A. KINDBERG.

SPEED GOVERNOR.

APPLICATION FILED AUG. 26, 1910.

1,029,302. Patented June 11, 1912.

Fig. 1.

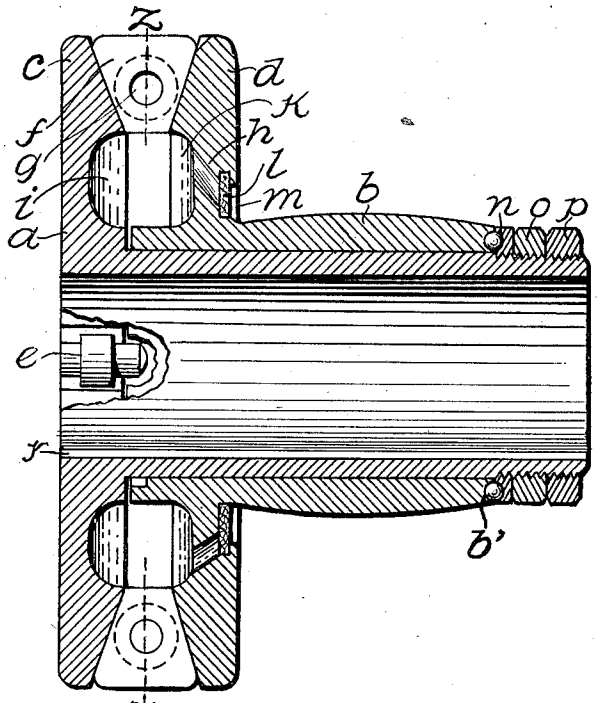
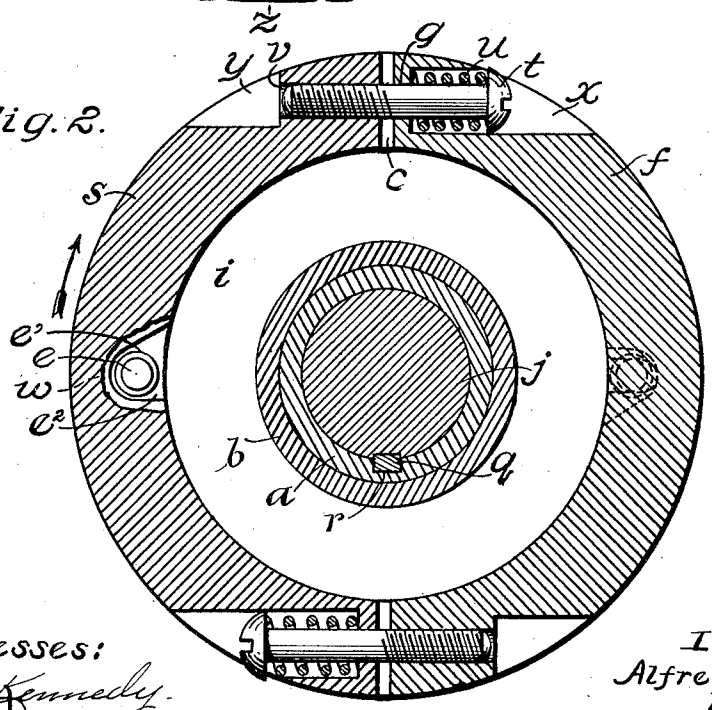


Fig. 2.



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UNITED STATES PATENT OFFICE.

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SPEED-GOVERNOR.

1,029,302. Specification of Letters Patent. Patented June 11, 1912.

Application filed August 26, 1910. Serial No. 579,062.

To all whom it may concern:

Be it known that I, ALFRED KINDBERG, a citizen of the United States of America, and a resident of Rockwell City, Calhoun county, Iowa, have invented certain new and useful Improvements in Speed-Governors, of which the following is a specification.

My invention relates to improvements in speed-governors, and the object of my improvement is to provide a compact and easily regulated governor, adjustable for variations of speed, and quickly responsive to the forces brought to bear upon it. This object I have accomplished by the means which are hereinafter described and claimed, and which are illustrated in the accompanying drawings, in which:

Figure 1 is a central vertical axial section of my improved speed-governor, parts being broken away to better disclose parts of the construction. Fig. 2 is a vertical transverse section of said governor, taken along the line *z*—*z* in Fig. 1.

Similar characters of reference designate corresponding parts throughout the several views.

Upon a rotary shaft *j* a bushing *a* is secured by means of a key *q* inserted in the keyway *r*. Upon the outer cylindrical surface of said bushing is movably seated a sleeve *b*. The right-hand end of the bushing *a* has on a part of its outer surface adjacent to said end exterior threads adapted to receive an adjusting-nut *n* and the lock-nuts *o* and *p*. The sleeve *b* is longitudinally adjustable along said bushing, the lock-nut *n* fixing its location thereon adjustably. Both the said bushing and said sleeve have opposed annular flanges *c* and *d* respectively, spaced apart to receive sectional governor-weights *f* and *s* therebetween. The contacting faces of said weights and of the said flanges are beveled with similar slopes extending outwardly, to permit of the weights being projected outwardly when under the stress of centrifugal force. The weights may be made in any desired number, but I have shown but two, *f* and *s*, together completing a bi-partite ring concentric with said shaft.

The weights *f* and *s* are elastically connected in the following manner. The adjacent ends of said weights have large alined openings *y* and *x* respectively, also communicating alined openings *v* and *g* respectively, the opening *v* being interiorly threaded in each case to receive the threaded part of an adjusting-screw *t*, the opening *g* being left smooth to permit said screw to slide therein. In each case, a coiled compression-spring *u* is seated about the shaft of each screw *t*, between the screw-head and the inner closure-wall of the larger inclosing opening *x*. The tension of said spring may be varied by turning said screw *t*. To limit the inward movement of said weights the flanges *c* and *d* on the bushing *a* and sleeve *b* are forced toward each other and held in the adjusted position by the said lock-nuts. When these flanges are thus forced toward each other, the weight-parts *f* and *s* are forced outwardly, moving easily along the beveled flanges *c* and *d*. The adjustment of the lock-nuts thus variably limits the minimum speed, while the adjustment by varying the tension of the springs *u* between the weights *f* and *s*, variably regulates the maximum speed. To operatively connect the flange *c* of said bushing *a* and said weights *f* and *s*, they are provided with alined openings parallel with the shaft *j*, the openings in the weights being of a proper size to fit the ends of the pins *e*, while the openings in the flange *c* are longer in a radial direction from said shaft to permit of the movement outward of said weights while at the same time fixing a limit to their outward throw. As shown in Fig. 2, the part of each opening e^2 in said flange is made wider on its inner side nearest said shaft, by inclining the forward wall of the opening in the direction of rotation of the shaft as shown by the arrow in said figure. The opening e^2 is so widened, in order to provide room for the pin *e*, the latter bearing an anti-friction concentric movable sleeve e^1, so that when sudden increases of speed occur in the shaft *j*, the action of said pin *e* in relation to the weight in which its end is inserted is modified to break the sudden jar by reason of such pin sliding along the inclined forward wall of the opening e^2. The weights are therefore pushed out more gradually than if there were no such intermediate means for removing the shock of sudden changes of speed, such as are produced in an internal-combustion engine because of the power-strokes therein.

I have shown the opposed surfaces of the flanges *c* and *d* within the beveled parts, or rather between such beveled parts and the respective supporting bodies *a* and *b*, annularly hollowed out at *i* and *k* to provide a ring-shaped space adapted to receive oil from the conduits *h*, the latter being formed in the flange *d* and inclined toward the weights *f* and *s* so that the centrifugal force may direct the lubricant outwardly toward the bearing surfaces of said flanges and weights. The conduits *h* communicate between said oil-space and a ring-shaped groove *m* on the outer face of the flange *d*, concentric therewith. In said groove *m* is removably seated a porous washer or ring *l* of felt or other suitable substance which receives oil injected into said groove and holds it, permitting the lubricant to ooze slowly into the conduits *h* under the influence of centrifugal force. The oil-can spout may be inserted in the groove *m* when the shaft is in motion to furnish lubricant to said felt-ring *l* at any time.

The above described means give the governor a nice adjustment for varying its limits of speed, and cause it to be quickly responsive without shocks upon the moving or connected parts.

I have shown at b^1 anti-friction balls seated between the ring-sleeve *b* and the nut *n*, but such anti-friction means may be located between some other part of said sleeve and the contacting part of the ring *a* or its sleeve, as desired. The outer curved surface of the cylindrical sleeve *b* is a drive-pulley adapted to actuate a driven-pulley by means of a belt (not shown). The lock-nuts *n*, *o*, *p* may be adjusted to cause the flange or ring *d* and the contacting weights *f* and *s* to act as a species of friction-clutch, permitting slippage at a predetermined maximum of speed of the weights, or while making an adjustment of said nuts.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In combination, a rotary shaft, a bushing fixed thereon and having an integral flange beveled on one side, a sleeve rotatably and slidably mounted on said bushing and provided with an exterior pulley surface and with an integral flange similar to the other said flange with a similar bevel on its face which is adjacent to the beveled face of the other flange and spaced apart therefrom, elastically-connected governor-weights located oppositely about said shaft and having their opposite faces beveled to fit the abutting beveled faces of said flanges and adapted to contact frictionally therewith, means for varying the tension of the elastic connections between said weights to limit their outward movement, and means for adjustably securing said sleeve upon said bushing to cause its beveled flange to more or less compress the weights between itself and the other beveled flange to adjustably vary the inward limit of play of said weights.

2. In combination, a rotary shaft, a beveled ring secured thereon, another beveled ring movably seated about said shaft, said rings having annular hollows combined to form an oil-chamber concentric with the shaft, one of said rings having a circular hollow in its outer face in communication with the said oil-chamber, an absorbent gasket in said last-mentioned hollow adapted to deliver oil gradually to said chamber, and elastically-connected governor-weights conformed to and seated movably upon the bevels of said rings.

3. In combination, a rotary shaft, a bushing secured thereon having a beveled flange, a sleeve movably seated upon said bushing and having a like beveled flange, elastically-linked governor-weights fitted movably in contact with the beveled faces of said flanges, said weights and said fixed flange having alined communicating sockets, a pin seated in each pair of alined sockets, the sockets in the flange being radially of larger dimensions than the diameters of the pins therein and wider near the shaft with the forward wall of each sloped forwardly to permit the inclosed pins to slide therealong and form differential connections to gradually overcome the inertia of the parts to be driven.

Signed at Waterloo, Iowa, this 8th day of Aug. 1910.

ALFRED KINDBERG.

Witnesses:
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