

May 26, 1953

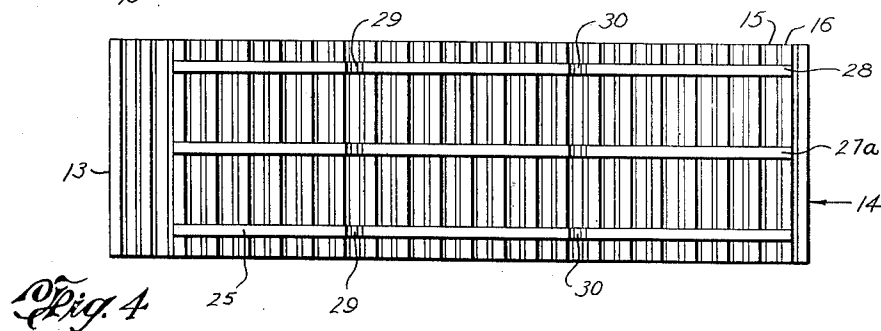
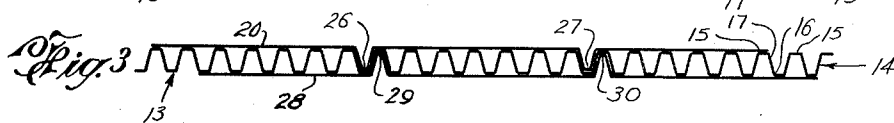
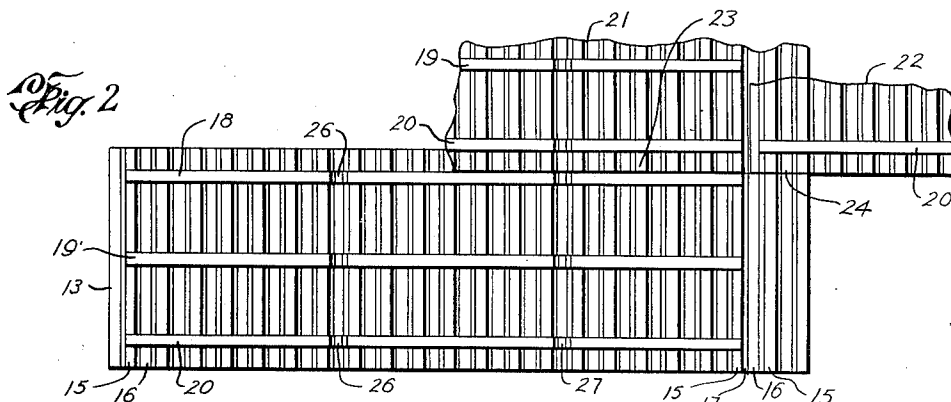
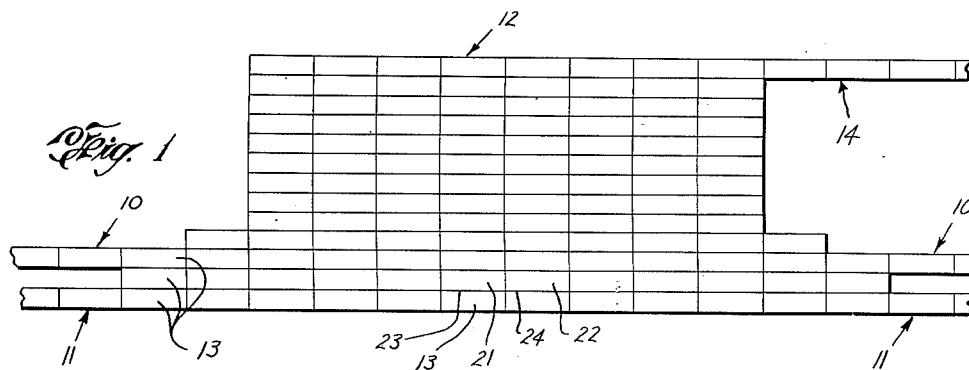
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2,639,650

PREFABRICATED RUNWAY CONSTRUCTION

Filed June 24, 1950

3 Sheets-Sheet 1



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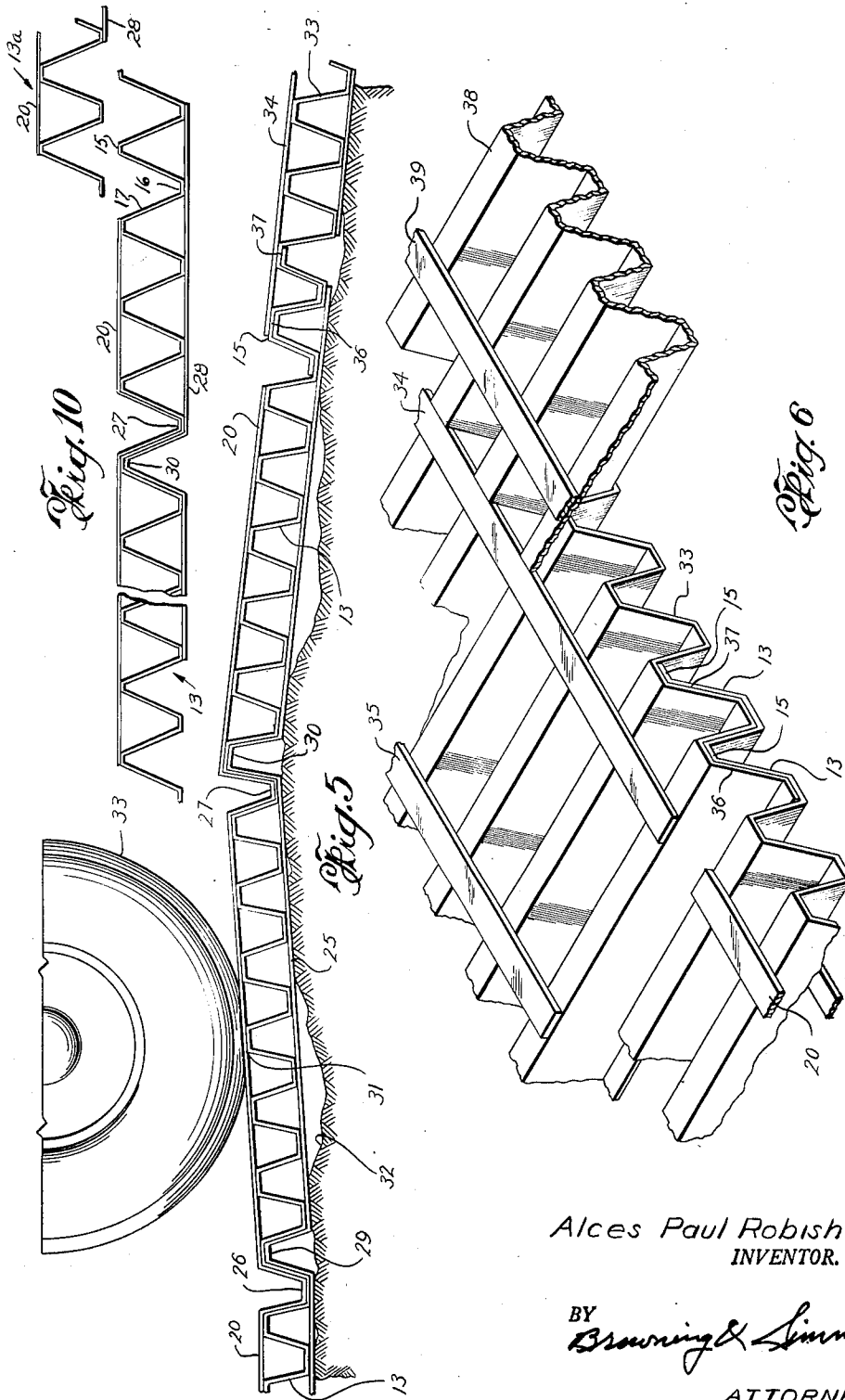
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PREFABRICATED RUNWAY CONSTRUCTION

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3 Sheets-Sheet 2



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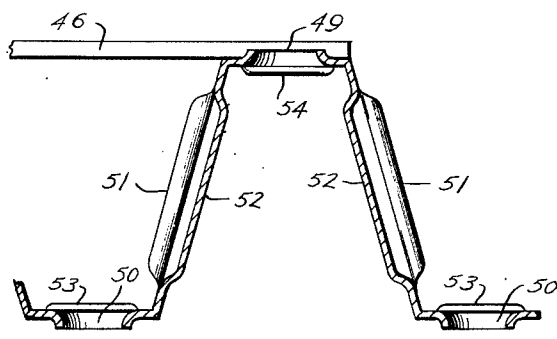
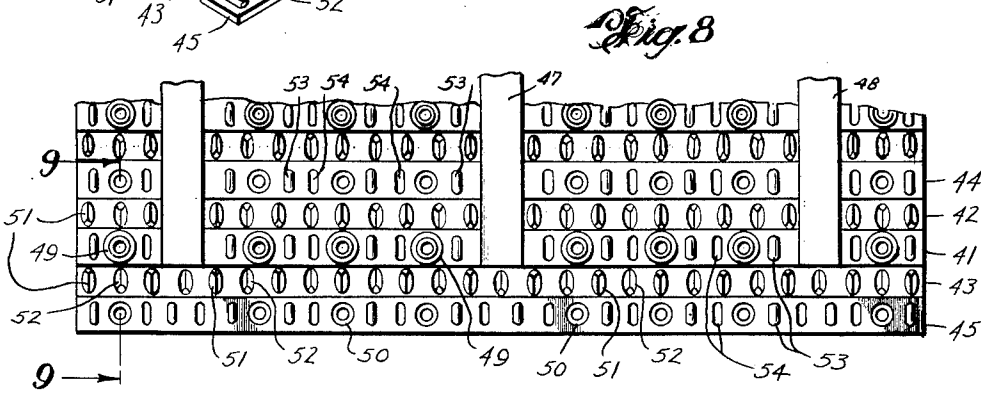
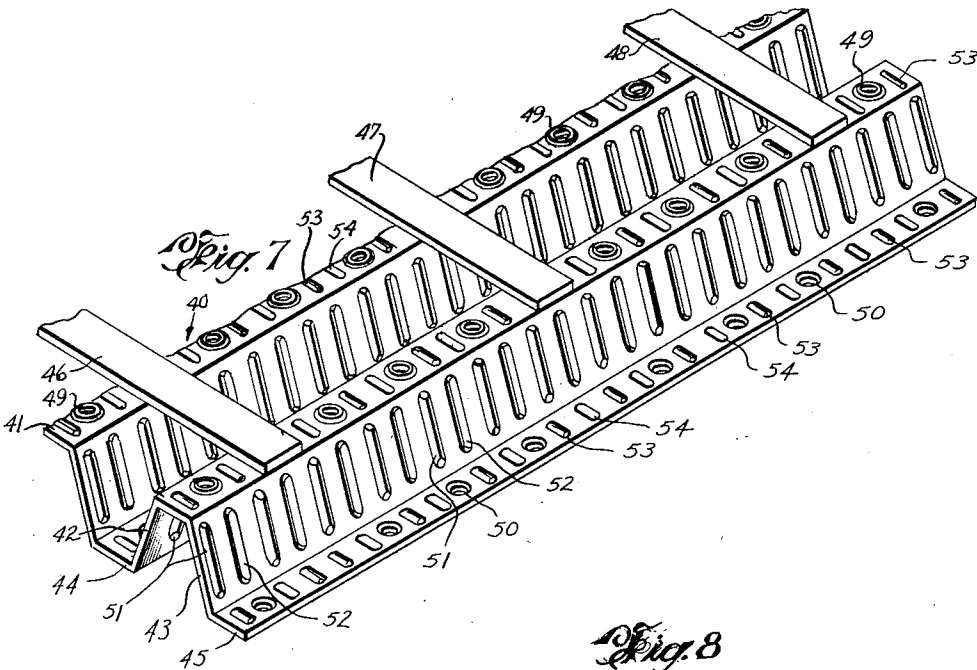
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PREFABRICATED RUNWAY CONSTRUCTION

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3 Sheets-Sheet 3



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PREFABRICATED RUNWAY CONSTRUCTION

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4 Claims. (Cl. 94-13)

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This invention relates to a prefabricated construction useful for runways, roadways, walkways, decks, cattle guards, bridge spans and the like, and has as its principal object the disclosure of a construction that is light weight, capable of withstanding high stresses and heavy loads, and is adaptable for traversing a wide variety of terrains.

Another object is to provide a trussed construction that can withstand high stresses and support heavy loads but that includes flexible portions making it adaptable to rough, soft or swampy terrain.

A further object of the invention is to provide a corrugated, trussed construction that may be built in portable sections relatively light in weight and that can be easily interlocked to other like sections along any edge to provide a continuous deck or surface suitable as a roadway, mat, or the like.

Another object is to disclose a construction that presents a large bearing surface to the base on which it is employed, which bearing surface increases as the construction tends to settle.

A further object is to provide a flexible, trussed construction that is capable of withstanding high lateral, vertical and longitudinal stresses and provide a large bearing surface on rough or muddy ground.

Still another object is to provide prefabricated sections from which a roadway may be readily and economically constructed and which are recoverable for repeated use.

Other objects of this invention will become apparent from a reading of the following description taken in conjunction with the illustrated embodiment and claims.

In general, the present invention embodies a section suitable for use in making roadways and the like comprising a member made from a continuous web of sheet metal, galvanized sheet metal or other suitable material provided with a plurality of laterally extending corrugations. This member is preferably square or rectangular in over-all shape. Trussing members in the form of narrow elongate members such as metal straps are positioned on both side faces of the corrugated member and extend transversely to the corrugations. The straps are secured at the point of contact with the ridge portions of the corrugations. Each section may be constructed such that the straps on one side thereof will extend from the corrugation at one end of the corrugated member to within at least one corrugation of the other end while the straps on the other

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side extend from the corrugation at the latter end to within at least one corrugation of the first end. This mode of trussing leaves open corrugations at opposite ends and on opposite sides or side faces free to overlap or underlap like open corrugations in an identical section; thus permitting any two sections to be loosely and flexibly interlocked at adjacent ends. The straps may be positioned adjacent the outer side edges to leave a minor or relatively small marginal portion or area of the corrugations on each side edge open to overlap or underlap marginal corrugations of like sections thus permitting flexible, lateral interlocking of adjacent sections.

In the preferred embodiment, the straps include at least one intermediate contoured or shaped portion which will engage in and line the groove of a corrugation. The contoured portions of top and bottom straps are fitted into adjacent corrugations situated between the ends of the member so that the sections will include adjacent open corrugations between trussed, corrugated subsections. These open corrugations provide vertical flexibility between adjacent subsections. The subsections, however, are rigid because of the straps.

It is also contemplated by this invention to add strength to, and at the same time lighten the construction of the sections by providing annular, flanged openings at spaced intervals along the top and bottom ridges of the corrugations. Preferably, the openings in the ridges include coniform flanges extending outwardly from the ridge surface. Transversely extending ribs or corrugations may if desired be impressed at spaced intervals along the ridges, or between openings along the ridges of the corrugations. Additional strength may be added to the construction by impressing a series of vertical ribs along the walls of the main corrugations. This reinforcement of the web of sheet metal makes it possible to utilize very light gauge material thereby reducing both the cost and the weight of the sections.

In the accompanying drawings which form a part of the instant specification, like reference numerals are used to indicate like parts in the various views.

Fig. 1 is a plan view of a plurality of interlocked, prefabricated sections making up a roadway, walkway and turning deck;

Fig. 2 is a top plan view upon an enlarged scale of a single section constructed in accordance with the present invention and including frag-

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mentary portions of other sections interlocking therewith;

Fig. 3 is a side elevation of one of the sections shown in Figs. 1 and 2;

Fig. 4 is a bottom plan view of the section shown in Fig. 3;

Fig. 5 is a side elevation of several interlocking sections placed on irregular terrain and forming a roadway;

Fig. 6 is a detailed perspective view showing the mode of interlocking individual sections;

Fig. 7 is an enlarged perspective view of one of the corrugations of the preferred construction including stiffening elements;

Fig. 8 is a fragmentary top plan view of the corrugation shown in Fig. 7;

Fig. 9 is a view taken along the line 9—9 in Fig. 8 in the direction of the arrows; and

Fig. 10 is an exploded view showing a complete section and a portion of another section illustrating the mode of interlocking the ends of two sections.

Referring to the drawings, particularly Fig. 1, the numerals 10 and 11 designate runway sections of a roadway leading to deck 12 made up of a plurality of interlocking panels or sections 13. The deck 12 is useful for loading, unloading, parking and turning of vehicles, or as a landing deck for aircraft. A walkway 14 may lead from deck 12.

Panel 13, as shown in Figs. 2, 3 and 4, comprises a rectangular member in the form of a single web of sheet metal formed with laterally extending corrugations with top and bottom flat ridge surfaces 15 and 16 connected by inclined walls 17. Narrow elongate members such as straps 18, 19 and 20 extend along one side or face which may be the top of member 13 transversely of the corrugations and parallel to the side edges of the panel. Strap 19 extends along the middle of the panel while straps 18 and 20 extend near the opposite side edges leaving a corrugated marginal area. The bottom of member 14 is provided with narrow elongate members such as straps 25, 27a and 28 placed generally opposite the corresponding top straps. The truss members are secured to the corrugation ridges such as surfaces 15 and 16 at the point of contact therewith as by spot welding or other suitable means.

The corrugations may have rounded ridges of the more or less conventional type, but flat ridge surfaces connected by flat vertical or sloping walls to give right, obtuse or acute angled construction is generally preferred because of the greater strength of this type construction. The obtuse angled construction shown in Fig. 3 has the advantage of presenting an ever increasing bearing surface as the section settles in soft earth.

Straps 18, 19 and 20 may include downwardly extending contoured or shaped portions 26 and 27, which may be formed by pressing or bending the straps to conform to the shape of the corrugation grooves whereby the underwalls of the shaped portion form a snug fit with the walls of the groove; the shaped portions may be secured if desired to the groove. The bottom straps also include upwardly extending contoured portions 29 and 30 that engage in the grooves adjacent the grooves into which contoured portions 26 and 27 fit. This construction divides each section into at least two rigid subsections of trussed corrugations connected by flexible portions provided by the untrussed intermediate corrugations

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whereby rough terrain is easily traversed as appears from Fig. 5. The straps, due to their conformity with the corrugations in the flexible portion of member 13, strengthen these flexible portions but do not appreciably interfere with their flexibility. While each subsection has been shown in the drawings as divided by two adjacent corrugations having straps fitting into the grooves thereof, greater areas of flexibility may be achieved by fitting the top and bottom straps into three or more adjacent corrugations. In some cases, the construction may include an even number of non-reinforced grooves on either the top or bottom, the other side having an odd number. Generally, if the sections are used on fairly level ground or as bridge spans, a completely trussed construction without inner areas of flexible corrugations will be preferred whereas a modification of the type illustrated in Fig. 2 will be preferred where the sections need vertical flexibility.

It will be noted that the top straps extend from surface 15 at the corrugation at the left end of member 13, as viewed in Figs. 2 and 3, to a corrugation adjacent to but at least one corrugation removed from the opposite end whereas the bottom straps extend from surface 16 of the corrugation at the right end of the section to a corrugation adjacent to but at least one corrugation removed from the left end. This construction permits the interlocking of ends of like sections with one, two or more interlocked corrugations. For example, sections 21 and 22 of Fig. 2 are interlocked with each other at their ends, the untrussed end of section 22 overlapping the untrussed end of section 21. The untrussed portions at opposite ends may include as many as two to four or even more corrugations depending on the degree of interlocking with other sections to be obtained. Lateral overlapping of the side edges of identical sections may be provided by placing the open marginal area of one section over the other as shown in Fig. 2. The edge 23 of section 21 may be flush with strap 18. Strap 18 serves to limit the degree of overlapping of the sections, and the loose overlapping gives lateral and vertical flexibility between adjacent sections to adapt them more readily to rough ground.

Fig. 10 represents an enlarged view of the section shown in Fig. 3. A portion of another section 13a is shown in exploded relationship with the section 13. This illustrates the manner in which the ends overlap, it being understood that to connect section 13a with section 13, it is merely necessary that the section 13a be lowered from the position shown in Fig. 10 until it mates with the end of section 13.

The adaptability of the trussed construction for rough terrain and for use in supporting vehicles is shown in Fig. 5. The rigid trussed subsection 31 between untrussed corrugations 27 and 29 will readily bridge irregularities, such as 32, in the terrain without bending to any appreciable extent under heavy loads when the wheel 33 of a vehicle places direct stress upon that portion. On the other hand, the flexible corrugated portions 26 and 29 and 27 and 30 connecting the trussed subsections have high vertical and longitudinal strength because of the straps lining the walls of the grooves, and yet are flexible and will conform to irregularities in the terrain by permitting the section to bend somewhat at these portions.

The untrussed, upper corrugations at the right end of member 13 are overlapped by the un-

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trussed under corrugations at the left end of member 33 to form a continuous roadway. This connection provides a loose fit between the two sections and gives another point of flexibility to the runway at the point of interlocking.

Fig. 6 shows more clearly the interlocking of the untrussed end corrugations at the joining ends of the two sections. It will be noted that corrugated member 33 having upper straps 34 and 35 includes open troughs 36 and 37 which receive, respectively, trough portions such as 15 of member 13. A perspective view is also shown of two sections interlocking at the side edges. Corrugated member 33 containing marginal straps 39 overlaps the corrugated marginal portion of member 33. The edge of section 33 is flush with the edge of strap 34.

Other modifications of the present invention are shown in Figs. 7, 8 and 9. Corrugation 40 including top ridge surface 41 and sidewalls 42 and 43 connecting to bottom ridge surfaces 44 and 45 is shown as the end portion of a section of the type heretofore described, it being understood that this end portion is only one of many corrugations made up into a sheet having the same general configuration as that shown in Figs. 1 to 6. Transversely extending straps 46, 47 and 48 are secured to ridge 41. Straps 46, 47 and 48 correspond to straps 18, 19 and 20 in Fig. 2 in both position and extent. Also, corresponding straps are placed on the bottom of the section in the same manner as straps 25, 27 and 28 in Fig. 4. Thus, in general, the panel made up in accordance with Fig. 7 will have the same general configuration and disposition as the panel shown in Figs. 2, 3 and 4 except for the strengthening structures described immediately below. The top ridge surface 41 may include a series of annular openings 49, which are provided with upwardly extending, coniform flanges, located at spaced intervals between the strap members and in the marginal areas beyond the side straps. These upwardly extending flanges serve several purposes, namely, to provide improved traction between the wheels of vehicles and the ridges, to strengthen the top ridges by adding the stiffening flanged portion, to reduce the weight of the member, and to relieve suction caused by sticky soil filling in part of the under corrugations when it is desired to remove a section.

The bottom ridge surfaces such as 44 and 45 also may contain at spaced intervals a series of annular openings 50 similar to 49 but with downwardly extending flanges. These flanged openings serve in the same manner as openings 49.

If desired, wall members 42 and 43 of the corrugations may be provided with a series of vertically extending, trough-like stiffening ribs such as 51 and 52 which alternately project from and are depressed into the walls. Ribs 51 project outwardly as shown while ribs 52 are indented into the wall. These ribs in effect are spaced corrugations along the wall surfaces of the corrugations of the main member and may be added to give additional vertical strength to the trussed section.

Also, if desired, the ridge portions 41, 44 and 45 may include at spaced intervals projecting ribs or corrugations such as 53 and 54 in order to improve traction between the ridges and wheels of vehicles and to add additional longitudinal strength to the main corrugations. The ribs extend transversely of the corrugations and may be formed alternately upwardly and down-

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wardly. The ridge corrugations may be used alone or spaced between the annular openings.

The top and side ribs may be used alone or in combination with each other or in combination with the annular openings or the openings may be used alone depending on the extent of vertical and longitudinal strength desired and the lightness to be achieved for a given degree of strength.

While as a preferred embodiment there has been shown a section comprising a corrugated member and three longitudinal straps extending on the top and bottom thereof in opposition to each other, it will be obvious that other strap arrangements may be employed satisfactorily. For example, two straps may be extended along the top portion at about equal distances from the edges while a single strap member may be extended longitudinally along the center of the bottom of the section.

By way of example and not by way of limitation, a typical prefabricated section may be about ten feet long and three feet wide with corrugations approximately four inches in thickness. The corrugated member may be constructed of galvanized sheet metal in order to resist corrosion in damp locations and will generally be of a lighter gauge metal than the straps.

It will be seen that the present invention has many advantages over prior art portable, prefabricated constructions such as those made of wood. The present construction is easily prefabricated and shipped in sections, and, in addition, the sections are of sufficient lightness to be laid down by hand. Furthermore, wood or other similar construction materials are much heavier and bulkier for a given degree of strength than the present construction and wood structures rot and decay rapidly in wet climates. Mild, galvanized steel or stainless steel may be used in the present construction to resist oxidation-type corrosion and will give the semi-permanence desired for oil field roadways and the like. The use of corrugations also has an advantage over prior art constructions in that the member has substantial thickness and will rise above surface waters or mud. When a load is placed on the construction, the bearing area of the bottom corrugations increases due to the wedging action of the under corrugations on the soil forced up into them. At the same time the corrugations tend to hold soft earth or mud and resist their outflow which maintains the member on an even level and retards settling of the roadway. The load is uniformly distributed over a large bearing area because of the rigidity of the trussed sections so that the unit bearing load is not excessively great.

The roadway may be readily, quickly and economically laid and is recoverable for use at a different location. The sections lend themselves to convenient storage and transportation. The construction of the individual sections is such that they may be used interchangeably with either side up.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. A prefabricated construction section comprising a continuous corrugated sheet member, narrow elongate members positioned transversely of the corrugations on both top and bottom side faces of the sheet member and secured to the peaks of the corrugations providing a trussed construction, said elongate members on one side face of the corrugated member extending from the endmost corrugation at a first end of said sheet member to a corrugation adjacent but at least one corrugation removed from an end of said corrugated sheet member opposite said first end, and said elongate members on the other side face extending from the endmost corrugation at said opposite end to a corrugation adjacent to but at least one corrugation removed from said first end of the sheet member thereby leaving an end portion of said other side face unobstructed by said elongate members to receive, in mating relationship, the first end of another section which is similarly constructed.

2. The section of claim 1 wherein each elongate member at a point intermediate its ends has at least one shaped portion conforming to the corrugations, and wherein one of such shaped portions of each top elongate member mates in the same upwardly facing corrugation and one of such shaped portions of each bottom elongate member mates in the same downwardly

facing corrugation, said same upwardly and said same downwardly facing corrugations being immediately adjacent each other and having a common wall.

3. The section of claim 1 wherein at least two of said elongate members are of narrow width relative to the width of said sheet member and are secured to each side face of the sheet member providing marginal areas along each edge of the sheet member, which areas are open and unobstructed.

4. The section of claim 1 wherein the corrugations of the sheet member are provided with stiffening elements formed therein as an integral part of the sheet member and reinforcing the peaks of the corrugations against horizontal forces.

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