

No. 866,820.

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G. L. SMITH.
ELEVATOR MACHINE.

APPLICATION FILED AUG. 11, 1906. RENEWED JULY 12, 1907.

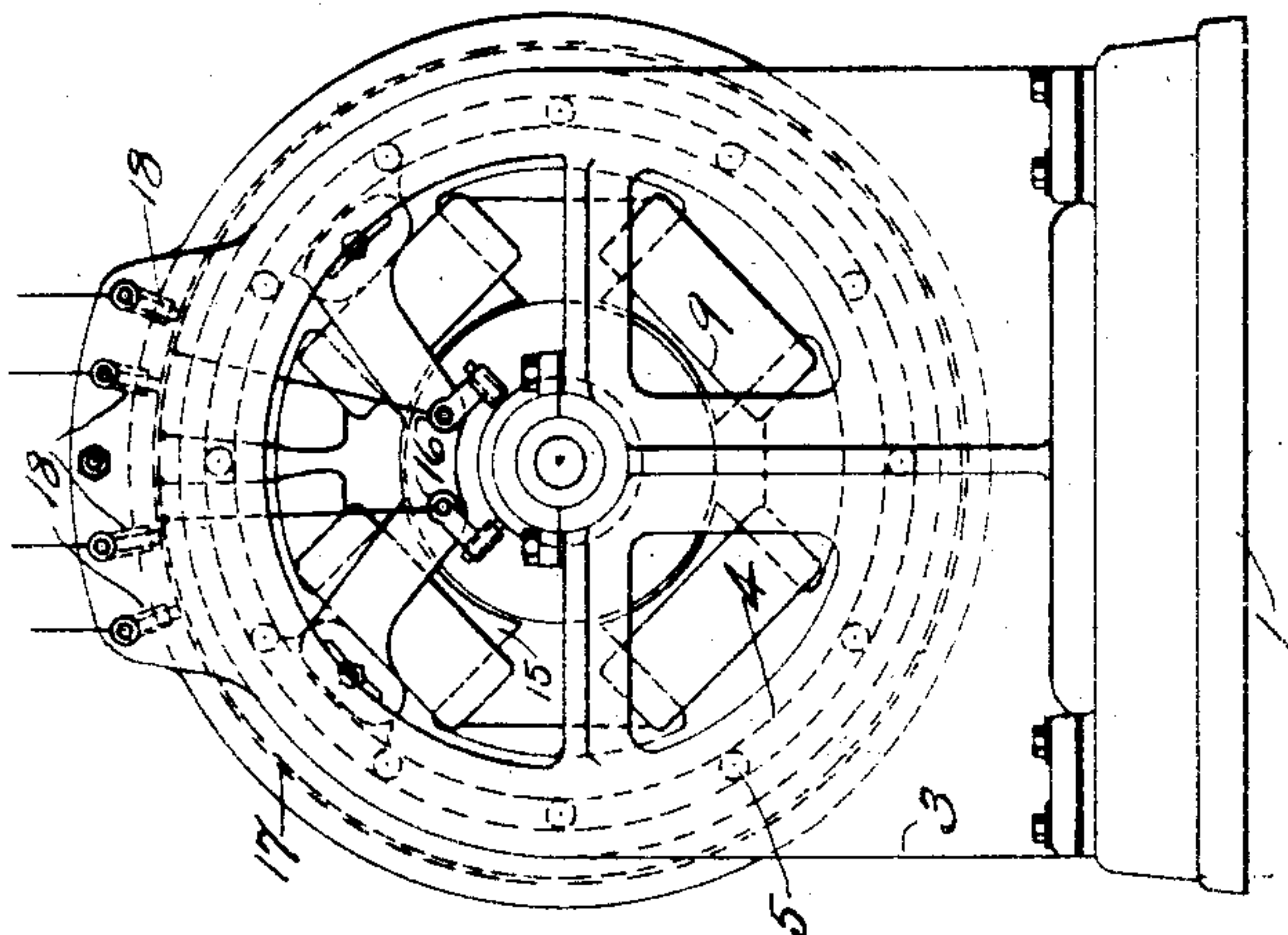


Fig. 2

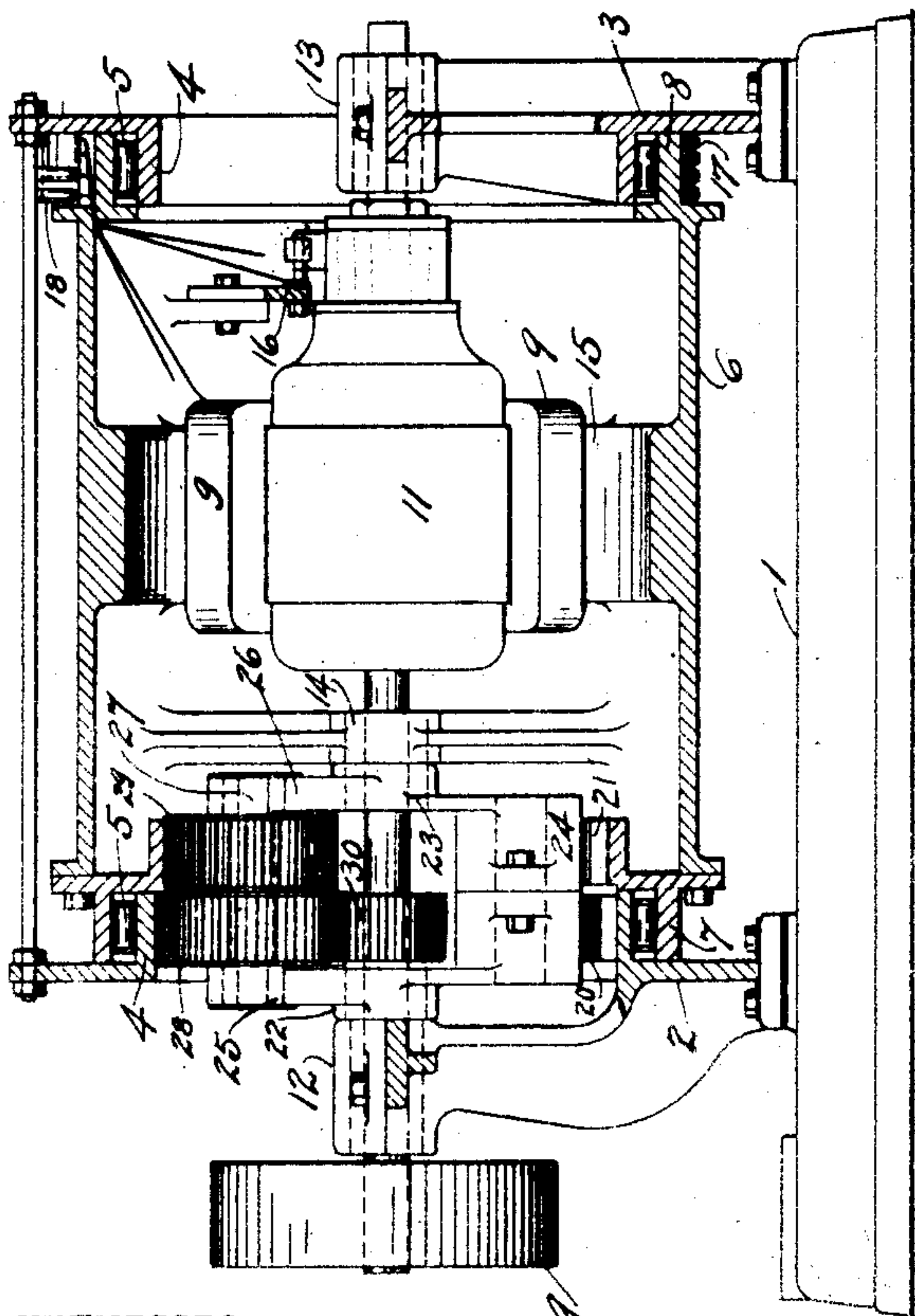


Fig. 1

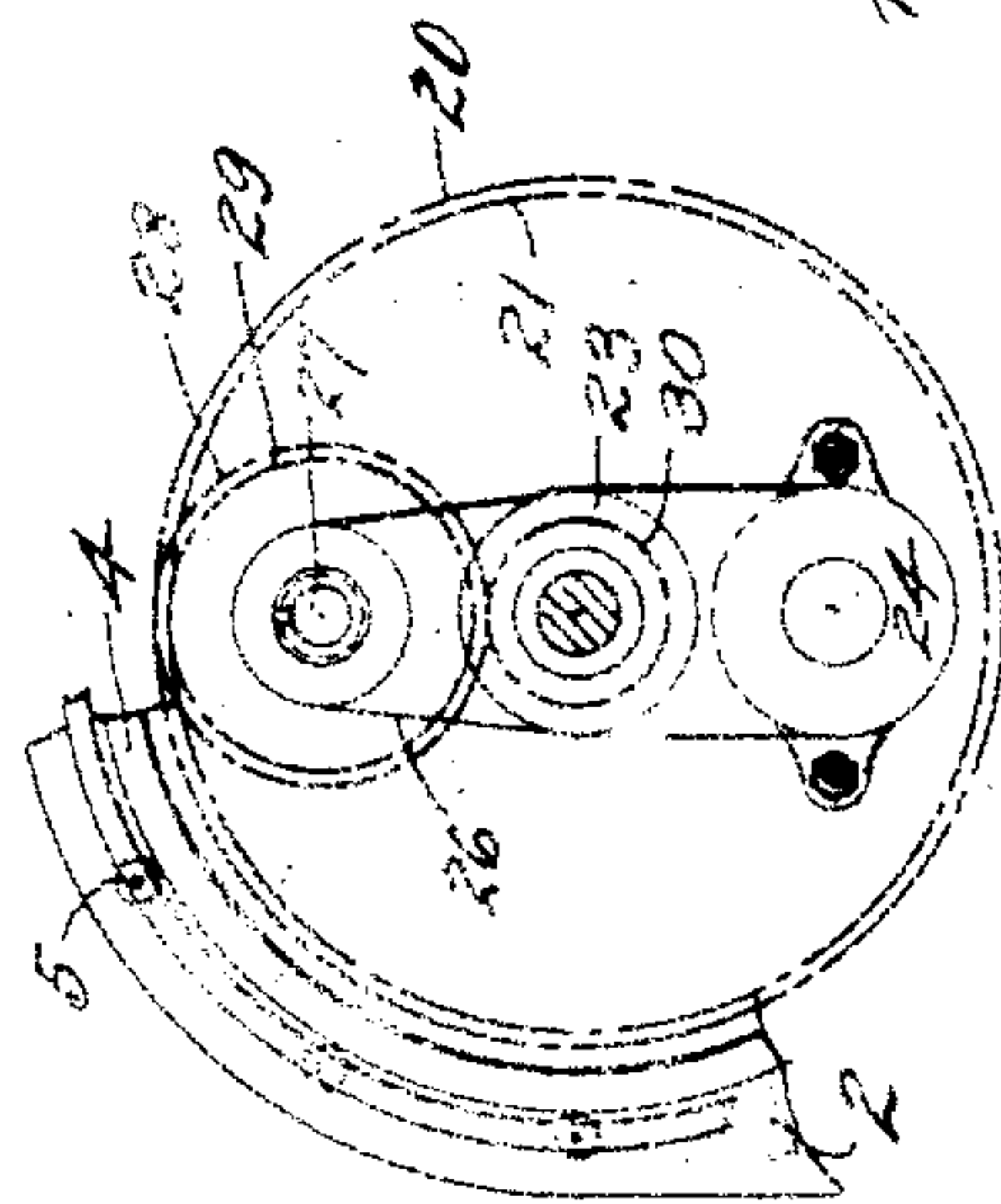


Fig. 3

WITNESSES.

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GEORGE L. SMITH, OF CHICAGO, ILLINOIS.

ELEVATOR-MACHINE.

No. 836,820.

Specification of Letters Patent.

Patented Sept. 24, 1907.

Application filed August 11, 1906, Serial No. 330,210. Renewed July 12, 1907. Serial No. 383,516.

To all whom it may concern:

Be it known that I, GEORGE L. SMITH, a subject of the King of Great Britain and Ireland, and a resident of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Elevator-Machines, of which the following is a specification.

My invention relates to elevator machines, but more particularly to the electric type of machines; and the objects of my improvements are, first, to produce a machine that is very compact so as to take up a minimum amount of floor space in the setting, and second, to adapt an arrangement of gearing thereto whereby a maximum range of speeds for the cable drum may be had with a minimum amount of change in pitch diameter of the operating gears. I accomplish these objects by the mechanism hereinafter described, and which is illustrated in the accompanying drawing in which:

Figure 1, represents a side view of the machine partly in section, and showing its general arrangement and construction. Fig. 2, is a front end view of the same, and Fig. 3, serves to further illustrate the arrangement of gearing of Fig. 1.

Similar reference numerals refer to similar parts throughout the several views.

Suitably mounted on and secured to a bed plate 1, are two supports 2 and 3, each being provided with an annular flange 4, having a roller bearing 5 mounted thereon, and upon the latter rotates the cable drum 6, by means of the flanges 7 and 8, secured thereto.

On the same axial line with the drum is a motor having an armature 11, which rotates in bearings 12 and 13, secured to supports 2 and 3 respectively, and also an auxiliary bearing 14, secured to the drum. The field frame 15, of the motor with its exciting coils, is secured to the interior of the cable drum and rotates therewith as do also the brushes and brush holders 16, for the armature.

On the drum flange 8, and suitably insulated therefrom and from each other, are secured four copper bands 17, two of which being electrically connected with the exciting coils, and two with the armature brushes, and by means of the four stationary brushes 18, each in electrical contact with a copper band 17, the motor may be driven or reversed in rotation by adapting to these brushes a suitable source of current supply.

19, is a brake pulley for the motor to which may be applied any of the well-known forms of electro-mechanical brakes.

Secured to flange 4, on support 2, is an internal tooth gear 20, and adjacent to this gear and secured to the drum is another internal tooth gear 21, and the two differ slightly in pitch diameter so as to vary in number of teeth to the extent of one, two or three teeth according to the gear ratio desired. Between the bearings 12, and 14, and rotatably mounted on the armature shaft, are a pair of hubs 22 and 23, provided with a balancing weight

24, and arms 25 and 26. Rotatably mounted on the arms is a shaft 27, to which are secured a pair of planetary gears 28 and 29, which latter therefore maintain a fixed relation toward each other. These planetary gears also differ in pitch diameter and number of teeth to the same extent as the internal tooth gears so as to mesh therewith correspondingly as indicated. A drive pinion 30, secured to the motor shaft and in mesh with gear 28, completes the gearing. By this arrangement, it will be observed, that when the gears 20 and 21, differ in pitch diameter so as to render a difference of one tooth the rotation of the armature causes the drum to rotate very slowly, suitable for hoisting purposes. By differing two teeth the speed is practically doubled, by three teeth, trebled, etc. thus affording a wide range of speeds with a minimum amount of change in pitch diameter of the gears. Also it will be observed that by mounting the motor or prime mover inside of the cable drum and employing a system of drive-gearing after the manner indicated, a very compact form of machine, and one that will consume a minimum amount of floor space, is secured.

Having thus particularly set forth a construction to embody the essential features of my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In an elevator machine, in combination, a base, a pair of standards mounted thereon and terminating in central bearings, an annular flange secured to each standard, roller bearings on said flanges, a cable drum revolubly mounted on said roller bearings, an annular internal tooth rack secured to one of said flanges, an internal tooth gear secured to said drum, arranged adjacent to said rack but of differing pitch diameter therefrom, a motor revolubly mounted on the interior of the drum, a shaft for said motor rotating in said central bearings, a frame work rotatably mounted about said motor shaft, a shaft carried by said frame-work, a planetary gear rotatably mounted on said shaft and in mesh with said rack; a second planetary gear mounted on said shaft at the side of said first planetary gear and in mesh with said internal tooth gear, means for securing the planetary gears together so as to prevent their relative movement, means operatively connecting said motor shaft with said planetary gears, and means for conducting power to said motor from a source of supply.

2. In an elevator machine in combination a base, a pair of standards mounted thereon and terminating in central bearings, an annular flange secured to each standard, roller bearings on said flanges, a cable drum revolubly mounted on said roller bearings, a motor revolubly mounted in the interior of said drum and on said central bearings, a gearing operatively connecting said motor with the drum, and means whereby power is conducted to said motor.

3. In an elevator machine in combination, a base, a pair of standards mounted thereon and terminating in central bearings, an annular flange secured to each standard, a cable drum, annular flanges whereby said cable drum is revolubly mounted on the flanges secured to said standards; a motor revolubly mounted in the interior of the drum and on said central bearings, a gearing operatively connecting the cable drum with the motor, four bands suitably mounted on the peripheral surface of a flange se-

cured to the cable drum, and means electrically connecting said bands with said motor.

4. In an elevator machine in combination a base, a pair of standards mounted thereon, and a cable drum revolvably mounted on said standards, an annular internal tooth rack secured to one of said standards, an internal tooth gear secured to the drum and arranged adjacent to said rack and on the same axial line therewith, a motor, a shaft therefor, a frame-work rotatably mounted about said shaft, a shaft carried by said frame-work, and a planetary gear rotatably mounted thereon, and in mesh with said rack, a second planetary gear mounted on said

shaft at the side of said first planetary gear, and in mesh with said internal tooth gear, means for securing said planetary gears together so as to prevent their relative movement, and means operatively connected with the motor whereby the planetary gears are rotated.

Signed at Chicago, county of Cook, State of Illinois this 8th day of August 1906.

GEORGE L. SMITH.

Witnesses:

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JOHN A. BUTTS.