

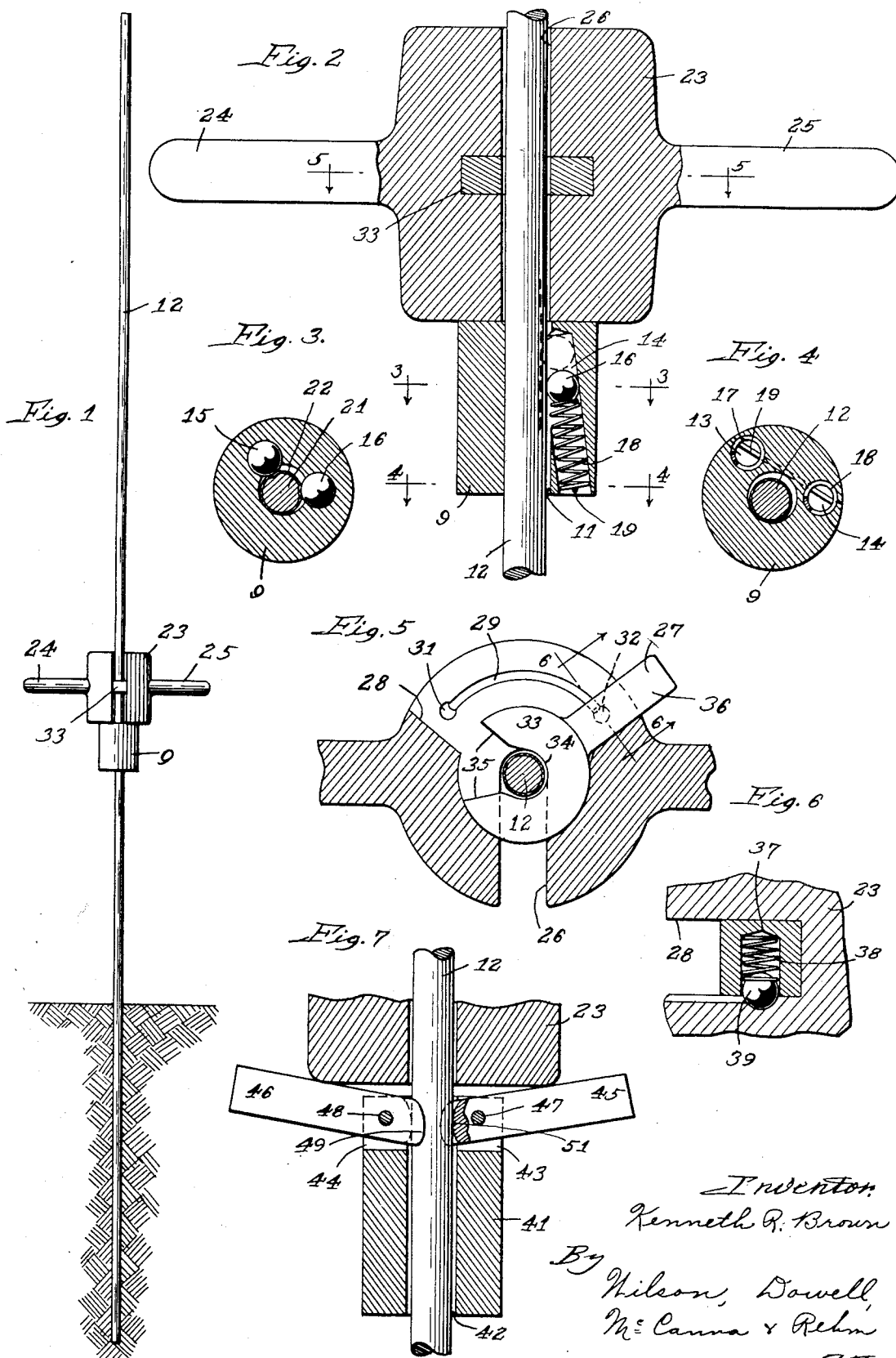
March 10, 1936.

K. R. BROWN

2,033,227

ROD DRIVER

Filed Aug. 11, 1932



Inventor
Kenneth R. Brown
By
Wilson, Dowell,
McCanna & Rehm
Attys

UNITED STATES PATENT OFFICE

2,033,227

ROD DRIVER

Kenneth R. Brown, Rockford, Ill.

Application August 11, 1932, Serial No. 628,292

1 Claim. (Cl. 61—73)

This invention relates to rod drivers and has special reference to a device particularly adapted for the driving of metal rods or tubes such as used for making connection to ground for lightning arresters or towers or for grounding the neutral conductors of secondary electric distribution systems.

The present invention contemplates the provision of means for conveniently and efficiently driving ground rods of the type employed for grounding lightning arresters and in making other electrical ground connections. These rods are customarily from eight to twenty feet long and are of relatively thin cross-section. It has been customary in the past to drive these rods by means of a sledge operating against the end of the rod and, because of their length, it has been necessary to make special provision for driving them. In some instances, it has been necessary to build a scaffolding so that the person driving the rod may be elevated to a sufficient height to drive against its end. In other instances, and wherever possible, they have been driven next to poles so that the person doing the driving might climb the pole and drive against its end. In each instance, however, it has been necessary to provide two workmen, one swinging the sledge against the end of the rod and one to hold the rod. This difficulty in driving is beset by a number of serious disadvantages. As previously mentioned, it is often necessary to build a scaffolding. On the other hand, when the person driving drives from a pole, it is necessary for the linemen to suspend operations on that pole while the driving is going on because of the danger of the men above dropping tools and the danger that the swaying of the pole due to the driving might injure one of the linemen by contact with live wires. In addition to this, the operation has a certain element of danger because of the difficulty of holding a long rod of this character perfectly still. Often the rod sways because of its flexibility so that the person driving misses the end of the rod with the sledge. In some instances, the person driving has thus lost his balance and, in others, they have dropped the sledge striking the person below who is holding the rod. Furthermore, when long rods are used, the rods must be of greater diameter than is necessary for the purpose in order to give them sufficient rigidity to permit their being driven from the end.

An object of the invention is to provide a generally improved tool for driving rods from the ground wherein an impact shoulder is positioned on the rod intermediate its ends and is movable

along the rod as driving proceeds and a driving member is disposed above the shoulder for imparting a driving force to the shoulder and thence to the rod.

A further object of the invention is to provide a driving chuck having novel and highly efficient clutch means for securing the chuck to the rod.

I have also aimed to provide a driving member of novel structural characteristics adapted to facilitate the use of the device.

Another object of the invention is to provide a driving device wherein the driving member is balanced about the rod and is of such weight as to provide a driving impact against the shoulder, the member having means for slidably securing the same on the rod and permitting its lateral withdrawal from the rod.

Other objects and attendant advantages will become apparent to those skilled in the art from the following description and accompanying drawing, in which—

Figure 1 is a vertical perspective showing the driving device in position upon a rod;

Fig. 2 is a longitudinal section through the driving member and chuck;

Fig. 3 is a lateral section through the chuck taken on the line 3—3 of Fig. 2;

Fig. 4 is a section taken on the line 4—4 of Fig. 2;

Fig. 5 is a lateral section taken on the line 5—5 of Fig. 2;

Fig. 6 is a section on the line 6—6 of Fig. 5 showing the spring detent, and

Fig. 7 is a longitudinal section through a modified form of chuck.

My invention contemplates the provision of a chuck or driving shoulder arranged to be adjustably positioned upon the rod at a point adjacent to the ground and convenient for driving. A driving member or hammer is slidably positioned upon the rod above the chuck so that it may be manually raised and forced downward against the chuck to impart a driving force to the rod. The chuck is so arranged that as the driving proceeds it may be raised so that it will always occupy a convenient position for an operator standing upon the ground. This arrangement accomplishes two purposes, first, it permits the operator to do the driving from the ground without any scaffolding or elevated support whatever, and, secondly, it permits a single person to carry on the entire operation eliminating the necessity of having a second person hold the rod during the driving thereof.

Referring to the drawing, the numeral 9 design-

nates generally a cylindrical chuck having a centrally disposed bore 11 adapted to receive the ground rod designated generally by the numeral 12. The chuck is provided with two angularly disposed bores 13 and 14 arranged to intersect the central bore 11, as best shown in Fig. 3, the intersection being such that the junction between the central bore and the bores 13 and 14 serve to retain clutch balls 15 and 16 and prevent their passage into the central bore. Coil springs 17 and 18 are positioned in the bores 13 and 14 and bear against the bottom of the clutch balls 15 and 16. The lower ends of the springs 17 and 18 bear against a pin 19 which extends laterally through the chuck and against the lower ends of the bores 13 and 14. It will be seen that when the rod 12 is inserted in the central bore 11, the clutch balls are moved downward somewhat in the bores 13 and 14, the springs maintaining the balls so that they will bear at one side against the sides of the bores 13 and 14 and at the other side against the rod 12. If force is applied to the upper end of the chuck, the balls will be wedged between the sides of the bores and the rod preventing relative movement in this direction. The rod 12 usually consists of a steel center, as shown at 21, having a copper coating, as shown at 22. During this wedging operation, the balls slightly distort the soft copper coating and give a firm grip of the chuck on the rod. However, the curved surface of the balls is not such as to cut or gouge off the soft copper coating but merely produce a surface indentation. If desired, the slope of the diagonal bores 13 and 14 may be such that when the chuck is used on a rod of such size as to completely fill the central bore, the clutch balls will occupy a clutching position between the ends of the bores, so that when slightly smaller rods are used, such as indicated in dotted lines in Fig. 2, the balls can move to a clutching position at the end of the bores as shown in dotted lines in the same figure.

The driving member or hammer consists of a central weight portion designated generally by the numeral 23 and a pair of handles 24 and 25 positioned on opposite sides of the central portion 23, the handles being adapted to be grasped by the operator to raise the weight and drive it downwardly against the chuck. The hammer is provided with a longitudinal slot 26 extending from the side to the center of the central portion 23 for the purpose of receiving the ground rod 12. It will be seen that through the provision of this slot, the hammer may be moved laterally over the rod. In order to hold the rod at the center of the hammer, a retainer, designated generally by 27, is positioned in a lateral slot 28 and extends into the center of the hammer completely around the position normally occupied by the ground rod, as best shown in Fig. 5. The lower side of the slot is provided with an arcuate groove 29 having circular depressions 31 and 32 at opposite ends thereof for a purpose presently to be described. The retainer 27 is provided with an inner semi-circular portion 33 having a central opening 34 for the reception of the ground rod and flared ends 35, the distance between these ends being at least as much as the distance across the slot 26. A handle 36 is secured to the semi-circular portion 33 and extends outward through the slot 28 so that it may be grasped by the fingers, the handle serving to rotate the semi-circular portion 33 between a position shown in Fig. 5 wherein the semi-circular portion extends across the slot 26 and a

position at the other end of the slot in which the opening 35 in the semi-circular retainer portion coincides with the slot 26 so that the hammer may be removed from the rod.

In order to hold the retainer in the hammer when the hammer is off from the rod, a ball detent is provided, shown in Fig. 6. This consists of a bore 37 on the bottom side of the retainer handle 36 arranged to receive a spring 38 and a ball 39. The bore 37 is in a position such that the ball 39 will rest in the groove 29 or either of the depressions 31 and 32, the spring 38 maintaining the ball firmly in these depressions. The circular depressions or sockets 31 and 32 are provided so that the ball 39 will cooperate therewith to secure the retainer in either of the above-mentioned positions.

In Fig. 7, I have shown a modified form of chuck. This consists of a body portion 41 having an axial bore 42 and opposed slots 43 and 44 at its upper end. Clamping fingers 45 and 46 are supported in the slots 43 and 44 on pins 47 and 48, the inner ends of the fingers being arranged to partially surround the rod 12 transversely of its length, as shown at 49. The inner ends of the fingers are also provided with an arcuate face 51 arranged to come into contact with opposite sides of the rod when the outer ends of the fingers are moved downward to grasp the rod. In this form, the fingers 45 and 46 are so arranged that the ends will come into contact with the rod before the fingers reach a horizontal position so that impacts of the hammer 23 will be exerted against the fingers intermediate their ends and not against the body portion 41, so that at each impact the fingers will be caused to grip the rod tightly.

In operation, the chuck is slipped over the bottom of the rod 12 and moved upward thereon a suitable distance for driving. The end of the rod is then placed against the ground at the point in which the rod is to be driven and the hammer is positioned on the rod. This is accomplished by having the retainer with the ball 39 in the circular depression 31, whereupon the opening 35 will coincide with the slot 26 so that the hammer may be moved laterally onto the rod. The handle 36 of the retainer is then moved along the slot 28 until the ball 39 drops into the depression 32, whereupon the hammer will be securely held on the rod. The operator then grasps the handles 24 and 25 to raise the hammer and either allows it to fall or forces it downward against the chuck in a driving stroke. These driving strokes are repeated until the rod has moved into the ground a sufficient distance to lower the chuck to an inconvenient position. At this point the retainer may be rotated to the open position so that the hammer may be removed from the rod above the chuck and may be slipped onto the rod below the chuck to give the chuck a tap at the bottom to loosen the clutch balls 15 and 16 and move the chuck up to a more convenient driving position. The hammer is then again placed on the rod and driving continued. These operations are repeated until the rod is inserted into the ground a sufficient depth, which may be until the top of the rod is almost flush with the surface of the ground.

Attention is directed to the fact that all of the operations involved in the driving of the rod are carried out from the surface of the ground, thereby relieving the operator of the necessity of climbing or the necessity of constructing a scaffolding. The operations are conveniently carried

out by a single operator, thereby eliminating the necessity of two workmen. Because of the fact that the hammer is secured directly on the rod, there is no danger of injury to the workmen. 5 This simple and convenient method of driving the rods permits their installation in much more desirable locations than at present because it is now more convenient to locate them near a pole because of the ease in driving. Furthermore, it 10 will be seen that rods of any length can be driven with equal facility so that when the present device is employed there is no reason for reducing the length of the rod below that normally desirable because of the difficulty of driving the 15 longer rod. Because of the fact that the driving operation is carried on relatively close to the surface of the ground, the diameter of the rod may be materially less than has heretofore been necessary with long rods, the increased diameter 20 previously being required to permit the driving of the rod from the end. Another advantage of the present device lies in the fact that it may also be used for the removal of temporary ground rods. That is, the chuck may be reversed end 25 for end and the hammer used at the lower end of the chuck, the operator exerting a striking blow upward to drive the rod from the ground. Practical tests have shown that, because of these advantages, the cost of installing a ground rod 30 by means of the present device is about 40% below the cost of previous methods.

The hammer retainer is arranged to be secured in either an open or a closed position in order to prevent the retainer from falling out when 35 it occupies its open position and to prevent the retainer from shifting during the driving operations.

While I have thus described and illustrated a specific embodiment of my invention, I am aware 40 that numerous alterations and changes may be made therein without materially departing from the spirit of the invention or the scope of the appended claim, in which I claim:

In combination, a long, slender ground rod of relatively thin cross-section adapted to be driven into the ground substantially its entire length for grounding connections and the like, a chuck body 5 having a central bore to freely receive the rod, a driving shoulder at each end of said body, and rod gripping means within said chuck body having wedging engagement between the rod and 10 body when force is applied by striking downwardly on the upper driving shoulder and releasing from said wedging engagement when force is applied by striking upwardly on the lower driving 15 shoulder, said wedging engagement serving to fixedly attach said chuck body to the rod so that successive driving blows against the upper shoulder will force the rod into the ground and 20 release of said engagement will permit quick sliding of the chuck body to a higher driving position on the rod, and a driving hammer having a weight body with handles projecting from opposite sides 25 thereof, said hammer body having a horizontal slot extending from the side inwardly to the center to permit free passage of the rod laterally with respect to the hammer body to and from 30 the center thereof when placing the hammer body in a working position on the rod and removing it therefrom, and retainer means on the hammer body operable to close and open said slot for 35 retaining the hammer in working positions on the rod above and below the chuck body and permitting quick removal therefrom, whereby the hammer may be quickly positioned for free manipulation up and down on the rod above the 40 chuck body to impart rod driving strokes against the upper driving shoulder and below the chuck body to impart chuck releasing strokes against the lower driving shoulder, and whereby upon successively advancing the chuck body to higher working positions on the rod the long, small diameter rod may be driven into the ground to 45 considerable depth without whipping or distorting the rod.

KENNETH R. BROWN.