(No Model.) 3 Sheets—Sheet 1.

I. BISHOP & A. F. L. BELL.

LIFTING MECHANISM FOR CABLE GRIPS.

No. 478,911. Patented July 12, 1892.

Fig. 2.

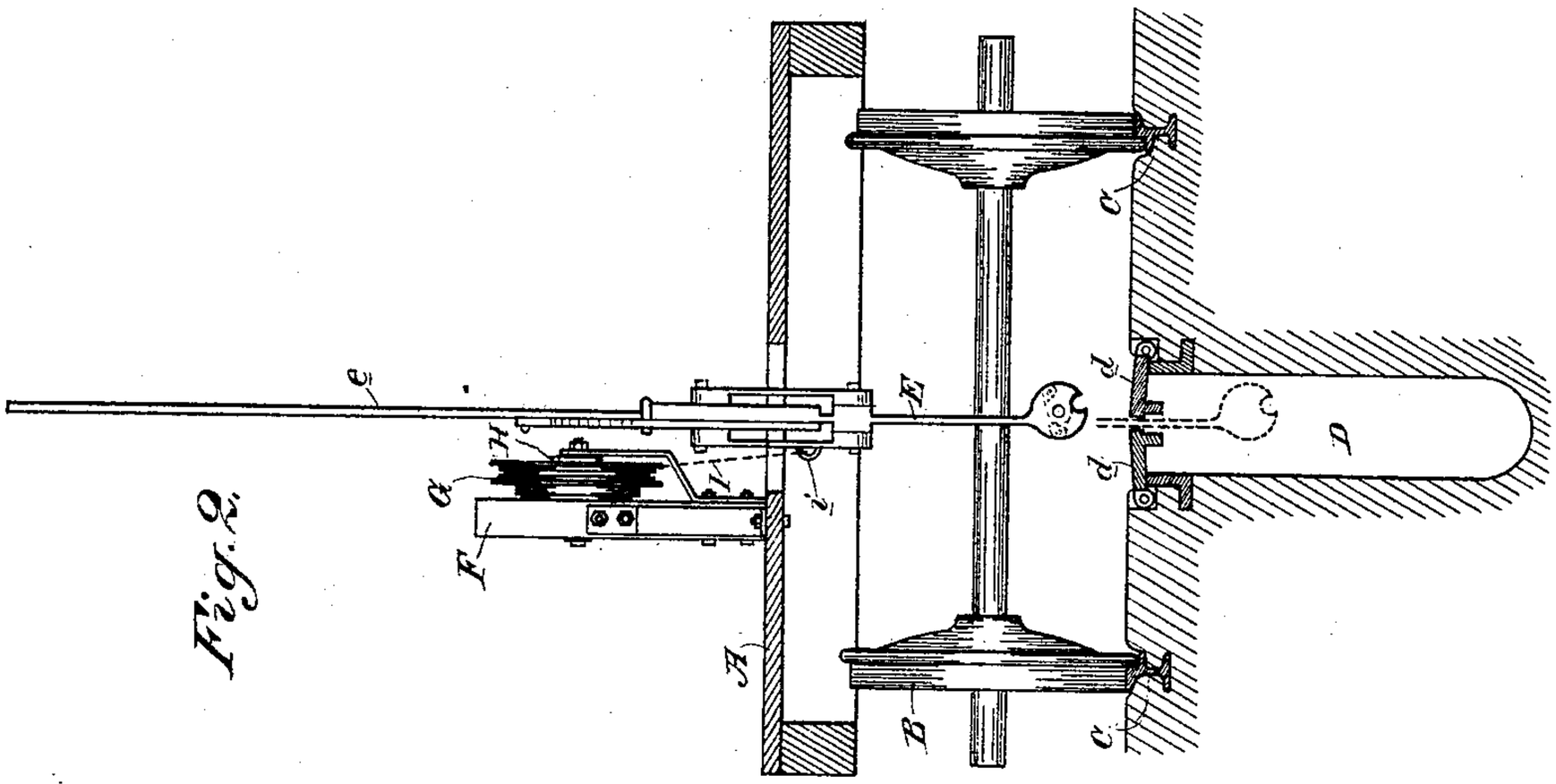
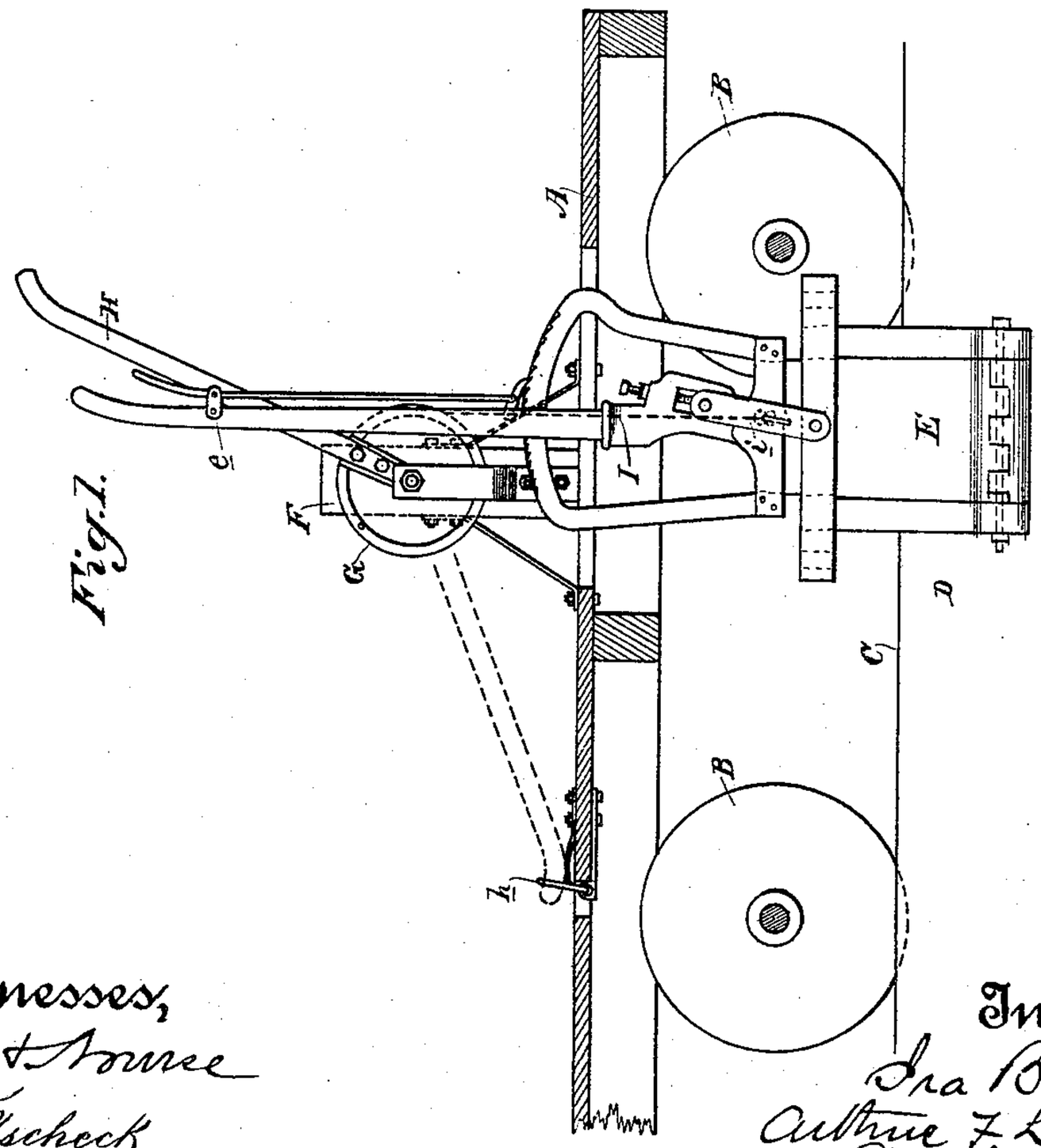


Fig. 1.



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I. BISHOP & A. F. L. BELL.

LIFTING MECHANISM FOR CABLE GRIPS.

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Fig. 3.

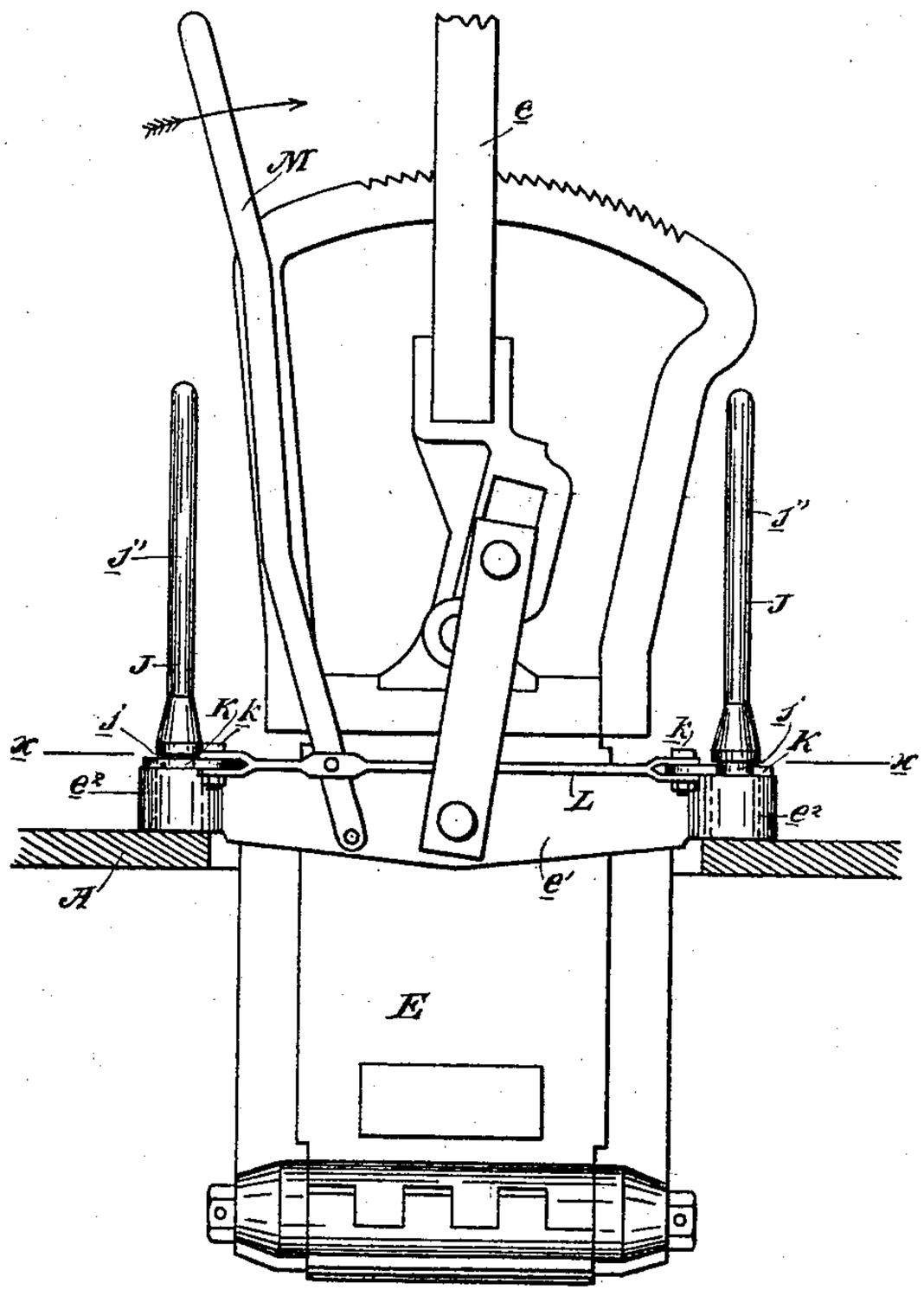
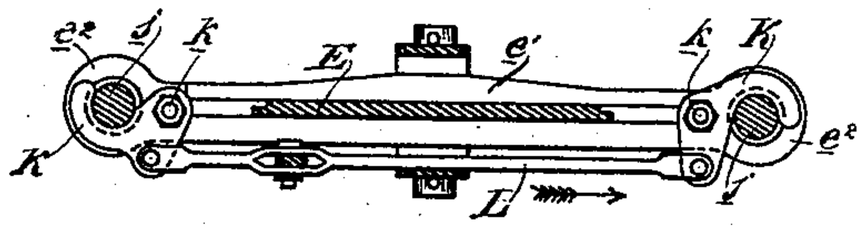


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

I. BISHOP & A. F. L. BELL.

LIFTING MECHANISM FOR CABLE GRIPS.

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Fig. 9.

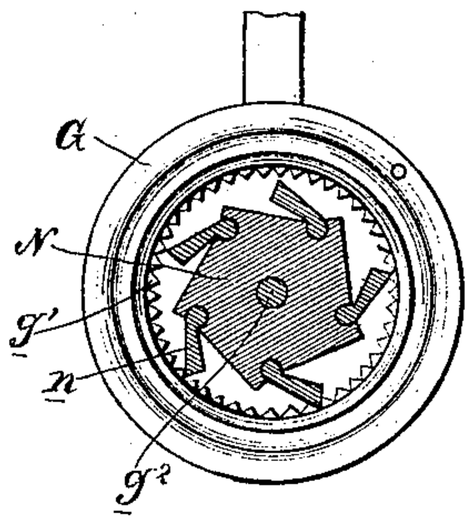


Fig. 7.

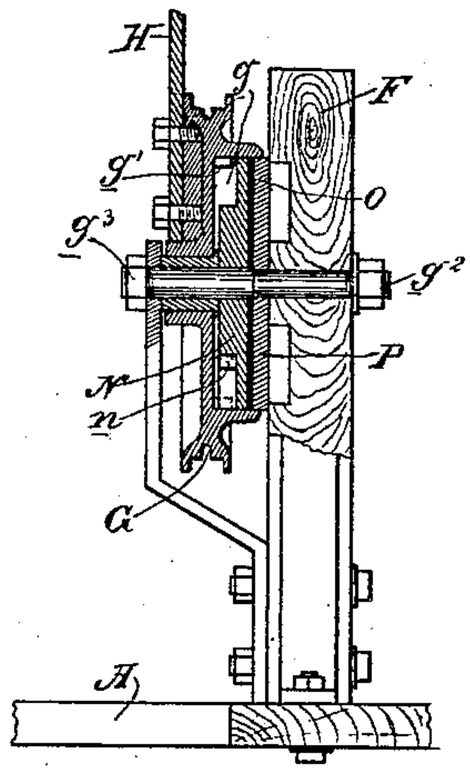


Fig. 8.

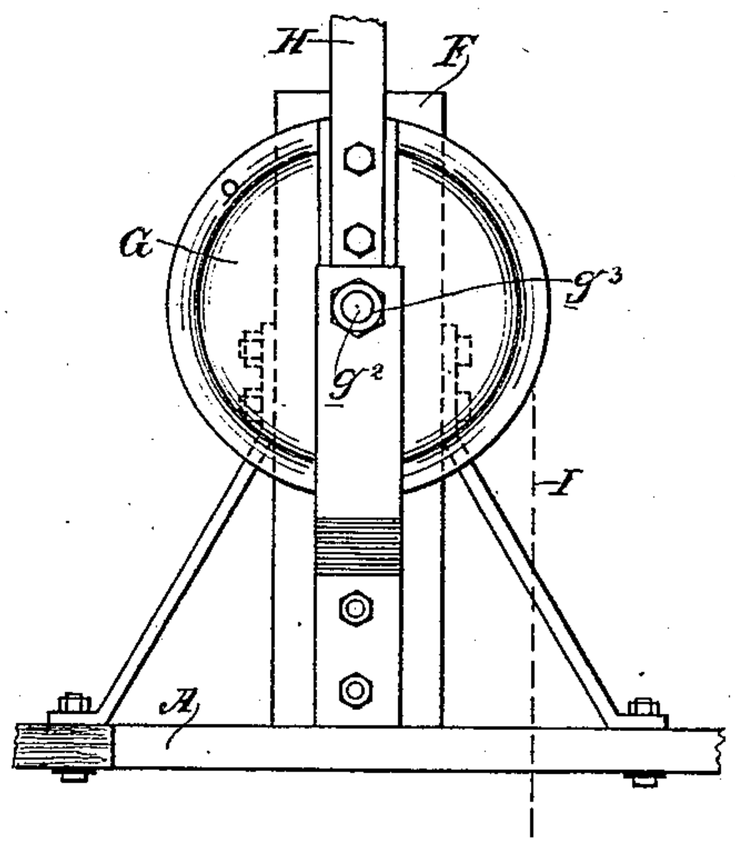


Fig. 5.

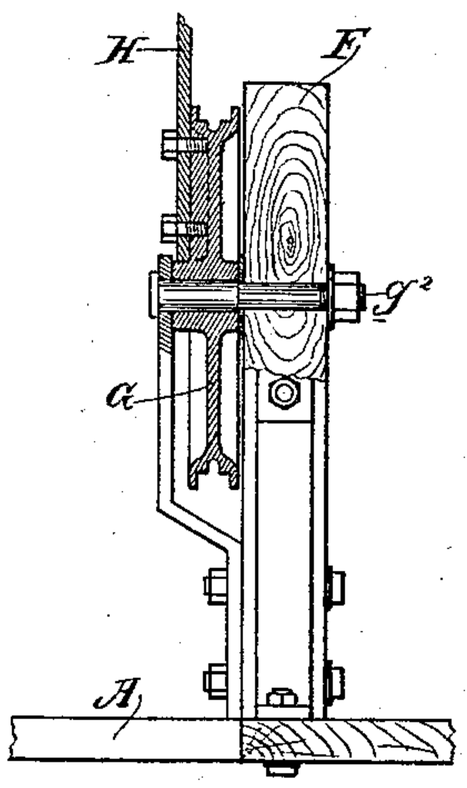
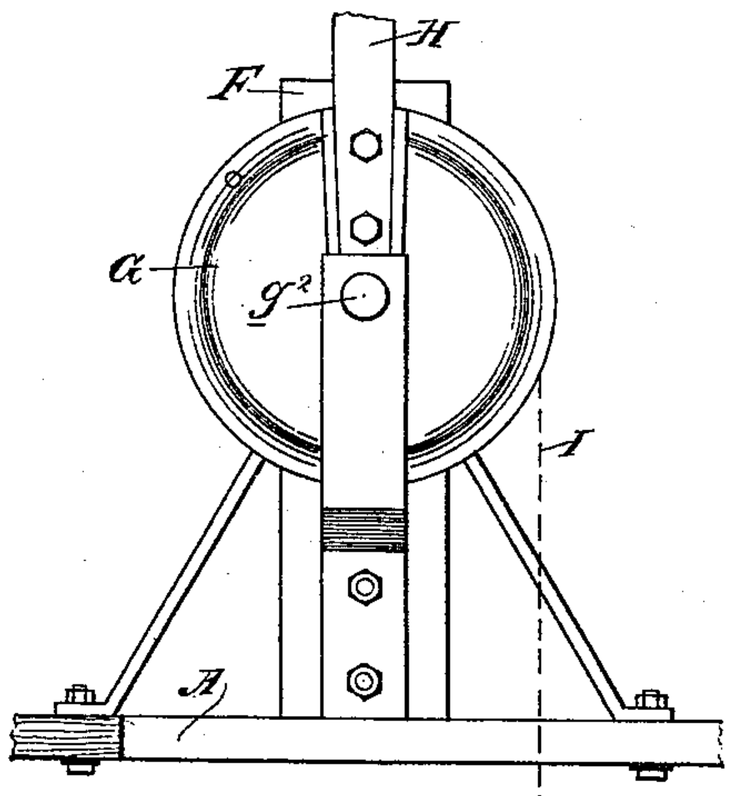


Fig. 6.



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UNITED STATES PATENT OFFICE.

IRA BISHOP AND ARTHUR F. L. BELL, OF SAN FRANCISCO, CALIFORNIA.

LIFTING MECHANISM FOR CABLE-GRIPS.

SPECIFICATION forming part of Letters Patent No. 478,911, dated July 12, 1892.

Application filed January 29, 1892. Serial No. 419,710. (No model.)

To all whom it may concern:

Be it known that we, IRA BISHOP and ARTHUR F. L. BELL, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Lifting Mechanisms for Cable-Railway Grips; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to the class of cable railways, and especially to the means by which the grip is raised out of and lowered into the tube or tunnel.

Our invention consists in the novel lever and connections for raising and lowering the grip; also, in the novel lever and connections for releasing the grip from its supporting devices previous to being raised and connecting it with them when lowered, all of which, together with details of construction and arrangement, we shall hereinafter fully describe, and specifically point out in the claims.

In the operation of cable roads it is often necessary to remove the grip from the tube or tunnel, which removal is effected through openings or traps in its top and located at suitable intervals throughout the length of the road.

Where the object in removing the grip is simply for the purpose of readjustment or temporary repair, its removal is not often required; but where, as in some roads, long stretches are passed over simply by gravity it is of decided advantage to remove the grip, and this becomes necessary in cases where the tube or tunnel does not extend under the gravity portion of the road, but begins again when this portion is passed, at which point the grip must be lowered again.

The object of our invention is to provide simple and effective means for easily and readily removing the grip from the tube or tunnel and replacing it therein.

Referring to the accompanying drawings for a more complete explanation of our invention, Figure 1 is a side elevation of a grip, showing the means for raising it. Fig. 2 is a cross-section of a car and tube or tunnel, showing an end view of the grip as raised out of the tube or tunnel. Fig. 3 is a side elevation of the grip, showing the means for releasing it from its supporting devices. Fig. 4 is a horizontal cross-section of the grip on the line *x x* of Fig. 3. Fig. 5 is a vertical section of the chain-sheave for lifting the grip. Fig. 6 is a front view of the same. Fig. 7 is a vertical section of the chain-sheave, showing the application thereto of a controlling friction device. Fig. 8 is a front view of said sheave. Fig. 9 is a detail section showing the arrangement of the pawls and ratchet of the friction device.

Referring to Figs. 1 and 2, A is the frame of the car, of which B are the wheels, traveling upon the tracks C of the roadway.

D is the tube or tunnel, in the top of which, as shown in Fig. 2, is a trap-door or opening *d*.

Carried by the car A is the grip, (represented generally by E and having an operating-lever *e*.)

Mounted in a fixed standard or support F, carried by the car, is a sheave G. To this is secured a lever H, by which said sheave is partially rotated. To the periphery of the sheave is secured a chain or rope I, the lower end of which is secured to the grip in a suitable manner, as is shown at *i*. By moving the lever H to the position shown in dotted lines the sheave G is partially rotated, whereby the chain or rope is wound up and the grip E is lifted out of the tube or tunnel, as is shown in Fig. 2. In this position it may be held up by a link *h*, fitting over the end of the lever and holding it down. By releasing the lever and lifting it to the position shown in Fig. 1, or, if a greater amount of movement be desired, throwing said lever to a horizontal position on the back of the car corresponding to the position on the front, the sheave G is rotated in a reverse direction and the grip is lowered into the tube or tunnel, Fig. 1, the trap-door having been first raised.

Now in order to provide for the disengagement of the grip from its supporting devices to effect its re-engagement therewith and to guide it in its vertical movement we have the following mechanism, reference being had to Figs. 3 and 4: What is usually termed the "suspending-bar" or "yoke" *e'* of the grip is fitted over pins J, secured to some portion of the car or truck. These pins are long ones, having what may be termed "extensions" *j'*. The yoke or bar has end sockets e^2, which drop over these pins. In the pins, near their

lower ends, are formed notches, here shown in the form of circumferential grooves *j*. Into these grooves are adapted to fit the hooks K, (best seen in Fig. 4,) said hooks being pivoted at *k* to the bar *e'* of the grip and connected by a rod L, said rod being operated by a pivoted lever M. (Seen in Fig. 3.) Now when the lever is in the position shown in Fig. 3 the hooks K are thrown to their engagement in the grooves *j* and serve to hold the suspending-bar or yoke *e'* in place on the pins J. To release them, the lever M is thrown in the direction of the arrow shown in Fig. 3, whereby the hooks are thrown outwardly from their engagement with the grooves, thereby releasing the grip from the pins, so that by the operation of the lifting-lever H the grip may be raised bodily upon said pins. When the grip is lowered to place again, the lever M is reversed and the hooks K are once more thrown to their engagement. In this vertical movement of the grip the sockets of its bar or yoke do not leave the pins J, which by reason of their extensions *j* are long enough to permit the grip to remain upon them even when raised high enough to emerge from the tube or tunnel. These pins therefore serve as guides for the grip in its vertical movement. It may be necessary to provide some means of counterbalancing the weight of the grip while being lowered.

It is obvious that the pushing forward of the lever H requires simply the exertion of power on the part of the gripman; but when the securing-link *h* is released from the lever and said lever is allowed to come up to the position shown or even farther back to a horizontal position on the car it is evident that the weight of the grip in being lowered will require the greatest care on the part of the gripman to let it down gently or to avoid the consequences of his carelessness—namely, the violent swinging of the lever, which may result in injury. We have therefore designed a friction device which will not only act on the back-stroke of the lever while the grip is being lowered, but will allow the lever H to be thrown forward freely to lift the grip.

Referring now to Fig. 7, it will be seen that the sheave G is formed on its inner side with the chamber *g*, around the rim of which is a series of ratchet-teeth *g'*. (Shown clearly in Fig. 9.)

Upon the supporting-pin or axis g^2 of the sheave is mounted a pawl-carrying friction-disk N, which has, as seen in Fig. 9, a number of pawls *n*, adapted to engage the ratchet-teeth *g'* in one direction, but to slip them freely in the other direction. Upon the inner face of this pawl-carrying disk is a friction-face O, of leather or other suitable material.

Secured firmly to the standard F is a fixed friction-disk P, against which the friction-face O of the pawl-carrying disk N bears, as shown in Fig. 7. The degree of this frictional contact is regulated by tightening up the nuts g^3 on the pivot-pin g^2. Now when the lever H is thrown forwardly to lift the grip the teeth *g'* of the chain-sheave G simply slip the pawls *n*; but upon raising the lever H to lower the grip the ratchet-teeth engage the pawls, and the pawl-carrying disk N is thereby rotated, but with any amount of friction desired to counterbalance the weight of the descending grip.

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

1. In combination with a vertically-movable grip of a cable-railway car, the means for raising said grip out of and lowering it into the tube or tunnel, consisting of a rotary sheave mounted upon the car and the chain or rope secured to the grip and to said sheave and adapted to wind upon and unwind from said sheave, substantially as herein described.

2. In combination with the vertically-movable grip of a cable-railway car, the means for raising and lowering said grip out of and into the tube or tunnel, consisting of the rotary sheave, the operating-lever attached to it, whereby it is rotated, and the chain or rope connecting said sheave with the grip, substantially as herein described.

3. In combination with the vertically-movable grip of a cable-railway car, a locking device for holding it in place on its suspending devices and releasing it and a mechanism carried by the car and connected with the grip for raising and lowering it when released out of and into the tube or tunnel, substantially as herein described.

4. In combination with the vertically-movable grip of a cable-railway car, a locking device for holding it in place on its suspending devices and releasing it and the means for lifting and lowering the grip when released out of and into the tube or tunnel, consisting of the rotary sheave with its lever and the chain or rope connecting the sheave and grip, substantially as herein described.

5. In combination with the vertically-movable grip of a cable-railway car, a mechanism for lifting the grip out of the tube or tunnel and lowering it therein and the pins J, having extensions *j'*, over which said grip is fitted and on which it moves up and down and is guided in said movement, substantially as herein described.

6. In combination with the vertically-movable grip of a cable-railway car, the fixed pins with their extensions, upon which said grip is fitted and guided in its movement, locking devices carried by the grip for engaging and disengaging said pins to hold the grip in place and to relieve it, and means for operating said locking devices, substantially as herein described.

7. In combination with the vertically-movable grip of a cable-railway car, the fixed guide-pins over which said grip is fitted, said pins having notches or grooves, the pivoted hooks carried by the grip and adapted to be thrown into and out of engagement with said notches or grooves, and a lever and connect-

ing devices for operating said hooks, substantially as herein described.

8. In a cable-railway car, the combination of the grip, the fixed guide-pins over which it is fitted, said pins having notches or grooves, the pivoted hooks carried by the grip for engaging said notches or grooves, a lever and connections for operating the hooks to throw them into and out of engagement, and a means for raising and lowering the grip when released by its hooks, substantially as herein described.

9. In a cable-railway car, the combination of the grip, the fixed guide-pins over which it is fitted, said pins having notches or grooves, the pivoted hooks carried by the grip for engaging said notches or grooves, a lever and connections for operating the hooks to throw them into and out of engagement, and a means for raising and lowering the grip when released from the pins, consisting of the sheave, the lever for operating the sheave, and the chain or rope connecting the sheave with the grip, substantially as herein described.

10. In combination with the vertically-movable grip of a cable-railway car, the rotary sheave carried by the car, the lever connected with the sheave, and the chain or rope connecting the sheave with the grip, whereby said grip is raised and lowered, and a friction attachment operating upon the sheave to control its return movement when lowering the grip, substantially as herein described.

11. In combination with the grip of a cable-railway car, the means for raising and lowering the grip, consisting of the rotary sheave G and the chain or rope I, connecting said sheave with the grip, and the means for controlling the return movement of the sheave when the grip is being lowered, consisting of the friction-disk N, having the pawls n, and the series of ratchet-teeth g' of the sheave, with which the pawls engage in one direction, substantially as herein described.

12. In combination with the grip of a cable-railway car, the means for raising and lowering the grip, consisting of the rotary sheave G and the chain or rope I, connecting said sheave with the grip, and the means for controlling the return movement of the sheave when the grip is being lowered, consisting of the friction-disk N, having the pawls n, the series of ratchet-teeth g' of the sheave, with which the pawls engage in one direction, and the fixed friction-plate against which the friction-disk bears, substantially as herein described.

13. In combination with the grip of a cable-railway car, the means for raising and lowering the grip, consisting of the rotary sheave G and the chain or rope I, connecting said sheave with the grip, and the means for controlling the return movement of the sheave when the grip is being lowered, consisting of the friction-disk N, having the pawls n, the series of ratchet-teeth g' of the sheave, with which the pawls engage in one direction, the fixed friction-plate against which the friction-disk bears, and the pivot pin or axle and nuts for regulating the degree of said friction, substantially as herein described.

In witness whereof we have hereunto set our hands.

IRA BISHOP.
ARTHUR F. L. BELL.

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