

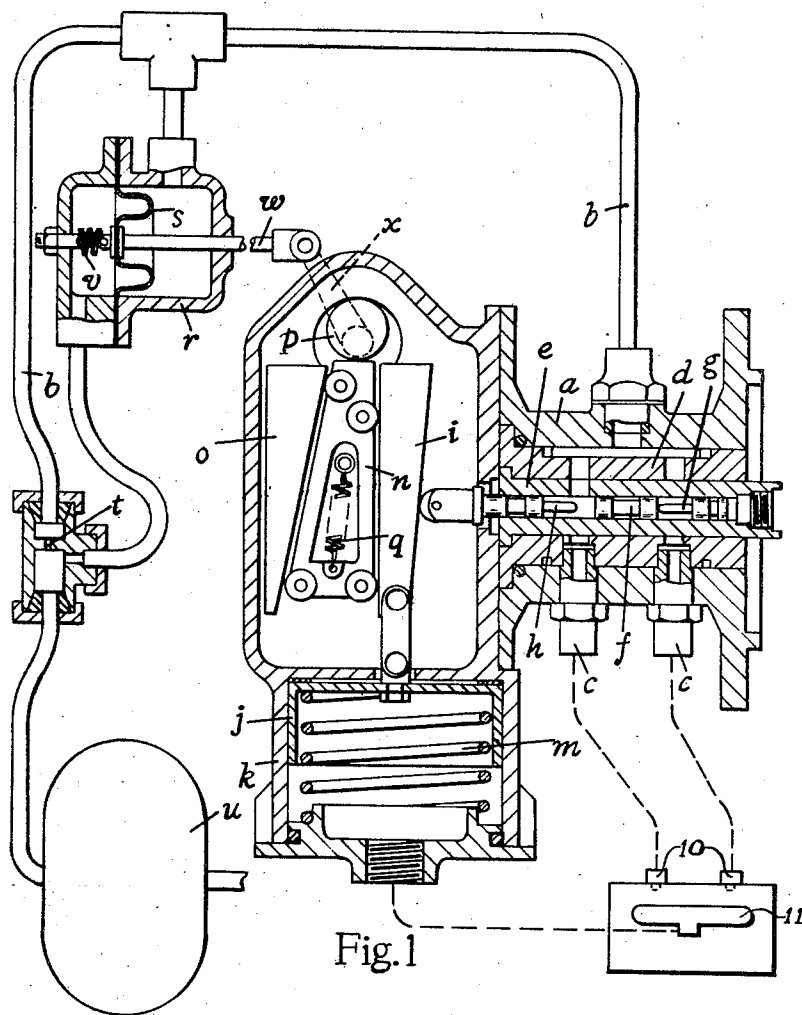
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MEANS FOR CONTROLLING THE SUPPLY OF LIQUID
FUEL TO AN INTERNAL COMBUSTION ENGINE

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2 Sheets-Sheet 1



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MEANS FOR CONTROLLING THE SUPPLY OF LIQUID FUEL TO AN INTERNAL COMBUSTION ENGINE

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1 Claim. (Cl. 123—140)

A known type of metering mechanism for supplying liquid fuel in measured quantities to an internal combustion engine comprises a reciprocatory shuttle which is supplied by a pump. To enable the quantity of fuel delivered to the engine in each reciprocatory movement of the shuttle to be varied automatically in response to varying load conditions, the extent of movement of the shuttle has hitherto been controlled by an adjustable end stop which is movable by a mechanism responsive to variation of air pressure in the air-intake manifold of the engine.

The invention comprises the combination with a fuel metering mechanism of the type above specified, of means responsive to both variations of air pressure in the air-intake manifold of the engine, and variations of the rate at which the liquid fuel is supplied to the engine for automatically adjusting the adjustable stop of the metering mechanism.

In the accompanying drawings, Figure 1 is a sectional side elevation of a fuel control means of the kind specified which embodies one form of the invention. Figure 2 illustrates a modified form of the invention.

The fuel control means comprises a body part *a* to which are connected a fuel supply pipe *b* and a plurality of delivery pipes *c*, two of which latter appear in the drawing, the delivery pipes terminating in fuel injection nozzles 10 (Figure 1) attached to the engine. Within the body part is contained a ported sleeve *d*, and within the sleeve is contained a rotary ported barrel *e* which is driven by the engine. The barrel contains a shuttle *f* which is reciprocable within the barrel by pressure of the incoming fuel alternately acting on opposite ends of the shuttle, and the extent of movement of the shuttle is determined by a fixed stop *g* and adjustable stop *h*. The present invention relates to the means required for effecting adjustment of the stop *h*.

In the example shown in Figure 1, the position of the stop *h* is determined by an abutment in the form of an endwise slidable wedge *i*. The wedge is movable longitudinally in response to variations of air pressure in the air-intake manifold 11 of the engine, by a piston *j* contained in a cylinder *k* and loaded by a spring *m*, the cylinder being adapted at one end for pipe connection to the air-intake manifold.

According to the invention there is combined with the wedge *i* another wedge *n* by which the wedge *i* can be moved laterally. The second wedge is supported at one side on a fixed ramp *o* and is movable endwise in one direction by an angularly movable cam *p*, movement in the opposite direction being effected by a spring *q*. The cam *p* is operable by a device which is responsive to variations in the rate of fuel flow.

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In this example the means for actuating the cam consists of a chambered part *r* which is divided into two compartments by a flexible diaphragm *s*, the two compartments being connected to the fuel supply pipe *b* at opposite sides of a venturi throat *t* or like orifice in the said pipe adapted to set up a liquid pressure difference which varies with the rate of fuel flow and which can be utilised for actuating the diaphragm *s*, the pipe *b* being supplied by a pump *u* driven by the engine. The diaphragm *s* is preferably loaded by a spring *v* which is adjustable to enable the diaphragm to be responsive to any given pressure difference acting on the opposite sides of the diaphragm. The diaphragm is connected to the cam, by a rod *w* and lever *x*.

The arrangement is such that during variations of air pressure in the intake manifold, the position of the shuttle stop *h* is determined by the first mentioned wedge. But this position is also variable by actuation of the other wedge in response to variations of rate of fuel flow.

By this invention the maintenance of any desired fuel-air ratio under all running conditions of the engine can be effected in a satisfactory manner. The invention is not, however, restricted to the example described, as other equivalent means responsive to air and fuel flow may be used for producing the desired result.

In the example shown in Figure 2, the second wedge *n* is movable in one direction by a thrust piece *y* acting on one edge of the wedge and operable by a fuel pressure difference acting on opposite sides of a diaphragm *s* loaded by a spring *v*, one end of the thrust piece being in contact with the diaphragm. The latter is contained in a chambered part *r* having its ends connected by pipes to the opposite ends of a venturi or other restricted orifice *t* in the fuel supply pipe.

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

Means for controlling the supply of liquid fuel to an internal combustion engine having an air-intake manifold, comprising the combination with means including a fuel metering mechanism for supplying liquid fuel to the engine, which mechanism has a reciprocatory shuttle and an adjustable stop for controlling the extent of movement of said shuttle, of a first wedge arranged to act on said stop for varying the position thereof, means responsive to variations of air pressure in the air-intake manifold of the engine for imparting endwise movement to said wedge, a fixed guide, a second wedge arranged between said fixed guide and first wedge to act on the latter, and means responsive to variations in the rate of fuel supply to the engine for imparting endwise movement to said second wedge.

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