

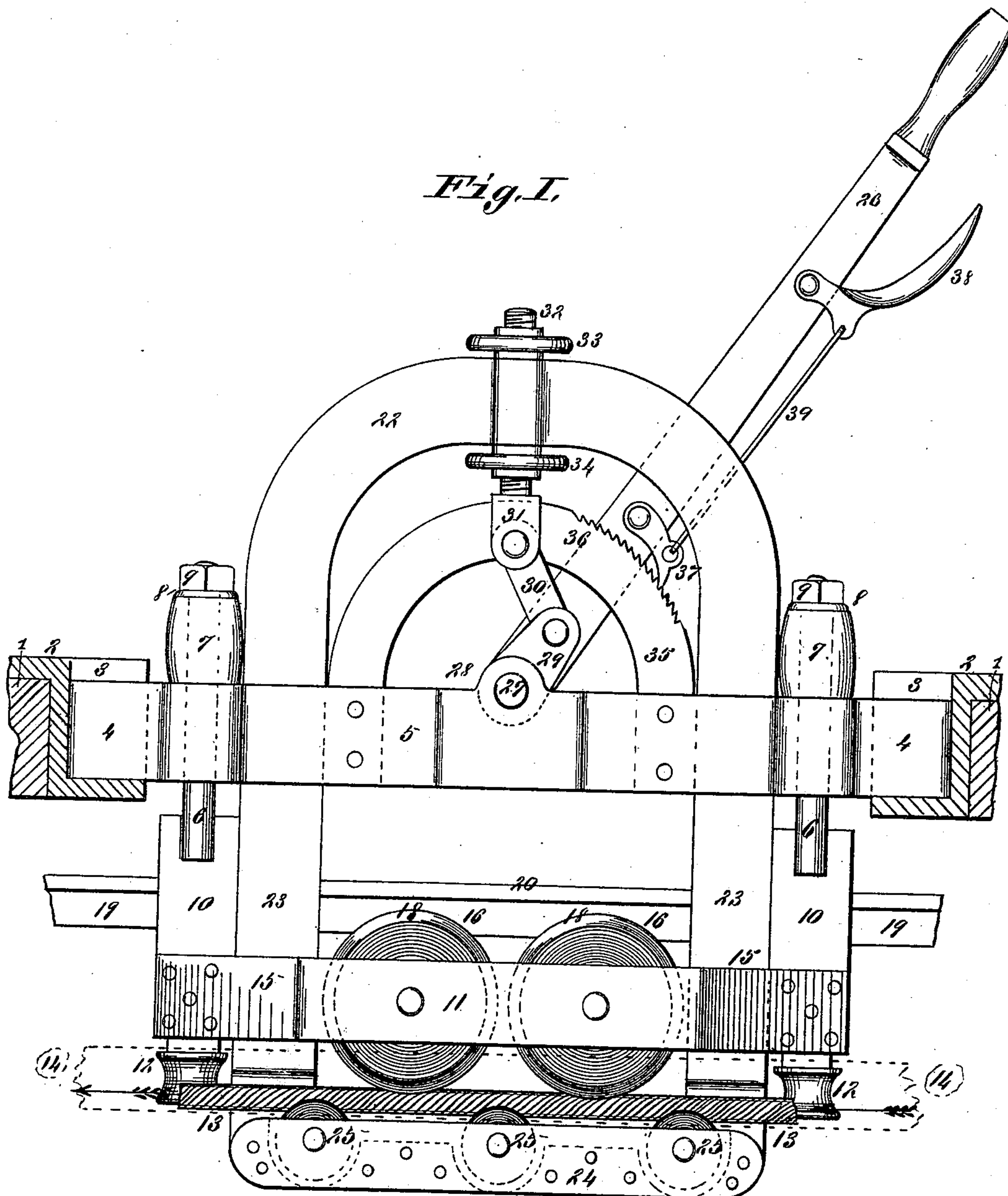
(No Model.)

4 Sheets—Sheet 1.

C. J. P. HEIM.
CABLE GRIP, &c.

No. 426,935.

Patented Apr. 29, 1890.



Attest:
W. E. Knight
E. Arthur

Inventor:
Charles J. P. Heim
By W. E. Knight & Co.
Attys.

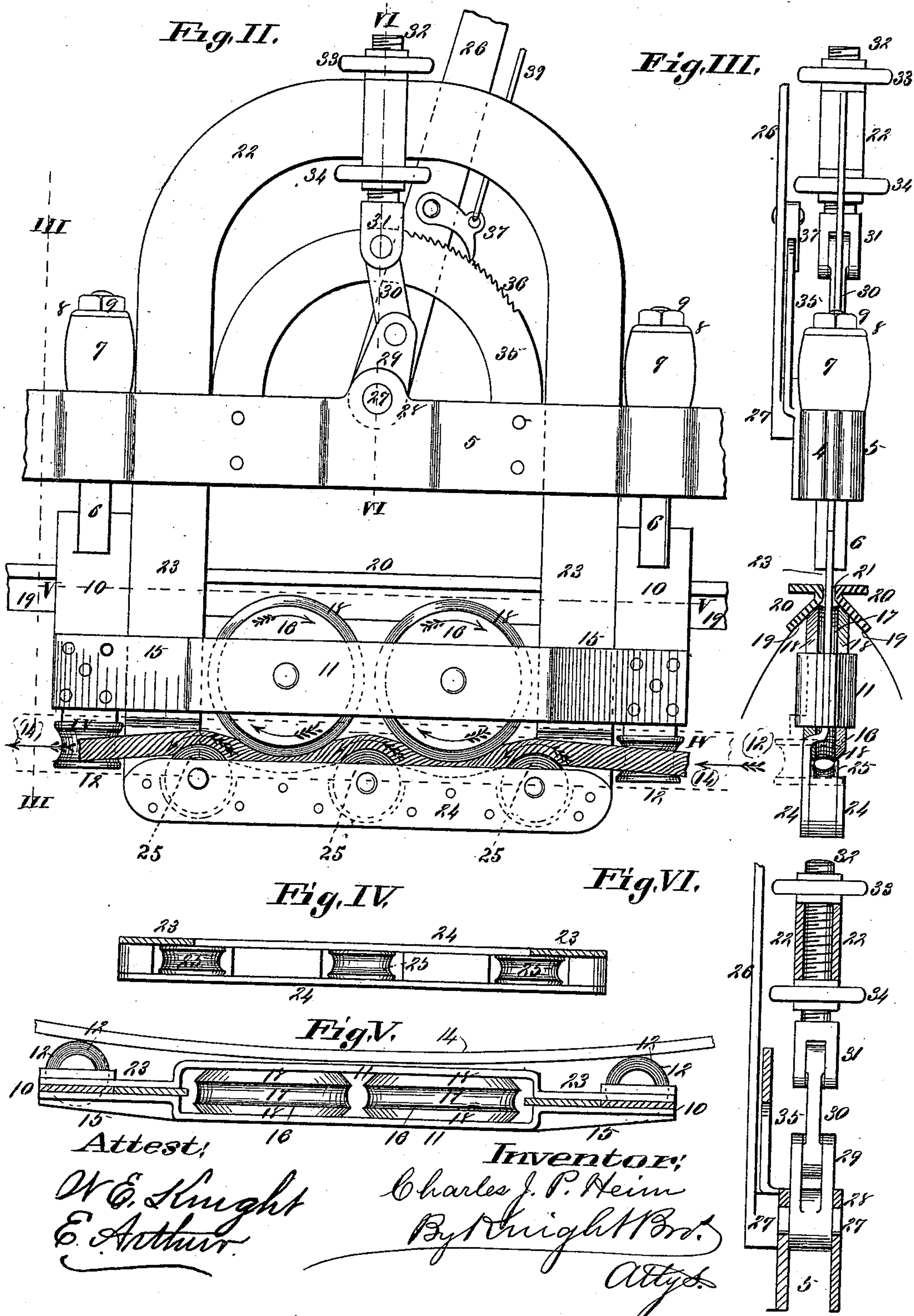
(No Model.)

4 Sheets—Sheet 2.

C. J. P. HEIM.
CABLE GRIP, &c.

No. 426,935.

Patented Apr. 29, 1890.



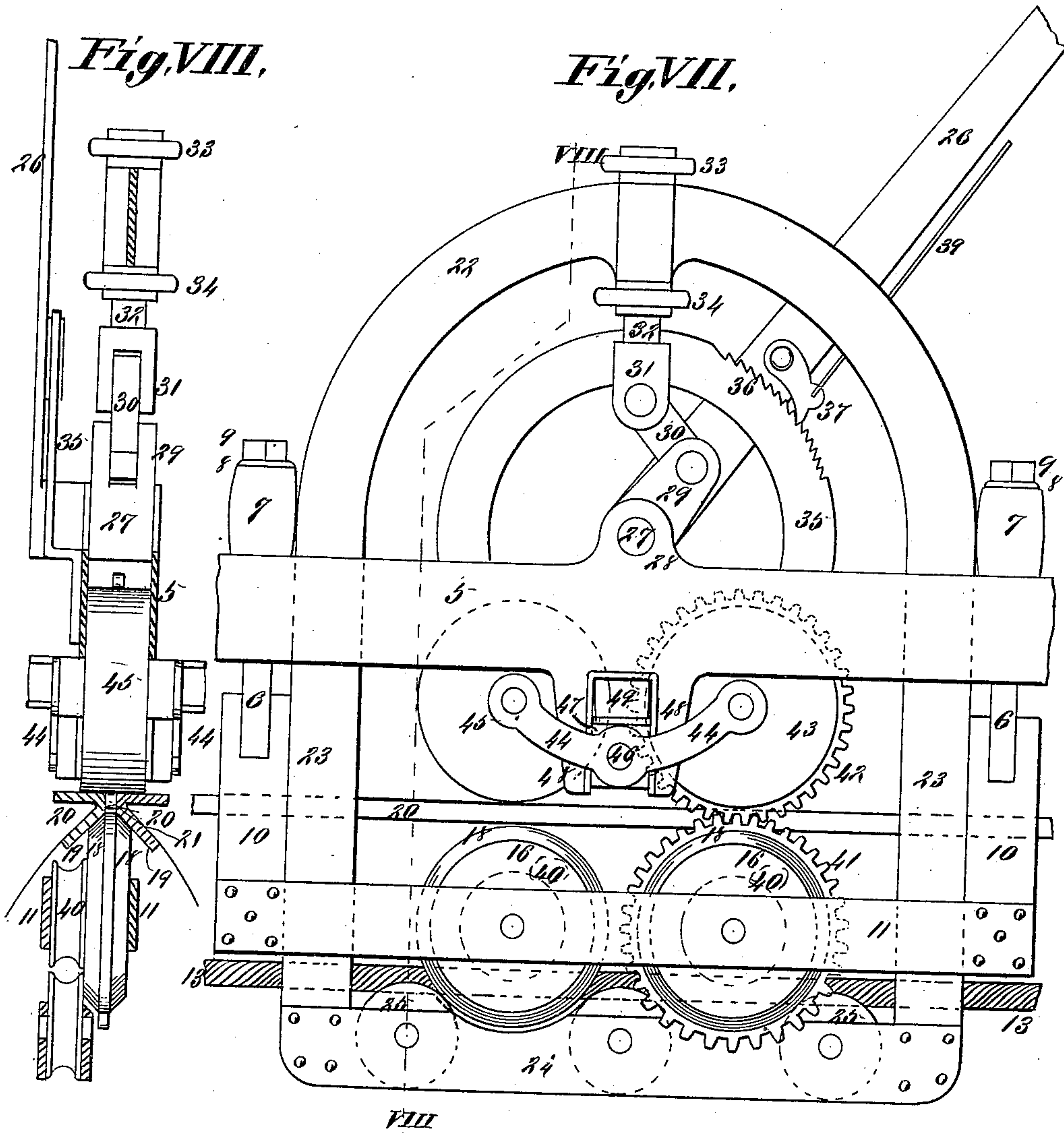
(No Model.)

4 Sheets—Sheet 3.

C. J. P. HEIM.
CABLE GRIP, &c.

No. 426,935.

Patented Apr. 29, 1890.



Attest:
W. E. Knight
E. Arthur

Inventor:
Charles J. P. Heim
By Knight & Co.
Attys.

(No Model.)

4 Sheets—Sheet 4.

C. J. P. HEIM.
CABLE GRIP, &c.

No. 426,935.

Patented Apr. 29, 1890.

Fig. IX.

Fig. X.

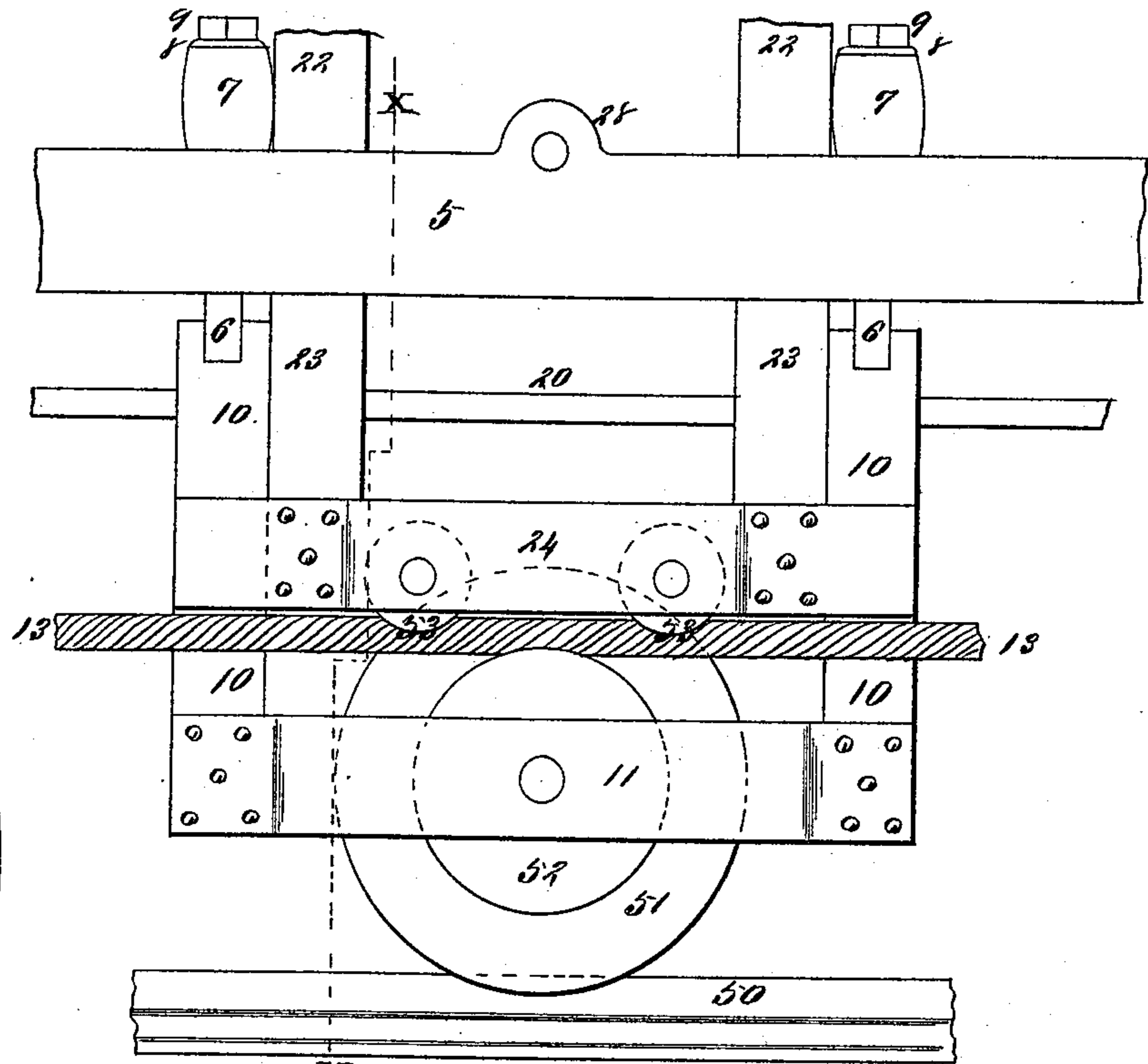
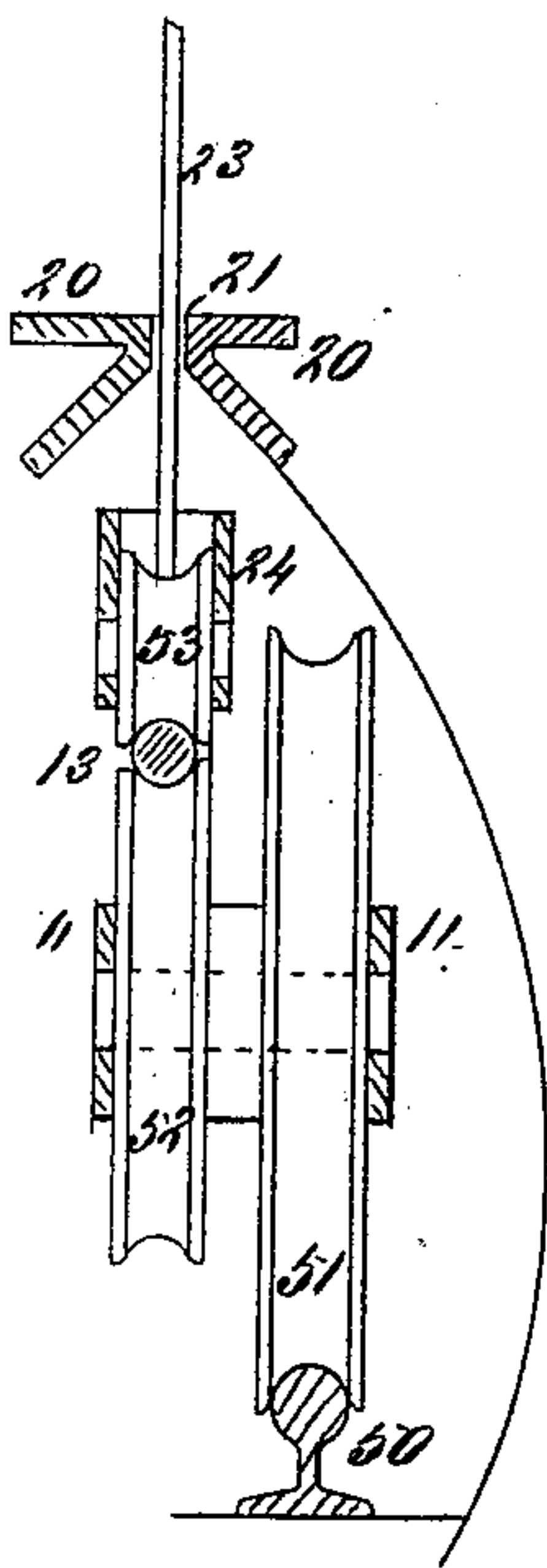


Fig. XI.

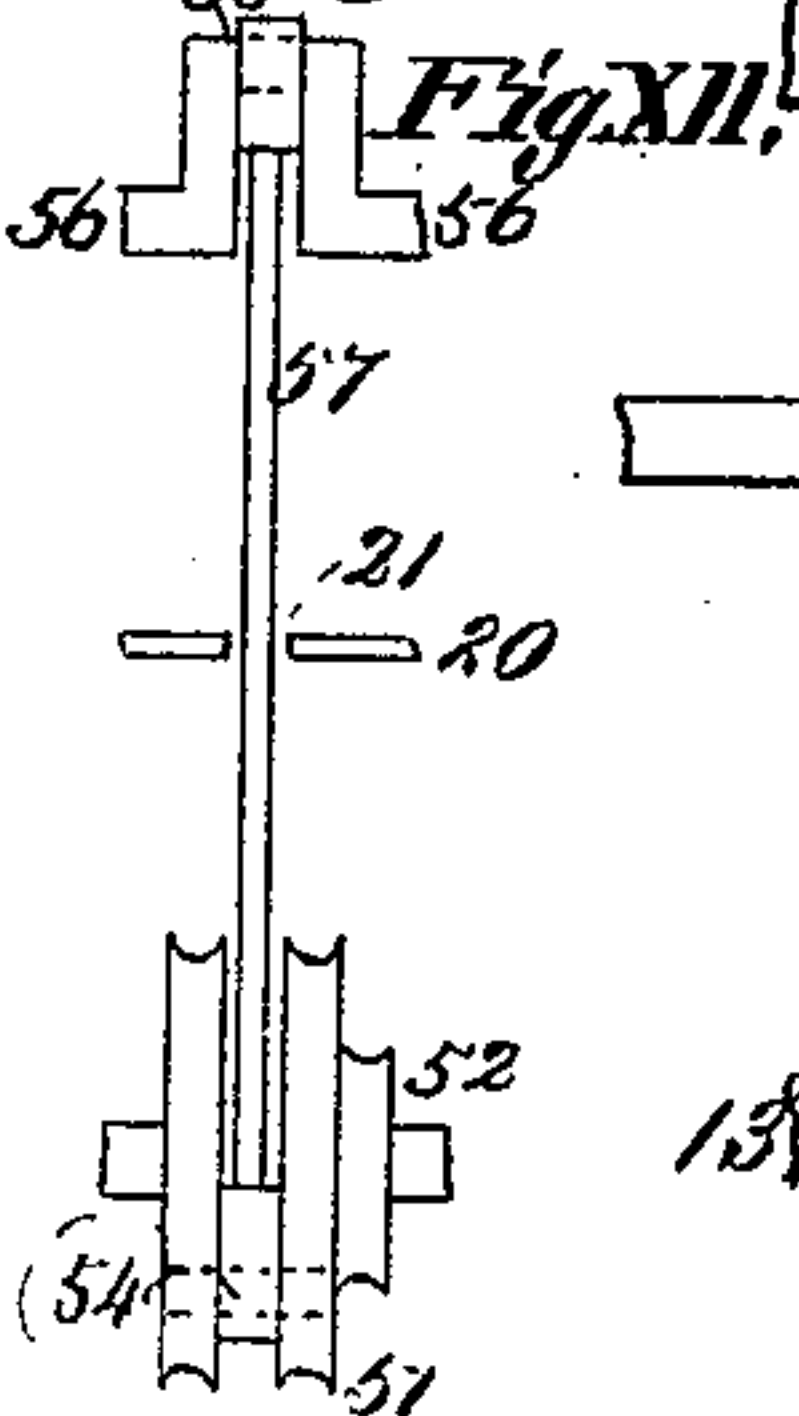
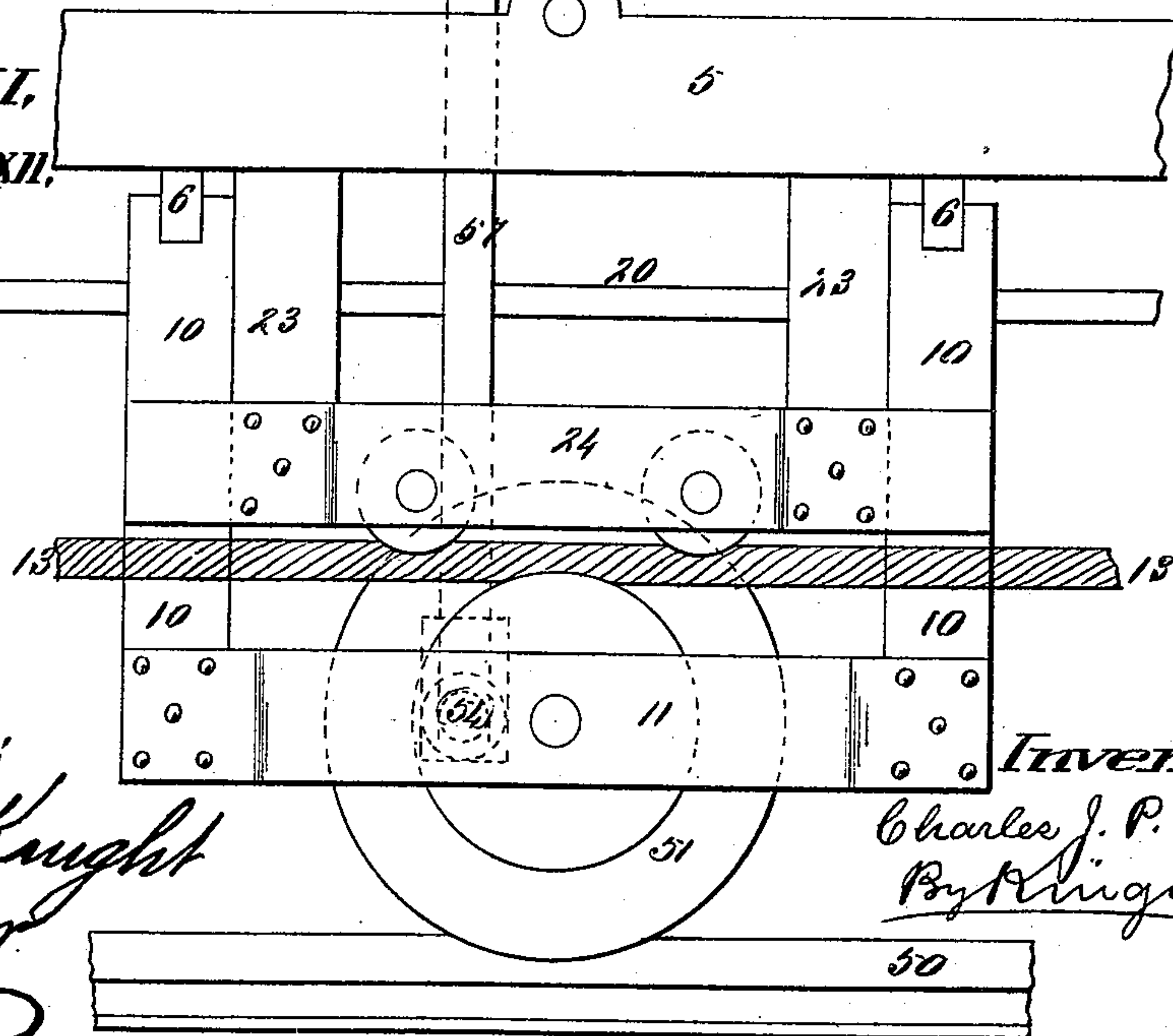


Fig. XII.



Attest:

W. E. Knight
E. Arthur

Inventor:

Charles J. P. Heim
By Knight Bros.

Atty

UNITED STATES PATENT OFFICE.

CHARLES J. P. HEIM, OF ST. LOUIS, MISSOURI.

CABLE-GRIP, &c.

SPECIFICATION forming part of Letters Patent No. 426,935, dated April 29, 1890.

Application filed November 25, 1887. Serial No. 256,138. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. P. HEIM, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Devices for Propelling Cars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 This is a device having wheels driven by the cable and which actuate the car by friction against fixed rails.

Figure I is a side elevation of the device, the bearings upon the car-body being shown 15 in vertical longitudinal section. The cable in this figure is shown running free between the pulleys. Fig. II is a side elevation of the device with the cable gripped, not, however, to prevent its passage between the rolls, but 20 to cause the rotation of the drive-pulleys. Fig. III is a vertical section at III III, Fig. II, showing a front elevation of the device. Fig. IV is a horizontal section at IV IV, Fig. II. Fig. V is a horizontal section at V V, Fig. II. 25 Fig. VI is a vertical transverse section at VI VI, Fig. II. Fig. VII is a side elevation of a modification. Fig. VIII is a vertical transverse section at VIII VIII, Fig. VII. Fig. IX is a side elevation of a modification. Fig. 30 X is a vertical transverse section at X X, Fig. IX. Fig. XI is a similar view to Fig. IX with the addition of a pitman connected to a wrist-pin on the drive-wheel and intended for engagement upon a crank of similar radius on the car-axle. Fig. XII is a diagram showing 35 the connection of the pitman with a wrist-pin of the wheel which is driven by the cable and a crank in the axle of the car-wheel.

At 1 are shown parts of the car-body.

40 2 2 are metal bearing-pieces having recesses 3, in which fit the ends 4 of the frame-bar 5.

6 6 are rods working vertically through the frame-bar 5 and supported by springs 7, 45 which stand upon the frame-bar 5 and upon which bear the washers 8, upon which bear the nuts 9, which screw upon the hanger-rods 6. Upon the rods 6 is suspended a frame having vertical end pieces 10 and horizontal 50 bars 11, whose ends are riveted or otherwise secured to the vertical pieces 10.

12 12 are vertical grooved pulleys having

bearing upon the lower parts of the pieces 10. These pulleys 12 are in such a position that in passing around a curve in one direction the 55 cable 13 will have side bearing in the groove of the pulleys, while at the same time the other side of the pulleys bear against a rail 14 at the side of the conduit, and by their bearing against it tend to move the car along. 60 In going around curves in the opposite direction the side bar 11 may bear against rollers at the side of the conduit, the bar 11 having inclined ends 15 to prevent any jar against the rollers. 65

No novelty is claimed for the rollers at the side of the conduit to take the impact of the grip-frame, as the device is well known. The bars 11 give bearing (see Figs. I, II, and V) to two wheels 16, having a circumferential groove 70 17, in which the cable 13 runs upon each side of the groove. The wheels have friction-surfaces 18, adapted to bear against the under face 19 of the grip-slot rails 20 upon each side of the slot 21. As shown in Figs. I, II, III, 75 V, VII, and VIII, the friction-surfaces are beveled to fit the slot-rails, having a V form in transverse section. The friction-surfaces of the wheels 16 may be made to fit the under sides of slot-rails of any form. The construction is such that the wheels 16 may be 80 just out of contact with the slot-rails when the cable is ungripped, so that there will be no friction between the wheels and rails at this time, and so that when the cable is lifted 85 the frictional contact will at once take place.

22 is an arched frame, whose vertical side bars or legs 23 work between the vertical pieces 10 and the bars 11, which form guides for the frame in its vertical movements, the 90 frame 22 being also guided in the frame-bar 5. To the lower ends of the side bars 23 are attached the ends of horizontal bars 24, which give bearing to the pulleys 25, upon which the cable 13 runs. 95

26 is a hand-lever attached to a rock-shaft 27, which has bearing at 28 in the frame-bar 5, and which forms the fulcrum of the lever. 29 is an arm upon the rock-shaft, connected by a link 30 to the ears 31 at the lower end 100 of the screw-rod 32. The screw-rod is within a vertical socket at the upper part of the frame 22.

33 and 34 are nuts upon the screw-rod 32,

which bear, respectively, against the upper and under side of the frame 22 at the socket. These nuts hold the screw-rod in place and give means for the vertical adjustment of the screw-rod.

35 is a ratchet-bar, whose ratchet-teeth 36 are engaged by a pawl 37 on the lever 26. The pawl is lifted by a lever 38 by means of a rod 39, that connects them. This is a common device for holding a hand-lever in position and needs no further description. When the hand-lever is moved from the position shown in Fig. I to that shown in Fig. II, the cable is gripped sufficiently to cause the rotation of the friction-wheels 16, and at the same time these wheels are pressed by the cable hard against the under sides of the slot-rails, so as to drive the car forward by friction. It is intended that the friction between the cable and the wheels 16 shall be greater than the friction between the wheels and the slot-rails, so that the wheels shall turn with the cable when it is gripped, and so that there shall be little wear of the cable, the wear incident to the starting of the car being upon the friction-pulleys and the slot-rails.

In order to cheaply overcome the effects of wear upon the friction-surfaces 18, they are preferably made removable.

In the modification shown in Figs. VII and VIII each of the friction-wheels 16 has attached to one side a grooved pulley 40. In this case the cable 13 runs in the circumferential grooves of the pulleys 40, so as to cause the rotation of the friction-wheels. Upon the periphery of one of the friction-wheels 16 are cogs 41, which engage the cogs 42 of a wheel 43, having at each side of the cogs bearing-surfaces 18, which run on the grip-rails each side of the slot 21. It will be understood that the cogs 41 and 42 engage each other within the slot 21. The wheel 43 has bearing in bars 44, which also give bearing to another wheel 45, that has a smooth periphery running upon the slot-rails. The bars 44 are supported at their middle on a pivot-pin 46, which passes through a vertically-movable block 47, working between pedestal-jaws 48, that depend from the frame-bar 5. Above the block 47 is a spring 49, that forces the block 47 downward, and so forces the wheels 43 and 45 down upon the slot-rails. In place of a pin 46 passing through the block 47, as described, studs may project from the sides of the block for the same purpose. It will be seen that the bars 44 act as an equalizer. In this form of the device there are three friction-drivers—namely, the two wheels 16 and the wheel 43.

It is obvious that a single one of the friction driving-wheels 16 may be used in place of the two shown and described, and a single pulley 25 used to press the cable into the groove of said friction-wheel. I however regard the construction hereinbefore described as the better form.

Where it is not feasible to obtain a bearing

for the friction-wheel against the grip-slot rails, and there is no other continuous fixed surface against which the friction-surface of the wheel which is driven by the cable can act to propel the car, I provide a fixed rail for this purpose, the construction and arrangement of the parts of which, as well as those of the other parts of the device, will now be described.

In the form of the device shown in Figs. IX, X, XI, and XII there is a raised rail 50 at the bottom of the conduit, upon which the drive-wheel 51 bears, the wheel being grooved peripherally to fit the rail. This wheel 51 has fixed to one side a grooved pulley 52, in which the cable 13 runs, the pulley 52 practically forming part of the wheel 51. The friction-wheel 51 is supported on the bars 11 of the frame 10, which is supported on the springs 7, so that the wheel may accommodate itself to the rail. The pressure-pulleys 53 have bearing in the movable frame 22 and act to force the cable down on the pulley 52 to cause the hard pressure of the wheel 51 upon the rail 50, and thus to drive the car forward. The springs 7 should, in the absence of the pressure of the pulleys 53, hold the friction-wheel 51 just out of contact with the rail 50, so that there will be no unnecessary friction of the parts when the car is at rest, which would cut depressions in the rail. As any equivalent means for preventing the friction of the drive-wheel 51 against the rail 50 when the car is at rest, I connect a wrist-pin 54 on the wheel 51 with a U-crank 55 on one of the car-axles 56 by means of a pitman 57, so that the friction-wheel cannot turn, except when the car is moving forward.

In the form of the device shown in Figs. I to VIII, inclusive, the pressure-pulleys by which the cable is forced against the drive-wheels on pulleys therein are beneath the cable and move upward in applying the grip, while in the device as shown in Figs. IX to XII, inclusive, the position and movement of these pulleys are reversed.

I claim as my invention—

1. The combination, in a car-driving device, of a wheel 16, grooved at its periphery to receive the cable and having peripheral friction-surfaces 18, adapted to be forced against the under side of the grip-slot rails 20, the grip-slot rails, movable pulley 25, adapted to press the cable against the friction-wheel 16, and a frame depending from the car, giving support to the said friction-wheel and pulley, substantially as described.

2. The combination of wheels 16, having a peripheral groove to receive the cable, and friction-surfaces 18 outside the groove and supported on a frame suspended on springs, and a grooved pulley adapted to receive the cable and connected with an operating-lever constructed to move the pulley to and from the friction-wheel.

3. The combination of the grip-slot rails, a friction-wheel adapted for frictional contact

with the grip-slot rails, having bearing on a movable frame supported on springs, and a vertically-movable frame actuated by a lever and carrying a grooved pulley adapted to press the cable against the friction-wheel, substantially as and for the purpose set forth.

4. The combination of the grip-slot rails, a wheel within the conduit, rotated by the cable and bearing against the under side of the grip-slot rails, a wheel bearing upon the top of the grip-rails, and cogs on the wheels between the friction-surfaces engaging together within the slot, and frames depending from the car and giving bearing to the wheel and pulley, for the purpose set forth.

5. The combination of the grip-slot rails, wheels within the conduit, supported on a frame which is supported by springs, said wheels having peripheral friction-surfaces adapted to bear against the under sides of the grip-slot rails, pulleys on a frame, actuated by a lever adapted to force the cable against pulleys on the friction-wheel, and friction-wheels pressed down on the grip-slot rails by a spring-and-cog connection between one of the wheels in the conduit and one above the conduit.

6. The combination of a grip-frame, grooved pulleys 12, adapted to receive the drive-cable in their circumferential grooves and turning on vertical arbors upon the frame at the height of the cable when engaged by the grip and beside the cable, a rail within the conduit at the inner side of the curve, against which the periphery of the pulleys bear in passing around the curve and said cable, substantially as set forth.

7. The combination of the grip-slot rails, a friction-wheel turned by the cable within the conduit, connected to a frame depending from the car and bearing against the under sides of the grip-slot rails, and a wheel carried by the car and running along the top of the grip-slot rails, for the purpose set forth.

8. In a device for driving cars, a cable, a wheel supported on a frame depending from the car and rotated by the cable, a movable pulley adapted to press the cable into bearing-grooves of the wheel, and a rail upon which the wheel has peripheral friction-bearing, substantially as described.

9. In a device for driving cars, a cable within a conduit, a wheel within the conduit, supported on a frame depending from the car and having an annular groove to receive the cable, a movable pulley adapted to force the cable into the annular groove, and a rail within the conduit, against which the periphery of the wheel has frictional contact, substantially as described.

10. The combination, with a cable-railway car, of a wheel having a groove to receive the driving-cable and having a circumferential friction-surface, a fixed rail against which said friction-surface bears to propel the car, a movable grooved pulley adapted to force the cable into the groove of said friction-wheel, and a frame depending from the car, supporting said pulley and wheel, substantially as described.

CHAS. J. P. HEIM.

In presence of—

SAML. KNIGHT,
JAS. E. KNIGHT.