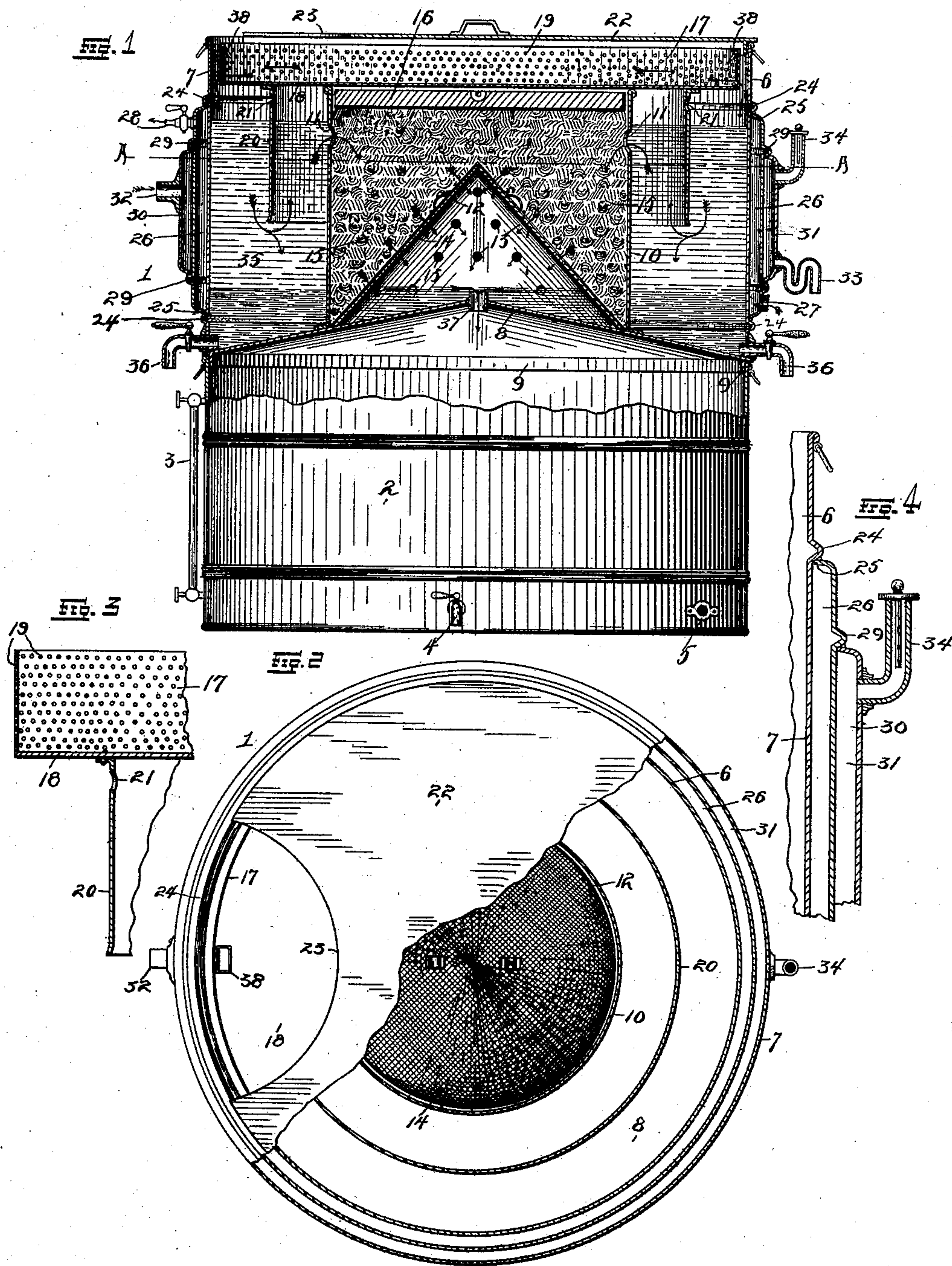


(No Model.)

A. H. FRANKE.  
OIL FILTER.

No. 603,327.

Patented May 3, 1898.



Witnesses

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# UNITED STATES PATENT OFFICE.

AUGUST H. FRANKE, OF ST. LOUIS, MISSOURI.

## OIL-FILTER.

SPECIFICATION forming part of Letters Patent No. 603,327, dated May 3, 1898.

Application filed October 11, 1897. Serial No. 654,859. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST H. FRANKE, of St. Louis, State of Missouri, have invented certain new and useful Improvements in Oil-  
5 Filters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in oil-  
10 filters; and it consists in the novel arrangement, construction, and combination of parts, as will be more fully hereinafter described, and set forth in the claims.

The object of my invention is to construct  
15 an oil-filter to be made of galvanized sheet-iron, sheet-copper, or other suitable material provided with proper outlets, inlets, gages, fittings, &c., all for the purpose to purify and refine impure or dirty lubricating-oils or other  
20 impure or unrefined oils.

This apparatus is to be provided with a large area of heat communication to the impure or dirty oil by means of heat conducted through air within a so-called "air-jacket" which sur-  
25 rounds the impure oil or settling-chamber from an outer so-called "steam-jacket" which surrounds said air-jacket, the intensity of said heat communication to the impure oil to be regulated by increasing or decreasing the  
30 circulation of air through said air-jacket and also by increasing or decreasing the amount of steam heat admitted into the said steam-jacket. This heat communication is to be ap-  
35 plied in such a manner as to avoid stirring up the precipitated impurities by circulation as much as possible.

In carrying out this invention a large remov-  
able straining-surface, a deflecting-shield, set-  
tling-chamber, filtering-chamber, and a large  
40 area of effective filtering-surface by means of a perforated cone or hood are furnished, the cone or hood to be covered by muslin or cloth for the purpose of preventing particles  
45 of and from the filtering material passing through the said perforated cone or hood and gaining access to the reservoir, to have a suitable reservoir for the purpose of storing and cooling the purified oil after it passes  
50 through the filter proper, and to provide suitable outlets and gages in the reservoir, the device as a whole to be strong, substantial, and convenient to operate.

Referring to the drawings, Figure 1 is a ver-  
tical sectional view of my complete invention, showing the reservoir or tank partly in side  
55 view. Fig. 2 is a top plan view, with half in section, approximately taken on the line A A of Fig. 1. Fig. 3 is an enlarged sectional view, with parts broken away, of the strainer and  
60 deflecting-shield. Fig. 4 is an enlarged sectional view, with parts broken away, of the outer wall and so-called "air" and "steam" jackets.

In the drawings, 1 indicates my complete  
invention, which consists of a lower reservoir  
65 or tank 2, in the outer surface of which is secured in any desirable manner a sight-gage 3, clean-oil faucet 4, and a nipple 5 for use in automatic-oiling systems, and in this res-  
ervoir or tank is stored and cooled the puri-  
70 fied oil. Upon this reservoir or tank 2 is mounted a receptacle 6, which consists of a wall 7, mounted upon and secured to an up-  
ward-flared or cone-shaped bottom 8, which is provided with an inward flange 9 for the  
75 purpose of snugly fitting within the upper edge of the reservoir 2.

To the bottom 8 is secured in a suitable  
manner a cylinder or wall 10, provided near  
80 its top with holes or perforations 11, the pur-  
pose of which will be fully hereinafter de-  
scribed.

Within the cylinder or wall 10 is loosely  
placed or set a cone or hood 12, which is pro-  
vided with a series of perforations 13, and  
85 over said hood and perforations is placed a muslin or cloth cover 14, through which the oil must pass before entering the perfora-  
tions. Immediately above said muslin or  
cloth cover 14 and over the cone or hood 12  
90 and within the cylinder or wall 10 is packed any suitable filtering material 15, such as white waste or other suitable oil-filtering sub-  
stance.

Upon the filtering material 15 is placed the  
compressing-plate 16, which is made of some  
95 heavy material—such as iron, &c.—for the purpose of maintaining a uniform pressure on said filtering material and to make it com-  
pact to assure good work.  
100

Upon the top of the cylinder or wall 10 is  
supported the removable strainer 17, which  
is composed of a solid bottom 18 to act as a  
settling-surface and a foraminous or perfo-



rated wall or side 19 to act as a straining-surface, and to the under surface of the bottom of said removable strainer is secured in a substantial manner a deflecting-shield 20, which  
5 is provided near its top with perforations 21, which is for the purpose of acting as an air-vent, allowing the oil to raise to the desired height between the shield 20 and cylinder or wall 10.

10 On top of the receptacle 6 and over the removable strainer is a removable lid or cover 22 to be either flat or slightly cone or hood shaped, and in said lid is an opening 23, through which the dirty oil may be poured  
15 into the strainer 17 without removing the lid or cover.

In and around the wall 7 of the receptacle 6 are formed two separate beads or swages 24, one near the upper edge and one near the  
20 lower edge of said wall 7, for the purpose of strengthening and stiffening these particular parts of the wall 7 and also for the purpose of forming shoulders or projections on said wall 7, and between said two beads or swages  
25 24 and surrounding said wall 7 is fitted and secured in a suitable manner by solder or otherwise a cylinder or casing having its edges 25 crimped in or turned in a suitable manner to form the inclosed air-space or air-chamber  
30 26, forming a so-called "air-jacket" around and attached to said wall 7. This inclosed air-space 26 is for the purpose of controlling the circulation of air in contact with the wall 7 between the beads or swages 24. In order  
35 to do this, an opening 27 is formed in the lower part of said jacket 25 to act as an air-inlet, and the circulation of air is regulated by an adjustable outlet or valve 28, formed at the upper portion of said jacket at the op-  
40 posite side to the inlet 27. In and around this jacket or casing 25 are also formed two beads or swages 29 for the purpose of strengthening these parts of said jacket, and between which is secured another jacket or casing 30  
45 of less width than the jacket or casing 25, and the space formed by said jacket 30 acts as an inclosed steam-space or steam-chamber 31. The steam is communicated to said steam-chamber 31 from any source through the  
50 steam-inlet 32, secured to the steam-jacket 30, and the steam circulates through said chamber and is discharged through a trap 33, formed on said jacket 30 opposite to the inlet 32, and above the trap 33 and in the upper portion  
55 of said jacket is located a relief-valve 34, which is used to allow the steam to escape should the chamber become overcrowded with pressure.

The object of the steam-jacket being placed  
60 upon and around the air-jacket is to provide a large area of low-heating surface to the receptacle or filter through the circulating air within said air-jacket.

I do not desire to limit myself to this precise construction of removable strainer, as I  
65 may arrange the bottom to flare downwardly toward the center, the object of which is that

it will cause all large and heavy impurities to settle to the bottom and in the center on account of its inclination. 70

The operation of my invention is as follows: The dirty waste oil is poured or fed into the removable strainer, which retains all the coarser impurities. The oil passes through the fine foraminous or perforated wall, drip-  
75 ping down toward the bottom of the refining or settling chamber 35, formed by the wall 7 and the cylinder 10, in such a manner that the unsettled oil is always kept away from the filtering material by the deflecting-shield  
80 20, which is suspended from the lower surface of the removable strainer. As the oil passes down and settles in the refining or settling chamber 35 it is heated by the steam-jacket with steam through the air in the  
85 air chamber or jacket, thinning the oil and making it bright and clear. The larger percent. of the impurities left in the oil after leaving the settling-chamber, together with all the entrained water, are separated from the  
90 oil and settled on the bottom of the refining or settling chamber, from whence they are readily withdrawn through the dirt-faucets 36, located at the bottom of the refining or settling chamber 35. Of these faucets I may  
95 retain as many as deemed best. The oil after being strained, heated, and settled then gradually overflows through the holes or perforations 11, formed in the upper side of the cylinder 10, and filters through a large area  
100 of compressed filtering material and through the muslin or cloth cover over the perforated cone or hood 12 by capillary attraction and into the cone or hood through perforations 13  
105 formed therein. After the oil passes into the cone or hood 12 should there be any further impurity it has a tendency to settle on the inclined surface, where the cone rests upon the bottom 8 of the receptacle. The oil, after filling a small portion of space in the hood,  
110 overflows through the nipple or tube 37, secured at the apex of the cone-shaped bottom 8, and into the reservoir or tank 2, where it is delivered refined, purified, and cold at the clean-oil faucet 4. 115

When it is desired to clean the impurities from the strainer 17, the lid or cover 22 is removed, and then the strainer, by the use of the handles 38, is lifted out, which when removed opens the entire refining-chamber.  
120 Then by simply taking off the compressing-plate the filtering material may be inspected or renewed without wasting any oil or disturbing any parts of the apparatus. When this is done, the perforated cone can be lifted  
125 or pulled out of the cylinder 10.

The strainer proper or the foraminous wall being placed at the side and not at the bottom of the removable strainer avoids clogging by the heavier impurities, which remain on  
130 the bottom and do not come in contact with the perforations.

By heating the dirty waste lubricating-oil up to about 150° Fahrenheit and maintaining



this low heat within it for sixty minutes or more the volatile elements that may be contained in the oil and which have no lubricating properties are evaporated, thereby refining the oil without injury to its lubricating qualities.

The inner surface of the steam-jacket 30 I provide with an asbestos-cement coating or other suitable coating for the prevention of deterioration and rust and also to reduce the intensity of the heat radiating from the steam-jacket.

The object of having the heat communication to the dirty, impure, or unrefined oil placed some distance above the bottom of the settling or refining chamber is to avoid stirring up or disturbing the precipitated impurities by circulation as much as possible, as by this method the heat is not applied under nor near the settling-bottom containing the precipitated or settled impurities.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an oil-filter, an outer wall, a bottom attached to said outer wall, an inclosing or jacketing wall surrounding and attached to the outer side of said outer wall forming an inclosed air-chamber or air-jacket around the outer side of the said outer wall, one or more openings near the upper and one or more openings near the lower edge of, and in the said inclosing or jacketing wall and communicating with the upper and lower parts of the said inclosed air-chamber, an incasing wall of less width than the said inclosing or jacketing wall, surrounding and attached to the outer side of, and between the said upper and lower openings in the said inclosing or jacketing wall to form a steam-chamber around the outer side of said inclosing or jacketing wall, a steam-inlet fitting, an outlet-check and a relief-valve attached to said incasing wall and in suitable communication with the said steam-chamber, all for the purpose to adjustably reduce the intensity of the heat communicated to the oil within the said outer wall by the steam heat within the said steam-chamber, substantially as shown and for the purpose set forth and specified.

2. In an oil-filter, an upper tank resting on a lower tank or reservoir, said upper tank having an upward-flared bottom, an outer wall, attached to the said bottom, an inner wall having openings near its upper edge, a strainer resting on the upper edge of said inner wall, a deflecting-shield attached to said strainer and suspended in the chamber formed between said outer wall and said inner wall, said outer wall to have formed in and around it one swage near its lower edge and one swage near its upper edge for the purpose to strengthen these parts of said outer wall and for the purpose to form shoulders, an inclosing wall its upper edge and also lower edge are turned inwardly and form connecting-walls attached to and surrounding

the outer side of the said outer wall and between the said upper and lower swage forming an air-chamber; to have one bead near the upper edge of, and in and around the said inclosing wall and one bead in and around and near the lower edge of the said inclosing wall, suitable openings above the said upper bead and in the said inclosing wall and suitable openings below the said lower bead and in the said inclosing wall, a casing attached to and surrounding the outer side of the said inclosing wall and between the said upper and lower beads, forming a steam-chamber, a steam-inlet opening, outlet-opening and relief-opening in said casing, substantially as shown and for the purpose as set forth.

3. In an oil-filter having a receptacle mounted upon a reservoir, said receptacle provided with an inclined or cone-shaped bottom, a cylinder or wall mounted upon said bottom, said cylinder provided near its top with perforations, a cone or hood placed within said cylinder and resting upon the inclined bottom, filtering material placed within said cylinder on top of said cone, a removable strainer provided with a deflecting-shield placed upon said cylinder, substantially as shown and for the purpose set forth.

4. In an oil-filter composed of a receptacle having an inclined bottom, a tube or nipple placed in said bottom at the apex thereof, said nipple used for the purpose of delivering the oil from the filter into the reservoir, a cone or hood removably mounted upon said bottom over the nipple, said cone provided with perforations and covered with fibrous cloth which is for the purpose of preventing any part of the filtering material passing through the perforated cone, a cylinder mounted upon said bottom and surrounding said cone, said cylinder provided with perforations which are for the purpose of allowing the oil to pass into said cylinder and into filtering material placed therein, a removable strainer placed upon said cylinder, a deflecting-shield carried by said strainer and extending downwardly into and around into the refining or settling chamber, said deflecting-shield acting as a division-wall preventing the dirty oil from passing through the perforations in the cylinder until it is settled or refined, and reaches the lower end of said deflecting-shield, an air-jacket formed on the outer surface of and surrounding said receptacle and a steam-jacket mounted on the outer surface of and surrounding the air-jacket which is for the purpose of communicating a low degree of heat to the oil in the receptacle, substantially as shown and for the purpose set forth.

5. In an oil-filter having a receptacle provided with a steam-jacket, an air-jacket interposed between the steam-jacket and receptacle and surrounding said receptacle, the air-jacket provided with means for regulating the heat in said air-jacket by increasing or decreasing the circulation of air within said air-jacket by increasing or decreasing the air



inlet and outlet openings, said steam-jacket being of shorter width than the air-jacket, and is provided with steam through its inlet, a cylinder secured to the bottom of said receptacle a cone placed in said cylinder, said cone provided with perforations and covered with fibrous material, filtering material packed in said cylinder and over the cone, and held compressed by a compressing-plate, a removable strainer provided with a perforated side or wall and solid bottom placed and resting upon the said cylinder, said strainer supporting a deflecting-shield secured to the bottom, and extending downward acting as a division-wall in the refining-chamber for the purpose as shown and described.

6. In an oil-filter having a receptacle provided with an inclined bottom designed for strength and provided at its apex with a tube or nipple, a division-wall or cylinder secured to said bottom and extending upwardly and provided with perforations, said division-wall or cylinder forming a refining or settling chamber between it and the wall of the receptacle, faucets secured to said receptacle in communication with the lower or bottom edge of the settling-chamber, an air-jacket formed on the side of said receptacle and interposed between the steam-jacket and receptacle, the steam-jacket adapted for the purpose to heat the air in said air-jacket which air if freely circulating will communicate low heat to the oil in the refining-chamber, a deflecting-shield extending into said refining-chamber and secured to a strainer, said strainer removably mounted upon the cylin-

der substantially as shown and for the purpose set forth.

7. In an improved oil-filter, having a receptacle provided with an air and steam jacket on its side, said air-jacket interposed between the steam-jacket and receptacle, said air-jacket being of greater width than the steam-jacket and provided with means to regulate the circulation of air through said air-jacket, said steam-jacket coated on its inner surface with an asbestos cement or other coating, for the prevention of deterioration and for the purpose of decreasing the intensity of heat through its walls, said receptacle provided with an inclined bottom having an outlet at its apex, a division-wall or cylinder secured to said bottom, and provided with perforations, a perforated cone movably mounted in said cylinder and resting on the bottom, a cloth or fibrous material placed over said cone, filtering material tightly compressed in said cylinder and over the cloth-covered cone, a compressing-plate placed upon said material, a movable strainer mounted upon said cylinder, said removable strainer having a solid bottom and perforated wall, a deflecting-shield carried by said strainer, and extending into the refining-chamber, substantially as shown and for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

AUGUST H. FRANKE.

Witnesses:

ALFRED A. EICKS,  
GEO. F. LANE.