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C. A. LINDBLOM.
Car Truck.

No. 231,822. Patented Aug. 31, 1880.

Fig. 1.

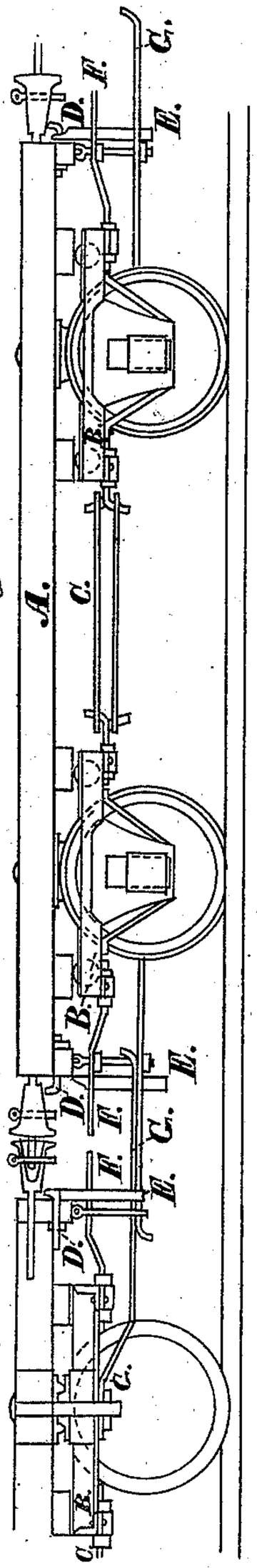

Fig. 2.

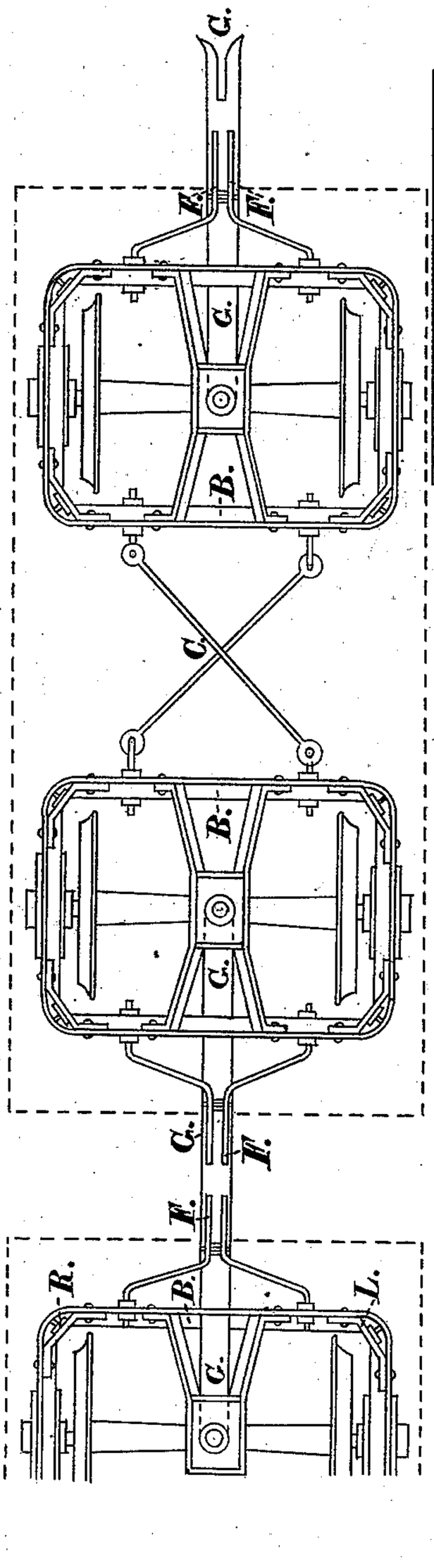

Fig. 3.

Fig. 4.

Fig. 5.

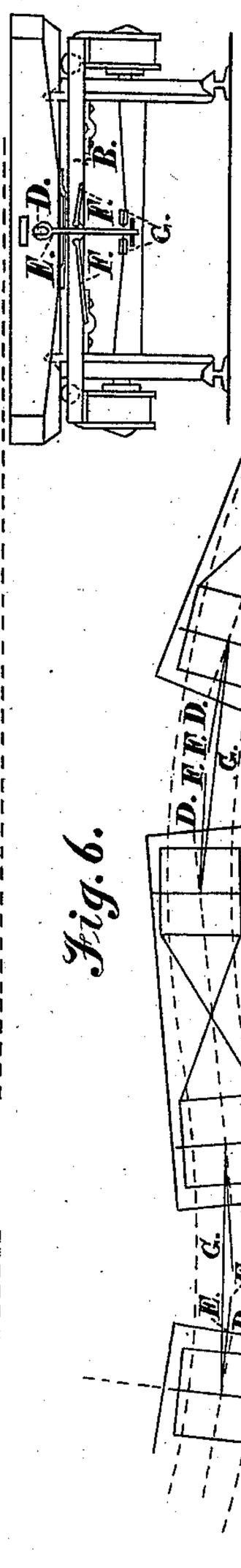

Fig. 6.

Witnesses;

Chas. Coddington

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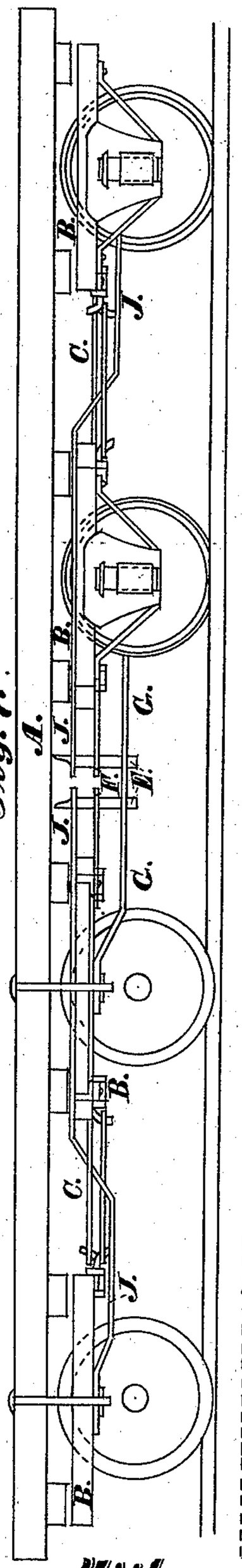

Fig. 7.

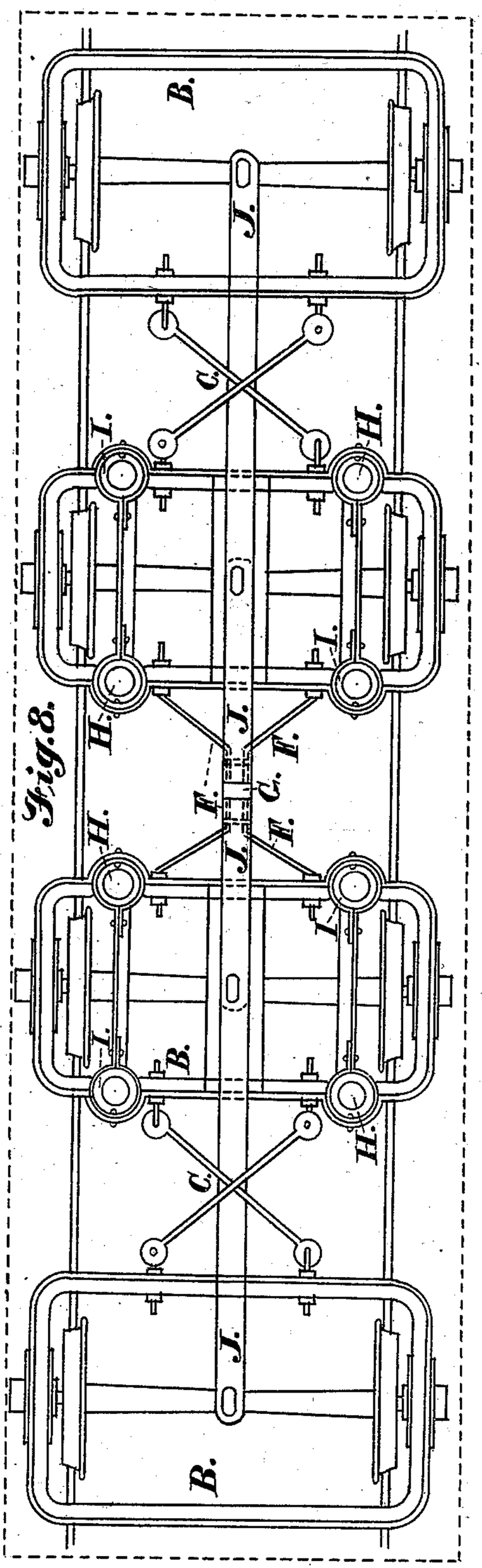

Fig. 8.

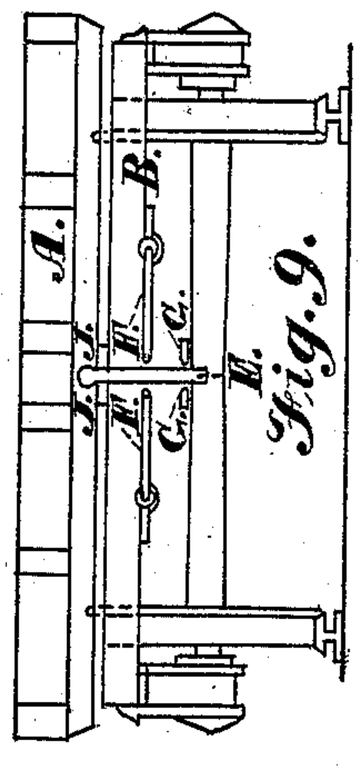

Fig. 9.

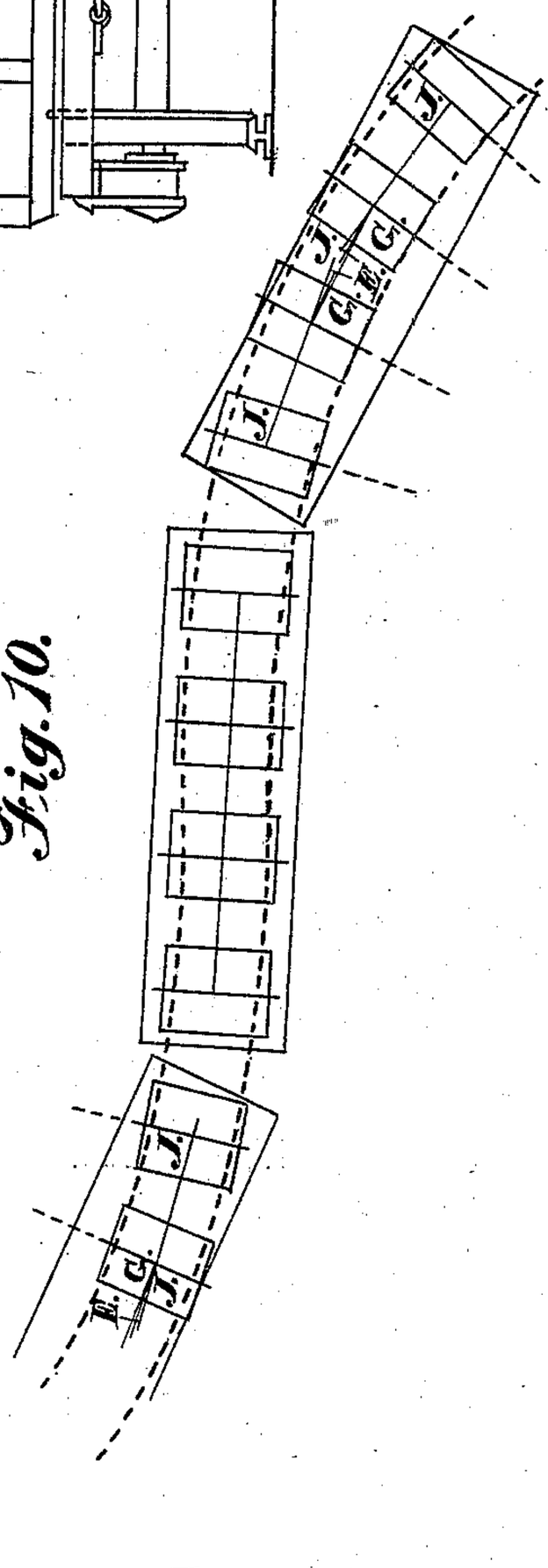

Fig. 10.

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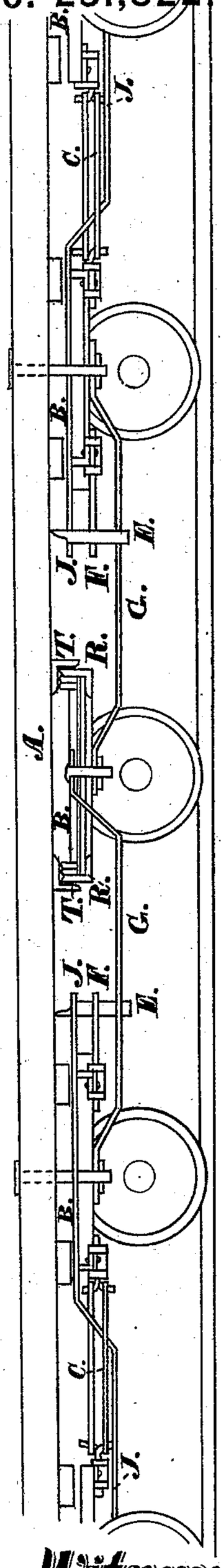

Fig. 11.

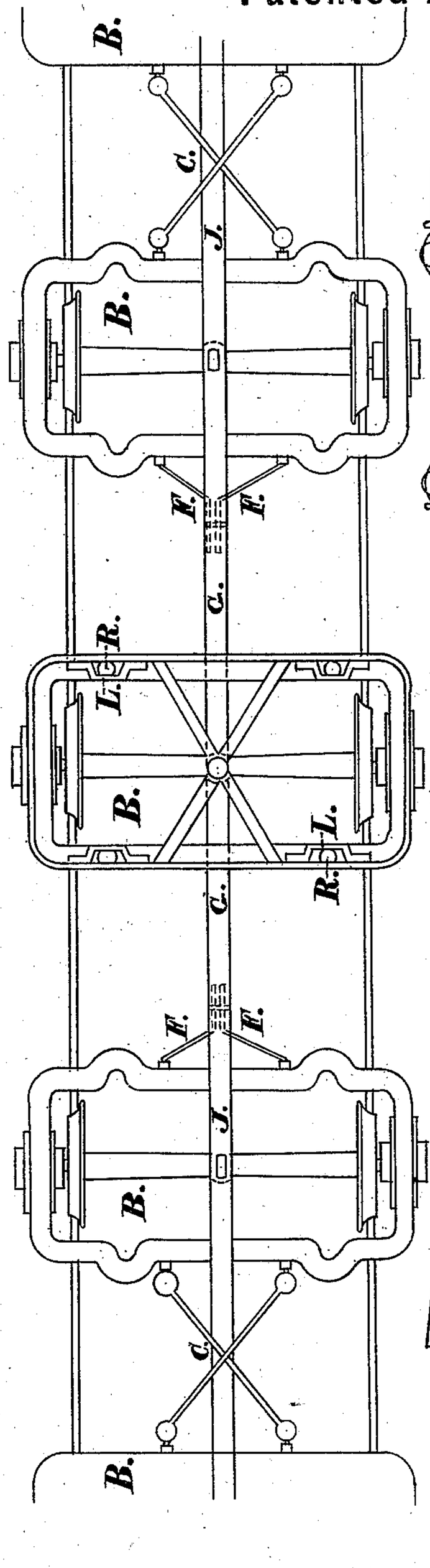

Fig. 12.

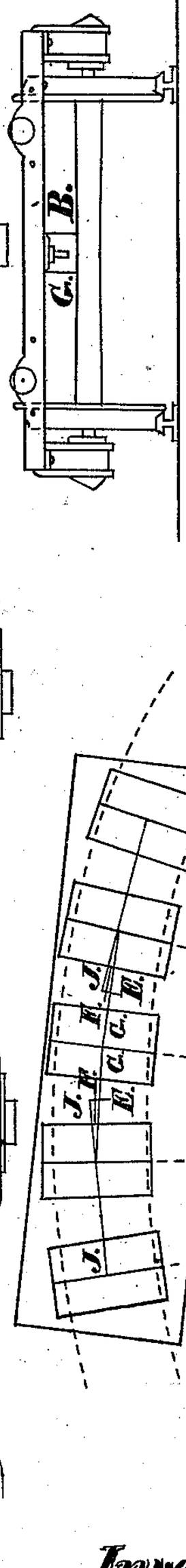

Fig. 13.

Fig. 14.

Witnesses;
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Thos. Alexander Jr.

Inventor;
Charles Axel Lindblom

UNITED STATES PATENT OFFICE.

CHARLES A. LINDBLOM, OF NEW YORK, N. Y.

CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 231,822, dated August 31, 1880.

Application filed January 7, 1880.

To all whom it may concern:

Be it known that I, CHARLES AXEL LINDBLOM, of the city of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Running-Gear for Horse, Tramway, and Railway Cars on two, four, five, or more axles, of which the following is a specification.

The nature of my invention, which is to secure a flexible wheel-base for railway or tramway cars, consists in a novel arrangement of single-axle bogies in combination with certain mechanism whereby a secure and firm rotation of the bogies on their king-bolts is secured, and by means of which, in going around a curve, the axle of each bogie is kept accurately or approximately in the radius of the curve; and I do hereby declare that the following is a clear, full, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, similar letters indicating similar parts, making a part of this specification, in which—

Figure 1 is a side view of a car on two axles constructed according to my invention. Fig. 2 is a plan or ground view of the said car, showing the axles, bogie-frames, diagonal connecting-rods, and part of the mechanism which conducts the rotation. Fig. 3 is a vertical longitudinal section of one-half of a car coupled to car, Fig. 1. Fig. 4 is a plan or ground view of a bogie attached to Fig. 2. Fig. 5 is an end view of car, showing car-bottom and bogie. Fig. 6 shows the positions the axles take when on a reverse curve. Fig. 7 is a side view of a car on four axles constructed in accordance with my invention, the two first bogies to the left showing parts in section. Fig. 8 is a ground view of said car, the two end bogies not being complete, same being shown in Figs. 2 and 4. Fig. 9 is a vertical central cross-section of car and front view of bogie. Fig. 10 shows the positions the axles of a car on four axles take on a reverse curve. Fig. 11 is a side view of a car on five axles constructed in accordance with my invention, portions of bogies being shown in section. Fig. 12 is a ground view of said car, the first, second, fourth, and fifth bogies not being complete, same being shown in Figs. 4 and 8. Fig. 13 is a front view of middle bogie of Fig. 12. Fig. 14 shows the positions the axles of a car on five axles take on a curve.

I will now proceed to explain the application of my invention to a car on two axles, as shown in Figs. 1, 2, 3, 4, 5, and 6.

Under the car-bottom A, Fig. 1, are placed two single-axle bogies attached to the car by the usual well-known center-plates and king-bolts, and connected to each other by the usual well-known diagonal rods C or by diagonal chains.

A steel roller, R, Fig. 4, can be advantageously placed on each corner of the bogies, secured by an iron strap, L, to reduce the friction which takes place during the rotation of the bogie when on a curve.

The front and rear ends of the car are similarly constructed as follows, viz: A hook-bolt, D, Fig. 1, is screwed into the head-stock of the car, so placed that a line drawn from it would pass through the king-bolts, and to this hook-bolt is hung the lever E. Under the bogie-frame is fastened, at right angles to its axle, the bogie-arm F, which passes under the hook-bolt D and embraces the lever E.

A lever-guide, G, is fastened to the bottom of the king-bolt, under the bogie-frame, by a cutter or split pin, allowing it to work freely on the king-bolt. It is provided with a hole, through which the lever E drops, and it extends to and embraces a similar lever on the next car. The lever-guides G G, being held by the levers E E, form together a rigid connection from king-bolt on one car to king-bolt on the other, as shown in Figs. 1 and 3.

The weight of the lever-guide G is supported by an eyebolt suspended from a slide-bar under the head-stock of the car. This eyebolt is provided with two nuts—one for bogie-arm F and the other for lever-guide G. By means of these nuts the proper elevation of bogie-arm F above the lever-guide G is regulated.

The above-described arrangement will be found to work as follows, viz: When the cars are on a straight road the lever-guides G will be on a straight line, with the king-bolts at right angles to the car-axles, and will thus cause the lever E to hang perpendicularly from its hook-bolt. The lever will hold the bogie-arm F midway between the two rails, parallel to

them, and consequently, as said bogie-arm F is fastened to the bogie-frame at right angles to the wheel-axle, the axle will be held at right angles to the rails and the wheels parallel to them. Now, suppose the car enters upon a curve; as the lever-guides G G, Figs. 1 and 3, move freely upon their king-bolts, they will always form the chord of the curve, each lever-guide drawing with it the lower end of its lever E, which passes through it. Now, as the lever E passes through the bogie-arm F, said bogie-arm has to follow the lever. This causes the bogie-frames to rotate on their king-bolts, so that the inner end of the axle of each bogie will point toward the center of the curve and the wheels will be parallel to the tangents of the curve. As the second bogie-frame is attached to the first by the diagonal rods C, Fig. 2, the second bogie has to rotate equally with the first, but in an opposite direction, as shown in Fig. 6.

From the foregoing account it will be seen that the front lever on each car controls the rotation of the two bogies of the car. In order, then, that the car may pass reverse curves, the lever E at the rear end of the car should be unhooked from its hook-bolt and suspended from the bogie-arm F, (see Fig. 1,) from which it should drop through its lever-guide G.

In order to use the above-described two-axle wheel-base on a tramway-car, the lever-guide G should project in front of the car and serve as a pole between the horses.

In constructing a car on four axles the above-described arrangement for guiding and controlling the rotation of the bogies, consisting of the bogie-arms F F, the lever-guide G, and the levers E E, is placed under the center of the car, between the second and third bogies, the first bogie being connected to the second and the third to the fourth by the usual and well-known diagonal rods C, or by diagonal chains, and there being between the second and third bogies no connection other than the arrangement above described, (see Figs. 7, 8, 9, and 10,) the only other difference being that the lever-guide in this arrangement is one iron running from the second to the third bogie's king-bolts, instead of in two pieces, as when between two cars, each on two axles, and the levers E E, instead of being suspended from hook-bolts in the bottom of the car, are suspended from the center bars, J J, which I will now describe. These center bars, J J, are respectively placed under the center of the car-bottom. One of them is attached to the lower end of the first bogie's king-bolt, to which it is secured by a split pin. From there it extends backward over the second bogie to about the middle of the car, being pierced and secured by the king-bolt of the second bogie. The other is arranged in like manner, being secured to the lower end of the fourth bogie's king-bolt, from whence it is carried forward over the third bogie, to which it is secured by the king-bolt to about the middle of the car.

The king-bolts of the second and third bogies pass through slots prepared for them in the bottom of the car. These slots must be large enough to permit the king-bolts to have such side play in the car-bottom as may be necessary to permit their bogies to have a free lateral movement in addition to their rotating movement.

On the second and third bogie-frames are placed four iron balls, H, in the sockets I, as shown in Fig. 8. These balls take the place of the steel rollers R, Fig. 2, and permit said bogie-frames to rotate and move laterally under the car-bottom without friction.

It will be seen that when a car thus constructed moves onto a curve the pressure of the rails on the flanges of the wheels will cause the second and third bogies to move laterally under the car-bottom and entirely independent of it, and we will have the first and second bogies running together and the third and fourth bogies running together, each bogie controlled and guided in its rotation by the above-described arrangement, and each pair of bogies forming one flexible wheel-base, controlled and guided in the same manner as is shown in Figs. 1, 2, 3, and 4, and these two flexible wheel-bases forming together one flexible wheel-base on four axles, as shown in Figs. 7 and 8.

A flexible wheel-base on five axles can be formed by combining a transverse-moving axle with the above-described arrangement for a four-axle flexible wheel-base, as is shown in Figs. 11, 12, 13, and 14. Under the bottom of the car two angle-irons, T, are fastened at right angles to its center line. The frame of the transverse-moving axle is fitted between these two angle-irons, so that it may have perfect freedom to move laterally under the car when the car enters a curve. Instead of the angle-irons T, iron rods could be used transversely fastened under the car-bottom, with the axle-frame so attached to them that it could freely move sidewise.

The first, second, fourth, and fifth bogies and the arrangement for controlling their rotation are applied to this car in the same manner as to a car on four axles, as shown in Figs. 7 and 8, except that the center bars, J, instead of running to about the middle of the car, are each carried to just inside of the inner bogies, to which they are respectively attached, and that the lever-guide G can be in two pieces, attached to a center-pin on the transverse-moving axle, as shown in Fig. 11, or one iron extending from the king-bolt of the second to the king-bolt of the fourth bogie. In the latter case the middle transverse-moving axle will have no connection with the other bogies of the car. Either mode will work equally correct.

In using these five-axle cars on railroads with curves of less than three hundred feet radius it would be better to place the two bogies having lateral and rotating motion on

the ends of the car and the two bogies having rotating motion only next to them, the rest of the arrangement to be unchanged.

In adjusting the lever-guide G and bogie-arm F, the best results will be obtained by using the following formula, or formula approximate thereto, to wit:

For a car on two axles: The distance measured along the lever-guides G G from king-bolt on one car to king-bolt on the other (see Figs. 1 and 3) is to the distance between the king-bolts on one car as that part of lever E which is between bogie-arm F and lever-guide G is to that part which is between bogie-arm F and hook-bolt D.

For a car on four or more axles: The length of the lever-guide is to the distance between the king-bolt of end bogie and the king-bolt of next inside bogie as that part of lever E which is between bogie-arm F and lever-guide G is to that part which is between bogie-arm F and center bar, J.

From this description it is manifest that any convenient number of bogies may be connected together in the manner described without departing from the spirit of my invention, which may be said to consist mainly in the employment, with a series of bogies, of swinging levers, bogie-arms, and guide-levers, said swinging levers being either suspended from the car or from a second lever pivoted to the car.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, with two single-axle bogies, each connected with a car-frame and provided with the bogie-arms F, of the lever-guide G and swinging levers E, connecting the lever-guide and bogie-arms, substantially as described, and for the purpose set forth.

2. The combination, with two single-axle bogies, each connected with a car-frame and provided with the bogie-arms F, of the lever-guide G, swinging levers E, a third single-axle bogie, and diagonal rods pivoted thereto and to the adjacent bogie, substantially as described, and for the purpose set forth.

3. The combination, with two single-axle bogies, each connected with a car-frame and with each other by the diagonal pivoted rods C, and provided with the bogie-arms F, of the central pivoted bar, J, swinging levers E, and lever-guide G, connecting the two single-axle bogies with a pair of single-axle bogies similarly constructed and connected together, substantially as described, and for the purpose set forth.

CHARLES AXEL LINDBLOM.

Witnesses:
CH. E. CODDINGTON,
THOS. ALEXANDER, Jr.