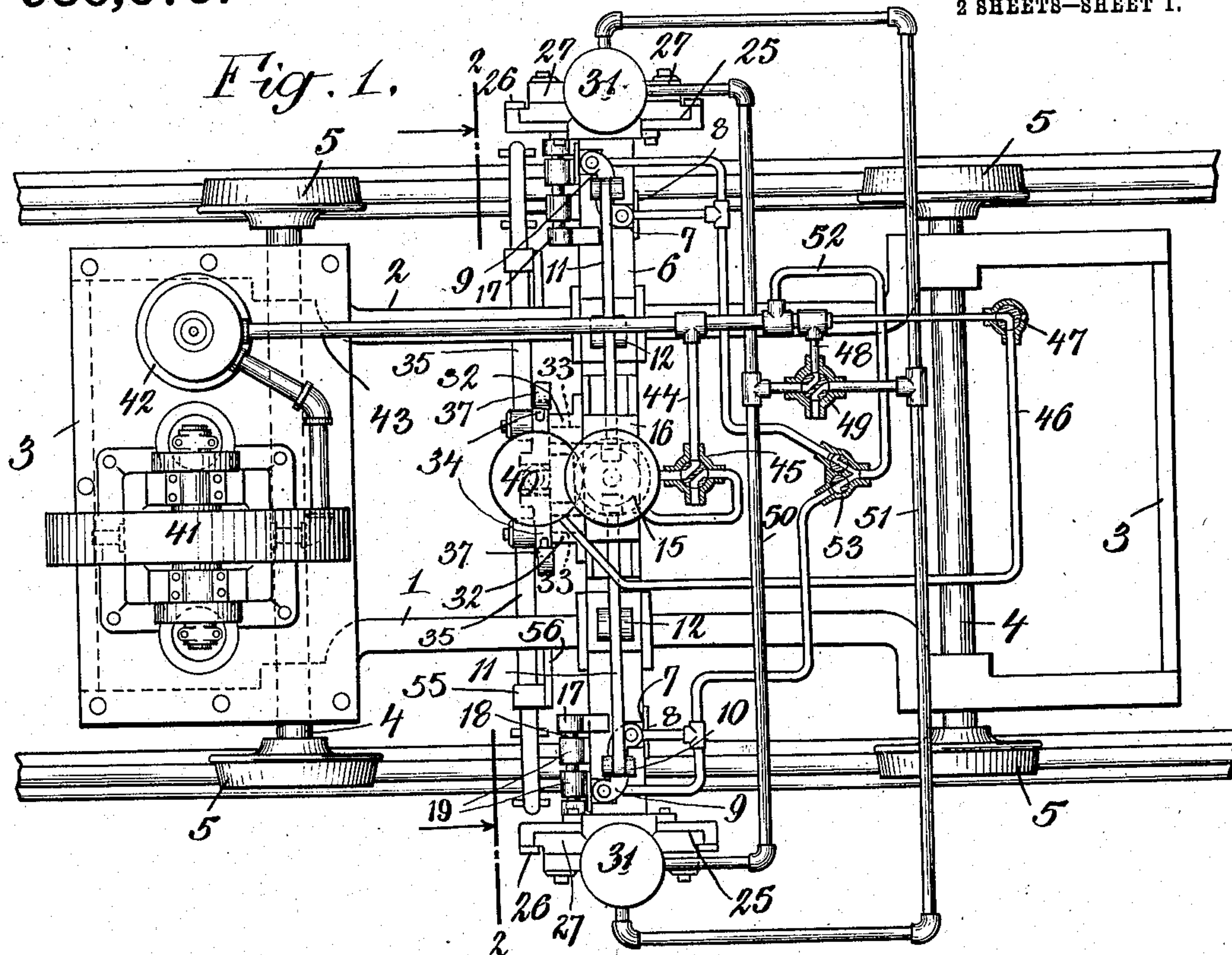


R. C. SPANDAU.  
 TRACK LAYING APPARATUS.  
 APPLICATION FILED MAY 5, 1908.

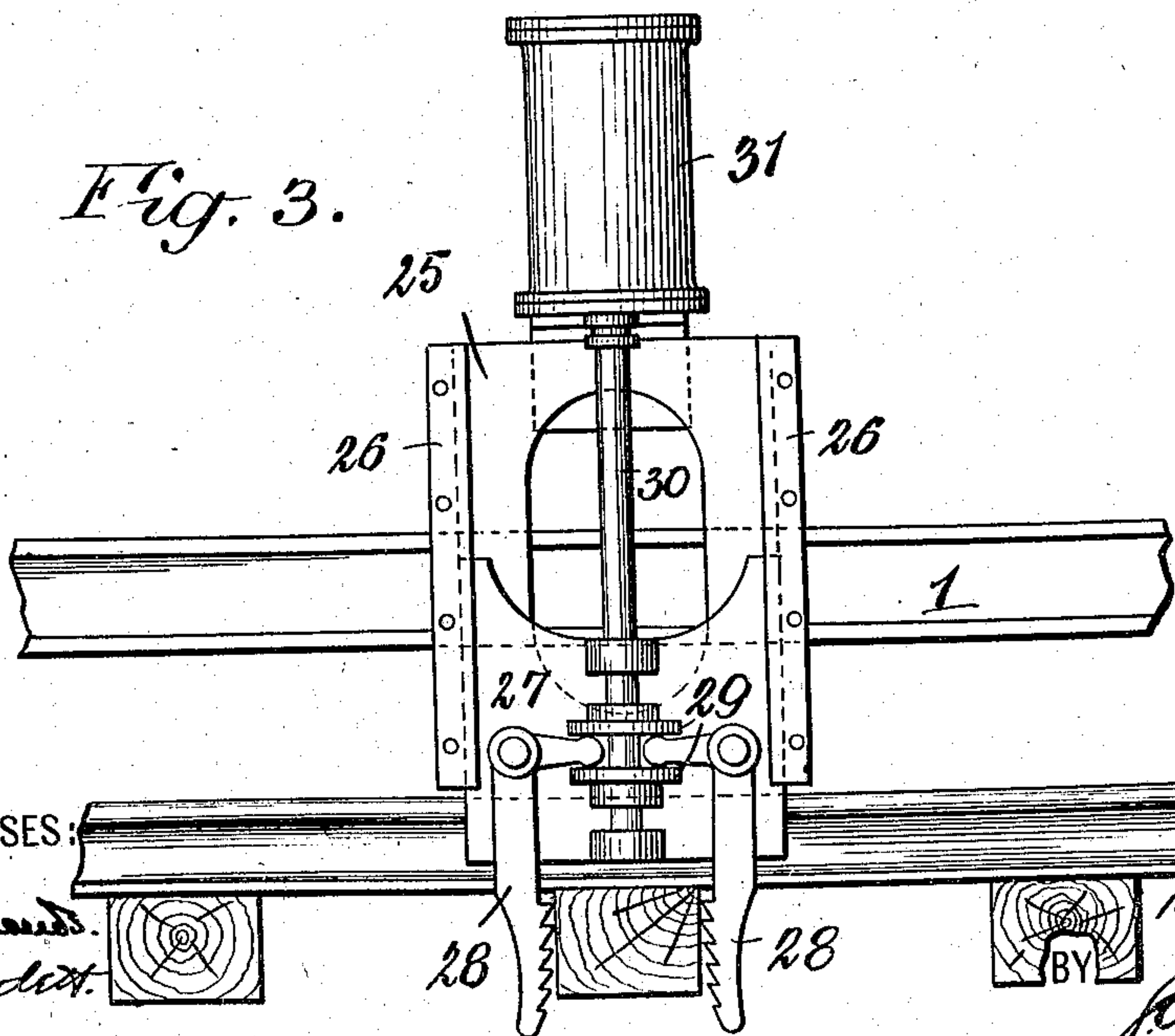
Patented Oct. 12, 1909.

2 SHEETS—SHEET 1.

936,679.



*Fig. 3.*



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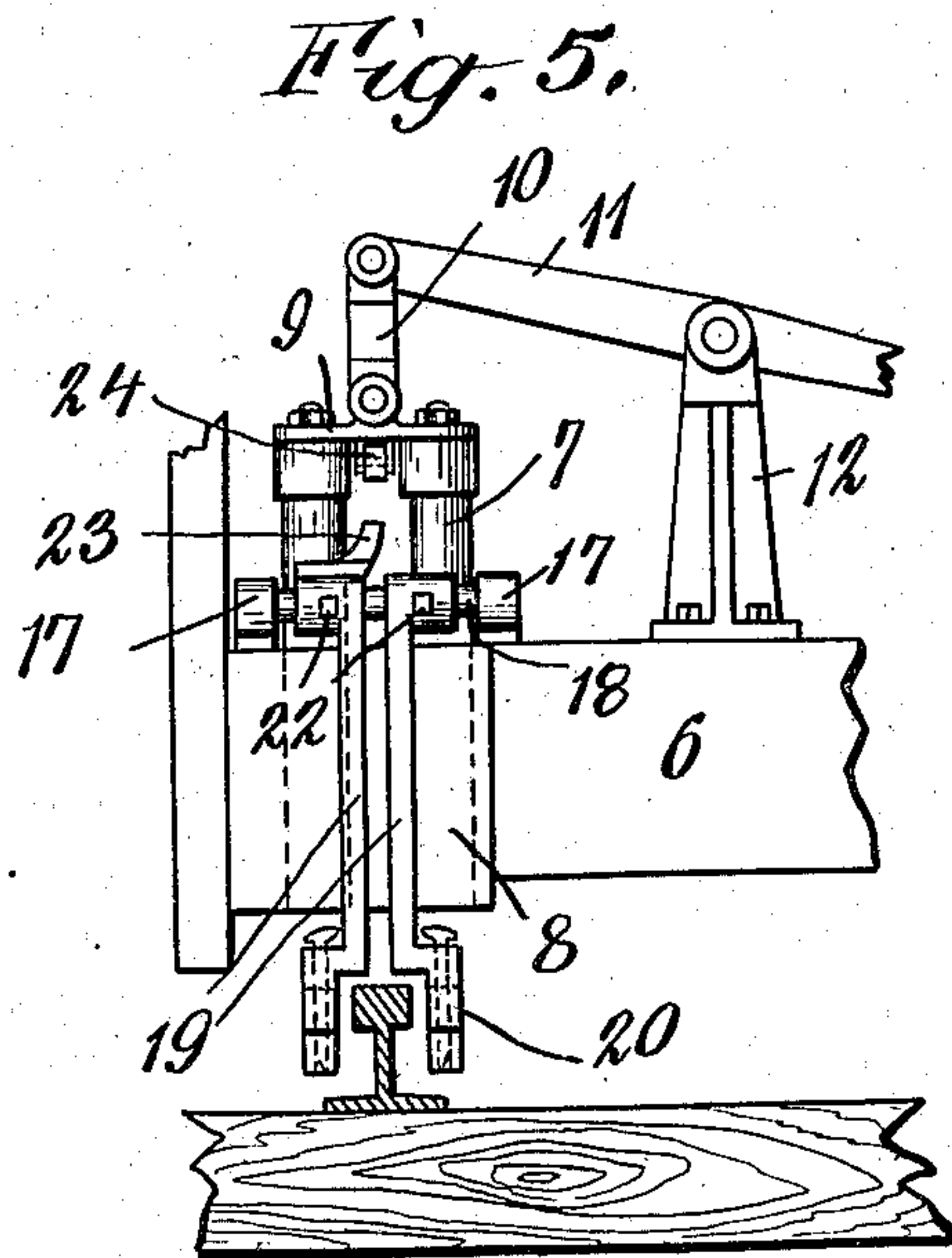
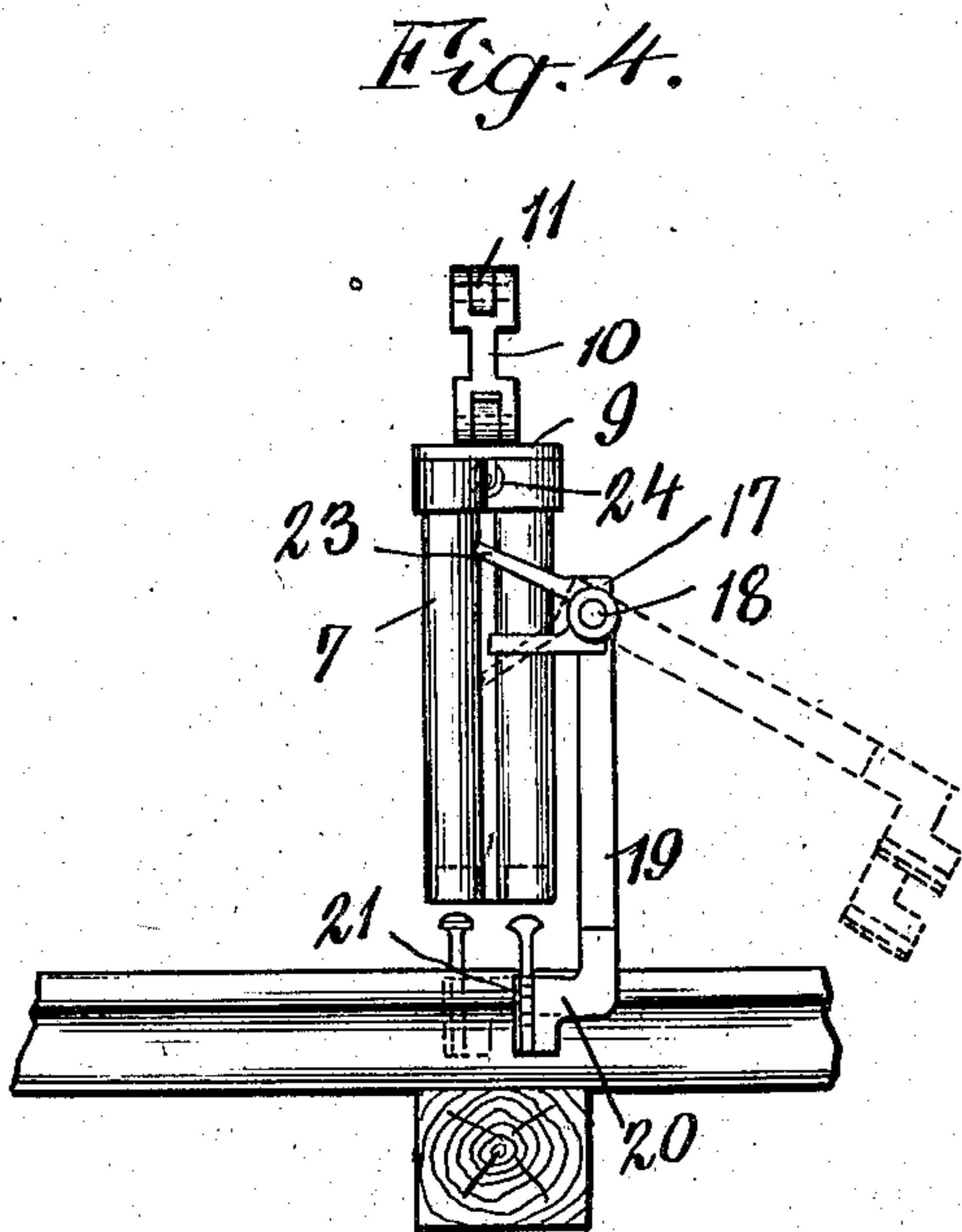
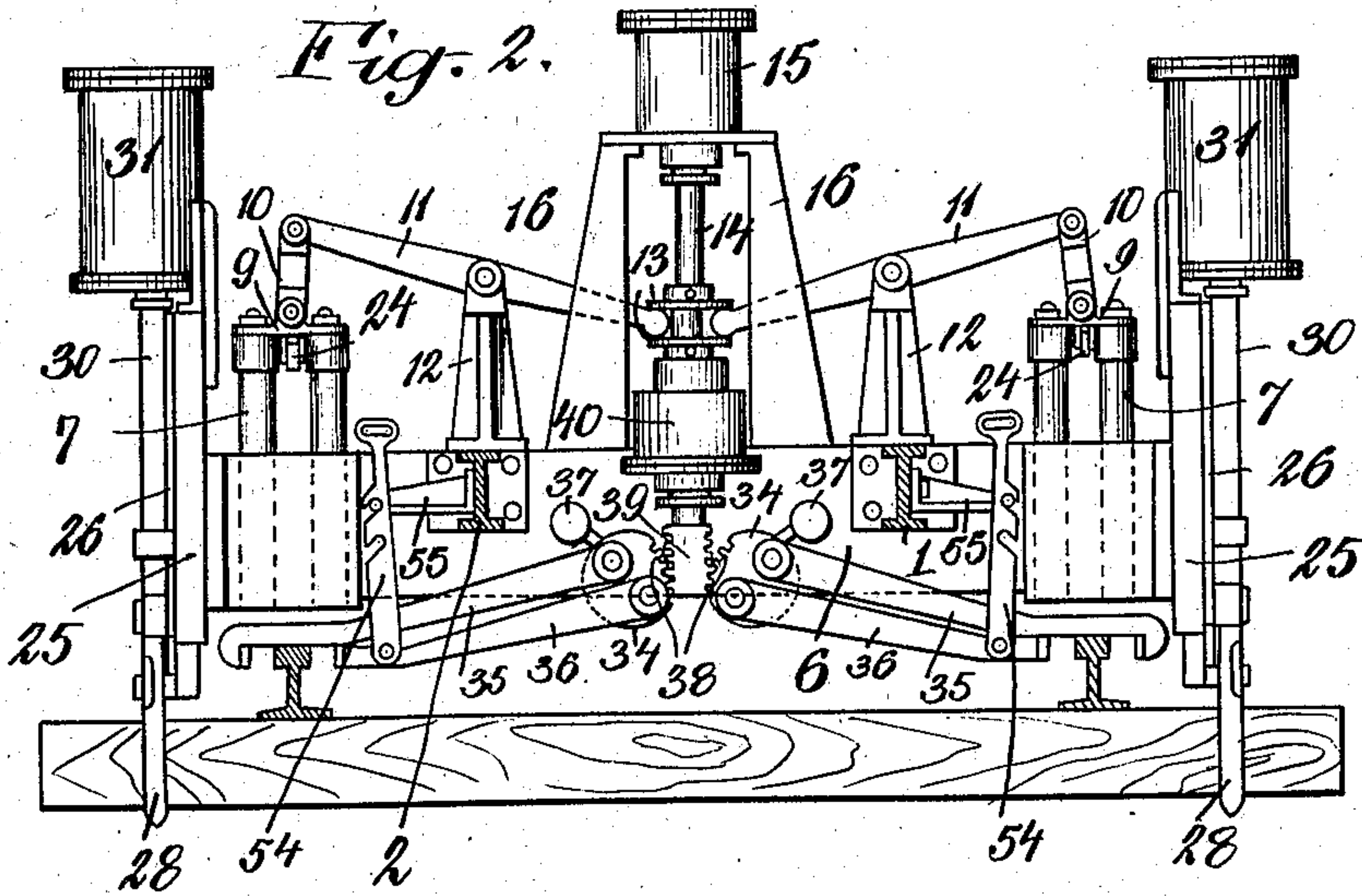
ATTORNEY

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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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## TRACK-LAYING APPARATUS.

936,679.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed May 5, 1906. Serial No. 430,957.

To all whom it may concern:

Be it known that I, RICHARD C. SPANDAU, a citizen of the United States, residing at Danville, in the county of Vermilion and State of Illinois, have invented certain new and useful Improvements in Track-Laying Apparatus, of which the following is a specification.

This invention is directed to the provision of an improved form of track-laying apparatus, whereby the tracks for railway trains may be laid rapidly and at considerably reduced expense.

The invention involves the provision of a truck adapted to run on the rails laid and carrying the apparatus which is employed, this including gaging devices for positioning the rails at the proper distance apart, means for lifting the ties into solid contact with the bottom surfaces of the rails, spike-holders for holding the spikes in position, pneumatic hammers for driving the spikes, and means for raising and lowering these hammers.

The pneumatic hammers are preferably arranged for vertical movement in suitable guides, and devices, preferably pneumatically operated, are provided for lowering these hammers as the spikes are driven and raising them when the spikes have been driven into position. The spike-holders are arranged for movement to operative and inoperative positions, in the former of which they hold the spikes in position under the hammers. Preferably, the movement of the spike-holders to inoperative position is effected automatically as the hammers are lowered, this movement taking place as soon as the spikes have been driven into the ties far enough to hold them in position and resulting in moving the holders to such position that new spikes may be inserted therein while the ones formerly held thereby are being driven into position. The means for lifting the ties against the rails is preferably pneumatically actuated and includes cross-heads movable vertically at opposite sides of the truck and each having a pair of grab-levers pivotally mounted thereon and adapted to grasp a tie between them.

The preferred embodiment of my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the apparatus with the air connections illustrated dia-

grammatically, Fig. 2 is a transverse section of the same on the line 2—2 of Fig. 1; Fig. 3 is a detail view in elevation of the tie-lifting devices; and Figs. 4 and 5 are detail views of the spike-holders and hammers.

Referring to the drawings, the apparatus consists of a truck having side-frames 1 and 2 connected by suitable cross-braces 3, axles 4 mounted for rotation in suitable bearings formed in the side-frames, and wheels 5 on these axles. Extending across the truck and secured upon the side-frames, is a bolster or support 6 upon which most of the operating devices are mounted. Pneumatically-operated hammers 7 of any suitable construction are mounted upon the support 6 and arranged for vertical movement thereon, this being done preferably by providing vertically-disposed grooves in the support 6, in which the hammers 7 fit, and cover-plates 8 secured to the support 6 for maintaining the hammers in these grooves and guiding them in their vertical movement. Preferably a pair of hammers 7 is employed at each side of the truck, so that two spikes for each rail may be driven simultaneously, one on either side of the rail, and these two hammers are displaced somewhat in the direction of the length of the truck, so that the two spikes are not directly opposite each other. The hammers of each pair are secured at their upper ends to a cross-head 9 connected by a link 10 to a lever 11 which is pivotally mounted upon a standard 12 secured upon the support 6. The adjacent ends of the two levers 11 enter between collars 13 upon a piston-rod 14 on which is secured a piston adapted to reciprocate in a cylinder 15, this cylinder being mounted upon standards 16 rising from the support 6.

Mounted upon the support 6 at each side of the truck are a pair of bearing-blocks 17 in which a shaft 18 is mounted for rotation. Secured on this shaft are two spike-holders 19, which extend downwardly from shaft 18 and at their lower ends are provided with offset portions 20 adapted to extend under the hammers 7. In the end of the portion 20 of each holder is a vertically-disposed groove adapted to receive a spike, and a gate 21 is pivotally mounted upon the end of each holder for retaining a spike in the groove, this gate being pressed to the closed position by a spring, so that when a spike



has been driven a short distance into a tie the holder can be moved from the operative position and the gate will turn on its hinge so as to release the spike. The holders 19 are secured upon shaft 18 by set-screws 22, so that by loosening these screws the holders may be positioned at a greater or less distance apart, to adapt the apparatus for use with rails having flanges of different widths. Extending upwardly from one of the holders 19 of each pair, is an arm 23, the upper end of which lies between the pair of hammers adjacent thereto. This end of arm 23 is adapted to be engaged by a roller 24 mounted on the under side of the cross-head 9. Secured to each end of the support 6 is a frame 25 having vertically-disposed guide-flanges 26 at opposite sides thereof, and a cross-head 27 is adapted to move vertically upon frame 25, being held in position by the guides 26. Pivotally mounted upon the cross-head 27 are two grab-levers 28. These levers are in the form of bell-cranks and at one end have a plurality of teeth formed thereon, as shown in Fig. 3. The other ends of the two levers 28 extend between collars 29 upon a piston-rod 30 having a piston thereon adapted to reciprocate in a cylinder 31 which is mounted upon the frame 25.

The means for positioning the rails at the proper distance apart consists of two pairs of gage-arms, the arms of each pair being movable to cause their ends to grip a rail between them and move the same to the proper position. A bracket 32 is secured to one side of the support 6 and is formed to provide bearings for two short shafts 33. On one end of each of these shafts is secured a disk 34, to which the gage-arms 35 and 36 are pivotally connected at diametrically opposite points. The end of the arm 35 is downwardly turned, so that the ends of the two arms are opposite each other and may grip a rail between them. To each of the disks 34 is secured a weight 37, which when the disk 34 is released moves it in a direction to separate the ends of the arms 35 and 36. Formed on each of the disks 34 is a segmental gear 38, and these gears mesh with the teeth of racks formed on opposite sides of a piston-rod 39, the upper end of which carries a piston adapted to reciprocate in a cylinder 40 secured upon the support 6. A hanger 54 is pivotally connected at its lower end to each of the gage-arms 36, and in each of these hangers are two notches adapted to receive a pin on the end of an arm 55 projecting from the side-frame 2. When the hangers are in the position in which they are shown in Fig. 2, the gage-arms 35 and 36 are in the operative position, but by raising the hangers by means of the handles provided upon their upper ends, so that the pins on the arms 55 are received in the lower notches in the hangers, the gage-arms 35,

36, will be turned upon their pivots to carry the ends thereof to inoperative position.

Upon one end of the truck is a platform on which is secured an engine-driven air-compressor 41 and an equalizing tank 42, 70 and a pipe 43 leading from this tank supplies the air to all of the pneumatically operated devices. In Fig. 1, the piping to the various cylinders and the valves for controlling the various devices are shown diagrammatically. A pipe 44 branching from the pipe 43 supplies air to either the upper or the lower end of the cylinder 15, a two-way valve 45 being connected in the pipe 44 by means of which either end of cylinder 15 may be connected to the supply-pipe 44 and the other end connected to the exhaust-port of the valve. A branch pipe 46 carries air from the pipe 43 to the upper end of the cylinder 40, and in this pipe is a valve 47 serving to permit or cut off the supply of air. A pipe 48 carries air from the pipe 43 to a two-way valve 49, from which pipes 50 lead to the upper ends of the cylinders 31, and pipes 51 lead to the lower ends of those cylinders. It will be seen that by operating the valve 49, air may be permitted to flow from the supply-pipe 43 through the pipe 50 to the upper ends of cylinders 31 and exhausted from the lower ends through pipe 51 and the exhaust-port of the valve or may be supplied to the lower ends of cylinders 31 through pipe 51 and exhausted from the upper ends of the cylinders through pipe 50 and the exhaust-port of the valve. A pipe 52 carries air to the pneumatically operated hammers 7, and in this pipe is a double valve 53 by which the supply of air to either pair of hammers is controlled.

The operation of the apparatus will now be described. When a pair of rails have been laid in approximate position upon the ties and the ends thereof connected by means of the fish-plates to the ends of the rails previously laid, the truck is run onto these rails a short distance. The gage-arms are then operated to position the two rails at the proper distance apart. This is done by turning the valve 47 to the position for admitting air to the upper end of cylinder 40, whereby the piston of that cylinder is moved downwardly and the racks 39 thereof turn the disks 34 in a direction to bring the ends of the two pairs of gage-arms together upon opposite sides of a rail and move the two rails to the proper relative positions. The valve 49 is then operated to admit air through pipe 50 to the upper ends of the cylinders 31 and exhaust it through pipe 51 from the lower ends of those cylinders, so as to permit the cross-heads 27 and the grab-levers 28 carried thereby to move vertically downward. When at the lower limit of this downward movement, the toothed ends of the levers 28 lie on opposite sides



of a tie and the valve 49 is then operated to reverse the air connections to the cylinders 31, so that the pistons thereof are raised. In this upward movement of the pistons and the rods 30 thereof, the levers 28 are turned on their pivots until the teeth thereon engage opposite sides of a tie and further upward movement of the pistons of cylinders 31 raises the cross-heads 27, the levers 28 and the tie held by the levers, until the tie is drawn into solid contact with the bottom surfaces of the rails. Spikes are then inserted in the holders 19, and these holders moved to such positions that the spikes are held directly under the hammers corresponding thereto. The valve 45 is then operated to admit air to the lower end of cylinder 15 and exhaust it from the upper end, thereby operating the levers 11 to move the hammers 7 vertically downward. When the hammers are in contact with the heads of the spikes, the valves 53 are operated to admit air to the hammers and the latter are thereby operated to drive the spikes into the tie. When the spikes have been driven into the tie such a distance that they do not require to be held in position, the rollers 24 on the cross-heads 9 of the hammers come into contact with the arms 23, and as the cross-heads are lowered the shafts 18 are rocked in their bearings so as to carry the holders 19 to inoperative position, in which they are shown in dotted lines in Fig. 4, the spikes being released by the spring-pressed gates of the holders as they move from the operative position in which they are shown in full lines in Fig. 4. Thus while the spikes are being driven into the tie, new spikes may be inserted in the holders 19. During the entire operation of driving the spikes home, the tie is held up against the under surfaces of the rails by the grab-levers 28 and sufficient pressure is maintained within the lower end of cylinder 15 to cause the hammers to move downwardly as the spikes are driven. When the spikes have been driven into position, the valve 49 is operated to exhaust air from the lower ends of cylinders 31 through pipe 51 and admit air through pipe 50 to the upper ends of those cylinders, so as to operate the grab-levers 28 to release the tie. Also, valve 45 is operated to reverse the air connections to the cylinder 15, thereby operating the levers 11 to raise the hammers 7. The valve 47 may then be operated to permit the exhaust of air from the cylinder 40, whereupon the weights 37 will turn the disks 34 in the direction to cause separation of the ends of the pairs of gage-arms. The truck may then be moved along to a new position for spiking the rail to another tie. When the truck is to be moved a considerable distance, the gage-arms 35 and 36 are held in inoperative position, in which they lie above the

plane of the upper surfaces of the rails, by means of the arms 54.

Having now described my invention, what I claim as new therein and desire to secure by Letters Patent is as follows:—

1. In a track-laying apparatus, a support, a pneumatically-operated hammer movable bodily up and down upon said support, pneumatic means for operating said hammer, and means for simultaneously lowering said hammer bodily so that the hammer will follow a spike during the driving operation to keep the hammer in position for driving the spike, substantially as set forth. 70
2. In a track-laying apparatus, a support, a pneumatically-operated hammer movable bodily up and down upon said support, pneumatic means for operating said hammer, and pneumatically-operated means for simultaneously lowering said hammer bodily so that the hammer will follow a spike during the driving operation to keep the hammer in position for driving the spike, substantially as set forth. 80
3. In a track-laying apparatus, a support, two pneumatic hammers movable bodily up and down upon said support at opposite sides of the apparatus, pneumatic means for operating said hammers, and a single pneumatically-operated means for lowering said hammers bodily so that the hammers will follow the spikes during the driving operation to keep the hammers in position for driving the spikes, substantially as set forth. 90
4. A track-laying apparatus comprising a truck provided with wheels adapted to run on the rails of the track being laid, a hammer mounted on the truck, means for operating the same, and a spike-holder for holding a spike in position under the hammer to spike the rail on which the truck stands, said holder being movable during the operation of driving a spike between operative and inoperative positions, substantially as set forth. 100
5. A track-laying apparatus comprising a truck provided with wheels adapted to run on the rails of the track being laid, a hammer mounted on the truck, means for operating the same, means on the truck for raising and lowering the hammer, and a spike-holder movable during the operation of driving a spike from operative to inoperative positions and adapted to hold a spike in position for spiking the rail on which the truck stands, substantially as set forth. 110
6. A track-laying apparatus comprising a truck provided with wheels adapted to run on the rails of the track being laid, two pneumatic hammers movable vertically upon said truck at opposite sides thereof, means for raising and lowering said hammers bodily, means for operating the hammers, and a spike-holder for holding a spike in position under each of said hammers for 120



spiking the rails on which the truck stands, said spike-holders being movable to operative and inoperative positions, substantially as set forth.

5 7. In a track-laying apparatus, the combination of a support, two pneumatic hammers movable upon said support at opposite sides of the apparatus, means for simultaneously raising and lowering said hammers bodily including a cylinder, a piston  
10 therein and pipes leading to the cylinder, and a spike-holder for each of said hammers movable to operative and inoperative positions, substantially as set forth.

15 8. A track-laying apparatus consisting of a truck adapted to run on rails, a hammer mounted on the truck, means for operating the hammer to drive a spike, means for lowering the hammer bodily as the driving operation progresses, a spike-holder for holding a  
20 spike in position under the hammer, and means for moving the holder to inoperative position actuated during the driving operation in lowering the hammer, said holder  
25 when so moved releasing the spike to permit it to be driven home, substantially as set forth.

9. In a track-laying apparatus, the combination of a hammer, means for operating  
30 the same, means for raising and lowering the hammer bodily, a spike-holder, and means operated as said hammer is lowered bodily for moving said holder to inoperative position, substantially as set forth.

35 10. In a track-laying apparatus, the combination of a support, pneumatic hammers movable upon said support, pneumatic means for raising and lowering the hammers bodily, a spike-holder for each hammer, and means  
40 for moving each spike-holder to inoperative position as its hammer is lowered, substantially as set forth.

45 11. In a track-laying apparatus, the combination of a hammer, means for operating the same, a spike-holder for holding a spike in position for the hammer, said holder being movable to operative and inoperative positions, and means for effecting an adjustment of the operative position of said  
50 holder to compensate for variations in the materials employed, substantially as set forth.

55 12. In a track-laying apparatus, the combination of two hammers for driving spikes on opposite sides of a rail, means for operating the hammers, two spike-holders for holding spikes in position for the hammers, and means for adjusting said holders toward and  
60 away from each other, substantially as set forth.

65 13. A track-laying apparatus consisting of a truck adapted to run on rails, pairs of parallel guides stationarily mounted upon said truck at opposite sides thereof, a cross-head movable vertically upon each pair of

guides, a pair of grab-hooks pivotally mounted upon each cross-head, and means for operating each pair of grab-hooks and each cross-head, substantially as set forth.

14. A track-laying apparatus consisting of  
70 a truck adapted to run on rails, pairs of parallel guides stationarily mounted upon said truck at opposite sides thereof, a cross-head vertically movable upon each pair of guides, a pair of grab-levers pivotally  
75 mounted upon each cross-head, and means for turning said levers on their pivots to cause them to grip a tie and for raising said cross-heads to raise the tie into contact with a rail, substantially as set forth. 80

15. In a track-laying apparatus, a pair of vertically-arranged guides, a cross-head movable thereon, a pair of grab-levers pivotally mounted on said cross-head, and a pneumatic operating device connected to said grab-  
85 levers for turning them on their pivots and for raising the levers and said cross-head, substantially as set forth.

16. In a track-laying apparatus, the combination of a support, pneumatic hammers  
90 movable thereon, means for raising and lowering said hammers bodily, means for operating the hammers, and pneumatically operated means for gripping a tie and raising it against a rail, substantially as set  
95 forth.

17. In a track-laying apparatus, the combination of a support, pneumatic hammers movable thereon, means for raising and lowering said hammers bodily, means for operating  
100 the hammers, a vertically-movable cross-head, grab-levers pivotally mounted thereon, and pneumatic operating means connected to said levers, substantially as set forth.

18. In a track-laying apparatus, the combination of a support, pneumatic hammers  
105 movable thereon, means for raising and lowering said hammers bodily, means for operating the hammers, spike-holders for the hammers movable to operative and inoperative  
110 positions, and pneumatically-operated means for lifting a tie into contact with a rail, substantially as set forth.

19. In a track-laying apparatus, the combination of a support, pneumatic hammers  
115 movable thereon at opposite sides of the apparatus, means for raising and lowering said hammers, spike-holders for the hammers movable from operative to inoperative positions in correspondence with the downward movement of the hammers, vertically-  
120 movable cross-heads at opposite sides of the apparatus, a pair of grab-levers pivotally mounted on each cross-head, and a pneumatic operating device connected to each  
125 pair of grab-levers, substantially as set forth.

20. A track-laying apparatus having a pair of gage-arms mounted thereon and means for moving each of said arms toward  
130 and away from the other, said arms being



adapted to engage opposite sides of the same rail and move the rail in one direction or the other to position it upon the ties, substantially as set forth.

21. A track-laying apparatus adapted to run on rails, having two pairs of gage-arms mounted thereon and means for moving both of the arms of either of said pairs to cause said arms to grip a rail and move it in either direction to position it upon the ties, substantially as set forth.

22. In a track-laying apparatus, two pairs of gage-arms, and a pneumatic operating device for simultaneously moving the arms of each pair in opposite directions to cause their ends to grip and position a rail, substantially as set forth.

23. In a track-laying apparatus, a pair of gage-arms, a pneumatic operating device for moving the arms of each pair relatively to cause them to grip and position a rail, and means for moving the arms of each pair to separate the ends thereof, substantially as set forth.

24. A track-laying apparatus consisting of a truck adapted to run on rails, gage-arms mounted on the truck, means for operating said arms to grip and position the rails, and means for supporting said arms in inoperative positions in which they lie above the upper surface of the rails, substantially as set forth.

25. In a track-laying apparatus, the combination of means for positioning a pair of rails relatively, pneumatically operated means for lifting a tie against a rail, pneumatic hammers, and means for raising and lowering the hammers, substantially as set forth.

26. In a track-laying apparatus, the combination of pneumatically-operated gage-arms for positioning rails relatively, pneumatically-operated lifting devices for lifting a tie against a rail, pneumatic hammers, and pneumatically-operated means for raising and lowering the hammers, substantially as set forth.

27. In a track-laying apparatus, the combination of a support, means mounted thereon for positioning a pair of rails relatively, pneumatically-operated means for lifting a tie against a rail, pneumatic hammers movable upon said support, means for raising and lowering the hammers, and spike-holders for the hammers movable to operative and inoperative positions, substantially as set forth.

This specification signed and witnessed this 17th day of April, 1908.

RICHARD C. SPANDAU.

Witnesses:

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W. E. DRURY.