P. J. R. POSTEL-VINAY.

COMPRESSION RELIEF SYSTEM FOR STAR SHAPED ENGINES.

APPLICATION FILED OCT. 31, 1921.

1,420,282. **Patented June 20, 1922.**

2 SHEETS—SHEET 1.

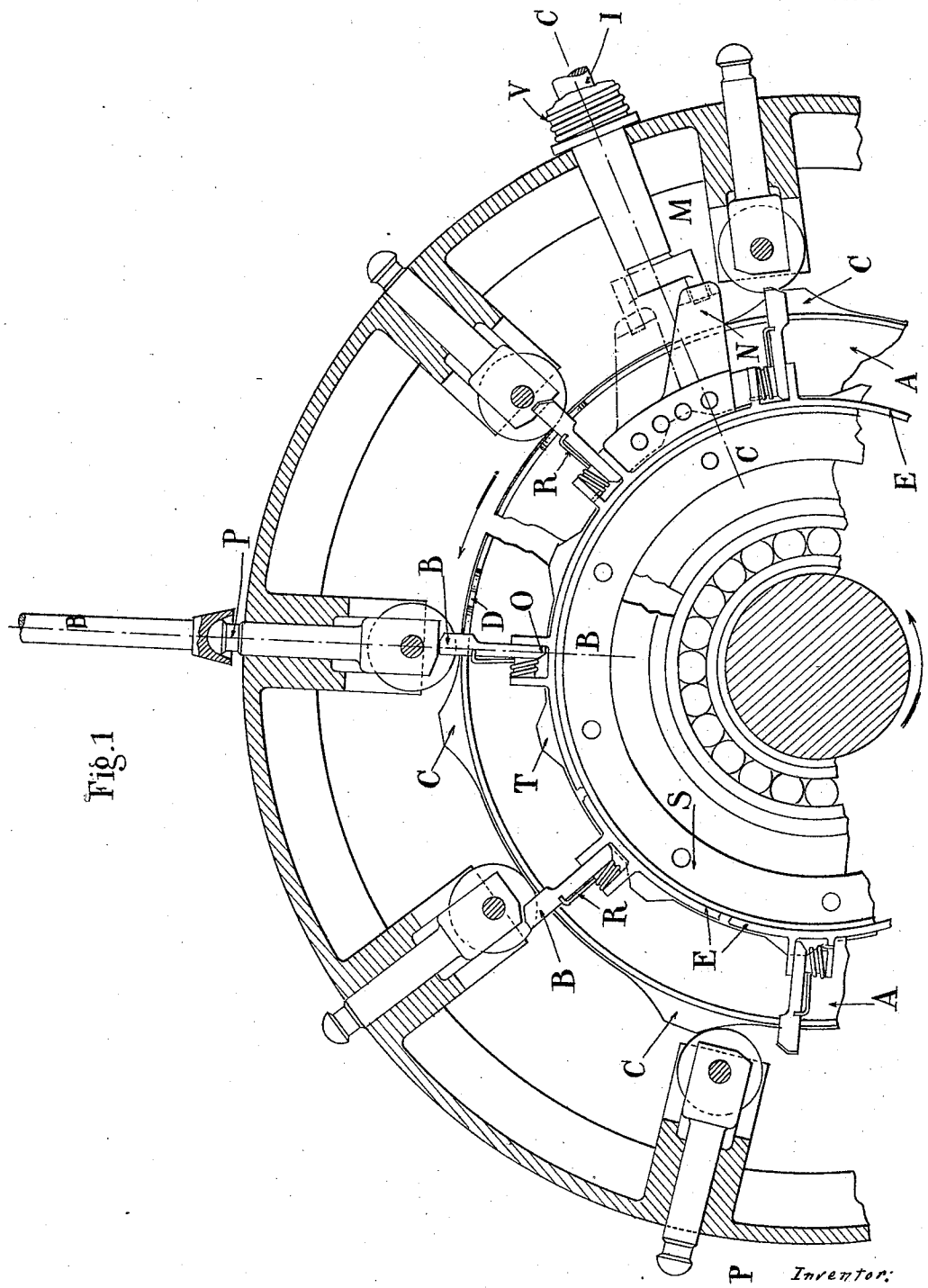


Fig.1

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2 SHEETS—SHEET 2.

Fig. 2

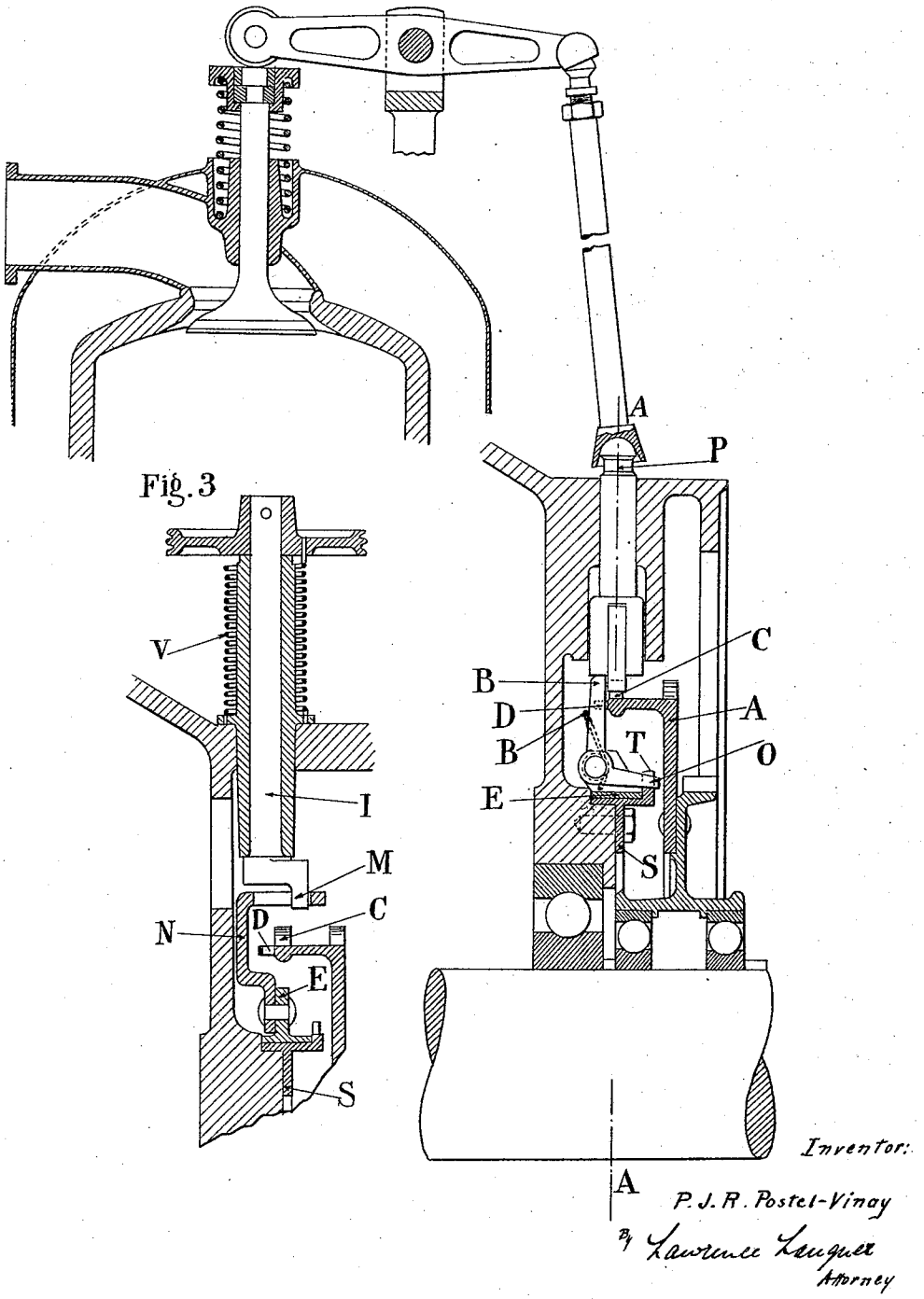


Fig. 3

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COMPRESSION-RELIEF SYSTEM FOR STAR-SHAPED ENGINES.

1,420,282. Specification of Letters Patent. **Patented June 20, 1922.**

Application filed October 31, 1921. Serial No. 511,796.

To all whom it may concern:

Be it known that I, PIERRE JEAN RENÉ POSTEL-VINAY, citizen of the French Republic, residing at Paris, in the Republic of France, have invented new and useful Improvements in Compression-Relief Systems for Star-Shaped Engines, of which the following is a specification.

In order to facilitate the starting thereof, there have already been used in engines having longitudinally disposed cylinders devices for modifying the filling of the cylinders, and acting to diminish the compression.

In engines having cylinders in star disposition, the same arrangements of parts are not available in practice.

The system according to the invention permits of diminishing the filling of the cylinders and the compression by acting on the control devices of the valves, by modifying the relative periods of opening.

It is applicable to engines of the star type having valve gear concentric with the driving shaft.

In the accompanying drawing and by way of example:

Fig. 1 is a cross-section on the line A—A (Fig. 2) of a compression relief system for engines of the star type, according to the invention.

Fig. 2 is a section on the line B—B (Fig. 1) with a partial axial section of a cylinder.

Fig. 3 is a second section on the line C—C (Fig. 1).

As shown in the drawing, A is the ring carrying the cams C of an ordinary valve gear, for this class of engines.

The relief system consists of an annular member or ring E carrying as many retaining levers B as there are pusher rods P for the control of the valves whose action is to be considered.

The said annular member E is revoluble on a support S having as many bosses or gradients T as there are levers.

The ring E is actuated from the exterior of the engine by a shaft I having a crank M exerting an effort in the groove of a piece N secured to the ring E.

The ring A carrying the cams C is provided laterally with as many lateral bosses D as there are cams.

In the example described, the action takes place upon the admission valves, and the device operates as follows: For the starting, by acting upon the shaft I in the proper direction, the ring E rotates through a certain angle; the arms O of the retaining levers leave the bosses T, the springs R cause the levers to rise in the plane of the pusher rods. As the action continues, these levers B gradually raise by their ends the pusher rods P by a certain height which is considered sufficient, but which is only a portion of the ordinary lift produced by the cams C. All the pusher rods for the admission, except those already raised by the cams C, are raised. All the cylinders are thus in communication with the admission manifold. The couple of rotation necessary for the beginning of the engine starting is therefore extremely small.

By continuing to exert this effort of rotation to obtain the starting, it happens that: the cams C move in co-ordinated time under the rollers of the pusher rods, raising the latter as if to effect a normal admission, but during the descent for the closing, the pusher rod P is retained by the lever B. It is only when the bosses D of the cam ring have driven back the lever B, that the pusher rod is released and that the admission valve falls again on its seat.

The angular distance of these bosses D with reference to the cams is regulated in such manner that, by means of the valve which has remained open, the piston when rising again for compression in its cylinder may drive without difficulty a considerable part of the cylinder contents into the admission manifold.

When the valve has again fallen, this piston may compress the mixture remaining in the cylinder, but the effort necessary to obtain this small compression is much less than the normal effort, and is the smaller as the valve remains open the longer and as the crank brings the piston nearer to the end of the stroke.

The starting revolutions may thus be carried out with a small effort.

The cycles with low compression follow each other regularly, for when once the bosses D have passed by, the lever B is returned against the pusher rod by its spring R, but it occupies its retaining position only when the cam is commencing the admission at the normal point, has raised the

pusher rod in order to permit the spring R to effect the complete return of the lever to its straight position.

When the engine has started, and when a sufficient speed is acquired which is able to stand the normal compressions, the shaft I is no longer actuated; by the effect of the control devices or of a spring V, the ring E is returned, drawing with it the retaining levers B which are released from the pusher rods in their plane. The small arms O of the levers then rise upon the bosses T, thereby tilting to the rear the arms B which will thus clear the bosses D.

In the normal working of the engine, the relief device is thus completely at rest, without touching any of the parts in movement, and cannot cause any hindrance to the running.

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

1. A compression relief device for internal combustion engines having radial cylinders, comprising a ring having cams thereon, means for rotating said ring, pusher rods adapted to be operated by the cams, valves in the engine cylinders, means for operatively connecting said valves to the pusher rods, springs tending to close said valves, an annular member, means for supporting said annular member concentrically with the cam ring, means for rotating said annular member by a certain angle, spring controlled levers pivoted on said annular member and adapted to engage with the pusher rods for preventing the valves from closing, stationary bosses adapted to act on said levers and releasing bosses on the cam ring adapted to act upon the levers.

2. A compression relief device for internal combustion engines having radial cylinders, comprising a ring having cams thereon, means for rotating said ring, pusher rods adapted to be operated by the cams, valves in the engine cylinders, means for operatively connecting said valves to the pusher rods, springs tending to close said valves, an annular member, means for supporting said annular member concentrically with the cam ring, means for rotating said annular member by a certain angle, spring controlled bell crank levers pivoted on said annular member, stationary bosses on a fixed part of the device and releasing bosses on the cam ring, one arm of the said bell crank levers being adapted to engage with the stationary bosses and the other arm thereof being adapted to engage with the pusher rods and the releasing bosses.

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

PIERRE JEAN RENÉ POSTEL-VINAY.