

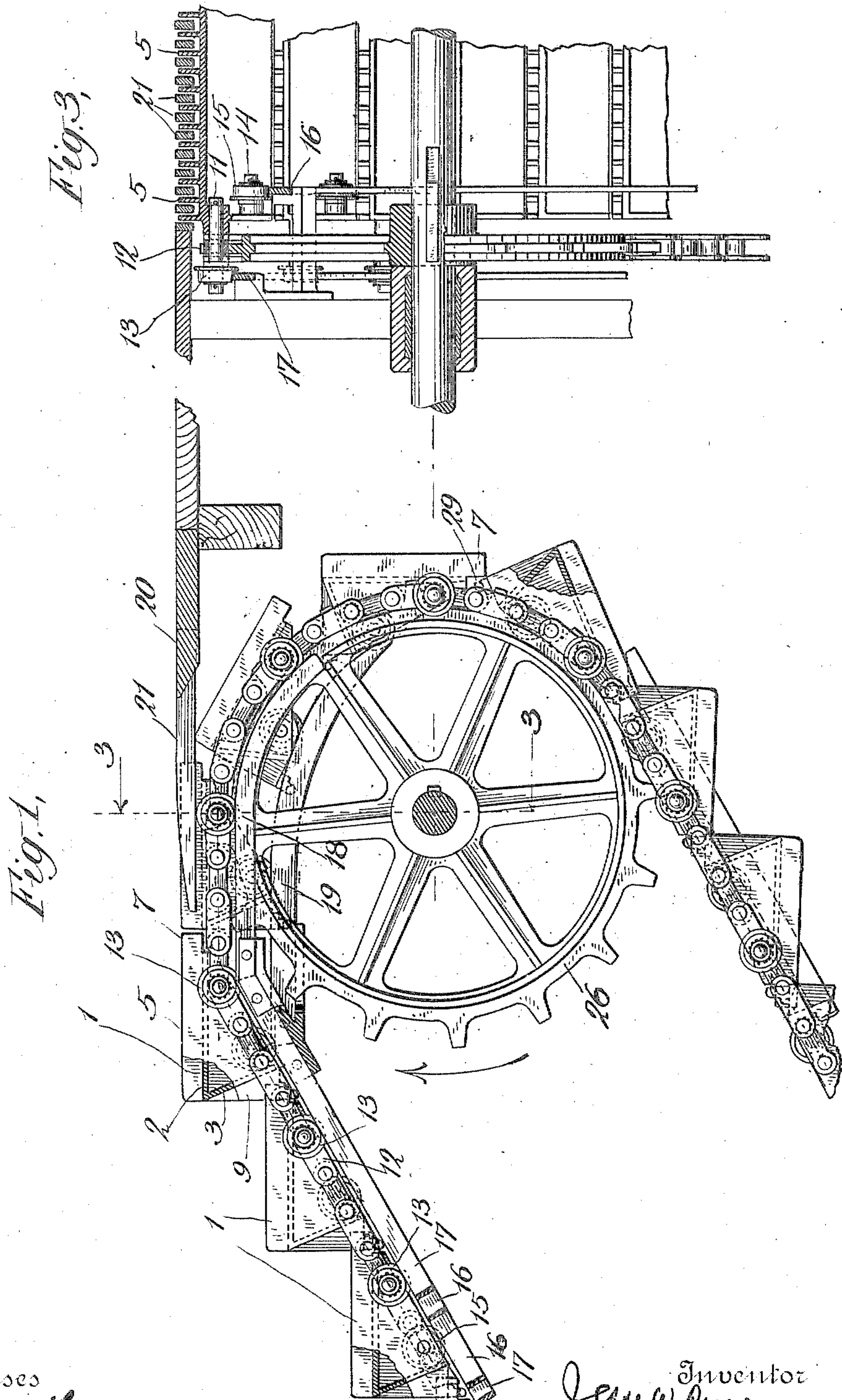
No. 817,338.

PATENTED APR. 10, 1906.

J. W. RENO.
INCLINED ELEVATOR.

APPLICATION FILED JAN. 11, 1906.

3 SHEETS—SHEET 1.



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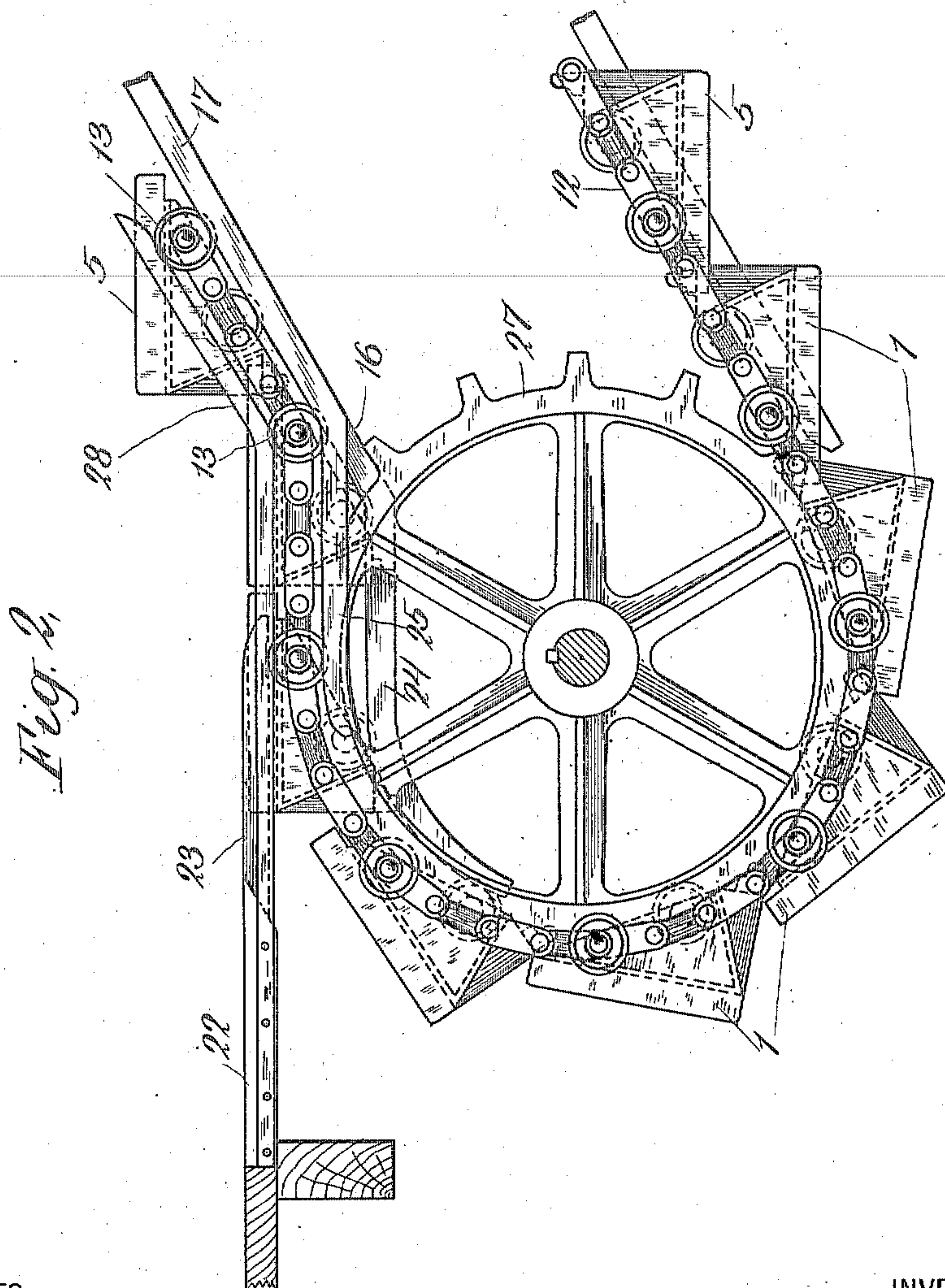
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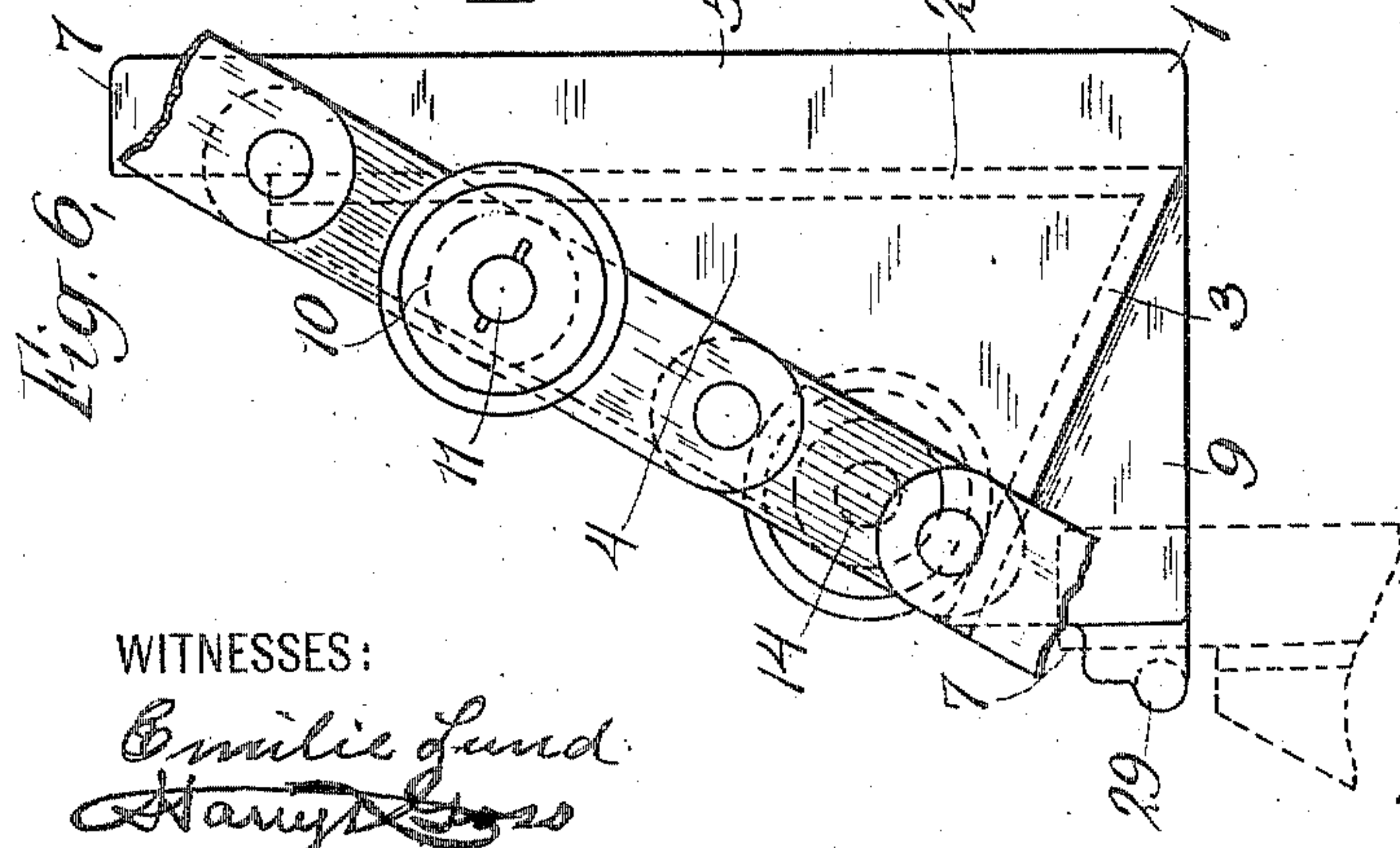
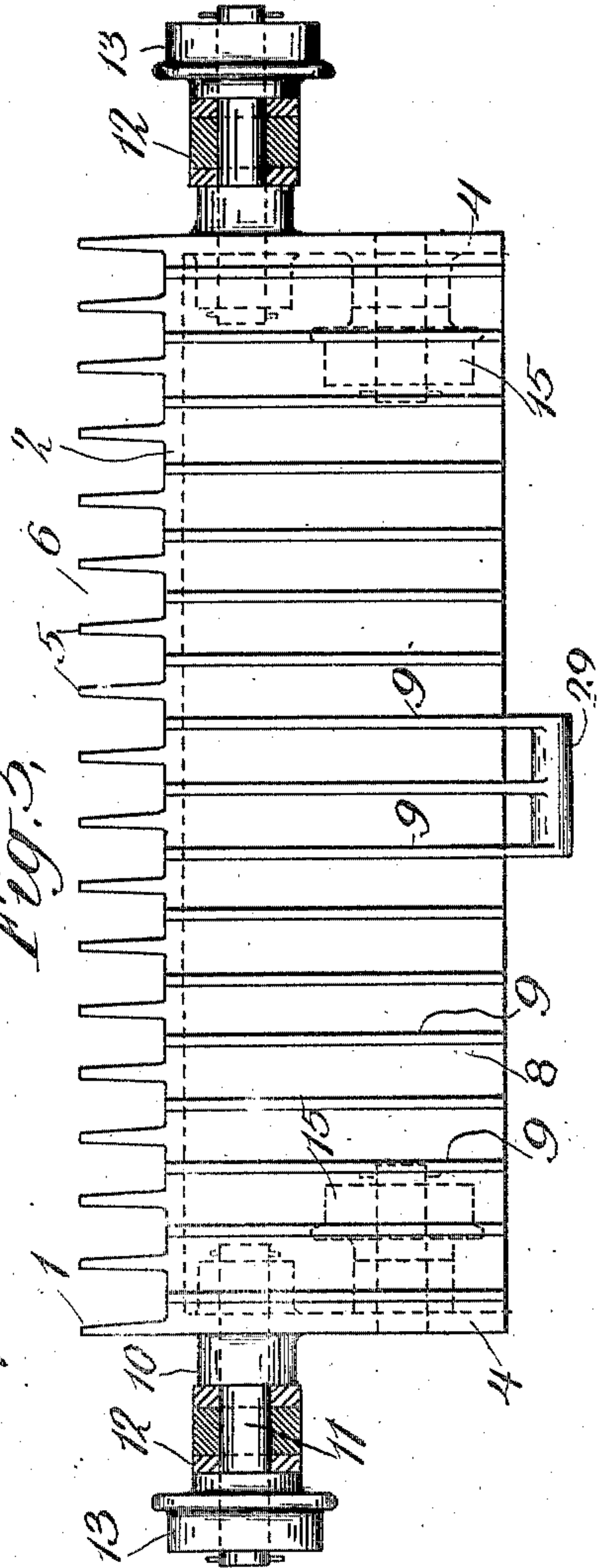
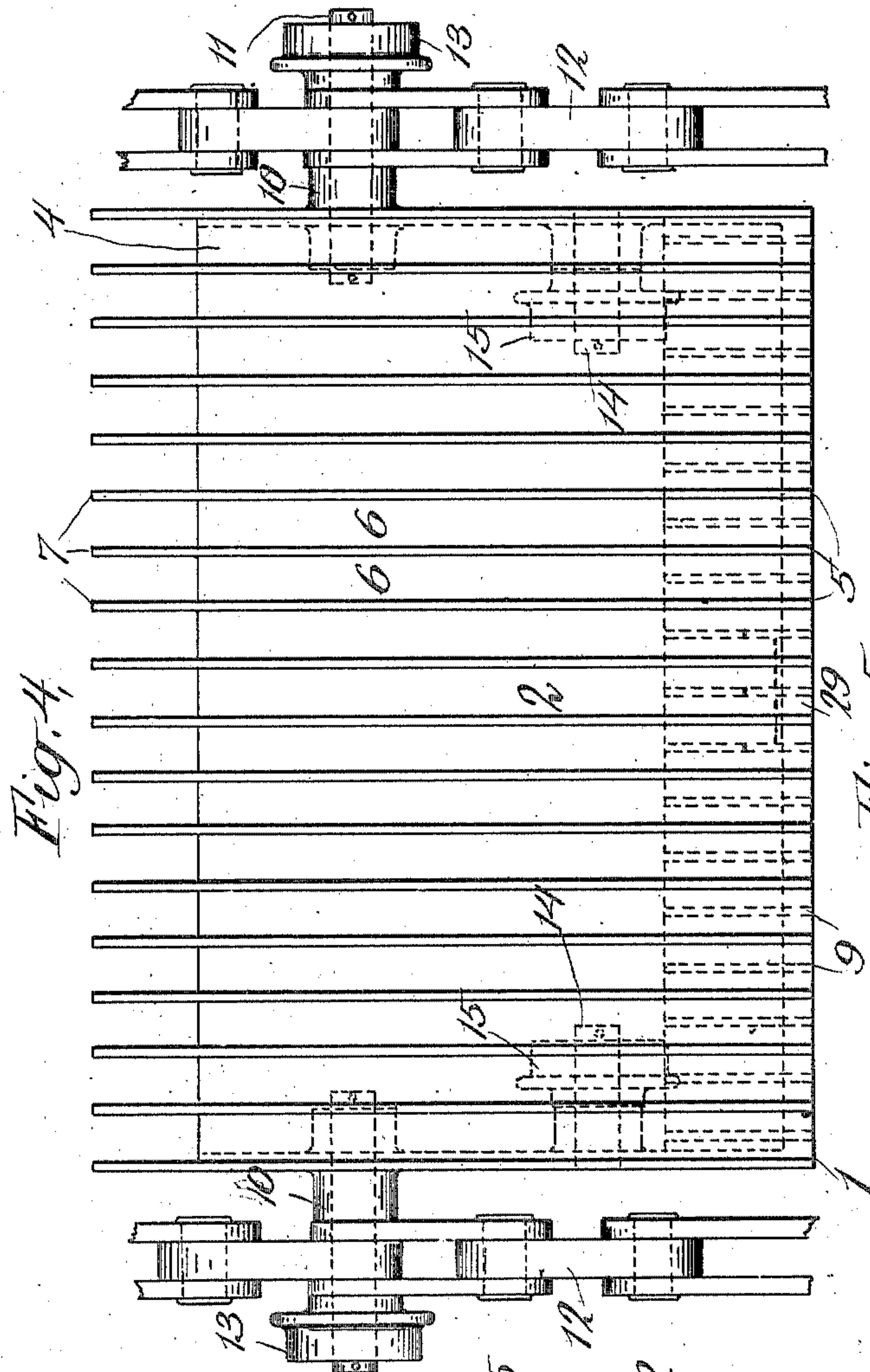
ATTORNEY

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JESSE W. RENO, OF NEW YORK, N. Y.

INCLINED ELEVATOR.

No. 817,338.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed January 11, 1906. Serial No. 295,591.

To all whom it may concern:

Be it known that I, JESSE W. RENO, a citizen of the United States of America, and a resident of New York, State of New York, have invented certain new and useful Improvements in Inclined Elevators, of which the following is a specification.

My invention relates to inclined elevators, in which steps of the general size and form of the steps of an ordinary stairway are pivotally connected to an endless chain and mounted upon an appropriate inclined structure, upon which they may be driven in either direction to carry passengers up or down, as the case may be, from one level to another.

The object of my invention is to provide an elevator of this class which shall be simple and effective in its construction and operation, and especially one which shall be safe and convenient for passengers.

My invention consists in the novel construction of the steps and in the novel combinations of the steps, the landings, and the inclined supporting construction, to be hereinafter more fully pointed out and described.

In the drawings accompanying and forming part of this specification, Figure 1 represents a side view of the upper landing and a portion of the incline, partially in section, of an elevator constructed in accordance with my present invention. Fig. 2 represents a similar view of the lower landing, and Fig. 3 a partial section on line 3 3 of Fig. 1. Fig. 4 represents an enlarged plan view of one of the steps with chain attached; and Figs. 5 and 6 represent, respectively, front and end elevations of the same.

The reference characters are used in the same sense throughout the drawings and the specification.

Numerals 1 represents one of the series of steps which, taken together, form the movable tread-platform of the elevator. These steps are preferably formed of an integral casting, consisting of a horizontal web 2, forming the tread-support, a front web 3, inclined downwardly and rearwardly from the front edge of the horizontal web 2, and end webs 4, which connect or join the horizontal and front webs. Formed upon the top of the horizontal web 2 are the longitudinal tread-ribs 5, longitudinal with respect to the general direction of the tread-platform, pro-

ducing the relatively shallow grooves 6 between said ribs. The rear ends 7 of the ribs 5 extend some distance beyond the back edge of the web 2 and enter vertical grooves or slots 8 in the adjoining step, which slots or grooves are produced by the formation of the ribs 9 on the front of the inclined web 3, the ribs 9 being substantially triangular in shape, as seen from the end of the step. (See Fig. 6.)

The upper surfaces of the ribs 5 form the tread-surface proper of the step, and the front edges of the vertical ribs 9 form the risers thereof. The ribs 9 are in staggered relation with the ribs 5—that is to say, the ribs 5 are in line with the grooves 8—and the rear ends 7 of the tread-ribs extend into the grooves 8 when the steps are in their operative position on the incline of the elevator. The purpose of this construction is to prevent the passenger's foot or apparel from entering and becoming caught between the back edge of one step and the riser of another, especially as the steps are changing their relative positions in passing to or from a landing. Formed on the outside of the end webs 4 are the hubs 10, in which are secured the pins 11. These pins pass through links of the chains 12 and have mounted on their outer ends the truck-wheels 13. On the inside of and secured to the end webs 4 are the pins 14, on which are mounted the truck-wheels 15.

The inner truck-wheels travel upon the inclined tracks 16, while the outer truck-wheels 13 travel upon the inclined tracks 17. On the straight portions of the incline the tracks 16 and 17 lie in the same plane. At the upper landing a curve portion of track 18 is provided for the outer wheels and a curve track 19 for the inner wheels.

20 is the upper comb-landing, which is provided with teeth or prongs 21, adapted to enter the grooves 6 of the steps. The curve tracks 18 and 19 are so formed and located that as the step approaches the comb-landing, and after it has reached the level thereof, it will be advanced substantially horizontally and permit the prongs 21 of the comb to enter the shallow grooves. The ends of the prongs being below the surface of the step, the passenger will be landed safely and gently upon the comb as the step advances and afterward recedes in its continued travel along the curved tracks 18 and 19.

22 is the comb-landing for the lower end of the elevator, and it is provided with teeth or prongs 23, which extend forward and enter the grooves 6 of the steps.

24 and 25 represent, respectively, the portions of track on which the inner and outer truck-wheels travel while the steps are coming into position at the lower landing. A pair of sprocket-wheels 26 is provided at the upper landing, and a pair of similar sprocket-wheels 27 is provided at the lower landing. These wheels engage the chains 12 in a manner that is well understood, and either one or both may be driven by any appropriate means. The short sections of tracks 18 and 19 at the upper landing and 24 and 25 at the lower landing have short horizontal portions arranged at the proper distance apart vertically to maintain the tread-surface of the step in substantially horizontal position while the step is entering or leaving, as the case may be, the comb-landings. These horizontal portions may join the inclined portions 16 and 17 in an angle, or they may be connected therewith by curves, as is well understood. The other ends of the curved track portions 18, 19, 24, and 25 are curved, so as to guide the steps gently from the straight horizontal portions to the positions they take in passing around the sprocket-wheels. It will be observed by reference to Fig. 2 that the tension on the chain at the lower sprocket-wheel tends to cause the track-wheels 13 to leave the track 17 and the track 25 as the chain tends to straighten out. In order to prevent this, I provide a guard-rail 28, which is placed over the track-wheels 13 and holds them down in position.

It will be noticed from the manner in which the steps 2 are pivoted to the chains 12 that as the steps become inverted in passing around the upper sprocket-wheel—for instance, when said wheel is traveling in the direction of the arrow in Fig. 1—the steps would naturally swing down and vibrate back and forth, thereby causing objectionable noise as well as taking up more space. In order to prevent this, I provide means whereby the end of the step farthest from the pin 11 engages the opposite end of the adjacent step. This means consists of a lug or cylindrical portion 29, formed upon an extension of one or more of the vertical ribs 9, which engages the end 7 of the extension of the tread-ribs 5 on that portion of the tread-belt which hangs in an inverted position. This engaging means also prevents the step from tipping when a heavy weight is brought to bear upon the extreme end of the extension 7.

The operation of my invention will be obvious from the foregoing description. The tread-belt may be driven in either direction by merely reversing the power without any change in the mechanism or its adjustment.

Some difficulty has heretofore been experienced in attempting to construct an inclined elevator having steps of the general shape and size of an ordinary stairway because of the difficulties of providing means for preventing the apparel of passengers, especially the dresses of women, from becoming caught between the front edge of the step and the riser of the adjacent step. By means of my improved construction this difficulty is entirely obviated in a practical and efficient manner and in a manner that does not require extreme accuracy of construction.

Having thus described my invention, what I claim is—

1. A series of movable steps for an inclined elevator operatively connected together, the riser of each step being provided with slots adapted to register with projections formed on the tread of the adjacent step.

2. A step for inclined elevators having its tread portion composed of ribs, and having vertical grooves in its riser adapted to receive the ends of the ribs of an adjacent step.

3. A step for inclined elevators having longitudinal grooves in its tread-surface, and vertical grooves in its riser in staggered relation to the grooves in said tread-surface.

4. A step for inclined elevators having longitudinal ribs on its tread, and grooves in its riser in line therewith, said grooves increasing in depth from the upper front edge of the step downwardly.

5. A step for inclined elevators having a main horizontal web, a web joined to the front edge thereof, extending downwardly and inclined under said horizontal web and vertical ribs secured thereto to form a riser for said step.

6. A step for inclined elevators having its tread-surface formed of longitudinal ribs secured to a horizontal web, and having its riser formed of triangular-shaped ribs joined to an inclined transverse web.

7. A step for inclined elevators formed of a horizontal web for the tread, a transverse web for the riser, and webs joining said horizontal and transverse webs, and a pair of truck-wheels at either end of said step, one of each pair of truck-wheels being mounted outside of said end web, and one of each pair inside thereof.

8. A step for inclined elevators having a horizontal web for its tread-support, an inclined front web for its riser, and end webs joining said horizontal web and said riser, a pair of truck-wheels secured to the inside of said end webs, a pair of truck-wheels secured to the outside thereof, and chains in pivotal connection with the journals of said outside truck-wheels.

9. In an inclined elevator a series of steps in pivotal connection with an endless chain, and engaging means on the front and rear

portions of said steps to limit the turning of said steps upon their pivots.

10. In an inclined elevator a series of steps in pivotal connection with a chain having extensions upon their front and rear portions adapted to mutually engage to limit the turning of said steps upon their pivots.

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

JESSE W. RENO.

Witnesses:

GEO. E. HARDY,
EMILIE LUND.