

No. 719,848.

PATENTED FEB. 3, 1903.

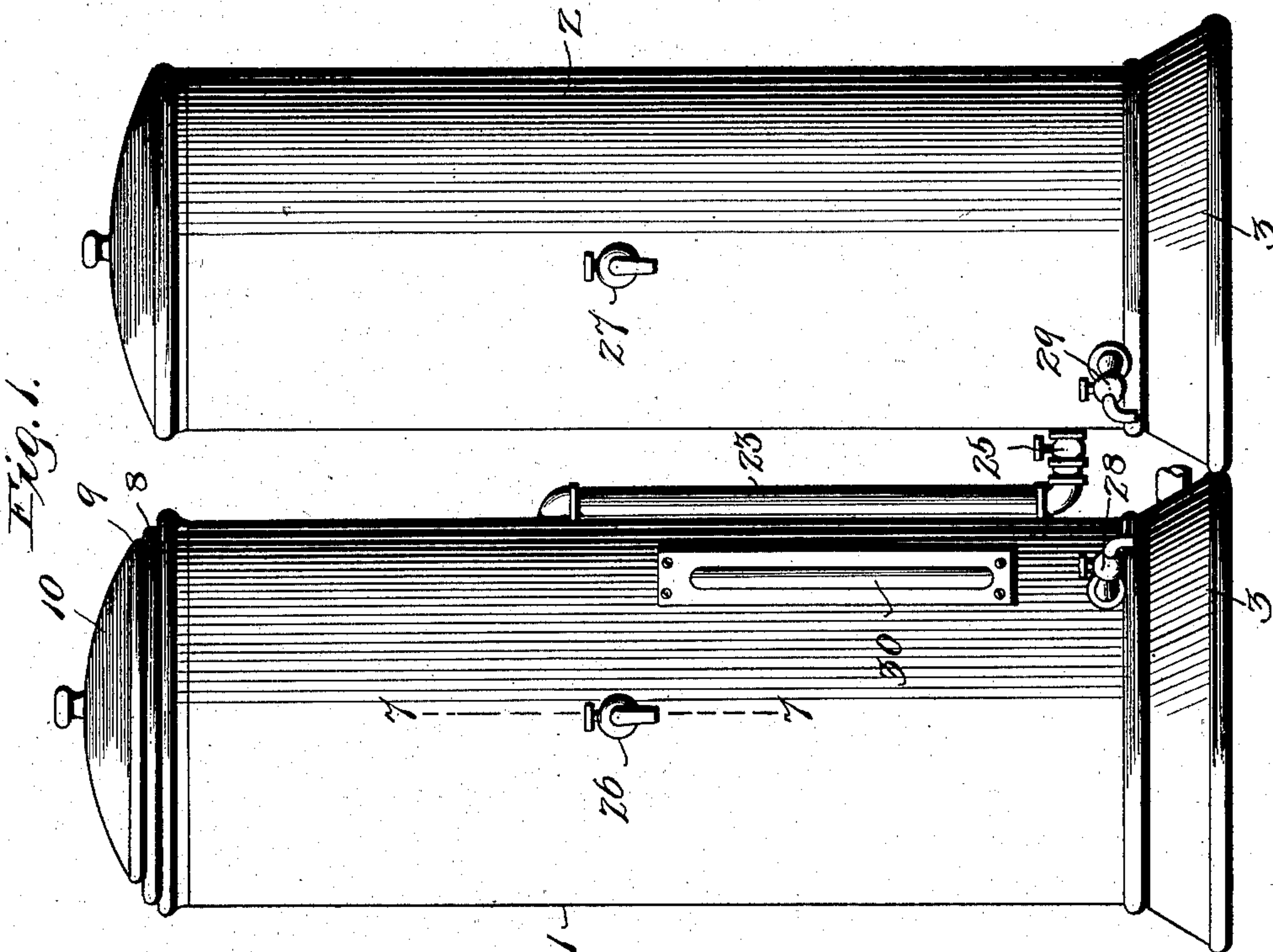
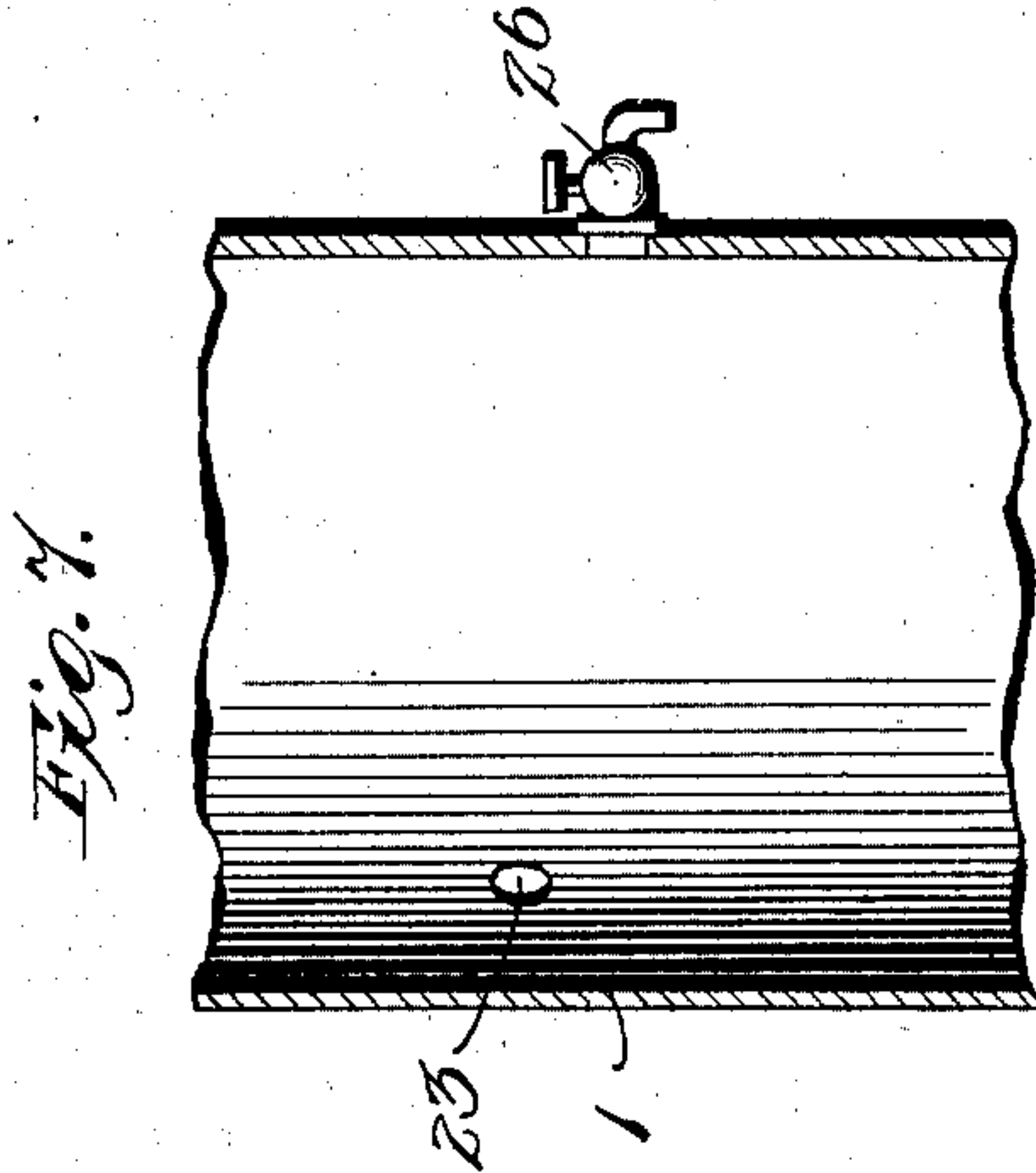
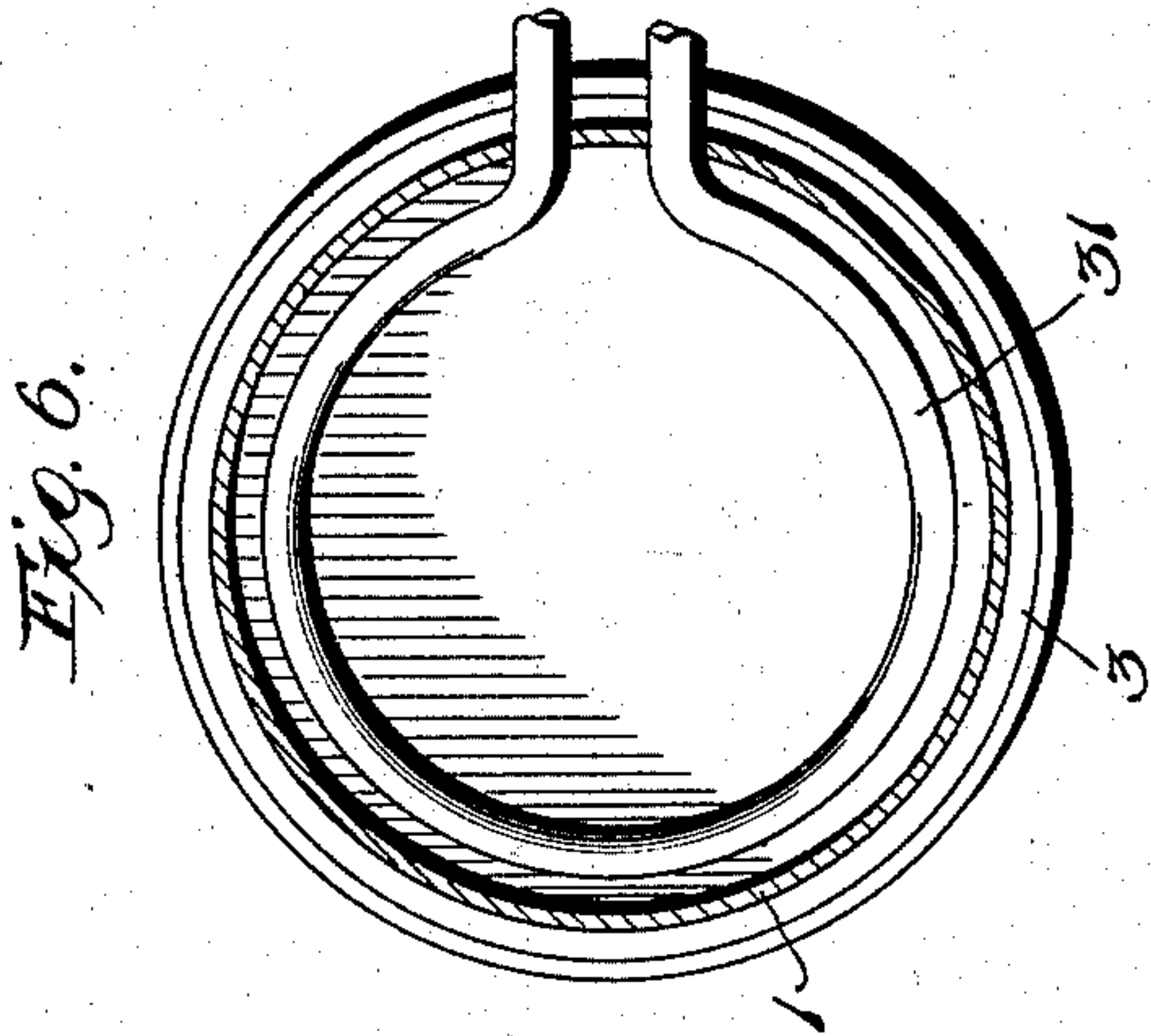
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OIL FILTER.

APPLICATION FILED FEB. 27, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
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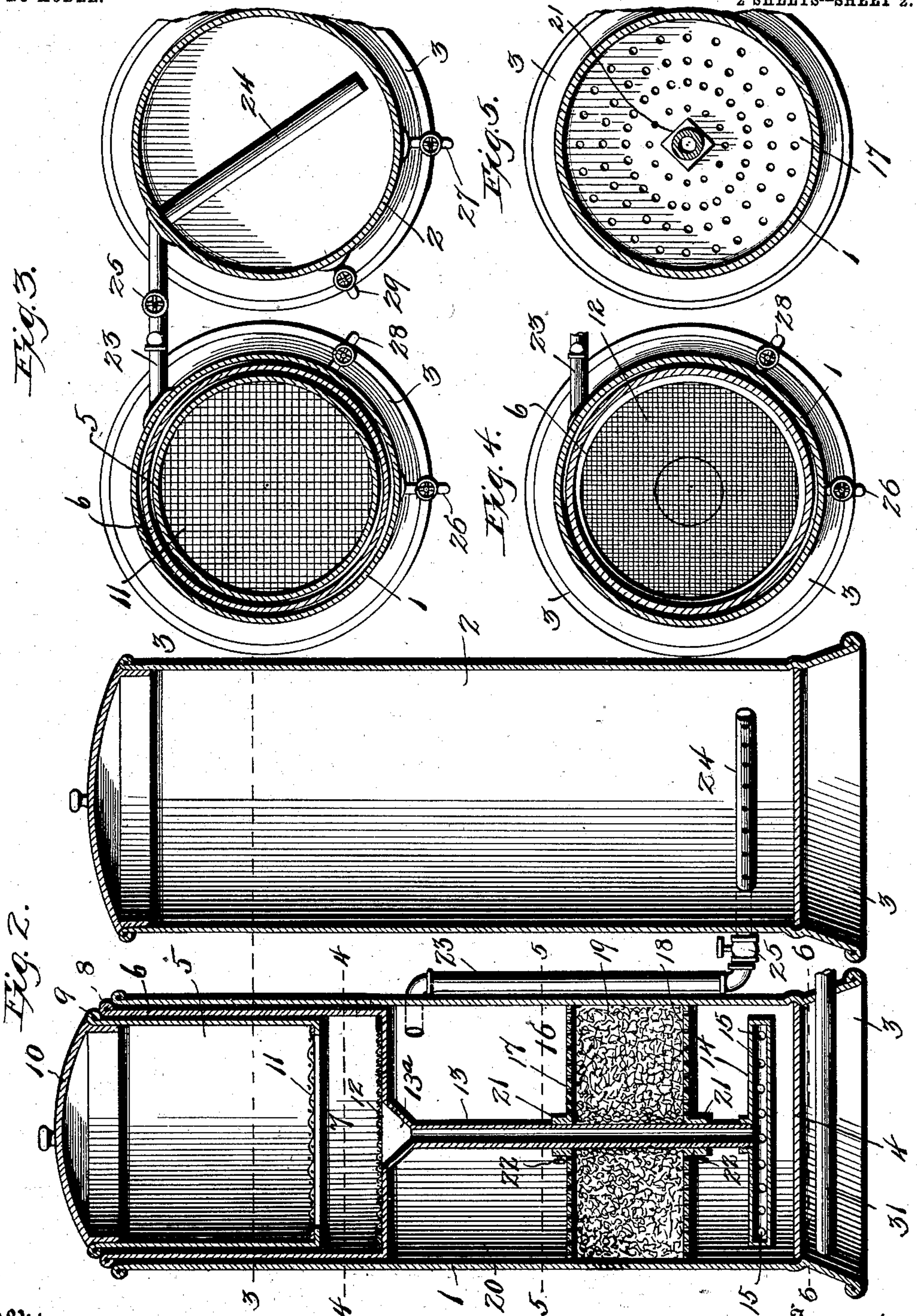
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OIL FILTER.

APPLICATION FILED FEB. 27, 1902.

NO MODEL.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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OIL-FILTER.

SPECIFICATION forming part of Letters Patent No. 719,848, dated February 3, 1903.

Application filed February 27, 1902. Serial No. 95,985. (No model.)

To all whom it may concern:

Be it known that we, ALFRED G. NORCUTT and ANDREW HUSSEL, citizens of the United States, residing at Henderson, in the county of Henderson and State of Kentucky, have invented certain new and useful Improvements in Oil-Filters, of which the following is a specification.

This invention relates to filtering apparatus, and has special reference to that class of filters known in the art as "oil-filters."

To this end the invention has in view the provision of a simple and practical type of improved filter embodying means for thoroughly cleansing any and all kinds of machine-oil by the removal of all impurities and foreign substances therefrom.

In carrying out the general object of thoroughly and effectually separating impurities and foreign substances from oil the invention comprehends a construction of apparatus in which the different instrumentalities thereof are assembled not only in the most effective relation, but also in such a way as to permit of ready and convenient access being had to every part of the apparatus, thus facilitating the cleansing of the individual parts or renewal thereof whenever desired or required.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts, which will be hereinafter more fully described, illustrated, and claimed.

The essential features of the invention are necessarily susceptible to some structural changes without departing from the spirit or scope thereof; but the preferred embodiment of the improvements is shown in the accompanying drawings, in which—

Figure 1 is an elevation of a complete oil-filtering apparatus constructed in accordance with the present invention. Fig. 2 is a vertical longitudinal sectional view of the filter or filtering apparatus. Fig. 3 is a cross-sectional view on the line 3 3 of Fig. 2. Fig. 4 is a similar view on the line 4 4 of Fig. 2. Fig. 5 is a similar view on the line 5 5 of Fig. 2. Fig. 6 is a similar view on the line 6 6 of Fig. 2. Fig. 7 is a detail sectional view on the line 7 7 of Fig. 1, showing the relative difference in elevation between the service-faucet for the filtration-tank and the connection

of the delivery or circulating pipe therewith, whereby the pressure may be relieved from the valve in the said delivery-pipe to permit of the isolation of the filtering-tank from the storage-tank.

Like reference-numerals designate corresponding parts in the several figures of the drawings.

In carrying out the invention it has been found advantageous to associate together a pair of upright tanks, preferably of substantially duplicate form and designed, respectively, for filtration and storage purposes, although in the practical operation of the apparatus the storage-tank also involves a final purifying or cleansing action for the oil. The separate tanks are designated, respectively, by the reference-numerals 1 and 2 and are usually arranged in proximal relation to constitute directly adjacent parts of the same apparatus. Ordinarily the tanks are preferably of a general cylindrical shape, although it is obvious that any suitable shape or size of tanks may be utilized, so long as the essential elements of construction are preserved. Both of the tanks 1 and 2 are provided at their lower ends with flared hollow bases 3, upon which they are supported.

Referring specifically to the filtration-tank and the elements associated therewith to provide for the straining or filtration of the oil, it is to be observed that the said filtration-tank is provided with a closed bottom 4, but is open at its top or upper end to provide for detachably receiving within its upper end portion the separate primary and secondary supply vessels 5 and 6, respectively. The said primary supply and secondary supply vessels 5 and 6 are designed to be nested one within the other and also within the upper end portion of the filtration-tank 1; but the said vessels 5 and 6 are of different depths, whereby there is provided between the bottoms of the vessels a well-defined intervening settling-chamber 7, within which may settle and collect such waste or foreign substances as may pass out of the first or primary vessel 5 into the larger and secondary vessel 6, thus materially aiding a thorough initial straining of the oil before it is conducted to the filtering devices proper, to be presently described.

Both of the supply vessels 5 and 6 are of the same cross-sectional shape as the tank 1 and are therefore preferably in the form of cylin-

drical bodies approximately of the diameter of the tank 1, as it will be observed from the figures of the drawings that the larger secondary supply vessel 6 snugly registers inside of the upper end portion of the tank 1, while the primary vessel 5 likewise registers within the said secondary vessel 6 and extends a greater portion of the depth thereof, only leaving sufficient space between the bottoms to provide the settling-chamber 7 referred to. At its open upper end the secondary supply vessel 6 is formed with an annular holding flange or bead 8, engaging the top edge of the tank 1, and the primary supply vessel 5 is also provided at its upper end with a similar holding flange or bead 9, likewise engaging the upper end of the vessel 6. This completes a snug nesting relation between the two supply vessels and the storage-tank, while at the same time permitting of the ready separation of these individual elements for cleaning or other purposes. A single closure or covering 10 is fitted over the open upper end of the primary supply vessel 5, and therefore constitutes a common closure for both supply vessels and the upper end of the filtration-tank. At its bottom the primary supply vessel 5 is provided with a coarse strainer-screen 11, which serves to separate from the oil the heavier and larger foreign substances or impurities before the oil passes into the settling-chamber 7 of the secondary supply vessel, and the latter has fitted within the bottom thereof a supplemental strainer-screen 12, of a materially finer mesh than the first screen 11 and designed to separate from the oil all finer impurities, such as would have a tendency to clog or otherwise interfere with the filtering action of the apparatus.

There is associated with the secondary supply vessel an oil-conductor 13, preferably in the form of a pipe or tube pendent from the bottom of the secondary supply vessel and extending to a point in close proximity to the closed bottom 4 of the filtration-tank. The said oil-conductor or conducting-pipe 13 is preferably provided at its upper end with a receiving-funnel 13^a, an opening through the bottom of the vessel, and disposed beneath the supplemental screen 12, so as to receive the doubly-strained oil from the settling-chamber 7 and direct it into the conductor or pipe 13, which leads it into the bottom portion of the filtration-tank.

At the extreme lower end the oil-conductor or conducting-pipe 13 is provided with a horizontally-disposed hollow cross-arm 14, constituting an oil-distributing head and provided throughout its length with a plurality of discharging-holes 15, through which the strained oil is delivered or discharged in the bottom portion of the filtration-tank and beneath the filter-bed 16.

The filter-bed 16 encircles the oil-conductor or conducting-pipe and is located intermediate the distributing-head 14 and the bottom secondary supply vessel 6. The said

bed 16 essentially consists of a pair of upper and lower perforated strainer-plates 17 and 18 and a body or strata of filtering material 19 confined between the said plates. The upper and lower perforated strainer-plates 17 and 18 are of the same diameter as the interior diameter of the filtration-tank 1, and the interval between the peripheral edges of the plates is entirely filled with the filtering strata or material 19, whereby it is impossible for any oil to pass into the upper oil-chamber 20 above the filter-bed without passing through the filtering strata or material 19.

Under certain conditions a more effective filtration or cleansing is accomplished by providing a comparatively small or large sediment-chamber beneath the filter-bed. This is provided for by making the said filter-bed vertically adjustable upon the oil conductor or pipe 13. In the preferred construction holding-collars 21 are slidably mounted on the oil-conductor above and below the filter-bed and are held in an adjusted position through the medium of set-screws or equivalent fastenings 22.

In the use of the apparatus the oil which is introduced into the primary supply vessel 5 is subjected to the successive straining influence of the screens 11 and 12 and by its own pressure is forced through and out of the oil-conductor and up through the filter-bed 16 into the oil-chamber 20, between the filter-bed and the bottom of the secondary supply vessel. From this oil-chamber, which contains filtered oil, the latter passes through the delivery-pipe 23 into the storage-tank 2. The delivery-pipe 23 is suitably connected at one end to the tank 1 at a point in communication with the chamber, 20 and from such connection extends downwardly in a plane between the two tanks to a point close to the bottom of the tanks. The said delivery-pipe 23 is then extended into the bottom portion of the storage-tank 2 and is provided therein with a perforated discharge-section 24, which delivers the oil in jets into the bottom of the storage-tank. The latter tank is partly filled with water, so that the oil is compelled to ascend through such water, and thus be subjected to a final purifying action within the storage-tank.

At a point between the two tanks the delivery-pipe 23 (which is flush with the inside of the tank) is provided with a check-valve 25, which opens in a direction to permit the flow of oil into the storage-tank and closes in a direction to prevent backflow out of the latter tank.

The tanks have fitted to the same, preferably at the front sides thereof, service-faucets 26 and 27, respectively, the faucet 26 for the filtration-tank being fitted thereto at a point below the plane of the connection of the pipe 23 with the filtration-tank. This relative elevation between the upper end of the pipe 23 and the service-faucet 26 is shown in Fig. 7 of the drawings. By reason of this

construction sufficient filtered oil may be drawn out of the filtration-tank to take the pressure off the check-valve 25, and thus cut off communication between the two tanks, whereby the filtration-tank may be isolated for cleaning purposes.

Under normal conditions when the filtered-oil chamber 20 is filled with oil up to or above the plane of the pipe connection 23 the pressure of the column of oil in the pipe 23, plus the additional pressure exerted from the body of oil in the chamber 20, is sufficient to hold the check-valve 25 in an open condition, thus maintaining free communication between the storage-tank and the filtered-oil chamber 20. It is only by removing from the pipe 23 the additional pressure exerted by the body of oil in the chamber 20 that the check-valve 25 can close from the pressure of oil in the storage-tank, and consequently the present invention contemplates the novel idea of providing the chamber portion 20 of the filtration-tank with a service-faucet disposed below the plane of the pipe connection 23. This has been found very advantageous in a "double-tank" filter to provide for the convenient isolation of one tank from the other.

Draw-off cocks 28 and 29 are respectively fitted to the lower portions of the filtration and storage tanks, the cock 28 permitting of the withdrawal of oil from the filtration-tank prior to its filtration in order to clean the filter, while the cock 29 serves an equivalent purpose in connection with the storage-tank. A glass gage 30, fitted to the filtration-tank and having suitable nipple connections therewith, provides means whereby the amount of oil and water in the apparatus may be readily ascertained.

The arrangement and relation of the several faucets and cocks are of special utility in the carrying out of the present invention and present certain advantages peculiar to an oil-filtering apparatus. Reference has already been made to the utility of the feature of arranging the service-faucet 26 below the horizontal plane of the upper end of the pipe connection 23; and in this connection it is to be further noted that one of the special advantages of having the faucet 26 so related to the upper end of the pipe 23 is that when the apparatus is in use if filtered oil is needed it can be withdrawn at the faucet 26 without waiting until the same shall be risen to the level of the pipe 23, passed through such pipe and the water at the bottom of the storage-tank, and then have risen to the level of the faucet 27 after passing through the water twice.

A second and distinct advantage of the special position of the faucet 26 is that in cleaning the filter the said faucet allows the withdrawal of all filtered oil in the filtering-tank above the filtering-bed, and when that is done the check-valve 25 necessarily closes, thus holding all of the oil in the storage-tank, thereby carrying out the function previously expressed—namely, that of the filtration-tank

being isolated from the storage-tank for cleaning purposes.

In the cleaning of the filter the use of the faucet 26 allows the withdrawal of all oil above the filtering-bed and after such withdrawal serves to admit air. The faucet 28 at the bottom of the filtering-tank being opened the water at the bottom of said tank is withdrawn, and the air from the faucet 26 then forces all oil out of the filtering-bed and through the faucet or cock 28, where it is caught in a vessel and saved for further filtration.

In this class of apparatus the best results are accomplished by carrying on the filtration at a proper temperature. This may be conveniently accomplished in the present apparatus by the employment of a heating-coil 31, housed within the hollow base 3 of the filtration-tank and supplied with steam, hot water, or other heating agent in order to maintain the apparatus and the oil at the desired temperature.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described oil-filter will be readily apparent without further description; and it will be understood that changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or scope of the invention or sacrificing any of the advantages thereof.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

In an oil-filter, an upright filtration-tank having an interior filter-bed located above its bottom, and a filtered-oil chamber confined above said bed, a separate storage-tank, a pendent delivery-pipe communicating at its upper end with the upper portion of said filtered-oil chamber of the filtration-tank, and whose opposite and lower end extends into and communicates with the bottom portion of the separate storage-tank, said delivery-pipe being provided with a check-valve arranged to be closed under certain conditions by the pressure of the column within the storage-tank, a service-faucet communicating with the filtered-oil chamber of the filtration-tank below the plane of said communication of the delivery-pipe therewith, a corresponding service-faucet fitted to the storage-tank in substantially the same plane, and a draw-off cock in communication with the bottom portion of the filtration-tank below the filtration-bed and cooperating with the said service-faucet of the filtration-tank during the cleaning operation.

In testimony whereof we affix our signatures in presence of two witnesses.

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ANDREW HUSSEL.

Witnesses:

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