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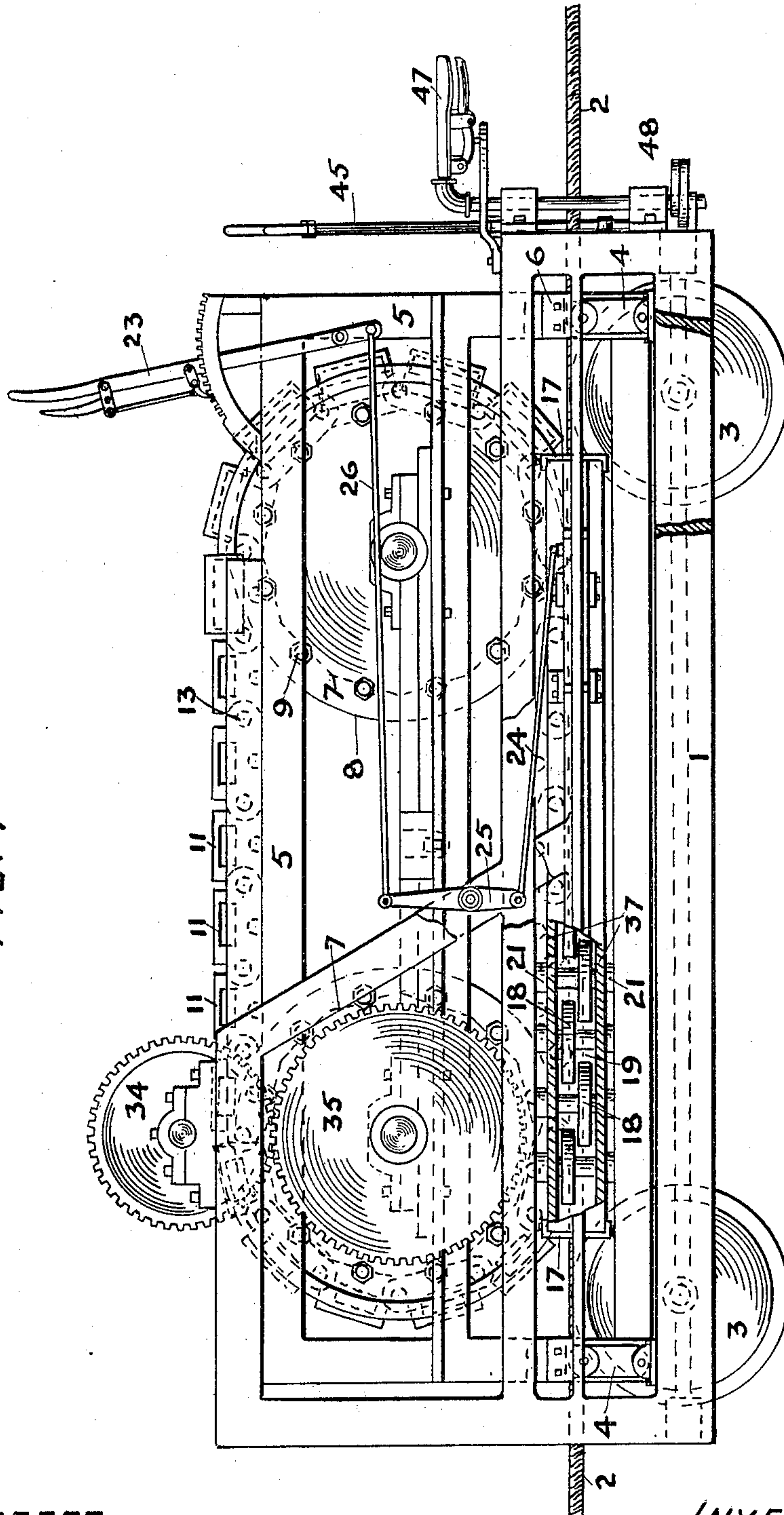
PATENTED AUG. 14, 1906.

G. S. FOUTS.  
AUTOMATIC CABLE CHAIN GRIP.

APPLICATION FILED FEB. 6, 1905.

4 SHEETS—SHEET 1.

FIG. 1



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*Celeste Ansell*

INVENTOR:

*George S. Fouts*  
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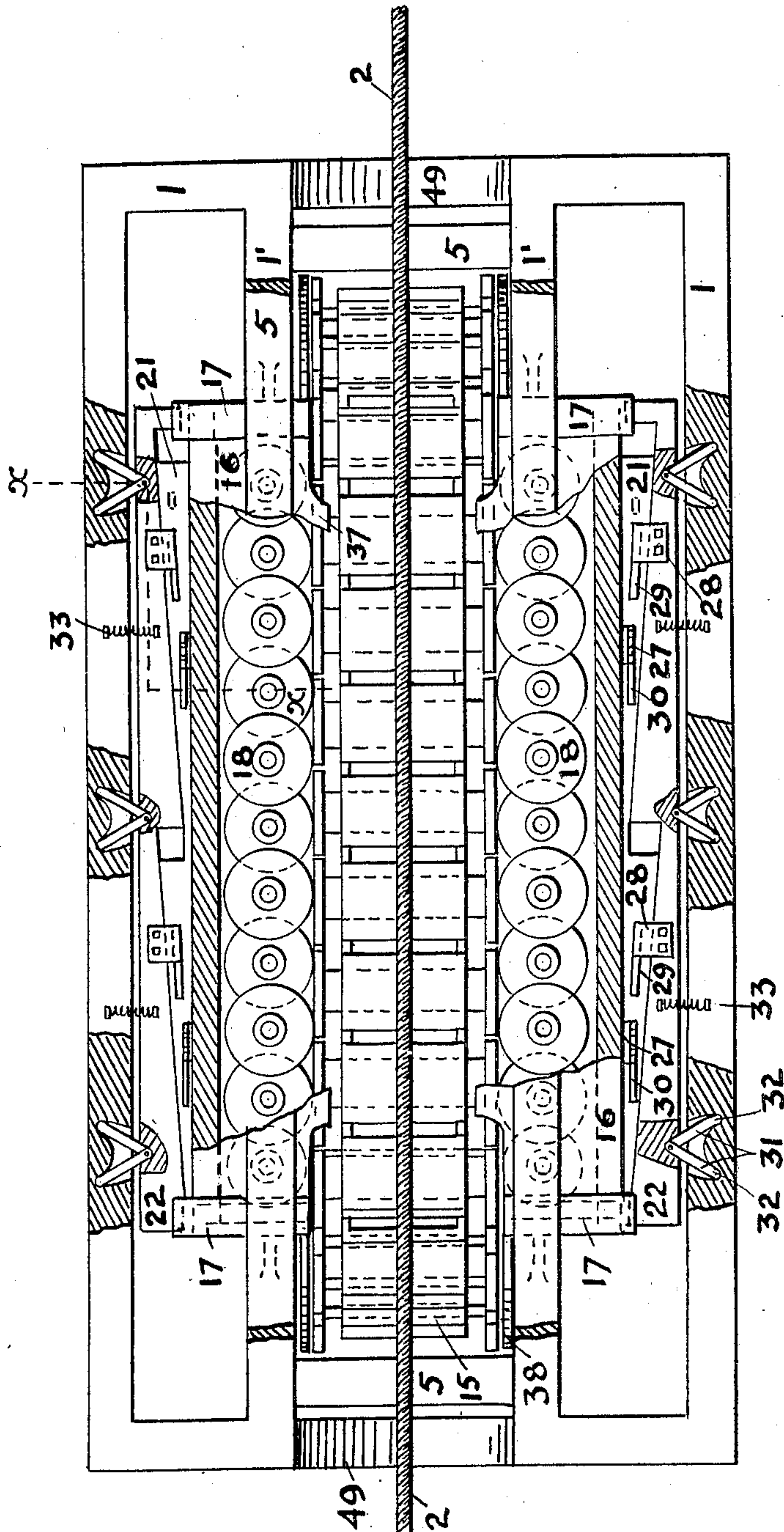
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4 SHEETS—SHEET 2.

FIG. 2



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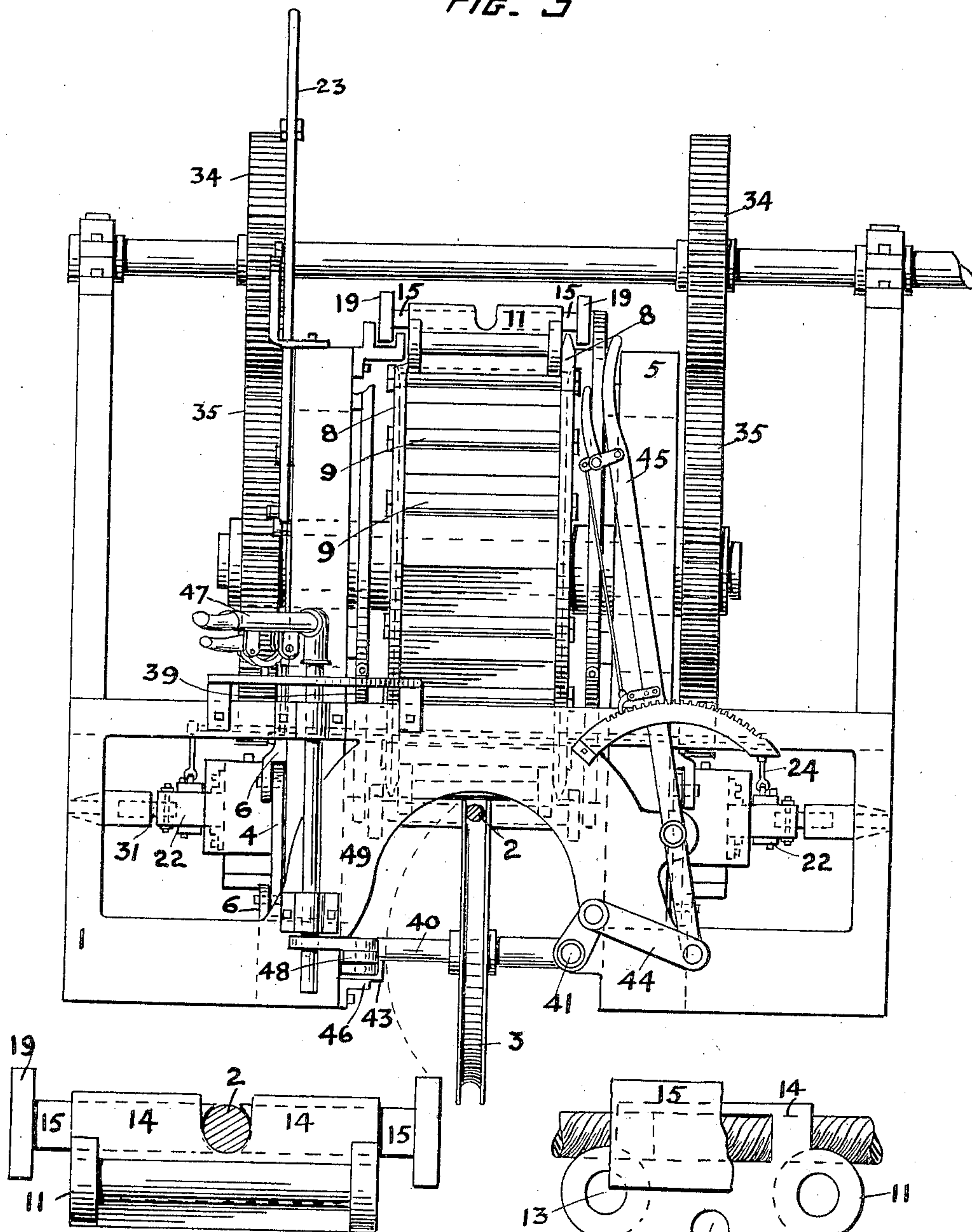
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4 SHEETS—SHEET 3.

FIG. 3



WITNESSES: FIG. 9

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4 SHEETS—SHEET 4.

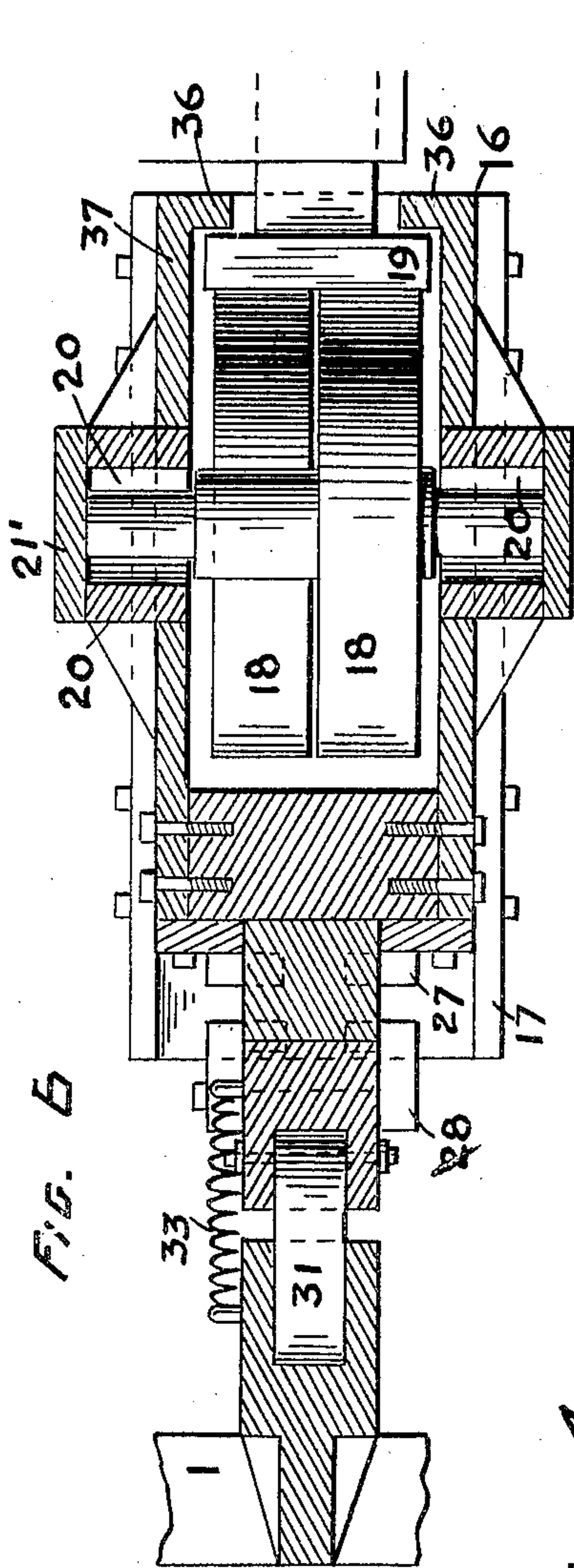


FIG. 8

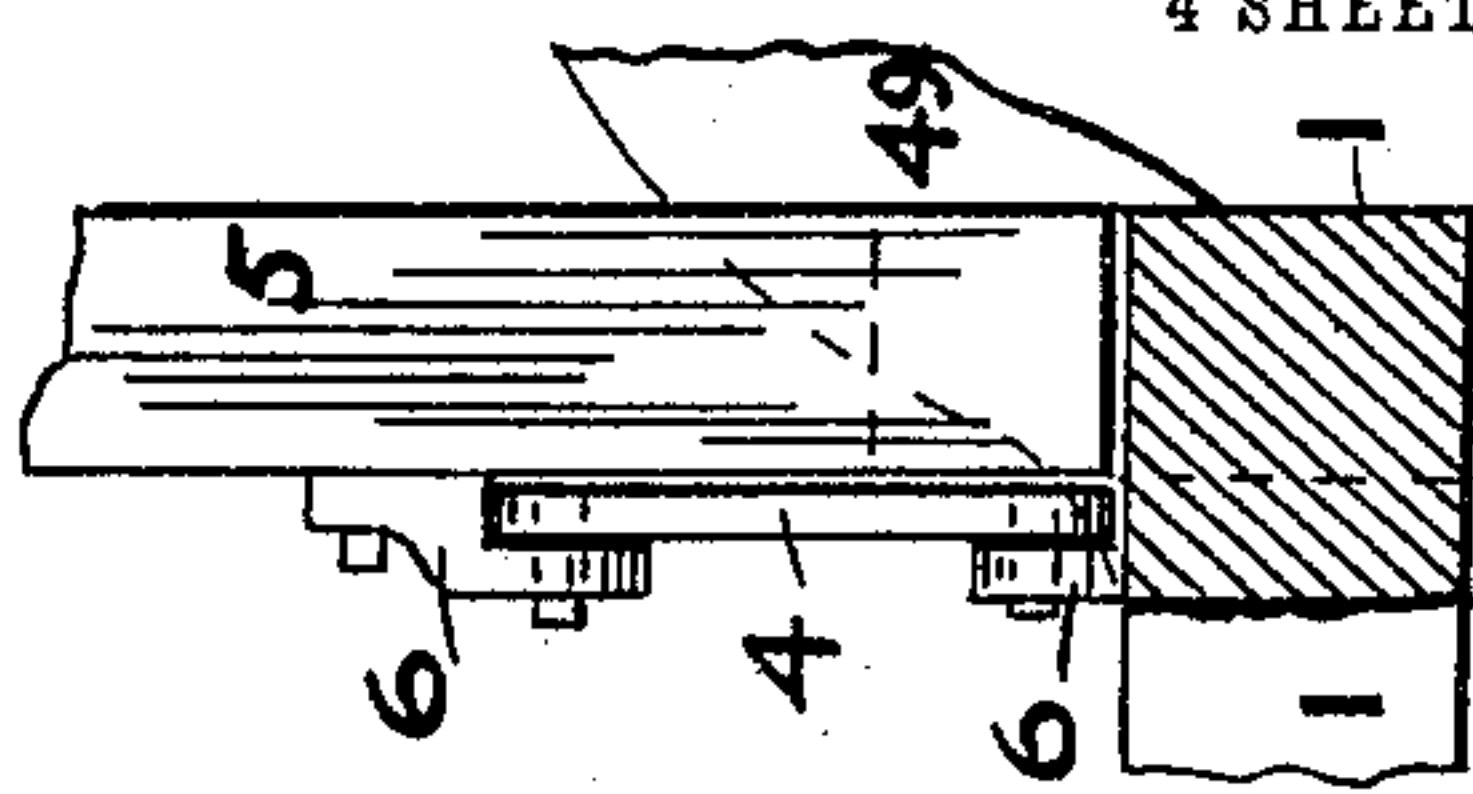


FIG. 7

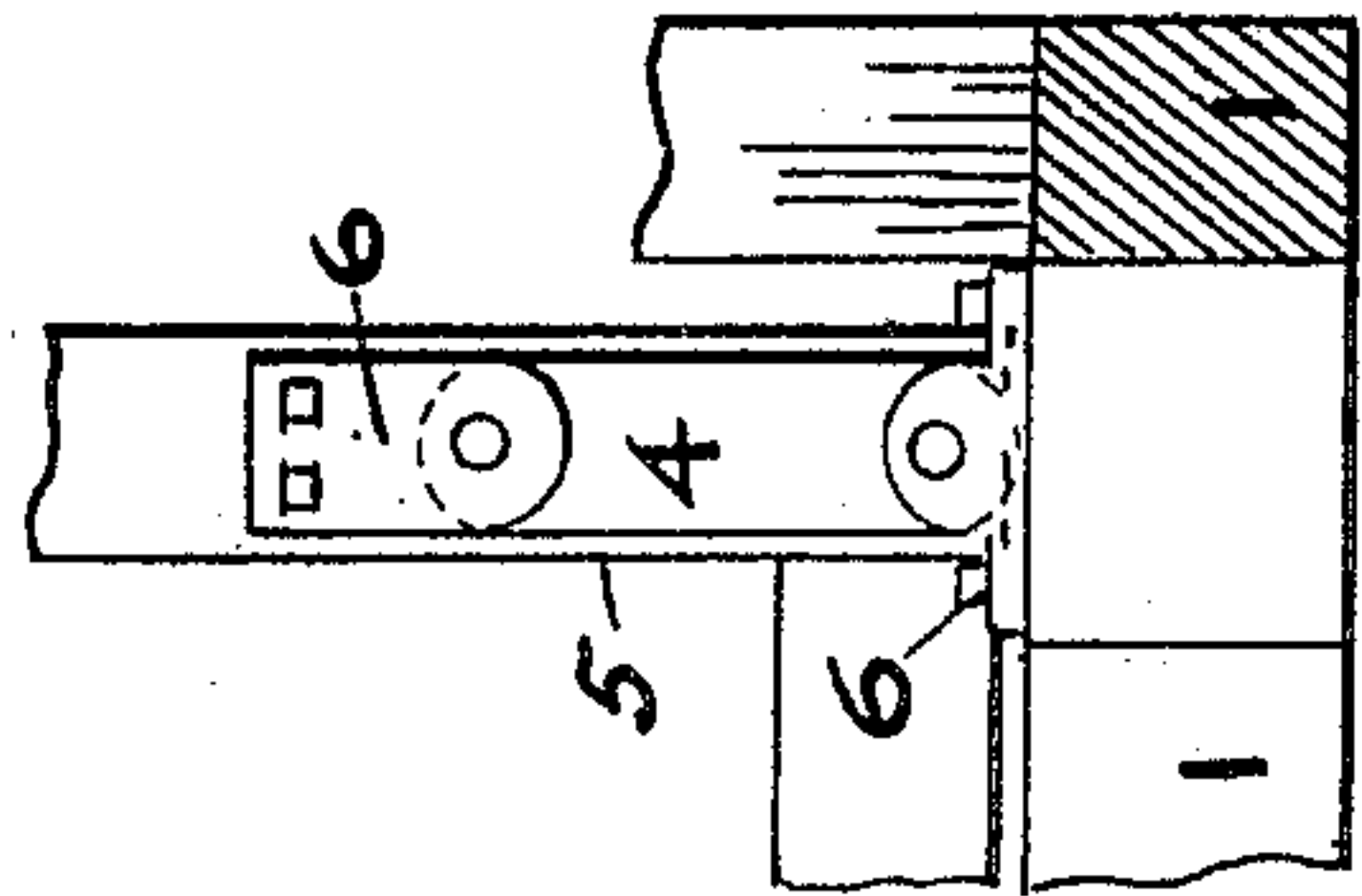


FIG. 4

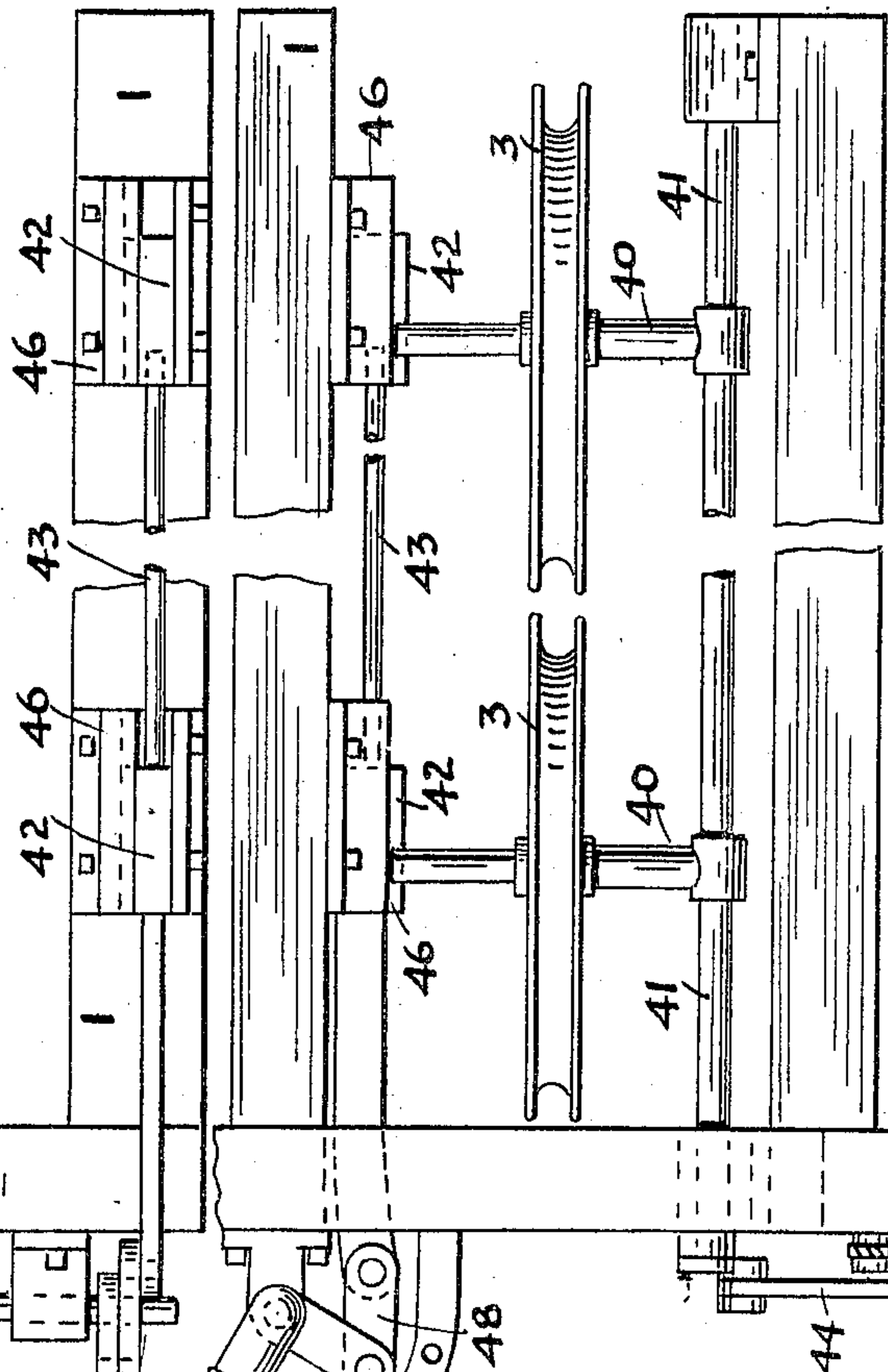


FIG. 5

WITNESSES:

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INVENTOR:

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# UNITED STATES PATENT OFFICE.

GEORGE SHOUME FOUTS, OF SAN FRANCISCO, CALIFORNIA.

## AUTOMATIC CABLE-CHAIN GRIP.

No. 828,645.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed February 6, 1905. Serial No. 244,435.

*To all whom it may concern:*

Be it known that I, GEORGE SHOUME FOUTS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Automatic Cable-Chain Grips, of which the following is a specification.

This invention is intended to facilitate transportation in localities where hauling by other methods is difficult. It is intended to take the place of the heavy teams now used in some kind of hauling and to entirely supersede the slow and cumbersome traction-engines which are sometimes employed when the nature of the surface permits.

In desert regions, where the traction-engines cannot be successfully used and where water is obtained with difficulty, a railway could not be built, nor a suitable road be made my invention is capable of being employed at small expense and with very effective results as compared with all previous means of transportation.

The accompanying drawings illustrate the invention.

Figure 1 is a side elevation. Fig. 2 is a bottom plan. Fig. 3 is an end elevation. Fig. 4 is a side view of the devices for locking the cable-supporting sheaves. Fig. 5 is a plan view of the sheaves for supporting the cable while it is in the machine. Fig. 6 is a sectional view of the governor. Fig. 7 is a detail side elevation showing the jointing between the inside and outside frames. Fig. 8 is an end elevation of the same. Fig. 9 is an end elevation of a chain-link and cable-grip in gripping position. Fig. 10 is a side view of the same.

The main frame of the machine is shown at 1, and it must be supposed to be attached to or supported by any kind of wheel-truck carrying a steam-engine, gasoline-engine, electric motor, or any suitable source of power.

A cable 2 is laid between terminal points, and this cable can be of any length, depending upon the distance between said terminals. The cable is ordinarily stationary, so that the machine travels upon it, and such is the arrangement illustrated in the drawings; but it is quite possible to reverse the operation, to fix the machine as a stationary plant, and to cause said machine to act as the means for drawing a moving cable. This cable always passes through the machine

and when used as illustrated rests upon the idle guide-pulleys 3.

At each end of the inner longitudinal beams of the main frame is pivoted a link or rocker-arm 4, to the upper ends of all of which are pivoted the inside frame 5 by means of brackets 6. The rocker-arms are rounded at both ends, so that they can turn easily in the correspondingly-rounded bearings. The inside frame is then hung upon the links or rocker-arms and can be moved for a limited distance longitudinally on the main frame; but it is so supported as to always leave a clearance between it and the main frame, so that its movement produces no friction. On the movable frame are journaled two wheels 7 7, having flanges 8, which are connected by transverse pins or rods 9, which become driving-bars for the chain carried by said wheels. This chain is composed of links 11, which are shown in detail in Figs. 9 and 10, and it may be called a "sprocket-chain," because it is driven by wheels in substantially the same way as ordinary sprocket-chains are driven. The links are each provided with a recess 12 to receive the rods 9, which drive them, and are also hinged together by means of pins 13, as shown in Fig. 1. The cable, whether stationary or endless, passes straight through the machine without being wound upon drums, or coiled, or constricted in any manner. This is because the grip is a chain-grip in the line of the cable, which does not depend in any way upon the changing of the direction of the movement of the cable.

On each link are formed bearings for transversely-movable grips 15 moving oppositely to each other and having faces adapted to bear upon and clamp the cable. These faces are preferably somewhat rounded, as shown in Fig. 9, because round faces fit the cable and make a more secure hold. I have shown one of such grips on each side of each link, and it will therefore be understood that each link of the chain provides bearings for oppositely-moving parts which seize and hold the straight cable between them, and that a number of chains-links, as they pass around the sprocket-pulleys, seize and grip the cable at the same time, thereby securing a very strong attachment and causing the cable to pass longitudinally of the frame.

Laterally-movable means, as frames 16, are provided for forcing the grips or jaws inward against the cable. The frames are



mounted in guideways 17 and are preferably provided with antifriction - bearings, as wheels 18, which engage with the outer ends of the jaws. I prefer to stagger the wheels—  
 5 that is, to arrange them in two planes one above the other and provide the outer end of each jaw with a head or enlarged surface 19, which permits of the use of larger wheels. I also prefer to use antifriction-bearings for the  
 10 axles of the wheels, as rollers 20, which are arranged in cylindrical projections 21'.

Between the outer frame and each of the frames 16 are two oppositely - arranged wedges 21 and 22, one of which is longitudi-  
 15 nally movable relatively to the other, as by means of a lever 23 and two rods 24. The rods 24 are connected with the lever by means of a lever 25 and a rod 26. The movable wedge is held between the frame 16 and  
 20 the stationary wedge by means of lugged brackets 27 and 28, the lugs of which fit in slots 29 and 30. By using wedges a uniform pressure may be applied simultaneously to all the jaws in contact with the cable at the  
 25 same time, and they also permit of the jaws being forced farther inward as they become worn. The stationary wedges are provided with sets of oppositely-inclined rockers or toggles 31, which are seated at their free ends  
 30 in recesses or sockets 32 in the outer frame 1. Springs 33 are arranged to normally hold the stationary wedges outward as far as they will go, which will keep both toggles seated in their respective sockets.

35 When there is no pressure of the jaws on the cable, the toggles will maintain this normal position; but as soon as the inner wedge is moved so as to cause the jaws of the forwardly-moving grip or chain to contact with  
 40 the stationary cable the chain will cease its forward movement for an instant, which will cause the frame to move backward, which in turn will cause the rearwardly-inclined toggles to swing to the rear, which will force the  
 45 wedges and the frame 16, carrying the wheels, to move toward the cable, and thereby automatically clamp the cable with sufficient force to draw the load which may be attached to the vehicle on which the grip and its frame  
 50 is mounted. It will also cause the pressure or tension of the grip on the cable to be automatically varied or governed according to the load that is being drawn, for the greater the pull of the load the greater will be the move-  
 55 ment of the frame and the grip to the rear, which will cause the toggles to be swung farther to the rear, which in turn will increase the inward movement of the frame and antifriction-wheels, and thus force the inner ends  
 60 of the jaws into firmer contact with the cable. In this manner the beginning of the gripping movement can be controlled manually by the setting-lever 23; but the latter or effective part is automatic. To release the grip, the  
 65 movable wedge is forced to the rear by the

lever 23, which will loosen the jaws from the cable sufficiently to let the frame return to its normal position, or, if the pressure is so great as to prevent the loosening of the wedges by the lever, the sprocket-wheels 70 may be given a sufficient rotation to the rear to return the frame to its normal position. As soon as the frame is thus released springs 33, which are attached to the outer frame and to the stationary wedge, will instantly draw 75 the grip-frame and jaws outward away from the cable and also cause the outer end of each of the toggles to be seated in its respective socket. Owing to the fact that these parts vary or control the force or pressure of the 80 grip on the cable, I call them the "governor."

The sprocket wheels and chain are driven by means of a pair of gear-wheels 34, which meshes with gear-wheels 35, mounted on the shaft 1 of the sprocket-wheels. The wheels 85 34 are driven from any suitable source of power, (not shown,) and the shafts of wheels 34 and 35 are arranged on a line at right angles to the length of the frame 5, so that the frame may be moved longitudinally in either 90 direction to set the grip without its throwing the gear-wheels out of mesh. By thus arranging the driving mechanism and providing the pairs of toggles it is evident that the frame carrying the grip may be moved in 95 either direction lengthwise of the cable, and the grips will operate just the same, thereby rendering the entire mechanism reversible. It also causes the rotation of the driving gear-wheels 34 to move the frame backward, 100 which will assist in forcing the jaws inward by the action of the toggles, as heretofore described. As the chain is driven around by the two sprocket-wheels the heads on the ends of the jaws are caused to pass between the 105 flanges 36 on the plates 37 of the frame 16, as shown in Figs. 2 and 6, which will cause the jaws to be moved toward or away from the cable, according as the frame is moved forward or back; but they are caused to pass in- 110 side of two guides 38 when not in contact with the cable, which will prevent any of the blocks or jaws from accidentally slipping out of the chain-link. These guides extend from each end of the plates 37 up around the 115 sprocket-wheels, and to cause their ends to always register with or retain the proper position relatively to the plates they are flexible, as by means of a joint 39, and are connected at their tips to the frames 16, so as to 120 be moved back and forth with them. To further facilitate the passage of the jaws into engagement with the cable, the end wheels are preferably made a trifle smaller in diameter than the others, which will permit of the 125 head of the jaw being a trifle to one side without its failing to properly engage with the first wheel with which it comes in contact. A grip of this character acts on the principle of a "hand-over-hand" contact, for the jaws 130



are successively brought into contact with the cable always in the same order, and as soon as one jaw is released at the rear end of the grip another one at the forward end engages with the cable and gradually passes to the rear, when it is again released and passes forward to again engage the cable.

As above described my automatically-governed traveling grip comprises three elements or members—the cable, the frame, and the grip, consisting of a plurality of gripping-jaws adapted to be forcibly engaged with or released from the cable in succession, and it can be operated to draw a load along a stationary cable or other fixed track or to draw a cable longitudinally in either direction. It also permits the grip to go entirely to the end of the cable without having to bend, constrict, or coil the cable in any manner. Any suitable-sized cable may be used, and the amount of grippage can be changed or varied by varying the length of the chain, which runs parallel with the cable, or by the number of jaws that are caused to engage with the cable simultaneously. In the use of such a device for traction purposes it is frequently desirable to release the cable from the machine and to put the same or another cable back in position to be grasped by the jaws. To accomplish this purpose quickly and effectively, the pulleys 3 are preferably mounted on swinging axles 40, which are each connected at one end with a rock-shaft 41 and are supported at the other end by a plate 42 on a sliding rod or bar 43. A link 44 connects the shaft with the lower end of a lever 45, by means of which the shaft is rocked or partly rotated when it is desired to take up or release the cable. The rod 43 is moved longitudinally in its bracket-like bearings 46 by means of a lever 47 and link 48. The bearings for the axles 40 are preferably mounted on the beams 1', and the lower end beams of the outer frame 1 are arched, as shown at 49, for the passage of the cable when the upper portion of the pulleys 3 are swung down or up, as indicated by the dotted lines in Fig. 3. When it is desired to release the cable, the plates are withdrawn from under the free ends of the axle by means of the lever 47, when the axles can be swung down by the releasing-lever 45 and turn the pulleys so that the cable will drop out of the grooves in the pulleys. When it is desired to take up the same or another cable, as in switching, to let two motors pass, the cable is raised into position to be caught by the jaws of the grip, and the pulleys and axles are swung up into position by the lever 45 and the plates slipped back under the free ends of the axles, when the machine is ready for use.

To operate the machine, the setting-lever is drawn back to slide the movable wedge, which will throw the inner ends of the jaws into contact with the cable with sufficient

force to start to swing the inner frame, which will cause the toggles that are inclined in the direction in which the frame is moved to swing in their sockets and automatically increase the pressure of the jaws against the cable until it is great enough to move the load forward, and no more, as the chain is passed around the sprocket-wheels. In this manner the weight of the load that can be drawn is governed entirely by the strength of the cable or the parts comprising the gripping mechanism and not by the slippage of the jaws upon the cable, as heretofore constructed. This will avoid any wear upon the cable or jaws on account of slippage, which will permit of a cable being used longer than it could be if it were subject to wear or abrasion by the sliding of the jaws on the cable.

The vehicle on which the grip is mounted can be of any desired construction and can be provided with means for steering it or moving it laterally to a limited extent relatively to the length of the cable. This will permit of the cable being provided with turns or angles, and it will also permit of two motors passing each other on the same line, as by overlapping the ends of two cables at the switching-point or by laying an extra cable parallel with the main cable for the required distance. It also permits of having branch lines, for all that is necessary is to have the end of the branch line extend parallel with the main line for a sufficient distance, as all that is necessary to operate the machine in either of the above instances is to move it into such a position before releasing the grip from one cable that the other cable can be placed in the grip, after which the machine can be guided to cause it to follow the direction of the new cable.

Having described my invention, I claim—

1. In a gripping device, three members, two of which are relatively movable longitudinally one to the other, and the third member is mounted on one of the said two members and movable longitudinally relative thereto and provided with gripping means for detachably engaging with the other one of said members.

2. In a gripping-machine, three members, two of which are relatively movable, one to the other, and the third one is flexible and mounted on one of said two members and has a portion of its length movable longitudinally relatively to the other member and provided with gripping means for detachably engaging therewith.

3. In a gripping device, a track, a frame, and a jointed member mounted on the frame with a portion of its length movable parallel with the track and provided with gripping means for detachably engaging therewith.

4. In a gripping device, a cable, a frame, and a chain mounted on the frame with a portion of its length movable parallel with and



adjacent to the cable, the links of the chain being provided with gripping means for detachably engaging with the cable.

5 In a gripping device, a cable, a frame, and a chain mounted on the frame with a portion of its length movable longitudinally parallel with and adjacent to the cable, gripping-jaws mounted in the links, and means for forcing the jaws into engagement with  
10 the cable.

6. In a gripping device, a frame and a chain mounted thereon with a portion of its length movable longitudinally with a cable, gripping-jaws movable longitudinally in the  
15 links on both sides of the cable, and means for forcing the inner ends of the jaws into engagement with the cable.

7. In a gripping device, a cable, a frame and a chain mounted thereon with a portion  
20 of its length movable longitudinally with the cable and provided with recessed and grooved links, longitudinally-movable jaws in said recesses on both sides of the cable, and means for forcing the inner ends of the jaws into en-  
25 gagement with the cable while the cable is in said grooves.

8. In a gripping device, a frame and a chain mounted thereon with a portion of its length movable longitudinally with a cable,  
30 jaws in the links of the chain, the inner ends of the jaws being adapted to be forced into engagement with a cable and the outer end of each jaw being provided with an enlarged head, and means for engaging with said head  
35 and forcing the jaws inward against the cable.

9. In a gripping device, a frame and a chain mounted thereon with a portion of its length movable longitudinally with a cable,  
40 inwardly-movable jaws on the chain, laterally-movable means for moving the jaws and antifriction devices in said means for engaging with the outer ends of said jaws.

10. In a gripping device, a frame and a chain mounted thereon with a portion of its  
45 length movable longitudinally with a cable, jaws in the links of the chain, the outer end of each jaw being provided with a head, a laterally-movable frame, antifriction-wheels journaled in said frame in position for engag-  
50 ing with said heads, and means for moving the last-mentioned frame.

11. In a gripping device, a frame, a chain mounted thereon with a portion of its length movable in a straight line, jaws on the chain  
55 in position to be forced into engagement with a track and wedges for simultaneously forcing a portion of the jaws of said chain into engagement with the track.

12. In a gripping device, a frame, a chain  
60 mounted thereon with a portion of its length movable in a straight line, jaws on the chain in position to be forced into engagement with a track, pairs of wedges for simultaneously operating the jaws of said portion, a lever for

longitudinally moving one wedge of each pair, and means for locking said lever in any desired position.

13. In a gripping device, a frame an element thereon movable longitudinally relative thereto and provided with means for en-  
70 gaging with a track, and means for automatically varying the pressure of said engagement.

14. In a gripping device, a frame, a longitudinally-movable element mounted thereon  
75 and provided with jaws in position to be forced into engagement with a track, manually-operable means for causing the jaws to engage with the track, and means for auto-  
80 matically increasing the pressure of the jaws against the track.

15. In a gripping device, a movable frame, an element mounted thereon and movable longitudinally relative thereto and provided  
85 with jaws in position to engage with a track, and means for automatically varying the pressure of said engagement when the frame is moved in either direction.

16. In a gripping device, a frame, a longitudinally-movable element mounted there-  
90 on, provided with jaws in position to be successively engaged with a track in the same order, and means for automatically varying the pressure of said engagement.

17. In a gripping device, a frame, a longitudinally-movable element mounted there-  
95 on and provided with means for engaging with a track, and toggles for causing the pressure of said engagement to be automatically varied.

18. In a gripping device, a movable frame, a chain movably mounted thereon and pro-  
100 vided with jaws in position to be moved into engagement with a track, and toggles arranged in pairs in position to be moved so as to cause the pressure of said engagement to be automatically varied when the frame is moved in either direction.

19. In a gripping device, a frame, a chain movably mounted thereon and provided with  
105 jaws in position to be forced into engagement with a track, wedges for placing the jaws in contact with the track, toggles for moving said wedges laterally inward, and springs for moving the wedges outward.

20. In a gripping device, two frames, one within the other, the inner frame being longi-  
110 tudinally movable relatively to the outer frame, a chain movably mounted on the inner frame and provided with means for engaging a track, and means for moving the inner frame to vary the pressure of said en-  
115 gagement.

21. In a gripping device, two frames, one within the other, links for supporting the in-  
120 ner frame so as to permit of longitudinal movement thereof, a chain movably mounted on the inner frame and provided with



means for engaging a track and means for automatically varying the pressure of said engagement when said inner frame is moved in either direction.

5 22. In a gripping device, two frames, one within the other, the inner frame being movable longitudinally, a pair of sprocket-wheels on the inner frame, a chain over said wheels provided with means for engaging with a track, and means for rotating said wheels.

10 23. In a gripping device, two frames, one within the other, the inner frame being movable longitudinally, pairs of flanged wheels mounted on the inner frame, rods for connecting the flanges of each pair of wheels, means for driving said wheels in either direction, and a chain on said wheels provided with means for engagement with a track, the links of the chain being recessed transversely  
20 to engage with said rods.

24. In a gripping device, a frame, sprocket-wheels mounted thereon, a chain over said wheels, jaws movably mounted in the chain, means for preventing the outward movement  
25 of the jaws at one portion of its movement and means for forcing the jaws inward at another portion of its movement.

25. In a gripping device, a frame, sprocket-wheels mounted thereon, a chain over said  
30 wheels, jaws movably mounted in the chain in position to engage with a track, the outer end of each jaw being provided with a head, a guideway for engaging said heads and preventing outward movement thereof when the  
35 jaws are not in engagement with the track, and a flange member for engaging with the heads to move the jaws out of engagement with said track.

26. In a gripping device, a frame, sprocket-wheels mounted thereon, a chain over said  
40 wheels, movable jaws on the chain in position to engage with a track, the outer end of each jaw being provided with a head, a guideway for engaging said heads to prevent outward movement, a frame provided with a  
45 flange for engaging with said heads and moving the jaws outward, antifriction-wheels for engaging with the heads when the jaws are in engagement with the track, each end of the  
50 guideway being flexible and connected with the frame, and means for moving the flanged

frame and antifriction-wheels toward and from the track.

27. In a gripping device, a cable, a frame, and a chain on the frame provided with  
55 means for engaging with the cable, pulleys for supporting the cable, and means for moving the pulleys to remove or replace the cable.

28. In a gripping device, a cable, a frame, and a chain on the frame provided with  
60 means for engaging with the cable, a rock-shaft, axles secured thereto at one end, removable means for supporting the free ends of the axles, pulleys on said axles and a lever for rocking the shaft.  
65

29. In a gripping device, a cable, a frame and a chain on the frame provided with means for engaging with the cable, pivoted axles, each provided with a pulley, movable  
70 plates for supporting the free ends of said axles, and a rod and a lever for moving the plates into or out of engagement with the free ends of said axles.

30. In a gripping device, an arched frame, a pulley detachably mounted at each end of  
75 the frame and in line with said arch, a cable over said pulleys, and a chain movably mounted on the frame provided with means for engaging with the portion of the cable between said pulleys.  
80

31. In a gripping device, a support, two opposing series of movable gripping members thereon, means for moving the members of said series respectively toward and from each other, removable means for supporting a  
85 member between said series in position to be engaged by the members thereof, and means for moving said members to propel the support.

32. In a gripping device, a support, gripping mechanism thereon opening to the bottom, a removable support for holding a traction element within said mechanism, and means on the support for actuating the mechanism to propel the support forward.  
95

In testimony whereof I have affixed my signature, in presence of two witnesses, this 25th day of January, 1905.

GEORGE SHOUME FOUTS.

Witnesses:

M. R. SEELY,  
CELESTE ANSELL.