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L. JOHN

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CARTRIDGE FOR USE IN APPARATUS FOR DECARBONIZING ENGINES

Original Filed Aug. 15, 1928

Fig. 1

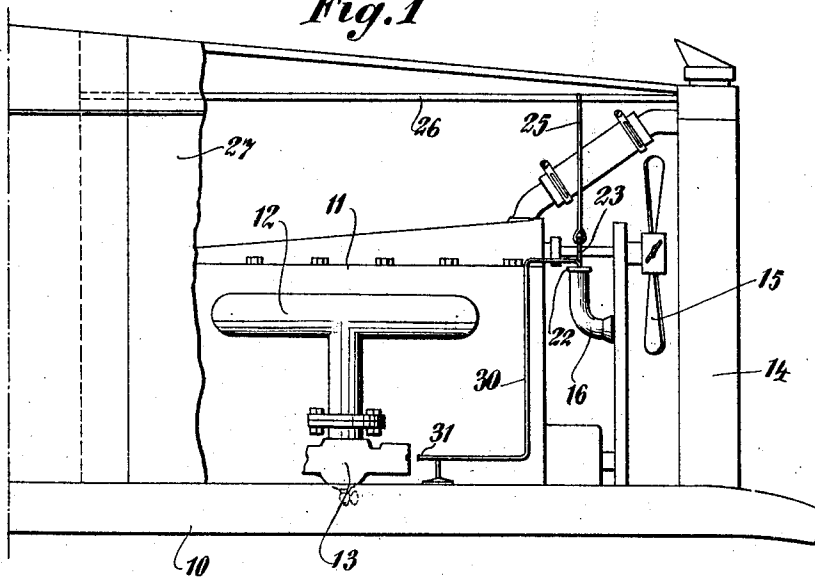


Fig. 2

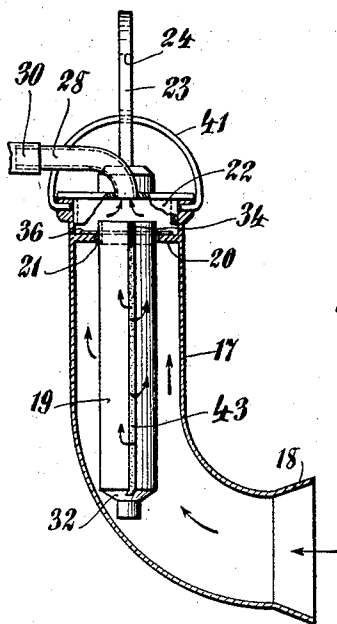
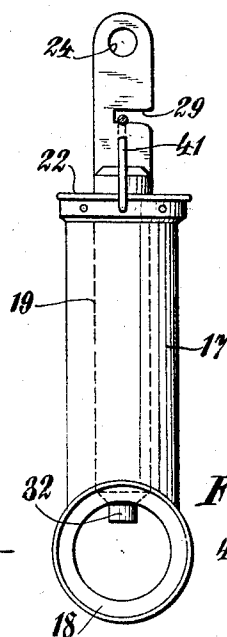
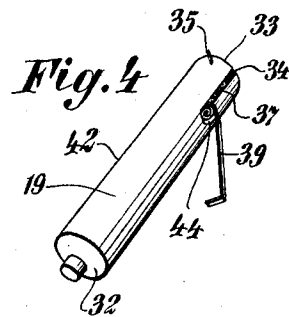
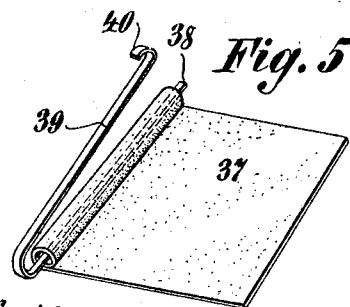
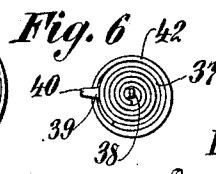


Fig. 3



Inventor:
Lillian John,
By her Attorney:
Warren S. Ostow

UNITED STATES PATENT OFFICE

LILLIAN JOHN, OF MIDDLETOWN TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS TO E. SEIFERT, OF CHICAGO, ILLINOIS

CARTRIDGE FOR USE IN APPARATUS FOR DECARBONIZING ENGINES

Original application filed August 15, 1928, Serial No. 299,863. Divided and this application filed January 7, 1930. Serial No. 419,190.

The invention relates in general to a cartridge constituting a replaceable element for use in an apparatus designed to feed an internal combustion engine a vapor capable of removing or assisting to remove carbon deposits from the engine and this application constitutes a division of my copending application on method and apparatus for decarbonizing engines, Serial No. 299,863 filed August 15, 1928.

In the companion application it is suggested that apparatus be provided by means of which a gaseous oxidizing reagent capable of removing the carbon deposits in the engine be introduced into the combustion supporting air as it passes into the engine carburetor.

The primary object of this invention is to provide an improved form of vaporizer and specifically an improved form of replaceable receptacle, hereinafter referred to as a cartridge, for storing and releasing the oxidizing reagent with which the vaporizer is charged from time to time.

Still another object of the invention specifically relating to the cartridge element of the apparatus is to provide a structure which can be manufactured with the volatile oxidizing substance sealed therein and which is provided with self-contained means for breaking the seal and for forming an opening of limited but definite dimensions and which opening can be conveniently formed by the operator at the time when it is desired to replenish the vaporizer with a fresh cartridge.

Various other objects and advantages of the invention will be in part obvious from a consideration of the method features of the disclosure and from an inspection of the accompanying drawings and in part will be more fully set forth in the following particular description of one method of practicing the invention, and the invention also consists in certain new and novel modifications of the preferred method and other fea-

tures of construction and combinations of parts hereinafter set forth and claimed.

In the accompanying drawing:

Fig. 1 is a fragmentary view of part of an automobile engine showing one position in which a vaporizer may be used provided with a cartridge of the type featured in this disclosure;

Fig. 2 is an enlarged axial section taken through the vaporizer shown in side elevation in Fig. 1 and equipped with one form of cartridge constituting a preferred embodiment of the invention herein featured;

Fig. 3 is a view in front elevation of the vaporizer shown in Fig. 2, looking at the same from the right side;

Fig. 4 is a perspective view of the cartridge shown in Fig. 2 and which cartridge in Fig. 4 is in a partly open position and in Fig. 2 is in its fully opened position;

Fig. 5 is a view in perspective of the fabric and releasing ribbon forming part of the cartridge contents, showing the same in the course of construction; and

Fig. 6 is an end view of the cartridge of Fig. 4 with the cork stopper removed to show the fabric roll.

Referring to Fig. 1, there is shown part of an automotive vehicle 10 provided with a multi-cylinder engine 11 having a manifold 12 supplied from a carburetor 13. There is also disclosed the side of the radiator 14 positioned between which and the engine is the fan 15 and in general it is to be understood that the showing is intended to represent a conventional form of automotive power plant of the internal combustion type. A vaporizer 16 is positioned in the path of the hot air drawn by the fan through the radiator and is disposed in position to discharge its contents into the air intake port of the carburetor 13.

It is also suggested that the vaporizer 16 may be hung in an exposed position in advance of the radiator 14. This has an advantage in that it may be recharged without

lifting the engine hood, and as the contained cartridge would in this case be exposed to a current of cold air the life of the cartridge would be prolonged over that of the cartridge when positioned in the path of the hot air from the fan as shown in Fig. 1.

Referring to Fig. 2 for a detailed description of the vaporizer, it will be noted that it consists primarily of an L- or J-shaped hollow drawn metal tube 17, the lower end of which extends horizontally and is flared as shown at 18 to form an air intake facing the fan and radiator. The upper end of the tube 17 is open to provide an entrance for the cartridges 19 hereinafter described.

The tube is provided adjacent its upper end with an integral inwardly projecting peripheral flange 20 constituting a cartridge seat and having an opening 21 centered therein and designed to dispose the cartridge in its position centered within the tube 17 and in the path of the air passing through the vaporizer as indicated by the arrows in Fig. 2.

The open upper end of the tube 17 is closed by means of a cap 22 secured rigidly to the lower end of a hanging plate 23. This plate is provided with an aperture 24 through which may be threaded a link 25 suspended from the hood rod 26 at the top of the engine closure 27. The upper end of the tube 17 is provided with a bale 41 designed to engage in a slot 29 formed in the side of the plate 23 in order to secure the closure to the vaporizer or, more properly, to secure the vaporizer in position suspended from the link 25. The cap 22 is provided with an L-shaped nipple 28 which is connected by means of a rubber tubing 30 with a nozzle 31 terminating a few inches from and directing its contents into the air intake port of the carburetor 13. It is appreciated that an air conduit is provided by the relatively wide bore of the tube 17 and which conduit discharges through a tube of relatively small cross sectional area directly into the fuel line leading into the engine.

Referring to the cartridge shell or container 42, it will be noted that it is of cylindrical form having a closed end 32 and an open end 33 which open end is adapted to be closed by means of a cork stopper 34. A pin 35 extends through the side of the container and through the cork stopper to secure the same to the container.

Opposite ends of this pin project beyond the outline of the container and provide diametrically spaced means 36 for suspending the cartridge from the seat 20 as particularly shown in Fig. 2. Within the container is a roll of fabric 37, preferably a form of felt capable of absorbing and retaining a large percentage of a water solution. In the instant case, this oxidizing substance is preferably a saturated water solution of ammonium carbonate, but it is within the scope of this disclosure to use other equivalent liquid oxi-

dizing substances, one example of which is hydrogen peroxide.

It is proposed that the cartridges be constructed as a factory product, each completed with its vaporizable contents, and that they remain sealed until used. The present disclosure features means for breaking the seal, opening and exposing the contents to the vaporizing action of the air stream passing through the vaporizer but it is also required that the area of exposure be restricted in area but not in length. This opening of the container and the providing of the requisite exposure along the entire length of the cartridge is attained by positioning in the container a U-shaped releasing ribbon, one leg 38 of which is contained in and centered in the roll of fabric and the other leg 39 of which is positioned between the roll of fabric and the adjacent side of the container. The free end of the leg 39 is provided with a hook extension 40 which extends outwardly of the container 42 and normally overlaps its open end. This extension 40 provides a handle by means of which the releasing ribbon is drawn outwardly and downwardly as shown in Fig. 4 thus tearing a slot opening in the side of the container.

This container is formed of an easily tearable material and in the instant case is formed of thin sheet lead. It will be obvious that as the ribbon is drawn outwardly and downwardly as indicated in Fig. 4, a narrow slit 43 will be formed from end to end of the lead tube as particularly shown in Fig. 2. At the termination of the slitting operation the cut away strip of material 44 is torn off, and the releasing ribbon is withdrawn entirely from the container and thrown away, leaving the cartridge in the condition shown in Fig. 2.

In forming the fabric roll in the cartridge, the fabric is preferably cut into a rectangular sheet and rolled about the leg 38 of the releasing ribbon as shown in Fig. 5. The outer leg 39 of the ribbon is then bent into position laying flat against the fabric roll and inserted into the open end of the cartridge shell 42 as shown in Fig. 6. The felt roll is then saturated with the oxidizing substance and the cork stopper forced into closing position.

In operation it will be simply necessary to open a fresh cartridge as thus described, remove the bale 41 thus releasing the tube 17 which can be held in the hand while being recharged. The prepared cartridge is then inserted into the top of the tube and the same restored in position with the cap closing its upper end. By replacing the bale in the position shown in Fig. 3, the parts are locked in position and the device as a whole is in position ready to function.

The engine is caused to operate, as for instance in the illustrated case the vehicle is caused to run a distance in one case of about

seven miles. During this time the heated air from the fan passes into and through the vaporizer subjecting the exposed surface of the saturated felt to the volatilizing action of the warm air current. The same action takes place when the vaporizer 16 is secured to the front of the radiator except, of course, that the rate of evaporation is slower. In either case small particles of the ammonium carbonate or other oxidizing reagent used are picked up by the air stream and passed through the conduit through the carburetor and then into the manifold of the engine. Considering that in one practical actuation of the process ten or fifteen minutes running of the engine was required to effect the cleaning out of all of the carbon and that less than one quarter of an ounce of the water solution of the ammonium carbonate was used, the percentage of ammonium carbonate particles present per unit volume of air passed into the engine is too small to ascertain and accordingly in the following claims the reference to a small quantity of oxidizing reagent present is intended to indicate the amount that would be present when a small area of fabric saturated with a water solution of the reagent is exposed to one vaporizing effect of a large volume of air either hot or cold.

It has been found that on removing the spark plugs from the engine previously fouled plugs were clean and all evidence of carbon deposit had disappeared.

As there was no evidence of scoring visible on the inner side of the cylinder and as the cleaning out of the cylinder had taken place without any noticeable change in the functioning of the engine except that which would be expected from a freshly decarbonized engine, it is assumed that the carbon simply passed off with the exhaust gases in such finely comminuted or gaseous form as to prevent it being noted.

It is not regarded as necessary to maintain the feed of oxidizing gas herein featured at all times and it is therefore sufficient to insert a new cartridge from time to time and whenever it is felt that the carbon accumulation should be removed to improve the efficiency of the engine.

I claim:

1. A cartridge comprising a container formed of easily tearable sheet metal and having an open end, a closure for said end, a fabric in the container saturated with a volatile substance, a U-shape releasing metallic ribbon having one leg embedded in the fabric, the other leg positioned between the fabric and the side of the tearable container and said other leg having an end portion projecting exteriorally of the container through the open end and providing a handle for engaging the ribbon when it is desired to cause the ribbon to tear out a portion of the side and thus form a slit in the

metal of the container and expose the fabric with its volatile substance.

2. A cartridge comprising a container formed of an easily tearable material, a volatile substance in said container, means for tearing an opening slot of uniform width in the container comprising a releasing ribbon having a flat side of uniform width extending along the inner side of the container engaging the same flatwise and having an end projecting exteriorally of the container, said end providing a handle by means of which the ribbon may be grasped and pulled away from the container in tearing away a strip from the side thereof thereby to form a slot opening to expose the contained volatile substance.

3. A cartridge comprising a thin sheet metal container, fabric in said container saturated with a solution of a volatile chemical sealed within the container, and means for tearing an opening in the form of a slot of substantially uniform width in the side of the container thereby to expose the saturated fabric and thus permit the chemical to evaporate and escape through the torn slotted opening.

4. A cylindrical cartridge comprising a container closed at one end and open at the other, a closure for the open end, a fabric in the container, a releasing ribbon having a portion disposed between the fibre and the side of the container and having an end projecting exteriorally of the container and providing a handle and said ribbon acting when the handle is drawn along the container to cut from the side of the container a narrow strip of material thus forming a slot in the side of the container and thus expose the contents of the container.

5. An article of manufacture constituting a cartridge for use in charging a carbon remover apparatus, comprising a sealed container provided with means for forming a narrow slotted form of opening in the same and said container having sealed therein a vaporizable reagent.

6. An article of manufacture constituting a cartridge for use in charging a carbon remover apparatus, comprising a thin sheet metal container, capable of being readily torn to expose its contents, self-contained means for tearing the same, and a vaporizable substance capable of giving off a carbon-affecting gas, sealed within said container and adapted to be exposed for evaporation when the container is torn open.

7. An article of manufacture constituting a cylindrical chemical containing cartridge normally sealing its contents, and provided with self-contained means for ripping an opening slot lengthwise along one side of the cartridge.

8. A sealed cylindrical container of easily tearable sheet metal, open at one end, means

for closing said open end, a flat tearing device having a portion engaging flatwise against the inner side of the side of the container, extending substantially along the entire length thereof and overlapping the edge defining said open end, and adapted when drawn across said side to cut therefrom a narrow strip of material leaving a slot form of opening along the length of the container to expose its contents.

10 Signed at Atlantic Highlands, in the county of Monmouth and State of New Jersey, this 13th day of December, A. D. 1929.

LILLIAN JOHN.

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