May 26, 1959 H. G. MILLER 2,887,908

RAIL DRILL

Filed Nov. 19, 1956 3 Sheets-Sheet 1

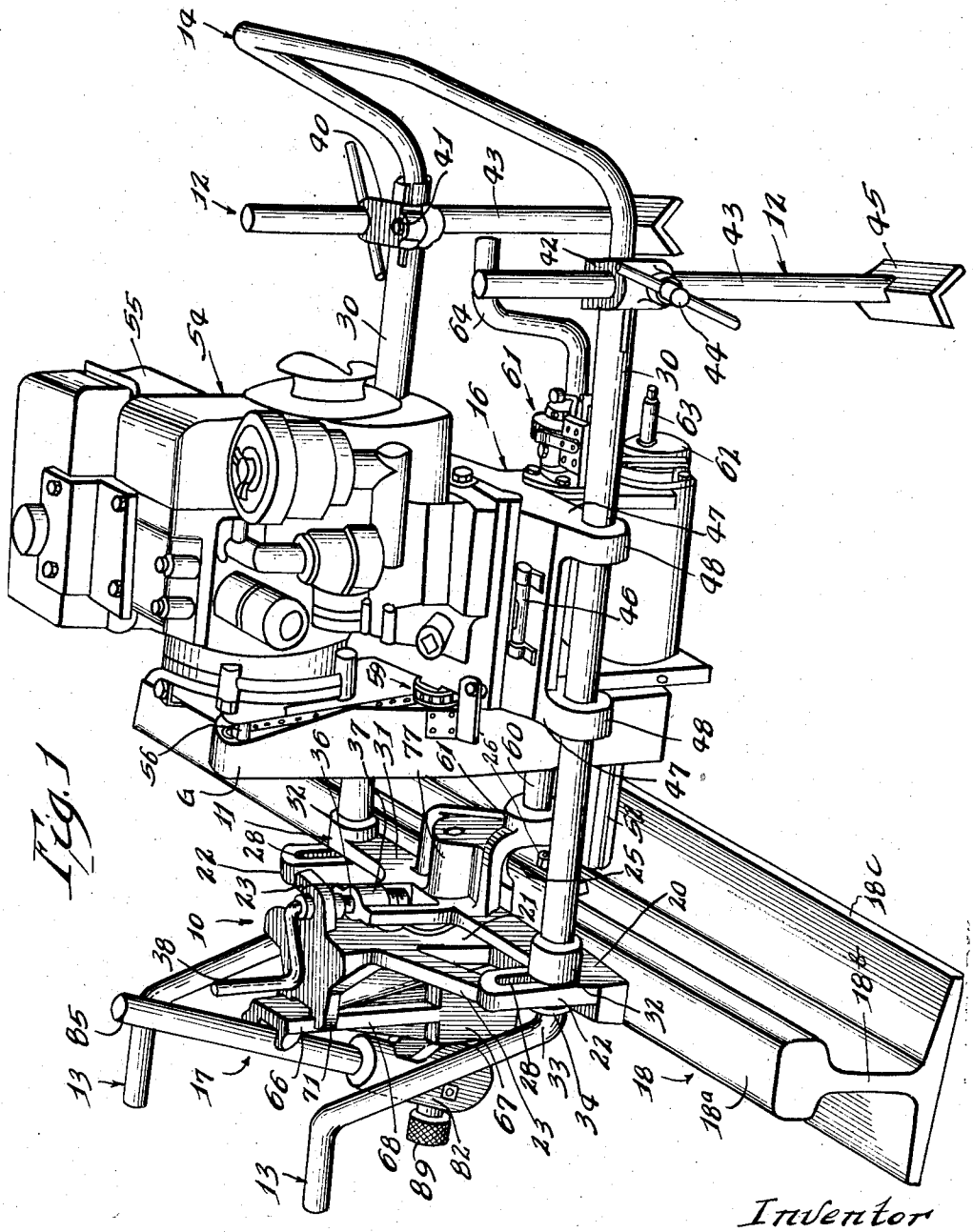


Fig. 1

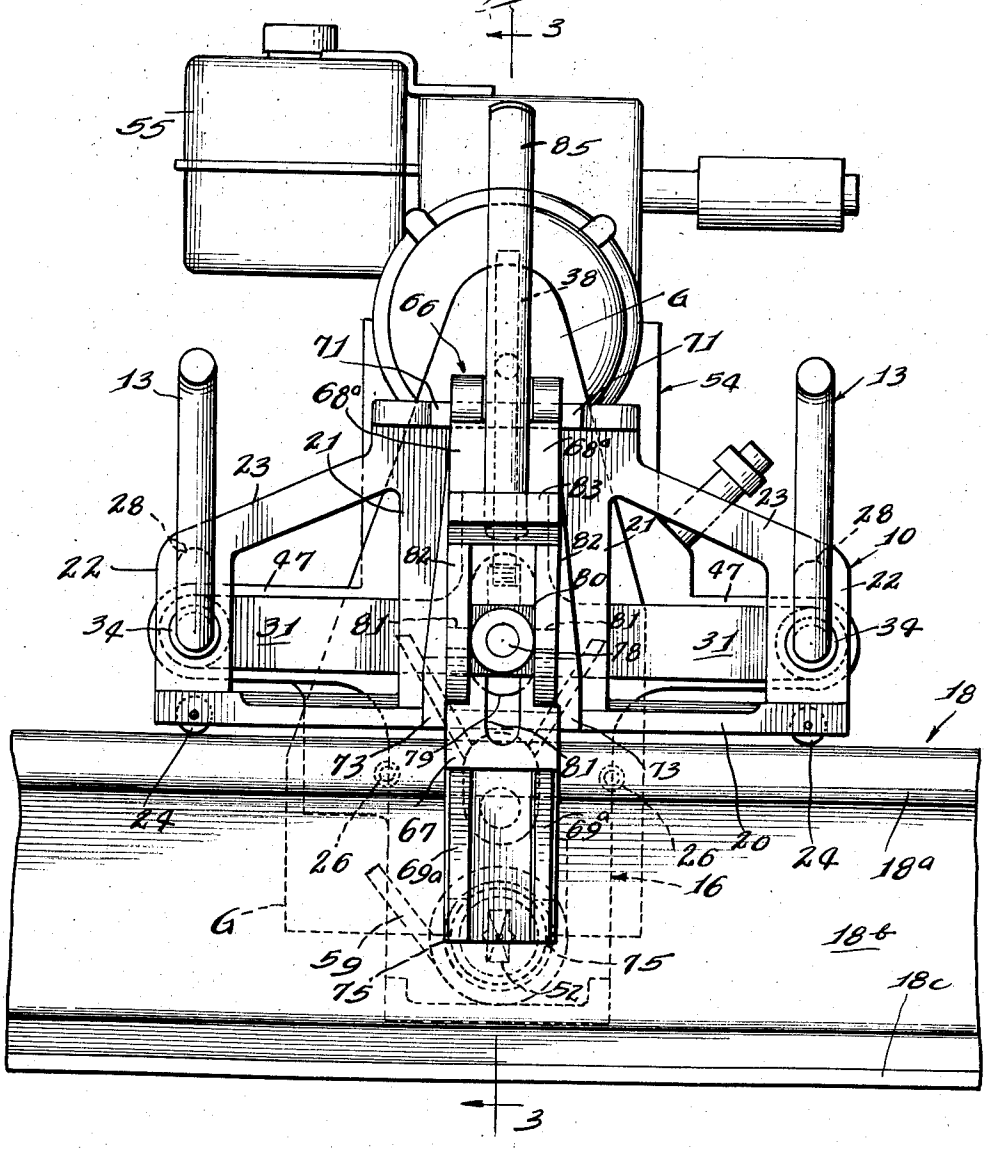
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Fig 2.



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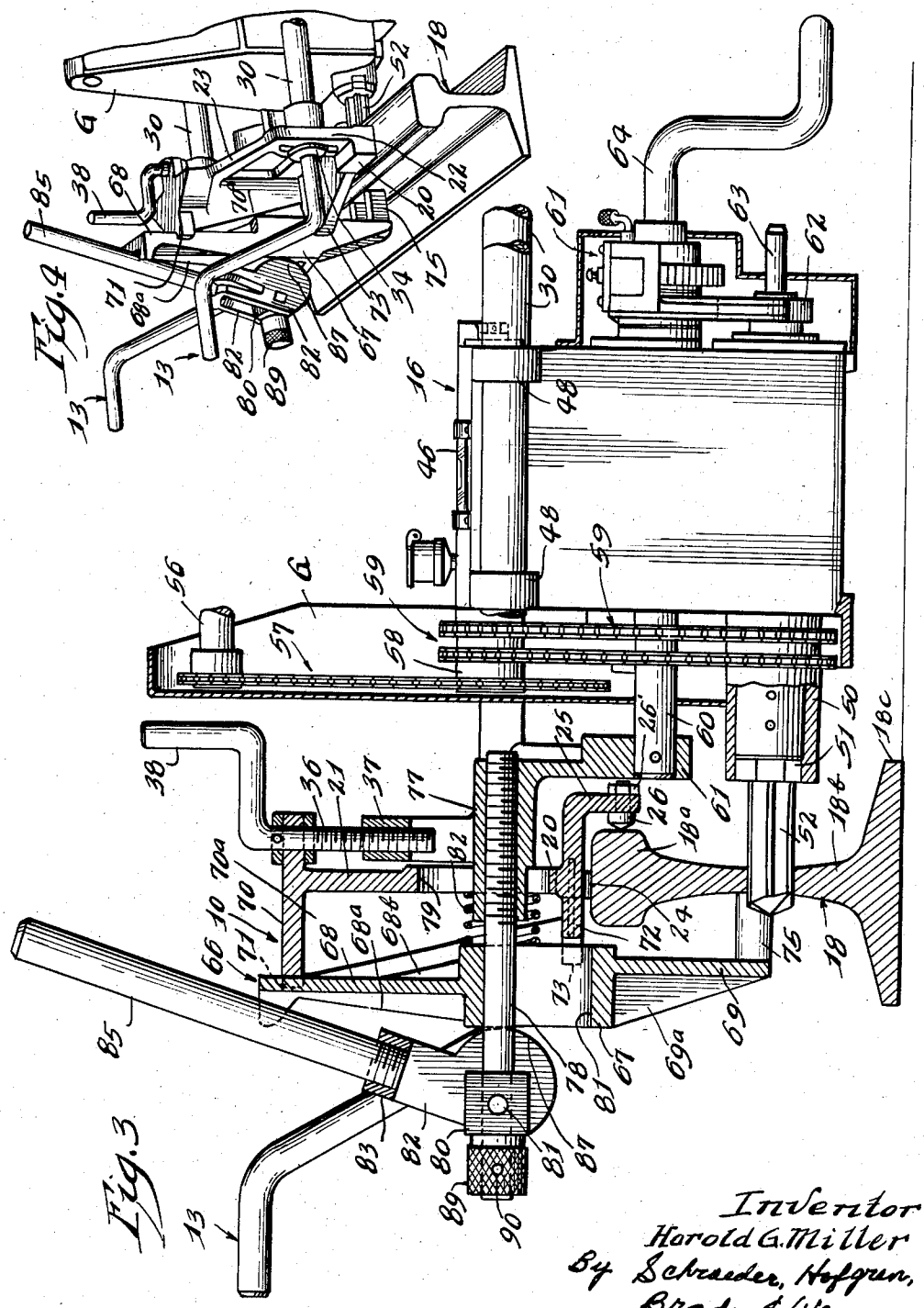


Fig. 4

Fig. 3

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RAIL DRILL

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Application November 19, 1956, Serial No. 622,929

7 Claims. (Cl. 77—11)

This invention relates to drills and more particularly to drills of the type commonly referred to as rail drills, for use in drilling holes in the webs of rails of railroad tracks.

It is a general object of the invention to provide a new and improved rail drill of the character described including novel means for clamping the drill to a rail preparatory to drilling.

Another object is to provide a new and improved clamping mechanism for positively clamping a rail drill to a rail.

It is also an object of the invention to provide a new and improved rail drill clamping mechanism for positively clamping the drill to a rail and which is quickly releasable to free the drill for removal or repositioning relative to the rail.

A further object is to provide a new and improved rail drill clamping mechanism including a vertically disposed clamping bar for engaging the rail in opposition to the drill bit, and means mounting the clamping bar so that it may be moved to a generally horizontal out-of-the-way position, when released, to permit withdrawal of the drill bit and removal of the drill from its mounted position on a rail.

Another object is to provide a new and improved rail drill including a frame member supporting a drill head and adapted to rest on the top of a rail, and mechanism for clamping the frame member to the rail including a vertically disposed clamping bar engageable with the frame member above the rail and engageable with the rail below its top to securely hold the drill head during operation against the tendency of the drill head to rise and back away from the rail.

Other objects and advantages will become readily apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a rail drill embodying the principles of the present invention;

Fig. 2 is a front end elevational view of the rail drill illustrated in Fig. 1, taken from the left end of the drill as viewed in Fig. 1;

Fig. 3 is an enlarged, fragmentary, vertical sectional view of the drill illustrated in Figs. 1 and 2, taken at about the line 3—3 of Fig. 2, with parts including the drive motor omitted, and partly in elevation;

Fig. 4 is a fragmentary perspective view of the drill at a smaller scale.

While an illustrative embodiment of the invention is shown in the drawings and will be described in detail herein, the invention is susceptible of embodiment in many different forms, and it should be understood that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawings, as illustrated, the rail drill includes a base or frame member **10**, a framework

generally designated **11** vertically adjustable on the frame member **10**, vertically adjustable ground engaging supports **12** attached to the framework, handles **13** and **14** on the framework, a drill head or housing generally designated **16** horizontally slidable on the framework, and a clamping mechanism generally designated **17** for clamping the frame member **10** securely to a rail such as that illustrated at **18**. The rail is of a conventional type and includes ball **18***a*, web **18***b*, and base **18***c*.

The base or frame member **10** when mounted, as illustrated, is vertically disposed and is elongated in the direction of the length of the rail **18**. It comprises a generally flat elongated base leg **20** (Figs. 2 and 4) having an integral central widened post section **21** and, spaced from the central section **21**, upstanding end post sections **22**. The central post section **21** is connected to each of the end post sections **22** by integral brace members **23**. Adjacent opposite ends of the base leg **20**, it is provided with rotatably mounted rollers **24** adapted to engage and rest upon the top of the ball **18***a* of the rail **18**.

As seen best in Fig. 3, the base leg **20** of the frame member **10** is formed adjacent a central portion thereof with a laterally and downwardly extending projection **25** which skirts the side of the rail **18**. The skirting portion of the projection **25** is provided with a pair of horizontally spaced, preferably pointed bearing members **26** rigidly secured to the projection by nuts **26'** and adapted to engage the side of the ball of the rail. The function of the bearing or abutment members **26** will be described more in detail presently.

In order to mount the framework **11**, the end post sections **22** of the frame member **10** are each provided with an opening extending transversely therethrough and elongated in a vertical direction so as to form a vertically extending slot **28** (Figs. 1 and 2). The framework **11** comprises a pair of spaced parallel rods **30** (Figs. 1 and 3) which are mounted in the slots **28** in the frame member **10** for vertical adjustment. The rods extend transversely of the frame member and in a direction away therefrom. Adjacent the frame member **10**, the rods **30** are rigidly connected by means of a transversely extending brace **31** (Fig. 1) formed at its opposite ends with collars **32** which may be secured on the rods **30** by means such as set screws not visible. At the ends of the rods **30** opposite from the brace **31**, the rods are rigidly connected by a generally U-shaped handle **14** which may be secured to the rods telescopically, as illustrated, or which may be an integral part of the rods **30**.

Adjacent the brace **31** and on the opposite side of the frame member **10** from the brace, the rods **30** are provided with the handle portions **13** previously referred to. The rods **30** may be of tubular formation, and the handles **13** include end portions **33** telescoped into the portions of the rods **30** which are fitted in the slots **28**. The portions **33** of the handles may be rigidly secured to the rods **30** by means of the set screws previously referred to. Each of the portions **33** of the handles is provided with collar **34** secured thereto and abutting the frame member **10** in opposition to the collars **32**. The rods **30**, the brace **31**, and the handles **13** and **14** are thereby formed into a rigid framework for supporting the drill head **16**.

The brace **31** abuts against the frame member **10** and is slidably engaged therewith. In order to obtain vertical adjustment of the framework **11** relative to the frame member **10**, the frame member **10** is provided adjacent the top with a rotatably mounted, axially restrained, screw threaded shaft **36** which extends downwardly therefrom. The shaft **36** is threaded into a central upstanding post **37** integral with the brace **31**. The shaft **36** is provided at its upper end with a crank handle **38** which is accessible for manual operation in order to adjust the eleva-

tion of the framework **11** relative to the frame member **10**.

In order to provide for levelling the framework **11** when vertical adjustment is obtained by means of the screw shaft **36**, each of the rods **30** is provided, adjacent the handle **14** with an adjustable ground engaging support **12**. Each of the ground supports comprises a split bracket **40** which embraces the rod **30** and is rigidly clamped thereto by means of a tightening screw **41**. Laterally offset from the rod **30** each of the brackets **40** includes a vertically disposed tubular section **42** which receives a vertically extending post support **43**. The posts **43** are slidable in the tubular portions **42** and may be clamped in vertically adjusted positions by means of clamping screws **44** provided with handles for manual operation. Each of the post supports **43** is provided at the bottom end with a ground engaging angle member **45** adapted to rest on the ground, the track bed or ties. Thus, it will be seen that on vertical adjustment by means of the shaft **36**, the frame **11** may be levelled by adjustment of the posts **43**. The drill head may be provided with a suitable air bubble level tube **46** for indicating when the framework is level.

The drill housing or head **16** is provided at each of two opposite sides with a pair of laterally projecting arms **47** (Figs. 1 and 2) which terminate in tubular collars **48** slidable on the rods **30**. The head **16** is thereby mounted for adjustment and for feeding movement in the direction of the length of rods **30**.

The head **16** includes a rotatable spindle **50** (Figure 3) provided with suitable chuck means **51** for holding a drill bit such as that illustrated at **52**, usually a flat beaded bit for rail drilling. Rotation of the quill **50** is obtained by means of a drive motor mounted on the head **16**, herein illustrated as a gasoline engine **54** (Fig. 1) which may be supplied with fuel from a tank **55** supported on the engine. The engine **54** has been omitted from Fig. 3. Power is transmitted from the engine **54** by means of its drive shaft **56** which is provided with a sprocket and chain drive **57** (Fig. 3) to an intermediate shaft **58** supported in the head **16**. Power is transmitted from the shaft **58** to the spindle **50** by means of double chain and sprocket drives **59**. The chains and sprockets are desirably enclosed by a chain guard G.

In the drill illustrated, power feed of the drill head **16** is obtained from the power driven spindle **50**. However, the details of this power feed of the head **16** form no part of the present invention, and will be described only generally herein. The power feed is described more in detail and claimed in my copending application filed November 19, 1956 as Serial No. 623,073.

Generally, power feed of the head **16** is obtained by means of a shaft **60** pinned in a depending portion **61** of the cross brace **31**. The shaft **60** is formed with a screw threaded portion (not visible) projecting into the housing **16**, and the housing is provided with a rotatably mounted sleeve threaded on the shaft **60** and held against axial movement in the housing. The sleeve (not visible) is rotated by a pawl and ratchet mechanism **61** actuated by cam means **62** provided on a shaft portion **63** projecting from the rear of the housing **16** and integral with the rotatable spindle **50**. Thus, it will be seen that on rotation of the spindle **50**, power feed of the head **16** toward the rail **18** may be obtained, the housing sliding along the rods **30**.

The pawl and ratchet mechanism **61** may be disabled whenever desired and feed movement or withdrawal of the head obtained by means of a manually accessible crank handle **64** integral with the rotatable sleeve referred to.

The clamping mechanism previously referred to and generally designated **17** includes an elongated clamping bar or plate **66**. The bar **66** is formed with a block-like central portion **67** and vertically disposed elongated, generally flat portions **68** and **69** extending in opposite directions therefrom. The upwardly extending portion **68** is provided with outer spaced reinforcing webs **68***a* (Figs. 2 and 3) and an inner central reinforcing web **68***b* (Fig. 3). The downwardly extending portion **69** is provided with spaced outer reinforcing webs **69***a*.

Near its upper end, the clamp bar **66** is engageable with the frame member **10**, and adjacent its lower end is engageable with the web **18***b* of the rail **18**. To To this end the frame member **10**, at its upper end **18**. To this end, the frame member **10**, at its upper end is formed with a laterally projecting abutment part **70** (Fig. 3) and spaced reinforcing webs **70***a* which brace the abutment member **70**. The outer edge of the extension **70** forms an abutment surface engageable with the upper end of the clamp member **66** and is formed with spaced guide lugs **71** for receiving the upper end of the clamp bar therebetween. The base leg **20** of the frame member **10** also includes a laterally projecting portion **72** formed with spaced guide lugs **73** which receive therebetween the block-like central portion **67** of the clamp bar **66**. At its lower end, the clamp bar **66** is provided with spaced laterally projecting abutment parts **75**. Inasmuch as the clamp bar **66** is vertically aligned with the drill bit **52**, and the abutment members **75** are generally at about the level of the drill bit, the lugs are spaced apart by a sufficient amount to accommodate the drill bit **52** when it projects through the rail web **18***b*.

In order to mount the clamp bar **66** for clamping engagement with the frame member **21** and the rail and for release therefrom, the cross brace **31** connecting rods **30** is formed with a horizontally disposed post **77** (Figs. 1 and 3) positioned above the level of the rail and having threaded therein adjustably a horizontally disposed rod **78**. The rod **78** is thereby fixed in the framework **11** for adjustment in the direction of its length. The post **77** and the rod **78** project through a vertically elongated opening **79** provided in the central post section **21** of the frame member **10**. The arrangement of the post **77** in the elongated opening **79** permits vertical adjustment of the cross brace **31** relative to the frame member **10**, as previously described. The clamp bar **66** at the central block like portion **67** is also provided with a vertically elongated opening **81** through which the rod **78** projects. The clamp bar is thereby loosely mounted on the rod **78**. The elongated slot **81** also permits the vertical adjustment previously referred to, in addition to providing further advantages described hereinafter. A spring **82** surrounds the post **77** and the rod **78** and bears against the frame member **10** and against the clamp bar **66** to normally urge the clamp bar away from the frame member **10**.

In order to clamp the bar tightly against the frame member and the rail, the rod **78** is provided with a movably mounted lever arm having a cam for engagement with the clamp bar. To this end, the rod **78** carries a pivot block **80** rotatable on the rod and provided with oppositely projecting trunnions **81**. The cam lever comprises a yoke shaped lower portion having spaced depending legs **82** rigidly connected by a cross member **83**. The depending legs **82** are pivotally mounted on the trunnions **81** for movement about an axis transverse to the axis of the rod **78**. An elongated handle portion **85** is threadably secured in the cross member **83** to permit manual operation of the lever. The depending legs **82** each include a cam portion **87** engageable with the block like central portion **67** of the clamp bar **66**. On movement of the lever arm in one direction (clockwise in Fig. 3) about the axis **81** the cams **87** engage the clamp bar to force it tightly against the frame member **10** and the rail **18**. On movement of the lever in the opposite direction the cam bar **66** is quickly released. The pivot block **80** is retained on the rod **78** by means of a retaining nut **89** threaded on the rod **78** and hold in position by a set screw **90**. The exterior of the nut **89** may be knurled to facilitate adjustment of the rod **78** in the post **77**.

In operation, when the cam lever is moved to the posi-

tion illustrated in the drawings, particularly Fig. 3, the depending abutment members **26** on the frame **10** are drawn against one side of the ball of a rail. At the same time the clamp bar **66** is forced tightly against the abutment member **70** of the frame **10**, and tightly against the web of the rail. In this manner, the frame member **10**, and therefore the framework **11** and drill head **16**, are rigidly attached to the rail without the use of tools. During feed of the drill head **16** when the drill bit engages the rail, there is a tendency for the drill head to back away from the rail and to rise. This undesirable tendency is opposed by the clamping mechanism described and the drill bit is effectively held in the desired position.

The cam lever illustrated may be operated to quickly release the clamp bar **66** and thereby permit quick removal of the drill from the rail and out of the path of an approaching train. This quick release also permits slidable movement of the entire rail drill along the length of the rail for repositioning the bit **52** to drill successive holes in spaced positions along the rail with a minimum of time and labor.

Also, when it is desired to withdraw the drill bit and completely remove the rail drill from the rail for use somewhere else, the pivot block **80** permits rotation of the cam lever on the rod **78** so that the lever may be flopped over to lie on one of the handles **13**. The elongated slot **81** in the clamp bar **66** in addition to permitting the vertical adjustment described, also facilitates rotation of the clamp bar about the rod **78** and sliding movement of the clamp bar relative to the rod **78**, so that when released the clamp bar may also be flopped over to lie on one of the handles **13**. In this manner, no projecting parts are left below the level of the rail on one side so that the entire rail drill may be readily withdrawn and removed for use elsewhere. The spring **82** is effective to retain the clamp bar and cam lever in whatever positions they are placed.

I claim:

1. A rail drill, comprising, an upright drill supporting frame having support means positionable on the top of a rail at spaced positions along the rail to support the drill and laterally facing abutment means engageable with one side of the rail when the support means is positioned on the rail, a pair of spaced parallel rods extending laterally from the frame and vertically slidably mounted therein for adjustment, a brace rigidly connecting the rods adjacent the frame and vertically slidable against the frame for adjustment with the rods, manually operable screw means connected between the frame and the brace for vertically adjusting the rods and brace relative to the frame, ground engaging drill support means vertically adjusting on the rods at positions spaced from the brace to maintain the rods in level positions, a drill head slidable on the rods toward and away from the frame, a drill spindle rotatable in the head, drive means on the head for rotating the spindle, and clamping means carried by the brace and engageable with the frame and the rail for securely clamping the frame to the rail.

2. A portable rail drill for drilling a hole in the web of a rail, comprising, a frame member having support means adapted to rest on the top of a rail and laterally facing abutment means at one side thereof engageable with one side of the rail when the support means is rested on the rail, a framework vertically slidably mounted on the frame member at said one side thereof for vertical adjustment, a drill head mounted on the framework, a post on the framework extending laterally therefrom through an opening in the frame member to the opposite side of the frame member, a clamp bar loosely mounted on the post, said clamp bar having one end engageable with the frame member above the rail and an opposite end engageable with the web of the rail on the side of the rail opposite said abutment means, and a lever on the post having a cam engageable with the clamp bar to force the bar tightly against the frame member and the rail web.

3. A rail drill, comprising, a frame having support means adapted to rest on the top of a rail and laterally facing abutment means at one side of the support means engageable with one side of the rail when the support means is rested on the rail, a drill head on the frame at said one side of the support means having a rotatable spindle at the level of the rail web for supporting a drill bit to drill the rail web, and clamping mechanism for securing said frame to the rail including, a clamping bar loosely supported on the frame at the opposite side of the support means for engagement with the frame at a position spaced above the level of the rail and for engagement with the web of the rail at the side opposite said abutment means and drill head, and means acting between the frame and the clamping bar for forcing the clamping bar tightly against the frame and the rail web.

4. A portable rail drill, comprising, a frame including an upright support having spaced rollers engageable with the top of a length of rail and spaced lugs at one side of the rollers for engagement with one side of the rail, a drill head on the frame at said one side of the rollers, an abutment on said support projecting laterally to the opposite side of the rollers, spaced guide flanges on the abutment and on said support, a post on the frame projecting laterally away from said drill head to said opposite side of the rollers, a clamp bar loosely mounted on the post and positionable within the guide flanges, the clamp bar being engageable adjacent its upper end with said abutment and having adjacent its lower end a lateral projection engageable with the web of the rail on the side of the rail opposite said lugs, and means on the post engageable with the clamp bar to clamp the bar tightly against the abutment member and the rail web.

5. A portable rail drill for drilling a hole in the web of a rail, comprising, a frame including support means positionable on the top of a length of rail and laterally facing abutment means adapted to engage one side of the ball of the rail when the support means is positioned on the rail, a drill head on the frame at said one side of the rail, a rotatable spindle on the drill head at the level of the rail bed for supporting a drill bit to drill the rail web, a laterally projecting post longitudinally adjustable in the frame and extending to the opposite side of the rail, a clamp plate loosely mounted on the post for engagement adjacent its upper end with said support above the level of the rail and for engagement adjacent its lower end with the web of the rail on the side opposite the abutment means and drill head, a spring surrounding the post and bearing against said support and said clamp plate, and a lever arm pivoted on said post and having a cam engageable with said clamp plate in opposition to the spring to clamp the plate tightly against said support and rail web on pivotal movement of the lever in one direction and effective to quickly release the clamp plate on movement of the lever in the opposite direction.

6. A portable rail drill, comprising, a frame having a support adapted to rest on the top of a rail and abutment means engageable with one side of the rail, a drill head on the frame at said one side of the rail, a post in the frame adjacent said support and extending laterally therefrom to the opposite side of the rail, an elongated clamp bar having an opening therethrough elongated in the direction of the length of said bar and through which said post projects loosely, said clamp bar being engageable with said support above the level of the rail and engageable with the web of the rail at the side opposite said abutment means, a pivot block rotatable on the post beyond the clamp bar, and a lever arm pivoted on the pivot block on an axis normal to the post axis and having a cam engageable with the clamp bar to clamp

the bar against said support and rail web on pivotal movement of the arm in one direction and effective to release the clamp bar on movement in the opposite direction.

7. A portable rail drill, comprising, a frame having an upright support adapted to rest on the top of a rail and having an abutment to engage one side of the rail, a drill head on the frame at said one side of the rail, a pair of spaced handles secured in said frame and extending laterally to the opposite side of the rail, a post in the frame adjacent said support, between said handles, above said abutment and extending in a direction away from the drill head to said opposite side of the rail, an elongated clamp bar having an opening therethrough elongated in the direction of the length of said bar and through which said post projects, a spring surrounding said post and bearing against said support and said clamp bar to normally urge the clamp bar away from said support, said clamp bar being engageable with said support above the level of the rail and engageable with the rail web, a pivot block rotatable on the post beyond the clamp bar, and a lever arm pivoted on the

pivot block on an axis normal to the post axis and having a cam engageable with the clamp bar to clamp the bar against said support and rail on pivotal movement of the arm in one direction and effective to release the clamp bar on movement in the opposite direction, said pivot block mounting of said lever arm permitting rotation of the lever on the post on release of said clamp bar to lay the lever arm over one of said handles, and said elongated slot in said clamp bar permitting rotation and sliding movement of the clamp bar relative to said post on release of the clamp bar to also lay the bar over on one of said handles, and said spring being effective to retain said lever arm and clamp bar in said last named positions.

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