(No Model.) 3 Sheets—Sheet 1.

J. J. GRAFF.

CABLE RAILROAD GRIP AND CROSSING.

No. 387,782. Patented Aug. 14, 1888.

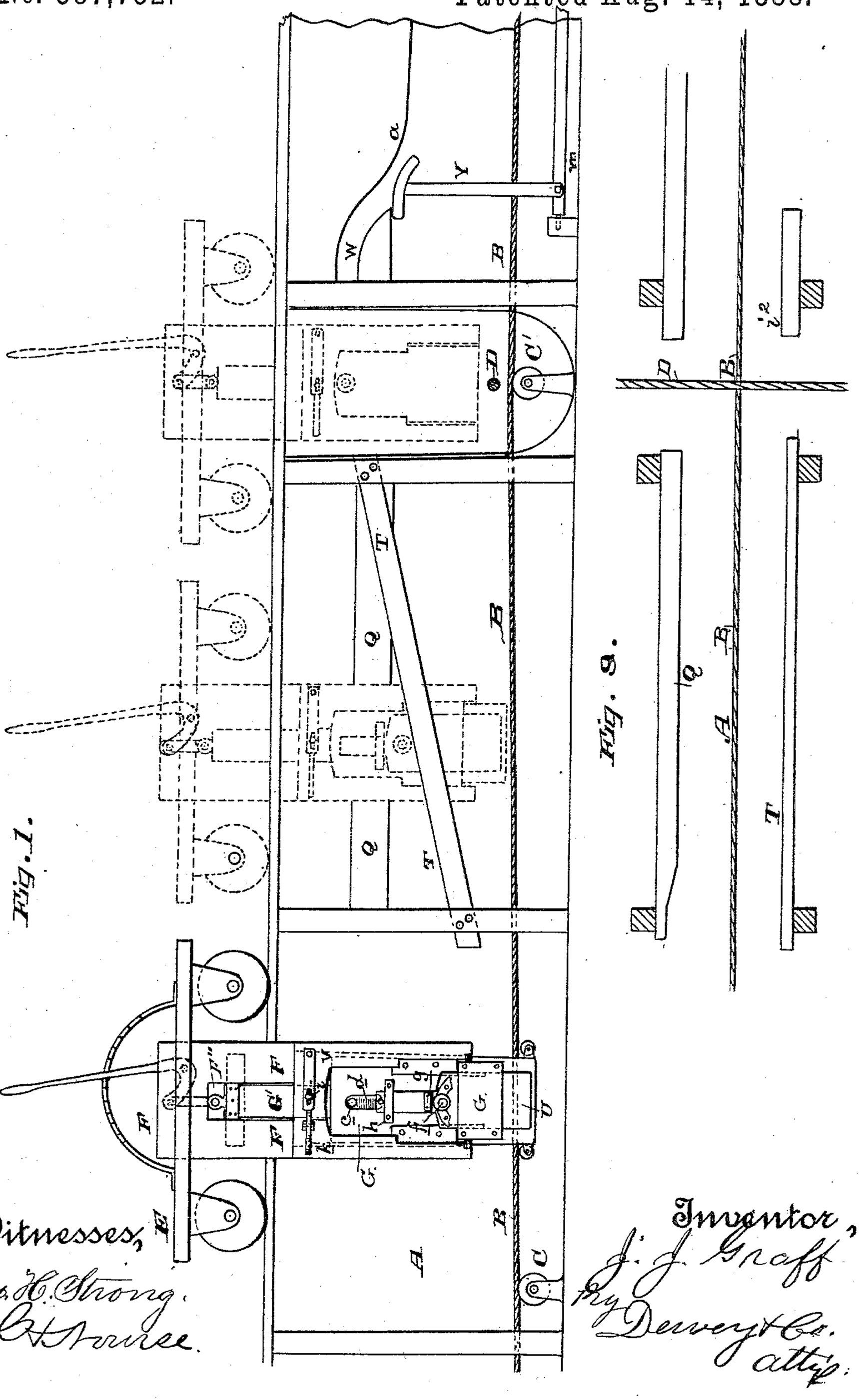

Fig. 1. Fig. 2.

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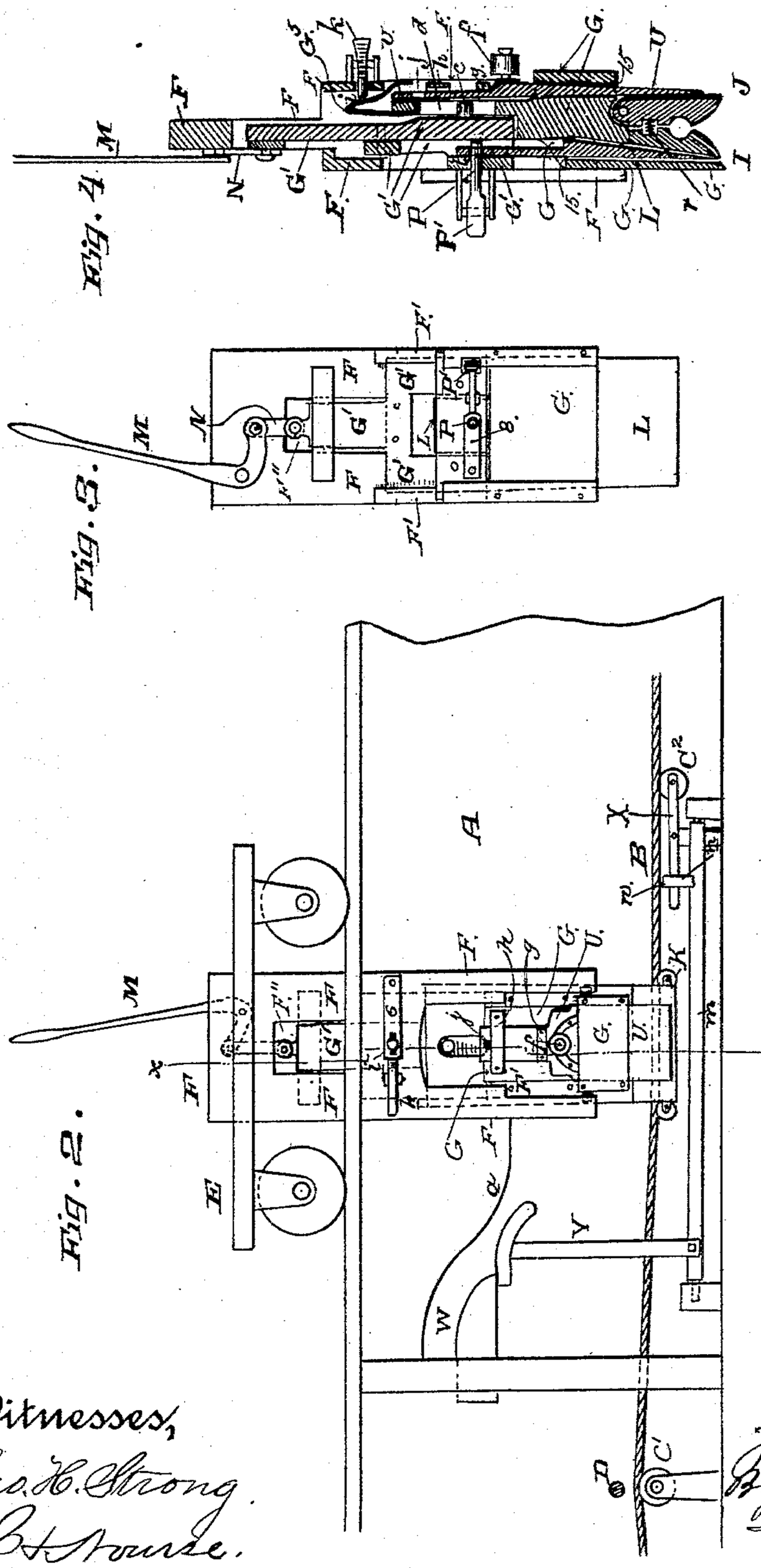

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CABLE RAILROAD GRIP AND CROSSING.

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Fig. 5.

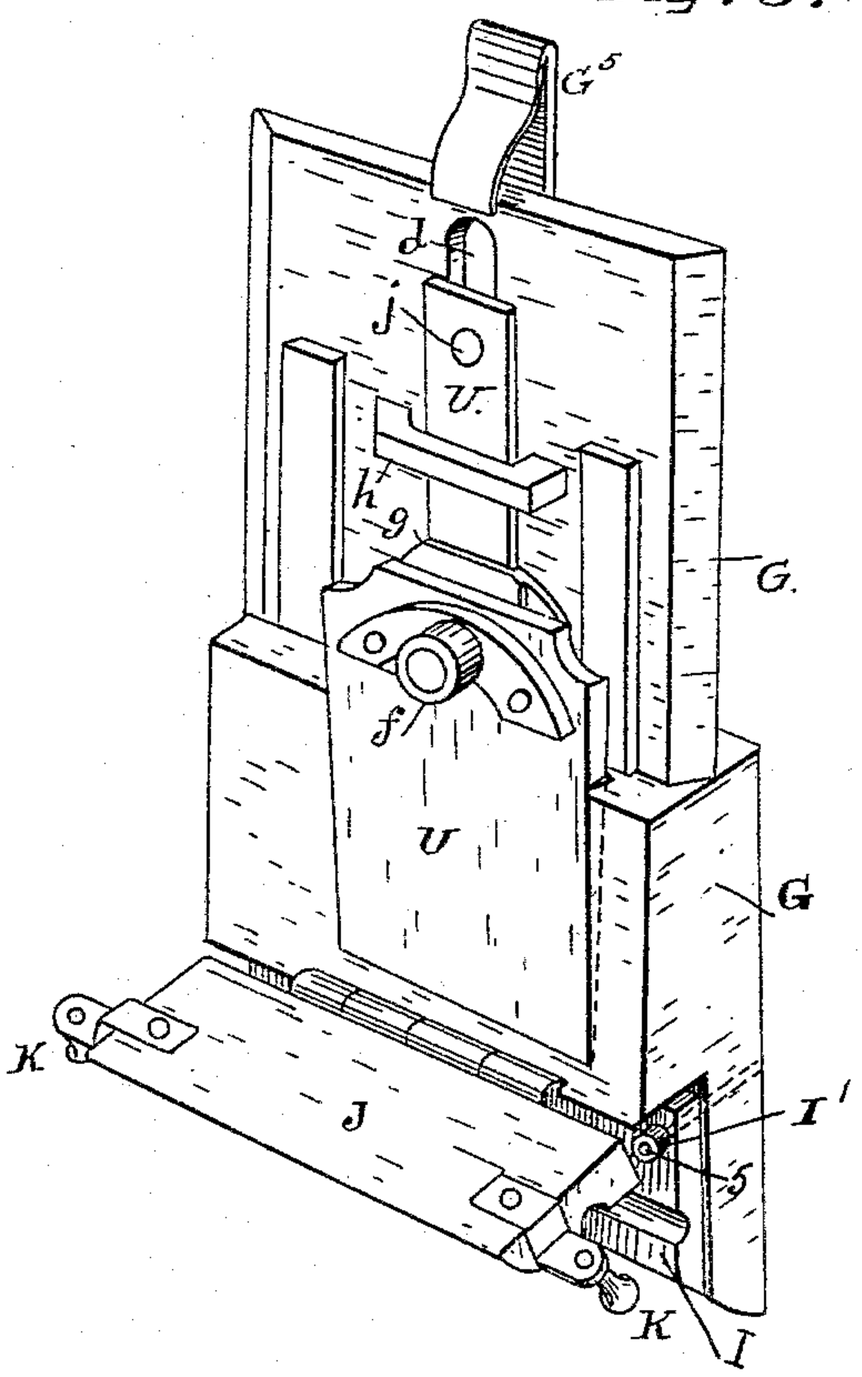


Fig. 6.

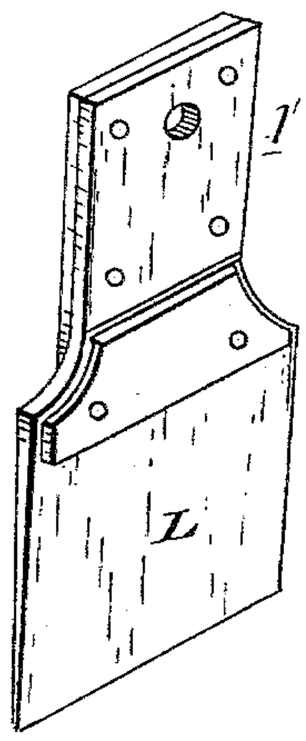


Fig. 7.

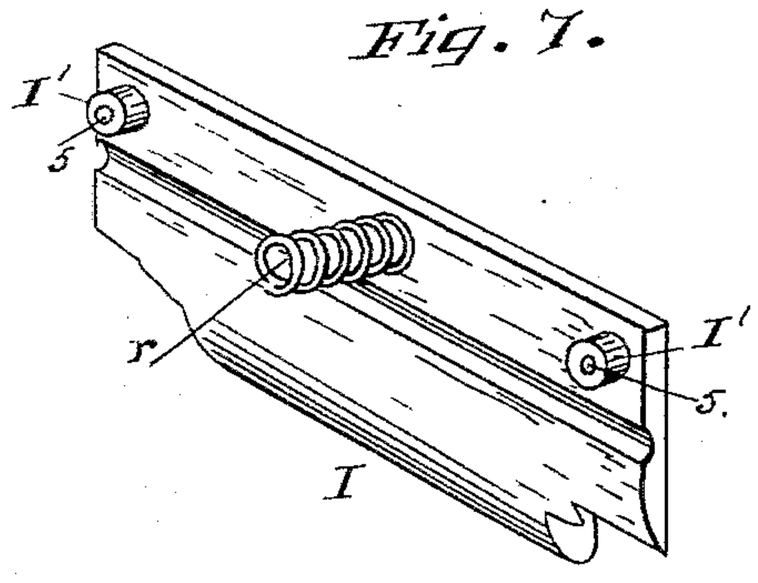
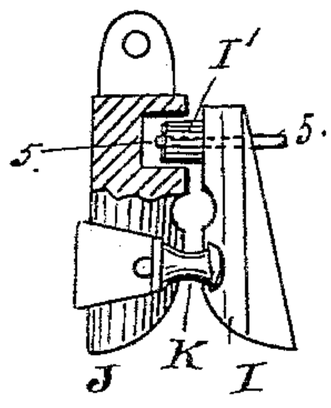


Fig. 8.



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UNITED STATES PATENT OFFICE.

JUSTIN J. GRAFF, OF SAN FRANCISCO, CALIFORNIA.

CABLE-RAILROAD GRIP AND CROSSING.

SPECIFICATION forming part of Letters Patent No. 387,782, dated August 14, 1888.

Application filed August 31, 1887. Serial No. 248,414. (No model.)

To all whom it may concern:

Be it known that I, JUSTIN J. GRAFF, of the city and county of San Francisco, State of California, have invented an Improvement in Cable-Railway Grips and Crossings; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in cable railways and the grips or means employed for propelling the cars thereon, so that the cable may be dropped and the grip may be raised for the purpose of crossing another and transverse cable line or passing any other obstruction.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation showing, first, in full outline the position of the grip holding the cable; second, in dotted outlines the position after it has let go the cable and commenced to rise, so as to pass the transverse cable, and, third, another dotted outline showing the position at the highest point above the transverse rope. Fig. 2 shows the grip after it has descended upon the other side of the transverse rope and ready to take up its own cable again. Fig. 3 is an opposite side view of the slide-frame and lever. Fig. 4 is a section on the line *x x* of Fig. 2. Fig. 5 is a perspective view of the slide G and grip-jaws. Fig. 6 is a view of slide L. Fig. 7 is a view of the jaw I. Fig. 8 is a transverse section of the jaws. Fig. 9 is a horizontal section of the tube.

A represents a cable-railway tube or tunnel within which the endless traveling cable B runs, being supported upon pulleys C at intervals along the tube.

D represents a transverse cable crossing above the cable B, and over which it is necessary to carry the grip of the first-described line.

E represents the dummy or car upon which the fixed main frame F of the grip is secured. This frame F may be of any suitable construction, being provided with grooves or channels F′ F′, and between the lower portions of its sides the movable frame G is secured and adapted to have a vertical sliding movement, the said frame G carrying at its lower end the grip-jaws I and J, as shown in Fig. 4.

The jaw I (see Fig. 5) is attached to the frame G by pins or bolts 5 passing through its upper part and carrying rollers I′, which are above the line of travel of the cable and which enter corresponding sockets in the upper portion of the opposite jaw, J, and thus serve to prevent the rope rising above the proper or desired level when the jaws are opened. The jaw J has rollers K journaled on arms at each end, so that they stand beneath the line of travel of the rope when the latter is between the jaws, and when the jaws are opened, to allow the rope to run freely and not drive the car, the rope will be supported upon these rollers. The closing of the jaws is effected by means of wedge-shaped plates L and U, which slide up and down in the frame G in suitable guides, 15, so that these wedges pass down behind the jaws I and J, respectively. The jaw I has a sliding movement to and from the jaw J, this movement being effected by moving the wedge-shaped plate L up and down behind the jaw, and the jaw has sufficient movement on the pins or bolts which support the rollers I′ to allow this movement. While this movement of the jaw I is produced for the purpose of gripping and holding against the rope, the opposite jaw, J, is held firmly in its place by means of the wedge U, which is forced down behind it, and remains in this position during the ordinary travel of the car.

The movement of the wedge L is effected by means of a slide, G′, which moves in the guides F′ and a slot, F″, in the main frame F, and has its lower end connected with the wedge L by means of a spring-actuated pin, P, which passes through the lower part of the slide G′ and enters the hole *l* in the upper part of the wedge or its shank.

M is a lever fulcrumed upon the main frame F, and connected by a link, N, with the upper part of the slide G′, so that by the movement of the lever M the slide G′ and wedge L are caused to move up or down behind the movable jaw I, and thus allow it to be pressed back or withdrawn, to allow the cable to run free, or forced forward, so as to grip the cable between itself and the opposite jaw, J, which, as before described, is held immovable by means of the wedge U. The jaws are separated when released from the wedges by a spring or springs, *r*, fixed between the jaws so as to press outwardly against them. In order to prevent the

rope from dropping out entirely from between the jaws when the latter are opened to release the cable, the rollers K are fixed to the jaw J so as to stand below the cable, and it travels over these rollers when the jaws are separated to stop the car, as before described. The sliding frame G is kept in place within the frame F and prevented from dropping below the proper point by means of a pin, *c*, which projects from the lower part of the sliding frame G′ and passes through the slot *d* in the upper portion of the frame G. This slot is long enough to allow the lower slide, G, to move upward as far as may be necessary to raise the grips above the transverse crossing cable D. When it is desired to automatically drop the rope upon arriving at the crossing, it is done in the following manner:

When the wedge U has been started upward by the incline T, the hinged jaw J will swing outward, so as to drop the cable, and the opposite wedge will at the same instant be relieved of pressure. The lever P′, which operates the spring-latch P, strikes the projection Q in the side of the cable-tube, and this withdraws the holding pin or latch P, so that the wedge L will be released from the sliding frame G′, and will be free to move upward with the frame G without any action upon the sliding frame G′, and the lever M and connecting-link N of these parts remaining stationary while the automatic operation is taking place.

Upon the opposite side of the cable-tube from the projection Q is fixed an inclined plane, T. The jaw J of the grip is hinged to the lower part of the frame G, so that it may swing outward when released from the pressure of the wedge-shaped slide U. This slide has an anti-friction roller, *f*, projecting from its upper portion, so as to engage with the inclined plane T, and as the car moves along, the slide U will be raised by the action of the inclined plane until the shoulder at *g* strikes the guide *h*, which is fixed to the sliding frame G, and the continued travel of the roller *f* up the inclined plane T then raises the whole of the sliding frame G within the outer frame F. The first upward movement of the slide U is sufficient to entirely release the hinged swinging jaw J and allow it to swing outward sufficiently to entirely clear the cable B, which is thus left when the frame G is raised upward by the above-described action. This frame carrying the gripping-jaws is raised to such a height that they are entirely above the crossing cable D, and when it arrives at this point a spring, 6, actuates a pin, *i*, which passes through the main stationary frame F, said pin being forced back into its socket or seat in the main frame by a curved spring-plate, G^5, secured to and projecting from the upper portion of the sliding frame G, as shown in Fig. 4, in which position the pin *i* remains until the lower end of the spring plate G^5 passes above it, when the pin will immediately spring forward into the hole *j* in the slide U. This holds the whole device, and prevents it dropping during the time it is crossing the transverse tube and the cable D. As soon as it has passed this tube, the outer end of the lever *k* strikes a projection, i^2, within the cable-tube and in the path of the lever which acts upon it, so that it withdraws the pin *i* out of the hole *j*, and thus allows the slide U to be carried down again by the action of a cam, W, into which the pulley *f* enters as it reaches this point and permits the frame G to drop to its normal position.

The pulley C′, which is beneath the transverse rope D, and above which the rope B travels, is somewhat higher than the remainder of the pulleys C in the tube, so that the rope is held up to a point where it can be easily seized by the grip after it has passed over the transverse rope and has dropped to its normal position. In order to assist in this action, a pulley, C^2, is pivoted to a lever, X, which is conveniently fulcrumed in the bottom of the tube, so that the pulley C^2 is in line beneath the rope B. An arm, Y, which is moved laterally by the passing grip-frame, is connected with the oscillating shaft *m*, and by means of a lever, *n*, upon this shaft acts upon the lever X, so as to throw one end down and raise the pulley C^2 beneath the rope B. When this is done, the rope is automatically raised to a level with that portion traveling over the pulley C′, and will be high enough so that it will pass between the jaws I and J of the grip. If desired, this result may be produced without the lever mechanism by fixing the pulley C^2 permanently at a short distance from C′ and at an equal height.

The continuation *a* of the stationary incline or cam W within the cable-tube acts upon the slide U to again force it down, so as to close the jaw J and hold it firmly in its normal position with its rollers beneath the rope or cable, while the pin *c* in the slot *d* prevents the mechanism from sliding down too far. As soon as the sliding frame has moved down to a point where the hole *l* in the upper part of the wedge-shaped slide L has arrived opposite the pin P, the spring, acting upon the latter, will force it into the hole *l*, and the lever M will again be connected with the slide L, so that it may be operated to move the jaw I toward the jaw J and again grip the rope, so that the car may proceed on its journey.

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

1. A cable-railway grip consisting of the exterior stationary frame and guide, F, and the secondary frame G, having a vertical movement within the frame F, in combination with the rope-gripping jaws attached to the lower end of the frame G, the wedge-shaped slides between which these jaws are held in position, and a lever and connecting-slides, whereby one of the wedges may be operated to open or close the jaws for the purpose of releasing or gripping the cable, substantially as herein described.

2. In a cable-railway grip, the stationary frame F, fixed to the car or dummy, a supplemental frame, G, sliding vertically within the frame F, and having the jaw J hinged to its lower end, so as to open outwardly about its hinge, a wedge-shaped slide by which said jaw is closed and held in a vertical position, and the opposing jaw I, having guiding and holding pins upon which it moves to and from the jaw J, and a vertically-moving wedge-shaped slide connected with the operating-lever in the car for the purpose of compressing the cable between it and the opposite jaw or releasing the same, substantially as herein described.

3. The stationary frame F, secured to the car or dummy, the supplemental frame G, sliding vertically within the same and carrying the gripping-jaws at its lower end, and a sliding frame, G′, guided and moving upon the main stationary frame and having a spring-actuated lever and pin, in combination with the vertically-moving wedge-shaped slide L, by which the jaws are operated to release or grip the cable, said slide having a hole which is engaged by the pin, so as to connect it with the operating-lever upon the dummy, substantially as herein described.

4. The stationary frame fixed to the dummy and having the supplemental vertically-sliding frame G, carrying the gripping-jaws at the lower end and movable within the main frame, the horizontally-moving jaw I, with the operating wedge-shaped slide L, connected with the lever in the car, and the opposing hinged jaw J, having a wedge-shaped slide, U, movable behind it and holding it in position, the roller *f*, projecting from the side of the sliding wedge U, and the stops *g* and *h*, to limit the upward movement of the wedge upon the frame G, in combination with the fixed incline T on the side of the rope-tube, whereby the frame G is automatically raised upon approaching the transverse crossing rope of another line, substantially as herein described.

5. The main frame of a cable-railway grip, fixed to the car or dummy, the supplemental vertically-sliding frame G, guided within the main frame, having the gripping-jaws, with their operating wedge-shaped slides upon opposite sides of the frame G, one being connected by a spring-actuated lever and pin with the operating-lever upon the car and the other provided with an anti-friction roller or lug, *f*, whereby it may be raised or depressed, in combination with fixed lugs or projections upon the side of the tube, which will disengage the spring-lever and pin, and the incline, whereby the movable frame is raised with its grip above the level of the obstruction to be passed, substantially as herein described.

6. The fixed and movable frames of the grip, the jaws with their actuating and holding wedge-shaped slides and operating-lever, and the connecting spring-actuated pin *i*, in combination with the fixed guide or channel W within the tube and the projections or lugs, whereby the holding-catches are disengaged and the grip thrown down again for the purpose of grasping the rope after passing the obstruction, substantially as herein described.

In witness whereof I have hereunto set my hand.

JUSTIN J. GRAFF.

Witnesses:
S. H. NOURSE,
H. C. LEE.