(No Model.)

E. H. MURPHY.

GREASE AND OIL SEPARATOR.

No. 409,698. Patented Aug. 27, 1889.

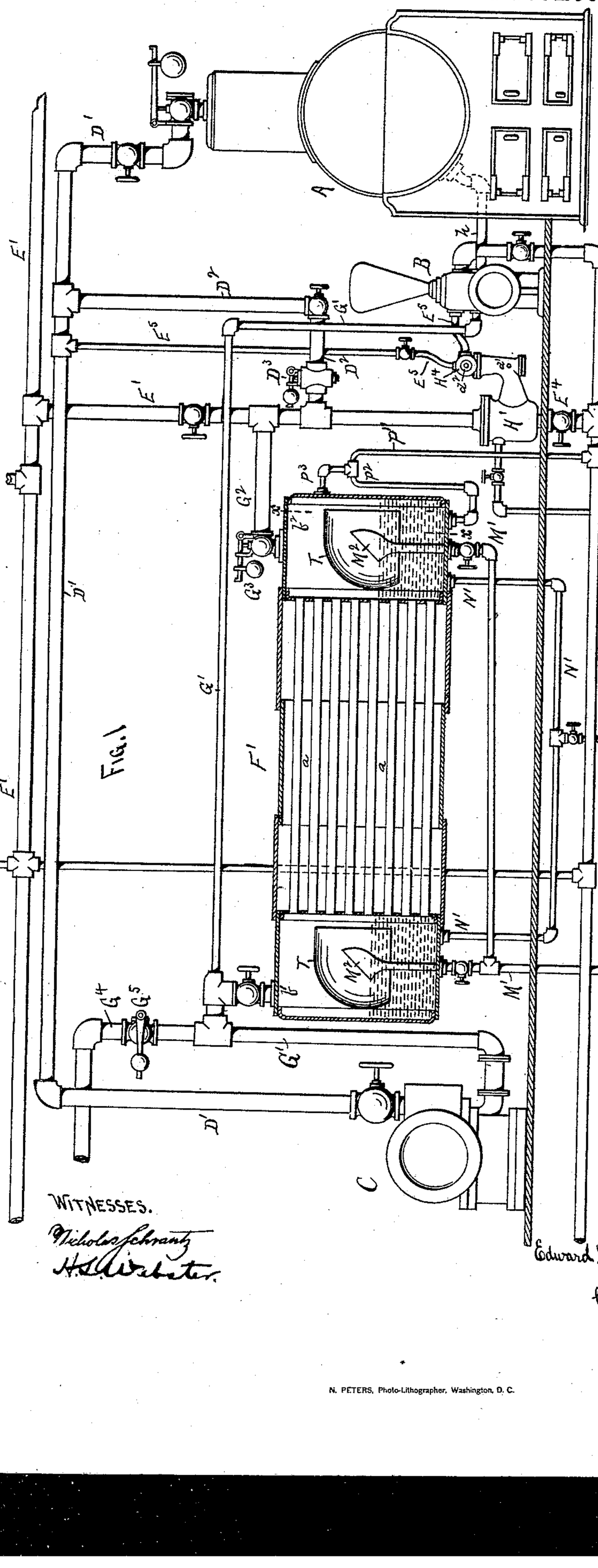

FIG. 1.

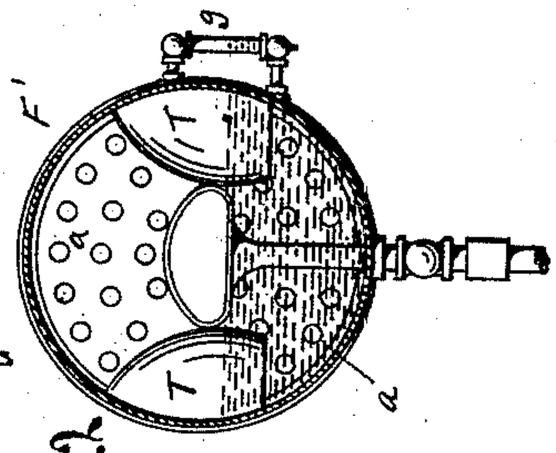

FIG. 2.

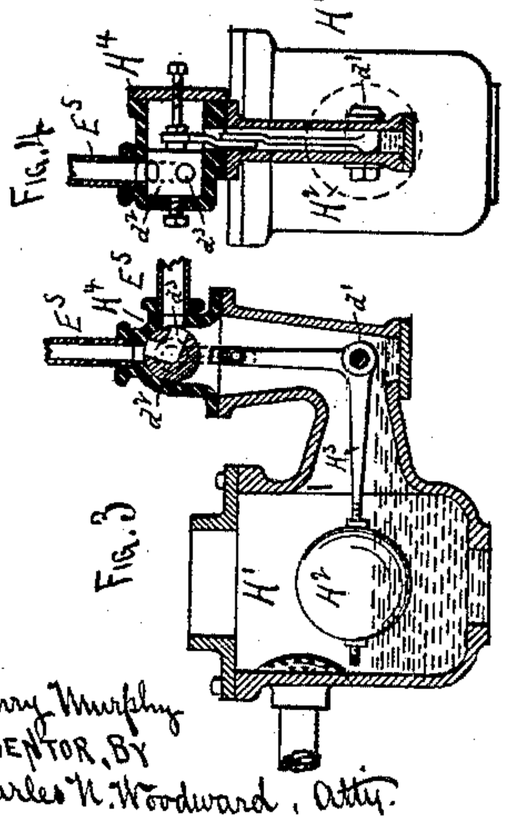

FIG. 4.

FIG. 3.

WITNESSES.

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GREASE AND OIL SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 409,698, dated August 27, 1889.

Application filed April 30, 1887. Serial No. 236,726. (No model.)

To all whom it may concern:

Be it known that I, EDWARD HENRY MURPHY, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Apparatus for Extracting the Oil and Fatty Matter from Exhaust-Steam, of which the following is a specification.

This invention relates to steam-generators and systems of heating and other apparatus connected therewith; and it consists in the construction and arrangement of parts whereby the lubricating-oil and fatty matter conducted away from the engine, pumps, and other motors by the exhaust-steam is extracted from said exhaust-steam and prevented from entering the feed-water of the generators or the radiating system and other piping, as hereinafter shown and described, and specifically pointed out in the claims.

This invention may be applied to combined systems embracing steam-heating and machinery-operating apparatus, or to systems of steam-heating apparatus alone, or to an ordinary machinery-operating system, or in connection with any form of apparatus in which high-pressure steam-generators are employed.

The apparatus will be found peculiarly applicable to the combined steam-heating and machinery-operating system, such as is ordinarily employed in manufacturing and mercantile establishments, and for the purpose of illustration I have shown in the drawings an improved form of the apparatus embodying the invention as applied to such a system.

Figure 1 represents a side elevation, partially in section, of the system complete. Fig. 2 is a cross-sectional view on the line $x\,x$ of Fig. 1. Fig. 3 is an enlarged sectional detail of the combined automatic feed-water regulator and pump-governor. Fig. 4 is a cross-sectional view of the tank on the line $y\,y$ of Fig. 3.

A represents the generator; B, the pump; C, the engine; D, the steam-piping for supplying the engine; and E′, the piping for conducting the steam to the radiating system, all these parts constructed and connected in the ordinary manner.

F′ represents a tank, which may be constructed of any desired size and placed at any convenient point with relation to the generators and other parts, and into which all the exhaust-steam from the engines, pumps, and other motors connected into the system, or from several systems, is conducted by piping G, as shown. This tank F′ is shown in the drawings provided with flues *a*, by which the feed-water, or water intended to be used for other purposes, may be heated; but the flues could be dispensed with entirely or arranged in any other manner without affecting the operation.

The exhaust-piping is shown connected into the top of the tank near one end at b', and arranged to exit at b^2 by the piping G^2 at the other end, a safety-valve G^3 being inserted into the piping G^2 to insure the tank and piping from danger from overpressure. From the tank F′ the piping G^2 is connected into the piping E′, leading into the radiating supply system, as shown.

The piping E′ is conducted down into the main return E^3 from the radiating system E′ through a casing H′ and globe or other valve E^4, this casing containing an automatic water-regulating and pump-governing apparatus, as hereinafter described.

D^2 represents a pipe connecting the main steam-supply pipe D^2 with the piping E′, leading to the radiating system, whereby the radiating system may be supplied with steam direct from the generator A to supplement the exhaust-steam passing through the tank F′. This pipe D^2 is provided with a reducing-valve D^3 between the pipes D^2 and E′, by which the high pressure of the steam from the generator may be reduced to the low pressure required for the radiating apparatus.

Within the casing H′ a float H^3 on the end of an arm H^3 is secured, the arm being pivoted at d' to the casing H′ and bent upward at right angles and connected to a rolling valve d^2, so that the rising and falling of the float will operate the valve. The supply of steam to operate the pump is conducted through casing H^4 of this valve d^2 by piping E^5 from the main pipe D′ or direct from the generator A, as preferred.

In Fig. 2 the valve d^2 is shown in section partially open, and with the pipe E^5, for sup-

plying the pump with steam, passing through its casing H^4 on its way to the pump B, and if the water rises in the casing H′ the float H^2 will be correspondingly raised and the opening d^3 in the valve d^2 correspondingly increased, so that the supply of steam to the pump will be increased and the pump operated at a faster speed and increase the amount fed to the boilers. Then, on the other hand, if the water falls in the casing the valve-opening will be correspondingly reduced and the supply of steam to the pump decreased, so that the pump will run at a slower speed and decrease the amount fed to the boilers. The return-mains E^3 of the radiating system E′ are connected and arranged in the ordinary manner, as shown, and the casing H, as before stated, is connected into the return-main, so that the water in the return is free to rise into the casing and operate the float.

The process of converting the water in the generators into steam by reducing the quantity of water in the boilers renders it necessary to restore it by supplying fresh water or preserving the water of condensation and returning it to the boilers, and thus economizing in the water-supply. This latter course is the one almost universally adopted, and to regulate the return of the water of condensation of the generators so that the amount returned shall equal the amount removed by the vaporization (plus the small amount lost by evaporization and the impure water resulting from the condensation of the exhaust-steam) is one of the objects of this apparatus, which I accomplish, as before stated, by the float adapted to be raised and lowered by the increasing and decreasing quantity of the water of condensation to correspondingly increase and decrease the steam-supply to the pump, and thus regulate its speed and the quantity passed through it. The increase of the water thus causes the pump to work faster and supply a greater quantity to the boilers, and the decrease of the water correspondingly decreases the speed of the pump and causes it to supply a less quantity of water to the boilers, the supply thus equaling the extraction by the conversion into steam, and automatically preserving an equilibrium in the generators and securing the best possible results from the operation of the system.

In steam-generating systems in which engines, pumps, and other motors are connected, and in which the exhaust-steam therefrom is utilized for heating and other purposes, much annoyance is encountered and damage done to the generators and piping by the deposit therein of the lubricating-oils carried off by the exhaust-steam, and to remove this oil and fatty matter from the exhaust-steam, while at the same time utilizing the exhaust-steam, as before, is one of the objects of my invention, which consists in an apparatus for collecting it from the surface of the water of condensation of the exhaust-steam. This apparatus consists in arranging in the tank F′, through which the exhaust-steam is conducted, of one or more pipes M′, having flaring mouths M^2, the lowermost edge of the flaring mouths being about on a line with the surface of the water, as shown, so that grease and oil floating on the surface of the water will run into these flaring mouths and be conducted away from the tank by the pipes M′ into a sewer or waste-tank, or into a receptacle provided for that purpose, and prevented from being conducted into the generators or the piping connected therewith. These pipes M′ may be formed of any size, and as many may be employed as may be found necessary.

In the drawings I have shown two of the flaring-mouthed pipes, which will be the number generally employed when the tank F′ is provided with the flues *a*, and thus utilized as a combined tank and heater but; as before stated, any number may be employed.

The pipes M′ will be conducted through steam trap or traps M^3, so that the steam cannot escape therethrough in event of the water being all discharged from the tank and piping, and the outflow regulated so as to preserve a uniform water-line in the tank.

A "by-pass" pipe M^4 is arranged to connect the piping M′ with the escape-pipe M^5 independently of the trap M^3, so that the water containing the oil and grease may be conducted directly into the sewer or waste-tank, if required, or in event of the trap becoming clogged or otherwise inoperative.

N′ represents blow-off pipes by which the water in the tank F′ may be discharged into the sewer or waste-tank when required. P represents a safety attachment or piping connecting the tank F′ at its lower part with the return-main E^3 by running upward at P^2 above the water-line of the tank, and with a small pipe P^3 connected into it above the water-line, so as to enable the steam in the tank above the water-line to enter the pipe P′ and equalize the pressure therein and prevent the piping acting as a siphon and drawing the water from the tank into the return-mains. By this simple device if the water is allowed to rise above the outlet P, it will return into the return-mains E and not overflow into the radiating system or back into the engines or pumps, while at the same time the presence of the equalizing-pipe P^3 prevents the water being drawn into the return-mains.

The tank F′ will be provided with a glass water-gage *g*, (see Fig. 2,) by which the height of the water in the tank may be ascertained at all times.

In the tank F′, opposite the flaring mouths M^2 of the pipes M′, will be arranged curved guide-plates T, adapted to confine the water and cause all of the floating grease and oil to pass into the mouth, and effectually preventing any of the surface water from passing around the mouths, thus insuring the gathering of all the oil and grease from the surface of the water.

The construction of the plates and the action of the flaring-mouthed pipes M^2 are more clearly shown in Fig. 4, which represents a cross-section of the tank at the point where the plates and pipe are inserted.

E^5 represents the connection between the pump and generators, and *h* represents the piping by which the fresh water may be supplied to the generators through the casing H', or at any other suitable point.

G^4 represents a branch having a back-pressure valve G^4, by which means the exhaust-steam may be conducted directly into the atmosphere when not required for heating purposes.

Having thus described my invention, what I claim as new is—

1. In a steam-generating system, the combination, with the generators, pumps, engines, and other apparatus operated by said steam, of a tank through which the exhaust-steam from said pumps, engines, and other motors is conducted and in which the water of condensation is stored, and one or more pipes having flaring mouths in line with the surface of said water and adapted to receive the oil and fatty matter precipitated from said exhaust-steam and conducting it from said tank, and a trap M^3, through which the said water is discharged from said tank and retained at a uniform level therein, substantially as and for the purpose set forth.

2. In a steam-generating system, the combination, with the generators, pumps, engines, and other apparatus operated by said steam, of a tank through which the exhaust-steam from said pumps, engines, and other motors is conducted and in which the water of condensation is stored, safety-pipe P', connected into said tank below the water-line, and with bend P^2 rising above the water-line, and having combined equalizing and overflow pipe P^3 connecting said bend with said tank above the water-line, substantially as and for the purpose set forth.

3. In a steam-generating system, the combination, with the generators, pumps, engines, and other apparatus operated by said steam, of a tank through which the exhaust-steam from said pumps, engines, and other motors is conducted and in which the water of condensation is stored, one or more pipes having flaring mouths in line with the surface of said water and adapted to receive the oil and fatty matter precipitated from said exhaust-steam and conducting it from said tank, a trap M^3, through which said water is discharged from said tank and retained at a uniform level therein, and a by-pass pipe M^4, connecting said piping on each side of said trap, whereby the water may be discharged from said tank without passing through said trap, substantially as and for the purpose set forth.

4. In a high-pressure steam-generating apparatus, the combination, with said generating apparatus, of a radiating supply-piping connected to said generator through a reducing-valve, whereby the pressure in said radiator system is less than in said generator, piping, whereby the exhaust from the engines, pumps, and other motors operated by said high-pressure steam is discharged into said radiating system, tank F', through which said exhaust-steam passes and in which the oil and grease from said exhaust-steam are precipitated, flaring-mouthed pipe or pipes M^3, adapted to receive the said oil and grease from the surface of the water of condensation from said exhaust-steam in said tank and conduct it therefrom, piping connecting said radiating system with said generator through a pump or other means for returning the water of condensation to said generators, an equalizing-pipe E^2, connecting said radiating system with said return-piping through a casing H', and a float within said casing adapted to control the valve through which the supply of the steam to said pump or other motors passes, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWARD HENRY MURPHY.

Witnesses:
O. D. WHEELER,
EVA POPE.