P. A. GEISLER.

MACHINE FOR DIGGING OUT RAILWAY TIES.

APPLICATION FILED JAN. 19, 1917.

1,252,564.

Patented Jan. 8, 1918.

3 SHEETS—SHEET 1.

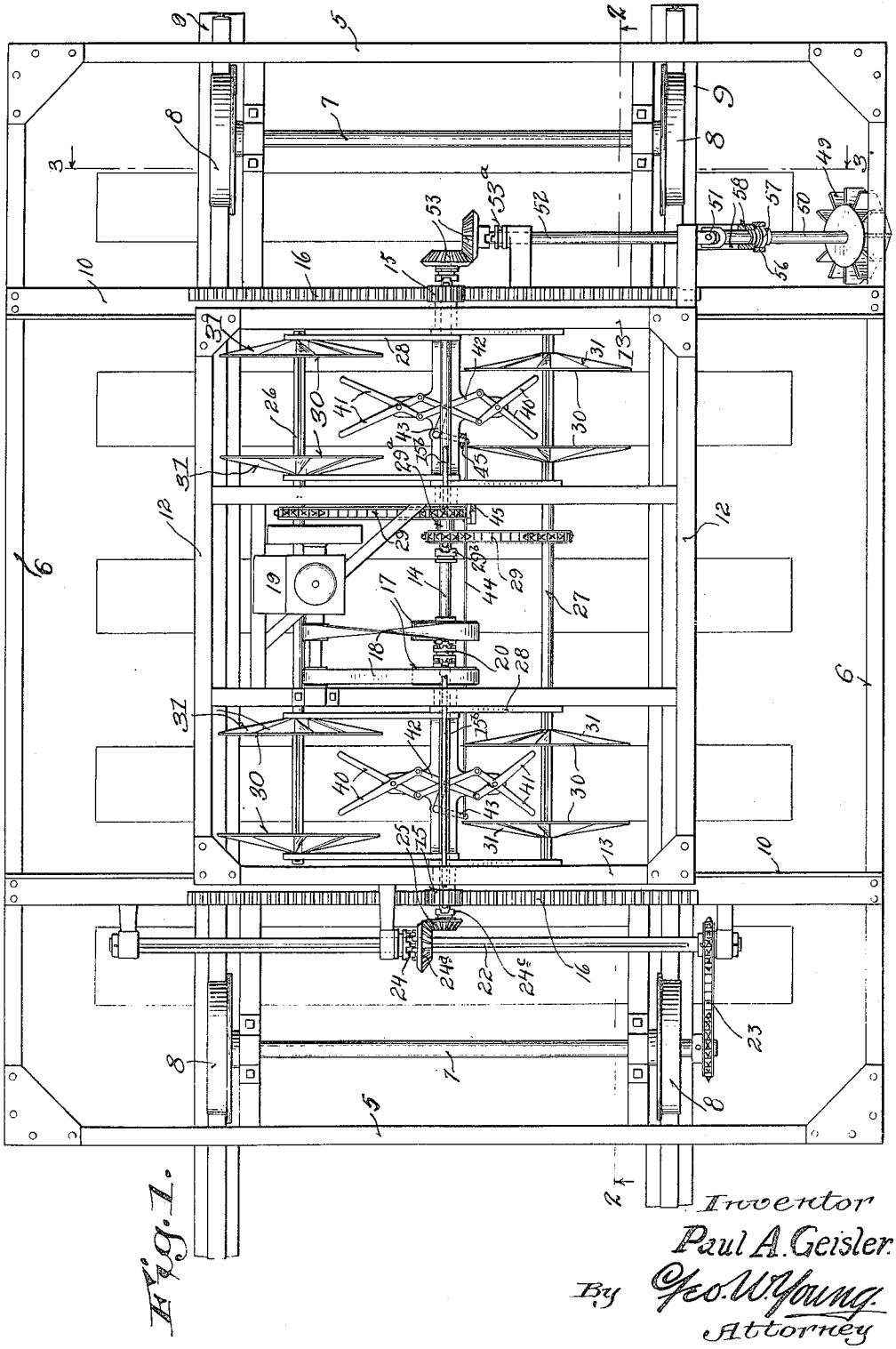


Fig. 1.

Inventor
Paul A. Geisler.
By Geo. W. Young.
Attorney

P. A. GEISLER.

MACHINE FOR DIGGING OUT RAILWAY TIES.

APPLICATION FILED JAN. 19, 1917.

1,252,564.

Patented Jan. 8, 1918.

3 SHEETS—SHEET 2.

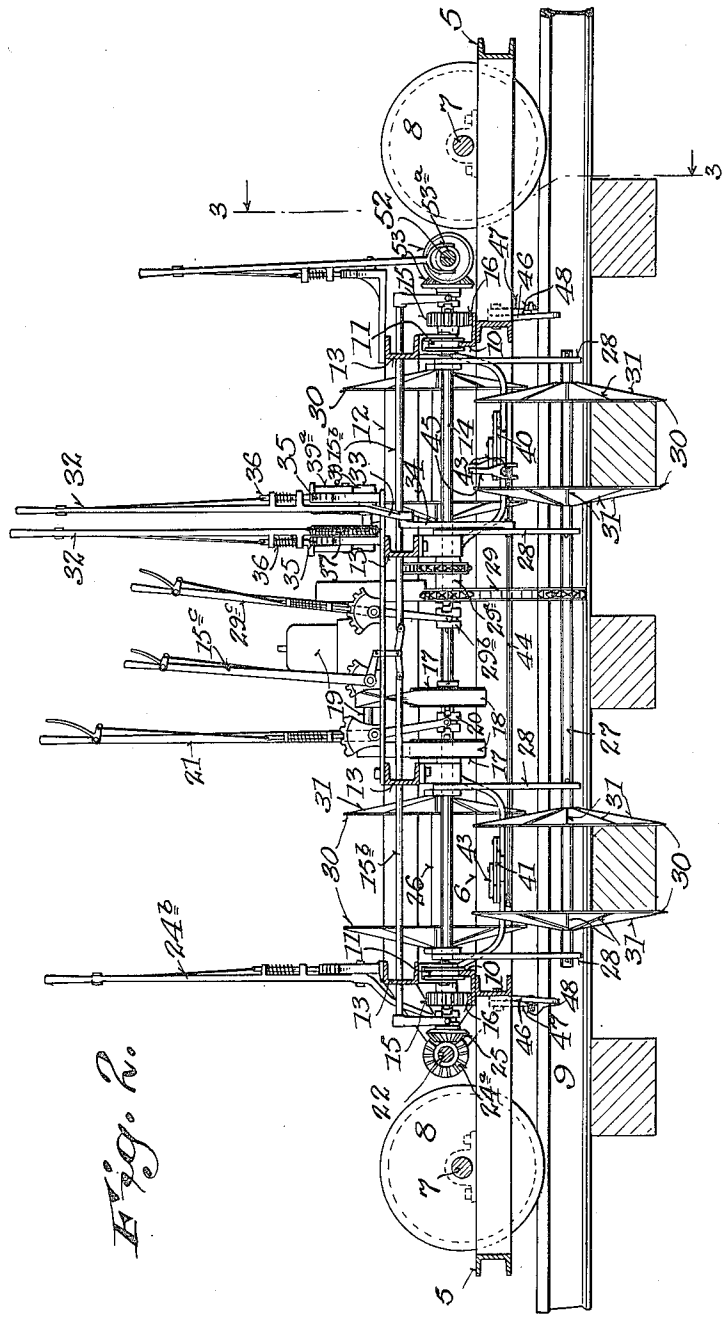


Fig. 2.

Inventor
Paul A. Geisler.
By Jos. W. Young
Attorney

P. A. GEISLER.

MACHINE FOR DIGGING OUT RAILWAY TIES.

APPLICATION FILED JAN. 19, 1917.

1,252,564.

Patented Jan. 8, 1918.

3 SHEETS—SHEET 3.

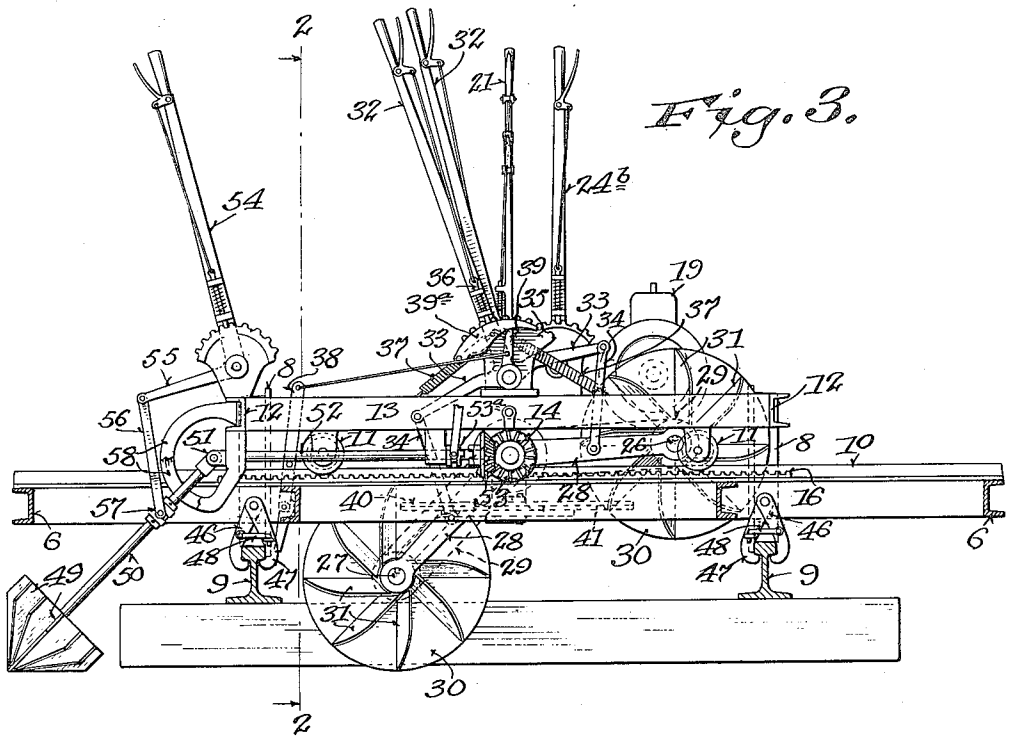


Fig. 3.

Inventor
Paul A. Geisler.
By Geo. W. Young
Attorney

UNITED STATES PATENT OFFICE.

PAUL A. GEISLER, OF MILWAUKEE, WISCONSIN.

MACHINE FOR DIGGING OUT RAILWAY-TIES.

1,252,564. Specification of Letters Patent. Patented Jan. 8, 1918.

Application filed January 19, 1917. Serial No. 143,238.

To all whom it may concern:

Be it known that I, PAUL A. GEISLER, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Machines for Digging Out Railway-Ties; and I do hereby declare that the following is a full, clear, and exact description thereof.

As the ties of a railway become unfit for further use, they are withdrawn and replaced by fresh ties. This continual withdrawal and replacement of ties entails a considerable expenditure of time and labor which is consumed mostly in digging up the track-way to permit withdrawal of the old ties. The replacement of the new ties occupies comparatively very little time.

It is therefore primarily the object of my invention to provide a machine adapted to dig up the track-way at the sides and ends of one or a plurality of ties, whereby the tie may be slid transversely of the rails for withdrawal.

Inasmuch as it is necessary to dig between the rails and at the outer sides thereof, a more specific object of my invention is to provide a machine including readily controlled digging members which are vertically movable to provide a clearance for the rails when moved therepast to the outer portions of the ties.

A further important object resides in the provision of such a machine which is adapted to travel on the railway rails whereby it may be most conveniently shifted for digging association with desired ties.

A still further important object resides in the provision of a rail carried machine which is provided with means for anchoring it to the rails when in operation, whereby to prevent possible lifting movement of the machine upon engagement of the cutting members with relatively hard material.

I propose to employ a pair of digging members adapted for slidable engagement with the sides of a tie, and so formed as to be urged against the tie upon engagement with the ground in their digging operations. In connection with these digging members it is an object of my invention to provide an arrangement for spreading the digging members apart a distance greater than the width of the tie, whereby upon assuming an approximate operative position over the tie, said digging members may be lowered and will automatically feed inwardly to proper engagement with the tie, thus facilitating their initial association therewith.

A still further object of my invention resides in the provision of a means for lifting the digging members, which is operable automatically upon movement of said digging members adjacent the rail, whereby to prevent their possible engagement with the rail, it being appreciated that it is desired to dig as close to the rail as possible.

With the above and other objects and advantages in view, the invention resides more particularly in the novel combination, formation and arrangement of parts hereinafter described and pointed out in the appended claims.

In the drawings:

Figure 1 is a plan view of a tie digging machine constructed in accordance with my invention.

Fig. 2 is a longitudinal sectional view through my machine on the line 2—2 of Fig. 1 and Fig. 3 is a transverse sectional view through the machine on the line 3—3 of Fig. 1.

Referring now more particularly to the accompanying drawings, the present embodiment of my machine comprises a body frame including the end sills 5 and side sills 6 which carry the transversely disposed axles 7 on which are mounted wheels 8 adapted to ride upon the rails 9 of the track-way. This body frame carries a plurality of transverse angle iron track rails 10 on which are mounted wheels 11 carried by a transversely shiftable frame including the side sills 12 and transverse sills 13, said shiftable frame carrying the digging members and the operating means therefor.

The main drive shaft 14 of the machine is carried by the central portion of the shiftable frame, and for moving the frame, gears 15 are provided on the ends of the shaft and mesh with transverse racks 16 carried on the body frame. These gears are loosely mounted on the shafts and are engageable by splined clutches, controlled by links 15^b extending to a common centrally disposed control lever 15^c. This main shaft 14 has loosely mounted thereon a pair of pulleys 17 connected by straight and twisted belts 18 with the drive shaft of an engine 19, and a clutch member 20 controlled by an upstanding lever 21 is splined on the shaft for engagement with the pulleys 17 to impart

selective reverse movements thereto. Thus the shiftable frame may be moved to either side of the track-way. For propelling the entire machine a transverse shaft 22 is carried by the body frame at one end and is connected by sprocket chains 23 with one of the wheel axles 7. Splined on this shaft 22 is a clutch 24 adapted for engagement with a gear wheel 24[a] loosely mounted on the shaft and held in mesh with a beveled gear 25 on the main shaft 14, whereby the machine may be propelled from the main shaft in any desired shifted position of the shiftable frame by releasing the clutches of the shifting gears 15 and the clutch of the digging members hereinafter mentioned. The propelling clutch 24 is controlled by a lever 24[b] pivoted on the shiftable frame. Thus upon a digging operation in connection with one or more ties being completed, with the shiftable frame projecting at one side of the body frame, the machine may be propelled a short distance to start a fresh digging operation at the same side of the track-way where the first digging operation was completed, thus conducing to a considerable economy of time in operation.

The digging means carried by the shiftable frame comprises a pair of longitudinally extending shafts 26 and 27 journaled in the ends of series of hanger links 28 which are journally connected with and extend downwardly and outwardly from the main drive shaft 14. These digging shafts are driven by sprocket chains 29 trained about sprockets thereon and on a sleeve 29[a] loose on the main shaft 14, this sleeve being engageable by a clutch 29[b] splined on the main shaft and controlled by an upstanding lever 29[c]. Splined on the end portions of each of the shafts 26 and 27 are a pair of digging members comprising disks 30 at the outer sides of each of which is provided a radial series of tapered inclined blades 31 whereby upon rotative movement of the disks, the road bed material will be dug and laterally turned to expose the sides of the tie. It is noted that by the tapered formation of the blades, the disks are automatically fed inwardly toward the tie and thus will snugly engage the tie in their digging movement longitudinally thereof. For raising and lowering each of the shafts 26 and 27 an upstanding lever 32 is pivoted to the shiftable frame and has a lateral arm 33 at its lower end connected by a link 34 with one of the shaft hanger links 28. A rack segment 35 is associated with the lever for coaction with a conventional grip operated pawl 36 thereon. Thus the shafts may be readily raised and lowered to adjust the digging members for association with different ties, and for clearance of the rails 9 in movement therepast.

It is noted that two pairs of digging members are associated with each tie and that the knife blades 31 of the pairs are inclined in opposite directions. The digging operation of the machine is started with one pair of cutting members at the central portion of the trackway. The movable bed is then shifted in the direction of cutting movement of the blades until the cutting members are disposed adjacent the rails. The cutting members are then lifted to clear the rails and lowered to dig at the sides of the tie outwardly of the rail. The movable frame is then shifted backwardly and the other pair of cutting members operated to dig the other side of the trackway. It is noted that the direction of cutting movement of the cutting members is such that the blades 11 present obtuse angles in conjunction with the body disk 30 whereby to procure a turning or plowing movement of the roadbed portion engaged thereby.

The cutting members are normally urged to a raised position by springs 37 on the shiftable frame connected with the control levers, and to provide for an automatic release of the holding pawls 36 upon movement of the cutting members adjacent respective rails, an intermediately pivoted trigger lever 38 is carried by the shiftable frame immediately outwardly of the cutting members of each shaft 26 and 27 and this lever is connected with an upstanding pivoted lever 39 connected with a pivoted block 39[a] engageable with a corresponding pawl 36 for lifting said pawl and thus releasing the control lever to permit lifting operation of the corresponding spring 37. Thus the possibility of damage of the cutting members is prevented, although it is noted that in the present instance the blades 31 are disposed inwardly of the peripheral edges of the disks 30, and hence said disks would bear against the rail with very little damage. In some instances however, it may be desired to project the ends of the blades past the edges of the disks in an obvious manner to procure a more efficient cutting action.

When the pairs of cutting members which are splined on the shafts 26 and 27 are raised, it is desired to spread said cutting members whereby to insure their disposition at the sides of the tie by engaging them with the ground outwardly of the tie and permitting them to feed inwardly by their natural ground engagement to a position engaging the sides of the rails. To accomplish this, each pair of cutting members at one side of the machine has disposed therebetween a pair of straight intermediately pivoted crossed levers 40 and each pair of cutting members at the opposite side of the frame have pivoted therebetween a pair of intermediately pivoted angle levers 41. The levers 40 and 41 of the transversely opposed

pairs of cutting members are connected by links 42 to thus produce in effect lazy tongs, which are connected and actuated by the longitudinally extending arm of an angle lever 43 which has a link 44 pivoted to its transversely extending arm, this link 44 extending to the central portion of the machine for connection with a common control lever 45. Thus upon moving the links 44 inwardly, each of the pairs of cutting members will be simultaneously moved apart by the sliding engagement of the ends of the levers 40 and 41 disposed therebetween.

In the digging operation, engagement of the cutting members with relatively hard road-bed material might tend to lift the entire machine from the rails, and to prevent this, anchoring hooks 46 are pivoted to the body frame and extend downwardly and outwardly thereof with their bill portions adapted to slidably engage under the outer portions of the balls of the rails, the inward inclination of the hooks being such as to prevent their slippage from interlocking relation with the rail. To afford a more positive sliding anchorage, inner hook members 47 may be also provided to engage under the inner portions of the rails, and each pair of said hook members may be connected by a hook 48.

The entire machine so far described may be thus most readily manipulated to dig or plow up the dirt at the sides of rails which it is desired to remove. To procure the longitudinal sliding movement of the ties, it is necessary for the ends of said ties to be exposed, and to dig a clearance at the ends of the rails, an end digging member is provided including radial relatively wide blades 49 carried on a shaft 50 extending outwardly from one side of the shiftable frame and connected at its inner end by a universal coupling 51 with a shaft 52 journaled on the shiftable frame and connected by bevel gears 53 and a clutch 53^a with the main drive shaft 14. Movement of this digging member is controlled by an upstanding control lever 54 having a lateral arm 55 thereon connected by a link 56 with a collar 57 journaled on the shaft 50, said shaft being held against horizontal pivotal movement by guide plates 58. In some types of road-beds wherein the bed inclines downwardly from the outer ends of the rails, relatively little digging is required, but under conditions where the road-bed lies flush with the surrounding ground a relatively long cut may be procured by shifting the carrying frame, to provide a sufficient clearance to withdraw the rails.

Although I have shown the power unit of my machine as comprising an internal combustion engine 19, it is obvious that any power means may be provided, and in tie replacing operations on the road-beds of electric railroads, a considerable economy will be procured by utilizing an electric motor which may receive its power from a suitable trolley carried preferably by the body frame.

Although I have shown cutting members adapted for association only with two ties, it is obvious that sets of cutting members may be employed for any number of ties, since should it be only desired to dig out a single tie the remaining cutting members may be retained in their lifted inoperative position. It is also obvious that to meet differing conditions of use, various changes and modifications of structure may be resorted to, without departing in any manner from the spirit of my invention, and it is therefore to be understood that the scope of the invention is limited only by the scope of the appended claims.

What is claimed is:

1. A machine for digging out railway ties comprising a body frame adapted to rest on the railway track, a shiftable frame mounted on the body frame and movable transversely of the track rails, a pair of cutting members carried by the shiftable frame, and means for moving the cutting members apart and longitudinal of the track rails.

2. A machine for digging out railway ties comprising a frame, a pair of cutting members carried by the frame, and means for moving said cutting members apart, said means including a pair of intermediately pivoted levers, and means for forcing the ends of said levers into engagement with the cutting members.

3. A machine for digging out railway ties comprising a frame, a pair of cutting members carried by the frame, and means for moving said cutting members apart, said means including a set of lazy tongs, and actuating means for operating said tongs.

4. A machine for digging out railway ties comprising a frame, two pairs of opposed cutting members carried by the frame, a pair of intermediately pivoted levers disposed between each pair of cutting members, links connecting the adjacent ends of the levers, an angle lever pivoted to said links, and means for actuating the angle lever to spread the cutting members apart.

5. A machine for digging out railway ties comprising a body frame, a frame mounted thereon and shiftable transversely of the body frame, a pair of cutting members carried by the shiftable frame, means for vertically moving said cutting members and means for moving said cutting members apart.

6. A machine for digging out railway ties comprising a body frame, a shiftable frame mounted on the body frame, a shaft carried by the shiftable frame, a pair of cutting members splined on the shaft, means for

moving said shaft vertically and means for moving said cutting members longitudinally of the shaft.

7. A machine for digging out railway ties comprising a frame, a pair of cutting members carried thereby, means for operating the cutting members, and means for automatically feeding the cutting members toward each other during operation.

8. A machine for digging out railway ties comprising a frame, a pair of cutting members carried thereby, means for moving the cutting members apart preparatory to cutting, means for operating the cutting members, and means for automatically feeding the cutting members toward each other during operation.

9. A machine for digging out railway ties comprising a body frame, a shiftable frame mounted thereon, a shaft carried by the shiftable frame and a pair of cutting members splined on said shaft, each cutting member including a disk portion and tapered blades radially disposed at one side of the disk.

10. A machine for digging out railway ties comprising a body frame, a shiftable frame mounted thereon, a rack on the body frame, a main drive shaft carried by the shiftable frame, gears on the drive shaft meshing with said rack, hanger links journaled on the main drive shaft, cutting member shafts journaled in said hanger links, sprocket connections between the cutting member shafts and the main drive shaft, cutting members on said cutting member shafts and means for moving said cutting member shafts vertically.

11. A machine for digging out railway ties comprising a body frame, a shiftable frame mounted thereon, a rack on the body frame, a main drive shaft carried by the shiftable frame, gears on the drive shaft meshing with said rack, hanger links journaled on the main drive shaft, cutting member shafts journaled in said hanger links, sprocket connections between cutting member shafts and the main drive shaft, cutting members on said cutting member shafts and means for moving said cutting member shafts vertically and means for operating the main drive shaft in alternately opposite directions.

12. A machine for digging out railway ties comprising a frame, a hanger arm pivotally mounted on the frame, a cutting member on the free end of the arm, means for lowering the member into engagement with the material to be cut, and means for automatically raising said cutting member when the same reaches a predetermined point.

13. A machine for digging out railway ties comprising a body frame, a frame shiftable thereon, a hanger arm pivotally mounted on the shiftable frame, a cutting member on the free end of the arm, means for lowering the member into engagement with material to be cut, and means for automatically raising said cutting member when the shiftable frame has been moved a predetermined extent.

14. The combination with the pair of rails of a track-way, of a frame movable transversely of said rails, a hanger arm pivotally mounted on said frame, a cutting member on the free end of the arm, means for lowering said member into engagement with the material to be cut, and means for engagement with one of said track rails when the frame has been moved transversely thereof to a predetermined extent, whereby to automatically raise the cutting member clear of said rail.

15. The combination with a pair of rails of a track-way, of a frame movable transversely of the track-way, means for moving said frame, a hanger arm pivotally carried on the frame, a cutting member on the free end of the hanger arm, a lever on the frame, an arm on the lever linked to the hanger arm, whereby to raise and lower the cutting member, lever holding means to retain the cutting member in lowered position, means urging the cutting member to a raised position, and a trip carried by the frame to engage one of the track rails for releasing the lever holding means when the frame has been moved a predetermined extent.

16. The combination with the pair of rails of a track-way, of a frame movable transversely of the track-way, means for moving said frame, a hanger arm pivotally carried by the frame, a cutting member on the free end of the hanger arm, an operating lever on the frame, a pawl on the lever, a notched plate to be engaged by said pawl for holding the lever in adjusted position, an arm carried by the lever and linked to the hanger arm, whereby to raise and lower the cutting member, means urging the cutting member to a raised position, a pivoted block engageable with said pawl to move it out of engagement with said notched plate, and means engageable with one of said track rails for actuating said block.

17. The combination with a pair of rails of a track-way, of a frame movable transversely of the track-way, means for moving said frame, a hanger arm pivotally carried by the frame, a cutting member on the free end of the hanger arm, an operating lever pivoted to the frame, a pawl on the lever, a notched plate to be engaged by said pawl, an arm extending from the operating lever, said arm being linked to the hanger arm, whereby to raise and lower the cutting member, means urging the cutting member to a raised position, a pivoted block adapted to engage said pawl to move it out of engagement with said notched plate, a block en-

gaging lever, a trip lever to engage one of said track rails, and a connection between said trip lever and block engaging lever, said trip being adapted to be brought into engagement with one of said track rails when the frame has been moved a predetermined extent.

18. A machine for digging out railway ties comprising a body frame, a shiftable frame mounted thereon, a rack on the body frame, a main drive shaft carried by the shiftable frame, a gear on the shaft meshing with the rack, cutting members carried by the shiftable frame, a driving connection between said cutting member and drive shaft, and means for operating the drive shaft in alternately opposite directions to change the direction of movement of the frame and cutting members to cause the same to operate in unison.

19. A machine for digging out railway ties comprising a body frame, a shiftable frame mounted thereon, a main drive shaft on the shiftable frame, a pair of cutting members adapted to operate on the opposite sides of a railway tie, an additional cutting member adapted to operate at the end of a railway tie, a connection between each of said cutting members and drive shaft to cause the former to operate in unison.

20. A machine for digging out railway ties comprising a body frame, a shiftable frame mounted thereon, a rack on the body frame, a main drive shaft carried by the shiftable frame, a gear on the shaft meshing with the rack, a pair of cutting members adapted to operate on the opposite sides of a railway tie, an additional cutting member adapted to operate at the end of a railway tie, a driving connection between each of said cutting members and the drive shaft, and means for operating said drive shaft, whereby the several cutting members may be operated simultaneously with the movement of said shiftable frame.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

PAUL A. GEISLER.

Witnesses:
EDWARD G. LOESER,
FRANK L. RATCLIFFE.