

June 8, 1937.

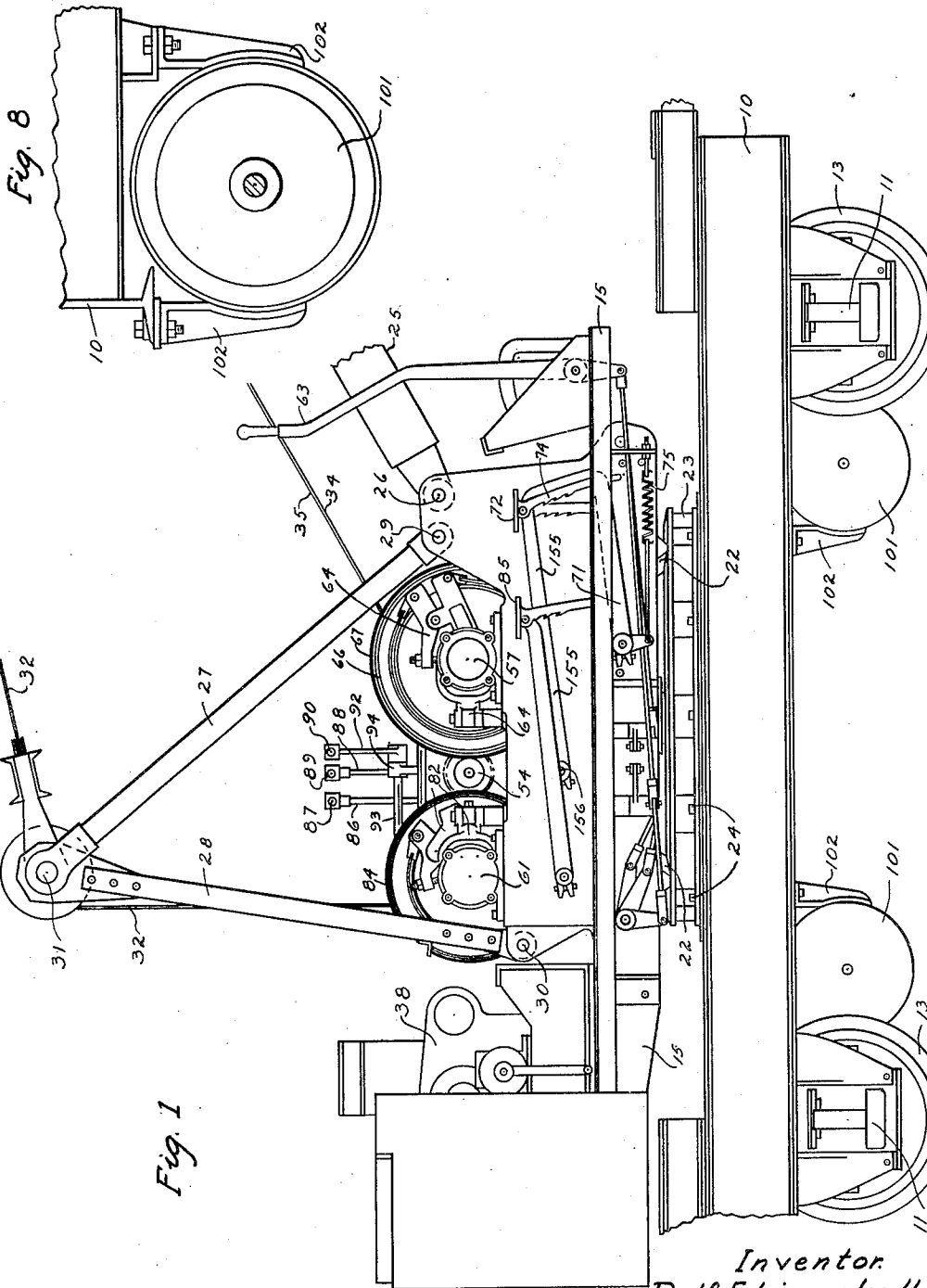
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2,083,460

EXCAVATING MACHINE

Filed June 12, 1936

5 Sheets-Sheet 1



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EXCAVATING MACHINE

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5 Sheets-Sheet 2

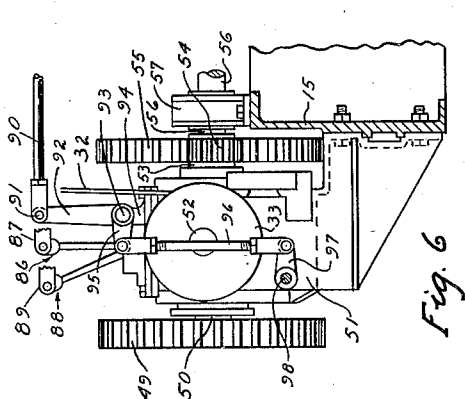


Fig. 6

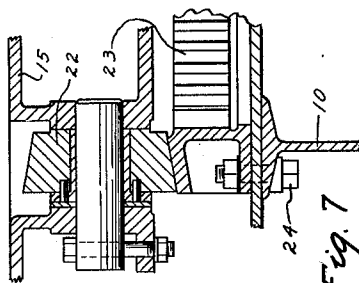


Fig. 7

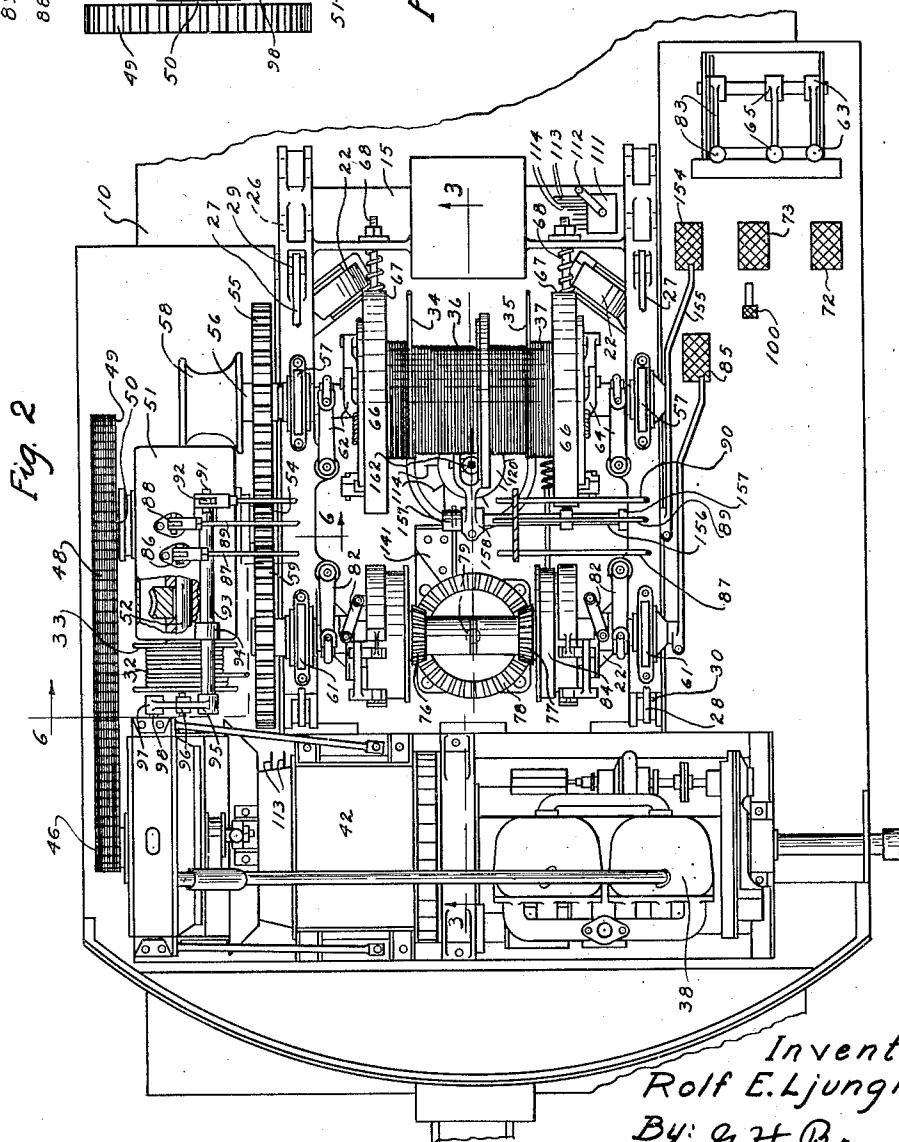


Fig. 2

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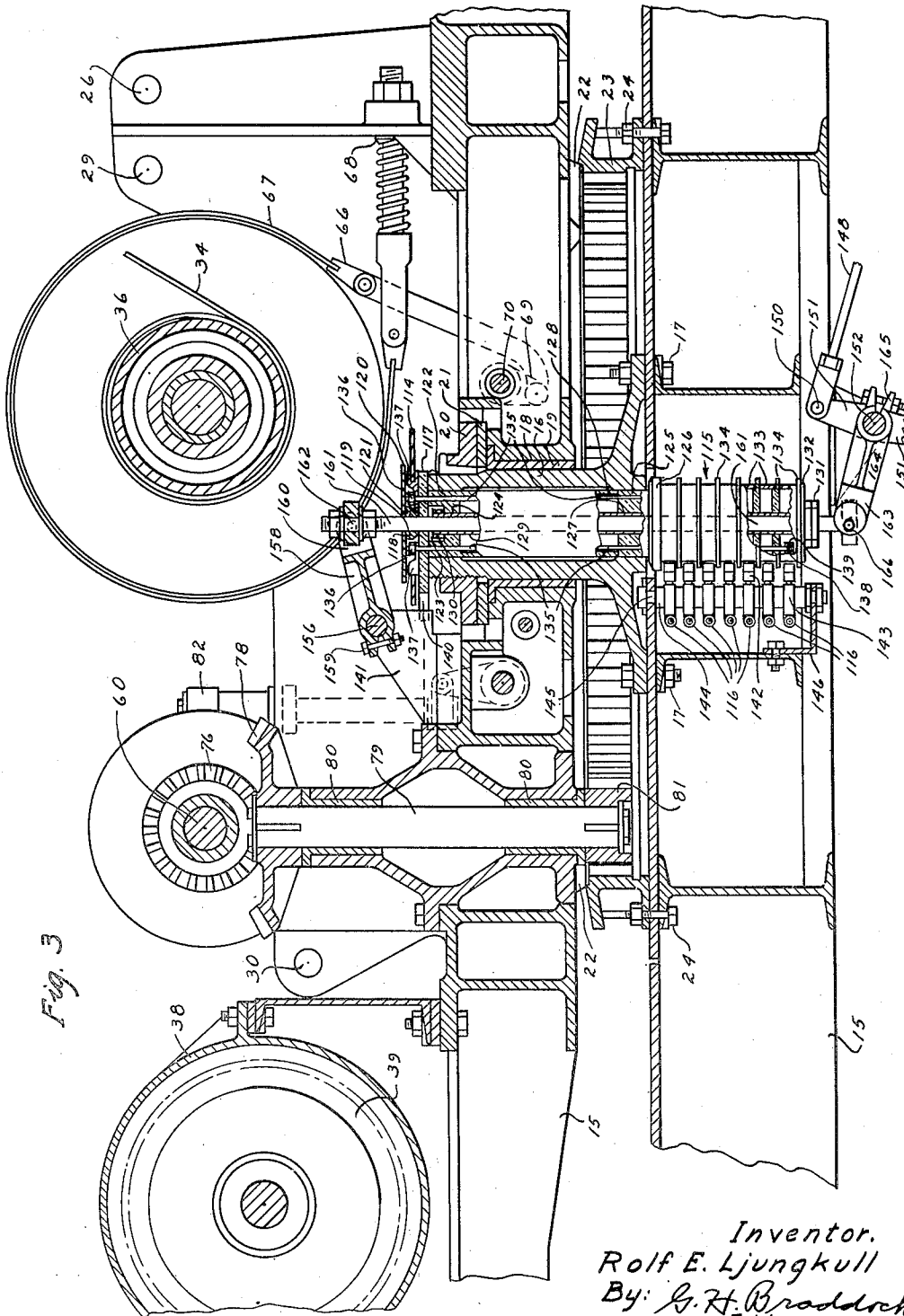
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EXCAVATING MACHINE

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June 8, 1937.

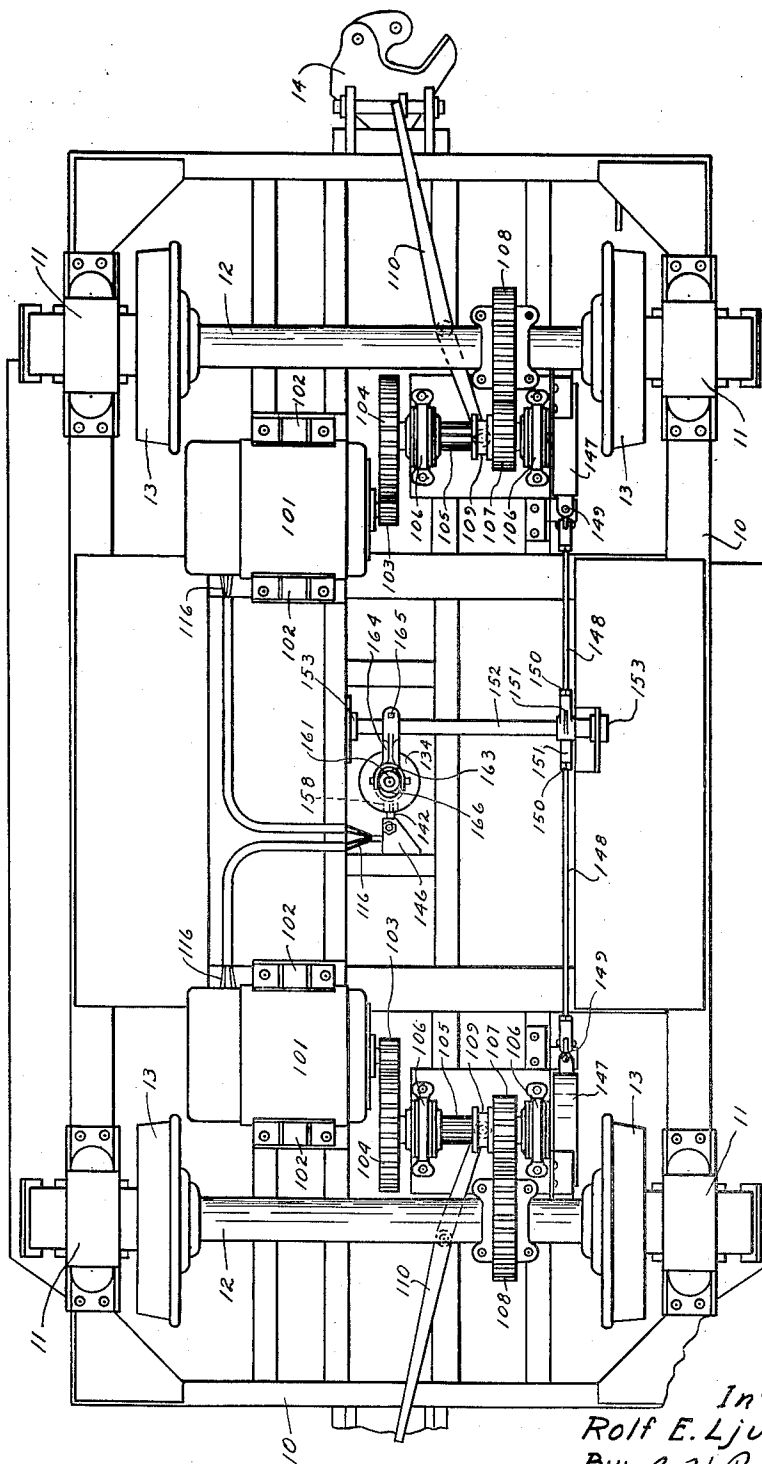
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EXCAVATING MACHINE

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5 Sheets-Sheet 4



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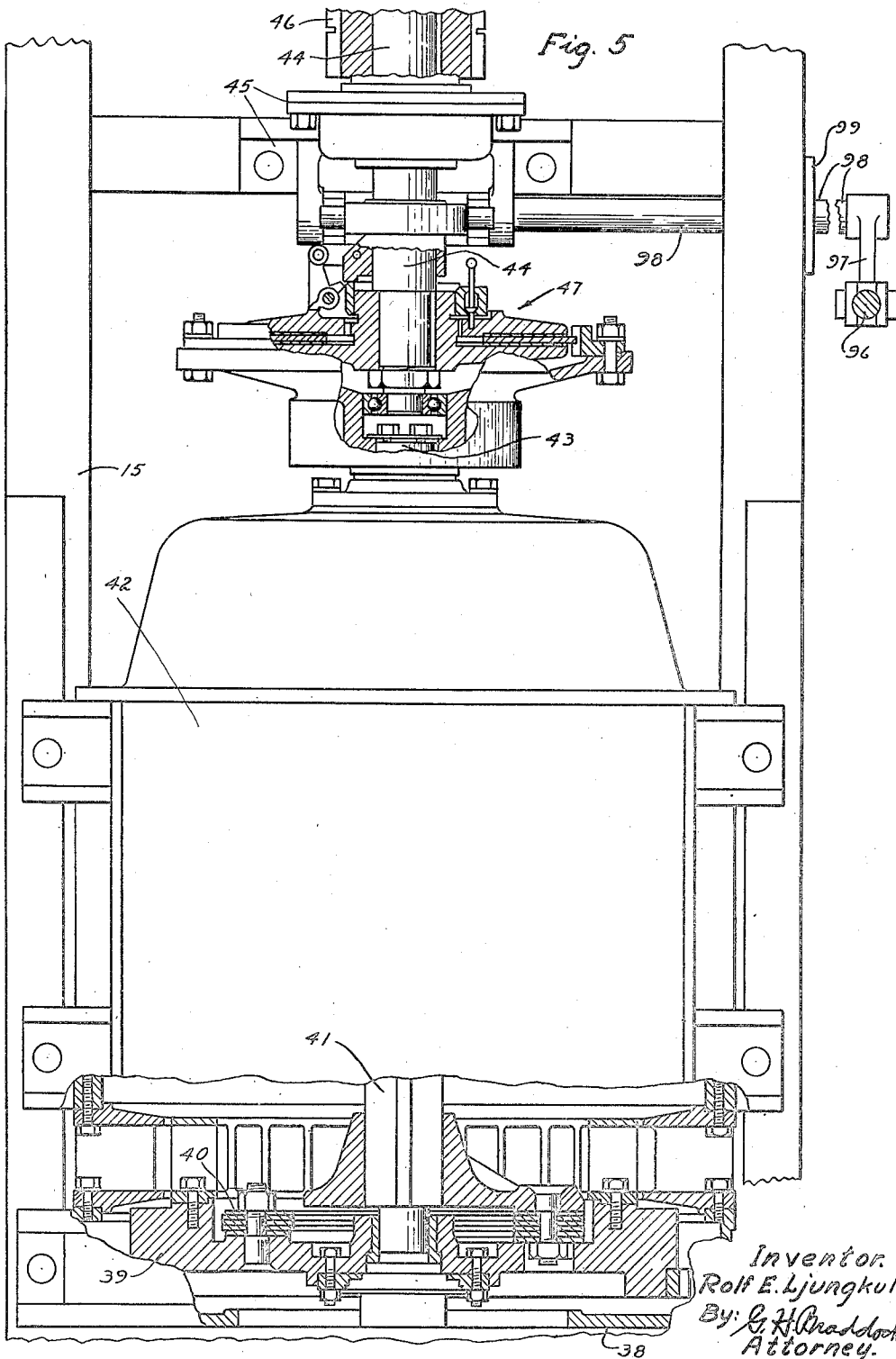
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EXCAVATING MACHINE

Filed June 12, 1936

5 Sheets-Sheet 5



UNITED STATES PATENT OFFICE

2,083,460

EXCAVATING MACHINE

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Application June 12, 1936, Serial No. 84,906

28 Claims. (Cl. 212—38)

This invention relates to an excavating machine of the type ordinarily known as locomotive ditchers or cranes.

A locomotive ditcher, crane, etc., such as commonly employed on railroad or other tracks or surfaces to excavate and/or remove material either in the construction or maintenance of a right-of-way, ordinarily consists of a ditcher or crane unit comprising a car having a boom and bucket or dipper and operating mechanism for the boom and bucket or dipper mounted upon a revolvable platform or deck upon the car, the operating mechanism also being adapted to cause the platform or deck to be revolved so that the boom with bucket or dipper can be swung from side to side of the ditcher or crane in the operations of excavating and/or removing material from any location about the ditcher or crane and adjacent thereto. The power plant is sometimes carried by the revolvable platform or deck, and in such case the entire operating mechanism is mounted for relative rotation upon the car frame. In addition to driving the operating mechanism for the boom, bucket or dipper, and for revolving the platform or deck upon the car frame, the power plant when upon the revolvable platform or deck has been mechanically connected up to propel the car or ditcher unit or crane unit along a railroad track or other track or surface. Sometimes locomotive ditchers, cranes, etc., as heretofore known, including booms, buckets or dippers, revolvable platforms or decks, and adapted to be propelled, have been electrically driven; that is to say, all or some of the operations, including hoisting, swinging and propelling have been performed by the power of electric motors.

An object of the present invention is to provide an excavating machine including devices for swinging and hoisting which will be mechanically connected up to be driven, and also including devices for propelling the machine which will be electrically connected up to be driven.

A further object is to provide an excavating machine consisting of a ditcher or crane unit including a revolvable platform or deck, boom, bucket or dipper, etc., which will be mechanically driven, and also including supporting wheels for said ditcher or crane unit which will be propelled by the power of an electric motor, or motors.

A further object is to provide an excavating machine consisting of a ditcher or crane unit comprising a car body having a boom and bucket or dipper and operating mechanism therefor mounted upon a revolvable platform or deck upon said car body, said operating mechanism also being adapted to cause said platform or deck to be revolved, and said unit including a power plant carried by said revolvable platform or deck

and mechanically connected up to actuate said boom, bucket or dipper and said revolvable platform or deck, the power plant including a generator upon the revolvable platform driven by the means which actuates said boom, bucket or dipper and said revolvable platform, and said ditcher or crane unit additionally including an electric motor, or motors, adapted to be actuated or driven in either direction by said generator to propel said unit in either direction, said electric motor, or motors, being located upon said car body, desirably beneath the frame thereof.

A further object is to provide an excavating machine consisting of a ditcher or crane unit comprising a car body having a boom and bucket or dipper and operating mechanism therefor mounted upon a revolvable platform or deck upon said car body, said operating mechanism also being adapted to cause said platform or deck to be revolved, and said unit including a constant speed power plant carried by said revolvable platform or deck and mechanically connected up to actuate said boom, bucket or dipper and said revolvable platform or deck, whereby all of the operations of the hoisting, swinging and boom hoisting units of the excavating machine will be performed at constant speed, the power plant including a generator upon the revolvable platform driven by the means which actuates said boom, bucket or dipper and said revolvable platform, and said ditcher or crane unit additionally including an electric motor, or motors, located upon the car body and adapted to be actuated or driven in either direction by said generator to propel said ditcher or crane unit in either direction.

A further object is to provide an excavating machine as stated in the preceding paragraph, wherein the generator employed is designed with the end in view of causing the speeds of the electric motor, or motors, for propelling the ditcher or crane unit to automatically adjust themselves to a lower value under heavier loads and to a higher value under lighter load conditions, whereby to obtain high tractive or propulsion effort at low speeds under heavier loads, a wide range of speeds, and high traveling speed under lighter loads, while also maintaining capacity in the excavating machine for performance of all of the operations of the hoisting, swinging and boom hoisting units at constant speed, as before mentioned.

And a further object is to provide an excavating machine of the locomotive ditcher, crane, etc., type which will include various improved features and characteristics of construction novel both as individual entities of the excavating machine and in combination with each other.

A certain type of machine of the present general character in the past has been propelled

mechanically through a four speed transmission connected direct to a gasoline engine upon a revolvable platform or deck of the machine. The gasoline engine has been governed at constant speed, and the arrangement has resulted in four constant traveling speeds. To start a machine having four speed transmission as outlined when under heavy load it is necessary to slip the engine clutch, and, also, it is quite expensive to build a mechanically propelled machine having a high tractive effort at low speeds as well as a desirably high traveling speed.

It is obviously desirable that a locomotive ditcher or crane have a maximum tractive effort at low speeds without unnecessary loss of power, as well as a high traveling speed. It is, also, obviously desirable that all of the operations of the hoisting, swinging and boom hoisting units of a machine of the present character be performed at constant speed. To the production of a machine having these mentioned characteristics, and wherein the power plant is carried by the revolvable platform or deck of the machine, the boom, bucket or dipper and said revolvable platform or deck are connected up to be mechanically actuated by a power plant designed to operate at constant speed, and electrical means including a generator upon the revolvable platform and driven by the power plant is employed to transmit power to a motor, or motors, for propelling the machine. That is, a generator driven by the power plant electrically transmits power from the power plant to a motor, or motors, for propelling the wheels of the ditcher or crane unit. The arrangement provides an ideal machine at expense considerably less than would be necessary to build an equivalent structure mechanically propelling the machine through a four speed, or other, transmission.

In short, the excavating machine of the invention utilizes devices for swinging and hoisting which are mechanically actuated at constant speed by the power plant employed, and electrical equipment actuated by said power plant for propelling said machine and adapted to the purpose of obtaining a high-starting tractive effort, a great range of speed, and a high maximum speed.

With the above objects in view, as well as others which will appear as the specification proceeds, the invention comprises the construction, arrangement and combination of parts as now to be fully described and as hereinafter to be specifically claimed, it being understood that the disclosure herein is merely illustrative and intended in no way in a limiting sense, changes in details of construction and arrangement of parts being permissible so long as within the spirit of the invention and the scope of the claims which follow.

In the accompanying drawings forming a part of this specification,

Fig. 1 is a side elevational view of an excavating machine having the features of the invention, parts being omitted and other parts being broken away;

Fig. 2 is a top plan view of the machine, parts being omitted;

Fig. 3 is an enlarged sectional view taken on line 3—3 in Fig. 2, parts being omitted;

Fig. 4 is a bottom plan view of the machine;

Fig. 5 is a view showing the generator in elevational plan and on an enlarged scale, and detailing parts associated with said generator, some of said parts being disclosed in section and others in elevation;

Fig. 6 is a detail sectional view taken on line 6—6 in Fig. 2;

Fig. 7 is a sectional view detailing the manner in which the revolvable platform or deck of the excavating machine is supported upon and rideable over the bull gear fixedly attached to the car frame; and

Fig. 8 is an end elevational view of an electric motor of Fig. 4, the motor shaft being sectioned, detailing the manner of attaching the motors to the underside of the car frame.

With respect to the drawings and the numerals of reference thereon, the excavating machine includes a car consisting of a frame 10 having bearings 11 for front and rear axles 12 rigidly supporting traveling wheels 13. A coupling member 14 upon the car frame is for the purpose of coupling the excavating machine with a different car, which may in some instances be propelled by the excavating machine, and may in some instances propel said machine.

The car frame 10 supports a platform or deck 15 which is revolvable thereon. As shown, a hollow upright or standard 16 is secured upon the car frame 10, as by headed and nutted screw bolts 17, and the platform or deck 15 includes a vertical opening 18 which receives said standard 16, numeral 19 representing a bushing interposed between the upright or standard and said opening, 20 denoting a nut screwed upon the upper end of said upright or standard to hold the platform or deck in place, and 21 indicating a washer beneath the nut 20 and engaging the bushing and the portion of the platform or deck about the opening 18.

A circumferential portion of the platform or deck 15 includes conveniently mounted rollers 22 spaced about said platform or deck and concentric with the vertical opening 18, said rollers 22 being supported upon and rideable over a bull gear 23, which is also concentric with said opening 18 and is fixedly attached to the car frame 10, as by means of headed and nutted bolts 24. See Figs. 1, 2, 3 and 7.

A boom upon the revolvable platform or deck 15, which may be of usual construction, is designated 25, and is pivoted upon a part of said platform or deck as at 26, and a mast, which may also be of usual construction, includes obliquely disposed, upwardly extending bars, denoted 27 and 28, the former being attached to a part of the platform or deck at 29, and the latter being attached to the platform or deck at 30. As shown, there are two bars 27 and 28, respectively, one at each side of the mast. The upper ends of the bars 27 and 28 carry a bail sheave axle 31.

The boom 25 supports a bucket or dipper (not shown) in usual manner. A cable 32 is for the purpose of accomplishing hoisting or raising and lowering operations of said boom 25. A drum 33 for actuating the cable 32 is mounted upon the revolvable platform or deck. As shown, the cable 32 has one of its end portions wrapped about the drum 33, and said cable extends over pulleys supported by the bail sheave axle 31 and by the outer end (not shown) of the boom and is attached to the mast. When the drum 33 is rotated in direction to wind the cable 32 thereon, the boom is hoisted or raised, and when said drum 33 is rotated, or allowed to rotate, in opposite directions said boom is lowered by gravity.

Cables, indicated 34 and 35, respectively, extend to the bucket or dipper, which may be of ordinary or preferred construction, or may be any other element or elements adapted to the

well known purpose of excavating machines. Drums, denoted 36 and 37, respectively, for actuating the cables 34 and 35, respectively, are also mounted upon the platform or deck 15. The cable 34 has one of its end portions wrapped about the drum 36 and said cable extends upwardly over a pulley (not shown) on the outer end of the boom and is connected to the bucket or dipper. The cable 35 has one of its end portions wrapped about the drum 37, and said cable extends upwardly over a pulley (not shown) on the outer end of the boom and is connected to said bucket or dipper. When a drum 36 or 37 is rotated in direction to wind the corresponding cable 34 or 35 thereon, said cable is drawn over its corresponding pulley to shorten the portion of the cable extending from the pulley to the bucket or dipper, to raise the bucket or dipper, or close it, as the case may be. When the corresponding drum is rotated, or allowed to rotate, in opposite direction, the bucket or dipper is lowered, or allowed to open by gravity, as the case may be, the portion of the cable extending from the corresponding pulley to the bucket or dipper obviously becoming lengthened. For certain work only one cable, such as 34 or 35, will be employed, one of the drums 36 or 37 being out of use at the time.

The revolvable platform or deck 15 suitably supports a power plant which is as disclosed an internal combustion engine 38, and said engine includes a fly wheel 39 which is conveniently and desirably flexibly connected, as represented generally at 40, to the driving shaft 41 of a generator 42. The generator 42 is also suitably supported upon the revolvable platform or deck 15, and said internal combustion engine and generator are of course rigidly secured to said platform or deck. Said generator 42 is desirably of that type designed for drooping characteristics of the generator volt-ampere curve and wherein the voltage is high for low current and low for high current. As disclosed, the generator includes a driven shaft 43 arranged opposite the engine 38, adapted to be clutched to a stub shaft 44, mounted in suitable bearings 45 upon the platform or deck, fixedly carrying a sprocket wheel 46. A clutch 47 for connecting the driven shaft 43 to drive the stub shaft 44 may be of the construction as shown, or of any other suitable construction, and said clutch 47 is manipulated in a manner to be hereinafter stated.

It should be here remarked, that while I have preferred to disclose the generator 42 directly connected with the internal combustion engine to be driven thereby, said generator could just as readily be driven by said engine through the instrumentality of a chain or belt. It should also be remarked that the stub shaft 44, or equivalent, could just as readily be driven from the engine 38, either directly or by chain or belt, instead of being driven by said engine through the instrumentality of the generator in the manner as illustrated.

A sprocket chain 48 which rides over the sprocket wheel 46, also rides over a larger sprocket wheel 49 fixed upon a shaft 50 which enters a gear case 51, as shown more clearly in Figs. 2 and 6, said shaft 50 being conveniently mounted in a wall of said gear case. The gear case 51 is fixedly mounted upon the platform or deck 15 in any suitable way and includes ordinary or preferred gear connections adapted to drive a shaft 52 suitably carrying the drum 33,

and also adapted to drive a shaft 53 which fixedly carries a pinion 54. The pinion 54 meshes with a gear 55 fixed upon a shaft 56 suitably mounted in bearings 57 fixed upon the platform or deck 15. The drums 36 and 37 are conveniently mounted upon the shaft 56, in a well known and common manner, to be in alignment with each other as shown. The shaft 56 also fixedly carries a winch 58. The pinion 54 also meshes with a gear 59 fixed upon a shaft 60 suitably mounted in bearings 61 fixed upon said platform or deck 15.

The drums 36 and 37 are normally loose upon the shaft 56, and are adapted to be rotated, independently of each other, with said shaft 56, and in the same direction. A clutch, denoted generally at 62, is for the purpose of clutching the drum 36 to the shaft 56, and a clutch lever 63 is for actuating said clutch 62 to operative and inoperative positions. A clutch, denoted generally at 64, is for the purpose of clutching the drum 37 to the shaft 56, and a clutch lever 65 is for actuating said clutch 64 to operative and inoperative positions. The clutches 62 and 64 are of ordinary construction and are operated in well known manner requiring no further description herein. Also, the drums 36 and 37 may be of ordinary or preferred structure forming no part of the present invention.

Each drum 36 and 37 is as disclosed provided with a brake 66. Said brakes 66 may be duplicates, and each may consist, as shown more clearly in Figs. 2 and 3, of a brake band 67 surrounding a flange of the drum, said band having resilient attachment at one of its ends, as indicated at 68, with a part of the platform or deck 15, and being attached at its other end to a lever 69 fixed upon a drum braking shaft 70 to which drum braking mechanism 71 is suitably attached. In Fig. 2, numeral 72 indicates a braking pedal for operating the brake associated with the drum 36, and 73 indicates a braking pedal for operating the brake associated with the drum 37, the operation of said brakes being accomplished through the mechanism 71. Said braking mechanism 71 for the brake for each of the drums 36 and 37 includes serrations 74 for engagement with a notch in the platform or deck 15 to maintain the corresponding brake in operative position when this is intentional, and a coil spring 75, one conveniently attached to each mechanism 71 and to the platform or deck, is for returning the brakes and the actuating mechanisms therefor, including the pedals 72 and 73, to inoperative positions when the serrations 74 are released from the notches, as will be understood. The brakes for the drums 36 and 37 are ordinary structure of machines of the present general character and require no further description herein.

The shaft 60 conveniently supports oppositely disposed bevel gears, represented 76 and 77, each normally loose upon said shaft 60. The bevel gears 76 and 77 mesh with a larger gear 78 fixed upon a vertical shaft 79 suitably mounted in bearings 80 fixed upon the platform or deck 15. Said vertical shaft 79 fixedly carries a pinion 81 at its lower end which meshes with the teeth of the bull gear 23. The bevel gears 76 and 77 mesh with portions of the larger gear 78 at the opposite sides of the vertical shaft 79, and clutches 82 are for separately clutching said bevel gears 76 and 77 to said shaft 60. A single clutch lever 83 is for actuating each of the clutches 82, the arrangement being such that both clutches may be

inoperative, or either one, but not both, operative to clutch one or the other of the bevel gears 76 or 77 to the shaft 60. Evidently, when the bevel gear 76 is clutched to the shaft 60 and said shaft is rotated, the larger gear 78, with the vertical shaft 79 and pinion 81, will be rotated in one direction, and when the bevel gear 77 is clutched to said shaft 60 and the shaft is rotated, said larger gear 78, with the vertical shaft 79 and the pinion 81, will be rotated in opposite direction. Rotation of the pinion 81 in either direction will, obviously, cause the platform or deck 15 to be revolved in direction to correspond about its axis, by reason of the engagement of said pinion 81 with the bull gear 23. The specific arrangement for clutching the bevel gears 76 and 77 to the shaft 60 is well known and requires no fuller description herein.

A brake 84 for the shaft 60, and hence for the revolvable platform or deck 15, may be of any suitable construction, as, for example, more or less similar to the brakes for the drums 36 and 37, and said brake 84 may be actuable by means of a braking pedal 85, similar to the pedals 72 and 73. A brake such as 84 is ordinary equipment of machines of the present general character, and, therefore, requires no further description herein.

A shifting yoke 86, associated with the gear case 51 in any suitable manner (not necessary to be specifically illustrated herein), is for the purpose of connecting the shaft 52 carrying the drum 33 with the shaft 50 which carries the gear 49 driven by the chain 48. The shifting yoke 86 is manipulatable by an operating rod 87, and is adapted to have three different positions, including a position for causing the drum 33 to be rotated in direction to wind up the cable 32 to thus raise or hoist the boom 25, a position for causing said drum 33 to be rotated in opposite direction to unwind said cable 32 to thus allow the boom, etc. to be lowered by gravity, and a neutral position. When the shifting yoke 86 is in neutral position, the drum 33 is held stationary, by worm and worm wheel interengagement within the gear case 51 in the present embodiment of the invention.

A shifting yoke 88, also associated with the gear case 51 in any suitable manner, is for the purpose of connecting the shaft 56 carrying the drums 36 and 37, and the shaft 60 carrying the bevel gears 76 and 77, with said shaft 50. The shifting yoke 88 is manipulatable by an operating rod 89, and is adapted to have three different positions, including a low speed position, a high speed position, and a neutral position. When the shifting yoke 88 is in neutral position, the shafts 56 and 60 are separated from driving connection with the shaft 50.

The clutch 47, for clutching the shaft 43, driven by the generator, with the stub shaft 44, is manipulatable by an operating rod 90. As shown more clearly in Figs. 2, 5 and 6, an end of said rod 90 is pivoted, as at 91, to a lever 92 which is fixed to a shaft 93 mounted in bearings 94 upon the gear case 51. Said shaft 93 also fixedly carries a lever 95 which is pivotally attached to one end of a link 96. Said link 96 is adjustable lengthwise, and the opposite end thereof is pivotally attached to a lever 97 fixed upon a shaft 98 suitably mounted in a bearing 99 and one of the bearings 45 upon the platform or deck. Evidently, longitudinal manipulation of the operating rod 90 will rotate the shaft 98, and the arrangement is such that the clutch 47, between

the shaft 43 and the stub shaft 44, is movable to operative and inoperative positions by rotation of said shaft 98, as will be very clear from Fig. 5.

A throttle lever for the internal combustion engine is designated 100.

It will be evident from the description thus far given, that the clutch 47 can be manipulated to disconnect the shafts 43 and 44, so that the chain 48 and all of the parts driven thereby will be stationary. When the clutch 47 connects said shafts 43 and 44, said chain 48 is driven to rotate the shaft 50 when the internal combustion engine is operative. When said shaft 50 is rotating, the drum 33, the drums 36 and 37, the winch 58, and the vertical shaft 79, can each be stationary or in motion, all independently of each other, and said shaft 79 can be rotated in either direction, necessary or preferred at some particular time. And all of the brakes and clutches thus far described are capable of independent actuation, the operating parts being satisfactorily adapted to accomplish all of the working operations in the machine except those necessary to propel said machine.

The ditcher or crane unit including the revolvable platform or deck, boom, bucket or dipper, winch, etc. is adapted to be propelled by electric motive power, the machine including a pair of electric motors as shown, although a single motor or more than two could be employed. Said electric motors are designated 101 in Figs. 1, 4 and 8 and are actuated or driven in either direction by the generator 42. Each electric motor 101 is conveniently and rigidly attached, as by brackets 102, to the under side of the car frame 10 at location adjacent an axle 12 to be driven. As shown, the shaft of each electric motor 101 carries a pinion 103 which meshes with a gear 104 fixed upon a shaft 105 mounted in brackets 106 fixed to the car frame, and said shaft 105 also carries a gear 107 which meshes with a gear 108 fixed upon the axle 12 to be driven. While the gears 108 are as shown connected directly to the axles 12, the connections could include differentials, as will be apparent. A clutch for making and breaking driving connection between each electric motor 101 and the axle driven thereby is conveniently arranged upon the shaft 105 and is represented 109, and a clutch shifter lever for each clutch 109 is designated 110. The clutches 109 with shifter levers 110 are especially for removing the electric motors 101 from driving connection with the axles 12 when the excavating machine is to be towed or drawn. Ordinarily, the clutches 109 are positioned to drivingly connect said electric motor to said axles.

The electric motors 101 are of the reversing type, and a controller, indicated 111, for said motors is suitably and rigidly mounted upon the revolvable platform or deck 15. See Fig. 2. The controller 111 may be of any construction suiting it to its purpose. It includes a control lever 112 adapted to be manipulated to selected positions to close various different circuits for the electric motors 101 adapted to cause said motors to be driven at predetermined and preferred speed and in either direction. A series of lead wires 113, including a sufficient number suitable to the purpose, extend between the generator 42 and the controller 111. The connection of the lead wires 113 between said generator 42 and said controller 111 can be made in ordinary manner, both said generator and controller being carried by the platform or deck 15 and movable there-

with, and being supported in stationary relation to each other. As shown, two lead wires 113 extend between the generator and the controller. Also as shown, seven lead wires 114 extend between the controller 111 and a contact element assembly, represented generally at 115, and four lead wires 116 extend between each electric motor 101 and said contact element assembly.

It should be remarked that a greater or less number of lead wires, such as 113, 114 and 116, might in some instances be employed, depending upon the type of electrical apparatus, particularly the type of controller, utilized, the present disclosure being illustrative of the principle here involved, and specifically disclosing the requisite number of lead wires for employment with the specific controller 111 illustrated, which controller has heretofore been and is now an article of commerce operable in a well known manner. More specifically stated, I have illustrated, and shall presently describe, a contact element assembly 115 constructed and arranged to function as a connector between lead wires from the controller 111 and lead wires from the electric motors 101 in instances when seven lead wires extend between the controller and contact element assembly and four lead wires extend between each electric motor and said contact element assembly. In case of alteration or modification of said electric hook-up, the contact element assembly 115 can, of course, be altered or modified to suit the conditions.

As will be apparent, the electric motors 101 being fixed upon the car frame 10, and the controller 111 being fixed upon the revolvable platform or deck 15 in spaced relation to the axis thereof, and movable with said platform or deck, an arrangement of conducting connections between said controller and electric motors which includes no loose and dangling lead wires is desirable although it is to be understood that the lead wires 114 and 116 as disclosed could be joined together in appropriate manner, sufficient slack in the connections to allow for the revolving movements of the platform or deck 15 of course being permitted, and the contact element assembly 115 thus eliminated. But said contact element assembly, or equivalent, making provision for neat, practical and vastly more satisfactory conducting connections between said controller and said electric motors is greatly to be preferred.

The contact element assembly 115 is very clearly disclosed in Fig. 3. As there shown, an insulating plate 117 rests upon the upper end of the upright or standard 16 and includes an upwardly extending hub 118 which is arranged centrally over the vertical opening 18 and is provided with a central vertical opening 119 for a purpose to be set forth, said opening 119 also extending through the insulating plate. A guard disc 120 of insulating material is attached to the upper surface of the hub 118, as by screws 121, and includes an opening which aligns with the opening 119.

An upper collar 122 of insulating material is rotatably fitted into the upper end portion of the vertical opening in the hollow upright or standard 16, and said collar 122 includes a concavity 123 in its upper end directly beneath the insulating plate 117, and an opening 124 beneath said concavity and in vertical alignment with the opening 119. A lower collar 125 of insulating material is rotatably fitted into the lower end

portion of the vertical opening in the upright or standard 16, and said collar 125 includes an annular flange 126 directly beneath said vertical opening at the elevation of the car frame 10, and an opening 127 in vertical alignment with the openings 119 and 124. A tube 128 of insulating material is disposed in the vertical opening in the upright or standard 16 and extends between the collars 122 and 125 as a pipe separator for said collars.

A hollow tie pipe 129 extends through the openings 124 and 127, and projects beyond the lower end of the collar 125 for some considerable distance. The upper end of the tie pipe 129 carries a collar 130 which is arranged in the concavity 123, and the lower end of said tie pipe has thereon a nut or nuts, 131 arranged at the outer side of a washer 132 upon said tie pipe.

A series of contact rings 133, seven as shown, are arranged about the tie pipe 129 in spaced relation thereto and between the lower collar 125 and the washer 132, and a series of separator insulating discs 134, seven as shown, are arranged between each pair of adjacent contact rings 133 and between the lowermost contact ring and the washer 132.

A series of connector rods 135, seven as shown, including one connector rod for each contact ring, extend in spaced relation to each other through the insulating plate 117, the upper collar 122, the tube 128, the lower collar 125, and a greater or less number of the contact rings 133 and insulating discs 134, said connector rods being of variable lengths, and being in spaced relation to all contact rings except one to which connected.

The upper end of each connector rod 135 carries a nut 136 which attaches a contact member 137 to said connector and against the insulating plate 117 beneath the guard disc 120, and each contact member 137 is separately attached to a lead wire 114 from the controller 111. The lower end portions of the connector rods 135 are threaded, as at 138, and the threaded portion 138 of each connector rod 135 is received in an internally threaded boss 139 upon a contact ring 133, each contact ring having a boss adapted to separately receive a connector rod.

The nut, or nuts, 131 upon the tie pipe 129 is, obviously, adapted to be turned home against the washer 132 to clamp all of the elements as so far described of the contact element assembly into a unitary structure, which structure is adapted to revolve in the vertical opening through the upright or standard 16 with the platform or deck 15 as this revolves. To the end that said unitary structure will revolve with said platform or deck, the insulating plate 117 is provided with a slot 140 which receives a corner portion of a bracket 141 suitably fixed upon the platform or deck, and for a further purpose to be set forth. Evidently, by thus causing rotation of the insulating plate 117 with the revolvable platform or deck, all of the connector rods 135 and contact members 137 bear stationary or fixed relation with respect to the controller 111, so that the lead wires 114 can be connected between the connector rods 135 and the controller 111 in ordinary manner.

The contact element assembly 115 also includes spaced apart contact brushes 142, one in engagement with each contact ring 133. Said contact brushes 142 can be of any ordinary or preferred construction. As shown each contact

brush 142 is carried by a holder 143 therefor, and said holders 143 are suitably fixed in spaced relation to each other upon an insulating pipe 144 itself conveniently carried by the car frame 10, as at 145, and by a bracket 146 upon said car frame. The brush holders 143 support the lead wires 116 which are appropriately connected to the electric motors 101. Said brush holders and electrical motors obviously having stationary or fixed relation with respect to each other, the connection for both ends of said lead wires 116 can be ordinary binding post connections.

It will be seen that the parts of the contact element assembly 115 which move relatively to each other in practice are the unitary structure including the contact rings 133 which are rotatable relatively to the contact brushes 142, and said contact brushes 142 ride said contact rings 133 as these rotate, to continuously provide conducting capacity for electrical current between each of the lead wires 114 and the corresponding lead wires 116.

It has been stated that the generator 42 is designed for drooping characteristics of the generator volt-ampere curve—the voltage being high for low current and low for high current. Consequently, under heavy load the speeds of the electric motors 101 will automatically adjust themselves to a low value, while under light load conditions the speeds of said electric motors will automatically adjust themselves to a high value. As shown, there are two electric motors 101 which operate in series at low speeds and in parallel at higher speeds.

An electric generator, such as 42, designed with the purpose in view of providing a high-starting tractive effort, a great range of speed, and a high maximum speed for a locomotive ditcher, crane, etc., obviously could not be at the same time used for energizing electric motor means for operating the hoisting, swinging and boom hoisting units of said locomotive ditcher, crane, etc., because it is necessary that operations of said hoisting, swinging and boom hoisting units be performed at constant speed. If the hoisting, swinging and boom hoisting units of the machine of the invention were driven by electric motors, as in several machines of the prior art, it would be necessary to supply one or more additional generators, actuated by the engine 38, to supply current to said motors. That is to say, motor means as driven in the machine of the invention would be necessary to propel the machine by receiving power from the generator 42, and one or more additional generators for energizing additional motors for operating the hoisting, swinging and boom hoisting units would also be required. An additional generator or generators would entail considerable expense, and additional generators and motors would be prohibitive on account of limited space on a machine of the present character. The mechanical drive of the hoisting, swinging and boom hoisting units is much simpler and considerably less expensive.

As will be clear from the full description hereinbefore appearing, a machine made according to the invention obtains high tractive effort at low speeds, a wide range of speeds, and high traveling speeds, as well as constant speed for all operations of the hoisting, swinging and boom hoisting units. And to the accomplishment of these ends, the machine requires but a single generator, in combination with the devices mechanically propelled by the engine 38 to operate all of the hoisting, swinging and boom hoisting units. The

machine is propelled independently of the actuation of the excavating, hoisting and revolving units, and by employment of mechanism of the simplest type possible the machine is more flexible than more or less similar machines heretofore known.

The proper and ideal location of the power plant of a machine of the present character is upon the revoluble platform or deck, as illustrated and described. From the power plant motion is transmitted or translated to the various entities of the machine required to be operated in the simplest manner possible and in a manner to preserve the maximum in capacity and the maximum in operating results, considered from the standpoint of precisely those operations required to be performed by a machine of the present nature.

The machine includes brakes 147 for the wheels 13 of the car. As disclosed, there is a brake 147 upon each shaft 105, said brake being arranged to engage its corresponding shaft 105 at the side of a bracket 106 opposite the gear 107. See Fig. 4. The brakes 147 may be of any ordinary or preferred construction. Numeral 148 denotes a reach rod extending inwardly from each brake 147, each reach rod 148 being pivotally attached at its outer end, as at 149, to suitable manipulating mechanism for the corresponding brake. The inner end of each reach rod 148 is pivotally attached, as at 150, to a lever 151, and the levers 151 are fixed upon a horizontal shaft 152 suitably mounted for rotation in bearings 153 fixedly attached to and under part of the car frame 10. The levers 151 as disclosed are arranged substantially diametrically opposite each other upon the shaft 152, one of said levers 151 normally extending upwardly and the other downwardly, as in Fig. 3.

A braking pedal for rotating or oscillating the horizontal shaft 152 is indicated 154, and braking mechanism, denoted generally at 155, connects said braking pedal 154 with a shaft 156 mounted in suitable bearings 157 upon the platform or deck 15, one of said bearings 157 being arranged in the bracket 141. The connection between the braking pedal 154 and the shaft 156 is of such nature that manipulation of said braking pedal causes said shaft to rotate or oscillate. Means for locking the braking pedal 154 in any depressed position, and for returning said braking pedal to normal, elevated position when released, may be similar to the means for the same purpose already described in connection with the pedals 72 and 73.

A lever 158 is conveniently fixed to the shaft 156, as at 159, and said lever 158 includes a bifurcated outer end portion 160.

A vertically reciprocable brake rod 161 is arranged to slide in the hollow tie pipe 129 and the openings through the guard disc 120 and the hub 118, and said brake rod extends upwardly a distance beyond said guard disc 120 and downwardly a distance beyond the nuts 131.

A suitable lost motion, swivel connection between the bifurcated end portion 160 of the lever 158 and the upper end portion of the vertical brake rod 161, is represented generally at 162, and another lost motion connection between the lower end portion of said brake rod 161 and the adjacent bifurcated end portion 163 of a lever 164 having its opposite end portion fixed to the horizontal shaft 152, as at 165, is denoted generally at 166. It will be obvious that rotation or oscillation of the shaft 156, produced by actuation of the braking pedal 154, will cause vertical reciprocation of the brake rod 161, which re-

ciprocation will in turn rotate or oscillate the horizontal shaft 152, through the instrumentality of the lever 164, to thus manipulate the levers 151 and the reach rods 148 to operate the brakes 147 in a manner which will be understood. It will be apparent that either, or both, of the connections 162 and 166 will be constructed to care for the revolving of the platform or deck 15 relatively to the car frame 10, the portion of the wheel braking mechanism upon the platform or deck obviously having movement of rotation relatively to the portion of said wheel braking mechanism upon the car frame when the platform or deck is revolved.

As will be very clear from Fig. 2, all of the elements for manipulating the various working parts of the excavating machine, including both the working parts having to do with swinging and hoisting, and the working parts having to do with propulsion of the machine, are arranged to be conveniently accessible to an operator. See the elements 63, 65, 83, 72, 73, 154, 100, 85, 87, 89, 90 and 112.

Among the many advantages of the present design of machine, those of simplicity of construction and smoothness of control might be specifically mentioned. The propelling arrangement as described gives extremely smooth acceleration with the engine developing the maximum horsepower at all speeds, since the speed of the engine is constant. A high traveling speed is obtainable. A very high draw bar pull can be obtained at slow speeds.

What is claimed is:

1. An excavating machine comprising a car body having supporting wheels, a revolvable platform upon said car body, electric motor means upon the car body and connected up to propel said supporting wheels, devices upon said revolvable platform adapted to be actuated to accomplish hoisting and swinging operations, a prime mover upon said revolvable platform, means mechanically driven by said prime mover for actuating said devices for accomplishing said hoisting and swinging operations, a generator upon said revolvable platform for energizing said electric motor means, and means connecting said generator with said prime mover to be driven thereby.

2. An excavating machine comprising a car body having supporting wheels, a revolvable platform upon said car body, electric motor means upon the car body and connected up to propel said supporting wheels at variable speeds, devices upon said revolvable platform adapted to be actuated to accomplish hoisting and swinging operations, a prime mover upon said revolvable platform adapted to be operated at constant speed, means mechanically driven by said prime mover for actuating said devices for accomplishing said hoisting and swinging operations at constant speed, a generator upon said revolvable platform for energizing said electric motor mean, and means connecting said generator with said prime mover to be driven thereby.

3. An excavating machine comprising a car body having supporting wheels, a platform revolvably mounted upon said car body, electric motor means upon the car body and connected up to propel said supporting wheels, devices upon said revolvable platform adapted to be actuated to accomplish hoisting operations and revolving operations of said platform, an internal combustion engine upon said revolvable platform, means mechanically driven by said internal com-

bustion engine for actuating said devices for accomplishing hoisting operations and revolving operations of the platform, a generator upon said revolvable platform for energizing said electric motor means, and means connecting said generator with said internal combustion engine to be driven thereby.

4. An excavating machine comprising a car body having supporting wheels, a platform revolvably mounted upon said car body, electric motor means upon the car body and connected up to propel said supporting wheels at variable speeds in either direction, devices upon said revolvable platform adapted to be actuated to accomplish hoisting operations and revolving operations of said platform, an internal combustion engine upon said revolvable platform adapted to be operated at constant speed, means mechanically driven at constant speed by said internal combustion engine for actuating said devices for accomplishing hoisting operations and revolving operations of the platform, a generator upon said revolvable platform for energizing said electric motor means, and means connecting said generator with said internal combustion engine to be driven thereby.

5. An excavating machine comprising a car body having supporting wheels, a revolvable platform upon said car body, devices supported by said revolvable platform adapted to be actuated to cause the platform to be revolved, devices supported by said revolvable platform adapted to be actuated to accomplish hoisting operations, electric motor means supported by said car body adapted to be driven to propel said supporting wheels, a prime mover upon said revolvable platform, mechanical means upon the revolvable platform and driven by said prime mover for actuating said devices to cause said platform to be revolved and to accomplish said hoisting operations, a generator supported upon said revolvable platform for energizing said electric motor means, electrical connections between said generator and said electric motor means, and means connecting said generator with said prime mover to be driven thereby.

6. An excavating machine comprising a car body having supporting wheels, a revolvable platform upon said car body, devices supported by said revolvable platform adapted to be actuated at constant speed to cause the platform to be revolved, devices supported by said revolvable platform adapted to be actuated at constant speed to accomplish hoisting operations, electric motor means supported by said car body adapted to be driven at variable speeds to propel said supporting wheels, a prime mover upon said revolvable platform adapted to be operated at constant speed, means upon the revolvable platform and mechanically driven at constant speed by said prime mover for actuating said devices to cause said platform to be revolved and to accomplish said hoisting operations, a generator supported upon said revolvable platform for energizing said electric motor means, electrical connections between said generator and said electric motor means, and means for connecting said generator with said prime mover to be driven thereby.

7. An excavating machine comprising a car body having supporting wheels, a platform revolvably mounted upon said car body, devices supported by said revolvable platform adapted to be actuated at constant speed to cause the platform to be revolved, devices supported by said

revolvable platform adapted to be actuated at constant speed to accomplish hoisting operations, electric motor means supported by said car body adapted to be driven at variable speeds in either direction to propel said supporting wheels, an internal combustion engine upon said revolvable platform adapted to be operated at constant speed, means upon the revolvable platform and mechanically driven at constant speed by said internal combustion engine for actuating said devices to cause said platform to be revolved and to accomplish said hoisting operations, a generator supported upon said revolvable platform for energizing said electric motor means, electrical connections between said generator and said electric motor means, and means for connecting said generator with said internal combustion engine to be driven thereby.

8. An excavating machine comprising a car body having supporting wheels, a platform revolvably mounted upon said car body, devices supported by said revolvable platform adapted to be actuated at constant speed to cause the platform to be revolved, devices supported by said revolvable platform adapted to be actuated at constant speed to accomplish hoisting operations, electric motor means supported by said car body adapted to be driven at variable speeds in either direction to propel said supporting wheels, an internal combustion engine upon said revolvable platform adapted to be operated at constant speed, means upon the revolvable platform and mechanically driven at constant speed by said internal combustion engine for actuating said devices to cause said platform to be revolved and to accomplish said hoisting operations, a generator supported upon said revolvable platform for energizing said electric motor means, a controller upon said revolvable platform, electrical circuits including said generator, controller and electric motor means, and means for connecting said generator with said internal combustion engine to be driven thereby.

9. An excavating machine comprising a car body, a revolvable platform thereon, devices for revolving said platform and for accomplishing hoisting operations mounted upon said revolvable platform, electric motor means upon said car body for propelling said machine, a generator upon said revolvable platform for supplying energy to said electric motor means, conducting connections from said generator to said electric motor means, a prime mover upon said revolvable platform, means for connecting said prime mover to said generator to continuously drive the same, and means for selectively and independently connecting said prime mover to each of said devices to actuate the same while said generator is in operation, said last mentioned means including mechanism whereby a plurality of said devices can be simultaneously actuated.

10. An excavating machine comprising a car body, a revolvable platform thereon, devices for revolving said platform and for accomplishing hoisting operations mounted upon said revolvable platform, electric motor means upon said car body for propelling said machine, a generator upon said revolvable platform for supplying energy to said electric motor means, conducting connections from said generator to said electric motor means, a prime mover upon said revolvable platform, means for connecting said prime mover to said generator to drive the same, mechanical driving connections between said prime mover and each of said devices, and means for causing

said devices to be selectively actuated by said prime mover independently of the actuations of said generator, said last mentioned means including mechanism whereby a plurality of said devices can be simultaneously actuated.

11. An excavating machine comprising a car body, a revolvable platform thereon, a prime mover upon said revolvable platform, devices for hoisting and for revolving said platform mounted upon said revolvable platform, a generator upon said revolvable platform, mechanical driving connections between said prime mover and said devices for hoisting and for revolving said platform, a mechanical driving connection between said prime mover and said generator, means for causing said devices for hoisting and for revolving said platform to be selectively actuated by said prime mover independently of the actuations of said generator, said means including mechanism whereby a plurality of said devices can be actuated simultaneously and concurrently with the actuation of said generator, electric motor means upon said car body, members driven by said motor means to propel the machine, a controller upon the machine, and conducting connections between said generator and said controller and between said controller and said electric motor means.

12. An excavating machine comprising a car body, a revolvable platform thereon, a prime mover upon said revolvable platform, devices for revolving said platform mounted thereon, mechanical driving connections between said prime mover and said devices for revolving said platform, hoisting devices mounted upon said revolvable platform, mechanical driving connections between said prime mover and said hoisting devices, a generator upon said revolvable platform, a mechanical driving connection between said prime mover and said generator, means for causing said devices for revolving said platform and for hoisting to be selectively actuated by said prime mover independently of the actuations of said generator, said means including mechanism whereby a plurality of said devices can be actuated simultaneously, electric motor means upon said car body, means driven by said motor means to propel said machine, and conducting connections between said generator and said electric motor means.

13. An excavating machine comprising a car body, a revolvable platform thereon, a prime mover upon said revolvable platform, devices for revolving said platform and for accomplishing excavating and hoisting operations mounted upon said revolvable platform, mechanical driving connections between said prime mover and each of said devices, means for causing said devices to be selectively and independently actuated by said prime mover, said means including mechanism whereby a plurality of said devices can be simultaneously actuated, a generator upon said revolvable platform and driven by said prime mover independently of actuations of said devices, electric motor means upon said car body, means driven by said motor means to propel the machine, and conducting connections between said generator and said electric motor means.

14. An excavating machine comprising a car body, a revolvable platform thereon, a prime mover upon said revolvable platform, excavating and hoisting and swinging devices upon said revolvable platform, a generator upon said revolvable platform, mechanical driving connections between said prime mover and said generator

and between said prime mover and said devices, respectively, means for causing said devices to be selectively actuated by said prime mover independently of each other and independently of said generator, said means including mechanism whereby a plurality of said devices can be simultaneously actuated, electric motor means upon said car body, means driven by said motor means to propel the machine, and conducting connections between said generator and said electric motor means.

15. An excavating machine comprising a car body, a revoluble platform thereon, a boom and operating mechanism for said boom mounted upon said revoluble platform, means for revolving said platform, a prime mover upon said revoluble platform and mechanically connected up to actuate said boom operating mechanism and said means for revolving said platform, a generator upon said revoluble platform and driven by said prime mover, electric motor means upon said car body, means driven by said motor means to propel the machine, and conducting connections between said generator and said electric motor means.

16. An excavating machine comprising a car body having traveling wheels, a revoluble platform upon said car body, devices for revolving said platform and for accomplishing hoisting operations mounted upon said revoluble platform, electric motor means upon said car body for propelling said traveling wheels, a generator upon said revoluble platform for supplying energy to said electric motor means, said generator being adapted to cause said electric motor means to adjust itself to speeds of relatively lower value under heavier loads and of relatively higher value under lighter loads, conducting connections from said generator to said electric motor means, a prime mover upon said revoluble platform, means for connecting said prime mover to said generator to drive the same, and means for mechanically selectively connecting said prime mover to each of said devices for revolving said platform and for accomplishing hoisting operations.

17. An excavating machine comprising a car body having traveling wheels, a revoluble platform upon said car body, devices for revolving said platform and for accomplishing hoisting operations mounted upon said revoluble platform, electric motor means upon said car body for propelling said traveling wheels at variable speeds, a generator upon said revoluble platform for supplying energy to said electric motor means, said generator being adapted to cause said electric motor means to adjust itself to speeds of relatively lower value under heavier loads and of relatively higher value under lighter loads, conducting connections from said generator to said electric motor means, a prime mover upon said revoluble platform adapted to be operated at constant speed, means for connecting said prime mover to said generator to drive the same, and means for mechanically selectively connecting said prime mover to each of said devices for revolving said platform and for accomplishing hoisting operations.

18. An excavating machine comprising a car body having traveling wheels, a revoluble platform upon said car body, devices for revolving said platform and for accomplishing hoisting operations mounted upon said revoluble platform, electric motor means upon said car body for propelling said traveling wheels at variable

speeds, a generator upon said revoluble platform for supplying energy to said electric motor means, conducting connections from said generator to said electric motor means, a prime mover upon said revoluble platform adapted to be operated at constant speed, means for connecting said prime mover to said generator to drive the same, and means for mechanically selectively connecting said prime mover to each of said devices for revolving said platform and for accomplishing hoisting operations, whereby to actuate all of said devices at constant speed.

19. An excavating machine comprising a car body having traveling wheels, a platform revoluble upon said car body, electric motor means upon the car body adapted to propel said traveling wheels at variable speeds, devices adapted to be actuated to revolve said platform and to accomplish hoisting operations mounted upon said revoluble platform, a prime mover mounted upon said revoluble platform, means for selectively mechanically connecting said prime mover to any of said devices, whereby each of the devices can be actuated at constant speed, a generator upon said revoluble platform for energizing said electric motor means, conducting connections from said generator to said electric motor means, and means mechanically connecting said generator to said prime mover to be driven thereby.

20. An excavating machine comprising a car body having traveling wheels, electric motor means upon said car body adapted to propel said traveling wheels at variable speeds, a platform revoluble upon said car body, a power plant mounted upon said revoluble platform, said power plant consisting of a prime mover and a generator adapted to be actuated by said prime mover, devices adapted to be actuated to revolve said platform and to accomplish hoisting operations mounted upon said revoluble platform, means for selectively mechanically connecting said prime mover to any of said devices, and conducting connections from said generator to said electric motor means.

21. An excavating machine comprising a car body having supporting wheels, a platform revolubly mounted upon said car body, devices supported by said revoluble platform adapted to be actuated at constant speed to cause the platform to be revolved, devices supported by said revoluble platform adapted to be actuated at constant speed to accomplish hoisting operations, electric motor means supported by said car body adapted to be driven at variable speeds in either direction to propel said supporting wheels, a prime mover upon said revoluble platform adapted to be operated at constant speed, means upon the revoluble platform and mechanically driven at constant speed by said prime mover for actuating said devices to cause said platform to be revolved and to accomplish said hoisting operations, a generator supported upon said revoluble platform for energizing said electric motor means, electrical connections between said generator and said electric motor means, and means for connecting said generator with said prime mover to be driven thereby.

22. An excavating machine comprising a car body having supporting wheels, a platform revolubly mounted upon said car body, devices supported by said revoluble platform adapted to be actuated at constant speed to cause the platform to be revolved, devices supported by said revoluble platform adapted to be actuated

at constant speed to accomplish hoisting operations, electric motor means supported by said car body adapted to be driven at variable speeds in either direction to propel said supporting wheels, a prime mover upon said revolvable platform adapted to be operated at constant speed, means upon the revolvable platform and mechanically driven at constant speed by said prime mover for actuating said devices to cause said platform to be revolved and to accomplish said hoisting operations, a generator supported upon said revolvable platform for energizing said electric motor means, a controller upon said revolvable platform, electric circuits including said generator, controller and electric motor means, and means for connecting said generator with said prime mover to be driven thereby.

23. An excavating machine comprising a car body having traveling wheels, a revolvable platform upon said car body, devices for revolving said platform and for accomplishing hoisting operations mounted upon said revolvable platform, electric motor means upon said car body for propelling said traveling wheels, a generator upon said revolvable platform for supplying energy to said electric motor means, said generator being adapted to cause said electric motor means to adjust itself to speeds of relatively lower value under heavier loads and of relatively higher value under lighter loads, conducting connections from said generator to said electric motor means, an internal combustion engine upon said revolvable platform, means for connecting said internal combustion engine to said generator to drive the same, and means for mechanically selectively connecting said internal combustion engine to each of said devices for revolving said platform and for accomplishing hoisting operations.

24. An excavating machine comprising a car body having traveling wheels, a revolvable platform upon said car body, devices for revolving said platform and for accomplishing hoisting operations mounted upon said revolvable platform, electric motor means upon said car body for propelling said traveling wheels at variable speeds, a generator upon said revolvable platform for supplying energy to said electric motor means, said generator being adapted to cause said electric motor means to adjust itself to speeds of relatively lower value under heavier loads and of relatively higher value under lighter loads, conducting connections from said generator to said electric motor means, an internal combustion engine upon said revolvable platform adapted to be operated at constant speed, means for connecting said internal combustion engine to said generator to drive the same, and means for mechanically selectively connecting said internal combustion engine to each of said devices for revolving said platform and for accomplishing hoisting operations.

25. An excavating machine comprising a car body having traveling wheels, a revolvable platform upon said car body, working devices mounted upon said revolvable platform, electric motor means upon said car body for propelling said traveling wheels, a generator upon said revolvable platform for supplying energy to said electric

motor means, said generator being adapted to cause said electric motor means to adjust itself to speeds of relatively lower value under heavier loads and of relatively higher value under lighter loads, conducting connections from said generator to said electric motor means, a prime mover upon said revolvable platform, means for connecting said prime mover to said generator to drive the same, and means for mechanically selectively connecting said prime mover to each of said working devices.

26. An excavating machine comprising a car body having traveling wheels, a revolvable platform upon said car body, working devices upon said revolvable platform, electric motor means upon said car body for propelling said traveling wheels at variable speeds, a generator upon said revolvable platform for supplying energy to said electric motor means, said generator being adapted to cause said electric motor means to adjust itself to speeds of relatively lower value under heavier loads and of relatively higher value under lighter loads, conducting connections from said generator to said electric motor means, a prime mover upon said revolvable platform adapted to be operated at constant speed, means for connecting said prime mover to said generator to drive the same, and means for mechanically selectively connecting said prime mover to each of said working devices.

27. An excavating machine comprising a car body having supporting wheels, a platform revolvably mounted upon said car body, working devices supported by said revolvable platform and adapted to be operated at constant speed, electric motor means supported by said car body adapted to be driven at variable speeds in either direction to propel said supporting wheels, a prime mover upon said revolvable platform adapted to be operated at constant speed, means upon the revolvable platform and mechanically driven at constant speed by said prime mover for actuating said working devices, a generator supported upon said revolvable platform for energizing said electric motor means, electrical connections between said generator and said electric motor means, and means for connecting said generator with said prime mover to be driven thereby.

28. An excavating machine comprising a car body having supporting wheels, a platform revolvably mounted upon said car body, working devices supported by said car body and adapted to be actuated at constant speed, electric motor means supported by said car body adapted to be driven at variable speeds in either direction to propel said supporting wheels, a prime mover upon said revolvable platform adapted to be operated at constant speed, means upon said revolvable platform and mechanically driven at constant speed by said prime mover for actuating said working devices, a generator supported upon said revolvable platform for energizing said electric motor means, a controller upon said revolvable platform, electric circuits including said generator, controller and electric motor means, and means for connecting said generator with said prime mover to be driven thereby.