No. 864,547. PATENTED AUG. 27, 1907.

N. E. LEMMON.

SPEED GOVERNING DEVICE.

APPLICATION FILED JAN. 29, 1906.

3 SHEETS—SHEET 1.

Fig. 1.

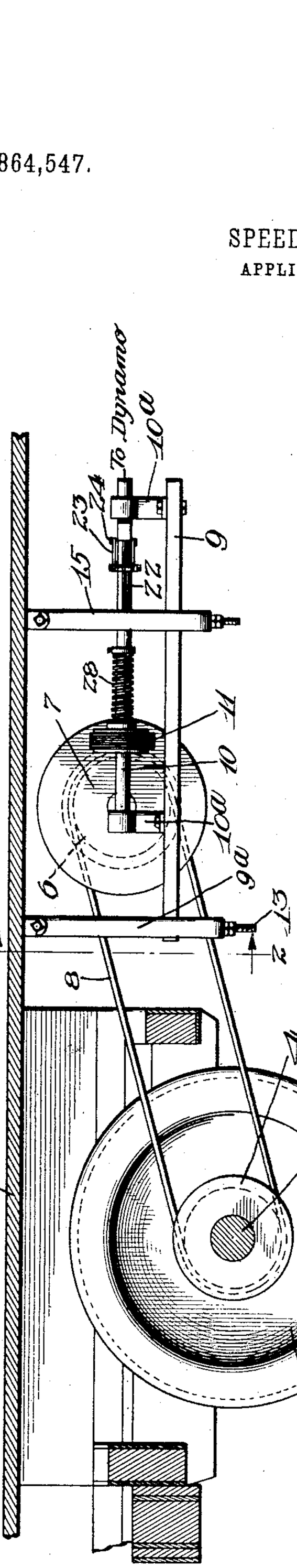


Fig. 3.

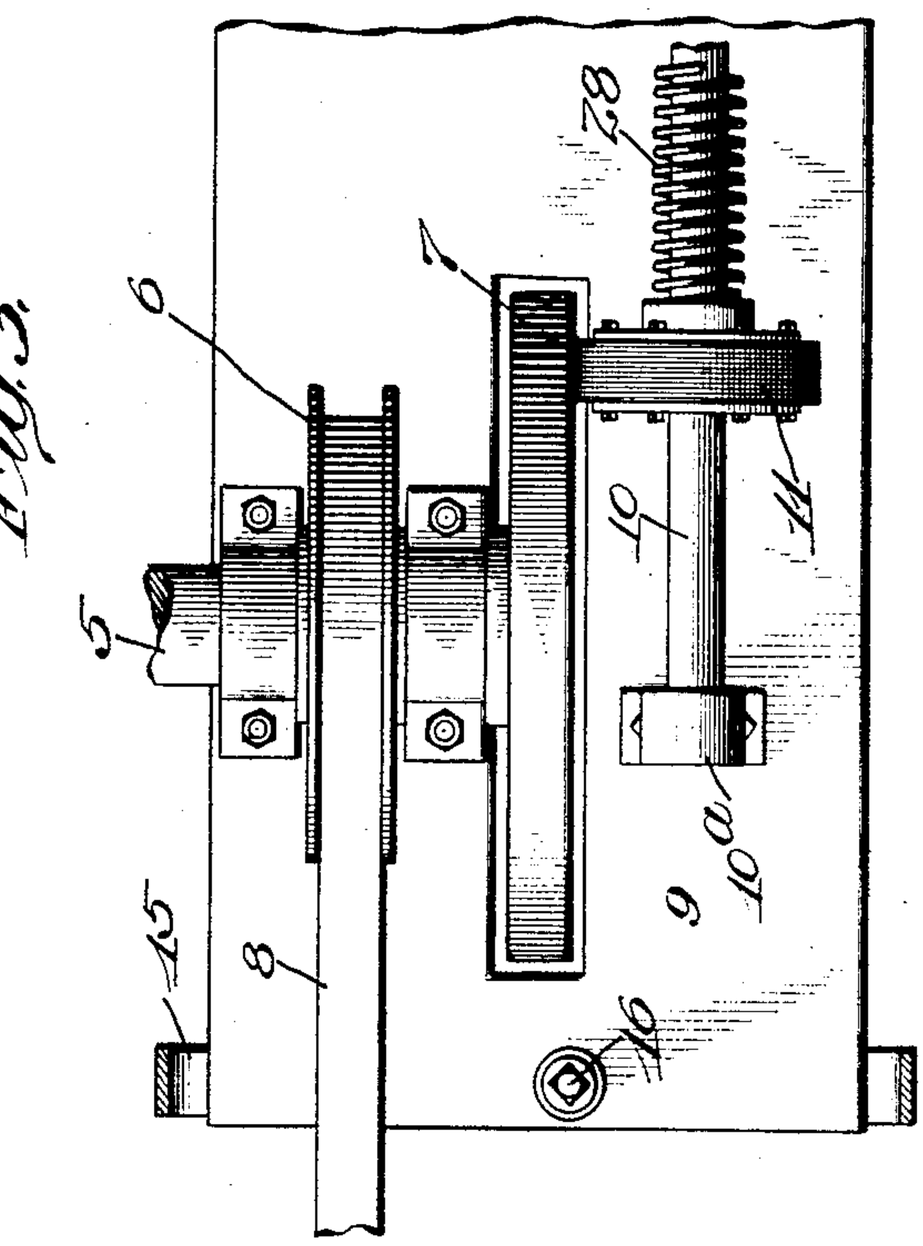
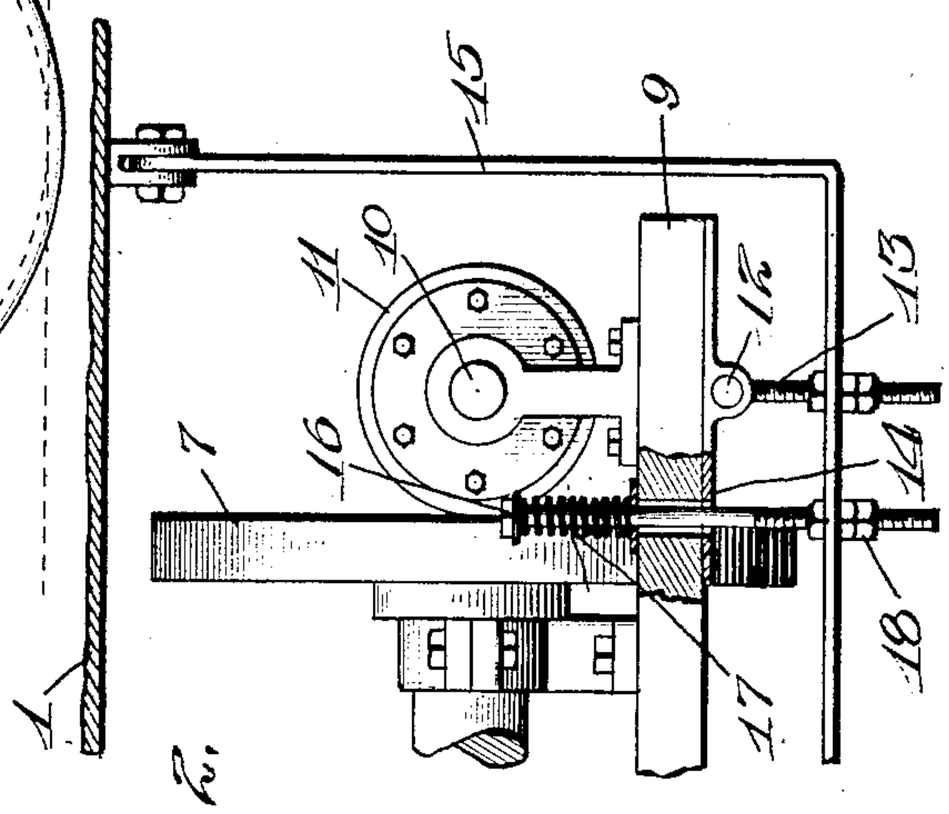


Fig. 2.



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3 SHEETS—SHEET 2.

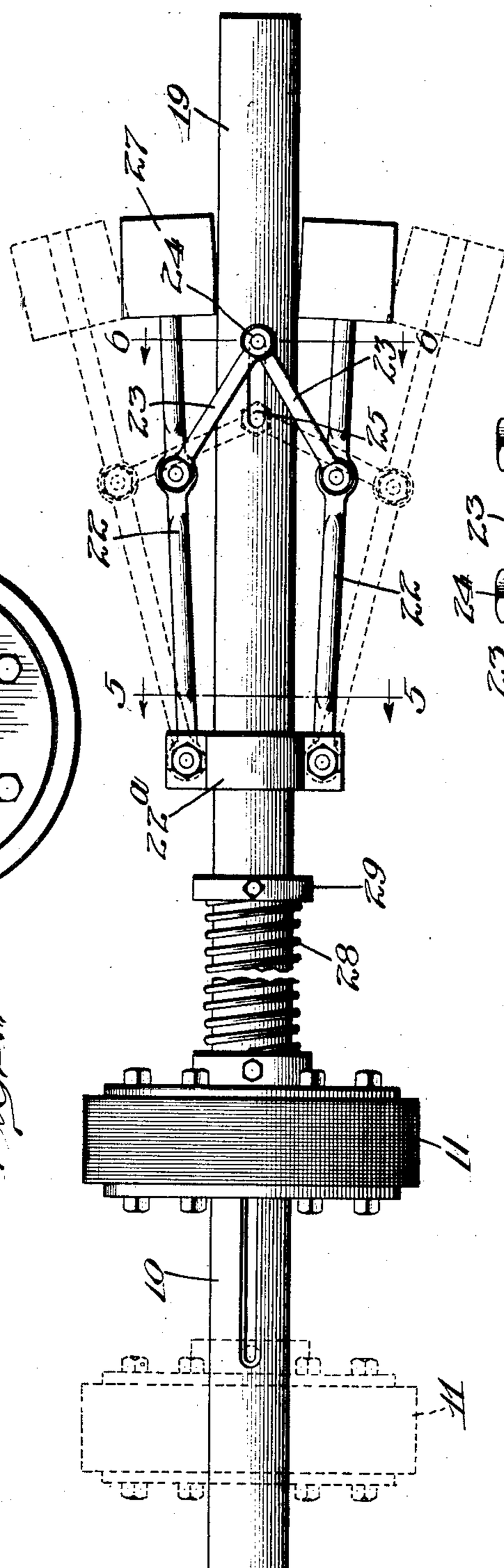

Fig. 4.

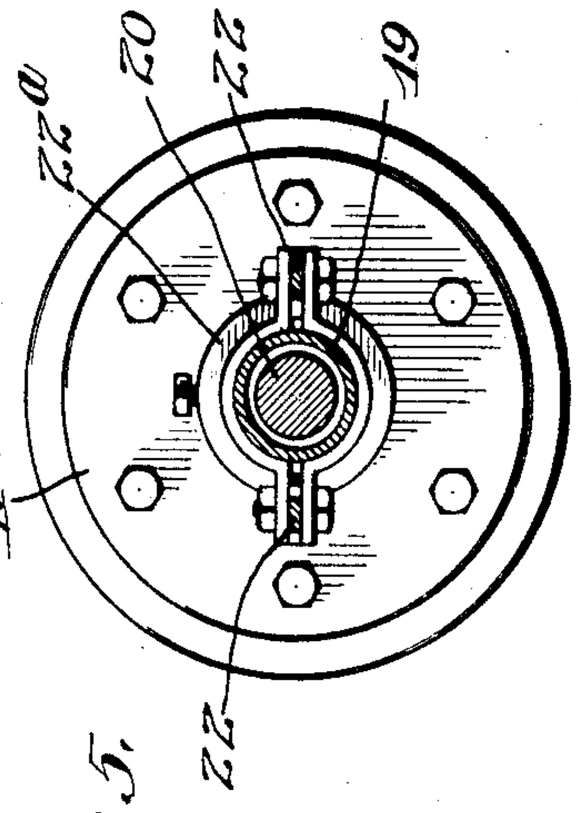

Fig. 5.

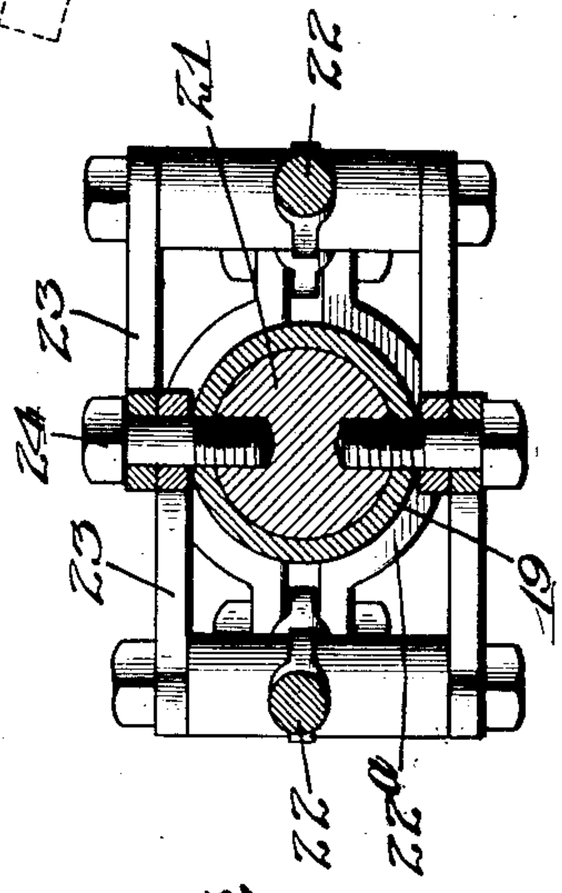

Fig. 6.

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3 SHEETS—SHEET 3.

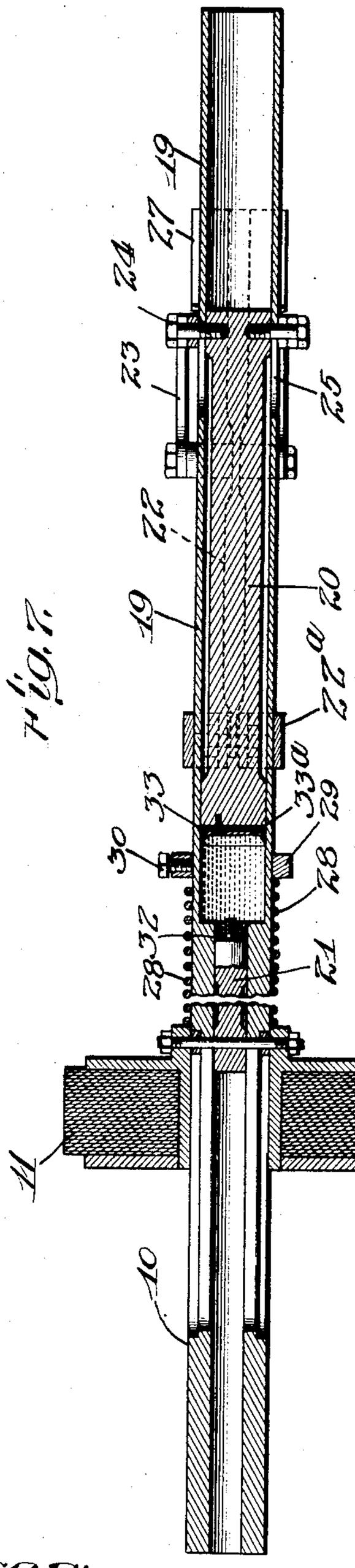

Fig. 7.

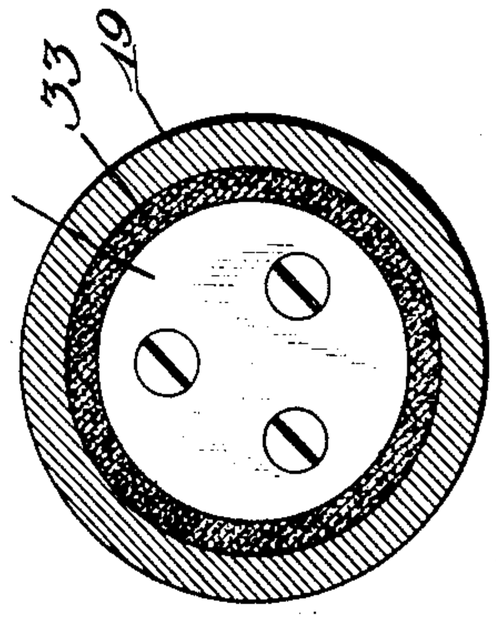

Fig. 9.

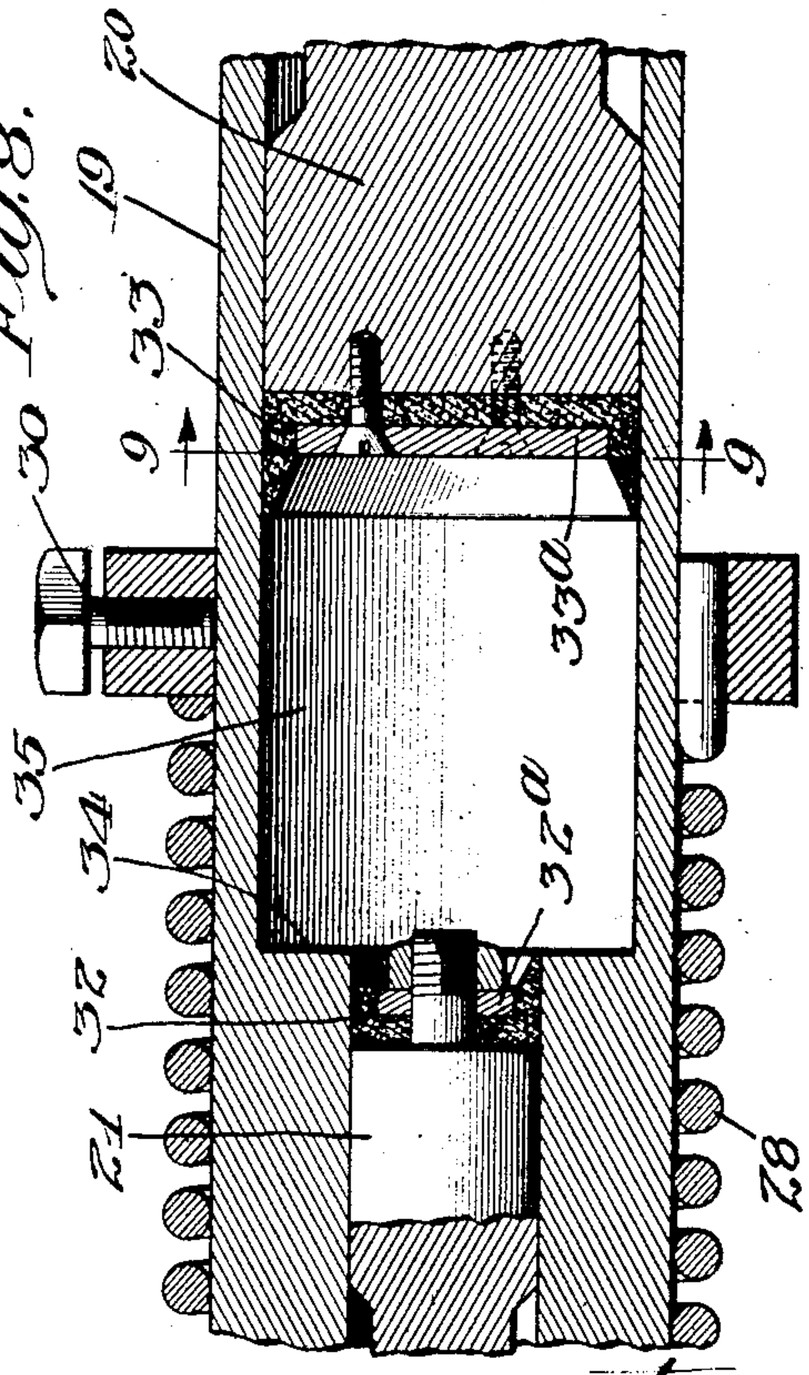

Fig. 8.

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UNITED STATES PATENT OFFICE.

NORMAN E. LEMMON, OF PULLMAN, ILLINOIS.

SPEED-GOVERNING DEVICE.

No. 864,547. Specification of Letters Patent. Patented Aug. 27, 1907.

Application filed January 29, 1906. Serial No. 298,353.

To all whom it may concern:

Be it known that I, NORMAN E. LEMMON, a citizen of the United States of America, and a resident of Pullman, Cook county, Illinois, have invented a certain new and useful Improvement in Speed-Governing Devices, of which the following is a specification.

My invention relates to improvements in mechanism for utilizing axle energy and governors therefor.

The object of my invention is to provide a device for so regulating the revolutions of a transmitting device as to maintain a constant speed at all times regardless of the speed of the car.

A further object is the production of a device that is easily adjusted and will adapt itself to the varying positions of the car body and axle.

A further object is the production of a device that can be economically constructed and easily attached to the car, and one that will not easily get out of order.

These and such other objects as may hereinafter appear are attained by my device, an embodiment of which is illustrated in the accompanying drawings, in which

Figure 1 represents a side elevation of my device adapted for use in transferring power from a car axle to a dynamo. Fig. 2 is a cross section on the line 2—2 of Fig. 1, looking in the direction indicated by the arrows. Fig. 3 is an enlarged plan view of a portion of Fig. 1. Fig. 4 is a plan view of my device with a changed position of the governor and attachments, shown in dotted lines. Fig. 5 is a sectional view on line 5—5 of Fig. 4, looking in the direction indicated by the arrows. Fig. 6 is a sectional view on line 6—6 of Fig. 4 looking in the direction indicated by the arrows. Fig. 7 is a longitudinal section of Fig. 4. Fig. 8 is an enlarged detail of a portion of Fig. 7. Fig. 9 is a cross section on line 9—9 of Fig. 8, looking in the direction indicated by the arrows.

Like numerals of reference indicate like parts in the several figures of the drawings.

Referring by numerals to the accompanying drawings, 1 indicates the bottom of a car, 2 a car axle, and 3 a car wheel. A pulley 4 is attached to the axle. Secured to the bottom of the car in any well-known manner is an axle 5 having secured thereto a pulley 6 and an end wheel 7. A belt 8 connects the two pulleys and serves to transmit power from the axle 2 to the axle 5. A shelf 9 is suspended from the car bottom close to the wheel 7, and on this shelf is seated a shaft 10. The shaft carries a friction wheel 11 which can be put in and out of frictional contact with the wheel 7 by a rocking movement of the shelf 9. This is illustrated in Fig. 2 in which the shelf 9 is shown as pivotally seated at 12 on the end of the bolt 13. A second bolt 14 extends through the hanger 15 and one side of the shelf 9 terminated at its upper end by a head 16 having a spring 17 seated between the face of the head and the bottom of the shelf. By operating the nut 18 below the hanger, the rod 14 is raised or lowered, thus changing the inclination of the plane of the shelf 9 and throwing the wheel 11 against the face of the wheel 7 or away from it, as desired.

Referring now to Figs. 4 and 5, the shaft 10 comprises an outer shell 19 with interior plungers 20 and 21. Near the end of the shaft opposite the friction wheel is a governor comprising link bars 22 secured to the shaft and connected together by means of links 23, which are pivotally connected together at 24 to the plunger 20 through a slotted opening 25 in the casing of the shaft. Governor weights 27—27 are secured to the end of the link bars, which are operated by the longitudinal movement of the plunger 20. At the end of the shaft near the wheel 11 is provided a surrounding spring 28, the longitudinal movement of which is checked by means of the collar 29 surrounding the shaft. The position of this spring may be varied by shifting the position of the collar, which is held in place by means of a nut and bolt 30. The wheel 11 is secured to the end of the plunger 21 and the longitudinal movement of this plunger shifts the longitudinal position of the wheel. The plungers 20 and 21 are preferably of varying diameter, 20, as shown, having a sectional area of about four times the sectional area of plunger 21.

Referring to Fig. 8, the end of the plunger 20 is provided with a cap or washer 32 preferably of leather or some light material and a similar cap or washer 33 is provided on the end of plunger 20. The opening in the shaft within which the plunger 20 works terminates in an annular shoulder 34 surrounding the opening in the shaft within which the plunger 21 operates. A space is left between the face of the shoulder and the end of the plunger 20 which is filled with some liquid, preferably glycerin or a liquid of like characteristics. This chamber 35 filled with liquid forms a cushion against which the faces of the plungers operate. It will be noted that as the sectional area of the plunger 20 is much greater than the sectional area of plunger 21, the strokes of the two plungers will vary in like degree. So if the area is in the proportion of four to one, a longitudinal movement of four inches on the part of plunger 21 will cause a movement of only one inch longitudinal movement in plunger 20. The spring 28, as shown in Figs. 7 and 8, is secured to the collar 29, and the hub of the wheel 11; when the wheel is in the desired position the spring is under sufficient tension to hold the governor weights in place. When the speed increases the governor weights fly outwardly and force the wheel 11 toward the center of the friction wheel 7, thus diminishing the speed; the tension of the spring is such, however, that when the speed of the train is reduced to normal, the tension of the spring pulls

the wheel 11 back into normal position, and the force transmitted through the plunger and liquid throw the governor weights back into normal position.

It is a well known fact that it is extremely difficult to transmit power from an axle, owing to the varying speed at which the train moves and when the power is intended to be transferred into electrical energy the increase and diminution in the speed of the train is an important element in the case.

In the ordinary devices used in the transmission of axle power, the question of governing that power has been one difficult of solution. By my device, however, I attain nearly perfect regulation with respect to the varying speed of the train. As the power from the car axle 2 is transmitted directly to axle 5, this axle revolves in the same relative manner as axle 2, carrying with it the end wheel 7. The position of the friction wheel 11 with relation to the diameter of the end wheel 7 is so arranged as that the revolutions transmitted to the shaft 10 will be at some fixed speed desired. Any variation, therefore, in the velocity at which the train moves will cause a corresponding increase or decrease in the number of revolutions of the shaft 10 carrying the governor. The governor, being set for the same number of revolutions as the wheel 11, any increase in such revolutions throws out the weights 27. This action, through the medium of the links 22 and 23, pushes the plunger 20 in the direction of the friction wheel. A horizontal movement of say one inch in this plunger results in a horizontal movement in the same direction of the plunger 21 of four inches. As this plunger carries with it the friction wheel 11, the friction wheel is carried four inches nearer the center of the end wheel 7. This change in the relative positions of the wheel results in reducing the number of revolutions per minute in the wheel and the consequent slowing down is transmitted through the governor, varying the position of the plunger 20 through the medium of the links 23. It will be seen that as the friction wheel can travel over the face of the end wheel 7, from the periphery to the center the revolutions may be reduced to *nil*. It is evident, therefore, by carefully adjusting the proportion of the different parts of the device to the required number of revolutions desired, this desired rate of revolution may be maintained, regardless of any increase in the speed of the train.

Referring to Fig. 2, it will be noted that the shelf 9 rests on the end of the bolt 13, rendering the shelf easily adjustable. In the event that it is desired to throw the friction wheel out of engagement with the end wheel, it is simply necessary to operate the nut 18, tilting that side of the shelf nearest the end wheel upwardly and throwing the face of the friction wheel away from the face of the end wheel. At the same time the use of the two bolts 13 and 14 gives all necessary rigidity to the shelf.

It is evident that there are other means of pressing the friction wheel against the end wheel, and that applicant is not limited to this specific device.

The question of the transmission of axle energy into a form in which it can be utilized, as, for instance, in the operation of a dynamo to be used in car lighting, is one that has been sought for for some time. One of the objections to devices of this character is that the varying speeds of the train results in a transmission of variable power with a consequent increase or diminution of energy in the dynamo. In the event that the apparatus is arranged with relation to a certain speed, an increased speed is injurious to the operation of the parts and a diminution in the speed results in a diminution of the power with a consequent lessening of the value of the device. In the operation of applicant's device, however, these difficulties have been overcome and a constant power can be maintained without regard to the speed of the train.

The device is simple in construction, has few parts and can be readily secured to the car without it being necessary in any way to disarrange or change the location of any of the various portions of the car body.

The fact that the end wheel and shaft connections which are secured to the body of the car are not connected rigidly to the car axle but through the medium of a belt prevents any disarrangement of the mechanism of the device through the varying positions of the car body and axle, such varying positions being compensated in the connecting chain 8.

I claim:

1. In a device of the class described, the combination with the driving mechanism including a wheel, of a second wheel adapted to be brought in frictional contact therewith, and adapted to travel radially thereof, a shaft driven by said wheel, interior reciprocating shafts, and means for regulating the longitudinal movement of said interior shafts.

2. In a device of the class described, the combination with the driving mechanism, of a wheel in frictional contact therewith, and adapted to travel radially thereof, a shaft driven by said wheel, interior reciprocating shafts, and means for regulating the longitudinal movement of said interior shafts, said means comprising a toggle mechanism secured to said outer and inner shafts.

3. In a device of the class described, the combination with the driving mechanism, of a wheel in frictional contact therewith, and adapted to travel radially thereof, a shaft driven by said wheel, interior reciprocating shafts having a chamber located therebetween and toggle mechanism uniting one of said interior shafts with the outer shaft.

4. In a device of the class described, the combination with the driving mechanism, of a wheel in frictional contact therewith, and adapted to travel radially thereof, a shaft driven by said wheel, interior reciprocating shafts having a chamber filled with liquid located therebetween and toggle mechanism uniting one of said interior shafts with the outer shaft.

5. In a device of the class described, the combination with the driving mechanism, of a wheel in frictional contact therewith, and adapted to travel radially thereof, a shaft driven by said wheel, interior reciprocating shafts of different diameters, and means for regulating the longitudinal movement of said interior shafts.

6. In a device of the class described, the combination with the driving mechanism, of a wheel in frictional contact therewith, and adapted to travel radially thereof, a shaft driven by said wheel, interior reciprocating shafts of different diameters, and means for regulating the longitudinal movement of said interior shafts, said means comprising a toggle mechanism secured to said outer and inner shafts.

7. In a device of the class described, the combination with the driving mechanism, of a wheel in frictional contact therewith, and adapted to travel radially thereof, a shaft driven by said wheel, interior reciprocating shafts of different diameters having a chamber located therebetween and toggle mechanism uniting one of said interior shafts with the outer shaft.

8. In a device of the class described, the combination with the driving mechanism, of a wheel in frictional contact therewith, and adapted to travel radially thereof, a

shaft driven by said wheel, interior reciprocating shafts of different diameters having a chamber filled with liquid located therebetween, and toggle mechanism uniting one of said interior shafts with the outer shaft.

9. In a device of the class described, the combination with a driving mechanism, of a wheel in frictional contact therewith, a hollow shaft operated by said wheel, interior shafts of varying diameter having a chamber filled with liquid between the ends of said shafts, one of said shafts being adapted to move the frictional shaft radially of the driving mechanism, and means operated by the revolution of said outer shaft for imparting a longitudinal movement to the interior shaft and thereby operate said first named outer shaft for restoring said parts to their normal position.

10. In a speed-governor, the combination with a hollow slotted shaft, of a pair of interior longitudinally movable shafts, a liquid-filled chamber therebetween, one of said interior shafts or plungers being of a greater diameter than the other, whereby the longitudinal motion imparted thereto will be transmitted through said chamber and impart a varying longitudinal motion to said second shaft or plunger.

Signed by me at Pullman, Cook county, Ill., this 19th day of Jan'y 1906.

NORMAN E. LEMMON.

Witnesses:
DAVID J. HARRIS,
F. W. FRENCH.