

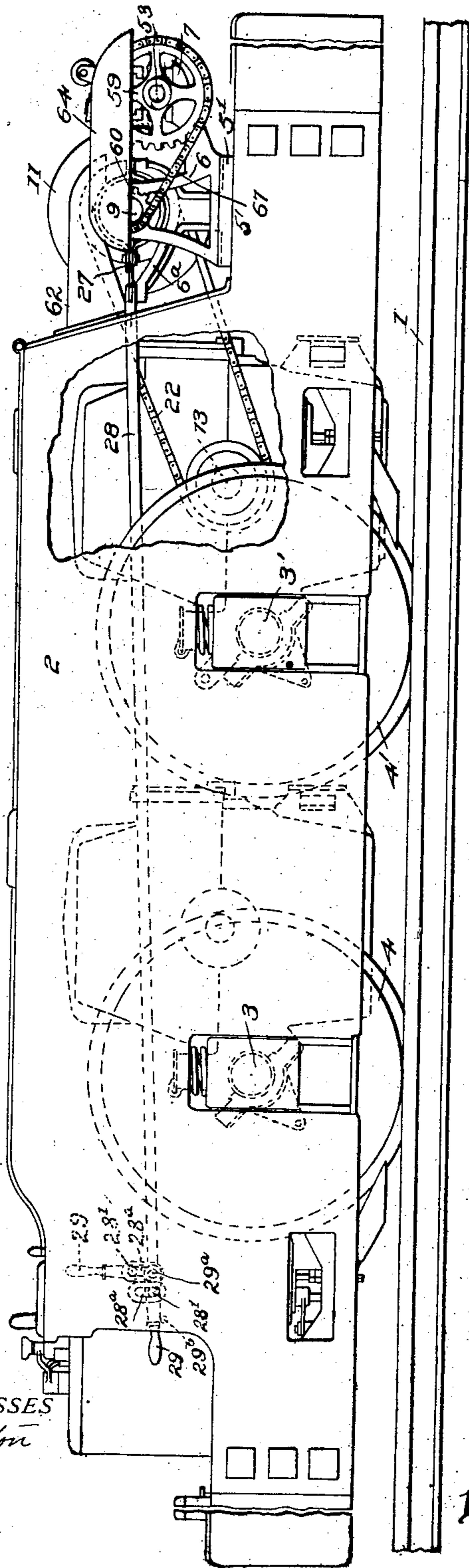
954,475.

F. L. SESSIONS.
ELECTRIC LOCOMOTIVE.
APPLICATION FILED MAR. 1, 1904.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



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Fig. 6.

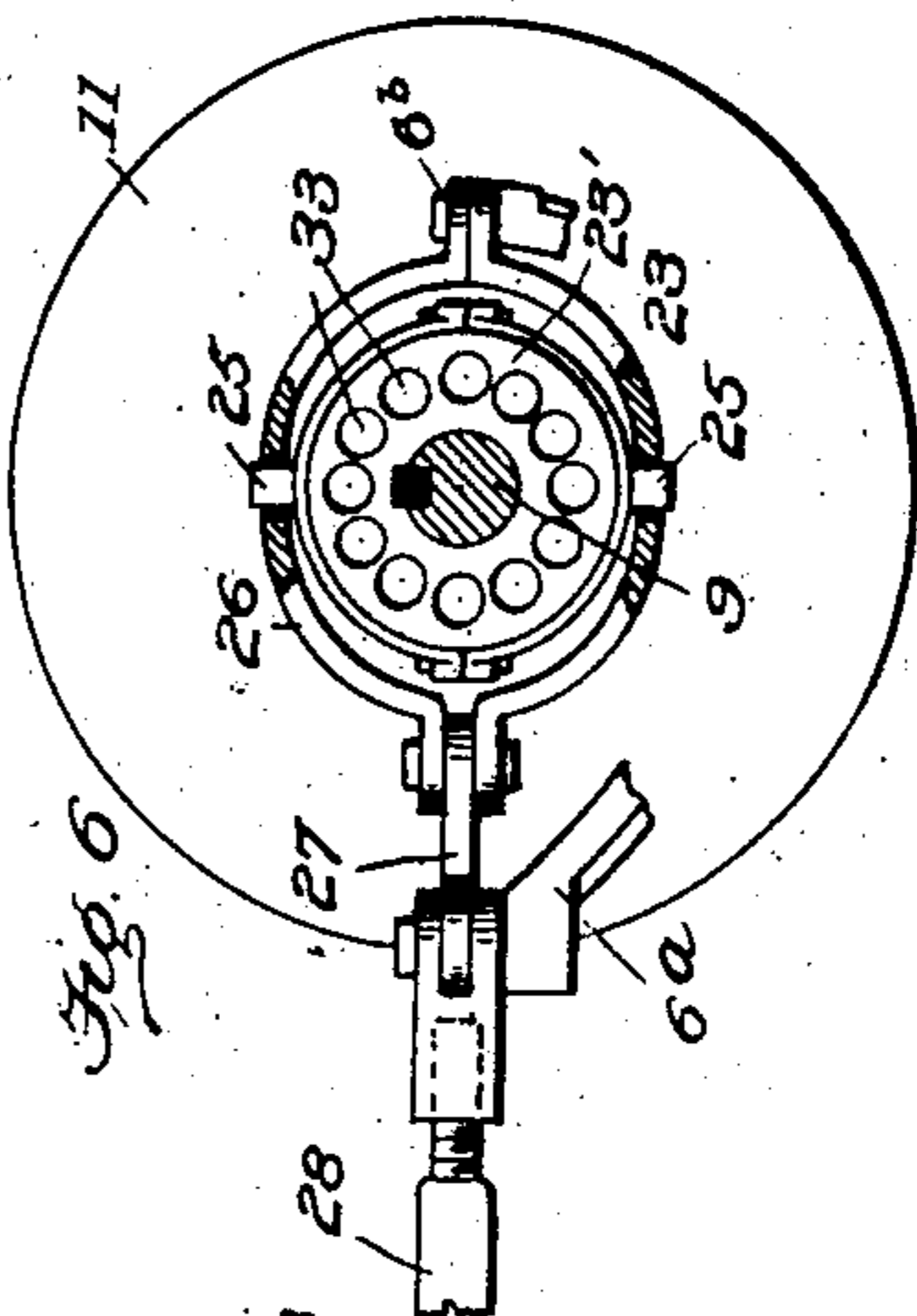


Fig. 5.

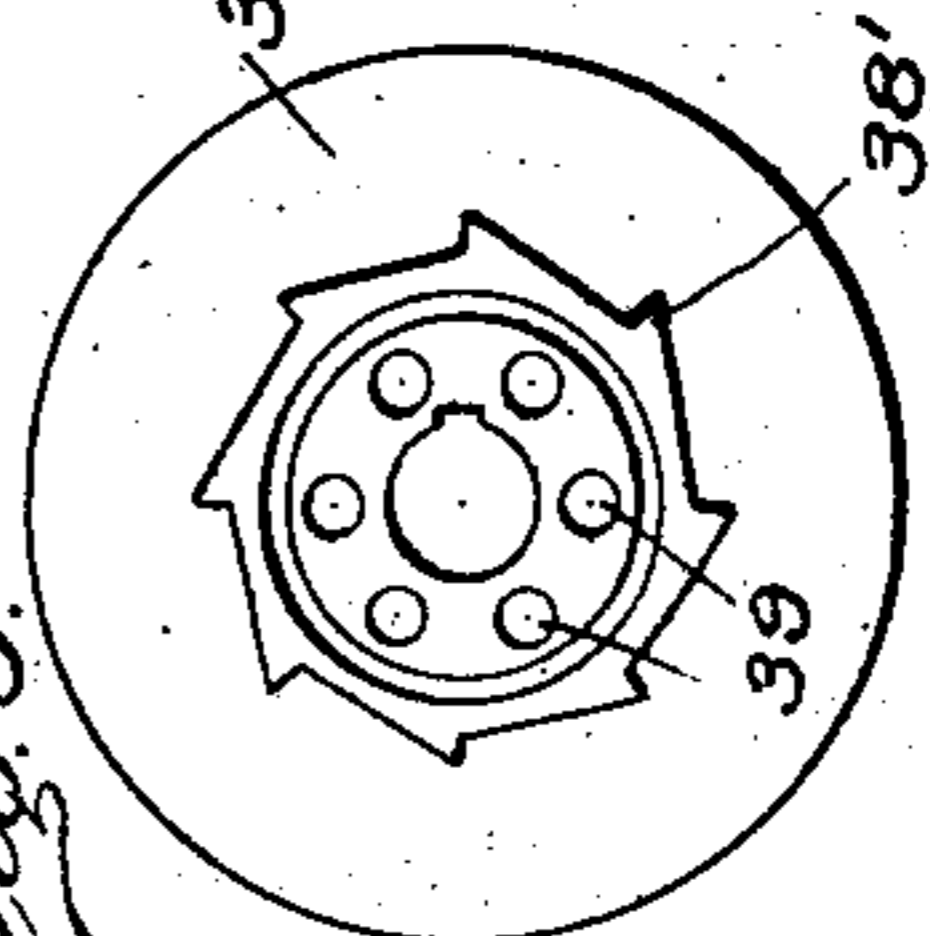
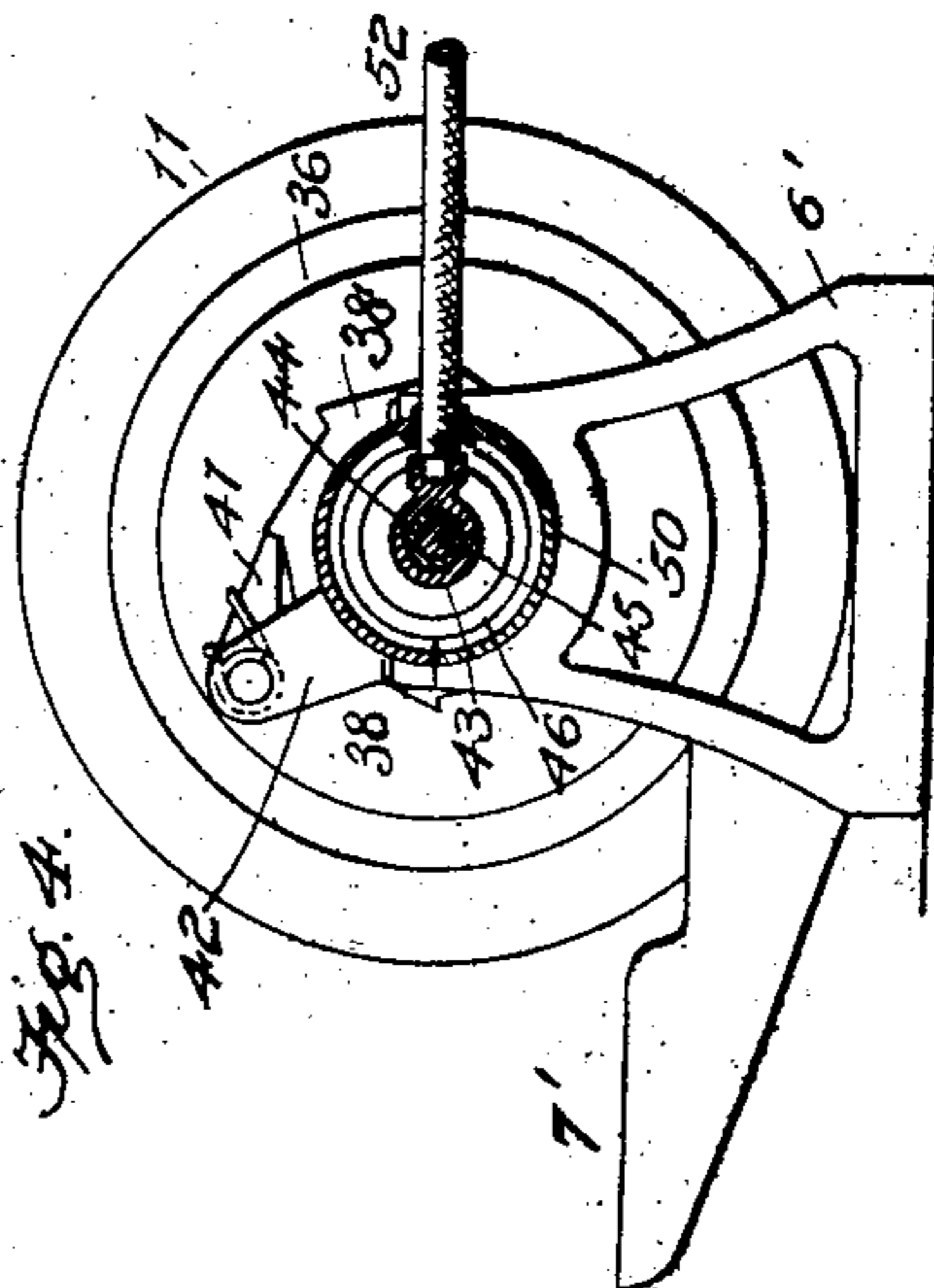


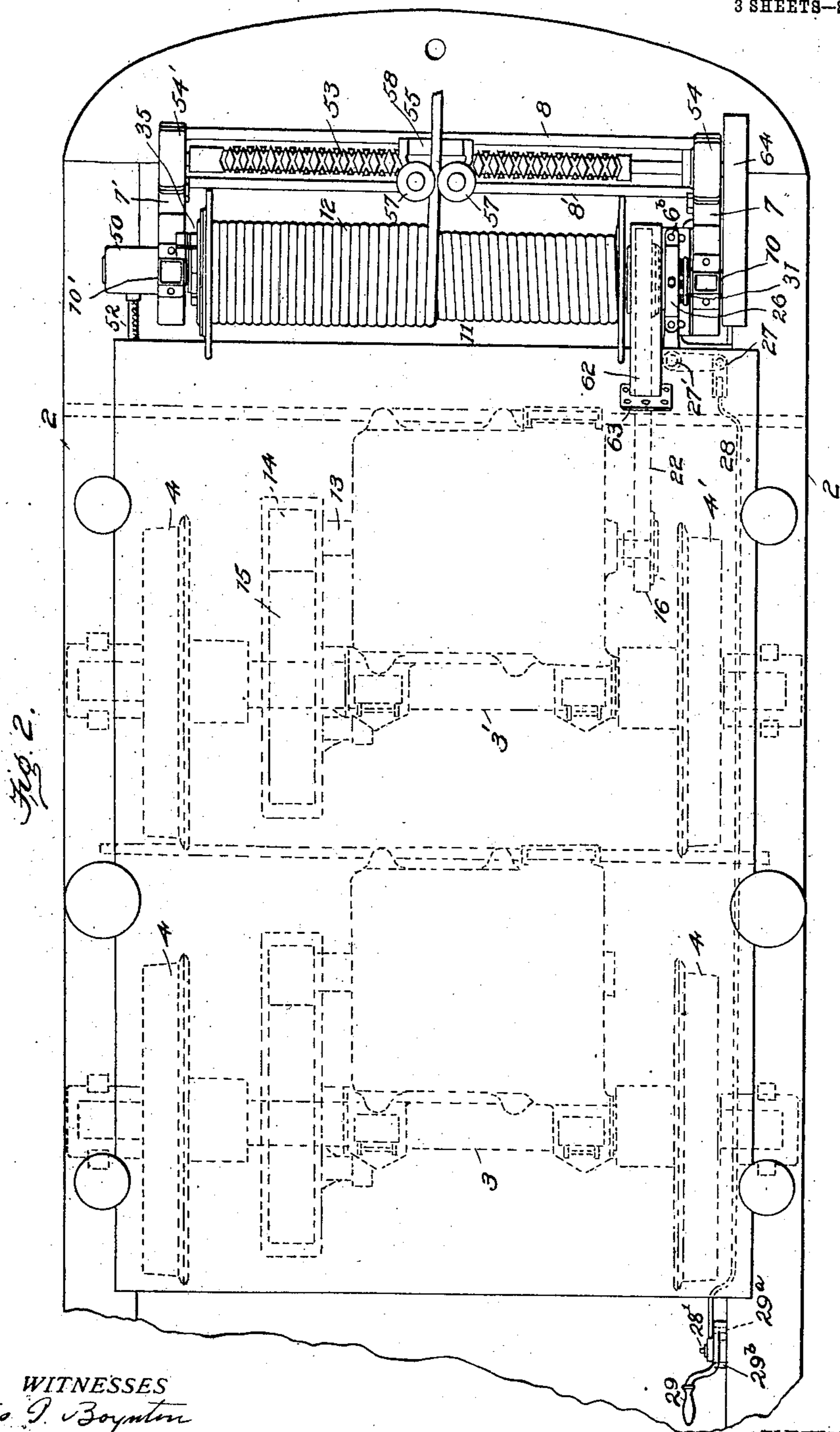
Fig. 4.



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3 SHEETS--SHEET 2.



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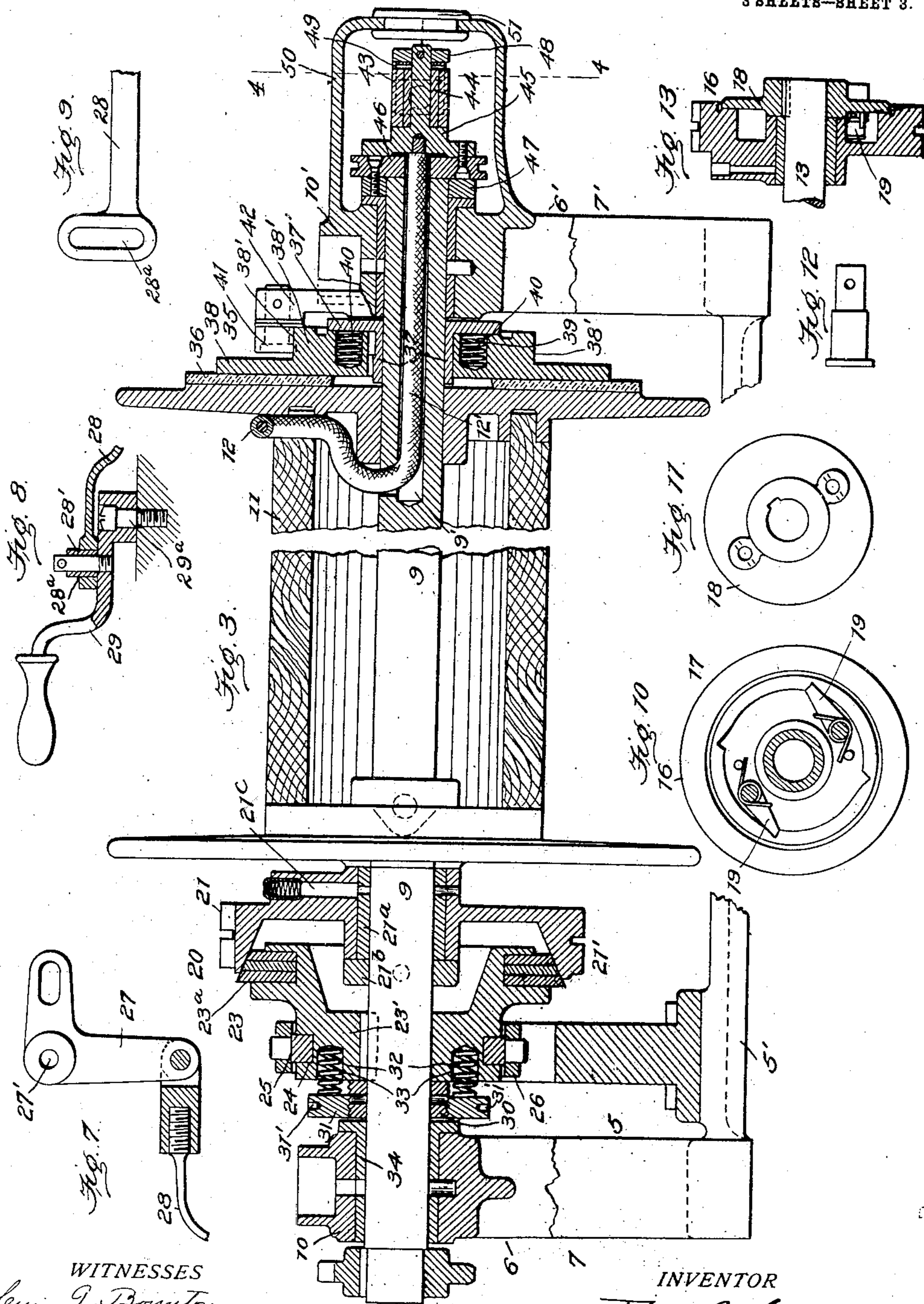
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3 SHEETS—SHEET 3.



WITNESSES
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UNITED STATES PATENT OFFICE.

FRANK L. SESSIONS, OF COLUMBUS, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE JEFFERY MANUFACTURING COMPANY, A CORPORATION OF OHIO.

ELECTRIC LOCOMOTIVE.

954,475.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed March 1, 1904. Serial No. 196,077.

To all whom it may concern:

Be it known that I, FRANK L. SESSIONS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Electric Locomotives, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in electric locomotives, it being particularly adapted for use in connection with locomotives used for hauling cars in mines.

The principal object of the invention is to provide a cable-reel attachment, carried by the locomotive and operated by a movable part thereon. The cable which is wound and unwound on the reeling mechanism affords a supplemental means for conducting current to the motor or motors on the locomotive when it is desired to have the locomotive leave the main track in the main entries of the mine and haul cars to and from rooms leading off from the side entries.

In the drawings—Figure 1 is a side elevation of a locomotive embodying my improvements. Fig. 2 is a top plan view of the same. Fig. 3 is a view partly in side elevation and partly in section of the cable-reel. Fig. 4 is a section on the line 4-4, Fig. 3. Figs. 5 to 13 show details.

In the drawings 1 represents the track-way over which the locomotive is adapted to travel.

2 indicates the frame of the locomotive. It may be of any desired style or shape.

3, 3' indicate the axles of the locomotive and 4, 4' the front and rear track-wheels which are secured to said axles respectively. Preferably the frame is yieldingly mounted upon the said axles.

The motors for driving the axles may be mounted within the frame in any well known manner. For illustration in the drawing I have shown a separate motor for driving each axle. Each motor is mounted at its rear end upon its respective axle and is free to swing bodily relative to the axis of the said axle. At their front ends the motors are supported so as to permit their front ends to move up and down to compensate for the unevenness of travel of the locomotive in any of the ways now known for accomplishing these results.

5 indicates a frame or support for the

cable-reeling mechanism. It is secured to the front end of the locomotive and comprises a bottom plate 5', the standards 6, 6' and the forwardly projecting arms 7, 7', connected together by means of transversely arranged bars 8, 8'.

9 is a reel or drum shaft mounted in bearings 10, 10', carried by the standards 6, 6', respectively.

11 is a drum or reel rigidly secured to the said shaft 9 between its bearings 10, 10'. The shaft 9 is hollow for a portion of its length, as shown at 9', and is adapted to receive the end 12' of the flexible cable 12 which is wound upon the reel.

Heretofore in the construction of cable reeling devices for locomotives of this type, considerable difficulty has been experienced in providing means for operating the reel or drum so that it will properly pay out and wind up the cable as the locomotive is moving away from or approaching the points at which the cable is connected with the electrical circuit. In paying out the cable, in order to prevent back-lashing of the reel, I have found it advisable to interpose a braking mechanism between the reel and some stationary part of the locomotive, and in winding up the cable I have found it particularly desirable to have the cable wound on the reel at a speed greater than the speed of travel of the locomotive, so as to insure that the wheels of the locomotive will not run over and mutilate the cable.

In order to accomplish the above results, namely, of having the reel wind up the cable at a greater rate than the speed of travel of the car, and pay out the cable under tension as the car moves away from the point at which the cable is connected to the main conductor, I arrange to drive the reel shaft from the armature shaft of the front motor and interpose between the armature shaft and the reel shaft a train of power-transmitting drums, including therein a positive clutch and a friction clutch, the positive clutch being adapted to operate only when the locomotive is running toward the paid out cable.

13 indicates the front armature shaft.

14 is a pinion secured to one end thereof and adapted to mesh with a gear wheel 15 which is secured to the front axle 3'. At its other end the armature shaft 13 has mounted upon it a sprocket or drive-wheel 16.

17 indicates as an entirety a positive clutch of the ratchet and pawl type which is interposed between the said shaft 13 and the drive-wheel 16. This clutch 17 comprises the pawl-carrying disk 18 which is keyed to the said shaft 13.

19 are spring-controlled pawls mounted on the pawl carrier and adapted to engage with the walls of teeth arranged on the inner periphery of the rim of the wheel 16. When the locomotive is traveling so as to pay out cable the armature shaft 13 revolves the pawl carrier clockwise and the pawls ride freely over the notches or teeth in the wheel 16, but when the locomotive is running in the opposite direction and it is essential that the cable should be wound up, the said pawls engage with the walls of the notches in the wheel 16 and the said wheel is positively driven.

20 indicates in its entirety a friction clutch interposed between the drum shaft and the armature shaft 13.

21 is the recessed element of the clutch loosely mounted on the shaft 9 immediately adjacent to the drum 11. This element of the clutch is preferably mounted on a sleeve 21^a loose on the said drum shaft and is held against lateral displacement by a collar 21^b secured to the shaft. 21^c indicates an oil duct in the said clutch element 21 through which oil may be supplied to lubricate the bearing surface between the sleeve and the drum shaft. 21' is a sprocket or drive wheel carried by the said clutch element 21 and preferably formed integral therewith.

22 is a driving belt or chain connecting the wheel 21' with the drive wheel 16 on the armature shaft 13.

23 is the movable element of the friction clutch 20. It comprises a sleeve 23' splined to the drum shaft 9 and adapted to rotate therewith and move longitudinally thereon. It carries at its inner end the tapered friction plates 23^a adapted to engage with the walls of the recess in the clutch element 21.

24 is a groove in the periphery of the sleeve 23' adapted to receive the trunnions 25 of the operating yoke 26.

The mechanism for shifting the movable clutch element 23 operating through yoke 26 comprises a bell crank lever 27 pivoted at 27' to an arm 6^a carried by the standard 6. This bell crank lever has one arm pivoted to the inner end of the yoke 26, which is fulcrumed at 6^b on a forwardly extending arm of the standard 6, and its other end pivoted to the forward end of the controlling or shifting rod 28, which extends rearward to the opposite end of the locomotive and is pivoted at 28' to an operating handle 29 mounted on the frame of the locomotive within easy reaching distance of the operator.

30 is a sleeve secured on the drum shaft

9 outside of the clutch element 23. It is externally screw threaded to receive the disk or plate 31 which may be adjusted longitudinally of the said sleeve.

32 indicates springs situated in recesses 33 in the clutch element 23 and bearing at their outer ends against the disk 31. These springs 32 normally tend to hold the clutch element 23 in engagement with the clutch element 21 and the pressure with which this engagement is maintained may be regulated or varied by adjusting the disk 31 longitudinally of the sleeve 30. 31' are apertures in the periphery of the said disk 31 adapted to receive the wrench for turning the said plate.

The clutch controlling handle 29 is fulcrumed at 29^a to the locomotive frame. The pin or roller 28' connecting the handle 29 with the rod 28 is adapted to move up and down in a slot 28^a in the enlarged rear end of the rod 28. When for any reason the springs 32 do not cause the requisite friction between the clutch elements the operator may increase the friction by throwing the lever 29 upward as indicated in dotted lines in Fig. 1 thereby imparting a downward thrust on the rod 28 and pressing the movable element 23 of the clutch more firmly into engagement with the stationary element 21. To separate the clutch elements the lever 29 is swung downward to substantially a horizontal position in which position the rod 28 is drawn rearwardly causing the disengaging of the clutch elements. The stop 29^b limits the throw of the lever 29.

As heretofore stated it is essential that means should be provided for preventing the back-lashing of the cable as it is unwinding from the reel, or in other words to control the unwinding movements of the reel. I provide such a controlling device preferably at the opposite side of the reel from the friction clutch 20.

35 indicates as an entirety a friction clutch for controlling the unwinding movements of the reel.

36 is a friction disk secured to the end of the drum 11. Preferably this friction disk is made of some fibrous material such as wood, wood fiber, or the like.

37 is a sleeve loosely mounted on the shaft 9. 38 is a disk or plate keyed to the said sleeve 37 and adapted to move longitudinally thereof. 39 are a series of recesses or apertures in the said plate 38 adapted to receive the springs 40 which bear against the flange 37' on the sleeve 37 and tend to press the plate 38 into the engagement with the friction disk 36. The plate 38 carries a ratchet wheel 38' preferably formed integral therewith, the teeth of which are adapted to be engaged by a spring controlled pawl 41. This pawl is mounted on

a pin or pivot 41' secured to an arm 42 projecting from the standard 6' of the reel frame 5. The ratchet and pawl are so correlated that when the reel is rotating to unwind the cable the pawl will engage with one of the ratchet teeth and prevent the rotation of the disk or plate 38, whereby the frictional resistance between the said plate and the friction disk 36 will tend to prevent the rotation of the reel or drum. This frictional resistance, however, is only sufficient to maintain a slight tension on the cable and to keep the reel or drum from running too rapidly and allowing the cable to backlash. When the cable is being reeled up the pawl 41 runs over the teeth on the ratchet wheel 38' and the plates 36 and 38 will rotate in the same direction. During this operation frictional resistance will be established between the flange 37' of the sleeve 37 and the inner wall of the bearing 10', but as the surface between these two elements is kept thoroughly lubricated, the frictional resistance between them will be inconsequential.

The current from the cable 12 is taken off to the motors from a collector 43 which is mounted on a sleeve 44 on the terminal plug or block 45 which is secured to the insulating plate 46. This plate 46 is in turn secured to a collar 47 secured to the drum shaft 9. The inner end 12' of the cable 12, which extends through the hollow end 9' of the drum shaft is electrically connected with the plug or terminal 45. 48 is a collar secured to the outer end of this terminal or plug 43, and 49 is a spring pressing against this collar and secured to the collector ring 43. This spring is preferably formed of a metal which is a good conductor of electricity and insures good electrical contact between the collector 43 and the terminal plug 45. Preferably this collector device is arranged within a housing or casing 50 which is carried by the standard 6'. This casing is formed in two parts, an upper and a lower one, separable in horizontal planes. In its end wall opposite to the end of the terminal plug 45 is inserted a wooden plug or disk 51 which is adapted to protect the electrical parts from dirt and to act as an insulating block between the electric terminal and the casing. 52 indicates a conductor electrically connected with the collector 43 and leading from thence to the motors.

Any suitable form of device for causing the cable to be wound uniformly and evenly in strands upon the reel may be employed. For illustration I have shown a cable-guiding device comprising a double threaded rod 53, mounted at its ends in bearings 54 and 54' carried on the forwardly projecting arms 7, 7' of the reel frame 5.

55 is a traveler or carriage adapted to travel back and forth along the double threaded rod 53. This traveler is mounted on the transversely arranged guide bars 8--8' and is provided with anti-friction guide rollers 57--57' between which the cable passes. 58 is another roller carried by the traveler 55 upon which the cable rests.

59 is a sprocket wheel secured to one end of the rod 53 and 60 is a sprocket wheel secured at the same end of the reel shaft.

61 is a chain belt connecting the sprocket wheels 59 and 60.

It will be seen that when the drum shaft is rotated the shaft 53 is also rotated and the traveler 55 is caused to direct the reeling and unreeling movements of the cable.

62 is a shield or casing secured at 63 to the frame of the locomotive and arranged to cover and protect the sprocket-chain 22. 64 is a similar hood or casing secured to the standard 6 of the reel frame and arranged to protect the chain 61.

I am aware of the fact that heretofore it has been proposed to arrange upon the drum shaft means for manually controlling the rotation of the said shaft, but I believe myself to be the first to have provided automatically acting means associated with the drum shaft for preventing the too rapid rotation of the said shaft during the unreeling of the cable.

Applicant is aware of the fact that it has been proposed heretofore to include in the train of operating devices for an electric cable reel a friction clutch one of whose members is movable relative to the other so that the clutch can be disengaged when desired. In the construction referred to the movable element carries a spring which is interposed between a collar or sleeve and the plate or disk which is adapted to be thrown into engagement with the friction surface of the other element of the clutch, the said spring tending to make such engagement a yielding one. In this construction, it is necessary for the operator of the locomotive, during the winding up of the cable reel, to hold said movable element in engagement by keeping his hand on the controlling lever, or by locking the said lever so as to hold the clutch elements in engagement. In applicant's construction it will be noted that the elements of the friction clutch are normally held in yielding engagement with each other and that the lever for controlling the movable element of the clutch is only used when it is desired to throw the elements of the clutch out of engagement or to increase the pressure between the clutch elements. This arrangement of parts in applicant's clutch and the mechanism controlling the same is a decided improvement over the construction in reeling devices of the earlier art, since the positive operation of the reel is insured when the locomotive is moving

forward from the fact that the elements of the friction clutch are normally held in engagement with each other and no manual labor must be performed, such as is necessary in the earlier types of reeling mechanisms, in order to cause the engagement of the elements of the friction clutch when it is desired to have the locomotive move toward the paid out cable. In the earlier types of reeling mechanisms employing such a friction clutch as is hereinbefore referred to, in which the elements of said clutch are not held normally in engagement as in applicant's construction, there is always a possibility of the operator starting his locomotive forward before throwing the elements of the friction clutch into engagement with each other and by so doing running over and mutilating the cable.

20 What I claim is:—

1. In an electric locomotive, the combination with the axles, the track wheels, the frame and the motor, of a longitudinally stationary reel shaft mounted on said frame, the reel on said shaft, the train of power transmitting devices adapted to transmit the energy of the said motor to the reel shaft, and having in said train a friction clutch the elements of which are arranged on said reel shaft, the drive element being longitudinally stationary and the driven element longitudinally movable, a collar fixed upon the shaft and a plurality of springs arranged to hold the elements of said clutch normally in engagement with each other and abutting at one end against the said collar and at the other end against said movably driven element, substantially as set forth.

2. In an electric locomotive, the combination with the axles, the track wheels, the frame and the motor, of an axially stationary reel shaft mounted on said frame, the reel on said shaft, the train of power-transmitting devices interposed between said motor and the reel shaft, and having in said train a friction clutch the elements of which are arranged on said reel shaft, the driving element being axially stationary and the driven element axially movable, a collar adjustably threaded upon the shaft, a plurality of springs arranged to hold the elements of said clutch normally in engagement with each other, and abutting at one end against the said collar and at the other end against the movably driven element, substantially as set forth.

3. In a cable reeling mechanism for an electric locomotive, the combination with the reel shaft and the reel thereon, of a friction clutch the elements of which are arranged on said shaft, and one of which is movable longitudinally of said shaft, a screw-threaded sleeve arranged on said shaft adjacent to said movable clutch element, a disk fitted on the said sleeve and adjustable longitudi-

nally thereof, and a plurality of springs interposed between said disk and said movable clutch element and adapted to hold it normally in engagement with the other element of the clutch, substantially as set forth. 70

4. In a cable reeling mechanism for an electric locomotive, the combination with the reel shaft and the reel secured thereon, of a friction plate secured to the reel, a second plate loosely mounted on the reel shaft adjacent to said friction plate, means for normally holding the said plates in engagement and means for holding the second plate against rotation in one direction, substantially as set forth. 75

5. In a cable reeling mechanism for electric locomotives, the combination with a reel shaft and a reel thereon, of the friction plate carried by said reel, a second plate arranged on said shaft adjacent to said friction plate, means for holding said plates normally in engagement with each other and means for preventing the rotation of one of said plates in one direction, whereby the rotation of the reel in that direction will be opposed by the friction between said plates, substantially as set forth. 80

6. In a cable reeling mechanism for an electric locomotive, the combination with the reel shaft, the bearings therefor and the reel on said shaft, of the friction plate secured to said reel, the flanged sleeve loosely mounted on said reel shaft the disk secured on said sleeve and movable longitudinally thereof, a plurality of springs interposed between said sleeve and said disk and adapted to normally hold said disk in engagement with said friction plate on the reel and means for holding the said disk against rotation in one direction, substantially as set forth. 85

7. In a cable reeling mechanism for an electric locomotive, the combination with the reel shaft, the bearings therefor and the reel on said shaft, of the friction plate secured to said reel, the flanged sleeve loosely mounted on the said reel shaft, the disk secured on said sleeve and movable longitudinally thereof, a plurality of springs interposed between said sleeve and said disk and adapted to normally hold said disk in engagement with said friction plate on the reel, a ratchet carried by said disk, and a pawl arranged to engage with said ratchet to prevent the rotation of said disk in one direction. 90

8. In a cable reeling mechanism for an electric locomotive, the combination with a reel shaft having a hollow end for the reception of the cable, the bearing for said shaft and the reel mounted thereon, of the current collecting device arranged at the said hollowed end of the shaft and comprising a terminal plug insulated from said shaft, and a collector mounted on said plug, substantially as set forth. 95

9. In a cable reeling mechanism for an 100

electric locomotive, the combination with a reel shaft having a hollowed end adapted to receive one end of the cable, a bearing for said shaft and the reel mounted thereon, of a current-collecting device arranged at the hollowed end of the shaft comprising a terminal plug insulated from said shaft, a sleeve on said plug, a collector on said sleeve, and a collar secured to the plug and adapted to position said sleeve and collector thereon, substantially as set forth.

10. In a cable reeling mechanism for an electric locomotive, the combination with a reel shaft having a hollowed end adapted to receive one end of the cable, a bearing for said shaft and the reel mounted thereon, of a current-collecting device arranged at the hollowed end of the shaft, comprising a terminal plug insulated from said shaft, a sleeve on said plug, a collector on said sleeve, a collar secured to said plug, and a spring conductor bearing against said collar and secured to said collector, substantially as set forth.

11. In a cable reeling device for an electric locomotive, the combination with the reel shaft and the reel thereon, of a friction-retarding device associated with said reel and adapted to automatically oppose its rotation in one direction only, substantially as set forth.

12. In a cable reeling mechanism for an electric locomotive, the combination of the reel frame, the reel shaft mounted in bearings therein, the reel on said shaft, and the friction-retarding device associated with said reel, the elements of said friction-retarding device being arranged to automatically rotate with said reel in one direction and to oppose its rotation in the other direction.

13. In a cable reeling mechanism for an electric locomotive, the combination with a reel frame carried by the locomotive, a reel shaft mounted therein and a reel on said shaft, of a friction-retarding device one element of which is carried by and adapted to rotate with said reel and the other element of which is normally held in engagement with said element on the reel and is free to rotate therewith in one direction and is automatically held against rotation therewith in the other direction.

14. In a cable reeling mechanism for an electric locomotive, the combination with the cable reel of the brake tending normally to oppose the rotation of said reel in one direction only, and means for rotating the reel in the opposite direction.

15. In a cable reeling mechanism for an electric locomotive, the combination with a cable reel or drum of power transmitting means for rotating said reel or drum in one direction only, and a brake tending nor-

mally to oppose the rotation of the wheel or drum in the other direction only.

16. In a cable reeling mechanism for an electric locomotive, the combination with a cable reel or drum of means for rotating the said reel or drum to effect the winding up of the cable, and means tending normally to oppose the rotation of the said drum or reel only in the direction for paying out the cable.

17. In a cable reeling mechanism for an electric locomotive, the combination with a cable reel or drum, of means located at one end of said reel or drum for effecting its rotation, and means located at the opposite end of said drum for opposing its rotation.

18. In a cable reeling mechanism for electric locomotives, the combination with the cable reel or drum, of means located at one end of said reel or drum adapted to effect its rotation in one direction, and means arranged at the opposite end of said drum adapted to normally oppose its rotation in the opposite direction.

19. In a cable reeling mechanism for an electric locomotive, the combination with a cable reel or drum, and the cable, of the current-collecting device arranged at one end of said drum and comprising a terminal plug electrically connected to one end of said cable, and a tubular collector mounted on said plug.

20. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted electric cable reel, of a train of power transmitting devices for rotating the said reel interposed between it and a rotating shaft and including a friction clutch the elements of which are normally held in forced contact with each other by springs acting longitudinally of the axis about which the elements of said friction clutch rotate.

21. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted electric cable reel, of a train of power transmitting devices for rotating the said reel interposed between it and a rotating shaft and including a friction clutch the elements of which are normally held in forced contact with each other by springs rotating with one element of said clutch.

22. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted electric cable reel and a power transmitting mechanism for rotating said reel, of a pair of friction disks normally held in forced contact with each other, and one carried by the reel and the other arranged to rotate with the first one when the reel rotates to wind up cable and to remain stationary when the reel rotates cable paying off direction.

23. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted electric cable reel, of a pair of frictionally engaging elements connected to said reel to rotate together therewith in cable winding up direction, and means for holding one of said frictional elements stationary when the reel is rotated in cable paying off direction.

24. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted cable reel, of automatically acting energy dissipating means for opposing the rotation of the said reel only in the direction in which it pays off cable.

25. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted cable reel, of automatically acting means for opposing the rotation of the said reel only in the direction in which it pays off cable, and a second additional means for rotating said reel in cable winding up direction.

26. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted cable reel; of automatically acting means for opposing the rotation of the said reel only in the direction in which it pays off cable, and power transmit-

ting mechanism for rotating said reel in cable winding up direction including a friction clutch.

27. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted cable reel, of automatically acting means for opposing the rotation of the said reel only in the direction in which it pays off cable, and power transmitting means for rotating said reel in cable winding up direction including a friction clutch and a positive clutch.

28. In a cable reeling mechanism for an electric locomotive, the combination with a suitably mounted cable reel, of automatically acting means for opposing the rotation of the said reel only in the direction in which it pays off cable, and power transmitting means for rotating said reel in cable winding up direction including a friction clutch and a positive clutch automatically acting to transmit power only in one direction of rotation.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK L. SESSIONS.

Witnesses:

CURTIS C. MARSHALL,
W. E. BEBB.