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G. LIDSEEN & L. L. BLAKE.

SPEED GOVERNOR.

APPLICATION FILED SEPT. 18, 1906.

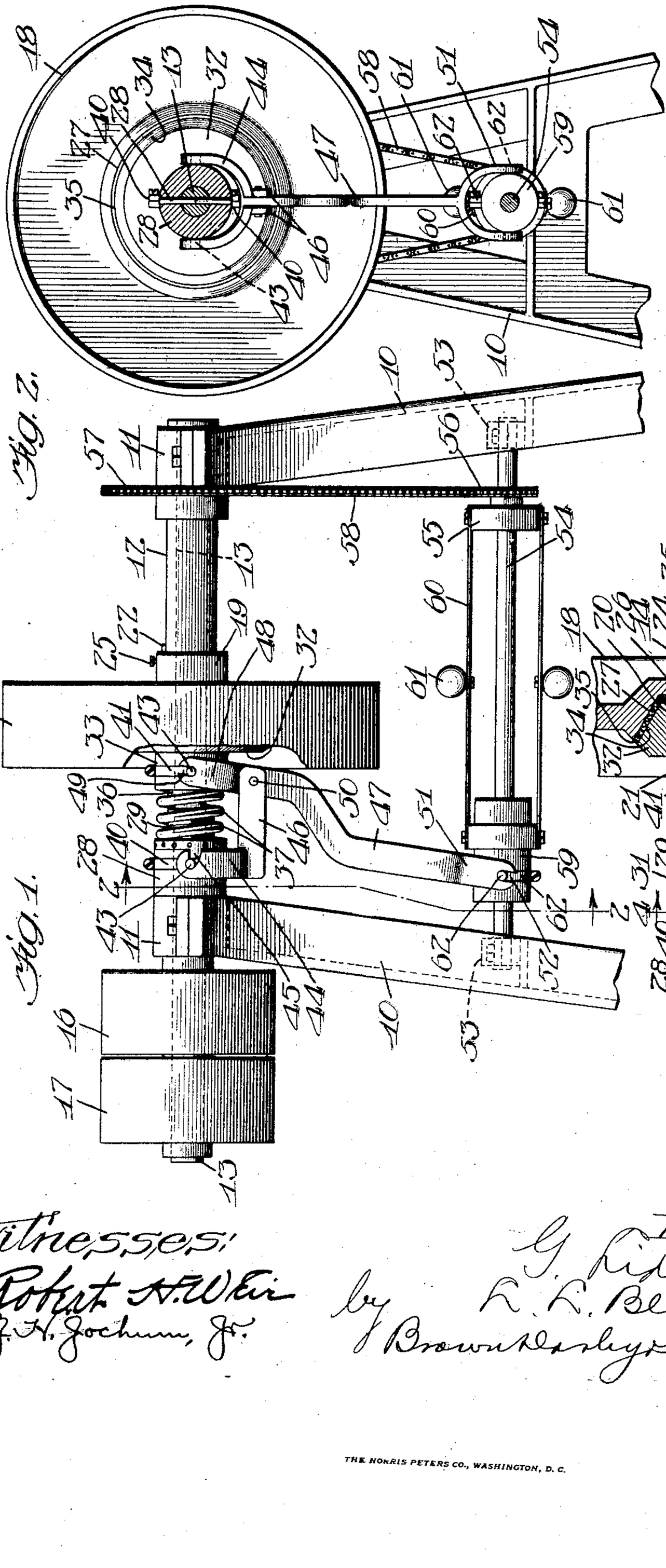

Fig. 2.

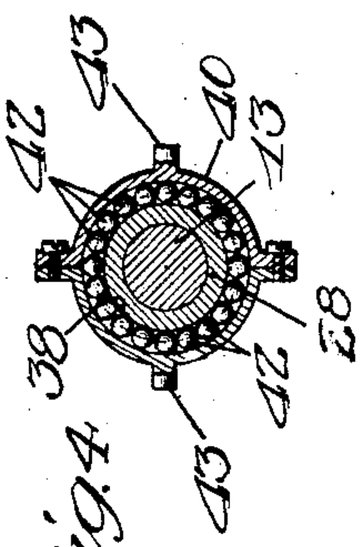

Fig. 4.

Fig. 1.

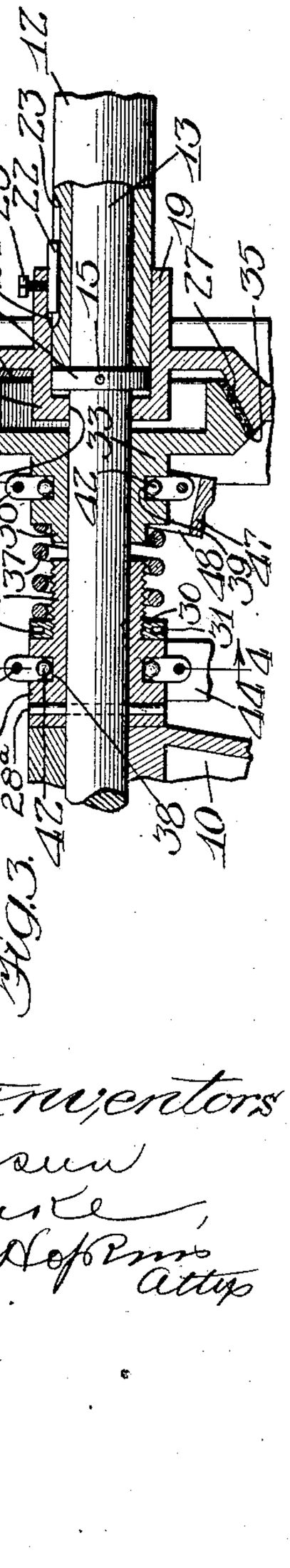

Fig. 3.

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UNITED STATES PATENT OFFICE.

GUSTAVE LIDSEEN AND LUDWIG L. BLAKE, OF CHICAGO, ILLINOIS; SAID LIDSEEN ASSIGNOR TO SAID BLAKE.

SPEED-GOVERNOR.

No. 866,795. Specification of Letters Patent. Patented Sept. 24, 1907.

Application filed September 18, 1906. Serial No. 335,078.

To all whom it may concern:

Be it known that we, GUSTAVE LIDSEEN and LUDWIG L. BLAKE, citizens of the United States, residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Speed-Governors, of which the following is a full, clear, and exact specification.

This invention relates to improvements in speed governors or devices of that character particularly adapted for regulating or converting an irregular speed derived from any source of power into a regular and uniform power.

A further object is to construct an improved device of this character which may be set to a pre-determined speed.

A further object is to construct an improved device of this character provided with a plurality of shafts with interposed coöperating clutch members carried by the respective shafts, which will permit one of the shafts to rotate at a greater rate of speed than the other shaft.

A further object is to provide an improved device of this character comprising a plurality of shafts with interposed clutch mechanism so disposed with relation to each other that the two shafts will be driven in unison up to a pre-determined rate of speed, and which will permit one of the shafts to rotate independently of the other to the extent of any excess rate of speed which may be transmitted to the said shaft.

A further object is to construct an improved device of this character, which will be simple and cheap in construction and effective in operation.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawing illustrating an exemplification of the invention and in which:—

Figure 1 is an elevation, partly broken away, of a governor embodying the principles of the invention; Fig. 2 is a sectional view on line 2—2 of Fig. 1; Fig. 3 is a detail longitudinal sectional view of the movable clutch member and its controlling mechanism; Fig. 4 is a detail sectional view on line 4—4 of Fig. 3.

Referring more particularly to the drawing and in which the same reference characters designate similar parts throughout the several views, the numeral 10 designates the supporting standards of a suitable frame provided with bearings 11 preferably located at the upper ends thereof. Journaled in the bearing of one of the standards is one end of a hollow or tubular shaft 12 which projects inwardly and terminates at a point substantially midway of the standards. A shaft 13 is journaled in the bearing in the other standard, and extends loosely through the tubular or hollow shaft 12, and terminates substantially flush with the outer end of the said shaft 12.

A flange or collar 14 surrounds the shaft 13 and is secured thereto adjacent the end of the tubular shaft 12 in any suitable manner, such as by means of a pin or bolt 15. This flange or collar 14 is of a diameter substantially equal to the diameter of the adjacent end of the shaft 12 and serves as a means to retain the two shafts in their relative position. The ordinary fast and loose pulleys 16—17 are secured to the shaft 13, and are preferably located on the outside of the standards. A pulley or belt wheel 18 is provided with a tubular hub 19, one end of which is closed as at 20 and provided with an aperture 21, of a diameter slightly larger than the diameter of the shaft 13, and through which said shaft passes. The inner end of the shaft 12 is adapted to enter the open end of the tubular hub 19, and said hub 19 and axle 12 are secured together in any desired or suitable manner, such as by means of a key 22 which is adapted to be seated in coöperating grooves or seats 23—24, respectively, in the shaft 12 and the hub 19, and said key is held from longitudinal displacement preferably by means of a fastening or securing screw or bolt 25. When in position the flange or collar 14 will be located between the closed end of the hub 19 and the end of the shaft 12, and if desired any suitable anti-friction means (not shown) may be interposed between the end 20 of the hub 19 and the end of the shaft 12. The pulley 18 is preferably recessed around the hub 19, as at 26 to form a clutch face 27.

A sleeve or collar 28 is keyed to the shaft 13, preferably adjacent the standard on the side of the pulley adjacent the clutch face 27, by means of a key or pin 28^a, and said sleeve or collar is provided with a reduced threaded portion 29 adjacent the pulley 18, and mounted for rotative adjustment on this reduced portion is a collar or plate 30 which is preferably provided with peripheral wrench seats 31, by means of which the same may be adjusted for a purpose to be set forth. An adjustable clutch member 32 is provided with a hub 33 which surrounds the shaft 13 and said member is provided with an active edge 34 adapted to coöperate with the edge 27 of the pulley 18. If desired a suitable material 35 may be secured to the face of one of the clutch members, preferably the member 32. The hub 33 is provided with a reduced portion 36 adjacent to and preferably of a diameter equal to the diameter of the reduced threaded portion 29 of the sleeve or collar 28. An expansion spring 37, preferably in the shape of a coil is disposed between the hub 33 and the adjustable plate or member 30, with its ends engaging these parts and surrounding the reduced por-

tions 29—36, and said spring exerts its strain upon the clutch member 32 to normally hold the clutch faces 27—32 into operative engagement and with sufficient friction as to cause the parts to rotate in unison under normal conditions.

The sleeve or collar 28 and the hub 33 are provided respectively with a circumferential groove 38—39, and seated within these grooves are collars 40—41, preferably provided with a plurality of balls 42, to reduce the friction, and each of the collars are provided with diametrically opposite lateral projecting lugs or ears 43.

A yoke 44 provided with slots 45 in the arms thereof is adapted to surround the sleeve or collar 28 in such a manner as to engage and be supported by the lugs or ears 43 on the sleeve or collar 28. The body portion 46 projects towards the pulley or belt wheel 18 and terminates preferably adjacent the clutch member 32. An arm or lever 47 having a yoked end 48 comprising arms is adapted to partially surround the collar 41, and said arms are preferably provided with open recesses 49 adapted to receive the lugs or ears 43 of the collar 33. This arm or lever 47 is pivotally supported as at 50 to the body portion 46 of the yoke 44, the free end of said arm or lever projects preferably below the shafts 12—13 and terminates in a yoked extremity, the arms 51 of which are provided with recesses 52.

Journaled in suitable bearings 53 secured to the standard, preferably below the bearings 11, is a shaft 54 to which is secured a collar 55 and secured to the collar is a sprocket wheel 56. A corresponding sprocket 57 of a larger diameter is secured to the shaft 12, and passing around said sprockets is a chain or belt 58. Loosely mounted upon the shaft 54 is a sliding sleeve or collar 59, and this collar is connected to the stationary sleeve or collar 55, by means of flexible members or strips 60, such as springs, and secured to these members, preferably intermediate the collars 55—59 are suitable weights 61. The sleeve or collar 59 is provided with a supplemental collar 62 loosely surrounding the same and provided with laterally projecting ears or lugs 62 which are adapted to enter and stand within the recesses 52.

In operation the collar or plate 30 is first adjusted to secure the desired tension on the spring 37, and the proper degree of friction between the clutch faces 34—27 according to the speed it is desired to drive the shaft 12 and the pulley 18. The belt (not shown) is shifted from the loose pulley 17 to the fast pulley 16, which will drive both of the shafts 12—13. These two shafts will continue to rotate in unison until the clutch faces are automatically separated. When the shaft 12 is rotated, but at a much greater rate of speed on account of its being "geared up" from the shaft 12 the shaft 54 will also be rotated. As the shaft 54 rotates the governor balls 61 will be thrown out by centrifugal force against the tension of the flexible members 60, thereby tending to draw upon the collar or sleeve 59 to move the same upon the shaft 54, to rock the arm or lever 47. Under normal conditions, the spring 37 will hold the clutch faces 34—27 together to overcome the centrifugal force of the weights 61, but when the speed of the driven shaft 12 increases beyond the desired speed limit, the extra centrifugal force of the weights 61 will overcome the tension of the spring 37, and will draw the collar or sleeve 59 along the shaft 54. This action will rock the arm or lever 47 upon its pivot 50 causing the arms 48 thereof to draw the clutch member 33 back to disengage the clutch faces 34—27. The parts will remain in this position until the shaft 12 has acquired the desired speed. The spring 37 will then be strong enough to overcome the centrifugal force of the weights 61, and the arm or lever 47 will draw the collar or sleeve 59 back along the shaft 54, while the clutch member will assume its operative position. Thus it will be seen that this improved governor will be automatic in operation and may be used to equalize and produce a steady and uniform power from any irregular source, the clutch being controlled by the governor, which latter rotates at a greater rate of speed than the uniform power, a more sensitive governor will be produced which will effectively operate the clutch to release the irregular power under varying conditions of the load on the uniform power.

In order that the invention might be fully understood, the details of an embodiment thereof have been thus specifically described, but

What I claim is:—

1. In a device of the class described, the combination of a driving and a driven shaft, coöperating clutch members respectively on said shafts, yielding means for normally holding said members in engagement, a governor separate from the shafts and operative connections respectively between the governor and the driven shaft and the clutch member of the other shaft, said governor being adapted to move said clutch member against the tension of the yielding means to permit the driving shaft to rotate at a greater rate of speed than the driven shaft.

2. In a device of the class described, the combination of a driving and a driven shaft, coöperating clutch members respectively on said shafts, yielding means for normally holding said members in engagement, a governor separate from the shafts, operative connections respectively between the governor and the driven shaft and the clutch member of the other shaft, said governor being adapted to move said clutch member against the tension of the yielding means to permit the said other shaft to rotate at a greater rate of speed than the driven shaft, and means for varying the tension of said yielding means.

3. In a device of the class described, the combination of a driving and a driven shaft, clutch members on said shafts, one of said members being movable, a collar secured to the driving shaft, yielding means disposed between said collar and the movable clutch member for normally holding said clutch member in engagement with the clutch member of the driven shaft, a governor separate from the shafts, operative connection between the governor and the driven shafts and between the governor and the movable clutch member for moving said clutch member against the tension of the yielding means to permit the driving shaft to rotate at a greater rate of speed than the driven shaft.

4. In a device of the class described, the combination of a driving and a driven shaft, clutch members respectively on said shafts, one of said members being movable with relation to its shaft, a sleeve secured to the driving shaft, an adjustable collar on said sleeve, yielding means disposed between and with its ends respectively engaging the collar and the movable clutch member for normally holding said movable clutch member into engagement with the other member, a governor separate from the shafts, a connection between the clutch member and the governor, and a connection between said governor and the driven shaft for operating the governor to move the clutch member against the tension of the yielding means to permit the driving shaft to rotate at a greater rate of speed than the driven shaft.

5. In a device of the class described, the combination of concentric driving and driven shafts, coöperating clutch members respectively on said shafts, a sleeve on the driving shaft, an adjustable collar on said sleeve, the clutch mem-

ber on said shaft being longitudinally movable, a spring surrounding said shaft, the ends of said spring respectively engaging the movable clutch member, and the collar for normally holding said member in engagement with the other clutch member, a governor, independent of the shafts, an operative connection between the governor and the driven shaft, and means operated by the governor for moving the movable clutch member against the tension of the spring to permit the driving shaft to rotate at a greater rate of speed than the driven shaft.

6. In a device of the class described, the combination of concentric driving and driven shafts, coöperating clutch members respectively on said shafts, a sleeve on the driven shaft, an adjustable collar on said sleeve, the clutch member on the driving shaft being longitudinally movable, a spring surrounding the shaft and disposed between the collar and the movable clutch member for normally holding said member in engagement with the other clutch member, a governor separate from said shafts, a pivoted lever one end of which is connected to the movable clutch member, the other end being connected to the governor, and an operative connection between the driven shaft and the governor, whereby the excess of speed of the driven shaft will operate the governor to move the clutch member against the tension of the spring.

7. In a device of the class described, the combination of concentric driving and driven shafts, coöperating clutch members respectively on said shafts, a sleeve on the driving shaft, an adjustable collar on said sleeve, the clutch member on the driving shaft being longitudinally movable, a spring surrounding the shaft and disposed between the collar and the movable clutch member for normally holding said member in engagement with the other clutch member, a governor separate from the shafts, a supporting yoke, a lever pivoted between its ends to the yoke, one end of said lever being connected to the movable clutch member, the other end being connected to the governor, and an operative connection between the driven shaft and the governor, whereby the excess of speed of the last said shaft will operate the governor to move the clutch member against the tension of the spring.

8. In a device of the class described, the combination of concentric driving and driven shafts, coöperating clutch members respectively on said shafts, a sleeve on the driving shaft, said sleeve being provided with a reduced threaded portion, a collar on said threaded portion, the clutch member on the last said shaft being longitudinally adjustable, a spring surrounding the threaded portion, one end of said spring engaging the collar and the other end engaging the clutch member a yoke supported by the sleeve, a lever pivotally supported by the yoke, one end of the lever engaging the clutch member, a governor separate from said shafts, an operative connection between the governor and the other end of the lever, and an operative connection between the driven shaft and the governor, the centrifugal motion of the governor being adapted to rock the lever to move the clutch member against the tension of the spring to permit the driving shaft to rotate at a greater rate of speed than the driven shaft.

9. In a device of the class described, the combination of a tubular shaft, a clutch member sleeved upon one end of the shaft, means for securing said member to the shaft, a second shaft passing through the first shaft and projecting beyond the end of the first shaft to whiich the clutch member is secured, a longitudinally movable clutch member on the second shaft, a sleeve also on said shaft, a spring interposed between the sleeve and the last said clutch member for holding the latter normally in frictional engagement with the first clutch member, a governor separate from the shafts, an operative connection between the tubular shaft and the governor, and means engaging the movable clutch member and controlled by the governor, adapted to move said clutch member against the tension of the spring to release the shafts and permit one of the shafts to rotate at a greater rate of speed than the other shaft.

10. In a device of the class described, the combination of a tubular shaft, a clutch member sleeved upon one end of the shaft, means for securing said member to the shaft, a second shaft passing through the first shaft and projecting beyond the end of the first shaft to which the clutch member is secured, a longitudinally movable clutch member on the second shaft, a sleeve also on said shaft, a spring interposed between the sleeve and the last said clutch member for holding the latter normally in frictional engagement with the first clutch member, a governor independent of the shafts an operative connection between the tubular shaft and the governor, a connection between the govenor and the movable clutch member, adapted to move the clutch member against the tension of the spring to release said shafts and permit the second shaft to rotate at a greater rate of speed than the tubular shaft, and means for adjusting the tension of the spring to vary the friction of the clutch members.

11. In a device of the class described, the combination of a driving and a driven shaft, coöperating clutch members respectively on said shafts for locking the shafts to rotate in unison, a governor shaft, separate from the first said shafts gearing connecting the governor shaft with the driven shaft, and means controlled by the governor shaft and engaging the clutch member on the driving shaft, adapted to unlock the shafts when the driven shaft is rotated beyond a predetermined speed to permit the driving shaft to rotate independently of said driven shaft.

12. In a device of the class described, the combination of a driving and a driven shaft, coöperating clutch members on said shafts, a collar secured to the driving shaft, a yielding member disposed between the collar and the respective clutch member, a yoke removably engaging the collar, a governor supported independently of the shaft, a lever pivoted between its ends to the yoke, one end of said lever being removably pivoted to the clutch member on the driving shaft, the other end being pivotally connected with the governor, and gearing connecting the driven shaft and the governor for causing the governor to release the clutches when the driven shaft is rotated beyond a predetermined speed.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 15th day of September A. D. 1906.

GUSTAVE LIDSEEN.
LUDWIG L. BLAKE.

Witnesses:
J. H. JOCHUM, Jr.,
E. C. SEMPLE.