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V. CRONSTEDT

2,315,049

COMBINED WIRE SUPPORT AND CORROSION INHIBITOR

Filed Aug. 22, 1940

Fig. 1

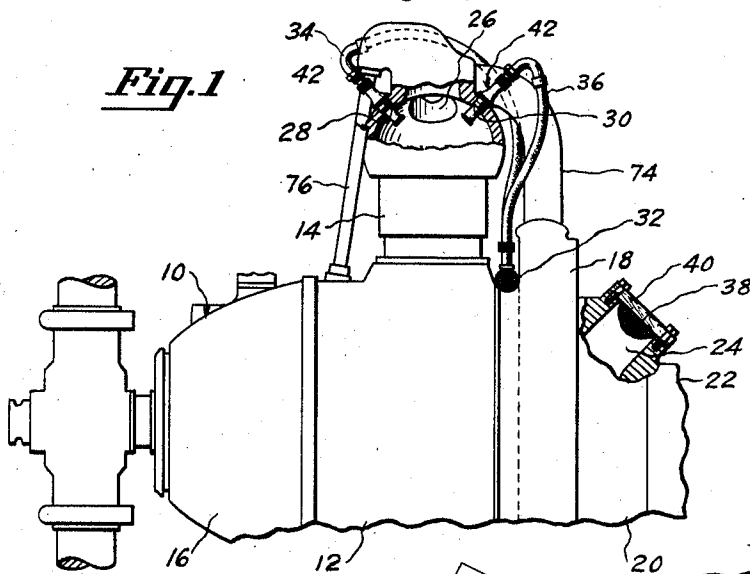


Fig. 2

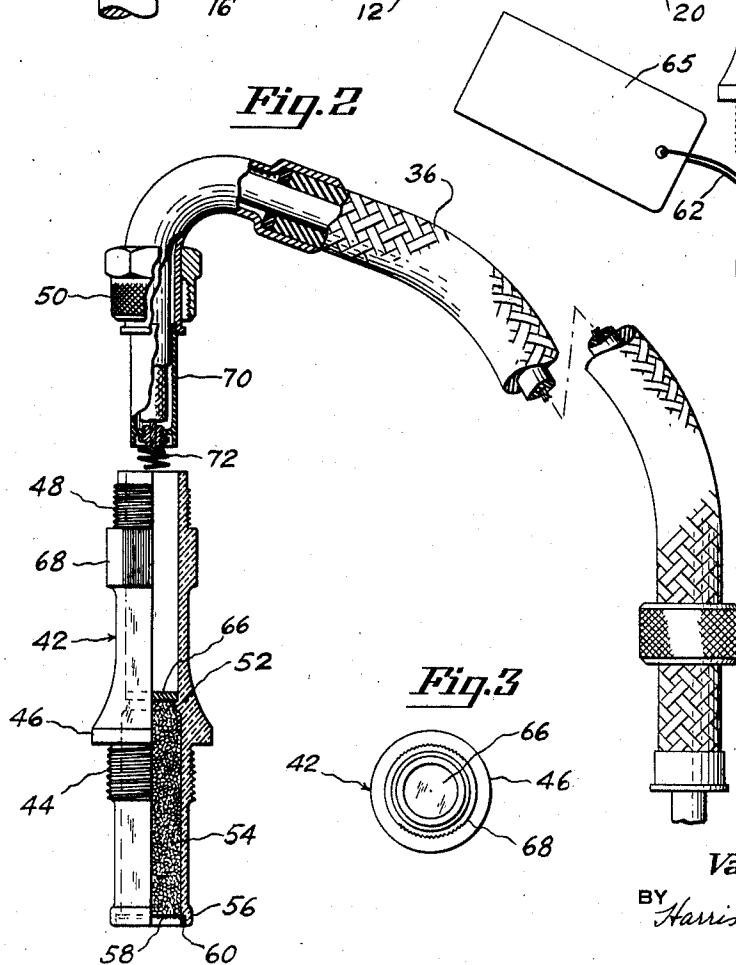


Fig. 3

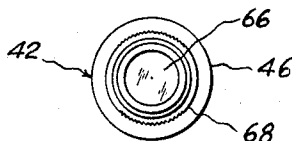


Fig. 4

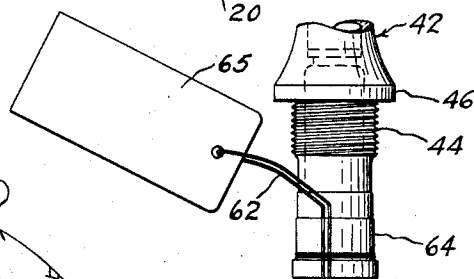
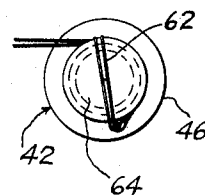


Fig. 5



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2,315,049

COMBINED WIRE SUPPORT AND CORROSION
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14 Claims. (Cl. 123—198)

This invention relates to improvements in anti-corrosion devices and has particular reference to anti-corrosion devices for use in internal-combustion engines while in storage or shipment.

An object of the invention resides in the provision of an improved anti-corrosion device of the character indicated which is economical to manufacture and easy to charge and install in an engine being prepared for storage or transportation.

A further object resides in the provision of an improved anti-corrosion device of the character indicated arranged to retain the engine ignition cables in position during storage or transportation and protect the spark plug terminals of the ignition cables.

A still further object resides in the provision of an improved corrosion inhibitor of the character indicated which may be kept in storage for a prolonged interval without material deterioration and which can be rendered operative for installation in an engine by a simple operation removing an air seal from a portion of the inhibitor.

Other objects and advantages will be more particularly pointed out hereinafter or will become apparent as the description proceeds.

In the accompanying drawing, in which like reference numerals are used to designate similar parts throughout, there is illustrated a suitable mechanical embodiment for the purpose of disclosing the invention. The drawing, however, is for the purpose of illustration only and is not to be taken as limiting or restricting the invention since it will be apparent to those skilled in the art that various changes in the illustrated embodiment may be resorted to without in any way exceeding the scope of the invention.

In the drawing,

Fig. 1 is a diagrammatic illustration of an internal-combustion engine showing corrosion inhibitors constructed according to the invention installed therein.

Fig. 2 is a partly sectional, partly elevational view of a corrosion inhibitor constructed according to the invention showing the manner in which the spark plug cable is attached thereto.

Fig. 3 is a top plan view of the corrosion inhibitor illustrated in Fig. 2.

Fig. 4 is an elevational view of the lower end of the corrosion inhibitor illustrated in Fig. 2 showing a moisture seal applied thereto, and

Fig. 5 is a bottom plan view of the corrosion

inhibitor with the moisture seal applied thereto.

In preparing engines for prolonged storage or for transportation, special care has been found to be necessary to prevent corrosion of the metal parts of the engine. All of the exterior parts of the engine can be painted or lacquered effectively to prevent external corrosion but in the interior of the engine the metal surfaces must be maintained free of any substance which would tend to harden on and adhere to the surfaces and interfere with operation of the engine when the engine is removed from storage or transportation and placed in operation. While these internal surfaces can be, and usually are, coated with a suitable oil or grease, it has been found that this treatment is not sufficient to prevent corrosion when the engines are subjected to relatively humid atmospheric conditions during storage or transportation and that it is necessary to maintain the air in the interior of the engine, and particularly in the engine cylinders, in a dry condition if deterioration of the engine by corrosion of its internal metal surfaces is to be avoided. It has been found that internal corrosion of the engine can be materially inhibited by disposing within the engine cavities suitable air drying or desiccating devices in the form of containers filled with moisture absorbing material and tightly sealing all of the apertures leading to the interior of the engine. This general idea is particularly set forth in United States application Serial No. 310,003, filed December 19, 1939, by Allan P. Ayers, Jr., for Corrosion inhibitors, and assigned to the assignee of the present application, and several forms of suitable air drying devices are particularly described in that application. Since the filing of the above-mentioned application, however, the air drying devices described therein have been materially improved and modified in such a manner that they not only perform their moisture absorbing function in a more efficient manner, but are more convenient to manufacture and install and also perform the additional function of maintaining the engine ignition cables in place during storage or transportation and protect the spark plug terminals of these cables.

Referring to the drawing in detail, the numeral 10 generally indicates an internal-combustion engine having a crankcase 12 and one or more cylinders, as indicated at 14. On one side of the crankcase there is a nose section 16 communicating interiorly with the crankcase and upon the opposite side of the crankcase there is a blower section 18 disposed between the crank-

case and a fuel induction section 20 the outer end of which is closed by the accessory section 22. Various openings, such as the carburetor passage 24, lead into the interior of the crankcase portion and valve openings, one of which is indicated at 26, and spark plug apertures, as indicated at 28 and 30, lead into the outer or head ends of the individual cylinders. In each cylinder there is a reciprocable piston, not illustrated, connected to an engine crankshaft in a manner well known to the art. In the case of a radial engine, such as that illustrated, an ignition harness 32 surrounds some portion of the engine, such as the blower section 18, and from this harness individual ignition cables, as indicated at 34 and 36, lead to the spark plug locations in the heads of the various cylinders.

The air enclosed in the main crankcase portion of the engine may be maintained in a dry condition by suitable means such as bodies of desiccating material supported within the apertures leading into the crankcase by sealing members which close these apertures. In the case of the carburetor aperture 24 a body of desiccating material 38 is supported on the inner face of a plate 40 which covers and closes the aperture 24. While these bodies of desiccating material will effectively dry the air in the interior of the crankcase they do not effectively dry the air in the outer portion of the engine cylinders because these portions are sealed off from the interior of the crankcase by the respective engine pistons mentioned above and it is, therefore, desirable to provide additional means for maintaining the air in the outer portions of the various cylinders in a dry condition. A suitable device for this purpose is generally indicated at 42 and particularly illustrated in Fig. 2. The element 42 may conveniently comprise an elongated tubular member having a threaded portion 44 intermediate its length for reception in one of the threaded spark plug apertures of the engine, a shoulder 46 at one end of the threaded portion 44 to limit the movement of the element through the spark plug aperture and provide a seal between the element and the outer face of the aperture, and a threaded portion 48 at the end which projects out of the cylinder to receive the retaining nut 50 of the respective ignition cable. Intermediate its length and adjacent to the screw threaded portion 44 the tubular element 42 is provided with an annular internal shoulder 52 which locates the upper end of a chamber 54 containing the moisture absorbing or desiccating material for drying the air in the engine cylinder to which the element is applied. This chamber extends beyond the threaded portion 44 a distance such that the engine piston is in its top dead center position will just clear the inner end of the element when the element is inserted in the cylinder thereby providing a chamber of the maximum capacity possible based on the consideration that the chamber must pass through the spark plug aperture and must clear the engine piston. At the end of the chamber opposite the threaded portion 44 the element is provided with an external bead 56 for diverting the flow of any fluid, such as oil, which might drip onto the exterior of the chamber away from the open inner end of the chamber to avoid contamination of the chamber contained material. The tubular element 42 is preferably formed of a transparent thermoplastic material which can be readily molded to the desired shape without the necessity of any machine operations and the tubular wall of the

chamber 54 is made imperforate so that fluid, particularly oil, cannot pass through this wall to the material contained therein. A screen 58 is secured in the open end of the member at the end of the chamber 54 by suitable means such as the thermoplastic washer 60 which may be pressed into position and fused or cemented to the end of the tubular member to secure it permanently in place. If desired, the ring 60 may be given a distinctive color to designate the size or model of the element to which it is applied. After the tubular element 42 has been molded and the screen 58 fixed in place the end of the chamber opposite the threaded portion 44 and the screened end is covered with a layer of thin impervious material, such as, "Cellophane," a rupturing thread 62 being first applied to the member so that it will lie beneath the coating 64 when the article is finished, this thread having a portion projecting from the coating and being so arranged around the end of the tubular element that when the projecting portion of the thread is pulled the sealing coating of "Cellophane" or other equivalent material will be ruptured and torn away from the end of the element. A pull pad or tag 65 of such size that it will not enter the spark plug aperture may be applied to the projecting end of the rupturing thread to insure removal of the seal before insertion of the element into the cylinder aperture. In order to make this end seal entirely secure and air tight it has been found desirable to dip the end of the element into a material such as lacquer after the "Cellophane" coating has been put in place on the member.

After the seal 64 is applied the chamber is filled with a suitable desiccating material, such as "Silica Gel" up to the level of the shoulder 52, this material being maintained in a moisture free condition in a suitable air tight container or desiccating furnace until the moment of its introduction into the element 42. Immediately after the desiccating material has been loaded into the member 42 a soft-plug 66 is inserted in the open end of the tubular member and forced down and straightened on the shoulder 52 so that it presses into the inner surface of the tubular member immediately above the shoulder and provides an air tight seal at the upper end of the chamber 54. When the seal 66 has been properly inserted the element 42 is complete for storage. When the elements 42 are applied to an engine the valve apertures, such as the aperture 26, are securely sealed either by the valves or seals over the outlets to prevent any change in the air content of the outer portions of the respective cylinders. The seal 64 is then removed from an element 42 and the element is immediately threaded into a spark plug aperture until the shoulder 46 is drawn into contact with the outer end of the aperture. It has been found that sufficient torque can be applied to these members by the fingers using the knurled section 68, without the necessity of using wrenches or other metal tools on the thermoplastic elements. After the element has been threaded into place the terminal member 70 of the respective spark plug cable is inserted into the open outer end of the member and the retaining nut 50 is then threaded onto the threaded portion 48 to secure the ignition cable in position, which is substantially the position it would occupy if attached to an engine spark plug. This assembly protects the insulating terminal 70 and the contact spring 72 against damage during storage or transportation and holds the cable in place without the necessity of taping the end of

the cable to an engine part as the intake pipe 74 or valve push rod cover 76 as has previously been necessary. The above process is repeated until an element 42 has been inserted in each spark plug aperture of the engine and the respective ignition cables attached thereto. When this has been done the engine is ready for crating or other preparations for storage or shipment.

The transparent nature of the thermoplastic material of which the elements 42 are formed has a particular advantage in that the color of the desiccating material in the chamber 54 will show through this material. As the color of the material changes with the absorption of moisture by the material, the condition of the desiccating element can always be determined at a glance without the necessity of removing the element from the engine. If the color indicates that the element has absorbed its full capacity of moisture a new element can be substituted in the manner described above and the defective element restored to operative condition by placing it for a necessary interval in a desiccating chamber or oven to remove the moisture content from the moisture absorbing material in the element. By this means the elements can be used over again until they become unuseable from excessive wear or breakage. After an element has been reconditioned the seal 64 will be reapplied to it unless it is intended to reuse it immediately in an engine.

While a suitable structural embodiment has been hereinabove described and illustrated in the accompanying drawing for the purpose of disclosing the invention, it is to be understood that the invention is not limited to the particular embodiment so illustrated and described, but that such changes in the size, shape and arrangement of the various parts and in the materials of which they are formed may be resorted to as come within the scope of the sub-joined claims.

Having now described the invention so that others skilled in the art may clearly understand the same, what it is desired to secure by Letters Patent is as follows:

1. A device for maintaining the air in an engine cylinder in a substantially moisture free condition and for protecting an ignition cable terminal comprising, an elongated tubular member having a chamber for desiccating material in one end thereof and a receptacle for an ignition cable terminal in the opposite end thereof.

2. A device for maintaining the air in an engine cylinder in a substantially moisture free condition and for protecting an ignition cable terminal comprising, an elongated tubular member having a chamber for desiccating material in one end thereof and a receptacle for an ignition cable terminal in the opposite end thereof and means for securing said member in a cylinder aperture with said chamber in communication with the interior of the cylinder.

3. A device for maintaining the air in an engine cylinder in a substantially moisture free condition and for protecting an ignition cable terminal comprising, an elongated tubular member having a chamber for desiccating material in one end thereof and a receptacle for said terminal in the opposite end, and an impervious partition between said chamber and said receptacle.

4. A device as set forth in claim 1 having a perforate closure at the chamber end thereof for retaining desiccating material in said chamber while permitting access of air to the interior of said chamber.

5. In combination with an engine having an aperture leading to the interior of a cylinder and an ignition cable leading to a position adjacent said aperture, a holder located in said aperture and containing desiccating material exposed to the air in the interior of said cylinder, said holder having a chamber receiving the end of said ignition cable and means for securing said cable to said holder.

6. A device as set forth in claim 3 having an externally screw threaded portion in the region of the adjacent ends of said chamber and said receptacle for engagement with the threads of an internally threaded spark plug aperture, and an external shoulder at the receptacle end of said screw threaded portion for engagement with the cylinder at the outer end of said aperture.

7. A device as set forth in claim 2 having means at the end of said receptacle opposite said chamber for rigidly attaching the end of an ignition cable thereto.

8. A device as set forth in claim 2 having an impervious closure at one end of said chamber, a perforate closure at the opposite end of said chamber and a temporary seal over said perforate closure.

9. A device as set forth in claim 2 in which said elongated tubular member is formed of transparent material so that the desiccating material in said chamber is visible through said member.

10. A device as set forth in claim 2 having a perforate closure in the end of said tubular member at the corresponding end of said chamber, and an external bead on the end of said member surrounding said chamber to prevent liquids from flowing over the end of said member into said chamber.

11. A corrosion inhibitor adapted to be secured in an engine aperture comprising, an elongated tubular member having an internal shoulder intermediate its length, a chamber for desiccating material in the end portion at one side of said shoulder and a chamber for a spark plug cable terminal in the end portion at the opposite side of said shoulder.

12. A device for drying the air in an engine cylinder provided with a threaded spark plug aperture comprising, an elongated tubular member having an externally threaded portion intermediate its length for engagement with the threads of said spark plug aperture and an internal shoulder adjacent to said threaded portion, means providing a chamber for desiccating material at one side of said internal shoulder and a threaded portion at the end opposite said chamber for receiving an ignition cable retaining nut.

13. A device for maintaining the air in an engine cylinder in a substantially moisture free condition and for supporting an ignition cable terminal comprising, an elongated tubular member having a chamber for desiccating material in one end thereof and connecting means for an ignition cable terminal at the opposite end thereof.

14. A device for maintaining the air in an engine cylinder in a substantially moisture free condition and for protecting an ignition cable terminal comprising, an elongated tubular member having a chamber for desiccating material in one end thereof and connecting means for an ignition cable, including a receptacle for the ignition cable terminal, at the opposite end of said device.

VAL CRONSTEDT.