Feb. 22, 1966 W. P. GRAHAM ETAL 3,236,991

SIDEWALK HEATING MEANS FOR MELTING SNOW

Filed Dec. 18, 1963

2 Sheets-Sheet 1

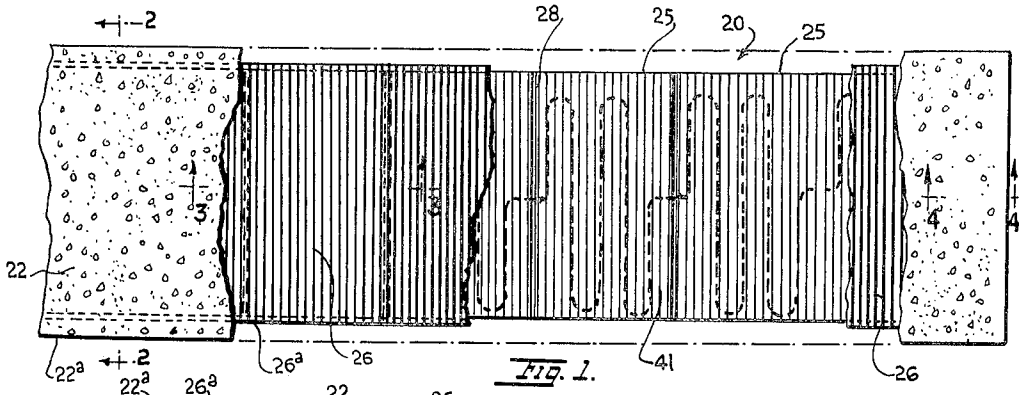


Fig. 1.

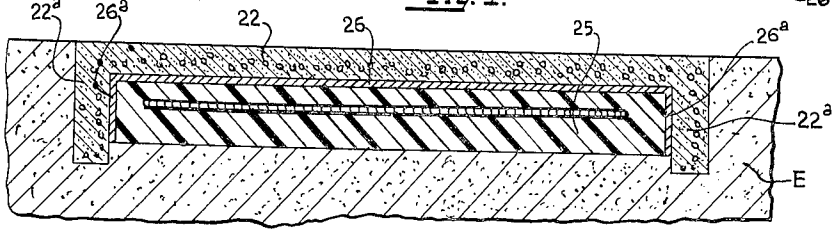


Fig. 2.

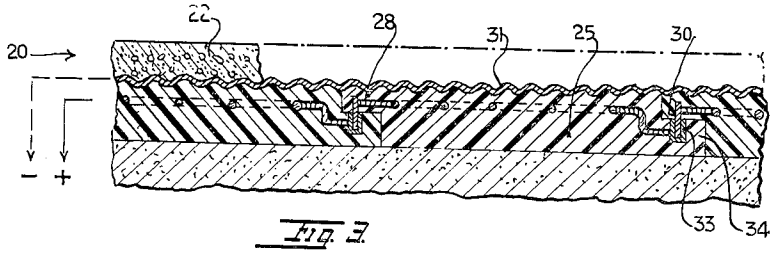


Fig. 3.

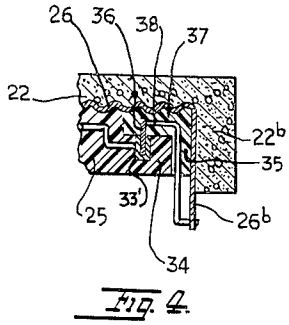


Fig. 4.

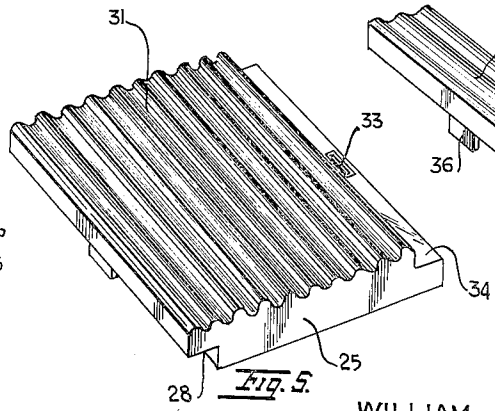


Fig. 5.

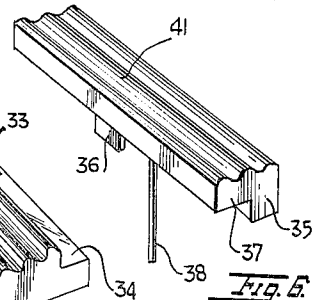


Fig. 6.

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SIDEWALK HEATING MEANS FOR MELTING SNOW

Filed Dec. 18, 1963 2 Sheets-Sheet 2

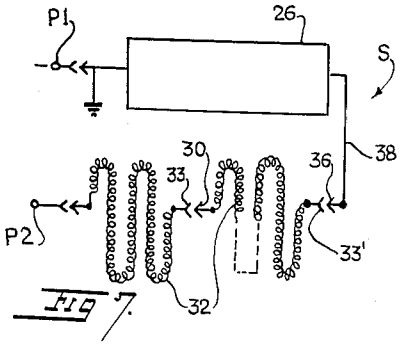


Fig. 7.

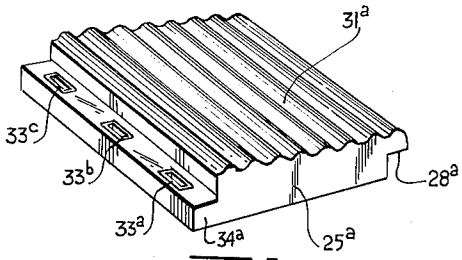


Fig. 8.

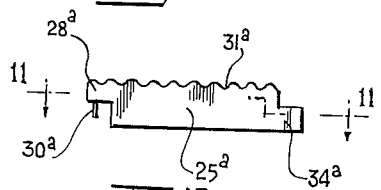


Fig. 10.

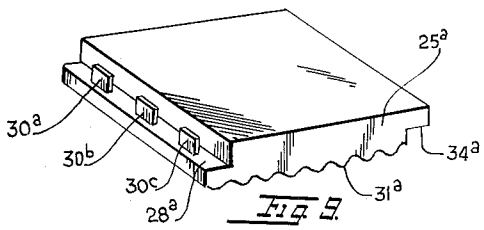


Fig. 9.

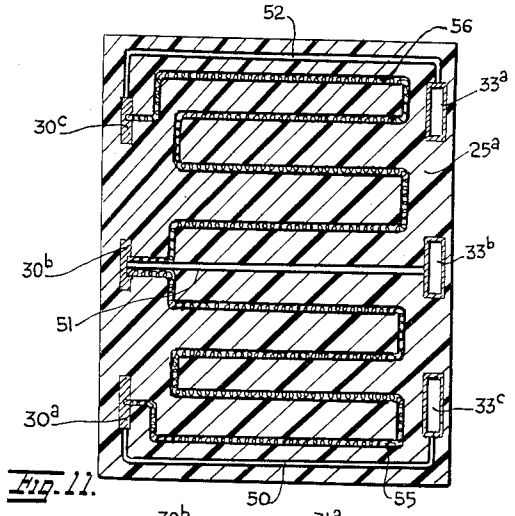


Fig. 11.

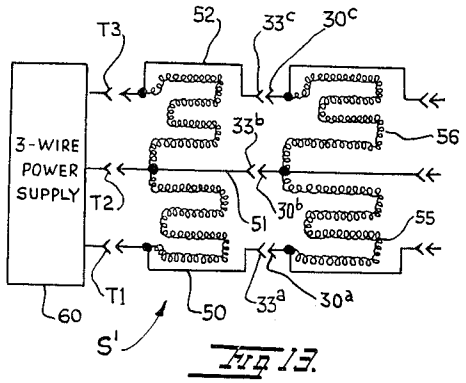


Fig. 13.

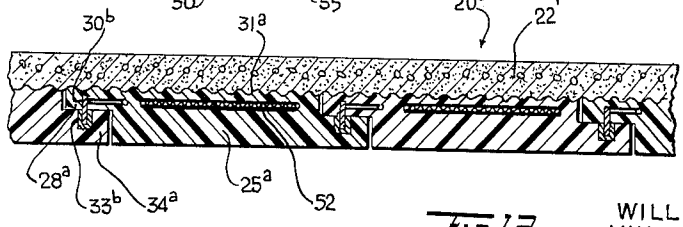


Fig. 12.

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SIDEWALK HEATING MEANS FOR MELTING SNOW

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7 Claims. (Cl. 219—213)

This invention concerns a sidewalk construction provided with heating means for melting snow and ice which may accumulate thereon.

It is one object to provide a sidewalk or roadway construction in which blocks forming the bed of the sidewalk or roadway contain heating elements.

A further object is to provide a sidewalk construction as described wherein the blocks have corrugated upper surfaces.

Another object is to provide a sidewalk having a concrete upper layer, and a bottom layer made of a series of blocks containing heating elements and having corrugated upper surfaces.

Still another object is to provide a sidewalk construction with a concrete upper layer, a bottom layer made of a series of blocks having corrugated upper surfaces, and an intermediate metal foil layer for distributing heat uniformly to the upper layer from heating elements in the blocks.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are morparticularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a top plan view of a sidewalk embodying the invention, parts being broken away to show inner layers.

FIGS. 2, 3 and 4 are enlarged sectional views taken on lines 2—2, 3—3 and 4—4, respectively, of FIG. 1.

FIG. 5 is a perspective view of a paving block employed in the sidewalk of FIGS. 1–4.

FIG. 6 is a perspective view of a paving block employed as an end member in the sidewalk.

FIG. 7 is an electrical diagram of the heating system of the sidewalk.

FIG. 8 is a perspective view of another paving block.

FIG. 9 is a perspective view of the block of FIG. 8 in an inverted position.

FIG. 10 is an end elevational view of the block of FIGS. 8 and 9.

FIG. 11 is an enlarged horizontal sectional view taken on line 11—11 of FIG. 10.

FIG. 12 is a sectional view similar to FIG. 3 of a sidewalk employing blocks as shown in FIGS. 8–11.

FIG. 13 is an electrical diagram of the heating system of the sidewalk of FIG. 12.

Referring to the drawings, there is shown in FIGS. 1–4 a sidewalk 20 having an upper horizontal concrete layer or slab 22, a bottom layer formed by a horizontal series of blocks 25 and an intermediate layer formed by a sheet of metal foil 26. The several blocks 25 as best shown in FIGS. 3–5, each has an overhanging flange 28 at one edge from which depends a metal plate or prong 30. This prong is connected to one end of a sinuous horizontal heating element 32 formed from coiled resistance wire. The other end of the heating element terminates at a socket 33 set in a ledge 34 extending outwardly of the other edge of the block.

The blocks are arranged in a series so that the flange 28 at one edge of a block 25 overlays the ledge 34 of the next adjacent block. The end of the walk may be finished

by a block 35. This block is L-shaped in cross section with an upper horizontal flange 37 having a depending prong 36 to engage in the socket 33 of the last block 25 in the sidewalk. As shown in FIGS. 4 and 6, the end block 35 has a wire 38 connected to prong 36 and passing out of the bottom of the block where it connects to the end wall 26^b of foil 26.

Upper surfaces 31 and 41 of the blocks 25, 35 are formed with corrugations in the form of alternate ridges and valleys. Metal foil sheet 26 conforms to the convolutions in the corrugated surfaces of the blocks. The sheet 26 serves to conduct heat from the blocks 25 and to distribute the heat uniformly to the overlaying concrete layer 22.

The foil sheet 26 may be draped downwardly at 26^a at opposite ends of the blocks 25 as shown best in FIG. 2. The concrete slab may be provided with depending side walls 22^a to cover the foil ends 26^a and the ends of the blocks 25 and 35.

FIG. 7 shows the circuit diagram of the heating system S. Foil sheet 26 is grounded and serves as a return conductor for electric current applied via power terminals P1, P2. The heating elements 32 are connected in series by engagement of the prongs 30 in the respective sockets 33. The end socket 33′ engages prong 36 to which wire 38 is connected. Wire 38 is connected to the depending end wall 26^b of the foil sheet 26 at block 35. The slab 22 has an end wall 22^b to finish the walk at the right end thereof as shown in FIG. 4.

The corrugations in the blocks 25, 35 insure that the slab 22 is retained in permanent engagement with the underlying blocks and foil. The blocks 25, 35 are preferably made of insulation material such as plastic or composition material. Earth E surrounds the sidewalk 20 as shown in FIGS. 2 and 3.

FIG. 12 shows part of another sidewalk 20^a in which blocks 25^a are arranged in a series. These blocks, as shown in FIGS. 8, 9, 10 and 12, have corrugated upper surfaces 31^a. Flange 28^a at the end of each block has three depending prongs or plates 30^a, 30^b and 30^c. Ledge 34^a at the opposite end of each block has three sockets 33^a, 33^b, 33^c to receive prongs of adjacent blocks.

Inside each block 25^a a wire 50 connects prong 30^a to socket 33^a; see FIG. 11. Wire 51 connects prong 30^b to socket 33^b. Wire 52 connects prong 30^c to socket 33^c. Between prongs 30^a and 30^b is a sinuous flat heating element 55 made of coiled resistance wire. Between prongs 30^b and 30^c is another flat heating element 56.

The electrical system S′ of sidewalk 20^a employs a three-wire power supply 60 shown in FIG. 13. One terminal T1 connects to a prong 30^a. Center terminal T2 connects to adjacent prong 30^b and third end terminal T3 connects to end prong 30^c. The center terminal T2 and the center wires 51 form a common center line which serves as a return circuit for the two heating elements 55, 56 in each block. The system S′ may be supplied by a source of 220 volts, with each half of the system carrying 110 volts.

The foil layer 26 may be employed between the concrete slab 22′ as in sidewalk 20. If the layer 26 is omitted the system will remain operative since the center wires 51 provide the return circuit for the electric current which heats the elements 55, 56. The bottom of slab 22′ is locked in the corrugations of the upper corrugated surfaces 31^a of the blocks, as shown in FIG. 12.

The sidewalks 20 and 20^a are both provided with heating elements installed in paving blocks. It is only necessary to engage the prong or prongs of one block with the socket or sockets of another block and connect a power supply to one end block or to a block and foil layer to complete the electrical system. The concrete slab

when poured assumes a corrugated form at its bottom locked with the corrugations in the blocks to maintain dimensional stability of the sidewalk.

Blocks 25, 25a and 35 may be made of plastic, concrete, asphalt or other composition material.

While we have illustrated and described the preferred embodiments of our invention, it is to be understood that we do not limit ourselves to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described our invention, what we claim as new, and desire to secure by United States Letters Patent is:

1. A sidewalk construction, comprising a series of rectangular insulated blocks disposed in edge-to-edge juxtaposition to define a horizontal layer, each of said blocks having a corrugated upper surface, said blocks each having an outwardly extending flange at one lateral edge and an outwardly extending ledge at the opposite lateral edge so that the flange of each block overlays the ledge of the next adjacent block, a metal foil sheet overlaying the layer of blocks and conforming to the corrugations therein, a slab of poured paving material overlaying the foil sheet and locked with the corrugated upper surfaces of the blocks, electrical heating elements in the blocks, and interengageable connector elements in the ledges and flanges connected to the electrical heating elements to define a continuous electric circuit from end to end of the layer of blocks, said foil sheet serving to conduct heat from the blocks and distribute the heat uniformly to the slab.

2. A sidewalk construction, comprising a series of rectangular insulated blocks disposed in edge-to-edge juxatposition to define a horizontal layer, each of said blocks having a corrugated upper surface, said blocks each having an outwardly extending flange at one lateral edge and an outwardly extending ledge at the opposite lateral edge so that the flange of each block overlays the ledge of the next adjacent block, a metal foil sheet overlaying the layer of blocks and conforming to the corrugations therein, a slab of poured paving material overlaying the foil sheet and locked with the corrugated upper surfaces of the blocks, electrical heating elements in the blocks, and interengageable connector elements in the ledges and flanges connected to the electrical heating elements to define a continuous electric circuit from end to end of the layer of blocks, said foil sheet serving to conduct heat from the blocks and distribute the heat uniformly to the slab, the heating element in an end one of the blocks being electrically connected to the foil sheet, so that the foil sheet serves as a return path for electric current supplied to the heating elements.

3. A sidewalk construction, comprising a series of rectangular insulated blocks disposed in edge-to-edge juxtaposition to define a horizontal layer, each of said blocks having a corrugated upper surface, said blocks each having an outwardly extending flange at one lateral edge and an outwardly extending ledge at the opposite lateral edge so that the flange of each block overlays the ledge of the next adjacent block, a metal foil sheet overlaying the layer of blocks and conforming to the corrugations therein, a slab of poured paving material overlaying the foil sheet and locked with the corrugated upper surfaces of the blocks, electrical heating elements in the blocks, and interengageable connector elements in the ledges and flanges connected to the electrical heating elements to define a continuous electric circuit from end to end of the layer of blocks, said foil sheet serving to condut heat from the blocks and distribute the heat uniformly to the slab, and an L-shaped other block terminating said series of blocks, said other block having an electrical connector element engaged with a connector element in the block next adjacent said other block in said series, and a wire connecting said foil sheet and the connector element in said other block, so that the foil sheet serves as a return path for electric current supplied to the heating elements.

4. As an article of manufacture, a paving block for a sidewalk, comprising a flat rectangular insulated member having one corrugated side formed with alternating ridges and valleys, an outwardly extending top flange at one lateral edge of the block, an outwardly extending bottom ledge at the opposite lateral edge of the block, two electrical heating coils in the block, three prongs seated in said flange, a first one and second one of the prongs being connected to opposite ends of one of the coils, a third one and the second one of the prongs being connected to opposite ends of the other coil, three sockets seated in said ledge, said prongs being respectively connected by wires to the sockets, whereby current of one voltage applied at the prongs passes through the coils while the same voltage appears at the sockets.

5. A sidewalk construction, comprising a series of rectangular insulated blocks disposed in edge-to-edge juxtaposition to define a horizontal layer, each of said blocks having a corrugated upper surface, said blocks each having an outwardly extending flange at one lateral edge and an outwardly extending ledge at the opposite lateral edge so that the flange of each block overlays the ledge of the next adjacent block, two electrical heating coils in each block, three prongs seated in the flange of each block, a first one and second one of the prongs being connected to opposite ends of one of the coils, a third one and the second one of the prongs being connected to opposite ends of the other coil, three sockets seated in the ledge of each block, the prongs in each block being respectively connected by wires to the sockets in the same block respectively, the prongs of each block being engaged in the sockets of each adjacent block, whereby current of one voltage applied at the prongs passes through one coil in each block in a series circuit, and passes through the other coil in each block in another series circuit, while one wire in each block is common to both series circuits to serve as a current return wire.

6. A sidewalk construction, comprising a series of rectangular insulated blocks disposed in edge-to-edge juxtaposition to define a horizontal layer, each of said blocks having a corrugated upper surface, said blocks each having an outwardly extending flange at one lateral edge and an outwardly extending ledge at the opposite lateral edge so that the flange of each block overlays the ledge of the next adjacent block, two electrical heating coils in each block, three prongs seated in the flange of each block, a first one and second one of the prongs being connected to opposite ends of one of the coils, a third one and the second one of the prongs being connected to opposite ends of the other coil, three sockets seated in the ledge of each block, the prongs in each block being respectively connected by wires to the sockets in the same block respectively, the prongs of each block being engaged in the sockets of each adjacent block, whereby current of one voltage applied at the prongs passes through one coil in each block in a series circuit, and passes through the other coil in each block in another series circuit, while one wire in each block is common to both series circuits to serve as a current return wire, and a slab of poured paving material overlaying and locked with the corrugated upper surfaces of the blocks.

7. A sidewalk construction, comprising a series of rectangular insulated blocks disposed in edge-to-edge juxtaposition to define a horizontal layer, each of said blocks having a corrugated upper surface, said blocks each having an outwardly extending flange at one lateral edge and an outwardly extending ledge at the opposite lateral edge so that the flange of each block overlays the ledge of the next adjacent block, two electrical heating coils in each block, three prongs seated in the flange of each block, a first one and second one of the prongs being connected to opposite ends of one of the coils, a third one and the second one of the prongs being connected to opposite

ends of the other coil, three sockets seated in the ledge of each block, the prongs in each block being respectively connected by wires to the sockets in the same block respectively, the prongs of each block being engaged in the sockets of each adjacent block, whereby current of one voltage applied at the prongs passes through one coil in each block in a series circuit, and passes through the other coil in each block in another series circuit, while one wire in each block is common to both series circuits to serve as a current return wire, a metal foil sheet overlaying the corrugated surfaces of the blocks, and a slab of poured paving material overlaying the foil sheet and locked with the corrugations in the blocks, whereby the foil sheet conducts heat from the blocks and distributes the heat uniformly to the slab.

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