

A. L. HADLEY.
MAGNETIC SEPARATOR.
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1,263,406.

Patented Apr. 23, 1918.

Fig. 1.

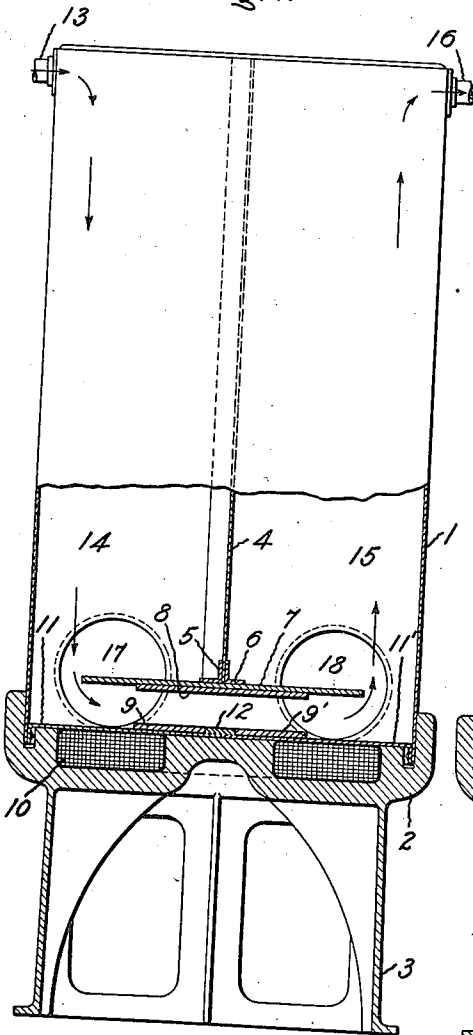


Fig. 2.

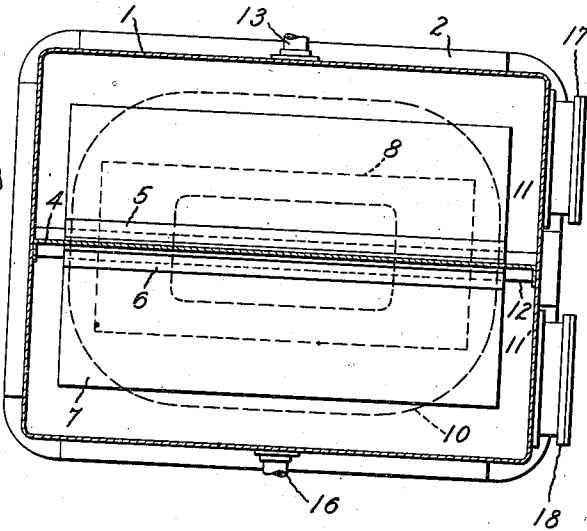
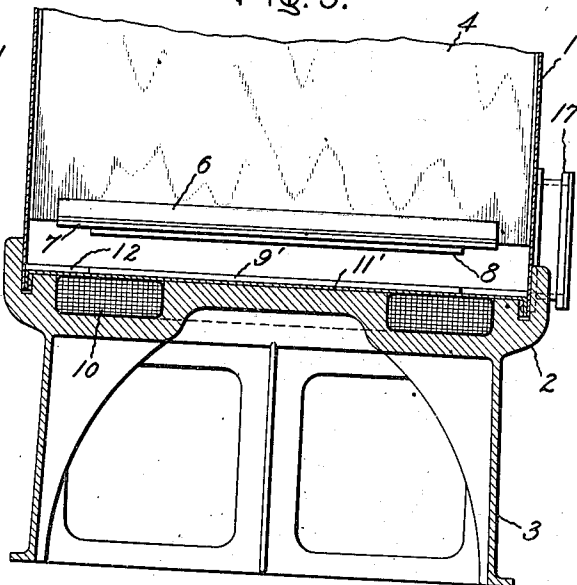


Fig. 3.



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UNITED STATES PATENT OFFICE.

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MAGNETIC SEPARATOR.

1,263,406.

Specification of Letters Patent. Patented Apr. 23, 1918.

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To all whom it may concern:

Be it known that I, ARTHUR L. HADLEY, a citizen of the United States, residing at Fort Wayne, county of Allen, State of Indiana, have invented certain new and useful Improvements in Magnetic Separators, of which the following is a specification.

The present invention comprises a device for separating magnetic particles from liquids, for example, from oil.

One of the features of my improved apparatus is a conduit for the liquid, the opposite walls of which consist of magnetic material and a magnetizing coil so arranged that the magnetic circuit passes through the liquid from one wall to the other. The construction and novel features of my invention will be better understood from the following description with reference to the accompanying drawings in which,

Figure 1 is a longitudinal section; Fig. 2, a plan view with the top removed, and Fig. 3 a longitudinal section taken at right angles to Fig. 2.

As best shown in Fig. 1, the device comprises an inclosed tank 1, resting on a cast-iron base 2, and supported by legs 3. The tank is divided into two chambers by a partition 4. Attached to the free end of the partition by angle irons 5 and 6, is a transverse plate 7 spaced away from the base of the tank. The plate 7 is reinforced by another and narrower plate 8 to increase the magnetic permeability so as to carry the magnetic flux to the ends of plate 7. Opposite to the plates 7 and 8, are plates 9 and 9' resting on the bottom of the tank. A magnetic flux is generated by a rectangular electrical coil 10, indicated in section in Figs. 1 and 3, and in dotted outline in Fig. 2. The walls of the tank, the base 2, the longitudinal and transverse plates 4, 7, 8, 9 and 9' all consist of iron or steel, but the plates 11, 11' acting as a cover for the coil 10 consist of non-magnetic materials such as brass. The magnetic flux is diverted across the conduit connecting the two chambers 14 and 15, by the non-magnetic bottom 11, 11' of the tank and the oppositely located magnetic partition plates 7 and 8. The insert 12 consisting of brass or other suitable material located between the plates 9, 9', as indicated in Fig. 2, is used to weld together the two brass plates. When the coil 10 is energized, preferably with direct current, the lines of

force pass from the plates 9 and 9', respectively, to the plates 7 and 8, through the fluid, thereby magnetizing and removing the iron filings, or the like.

The oil or other liquid to be subjected to magnetic purification enters the tank through an inlet pipe 13, flows downwardly in one section 14 of the tank, as indicated by arrows, then flows between the space between the walls 8 and 9, and passes upwardly through the adjoining section 15 of the tank, escaping from the tank through an outlet pipe 16.

While passing between the plates 8 and 9, 9', the fluid is subjected to the most intense magnetic field, but as the tank itself consists of magnetic material the magnetic flux as a matter of fact extends substantially to the top of the tank so that the fluid passing through the tank is substantially continuously under purifying influence of the magnetic field. The magnetic particles in the fluid drawn to the magnetic poles, may be removed through the manholes 17 and 18 from time to time.

The large size of the tank compared with the size of the inlet pipe causes the fluid to pass between the magnetic poles at a slower rate than in the pipes, so as to permit settling and a complete removal of the suspended magnetic particles.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. A magnetic separator comprising a tank consisting of magnetic material, a magnetizing winding located at one end of said tank and positioned to generate a flux traversing in part at least the wall of said tank and the space within said tank, a partition dividing said tank into chambers but leaving a connecting passage between said chambers adjacent said winding, and a plate of magnetic material spaced away from the base of said tank to divert magnetic flux across the passage leading from one chamber to the other chamber.

2. A magnetic separator comprising an inclosed tank, a partition therefor spaced away from one end of said tank, a magnetic plate transverse to said partition adjoining the free end of said partition, a magnetic plate located opposite said transverse plate and adjacent the end of said tank, and means for generating a magnetic flux passing from said end plate across the in-

intervening space, and through the transverse plate.

3. A magnetic separator comprising an inclosed tank, a partition therefor, spaced 5 away from one end of said tank and extending to the opposite end, a transverse plate of magnetic material joined to the free end of said partition, a plate of magnetic material joined to the free end of 10 said partition, a plate of magnetic material spaced away from said transverse plate, an electromagnetic coil located to generate a magnetic flux passing between said plates through the intervening space, and conduits 15 for respectively admitting and withdrawing oil from the tank on opposite sides of said partition.

4. A magnetic separator comprising an inclosed tank, a partition therefor, spaced 20 away from one end of said tank and extending to the opposite end of said tank, a transverse plate of magnetic material adjoining the free end of said partition and leaving a passage from one side of the partition to 25 the other, a plate of magnetic material bounding said passage opposite said trans-

verse plate, and a magnetic coil for generating magnetic fluxes passing between said magnetic plates bounding said passage to the transverse plate across the intervening space. 30

5. A magnetic separator comprising an inclosed iron or steel tank, a partition therefor spaced away from one end of said tank and extending to the opposite end, a transverse 35 plate of magnetic material extending from the free end of said partition partly across said tank, a second transverse magnetic plate spaced away from said plate, an electrical winding for generating a magnetic flux, the circuit of which includes the 40 base of said tank, and said transverse plates, a covering of non-magnetic material for said winding, and conduits at opposite sides of said partition remote from said transverse 45 plate for respectively introducing and withdrawing liquid to be subjected to magnetic purification.

In witness whereof, I have hereunto set my hand this 4th day of October, 1916.

ARTHUR L. HADLEY.