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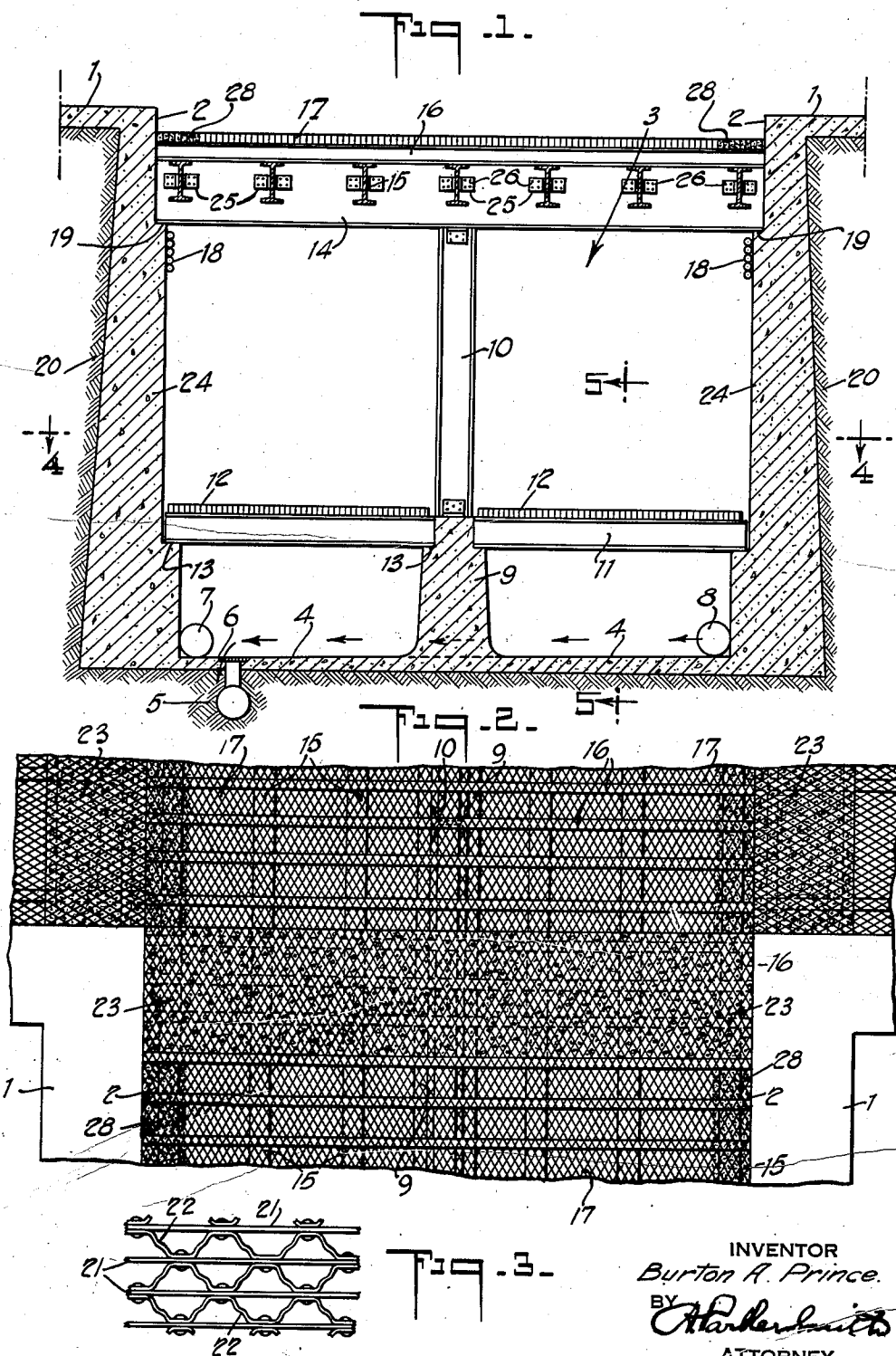
B. A. PRINCE

2,160,315

DOUBLE-DECKED GRATING-PAVED STREET

Filed Sept. 12, 1936

2 Sheets-Sheet 1



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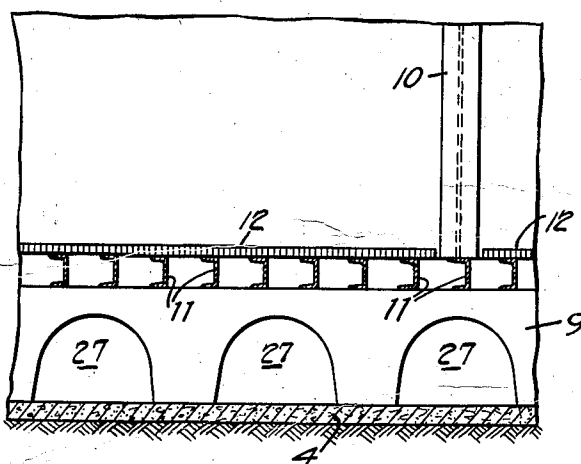
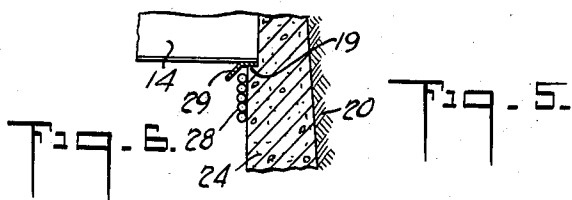
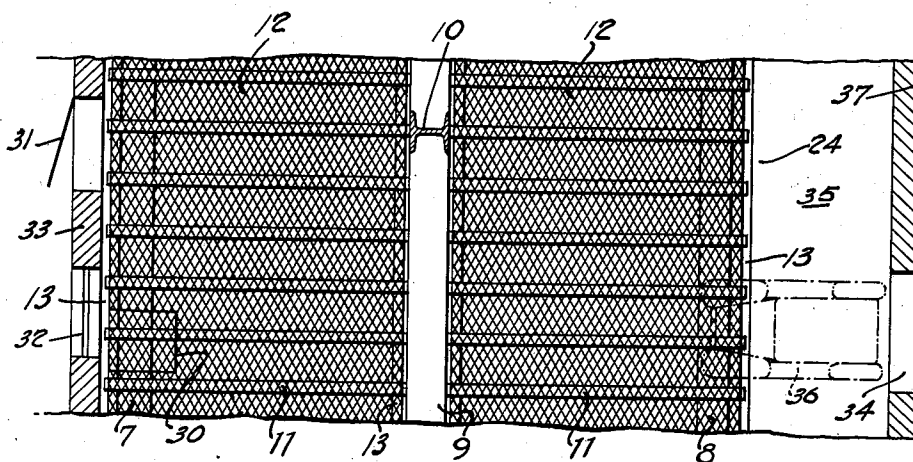
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2 Sheets-Sheet 2

Fig. 4.



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2,160,315

DOUBLE-DECKED GRATING-PAVED STREET

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Application September 12, 1936, Serial No. 100,436

11 Claims. (Cl. 94—1)

The present invention relates mainly to a novel construction of much travelled streets in large cities, such as Fifth Avenue in New York, or those in "the loop" district in Chicago, along which a constant stream of heavy motorized traffic is usually flowing. The difficulty of keeping the pavement of such main arteries of traffic in smooth condition, and the cost and trouble of cleaning them, especially after a sudden accumulation of snow and ice, are well known. The inconvenience and expense of digging up underground pipes and removing and replacing ordinary forms of pavement are equally notorious as well as is the frequent occurrence of serious traffic accidents caused by motor cars skidding on the slippery and crowded roadways. Furthermore the delays caused by congestion of the traffic have long been a serious matter and an important object of my invention is to double the capacity of existing rights of way, without the erection of unsightly elevated structures which would render heavy damages collectible from the city by abutting property owners.

All these difficulties can be avoided by the use of the present invention which consists essentially in lowering the surface of the earth under the existing street level a sufficient distance, installing at the street grade an open mesh grating of special type adapted to form a non-skid road surface for the traffic and another grating roadway in the trench so formed at a depth sufficient to leave headroom for a second stream of motorized traffic thereover, preferably leaving enough room under such lower grating to ensure automatic drainage and clearance during and after any ordinary snowfall and to permit men to work on the exposed or buried pipes and sewage conduits, while providing proper drainage for the surface of the ground beneath so that all dirt and snow falling through said grating can be flushed into the storm sewers by streams of water from the hydrants.

The type and weight of grating best suited for use with my present invention are illustrated and described in Patent No. 1,991,154, granted Feb. 12, 1935, to Walter E. Irving, said patent showing the broad idea of using an open mesh grating for supporting the burden of motorized traffic as applied to the special case of bridges.

The best type of construction at present known to me embodying my invention is illustrated in the accompanying two sheets of drawings in which,

Fig. 1 is a cross section of a street construction showing my invention employed therein,

Fig. 2 is a plan view thereof with parts broken away.

Fig. 3 is an enlarged detail plan showing the preferred form or type of grating mesh.

Fig. 4 is a horizontal section on line 4—4 of Fig. 1, showing the lower roadway in plan with parts broken away, and a modified construction of trench walls.

Fig. 5 is a detail vertical section on line 5—5 of Fig. 1, parts being broken away, and

Fig. 6 is a detail section on a vertical plane showing a modified form of protecting covering for certain electric cables.

Throughout the drawings like reference characters indicate like parts.

Referring to Figs. 1 and 2 I have indicated at 1, 1, the sidewalks and at 2, 2, the curbs therefor, as in an ordinary street construction, but with said curbs carried to any necessary depth, as indicated at 24, 24. A trench dug between said curbs is generally indicated at 3 as extending to a depth more than sufficient to provide headway for a submerged line of traffic, and 17 indicates an open mesh grating supported over said trench by transverse, shallow, relatively light channel irons 16, 16, turned up on edge and resting on beams 15, 15 carried by widely spaced apart girders 14.

These girders, as shown, rest on ledges 19, 19, extending along the faces of the trench side walls 24, which usually would be constructed of concrete. In Fig. 1 these girders are shown as deep I-beams and would be spaced apart a considerable distance which would be spanned by the plurality of lighter I-beams 15, the ends of the latter being supported by said girders 14, as by angle plates 25, 25, which may be riveted or bolted to the web portions of both, as indicated at 26, 26. These girders 14 may also be supported at points intermediate of their ends as by vertical members 10 which, as shown in Fig. 4, may be I-beams set on top of a wall 9, running lengthwise of the trench bottom 4 and approximately along the central line thereof. Preferably such wall is pierced by a plurality of wide arches 27, as shown in Fig. 5, so as to afford free passage from one side of the trench bottom to the other for workmen and inspectors and free surface drainage from one edge to the other of said trench floor.

The side faces of wall 9 and the lower side faces of walls 24, 24, preferably should have ledges 13, 13, formed therein and on which channel beams 11, 11, may have their ends supported. The foregoing described structure, or some other equiv-

alent therefor, supports the lower grating road-
way 12. These channel beams may be heavier
than those 16 supporting the upper grating 17
and may have wider flanges, as shown, to carry
the weight of heavy trucks, in case the lower
roadway is reserved for truck traffic, while only
lighter vehicles are permitted on the upper road-
way 17.

The gratings 12 and 17, particularly the latter,
should have from 50% to 80% of their surplus
areas left open, the remaining percentages of
such surface areas consisting of the upper edges
of the bars and strips forming said grating.

If desired a filling of cement 28 or other mastic
may be placed in some of the mesh openings of
the upper grating to form a narrow impervious
strip immediately adjacent each curb 2 to catch
small objects which pedestrians may drop while
standing on the sidewalk and also serve as pro-

tection for cables 18, 18, from snow, rain and

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Van Hoften Patent No. 1,629,134, and when re-
pairs to the water pipes, gas pipes and sewers are
needed sections or panels of the lower deck 12
may be taken out by loosening and removing bolts
connecting adjacent original panels or sections, 5
or in the case of smaller openings they can be
made by burning or chiseling out the rivets and
cutting the grating bars and strips so as to remove
an area of any desired size which can be replaced
and re-riveted in position after repairs to pipes 10
or sewers have been completed.

Also, either or both gratings 12 and 17 may
have a hinged trap door formed therein, as indi-
cated at 30 in Fig. 4, perhaps one for each city
block.

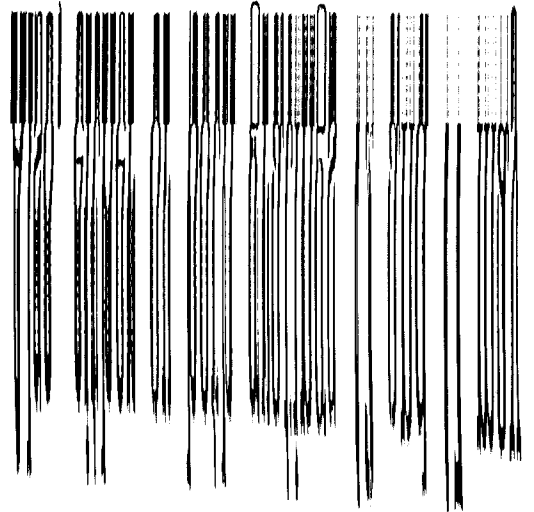
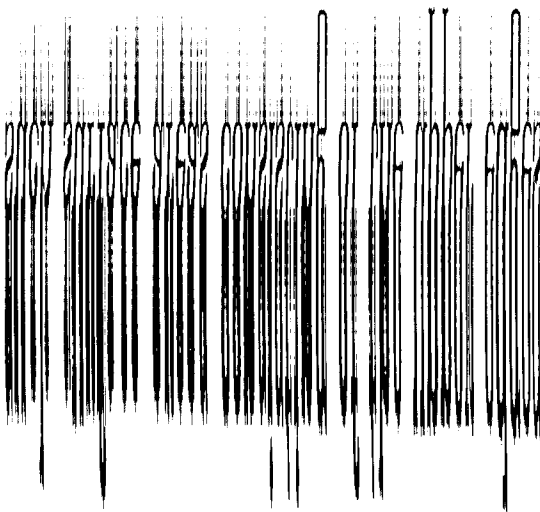
The depth of the trench below the lower grat-
ing should be sufficient to accommodate nearly all
of the average winter snowfall in the neighbor-
hood. The figures on such snowfall can always

be obtained from the weather bureau as the

figures on such snowfall can always
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some of the fresh air in front of them down through the upper grating into the trench while sucking in behind them, upwards through such upper grating, volumes of air from the trench interior. This last described action of rapidly moving cars on bridges built in accordance with the invention of the before mentioned Irving Patent 1,991,154 has been found most effective in drying the gratings after any wetting thereof, and in keeping them dry and clean between rains, thus preserving them from rusting and rendering repainting largely unnecessary. My invention would perform those useful functions also by virtue of its automatic ventilating action above pointed out quite as effectively as have the other bridge deckings now and for some time in daily use.

Various modifications in details of construction, other than those hereinbefore suggested, could be made in special cases without departing from the underlying principles of my invention as hereinbefore explained, and hereinafter pointed out in the appended claims, so long as a self-draining storage space is provided for average snow accumulations below an open mesh grating serving as a street pavement.

A pavement composed of perforated plates would not serve the more important purposes and objects of my invention since free spaces for expansion and contraction would have to be left between the loosely fastened abutting ends of such relatively short plates, and such plate ends would soon be rendered still looser under the impact of traffic and begin jumping up and down under the rapidly moving cars. Also the percentage of area of open spaces through such plates could not be made large enough to render their surfaces self-cleaning and non-skid in character as are grating roadways formed of narrow strips set on edge as herein described. The absence of non-skid action in any road surface formed of discontinuous plate-like surfaces has been proven by the experience with a bridge decking formed of spaced-apart, horizontally extending, tongues of plate metal. After a short period of use it was found necessary to give such decking at least a little non-skid character by welding little knobs of metal on the upper surface of every such horizontally extending tongue, and subsequent designs of that type and included a similar hump or projection formed integral with the upper surface of each such tongue.

Having described my invention, I claim:

1. A highway structure particularly adapted for motorized traffic and adapted to effect automatic removal of falling snow from the path thereof comprising the combination of a foundation therefor including a trench of relatively large cross section extending lengthwise below the surface of such highway and provided with a waterproof bottom surface, together with means for draining the same, and an open mesh grating, the open spaces in which have an aggregate area exceeding fifty per cent. of its total area, supported over said trench at the proper level for accommodating said traffic and serving as a self-cleaning screen forming the surface of a major portion of such highway affording open passage through the same for light and air to the lower level and for rain and snow to the drain below, together with a second grating supported in said trench at a distance from the bottom thereof sufficient to allow room for men working beneath it and at a distance below said first mentioned

grating sufficient to afford room for motorized traffic thereon.

2. A structure such as defined in claim 1 combined with paved sidewalks properly curbed and extending along either side of such highway, and in which said trench and upper grating extend from one of such curbs to the other.

3. A combination such as defined in claim 1 in which said gratings are formed of a plurality of metal strips all set on edge with their upper surfaces all lying in substantially one and the same plane, and many of their lower edges supported along spaced-apart lines, said strips being held together at all points of contact one with another with sufficient rigidity to form a unitary structure presenting a reticulated upper surface serving as a roadway for the traffic.

4. A combination such as defined in claim 1 in which said gratings are formed of a plurality of metal strips all set on edge with their upper surfaces all lying in substantially one and the same plane, and many of their lower edges supported along spaced-apart lines, said strips being held together at all points of contact one with another with sufficient rigidity to form a unitary structure presenting a reticulated upper surface serving as a roadway for the traffic; said metal strips being of two classes, the members of one of which classes are straight bars of uniform depth extending parallel to the line of such traffic, while the members of the second class are bent into wave-like form and are interspersed between said straight bars.

5. A combination such as defined in claim 1 in which said gratings are formed of a plurality of metal strips all set on edge with their upper surfaces all lying substantially in one and the same plane and many of their lower edges supported along spaced-apart lines said strips being held together at all points of contact one with another with sufficient rigidity to form a unitary structure presenting a reticulated upper surface serving as a roadway for the traffic, said grating being in the form of continuous, structurally integral sections extending from curb to curb and from one expansion joint to another substantially remote expansion joint.

6. A combination such as defined in claim 1 in which the entire exposed bottom surface of said trench is slightly inclined downward toward one side, whereby storm sewer openings need only be provided along that side.

7. A combination such as defined in claim 1 in which said trench has concrete side walls and the supports for said lower grating comprise a third wall extending along substantially the medial line of said trench and ledges formed on the inner surfaces of all said walls, together with a plurality of spaced-apart beams extending transversely of said trench and having their ends resting on said ledges.

8. A combination such as defined in claim 1 in which said trench has concrete side walls and the supports for said lower grating comprise a wall extending substantially along the medial line of said trench and ledges formed on the inner surfaces of all said walls, while the supports for said upper grating comprise vertically extending metal uprights set on said center wall.

9. A combination such as defined in claim 1 in which said upper grating has a greater percentage of open mesh space than said lower grating and the supporting structure for said upper grating comprises a plurality of transversely extending, parallel, narrow sills set about fifteen

inches apart on which said grating may rest directly with the straight bars thereof extending lengthwise of the roadway; whereby a grating of sufficient lightness and openness to permit commercial fabrication and ensure free air circulation may be used, but still support the heavy wheel loadings of modern motor trucks.

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10. A structure designed for use in a city street and adapted to effect automatic removal of falling snow from the surface thereof comprising in combination an open mesh grating forming a major portion of a self-cleaning street surface reserved for vehicular traffic and giving light and ventilation to a relatively deep and wide trench located beneath said grating, a sec-

ond grating of substantially the same area as the first extending horizontally across said trench interior at a depth sufficient to permit of the passage of sub-surface streams of traffic and at a height above the bottom of said trench sufficient to afford room for workmen employed therein.

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11. A structure such as defined in claim 10 in which said lower grating is supported in part by a wall extending along the medial line of said trench and having a plurality of relatively large openings therein to afford passage therethrough for such workmen.

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