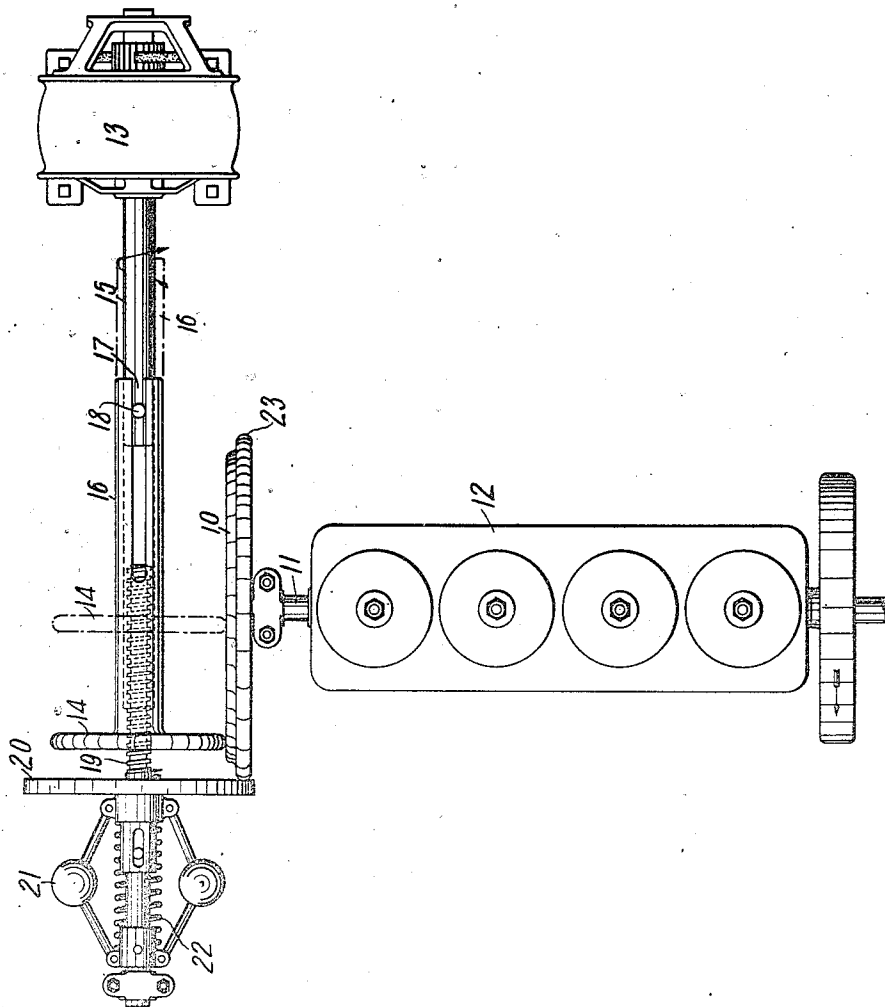


W. H. McCLELLAND, JR.
SPEED CONTROLLING APPARATUS.
APPLICATION FILED AUG. 5, 1912.

1,052,496.

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WITNESSES:

W. T. Holman
R. W. Dunham

INVENTOR.

William H. McClelland, Jr.
BY *A. L. Versell*
His ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM H. McCLELLAND, JR., OF WILKINSBURG, PENNSYLVANIA.

SPEED-CONTROLLING APPARATUS.

1,052,496.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM H. McCLELLAND, JR., a citizen of the United States, residing at 651 Trenton avenue, 5 Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Speed-Controlling Apparatus, of which the following is a specification.

10 My invention relates to apparatus for varying the relative speed of a driving member and a member driven thereby.

I will describe one form of apparatus embodying my invention and then point out 15 the novel features thereof in claims.

The accompanying drawing is a view showing one form of apparatus embodying my invention.

20 One feature of my invention is the provision, in combination with a driving member and a member driven thereby, of a third moving member, and means responsive to the relative speed of the third member and the driven member for varying the relative 25 speed of the driving member and the driven member.

Another feature of my invention is the provision of a coacting screw and nut, one of which is operatively connected with the 30 third member and the other with the driven member, and means responsive to the relative speed of the screw and nut for varying the relative speed of the driving and the driven members.

35 Referring to the drawing, 12 is a driving member here shown as being an internal combustion engine.

13 is a member driven by the member 12, and as here shown is an electric generator. 40 It is desirable that the speed of the generator 13 should be substantially constant regardless of variations in the speed of the engine 12.

10 is a disk secured to a shaft 11 which 45 is driven by the engine 12, and 14 is a disk operatively connected with the generator 13. As here shown, the periphery of the disk 14 engages with the face of the disk 10. The disk 14 is carried by a sleeve 16 which is 50 constrained to rotate with, but is free to slide longitudinally on, a shaft 15 connected with the generator. As here shown, the sleeve 16 is provided with a slot 17 which slides freely over a pin 18 secured 55 to the shaft 15. It will be seen that by this construction the disk 14 is movable radially

over the face of the disk 10, and it will also be seen that the relative speed of the engine 12 and generator 13 depends upon the position of the disk 14 relative to the center of 60 the disk 10.

19 is a member driven at a predetermined speed by any suitable means. As here shown this member is a screw operatively 65 connected with a disk 20 which is driven by a flange 23 on the disk 10. Usually the predetermined speed of screw 19 will be the speed at which it is driven when the engine 12 is operating at its lowest possible speed. The predetermined speed of the screw is as 70 here shown determined by means of a centrifugal device 21 and a spring 22. This centrifugal device and spring are so adjusted that when the speed of the disk 10 is such as to drive the disk 20 at or below 75 the predetermined speed of the latter the disk 20 is held in frictional engagement with disk 10 by the spring 22, but that when disk 10 exceeds this speed and attempts to increase the speed of disk 20 80 above the predetermined speed, the friction between disks 20 and 10 is reduced by the centrifugal device so that slippage occurs between the disks and the speed of disk 20 continues at the predetermined value. 85

With the particular arrangement of apparatus here shown, the predetermined speed of the disk 20 is the same as the speed at which it is desired that the generator 13 should be driven. Also, the parts are as 90 here shown so proportioned that when the disk 14 occupies substantially the position shown with reference to the center of the disk 10, the two disks 14 and 20 will be rotated at the same speed until the speed exceeds the predetermined speed of disk 20. 95 That is, the parts are so proportioned that when disk 14 occupies the position shown, the ratio between the speeds of disks 10 and 20 is the same as the ratio between the speeds of disks 10 and 14. 100

The disk end of the sleeve 16 is threaded to form a nut which coacts with the screw 19. It will be seen that as long as the screw 19 and the disk 14 rotate at the same speed 105 there will be no radial movement of the disk 14 over the disk 10, but that if the screw 19 and the disk 14 rotate at different speeds the disk 14 will be moved toward or away from the center of the disk 10 according as the 110 speed of the disk 14 is greater or less than the speed of the screw 19.

The operation of the apparatus here shown is as follows: When the engine 12 is at rest the disk 14 will usually occupy substantially the position in which it is shown in full lines with reference to the center of disk 10. When the engine starts to rotate in the direction indicated by the arrow, disks 20 and 14 are rotated both at the same speed, so that disk 14 does not move radially on disk 10. As the speed of disk 10 increases, the speed of disks 20 and 14 increases in the same proportion until the speed of disk 20 reaches the predetermined value. When the speed of disk 10 increases beyond this point, disk 20 slips on disk 10, so that disk 14 then rotates faster than disk 20, and this relative movement of disks 20 and 14 causes disk 14 to be moved toward the center of disk 10, that is, toward the position shown in dot and dash lines, until it reaches a point where it is rotated at the same speed as disk 20. This movement of disk 14 toward the center of disk 10 will continue as long as the speed of disk 10 increases. A decrease in the speed of disk 10 will obviously cause disk 14 to move away from the center of disk 10. It will be seen therefore that disk 14 constantly seeks a position on screw 19 where there will be no relative rotation of disk 14 and screw 19.

It will be seen that regardless of the speed of the engine 12, the speed of the generator 13 is constant.

The centrifugal device 21 may be very small, its necessary size being only such as to provide the power required to overcome the sliding friction between disks 10 and 14, which friction is extremely small owing to the rolling action between these disks. It will be seen therefore that I have provided a speed controlling apparatus which has close regulation, is very light, and which occupies only a very small amount of space.

Although I have herein shown and described only one form of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:—

1. In combination, a variable speed driving member, a member driven thereby, a third member operated at a substantially constant speed, and means interposed between the driving member and the driven member and controlled by the third member for controlling the speed of the driven member.

2. In combination, a variable speed driving member, a member driven thereby, a third member operated at a substantially constant speed, and means interposed between the driving member and the driven

member and controlled by the third member for maintaining the speed of the driven member substantially constant.

3. In combination, a variable speed driving member, a member driven thereby, a third member operated at or below a predetermined speed, and means interposed between the driving member and the driven member and controlled by the third member for maintaining the speed of the driven member at a predetermined value.

4. In combination, a variable speed driving member, a member driven thereby, a third member operated at a constant speed, a coacting screw and nut one of which is operatively connected with the said driven member and the other with the said third member, and means responsive to relative movement of the screw and nut for controlling the speed of the driven member.

5. In combination, a variable speed driving disk, a disk driven thereby and adapted to be moved radially over the face of the driving disk, a member operated at a substantially constant speed, and means controlled by the said member for moving the said driven disk radially over the face of the driving disk.

6. In combination, a variable speed driving disk, a disk driven thereby, the periphery of one of said disks engaging the face of the other disk, a member operated at a substantially constant speed, and means controlled by the said member for moving the one of said disks radially over the face of the other disk.

7. In combination, a variable speed driving disk, a disk driven thereby, the periphery of one of said disks engaging the face of the other disk, a member operated at a substantially constant speed, a coacting screw and nut one of which is operatively connected with the driven disk and the other with the said member, the one of said disks being moved radially over the face of the other disk by relative movement of the screw and nut.

8. In combination, a variable speed driving member, a member driven thereby, a coacting screw and nut one of which is operatively connected with the driven member and the other of which is driven at a substantially constant speed, and means responsive to relative movement of the screw and nut for controlling the speed of the driven member.

9. In combination, a variable speed driving member, a member driven thereby, a third member operated at a substantially constant speed, and means responsive to the speed of the driven member relative to the speed of the third member for controlling the speed of the driven member.

10. In combination, a variable speed driving member, a member driven thereby, a

third member operated at a substantially constant speed, and means controlled by the third member for controlling the speed of the driven member.

5 11. In combination, a variable speed driving member, a second member driven thereby, a third member driven by the driving member, a centrifugal device for maintaining the speed of the third member substantially constant, and means controlled by the
10 third member for controlling the speed of the second member.

12. In combination, a variable speed driving member, a member driven thereby, a
15 third member driven by the driving member, means for maintaining the speed of the third member substantially constant, and means controlled by the third member for controlling the speed of the second member.

20 13. In combination, a driving member, a member driven thereby at variable relative speed, a third member operating at a substantially constant speed, and means responsive to the speed of the third member
25 relative to the speed of the driven member for varying the speed of the driving member relative to the speed of the driven member.

14. In combination, a driving member, a

member driven thereby at variable relative speed, a third moving member, and means responsive to the speed of the third member relative to the speed of the driven member for varying the speed of the driving member relative to the speed of the driven
35 member.

15. In combination, a driving member, a member driven thereby, a third moving member, and means responsive to the speed of the third member relative to the speed
40 of the driven member for varying the speed of the driving member relative to the speed of the driven member.

16. In combination, a variable speed driving member, a member driven thereby, a
45 third member driven at a predetermined speed by the driving member and means responsive to variations in the speed of the driven member relative to the speed of the third member for varying the speed of the
50 driving member relative to the speed of the driven member.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. McCLELLAND, Jr.

Witnesses:

MENA QUEALE,

C. W. DUNHAM.