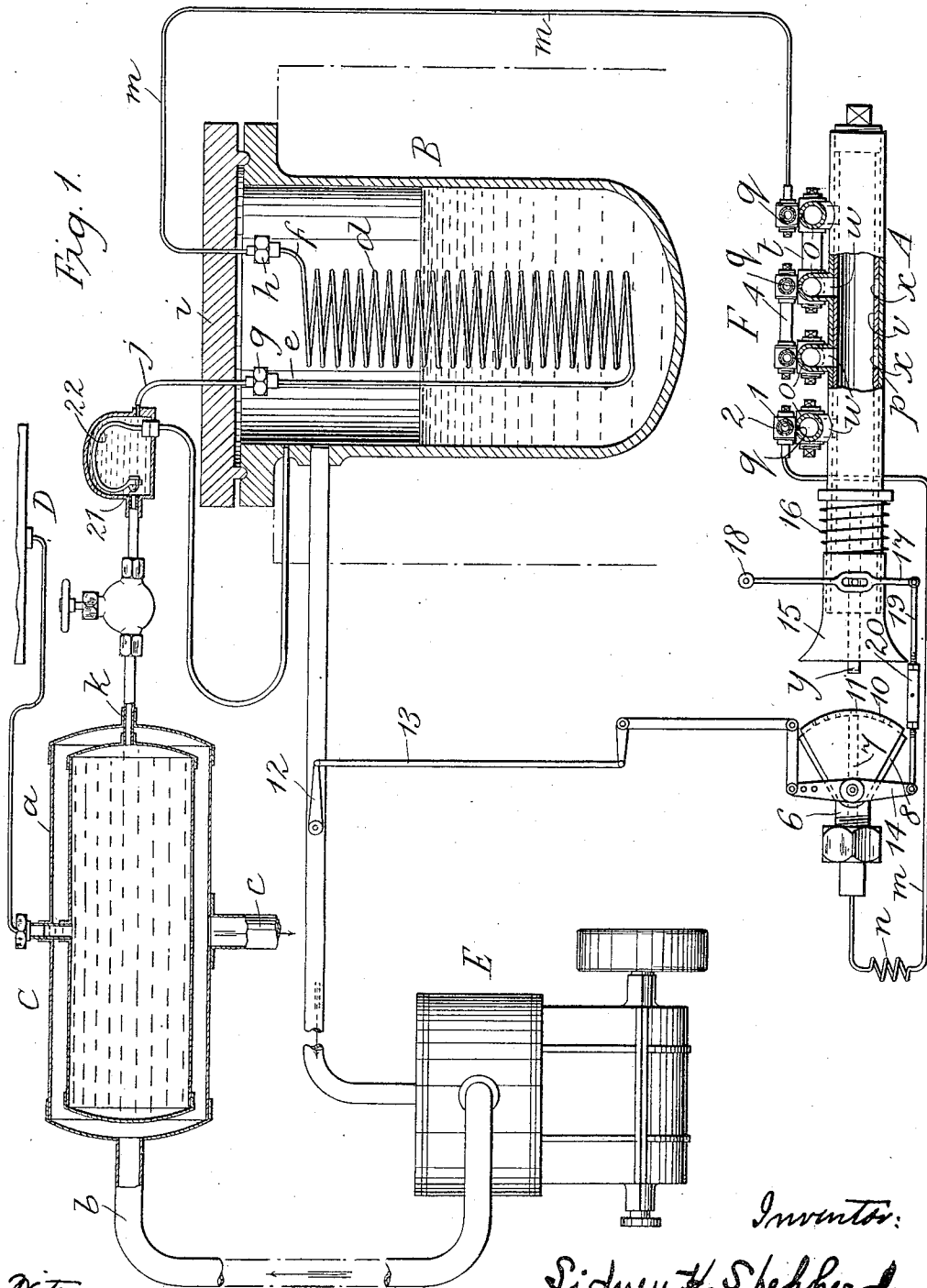


S. H. SHEPHERD.
STEAM GENERATING SYSTEM.
APPLICATION FILED JAN. 14, 1911.

1,016,857.

Patented Feb. 6, 1912

2 SHEETS—SHEET 1.



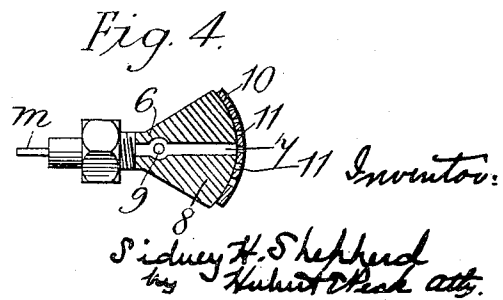
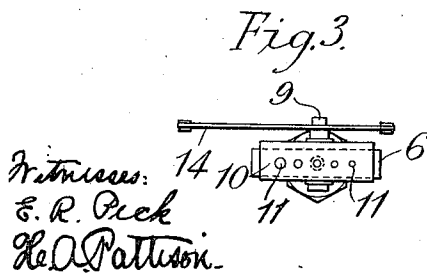
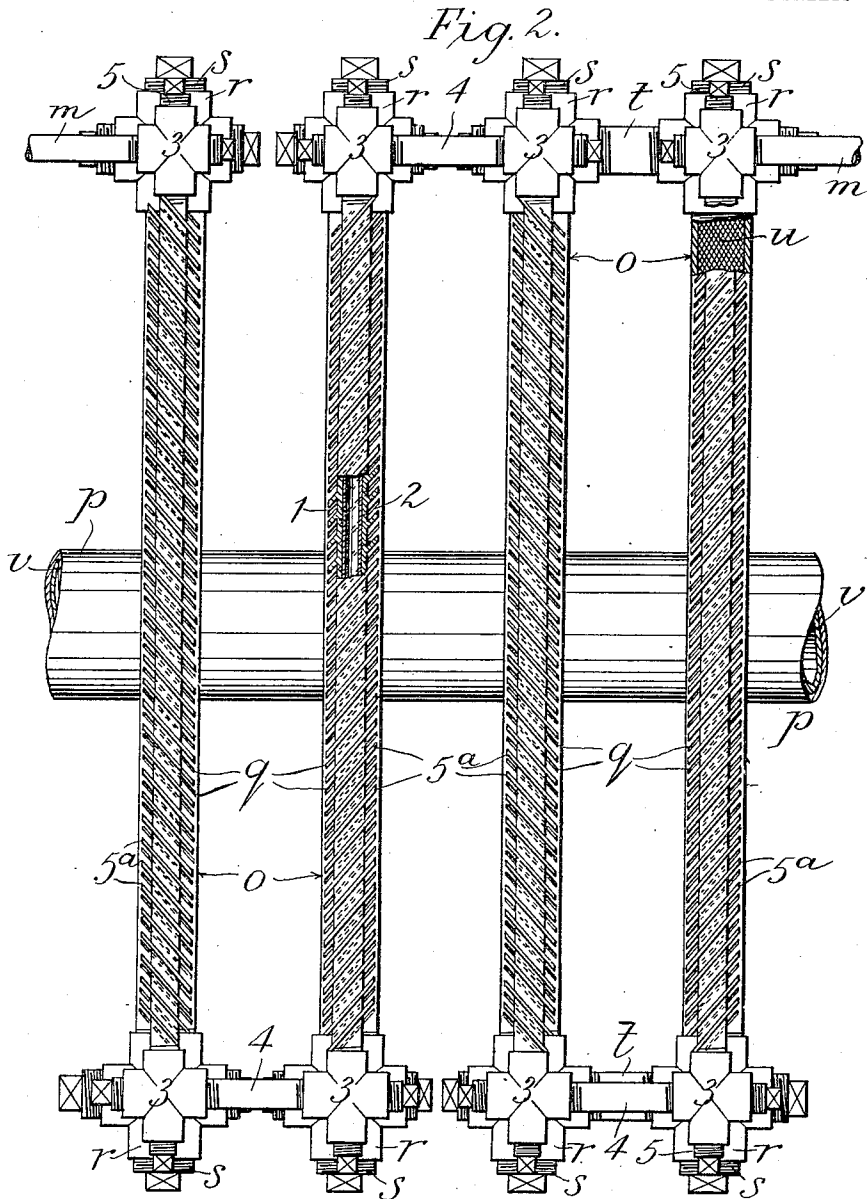
Witnesses:
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H. A. Patterson.

Inventor:
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UNITED STATES PATENT OFFICE.

SYDNEY HOWARD SHEPHERD, OF CRICKLEWOOD, ENGLAND.

STEAM-GENERATING SYSTEM.

1,016,857.

Specification of Letters Patent.

Patented Feb. 6, 1912.

Application filed January 14, 1911. Serial No. 602,717.

To all whom it may concern:

Be it known that I, SYDNEY HOWARD SHEPHERD, a subject of the King of Great Britain and Ireland, residing at Cricklewood, in the county of Middlesex, England, have invented an Improved Steam-Generating System, of which the following is a specification.

This invention relates to a steam generating system, more especially applicable to road vehicles and it has for its object to provide an arrangement wherein steam, after the plant has been once rendered operative, is caused to vaporize oil for use in a burner at the same time as it controls the supply to the burner in accordance with varying conditions. For this purpose the oil is heated preliminarily by exhaust steam from the motor and thereafter by steam in the generator, being finally superheated if necessary, by a device subject to the action of the flame from the burner.

The plant, which embodies certain constructional details of importance, will be understood from the accompanying drawings in which—

Figure 1 is a more or less diagrammatic view partly in section of the general arrangement of such of the parts as are necessary to illustrate the improvements. Fig. 2 is a plan of the vapor burner and part of the vapor superheating device, certain portions being in section. Fig. 3 is a front elevation of the vapor supply nozzle and Fig. 4 is a sectional side elevation thereof.

As shown in the said drawings A is the vapor burner, B the steam generator, C a vessel adapted to be maintained full of oil under a head of pressure from a supply tank D.

E represents the motor.

The vessel C is provided with a jacket *a* having a pipe connection at *b* leading to the exhaust of the motor and another pipe connection at *c* leading to the atmosphere.

d is a vaporizing coil which has its ends *e*, *f* connected by unions *g* *h* to the boiler cover *i*, the union *g* being at the extremity of a pipe *j* leading to the oil outlet of the vessel C at *k*. The union *h* is at the extremity of a pipe *m* adapted to conduct oil vapor to the burner through, it may be, a superheater F and a coil *n* to which latter a hand lamp can be applied to start the burner A.

The burner comprises a series of tubes *o* connected intermediate of their length to a

mixing tube *p* and formed with a series of slits *q* made wider at the outlet end than at the inlet end and preferably arranged at an angle to the axis of the tube which possesses the combined advantage over slots arranged transversely of affording increased area for the vapor while rendering the tube stronger to resist bending.

The tubes are fitted at each end with a screw threaded cross piece *r* which with the aid of plugs *s* render it easy to clean the burner and at the same time to connect the tubes or such of them as may be found necessary by pipes *t* serving to equalize pressure in the tubes. Preferably each tube *o* is fitted with a gauze liner *u* so that carbonaceous deposit or dirt from the roadway may be rapidly removed by removing such a liner and replacing it with another.

v is a revoluble control tube in the mixing tube *p* provided with a series of ports *w* leading to the several burner tubes so that when it occupies the position shown all the tubes *o* are supplied with vapor, and, further, provided with a fewer number of ports *x* so that when the tube *v* is partially rotated vapor can be supplied to certain only of the tubes *o* thus restricting the heating.

y is a handle by which the tube *v* can be turned.

The superheating device F comprises a set of drawn steel tubes 1 arranged concentrically within cast iron tubes 2 adapted to be connected in series, as shown, by screw threaded cross pieces 3 and tubes 4, plugs 5 serving to close such of the ends as may be required.

5^a are gills on the tubes 2 preferably inclined to the axis of the latter to agree with the slits in the burner tubes *o* and adapted to rest on the latter or spaces between the slits.

The supply of vapor to the burner A from the tube *m* is controlled by a nozzle 6 having a stationary orifice 7 disposed centrally in a head 8 formed with a face which is struck with the point 9 as a center. Co-acting with the said head 8 is a valve plate 10 having a series of orifices 11 increasing in magnitude as shown and adapted to be moved, in accordance with actuation of a throttle valve 12 through a link 13 and lever 14. Thus assuming the central orifice 11 in plate 10 to be normally in use any increase in opening of the throttle 12 will re-

sult in a larger orifice 11 being brought into register with the orifice 7 and vice versa.

In order that the amount of air admitted to the burner may be varied proportionally to the variation in the vapor supply an inductor 15 movable along the mixing tube *p* and acted upon by a spring 16 may be moved by a lever 17 pivoted at 18 and having a pin and slot connection with the said inductor, by a link 19 attached to the lever 14, the arrangement being such that the inductor advances toward the nozzle as the vapor supply decreases and vice versa.

20 is an adjusting nut by which the position of the inductor in relation to the nozzle can be altered.

The flow of oil between the vessel C and the vaporizing coil *d* is controlled by a valve 21 that opens to a greater or lesser degree as the pressure in the generator B decreases and increases. This valve 21 is actuated by a Bourdon pressure tube 22 connected to the generator.

What I claim is:—

1. In combination, a steam generator, an oil vapor burner adapted to heat such generator, a motor deriving steam from the generator, an oil vessel adapted to be heated by exhaust steam from the motor and a vaporizer associated with the burner supplied with oil from the oil vessel and located in the generator, substantially as described.

2. In combination, a steam generator, an oil vapor burner adapted to heat such generator, a motor deriving steam from the generator, an oil vessel adapted to be heated by exhaust steam from the motor, a vaporizer associated with the burner supplied with oil from the oil vessel and located in the generator and means comprising a Bourdon pressure tube adapted to control the flow of oil from the vessel to the vaporizer in accordance with the pressure in the generator.

3. In combination, a steam generator, an

oil vapor burner adapted to heat such generator, a motor deriving steam from the generator, an oil vessel adapted to be heated by exhaust steam from the motor, a vaporizer supplied with oil from the oil vessel, a connection from the vaporizer leading to the burner, a vapor nozzle co-acting with the burner, a throttle valve controlling the supply of steam to the motor and means associated with the nozzle adapted to be operated conjointly with the throttle valve and vary the supply of vapor in accordance with the variation in the supply of steam.

4. In combination, a steam generator, an oil vapor burner adapted to heat such generator, a motor deriving steam from the generator, an oil vessel adapted to be heated by exhaust steam from the motor, a vaporizer supplied with oil from the oil vessel, a connection from the vaporizer leading to the burner, a vapor nozzle co-acting with the burner, a throttle valve controlling the supply of steam to the motor, an adjustable air inductor associated with the burner, a valve plate associated with the nozzle adapted to vary the discharge of vapor therefrom, and means connecting the throttle valve, valve plate and inductor for simultaneous operation.

5. In combination, a steam generator, an oil vapor burner adapted to heat such generator, a motor deriving steam from the generator, an oil vessel adapted to be heated by exhaust steam from the motor, a vaporizer associated with the burner supplied with oil from the oil vessel and located in the generator, and a superheating device heated by the burner receiving vapor from the vaporizer and conducting it to the burner.

Signed at London, England, this 23rd day of December, 1910.

SYDNEY HOWARD SHEPHERD.

Witnesses:

NURAN CROMEY,
H. D. JAMESON.