May 3, 1932. H. H. TALBOYS 1,856,893

SPIKE DRIVER

Filed July 3, 1930 5 Sheets-Sheet 1

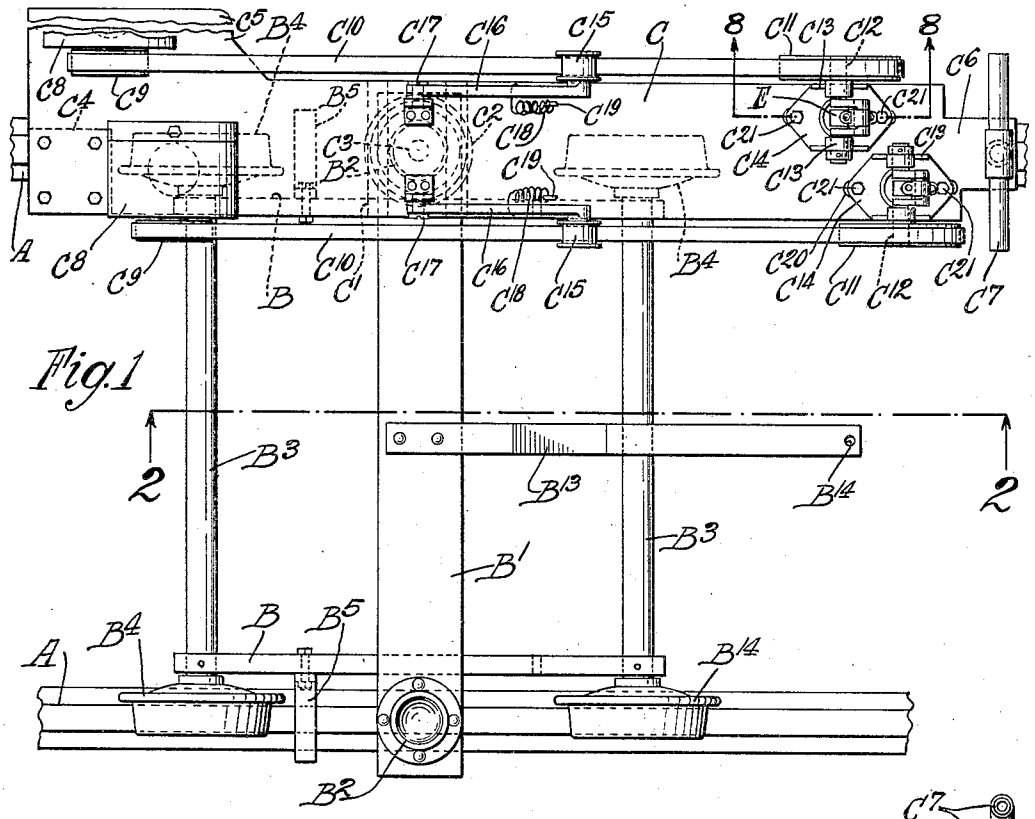

Fig. 1

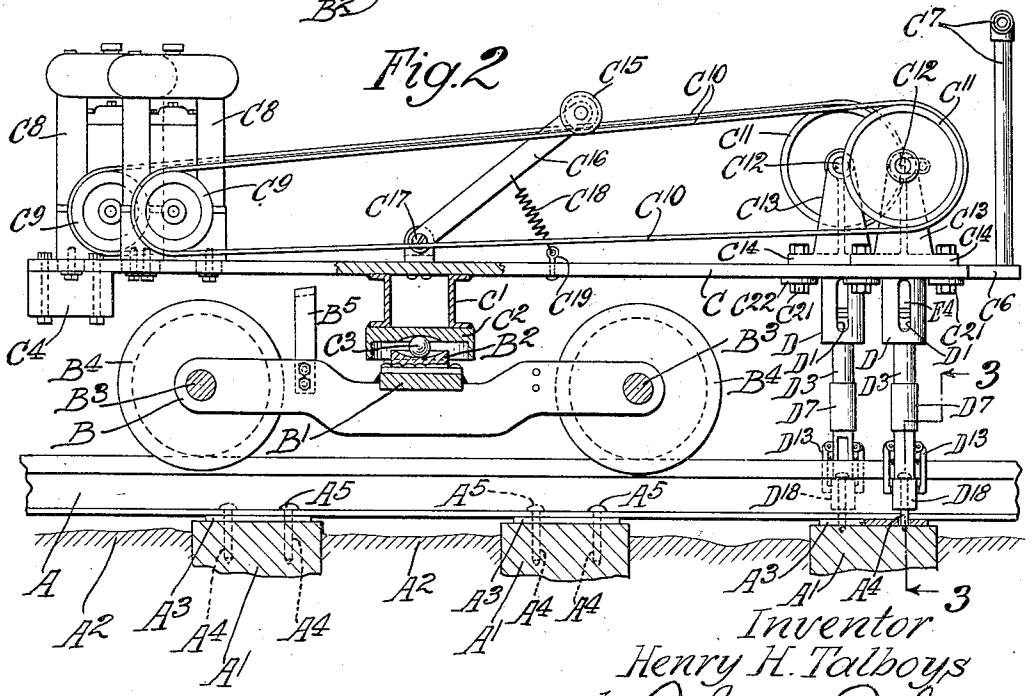

Fig. 2

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May 3, 1932. H. H. TALBOYS 1,856,893

SPIKE DRIVER

Filed July 3, 1930 5 Sheets-Sheet 2

Fig.4

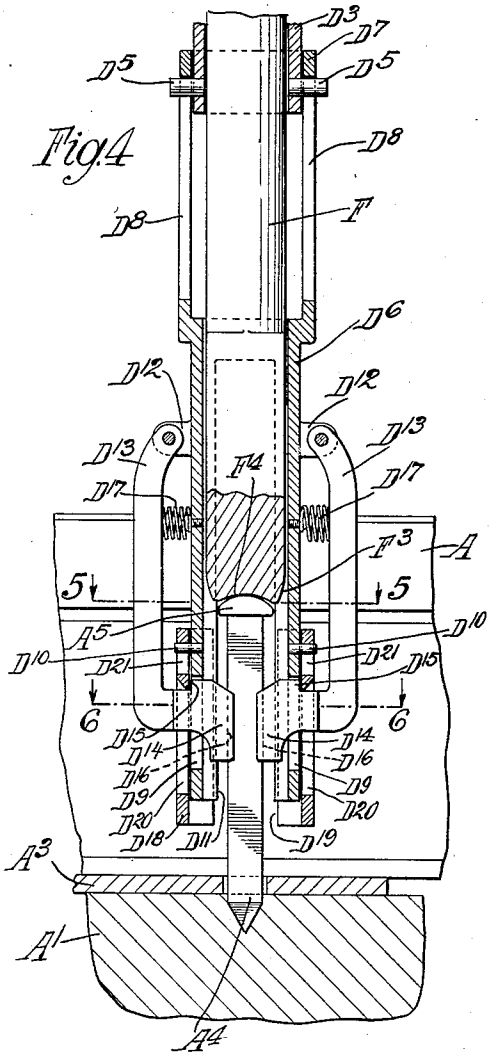


Fig.3

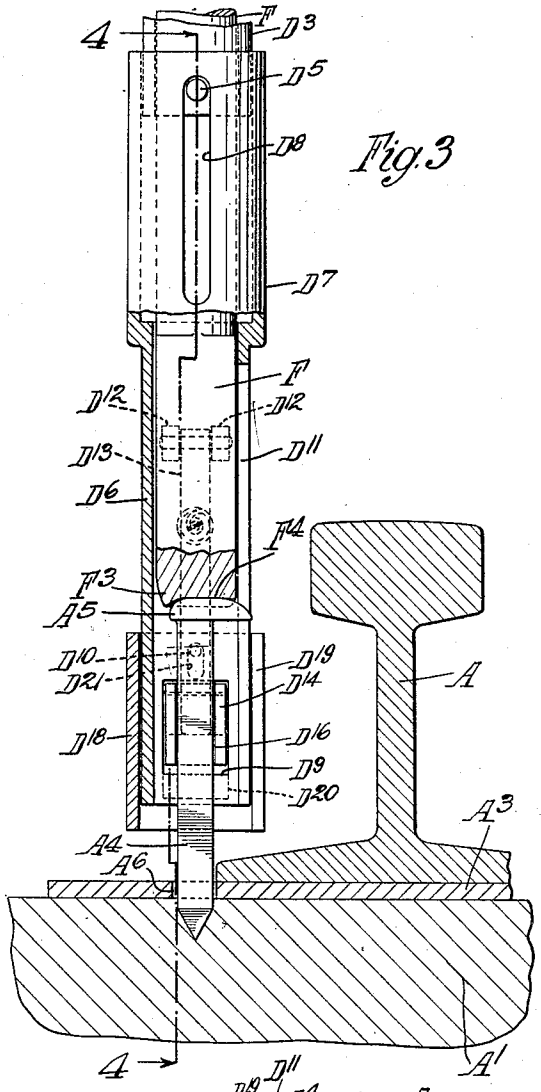


Fig.5

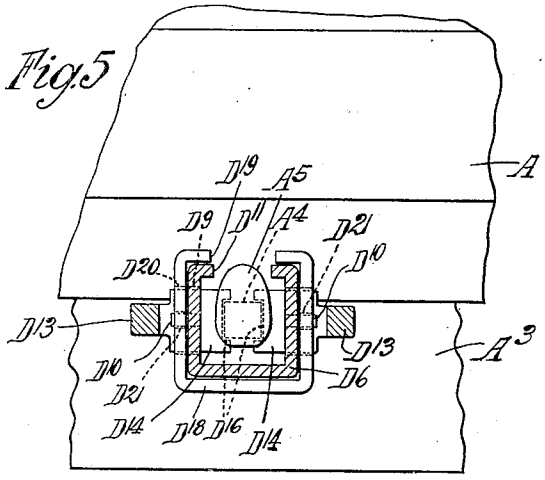
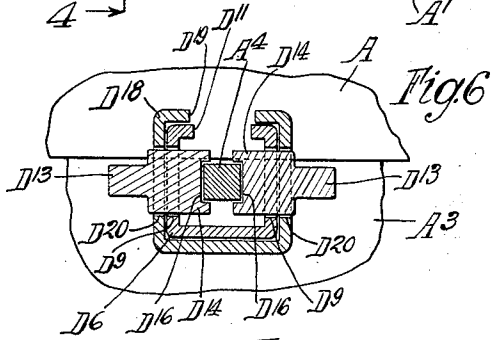


Fig.6



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May 3, 1932. H. H. TALBOYS 1,856,893

SPIKE DRIVER

Filed July 3, 1930 5 Sheets-Sheet 3

Fig. 7

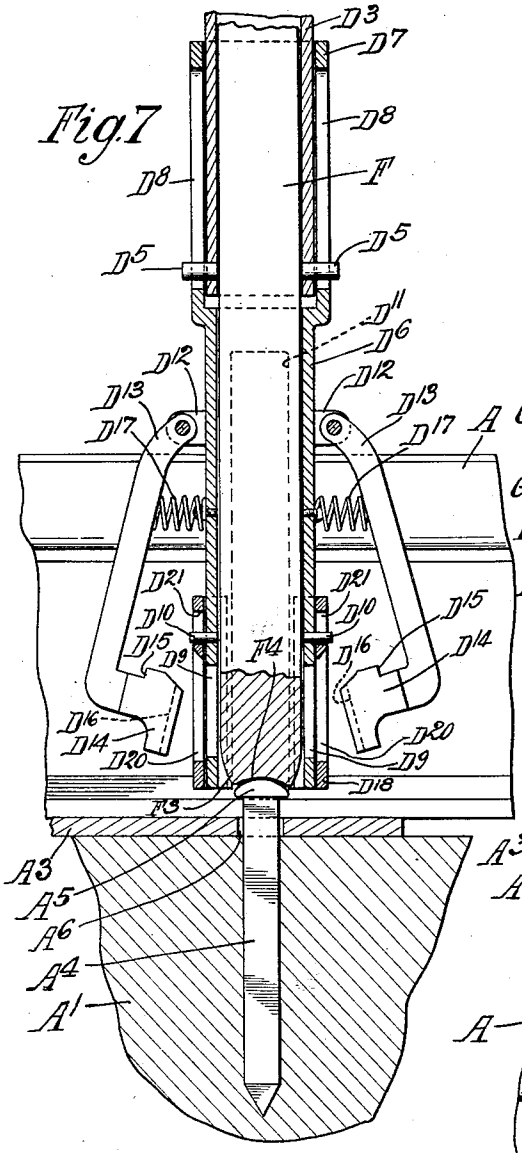


Fig. 13

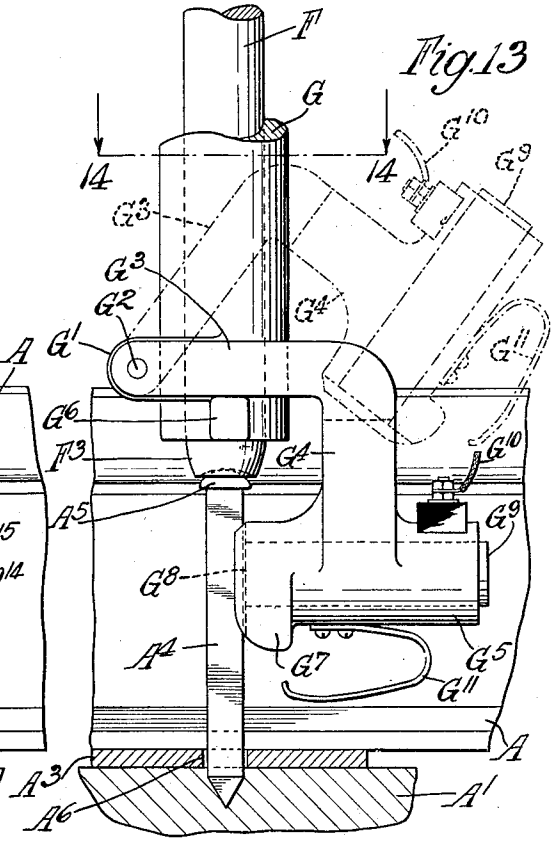
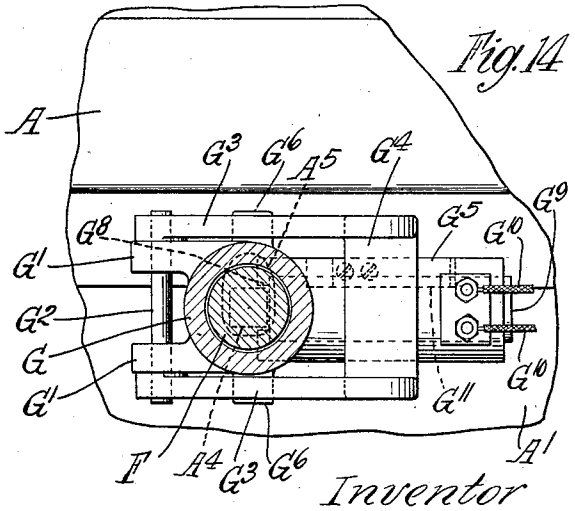


Fig. 14



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May 3, 1932. H. H. TALBOYS 1,856,893

SPIKE DRIVER

Filed July 3, 1930 5 Sheets-Sheet 4

Fig. 8

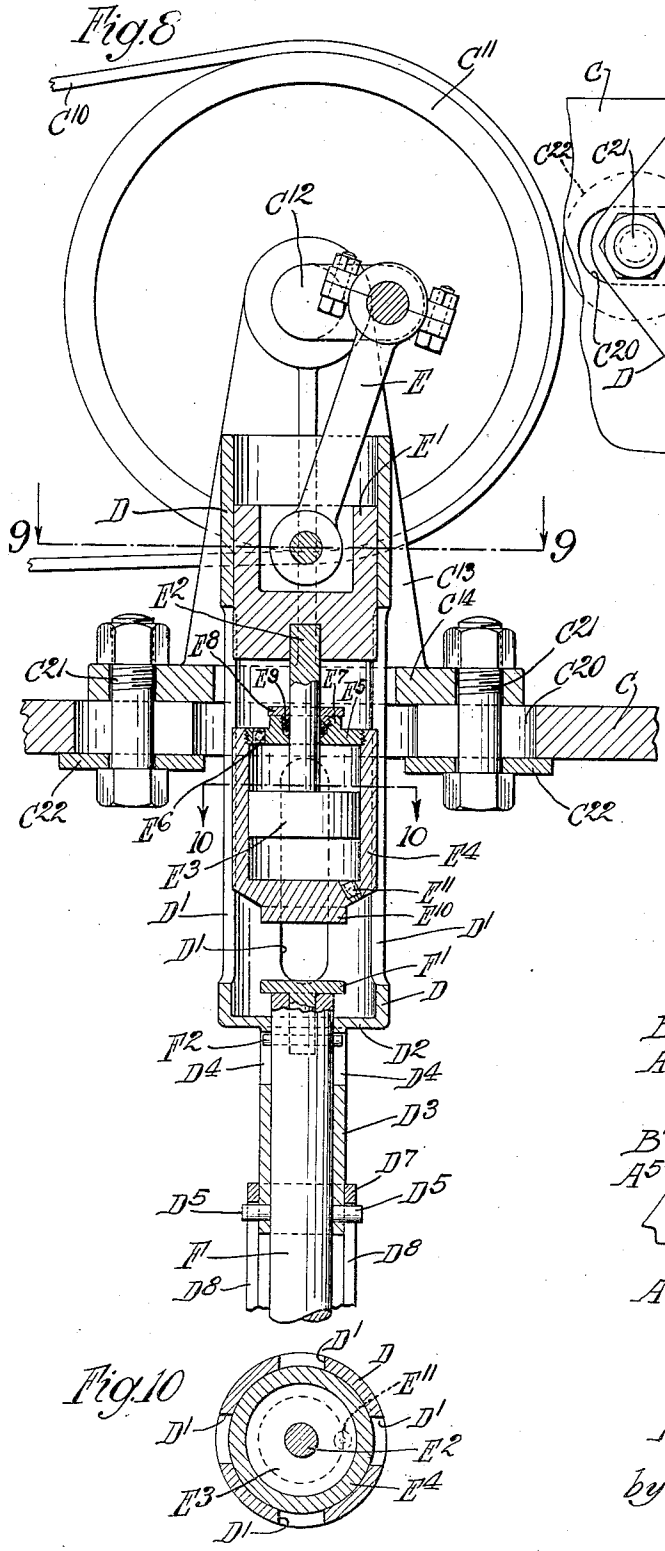

Fig. 9

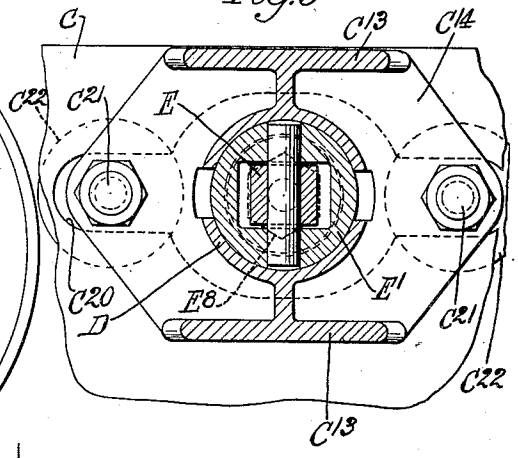

Fig. 16

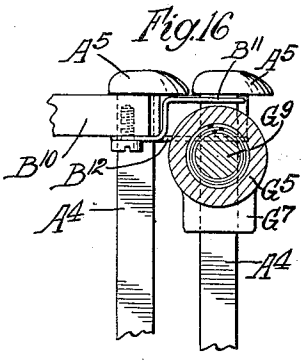

Fig. 15

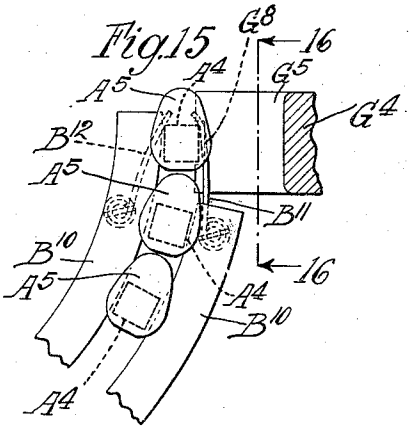

Fig. 10

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May 3, 1932. H. H. TALBOYS 1,856,893

SPIKE DRIVER

Filed July 3, 1930 5 Sheets-Sheet 5

Fig. 12

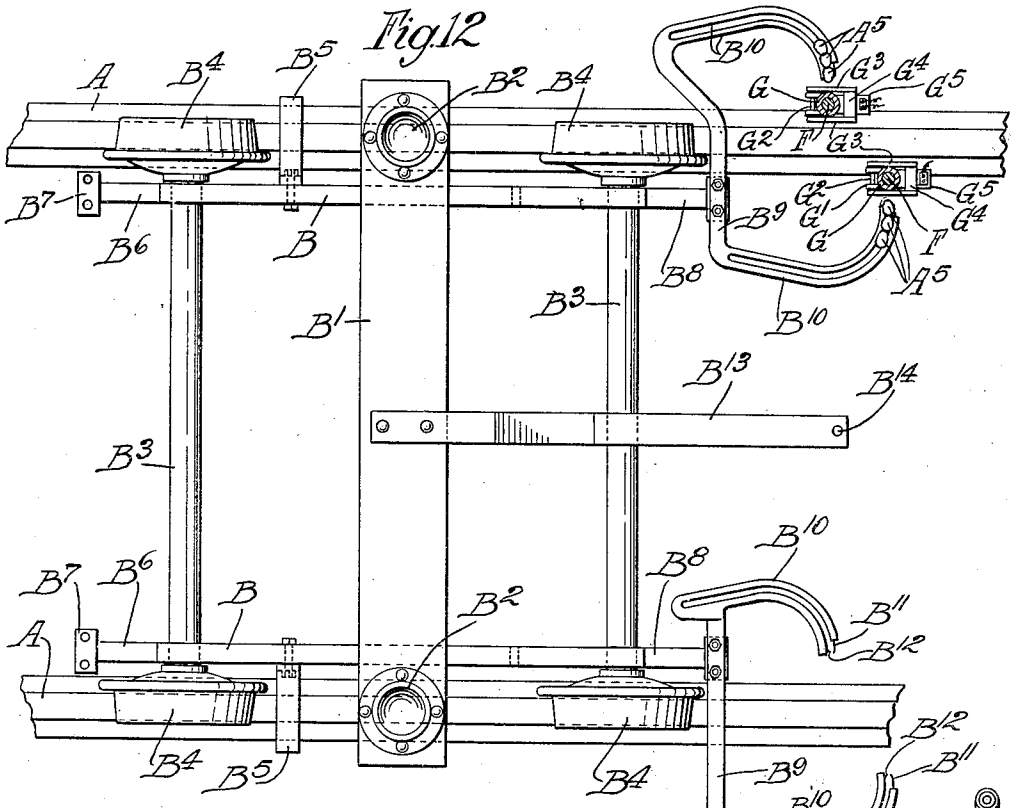
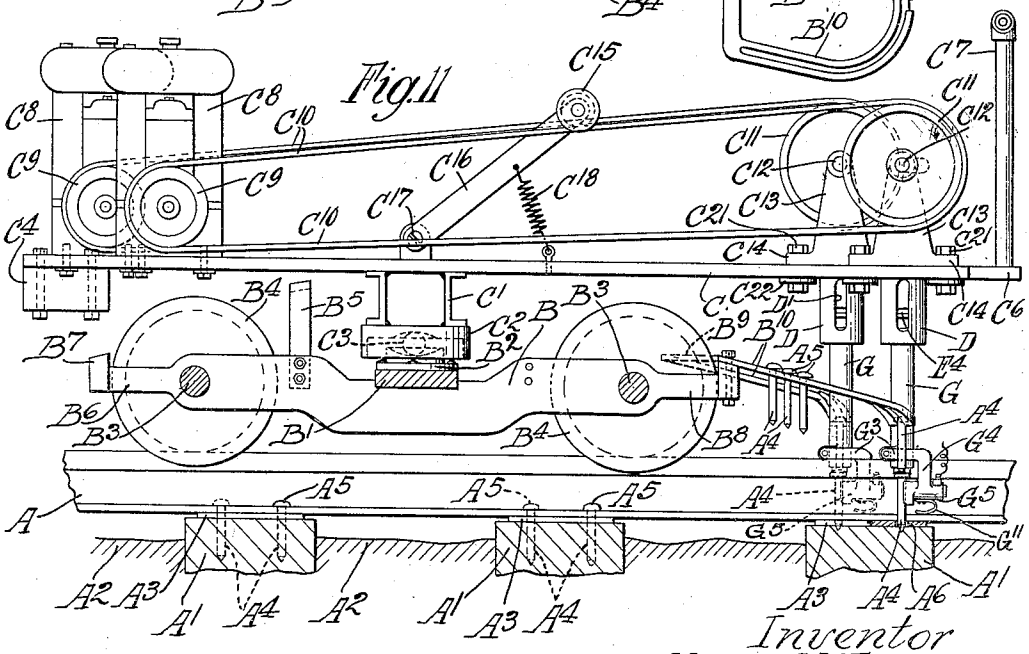


Fig. 11



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Patented May 3, 1932

1,856,893

UNITED STATES PATENT OFFICE

HENRY H. TALBOYS, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO NORDBERG MANUFACTURING COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN

SPIKE DRIVER

Application filed July 3, 1930. Serial No. 465,583.

This invention relates to a nail or spike driver and the form illustrated herewith is particularly intended for use as a spike driving machine for driving railroad spikes, although the apparatus and the principles involved may be used in many other connections.

The invention has for one object to provide a movable means for driving railroad spikes. Another object is to provide such a means which may be moved along railroad tracks and used to spike them in place. Another object is to provide a power driven spike driving machine, and a further object is to provide a power driven, automatically fed, hand controlled spike driving machine.

Other objects will appear from time to time in the course of the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a plan view of the machine in position on a railroad track;

Figure 2 is a longitudinal vertical cross section, taken at line 2—2 of Figure 1;

Figure 3 is a detailed vertical cross section, on an enlarged scale, of the lower end of the hammer in driving position, taken at line 3—3 of Figure 2;

Figure 4 is a sectional view generally similar to Figure 3 and taken at line 4—4 of Figure 3;

Figure 5 is a transverse cross sectional detail taken at line 5—5 of Figure 4;

Figure 6 is a transverse cross sectional detail taken at line 6—6 of Figure 4;

Figure 7 is a view generally similar to Figure 4, showing the spike at the end of the driving, with the parts in the position which they occupy at that time;

Figure 8 is a longitudinal vertical cross sectional detail showing the upper end of the hammer mechanism and taken on line 8—8 of Figure 1, on an enlarged scale;

Figure 9 is a transverse cross section taken at line 9—9 of Figure 8;

Figure 10 is a transverse cross sectional detail taken at line 10—10 of Figure 8;

Figure 11 is a longitudinal vertical cross sectional view similar to Figure 2, but showing a modified form of the machine in which an automatic spike feeding mechanism and a magnetic spike holding mechanism are provided;

Figure 12 is a plan view of the form of the machine shown in Figure 11, with parts in section;

Figure 13 is a side elevation of the magnetic spike holding mechanism with parts omitted and parts in section;

Figure 14 is a transverse sectional detail taken at line 14—14 of Figure 13;

Figure 15 is an enlarged detail shown in plan of the lower discharge end of the spike feeding mechanism with parts omitted and parts in section.

Figure 16 is a transverse vertical cross sectional detail taken at line 16—16 of Figure 15.

Like parts are designated by like characters throughout the specification and drawings.

A, A indicate rails supported on ties A^1, A^1 which are positioned in a road bed or other supporting surface A^2. Between the ties and the rails are tie plates A^3, A^3. The ties are held in place by spikes A^4 which are preferably provided with heads A^5. The heads may be more or less oval in plan as indicated in the drawings and positioned unsymmetrically upon the shaft of the spike. The details of the shape of the spike, however, form no particular part of the present invention and are only shown as illustrating typical railroad spikes of a type now commonly in use. The tie plates are provided with perforations A^6, as shown.

The machine is preferably mounted on a chassis or carriage which may be formed of side frame members B, which are joined together by a cross member B^1. Positioned on the cross member adjacent each of its ends, is a more or less cup-shaped receiving and supporting member B^2. Axles B^3, B^3 carrying flanged wheels B^4, B^4 are journaled in the side frame members B. Upwardly extending stops B^5 are positioned on each of the side frame members B. In the form of the invention shown in Figures 11 and 12, the side

frame members B, at their rear ends, are provided with extensions B^6 which carry stops B^7 and at their forward ends are provided with extensions B^8 which carry laterally extending members B^9 from which extend downwardly extending channel members B^{10}. Spike engaging springs B^{11}, B^{12} are preferably mounted adjacent the lower or discharge end of each of the members B^{10}. Attached to the cross member B^1 preferably at its middle, is a bar B^{13} provided with a perforation B^{14} into which a coupling may be inserted. By means of the bar the carriage and the machine upon it may be connected to any suitable power source and pulled along.

C is a relatively flat and extended frame member which carries the spike driving mechanism proper. Extending downwardly from the member C is a spacer C^1 which carries an inverted cup-shaped member C^2 which rests on a ball C^3, which ball is supported in the upwardly faced cup member B^2 on the cross member B^1 of the truck frame. At one end the member C carries a counterweight C^4 which tends to depress the end upon which it is positioned. The frame member C at the end adjacent the counterweight, may be provided with a laterally extending part C^5. At its opposite end the member C may be reduced as at C^6 and carries an upwardly extending handle member C^7. Supported on the frame member C are two substantially independent nail or spike driving machines. They are arranged so that they may operate simultaneously and thus two spikes may be driven at the same time. Since the spike driving machines and their driving engines and connections are preferably identical, only one will be described. Engines C^8 are mounted on the member C. The engines carry driving wheels C^9 over which are positioned driving belts C^{10}. The belts drive fly wheels C^{11} which are positioned on crank shafts C^{12} which are journaled in pairs of upwardly extending supporting members C^{13}, C^{13}. Each of these pairs is mounted upon and preferably integral with a base part C^{14}. A belt tightening member C^{15} is in contact with each belt. These members are carried upon arms C^{16} which are pivotally positioned on the member C as at C^{17} and are provided with tension springs C^{18}, each of which is fastened at one end to one of the members C^{16} and at its other end to an eye bolt C^{19} which is positioned in the member C. The member C is provided with two irregularly shaped perforations C^{20}. The shape of these perforations is indicated in dotted lines in Figure 9. Bolts C^{21} extend through the perforations C^{20} and by means of them the plate C^{14} is held in place. By reason of the size and shape of the perforation C^{20} the plate C^{14} may be moved so as to adjust its position. C^{22} are washers positioned beneath the member C and engaging the bolts C^{21}.

D, D are cylinders positioned between each pair of members C^{13} and they may be integral with those members. The cylinders D are provided throughout the major portion of their lengths with slots or openings D^1, D^1. They are provided with partially closed bottoms D^2 from which hollow extensions D^3 project. These extensions are slotted as at D^4 and provided with laterally extending pins D^5, D^5. D^6 is a second hollow member. As indicated particularly in Figures 3, 4, 7 and 8, it is formed with a relatively longer portion of one diameter and a relatively shorter portion D^7 of a larger diameter. The portion D^6 may be of generally squared cross section as indicated in Figures 5 and 6. In the portion D^7 are formed two slots D^8 which are preferably oppositely placed and through which the pins D^5 penetrate. Adjacent its bottom the portion D^6 is provided with slots D^9 and, preferably above them, with laterally extending pins D^{10}. Along one side throughout the major portion of its length, the portion D^6 is provided with an elongated slot D^{11}. Ears D^{12}, D^{12} are formed on the portion D^6 and provide pivotal support for arms D^{13}, D^{13}. Adjacent their lower ends, the arms D^{13} are inwardly bent and carry contacting shoes D^{14}, each of which has an upwardly extending shoulder D^{15} and is provided on its inner face with a groove D^{16}. Compression springs D^{17} are fastened each at one end upon the portion D^6 and bear against the arms D^{13}, tending to force them out. D^{18} is a collar which is generally rectangular in cross section to correspond in shape to the member D^6. It is positioned about the lower end of that member and is provided with a slot D^{19} corresponding to the slot D^{11} in the member D^6. It is also provided with two relatively long slots D^{20} which extend throughout the major portion of its length and two relatively shorter slots D^{21}, D^{21}. These latter slots are positioned above the slots D^{20} and the pins D^{10} extend through them.

I have now described the hammer guiding and spike engaging and guiding assembly. I shall next describe the hammering mechanism.

To the throw of each crank shaft C^{12} there is fastened a connecting rod E. This connecting rod engages a cross head E^1 from which a member E^2 extends downwardly. This member carries a piston E^3. E^4 is a cushioning cylinder or hammer member slidably mounted within the member D and having slidably mounted within itself the piston E^3. The cushioning cylinder E^4 is hollow as shown and is provided at its upper end with a removable closing plate E^5 within which is positioned a ball valve E^6 which is so shaped and arranged that it will open in response to

suction from within and will close in response to pressure from within. The closing plate E^5 is provided with a hollow interiorly threaded packing receiving member E^7 within which a packing E^8 may be positioned. E^9 is a packing gland adapted to be removably and adjustably seated in the member E^7. The cushioning cylinder E^4 is provided in its bottom with a striking part E^{10} and has also a valve E^{11} which is shaped and arranged to open in response to suction from within and to close in response to pressure from within.

F is an anvil block slidably mounted within the member D^3 and extending through the hollow members D^6 and D^7. It may be provided in its top with a hardened and removable plug F^1 and has extending through it a pin F^2. This pin, at each end, projects into the slots D^4. The lower end of the anvil block F may be reduced as shown at F^3 and provided with a hollow F^4 shaped to conform to or to accommodate the head of the spike which is to be driven.

In the form of the invention shown in Figures 1 to 10, inclusive, the spikes are fed into the machine by hand, being inserted through the slots D^{11}. In the form of the device shown in Figures 11 to 16, inclusive, an automatic feed is provided. The vehicle frame is essentially the same as that shown in the earlier figures except as above mentioned the spike feeding assemblies B^9, B^{10} are attached to forwardly extending projections from the vehicle frame members. In this modified form of the invention, the hammering assembly is essentially the same as that described above except that the spike engaging parts are different. The hammer F is surrounded and guided by a tubular member G. This member is provided with a pair of ears G^1 in which a shaft G^2 is journaled. Mounted on this shaft are arms G^3, G^3 which are downwardly bent as at G^4 and attached to and preferably formed integral with a magnet housing G^5. G^6, G^6 are stops formed on the member G and projecting laterally therefrom and serving as stops to limit the downward movement of the magnet assembly. The magnet is provided with a contact shoe or part G^7 which is grooved or notched as at G^8 to conform more or less to the shape of the spike. A magnet coil G^9 is positioned within the housing G^5 and is connected to conductors G^{10}, G^{10} by means of which current to energize the magnet is conducted to it by any suitable source. This might, for example, be the magneto which is used in connection with the driving engine. A spring G^{11} is mounted on the bottom of the housing G^5 so as to contact the flange of the rail.

It will be realized that while I have herewith shown and described a practical operative device, nevertheless many changes might be made in the size, shape, number and disposition of parts without departing from the spirit of my invention and therefore I wish that my showing be taken as in a sense diagrammatic. In particular, although I have shown only a single spike driving assembly mounted on the truck, obviously two might be used together and they might be operated in any manner suitable. In particular any type of hammer drive might be used. For many purposes it is advisable to use internal combustion engines which I have shown. However, for some purposes it is possible to use a pneumatic or a solenoid or other electric hammer, or internal combustion hammer.

The use and operation of my invention are as follows:

I shall first describe the use and operation of the invention in the form illustrated in Figures 1 to 10, inclusive. When it is desired to use the machine to drive spikes in a railroad, the parts are assembled as shown in Figures 1 and 2. The machine is put upon the rails and moved to the place where it is to be used. The parts are so proportioned that the machine is heavy at the rear or engine end and thus unless it is positively depressed at the other end, it automatically tilts rearwardly and raises the driving mechanism out of contact with the rail. The member D^6 thus by its own weight slides into the lowest position as indicated in Figure 4. At this time, also, the member D^{13} also moves or is moved into the lower position shown in Figure 4 and the shoulders D^{15} are engaged by it. A spike is inserted through the slot D^{11} between the shoes D^{14} and is guided and held by them. With the parts in this position, which is illustrated particularly in Figures 1, 2, 3 and 4, the operator exerts a downward pressure upon the driving machine, usually by pressing upon the handle C^7. The forward or driving end of the machine is thus tilted downwardly and then when the driving engine is operated, the hammer which rests upon the head of the spike is successively struck by the striking part E^{10} of the cushioning piston E^4 and the spike is driven. The cushioning piston is inserted in order to cushion the hammer blow and the shock incident thereto. The arrangement of the valve and the piston within the cushioning piston is such that an air cushion is provided. Each of the valves is arranged to open only from suction from within so that air is constantly and positively drawn into the cushioning piston E^4 but is not positively discharged therefrom. It may leak out past the packing and if so it will be replaced by air drawn in under the influence of suction from within. Air will normally be under compression on both sides of the cushioning E^3 within the cushioning piston E^4. As the driving continues, the spike is driven downward toward the position shown in Figure 7. After it has been driven down a certain dis-

tance, the lower end of the member D^{18} contacts the flange of the rail or some other part and it cannot move down further. The member D^6, however, continues to move down and thus the arms D^{13} which are pivoted on D^6 move downward and the shoulders D^{15} escape from contact with the portions of the member D^{18} which have held them as shown in Figure 4, and when they are free to do so, they swing outwardly under the influence of the springs D^{17} into the position shown in Figure 7. They thus no longer hold or contact the spike and as the hammering continues the spike may be freely driven to its final position.

In the form of the invention shown in Figures 11 to 16, inclusive, a certain number of spikes are inserted in the slots of the spike carrying members B^{10}. They tend to move downward by gravity and this tendency is increased due to the shock or jar or shaking which the machine undergoes, during hammering. Thus partially by gravity and partially because of this shaking, the spikes are fed steadily downward toward the nailing position. Accidental discharge of the spikes is prevented by means of the springs B^{11}, B^{12} at the discharge end of the feeders. When driving is to be done with this modified form of the invention, the magnet assembly is moved into the position shown in full lines in Figure 13. The machine is somewhat depressed by the operator preferably by pressure upon the handle C^7 and it is moved backward and forward or otherwise so as to bring the contacting parts G^7 of the magnet into position to engage a spike within the slot or groove G^8. The machine is then moved laterally sufficiently to position the spike over the appropriate opening in the tie plate and it is then further depressed and the driving operation is commenced. As the spike moves downward under the influence of the hammer, the member G of the magnet assembly moves with it. After a certain amount of movement, the spring G^{11} contacts the flange of the rail or some other fixed part, and is compressed. At first the compression is not sufficient to overcome the magnetic influence and to separate the magnet from the spike. As the downward movement continues, however, a point is reached at which the spring is compressed sufficiently so that it overcomes the magnetism and the magnet assembly is in effect "snapped" out of contact with the spike and into or toward the dotted line position of Figure 13. The magnet assembly being now out of contact with the spike and out of the way of the hammer, the spike may be driven home. When the parts are again raised for driving another spike, the magnet will return to its spike engaging or full line position as shown in Figure 13. In either form of the device the hammering assembly as carried by the frame member C, may be positioned on either side of the machine, that is to say, it may be lifted so as to occupy either one of the cup-shaped supporting members B^2. Thus it may be used to drive spikes along one rail or along another.

The joint for the support for the driving assembly is in effect a universal joint. The ball upon which it is supported may have considerable motion in its supports and thus the frame may be tilted vertically, swung laterally or moved backwards and forwards. This is of importance because it avoids necessity of moving the entire truck to place the spike and to position the hammer assembly properly with relation to the spike. By means of my device and by means of movement and adjustment made possible through its use the spike may always be driven straight and vertically instead of being in an inclined position as is often the case with present practice.

I claim:

1. In a spike driver, a movable carriage, a spike driving machine, carried pivotally thereby, said carriage provided with a fitting adapted to receive said spike driving machine, said machine being gravitally held upon said fitting, and being readily upwardly removable therefrom, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly and a generally horizontal supporting frame with which they are unitarily movable, said frame being freely tiltable in relation to the carriage during the normal spike driving operation.

2. In a spike driver, a movable carriage, a spike driving machine, pivotally carried thereby, said carriage provided with a fitting adapted to receive said spike driving machine, said machine being gravitally held upon said fitting, and being readily upwardly removable therefrom, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly, said spike gripping assembly adapted in one position to grip the spike and to be moved to release the spike and a generally horizontal supporting frame with which they are unitarily movable, said frame being freely tiltable in relation to the carriage during the normal spike driving operation.

3. In a spike driver, a movable carriage, a spike driving machine movably carried thereby, said carriage provided with a fitting adapted to receive said spike driving machine, said machine being gravitally held upon said fitting, and being readily upwardly removable therefrom, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly and a generally horizontal supporting frame with which they are unitarily movable, said frame being freely tiltable in relation to the car-

riage during the normal spike driving operation.

4. In a spike driver, a movable carriage, a spike driving machine removably and movably carried thereby, said carriage provided with a fitting adapted to receive said spike driving machine, said machine being gravitally held upon said fitting, and being readily upwardly removable therefrom, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly and a generally horizontal supporting frame with which they are unitarily movable, said frame being freely tiltable in relation to the carriage during the normal spike driving operation.

5. In a spike driver, a movable carriage, a spike driving machine movably carried thereby, said carriage provided with a fitting adapted to receive said spike driving machine, said machine being gravitally held upon said fitting, and being readily upwardly removable therefrom, said machine including a support and a hammer, the spike driving machine as a whole tiltably mounted on the carriage for ready movement during the normal spike driving operation, a hammer guiding assembly and a spike gripping assembly.

6. In a spike driver, a movable carriage, a spike driving machine carried thereby, said carriage provided with a fitting adapted to receive said spike driving machine, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly, said spike gripping assembly adapted in one position to grip the spike and adapted to contact a fixed object outside of the spike driver and thereby to be moved to release the spike.

7. In a spike driver, a movable carriage, a spike driving machine removably and movably carried thereby, said carriage provided with a plurality of fittings adapted selectively to receive said spike driving machine, said machine includng a support, a hammer, a hammer guiding assembly and a spike gripping assembly.

8. In a spike driver, a movable carriage, a spike driving machine removably and movably carried thereby, said carriage provided with a plurality of fittings adapted selectively to receive said spike driving machine, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly, said spike gripping assembly adapted in one position to grip the spike and adapted to contact a fixed object outside of the spike driver and thereby to be moved to release the spike.

9. In a spike driver, a movable carriage, a spike driving machine removably and movably carried thereby, said carriage provided with a plurality of fittings adapted selectively to receive said spike driving machine, said machine including a support, a hammer, the spike driving machine as a whole adapted to be tilted in relation to the carriage, a hammer guiding assembly and a spike gripping assembly.

10. In a spike driver, a movable carriage, a spike driving machine removably and movably carried thereby, said carriage provided with a plurality of fittings adapted selectively to receive said spike driving machine, said machine including a support and a hammer, the spike driver as a whole adapted to be tilted, a hammer guiding assembly and a spike gripping assembly, said spike gripping assembly adapted in one position to grip the spike and adapted to contact a fixed object outside of the spike driver and thereby to be moved to release the spike.

11. In a spike driver, a movable carriage, a spike driving machine removably and movably carried thereby, said carriage provided with a plurality of fittings adapted selectively to receive said spike driving machine, said machine including a support, a driving engine, a transmission and a hammer, the spike driver as a whole adapted to be tilted, a hammer guiding assembly and a movable spike gripping assembly, said spike gripping assembly adapted in one position to grip the spike and adapted to contact a fixed object outside of the spike driver and thereby to be moved to release the spike.

12. In a spike driver, a movable carriage, a spike driving machine carried thereby, said carriage provided with a fitting adapted to receive said spike driving machine, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly, said spike gripping assembly adapted in one position to grip the spike and to be moved to release the spike, said spike gripper embodying an electro-magnet.

13. In a spike driver, a movable carriage, a spike driving machine carried thereby, said carriage provided with a fitting adapted to receive said spike driving machine, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly, said spike gripping assembly adapted in one position to grip the spike and adapted to contact a fixed object outside of the spike driver and thereby to be moved to release the spike, said spike gripper embodying an electro-magnet.

14. In a spike driver, a movable carriage, a spike driving machine removably and movably carried thereby, said carriage provided with a plurality of fittings adapted selectively to receive said spike driving machine, said machine including a support, a driving engine, a transmission and a hammer, the spike driver as a whole adapted to be tilted, a hammer guiding assembly and a movable spike gripping assembly, said spike gripping assembly adapted in one position to grip the

spike and adapted to contact a fixed object outside of the spike driver and thereby to be moved to release the spike, said spike gripper embodying an electro-magnet.

15. In combination in a spike driving machine, a tiltably mounted platform carrying the spike driving mechanism proper, said mechanism including a hammer, a guide therefor, and a spike gripping assembly, the hammer guide and spike gripper being collapsible and adapted to expand under the influence of gravity when free to do so.

16. In combination in a spike driving machine, a tiltably mounted platform carrying the spike driving mechanism proper, said mechanism including a hammer, a guide therefor, and a spike gripping assembly, the hammer guide and spike gripper being collapsible and adapted to expand under the influence of gravity when free to do so, in combination with a hammer driving mechanism, including a piston.

17. In combination in a spike driving machine, a tiltably mounted platform carrying the spike driving mechanism proper, said mechanism including a hammer, a guide therefor, and a spike gripping assembly, the hammer guide and spike gripper being collapsible and adapted to expand under the influence of gravity when free to do so, in combination with a hammer driving mechanism, including a piston having within it a cushioning element.

18. In combination in a spike driving machine, a tiltably mounted platform carrying the spike driving mechanism proper, said mechanism including a hammer, a guide therefor, and a spike gripping assembly, the hammer guide and spike gripper being collapsible and adapted to expand under the influence of gravity when free to do so, in combination with a hammer driving mechanism including a piston having within it a cushioning element, and means for driving the piston.

19. In a movable spike driving machine, a wheeled truck and a movable spike driving assembly, removably and adjustably mounted thereon, said spike driving assembly including a supporting frame and carrying a plurality of independently mounted and independently operable spike drivers, each of said machines including a power source, a transmission means, a hammer, guiding and adjusting means for said hammer and a spike engaging and guiding means, said spike engaging means adapted in one position of adjustment to engage and hold the spike and in another adapted automatically to contact a fixed object separate from said machine and to be moved thereby to release the spike.

20. In combination in a spike driving machine, a hammer and a spike engaging means, the spike driving assembly as a whole being mounted for vertical movement, the spike engaging means provided with a part adapted to contact a fixed member outside of the driving assembly in response to downward movement of that assembly, whereby the spike engaging means is disengaged from the spike.

21. In combination in a spike driving machine, a hammer and a spike engaging means, the spike driving assembly as a whole being mounted for vertical movement, the spike engaging means provided with a part adapted to contact a fixed member outside of the driving assembly in response to downward movement of that assembly, whereby the spike engaging means is disengaged from the spike, said spike engaging means including a swinging member adapted in response to downward movement of the assembly to be swung out of engaging position.

22. In combination in a spike driving machine, a hammer and a spike engaging means, the spike driving assembly as a whole being mounted for vertical movement, the spike engaging means provided with a part adapted to contact a fixed member outside of the driving assembly in response to downward movement of that assembly, whereby the spike engaging means is disengaged from the spike, said spike engaging means including a magnetic swinging member adapted in response to downward movement of the assembly to be swung out of engaging position.

23. In combination in a spike driving machine, a hammer and a spike engaging means, the spike driving assembly as a whole being mounted for vertical movement, the spike engaging means provided with a part adapted to contact a fixed member outside of the driving assembly in response to downward movement of that assembly, whereby the spike engaging means is disengaged from the spike, said spike engaging means including a magnetic swinging member adapted in response to downward movement of the assembly to be swung out of engaging position, said magnetic member provided with a spring adapted to be compressed by lowering movement of the driving assembly.

24. In combination in a spike driving machine, a spike feeding means adapted to contain and feed a plurality of spikes progressively to a driving point and a driving assembly movably mounted with respect to said feed, said assembly including a spike engaging means adapted in one position to engage and withdraw a spike from said feed, to hold the spike for driving and adapted as the spike is driven to be moved out of engagement with the latter.

25. In combination in a spike driving machine, a spike feeding means adapted to contain and feed a plurality of spikes progressively to a driving point and a driving assembly movably mounted with respect to said feed, said assembly including a spike engaging means adapted in one position to

engage and withdraw a spike from said feed, to hold the spike for driving and adapted as the spike is driven to be moved out of engagement with the latter, said feed including spike retaining members adapted to be moved aside as a spike is withdrawn.

26. In combination in a spike driving machine, a spike feeding means adapted to contain and feed a plurality of spikes progressively to a driving point and a driving assembly movably mounted with respect to said feed, said assembly including a spike engaging means adapted in one position to engage and withdraw a spike from said feed, to hold the spike for driving and adapted as the spike is driven to be moved out of engagement with the latter, said spike engaging means including a magnet.

27. In combination in a spike driving machine, a spike feeding means adapted to contain and feed a plurality of spikes progressively to a driving point and a driving assembly movably mounted with respect to said feed, said assembly including a spike engaging means adapted in one position to engage and withdraw a spike from said feed, to hold the spike for driving and adapted as the spike is driven to be moved out of engagement with the latter, said feed including spike retaining members, adapted to be moved aside as a spike is withdrawn, said spike engaging means including a magnet.

28. In a spike driver for driving spikes for railroad rails and the like, a movable carriage adapted to travel along the track, a generally horizontal spike driver frame mounted on the carriage for ready bodily movement in relation thereto during the normal spike driving operation, and a spike driving assembly mounted upon the frame and movable unitarily therewith, including a hammer, guiding means therefor, actuating means therefor, and spike gripping means.

29. In a spike driver for driving spikes for railroad rails and the like, a movable carriage adapted to travel along the track, a generally horizontal spike driver frame mounted on the carriage for ready bodily movement in relation thereto during the normal spike driving operation, and a spike driving assembly mounted upon the frame and movable unitarily therewith, including a hammer, guiding means therefor, actuating means therefor, and spike gripping means, said frame being pivotally supported upon the carriage.

30. In a spike driver for driving spikes for railroad rails and the like, a movable carriage adapted to travel along the track, a spike driver frame mounted on the carriage for bodily movement in relation thereto, and a spike driving assembly mounted upon the frame and movable unitarily therewith, including a hammer, guiding means therefor, actuating means therefor, and spike gripping means, and gravital means for normally holding said frame with the spike driving assembly in inoperative position.

31. In a spike driver for driving spikes for railroad rails and the like, a movable carriage adapted to travel along the track, a spike driver frame mounted on the carriage for bodily movement in relation thereto, and a spike driving assembly mounted upon the frame and movable unitarily therewith, including a hammer, guiding means therefor, actuating means therefor, and spike gripping means, and gravital means for normally holding said frame with the spike driving assembly in inoperative position, including a pivotal mounting for said frame and a counterweight.

32. In a spike driver, a movable carriage, a generally horizontal frame tiltably mounted on said carriage for ready movement during the normal spike driving operation, a spike driving machine mounted upon said frame, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly.

33. In a spike driver, a movable carriage, a generally horizontal frame tiltably mounted on said carriage for ready movement during the normal spike driving operation, a spike driving machine mounted upon said frame, said machine including a support, a hammer, a hammer guiding assembly and a spike gripping assembly, said hammer guiding assembly and spike gripping assembly being unitarily movable with said frame.

34. In a spike driver machine, a movable carriage mounted for movement along the rails of a track, a supporting member for said machine pivotally mounted upon said carriage, said machine including a hammer, a hammer guiding assembly and a spike gripping assembly mounted on one side of its axis of tilt, and driving means for the hammer mounted on the opposite side of the axis of tilt.

35. In a spike driver machine, a movable carriage mounted for movement along the rails of a track, a spike driving machine carried thereby, and supporting means for said machine tiltably mounted on said carriage for rotation about an axis extending transversely across said track, said supporting means being manually tiltable toward the work, and means for gravitally moving said supporting means away from the work when released.

36. In a spike driver machine, a movable carriage mounted for movement along the rails of a track, a supporting member pivotally mounted upon said carriage, said machine including a fly wheel, a crank associated with said fly wheel, a link pivoted to said crank, a hammer head pivoted to said link and a guide for said hammer head.

37. In a spike driver machine, a movable

carriage mounted for movement along the rails of a track, a supporting member pivotally mounted upon said carriage, said machine including a fly wheel, a crank associated with said fly wheel, a link pivoted to said crank, a hammer head pivoted to said link and a guide for said hammer head, and means for aligning spikes in driving position.

38. In a spike driver machine, a movable carriage mounted for movement along the rails of a track, a supporting member pivotally mounted upon said carriage, said machine including a plurality of fly wheels, a crank associated with each said fly wheel, a link pivoted to each said crank, a hammer head pivoted to each said link, guiding means for each hammer head, and means for aligning spikes in driving position.

Signed at Milwaukee, county of Milwaukee and State of Wisconsin, this 14th day of June, 1930.

HENRY H. TALBOYS.