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INJECTOR FOR MINERAL OIL MOTORS

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Fig. 1

Fig. 2

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The present invention relates to injectors for use in connection with internal combustion engines, for injecting the fuel under pressure without the aid of pulverization air, and concerns that class of injectors in which a needle valve provided with a stem whose diameter is greater than the seat of the valve itself, effects the closure towards the cylinder and is borne down upon its seat by a strong loading spring which only allows the valve to rise when the oil under pressure is driven by the fuel injection pump.

The object of the present invention is to provide an injector wherein the tension of the loading spring can conveniently be temporarily released and then returned to its normal tension, for instance, in order to facilitate the starting of the engine, it being necessary afterwards to re-establish the normal working tension.

According to the present invention, the tension of the needle loading spring is rendered conveniently releasable by the provision of two concentric screws, the inner one of which is adapted to be locked in adjusted position, whilst the outer one is provided with a handle adapted to abut against a stop and capable of being rotated to release and to restore the tension of the spring.

The invention also includes a simple and effective filter for the fuel comprising a bush having an even number of threads with the grooves therebetween arranged open alternatively at opposite ends; there being a slight play between the bush itself and the injector body, as hereinafter more fully described.

In order that the said invention may be fully understood and readily carried into effect, an example thereof is hereinafter described with reference to and illustrated in the accompanying drawings.

In said drawings:

Figure 1 represents a section through the injector as a whole;

Figure 2 is a plan view of the same;

Figure 3 is the same view as Figure 2 with the handle disposed, and

Figure 4 is a view of the part constituting the filter.

Referring mainly to Figure 1, -a- represents the injector body with the valve seat. At -b- is shown a guide-bush for the spindle-valve -c-, which bush also acts as a filter as will hereinafter be explained. The spring -d- holds the valve fast on its seat. At -e- is indicated the fuel admission pipe. A flange -f- is provided which carries two concentric screws -g- and -h-, the latter being pointed and abutting against the upper plate of the spring -d-.

The screw -g- is provided with a handle -l- formed integral therewith. At -k- may be noted a detent pin for the handle -l-.

The whole is kept in position by bolts against an orifice provided in the motor cylinder combustion chamber.

The operation of the device is as follows:

When the oil driven by the injection pump has attained a sufficient degree of pressure, the diameter of the valve stem -a- being greater than that of the seat, the valve itself rises, overcoming the resistance of the spring -d-.

The outer surface of the bush -b- carries a multiple thread screw, having two or any other even number of threads. The grooves running between two contiguous threads are open alternately, one towards the top of the bush at the most restricted part of its diameter, in correspondence where- with terminates the fuel admission pipe -e-; and one towards the lower extremity of the valve-seat part. The diameter of bush -b- is slightly less than that of the aperture into which it penetrates.

It is manifest that the fuel entering the helicoidal grooves open towards the top must traverse this free space or play in order to reach the grooves opening downwardly, and thence the valve-seat.

Particles whose dimensions exceed those of the aforesaid free space are thus kept back within the former grooves, and the bush constitutes an effectual filter which may be cleaned with the greatest ease on withdrawing the bush itself.

It having moreover been noticed that in order to facilitate starting it is advisable to relax the tension of the spring, it being necessary afterwards to re-establish the normal working tension of the latter without any further trials; an adjusting screw -g- has been provided to which is attached a handle -l-. The screw carries on its axis another screw -h- and a fixing nut. Upon the top of the screw -h- rests the upper cap of the spring -d-.

The handle -l-, normally, strikes against the detent pin -k-. On starting, the lever -k- is turned in such manner as
to slacken the spring —*— as far as is requisite for starting, as in Figure 3, and it is then conveyed back to its normal position as soon as the engine is running.

The adjustment of the tension of the spring —*— is effected once for all by means of the screw —*— and fixed by its lock-nut.

It is plain that the operation of the lever —*— does not influence said adjustment, because after each starting the screw —*— is conveyed back to its original position.

In order to facilitate the adjustment by means of the screw —*—, the pin —*— is furnished with a graduation placed against the head thereof.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A spray nozzle for internal combustion engines, comprising a body adapted to be fastened to the cylinder head, an automatic needle valve, a valve seat formed in the body and open toward the cylinder, a spring forcing said valve against the seat, means for regulating the tension of said spring, means for supporting said regulating device, means for temporarily releasing the said regulated pressure and restoring it without disturbing said regulation and without any other alteration of the spray valve.

2. A spray nozzle for internal combustion engines, comprising a valve body, a valve seat in said body, a needle valve, a spring forcing said valve against the seat, a valve cage, screw means for regulating the pressure of the spring and for locking the same, a screw device for quickly releasing and for restoring the spring pressure, comprising a handle and a stop pin.

3. A spray nozzle for internal combustion engines, comprising a valve body, a valve seat in said body, a needle valve, a sleeve acting as a guide for said valve and having a slight play with the inner surface of the valve body, said sleeve being provided on its external surface with a plurality of spiral grooves each closed at one end, and alternately closed and open at the fuel entrance and at the valve seat end, thus acting as a filter for the fuel oil.

4. A spray valve for internal combustion engines, comprising a valve body, a valve seat in said body, a needle valve, a spring for forcing said valve against the seat, means for regulating the tension of said spring, a valve sleeve snugly fitting said valve and serving as a guide therefor, a nut closing said sleeve against the valve body, means for introducing the fuel toward the upper end of the valve body, spiral grooves on the outside surface of the sleeve, adapted to deliver filtered oil to the seat of the needle valve.

5. A spray nozzle for internal combustion engines, comprising a valve body, a spray valve, a valve seat in said body, a flange supported by the valve body, a spring to hold the spray valve against the seat, two concentric regulating screws carried by said flange and supporting said spring, a lever for the outer screw, a fixed stop for the said lever, a lock nut for the inner screw, and a spring engaging plate abutting against the said inner screw.

6. A spray nozzle for internal combustion engines, comprising a valve body, a spray valve, a valve seat in said body, means for supporting a spring against the valve and forcing it against the valve seat, a valve sleeve grooved on its outside surface and acting as fuel filter, together with means for permanent and temporary regulation of the spring tension.

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