United States Patent

Foote

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[54] EXHAUST PIPE PROTECTOR LOCK

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[73] Assignee: **Master Lock Company,** Milwaukee, Wis.

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[52] **U.S. Cl.**.....**70/159,** 70/53, 70/180, 70/203, 98/59

[51] **Int. Cl.**.....**E05b 65/12,** B60r 25/04

[58] **Field of Search**.....70/20, 39, 53, 57, 159, 177, 70/180, 240; 98/59; 137/383, 527.6

[56] **References Cited**

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[57] **ABSTRACT**

For the protection of the outer end portion of an internal combustion engine exhaust pipe, a protector is available which includes a collar secured to the outer end portion of the exhaust pipe hingedly carrying a protective cover formed with a weighted, radially outwardly projecting fin. The cover normally overlies and closes the open outer end of the exhaust pipe to which it is applied but will hingedly move to open position through exhaust gas pressure. This invention provides a lock for securing the cover in its closed position to prevent the undesired introduction of foreign material into the discharge end of the exhaust pipe when the engine is not being operated and the equipment or vehicle embodying the engine is idle and unattended.

10 Claims, 6 Drawing Figures

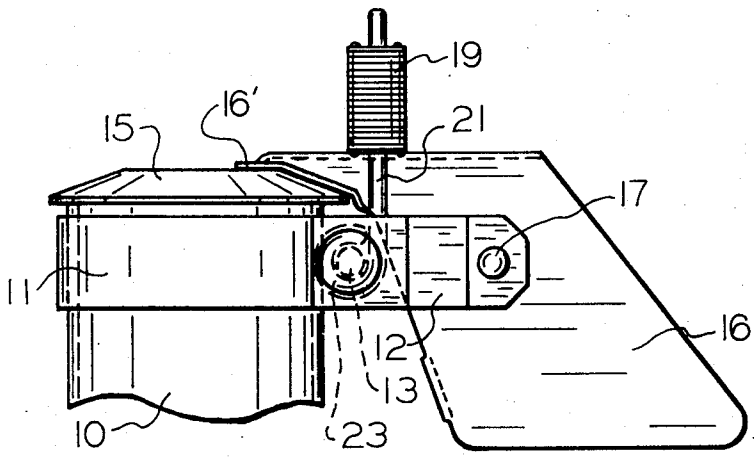


FIG - 1

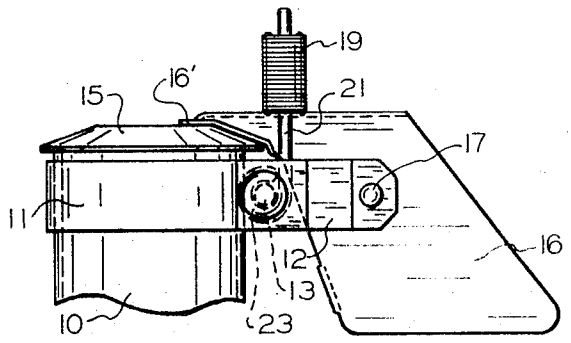


FIG - 2

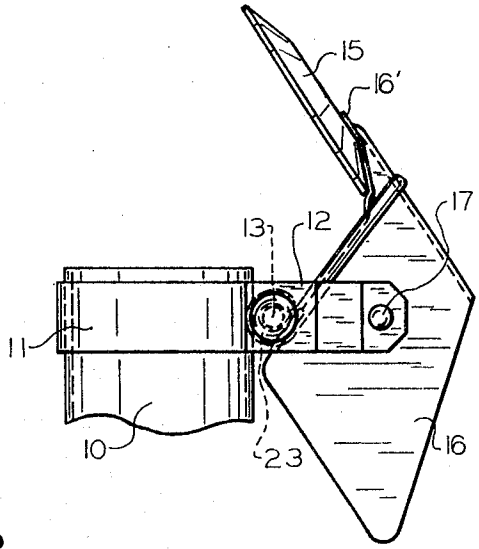


FIG - 3

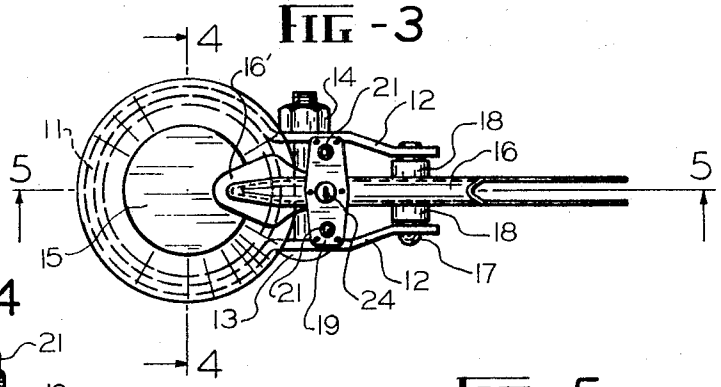


FIG - 4

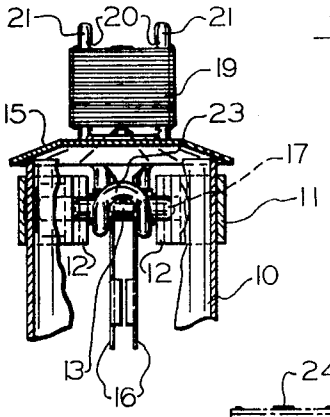


FIG - 5

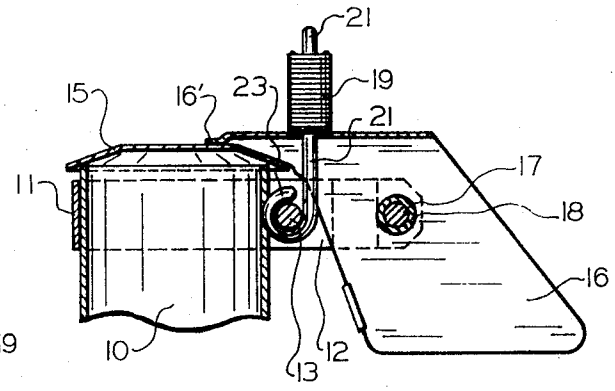
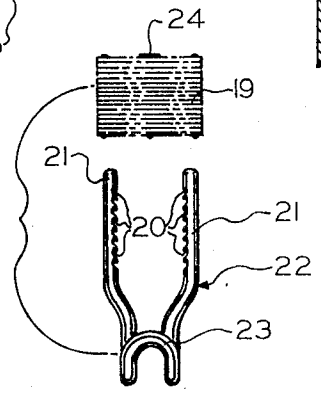


FIG - 6



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EXHAUST PIPE PROTECTOR LOCK

BACKGROUND OF THE INVENTION

While a conventional exhaust pipe protector in the form of a hingedly mounted cover serves its intended purpose and can normally move to and from its closing position, if the equipment embodying an internal combustion engine and its exhaust pipe is left unattended with the engine shut off there is no means, normally, of preventing a vandal or tamperer from manually opening the protective cover and introducing damaging foreign material into the exhaust pipe. To guard against this undesirable contingency, the present invention provides a padlock wherein the padlock body may be adjustably locked onto the legs of a specially formed shackle in impinging relation to a weighted fin which projects radially outwardly from the protective cover and which is interposed between and hingedly associated with the projecting straps on the collar which surrounds the open outer end of the engine exhaust pipe and secures the cover in opening and closing relation to the discharge end of said exhaust pipe. The collar straps are also joined by a nut carrying clamping bolt forwardly of an edge of the collar fin and the shank of said bolt is non-detachably engaged by the curled closed end of a specially formed padlock shackle. The shackle is positioned so that its legs extend upwardly on opposite sides of the cover fin. When it is desired to lock the cover onto the exhaust pipe end the padlock body is adjustably applied to the shackle legs and is locked thereon in a position of overlying impingment with the top of the cover fin. Thus, if an unauthorized attempt is made to open the cover it is precluded by the engagement between the cover fin and the padlock body. However, when the equipment is to be used and the engine operated, an authorized person may unlock the padlock body with the proper key and remove the padlock body from the shackle legs, eliminating the blocking contact with the cover fin, whereupon said protective cover may automatically open and close relative to the exhaust pipe in its normal manner.

Applicant is not aware of any prior art pertaining to locks for exhaust pipe protectors.

SUMMARY OF THE INVENTION

A general object of the invention is to provide a lock for an exhaust pipe protector which when applied and secured will prevent the exhaust pipe protector from being surreptitiously opened, but which, when applied, will prevent the protector from being opened relative to its exhaust pipe end.

A further object of the invention is to provide an exhaust pipe protector lock which may be applied to a standard exhaust pipe protector without any modification of the latter and which is readily detachable and portable.

Still further objects of the invention are to provide an exhaust pipe protector lock which is simple in design and construction, easy to manipulate and apply to or remove from an exhaust pipe protector, which is strong and durable and relatively inexpensive, and which is otherwise well adapted for its intended purposes.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing wherein the same reference characters indicate the same or similar parts in all of the views:

FIG. **1** is a side view of a collar and protective hinged cover assemblage applied to the outer end of an internal combustion engine exhaust pipe, the cover assemblage being equipped with the improved padlock shown in its secured position with the padlock body adjustably locked onto the padlock shackle legs and locking the cover in its pipe closing position;

FIG. **2** is a similar view only with the padlock body released and removed and showing the protective cover in an open position;

FIG. **3** is a plan view of the showing in FIG. **1**;

FIG. **4** is a fragmentary cross-sectional view taken approximately on line **4—4** of FIG. **3**;

FIG. **5** is a longitudinal vertical sectional view taken approximately on line **5—5** of FIG. **3**; and

FIG. **6** is an exploded front elevational view of the padlock body and shackle.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Although not limited thereto, the improved lock finds particular utility in connection with the exhaust pipe **10** of the exhaust systems of internal combustion engines incorporated in tractors, farm equipment, irrigation equipment, compressors, generator units, oil field equipment, and engines of the diesel or propane type.

The mounting collar of an available exhaust system protector is indicated by the numeral **11** and it is clamped around the open outer end portion of the exhaust pipe **10**, being formed with a pair of integral but spaced-apart laterally projecting straps **12** which are joined toward their inner ends by a transverse bolt **13** carrying a nut **14**. When the latter is tightened the non-displaceable clamping of the collar **11** onto the outer end portion of the exhaust pipe **10** is effected.

The exhaust system protector also includes a cover **15** of circular contour adapted to overlie the outer end of the exhaust pipe **10** in opening and closing relation thereto. The attaching plate portion **16'** of a weighted, laterally projecting fin **16** is rigidly secured to a top portion of the cover **15** in a manner so that the fin **16** will be oscillatably interposed between the collar straps **12**, being hingedly joined thereto by a transverse pin or pintle **17** carrying spacer collars **18**. The weighted fin **16** is shaped as shown in the drawing and may move from the position of FIG. **1** (When the cover **15** is closed) to the approximate position of FIG. **2** (when the cover is opened).

The available exhaust pipe protector above described and devoid of the improved lock can automatically move from its closed position of FIG. **1** to a degree of opening by the pressure of exhaust gases flowing outwardly through the exhaust pipe **10** when the engine is operating. When closed, as in FIG. **1**, the cover protects the open outer end of the exhaust pipe against the undesired entrance of dirt, sand or other foreign material. However, equipment which includes the exhaust pipe protector may be left idle and unattended and it has been found that vandals and tamperers may surreptitiously manually open the cover **15** and introduce damaging foreign material into the exhaust pipe **10** of the unattended equipment. The objective of the present invention is to provide an exhaust pipe protector lock which will forestall the last-mentioned undesirable contingency. The lock per se, and in combination with the exhaust pipe protector assemblage, will now be described in detail.

A padlock body is indicated by the numeral **19** and is of ordinary construction and its internal locking mechanism is adapted to engage selected notches **20** in the inserted legs **21** of a specially formed padlock shackle **22** when the padlock body is engaged with the shackle legs in the normal manner. As is best shown in FIGS. **4**, **5**, and **6** the closed end of the shackle is curled, as at **23**, with said curled portion non-displaceably engaging an intermediate portion of the transverse bolt **13** which connects the collar straps **12**. The shackle legs **21** are slightly outwardly bowed and extend upwardly from the curled end **23** on opposite faces of the fin **16** and thereabove, providing ample room for the engaged padlock body **19**.

The operation and use of the improved exhaust pipe protector lock is obvious. When it is desired to lock the exhaust pipe cover in its closed position to prevent opening thereof and undesired exposure of and access to the outer end of the exhaust pipe **10**, the padlock body **19** is engaged with the extended portions of the padlock legs **21** and is pushed downwardly until the bottom of the padlock body firmly engages and seats on the top of the fin **16**, whereupon the internal locking mechanism (not shown) will engage proper shackle leg notches **20**. The padlock body **19** is thus locked in adjusted position on the shackle legs **21** in such engagement with or proximity to the top of the fin **16** that it is impossible to hingedly move the cover **15** to an open position, whereby the outer end of the exhaust pipe **10** remains guarded, all as is shown in FIGS. **1**, **3**, **4**, and **5**.

When it is desired to operate the equipment with its engine running and the exhaust pipe cover released for normal hinging movement, the authorized possessor of the proper key for the padlock can insert it in the key-hole **24** and turn it to release the body locking mechanism. Thereupon the padlock body may be withdrawn from the padlock body free of the top of the fin **16** and when gases seek to exhaust from the pipe **10** the pressure of the gases will hingedly move the cover to an open position, as in FIG. **2**. When pressure against the cover wanes or ceases, the weight of the cover and its attached fin will hingedly return the cover to its closed, protective position. Also the cover may be manually opened.

The improved exhaust pipe protector lock when applied, provides an efficient means for locking the protector cover in closed relation on its exhaust pipe. When the lock is released the protector cover may function in its normal manner. The lock besides being easy to apply and operate is compact and portable, of simple construction, and well adapted for the purposes described.

What is claimed is:

1. In combination, an exhaust pipe having a discharge end; a protector for the latter including a relatively stationary member and a relatively movable member for normal movement to and from closing relation to the discharge end of the exhaust pipe; and a shackle-equipped padlock having the outer end portion of its shackle anchored to said relatively stationary member and having its body releasably locked to the shackle in movement blocking relation to said movable member.

2. The combination recited in claim **1** wherein the outer end portion of the padlock shackle is rockingly curled about a portion of said relatively stationary member.

3. The combination recited in claim **1** wherein the padlock body may be unlocked relative to the shackle legs and removed therefrom to permit said movable member to move to and from the discharge end of the exhaust pipe.

4. The combination recited in claim **1** wherein the relatively stationary member of the protector is secured about the discharge end of the exhaust pipe.

5. The combination recited in claim **4** wherein the relatively stationary member of the protector is formed with a lateral extension to which the movable member is hingedly connected.

6. The combination recited in claim **1** wherein both the stationary and movable members of the protector are formed with extensions with the extension on the stationary member being hingedly connected to the extension on the movable member.

7. The combination recited in claim **6** wherein the legs of the padlock shackle straddle the movable member extension.

8. For an exhaust pipe protector which includes a mounting member applied to the open end of the exhaust pipe and a cover for the latter having an extension hinged to the mounting member, the improvement which comprises: a pair of padlock shackle legs secured at their outer end portions to an element of the mounting member; and a padlock body lockably receiving the other end portions of said shackle legs to position said body in close adjacency to the cover extension to lock the cover onto the mounting member in closing relation to the open end of the exhaust pipe.

9. The exhaust pipe protector lock assemblage recited in claim **8** wherein the shackle legs are connected at their outer ends and are curled about an element of the mounting member to rockingly mount the shackle legs on the latter.

10. The assemblage recited in claim **9** wherein the mounting member is a collar having a pair of laterally projecting spaced-apart straps and the extension on the cover is a fin rockingly interposed between said straps, the shackle legs being inwardly of said straps but straddling said fin.

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