June 13, 1933. L. J. ARMSTRONG 1,914,231

TIMER

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Fig. 1.

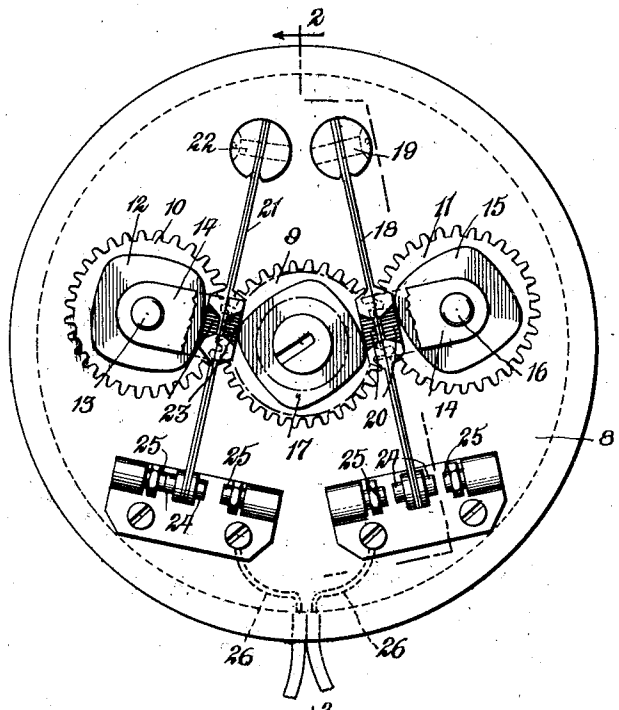
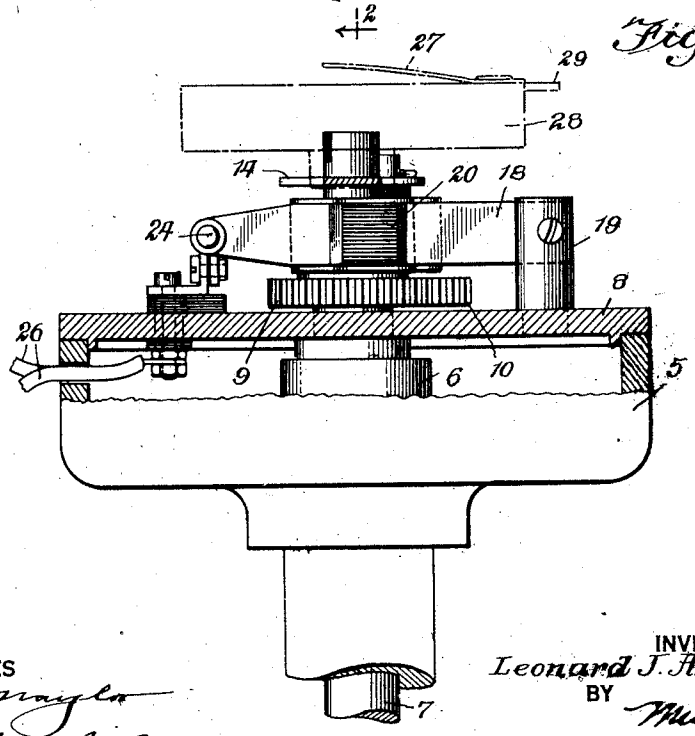


Fig. 2.



WITNESSES

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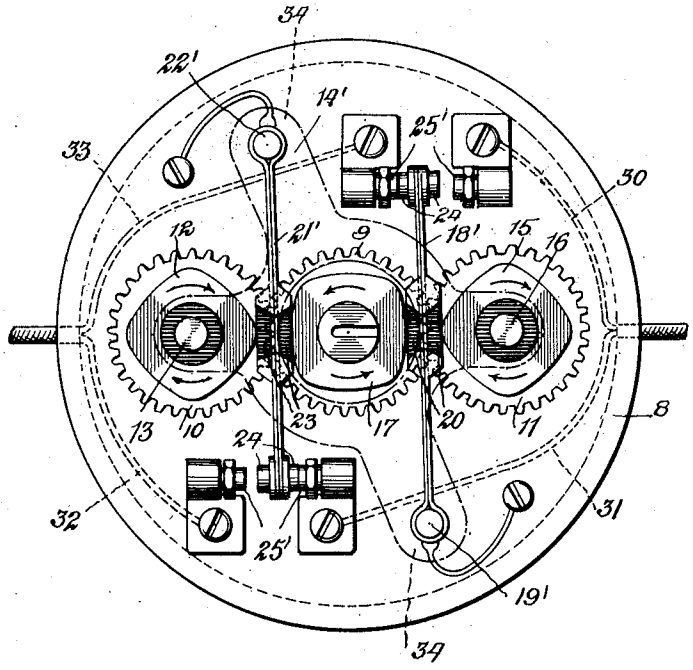
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Fig. 3.



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UNITED STATES PATENT OFFICE

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TIMER

Application filed January 15, 1932. Serial No. 586,886.

An object of the invention is to provide a timer which is of particular value when used with internal combustion engines and which has positive means for moving a contact into and out of engagement with a stationary contact to insure periodic contacts and to prevent missing when the engine is running at high speed.

Another object of the invention is to dispose an arm having the movable contact between two cams which engage the arm and which positively move the arm back and forth as the cams are rotated, the movement of the arm not only being determined by the speed at which the cams rotate, but by the configuration of the cams.

Still another object of the invention is to maintain a predetermined rate of rotation of the cams relatively to each other.

The invention further comprehends a timer in which a shaft is provided with a cam and a gear, the gear meshing with a gear or gears on one or more stub shafts, each of which has a cam between which and the first mentioned cam an arm of a movable contact is disposed to be positively moved back and forth relatively to a stationary contact or contacts with the running of the engine.

Additional objects of the invention will appear in the following specification in which the preferred form of the invention is described.

In the drawings similar reference characters refer to similar parts in the several views, of which

Figure 1 is a plan view illustrating the timer with parts broken away to show the construction,

Figure 2 is a sectional view on the line 2—2 of Figure 1, and

Figure 3 is a plan view of a modified form of the invention.

By referring to the drawings, it will be seen that a hollow base 5 is provided, the base having a bearing 6 in which is rotatably mounted a shaft 7. The hollow base 5 is closed by a plate 8 having an opening through which the shaft 7 extends. Secured to this shaft 7, above the plate 8, there is a gear 9 which meshes with gears 10 and 11, the gear 10 being secured to a cam 12, the gear 10 and the cam 12 being mounted for rotating on a stub shaft 13 which is secured to the plate 8 and to a frame 14. The gear 11 is secured to a cam 15, the gear 11 and the cam 15 being mounted to rotate on a stub shaft 16 which is secured to the plate 8 and to the frame 14, the frame 14 being broken away in Figure 1. Secured for rotating with the shaft 7 and the gear 9, there is a cam 17. It will be understood that, with the rotation of the shaft 7, the gear 9 and the cam 17 will be rotated and that through the gears 10 and 11, which mesh with the gear 9, the cams 12 and 15 will also be rotated, but in the opposite direction to the direction of rotation of the cam 17.

Disposed between the cams 17 and 15 there is an arm 18, which may be a spring arm, and which is anchored to a stud 19 mounted on the plate 8, the arm 18 having insulating members 20 at its sides which are engaged by the cams 15 and 17. In a similar manner, an arm 21, which may be a spring arm, is disposed between the cams 12 and 17, the arm 21 being anchored to a stud 22 secured to the plate 8 and having insulating members 23 at its sides which are engaged by the cams 12 and 17. It will be understood that the cams 12, 17 and 15 are of such a configuration that, with their rotation by means of the shaft 7 and the gears 9, 10 and 11, the cams will engage the insulating members 20 and 23 at both sides of the arms 18 and 21 at all times, so that, with the rotation of the cams, the insulating members 20 and 23 at both sides of the arms 18 and 21 will be positively moved by the cams back and forth. Each of the arms 18 and 21 is provided with oppositely disposed contact members 24 for engaging stationary contacts 25 between which the contact members 24 are disposed respectively. It will, therefore, be understood that, with the rotation of the shaft and through the gears and cams which have been described, the arms 18 and 21 will be positively moved back and forth, so that the contacts on the arms 18 and 21 will periodically engage the stationary contacts 25. These stationary contacts 25 are electrically connected with wires 26 leading from a primary circuit or circuits in an in-

duction coil or coils, the circuit being completed through the contacts 24 and 25, the arms 18 and 21 and the ground at the studs 19 and 22. The secondary circuit will preferably lead to a distributor brush 27 mounted on a base 28 which is secured for rotating with the shaft 7 and which has an electrode 29 from which a spark may jump to a communicating means leading to a spark plug.

It will be seen by referring to Figure 1 of the drawings, that the arms 18 and 21 are disposed at an angle to each other and that the cams 12, 15 and 17 are so disposed that a contact on one of the arms is in engagement with one of the stationary contacts, while the contacts 24 on the other arm are both spaced from the stationary contacts 25. It will be understood that various arrangements may be made with reference to positioning the arms 18 and 21, and also that various arrangements may be made with reference to the combination of the cams 12, 15 and 17, so that any desired positioning of the contacts on one of the arms may be obtained relatively to the positioning of the contacts on the other arm when the shaft has been turned to any predetermined position.

The construction illustrated in Figure 3 of the drawings corresponds with the construction illustrated in Figures 1 and 2 of the drawings, with the exception that the stationary contacts 25′ are insulated from each other and that there are preferably four coils, a primary circuit in each coil being connected by the wires 30, 31, 32 and 33 with each of the stationary contacts 25′. It will also be seen that in Figure 3 of the drawings the arms 18′ and 21′ are disposed parallel with each other, while in Figure 1 of the drawings the arms 18′ and 21′ are disposed at an angle to each other. It will also be seen that in Figure 3, the frame 14′ has arms 34 which are mounted on the studs 19′ and 22′, the said studs 19′ and 22′ being disposed at opposite sides of the plate 8. The frame 14′ is preferably insulated from the stub shafts 13 and 16.

What is claimed is:

1. In a timer, two rotatable cams, an arm having a movable contact, the arm being disposed between the cams, the cams having cam surfaces which engage opposite sides of the arm at all times to positively move the arm back and forth, and a stationary contact or contacts for engagement by the movable contact.

2. In a timer, two rotatable cams, an arm having a movable contact, the arm being disposed between the cams, the cams having cam surfaces which engage opposite sides of the arm at all times to positively move the arm back and forth, a stationary contact or contacts for engagement by the movable contact, and gearing connecting the cams.

3. In a timer, two cams, a shaft for rotating one of the cams, gearing connecting the cams for rotating the other cam, a movable contact having an arm disposed between the cams to be operated thereby, and two stationary contacts between which the movable contact is disposed for periodically engaging the stationary contacts.

4. In a timer, a shaft having a gear, a cam secured to the shaft, two stub shafts, two additional gears meshing with the first mentioned gear and with one mounted on each stub shaft, two additional cams, one secured for rotating with each of the additional gears, two arms, each disposed between one of the additional cams and the first mentioned cam to be positively moved back and forth thereby, two movable contacts, one mounted on each of the arms, and a plurality of stationary contacts positioned for engagement by the movable contacts.

5. In a timer, a shaft having a gear, a cam secured to the shaft, two stub shafts, two additional gears meshing with the first mentioned gear and with one mounted on each stub shaft, two additional cams, one secured for rotating with each of the additional gears, two arms, each disposed between one of the additional cams and the first mentioned cam to be positively moved back and forth thereby, the arms having insulation at the cams, two movable contacts, one mounted on each of the arms, and a plurality of stationary contacts positioned for engagement by the movable contacts.

6. In a timer, a shaft having a gear, a cam secured to the shaft, the cam having a plurality of cam surfaces, two stub shafts, two additional gears, one mounted for rotating on each stub shaft, the additional gears meshing with the first mentioned gear, two additional cams, one secured for rotating with each additional gear, each of the additional cams having a plurality of cam surfaces corresponding in number with the cam surfaces of the first mentioned cam, two arms, each disposed between one of the additional cams and the first mentioned cam to be positively moved back and forth thereby, the arms having insulation at the cams, two movable contacts, one mounted on each of the arms, and a plurality of stationary contacts positioned for engagement by the movable contacts.

7. In a timer, two cams, an arm having a movable contact, the arm being disposed between the cams to be positively moved back and forth thereby, a stationary contact or contacts for engagement by the movable contact, and means to rotate the cams in unison.

8. In a timer, a cam, two additional cams, two arms extending at an angle to each other, each arm being disposed between the first mentioned cam and one of the said additional cams to be operated thereby, contacts on each of the arms, and two sets of contacts, each set

of contacts being positioned for engagement by the contact or contacts on one of the arms.

9. In a timer, a cam, two additional cams, two arms extending at an angle to each other, each arm being disposed between the first mentioned cam and one of the said additional cams to be operated thereby, contacts on each of the arms, two sets of contacts, each set of contacts being positioned for engagement by the contact or contacts on one of the arms, and means for rotating the cams.

10. In a timer, a cam, two additional cams, two arms each disposed between the first mentioned cam and one of the additional cams, two pairs of contacts, a contact or contacts on each arm disposed between a pair of the first mentioned contacts, and means to rotate the cams.

11. In a timer, two cams, an arm having a movable contact, the arm being disposed between the cams and being engaged by the two cams at all times, a stationary contact or contacts for engagement by the movable contacts, and means to move the cams relatively to each other.

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