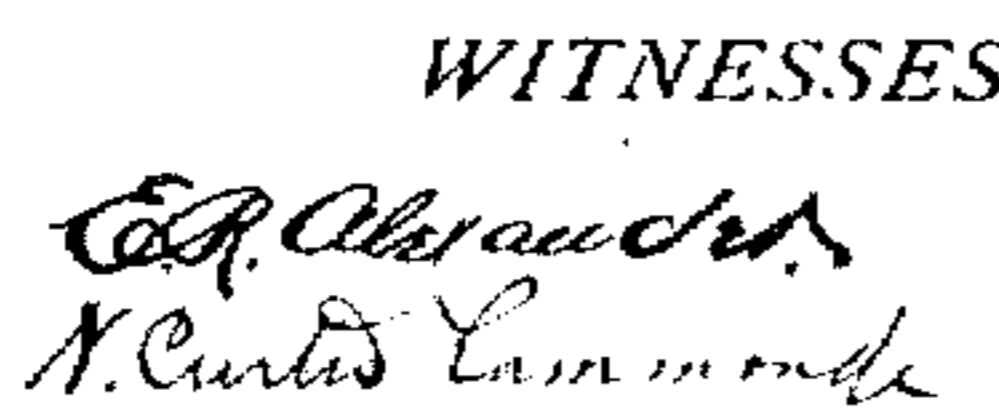


APPLICATION FILED OCT. 24, 1903. RENEWED DEC. 9, 1905.

Patented Mar. 23, 1909.

2 SHEETS—SHEET 1.



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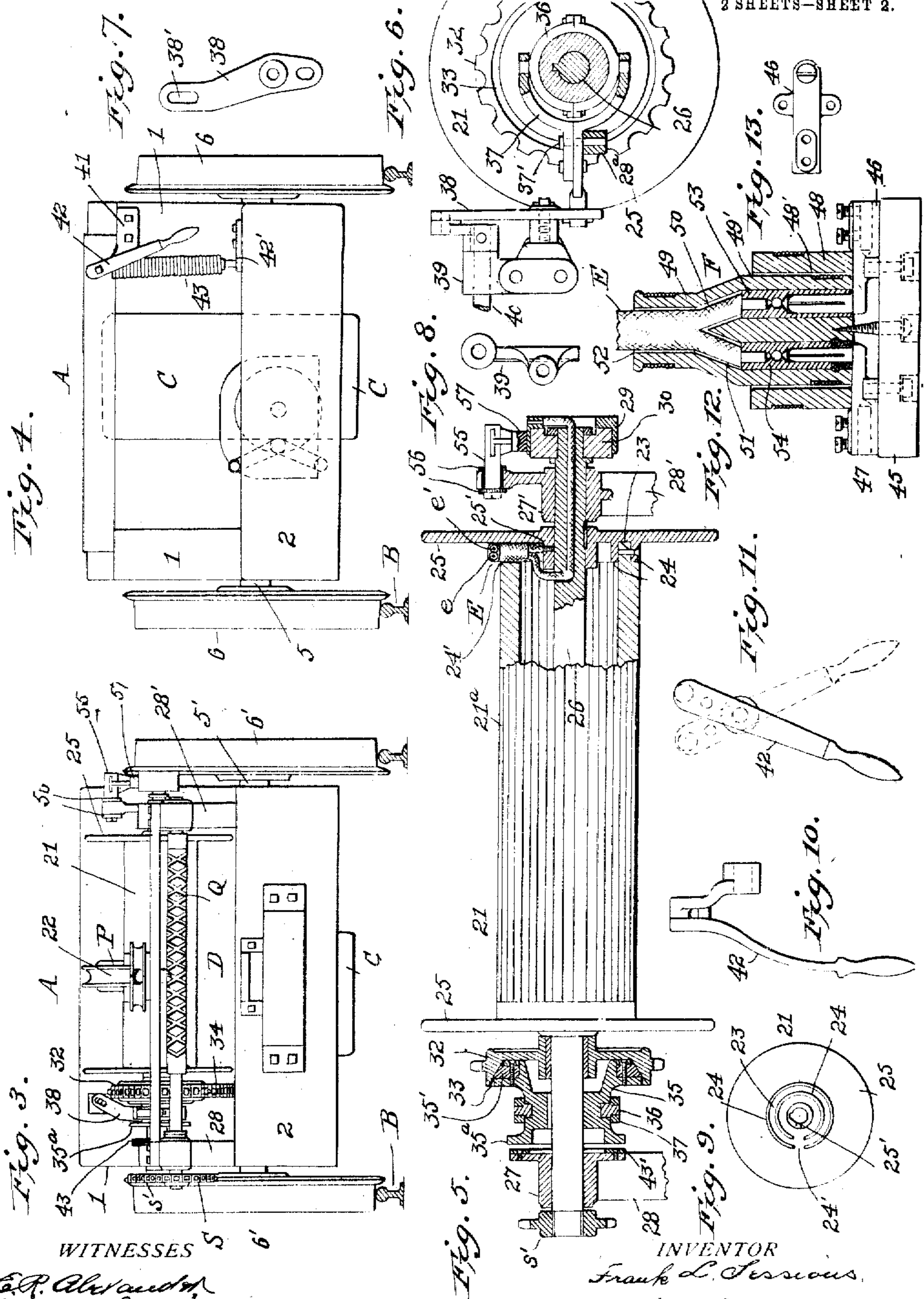
F. L. SESSIONS.
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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

ELECTRIC LOCOMOTIVE.

No. 915,895.

Specification of Letters Patent.

Patented March 23, 1909.

Application filed October 24, 1903, Serial No. 178,372. Renewed December 9, 1905. Serial No. 291,117.

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 devices by which an electric locomotive or other vehicle can be kept in electrical connection with a fixed conductor as it moves to and from said fixed conductor.

A mechanism of this sort is particularly adapted for use in electrical traction systems, such, for example, as are used in coal mines for gathering cars from different parts of the system and also for distributing them from point to point, without the necessity of equipping the system throughout its sections or branches with an expensive electrical equipment such as is necessary where the current for the locomotives is supplied entirely through fixed conductors.

In the drawings—Figure 1 is a side elevation, partly in section, of a mechanism embodying my improvements. Fig. 2 is a plan of the same with the cover of the vehicle removed. Fig. 3 is an end elevation looking from the right in Fig. 1. Fig. 4 is an end elevation looking from the left in Fig. 1. Figs. 5 to 16 show details.

In the drawings, I have selected, as a means of illustrating one of the ways in which my improvements can be employed, a locomotive particularly adapted for use in mines.

In an earlier patent No. 821,317, dated May 22, 1906, I have shown the manner in which coal mine locomotives of this character may be moved and guided from place to place in the mine, and reference may be made thereto for corresponding matters applicable to the present case.

Herein, A indicates the locomotive as an entirety, and B the track along which it is adapted to move.

C represents the motor on the car, and D the winding or gathering mechanism by which the flexible cable E can be wound up or paid out, as desired.

F is the fixed terminal or socket to which one end of the said flexible conductor may be connected.

The frame of the locomotive A comprises the side plates 1—1 and the end plates 2—2.

The side plates 1 of the frame are cut away at 3—3' to receive the bearing blocks 4 in which are mounted the axles 5—5'. These axles have secured to them the track wheels 6—6'.

7—7' are recesses or sockets in the side plates 1.

8—8 are springs seated in said sockets and having their lower ends bearing against the bearing blocks 4 and adapted to provide a yielding support for the frame on the said axles.

The motor C has its front end pivotally mounted on the axle 5', as indicated at c, c. At its other end the said motor has a recess between the projections or lugs c', c'.

9 is a transverse bar having its ends seated in notches 10 in the plates 1 of the frame. Attached to this transverse bar 9 is a depending arm or bar 10' having at its lower end the offset portion 10^a which is adapted to serve as a supporting and holding arm for the rear end of the motor C by engaging with the lugs c' c' thereof. By thus pivoting the motor at one end and supporting it loosely at its other end, I provide a flexibility of mounting of the motor which is very desirable in mechanisms of this character. Furthermore, in view of the fact that the axle 5' is mounted yieldingly with respect to the locomotive frame, the motor may also be said to be mounted yieldingly relative to the said frame. The armature shaft 11 extends transversely of the frame, as shown, and is provided at one end with the pinion 12 which is adapted to mesh with the gear wheel 13 rigidly secured to the axle 5'. 14 is a sprocket wheel likewise rigidly secured to the axle 5'. 15 is a sprocket wheel rigidly secured to the axle 5 in longitudinal alinement with the sprocket wheel 14. A drive chain 16 connects these two sprocket wheels and serves to transmit power from one to the other so that the axles 5—5' are driven uniformly and synchronously.

17 is an arm or plate secured at its inner end between the bearing blocks for the motor C on the axle 5'. At its outer end this plate 17 has bearings 17'—17' in which the counter shaft 18 is mounted. 19 is the pinion on one end of said shaft adapted to mesh with the gear wheel 13. At its other end this shaft has loosely mounted upon it a sprocket wheel 20. A rack and pawl mechanism is interposed between this shaft and the sprocket wheel so as to positively rotate the latter

when the locomotive is running in one direction and permit it to revolve independently of the said shaft when the locomotive is moving in the opposite direction.

5 In Figs. 14, 15, and 16, I have shown a suitable ratchet and pawl mechanism. The inner end of the sprocket wheel 20 has the inwardly projecting ratchet teeth 20^a. 20^b is a pawl carrier rigidly secured to the shaft 18.
10 The two spring controlled pawls 20^c mounted in this carrier are adapted to engage with the teeth 20^a on the sprocket wheel when the rotation of the shaft 18 is anti-clockwise and to run freely over them when the shaft is rotating clockwise.

The winding or reeling mechanism F comprises a transversely mounted drum 21 and a guiding device for the flexible conductor, indicated as an entirety by 22, and adapted to
20 automatically guide the electrical cable so as to wind it in even coils upon the drum and make it occupy the least space possible and not be injured by other parts of the locomotive which might result if the coils were permitted to pile up one upon another unevenly.
25 The drum 21 consists of a wooden shell or cylinder 21^a fitted in annular grooves 23 in bosses 24 on the drum flanges 25.

26 is a drum shaft mounted in the bearings 30 27—27' carried by the standards 28—28' rigidly secured to the frame of the locomotive at the side thereof. One of the flanges 25 of the drum has a radially disposed passage-way 24' through its boss 24 and a screw threaded aperture 25' in the hub of said flange. The drum shaft 26 is keyed to the flanges 25. It has a passage-way leading from one end thereof and opening through the surface of the shaft at a point between the flanges of
40 the drum. The flexible cable E preferably consists of sections of wire *e*—*e'* insulated from each other and bound together, one of said parts serving as a positive and the other as a negative conductor. This conductor E
45 is carried through the passage-way 24' in one of the flanges 25 and has its negative wire *e'* secured in the threaded aperture 25' in the flange. The positive wire *e* is extended through the passage-way in the shaft 26 and
50 is electrically connected with a collector ring 29 secured to the end of the shaft and insulated therefrom. This insulation of the collector ring 29 is accomplished in the following manner. 30 is a wooden drum fitted
55 into said collector ring and rigidly secured on the said shaft 26. At the other end of the shaft 26 from the collector ring and loosely mounted thereon is a sprocket wheel 32 having its outer face recessed, as indicated at 33, to form one element of a friction clutch. 34
60 is a chain connecting the said sprocket wheel 33 with the sprocket wheel 20 on the shaft 18.

35 is a sleeve splined to the shaft 26. It has secured to its inner end the friction ring
65 35' which forms the second element of the

aforementioned friction clutch. At its other end the sleeve 35 carries a flange 35^a for a purpose to be hereinafter described.

36 is a collar fitted to the sleeve 35. It has pivoted to it the clutch lever 37 which extends toward the operator's platform on the locomotive, and is itself pivotally mounted at 37' on an arm 28^a of the standard 28. The train of transmitting devices through which power is applied to shift the lever 37
75 comprises an arm or lever 38 pivotally connected to a block or bearing plate 39 which is rigidly secured to the frame of the locomotive. The outer end of the lever 37 extends through an oval aperture in the lower
80 end of the lever 38.

40 is a rock shaft mounted at its forward end in the bearing block 39 and extending therethrough and through the aperture 38' in the upper end of the lever 38. At its rear
85 end the said shaft is mounted in a bearing 41 likewise secured to the frame of the locomotive.

42 is a hand operating lever rigidly secured to the shaft 40.

43 is a double acting spring having one end attached to an arm of the lever and the other end secured at 42' to the frame of the locomotive. The points of attachment of the spring to the lever and to the frame are so
90 related to the axis of the shaft 40 that the spring will exert a holding draft on the lever 42 when its point of connection thereto is located on either side of the axis of the shaft 40.

In order to provide a brake for the drum so that the speed of its rotation can be controlled from the operator's platform, I secure the friction plate 43' to the inner face of the bearing 27. When it is desired to stop the
100 rotation of the shaft 26 the operator can shift the lever 42 so as to bring the flange 35^a on the sleeve 35 into engagement with the said friction plate 43' which will cause the desired result.

In an earlier application, Serial No. 149,667, filed by me March 24, 1903, I have shown a device for guiding the flexible conductor as it is wound up and paid out by the drum, and reference may be made thereto
110 for an understanding of corresponding matters applicable to the present case, and in this application the parts will be indicated in the way followed in said other earlier application. Herein, Q represents the double-threaded shaft, P the traveler thereon through which the flexible cable extends, *s* the sprocket wheel on the drum shaft, *s'* the sprocket wheel on the shaft Q, and S the chain engaging the said sprockets.

The fixed terminal or socket F is of the peculiar construction shown in Figs. 1, 12 and 13. 45 is a base plate preferably made of slate which may be secured to the walls of the mine entry at any desired point. 46 is
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the positive plug secured to the plate 45 and adapted to be connected with the positive line of the current supply system, and 47 is the negative plug secured to the plate 45 and adapted to be connected with the negative line of the current circuit. 48 is a cylindrical plug protector made of insulating material, preferably wood, secured to the plate 45 and having the socket 48'. The enlarged end 49' of the socket 49 is adapted to enter into said socket 48'. The shell of this socket 49 which is made of insulating material, has the passage-ways 50—51 which lead inward from its outer end and merge into an enlarged passage-way 52, at its other end. The cable E is inserted into the passage-way 52 and its positive and negative wires are then separated, the former leading through the passage-way 50 to the metallic socket 53 secured in said passage and the negative wire leading to the metallic socket 54 secured in the passage-way 51. These sockets are adapted to establish electrical connection between the plugs 46—47 and the positive and negative wires of the electrical conductor E, respectively. The parts of the plugs 46—47 which fit into sockets 53—54 are split, as shown, and the diameter of the plug is slightly larger than the diameter of its socket so that a tight fit is secured when the socket is pressed over the plug. 55 is a brush holder secured to the standard 27'. This holder is insulated from the standard, as indicated at 56. 57 is the brush or wiper carried by said holder and adapted to electrically contact with the collector ring 29. A conductor 58 leads from the binding post of the brush holder to the positive terminal of the motor.

The course of the current is as follows. From the positive plug 46 it flows through the positive wire *e* of the flexible cable E to the collector ring 29 and then through the brush 57 to the motor. The negative terminal of the motor is electrically connected to the frame of the machine so that the return circuit for the current is through the frame of the machine to the shaft 26, thence through the flange 25 and the negative wire *e'* to the negative terminal 47.

The gearing between the car axle and the countershaft which carries the reel is proportioned so as to cause the reel to wind up the cable faster than the locomotive travels thereby insuring that the locomotive will not run over the cable. The ratchet and pawl mechanism between the axle and the sprocket wheel 20 is constructed to cause the rotation of the said wheel when the locomotive is running toward the cable or when winding up the cable, and to permit the independent rotation of the said sprocket relative to the car axle when the cable is paid out. If the sprocket wheel 20 was secured to the shaft 18 or in other words directly connected at all times to the car

axle, since the reel is arranged to wind up the cable faster than the locomotive travels, it would also pay it out or unwind it with the same linear speed which would be too rapidly for a satisfactory disposition of the cable for rewinding.

By interposing a friction clutch between the drum shaft and one of the car axles and having one of the elements of said clutch directly connected so as to rotate with said axle when the locomotive is traveling toward the unwound cable, I insure that the said element will be positively driven. The shifting element of the clutch I prefer to have splined to the shaft about the axis of which the other element is free to rotate and upon which shaft it is loosely mounted, so that when the former element is shifted in one direction it will engage with the rotary element and cause the shaft to rotate, while when shifted a sufficient distance in the opposite direction, by engaging with a stationary surface, it will operate as a brake for the said shaft.

It has been proposed to construct a cable reeling mechanism for electric locomotives comprising a reel shaft, a reel secured thereon and a train of power transmitting devices connecting the said shaft to the motor on the car, and having a friction clutch in said train, one element of which is provided by a flange on the reel drum and the other element of which is carried by a sprocket wheel loosely mounted on the reel shaft and adapted to be shifted longitudinally thereof. The shifting of said sprocket wheel tends to throw the power transmitting devices out of alignment and to interfere with the efficiency of the frictional resistance between the elements of the clutch. Applicant is the first to provide a construction in which the cable is positively wound, when the locomotive is running toward the cable, at a speed greater than the speed of travel of the locomotive and to automatically permit the cable to unreel at a slower speed.

The ratchet and pawl mechanism not only serves to cause the positive rotation of the reel when the locomotive is traveling in one direction but the engagement of the spring-held pawls with the teeth of the ratchet serve to prevent any backlash of the cable as the locomotive runs in the opposite direction.

What I claim is:—

1. In a cable reeling mechanism for an electric locomotive, the combination with the locomotive car, the electric motor, and a shaft driven thereby, of a reel shaft, a reel supported on said shaft, and a train of power transmitting devices connecting said shafts having a friction clutch and a positive clutch in said train, means for throwing the elements of said friction clutch into and out of engagement with each other, and a friction-retarding device for controlling the cable-un-

winding movements of said reel, substantially as set forth.

2. In a cable reeling mechanism for electric locomotives, the combination with the locomotive car, the electric motor, and a shaft driven thereby, of a reel shaft, a reel supported thereon, and driving mechanism connecting said shafts having friction devices permitting slippage of elements of the driving mechanism relative to each other and a clutch for driving the reel shaft positively in one direction only, means for throwing the elements of said friction drive into and out of engagement with each other, and a friction-retarding device for controlling the unwinding movements of the reel, substantially as set forth.

3. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive car, an electric motor thereon, and a cable reel mounted on the car, of a train of power transmitting devices interposed between said reel and a revolving part on the car and having in said train a friction clutch both the elements of which are mounted on the axis of said reel, the one being connected with said rotatable part on the car and held against lateral movement relative to said reel, and the other being connected to the reel and movable into and out of engagement with the said first described element, means for throwing the elements of said friction clutch into and out of engagement with each other, and means for holding said clutch elements in forced contact with each other.

4. In a cable reeling mechanism for electric locomotives, the combination of a locomotive car, a positively driven shaft thereon, a reel shaft, a reel supported on said shaft, a sprocket wheel loosely mounted on the reel shaft, carrying one element of a friction clutch, a second friction clutch element splined to said reel shaft independent of said sprocket and reel, means for sliding the last mentioned friction clutch element longitudinally of the reel shaft and means connecting said sprocket wheel with said positively driven shaft, substantially as set forth.

5. In a cable reeling mechanism for electric locomotives, the combination with a locomotive car, and an electric motor thereon, of a reel shaft, a reel rigidly secured thereto, two friction clutch elements supported on said shaft independently of the reel, one mounted loosely upon said shaft and the other one splined to the shaft, a sprocket wheel secured to the loosely mounted element, power transmitting devices connecting said sprocket wheel with a rotating part on the car, and means for holding the elements of said clutch in forced contact with each other.

6. In a cable reeling mechanism for electric locomotives, the combination with the locomotive car, the electric motor, and a

shaft driven by the motor, of a reel shaft, a reel rigidly secured thereon, two clutch elements on said shaft arranged independently of the reel, the first adapted to rotate independently of the shaft and reel, the second adapted to rotate with the shaft, means for throwing the second element into and out of engagement with the first and means connecting said first described elements to the said driven shaft, substantially as set forth.

7. In a cable reeling mechanism for electric locomotives, the combination with the locomotive car, the electric motor, and a shaft driven thereby, of a reel shaft, a reel supported thereon, two friction clutch elements on said shaft independent of the reel, the first adapted to rotate independently of the shaft and reel, the second adapted to rotate with the shaft independently of the first element, means for throwing the said friction elements into or out of engagement with each other and two brake elements, one stationary on the frame, and the other rotary with the reel shaft, and means connecting said first described clutch element with said driven shaft, substantially as set forth.

8. In a cable reeling mechanism for electric locomotives the combination with the locomotive car, the electric motor, and a shaft driven thereby, of a reel shaft, a reel supported thereby, a train of power transmitting devices connecting said shafts having a friction clutch in said train, means for opening and closing said clutch, and devices for holding the clutch controlling means yieldingly in various positions of adjustment, substantially as set forth.

9. In a cable reeling mechanism for electric locomotives, the combination with the locomotive car, the electric motor, and a shaft driven thereby, of a reel shaft, a reel supported thereby, a train of power transmitting devices connecting said shafts having a friction clutch in said train, means for opening and closing said clutch, and a double acting spring for holding the clutch controlling means, substantially as set forth.

10. In a cable reeling mechanism for electric locomotives, the combination with the locomotive car, the electric motor, and a sprocket wheel loosely mounted on said shaft, a clutch adapted to cause the rotation of said sprocket wheel with the shaft in one direction and to permit its independent rotation when the shaft is rotating in the opposite direction, a countershaft, a winding reel supported thereon, and a train of power transmitting devices connecting said shaft with the aforesaid sprocket wheel having a friction clutch in the train, substantially as set forth.

11. In a cable reeling mechanism for electric locomotives, the combination with the locomotive car, the electric motor, and the shaft driven thereby, of a sprocket wheel

loosely mounted on said shaft, a clutch interposed between said shaft and sprocket wheel, a reel shaft, a reel or drum rigidly secured to the shaft, a sprocket wheel loosely mounted on said shaft, a sprocket chain connecting the aforesaid sprocket wheels, a friction clutch element carried by the sprocket wheel on the reel shaft, a sleeve splined upon said shaft, a second friction clutch element carried by the sleeve, and means for shifting the sleeve independently of the sprocket wheel on the reel shaft, substantially as set forth.

12. In a cable reeling mechanism for electric locomotives, the combination with the locomotive car of the reel frame secured to the car, the cable guiding mechanism, the framework for the guiding mechanism extending backward from the reel frame and situated in a relatively elevated position whereby the cable in winding or unwinding is guided to or from the top part of the drum, the electric motor on the car, the gearing extending from the motor to the drum shaft, and the friction clutch for connecting the gearing to the drum shaft, substantially as set forth.

13. In a cable reeling mechanism for electric locomotives, the combination with the locomotive car, of the reel frame secured to the car, the cable guiding mechanism, the reel shaft, the reel secured to the shaft, the power transmitting mechanism connecting said guiding mechanism with said shaft, the sprocket wheel loosely mounted on said shaft and carrying one element of a friction clutch, the second element of said clutch splined to said shaft and movable relative to said sprocket wheel and reel, and the train of power transmitting devices connecting the motor on the car with said sprocket wheel, substantially as set forth.

14. In a cable reeling mechanism for an electric locomotive, the combination with a car frame, an electric motor thereon, and a shaft driven by said motor, of a reel, and a train of power transmitting devices connecting the said shaft with said reel and having in said train a friction clutch and a positive clutch, and means for throwing the elements of said friction clutch into and out of engagement with each other.

15. In a cable reeling mechanism for an electric locomotive, the combination with a car frame, an electric motor thereon, and a shaft driven by said motor, of a reel, a train of power transmitting devices connecting the said shaft with said reel and having in said train a friction clutch and an automatically acting positive clutch, and means for throwing the elements of said friction clutch into and out of engagement with each other.

16. In a cable reeling mechanism for an electric locomotive, the combination with a car frame, an electric motor thereon, and a

shaft driven by said motor, of a reel, a train of power transmitting devices connecting the said shaft with said reel and having in said train a friction clutch and a positive clutch automatically acting to drive said reel in one direction only and means for throwing the elements of said friction clutch into and out of engagement with each other.

17. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive frame, a motor thereon, and a rotatable shaft driven by said motor, of a cable reel mounted on said frame, a train of power transmitting devices connecting said shaft with said reel and having in said train a friction clutch and a ratchet and pawl mechanism, and means for moving one element of said friction clutch into or out of engagement with the other one.

18. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive frame, a motor thereon and a shaft on the frame driven by the motor, of a cable reel mounted on said frame, a train of power transmitting devices connecting said shaft with said reel and having in said train a friction clutch and mechanism adapted to cause the rotation together of said shaft and reel in one direction and to permit the rotation of said shaft independent of the reel in the other direction, a retarding device for the reel, and means for throwing one element of said friction clutch out of engagement with the other one and into engagement with the said retarding device.

19. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive car having a power driven rotatable shaft therein, of a cable reel mounted on said car, a sprocket wheel mounted on the same axis with said reel and fixed against lateral movement relative to said reel, a friction clutch interposed between said sprocket wheel and said reel and having one element movable relative to the other one, means for throwing the elements of said friction clutch into and out of engagement with each other, and power transmitting mechanism connecting said sprocket wheel with said rotatable shaft.

20. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive car, an electric motor thereon, and a shaft driven by the motor, of a cable reel mounted on said car, a train of power transmitting devices interposed between said shaft and said reel and having in said train a friction clutch, both elements of which are mounted on the axis of said reel and one of which carries a sprocket wheel and is held against lateral movement relative to said reel and the other of which is movable into and out of engagement with the said first described element, and means for yieldingly holding said clutch elements together.

21. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive car, an electric motor thereon, and a shaft driven by the motor, of a cable reel mounted on said car, a train of power transmitting devices interposed between said shaft and said reel and having in said train a friction clutch, both elements of which are mounted on the axis of said reel and one of which carries a sprocket wheel and is held against lateral movement relative to said reel and the other of which is movable into and out of engagement with the said first described element, and means for holding said clutch elements in forced engagement with each other.

22. In a cable reeling mechanism for an electric locomotive, the combination with a motor car, an electric motor thereon and a shaft driven by said motor, of a cable reel mounted on said car, a friction clutch, the elements of which are mounted on the axis of said reel and one of which is laterally movable relative to said reel and adapted always to rotate therewith, and the other of which is fixed against lateral movement relative to said reel and may rotate independently thereof, means for connecting the last described friction clutch element to said driven shaft, and a friction retarding mechanism for retarding the rotation of said laterally movable clutch element.

23. In a cable reeling mechanism for an electric locomotive, the combination with a car truck, an electric motor thereon, and a shaft driven by said motor, of a wheel loosely mounted on said shaft, means for causing said wheel to rotate with the shaft in one direction and for permitting the said shaft to rotate in the opposite direction without imparting motion to said wheel, a counter shaft, a cable reel supported by said counter shaft, and power transmitting means connecting said counter shaft with the aforesaid wheel.

24. In a cable reeling mechanism for an electric locomotive, the combination with a car truck, an electric motor thereon, and a shaft driven by said motor, of a wheel loosely mounted on said shaft, means for causing said wheel to rotate with the shaft in one direction and for permitting the said shaft to rotate in the opposite direction without imparting motion to said wheel, a cable reel mounted on said car and a train of power transmitting devices interposed between said reel and said loosely mounted wheel and having in said train a clutch, the elements of which may be thrown into and out of engagement at will and means for throwing the elements of said clutch into and out of engagement with each other.

25. In a cable reeling mechanism for an electric locomotive, the combination of a car truck, an electric motor thereon, and a shaft

driven by said motor, of a wheel loosely mounted on said shaft, means for causing said wheel to rotate with the shaft in one direction and for permitting the said shaft to rotate in the opposite direction without imparting motion to said wheel, a cable reel mounted on said car and a train of power transmitting devices interposed between said reel and said loosely mounted wheel and having in said train a friction clutch, the elements of which may be thrown into and out of engagement at will and means for throwing the elements of said clutch into and out of engagement with each other.

26. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive truck and a motor thereon, of a cable reel mounted on said truck, and a train of power transmitting devices interposed between said motor and said reel and adapted to cause the reel to wind up cable in advance of the car and at a rate of speed greater than the rate of speed of advance of the car, and having in said train a positive clutch and a friction clutch and means for moving one element of said friction clutch into or out of engagement with the other one.

27. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive truck and a motor thereon, of a cable reel mounted on said truck, and a train of power transmitting devices interposed between said motor and said reel and adapted to cause the reel to wind up cable in advance of the car and at a rate of speed greater than the rate of speed of advance of the car, and having in said train a positive clutch and a friction clutch, a friction retarding device, and means for disconnecting the elements of said friction clutch and for throwing said retarding device into operation.

28. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive truck and a motor thereon, of a cable reel mounted on said truck, and a train of power transmitting devices interposed between said motor and said reel and adapted to cause the reel to wind up cable in advance of the car and at a rate of speed greater than the rate of speed of advance of the car, and having in said train a ratchet and pawl mechanism and a friction clutch, a friction retarding device, and means for disconnecting the elements of said friction clutch and for throwing said retarding device into operation.

29. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive car, an electric motor thereon, and a cable reel mounted on the car, of a train of power transmitting devices connecting said reel with a revolving part on the car and having in said train a positive clutch and a friction clutch, means for holding the

elements of said friction clutch in forced contact with each other, and means for throwing the elements of said friction clutch into and out of engagement with each other.

5 30. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive car, an electric motor thereon, and a cable reel mounted on the car, of a train of power transmitting devices connecting said reel with a revolving part on the
10 car and having in said train a positive clutch automatically acting to drive said reel in one direction only and a friction clutch, means for holding the elements of said friction
15 clutch in forced contact with each other, and means for throwing the elements of said friction clutch into and out of engagement with each other.

20 31. In a cable reeling mechanism for an electric locomotive, the combination with a locomotive car, an electric motor thereon, and a cable reel mounted on the car, of a train of power transmitting devices connecting said reel with a revolving part on the
25 car and having in said train a positive clutch and a friction clutch, means for holding the elements of said friction clutch in forced contact with each other, means for throwing the elements of said friction clutch into and
30 out of engagement with each other, and a friction-retarding device for controlling the unwinding movements of said reel.

32. In a cable-reeling mechanism for an electric locomotive, the combination with
35 the pair of axles, the track-wheels secured thereto, the frame mounted on said axles, the reel shaft mounted on said frame, the reel secured on said shaft, the train of power-transmitting devices interposed between one of said axles and said reel shaft
40 and having in said train a positive clutch and a friction clutch, and means for holding the elements of the friction clutch yieldingly in engagement with each other, substantially as set forth.

45 33. In a cable-reeling mechanism for an electric locomotive, the combination with a suitably mounted electric cable reel, of power-transmitting mechanism interposed between said reel and a rotating shaft and including a friction clutch the elements of
50 which are arranged to rotate together about an axis parallel to the axis of the reel.

34. In a cable-reeling mechanism for an
55 electric locomotive, the combination with a suitably mounted electric cable reel, of power-transmitting mechanism interposed between said reel and a rotating shaft and including a friction clutch the elements of
60 which are normally held in forced engage-

ment with each other and arranged to rotate together about an axis parallel to the axis of the reel.

35. In an electric locomotive, the combination of the truck, the motor, the reel shaft, 65 and the train of power transmitting mechanism interposed between the reel shaft and the motor having a friction clutch in said train, the elements of which are normally held yieldingly in engagement with each
70 other.

36. In an electric locomotive, the combination of the truck, the motor, the reel shaft, the reel on said shaft, the train of power-transmitting devices interposed between 75 the said motor and the reel shaft, and having in said train a friction clutch one element of which is loose upon said shaft and the other element of which is keyed to the shaft, and means for normally holding said elements 80 in engagement with each other, substantially as set forth.

37. In an electric locomotive, the combination of the truck, the motor, the reel shaft, the reel on said shaft, the train of power- 85 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 the reel shaft and are normally held in yielding engagement with 90 each other, substantially as set forth.

38. In an electric locomotive, the combination with the axles, the track wheels, the frame, and the motor, of the reel shaft mounted on the frame, the reel on said shaft, 95 the train of power transmitting devices interposed between the motor and the reel shaft, and having in said train a friction clutch the elements of which are arranged on the reel shaft, means for holding the said elements 100 yieldingly in engagement with each other, and means for adjusting the said last described means, substantially as set forth.

39. In an electric locomotive, the combination with the truck and a shaft adapted 105 to rotate as the truck is moved in either direction, of a cable drum or reel adapted to carry a cable for conducting electricity to the motor on the truck, and the train of power transmitting devices interposed be- 110 tween said shaft and said drum, and having in said train a friction clutch, the elements of which are normally held in engagement with each other.

In testimony whereof I affix my signature 115 in presence of two witnesses.

FRANK L. SESSIONS.

Witnesses:

C. E. WAXBOM,
L. E. HAMILTON.