Sept. 2, 1924. 1,507,420

W. C. PARMLEY ET AL

EXPANSIBLE JOINT CONSTRUCTION

Filed Feb. 13, 1919

Fig. 1.

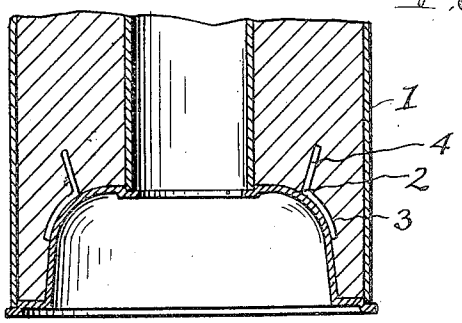



Fig. 2.

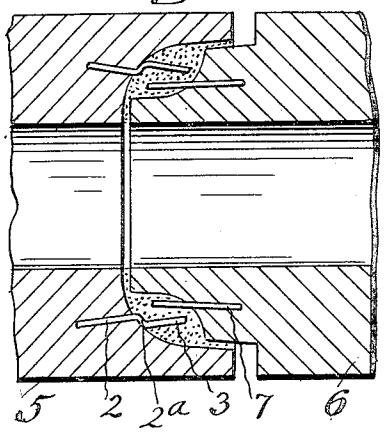
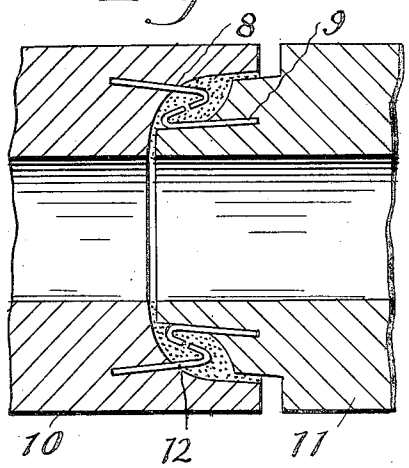



Fig. 3.



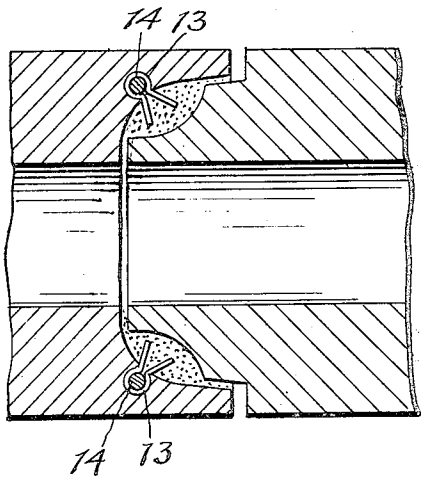




Fig. 4.

Inventors.
Walter C. Parmley and
Charles Gilman.
Thurston & Kerr
attys.

Patented Sept. 2, 1924. 1,507,420

# UNITED STATES PATENT OFFICE.

WALTER C. PARMLEY, OF UPPER MONTCLAIR, AND CHARLES GILMAN, OF PLAINFIELD, NEW JERSEY.

## EXPANSIBLE-JOINT CONSTRUCTION.

Application filed February 13, 1919. Serial No. 276,854.

*To all whom it may concern:*

Be it known that we, WALTER C. PARMLEY and CHARLES GILMAN, citizens of the United States, and residents, respectively, of Upper Montclair, in the county of Essex and State of New Jersey, and Plainfield, in the county of Union and State of New Jersey, have invented a certain new and useful Improvement in Expansible-Joint Construction (B), of which the following is a full, clear, and exact description.

The purpose of this invention is to provide a construction adapted for use in connection with forming a water and seepage proof joint between adjacent bodies of concrete, such for instance, as adjacent sections of a wall, a floor, or adjacent sections of sewer or water pipe which are made of concrete or analogous substances.

The result is effected by the use of a metal strip which extends across the joint between the concrete parts before mentioned.

We are aware that it has been heretofore proposed to use a metal strip under substantially the same circumstances as the metal strip which it is proposed to use in carrying out the present invention, but so far as we are aware, the metal strips used have been folded so that when expansion and contraction took place between the adjacent bodies of concrete, the strip accommodated itself to the movement by virtue of relative movement of the folds or bends into which the strip is folded.

In the present invention the principle underlying is quite different and distinct from that which has been used heretofore, in that instead of relying upon the mobility of folded portions of the strip of metal which extends across the joint, we rely upon the plasticity or stretchability of the metal which is employed. In other words the strip of metal which we employ in forming the seal for the joints is a strip of metal which has sufficient tensile strength for the purpose, and yet is possessed of sufficient plasticity so that it may be elongated or slightly compressed under the expanding and contracting action, or limited relative displacement, which may take place between the adjacent concrete bodies, with which it is associated.

Reference should be had to the accompanying drawings forming a part of this specification, in which Fig. 1 represents in section, a mold for the forming of a concrete pipe; Fig. 2 shows in section the adjacent ends of two concrete pipe sections; Fig. 3 shows the adjacent ends of two concrete pipe sections embodying a modified form of our invention; and Fig. 4 shows in section, the ends of two concrete pipe sections embodying a modified form of our invention.

As stated in the first part of this specification, the application of the present invention is broad enough to cover its use in connection with adjacent sections of a floor, wall, or in fact, any other concrete construction in which there are in juxtaposition two concrete bodies which may be subjected to expansion and contraction, and between which it is desired to place a water-tight and seepage tight joint.

However, for the purposes of disclosure, the invention will be explained in its application to concrete water or sewer pipes without in any way intending to limit the invention thereby.

Referring to Fig. 1, 1 indicates a suitable mold for the forming of a concrete water or sewer pipe. In molding the pipe, a suitable annular strip such as indicated at 2 is placed within the mold at the lower end thereof, so that the end 3 lies against the outer wall of the mold, and the concrete forming the pipe is behind this portion of the strip. The other portion of the strip, as indicated at 4, extends within the body of concrete, and in order to secure the required amount of adhesion it is desirable that this portion of the strip be roughened or otherwise prepared in order to obtain a firm bonding between the concrete and the portion 4 of the strip.

When the pipe is removed from the mold, the portion 3 of the strip is visible, and may be pulled outwardly from its adhesion to the wall of the pipe into some such position as is indicated in Fig. 2.

Referring now more particularly to Fig. 2, 5 indicates the bell end of a concrete pipe, while 6 represents the spigot end of a concrete pipe, these pipes when in proper position with respect to each other, providing the usual space between them for the reception of a cement, grout or mortar, as

is well known in the art. The end 3 of the strip 2 extends into the space between the adjacent sections of the pipe, and when the space is filled with cement, mortar or grout, the end 3 becomes imbedded in the mortar or grout. It will be seen that the strip 2 effectually seals any possible line of cleavage between the body of grout or mortar and the pipe section 5, and in the event of any expansion and contraction taking place in the joint between the pipe sections 5 and 6, such expansion and contraction will be taken care of by the movement of the metal forming the strip 2, due to its ductility and compressibility. Any movement of expansion will, as it stretches the metal strip 2 have a tendency to cause the strip to recede from its contact with the grout or mortar, thus forming a cavity in which the metal strip may subsequently have movement to accommodate relative movement between the pipe sections 5 and 6.

In order to positively assure that any line of cleavage between the cement, grout or mortar and either of the pipe sections shall be between the pipe section 5 and the grout or mortar, it is desirable to locate a reinforcing member such as indicated at 7, in the spigot end of the pipe 6, which member 7 extends into the space between the pipe sections, so that when the space between the sections is filled with cement, mortar or grout, the reinforcing member 7 is imbedded therein, and therefore holds the body of grout or mortar securely with respect to the pipe section 6.

Additional precaution to insure this result may be taken by coating the inside of the bell end of the pipe section 5 with asphalt, paint, grease, or other suitable substance which will prevent the adhesion of the grout or mortar which is poured into the joint between the pipe sections, and further, a portion of the strip 2 adjacent the place where the strip emerges from the body of the pipe 5, as for instance the point indicated at $2^a$ in Fig. 2, may also be painted or otherwise coated in order to prevent the adhesion of grout to the strip 2.

Under these conditions it will thus be seen that any line of cleavage between the cement, mortar or grout of the joint and the pipe sections is anticipated and predetermined, so that it will occur between the cement grout and the bell end of the pipe section 5, and any seepage due to the same is prevented by the presence of the strip 2.

It will be observed that one end of the strip 2 is imbedded in the pipe 5, while the other end of the strip is imbedded in the cement, mortar or grout of the joint, while an intermediate portion of the strip is free from adhesion to the grout, and consequently is free to respond to any stretching or compressing action which may be incident to the expansion or contraction between the pipe sections.

The strip of metal, such as lead, is capable of stretching an appreciable amount which thus permits a considerable range of relative movement to accommodate the range of expansion and contraction, or shearing action between the pipe sections, without rupture.

Fig. 3 illustrates a modification of the invention in which, however, the same principles are present as that which is shown in Fig. 2. In this instance, two similar strips of metal, as of lead, the same being indicated at 8 and 9, are respectively imbedded at their end portions in the adjacent sections 10 and 11 of the pipe. The ends of the strips 8 and 9 extend into the space between the adjacent sections, and these strips thus protect against leakage along a possible line of cleavage between the grout in the joint and the pipe 10, or between the pipe 11 and the grout in the joint. This result is accomplished even though neither the bell end nor the spigot end of the adjacent pipe sections are painted or otherwise coated. However, the effectiveness of the joint is increased if each of the strips is painted or otherwise coated for a short distance along the strip where the strip emerges from the pipe section with which it is associated, as for instance, at the point 12 in the strip 8. The reason for so doing this, is as explained heretofore, to wit, in any stretching of the metal, due to expansion, a chamber is created by the stretching in which the strip may act or react under the relative movement which takes place between the pipe sections.

In Fig. 4 a further modification of the invention is shown, by which there is obtained a double seal or double metal strip along the line of anticipated cleavage.

As shown in this figure, a folded strip, such as indicated at 13, is used, the strip being folded about a core, such as indicated at 14, which is preferably made of flexible material such as cord or wire which has been treated with asphalt or other similar substance in order to prevent corrosion. The ends of the strip 13 extend into the space between the adjacent pipe sections and are imbedded in the concrete mortar or grout which is poured into the joint. The flexible member 14 permits a certain amount of relative movement of the strip 13 with respect to the pipe section with which it is associated, and thus assists by increasing the flexibility.

The various expedients which have before been proposed, of painting the end of the pipe section which carries the strip 13, and of providing a metal reinforcing member associated with the pipe section having the spigot end for the purpose of bonding cement, mortar or grout in the joint to that pipe, may be utilized in the construction

shown in Fig. 4, with the same advantages present as that which has before been described.

While in the specification we have indicated that the strip of metal employed is of lead, it should be understood that the invention is not limited to a strip of this particular metal, but any metal which has the properties of ductility and sufficient tensile strength may be utilized with equal facility.

It will be obvious that where the joint between the adjacent concrete members is a straight joint, a straight strip of metal may be used. In fact, the character of the joint determines the form or shape of the strip of metal.

Having described our invention, we claim:—

1. The combination of adjacent masses of concrete, of an expansible joint comprising a strip of ductile metal having its opposite edges imbedded in the concrete masses and extending across the line of jointure, a portion of said strip between the edges thereof being free from adhesion to the concrete and positioned to be stretched or compressed by movement of the masses of concrete.

2. The combination of adjacent masses of concrete, of an expansible joint comprising a strip of ductile metal having its opposite edges imbedded in the concrete masses and extending across the line of jointure, a portion of the strip between the edges thereof having a coating which prevents adhesion of the coated part to the concrete in which it is imbedded and positioned to be stretched or compressed by movement of the masses of concrete.

3. The combination of two adjacent bodies of concrete, one of the bodies being coated with a material to prevent adhesion, of an expansible joint comprising a substantially straight strip of ductile material which extends across the line of jointure, one edge of the strip being imbedded in one of the concrete bodies, and the opposite edge of the strip being imbedded in the other of the concrete bodies whereby said strip is subject to tension or compression as the joint expands or contracts.

4. The combination of two concrete members, mortar joint between them, a substantially straight strip of ductile material which crosses said joint, one edge of which strip is imbedded in one of the members, the other edge of which is imbedded in the mortar of the joint.

5. The combination of two concrete members with mortar in the joint between them, of a first strip of ductile metal, one edge of which is imbedded in one of the members, the other edge of which is imbedded in the mortar of the joint, and a second strip having one edge imbedded in the other of the concrete members, said strip having its opposite edge imbedded in the concrete of the joint each of said strips having portions between the imbedded ends thereof which are free from adhesion to the concrete whereby the said strips may be stretched or compressed by movement of the concrete members.

6. The combination of two concrete members with mortar in the joint between them, of a first strip of ducile metal, one edge of which is imbedded in one of the members, the other edge of which is imbedded in the mortar of the joint, and a second strip having one edge imbedded in the other of the concrete members, said strip having its opposite edge imbedded in the concrete of the joint, each of said strips at portions thereof between the edges being coated, thereby to prevent adhesion between the coated portion of the concrete and the mortar of the joint.

In testimony whereof, we hereunto affix our signatures, in the presence of two witnesses.

WALTER C. PARMLEY.
CHARLES GILMAN.

Witnesses:
CORYDON T. PURDY,
J. T. BLANCHFIELD.