

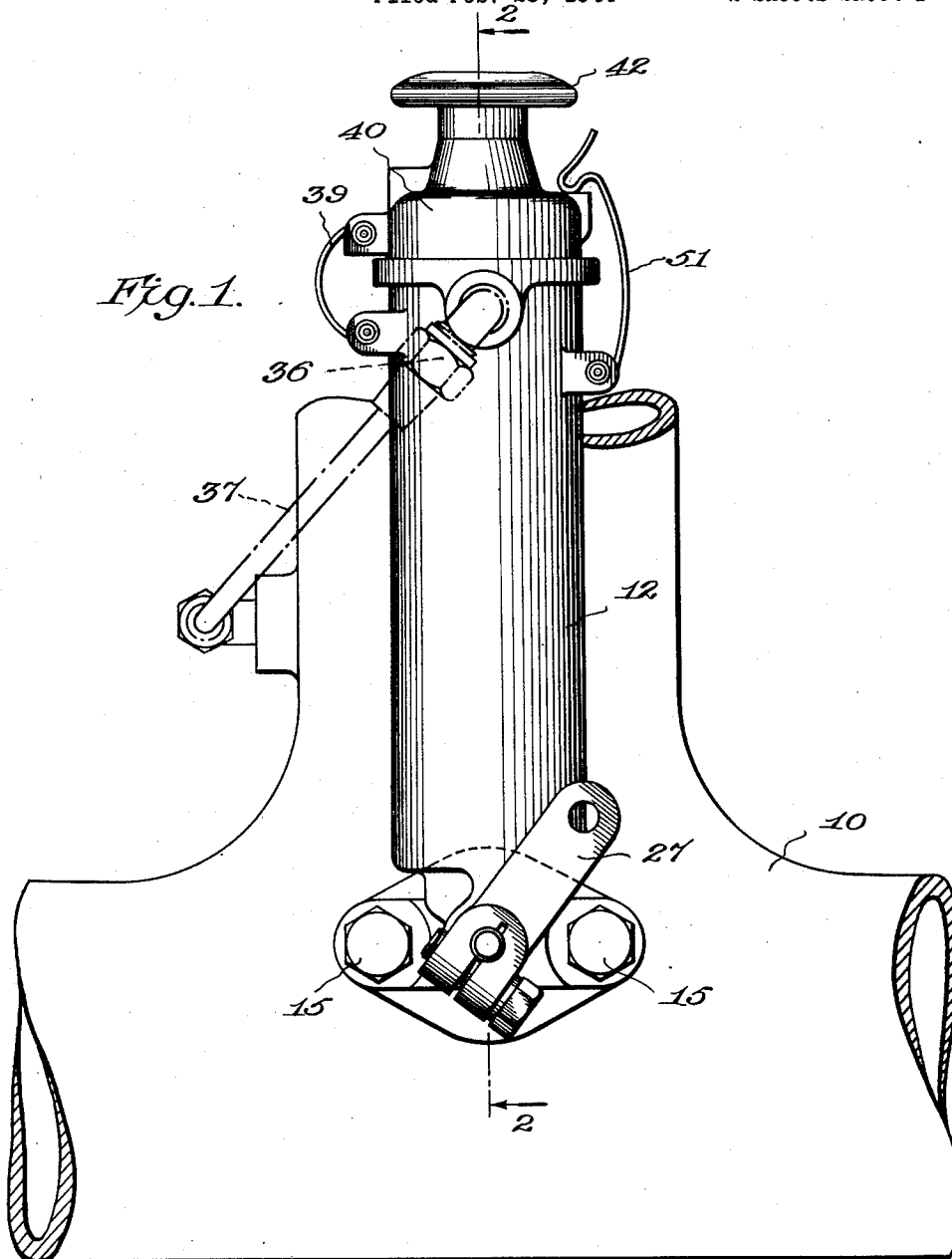
Dec. 5, 1944.

J. F. GREATHOUSE
DIESEL STARTING BOOSTER

2,364,356

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2 Sheets-Sheet 1



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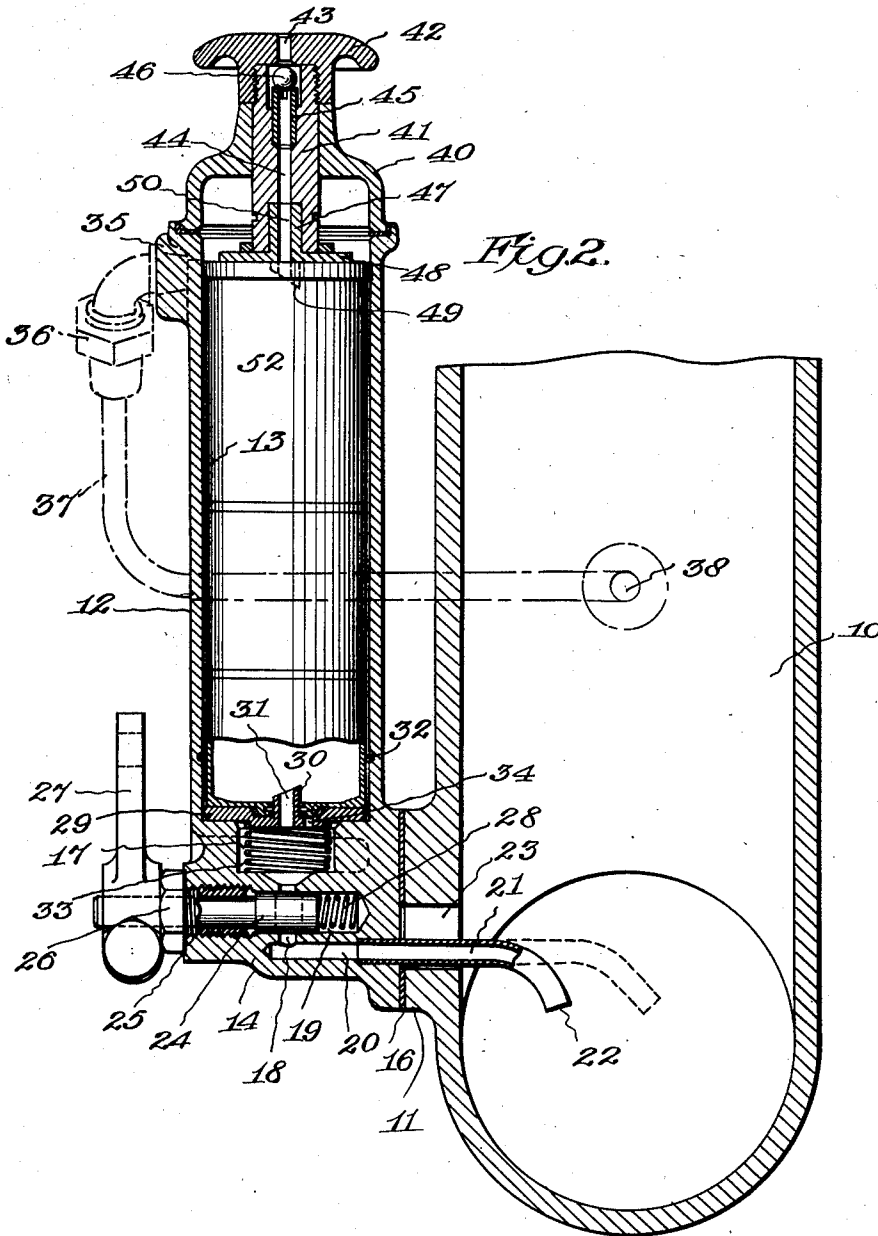
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DIESEL STARTING BOOSTER

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9 Claims. (Cl. 123—187.5)

The present invention relates to starting aid mechanisms for internal combustion engines, and embodies more specifically an improved device by means of which the starting of internal combustion engines, particularly of the Diesel type, may be greatly facilitated. More particularly, the invention embodies a mechanism by means of which a supplementary and relatively highly volatile fuel may be introduced into the air-intake manifold of the engine prior to and during the starting operation, thereby facilitating the starting, particularly in cold weather.

Devices of this general character have heretofore been designed but have not gone into general use because the structure of such devices has not enabled adequate control of the supplementary fuel to be effected and also because the mechanism has not been such as to enable such supplementary fuel to be conveniently and effectively charged and maintained in such starting aid devices.

An object of the present invention, accordingly, is to provide a device by means of which the starting of internal combustion engines may be aided and by means of which a supplementary charge of relatively volatile fuel may be introduced into the engine prior to and during the starting operation.

A further object of the invention is to provide a starting aid mechanism for engines wherein the supplementary and relatively volatile fuel may be readily charged and maintained in the starting aid mechanism and also effectively metered or supplied to the internal combustion engine when and as desired.

Other objects of the invention will be apparent as it is described in greater detail in connection with the accompanying drawings, wherein

Figure 1 is a view in front elevation showing an engine starting aid mechanism constructed in accordance with the present invention, the mechanism being shown as mounted upon the air-intake manifold of an internal combustion engine, and

Figure 2 is a view in section, taken on the line 2—2 of Figure 1 and looking in the direction of the arrows.

Referring to the above drawings, the air-intake manifold of an internal combustion engine is shown at 10 as being provided with a boss or land 11 to which a starting aid device 12 is adapted to be secured. The device 12 is formed with a chamber 13 which may be of cylindrical shape and which is formed, at its lower extremity, with a bracket portion 14, adapted to be secured by

means of bolts 15 to the land 11. A gasket 16 may be provided to insure a fluid-tight joint.

A lower portion of the chamber 13 is formed with a recess 17, terminating in a passage 18, in the intermediate portion of which a valve chamber 19 is formed. The passage 18 communicates with a passage 20 connected to a tube 21 which extends into the manifold 10 and which may be formed with a restricted outlet at 22 in order to limit the rate at which the fuel is introduced into the manifold. The tube 21 is received within an aperture 23 formed in the land 11 to facilitate the mounting of the device upon the manifold.

A cylindrical valve member 24 is provided within the valve chamber 19 and secured in a desired position by means of a threaded bushing 25 and lock nut 26. A valve lever 27 and spring 28 facilitate actuation and seating of the valve, as will be clearly seen in Figure 2.

Within the lower portion of the chamber 13 a disc 29 is slidably received, the disc being formed with a piercing element 30 having a central passage 31 formed therein communicating between the opposite sides of the disc. A retaining ring 32 serves to maintain the disc within the chamber 13 while a spring 33 normally urges the disc upwardly. The disc 29 is also formed with an aperture 34 therein to insure that free communication is maintained at all times between opposite sides of the disc 29.

In order to equalize the pressure between the manifold 10 and the chamber 13, a boss 35 is formed on the fitting 12 and receives a fitting 36 communicating with a tube 37 that is connected at 38 to the air-intake manifold. A loose hinge connection 39 is provided at the top of the device 12 and is hingedly connected to a cover 40 within which plunger 41 is slidable. The plunger 41 terminates in a manually operated handle 42 apertured at 43 and is formed with a central conduit 44 communicating with a tube 45 serving as a seat for a ball check valve 46. The lower end of the plunger 41 receives a fitting 47 formed with a disc 48 and a piercing member 49, the fitting being formed with a central passage 50 communicating with the passage 44.

A retaining bale or clip 51 is provided to secure the cover in its normal closed position as illustrated in the drawings.

In operation, a container 52 is inserted in the chamber 13 and the plunger 41 is depressed to cause the container to be pierced at both ends. The contents of the container thus escape and flow into the duct 18 and, as controlled by the valve 24, into the engine manifold.

Prior to the piercing of the container, the control valve 24 should be closed. In piercing the container the plunger 41 should be depressed to the limit of its travel and then withdrawn. The control valve 24 is opened for a predetermined length of time, after which the engine is started. After the charge of volatile fuel is exhausted, the valve 24 is closed.

While the invention has been described with reference to the specific structure shown in the accompanying drawings, it is not to be limited save as defined in the appended claims.

I claim:

1. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, a valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, means in the chamber to pierce the container, and means associated with the chamber to cause the container to be pierced by the piercing mechanism.
2. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, a valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, means in the chamber to pierce the container, and a plunger on the cover to cause the container to be pierced by the piercing mechanism.
3. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, a valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, means in the chamber to pierce the container, a plunger on the cover, and a piercing tool actuated by the plunger.
4. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, a valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, a piercing tool in the bottom of the chamber, a plunger on the cover, and a piercing tool actuated by the plunger.
5. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, a

valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, a second passage between the manifold and container adjacent the cover, a piercing tool in the bottom of the chamber, a plunger on the cover, and a piercing tool actuated by the plunger.

6. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, a valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, means in the chamber to pierce the container, and a plunger on the cover to cause the container to be pierced by the piercing mechanism and means in the chamber to eject the container when the cover is released.

7. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, a valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, means in the chamber to pierce the container, a plunger on the cover to cause the container to be pierced by the piercing mechanism, a passage in the plunger between the chamber and the atmosphere, and a check valve in the passage.

8. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, a valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, means in the chamber to pierce the container, a plunger on the cover to cause the container to be pierced by the piercing mechanism, and means in the chamber to retain the piercing tool therein when the cover is released.

9. Engine starting aid mechanism for use with engine air inlet manifolds comprising a chamber, a passage between the chamber and manifold, means forming a restriction in the passage, a valve in the passage, a cover for the chamber releasable to permit a container to be inserted in the chamber, means in the chamber to pierce the container, and means associated with the chamber to cause the container to be pierced by the piercing mechanism.

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