Jan. 15, 1952 C. H. HARMON 2,582,905

SPARK ARRESTER AND PROTECTOR FOR EXHAUST PIPES

Filed Oct. 24, 1947

Fig. 1.

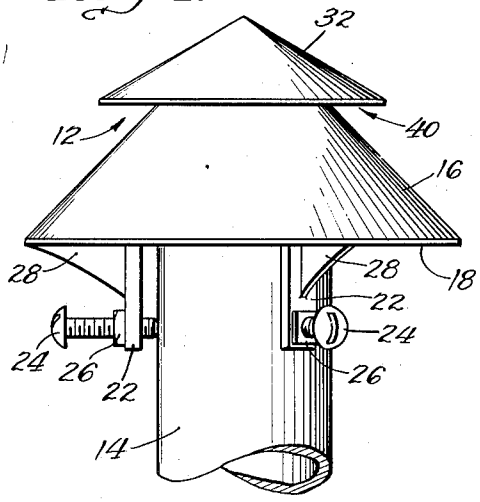


Fig. 2.

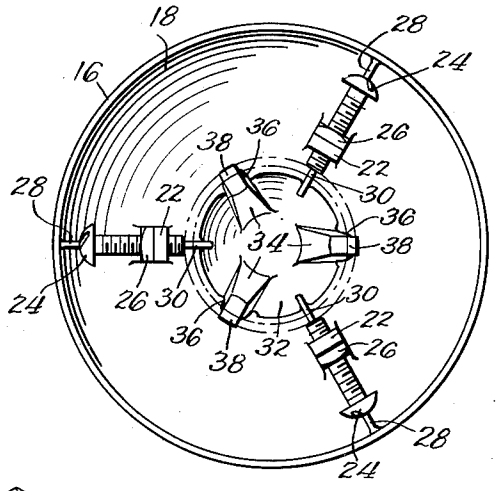
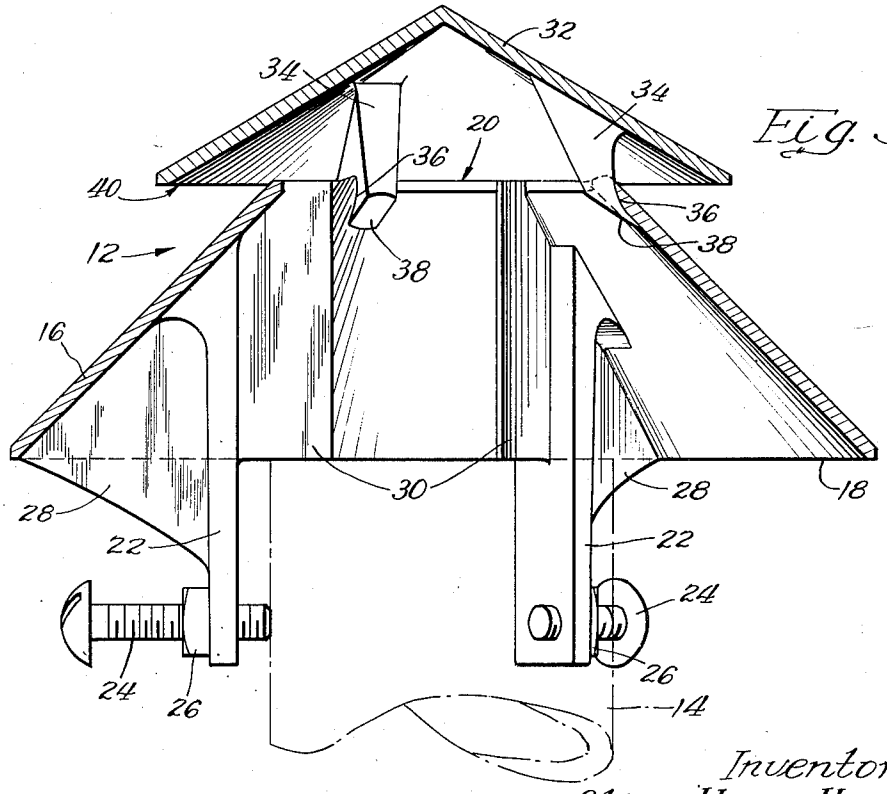


Fig. 3.



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SPARK ARRESTER AND PROTECTOR FOR EXHAUST PIPES

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2 Claims. (Cl. 98—83)

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The present invention relates to a spark arrester and extinguisher, particularly adaptable to the exhaust pipe of a farm tractor, but applicable also to use with stationary engines of all types.

Engines emit sparks through their exhaust pipes and this is particularly dangerous in case of farm tractors where the sparks can set fire to grain in the fields, and to buildings when used therein.

An object, therefore, of the present invention is the provision of a novel spark arrester and extinguisher, which can be attached to an exhaust pipe.

Another object is the provision of a simple device which is simple in operation and does not offer material resistance to the flow of exhaust gases from the exhaust pipe.

A further object is the provision of a spark arrester and extinguisher so constructed and arranged that the exhaust gases and any sparks carried thereby are directed against a baffle member or shield wherein the impact of the sparks against the baffle member extinguishes the sparks.

The device of the present invention is a generally cone-shaped device, constructed with an open base for receiving exhaust gases from the exhaust pipe, and having a closed axial outward end and a transverse opening therebetween. The device is provided with vanes to prevent the gases from swirling, and thereby to direct them axially outward against the closed outer end of the device.

A further object of the invention is the provision of a novel spark arrester and extinguisher which, when applied to a vertical exhaust pipe, prevents rain and foreign matter from entering the exhaust pipe. Most exhaust pipes on farm tractors today are arranged vertically.

Still another object is the provision of such a device as described above, which is exceedingly simple in construction. The major parts making up the devices are simple castings.

A still further object is the provision of such a device as described above, which is economical, both in the material used therein, and its manufacture.

With these and other objects in view, my invention consists in the construction, arrangement, and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, wherein:

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Figure 1 is a side view of the novel spark arrester of the present invention secured to an exhaust pipe;

Figure 2 is a bottom view of the device; and

Figure 3 is an enlarged vertical axial sectional view of the device.

Referring now in detail to the drawings, the device as a whole is indicated at 12, applied to exhaust pipe 14 of a tractor. The exhaust pipe 14, it will be observed, is arranged vertically as most exhaust pipes on farm tractors are arranged today. The device includes a main member 16, which is in the shape of a hollow truncated cone, having an open base or large end 18, and an open small end 20, the two ends furnishing an axial passage therethrough. The member 16 is in effect a baffle member and may be so termed.

A plurality of axially extending supporting legs 22 is formed on the inner surface of the wall of the cone member 16 intermediate the large and small ends thereof, and spaced circumferentially therearound. In the present instance, three such supporting legs are provided, although the particular number employed may be varied, if desired. The supporting legs 22 are preferably cast integral with the cone member 16, and may be of any desired shape, such as rectangular in cross section, as illustrated herein. The lower ends of the supporting legs 22 are provided with threaded openings for the reception of bolts 24 and lock nuts 26. The bolts 24 are arranged radially and are adapted to bear against the exhaust pipe 14 when the device is applied thereto, and the supporting legs 22 are positioned around the periphery of the end of the exhaust pipe. The supporting legs 22 are illustrated as being axially disposed, but other shapes may be employed, so long as they are adapted to fit around the exhaust pipe.

Strengthening webs 28 are formed between the supporting legs 22 and the wall of the cone member 16 below the point of juncture between the supporting legs and the wall. These webs 28 may be of small dimension in thickness, their purpose being to strengthen the supporting legs 22.

A plurality of vanes 30 are also formed integrally with the cone member 16 in the casting thereof. The vanes 30 are arranged radially and are formed on the vertical supporting legs 22 and the wall of the cone member 16 above the point of juncture between the latter. The upper ends of the vanes 30 in the present instance are flush with the upper small end 20 of the cone member

and extend inwardly from the marginal edge thereof. The inner edges of the vanes **30** are substantially vertical, and the vanes terminate downwardly at a point substantially in register with the lower open large end **18** of the cone member **16**. It will be understood that the vertical or axial dimension of the vanes **30** may be greater or less than that illustrated, the present arrangement being employed for convenience. It will also be understood that the vanes **30** can be made to extend radially inwardly toward each other to a greater or lesser extent than that illustrated.

A second cone shaped hollow member **32** is employed, which may also be referred to as a baffle member. The cone member **32** is also a casting and differs from the cone member **16** in that the former is not truncated. Formed integrally with the cone member **32** on the inner surface thereof are a plurality of lugs **34** extending generally downwardly or axially from the cone member. In the present instance the lugs **34** diverge outwardly downwardly and have a peculiar shape adapted to cooperate with the upper small end **20** of the truncated cone member **16**. The marginal edge of the upper smaller end **20** of the cone member **16** is provided with a plurality of notches **36** on the inner side thereof for receiving the lugs **34**. The lower ends of the lugs **34** are swaged at **38** against the inner surface of the wall of the cone member **16**, for securing the member **32** to the member **16**.

The upper cone member **32**, which may also be termed a shield, is of greater diameter than the upper small end of the truncated cone member **16**, thereby forming an opening **40**.

The whole device, including the cone member **16**, and the cone shaped shield **32**, is itself generally cone shaped, having a transverse opening **40** intermediate the ends. It will be understood that although cone shaped members are employed in the present instance, other shapes may be employed as well, such as square, hexagonal, etc., the chief characteristic being that the device converges outwardly axially of the exhaust pipe.

In applying the device to an exhaust pipe, the supporting legs **22** are positioned around the periphery of the outer end of the exhaust pipe, and the bolts turned in against the pipe. The lock nuts **26** insure that the bolts will remain tight against the exhaust pipe. The vanes **30** are so arranged and extend radially inwardly sufficiently that they engage the upper edge of the exhaust pipe. The vanes **30** thereby serve as stops to limit the movement of the device onto the exhaust pipe.

Exhaust gases emerging from the exhaust pipe and entering the device are prevented from swirling by the vanes **30**. There may be a tendency for the gases to swirl, and in so doing may emerge out the opening **40** without coming into contact with the inner surface of the device and especially the shield **32**. The vanes **30** baffle the exhaust gases and direct them axially through the device and the gases therefore impinge on the inner surface of the cone shaped shield **32**. Thereafter, of course, the gases do emerge through the opening **40**, but the impact of any sparks which may be in the exhaust gases on the surface of the shield **32** extinguishes the sparks.

Although the device is primarily designed for a vertical exhaust pipe, it can, of course, be applied to horizontal exhaust pipes as well. When applied to a vertical exhaust pipe, the device effectively prevents the entrance of rain and other foreign matter into the pipe.

The device is of simple construction, being made up of two simple castings, with the exception of the bolts, and the two castings are easily secured together by a simple operation.

While I have herein shown and described a preferred embodiment of my invention, manifestly it is susceptible of modification and rearrangement of the parts without departing from the spirit and scope thereof. I do not, therefore, wish to be understood as limiting my invention to the precise form herein disclosed, except as I may be so limited by the appended claims.

I claim as my invention:

1. In a spark arrester, a hollow truncated cone shape member having an axial passage therethrough, a plurality of supporting legs secured to the inner surface of and extending substantially axially out of the large end of said truncated member, said supporting legs being adapted for positioning around the outer periphery of the end of an exhaust pipe for securing the device thereto, a plurality of radially and axially extending vanes secured to the inner surface of said truncated member, said vanes extending a substantial distance radially inwardly of said legs, and a hollow cone shape member secured to and having its concave side directed toward the small end of said truncated member, there being a transverse opening between said members.

2. A device of the class described, composed of cast pieces, comprising, a hollow truncated cone shape member having its axial ends open, a plurality of supporting legs formed on the inner surface of said member and extending substantially axially out of the large end thereof, said supporting legs being spaced circumferentially and adapted to be positioned around the periphery of the end of an exhaust pipe for securing the device thereto, axial vanes formed on said supporting legs and extending radially inwardly therefrom, said vanes being so positioned as to engage the end of the exhaust pipe and extend into the projection of the interior thereof, and a hollow cone shape shield member having an open base, a plurality of lugs formed on the inner surface of said shield member, said lugs being swaged to said truncated cone member around the periphery of the small end thereof for securing said shield member thereto, the base of said shield member being of greater diameter than the small end of said truncated cone member for forming an opening between the members.

CLINE HARRY HARMON.

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