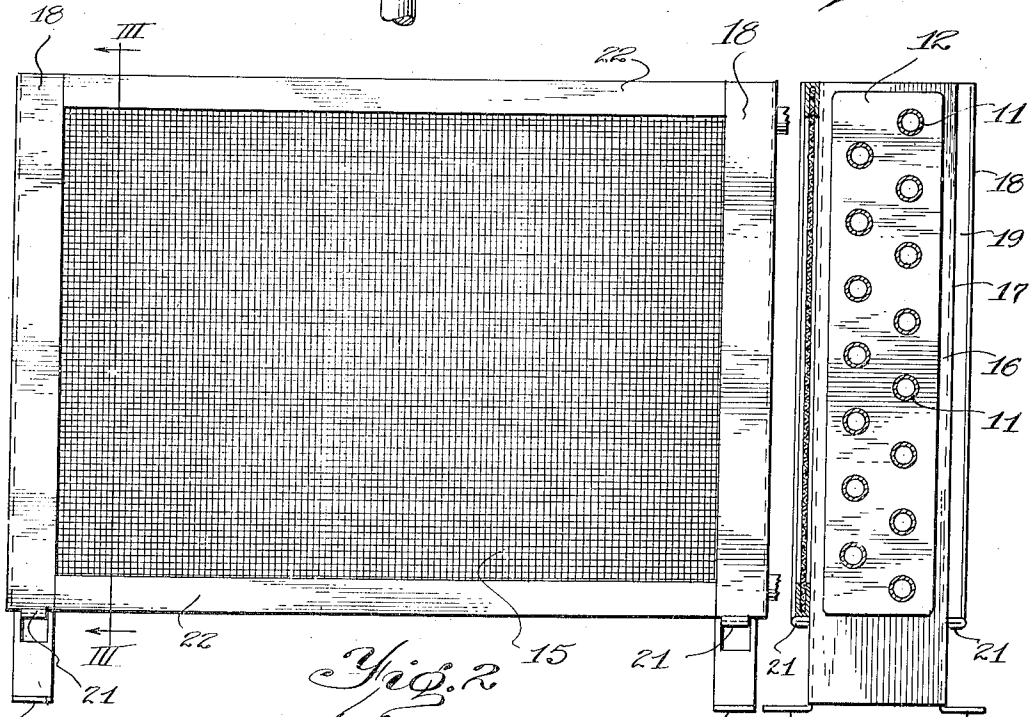


Fig. 2

Fig. 3

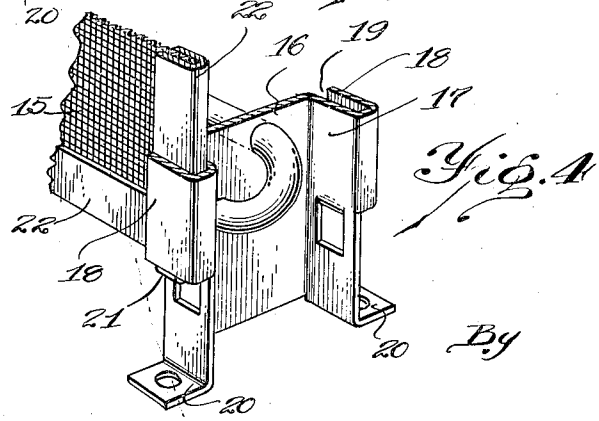


Fig. 4

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UNITED STATES PATENT OFFICE.

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CONDENSER ASSEMBLY.

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My invention relates generally to artificial refrigerating apparatus, and more particularly it relates to means for preventing the deposition of foreign matter upon the surfaces of the condenser units of such refrigerating systems which are particularly designed to facilitate the rapid transfer of heat by convection and radiation.

Heretofore, it has been suggested that the coiled tubing or so-called "bird-cage" type of condenser for mechanical refrigerating apparatus be replaced by the more efficient, more compact and less expensive type of condenser consisting of tubing bent into sinuous formation and provided with a large number of substantially parallel heat radiating fins. This radiating fin type of condenser has proven to be very efficient in laboratory tests, but in practical service is not satisfactory owing to difficulties which are inherent in the design thereof. In a condenser of this type it is necessary that a cooling fluid, usually air, be forced over the tubing and between the fins to cool them, and that the fins on the tubing be disposed relatively close together so that the air passing therebetween will have a scouring effect thereon and prevent the formation of a layer of dead air adjacent the fins, which acts as a heat insulating medium. However, as is well known, it is customary to place the condensing units of refrigerating systems in out of the way places, which are naturally seldom cleaned. As a result of this combination of relatively close fins and dirt laden air passing therebetween the fins, in a short time, become coated with foreign matter and frequently the space between the fins becomes entirely clogged with lint and the like, and the effectiveness of the condenser is thereby seriously impaired.

One object of my invention is to provide a novel combination of elements which permits of employing the radiating fin type of condenser but obviates the difficulties which have heretofore attended the use thereof on condensing units of refrigerating systems.

Another object of my invention consists in providing a novel arrangement of a condensing unit and a fluid cleansing device which is particularly effective in keeping the condensing unit clean and lends itself readily to alteration to accord with various conditions of installation.

A further object of my invention is to provide means for cleansing the cooling air which is simple and inexpensive in construction, which is readily replaceable when worn out or impaired, and is adapted to be associated with the condenser in such manner as to constitute a unitary structure when assembled.

For a more detailed understanding of my invention reference may now be had to the accompanying drawings which illustrate one form which my invention may assume, and in which:

Fig. 1 is a plan view partially in section, of a condenser assembly embodying my invention.

Fig. 2 is an elevational view of the structure illustrated in Fig. 1.

Fig. 3 is a vertical sectional view of the structure illustrated in Figs. 1 and 2, the section being along line III—III of Fig. 2.

Fig. 4 is a fragmentary sectional view in perspective showing in detail the arrangement of the condenser elements and the fluid cleaning screen.

My improved form of condenser assembly is adapted to be associated with any suitable form of refrigerating apparatus in which compressed refrigerant vapor is conducted into a condensing unit wherein the vapor is condensed while being subjected to influence of a cooling medium. One form of condenser assembly is herein illustrated and comprises a pair of spaced substantially vertical standards 10 which support a member composed of tubing of sinuous formation. This member 11 is provided with a plurality of substantially parallel heat conducting fins 12, which are composed of rectangular pieces of thin sheet metal of high heat conducting properties through regularly arranged openings in which the tubing passes. The openings in the fins 12 are so arranged as to present the greatest possible area of the tubing to a cooling medium to be passed between the fins. In the particular adaptation of my invention illustrated, air is employed as the cooling medium, and is caused to flow between the radiating fins and over the tubing 11 by means of a fan 14. The air is initially set in motion by the fan 14, passes through a screen 15, preferably of fine mesh and composed of metallic wires, which removes any foreign particles therefrom, and then passes between the fins 12 and impinges upon the tubing 11.

The standards 10, which are preferably composed of sheet metal, are each provided

with a main central portion 16 which forms the support for the tubing 11, and a vertically extending flange 17 at each side thereof which is bent at right angles thereto, the outer edges of which are doubled back upon itself in spaced relation with the portion 17, as shown at 18 to provide vertically extending channels or guideways 19. The lower ends of the flanges 17 are bent outwardly to form flanges 20 by means of which the members 10 may be secured in any desired position. The channels 19 are open at the top and at the inner side but are closed at their bottoms by outwardly struck lugs 21.

The screen 15 is provided with a rigid frame member 22 which serves to strengthen it. The frame member 22 is of such thickness that it fits snugly but slidably within the channel 19. The screen, with its frame 22 is of substantially the same height as the condenser unit and of such width that the ends thereof fit within the channels 19 in the supporting members 10 simultaneously. The lugs 21 of the members 10 serve to support the screen 15.

In the form of my invention illustrated the screen is disposed between the fan and the condenser unit because the fan is blowing air therethrough. If the fan is so connected to its source of power, or if any other reason renders it desirable that the fan rotates in the opposite direction, so as to draw air through the condenser, the screen 15 may be readily removed from its illustrated position and placed on the opposite side of the condenser unit. Thus the double channel arrangement permits of placing the screen on either side of the condenser unit, depending on the direction of rotation of the fan.

It will be noted that the screen is mounted upon the condensing coil support in such manner that the assembly constitutes a single unit. Also that, by making the screen readily removable, it is easily cleaned, repaired or replaced and will not interfere with the inspection or repair of the condensing coils.

Although I have illustrated but one form of my invention and have described in detail but a single application thereof, it will be apparent to those skilled in the art, that many minor modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

What I claim is:

1. In a refrigerating apparatus, a condenser provided with a plurality of relatively closely spaced fins, means for causing an air stream to engage said fins, and a screen for removing foreign particles from said air stream prior to its engagement with said fins.

2. In a refrigerating apparatus, a condenser, a supporting structure for said condenser, means for propelling an air stream against said condenser to cool the same, and a screen removably supported by said supporting structure and disposed to intercept said air stream prior to its engagement with the condenser to remove foreign particles therefrom.

3. In a refrigerating apparatus, a condenser, constructed of continuous tubing arranged in sinuous formation and provided with fins for increasing the effective heat transfer surface area thereof, means for causing an air stream to engage said tubing and fins, and a screen disposed transversely of said air stream to remove foreign particles therefrom prior to its impingement against said condenser.

4. In a mechanical refrigerating apparatus, a condenser unit comprising a plurality of spaced supporting standards, a coil of tubing supported on said standards and provided with heat radiating fins, and a screen member disposed parallel to said coil of tubing and adjacent thereto and supported upon said standards.

5. In a mechanical refrigerating apparatus, a condenser unit comprising a plurality of spaced supporting standards, a coil of tubing supported on said standards and provided with heat radiating fins, and a screen member, said standards being provided with means for supporting said screen in proximity to said coil of tubing, said screen being readily removable from said standards.

6. In a mechanical refrigerating apparatus, a condenser unit comprising a plurality of spaced supporting standards, a coil of tubing supported on said standards and provided with heat radiating fins, and a screen member, said standards being provided with means for supporting said screen in proximity to said coil of tubing on either side of said coil of tubing, said screen being readily removable from said standards.

In testimony whereof I hereunto affix my signature.

CHARLES C. SPREEN.