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M. SCHALSCHA.

ELECTRIC LOCOMOTIVE AND RAILWAY SYSTEM THEREFOR.

No. 576,622. Patented Feb. 9, 1897.

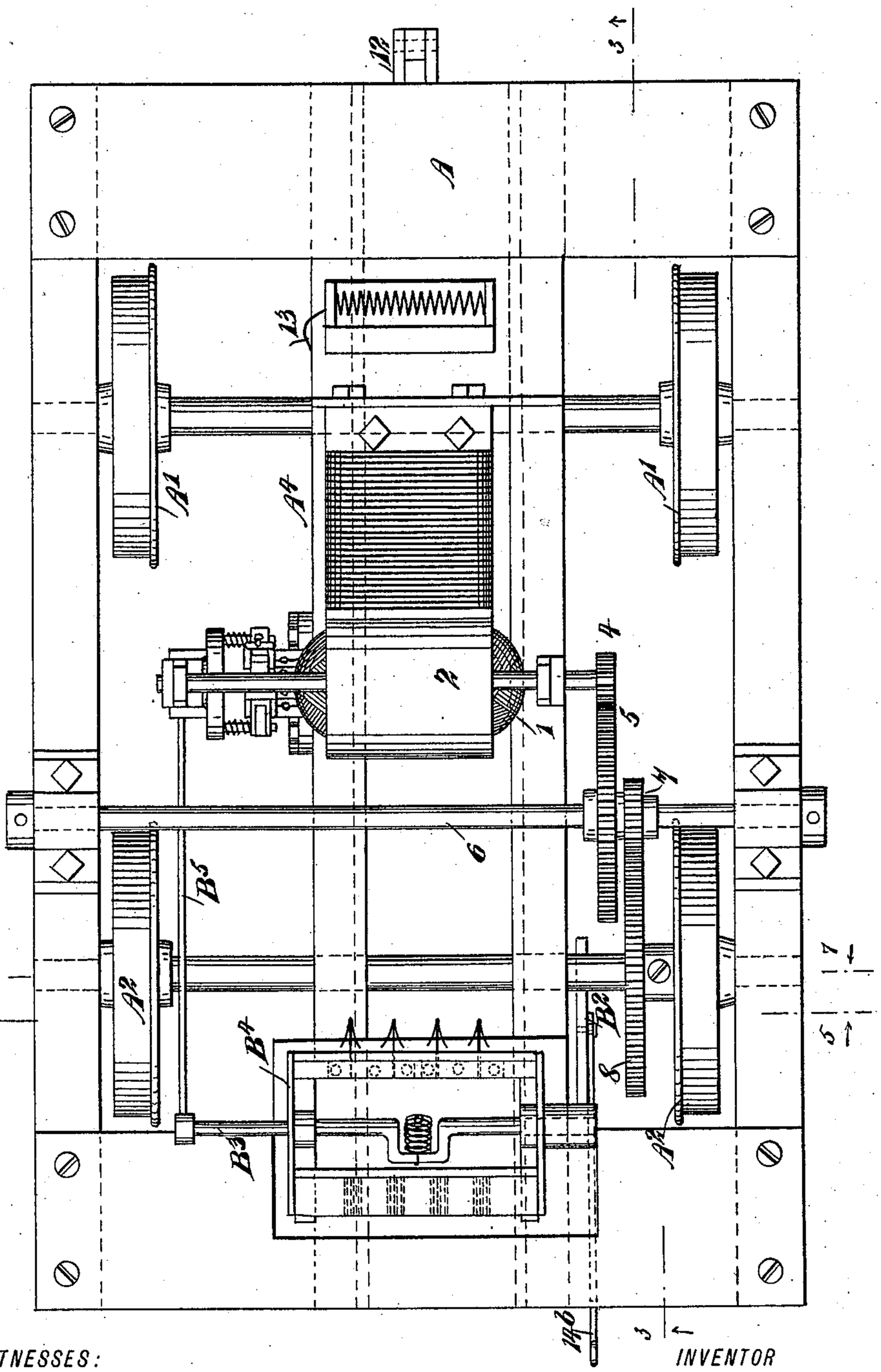

Fig. 1.

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Fig. 2

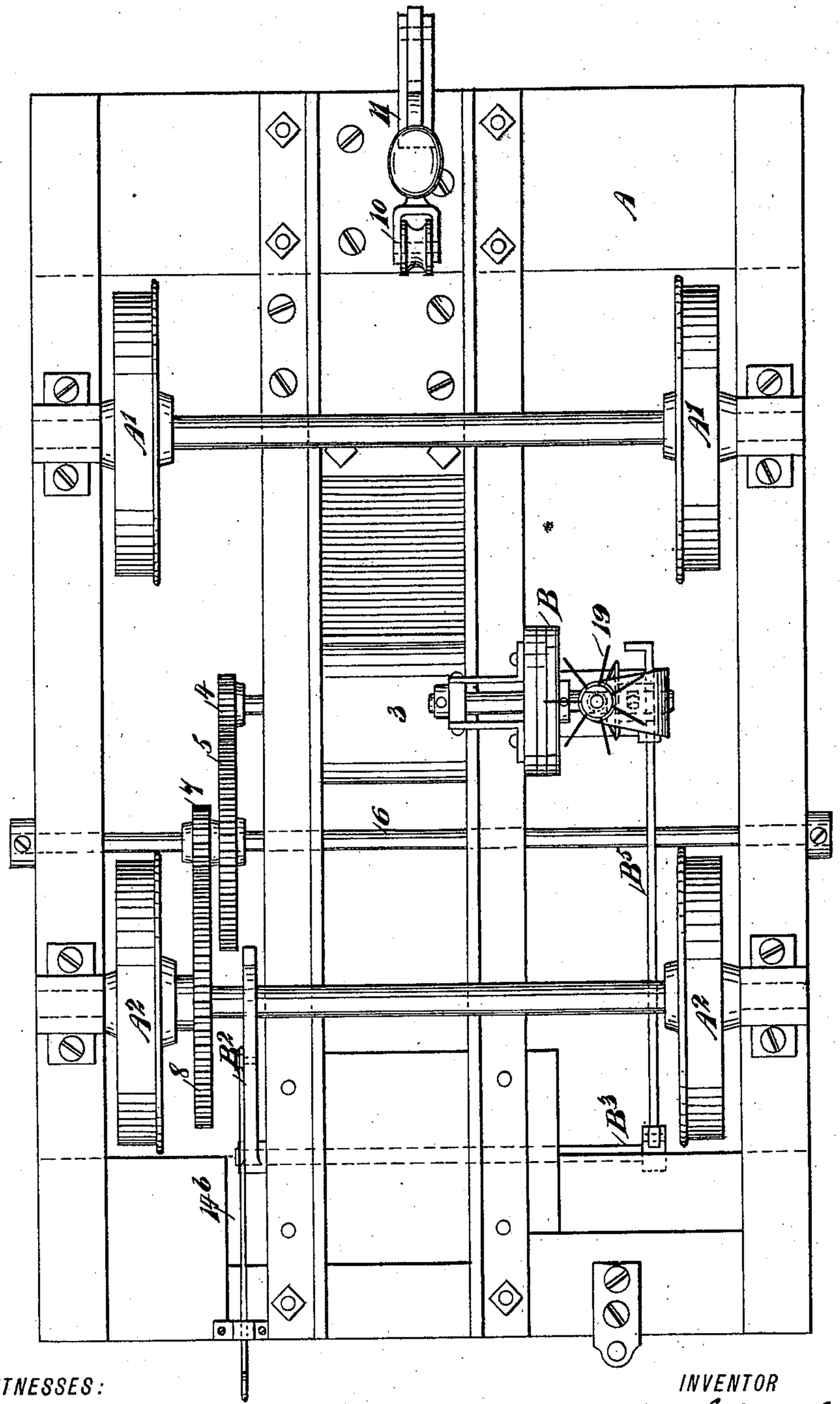

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Fig. 4

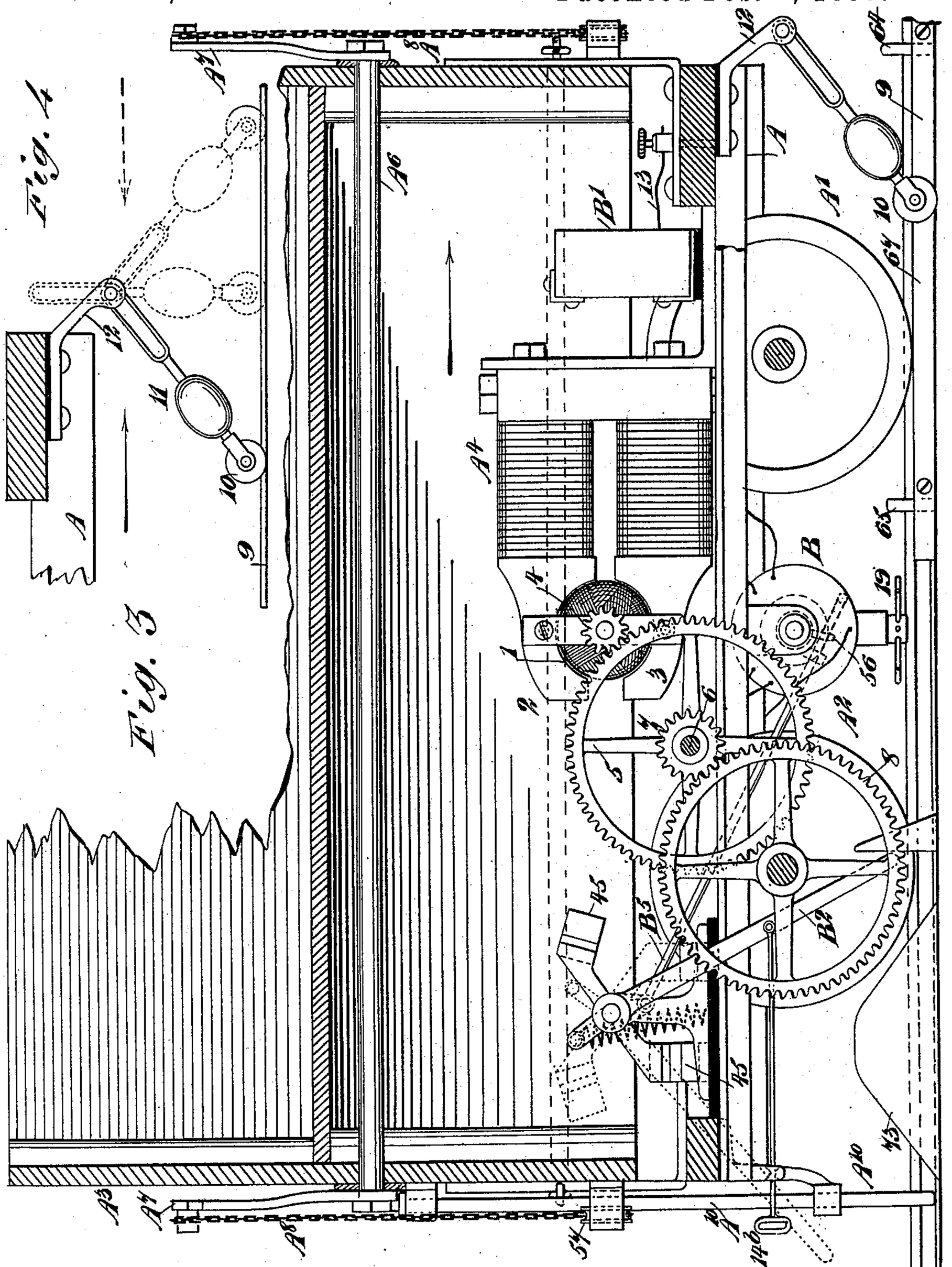

Fig. 5

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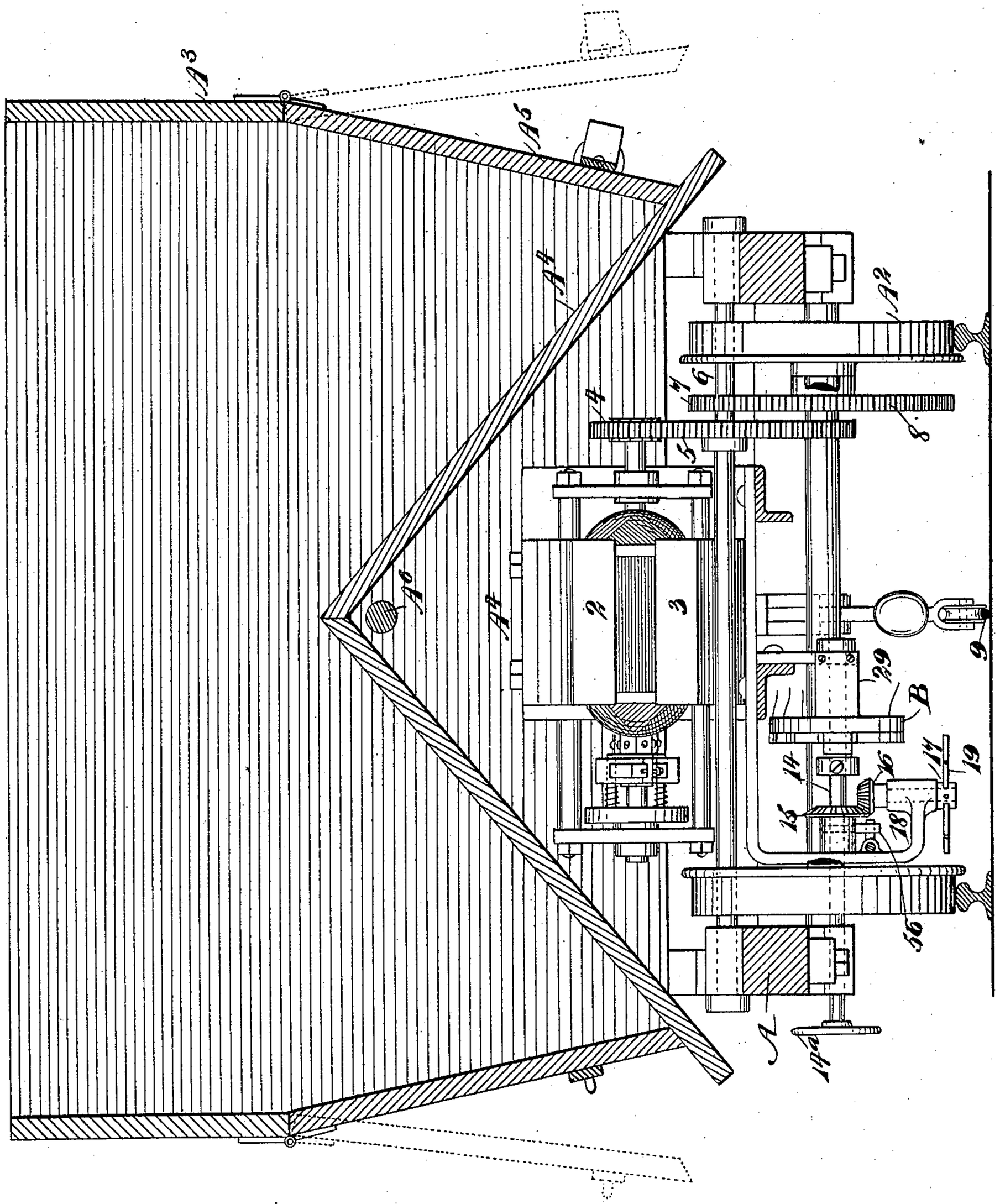

Fig. 5.

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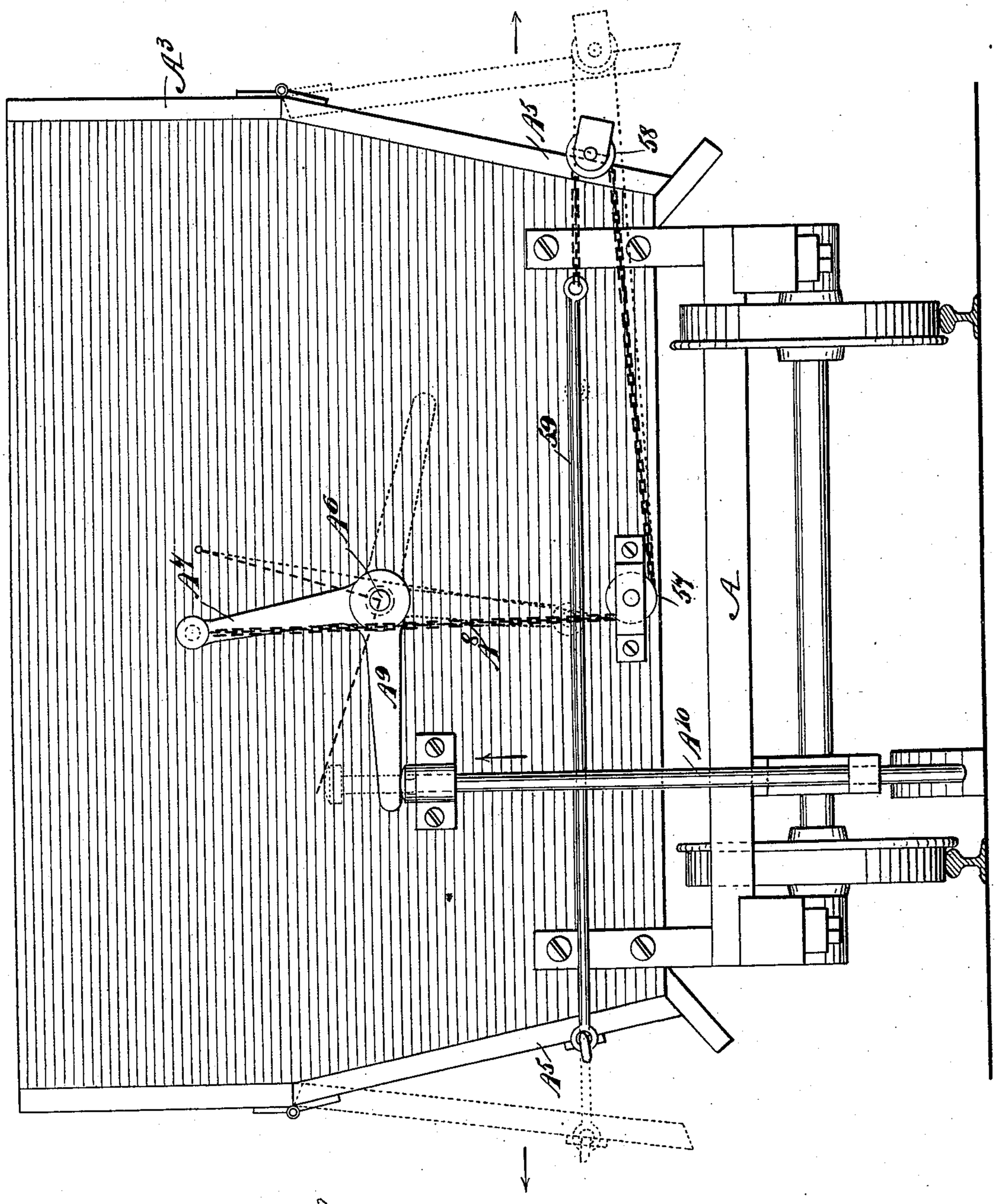

Fig. 6.

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Fig. 10

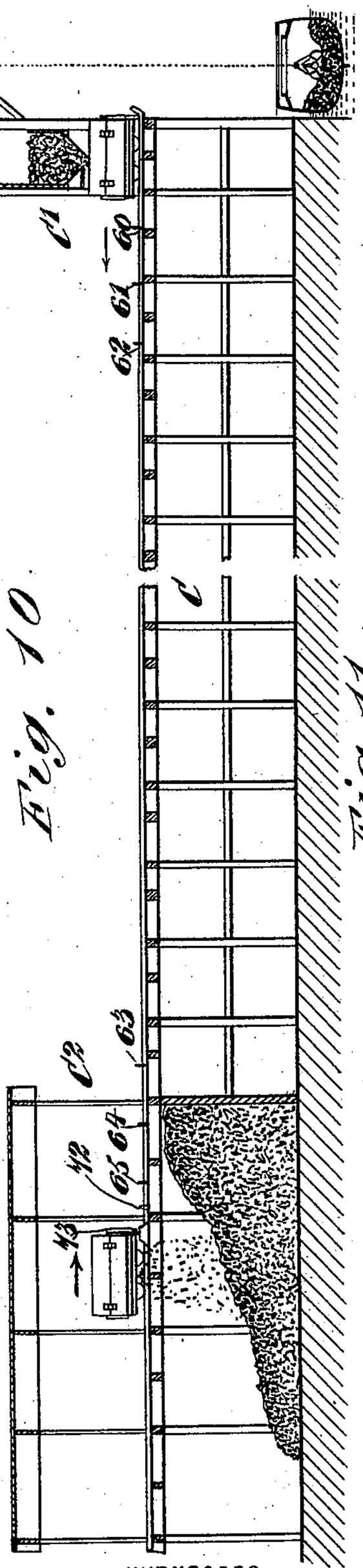


Fig. 11

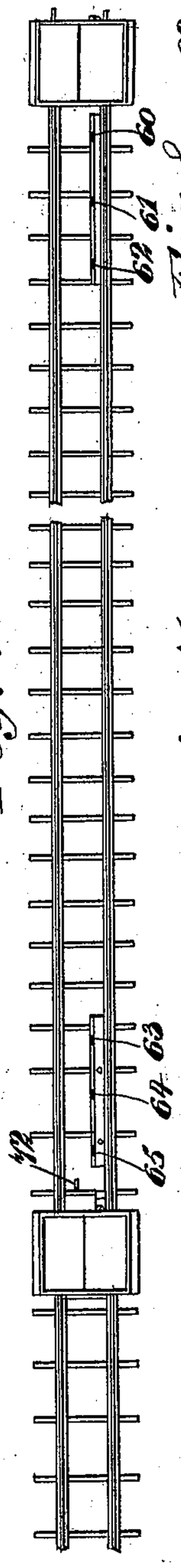


Fig. 8

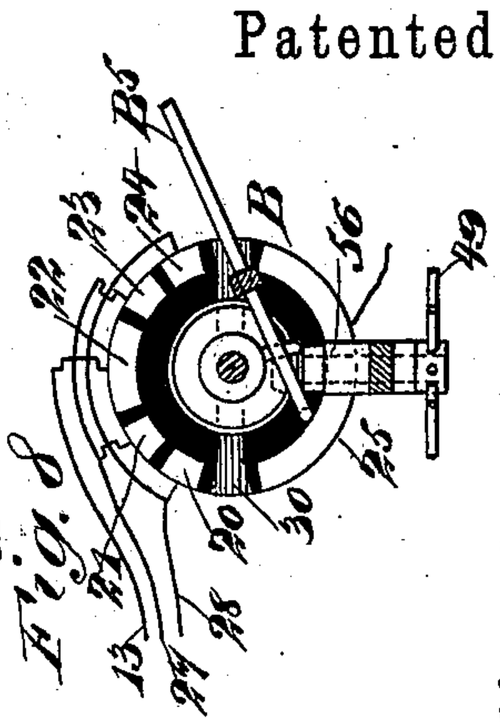


Fig. 9

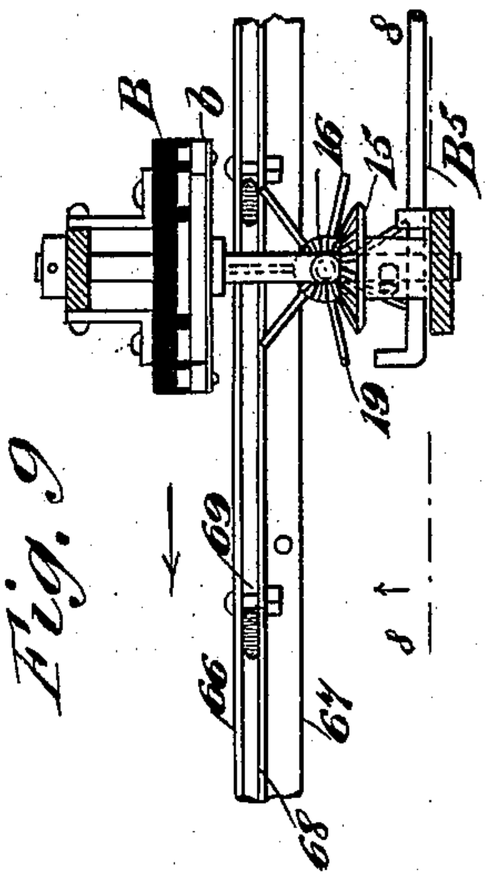
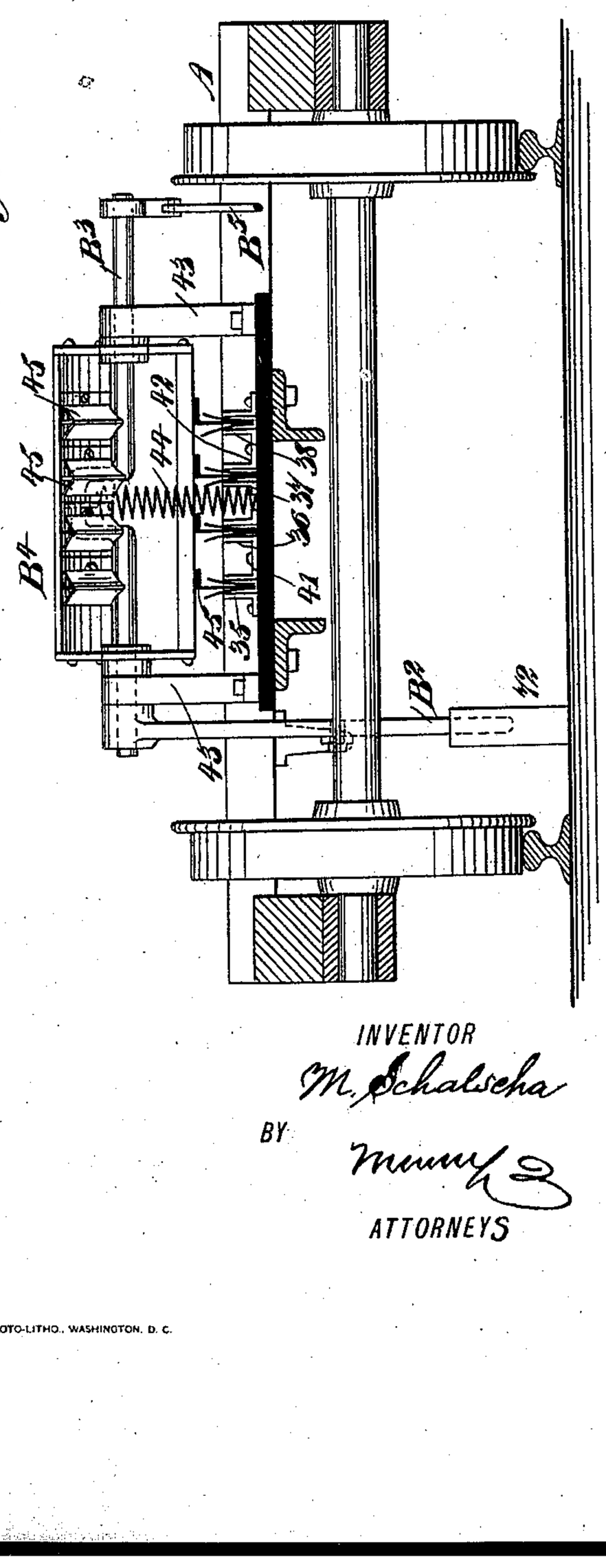


Fig. 7



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ELECTRIC LOCOMOTIVE AND RAILWAY SYSTEM THEREFOR.

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Fig. 12

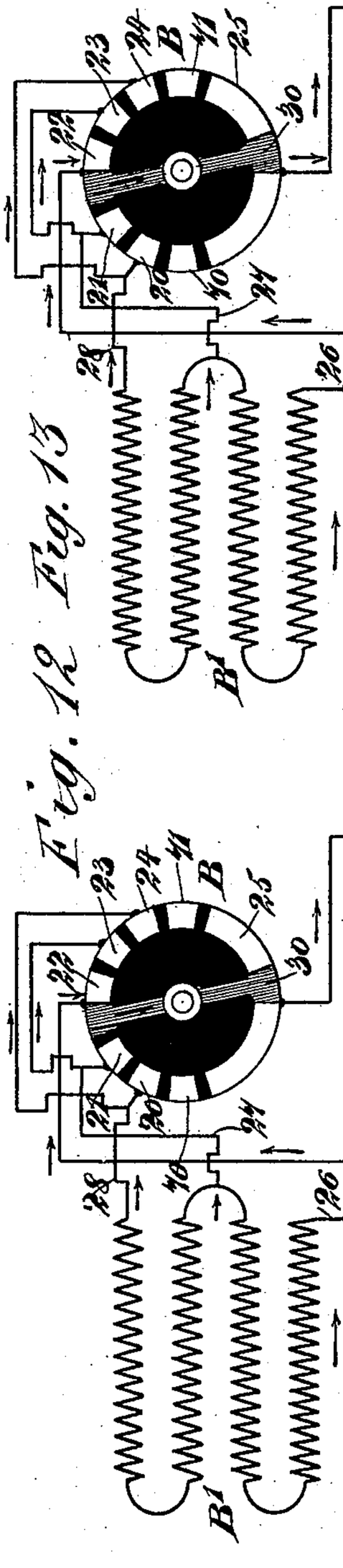

Fig. 13

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UNITED STATES PATENT OFFICE.

MAXIMILIAN SCHALSCHA, OF HOBOKEN, NEW JERSEY.

ELECTRIC LOCOMOTIVE AND RAILWAY SYSTEM THEREFOR.

SPECIFICATION forming part of Letters Patent No. 576,622, dated February 9, 1897.

Application filed February 20, 1896. Serial No. 580,069. (No model.)

To all whom it may concern:

Be it known that I, MAXIMILIAN SCHALSCHA, of Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in an Electrical Locomotive and Railway System Therefor, of which the following is a full, clear, and exact description.

This invention relates to cars propelled by electricity and in which the current is automatically regulated, thus dispensing with the services of an attendant while moving from one point to another and return; and the object is to provide means for rapidly and economically conveying material from one point to another, such, for instance, as coal from a vessel or railway-car to a place of storage or consumption, the car being started from its loading-point by an attendant turning on the initial current, after which the car will automatically and gradually attain its full speed, which is maintained until the car approaches nearly to its destination, where the current will be gradually and finally cut out and reversed; and a further object is in the case of a dumping-car to provide a simple and automatic means for releasing the dumping mechanism whereby the contents may be dumped or discharged into the desired pocket or receptacle.

I will describe a car and operating mechanism embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a car-truck and operating mechanism embodying my invention. Fig. 2 is a bottom plan view thereof. Fig. 3 is a longitudinal vertical section on the line 3 3 of Fig. 1 and showing the body portion of the car. Fig. 4 shows the construction of a trolley employed. Fig. 5 is a section on the line 5 5 of Fig. 1. Fig. 6 is an end elevation. Fig. 7 is a section on the line 7 7 of Fig. 1. Fig. 8 is a side elevation and partial section on the line 8 8 of Fig. 9 of a regulating-switch employed. Fig. 9 is a top plan view thereof. Fig. 10 is an elevation and partial section showing the invention as operating on an elevated structure. Fig. 11 is a plan view thereof. Fig. 12 is a diagrammatic view of the electric circuit, showing the current as flowing in one direction; and Fig. 13 is a similar view, but showing the current as flowing in the opposite direction.

The car comprises a truck A, supported on wheels A′ and A^2 in the usual manner, and a body portion A^3, mounted on the truck-frame, the said body portion as here shown being constructed in the form of a dumping-car. The construction thereof will be described hereinafter.

On the truck A is mounted an electric motor A^4, comprising an armature 1 and the fields 2 and 3. On the shaft of the armature 1 is a pinion 4, meshing with a gear-wheel 5, mounted on a shaft 6, having bearings on the truck-frame and also having a pinion 7, meshing with a gear-wheel 8 on the axle of a pair of truck-wheels. As here shown, an electric conductor 9 is located between the tracks of the railway and is engaged by a trolley 10 on a hanger 11, having pivotal connection to the truck of the car. This hanger 11 has an elongated slot in its upper portion, which engages with a lug on a bracket 12, secured to the car-truck, but insulated therefrom. This slotted connection of the hanger with the bracket 12 allows for the reversing of the position of the trolley upon reversing the direction of the car movement, the several stages of such reversing of the trolley being plainly indicated in Fig. 4. It may be here stated, however, that I do not confine my invention to taking the current from a conductor arranged adjacent to or between the tracks, as it is quite obvious that the current may be taken from an overhead trolley-wire or from a storage battery on the car.

From a binding-post having an electrical connection with the bracket 12 a wire 13 connects with the several contact-plates of a reversing-switch B. This switch B comprises a disk of insulating material, mounted on a horizontal shaft 14, having bearings in hangers depending from the truck-frame, and on this shaft 14 is mounted a bevel-gear 15, meshing with a bevel-pinion 16 on a vertical shaft 17, supported in a hanger 18, mounted

on the truck-frame, and the lower portion of this shaft 17 is provided with radially-extending horizontal arms 19, adapted to engage with projections extended from the bed of the track, as will be hereinafter explained.

On the disk of insulating material comprised in the reversing-switch are mounted contact-plates 20, 21, 22, 23, 24, and 25, the last contact-plate 25 being extended in the form of the segment of a circle and adapted to coact with the several other contact-plates to close the circuit, and it will further be seen that the plate 22 is somewhat longer than the plates 20 21, &c., and has direct connection with the wire 13, leading to the trolley from the main source of electricity. From the wire 13 a shunt-wire 26 connects with the first coil of a rheostat B′, which is in connection with the second coil of the said rheostat, and from this second coil a wire 27 extends to connections with the plates 21 and 23. From the second coil of the rheostat a wire extends to the third and fourth coils of the said rheostat, and this fourth coil has a connection 28 with the contact-plates 20 and 24. By this arrangement it will be seen that the full current may be transmitted through the contact-plate 22 while the switch-lever is in engagement therewith, and that when said switch-lever is in connection with the plates 21 20 or with the plates 23 24 the current through the motor will be diminished because of the resistance offered by the rheostat. The disk B of the switch is rigidly mounted on the sleeve 29, which surrounds the shaft 14, and mounted on this shaft 14 and adapted to rotate therewith is a switch-arm 30, adapted to connect the contact-plate 25 with either one of the contact-plates 22 to 24.

A current-reversing switch B^a is mounted on the truck-frame and comprises pairs of contact-fingers 31, 32, 33, 34, 35, 36, 37, and 38. The adjacent contact-fingers 31 32 are connected by a web 39. The adjacent pairs of contact-fingers 33 and 34 are connected by a web 40. The adjacent pairs of contact-fingers 35 and 36 are connected by a web 41, and the adjacent pairs of fingers 37 38 are connected by a web 42.

A rock-lever B^2 has connection with a rock-shaft B^3, having bearings in posts 43, extended upward from the truck-frame, and from the central crank portion of this rock-shaft B^3 a spring 44 extends to a connection with a fixed part of the truck-frame, which serves as a resistance to the movement of the rock-shaft. On the rock-shaft is mounted a rectangular frame B^4, and from opposite sides of this frame B^4 a series of contact-fingers 45 extend downward and are adapted to engage between the spring-fingers 31 32, &c., to close the circuit to the field-magnet.

From the contact-plate 25 of the reversing-switch a wire 46 extends to a connection with one of the fingers 38 and also with one of the fingers 34, and from this finger 34 a wire 47 leads to the field 2 of the motor, which is connected in the ordinary manner with the field 3. From the field 3 a wire 48 connects with one of the fingers 31, and this finger 31 has a connection 49 with one of the fingers 38. The other of said fingers 31 has a connection 50, which also extends through one of the fingers 35 to a connection with one of the wheels of the truck, which of course is in connection with the track, serving in this instance as the return-conductor. From one of the contact-fingers 36, and leading through one of the contact-fingers 32, is a wire 51, connecting with one of the brushes 52, engaging with a commutator 53 of the motor-armature. From the other brush 54 a wire 55 extends to a connection with one of the fingers 33 and also to a connection with one of the fingers 37.

The circuits and connections, as above described, are plainly shown in Figs. 12 and 13, and by referring thereto it will be seen in Fig. 12 that when the contact-fingers carried by the frame B^4 close the circuit through the fingers 31, 32, 33, and 34 the current will first flow through the field 2, thence through the field 3, and thence out to the return-circuit, thus rotating the armature to move the car in one direction; but when the frame B^4 is reversed or rocked to close the circuit through the fingers 35, 36, 37, and 38 the current will of course be reversed to flow first through the field 3 and thence to the field 2 and out, as indicated in Fig. 13. The direction of the flow in these two figures is clearly indicated by the arrows.

Pivotally connected to an arm extended downward from the shaft B^3 is a shifting rod B^5, which, at its free end, has a hook portion adapted to engage with a pin 56, extending from the hub of the bevel-gear 15. This rod B^5 extends through a suitable guide and is adapted, at a certain time, to rotate the gear-wheel 15 and consequently the shaft 14, to rotate the switch-arm 30 from the plates 70 71 to the plates 25 24, as will be hereinafter explained.

I will now describe the body portion of the car as shown in the drawings. It is to be understood, however, that I do not limit the invention to this particular body portion, which is designed especially for transporting coal, ballast, ore, rock, sand, or like material from the source of supply to the place of deposit. The body portion A^3 is closed at its ends and sides, and has a floor A^4 inclined from the center laterally and downwardly, whereby the contents of the car may be discharged through openings in the sides of the car-body. The openings in the sides of the car-body are provided with swinging doors A^5, the lower edges of which engage closely with the outer portions of the car-floor. Extended longitudinally through the car-body and below the apex of the floor is a shaft A^6 which has bearings through the end walls of the car-body. Upon the outer ends of this shaft A^6 are mounted bell-crank levers A^7, from one arm of which chains A^8 extend

around pulleys 57, attached to the lower portion of the car-body, and thence around pulleys 58, attached to the ends of one of the swinging doors A^5, and thence to a connection with rods 59, which extend across the ends of the car-body to an engagement with the ends of the opposite door A^5. The arm A^9 of one of the levers A^7 is adapted to be engaged by a vertically-movable shifting bar A^{10}, having bearings through blocks attached to the car-body and to the truck.

By reference to Fig. 6 it will be seen that when the swinging doors A^5 are in their closed and locked position the upper ends of the levers A^7 will be at one side of the axis of the shaft A^6, so that the internal pressure against the doors will have a tendency to keep them very firmly in a locked position. When, however, the rod A^{10} shall have been moved upward, the levers A^7 will be rocked to present their ends to the opposite side of the shaft-axis, and then the internal pressure against the doors will cause the same to move to an open position, the levers A^7 moving to the position indicated in dotted lines in Fig. 6.

I will now describe the means for shifting the electric circuits and operating the dumping mechanism, referring particularly to Figs. 10 and 11, which show an elevated structure C, upon which the tracks are mounted, and having a receiving-station C′ at one end and a discharge-station C^2 at the other end, the said discharge-station being here indicated as comprising a series of coal-pockets. Extended upward from the bed of the track, adjacent to the receiving-station C′, are trip-arms 60, 61, and 62, and adjacent to the discharge-station are upwardly-extended trip-arms 63, 64, and 65. The sets of trip-arms are respectively adjustable one arm relatively to the other, and each set is preferably adjustable with relation to its distance from its station. As is clearly shown in Fig. 9, the trip-arms of a set are engaged between a flange 66, extending upward from one edge of a plate 67, adapted to be bolted to the bed or cross-ties of the railway, and a flange 68, extended upward from said plate 67, but adjustable transversely thereof. Clamping-bolts 69 extend through perforations in the flanges 66 and 68, and obviously by manipulating these bolts the arms may be securely clamped at the desired position between the flanges. Of course the whole clamping device may be shifted to or from the station, as may be desired.

When the car is at a standstill, the arm 30 of the regulating-switch B will be in engagement with the inactive plates 70 and 71. After the car shall have been loaded an attendant will turn on the initial current by shifting the arm 30 to engage at one end with the plate 25 and at the other end with a plate 20, and thus the current will flow through the greatest resistance of the rheostat. This, however, will be sufficient to start the car on its way to the discharge-station. As the car moves one of the radial arms 19 will engage with the arm 60 and cause the switch-arm 30 to move into engagement with the plate 21, which is in connection with the lesser resistance of the rheostat, and consequently an increased current will flow through the fields of the motor, accelerating the movement of the car, and then another arm 19 will engage with the arm 61, which will operate the parts to move the arm 30 into engagement with one end of the plate 22. A further movement of the car will cause an arm 19 to engage with the arm 62, and this will shift the end of the arm 30 into engagement with the opposite end of the plate 22, where it will remain to impart a full current to the motor to propel the car toward its dumping-station at full speed. As it approaches its dumping-station the arms 19 will consecutively engage the arms 63 64 65 and gradually shift the end of the arm 30 from the plate 22 to the plate 23 and from the plate 23 to the plate 24, thus gradually cutting off the current and diminishing the speed of the car. The arm 65 will shift the lever 30 into engagement with the inactive plates 70 and 71, completely cutting off the current. The car by its own momentum will proceed to the desired dumping-pocket, over which is arranged a block 72, adapted to engage with the end of the lever B^2, and thus by rocking said lever shifting the connections through the switch B′, and this rocking of the lever B^2 will operate the rod B^5 to rotate the bevel-gear 15 and shaft 14 to move the switch-arm 30 into engagement with the plates 20 and 25, thus providing the initial current for the return movement of the car. During this shifting of the arm 30 the lower end of the bar A^{10} will engage against the inclined side of a block 73, arranged on the road-bed, and by riding said incline will operate the levers A^7 to release the doors A^5, thus allowing the contents of the car to be dumped into the pockets, and then the car will immediately proceed on its return journey, gaining speed from the increased current caused by the arms 65 64 63 and diminishing speed at the end of its journey through the action of the arms 62 61 60.

In starting the car the initial current may be turned on by turning a hand-wheel 14^a on an outwardly-extended portion of the shaft 14, and the course of the current through the motor-fields may be manually changed, if desired, by operating a rod 14^b, engaging with the lever B^2 and extended outward beyond the end of the car.

It will be seen that the rod B^5 constitutes a connection between the switch mechanism and the contact devices and a connection which will transmit operative movement from one of said devices to the other, while the arm B^2 and arms 19 and projections 65 64 and 63 each constitute independent means for directly operating the switch mechanism and contact devices.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. A transporting device, comprising a car, an electric motor thereon, an electric-current conveyer on the track-bed, a trolley having connection with said conveyer, an arm extended from said trolley and having a longitudinal slot, a hanger on the car-truck, having a pivot extended through said slot, and a connection between said hanger and the motor, substantially as specified.

2. An electrical locomotive having a truck, a motor carried by the truck, contact devices capable of leading the current in opposite directions to the field-magnets of the motor, a rock-shaft, a contact-frame carried on the rock-shaft and coöperating with the said contact devices, means for operating the rock-shaft, switch mechanism by which the degree of the current flowing to the motor may be regulated, and a connection between said switch mechanism and the rock-shaft, substantially as described.

3. In an electrical locomotive, the combination with a truck, of an electrical motor, switch mechanism capable of regulating the degree of the current applied to the motor, contact devices capable of changing the direction in which the current flows to the motor, and a connection between the switch mechanism and the contact devices by which they may have synchronous operation, substantially as described.

4. In an electrical locomotive, the combination with a truck, of a motor, switch mechanism capable of regulating the degree of the current applied to the motor, contact devices capable of changing the direction in which the current flows to the motor, a connection between the switch mechanism and the contact devices by which the two may have synchronous operation, and means for operating the switch mechanism and contact devices, substantially as described.

5. In an electrical locomotive, the combination with a truck, of a motor, switch mechanism capable of regulating the degree of the current flowing to the motor, detent-operated gearing for actuating said switch mechanism, a mounted pin moving in unison with the gearing, contact devices capable of regulating the direction in which the current flows to the motor, a rod connected to said contact devices and extending to the said pin, the rod being periodically engaged by the pin, and means for operating the contact devices, substantially as described.

6. In an electrical locomotive, the combination with a truck, of a motor, a rheostat, a switch coöperating with the rheostat whereby the degree of the current supplied to the motor is regulated, a shaft connected with the switch, an arm carried by the shaft and capable of being engaged to turn the shaft, contact devices capable of changing the direction in which the current flows to the motor, a rod moved by the operation of the contact devices, and a pin carried by the shaft in connection with the switch, the pin being capable of engagement with the rod, substantially as described.

7. The combination with a car having doors at its sides, the doors being hinged on horizontal axes, of a rock-shaft mounted longitudinally on the car, a vertically-sliding trip-rod, a bell-crank lever fixed to the rock-shaft and having one arm engaged by the trip-rod, a connecting-link attached to one door, and a flexible connection attached to the link and having rolling connection with the remaining door, the flexible connection being also connected with the bell-crank lever, substantially as described.

8. The combination of a supported hanger, a trolley and a longitudinally-slotted arm carrying the trolley, the arm being pivotally connected with the hanger through the medium of the slot and the arm being capable of movement vertically and laterally so as to extend downwardly and laterally from either side of the hanger, substantially as described.

9. A railway-track having a plurality of tripping-arms and two plates supported on the track, the plates having the tripping-arms adjustably held between them and the tripping-arms extending upwardly from the plates, substantially as described.

10. An electrical device having a motor, contact devices capable of regulating the direction in which the current flows to the motor, switch mechanism regulating the degree of the current applied to the motor, a mechanical connection between the switch mechanism and the contact devices, and capable of transmitting operative movement from one to the other and independent means for directly operating the switch mechanism and contact devices, substantially as described.

11. The combination of an electrical device, switch mechanism capable of regulating the degree of the current applied to the electrical device, contact devices capable of changing the direction in which the current flows to the electrical device, the switch mechanism and contact devices being independent of each other and independently operative, a mechanical connection between the switch mechanism and the contact devices, and independent means respectively for operating the switch mechanism and contact devices, substantially as described.

12. The combination of an electrical motor, means capable of regulating the degree of the current applied to the motor, additional means capable of changing the direction in which the current flows to the motor, a mechanical connection between the two means, and two independent operating mechanisms respectively for the means for regulating the degree of the current and the means for changing the direction in which the current flows, substantially as described.

13. The combination of an electrical device, automatically-operative means capable of

regulating the degree of the current applied to the electrical device, additional and automatically-operative means capable of changing the direction in which the current flows to the electrical device, and a mechanical connection between the two means and capable of giving them synchronous operation, substantially as described.

14. A railway system having a track, a vehicle movable on the track, an electrical motor on the vehicle, contact devices capable of regulating the direction in which the current flows to the motor, switch mechanism regulating the degree of the current applied to the motor, a mechanical connection between the switch mechanism and contact devices, the mechanical connection being capable of transmitting operative movement from one to the other, two independent means respectively for directly operating the switch mechanism and contact devices, and projections carried by the track and capable of engaging said independent means, substantially as described.

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