(No Model.) 3 Sheets—Sheet 1.

T. L. JOHNSON.

CABLE RAILWAY MECHANISM.

No. 317,139. Patented May 5, 1885.

Fig. 1.

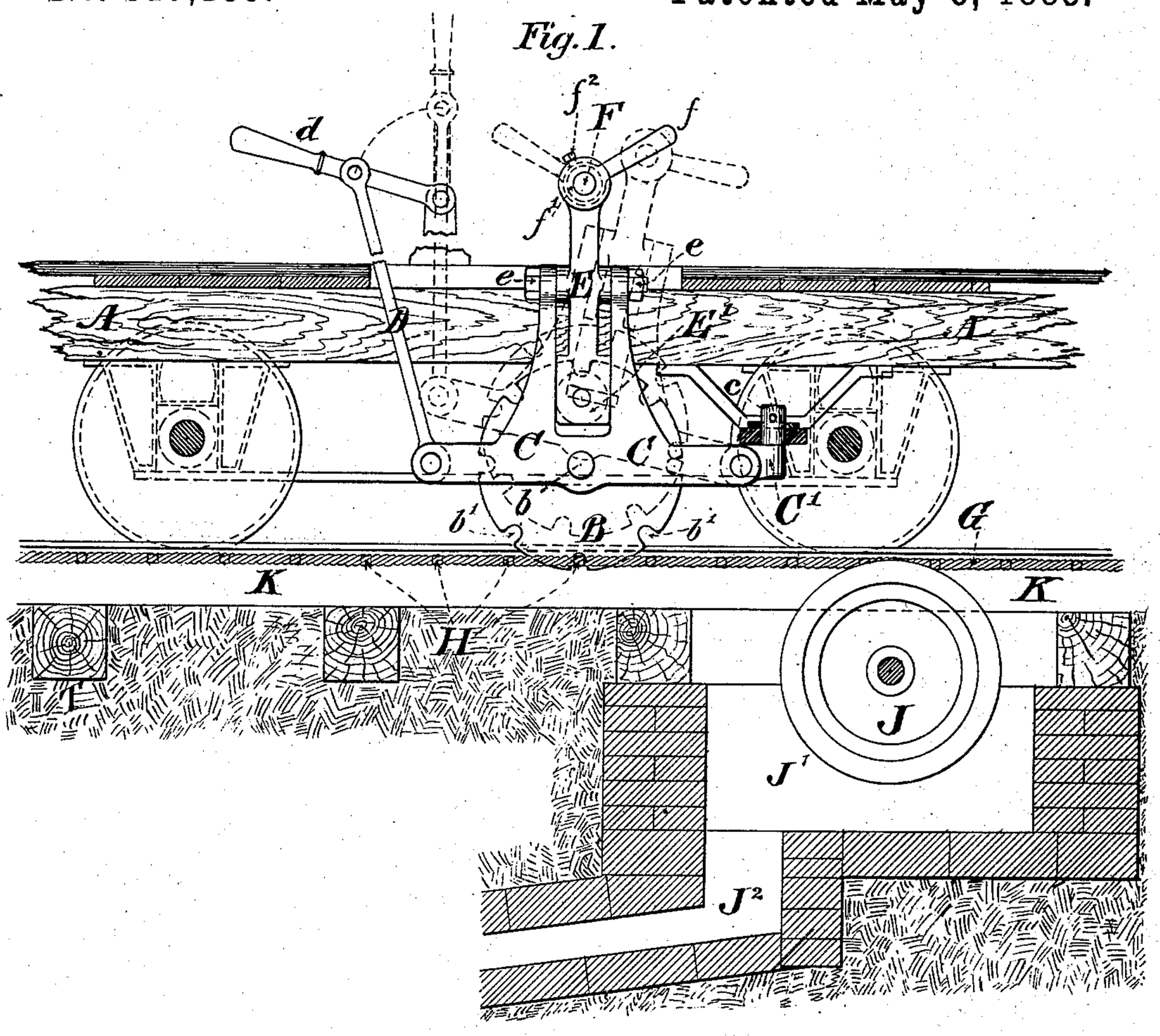
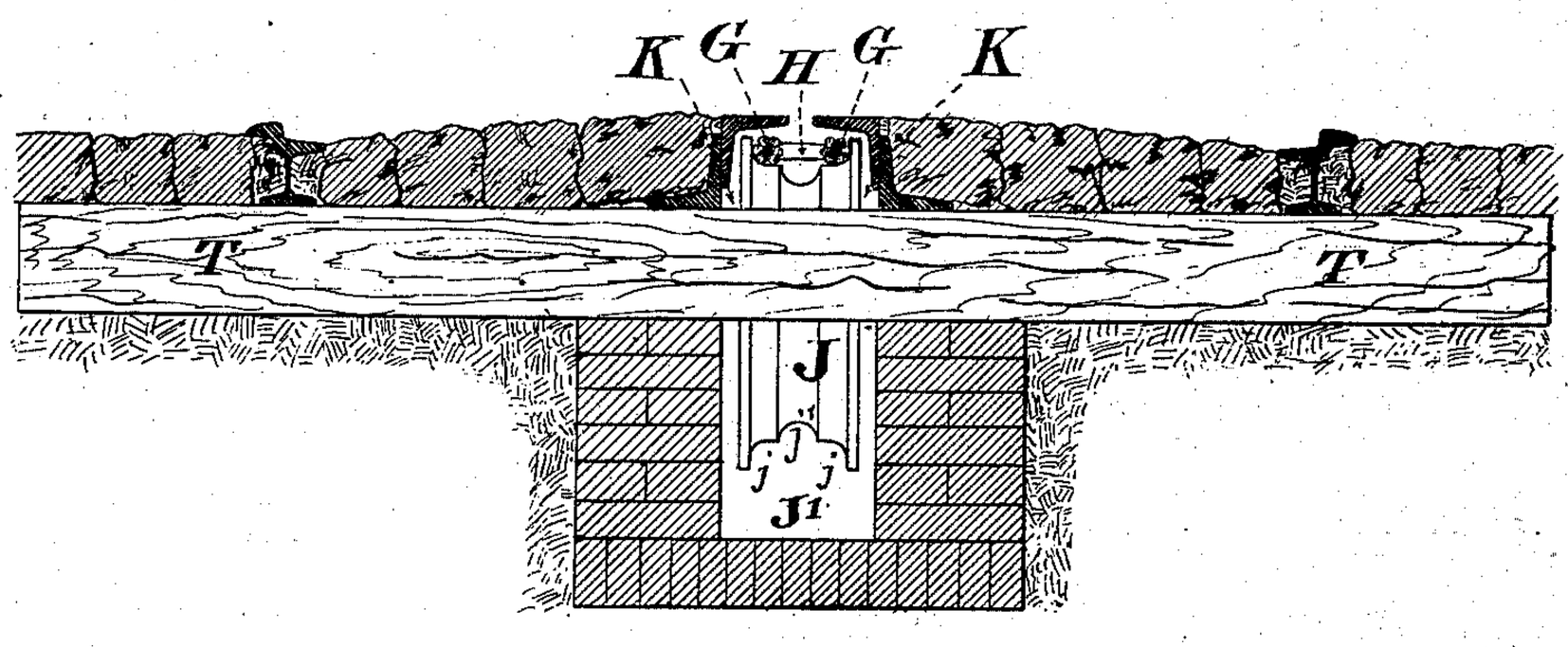


Fig. 2.



Witnesses.

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(No Model.) 3 Sheets—Sheet 2.

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CABLE RAILWAY MECHANISM.

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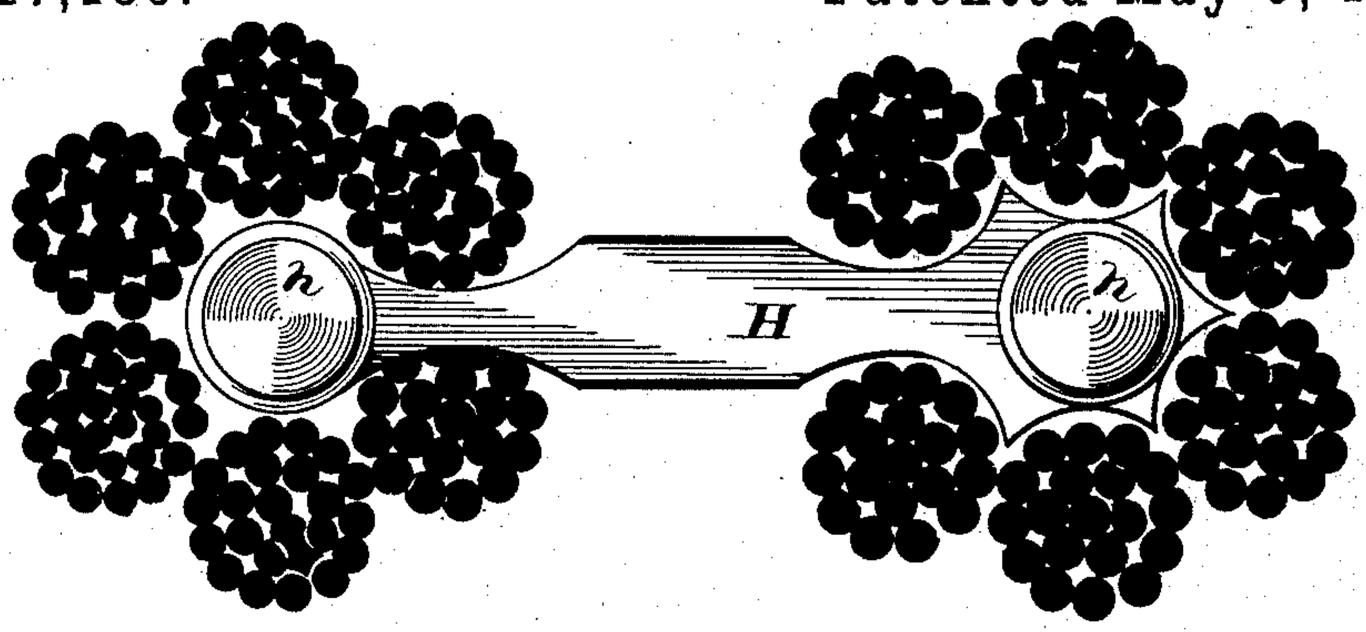

Fig. 3.

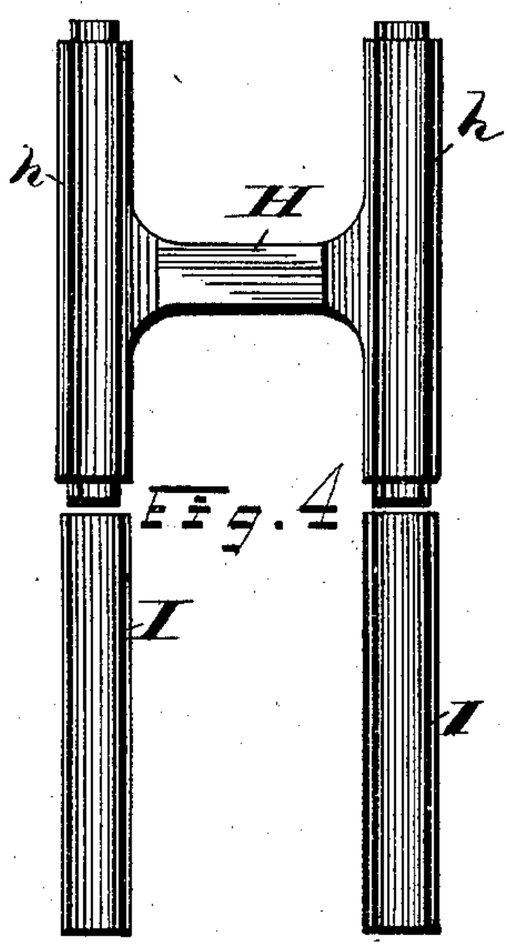

Fig. 4.

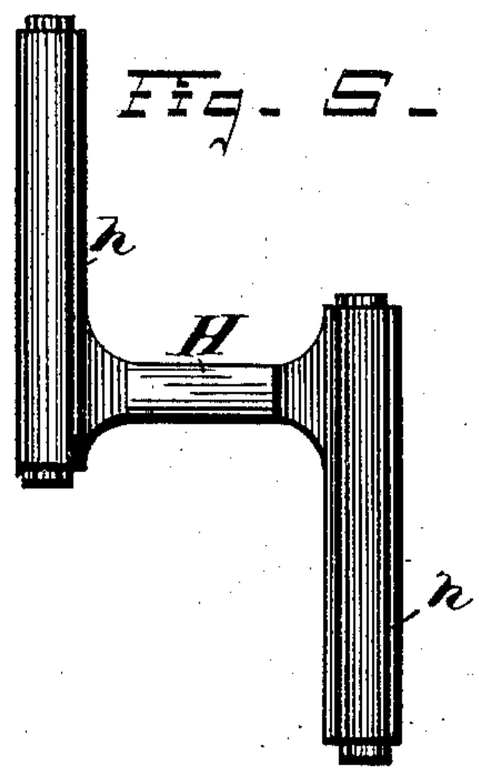

Fig. 5.

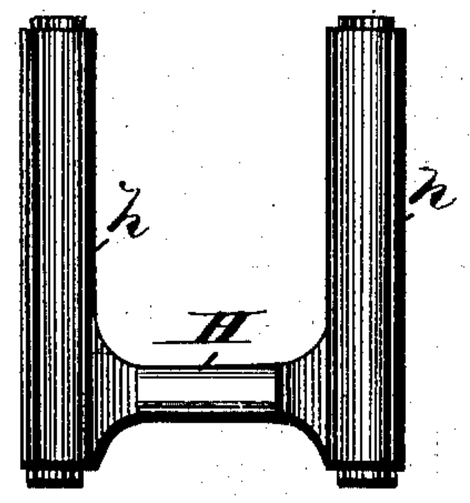

Fig. 6.

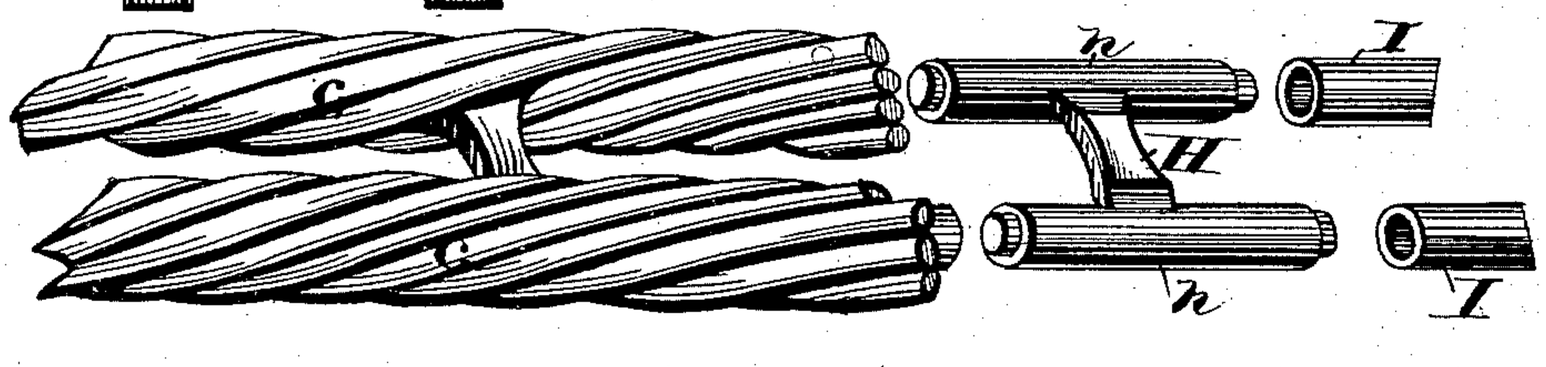

Fig. 7.

WITNESSES

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(No Model.) 3 Sheets—Sheet 3.

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CABLE RAILWAY MECHANISM.

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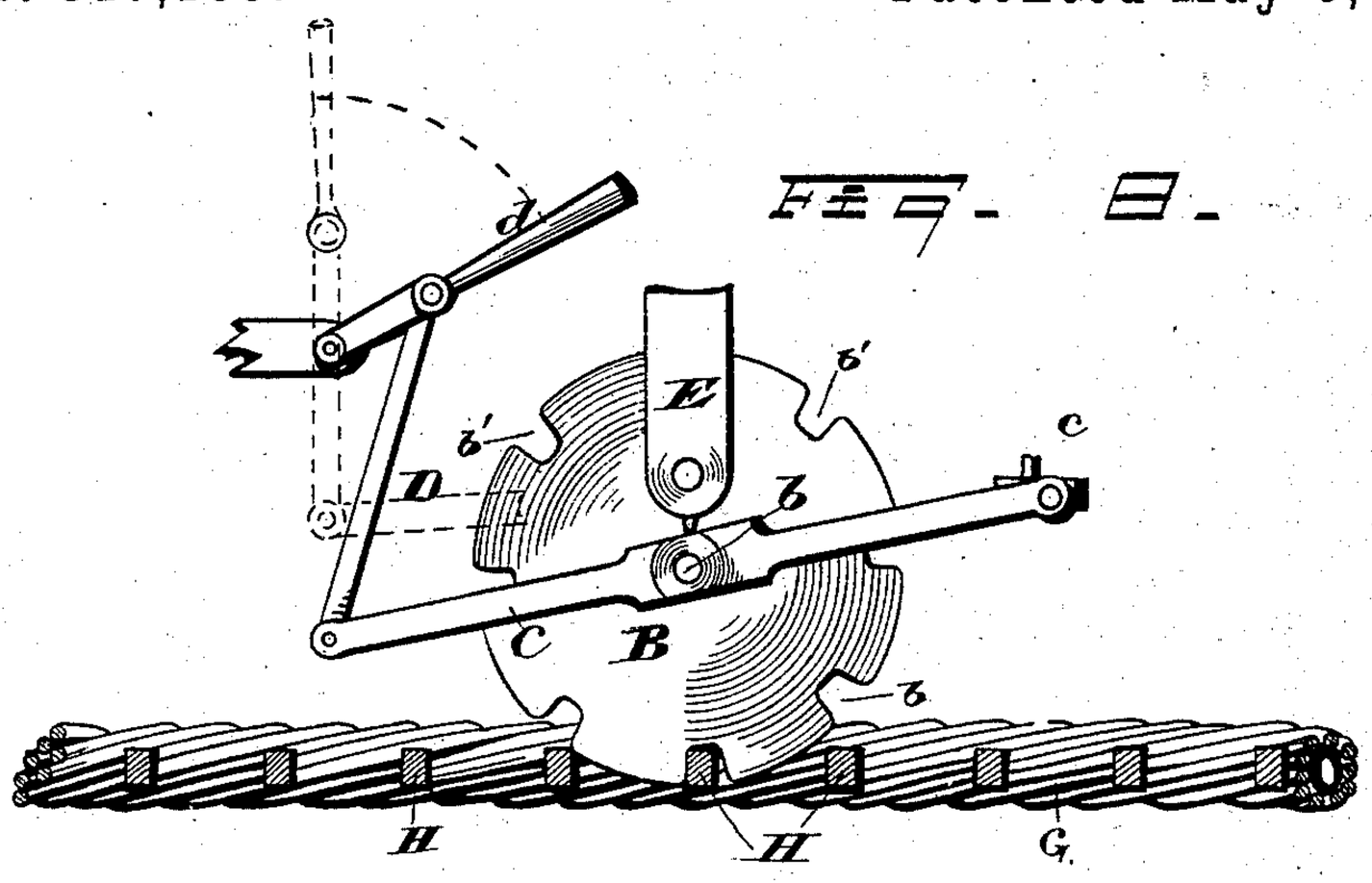

FIG. 8.

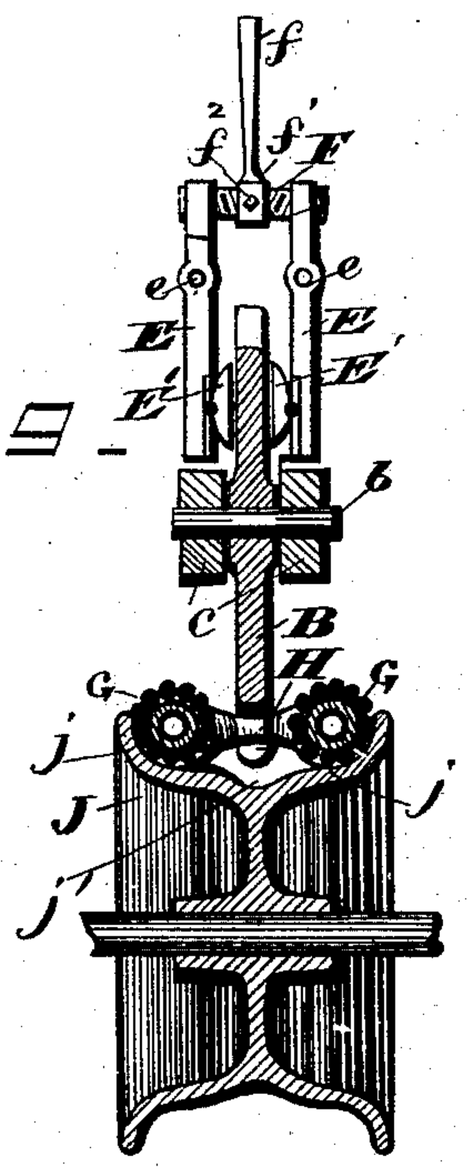

FIG. 9.

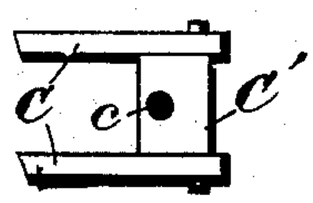

FIG. 10.

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UNITED STATES PATENT OFFICE.

TOM L. JOHNSON, OF CLEVELAND, OHIO.

CABLE-RAILWAY MECHANISM.

SPECIFICATION forming part of Letters Patent No. 317,139, dated May 5, 1885.

Application filed April 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, TOM L. JOHNSON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Cable-Railway Mechanism, which invention is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to provide an improved traction-cable, and more ready, much simpler, and more desirable means than those heretofore used for connecting and disconnecting the car and cable.

The invention consists in a specially-constructed double cable, hereinafter described.

In the accompanying drawings, Figure 1 is a side elevation of a car, with portions broken away, showing the connecting-disk and attachments, and underneath a longitudinal vertical section of the cable-way, showing the cable and one of its carrying-pulleys. Fig. 2 is a transverse vertical section of the road-bed, car-track, cable-way, and double cable therein. Fig. 3 is an enlarged transverse vertical section of the cable, showing a cross-stop in end view. Figs. 4, 5, and 6 show the cross-stops slightly varied in form, and their connecting-tubes. Fig. 7 is a perspective view of a portion of the double cable, a cross-stop, and a portion of the intervening tubes. Fig. 8 is a side elevation of the connecting-disk and portions of its attachments, with one of the cables removed, showing the cross-stops in section, and with one of said stops engaged with said disk. Fig. 9 is a transverse vertical section through a carrying-pulley, the double cable, its connecting-disk, and supporting shaft and frame, and, in end elevation, a portion of the brake device for said disk. Fig. 10 is a view in plan of the pivoted portions of the disk-frame.

In said figures, the letter A indicates a car, to which is attached the device or circular disk for connecting it with the cable, and to which car other cars may be attached for propulsion, if desired; or this mechanism may be attached to each individual car, if preferred.

B indicates a connecting-disk consisting of circular plate, preferably of steel, with notches or re-entrant angles, not teeth, in its periphery, as shown at *b'*, and secured to the shaft *b*, journaled in suitable bearings mounted on the frame C, which frame is pivoted at one end to the block C', so that the opposite end of the frame may be raised or lowered. The block C' also is pivoted on the vertical pin *c*, by means of which the frame C is allowed a limited lateral motion, for purposes hereinafter explained. To the free end of the frame is attached the rod D, pivoted to the lever *d*, so that when said lever is raised to a vertical position, as shown in dotted lines, the free end will be lifted and the frame C supported in its raised position. It will be noted that as little of the periphery of the disk is cut away for the purpose of forming these notches as will permit their easy entry over the cable-stops H, hereinafter described, the object being to secure the rotation of the disk by its first striking the cable upon its periphery, and thus striking the cable with as little jar as possible. The diameter of said disk for ordinary passenger-car service need not exceed twenty inches, and its thickness, if of steel, not more than a half-inch.

The levers E, journaled at *e* in bearings mounted upon the frame C, are provided with friction-blocks E', adapted to press upon the sides of the disk B. On the upper ends of these levers are bosses, through the eyes of which the rod F, forming both a right and left hand screw, passes. Said rod is provided with a handle or hand-lever, *f*, having a boss, *f'*, at its lower end fitted over it, and secured thereto by a set-screw, *f*, so that said handle may at any time be adjusted to stand in any required position or angle. One motion of the handle f^2 thus moves the levers E so as to press the friction-blocks E' against the disk B with sufficient force to either stop its revolutions or to only retard its motion. A reverse motion of the handle *f* will obviously withdraw the friction-blocks E' from contact with the disk B by spreading apart the lower ends of the levers E, thus allowing said disk to freely rotate under any rotary impulse that may be imparted to it. The friction-blocks E' are pivoted or hinged to the levers E, in order that they may the better adjust themselves to a good bearing-surface upon the disk B. By this arrangement of brake mechanism it will be observed that said mechanism, whether the friction-blocks E be applied or not, always partakes of the motions of the adjustable frame

C, to which it, as well as the disk B, is secured. The friction-blocks E′ can therefore never operate out of true relation with said disk.

Traction-cables as usually constructed consist of several strands twisted helically around a centrally core—usually hemp—each strand of the cable consisting of several wires twisted together. My improved construction consists of two cables, G G, Fig. 9, arranged parallel with each other, forming a double cable, and separated about one inch (a little more or less) apart. The two cables are connected by cross-stops H, which enter the respective cables between the strands and at such equal intervals as the twist in the strands will admit—say from five to eight inches. These cross-stops are formed with end pieces or cores, *h*, parallel to each other, but at right angles to the central part or cross-stop proper, and of suitable size and shape to form a portion of the core of the respective cables. If the cross-stops are eight inches apart, these pieces should be about four inches long, and the ends reduced in diameter, so as to enter loosely a short distance into the ends of the tubes I, laid in the cable between said cores *h*. The tubes I and parts *h* thus form continuous cores for the respective cables, with socket-joints at each union of the parts *h* and I, and thus retain and permit flexibility of the cable in curving around the driving-pulleys without angle or kink.

The cross-stops H are made thin and broad at the parts where they enter the cable, so that the strands are but slightly separated at these points, as shown in Fig. 3. If the cross-stops are of cast metal, a preferable form is shown in Fig. 4; but if forged they may be made to better advantage by upsetting and bending them in the manner shown in Figs. 5 and 6, and they may be easily thus shaped by a drop-press.

At suitable distances apart—say twenty-five or thirty feet—the cable is supported on carrying-pulleys J, Figs. 1 and 9. Each of said pulleys has two seats, one for each of the cables, and a guiding-flange on either side, as shown, and between the cable-seats a deep annular groove, *j′*, through which the periphery of the disk may pass without contact with the pulley. These pulleys are mounted in suitable bearings located in pits J′, leading under the cable-way, and provided with movable covers at the sides of the pulleys, so that the journals of said pulleys may be at all times accessible for oiling, inspection, or repairs. These pits should be provided with suitable means for drainage, leading, when practicable, to sewers, as shown at J^2, Fig. 1.

The cable-way K, Figs. 1 and 2, through which the cable passes, is formed of suitable plates of iron, with a narrow slot or longitudinal opening above, through which the disk B enters. The cable, as shown, operates near the top of the road-bed, and as the cable-way is only of sufficient size to properly accommodate the cable, there is ample room for the location of the cable-way above the cross-ties T, Fig. 2.

In operating the machinery, when the cable is in motion, the disk B is lowered to an engagement with the cross-stops H. This engagement is, first, only on the periphery of the disk, starting the same into motion, and is immediately followed by the successive engagement of the notches of the disk with the stops of the cable, in consequence of which the disk is revolved at the same rate of speed at which the cable is moving. Next the friction-blocks E′ are applied to the disk B, and its rotation thereby gradually retarded and stopped. The car by this means is gently started and its motion more or less accelerated, according to the celerity with which the disk B is stopped by the brake mechanism. The car may thus be moved along slowly for a time, and its speed then quickly accelerated to that of the cable.

When it is desired to stop the car temporarily, the starting brake mechanism above described is released, and the disk B left to revolve with the motion of the cable. Stoppage-brakes may also be fitted and applied to the car-wheels in the usual manner, to quickly stop the car.

By partially removing the pressure of the starting-brake from the disk B said disk will slowly revolve, thus only imparting motion to the car at such reduced speed as may be required. At any time the disk B may be raised from its engagement with the cable to some distance above the road-bed, as already described, so that the car may be switched from the main track, if necessary, or cross a cable at right angles to its own direction. The car and its operative mechanism are therefore completely under the control of the operator.

The thickness of the disk B not exceeding one-half of an inch, or even less, and the groove in the cable-way not being more than about three-fourths of an inch wide, or less, but little dirt, comparatively, will enter the tunnel, and the internal shape of the cable-way being clear and unobstructed by internal rails or other devices, any dirt accumulating therein can be mechanically swept from the same with great facility and deposited in the pits provided for the carrying-pulleys, from which it may easily be removed by drainage or otherwise. In passing around curves the frame C, by means of its vertical pivot *c*, can adjust itself laterally, so that the disk will follow the groove in the cable-way unaffected by slight deviations of the car on its rail-track.

It will be observed that in this system of cable-traction the cable is not lifted from its carrying-pulleys, which lifting is always done when any of the numerous forms of "cable-grips" are employed.

I am aware that it has been proposed to operate a toothed circular disk by means of traction-chains; but I am not aware that a traction-cable constructed as herein described and a rotary disk mounted on an adjustable

frame have ever been known or used prior to my invention of the same.

Having thus fully described my said improvements, as of my invention, I claim—

1. A railway traction-cable composed of two cables provided with cross-stops having side pieces within the strands of the respective cables, and forming sections of cores thereof, whereby said cables are secured to each other at suitable distance apart, substantially as and for the purposes set forth.

2. In a double traction-cable for cable railways, in combination with cross-stops provided with side pieces within the strands of said cable, intermediate tubes forming with said side pieces flexible and continuous cores for said cable, substantially as and for the purposes set forth.

3. In a cable-railway car, in combination with a rotary traction disk or wheel, a friction-brake consisting of two brake blocks or shoes, operated by a hand lever or levers to make contact with opposite sides of said disk for stopping the same to propel the car, and to recede therefrom in opposite directions for releasing said disk to stop the car, substantially as and for the purposes set forth.

4. In a cable-railway system, in combination with a double traction-cable provided with cross-stops, a laterally-adjustable rotary disk or wheel mounted upon a car and adapted to travel in a slotted cable-way, whereby provision is made for said disk while traveling in said cable-way to accommodate itself to lateral oscillation of the car, substantially as and for the purposes set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 28th day of March, 1884.

TOM L. JOHNSON.

Witnesses:
CHAS. H. DORER,
GEO. W. KING.