Oct. 5, 1948. M. MALLORY 2,450,805

ADJUSTABLE TIMING CONTROL

Filed April 1, 1948

FIG. 1.

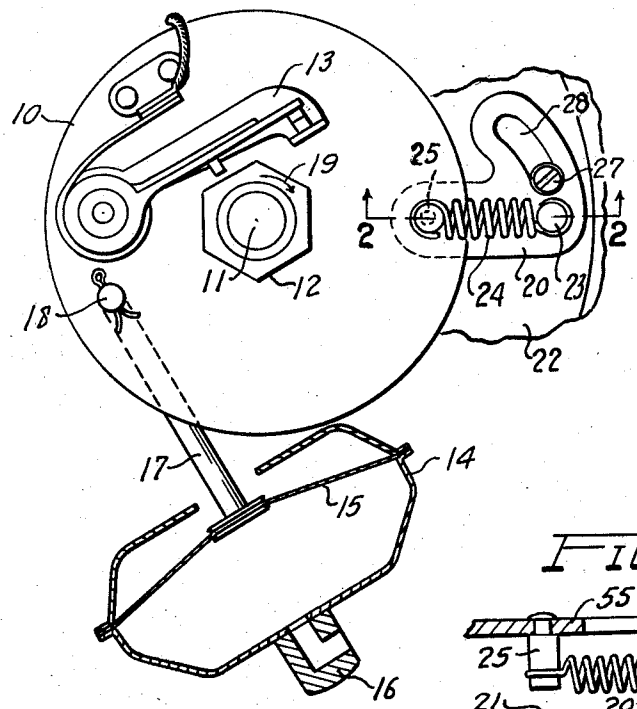
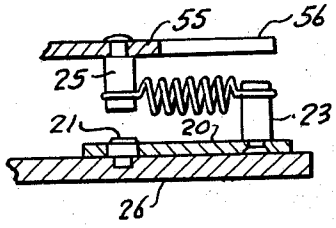


FIG. 3.



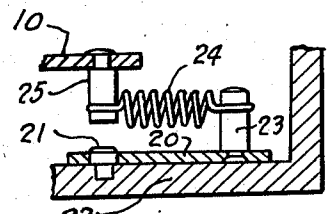


FIG. 2.

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ADJUSTABLE TIMING CONTROL

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4 Claims. (Cl. 200—31)

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This invention relates to an adjustable control device and more particularly to a device for adjustably controlling an ignition timer.

In my prior patents for Ignition timer, 2,306,889, December 29, 1942, and for Ignition system, 2,354,472, July 25, 1944, there is disclosed means by which the curve of advance of the spark could be adjusted without much change in the point where advance would begin. This was achieved by interposing an adjustably mounted spring between two members which had limited arcuate movement with respect to each other, the spark being controlled in accordance with said movement. The mountings disclosed in my prior patents were relatively complicated and not entirely satisfactory.

The object of the present invention is to connect two members for limited relative arcuate movement with an interposed spring so that the spring resistance to the start of the arcuate movement may be kept precisely the same while the rate of increase of resistance may be varied by a very simple adjustment of a construction that is much simpler than those shown in my said prior patents. Other objects and features of the invention will appear as the description proceeds.

In the accompanying drawings, forming a part of this specification, Fig. 1 is a plan view of one embodiment of the invention, and Fig. 2 is a detail section on the line 2—2 of Fig. 1. Fig. 3 is a view like Fig. 2, but showing a different application of the invention.

In the form illustrated a plate 10 is shown mounted for limited arcuate movement about a timer shaft 11 which carries a cam 12 for operating a make and break device 13 mounted on the plate. A casing 14 provided with a diaphragm 15 is connected in a known manner by a pipe 16 to the intake of an engine, not shown. The diaphragm is attached to a rod 17 pivoted at 18 to the plate. Suction in the casing tends to move the plate in an anti-clockwise direction. With the shaft and cam turning in a clockwise direction, as indicated by arrow 19, it will be seen that increased suction tends to advance the spark. In the position in which the parts are shown in the drawings, the spark is fully retarded.

A bracket 20 is pivoted at 21 to a member 22 which is fixed in position relative to plate 10. The bracket carries a post or pin 23, and one end of a tension spring 24 is connected to post 23 and the other end is connected to a post 25 mounted in plate 10 in alinement with pivot 21 in the position shown in the drawings. There is a slot 28 in the bracket concentric with pivot 21, and a screw

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27 through the slot into member 22 fixes the bracket in adjusted position about its pivot.

It will be seen that the portion of the bracket between pivot 21 and post 23 constitutes an arm that is parallel with spring 24 when plate 10 is in spark-retarding position, and as the bracket is adjusted about pivot 21 the length of the arm, and so the distance between post 23 and the initial position of post 25, remain constant. Therefore, the tension of spring 24 remains exactly the same when the spark-advancing movement of plate 10 begins regardless of whether the arm is in radial alinement with post 25, as shown in Fig. 1, or whether it is at the other limit of its adjustment or any place in between. However, as the plate moves in spark-advancing direction, the rapidity with which the tension increases accelerates as the arm is moved from its Fig. 1 position towards its other limit of adjustment.

While the invention is shown with the adjustable arm mounted on the stationary member, the same operative relation may be obtained by mounting the arm on the movable member or plate. Likewise, the same mounting of arm and spring will function to give a constant initial tension between two members having limited relative arcuate movement while enabling the ready and accurate adjustment of the rate of increase of tension, whether the relatively movable members are mounted as shown in this case, or as in said prior Patent 2,306,889, and whatever the varying force against which the spring works. Fig. 3 shows the application of the invention to plates 26 and 55 which may correspond to the similarly designated parts in said Patent 2,306,889, taking the place of the complicated connection designated 75 to 89 in said patent. A notch 56 is shown in plate 55 for readier access to adjusting screw 27.

While posts or pins 23 and 25 are convenient means for attaching the spring, it will be readily understood that other means of attachment may be employed, provided the spring is effectively attached to the proper points on the oscillating member and arm, respectively. Other changes in details may be made within the scope of the appended claims.

What I claim is:

1. In combination, a first member arcuately movable for a limited distance with respect to a second member, a tension spring having one end attached to a point on one of said members, an arm pivoted on the other member about an axis perpendicular to the plane of said arcuate movement and in line with said point when the first member is at one limit of its movement, means

attaching the other end of the spring to the free end of the arm, and means for adjustably securing the arm against swinging about said pivot with the arm holding the spring in a direction so that it is stretched by movement of the first member towards its other limit of movement, and means for exerting variable force tending to move the first member against the tension of the spring.

2. In an internal combustion engine having a timer, a first member arcuately movable a limited distance with respect to a second member, connections from the members to the timer to advance the spark by the movement of the first member towards one limit and to retard the spark by movement of the member towards its other limit, means tending, with a force varied by changes in the operation of the engine, to turn the first member in one direction, and a tension spring tending to hold the first member at one limit of its travel against said force, one end of the spring being attached to a point on one member and its other end being attached to the free end of an arm that is pivotally mounted on the other member for turning about an axis in line with said point when the first member is at the limit of the travel in the direction in which it is urged by the spring, and means for adjustably fixing the arm in a selected position about its pivot.

3. In an internal combustion engine having a timer, a first member arcuately movable a limited distance with respect to a second member, connections from the members to the timer to

advance the spark by the movement of the first member towards one limit and to retard the spark by movement of the member towards its other limit, means tending, with a force varied by changes in the operation of the engine, to turn the first member in one direction, and a tension spring tending to hold the first member at one limit of its travel against said force, pins in the two members in axial alinement when the first member is at the limit towards which the spring moves it, an arm mounted on the pin in the second member, and means to fix the arm in adjusted position about its pivot pin, one end of the spring being attached to the pin on the first member and the other being attached to the free end of the arm.

4. In an internal combustion engine having a timer and an intake, means in the timer comprising a plate carrying a circuit breaker and mounted for limited arcuate movement to advance and retard the spark, a suction device connected to the intake and the plate to turn the plate in spark-advancing direction as the suction increases, a pin in the plate, a fixed pin in line with the first said pin when the plate is in spark-retarding position, an arm pivoted on the second said pin, a tension spring having one end attached to the first said pin and the other end attached to the free end of the arm, and means to fix the arm in adjusted position about its pivot.

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No references cited.