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FILTERING AND DEHYDRATING DEVICE FOR THE REFRIGERANT
IN MECHANICAL REFRIGERATORS
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FIG. 1.

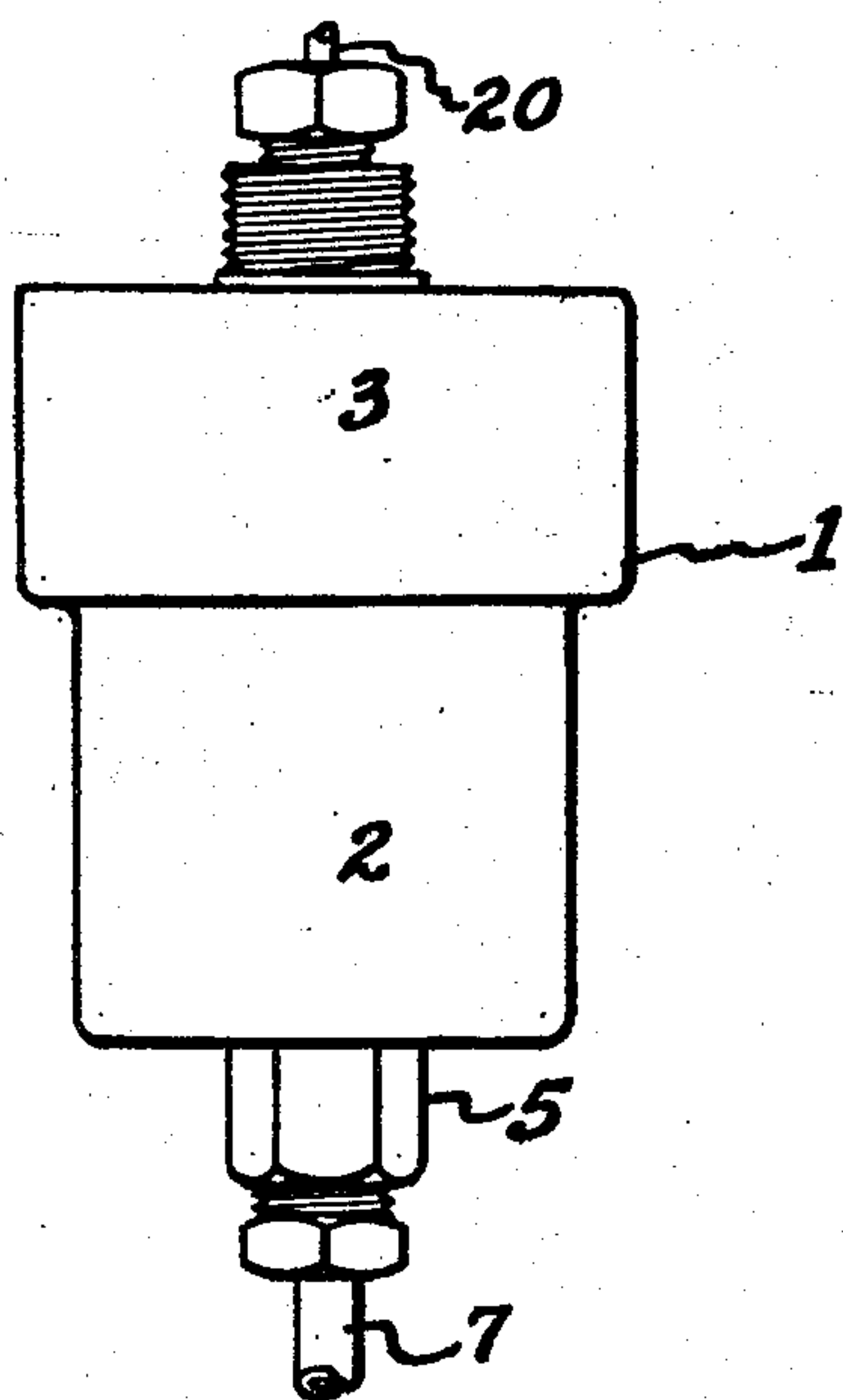
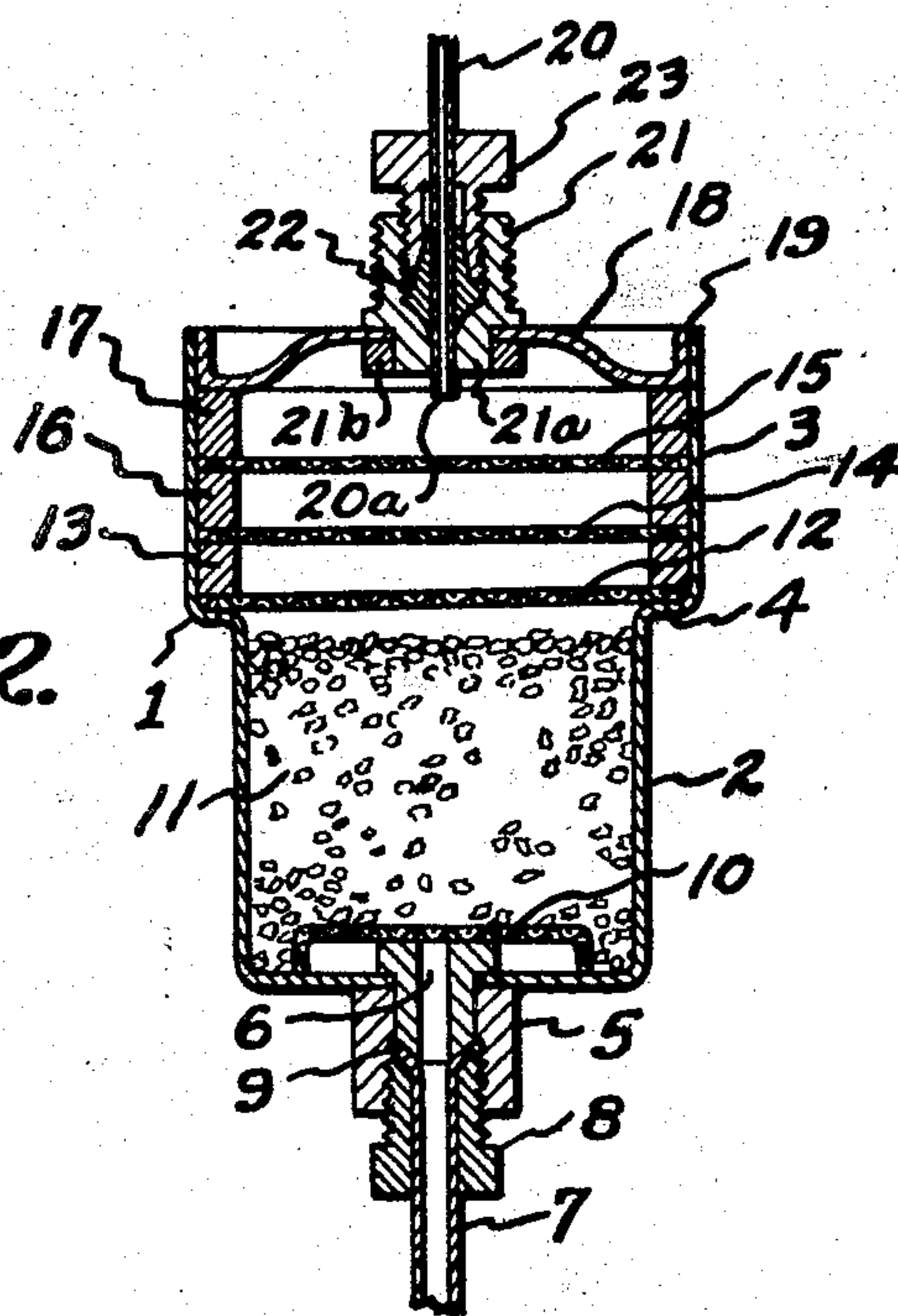


FIG. 2.



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UNITED STATES PATENT OFFICE

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FILTERING AND DEHYDRATING DEVICE
FOR THE REFRIGERANT IN MECHANICAL
REFRIGERATORSWilliam R. Mittendorf, Cincinnati, Ohio, assign-
or to The Crosley Corporation, Cincinnati,
Ohio, a corporation of Ohio

Application September 18, 1935, Serial No. 41,105

4 Claims. (Cl. 210—131)

My invention has to do with mechanical re-
frigerators, and its primary object is to provide
a device for removing impurities, foreign matter
and/or moisture, from the refrigerant stream.

5 It is well known that moisture in a mechanical
refrigerating system is highly disadvantageous in
that it becomes entrained in the stream of re-
frigerant passing therewith through various por-
tions of the apparatus, until it reaches a low tem-
10 perature portion, whereupon the moisture freezes
into ice, and either clogs small passages or forms
dead spots in the evaporator. As a consequence,
elaborate procedures are ordinarily taken to elim-
15 inate moisture from the apparatus, both in set-
ting up new refrigeration devices and in repair-
ing those already in use, where such repairing
requires a disassembly of the parts.

Again, mechanical impurities or foreign matter
in the refrigerant stream are a source of consid-
20 erable trouble in all types of refrigeration appa-
ratus, but especially in those types employing a
flooded evaporator which is continuously fed by a
restricted flow device, which may be a capillary
tube or other mechanism.

25 An object of my invention is to provide a device
which will be simple in construction, economical
to produce, and which will serve as an effective
barrier not only to mechanical impurities, but
also to congealable substances, such as moisture,
30 which would tend to interfere with the operation
of the apparatus.

A supplementary object of my invention is the
provision of a device which will entrap or remove
moisture from the refrigeration stream, and
35 which device may be located ahead of the evapo-
rator so as to keep any moisture in the system on
the high pressure side of the apparatus.

It is an object of my invention to provide a
combined filter and dehydrator which is small
40 in size, and which, without alteration of the de-
sign or construction of other parts of the refrig-
erating apparatus, may be combined with new or
existing machines.

These and other objects of my invention which
45 will be set forth hereinafter, or will be apparent
to one skilled in the art upon reading these speci-
fications, I accomplish by that certain construc-
tion and arrangement of parts of which I shall
now describe a preferred embodiment. Refer-
50 ence is made to the drawing, wherein:

Figure 1 is an exterior plan view of my device,
and Fig. 2 is a sectional view thereof taken along
the axis.

In the exemplary and preferred embodiment of
55 my invention I provide a casing or body 1 of

generally cylindrical form, and having two por-
tions 2 and 3 of different diameters so that a
shoulder 4 is provided therebetween. This cas-
ing may be made of drawn or stamped sheet
metal. An entrance fitting is provided as shown 5
at 5, which fitting may be brazed or welded, or
otherwise attached to the casing, or, of course,
formed integral therewith. The fitting is per-
forated as at 6 for the passing of refrigerant.
10 The fitting may preferably be of any of those
well-known types whereby flexible metallic tub-
ing is connected to other apparatus. In the fig-
ures, the entrance tubing is shown at 7, prefer-
ably a tinned copper tubing, either attached to
15 or forming a part of the condenser of the re-
frigerator apparatus. Where the condenser is
formed of one or more tubes formed into convo-
lutions and provided with fins, the end of such
tubing may be attached directly to the fitting 5.

I have shown a type of fitting in which a mem- 20
ber 8 is placed about the tubing, the tubing flared
as at 9, and the member 8 then screwed tightly
into the fitting 5.

As I have illustrated my exemplary embodi-
ment, a portion of the fitting 5 extends into the 25
casing 1. Over this extension I place a screen
member 10. By reason of the projection of the
fitting 5, this screen member may conveniently
be of cup-shape, so as to hold itself in place in
the casing. Other equivalent constructions are 30
within the province of the skilled worker to
devise.

Into the reduced portion 2 of the casing, I
place a quantity of moisture-removing substance
as shown at 11. There are several materials 35
which can be employed for this purpose. Any
hygroscopic salt which is inert to the refrigerant
or metal parts, and which is not adapted to
liquefy upon the absorption of small quantities of
moisture, may be employed. Thus calcium 40
chloride is a material which will be found satis-
factory. Since the quantity of moisture which
will be found in refrigerating apparatus upon as-
sembly, or which will get into it when repairs are
made is comparatively small, and since the re- 45
frigerating apparatus operates as a closed system
so that additional moisture does not enter it from
time to time, I prefer to use some form of absorb-
ent material for the moisture which has no tend-
ency to become dissolved therein. For this pur- 50
pose there are also a number of materials which
can be used. I prefer to use activated alumina.

A screen member 12 is next placed in the cas-
ing, being of a size to rest upon the shoulder 4.
Next a spacing ring 13 is placed on the screen. 55

Additional screen members 14 and 15 may be employed if desired, each preferably being spaced from the other and/or surmounted by spacing rings 16, 17, and etc. The screen used is a fine mesh screen, having about sixty meshes to the linear inch in some instances, and as many as several hundred per inch in other cases. It is for the purpose not only of holding back any of the hygroscopic or moisture-removing substance, but also for the purpose of holding back any other mechanical impurities, or other foreign substances which may be entrained in the refrigerant stream.

When as many of the screen members have been placed in the casing as desired, I place in the casing a cap or closure member indicated at 18, preferably one having a peripheral flange 19. This cap or closure member may be fastened to the casing again in any way desired, but I have found it most convenient to close the casing by welding the flange 19 of the closure member to the edge of the container or housing, electrically or by the use of a flame.

The closure member is perforated to receive an outlet tube. I have shown as an outlet tube a capillary tube 20, which may be carried direct to the evaporator of a refrigerator. This capillary tube preferably projects a slight distance through the cap or closure member as shown in Fig. 2 at 20a. The purpose of this is to prevent any mechanical impurities which may possibly pass the screens from being swept into the capillary tube. The cap or closure is provided with a fitting for making a liquid tight seal with the outlet tube. One such fitting illustrated comprises an internally and externally threaded hollow boss or sleeve 21, which may be integral with the cap member 18, but which is preferably formed with a reduced portion 21a projecting through, and closely fitting within a central bore in the cap member 18. A collar 21b is welded or otherwise solidly fastened to the reduced portion 21a on the other side of the cap member 18, to hold the assembly in fixed and leakproof relation with said cap member. The external threads on the member 21 are for purposes of attachment to other portions of a refrigerator. A resilient compressible and expansible packing means 22 is placed within the sleeve and about the tube, whereupon a threaded member 23 is threaded into the sleeve to compress the packing about the tube, to hold it solidly in place and to make a liquid-tight connection.

Modifications may be made in my invention without departing from the spirit thereof.

Having thus described my invention, what I

claim as new and desire to secure by Letters Patent, is:—

1. In combination in a device of the character described, a cylindrical housing having portions of varying diameters, leaving a shoulder therebetween, an entrance fitting in the portion of the smaller diameter, a screen member overlying said entrance fitting, a filling of hygroscopic material in said portion of smaller diameter, a screen member in the portion of the larger diameter and resting on said shoulder, an additional screen member, a spacing ring in said portion of larger diameter, and having a diameter larger than the internal diameter of said portion of smaller diameter, said spacer ring being located between said screens, and means for closing said casing.

2. In a device of the character described, a substantially cylindrical housing having portions of at least two different diameters, comprising in the order named, an entrance fitting, a screen covering said fitting, a filling of hygroscopic filtering material, said fitting, screen and filling being located in the smaller portion, a second screen to retain said filling in place, at least one fine mesh screen spaced from said last mentioned screen, said second screen and said fine mesh screen being located in the larger portion, and a cover member provided with an exit fitting.

3. In a device of the character described, a substantially cylindrical housing having portions of at least two different diameters, comprising in the order named, an entrance fitting, a screen covering said fitting, a filling of hygroscopic filtering material, said fitting, screen and filling being located in the smaller portion, a second screen to retain said filling in place, a plurality of interspaced fine mesh screens spaced from said last mentioned screen, said second screen and said plurality of fine mesh screens being located in the larger portion, and a cover member spaced from the last of said fine mesh screens and provided with an exit fitting.

4. In combination in a device of the character described, a cylindrical housing having portions of different diameters, leaving a shoulder therebetween, tube fittings in each end of said housing, a screen in the smaller portion of said housing covering said fitting, a filling of hygroscopic material in said smaller portion, a screen member in said larger portion resting on said shoulder and at least one additional screen member of fine mesh in said larger portion spaced from said last mentioned screen member.

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