No. 841,042. PATENTED JAN. 8, 1907.

A. E. NORRIS.

HOISTING ENGINE.

APPLICATION FILED NOV. 22, 1905.

4 SHEETS—SHEET 1.

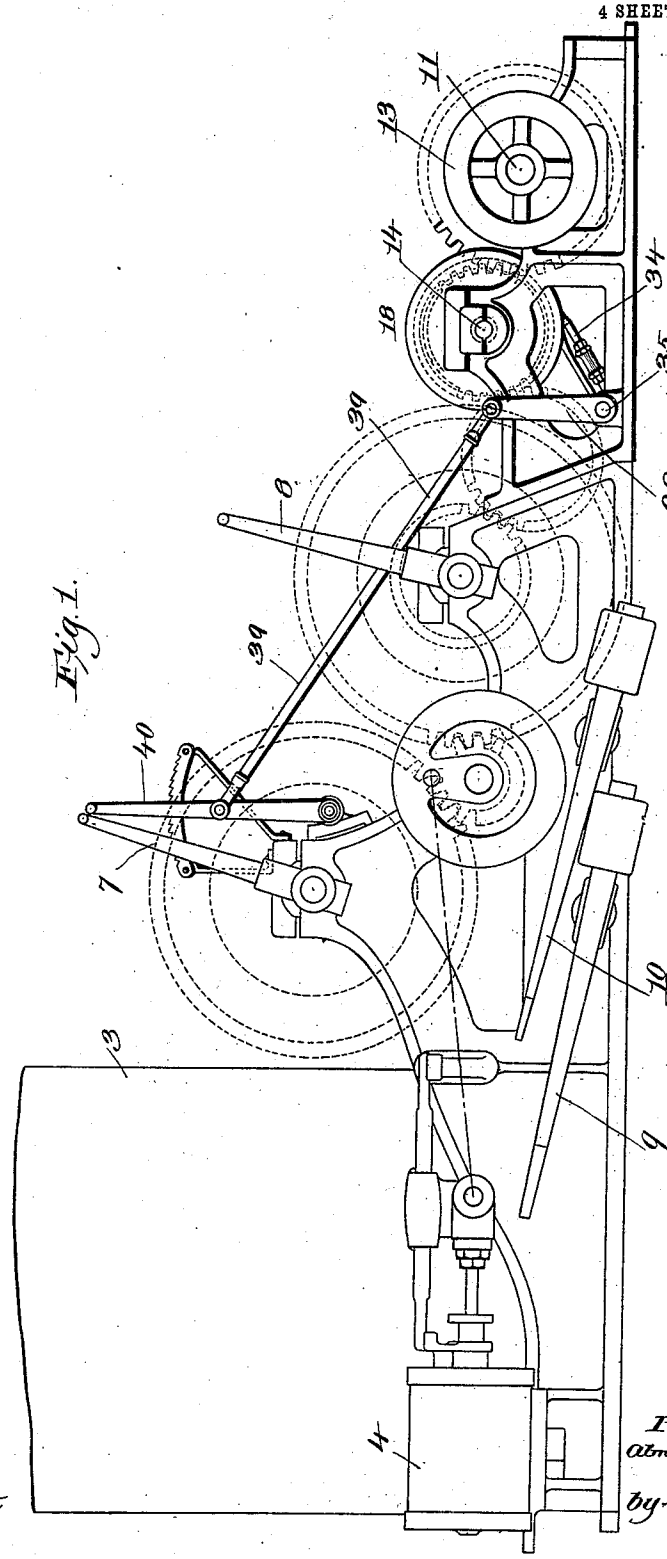


Fig. 1.

Witnesses.
W. C. Lunsford.
Walter R. Trott

Inventor.
Abner E. Norris
by Crosby Gregory
Atty's

THE NORRIS PETERS CO., WASHINGTON, D. C.

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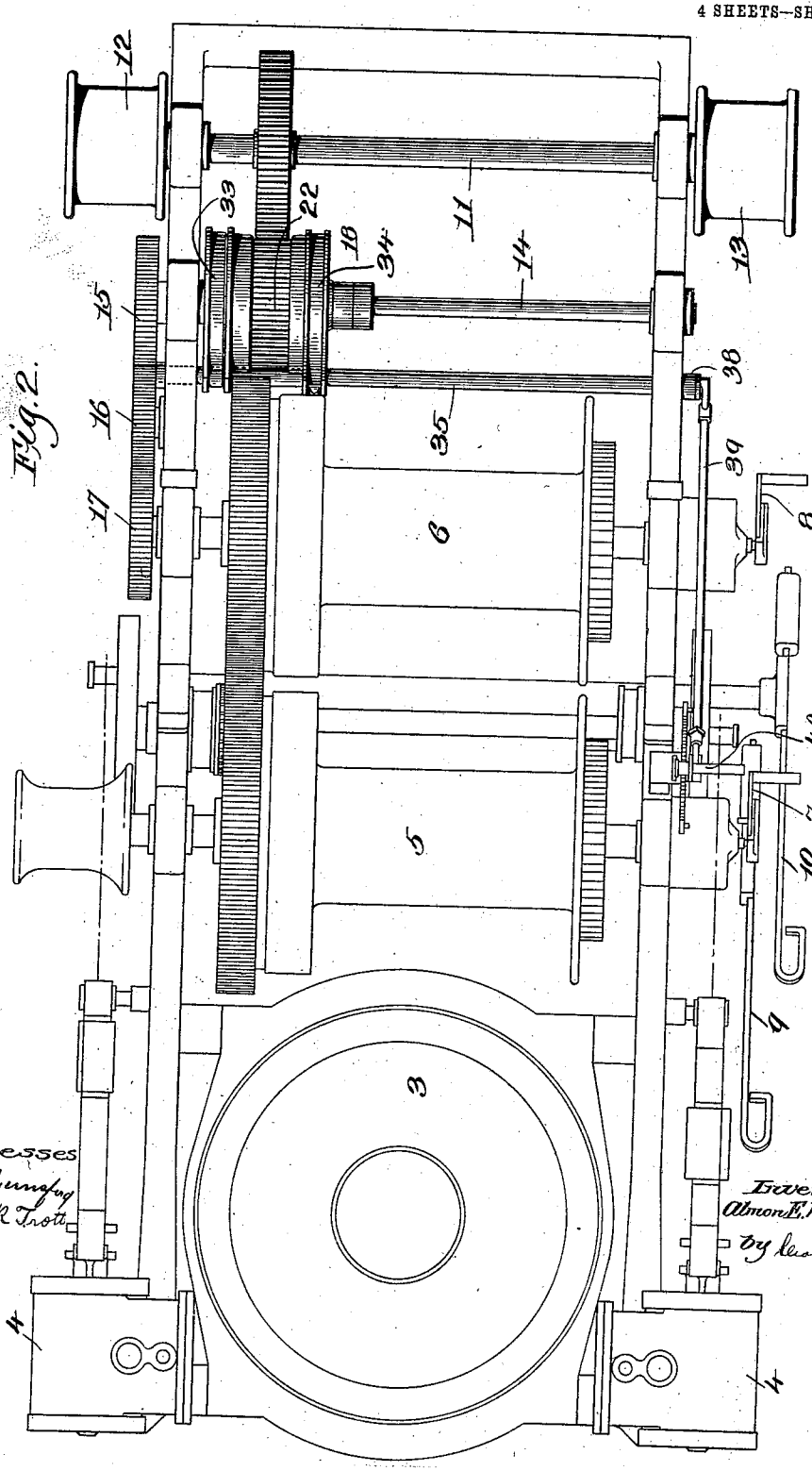
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4 SHEETS—SHEET 2.

Fig. 2.



Witnesses
W. C. Lumsden
Walter K. Trott

Inventor:
Almon E. Norris
by Lemby & Page
atty's

THE NORRIS PETERS CO., WASHINGTON, D. C.

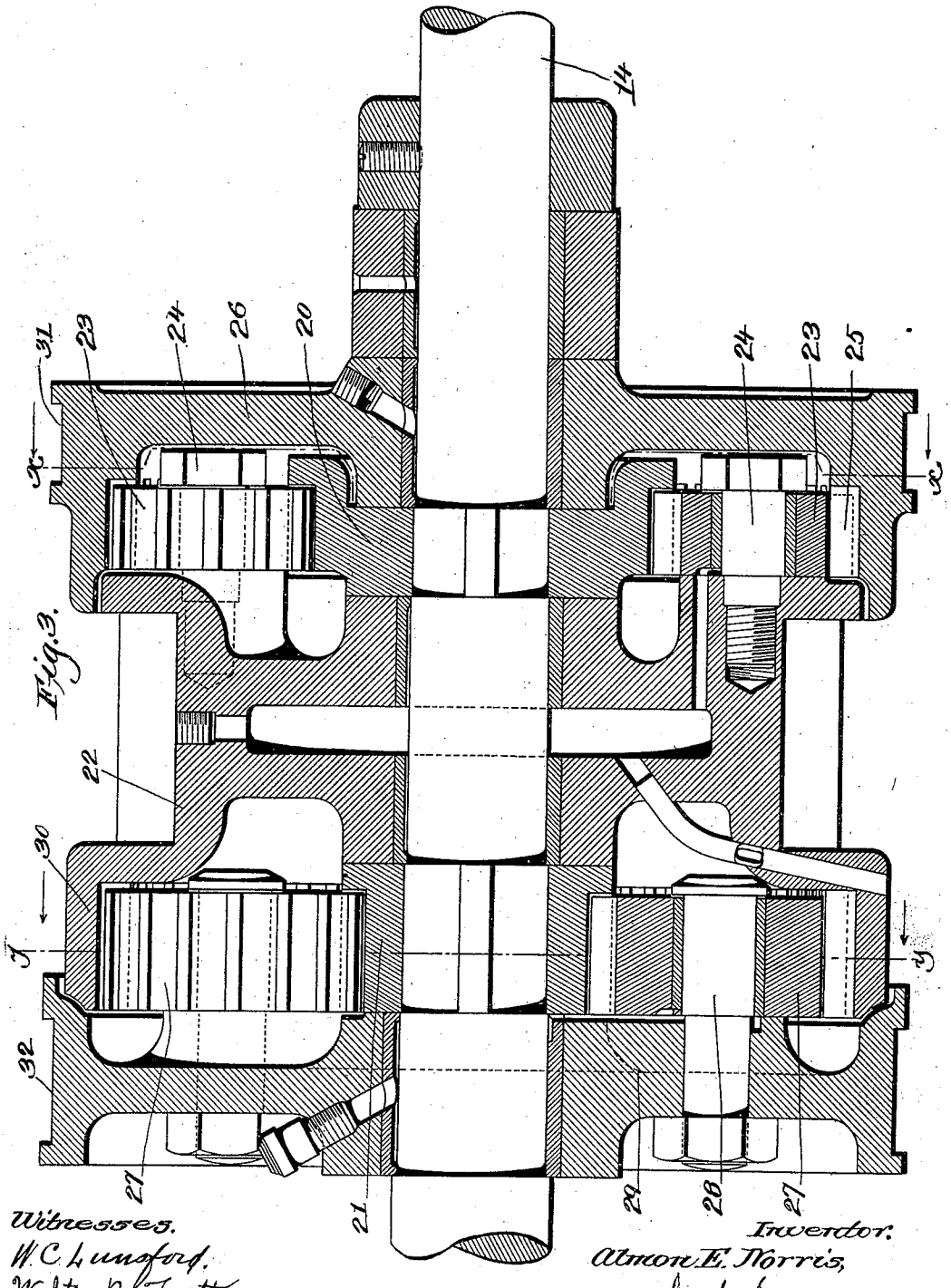
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4 SHEETS—SHEET 3.



Witnesses.
W. C. Lumsford.
Walter K. Trott

Inventor.
Almon E. Norris,
by Kirby Gregory
Atty's.

THE NORRIS PETERS CO., WASHINGTON, D. C.

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4 SHEETS—SHEET 4.

Fig. 5.

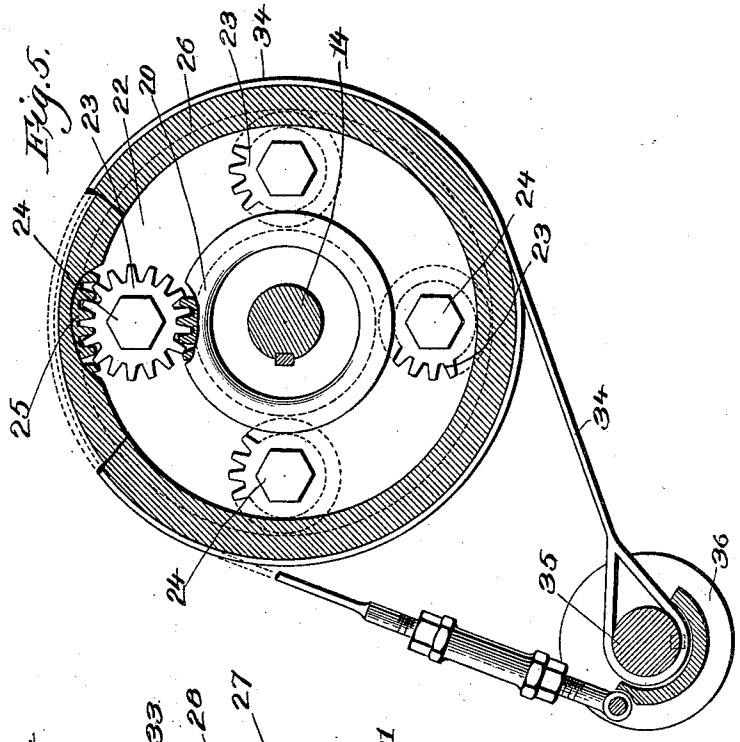
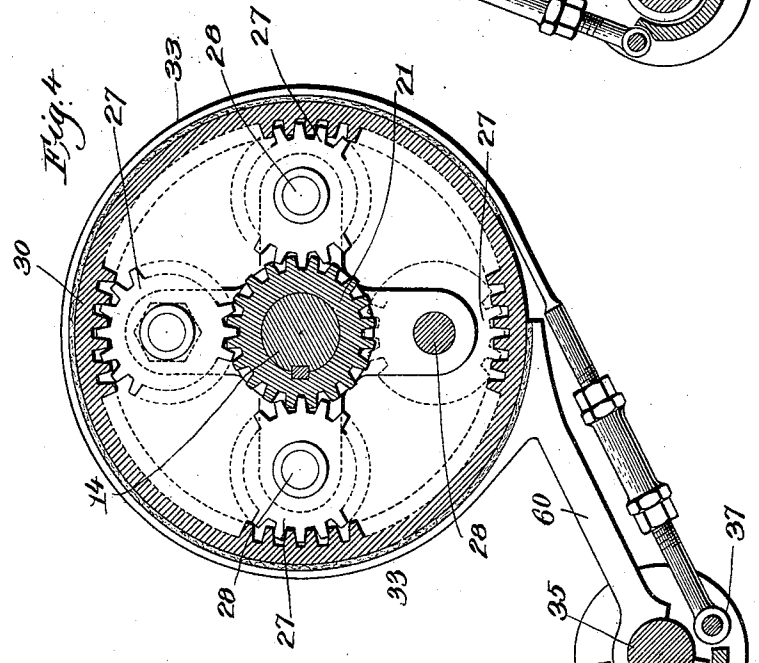


Fig. 4.



Witnesses:
W. C. Lunsford
Walter K. Trott

Inventor:
Almon E. Norris.
by Crosby Gregory
Attys

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALMON E. NORRIS, OF CAMBRIDGE, MASSACHUSETTS.

HOISTING-ENGINE.

No. 841,042. Specification of Letters Patent. Patented Jan. 8, 1907.

Application filed November 22, 1905. Serial No. 288,524.

To all whom it may concern:

Be it known that I, ALMON E. NORRIS, a citizen of the United States, residing at Cambridge, county of Middlesex, and State of Massachusetts, have invented an Improvement in Hoisting-Engines, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

This invention relates to a hoisting-engine having, in addition to the regular hoisting-drums, a swinging gear for swinging a derrick, crane, or similar device; and the invention has for its object to provide a novel gearing to be interposed between the hoisting-drums and the drums of the swinging gear for driving said drums in either direction.

Heretofore the drums of the swinging gear, on which the swinging rope is wound, have been driven from the hoisting-drum by two independent clutches, one of which is adapted to drive the swinging drums in one direction and the other of which drives them in the opposite direction.

In my invention I drive the swinging drums by means of a differential reversing-gearing, all of which will be more fully hereinafter described and then pointed out in the claims.

In the drawings, Figure 1 is a side view of a hoisting-engine embodying my invention. Fig. 2 is a top plan view. Fig. 3 is an enlarged sectional view through the differential reversing-gearing. Fig. 4 is a reduced section on the line *y y*, Fig. 3; and Fig. 5 is a similar section on the line *x x*, Fig. 3.

I will first describe briefly the main elements of the hoisting-engine and then describe particularly my improvement.

3 designates the boiler, 4 the cylinders of the engine, and 5 and 6 two hoisting-rope friction-drums, which are driven from the engine, all as usual in this class of devices, the drum 6 being driven from the drum 5. 7 and 8 designate the handles of the clutches by which the drums 5 and 6, respectively, are controlled, and 9 and 10 are the brake-controlling levers. These parts are all of ordinary construction and form no part of my present invention.

Situated in front of the hoisting-drums is a shaft 11, carrying thereon two swinger-drums 12 and 13, on which the opposite ends of the swinging ropes are inversely coiled, as usual. The shaft 11 is driven in one direction or the other, according to the direction in which it is desired to swing the derrick or boom, the rotation of the shaft in one direction winding up one end of the swinging rope on one drum and unwinding it from the other, and its rotation in the opposite direction reversing this operation.

The shaft 11 is driven from a countershaft 14, which in turn is driven from the shaft of the drum 6 by suitable gears 15, 16, and 17. The shaft 14 is always rotated in the same direction, and in order to drive the shaft 11 in either direction from this shaft 14 I employ the differential gearing mechanism, which is designated generally by 18 in Figs. 1 and 2 and which is shown in detail in Figs. 3, 4, and 5.

This differential reversing-gear mechanism comprises two gears 20 and 21, both fast on the shaft 14 and both geared to the driving member or gear 22, which is loose upon the shaft. The gearing connecting the driving-gear 22 with the gear 20 comprises a plurality of pinions 23, each loosely mounted on a stud 24, carried by the driving-gear 22 and each meshing not only with the gear 20, but also with the internal gear 25, forming part of or rigid with a brake or resistance member 26, which is loose upon the shaft 14. The gearing which connects the driving-gear 22 with the gear 21 consists of a plurality of pinions 27, each loosely mounted on a stud 28, carried by a resistance or brake member 29, also loose on a shaft 14. Said gears 27 mesh both with the gears 21 and with an internal gear 30, which is rigid with or forms part of the driving-gear 22. Both the resistance or brake members 26 and 29 are provided at their peripheries with brake-surfaces, (designated 31 and 32, respectively,) and encircling each brake-surface is a strap-brake, said brakes being designated 34 and 33, respectively. The two strap-brakes 33 and 34 are connected to a suitable brake-operating mechanism in such a way that when either brake is applied the other brake is loose.

As herein shown, one end of the brake-band 34 is looped about a brake-operating shaft 35, and the other end of said band is connected to a collar 36, fast on the shaft, and one end of the brake-band 33 is connected to a strut member 60, which bears against the shaft 35, and the other end is eccentrically connected to a collar 37. The connections between the brake-bands 33 and

34 and the collars 36 and 37 are such that when the shaft 35 is turned in one direction one brake is applied and the other released, and when turned in the opposite direction the other brake will be applied and the first released.

The shaft 35 has rigid therewith a crank-arm 38, which is connected by a link 39 with a suitable controlling-lever 40, situated in a convenient position for manipulation by the engineer.

With this construction it will be seen that if the brake-band 34 is applied to the brake or resistance member 26 so as to hold said member stationary rotation of the shaft 14 will be transmitted to the driving member 22 through the gears 23, said driving member 22 rotating at a slower speed than the shaft 14, but in the same direction, for since the internal gear 25 is stationary it forms a resistance-gear against which the pinions 23 rotate, and the rotation of the pinions 23, caused by the gear 20, advances the driving member 22. During this time the resistance or brake member 29 and the gears 27 carried thereby are running loose. Setting of the brake 34, therefore, will result in rotating the driving member 22 in the same direction as that of the shaft 14. If, on the other hand, the brake 33 be set and the brake 34 loose, then the support for the pinions 27 becomes a stationary support, and the rotation of the gear 21 is transmitted to the driving member 22 through the pinions 27. The arrangement of this gear is such, however, that the driving member 22 is rotated oppositely from the shaft 14. Since the driving member 22 is geared to the drum-carrying shaft 11, it will be observed that said latter shaft may be rotated in either direction by merely setting one or the other of the brakes 33 34.

In this embodiment of my invention the driving member 22 is provided with gear-teeth which mesh directly with a gear on the shaft 11, but any suitable means of transmitting power from the driving member to the shaft 11 may be employed.

The drawings illustrate one embodiment of my invention only.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A hoisting-engine, a derrick-swinging shaft having a gear thereon, a driving-shaft operated by the hoisting-engine, a driving-gear loose on the driving-shaft and meshing with the gear on the derrick-swinging shaft, two trains of normally inoperative gearing connecting the driving-gear with the driving-shaft, one adapted to rotate the driving-gear in one direction and the other to rotate the driving-gear in the other direction, and means to render either train of gears operative.

2. A hoisting-engine, a derrick-swinging shaft having a gear thereon, a driving-shaft operated by the hoisting-engine, a driving-gear loose on the driving-shaft and meshing with the gear on the derrick-swinging shaft, and two sets of gearing each including a resistance member for rotating the driving-gear, one set of gearing operating to rotate the driving-gear in one direction and the other set to rotate it in the opposite direction.

3. In a hoisting-engine, a driving-shaft connected thereto to be driven thereby, a derrick-swinging shaft situated in front of the driving-shaft and having a gear thereon, a driving-gear loose on the driving-shaft and meshing with that on the derrick-swinging shaft, two trains of gearing connecting the driving-gear with the driving-shaft, each train of gearing including a brake member, a band-brake coöperating with each brake member, and means for operating either band-brake, said means being situated adjacent the controlling means for the hoisting-drum.

4. A hoisting-engine including a drum and means for controlling the same, a derrick-swinging shaft situated at the front of the drum and having a gear thereon, a driving-shaft having a gear loose thereon, which gear meshes with the gear on the derrick-swinging shaft, two sets of gearing for rotating the driving-gear in either direction from the driving-shaft, and means situated adjacent the drum-controlling means for controlling the operation of the two sets of gearing.

5. A hoisting-engine, a driving-shaft connected thereto to be driven thereby constantly in one direction, two gears fast on the driving-shaft, a driving-gear loosely mounted on said shaft, two brake members also loosely mounted on said shaft, one of said brake members carrying a plurality of pinions meshing both with one of the gears on the driving-shaft and a gear rigid with the driving-gear, said driving-gear having a plurality of pinions meshing with the other gear fast on the driving-shaft and the other resistance member, and a brake for each resistance member.

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

ALMON E. NORRIS.

Witnesses:
LOUIS C. SMITH,
MARGARET A. DUNN.