

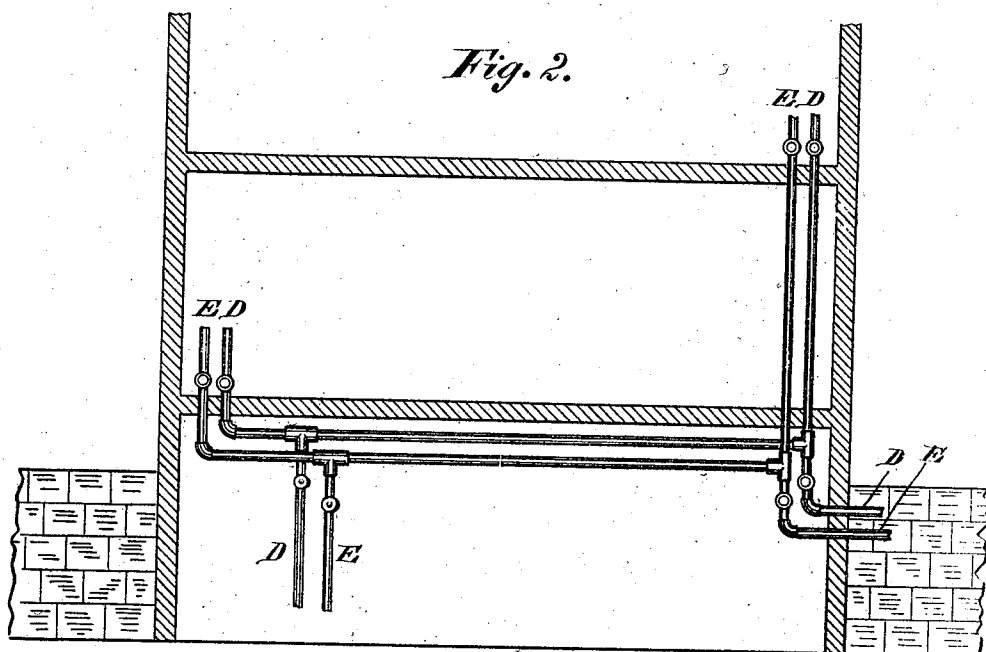
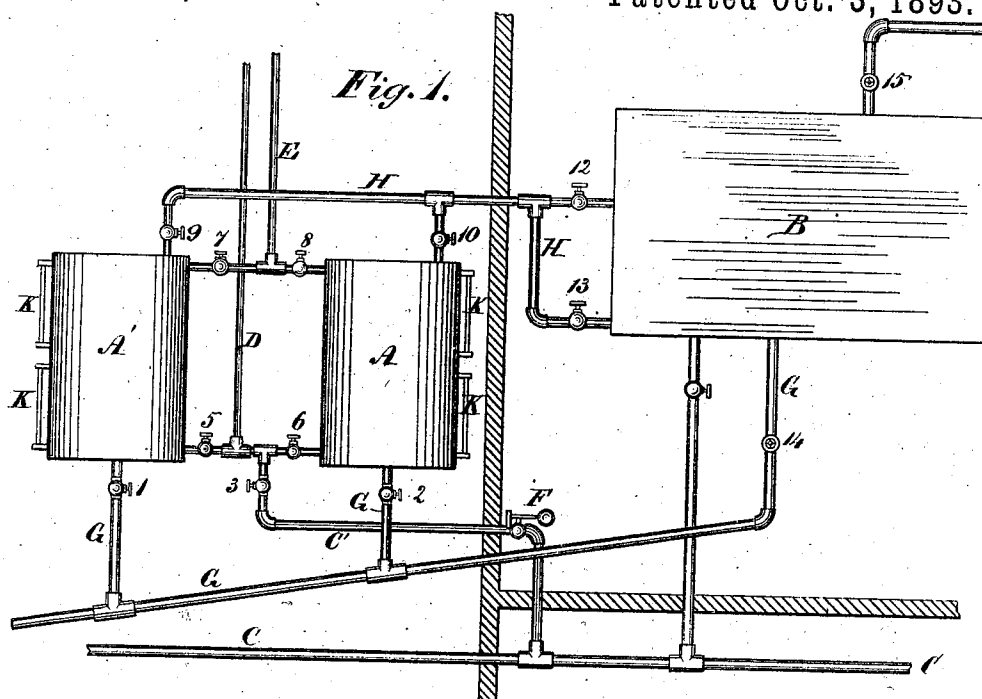
(No Model.)

H. H. BAILEY.

APPARATUS FOR FEEDING HYDROCARBON OR OTHER OILS INTO
STOVES, FURNACES, &c.

No. 505,871.

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UNITED STATES PATENT OFFICE

HORACE H. BAILEY, OF OTTAWA, CANADA.

APPARATUS FOR FEEDING HYDROCARBON OR OTHER OILS INTO STOVES, FURNACES, &c.

SPECIFICATION forming part of Letters Patent No. 505,871, dated October 3, 1893.

Application filed June 12, 1890. Serial No. 355,166. (No model.)

To all whom it may concern:

Be it known that I, HORACE HENRY BAILEY, a citizen of the Dominion of Canada, residing at Ottawa, in the county of Carleton, in the Province of Ontario, Canada, a subject of the Queen of Great Britain, have invented certain new and useful Improvements in Apparatus for Feeding Hydrocarbon or other Oils into Stoves, Fireplaces, Furnaces, Retorts, &c., for Heating and Lighting Purposes, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters and numerals of reference indicate corresponding parts in all the figures.

Figure 1 is an elevation, partly sectional, of a device embodying my invention. Fig. 2 is a like view from a different point of position, showing the system of oil and water pipes in a part of a building, the said oil and water pipes being similar to the ordinary water or gas pipes used in the usual house water supply or gas lighting systems, and having the like connections and accessory valves, joints, elbows and pipes.

The object of my invention is to feed or force hydrocarbon or other oils into a stove, fireplace, grate, furnace, or retort, so as to overcome the defects heretofore encountered in attempting to feed oil by gravitation, suction, or pumping.

Heretofore when the water and oil such as crude petroleum or other like substances have been burned together for heating and lighting purposes, too much back pressure from the retort, or place of combustion back upon the reservoir through the feed of the oil, has been encountered, and too strong odors have arisen, which together with other well known disadvantages incident to these contrivances, have rendered them extremely objectionable. In my invention the attempt is made to overcome every objection to the use of hydrocarbon or other oils in this connection for heating and lighting purposes; and is more especially useful as rendering the combustion of hydrocarbon or other oils with water as a substitute in heating and lighting for coal or other fuel.

My invention is equally adapted for heat-

ing and lighting on board of steamships or dwellings and other buildings and the construction shown prevents the escape of odors as well as the back pressure from the burner, back upon the reservoir through the feed, as well as removing all the other objectionable features in analogous apparatus which have been found to be defective.

In using my invention no odors escape into any room or compartment which is desired to be either heated or lighted or both; nor does any odor arise or evaporation take place from the stored oil should the character of the building, the rooms, or the compartments desired to be either heated or lighted require the storage of a quantity of the crude petroleum or other such oil as for instance in a steamship or other vessel equipped with my apparatus, or in case it is desirable to apply the apparatus to heating and lighting a city or town, in which case it might be deemed expedient to store enough oil to last for some time. It will be observed, that the oil is always closely covered so as to prohibit the access thereto of air as the oil is continually, from the time of its being placed in the reservoir to during its flow to the place where it is consumed by combustion in the retort or burner, inclosed in air tight receptacles; first in the storage or supply reservoir and pressure tanks, and, second, in the pipes between the reservoir and tanks and the retorts or burners as will be hereinafter more clearly set forth. By the constructions shown in the drawings and to be hereinafter described there is no friction to impede the free passage or flow of the oil nor any liability of its stiffening or becoming clogged while being fed to the place of combustion, and the act of combustion, as is liable to happen and, in fact, has happened in those constructions when pumps have been employed to force the oil to the retort or burner, it having been found in such devices that the action of the oil on the valves and plungers of these pumps has been such as to produce certain chemical and mechanical changes in the material of the parts of such pumps, thereby rendering them useless after a certain period of time, as well as to effect the deposition of particles or layers of thickened oil and sediment about the valves, plungers and like fixtures of such

pumps whereby has arisen much detriment to their usefulness for this purpose of pumping oil. In like manner the feeding pressure for the oil to the retort or burner does not depend upon placing the oil supply reservoir at a higher level than the retort or burner or the place of combustion, or upon a gravity feed pressure as it has been found that no sufficient degree or strength of such pressure can in this manner be produced as the action of gravity simply, is not enough to overcome the back pressure from the retort or burner. By the arrangement of my apparatus I obtain a hydraulic feeding pressure in the tanks or cylinders and this is much greater than the back pressure from the retort or burner can possibly be.

The invention consists in the construction and combination of the various parts of the apparatus as will be hereinafter fully described and pointed out in the claim.

In the drawings, A, A', are pressure tanks constructed of suitable material and of sufficient strength to withstand a desired pressure; B, an oil supply or reservoir for storage purposes and may be placed in an outer building or other convenient place and should be constructed of suitable material to hold oil, or water, and be gas proof or of sufficient strength to prevent odor arising from the oil. This reservoir preferably should not be located below the pressure tanks A, A', as otherwise it will be necessary to raise the oil in the reservoir by causing water to flow into the reservoir by means of a pump or other equivalent device such as the corporation water pressure in a city or town, or by the displacement pressure of the hull of a ship where practicable, or by a hydraulic ram or by the water of a stream running from a higher to a lower level, the same being done to raise the oil in the reservoir to the required higher level as such oil floats on the water since its specific gravity is less than that of the water. The object of the oil being raised to the higher level just mentioned is to allow of its being drawn in to the pressure tanks, A, A', as will be hereinafter more clearly set forth.

The outlet pipe, H, from reservoir, B, should extend to near its bottom if it is on a level or higher than the pressure tanks, A, A', leaving a distance of level between the attachment of the pipe to the reservoir and the bottom or lowest level of the reservoir so that a layer of water of that thickness may always be in place at the bottom of the reservoir to receive any dirt, sand or other settleings or impurities which are drawn off with the water, when it is emptied from the reservoir preparatory to refilling it with oil. It is to be observed that by this arrangement the reservoir, B, is never completely filled with oil and it is also to be remembered that the oil should never be completely drawn from the upper level or top of the same.

C is a water pipe connected with a water system or a force pump by or from which the

pressure in the tanks, A, A', is attained and water supplied to reservoir, B, when it is desirable to do so, as hereinbefore explained.

E, is a small oil conduit or pipe connecting the tanks at the top and having a T-shaped connection and a single pipe leading off to any desired place. Said pipe, E, may have as many branches as there are fires to feed, for the purpose of conveying oil to any stove or stoves, fireplace, grate, retort or retorts, furnace or furnaces, some of which may be located in the top of a building and others in the basement or an adjoining building, or if the apparatus be set up to supply a city or town this pipe, E, may be laid in the street as a main, allowing the branches to extend to the different parts of the city or town. The oil being under a high pressure is forced through the pipe, E, and its branches if any are attached to it, to any required distance. D, is a small water main pipe connecting the bottom of the tanks, A, A', and having similar connections to pipe, E, for the purpose of conveying water to any stove, furnace, fireplace, grate, retort, &c., the water being under the same high pressure as the oil and is forced through the pipes any distance or elevation required, the same as the oil is also forced.

F is a safety overflow valve of any well known construction for regulating the pressure in tanks, A, A', and consequently in the oil and water feed pipes, E, D.

G, G, are waste pipes leading from the bottom of the tanks, A, A', and reservoir, B, to the sewer or underdrain or other out of the way place. The pipe, H, leads from the oil well or reservoir, B, to the tops of the tanks, A, A', for the purpose of filling said pressure tanks, A, A'. K, K, K, are gage glasses for the purpose of distinguishing at sight the quantity of oil and water in the tanks, A, A'. All of said pipes are suitably provided with valves for regulating the flow through the system and for the purpose of controlling the oil and water as hereinafter set forth.

The operation of my invention is as follows: First, letting it be supposed that the tanks, A, A', and the reservoir or supply, B, are full of oil of any kind, suitable for the object for which my invention is intended above the water at the bottoms of the same, and that all the valves are closed, valve 7 in pipe, E, is opened and thereby a free passage made through which the oil may flow from the top or highest level of the tank, A', through pipe, E, and all of its branches or any of them to the place where it is to be consumed by combustion as set forth, or to this actual combustion, or to the feed valve located in this pipe or any of its branches at a point near any stove, grate, fireplace, retort, or furnace, or other contrivance suitable to this combustion or generation of gas as the case may be. Valve 5 in pipe D, is then opened and thereby a free passage for the water is then made from the bottom of the tank, A', and through pipe, D, and its branches, if there be any, it

being understood that the ramifications of the corporation water system in cities or towns may be substituted for the branches of the pipe, D, when it is convenient to do so. The water is thus allowed a free passage through the valve, 5, and its necessary pipe any distance to a feed valve located in this pipe at any convenient point near any stove, grate, fireplace, retort or furnace, or other contrivance suitable to this combustion or generation of gas. Valve 3,—the same being a water supply valve—is then opened and the hydraulic pressure in pipe, C, is then at once applied to tank, A', and the water and oil pipes, D, E, which pressure acts to force the flow of oil through pipe, E, and the flow of water through the pipe, D, to place of combustion or use, such water or pressure from pipe, C, supplying the volume of water necessary for tank, A', and pipe, D. These said valves, 7, 5 and 3, having thus been opened in the relative order in point of time successively as set forth, may all remain open until the whole of the oil at first contained in the tank, A', has been forced out and consumed by the combustion with the water or generated into gas as set forth. The progress of this emptying of the oil upward and out of the tank, A', through the oil feed pipe, E, and the relative rise and hydraulic effect of the water which, coming in at the bottom of the tank, A', through the water supply pipe, C, is acting to force the oil out upward through the oil feed pipe; may be readily seen through the gage glasses, K, K, of the tank, A'. When the oil is nearly all consumed by combustion or converted into gas as set forth, and the water consequently rises in the tank, A', to a level near the top of this tank, as the gage glass will admit of being readily seen, the valves 3, 5, and 7, are closed and the valves 6, and 8, opened, thereby transferring the pressure and consequently the oil and water feed to tank, A, exactly and in like manner as the same pressure and its resultants had previously operated in tank, A', and without in any manner interfering with the continuous and steady feed to the place of combustion as set forth. While the tank, A, is thus supplying the place of the tank, A', relatively to the results required, the latter tank may be refilled with oil; or this tank, A', may be refilled with oil at any other time as it is independent of the tank, A. By opening the valve, 9, valves 12 and 13 being open when reservoir, B, is full of oil thereby making a clear conduit from reservoir, B, to tank, A', and then opening the valve 1 under the tank, A', the water in this tank will immediately seek to fall to a lower level in the tank by passing out through the outlet pipe, G, at the bottom of the tank, A'. The weight of the water in the tank thus seeking an outlet, by its weight will cause the oil to flow into the tank, A', from the tank, B. (In a corresponding manner the tank, A, may be also speedily and completely filled when it is emptied of the oil

as it is fed to the place and point of combustion.) When the water has nearly all run out of the tank, A', as will be indicated by its highest level disappearing below the lowest point of the lower gage glass, the valve, 1, is to be closed as well as the valve, 9. While the water is falling in the tank, A', its action creates a vacuum which is speedily filled by the oil running in from the tank, B, through the feed or filling pipe, H. As a matter of fact, no perceptible vacuum occurs as formed by the receding or lowering of the water in the tank, A', as the oil flowing freely in, follows hard upon the water as it is in the act of receding from the tank, A', through the pipe, G. So soon therefore, as the water will have sufficiently receded in this tank, A', and the valves, 1, and 9, will have been closed after the tank is sufficiently emptied of water and is consequently filled full enough with oil from the tank, B, the hydraulic pressure exerted through the pipe, C, may be again applied and the tank, A', is again ready to feed oil to the fire in the retort or other construction for its combustion as above shown. In like manner also the tank, A, is to be treated when empty.

Should it be desirable to feed from both tanks, A, A', at the same time and these tanks have thereby become empty at the same time, they may be refilled simultaneously or alternately as may be deemed expedient. When it is intended to feed from both tanks, A, A', at the same time, let it be supposed that both these tanks are full of oil and all of the valves closed, and then let the valves, 7 and 8, be opened. In this manner a free passage or oil conduit, between the tanks, A, A', at the top and through the oil feed pipe, E, and its branches, should the pipe, E, be arranged with branches, which free passage or conduit for the oil will thus be extended to reach to the feed valves located in the pipe, E, or the branches thereof, at the stove, furnace, &c. The valves, 5 and 6, are next to be opened to leave a free passage for water between the tanks, A, A', at the bottom or lowest level of these tanks which free passage for the water will thus be extended to reach through the water pipe, D, and its branches, if any are arranged, as complements to the ramifications of the oil pipe, E, to the feed valve or valves located in the pipe, D, or its branches, at or near the combustion point—the stoves, furnaces, retorts, &c., as set forth. The valve 3 is lastly to be opened and the water or hydraulic pressure to be allowed to be exerted through pipe, C, which represents the corporation water works system or its equivalent, and the larger space than the diameter or caliber of this pipe, C, as represented in the tanks, A, A', upon the oil to be thus fed through the pipe, D, to the fire; and this hydraulic pressure may remain continually acting upon the contents of these tanks if desired.

To fill tank A', when both tanks are in use

and the water and oil at the same level in both; close valves, 5 and 7, thereby cutting off all connection between tanks A', and A, and proceed to fill tank, A', as hereinbefore set forth. When tank, A', is full of oil and valves, 1 and 9, closed, transfer the feed and the pressure from tank, A, to tank A', by first closing valves, 6 and 8, thereby cutting off entirely tank, A, and immediately open valves, 5 and 7, and the pressure and feed goes on as before.

To fill the tank, A, first open valve, 10, leaving a clear oil conduit from reservoir, B, (valves 12 and 13 being open when reservoir, B, is full of oil) to tank, A. Then open valve 2 under the tank, A, and allow the water and all sand, or sediment which may have been in the oil and have settled through the water to run away leaving the tank clean. When the water has fallen to the bottom of the gage glass, close valve 2 and valve 10, and open valves, 6 and 8, and the feed goes on equally from both tanks and requires no further attention whatever until the oil is all consumed.

It is observable that the pipe, H, leading from the tank, B, is arranged with such connections that the oil may be drawn from the top or highest level of the said tank, as well as from a lower level, the valves, 12 and 13, being introduced into this pipe, H, for the purpose of assisting the taking of the oil from the lower or the higher level. Valve 15 is also arranged to assist the filling of this reservoir or storage tank, B, with oil. It is observable also that an overflow or safety valve, F, is arranged in the water pressure pipe, C, for the purpose of preventing too great a hydraulic pressure from the corporation water system or a force pump or other equivalent, the resultant of which might be too great for the resistance of the tanks, A, A'. By this construction above shown, also, should the apparatus embodying my invention be used in any place where no corporation water works system exists, then and in that case a simple water force pump can be used to fill the tanks

and thus apply the hydraulic pressure to the oil in them, and the water discharged from these tanks as above explained may be gathered into a well or cistern to be used over again. The refilling of the tanks takes up only a few minutes of the operative's time by this apparatus, and there are no pumps, valves, or other devices or accessories to get out of order and the invention will do its work automatically without any other attention than such as is required to regulate the filling of the tanks; neither is any special skill nor experience required to be possessed by the operative to insure perfect work from my apparatus.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

In an apparatus for feeding hydro-carbon oils into stoves the combination of a series of pressure cylinders A, A', an oil reservoir B, elevated above the pressure cylinders A, A', a feed pipe H, connecting the oil reservoir B and pressure cylinders A, A', a water main C, a pipe C' in connection with the water main and entering each of the cylinders A, A', at or near the bottom, said pipe C', adapted to supply water to the said cylinders at a high pressure to force the oil upward therein, a pipe E, entering said cylinders at or near the top thereof and connecting said cylinders with the burner, a safety valve F on the pipe C', valves respectively 5, and 6, on the pipe C', in order that the water pressure can be supplied alternately either respectively to the cylinder A', or A, and valves 7, and 8, on the pipe E in order that the oil can be taken either respectively from the tank A', or A, and a waste pipe G, provided with suitable valves to remove sediment or refuse from the cylinders A', A, and from the reservoir B, substantially as and for the purpose set forth.

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Witnesses:

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