

Feb. 25, 1958

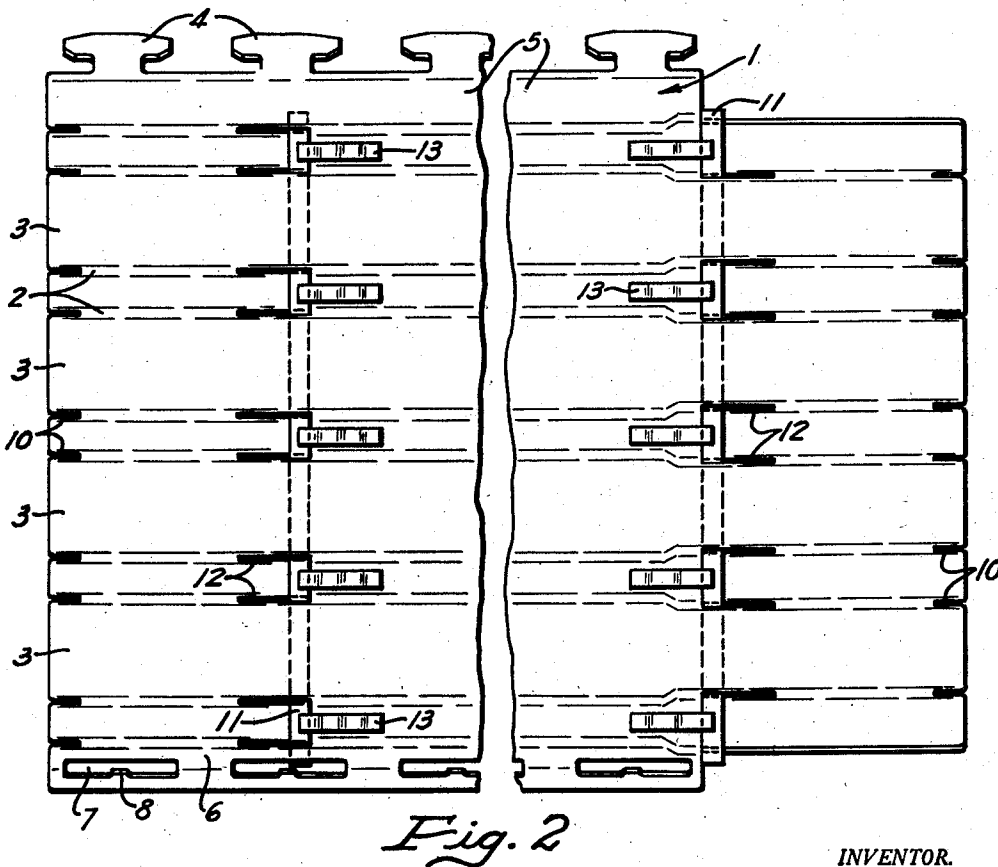
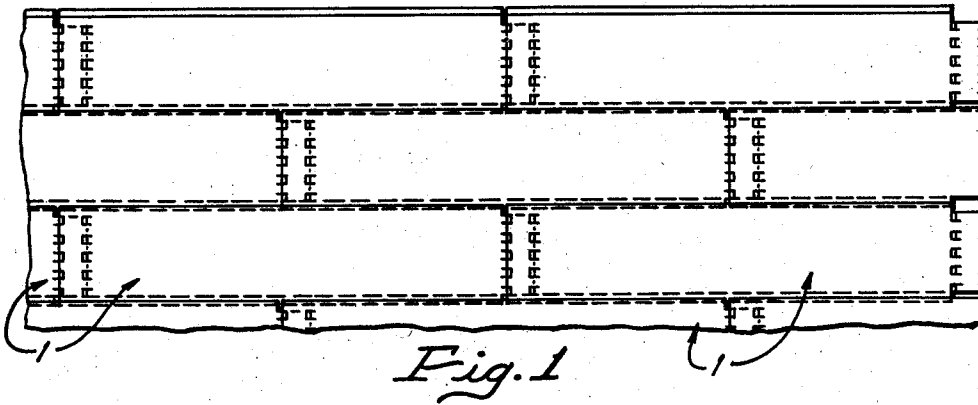
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2,824,501

SHEET METAL MAT FOR AIRFIELDS

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2 Sheets-Sheet 1



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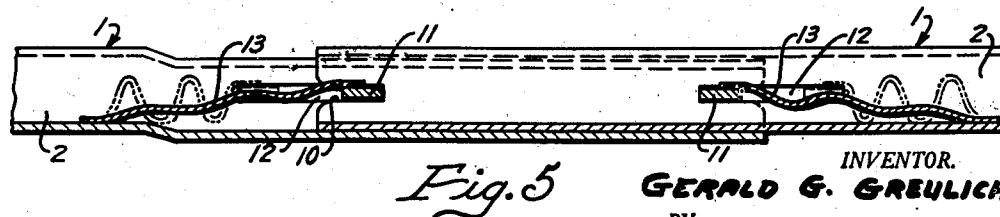
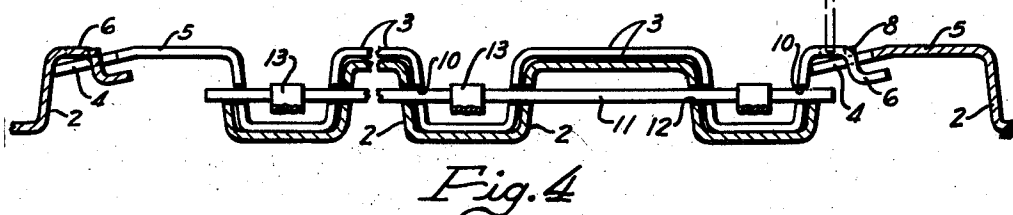
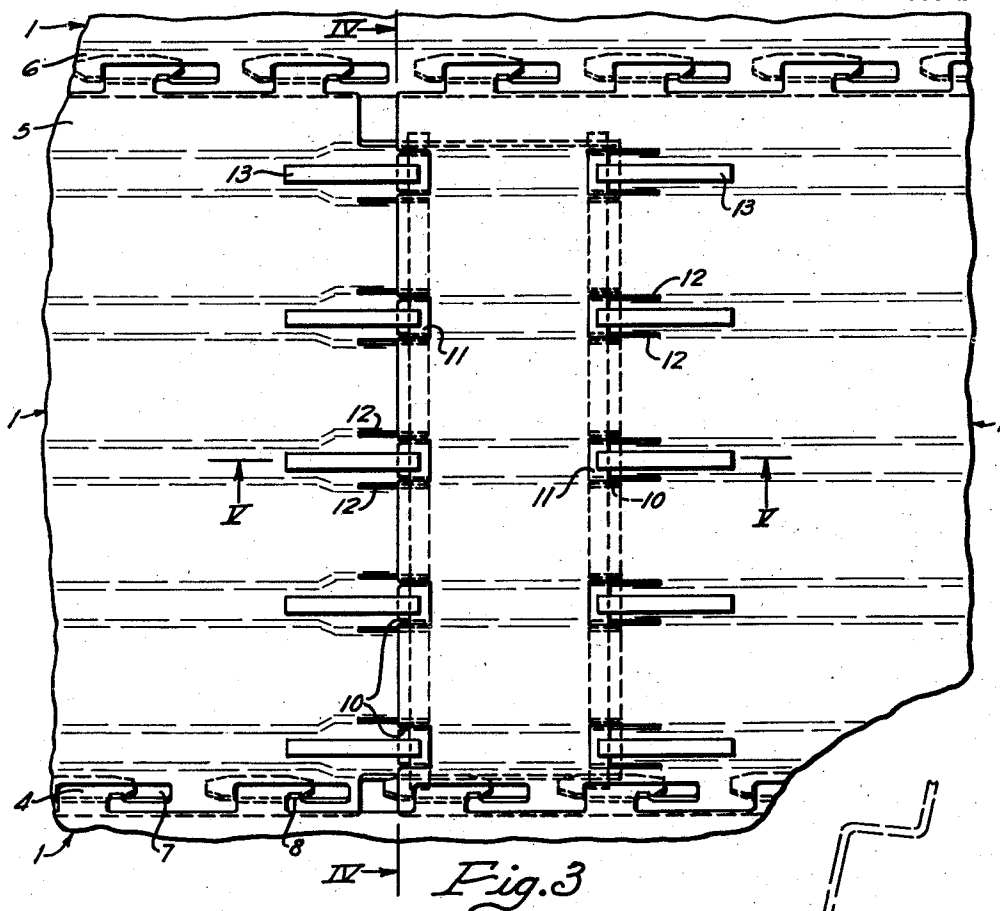


Fig. 5

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SHEET METAL MAT FOR AIRFIELDS

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4 Claims. (Cl. 94—13)

This invention relates to sheet metal mats which are connected side by side and end to end to form airfield decks, and more particularly to the way in which the mats are connected together at their ends.

Since ribbed or corrugated plates have been introduced and used extensively in landing mats for surfacing airfields, airplane wheel loads have become greater and greater. The connections between the sides of the mats give reasonable service, but the combination of rapidly engaging side joints with satisfactory end moment resistance joints has presented a very difficult problem because the laying and connection of mats under enemy opposition requires connections that can be effected rapidly and yet be simple and strong. Such moment resisting end joints with bending resistance approaching the strength of the main bodies of the mats have been omitted heretofore. Some types of end connectors are in use, but they have not had significant end moment resistance and therefore have permitted relatively free vertical rotation or bending of the mat ends. This has greatly limited the carrying capacity of the mat as a whole through accelerating the churning of the soil beneath the mat.

It is among the objects of this invention to provide airfield deck mats which have strong but simple end joints that do not interfere with the rapid connection of the side joints, which strongly resist rotation or bending under heavy loads, and which can be connected after the mats are lying flat on the ground.

In accordance with this invention, the airfield deck is formed from a plurality of metal mats which are laid with their sides and ends overlapping and detachably connected together. Each mat is formed principally from a sheet metal plate having corrugations extending lengthwise of it. The opposite ends of the corrugations are provided in their side walls with notches that extend lengthwise of the mat. A cross bar extends through the side walls of the corrugations near the inner end of each of the overlapped or overlapping end portions. The notches are positioned to receive the cross bars of like mats at their ends. Where the sides of the mats must be connected while one of the mats is in an inclined or vertical position, after which it is swung down to the ground, the cross bars are slidably mounted in slots. The bars are disposed in the inner ends of these slots while the mats are being connected side by side, and then the bars are moved toward the outer ends of the slots to slide the bars into the notches of the adjoining plates.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which

Fig. 1 is a plan view, somewhat diagrammatic, of a portion of an airfield deck formed from my mats;

Fig. 2 is an enlarged fragmentary plan view of a single mat;

Fig. 3 is an enlarged fragmentary plan view of a portion of the deck shown in Fig. 1;

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Fig. 4 is an enlarged vertical transverse section, with its central portion broken away, taken on the line IV—IV of Fig. 3; and

Fig. 5 is a still further enlarged longitudinal vertical section of an end-connecting detail, taken on the line V—V of Fig. 3.

All of the sheet metal mats shown connected together in staggered relation in Fig. 1 are made in the same way. All of the mats are the same width, and all but half-length end mats are the same length. One of the mats is illustrated in detail in Fig. 2. It is of general rectangular shape, with one end reduced in width and with connecting members projecting from one side. Each mat is formed mainly from a sheet metal plate 1 provided with corrugations that extend lengthwise of the mat to increase its stiffness and to give it depth. The corrugations form laterally spaced troughs. The bottom of each trough preferably is flat and its side walls 2 diverge upward, most suitably at an angle of between five and ten degrees to the vertical, as shown in Fig. 4. The tops of the troughs are spaced uniform distances apart by flat horizontal tread areas 3, which are the parts of the plate that are engaged by the wheels of airplanes on the deck. The tread areas may be provided at suitable intervals with the customary circular holes (not shown).

The sides of the mats may be connected together in various well known ways. For example, one side of each plate may be cut to provide it with connecting members 4 integral with an adjoining flange 5. These members are bent downward a short distance, so that they are inclined relative to the top of the mat, generally about fifteen degrees. Each of the connecting members has a neck terminating at its outer end in a head which extends lengthwise of the mat, preferably in opposite directions from the neck. A flange 6 at the opposite side of the plate has its marginal portion turned downward and then outward. This strengthens the flange and also avoids the danger of the edge of the flange cutting the membrane on which these mats often are laid. The flange 6, including the upper part of its marginal portion is provided with slots 7 which extend lengthwise of the mat. The slots are directly opposite the connecting members at the other side of the mat and are formed to receive the connecting members on an adjoining mat of like construction.

The mat having the connectors that are to be inserted in such slots has to be inclined rather steeply, as indicated in the broken line position in Fig. 4, so that the connectors can be pushed down through the slots in the mat resting on the ground. The raised mat then is moved lengthwise in either direction as far as it will go in order to slide the heads of its connecting members under the adjoining plate between its slots to interconnect the plates. Following this, the raised mat is allowed to swing down to the ground beside the first one. When this occurs, one side of each connector neck substantially engages one end of the associated slot as shown in Fig. 3, while the opposite side of the neck is close to one side of a lug 8 that projects upward from the central part of the outer or lower wall of the slot. Consequently, as long as both mats are on the ground they cannot be moved lengthwise relative to each other to disconnect them. If, before it was lowered, the raised mat had been moved in the opposite direction, the necks of its connectors 4 would then have swung down into the spaces on the side of lugs 8 opposite to the side where the necks appear in the drawing. Therefore, whichever way a raised mat is moved before it is swung down beside the one that it is being connected to, the lugs in the slots will prevent the mats from becoming disconnected accidentally.

The mats overlap at their opposite ends and are fastened together there in order to strengthen the deck and make it more of an integral unit. Accordingly, one end of

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each corrugated plate is formed for receiving the overlapping end of the adjoining mat. This is done by spreading out the troughs between the tread plates to increase their width enough to receive the ends of the troughs of the overlapping mat in nesting relation. Also, to allow the tops of the mats to lie in the same plane, the overlapped end of each plate is offset downward the thickness of the metal as shown in Fig. 5. Flanges 5 and 6 are omitted from this end of the plate, as shown in Fig. 2, to avoid double thickness. The opposite ends of side walls 2 of the corrugations are provided with notches 10 extending lengthwise of the mat. The notches are aligned across the mat. Near the inner end of each overlapping or overlapped end portion of the mat there is a cross bar 11 that extends through the side walls of the corrugations. For this purpose those walls are provided with slots 12 extending lengthwise of the mat. The slots and notches are so positioned that the notches can receive the cross bars of like mats when the mats are overlapped at their ends. Preferably, all of the slots and notches in a mat are located in the same plane. The slots permit the bars to be retracted at the inner ends of the slots while a mat is being connected to the side of adjoining mats. Then, after that mat has been swung down onto the ground, one of its cross bars and one of those of the mat whose end it overlaps can be moved toward the outer ends of their slots and into the notches of those two mats. This will lock the ends of the mats together and reinforce them.

In order to hold the cross bars retracted until the ends of adjoining mats have been overlapped, and also to hold the bars in the notches after they have been driven into them, the bars are fastened to the corrugated plates by flexible means such as soft metal straps 13. The straps have their opposite ends welded to the cross bars and to the bottoms of the plate corrugations. Originally, the straps are crimped, as shown in Fig. 2 and in dotted lines in Fig. 5, to hold the bars in the inner ends of slots 12. When the ends of the mats have been overlapped, the bars are driven or pulled into the end notches 10, the straps becoming straightened as this is done. The straightened straps then prevent the bars from working back out of the notches. Yet, if it is desired to disconnect the mats, the bars can readily be driven out of the notches because the flexible straps will bend to permit it.

The portions of cross bars 11 extending across the troughs of the plate corrugations are readily accessible for driving or otherwise moving lengthwise of slots 12. The bars engaged in the notches form a simple but positive joint to hold the adjoining mats in alignment and to resist rotation or bending from loads on either side of the joint.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A mat adapted to be laid on the ground with like mats to form an airfield deck, the mat comprising a sheet metal plate having end portions adapted to be disposed in overlapping relation with end portions of other mats, the plate also having corrugations extending lengthwise thereof with the opposite ends of the corrugations pro-

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vided in their side walls with notches extending lengthwise of the mat, and a cross bar extending transversely of the plate and through the side walls of the corrugations near the inner end of each of said end portions and being in substantially horizontal alignment with the notches, whereby said notches can receive the cross bars of like mats when the mats are disposed in end-overlapping relation.

2. A mat adapted to be laid on the ground with like mats to form an airfield deck, the mat comprising a sheet metal plate having end portions adapted to be disposed in overlapping relation with end portions of other mats, one end portion of the mat being offset downwardly the thickness of the plate material, the plate also having corrugations extending lengthwise thereof with the opposite ends of the corrugations provided in their side walls with notches extending lengthwise of the mat, and a cross bar extending transversely of the plate and through the side walls of the corrugations near the inner end of each of said end portions, all of said notches and bars lying in the same horizontal plane, whereby the notches can receive the cross bars of like mats when the mats are disposed in end-overlapping relation.

3. A mat adapted to be laid on the ground with like mats to form an airfield deck, the mat comprising a sheet metal plate having end portions adapted to be disposed in overlapping relation with end portions of other mats, the plate also having corrugations extending lengthwise thereof with the opposite ends of the corrugations provided in their side walls with notches extending lengthwise of the mat, the side walls of the corrugations near the inner end of each of said end portions being provided with aligned slots extending lengthwise thereof, and a cross bar slidably mounted in the inner ends of the slots at each end of the plate and movable outward toward the end of the plate nearest the bar to insert the bar in end notches of a like mat when the mats are disposed in end-overlapping relation with said last-mentioned notches in horizontal alignment with the bar.

4. A mat adapted to be laid on the ground with like mats to form an airfield deck, the mat comprising a sheet metal plate having end portions adapted to be disposed in overlapping relation with end portions of other mats, the plate also having corrugations extending lengthwise thereof with the opposite ends of the corrugations provided in their side walls with notches extending lengthwise of the mat, the side walls of the corrugations near the inner end of each of said end portions being provided with aligned slots extending lengthwise thereof, and a cross bar slidably mounted in the slots at each end of the plate, bendable metal straps secured at their ends to the bar and the plate and normally crimped to hold the bar at the inner ends of the slots, said straps being adapted to be straightened to permit the bar to be moved toward the outer ends of the slots and into end notches of a like mat when the mats are disposed in end-overlapping relation with said last-mentioned notches in horizontal alignment with the bar.

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