No. 847,855. PATENTED MAR. 19, 1907.

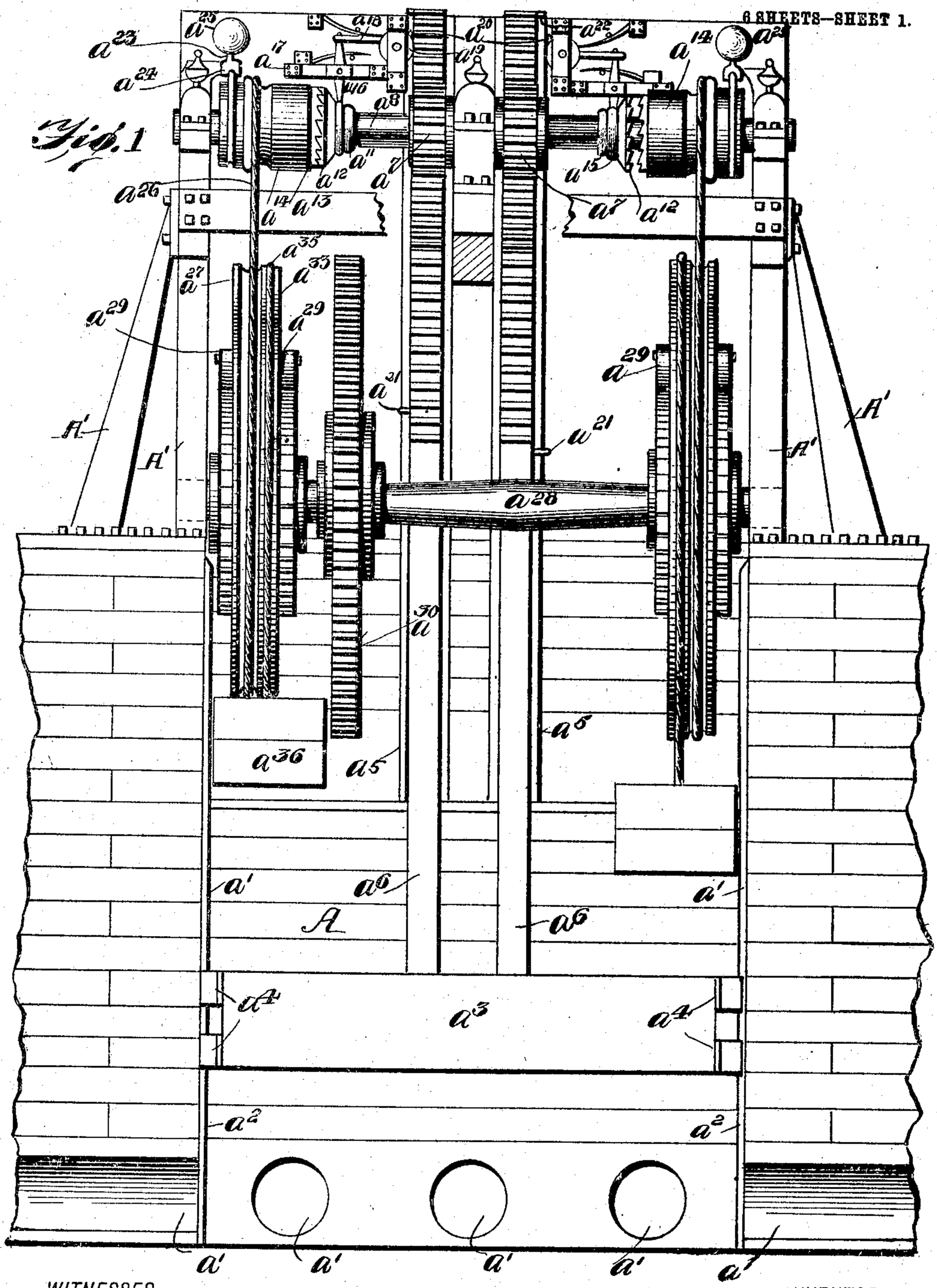
G. M. VROOME.

COMBINATION POWER MACHINE.

APPLICATION FILED FEB. 9, 1905.

6 SHEETS—SHEET 1.

Fig. 1.



WITNESSES.

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C. E. Frazier

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ATTORNEYS

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6 SHEETS—SHEET 2.

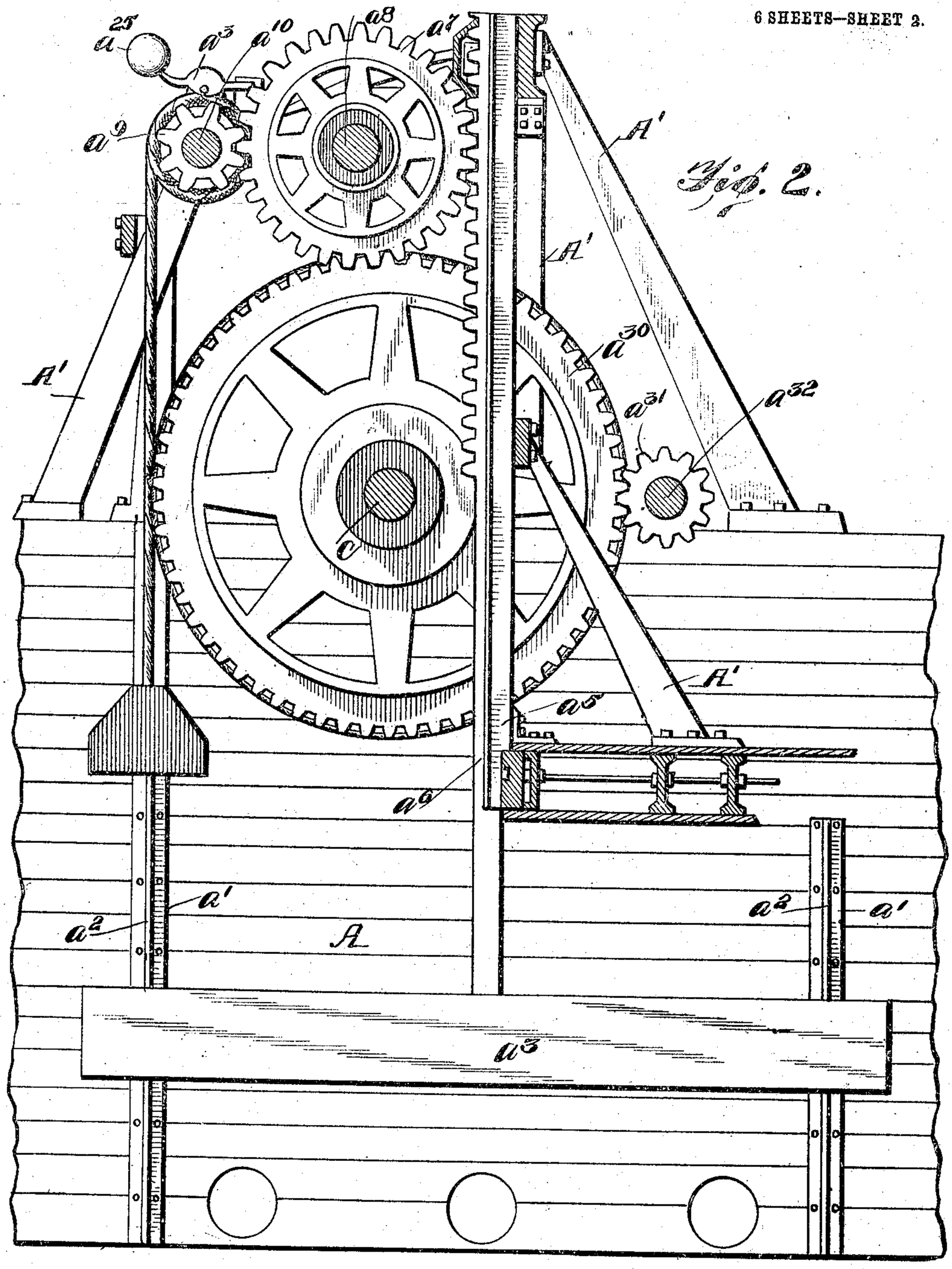

Fig. 2.

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6 SHEETS—SHEET 3.

Fig. 4.

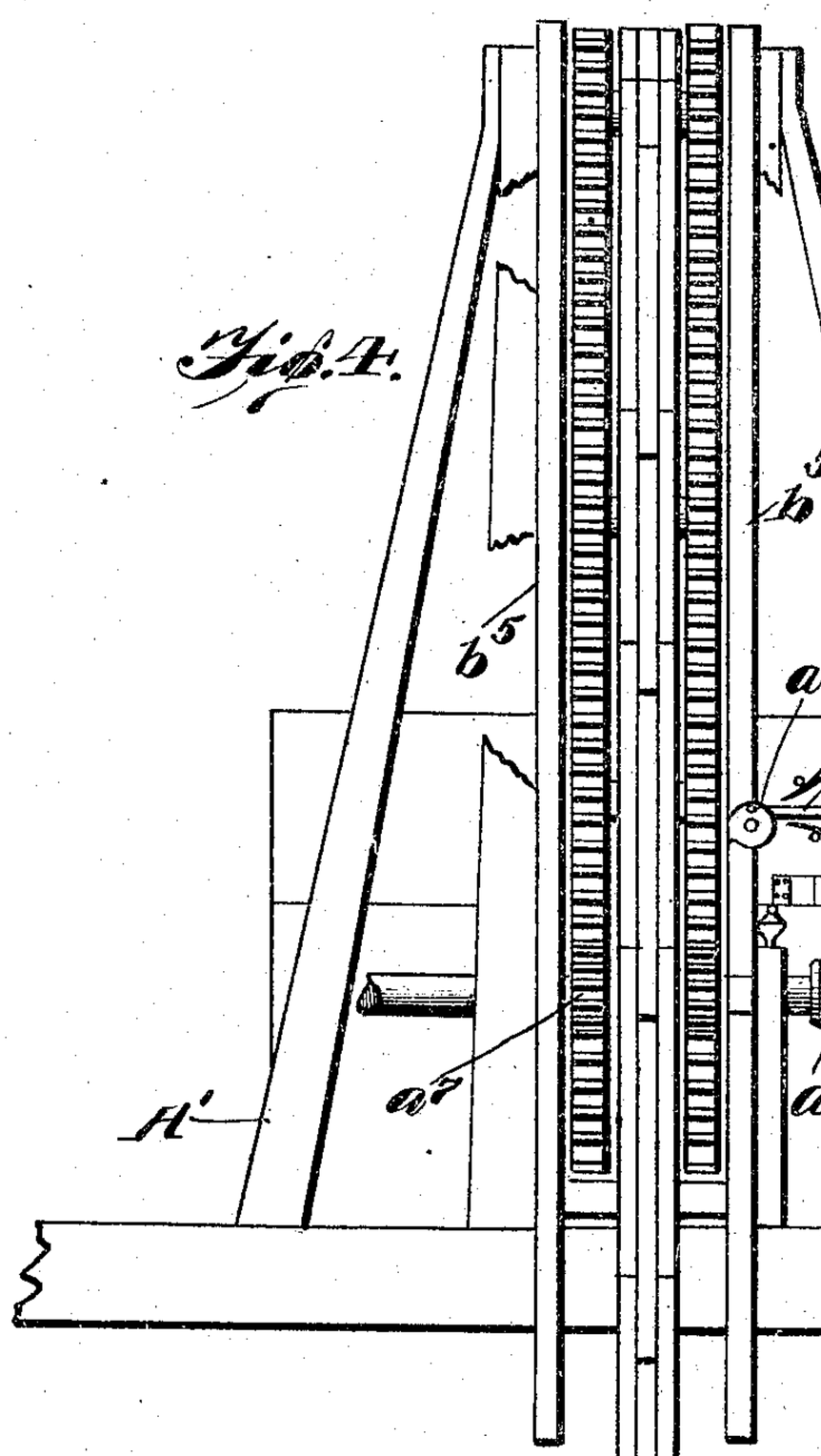


Fig. 5.

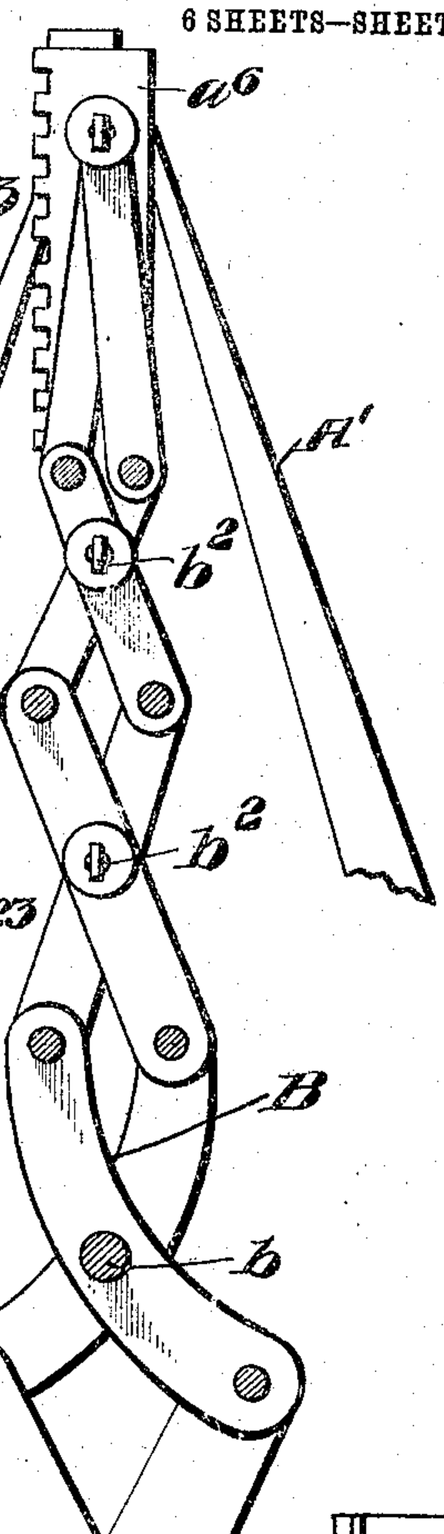
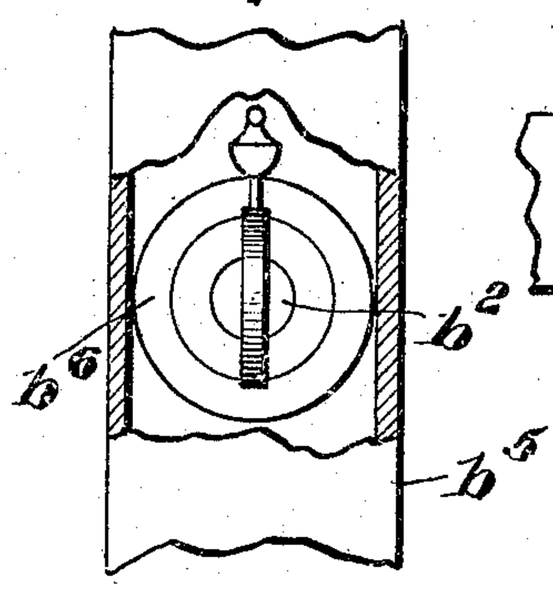
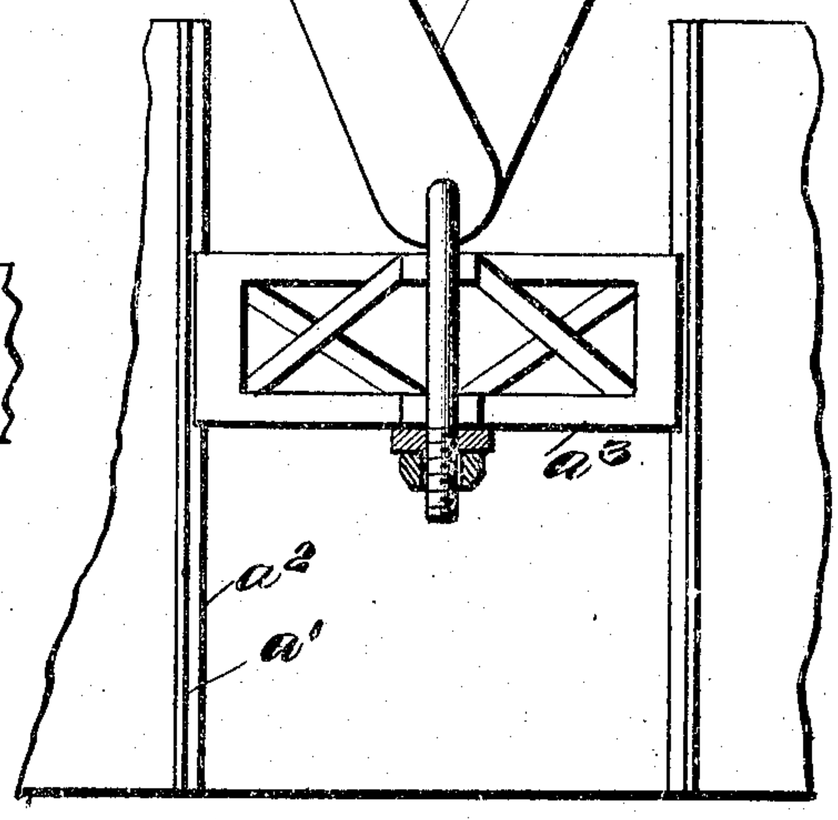


Fig. 12.





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6 SHEETS—SHEET 4.

Fig. 5.

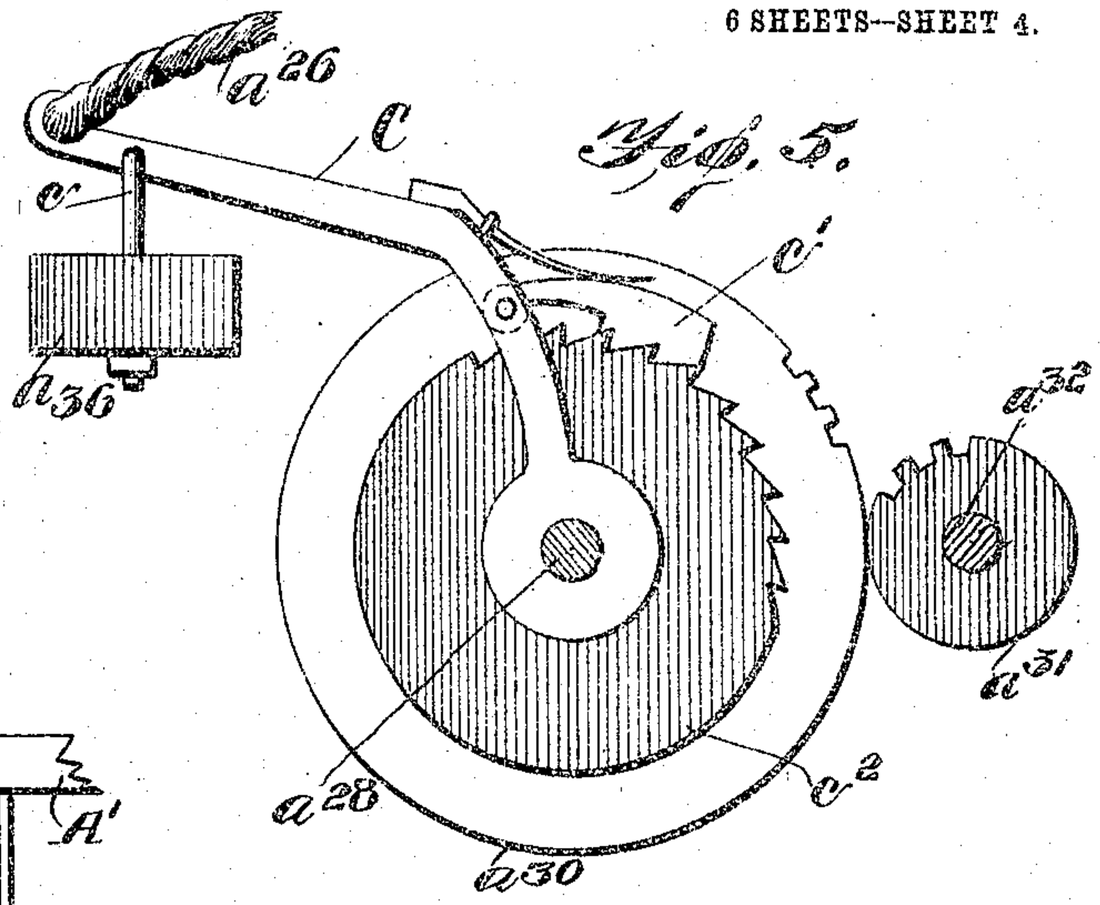


Fig. 7.

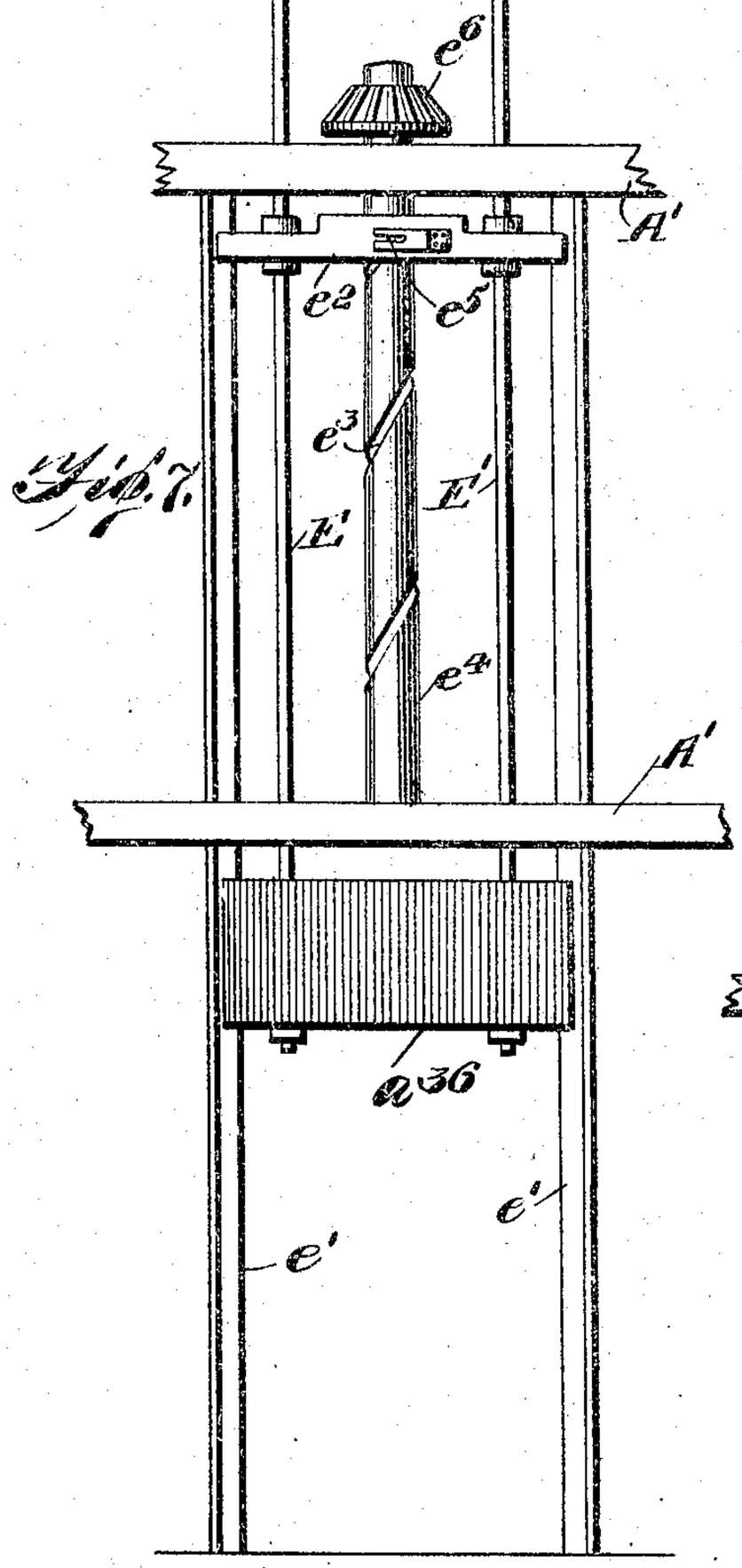
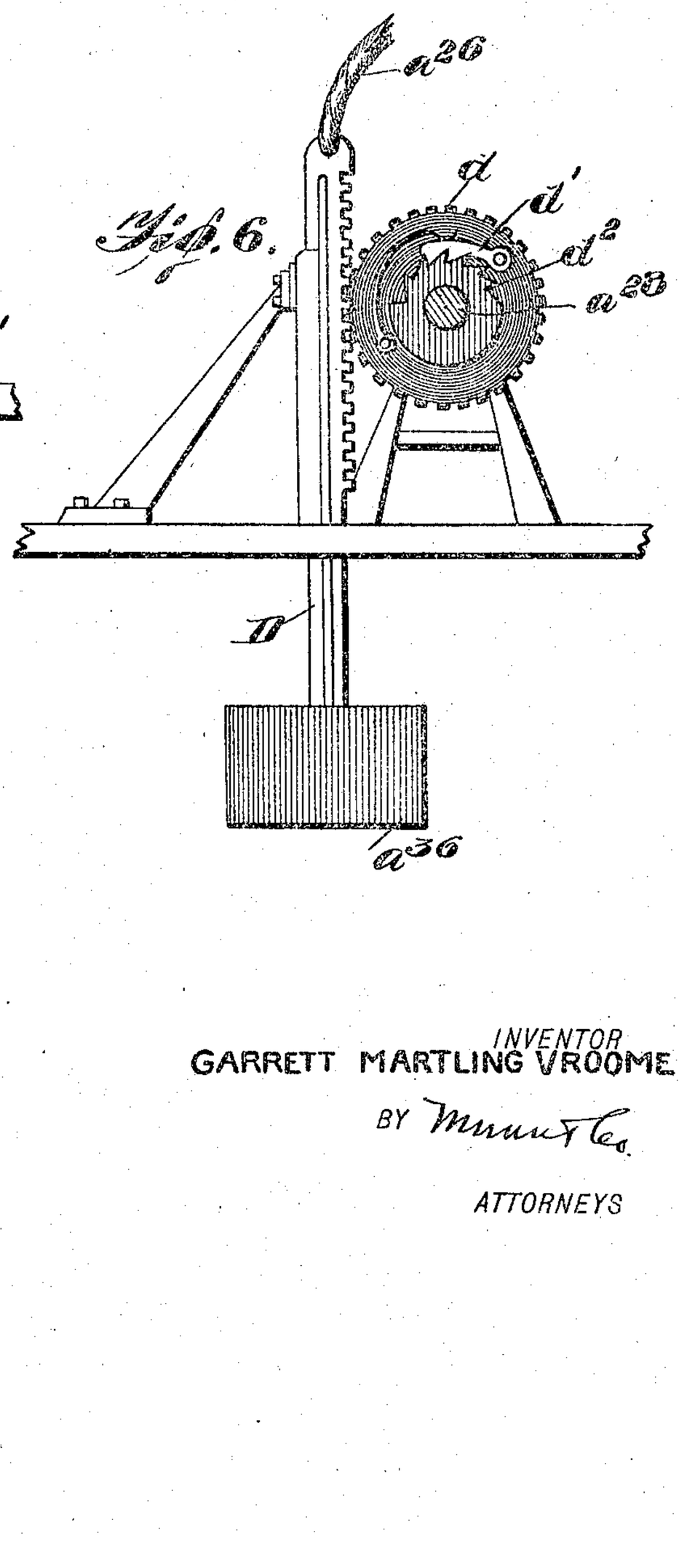


Fig. 6.



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6 SHEETS—SHEET 5.

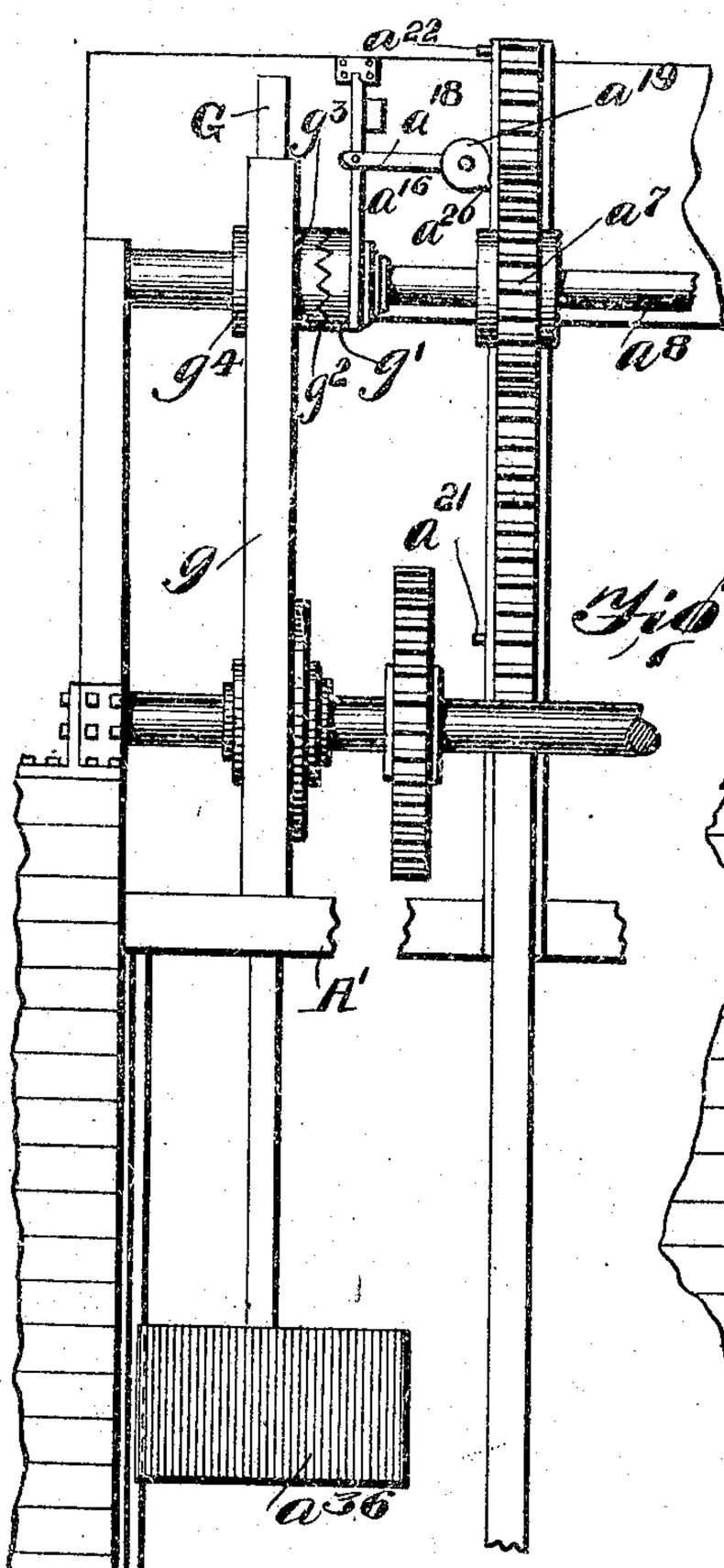

Fig. 8.

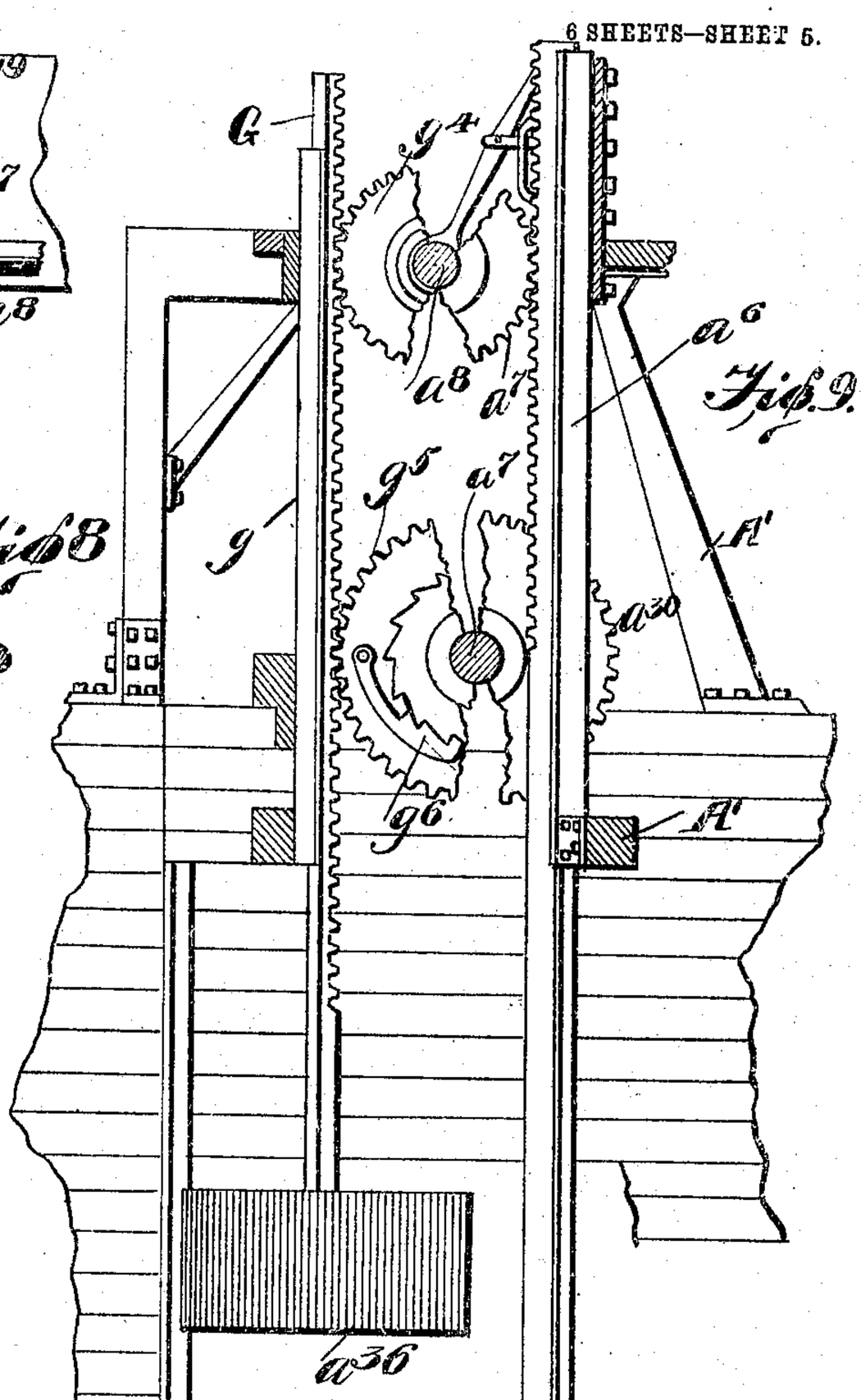

Fig. 9.

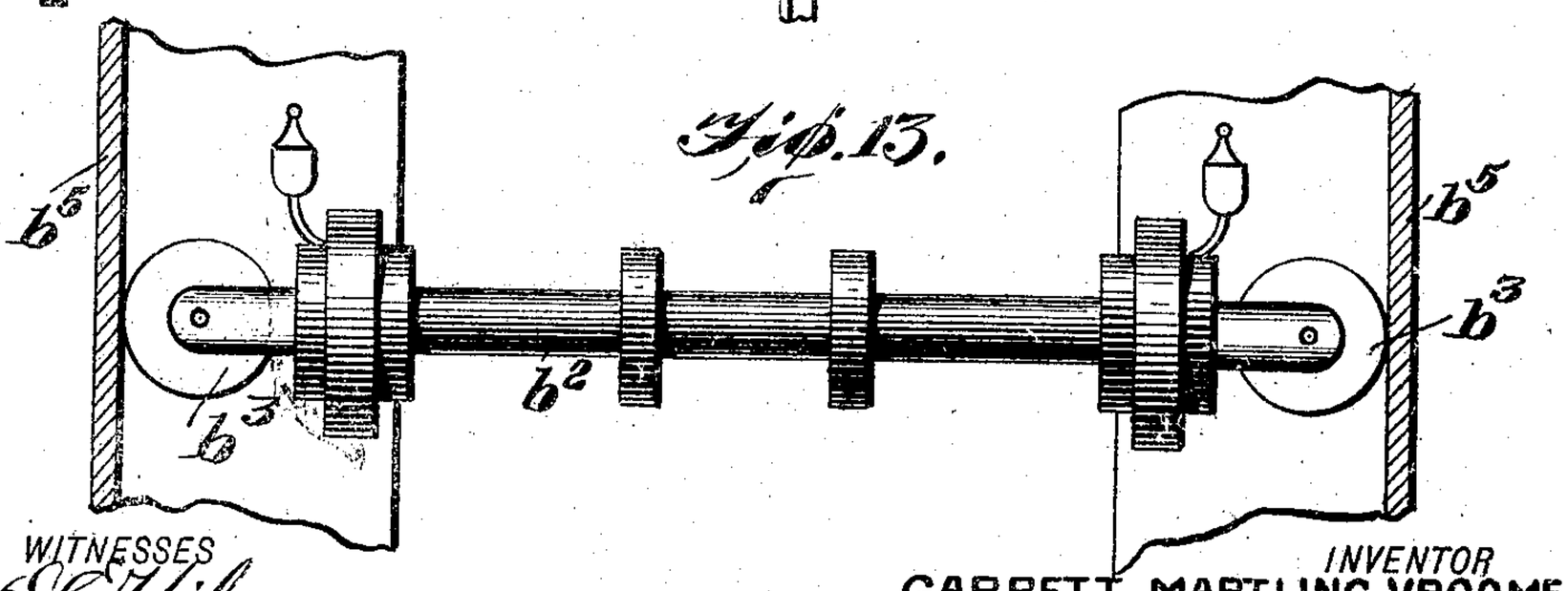

Fig. 13.

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6 SHEETS—SHEET 6.

Fig. 10

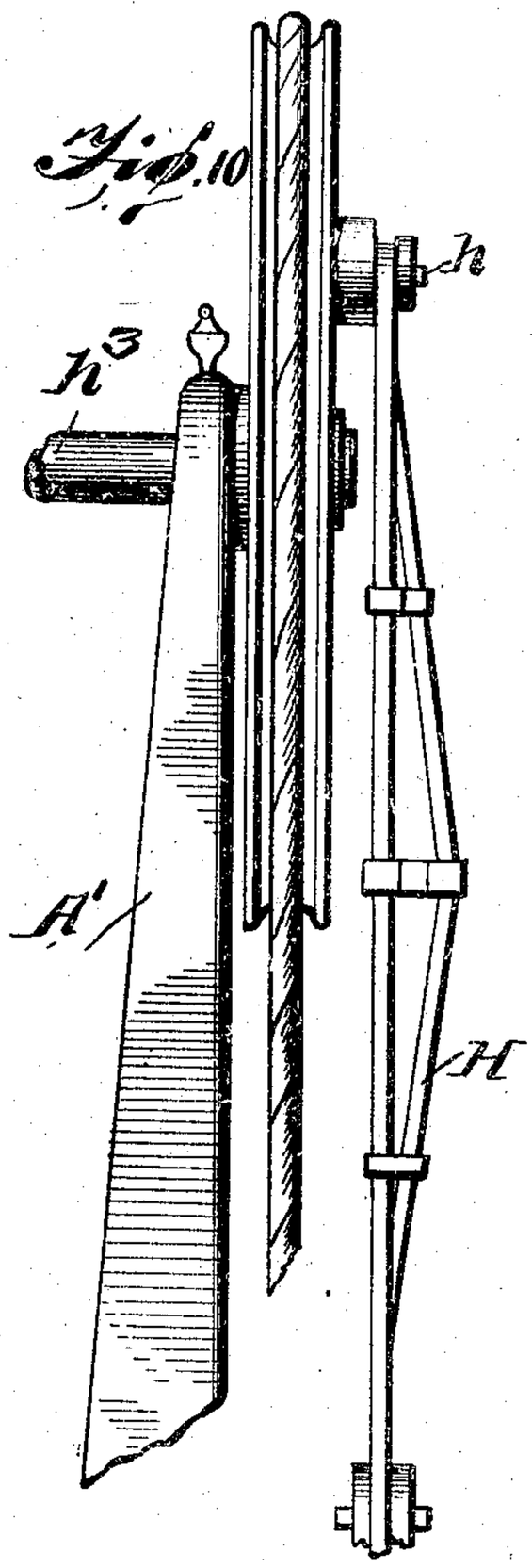


Fig. 11

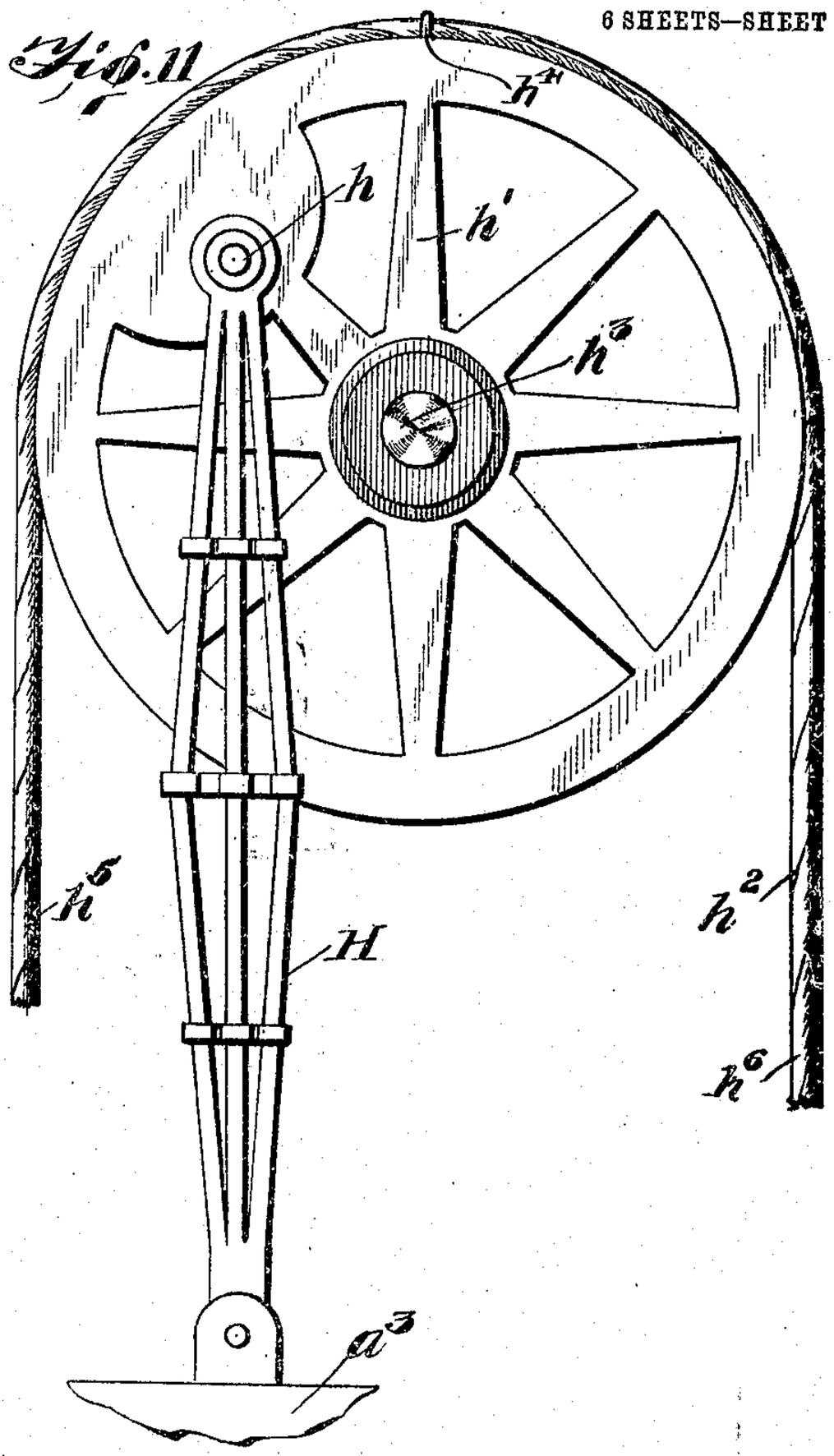
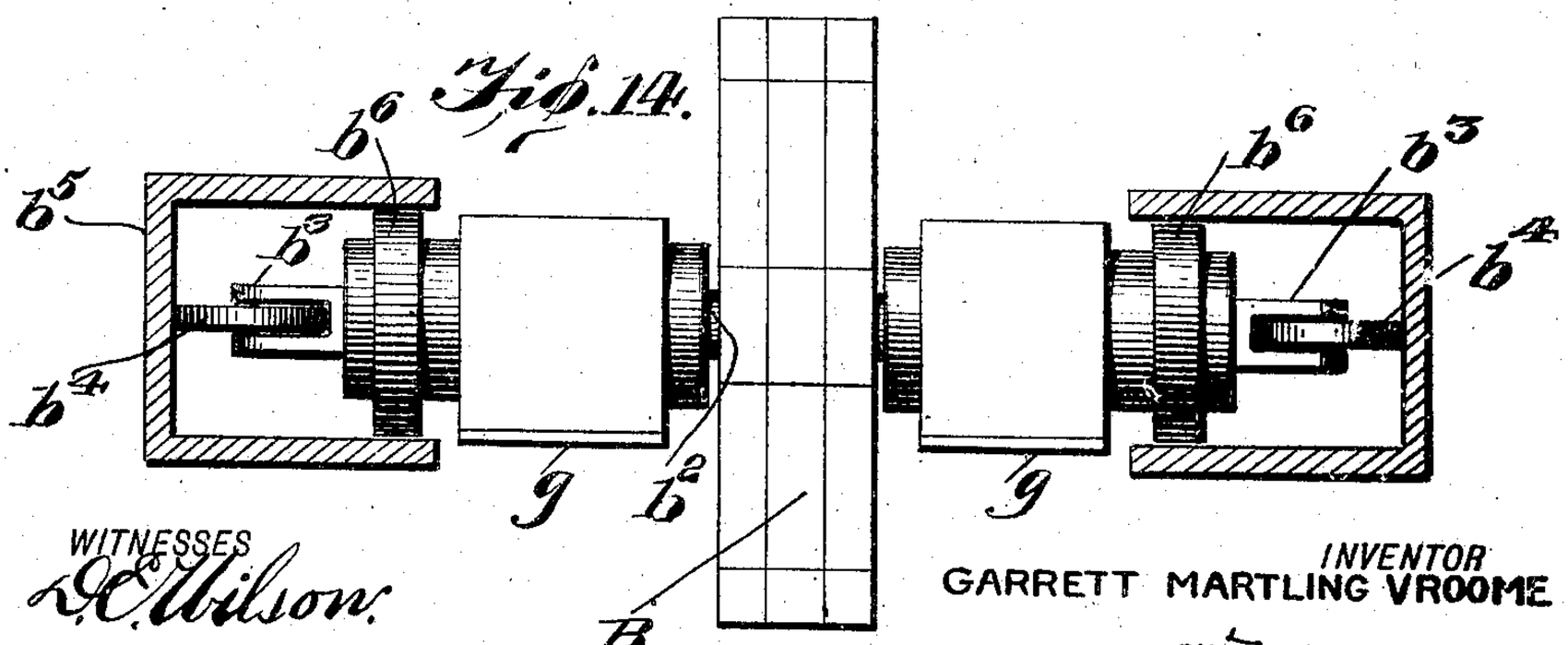


Fig. 14.



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UNITED STATES PATENT OFFICE.

GARRETT MARTLING VROOME, OF CASTLETON CORNERS, NEW YORK.

COMBINATION POWER-MACHINE.

No. 847,855. Specification of Letters Patent. Patented March 19, 1907.

Application filed February 9, 1905. Serial No. 244,972.

To all whom it may concern:

Be it known that I, GARRETT MARTLING VROOME, a citizen of the United States, and a resident of Castleton Corners, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Combination Power-Machines, of which the following is a specification.

My invention is an improvement in combination power-machines, and consists in certain novel constructions and combinations of parts hereinafter described and claimed.

Referring to the drawings forming a part hereof, Figure 1 is a front view of an embodiment of my invention. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a side view showing a modified form. Fig. 4 is a front view of Fig. 3. Fig. 5 is a view of a modified form of mechanism for connecting the weight and driving-shaft. Fig. 6 is another modification of the connection between the weight and the driving-shaft. Fig. 7 is a front view of a modified form of mechanism for connecting the float to the transmission-shaft. Fig. 8 is a front view of another modification, and Fig. 9 is a side view of the same. Fig. 10 shows another modification of my invention. Fig. 11 is a side view thereof, and Figs. 12, 13, and 14 are detail views of parts shown in Figs. 4 and 5.

In the embodiment shown in Figs. 1 and 2 the mechanism is supported within and above a pit A, of masonry or other suitable material, communicating with the water of the ocean through the conduits a, whereby the water in the pit may be influenced by the tide. Slideways a', comprising a plate provided with a projecting tongue a^2, are secured to the sides of the pit, and floats a^3 are arranged within the pit to be acted upon by the tide-water, the said floats being provided with brackets a^4 at the ends thereof for engaging the slideways, the brackets having grooves for receiving the tongues, whereby to guide the floats in their rising-and-falling movement. Vertical guideways a^5 are supported in the pit by a suitable framework A′, and slidably mounted on the guideways are rack-bars a^6, the rack-bars being connected at the lower ends to the floats and engaging pinions a^7, journaled upon shafts a^8, supported by the framework A′ before mentioned. The pinions a^7 mesh with pinions a^9, secured upon a shaft a^{10}, journaled in the framework, and upon the shaft a^{10} is slidably mounted a sleeve a^{11}, having upon one of the ends thereof a clutch-face a^{12}, meshing with the clutch-face a^{13} upon a drum a^{14}, journaled loosely on the shaft. The sleeve a^{11} is provided with a gloove encircled by a ring a^{15} upon one end of the lever a^{16}, journaled in a bracket a^{17}, secured to the framework A′, the opposite end of the lever being connected by a link a^{18} with a wheel a^{19}, journaled in an angular portion of the bracket a^{17}. The wheel a^{19} is provided with a projection a^{20}, adapted to be engaged by projections a^{21} a^{22} upon the upper and lower portions of the rack-bar, the said projections acting to partially rotate the wheel, whereby to operate the clutch.

A brake is provided for the drum a^{14}, comprising a lever a^{23}, pivoted upon the frame, and provided with a brake-shoe a^{24}, engaging the drum, the lever being provided with a weight a^{25}, whereby to make suitable pressure upon the drum.

The drum a^{14} has wound thereon a rope a^{26}, winding at its other end upon a grooved pulley a^{27}, loosely journaled upon a driving-shaft a^{28}, mounted in the framework A′ and connected thereto by a pawl-and-ratchet mechanism a^{29}. The pawl-and-ratchet mechanism a^{29} is so arranged that when the rope is wound upon the drum a^{14} the grooved pulley a^{27} is disconnected from the shaft a^{28}. The pulley a^{27} is provided with another groove a^{33}, and wound within the groove is a rope a^{35}, connected to a weight a^{36}, movable vertically in the pit.

The motion of the shaft a^{28} is transmitted by means of the gear-wheel a^{30}, rigid with the shaft and meshing with the pinion a^{31} upon a shaft a^{32}, journaled in the framework, from whence it may be distributed in any suitable manner.

It will be evident from the description that when the float a^3 is moved upward by the tide the rack-bars a^6 at the commencement of their movement will partially rotate the wheels a^{19}, through the engagement of the projections a^{22} on the rack-bar with the projection a^{20} upon the wheels, to swing the lever a^{16} to operate the clutch a^{12} a^{13} to connect the shaft a^{11} with the drum a^{14}. The winding of the rope a^{26} upon the drum a^{14} rotates the pulley a^{27} and winds up the rope a^{35} in the groove a^{33}, thus elevating the weight a^{36}. The pawl-and-ratchet connection of the pulley a^{27} with the shaft a^{28} permits the movement of the drum without affecting the shaft. At high tide the projections a^{21} engage the pro-

jection of the wheel a^{19} and again partially rotates the said wheel to operate the clutch to disconnect the drum from the shaft. The pull of the weight upon the grooved pulley a^{27} will now tend to rotate the same in the opposite direction—that is, in a direction to unwind the rope attached to the weight. The pulley a^{27} is now, however, connected with the shaft a^{28} by the pawl-and-ratchet mechanism and rotates the said shaft, this movement of rotation being transmitted, through the gear-wheel a^{30} and the pinion a^{31}, to the shaft a^{32}.

In the modification shown in Figs. 3 and 4 the weight a^3 is attached to the lower end of a system of lazy-tongs B, working upon a fixed shaft b and having secured to the upper end thereof the rack-bar a^6, meshing with the pinions a^7, as before described. It will be understood that the mechanism shown in Figs. 3 and 4 is merely a modification of the manner of connecting the float a^3 with the rack-bars.

In Fig. 5 the grooved pulley a^{27} is dispensed with, and the weight a^{36} is connected by a link c with a lever C, loosely mounted upon the shaft a^{28} and provided with a spring-pressed pawl c', engaging a ratchet-wheel c^2, rigid with the shaft a^{28}. It will be evident that when the rope a^{26} is wound upon the drum a^{14} the arm C will be drawn upward, pulling up the weight a^{36}, the pawl c' moving idly over the ratchet-teeth. When the weight has reached its highest position and the drum a^{14} is released from the shaft a^8, the weight tends to draw downward the arm C and the pawl c' engages the ratchet-wheel c^2, thus rotating the shaft a^{28}, the rotation being imparted to the shaft a^{32} by means of the intermeshing gear-wheels a^{30} a^{31}.

In Fig. 6 the weight a^{36} is attached to a rack-bar D, meshing with the gear-wheel d, loosely mounted on the shaft a^{28}, the gear being provided with a spring-pressed pawl d', engaging a ratchet-wheel d^2, rigid with the shaft a^{28}. When the weight is drawn upward by means of the rack-bar D and the rope a^{26}, the gear-wheel d is rotated and the pawl d' slips idly over the teeth of the ratchet-wheel d^2. When, however, the weight commences to descend, the pawl engages the ratchet, thus rotating the shaft a^{28}.

In Fig. 7 the weight a^{36} is connected by the links E E′ to a yoke e, the yoke being connected by the rope a^{26} with the drum a^{14}. The links E E′ slide through bearings in the supporting-framework A′, and the weight is guided in its upward and downward movement by the guideways e'. A cross-bar e^2 is secured to the links E E′, and the said cross-bar is provided with a pin e^5, engaging a spiral groove e^3 in a vertical shaft e^4, mounted for rotation in the framework A′. The bevel-gear e^6 is secured to the upper end of the shaft e^4, and the bevel-gear e^6 may be arranged to mesh with a bevel-gear (not shown) upon the shaft a^{28} and connected to the shaft by pawl-and-ratchet mechanism similar to that shown in Fig. 6 in such manner that when the weight moves upward the rotation of the shaft e^4 is not imparted to the shaft a^{28}; but when said weight moves downward the pawl-and-ratchet mechanism connects the shaft e^4 with the shaft a^{28}.

In Figs. 8 and 9 is shown a front and side view of a modification wherein the weight a^{36} is connected to a rack-bar G, slidable in a guideway g, supported in any suitable manner by the framework A′ and engaging the pinion g^4, loosely mounted upon the shaft a^8. The shaft a^8 has mounted for longitudinal movement thereon, but keyed thereto, a sleeve g', provided with a clutch-face g^2, engaging a clutch-face g^3 upon the pinion g^4 before described. The sliding sleeve is operated by the same operating mechanism shown in Figs. 1 and 2, comprising the lever a^{18} and the link a^{18}, connecting said lever to the wheel a^{19}, the wheel having a projection a^{20}, engaged by the projections a^{21} and a^{22} before described. The rack-bar G also engages a gear-wheel g^5, loosely mounted on the shaft a^{28} and connected thereby to pawl-and-ratchet mechanism g^6 in such manner that when the rack-bar moves upward the gear-wheel g^5 rotates loosely on the shaft a^{28} and when said rack-bar moves downward the pawl-and-ratchet mechanism g^6 connects the gear-wheel to the shaft. The shaft a^{28} is provided with the usual gear-wheel a^{30} for transmitting movement, and the pinion a^7 is actuated by the rack-bar a^6, before described.

In Figs. 10 and 11 is shown a modification wherein the float a^3 is connected by a truss-bar H with the crank-pin h of a wheel h', secured to a shaft h^3, the wheel h' being grooved to receive a rope h^2, the rope being secured at the point h^4 to the periphery of the wheel. The ends of the rope h^2 are connected directly with the rack-bars a^6, one end of the rope being connected to one rack-bar and the other end to the other rack-bar. The wheel h' is so proportioned with respect to the height of the rise of the tide that at high tide the crank-pin will be at about the position shown in Fig. 11, while at low tide it will make a similar angle with the horizontal diameter of the wheel, but on the lower side of said diameter. It will be evident from the description that when the tide rises the rack-bars secured to the end h^5 of the rope h^2 will be elevated while at the falling of the tide the rack-bar secured to the end h^6 of the rope h^2 will be elevated. In this manner both the rise and fall of the tide will be utilized.

In Figs. 12, 13, and 14 is shown in detail a means for guiding the lazy-tongs in the modification shown in Figs. 3 and 4. The pivot-rods b^2 in this device have their ends forked

at b^3 and have journaled in the fork friction-rollers b^4, engaging the sides of the guideways b^5. Other friction-rollers b^6 are journaled directly upon the pivot-rods and also engage the guideways. This arrangement constrains the pivot-rods of the lazy-tongs to move in vertical lines and in the same vertical plane.

What I claim is—

1. In an apparatus of the class described, the combination of a float arranged to be acted upon by the rise and the fall of the tide, a rack-bar secured to the float, a shaft, a pinion secured thereto and meshing with the teeth of the rack-bar, a drum journaled on said shaft, a clutch for connecting the drum and said shaft, means whereby the rack-bar may operate the clutch to release the drum at the end of its upward movement, a driving-shaft below said first shaft, a pulley journaled on the driving-shaft, a pawl-and-ratchet connection between the pulley and the driving-shaft, means connecting the drum and the pulley for imparting rotary movement thereto, said pawl-and-ratchet connection releasing the shaft during said rotary movement, and a cable winding upon the pulley during said movement and having an attached weight whereby to rotate said pulley and driving-shaft in the opposite direction when the drum is released.

2. In apparatus of the class described, the combination with the float adapted to be acted upon by the rise and the fall of the tide, shaft journaled above the float, means connected with the float, for rotating the shaft, a drum journaled on the shaft, clutch mechanism for connecting the drum to the shaft, means connected with the float for actuating said clutch to connect the drum and shaft when the float moves in one direction, and for releasing the connection when said float moves in the opposite direction, a driving-shaft, a pulley on said driving-shaft, a rope having an attached weight connected with said pulley for rotating the driving-shaft in one direction, and means for imparting the rotary movement of the drum to the pulley whereby to wind the rope thereon.

3. In an apparatus of the class described, the combination with the float adapted to be acted upon by the rise and the fall of the tide, a shaft journaled above the float, means connected with the float for rotating the shaft during the upward movement of said float, a driving-shaft, a pulley on said driving-shaft, a rope having an attached weight connected with said pulley for rotating the driving-shaft in one direction, and means for imparting the rotary movement of said first-named shaft to the pulley whereby to wind the rope thereon.

Signed at Castleton Corners, in the county of Richmond and State of New York, this 6th day of February, A. D. 1905.

GARRETT MARTLING VROOME.

Witnesses:
FRANK H. BRITTON,
HENRY E. BUSH.