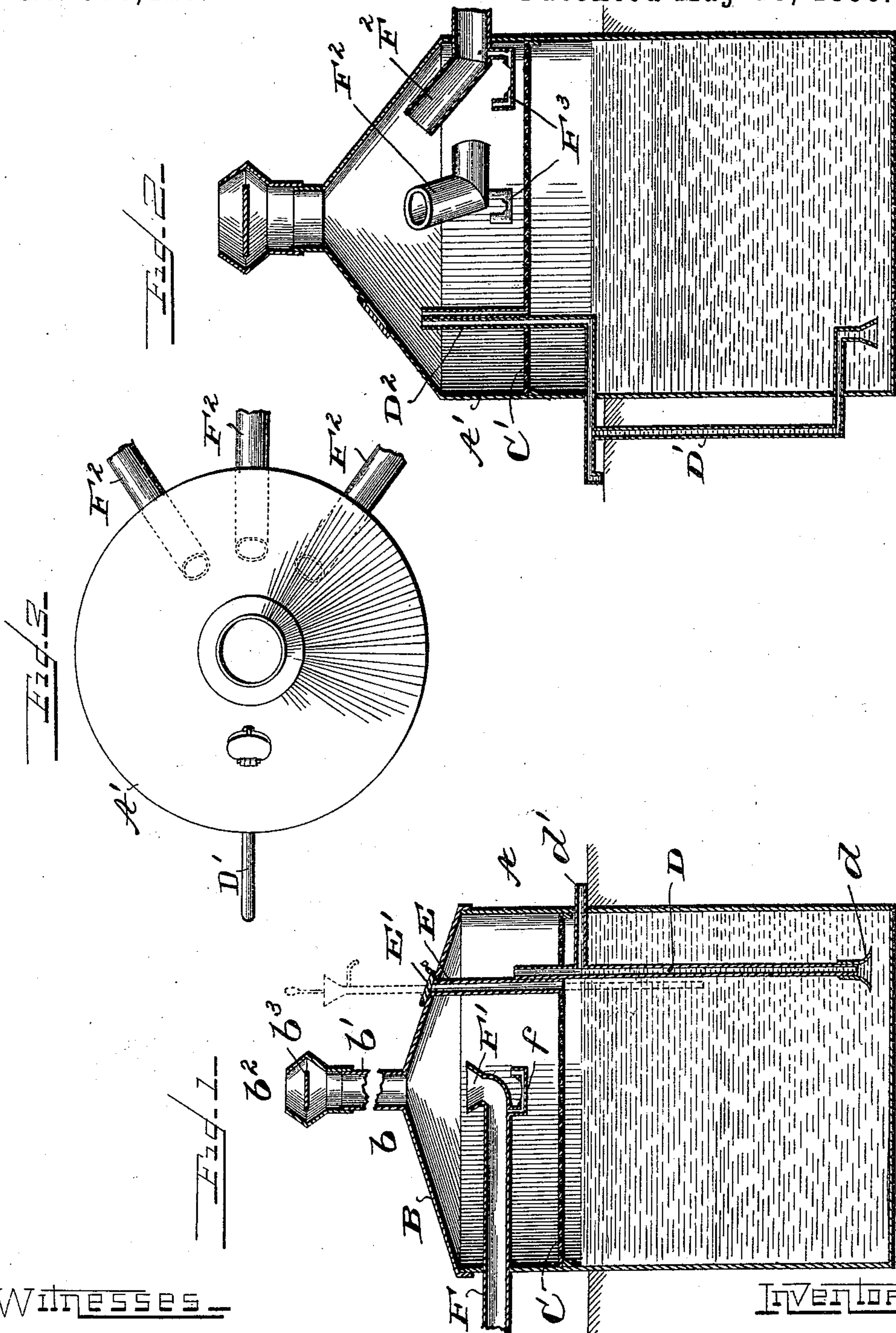


(No Model.)

S. J. McDONALD.  
STEAM AND OIL SEPARATOR.

No. 560,420.

Patented May 19, 1896.



Witnesses \_\_\_\_\_

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# UNITED STATES PATENT OFFICE.

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## STEAM AND OIL SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 560,420, dated May 19, 1896.

Application filed November 16, 1895. Serial No. 569,196. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL J. McDONALD, a citizen of the United States, residing at Warren, in the county of Warren and State of Pennsylvania, have invented certain new and useful Improvements in Oil-Saving Apparatus for Cylinder-Exhausts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention and a slight modification of the same, said invention being fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a vertical sectional view of an apparatus embodying my invention. Fig. 2 represents a similar sectional view of a slightly-modified construction, and Fig. 3 is a top plan view of the same.

The object of my invention is to provide an apparatus adapted to be attached to one or more exhaust-steam pipes from steam-engine cylinders for separating the oil from the exhaust-steam and collecting it, so that it can be removed from the apparatus and used over again, thereby effecting a very considerable saving in the cost of running the steam-engines.

In the drawings, A represents a receptacle constructed, preferably, of galvanized iron or other sheet metal and provided with a cover B, detachably secured to the receptacle and having upwardly-tapering portions terminating in a discharge-aperture *b*. I may provide the said discharge-aperture with a vertical discharge-pipe *b'*, of any desired length, as shown, and said pipe may also be provided at its upper end with an enlarged hood *b''*, having suitable baffle-plates *b'''*, if found desirable; but the hood and pipe may be dispensed with. In the upper part of the receptacle A a perforated diaphragm C is supported in any suitable manner.

D represents an overflow-pipe extending vertically from a point adjacent to the bottom

of the receptacle, where it is provided, preferably, with a flaring mouth *d*, to a point above the diaphragm C, said overflow-pipe having a discharge-pipe *d'* at a point below the diaphragm C, which extends laterally through the side wall of the receptacle.

E represents a vertical passage extending from the cover B downwardly to and through the diaphragm C, the said passage being preferably provided with a removable closing-cap *E'* on the outside of cover B. I prefer to provide said cap with a padlock or other securing means, as indicated in the drawings, to prevent it from being opened by an unauthorized person.

F represents the exhaust-pipe from a steam-cylinder—as, for instance, the exhaust-pipe from a large factory or other plant in which a steam-cylinder is employed. This pipe is introduced into the receptacle, preferably through an aperture in the side, and has its discharge end *F'* turned upwardly, so as to discharge the exhaust-steam upward toward the roof or cover of the receptacle. The object of this construction is to prevent the agitation of the contents of the lower part of the receptacle which would result in consequence of its discharging downwardly. In order to prevent water of condensation from accumulating in the pipe F, I provide the said pipe with a drip-pipe *f*, which extends downwardly, horizontally, and upwardly. This pipe will drain the main pipe F and thus prevent it from filling up and freezing during cold weather when the device is not in operation. In order to prevent the bursting of the drip-pipe, I cut away the upper part of the horizontal portion of the pipe, as shown. It will be seen that even in the drip-pipe the discharge is upward instead of downward.

The operation of the apparatus will be as follows: The exhaust-steam is discharged upwardly from the discharge end of the exhaust-pipe F, carrying with it some water of condensation and the particles of oil which are transported by the steam in a finely-divided condition from the cylinder. The oil and water being heavier than the steam fall upon the diaphragm C, while the steam escapes through the discharge-aperture in the cover into the air. The oil and water falling upon



the diaphragm separate and pass through the apertures therein into the bottom of the receptacle, where the particles of oil unite and float upon the surface of the water. When  
 5 sufficient oil and water have accumulated in the receptacle to rise to a level of the overflow-pipe, the water will be forced up in said pipe and thereafter overflow. The amount of oil will thereafter constantly increase, while  
 10 the water will continue to be forced out in a steady stream through the overflow-pipe. The said overflow-pipe having an open end projecting above the laterally-extending branch, the water will simply overflow and cannot be  
 15 siphoned out, as would be the case if the upper section of the pipe was not open. When a considerable amount of oil has accumulated, it is withdrawn by inserting a suitable pump in the vertical passage E and pumping it into  
 20 a suitable receptacle, when it will be found to be clean and ready to be used over again. I prefer to sink the receptacle A in the ground, as indicated in the drawings, and in some instances I find it advantageous to bring the  
 25 overflow-pipe outside of the receptacle at a point adjacent to the bottom of the receptacle, as shown in Fig. 2. In this figure A' represents the receptacle, and D' the overflow-pipe, extending through the side of the receptacle  
 30 at a point adjacent to the bottom of the same, and then extending vertically to a point below the diaphragm C'. The upper part D<sup>2</sup> of the overflow-pipe extends from a point above the diaphragm downward and out  
 35 through the casing, where it connects with the pipe D' to prevent its siphoning. In this figure and in Fig. 3, which is a top plan view of the same apparatus, I have indicated a number of exhaust-pipes F<sup>2</sup> F<sup>2</sup>, which discharge  
 40 into the receptacle, each of said pipes having its discharge end turned upwardly and provided with the drip-pipe F<sup>3</sup> previously described with reference to Fig. 1. It is obvious that where there are several steam en-  
 45 gines or cylinders in a factory the exhaust-pipes from all may be conducted to the oil-saving apparatus, as herein indicated.

By placing the overflow-pipe outside of the receptacle, in case of freezing the only effect  
 50 would be to drain off more of the water and lower the height of the surface of the oil in the receptacle; but no oil could escape.

What I claim, and desire to secure by Letters Patent, is—

1. In an oil-saving device the combination 55 with the receptacle, of an exhaust-pipe extending therein, provided with an upwardly-discharging orifice, a drip-pipe connected to said exhaust-pipe adjacent to said orifice, said drip-pipe discharging upwardly, an overflow- 60 pipe communicating with the lower part of the receptacle and discharging at a point adjacent to its upper portion and an aperture for the insertion of an oil-withdrawing device adjacent to the upper part of said receptacle, 65 substantially as described.

2. In an oil-saving device, the combination with the receptacle having a steam-outlet at its upper end communicating with the open air, an exhaust-pipe extending into said re- 70 ceptacle and having an upwardly-projecting discharge-orifice extending toward said steam-outlet, a perforated diaphragm beneath said orifice for arresting the fall of water and oil from said orifice, an overflow-pipe commu- 75 nicating with the interior of the receptacle adjacent to its lower end, and extending outside said receptacle to a point adjacent to the upper part of said receptacle, an aperture in said receptacle for the insertion of an oil-with- 80 drawing device and a passage extending through the diaphragm in line with said aperture for said oil-withdrawing device, substantially as described.

3. In an oil-saving device the combination 85 with the receptacle, of an exhaust-pipe extending into said receptacle and provided with an upwardly-discharging orifice, a drip-pipe connected to said exhaust-pipe adjacent to said discharge-orifice and provided with a 90 horizontal portion and upwardly-extending portions, said horizontal portion of the drip-pipe being cut away on its upper side, the overflow-pipe communicating with the lower part of said receptacle, and discharging at a 95 point adjacent to its upper part, and means for withdrawing the oil, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL J. McDONALD.

Witnesses:

L. P. WHITAKER,  
 J. D. KINGSBERRY.