

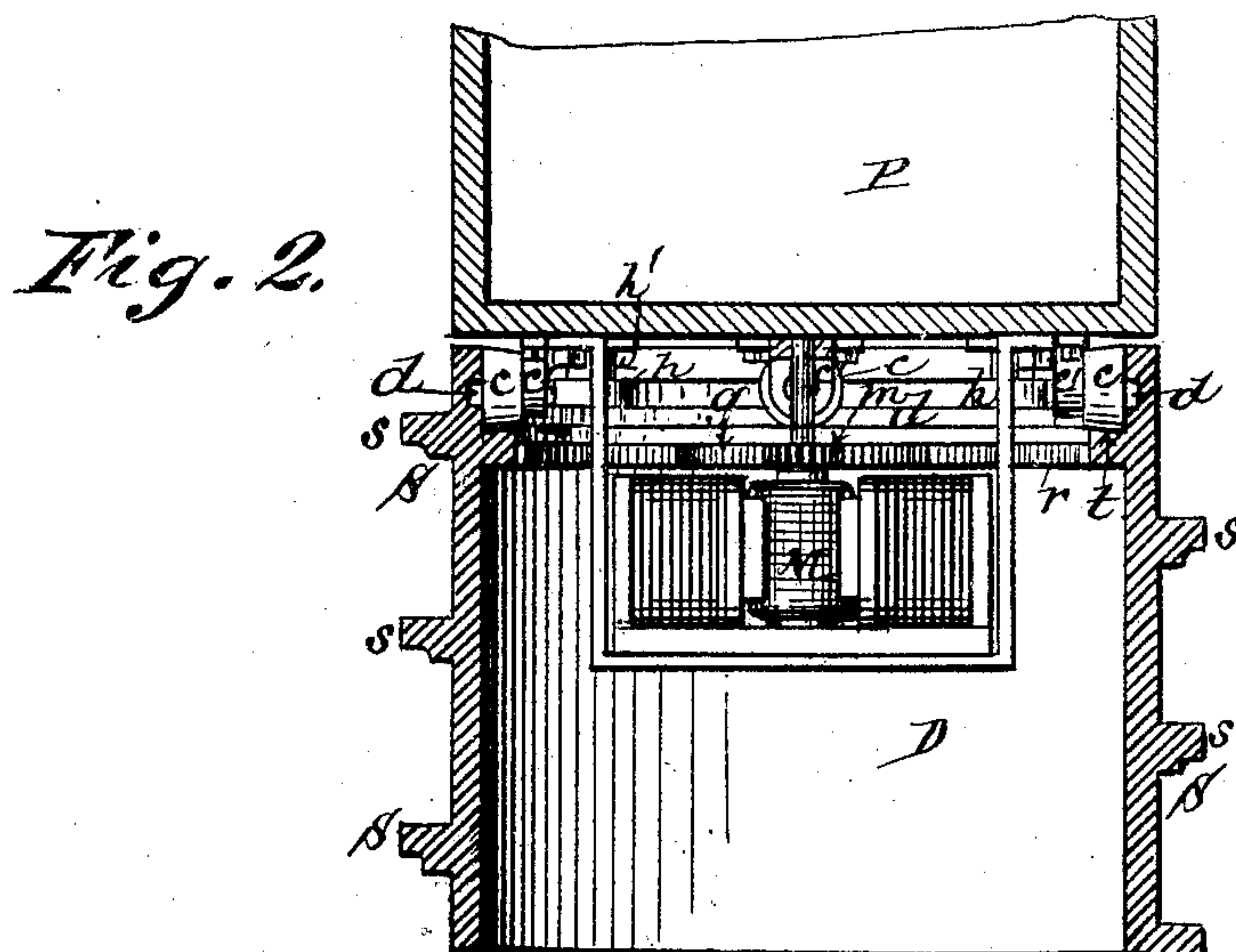
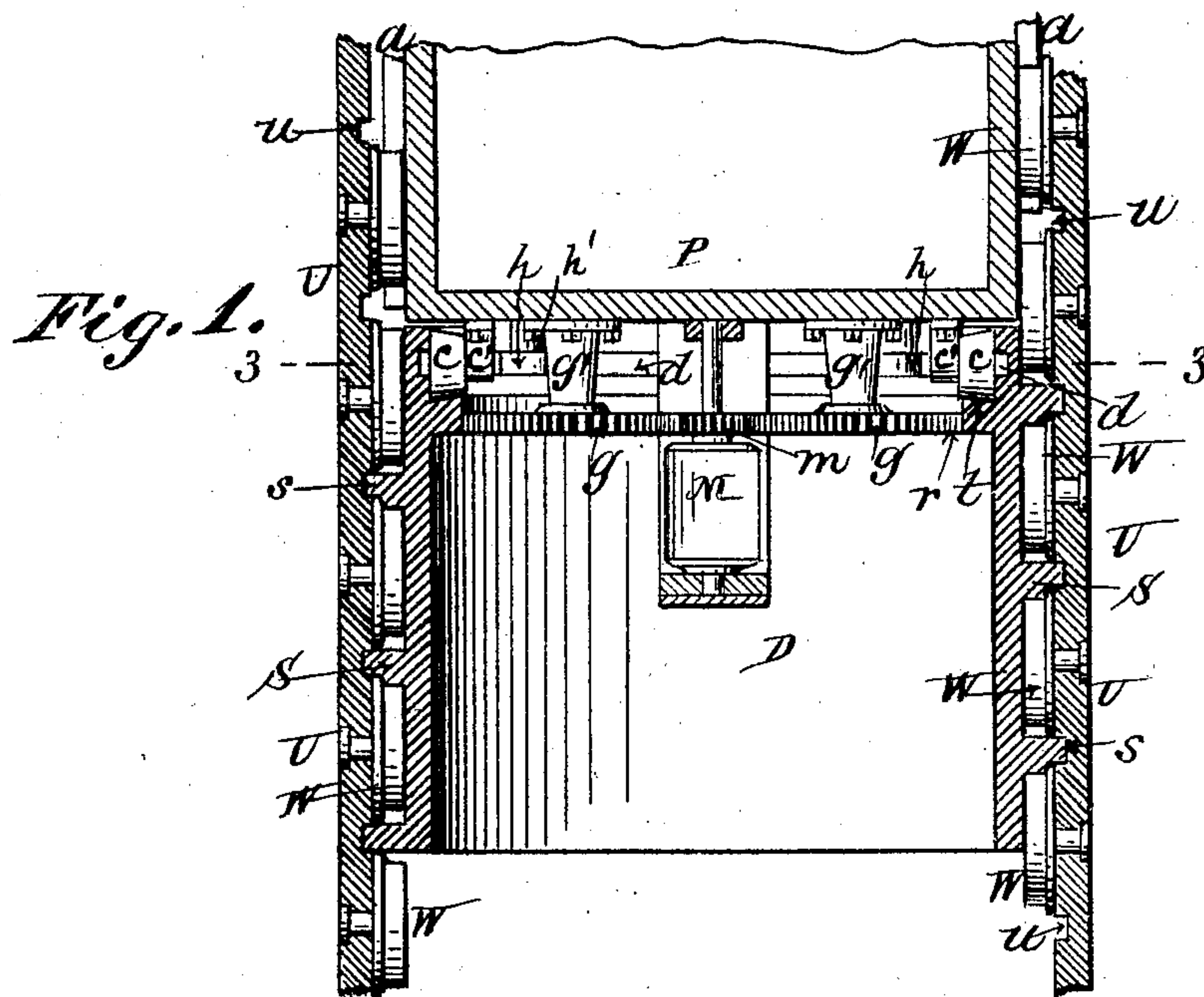
No. 765,348.

PATENTED JULY 19, 1904.

E. H. VOGEL.
ELECTRIC ELEVATOR.
APPLICATION FILED NOV. 16, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

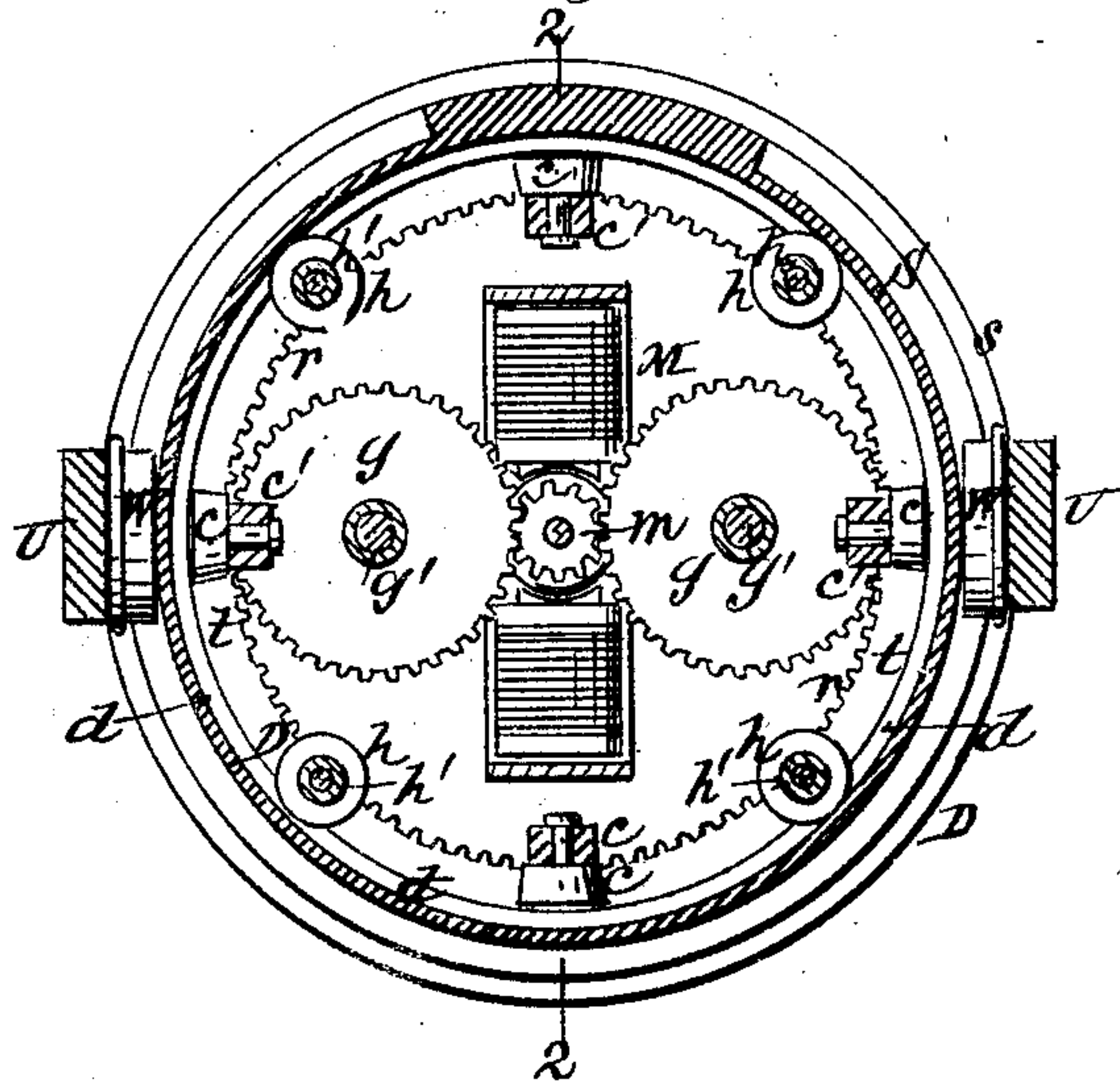


Fig. 4.

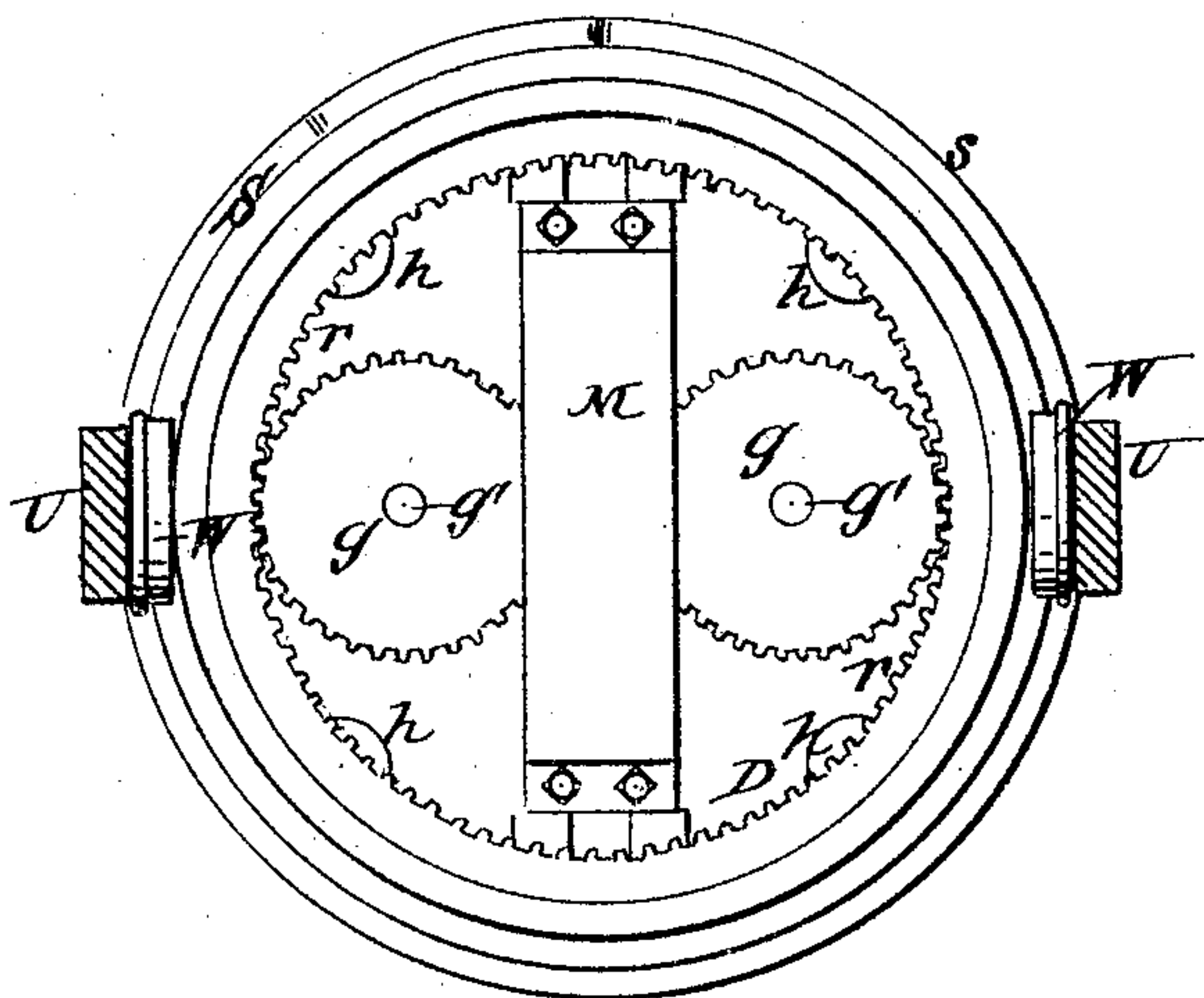
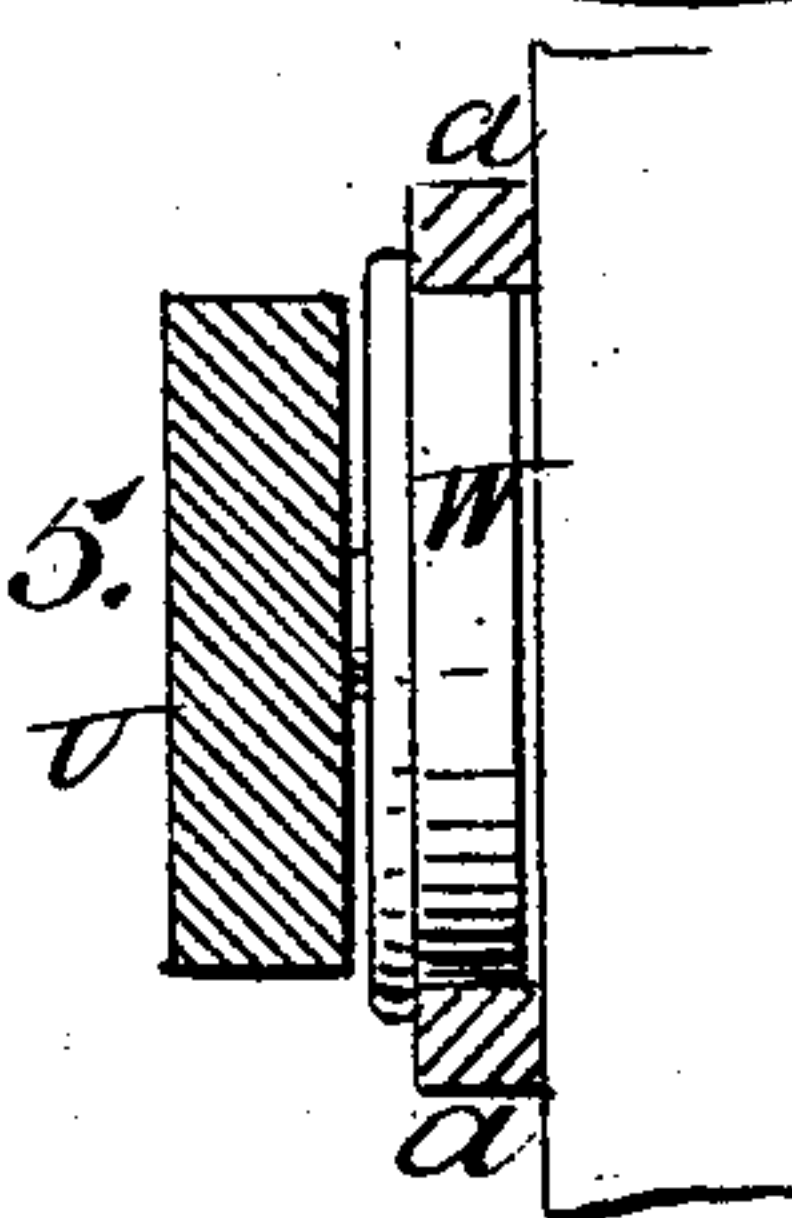


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTRIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 765,348, dated July 19, 1904.

Application filed November 16, 1903. Serial No. 181,281. (No model.)

To all whom it may concern:

Be it known that I, ERNEST H. VOGEL, a citizen of the United States, residing in the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Electric Elevators, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My invention relates to elevators and lifts operated by electric motors in conjunction either directly or indirectly with screw-threads or worms. My object is to overcome the practical objections heretofore attendant upon the use of screw-threads for this purpose and to attain a safe smooth-running device by which the elevator may be operated with less power, the frictional resistance being reduced to the minimum.

The invention consists, essentially, in a relatively large screw-drum actuated internally by a motor and mechanism supported on the car or platform, the screw thread or way being formed upon the periphery of the drum. By this means I am enabled to use a thread or way of comparatively low pitch or grade and to use engaging wheels of large diameter, so that for a given speed of motion imparted to the car or platform a relatively slow motion of the operative parts is sufficient. In fact, I attain all the advantages involved in the use of wheels of large diameter and broad tread upon a road of slight incline or grade, and hence not only attain a smooth even motion with the minimum of power, but also obviate the excessive wear and the danger involved in the use of a plurality of screws or worms of high pitch engaging with wheels of small diameter.

The motion and actuating parts being all inclosed within the drum are isolated and protected thereby and are less exposed to injury or derangement.

My invention also includes certain features in the construction and arrangement of parts hereinafter described and claimed specifically.

In the accompanying drawings, Figure 1 is a vertical sectional elevation; Fig. 2, a section on plane of line 2 2, Fig. 3, a

horizontal section on plane of line 3 3, Fig. 1; Fig. 4, a view of the under side of the worm-drum; Fig. 5, a horizontal sectional detail, on an enlarged scale, showing the lateral guides.

P represents the platform or floor of a car or lift on the under side of which is mounted the electric motor M, to the armature-shaft of which is secured the pinion *m*. This pinion *m* meshes into intermediate gears *g g*, mounted upon studs *g' g'*, secured to the under side of the platform P and meshing also with the internal annular rack *r*, formed upon or made integral with the drum D.

Above the rack *r* the internal surface of the drum D is formed with an annular groove *d*, forming the tread or way for a series of horizontal rollers *h h*, fulcrumed on studs or standards *h' h'* upon the bottom of the platform. These horizontal rollers steady the drum centrally and internally and preserve its alignment with the platform P and the operative parts.

c c are truncated conical rollers mounted in bearings *c' c'* on the under side of the platform P and traveling on the inclined annular track *t*, integral with the drum D and preferably arranged on the interior surface, as shown, although, if preferred, it may be formed upon the extreme upper edge of the drum with like result.

S is a spiral screw-thread way or track formed integral with or upon the periphery of the drum D and engaging with the wheels W W, pivotally supported upon the uprights U U. It will be noted that by forming the spiral way S upon the periphery of the drum D, which is necessarily of a diameter at least as large as the width of the elevator and may be made larger, if desired, I am enabled to obtain a slight grade or pitch and at the same time employ wheels W W of large tread and diameter as compared with those heretofore used, thereby reducing resistance and economy of power while insuring an even uniform motion.

In order to guard against accident in the event of one or more of the wheels W W or journals breaking from place, I prefer to form the screwway S with a rib or tongue *s*, which

protrudes into a groove *u*, formed for their reception in the inner face of each upright *U*. Thus the drum *D* will be supported independent of the wheels *W W* in case of necessity and sustained in proper relation to the floor of the car or platform *P* until the damage can be repaired.

a a are vertical guides upon the car or platform *P*, which engage the wheels *W W* laterally, preserve the alinement of the said platform *P*, and prevent its turning upon or rotating with the drum *D*.

It will be seen that my apparatus is comparatively simple and cheap of construction, parts being strong and not liable to get out of order, and since the wear of frictional contact is reduced to the minimum the device will sustain a maximum of use without replacement.

The large peripheral area attained by the use of a single drum or worm is of great advantage in that it enables me to use a thread of relatively great thickness and strength, as well as to reduce the grade or pitch of the same, and at the same time to make the distance between the convolutions sufficient to admit of the use of wheels of large diameter and wide tread. Furthermore, the use of the large hollow worm-drum enables me to arrange all the actuating parts within the drum, where they are isolated and protected against contact with extraneous objects, thus preventing injury to the parts and avoiding danger from contact therewith.

I have herein shown my worm-drum as engaging with two diametrically-opposed series of wheels. It is obvious that it would be operative with one set, although two or more are desirable in order to properly balance and support the parts, it being understood that where three or more vertical series of supporting-wheels are used they are arranged at equidistant points around the worm-drum.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an elevating device, the combination with the platform, of an electric motor thereon a driving-pinion on the armature-shaft of said motor intermediate gearing supported on the platform, and arranged to transmit motion from said driving-pinion to an annular rack, said rack integral with and upon the interior surface of a worm-drum, said worm-drum threaded peripherally for engagement with a series of vertically-arranged supporting-wheels, and the said vertically-arranged supporting-wheels, for the purpose described.

2. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion upon the armature-shaft of said motor, intermediate gearing supported on the platform and arranged to transmit motion from said driving-pinion to an annular rack, said rack integral with and upon the interior surface of a worm-drum, said worm-

drum threaded peripherally for engagement with two diametrically-opposed series of vertically-arranged supporting-wheels, and the said two opposed series of supporting-wheels, for the purpose described.

3. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion upon the armature-shaft of said electric motor, intermediate gearing supported on the platform and arranged to transmit motion from said driving-pinion to an annular rack, said rack integral with and upon the interior surface of a worm-drum, said worm-drum threaded peripherally for engagement with a series of vertically-arranged supporting-wheels, and the said vertically-arranged supporting-wheels, for the purpose described.

4. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion upon the armature-shaft of said motor, intermediate gearing supported upon the platform and arranged to transmit motion from said driving-pinion to an annular rack, said annular rack integral with and upon the interior surface of a worm-drum, said worm-drum formed with a peripheral screw-thread way, vertically-arranged supporting-wheels for engaging with said screw-thread way on the worm-drum, an annular track on the interior of the worm-drum, and a series of rollers traveling on said annular track and supported upon the said platform, for the purpose described.

5. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion upon the armature-shaft of said motor, intermediate gearing supported upon the platform and arranged to transmit motion from said driving-pinion to an annular rack, said annular rack integral with and upon the interior surface of a worm-drum, said worm-drum formed with a peripheral screw-thread way, vertically-arranged supporting-wheels for engaging with said screw-thread way on the worm-drum, an inclined annular track on the interior of the worm-drum, and a series of conical rollers traveling on said annular track and supported upon the said platform, for the purpose described.

6. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion upon the armature-shaft of said motor, intermediate gearing supported upon the platform and arranged to transmit motion from said driving-pinion to an annular rack, said annular rack integral with and upon the interior surface of a worm-drum; said worm-drum formed with a peripheral screw-thread way, vertically-arranged supporting-wheels for engaging with said screw-thread way on the worm-drum, and vertical ways on said platform arranged to bear laterally upon the said vertical wheels for the purpose set forth.

7. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion upon the armature-shaft of said motor, intermediate gearing supported upon the platform and arranged to transmit motion from said driving-pinion to an annular rack, said annular rack integral with and upon the interior surface of a worm-drum; said worm-drum formed with a peripheral screw-thread way, vertically-arranged supporting-wheels for engaging with said screw-thread way on the worm-drum, an annular groove formed in the interior surface of said worm-drum, and a series of horizontal rollers traveling in said annular groove and supported upon the said platform for the purpose described.

8. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion upon the armature-shaft of said motor, intermediate gearing supported upon the platform and arranged to transmit motion from said driving-pinion to an annular rack, said annular rack integral with and upon the interior surface of a worm-drum, said worm-drum formed with a peripheral screw-thread way having an extension-rib, vertically-arranged wheels for engaging with the said screw-thread way on the worm-drum, and a series of grooves formed in a stationary upright or uprights and arranged to receive and support the said extension-ribs on the said peripheral screw-thread ways on the worm-drum, for the purpose described.

9. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion on the armature-shaft of said motor, intermediate gearing supported on said platform and arranged to transmit motion from said driving-pinion to an annu-

lar rack, said rack integral with and upon the interior surface of a worm-drum, said worm-drum formed with a peripheral screw-thread way, vertically-arranged wheels for engaging with said screw-thread way on the worm-drum, an inclined annular track on the interior of the worm-drum, a series of conical rollers traveling on said annular track and supported on said platform, an annular groove formed in the interior surface of said worm-drum, and a series of horizontal rollers traveling in said annular groove and supported upon said platform, for the purpose described.

10. In an elevating device, the combination with the platform, of an electric motor thereon, a driving-pinion on the armature-shaft of said motor, intermediate gearing supported on said platform and arranged to transmit motion from said driving-pinion to an annular rack, said rack integral with and upon the interior surface of a worm-drum, said worm-drum formed with a peripheral screw-thread way, vertically-arranged wheels for engaging with said screw-thread way on the worm-drum, an inclined annular track on the interior of the worm-drum, a series of conical rollers traveling on said annular track and supported on said platform, an annular groove formed in the interior surface of said worm-drum, a series of horizontal rollers traveling in said annular groove and supported upon said platform, and vertical ways on said platform arranged to bear laterally upon the said vertical wheels, for the purpose described.

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