Dec. 22, 1942. E. R. DUDLEY 2,305,955

GRATING AND COVER FOR DRAINS

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FIG. 1.

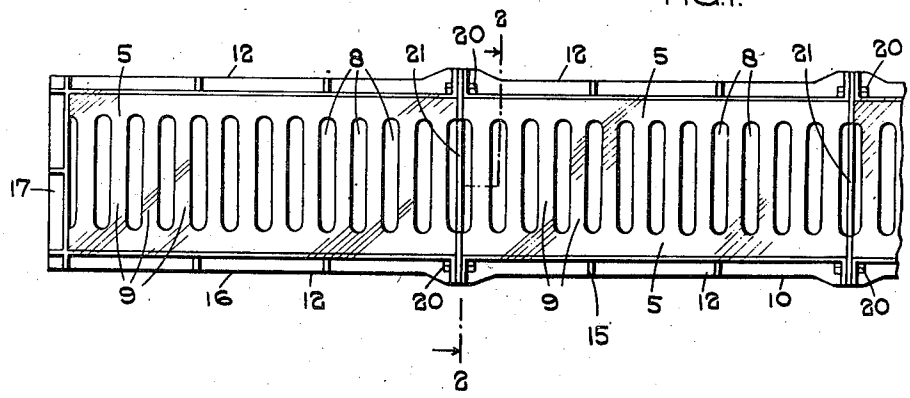


FIG. 1A

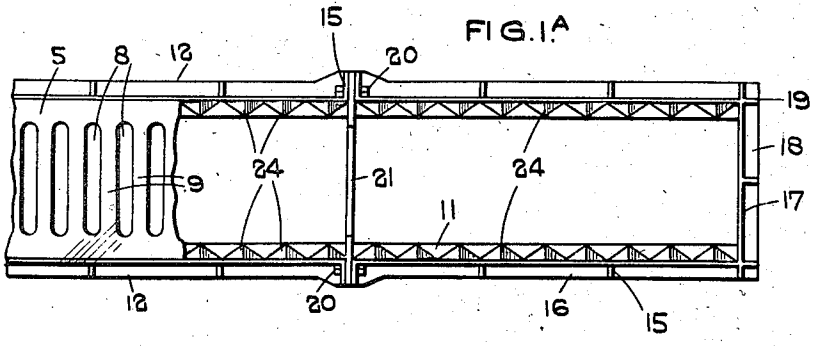
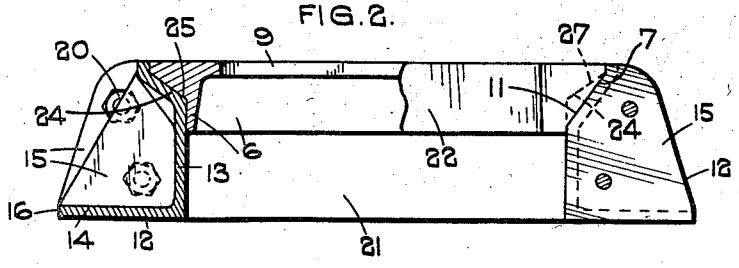


FIG. 2.



Edward Richard Dudley
Inventor

Faulmin & Faulmin
Attorneys.

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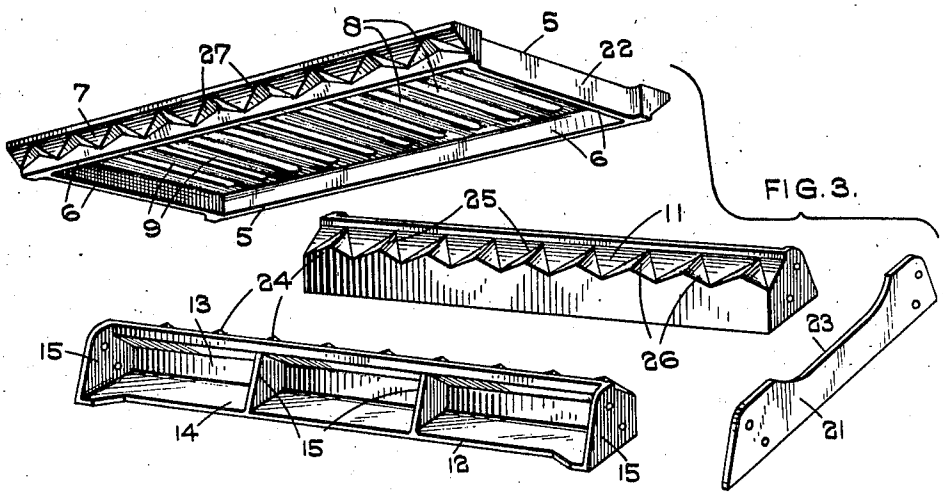


FIG. 3.

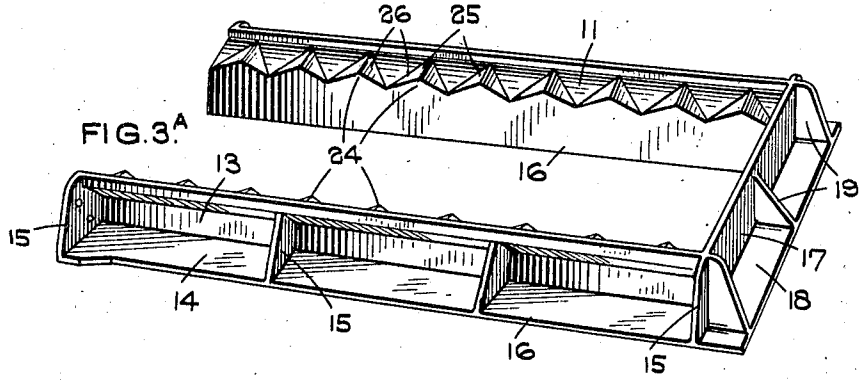


FIG. 3.A

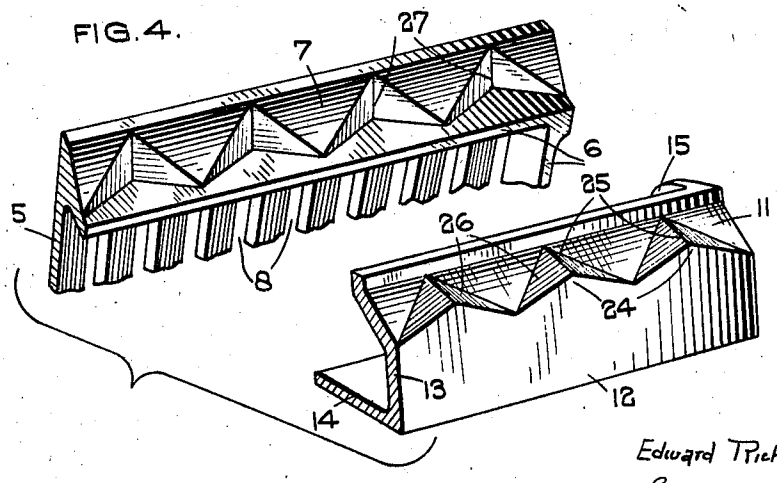


FIG. 4.

Edward Richard Dudley
Inventor

Faulmin & Faulmin
Attorneys

Patented Dec. 22, 1942

2,305,955

UNITED STATES PATENT OFFICE

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GRATING AND COVER FOR DRAINS

Edward Richard Dudley, Cradley Heath, England

Application March 27, 1941, Serial No. 385,568
In Great Britain August 29, 1939

4 Claims. (Cl. 94—33)

This invention relates to frames and gratings and covers for drains of the kind in which both the grating or cover and the frame into which it fits are provided with surfaces which seat together when the grating or cover is placed in position.

One of the objects of the present invention is to construct a drainage frame and cover or grating of indefinite length so that it can conveniently be fixed without extensive preparation of the ground.

Another object of the present invention is to construct a drainage frame and cover or grating of indefinite length which can conveniently be handled and fixed without the use of skilled labour.

A further object of the invention is to construct such a drainage frame and cover or grating so that rocking movement between the cover or grating and the frame is eliminated without the necessity of machining the seating faces.

A further object of the present invention is to construct a drainage frame and cover or grating of indefinite length in such a manner that the frame members will be held more securely in position against endwise movement relatively to each other.

Referring to the drawings:

Figures 1 and 1A are plan views of a plurality of gratings, and a frame therefor, constructed in accordance with the present invention.

Figure 2 is a section, to an enlarged scale, on the line 2—2 of Figure 1.

Figures 3 and 3A are perspective views of each of the different components shown in Figure 1.

Figure 4 is an enlarged fragmentary perspective view showing the coacting faces of a grating and a frame section.

In the construction illustrated, which is suitable for covering a long drainage channel in the surface of an aerodrome, a plurality of rectangular gratings 5, which may be all of the same length or of two or more different lengths, is provided.

Each grating 5 is provided at its longitudinal and transverse edges with dependent flanges 6 of substantial section, the outer faces 7 of the longitudinal flanges 6 being mutually convergent in a downward direction.

The drainage openings may consist of transverse parallel slots 8, which may be at right angles or inclined to the longitudinal edges of the grating 5, and the bars 9 between them may be of wedge section, so that the slots 8 are wider at the underside of the grating 5 than at the top. Such an arrangement tends to prevent choking of the openings 8.

The gratings 5 are arranged end to end in a fixed frame 10 which is set in the ground, the upper surfaces of the gratings 5 being substantially flush with the upper edge of the frame 10, the inner faces of which are provided with bevelled seatings 11 for engagement by the faces 7 of the gratings 5.

The frame 10 comprises a plurality of pairs of opposed side sections 12 which are secured together end to end to suit the length of the drainage channel to be covered. Each of these side sections 12 may be formed as a casting having a main wall 13 which is inclined outwardly in its upper portion to provide the seating face 11 aforesaid and a horizontal flange 14 extending outwardly from the foot of the main wall. Preferably the seating face 11 terminates short of the upper edge of the main wall 13. Vertical webs 15 integrally united with the main wall 13 and flange 14 are provided at the ends of the section 12 and at two or more intermediate positions to reinforce the seating face 11.

The side sections 12 of the frame 10 may be equal in length to the gratings 5 associated therewith, and the ends of each grating 5 may be disposed flush with those of a pair of opposed frame sections 12, or each grating may be supported partly on one pair of frame sections and partly on the next pair.

The frame 10 is completed by end sections 16 of U shape, which are formed as single castings, the parallel limbs of each such end section being of similar construction to the side sections 12 above described, and provided with inclined seatings 11 for the associated grating 5 in like manner. The parallel limbs aforesaid may be relatively short, or they may be made equal in length to the side sections as illustrated.

The frame is thus of sectional construction and has U shaped members at its ends.

The transverse portion 17 of each end section 16 may be of plain L section, with the flange 18 thereof directed outwardly and continuous with the foot flanges 14 of the parallel limbs, stiffening webs 19 which correspond to the webs 15 of the limbs aforesaid also being provided.

In assembling the frame 10, the end vertical webs 15 of each side section 12 are connected to those of the adjacent sections by means of bolts 20, and the endmost side sections 12 are similarly connected to the limbs of the end sections 16.

The frame 10 is set in concrete or otherwise

secured at the edges of the drainage channel, and each side section 12 may be connected to the opposite section by one or more integral or other cross members.

These may take the form of metal plates 21 which are interposed between adjacent frame sections and held in place by the bolts 20 connecting the latter. A drainage opening may be formed between each two adjacent gratings 5, and between the end gratings and the transverse portions 17 of the frame sections 18, by recessing the end flanges of the gratings as at 22, the upper edges of the cross members 21 being in this case recessed as at 23.

To prevent tilting of the gratings 5 in a plane transverse to the frame 10 when under load, and also to prevent their displacement longitudinally of the frame 10, the coacting surfaces 7, 11 of the gratings 5 and frame 10 are provided with interengaging pyramidal projections, preferably complementary in form.

Conveniently the seating surface 11 on each frame section is formed with a plurality of equally spaced pyramidal teeth 24 which are triangular in plan view and whose top edges 25 are inclined downwardly towards the interior of the frame, the ends of the teeth 24 being vertical and preferably continuous with the inner face of the main wall 13 of the section. The top edges 25 of the teeth 24, which are disposed in planes at right angles to the inner face aforesaid, may be inclined at a smaller angle than that shown, and may even be horizontal. The lower corners of each triangular tooth 24 may meet those of adjacent teeth, the sloping tooth sides 26 meeting the bevelled seating surface 11 in lines which preferably extend to the inner edge of the latter.

With such an arrangement, the bevelled faces 7 on the gratings 5 are formed with pyramidal recesses 27 which are adapted to receive, and are complementary to, the teeth 24 on the frame sections. The parts of the seating face 7 between these recesses 27 may be regarded, of course, as pyramidal projections which interengage with those on the frame sections.

Obviously the gratings 5 above described may be replaced by, or used in conjunction with, imperforate cover plates adapted to seat in the fixed frame 10, and the seating faces of these cover plates may be formed with recesses which correspond to the recesses 27 in the gratings 5.

Furthermore, it should be understood that, although the invention has been described with reference to aerodrome gratings, it is equally applicable to street and channel gratings.

The drainage frame and cover or grating in accordance with the present invention is a self-contained structure and when in use is not dependent upon external support from the ground to cause the parts to retain their proper relative positions. Moreover its construction in sectional lengths which are simply bolted together with intervening cross plates, enables the structure to be handled and assembled without skilled labour.

The particular form of the interengaging projections on the frame and on the cover or grating enables a non-rocking engagement between the cover or grating and the frame to be obtained without the necessity of machining the seating faces.

The use of the U shaped end pieces of the frame incorporating integral side and end portions relieves the sections of the frame intermediate the ends from endwise stresses such as might distort the frame and cause it to move so that the side sections at one side are no longer directly opposite to those of the other side.

What I claim then is:

1. A framing and covering for a long drainage channel comprising a plurality of sectional lengths adapted to be bolted together end to end so as to provide a continuous drain of unlimited length each sectional length consisting of two side members having on their upper surface seatings which are angularly inclined towards the centre of the drain; pyramidal projections on said seatings; a cover having inclined seatings along its under surface with pyramidal recesses thereon adapted to engage with the seatings on the side members; transverse members between the ends of adjacent side members; means for securing the side members end to end but with the transverse members between the ends of the side members, the transverse members serving to position the side members in correct relation to each other and to the cover; and inwardly directed recesses in the outer faces of the side members.

2. A framing and covering for a long drainage channel comprising a plurality of sectional lengths adapted to be bolted together end to end so as to provide a continuous drain of unlimited length, each sectional length consisting of two side members having on their upper surface seatings which are angularly inclined towards the centre of the drain; pyramidal projections on said seatings; a cover of length equal to that of the side members and having coacting inclined seatings along its under surface with pyramidal recesses thereon; and transverse members of a shape corresponding with that of the cover and side members when assembled together so that the upper surface of the transverse member will correspond with and be continuous with the upper surfaces of the cover; means for securing the side members end to end but with the transverse members between the ends of the side members, the transverse members serving to position the said members in correct relation to each other and to the cover; and means for enabling the side members to key into concrete and to be thereby fixed in relation to the ground.

3. A framing and covering for a long drainage channel comprising side members having an inner wall, the lower portion of which is substantially vertical, and the upper portion inclined to form a seating for the cover; pyramidal projections on said seating; a lateral outwardly projecting web at each end of each side member and having bolt holes; intermediate lateral outwardly projecting webs on the side members, a horizontal outwardly projecting flange at the base of each side member the vertical cum inclined wall together with the said flanges forming pockets which when embedded in concrete serve to prevent displacement of the side members in directions both vertically and longitudinally; a cover of length equal to that of the side members and having coacting inclined seatings along its under surface with pyramidal recesses thereon; transverse members of a shape corresponding with that of the cover and side members when assembled together so that the upper surface of the transverse member will correspond with and be continuous with the upper surfaces of the cover; means for securing the side members end to end but with the transverse members between the ends of the side members, the transverse members serving to position the side members in correct relation to each other and to the cover and end members comprising similar

side members with integral transverse members forming a frame of substantially U shape in plan.

4. A framing and covering for a long drainage channel comprising a plurality of sectional lengths adapted to be bolted together end to end so as to provide a continuous drain of unlimited length, each sectional length consisting of two side members having on their upper surface seatings which are angularly inclined towards the centre of the drain; pyramidal projections on said seatings; a cover having inclined seatings along its under surface with pyramidal recesses thereon adapted to engage with the seatings on the side members; transverse members between the ends of adjacent side members; means for securing the side members end to end but with the transverse members between the ends of the side members, the transverse members serving to position the side members in correct relation to each other and to the cover; inwardly directed recesses on the outer faces of the side members and end members comprising similar side members with integral transverse members forming a frame of substantially U shape in plan.

E. R. DUDLEY.