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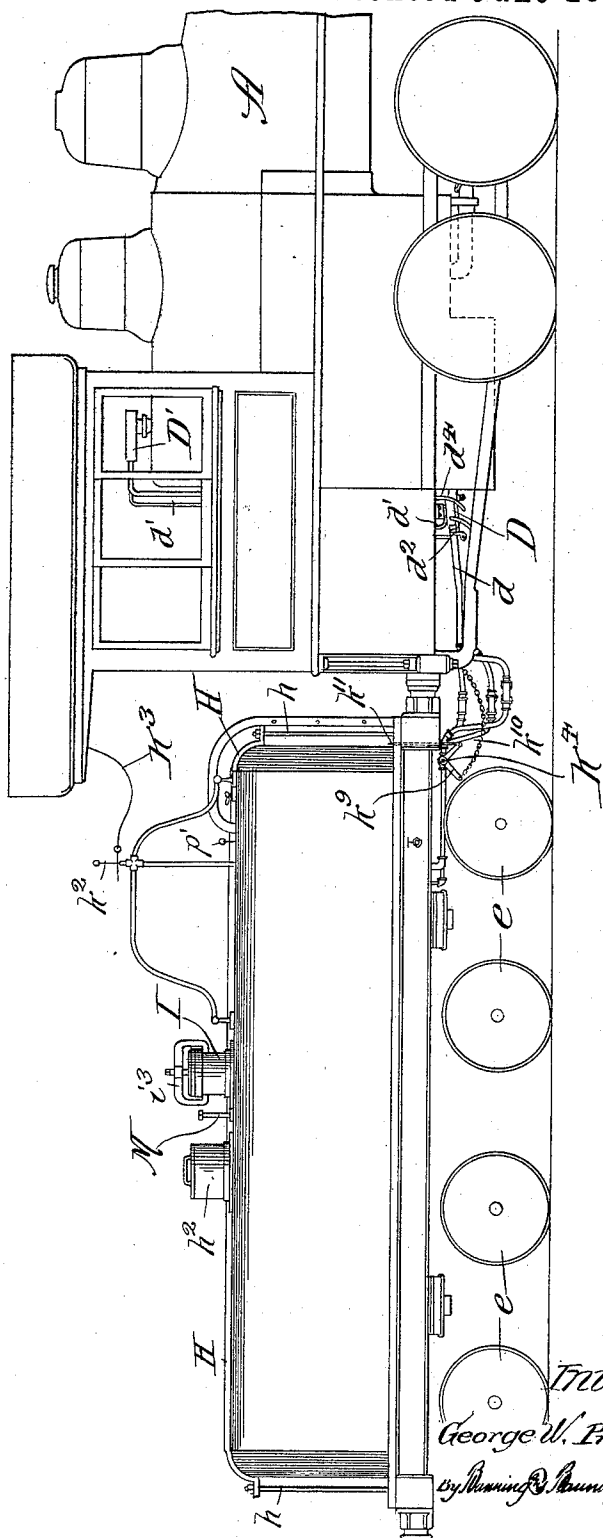
9 Sheets—Sheet 1.

G. W. PRESCOTT.
OIL BURNING LOCOMOTIVE.

No. 606,237.

Patented June 28, 1898.

Fig. 1.



Witnesses:
C. E. Gaylord,
L. W. Allen

Inventor:
George W. Prescott,
By Manning & Manning, Attys.

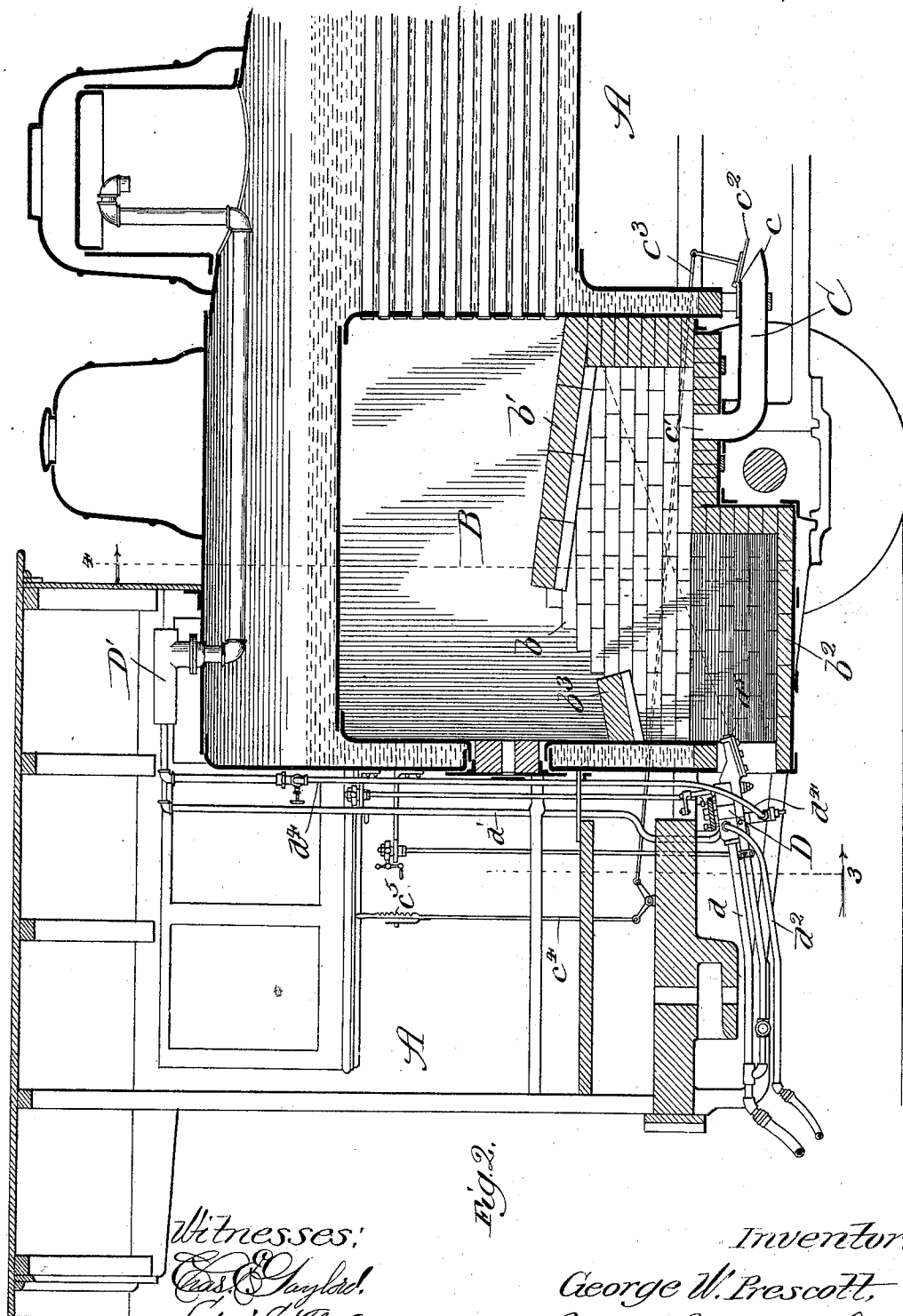
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No. 606,237.

Patented June 28, 1898.



Witnesses:
Eas. Gaylord!
Lute J. Allen

Inventor
George W. Prescott,
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(No Model.)

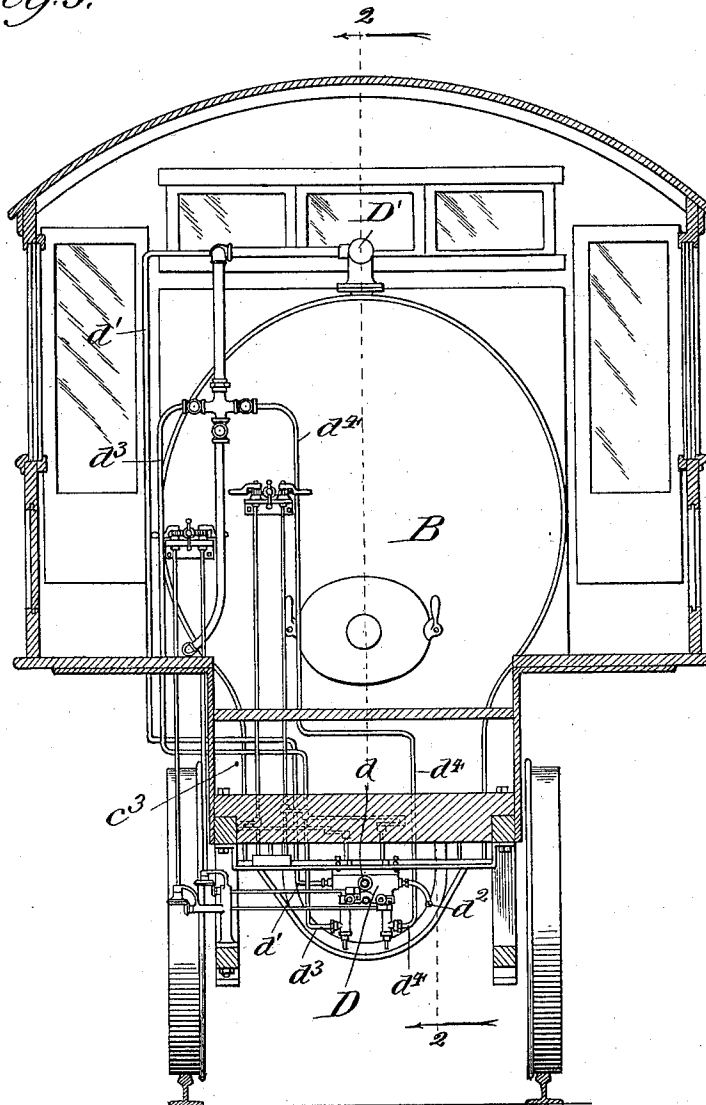
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Fig. 3.



Witnesses:

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(No Model.)

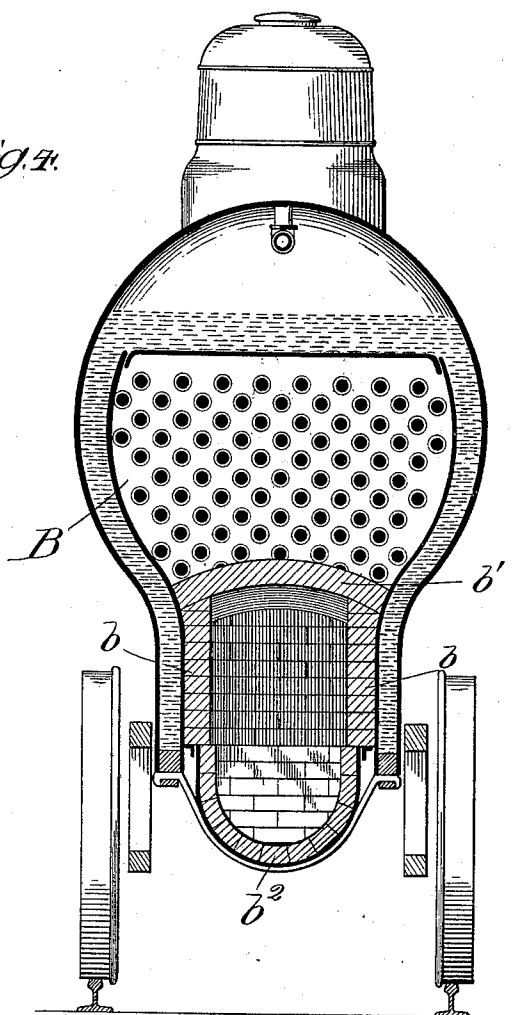
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Patented June 28, 1898.

Fig. 4.



Witnesses:
Carl C. Gaylord,
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(No Model.)

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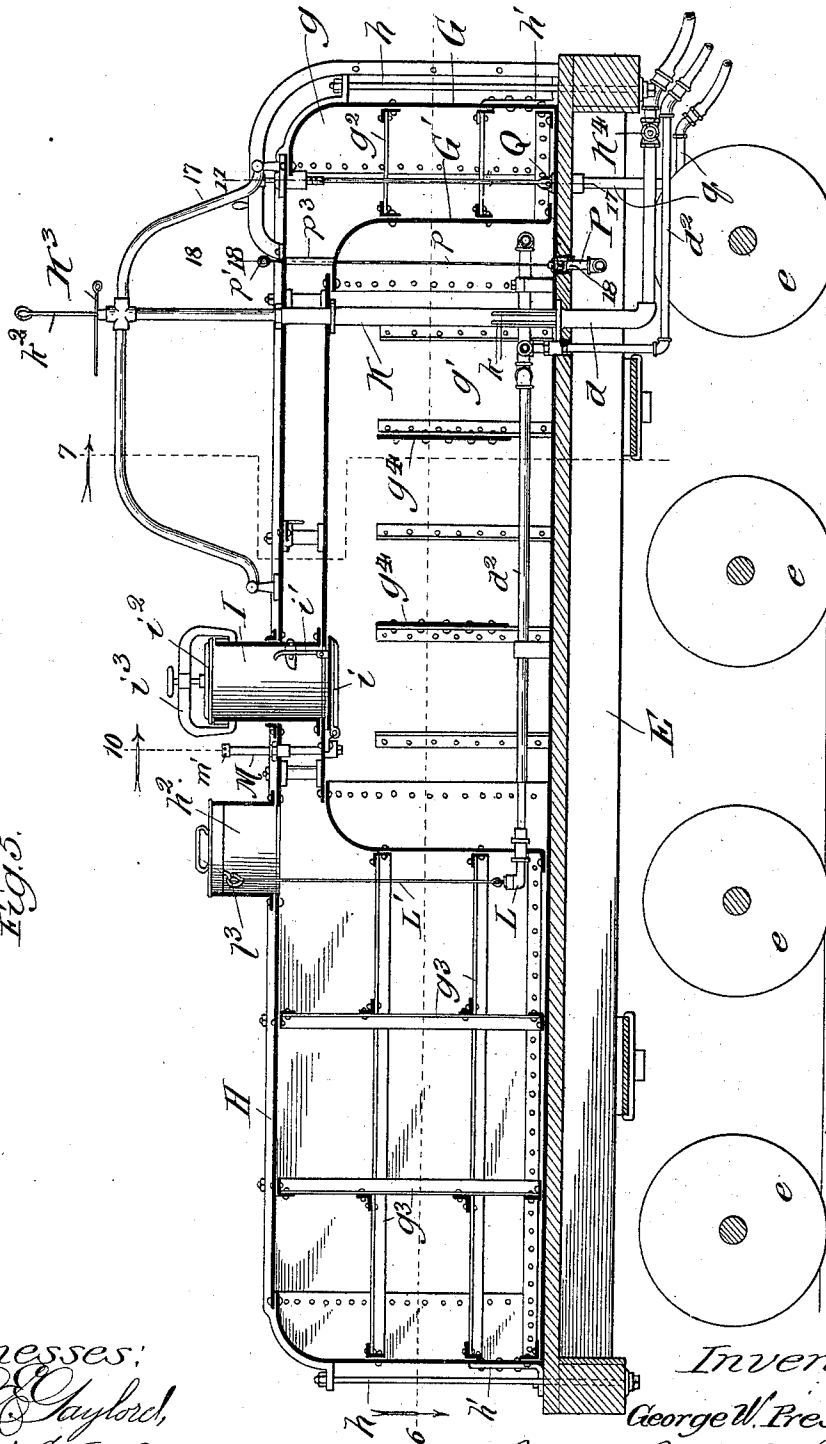


Fig. 5.

Witnesses:
E. C. Gaylord,
Lute S. Hall.

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(No Model.)

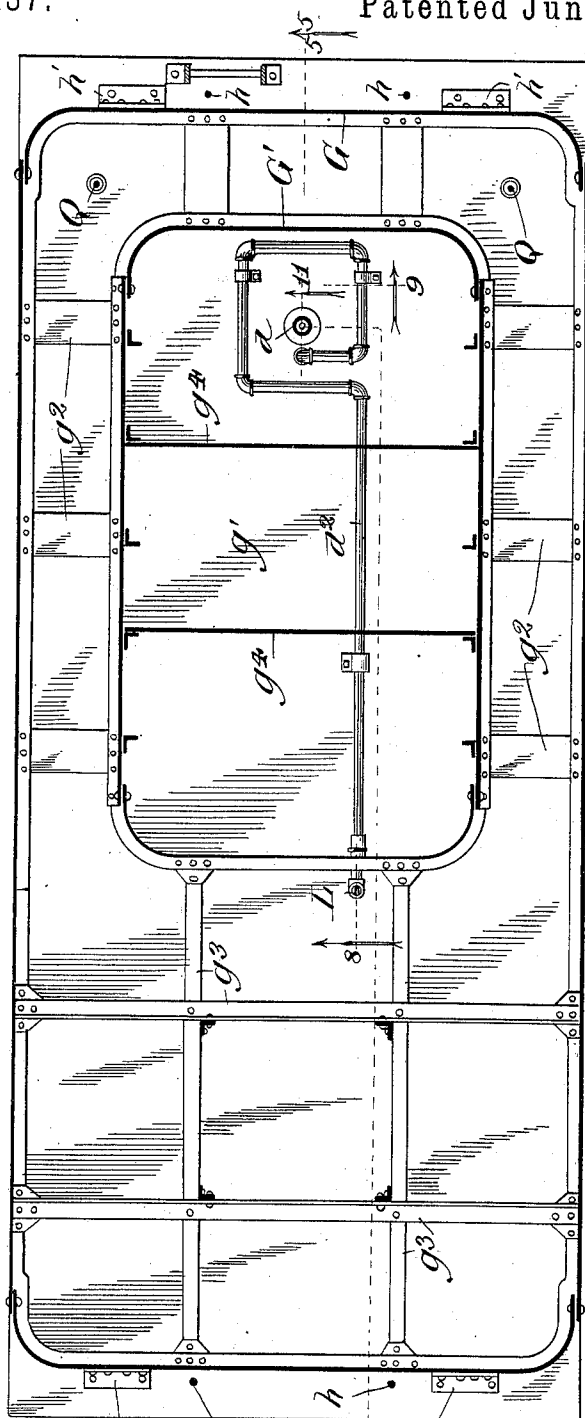
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G. W. PRESCOTT.
OIL BURNING LOCOMOTIVE.

No. 606,237.

Patented June 28, 1898.

Fig. 6.



Witnesses:
C. S. Gaylord,
Lute J. [unclear]

Inventor:
George W. Prescott,
By [unclear] [unclear] [unclear] [unclear] [unclear]

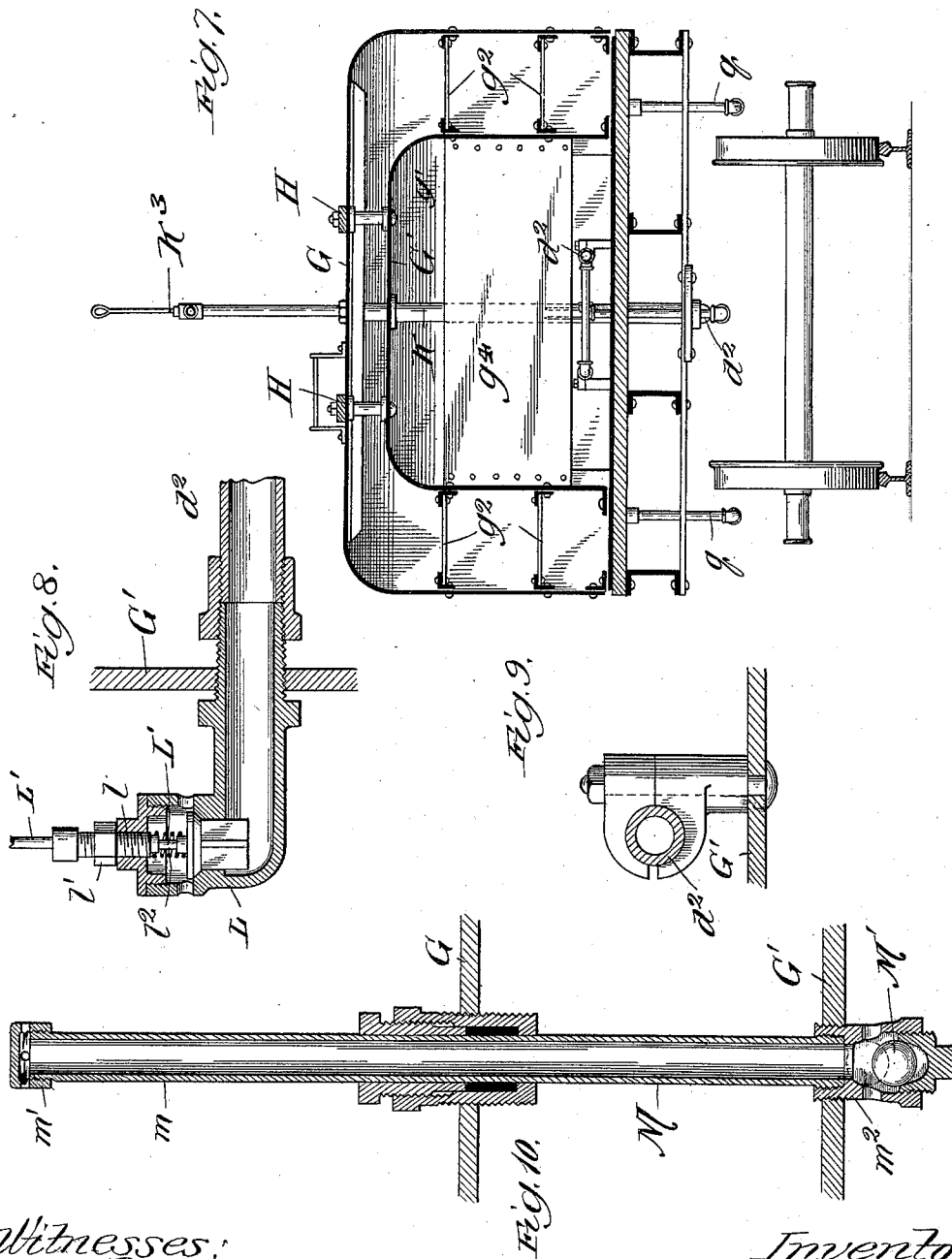
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G. W. PRESCOTT.
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No. 606,237.

Patented June 28, 1898.



Witnesses:

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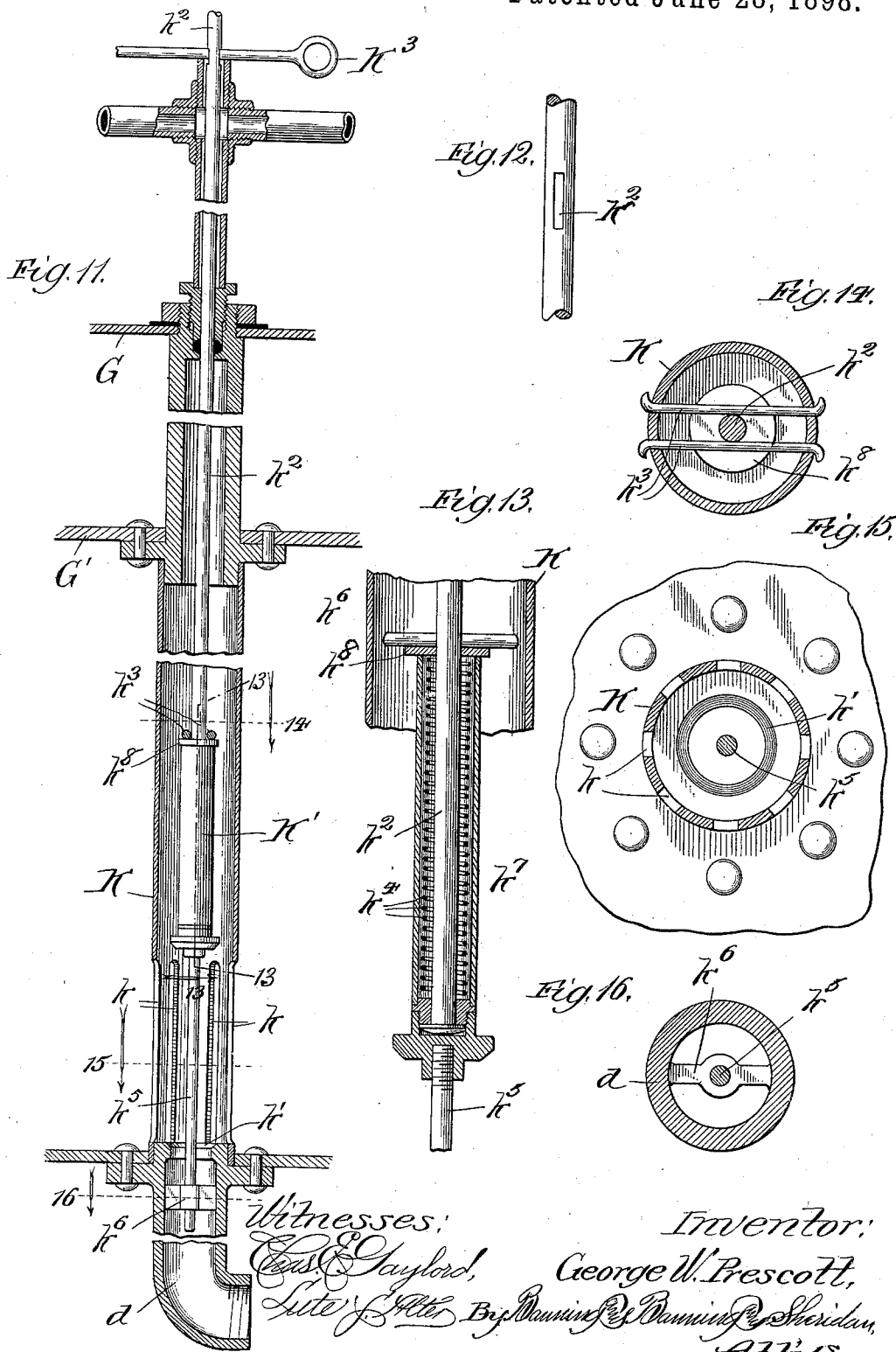
(No Model.)

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G. W. PRESCOTT.
OIL BURNING LOCOMOTIVE.

No. 606,237.

Patented June 28, 1898.



(No Model.)

G. W. PRESCOTT.
OIL BURNING LOCOMOTIVE.

9 Sheets—Sheet 9.

No. 606,237.

Patented June 28, 1898.

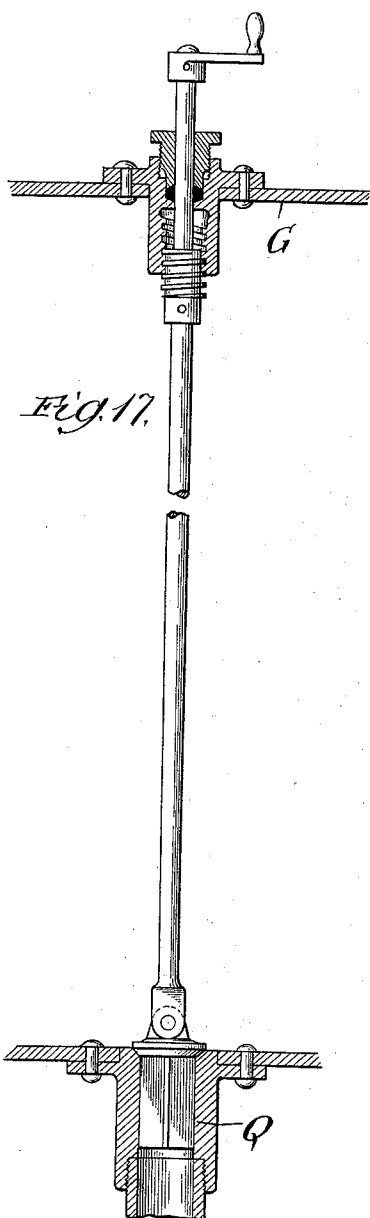


Fig. 17.

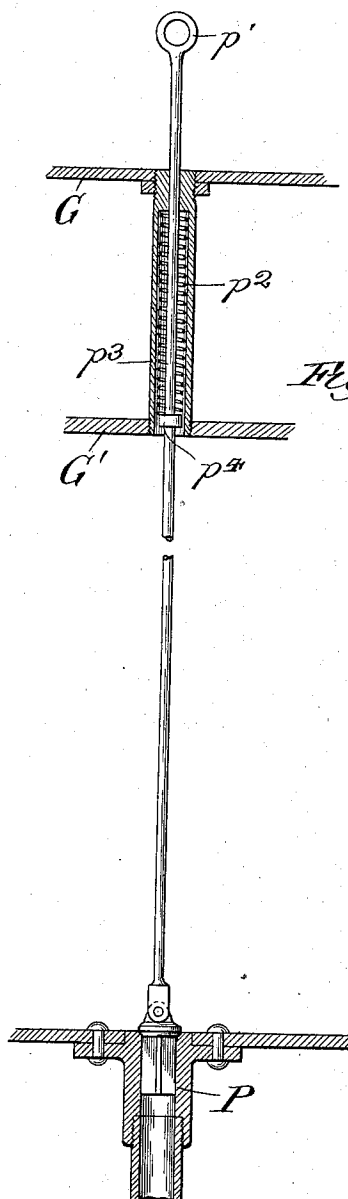


Fig. 18.

Witnesses:
Edw. G. Taylor,
John S. Allen

Inventor:
George W. Prescott,
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UNITED STATES PATENT OFFICE.

GEORGE W. PRESCOTT, OF HIGHLAND, CALIFORNIA.

OIL-BURNING LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 606,237, dated June 28, 1898.

Application filed December 14, 1896. Serial No. 615,575. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. PRESCOTT, a citizen of the United States, residing at Highland, San Bernardino county, California, have invented certain new and useful Improvements in Oil-Burning Locomotives, of which the following is a specification.

The object of my invention is to provide a simple, economical, and efficient locomotive-engine particularly adapted for the burning of hydrocarbon oils; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a portion of the locomotive and tender fitted with my improvements; Fig. 2, a sectional elevation of a portion of the locomotive, taken on the lines 2 2 of Fig. 3; Fig. 3, a transverse sectional elevation taken through the cab on line 3 of Fig. 2; Fig. 4, a transverse sectional elevation of the locomotive fire-box, taken on line 4 of Fig. 2; Fig. 5, a longitudinal sectional elevation of the tender, taken on line 5 of Fig. 6; Fig. 6, a plan sectional view of the tender, taken on line 6 of Fig. 5; Fig. 7, a transverse sectional view of the tender, taken on line 7 of Fig. 5; Fig. 8, an enlarged sectional view of the valve for supplying steam to the water, or vice versa, taken on line 8 of Fig. 6; Fig. 9, an elevation of one of the supporting-studs, showing the pipe partly in section, taken on line 9 of Fig. 6; Fig. 10, an enlarged vertical sectional elevation of the vent-tube and valve, taken on line 10 of Fig. 5; Fig. 11, an enlarged vertical sectional elevation of the oil-feed valve, taken on line 11 of Fig. 6; Fig. 12, an enlarged view of the upper portion of the valve-rod; Fig. 13, an enlarged sectional view of the lower portion of the valve-rod and other parts, taken on line 13 of Fig. 11; Fig. 14, an enlarged plan sectional view taken on the line 14 of Fig. 11. Figs. 15 and 16 are similar views taken on the lines 15 and 16 of Fig. 11; Fig. 17, an enlarged vertical sectional view taken on line 17 of Fig. 5, showing the feed-water valve; and Fig. 18, an enlarged broken vertical sectional view of the water-draw-off valve, taken on line 18 of Fig. 5.

In illustrating and describing my improvements I will illustrate only that which I consider to be new in connection with so much

of the mechanisms as are old as will enable those skilled in the art to make and practice the invention, leaving out of consideration the mechanisms which are well known in the art, so as to avoid confusion or ambiguity.

In constructing a locomotive and tender in accordance with my improvements I use a locomotive A and provide it with a fire-box B. The fire-box is arranged in the usual portion of the locomotive, and in order to adapt it for the economical combustion of liquid or comminuted hydrocarbons of all kinds I provide the fire-box with a lining *b*, formed of refractory material, preferably fire-brick. The upper portion of the fuel-chamber is provided with an arched roof *b'*, as shown in Fig. 4, and forms a portion only of the roof, while the bottom or lower portion *b²* is oppositely curved. By making the lower and upper portions of the fire-box in oppositely-formed arches I practically do away with all sharp corners, so as to interfere as little as possible with the development of the flames, and at the same time permit of an arrangement of the interior lining so that it may be readily locked in position or prevented from displacement during the operation or running of the locomotive, especially when the walls are subjected to high temperature. I further provide the rear jacket of the fire-box with a deflecting relatively lower arch *b³*, that forms a portion of the roof and acts to force the distilled gases into contact with the incoming air and ignited gases and perfect its combustion; otherwise such gases would be liable to be broken up, the carbon liberated, and smoke formed, which would interfere largely with the economy of combustion.

To admit the proper amount of atmospheric air and its oxygen into the furnace to support combustion, I provide the bottom portion with a right-angular pipe C and arrange its open end *c* toward the front of the fire-box, while its inner or educt opening *c'* is arranged so as to lead the air in at a point in the bottom of the fire-box where it will be freed to readily mix with the atomized oil or distilled gases, and thus support combustion in the most economical manner. The inlet-opening of this air-pipe is provided with a swinging door *c²*, having lever and rod connections *c³* with a handle *c⁴*, which is arranged in convenient position in the cab, the upper portion of the handle being provided with suitable adjust-

ing and retaining mechanism c^5 , by which the position of the door and the size of the opening may be regulated.

To supply the requisite amount of liquid hydrocarbon to the fire-box or fuel-chamber economically and efficiently, I provide a burner D, which is arranged at the lower portion of the rear jacket. This burner is provided with an oil-supply pipe d , which leads to and is connected with the oil-chamber of the tender, hereinafter described.

It is well known, especially in this country, that the use of locomotives in different sections of the country is such that at one time it is in a comparatively warm climate and at another in a comparatively cold climate. This is particularly the case during the late fall months or early spring. Provision must be made, therefore, by which the oil in the burner should be maintained as nearly as possible at a predetermined temperature to prevent the forming of unnecessary gas or prevent the oil from congealing. In order to accomplish this result, I provide a steam-supply header D' and connect it by means of a supply-pipe d' to a chamber of the burner that surrounds the oil-chamber. The details of construction of the burner-chamber I will not in this specification describe and claim, preferring to leave this for a subsequent application, in which I will describe and claim it broadly. I connect the burner with a second pipe d^2 , that is led back through the oil-chamber of the tender and connects with the water-space of the tender, so that at times a supply of steam may be furnished the burner to keep the oil up to a predetermined temperature, and when the surrounding atmosphere is warm the steam may be shut off and a supply of water furnished to the burner to provide for a lower temperature. In Fig. 6 I have shown the pipe d^2 as leading in through the oil-space of the tender and surrounding the outlet or supply pipe d back into the water-space of the tender. The oil-burner is further provided with two pipes d^3 and d^4 , that lead to each side of the burner and connect it with the steam-head, so that such steam may be used in the burner for the purpose of atomizing the oil as it flows over the end d^5 of the burner. The outlet for the steam is at the lower portion of the front end of the burner, and the oil flows over the upper portion of the front end, so as to be contacted by the steam, atomized, and driven forward against the front portion of the wall, as indicated by the dotted lines. While it is being driven forward it mingles with the incoming air, and when ignited combustion takes place.

In constructing the tender in accordance with my improvements I provide the usual platform E, supported in the usual way by means of the wheels e . On the upper portion of the platform is secured a tank for holding the water and the oil. This tank is formed of an outside casing G and an inner casing G'. The space g between the inner and outer cas-

ing I use for holding water, while the central space g' , which is inclosed by the inner casing, I use for the purpose of holding the oil. These casings are preferably formed of metal and are spaced apart and braced by means of stays g^2 and braces g^3 .

In order to hold the tank down firmly in connection with the platform of the tender and prevent its displacement at all times, I provide two straps H, that are passed longitudinally over the upper portion of the casing, and secure them by means of bolts h to the front and rear sills. The lower portions of the front and rear of the casing are provided with lugs h' , which are also securely bolted to the respective sills, thus at all times insuring a safe engagement of the tank with the truck, which will prevent the oil from running over the ground and taking fire. The oil-chamber is provided with transverse sheets g^4 , that are vertically disposed and so placed in the oil as to prevent splashing or minimize the disturbance of the oil due to sudden stoppage or starting of the locomotive. The oil-chamber is provided with a filling-tube I, which passes through the water-space and has its lower portion or opening in the upper wall of the oil-chamber provided with a door i , held in place by means of a latch i' . The upper portion of it is provided with a cover i^2 , held in place by means of a bridge i^3 , both of which are so arranged and constructed as to be oil-tight. The water-tank is provided with the usual filling-tube and cover h^2 . The advantages of this specific structure of tender are such that the oil is incased, as it were, in a body of water, so that the effect of the surrounding atmosphere is prevented from affecting the oil until it has passed through the water, which forms largely an insulating medium and materially assists in keeping the oil at a determined temperature.

To furnish the oil-supply pipe with its requisite amount of oil, I provide a tube K and support it in desired vertical position around the inlet of the supply-pipe, preferably between the upper and lower walls of the oil-chamber. This pipe is provided with vertical slots or openings k , through which the oil must enter before entering the supply-pipe, and such slot acts as a guard to prevent large pieces of sediment or fibrous material from entering the supply-pipe and clogging the same. By making these slots or openings of a considerable length I furnish means, as it were, to prevent or minimize the danger of clogging—that is, small pieces of fibrous material will usually flow on the upper portion of the oil, so that oil may pass under and over and enter the pipes. The inside of this pipe, or, more properly speaking, the inlet-opening of the supply-pipe, is provided with a valve-seat k' , and the tube K is provided with a vertically-movable valve K', having its rod portion k^2 extending out through the upper portion thereof, so that it may be readily reached by the attendant to open the valve.

The inner portion of the tube is provided with transverse rods k^3 , and between such rods and the valve is inserted a helical coiled spring k^4 , so that the normal tendency of the valve is toward a closed position to prevent the out-flow or supply of the liquid from entering the burner or being distributed on the ground, as the case may be. The lower portion of the valve is provided with a stem k^5 , which passes through suitable bearings k^6 , and thus assists in the proper positioning of the valve. The valve is provided with a tube k^7 , that surrounds the helical coiled spring to prevent its displacement, while between the helical spring and the transverse rods is a loose washer k^8 .

It is desirable at times to prevent the liquid hydrocarbon from leaving the supply-chamber. Especially is this true if an accident should occur, so that the danger from fire may be minimized. In order to provide means for accomplishing this result, I provide the upper part of the valve-rod with a perforation or opening K^2 , in which a key or pin K^3 may be inserted. The pin is connected with some portion of the locomotive by means of a cable, wire, or chain. I further provide the supply-pipe with a valve K^4 , which has bell-crank levers k^9 , one of such levers being connected with some portion of the locomotive by means of a chain or similar device k^{10} , the arrangement being such that if the tender or locomotive tip over or become separated the pin is pulled out and the valve K^4 turned to its closed position, thus preventing the oil from leaving the tank. As abovestated, the valve K^4 is provided with bell-crank-lever arms, one of which is provided with a vertical pin k^{11} , that extends above the floor of the tender, so that by pressing the same the attendant may open the valve the required amount.

As hereinbefore stated, it is found desirable to use steam or water in connection with the burner and the oil-tank, so as to provide for as near a uniform or predetermined temperature as possible. In order to accomplish this result as economically as possible, the pipe d^2 , which supplies steam or water for this purpose, is provided at the end in the water-supply reservoir with a valve L of the fluted type. This valve is given the desired tension by means of a set-screw l , jam-nut l' , and a helical spring l^2 , which is interposed between the set-screw and the fluted valve. It will be seen, therefore, that the pressure of the valve may be regulated to any desired extent, so that if a pressure of twenty pounds of steam is necessary to keep the oil from congealing the valve will resist all pressure up to that amount, while an excess of pressure above that amount will open the valve and permit the steam to escape into the water. The valve is provided with a stem or rod L' , that is led up to and which may be connected with a hook l^3 , so that if it be desired to furnish a supply of water to lower the temperature of the oil the steam may be shut off in

the engine-cab and the rod held in the position shown in Fig. 5. This opens the valve and allows a supply of water to flow back through the pipe and in the oil, and thus assist in lowering the temperature of the oil in the tank and in the burner.

At times it is well known that a certain amount of gas will form from the oil or that the oil in flowing out will need the assistance of the atmospheric pressure. In order to provide for the escape of gas, the necessary supply of atmospheric pressure, and prevent oil from escaping should the tender tip over, I make a tube M and arrange it in the upper portion of the oil-chamber, so that its upper end m extends out into the air. The upper portion of the tube is provided with a perforated cap m' and the lower portion with a perforated valve-casing m^2 . When the tender is in its normal position, the parts occupy the relative positions shown in Fig. 10, in which it will be noticed that a ball M' is so arranged as not to interfere or obstruct the passage of gas into the open air or the inflow of atmospheric air. Should the tender be tipped over, however, the ball will roll into the position shown in dotted outline, Fig. 10, and prevent the outflow of the oil.

It is well known that some of the oils of commerce, especially those used for fuel purposes, have a small quantity of moisture therein, which is liable to settle and would naturally be drawn off into the burner to interfere with the combustion. In order to provide for the drawing off of this water I provide a draw-off valve P and arrange it in the lower portion or floor of the oil-chamber. This valve is provided with a stem or rod p , which extends up above the upper portion of the tender and is provided with a handle or similar portion p' . A helical coiled spring p^2 is arranged in a tubular casing p^3 between the walls of the water and oil chambers and abuts against a shoulder p^4 of the valve-rod, so as to act to normally keep such rod closed at all times. In examining Fig. 11 it will be seen that the lower portions of the openings k of the oil-supply tube are arranged slightly above the bottom of the oil-supply tank. This arrangement is for the purpose of allowing a small portion of water to accumulate in the bottom and not be drawn into the supply-pipe. This water may be drawn off through the valve above described whenever the attendant thinks there is sufficient quantity in the tank to necessitate the drawing off of the same.

In Fig. 17 I have shown the valve Q , that is connected with the pipe q , that leads to the water-injector, so as to furnish the boiler with its proper supply of water. This valve is of an old and well-known form in common use and needs no particular description here.

While I have described my invention with more or less minuteness as regards details and as being embodied in certain precise forms, I do not desire to be limited thereto

unduly or any more than is pointed out in the claims. On the contrary, I contemplate all proper changes in form, construction, and arrangement, the omission of immaterial elements, and the substitution of equivalents as circumstances may suggest or necessity render expedient.

I claim—

1. In mechanisms of the class described, the combination of a locomotive provided with a fire-box, a lining of refractory material in the fire-box, an arched upper roof covering a portion of the front of the fuel-chamber, a relatively lower roof covering a portion of the rear of the fuel-chamber, a hydrocarbon-fuel burner arranged in the lower portion of the rear wall of the fire-box so as to direct the fuel across the fire-box and against the front wall thereof, and a right-angular pipe or passage arranged with its inlet-opening toward the front end of the locomotive and connected with the fire-box in the front portion thereof, so as to admit air at substantially right angles to the injection of the fuel, substantially as described.

2. In mechanisms of the class described, the combination of a locomotive provided with a fire-box or fuel-chamber, a liquid-hydrocarbon burner arranged in such fuel-chamber, a tender provided with an oil-supply reservoir and a water-reservoir, an oil-supply pipe connecting the burner with the supply-chamber, a steam-pipe leading from the source of steam-supply to and around the burner and to the source of water-supply, a valve on said steam-pipe to govern the admission of steam and a second valve on said pipe arranged in the water-supply chamber, whereby steam or water may be sent through such pipe for the purposes described, substantially as described.

3. In mechanisms of the class described, the combination of a locomotive provided with a fire-box or fuel-chamber, an oil-burner arranged in such chamber, a tender provided with an oil-reservoir, an oil-supply pipe connecting the oil-reservoir with the oil-burner, a vertical perforated tube surrounding the inlet of the oil-supply pipe in the oil-chamber, a vertically-movable valve in the vertical tube, a helically-coiled spring for normally holding the vertically-movable valve closed, a pin for holding the vertically-movable valve in its open position, and means for connecting the pin on the vertically-movable valve with the locomotive so that when the normal relation of the tender and locomotive is disturbed the pin is withdrawn and the valve closed, substantially as described.

4. In mechanisms of the class described, the combination of a locomotive provided with a fire-box or fuel-chamber, an oil-burner arranged in such chamber, a tender provided with an oil-reservoir, an oil-supply pipe connecting such reservoir with the oil-burner, a vertical perforated tube surrounding the inlet of the oil-supply pipe in the oil-chamber, a vertically-movable valve in the vertical

tube, a helically-coiled spring for normally holding said vertically-movable valve closed, a pin for holding the vertically-movable valve in its open position, means for connecting the pin on the vertically-movable valve with the locomotive, a supply-valve in the oil-supply pipe, and means connecting the supply-valve on the supply-pipe with the locomotive, so that when the normal relation of the tender and locomotive is disturbed such mechanisms are operated and both of the valves closed, substantially as described.

5. In mechanisms of the class described, the combination of a locomotive provided with a fire-box or fuel-chamber, an oil-burner in such chamber, a tender provided with a water-reservoir and an oil-reservoir, an oil-supply pipe in the oil-reservoir and connected with the oil-burner, a steam-supply pipe leading from a source of steam-supply arranged contiguous to the oil-supply pipe through such reservoir and having its open end arranged in the water-supply chamber, and means for admitting either steam or water into such steam-supply pipe as desired, substantially as described.

6. In mechanisms of the class described, the combination of a locomotive provided with a fire-box or fuel-chamber, an oil-burner in such chamber, a tender provided with a water-reservoir and an oil-reservoir, an oil-supply pipe in the oil-reservoir and connected with the oil-burner, a steam-supply pipe leading from a source of steam-supply around the burner to the oil-reservoir, around the oil-supply pipe and through such reservoir, and with its open end arranged in the water-supply chamber, and means for admitting either steam or water into such steam-supply pipe as desired, substantially as described.

7. In mechanisms of the class described, a tender providing an oil-reservoir, a water-drip valve arranged flush with the bottom of the oil-receptacle, and an oil-supply valve in the lower portion of the oil-supply chamber with its inlet-opening arranged slightly above the bottom portion thereof, substantially as described.

8. In mechanisms of the class described, a tender in which there are combined inner side walls and cover to provide an oil-receptacle, a water-drip valve arranged with its inlet-opening flush with the bottom of the oil-receptacle, an oil-supply pipe with its inlet-opening arranged in such oil-reservoirs slightly above the bottom portion thereof, and a combined air and gas vent arranged in the upper portion of the oil-receptacle with an automatic valve so that when the normal position of the tender is disturbed such valve will be automatically closed and oil prevented from escaping therefrom, substantially as described.

GEORGE W. PRESCOTT.

Witnesses:

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