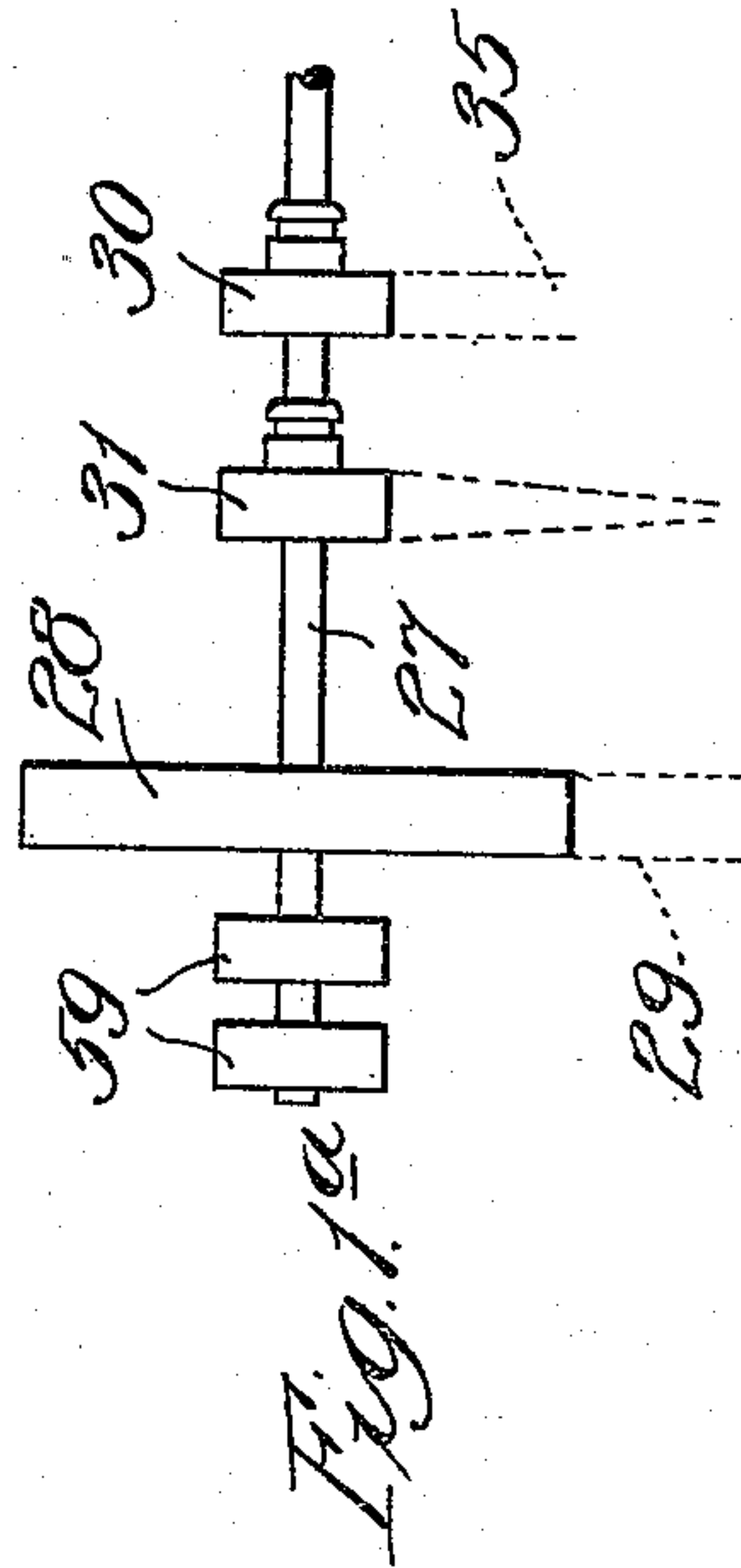
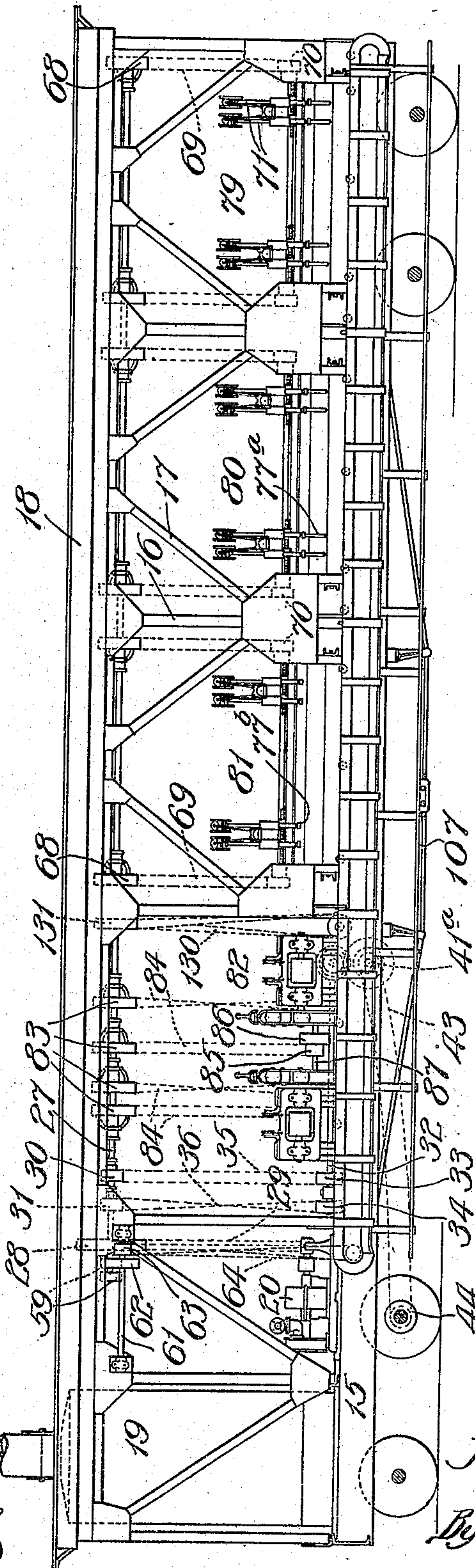


J. W. KENDRICK.  
 APPARATUS FOR PREPARING RAILWAY TIES TO BE USED WITH SCREW SPIKES.  
 932,475. APPLICATION FILED SEPT. 22, 1908. Patented Aug. 31, 1909.  
 6 SHEETS—SHEET 1.

*Fig. 1.*



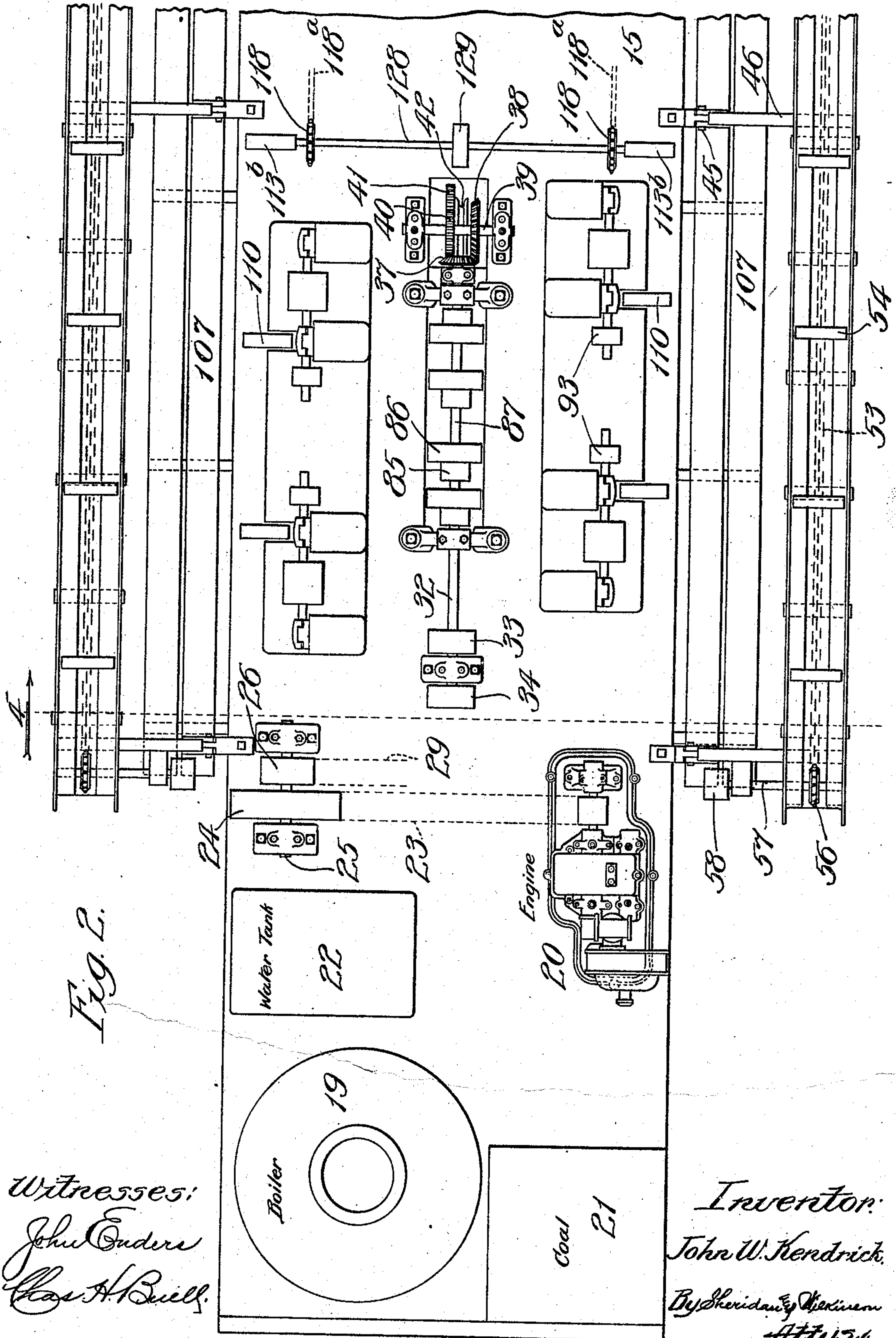
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 6 SHEETS—SHEET 2.



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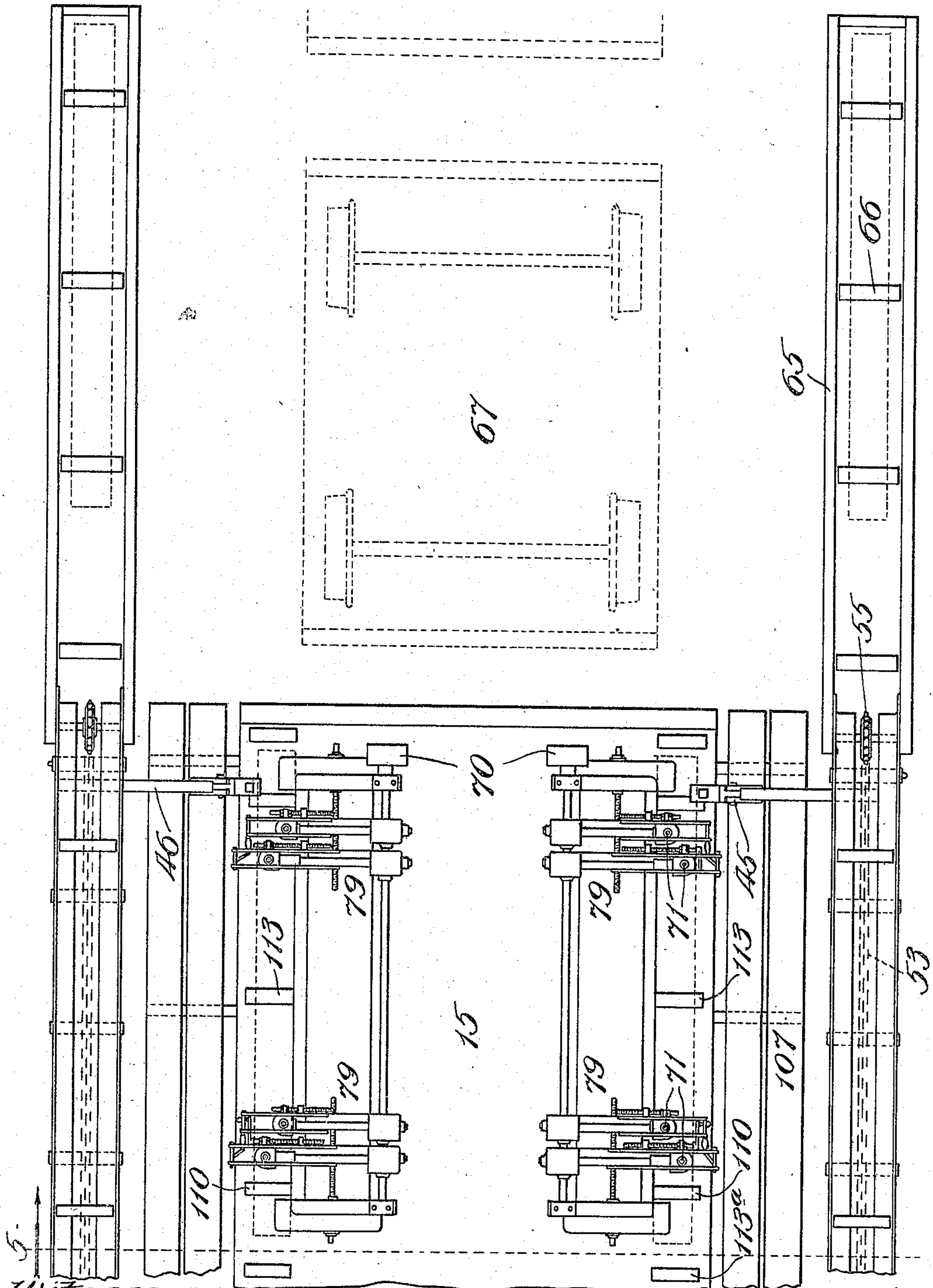
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6 SHEETS—SHEET 3.



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Fig. 3.

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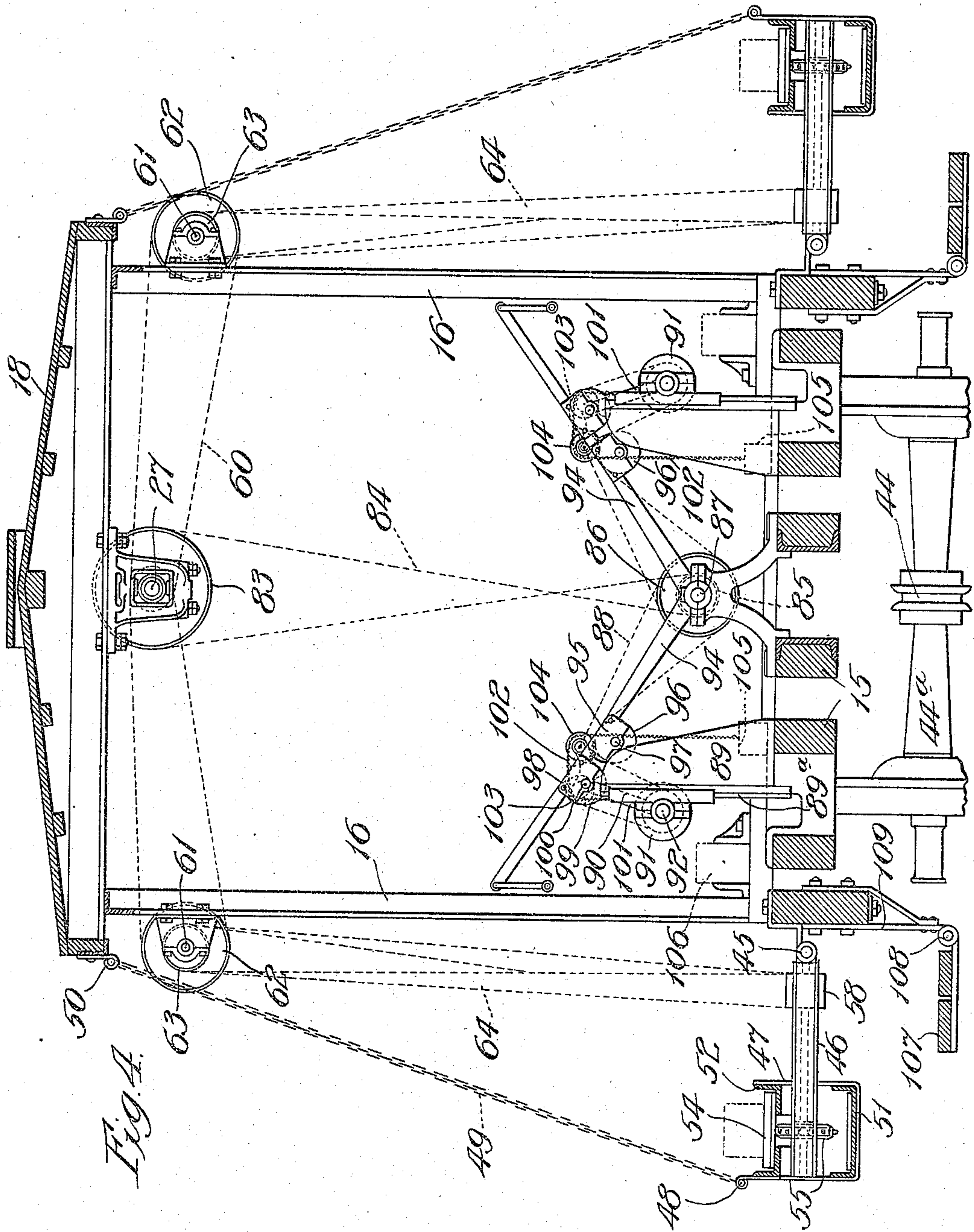
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6 SHEETS—SHEET 4.

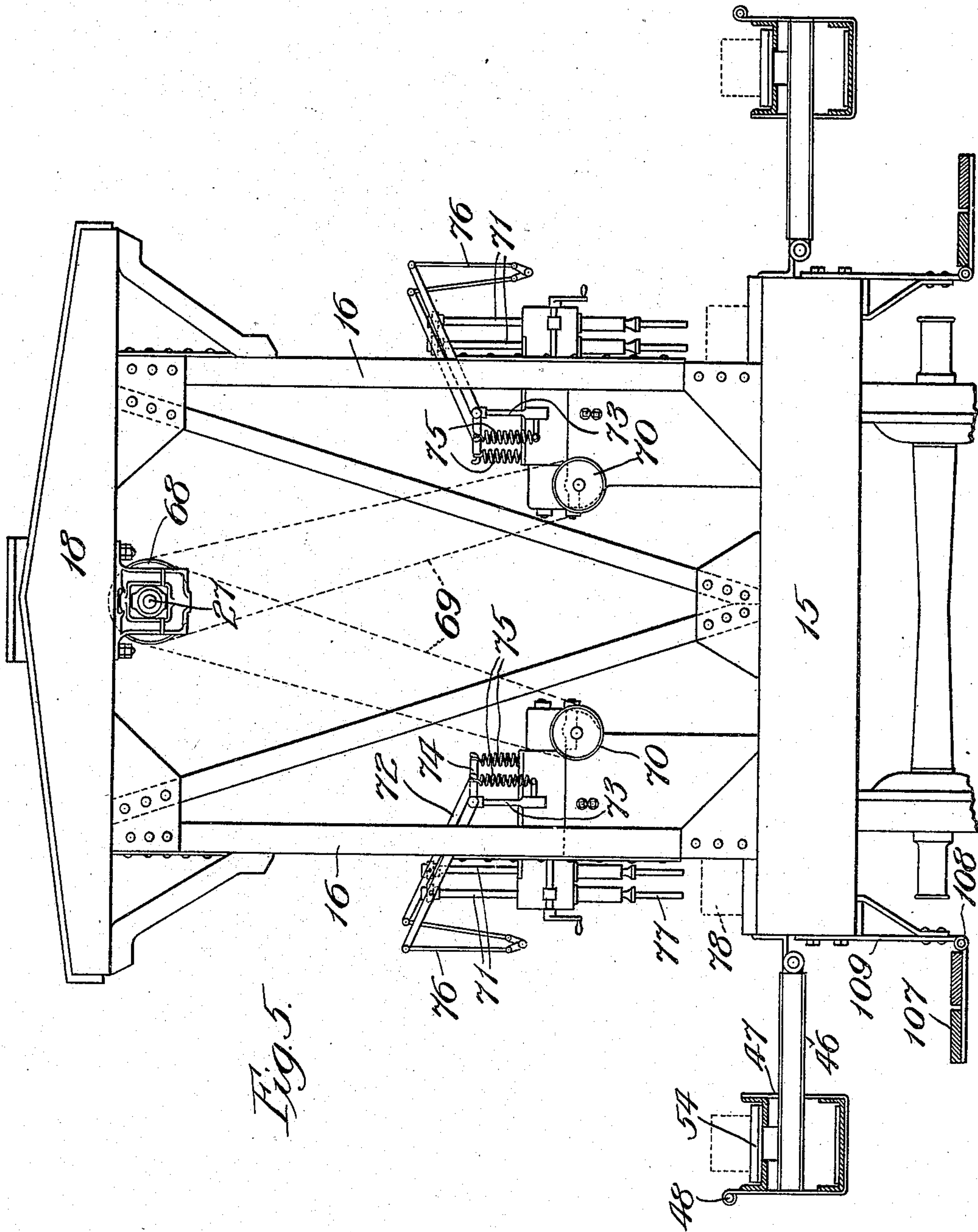


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 932,475.      6 SHEETS—SHEET 5.



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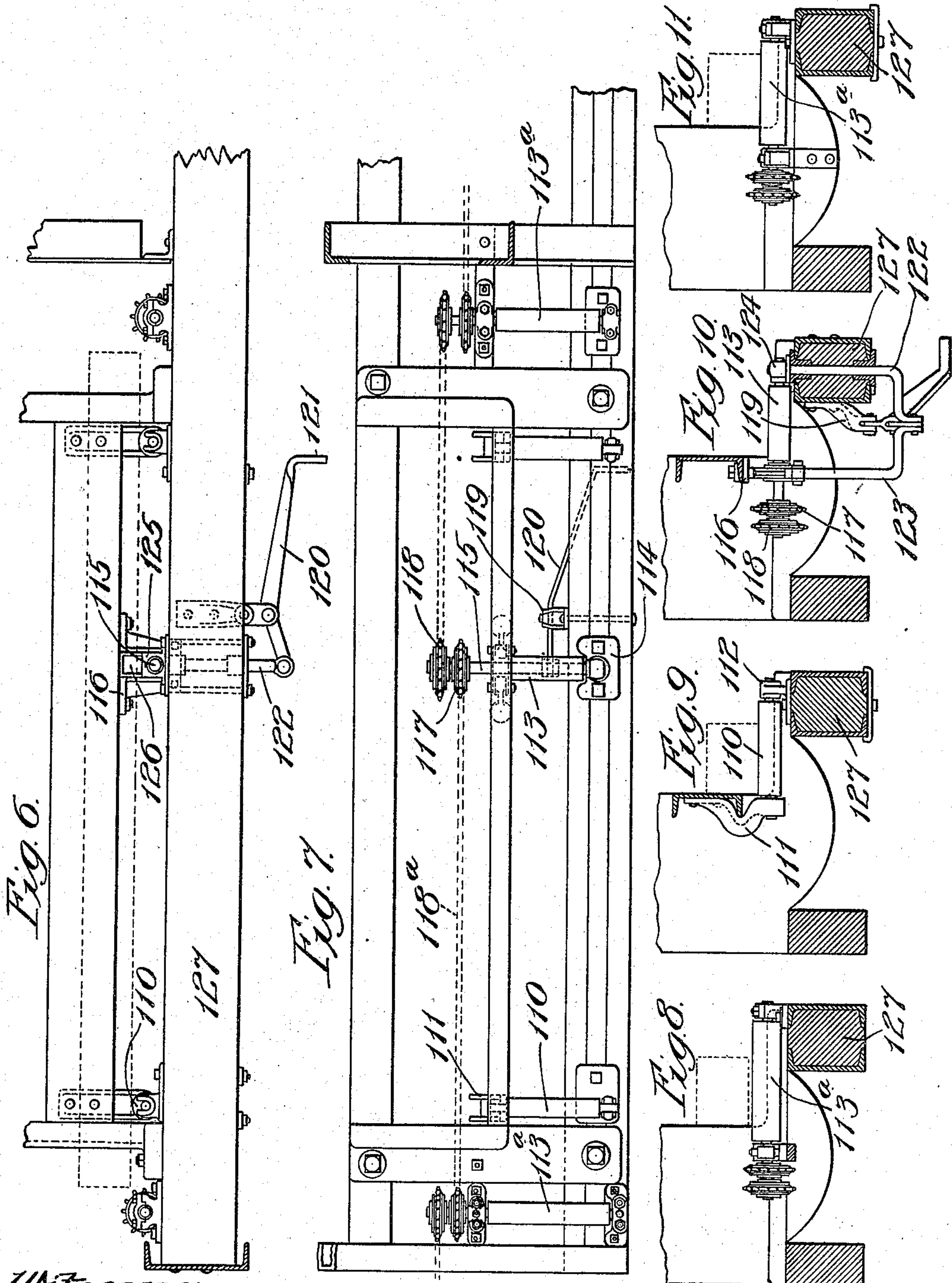
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APPLICATION FILED SEPT. 22, 1908.

932,475.

Patented Aug. 31, 1909.

6 SHEETS—SHEET 6.



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# UNITED STATES PATENT OFFICE.

JOHN W. KENDRICK, OF CHICAGO, ILLINOIS.

APPARATUS FOR PREPARING RAILWAY-TIES TO BE USED WITH SCREW-SPIKES.

932,475.

Specification of Letters Patent.

Patented Aug. 31, 1909.

Application filed September 22, 1908. Serial No. 454,207.

*To all whom it may concern:*

Be it known that I, JOHN W. KENDRICK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Preparing Railway-Ties to be Used with Screw-Spikes, of which the following is a specification.

The object of my invention is to provide apparatus by which railway ties may be adapted to be used with screw spikes. This object and various others will be made apparent in the following specification and claims, when taken in connection with the accompanying drawings.

As is well-known, it has been the common practice heretofore to fasten track rails down to the ties by means of spikes which are driven in place with hammers or sledges. These spikes hold the rails securely to the ties for a few months or years, but eventually they become loosened. This is due in part to the pounding of the rails upon the ties, caused by the passage of locomotives over them. Moreover, the ties have a tendency to rot around the spikes. Thus, it frequently happens that a railroad tie is rendered useless simply because of a light deterioration of the wood around the spikes when all the remainder of the tie is perfectly sound. I have found that several years can be added to the useful life of railroad ties by removing the ordinary driven spikes, and boring out the spike holes with augers, tapping a coarse screw thread in the holes formed by the augers, screwing wooden plugs into the holes, each plug having an axial hole therein, and then driving iron or steel screw spikes into the holes in the plugs in place of the ordinary spikes. The wooden plugs which are screwed into the holes are each made with an external screw thread adapted to engage the internal screw thread in the corresponding hole bored in the tie. The plugs may be made with a slight taper so that they go tightly in place in the holes in the ties or they may be made cylindrical if preferred. It would obviously be impracticable to drive each plug in so that its end would be exactly flush with the surface of the tie. I, therefore, have found it necessary, after the plugs have been driven

into the holes to run a scarfing tool across the surface of the tie to cut off the projecting ends of the plugs.

To make the railway ties over in the manner just described, when they are already in use for the purpose of supporting the rails as well as to keep them in proper relative position, it is most practicable to take them out from under the rails, perform the successive operations on them, and then put them back and drive the iron or steel screw spikes. I have invented a tool car adapted to travel along on the track and carrying all the tools necessary to perform these various operations upon the ties. With this apparatus it becomes possible to systematically make over all the ties on a stretch of track. The tool car is placed on the track in proximity to the ties that need treatment, these ties are drawn out from under the rails, laid on little push cars and moved up to the tool car or carried to it directly by manual labor. Here they are subjected to the various operations and then laid back on the push cars or carried by manual labor. They are then taken back to the places from which were removed and are relaid, the rails being fastened down to them by means of screw spikes.

Having made a general statement of the object and nature of my invention, I will now describe one particular embodiment thereof, with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the car carrying the apparatus for treating the ties. Fig. 1<sup>a</sup> is an elevation of a detail of Fig. 1. Fig. 2 is a top plan view of one end of this car, the roof being removed. Fig. 3 is a top plan view of the other end of the car, the roof being removed. Fig. 4 is a cross section of the car, taken on line 4 in Fig. 2. Fig. 5 is a cross section, taken on the line 5 in Fig. 3. Fig. 6 is an elevation of a support for the ties while they are being worked upon. Fig. 7 is a plan view of the same. Figs. 8, 9, 10 and 11 are cross sections of this support, taken at various points along its length.

On the under framework 15 of the car, stand the side posts 16, which support the roof structure 18 reinforced by diagonal braces 17. At one end of the car are a steam generator 19, a steam motor 20, coal box 21



and water tank 22. From the motor 20, a driving belt 23 leads horizontally across the car to the belt wheel 24 on the countershaft 25. This countershaft 25 also carries a belt pulley 26 which connects by a belt 29 to the belt wheel 28 on one end of the long countershaft 27 which extends the entire length of the car under the center of the roof. From this shaft 27 all the various elements of apparatus are driven by means of belts, clutches being provided so each machine can be controlled independently.

Among the other belt wheels carried by the shaft 27 are the two belt pulleys 30 and 31 which connect, respectively, by the belts 35 and 36 to the pulleys 33 and 34 on a countershaft 32 at the bottom of the car. One of the belts 36 is crossed and there are clutches provided for the two pulleys 30 and 31; thus by the alternative use of these clutches the countershaft 32 can be rotated in either direction. This shaft 32 carries a beveled pinion 37 which engages a beveled gear wheel 38 on the countershaft 39. There is a gear wheel 40 on the countershaft 39 which engages the larger wheel 41 on another countershaft 41<sup>a</sup>. The shaft 41<sup>a</sup> also carries a chain pulley 42 from which a driving chain 43 is connected to the chain pulley 44 on the car axle 44<sup>a</sup>.

A conveyer for the ties is mounted at each side of the car on the supporting arms 46 which are pivoted at 45. These arms 46 carry yokes 47 and each yoke terminates at one end in an eye 48 which is connected by a chain 49 to the eye 50 attached to the edge of the roof 18. In the yokes 47 lies a channel beam 51 and above this are two angle irons 52 arranged as shown in Fig. 4. An endless chain conveyer 53 having transverse blocks 54 attached along its length passes around the sprocket wheels 55 and 56 at opposite ends of the conveyer frame. The sprocket 55 is an idler, but the sprocket 56 is fixed on the shaft 57 which also carries the belt pulley 58. There is a pair of belt pulleys 59 on the shaft 27 from which belts 60 lead to the belt wheels 62 on the shaft 61 at either side of the car. Each shaft 61 carries another belt pulley 63 from which a belt 64 leads with a quarter twist to the belt pulley 58 already mentioned.

In alinement with each conveyer at the sides of the car is a supporting framework 65 which carries idle rollers 66, as shown in Fig. 3. These extension supports 65 extend beyond the end of the car at the sides so that a push car 67 can stand between them. They are pivoted at one end to the shafts of the sprocket wheels 55 and the extremities rest on the ground when they are in use. They can be folded up to the car on their pivots when the car is moving.

The reference numeral 79 (Fig. 1) indicates a machine for simultaneously boring

four holes in a tie, the boring tools being relatively fixed so that the holes shall come in the right places to adapt them to the gage spacing of the rails. The reference numeral 80 indicates generally a machine for tapping screw threads in the holes bored by the machine 79 and the reference numeral 81 indicates generally a machine for screwing the externally threaded wooden plugs into the holes tapped by the machine 80. The reference numeral 82 indicates a machine for scarfing the top surfaces of the ties where the plugs have been driven by the machine 81. Each of the machines 79, 80 and 81 is driven by a belt 69 which connects from the belt wheel 68 on the countershaft 27 to the belt pulley 70 on the driving machine. These three machines 79, 80 and 81 are substantially alike, differing merely in the working tools which they carry. One of these machines is shown somewhat in detail in Fig. 5, which I will now describe. The vertical shafts 71 are adapted to be rotated from the belt pulleys 70 by means of gearing not shown. At the same time these shafts 71 are free to slide vertically. Over each shaft 71 is a lever 72 having an intermediate fulcrum at the top of the standard 73. To one end 74 a tensile spring 75 is attached. To the other end of the lever the depending handle 76 is attached. Each lever 72 has a pivotal connection to the upper end of its respective tool shaft 71. At their lower ends the shafts 71 carry tools 77. In the case of the boring machine 79 the tool 77 is an auger. In the case of the thread cutting machine 80, the tool 77<sup>a</sup> is a tap, and in the case of the plug driving machine 81, tool 77<sup>b</sup> is a chuck which engages the upper end of the wooden screw plug. The ties in the position which they occupy when being acted upon by the machines 79 80 and 81 are represented by the reference numerals 78.

The scarfing machine 82 is driven by a belt 84 which connects from the pulley 83 on the countershaft 27 to the pulley 86 on another countershaft 87. There are four scarfing machines 82, and hence there are four such driving connections as have just been described. Each belt wheel 86 on the shaft 87 (see Fig. 2) has fixed thereto at its side a belt pulley 85 from which a belt 88 leads to the respective scarfing machine. Each scarfing machine 82 has a fixed frame 89 with a vertical guide 89<sup>a</sup>. A sliding carriage 90 engages this guide and carries a horizontal shaft 92 on which a cutter wheel 91 and a belt pulley are mounted. A long lever 94 is pivoted on the countershaft 87 and this carries two brackets 95 and 98 which support idler pulleys 96 and 99 on the respective shafts 97 and 100. A link connects at one end to the shaft 92 and has its other end pivotally connected to the



lever 94. The belt 88 passes over the two idlers 96 and 99. A counter weight 105 is connected by a chain 102 to the sliding frame 90. The chain 102 passes over the two pulleys 103 and 104 fixed at the top of the standard 89. The reference numeral 106 indicates a tie placed in position to be operated upon by the scarfing wheel 91.

At the sides of the car between the car and the conveyers 47 are the running boards 107. The men operating the machines 79, 80, 81 and 82 stand on these running boards 107. These boards are pivoted at 108 to the lower ends of the brackets 109.

There is a series of transverse idler rollers 110 adapted to support the tie that is being operated upon by each of the machines 79, 80, 81 and 82. Thus, it will be seen that as soon as the operation is completed by one machine, the tie can roll along on the rollers 110 in a direction of its length to a position where it is ready to be acted upon by the next machine of the series. Each roller 110 is supported at its inner end by a bracket 111 (see Fig. 9) which hangs down from the floor framework of the car, and at its outer end the roller 110 is supported by a bracket 112 resting on the car framework. In front of each one of the machines, 79, 80 and 81 there is a driving roller 113, and between each machine and the machine following it in the direction in which the ties move there is another driving roller 113<sup>a</sup>. The rollers 113<sup>a</sup> are mounted on fixed axes, but the rollers 113 are capable of vertical adjustment. Each roller 113 is fixed on a shaft 115. The rollers 113 and 113<sup>a</sup> are driven by means of chains 118<sup>a</sup> which connect them in succession, passing over the sprocket wheels 117 and 118. The lever 120 has an intermediate fulcrum on the end of the bracket 119. At one end it carries a foot treadle 121 and at the other end a yoke having two arms 122 and 123, which support the respective journal bearings 124 and 125 for the ends of the roller shaft 115. The yoke arm 122 passes up through a vertical hole in the longitudinal sill 127 and this acts as a guide. A bushing cap 114 is provided at the top of this hole. A guide bracket 116 with a guide slot 126 is provided for the other journal block 125. At the end of the car next to the boiler and steam motor the live rollers 113<sup>b</sup> are connected on one shaft 128 across the car. This carries a belt wheel 129 which is adapted to be driven by the quarter twist belt 130 from the wheel 131 on the shaft 27. Thus the live rollers 113 and 113<sup>a</sup> are all kept moving by the chains 118<sup>a</sup> and the sprocket wheels 117 and 118.

The tool car which has been illustrated and described can be drawn in the ordinary manner by a locomotive to the region of the track where it is desired to make over the ties. The ties can be fed to the machines directly

by the workmen as they remove them from under the rails. If preferred, the tool car can stand on the track at the end of a section on which the ties are to be treated, and the ties will be drawn from beneath the rails, loaded on the push cars 67 and moved along the track till they are brought to the end of the tool car, as shown in Fig. 3. Then the ties will be lifted off from the push car 67 and placed in the boring machine 79. Each machine on each side of the car will be controlled by an operator standing on the running board 107. The operator at the machine 79 will feed the augers 77 by means of the handles 76. As soon as the holes are bored he will release his pull on the handle 76 and permit the springs 75 to withdraw the augers 77. Then with his foot he will press down on the treadle 121, thus bringing the live roller 113 up under the tie. This will cause the tie to move lengthwise into a position to be worked upon by the machine 80, the movement of the tie to this position being completed by the intermediate live roller 113<sup>a</sup>. In a similar manner the operator at the machine 80 will tap the holes in the ties with screw threads and then pass the tie along to the machine 81. Also in a similar manner the screw plugs will be driven by the machine 81 and then the tie will be passed on to the machine 82. The screw plugs will preferably have the holes to receive the screw spikes bored in them before they are supplied for use in connection with this outfit.

When acted upon by the machines 79, 80 and 81, the tie will lie flat on the supporting rollers 110, 113 and 113<sup>a</sup>, but the tie will be turned up on edge to be acted upon by the scarfing wheels 91 of the machines 82. By pulling down the lever 94, the operator will traverse the scarfing wheel 91 across the top surface of the tie, thus cutting off the projecting end of the screw plug and making a smooth surface for the tie plate.

After the ties are scarfed by the machines 82, the operators at these machines lift them out and lay them on the conveyers 53—54. These are running all the time and they carry the ties back to the end of the car to the inclined frame 65 from which the workmen can lift them aside, either piling them temporarily on the ground or at once loading them on the push cars 67. The space over the center sill between the two rows of machines on either side of the car can be used as a storage place for a certain number of ties, either before or after treatment of the same.

When the ties have been removed, treated and replaced over a convenient section of the track, the tool car is moved by its own power through the driving connections that have already been traced, comprising the drive chain 43. The car can be moved in either direction, as desired, by the alternative use of the two driving pulleys 30 and



31. These give opposite rotation to the driven pulleys 33 and 34, because the one belt 36 is twisted while the other belt 35 is straight. When the car is being moved any considerable distance, or where there is only the standard clearance for the car framework, then the conveyer frames 46—47 must be folded up against the sides of the car, and at the same time the running boards 107 must be folded likewise. When the conveyers have been folded as described, the supports 65 at the ends of the conveyers can be folded in across the end of the car.

It may be desirable in making over ties in the manner that has been described to have a plurality of these tool cars which can be spaced apart at intervals along the section of the track that is being worked upon. Then when it is necessary to clear the track to permit a train to pass through, a locomotive can couple up the tool cars in series and pull them out on the side track, and then after the train has passed, the locomotive can distribute the cars to their work. But in any case each car should preferably have motor connections and sufficient power to propel itself along the track.

By the use of the apparatus which I have disclosed, it will be possible to change the ties over in the manner described with great economy of effort and with such rapidity that the track will not be obstructed for any considerable length of time. My system may also be employed in the preparation of new ties to adapt them for use with screw spikes.

I claim:

1. In a device of the class described, a car, serially arranged machines thereon adapted to perform successive operations on railway ties to prepare them for use with screw spikes, and means to drive the said machines, and a conveyer to return the ties from one end of the car to the opposite end thereof.

2. In a device of the class described, a car, serially arranged machines thereon adapted to perform successive operations on railway ties to prepare them for use with screw spikes, means to drive the said machines, and means to shift the ties lengthwise from one machine to another.

3. In a device of the class described, a car, serially arranged machines thereon adapted to perform successive operations on railway ties to prepare them for use with screw spikes, means to support the ties in position to be worked upon by the individual machines, and means to move the ties lengthwise from the support at one machine to the support at another machine.

4. In a device of the class described, a car, a boring machine on the car to bore holes in ties, another machine to form internal screw threads in said holes, another machine to

drive screw plugs in said holes, and another machine to scarf the top surfaces of the ties.

5. In a device of the class described, a car, machines arranged along the length of the car adapted to perform successive operations on railway ties to prepare them for use with screw spikes, and means to shift the ties lengthwise successively from one machine to the next.

6. In a device of the class described, a car, serially arranged machines thereon adapted to perform successive operations on railway ties to prepare them for use with screw spikes, means to shift the ties successively from one machine to the next along the length of the car, and additional means to return the ties back to the end of the car at which they started.

7. In a device of the class described, a car, a series of machines thereon arranged lengthwise of the car and adapted to perform successive operations on railway ties to prepare them for use with screw spikes, supporting rollers for the ties at the various machines, a source of power applied to rotate certain of said rollers, and means to apply said power to propel the ties from one machine to the next when desired.

8. In a device of the class described, a car, a series of machines arranged along the length of the car and adapted to perform successive operations on railway ties to prepare them for use with screw spikes, idle supporting rollers at each machine, intermediate live rollers at each machine, and means to apply said live rollers to the ties when desired for the purpose of propelling them from one machine to the next.

9. In a device of the class described, a car, serially arranged machines thereon adapted to perform successive operations on railway ties to prepare them for use with screw spikes, means to shift the ties along the length of the car from one machine to another in succession, and a conveyer at the side of the car adapted to carry the ties from the last machine at one end of the car back to the opposite end thereof.

10. In a device of the class described, a car, serially arranged machines supported thereon adapted to perform successive operations on railway ties to prepare them for use with screw spikes, supports for the ties on the car at the respective machines, a source of power at one end of the car, means to communicate the power to the various machines, and means to apply the power to propel the entire car along the railway track.

11. In a device of the class described, a car, a series of machines arranged along the length of the car and adapted to perform successive operations on railway ties to prepare them for use with screw spikes, platforms for operators at the several machines, supports



for ties at the several machines, power operated means for shifting the ties from one machine to the next, and foot treadles adjacent said platforms for rendering said tie shifting means operative.

12. In a device of the class described, a car, a series of machines arranged along the length of the car and adapted to perform successive operations on railway ties to prepare them for use with screw spikes, a pair of idle rollers in front of each machine adapted to support a tie while being operated upon by the machine, live rollers between one machine and the next, and other live rollers in front of each machine adapted to be rendered operative to shift the ties when desired.

13. In a device of the class described, a car a series of machines arranged along the length of the car and adapted to perform successive operations on railway ties to prepare them for use with screw spikes, means to shift the ties successively from one machine to the next, and a conveyer at the side of the car adapted to carry said ties back to the end of the car from which they started, said conveyer being adapted to fold against the car when not in use.

14. In a device of the class described, a car a series of machines arranged along the length of the car and adapted to perform successive operations on railway ties to prepare them for use with screw spikes, means to shift the ties successively from one machine to the next, and a conveyer at the side of the car adapted to carry said ties back to the end of the car from which they started, said conveyers having extension supports projecting beyond the end of the car, said supports being adapted to fold toward the car when not in use.

15. In a device of the class described, a car, serially arranged machines thereon adapted to perform successive operations on railway ties to prepare them for use with screw spikes, and means to shift the ties lengthwise from one machine to another, each of said machines having a support for a tie and having hand operated means to traverse a working tool to and from the tie.

16. In a device of the class described, a car, machines arranged along the length of the car adapted to perform successive operations on railway ties to prepare them for use with screw spikes, a motor, a countershaft extending along the length of the car driven by said motor, belts from said shaft to the various machines, and clutches on said shaft for the respective belts.

17. In a device of the class described, a car, a boring machine on the car to bore holes in ties, another machine to form internal screw threads in said holes, another machine to drive screw plugs in said holes, another machine to scarf the top surface of the ties,

and means to shift the ties from one machine to the next in order.

18. In a device of the class described, a car, a boring machine on the car to bore holes in ties, another machine to form internal screw threads in said holes, another machine to drive screw plugs in said holes, another machine to scarf the top surfaces of the ties, said machines being arranged serially along the length of the car, and means to shift the ties from one machine to the next in order.

19. In a device of the class described, a car, a boring machine on the car to bore holes in ties, another machine to form internal screw threads in said holes, another machine to drive screw plugs in said holes, another machine to scarf the top surfaces of the ties, said machines being arranged serially along the length of the car, means to shift the ties successively from one machine to the next in order, and a conveyer to return the ties to the end of the car at which they started.

20. In a device of the class described, a car, serially arranged machines thereon each carrying a tool adapted to work upon a railway tie to prepare it for use with screw spikes, automatically acting means to withhold said tools from the tie, and hand operated means acting in opposition thereto to cause the tools to act upon the ties, supporting rollers for the ties at each machine, and means to actuate said rollers when desired to shift the ties from one machine to the next machine in series.

21. In a device of the class described, a car, machines thereon each having supporting rollers to receive a railway tie, tools carried by said machines adapted to act upon such ties, means controllable at the will of the operator for shifting the ties from one machine to the next, and manually operated means for causing said tools to act upon the ties.

22. In a device of the class described, a car having a floor framework, two rows of machines arranged respectively along the sides of the car and supported by said framework, each row of machines being adapted to perform successive operations on railway ties to prepare them for use with screw spikes, and means to shift the ties from one machine to the next along each row.

23. In a device of the class described, a car, a row of machines on each side of the car adapted to perform successive operations on railway ties to prepare them for use with screw spikes, a running board on each side of the car for operators at the various machines, and return conveyers for the ties supported at each side of the car beyond the running boards.

24. In a device of the class described, a car, a longitudinally extending car framework, serially arranged machines mounted



thereon and extending along the length of the car, said machines being adapted to perform successive operations on railway ties to prepare them for use with screw spikes, and  
5 means to drive said machines.

25. In a device of the class described, a car comprising a floor framework, supporting trucks for said framework, serially arranged machines mounted directly upon said frame-  
10 work and adapted to perform successive oper-

ations on railway ties to prepare them for use with screw spikes, and means to drive the said machines.

In testimony whereof, I have subscribed my name.

JOHN W. KENDRICK.

Witnesses:

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