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SPEED GOVERNOR FOR ALTERNATING CURRENT MOTORS

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Fig. 1.

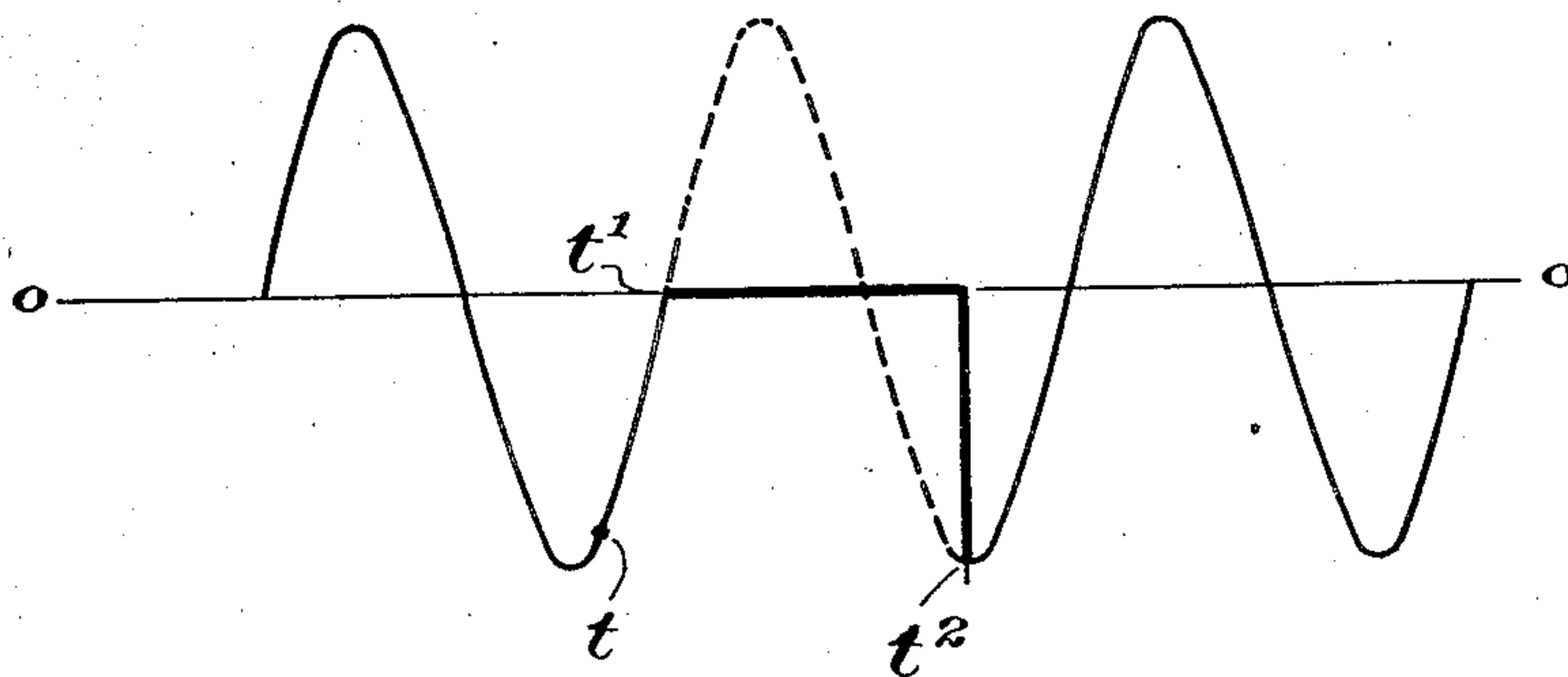
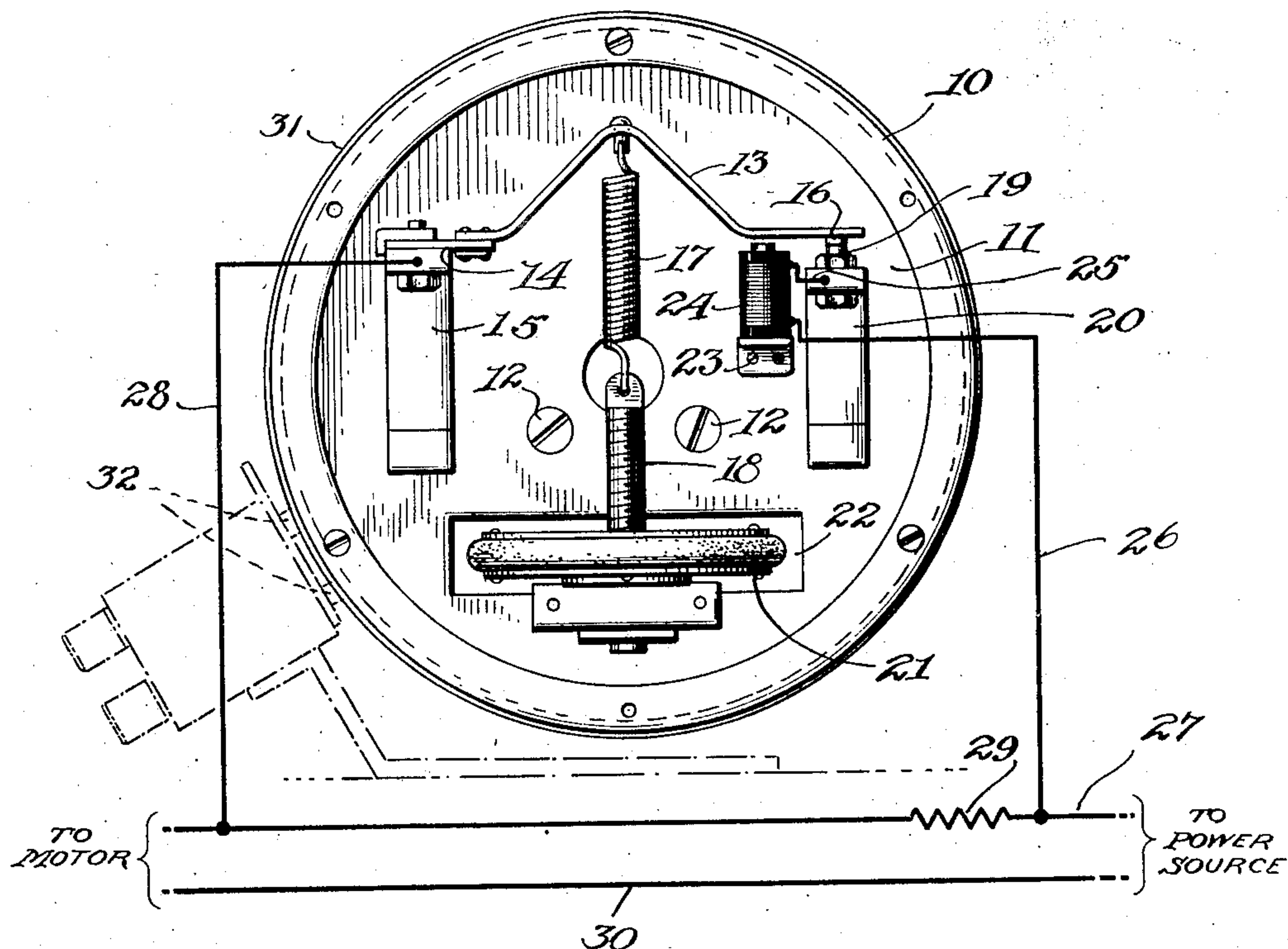


Fig. 2.

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SPEED GOVERNOR FOR ALTERNATING CURRENT MOTORS

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This invention relates to governors for electric motors operated by alternating currents and more particularly to a device for preventing sparking at the contacts in the governors.

The governor to which the present invention relates is intended particularly for use in connection with the driving motors of printing telegraph machines although it is not limited to this use but is well adapted for use in connection with any motor using alternating current.

In printing telegraph systems, as for instance those employing so-called simplex printers, the driving motors of the transmitting and printing apparatus at the various stations are operated at a definite prearranged speed. Such motors are provided with governors operating to reduce the current in the circuit through the motor upon the latter exceeding the prearranged speed by means of a circuit breaker carried by the governor and arranged to open by centrifugal force whenever such force, due to the motor speed, exceeds a definite amount.

Where such motors are operated by direct current this type of governor is quite satisfactory but where alternating current is employed injurious sparking occurs at the contacts if the circuit breaker opens at or near either peak of the current wave while no sparking will occur if the circuit breaker is opened at the instant the current crosses the neutral line or, in other words, is at zero potential.

One of the objects of the present invention is to provide a circuit breaker arrangement in such a governor wherein the circuit breaker will open only at the instant the current wave passes through zero so that no sparking will occur in the operation of the governor.

Other objects and advantages will appear as the description proceeds.

The invention will now be described in detail, reference being had to the accompanying drawing wherein:—

Figure 1 is an elevation or face view of the improved governor.

Figure 2 is a diagram illustrating the ac-

tion of the circuit breaker and in the governor in its relation to the oscillations of the alternating current.

The governor herein shown has a cylindrical casing 10 provided with a closed end 11 which is secured to a suitable flanged coupling (not shown) on the motor shaft by screws 12.

The governor mechanism includes a weight arm 13 consisting of a small bent strip fastened by a flat spring 14 to a metal bracket 15. The weight arm has at its opposite end a contact 16. A retractile spring 17 fastened to an adjusting screw 18 holds the contact 16 against a companion contact 19 mounted upon a bracket 20 secured to the end 11 of the casing. The contacts 16 and 19 are maintained in engagement until the centrifugal force of the weight arm overcomes the tension of the spring 17, due to the motor exceeding the speed for which the governor is adjusted. When the contacts open a resistance is connected in the motor circuit which tends to reduce the motor speed. The closing and opening of the contacts holds the motor speed constant to the value for which the governor is adjusted.

The tension of the spring 17 may be varied by an adjusting wheel 21 mounted upon the screw 18 so that when the wheel is rotated the screw will move longitudinally thereof. The screw is retained against rotation with the wheel by means not shown. The adjusting wheel extends through an aperture 22 in the closed end 11 of the casing and also through a similar opening in the cover plate (not shown) so that it may be turned from the exterior of the governor.

Secured to the closed end 11 alongside of the bracket 20 is a bracket 23 whereon is mounted an electro-magnet 24 which, when energized acts in conjunction with the spring 17 on the strip 13, the latter forming an armature for the magnet. This magnet has one end of its winding connected by a wire 25 to the bracket 20 and thus to the contact 19. For the purpose of describing the operation I have shown the other terminal of the magnet winding connected by a conductor 26 to a conductor 27 connected to a

suitable source of alternating currents and to the motor (not shown) on which the governor is mounted. I have also shown the bracket 15 connected by a conductor 28 to the conductor 27. In practice, however, the conductors 26 and 28 are connected to a pair of slip rings indicated at 31 which are carried upon the periphery of the governor. Brushes 32 bearing upon the slip rings are connected to the conductor 27 upon either side of the resistance 29. The other conductor leading from the power source to the motor is shown at 30.

By proper adjustment of the wheel 21, the spring is tensioned so that the force exerted thereby is just sufficient to hold the contact 16 in engagement with the contact 19, with the motor running at the desired speed, any excess of this speed tending to cause the weight arm 13 to swing outwardly against tension of the spring and thus to separate the contacts 16 and 19 and break the shunt circuit to the motor around the resistance 29, so that the current through the motor will drop and the motor will slow down. However, so long as the magnet is exerting any force on the strip 13 the contacts 16 and 19 will not separate at this instant.

In Figure 2 is illustrated a typical curve for an alternating current, wherein the line 0—0 is the line of no current or zero line. Suppose, for instance, that the motor exceeds the speed limit desired at a point near a peak in an oscillation such as t .

Then the magnet energization will be relatively large and the arm 13 will be held firmly so that the contacts 16 and 19 cannot open. As the alternating current wave drops to the point, t^1 , where the curve crosses the zero line, the magnet will be fully deenergized so that the centrifugal action of the arm 13 will now overcome the unaided resistance of the spring 17 and the contact 16 will separate from the contact 19. Obviously, there can be no sparking at this instant since the current is zero. These contacts will remain separated until the speed of the motor drops to the required speed, whereupon the contacts will close. This may take

place at any point in the oscillation as t^2 without sparking.

The circuit connections of the governor with the power conductor 27, are shown diagrammatically at 26 and 28, but in practice the connections are made through a pair of rings 31 on the periphery of the governor casing and a pair of brushes 32 bearing thereon.

I claim:

1. A speed governor for alternating current motors comprising a casing adapted to be secured to the motor shaft, a pair of contacts carried by said casing, one contact being rigidly secured and the other movably secured thereto, a spring carried by the casing and operating to normally hold the movable contact in engagement with the fixed contact with a predetermined pressure against the action of centrifugal force, an electromagnet secured to the casing and arranged to assist the spring in holding the movable contact, said magnet being of the alternating current type whereby its magnetic field is weakened at each zero point in the alternating current waves, said magnet and contacts being series connected in circuit with an alternating current supply and the motor circuit.

2. A speed governor for alternating current motors including an arm mounted to swing outwardly at one end under the influence of centrifugal force, a contact carried by the free end of said arm, a fixed contact wherewith the first contact normally engages, a spring engaging said arm and exerting a predetermined force to normally hold said contacts in engagement, and an electromagnet carried by said governor and arranged to attract said arm in the same direction as the tension of the spring, said magnet being of the alternating current type whereby its magnetic field is weakened at each zero point in the alternating current waves, said magnet and contacts being series connected in circuit with the alternating current supply and the motor circuit.

In testimony whereof I affix my signature.

RALEIGH J. WISE.