April 15 , 1924. 1,490,656

J. BIGNAN

SYSTEM OF CONTROL FOR THE DISTRIBUTING GEARS OF HEAT ENGINES

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Fig.1

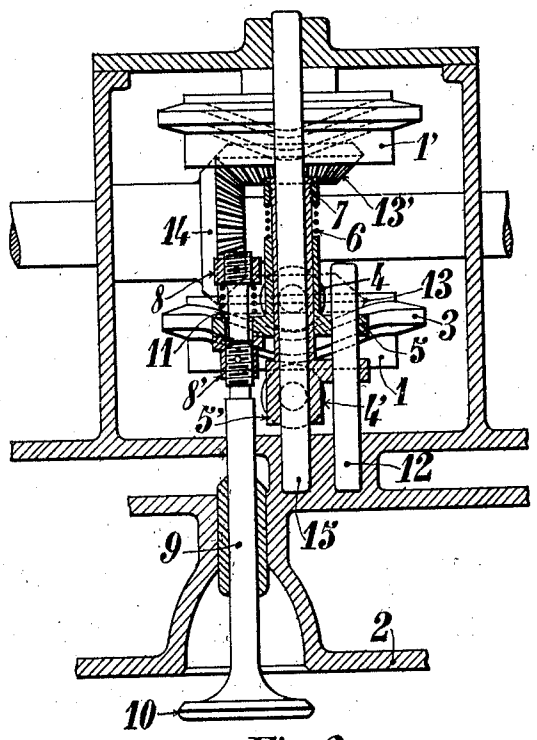
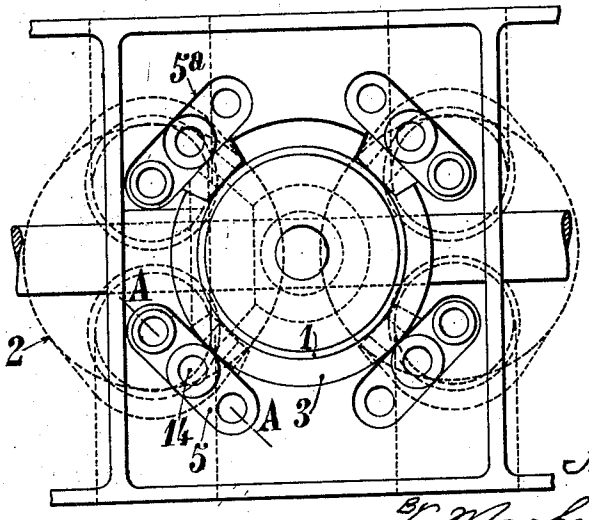


Fig.2



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Fig. 3

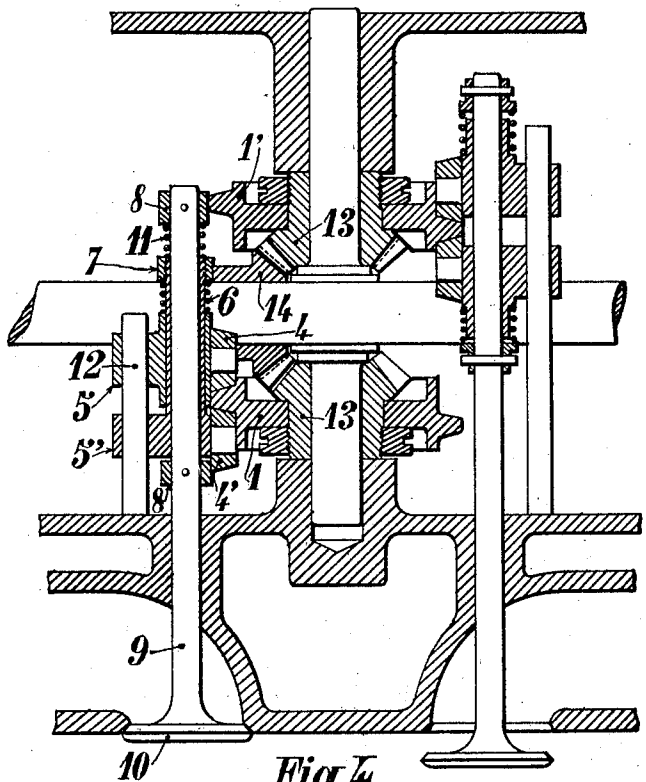
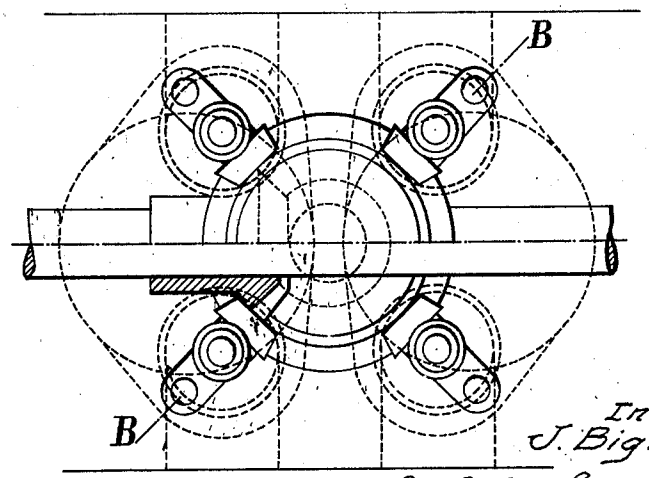


Fig. 4



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Fig.5

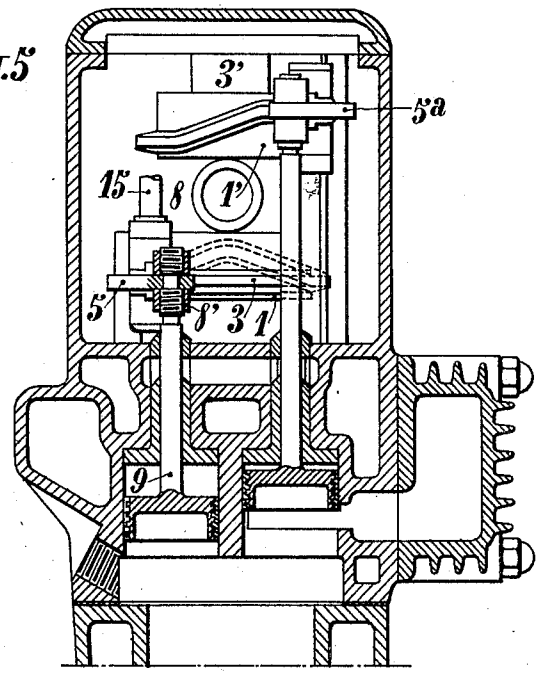
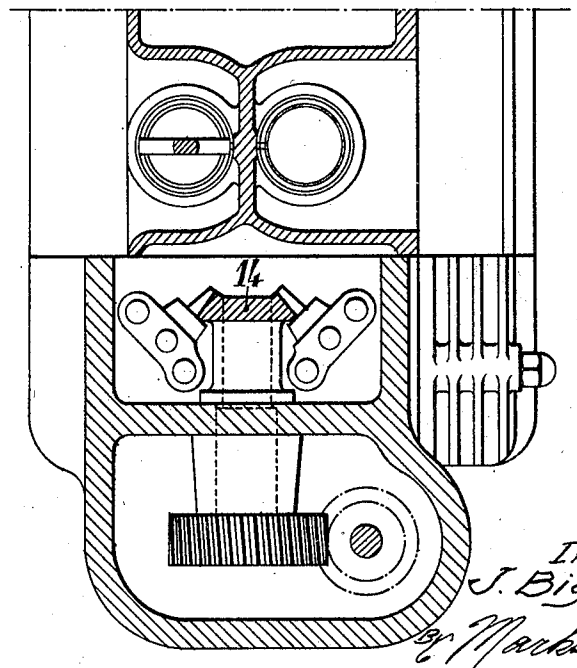


Fig.6



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Patented Apr. 15, 1924. 1,490,656

UNITED STATES PATENT OFFICE.

JACQUES BIGNAN, OF COURBEVOIE, FRANCE, ASSIGNOR TO ETABLISSEMENTS INDUSTRIELS JACQUES BIGNAN, OF COURBEVOIE, FRANCE.

SYSTEM OF CONTROL FOR THE DISTRIBUTING GEARS OF HEAT ENGINES.

Application filed December 12, 1922. Serial No. 606,505.

To all whom it may concern:

Be it known that I, JACQUES BIGNAN, a citizen of the French Republic, residing at 15 Rue de Normandie, Courbevoie, Seine, France, have invented certain new and useful Improvements in a System of Control for the Distributing Gears of Heat Engines, of which the following is a specification.

The present invention relates to a system of control for the distributing gear of heat engines; this system finds its application for the control of the valves, jackets, slide valves or any other system of distribution for internal combustion engines or steam engines and can be more particularly used for the control of the distributing gear of two adjacent cylinders of a multi-cylinder power unit.

The system forming the subject matter of the invention is characterized in that the reciprocating movement of each distributing member is controlled by a cam, the axis of rotation of which is parallel to the axis of the cylinder and carrying a projecting rolling track clamped between two rollers integral with the distributing member through the medium or not of resilient ties.

The accompanying drawing illustrates, by way of example, various forms of carrying out the invention, applied to the control of the distributing members of two adjacent cylinders of a multi-cylinder power unit.

Fig. 1 shows in elevation, partly in section according to A—A, the control device.

Fig. 2 is a plan view of Fig. 1.

Fig. 3 is a sectional elevation according to B—B of a constructional modification.

Fig. 4 is a plan view of Fig. 3.

Fig. 5 is a sectional elevation of a second constructional modification.

Fig. 6 is a plan view corresponding to Fig. 5.

For the clearness of the description, the construction and operation of the control device of the distributing members of a single cylinder will first be explained. Then the combination of two of these devices will be described in the particular cases illustrated.

Referring to Fig. 1, the cam 1 can rotate about an axis parallel to the axis of the cylinder 2 and comprises a projecting rolling track 3 on which run, on either side, the rollers 4 and 4′.

The rollers 4 and 4′ can rotate about axes integral with the roller-carrier made in two parts 5 and 5′. The part 5′ slides within the part 5 and a spring 6 clamped between this latter and a nut 7 screwed on an extension of 5′, constantly tends to bring together the two rollers 4 and 4′, so that they clamp between them the projecting rolling track 3; this arrangement is adapted to avoid any noise and to take up the play. The part 5′ is moreover guided by a rod 14.

On the other hand, the part 5 can move between two rings 8 and 8′, screwed and pinned on the rod 9 of the valve 10, whilst a spring 11 tends to constantly hold the part 5 in contact with the ring 8. Finally, the guiding of the roller-carrier is completed by the rod 12 on which slide the parts 5 and 5′.

The operation is then as follows:

When during its rotation the cam 1 determines the downward movement of the roller 4′ and consequently of the part 5′, the part 5 is actuated in the same direction as well as the roller 4, by the nut-ring 7 and the spring 6. The part 5 then comes in contact with the ring 8′, this determining the actuation of the rod 9 and the opening of the valve 10.

When the cam 1 lifts the roller 4 and consequently the part 5, the spring 6 acting on the nut 7 forces the roller 4′ to constantly remain in contact with the rolling track 3; at the same time, the spring 11 and the ring 8 permit the actuation of the rod and the application of the valve upon its seat; the movement of the part 5 continuing, this latter compresses the spring 11, this having the effect of the very complete closing of the valve 10.

It is obvious that a similar roller-carrier 5^a is provided for the second valve of the cylinder, also controlled by the cam 1, the rolling track and the speed of rotation of which are determined in consequence.

It is also possible to control by two similar cams, which are co-axial but angularly displaced in a suitable manner, the distributing members of two consecutive cylinders of a multi-cylinder power unit. In the example shown in Fig. 1, both cams 1 and 1′ rotate in reverse direction at the

same speed and are displaced 180 degrees relatively to each other. The device for transmitting the movements to the cams can be of any type whatever; particularly, each of the cams 1 and 1′ can be integral with a pinion 13 and 13′ gearing with a bevel pinion 14, the points of engagement of each of the pinions 13 and 13′ being diametrically opposite to each other.

With the device illustrated in Figs. 1 and 2, it is possible to choose for the valves the best arrangement in which these valves are not subjected to any stress prejudicious to their proper operation. But it is also possible to arrange the roller-carriers directly on the valve rod 9, so as to do away with the guide rod (Figs. 3 and 4).

In this example, the roller-carrier 5′ slides on the rod 9 of the valve 10 and on the roller-carrier 5′ slides the roller-carrier 5. The parts 5 and 5′ are moreover guided by the rod 12.

The nut 7, screwed on the part 5′ serves as a bearing, on the one hand, for the spring 6 which bears at the other end of the part 5 and, on the other hand, for the spring 11 which bears at the other end on the ring 8 pinned on to the rod 9.

It is easy to see that this modification of constructional arrangements does not necessitate any modification in the operation described for the first form of construction.

As stated, the system of control forming the subject-matter of the invention applies to the control of any distributing members. By way of example, Figs. 5 and 6 show the application of this system of control to a distribution by means of slide valves; this form of construction is very similar as far as the construction and operation are concerned to that illustrated in Figs. 1 and 2 but, as the spring 11 permitting the application of the valve 10 upon its seat does not present any longer any interest, the rings 8 and 8′ directly clamp between them the extension of the roller-carrier 5 without any resilient intermediary.

The control device forming the subject-matter of the invention may give rise to other numerous modifications which, as well as the forms of construction given above, constitute only particular examples which do not depart from the scope of the invention.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a system of control for the distributing members of heat engines, a rod parallel to the axis of the cylinder, a cam capable of rotating on this rod, a side rolling track cut on this cam, rollers arranged on either side of this rolling track, axes supporting these rollers, a sleeve supporting the axis of the upper roller, a sleeve supporting the axis of the lower roller, means for guiding these sleeves, means for connecting the said sleeves to the distributing member and means for rotating the cam.

2. In a system of control for the distributing members of heat engines, a rod parallel to the axis of the cylinder, a cam capable of rotating on this rod, a side rolling track cut on this cam, rollers arranged on either side of this rolling track, axes supporting these rollers, a sleeve supporting the axis of the upper roller, a sleeve supporting the axis of the lower roller, a guide rod passing axially through both sleeves, means for connecting the said sleeves to the distributing member and means for rotating the cam.

3. In a system of control for the distributing members of heat engines, a rod parallel to the axis of the cylinder, a cam capable of rotating on this rod, a side rolling track cut on this cam, rollers arranged on either side of this rolling track, axes supporting these rollers, a sleeve supporting the axis of the upper roller, a sleeve supporting the axis of the lower roller, a guide rod passing axially through both sleeves, a rod integral with the distributing member, means for connecting one of the sleeves to this rod, means for connecting the two sleeves together and means for rotating the cam.

4. In a system of control for the distributing members of heat engines, a rod parallel to the axis of the cylinder, a cam capable of rotating on this rod, a side rolling track cut on this cam, rollers arranged on either side of this rolling track, axes supporting these rollers, a sleeve supporting the axis of the upper roller, a sleeve supporting the axis of the lower roller, a guide rod passing axially through both sleeves, a rod integral with the distributing member, a ring secured to the upper part of this rod, a resilient member acting between this ring and the lower sleeve for moving them apart, a resilient member acting on the upper sleeve and the lower sleeve for moving them together, an abutment secured to the lower part of the rod and means for rotating the cam.

In testimony whereof I have signed my name to this specification.

JACQUES BIGNAN.

Witnesses:
HENRI MORIN,
A. MORIOT.