July 22, 1952 L. POLSELLI ET AL 2,604,300

PIN PULLING MACHINE

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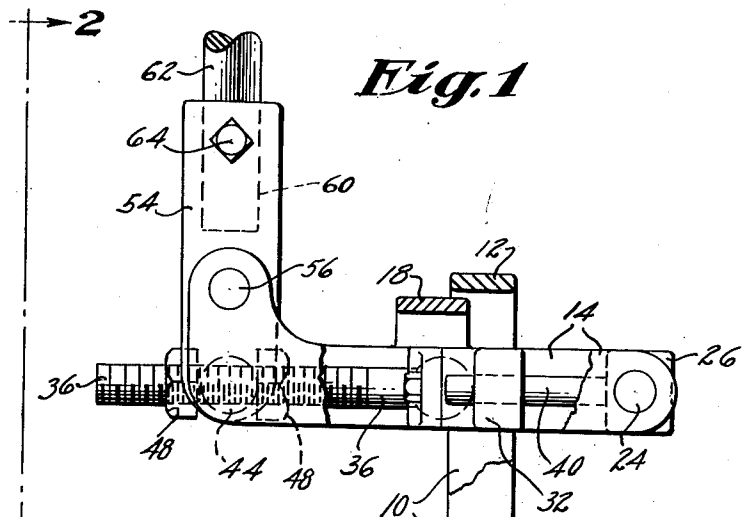



Fig. 1

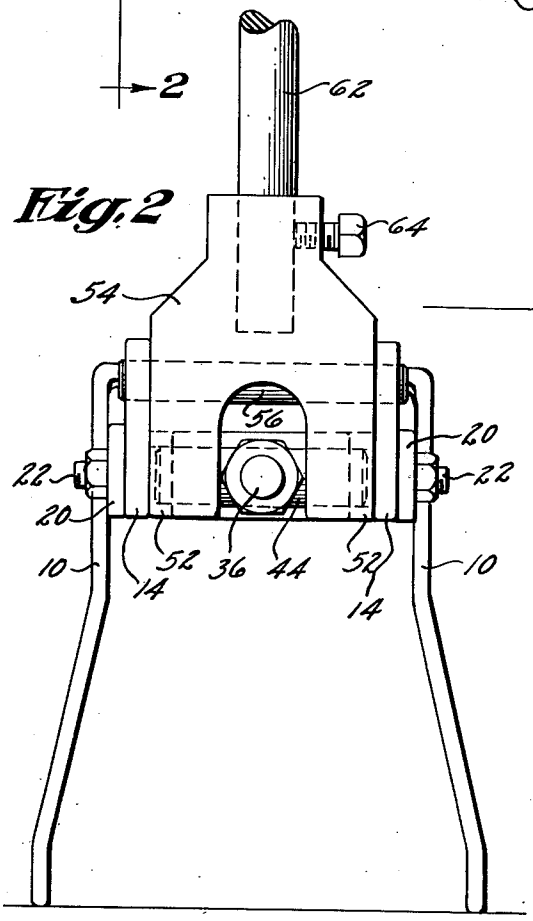



Fig. 2

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Fig. 3

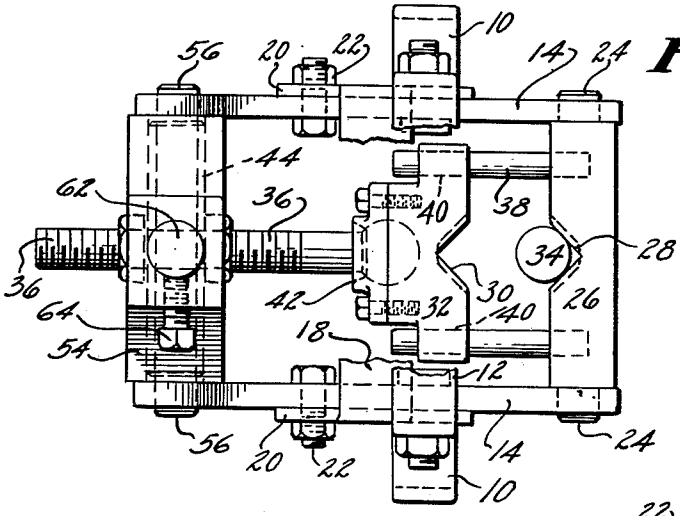



Fig. 5

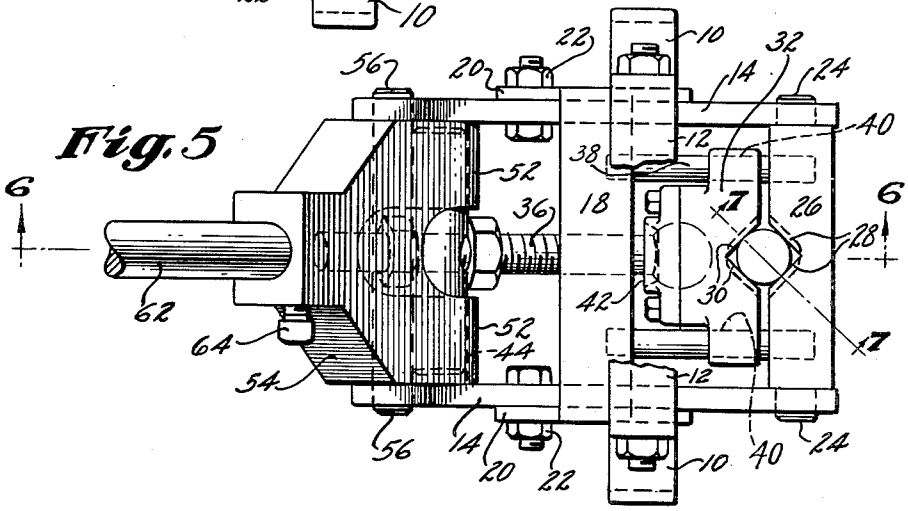
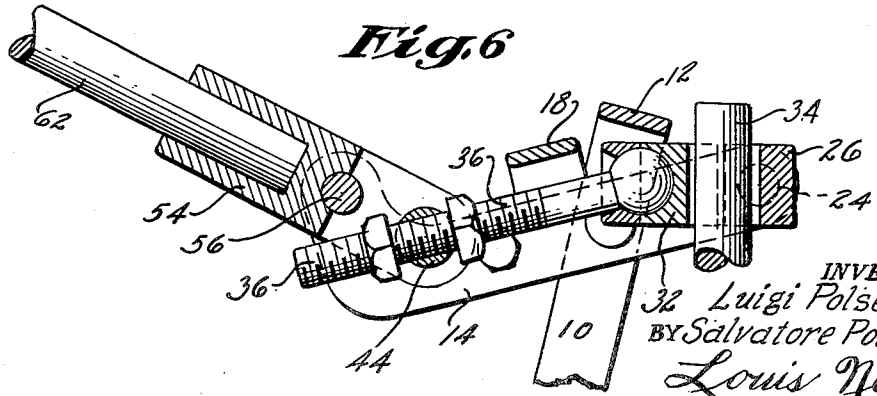



Fig. 6




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Fig. 7

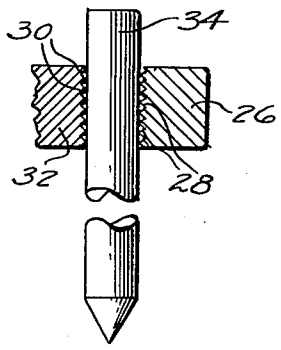



Fig. 4




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# UNITED STATES PATENT OFFICE

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## PIN PULLING MACHINE

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1 Claim. (Cl. 254—132)

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Our invention relates to a pin pulling machine of the type used for pulling out pins which are driven into the ground as markers or for holding concrete forms in road work or building construction.

One object of the invention is to produce an improved pin pulling machine of the type set forth.

A further object is to produce an improved pin pulling machine the pin-gripping element of which is pivotally mounted so as to adjust itself automatically to adequate gripping position whether the pin be vertical or whether it be at angle to the vertical, to the end that the pin is pulled out in the direction of its axis thereby facilitating the work and reducing disturbance to the ground adjacent the pin.

A still further object is to make a relatively small and compact machine which can readily be transported from one location to another.

A still further object is to produce an improved pulling machine which will be sturdy and which can be used for efficiently pulling out the types of pins used in average construction work.

These and other objects are attained by our invention as set forth in the following specification and as shown in the accompanying drawing in which:

Fig. 1 is a view, partly in side elevation and partly in section of a pin pulling machine embodying our invention the same being shown in non-operating position.

Fig. 2 is a rear elevational view looking in the direction of line 2—2 on Fig. 1.

Fig. 3 is a top plan view of the machine shown in Fig. 1.

Fig. 4 is an enlarged perspective view of the machine shown in operating position.

Fig. 5 is a reduced top plan view of the machine as shown in Fig. 4.

Fig. 6 is a section on line 6—6 on Fig. 5.

Fig. 7 is a section on line 7—7 on Fig. 5.

The machine illustrated includes a yoke formed of downwardly diverging legs 10 adapted to rest on the ground to form a fulcrum point and a cross piece 12 which connects the upper ends of the legs. To the legs 10, at a point below the cross piece 12, there are secured, as by bolts and nuts 16, two spaced horizontal side arms 14. If desired, a reinforcing member formed of a cross piece 18 and side pieces 20 may also be secured to the side arms 14 to reinforce the same. As shown, the front ends of the side pieces 20 are secured by the bolts, and nuts 16 above mentioned, and the rear ends of the side pieces 20

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are secured by means of other bolts and nuts 22.

The front ends of the arms 14 are provided with openings in which are journalled trunnions 24 carried by the ends of a jaw 26 whereby said jaw may pivot about the axis of these trunnions. Except for being so pivoted, the jaw 26 may be said to be fixed relative to the remaining parts. The inner side of jaw 26 is provided with a recess 28 which coacts with a complementary recess 30 on the adjacent side of a movable jaw 32. The walls of recesses 28 and 30 are serrated, as shown in Fig. 7, better to grip a pin 34 to be pulled. The movable jaw 32 is carried by an actuating rod 36, and is guided by arms 38 which are carried by fixed jaw 26 and which move freely in openings 40 in the opposite ends of jaw 32. In order to permit jaw 32 to pivot with jaw 26, a universal joint or coupling 42 is interposed between jaw 26 and its actuating rod 36. By this arrangement the jaws 26 and 32 are integrated by arms 38 and are able to pivot as a unit, and within limits, about the axis of trunnions 24.

The actuating rod 36 is threaded along its rear portion and is adapted to pass rearwardly through a hole formed in a shaft 44 and to be adjustably secured in position by nuts 48. The shaft 44 is journalled in openings formed in the lower ends of the limbs 52 of an actuating U-shaped member 54. The U-shaped member 54 is rotatably secured in position by means of a shaft 56 the ends of which engage openings formed in upturned rear ends 58 of the sidearms 14. The U-shaped member 54 is provided with a socket or recess 60 for receiving a lever 62. A set screw 64 may be used for retaining the lever 62 in position.

The operation is as follows:

With the lever 62 in vertical position, and with movable jaw 32 retracted from fixed jaw 26, as shown in Figs. 1 and 3, the apparatus is lifted and lowered over the pin 34 until the legs 10 rest on the ground. The pin 34 now extends upwardly between the jaws as shown in the drawings. When the lever 62 is moved, in counter clockwise direction, from the substantially vertical position of Figs. 1 and 3 to the inclined position of Figs. 4 and 5, the movable jaw 32 is moved to the right until the pin 34 is tightly clamped between the serrated edges of jaws 26 and 32. With the pin tightly clamped between the jaws, and with the legs 60 serving as a fulcrum, further downward pressure on the lever 62, will exert an upward pull on the jaws 26 and 32 and on the pin 34 clamped therebetween, to pull the pin up out of the ground.

The pin 34 is usually driven into the ground as nearly perpendicular as possible but it sometimes

happens that the pin is not quite vertical. Also, because of unevenness of the ground, the horizontal plane of the jaws may not be normal to the pin axis, even if the pin is vertical. Therefore, we have arranged the jaws **26** and **32** for limited pivotal movement about their horizontal axes thus allowing the jaws to adjust themselves to the pin to be pulled. In other words, if the pin is at a slight angle to the perpendicular, and if the jaws **26** and **32** were fixed in a horizontal plane, the pin will be engaged by only a part of the serrated surfaces of the jaws, whereas, by allowing the jaws to pivot, they will adjust themselves and the pin will be gripped by the entire serrated surfaces of the jaws the same as if the jaws were initially disposed at the appropriate angle.

Furthermore, if the jaws are fixed in a horizontal plane, the movement of the lever **62** and the jaws **26** and **32** in counterclockwise direction will tend to rotate the pin as a whole about the fulcrum point. But since the portion of the pin which is below the jaws is excentric with reference to the fulcrum point, the pin can not rotate without pushing the earth to the right of the pin as viewed in Fig. 6. To so push the earth is very difficult and in the case of a rock near the right hand side of the pin, it is impossible. This greatly increases the difficulty in pulling out the pin. In other words, if the pin can be pulled out in the direction in which it was driven, with minimum lateral disturbance of the earth around the pin, the work of pulling the pin out is much reduced. By allowing the jaws to pivot, they adjust themselves to the angle of the pin and when force is applied, the jaws tend to pull the pin in the direction in which it was initially driven into the ground. But once the pin is pulled out a little, the adjustment referred to may cease to be valid and therefore the pin, especially when driven fairly deep into the ground, is preferably pulled out by a series of short strokes and not by one continuous pull or stroke. For example, when the jaws first engage the pin, and after the lever **62** has been moved to the position of Fig. 6 to raise the pin accordingly, the lever **62** is moved back to the



vertical position to retract the jaw **32**. With the jaws disengaged from the pin, further movement of the lever **62** in clockwise direction will lower the jaws somewhat so as to cause them to engage a lower portion of the pin whereupon the lever **62** is again moved to the position of Fig. 6 again to raise the pin through a corresponding distance. By this means, namely, the pivotal mounting of the jaws, the pin is properly engaged at all times regardless of the initial or subsequent angle of the pin to the perpendicular and the step by step raising of the pin facilities the work by eliminating, or at least greatly reducing lateral disturbance of the earth around the pin, that is to say, by pulling the pin in the direction in which it was driven instead of at an angle to such direction.

What we claim is:

A pin pulling machine including a yoke, a pair of horizontally disposed parallel arms pivoted to the limbs of said yoke, a first jaw pivotally carried by the front ends of said arms, an actuating member pivotally carried by the rear ends of said arms, a push rod pivotally connected to one end of said actuating member, a second jaw pivotally carried by said push rod and adapted to coact with said first jaw to grip a pin therebetween, an operating lever engageable with the other end of said actuating member for rocking the latter about its pivot to move said push rod and said second jaw horizontally toward or away from said first jaw, and guide rods carried by said first jaw, there being openings in said second jaw through which the guide rods pass with a sliding fit.

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SALVATORE POLSELLI.


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