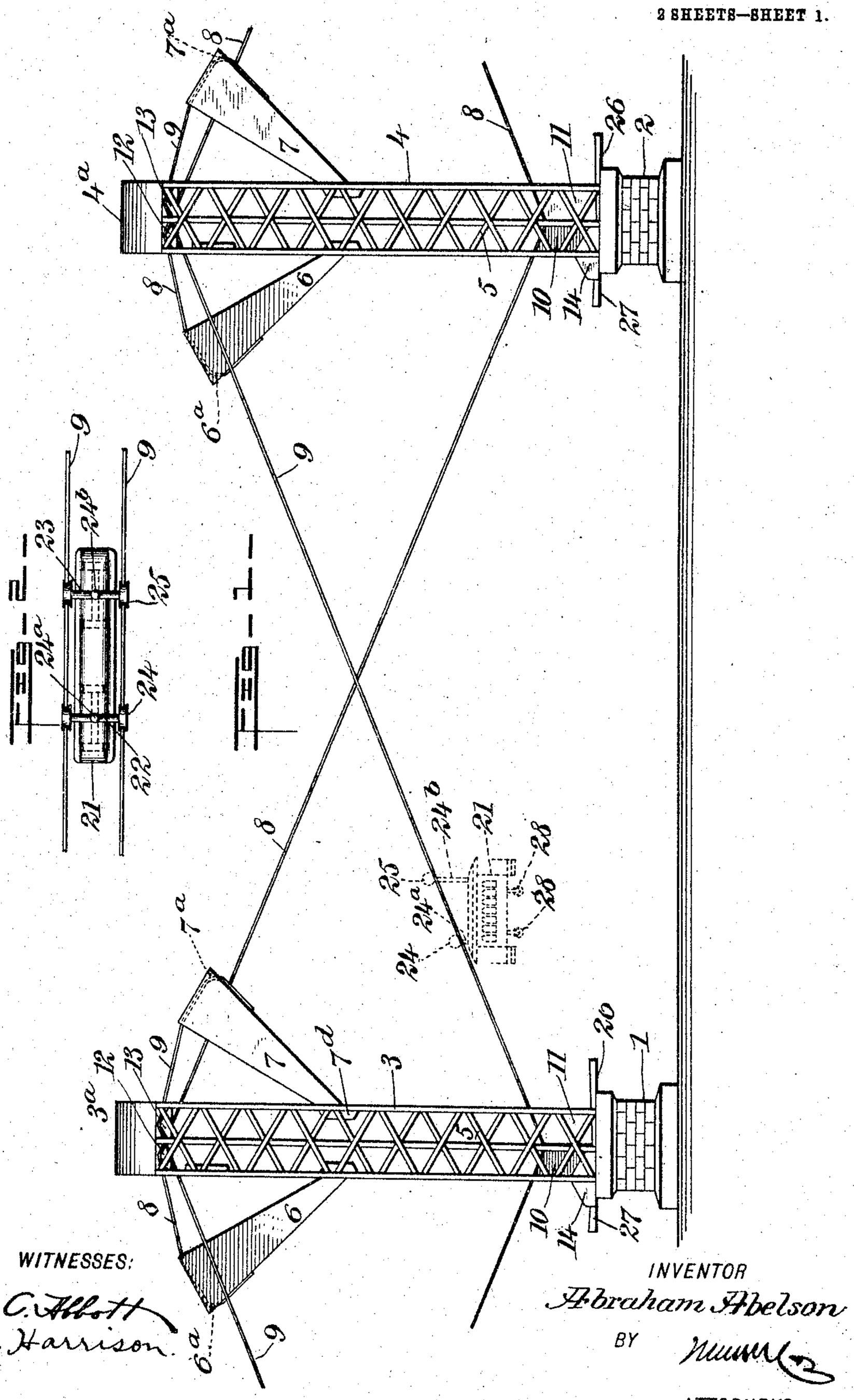
No. 780,966. PATENTED JAN. 31, 1905.

A. ABELSON.

GRAVITY RAILWAY SYSTEM.

APPLICATION FILED JAN. 26, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

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2 SHEETS—SHEET 2.

FIG. 3.

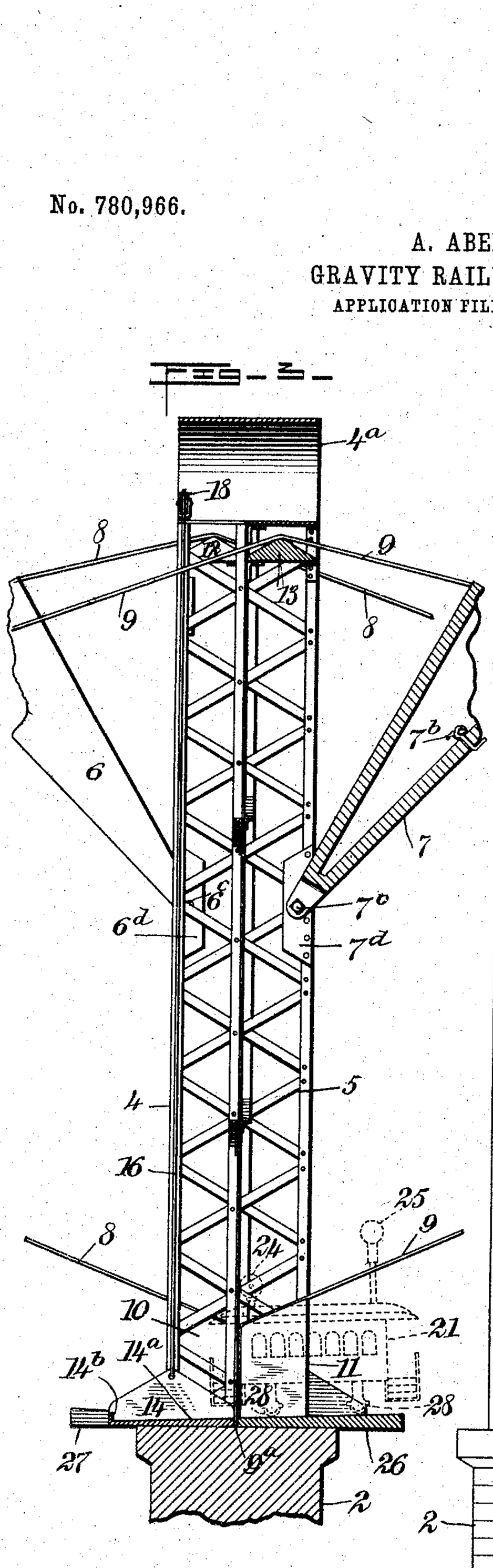
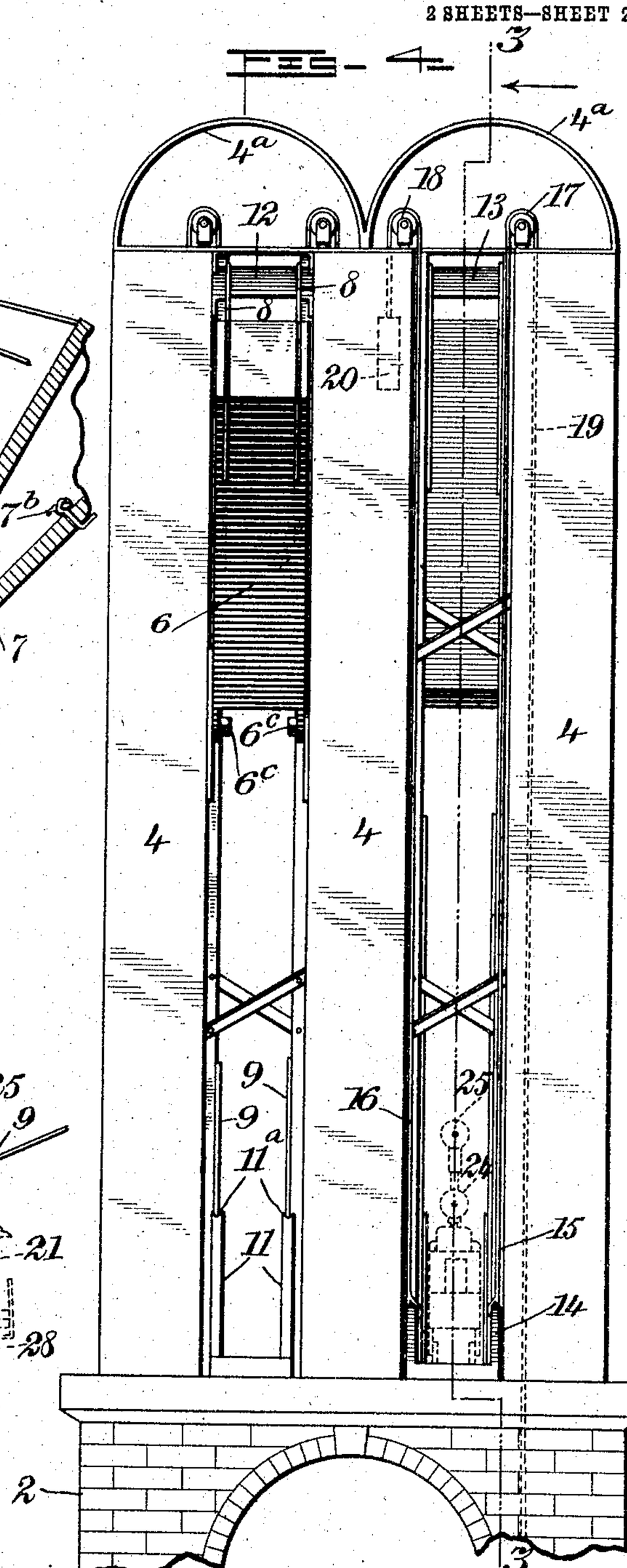


FIG. 4.



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No. 780,966. Patented January 31, 1905.

UNITED STATES PATENT OFFICE.

ABRAHAM ABELSON, OF NEW YORK, N. Y.

GRAVITY-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 780,966, dated January 31, 1905.

Application filed January 26, 1904. Serial No. 190,715.

To all whom it may concern:

Be it known that I, ABRAHAM ABELSON, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Gravity-Railway System, of which the following is a full, clear, and exact description.

My invention relates to railways and admits of general use, but is particularly applicable for railways used in cities for purposes of passenger traffic.

Among the more prominent objects of my invention are the following: first, to provide a passenger-railway in which the vehicles are propelled in different directions by gravity only; second, to automatically take up any slack in the track-cables; third, to readily provide for lifting the vehicles from a low level to a high level incidental to the travel of the cars from one part of the city to the other.

There are divers other objects sought to be accomplished by my invention, as may be seen from the following specification and the claims appended thereto.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary side elevation showing my invention as applied to a street-railway. Fig. 2 is a fragmentary plan view of one of the vehicles in transit from one of the towers to another. Fig. 3 is a vertical section upon the line 3 3 in Fig. 4 looking in the direction of the arrow and showing the equipment of one of the towers; and Fig. 4 is a front elevation of one of the towers, showing substantially the same mechanism as that disclosed in Fig. 3, the view being taken at a right angle to that of Fig. 3.

Upon the pedestals 1 2 are mounted hoisting-towers 3 4, provided with skeleton framework 5, thereby giving the towers great strength and a proper amount of resiliency. Each tower is provided with movable weights 6 7, each of a substantially wedge shape and pivoted at its lower end, as shown. The track-cables are shown at 8 9 and are arranged in pairs, as indicated in Fig. 2, each pair being connected with its appropriate weight 6 7, as shown more particularly in Figs. 1 and 3. The cables pass over the tops of the weights through slots 6^a 7^a and are connected to the weights, as at 7^b. At 10 11 are shown guides provided with guideways 11^a for engaging the track-cables 8 9. The track-cables are anchored at 9^a within the pedestals, as indicated in Fig. 3.

Mounted within each tower 3 4 are saddles 12 13, over which the track-cables 8 9 pass, so as to be movable relatively thereto. The cables 9 pass over the saddle 13 and engage the weight 7, whereas the cables 8 pass over the saddle 12 and engage the weight 6. The weights swing radially outward, as shown, thereby maintaining the tension of the track-cables as nearly constant as practicable. The weights perform another office—to wit, they serve as counterbalances for the tension of the cables—that is to say, without the weights the cables would pull the towers laterally and tend to strain or distort them, whereas by the use of the weights there is no lateral pull upon the towers, the pressure being directed downward. It will be noted that these weights compensate for differences in the lengths of the cables. For instance, if owing to expansion or contraction the cables become elongated or shortened, the weights merely swing farther out from the towers or approach the towers, as the case may be, thereby maintaining the cables in a substantially constant position and also rendering the tension of the cables substantially the same at all times.

Each tower is provided with an elevator-carriage 14, having substantially the shape of a stirrup, as shown. The lift-cables 15 16 are connected with the elevator-carriage and are free to raise and lower the same, as in ordinary elevators. The lift-cables pass over pulleys 17 18, each cable 16 being provided with a counterweight 20 for balancing the elevator-carriage. The cable 19 is a continuation of the cable 15 and is used for actuating the elevator by any convenient power. The elevators in the several towers are entirely independent of each other, the power for actuating them being preferably local.

Each weight 6 7 is mounted upon pivots 6^c 7^c, these pivots being in turn mounted upon pivot-plates 6^d 7^d, as indicated in Fig. 3.

The passenger-cars are shown at 21, each being provided with axles 22 23 and cable-wheels 24 25, these axles being pivoted upon the car at 24^a 24^b and free to turn to various angles relatively thereto, as indicated by full and dotted lines in Fig. 2.

Mounted upon each pedestal 1 2 are floorings 26 27, the upper surfaces of which are inclined, as indicated in Fig. 3. As shown in this figure, the bottom 14^a of each elevator-carriage 14 is slightly inclined upon its upper surface, which is in alinement with the upper surface of the flooring 26. Each elevator-carriage 14 is further provided with a limiting-stop 14^b, across which the wheels 28 cannot pass when the car descends from the cables and lands upon the flooring, as indicated by dotted lines in Fig. 3. The wheels 28 of the car are merely vehicle-wheels of ordinary construction operating upon the principle of casters or rollers.

The operation of my invention is as follows: Into one of the elevator-carriages 14 a car 21 is placed, this car being filled with passengers. During this time the axles 22 23 are swung into the respective positions indicated by dotted lines in Fig. 2. The elevator mechanism is now thrown into action, and the carriage 14 is hoisted to the top of the tower, thus elevating the car 21. Arriving at the top of the tower the axles 22 23 are swung into the positions indicated in full lines in Fig. 2, the cable-wheels 24 25 being placed firmly upon the track-cables 9. The elevator is now lowered, leaving the car suspended upon the track-cables, as indicated by dotted lines in Fig. 1. The car thereupon descends by gravity to the next tower—the one shown at the left of Fig. 3. The car lands upon the flooring 26, and as the upper surface of this flooring is inclined the car drifts also by its own gravity into the next elevator-carriage 14. Upon landing upon the flooring 26 the axles 24 25 are again swung into the position indicated by dotted lines in Fig. 2. The car then drifts by its own gravity into the next elevator-carriage 14 and is again raised and placed upon the next successive pair of track-cables and allowed to descend to another tower.

I claim a great saving of the power required to propel the cars, for the reason that comparatively little power is needed for the purpose of raising the cars vertically, and to raise the cars a few feet vertically causes them to drift a comparatively great distance horizontally. The track-cables being comparatively free from joints and irregularities cause the cars to be transferred with a minimum expenditure of energy, none being required except to raise the vehicles vertically upward. The elevator-carriages being counterbalanced, the net weight of the vehicle is practically all that is necessary to be lifted.

It will be noted that the guideways 11 11^a do not interfere with the rotation of the cable-wheels 24 25, for the reason that the guideways engage the under sides of the cables, whereas the cable-wheels engage the top portions thereof. The wheels 24 25 are preferably mounted upon ball-bearings.

While my apparatus is preferably employed for carrying passengers in cities, I do not limit myself to this particular use for it, for obviously the device may be employed in a diversity of relations, including pleasure-railways, aquatic paraphernalia, and the like.

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

1. A gravity-railway system, comprising a plurality of towers, a saddle-block mounted upon one of said towers, track-cables stretched over said saddle-block, mechanism connected with said track-cables for maintaining the same taut, and a vehicle provided with mechanism for engaging said track-cables in order to carry said vehicles thereupon.

2. A gravity-railway system, comprising inclined track-cables, guides provided with guideways engaging said cables and maintaining the same in predetermined normal positions, and a vehicle provided with mechanism for engaging said cables, said vehicle being free to move along the incline of said cable by gravity alone.

3. In a gravity-railway system, the combination of a tower, a weight free to move relatively thereto, track-cables connected with said weight and extending obliquely downward to a point removed from said tower, and a vehicle mounted upon said track-cables and free to move thereupon by its own weight.

4. A gravity-railway system, comprising a tower, an elevator mounted therein, a plurality of track-cables extending from said tower to a point distant therefrom, and a swinging weight mounted upon said tower and connected with said cables for the purpose of maintaining the same taut.

5. In a gravity-railway system, the combination of a tower, track-cables connected therewith and sustained thereby, and a swinging weight journaled upon said tower and free to swing relatively thereto, said weight being connected with said track-cables for counterbalancing the weight thereof, thus rendering the pressure of said cables directly downward.

6. In a gravity-railway system, the combination of a plurality of towers spaced apart, track-cables extending from one of said towers to the other, said track-cables being inclined relatively to the horizon and arranged in succession so as to form a continuous system, a vehicle provided with mechanism for engaging said track-cables and thereby causing said vehicle to move from one of said towers to the other successively by the action of

gravity alone, and separate mechanisms connected with the several towers for raising said vehicle periodically.

7. In a gravity-railway system, the combination of a plurality of towers, track-cables arranged in successive pairs and connecting the towers together, said track-cables of each pair being parallel with each other, and a vehicle provided with separate members for engaging the respective cables of a pair, said vehicle being suspended from said members and being normally maintained in balance by the track-cables of a pair.

8. In a gravity-railway system, the combination of a plurality of towers spaced apart, track-cables connecting the top of one tower with the bottom of another tower, the cables being so disposed relatively to the towers that the tension of one cable in its action upon the tower opposes the tension of another cable, thereby tending to maintain said cables in balance, and a gravity-controlled vehicle provided with mechanism for engaging said cables.

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

ABRAHAM ABELSON.

Witnesses:
WALTON HARRISON,
ALEXANDER LEVENE.