No. 756,452. PATENTED APR. 5, 1904.

V. G. APPLE.

AUTOMATICALLY GOVERNED DRIVING WHEEL.

APPLICATION FILED NOV. 9, 1903.

NO MODEL.

Fig. 2.

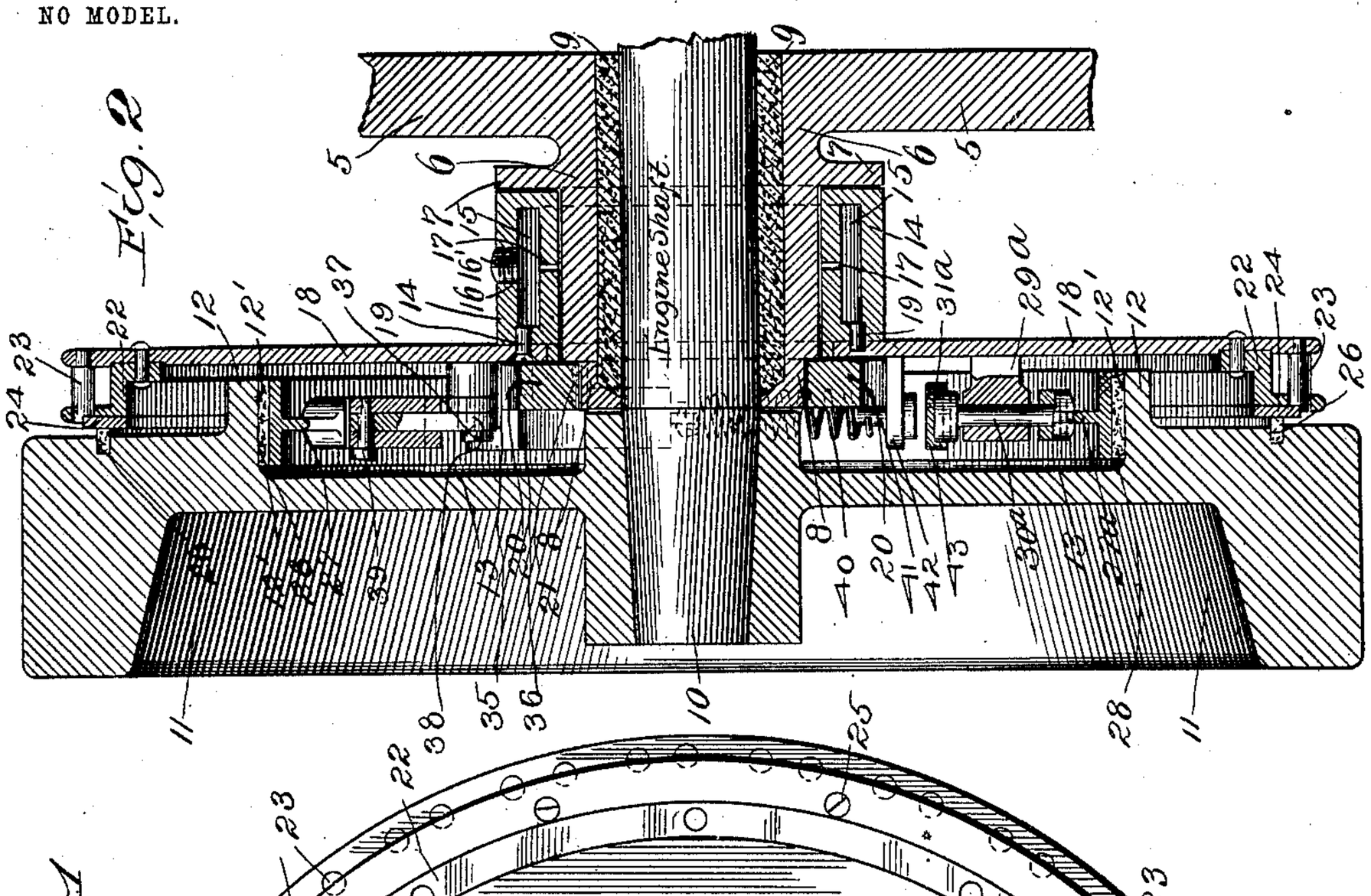
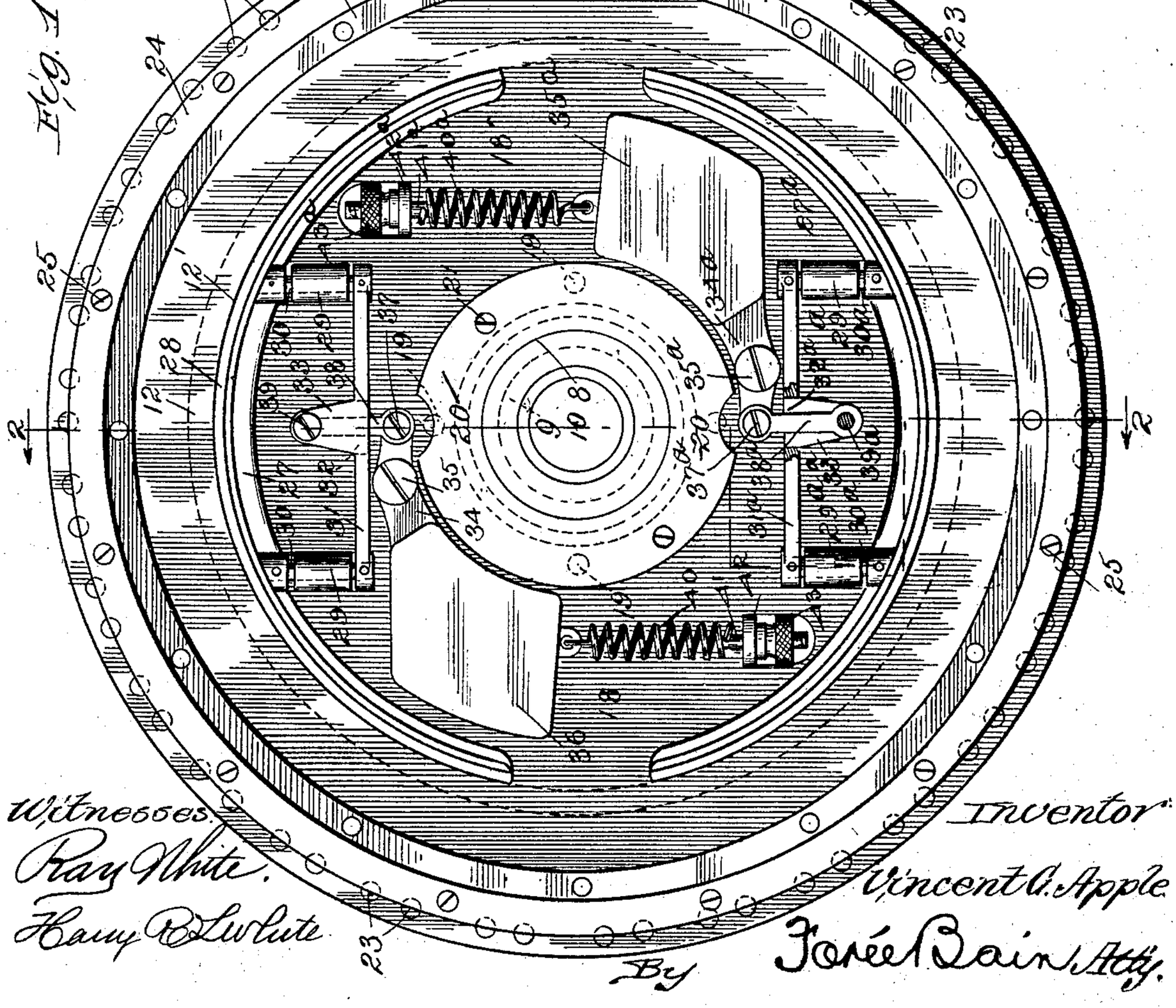


Fig. 1.



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No. 756,452. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

VINCENT G. APPLE, OF DAYTON, OHIO.

AUTOMATICALLY-GOVERNED DRIVING-WHEEL.

SPECIFICATION forming part of Letters Patent No. 756,452, dated April 5, 1904.

Application filed November 9, 1903. Serial No. 180,462. (No model.)

To all whom it may concern:

Be it known that I, VINCENT G. APPLE, of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Automatically-Governed Driving-Wheels; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

The primary object of my invention is to provide an improved automatically-governed driving-wheel adapted to coöperate with the fly-wheel or other moving part of a prime mover to transmit power to devices to be driven at a speed constantly at or below a given maximum.

In transmitting power from a variable-speed prime mover—such, for instance, as a gas-engine—to a device which has a definite speed rating beyond which it should not be driven—as, for example, a dynamo—it is advantageous to employ a power-transmitting instrumentality which is so governed that it cannot exceed a rate of speed consistent with the speed which it is advantageous to impart to the driven device. Further, it is highly advantageous to collocate the governed instrumentality with the prime mover rather than with the device to be driven, as in its first-mentioned position it is subject usually to a relatively lower speed of rotation than when associated with the driven device. In consequence the governor exercises its functions with greater precision, subject to less wear and under less strain than otherwise, and, further, the presence of an ungoverned high-speed part collocated with the dynamo is avoided, with obvious advantages of increased durability and the like. It is with a view to providing such a governed power-transmitting instrumentality adapted to be associated with the fly-wheel of an engine which will be simple and compact in construction and efficient in operation that my invention is designed.

In the drawings, wherein I have illustrated an advantageous embodiment of my invention, Figure 1 is a front elevation of the driving-wheel removed from the engine fly-wheel with which it is designed to coöperate. Fig. 2 is a section taken on line 2 of Fig. 1, showing the driving-wheel associated in proper relation with the coöperating engine parts.

In said drawings, wherein like numerals of reference refer always to like parts, 5 indicates a portion of an engine-casing provided with an outwardly-projecting hub 6, designed to interiorly receive and afford a bearing for an engine-shaft. Exteriorly the hub 6 is provided with an annular flange 7, disposed at a suitable distance from the outer or forward end thereof. At said forward end the hub is reduced, as shown at 8.

9 indicates a packing, of any suitable material, surrounding the engine-shaft 10, which projects through and beyond the hub.

11 indicates the engine fly-wheel, the forward or outer surface of which is of any suitable configuration and which is provided on its rear face with an annular flange 12, concentric with the axis of the wheel. The flange 12 has a smooth interior surface 12′ surrounding the rearwardly-opening recess 13 in the rear face of the wheel. Thus the fly-wheel, with its flange 12 and recess 13, is adapted to constitute one member of a friction-clutch.

14 indicates a sleeve mounted for rotation upon the portion of the hub 6 intermediate the flange 7 and the reduced portion 8 thereof.

15 is an oil-channel in the sleeve 14, extending circumferentially therethrough.

16 is an oil-hole extending from the channel 15 to the exterior of the sleeve and provided with a suitable stopper 16′.

17 17 indicate oil-holes extending from the channel 15 to the bearing-face of the sleeve.

18 indicates an imperforate disk of greater radius than the annular flange 12 of the fly-wheel, forming the body of the driving-wheel and secured to the sleeve 14, as by means of screws 19.

20 indicates a collar mounted for rotation upon the reduced portion 8 of the hub 6 and suitably secured to the sleeve 14, as by screws 21, to aid in maintaining the disk 18 in proper position. The outer periphery of the disk is arranged to carry a suitable rim or sprocket-teeth or the like, whereby it is adapted for use as a power-transmitting medium for belting, chains, or the like. In the present instance I have illustrated the disk as provided with an annular rim 22, bolted thereto near

its outer periphery and arranged, together with the disk, to carry a series of studs 23, which serve as sprocket-teeth to receive a chain.

24 indicates a ring arranged to secure the studs 23 in position, said ring being secured to the rim 22 by screws 25.

The relative positions of the driving-wheel disk 18 and the fly-wheel 11 are such that the edge of the annular flange 12 of the fly-wheel lies closely adjacent the outer face of the disk, while the outer or forward face of the ring 24 of the disk closely approaches the inner face of the fly-wheel 11. These parts may be brought so closely together as to be practically dust-tight, or to secure perfect inclosure of the parts within the recess 13 of the fly-wheel a packing-ring 26 may be interposed between the fly-wheel 11 and a proximate element of the friction-disk 18. Within the chamber formed by the recess 13 of the fly-wheel and the disk 18 is arranged mechanism constituting a clutch-governor carried by the driving-wheel disk.

27 and 27ª indicate two arc-shaped clutch-shoes corresponding in curvature with the face 12′ of the flange 12 of the fly-wheel 11. These shoes are arranged on diametrically opposite sides of the recess 13 and, with their associated devices, are exactly identical. Only the shoe 27 and its associated devices will be described, it being understood that the mechanism of the other shoe is identical in every respect with that described, like parts of the mechanism of the other shoe being indicated by like numerals of reference differentiated by the exponent symbol "a." The shoe 27 is provided with a frictional surface 28, of any suitable material, adapted to bear against the face 12′ of flange 12.

29 29 indicate bearing-lugs projecting from the face of the wheel 18 beneath the shoe 27.

30 30 indicate pins extending through said bearing-lugs, each at one end secured to the shoe 27 and at its other end secured to a cross-bar 31. The cross-bar 31 is centrally apertured, as shown at 32, and is provided with a pair of projecting parallel ears 33.

34 indicates a governor-arm, pivotally mounted on a stud 35, carried by the wheel 18. At one end said arm is weighted, as at 36, while the other shorter arm is pivoted, as at 37, to a radially-disposed link 38, whose opposite end is pivoted, as at 39, in the ears 33 of the cross-bar 31. The position of the governor-arm is such that when the weight 36 is moved inwardly toward the shaft the short arm of the lever is moved outward, forcing the shoe 27 radially outward, so that its friction-face 28 contacts with the inner surface 13′ of the fly-wheel flange 12. A spring is provided to normally hold the arm 36 in position to maintain such contact between the friction-clutch members, such spring being indicated as a coiled spring 40, at one end attached to the arm 36 and at its other end attached to an adjusting-screw 41, which extends through a bracket 42, projecting from the face of the disk 18. 43 indicates an adjustable nut mounted on said screw 41 and adjustable to vary the tension of spring 40.

The operation of the device will be as follows: The engine-shaft being rotated at any varying speeds will initially carry with it the disk 18 by reason of the engagement of the friction-shoes 27 and 27ª, carried by said disk, with the interior surface 12′ of the fly-wheel flange 12. As the speed of rotation of the engine-shaft increases, however, centrifugal action causes the weights 36 and 36ª to press outward against the tension of their respective springs, thereby tending to withdraw the friction-shoes from contact with the fly-wheel flange. Should the speed of the engine exceed a predetermined speed, determined by the adjustment of the springs 40, the centrifugal action will suffice to overcome the tension of said governor-springs to such an extent as to weaken the frictional engagement of the shoes with the rim or cause the complete withdrawal of said friction-shoe with the fly-wheel flange. Consequently the rim 12 slips more or less relative to the shoes or is entirely freed from them. The frictional contact of the clutch members will thus be continually controlled by the governor as long as the speed of rotation of the fly-wheel exceeds that consistent with the rated limit of the driving-wheel 18; but should the speed of the fly-wheel fall below such speed consistent with said predetermined rate the springs will restore the arms 36 to such position as to force the shoes again into contact with the fly-wheel flange. The driven wheel 18 is therefore adapted to rotate synchronously with the fly-wheel 11 at any speed less than a predetermined speed; but upon the fly-wheel 11 exceeding such predetermined speed the driving-wheel 18 will be prevented by the action of the governor from receiving an excessive speed of rotation from such fly-wheel.

Among the advantages incident to the structure herein described are simplicity of construction and economy of space and mechanism. By mounting the driving-wheel upon the hub of the engine-casing the driving-wheel may be employed without taking up any more space than has heretofore been given to the fly-wheel and the driving-wheel is afforded a solid bearing, The arrangement of the clutch-governor within a cavity formed in the fly-wheel also tends to economy of space, and the arrangement of the overlapping elements of the fly-wheel and driving-wheel provides for the clutch-governor a substantially dust-proof chamber, which may be made entirely dust-proof by the provision of suitable packing, if desired.

Numerous other advantages will be apparent to those skilled in the art.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent of the United States, is—

1. In combination with an engine-casing having an outwardly-projecting hub, a shaft extending through said hub, and a fly-wheel mounted on the shaft beyond said hub, of a driving-wheel mounted for rotation on the exterior of the engine-hub, and governed clutch devices adapted and arranged to connect said driving-wheel with the engine fly-wheel.

2. In combination with an engine-casing having an outwardly-projecting hub, a shaft extending through said hub, and a fly-wheel provided with a recess in its rear face, mounted on the shaft beyond the hub, of a driving-wheel mounted for rotation upon the exterior of the hub, and a governor-clutch carried by the driving-wheel arranged within the fly-wheel recess and adapted to coact with the fly-wheel to connect the driving-wheel with the engine fly-wheel.

3. The combination with an engine having a shaft, a fly-wheel mounted on said shaft, and a bearing-hub for the shaft adjacent the fly-wheel, of a driving-wheel mounted for rotation on the said hub, and governor-clutch devices carried by the driving-wheel adapted and arranged to coact with the engine fly-wheel to connect the driving-wheel with said fly-wheel for rotation therewith.

4. In combination with an engine having a shaft, a fly-wheel mounted on said shaft and provided with a recess in its face, and a bearing for the shaft adjacent the fly-wheel, of a driving-wheel, comprising an imperforate disk mounted for rotation on the exterior of the shaft-bearing and arranged to overlie the recess in the fly-wheel to form therewith a substantially closed chamber, and governor-clutch devices carried by the driving-wheel arranged to coact with the fly-wheel to afford connection between the said fly-wheel and said driving-wheel.

5. In combination, a constantly-rotating driven wheel, having a recess in one face, a driving-wheel comprising an imperforate disk loosely mounted coaxially therewith and arranged to overlie the recess to form therewith a substantially closed chamber, friction-shoes, as 27, arranged and adapted for frictional contact with the interior face of the recess, pins, as 30, carrying said shoes, guides, as 29, for said pins, carried by the driving-wheel disk, and centrifugal governor devices carried by the disk and operatively connected with said pins 30.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

VINCENT G. APPLE.

In presence of—
N. H. KELLEHER,
LILLIE WELLS.