No. 885,943. PATENTED APR. 28, 1908.

D. A. MOORE.

RAIL DRILLING MACHINE.

APPLICATION FILED JULY 15, 1904.

4 SHEETS—SHEET 1.

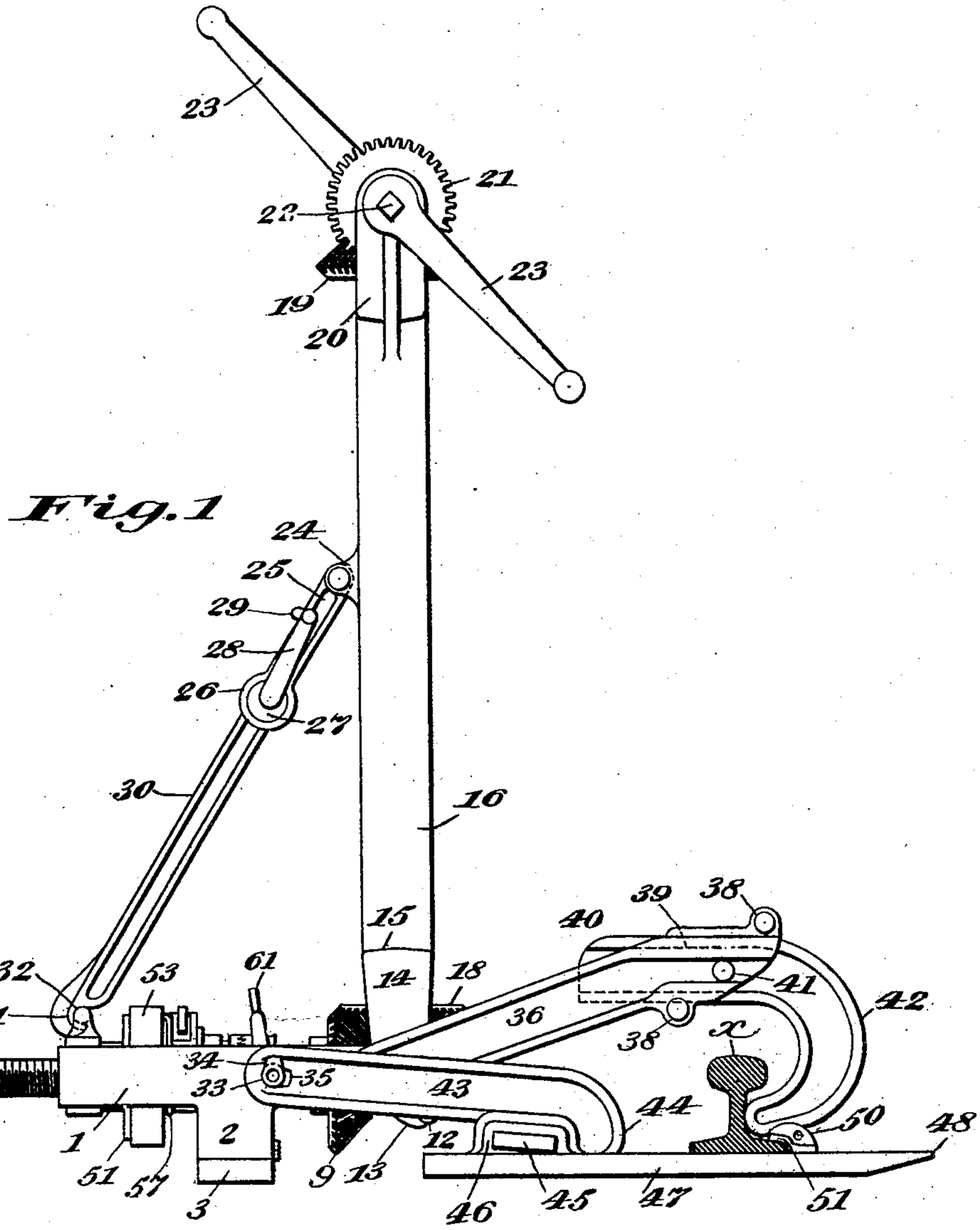

Fig. 1

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4 SHEETS—SHEET 2.

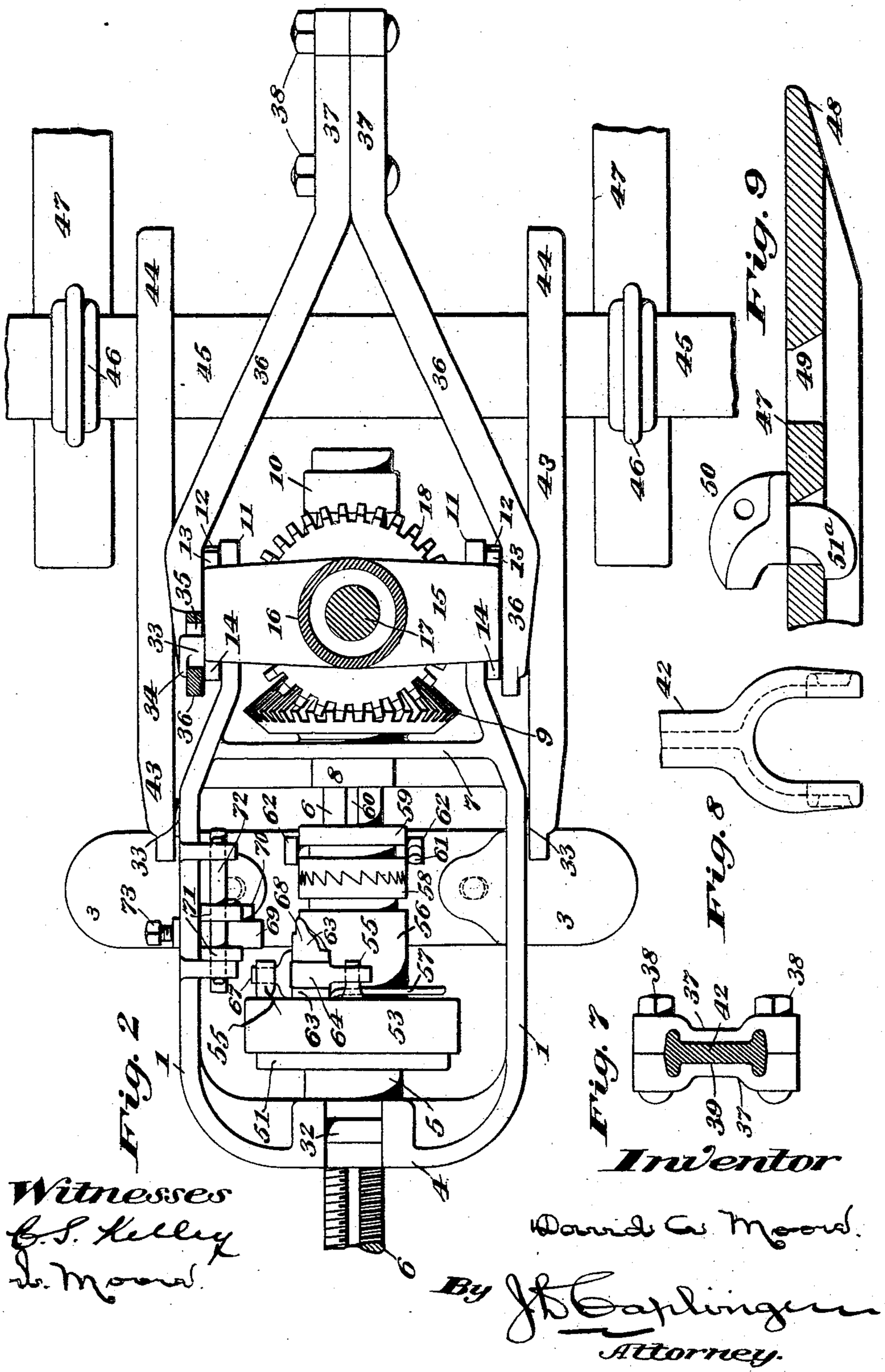

Fig. 2

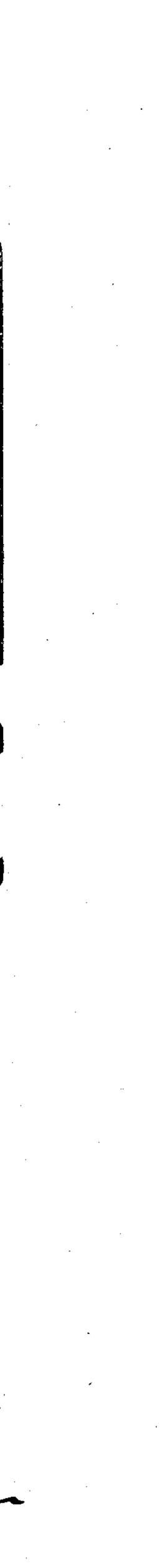

Fig. 9

Fig. 8

Fig. 7

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4 SHEETS—SHEET 3.

Fig. 3.

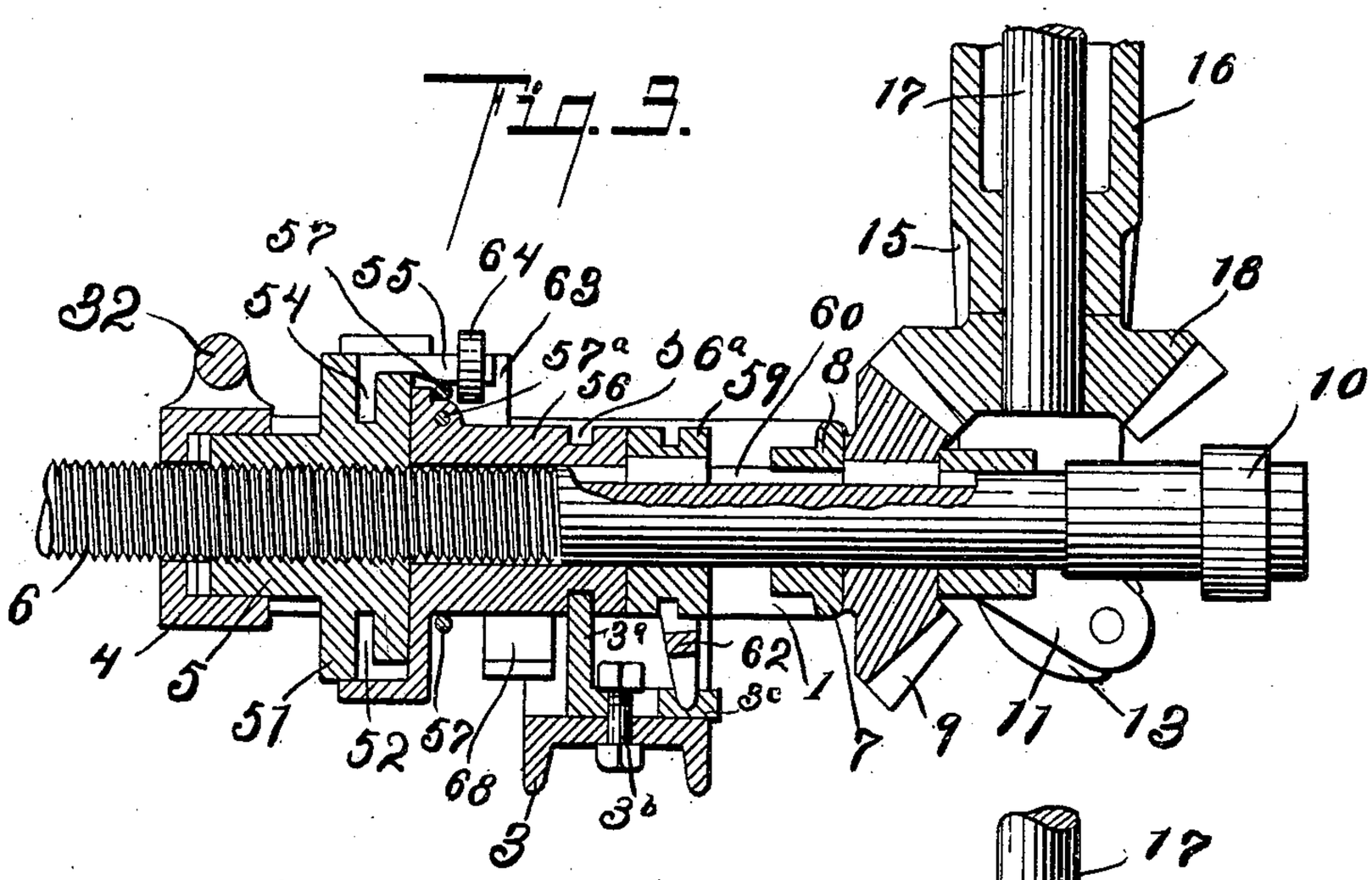

Fig. 11.

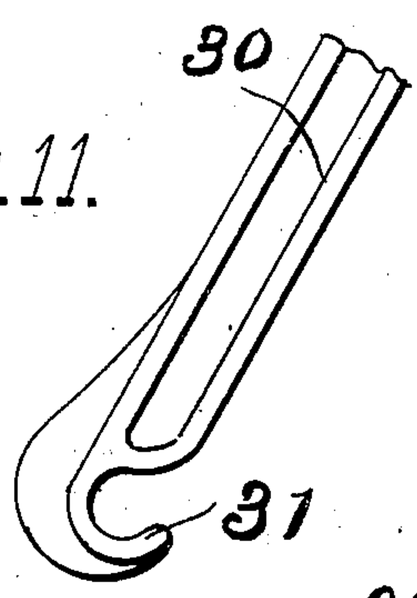

Fig. 14.

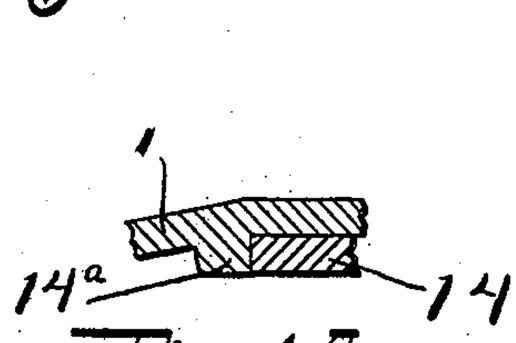

Fig. 10.

Witnesses

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4 SHEETS—SHEET 4.

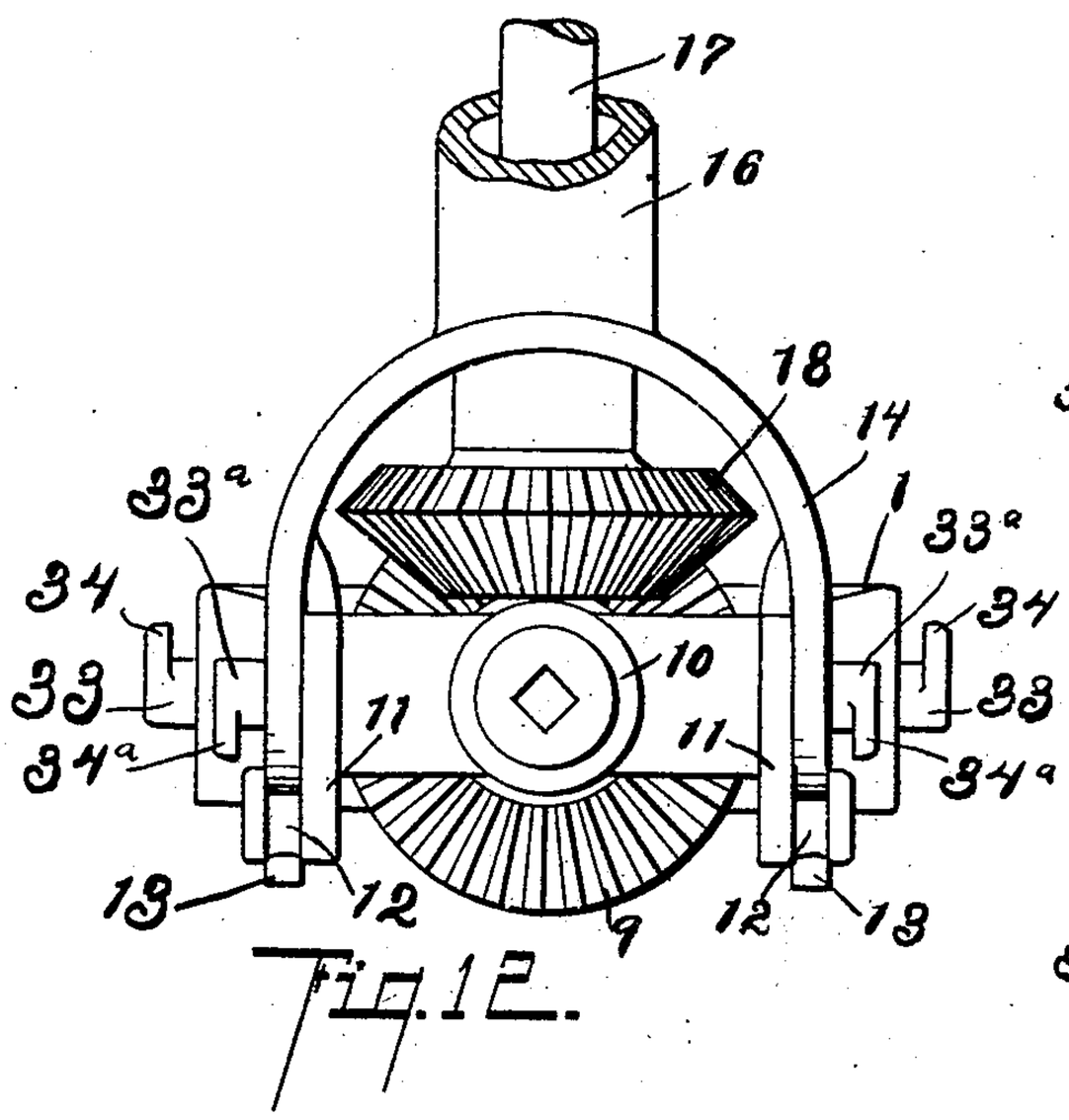

Fig. 12.

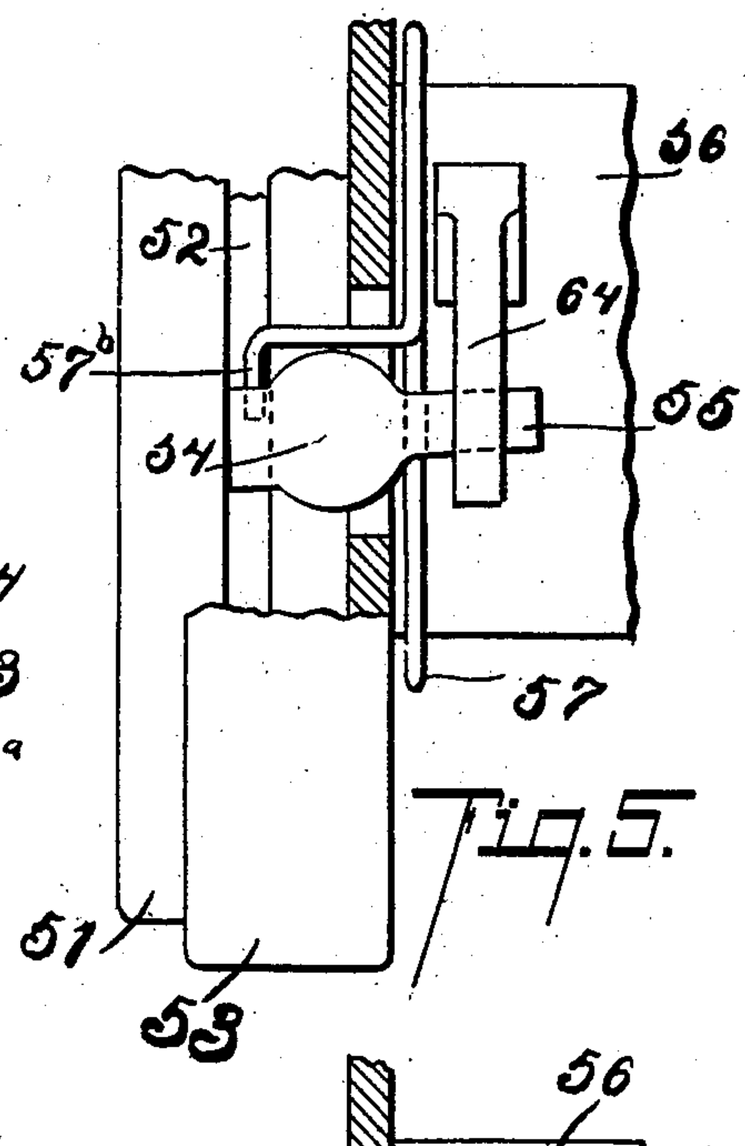

Fig. 5.

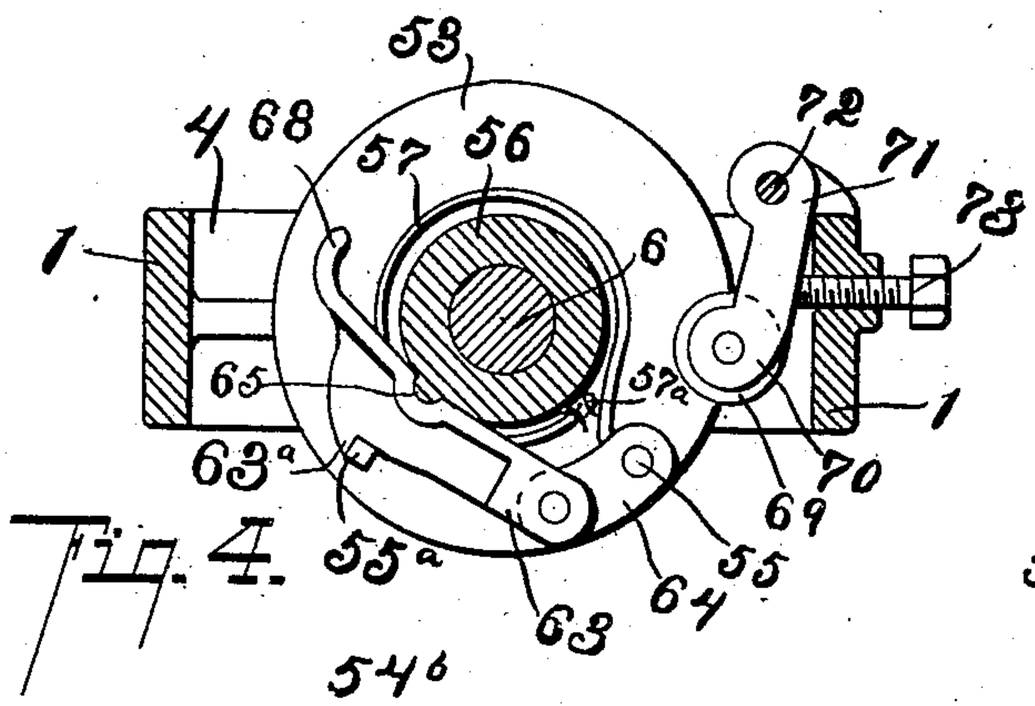

Fig. 4.

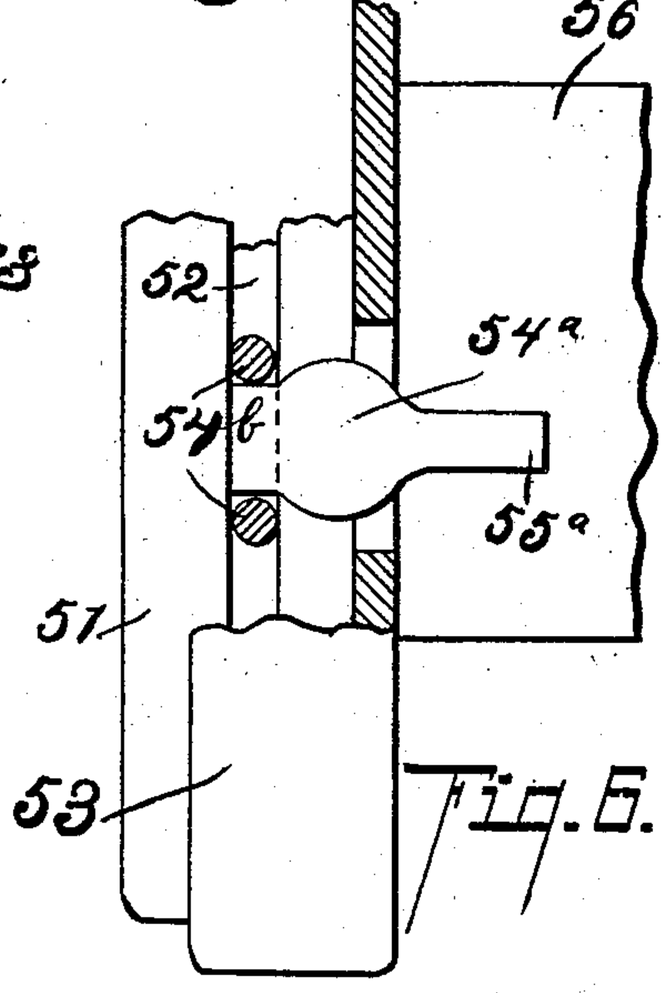

Fig. 6.

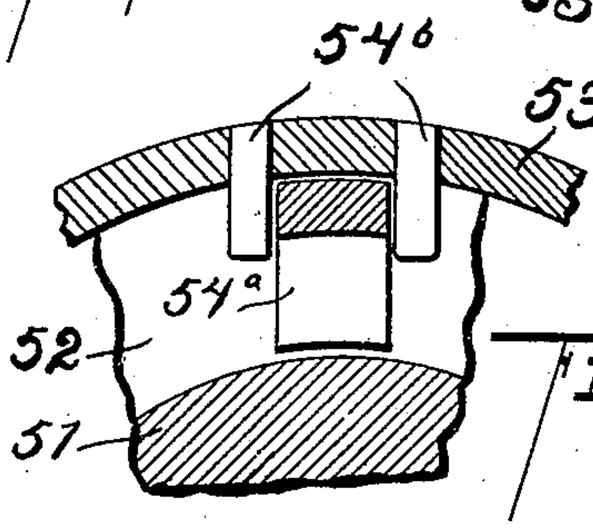

Fig. 13.

Witnesses

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Lulu Greenfield

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UNITED STATES PATENT OFFICE.

DAVID A. MOORE, OF HARVEY, ILLINOIS.

RAIL-DRILLING MACHINE.

No. 885,943. Specification of Letters Patent. Patented April 28, 1908.

Application filed July 15, 1904. Serial No. 216,661.

To all whom it may concern:

Be it known that I, DAVID A. MOORE, a citizen of the United States, residing at Harvey, in the county of Cook and State of Illinois, have invented certain Improvements in Rail-Drilling Machines, of which the following is a specification.

This invention relates to certain improvements in rail drilling machines such as are especially adapted for use in the making of repairs along railway lines, and the object of the invention is, in part to provide a machine of this character of a simple and inexpensive nature and of a compact, strong and durable construction having improved means for holding it in position while in use and in part to provide, for use in such machines a novel and improved feed mechanism by means of which the drill is automatically fed up to its work during the operation of the machine.

The invention consists in certain novel features of the construction, combination and arrangement of the several parts of the improved drilling machine, whereby certain important advantages are attained and the device is made simpler, cheaper and otherwise better adapted and more convenient for use than various other forms of drilling machine heretofore devised, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings which serve to illustrate my invention—Figure 1 is a side elevation drawn to a small scale and showing the improved drilling machine as it appears when applied for use to a railway rail to be drilled. Fig. 2 is a partial plan view, drawn to a larger scale and showing certain portions of the improved drilling machine at the lower part thereof, including the feed mechanism. Fig. 3 is an axial section taken vertically through the devices shown in Fig. 2. Fig. 4 is a transverse section taken vertically through the machine in the plane indicated by line *a*—*a* in Fig. 3 and showing features of the feed mechanism to be hereinafter referred to. Fig. 5 is a fragmentary view showing the construction and arrangement of the spring actuated feed dog forming part of the feed mechanism. Fig. 6 is a view similar to Fig. 5, but showing the construction and arrangement of the auxiliary dog of the improved feed mechanism. Fig. 7 is a sectional detail view taken in the plane indicated by line *b*—*b* in Fig. 1 and showing the means for adjusting the upper rail engaging hook or anchor of the machine. Fig. 8 is a fragmentary detail view showing the forked construction of the end portion of said rail engaging hook or anchor. Fig. 9 is a sectional view drawn to a larger scale and showing the adjustable rail engaging means carried by the bed plates of the improved machine. Fig. 10 is an enlarged fragmentary side elevation of the rail drilling machine constructed according to my invention and showing certain details of the detachable fastenings for connecting the rail engaging hooks to the main frame of the machine; Fig. 11 is an enlarged fragmentary view of the hooked lower end portion of the included brace of the machine; Fig. 12 is a front end elevation of the machine with its rail engaging hooks detached and the upper part of the column of its upper frame member broken away, and Fig. 13 is an enlarged sectional view taken in the plane indicated by line *a*—*a* in Fig. 6, and showing the arrangement of pins for holding in position the detent dog of the feed mechanism. Fig. 14 is an enlarged detail section taken on a line corresponding to line 14—14 of Fig. 10, showing the stops for the vertical frame.

The improved drilling machine constructed according to my invention comprises two detachably connected parts or members which, when the machine is in use for drilling, are adapted to be securely locked together but which are capable of being readily disengaged or disconnected one from the other. One of these parts or members, which I may call the lower member, or frame of the device, is in the nature of a metallic frame-work on which are carried the drill, feed mechanism, and lower anchoring devices, and this member is adapted to be set in position between the rails or alongside the track and has no upwardly extended portions of sufficient height to interfere with the free passage of engines or cars above it along the track.

The other member or part of the machine comprises an upwardly extended column whereon are carried the driving means and which is provided at its lower part with hook like devices for engagement with reciprocal devices on the lower member, and is also provided with locking means for holding said reciprocal engaging devices on the respective members engaged during the operation of the machine. This last named part or member may be called the upper member and also comprises the upper rail engaging hooks or

anchors which are adapted to extend over the rails and to engage the surface of the web opposite to that at which the drill is operating. The upper member of the machine is extended upwards to a considerable elevation above the rails and consequently would be in the way of trains passing over the track and for this reason I provide the detachable engaging devices for holding the members in relation while the machine is being operated, these devices being of such a nature as to permit, when desired, of completely disconnecting the upper member of the machine while the lower member is left in position. In this way not only is there no interference with traffic during the use of the machine, but the delay which would ordinarily result from removing the drill and lower portions of the machine to permit the passage of a train is altogether avoided, and the drill may remain, when the upper member is disconnected, in precisely the position to which it had been advanced so that the work may commence without adjustment of the operative parts immediately upon the readjustment of the upper member of the machine.

The metallic frame of the lower member comprises side bars 1, 1, having downwardly extended portions 2, 2 beneath which is extended a base-plate 3, of any convenient length and which affords a solid support for the mechanism either upon the ties or ballast. At the rear of the frame the side bars 1, 1 are tied together by a cross bar 4, the central portion of which is formed with a hollowed bearing wherein is received the rear end of the feed nut 5, the bore of which is screw-threaded for engagement with the threads of the feed screw 6, which is passed through said nut and is extended lengthwise through the central part of the frame. 7 indicates a cross brace at the opposite end of the frame and this is also formed with a bearing 8 in which the screw or spindle 6 is adapted for both turning and endwise movement. Beyond the brace 7 a bevel gear wheel 9 is keyed or otherwise held on the spindle 6, and at the forward end of the frame or at that end adjacent to the drill socket 10 on spindle 6, the side bars 1, 1 are formed with downwardly directed ears 11, 11, on the outer sides of which are headed lugs or projections 12, on which are adapted to be engaged forwardly directed hooks 13, 13, on the downwardly directed arms or forks 14, 14 of a yoke 15 integrally produced at the base of the hollow pillar or column 16 forming the body portion of the upper member.

In the axis of the hollow column 16 is held to turn a vertical shaft 17, the lower end of which is extended down between the arms of forks 14 and carries a bevel gear wheel 18 adapted, when the members are connected, for driving engagement with the wheel 9 on spindle 6, so that the movement of shaft 17 may at such times be communicated to the drill spindle. The upper end of the column 16 is also provided with forks or arms 20, and between them the upper end of shaft 17 carries a bevel gear wheel 19 meshing with a similar wheel 21 on a cross shaft 22 journaled transversely between the two arms or forks and having its opposite ends provided with reversely set crank handles 23, 23 by means of which the drilling machine may be driven by two men.

At the rear side of column 16 and about midway of the same are integral spaced lugs 24, between which is pivotally held one end of a locking bar or member 25, the opposite end of which is forked as seen at 26, its forks or bifurcations being provided with circular bearings or journals in which is held to turn an eccentric block or piece 27 having at one side of member 25 a handle 28 by means of which the eccentric may be turned in its bearings in forks 26, a stop 29 being provided on the handle for engagement with member 25 to hold the eccentric when adjusted to locking position.

On the eccentric 27 between the arms or forks 26, 26 of member 25 is loosely held the upper end of a locking bar or hasp 30, the lower end of which has a hook like part 31 for engagement with a bail 32 extended upwards from the cross bar 4 at the rear end of the frame of the lower member.

When the hook like parts 13 at the base of arms or forks 14 of yoke 15 are engaged with lugs 12 on the frame of the lower member, the column 16 may be adjusted to a vertical position as seen in Fig. 1, so that the teeth of wheels 18 and 9 are in mesh, and when the handle 28 of eccentric 27 is thrown downwards from the position seen in full lines in Fig. 1, a certain extent of downward or lengthening movement is imparted by the eccentric to the locking bar 30, sufficient to permit of engaging its hook like lower end 31 with the bail 32 at the rear of the frame of the lower member. When the parts are in this position, the eccentric 27 may, by a reverse movement of its handle 28 to the position shown in full lines in Fig. 1, be reversely turned, so as to draw up on and shorten the locking bar 30, whereupon the column 16 will be drawn back against the stops 14 on the frame and will be effectively held upon the lower member with the gears 18 and 9 in engagement so that movement of crank handles 23 will be transmitted to the drill spindle to turn the same.

When the eccentric has been operated as above described, to lock the parts in relation, it will be evident that a reverse movement of its handle 28 will at once release the locking bar from bail 32 so that the column and parts carried thereby may be completely removed from the machine.

At corresponding points, the side bars 1, 1 of the frame of the lower member of the machine carry upon their outer surfaces lugs or projections 33, the extremities of which have upturned hook like extensions 34 for detachable connection with the rear ends of coupling bars 43, which have at their rear ends slotted openings 35 for the passage of the lugs 33 and extensions 34 when the coupling bars are held in a more or less nearly vertical position, the width of the slotted openings 35 being, however, such that when the coupling bars 43 are turned to a horizontal position as shown in full lines in Fig. 1, the extensions 34 will engage on the outer surfaces of the bars above the openings and securely hold the said coupling bars in relation on the frame of the lower member. When the bars 43 are again lifted to a vertical position, they may, of course, be detached from the side bars 1, 1.

The forward ends of coupling bars 43 have hooked portions 44, for engagement over and beneath the forward edge of a tie bar 45 formed of a stout piece of metal of proper length, the ends of which have engagement in eyes or sockets 46 produced on the rear ends of bed plates 47 adapted to be extended beneath the rail to be drilled indicated at x on Fig. 1 and to rest upon the ballast between the ties, the forward ends 48 of said plates 47 being made tapered or pointed as seen in Figs. 1 and 9, so as to be capable of being more readily forced beneath the rail. The plates 48 have, at intervals along their lengths openings, 49 in which are adapted for insertion flange hooks 50, for engagement over the outer rail flange as seen in Fig. 1, and said hooks 50 have their lower portions 51^a also made in hook form as seen in Fig. 9, for engagement beneath the bed plates 47 so that when the parts are in position for use of the machine, the rail hooks will be securely held to the bed plates by their hooked lower portions and will, by their engagement with the rail flange, effectively lock the bed plates to the rails.

Adjacent to their rear edge portions, the forks or arms 14, 14, of yoke 15 have upon their outer surfaces integral outwardly directed lugs or projections 33^a similar to the lugs 33 on side bars 1, and said lugs 33^a have rearwardly directed extensions 34^a at their outer ends similar to the extensions 34 of said lugs 33 on side bars 1, the lugs 33^a and their extensions 34^a being adapted to be passed through openings 35^a in the rear ends of the arms 36, 36 of a yoke which forms a support wherein is adjustably held the upper rail engaging hook or anchor 42. The opening 35^a is of such a formation as to permit the arms of the yoke to be disengaged from the rail engaging hook or anchor when the parts 36 are swung pivotally rearwards out of position above the rail, but when said arms are in position above the rail as seen in Fig. 1, they are locked to the lugs 33^a on arms 14 of yoke 15.

The forward ends of the arms 36 of the hook supporting yoke are inclined or bent towards each other and have parallel extremities 37, 37 which fit flush one on the other and are held together by bolts 38 or the like in such a way as to form between them a guide way 39 in which is adapted to slide lengthwise the shank portion of the upper rail engaging hook or anchor 42 as seen in Fig. 7. The extremity of said part 42 is bent downwards so as to take outside the rail x as seen in Fig. 1 and is then directed towards the outer surface of the said rail as indicated in Fig. 1, said extremity being forked as seen in Fig. 8, so as to afford space for the operation of the drill. The hook 42 is adjustably secured in the guide-way 39 by means of the bolt 41.

The feed nut 5 has an enlarged portion 51 of annular form in which is produced a peripheral groove 52 also of annular formation and wherein are arranged for operation a feed dog 54 and a detent dog 54^a.

53 indicates a casing extended around the grooved portion of the enlargement 51 of the feed nut and said casing has a boss or hub 56 extended from it on the side opposite the nut, the drill spindle 6 being adapted for free turning and endwise movement in said hub or boss.

56^a indicates an annular groove produced in the hub or boss 56 and in the under part of said groove or channel 56^a is engaged the upper edge portion of a vertically extended plate 3^a of angular form, adjustably held by means of a bolt or screw 3^b on the central part of base plate 3 and adapted, by the engagement of its vertical part in the groove of hub 56, to form a solid and secure backing or reinforce to hold the casing and nut in position against endwise movement. The adjustable mounting of plate 3^a on base plate 3 affords compensation for wear of the parts.

The forward end of the boss or hub 56 is provided with a ratchet-like clutch surface adapted for engagement with a similar clutch surface as seen at 58, on the adjacent end of a slide collar 59 keyed in a key way 60 extended lengthwise of the drill spindle and adapted for movement endwise on said spindle while being held by reason of its key to turn in unison therewith. The collar 59 is provided with a perimetral groove in opposite sides of which are engaged pins on the arms or forks 62 of a lever 61, which has a pivotal bearing as seen at 3^a in Fig. 3, at its lower end in a socket produced in the horizontal portion of the angle plate 3^a. By swinging lever 61 it is evident that the clutch collar 59 may be engaged with or disengaged

from the clutch surface on the hub or boss 56 of the casing and when these parts are engaged, the casing will be driven in unison with the drill spindle 6, while when said parts are disengaged, the rotative movement of the spindle will not be transmitted through said collar 59 to the casing.

The dogs 54 and 54[a] above referred to have tails 55, 55[a] which are extended through openings in the casing 53 and project therefrom as shown in Figs. 1, 2, 3, 4, 5 and 6, the tail 55 of dog 54 being rounded and having engagement in a perforation in one end of a link 64 the opposite end of which has pivotal connection between forks on a lever 63 held for pivotal movement at its central part on a feather or rib 65 produced along one side of the casing hub 56. The lever 63 is also provided with a shoulder 63[a] engaged, normally, with the tail 55[a] of the detent dog 54[a].

The end of the lever 63 opposite the link 64 is arranged to project from the hub 56 and has a laterally directed or offset portion 68 which is adapted, in the rotation of the casing, to engage and strike upon a roller 69 held to turn in a bracket 70 having upwardly extended arms 71 pivotally held on a rod 72 supported on lugs at one of the side bars 1 and of a length sufficient to permit said bracket 70 and the roll 69 carried thereby to be adjusted out of position for engagement with the offset or laterally directed portion 68 of lever 63.

73 indicates a screw passed through the adjacent side bar 1 with its tip engaged on a part of bracket 70 by which means the bracket may be adjusted so that the roll 69 shall stand nearer to or further from the boss or hub 56 of casing 53 whereby the extent of pivotal movement of the lever 63 on contact with the roll 69 may be varied at will.

57 indicates a coil spring of suitable tension with one end held in a lug on the casing as indicated at 57[a]. This spring is passed around the hub or boss of the casing and has its opposite end 57[b] passed through the opening at which the tail of dog 54 protrudes from the casing, said end 57[b] of the spring having connection with the dog in such a way as to tend to throw the dog pivotally with relation to the link 64 with which the tail of said dog is engaged and impart to said dog a twisting movement as indicated in Fig. 5, whereby the corners of the dog are caused to bind on opposite walls of the groove 52 in the enlargement 51 of feed nut 5.

54[b], 54[b] indicate pins carried by the casing 53 at opposite sides of the detent dog 54[a] to limit the pivotal or twisting movement thereof.

In the operation of the feed mechanism, it will be seen that as the drill spindle turns, being driven from the gearing above described, the feed nut will turn in unison therewith, being locked thereto by the twisting or pivotal movement of the detent dog 54[a] which on contact of its tail 55[a] with the shoulder 63[a] on lever 63 when said lever stands in its normal position as shown in Fig. 4 has such a twisting or pivotal movement imparted to it as will cause its corners to bind on opposite walls of the groove 52 in the nut enlargement so that the nut and casing will be locked to turn in unison, the casing being, of course, driven in unison with the drill spindle owing to its engagement with clutch collar 59. When, in the rotation of the casing, the lever 63 has its offset portion 68 brought into contact with roll 69, it will be evident that pivotal movement will be imparted to the lever in such a way as to move the shoulder 63[a] out of contact with the tail 55[a] of detent dog 54[a] whereby the nut and casing will be disconnected, and at the same time, the opposite end of lever 63 will act through the connection of link 64 with the tail of dog 54, to draw said dog 54 over toward the right hand side as the parts are shown in Fig. 4, the spring 57 serving, during said movement of the lever, to hold the corners of said dog 54 engaged on the walls of groove 52 in nut enlargement 51, whereby a forward feeding impulse will be imparted to the nut independent of the rotative movement of the casing, such feeding movement being, of course, dependent, for its extent, upon the position in which the roll 69 has been adjusted by means of screw 73. When the lever shall have passed the roll 69, the tension of spring 57 will be at once exerted to retract the parts, the dog 54 which has connection with said spring being drawn rearwardly along the groove of the nut enlargement, the corners of the dog offering no resistance to such movement by reason of the inclined position in which the dog is held by said spring and in this way the parts are set in position to afford the next feeding impulse when lever 63 shall again contact with roll 69. The rocking movement of said lever 63 under the tension of spring 57 will also act, by contact of the projection 63[a] on tail 55[a] of dog 54[a] to rock said dog 54[a] and again engage its corners with the walls of the groove in the nut engagement so that the nut cannot slip backward but must turn forwardly in unison with the casing.

The construction of the improved drilling machine is such as to especially adapt the device for use in railway service, since the two members of the machine are capable of being readily connected and disconnected, so that the upper member may be disconnected at will to permit the passage of trains without affecting the adjustment of the lower member which may be permitted to remain in position for use at all times. In this way the device is rendered well adapted

for use in locations where other forms of drilling machine could not be employed with any great degree of benefit. The peculiar arrangement of the locking means and engaging devices by which the members are connected is also of such a nature as to permit of securely connecting the members in a very short space of time so that as little interruption of work as possible occurs at the passage of a train.

The feeding mechanism is also of such a nature as to permit of being conveniently and effectively regulated to accommodate the machine for use in connection with materials of different degrees of hardness, it being possible to vary the feed with great delicacy so that as much work as may be possible can be accomplished without liability of a breakdown. In the initial adjustment of the machine for drilling a rail, the device also affords a considerable economy in time in running the drill up to the work, since it will be evident that when lever 61 is thrown to disengage collar 59 from the clutch surface on the casing hub, the said casing together with the feed nut may be held stationary as, for example, by pressure from the foot of the operator while the drill spindle will be driven with the result that the nut will traverse the feed screw and rapidly apply the drill to the rail. When the drill has been set up to the work in this way, the lever 61 will, of course, be reversely swung to cause the ensuing feed to be accomplished at such a rate as may be provided for by adjustment of roll 69.

From the above description it will be seen that the improved drilling machine is of an extremely simple and inexpensive nature and of a compact, strong and durable construction such as will especially adapt the device for use in railway service, and it will also be obvious from the above description that the device is capable of considerable modification without material departure from the principles and spirit of the invention and for this reason I do not wish to be understood as limiting myself to the precise form and arrangement of the several parts of the device as herein set forth in carrying out my invention in practice.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a device of the character described, the combination of a driving spindle having screw-threads; a nut engaged with the threads; a casing having clutch mechanism for operating it in connection with the spindle; a lever pivoted on the casing and adapted for reverse actuation; two dogs adapted for movement in and out of locking engagement with the nut and alternately and reversely actuated from the lever when reversely moved to grip and release the nut; and means for moving said lever.

2. In a device of the character described, the combination of a screw-threaded spindle having driving means; a nut engaged with the threads of the spindle and having a circumferential groove; two dogs in said groove with portions adapted when the dogs are moved pivotally to grip and release the nut; a casing extended over said dogs; clutch mechanism for operating the casing from the spindle; a lever pivoted on the casing and having a shoulder adapted when the lever is moved in one direction, to engage one dog and move the same pivotally; a link extended from the opposite end of the lever and having connection with the other dog to move the same when the lever is moved in a reverse direction; a spring for returning the last named dog to normal position; a pivoted bracket; a roller carried thereby and engageable with the lever in the rotation of the casing; and means for adjusting the bracket.

3. A device of the character described, comprising a frame; a drill spindle; driving mechanism; a connection for turning the drill spindle from the driving mechanism; a lever having means for turning it in unison with the driving mechanism and adapted for reciprocatory movement, independently thereof; feed mechanism comprising reciprocal screw-threaded parts adapted when independently actuated, to move the drill spindle endwise, one of said parts having connection with the lever for moving it independently of the other part when said lever is reciprocated; and a device carried by the frame and engageable with said lever to impart reciprocatory movement thereto.

4. A device of the character described, comprising a frame; a drill spindle; driving mechanism; feed mechanism comprising reciprocal screw-threaded parts adapted, when independently actuated, to impart endwise movement to the drill spindle and a dog adapted for engagement with one of said parts to independently actuate the same; a device driven from the driving mechanism, but capable of independent movement and having connection with the dog to move the same to actuate one part of the feed mechanism independently of the other part; and means carried by the frame for engagement with said device to independently move the same to actuate said dog.

5. In a device of the character described, the combination of a drill spindle; driving means; feed mechanism comprising reciprocal screw-threaded parts; a device arranged to lock the parts of the feed mechanism to turn in unison; another device arranged to turn one part of the feed mechanism relative to the other part to impart endwise feeding movement to the drill spindle and means for alternately operating said devices.

6. In a device of the character described, the combination of a drill spindle; driving

means; feed mechanism comprising reciprocal threaded parts; a device arranged to lock the parts of the feed mechanism to turn in unison; another device arranged to turn one part of the feed mechanism relative to the other; a member movable in unison with the drill spindle and adapted when actuated to alternately operate said devices; and adjustable means for actuating said member.

7. A device of the character described comprising a frame; a driven drill spindle; a part arranged to turn in unison with the drill spindle but capable of independent movement; feed mechanism for moving the drill spindle endwise and actuated from the independent movement of said part; and a device carried by the frame for engagement with said independently movable part to independently move and actuate the same to operate said feed mechanism.

8. A device of the character described comprising a driven drill spindle; feed mechanism comprising parts having reciprocal screw-threads and capable of relative movement to feed said drill spindle endwise; a lever mounted for movement; a dog connected with the lever and adapted, when the lever is moved in one direction, to be engaged with one of the threaded parts to move the same relatively to the other threaded part; another dog actuated on reverse movement of the lever to lock the threaded parts for movement in unison with each other; means to actuate the lever; and means to vary the extent of movement thereof when actuated.

9. In a device of the character described, the combination of a driven drill spindle; a feed screw connected to turn therewith; a nut having threaded engagement with said feed-screw and provided with a grooved portion; a casing inclosing the grooved portion of the nut; a dog carried by the casing and having a portion engaged in the groove of the nut and adapted, when said dog is pivotally moved, to bind on the walls of said groove; means to move the casing in unison with the drill spindle; a lever carried by the casing and pivotally mounted and having connection with the dog to move the same pivotally when the lever is swung pivotally; and means to actuate said lever to move the same pivotally.

10. In a device of the character described, the combination of a driven drill spindle; a feed screw connected to turn therewith; a nut having threaded engagement with the feed-screw and provided with a grooved portion; a casing at the grooved portion of the nut; a lever pivotally mounted on the casing; means for imparting pivotal movement in one direction to the lever at each rotation of the casing; means to rotate the casing in unison with the drill spindle; a retracting spring having connection with said lever and arranged to retract the same after each pivotal movement; a dog carried by the casing with a portion engaged in the groove of said nut and adapted, when said dog is pivotally moved, to bind on the walls of said groove; a connection between the lever and said dog to move the dog pivotally and forward along said groove at each operation of the lever by its actuating means; and another dog actuated pivotally on the movement of the lever by its retracting spring, said last-named dog being also carried by the casing and having a portion engaged in the groove of the nut and adapted, when the dog is pivotally moved, to bind on the walls of the groove to lock the nut to the casing.

11. The combination with a drill spindle, of driving means therefor; a feed screw for said drill spindle; a feed nut therefor; a driven feed member; means for connecting said feed member to said feed nut whereby they are normally revolved together; a lever carried by said feed member adapted upon actuation to disengage said connecting means for said feed member and nut and to impart a feeding movement to said feed nut; and means for actuating said lever as said feed member is revolved.

12. The combination with a drill spindle, of driving means therefor; a feed screw for said spindle; a feed nut therefor; a driven feed member; means for connecting said feed member to said feed nut whereby they are normally revolved together; and intermittently-actuated means carried by said feed member adapted upon its actuation to disengage said connecting means for said feed member and nut and to impart a feeding movement to said feed nut.

13. A rail drilling machine, comprising a horizontal frame member having a drill spindle and feed mechanism; a vertical frame member carrying a driving mechanism, having hooks at its base adapted to be detachably engaged with said horizontal frame member; a stop for limiting the rearward movement of said vertical frame when erected upon said base; and a contractible brace for locking said vertical frame member in an erected position pivoted thereto and having a hook at its lower end adapted to detachably engage said horizontal frame member, whereby the frame members are clamped in position or released.

14. A device of the character described, comprising a horizontal frame member; a detachable vertical frame member having hooks at its lower end adapted to engage lugs provided therefor on the horizontal frame member; a driving shaft carried by said vertical frame member; a brace pivotally secured to said vertical frame adapted to be engaged with said horizontal frame; and means for adjusting said brace to clamp the parts in position.

15. In a structure of the class described,

the combination with a horizontal frame, of a vertical frame adapted to be erected upon and engaged at its lower end with said horizontal frame; a brace for said upright pivotally secured thereto, said base having a hook adapted to engage said horizontal frame; and an eccentric for adjusting said hook whereby said vertical frame is held rigidly in position.

16. In a structure of the class described, the combination with a horizontal frame, of a vertical frame; lugs on said horizontal frame; forwardly facing hooks on said upright adapted to engage said lugs; stops for said upright arranged to limit the rearward movement thereof; and a contractible brace for locking said upright against said stops whereby the same is rigidly held in position.

17. In a structure of the class described, the combination with a horizontal frame, of a vertical frame; lugs on said horizontal frame; hooks on said vertical frame adapted to be engaged on said lugs; stops for said upright; and a detachable brace for locking said vertical frame against said stops whereby the same is held rigidly in position when erected.

18. In a structure of the class described, the combination of a base frame having oppositely-projecting lugs provided with projections adjacent to but spaced apart from said lugs, and an upright frame having oppositely-arranged hook-like portions engageable with the lugs, adapted to rest against said projections, and locking means detachably connecting said upright frame to said base frame when said hook portions are in engagement with said lugs.

In testimony whereof I have hereunto signed my name at Chicago, Illinois, this 18th day of June, 1904, in the presence of two subscribing witnesses.

DAVID A. MOORE.

Witnesses:
J. D. CAPLINGER,
W. MOORE.