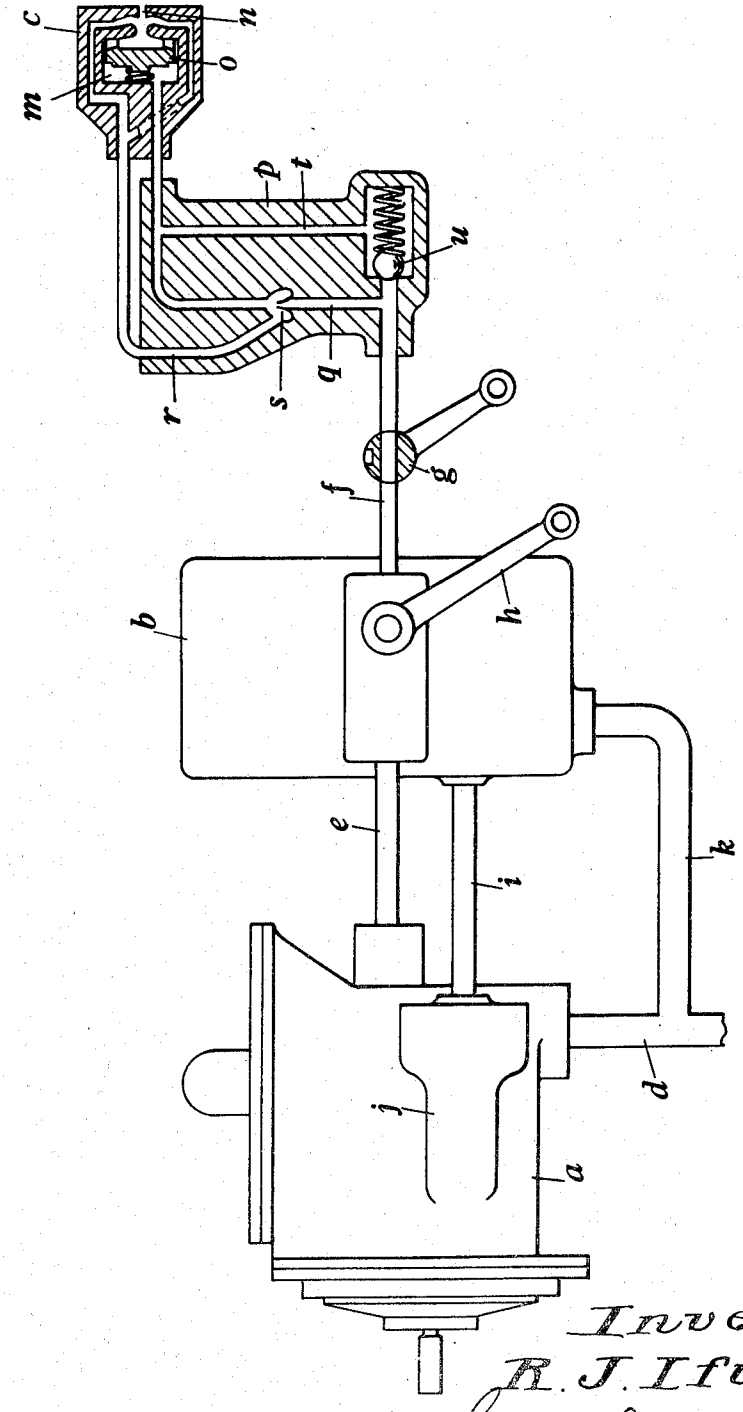
Aug. 22, 1950 R. J. IFIELD 2,519,658

LIQUID FUEL SUPPLY SYSTEM

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LIQUID FUEL SUPPLY SYSTEM

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1 Claim. (Cl. 299—58)

1

This invention relates to liquid fuel supply systems used in conjunction with the combustion chambers of internal combustion prime movers, furnaces and the like, and of the kind in which the liquid fuel before discharge through a nozzle or each of a plurality of nozzles is caused to pass through a swirl chamber wherein rotary motion is imparted to the liquid fuel.

To maintain an adequate rate of rotation over a wide range of variation of the rate of discharge, it is already known to supply excess liquid to the nozzle, and return the excess from the swirl chamber to the system. The object of the present invention is to enable the excess liquid to be circulated in a simpler and more convenient manner than heretofore.

The invention comprises a system having a localised path in which excess liquid fuel supplied to the nozzle or nozzles can be circulated, an injector for maintaining the circulation in the said path, and a variable-delivery pump for supplying a variable quantity of liquid fuel to the nozzle or nozzles and the injector.

The invention also comprises a system having, in addition to the features specified in the preceding paragraph, a relief valve arranged to by-pass the injector when the pressure of the liquid fuel exceeds a predetermined amount.

The accompanying drawing is a diagrammatic part sectional side view illustrating one mode of carrying the invention into effect.

In the drawing *a* indicates a variable delivery pump which serves to supply liquid fuel through any convenient control device *b* to a nozzle or nozzles as *c* in the combustion chamber or chambers (not shown) of an internal combustion prime mover. The pump *a* is connected by an inlet pipe *d* to a liquid fuel supply tank (not shown), and by an outlet pipe *e* to the control device *b* from which liquid fuel supplied by the pump is delivered to the nozzle or nozzles as *c* through a pipe *f* provided with a valve *g*. The control device *b* is provided with a controlling lever *h*, and is connected by a pipe *i* to a servo-motor *j* for regulating the output of the pump, and by a fluid return pipe *k* to the pump inlet pipe *d*. In the nozzle, or each nozzle *c* is a chamber *m* through which liquid fuel is caused to flow before emerging from the nozzle outlet *n*, and which contains a swirl plug *o* by which rotary motion is imparted to the liquid fuel flowing through the chamber.

The system above described is known and does not require further description.

In applying the invention in the manner shown in the drawing to the system above described, I employ a body *p* having a main passage *q* through which liquid fuel from the delivery pipe

2

f can flow to the nozzle or nozzles *c*. The body *p* is also provided with a return passage *r* which together with a part of the main passage *q* forms a localised path in which excess liquid fuel supplied to the nozzle or nozzles *c* can be circulated. To set up the required flow in this path, an injector *s* is situated in the main passage *q* at the junction of this passage and the return passage *r*.

As the action of the circulatory part of the system is required mainly under conditions of restricted or moderate flow through the main passage *q*, and as it is sometimes advantageous under high rates of flow to reduce the flow in the circulating path I may combine with the system a branch passage *t* arranged to by-pass the injector *s*, and in the branch passage I provide a normally closed and spring loaded relief valve *u* responsive to the pressure in the system at the inlet side of the injector. When the fluid pressure in the system reaches some predetermined amount the valve *u* opens and by-passes some or all of the liquid which would otherwise pass through the injector *s*.

By means of a system as above described I am able to meet the requirements specified in a very simple and convenient manner.

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

A liquid fuel supply system for an internal combustion prime mover, comprising in combination at least one nozzle having a swirl chamber through which liquid fuel supplied to the nozzle passes before discharge from the nozzle, a variable-delivery fuel pump, a supply passage through which liquid fuel in excess of the amount required to flow through the nozzle can flow from the pump to the nozzle, a return passage through which the excess fuel supplied by the pump to the nozzle can return to the supply passage, and which together with a part of the supply passage forms a localised path in which the excess fuel can circulate, and an injector situated in the supply passage at a position adjacent to one end of the return passage so that liquid fuel flowing through the injector promotes liquid flow through the return passage.

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