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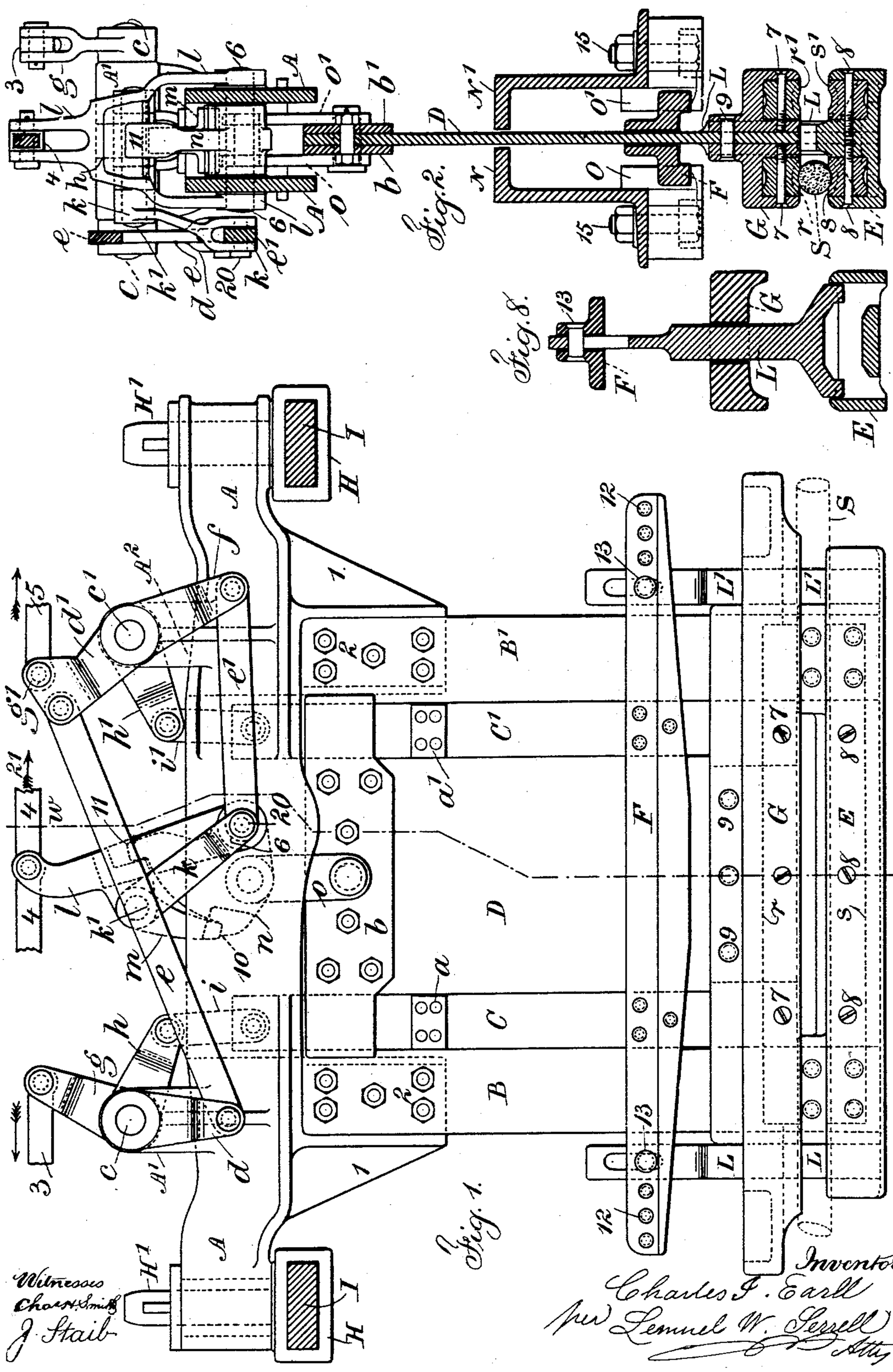
GRIP MECHANISM FOR CABLE RAILWAYS.

No. 520,259. Patented May 22, 1894.



Witnesses
Chas. A. Smith
J. Stair

Inventor
Charles I. Earll
per Lemuel W. Serrell
Atty.

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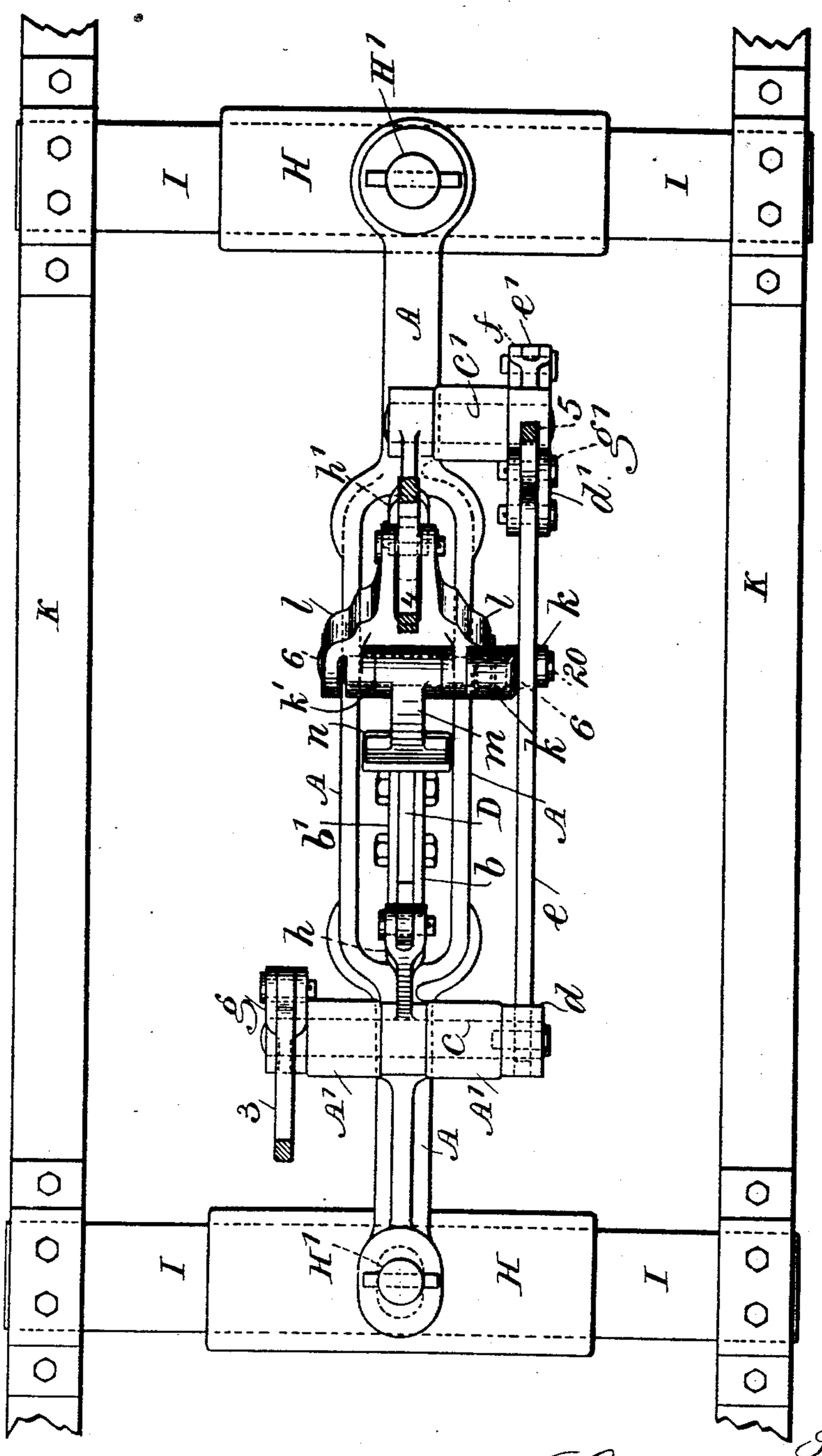
Fig. 3.



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Chas. A. Smith
J. Stair

Inventor
Charles I. Earll
per Lemuel W. Serrell
Atty.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

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Fig. 4.

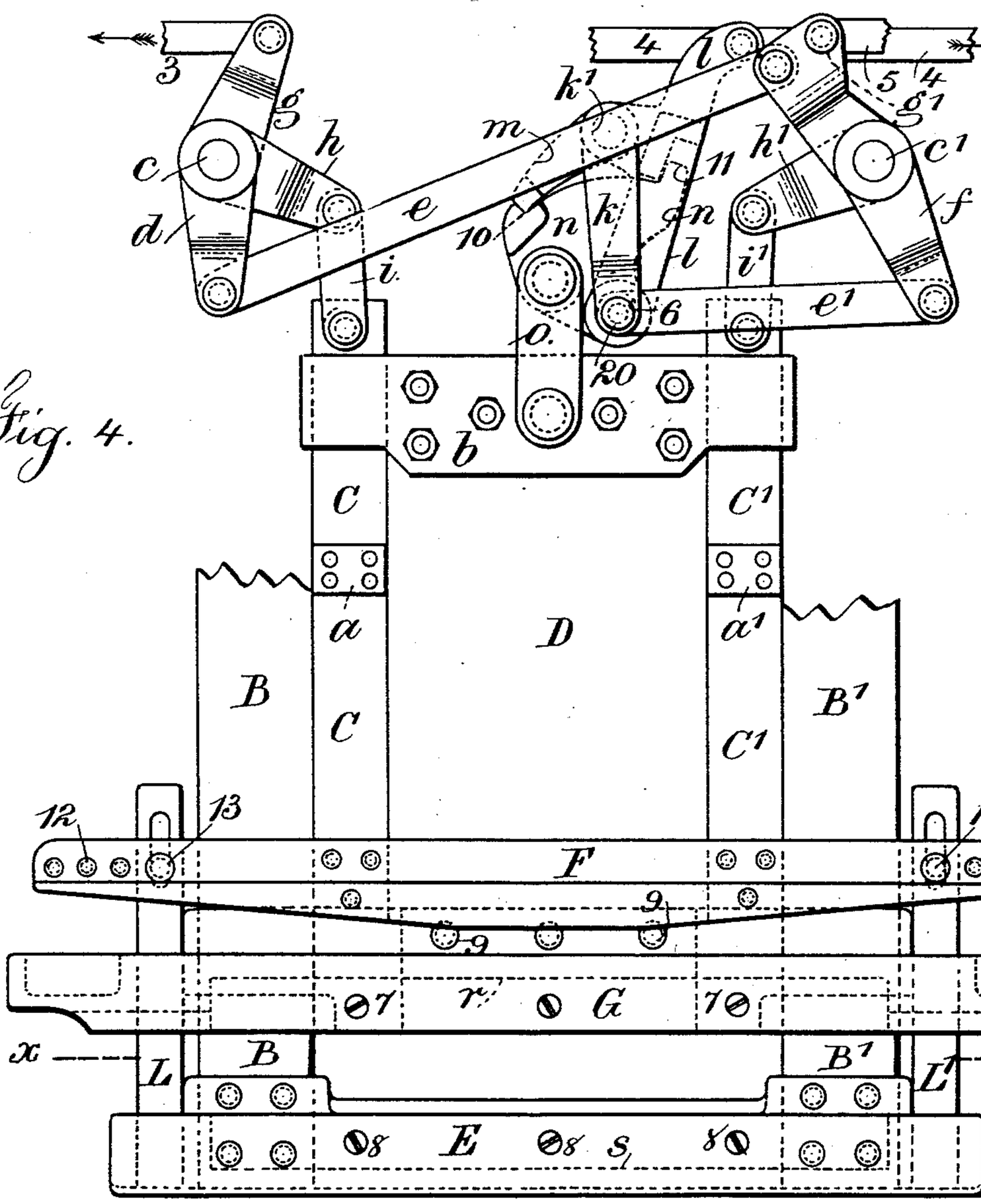
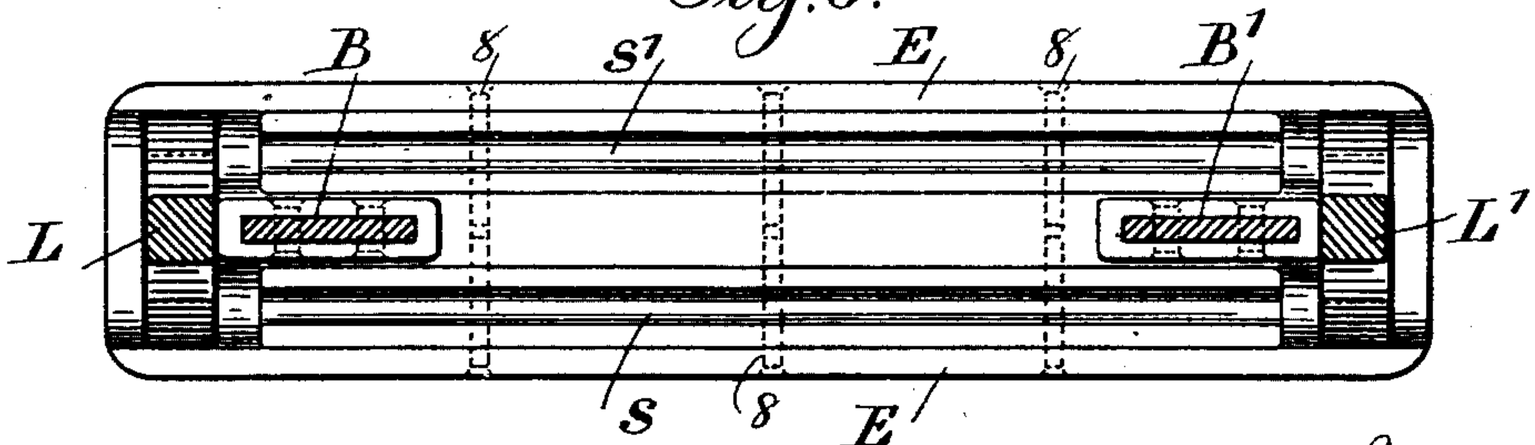


Fig. 6.



Witnesses
Chas. H. Smith
J. Stair

Inventor
Charles I. Earll
per Lemuel W. Serrell
Atty.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

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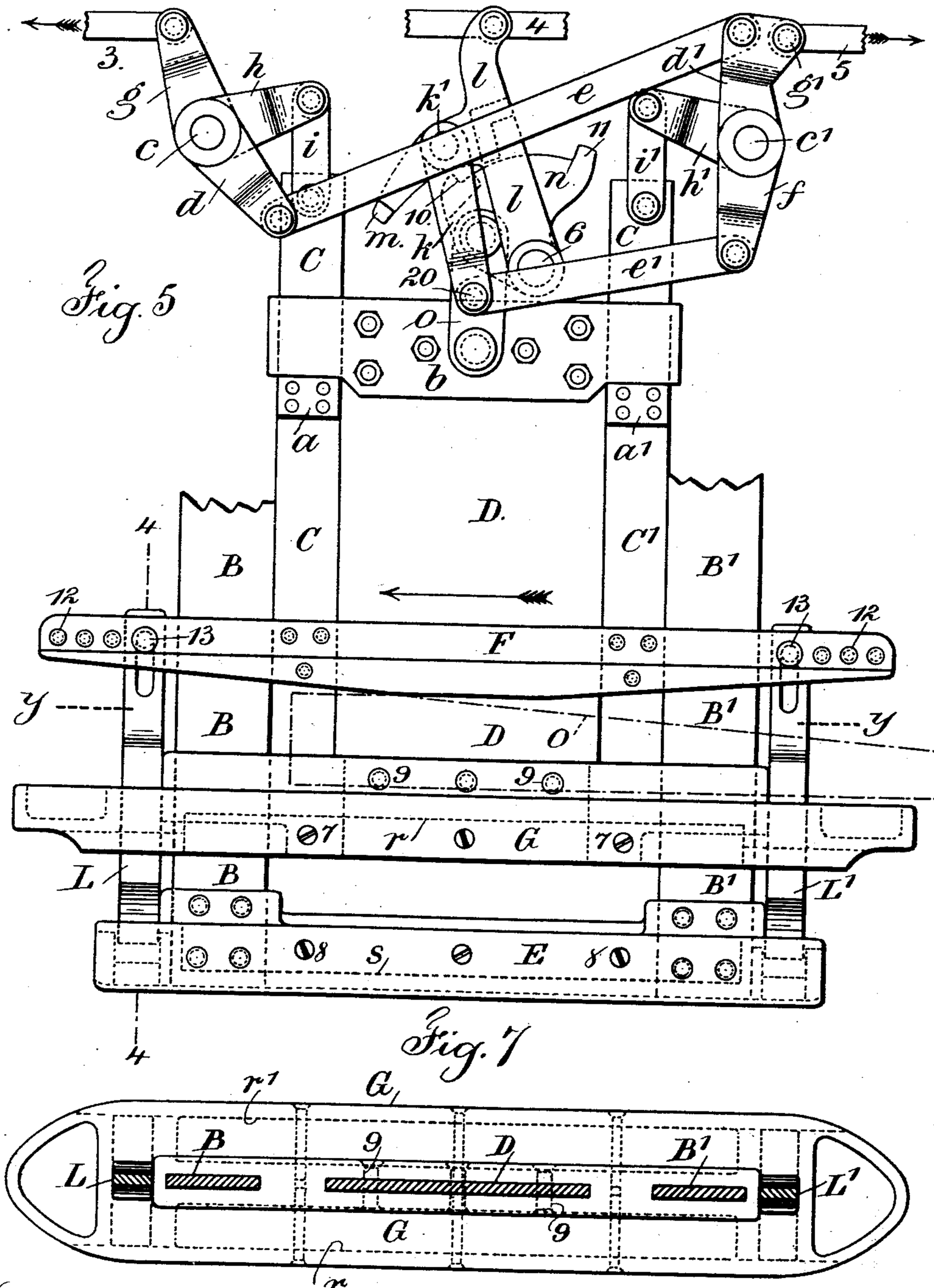

Fig. 5

Fig. 7

Witnesses

Chas. N. Smith

J. Stair

Inventor

Charles I. Earll

per Lemuel W. Serrell

Atty.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

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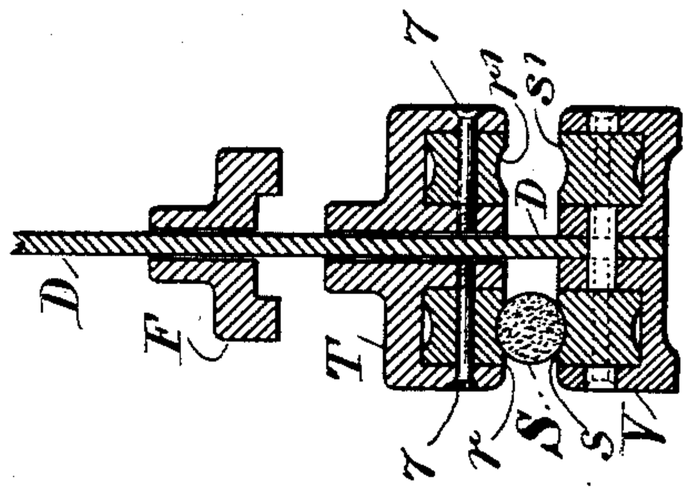

Fig. 10.

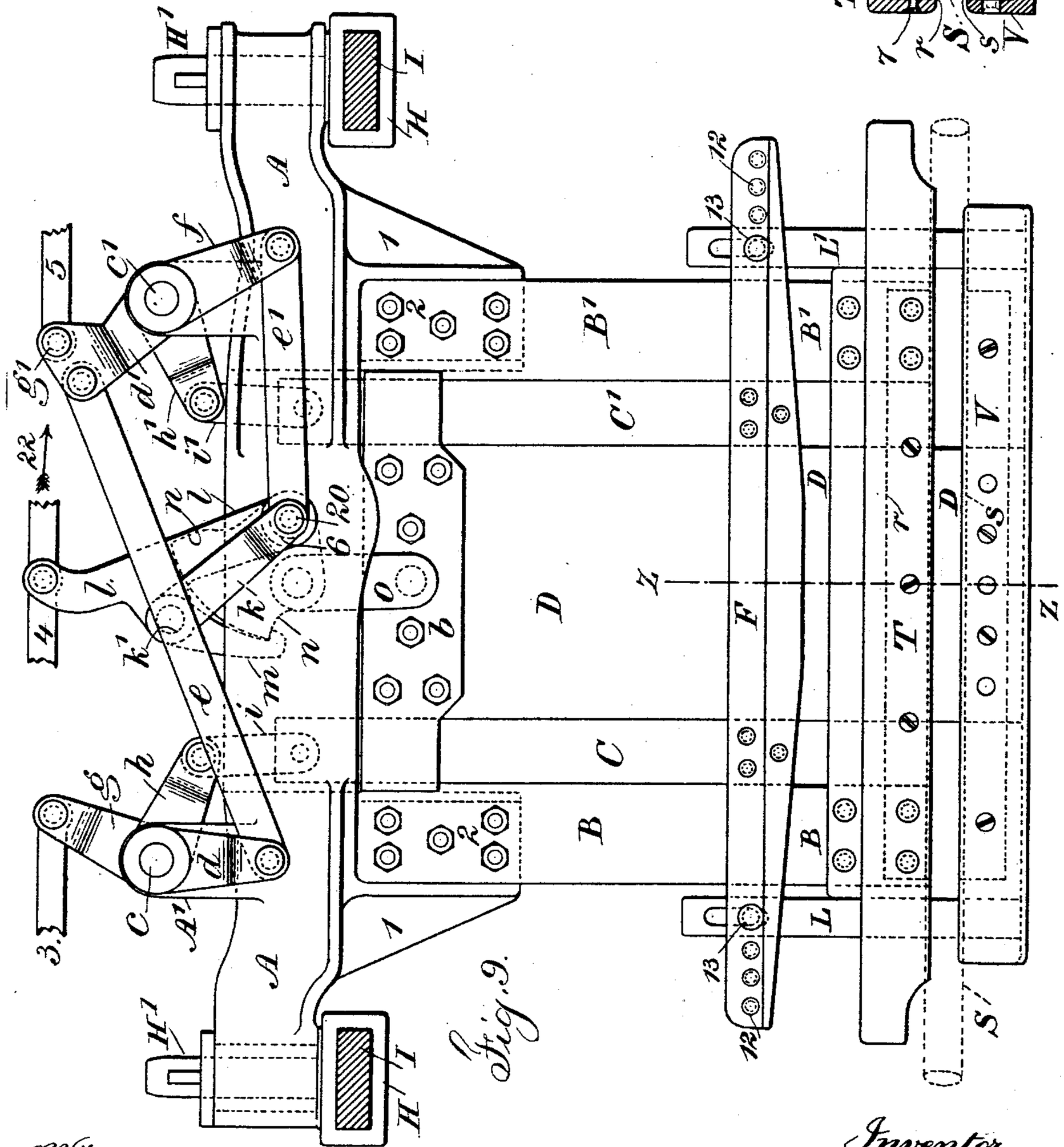

Fig. 9.

Witnesses

Chas. A. Smith

J. Stair

Inventor

Charles I. Earll

per Lemuel W. Serrell

Atty.

THE NATIONAL LITHOGRAPHING COMPANY.
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES I. EARLL, OF NEW YORK, N. Y.

GRIP MECHANISM FOR CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 520,259, dated May 22, 1894.

Application filed June 12, 1893. Serial No. 477,293. (No model.)

To all whom it may concern:

Be it known that I, CHARLES I. EARLL, a citizen of the United States, residing in the city, county, and State of New York, have invented a new and useful Improvement in Grip Mechanism for Cable Railways, of which the following is a specification.

My invention relates to improvements in grip mechanism for cable railways, the objects thereof being to readily grip and ungrip the cable in starting and stopping the cable car, and also from the car and automatically to operate and release the movable jaw and throw out the cable.

In carrying out my invention I employ devices operated from the car for raising and lowering the movable jaw to grip and ungrip the cable in stopping and starting the car; also devices operated from the car for releasing the movable jaw and throwing out the cable from the grip together with devices connected with the slot rails of the cable conduit for automatically performing the same operation. These devices may be operated from either end of the car or from an intermediate point when a special grip car is used. All of these devices are hereinafter more fully described.

In the drawings:—Figure 1 is a side elevation illustrating my improvements with the parts in the position occupied when the cable is gripped. Fig. 2 is a vertical cross section at the line *w. w.* of Fig. 1. showing the gripping mechanism and in addition a cross section of the slot rails and end elevation of the ejector bars connected therewith. Fig. 3 is a plan view of said parts. Fig. 4 is a partial side elevation with the parts in the position they will assume when the movable jaw is fully raised. Fig. 5 is a partial side elevation with the parts in the position they will assume when the movable jaw is operated and the cable simultaneously released and thrown out or ejected either from the car mechanism or automatically. Fig. 6 is a sectional plan at the line *x x* of Fig. 4. Fig. 7 is a sectional plan at the line *y y* of Fig. 5. Fig. 8 is a detached vertical section at 4, 4, of Fig. 5. Fig. 9 is an elevation illustrating a modification of my device and Fig. 10 is a vertical section at *z z* of Fig. 9.

A represents the yoke frame carrying the operating mechanism and which yoke frame is supported from the truck of the car. The longitudinal girders K have connected to them the cross carrying bars I. The carrier sleeves H surround and are adapted to move lengthwise upon the bars I and these sleeves have rising pins H′ which pass through holes made in the respective ends of the yoke frame A and the yoke frame and the grip mechanism supported thereby are thus connected to and carried by the cable car. The yoke frame A is made with depending ribbed portions 1 to which the vertically placed outer shanks B B′ are secured by the bolts 2 and standards A′ A² rise from the said yoke frame to receive and act as bearings for the rock shafts *c c′*. The vertically placed intermediate shanks C C′ and central shank D occupy the space between the outer shanks B B′ and are in the same plane therewith so as to pass freely through the slot between the slot rails N N′. The blocks *a a′* are secured upon the opposite faces of the shanks C C′ and the crosshead plates *b b′* are bolted to the opposite faces of the central shank D and their free ends extend across the shanks C C′ and over the adjacent edges of the outer shanks B B′ whereby the outer shanks B B′ act as guides for the plates *b b′* and shank D and the plates *b b′* act as guides for the shanks C C′.

d d′ represent rocker arms upon the rock shafts *c c′* and these rocker arms are connected by a link *e*. Rocker arms *h h′* are also connected to the shafts *c c′* and links *i i′* connect the ends of these rocker arms *h h′* with the upper ends of the intermediate shanks C C′ within the open yoke frame A. A rocker arm *g* is connected to the shaft *c* and a connecting rod 3 passes from its upper end to one end of the cable car; and a connecting rod 5 from the other end of the cable car is connected to the upper end of the rocker arm *d′* by a pivot pin *g′*. A lever *l* forked at its lower end is pivoted to the yoke frame A by the pivot pin 6 and a rock shaft *k′* passes through this lever *l* and to the outer end of this rock shaft *k′* is connected a rocker arm *k* whose lower end is connected to the rock shaft *c′* by the link *e′* and rocker arm *f*, which latter is connected to the rock shaft *c′*. The rock shaft *k′* carries a pawl *m* and the upper end of the lever *l* is provided with a

connecting rod and coupling 4 extending in both directions to the respective ends of the cable car.

Within the forked lever *l* upon the pivot pin 6 is mounted a tumbler *n* and links *o o'* are pivoted to said tumbler and to the central shank D upon the opposite faces of the crosshead plates *b b'*. The tumbler *n* is provided with a notch 10 for the pawl *m* and a projection 11 against which the cross web of the lever *l* bears, and the axial center of the pin 20 connecting the rocker arm *k* and link *e'* in the normal position of the parts agrees essentially with the axial center of the pivot pin 6 so that in the position Fig. 1 it is possible to rock the lever *l* by the connecting rod 4 and by means of the pawl *m*, tumbler *n* and links *o o'* to raise and lower the central shank D without moving or throwing out the pawl *m* or operating the rocker arm *k* or disturbing any of the other parts of the grip mechanism. The lower jaw E is secured to the outer shanks B B' and is stationary.

The upper jaw G is secured to the central shank D and is vertically movable therewith. The lower jaw E is a casting with central end mortises for the outer shanks B B' and the upper jaw G is also a casting with a central mortise for the shanks B B' which pass through it and for the central shank D to which said jaw is attached by the rivets 9. These jaws are made with recesses to receive the grip shoes *r r'* and *s s'* which act upon the cable S and said grip shoes are held removably in place in said recesses by the pins 7, 8.

A lifter bar F illustrated as made in two similar parts is securely riveted to the intermediate shanks C C' and to each other upon the opposite aligned faces of the shanks, and the respective ends of said bar are secured together by rivets 12 and are provided with pins 13.

The respective ends of the lower jaw E are provided with depressions or recesses extending across the said jaw widthwise and L L' are ejectors whose inclined flaring lower ends are received in said recesses. These ejectors extend up through the jaw G and through the lifter bar F and their upper ends are slotted for the pins 13 of said lifter bar. The lower edges of the lifter bar F are inclined in opposite directions from the central portion toward the ends, and I provide in the cable conduit and preferably connected to the under sides of the slot rails inclined ejector bars O O' whose purpose will be hereinafter more fully described.

In the position of the parts Fig. 1 the cable shown in dotted lines is supposed to be gripped between the jaws E G pressure being applied through the connecting rod 4 lever *l* pawl *m* tumbler *n* and links *o o'* to force down the central shank D and movable jaw G upon the cable, this pressure being augmented in proportion to the power applied by the operator on the cable car in drawing upon the rod 4. To ungrip the cable in order to apply the usual brakes and stop the cable car for passengers to alight, the connecting rod 4 is pulled upon in the direction of the arrow 21, Fig. 1, operating the lever *l* and causing its cross web to bear upon the projection 11 of the tumbler *n* and raising said tumbler *n*, links *o o'*, shank D and upper jaw G to whatever extent may be necessary to free the cable. To start the car the motion of these parts is reversed and the shank D and jaw G are forced down as heretofore described. There are times when it is desired to throw out the cable entirely and this operation shown by Fig. 5 may be effected in two ways, either by the operator on the car, or automatically. When effected by the operator on the car one of the connecting rods 3 or 5 is pulled upon (according to the direction in which the car is moving) in the direction of the arrow and the rocker arms *g*, *d* and *h* on the shaft *c* and the rocker arms *d'*, *h'* and *f* on the shaft *c'* together with the links *e e'* are operated and swung over toward the position shown in Fig. 5, raising the links *i*, *i'* intermediate shanks C C' and lifter bar F and moving the pins 13 upward in the slots of the ejectors L L' and simultaneously pushing forward the link *e'* swinging the rocker arm *k* upon the rock shaft *k'* and raising the pawl *m* out of engagement, with the tumbler *n*. This movement brings the blocks *a a'* up against the crosshead plates *b b'* and the pins 13 to the upper ends of the slots of the ejectors L L'. The further movement upon the aforesaid parts brings them into the full position shown in Fig. 5 wherein the intermediate shanks C C' by their blocks *a a'*, the plates *b b'* and shank D have lifted the movable jaw G off the cable and the lifter bar F secured to the shank C C' has elevated the ejectors L L' and caused their inclines to act upon the cable and eject or slide it out of the grip mechanism. In this operation the position of the lever *l* is not affected. When the cable is ejected automatically the operation is accomplished by the ejector bars O O' shown in the end view Fig. 2 and in dotted lines Fig. 5. These ejector bars O O' are illustrated as connected by bolts 15 to the foot plates of the slot rails N N' or said ejector bars O O' may be connected to the conduit structure in any desired manner, and they have inclined edge faces that come within and rise between the vertical inner faces of said slot rails. In the movement of the cable car and as the grip mechanism comes along to the fixed ejector bars O O' the under inclined edges of the lifter bar F ride up the inclined edges of these ejector bars O O' lifting the bar F and intermediate shanks C C' connected therewith. This movement brings the blocks *a a'* up to the plates *b b'* and the pins 13 to the top of the slots of the ejectors L L' and simultaneously by the links *i i'* swings the rocker arms *h h'*, shafts *c c'*, rocker arms *d d' f*, links *e e'*, rocker arm *k*, and rock shaft *k'* and lifts the pawl *m* from the tum-

bler *n* releasing the shank D and movable jaw G and the further movement of the parts just described elevates the jaw G and ejector bars O O′ and slides the cable out of the grip mechanism. When these parts return by the descent of the moving jaw to a normal position the tumbler *n* is rotated and the pawl *m* turned down to place against the tumbler thereby bringing the center of the pin 20 connecting the rocker arm *k* and link *e′* into axial line with that of the pivot pin 6.

In the modification shown in Figs. 9 and 10, the upper jaw T is stationary and is secured to the outer shanks B B′ and the lower jaw V is movable and is secured to the central shank D the blocks *a a′* are not employed, the tumbler *n* is of slightly modified form, and the pawl *m* is made with a hooked end to engage the lower edge of the said tumbler. Otherwise the construction and operation of the other parts is the same as heretofore described. In this modification the lower movable jaw is raised and the cable gripped by pulling on the rod 4 in the direction of the arrow 22, Fig. 9, and this jaw is dropped and the cable released or ungripped by tripping the pawl *m*, by the mechanism heretofore described by pulling on either rod 3 or 5 from the cable car, or automatically by the ejector bars O O′ in the trench raising the lifter plate F and when the lower jaw V drops and the lifter bar F raises the ejectors L L′ by the automatic action of the bars O O′, the cable is slid out of the grip mechanism by the inclines of the ejectors L L′.

I claim as my invention—

1. In a grip mechanism the combination with a stationary and a movable jaw; of a tumbler and a pivot therefor and connections from said tumbler to said movable jaw and to the car for operating said tumbler, a pawl engaging the tumbler and devices for disengaging said pawl from said tumbler to permit the jaws to open and release the cable, substantially as set forth.

2. In a grip mechanism the combination with a stationary and movable jaw; of a shank carrying the movable jaw, a tumbler and links connecting the said tumbler with the shank a lever operated from the car and a pawl carried by said lever and engaging the said tumbler, whereby the movable jaw is operated to grip and ungrip the cable, substantially as specified.

3. In a grip mechanism the combination with a stationary and movable jaw; of a shank carrying the movable jaw, a tumbler and links connecting the said tumbler with the shank, a lever operated from the car and a pawl carried by said lever and engaging the said tumbler, and devices acting upon the said pawl for disengaging it from the tumbler, substantially as set forth.

4. In a grip mechanism the combination with a stationary and a movable jaw; of the central shank D connected to the movable jaw, the tumbler *n* and its connection to the shank D, the lever *l* and the rod 4 for moving said lever from the car, and a pawl *m* pivoted to the lever *l* and adapted to engage the tumbler for operating the movable jaw, substantially as set forth.

5. In a grip mechanism the combination with a stationary and a movable jaw; of the central shank D connected to the movable jaw, the tumbler *n* and its connection to the shank D, the lever *l*, the pivot pin 6 upon which both the tumbler *n* and lever *l* are mounted, and the rod 4 for moving said lever from the car, and a pawl *m* pivoted to the lever *l* and adapted to engage the tumbler for operating the movable jaw, substantially as set forth.

6. In a grip mechanism, the combination with a stationary and a movable jaw; of the central shank D connected to the movable jaw, the crosshead and guide plates *b b′* upon the upper end of said shank, the tumbler *n* having a notch 10 and projection 11, the links pivoted to and connecting the tumbler and shank D, the rocking lever *l* and a connection therefrom to the car, a pawl pivoted to said lever and engaging the tumbler in the notch 10, whereby the lever and pawl move the tumbler and parts operated thereby in one direction and the lever and projection 11 move the tumbler and parts in the other direction, substantially as set forth.

7. In a grip mechanism the combination with a stationary jaw, a movable jaw and their shanks and the mechanism for operating said jaw; of the intermediate shanks C C′, the lifter bar F secured thereto, the ejector bars O O′ in the cable trench for acting upon and automatically lifting the bar F and the ejectors L L′ connected to and operated by the bar F whereby the movable jaw and cable are released or ungripped and the cable thrown out, substantially as set forth.

8. In a grip mechanism, the combination with the stationary and the movable jaws and their shanks; of the intermediate shanks C C′, the lifter bar F and blocks *a a′* secured to said shanks C C′, the ejectors L L′ extending through the lifter bar and having slotted connections at their upper ends and inclines at their lower ends received in recesses in the lower jaw, and means for raising the lifter bar F to release or ungrip and throw out the cable, substantially as set forth.

9. In a grip mechanism, the combination with the movable jaw, its shank D, the pawl and mechanism engaged by said pawl and connected to the shank, and devices for operating the same in gripping the cable; of the rock shafts *c c′*, the rocker arms *d d′ f* and *k*, the connecting links *e e′* and the rock shaft *k′* to which said pawl is pivoted, and mechanism substantially as specified for operating the aforesaid rock shafts, arms and links for moving the said pawl to release the movable jaw, substantially as set forth.

10. The combination with the gripping jaws, the means for actuating and holding

the same, and a cable ejector; of a lifter bar movable independently of the gripping jaws and their shanks, stationary inclines within the cable trench and with which the lifter bar comes into contact and is raised, connections from the lifter bar by which the grip holding mechanism is first disconnected and then the gripping jaws are opened and the ejector raised for throwing out the cable, substantially as specified.

Signed by me this 31st day of May, A. D. 1893.

CHARLES I. EARLL.

Witnesses:
GEO. T. PINCKNEY,
HAROLD SERRELL.