A. L. HEGLAR.

SPEED MULTIPLYING MECHANISM FOR MOTORS.

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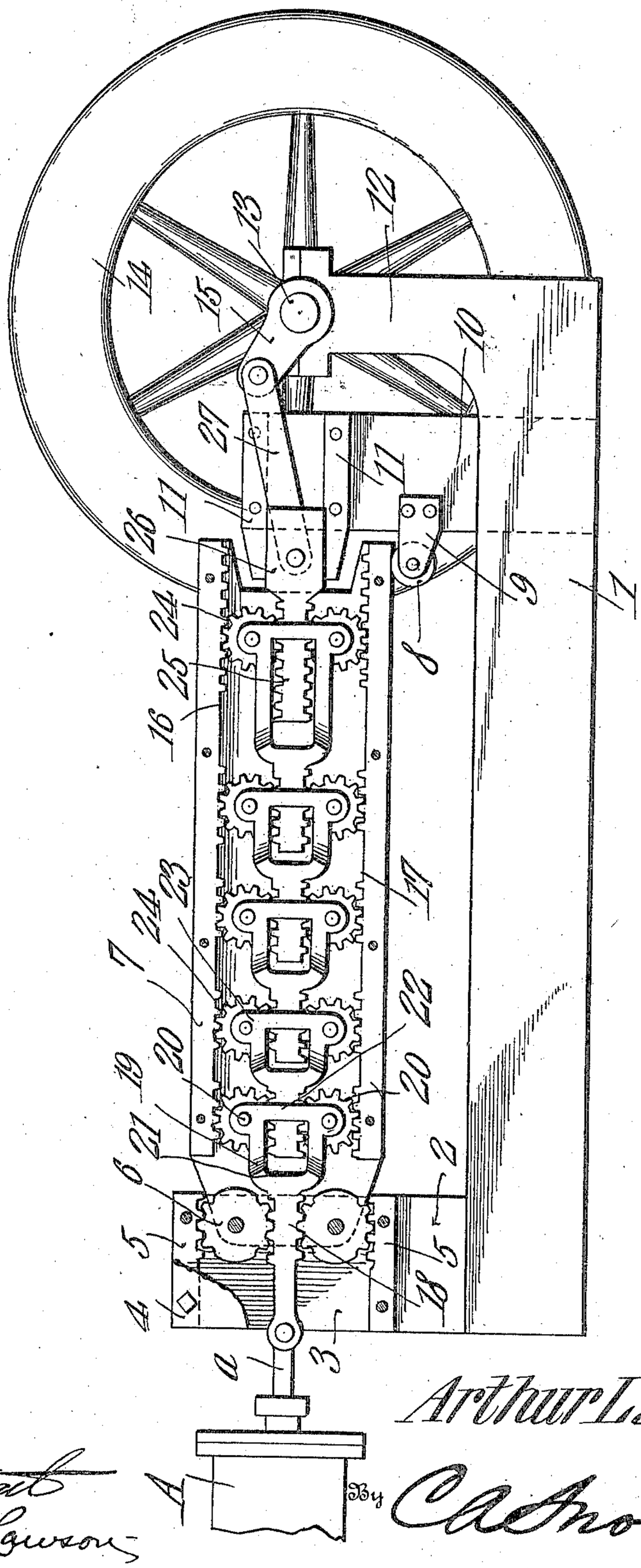
947,908.

Patented Feb. 1, 1910.



Witnesses

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SPEED-MULTIPLYING MECHANISM FOR MOTORS.

947,908. Specification of Letters Patent. Patented Feb. 1, 1910.

Application filed March 6, 1909. Serial No. 481,655.

To all whom it may concern:

Be it known that I, ARTHUR L. HEGLAR, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented a new and useful Speed-Multiplying Mechanism for Motors, of which the following is a specification.

This invention relates to speed multiplying mechanism for use in connection with motors of different types and it is more especially designed as an improvement upon the structure shown in an application filed by me on December 19th, 1908, Serial Number 468,378.

The object of the invention is to simplify the speed multiplying mechanism and to so construct the same as to avoid all tendency of the parts to become distorted and displaced, this result being obtained by equalizing the resistance to which the various power-transmitting elements are subjected, the mean line of resistance extending straight through the longitudinal center of the speed multiplying mechanism.

With these and other objects in view the invention consists in certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims.

In the accompanying drawing the preferred form of the invention has been shown. Said drawing is a front elevation of the speed multiplying mechanism, the face-plate of the casing of the mechanism being removed and a portion of an engine cylinder being shown connected to the mechanism.

Referring to the drawing by characters of reference 1 designates the base on which the speed multiplying mechanism is mounted, this base being provided with a standard 2 at one end having an opening 3 extending therethrough and designed to be closed at one side by means of a removable face-plate 4. Opposed racks 5 are mounted within the opening 3 and mesh with gears 6 journaled within opposite portions of one end of the casing 7 of the mechanism. This casing is open at both ends and one of its faces is designed to be closed by means of a plate (not shown) so as to conceal the interior mechanism from view and protect it from dust, etc. That end of the casing 7 farthest removed from the gears 6 is mounted upon an anti-friction roller 8 journaled within a bracket 9, said bracket extending from a standard 10 which projects upwardly from the base 1 and is provided with guides 11. A standard 12 extends upwardly from one end of the base 1 and adjacent the standards 10, and constitutes a bearing for the shaft 13 on which is arranged a fly-wheel 14, said shaft being provided with a crank arm 15.

Formed longitudinally within opposed portions of the casing 7 are racks 16 and 17 and each of these racks can be continuous from end to end or can be made up of toothed sections, as preferred.

Extending between the gears 6 is a stem 18 having teeth upon opposed faces thereof which mesh with the gears, this stem being connected at one end to the piston-rod *a* of an engine A, while its other end extends from a cross-head 19 of any preferred form and having opposed gears 20 which mesh with the racks 16 and 17 respectively. The cross-head 19 has a recess 21 designed to receive a stem 22 which projects between the gears 20 and has teeth upon its opposed faces and meshing with the gears 20, this stem projecting from a cross-head 23 which is similar to the cross-head 19 and is provided with opposed gears 24 which mesh with the racks 16 and 17 respectively. Any desired number of these cross-heads, gears and stems may be employed, the stem of each cross-head projecting between the gears of one of the adjoining cross-heads, as illustrated in the drawing. It is to be understood also that the lengths of the stems increase in proportion to the distances of the said stems from the gears 6, and the recesses within the cross-heads correspondingly increase so as to receive these stems. The gears 24 of the cross-head farthest removed from engine A mesh with teeth upon opposed faces of a stem 25 extending from a cross-head 26, which is mounted to reciprocate between the guides 11. A pitman 27 connects this cross-head with the crank 15 heretofore referred to.

When a slight longitudinal movement is imparted to the stem 18 the teeth thereon partly rotate the gears 6 which thus travel along the racks 5 and push the casing 7 longitudinally upon the roller 8. At the same time the cross-head 19 moves longitudinally within the casing 7 and its gears 20 are caused to travel along the racks 16 and 17 and to push the stem 22 of the adjoining cross-head longitudinally at a greater speed than the stem 18. Movement is thus trans-

mitted from cross-head to cross-head, the speed of movement of each cross-head being double that of the cross-head from which it receives motion. The end cross-head when moved longitudinally transmits motion through its gears 24 to the stem 25 so as to drive the cross-head 26 longitudinally a sufficient distance to produce a one-half revolution of the shaft 13 and fly-wheel 14. By moving the piston rod *a* in the reverse direction the rotation of shaft 13 can be completed in the same manner as hereinbefore described.

It will be understood that by providing speed multiplying mechanism such as herein described a very slight movement of a piston or other power element can be greatly multiplied, the mechanism utilized for that purpose being compact, durable and efficient.

Obviously various changes may be made in the construction and arrangement of the parts without departing from the spirit or sacrificing the advantages of the invention.

What is claimed is:—

1. The combination with a driving element and a driven element, of mechanism interposed therebetween for multiplying speed, said mechanism including opposed stationary racks, separate gears meshing therewith, a stem connected to the driving element and projecting between the gears, said stem having teeth meshing with the respective gears, an anti-friction device, a casing supported thereon and movable with the gears, opposed racks within the casing and fixed thereto, separate gears meshing with the respective racks, said gears being movable with the stem, and a toothed stem actuated by the last mentioned gears for operating the driven element, said stems being disposed in alinement.

2. The combination with a driving element and a driven element, of mechanism interposed therebetween for multiplying speed, said mechanism including opposed stationary racks, an anti-friction device, a movable casing mounted adjacent one end upon said device, spaced gears carried by the casing and engaging the respective racks, said gears constituting movable supports for one end of the casing, a toothed stem connected to and operated by the driving element and extending between and meshing with the gears, gears movable with the stem, racks secured within the casing to opposite portions thereof and meshing with the respective gears on the said stem, and a toothed stem extending between and meshing with the last mentioned gears and operatively connected to the driven element, said stems being disposed in alinement along the longitudinal center of the casing.

3. The combination with a driving element and a driven element, of mechanism interposed therebetween for multiplying speed, said mechanism including opposed stationary racks, a movable casing, spaced gears carried by the casing and meshing with the respective racks, said gears and racks constituting supports for one end of the casing, a support for the other end of the casing, a slidable cross-head operatively connected to the driven element, a stem projecting therefrom and having opposed series of teeth, a stem connected to and actuated by the driving element, said stem having opposed series of teeth and projecting between and meshing with the gears, racks secured to the casing, gears carried by the last mentioned stem and meshing with the said racks, and means actuated by said gears for shifting the stem of the cross-head longitudinally, all of the stems being disposed in alinement and along the longitudinal center of the casing.

4. The combination with a supporting structure, opposed racks thereon, and an anti-friction device supported by said structure, of a casing movably mounted upon said device, opposed gears journaled within the casing and engaging the racks, opposed racks within the casing, a series of cross-heads movably mounted within the casing, opposed gears journaled upon each cross-head and meshing with the respective racks within the casing, a stem extending from one of the cross-heads and between and meshing with the gears journaled within the casing, a driving element connected to said stem, stems extending from the other cross-heads, each stem projecting between and meshing with the gears of one of the adjoining cross-heads, and a driven element extending between and meshing with the gears of one of the cross-heads.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ARTHUR L. HEGLAR.

Witnesses:

E. HUME TALBERT,

E. DANIELS.