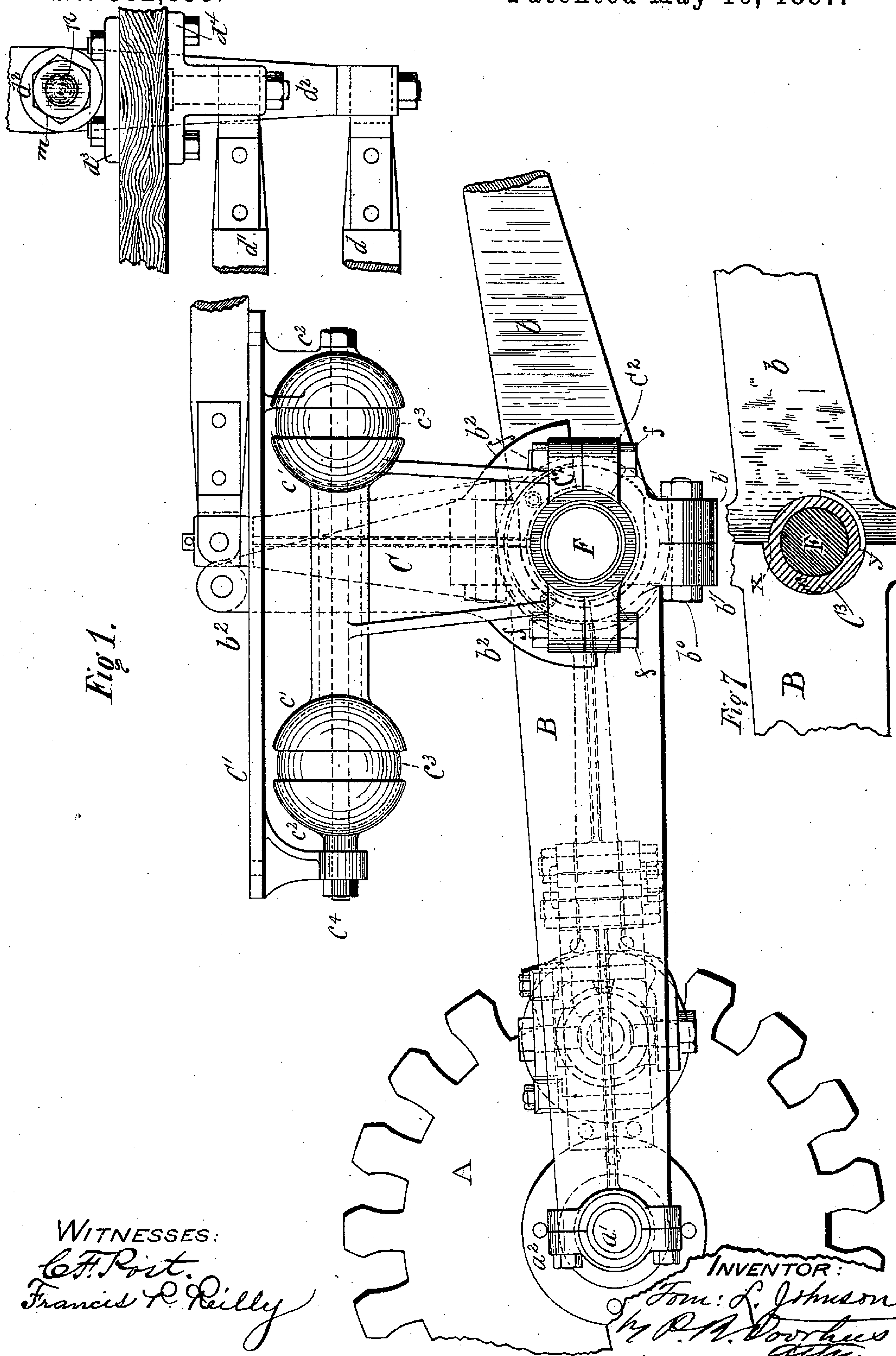
(No Model.) 3 Sheets—Sheet 1.

T. L. JOHNSON.

CABLE CAR MECHANISM.

No. 362,633. Patented May 10, 1887.



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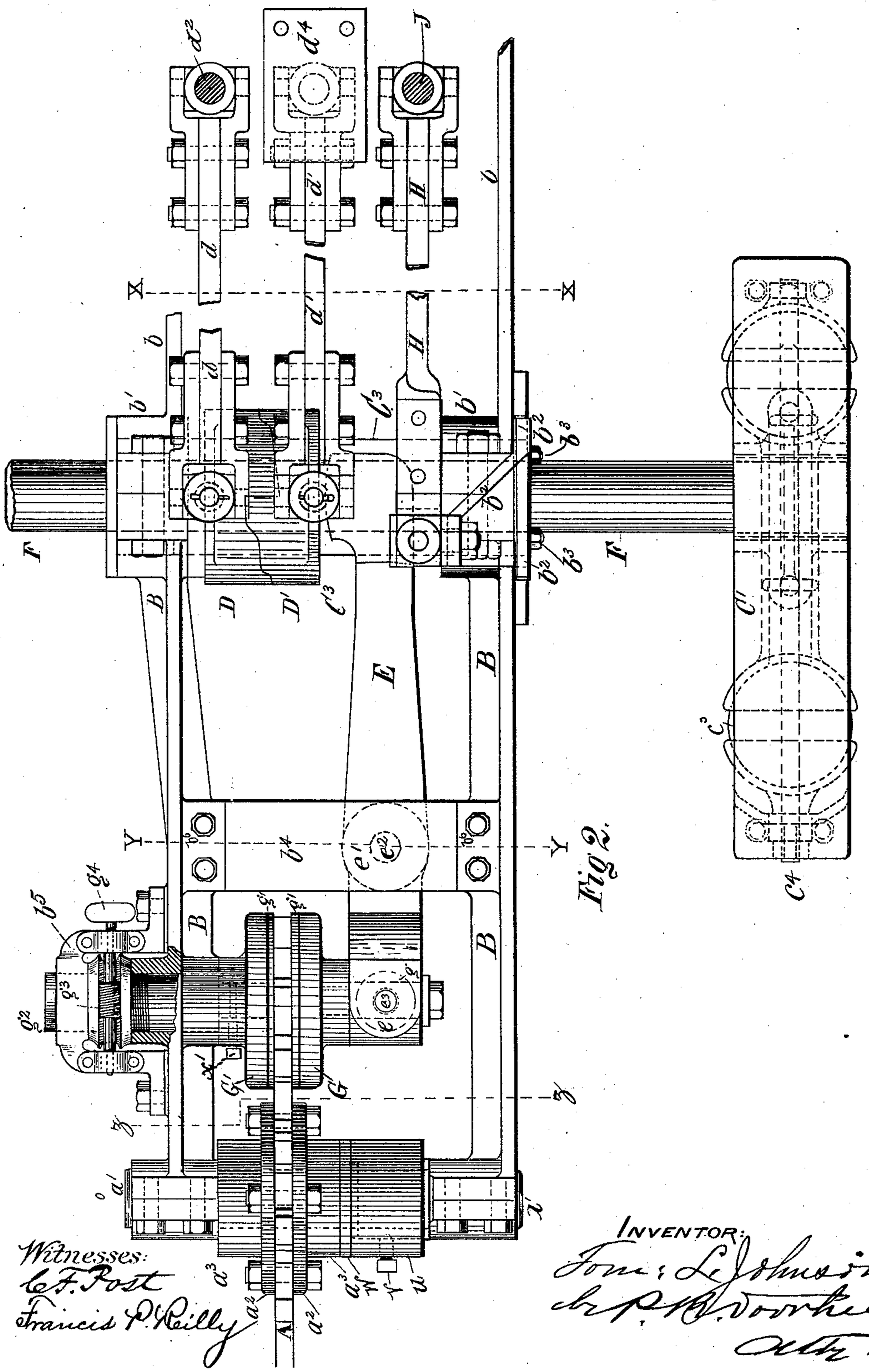

Fig 2.

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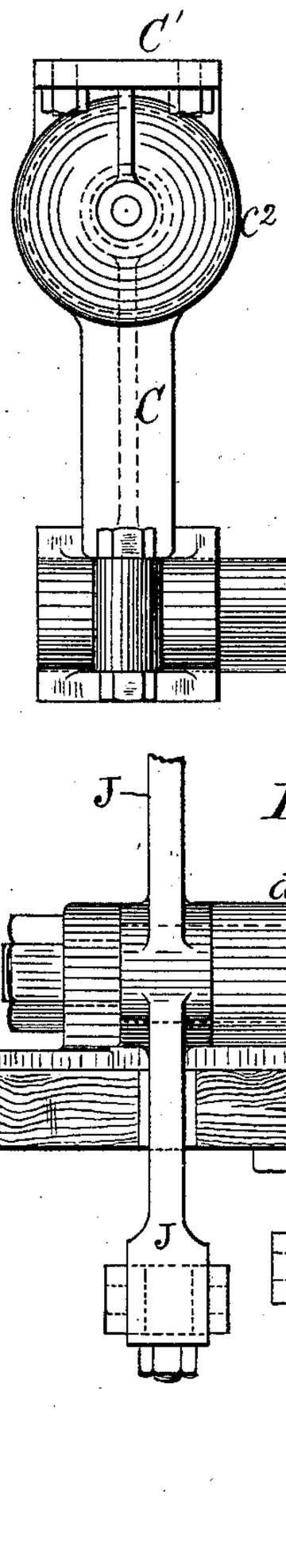


Fig 3.

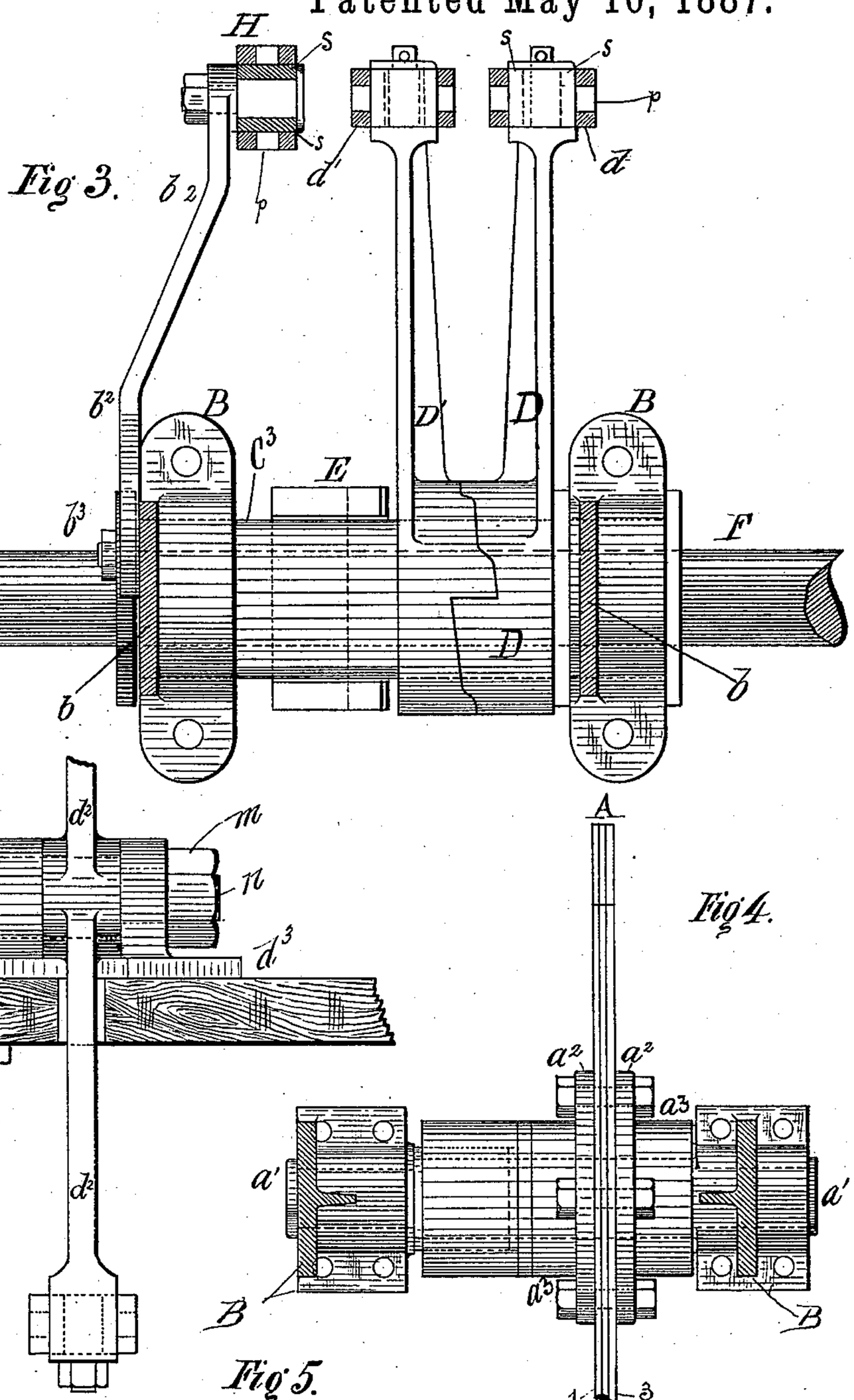
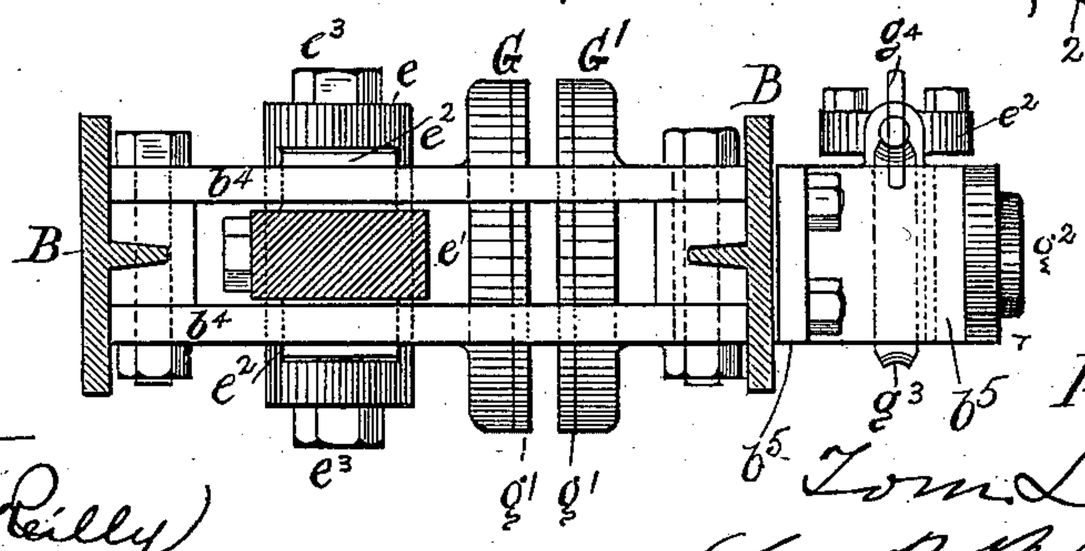


Fig 6.

Fig 4.

Fig 5.



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TOM L. JOHNSON, OF CLEVELAND, OHIO.

CABLE-CAR MECHANISM.

SPECIFICATION forming part of Letters Patent No. 362,633, dated May 10, 1887.

Application filed April 9, 1886. Serial No. 198,331. (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-Car Mechanism, which invention or improvements are fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to improve the mechanism of cable cars in that class of mechanism which couples the car to the cable by a notched wheel or disk instead of by a grip.

The invention consists of the parts and combinations of parts, as hereinafter described, and particularly set forth in the claims.

In the accompanying drawings, Figure 1 shows a side view of the mechanism and coupling wheel or disk detached from the car-body. Fig. 2 shows in plan the mechanism illustrated in Fig. 1. Fig. 3 is an end view of parts, taken through line X X of Fig. 2. Fig. 4 is an end view of the coupling wheel or disk, taken from the right through the line *z z* of Fig. 2. Fig. 5 is an end view of the brake mechanism, taken from the right through line Y Y of Fig. 2. Fig. 6 is a front end view of operating-levers, looking from the right of Figs. 1 and 2. Fig. 7 shows in side view certain details, hereinafter described. In said figures the several parts are indicated by letters, as follows:

A indicates the disk, having teeth cut in its periphery for engagement with a traction-cable; *a'*, a stationary shaft on which said disk revolves, and to which it is attached by means of flanged collars a^2 a^2 and bosses a^3 a^3, which revolve with said disk. The disk A is adjusted on the shaft *a'* to prevent side-play by the collar *u*, secured to said shaft by a set-screw, *v*, and an interposed washer or liner, *w*. The frame B, which carries the disk A and its detailed parts, is prolonged into arms *b b*, which carry weights (not shown) to counterbalance said frame, which is free to vibrate or oscillate about the main shaft F as a center, as hereinafter described. Said frame is braced and connected together by the cross bars b^4 b^4, and also further connected by the hollow brace or sleeve C^3, upon which it is mounted. By means of said sleeve directly mounted on the shaft F the frame B is free either to shift sidewise or to vibrate on the stationary main shaft F, as hereinafter more particularly described. The arms *b*, forming part of the frame B, are made as separate pieces united to the parts B through their respective jaws, forming a boss, *b' b'*, by means of bolts b^3, as shown in Fig. 1. The arms *b b* can, however, if desired, be directly connected to the sleeve C^3, instead of to the frame B. The arm b^2 is attached to the sleeve C^3 by the bolts b^3. Said arm operates, when vibrated, to either lift or lower the frame B and the disk A by oscillating the sleeve C^3 on the shaft F as a center. The hangers C, one on each side, which support the ends of the stationary shaft F in suitable bearings provided with caps C^2 and bolts *f*, are secured by plates C' to the body or framing of the car. The hangers C are provided with cupped ends *c'*, offset horizontally, as shown, and the plates C' have corresponding dished or cupped disks, c^2, secured in brackets forming parts thereof and depending therefrom.

Between the disks *c' c²* are inserted rubber balls c^3, through which the disks *c' c²* and the hangers C are united to the plates C' by bolts c^4, passed through the brackets depending from the ends of said plates and secured by nuts, as shown in Fig. 1. The clutches D D' are loosely mounted on the sleeve C^3; D', however, being prevented from rotary motion by means of the arm or rod *d'*, which ends in a swivel-fork connection, *p s*, with the plate d^4, which plate is bolted to the lower part of the car-body, preferably under its front platform. The clutch D is free to rotate on the sleeve C^3 when operated by the rod *d*, connected thereto at one end by a swivel-fork connection, *p s*, and by a similar fork-connection at its other end to the brake-lever d^2, which lever passes up through the platform of the car, conveniently placed to be operated by hand. Said brake-lever is supported on a center bolt, *n*, provided with end nuts, *m*, in a bearing, d^3, bolted on top of the floor of said platform. The brake-arm E oscillates on a center, e^2, as a fulcrum. Said center may either be part of a boss reduced, as shown in Fig. 5, or a pin fitted through an eye in said boss, as shown in Fig. 1. The brake-arm E ends in a fork, *e*, which loosely embraces the sliding brake-shoe G, the fork *e* being connected to

said shoe by the stud-bolts e^3. Said stud-bolts are screwed into holes made for the purpose in the boss of the brake-shoe G. Said shoe is held from "wabbling" by means of a surface-bearing, (shown by the dotted circle g, Fig. 2,) which fits neatly to the inside of the forked end of the brake-arm E.

The brake-shoes G G′ are provided with false or renewable faces $g\,g'$, of leather or metal, secured in any suitable or convenient manner to said shoes, in order to take the wear due to friction against the wheel or disk A. The stationary brake-shoe G′ is provided with a shank, g^2, which is screw-threaded a portion of its length. Said shank has a smooth bearing in a boss on the frame B, and its end is further supported by an outside bearing, b^5, secured to the frame B. The worm-wheel g^3, fitting neatly between the outside bearing, g^5, and the frame B, and free to revolve, but not to move sidewise, is threaded to fit over the threaded part of the shank g^2, and a worm-shaft, g^4, operates said wheel. This worm mechanism, as an adjunct to the brake-shoe G′, holds the same stationary after its adjustment has been made through the instrumentality of said mechanism; but the set-screw x' is added to more securely clamp the shoe to its shaft after adjustment by the worm-wheel g^3.

The complete operation of the mechanism above described is as follows: The arm b^2 is connected through the rod H to the lever J, Fig. 6, which lever has a bearing on the bolt n, which passes through its eye in common with the brake-lever d^2 in the bearing d^3 on the car-platform. By moving, therefore, the lever J, the arm b^2, secured by the bolts b^3 to the sleeve C^3, on which the frame B is secured, gives motion to said frame and to the disk A, secured thereto in a vertical direction, either up or down. Said movement of the frame B is thus effected, as clearly shown in Fig. 7. The sleeve C^3 has at this point a portion of its circumference of smaller radius than the remainder, leaving two projections or stops, $x\,y$, where the radii of different lengths terminate. Portions of the circumference of each eye in the frame B are similarly of different radii, so that stop may be opposed to stop between the eye and the sleeve, as clearly seen in Fig. 7. It is therefore evident that whenever the projection x is lowered by the rotation of the sleeve C^3 the frame B will follow said sleeve down, the part B falling by its own weight or preponderance over the part b. It is also evident that if the disk A or frame B should be thrown up from any cause said disk and frame will rise unimpeded by said sleeve, no matter what the sleeve's position, as its rotary or angular motion is limited. The arm b^2, being secured to the sleeve C^3 by bolts b^3, will always, when operated by the hand-lever J, lift the disk A out of the cable-slot, as well as permit it to descend therein, as just described; but no part of the machinery offers any impediment to the rise of said disk should it meet with any obstruction while the car is in motion. The disk A having been lowered into the slot in the cable-way and its notches engaged with the cable, said disk will revolve with such speed as the traveling cable may impart to it, the car in the meantime remaining at rest. The next step is to start the car in motion. This is effected by operating the hand-lever d^2, which, connected by the rod d to the clutch or crab D, partly rotates or oscillates the same, thereby sliding the clutch or crab D′ sidewise on the sleeve C^3, as said clutch D′ is prevented from rotating by the rod d', articulated thereto and to the plate d^4 on the body of the car. The sliding motion thus given to the clutch D′ throws over the brake-lever E, which lever in turn moves the brake-shoe G hard against one side face of the disk A. The brake-shoe G′ being adjusted so that it just clears the other side of the disk A, said pressure of the shoe G clamps the disk tight between the two brake-shoes, so that it cannot revolve. Its stoppage therefore, being fast to the cable, starts the car. Sufficient side-play is permitted to the disk on its shaft a' to prevent the pressure of the brake-shoe G from warping or springing said disk. Such tendency is, moreover, neutralized by the nice adjustment of the brake-shoe G′, effected by its worm-gearing g^4, hereinbefore described. As the clutches D D′ are each loosely fitted on the sleeve C^3, the one permanently non-rotative and the other adjustably so, any upward movement of the disk A, and consequently of its frame B, caused by any obstruction, can readily take place, regardless of whether the brake-shoes G G′ are in or out of engagement with said disk—that is, whether the starting-brake is on or off.

It will be observed that the rods d, d', and H are so connected at each end, respectively, to the arm b^2, the arms D D′, plate d^4, and hand-levers d^2 and J by forked swivel-joints $p\,s$ that the whole frame B, with its attached mechanism, can freely slide sidewise on the shaft F. This sliding motion or self-adjustment is necessary, because the car-body is subject to oscillation, while the disk A is held in an absolute path by the cable-way slot, and also because the part of the car-body supporting the hangers C and the said disk adopt different paths in passing around curves. The disk A, being thus free to rise or fall automatically, or by reason of meeting any obstruction, as hereinbefore described, does so rise and then fall after passing such obstruction without in any wise jarring or straining the operating-levers or other connections. By this arrangement, also, the disk A can be automatically switched from one slotted cable over to another when the car is switched or directed at an angle in its course, such switching or change of direction being frequently desirable. By throwing back the sleeve C^3 by operating the hand-lever J over a notched quadrant or otherwise, and thus anchoring also the lever b^2, the disk A is lifted up entirely clear of the cable-way slot and held up clear of all obstructions.

In practice it has been found that with all the above-mentioned parts working well both noise and uncomfortable sensations were produced by backlash between the disk and stops and by vibrations in the connections and in the car-body. These undesirable features have been obviated by making the disk A of two or more pieces in thickness, as indicated by the figures 1 2 3, Fig. 4. Such pieced construction takes away metallic ring and deadens noise. Such sound-deadening effect is further aided by making one of such thicknesses of a piece of some dead substance, as paper or wood. Three pieces, however, of the same metal (preferably steel) have been found the best number to effect the purpose, and the use of such number of pieces of metal dispenses with any absolute necessity of using special sound-deadening material. Vibration is of course also much neutralized or prevented by the use of the large ball rubber washers c^3 in the main hangers C, and still further, also, by taking the "spring" out of the floors of the cars by making the same of very heavy flooring material. The application of extra-heavy flooring for such purpose has been found very efficacious.

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

1. In combination with a cable car, a rocking frame pivoted to automatically oscillate vertically and slide laterally on a common center and carrying a driving disk or wheel adapted by notches or teeth to engage with or couple the car to a traction-cable, whereby said frame is free to rise whenever said disk meets an obstruction, to thereafter fall and permit said disk to re-engage the cable, and also slide laterally as guided by said disk's deviation from a straight line, substantially as and for the purposes set forth.

2. In combination with a cable car, a disk or wheel for coupling the car to its driving-cable, constructed of two or more thicknesses of material, at least one of said pieces made of metal and the other or others of metal and some sound-deadening material, one or both, whereby the noise of the mechanism is materially lessened, substantially as and for the purposes set forth.

3. In a cable-car mechanism, an oscillating sleeve, as C^3, mounted upon a fixed shaft and provided with a stop, as x, an arm, as b^2, a rod, as H, and a hand-lever, as J, in combination with an oscillating frame, as B, mounted on said sleeve and provided with a corresponding stop in its eye and carrying a cable-coupling disk, as A, whereby said disk is both thrown up out of connection with the traction-cable and allowed to again re-engage the same by operating said lever J, substantially as and for the purposes set forth.

4. In a cable-car mechanism, an oscillating sleeve, as C^3, mounted upon a fixed shaft and provided with a stop, as y, in combination with a coupling-disk, as A, carried in an oscillating frame, as B, mounted on said sleeve and provided with a corresponding stop in its eye, with lost motion between said stops, whereby said disk, when coupled to the cable, is permitted to automatically rise to obstructions and to automatically fall thereafter by the preponderance of said frame and re-engage the cable, substantially as and for the purposes set forth.

5. In a cable-car mechanism, in combination with a driving wheel or disk, as A, a brake-shoe, as G′, provided with gearing for adjustably fixing the same nearly in contact with one side face of said wheel, substantially as and for the purposes set forth.

6. In a cable-car mechanism, in combination with a driving wheel or disk, as A, and a fixed brake-shoe, as G′, a pair of clutches, as D D′, the one stationary, the other sliding upon a common center, a pivoted brake-lever, as E, and a brake shoe, as G, secured thereto, whereby said brake-shoes are caused to clamp or release said disk at will by operating said rocking clutch, substantially as and for the purposes set forth.

7. A cable-car mechanism secured to a car, consisting of the following-named elements in combination, namely: a frame carrying a cable-coupling disk pivoted to rise and fall with said disk, a brake mechanism for said disk, loosely mounted on a common center with said frame and connected by pivotal connections to the car and to a hand-lever thereon, whereby said frame is permitted to slide laterally on its pivotal center whenever said disk is deflected from a straight line in its passage through the slot in the cable-way without disturbance of or hinderance by its car-connections, substantially as and for the purposes set forth.

8. In combination with a cable car, a shaft for carrying the mechanism for connecting the car and cable, suspended from the body of the car in elastic bearings, whereby jar or shock is taken up by the elasticity of said bearings in both horizontal and vertical directions, substantially as and for the purposes set forth.

9. In combination with a cable car, a shaft, as F, carrying the mechanism for connecting the car and cable, suspended in hangers, as C, coupled to brackets, as C′, on the body of the car by means of cupped flanges, as c' c^2, rubber balls, as c^3, and bolts, as c^4, substantially as and for the purposes set forth.

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