

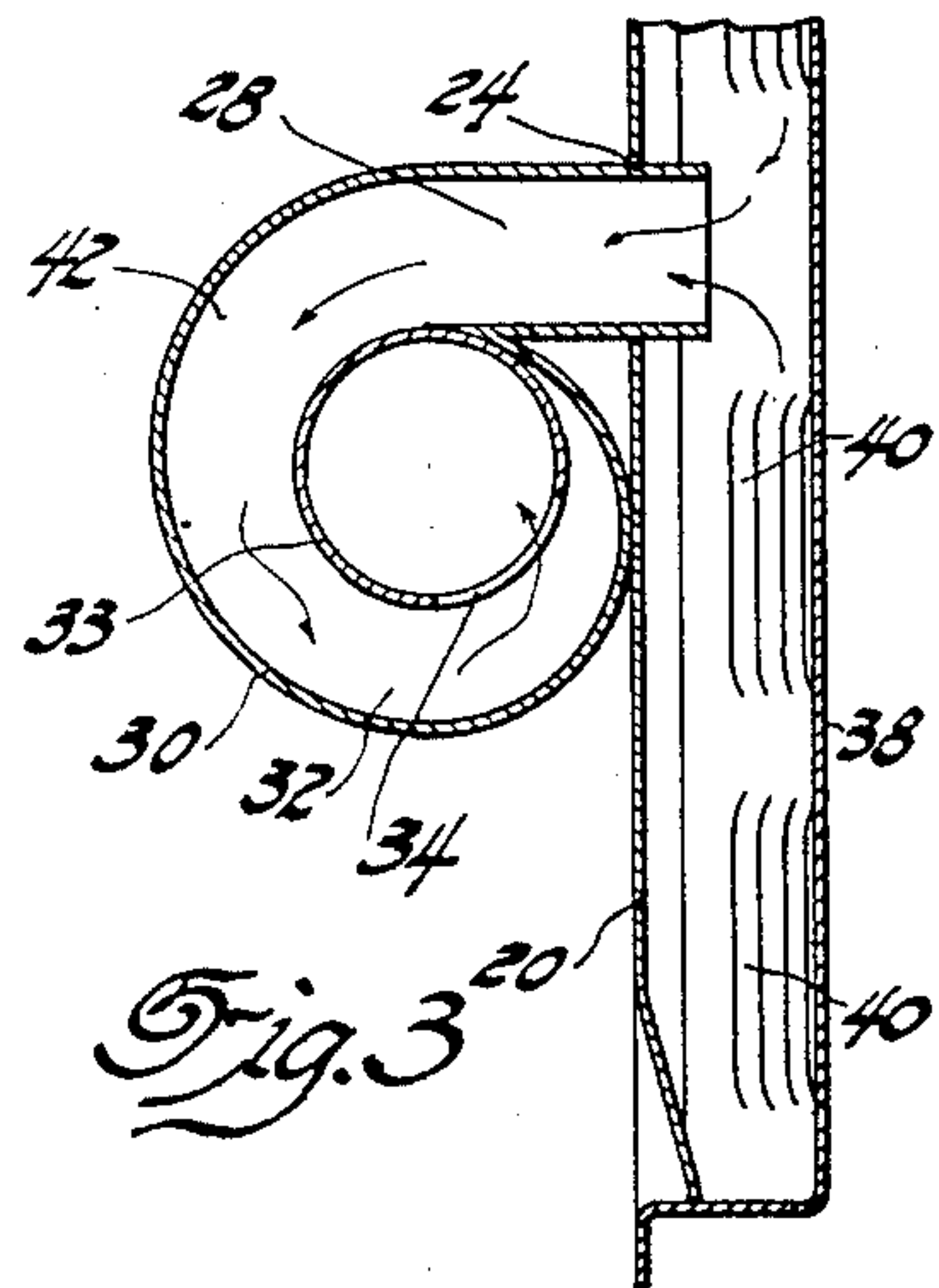
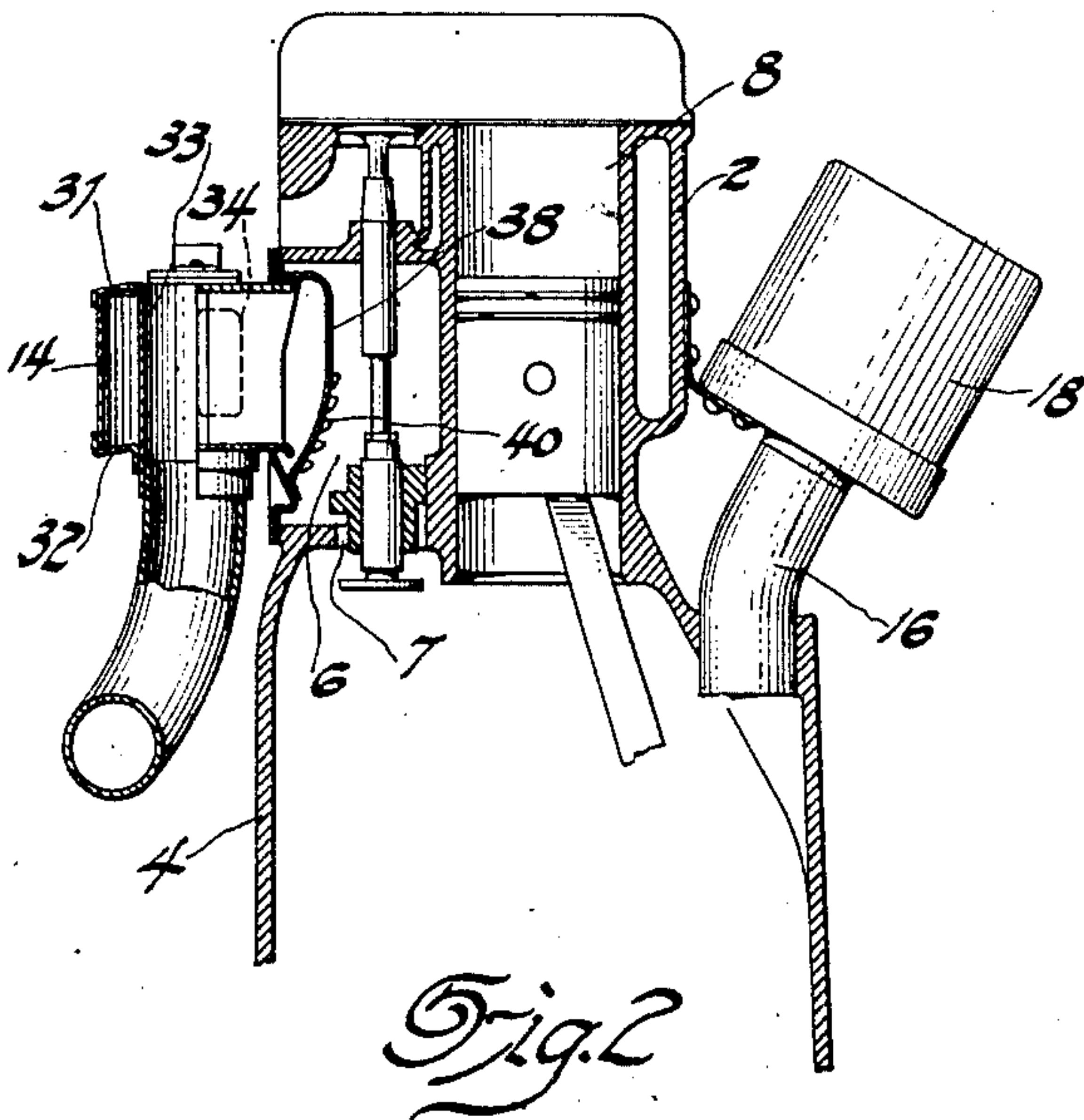
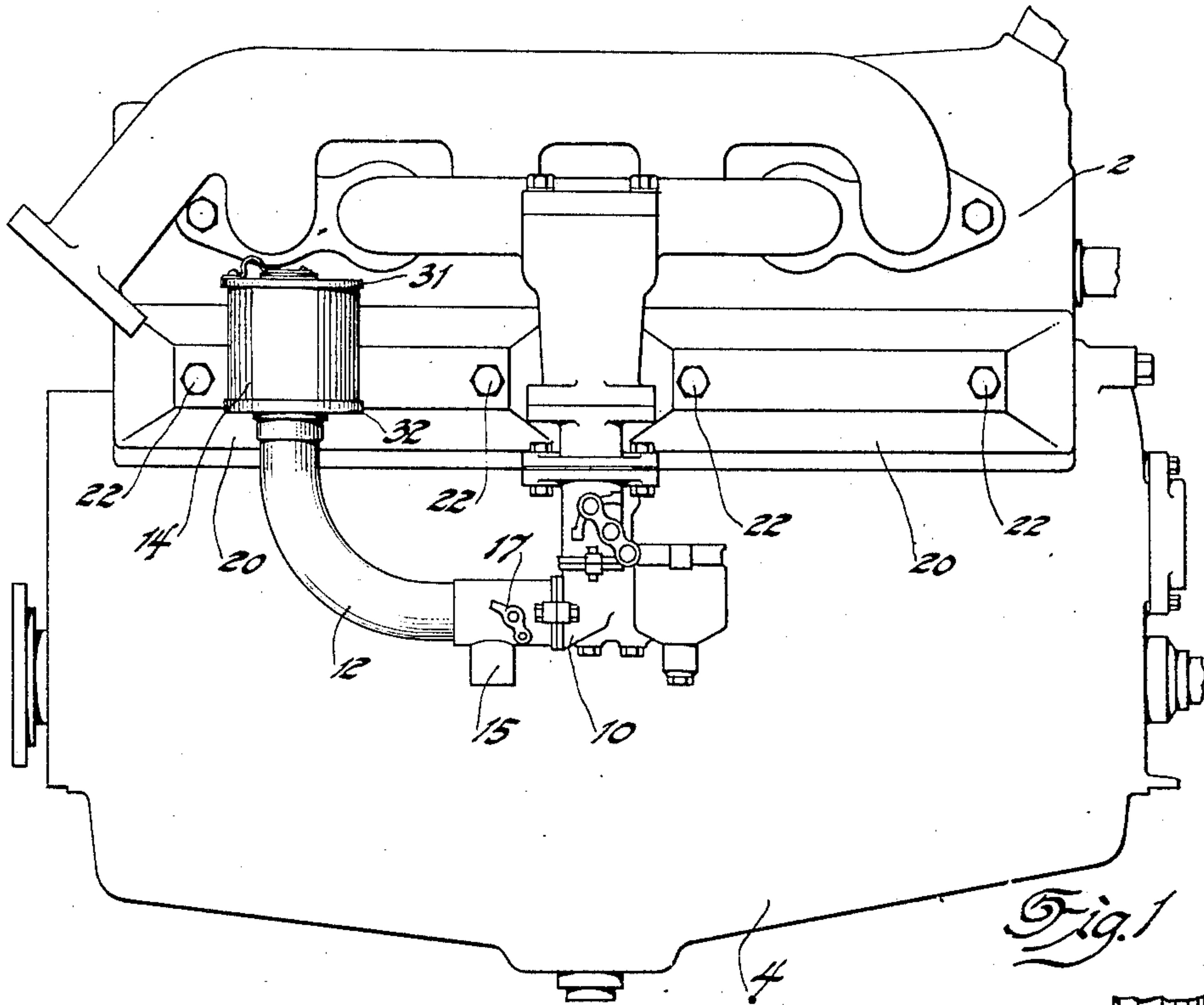
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R. K. JACK

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ENGINE

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## UNITED STATES PATENT OFFICE.

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## ENGINE.

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This invention relates to engines particularly of the internal combustion type having crankcases provided with means for passing an air stream therethrough for effecting  
5 evaporation of diluents from the crankcase oil and incidentally a slight cooling of the engine. In the operation of engines so equipped it has been found that the stream of air in its passage through the crank case entrains with  
10 it fine particles of oil. Where the crankcase vapors are led to the carburetor to form the combustible mixture, these oil particles upon condensation collect upon the needle valve and other parts with which they come in contact and are likely to clog the fine passages  
15 and to some extent "gum up" moving parts. To obviate this difficulty, I employ a separator to remove particles of oil from the vapors issuing from the crankcase. While this separator may be positioned wherever desired in the passage leading from the crankcase to the carburetor, I have preferred to locate it adjacent the crankcase, preferably upon the cover for the valve chamber which, in present  
20 day engines, is in direct communication with the crankcase. I have also preferably so designed my separator as to provide for the return of oil particles to the crankcase.

Referring to the drawings:

30 Figure 1 is a side elevation of an automobile engine with my device applied thereto.

Figure 2 is a partial vertical section through the engine, the separator being shown in section on the line 2—2 of Figure 3  
35 but in reversed relation to the engine to better illustrate the construction.

Figure 3 is a horizontal section through the cleaner and a portion of the valve cover.

The reference character 2 indicates a conventional type of internal combustion engine having a crankcase 4. While this invention is applicable to any of the various types of engines I have chosen to illustrate an engine of the L-head type in which the valve compartment 6 is at one side of the cylinders 8, this compartment housing the valve stems and tappets in the usual manner and having communication with the crankcase through the usual openings 7 through which the valve tappet guides pass. The engine is provided with a conventional carburetor 10 drawing part of its air supply from the crankcase through  
40 conduit 12, oil separator 14, and valve compartment 6, and the remainder through con-

duit 15. A suitable valve, indicated at 17, 55 may be provided to determine the relative proportions of the two components of the air supply. The air drawn from the crankcase is replaced by air entering through conduit 16 which may be provided with air cleaner 18 of  
60 any desired type to prevent dirt from being carried into the crankcase by the entering stream.

The engine illustrated has a plurality of valve compartments 6 each of which is provided with a cover 20 of conventional type secured to the motor block by the usual bolts or studs 22. One of these covers is apertured at 24 and in the opening is fitted the tangentially arranged intake passage 28 of the oil separator. This separator is preferably in the form of a cylinder 30 having end closures 31 and 32 and provided with a substantially centrally arranged stand-pipe 33 which is in communication with the conduit 12 leading to  
70 the carburetor. This stand-pipe is provided with an opening 34 spaced from the bottom closure 32 of the separator and establishing communication between the interior of the separator and the stand-pipe. 80

Upon the interior of the valve cover 20 I have provided baffle plate 38, preferably louvered as at 40, this baffle serving to effect a partial separation of oil particles from the  
85 issuing air stream.

In the operation of the device clean air supplied to the crankcase through the air cleaner 18 and conduit 16 mingles with the oil and oil vapors in the crankcase and effects evaporation of diluents. The resulting mixture passes into valve compartment 6 through opening 7 and thence through louvers 40 into the tangentially arranged passage 28 leading to the oil separator. The effect of the tangential arrangement of passage 28 is to impart to the entering air stream a whirling motion which results in the projection of particles of oil against the outer walls of the separator on which they collect and trickle down upon the bottom 32 of the separator  
90 and eventually find their way through passage 28 to the valve chamber and crankcase. The portion 30 of the spiral passage surrounding the stand-pipe 33 forms an effective trap for the collection of oil particles. This  
105 return flow of oil usually takes place when the engine comes to rest. The location of the opening 34 in the stand-pipe above the



bottom 32 of the separator prevents the passage of the collected oil into the conduit 12 leading to the carburetor. The purified air passes through the opening 34 into the conduit 12 where it is joined by air entering through passage 15, finally entering the carburetor to form the combustible mixture.

The mounting of the oil separator on the valve compartment is of special advantage. In the first place the valve compartment is sufficiently far removed from the crankcase so that the large particles of oil do not reach the outlet. In the second place, the valve cover is usually in the form of a light metal stamping and it is a very easy matter to secure upon it on one side the baffle 38 and on the other side the simple form of oil separator which is also preferably formed of sheet metal disclosed in this application. Thus any modification of the castings constituting the engine is avoided and a satisfactory device is secured at minimum expense.

I claim:

1. An internal combustion engine having a carburetor and a crankcase, said crankcase having an air admission opening, a valve chamber in communication with the crankcase, means for connection said valve chamber with the carburetor to supply air to the latter, and an oil separator interposed in said means and communicating with said valve compartment for receiving air therefrom and returning oil thereto.

2. An internal combustion engine having a carburetor, crankcase, and cylinders, a valve compartment arranged adjacent the cylinders and in communication with the crankcase, a cover for said valve compartment, a conduit leading from said compartment to the carburetor and an oil separator interposed between said conduit and cover and mounted on the latter and arranged to return oil particles to the said compartment.

3. In the combination as defined in claim 2, said separator being provided with a tangentially arranged inlet to give a whirling motion to the entering air stream to separate oil particles therefrom.

4. An internal combustion engine having

a crankcase, means for admitting air to the crankcase, said crankcase being provided with an air outlet, means for withdrawing air from the crankcase through said outlet, an oil separator at said outlet in the form of a cylinder provided with a tangentially arranged air inlet opening to impart a spiral motion to the entering air stream, a centrally arranged discharge pipe within said separator having an opening therein establishing communication with the interior of the separator, said opening being removed from the bottom of the separator.

5. An internal combustion engine having a carburetor and a crankcase provided with an air inlet opening, a valve chamber in communication with the crankcase and provided with a cover, a substantially cylindrical oil separator mounted on said cover and provided with a tangentially arranged air inlet communicating with the valve chamber and designed to impart a whirling motion to the entering air stream, a stand-pipe arranged within said oil separator and having a discharge orifice spaced above the bottom of the separator whereby oil particles separated from the air stream collect in the bottom of the separator and are returned to the valve compartment, and a conduit connecting said stand-pipe with the carburetor.

6. In the combination as defined in claim 5, and a baffle in the valve chamber extending over said air inlet.

7. An internal combustion engine having a crankcase, means for admitting air to the crankcase, a valve chamber in communication with the crankcase, said chamber being provided with an air outlet, means for applying suction to said outlet to withdraw vapors from the crankcase, and an oil separator at said outlet for separating oil particles from the discharging air stream and returning them to the valve chamber.

8. In the combination as defined in claim 7, said chamber being provided with a removable cover and said separator being mounted on said cover.

In testimony whereof I affix my signature.

ROBERT K. JACK.