No. 708,626. Patented Sept. 9, 1902.

L. W. DEXTER.

ELEVATOR.

(Application filed Dec. 23, 1901.)

(No Model.) 3 Sheets—Sheet 1.

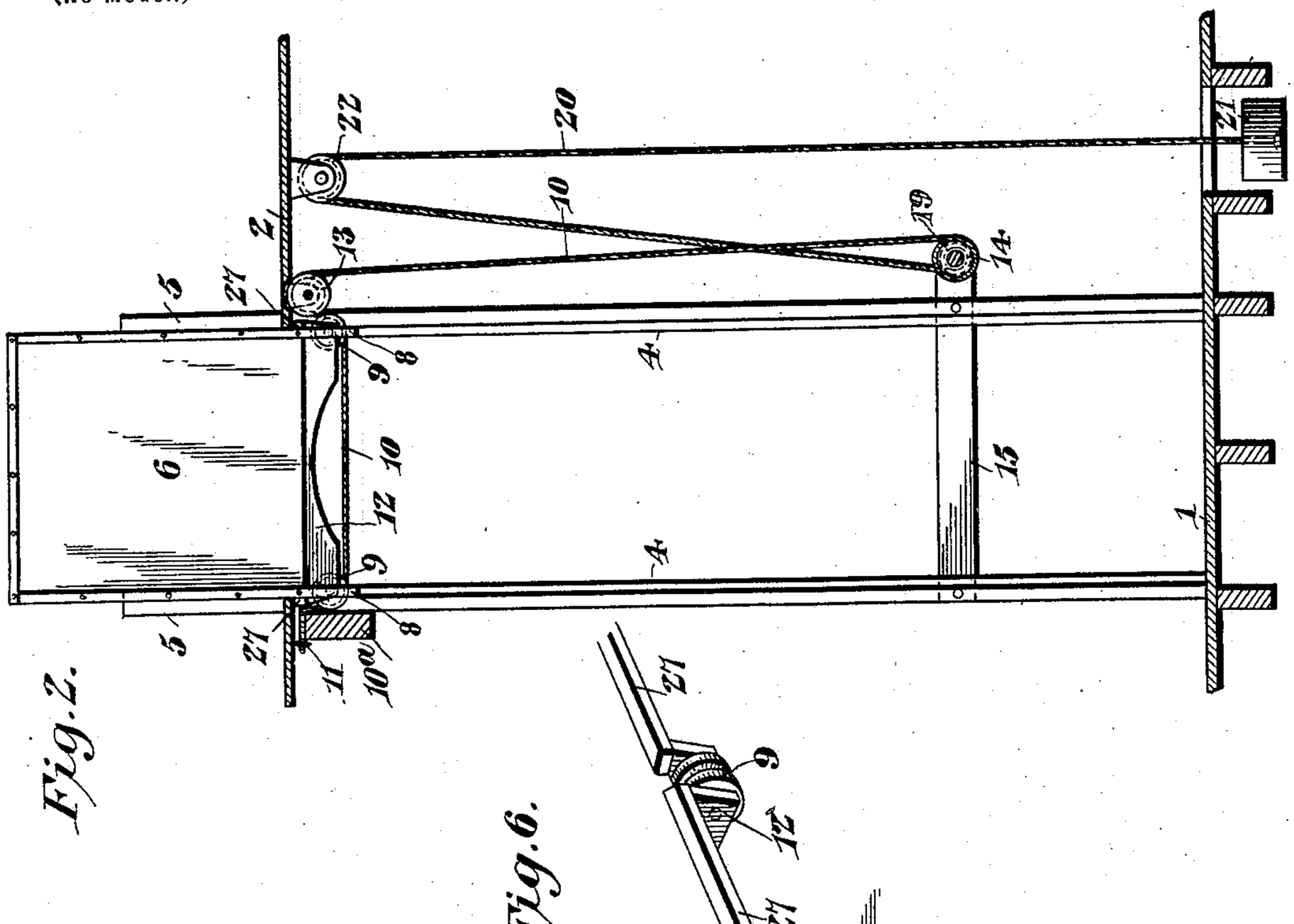

Fig. 2.

Fig. 6.

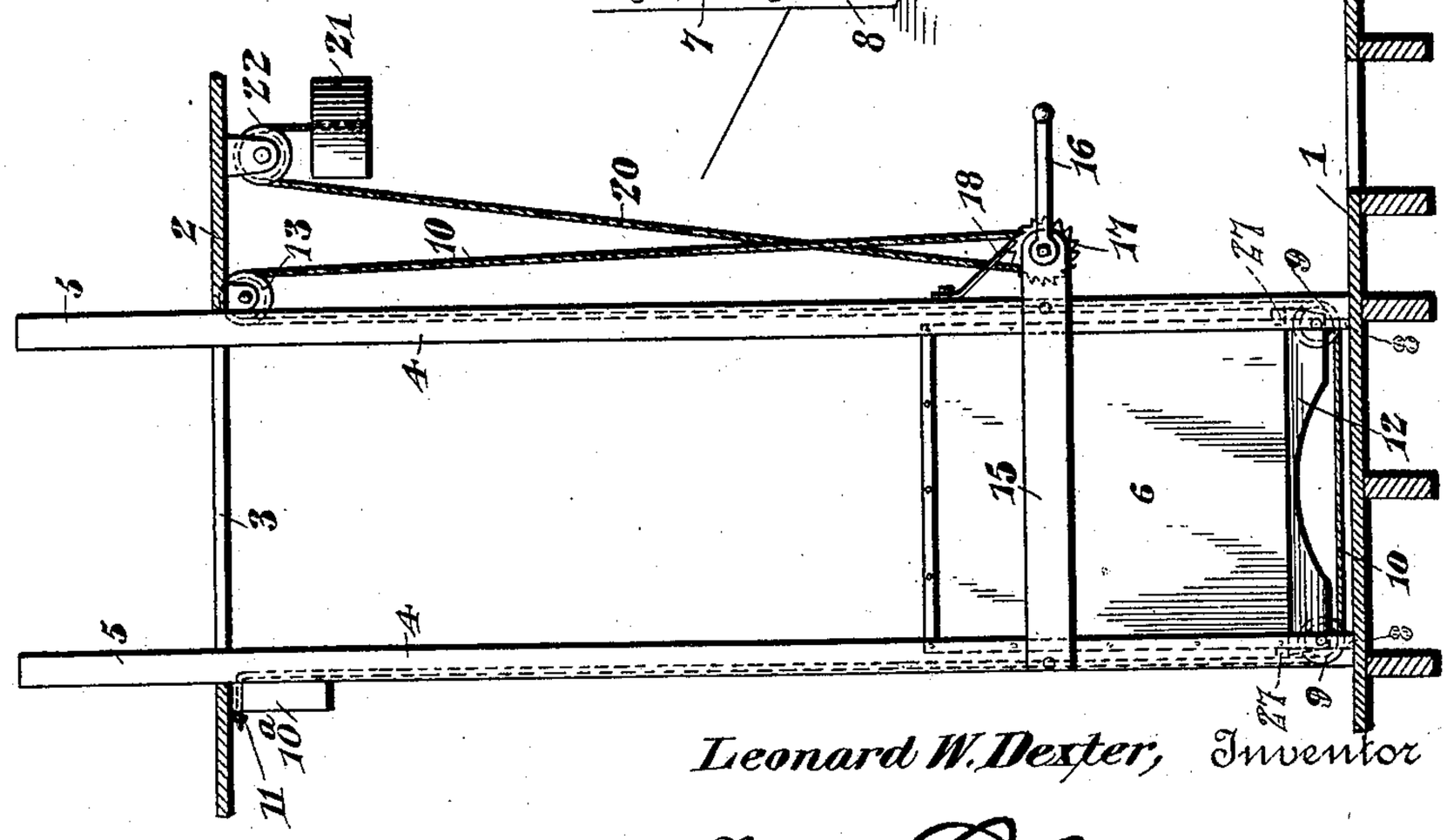

Fig. 1.

Witnesses
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Fig. 4.

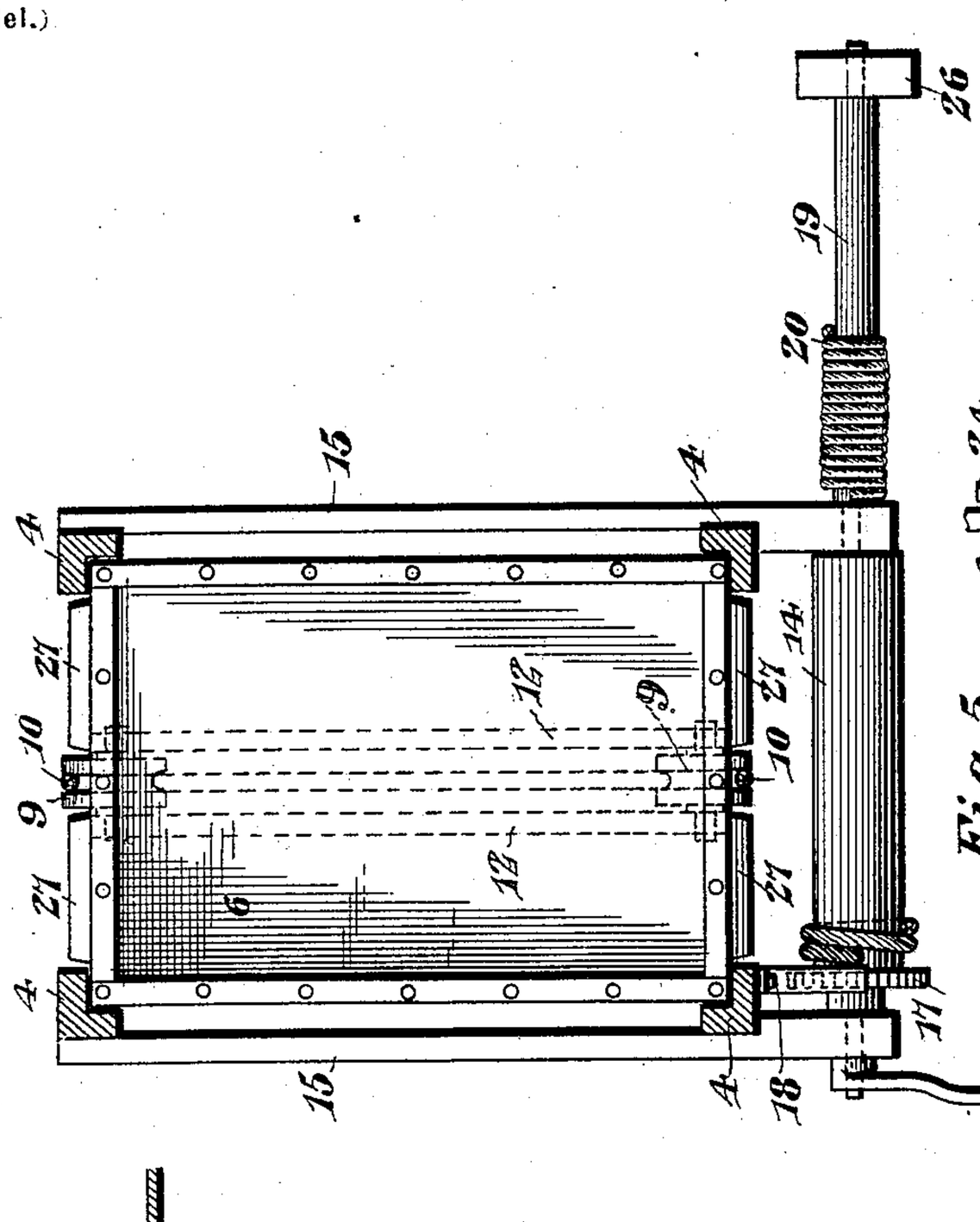

Fig. 5.

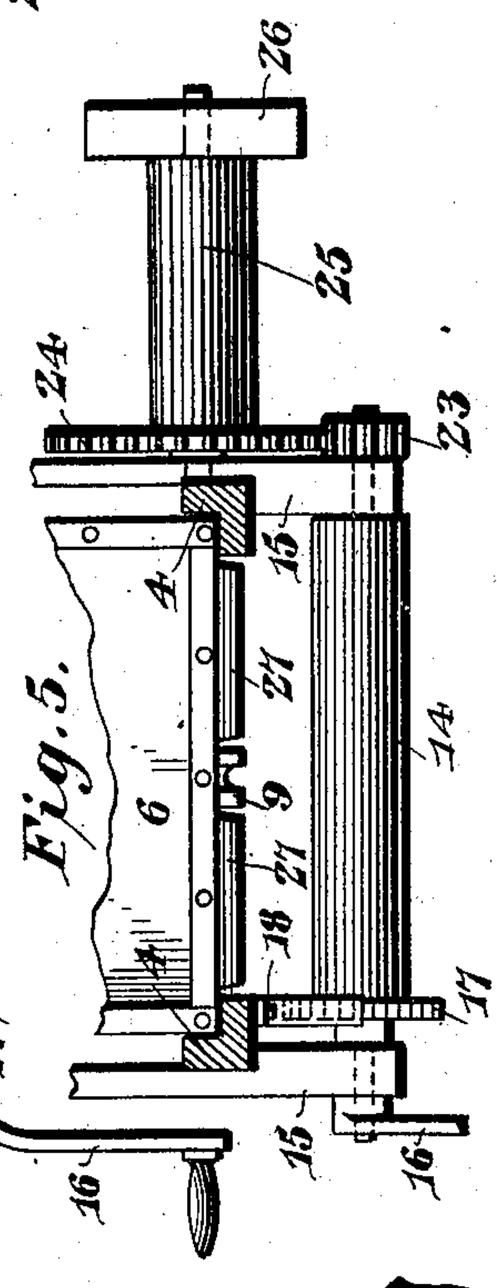

Fig. 3.

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Fig. 8.

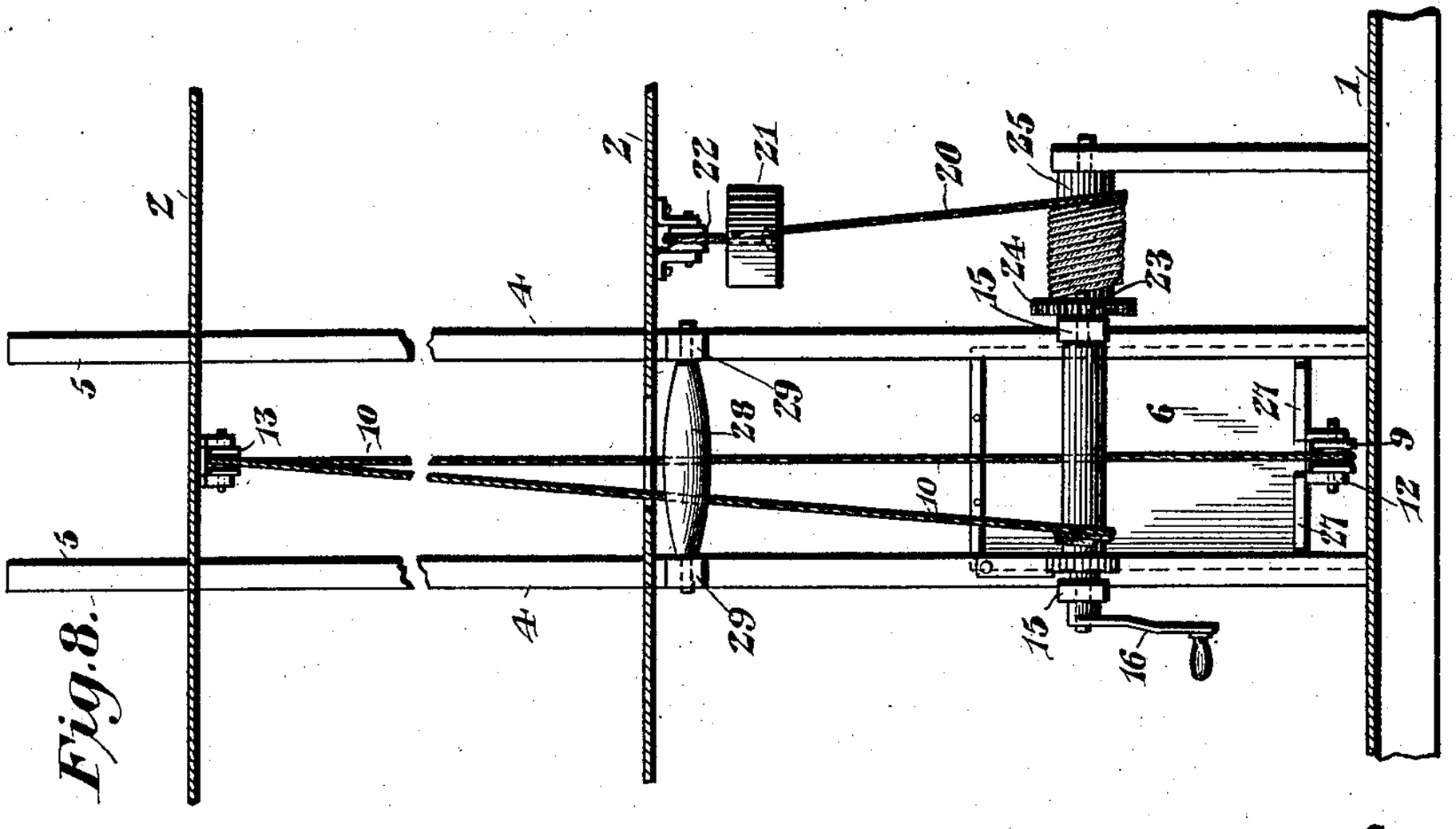
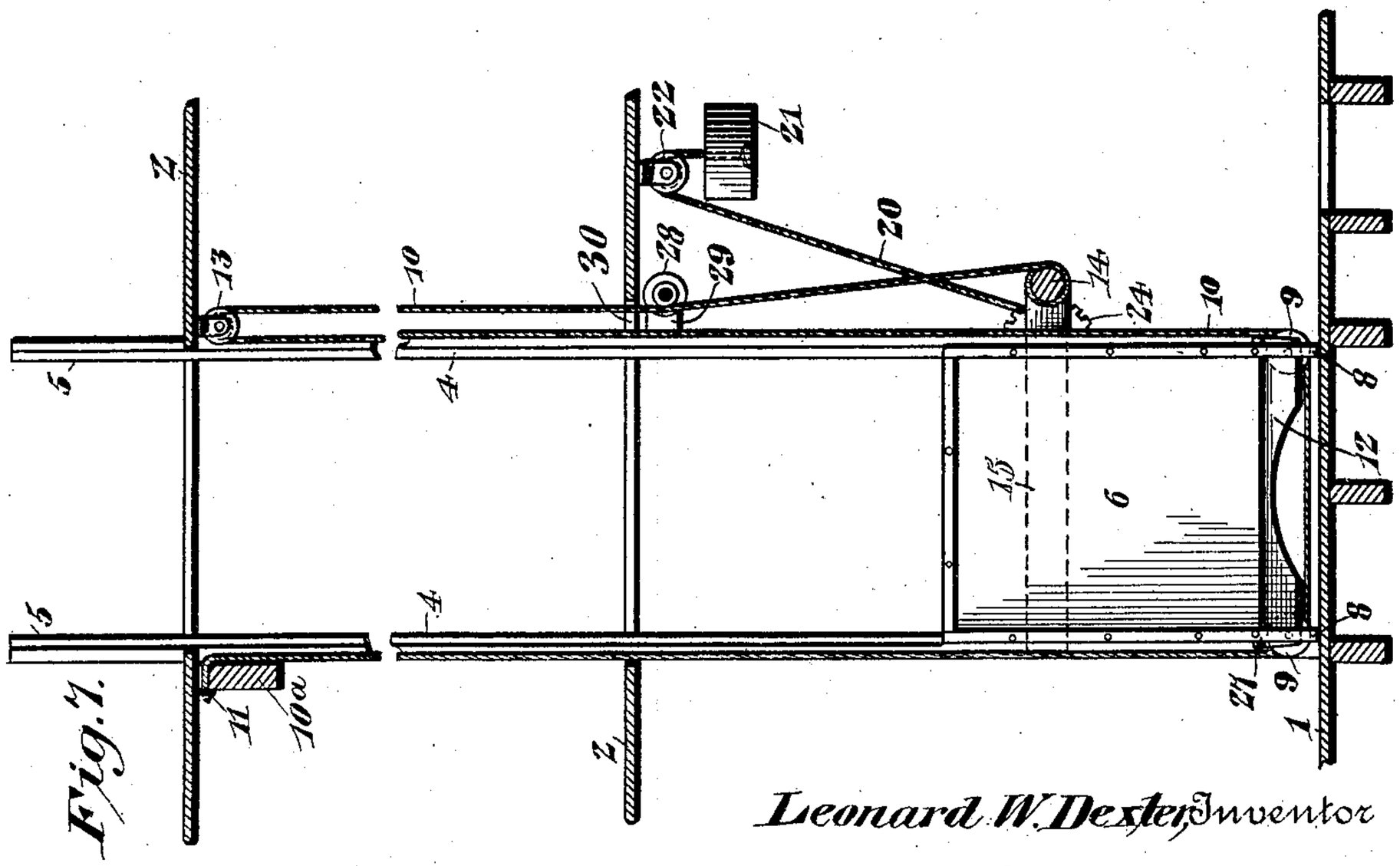


Fig. 7.



Witnesses
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Leonard W. Dexter, Inventor

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UNITED STATES PATENT OFFICE.

LEONARD WARREN DEXTER, OF SAN JOSE, CALIFORNIA.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 708,626, dated September 9, 1902.

Application filed December 23, 1901. Serial No. 86,919. (No model.)

To all whom it may concern:

Be it known that I, LEONARD WARREN DEXTER, a citizen of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented a new and useful Elevator, of which the following is a specification.

This invention relates to elevators, and is designed to provide an improved hand-operated device particularly adapted for household use to elevate wood, provisions, and other articles from a cellar to the upper floors of a building in a quick and convenient manner.

It is furthermore designed to provide for conveniently manipulating the elevating means from the lower or basement floor and to effectually guide the car or box, so as to obviate lateral swinging thereof, and also to conveniently limit the upward movement of the box, so as to stop the same in a proper position for conveniently removing the contents of the box.

A further object is to provide for preventing the elevating-cable from binding upon the first floor when the elevator is arranged to rise above the first floor and also to provide for automatically feeding the cable to the winding-drum so that it may be wound evenly thereon.

Another object is to have all of the parts of the device compactly assembled, so as to take up as little room as possible and to present a strong, durable, and conveniently-manipulated device.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side elevation of the improved elevator with the box at its lowermost position. Fig. 2 is a longitudinal sectional view showing the box at its upper limit. Fig. 3 is a front elevation of the device. Fig. 4 is a cross-sectional view taken on the line 4 4 of Fig. 3. Fig. 5 is a detail view similar to Fig. 4 and showing a modified arrangement of the weight-drum. Fig. 6 is a detail perspective view of one corner of the elevator box or cage to show one of the feet thereof. Fig. 7 is a longitudinal sectional view of the device, showing the arrangement of the device when the elevator is to be raised above the first floor. Fig. 8 is a front elevation thereof.

Like characters of reference designate corresponding parts in all the figures of the drawings.

Referring to the accompanying drawings, 1 designates a lower or cellar floor, and 2 an upper floor — as, for instance, that of a kitchen—and in this latter floor there is provided a substantially rectangular opening 3, through which the box or cage of the elevator is adapted to be projected. Located in the respective corners of the opening 3 and extending upwardly from the lower floor 1 are the four angular or L-shaped standards or guideways 4, which have their upper ends projected a suitable distance above the upper floor, as indicated at 5, so as to support the box when projected above the upper floor.

The box or cage 6 is rectangular in shape and has an open top, and its upright corners are provided with angular metallic binding-strips 7, which work in the guideways 4, so as to protect the edges of the wooden box. The lower ends of the strips 7 are projected a suitable distance below the bottom of the box, so as to form legs 8, which are designed to rest upon the lowermost floor, so as to prevent contact of the pulleys 9, carried by the bottom of the box, from striking against the floor, and thereby becoming broken or damaged. For raising and lowering the box there is provided a cable 10, which has one end passed through an opening in one of the floor-beams 10^a, at the back of the opening in the upper floor, and provided with a knot or other suitable stop 11 to connect the cable to said beam. The intermediate portion of the cable passes downwardly and across the under sides of the opposite grooved pulleys 9, which are alined centrally across the bottom of the box and journaled between two transverse cleats 12, secured across the bottom of the box. In addition to forming bearings for the rollers or pulleys 9 the cleats 12 also stiffen and

strengthen the bottom of the box. A grooved pulley or guide 13 is mounted upon the under side of the floor 2 and is located externally of the elevator-shaft and alined opposite the connection between the upper end of the cable 10 and the beam 10^a, to which said cable is connected. The cable also passes upwardly and over the guide or pulley 13 and thence downwardly to the drum or windlass 14, which is mounted transversely across the lower portion of the elevator-shaft and journaled between bars 15, which are fastened to the outer sides of the respective front and rear guideways 4 and are projected in front thereof, so as to accommodate the drum. One end of this drum is provided with an operating crank-handle 16 and also has a ratchet-disk 17 for coöperation with a ratchet-dog 18, mounted upon the adjacent guideway 4. The opposite journal of the windlass is extended and provided with a drum 19, upon which is wound one end of a cable 20, which has a weight 21 connected to the opposite end and has its intermediate portion reeved through a grooved roller or pulley 22, hung from the upper floor 2, the weight being just sufficient to balance the empty box, thereby facilitating the raising and lowering of the latter. In some instances it may be desirable to use a very short cable 20, and to provide for this contingency there has been provided means shown in Fig. 5 of the drawings, wherein it will be seen that one journal of the hoisting-drum is provided with a small pinion 23, which is in mesh with a larger gear 24, carried by a drum or roller 25, which is mounted between the projected end of the adjacent bar 15 and a suitable upright 26, substantially in the manner shown in Fig. 4, with the exception that the drum 25 is entirely separate from the drum 14 and is offset laterally therefrom. By the intermediate gearing between the journal of the winding-drum 14 and the weight-drum 25 the latter will be driven at a comparatively low rate of speed, thereby winding and unwinding but a comparatively short portion of the weight-rope and also resulting in a comparatively slight raising and lowering of the counterbalancing-weight. It is preferred to connect the counterbalance to the operating means rather than to the box or car in order that the open top of the latter may be unobstructed and access may be conveniently had thereto.

From the foregoing description it will be seen that one end of the hoisting-cable is made fast at a point above the hoisting-drum, the opposite end is wound upon the hoisting-drum, the intermediate portion is reeved through a guide also located above the drum, and the box is supported upon that portion of the cable which lies between its fixed end and the guide, so that when the free end of the cable is wound upon the drum the box will be elevated with the intermediate portion of the cable in a simple and effective manner.

To limit the upward movement of the box, as indicated in Fig. 2 of the drawings, the bottom of the box is provided with opposite projected portions 27, forming stop-flanges which are adapted to strike against the upper floor 2, and thereby prevent the box from being projected above the floor. It will here be noted that the upper projected ends 5 of the guideways 4 are designed to brace the box when elevated to its upper limit and to prevent the box from being accidentally upset when removing the wood or other articles from the box.

As shown in Fig. 1, it will be seen that the feet 8 of the box project somewhat below the rollers 9 at the bottom of the box, so as to support said rollers and the cleats 12 out of contact with the lower floor when the box is supported thereon. Furthermore, the bars 15, which support the winding-drum, also form braces for the lower end portions of the guideways.

In addition to bracing the box when raised to its upper limit the upper end portions 5 of the guideways are terminated short of the ceiling of the room into which they project, so as to permit of the box being conveniently removed from the guideways whenever it may become necessary for repairs or for any other purpose.

When the apparatus is arranged to have the elevator car or box rise above the first floor, as illustrated in Figs. 7 and 8, it is apparent that the lower portion of the cable 10, which is being wound upon the drum 14, is liable to bind upon the edge of the first floor, as the cable is inclined outwardly from this first floor to the drum, and to overcome this objection I have provided an antifriction-roller 28, located externally of and transversely across the shaft and supported in bearings or brackets 29, carried by the adjacent guideways 4, the roller being located adjacent to the lower side of the first floor and in the path of the outer side of the cable 10, so as to hold the same out of engagement with the edge of said floor, which is preferably cut away, as at 30, so as to accommodate the cable.

As indicated in Fig. 8, it will be seen that the antifriction-roller 28 is tapered in opposite directions from its center, which shape of roller acts to feed the cable 10 laterally, and thereby guide the same to the winding-drum, so as to feed the cable longitudinally thereon and insure a proper winding and unwinding thereof. This antifriction and guide roller feature of the invention is important only when the elevator rises above the first floor, as it is entirely unnecessary when the elevator rises only as high as the guide-pulley 13, but is absolutely necessary in the instance mentioned, for the reason that the elevating-cable would otherwise bind upon the floor and instead of being fed regularly in even coils throughout the length of the winding-drum it would collect and wind upon one end only thereof, and thereby result in a slipping and ineffectual winding of the cable.

What I claim is—

1. In an elevator, the combination with a polygonal skeleton shaft made up of upstanding angle-shaped guideways at the corners thereof, of a polygonal open-top box or car mounted in the shaft with its upright edges working in the correspoding guideways, guide-pulleys upon the bottom of the car and located between corresponding upright corners thereof, a hoisting-cable having one end fixed at a point between a pair of guideways and its intermediate portion engaging the guide-pulleys on the box, a fixed guide-pulley located opposite the fixed end of the cable, the free portion of the cable passing over the fixed guide-pulley, means for operating the cable to raise and lower the box or car, and a counterbalance connected to the operating means and independent of the box or car.

2. In an elevator, the combination with a shaft, of a box or car working therein, a hoisting-cable connected to the box or car, a winding-drum having a cable connected thereto, a weight-drum mounted independently of the hoisting-drum, a pinion upon the hoisting-drum, a gear carried by the weight-drum in mesh with the pinion and of greater diameter than said pinion, and a counterbalance-weight having a cable connected to the weight-drum.

3. In an elevator, the combination with the floor having a shaft-opening therein, of upstanding rigid guideways forming the shaft and projected above the floor, an open-top box or car working in the guideways and provided upon its bottom with a cable-guide, a fixed cable-guide located below the floor at one side of the shaft-opening, a hoisting-cable having one end fixed at a point opposite the fixed cable-guide and passing around the guide on the box or car and around the fixed cable-guide, means for manipulating the cable to raise and lower the box or car, the space across the top of the shaft formed by the guideways being open to permit the box or car to project above the floor into the room when elevated to its upper limit by the hoisting-cable, means carried by the car for engagement with the floor to stop the car, and a counterbalance connected to the manipulating means and independent of the box or car.

4. In an elevator, the combination with a shaft, a cage or car working therein, a winding-drum, a hoisting-cable connected to the cage or car and the drum, and a supporting-guide for the intermediate portion of the cable, of a tapered antifriction guide-roller located in the path of the cable adjacent to the drum and fixed against endwise movement.

5. In an elevator, the combination with a shaft, a cage or car working therein, a winding-drum, a hoisting-cable connected to the cage or car and the drum, and a supporting-guide for the intermediate portion of the cable, of an antifriction guide-roller which is fixed against endwise movement tapered in opposite directions from the middle thereof and located in the path of the cable adjacent to the drum.

6. In an elevator, the combination of a shaft, a cage or car working therein, a winding-drum mounted externally upon the shaft, a hoisting-cable connected to the cage or car and the winding-drum, a supporting-guide for the intermediate portion of the cable, and an antifriction guide-roller which is fixed against endwise movement tapered in opposite directions from its center and mounted externally upon the shaft above the winding-drum and in the path of that portion of the hoisting-cable which extends to the drum.

7. In an elevator, the combination with the floor having a substantially rectangular shaft-opening formed therein, four angle-guideways rising from below the floor and projected upwardly through the corners of the opening in said floor, a box having its upright corners working in the guideways, guide-pulleys mounted externally upon the bottom of the box, a hoisting-drum, a fixed guide-pulley located above the drum, a hoisting-cable having one end fixed and its opposite end connected to the hoisting-drum, the intermediate portion of the cable being passed across the pulleys of the box and over the fixed guide-pulley, a weight-drum in operative relation to the hoisting-drum, a guide-pulley located above the weight-drum, a weight-cable reeved through the pulley and having one end connected to the weight-drum, and a counterbalancing-weight connected to the opposite free end of the weight-cable.

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

LEONARD WARREN DEXTER.

Witnesses:

CHARLES CLARK,

GEO. D. SMITH.