P. A. ISENBERG.

VALVE SILENCER.

APPLICATION FILED AUG. 15, 1910.

997,296. Patented July 11, 1911.

Fig. 1.

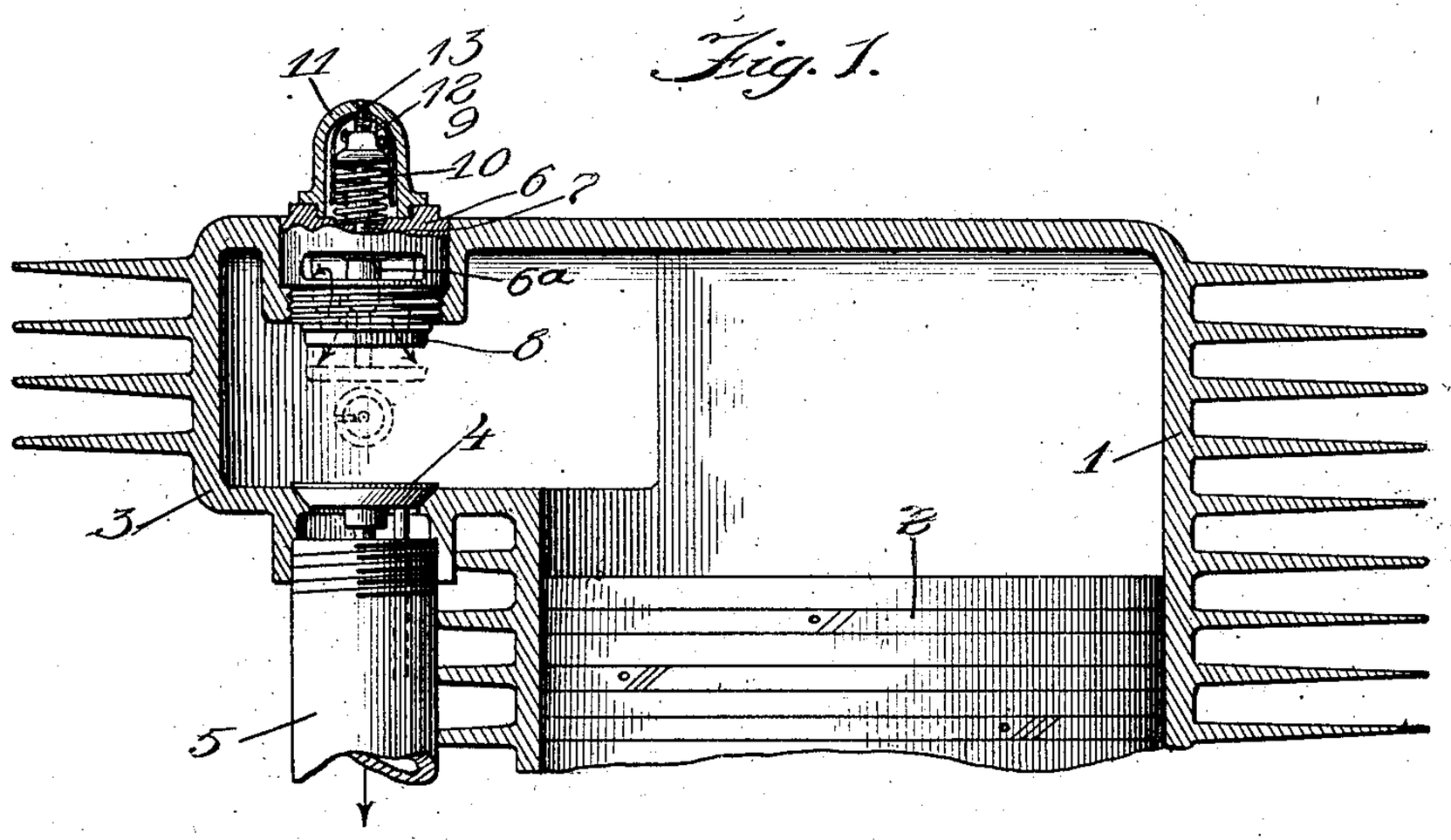


Fig. 2.

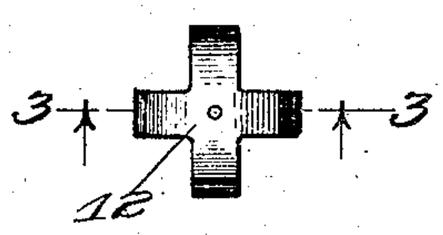


Fig. 3.

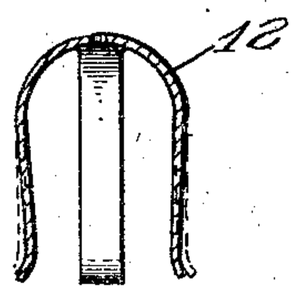
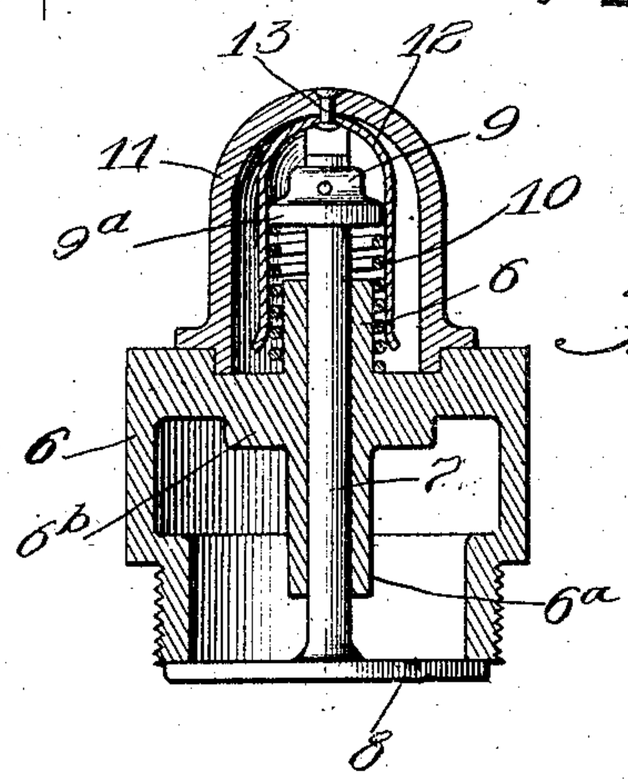


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

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VALVE-SILENCER.

997,296. Specification of Letters Patent. Patented July 11, 1911.

Application filed August 15, 1910. Serial No. 577,248.

To all whom it may concern:

Be it known that I, PAUL A. ISENBERG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Valve-Silencers, of which the following is a specification.

My invention relates to valve silencers for silencing the action of the inlet valve of internal combustion engines, and the object of the invention is to produce a simple and easily constructed device which shall prevent noise attending the valve action. I accomplish my object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of a portion of the cylinder of an explosion engine equipped with my valve silencer. Fig. 2 is a plan of the silencing clip. Fig. 3 is a section thereof on the line 3—3, Fig. 2, and Fig. 4 is a central section of the inlet valve and associated parts.

Similar numerals refer to similar parts throughout the several views.

Referring to the form of apparatus selected to illustrate the invention, the engine cylinder 1 is provided with a piston 2 of any suitable construction. The valve box 3 has an outlet valve 4 controlling the exhaust 5 in the manner common to this type of engine. An inlet valve casing 6 is screwed into the box 3 and is provided with a longitudinally apertured sleeve 6^a which forms a guide for the stem 7 of the inlet valve 8. On the outer end of stem 7 is rigidly secured a head 9 which is engaged by a compression spring 10 for normally holding the valve 8 closed. Said spring is interposed between the top 6^b of casing 6 and the under side of head 9, and preferably surrounds sleeve 6^a which tends to hold the spring in position. The head 9, spring 10 and upper end of the valve stem are housed within a dome-shaped cap 11 which is secured to casing 6, as shown in Figs. 1 and 4. A ring or disk 9^a is formed upon head 9, and makes sliding contact with the fingers of the clip 12. In its preferred form said clip is approximately dome-shaped and is secured by a rivet 13 or otherwise to the inside of cap 11 concentrically therewith, and in such position that the fingers of the clip, which are formed of spring metal, will frictionally engage the sides of the disk 9^a and retard the movement of said disk and parts attached thereto. By preference the clip is formed of a single piece of spring sheet metal, as shown.

In operation, valve 8 is normally held closed by spring 10, supplemented at times by the pressure of the gases within the engine cylinder. When, however, the cylinder is to receive a charge of gasolene vapor or other inflammable gas the suction created by the downward movement of the piston causes the valve to open to admit the charge. The force of the suction is, of course, balanced against the force of the spring and without the clip the valve is so sensitive as to vibrate when the charge is being sucked in, resulting in what is termed a "snoring" noise. My clip, however, acts as a retarder, reducing the sensitiveness of the valve and effectually preventing the noise. It also serves to reduce the clicking noise due to the shock from the sudden arresting of the valve in opening or closing. In a gasolene engine running at normal speed the sudden opening and closing of the inlet valve also produces a loud and rapid clicking noise, and causes a vibration which is very annoying, especially in the case of motor cycle engines. Of course this noise and vibration is not affected by the engine muffler, and the muffling of the engine serves only to bring out by comparison the noise due to the operation of the valve.

It will be noted that the clip is simple in construction, and is durable because it is protected from the heat of the gases by the stationary parts interposed between the clip and the gases of combustion. It takes no additional space and is protected by the cap 11 from contact with outside objects.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In combination, a valve casing, a valve movable in a straight line therein, a spring tending to constantly urge said valve in one direction therein, and a dome shaped spring clip adapted to exert pressure radially inward toward a portion of said valve from different points around it for retarding the action of the valve.

2. In combination, a valve casing, an in-

let valve controlling the passage therethrough, a spring for normally holding said valve closed, a disk connected to said valve, a cap over said disk and spring and a clip secured to said cap and adapted to frictionally engage the sides of said disk for silencing said valve.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

PAUL A. ISENBERG.

Witnesses:

HOWARD M. COX,

MARGARET D. ROBB.