

E. JOHNSON.
OIL SEPARATOR.
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1,230,581.

Patented June 19, 1917.

Fig. 2

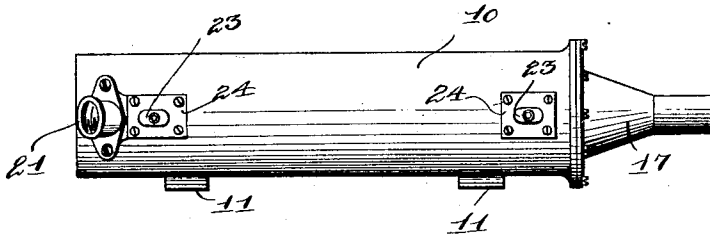


Fig. 4

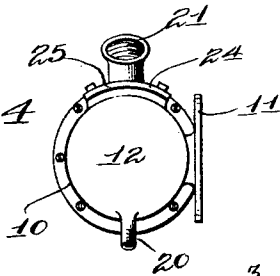


Fig. 1

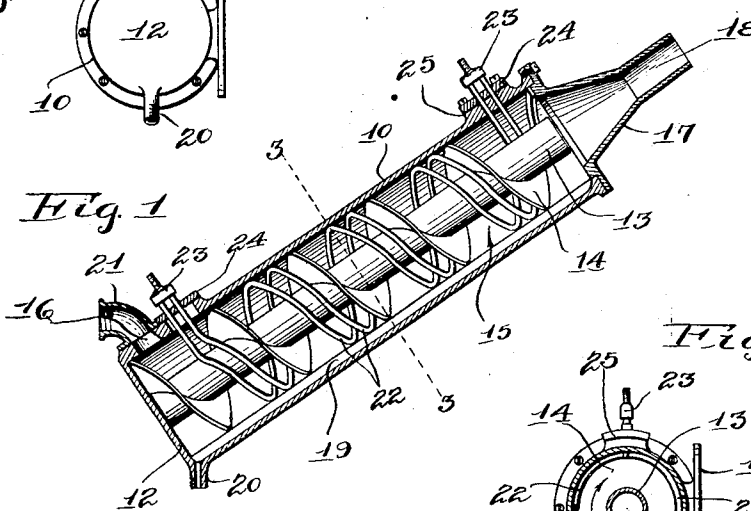
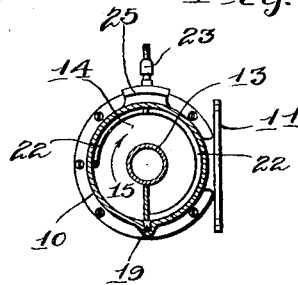


Fig. 3



Witnesses
J. C. Caswell
A. M. Ruge

Inventor
Edward Johnson
by John E. Stryker Atty.

UNITED STATES PATENT OFFICE.

EDWARD JOHNSON, OF ST. PAUL, MINNESOTA, ASSIGNOR TO LESLIE S. HACKNEY, OF ST. PAUL, MINNESOTA.

OIL-SEPARATOR.

1,230,581.

Specification of Letters Patent.

Patented June 19, 1917.

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To all whom it may concern:

Be it known that I, EDWARD JOHNSON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented new and useful Improvements in Oil-Separators, of which the following is a specification.

Under many circumstances it is desirable to employ the exhaust steam from a steam engine by condensing it and returning the water of condensation to the boiler to be used again. It is found, however, that in passing through the cylinder of an engine, steam picks up quantities of lubricating oil, which, if returned to the boiler, results in damage thereto.

The object of my present invention is to provide an inexpensive, durable and efficient device adapted to receive the exhaust steam from the cylinder of an engine and to separate and remove the oil therefrom.

A further object of my invention is to provide a device of this kind comprising a steam conduit with devices therein to separate oil from the steam, certain of said devices forming independent return conduits adapted to heat the water therein by conduction from the surrounding steam.

In the drawings Figure 1 is a longitudinal, central, sectional view of my improved device in position for use; Fig. 2 is a plan view thereof; Fig. 3 is a vertical, central, sectional view taken on the line 3—3 of Fig. 1, and Fig. 4 is an end elevation of said device.

Referring to the drawings, I have used the reference numeral 10 to indicate the cylinder, which comprises the body of my improved oil separator. Brackets 11 formed upon one side of said cylinder furnish means for securing the same in inclined position (as shown in Fig. 1) upon a suitable mounting. The lower end of said cylinder is closed by a head 12, and the upper end thereof is open. A core 13 within the cylinder 10 is surrounded by a spiral partition 14, which fits snugly against the inner periphery of the cylinder and forms therewith a spiral passageway 15 extending from one end of said cylinder to the other. An inlet port 16 is formed in the top of the cylinder near the lower end thereof and opens into the spiral passageway 15, and a cone-shaped coupling 17 secured to the open end of the cylinder provides an outlet port 18, into which

said passageway opens. A longitudinal groove or gutter 19 formed within the inner periphery at the bottom of the cylinder communicates with the passageway 15 throughout its length and said gutter discharges at the lowermost point of the cylinder into an outlet nipple 20 formed thereon. The inlet port 16 communicates through the coupling 21 and other suitable conduits (not shown) with the exhaust port of a steam cylinder, and steam therefrom, being under considerable pressure, is forced into the cylinder 10 and around the spiral passageway 15 to the outlet port 18, which may open into any suitable steam condensing device (not shown). Steam passes around the spiral passageway 15 at high velocity and oil particles therein contained are thrown by centrifugal force against the walls of the cylinder 10 and are also deposited upon the spiral wall 14, and then impelled by the current of steam to flow upon said surfaces around to the gutter 19. Oil entering said gutter passes out of the current of steam and flows by gravity to the outlet nipple 20 communicating therewith.

To employ the heat from the exhaust steam and to further assist in collecting oil particles carried in the steam, I provide a plurality of tubes 22 spirally arranged within the passageway. These tubes 22 enter through the top of the cylinder 10 near the outlet port 18 and pass from said cylinder at points near the inlet port 16, the adjacent ends of said tubes being joined by suitable pipe fittings 23. Cap-plates 24, having packing strips 25 beneath them, are secured to the cylinder 10 to form tight joints about the openings in said cylinder through which the tubes 22 pass. These tubes are adapted to conduct water from the condensing device above mentioned to an engine boiler and the temperature of the water in said tubes is considerably increased by reason of the hot steam surrounding the tubes, thereby minimizing the fuel required to generate steam within the boiler. Steam condenses upon the surfaces of said tubes, the temperature thereof being lower than the surrounding steam, and forms a liquid film, which is impelled by the current of steam toward the gutter 19. Oil coming in contact with said film-coated tubes adheres thereto and readily moves thereon toward the gutter 19, where it is collected.

It will be noted that the walls forming the spiral passageway 15 are smooth and by reason of their shape offer no substantial resistance to the current of steam as would baffle-plates or the like, and it will also be noted that the tubes 22 are bent to conform to said spiral passageway and therefore do not impede the current of steam.

10 Having described my invention, what I claim as new and desire to protect by Letters Patent is:—

1. In a device of the class described, a cylinder having a discharge gutter therein, a spiral partition in said cylinder forming a helical passageway for steam and a tube spirally arranged within said passageway to conduct water through said cylinder, the walls of said partition and the outer surface of said tube being adapted to collect oil from the steam and conduct the same to said discharge gutter.

2. In a device of the class described, a cylinder having a discharge gutter therein, a spiral partition, in said cylinder, forming a helical passageway for steam, and a conduit spirally arranged in said passageway and resting against the walls of said cylinder, said conduit being adapted to carry water in the bore thereof through the cylinder, while the outer surface of said conduit is adapted to aid in collecting oil from the steam and leading the same to said gutter.

3. In a device of the class described, a cylinder having a discharge gutter therein, a spiral partition in said cylinder forming a helical passageway for steam and a conduit for water passing through said cylinder, that portion thereof inclosed within the cylinder comprising a plurality of branches spirally arranged within said passageway, said partition and conduit being adapted to collect oil upon their surfaces and conduct the same to said gutter, while the water in said branches is heated by the surrounding steam.

4. In a device of the class described, a cylinder having a discharge gutter therein, a spiral partition in said cylinder forming a helical passageway for steam which communicates throughout its length with said gutter and a plurality of tubes spirally arranged within said passageway to return the condensed steam through said cylinder, the walls of said partition and the outer surfaces of said tubes being adapted to collect oil from the steam as it traverses said passageway and conduct the oil to said discharge gutter.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD JOHNSON.

Witnesses:

JOHN E. STRYKER,
F. C. CASWELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."