

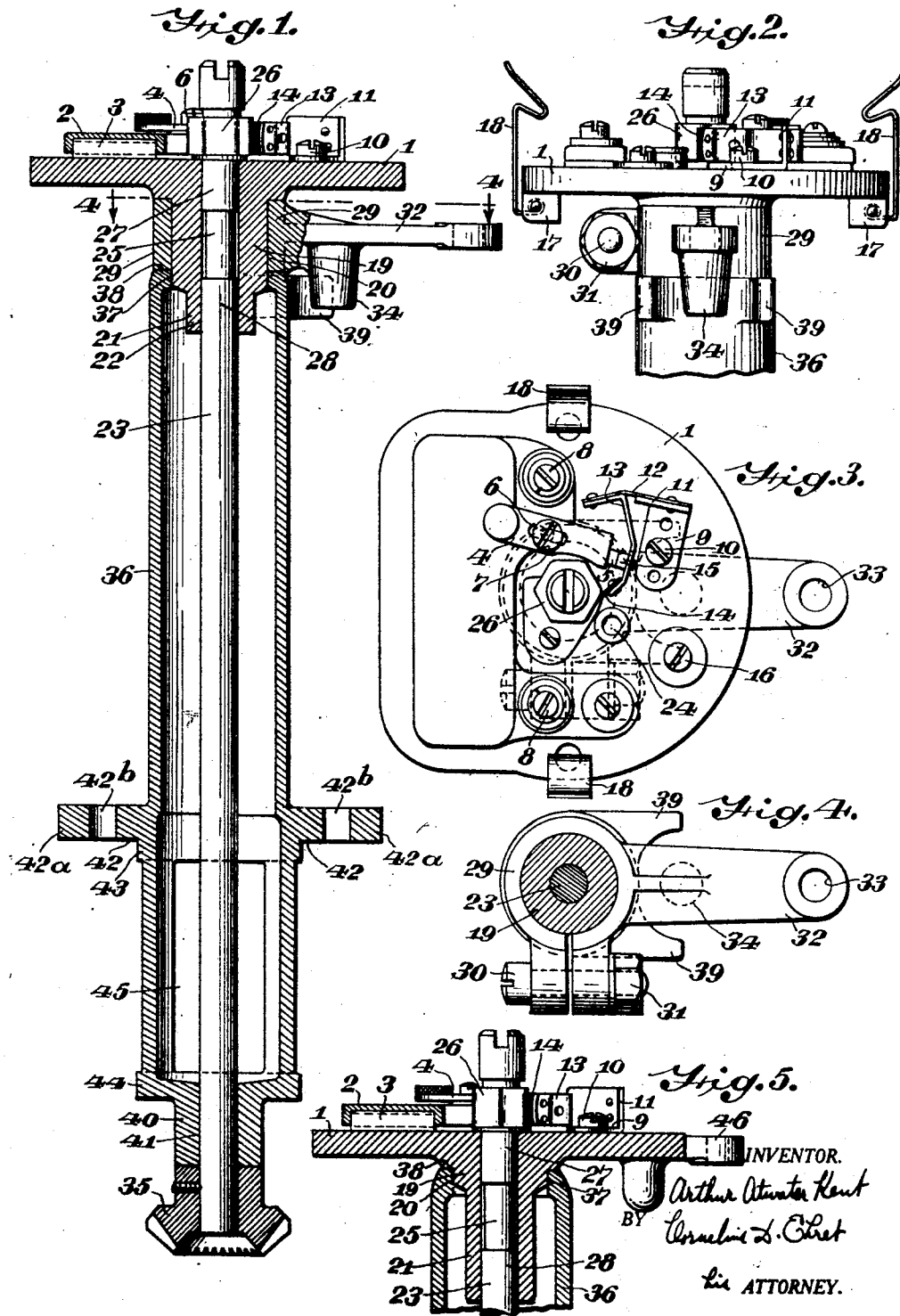
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A. A. KENT

1,560,246

IGNITION APPARATUS

Filed Feb. 20, 1920



UNITED STATES PATENT OFFICE.

ARTHUR ATWATER KENT, OF ARDMORE, PENNSYLVANIA.

IGNITION APPARATUS.

Application filed February 20, 1920. Serial No. 360,236.

To all whom it may concern:

Be it known that I, ARTHUR ATWATER KENT, a citizen of the United States, residing in Ardmore, county of Montgomery, and State of Pennsylvania, have invented certain new and useful Improvements in Ignition Apparatus, of which the following is a specification.

My invention relates to ignition apparatus, and more particularly to means for supporting a timer or interrupter mechanism of ignition apparatus upon an automobile or other internal combustion engine or associated structure.

One object of my invention is to support the interrupter or timing mechanism clear of other parts associated therewith in proximity to the engine.

A further object is to support the ignition device and its driving shaft on a long sleeve in such manner that the driving shaft will always be in perfect alignment with its bearings.

Other objects and advantages will appear from the following detailed description in connection with the accompanying drawings which illustrate one of the forms my invention may take and in which:

Fig. 1 is a section of an ignition mechanism and its supporting structure showing a side view of the adjusting mechanism partly in elevation.

Fig. 2 is a front elevation of the ignition and adjusting mechanism with a part of the supporting structure broken away.

Fig. 3 is a top plan view.

Fig. 4 is a section on line 4—4 of Fig. 1 looking downwardly.

Fig. 5 is a vertical section of ignition mechanism with a modified form of supporting and adjusting mechanism, a part of the supporting mechanism being broken away.

Referring to the drawing, in Figs. 1, 2, 3 and 5 is shown, by way of example, an interrupter of the character described in U. S. Patent 1,289,036 granted to A. A. Kent on December 24, 1918.

Upon the base 1 is mounted the metal cap 2, which is electrically insulated from base 1 and under which is held condenser 3. Upon the cap member 2 is mounted bar 4

which carries the relatively stationary contact 5. In the bar 4 is the slot 6. The bar 4 is held upon the cap 2 by means of screw 7, the slot 6 allowing for slight adjustment. The cap 2 is held on base member 1 by means of screws 8. Mounted on the base member 1 is bracket 9, adjustably held thereon by screw 10, and having an upturned portion 11 to which is rigidly secured the spring member 12, which extends inwardly beyond the upturned portion 11 and at its free end carries the movable contact point lever or member 13. On the free end of member 13 is a fiber tip 14. The movable contact point 15 is carried on member 13, as shown in Fig. 3.

The base member 1 is also provided with binding post 16; and on the under side of base member 1 are apertured lugs 17 to which are pivoted spring arms or latches 18 for holding a distributor cap. Near the center of base member 1 is a hub 19 having a machined neck 20 and a reduced portion 21. Through the base member 1 and the downwardly extending hub 19 and portion 21 is the opening 22. The cam shaft 23 is mounted to turn freely in the opening 22 in the hub 19 and extension 21. The shaft has a portion 25 of less diameter between its bearing surfaces. In the base member 1, see Fig. 3, is oil hole 24, from which an opening leads through the hub to reduced portion 25.

On the upper end of shaft 23 is cam 26 having a desired number of projections, there being six in the example illustrated. Cam 26 engages fiber tip 14 on the end of member 13 for periodically separating contact 15 from contact 5.

The shaft 23 has two bearing surfaces 27 and 28 in the hub 19 and extension 21, spaced apart by reduced portion 25.

Surrounding the neck 20 of hub 19 is a split ring or collar 29 which is clamped to the neck by means of bolt 30 and nut 31. Extending from collar 29 is a rigid or integral arm 32 having at its outer end an opening 33, by means of which an operating lever or rod may be attached. On the under side of arm 32 near the neck 29 is a lug 34.

At the lower end of shaft 23 and suitably

secured thereto is bevel gear 35 which is adapted to mesh with a similar gear on a shaft driven by the engine.

Surrounding the cam shaft 23 and spaced therefrom between the collar 29 and gear 26 is a rigid sleeve member 36, at the upper end of which is a bearing 37 and a bearing surface 38 on its upper edge.

As will be seen in Fig. 1, the hub 19 extends downwardly beyond the collar 29 into the bearing 37 of sleeve 36, the bearing surface 38 of sleeve 36 abutting against the lower edge of collar 29.

Near the upper end of sleeve 36 are two lugs 39 spaced apart a suitable distance. These lugs are adapted to engage lug 34 on arm 32 and limit its rotary movement. By this construction the arm 32 may be rotated through a suitable angle, and operating upon neck 20 rotates base plate 1 and contact points 5 and 15, changing their relation to the cam 26 for advancing or retarding the ignition spark; but the adjustment is limited by lug 34 and the two lugs 39 to the useful and safe range.

The sleeve 36 at its lower end is contracted, forming the portion 40 having bearing 41 for the lower end of the cam shaft.

Intermediate the ends of sleeve 36 is a shoulder 42, which may be provided with extensions 42^a having holes 42^b adapted to receive bolts for securing the sleeve to the engine or frame. Below shoulder 42 is a second smaller shoulder 43, and immediately above portion 40 is a similar shoulder 44. The shoulders 43 and 44 are preferably of the same diameter and machined true, and are adapted to be engaged by a bracket or collar on the engine or frame for laterally supporting and positioning the sleeve 36 and its related parts.

In that part of sleeve 36 between shoulders 43 and 44 may be provided the lateral openings 45.

In the modified form of my invention illustrated in Fig. 5, the collar 29 and adjusting arm 32 are dispensed with. The neck 20 is correspondingly shortened, being only of sufficient length to enter the bearing 37 at the upper end of sleeve 36. The bearing surface 38 on the upper end of sleeve 36 abuts directly against a shoulder formed on plate 1, instead of against collar 29, as in the form of the invention shown in Figs. 1 to 4.

As illustrated in Fig. 5, the plate 1 is provided with a lug 46, by means of which plate 1 and the contact points 5 and 15 may be rotated with respect to the cam for the purpose of varying the time of production of the ignition spark.

Each of the necks or hubs 20 of the structure hereinbefore described fits more or less loosely in the bearing 37 at the upper end of sleeve 36, whereby the upper end of the

sleeve 36 laterally supports the interrupter structure, without, however, necessity for true or correct alignment of bearing at the upper end of the sleeve 36 with the cam shaft bearing 41 at the lower end thereof, and with the bearings 27 and 28 within the interrupter structure itself. By the structure described, the cam shaft is required to have bearings only in the interrupter structure itself, as in its neck or hub 20, and at the lower end of the sleeve, rendering the structure cheaper and simpler than in case it were attempted to effect a perfect bearing of the shaft 23 with respect to the upper end of sleeve 36.

By the construction described, the cam shaft 23 will take perfect alignment with its bearing at 41 and at 27, 28 within the neck 20, and any lateral variation of the upper end of the sleeve 36 is unimportant and effects no disaligning strain upon the shaft 23.

It is a characteristic of my structure, therefore, that in the long sleeve the cam shaft has a bearing at one end thereof, while at its other end it has a bearing in the interrupter structure, which latter has a loose bearing or lateral support in the upper end of the sleeve.

In connection with internal combustion engines, and particularly those utilized upon motor vehicles, it is in many cases necessary or desirable that the timing mechanism proper, comprising the co-acting contacts and the distributor cap, shall be located at a considerable distance from or clear of the engine and clear of or remote from other parts; and yet it is essential that the cam be driven by a shaft of the engine, generally its valve-controlling cam shaft. To meet these conditions, there is provided the long sleeve 36 carrying at its one end the timing mechanism and at its other end providing a bearing 41 for the cam shaft 23, upon which is secured the gear 35 driven by the engine. The arrangement necessitates an unusually long cam shaft 23, and it is a further necessity that the cam shaft 23 and its attached cam 26 remain always in fixed relation as regards lateral movement with respect to the base member 1 and the movable contact carried thereby. It is difficult and a source of useless expense to provide a cam shaft of such unusual length which is strictly straight or true from end to end. Accordingly, there is provided a shaft bearing in the member 1 or its attached neck 20 ensuring no lateral play as between the shaft 23 and its cam 26 and the member 1 and the movable contact arm 13, whereby the timing of the ignition is maintained regular and uniform; there is provided also a bearing for the shaft 23 at 41 upon the sleeve member 36 itself, and there is additionally provided looseness between the neck or member 20 and the upper bearing portion 37 of

the long sleeve 36. with this construction the shaft 23 need not be absolutely true from end to end, and in case the upper end is slightly out of alignment with the axis of its bearing at its lower end at 41 the resultant lateral movement or play will take place as between the neck 20 and the sleeve bearing 37, and there will be no lateral movement or play as between the rotating elements 23 and 26 and their relatively fixed co-acting members 1, 20 and 13, whereby notwithstanding the lack of perfection of the shaft 23 the ignition will continue to be uniform and regular, and there will be avoided the unduly hastened wear that would otherwise occur between the bearings 27 or 28 of the shaft 23 and the member 1 or its neck 20. in other words, if there be slight untruth in the shaft 23 as between its opposite ends, the resultant lateral movement is partaken of not only by the shaft 23 and the attached cam 26, but also by the co-acting timing elements. The structure is in effect a long shaft having a rigidly supported bearing, as at 41. at its one end, beyond which it is free to move laterally or partake of lateral play, the bearing 37 at the upper end of the sleeve 36 permitting but limiting such play, but nevertheless maintaining high degree of accuracy of relation between the shaft 23 and its attached cam 26 and the structure carried by or forming part of the base 1, because the base member 1 and the parts carried thereby and the upper end of the shaft 23 partake jointly of the lateral movement or play, without relative lateral movement of the upper end of the shaft 23 with respect to the member 1 and the parts carried thereby.

What I claim is:

1. Ignition apparatus comprising a base member, ignition circuit controlling contacts carried thereby, a neck on said base member, a cam shaft having a bearing therein, and a sleeve through which said shaft extends having at its end adjacent said base member a loose bearing for said neck and at its other end a bearing for said cam shaft, whereby said shaft is aligned by its bearings in said neck and remote end of said sleeve independently of the bearing between said neck and said sleeve.

2. Ignition apparatus comprising a base member, ignition circuit controlling contacts carried thereby, a neck on said base member, a shoulder on said base member, a cam shaft having a bearing in said base member concentric with said neck, and a sleeve having at its end adjacent said base member bearings for said neck and shoulder and at its opposite end a bearing for said cam shaft, the said neck bearing being loose to permit slight radial movement of the first named bearing with respect to the sleeve.

3. Ignition apparatus comprising a base

member, ignition circuit controlling contacts carried thereby, a neck on said base member, a cam shaft having a bearing therein, a sleeve through which said shaft extends having at its end adjacent said base member a bearing for said neck and at its other end a bearing for said cam shaft, a member for rotating said base member, and co-acting projections on said member and on said sleeve limiting the rotation on said base member.

4. Ignition apparatus comprising a base member, ignition circuit controlling contacts carried thereby, a neck on said base member, a cam shaft having a bearing therein, a sleeve through which said shaft extends having at its end adjacent said base member a loose bearing for said neck and at its other end a bearing for said cam shaft, and means on said sleeve intermediate its ends for securing the same to a support.

5. Ignition apparatus comprising a base member, ignition circuit controlling contacts thereon, a long sleeve supporting said base member, a cam shaft having a bearing in said base member and extending through said sleeve, a neck on said base member concentric with the bearing of said shaft and having a loose bearing in the end of said sleeve adjacent said base member, and a bearing for said cam shaft at the opposite end of said sleeve.

6. Ignition apparatus comprising a base member, ignition circuit controlling contacts thereon, a long sleeve supporting said base member, a cam shaft having aligning bearings in said base member and at the remote end of said sleeve, and a neck on said base member having a short loose bearing in the end of said sleeve adjacent said base member and abutting against the end of said sleeve member.

7. Ignition apparatus comprising a base member, ignition circuit controlling contacts thereon, a neck on said base member, a long sleeve having a short loose bearing upon said neck, said neck having a portion of diameter less than the diameter of the bearing between said neck and said sleeve and extending into said sleeve, and a cam shaft having aligning bearings in said portion of said neck and at the remote end of said sleeve.

8. Ignition apparatus comprising a base member, ignition circuit controlling contacts thereon, a cam shaft having a bearing on said base member, a cam on said shaft controlling the co-action of said contacts, a rigidly supported bearing for said cam shaft at its end opposite said base member, and means remote from said rigidly supported bearing and adjacent said base member permitting and limiting joint lateral movement of said base member and the end of the cam shaft adjacent thereto.

9. Ignition apparatus comprising a base member, ignition controlling contacts thereon, a cam shaft having a bearing on said base member, a cam on said shaft controlling the co-action of said contacts, a long sleeve, a bearing for said cam shaft rigidly supported by said sleeve at the end of said shaft remote from said base member, said sleeve at its end adjacent said base member having an aperture in which said base member is loosely confined, whereby joint lateral movement of said base member and the end of said cam shaft remote from said rigidly supported bearing is permitted and limited.

In testimony whereof I have hereunto affixed my signature this 18th day of February, 1920.

ARTHUR ATWATER KENT