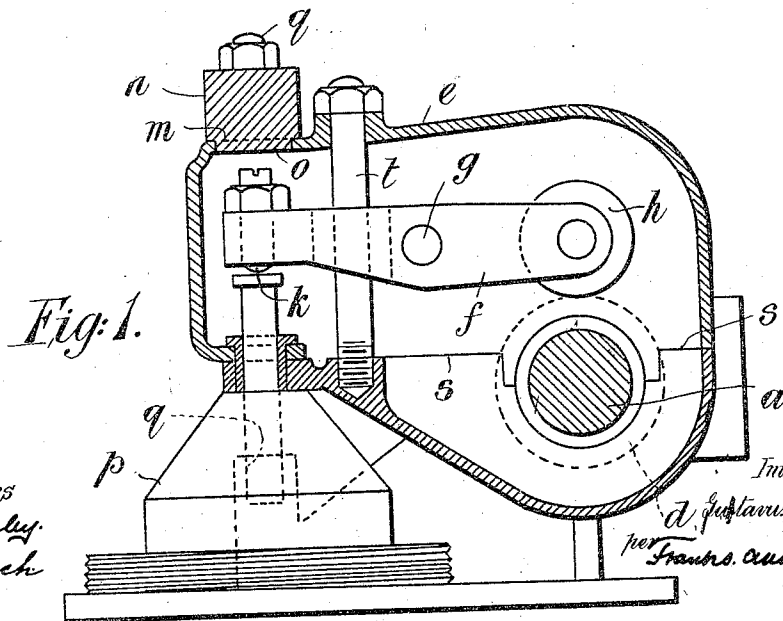
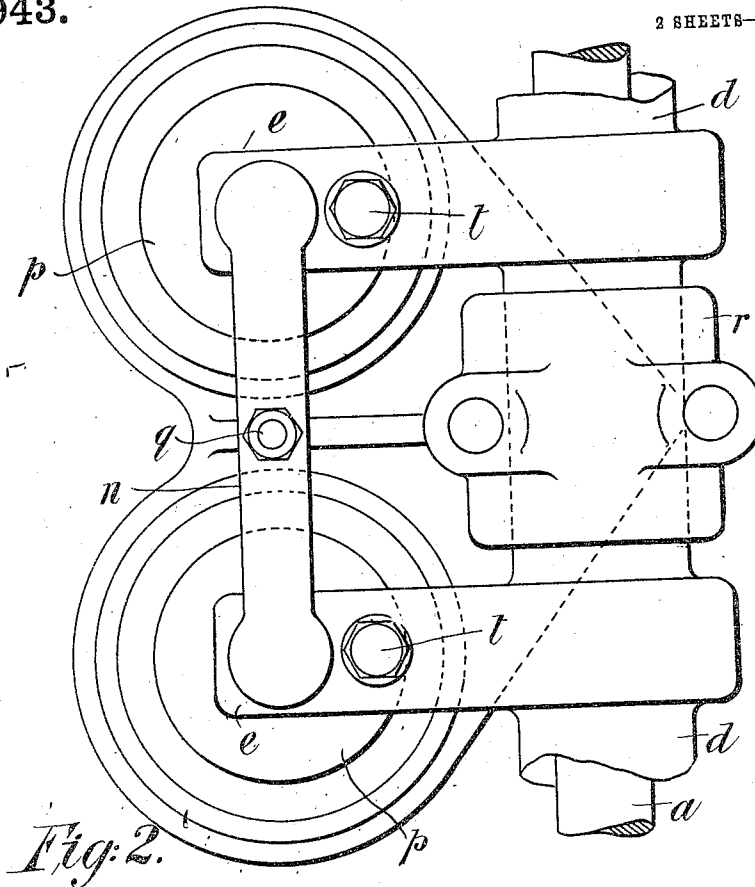


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VALVE OPERATING MECHANISM FOR USE IN INTERNAL COMBUSTION ENGINES.
APPLICATION FILED DEC. 6, 1909.

Patented Dec. 27, 1910.

2 SHEETS-SHEET 1.

979,943.



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Fig. 4.

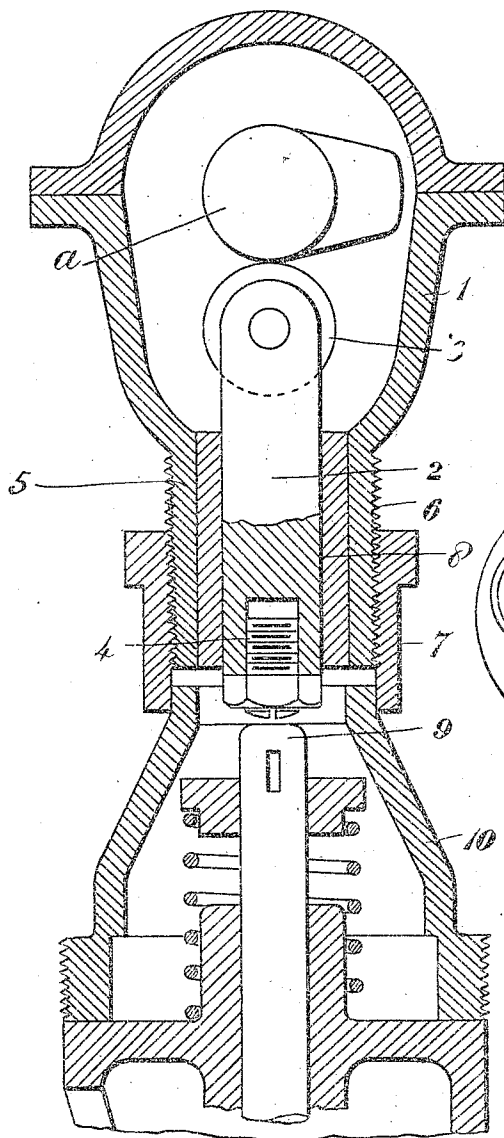
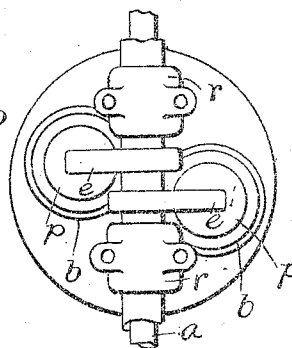


Fig. 3.



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UNITED STATES PATENT OFFICE.

GUSTAVUS GREEN, OF BEXHILL, ENGLAND.

VALVE-OPERATING MECHANISM FOR USE IN INTERNAL-COMBUSTION ENGINES.

979,943.

Specification of Letters Patent.

Patented Dec. 27, 1910.

Application filed December 6, 1909. Serial No. 531,676.

To all whom it may concern:

Be it known that I, GUSTAVUS GREEN, a subject of the King of Great Britain, residing at 49 Reginald road, Bexhill, in the county of Sussex, England, have invented new and useful Improvements in Valve-Operating Mechanism for Use in Internal-Combustion Engines, of which the following is a specification.

This invention relates to removable valve operating mechanism for internal combustion engines of the type in which an overhead cam shaft has a casing revoluble upon it carrying the operating mechanism between the same and the valve; and has for its object to perfect the lubrication of such mechanism as well as to produce improvements of the general form and arrangement.

The invention is illustrated in the accompanying drawings in which—

Figures 1 and 2 are a sectional elevation and plan respectively of the arrangement adopted according to the invention where operating levers are employed. Fig. 3 is a plan of a modification. Fig. 4 is a sectional elevation of the arrangement for a shaft directly over the valves.

In the arrangement shown in Figs. 1 and 2, the cam shaft *a* is mounted above the cylinders of the internal combustion engine, but not directly above the valves. The cam shaft is surrounded throughout its length by a casing *d* which is cylindrical in form in most parts. Where the cams are placed, *i. e.*, opposite to the valves, this casing has lateral extensions *e* adapted to allow of the rotation of the cams and also arranged to support the levers through which the cams effect the operation of the valves. As may be seen from Fig. 1 the valve operating lever *f* is mounted upon a pivot *g* secured in the lateral extension *e*, and the lever carries on the one end a roller *h* adapted to bear upon the cam, and at the other end an adjustable pin *k* adapted to strike the head of the valve stem or a plunger arranged in between the valve stem and the lever. To allow of access being obtained to the pin *k* for the purpose of adjustment an opening which may be closed by a screw cap is provided at *m* in the casing above the pin. In the form shown, however, the opening *m* is closed in another way. It may be found that the caps of the bearings in which the cam shaft casing is secured can be screwed sufficiently tight to prevent the casing lifting from off

the valves. If this is not found to be sufficient it is convenient to provide a bridge piece *n* secured by a bolt and nut *q* to the central web of the bracket *r* supporting the cam shaft casing, and having downwardly projecting parts adapted to fit the openings at *m* so as to at once close these openings and to press down the ends of the lateral extensions upon the dome-shaped cap nuts *p* which secure the valve cages in place. The whole casing *d* is formed in two parts separable along the line *s*. As will be seen the two parts are held together by the action of the bridge piece *n* and the bolt *t*, and the joint between them is machined so that it is practically oil-tight. The lower part of the lateral extensions *e* between the cams serves to contain oil and so long as the joint *s* does not permit leakage the oil is not lost when the cam casing is revolved.

In the mechanism illustrated the whole of the cam casing, *i. e.*, both its lateral extensions and cylindrical portions, is intended to revolve within its bearings *r* and about the axis of the cam shaft *a*. To allow of such revolution it is obviously necessary to remove the bridge piece *n* from above the lateral extensions where such bridge piece is used, but when this is done the lateral extensions can all be turned over so that ready access is obtained to the valves.

As Fig. 3 indicates, the cam shaft may lie centrally over the cylinders and between the valves the lateral extensions *a* then project alternately on either side.

Occasionally the arrangement shown in Fig. 4 may be of advantage. In this case the cam shaft *a* is vertically above the valves but a sufficient distance away to allow of access to the valves being obtained without moving it. Naturally there is now no lever to convey the motion of the cam to the valve but instead a simple plunger 2 carrying a roller 3 at the top and an adjustable striking pin 4 at the bottom. The extension 5 of the cam case is in this case in a vertical plane instead of a horizontal one. The lower part of the extension is threaded as at 6 and a sleeve 7 is adapted to be moved up and down upon this thread so as to be disengaged from or engaged with the top of the dome nut *p*. The whole casing of the cam shaft is revoluble about the axis of the cam shaft itself and the casing may be mounted either in suitable external bearings surrounding its cylindrical portions or it may have bearings

formed in it adapted to allow it to rotate upon the shaft. It will be noted that this construction has the advantage that any oil which may leak gradually from the cam case simply enters the valves and serves to lubricate them.

It is obviously not necessary that the whole casing should turn in this fashion, but it is quite sufficient if segments of the casing to which the extensions are secured are revoluble. If desired only the extensions themselves may rotate about the cylindrical part of the casing.

What I claim is:—

1. In an internal combustion engine the combination of an overhead cam shaft, a casing surrounding said shaft and revoluble thereon, operating levers extending from the cams to the valve stems mounted in said casing, and extensions on said casing surrounding the levers.

2. In an internal combustion engine the combination of an overhead cam shaft, a casing surrounding said shaft and revoluble thereon, lateral extensions in said casing, guides formed in said extensions, plungers sliding in said guides and contacting with the valve stems, and operating levers extending from the cams to the plungers and mounted in and inclosed by the extensions of the casing.

3. In an internal combustion engine the combination with the valves of an overhead

cam shaft, a casing revoluble thereon, extensions from said casing, and mechanism conveying motion from the cams to the valves mounted in said extensions and inclosed thereby.

4. In an internal combustion engine, the combination of an overhead cam shaft, a casing surrounding said cam shaft and revoluble thereon, extensions from said casing, valves and domes over said valves adapted to be joined to the extensions of the casing.

5. In an internal combustion engine, a combination of an overhead cam shaft, a casing surrounding said shaft and revoluble thereon, extensions from said cam shaft carrying mechanism intermediate between the cams and valves, and means for pressing down said extensions so as to prevent undesired rotation.

6. In an internal combustion engine the combination with an overhead cam shaft, of a casing formed in parts surrounding said shaft and revoluble thereon, extensions on opposite sides of said casing and mechanism between the cams and the valves mounted in and inclosed by said extensions.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAVUS GREEN.

Witnesses:

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