(No Model.) 2 Sheets—Sheet 1.

J. HELLINGS.

CABLE GRIPPING DEVICE.

No. 353,941. Patented Dec. 7, 1886.

FIG. 7.

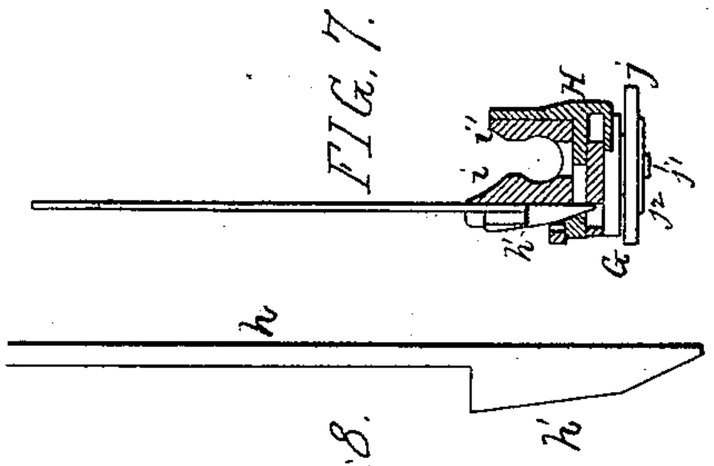


FIG. 8.

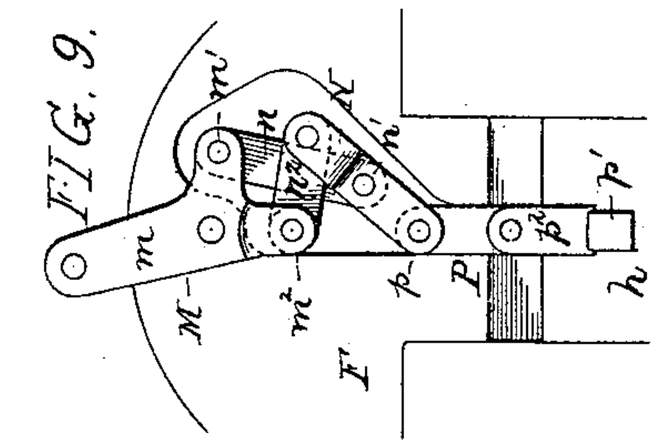


FIG. 9.

FIG. 6.

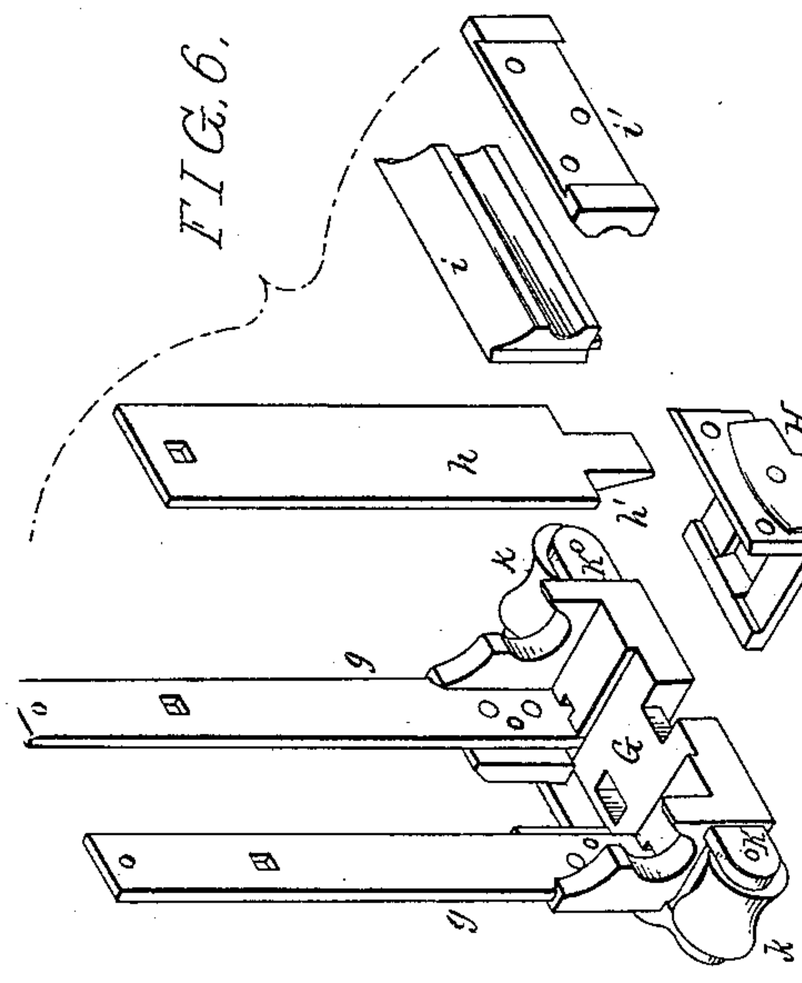


FIG. 1.

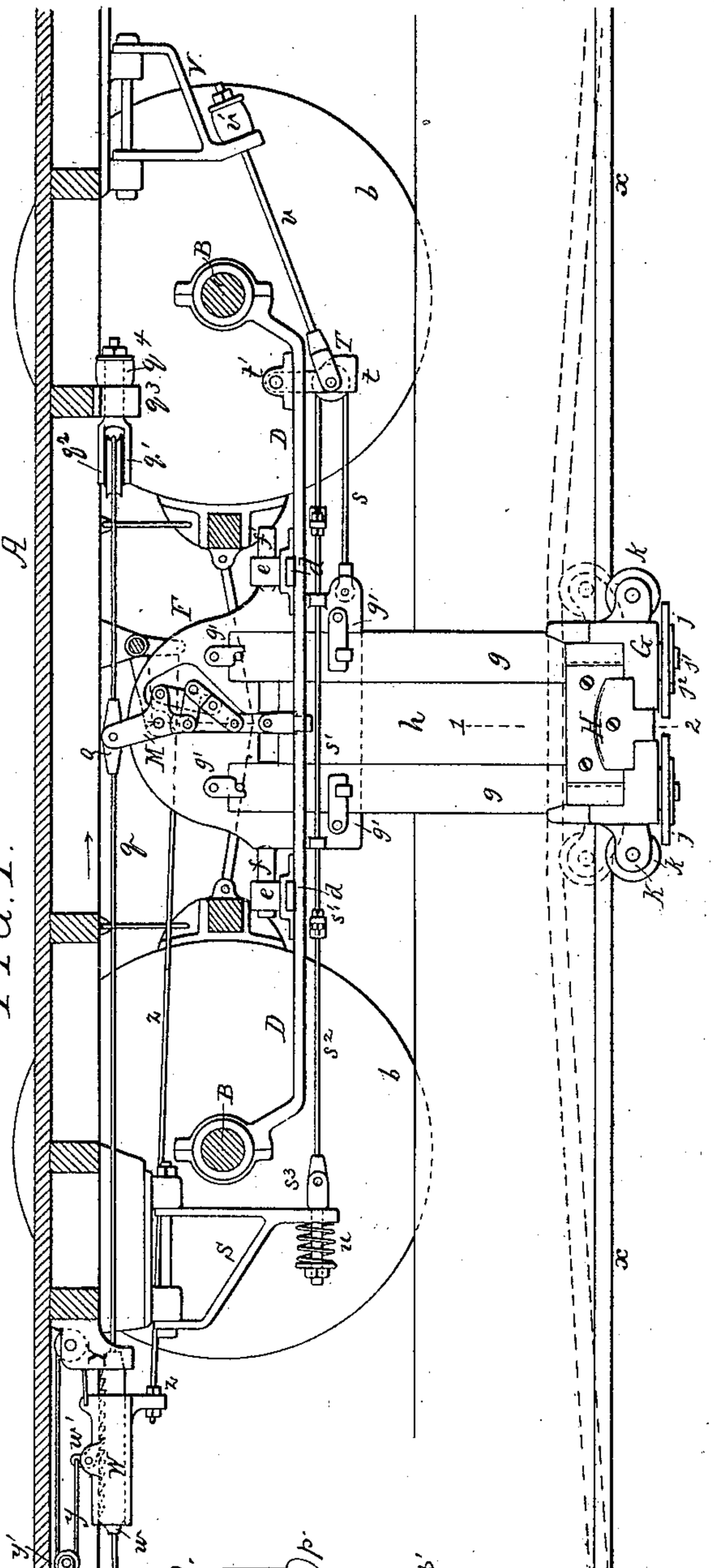
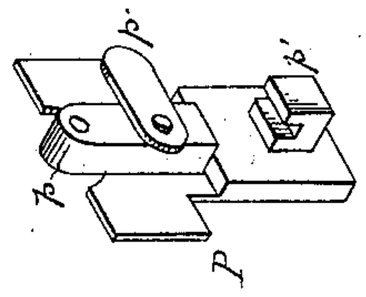


FIG. 10.



Witnesses:
John E. Parker
Wm. D. Conner

Inventor:
John Hellings
by his Attorneys
Howson & Sons

(No Model.) 2 Sheets—Sheet 2.

J. HELLINGS.

CABLE GRIPPING DEVICE.

No. 353,941. Patented Dec. 7, 1886.

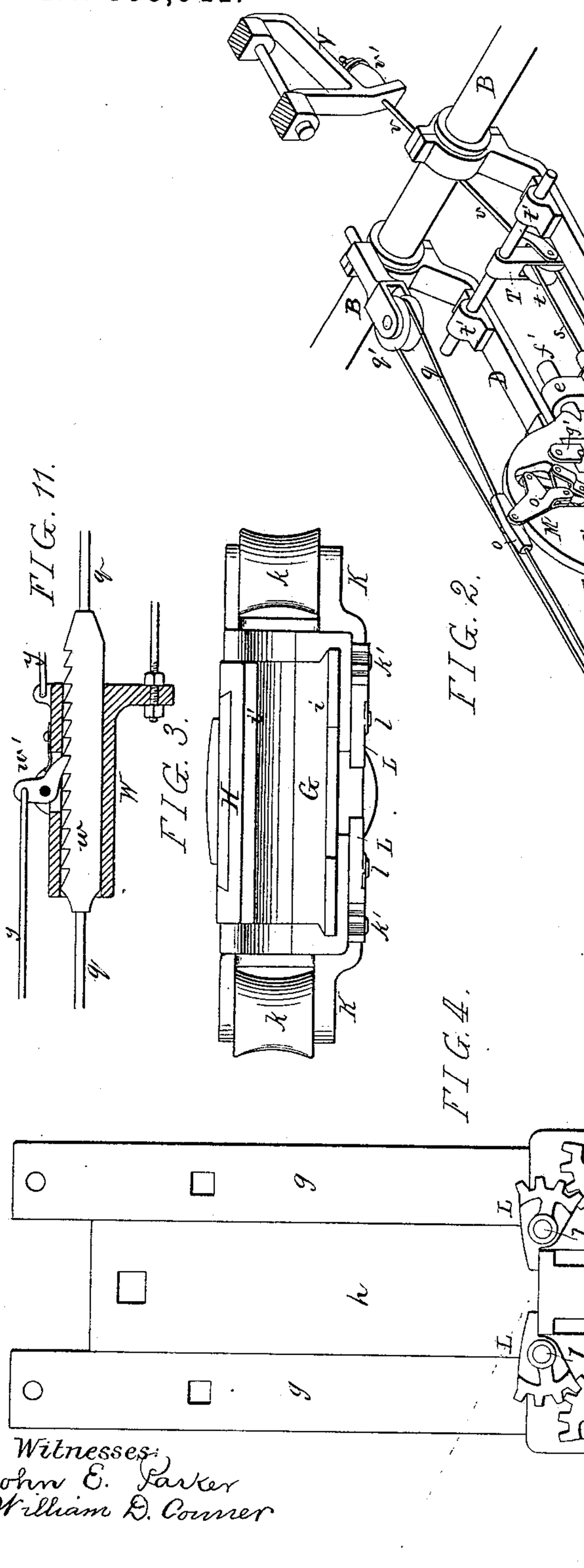


FIG. 1.

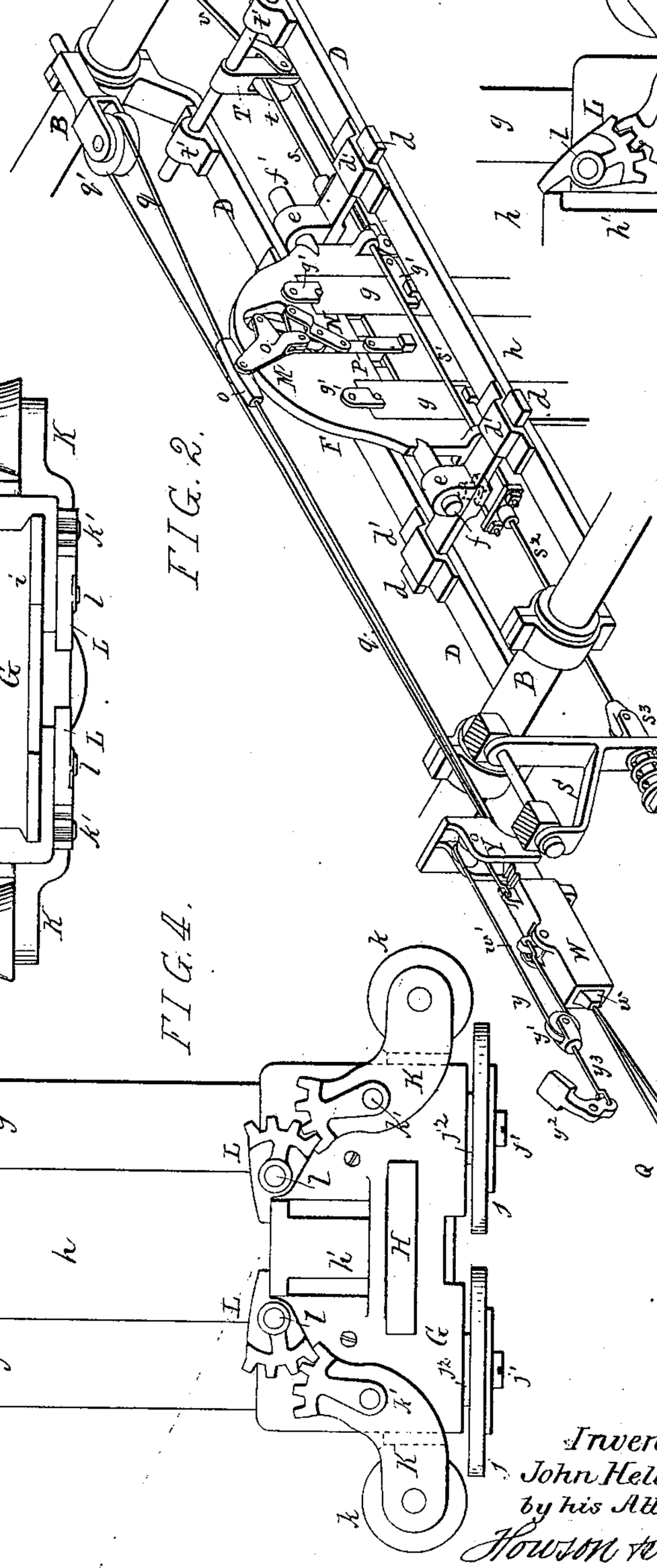


FIG. 2.

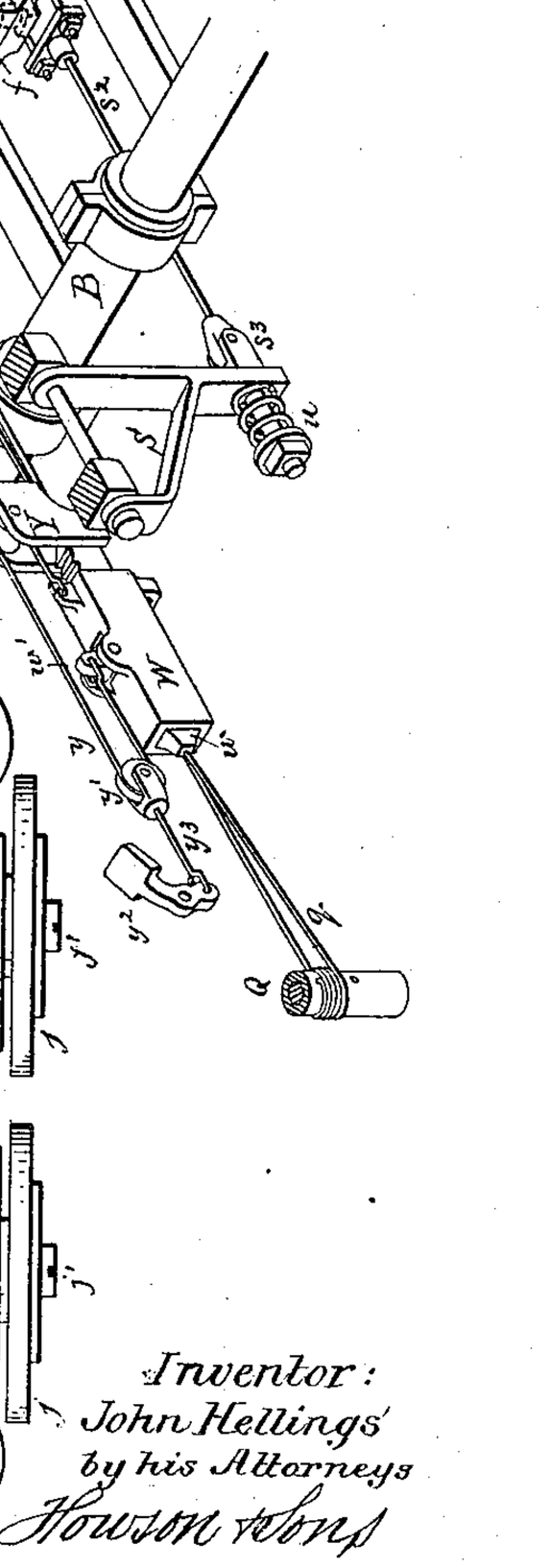


FIG. 3.

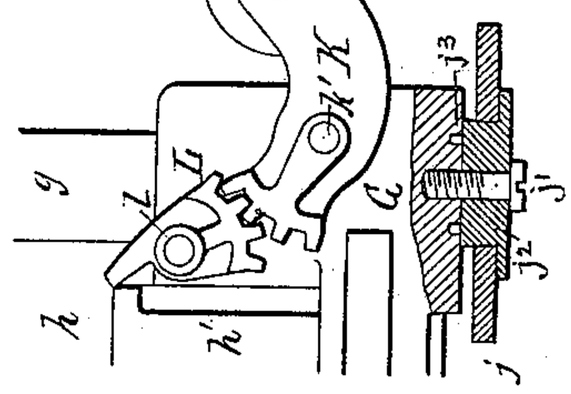


FIG. 5.

FIG. 4.

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UNITED STATES PATENT OFFICE.

JOHN HELLINGS, OF PHILADELPHIA, PENNSYLVANIA.

CABLE-GRIPPING DEVICE.

SPECIFICATION forming part of Letters Patent No. 353,941, dated December 7, 1886.

Application filed June 14, 1886. Serial No. 205,052. (No model.)

To all whom it may concern:

Be it known that I, JOHN HELLINGS, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented an Improved Cable-Gripping Device, of which the following is a specification.

My invention relates to certain improvements in the construction of cable gripping and braking devices for cable-driven cars.

My invention consists, first, in the construction of the grip proper so that it can be easily removed from the car and taken apart without the aid of skilled mechanics, in order to renew the different parts; secondly, in the construction of the grip-head so that a universal movement is obtained; thirdly, in the construction of the braking attachment so that the brakes may be either applied or released when the grip is released; fourthly, in the construction of the grip so that when the car is started the forward movement of the cable will increase the grip of the jaws on the cable; fifthly, in the construction of the levers for operating the grip proper so that an increase of pressure is obtained, and at the same time a long movement of the grip-wedge is secured; and, sixthly, in the construction of the devices for lifting the cable clear of the gripping-jaws when required.

In the accompanying drawings, Figure 1 is a longitudinal section of my improved gripping and braking device for cable-driven cars. Fig. 2 is a perspective view of the operating mechanism with part of the grip proper removed. Fig. 3 is a plan view of the grip proper. Fig. 4 is a rear view of the grip proper. Fig. 5 is a rear view of part of the grip proper, showing one of the bearing-rollers raised. Fig. 6 is a perspective view showing the different parts of the grip proper detached. Fig. 7 is a sectional view on the line 1 2, Fig. 1. Fig. 8 is a detached view of the wedge-bar. Fig. 9 is a detached view of the grip-operating levers, and Figs. 10 and 11 detached views of part of the operating devices.

A is the car-frame; B B, the axles; *b*, the traction-wheels, and *x* represents the line of the power-driven cable. Suitable hangers or frames, D D, are hung from the two axles B B, as shown in Figs. 1 and 2, and on these hangers or frames are cross-bars *d d*, adapted to move transversely across the frame D, and held in place vertically by suitable guides or straps, *d'*. On each of the cross-bars *d* is mounted a vertically-pivoted bearing-block, *e*. In these blocks rest the trunnions *f f* of the grip-head F, which carries the grip proper. It will thus be seen that the grip-head will accommodate itself to any irregular curves in the slot of the conduit.

The grip proper, which is suspended from the head F, is constructed as follows: Two bars, *g g*, are secured to a casing, G, Fig. 6, which carries the cable-gripping jaws. These bars are detachably secured to the head F by turn-buckles *g'*, Fig. 2, or other suitable devices by which they can be readily removed from the head. The casing G is preferably cast in one piece, as shown in Fig. 6, the bars *g* being secured to the back portion of the casing by bolts or rivets. Sliding transversely in this casing is the movable gripping-jaw H, acted upon by the sliding wedge-bar *h*, which has an acting face, *h'*, with two inclines, the first portion being sharp to get a quick motion, while the other incline is less sharp, as shown in Fig. 8. This wedge-bar *h* passes through suitable vertical slots in the casing, as shown in Figs. 6 and 7, and through an opening in the sliding jaw H. The casing G has a removable shoe or jaw, *i*, held in place by dovetail guides and set-screws passing through the back of the casing and into the shoe, Fig. 6, and the jaw H has a removable shoe, *i'*, which slides over a dovetailed portion of the jaw, and is also held in place by set-screws. It will be evident that when the wedge-bar *h* is forced down the sharp incline acts on the sliding jaw H first, and then when the jaws commence to tighten on the cable *x* the slow wedge comes into action with increased power. On the under side of the casing are the usual rollers, *j j*, secured to the casing by a bolt, *j'*, Fig. 5, which passes through a sleeve, j^2, into a tapped orifice in the casing. The sleeve j^2 has one or more pins, j^2, which prevent the sleeve from turning and the bolt from becoming loose and falling out. The end rollers, *k*, which support the cable, have their bearings in arms K, pivoted at *k'* to the casing. The opposite end of

each arm K has a segment of a gear, which meshes with a segment of a gear on a lever, L, also pivoted to the casing at *l*, Fig. 4. The opposite end of the lever rests on the top of the wedge *h'*. If the cable has to be lifted out of the grip for any purpose whatever, the wedge-bar H is pulled up to the position shown in Fig. 5, raising the rollers *k* clear of the gripping-jaws, Fig. 1. If necessary, the cable *x* can be thrown off the rollers *k* by the operator moving the head F sidewise, gaining access to it through the usual opening in the floor of the car. This raising of the cable clear of the grip is very important in case of an accident where the moving cable is caught in the grip by the cutting or wearing away of one of the strands of the cable.

The devices for operating the jaws of the grip are constructed as follows: M is a lever having three arms, *m m' m²*, Fig. 9. The arm *m* is connected to the rope or rod by which the grip is operated, and the arm *m'* is connected to a link, *n*, which is pivoted at *n'* to a lever, N, while the upper end of this lever is connected to the arm *m²* of the lever M by a link, *n²*. The lower end is connected to the sliding plate P, Figs. 9 and 10, at *p*. This plate slides in suitable ways in the head F, and is attached at its lower end to the sliding bar *h* by a lug, *p'*, passing through an orifice in the bar, and a turn-buckle, *p²*, or other suitable retaining device passing under a lip of the lug, thus securely retaining the bar *h* in place, while at the same time allowing the ready removal of the bar. The rope, chain, or rod *q* for operating the lever M is attached to a vertical shaft, Q, at the front of the car, one end passing around the shaft and then around a pulley, *q'*, near the rear of the car, and back again around the shaft in the opposite direction to the first coil, so that as the shaft is moved by turning the hand-wheel Q' in one direction one end of the rope *q* is coiled around the shaft, while the other end is uncoiled. The continuity of the rope is interrupted by a rack-block, *w*, (described hereinafter,) and the block *o*, to which is attached the arm *m* of the lever M. By turning the hand-wheel Q' to move the rope in the direction of the arrow, Fig. 1, the lever forces the bar *h* down and closes the grip.

The levers M and N and links *n n²* form a very powerful lever movement, the point *n'* acting as a fulcrum for the lever N, exerting a downward movement at the same time as the arm *m²* tends to straighten the knee-joint, as will be readily seen in referring to Fig. 9. The pulley *q'* has its bearings in a block, *q²*, the spindle of which passes through a hanger, *q³*, a spring, *q⁴*, being confined between the hanger and a nut on the spindle, so that when any undue strain is exerted on the rope *q* the spring *q⁴* will yield.

On referring to Fig. 1 it will be noticed that the trunnions *f f'* can have a longitudinal movement in their bearings *e*. The shoulder of the trunnion *f'*, when the car is not in motion, however, is held against the face of its bearing *e* by the following mechanism: Connected to the rear end of the head F is a rope, *s*, which passes around a pulley, *t*, on a swiveled bracket, T, and is connected to a yoke, *s'*, which passes on each side of and is guided by the head F. The opposite end of this yoke is connected to a rope or rod, *s²*, attached to a stud, *s³*, which passes through a hinged bracket, S, and between this bracket and a nut on the stud *s³* is a spring, *u*. The bracket T has its bearings in blocks *t'* on the frame D, and is adapted to swing longitudinally and to have a transverse movement in the blocks *t'*, in order to adapt itself to the irregular movements of the grip-head F.

Attached to the bracket T is a rod, *v*, which passes through a pivoted bracket, V, hung to the frame of the car, and between this bracket and a nut on the rod *v* is a spring, *v'*. When the gripping-jaws are closed on the grip by the turning of the shaft Q, the head F and grip proper will move first, the trunnions *f f'* sliding in the blocks *e*. This movement will compress the springs *u v'*, which will take up a portion of the shock caused by the sudden gripping of the cable by the jaws, and at the same time increase the grip of the jaws on the cable, as the arm *m* of the lever M is held by the rope *q*, and as the head F moves the lever will force the bar *h* down, as will readily be seen by referring to Fig. 1.

The mechanism for operating the brakes is constructed as follows: A rack-block, *w*, referred to above, is secured to the grip-operating rope *q*, Figs. 1 and 11, and is contained in a box, W, having a pivoted pawl, *w'*. A rope, *y*, is connected to the back portion of the box W, and passes around a pulley having its bearings in a bracket, Y, secured to the frame of the car, and then around a pulley, *y'*, connected in the present instance to a foot-lever, *y²*, by a rod, *y³*. The rope *y* thence passes and is attached to one arm of the pawl *w'*. A rod, *z*, connects the brake-levers with the box W, as shown in Fig. 1. Any braking devices may be used; but I have shown the forms in which the brake-beams are operated through the medium of knee-joint levers. The bracket Y also acts as a stop for the box W in its rearward movement. When the pawl is in the position shown in Fig. 1, the brakes will be put on as the grip is released; but if the foot-lever *y²* is depressed the pawl is raised and the grip can be manipulated without interfering with the brakes, or both grip and brakes can be released. The teeth in the rack *w* are for the purpose of taking up slack caused by the wear of the brake-shoes. It will thus be seen that the one shaft Q operates both the grip and brakes, the foot lever *y²* only being used when it is wished to disconnect the brakes. A lever can be used in place of the shaft Q, if desired.

I claim as my invention—

1. The combination, in a cable-gripping device, of the gripping-head F and frame with

sliding bars *d* and pivoted blocks *e e*, in which the head is pivoted, substantially as specified.

2. The combination, in a cable-gripping device, of the supporting-frame and head F, carrying gripping-jaws and having a longitudinal play on the frame, with a lever, M, pivoted to the head F and adapted to actuate the gripping-jaws, and connected to the grip-actuating mechanism on the car, whereby the grip of the jaws on the cable is increased as the head is moved forward on the frame by the cable, substantially as specified.

3. The combination, in a cable-grip, of the grip proper with cable-supporting rollers and mechanism for raising the rollers to elevate the cable clear of the grip, substantially as specified.

4. The combination of the stationary jaw of the cable-grip and a sliding jaw with a wedge the bearing-surface of which is of different degrees of inclination, substantially as described.

5. The combination of the casing G and sliding jaw H with a removable shoe, *i*, which, when in place, retains the sliding jaw H, substantially as specified.

6. The combination of the casing G and sliding bar *h*, to be operated by the actuating mechanism on the car, with a pivoted cable-supporting lever, K, adapted to be operated by the bar *h*, all substantially as described.

7. The combination of a carrying-frame of a cable-gripping device with a sliding grip-head, rods or ropes *s s' s²*, and spring *u*, as and for the purpose described.

8. The combination of the carrying-frame of a cable-gripping device and sliding grip-head F with rods or ropes *s s' s²*, swiveled bearings T, S, and V, and springs *u* and *v'*, all constructed substantially as and for the purpose set forth.

9. The combination of the lever M, having arms *m m' m²*, with the sliding plate P, connected to the arms *m' m²* of the lever M, and lever N and links *n n²*, all substantially as described.

10. The combination of the grip-operating rope *q*, the braking mechanism, and a bar, *w*, having one or more teeth, with a casing, W, pawl *w'*, pivoted thereto and adapted to engage the teeth of the bar *w*, the casing W, connected to the braking mechanism, and devices for raising and lowering the pawl to throw the brakes in and out of gear with the bar *w* on the rope *q*, substantially as described.

11. The combination of the bar *w*, casing W, and pawl *w'* with a rope, *y*, passing around a pulley on a hanger, Y, and around a pulley, *y'*, connected to the foot-lever *y²*, one end of the rope *y* connected to the pawl *w'*, and the other connected to the casing W, all substantially as and for the purpose described.

12. The combination of the casing G, wheels *j*, sleeve *j²*, having pins *j³*, fitting in orifices in the casing G, and a screw-bolt, *j'*, all substantially as set forth.

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

JOHN HELLINGS.

Witnesses:
WILLIAM D. CONNER,
HARRY SMITH.