

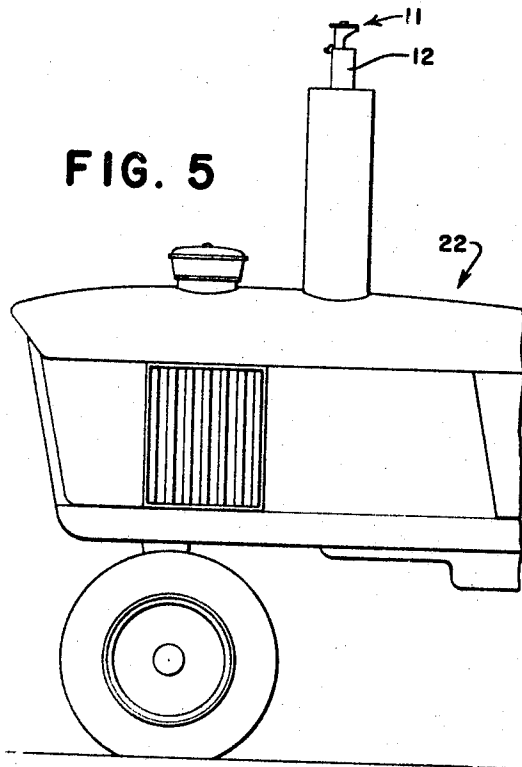
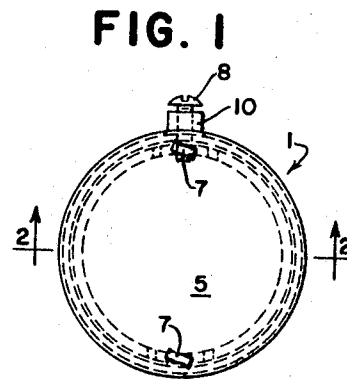
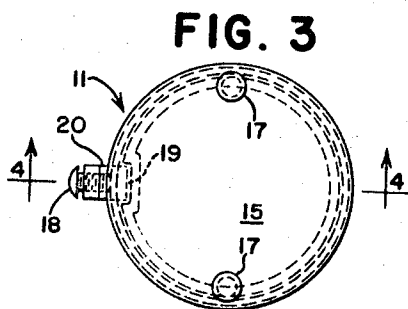
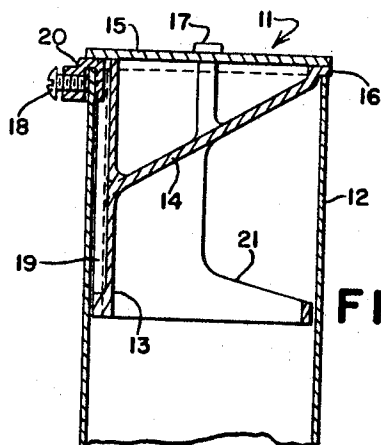
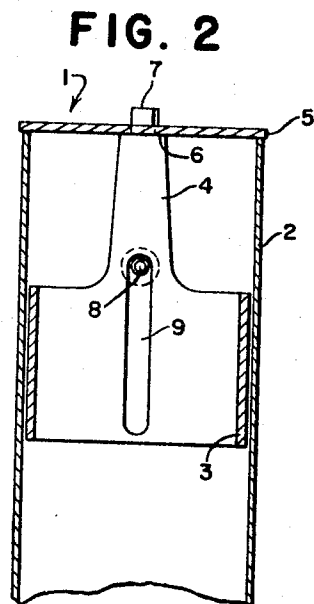
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3,446,010

WEATHER CAP

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3,446,010

WEATHER CAP

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10 Claims

ABSTRACT OF THE DISCLOSURE

A weather cap for vertical exhaust pipes on internal combustion engines including a hollow body slidably received in the exhaust pipe and a closure plate secured to the upper end of the hollow body. The closure plate is of a size to cover the outlet end of the exhaust pipe and the hollow body is provided with at least one opening in its side wall to allow the escape of exhaust gases when exhaust pressure acting on the closure plate lifts the weather cap.

Background of the invention

This invention relates generally to weather caps for vertical exhaust pipes on internal combustion engines.

When an engine is provided with a vertical exhaust pipe, some precaution must be taken to prevent moisture such as rain and snow from entering the exhaust pipe. To date, the generally accepted way to prevent moisture from entering a vertical exhaust pipe is to provide the pipe with a pivoted cap. Such pivoted caps have not been entirely satisfactory in that they tend to chatter during use and thereby cause undue noise, and also they were easily blown open by wind.

Summary of the invention

The objects of the present invention are to overcome the above-mentioned disadvantages by providing a weather cap which is mounted inside the exhaust pipe with provision being made for vertical sliding movement such that the exhaust gas pressure from the engine will vertically raise the cap and the gases will escape through an opening provided in the side of the cap. In the absence of exhaust pressure, gravitational forces will slide the cap down to cover the pipe. Since the cap has only a vertical component of movement, it cannot be opened by wind.

In one embodiment of the invention, the bottom surface is inclined to deflect the exhaust gases from the vertical direction to the horizontal direction and out through the opening provided in the cap. This change in direction of the exhaust gases will provide a horizontal force against a wall of the cap, and, through the action of frictional forces, will prevent the continual opening and closing action or chattering noise present in the pivoted weather cap.

Brief description of the drawings

Other objects, advantages, and features of the invention will appear from a reading of the following illustrative description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a top plan view of a weather cap according to the instant invention mounted in an exhaust pipe.

FIG. 2 is a cross-sectional view taken substantially along the line 2—2 of FIG. 1.

FIG. 3 is a view similar to FIG. 1, but showing a modified form of weather cap.

FIG. 4 is a cross-sectional view taken substantially along the line 4—4 of FIG. 3.

FIG. 5 is a diagrammatic view of the invention mounted on the vertical exhaust pipe of a conventional tractor.

Description of the preferred embodiment

With reference to the drawings, and in particular to FIGS. 1 and 2, one embodiment of the weather cap according to the instant invention is indicated in its entirety by the numeral 1. The cap 1 is mounted within a vertical exhaust pipe 2. The cap includes a hollow cylindrical body member 3 which fits inside the exhaust pipe with sufficient clearance that it can move up and down freely. The body member terminates in a pair of diametrically opposed upwardly extending standards 4 which support a closure plate 5. The closure plate 5 rests on upwardly facing shoulders 6 provided on the standards 4 and is held in position by a pair of tabs 7 which are an integral part of the standards. The tabs 7 can be twisted, as illustrated, or otherwise bent out of the vertical plane to secure the closure plate in position on the standards.

The operation of the weather cap will now be readily apparent. The exhaust gases will act against the closure plate and vertically lift the entire weather cap. The body member 3 will guide the cap so that its movement will be restricted to vertical components. As the cap is lifted, the exhaust gases can escape through the openings provided between the body portion 3 and the closure plate 5 by the standards 4. When the internal combustion engine is turned off so there is no longer exhaust gases within the exhaust pipe, gravity will act on the weather cap to slide the body portion and standards back into the exhaust pipe so that the closure plate can rest upon the exhaust pipe and thereby close it off to outside moisture.

In order to prevent the weather cap from being lifted completely out of the exhaust pipe by the pressure of the gases, a stop member is provided. This stop member can be in numerous forms, but in the embodiment shown in FIGS. 1 and 2, it takes the form of a setscrew 8 which passes through the side of the exhaust pipe and into a slot 9 provided in the body portion 3 and one of the standards 4. If the exhaust pipe is constructed of a material that is not of sufficient strength to securely hold the setscrew, a threaded boss 10 can be secured, as by welding, to the outer surface of the pipe to add the rigidity necessary to hold the setscrew. The cap can be made of sufficient length so that the stop is used only infrequently.

Referring now to FIGS. 3 and 4, a second embodiment of a weather cap according to the instant invention is indicated in its entirety by the numeral 11 and is shown mounted within a vertical exhaust pipe 12. The cap 11 includes a cylindrical body member 13 which has sufficient clearance within the pipe so that it can move up and down freely. An inclined plate 14 is provided within the cylindrical body member 13 and extends from approximately midway the length of the body member at one side thereof to the upper end of the body member at a diametrically opposed side thereof. The upper portion of the cylindrical body member terminates in an outwardly directed horizontal flange 16 which will rest upon the upper edge of the exhaust pipe.

A portion of the wall of body member 13 under the inclined plate is removed, as indicated at 21, to allow for the escape of the exhaust gases. The location of the opening provided by the removed wall portion is such that when gases strike the inclined plate 14 and are deflected from their vertical direction of travel to a horizontal direction of travel, they will pass directly out the opening.

A portion of the cylindrical body member which is diametrically opposed to the opening in the body member is recessed inwardly as indicated at 19 to provide a groove which will receive the inner portion of a clip 20 placed over the upper portion of the exhaust pipe. The clip 20 is held in position by setscrew 18. The groove extends longitudinally of the body member from the top surface thereof down to a lower portion thereof. The lowermost

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portion of the body member is not recessed, and this portion of the body member, in cooperation with the clip 20, serves as a stop to limit the upward movement of the weather cap so that the pressure of the exhaust gases cannot remove the entire cap from the exhaust pipe.

A closure plate 15 rests on the upper surface of the cylindrical body portion 13 and is secured thereto by any suitable means such as the rivets 17.

The weather cap illustrated in FIGS. 3 and 4 functions in the same manner as the cap illustrated in FIGS. 1 and 2, but has several advantages. The direction of exhaust can be controlled by loosening the screw 18 and moving the clip 20 around the exhaust pipe. As the clip is moved about the exhaust pipe, the cap must rotate within the pipe due to engagement by the clip with the sides of the groove. Also, the exhaust gases striking the inclined plate will create a horizontal force component which, through the action of frictional forces, will prevent the continual opening and closing action which creates the chattering noise in the pivoted type cap.

In FIG. 5 there is illustrated a portion of a conventional tractor 22 which has a vertical exhaust pipe 12 with a weather cap according to the present invention incorporated therein. The weather cap is illustrated in the raised position which it will assume while the tractor is in operation.

Although only two embodiments of the present invention have been described and illustrated, it should be understood that other embodiments may exist and obvious variations may be made, all without departing from the spirit and scope of this invention.

I claim:

1. A weather cap for vertical exhaust pipes on internal combustion engines, said cap including a hollow body member which is adapted for insertion into an exhaust pipe, said body member having an outer contour substantially the same as the inner contour of the exhaust pipe and being of a size to freely slide within the exhaust pipe, a closure plate secured to the upper end of said body member and having an outer perimeter at least as large as the perimeter of the opening in the exhaust pipe whereby said closure plate will close the outlet end of the exhaust pipe when said hollow body member is inserted into the exhaust pipe and will limit the downward movement of said hollow body member into the exhaust pipe, and there being at least one opening provided in the wall of said body member, whereby exhaust gas pressure may freely raise said weather cap and escape through the opening provided in the wall of the hollow body member and upon release of the exhaust gas pressure said weather cap may freely slide downwardly to close off the outlet end of said exhaust pipe.

2. A weather cap according to claim 1 wherein stop means are provided to limit the upward movement of said hollow body member out of said exhaust pipe.

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3. A weather cap according to claim 2 wherein said stop means includes an elongated vertical slot provided in the hollow body member and a screw extending through the exhaust pipe into said slot.

4. A weather cap according to claim 2 in which said stop means includes clip means secured over a wall of the outlet end of the exhaust pipe, said clip means being engageable with a portion of said hollow body member when said cap is in its fully-raised position.

5. A weather cap according to claim 4 in which guide means are provided to allow adjustment of the direction of escape of exhaust gases.

6. A weather cap according to claim 5 in which said guide means includes a vertical groove provided in the outer surface of the wall of said hollow body member, said groove slidably receiving a portion of said clip means which is positioned within said exhaust pipe, the bottom wall of said groove constituting the portion of said hollow body member which is engageable with said clip means when said cap is in its fully raised position.

7. A weather cap according to claim 1 which further includes an inclined plate provided within said hollow body member, said inclined plate extending from a point on the wall of the hollow body portion directly above the opening to a point on the wall of the hollow body portion which is opposed to and substantially below the uppermost portion of the opening.

8. A weather cap according to claim 7 in which guide means are provided to allow adjustment of the direction of exhaust gases.

9. A weather cap according to claim 8 in which said guide means includes groove means provided in the outer surface of the wall of said hollow body member, and a releasable clip secured over a wall of the outlet end of the exhaust pipe and extending into said groove means.

10. A weather cap according to claim 9 in which said groove means extends from the upper end of said hollow body member downwardly to a point just above the bottom end of said hollow body member, the bottom end of said groove means serving as an abutment which will engage said clip means to limit the upper movement of said cap.

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(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,446,010 Dated 27 May 1969

Inventor(s) Richard Bruce Hopkins

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 15, change "outher" to -- outer --;
line 30, after "of" insert -- escape of --; line 39,
change "botom" to -- bottom --.

SIGNED AND
SEALED

OCT 28 1969

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents