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VALVE AND THE METHOD OF MAKING IT

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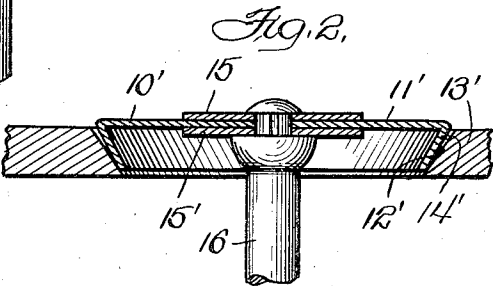
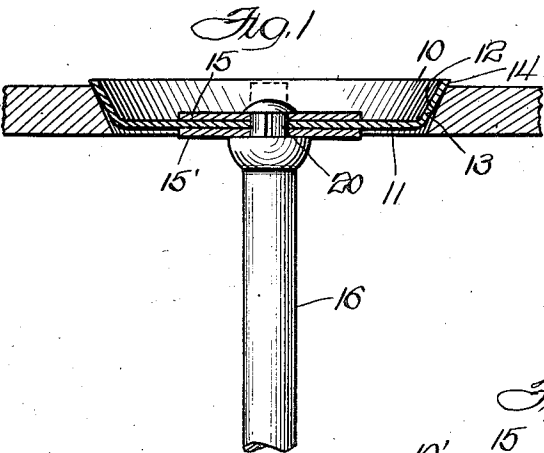
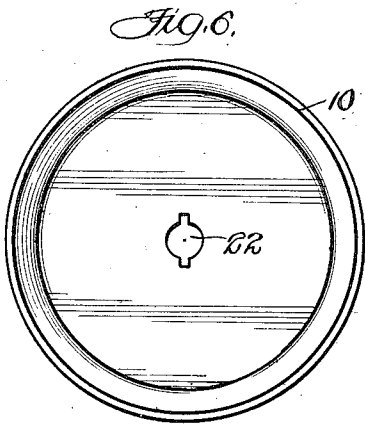
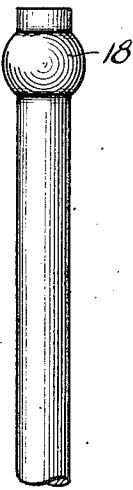


Fig. 3. *Fig. 4.* *Fig. 5.*



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UNITED STATES PATENT OFFICE.

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VALVE AND THE METHOD OF MAKING IT.

Application filed December 1, 1922. Serial No. 604,316.

To all whom it may concern:

Be it known that we, AARON M. SEARLES and FORÉE BAIN, citizens of the United States, respectively residing at Chicago, in the county of Cook and State of Illinois, and at La Grange, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valves and the Methods of Making Them, of which the following is a specification.

This invention relates to valves and the method of making them.

One of the objects of the invention is to make a light, elastic, poppet valve.

Another object is to make a valve substantially unaffected by high temperature; that will not warp and which is substantially non-corrosive and non-oxidizable.

A further object is to make a valve with an elastic rim seat.

A further object is to provide a poppet valve, which, having an elastic rim, tends to increase its diameter by force of explosion or internal pressure.

A further object is to provide improved means for securing the valve to the valve stem.

Another object is to provide a valve which has substantially no affinity for free carbon and which will not accumulate deposits of carbon on its working surfaces.

Other objects and advantages will readily appear to persons versed in the art, from a consideration of the following description, when taken in conjunction with the drawings, wherein:—

Fig. 1 is a central vertical section thru an embodiment containing the invention.

Fig. 2 is a modification of Fig. 1.

Fig. 3 is a rod of which the valve stem is to be made.

Fig. 4 shows the rod after one end has been upset to provide an enlargement of which to construct a shoulder.

Fig. 5 is a finished valve stem ready to be inserted in the valve and to be secured thereto.

Fig. 6 is a plan view of the valve before being fastened to its stem.

In all the views the same reference characters are employed to indicate similar parts.

The valve 10 is made of sheet metal of uniform thickness throughout, as shown in Figs. 1 and 2. A disk of metal is formed to provide a central disk part 11 and a surrounding

rim part 12—12', thus making the valve cup-shape with an outwardly flaring rim, as shown in Fig. 1 or an inwardly converging rim, as shown in Fig. 2.

The seat 13 for the valve is shown to be angularly more obtuse than the confronting surface 12 of the valve so that the free edge 14—14' of the valve, in either case, will contact the seat 13—13' first. Further pressure tends to increase the contacting seating surfaces by slight compression of the rim of the valve.

In Fig. 2 the valve seat 13' is slightly more acute than the confronting valve surface to produce the above described effect.

Washers 15—15' are used to reenforce the disk or body part of the valve. The stem 16 is preferably secured to the valve and washers by upsetting the end of the stem by application of pressure while the end of the stem is hot.

A rod 17 is cut to suitable length, then one end is upset to provide the enlargement 18. The enlargement is then reduced to provide the shoulder 19 and the reduced tenon 20. The tenon is left longer than to merely extend thru the valve and washers, as shown in broken line in Fig. 1, so that it may be subsequently upset to increase its diameter and to fully fill the angular or irregular axial hole in the valve and the washers.

The valve 10 and washers 15—15' each have an axial perforation 22, which is irregular in outline, that is to say, it is not truly round so that when part of the tenon completely fills these openings, as when the tenon is upset therein, the stem is thereby prevented from rotating. As the valve wears at its rim edge, or when pressure is applied to it, the rim is contracted thereby and larger surfaces of the valve and the valve seat are brought into intimate contact.

The valve, made as described, is light, has little inertia and momentum and is especially adaptable for high speed engines.

Having described our invention what we claim as new and desire to secure by Letters Patent, is:—

1. In combination with an inwardly tapered substantially unyielding valve seat, a hollow cap shape poppet valve having its perimeter tapered at a different angle from a common axis from that of the seat so that the outside end surface of the valve, near its free edge, contacts the valve seat first in

closing the valve and increased pressure tends to increase the contacting area of the valve with its seat.

2. In combination with an interiorly and
5 inwardly tapered, substantially rigid valve seat; a valve comprising a disk in a single plane, perpendicular to its axis of movement, and terminating in a yielding annular flange,

tapered to a different extent to said axis than the aforesaid seat, whereby increased pressure on said valve tends to increase the contacting surface area of said valve and seat. 10
In testimony whereof we hereunto set our hands.

AARON M. SEARLES.
FORÉE BAIN.