

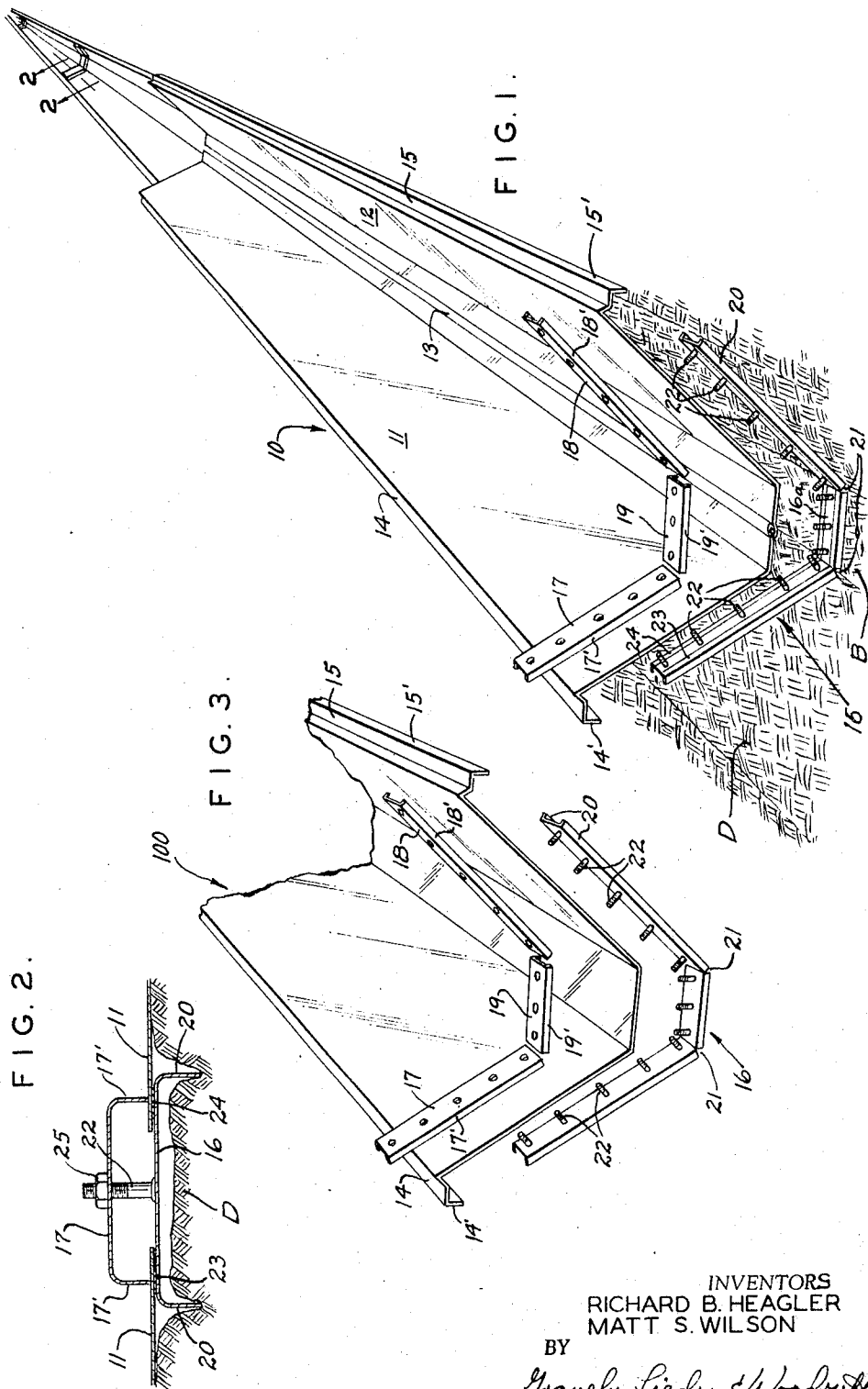
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DITCH LINER

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DITCH LINER

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This invention relates to improvements in ditch liners and especially irrigation ditch liners.

The problems with irrigation ditches are that unlined ditches result in loss of precious water through seepage and loss of earth through erosion. To cut such losses it has been the practice to use concrete or flexible plastic liners. Concrete liners are effective to cut water loss, but the concrete is expensive to install and is always subject to damage due to frost heave and earth movement, and temperature change. The plastic liners are difficult to hold in place and can be easily punctured which obviously defeats the purpose.

It is, therefore, an object to provide a metallic liner for irrigation ditches, which liner can be quickly installed and will have flexibility to suit ground conditions.

Another object is to provide a reusable ditch liner so that the liner can be installed in different ditch locations so as to avoid the losses of liners due to change of irrigation flow, and for other similar reasons.

It is another object to provide an irrigation ditch liner composed of sections which fit together with expansion joints resistant to leakage and to allow temperature expansion and contraction, and formed to stay in place under severe surface wind conditions.

Yet another object is to provide a ditch liner which is made of flexible materials highly resistant to punctures, easily transportable, and capable of conforming to ditch slope variations.

Other objects and advantages of this improvement will appear presently in connection with the disclosure of preferred forms of ditch liners shown in the accompanying drawing, wherein:

FIG. 1 is a fragmentary perspective view of a ditch and liner therefor to show the principles of the invention;

FIG. 2 is a fragmentary and enlarged sectional view taken at line 2-2 in FIG. 1; and

FIG. 3 is a fragmentary view similar to FIG. 1 but illustrating a modification.

Referring now to the several views of the drawing, and particularly to FIG. 1, a preferred form of the ditch liner 10 is seen to comprise a pair of sheets 11 and 12 which are formed as right and left hand parts joined along a seam 13 which may be of typical interlocked construction in which the margins of the sections 11 and 12 are bent back upon themselves to provide folded margins which interfit prior to being pressed flat. The seam may be welded or riveted or fastened with such connections that are typical and are well known in the sheet metal art and do not need to be specifically shown. Each section of the liner is formed with ground hugging, wind deflecting flanges 14 and 15 respectively, and these flanges are formed with ground engaging lips 14' and 15'.

Means to assemble the liner 10 in sections joined at end abutment connections, comprise bottom battens, one of which is shown at 16 and a top batten made of separate parts 17, 18 and 19, respectively. The bottom batten 16 typically is formed as a single channel shaped member having down turned flanges 20 along its opposite margins, and notches 21 formed in the respective margins 20 intermediate the ends thereof so that there is provided a bottom section 16a which is adapted to fit in the bottom part B of the irrigation ditch generally shown at D. The ditch D is formed with sloping sides and a flat bottom, and the lower batten 16 is intended to conform to the dimen-

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sions of the bottom B and the sloping sides. The batten 16 is provided with a plurality of suitably spaced threaded studs 22 which project outwardly opposite to the down turned flanges 20. On each side of the line of studs there is provided a continuous seal strip 23 and 24, respectively.

The top batten made in separate sections 17, 18 and 19 consists essentially in three channel shaped members, each having down turned marginal flanges 17', 18' and 19', respectively. The battens are also formed with suitably spaced apertures which match the spacing of the threaded studs 22 in the bottom batten.

It is noted that the ditch D is formed so as to have a substantially regular cross section throughout its length which is determined by the selected size of the ditch liner. A plurality of lengths of ditch liner sections 11 and 12 are assembled in the finished ditch D, and the connection between adjacent ends of the sections 11 and 12 is established by the cooperation of the bottom and top battens. It is noted in FIG. 1 that the ditch liner sections 11 and 12 are adapted to rest on the seal strip 24 so that there is a leak proof joint formed thereby. After the ditch liner sections 11 and 12 have been properly placed on the sealing strip 24 the top batten sections 17, 18 and 19 are placed in position over the threaded studs 22 and securing nuts (see nut 25 in FIG. 2) are threaded down compressing the respective flanges on the upper batten sections against the exposed surface of the liner sections and forcing the same against the sealing strip 24. The ditch liner sections adapted to rest on the sealing strip 23 are not shown for clarity of disclosure.

In the disclosure of FIG. 3 it is understood that the liner sections 11 and 12 are lowered into the ditch D and the ditch is so dimensioned that the down turned flanges 14' and 15' are adapted to dig into the surface of the earth along the margins of the ditch so as to form a wind seal to prevent wind getting underneath the flanges 14 and 15 which would result in lifting the ditch liner 10 out of position. Furthermore, the flanges 14' and 15' can be back filled to further insure seal against the effort of wind to get under and lift the ditch liner.

In connection with FIG. 2, a typical longitudinal section has been shown between the bottom batten 16 having the down turned flanges 20 and the top batten section 17 which is held in place by the nut 25 threaded down upon stud 22. The top batten 17 has its down turned flanges 17' engaged upon the marginal portions of two adjacent ditch liners 10, and sealing strips 23 and 24 are interposed between the bottom batten 16 and the end margins of the ditch liners 10. While the nut 25 acts to draw the top batten 17 downwardly, it is observed that there is no obstruction to the end margins of the ditch liners 10 moving horizontally toward or away from each other, thereby accommodating expansion and contraction of the ditch liner, as well as permitting a certain degree of flexibility in the initial installation of the sections of the liner. It is also observed in FIG. 2 that the bottom batten 16 has its down turned flanges 20 directed to dig into the surfaces of the ditch in the sloping sides as well as in the bottom, whereby the batten acts under the weight of the ditch liner and the water carried therein to resist movement. Consequently, the ditch liner is stabilized in its position and tends to remain so by reason of the gripping action of the several flanges 20 at the successive joints.

FIG. 3 illustrates a modification which is similar in most respects to the disclosure in FIG. 1 except that the ditch liner is shown to be formed of a single piece of sheet material 100. In other respects the parts of the assembly shown in FIG. 3 are similar to the disclosure in FIG. 1 and like parts are indicated by like reference numerals.

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While the referred material for the ditch liner may be sheet metal treated so as to be resistant to corrosion and rust, it is also contemplated that non-metallic sheet materials can also be utilized in the same manner. The shaping of the ditch liner 10 or 100 will generally determine the shape of the irrigation ditch to be formed. Since ditch sloping is in many cases subject to the condition of the earth, a certain degree of flexibility is obtained by reason of the notching 21 in the bottom batten, thereby making it possible to adjust the angular relation between the opposite sloping portions of the bottom batten relative to the bottom section 16a of the batten. The respective top batten sections 17, 18 and 19 do not necessarily have to be in end abutment, but can be somewhat shorter so long as the sections perform the intended function of holding the end portions of the ditch liner against the sealing strips along the entire length thereof so as to complete a leak proof joint which, according to the disclosure in FIG. 2, has a substantial degree of longitudinal movement without losing its water retaining characteristic.

The presently improved ditch liner is shown in certain preferred forms which should be fully understandable in view of the foregoing disclosure. Obviously, certain modifications and changes will come to mind in view of the foregoing disclosure, and it is intended to cover such changes and modifications within the scope of the appended claims.

What is claimed is:

1. An irrigation ditch liner assembly comprising a plurality of liner sections each having transverse end lips and longitudinal side flanges, said liner sections being positionable in an irrigation ditch in alignment with said end lips spaced apart, said side flanges having margins engaged

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in the surface along the irrigation ditch to seal the sides of said liner section against wind lift effects, bottom batten means in the ditch in position to support adjacent end lips, said bottom batten means being a channel having spaced marginal flanges directed to engage in the irrigation ditch, top batten means engaged upon adjacent end lips, means connecting said top and bottom batten means together to clamp said end lips therebetween, and means to seal the connection between said batten means and said end lips against seepage of irrigation fluid through the connection.

2. A ditch liner including a plurality of liner sections arranged in end-to-end alignment, each section having a cross-sectional shape conforming to the configuration of the ditch, bottom batten means supporting said liner section ends, top batten means engaged in said liner sections over said aligned ends, and means connecting said bottom and top batten means in position to form a seal between said liner section ends, said bottom batten means comprising channels having elongated side flanges directed to dig into the earth and having notches in said side flanges to permit said bottom batten means to be bent to conform to the ditch configuration.

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