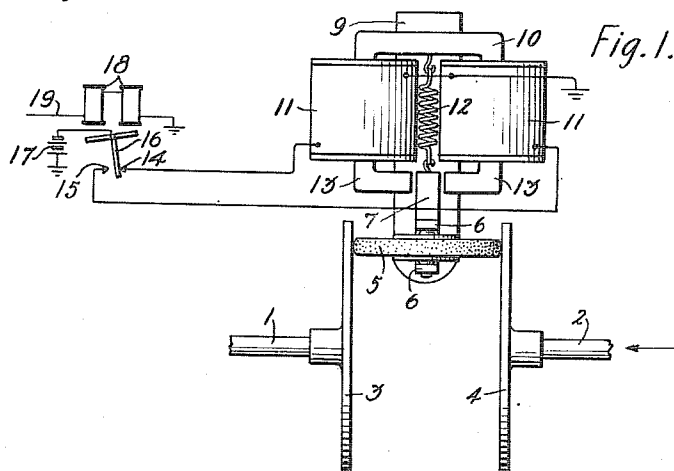
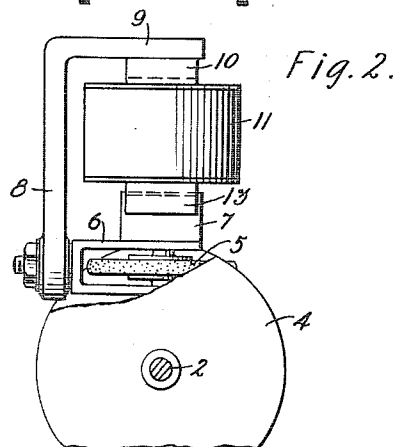
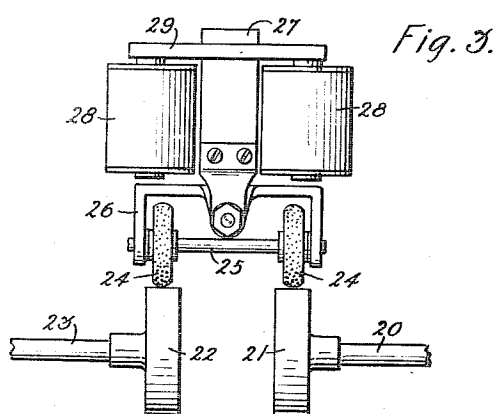


P. M. RAINEY.
SPEED CHANGING DEVICE.
APPLICATION FILED FEB. 8, 1918.

1,296,850.

Patented Mar. 11, 1919.



Inventor:
Paul M. Rainey.
by *J. E. Roberts* Atty.

UNITED STATES PATENT OFFICE.

PAUL M. RAINEY, OF GLEN RIDGE, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SPEED-CHANGING DEVICE.

1,296,850.

Specification of Letters Patent.

Patented Mar. 11, 1918

Application filed February 8, 1918. Serial No. 216,109.

To all whom it may concern:

Be it known that I, PAUL M. RAINEY, a citizen of the United States, residing at Glen Ridge, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Speed-Changing Devices, of which the following is a full, clear, concise, and exact description.

This invention relates to speed changing means and has for its object the provision of simple, compact, but highly efficient devices for varying the speed ratio between two moving mechanisms without interrupting the continuity of their operation.

To this end, the invention comprises two moving members, one driving and the other driven, which are connected by gearing having flexible driving surfaces; and means for so moving said gearing that the effective gear ratio between the moving members is readily altered, this alteration being dependent on the fact that the driving surfaces are of flexible material. The means for moving said gearing is actuated by controlling mechanism and is so arranged that the gear ratio may be increased or decreased in a predetermined manner. This mechanism is shown as adapted to be controlled by electric means and is particularly useful in printing telegraph systems to maintain the speed of the receiving distributor in synchronism with that of the sending distributor.

The invention is illustrated in the drawing, of which Figure 1 is an elevation of the device; Fig. 2 is an end view of the device as shown in Fig. 1 looking in the direction of the arrow, with a certain portion of the mechanism cut away; and Fig. 3 is an elevation of a modified form.

This invention, as shown in Figs. 1 and 2, consists of two shafts 1 and 2, having on adjacent ends driving disks 3 and 4. These disks are connected for transmission purposes by a disk 5 having its driving surface composed of flexible material. This disk is mounted in a U-shaped frame 6, which is pivoted at its rear end on an upright member 8, the U-shaped member being extended upwardly to form an armature 7, which extends between the pole pieces 13 of magnets 11 mounted on a forwardly extended portion 9 of the upright member 8. This armature is maintained in a position midway between the pole pieces 13 by a

spring 12 attached at one end to said armature 7 and at the other end to the yoke piece 10 of the magnets 11.

To control the actuation of the armature 7, and therethrough the movement of the disk 5, there is provided a control magnet 18 energized over a line wire 19 and adapted to move its armature 16 between two contacts 14 and 15, and connect a battery 17 to one or the other of the windings of magnets 11. This controlling device is of the same general character as that set forth in my application entitled "Synchronizing system for multiplex telegraphy", filed March 26, 1914, Serial No. 827,315, in the drawing of which the magnet 22 corresponds to the magnet 18 in this application. In accordance with the operation of this control system, as set forth in my above-mentioned application, when the speed of the mechanism at the one end of the line reaches a value greater or less than that at the other end of the line, an impulse is sent which moves the armature 16 to energize one or the other of the magnets 11. In the structure of this invention this energization of one of magnets 11 shifts the angular position of the disk 5, and therefore changes the effective radial distance of the points of contacts of the disk 5 with the disks 3 and 4. The fact that the surface of the disk 5 is composed of flexible material will permit of a certain amount of angular displacement of disk 5 without reducing the effective driving contact between the disk 5 and disks 3 and 4.

In the modification shown in Fig. 3, two shafts, 20 and 23, are shown having disks 21 and 22 respectively at their adjacent ends and upon which bear disks 24 mounted on a shaft 25, the surfaces of these disks being composed of flexible material. The disks 24 are mounted in a frame 26 pivoted in an upright member 27, which is connected to a frame 29, on which are also mounted magnets 28. The upper portions of frame 26 act as armatures for the respective magnets 28. This mechanism is connected to a controlling device in a manner identical with that shown in Fig. 1, the effect of the control on this device being similar to that shown and described with respect to Fig. 1. For example, if the left-hand magnet 28 is energized it tends to lift the left-hand disk 24 away from disk 22 and to force right-hand disk 24 against disk 21, so that the ef-

fective working radii of the two disks are altered, the flexibility of the driving surfaces of the two disks permitting this alteration.

- 5 In the particular application of this device to a printing telegraph system, the device will preferably be located at the receiving end of the system and one of the pair of shafts will be driven by a motor
10 whose speed is substantially constant. The other of the pair of shafts will be connected to the receiving distributor in a manner which is well-known. Therefore, if at any time the speed of the receiving distributor
15 falls outside the limits predetermined for the proper operation thereof, the control mechanism comes into play to actuate one or the other of the magnets to cause the alteration of the gear ratio between the two shafts
20 and thereby rectify the difference in speed.

What is claimed is:

1. A speed changing device comprising a driving and a driven surface, in combination with an intermediate rotating member
25 for transmitting power between said driving and driven surfaces, said intermediate member being composed of resilient material, and means for moving said intermediate rotating member during the transmission of power to inversely and simultaneously alter the effective radii of contact between the intermediate rotating member and the driving and driven surfaces respectively without substantially reducing the effective
30 pressure between the contact and surfaces.

2. A speed changing device comprising a driving and a driven member, in combination with an intermediate member for transmitting power between said driving and
40 driven members, said intermediate member being composed of resilient material, and means for altering the mass distribution of said intermediate member to vary the transmission ratio between the two members.

3. A speed changing device comprising a driving and a driven disk, in combination with intermediate disks for transmitting power between said driving and driven disks, said intermediate disks comprising resilient material, and means for altering
50 the mass distribution of said intermediate disks to vary the transmission ratio between the two members.

4. A speed changing device comprising a driving and a driven shaft having friction disks on their adjacent ends, means for transmitting power between said disks comprising a pair of friction disks having resilient material on their outer surfaces adapted to bear on the periphery of said driving
60 and driven disks, means connecting said resilient disks, and means for moving said disks in opposite directions with respect to said driving and driven disks to alter the effective transmission ratio between the driving and driven shafts.

5. A speed changing device comprising a driving and a driven shaft having friction disks on their adjacent ends, power transmitting disks having their outer surfaces
70 composed of resilient material bearing on each of said friction disks, both of said power transmitting disks being mounted in a yoke member, a pair of magnets disposed adjacent opposite ends of said yoke member, armatures for said magnets carried by said yoke member, and electrical means for energizing one or the other of said magnets to simultaneously move said power transmitting disks in opposite directions with respect to said driving and driven disks to alter the transmission ratio between the two shafts.

In witness whereof, I hereunto subscribe my name this 1st day of February, A. D. 1918.

PAUL M. RAINEY.