

May 3, 1966

E. M. SHEPERD ETAL

3,249,334

HYDRAULIC SPIKE PULLER

Original Filed Feb. 27, 1962

5 Sheets-Sheet 1

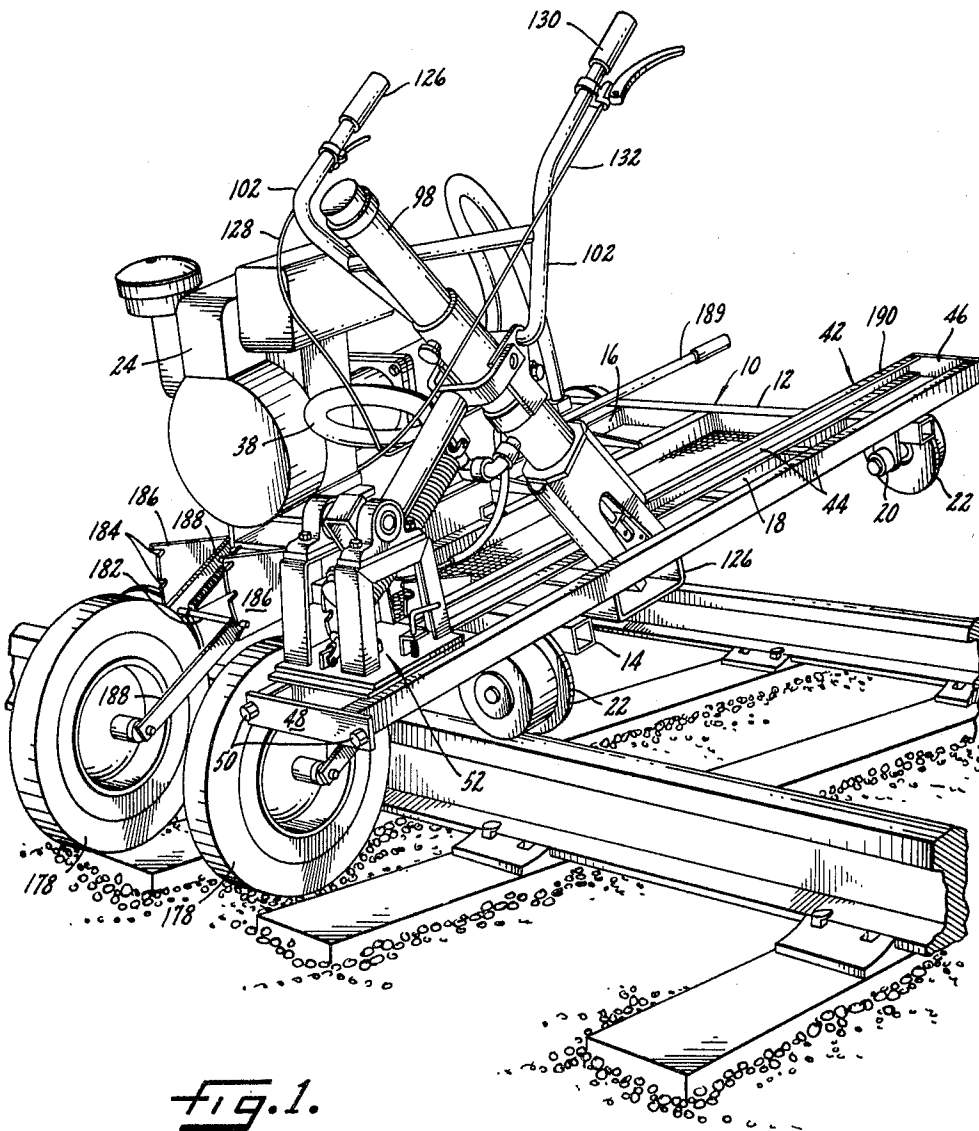


Fig. 1.

INVENTORS,
ERVIN M. SHEPERD
EDWARD H. KRAUSE, JR.
BY
Parker & Carter
Attorneys.

May 3, 1966

E. M. SHEPERD ETAL

3,249,334

HYDRAULIC SPIKE PULLER

Original Filed Feb. 27, 1962

5 Sheets-Sheet 3

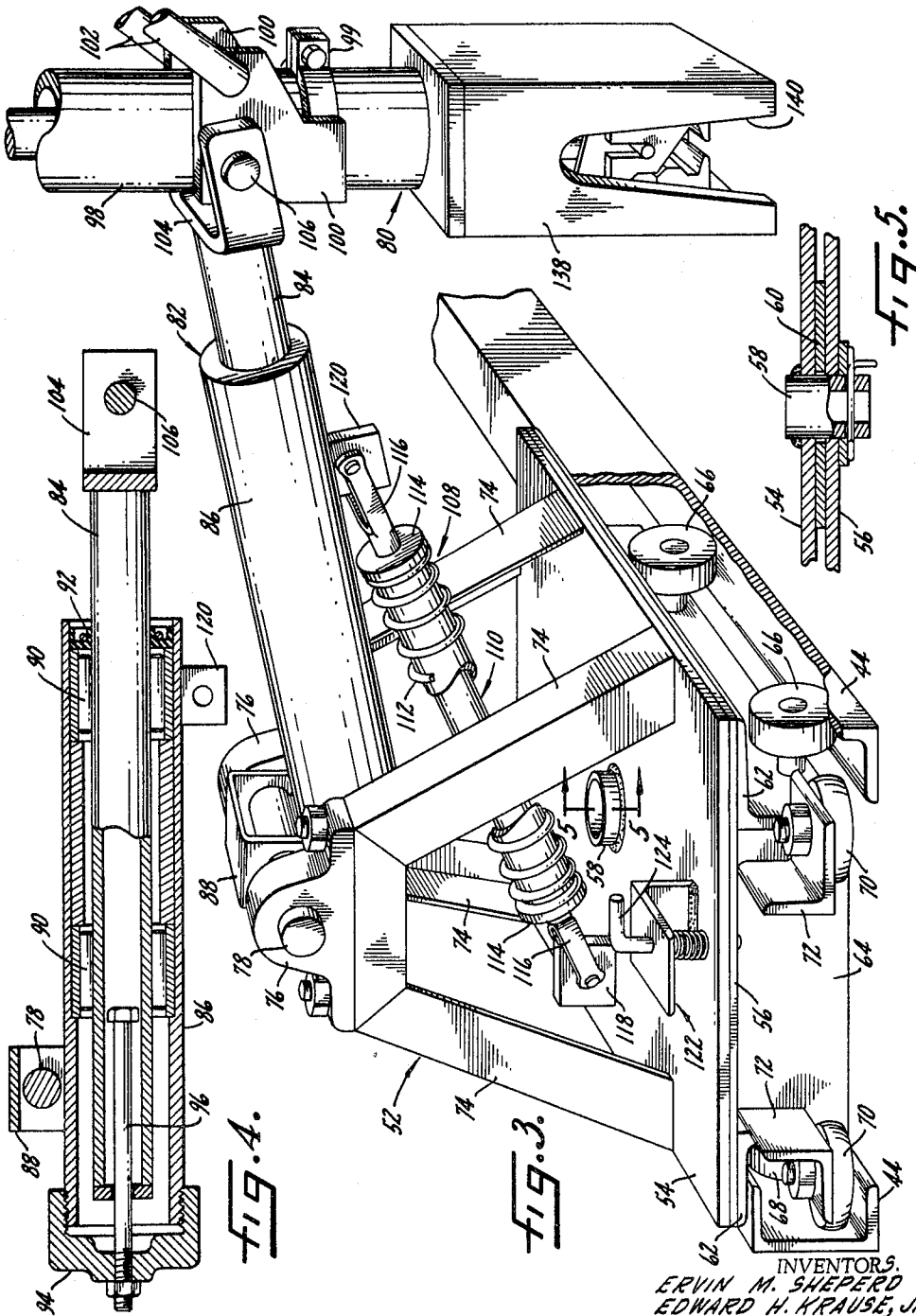


FIG. 4.

FIG. 3.

FIG. 5.

INVENTORS,
ERVIN M. SHEPERD
EDWARD H. KRAUSE, JR.
BY
Parker & Carter
Attorneys.

May 3, 1966

E. M. SHEPERD ETAL

3,249,334

HYDRAULIC SPIKE PULLER

Original Filed Feb. 27, 1962

5 Sheets-Sheet 4

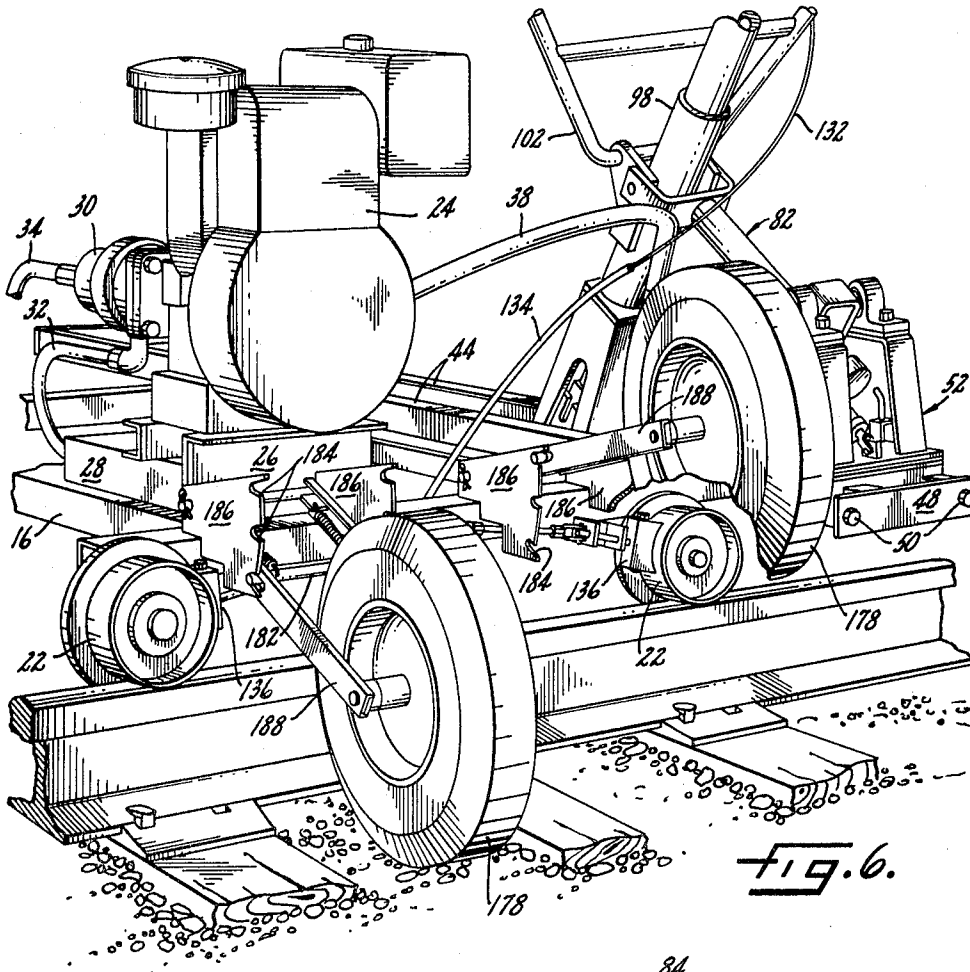


FIG. 6.

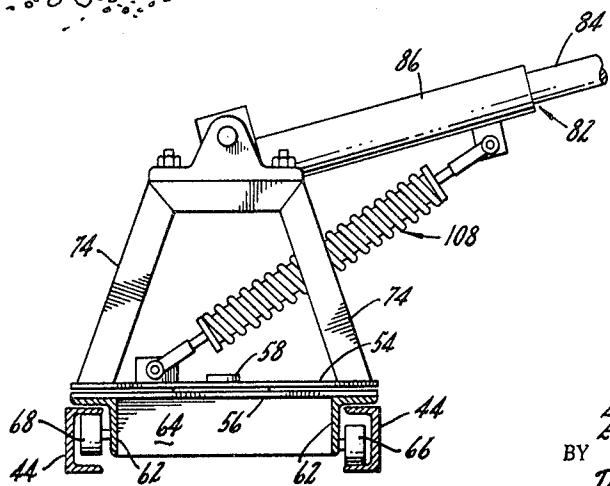


FIG. 7.

INVENTORS.
ERVIN M. SHEPERD
EDWARD H. KRAUSE, JR.
BY
Darker & Carter
Attorneys.

May 3, 1966

E. M. SHEPERD ET AL

3,249,334

HYDRAULIC SPIKE PULLER

Original Filed Feb. 27, 1962

5 Sheets-Sheet 5

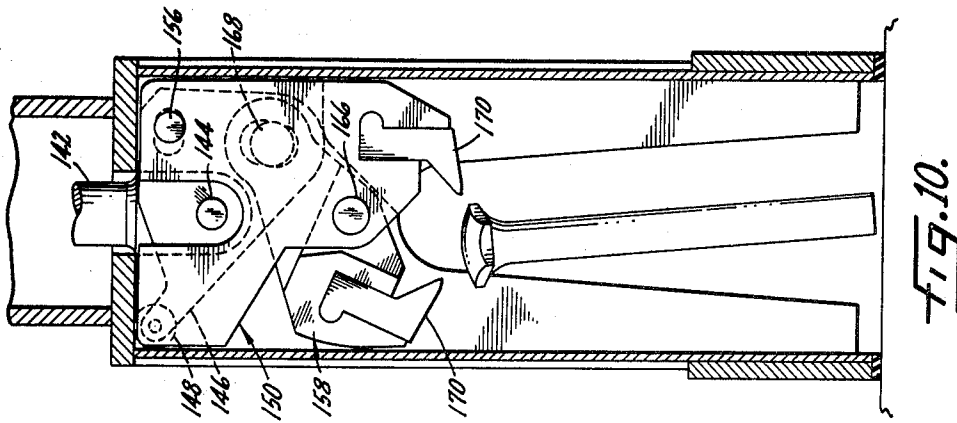


FIG. 10.

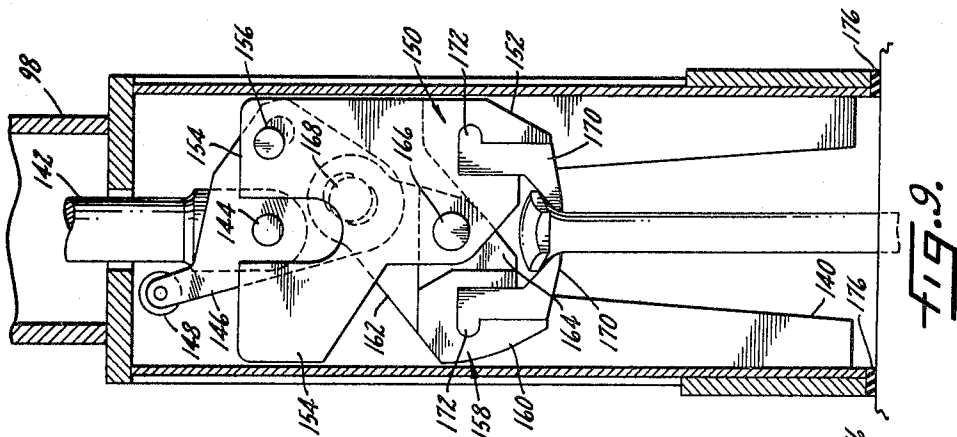


FIG. 9.

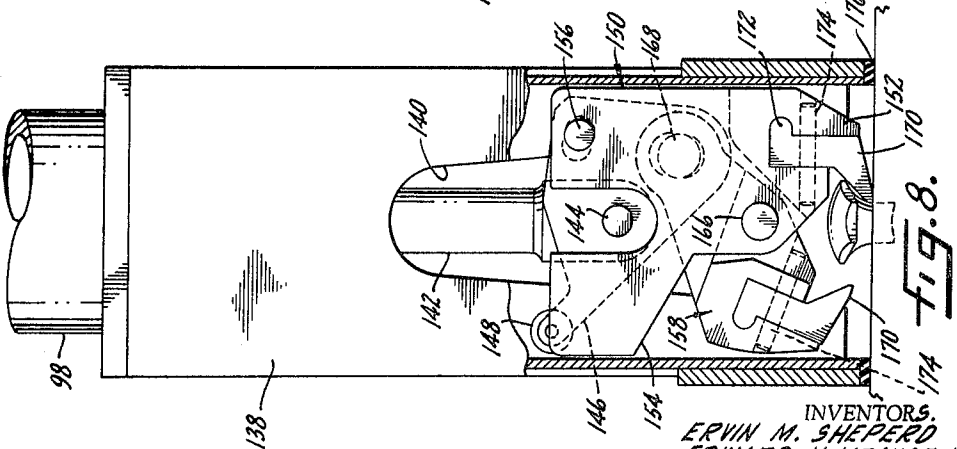


FIG. 8.

INVENTORS,
ERVIN M. SHEPERD
EDWARD H. KRAUSE, JR.
BY
Darker & Carter
Attorneys

1

3,249,334

HYDRAULIC SPIKE PULLER

Ervin M. Sheperd and Edward H. Krause, Jr., Milwaukee, Wis., assignors to Nordberg Manufacturing Company, Milwaukee, Wis., a corporation of Wisconsin
 Original application Feb. 27, 1962, Ser. No. 176,064, now Patent No. 3,137,479, dated June 16, 1964. Divided and this application Mar. 2, 1964, Ser. No. 354,200
 4 Claims. (Cl. 254-18)

This is a division of Serial No. 176,064, filed February 27, 1962, now United States Patent No. 3,137,479, issued June 16, 1964.

This invention is in the field of spike pullers to be used to pull the spikes on railroad tracks and is concerned with a hydraulically operated spike puller, although it may be otherwise.

A primary object of the invention is a spike puller for use on railroad track which is compact, simple and fast.

Another object is a spike puller of the above type which is designed for pulling spikes on both rails, but is, nevertheless, a one man machine.

Another object is a spike puller in which the operator bears none of its weight.

Another object is a spike puller with simple controls.

Another object is a spike puller with pulling claws of the gripping type to pull any size or condition of spike.

Another object is a spike puller with pulling claws having replaceable wearing parts.

Other objects will appear from time to time in the ensuing specification and drawings in which:

FIGURE 1 is a perspective of the spike puller in set off condition;

FIGURE 2 is a perspective of the spike puller in spike pulling position;

FIGURE 3 is a perspective of the spike pulling gun and its supporting mechanism, partly broken away for clarity;

FIGURE 4 is a longitudinal section through the telescopic mounting for the gun itself;

FIGURE 5 is a section along line 5-5 of FIGURE 3;

FIGURE 6 is a partial perspective;

FIGURE 7 is a schematic of the traversing carriage; and

FIGURES 8, 9 and 10 are side views of the spike pulling gun, partly broken away, showing various operating positions.

In FIGURES 1 and 2, the invention has been shown with a generally square or rectangular frame 10 made up of longitudinally disposed side tubes 12 and 14 interconnected by laterally disposed front and rear angles 16 and 18 or the like. These parts are suitably connected by welding or otherwise and it will be noted that the side tubes extend somewhat beyond each end of the frame and support a bearing 20 at each corner for a suitable flanged wheel 22.

The frame supports a suitable source of power, for example a gasoline engine 24 mounted at 26 on a tank or reservoir 28 for hydraulic fluid or the like, which in turn is mounted on the frame. The engine drives a pump 30 which draws fluid from the tank through a suitable line 32 and sends it through a suitable line 34 to a valve 36 mounted on the frame. The valve, in turn, controls the supply of fluid through a line 38 to a spike puller, to be explained in detail hereinafter, or returns fluid by a line 40 to the tank or sump.

It will be noted that the power source, pump, valve, tank, etc. are mounted more or less on the front of the frame. A cross slide, indicated generally at 42, is mounted across the rear. The cross slide is made up of suitable rails 44 which, in the form shown, are oppositely disposed channels, facing inwardly toward each other, suitably welded or otherwise connected to frame members

2

12 and 14 and extending beyond the outer ends of the frame so that these tracks or slides or channels overlap both rails, when the vehicle is mounted on track, as shown in FIGURES 1 and 2. They may extend any suitable distance on each side of the rails. For example, the cross slide might be approximately, but not necessarily, about the same length as a tie, or somewhat less. In any event, one end of the cross slide may be closed by a suitable flat 46 welded or otherwise held across the ends of the channels while the other end has a plate 48, removably mounted across it by bolts 50 or the like to allow the spike puller to be mounted and removed.

The cross slide serves as a track or channel for a traversing carriage, indicated generally at 52. As shown more in detail in FIGURE 3, it may include upper and lower carriages 54 and 56 pivoted to each other at 58 on a suitable washer type bearing or spacer 60. The lower carriage 56, which is in the form of a plate, rectangular, square or otherwise, has back-to-back angle irons 62 suitably connected by welding or otherwise along the front and rear edge and closed on each end by a cross plate 64 to thus define a square or rectangular box below the lower carriage. The dimensioning is such that the box will fit between the channels 44 of the cross slide. Suitable rollers or wheels, 66 rear and 68 forward, project from the sides of the box and fit into the channels 44 so that the entire carriage may roll back and forth. To prevent the carriage from twisting or canting in the channels, stability rollers 70 are mounted about vertical axes on flanges 72, welded or otherwise connected to extend from the ends of the box so that the rollers 70 will bear against the inside of the channels 44 of the cross slide. The result is that the weight of the traversing carriage is carried by the rollers 66 and 68 while stability is maintained by the rollers 70.

Since the upper carriage 54 is pivoted at 58 on the lower carriage, we have the effect of a turntable. A frame in the form of four upstanding, inclined legs or angles 74, suitably welded or otherwise connected to the upper surface of the upper carriage, extend up to bearing or pillow blocks 76, suitably spaced from each other to support a pivot 78 for the spike puller, indicated generally at 80. The spike puller is mounted on a boom 82 which is telescopic, an inner tube or rod 84 fitting in an outer tube 86, the outer tube 86 being connected to the pivot 78 by a U-shaped bracket 88, the legs of which are welded or otherwise suitably connected to the outside of the outer tube 86 with the pivot 78 extending through that portion of the bracket above the outer tube.

As shown in FIGURE 4, the boom may have suitable bearings 90 between the inner and outer tubes with a seal 92 at one end and a closing cap 94 at the other. A bolt 96 extends from the cap 94 inside of the end of the inner tube to thereby define or limit the travel of the telescopic connection.

The spike puller 80 may have a power cylinder 98 which, in detail, may be the same as that shown in U.S. Patent No. 2,797,889, issued July 2, 1957, or otherwise. In any event, suitable plates 100 are mounted on the outside of the piston 98, one on each side, and held by a clamp 99, with ears through which handlebars 102 extend. A yoke 104 straddles the plates to provide a pivotal connection at 106 on each side while the yoke is connected to the outer end of the inner tube 84 of the telescopic boom. Thus, movement of the handlebars will pivot the power piston and cylinder 98 in the yoke 104.

The weight of the boom and spike puller is counter-balanced by a spring mechanism 108 which includes telescoped guides 110 surrounded by a suitable coil spring 112 or the like compressed between abutments 114 at each end. The guides have yokes 116 at each end which

connect to flats at each end, one 118 welded or otherwise connected to the upper carriage, and the other 120 on the outer tube of the telescopic boom.

We mount a spring biased lock 122 of any suitable type on the upper carriage which may have a handle 124 for the user to operate. The lower carriage has suitable openings to accept the lock, and we position one so that the upper carriage may be locked in an operating position, such as shown in FIGURE 2, with the boom extending longitudinally or in a traveling position, such as shown in FIGURE 1, with the boom extending laterally. Thus, the spike puller may be pivoted to the travelling position and we connect, by welding or otherwise, a suitable channel 126 to the bottom of the cross slide as a rest or support for the lower end of the spike puller, as shown in FIGURE 1.

The handles of the handlebar may have suitable controls or levers that operate the spike puller and the brake. For example, the right handle 126 may have a lever connected to a boden wire 128 running to the valve 36. Thus, manipulation of this lever will supply or cut off hydraulic fluid to the power cylinder of the spike puller by operating the valve 36. The other handle 130 may have a lever connected to a boden wire 132 or the like extending through a suitable guide 134 connected to the frame and, in turn, running to brakes 136 which bear against the wheels on the left side in FIGURE 2.

As shown in FIGURE 7, we offset the wheels 66 and 68 on the traversing carriage somewhat to counteract the weight of the boom and spike puller. For example, the rear wheels 66 are set on an axis somewhat lower than the front wheels 68 so that the rear wheels bear on the bottom flange of the rear channels 44 while the front wheels bear against the top flange of the front channels 44. Thus, the turntable will be maintained in a generally horizontal and stable position during operation.

The power cylinder 98 of the spike puller may have a suitable housing or guide 138 connected to the lower end thereof which may have a generally open interior and open on the lower end thereof with side slots 140, if desired. The housing may be generally rectangular or square in cross section on the inside and serves as a vertical guide for the operating jaws of the spike puller, shown more in detail in FIGURES 8 through 10. The piston rod 142 extends into the guide and is pivoted at 144 to a pair of pivot pieces 146, one on each side of the piston rod, each having an upper arm extending up to a roller 148. A non-pivoting jaw 150, which is made in the form of a yoke with a solid portion 152 at the bottom and upstanding ears 154 on each side, is connected at 156 to the other side of the pivot pieces 146 by a pin and slot connection to allow a certain amount of play. It should be noted that the sides of the non-pivoting jaw fit sufficiently snugly against the sides of the housing such that the jaw can only move up or down, much like a piston. It will be understood that the pivot pieces 146 extend down inside of the upstanding ears 154 of the non-pivoting jaws, as shown in broken lines in FIGURES 8 through 10. A pivoting jaw 158 has a solid, somewhat wider, lower portion 160 and an upstanding ear 162 which also extends up inside of the ears 154 of the non-pivoting jaw. A third section of an intermediate thickness, as at 164, extends up inside of the ears on the non-pivoting jaw and is pivoted thereto at 166. The upper end of the ear 162 is connected to the lower end of the pivot piece 164 by a pin and slot connection 168.

Both the non-pivoting jaw and the pivoting jaw may have laterally disposed slots across their lower ends to accept undercut spike jaws 170 dovetailed somewhat at the top, as at 172, and held therein by a removable pin or the like 174. The bottom of the frame or guide 138 may have a wear-resistant surface or coating or hard weld 176, if desired.

We may mount one or more set off wheels 178 on one side, shown in this case as two such wheels, each being

mounted on arms 188 pivoted to the frame and adapted to be adjusted to any one of three possible positions by pulling spring biased bar 182 outwardly and moving the arms 188 up or down until the bar falls in one of the appropriate notches 184 in the segments 186, also mounted on the frame. Thus, the wheels may be in a raised position while the device is pulling spikes or may be in a lowered position so that the operator may wheelbarrow the device off of the track. For this purpose, we may provide a handlebar 189 welded or otherwise suitably connected to the frame and projecting from the opposite side on the forward part of the frame. The operator may stand next to the frame, facing it with his right hand on the handle 189 and his left hand on the portion designated 190 of the slide rail of the cross slide to raise the right side, in FIGURE 1, with the left side resting on the set off wheels.

The use, operation and function of my invention are as follows:

We provide a power operated spike puller which, although it is shown as manually movable on the rails, may have power to the wheels. But since it is a quite small unit, power operated wheels are not considered necessary.

One advantage of the present arrangement is that the operator may push the buggy or carriage along until it is positioned where the spike puller 80 is fairly close to a spike to be pulled. The operator then closes the lever on the left handlebar 130, which actuates the brakes and holds the carriage in place. He then moves the spike puller either in or out by the telescopic boom until the jaws are positioned directly over the spike to be pulled. Also, the traversing carriage may be moved to either one way or the other, depending upon whether the spike is inside or outside of the rail, to get accurate alignment. The spike puller may then be depressed until the jaws grip the spike head.

This can all be done very simply and easily since the weight of the spike puller is counterbalanced by the spring arrangement under the telescopic boom. Once in position, the operator actuates the lever on the right handlebar which operates the valve to supply high pressure fluid to the power cylinder above the jaws which in turn operates the jaws.

The operator may easily flip the set off wheels 178 to their raised position, as shown in FIGURE 2, when the machine is working. But when he wishes to set off to allow traffic to pass, both wheels may be put in the lower position in FIGURE 1 and then the device wheelbarrows off the track. When either traveling or during set off, the upper carriage may be unlocked and pivoted to the position shown in FIGURE 1 in which the boom is lateral and the end of the spike puller may be put in its socket 126. Thus, the entire machine is compact and can be wheelbarrowed without difficulty.

As shown in the various positions in FIGURES 8, 9 and 10, the jaws automatically close at the bottom to grab the spike head and automatically open on the top to release the withdrawn spike. The operator manipulates the handlebars so that the non-pivoting jaw is fitted in under the spike head. Then by pressing down on the handlebars and spike puller, the non-pivoting jaw is forced up somewhat and the pin rises in the slot at 156, which pivots the pivot pieces 146 clockwise. This moves the pin in the slot at 168 to pivot the pivoting jaw 158 counterclockwise, thus bringing the other spike jaw under the spike head. It should be noted that when the spike puller is being carried with pressure on the non-pivoting jaw 152, the relationship of the part is such that the pivoting jaw 160 will be pivoted open by gravity.

When the piston rod 142 starts its up movement, the pivoting and non-pivoting jaws have an ice tong action to draw the spike up with them. Toward the top of the stroke, the cam roller 148 on the pivot pieces will hit the top of the guide, as shown in FIGURE 10, and further

movement will cause the pivot pieces 146 to pivot counter-clockwise. Through the pin and slot connections 156 and 168, this will move pivoting jaw 160 clockwise, thereby opening the jaws and dropping the spike.

Thus, the jaws automatically open at the top of the stroke to drop the spike and automatically close at the bottom when the operator pushes the non-pivoting jaw 152 down against the rail plate. Thus, at both extremes or ends of its movement, the jaws are completely automatic.

One advantage of the structure shown is that the jaw inserts 170 may be removed and replaced when worn, and this may be done simply and quickly in the field. Further, these inserts may be coated or supplied with a surface hardening or made from a special steel to withstand the abrasion and wear from contact with the plates and spike heads. Thus, the entire jaw mechanism does not require replacement.

While we have shown and described the preferred form and suggested several variations of our invention, it should be understood that suitable additional variations, substitutions, modifications, changes and alterations may be made without departing from the invention's fundamental theme. We, therefore, wish that the invention be unrestricted, except as by the appended claims.

We claim:

1. In a hydraulic spike puller to be used on a railroad track, a housing to be disposed generally vertically over a spike to be pulled, a pair of jaws pivotally mounted relative to each other in the housing to be moved between a lower and a raised position, the jaws being constructed to grab the head of a spike when in the lower position, power means for raising and lowering the jaws, and cam surface means and a linkage means effective between the jaws to operate them in response to operation of the power means such that the jaws will automatically open in the raised position to release the thus withdrawn spike and will close automatically in response to one of the jaws being pressed down against a tie in their lower position to grab the head of a spike.

2. The structure of claim 1 further characterized in that the jaws include a relatively non-pivoting jaw slidably mounted in the housing, the housing being in the form of an elongated generally closed channel the interior of which is closely fitted to and, therefore, re-

strains the relatively non-pivoting jaw against pivoting, the power means including a power operated piston, piston rod and cylinder, the linkage means being connected to the piston rod thereof, and the cam surface means including pin and slot connections between the jaws and linkage means such that the jaws will normally be open, but when pressure is applied to the relatively non-pivoting jaw, the movable jaw will close automatically.

3. The structure of claim 2 further characterized in that the cam surface means includes a cam roller on the linkage means and a cam surface means in the housing to be engaged by the roller to move the linkage means, when the jaws are drawn sufficiently upwardly, to withdraw a spike, thereby causing the jaws to open and release the thus withdrawn spike.

4. For use in a spike puller, a jaw insert to be removably mounted in a jaw structure of the spike puller having a slot therein opening laterally therebetween and closed front and rear, the jaw insert having a shank which is about as wide as it is long with generally flat front and rear surfaces so that the jaw insert may be laterally inserted in the open sided slot in the jaw structure, a full width tab offset to the rear of the shank at the upper end thereof to dovetail into a corresponding slot in the jaw structure, and a full width tooth offset on the front shank of the opposite tab and at the lower end and having a spike head engaging face generally at an obtuse angle to the shank.

References Cited by the Examiner

UNITED STATES PATENTS

769,032	8/1904	Thatcher	-----	254—20
1,531,941	3/1925	Hosmer et al.	-----	254—21
1,556,755	10/1925	Burman	-----	81—423
2,570,915	10/1951	Buck	-----	254—18
2,676,838	4/1954	Gardner	-----	294—104
2,709,570	5/1955	Henry	-----	254—18
2,870,988	1/1959	Vazquez	-----	254—22
2,945,674	7/1960	Hursh	-----	254—18

FOREIGN PATENTS

773,112	4/1957	Great Britain.
---------	--------	----------------

WILLIAM FELDMAN, *Primary Examiner.*

MILTON S. MEHR, *Examiner.*