

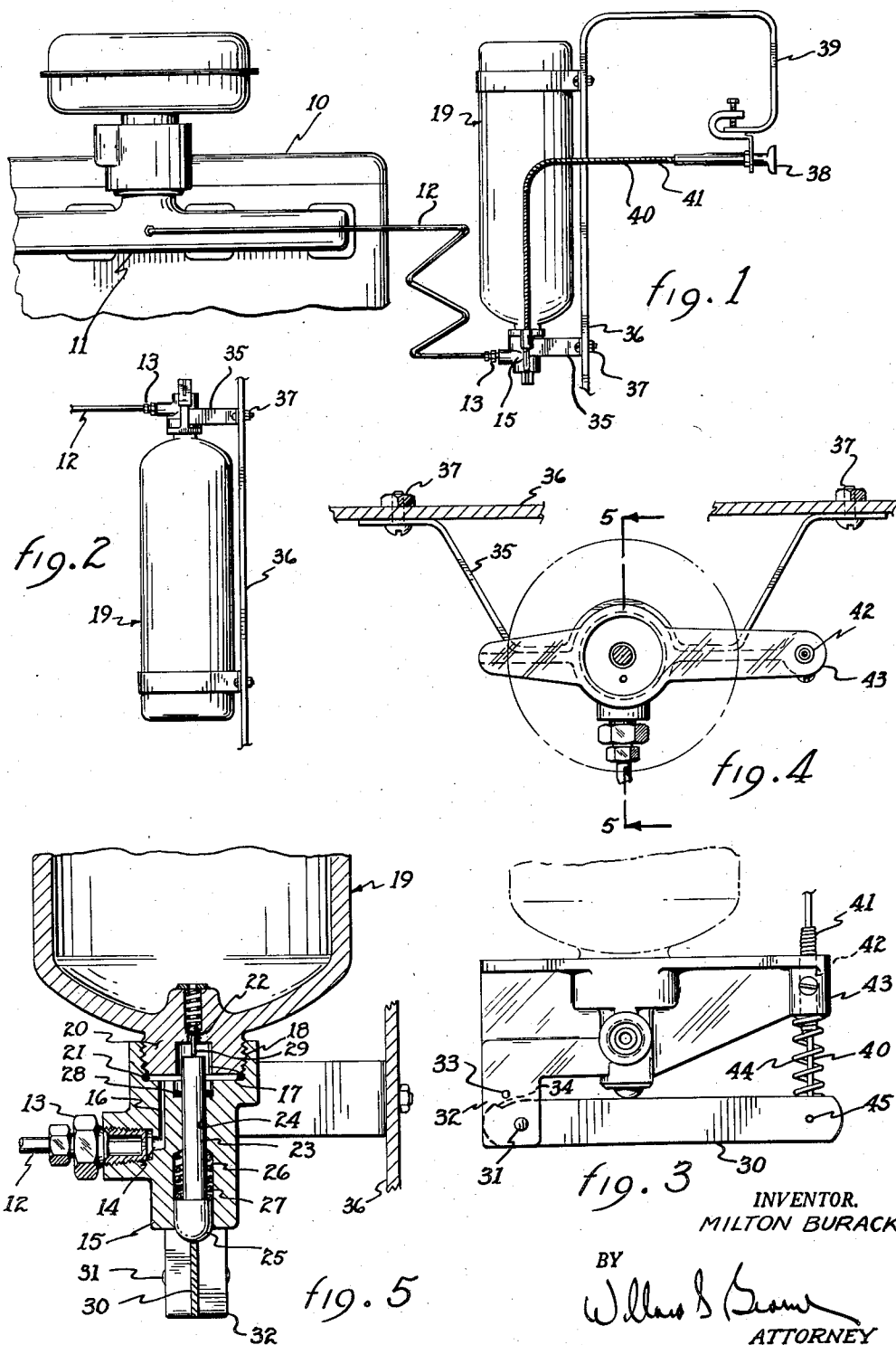
Dec. 2, 1958

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2,862,491

STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES

Filed April 22, 1957



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2,862,491

STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES

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Application April 22, 1957, Serial No. 654,387

1 Claim. (Cl. 123—187.5)

This invention pertains to starting devices for internal combustion engines and is particularly directed to a device for injecting a specially compounded mixture of liquified petroleum products in an internal combustion engine to automatically trigger ignition and maintain combustion of regular fuels to accelerate starting the engine at all temperatures.

One of the objects of this invention is to provide a simple, safe, economical, effective starting device for internal combustion engines.

Another object is to provide a simple starting device for internal combustion engines which is particularly effective in excessive low temperature starting.

A further object of this invention is to provide a starting device to provide instant starting of an internal combustion engine despite outdoor exposure of the engine to sub-zero temperatures.

It is also an object of this invention to provide a starting device as described which is equally adapted to starting gas or gasoline engines and diesel engines.

An object is further to provide a starting device which operates instantly to prevent oil dilution and which will tend to eliminate oil consumption.

Another object of the device is to prevent excessive wear on piston rings and cylinder walls by assuring immediate combustion and preventing raw fuel from scavenging lubrication therefrom.

Still another object is to provide a starting apparatus which will tend to remove excessive carbon deposits from cylinder heads and spark plugs during the starting operation.

Further, the device prevents excessive wear and tear on the electrical system of the engine because of immediate combustion in starting.

And finally, the device decreases over-all fuel consumption as it prevents fuel waste during starting.

Further features and advantages of this invention will appear from a detailed description of the drawings in which:

Fig. 1 is a general side elevation of the apparatus incorporating the features of this invention shown applied to a diesel internal combustion engine.

Fig. 2 is a view showing the installation of the device for starting gas or gasoline operated internal combustion engines.

Fig. 3 is an enlarged side elevation of the control valve of the apparatus shown in Fig. 1.

Fig. 4 is an enlarged plan view of the apparatus shown in Fig. 3.

Fig. 5 is a section on the line 5—5 of Fig. 4.

As an example of one embodiment of this invention there is shown an internal combustion engine 10 having the usual intake manifold 11 to which is connected the supply line 12 which is connected to the discharge fitting 13 mounted in the discharge port 14 in the valve body 15. The discharge port 14 is connected through a restrictive passageway 16, shown in Fig. 5, the valve

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body 15 into the chamber 17 formed by the threaded bore 18 in the valve body 15.

The starting fuel supply tank 19, containing a specially compounded mixture of liquified petroleum products to automatically trigger ignition and maintain combustion of regular fuels to accelerate starting the engine, has a threaded neck 20 which fits the threaded bore 18 and is screwed down against a sealing gasket 21 in the bottom of the bore 18 forming a tight closure for the chamber 17. An inwardly deflectable check valve 22 is carried in the neck 20 of the tank 19 which normally keeps the supply of fuel in the tank sealed therein.

An axially slidable stem 23 is carried in the bore 24 of the body 15 and has an enlarged outer end 25 slidably mounted in the counterbore 26 in the body 15. A compression spring 27 in the counterbore 26 around the stem 23 serves to normally move the stem outwardly to inoperative retracted position. The inner end of the stem 23 passes through a suitable seal 28 and projects into the chamber 17 to engage the outer end 29 of the check valve 22. An actuating lever 30 is pivotally mounted on a pin 31 carried on the integral bracket 32 of the valve body 15 and a stop pin 33 in the bracket 32 engaging the abutment surface 34 on the lever 30 to limit outward swinging thereof and the proper retention of the stem 23 in the valve body.

The valve body 15 is suitably mounted by a bracket 35 fixed thereto on the vehicle frame 36 by suitable bolts 37. A pull knob 38 is suitably mounted conveniently on the dash board 39 and has a pull wire 40 passing through the flexible sheath 41. The outer end of the sheath 41 is fixed in the bore 42 in the lug 43 of the valve body and the outer end of the pull wire is suitably connected to the outer end of the lever 30. When the knob 38 is pulled while cranking the engine, the stem 23 is moved momentarily inwardly opening the valve 22 to allow the contents of the tank 19 to escape at a predetermined rate through the passageway 16 into the supply line 12 and then into the intake manifold of the engine to effect starting. For diesel engines, the tank is mounted above the valve body as shown in Fig. 1. For gasoline or gas engines the tank is mounted below the valve as shown in Fig. 2. The pull knob 38 automatically returns to closed position by the operation of a compression spring 44 surrounding the pull wire 40 between the lug 43 and the outer end connection 45 on the lever 30. Momentarily pulling the knob just prior to or during cranking the engine effects the proper starting of the engine.

While the apparatus herein disclosed and described constitutes a preferred form of the invention, it is also to be understood that the apparatus is capable of mechanical alteration without departing from the spirit of the invention and that such mechanical arrangement and commercial adaptation as fall within the scope of the appended claims are intended to be included herein.

Having thus fully set forth and described this invention what is claimed and desired to be obtained by United States Letters Patent is:

An internal combustion engine starting aid comprising a tank containing a compressed, highly volatile explosive gas and a control valve mechanism adapted to manual modulation of a continuous flow of said gas from said cylinder, said control valve mechanism comprising a valve body having a discharge port connected to the intake manifold of the internal combustion engine, a chamber in said valve body formed by a threaded bore, a restrictive passageway in said valve body interconnected between said discharge port and said chamber to limit flow therebetween, a threaded neck on said tank adapted to fit in said threaded bore to close said chamber, an inwardly deflectable normally closed check valve in the neck of said tank to retain the gas in said tank, an auxiliary

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slidable stem adapted to engage said check valve carried in a bore formed in said valve body having an enlarged outer end slidably mounted in a counterbore formed in said valve body, a compression spring in said counterbore located around said stem and acting between the enlarged outer end of said stem and the bottom of said counterbore to move said stem away from said check valve, an actuating lever having one end pivotally mounted on said valve body, the outer end of said stem engaging an intermediate portion of said lever, a pull knob having movable control wire connected to the other end

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of said lever, and a spring interacting between said other end of said lever and said valve body to yieldingly urge said lever away from said stem whereby manipulation of said pull knob regulates the degree of opening of said check valve.

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