(No Model.) 2 Sheets—Sheet 1.

F. M. CAMPBELL & W. L. FLOWER.

OIL FILTER.

No. 456,797. Patented July 28, 1891.

Fig. 1.

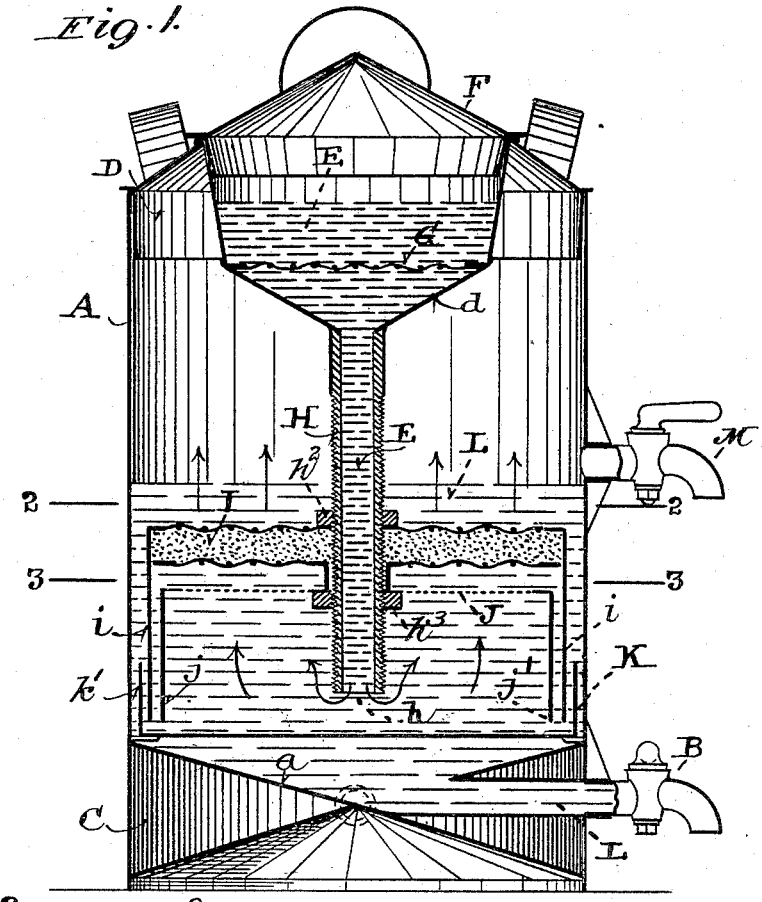


Fig. 2.

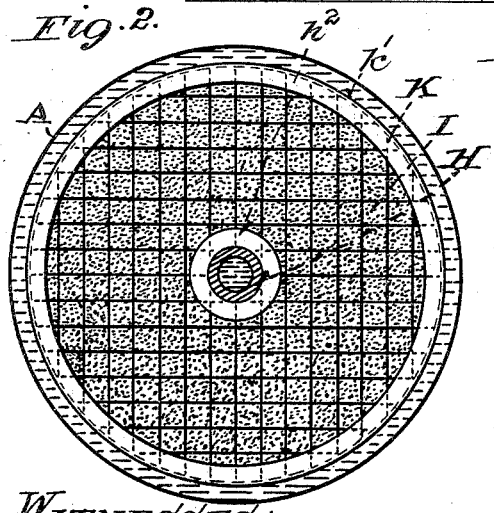
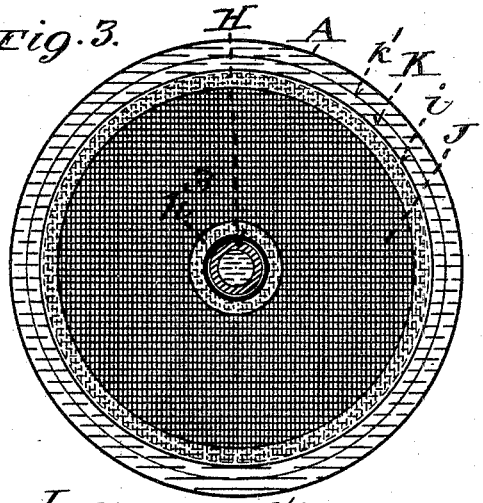


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

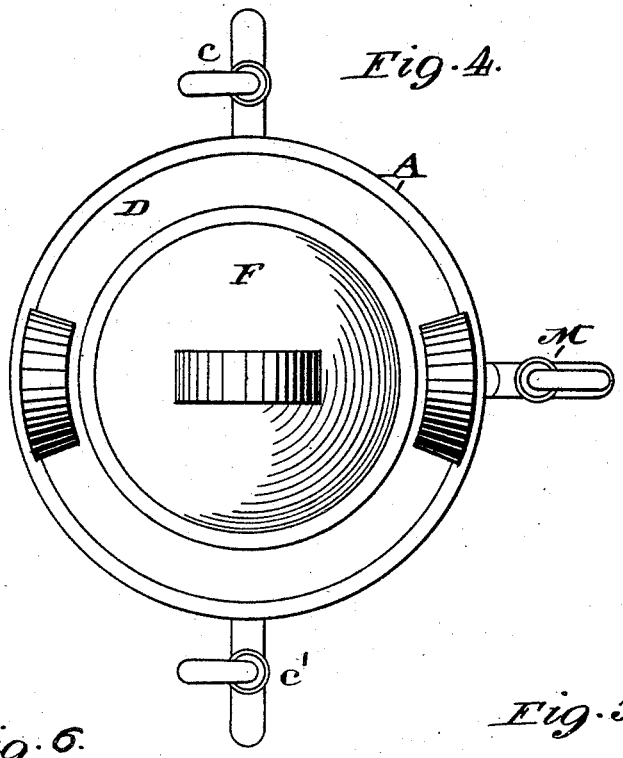


Fig. 6.

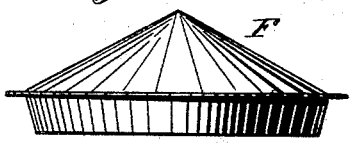


Fig. 5.

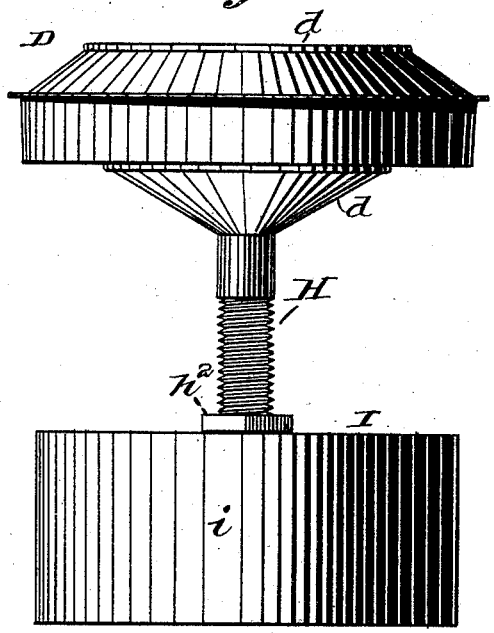
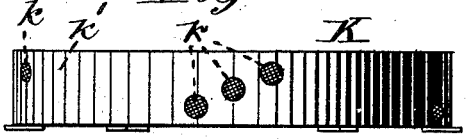


Fig. 7.



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UNITED STATES PATENT OFFICE.

FRANCIS M. CAMPBELL AND WALTER L. FLOWER, OF ST. LOUIS, MISSOURI.

OIL-FILTER.

SPECIFICATION forming part of Letters Patent No. 456,797, dated July 28, 1891.

Application filed February 7, 1891. Serial No. 380,678. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS M. CAMPBELL and WALTER L. FLOWER, of St. Louis, Missouri, have jointly made a new and useful Improvement in Oil-Filters, of which the following is a full, clear, and exact description.

A feature of the present improved construction is the means whereby the oil to be filtered is, in its passage through the filter, directed more advantageously through the filter-bed than in oil-filters hitherto in use.

Another feature is the provision whereby the larger particles of matter to be filtered out are separated from the oil while in contact with the water, but before it reaches the filter-bed.

Another feature is the removable receptacle for the dirt separated from the oil. The improvement also has reference to the special means for draining the filter and for heating it, all substantially as is hereinafter described and claimed, aided by the annexed drawings, making part of this specification, in which—

Figure 1 is a vertical section of the improved filter; Fig. 2, a horizontal section on the line 2 2 of Fig. 1; Fig. 3, a horizontal section on the line 3 3 of Fig. 1; Fig. 4, a plan of the filter; Fig. 5, a side elevation of the principal portion of the removable part of the filter; Fig. 6, a side elevation of the cover of the parts shown in Fig. 5; and Fig. 7, a side elevation of the receptacle for the dirt.

The same letters of reference denote the same parts.

A represents the casing or what may be termed the "fixed" part of the construction. It is usually of the upright cylindrical form, substantially as shown, and in size adapted to any desired capacity.

B represents a cock for draining the water from the casing, and the bottom *a* of the casing, whence the drainage passes to said cock, is suitably depressed, substantially as shown. Beneath said bottom *a* is a chamber C, into which steam or other heating agent can be introduced for the purpose of warming the filter and its contents whenever it may be desired. The cocks *c c'* are for controlling the circulation of such steam or other heating agent.

The remaining portion of the construction is preferably adapted to be removable from the casing, and it is constructed preferably as follows:

D represents the cover for the casing. It has a central depression *d*, into which the oil E to be filtered is placed. A cover F is used to close said depression, and a strainer G of coarse mesh may be used at or toward the bottom of the depression, substantially as shown. The oil placed in the depression *d* flows thence downward through a tubular stem H, which leads downward within the casing, and so as to deliver the oil into the interior of the casing toward the bottom thereof. A filter-bed I, composed of suitable material, preferably bone-black, is attached to the stem H. It is somewhat smaller in diameter than the casing, and at its periphery it is provided with a downwardly-extending flange *i*. This flange at its upper end is closely connected with the filter-bed, so that no oil can find its way between the periphery of the bed and the flange, and at its lower end the flange extends below the level of the outlet *h* from the stem H.

J represents a strainer attached to the stem H below the level of the filter-bed and provided at its periphery with a downwardly-extending flange *j*, which extends within the flange *i* to bring its lower edge *j'* below the level of the stem-outlet *h*.

K represents a pan which rests removably upon the bottom of the casing and large enough in diameter to inclose the flanges *i j*, substantially as shown.

The operation is as follows: The casing being suitably filled with water L, substantially as is indicated in Fig. 1, and the parts being in position, the oil is poured into the depression *d* in the casing-cover. The strainer G serves to catch exceptionally large pieces which may be in the oil; but the oil, with the principal portion of its impurities, passes downward through the stem H and is delivered into the water of the casing, but at a level therein above the lower edges of the flanges *i j*, or either thereof. By this means the impure oil is inclosed in the water, so that it cannot rise therefrom without passing first through the strainer J and then through the filter-bed I, as indicated by the arrows in Fig.

1. In oil-filters as hitherto made the oil is liable to escape upward between the periphery of the filter-bed and the casing, and in consequence is but imperfectly filtered. This difficulty is obviated in the manner described. The strainer J is of sufficiently fine mesh to arrest almost all of the impurities in the oil, and the filter-bed is preferably adapted to what may be termed the "finishing work," in that it serves to filter out the finest impurities and to restore the proper color to the oil. The operation being completed and the oil being drawn off through the cock M above the level of the filter-bed, the water is drained through the cock B. The dirt caught by the strainer J and also beneath the filter-bed drops into the pan K. As the water is thus lowered in the casing it can escape also from the pan K through suitable openings k in its wall k', and preferably guarded by means of finely-perforated metal, substantially as shown. The drawing off of the water preferably precedes the removal from the casing of the pan K, and to remove said pan the stem H, together with the parts thereto attached, as described, is first lifted out of the casing, after which the pan containing the dirt can be withdrawn from the casing. All parts of the construction can now be readily reached for cleaning purposes or for any needed repairs, and by simply replacing the pan and then the other named removable parts in the casing the filter is ready for use again. In this manner the oil is very thoroughly cleaned, and by means of a device all parts of which can be readily reached. In colder weather the heating-chamber is of considerable value, in that thereby the water within the casing and also the oil and the parts of the filter can be warmed and the filtering operation in consequence promoted. It is quite desirable to use the strainer J and when it is used to employ the form thereof shown; but the improvement in a measure can be carried out by omitting this strainer and employing the filter-bed I as the sole means for purifying the oil; or, again, the strainer J, in the place of having its own flange j, may at its periphery be connected with the filter-bed flange i; but a preferable construction is the one exhibited. The filter-bed and also the strainer J are preferably vertically adjustable upon the stem H, to which end such stem is threaded, as shown, and the nuts h^2 h^3 are used thereon, substantially as shown.

We claim—

1. The combination of the casing adapted to have the water and the oil drain off therefrom, as described, with the inlet-pipe H, the flanged filter-bed attached to said pipe, the strainer J beneath said filter-bed, and the pan K beneath said strainer, substantially as described.

2. The combination of the casing having the outlets for the water and oil, as described, the depressed casing-cover, the inlet-pipe attached to said cover and provided with the flanged filter-bed and the flanged strainer J and the pan K, said strainer being beneath said filter-bed and said pan being beneath said strainer, substantially as described.

3. The combination of the casing having the described outlets for the water and oil, respectively, with the inlet-pipe provided with the flanged filter-bed, the lower edge of said flange extending below the level of the outlet from said pipe, substantially as described.

4. An oil-filter having the pan K and the inlet-pipe provided with the flanged filter-bed, said inlet-pipe, filter-bed, and pan being removable from the casing of the filter, substantially as described.

Witness our hands this 5th day of February, 1891.

FRANCIS M. CAMPBELL.
WALTER L. FLOWER.

Witnesses:
C. D. MOODY,
A. BONVILLE.