

F. J. PHILBROOK.
AIR INLET VALVE FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JUNE 16, 1916.

1,246,458.

Patented Nov. 13, 1917.

Fig. 1.

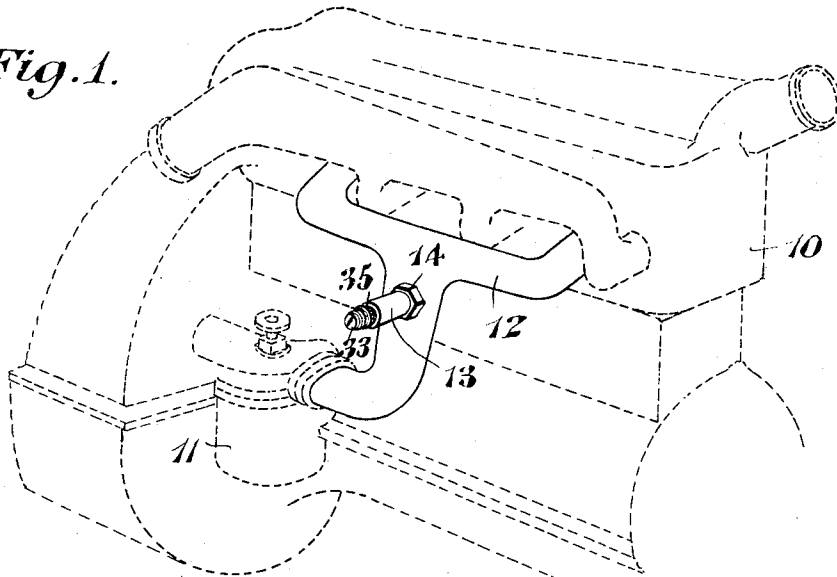


Fig. 2.

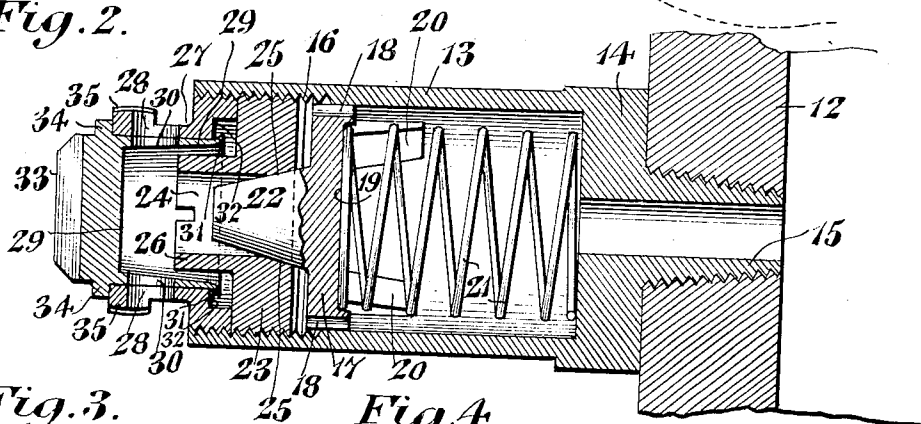


Fig. 3.

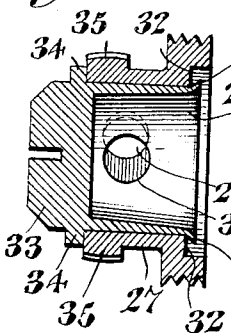


Fig. 4.

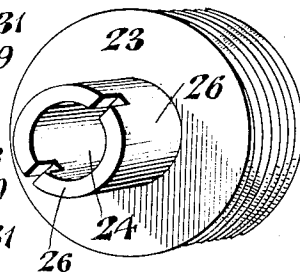
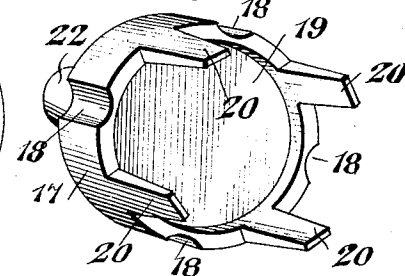


Fig. 5.



WITNESSES

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FRANCIS JEROME PHILBROOK, OF BREWER, MAINE.

AIR-INLET VALVE FOR INTERNAL-COMBUSTION ENGINES.

1,246,458.

Specification of Letters Patent.

Patented Nov. 13, 1917.

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To all whom it may concern:

Be it known that I, FRANCIS J. PHILBROOK, a citizen of the United States, residing at Brewer, in the county of Penobscot and State of Maine, have invented a new and useful Air-Inlet Valve for Internal-Combustion Engines, of which the following is a specification.

The present invention relates to an improved air inlet valve for internal combustion engines, which is adapted to regulate the intake of atmospheric air into the manifold of the engine with the already co-mingled hydrocarbon oil and air, after the latter is raised from the carbureter by the suction of the engine.

An object of the present invention is to provide a simple, inexpensive device, which is easily adjusted, and which has not only an adjustment for the tension of the suction operated valve to adapt the device to engines of different suction powers, but also has an air port adjustment to regulate the intake of air when the suction operated valve is open.

Another object of the present invention is to provide a device of this character with an adjustable valve seat for the suction operated valve, and to provide an improved locking means for holding the seat when it is adjusted.

Other objects and advantages of this invention, as well as the above, will be clearly brought out in the following specific disclosure of the present preferred embodiment of the invention, the same being illustrated in the accompanying drawing, wherein—

Figure 1 is a perspective view of an air inlet valve, constructed according to this invention, and applied to a manifold, the dotted lines showing one type of internal combustion engine, with which the improvement may be employed.

Fig. 2 is an enlarged longitudinal central section through the improved device, showing one wall of the manifold to which the device is attached.

Fig. 3 is a sectional view, through the combined air controlling and lock nut cap, the section being taken at 90 degrees about the axis of the cap from the showing in Fig. 2.

Fig. 4 is a detail perspective view of the valve seat disk, which is adjustable in the device.

Fig. 5 is a detail perspective view of the

piston valve, which is adapted to be spring held against the valve seat disk, the view showing the seat and the centering lugs for the outer end of the spring.

Referring to this drawing, 10 designates an internal combustion engine of any approved type, the same having the usual carbureter 11, and intake manifold 12, leading from the carbureter to the cylinders of the engine.

The device of this invention comprises a cylindrical casing 13, which is preferably of uniform diameter from end to end, is provided with an inner end wall 14, which is perforated and from which extends an externally threaded attaching nipple 15. The nipple 15 engages in a threaded opening formed through the outer wall of the manifold 12, and the casing 13 extends outwardly from the wall, as shown in Figs. 1 and 2. The casing 13 is internally threaded at its outer end, as shown at 16.

Within the casing 13 is a piston valve, the same comprising a piston head or disk 17, which has a sliding fit within the cylinder 13, and which is provided with a plurality of transversely extending peripheral notches 18, which admit the free passage of air about the piston 17. As shown to advantage in Fig. 5, the inner face of the piston 17 is recessed to provide a preferably cylindrical depression or seat 19. The piston has inwardly extending lugs 20, which are spaced apart and arranged about the seat 19. A spring 21 has one end bearing against the inner wall 14 of the casing and its opposite end resting in the seat 19 of the piston. The lugs 20 confine the spring 21 in the seat 19. The forward or outer face of the piston 20 is provided with an outwardly extending conical projection 22 constituting a valve head.

Threaded into the outer open end of the casing 13 is a disk 23. The disk 23 has a central opening 24 into which the valve head 22 projects, the inner end of the opening 24 being flared to provide a conical valve seat 25 to receive the valve head 22 thereagainst. A hollow boss 26 projects from the outer or forward side of the disk 23, and has kerfs in its end at diametrically opposite points thereof to receive a screw driver, or the like, for turning the disk 23 when adjusting it in the cylinder.

A cap 27 is threaded into the outer open end of the casing 13, and is adapted to be

turned up against the disk 23, to bind there-
against, and lock the disk and the cap from
movement from the casing 13 incident to vi-
bration of the device by the engine. The
5 cap 27 is of sufficient internal diameter to re-
ceive the boss 26 therein. Air ports 28 are
arranged preferably at diametrically oppo-
site points on the cap 27 to admit air into
the cap, and into the boss 26.

10 A turning plug 29 is fitted through the
open outer end of the cap and closes the
same and is hollow to receive the forward
end of the boss 26. The turning plug 29
has ports 30 adapted to register with the
15 ports 28 in the cap and admit air into the
device. The turning plug 29 preferably has
its wall tapering inwardly and is held in
frictional contact with the cap 27 by the ex-
panded flange 31, on its inner end. This
20 flange lies against an annular shoulder 32
formed within the inner end of the cap. The
outer end of the turning plug 29 is provided
with an enlarged head 33 having a kerf
therein to receive a screw driver, or the like,
25 for rotating the plug to register the ports
28 and 30 more or less, and control the flow
of air into the casing 13. The plug and the
cap are removable as a unit from the cas-
ing, while the plug is capable of independ-
30 ent movement.

At the base of the head 33 is an annular
flange 34, which bears against the outer end
of the cap 27 and coöperates with the ex-
panded flange 31 to hold the turning plug
35 29 in the cap. The outer end of the cap 27
is provided with an enlarged transversely
corrugated bead 35 to provide a finger hold,
or means to be engaged by pliers, or other
suitable tool, for turning the cap 27 in the
40 threaded end of the casing 13.

In use, the usual suction in the manifold
12 draws the piston 17 backwardly against
the tension of the spring 21. As the piston
is drawn backwardly, the valve head 22 is
45 withdrawn from the valve seat 25 to open
the passage through the casing 13. The disk
23 may be turned up to compress the spring
21 and increase the tension thereof, so that
greater suction will be required to move the
50 piston valve inwardly in the casing 13.
When the disk 23 is adjusted, the cap 27 is
then applied to the outer end of the casing.
The cap is turned up against the disk 23 to
lock the same in position.

55 After the desired adjustment of the ten-
sion of the valve 22 is obtained, the turning
plug 29 may be turned to bring the ports 28
and 30 into full register, or to partially over-
lap, as shown in Fig. 3, and to thus regulate
60 the amount of air which may pass through
the casing 13, when the valve 22 is opened.

What is claimed is:—

1. An air inlet valve for internal combus-
65 tion engines comprising a casing adapted
for attachment at its inner end to the mani-

fold of an internal combustion engine and
having an internally threaded bore at its
outer end, a spring pressed valve movable
lengthwise in the casing and being normally
closed; a disk threaded in the outer end of 70
the casing and adapted to be adjusted longi-
tudinally therein against the spring pressed
valve to vary the closing tension of the same,
and a cap threaded in the outer end of the
casing and adapted to be turned up against 75
the disk to lock it in adjusted position.

2. An air inlet valve for internal combus-
tion engines comprising a casing adapted
for attachment at its inner end to the mani-
fold of an internal combustion engine and 80
having an internally threaded bore at its
outer end, a piston valve slidable lengthwise
in the casing, a spring in the casing bear-
ing against the piston valve to urge it out-
wardly, a disk threaded in the outer end 85
of the casing and adapted to be adjusted
longitudinally therein against the piston
valve to vary the pressure of the latter
against the disk, said disk constituting a
seat for the valve, and an apertured cap 90
threaded in the outer end of the casing and
adapted to be turned up against the disk
to bind the latter from displacement when
adjusted.

3. An air inlet valve for internal combus- 95
tion engines comprising a casing adapted
for attachment at one end of the manifold
of an internal combustion engine, a piston
valve longitudinally movable in the cas-
ing, a spring in the inner end of the casing 100
engaging the piston valve to urge the lat-
ter forwardly, a disk threaded into the outer
end of the casing and adapted for adjust-
ment longitudinally therein against said
piston valve and having a valve seat for co- 105
operation therewith, a cap screw threaded
into the outer end of the casing and adapt-
ed to be turned up against said disk to lock
the disk and the cap from movement in the
casing, and a turning plug mounted in the 110
cap, said cap and said plug having air ports
therein adapted to register by the turning
of the plug to admit air into the forward
end of the casing.

4. An air inlet valve for internal combus- 115
tion engines comprising a cylindrical cas-
ing terminating in a reduced externally
threaded attaching nipple at its inner end
and having internal threads at its outer
end, a piston slidable in the threaded end 120
of the casing having an outwardly extend-
ing conical valve head and having air open-
ings therethrough, a spring between the in-
ner end of the casing and said piston to
urge the latter outwardly, a disk threaded 125
into the outer end of the casing and having
a central opening with a conical valve seat
at its inner end to receive said valve and
having an outwardly extending kerfed boss
at the opposite end of said opening for 130

turning the disk, a cap threaded into said outer end of the cylinder and adapted to bind against said disk to hold the same from turning in the cylinder, said cap being provided with lateral openings communicating with the casing, and a hollow turning plug fitting in the outer end of said cap and having openings therein adapted to be brought into register with the openings in the cap to regulate the intake of air to the casing.

5. A casing having means at its inner end for attaching the same in position and having an internally threaded outer end, a piston slidably mounted in the casing and having at its inner side a spring seat and lugs extending inwardly about the spring seat and having at its outer side an outwardly extending conical valve head the periphery of said piston being notched, a spring engaging at one end against the inner end of the casing and at its opposite end between the lugs and in said spring seat to support the piston and to urge the same outwardly, and a disk threaded within the outer end of the casing and having a central bore with a valve seat at its inner end to receive the valve head and adapted to be adjusted longitudinally in the casing to vary the tension of the spring in seating the valve, said disk having on its outer side a projecting hollow boss with kerfs therein.

6. In combination with a casing having a spring pressed valve therein, said casing being threaded at one end, a hollow cap threaded to engage the threads of the casing, said cap being provided with a side opening communicating with the casing and open at its outer end, and a hollow turning plug fitting in and closing the outer end of

said cap and projecting from said outer end, said plug having an opening adapted to register with the opening in the cap to regulate the intake of air, said cap and said plug being removable as a unit, and the plug being movable independently of the cap.

7. In combination with a casing having means at one end for attaching the same in position and internally threaded at its other end, a spring-pressed valve located within the casing, a disk threaded to engage the threads of the casing and constitute an adjustable seat for the valve, and a cap for closing the outer end of the casing said cap having threads to engage the threads of the casing so as to turn within the casing and bear against the disk, said cap being perforated.

8. In combination with a casing having means at one end for attaching the same in position and internally threaded at its other end, a spring-pressed valve located within the casing, a disk threaded to engage the threads of the casing and constitute an adjustable seat for the valve, a cap for closing the outer end of the casing, said cap having threads to engage the threads of the casing so as to turn within the casing and bear against the disk and lock it in adjusted position, and means provided on the cap and forming an adjustable air inlet.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

FRANCIS JEROME PHILBROOK.

Witnesses:

EDWIN LORD,
C. M. PERKINS.