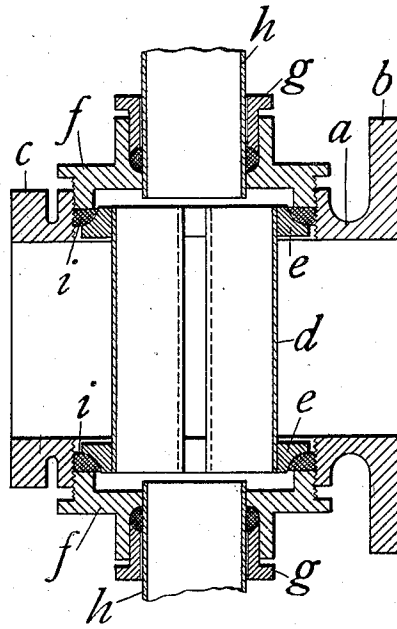
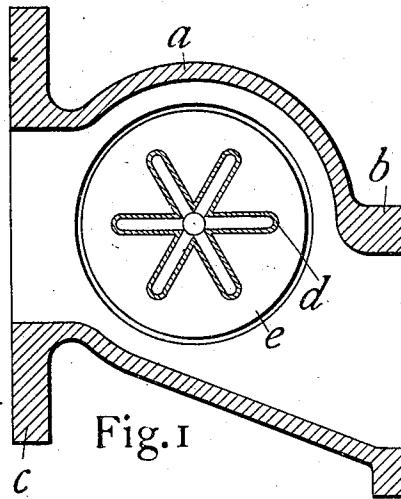


J. S. COTTRELL.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED DEC. 11, 1907.

906,111.

Patented Dec. 8, 1908.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN SWINFEN COTTRELL, OF BIRMINGHAM, ENGLAND.

INTERNAL-COMBUSTION ENGINE.

No. 906,111.

Specification of Letters Patent.

Patented Dec. 8, 1908.

Application filed December 11, 1907. Serial No. 406,075.

To all whom it may concern:

Be it known that I, JOHN SWINFEN COTTRELL, citizen of Great Britain, residing at Penshurst, Richmond Hill Road, Edgbaston, Birmingham, England, have invented new and useful Improvements Relating to Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines of the paraffin or heavy oil type, and has for its object to secure more convenient and effective utilization of the heat in the exhaust gases for vaporization of the fuel than is obtainable with the devices ordinarily employed. It has been proposed to secure a heater on to the exhaust outlets of an engine and also to arrange in pipe connection with such outlets a heater consisting of a central fuel tube surrounded by an exhaust gas jacket.

Referring to the accompanying sheet of explanatory drawings:—Figure 1 is a sectional end elevation and Fig. 2 a sectional plan of a single heater constructed in accordance with this invention.

The same reference letters in the two views indicate the same or similar parts.

In carrying the invention into effect there is employed a case *a* formed with suitable flanges *b* and *c* for connection respectively to the exhaust pipe and the engine cylinder. A central corrugated or ribbed tube *d* is mounted transversely within the case and provided with end rings *e*. The tube is held in position by screwed end caps *f* provided with glands *g* for the connection of pipes *h* leading respectively to the carbureter and either the engine inlet or another heater. The caps *f* operating in conjunction with the tube rings *e* and packing rings *i* prevent escape of exhaust gases from the space around the central tube *d*. For multi-cylinder engines one of the devices as above described is mounted on each exhaust outlet, the whole being suit-

ably connected together by pipes. Fuel from an ordinary carbureter enters the tube *d* at one end and after passing therethrough issues from the other end to either an adjacent heater or the engine inlet according as to whether the engine has a single or multiple cylinders. With the above apparatus an effective utilization of the exhaust heat for completing the vaporization of the fuel is obtained and uniformity in the quality of the combustible mixture insured.

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

1. In fuel heating appliances for internal combustion engines of the heavy oil type, the combination comprising a flanged heating chamber attachable directly to the exhaust outlet of the engine, a tube mounted transversely within the said chamber, end rings secured to the said tube, detachable end caps serving to maintain the transverse tube in position, glands formed in the said caps, and pipes inserted in the said glands, substantially as set forth.

2. In fuel heating appliances for internal combustion engines of the heavy oil type, the combination comprising a flanged heating chamber attachable directly to the exhaust outlet of the engine, a corrugated tube mounted transversely within the said chamber, end rings secured to the said tube, screwed end caps serving to maintain the transverse tube in position, packing rings between the caps and rings of the tube, glands formed in the said caps, and pipes inserted in the said glands, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN SWINFEN COTTRELL.

Witnesses:

JOHN MORGAN,
HENRY DAVIS.