No. 758,323. PATENTED APR. 26, 1904.

D. L. LINDQUIST.

FRICTION GEAR.

APPLICATION FILED SEPT. 11, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

FIG. 1.

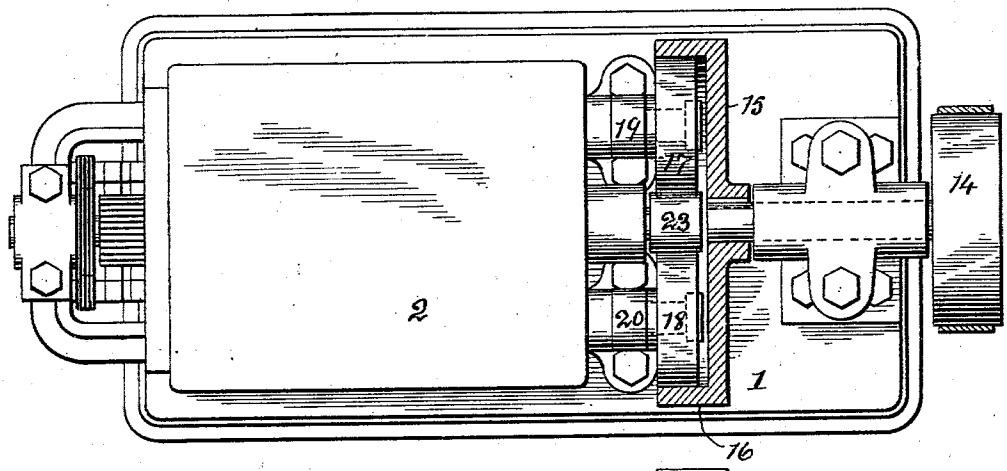


FIG. 2.

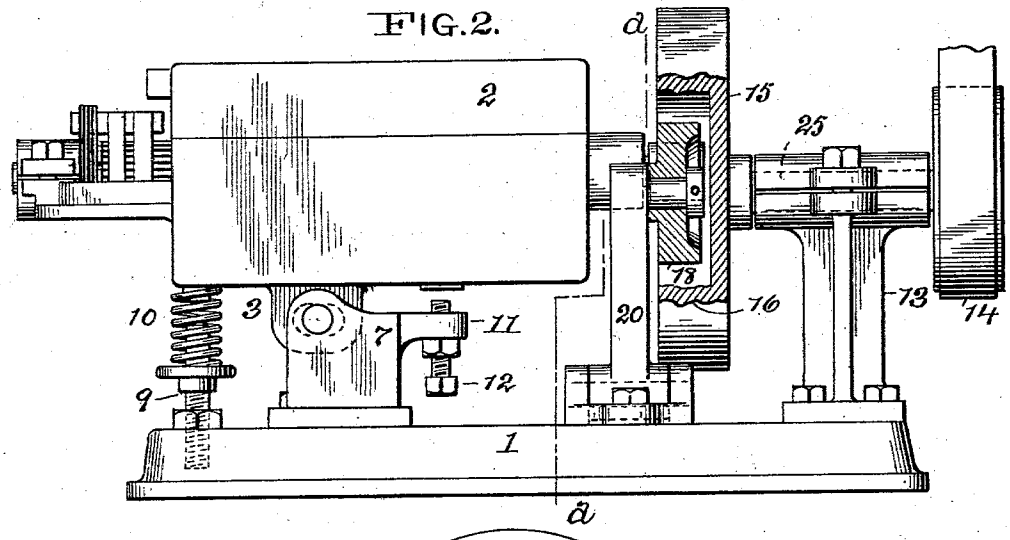
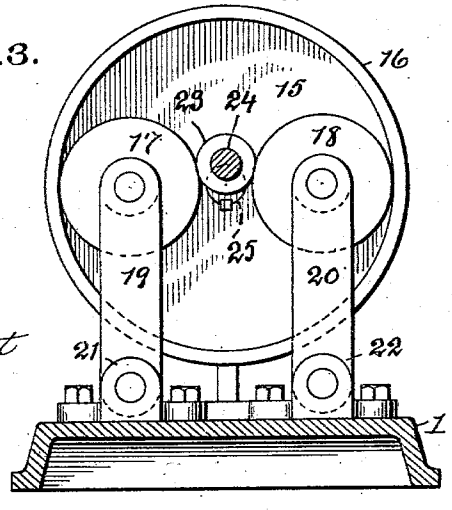


FIG. 3.



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NO MODEL. 3 SHEETS—SHEET 2.

FIG. 4.

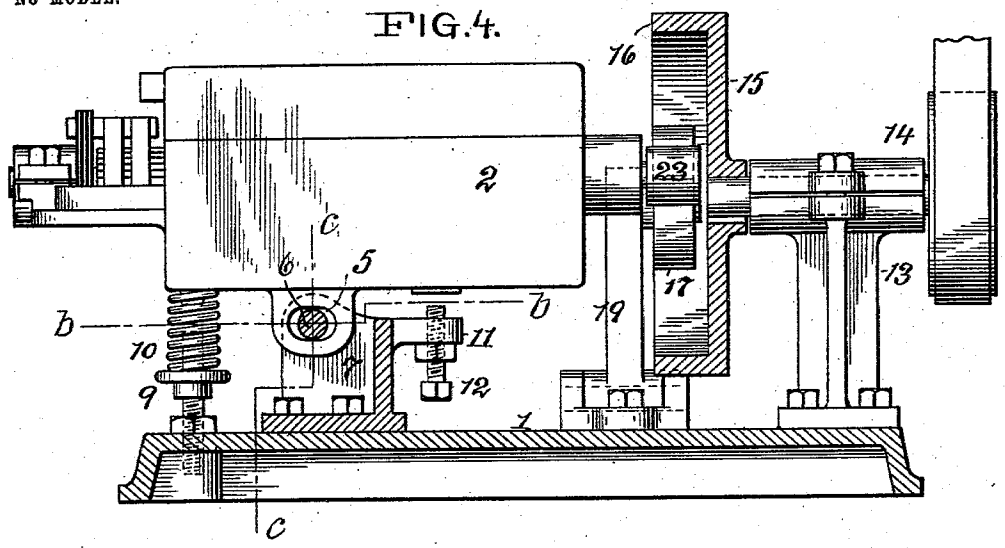


FIG. 5.

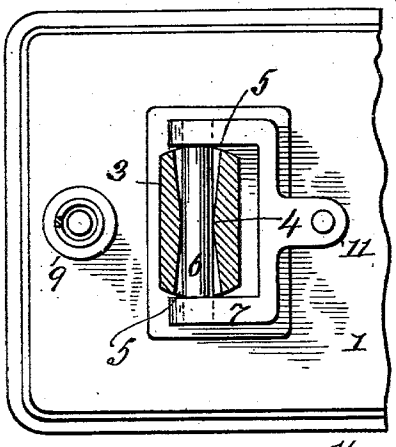


FIG. 6.

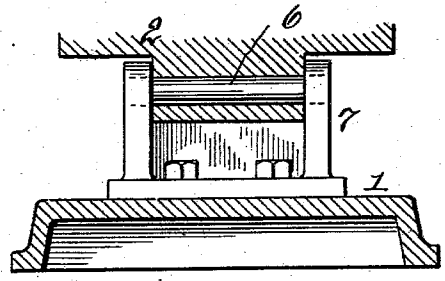
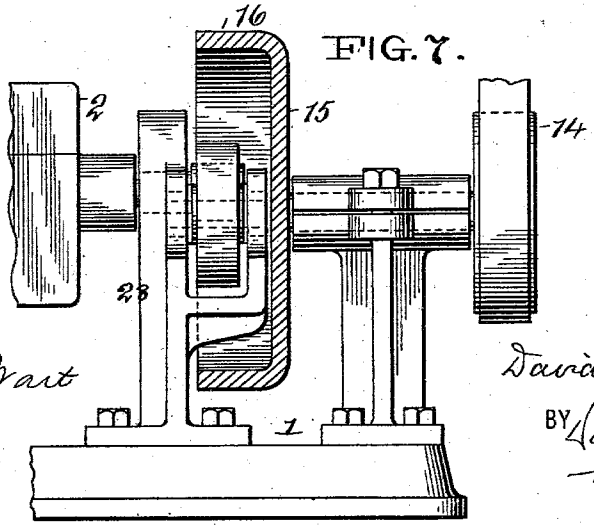


FIG. 7.



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NO MODEL. 3 SHEETS—SHEET 3.

FIG. 8.

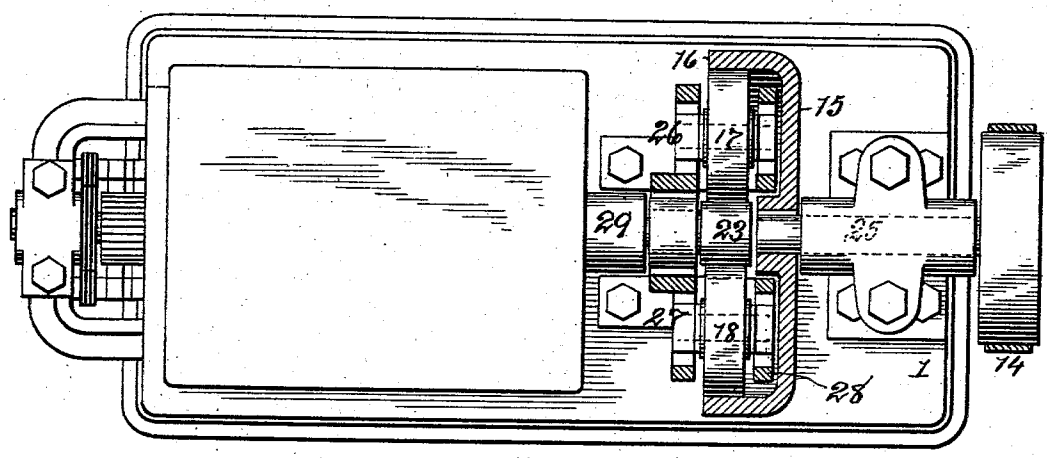


FIG. 9.

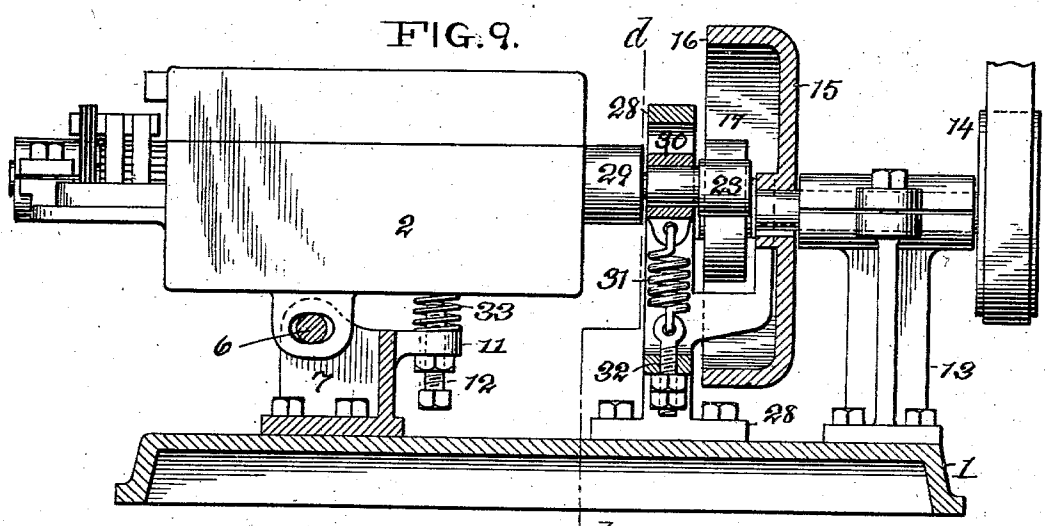
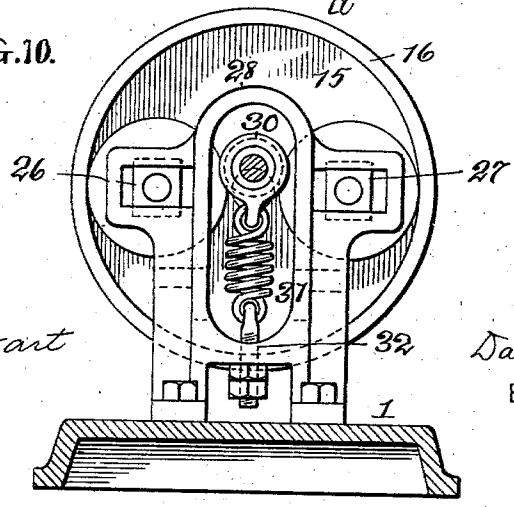


FIG. 10.



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No. 758,323. Patented April 26, 1904.

UNITED STATES PATENT OFFICE.

DAVID LEONARD LINDQUIST, OF YONKERS, NEW YORK.

FRICTION-GEAR.

SPECIFICATION forming part of Letters Patent No. 758,323, dated April 26, 1904.

Application filed September 11, 1903. Serial No. 172,795. (No model.)

To all whom it may concern:

Be it known that I, DAVID LEONARD LINDQUIST, a subject of the King of Sweden and Norway, and a resident of Yonkers, Westchester county, New York, have invented a new and useful Improvement in Friction-Gear, of which the following is a specification.

The invention relates to a friction-gear applicable to the driving of belt-pulleys, hoisting apparatus, and a great variety of other purposes.

The object of the invention is to simplify friction-gear mechanism by reducing the number of parts and by causing the frictional contact to occur between right cylindrical surfaces.

The invention consists in the various combinations and mechanisms more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of my apparatus. Fig. 2 is a side elevation thereof, showing one of the rollers and the friction-track in section. Fig. 3 is a section on the line *a a* of Fig. 2. Fig. 4 is a similar view to Fig. 2, showing the friction-track and bed-plate in section. Fig. 5 is a horizontal section on the line *b b* of Fig. 4. Fig. 6 is a vertical section on the line *c c* of Fig. 4. Fig. 7 represents a modification of the friction-gear, the friction-track being in section. Figs. 8, 9, 10 illustrate the same modification combined with a further modification in the spring-adjusting devices, Fig. 8 showing a horizontal section, Fig. 9 a vertical longitudinal section, and Fig. 10 a vertical transverse section on the line *d d* of Fig. 9.

Similar numbers of reference indicate like parts.

Referring first to the form of my apparatus shown in Figs. 1 to 6, inclusive, 1 is the bed-plate, and 2 the casing, of an electric motor supported thereon. On the lower side of said casing is a lug 3, having an opening the cross-section of which is circular midway its length, as shown at 4, Fig. 5, and approximately elliptical at the ends, as represented at 5. The cylindrical pivot-pin 6 passes through said opening and through openings in the bracket 7, secured on the bed 1. By reason of this construction the motor may be tilted in a vertical plane around the pivot-pin as an axis and may also be turned in a horizontal plane, so far as the elliptical openings 5 will permit, around a vertical axis passing through the middle point 8 of said pin. It is thus supported on a universal joint. In the bed 1 is an adjustable screw-stop 9, between which and the motor is interposed a helical spring 10. On the opposite side of the motor-pivot and projecting from the bracket 7 is an arm 11, which carries an adjustable screw-stop 12. By adjusting the screws 9 and 10 the inclination of the motor in either direction in a vertical plane may be limited. Supported in a standard 13 on the bed-plate is a shaft 25, carrying at one end the belt-pulley 14 and at the other end the pulley 15, having a flange 16, the inner periphery of which forms a friction-track for the two rollors 17 and 18. Said rollers are journaled at the upper ends of arms 19 20, which at their lower ends are pivoted in lugs 21 22 on the bed-plate. Between said rollers is a pulley 23, fast on the motor-shaft 24. The motor-shaft 24 is not in line with the friction-pulley shaft 25, the center of the motor-shaft being above the center of the pulley-shaft, as shown in Fig. 3. Any downward movement of the pulley 23 therefore tends to force said pulley between the rollers 17 18 and to set said rollers outwardly through the swinging of their supporting-arms 19 20, thus augmenting their frictional engagement with the inner periphery of the flange 16 on pulley 15. The position of the pivot-lug 3 is such that the motor has preponderance on the side at which the pulley 23 is located, so that said preponderance tends in the manner described to wedge the pulley 23 between the rollers 17 18. In order to make the contact between pulley 23 and rollers 17 18 an elastic one to prevent jar, the helical spring 10 is introduced between the motor-casing and the screw 9. Through said spring 10, also, by suitably adjusting the screw 9 the pressure of the pulley 23 on rollers 17 and 18 may be regulated. The enlargement of the ends 5 of the opening for the motor pivot-pin 6 permits the motor, as already described, to turn on a vertical axis passing through the middle of the pin, and in this way the pulley 23 is free to adjust itself to any

irregularities in the frictional surfaces in contact tending to displace it in a horizontal plane. The length of the radius of the arc over which said pulley moves is sufficiently great to make its path in any direction for all practical purposes a straight line. It will be apparent that by this construction I avoid conical or inclined friction-surfaces and all devices for forcing the same together to take up wear and utilize only right cylinders in contact. Furthermore, their frictional engagement is automatic, elastic, due chiefly to gravity, and is secured through the supporting of the controlling member—the pulley 24—on practically a universal joint, which permits it not only to maintain a uniform and regulated contact, but to keep its position to that end despite the effects of wear and other irregularities.

In the modification of my device shown in Figs. 7 to 10, inclusive, the rollers 17 and 18 instead of being supported on swinging arms 19 20 are journaled in horizontally-sliding bearings 26 27, arranged in a standard 28, which is bolted to the bed-plate. The adjusting devices for pulley 23 may be the same as shown in Fig. 2, or I may omit the screw 9 and spring 10 and, as shown in Figs. 7, 8, 9, provide an enlargement of motor-shaft 24 between pulley 23 and its stuffing-box 29 to receive a sleeve 30, which at its lower side is connected by a helical spring 31 to an adjusting-screw 32, seated in standard 28. By suitably operating the screw 32 the elastic downward pressure of the pulley 23 on the rollers 17 and 18 may be regulated. A helical spring 33 is here also interposed between the bracket-arm 11 and the motor.

In operation, the motor being in rotation, the pulley 23 frictionally engages with the rollers 17 and 18 and these in turn with the track 16, thereby rotating said track, and hence the shaft 25 and belt-pulley 14.

I claim—

1. A rotary pulley, a universal-joint support therefor, a movable friction-track and friction-gears between and in contact with said pulley and said track.

2. A rotary pulley, a universal-joint support therefor, a movable friction-track surrounding said pulley and friction-gears between and in contact with said pulley and said track.

3. A rotary pulley, a universal-joint support therefor, a movable friction-track, friction-gears between and in contact with said pulley and said track, and means for regulating frictional contact between said pulley and said gears.

4. A rotary pulley, a universal-joint support therefor, a movable friction-track, friction-gears between and in contact with said pulley and said track and means for causing elastic frictional contact between said pulley and said gears.

5. A rotary pulley, a universal-joint support therefor, a rotatable friction-track surrounding said pulley and friction-gears between and in contact with said pulley and said track.

6. A rotary pulley a universal-joint support therefor a rotatable friction-track surrounding said pulley, friction-gears between and in contact with said pulley and said track and means for maintaining said pulley in yielding frictional contact with said gears.

7. A rotary pulley, a universal-joint support therefor, a rotatable friction-track surrounding said pulley and two movable friction-rollers between and in contact with said pulley and said track; the said track being rotatable about an axis parallel to the prolonged axis of rotation of said pulley.

8. A rotary pulley, a universal-joint support therefor, a rotatable friction-track surrounding said pulley and two movable friction-rollers between and in contact with said pulley and said track; the said pulley-rollers and track having right cylindrical contact-surfaces and the said track being rotatable about an axis parallel to the prolonged axis of rotation of said pulley.

9. Two movable friction-rollers, a rotatable friction-track surrounding and in contact with both, a pulley in frictional contact with said rollers and a universally-swinging arm supporting said pulley.

10. Two movable friction-rollers, a rotatable friction-track surrounding and in contact with both, a pulley in frictional contact with said rollers, a universally-swinging arm supporting said pulley and means acting upon said arm for regulating the frictional contact of said pulley with said rollers.

11. Two movable friction-rollers, a rotatable friction-track surrounding and in contact with both, a rotary pulley and a pivoted support for said pulley; the said pulley being disposed in frictional contact with said rollers and the said support being movable on its pivot in a vertical plane.

12. Two movable friction-rollers, a rotatable friction-track surrounding and in contact with both, a rotary pulley and a movable support therefor; the said pulley resting by gravity above and in frictional contact with said rollers.

13. Two movable friction-rollers, a rotatable friction-track surrounding and in contact with both, a rotary pulley in contact with said rollers, a movable support for said pulley and means acting on said support for adjusting the frictional contact of said pulley and said rollers.

14. An electric motor, a pulley on the armature-shaft thereof, a pivot-support for said motor, two movably-supported friction-rollers in contact with said pulley and a rotatable friction-track surrounding and in contact with said rollers.

15. An electric motor, a pulley on the armature-shaft thereof, a pivot-support for said mo-

tor—the said motor preponderating on the pulley side—two movably-supported friction-rollers in contact with said pulley and having their axes below the axis thereof and a rotatable friction-track surrounding and in contact with said rollers.

16. An electric motor, a pulley on the armature-shaft thereof, a pivot-support for said motor, means for adjusting the extent of movement of said motor on said pivot, two movably-supported friction-rollers in contact with said pulley, and a rotatable friction-track surrounding and in contact with said rollers.

17. A rotatable circular friction-track, two movable friction-rollers surrounded by said track, a rotary pulley in frictional contact with both rollers, a movable support for said pulley and an adjustable spring connected to said pulley-support and operating to force said pulley between said rollers and thereby to move said rollers in relatively opposite directions into frictional contact with said track.

18. A rotatable friction-track, two movable friction-rollers surrounded by said track, a rotary pulley in frictional contact with both rollers a movable support for said pulley and two adjustable mutually-opposing springs connected to said pulley-support.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID LEONARD LINDQUIST.

Witnesses:
HYATT L. GARRISON,
I. A. VAN WART.