Oct. 29, 1968 A. M. WESTERMAN 3,407,720

EXHAUST COVER

Filed Jan. 3, 1967

FIGURE 1

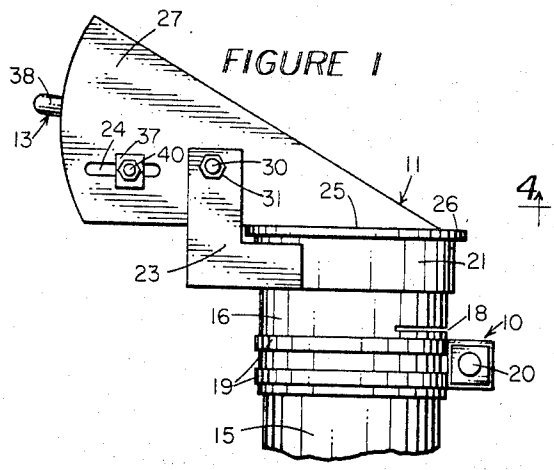


FIGURE 3

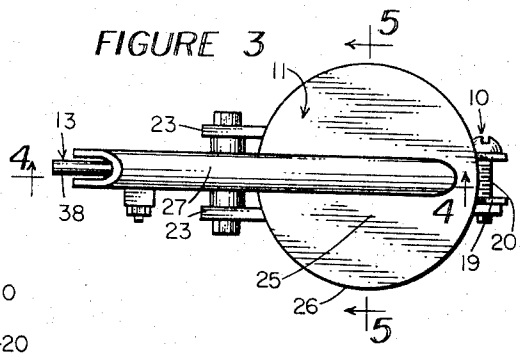
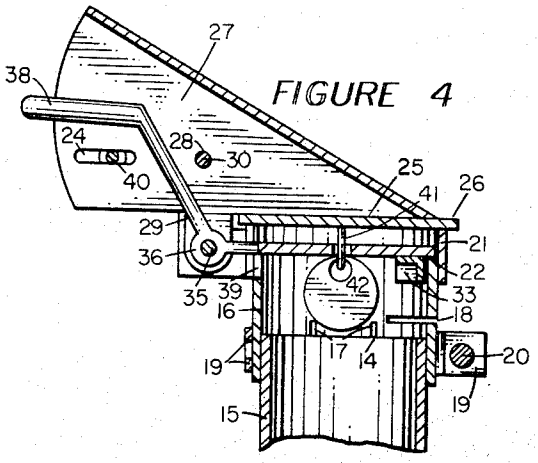


FIGURE 4



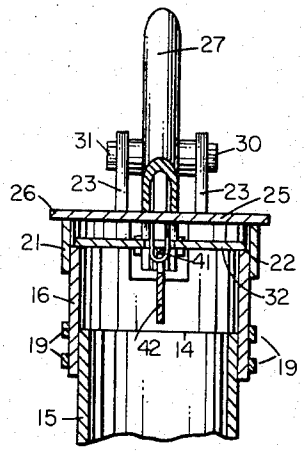


FIGURE 5

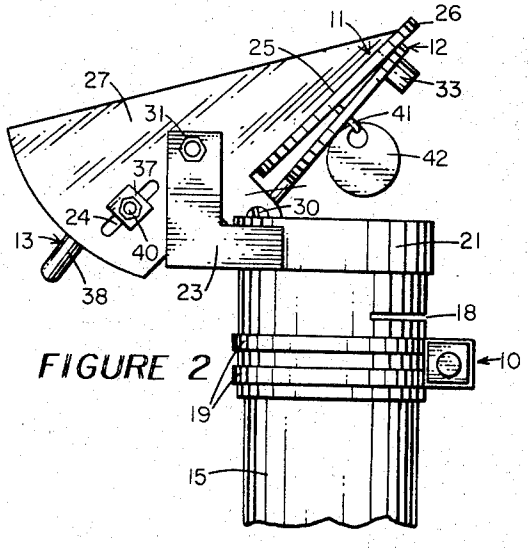


FIGURE 2

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EXHAUST COVER

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ABSTRACT OF THE DISCLOSURE

A cover movably associated with a mounting structure adapted to mount the cover over the top of a substantially vertical exhaust pipe to prevent entry of debris into the exhaust channel. The cover opens in response to exhaust gas pressure and has associated catch mechanism to prevent opening in response to physical forces external to the exhaust channel, such as wind.

My invention relates generally to a cover for vertical exhaust pipes and more particularly to such a cover that is pivotably mounted to open to allow normal exhaust escape but may not be opened by wind forces external to the exhaust pipe.

Many vehicles and machines having vertical or substantially vertically oriented exhaust pipes normally stand without cover during operation and oftentimes for extended storage periods. During such periods natural moisture, particularly rain, snow and the like, is relatively free to enter the exhaust pipe and be conveyed to some degree therethrough to the operating mechanism of the machine. This condition is not desirable because of the deleterious physical effects it may have upon the machine.

In response to the problem various caps have become known to prevent the ingress of debris through the exhaust pipe.

Such caps as are known are generally moveably mounted, for vertical or pivotable motion, to allow escape of exhaust gases, when present, from about the cap. Generally such caps have been biased to a normally closed position and are automatically opened by pressure of the exhaust gas. Manually operated caps have not been popular because of the effort involved in initial opening and the high probability of forgetting to close the cap upon cessation of use.

In the use of known automatically opening caps, it is generally possible for a wind of normal force, appropriately directed, to open the cap other than in response to exhaust gas pressures. If the cap be so opened, especially during an extended storage period, there will be no notice of it by an operator and the cap will cease to serve its purpose. With these thoughts in mind the instant invention was conceived to provide a cap not operable by the wind. In so doing it is:

A principal object of my invention to provide a cover for a vertically oriented exhaust pipe, having a pivotably mounted cap biased to a normally closed position but openable automatically by exhaust gas pressure, with auxiliary means of maintaining said cap in a closed condition against external wind forces exerted thereon.

A further object of my invention to provide such a cover that has external means of manually opening said cap, other than by pressure of exhaust gases from inside said exhaust system.

A still further object of my invention to provide such an exhaust cover that prevents substantially all physical debris from entering the exit orifice of a substantially vertically oriented exhaust pipe including particularly various naturally occurring aqueous matter.

A still further object of my invention to provide such

a device that is of new and novel design, of simple and economic manufacture and operation, of durable and rugged nature, and one that is otherwise well adapted to the uses and purposes for which it is intended.

These and other objects of my invention will become apparent from consideration of the following specification and the accompanying drawings which form a part of this application. In carrying out the objects of my invention, however, it is to be understood that its essential features are susceptible of change in design and arrangement with only one preferred practical embodiment being illustrated and specified, as required.

In the accompanying drawings, wherein like numbers of reference refer to similar parts throughout:

FIGURE 1 is a vertical orthographic side view of my invention in closed condition upon the upper exit orifice of a vertical exhaust pipe.

FIGURE 2 is a similar view of the same device illustrated in FIGURE 1, shown in an open condition.

FIGURE 3 is an orthographic plan view of the invention illustrated in FIGURE 1 showing its various parts, their configuration, and arrangement from this aspect.

FIGURE 4 is a medial vertical cross-sectional view of the invention of FIGURE 3, taken on line **4**—**4** thereon in the direction indicated by the arrows.

FIGURE 5 is a medial vertical cross-sectional view of the invention of FIGURE 3, perpendicular to that of FIGURE 4, taken on the line **5**—**5** on FIGURE 3 in the direction indicated by the arrows thereon.

Referring now to the drawings in greater detail and particularly that of FIGURE 1, it will there be seen that my invention comprises generally the mounting structure **10** pivotably mounting external covering cap **11** and internal catching cap **12** manually operable through opening means **13**. The invention is releaseably positioned about the uppermost exit orifice **14** of a substantially vertically oriented exhaust pipe **15** operatively carried by some machine (not shown).

Mounting structure **10** comprises cylindrical body **16** of such size and configuration as adapted to fit about the outer peripheral surface of exhaust pipe **15**. This body preferably is provided with plural vertical slits **17** allowing it to be more readily deformed to fit securely about an exhaust pipe, especially if there be some slight size variance, and at least one horizontal slit **18** in its upper part above its communication with exhaust pipe **15** to allow small amounts of air or exhaust gas to pass through the exhaust system without the opening of external covering cap **11**. A narrow cylindrical band **21** is provided about the upper extension of the outer periphery of body **16** to provide a shoulder **22** formed by the upper surface of body **16**, to receive the internal cap **12**; this band and body are preferably rigidly joined by welding or similar structural attachment. The body is fastened in place on exhaust pipe **15** by cooperating fastening band **19** and tightening nut-bolt combination **20** adapted to elastically deform the lower portion of cylinder body **16** to increase its frictional engagement with the exhaust pipe.

L shaped cap support arms **23** are structurally attached to upper band **21** of the body member to project upwardly and rearwardly therefrom to provide a pivot support for the caps **11**, **12**. Appropriate paired opposed holes are rovided in the upper ortion of the vertical extension of the cap support arms to pivotably receive the covering cap axle.

External covering cap **11** includes disk-like cover **25**, of a radius somewhat greater than that of upper band **21** of the mounting structure **10**, so that lip **26** projects laterally outward thereover. This lip is desirable to prevent ingress of water through the upper opening of band **21** but in cap

structures not embodying my invention this feature is deleterious because it provides a horizontal surface of which upwardly directed wind forces may operate to open the covering cap.

The covering cap structurally communicates with upwardly and laterally extending pivot arm **27**. In the instance illustrated this pivot arm is shaped in a cross-sectional U form from sheet metal. Appropriate holes **28** are provided in this member to cooperate with holes in cap support arms **23** to pivotably mount the unit. Downwardly depending catch cap mounting arm **29** is provided in the lower part of pivot arm **27**, lateral of the mounting structure, to provide for pivotable support of the catch cap.

Opposed slots **24** are provided in the mounting arm to receive adjustable weight **37** releasably positioned relative the slots by nut-bolt combination **40**, to allow variation of the eccentric mass of the member about its pivot point and thusly to vary the force of exhaust gases required to open the cover.

Pivot arm **27** is pivotably supported between cap support arms **23** by bolt **30**, extending through the holes in the cap support arms and holes **28** in the pivot arm, and maintained in position by cooperating nut **31**. This mounting is preferably by releasable means to provide for simple manufacture, assembly and replacement of parts.

Internal catch cap **12** includes circular disk-like cover **32** of a configuration similar to that of the body of mounting structure **10**, and of a size to allow the member to fit within the inner periphery of upper band **21** but rest upon and be supported from below by shoulder **22**, as illustrated particularly in the cross-sectional view of FIGURE 4. Curved catching dog **33** structurally communicates with the undersurface of cap **32** in its forward extension. The dog must be so configured in its downward extension and so spaced in its forward extension to allow upward pivotable motion of cap cover **32** about its pivotable mounting.

Disk weight **41** is movably mounted by eye **42** on the central lower surface of the catch cover to prevent undesirable fluttering or vibration of this member, particularly in response to variation in pressure of exhaust gases.

The rearward portion of the catch cover communicates with bell crank-like raising arm **34** pivotably mounted between opposed cap mounting arms by axle **35** extending through holes **36** in the mounting arms and cooperating holes in the raising arm. Preferably the raising arm projects between the legs of the pivot arm for cover of the member but the handle portion **38** of the arm must project rearwardly beyond the raising arm for manual manipulation. These requirements result generally in a bell crank type structure as illustrated.

A hole **39**, configured and positioned to allow passage of cap mounting arms **29**, is provided in the upper portion of band **21** and body **16**, as the case may require to allow the depending catch mounting arms to move pivotably within the body **16** when the cover cap is raised.

With the foregoing description of the structure of my invention its operation can be understood.

The external covering cap structure is designed as shown in FIGURE 1, to protect the upper orifice of exhaust pipe **15** when in a normally closed position. The member is pivotably mounted on arm **27** by bolt **30** and is formed so that the structure is slightly overbalanced to a closed position by greater weight on the forward side of the pivot point. Obviously other mechanical means of so biasing the structure might serve the purpose of my invention, if not so simply or so well.

External cover **11**, when it opens, pivots about axle **30**; at the same time catch cover **32** will pivot about axle **35**. As illustrated, there is greater redial distance between the forward lower surface of catching dog **33** and axle **30** than there is between this member and axle **35**. With axle **35** on the same frame and offset from axle **30**, axle **35** will tend to pivot in a forward direction upon pivotable motion of the cover cap tending to open. Obviously then, if the catch cap be in its normally lowered position and any external force be exerted upon the covering cap structure **11** tending to open it, the covering cap will be prevented from opening by the lower forward surface of catching dog **33** of catch cover **32** coming into engagement with the upper internal surface of body **16** of the mounting structure. If cover **11** is to be raised, the catching cap **12** must first be raised so that it may not come into engagement with body **16**. This may be done by upward pressure of exhaust gases presented through exhaust pipe **15** or by manual manipulation of the handle **38** of raising arm **34**.

Catch cap **32** is similarly biased by an eccentric mass to a downward position with catch dog **33** extending below axle **35**. Obviously, again such biasing might be by other mechanical means known in the art.

It is to be noted from the foregoing description of my invention that when the external cover of my invention is in its normally biased closed position it will maintain the upper exit orifice of a vertical exhaust pipe free from ingress of debris.

It is further to be noted that the cover will remain in closed position against external forces until such time as the auxiliary catch cover be raised from its normally biased position, either manually or by forces within the exhaust system.

The foregoing description of my invention is necessarily of a detailed nature so that a specific embodiment of it may be set forth, as required, but it is to be understood that various modifications of detail, rearrangement and multiplication of parts may be resorted to without departing from its spirit, essence or scope.

Having thusly described my invention, what I desire to protect by Letters Patent, and

What I claim is:

1. In a compound exhaust cover adapted to be maintained in closed condition against external force on a substantially vertically oriented cylindrical exhaust system, the improvement comprising:

a mounting structure carried by the upper part of an exhaust system with a cap support arm extending thereabove;

a first external covering cap, biased to operatively cover the upper orifice of said exhaust system, mounted for upward pivotal motion, on an axle carried by the cap support arm laterally from and above the exhaust system;

a catch cap pivotably mounted upon said exhaust system radially inward of said covering cap mounting, said catch cap being carried within the internal periphery of said exhaust system and having a depending catching dog to engage said internal periphery upon pivotable motion of said system about said covering cap pivot but not on motion about said catch cap pivot; and

means for limiting the maximum motion of said covering cap relative to said catch cap.

2. An exhaust cover or the nature aforesaid, for use with a substantially vertically oriented exhaust pipe, comprising, in combination:

a cylindrical mounting structure releasably positionable on the uppermost part of a substantially vertically oriented exhaust pipe and extending thereabove with a catch cap shoulder therein;

a cap support arm communicating with said mounting structure and extending laterally thereabove;

an external covering cap covering the upper vertical orifice of said mounting structure, having an upwardly extending support arm pivotably communicating with the upper lateral portion of said cap support arm, said covering cap support arm being mechanically biased to a normally closed position but pivotably moveable thereform;

a catch cap, pivotably mounted on said support arm

radially inward of said cover cap mounting, carried under said covering cap and within the internal periphery of said mounting structure and supported the catch cap shoulder against vertical motion therebelow, said catch cap having a forward depending catching dog configured to engage said mounting structure upon upward pivotable motion of said cover cap but not on upward pivotable motion of said catch cap, the said cover cap being mechanically biased to a normally closed position; and

means for limiting the maximum motion of catch cap relative to the covering cap.

3. The invention of claim 2 wherein said cap support arm is mechanically biased to a normally closed position by a weight adjustably positionable to vary the eccentric mass of said covering cap structure.

4. The invention of claim 2 wherein the means of limiting motion of the catch cap relative the covering cap is further characterized by a central eye on the lower surface of said covering cap extending through a slot in said catch cap and moveably mounting a weight therebelow to bias said catch cap to a normally downward position to prevent flutter.

5. The invention of claim 2 further characterized by an externally projecting bell crank-like operating arm communicating irrotatably with said catch cover to aid in manual manipulation thereof.

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