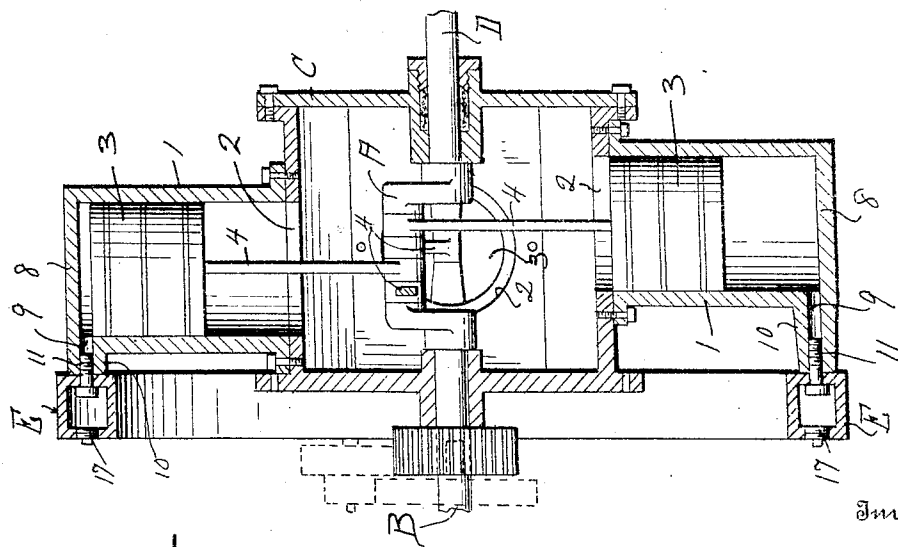
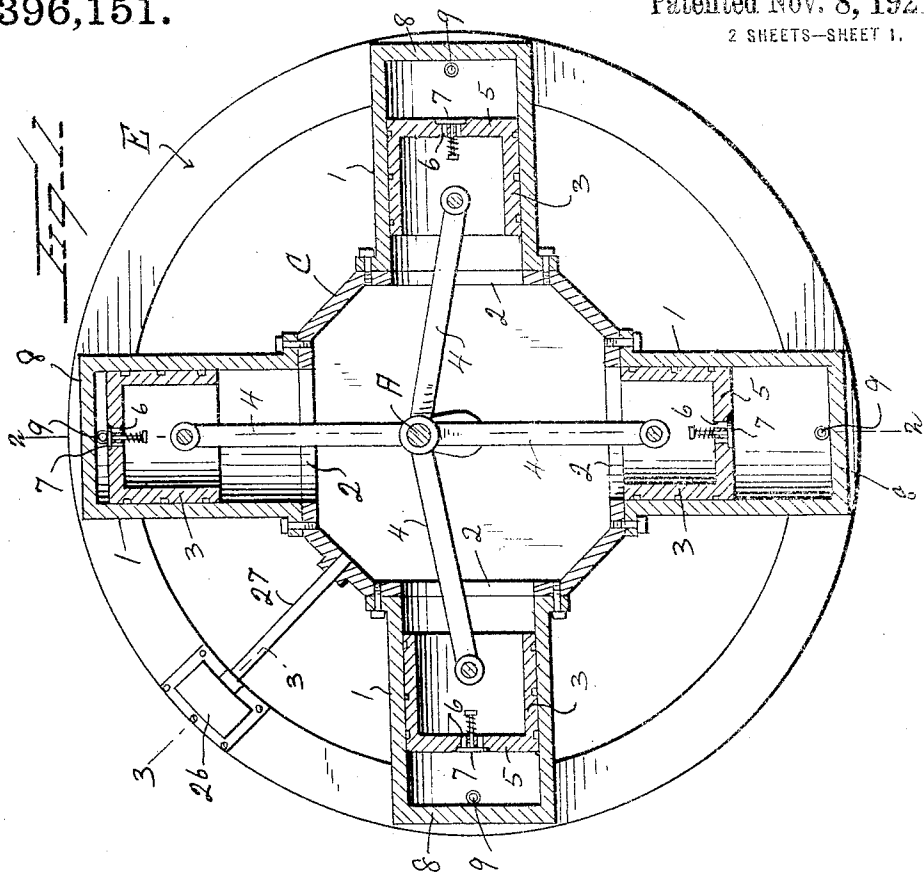


W. I. WHEELER.
SPEED CHANGING MECHANISM.
APPLICATION FILED FEB. 24, 1920.

1,396,151.

Patented Nov. 8, 1921.
2 SHEETS—SHEET 1.



Inventor

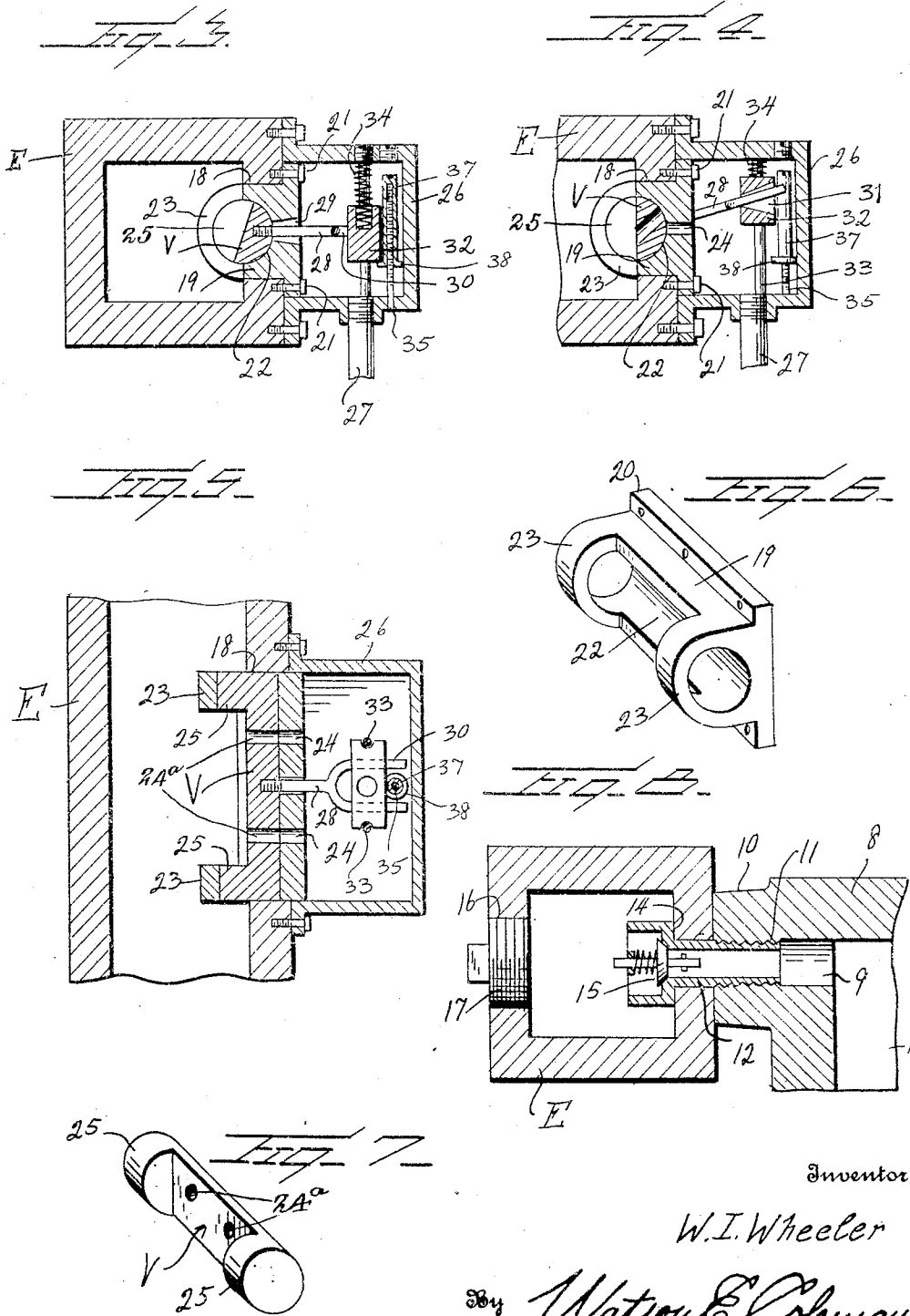
W. I. Wheeler

By *Watson E. Coleman*
Attorney

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UNITED STATES PATENT OFFICE.

WILLIAM I. WHEELER, OF SCOTTVILLE, ILLINOIS.

SPEED-CHANGING MECHANISM.

1,396,151.

Specification of Letters Patent.

Patented Nov. 8, 1921.

Application filed February 24, 1920. Serial No. 360,954.

To all whom it may concern:

Be it known that I, WILLIAM I. WHEELER, a citizen of the United States, residing at Scottville, in the county of Macoupin and State of Illinois, have invented certain new and useful Improvements in Speed-Changing Mechanism, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to certain improvements in speed changing mechanism, and it is an object of the invention to provide a novel and improved mechanism of this general character wherein means is provided for automatically varying the speed of the driven shaft of a motor vehicle in accordance with the engine load, without the necessity of any manual operation.

It is also an object of the invention to provide a novel and improved device of this general character embodying a structure including a plurality of cylinders in communication with a central casing or reservoir and wherein is included a continuous chamber in communication with each of the cylinders and in communication at a single point with the casing or reservoir, together with pistons mounted for rectilinear movement within the cylinders and in operative engagement with a crank interposed in the driving shaft.

Another object of the invention is to provide a novel and improved mechanism of this general character wherein the single connection between the casing or reservoir and the continuous chamber is under control of a valve operable under the influence of centrifugal force, so that the flow of the fluid medium may be regulated in accordance with the requirements of practice and as dependent upon the engine load.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved speed changing mechanism, whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

50 The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to de-

scribe the same with reference to the accompanying drawings, wherein:—

Figure 1 is a view partly in section and partly in elevation illustrating a speed changing mechanism constructed in accordance with all embodiments of my invention; Figure 2 is a vertical sectional view taken substantially on the line 2—2 of Fig. 1 with portions in elevation of the structure as illustrated in Fig. 1;

Figure 3 is an enlarged fragmentary sectional view taken substantially on the line 3—3 of Fig. 1;

Figure 4 is a fragmentary sectional view illustrating in detail the controlling valve, said valve being shown in a closed position;

Figure 5 is a fragmentary view taken in a direction circumferentially of the continuous chamber and through the controlling valve, said controlling valve being shown in full open position;

Figure 6 is a view in perspective of the supporting member for the valve unapplied;

Figure 7 is a view in perspective of the controlling valve as herein embodied unapplied; and

Figure 8 is an enlarged fragmentary sectional view illustrating in detail a connection between a cylinder and the continuous chamber.

As disclosed in the accompanying drawings, D denotes a driving shaft which extends through the axial center of a casing or reservoir C and which casing or reservoir is capable of rotation about the shaft D independently thereof and vice versa. Within the casing or reservoir C, the shaft D is provided with the crank A. The driving shaft D is adapted to coact with the driven shaft B in any ordinary or preferred manner, and preferably through the medium of a mechanism substantially the same as that embodied in my co-pending application, Serial No. 243,526, filed July 6th, 1918. It is to be understood, however, that it is not my intention to limit the present invention to the particular mechanism illustrated in this prior application.

Radiating from the casing or reservoir C and suitably affixed thereto is a plurality of cylinders 1 equidistantly spaced in a direction circumferentially of the casing or reservoir C. The inner end of each of the cylin-

ders 1 is open and in communication with the interior of the casing or reservoir C through an opening 2 produced in the peripheral wall of the casing or reservoir C.

5 For rectilinear movement within each of the cylinders 1 is a piston 3, preferably of a hollow type, and which is operatively engaged through the medium of the rod 4 with the crank A of the shaft D. In order to assure a direct thrust of each of the rods 4 upon the crank A, adjacent cylinders 1 are laterally offset one with respect to the other, as may be occasioned by the requirements of practice.

15 The outer or closed end or head 5 of each of the pistons 3 is provided with a port 6 which is normally closed by a check valve 7. The check valve 7 opens upon the inward movement of the piston 3 but closes upon the outward movement thereof.

20 E denotes an annular chamber, preferably rectangular in cross section, although this particular configuration is not essential. The chamber E is arranged to one side of the cylinders 1 and is common to all of said cylinders. Each of the cylinders 1 adjacent its outer or closed end or head 8 is provided in its side wall with a port 9 defined by an outstanding nipple 10. A side wall of the chamber E abuts the outer end of the nipple 10, and is clamped or held thereto by the tubular member 11 loosely disposed through an opening 12 in the adjacent side wall of the member E and in threaded engagement 35 with the internal wall of the nipple 10. The end portion of the tubular member 11 within the chamber E is enlarged to afford a shoulder 14 which contacts with the inner face of the coacting side wall of the member E and whereby the tubular member 11 serves effectively to anchor the chamber E to a nipple 10.

40 Coacting with the end portion of the bore of the member 11 within the chamber E is a check valve 15 and which valve is closed upon the inward movement of the piston 3 within the coacting cylinder 1 and is opened upon the outward movement of said piston.

50 In order to facilitate the application of each of the tubular members 11 the outer side wall of the chamber E in alignment with the opening 12 is provided with the opening 16 of a diameter sufficient to permit the ready insertion therethrough of the member 11 and the enlarged end portion thereof. After the member 11 has been properly arranged, the opening 16 is closed by the plug 17 of a conventional type.

60 At a predetermined point between a pair of adjacent cylinders 1, the inner side wall of the chamber E is provided with an opening 18 which is closed by a block 19. The block 19 is provided with the marginal flanges 20 overlying the outer face of the inner side wall of the member E whereby the

block 19 may be effectively held in applied position through the instrumentality of the screws 21 or other fastening means.

The inner face of the block 19 has extending longitudinally thereof and entirely 70 therealong, a groove or channel 22 substantially semi-circular in cross section and the opposite end portions of the block 19 are provided with the inwardly disposed loops 23 having their inner walls or faces also 75 substantially semi-circular and in continuity with the groove or channel 22. The block 19 also has directed laterally therethrough and in communication with the groove or channel 22 the ports 24. V denotes a valve 80 member substantially semi-circular in cross section and provided at its opposite end portions with the cylindrical parts 25 which are received within the bearings provided by the loops 23. The central portion of the 85 valve member V is provided with the ports 24^a adapted to register with the ports 24 hereinbefore referred to.

The ports 24 communicate with a housing 26 herein disclosed as secured to the inner 90 side wall of the chamber E. In communication with the housing 26 through the inner wall thereof and leading to and in communication with the casing or reservoir C is the conduit or pipe 27.

95 At substantially the center of the convex or rounded face of the valve member V is secured an outstanding pin or shank 28 which is directed through a chamfered opening 29 provided in the block 19. The 100 finger or shank 28 is of a length to extend a desired distance within the housing 26 and terminates in the fork 30. Each of the tines or fingers of the fork 30 is loosely disposed through an opening 31 provided in 105 a poise or weight 32. The upper or lower walls of the opening 31 are converged in a direction toward the block 19 whereby the requisite relative movement between the poise or weight 32 and the tines or fingers 110 of the fork 30 is permitted. The poise or weight 32 has sliding movement between the guide rods or members 33 interposed between the top and bottom walls of the housing 26 whereby said weight or poise 32 115 has movement in substantially a fixed path of travel.

In practice, the casing or reservoir C, the cylinders 1 and the chamber E are substantially entirely filled with oil. When the 120 driving shaft D is set in motion, the oil is pumped by the pistons 3 into the chamber E through the ports 9 and the tubular members 11 and as the speed of the shaft D increases, the resultant centrifugal force causes the 125 weight or poise 32 to move outwardly, thereby rocking the valve member V, as illustrated in Fig. 4, into a position to completely close the ports 24 whereby the circulation of the oil or other fluid medium is 130

stopped, and the resistance offered between the pistons 3 and the closed or outer ends of the cylinders 1 drives the casing or reservoir C and the parts carried thereby as a unit with the driving shaft D and whereby the driven shaft is caused to operate direct from the drive shaft.

As the load on the engine increases, the resultant reduction in rotation of the casing or reservoir C and its concomitant parts will cause the weight or poise 32 to swing downwardly or inwardly in accordance with such increase of load resulting in the ports 24^a in the valve member V registering with the ports 24 in the block 19. This movement of the poise or weight 32 is facilitated by the spring or expansible member 34 carried by the upper face of the poise or weight 32. When said poise or weight is in a position to adjust the valve member V into a completely closed position, the spring or member 34 is placed under compression by contact with the top or outer wall of the housing 26 and as the rotation of the casing or reservoir C and the parts common thereto reduces, this spring or expansible member 34 functions to impart a movement to the weight or poise 32 in a direction to bring the ports 24^a into register with the ports 24 and the extent of the registering areas of the ports 24^a and 24 is dependent upon the increase in the load.

I also find it of advantage to provide means for positively limiting the extent of registration of the ports 24 and 26 and as herein embodied I arrange within the housing 26 a threaded post 35 extending between the fingers or tines of the fork 30 outwardly of the weight or poise 32. Threaded upon the post 35 is a sleeve 37 provided at its inner end with an outstanding annular flange 38. By rotating the sleeve 37 the flange 38 thereof may be adjusted with respect to the ports 24 so that when the poise or weight 32 comes in contact therewith, a positive stop is provided therefor.

From the foregoing description, it is thought to be obvious that a speed changing mechanism constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

1. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including

a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operably engaged with the driving shaft, each of said pistons having a port therein affording communication within the cylinder at opposite sides of the piston, a chamber in communication with the casing at a single point and with each of the cylinders at points beyond the pistons when at the limit of their movement away from the casing, said casing, cylinders and chamber being adapted to contain a mobile medium, and centrifugally operated means for retarding the flow of the mobile medium through the communication between the chamber and the casing.

2. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the driving shaft, each of said pistons having a port therein affording communication within the cylinder at opposite sides of the piston, a chamber in communication with the casing and with each of the cylinders at points beyond the pistons when at the limit of their movement away from the casing, said casing, cylinders and chamber being adapted to contain a mobile medium, and means operable under the influence of centrifugal force for retarding the flow of the mobile medium through the communication between the chamber and the casing.

3. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operably engaged with the driving shaft, each of said pistons having a port therein affording communication within the cylinder at opposite sides of the piston, a chamber in communication with the casing and with each of the cylinders at points beyond the pistons when at the limit of their movement away from the casing, said casing, cylinders and chamber being adapted to contain a mobile medium, a rocking valve for controlling the flow of said mobile medium through the communication between the chamber and the casing, and means carried by said valve whereby the same is rocked under the influence of centrifugal force.

4. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including a

casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operably engaged with the driving shaft, each of said pistons having a port therein affording communication within the cylinder at opposite sides of the piston, a chamber in communication with the casing and with each of the cylinders at points beyond the pistons when at the limit of their movement away from the casing, said casing, cylinders and chamber being adapted to contain a mobile medium, a rocking valve for controlling the flow of said mobile medium through the communication between the chamber and the casing, means carried by said valve whereby the same is rocked under the influence of centrifugal force, and means for limiting the movement of said rocking valve in one direction.

5. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operably engaged with the driving shaft, each of said pistons having a port therein affording communication within the cylinder at opposite sides of the piston, a chamber in communication with the casing and with each of the cylinders at points beyond the pistons when at the limit of their movement away from the casing, said casing, cylinders and chamber being adapted to contain a mobile medium, a rocking valve for controlling the flow of said mobile medium through the communication between the chamber and the casing, means carried by said valve whereby the same is rocked under the influence of centrifugal force, and means for limiting the movement of said rocking valve in one direction, said means being adjustable.

6. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operably engaged with the driving shaft, each of said pistons having a port therein affording communication within the cylinder at opposite sides of the piston, a chamber in communication with the casing and with each of the cylinders at points beyond the pistons when at the limit of their movement away from the casing, said casing, cylinders and chamber being adapted to contain a mobile medium, a rocking valve for controlling the flow of said mobile medium through the communication between the

chamber and the casing, means carried by said valve whereby the same is rocked under the influence of centrifugal force, and automatic means operating independently of the centrifugal action for imparting movement to the rock valve in one direction.

7. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable in the cylinders and operatively engaged with the driving shaft, each of said pistons having a port therein affording communication within the cylinder at opposite sides of the piston, a check valve coacting with the port and closing upon movement of the piston in one direction, a chamber in communication with the casing at a single point and with each of the cylinders at points beyond the pistons when at the limit of their movement away from the casing, a check valve coacting with each communication between the chamber and a cylinder, said check valve closing upon movement of the coacting piston in a direction opposite to that in which the check valve of the piston is closed, said casing, cylinders and chamber being adapted to contain a mobile medium, and automatic means for retarding the flow of said mobile medium through the communication between the chamber and the casing.

8. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operably engaged with the driving shaft, each of said pistons having a port therein affording communication within the cylinder at opposite sides of the piston, a chamber in communication with the casing at a single point and with each of the cylinders at points beyond the pistons when at the limit of their movement away from the casing, said casing, cylinders and chamber being adapted to contain a mobile medium, and centrifugally operated means for retarding the flow of the mobile medium through the communication between the chamber and the casing.

9. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts including a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operatively engaged with the driving shaft, a chamber in communication

with the casing and with each of the cylinders, and means operable under the influence of centrifugal force for controlling the flow of a fluid from the chamber to the casing and through the cylinders.

10. In a speed changing mechanism, a driving shaft, a driven shaft, and means operatively connecting said shafts, including a casing mounted upon the driving shaft and rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operatively engaged with the driving shaft, a chamber in communication with the casing and with each of the cylinders, and means operable under the influence of centrifugal force for offering a variable resistance to the flow of the mobile medium through the communication between the chamber and the casing and through the cylinders.

11. In a speed changing mechanism, a driving shaft, a driven shaft, and means op-

eratively connecting said shafts including a casing mounted upon the driving shaft and 25 rotatable independently thereof, cylinders carried by the casing and in communication therewith, pistons movable within the cylinders and operably engaged with the driving shaft, each of said pistons having a port 30 therein affording communication within the cylinder at opposite sides of the piston, a chamber in communication with the casing and with each of the cylinders at points beyond the pistons when at the limit of their 35 movement away from the casing, said casing, cylinders and chamber being adapted to contain a mobile medium, and means operable under the influence of centrifugal force for offering a variable resistance to 40 the flow of the mobile medium through the communication between the chamber and the casing and through the cylinders.

In testimony whereof I hereunto affix my signature.

WILLIAM I. WHEELER.