March 19, 1935. G. F. TOWNSEND 1,994,626

SPEED REGULATING DEVICE

Filed Jan. 19, 1933

FIG. 1

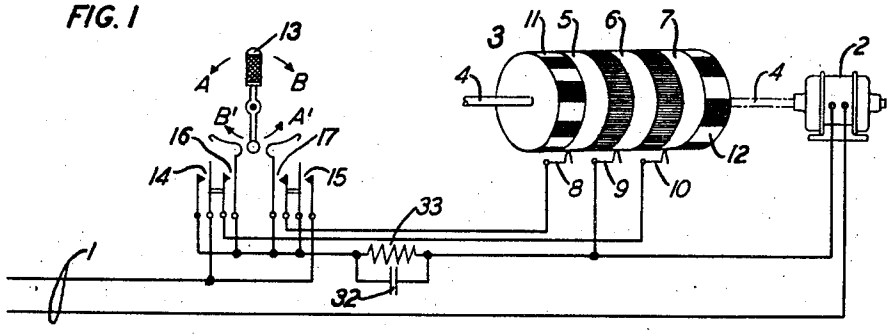


FIG. 2

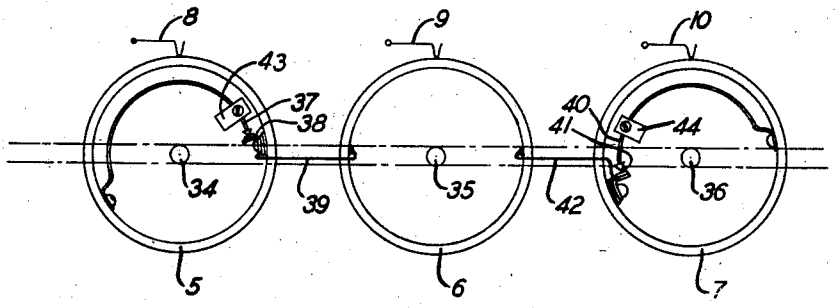
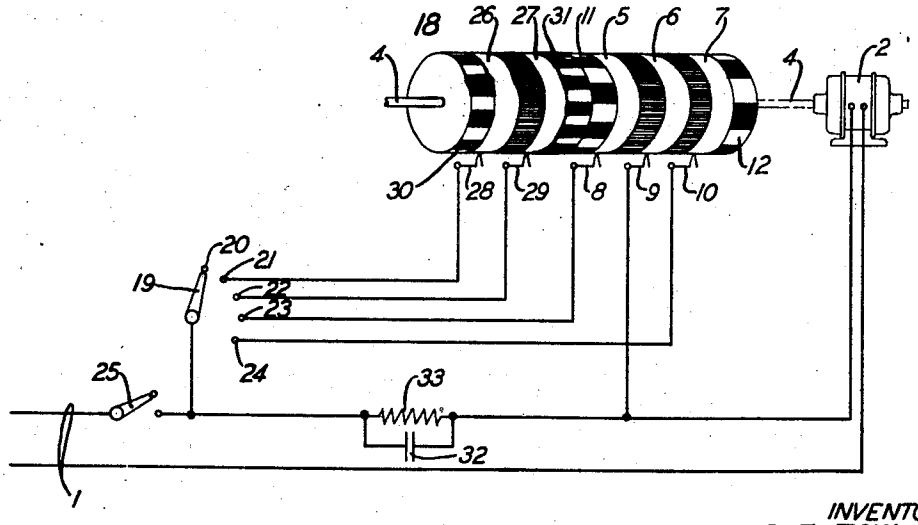


FIG. 3



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1,994,626

SPEED REGULATING DEVICE

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1 Claim. (Cl. 171—312)

This invention relates to an improved speed regulating device for a motor.

An object of the invention is to provide a motor with an improved speed regulating device which is capable of causing the motor to run at any one of several pre-assigned speeds.

Another object of the invention is to furnish an arrangement for immediately changing a printing telegraph set from transmission and/or reception at one speed to transmission and/or reception at an entirely different speed.

The invention will be described with reference to its application to a monitoring printing telegraph set. It is to be understood that this application is described in order to fully explain the invention and that the invention, which is capable of many other applications, is not to be restricted to this one application.

Monitoring printing telegraph sets are frequently used in telegraph repeater offices which employ two types of ordinary printing telegraph sets, one type having an operating speed of 368 O. P. M. (operations per minute) and the other type having a speed of 240 O. P. M. Heretofore, it has been necessary to have a double supply of monitoring printers, one supply having an operating speed of 368 O. P. M. and the other supply having a speed of 240 O. P. M.

If each monitoring printer could be easily switched from one speed to another, it would be possible to use a smaller number of monitoring printers in these repeater offices. Also, in view of space consideration, a two-speed arrangement is desirable in connection with telegraph board answering where a printer is mounted on a shelf in the board and is required to operate at both speeds.

The purpose of this invention, as applied to this given case, is to enable a monitoring printer to quickly change from operation at 368 O. P. M. to operation at 240 O. P. M. and vice versa.

In accordance with this invention, an improved governor assembly is applied to the motor of a monitoring printer. This governor assembly comprises two separate centrifugally operated governors which are mounted on the shaft of the motor and connection is made to them by means of three slip rings, each having a brush associated with it, likewise mounted on the motor shaft. One slip ring is connected to a governor which operates at 368 O. P. M., the second to a governor which operates at 240 O. P. M., and the third slip ring is common to both governors. Located at the front of the monitoring printer is a control switch which is connected to each of the three slip rings. The purpose of the control switch is to switch one of the governors out of the energizing circuit for the printer motor and to switch the other governor into the circuit. The neutral slip ring is used to complete the governing circuits.

This improved governor assembly may also readily be applied to a motor which is desired to have three or more operating speeds. To so apply this governor assembly, it is necessary to have as many governors as there are desired speeds and one more slip ring than the number of governors, the extra slip ring being common to all the governors. Of course, it is also necessary to have a position on the control switch for each desired speed.

This invention will be better understood from the following detailed description with reference to the accompanying drawing in which:

Figure 1 represents a two-speed governor assembly and subsidiary apparatus constructed in accordance with the invention and applied to the energizing circuit of a motor for a monitoring printer;

Fig. 2 shows, schematically, the internal connections of governor assembly 3; and

Fig. 3 represents an arrangement for a governor assembly having more than two cut-off speeds.

In Fig. 1, a source of power supply 1, such as 110 volts alternating current, is shown connected by means of a circuit, which may be called an energizing circuit, to a motor 2. Connected into the energizing circuit for motor 2 is a governor assembly 3 constructed in accordance with the invention. Governor assembly 3 is shown to be mounted upon motor shaft 4 of a monitoring printer (not shown) and to comprise two governors having slip rings 5, 6 and 7. Slip ring 5 connects to an ordinary governor adjusted, by means of weight 43 (shown in Fig. 2) to have a certain cut-off speed, such as 240 O. P. M. Slip ring 7 is connected to another governor adjusted by means of weight 44 (shown in Fig. 2), to have a different cut-off speed such as 368 O. P. M. Slip ring 6 is a common slip ring used to complete the governoring circuits by means of internal connections (wire conductors 39 and 42 shown in Fig. 2) from it to slip rings 5 and 7. Brushes 8, 9 and 10 are associated respectively with slip rings 5, 6 and 7. At the ends of governor assembly 3 are targets 11 and 12 which are similar to those commonly used in determining, by observations made through a stroboscope or a vibrating tuning fork, the speed of a rotating body, such as governor

assembly 3. Each of targets 11 and 12 is intended for a different speed. For example, target 11 might be intended for a speed of 240 O. P. M. and target 12 might be for a speed of 368 O. P. M.

Fig. 2 shows a cross-sectional view at each of slip rings 5, 6 and 7 with their associated brushes 8, 9 and 10. Circles 34, 35 and 36 represent cross-sections of motor shaft 4. One end of spring contact 37 is shown to be connected to slip ring 5 and the other end is shown to be resting on contact 38. Contact 38 is connected to common slip ring 6 by means of wire conductor 39. Likewise, spring contact 40 is shown to have one end connected to slip ring 7 and its other end resting on contact 41 which is connected to common slip ring 6 by means of wire conductor 42. When governor assembly 3 rotates, centrifugal force will, when sufficiently great, cause spring contact 37 to leave contact 38. The same is true for spring contact 40 and contact 41. The cut-off speed of the governor having slip ring 5 is the speed at which centrifugal force will be strong enough to cause spring contact 37 to leave contact 38. The term "cut-off speed" is used because, when motor 2 has attained this speed and spring contact 37 has left contact 38, governor assembly 3 will be cut-out of the energizing circuit and resistance 33 will, in effect, be shunted into the energizing circuit in place of governor assembly 3. The cut-off speed of the governor having slip ring 7 may be similarly defined. In order to adjust these cut-off speeds, weights 43 and 44 are attached to spring contacts 37 and 40, respectively. By varying the size and/or location of weights 43 and 44 upon spring contacts 37 and 40, the cut-off speeds will be correspondingly varied and can be adjusted as desired. It is to be recognized that this form of internal connections and this mode of adjustment have been given to illustrate the invention and they may be changed or altered without departing from the principles of operation of this invention.

Apparatus subsidiary to governor assembly 3 is shown in Fig. 1 to comprise various instrumentalities, such as control switch 13 having contacts 14, 15, 16 and 17 and various wire conductors associated with it. Control switch 13 may have, in addition to a neutral position, one position for each cut-off speed that is desired. In order to fully describe the invention, the operation of switch 13 will be described as applied to governor assembly 3 which will be assumed to have two governors adjusted to have cut-off speeds 240 O. P. M. and 368 O. P. M. respectively.

Control switch 13 is shown in Fig. 1 to be in its neutral position with all of its associated contacts 14, 15, 16 and 17 open. In this position, it can be seen that the energizing circuit for motor 2 is open both between the pair of contacts indicated at 14 and the pair indicated at 15. Under these conditions, current from power supply 1 is prevented from operating motor 2. Of course, this result could also be accomplished by having an ordinary switch (similar to switch 25 shown in Fig. 3) separately located at any convenient location in the energizing circuit, such as in the line leading to switch arm 19. When this ordinary switch is open, the energizing circuit would be broken and when the switch is closed, the energizing circuit would also be closed. However, it is more economical and convenient to use the arrangement shown in the drawing. Also, it reduces the number of parts required and makes the arrangement more compact.

In Figs. 1 and 2, it can be seen that when the top of control switch 13 is pushed in the direction of arrow A, its bottom part moves in the direction of arrow A', thereby closing contacts 17 and 15. The closing of the set of contacts indicated at 15 closes the energizing circuit for motor 2. The closing of the set of contacts indicated at 17 closes a path for current from power supply 1 to travel to brush 8, onto slip ring 5, to spring contact 37, to contact 38, to wire conductor 39, to neutral slip ring 6, on to brush 9, and then to motor 2. Since spring contacts 37 and 38 connected to slip ring 5 are adjusted to have a cut-off speed of 240 O. P. M., that will be the speed at which motor 2 will drive the printer.

If it should be desired to operate the monitoring printer at a different speed, such as 368 O. P. M., motor 2 can be caused to immediately change its speed, thereby immediately changing the monitoring printer from transmission and/or reception at one speed to transmission and/or reception at an entirely different speed. This can be done by pushing the top of control switch 13 in the direction of arrow B so that its bottom part moves in the direction of arrow B', thereby closing contacts 14 and 16. The result which follows this operation is similar to that just described except that current from power supply 1 will now travel to brush 10, onto slip ring 7 to spring contact 40, to contact 41, to wire conductor 42, to neutral slip ring 6, onto brush 9, and then to motor 2. Since spring contacts 40 and 41 connected to slip ring 7 are adjusted to have a cut-off speed of 368 O. P. M. that will now be the speed at which motor 2 will drive the printer.

In order to prevent sparking at contacts 37, 38, 40 and 41 of governor assembly 3 and also at contacts 16 and 17 of switch 13, a condenser 32 and resistance 33 are inserted into the energizing circuit.

Fig. 3 shows a governor assembly 18 having more than two governors, each adjusted to have a different cut-off speed, with an associated multiple switch 19 having contacts 20, 21, 22, 23 and 24. There is also an ordinary switch 25 located in the energizing circuit for motor 2. Switch 25 serves the same purpose as contacts 14 and 15 on switch 13. When switch 25 is in its open position (as it is shown to be in Fig. 3), the energizing circuit for motor 2 is also opened and motor 2 cannot be operated. When switch 25 is closed, the energizing circuit is likewise closed.

Switch 19 is shown in Fig. 3 to be touching its neutral contact 20. Contact 20 is not strictly necessary to the arrangement shown in Fig. 3 and may be omitted if desired. Its purpose is to provide a neutral position for switch 19 as a matter of convenience in operating governor 18.

Governor assembly 18 is shown to comprise five slip rings, 5, 6, 7, 26 and 27, with brushes 8, 9, 10, 28 and 29 associated therewith. As was the case with governor assembly 3, slip ring 6 of governor assembly 18 is a common slip ring. All of the other slip rings connect to separate governors of governor assembly 18 and are adjusted to have different cut-off speeds. In order to check the operation of these governors, targets 11, 12, 30 and 31 are provided for this purpose.

The operation of governor assembly 18 is essentially the same as that of governor assembly 3. To operate governor assembly 18, switch 25 should be closed in order to close the energizing circuit for motor 2. If, in a given case, it is desired to operate motor 2 at a speed to which the governor connected to slip ring 27 is adjusted,

switch 19 should be moved to touch contact 22 which leads to brush 29 associated with slip ring 27. Current from power supply 1 will pass through switch 25 to switch 19, then to brush 29, onto slip ring 27, through the internal connections (similar to those shown in Fig. 2) of governor assembly 18 to neutral slip ring 6, onto brush 9, and then to motor 2. Any of the other governors may be substituted for the one connected to slip ring 27 by moving switch 19 to the proper contact position. Current from power supply 1 will then traverse a path similar to that just described.

As has been stated above, this improved governor assembly may readily be applied to a motor which is desired to have any convenient number of operating speeds. To so apply this governor assembly, it is necessary to have, in addition to a common slip ring, a specially adjusted governor and corresponding slip ring and target for each of the desired speeds. Of course, it is also necessary to have a position on the control switch for each desired speed and a brush associated with each slip ring.

Thus, by means of the arrangements described above a printing telegraph set may be immediately changed from transmission and/or reception at one speed to transmission and/or reception at an entirely different speed. The arrangements shown in the drawing are illustrative of the operation of the invention and will serve to assist in interpreting the claim. The claim is not to be restricted to the precise construction described above, but is intended to include all changes and modifications employing the principles and features of operation of the invention.

What is claimed is:

A multispeed motor having instrumentalities for checking the various operating speeds of the motor, said instrumentalities including a plurality of governors having different preassigned cut-off speeds, and a plurality of targets having individually distinctive sets of markings, each of said targets being connected to a different governor, and each of said individually distinctive sets of markings corresponding to one of the preassigned cut-off speeds of the governors.

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