The invention relates generally to crock tile and it has particular relation to the sealing of adjacent ends of the tile together and a method of forming the seal.

It is conventional to use crock tile in drainage work, and ordinarily the adjacent ends of the tile should be properly sealed. In certain instances, such seals are formed by applying certain sealing materials as the tile is laid and while this practice has been followed, it requires considerable and careful work usually in a narrow ditch in which the tile is laid, and mainly for this reason the practice is relatively expensive. Moreover unless the workmen are particularly careful, the seals will not always be uniform. In other instances, seals have been applied to the tile prior to its being laid in the ditch, but this practice has been objectionable for the reason that exposed seals were frequently chipped or broken not only during manufacture, but also during subsequent handling and laying of the tile.

One object of the present invention is to provide an improved tile and seal therefor, which can be manufactured inexpensively and efficiently and wherein the seal is subject to minimum damage or breakage not only during its manufacture but also during handling and laying of the tile.

Another object of the invention is to provide an improved method of placing sealing material on tile which will reduce the cost of manufacture and avoid waste of sealing material.

Another object of the invention is to provide an improved sealing means for tile wherein the sealing means is more positively anchored on the tile so that particularly during handling of the tile, the material will stay in place.

Another object of the invention is to provide an improved method of forming a seal on tile wherein the sealing material includes tar or similar compound, wherein the seal may be formed more efficiently and be anchored more positively on the tile.

Another object of the invention is to provide a seal for tile, including a fibrous material and a tar or similar compound, wherein the fibrous material and compound may be placed on the tile in a generally continuous process until the desired size and shape of seal is obtained.

Another object of the invention is to provide an improved tile and sealing means therefor, which permits limited universal movement of one tile relative to another so as to compensate for or allow misalignment while still maintaining a sealed connection.

Other objects of the invention will become apparent from the following specification, from the drawings pertaining thereto, and from the claims hereinafter set forth.

For a better understanding of the invention, reference may be had to the drawings wherein:

Figure 1 is a cross-sectional view showing the end portions of two adjacent tile provided with sealing means constructed according to one form of the invention;

Fig. 2 is a fragmentary, cross-sectional view on a much larger scale, showing the construction of the ends of the tile illustrated in Fig. 1;

Fig. 3 is a view on the order of Fig. 2, illustrating another form of the invention;

Fig. 4 is a diagrammatic view illustrating the manner in which the tape is passed through melted tar or similar material and then is wound around the tile to form the seal.

Fig. 5 is a view illustrating generally how the sealing band or ring might be faced to provide the contour of band on the smaller end of the tile; and

Fig. 6 illustrates a method of forming the ring or band on the interior of the bell end of the tile.

Referring to Figs. 1 and 2, fragmentary end portions of two pieces of tile 10 and 11 are shown and it will be understood that each piece is identical to the other and that one end of each piece is of cylindrical character, while its other end is enlarged to provide a bell 12. This bell is of larger internal diameter than the outer diameter of the body of the tile, so that the smaller end of one tile may be inserted into the bell while still allowing enough space for sealing material between the surfaces.

As shown by Fig. 2, a sealing band or ring 13 is applied to the outer surface of the smaller end of the tile and this band or ring comprises tar, asphaltum, or similar compound such as may be derived usually from coal or petroleum, having spirally arranged convolutions of fabric tape indented at 14 imbedded therein. Such compound impregnates the fabric and coats both sides of each convolution and therefore both peripheral surfaces of the band or ring are coated therewith. The outer surface of the ring or band is axially tapered as indicated at 16.

The bell 12 has a band or ring 17 of tar or asphalt compound on its inner surface and the band has a tapered inner surface 18 adapted to fit the surface 16 of band 13. It will be understood now that when the smaller end of one tile
is inserted into the bell end of the other, the two tapered surfaces will contact and that the ends of the tiles are thus sealed by reason of the fact that each ring or band is solidified on and adheres to the surface of the tile and by reason of the fact that the tapered surfaces are in contact. It may be desirable to apply a thin coating of adhesive material to the tapered surfaces before the tiles are brought together so that the two rings will positively adhere one to the other and in this connection, a tar or asphaltum compound may be used which is of such character that when the tapered surfaces contact, adhesion of one surface to the other naturally will occur owing to tackiness of the material.

In forming the seal on the tile, and as shown by Fig. 4, the tape is unwound from a roll and is loosely dragged through a bath composed of heated and melted tar or asphaltum compound. As the tape passes through this bath, the liquid compound impregnates the fabric and coats the outer surfaces thereof to an extent to which it is heated. After passing through the bath, the tape is wound around the tile in a spiral fashion until the desired radial thickness is obtained and at this stage, the band and compound may appear generally as shown by Fig. 5. The built-up sealing ring or band will include a large amount of the compound but this material will be distributed through the fabric itself and will be disposed between convolutions so that the material is bound together by the several convolutions of tape.

After solidification of the compound, the peripheral surfaces may be faced by means of a suitable rotary and axially movable facing tool indicated at 2 in Fig. 5, which has one or more blades 22 provided with a cutting edge 24 for tapering the peripheral surface and a base cutting edge 25 for facing the end surface. The opposite end of the band may also be cut down by a suitable turning tool to provide a radial face 26 as shown by Figs. 1 and 2. The material thus cut away may be saved and used again and thus waste is avoided.

The band or ring in the bell end 12 may be formed by first placing a cardboard or paper 27 at the base of the bell, as seen in Fig. 6, so as to close the tile opening and then employing a rotary and axially movable tool 26 having one or more cross bars 29 and a central drill 30 for piloting or grinding the tool. An adjustable cutter bar is mounted on each blade and such bar has a cutting edge 31 for cutting the tapered surface and a lead edge 32 for cutting through the compound and finally through the cardboard 21. It follows that the sealing ring will be left in the bell and that the remainder of the compound is either removed as the tool advances or may be lifted out at the end of the operation. It is to be understood that the cutter is may be so tilted as to facilitate removal of the chips during turning of the tool. Also the diametrical dimensions and taper may be varied by adjustment of the tool. Other suitable tools may be designed for removing the compound as stated above.

According to Fig. 2, the band or ring on the smaller end of the tile is frusto-spherically surfaced as indicated at 30 and the inner surface of the bell or ring in the bell is surfaced to provide a frusto-spherically surfaced socket 35 for receiving such band or ring on the smaller end of the tile. These parts are associated in the same way as in the case of the tile shown by Fig. 2, but in this case relative universal movement within limits is allowed for non-alignment. Tools on the order of those described, excepting for a change in edge contour, may be used to form the spherical surfaces.

The formation of the seal on the smaller end of the tile may be accomplished efficiently and with minimum breakage of the ring owing primarily to the provision of the convolutions of fabric that reinforce one another and hold the compound in position and firmly on the tile. Again, some cooling of the compound occurs in each layer as a succeeding convolution is being wound or in other words each convolution is exposed for a short period of time before it is covered by a succeeding convolution and this allows for more uniform cooling and thus minimizes shrinkage stresses that otherwise might be present in the band to take place through a much thicker ring. Thus, the tar or asphaltum compound not only is applied efficiently along with a strengthening and holding fabric, but solidification and cooling occur more uniformly and breakage or cracking is minimized. Fabric convolutions might be used similarly in forming the ring or band on the bell but owing to the protection afforded by the bell, chipping or breaking through contact is not so apt to occur.

Again, the provision of frusto-spherical surfaces will allow for greater non-alignment and will expedite the laying of tile since it will be easier to place the tile in position. Thus, the tile will be sealed properly even if not aligned and will be held in sealed relation even though some misalignment occurs later after the tile has been laid.

Although more than one form of the invention has been illustrated and described in detail, it will be apparent to those skilled in the art that various modifications may be made without departing from the scope of the appended claims.

What is claimed is:

1. The method of forming a sealing band or ring around the inner surface of the bell end of a tile comprising placing a relatively stiff closure member on the base of the bell to close the tile opening leading to the bell, distempering the surface of the tile within, distempering the inner surface of the bell and allowing it to solidify, and then cutting out the central part of the solidified material and the closure member so as to open the tile and leave an annular sealing ring in the bell.

2. In a drainage tile, a sealing band extending around one end of the tile and adapted to co-operate with an end of a second tile, said band comprising a solidified tar compound having convolutions of fabric tape embedded therein and wound spirally on the spindle of the tile with the compound relatively thick between layers of the fabric, the outer surface of the band being axially tapered, said layer of compound and fabric being characterized further by reduced shrinkage stresses.

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