No. 772,734. PATENTED OCT. 18, 1904.

E. C. MORGAN.

GATHERING LOCOMOTIVE FOR MINE HAULAGE SYSTEMS.

APPLICATION FILED APR. 27, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

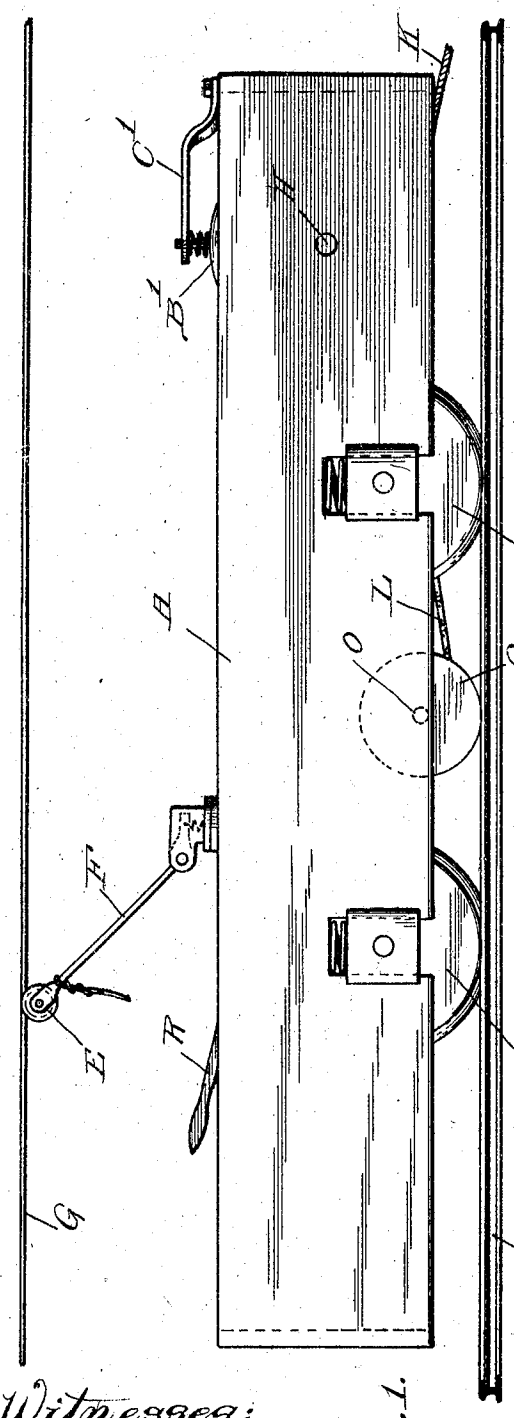


Fig. 1.

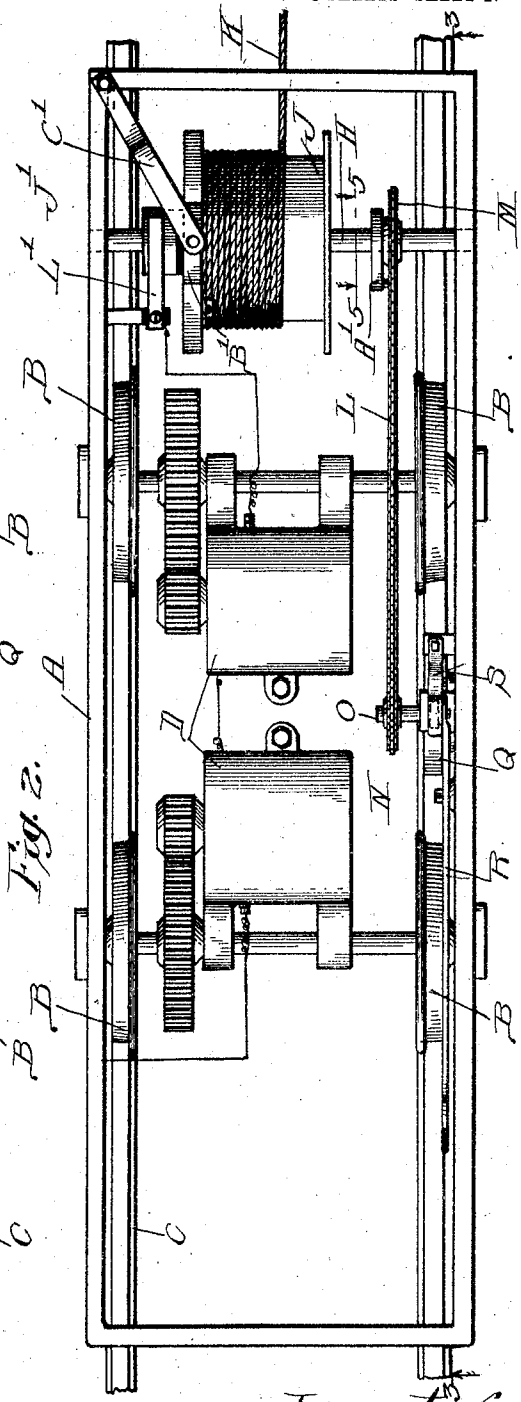


Fig. 2.

Witnesses:
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Robert H. Tilton

Inventor:
Edmund C. Morgan
by Brown & Darby
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NO MODEL. 3 SHEETS—SHEET 2.

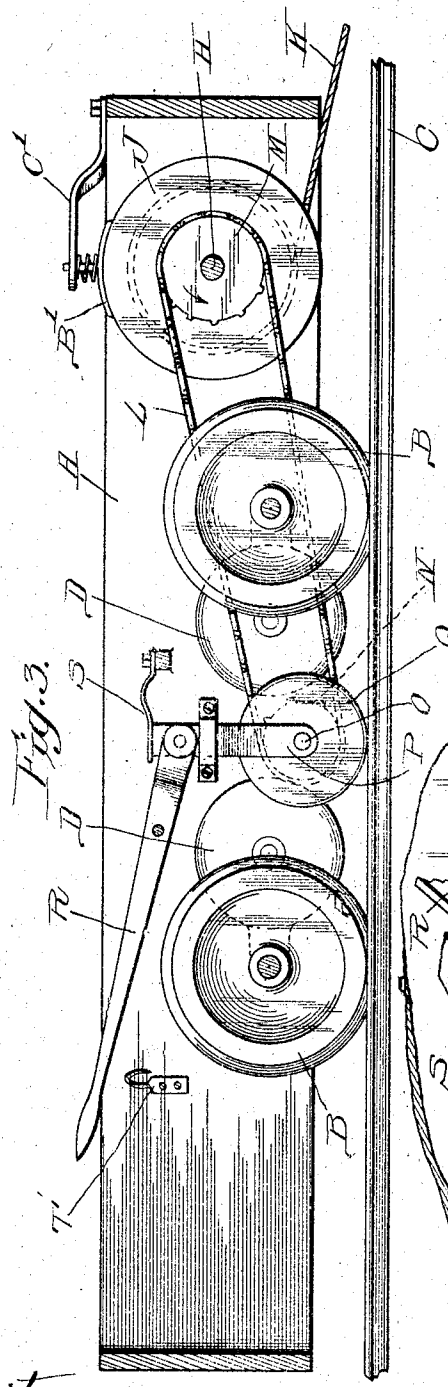


Fig. 3.

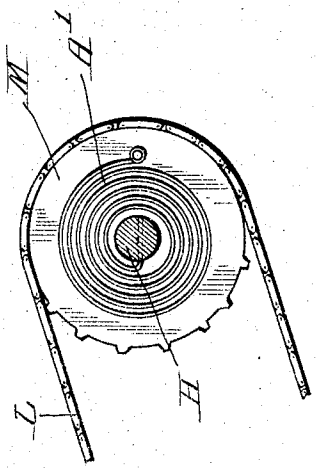


Fig. 5.

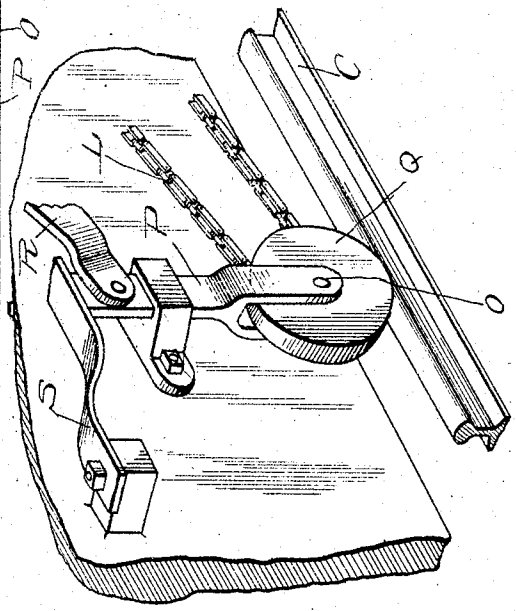


Fig. 4.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 6

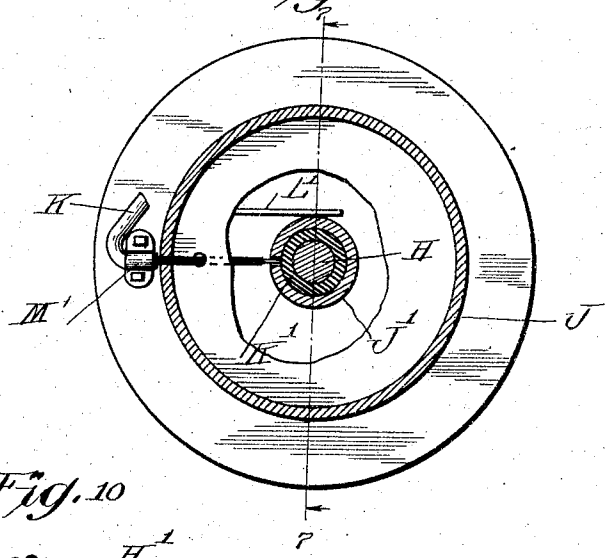


Fig. 10

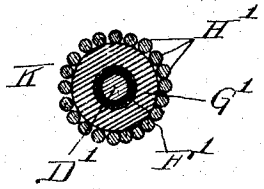


Fig. 8.

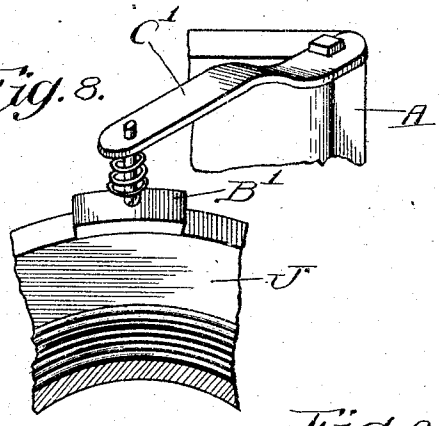


Fig. 7.

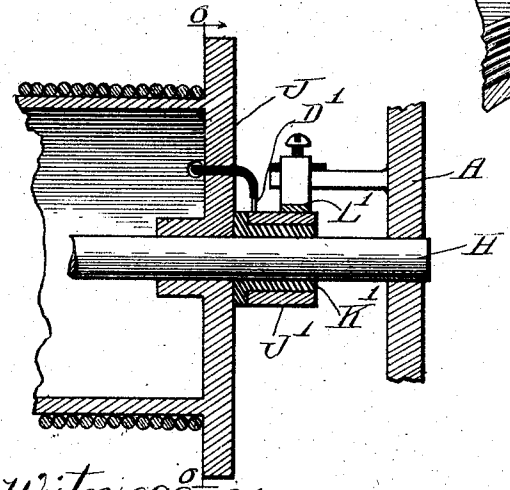
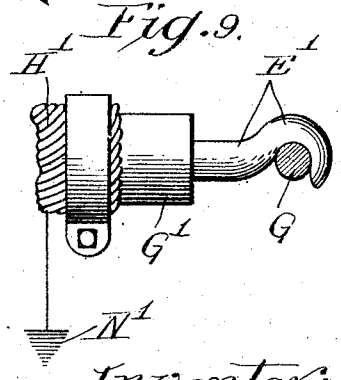


Fig. 9.



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No. 772,734. Patented October 18, 1904.

UNITED STATES PATENT OFFICE.

EDMUND C. MORGAN, OF CHICAGO, ILLINOIS.

GATHERING-LOCOMOTIVE FOR MINE-HAULAGE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 772,734, dated October 18, 1904.

Application filed April 27, 1904. Serial No. 205,253. (No model.)

To all whom it may concern:

Be it known that I, EDMUND C. MORGAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Gathering-Locomotive for Mine-Haulage Systems, of which the following is a specification.

This invention relates to gathering-locomotives for mine-haulage systems.

The object of the invention is to provide a construction and arrangement of gathering-locomotives for mine-haulage systems, which is simple and efficient.

A further object of the invention is to provide means whereby a locomotive may operate in entries or shafts of a mine and at a distance from the main or other entry in which is located the trolley wire or conductor through which current is supplied to the mine, the special object of the invention being to provide means for supplying the locomotive operating in the distant entry or shaft which is not supplied with a trolley wire or conductor, such locomotive being supplied with current from the trolley-wire through a cable or other conductor having connection with the trolley-wire in the main entry and being paid out or taken up, according to the movements of the locomotive.

A further object of the invention is to provide a conductor or cable for use in connection with gathering-locomotives, wherein one part of the cable operates as a supply-conductor and another part operates as a return-conductor.

A further object of the invention is to provide means which are simple and efficient for paying out and taking up the cable or other conductor employed in connection with gathering-locomotives.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a view in side elevation of a gathering-locomotive embodying the principles of my invention. Fig. 2 is a top plan view of the same, showing an arrangement of gathering-locomotive and means for taking up and paying out the conductor or cable. Fig. 3 is a view in vertical longitudinal section on the line 3 3 of Fig. 2 looking in the direction of the arrows. Fig. 4 is an enlarged detail view in perspective, parts broken off, showing means for operating the conductor or cable drum actuating means. Fig. 5 is a detail view in section on the line 5 5 of Fig. 2 looking in the direction of the arrows. Fig. 6 is a view in transverse section through the cable or conductor drum on the line 6 6 of Fig. 7 looking in the direction of the arrows, a portion of the hub of the end flange of the drum being broken out to show the means for connecting the supply-conductor portion of the cable to the collecting-ring. Fig. 7 is a broken detail view in section on the line 7 7 of Fig. 6 looking in the direction of the arrows. Fig. 8 is a broken detail view of the drum-brake. Fig. 9 is a broken detail view showing the manner of connecting the gathering cable or conductor to the main trolley-wire. Fig. 10 is a detail view, in transverse section, of the gathering cable or conductor.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

In the operation of mine-haulage plants it frequently becomes necessary or desirable to operate a locomotive within a shaft or entry in which there is no trolley wire or conductor—as, for instance, when it is desired or necessary to run a power-propelled locomotive or train of cars into a branch entry or shaft leading from the main entry of the mine. In such case it is desirable to provide means for supplying the locomotive with current to enable the same to develop the required power to operate the locomotive or the train. It has been proposed to accomplish this result by employing what has become known in the art as a "gathering-locomotive," where the necessary current for the operation of the locomotive is delivered to

such locomotive or to the motor through a conductor or cable wound upon a drum on the locomotive or its truck-frame and the free end of which is hooked over or otherwise secured to or in electrical connection with the trolley wire or conductor in the main entry or passage of the mine. In such arrangement it is desirable to provide means for unreeling or paying out such cable connection or gathering-conductor as the locomotive proceeds in a direction away from the main entry in which the trolley-wire is located and also for taking up or reeling such gathering-conductor onto the reel when the locomotive proceeds in a direction toward the entry in which the trolley-wire is located. In the accomplishment of these objects it has been proposed to operate the drum upon which the gathering-conductor is reeled or wound through gearing frictionally driven from the locomotive truck wheels or axles. Such arrangement, however, is not wholly satisfactory for the reason that it frequently happens that the truck-wheels skid along the road-bed or floor of the entry or along the skids or track-rails arranged therein on which the locomotive operates, especially in descending grades. In such cases the truck-wheels and their axles are locked by suitable brake mechanism or otherwise against rotation, thereby arresting the gearing which drives or actuates the gathering-conductor drum, and hence imposing a pull or strain on the gathering-conductor which might be sufficient to derange the trolley-wire in the main or supply entry, if not sufficient to break it. Again, it frequently happens in the operation of mine-haulage systems of the character referred to that metallic or electrically-conducting track-rails which might serve as return or ground conductors for the current supplied to the motor are not always provided for the locomotive when operating in side entries, it frequently being necessary or desirable to operate the locomotive either on wooden skids or rails, which are insulators, in order to save the expense involved in supplying metallic rails. In such event it becomes desirable to provide means for effecting a return or ground connection for the current employed for operating the motor.

It is among the special purposes of my present invention to provide means which are simple and efficient whereby the operation of the gathering-conductor reel-drum is not dependent upon the rotation of the truck or locomotive wheels or axles, and in the accomplishment of my objects in this respect I propose to provide means arranged to be set into operation by the movement of the truck as it progresses along the side entry and independent of the truck-wheels for operating the gathering-conductor drum, and I propose to employ means whereby the drum-actuating devices may be maintained out of operation—as, for instance, when the locomotive is operating along an entry containing a trolley-wire. In other words, I propose to provide the locomotive with an equipment of gathering-conductor and actuating mechanism therefor which may be thrown into and out of operation and maintained in or out of operation, as occasion may require, thereby enabling the locomotive to operate in either the main or other entry in which is located a trolley-wire or in a side or branch entry in which there is no trolley-wire, and in order to insure an efficient return or ground connection from the motor, whether the locomotive operates along metallic or conducting track-rails or upon wooden skids, which would serve as an insulation, I propose to so form and construct the gathering-conductor as that the same cable may be employed both as a supply-conductor and also as a return-conductor.

In the accompanying drawings I have shown constructions and arrangements of parts illustrating operative embodiments of the principles of my invention; but I desire it to be understood that my invention is not to be limited or restricted to the exact details of construction and arrangement therein shown, as many variations therefrom and changes in the details of construction and arrangement thereof would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention.

Referring to the accompanying drawings, reference-sign A designates a locomotive or truck frame supported upon the usual truck-wheels B, said truck-wheels operating along the rails C, which rails may be either wooden skids or the usual metallic rails. The locomotive may be driven in any suitable or convenient manner—as, for instance, by one or more electric motors D, suitably geared to the truck-axles. When operating along a main entry in which is located a trolley-wire, current may be supplied to the motors in any convenient manner—as, for instance, by means of a trolley-wheel E, carried by a pole F, suitably mounted upon the locomotive and contacting with a trolley wire or conductor G in the usual manner.

The parts so far described may be of the usual or any well-known construction, type, and arrangement.

Suitably mounted or journaled in the truck-frame is a shaft H, upon which is mounted a drum J.

K designates the gathering cable or conductor adapted to be brought into use when the locomotive is desired for use in a side entry or passage of the mine in which there is no trolley-wire, one end of said cable being in such case adapted to be hooked over a trolley-wire G (see Fig. 9) or otherwise electrically connected thereto and led to and wound upon drum J and secured at its other end thereto, as will be hereinafter more specific-

ally described. The drum-shaft and drum are driven through a sprocket-chain L or other suitable driving connection operating over a sprocket or other gear M, mounted upon shaft H, said sprocket-chain or other connection operating over a sprocket or drive wheel N, carried upon a short shaft O, suitably journaled in a bracket or casting P. Mounted upon stub-shaft O is a friction-wheel Q, arranged to be brought into peripheral contact with the tread of a rail C, whereby rotation may be imparted to shaft O by the advancing movement of the locomotive or truck frame and independent of rotation of the truck-wheels. In order that the friction gear or wheel Q may be raised out of contact with the rail C, I pivotally mount a lever R in convenient position upon the truck-frame and connect the same to bracket P, whereby by manipulating lever R the bracket P may be raised or lowered, thereby raising or lowering the friction-wheel R. If desired, a spring S may be employed to normally press the bracket P downwardly or in a direction to carry the friction-wheel Q into contact with a rail C. A convenient lock (indicated at T) may be provided for lever R to hold the same into position to maintain wheel Q out of engaging relation with respect to track C—as, for instance, when it is desired to operate the locomotive without the use of the gathering-conductor or along an entry or passage in which a trolley-wire is located. Of course it will be understood that when current is supplied to the locomotive through the gathering-conductor the trolley-wheel E and pole F are not required, and hence the pole in such case will be drawn down out of the way.

In order to guard against the danger of interrupting the action of the reel or drum J when the gathering attachment is in use in case the friction-wheel Q should be pressed into too close frictional contact or engagement with the rail, thereby preventing rotation of such friction-wheel, and thereby imposing a pull or strain on the gathering-conductor, I provide a yielding connection between the sprocket or other gear M and the drum-shaft H. This may be of any suitable or convenient arrangement—such, for instance, as the spiral spring A′, (see Figs. 2 and 5,) said spring having one end secured to shaft H and the other end connected to the gear M. In this manner it will be seen that relative movement of the gear M and shaft H is permitted, so that in case the rotation of friction-wheel Q is interrupted for any cause the continued rotation for a limited extent at least of the drum is permitted. If desired, and in order to prevent too rapid rotation of the drum, a brake-shoe B′ may be applied thereto in any suitable manner—as, for instance, by bearing upon the peripheral edge of an end flange of the drum, said brake-shoe being carried by an arm or bracket C′, suitably mounted upon the framework of the truck or locomotive.

It will be observed that the rotation of drum J to wind the cable thereon is imparted thereto through the spring A′, which is accordingly kept wound up during the operation of reeling up the gathering-cable, thereby imposing a yielding rotative tension on the drum.

In order to enable the gathering-conductor to perform the double function of a supply-conductor and a return or ground conductor, while at the same time maintaining the form of a round cable, which is the form which is best adapted for use in this connection, and at the same time to provide means for efficiently insulating the two parts of the cable from each other and to avoid wearing out of such insulation too rapidly, I provide a cable having a central or core portion D′ (see Fig. 10) and having the hook E′ (see Fig. 9) integral or in electrical connection therewith and constituting the supply-conductor of the gathering-cable. This core portion is suitably insulated—as, for instance, by applying thereto a rubber or other insulation (indicated at F′, Fig. 10,) over which, if desired, and in order to still further insure efficient insulation, may be applied an additional covering of insulation, (indicated at G′,) and on the outer side of covering G′ of insulation is applied or braided a plurality of copper wire or other forms of conductors H′, forming, in effect, a return-cable having a central core forming a supply-conductor and an outer or exterior conducting-surface, such conducting-surface being efficiently insulated from the central core-conductor. In attaching the end of this gathering-conductor to the drum the insulated core portion D′ thereof is passed through the drum and suitably connected to a conducting-ring J′, mounted upon an insulating-sleeve K, the latter being mounted upon shaft H and connected to rotate with the drum. An insulated brush L′ serves to collect current from ring J′. From this brush leads suitable conductors to the motors, constituting the current-supply connection to the motors. The return connection is effected by suitably clamping or otherwise securing electrically, as indicated at M′, the outer conducting-covering H′ of gathering-conductor K to the drum, as indicated in Fig. 6, electrical connection being completed from the motor through the frame of the locomotive, shaft H, and drum K to the return or ground conducting portion or covering of the cable and thence to ground in any suitable manner, as indicated at N′, Fig. 9.

In the manner above described it will be seen that I provide an exceedingly simple construction of gathering-cable, which is of cylindrical form, and hence of the form best adapted for winding upon the reel J, and wherein the insulation of the supply-conduc-

tor is efficiently protected by the outer return-conductor and the interposed insulation, and wherein such outer conducting portion of the gathering-conductor may serve as a return-conductor or ground connection whether the track-rails are of conducting material or not, and hence affording a most efficient ground connection in case the track-rails can be employed as return-conductors, and where the track-rails are not conductors serving as a return-conductor from the motor.

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a gathering-locomotive, a gathering-conductor, a drum upon which such conductor is wound, and means independent of the locomotive truck-wheels for actuating said drum, as and for the purpose set forth.

2. In a gathering-locomotive, a drum, a gathering-conductor adapted to be wound thereon or unwound therefrom, gearing independent of the locomotive truck-wheels for operating said drum, and means for throwing said gearing into and out of commission, as and for the purpose set forth.

3. In a gathering-locomotive, a truck having truck-wheels, a drum, a gathering-conductor adapted to be wound upon or unwound from said drum, actuating-gearing for said drum, including a friction-wheel, and means for throwing said friction-wheel into and out of contacting relation with respect to the rails upon which said truck-wheels operate, as and for the purpose set forth.

4. In a gathering-locomotive, a truck, a motor mounted thereon, truck-wheels driven from said motor, a drum mounted upon said truck, a gathering-conductor arranged to be reeled upon and unreeled from said drum, and gearing independent of said truck-wheels for actuating said drum, as and for the purpose set forth.

5. In a gathering-locomotive, a truck, truck-wheels supporting the same, a motor for driving said truck-wheels, a gathering-conductor arranged to be wound upon or unwound from said drum, a drum upon which said conductor is arranged to be wound, a bracket mounted upon the truck, a friction-wheel carried by said bracket and arranged to be brought into and out of contact with the track upon which the truck-wheels operate, and gearing driven by said friction-wheel for actuating said drum, as and for the purpose set forth.

6. In a gathering-locomotive, a truck, supporting-wheels therefor, a motor for operating said wheels, a drum mounted upon said truck, a gathering-conductor adapted to be wound upon and unwound from said drum, gearing independent of the truck-wheels for actuating said drum, and detachable means for maintaining said gearing out of operative relation, as and for the purpose set forth.

7. In a gathering-locomotive, a truck-frame, supporting-wheels therefor, a drum journaled in said frame, a gathering-conductor arranged to be reeled upon and unreeled from said drum, said cable having a central insulated conducting-core and an exterior conducting-surface, means for completing electrical connection between said core and motor of the locomotive, and return connections from the motor to the exterior conducting-surface of the cable, as and for the purpose set forth.

8. In a gathering-locomotive, a truck, a motor for operating the same, a drum mounted upon said truck, a conductor-ring insulated from but mounted to revolve with said drum, a gathering-cable having a central conducting-core, said cable adapted to be wound upon and unwound from said drum, said conducting-core being in electrical connection with said insulated ring, said cable having an exterior conducting-surface in electrical connection with the frame of the locomotive, means for completing electrical connection between the motor and said conductor-ring and between said motor and the frame of the truck, as and for the purpose set forth.

9. In a gathering-locomotive, a truck, a motor for operating the truck, a drum mounted upon the truck, a conductor-cable of cylindrical form and having a central conducting-core and an inclosing conducting-covering, an insulation interposed between said covering and core, means for establishing electrical connection between one side of the motor and said conducting-core, and means for establishing electrical connection between the opposite side of the motor and said inclosing covering, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 11th day of April, 1904, in the presence of the subscribing witnesses.

EDMUND C. MORGAN.

Witnesses:
C. H. SEEM,
S. E. DARBY.