

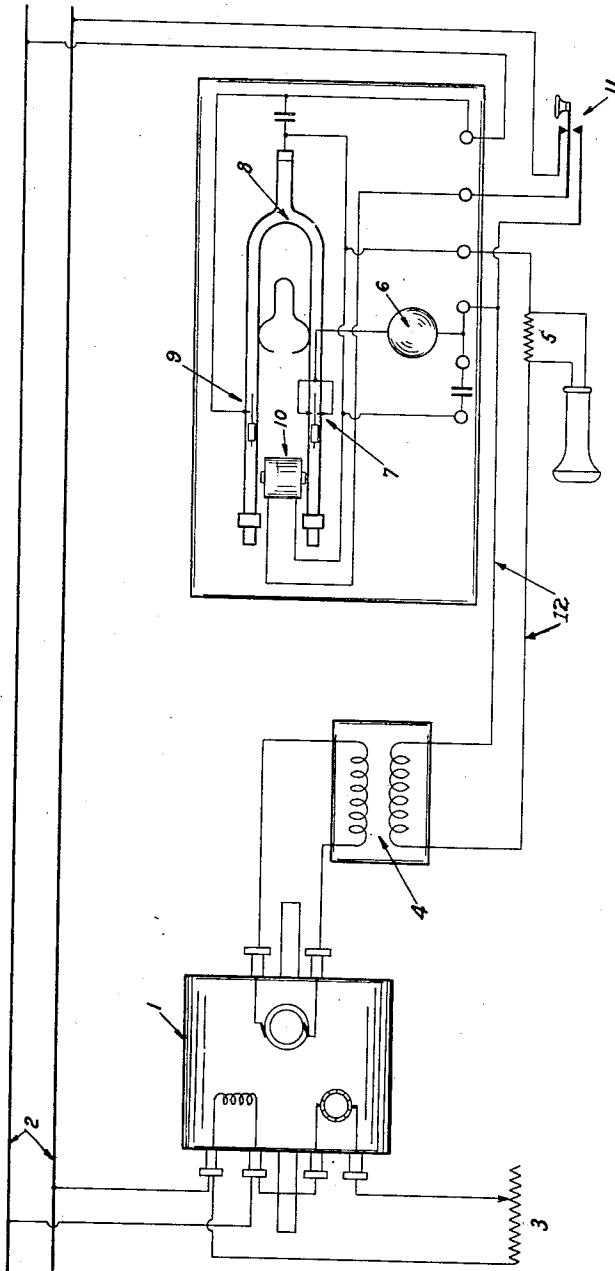
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SPEED CONTROL APPARATUS

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SPEED-CONTROL APPARATUS.

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To all whom it may concern:

Be it known that I, HARVEY C. HAYES, a citizen of the United States of America, and a resident of Washington, District of Columbia, have made new and useful Improvements in a Speed-Control Apparatus, of which the following is a specification.

My invention relates generally to an apparatus for giving constant speed by means of a tuning fork control and has for an object an open adjustment of the contact points when the tuning fork is at rest.

Another object of my invention is the employment of means for starting electrically the vibrations of the tuning fork.

A further object of my invention is the employment of means whereby the tuning fork speed control apparatus can be mounted in a moisture proof casing, located at a distant point, and started electrically.

My invention can be best understood by reference to the accompanying drawing, which is a schematic diagram of a complete system of speed control, in which (1) is a dynamotor, driven by current supplied by the D. C. mains (2) and is provided with a rheostat (3) connected in series with the armature of the dynamotor (1). The A. C. output of the dynamotor (1) passes through transformer (4), the secondary of which includes a small resistance (5) and a carbon filament incandescent lamp (6) for absorbing power from the A. C. circuit (12). The A. C. circuit (12) is closed through contacts (7) which are operated by one prong of an electrically driven tuning fork (8) when it is caused to operate through the action of a direct current passing through contact (9) and the coil of magnet (10).

It will be noted that the A. C. circuit is not closed continuously but only during the period that contacts (7) are closed by the moving fork prong and the length of this interval can be regulated by adjustment of the contact points (7). The power absorbed by the lamp (6) depends upon the point in the voltage curve that these contacts are made and this in turn depends upon the phase relation between the fork and the A. C. voltage. It results that the contacts will be made at a higher point on the voltage curve if the motor tends to speed up and at a lower point if the speed tends to drop. The resulting variation in the load drawn by the lamp (6) prevents the speed of the

motor from varying sufficiently for the A. C. voltage curve to get out of phase with the fork by a wave length providing the change of the D. C. voltage on the load on the motor does not vary more than a few points.

The apparatus as above described has not proved wholly satisfactory, for the reason that it fails to provide a satisfactory means of starting the vibrations of the tuning fork. If the contact (9) is adjusted properly the fork will start when the direct current is turned on but the natural wear of the points is such that this method cannot be depended upon for starting the vibrations of the fork and, moreover, the adjustment that will serve to start the vibrations of the fork is not the best adjustment for maintaining a quiet and steady motion. The best adjustment requires that the contact points (9) should be opened slightly when the fork is at rest. With such an adjustment, it has been necessary to start the fork vibrating by hand and whenever it becomes desirable to mount the apparatus at a distance or to enclose it from moisture when used on ship-board, it is not convenient to start the fork by hand.

In order to overcome the difficulty experienced from the first feature of my invention, namely, open contact points (9), I have added the switch (11) preferably of the push-button type, which serves to pass the alternating current through coil (10) while the button is depressed but when released connects the direct current through this coil (10).

In practice rheostat (3) is adjusted so that the speed of the dynamotor is such as to generate an alternating current very nearly in phase with the natural period of vibration of the tuning fork (8) and as a result, the tuning fork (8) will be set vibrating with considerable violence when the alternating current is passed through the coil (10). To start the vibrations of the tuning fork (8), the operator merely depresses switch (11) for a moment and the amplitude to which the tuning fork (8) is set vibrating by the alternating current is sufficient to operate contact (9) so that the direct current will maintain the vibrations when the push-button is released.

It is possible to employ various other switching arrangements than the one de-

scribed for passing the alternating current through the coil (10). The one shown is preferred because of its simplicity.

Having fully described my invention, I
5 claim:—

1. In a speed control apparatus, a tuning fork, one prong of which carries a normally open contact, a plurality of normally open contacts carried by the other prong, means
10 for creating vibrations in said fork, means for continuing said vibrations, and means for employing either of said means.

2. In a speed control apparatus, a tuning fork, means for creating vibrations in said
15 tuning fork, means for continuing said vi-

brations by passing a direct current through a contact adjustably attached to said tuning fork, said contact being normally open when said tuning fork is at rest and a means
20 for selectively using either of said means.

3. In a speed control apparatus, a tuning fork, a normally open contact carried by said tuning fork, means for creating vibrations in said tuning fork with alternating current, whereby said contact is closed,
25 means for continuing said vibrations with direct current, and means for selectively using either of said means.

HARVEY C. HAYES.