

Sept. 18, 1923.

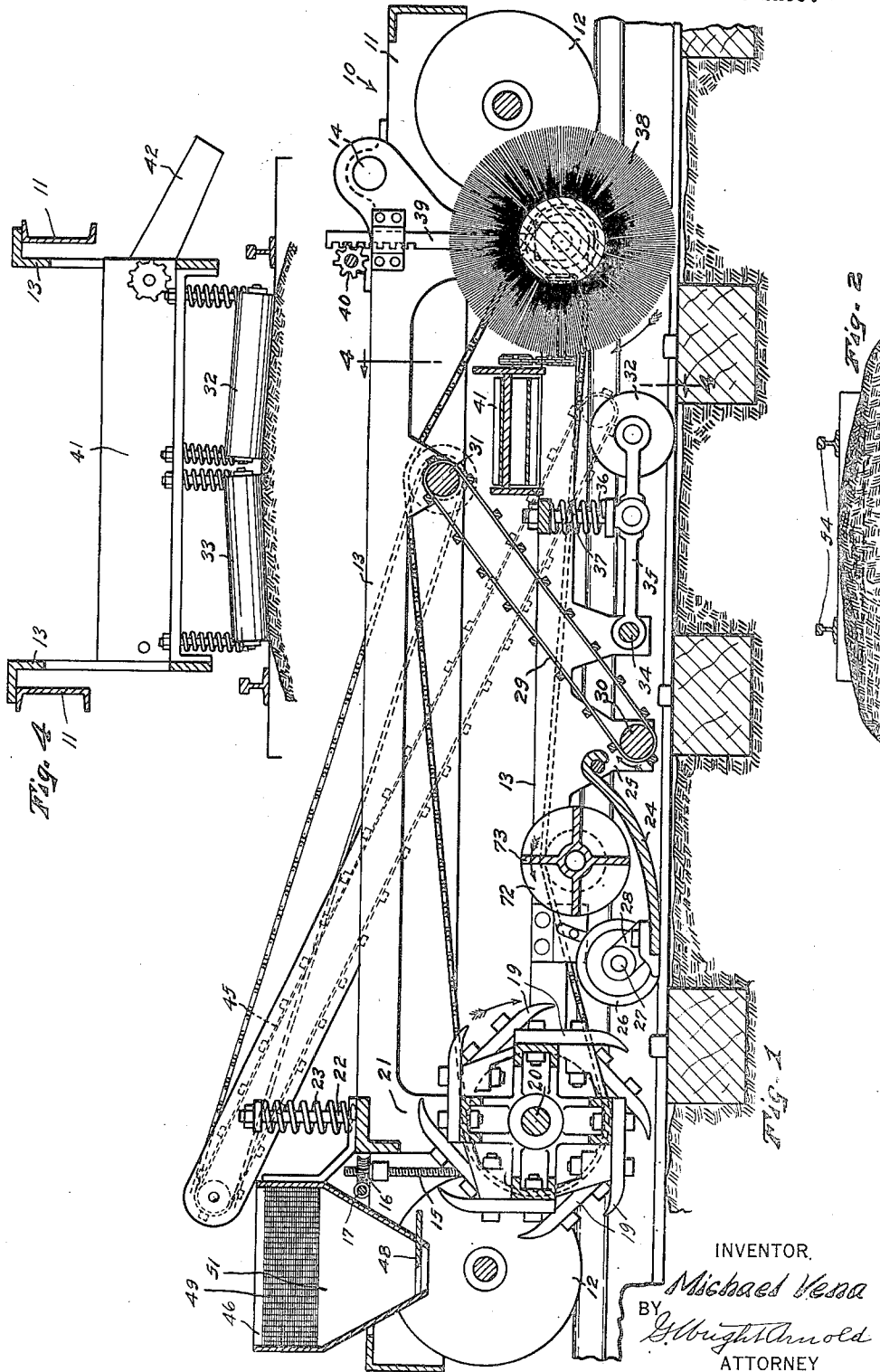
1,468,528

M. VENA

ROAD SURFACING MECHANISM

Filed Aug. 7, 1922

3 Sheets-Sheet 1



Sept. 18, 1923.

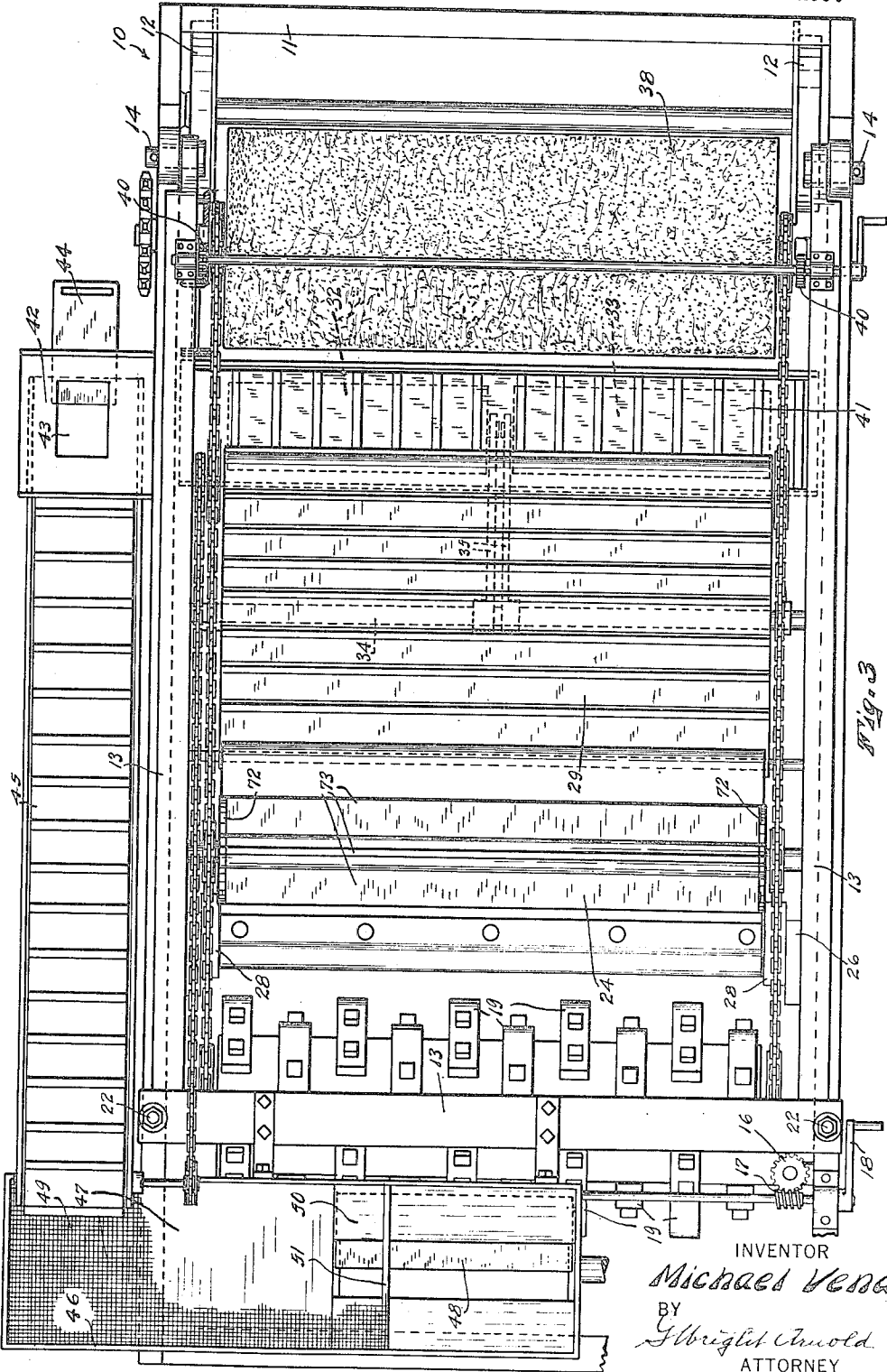
1,468,528

M. VENA

ROAD SURFACING MECHANISM

Filed Aug. 7, 1922

3 Sheets-Sheet 2



Sept. 18, 1923.

M. VENA

1,468,528

ROAD SURFACING MECHANISM

Filed Aug. 7, 1922

3 Sheets-Sheet 3

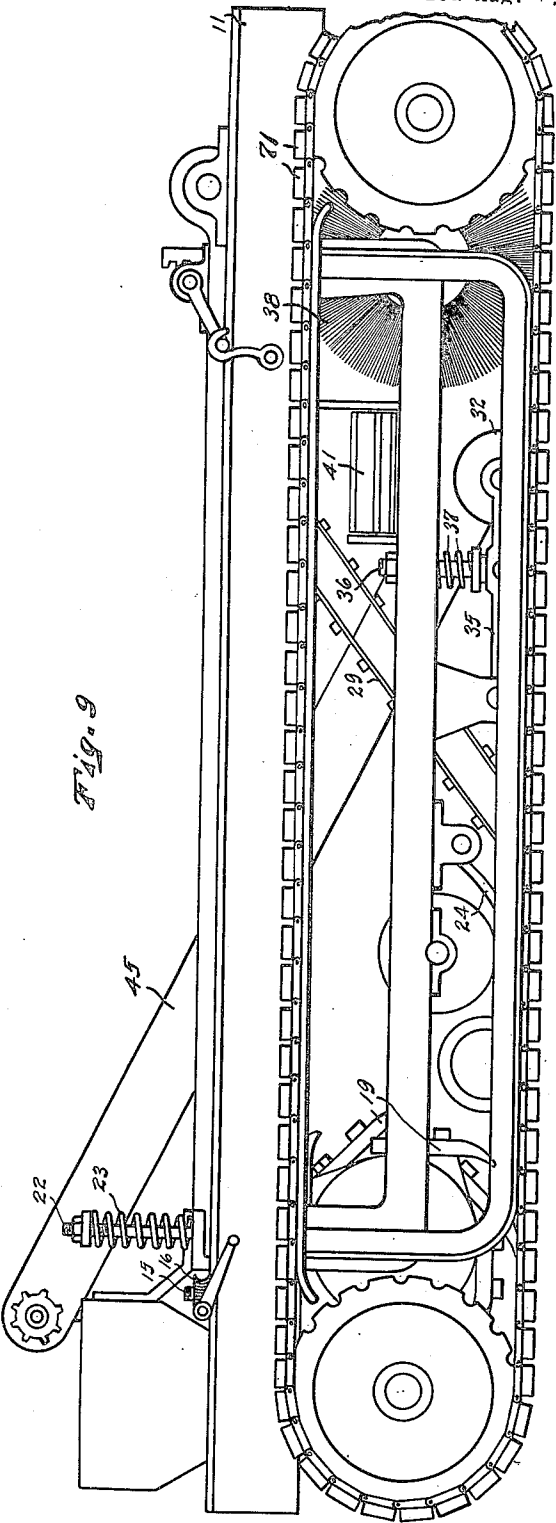


Fig. 9

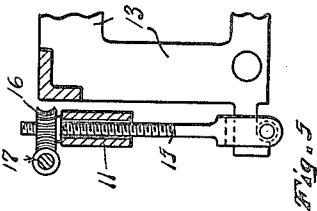
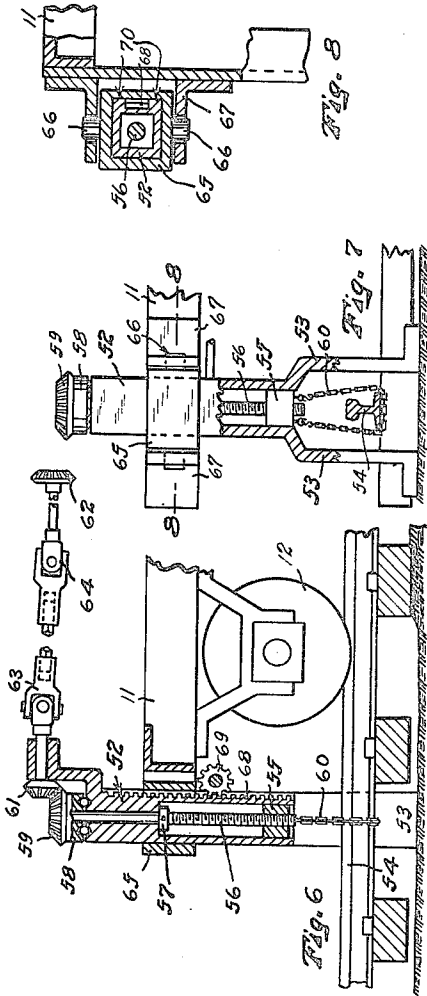


Fig. 5

INVENTOR  
*Michael Vena*  
BY  
*Wright Arnold*  
ATTORNEY

## UNITED STATES PATENT OFFICE.

MICHAEL VENA, OF SEATTLE, WASHINGTON.

## ROAD-SURFACING MECHANISM.

Application filed August 7, 1922. Serial No. 580,580.

*To all whom it may concern:*

Be it known that I, MICHAEL VENA, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented a certain new and useful Road-Surfacing Mechanism, of which the following is a specification.

My invention relates to a road-surfacing and grading mechanism, and more particularly to a mechanism for distributing cleaning up rendering uniform and finishing the material used as ballast either on the road bed of a railroad or of a highway, and also for grading the track of a railroad.

My invention will be particularly described as related to a railroad but it is understood that its application is not limited to this particular field of use. Heretofore in railroad construction the practice has been to run the gravel train upon the uneven newly laid track, and dump the gravel or crushed rock constituting the ballast material between the rails and then employ a large number of workmen to manually distribute the ballast material and properly surface the road-bed. Previous to distributing the material the rails must be elevated to track grade; and this lifting is ordinarily accomplished by means of jacks. Obviously the distributing of the material and elevating of the track manually is costly and very slow.

It is in general the purpose of my invention to perform this work by a machine, to do the same expeditiously and to cheapen the cost. A primary object of my invention is to provide a road surfacing mechanism which will level off, distribute, and position the surfacing material in the form of road-bed desired. A further primary object of my invention is to provide such a road surfacing mechanism which will carry a supply of ballasting material which may be precipitated in front of the surfacing mechanism in places where there may not be a sufficient supply of such material. A further primary object of my invention is to provide such a surfacing mechanism that the parts of the machine which actually come in contact with the road-bed may be elevated so that proper clearance may be had of the road-bed while transporting the surfacing mechanism to and from the sections of the road-bed which are to be operated upon by the machine. A further primary object of my invention is to provide a mechanism which may be em-

ployed in lifting the track, in order that the same may be raised to predetermined "track level" or "grade," and in order that said track may be raised in cases of repair work, for the quick removal of worn out ties and for the quick replacement of the same.

The above mentioned general objects of my invention together with others inherent in the same are attained by the mechanism illustrated in the following drawings, the same being merely preferred exemplary forms of embodiment of my invention throughout which drawings like reference numerals indicate like parts:

Figure 1 is a view in longitudinal section of a mechanism embodying my invention;

Fig. 2 is a view in cross-section of a common form of the road-bed of a railroad;

Fig. 3 is a plan view of said mechanism;

Fig. 4 is a view in cross-section on dotted line 4, 4 of Fig. 1;

Fig. 5 is a view of a detail illustrating one form of an elevating mechanism for the secondary frame;

Fig. 6 is a side view in longitudinal section of the track elevating mechanism;

Fig. 7 is a front view in partial section of the track elevating mechanism;

Fig. 8 is a cross section on dotted line 8, 8 of Fig. 7;

Fig. 9 is a view in side elevation of a modified form of my mechanism provided with caterpillar traction members for operation on highways or in the absence of a track.

A supporting vehicle or car (10) having a fixed frame (11) mounted on railroad wheels (12) is provided with a secondary frame (13) pivotally mounted at (14). Upon this secondary frame (13) are disposed in large measure the material distributing parts of my mechanism. This secondary frame is preferably provided with an elevating mechanism for the same. This mechanism as illustrated consists of a screw (15) provided with a gear (16) which in turn engages a pinion (17). This pinion is in turn operated by a crank (18), or if desired the said elevating means may be connected with the power means of the device.

On the front part of this secondary frame (13) is rotatively mounted a rotary digger (19) the function of which is to loosen the ballast material with which it may come in contact. This digger is mounted on a vertically adjustable shafting (20) which is journaled in a housing (21) to which is secured

rod (22). About this rod is a compression spring (23) disposed to hold said digger in its lowermost position, but which will permit said digger and its journal to rise upon meeting unduly great resistance so that breaking of the teeth may be prevented.

Back of the said digger is disposed a scraper (24) pivotally mounted at (25) and supported on its forward end by a wheel (26) idly mounted on shaft (27) having a link (28) which inclines backwardly, which shaft is journaled to the secondary frame (13). A carrier (29) preferably in the form of an endless belt is mounted immediately back of the said scraper (24). This belt is mounted on pulley (30) and driving pulley (31). Back of the said carrier belt is mounted surfacing rollers (32) and (33) pivotally mounted at (34) by means of arm (35) said arm being pivotally attached to a rod (36) which is preferably provided with a spring (37) which exerts a downward force upon its respective rollers.

On the rearmost part of the secondary frame is preferably disposed a rotary brush (38), the function of which is to provide a neat finish to the work and sweep all ballast material off the top of the ties. This brush is adjustably mounted on rack (39) which rack engages pinion (40) by means of which the said rotary brush may be elevated so as to clear the track if desired.

A transverse conveying endless belt (41) receives the material deposited thereon by the endless belt (29). This transverse carrier will deposit the material into a spout member (42) which will discharge the excess of ballast material to one side of the road-bed or, if preferred, conveyors could be provided to return said excess material to other cars in the rear. Moreover, this spout member is provided with a hole (43) covered by a slide (44) which will permit the material to fall upon the longitudinal carrier (45) which in turn is disposed to deposit the material in a hopper-shape bin (46) having a sloping floor (47) which causes the said material to move toward the middle of the car. This bin is provided with a sliding member (48) which may be withdrawn and permit the material to fall upon such portions of the road-bed as may have been inadequately supplied with the ballast material. A sloping screen (49) is preferably provided paralleling and spaced above the sloping floor (47), which provides for supplying fine material in a separate compartment (50) formed by a partition (51).

A track lifting mechanism is provided on the front end of the car (10), consisting of a stilt member 52 on each side of the car, said members having oppositely disposed leg members (53), which straddle the track rails (54). Inside the stilt member (52) is a block (55) slidably mounted therein. This

block (55) is also mounted on a threaded shaft (56), which is journaled in the upper part of the stilt member (52). Thrust collars (57) and (58) maintain said shaft in said stilt so that it does not move up or down longitudinally of said stilt. A bevel gear (59) mounted on the end of shaft (56) imparts rotary movement to said shaft (56) which causes the block (55) to move up or down as desired. To said block is detachably secured a chain (60) of such length that it may extend about the rail 54. Bevel gear 61 intermeshes with bevel gear 59. Said bevel gear 61 is connected to gear 62 by means of a shaft having universal joints 63 and 64 which permit an up and down movement to the stilt member 52. Said stilt member 52 is slidably mounted in a block 65 which is pivotally mounted by trunnion 66 in bracket 67.

An elevating mechanism for the stilt member 52 is provided by means of a pinion 68 engaging a rack 69. The teeth of this rack 69 are in a plane inside of the plane of the edges 70 of the stilt member, in order that the edges may serve as guide means to the stilt member, and thereby avoid all contact by the teeth with the guide block 65.

The modified form of a device embodying my invention shown in Fig. 9 is provided with the caterpillar 71 which adapts the same to travel independent of any track.

The mode of operation of a device embodying my invention is as follows:

If the track is not at grade the stilt 52 is lowered in position with the leg members 53 disposed astride the track rails 54 as illustrated in Fig. 7. The lowering of the stilt member is accomplished by actuating the pinion 68, which engages the rack 69. Thereupon a suitable means may be employed to connect the said track to the block 55. As herein shown, a chain 60 is employed to releasably secure said track to said block. Thereupon the actuating means connected with the bevel gear 59 is set in motion, which causes the said gear to revolve and this in turn causes the threaded shaft 56 to screw into the block 55. Since the said shaft is held by means of thrust-collars in a fixed position, the block 55 is caused to move upwardly as respects the said shaft, thereby lifting the track to the desired grade line, and of course lifting with it the end of the car to which it is attached.

Let it be noted that in accomplishing this there is no strain put upon the springs of the car itself. Also be it noted that the elevating stress is applied directly above the rail and as close thereto as can be, and permitting a clearance for elevating the track. It will be understood that the stilt members on each side of the track are thus caused to lift their respective rails.

After thus elevating the rails to grade,

material is disposed beneath the ties so that the said rails are maintained at said grade. This may be accomplished by pulling out slide 48 of the bin or the front end of the car, or by blocking if desired. Having thus secured the rail in elevated position, the stilt member is elevated to clear the ties, and any ballast material that may be between the rails. Then the surfacing machine is caused to advance. While advancing the digger member 19 is caused to revolve and loosen ballast material which has been deposited between the rails. After the same is loosened the material will come in contact with the scraper 24 on which it will ascend either by being pushed by the accumulation of material ahead of the scraper or if preferred the wheel 72 may be provided with paddle like projections 73 which will assist the material in ascending the scraper 24 from which it will fall upon the moving belt 29. From the moving belt 29 the material is dropped upon transverse carrier 41 which carries the surplus material to one side of the track, or if preferred other carriers (not shown) may be employed to load this on cars in the rear. Or again, said surface material may be caused to fall through the opening 43 upon the longitudinal carrier 45, from which the material may be caused to fall into a bin 46. In this wise ballast material may be available to be deposited between the tracks at any point where there may be an insufficiency of material. Immediately behind the moving belt 29 are the surfacing rollers 32 and 33 which operate to smooth the ballast that is left between the ties. These rollers are mounted so as to be inclined and thereby tend to form the ballast with sloping sides between the rails so that the ballast is higher in the middle than on each side. Immediately behind said rollers is preferably provided a rotary sweeper 38 which serves to sweep clean the top of the ties.

In this wise the machine is advanced section by section, first elevating the track to grade and then doing the surfacing operation.

On a finished road, where it is necessary to remove one or more ties, the applicability of the surfacing mechanism herein described is manifest. The rails may be lifted and thus ties removed that need to be replaced. If any new ballast material is desired it is readily available in the bin 46, wherein is provided either coarse or fine material.

When the work is completed it is only necessary to elevate the secondary frame 13 by means of the pinion 17 to remove all of the operating parts connected thereto, above the ground sufficiently to clear all ordinary obstructions between the rails. The rotary brush 38 is elevated by means of a separate rack 39 as the angle through which it would

be caused to revolve by elevating the secondary frame 13 would not be sufficient to make it clear the track.

Obviously, changes may be made in the forms, dimensions, and arrangement of the parts of my invention without departing from the principle thereof, the above setting forth only preferred forms of embodiment.

I claim:

1. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; a rotary excavator vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; means whereby material picked up by said scraper member may be conveyed away from said scraper member and a means for raising a portion of the track.

2. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; a rotary digger vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; a transverse conveyer; means whereby material picked up by said scraper member may be conveyed to said transverse conveyer; and a portable jack suspended from the frame, for raising the rails.

3. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; a rotary excavator vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; means whereby material picked up by said scraper member may be conveyed away from said scraper member; a vertically adjustably mounted roller disposed on each side of said machine back of said scraper member; and a portable jack suspended from the frame, for raising the rails.

4. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; a rotary digger vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; a transverse conveyer and means whereby material picked up by said scraper member may be conveyed to said transverse conveyer; a vertically adjustably mounted roller disposed on each side of said machine back of said scraper member; and a means for raising a portion of the track.

5. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; a track raising mechanism suspended from the frame; a rotary excavator vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; means whereby material picked up by said scraper member may be conveyed

away from said scraper member; and a rotary sweeper disposed back of said scraper member.

6. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; a screw-jack with an adjustable frame, adjustably suspended from the vehicle frame; a rotary excavator vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; means whereby material picked up by said scraper member may be conveyed away from said scraper member; a vertically adjustably mounted roller disposed on each side of said machine back of said scraper member; and a rotary sweeper disposed back of said roller members.

7. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; a jack with a frame that may be lowered to bear against the roadbed, suspended from the frame, for raising the rails; a rotary excavator vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; a transverse conveyor and means whereby material picked up by said scraper member may be conveyed to said transverse conveyor; and a conveyor belt whereby material picked up by said scraper member may be conveyed to said transverse conveyor.

8. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; vertical screws that may be rotated by the driving mechanism, having nuts held in slotted holes, with means for connecting the nuts to the rails, adjustably supported to the vehicle; a rotary excavator vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; a transverse conveyor and means whereby material picked up by said scraper member may be conveyed to said transverse conveyor; and a side conveyor whereby material from said transverse conveyor may be conveyed to the front end of said vehicle.

9. A road surfacing mechanism embodying a supporting vehicle; a secondary frame pivotally mounted to said vehicle; a rotary excavator vertically adjustably mounted on said secondary frame; a scraper member mounted back of said rotary excavator; means whereby material picked up by said scraper member may be conveyed away from said scraper member; and stilt members slidably mounted on the forward end portion of said vehicle and track elevating means disposed in said stilt members.

10. In combination with a road surfacing mechanism, stilt members, means to elevate said stilt members, a block slidably disposed

in said stilt members, a screw operatively disposed in said block, actuating means for said screw and releasable securing means attached to said block.

11. A road surfacing mechanism having a rotary digger, an adjustable scraper behind the digger, a means for elevating the material from the scraper; rotary baffles for feeding the material from the scraper to the conveyor; a transverse conveyor which receives the material from the means for elevating the material from the scraper; tamping rollers with springs for holding them downward; a rotary brush behind the tamping rollers; a longitudinal conveyor on the side of the machine which carries material from the transverse conveyor to the front of the machine; a screen at the forward end for receiving the material, which is provided with a hopper for feeding the material to the track as desired, screw jacks at the end of the machine for raising the track, said jacks being provided with frames that bear against the roadbed; a suitable frame for mounting and supporting the entire mechanism, and suitable means for movably supporting the frame.

12. A road surfacing mechanism having a rotary digger, an adjustable scraper behind the digger, a conveyor for elevating the material from the scraper; a transverse conveyor which receives the material from the former conveyor; tamping rollers with springs for holding them downward; a rotary brush behind the tamping rollers; a longitudinal conveyor on the side of the machine which carries material from the transverse conveyor to the front of the machine; a screen at the forward end for receiving the material, which is provided with a hopper for feeding the material to the track as desired; screw jacks at the end of the machine for raising the track, said jacks being provided with frames that bear against the roadbed; a suitable frame for mounting and supporting the entire mechanism and suitable means for movably supporting the frame.

13. A road surfacing mechanism having a rotary digger, an adjustable scraper behind the digger, a conveyor for elevating the material from the scraper; rotary baffles for feeding the material from the scraper to the conveyor; a transverse conveyor which receives the material from the former conveyor; means for finishing a roadbed; a longitudinal conveyor on the side of the machine which carries material from the transverse conveyor; a screen for receiving the material from the longitudinal conveyor, which is provided with a hopper for feeding the material to the track as desired; screw jacks at the end of the machine for raising the track, said jacks being provided with frames that bear against the

roadbed; a suitable frame for mounting and supporting the entire mechanism, and suitable means for movably supporting the frame.

14. A road surfacing machine having a rotary digger, an adjustable scraper behind the digger, a conveyor for elevating the material from the scraper; a transverse conveyor which receives the material from the former conveyor; tamping rollers with springs for holding them downward; a means for finishing a track; a means on the side of the machine which carries material from the transverse conveyor to the front of the machine; a screen at the forward end for receiving the material, which is provided with a hopper for feeding the material to the track as desired; screw jacks at the end of the machine for raising the track, said jacks being provided with frames that bear against the roadbed; a suitable frame for mounting and supporting the entire mechanism, and suitable means for movably supporting the frame.

15. A road surfacing mechanism having a rotary digger; an adjustable scraper behind the digger; a means for elevating the material from the scraper; a rotary baffle for feeding the material from the scraper to the means for elevating it, a transverse conveyor for receiving the material; tamping rollers with means for holding them down, a rotary brush behind the tamping rollers; a longitudinal conveyor on the side of the machine which carries material from the transverse conveyor to the front of the machine; a screen at the forward end for receiving the material, which is provided with a hopper for feeding the material to the track as desired; screw jacks at the end of the machine for raising the track, said jack being provided with frames that bear against the roadbed; a suitable frame for mounting and supporting the entire mechanism, and suitable means for movably supporting the frame.

16. A road surfacing mechanism having a rotary digger; an adjustable scraper behind the digger, a means for elevating the material from the scraper; a transverse conveyor which receives the material from the means for elevating; means for finishing a track; a means on the side of the machine which carries material from the transverse conveyor to the front of the machine; a screen at the forward end for receiving the material, which is provided with a hopper for feeding the material to the track as desired, screw jacks at the end of the machine for raising the track, said jacks being provided with frames that bear against the roadbed; a suitable frame for mounting and supporting the entire mechanism, and suitable means for movably supporting the frame.

17. A road surfacing mechanism having a rotary digger; an adjustable scraper behind the digger, a means for elevating the material from the scraper; a transverse conveyor which receives the material from the means for elevating; means for finishing a track; a means on the side of the machine which carries material from the transverse conveyor to the front of the machine; a screen at the forward end for receiving the material, which is provided with a hopper for feeding the material to the track as desired, and a means for raising a portion of the track.

18. A machine for surfacing roadbeds having a rotary digger; an adjustable scraper behind the digger; a means for elevating the material from the scraper; a rotary baffle for feeding the material from the scraper to the means for elevating it, a transverse conveyor for receiving the material; tamping rollers with means for holding them down; a rotary brush behind the tamping rollers; a longitudinal conveyor on the side of the machine which carries material from the transverse conveyor to the front of the machine; a screen at the forward end for receiving the material, which is provided with a hopper for feeding the material to the track as desired; a portable jack suspended from the frame, for raising the rails; and a suitable frame for mounting and supporting the entire mechanism.

19. A road surfacing mechanism having a rotary digger; a means for removing the excess dirt; a screen at the forward end for receiving the dirt, which is provided with a hopper for feeding it to the track as desired, and a means for raising a portion of the track.

20. A road surfacing mechanism having a means for loosening the dirt between the rails of a railroad; a means for finishing a track, a longitudinal conveyor for carrying dirt to the front of the machine, a screen for receiving the dirt, which has a hopper for feeding it to the track as desired, and a portable jack for raising a portion of the track.

21. A device of the type described embodying a means for loosening the dirt between the rails of a railroad; a means for elevating the excess material and dumping it outside of the rails; and a means for raising the rails.

22. In a road surfacing mechanism a digger; a means for removing the excess dirt; a means for packing and crowning the remaining dirt; and a means for cleaning and finishing the roadbed.

23. In a machine for surfacing the portion of a railroad between the rails; a means for loosening the material; a means for elevating the material and dumping it to one side; and a means for packing and finishing the material after the excess material has been removed.

24. In a machine for surfacing roadbeds, a means for loosening the material; a means for elevating the material and dumping it to one side; a means for packing and finishing the roadbed after the excess material has been removed; and a means for raising a small portion of the track.

25. A machine for surfacing roadbeds having a means with an adjustable scraper for loosening the material, a conveyor for elevating the material from the scraper, and dumping it to one side, a means for smoothing and finishing a track, portable jacks for raising a portion of the track, and a suitable frame for mounting and supporting the entire mechanism.

26. A machine for surfacing roadbeds having a means with an adjustable scraper for

loosening the material, a conveyor for elevating the material from the scraper and dumping it, a means for smoothing and finishing a track, and portable jacks for raising a portion of the track.

27. A road surfacing mechanism having a rotary digger; an adjustable scraper behind the digger, a means for elevating the material from the scraper; a transverse conveyor which receives the material from the means for elevating; a means on the side of the machine which carries material from the transverse conveyor to the front of the machine, and a means for feeding it to the track as desired.

In witness whereof, I hereunto subscribe my name this 31st day of July, A. D. 1922.

MICHAEL VENA.