G. H. M. CANTON, P. G. UNNE & E. J. J. SALMSON.

VALVE SPRING.

APPLICATION FILED NOV. 27, 1912.

1,154,971. Patented Sept. 28, 1915.

FIG. 1

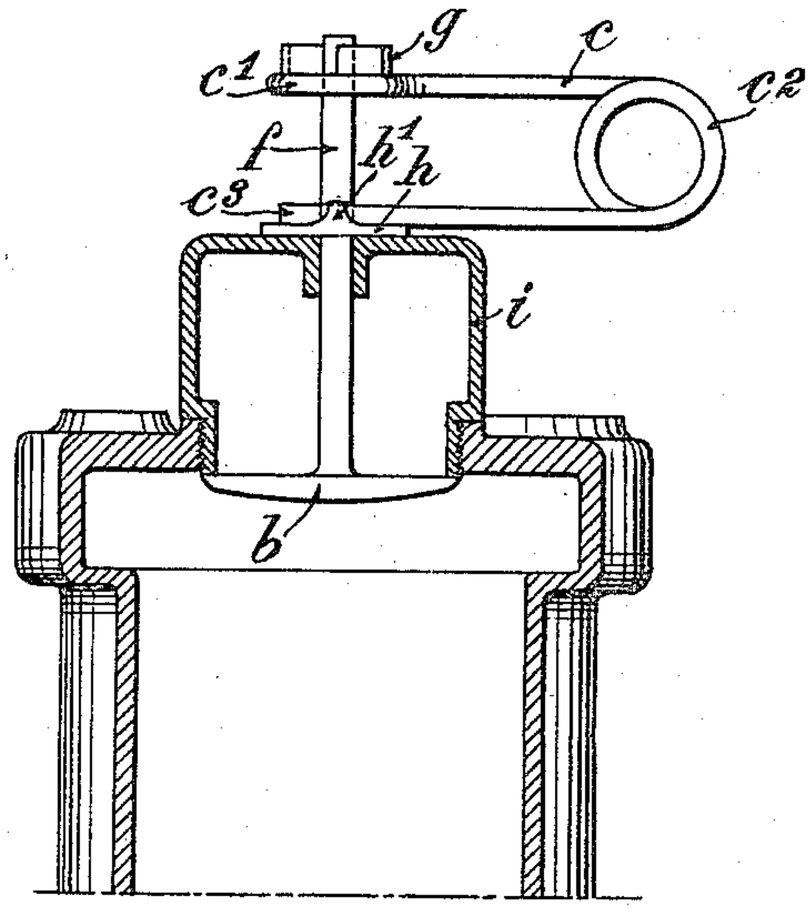
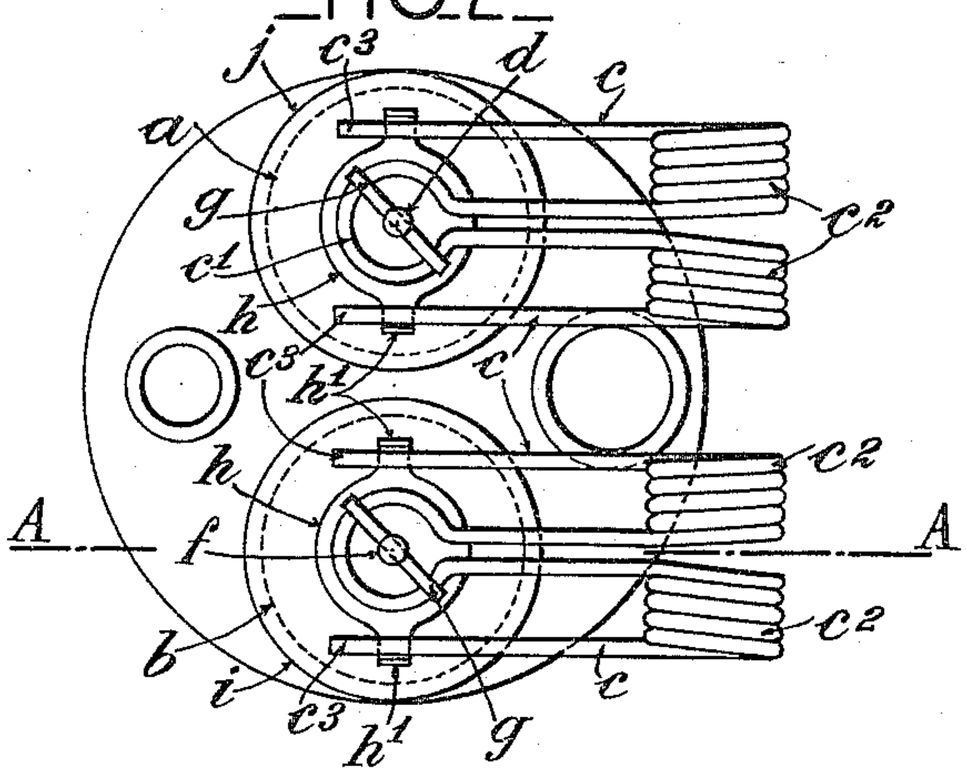


FIG. 2



Witnesses:-
Jak. Zelenka
Collier Franck

Inventors:-
Georges Henri Marius Canton
Pierre Georges Unné
Emile Jean Jules Salmson
by Osborne & Co
their Attorney

UNITED STATES PATENT OFFICE.

GEORGES HENRI MARIUS CANTON, PIERRE GEORGES UNNÉ, AND EMILE JEAN JULES SALMSON, OF BILLANCOURT, FRANCE.

VALVE-SPRING.

1,154,971. Specification of Letters Patent. Patented Sept. 28, 1915.

Original application filed March 29, 1912, Serial No. 687,011. Divided and this application filed November 27, 1912. Serial No. 733,765.

To all whom it may concern:

Be it known that we, GEORGES HENRI MARIUS CANTON, PIERRE GEORGES UNNÉ, and EMILE JEAN JULES SALMSON, respectively citizen of France, subject of the King of Sweden, and citizen of France, residing at 9 Avenue des Moulineaux, Billancourt, Seine, in the Republic of France, have invented new and useful Improvements in Valve-Springs, of which the following is a specification.

This invention relates to valve springs and more particularly to springs adapted to return to their seats the valves of explosion engines. In engines of this type actually in use, stoppages frequently occur which are very dangerous when the engines are mounted on aeroplanes since they may cause the machine to fall. These stoppages may be due to the defective operation of the valves caused by a molecular change in the material constituting the recoil springs. This invention removes all these disadvantages as the effective parts of the improved springs are at some distance from those portions of the engine which are liable to heat or anneal the springs, whereby the latter always retain their elasticity.

According to the invention, the springs are formed each by a steel wire wound in such a manner as to form one or more elastic coils remote from the parts of the engine which are liable to heat them.

The present application is a division of our copending application Serial Number 687011, filed March 29, 1912.

The invention is illustrated, by way of example, in the accompanying drawing in which—

Figure 1 is a vertical section along the line A—A, Fig. 2, through one end of an engine cylinder, showing in side elevation a valve and its spring; Fig. 2 is a corresponding plan view.

The admission and exhaust valves *a b*, are each returned to their seats by a spring *c* formed of a steel wire bent back at its middle portion in such manner as to form an eye or loop c^1 through which the corresponding valve stem *d* or *f* extends. The loop c^1 is held against upward movement by a cotter *g*. The two parts of the wire at both sides of the loop c^1 are coiled in inverse directions at c^2 in such manner as to form a double spring. The extremities c^3 of the wire are held by a metallic plate *h* which rests on the box or casing *i* or *j* of the corresponding valve and is provided with two lugs h^1 intended to retain the ends of the wire. When the valve opens, the loop c^1 of the spring is drawn toward the cylinder and the coiled parts c^2 of the spring are slightly wound up so that the reaction of said coiled parts will cause the valve to close when the force which tends to open the valve is removed. The spring thus formed has the advantage that its effective parts c^2 are at some distance from those portions of the engine which are liable to heat or anneal the spring. This spring thus always retains its elasticity.

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

1. In combination, a valve having a projecting stem, and means for closing said valve, said means comprising a spring formed of an integral strand having intermediate oppositely wound coaxial coils remote from the valve, intermediate arms extending from adjacent parts of said coils, respectively, and bent to form a loop engaging said valve stem, terminal arms tensioned by engagement with the casing of said valve, and means for retaining said loop in position.

2. In combination, a valve having a projecting stem and lugs projecting from the valve casing, and means for closing said valve, said means comprising a spring formed of an integral strand having intermediate oppositely wound co-axial coils remote from the valve, intermediate arms extending from adjacent parts of said coils, respectively, and bent to form a loop engaging said valve stem, and terminal arms frictionally engaging the lugs projecting from the valve casing.

3. In combination, a valve having a projecting stem, a pin passing through said stem at right angles to its axis, a valve casing having lugs projecting therefrom, and means for closing said valve, said means comprising a spring formed of a strand hav-

ing intermediate oppositely wound co-axial coils remote from the valve, intermediate arms extending from adjacent parts of said coils, respectively, and bent to form a loop engaging said valve stem and pressing against said pin, and terminal arms tensioned by frictionally engaging the lugs projecting from the valve casing.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGES HENRI MARIUS CANTON.
PIERRE GEORGES UNNÉ.
EMILE JEAN JULES SALMSON.

Witnesses:
ANTOINE LAVUX,
HANSON C. COXE.