

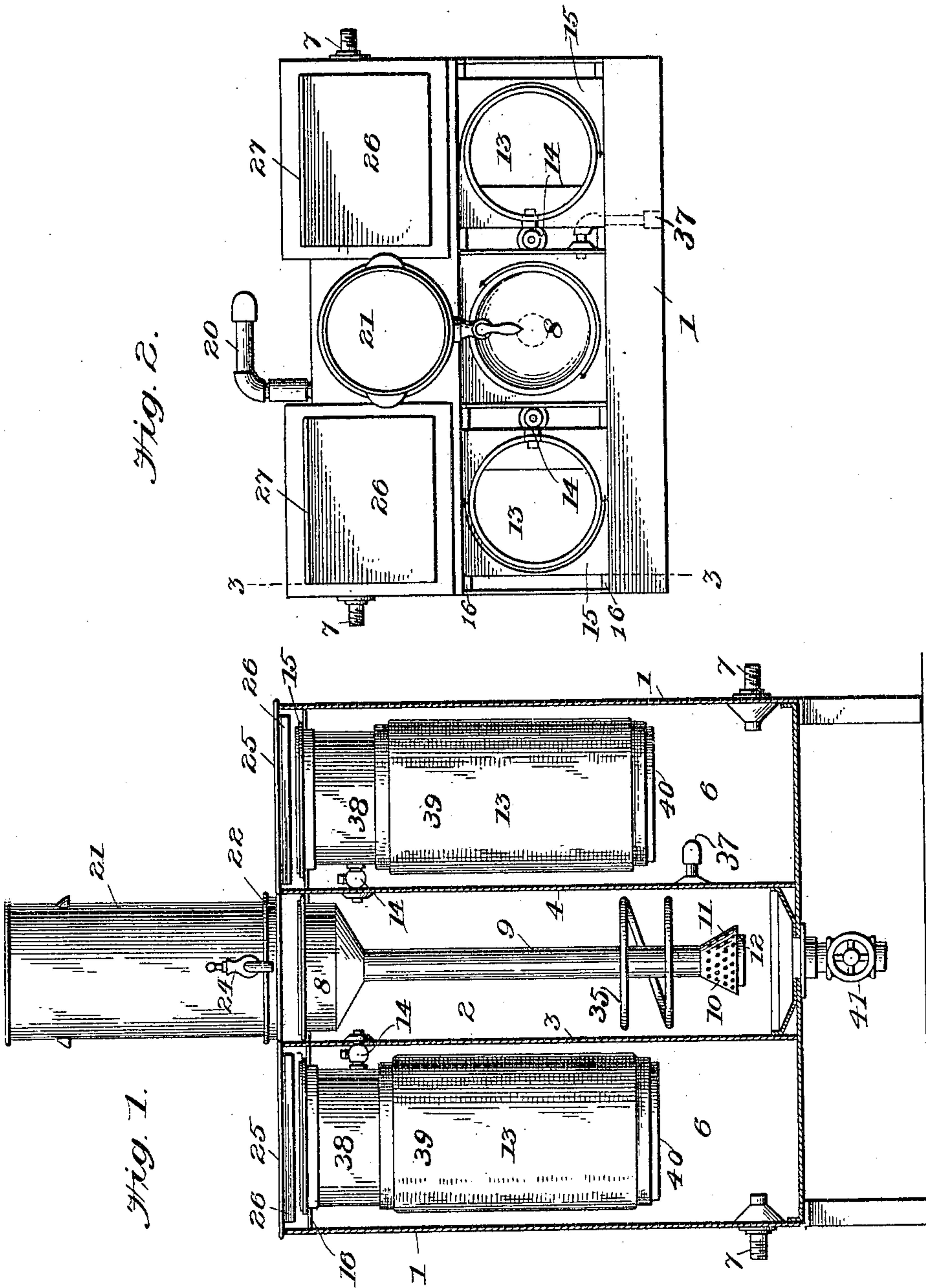
No. 819,896.

PATENTED MAY 8, 1906.

C. E. LEFEBVRE.
OIL FILTER.

APPLICATION FILED JAN. 18, 1902.

3 SHEETS—SHEET 1.



Witnesses:
D. Witt & Lucas,
Lawrence C. Cross

Inventor,
Charles E. Lefebvre,
by Jno. T. Cross,
his Attorney.

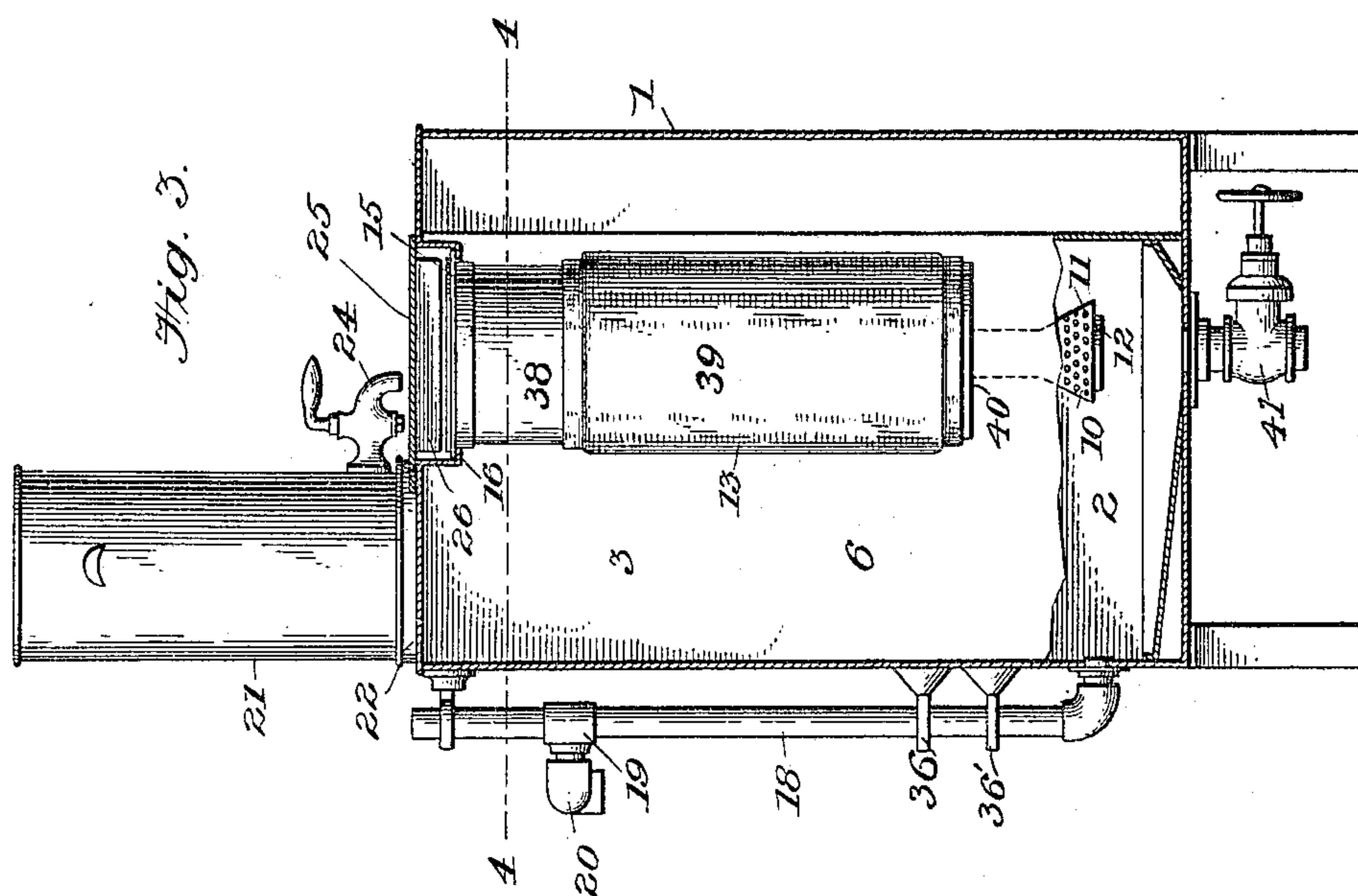
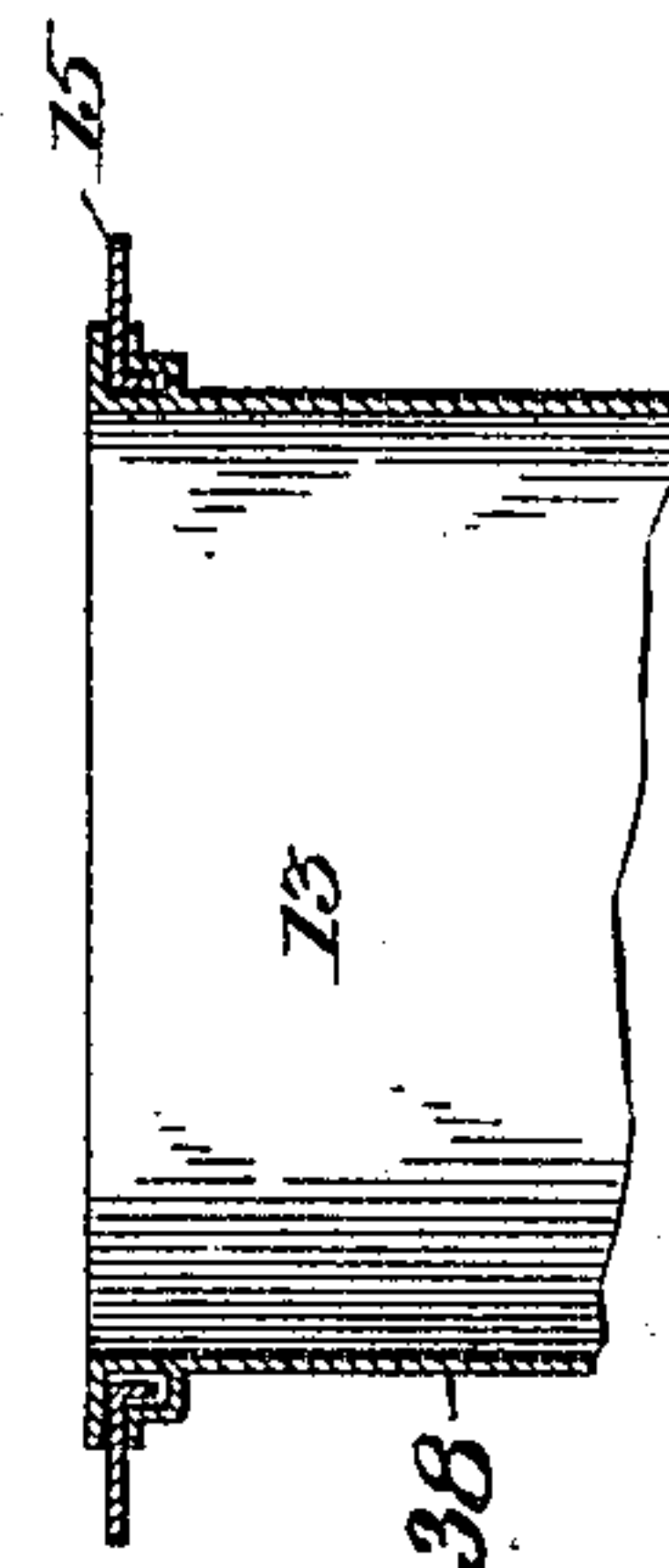
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3 SHEETS--SHEET 2.



Witnesses.

De Witt B. Lucas.
 Horace E. Cross

Inventor,

Charles E. Lefebvre,

by *Jno. T. Cross*
his Attorney.

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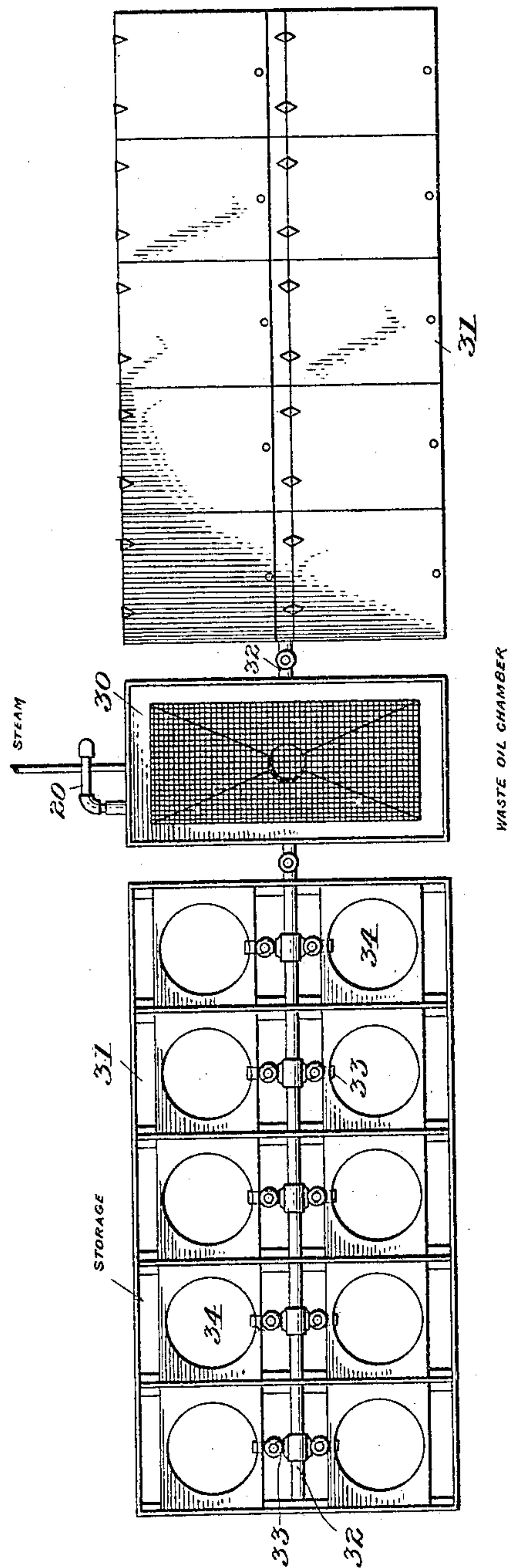
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3 SHEETS—SHEET 3.

Fig. 6.



Witnesses.
D. Witt B. Lucas,
Florence E. Cross

Inventor,
Charles E. Lefebvre,
by Jno. T. Cross,
his Attorney.

UNITED STATES PATENT OFFICE.

CHARLES EDWARD LEFEBVRE, OF PITTSBURG, PENNSYLVANIA.

OIL-FILTER.

No. 819,896.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed January 18, 1902. Serial No. 90,236.

To all whom it may concern:

Be it known that I, CHARLES EDWARD LEFEBVRE, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Oil-Filters, of which the following is a specification.

My invention has relation to certain improvements in oil-filters of the class designed for cleaning and removing all foreign matter from waste oils caught from engines and various types of metal-working machinery, and is particularly designed as an improvement on the apparatus shown in my United States Letters Patent No. 652,543, issued June 26, 1900.

One of the main objects of this invention is to increase the filtering capacity of the apparatus by providing two or more filtering-cylinders, each having a communication with the waste-oil-receiving chamber and each having an independent cut-off for closing said communicating passage in order that either of the filtering-cylinders can be removed from its inclosing casing for cleaning purposes without stopping the filtering operation of the other cylinders.

Another object of my invention is to provide an auxiliary receiving-tank, adapted to receive the waste oil as it is delivered from the machinery, the said tank being located on top of the filter-casing in rear of the receiving-funnel and having a spigot extending over the said funnel for discharging the oil from the said receiving-tank to the receiving-chamber, so that should it be desired to remove the waste-oil-receiving funnel or invert the filtering-cylinders for cleaning purposes the spigot can be closed and the tank partially revolved, so as to bring the spigot out of the path of either the funnel or filtering-cylinder. The waste-oil supply need not be interrupted during this cleaning operation, as the capacity of the tank will be large enough to receive and hold the incoming waste during such cleaning operation.

A further object of my invention consists in providing an adjustable overflow-pipe which regulates the amount of water contained in the receiving-chamber, the level of the water being regulated at will by the adjustment of a swiveled pipe forming part of the overflow-pipe.

A still further object of my invention is to

provide a filter so constructed that it may be readily applied to continuous-oiling systems by adding suitable connections, the various parts being capable of being cleaned while the filter is in operation without in any manner interrupting or interfering with its continuous operation.

Still further objects, uses, and advantages reside in the particular construction of the filtering elements or cylinders, so that they may be rotated in their supporting-flanges after being removed from the filtering or storage chamber and inverted over the receiving-funnel for the purpose of facilitating the removal of the filtering-cloth, also in providing pockets in the lids or coverings of the storage-chamber for storing clean supplies of filtering-cloth, and in other details of construction, which will be apparent on reference to the detailed description hereinafter appended, when taken in connection with the accompanying drawings.

Referring to the drawings, which form a part of this specification, and in which similar numerals of reference are used to designate similar parts, Figure 1 is a central sectional elevation of an oil-filter constructed in accordance with my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a sectional elevation taken transversely to Fig. 1 and about on the line 3 3 of Fig. 2. Fig. 4 is a cross-sectional view illustrating the water-holding and waste-oil-receiving chamber and the storage-chamber. Fig. 5 is a detail section showing the flange on the filtering-cylinder, and Fig. 6 is a plan view showing a number of filtering-cylinders suspended in the storage-chamber and a slightly-modified form of apparatus.

Referring particularly to the said drawings, 1 designates the outer casing, composed, preferably, of sheet metal, which is in this instance shown as rectangular in shape, but which might be cylindrical or of some other convenient form. The waste-oil-receiving and purifying chamber 2 is located in this instance in the center of the tank or casing and is formed by the side partitions 3 and 4 and a front partition 5, which is located a short distance back of the front wall of the outer casing 1, as shown clearly in Fig. 4 of the drawings. The storage-chamber 6 surrounds the receiving-chamber on three sides, as shown, and each end of the tank is provided with a

threaded nipple, as 7, by which connections with a suitable pump may be made, thus admitting of the oil being drawn from said storage-chamber from either or both sides of the receiving-chamber.

The receiving-funnel 8 comprises a funnel-shaped top terminating in a vertical pipe 9, which is substantially similar to the device shown in my prior patent, No. 652,543, with the exception that the bottom of said pipe is in the form of a cone, as 10, containing a number of small holes, as 11, and the bottom of the cone is provided with a screw-cap 12, which closes the end of the pipe 9. The purpose of this conical construction is to prevent the oil coming through the pipe 9 from stirring up the sediment in the bottom of the water-chamber, and the removable screw-cap 12 admits of the easy and quick cleaning of the pipe 9 in the event of its becoming clogged with particles of dirt and sediment.

A heating-coil 35, connected to the inlet and outlet pipes 36 and 36', surrounds the pipe 9 and is adapted to heat water contained in the chamber 2. A pipe 37 is provided near the bottom of the chamber 2 slightly above the level of the cone portion 10 of the pipe 9 and forms an inlet for the water retained in said chamber. A drain-pipe 41 is provided in the bottom of the chamber 2 for carrying off the sediment extracted from the oil and for emptying said chamber when required.

In the storage-chamber 6 is suspended the filtering elements or cylinders 13, located, preferably, diametrically opposite each other, as illustrated, and each having a communicating pipe and valve, as 14, connecting them with the receiving-chamber 2. These cylinders 13 are provided with a flange 15 at their upper ends, which rests on suitable ledges 16, provided, preferably, on the top or permanent covers of the storage-chambers for supporting said cylinders. The flange 15 is so constructed as to fit loosely on the upper end of the cylinder in such manner that the said cylinder can be revolved freely in the flange, so that when said cylinder is removed from the storage-chamber and placed over the waste-oil-receiving chamber it can be readily revolved when it is desired to remove the filtering-cloth and renew the same.

The filtering elements or cylinders 13 comprise the upper cylindrical portion 38, made of sheet metal, a lower cylindrical portion 40, rigidly connected with the portion 38 in any suitable manner, and is closed at its lower end. Filtering-cloth 39 or other similar material is attached to the cylindrical portions 38 and 40 in any suitable manner, but preferably removable. The ends of the communicating pipes and valves 14 fit removably within an opening in the cylindrical portions 38, so that when the filtering-cylinders 13 are slid laterally on the ledges 16 said pipes and valves will be disengaged from said cylin-

drical portions 39 to allow removal of the filters 13 for cleaning and the replacing of the filter material.

The oil-receiving chamber 2, which is adapted to be partially filled with water, is provided with an overflow-pipe 18, which enters the said chamber at a point near the bottom thereof and extends upwardly to a point about equal to the height of the casing. At a point in the pipe 18 a short distance below the top thereof I provide a T-coupling 19, into which is swiveled a pipe-arm 20. This arm 20 can be adjusted at any angle with relation to the pipe 18, so that the height of water in or to be maintained in the receiving-chamber 2 when said chamber is filled with oil above the water can be regulated by the adjustment of this arm, and the water will be caused to overflow through the pipe 18 and arm 20 after it reaches above the desired level. This pipe 18, which I have described as extending to the top of the casing and above the swiveled pipe-arm, is open at its top to prevent siphonic action in the event of the end of the pipe-arm 20 being connected with a drain-pipe, which is sometimes the case.

The auxiliary tank 21 is placed on top of the casing in the rear of the receiving-funnel 8, as shown in Fig. 2, a flange 22 being provided in the casing-top for its reception. A spigot 24 is provided in the lower portion of this tank, the said spigot extending over the said funnel. The purpose of the tank 21 is to prevent the necessity of shutting off the waste-oil supply when it is desired to remove the receiving-funnel 8 for cleansing purposes, and this is accomplished by simply turning off the valve in the spigot 24 and turning the said tank until the spigot is out of the path of the funnel.

The hinged lids 25 are provided over the filtering-cylinders 13, and under each lid I provide a pocket 26, open at its front edges, as at 27, the said pockets being adapted for the reception of clean filtering-cloth, so that this material will always be handy to the operator.

The construction and operation of my improved filter will be readily understood from the foregoing description.

The used or dirty oil is placed in the tank 21, from which it is allowed to pass through the spigot 24 into the funnel 8, through the pipe 9, and out of the cone 10 into the heated water contained in the chamber 2. Here the oil becomes finely divided by the action of the water and heat and rises to the top of the chamber 2, leaving behind all the larger or coarser impurities. The oil then passes through one or both of the pipes and valves 14 and through the filtering-cylinders into the storage-chamber 6, from which it may be drawn off for use.

It will also be readily seen that a filter con-

constructed in accordance with my invention can be very easily connected up for a continuous-oiling system. For instance, a dirty-oil drain from an engine or other machine
 5 can be directed into the auxiliary tank 21 and a suitable pump connected to either of the outlet-nipples 7 in the storage-chamber for pumping pure oil to the machinery, and the operation of a filter so connected would
 10 be entirely automatic.

When it is desired to construct a filter of greater capacity than that heretofore described—such, for instance, as might be used in large power stations—my invention can be
 15 utilized by slightly modifying the form of apparatus in the manner shown in Fig. 6 of the drawings. The principle of this construction is substantially the same as that heretofore described; but some of the parts
 20 are multiplied and the tanks, both storage and receiving, are of course increased in proportions and somewhat differently arranged, as will be seen on reference to the said figure above referred to. Referring by numerals to
 25 Fig. 6, 30 designates the water and dirty-oil receiving chamber, which carries the receiving-funnel 9. The storage-chambers 31 are separate and distinct from the receiving-chamber and are provided in their upper portions with feed-pipes, as 32, which commu-
 30 nicate with the receiving-chamber 30. Each of these pipes 32 is fitted with suitable connections, as 33, which are provided with valves and extend into the filtering-cylinders
 35 34. These cylinders can be multiplied to suit the capacity of the apparatus and are suspended on suitable ledges carried by the casing. The cylinders all being removable can be readily taken out for cleaning pur-
 40 poses and the respective valves in the connection leading to each cylinder can be turned off, thus allowing any one cylinder to be lifted out and cleaned independently of the others. Suitable pump connections can
 45 be made with the storage-chambers and other connections made in substantially the same manner heretofore described in connection with the smaller filter.

The uses and advantages of my improvements will be readily seen and by reason of the construction and possible arrangement of the various parts its adaptability to different systems of oiling will also be readily seen and understood.

55 I do not wish to be limited to the precise arrangement and construction illustrated and described, as various modifications might be made without departing from the spirit and scope of my invention.

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

1. In an oil-filter, the combination of a receiving-chamber, adapted to be partially
 65 filled with water and partially with oil, a re-

ceiving-funnel for carrying the waste oil to the bottom of said chamber to allow said oil to pass upward through the water, a pivoted overflow-pipe communicating with the lower
 70 portion of said chamber for adjusting the overflow of the water to regulate its height in said chamber without disturbing the oil therein, and a stationary pipe having an open upper end located adjacent the top of the receiving-chamber and communicating
 75 with the said overflow-pipe.

2. In an oil-filter the combination of a receiving-chamber adapted to be partially filled with water, a receiving-funnel for carrying the waste oil to the bottom of the wa-
 80 ter-chamber, separate storage-chambers adjacent to the receiving-chamber having communications therewith, an overflow-pipe communicating with the water-chamber near its bottom, a branch pipe connected to said
 85 overflow-pipe, and swivel connection for said branch pipe whereby it may be adjusted to any angle and thereby vary the height of the water in the receiving-chamber, substan-
 90 tially as described.

3. In an oil-filter, an outer casing, a secondary chamber located centrally within said outer casing so as to leave a space be-
 95 tween the front thereof and the outer casing, and adapted to be partially filled with water, removable means for passing oil through the water in said secondary chamber, a plurality of filters suspended adjacent said secondary
 100 chamber, each having a valved connection with the upper portions of said secondary chamber, and an auxiliary tank mounted upon said secondary chamber and provided with a projecting valve normally located
 105 over said means for passing oil through the water, said tank being rotatable to move said projecting valve out of the path of said means.

4. In an oil-filter, an outer casing forming a storage-tank, a plurality of oil-filtering chambers suspended in said tank, rotatable
 110 flanges upon said filter-chambers, by means of which they are suspended, removable filtering material surrounding said filtering-chamber, a secondary chamber located centrally of said tank so as to leave space be-
 115 tween its walls and the walls of the casing to permit intercommunication between the different parts of said tank, means for passing oil through said secondary chamber, which is adapted to contain water, and valved con-
 120 nections between said filtering-chambers and said secondary chamber.

5. In an oil-filter, an outer casing forming a storage-tank, filtering-chambers suspended in said storage-tank, a secondary chamber lo-
 125 cated centrally of said tank, one of the sides of said casing forming one side of said secondary chamber, all other sides of the chamber and casing being independent of each other, means for passing oil through said sec-
 130

ondary chamber, which is adapted to contain water, said means delivering the oil to the lower portion of said secondary chamber by means of a cone-shaped nozzle closed at its bottom and having openings in its upwardly-converging sides, and valved connections between said filtering-chambers and said secondary chamber.

6. The combination in an oil-filter, of an oil-washing chamber, a removable receiving-funnel located in said chamber adapted to discharge the uncleaned oil near the bottom thereof, storage and filtering chambers located adjacent to the washing-chambers, filtering-cylinders located in said storage-chambers having ports communicating with the receiving-chamber, an auxiliary cylindrical tank located adjacent to the top of the receiving-funnel adapted to receive the waste oil as it is delivered from its source of supply, a retaining-flange provided on the casing-top within which the auxiliary tank fits, and a spigot provided in the auxiliary tank adapted to extend over the receiving-funnel, the said tank being adapted to be turned in its retaining-flange to remove the spigot from the path of the receiving-funnel, substantially as described.

7. An oil-filter comprising a separate waste-oil-receiving chamber, separate stor-

age-chambers adjacent thereto, filtering-cylinders in the storage-chambers, communicating ports between the receiving-chamber and the filtering-cylinders, a removable receiving-funnel in the receiving-chamber extending to a point near the bottom of said chamber, a cone-shaped lower end formed on said receiving-funnel having perforations in its walls, and a removable bottom provided for said cone-shaped end, for the purpose described.

8. The combination in an oil-filter, of a filtering element comprising a receptacle closed at its lower end and having filtering-cloth removably secured about its sides through which the oil is adapted to percolate, an oil-port near the top of the filtering element communicating with the receiving-chamber of the filter, a flange loosely secured to the top of the filtering element by means of which said element is suspended in its casing, the said element being capable of rotation in its flange for the purpose of facilitating the removal of the cloth.

In witness whereof I have hereunto set my hand this 19th day of October, A. D. 1901.

CHARLES EDWARD LEFEBVRE.

Witnesses:

GEO. BROWNHILL,
W. L. LADLEY.