This invention relates to utility tunnels within which sewer, water, steam, gas, telephone or electrical lines, conveyor belts, pneumatic tubes, oil and coal pipe lines, and the like are laid. Such utility lines are usually laid in tunnels so that access may be had to these various lines for repair and replacement purposes. Most such tunnels in the past have been of masonry construction, and have been of a size that a human being can walk on the inside. Such tunnels are extremely expensive in construction and are often undesirable in certain installations.

Other tunnels have been proposed which are much smaller so that a human being cannot walk inside of them, and in such case provision must be made for access to the utility lines within the tunnel at spaced points in the tunnel. One such construction is disclosed and claimed in the copending application of one of the applicants herein, in an application Serial No. 209,170, filed February 2, 1951, and entitled "Conduit Construction," now Patent No. 2,706,493, dated April 19, 1955.

The advantages of the construction disclosed in said copending application are that the tunnel can be quickly and easily installed, either in original installations or by way of repair sections. It is also easily shipped and stored.

The present invention has to do with a walk-through type of utility tunnel, and the present invention therefore relates to certain features for rendering the interior of the tunnel accessible, and to a hanger construction for the support of utility lines within the tunnel.

It is an object, therefore, of the present invention to provide a walk-through type of utility tunnel which will be inexpensive to install and easy to repair. It is another object of the invention to provide a construction whereby access may easily be had by removing cover sections without the use of special tools, and whereby the cover sections can quickly and easily be replaced when it is desired to reclose the tunnel.

Another object of the invention is to provide a hanger ring structure within the tunnel which will serve to strengthen and brace the tunnel, particularly when the cover pieces are removed, and which will permit of their adjustments in a variety of positions to fit any particular problems in the laying of utility lines.

These and other objects of the invention which will be pointed out in more detail hereinafter, or which will be apparent to one skilled in the art upon reading these specifications, we accomplish by that structure and arrangement of parts of which we shall now describe an exemplary embodiment.

Reference is made to the drawings forming a part hereof and in which:

Figure 1 is a plan view of a portion of a tunnel according to the invention with parts broken away to show the construction;

Figure 2 is a fragmentary cross sectional view to a greatly enlarged scale taken on a line 2—2 of Figure 1;

Figure 3 is a fragmentary cross sectional view taken on a line 3—3 of Figure 1;

Figure 4 is a fragmentary cross sectional view taken on a line 4—4 of Figure 2;

Figure 5 is a cross sectional view on a greatly enlarged scale taken on a line 5—5 of Figure 1;

Figure 6 is a cross sectional view taken on a line 6—6 of Figure 5;

Figure 7 is a fragmentary cross sectional view taken on a line 7—7 of Figure 5;

Figure 8 is a fragmentary cross sectional view taken on a line 8—8 of Figure 5;

Figure 9 is an elevational view of one of the brace rods.

Briefly, in the practice of our invention we provide a plurality of cylindrical tunnel sections of corrugated sheet metal. These sections are secured together in axially overlapping relation as is well known in the art. Certain ends of these sections are provided with a rectangular opening when, which the tunnel is in place, will be at the top of the tunnel, and cover members are provided to close the openings and to overlap the edges of the openings on all sides. The cover members are held in place by tie rods extending between angle irons secured adjacent the opposed longitudinal edges of the openings, and the edges of the cover members are held down by railroad spikes or the like driven under the angle irons in the valleys of the corrugations.

At spaced points within the tunnel there are provided hanger rings provided with brackets to support the pipe supports for the utility tunnel. The hanger rings further serve to strengthen and brace the tunnel structure particularly in the region of the opening referred to above.

Referring now in more detail to the drawings, a utility tunnel is shown in Figure 1, and it will consist of a number of tunnel sections 10, which are full round, and at spaced points it will be provided with the section 11 having the rectangular opening. The sections 11 may be considered as connecting sections, although contrary to the usual meaning of the words, these sections are long enough to permit placing long lengths of utility pipe from the tunnel surface, and to facilitate prompt repairs to any section of the utility lines. In other words they are of substantial length. The sections 11 and 10 are lapped in the region indicated at 12. It will be understood that in Figure 1 the cover member is shown in place. The cover member is indicated generally at 13, and is likewise of corrugated sheet metal, formed so as to complete the cylindrical form of the tunnel. The cover member 13 is of a size to overlap the longitudinal edges 14 of the opening in the section 11, as well as the end edges of the opening.

Along each longitudinal edge 14, spaced therefrom and parallel thereto, are secured the angle iron members 15. The angle irons are bolted to the section 11 by a series of bolts 16. It will be noted that the cover member 13, when in place as best seen in Figure 2, overlaps the longitudinal edges 14 and abuts the angle irons 15 at both sides.

At spaced points along the angle irons 15 the brace channels 17 are provided which are welded to the angle irons 15 and bolted to the section 11 as clearly shown in Figures 1, 2 and 4.

The cover member 13 is held in place by means of the rods 18 extending between the angle irons 15 and held tightly in engagement by means of nuts 19 engaging the threaded ends 20 thereof.

In order to hold the longitudinal edges of the cover member 13 tightly in engagement in overlapping relation with the edges 14, we use a plurality of wedge-like members which may be ordinary railroad spikes as indicated at 21, and these are driven into position as best seen in Figure 3 over the cover member 13 and under the angle irons 15 in the valleys of the corrugations.

It will be clear that the cover member 13 may be removed by simply pulling out the spikes 21 and remov-
ing the tie rods 18. Conversely, the cover is replaced by replacing the tie rods 18 and driving in a plurality of the spikes 21.

The hanger ring is best seen in Figure 5, and it comprises two sub-semicircular arcuate members 22, which are con- 5 nected together at the top and bottom by means of straps 23 and 24. Each of the members 22, as best seen in the cross-sectional view of Figure 8, is channel shaped in cross section and is bolted to the sections 10 and 11 by a series of bolts 25 to form an arcuate box-like structure. The side walls 26 of the member 22 are provided with a series of holes aligned holes 27.

The members 22 serve as mounting members for any desired number of brackets of which four are shown in Figure 5. The brackets are composed principally of struts 29, brace rods 30 and adjustable supporting members 28. Struts 29 are bolted to the member 22 and also to the supporting angle members 28. The brace rods, as best seen in Figure 9, have a threaded end 31 and an offset 32. The offset end 32 may be passed through one of the holes 27, and the end 31 passes through one of a series of holes in the strut members 29. By means of a nut threaded on to the portion 31 of the brace rod the member 28 and 29 can be leveled. As clearly seen in Figure 5 the supporting members 28 may be of different lengths to suit the requirements of the installation, and of course, they may be adjusted with respect to the struts 29, as will be clear. The supporting members 28 define between them the longitudinal slots 33 and the supports 34 for the pipe rollers are positioned by means of washers and nuts 35 and 36, as best seen in Figure 7. These may of course be shifted longitudinally of the members 23 to suit the requirements of the particular installation.

Certain of the utility lines may of course be laid along the lower strut 24, or other pipe rollers supports may be secured to the strut 24.

The struts 23, as can clearly be seen from Figures 2 and 5, span the openings in the sections 11 and serve to brace the sections 11 when the cover 13 is removed.

It will be clear that numerous modifications may be made without departing from the spirit of our invention, and we therefore do not intend to limit ourselves otherwise and as set forth in the claims which follow.

Having now fully described our invention what we claim as new and desire to secure by Letters Patent is:

1. A utility tunnel structure of corrugated sheet metal comprising a plurality of sections in axially lapped relation, one at least of said sections having a rectangular opening at the top, and angle irons secured to said last named section adjacent each longitudinal edge of said opening, a cover member of a size to overlap the edges of said opening, a series of tie rods extending between said angle irons, and a plurality of wedge-like elements disposed in the valleys of the corrugations and extending over the edges of said cover member and under said angle irons respectively, to hold the edges of said cover member in tight contact with said longitudinal edges.

2. A structure of claim 1 wherein each of said sub-semicircular arcuate members includes a rib in a plane normal to the axis of said tunnel structure, each of said ribs having a plurality of spaced holes, a bracket secured to said rib by means of a bolt passing through one of said holes, and a brace rod secured to the bracket and engaging another one of said holes.

3. The structure of claim 1 wherein each of said sub-semicircular arcuate members is of channel shaped cross section and is bolted to the inside wall of said sections to form an arcuate box structure, the parallel arms of said channel shaped members being provided with a series of pairs of aligned holes, a bracket secured to each of said arcuate members by means of a bolt passing through a pair of said aligned holes, and a brace rod secured to said bracket and engaging others of said holes.

4. The structure of claim 1 wherein each of said sub-semicircular arcuate members is of channel shaped cross section and is bolted to the inside wall of said sections to form an arcuate box structure, the parallel arms of said channel shaped members being provided with a series of pairs of aligned holes, a brace rod secured to each of said arcuate members by means of a bolt passing through a pair of said aligned holes, and a brace rod secured to said bracket and engaging others of said holes.

5. A utility tunnel structure of corrugated sheet metal comprising a plurality of substantially cylindrical sections in axially lapped relation, one at least of said sections having a rectangular opening at the top, and angle irons secured to said last named section adjacent each longitudinal edge of said opening, a cover member of a size to overlap the edges of said opening, a series of tie rods extending between said angle irons, and a plurality of wedge-like elements disposed in the valleys of the corrugations and extending over the edges of said cover member and under said angle irons respectively, to hold the edges of said cover member in tight contact with said longitudinal edges.

6. A utility tunnel structure of corrugated sheet metal comprising a plurality of substantially cylindrical sections in axially lapped relation, one at least of said sections having a rectangular opening at the top, and angle irons secured to said last named section adjacent each longitudinal edge of said opening, a cover member of a size to overlap the edges of said opening, a series of tie rods extending between said angle irons, and a plurality of wedge-like elements disposed in the valleys of the corrugations and extending over the edges of said cover member and under said angle irons respectively, to hold the edges of said cover member in tight contact with said longitudinal edges.

7. A utility tunnel structure of corrugated sheet metal comprising a plurality of substantially cylindrical sections in axially lapped relation, one at least of said sections having a rectangular opening at the top, and angle irons secured to said last named section adjacent each longitudinal edge of said opening, a cover member of a size to overlap the edges of said opening, a series of tie rods extending between said angle irons, and a plurality of wedge-like elements disposed in the valleys of the corrugations and extending over the edges of said cover member and under said angle irons respectively, to hold the edges of said cover member in tight contact with said longitudinal edges.

8. The structure of claim 1, wherein each of said sub-semicircular arcuate members includes a rib in a plane normal to the axis of said tunnel structure, each of said ribs having a plurality of spaced holes, a bracket secured to said rib by means of a bolt passing through one of said holes, and a brace rod secured to the bracket and engaging another one of said holes.

9. The structure of claim 1, wherein each of said sub-semicircular arcuate members is of channel shaped cross section and is bolted to the inside wall of said sections to form an arcuate box structure, the parallel arms of said channel shaped members being provided with a series of pairs of aligned holes, a bracket secured to each of said arcuate members by means of a bolt passing through a pair of said aligned holes, and a brace rod secured to said bracket and engaging others of said holes.

10. The structure of claim 1, wherein each of said sub-semicircular arcuate members is of channel shaped cross section and is bolted to the inside wall of said sections to form an arcuate box structure, the parallel arms of said channel shaped members being provided with a series of pairs of aligned holes, a bracket secured to each of said arcuate members by means of a bolt passing through a pair of said aligned holes, and a brace rod secured to said bracket and engaging others of said holes.
of said channel shaped members being provided with a series of pairs of aligned holes, a bracket secured to each of said arcuate members by means of a bolt passing through a pair of said aligned holes, said bracket having a laterally extending flange provided with a series of holes, and brace rods bolted to said brackets and engaging others of said holes.

11. The structure of claim 10 wherein each of said brace rods is constituted of a rod having an offset at one end and being threaded at the other end, said threaded end passing through a hole in said laterally extending flange and being secured thereto by a nut and said offset end being in hooking engagement with another of the holes in said arcuate member.

References Cited in the file of this patent

UNITED STATES PATENTS
1,137,442 Abbott .......................... Apr. 27, 1915
1,801,076 Ganzer .......................... Apr. 14, 1931

FOREIGN PATENTS
267,494 Italy .......................... Sept. 9, 1929
445,576 Great Britain .......................... Apr. 14, 1936