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[56]

References Cited

UNITED STATES PATENTS

2,779,610	1/1957	Risley.....	285/369 X
3,056,195	10/1962	Hack.....	29/193.5
3,078,332	2/1963	Marx.....	174/91
3,140,107	7/1964	Hynes.....	285/340
3,265,414	8/1966	Reid et al.....	285/348

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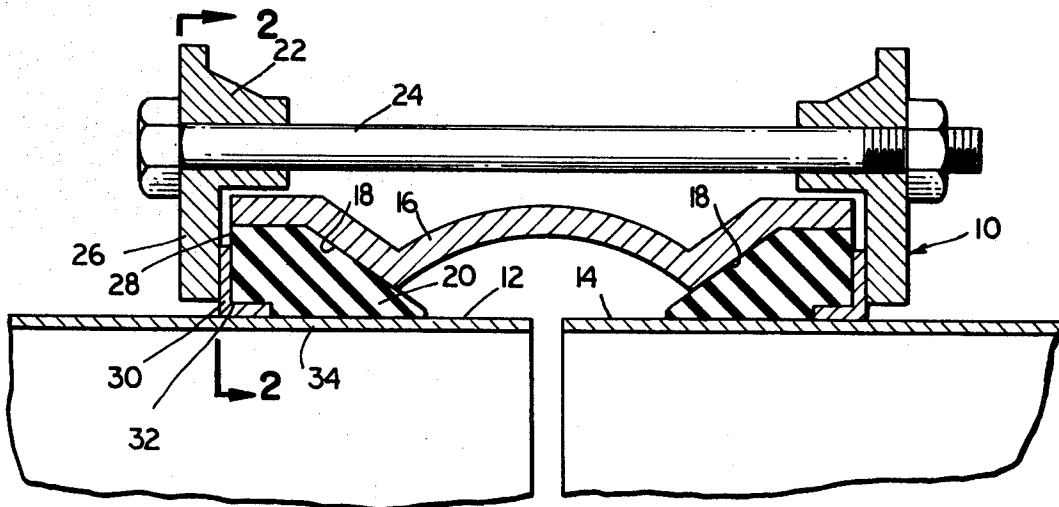
[54] **ELECTRICAL CONNECTOR STRIP FOR PIPE COUPLING**
2 Claims, 4 Drawing Figs.

[52] U.S. Cl..... **339/15,**
285/369

[51] Int. Cl..... **H01r 3/04**

[50] Field of Search..... **339/15, 16;**
285/348, 369; 174/91; 29/190, 193; 161/117, 149

ABSTRACT: An expandable conductive strip forming adjustable connectors for use in combination with ring gaskets to provide electrical continuity through both the followers and the interconnecting bolts or sleeve of a coupling mounted on a pipe.



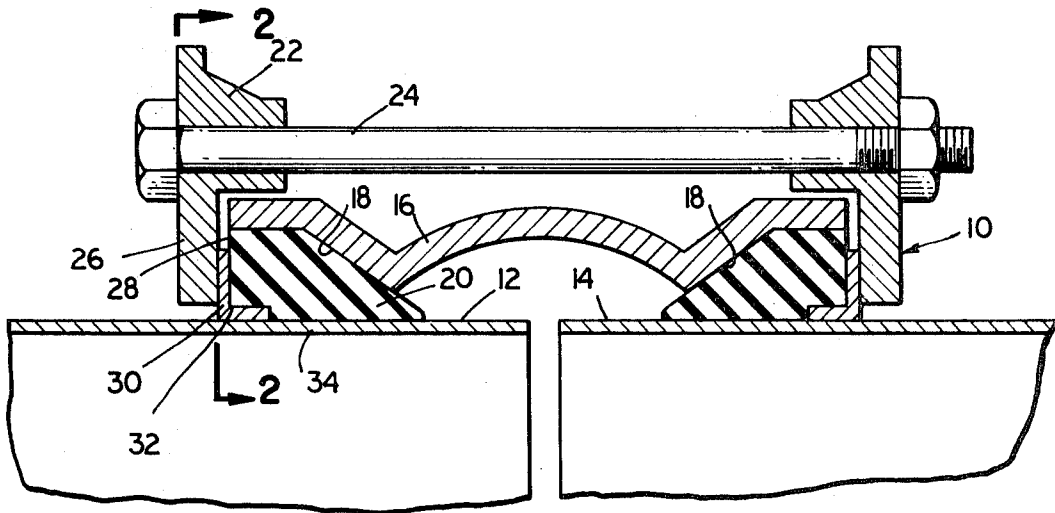


FIG_1

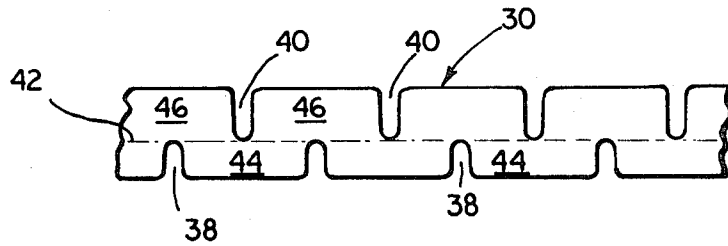


FIG_3

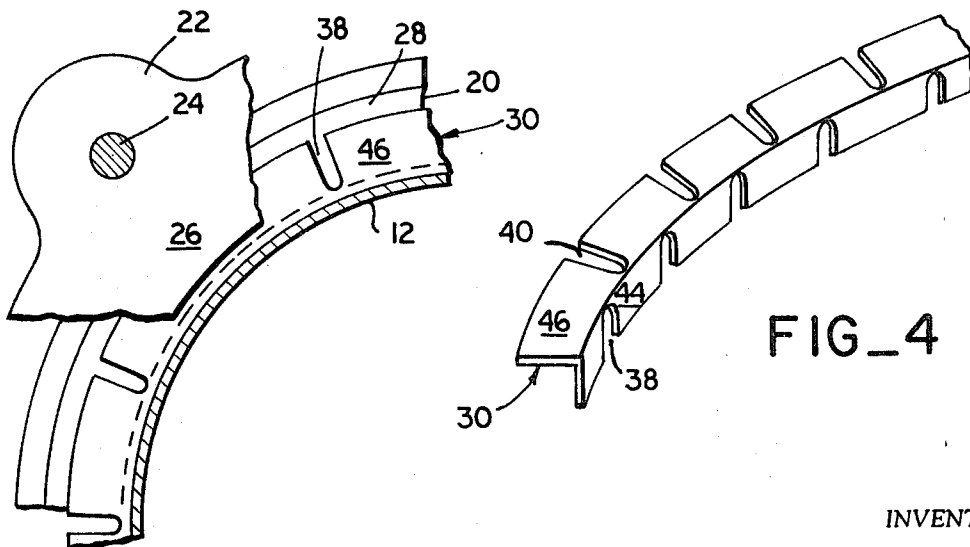


FIG_2

FIG_4

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ELECTRICAL CONNECTOR STRIP FOR PIPE COUPLING

The invention relates to pipe couplings and more particularly to electrically conductive devices for maintaining an electrical path through such couplings.

To combat electrolytic corrosion in underground metal conduits, it is necessary to provide a continuous electrical current path through the entire system even though it may be comprised of a large number of connected pipe sections. When pipe sections are connected by conventional couplings the pipe sections ordinarily do not butt together and therefore an electrical path must be provided through the coupling itself. The present invention solves this problem by means of a ring-shaped conductor having portions which are held tightly against the pipe surface and other portions which engage the coupling followers. The conductor is made in the form of a flexible metal strip which is shaped in a unique manner so that when properly fitted around the pipe it interconnects the pipe with metallic elements of the coupling and thereby provides a satisfactory current path. The flexible conductors can be produced in a long continuous strip form and stored in rolls, thus making it convenient to sever a length of the strip to form a conductor of the desired size.

It is therefore one object of the present invention to provide an effective electrical conductor for use in combination with conventional pipe couplings to provide electrical continuity through the couplings in a conduit comprised of a plurality of metal pipe sections.

Another object of my invention is to provide an electrical conductor ring for a pipe coupling that can be adjusted to fit pipes and couplers of different sizes.

Yet another object of my invention is to provide a flexible strip material for forming electrical conductor rings on pipe couplings which strip material can be stored and shipped in a coiled form and then cut to any size when used.

Another object of my invention is to provide an electrical conductor ring for a pipe coupling that is particularly well adapted for ease and economy of manufacture.

Other objects, advantages and features of the invention will become apparent from the following detailed description presented in conjunction with the accompanying drawings, in which:

FIG. 1 is a fragmentary view in side elevation and in section of a typical pipe coupling utilizing an electrical connector embodying the principles of the present invention;

FIG. 2 is a fragmentary view in section taken along the line 2-2 of FIG. 1;

FIG. 3 is a plan view of a section of my connector before being bent for use; and

FIG. 4 is a view in perspective of a section of my connector when bent and ready for installation on a coupling.

Referring to the drawing, FIG. 1 shows a typical coupling 10 for connecting two pipe sections 12 and 14 in a fluid conduit. As shown, the pipe sections normally do not touch each other but are spaced apart so that, to provide electrical continuity, a current path must be provided through the coupling. Generally, the coupling comprises a central sleeve member 16 that fits around the spaced apart ends of the adjacent pipe sections. Each end of the sleeve member has an inner surface 18 that diverges outwardly and forms a seat for an elastomeric gasket or packing ring 20. Each gasket fits snugly around the pipe and has a tapered nose portion that extends into the seat 18. A pair of annular follower rings 22 are located around the adjacent pipe sections at opposite ends of the sleeve member 16 and are connected by a plurality of bolts 24 that extend through circumferentially spaced apart openings in each follower ring. Each follower ring has an inner annular flange portion 26 that normally provides a force against a rear annular surface 28 of an adjacent gasket.

Since each follower ring has an inner diameter that is substantially greater than the pipe diameter in order for it to move freely in an axial direction thereon, it will not make an adequate electrical contact with the pipe. Hence, some other conductive path must be provided. In the present invention this problem is solved by an annular connector 30 which fits

around the rear corner edge 32 of each gasket 20. As shown in FIG. 1, this rear corner edge is formed on each gasket by its cylindrical inner surface 34 and its rear annular surface 28 which is perpendicular thereto. The connector 30 thus has a right angle cross section so that it will fit flush against the surfaces 34 and 28 at the corner edge 32 on each gasket.

Each connector 30 is made from a narrow strip of sheet metal such as a suitable steel with a thickness that provides considerable flexibility. When formed, the metal strip is punched with a first series of uniformly spaced apart notches 38 on one side and a second series of equally spaced notches 40 that extend inwardly from the other side and are offset from the first notches. All of the notches 38 and 40 terminate along a longitudinal line 42 which is preferably closer to one side edge of the strip than the other. The notches 38 thus form a series of connector segments 44 and the notches 40 form a series of segments 46 of substantially equal length but preferably somewhat wider. Now, when the connector 30 is bent to the annular shape of the gasket 20 with which it is to be used, the segments 44 bend slightly to form surfaces in a cylindrical-shaped pattern, while the segments 46 spread further apart in a radial pattern, as shown in FIG. 4. With the strip notched as described it will easily conform to any circular shape and thus can be used on any size of gasket.

When installed with a coupling, the inner connector segments 44 fit flush against the pipe surface and the inner gasket surface 34 near its rear corner 32. The radially connector segments 46 fit flush against the rear face 28 of each gasket and are engaged by the annular flange portion 26 of the follower ring 22. As the coupling bolts 24 are tightened to draw the follower rings together, the metal surfaces of the connector, the follower and the pipe come into closer contact and thus provide a better electrical contact. As may be seen in FIG. 1, the connectors 30 thus provide an excellent, reliable electrical path through the coupling at both ends and thus around the gap between the pipes being coupled.

While the coupling 20 is representative of typical pipe couplings, it is to be understood that the present invention is adaptable for use with various other couplings or fittings for pipe joints and in particular wherever electrical continuity is required between two conductive members that engage cylindrical and annular surfaces of a nonconductive member.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

I claim:

1. In combination with a pipe coupling for interconnecting a pair of aligned pipe sections comprised of a sleeve around said pipe sections having conical end seats, an elastomeric gasket in each end seat having a tapered nose section, a pair of follower rings located at the opposite ends of said sleeve, each having an inner annular portion adjacent a rear annular face of said gasket, and means for drawing said follower rings together, a pair of annular connectors of flexible electrically conductive material, each being located adjacent a said gasket and including an axially extending cylindrical portion located between the gasket and the outer pipe surface and integral radially extending portions located between the gasket and the adjacent follower ring, said axially extending portion of each said connector being comprised of spaced apart segments formed by a first series of notches along one side of the connector, said radially extending portions of each said connector being comprised of segments formed by a second series of spaced apart notches along the other side of said connector and offset from said first notches.

2. An electrical connector for a pipe coupling comprising a sheet metal strip bent along a longitudinal break line to form a first cylindrically shaped portion adapted to fit around a pipe, said first portion having a first series of notches extending inwardly from one side edge of said connector to form axially

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extending segments, and a second portion integral with said first portion comprised of a plurality of radially extending segments formed by a second series of notches spaced apart along

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the other side edge of said connector and offset from said first series of notches.

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