Nov. 30, 1937. G. WIRRER ET AL 2,100,620

VALVE INSERT

Filed March 25, 1937

Fig. 1

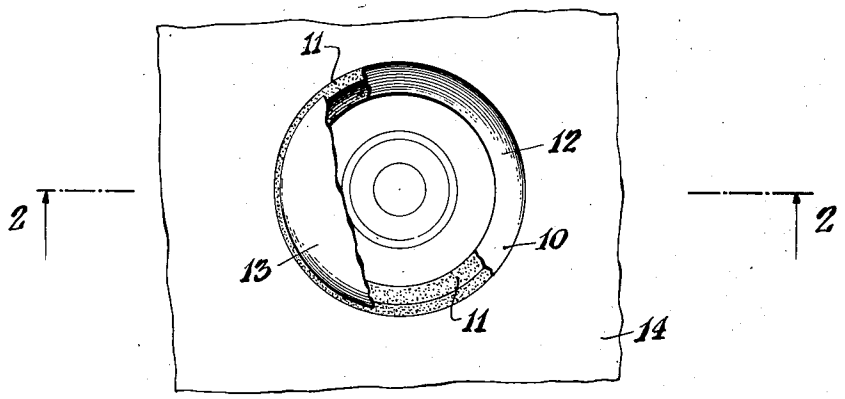
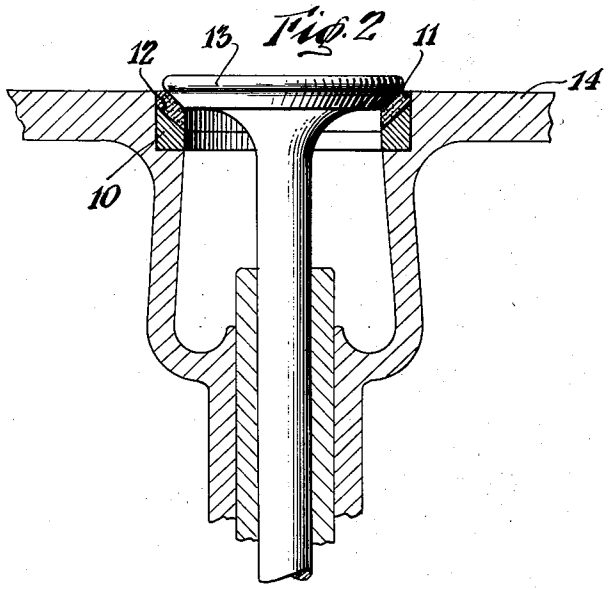


Fig. 2



INVENTORS
Gottfried Wirrer
BY William E. Day, Jr.
Hoguet, Neary & Campbell
their ATTORNEYS

Patented Nov. 30, 1937 2,100,620

UNITED STATES PATENT OFFICE

2,100,620

VALVE INSERT

Gottfried Wirrer and William E. Day, Jr., Plainfield, N. J., assignors to Mack Manufacturing Corporation, Long Island City, N. Y., a corporation of Delaware

Application March 25, 1937, Serial No. 132,898

4 Claims. (Cl. 75—124)

Our invention relates to alloys and more particularly to certain alloys that are especially adapted for valve inserts for internal combustion engines.

From various tests that we have made with nickel-iron alloys, and especially with the conventional 40% nickel-iron alloys, we have found that considerable difficulties are encountered because of the porosity and poor welding characteristics of these alloys when facing with stellite, which is a well known, non-ferrous alloy containing cobalt, tungsten, chromium, and carbon. The principal disadvantages of this 40% nickel-iron alloy when used for valve inserts are insufficient dispersion of the carbon, too great a porosity of the casting, and the difficulty of welding the parts made of this alloy to other parts made of dissimilar metals, such as for example, stellite.

In accordance with our invention we have discovered that all of the above mentioned disadvantages characteristic of the prior art nickel-iron alloys for valve inserts may be overcome by properly modifying these alloys. We have made and used with marked sucess valve inserts composed of our new and improved nickel-iron alloy. This alloy possesses a substantially finer dispersion of carbon than the conventional nickel-iron alloys, has relatively small porosity, and is easily welded to other metals such as stellite.

The improved valve inserts of our invention are made of nickel-iron alloys that contain certain percentages of aluminum, silicon, and manganese, and are faced by welding with some other suitable alloy such as stellite. The nickel-iron alloy that we have found most desirable for our improved valve inserts comprises the following materials and approximate proportions:

	Per cent
Nickel	39.0 – 41.0
Carbon	1.5 – 2.0
Manganese	0.3 – 0.6
Silicon	0.5 – 1.0
Aluminum	0.75– 1.25
Iron	57.95– 54.15
	100.00 100.00

One specific and non-limiting example of the alloy material that we have found commercially satisfactory is as follows:

	Per cent
Nickel	40.0
Carbon	1.75
Manganese	0.4
Silicon	0.75
Aluminum	1.0
Iron	56.1
	100.00

The method of preparing this alloy may be any of the well known prior art methods; for example, the metal may be melted and prepared either in an oil fired crucible or in an electric furnace. The charge consists of steel and the proper amount of cast iron to give the silicon, manganese and total carbon content. The correct amount of nickel is added to this charge and the aluminum is introduced at the end of the melting period, slightly in excess in order to aid in the reduction of oxides formed.

One illustrative embodiment of the valve insert of our invention and its mode of application is given in the accompanying drawing, in which:

Figure 1 is a plan view of the valve insert; and

Figure 2 is a side sectional view taken along line 2—2 of Figure 1, showing the valve insert and associated parts.

Referring to the drawing, the valve insert consists of an annular shaped member 10, which is composed of our new alloy material, to which is joined by welding an annular shaped member 11 made of stellite or other suitable material. The members 10 and 11 have juxtaposed conical or bevelled surfaces, as shown at 12. The valve 13 and valve housing 14 are of common construction.

It is to be understood that various changes may be made in the alloys and constructions disclosed herein without departing from the scope of our invention.

We claim:

1. An alloy particularly adapted for valve insert material comprising approximately 39.0–41.0% nickel, 1.5–2.0% carbon, 0.3–0.6% manganese, 0.5–1.0% silicon, 0.75–1.25% aluminum, and the remainder iron.

2. An alloy particularly adapted for valve insert material comprising approximately 40.0% nickel, 1.75% carbon, 0.4% manganese, 0.75% silicon, 1.0% aluminum, and the remainder iron.

3. A stellite faced valve insert comprising an annular member made of an alloy material containing approximately 39.0–41.0% nickel, 1.5–2.0% carbon, 0.3–0.6% manganese, 0.5–1.0% silicon, 0.75–1.25% aluminum, and the remainder iron.

4. A stellite faced valve insert comprising an annular member having a conical surface and made of an alloy material containing approximately 40.0% nickel, 1.75% carbon, 0.4% manganese, 0.75% silicon, 1.0% aluminum, and the remainder iron.

GOTTFRIED WIRRER.
W. E. DAY, JR.