

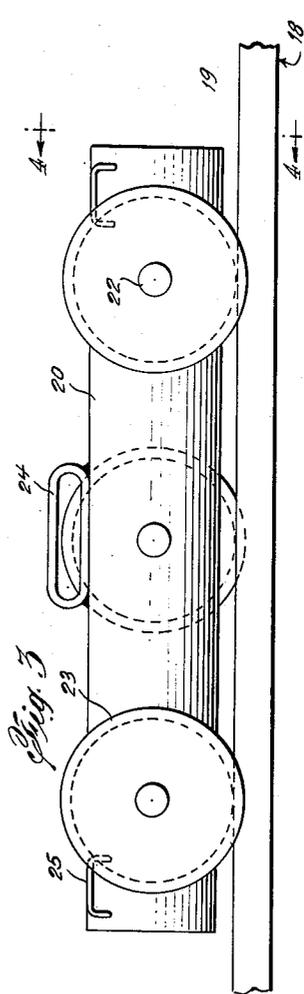
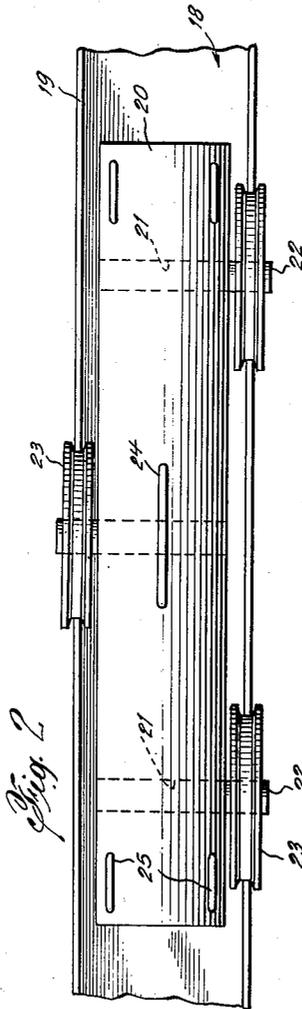
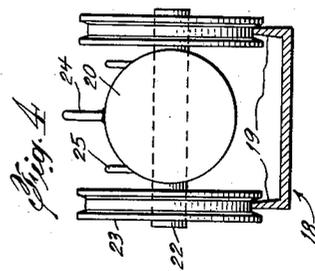
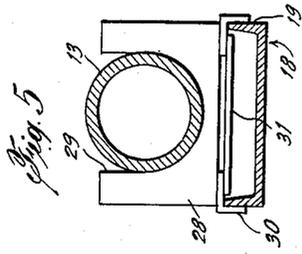
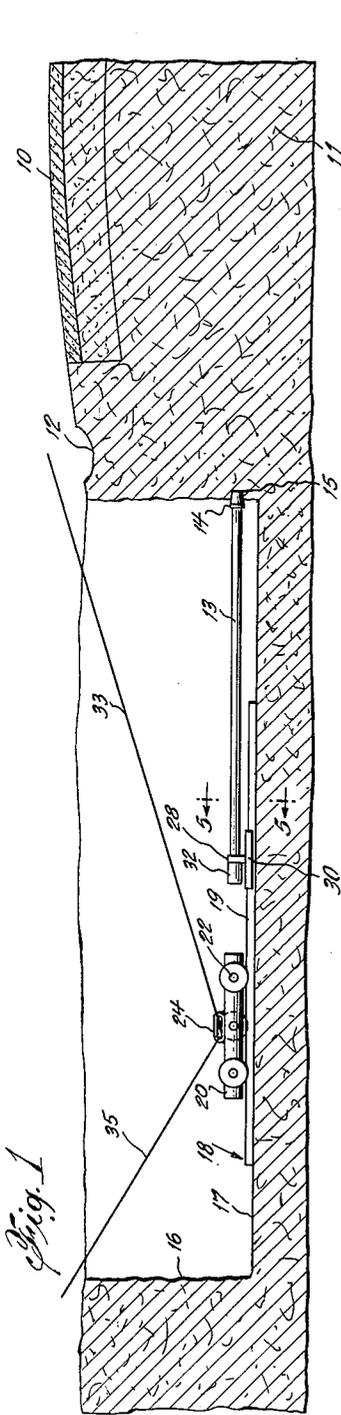
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PIPE DRIVER

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PIPE DRIVER

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This invention relates to impact drivers and relates more particularly to a novel driver assembly designed primarily for driving pipe through earth, power for the driver being supplied either by manual or by power driven means.

It is an important object of the invention to provide a small, portable, impact driving unit for driving pipes under highways, railroad tracks and the like.

In recent years power and communication lines have been buried in the ground rather than to have them supported on overhead installations. Various types of cable plows and trench diggers are employed for the straight cable burying operations along highways or even across fields. Difficulty is experienced, however, when a highway or railroad right-of-way is encountered.

The apparatus of the present invention readily drives a pipe for the cable through the earth for relatively short distances where a trench digging operation is not expedient.

In accordance with the present invention the impact driver is a mobile unit mounted on a trackway of suitable length. Cables extend from the impact driver both forwardly and rearwardly thereof. The driver assembly is first drawn rearwardly on the track and is then drawn forwardly with considerable speed, delivering a hard impact blow on the rear terminal of the pipe. Power for moving the driver assembly may be supplied manually by workmen or a double-drum winch may be employed, the particular source of power forming no part of the present invention.

The principal difficulty in an apparatus of this character resides in the tendency of the mobile unit to jump the tracks and in the preferred embodiment of the present invention this difficulty is solved by employing two spaced wheels on one side of the unit and a single, intermediately disposed wheel on the other side thereof.

In the drawing:

Fig. 1 is a vertical section taken through a highway or the like and provided on one side thereof with an excavation for the apparatus which constitutes the present invention, the view showing a side elevation of such apparatus.

Fig. 2 is a plan view of the driver element and also shows a broken plan view of the trackway.

Fig. 3 is an enlarged side elevation of the driver element.

Fig. 4 is an elevation of the forward end of the driver element, the view also showing a section through the trackway, the part in section being taken on line 4—4 of Fig. 3.

Fig. 5 is a vertical section taken on line 5—5 of Fig. 1.

Referring now to Fig. 1, the numeral 10 indicates a pavement on a highway, the earth below the pavement being shown at 11. A drainage ditch 12 is disposed along one or both sides of the pavement. The pipe which is to be driven through the earth below the pavement is shown at 13. In order to prevent damage to the forward end of the pipe and to prevent earth from entering the pipe, a coupling 14 is screwed on such forward end and a suitable plug 15, which may be tapered, is screwed into the coupling. Pipe of this character comes in random lengths and in most instances two or more lengths are joined together to completely span the earth below the pavement.

As soon as one section of pipe has been driven the sufficient distance, another section is coupled to the rear of the first section and the driving continues. In order to provide ample space for the apparatus forming the present invention and also for providing suitable space for the pipe, a relatively large excavation shown at 16 is first made which extends laterally from the point where the pipe is to be driven. The bottom 17 of the pit is preferably made relatively flat and the trackway 18 is placed upon such bottom.

The trackway may comprise an ordinary channel with spaced vertical walls 19 which form the tracks. The driver element preferably includes a suitable length of solid steel shafting 20 forming the impact driver. A three-foot length of six-inch shafting suffices for most purposes. In the preferred form of the invention three transverse holes 21 are first drilled in the solid impact driver. Shafts 22 may now be force-fitted in the openings, each of such shafts carrying at their outer ends flanged sheaves 23, the flanges being of sufficient distance apart to receive the upper end of the tracks 19.

It will be noted that the two terminal shafts are disposed a short distance from the respective terminals of the impact driver and that the intermediate shaft is located substantially equidistant from the two terminal shafts. An elongated eye element 24 is suitably secured as by welding to the upper edge of the impact driver substantially midway between the ends thereof. Also, for the purpose of carrying the driver element from the truck upon which it is transported, to the trackway, additional eye elements or handles 25 are welded at each corner section thereof. The pipe is arranged to be supported adjacent its rear terminal on a block 28 having

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a U-shaped recess 29 which receives the pipe in more or less snug fit relation. Inverted angles 30 are secured as by welding to the lower surface of the block, the vertical portions of the angles relatively closely fitting the outer walls of tracks 19. A transverse plate 31 may be welded to the lower surfaces of the angles, the width of the plate being such as to prevent binding action.

A relatively heavy coupling 32 is screwed on the rear terminal of pipe 13 and the pipe then placed on block 28 in the relationship shown in Fig. 1. A rope or cable 33 extends forwardly of the impact driver from eye 24 and another rope or cable 35 extends rearwardly thereof. In operation, a workman draws the driver element rearwardly by pulling on cable 35 and then two or more workmen pull forcibly on cable 33 drawing the driver 20 into engagement with coupling 32 at the rear end of pipe 13 with a sharp impact, thus driving the forward end of the pipe through the earth. The pipe supporting element comprising blocks 28 and flanges 30 advance as the pipe is driven and as soon as the pipe has been driven a sufficient distance another section is affixed to the rear and the operation continues.

If a double-drum power driven winch is used instead of the manual power, the winch is preferably placed upon the roadway and line 35 for retracting the driver unit passes over a pulley at the rear of the pit and back to one of the drums. The ropes are then wound around the drums and the rope is pulled by the winch when the rope is tightened.

It will be appreciated that the length of the pit can be materially reduced by using relative shorter sections of pipe. In almost every instance the pipe is left in the ground and the cable passed through it. In some cases, however, such as when passing a cable beneath a large tree, the pipe is first driven under the tree, the cable passed through it, and the pipe then withdrawn on the opposite side.

In certain types of work, such as in driving pipe through coral rock or shale, the plug on the forward end of the pipe will be omitted and the rock in chipped form enters the pipe from whence it must be periodically blown out by air or water under high pressure. In ordinary earth formation, however, once a hard clay enters the pipe it is packed so tightly it cannot thereafter be removed.

The precise reason why the provision of two spaced wheels or sheaves on one side of the impact unit and one intermediate wheel on the other side gives such excellent results, largely prevents jumping of the unit from the tracks, and provides greater stability and balance to the assembly, is not precisely known. In some types of work, however, two wheels placed at opposite ends of the terminal shafts will give good results and such arrangement may be used without departing from the spirit of the invention.

While one form or embodiment of the inven-

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tion has been shown and described herein for illustrative purposes, and the construction and arrangement incidental to a specific application thereof have been disclosed and discussed in detail, it is to be understood that the invention is limited neither to the mere details or relative arrangement of parts, nor to its specific embodiment shown herein, but that extensive deviations from the illustrated form or embodiment of the invention may be made without departing from the principles thereof.

What I claim is:

1. An impact driver assembly for driving pipes and the like through earth formations on a generally horizontal plane, said assembly including a mobile driver element which is mounted on a trackway comprising spaced tracks on which the driver element travels, said driver element including an elongated, substantially solid metallic body having transverse holes therein adjacent its opposed terminals and an intermediate hole midway between the terminal holes, flanged wheels carried on the terminal shafts on one side of the body and a similar wheel carried on the intermediate shaft on the opposite side of the body, said wheels engaging the tracks, an eye element carried by the body, and cables leading forwardly and rearwardly from said eye element.

2. An impact driver assembly for driving pipes and the like through earth formations on a generally horizontal plane, said assembly including a driver which is mounted on a trackway comprising spaced tracks, and a support for the rear section of the pipe mounted for sliding movement on the tracks, the driver element including an elongated, relatively heavy impact member which delivers successive impact blows to the rear terminal of the pipe; shafts carried by the impact member adjacent its terminals and intermediate said terminals, flanged wheels carried on the terminal shafts on one side of the impact member and a similar wheel carried on the intermediate shaft on the opposite side of such member, said wheels engaging the tracks; a cable leading forwardly and rearwardly from the driver, the pipe support comprising a block having a substantially U shaped recess for the pipe and flanges for retaining the block astride the trackway as the pipe is driven.

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