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MEANS FOR INFLATING ARTICLES

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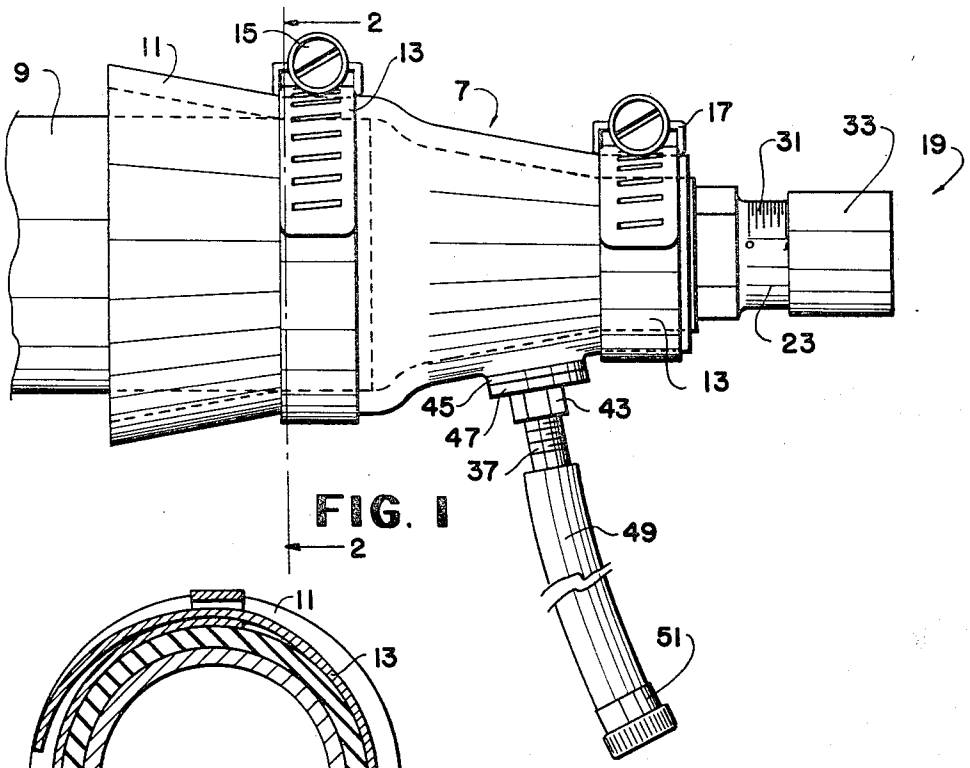


FIG. 1

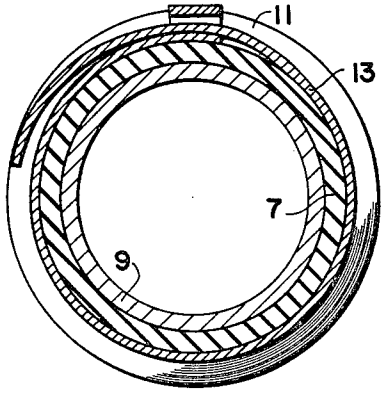


FIG. 2

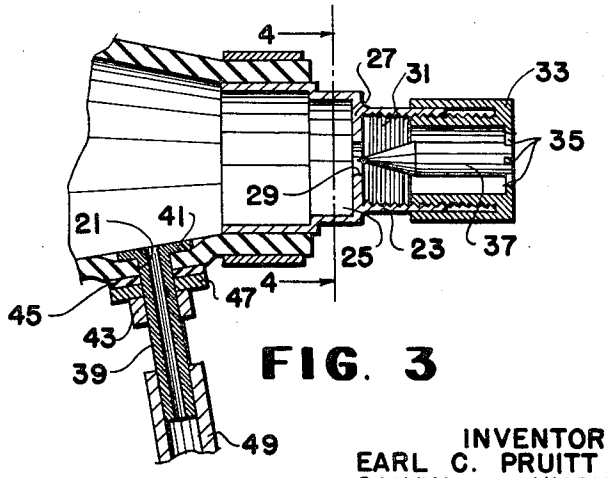


FIG. 3

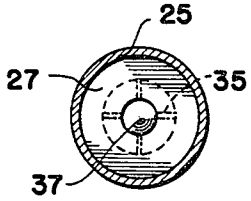


FIG. 4

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MEANS FOR INFLATING ARTICLES

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ABSTRACT OF THE DISCLOSURE

This invention relates to a new means for inflating articles, and more specifically this invention relates to a new means for inflating articles with exhaust gases from an internal combustion engine. In a more particular aspect this invention relates to a means for inflating articles with exhaust gases from an internal combustion engine where the pressure of the gases in the inflated article are safely regulated. The inflating means of this invention includes a frusto-conical shaped body having one end attached to the exhaust pipe of an internal combustion engine, a valve means mounted at the opposite end thereof to regulate the amount of gases passing into and out of the inflating means, and an inflating hose assembly attached thereto for auxiliary pressure as required.

Devices are known to the art for inflating articles by use of gases from an internal combustion engine. Many of these require the removal of a spark plug from one of the cylinders of the engine and utilize the compression gas from the one cylinder while the motor is being operated. These types of devices, it is apparent, require the user to remove a spark plug from the engine and install an inflating hose in its place, all of which is time consuming and is not of the type of operation suitable for use by the ordinary operator of a vehicle having an engine.

Those devices utilizing the exhaust gases are beset with the problems of controlling the pressure of the gases in the article being inflated and keeping the internal combustion engine to which the device has been attached operating against the back pressure created by the inflating device. It is apparent that articles to be inflated such as air mattresses, rubber and plastic rafts, water toys and the like can be easily ruptured by over inflation if the pressures from an inflating device are not adequately controlled. It is also quite clear that where the back pressure on the exhaust system of an internal combustion engine exceeds an operable pressure for the engine, the engine will cease to function.

We have invented a new apparatus for inflating articles which has a hollow body which has an inlet at one end and a restricted outlet at the other. A means connectible to an article to be inflated is mounted on the body between the inlet and the outlet. The inlet is removably mountable on the exhaust means of an internal combustion engine. The apparatus is constructed and adapted to pass exhaust gases from the exhaust means into the body with a portion of the gases passing out through the restricted outlet and the remaining portions of the gases passing into and through the inflating means to inflate articles.

The apparatus we have invented for inflating articles is easy to use and simple to fabricate. The inlet end of the body is tapered so that it will fit over most ordinary size exhaust pipes. A simple clamp secures the body to the exhaust pipe. The adjustable valve in the outlet end of the body allows sufficient exhaust gases to escape thus keeping the back pressure on the engine below the critical operation point. This arrangement also provides a safety factor in the apparatus which precludes an article being

inflated from rupture or breaking resulting from too much pressure, the valve always providing an adjustable by-pass for the gases.

Our invention is well adapted for use by tire service personnel as well as individual car owners and the like for inflating tires. We have found that the exhaust pressures and engine characteristics of modern internal combustion engines are such that it is possible to inflate tires by use of our apparatus. The advantage of our invention over the air pressure tanks and/or air compressors now commonly in use is, of course, readily apparent particularly in respect to initial cost, maintenance and ease of transportation. An additional advantage in this use of our invention lies in the fact that the use of exhaust gases, being relatively inert, reduces interior deterioration with the tire carcass and/or tube.

It is an object of this invention to provide a new apparatus for inflating articles.

It is another object of this invention to provide a new apparatus for inflating articles by utilizing the exhaust gases from an internal combustion engine.

It is still another object of this invention to provide a new apparatus for inflating articles wherein the pressures in the article being inflated can be adjustably controlled.

One more object of this invention is to provide a new apparatus for inflating articles that is easy to use and simple and economical to fabricate.

And still another object of this invention is to provide a new apparatus for inflating articles that does not create excessive back pressures on the exhaust system of an internal combustion engine.

Various other objects, advantages and features of the invention will become apparent to those skilled in the art from reading this disclosure.

Drawings accompany and are a part of this disclosure. These drawings depict preferred specific embodiments of the apparatus for inflating articles of our invention, and it is to be understood that these drawings are not to unduly limit the scope of the invention. In the drawings,

FIG. 1 is a side longitudinal view of a preferred specific embodiment of our invention.

FIG. 2 is a cross section taken along line 2—2 of FIG. 1.

FIG. 3 is a partial longitudinal view in cross section of the preferred specific embodiment of the valve and tube mounting of the invention.

FIG. 4 is a view in cross section taken along line 4—4 of FIG. 3.

In the following is a discussion and description of the invention made with reference to the drawings, whereon the same reference numerals are used to indicate the same or similar parts and/or structure. The discussion and description is of preferred specific embodiments of the new apparatus for inflating articles of our invention, and it is to be understood that the discussion and description is not to unduly limit the scope of the invention.

Referring now to the drawings in detail, FIG. 1 shows the body of the invention 7 attached to an exhaust pipe 9 of an internal combustion engine. This body 7 is generally frusto-conical in shape and can be made of any suitable pliable heat resistant material such as plastic, rubber, rubber-like material, or the like, but preferably of a fiber reinforced rubberoid material such as used on automobiles for waterhose connections. This material can be supplied by any of the many rubber goods manufacturers. The inlet portion 11 of the body 7 is preferably flared so as to be readily mountable upon varying sizes of exhaust pipes 9. The inlet portion 11 can be secured rigidly to the exhaust pipe 9 by any suitable means but preferably by a hose clamp 13. The embodiment of the hose clamp 13 as depicted on FIG. 1 is one which provides

a screw means 15 mounted on opposing clamp ears for tightening the clamp 13 and thus the outlet end 11 of the body 7 around the exhaust pipe 9. The clamping device 13 has proved very satisfactory in use.

The end of the body 7 having the smaller diameter is the outlet end portion 17 into which is mounted an adjustable valve assembly referred to generally at 19 by a similar but smaller clamping device 13 as hereinbefore described. A round tube aperture 21 is positioned in the body 7 between the clamps 13.

The adjusable needle valve assembly 19 has a hollow circular housing 23, one end portion of which is rigidly mounted in the outlet end portion 17 as hereinbefore described. A valve seat portion 25 is immediately adjacent to the aforesaid housing end portion and has a transverse disc 27 rigidly mounted therein. This disc 27 has a hole centered on the longitudinal axis of the assembly which forms a valve seat 29. The other end portion of the housing 23 has spaced calibration marks 31 scribed thereon. These scribe marks 31 are preferably circumferential and in longitudinal spaced relationship. The calibration marks 31 can be in any suitable number and spacing. If our apparatus is used primarily for inflation of tires, between two and four marks can be sufficient to indicate desired tire inflating pressures for different size engines, etc.

A valve sleeve 33 is threadely mounted on the projecting end portion of the housing 23. Two diametrical valve support members 35 are mounted on the outside end portion of the valve sleeve 33 in perpendicular relationship. These members 35 must be sufficiently strong to support a needle valve 37 rigidly mounted on the intersecting center point, but sufficiently narrow to allow exhaust gases to escape around the members 35. The needle valve 37 is in the shape of a cone on its projecting end portion and of sufficient length so as to project into the valve seat 29. The valve 37 preferably engages the valve seat 29 when the valve sleeve 33 has been rotated on the threads provided, so that the inside end portion of the sleeve is coincident with the zero marking of the calibrations 31.

A gauge tube 39 is mounted in and through the aperture 21. An integral mounting flange 41 on the inwardly projecting end portion of the gauge tube 39 is of such size so as to engage an inside portion of the body 7 immediately adjacent to the aperture 21. A mounting nut 43 is threadedly mounted on the tube 39. A seal washer 45 is engageably mounted on the tube 39 between the body 7 and the nut 43 and engages an outside portion of the body 7 adjacent to the aperture 21. A flat washer 47 is engagingly mounted on the tube 39 between the seal washer 45 and the nut 43. The mounting flange 41, seal washer 45, flat washer 47 and mounting nut 43 rigidly mount the tube 39 in the aperture 21, the tube 39 intercommunicating with the interior of the body 7.

An inflating hose 49 is mounted on the projecting end portion of the tube 39 by any suitable means such as a hose clamp, cementing, or the like but preferably by cementing. This hose can be made of any suitable fluid tight flexible material such as rubber, plastic, reinforced rubber-like material or the like, but preferably of plastic.

In operation, the engine of the internal combustion engine is started and passes exhaust gases in and through the exhaust pipe 9 and into the body 7. The valve 19 should be in a substantially open position allowing gases to pass therethrough. An end portion of the hose 49 preferably has a common innertube valve mounting connection 51 which is connected to the article to be inflated (not shown). At this point, a portion of the exhaust gases will pas through the aperture 21 and tube 37, into and through hose 49 and out connection 51 into the article being inflated. If additional pressure is desired to be introduced into the article being inflated, the valve 19 can be set to a more nearly closed position so as to further restrict the flow of exhaust gases through same by rotating the sleeve 33, until the article to be inflated is inflated to the desired pressure. By utilizing the scribe marks 31 on the housing 23 it is apparent that predetermined settings of the valve 19 can be utilized for specific pressuers at predetermined engine speeds.

The preferred specific embodiment of our invention having the adjustable needle valve 19 should not be construed as being restrictive to this arrangement only. A fixed predetermined outlet aperture can be utilized which will provide the same pressure at a given speed of the engine. This fixed aperture can be just sufficiently large to relieve back pressures from the engine and if additional pressure is desired the engine can be run faster. Engine revolution per minute not too much above engine idling speed for common stock automobiles has been found satisfactory.

The materials used in the fabrication of our invention except as hereinbefore noted are those well known to the art, such as metal or plastic, but preferably of metal.

The foregoing discussion and description has been made in connection with preferred specific embodiments of the new apparatus for inflating articles of our invention, and it is to be understood that the discussion and description is only intended to illustrate and teach those skilled in the art how to practice the invention, and such is not to unduly limit the scope of the invention, which is defined in the claims set forth hereinafter.

We claim:

1. A new apparatus for inflating articles comprising, a hollow frusto-conical shaped body having an inlet end portion in the end thereof having the larger diameter, an outlet end portion in the other end thereof, an aperture therein spaced between said end portions, a circular needle valve assembly mounted in the said outlet end portions, a circular needle valve assembly mounted in the said outlet end portion in close fitting engagement with the interior of said outlet end portion, said needle valve assembly having a hollow circular housing, said housing having an end portion mounted in the said outlet end portion of said body, a valve seat portion immediately adjacent to said housing end portion, said valve seat portion having a transverse disc mounted therein forming a valve seat, said valve seat having a hole centered therein, the other end portion of said housing having threads on the outside of the outer end portion thereof, a valve sleeve threadedly mounted on said outer end portion of said housing, said valve sleeve having two diametrical intersecting valve support members mounted in the outer end portion thereof, a conical valve rigidly and axially mounted on the intersecting center point of said support members, said valve adjustable projecting through said calibrated end portions and through and into said valve seat and engageable with said valve seat, a tube engagably and rigidly mounted in and through said aperture, an integral mounting flange on the inwardly projecting end portion of said tube, said mounting flange having a diameter greater than the diameter of said aperture and engaging an inside portion of said body adjacent to said aperture, a threaded mounting nut threadedly mounted on said tube, a seal washer mounted on said tube between said body and said nut and engaging an outside portion of said body adjacent to said aperture, a flat washer engagingly mounted on said tube between said seal washer and said nut, said mounting flange, seal washer, flat washer and mounting nut rigidly mounting said tube in said aperture, an inflating hose mounted on the other end portion of said tube, circular clamp means around said outlet end portion of said body securing said valve assembly in said outlet portion, adjustable circular clamp means slidably mounted around the inlet end portion of said body, said adjustable clamp means constructed and adapted to rigidly mount said

inlet portion of said body on the projecting end portion of an exhaust pipe of an internal combustion engine, said apparatus constructed and adapted to pass exhaust gases into said body from said exhaust pipe, a portion of said gases passing into and through said valve assembly housing and valve seat, around said valve and out through said valve sleeve, the remaining portion of said gases passing into said tube and through said tube and into said inflating hose, and through said inflating hose to inflate articles with said exhaust gases.

2. A new apparatus for inflating articles, comprising a hollow frusto-conical shaped body having an inlet end portion, an outlet end portion, an aperture spaced between said end portions, an adjustable needle valve assembly rigidly mounted in the said outlet end portion, a tube engageably and sealingly mounted in said aperture, an inflating hose mounted on the outwardly projecting end portion of said tube, said inlet portion of said body removably mounted on and about the projecting end portion of an exhaust pipe of an internal combustion engine by adjustable clamp means, said apparatus constructed and adapted to pass exhaust gases from said exhaust pipe into said body, a portion of said gases passing into and out of said valve assembly, and the remaining portion of said gases passing into said inflating tube to inflate articles.

3. A new apparatus for inflating articles, comprising a hollow frusto-conical shaped body having an inlet end portion, an outlet end portion, an aperture in said body, an adjustable valve means mounted in said outlet end

portion, a tube mounted in said aperture, an inflating hose mounted on said tube in fluid sealing relation therebetween, said inlet portion of said body removably mountable on and about the projecting end portion of an exhaust pipe of an internal combustion engine, and clamp means constructed and adapted to engage therearound said body in said inlet end portion and mount same on said end portion of said exhaust pipe in fluid sealing relation therebetween, said apparatus constructed and adapted to pass exhaust gases from said exhaust pipe into said body, a portion of said gases passing into and out of said valve means, and a remaining portion of said gases passing into said inflating tube to be used to inflate articles.

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