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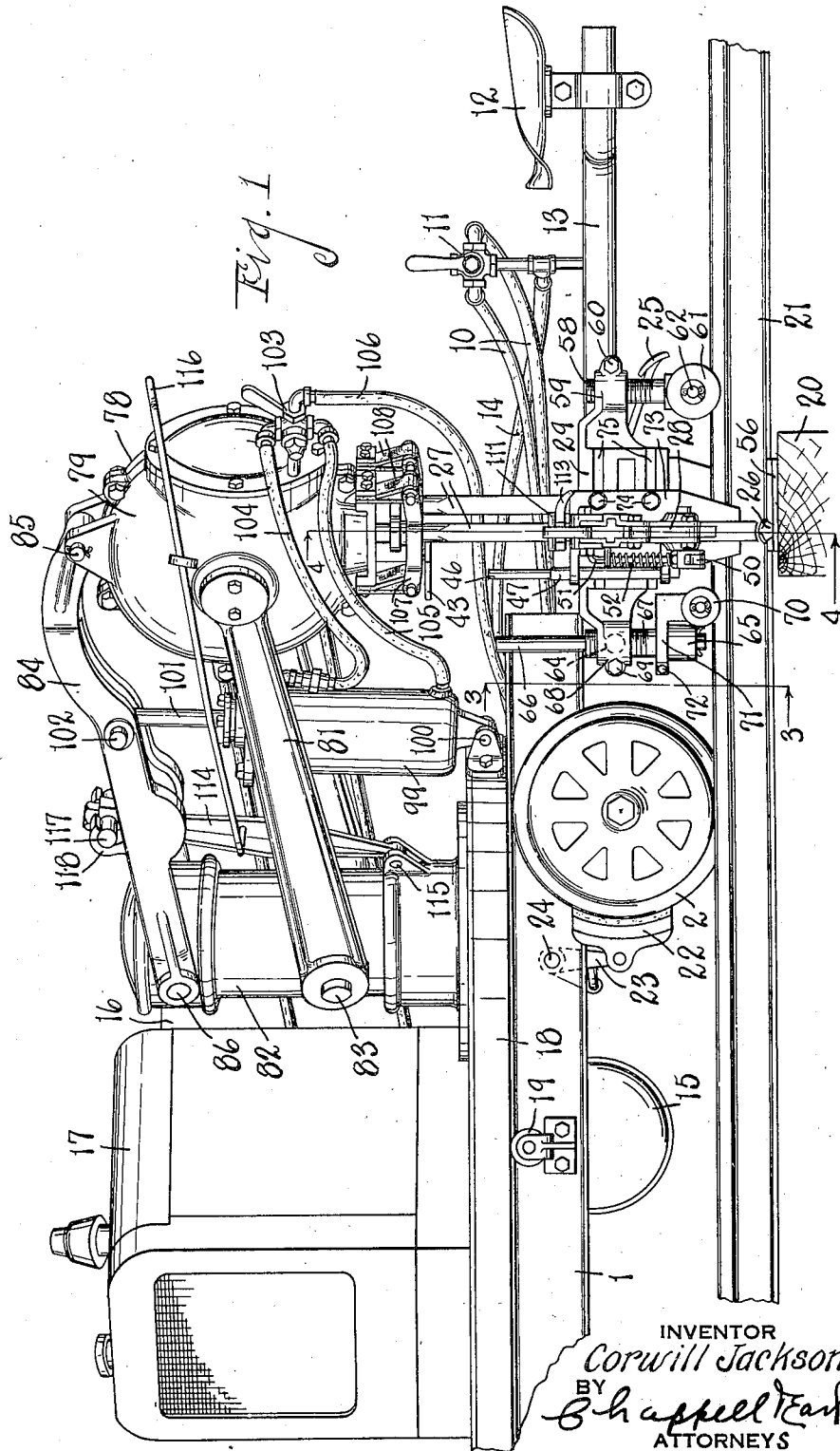
C. JACKSON

2,018,129

SPIKE DRIVING MACHINE

Filed July 9, 1934

7 Sheets-Sheet 1



Oct. 22, 1935.

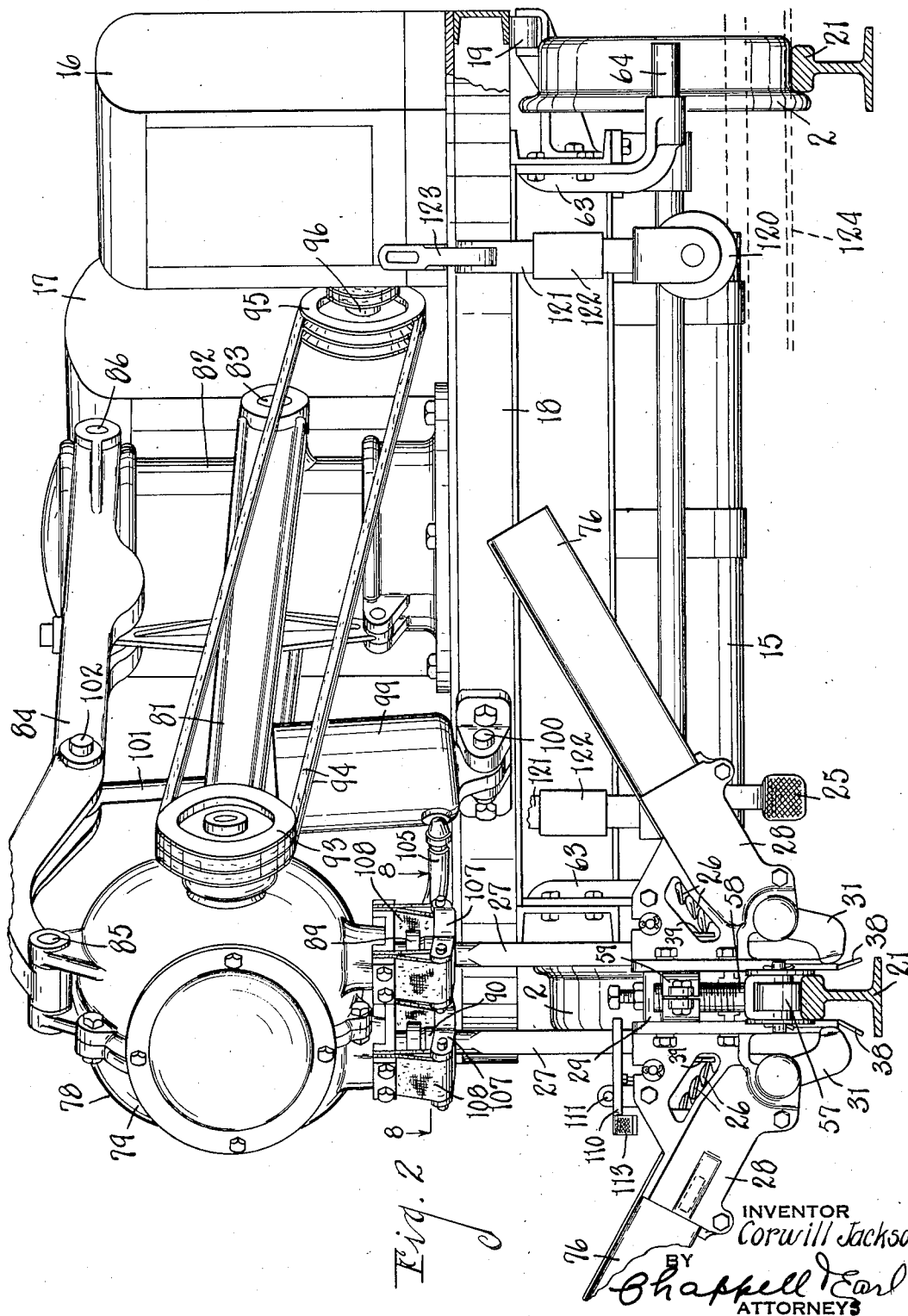
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SPIKE DRIVING MACHINE

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7 Sheets-Sheet 2



Oct. 22, 1935.

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SPIKE DRIVING MACHINE

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7 Sheets-Sheet 3

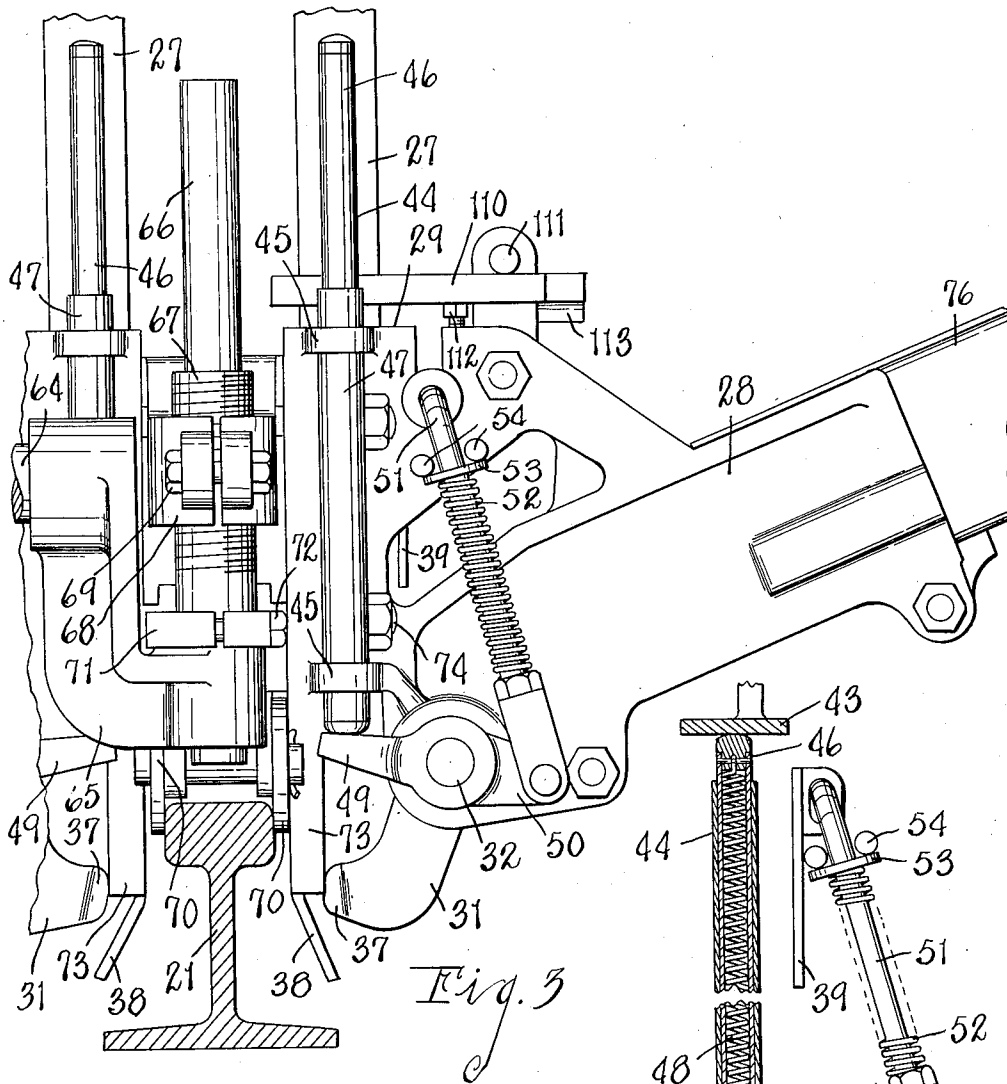


Fig. 3

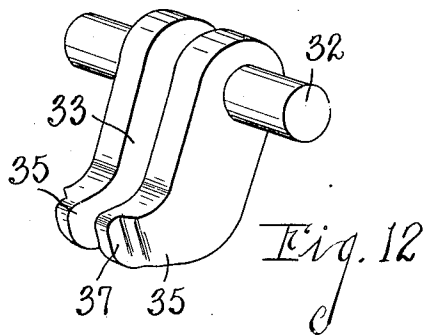


Fig. 12

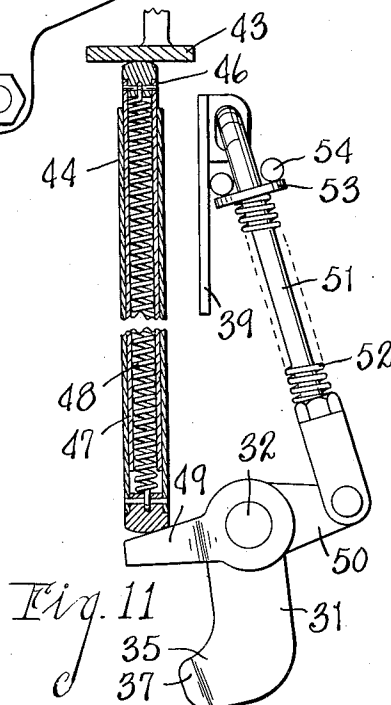


Fig. 11

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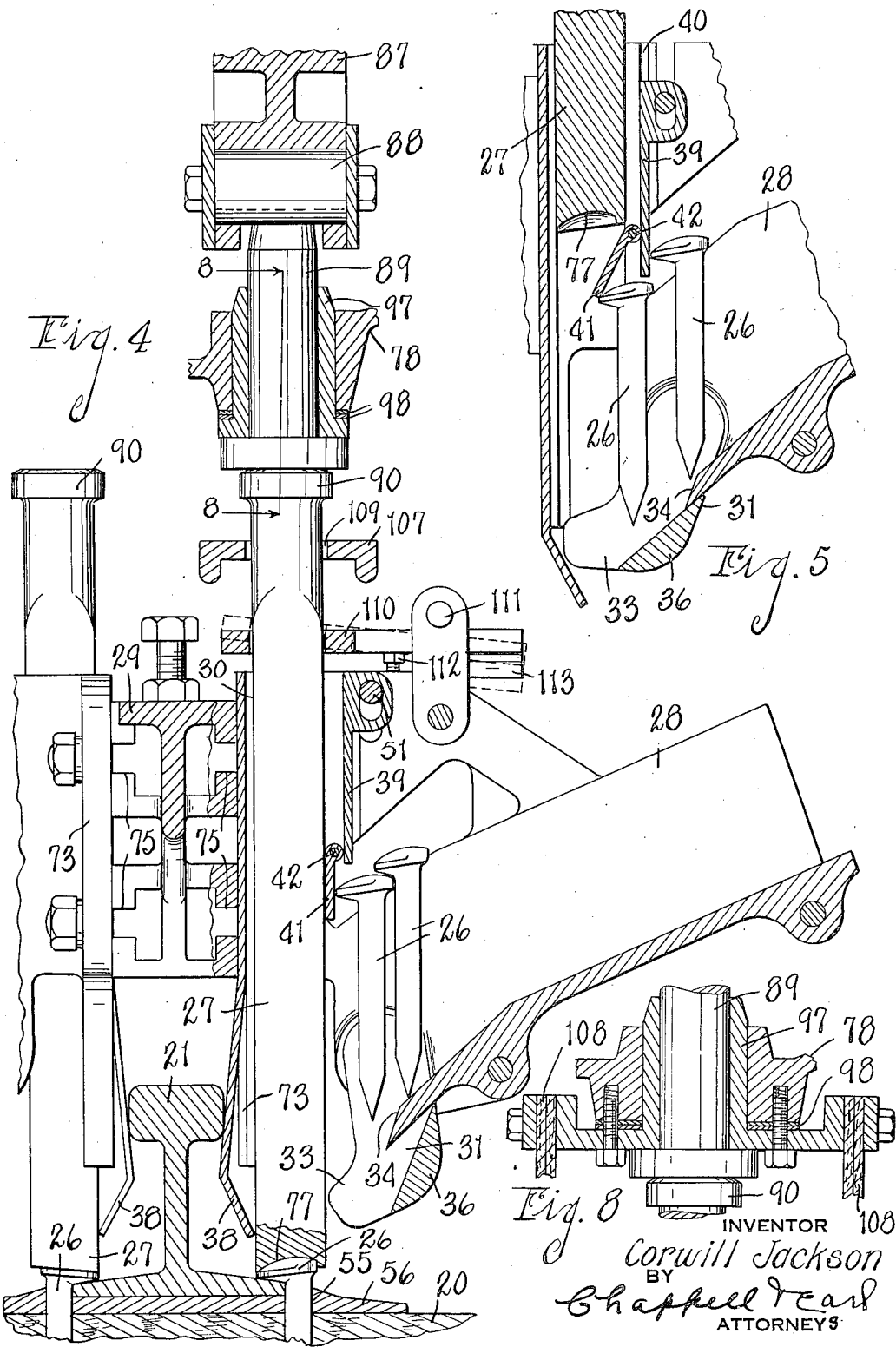
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2,018,129

SPIKE DRIVING MACHINE

Filed July 9, 1934

7 Sheets-Sheet 4



Oct. 22, 1935.

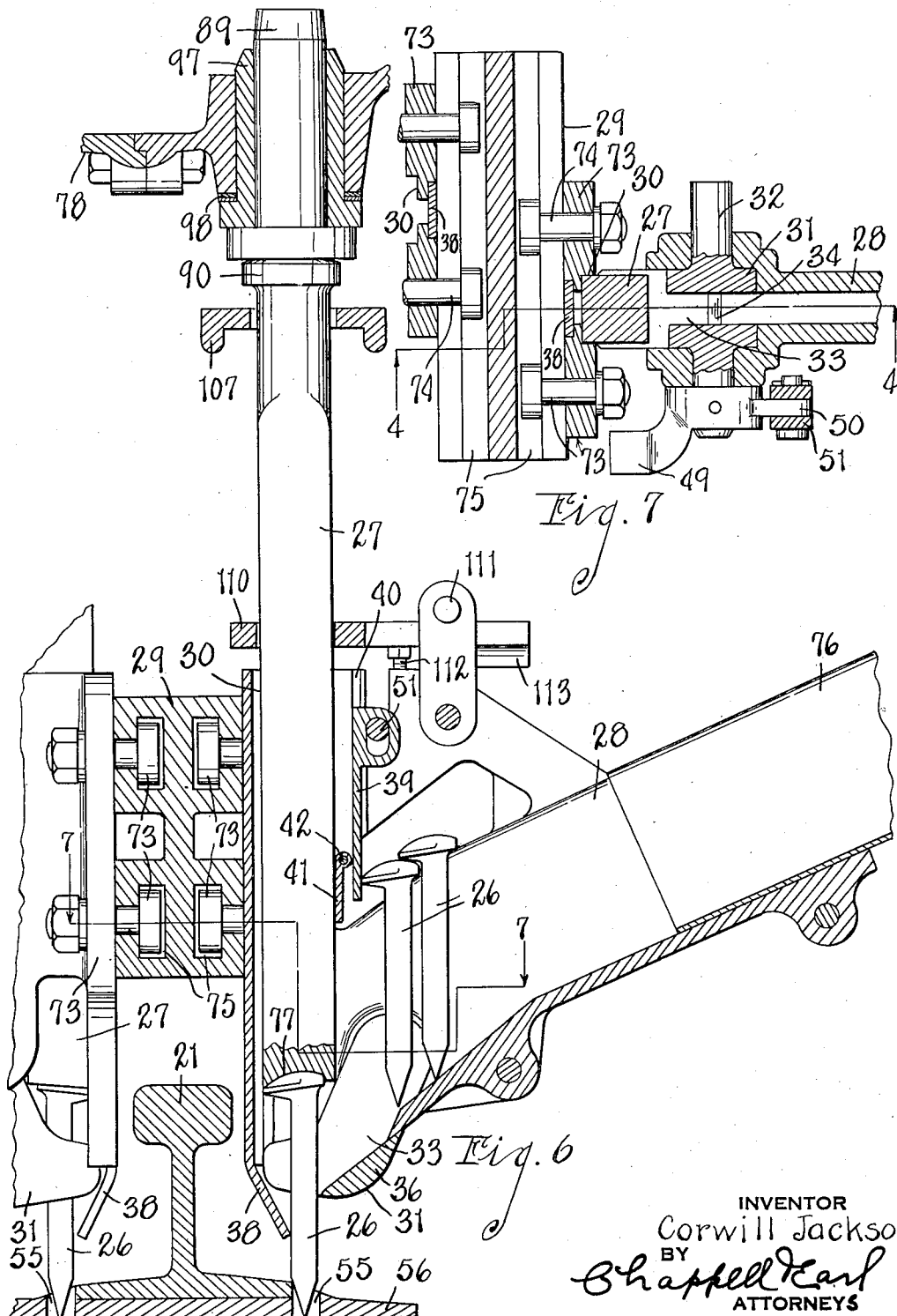
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SPIKE DRIVING MACHINE

Filed July 9, 1934

7 Sheets-Sheet 5



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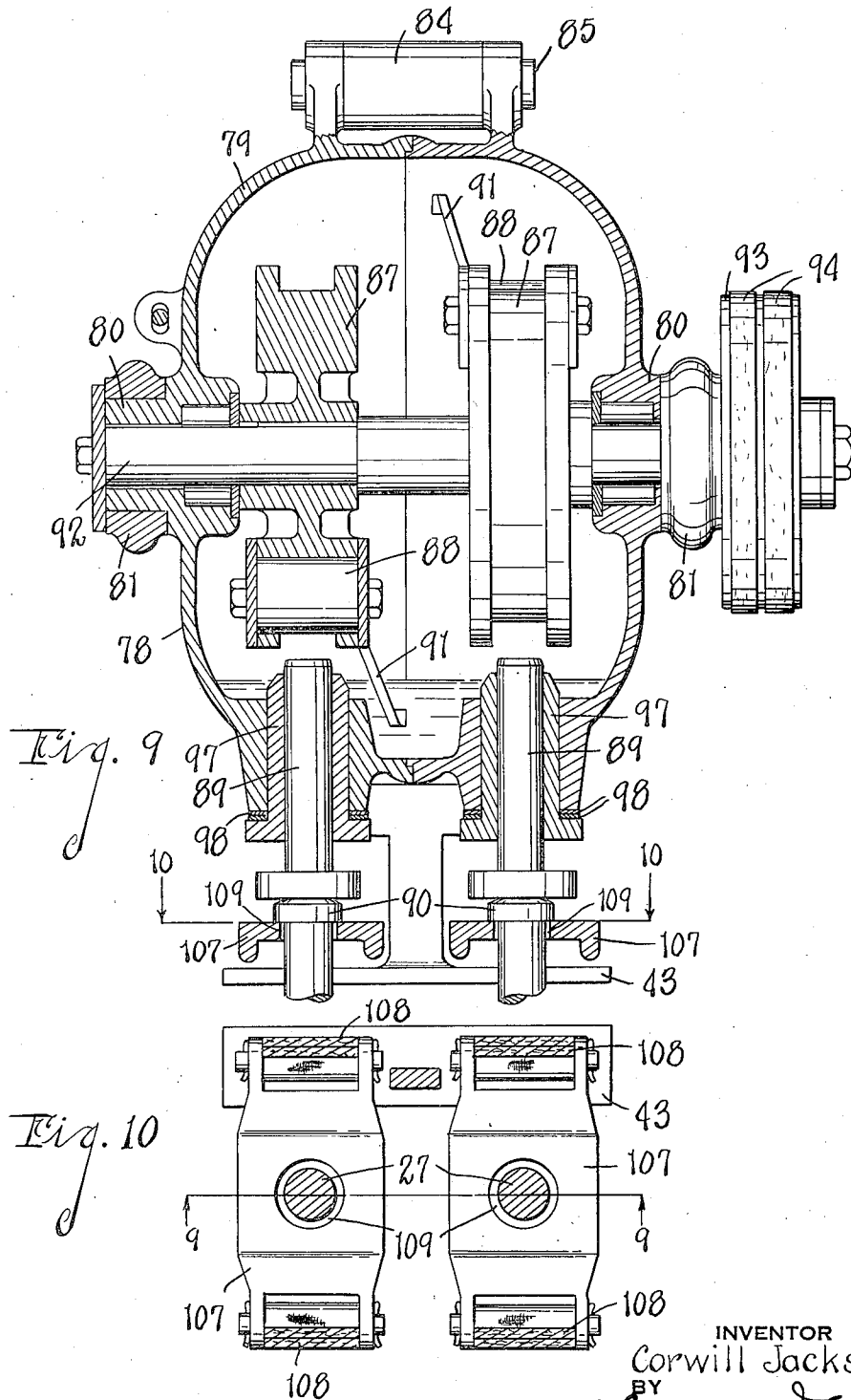
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SPIKE DRIVING MACHINE

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7 Sheets-Sheet 6



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SPIKE DRIVING MACHINE

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7 Sheets-Sheet 7

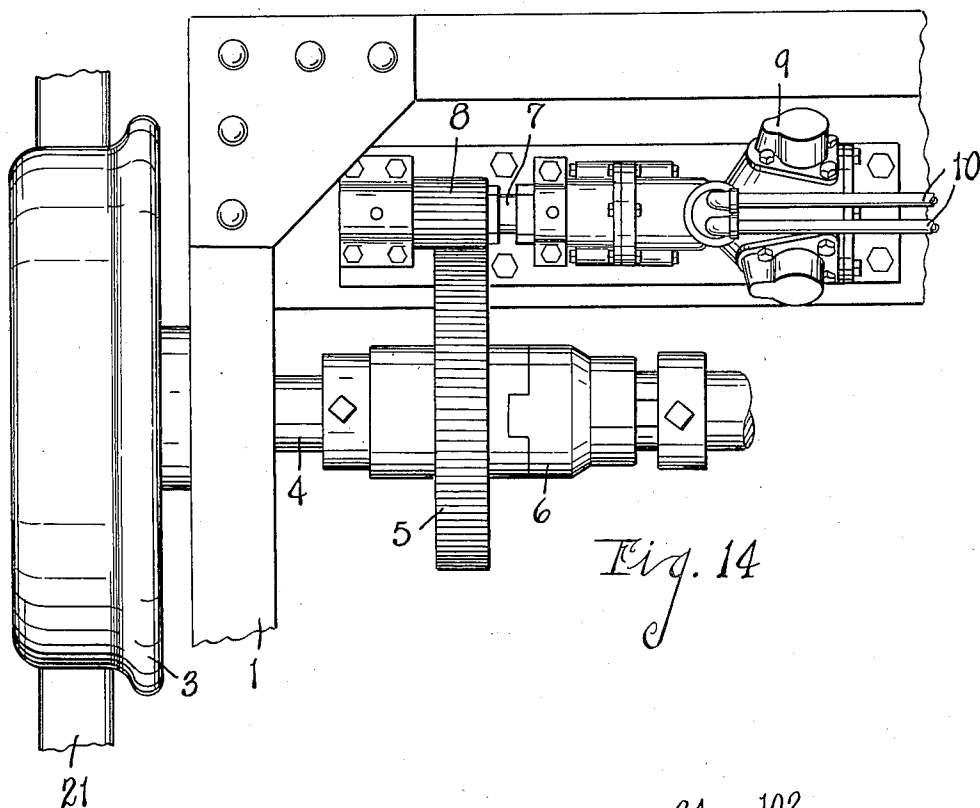


Fig. 14

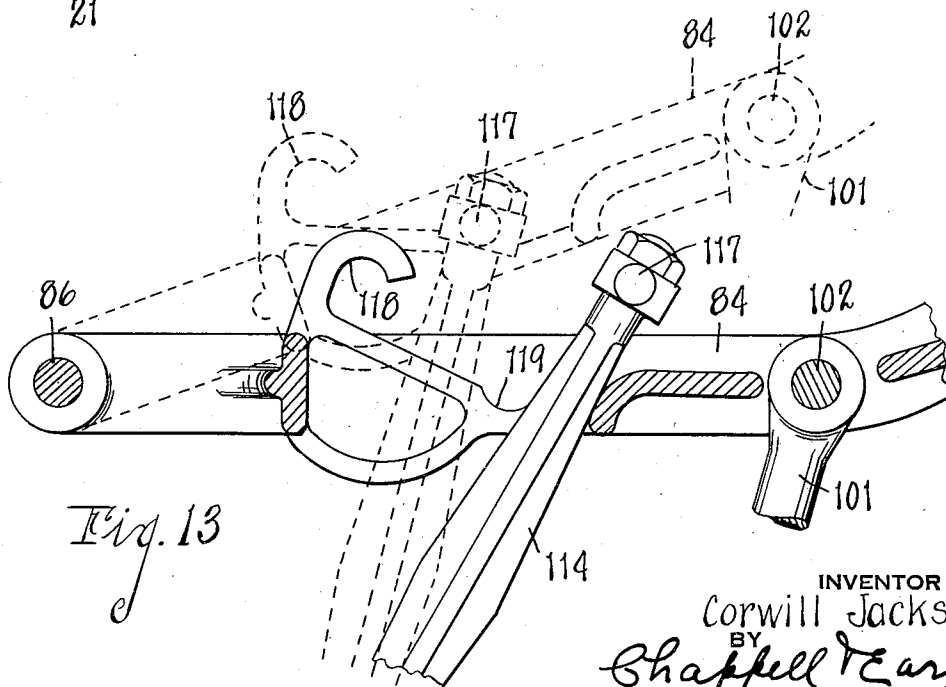


Fig. 13

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2,018,129

SPIKE DRIVING MACHINE

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Application July 9, 1934, Serial No. 734,361

53 Claims. (Cl. 104—17)

The main objects of this invention are:

First, to provide a spike driving machine by means of which the spikes securing the rails of a railway track to the ties may be rapidly and effectively driven.

Second, to provide a spike driving machine by means of which spikes of a railway track are driven with great uniformity and one in which the blows are so delivered to the spike as to provide a minimum fracturing of the fiber of the ties into which they are driven owing to the fact that all blows are delivered in the same relation to the spike.

Third, to provide a spike driving machine in which the spikes are successively and automatically discharged or fed to driving position.

Fourth, to provide a machine of this character which may be manipulated with a minimum of manual labor.

Fifth, to provide a spike driving means in which the spikes are rapidly driven by combined pressure and impacts or blows.

Sixth, to provide a machine of this character which may be accurately adjusted to particular work.

Objects relating to details and economies of my invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevation of my spike driving machine in operative relation to a track, a portion of the truck body being broken away.

Fig. 2 is a front elevation, parts being broken away or omitted for convenience in illustration.

Fig. 3 is an enlarged fragmentary view partially in section on line 3—3 of Fig. 1, showing details of the plunger head magazine, spike holder and feed mechanism.

Fig. 4 is an enlarged detail mainly in vertical section on a line corresponding to line 4—4 of Figs. 1 and 7.

Fig. 5 is an enlarged fragmentary section of certain parts shown in Fig. 4, with the plunger in retracted position and a spike in its initially released position or about to be discharged to the spike holder.

Fig. 6 is a fragmentary section similar to Figs. 4 and 5, illustrating the parts in another position, the plunger being in initial driving engagement with a spike.

Fig. 7 is a horizontal section corresponding to the broken line 7—7 of Fig. 6.

Fig. 8 is a fragmentary view mainly in section on line 8—8 of Fig. 4, showing details of the lifting connection for the plunger to the driving head.

Fig. 9 is a fragmentary view partially in vertical section centrally through the driving head.

Fig. 10 is a detail horizontal section on line 10—10 of Fig. 9 showing the details of the lifting stirrups for the plungers.

Fig. 11 is a fragmentary view partially in vertical section showing details of the operating means for the spike feed gate and the operative relation thereof to the spike holder.

Fig. 12 is a front perspective view of one of the spike holders.

Fig. 13 is a fragmentary sectional view illustrating the manually controlled stop means for controlling the upward movement of the driving head which in turn controls the spike feeding.

Fig. 14 is a fragmentary plan view of the reversible truck drive means whereby the machine may be accurately and properly adjusted to spike driving position.

The embodiment of my invention illustrated in the accompanying drawings comprises a truck designated generally by the numeral 1 and consisting of a suitable frame with carrying wheels 2 and 3 adapted to travel on the rails of a railway track, the wheels 3 being driving wheels mounted upon a driven axle 4 (Fig. 14) having a driven gear 5 rotatably mounted upon and connected to the axle through the clutch 6 shown more or less conventionally in Fig. 14.

The driving shaft 7 is provided with a pinion 8 meshing with the gear 5, the shaft being driven through a reversible air or fluid motor 9, the feed pipes for the motor being indicated at 10. These pipes lead to a control valve designated generally by the numeral 11 and suitably positioned for operation from the operator's seat 12. This operator's seat is carried by an arm 13 projecting from the end of the truck and located so that the operator has an unobstructed view of the spike driving mechanism.

The operating air or fluid air under pressure is supplied through a conduit 14 from a supply tank 15 which is in turn supplied from the air compressor conventionally shown at 16—see Fig. 2. The power plant, preferably an internal combustion engine, is conventionally shown at 17. The operating parts are carried by a turntable 18 mounted upon the truck, the supporting rollers

therefor being shown at 19. The ties are indicated at 20 and the rails at 21.

Brake shoes 22 are provided to coast with the wheels 2, these brake shoes being carried by the arms 23 on the rockshaft 24 operated from the foot lever 25 which is accessible from the operator's seat so that the movement of the truck along the track may be controlled and the spikes may be set for securing the truck in adjusted spike driving position. The spikes shown at 26 are successively delivered in driving relation to the plungers 27, the plungers constituting control means for the feeding of the spikes. The machine is adapted to drive two spikes simultaneously, and as the driving mechanisms, spike holders and magazines are duplicates, a description of one will suffice.

The magazines 28 are arranged in an inclined relation on opposite sides of the rail, these being mounted upon or carried by the plunger head designated generally by the numeral 29. The magazines are designed to receive and support the spikes arranged in a row, one after the other, with their heads upward and, as the magazines are inclined, the spikes slide down the magazines. The plungers reciprocate in suitable guides or ways 30 in the plunger head, each plunger being located at the inner end, or end in the plane of its coacting magazine.

The spike holder 31 is pivoted at 32 and has a vertical slot 33 adapted to receive the body portion of the spike, the holder being arranged so that the upper end of its slot opens to the magazine, permitting the spikes to pass into the slot of the holder and drop off the inner downwardly inclined delivery end 34 of the magazine, this end projecting into the slot of the holder.

The holder has forwardly projecting ends 35 adapted to extend below the plunger when the holder is in delivery position (see Fig. 6) in which position the bottom 36 of the holder constitutes an extension for the delivery end of the magazine bottom. These projecting ends 35 are notched or cut away at 37 to permit them to enter the plunger guide-way as shown in Fig. 6.

Opposite the spike holder is a spring or yielding spike holding jaw 38 adapted to supportingly engage a spike as it is forced downwardly by the plunger, the jaw yielding, as shown in Fig. 4, to permit the passage of the spike and also the spike driving plunger.

The delivery of spikes to the spike holder is controlled by means of the feed gate 39 slidably mounted in the guides 40 so that it may be raised to release a spike, as shown in Figs. 4 and 6. A pivoted wear plate 41 is provided to receive the spike head as it is discharged by the gate, this wear plate being pivoted at 42 and supported by the side of the plunger. The holder 36 is retracted and the gate operated by means of a tappet 43 carried by the driving head, the tappet being in position to engage the extensible push rod 44 supported by suitable guides 45 in the path of the tappet. This push rod is made up of telescoping sections 46 and 47, housing a spring 48 acting to extend the members. The push rod engages an arm 49 on the holder and has tension or thrust enough to retract the holder when the push rod is engaged by the tappet. The holder has an arm 50 connected by the link 51 to the gate 39. The holder is urged to operative position by the spring 52 supported on the link and engaging the thrust collar 53 supported by the pins 54. The spring 48 has sufficient tension to overcome the tension of the spring 52.

With this arrangement of parts, the delivery of the spikes is automatically controlled and they are delivered in proper position so that the operator can enter them into the holes 55 in the fish plates 56 merely by manipulating the truck through the means described. In practice, a practical way of doing this is to manipulate the truck to the approximate position, manipulate the machine to discharge a spike so that it drops down on top of the fish plate and then manipulate the truck to drop the spike into the proper opening in the fish plate.

The plunger head 29 is provided at its outer or front end with a roller 57 traveling on the rail, this being carried by an adjustable standard 58 threaded into a split extension 59 of the plunger head, a bolt 60 being provided for securing the standard in its adjusted position. Guide disks or flanges 61 are provided on the axle 62 of the roller, these engaging the sides of the head of the rail, as shown in Figs. 1 and 2. A flanged roller or wheel might be used instead of this roller and flange assembly illustrated, the assembly illustrated being in effect a flanged wheel.

The plunger head is carried by the bracket 63 having a stub shaft or journal 64 receiving the hanger 65 which in turn constitutes the support for the plunger head. This hanger is provided with a vertical spindle 66 having a threaded sleeve 67 thereon, the rear or inner end of the plunger head having a split threaded extension 68 receiving this sleeve and being provided with a clamping bolt 69 by means of which the sleeve is secured in its adjusted position. The sleeve is slidable on the spindle 66 and also may pivot or swivel thereon. Guide rollers 70 are carried by a bracket 71 mounted on the lower end of the sleeve, the bracket being split and secured in clamping engagement with the sleeve by means of the bolt 72—see Figs. 1 and 3. The purpose of this is to permit the adjustment of the sleeve without throwing the guide rollers out of position. The hanger 65 is slidable axially on the journal 64. This mounting for the plunger head described permits its adjusting itself to the track. It will be understood that the track is suitably positioned before the spiking operation.

To permit adjustment of the plungers to particular work or to accommodate the openings in the fish plates, the members 73 in which the plunger guides 30 are formed, are adjustably secured to the plunger head by means of the headed bolts 74 engaging horizontal T-shaped slots 75. These members 73 constitute supports for or are a part of the magazine 28, the magazines in the embodiment illustrated having sheet metal extensions 76.

It will be noted that the spike engaging faces of the plungers have recesses 77 conformed to receive and fit the heads of the spikes, the purpose of this being to prevent distortion or minimize lateral thrust on the spikes while being driven. It will be understood that the plungers do not reciprocate to deliver blows to the spikes but remain in engagement therewith under pressure, at the same time receiving a series of driving impulses or blows and the means by which this is accomplished will now be described.

The driving head designated generally by the numeral 78 comprises a casing or housing 79 provided with journals 80 engaging the carrying arms 81 which are pivoted on the pedestal 82 at 83. Tilting movement of the housing on its journals is prevented by means of the link 84 pivoted to the top of the housing at 85 and to 75

the pedestal at 86, the link being arranged in relation to the arms to provide a parallel movement and guide the mechanism in its vertical movement.

5 Within the housing are a pair of peripherally grooved impact wheels 87 having impact rollers 88 disposed across the grooves and to project from the peripheral surfaces of the grooves so that when the driving head is in operative position, the rollers are brought into operative relation to the tappets 89 operatively associated with the heads 90, the parts being shown in elevated position in which position the impact wheels are out of operative relation to the tappets in Fig. 9, and in lowered position in which the tappets are in operative relation to the impact wheels in Fig. 4.

The housing 79 is designed as a lubricant reservoir and the impact wheels are provided with splash arms 91 which serve to thoroughly lubricate the impact wheels and the ends of the tappets and also supply lubricant to the bearings for the shaft 92 of the impact wheels. This shaft is provided with a pulley 93 connected by V-belts 94 to the pulley 95 on the shaft 96 of the driving motor. The tappet bearings 97 are provided with shims 98 so that the upward movement of the tappets is limited and the proper relation of the tappet to the impact wheels maintained when the parts are in spike driving position.

The driving head is raised and lowered by means of the pneumatic or hydraulic engine consisting, in the embodiment illustrated, of a cylinder 99 pivoted at 100 on the bed or table 18 and provided with a plunger having a plunger rod 101 connected at 102 to the link 84. A control valve 103 is provided for this engine, the valve being provided with flexible connections 104 and 105 to the ends of the cylinder and with a flexible connection 106 to the pressure tank 15.

The plungers are connected to the driving head to be lifted thereby through the stirrups 107 which have openings to receive the upper ends of the plungers, the heads being adapted to rest on the top of the stirrups. The stirrups are suspended from the driving head by means of the flexible hanger straps 108. It will be noted that the holes 109 in these stirrups are substantially greater in diameter than the diameter of the portions of the plungers arranged relative thereto, and this with the flexible hangers prevents any binding action between the stirrups and the plungers, and this notwithstanding the adjustment that may be made in the plunger head, as described.

On the upward movement of the driving head, the stirrups coming into contact with the plungers, lifts them to the position shown in Fig. 5, allowing the delivery of a spike to the spike holder by which it is discharged to driving position. On the lowering of the head, the plungers are brought into engagement with the spikes as shown in Fig. 6, with the tappet resting on the plungers and the impact wheels in engagement with the tappets, so that the weight of the head is substantially upon the spikes which are driven home by a series of driving impulses made up or consisting of the combined weight of the parts and the impacts resulting from the engagement of the rollers with the tappets. This results in a very effective and rapid driving of spikes with a minimum of shock and wear upon the parts. When it is desired to deliver a spike,

the driving head is elevated to lift the plungers and discharge the spikes.

When it is desired to transport the machine, the plunger head is lifted out of engagement with the rail and this, in the embodiment illustrated, is accomplished by engaging the lifting clutch 110 with the plungers so that one of the plungers constitutes a hanger for the plunger head. This clutch or jaw 110 is fulcrumed at 111, an adjustable stop 112 being disposed in opposed relation to the fulcrum to limit the downward releasing movement of this clutch. The clutch is provided with a foot-piece 113 by means of which it may be swung up to clutching position, as indicated by dotted lines in Fig. 4, so that when the driving head is elevated, the plunger head is lifted therewith.

For transporting the machine considerable distances, the axle 4 is driven directly from the motor, the clutch 6 being then released. The driving connections for the axle to the motor are not illustrated as any suitable driving connections or transmission may be used.

To limit the upward movement of the driving head, I provide a manually controlled stop lever 114 which is pivoted on the pedestal at 115, and provided with an operating rod 116 having a hand-piece within the reach of the operator. This stop lever is provided with a laterally projecting stop 117 at its swinging end engageable with the forwardly facing hook-like stop 118 on the link 84 or with the stop recess 119 provided for the stop pin recesses, the link being longitudinally slotted, the upper end of the stop lever extending through the slot. When the stop 117 is in engagement with its coacting stop 118, the driving head is in position to support the plunger in position to prevent the delivery of a spike. When it is pulled forward to the position shown in Fig. 13 or in position to engage with the stop seats 119, the plunger is in the position shown in Fig. 5 so that a spike may be discharged from the magazine.

One of the main objects of the machine is the laying of replacement rails and it is, therefore, important that means be provided for getting the machine off the track, and I provide such means in the derailing rollers 120 which are mounted on standards 121 vertically adjustable in the brackets 122, these standards being operatively associated with the levers 123 pivoted on the truck frame so that the lever may be forced downwardly as by means of a crow-bar or the like to lower the derailing wheels into engagement with a rail indicated by dotted lines at 124 disposed transversely of the track. This lowering of the standards 121 raises the machine so that the flanges of its wheels clear the rails of the track. It is only necessary to lift the plunger head clear of the rails by the means described before the machine is moved laterally off the track.

My improved spike driving machine is of large capacity; that is, it drives the spikes very rapidly and may be quickly shifted from one spike driving position to another and the spikes discharged are quickly entered into the proper openings in the fish plates by manipulating the machine as has been described. The spikes are driven without distortion and so that the fracturing or breaking down of the fiber or grain of the ties is no more than is necessary for the entrance of the spike. In hand driving of spikes, frequently owing to the change of direction of successive blows, there is an objectionable amount of in-

jury to the fiber and consequently the security of the spike greatly lessened and entrance of moisture also made possible with consequent premature decay and insecurity.

5 I have not attempted to illustrate and describe various modifications and adaptations which I contemplate as it is believed that this disclosure will enable those skilled in the art to which my invention relates to embody or adapt the same as may be desired.

10 Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a machine of the class described, the combination with a railway truck, of a driving head mounted for vertical adjustment and provided with impact means, a plunger head provided with a plunger guide and with a vertically adjustable rail-engaging roller at its front end and with rail-engaging guide members, a supporting bracket for said plunger head pivotally mounted on said truck, a pivotal and vertically adjustable connection for the rear end of said plunger head to said bracket, a truck engaging guide at the rear of said plunger head, a plunger mounted in said guide in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the head is raised, a feed magazine on said plunger head adapted to support a plurality of spikes in upright position, a pivotally-mounted inwardly-facing channeled spike holder disposed to receive the spikes as they are successively discharged from said magazine, a spring spike supporting jaw disposed in opposed relation to said spike holder, means actuated on the downward movement of said driving head for swinging the holder out of the path of the plunger, a feed gate for said magazine, operating connections for said feed gate to said spike holder whereby the feed gate is opened to deliver a spike when the spike holder is swung to retracted position, and spring means for urging said spike holder to spike receiving position.

2. In a machine of the class described, the combination with a railway truck, of a driving head mounted for vertical adjustment and provided with impact means, a plunger head provided with a plunger guide and with a vertically adjustable rail-engaging roller at its front end and with rail-engaging guide members, a supporting bracket for said plunger head pivotally mounted on said truck, a pivotal and vertically adjustable connection for the rear end of said plunger head to said bracket, a truck engaging guide at the rear of said plunger head, a plunger mounted in said guide in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the head is raised, a feed magazine on said plunger head adapted to support a plurality of spikes in upright position, a pivotally-mounted inwardly-facing channeled spike holder disposed to receive the spikes as they are successively discharged from said magazine, means actuated on the downward movement of said driving head for swinging the holder out of the path of the plunger, a feed gate for said magazine, operating connections for said feed gate to said spike holder whereby the feed gate is opened to deliver a spike when the spike holder is swung to retracted position, and spring means for urging said spike holder to spike receiving position.

3. In a machine of the class described, the

combination with a railway truck, of a driving head mounted for vertical adjustment and provided with impact means, a plunger head provided with a plunger guide rail engaging means, a truck engaging guide at the rear of said plunger head, a plunger mounted in said guide in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the head is raised, a feed magazine on said plunger head adapted to support a plurality of spikes in upright position, a pivotally-mounted inwardly-facing channeled spike holder disposed to receive the spikes as they are successively discharged from said magazine, a spring spike supporting jaw disposed in opposed relation to said spike holder, means actuated on the downward movement of said driving head for swinging the holder out of the path of the plunger, a feed gate for said magazine, operating connections for said feed gate to said spike holder whereby the feed gate is opened to deliver a spike when the spike holder is swung to retracted position, and spring means for urging said spike holder to spike receiving position.

4. In a machine of the class described, the combination with a railway truck, of a driving head mounted for vertical adjustment and provided with impact means, a plunger head provided with a plunger guide rail engaging means, a truck engaging guide at the rear of said plunger head, a plunger mounted in said guide in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the head is raised, a feed magazine on said plunger head adapted to support a plurality of spikes in upright position, a pivotally-mounted inwardly-facing channeled spike holder disposed to receive the spikes as they are successively discharged from said magazine, means actuated on the downward movement of said driving head for swinging the holder out of the path of the plunger, a feed gate for said magazine, operating connections for said feed gate to said spike holder whereby the feed gate is opened to deliver a spike when the spike holder is swung to retracted position, and spring means for urging said spike holder to spike receiving position.

5. In a machine of the class described, the combination with a railway truck, of a driving head mounted for vertical adjustment and provided with impact means, a plunger head provided with a plunger guide and with a vertically adjustable rail roller at its front end and with rail engaging guide members, a supporting hanger for said plunger head pivotally mounted on said truck, a pivotal and vertically adjustable connection for the rear end of said plunger head to said bracket, a rail engaging guide at the rear of said plunger head, a plunger mounted in said guide in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the head is raised, a feed magazine on said plunger head, a pivoted spike holder into which spikes are delivered from said magazine, and a feed gate for said magazine operatively connected to said spike holder.

6. In a machine of the class described, the combination with a railway truck, of a driving head mounted for vertical adjustment and provided with impact means, a plunger head provided with a plunger guide and with a vertically adjustable rail roller at its front end and with rail

engaging guide members, a supporting hanger for said plunger head pivotally mounted on said truck, a pivotal and vertically adjustable connection for the rear end of said plunger head to said bracket, a rail engaging guide at the rear of said plunger head, a plunger mounted in said guide in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the head is raised, and means for feeding spikes to driving position controlled by said driving head.

7. In a machine of the class described, the combination with a railway truck, of a driving head mounted for vertical adjustment, and provided with impact means, a plunger head provided with a plunger guide and with a vertically adjustable rail roller at its front end and with rail engaging guide members, a supporting bracket for said plunger head pivotally mounted on said truck, a pivotal and vertically adjustable connection for the rear end of said plunger head to said bracket, a plunger mounted in said guide whereby it is supported in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the head is raised, and means for feeding spikes to driving position controlled by said driving head.

8. In a machine of the class described, the combination with a railway truck, of a driving head provided with impact means mounted for vertical adjustment, a plunger head provided with a plunger guide and with rail engaging means, a plunger mounted in said guide whereby it is supported in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the driving head is raised, a feed magazine on said plunger head, a pivoted spike holder into which spikes are delivered from said magazine, and a feed gate for said magazines operatively connected to said spike holder, said driving head acting to retract said holder and to open said gate when the plunger is in its advanced position.

9. In a machine of the class described, the combination with a railway truck, of a driving head provided with impact means mounted for vertical adjustment, a plunger head provided with a plunger guide and with rail engaging means, a plunger mounted in said guide whereby it is supported in operative relation to the impact means of said driving head, said plunger being connected with said driving head to be retracted thereby when the driving head is raised, a feed magazine on said plunger head, a movable spike holder into which spikes are delivered from said magazine, and a feed gate for said magazine operatively associated with said spike holder, and means for operating said spike holder and gate in timed relation to the operation of said plunger.

10. In a machine of the class described, the combination of a driving head provided with impact means, a plunger head provided with rail engaging means, a plunger mounted in said plunger head whereby it is supported in operative relation to the impact means of said driving head, a feed magazine, a pivoted spike holder into which spikes are delivered from said magazine, a feed gate for said magazine operatively connected to said spike holder, and means for retracting said holder and gate when the plunger is in its advanced position.

11. In a machine of the class described, the combination of a driving head provided with impact means, a plunger head provided with rail engaging means, a plunger mounted in said plunger head whereby it is supported in operative relation to the impact means of said driving head, a feed magazine, a spike holder into which spikes are delivered from said magazine, a feed gate for said magazine, and means for retracting said holder and gate when the plunger is in its advanced position.

12. In a machine of the class described, the combination of a plunger head provided with rail engaging means, a feed magazine on said plunger head adapted to support a plurality of spikes in upright position, a plunger at the delivery end of said magazine, a pivotally mounted inwardly facing channeled spike holder disposed to receive the spikes as they are successively discharged from said magazine, a spring spike supporting jaw disposed in opposed relation to said spike holder, a feed gate for said magazine, operating connections for said feed gate and spike holder, spring means for urging said spike holder to spike receiving position, and a tappet for said plunger head for retracting said gate and spike holder.

13. In a machine of the class described, the combination of a plunger head provided with rail engaging means, a feed magazine on said plunger head adapted to support a plurality of spikes in upright position, a plunger at the delivery end of said magazine, a pivotally mounted inwardly facing channeled spike holder disposed to receive the spikes as they are successively discharged from said magazine, a feed gate for said magazine, operating connections for said feed gate and spike holder, spring means for urging said spike holder to spike receiving position, and a tappet on said plunger head for retracting said gate and spike holder.

14. In a machine of the class described, the combination of a plunger head provided with rail engaging means, a plunger reciprocatingly mounted on said head, a feed magazine, a movably mounted spike holder disposed to receive the spikes as they are discharged from said magazine, a feed gate for said magazine operatively connected with said holder, a yielding spike supporting jaw disposed in opposed relation to said spike holder, and means for retracting said holder when the plunger is in its advanced position, said plunger acting to prevent the delivery of a spike to said holder prior to the retracting of the plunger.

15. In a machine of the class described, the combination of a plunger head provided with rail engaging means, a plunger reciprocatingly mounted on said head, a feed magazine, a movably mounted spike holder disposed to receive the spikes as they are discharged from said magazine, a feed gate for said magazine operatively connected with said holder, and means for retracting said holder when the plunger is in its advanced position.

16. In a machine of the class described, the combination with a railway truck, of a plunger head provided with rail-engaging guide means, a plunger mounted in said head, a channel-shaped spike holder operatively associated with said plunger and adapted to support a spike in upright position, an impact means for said plunger, and means for feeding spikes to said spike holder controlled by the said impact means.

17. In a machine of the class described, the combination with a railway truck, of a plunger

head provided with rail-engaging guide means, a plunger mounted in said head, a spike holder operatively associated with said plunger and adapted to support a spike in upright position, 5 an impact means for said plunger, and means for feeding spikes to said spike holder controlled by the said impact means.

18. In a machine of the class described, the combination with a supporting frame, of a driving head provided with impact means, said head 10 being mounted for vertical movement, a plunger head, a plunger mounted on said plunger head and in operative relation to said impact means of said driving head and connected therewith so 15 that the plunger is retracted when the head is raised and the impact means is brought into operative relation to said plunger when the head is lowered, a spike holder normally lying in the path of the plunger and adapted to be moved 20 out of the path of the plunger by the movement of the driving head, and a spike feed means operatively connected to said spike holder.

19. In a machine of the class described, the combination with a supporting frame, of a driving head provided with impact means, said head 25 being mounted for vertical movement, a plunger head, a plunger mounted on said plunger head and in operative relation to said impact means of said driving head and connected therewith so that the plunger is retracted when the head is 30 raised and the impact means is brought into operative relation to said plunger when the head is lowered, and a spike holder normally lying in the path of the plunger and adapted to be moved out of the path of the plunger by the 35 movement of the driving head.

20. In a machine of the class described, the combination with a supporting frame, of a driving head provided with impact means, said head 40 being mounted for vertical movement relative to said frame, a plunger head, and a plunger mounted on said plunger head and in operative relation to said impact means of said driving head and connected to said driving head so that 45 the plunger is retracted in said plunger head when the driving head is raised relative to the plunger head and the impact means is brought into operative relation to said plunger when the driving head is lowered relative to said plunger 50 head.

21. In a machine of the class described, the combination with a truck, of a driving head mounted for vertical adjustment relative to said truck and provided with impact means, a plunger 55 head disposed below said driving head, said plunger head being pivotally connected to said truck, means for detachably connecting said plunger head to said driving head, a plunger mounted on said plunger head in operative relation 60 to the impact means of said driving head and loosely connected to said driving head so as to be retracted in said plunger head when the driving head is raised relative to said plunger head, the impact means being inoperative with 65 respect to said plunger when said driving head is lifted, and means for discharging spikes to driving position controlled by the retraction of the plunger.

22. In a machine of the class described, the combination with a truck, of a driving head 70 mounted for vertical adjustment on said truck and provided with impact means, a plunger head disposed below said driving head, said plunger head being pivotally connected to said truck, means for detachably connecting said

plunger head to said driving head, and a plunger mounted on said plunger head in operative relation to the impact means of said driving head and loosely connected to said driving head so 5 as to be retracted in said plunger head when the driving head is raised relative to said plunger head, the impact means being inoperative with respect to said plunger when said driving head is lifted.

23. In a machine of the class described, the combination with a truck, of a driving head 10 mounted for vertical adjustment and provided with impact means, a plunger head disposed below said driving head, said plunger head being pivotally connected to said truck, means for 15 detachably connecting said plunger head to said driving head, a plunger mounted on said plunger head in operative relation to the impact means, and means for discharging spikes to driving position controlled by the retraction of the plunger. 20

24. In a machine of the class described, the combination with a truck, of a driving head 25 mounted for vertical adjustment on said truck and provided with impact means, a plunger head disposed below said driving head, said plunger being pivotally connected to said truck, means 30 for detachably connecting said plunger head to said driving head, and a plunger mounted on said plunger head in operative relation to the impact means. 30

25. In a machine of the class described, the combination of a carriage, a pedestal on said carriage, a pair of arms pivotally mounted on said pedestal, a chambered driving head pivotally 35 mounted on said arms, a parallel link connected to said driving head and to said pedestal, an impact wheel within said head provided with an impact member, a tappet operatively associated with said impact member, a plunger operatively 40 associated with said tappet and loosely connected to said driving head whereby when the head is lowered the tappet is moved into operative relation to the impact member and drops out of operative relation thereto when the head is raised, 45 and driving connections for said motor to said impact wheel.

26. In a machine of the class described, the combination with a truck, of a chambered driving head mounted on said truck for vertical adjustment, an impact wheel within said head having 50 a peripherally disposed impact roller, a tappet, and a plunger operatively associated with said tappet and loosely connected to said driving head whereby when the head is lowered the tappet is moved into operative relation to the im- 55 pact wheel and drops out of operative relation thereto when the head is raised.

27. In a structure of the class described, the combination of a casing, a wheel constituting a fly wheel revoluble in said casing, an impact 60 roller mounted on and supported in axial alignment with said wheel with a portion of the roller extending beyond the periphery of the wheel, a tappet slidably mounted in the casing with its inner end in position to coact with said impact 65 member, pivotally mounted parallel arms for supporting said casing, and pressure means for controlling the vertical movement of said arms and supporting against the rebound resulting from the impact of the impact members upon 70 the tappet.

28. In a structure of the class described, the combination of a casing, a wheel constituting a fly wheel revoluble in said casing, an impact roller mounted on and supported in axial align- 75

ment with said wheel with a portion of the roller extending beyond the periphery of the wheel, a tappet slidably mounted in the casing with its inner end in position to coact with said impact member, means for supporting said casing for vertical adjustment, and pressure means for controlling the vertical movement of said casing and supporting against the rebound resulting from the impact of the impact members upon the

29. In a machine of the class described, the combination with a truck, of a chambered driving head mounted on said truck for vertical adjustment, an impact wheel within said head having an impact member, a tappet, and a plunger operatively associated with said tappet and loosely connected to said driving head whereby when the head is lowered the tappet is moved into operative relation to the impact member and drops out of operative relation thereto when the head is raised.

30. In a machine of the class described, the combination of a plunger head provided with a vertical plunger guide, a plunger, means for delivering percussive blows to said plunger, means controlled by said plunger for feeding and supporting spikes in driving position carried by said head, and guide means on said head for supporting said head in spike positioning relation to a

31. In a machine of the class described, the combination of a carriage, means for guiding a spike to and supporting it in spaced relation to a rail and maintaining said spikes in vertical position for driving, and means for driving said spike in place, said last named means controlling the delivery of each spike to driving position.

32. In a structure of the class described, the combination of a pivoted supporting arm, a percussive engine mounted on said arm, and a fluid actuated piston supporting said arm between the pivoted end thereof and said engine for controlling the movement of said arm and acting as a rebound means for said engine.

33. In a machine of the class described, the combination of a plunger head, a spike magazine carried thereby, a plunger guide to which said magazine delivers, a spring supported spike holder adapted to receive a spike and hold it in position for driving, said spike holder being swung clear of the spike as it is seated by said plunger, and spike delivery means controlled by said plunger.

34. In a machine of the class described, the combination of a plunger head, a spike magazine carried thereby, a plunger guide to which said magazine delivers, and a spike holder adapted to receive a spike and hold it in position for driving, said spike holder being free to swing clear of the spike as it is seated by said plunger.

35. In a machine of the class described, the combination of a spike magazine, a plunger guide at the inner end of said magazine, a plunger reciprocatingly mounted in said guide, the plunger controlling the delivery of spikes to said guide, and means for delivering spikes to said guide one at a time controlled in synchronism with said plunger.

36. In a spike driving machine, the combination with a plunger head, a plunger reciprocatingly mounted thereon, a driving head mounted for vertical movement, means on said driving head for lifting said plunger when the driving head is lifted beyond a predetermined point and permit-

ting free movement of the plunger while in spike driving position, a tappet on said driving head resting upon the upper end of said plunger, an impact wheel on said driving head provided with an impact member adapted to coact with said tappet when the driving head is in lowered position, the weight of the driving head through such engagement being translated to said plunger, and a fluid actuated piston for controlling the movement of said driving head, constituting a rebound or shock absorbing means for said driving head.

37. In a spike driving machine, the combination with a plunger head, a plunger reciprocatingly mounted thereon, a driving head mounted for vertical movement relative to said plunger head, means on said driving head for lifting said plunger in said plunger head when the driving head is lifted beyond a predetermined point and permitting free movement of the plunger while in spike driving position, a tappet on said driving head resting upon the upper end of said plunger, and an impact wheel on said driving head provided with an impact member adapted to coact with said tappet when the driving head is in lowered position, the weight of the driving head through such engagement being translated to said plunger.

38. In a spike driving machine, the combination with a plunger head, a plunger reciprocatingly mounted thereon, a driving head mounted for vertical movement to coact with said plunger, means on said driving head for lifting said plunger when the driving head is lifted beyond a predetermined point and permitting free movement of the plunger while in spike driving position, and manually controlled means on said plunger head for detachably connecting the plunger head to the plunger whereby the plunger constitutes a hanger for lifting the plunger head through said driving head.

39. In a machine of the class described, the combination with a plunger head provided with a plunger guide, a magazine delivering to said guide, a plunger reciprocating in said guide, a gate controlling the delivery of spikes from said magazine, a pivoted wear plate disposed at the side of the plunger and to be engaged by the head of the spike delivered by the opening of the gate, the retraction of said plunger permitting said wear plate to swing below said plunger and discharge the spike into the guide, a channeled spike holder disposed to receive the body of the spikes delivered from said magazine and having forwardly projecting portions at the lower end extending below the plunger when in actuated position, and means operatively associated with the plunger for retracting said gate and holder, the holder having a portion underlying and constituting an extension for the bottom portion of the magazine when the holder is in actuated position.

40. In a machine of the class described, the combination with a plunger head provided with a plunger guide, a magazine delivering to said guide, a plunger reciprocating in said guide, a gate controlling the delivery of spikes from said magazine, a channeled spike holder disposed to receive the body of the spikes delivered from said magazine and having forwardly projecting portions at the lower end extending below the plunger when in actuated position, and means controlled by said plunger for retracting said gate and holder, the holder having a portion underlying and constituting an extension for the bot-

tom portion of the magazine when the holder is in actuated position.

41. In a machine of the class described, the combination with a plunger head provided with a plunger guide, a magazine delivering to said guide, a plunger reciprocating in said guide, a gate controlling the delivery of spikes from said magazine, a pivoted wear plate disposed at the side of the plunger and to be engaged by the head of the spike delivered by the opening of the gate, the retraction of said plunger permitting said wear plate to swing below said plunger and discharge the spike into the guide, a spike holder disposed to receive the spikes delivered from said magazine, and means operatively associated with the plunger for retracting said gate and holder.

42. In a machine of the class described, the combination of a plunger guide, a spike magazine terminating in said guide and adapted to hold spikes in a row, the spikes being advanced in said magazine as discharged therefrom, a plunger reciprocating in said guide, a wear plate at the side of said plunger against which the spikes are delivered from said magazine, and means controlled by said plunger for releasing the spikes in timed relation with the reciprocating movement of the plunger.

43. In a spike driving machine, the combination with means for feeding and supporting spikes in driving position, comprising a plunger guide and a magazine delivering thereto, a channeled spike holder operatively associated with said magazine to receive the body of the spike delivered thereby and having forwardly projecting portions entering said guide when the spike holder is in actuated position, a plunger recessed at its lower end to conform to the shape of the spike head, and a yielding jaw disposed in opposed relation to the spike holder to coact therewith for supporting the spike in driving position.

44. In a spike driving machine, the combination with means for feeding and supporting spikes in driving position, comprising a plunger guide and a magazine delivering thereto, a channeled spike holder operatively associated with said magazine to receive the body of the spike delivered thereby and having forwardly projecting portions entering said guide when the spike holder is in actuated position, and a plunger.

45. In a structure of the class described, the combination of a spike carrying means terminating in vertical guides, a plunger reciprocatingly mounted in said vertical guides, the release of one spike into driving position and the retention or holding back of spikes within the magazine being controlled by reciprocation of the plunger, and a truck on which said guide and magazine are mounted adapted to support said guide in position to deliver the spikes to driving position.

46. In a spike driving machine, the combination with means for feeding and supporting spikes in driving position, comprising a plunger guide and a magazine delivering thereto, a channeled spike holder operatively associated with said magazine to receive the body of the spike delivered thereby, a plunger, and means for imparting percussive blows to said plunger while the plunger is continuously subjected to a constant weight.

47. In a spike driving machine for railroad tracks, the combination with a truck, spike guides positioned on opposite sides of the rail to be spiked, plungers operatively associated with said guides, means controlled by said plungers for simultaneously feeding spikes to said guides and

maintaining the spikes in vertical position, and percussive spike driving means operatively associated with said plungers.

48. In a spike driving machine, the combination of a railway truck, spike guides mounted thereon in operative relation to a rail upon which the truck travels, means for maintaining spikes in vertical position for driving, a percussive driving means for said spikes, said percussive driving means being vertically movable relative to said truck, and means limiting the downward travel of said percussive driving means whereby the blows upon the spike are stopped when the percussive means is stopped by said limiting means.

49. In a spike driving machine, the combination with a railway truck provided with a plunger head supporting journal at each side projecting above the rails of the track on which the truck is traveling, of a plunger head, a hanger selectively engageable with said journals and provided with an upright, a sleeve on said upright having threaded engagement with the rear end of said plunger head, guide rollers at the lower end of said upright engaging the sides of the rail, a supporting roller for the front end of said plunger head provided with rail engaging guides and having threaded connection with said plunger head, a spike driving plunger on said plunger head, and driving means operatively associated with said plunger.

50. In a spike driving machine, the combination with a railway truck provided with a plunger head supporting journal disposed laterally of the track on which the truck is traveling, of a plunger head, a hanger on said journal and provided with an upright, a sleeve on said upright having threaded engagement with the rear end of said plunger head, rail engaging guide means at the lower end of said upright, a supporting roller for the front end of said plunger head provided with rail engaging guides and having threaded connection with said plunger head, a spike driving plunger on said plunger head, and driving means operatively associated with said plunger.

51. In a spike driving machine, the combination with a railway truck provided with a plunger head supporting journal disposed transversely of the track on which the truck is traveling, of a plunger head, a hanger on said journal and provided with an upright, a sleeve on said upright adjustably connected with the rear end of said plunger head for the vertical adjustment thereof, guide rail engaging means at the lower end of said upright, a supporting roller adjustably connected to the front end of said plunger head, a spike driving plunger on said plunger head, and driving means operatively associated with said plunger.

52. In a machine of the class described, the combination with a plunger head provided with track engaging guiding means, of a plunger reciprocatingly mounted on said head, a driving head provided with impact means operatively associated with said plunger, and a stirrup suspended by flexible straps from said driving head, said plunger being loosely arranged through said stirrup and provided with a head above the stirrup whereby it may be lifted by the driving head and the impact means of said driving head being brought into operative relation with said plunger by the lowering of the head.

53. In a machine of the class described, the combination with a plunger head provided with track engaging guiding means, of a plunger re-

5 ciprocatly mounted on said head, a driving head vertically movable relative to said plunger head and provided with impact means operatively associated with said plunger, and a stirrup on said driving head, said plunger being loosely arranged through said stirrup and provided with stirrup engaging means whereby the stirrup is

lifted by the lifting of driving head, the impact means of said driving head being brought into operative relation with said plunger by the lowering of the driving head relative to said plunger head.

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