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D. FISHER

1,862,591

CONDUIT THREADER

Filed July 17, 1931

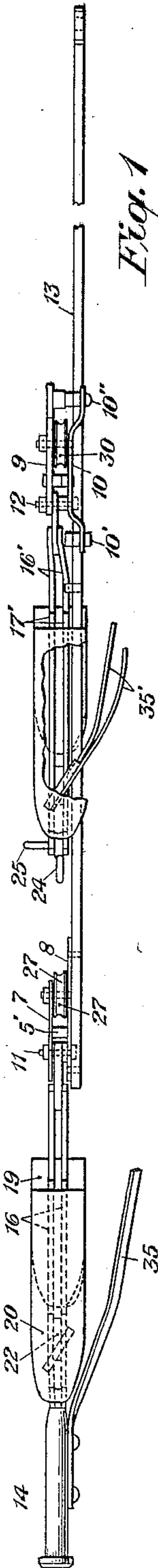


Fig. 1

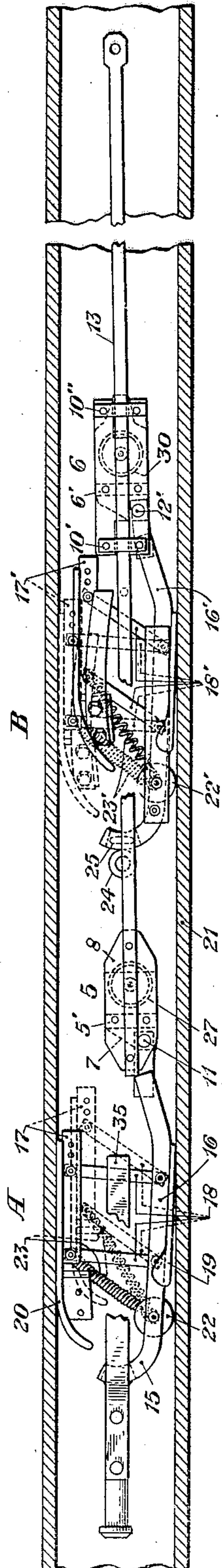


Fig. 3

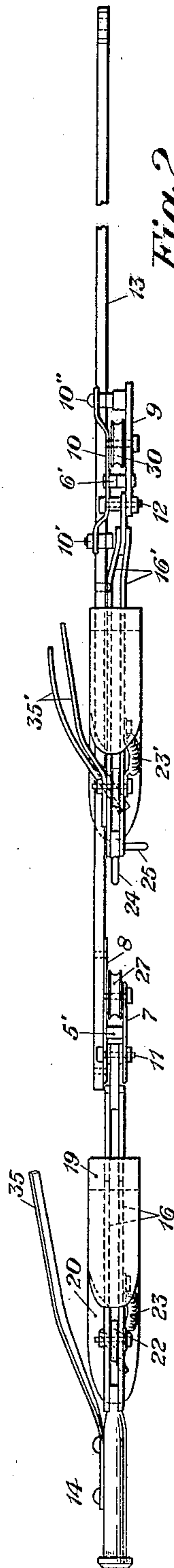


Fig. 2

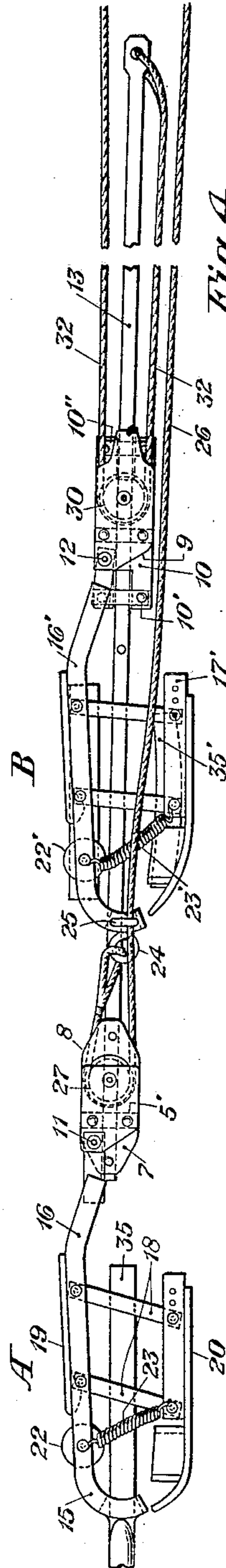


Fig. 4

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CONDUIT THREADER

Application filed July 17, 1931. Serial No. 551,523.

This invention relates to an improved device for threading conduits, and more particularly to a device which may be caused to traverse a conduit duct so as to draw there-
5 through a cable or the like.

A particular object of the invention is to provide a device of the above character which may be inserted in a conduit at one manhole and advanced or stepped along therein to the
10 next manhole to pull a pilot wire or rod to which a cable may be subsequently attached, and thus readily drawn through the conduit.

A further object is to provide a conduit threader of comparatively few and simple
15 elements so arranged that they present minimum resistance to the progress of the threader through the conduit.

These and further objects will be apparent from the following description, when considered in connection with the accompanying drawing in which one modification of the invention is illustrated.

Referring to the drawing, Figure 1 is a view of one side of the improved device.
25 Fig. 2 is a view of the opposite side thereof. Fig. 3 is a bottom view of the device positioned within a conduit duct; showing the the front traveler or wedge in full lines in extended position and engaging the walls of
30 a conduit duct; and in dotted lines in collapsed and disengaged position. The rear traveler in this figure is shown in full lines in collapsed position and in dotted lines in extended position. Fig. 4 is a plan view similar to Fig. 3 and showing the opposite side
35 thereof.

In the drawing in which the improved device is illustrated, A is applied to the front traveler and B is applied to the rear traveler.
40 These members are in general respects alike. A supporting block 5 is positioned between the travelers A and B, and a second supporting block or rider 6 is positioned at the rear of the traveler B. The supporting block 5 is
45 provided with parallel spaced plates 7 and 8, and the supporting block 6 is provided with parallel spaced plates 9 and 10. The rear end of the traveler A is pivotally connected between the plates of the block 5, for instance,
50 by means of a pin 11 which extends through

apertures in these members, and the rear end of the traveler B may be similarly connected to the block 6 by a pin 12. The parallel plates 7 and 8 of the block 5 and the parallel plates 9 and 10 of the block 6 are maintained in spaced relation, by means of inter-
55 posed bars 5' and 6', respectively, which are suitably riveted to said blocks. The plate 10 of the block or rider 6 is provided at each end with a pair of angular arms which extend
60 outwardly therefrom. A guide 10' interconnects the forward portions of the angular arms and a guide 10'' interconnects the rear portions of the angular arms. The latter guide member also interconnects the spaced
65 plates 9 and 10. Aligned slots are provided in each of the guides through which an elongated push rod 13 extends. The push rod 13 is riveted or otherwise secured at its front end to the side of plate 8 of block 5, and ex-
70 tends rearwardly and through the slots in the guides just mentioned in the block 6. Block 6 and traveler B are adapted to slide back and forth on the push rod 13, as will be presently
75 described.

A ram-head 14 is connected to the forward curved portion 15 of the traveler A. The portion 15 in turn is connected to a lower pair of spaced parallel bars 16 which extend rear-
80 wardly to the pivotal connection between the traveler A and the block 5. A collapsible upper jaw or shoe member having a flat surface is provided for the traveler A and includes an upper pair of spaced parallel bars
85 17 pivotally attached to the bars 16 by means of links 18 which form a toggle connection between these members, and permit the shoe or jaw to assume extended and collapsed po-
90 sitions. A rigid lower shoe member 19 having a flat surface is suitably attached to and carried by the bars 16. The upper shoe member 20 when expanded serves with the shoe member 19 to grip a conduit duct wall 21. The forward portion of the shoe member 20
95 is somewhat rounded and bent inwardly to slightly overlap the curved portion of the lower plates 15. It is preferred that the forward link 18 be shorter in length than its companion rear link. It is also preferred that the distance between the centers or
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pivotal connections of the links 18 with the lower spaced bars 16 be slightly less than the distance between the centers or pivotal connections of the links 18 with the upper spaced bars 17. The shortening of the forward link 18 and the difference in distance between the upper and lower pivotal connections of the links 18, as just outlined, cause the shoe members 19 and 20 to be brought together more closely at their noses or forward portions in their collapsed position. The shoe members in this collapsed position will assume a slightly wedge-shaped formation, and thus present a minimum resistance to their advance in the conduit. In the expanded position of the shoe members, the forward and rear links do not pass center at the same time. By this means a maximum gripping efficiency is provided. A roller 22 is journaled between the bars 16 on a bearing such, for instance, as a bolt, which may extend through said bars. The roller 22 is positioned in front of the shoe member 19 for the purpose of reducing the friction and for overriding any obstacles encountered in the duct during the advancement of the traveler A. A helical spring 23 is connected to the lower and upper plates 19 and 20, respectively. In the present instance this spring is shown as being connected at its lower end to the bearing for the roller 22 and at its upper end to one of the bolts which secures the forward link 18 to the bars 17. The spring provides tension which tends to keep the shoe members in expanded position and in contact with the conduit wall.

The rear traveler B, similarly to the traveler A, is provided with lower and upper pairs of parallel bars 16' and 17' respectively, which are interconnected by links 18'. Shoe members 19' and 20' are provided and similarly mounted and for the purpose specified in connection with like members on traveler A. The roller 22' which is journaled between the bars 16' performs the same function for the traveler B as that outlined in connection with the roller 22 of the traveler A. A spring 23' is also provided as in the traveler A for connecting the upper and lower bars 16' and 17' together. A ring 24 extends forwardly of the front portion of the lower bars 16', and an additional ring 25 is positioned at right angles adjacent to ring 24 and extends outwardly from said bars. The looped end of a pull line rope 26 is attached to the ring 24 and passes about a pulley 27 journaled between the bars 7 and 8 of the block 5. The pull line 26 passes from said pulley through the ring 25, and thence rearwardly. A second pull line 32 is attached by its looped end through an opening provided in the end of the push rod 13 and passes forwardly adjacent the push rod and about a pulley 30 journaled between the bars 9 and 10 of the rider 6.

The travelers A and B are supported by springs 35 and 35', respectively, which are provided for the purpose of supporting the travelers above any silt or the like which may be present in the conduit duct.

In the operation of the device the forward hinged traveler is inserted in the duct of a conduit at a manhole, and this traveler and the remainder of the device is pushed in as far as possible. By pulling on the line 26 the pulley 5 is drawn back and causes the push rod 13 to travel rearwardly. This action causes the toggle links 18 on the traveler A to assume a crosswise position and thus move the shoe members 19 and 20 into extended position to grip the walls 21 of the conduit duct. The shoe members lock under this condition, stopping the movement of the supporting blocks 5. By continued pulling on line 26 the rider 6 is drawn to a forward position, thereby causing the toggle links 18' of the traveler B to be moved to a longitudinal position to compress or collapse the shoe member 17'. The shoe members 16' and 17' in this position will release their grip on the walls of the duct, permitting the rear traveler B to move forward and draw the pulling-in line 32 forward.

After the rear traveler B is moved to its forward limit, the front traveler A is advanced by releasing line 26 and pulling line 32. This action causes the rider 6 to move backward and the toggle links 18' on rear traveler B will assume a crosswise position and lock the shoes 16' and 17' in an extended position to grip the duct walls 21. By pulling line 32, motion is transmitted to the end of the push rod 13 which forces it forward, thereby collapsing the toggle links 18 and also the shoes 19 and 20 of traveler A. The traveler A will be advanced in the duct in this collapsed position. The spring 23 will exert sufficient tension, when the forward limit of the push rod has been reached, to spread the shoe members of traveler A to an extended position to grip the duct walls 21.

The operations just described by which the shoes of the front and rear travelers are alternately collapsed and expanded, step the threader along the conduit duct by alternately pulling and releasing the lines 26 and 32.

What is claimed is:

1. A conduit threading device including a front traveler and a rear traveler, a pivoted shoe and a rigid shoe for each traveler for engaging a duct wall, toggle links connecting the pivoted shoe and rigid shoe together, a rod hingedly connected to the front traveler and providing a support upon which the rear traveler is adapted to reciprocate, a pulley and supporting block therefor carried on the forward end of said rod, a second pulley and supporting block therefor carried by the rear traveler, a pull line connected to the rear

traveler and passing over the first mentioned pulley for actuating the shoe members of the rear traveler to advance it in the duct, and a second pulley line connected to said rod and passing over the second mentioned pulley for actuating the shoe members of the front traveler to advance it in the duct alternately with the rear traveler.

2. A conduit threading device including a front traveler and a rear traveler, a pivoted shoe and a rigid shoe for each traveler, a pair of toggle links for connecting the pivoted shoe and rigid shoe together, and being movable with the pivoted shoe to collapsed and extended positions, resilient means connected to the pivoted shoe tending to maintain it in extended position, a rod hinged to the front traveler and providing a support upon which the rear traveler is adapted to reciprocate, a pulley and supporting block therefor carried on the forward end of said rod, a second pulley and supporting block therefor carried by the rear traveler, and pull lines respectively connected to the rear traveler and said rod and passing over the pulleys associated therewith for alternately collapsing and extending the pivoted shoes of the travelers to step them along with the rigid shoes and thus advance the threading device through the conduit duct.

In testimony whereof I have signed my name to this specification this 15th day of July, 1931.

DONALD FISHER.