March 19, 1963 T. W. ROBERG 3,081,599

TILE POSITIONER, SPACER AND GUIDE

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Fig. 1

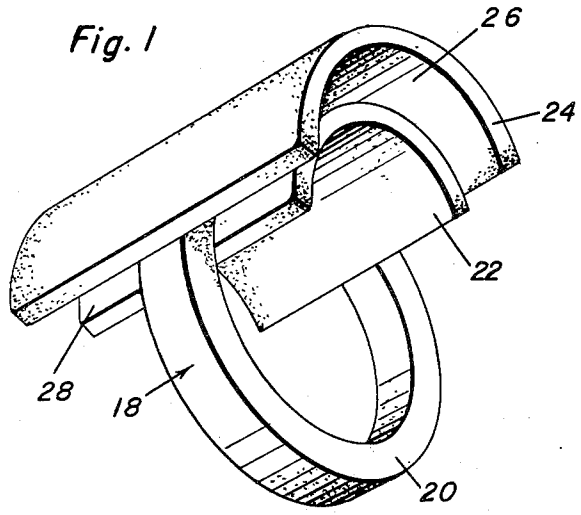


Fig. 2

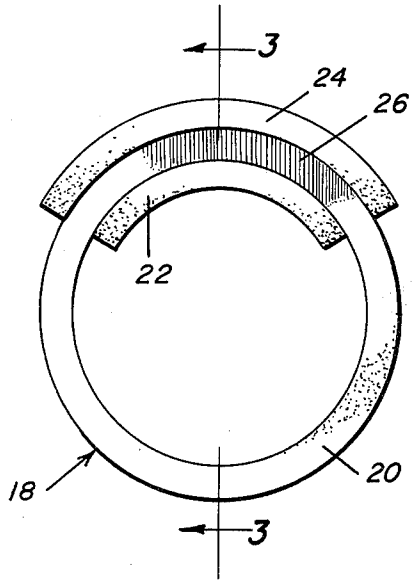
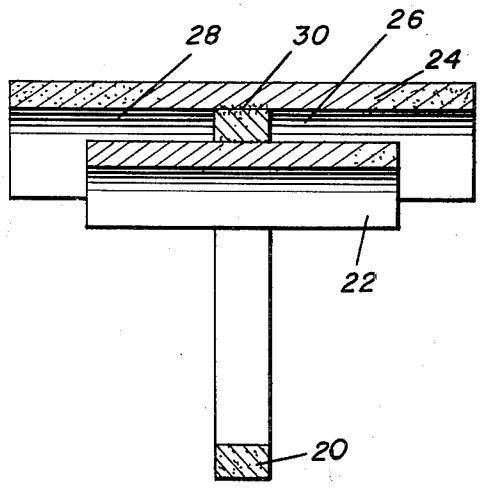


Fig. 3



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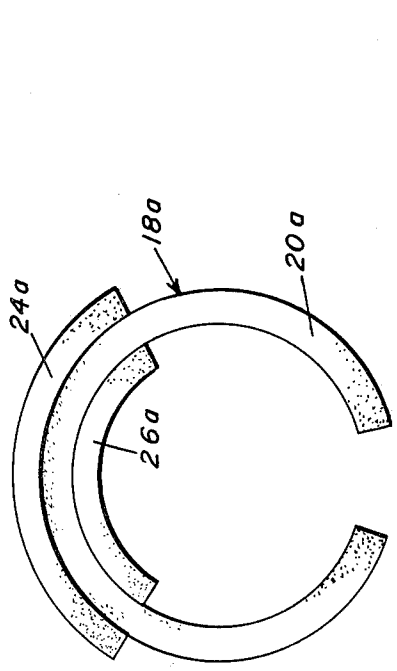


Fig. 5

Fig. 4

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TILE POSITIONER, SPACER AND GUIDE

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This invention relates to sub-soil tile assemblies and more particularly to a positioner, spacer and guide to facilitate placement of tile and also to form a complete tile line after the tile is installed.

An object of the present invention is to provide a spacer for common drain tile, the spacer material facilitating the application of tile by flexibly connecting the adjacent ends of adjacent tile so that they may be inserted in a ground opening, passing around bends in an opening and automatically becoming set in place with a proper junction between tiles.

Briefly, the spacer in accordance with this invention is constructed of a flexible root-repellant substance, for instance, bituminous product material commonly used in the building trade or plastic. There are a number of possible forms of the spacer, one of which is to have the spacer in the form of an open or closed ring with a pair of spaced flaps or panels joined to a segment of the ring and forming oppositely opening pockets to receive the adjacent ends of adjacent tiles. The pockets accept these ends of the tiles, and the spacer forms a hinge joint or connection between adjacent tiles so that the tile line may be bent as it is being applied in an opening in the ground. This has the great advantage of reducing digging, and after installation, the tile line is superior to tile laid in the ordinary way because the junctions of the tiles are positively connected.

There are numerous applications for tile lines constructed and laid with a spacer in accordance with the invention. Any place where ordinary tile lines are desirable or necessary, a line constructed and applied with the spacers of the invention may be resorted to with greater success than by using ordinary techniques and ordinary construction methods.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of a spacer in accordance with the invention.

FIGURE 2 is an end view of the spacer in FIGURE 1.

FIGURE 3 is a sectional view taken on the line 3—3 of FIGURE 2.

FIGURE 4 is a cross-sectional view showing a tile line being placed by using spacers such as shown in FIGURE 1.

FIGURE 5 is an elevational view of a modified form of the spacer.

In the accompanying drawings reference is first made to FIGURE 4. A sub-soil tunnel **10** is shown with a branch opening **12** at the surface of the soil and joining the sub-soil tunnel. Tile line **14** is being inserted in tunnel **10** by way of opening or inlet passage **12**. The tile line is made of a plurality of drain tile sections **16** joined together at the adjacent ends by spacers **18**. Although the spacers **18** are termed "spacers" for brevity they are actually positioners and guides for the tile.

Spacer **18** includes a closed spacer ring **20** less deformable because of its shape in an axial direction than in a radial direction, made of plastic or bituminous material containing an appreciable percentage of bituminous substance such as commonly used in the building trade.

For instance, asphalt may be a predominant part of spacer **18**.

Ring **20** has a pair of connector panels or flaps **22** and **24** joined to the inner and outer surfaces thereof. They are spaced apart by means of a segment of the ring **20**, and each panel is in the shape of a section of a cylinder. The inner panel **22** is shorter and narrower than panel **24**, which is the outer panel since they extend circumferentially by the same amount less than 180°. The two panels cooperate to form oppositely opening pockets **26** and **28** within which to accept portions of adjacent tiles **14**. The segment **30** of ring **20** with respect to which the panels are pivotally deformed to accommodate pivotal separation of the tiles, is fixed to the panels **22** and **24**, as by being made integral or cementing or stapling or otherwise joining. The ring **30** thus constitutes a stop or an abutment against which the adjacent end surfaces of adjacent tiles **14** bear.

FIGURE 5 illustrates a modification of the spacer. Spacer **18***a* is identical to spacer **18** with the exception that ring **20***a* is open at a portion thereof diametrically opposite to that portion to which panels **24***a* and **26***a* are secured. This will leave an opening at the bottom of the tile line and is particularly adaptable for drain tile used for conducting subsurface water to a remote location, for instance when laid on a gravel bed. Further, the open ring construction in spacer **18***a* is, perhaps, slightly easier to apply and is adjustabe so that it may be used with different diameter tiles, for instance three or four inch tiles.

In use, the spacer **18** or **18***a* or other spacers within the purview of the invention are connected to adjacent ends of adjacent tiles as shown in FIGURE 4. The tiles are pushed into the opening **12** one at a time with a single spacer **18** or **18***a* at the junctures of the tiles.

When connecting the tiles to the spacers, the adjacent ends of the tiles are simply slipped into the open ended and open sided pockets **26** and **28** and the inherent flexibility of the material from which the spacer **18** or spacer **18***a* is constructed forms a hinge connection between adjacent tiles.

Although a predominantly bituminous substance is mentioned as a preference for the construction of the spacers it is evident that the spacers may be made of flexible plastic or some other suitable substance having the inherent characteristics of sufficient flexibility and imperviousness to root growth and premature deterioration.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a tile line adapted to be inserted for subsoil use from the surface of the ground, the combination of a plurality of rigid tiles and interconnecting spacers each spacer being constructed of flexibly resilient material and constituting a hinge joint between tiles so that the tiles may be pushed around curves, said spacer having an arcuate resiliently bendable outer panel fitting over and frictionally engaging the outer surface of a portion of adjacent spaced tiles and when inserted in the ground the panel being located upwardly with reference to the lower surface of the tile to form a shield, said spacer including a second resiliently bendable inner panel parallel to and in close proximity to said outer panel and cooperating with said outer panel to form a pair of oppositely opening flexibly resilient pockets within which to accommodate the adjacent ends of adjacent tiles, said panels extending

circumferentially about said adjacent tiles by less than 180°.

2. In a tile line adapted to be inserted for subsoil use from the surface of the ground, the combination of a plurality of rigid tiles and interconnecting spacers each spacer being constructed of flexibly resilient material and constituting a hinge joint between tiles so that the tiles may be pushed around curves, said spacer having an arcuate resiliently bendable outer panel fitting over the outer surface of a portion of adjacent tiles and when inserted in the ground the panel being located upwardly with reference to the lower surface of the tile to form a shield, said spacer including a second arcuate resiliently bendable panel parallel to and in close proximity to said outer panel and cooperating with said outer panel to form a pair of oppositely opening flexibly resilient pockets within which to accommodate the adjacent ends of adjacent tiles, said second panel fitting against the inner surface of a portion of said adjacent tiles, a ring having a portion thereof located between said panels and constituting an abutment for the adjacent edges of adjacent tiles, said panels extending circumferentially of said tiles by less than 180°.

3. The combination of claim 2 wherein said ring is endless.

4. The combination of claim 2 wherein said ring is open whereby said ring is adjustable to different effective diameters.

5. A positioner and spacer for the confronting ends of adjacent drain tiles in a line of tiles, also adapted to function as a hinge joint between said adjacent tiles comprising, a spacer ring adapted to be fitted between said confronting ends and a flexibly resilient arcuate flap adapted to be superimposed upon and frictionally engage the outer surface of a segmental portion of adjacent tiles, said flap being disposed on and secured to a segmental portion of the outer surface of said ring, a second flexibly resilient arcuate flap secured to the inner surface of said

segmental portion of said ring, to thereby form a pair of oppositely opening pockets adapted to receive segmental portions of said confronting ends of adjacent tiles for frictional engagement thereof and to accommodate pivotal separation of the adjacent tiles in one plane, said first recited flap being separably secured to said ring and extending less than one-half the distance around said ring, said second flap also being separably secured to said ring and extending less than one-half the distance around said ring.

6. The combination of a pair of rigid tubular tiles and an interconnecting spacer, comprising, spacing means disposed between adjacent confronting ends of said tiles for spacing thereof in axial alignment with each other, pivotally deformable, arcuate connecting means secured to said spacing means on opposite radial sides of said confronting ends of the tiles and extending circumferentially thereabout by a limited amount to restrict pivotal separation of the tiles to one plane and prevent axial separation therebetween, said arcuate, pivotally deformable connecting means comprises a radially outer shield and a radially inner panel, said shield and panel extending axially between said tiles and circumferentially thereabout by less than 180° in order to accommodate pivotal separation in said one plane.

7. The combination of claim 6, wherein said shield is made of a root repelling material.

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