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ATTACHMENT FOR AN INTERNAL COMBUSTION ENGINE

Filed Dec. 6, 1930

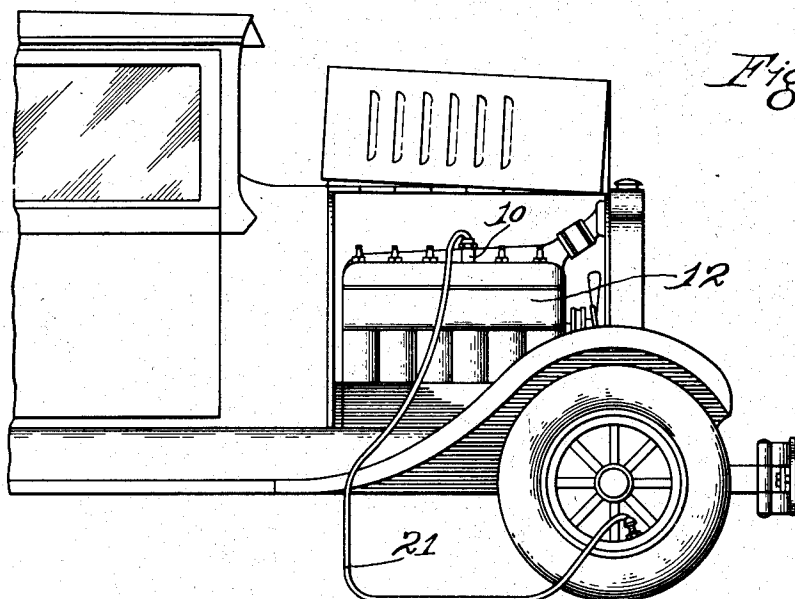


Fig. 1.

Fig. 2.

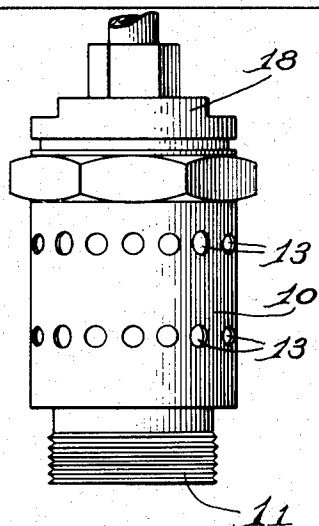


Fig. 3.

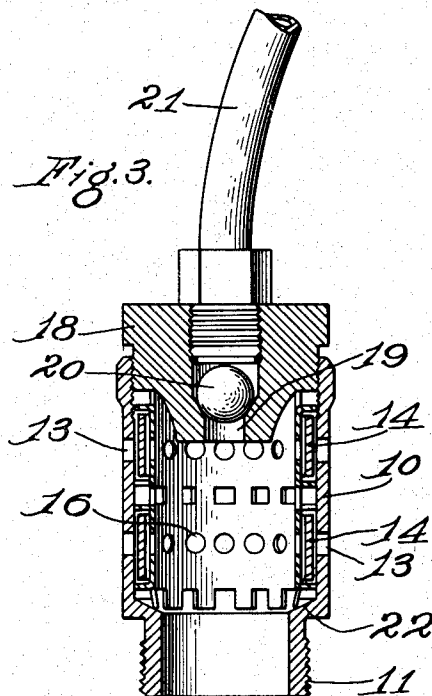
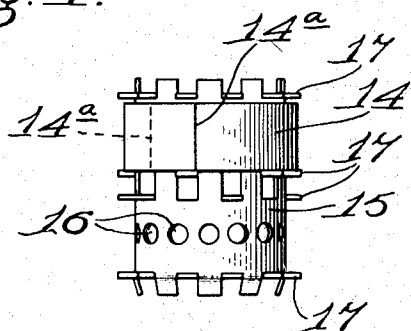


Fig. 4.



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## UNITED STATES PATENT OFFICE

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## ATTACHMENT FOR AN INTERNAL COMBUSTION ENGINE

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This invention relates to improvements in attachments for an internal combustion engine and, more especially, an air pump adapted for use in connection with a multi-cylinder internal combustion engine. My attachment is primarily adapted for use in connection with motor vehicles for tire inflation.

By the use of my invention, there is provided a very simple, cheaply manufactured, and easily operated device that may be carried in a motor vehicle and used for inflating tires thereof. The operation is very simple, requiring merely the removal of a spark plug from one of the cylinders of the engine and the insertion therein of my improved pump. The engine is then operated with the remaining cylinders and the one having the device attached operates in conjunction therewith to pump air.

Other features and advantages of my invention will appear more fully as I proceed with my specification.

In that form of device embodying the features of my invention shown in the accompanying drawing—

Figure 1 is a view in side elevation of the device in use; Fig. 2 is a view of the device in side elevation showing the same removed from the motor; Fig. 3 is a vertical sectional view; and Fig. 4 is a view in side elevation of the valve cage or retainer removed, showing one of the flap valves in place.

As shown in the drawing, the device includes a cylindrical casing 10 having its lower end somewhat reduced in diameter and provided with external threads 11 adapted to be screwed into the spark plug opening of one of the cylinders of a multi-cylinder internal combustion engine 12.

Numerals 13, 13 indicate air inlet holes in the casing 10. These openings are controlled by a check valve including the loose flaps or strips of material 14, 14 inside of the casing. These strips, for example, may be made of rawhide of sufficient length to give a slight overlap to the ends 14<sup>a</sup>, 14<sup>a</sup>, as shown.

The valve flaps 14, 14 are held in position by a cage or retainer, shown in Fig. 4, of cylindrical form, as indicated by 15, and preferably formed out of stamped or pressed

sheet metal. This retainer is provided with four rows of outwardly projecting lugs 17 forming two annular channels accommodating the strips or flaps 14. In Fig. 4, the upper flap 14 is shown in place and the lower one is removed. As shown in Fig. 3, the flaps 14 operate as check valves controlling the air inlet openings 13. That is, these strips are somewhat loosely held in place by the cage or retainer 15 so that they will permit air to enter the casing 10 through the holes 13; but will be forced out against the holes to close the same with an increase of pressure inside of the casing. The holes 16 in the retainer 15 under the flaps 14 assist in giving a quick closing action.

The upper end of the casing 10 is closed by a cap 18 having a centrally arranged air outlet 19 controlled by a ball check 20. The upper end of the cap 18 is adapted to receive the end of a flexible hose 21, as shown.

The interior of the lower end of the casing 10 is provided with a shoulder 22 to prevent displacement of the retainer 15.

In the operation of the device, the casing 10 is screwed into a spark plug opening, as above described. When the motor is operated, the piston in the cylinder to which the device is attached operates to draw air in through the openings 13 and expel it through the opening 19 into the hose 21.

The cap 18 is preferably threaded into the upper end of the casing 10, as shown. When this cap is removed, the valve mechanism for the inlet holes 13, that is, the retainer 15 and the flaps 14, 14, may easily be removed through the upper end of the casing for inspection, replacement and repair purposes.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as permissible, in view of the prior art.

What I regard as new, and desire to secure by Letters Patent, is:

1. A device of the character described including a casing adapted for communication with the interior of a cylinder of an internal combustion engine, said casing having a side opening to the atmosphere, a removable cap for said casing carrying an outlet valve, and a valve within said casing for said side opening which may be removed from said casing when said cap is removed.

2. A device of the character described including a casing adapted for communication with the interior of a cylinder of an internal combustion engine, said casing being provided with air inlet openings in the side wall, and in which there is provided a removable retainer in the casing holding flaps adjacent said inlet openings.

3. A device of the character described including a casing adapted for communication with the interior of a cylinder of an internal combustion engine, said casing being provided with inlet openings in the side wall and provided with a cylindrical valve flap retainer inside, said retainer being provided with annular channels for the reception of flaps.

In witness whereof, I have hereunto set my hand, this 4th day of December, 1930.

CHARLES J. COSTELLO.