Oct. 1, 1940. J. H. COOPER ET AL 2,216,434

TRACK-LAYING APPARATUS

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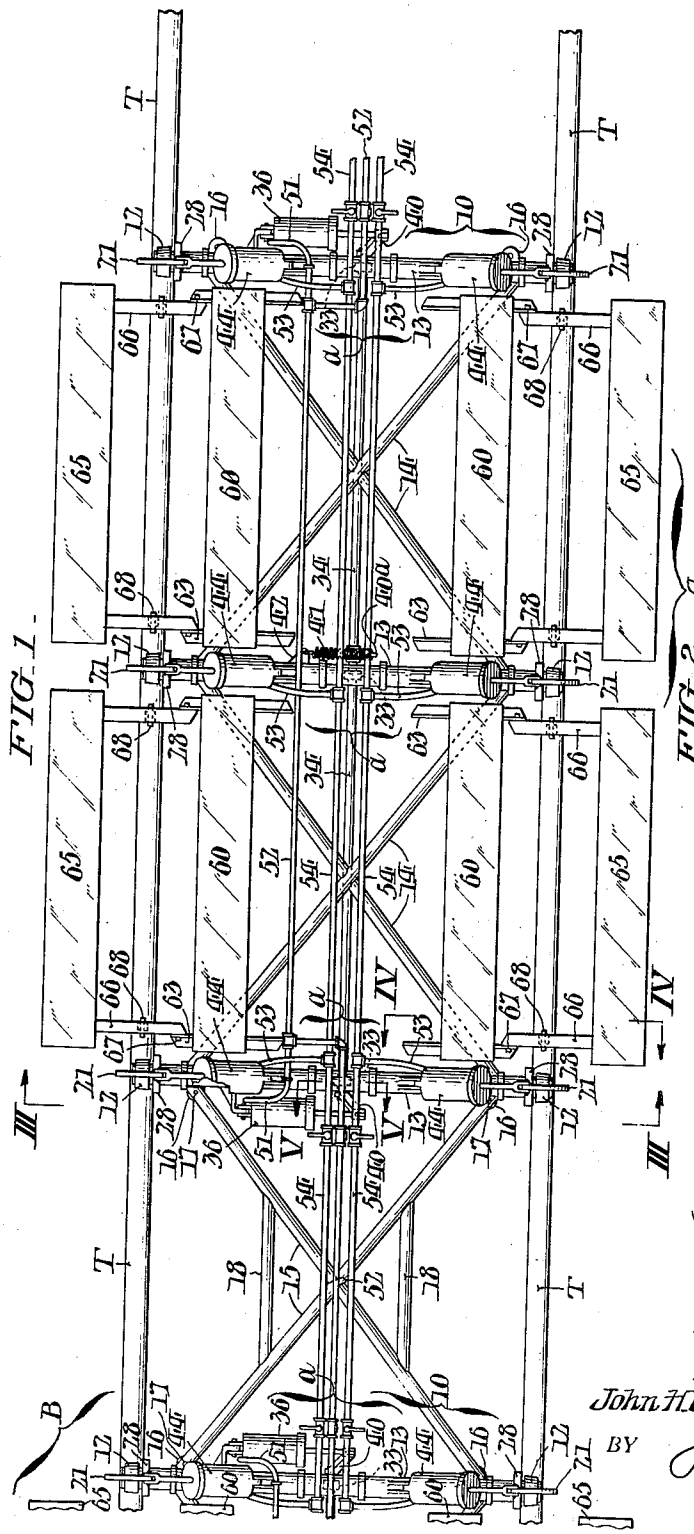


FIG. 1.

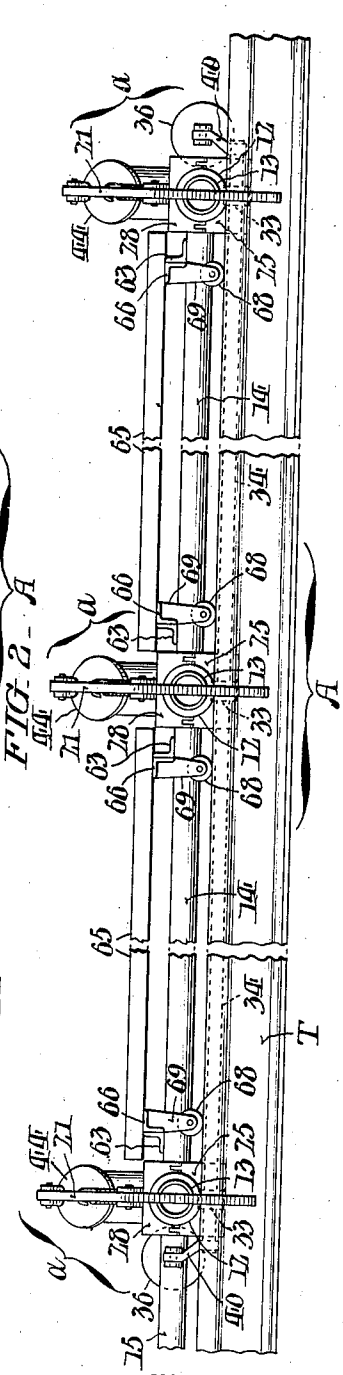


FIG. 2.

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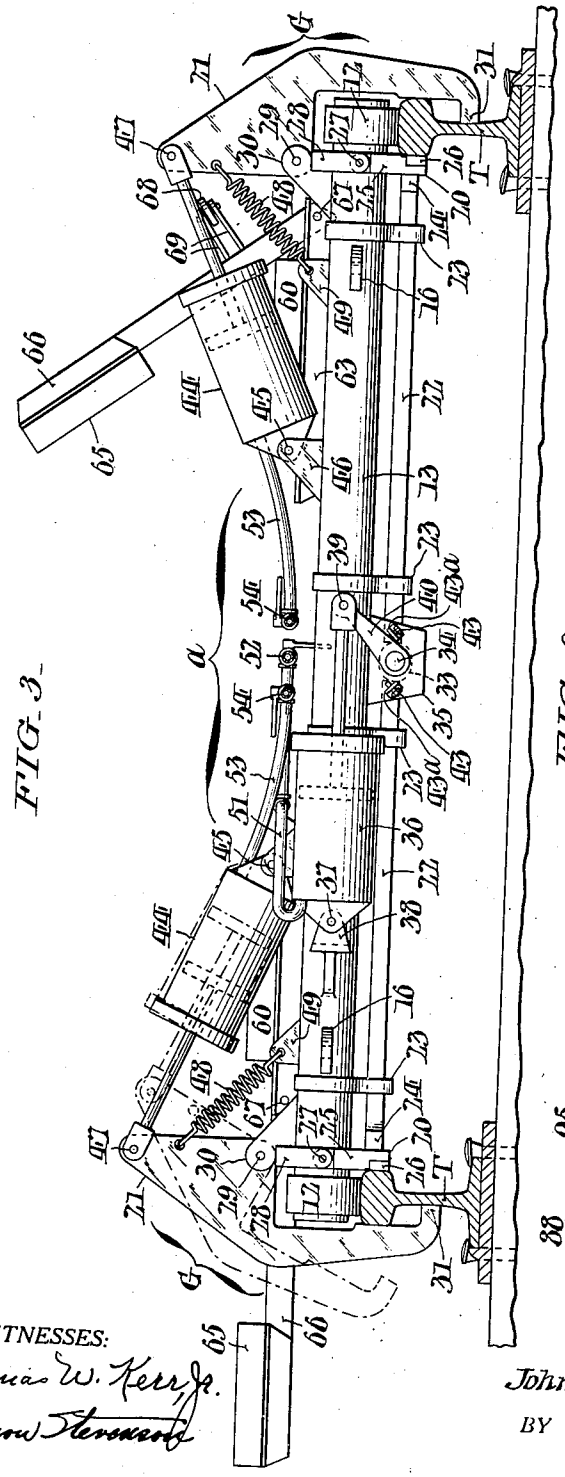


FIG. 3.

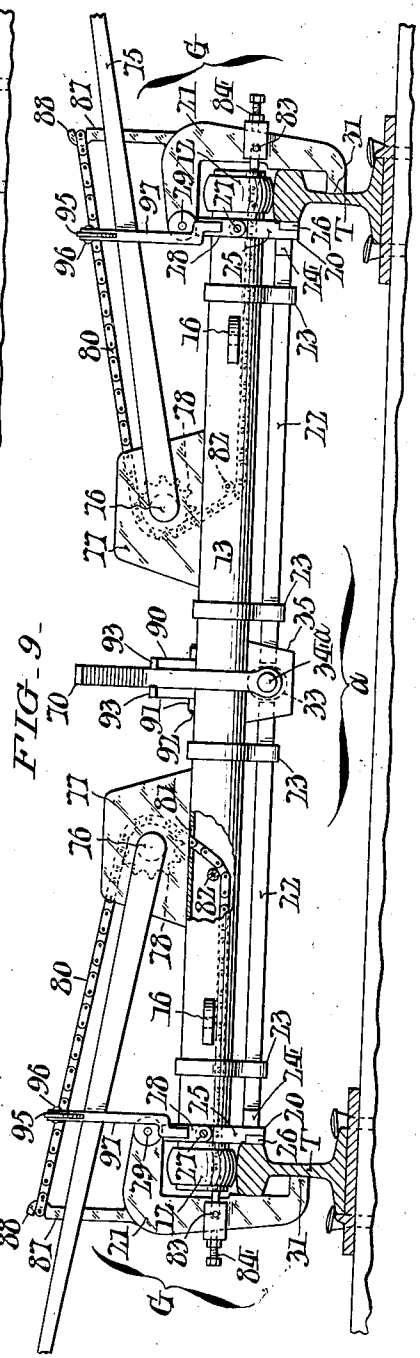


FIG. 9.

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TRACK-LAYING APPARATUS

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FIG. 4.

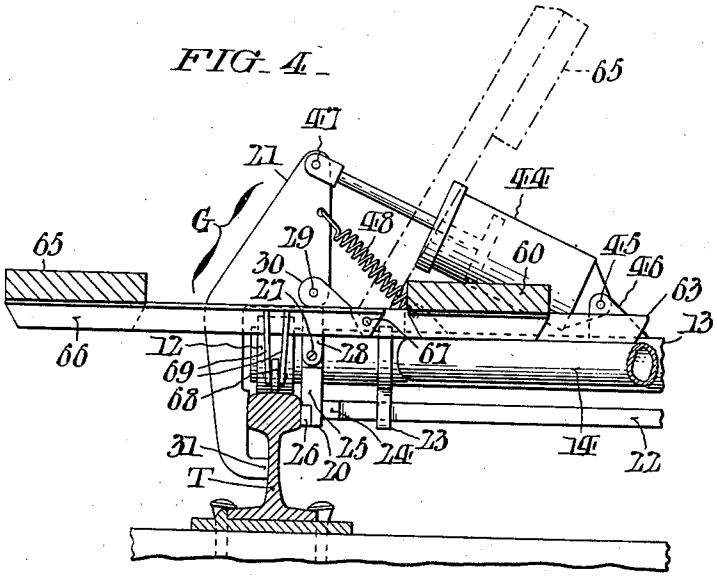


FIG. 5.

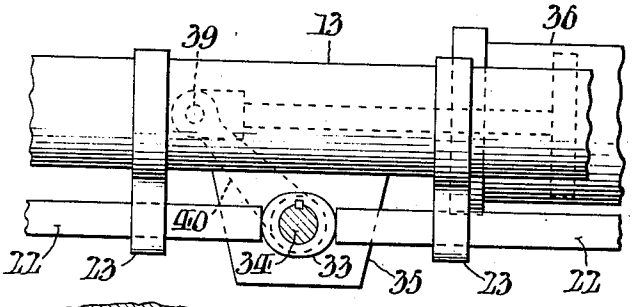
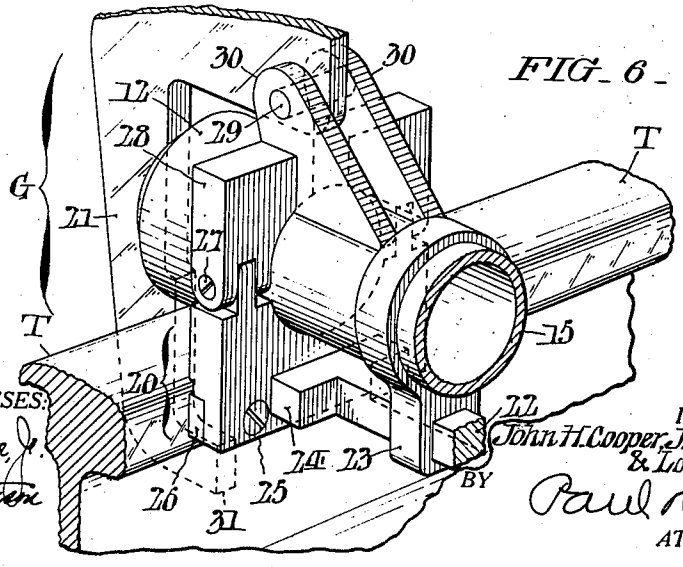


FIG. 6.



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TRACK-LAYING APPARATUS

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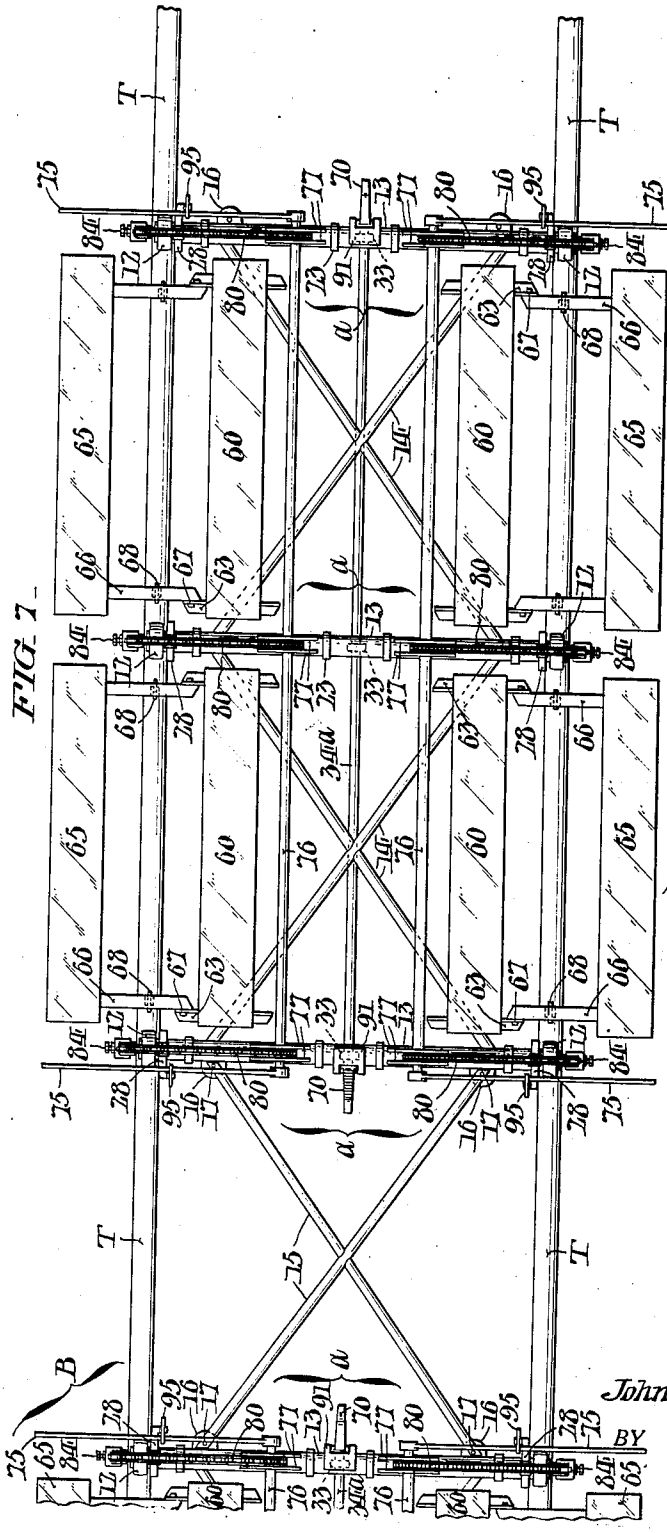


FIG. 7.

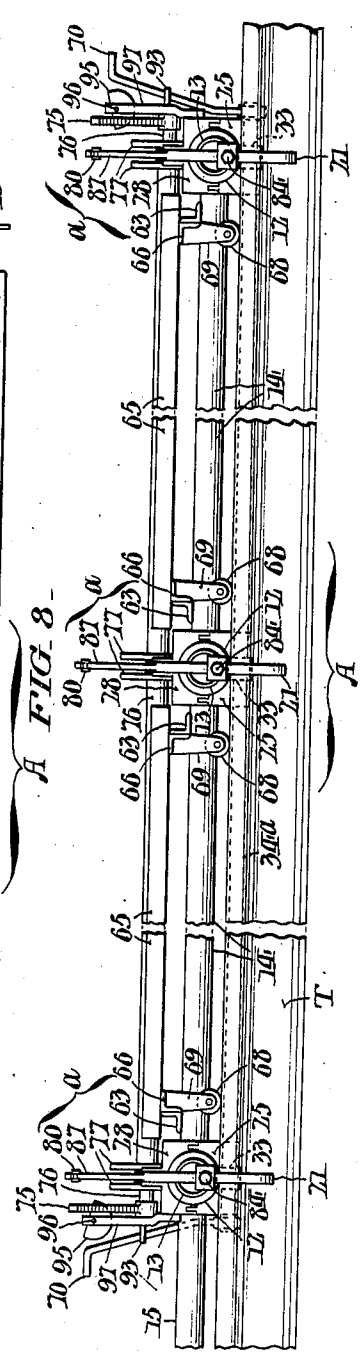


FIG. 8.

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UNITED STATES PATENT OFFICE

2,216,434

TRACK-LAYING APPARATUS

John H. Cooper, James E. Brower, and Loren E. Miller, Fort Wayne, Ind.

Application January 13, 1940, Serial No. 313,682

6 Claims. (Cl. 254—43)

This invention relates to track laying, and especially to the gauging and lining of track rails, and to assuring accuracy of the track when finally spiked. The invention not only assures better track work, but allows of doing the work more rapidly and at lower cost. In rail-laying, it allows of gauging and lining up a substantial length of track at one operation, and to finished gauge; so that a single gauging suffices, and it is unnecessary to regauge for refinement. Various other features and advantages of the invention will appear from the following description of species and forms of embodiment, and from the drawings. All the features and combinations shown or described are of our invention, so far as novel.

In the drawings, Fig. 1 is a plan view of a track gauging and lining machine or apparatus conveniently embodying our invention, mounted on the rails of a track as in service; Fig. 2 is a side view on a somewhat larger scale, omitting a portion of the machine illustrated in Fig. 1; Fig. 3 is an end view of a unit or machine taken as indicated by the line and arrows III—III in Fig. 1; Fig. 4 is a fragmentary end view with parts in section, taken as indicated by the line and arrows IV—IV in Fig. 1; Fig. 5 is a fragmentary sectional view taken substantially as indicated by the line and arrows V—V in Fig. 1; and Fig. 6 is a fragmentary perspective view of parts of the machine adjacent one of the track rails, with certain parts broken away.

Fig. 7 is a plan view similar to Fig. 1, illustrating a modified machine; Fig. 8 is a side view of this modified machine, similar to Fig. 2; and Fig. 9 is an end view similar to Fig. 3, with certain parts broken away.

In Fig. 1 there are illustrated a plurality of similar machine units A, B, each adapted to line up a certain length or section of track, such as about 10 feet. Fig. 1 shows one such unit A completely, and part of an adjacent unit B, coupled or connected to the unit A for combined operation of the two units. In practice, the whole machine is preferably operated to bring to positions of correct gauge and alignment the rails T, T in a track length or section on which the machine is, and to hold these rail lengths fixed in such positions until they have been securely spiked down; after which the machine is released from the track rails T, T and moved along to an adjacent section of the track, where the operation is repeated; and so on indefinitely.

As here shown, the unit A comprises a rigid framework 10 adapted for movement along the track T and provided for this purpose with rail-engaging supports, such as wheels 12. In the present instance, the unit A itself comprises a plurality of sub-units *a* operating in conjunction with one another, and all structurally included in the framework 10. As best shown in Figs. 1 and 3, the structural basis of each sub-unit *a* is a hollow (tubular) beam 13 extending across the track and serving as an axle for the rollers of the wheels 12, which are mounted on its ends. The beams 13 of the several sub-units *a* are permanently interconnected by crossed diagonal braces 14 welded or otherwise suitably united where they cross, and similarly attached to said beams 13 at their ends. Thus the framework 10 is made very stiff and rigid, especially against stresses in substantially a horizontal plane.

As shown in Fig. 1, the machine units A and B are interconnected by crossed braces 15 similar to the braces 14 of the unit A, but disconnectably attached to the adjacent beams 13 of said units A, B, as by having the ends of the braces 15 forked to engage over apertured lugs 16 on said beams 13 and pierced with holes for couplings 17 (in the nature of bolts or pins) extending through said lugs and the ends of said braces. For greater strength and rigidity, the braces 15 may themselves be braced together by short struts 18 having their ends welded to said braces 15. Thus the frameworks 10 of the two units A, B are practically united into one rigid frame.

As shown in Figs. 1, 2, and 3, and as already mentioned, each of the sub-units *a* includes one of the transverse beams 13 having on its ends the wheels 12 that rest on the track-rails T, T. At each end of each beam 13 is a rail-gripping arrangement G comprising relatively movable co-acting clamps 20 and 21 for engaging inside and outside a rail T. By moving these grippers G at opposite ends of the beam 13 apart or toward one another, the track rails T, T are spread apart or crowded together. In order that the machine may be free for movement along the track when the grip of these grippers G is relaxed, it is desirable to operate the grippers G by both moving the inside clamps 20 outward and inward and moving the outside clamps 21 inward and outward, so as to release both sets of clamps concurrently from both rails T, T after the latter are spiked down. As here shown, the inside clamps 20 and the outside clamps 21 are more or less independently movable relative to the beam 13 for this purpose.

For moving the inside clamps 20 toward and

from the track-rails T, T, there are transverse spreader-rods 22 slidably mounted below the beam 13 in brackets 23 attached to said beam, with T-heads 24 at their outer ends that engage against stout (inside) clamp plates 25, which extend parallel with the rails T, T, and may be provided with hardened facings 26 for making contact with the rails. In the present instance, the inside clamp plates 25 are not permanently attached to the spreader heads 24, but are rockably suspended from pivots 27 in brackets 28 attached to the ends of the beam 13. As also shown in Fig. 3, the outside clamps 21 consist of stout plates lying in a vertical plane perpendicular to the rails T, T, and are rockably mounted on the beam 13 on fulcrum pivots 29 above the rails T, T, between upward projecting ears 30, 30 on the brackets 28. These outside clamps 21 may have inward-projecting noses 31 for engaging the webs of the rails about at mid-height between the bases of the rails and their heads. In coaction with the engagement of the clamps 21 against the rail heads, these noses 31 assure against any tipping of the rails when moved inward by the clamps 21, 21.

For actuating the spreader rods 22 to spread the rails T, T, there are shown in Figs. 3 and 5 cams 33 of approximately elliptic outline mounted on a shaft 34 extending lengthwise along the center of the framework 10, and itself mounted in bearing brackets 35 depending from the beams 13. The cams 33 for the several spreaders 20 may be operated in unison by suitable means acting on the shaft 34. Preferably, the shaft 34 is multiply actuated at suitable distributed points, as by fluid motors 36 mounted on the beams 13 at opposite ends of the framework 10. As shown in Figs. 1 and 3, the cylinder of each motor 36 has its closed rear end pivoted at 37 to a bracket 38 on one side of the beam 13, and its piston rod is pivotally connected by a crank pin 39 to a crank arm 40 fixed to the corresponding end of the shaft 34. For reversely rotating the cam shaft 34 when motive fluid is shut off and vented from the motors 36, there is shown in Fig. 1 a helical tension spring 41 connected between a crank arm 40a on said shaft 34 and a lug 42 on the middle beam 13. Stop means may be provided for limiting the rail-spreading and the reverse rotation of the shaft 34 and its cams 33, such as stop screws 43 adjustable in lugs 43a on the brackets 35, Fig. 3.

For actuating the outer clamps 21, there are shown individual motors 44 whose cylinders are pivoted at 45 to brackets 46 on the several beams 13, and whose piston rods are pivoted at 47 to the upper ends of the clamp plates 21, substantially above their fulcrum pivots 29. Means are preferably provided for retracting the outside clamps 21 out of contact with the rails T, T when pressure in the cylinders of motors 44 is released, such as a helical tension spring 48 connected between each clamp 21 and a bracket 49 on the beam 13. As shown in Figs. 1 and 3, each of the motors 36 is connected by flexible piping 51 to a pipe line 52 extending throughout the length of the several units A, B. The motors 44 at opposite sides of the units A, B are connected by flexible piping 53 to pipe lines 54, 54 extending throughout the length of the several units A, B. Pressure fluid from any suitable source (such as compressed air) may be supplied to the pipe lines 52 and 54 under the control of suitable valve means, not shown; and thus all the inside and outside clamps 20 and 21 at both sides of the units A, B may be concurrently operated to bring the track rails T, T to gauge, and to line or align them properly relative to one another throughout the length of the several units A, B. If desired, of course, the two sets of inside clamps 20 at opposite sides of the units A, B may be operated concurrently by suitably controlling the pressure supplied through the pipe line 52, and the two sets of outside clamps 21 at opposite sides of the units A, B may each be operated concurrently by controlling the pressure supplied through the two pipe lines 54, 54 independently of that in the pipe line 52, and, if desired, independently of each other.

To facilitate spiking of the track rails while securely held to gauge and alignment by the grippers G of the several units A, B, platforms for workmen (operating pneumatic spike-drivers) are shown in Fig. 1, at opposite sides of each track rail T, T. The platforms 60 inside the rails are shown mounted on transverse angle bars 63 attached to the braces 14; while the platform 65 outside the track rails are mounted on angle bars 66 which are pivoted to the angle bars 63 at 67, so that they can be swung in out of the way (as shown in Figs. 3 and 4) when the whole apparatus is to be shifted along the track. Rollers 68 in brackets 69 on said bars 66 are provided for resting on the rails T, T when the platforms 65 are in use.

The apparatus illustrated in Figs. 7, 8, and 9 resembles that in Figs. 1–6 in its main essentials, and many corresponding parts and features are marked with the same reference characters (with an added letter where such distinction appears desirable) as a means of dispensing with repetitive description. In this instance, the cams 33 on the longitudinal shaft 34a are not operated by fluid motors, but mechanically, by hand levers or cranks 70 fixed to opposite ends of said shaft 34a. Likewise, provision is made for operating the outer clamps 21 mechanically rather than by fluid motors, by means of hand levers 75 attached to the ends of a longitudinal shaft 76 mounted in bearing brackets 77 above the beams 13, and connected to the clamps 21 by sprocket wheels 78 on said shaft 76 and coacting sprocket chains 80 extending down through openings 81 into the interior of the beam 13 and around anti-friction rollers 82 mounted therein, and thence through the beam to connections 83 to the clamps 21, 21. As here shown, each connection 83 includes an adjusting screw 84 with a lock-nut for adjusting the relation between the lever 75 and the clamp 21. To hold the sprocket chain 80 taut, there is shown an upstanding bracket arm 87 on the clamp 21, with a hook 88 at its upper end on which any desired link of the chain 80 may be hooked.

Provision may be made for locking the cams 33 and the shaft 34 in position to allow contraction of the spreaders 20, 20, as shown in Fig. 9, by means of locking plates 90 pivoted to brackets 91 on the beams 13 about transverse pivots 92, and having their ends forked at 93 to engage about the levers 70 when said plates are swung outward toward said levers 70, as shown in Figs. 8 and 9. The brackets 91 are shown in Fig. 7, but the locking plates 90 are omitted, to avoid confusion. Provision may be made for holding down the levers 75 to hold the outside clamp 21, 21 contracted, as by means of semi-circular locking plates 95 pivoted about horizontal transverse axes 96 on upright rods 97 attached to the brackets 28, Figs. 7, 8, 9.

Having thus described our invention, we claim:

1. Track-gauging and lining apparatus com-

prising a rigid framework mounted for movement along the track; opposed series of gauging and lining grippers for both track-rails on said framework, the grippers of each series comprising relatively movable coacting clamps for engaging outside and inside the rails; and means for operating the several rail-grippers of both series concurrently, to bring the rails to gauge and line them relative to one another.

2. Track-gauging and lining apparatus comprising a rigid framework mounted for movement along the track; opposed series of gauging and lining grippers for both track-rails on said framework, the grippers of each series comprising a set of movable clamps for engaging outside the rails and a set of movable clamps for engaging inside the rails; means for concurrently bringing corresponding sets of clamps of the two series to gauge; and means for concurrently forcing the other sets of clamps of the two series against the rails and the first-mentioned clamps, thus bringing the rails to gauge and lining them relative to one another.

3. Track-gauging and lining apparatus comprising a rigid framework mounted for movement along the track, and including a series of rigid beams extending across the track; rail-spreading and gauging means on said beams for engaging between the rails expansible to spread them to gauge, and contractible to release them, with means for expanding said rail-spreading and gauging means on the several beams concurrently; and rail clamps on said beams for engaging outside the rails contractible to force the rails inward to the gauge determined by said spreading and gauging means, and separable to release the rails, with means for contracting said rail clamps on the several beams concurrently, thus bringing the rails to gauge and also lining them relative to one another.

4. Track-gauging and lining apparatus comprising a rigid framework mounted for movement along the track, rail gauging spreaders on said framework, between the rails, comprising bars extending and movable transversely of the track, toward and from the rails, rail clamps mounted on said framework for engaging outside the rails, movable inward and outward transversely of the track, means for expanding said rail spreaders concurrently, comprising a shaft extending lengthwise of the framework, and cams thereon for engaging the inner ends of said spreader bars, and means extending lengthwise along said framework for concurrently moving the rail clamps at each side of the track inward toward the rail spreaders.

5. In track-engaging mechanism, the combination of a rigid beam extending transversely across the track, and provided with track-rail-engaging supports at its ends, rail spreaders mounted on said beam between the rails, comprising transverse bars below said beam movable lengthwise toward and from the rails, rail clamps pivotally mounted on the ends of said beam above the rails, for engaging outside the latter, a rotatable cam for actuating said spreader bars mounted below said beam between the inner ends of said bars, and means mounted on said beam for forcing said clamps inward against the rails and said spreaders.

6. In track-gauging mechanism, the combination of a rigid beam extending across the track, track wheels on the ends of said beam, brackets on said beam inside said wheels, track-rail spreaders below said beam supported by said brackets, rail clamps for engaging outside the rails pivoted on said brackets above the rails, means on said beam for forcing said spreaders outward against the inner sides of the rails, and means mounted on said beam for forcing said clamps inward against the rails and said spreaders.

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