No. 620,586. Patented Mar. 7, 1899.

J. HENDERSON.

CARBURETER.

(Application filed Mar. 14, 1898.)

(No Model.) 2 Sheets—Sheet 1.

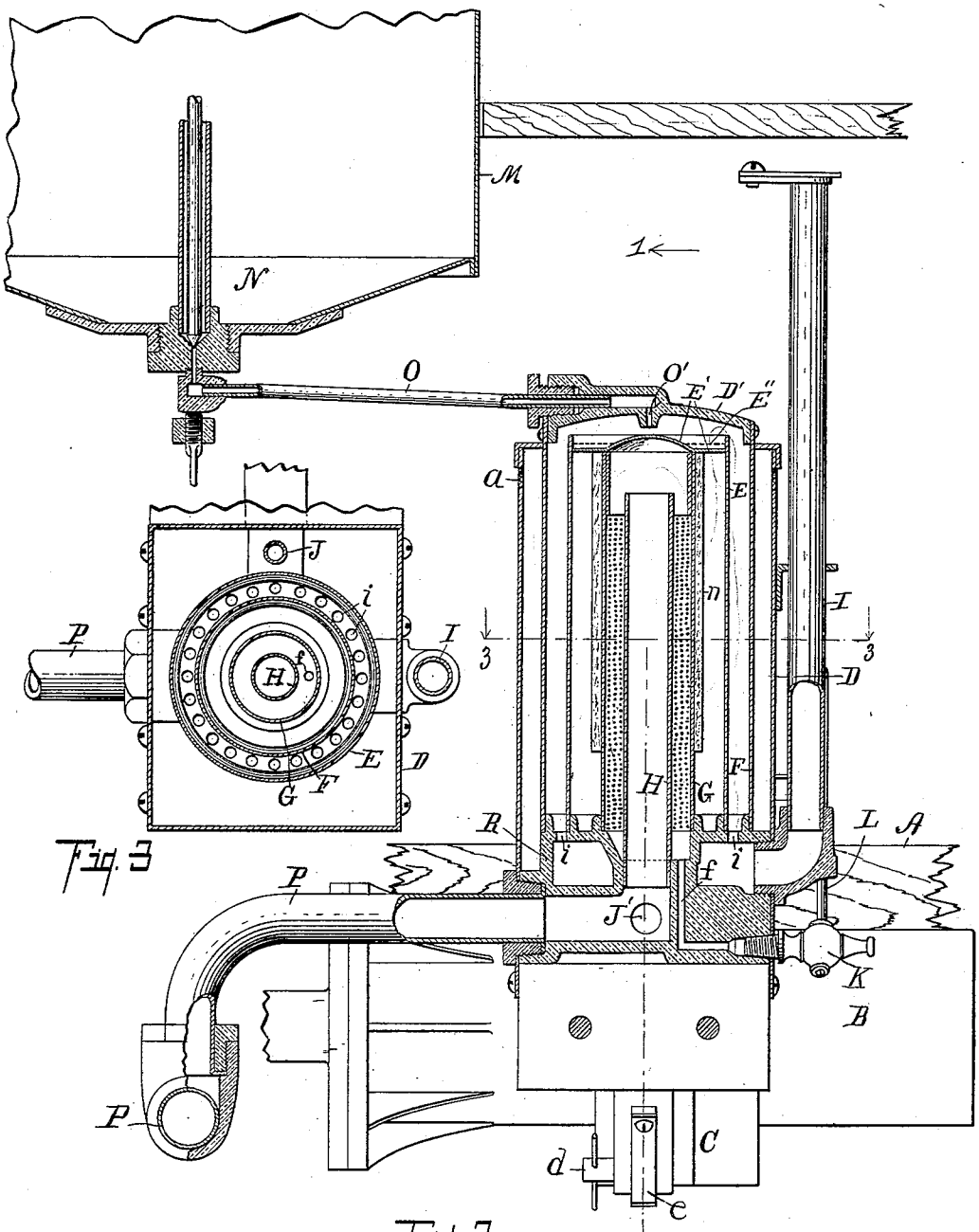

Fig. 3

Fig. 2

Witnesses.

W. S. Wood

Otis A. Earl

Inventor.

James Henderson

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Attorney.

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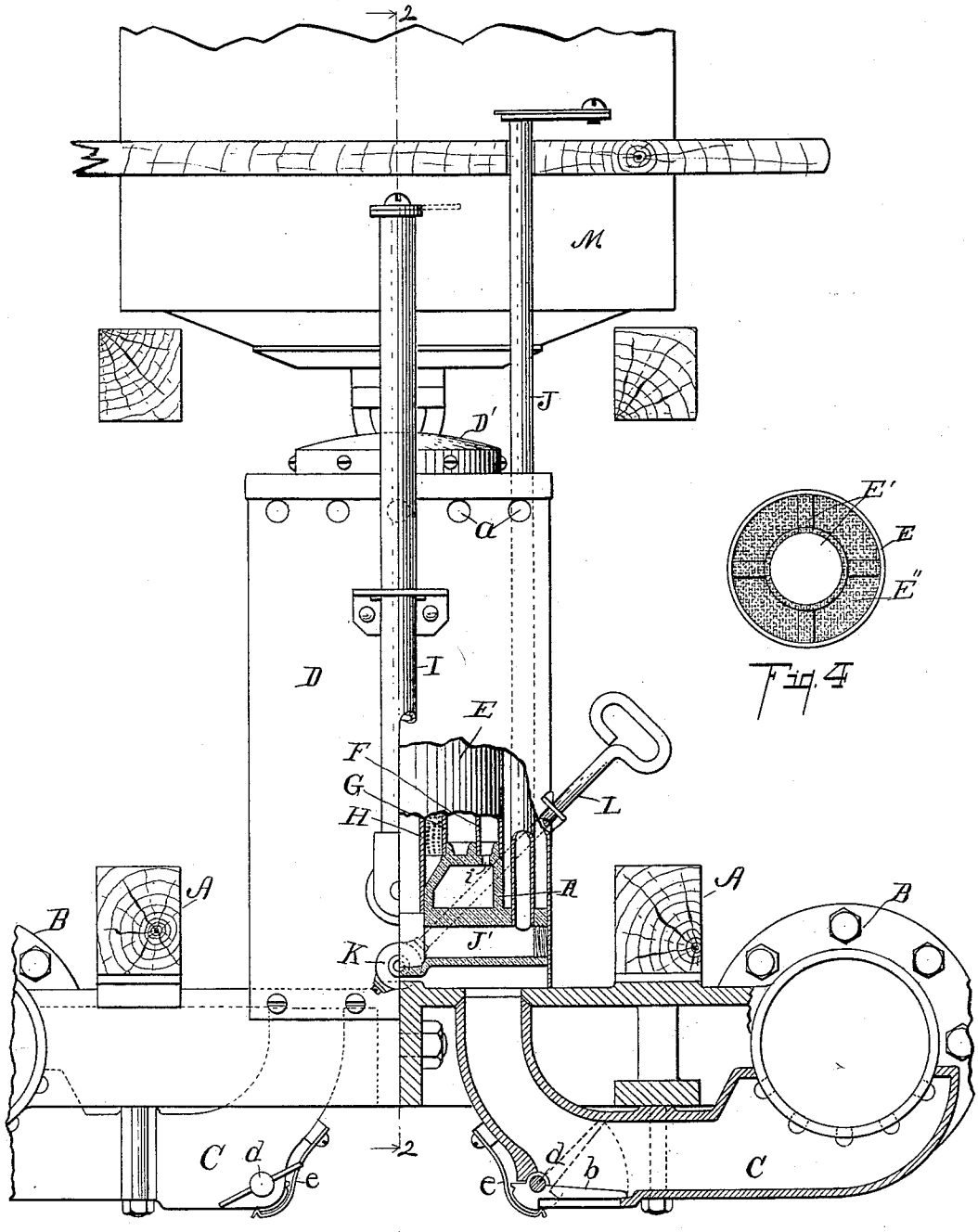

Fig. 1

Fig. 4

Witnesses.

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Otis A. Earl

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UNITED STATES PATENT OFFICE.

JAMES HENDERSON, OF THREE RIVERS, MICHIGAN, ASSIGNOR TO THE SHEFFIELD CAR COMPANY, OF SAME PLACE.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 620,586, dated March 7, 1899.

Application filed March 14, 1898. Serial No. 673,887. (No model.)

To all whom it may concern:

Be it known that I, JAMES HENDERSON, a citizen of the United States, residing at the city of Three Rivers, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to improvements in carbureters.

The objects of this invention are, first, to provide an improved means of vaporizing or mixing the oil or gasolene with air before it is introduced into the engine; second, to provide an improved construction whereby the heated exhaust products can be passed over the carbureter to heat the same when it is desired; third, to provide an improved carbureter which is easy to control; fourth, to provide an improved combination and arrangement of parts in a carbureter, and, fifth, to provide an improved construction of carbureter which is easy to control, drain, and operate.

Further objects of this invention will definitely appear in the detailed description to follow.

These objects of my invention are accomplished by the structure described in this specification.

The invention is definitely pointed out in the claims.

The structure is illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a detail view of the essential parts of my improved carbureter, showing the same connected to the cylinders of a double engine like that of a locomotive hand-car, the same being partially in section on line 1 1, Fig. 2. Fig. 2 is a detail sectional elevation of the essential parts of the structure, taken on line 2 2, Fig. 1. Fig. 3 is a transverse sectional view plan on line 3 3, Fig. 2. Fig. 4 4 is a plan view of the inner tubes of the carbureter.

In the drawings similar letters of reference refer to similar parts throughout the several views.

Referring to the lettered parts of the drawings, A A represent the beams of a locomotive hand-car and can also be said to represent the supports therefor when the engine is used in other relations. Any suitable support might be provided for the parts.

B are engine-cylinders which are jacketless, with exhaust-ports in their sides, though this structure is adapted for use with engine-cylinders having water-jackets. This is a double engine, a cylinder being shown on each side. Passages C C extend from the exhaust to the outer casing of the carbureter and are controlled by lid-valve *b* on the stems *d*. Spring *e* locks the valve open or in a closed position, as clearly appears. When the lid is turned up, the exhaust escapes into the air from the bottom, as appears in Fig. 1. When this valve is closed, the exhaust turns up to heat the carbureter by passing through the same. The carbureter is made up of a base portion R, containing an air-chamber and a passage to deliver air to said chamber and a passage for the explosive mixture, and a top portion D, with an inlet-passage for the liquid hydrocarbon, between which are supported concentric tubes or casings.

D is the outer casing, which is connected to the bottom R and embraces the carbureter proper. This casing is open at the bottom (see Fig. 3) and contains perforations *a* at the top to create a draft and to permit a free passage of the heated exhaust products from the engine to warm the inner parts of the same.

F is the outer chamber of the carbureter proper and is secured to the top D′ and the bottom R.

E is a tube concentric with tube F and is secured only to the bottom R of the carbureter and extends to near the top of the same. There are apertures *i* to the air-supply in the bottom R between tubes E and F to permit air to pass freely at that point. Concentric with the tube E and within the same is a perforated tube G. This is secured to the bottom R and extends up to near the height of the tube E. Over tube G is a cover E′, fitting over the same, with arms extending out to the tube E, secured thereto. On the tube G is supported a suitable wick *n*, like a lamp-wick. Within the tube G, concentric therewith, is a tube H, which is secured only to the bottom R and extends up within the

tube G toward the top thereof and is open at the top. The lower end of the tube H is connected to the passage to the feed-pipe P, which joins across pipe P', which delivers the explosive mixture to the engine-cylinders. As this invention does not relate to any igniting means or means of actuating the engine, none are here shown. Extending to one side of the opening in the bottom which leads to a supply-passage is a passage J', closed by a suitable plug at the end, from which extends a pipe or tube J, through which a quantity of fresh air can be introduced into the explosive mixture to dilute the same whenever it shall be necessary. This tube, however, is not essential, as the richness of the explosive mixture can be controlled by controlling the supply of liquid hydrocarbon delivered thereto.

I is an air-supply pipe connected to an open space in the bottom R of the carbureter and connected by the apertures *i* to the space between the tubes E and F, and this furnishes the supply of air to the carbureter, which is the usual supply.

M is a suitably-constructed tank (see Figs. 1 and 2) for storage of gasolene, kerosene, or similar hydrocarbon. The passage from the tank M is controlled by needle-valve N, a delivery-pipe O connects the valve to the passage in the top D' in the carbureter, and the aperture O' delivers the fluid directly over the center of the top E'. A gauze E'' is spread across from the tube G to the tube E. Any liquid there delivered spreads over the gauze E'' and is vaporized by the passage of the current of air over it or passes to the wick *n* below.

Surrounding the bottom of the tube H is a well or space to receive any unevaporated liquid which may not be vaporized. The passage *f* through the bottom R is controlled by stop-cock K and provides the means through which any surplus may be drained. This stop-cock K is controlled by handle L, which extends within convenient reach of the user. This also affords means of testing whether the supply of oil introduced is being completely utilized, so that any waste can be prevented. This is also of service in preventing the clogging of the carbureter by keeping it properly drained.

Having thus enumerated all the parts of my improved carbureter, I will now state the operation of the same.

Oil or any suitable hydrocarbon is admitted from the tank M through the aperture O' into the disk E, where it spreads out over the gauze E'' and is taken up by the wick *n*. When the engine is started, air will be drawn in through the pipe I and will pass up through the apertures *i* between the tubes E and F, and will then be drawn down through the gauze E'' and through the wick *n* and past the same, through the perforated tube G, up between the tubes G and H, down through the tube H, and through the pipes P P' out to the engine. When the engine operates and ignition occurs, the exhaust will be delivered through the passage C, around the bottom R of the carbureter, up between the casing D and the tube F, warming the current of air which passes between the tubes E and F, the heated exhaust products escaping through the apertures *a*. Thus it will be seen that as soon as the engine starts the carbureter is warmed. Should it become too much heated for the purpose or the heat be more than is desired, the current from the cylinder can be allowed to escape at the bottom by adjusting the valve *b* as heretofore stated.

In operation the drainage-cock K can be left open for a little time until the supply of the liquid explosive is properly regulated. If the explosive is very rich, it may be desirable to open the tube J to admit an extra supply of air. Ordinarily this is not required.

Having thus described my improved carbureter and improvements in explosive-engines, I desire to state that it can be considerably varied in its details without departing from my invention. The tube J and its connections can be entirely dispensed with. The structure is adapted to use with a single engine-cylinder as well as with two or even more. Under favorable conditions the jacket D might be dispensed with. Instead of making the tubes or casings of the device exactly concentric, which is most compact, they might be otherwise arranged and secure the same results. Instead of the small apertures *i* between the tubes E and F there could be an opening or openings of any form that would permit the passage of air at that point. The gauze E'', while it serves a very useful purpose, might be omitted. The entire structure can be supported in any well-known way and is adapted to use for stationary as well as locomotive engines.

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

1. The combination of a vapor-engine cylinder; a passage leading from the exhaust thereof with means of controlling the same; a carbureter made up of bottom R, having an inlet air-chamber and an outlet-passage for the explosive mixture; a top D' with a suitable properly-controlled inlet for hydrocarbon; an outer casing D, to receive the engine-exhaust, secured to the bottom R, and extending upwardly with opening *a* toward the top; a tube F, within casing D, connected with the bottom R, and to the top D' a tube E concentric with tube F, and secured to the bottom only, suitable passages being formed between the two at the bottom by perforations *i* to receive the air; perforated tube G, concentric with tube E connected to the bottom R, and covered at the top by disk E' a suitable gauze E'' extending over the space between E and G; a wick supported on the upper part of the tube G; tube H, secured to the bottom and extending up within the tube G; and connected to the outlet-passage all co-

acting for the purpose of mixing air with the hydrocarbon to supply the engine with an explosive mixture for the purpose specified.

2. A carbureter made up of bottom R, having an inlet air-chamber and an outlet-passage for the explosive mixture; a top D′ with a suitable properly-controlled inlet for hydrocarbon; an outer casing D, adapted to receive the engine-exhaust, secured to the bottom R, and extending upwardly with opening *a* toward the top; a tube F, within casing D, connected with the bottom R, and to the top D′ a tube E, concentric with tube F, and secured to the bottom only, suitable passages being formed between the two at the bottom by perforations *i* to receive the air, perforated tube G, concentric with tube E, connected to the bottom R, and covered at the top by disk E′ a suitable gauze E″ extending over the space between tubes E, and G; a wick supported on the upper part of the tube G; and connected to the outlet-passage all coacting for the purpose of mixing air with the hydrocarbon to supply an engine with an explosive mixture for the purpose specified.

3. A carbureter made up of bottom R, having an inlet air-chamber and an outlet-passage for the explosive mixture, a top D′ with a suitable properly-controlled inlet for hydrocarbon; an outer casing D, adapted to receive the engine-exhaust, secured to the bottom R, and extending upwardly with opening *a* toward the top; a tube F, within casing D, connected with the bottom R, and to the top D′; a tube E concentric with tube F, and secured to the bottom only, suitable passages being formed between the two at the bottom by perforations *i* to receive the air, perforated tube G, concentric with the tube E, and connected to the bottom R, and covered at the top by disk E′; a wick supported on the upper part of the tube G, and connected to the outlet-passage all coacting for the purpose of mixing air with the hydrocarbon to supply an engine with an explosive mixture for the purpose specified.

4. A carbureter made up of bottom R, having an inlet air-chamber and an outlet-passage for the explosive mixture; a top D′ with a suitable properly-controlled inlet for hydrocarbon; an outer casing D, adapted to receive the engine-exhaust secured to the bottom R, and extending upwardly with opening *a* toward the top; a tube F, within casing D, a tube E, concentric with tube F, and secured to the bottom only, suitable passages being formed between the two at the bottom by perforations *i* to receive the air, perforated tube G, concentric with tube E, connected to the bottom R, and covered at the top by disk E′ a suitable gauze E″ extending over the space between tubes E, and G, a wick supported on the upper part of the tube G and connecting to the outlet-passage, a suitable drainage-cock K, connecting by passage *f* to the interior of the carbureter; all coacting for the purpose of mixing air with the hydrocarbon to supply an engine with an explosive mixture for the purpose specified.

5. A carbureter made up of bottom R, having an inlet air-chamber and an outlet-passage for the explosive mixture; a top D′ with a suitable properly-controlled inlet for hydrocarbon; an outer casing D, adapted to receive the engine-exhaust, secured to the bottom R, and extending upwardly with opening *a* toward the top; a tube F, within casing D, connected with the bottom R, and to the top D′; a tube E, concentric with tube F, and secured to the bottom only, suitable passages being formed between the two at the bottom by perforations *i* to receive the air, perforated tube G, concentric with the tube E, and connected to the bottom R, and covered at the top by disk E′; a wick supported on the upper part of the tube G, and connected to the outlet-passage, and a suitable drainage-cock K, connecting by passage *f* to the interior of the carbureter all coacting for the purpose of mixing air with the hydrocarbon to supply an engine with an explosive mixture for the purpose specified.

6. In a carbureter the combination of a suitable bottom containing an air-inlet chamber and a delivery-passage; a top containing an inlet-passage for the liquid hydrocarbon; a series of casings one within the other forming chambers connected in series successively; the chamber formed by the outer casing being connected to the air-passage in the bottom, and the inner casing of which is connected with the supply-passage; a wick supported on one of the casings to absorb the liquid hydrocarbon and hold it where it can be evaporated by the passing current of air for the purpose specified.

7. In a carbureter the combination of a suitable bottom containing an air-inlet chamber and a delivery-passage; a top containing an inlet-passage for the liquid hydrocarbon; a series of casings one of which is perforated one within the other forming chambers connected in series successively; the chamber formed by the outer casing being connected to the air-passage in the bottom, and the inner casing of which is connected with the supply-passage; and a wick supported on perforated casings to absorb the liquid hydrocarbon and hold it where it can be evaporated by the passing current of air for the purpose specified.

8. In a carbureter the combination of a suitable bottom containing an air-inlet chamber and a delivery-passage; a top containing an inlet-passage for the liquid hydrocarbon; a series of casings provided with a cover at the top one within the other forming chambers connected in series successively; the chamber formed by the outer casing being connected to the air-passage in the bottom, and the inner casing of which is connected with the supply-passage; and a wick supported on one of the casings to absorb the liquid hydrocarbon and hold it where it can

be evaporated by the passing current of air for the purpose specified.

9. In a carbureter the combination of a suitable bottom containing an air-inlet chamber and a delivery-passage; a top containing an inlet-passage for the liquid hydrocarbon; a series of casings one within the other forming chambers connected in series successively; the chamber formed by the outer casing being connected to the air-passage in the bottom, and the inner casing of which is connected with the supply-passage; a wick supported on one of the casings to absorb the liquid hydrocarbon and hold it where it can be evaporated by the passing current of air, and a suitable drainage-cock connected to the bottom for the purpose specified.

10. In a carbureter the combination of a suitable bottom containing an air-inlet chamber and a delivery-passage; a top containing an inlet-passage for the liquid hydrocarbon; a series of casings one of which is peforated one within the other forming chambers connected in series successively; the chamber formed by the outer casing being connected to the air-passage in the bottom, and the inner casing of which is connected with the supply-passage; a wick supported on perforated casings to absorb the liquid hydrocarbon and hold it where it can be evaporated by the passing current of air; and a suitable drainage-cock connected to the bottom for the purpose specified.

11. In a carbureter the combination of a suitable bottom containing an air-inlet chamber and a delivery-passage; a top containing an inlet-passage for the liquid hydrocarbon; a series of casings and provided with a cover at the top one within the other forming chambers connected in series successively; the chamber formed by the outer casing being connected to the air-passage in the bottom, and the inner casing of which is connected with the supply-passage; a wick supported on one of the casings to absorb the liquid hydrocarbon and hold it where it can be evaporated by the passing current of air; and a suitable drainage-cock connected to the bottom for the purpose specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

JAMES HENDERSON. [L. S.]

Witnesses:
M. J. HUSS,
E. H. HENDERSON.