Nov. 8, 1938. A. R. ASKUE 2,135,487

CONDUIT ROD

Filed Jan. 26, 1935

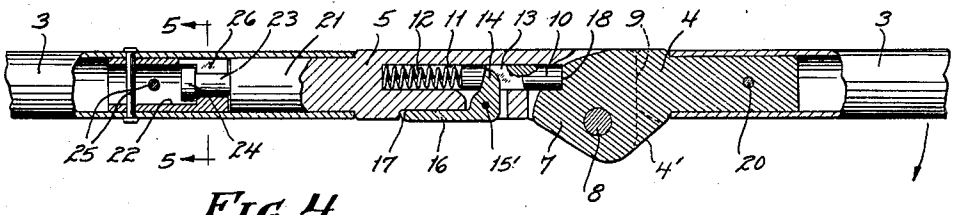


FIG. 4

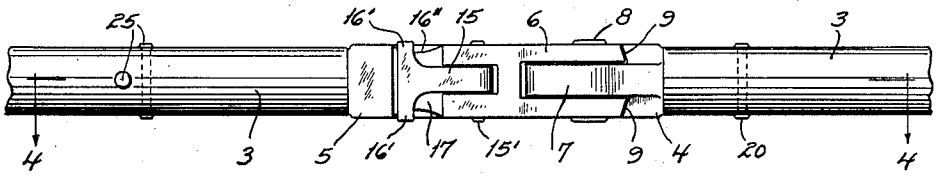


FIG. 3

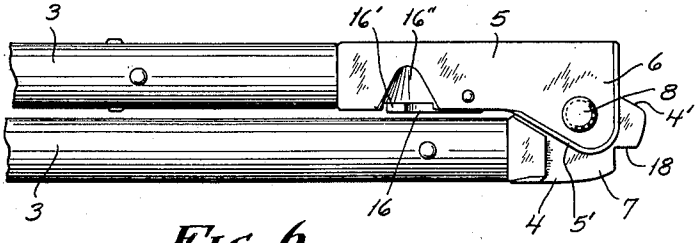


FIG. 6

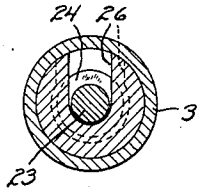


FIG. 5

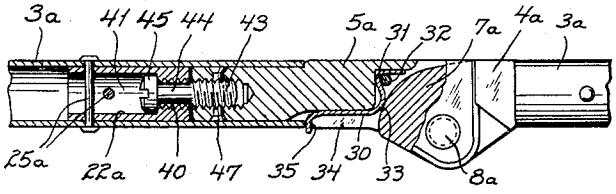


FIG. 7

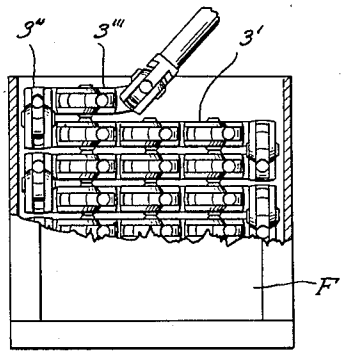


FIG. 2

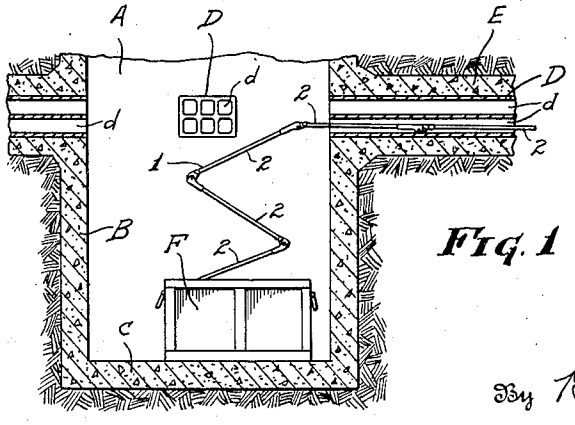


FIG. 1

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Patented Nov. 8, 1938

2,135,487

UNITED STATES PATENT OFFICE

2,135,487

CONDUIT ROD

Albert R. Askue, Mentor on the Lake, Ohio

Application January 26, 1935, Serial No. 3,616

3 Claims. (Cl. 287—91)

This invention relates to push rods, particularly such as are adapted to place electric service or telephone cables and the like in underground conduits.

Usually such conduits comprise aligned single or multiple void tile sections running for several hundred feet between manhole pits or joining points, and unless continuous pull wires are properly placed in the conduit tile voids when the tiles are laid, threading cables through such lengths of conduit is a very difficult operation. It is manifest that the workmen employed to lay the tile object to laying the pull wire as part of their duty, and hence often neglect to properly place the wire.

Sectional relatively stiff rods have also been used to pull such cables through underground conduits, and the main difficulty encountered in the use of such rods has been that the rod sections cannot be compactly stored unless the sections are taken apart after each operation of installing a cable has been completed. Joining and separating the rod sections on the job, of course, wastes considerable time.

One object of the present invention is to provide a sectional conduit rod, the sections of which may be permanently articulated and easily and compactly folded together for handling and storage after each use.

Another object is the provision of an articulated rod assembly for placing cables in underground conduits, e. g. wherein the individual sections in the assembly may be compactly stored without waste of package space.

A further object is to provide a locking device in association with articulated rod sections, by which lengths of rod, including from a few sections to dozens of such sections will not become disaligned in the conduit.

Further objects include the provision of an articulated conduit rod which will be comparatively light in weight, which will have no abrupt projections extending therefrom likely to catch against irregularities on the inner faces of the conduit, say against the tile joints, and which will moreover be strong and rugged in construction and adapted to be inexpensively made by production manufacturing methods.

A further object is to provide a conduit rod including articulated sections, which sections, when brought into alignment, will be automatically retained in this relationship.

A still further object is the provision of an improved articulated conduit rod, the sections of which are retained in substantially rigid alignment during the operation of being pushed through a conduit, but which will be automatically released for re-folding the sections for storage without requiring any special operation on the retaining means, other than the manual act of folding the sections.

The objects further include the provision of a swivel joint of novel construction for articulated rods of the class shown.

Other objects and novel features of the invention will become apparent from the following description relating to the accompanying drawing, showing the preferred forms. The essential novel characteristics are summarized in the claims.

Referring briefly to the drawing, Fig. 1 is a sectional diagrammatic view illustrating the lower portion of a manhole pit and the termini of three multiple void conduits communicating with the pit and further illustrating the manner in which the present conduit rod may be inserted into the conduit and/or removed and repacked during the cable placing operation; Fig. 2 is an end elevation of a suitable container for the rod sections, the upper portion of the container being broken away to show several of the folded sections in end elevation; Fig. 3 is a fragmentary plan view showing the adjacent ends of two sections in relatively aligned position; Fig. 4 is a fragmentary longitudinal sectional view taken substantially along the line **4—4** of Fig. 3; Fig. 5 is a transverse sectional view taken substantially along the line **5—5** of Fig. 4; Fig. 6 is a fragmentary side elevation of the end portions of the two sections in folded position, and Fig. 7 is a view corresponding to Fig. 4, but showing a modified joint arrangement for frictionally holding the swivel.

Referring to Fig. 1, A indicates a splicing chamber or manhole having side walls B and a bottom wall C. Communicating with the manhole are conduits formed, as shown, by multiple void tile D, having voids *d*. The tile may be set into masses of concrete, as at E, so that the respective voids of adjacent tile are retained in mutual alignment. When its is considered that these conduits sometimes run for several hundred feet, say to the next manhole, the difficulties of threading electric service cables, e. g. through each conduit—the voids *d*—are readily apparent. My conduit rods for accomplishing this and similar purposes are arranged as follows:

In Fig. 1, **1** indicates the conduit rod generally and **2** the individual sections. The sections as shown in Fig. 4 comprises light weight tubular elements **3**, one element having a fixed hinge

head 4 secured as by a pin or rivet 20, and the other a swivel hinge head 5. Both heads may, as a matter of choice, be swiveled. A suitable form of swivel will be hereinafter more fully described. The hinge head 5 is bifurcated at its extremity, as shown at 6, and the head 4 has a tongue 7 adapted to be embraced between the arms of the bifurcation 6 and secured thereto as by a hinge pin 8. Respective cooperating abutment surfaces at 9 prevent the hinge from being operated in one direction beyond alignment of the two sections. The sections may, however, be folded together as shown in Fig. 6, so that one section lies parallel to and adjacent the other section on any side thereof in compact arrangement.

The necessarily outwardly projecting portions of the hinge elements are provided with gradual lead surfaces 4' and 5', merging in a generous curve so that the hinge parts will not catch on the conduit walls.

To secure the sections in alignment I have shown, particularly in Figs. 3 and 4, a spring latch arrangement, including a latch bar 10 inserted into an axial bore 11 in the end of the head 5, the bore containing a suitable compression spring 12 arranged to force the bar outwardly of the bore. The bar 10 may be cut away on one side, as at 13, to receive the operating end 14 of a releasing lever 15, pivoted as at 15' to the member 5 and extending adjacent the latch bar 10, through a suitable lateral opening in the head 5. The lever has a latch releasing arm 16 lying close to the body of the head in a suitable depression 17, which normally guards the arm against accidental dislocation while the rod is being shoved through the conduit. The releasing arm has wing extensions 16' overhanging recesses 16'' provided on the sides of the head 5 for finger clearance to assist the operator in releasing the latch. The nose of the latch bar fits a suitable socket 18 in the tongue 7 of the fixed head 4 in a manner to retain the surfaces 9 in abutment. The tongue 7 is generously rounded on its outer end adjacent 4', Fig. 6, so as to cam the latch bar over the end of the tongue when the sections 2 are unfolded and aligned.

The preferred swivel joint to permit the sections to be closely packed together in folded condition may be arranged as follows: The shank 21 of the head 5 is circular to rotatably fit the circular end of the tube 3, as shown in Figs. 4 and 5, and the shank is retained in position by means of a hollow sleeve 22. The shank terminates in a reduced stem 23 and head 24 and the sleeve has a central bore and counter-bore complementary to the stem and head respectively. The outer end of the sleeve has a transverse slot 26, open at one side of the central bores, the slot being suitably shaped to laterally receive both the head and stem 24 and 23 respectively. This arrangement permits the shank 21 and sleeve 22 to be assembled in the relationship shown in Fig. 4 and the sleeve and swivel parts of the head 5 then inserted lengthwise into the open end of the section 3, after which the sleeve 22 may be secured as by the pins or rivets 25, the parts thus forming a permanent swivel joint.

It will be seen that by reason of the arrangement above described, the permanently articulated rod sections may be folded together in zigzag fashion, as shown in Fig. 1, the swivel joint permitting each section to be folded against any side of the section to which it is hinged. For example, a number of sections may be folded as just described and placed in a suitable container, such as F, Figs. 1 and 2, a series of sections forming one complete layer as at 3', Fig. 2. At the end of the series one section may be folded upon another vertically, as at 3'', whereupon the direction may again be changed, starting a new layer or tier as at 3'''. In practice, no such regularity of placement in the container is necessary for the sections fall more or less naturally into compact relationship of their own accord.

It is obvious, from Fig. 4, that when the sections are brought into alignment and locked, a substantially stiff rod assembly is secured, which will not tend to buckle when shoved through the receiving voids d of the conduit, even though these are relatively much larger than as shown. The manner in which the "pulling in wire" e. g. is secured to the end section of the articulated rod is not illustrated, various forms of securing devices being well known. The wire is, however, securely fastened to one end of the rod and the rod drawn through, dragging the wire with it. Afterward the cable is drawn through by means of the pulling in wire. As the rod is withdrawn from the conduit it may be immediately folded up, as illustrated in Fig. 1, and may be placed in the container F, it being of course, necessary to release each hinge joint before folding the section.

It is not necessary to positively lock the sections in alignment if the hinge joints can be maintained with their axes parallel and so that the sections can hinge only in the same direction. The swivel, assuming there is at least one swivel joint for each section, permits the rod to be so inserted into the conduit that all the hinge axes are parallel. In fact, if the supply of rod sections is slightly at one side of the axis of the conduit bore or void, each section as inserted will naturally assume the same position as all the preceding sections assumed at the same operation. This final operation, of course, determines the location of the hinge axes and ordinarily these will all remain in the same relationship. However, to make it more positive that the hinge axes will not get out of parallelism after the sections are beyond the control of the operator, I may, for example, use the frictional swivel lock shown in Fig. 7 or any equivalent device.

In Fig. 7 the head 5a is bifurcated to receive the tongue 7a of the head 4a as before, and there is a spring device associated with the joint in a manner to prevent the free swiveling of the head 5a in its rod section whenever the two rod sections are swung into alignment about the hinge axis. This, as shown, comprises a leaf spring 30 anchored as by a right angle bend 31 and appropriate pin or rivet 32 into a complementary seat in the throat of the bifurcated portion of the head 5a. From the anchored portion the spring extends across the path of movement of the outer end of the tongue 7a as at 33 and thence in a milled groove 34 to a position adjacent the end of the tube section 3a. Here the outwardly turned end 35 of the spring frictionally engages the rim of the tube whenever the rod sections are aligned (as shown) due to the tongues 7a pressing on the spring at 33, but the bent end of the spring withdraws from engagement with the tube rim when the rod sections are folded and the tongue swung clear of the spring. Thus, the swivel is entirely free at all times, except when the sections are aligned. One distinctive advantage of the arrangement just described is that the operator has merely to bodily fold the

sections together when the pull in wire has been placed, thus saving considerable time, as compared to having to individually release one latch per section in addition to folding the sections together.

Fig. 7 also shows a modified swivel which may prove more economical in quantity production. In place of the laterally slotted sleeve **22** is shown a sleeve **22***a* having a threaded bore **40** and a plain counterbore **41**. The shank of the head **5***a* is axially threaded at **43** to receive a screw **44** having a head **45** and undercut neck in the zone of the threads at **40**. The undercut portion permits the screw **44** to swivel in the sleeve **22***a* as will be obvious. The screw may be secured against turning relative to the shank of the head **5***a* by a suitable cross pin or rivet at **47**. The sleeve **22***a* is pinned in, as at **25***a*, as a last operation.

In practice, the conduit rod herein shown and described, has to be made in a total length extending from one splicing chamber to the next splicing chamber, and this usually is the distance as great as an average city block, and may be greater. Consequently, it is essential that a large number of rod sections shall comprise a single conduit rod. The term "large number" in the description and claims, shall be construed to mean in excess of a dozen or so sections.

I claim:

1. A conduit rod, comprising sections hinged together in such manner that adjacent sections will not swing relative to each other in one direction beyond alignment of the sections, a spring latch for securing the sections in alignment and means to release the latch, said means comprising an arm pivoted to one of said sections and operatively associated with the latch, said arm being normally disposed closely adjacent the section to which attached, a portion of the section adjacent the arm being cut away to provide latch operating clearance for the fingers of the operator.

2. In a rod of the class described, a plurality of rod elements, a hinge connection between said elements, including a hinge member for each element, one element being tubular and the hinge member thereof having a circular shank rotatably embraced by the tubular element, and means to secure the shank in place, said means comprising a sleeve having a central bore and counter-bore and a transverse slot communicating laterally with both the bore and counter-bore, a stem and head on the shank adapted to enter the slot laterally of the axis of the sleeve and seat in the bore and counter-bore respectively, and means to secure the sleeve in fixed position in the tubular element.

3. A conduit rod, comprising a large number of sections hinged together in such manner that adjacent sections will not swing relative to each other in one direction beyond alignment of the sections, releasable means to hold the sections in alignment, and a swivel joint in each of said sections, whereby the hinge axes of said sections may be rotated into a plurality of relative positions, and the adjacent sections folded together in pairs lying in intersecting planes.

ALBERT R. ASKUE.