E. P. SIMARD & A. O. BOUCHER.

RAIL GRINDING MACHINE.

APPLICATION FILED APR. 5, 1912.

1,067,624.

Patented July 15, 1913.

2 SHEETS—SHEET 1.

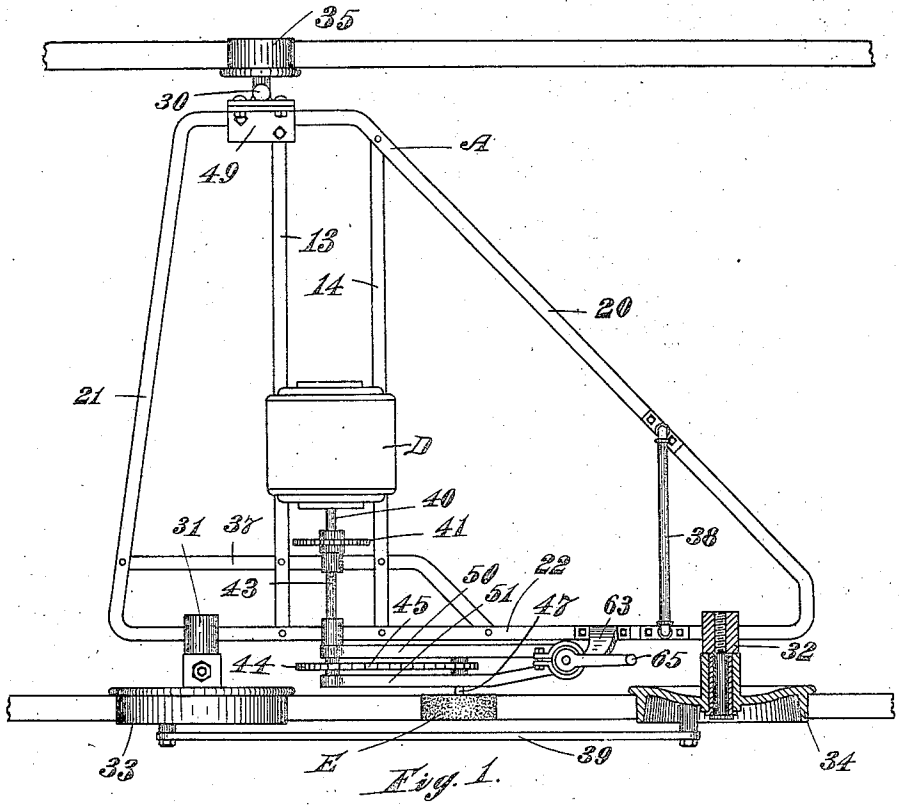


Fig. 1.

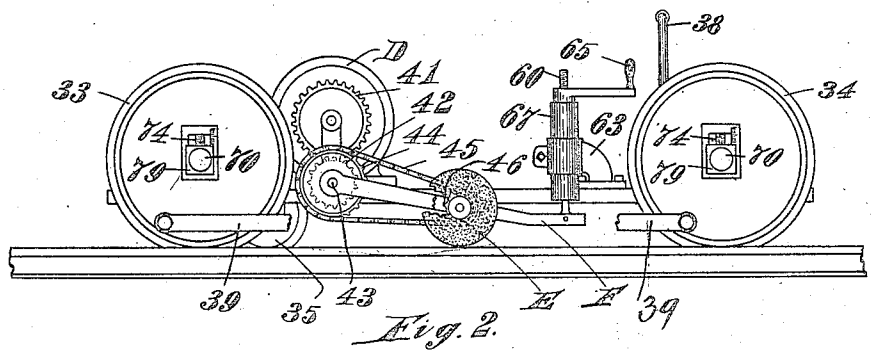


Fig. 2.

WITNESSES:

Lindsey A. Nicol.

Vera J. Donovan.

INVENTORS

Euphrosine P. Simard

Alphe A. Boucher

BY

Gardner D. Russell

ATTORNEY.

PHOTO-LITHO by SACKETT & WILHELMS CORP. N.Y.

E. P. SIMARD & A. O. BOUCHER.

RAIL GRINDING MACHINE.

APPLICATION FILED APR. 5, 1912.

1,067,624. Patented July 15, 1913.

2 SHEETS—SHEET 2.

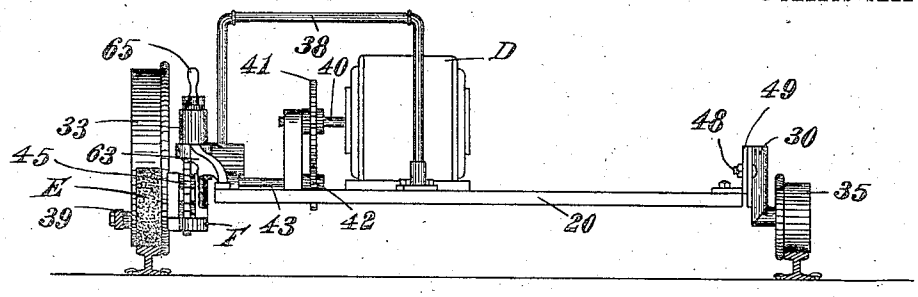


Fig. 3.

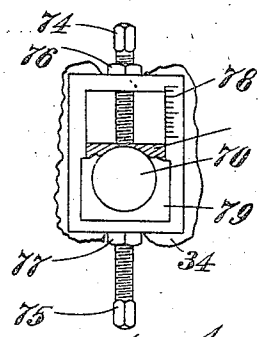


Fig. 4.

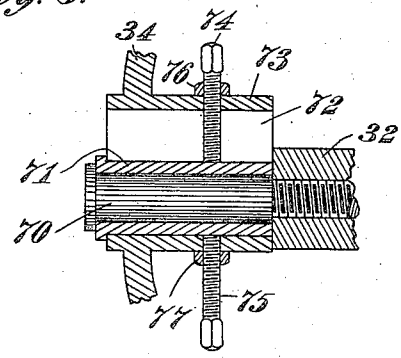


Fig. 5.

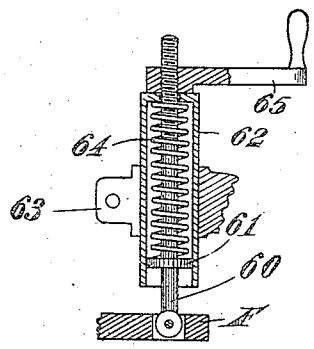


Fig. 6.

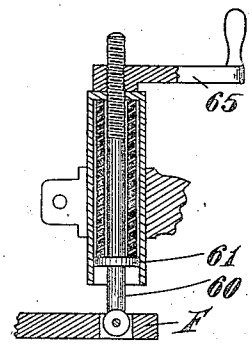


Fig. 7.

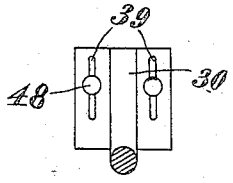


Fig. 8.

WITNESSES:

Sadger A. Nicol.

Vera L. Queeman.

INVENTORS

Epiphane P. Simard

Alphe O. Boucher

BY

Gardner W. Pearson

ATTORNEY.

UNITED STATES PATENT OFFICE.

EPIPHANE P. SIMARD, OF WALTHAM, AND ALPHE O. BOUCHER, OF LAWRENCE, MASSACHUSETTS.

RAIL-GRINDING MACHINE.

1,067,624. Specification of Letters Patent. Patented July 15, 1913.

Application filed April 5, 1912. Serial No. 688,791.

To all whom it may concern:

Be it known that I, EPIPHANE P. SIMARD, a citizen of the United States, residing at Waltham, in the county of Middlesex and State of Massachusetts, and ALPHE O. BOUCHER, a citizen of Canada, residing at Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Rail-Grinding Machines, of which the following is a specification.

Our invention is a rail grinding machine and its purpose is to reduce or remove irregularities in railroad rails. It is especially useful in grinding the rails of street railways to smooth rough surfaces or corrugations and to even up depressions. Such machines have been used before but they are not adjustable and the grinding wheels can only operate in a straight line parallel with the rail. One of the principal advantages of our machine is that it can be adjusted to grind at various angles with the general longitudinal surface of the rail.

In the drawings, Figure 1 is a plan view, the large front carrier wheel, bearing and hanger being shown in horizontal central section. Fig. 2 is an elevation from the side. Fig. 3 is an elevation from the front with the front carrier wheel omitted. Fig. 4 is an enlarged side elevation of one of the carrier wheels showing the adjustable journal box or block. Fig. 5 is an enlarged central vertical section of a carrier wheel, journal box and hanger. Fig. 6 is a vertical sectional view of the adjusting screw, spring, and arm for the grinding wheel. Fig. 7 is a view similar to Fig. 6 showing a modified construction. Fig. 8 is a detail of the adjustable hanger for the supporting wheel.

In our construction, we provide means for maintaining a uniform pressure and of positively determining and limiting the space to be ground on the rails. This space depends upon the depth of the depression in the rails and the adjustment of the machine. In grinding depressions, it is usually desirable to grind the rail from the bottom of the depression in a longer or shorter slope longitudinally in both directions. In this way, the depression still exists but is so gradual that it does little harm. To accomplish this purpose, we mount elastically our grinding wheel, which may be of the usual emery type, and provide it with an adjustable pressure spring whereby its pressure when once determined, is substantially uniform. It is also provided with a stop whereby the grinding wheel may recede from a certain point but cannot pass below it. To provide that the extreme lower line of action of the grinding wheel shall be limited by straight sloping lines to the bottom of the original depression, we mount the grinding wheel and its carriers upon a truck which preferably has two eccentrically adjustable carrier wheels of equal size which rest on one rail and a single carrier wheel or supporting wheel which may be larger or smaller and which rests on the other rail. The two carrier wheels on the same rail are so mounted on their axles or bearings that they can be made more or less eccentric in their action and they are connected by a connecting rod so that the action of the carrier wheels will raise and lower uniformly the side of the truck on which they are mounted. The grinding wheel is mounted on this side.

Our machine is held together by a light metallic frame A preferably made of channel iron but which may be of any other suitable material. The base of this frame 20, 21 and 22 forms preferably a triangle which carries the hangers 30, 31 and 32 for the flanged carrier wheels 33 and 34 and for the flanged supporting wheel 35. The girts or braces 13, 14 and 37 stiffen the frame, and the girts 13 and 14 may serve to support the motor D. A U shaped connecting bar 38 serves as a handle by which to push the truck along the rails by hand. The hanger 30 is formed with a journal for the supporting wheel 35 and should be so adjusted that when the carrier wheels 33 and 34 are centered on their bearings, the whole device is level and in what might be called its normal position. Hanger 30 has slots 39 through which pass bolts 48 into a plate 49 attached to frame A. By means of these slots and bolts, the hanger may be vertically adjusted to conform to larger or smaller carrier wheels.

The motor D mounted on the two girts 13 and 14 is secured thereon by screws, bolts or in any other suitable way and drives a shaft 40 which carries a gear 41 which may engage a gear 42 carried by shaft 43 which is carried in suitable bearings on the frame A and extends outside thereof where it carries a sprocket 44. This driving sprocket 44 by

BEST AVAILABLE COPY

means of a chain 45 drives through the medium of a driven sprocket 46 the shaft 47 which carries the grinding wheel E. Shaft 47 carrying sprocket 46 is mounted in suitable bearings on a pivoted frame comprising parallel members 50 and 51 pivoted on shaft 43 and forming together the grinding wheel arm F. The end of this arm F as shown in Figs. 6 and 7 is pivotally connected to the bottom of a grinding wheel spring adjusting screw 60 which carries a collar 61 and is slidable inside a cylindrical spring casing 62 which is carried by a bracket 63 fixed to member 22 of frame A. A spring 64 which bears against collar 61 and against the top of spring casing 62 normally tends to press downward the arm F carrying the grinding wheel E. We adjust the action of this arm through screw 60. To limit its downward action, we preferably use an adjusting crank 65 which engages the threads on screw 60 and bears against the top of casing 62 on the outside. By turning this to the right or left, the downward limit of action of the arm F is regulated.

Carrier wheels 33 and 34 are connected by a connecting rod 39 pivoted in the same relative position on each. Screwed to each hanger 31 or 32 is a journal 70 as shown in Fig. 5 and this passes through a journal box or block 71 which is slidable in a slot 72 formed in hub 73 and which extends radially through the center of a carrier wheel 34. The hub 73 of this wheel is extended inward as a shell sufficiently to permit adjusting bolts 74 and 75 to be passed therethrough and to bear against box 71. Preferably lock nuts 76 and 77 are used in connection therewith. A scale 78 on the outer face of each carrier wheel hub adjoining the squared end 79 of box 71 serves as a guide when adjusting by bolts 74 and 75, the center of revolution of each wheel. By means of these adjusting bolts the wheel action may be made eccentric with the result that in traveling the distance of the circumference of the carrier wheels, they will raise and lower the frame A a uniform distance.

The operation of our machine is as follows:—Assuming that the carrier wheels are 50″ in circumference, it is evident that if made eccentric they will raise and lower the frame once in every 50″ carrying therewith the grinding wheel. Suppose a depression of $\frac{1}{8}$ of an inch. The grinding wheel is set by handle 65 at the bottom of the depression. That is, so that it cannot grind below the bottom of the depression. If it is wished to grind this on a slope of 25″ each way, the scale on hub 73 is adjusted for $\frac{1}{16}$ of an inch making an eccentric action of $\frac{1}{8}$″. This will cause a gradual lifting of the grinding wheel from $\frac{1}{8}$″ depth to the surface at 25″. Now if it is desired to grind from the bottom of the $\frac{1}{8}$″ depression to a point 12½″ on each side, the hub scale is set at $\frac{1}{8}$″ substantially. In this case the grinding wheel will be lifted $\frac{1}{4}$″ from the bottom of the depression and $\frac{1}{8}$″ clear of the rail during each revolution of the carrier wheel and will therefore cease cutting at 12½″ each side of the depression. In this way, the device can be adjusted to cut on any desired slope. Of course, by centering the carrier wheels, the grinding wheel will cut parallel with the surface of the rail. By replacing the carrier wheels by others which are larger or smaller, the extreme cutting distance can be increased or diminished.

It is evident that a shaft and suitable gears may be used in place of the chain and sprocket shown in the drawings or suitable belting may be used. It may even be feasible to carry the grinding wheel directly upon the motor shaft of a light motor attached to the grinding wheel arm. Any suitable motor or engine whether electric, explosive or otherwise may be used, and any other suitable means for eccentrically mounting the carrier wheels may be used.

What we claim as our invention and desire to cover by Letters Patent, is:

1. In a rail grinding machine, the combination of a truck adapted to travel on the rails having on one side a pair of carrier wheels in engagement with one rail and being connected by a connecting rod and having adjustable bearings by which the action of the carrier wheels may be made eccentric, combined with a grinding wheel adjoining the rail on which the carrier wheels travel.

2. A rail grinding machine comprising a frame, a supporting wheel on one side thereof, two carrier wheels on the other side thereof arranged one behind the other and connected by connecting rod, means for adjusting said carrier wheels eccentrically, an arm pivoted to the frame adjacent to the rail and between the carrier wheels, a grinding wheel carried thereby, and an adjustable spring which engages the arm and is adapted to maintain the grinding wheel in yielding contact with the rail as described.

3. A rail grinding machine comprising a frame, a supporting wheel on one side thereof, two carrier wheels on the other side thereof arranged one behind the other and connected by connecting rod, means for adjusting said carrier wheels eccentrically, an arm pivoted to the frame adjacent to the rail and between the carrier wheels, a grinding wheel carried thereby, a casing fixed to the frame, a screw pivoted to the grinding wheel arm and extended through the top of said casing, a collar carried by the screw, a spring between said collar and the top of the casing, and an adjusting crank in engagement with the screw outside the casing as described.

4. A rail grinding machine comprising a frame, a supporting wheel on one side thereof, two journals carried by hangers on the opposite side of the frame, and two carrier wheels arranged one behind the other and connected by a connecting rod each of said wheels having a radial slot formed in its hub, a journal box passed over each journal and slidable in one of said slots, and adjusting bolts which pass through each carrier wheel hub and bear against a journal box, combined with a grinding wheel adjacent to the rail and between the carrier wheel as described.

5. A rail grinding machine comprising a frame, a supporting wheel on one side thereof, two journals carried by hangers on the opposite side of the frame, two carrier wheels arranged one behind the other and connected by a connecting rod each of said wheels having a radial slot formed in its hub, a journal box passed over each journal and slidable in one of said slots, adjusting bolts which pass through each carrier wheel hub and bear against a journal box, a grinding wheel arm pivoted to the frame adjacent to the rail and between the carrier wheels, a grinding wheel carried thereby, a casing fixed to the frame, a screw pivoted to the grinding wheel arm and extended through the top of said casing, a collar carried by the screw, a spring between said collar and the top of the casing, and an adjusting crank in engagement with the screw outside the casing as described.

6. In a rail grinding machine, a frame, a journal attached thereto, and a carrier wheel having a radial slot in its hub, combined with a square journal box slidable in the slot and passed over the journal, together with adjusting bolts which pass through the hub and engage said journal box as described.

7. In a rail grinding machine, a frame, a supporting wheel on one side thereof, two journals carried by hangers on the opposite side of the frame, and two carrier wheels arranged one behind the other and connected by a connecting rod, each of said wheels having a radial slot formed in its hub, combined with a journal box passed over each journal and slidable in one of said slots, and adjusting bolts which pass through each carrier wheel hub and bear against a journal box.

8. In a rail grinding machine, a frame, a supporting wheel on one side thereof, two journals carried by hangers on the opposite side of the frame, and two carrier wheels arranged one behind the other and connected by a connecting rod, each of said wheels having a radial slot formed in its hub, combined with a journal box passed over each journal and slidable in one of said slots, adjusting bolts which pass through each carrier wheel hub and bear against a journal box, and grinding means between said carrier wheels as described.

9. A rail grinding machine comprising a frame, a supporting wheel on one side thereof, carrier wheels on the other side thereof arranged one behind the other and connected by a connecting rod, and means for adjusting said carrier wheels eccentrically, combined with a grinding wheel located between the carrier wheels and carried by the frame, a spring which normally tends to keep the grinding wheel in contact with the rail, and an adjustable stop whereby the action of the spring on the grinding wheel may be limited.

In testimony whereof we hereto affix our signatures in presence of two witnesses.

EPIPHANE P. SIMARD.
ALPHE O. BOUCHER.

Witnesses:
JOHN J. DEVINE.
FISHER H. PEARSON.