April 28, 1959 W. E. OAKES 2,884,222

ENGINE AIR CUT-OFF DEVICE

Filed Jan. 10, 1957

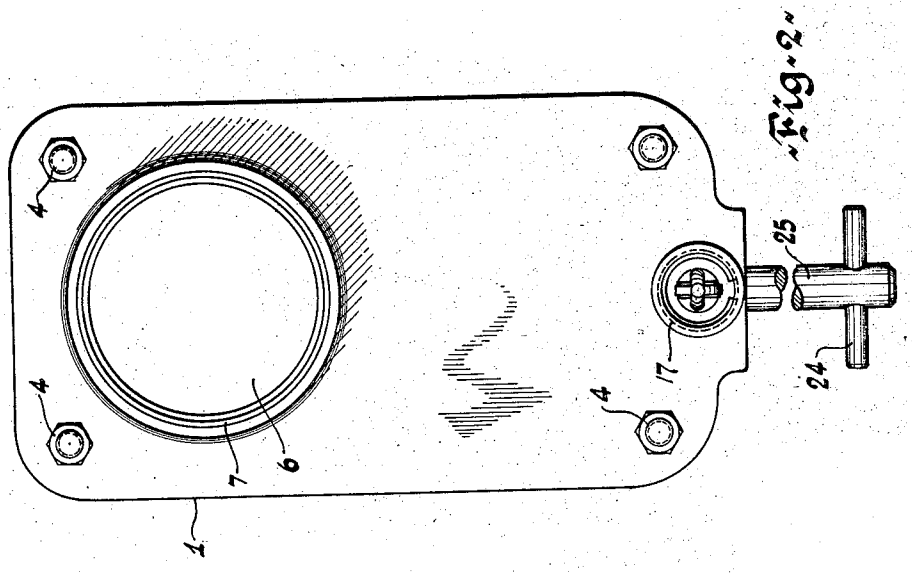


Fig. 2

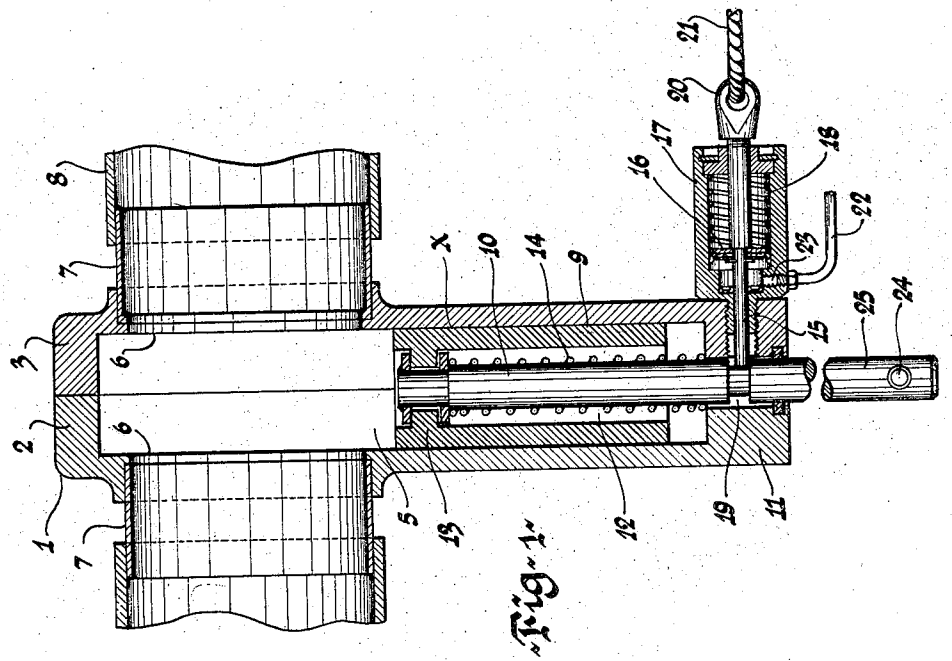


Fig. 1

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United States Patent Office 2,884,222 Patented Apr. 28, 1959

2,884,222

ENGINE AIR CUT-OFF DEVICE

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Application January 10, 1957, Serial No. 633,405

1 Claim. (Cl. 251—73)

This invention relates to an engine air cut-off device.

It is frequently advisable to provide fuel or air supply cut-off devices for engines. For instance, during the drilling of an oil or gas well several operations are performed which may result in natural gas flowing into the enclosure around the operating engines and attaining high concentration therein. The natural gas then enters the diesel engines through the air intake and, even though the fuel oil is shut off, the engine will continue to operate. This creates two hazards, namely, (1) sparks emitted from the engine exhausts may ignite the gas and air mixture around the engines and cause a general conflagration and (2) the copious supply of fuel causes the engines to attain excessive speeds which sometimes results in complete destruction of an engine due to centrifugal forces.

An object of the invention is to provide a simple, inexpensive engine air cut-off device which may be readily incorporated in or installed in existing engine intake manifolds.

The invention will be described with reference to the accompanying drawing, in which

Figure 1 is a longitudinal sectional elevation of a device in accordance with the invention, and

Figure 2 is a plan view of the device.

Referring to the drawing, the device comprises a main valve body 1 having two substantially identical generally rectangular half sections 2 and 3 bolted together as at 4 and forming a chamber 5. Adjacent one end of each section 2 and 3 is an opening 6. Openings 6 are aligned, as shown, and each is preferably fitted with a collar 7 or the like for insertion in and attachment to the air intake manifold 8 of an engine.

Reciprocally mounted in chamber 5 is a gate 9 which in one position is arranged to fully close the openings 6 to prevent passage of fluid through the manifold 8 and in another position is retracted into the chamber to fully clear the openings 6 and thus permit unrestricted passage of fluid through the manifold 8. It will be apparent that the inner surfaces of body 1 and the outer faces of gate 9 are machined smooth to provide effective sealing engagement therebetween.

Means for controlling movement of gate 9 comprises a spindle 10 extending through the end wall 11 of body 1 remote from the openings 6. Spindle 10 extends into a recess 12 in gate 9 and has its inner end anchored in the bottom wall 13 of the recess 12 as shown. A coil spring 14 is mounted on spindle 10 and has one end seated in the recess 12 and the other end seated on the inner surface of end wall 11 of body 1. It will thus be apparent that spring 14 urges gate 9 into its closed position as indicated above.

Means for holding gate 9 in retracted position against the action of spring 14 comprises a trip rod 15 to which is fixed a piston 16 reciprocally mounted in a cylinder 17 fixed to valve body 1 on the side wall thereof adjoining end wall 11. As shown, the axis of trip rod 15, piston 16 and cylinder 17 is normal to that

of spindle 10, and the end of rod 15 is urged into engagement with the side wall of spindle 10 by a coil spring 18 in cylinder 17 which acts upon piston 16. Spindle 10 has an annular recess 19 into which the end of rod 15 is adapted to enter to define the fully retracted position of spindle 10 and to lock the same in such position.

Means for tripping rod 15 to permit closing of the gate 9 under the action of spring 14 may comprise a clevis 20 on the outer end of rod 15 and a cable 21 attached to the clevis. Any suitable control lever may be connected to cable 21 to effect the tripping action. It will also be apparent that any other suitable means may be provided for effecting such tripping action. Thus, for instance, a compressed air line 22 may be connected to the cylinder at 23 for entry of air under pressure into the cylinder on the side of the piston opposite to the spring 18.

Means for re-setting the gate and spindle in retracted position following closing thereof may comprise a cross bar 24 mounted on the projecting end portion 25 of the spindle. It will be apparent that the cross bar 24 may be readily grasped to manually reciprocate the spindle and gate and thus re-set the same in open or retracted position.

There has thus been provided a device of the character described which may be easily installed in existing engine intake manifolds. The device imposes no obstruction to normal intake of air through the manifold. Moreover, there are no parts which are likely to shake loose or become detached and hence there is no danger of foreign bodies being drawn into the manifold. Since there is complete air shut off, possible flash back of hot gases through the manifold is eliminated. All moving parts are held firmly in contact with adjacent surfaces by the compression springs employed and thus wear caused by virbation is minimized. Positive, self-operating, and instantaneous shut-off action is provided by the structure. Moreover, the device lends itself to any convenient actuation of the spindle 9 and trip rod 15. Remote control of such members may be readily provided. It will also be observed that the device provides complete sealing of the air intake manifold passages from air which has not passed through the engine air cleaner.

The device described is of compact and rugged design, thus minimizing possibility of accidental damage.

An important feature of the device is the fact that only two positions of the gate are possible, i.e., completely closed and fully opened. There is no possibility of the gate being moved out of adjustment to cause an unnoticed partial blockage of the passage. Such a partial blockage would be very detrimental to the engine.

I claim:

A cut-off device for engine air manifold which comprises a valve body having two substantially identical unitary half sections secured together and forming a chamber, each said section having a flat portion of major extent constituting a side wall of said chamber and edge portions of minor extent extending right angularly from said flat portion, said edge portions of said sections constituting end walls of said chamber, each said side wall having an opening communicating with said chamber, said openings being axially aligned to define a passage through said chamber and each being arranged for connection to an engine air manifold for communication of said passage therewith, said chamber having a portion extending annularly about said openings and a portion projecting radially from said annular portion, the first one of said end walls terminating said annular portion adjacent said openings and the second one of said end walls terminating said radial portion remote

from said openings, a gate reciprocally mounted in said chamber, said gate being hollow and having a closed end in facing relation to said first end wall and an open end in facing relation to said second end wall, said gate being movable into said annular portion of said chamber to place its said closed end in abutment with said first end wall to fully close said passage and thereby define the closed position of said gate and into said radial portion of said chamber to fully open said passage and thereby define the open position of said gate, a spindle extending through said open end of said gate and being fixed to said closed end of said gate, said spindle extending through said second end wall, a spring mounted on said spindle, said spring engaging said second end wall and extending into said gate to urge said gate into said closed position, and means for holding said gate in said open position comprising a cylinder fixed to said valve body, a trip rod having a piston reciprocally mounted in said cylinder, said trip rod being disposed substantially right angularly to said spindle and having an end portion extending through said valve body into engagement with the side wall of said spindle, and a spring in said cylinder

urging said trip rod towards said spindle, said spindle having a recess in its side wall arranged to receive the end of said trip rod and defining said retracted position of said gate, said trip rod having a portion projecting outwardly from said cylinder, and means secured to said projecting portion to reciprocate the trip rod, said gate being at rest only in said fully open and said fully closed positions.

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