

March 30, 1943.

O. F. ARTHUR

2,315,180

FIELD MAT

Filed April 7, 1942

2 Sheets-Sheet 1

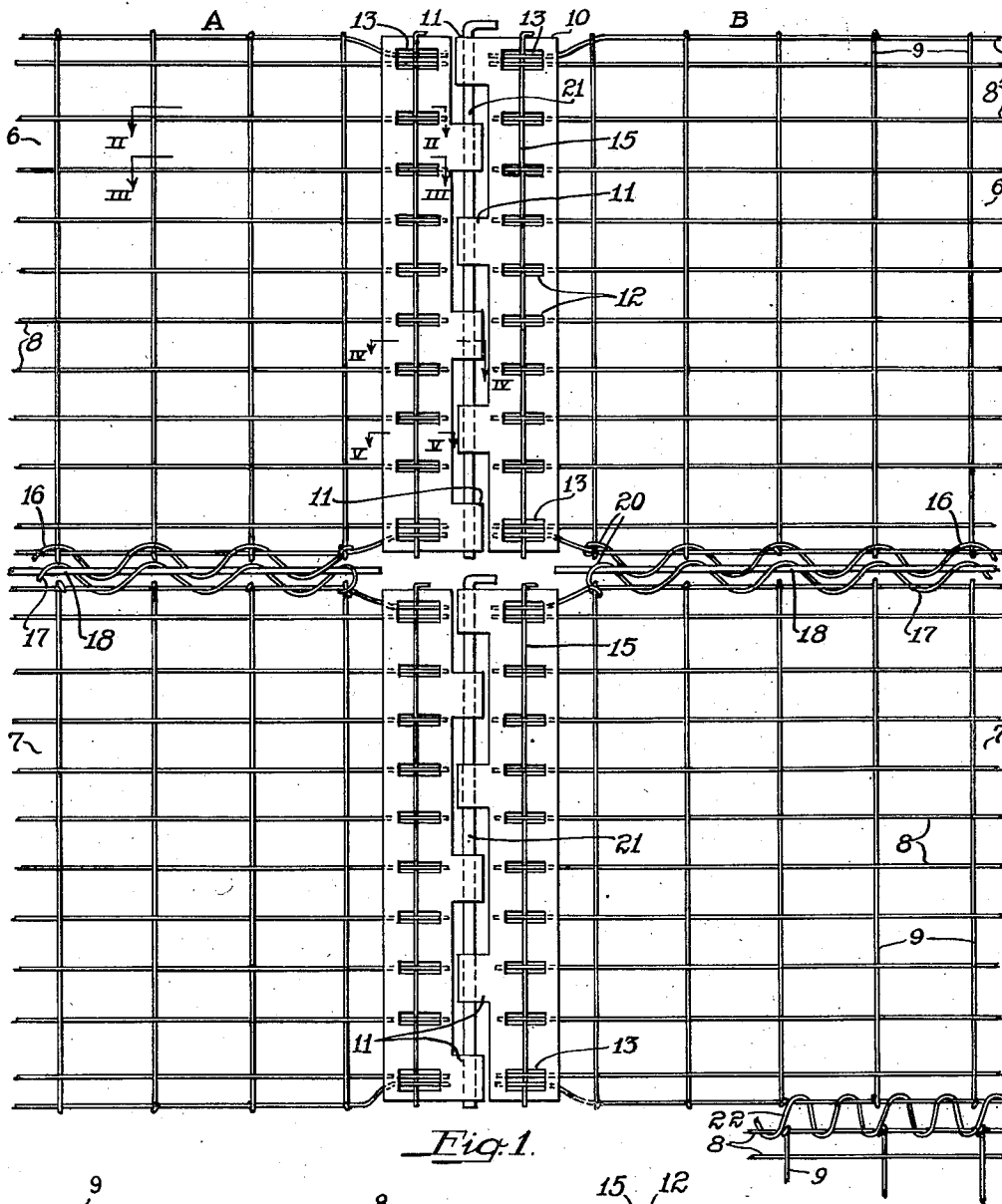


Fig. 1.

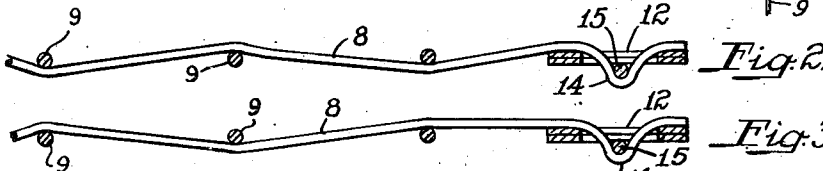


Fig. 2.

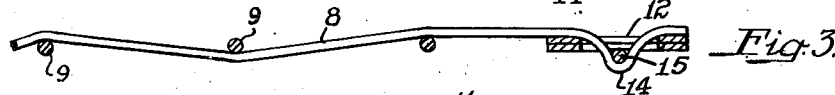


Fig. 3.



Fig. 4.



Fig. 5.

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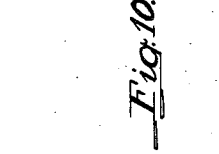
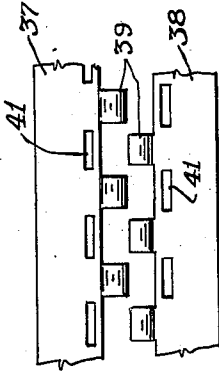
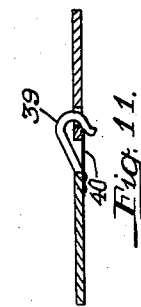
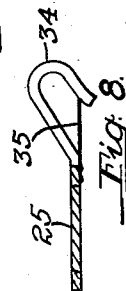
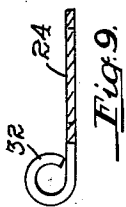
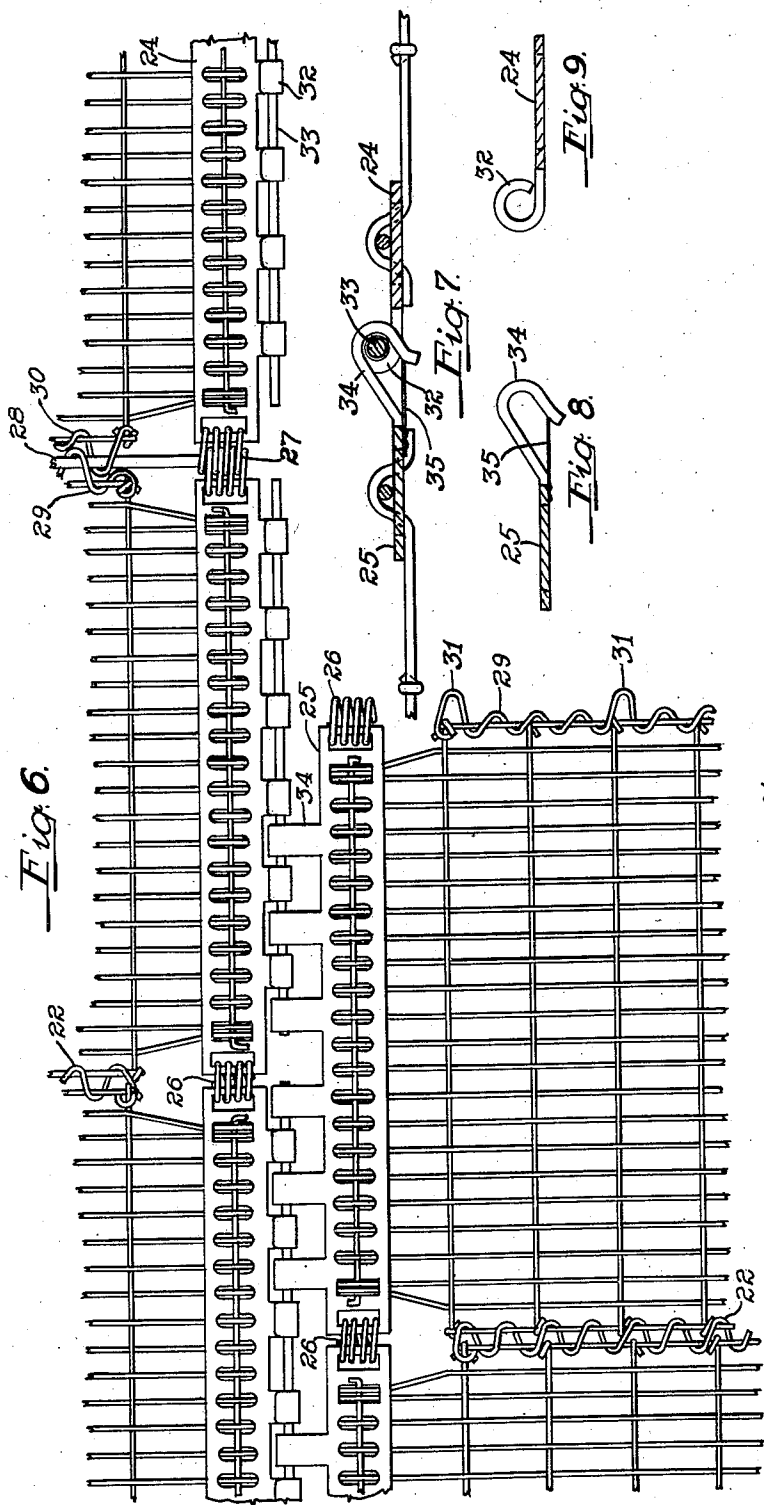
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,315,180

FIELD MAT

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Maryland

Application April 7, 1942, Serial No. 437,989

5 Claims. (Cl. 94-4)

My invention relates to mats, and more particularly to mats of wire mesh especially suited for use on soft, swampy or sandy ground, to thereby provide temporary landing fields for airplanes, truck tracks, or beach aprons, the mats being useful also for other purposes such as covers for bomb shelters, on hangar floors, etc.

One object of my invention is to provide a mat of the character referred to which can be quickly be laid in sections of a size suitable for convenient handling and the sections then connected to form a unitary complete mat structure which has great strength though made of mesh wires of standard gages, and which is not subject to any substantial degree of billowing or bulging.

Another object of my invention is to provide a mat structure which, although it comprises woven mesh, is so made that the individual strands are effectively held against slipping relatively to one another, even under the impacts of airplane landing wheels, or other forces.

In the accompanying drawings, Figure 1 is a plan view of a portion of my mat structure; Figs. 2, 3, 4, and 5 are enlarged sections taken on the lines II-II, III-III, IV-IV and V-V, respectively, of Fig. 1; Fig. 6 is a plan view showing a modification of the structure of Fig. 1; Figs. 7, 8 and 9 are sectional views of certain of the connecting elements of Fig. 6; Fig. 10 is a view showing a modified form of connection plates for mat sections, and Fig. 11 shows the manner in which the plates of Fig. 10 are connected together.

Each mat section A and B comprises a series of panels 6 and 7, together with a suitable number of additional panels of like structure which are not here shown.

Where the mat is to be employed for a wide landing field area, each mat panel may suitably be twelve feet wide, so that with two sections A-B placed side-by-side as shown in Fig. 1, there is a landing strip of approximately 24 feet in width. Additional sections can be laid alongside these two sections, as desired, and connected thereto.

Each panel is formed of strand members 8 which may be of about 12 feet in length—when a 12-foot wide mat section is desired. In the drawings, only part-length strands 8 are shown. The stay wires 9 are intermeshed or woven with the strands 8 by passing them over and under successive strand wires, the strands in turn passing over and under successive stay wires. The stay wires 9 may conveniently be about 14 inches long. The wires 8 and 9 may be 9-gage wire, and

are preferably of spring steel so that they will not easily become permanently bent in use or through handling, and the panels are further resistant to such deformation, because the strands can have slight sliding movement on the stays 9.

The extremities of the stays are snugly bent back around the marginal strands, connecting plates 10 being provided on both ends of each panel. While only one plate is here shown on each panel, it will be understood that at the other end of each group of strands 8 a similar plate 10 will be provided. These plates are here shown as formed of a single metal strip folded upon itself as shown in Fig. 4, to form a loop, after which portions of the loop are cut away to form eyes or knuckles 11. The plates have slots 12 and 13 punched therein and the strand wires, near their ends, are pushed into the slots by suitable dies, a distance sufficient to form permanent bends 14 therein. Rods or heavy wires 15 are then inserted through these loops or bends, to anchor the strands 8 to the plate and thereby prevent the strands from being pulled or shifted out of place, in either longitudinal or transverse directions.

The panels composing each mat section that extends longitudinally of the field are connected by spiral wires 16 and 17 and retaining rods 18. The wires 16 and 17 may initially be assembled on their respective mats by a rotary or screwing motion, after which their extremities can be bent tightly around a strand as indicated at 20. The spiral wires 16 and 17 are then brought into partially overlapping relation and the wire 18 inserted through turns of both. A series of panels thus connected may be folded upon one another accordion fashion, for transportation from the factory and for convenient laying at the field. As many panels as desired or practicable may thus be connected to form a mat section, loaded on a truck and sent to the field where it can be withdrawn by pulling the endmost panel, until all of the folds have been spread flatwise upon the ground. There can be some hundreds or even a thousand feet of panels preassembled and handled in this manner. Also, additional groups of folds can be connected to previously laid groups by other connecting wires 16-17-18.

When a section such as A has been laid and additional mat width is desired, another section such as B is laid alongside A, with the knuckles 11 of their respective plates in axial alignment, so that retaining rods 21 can be inserted to hold them in assembled relation. While these plates form a hinge joint that provides some flexibility,

they not only stiffen the longitudinal edges of the mat section and maintain such edges against relative deflection in vertical and horizontal directions, but cooperate to provide endwise anchorage for the strand wires 8 of both sections. Thus, if an impact tends to pull any of the strands of section B longitudinally of itself, such pull will be resisted not only by the plate 10 of that section, but by the plates 10 and strands 8 of the adjacent section A. The plates 10 are further capable of withstanding the weight of airplane or vehicle wheels, and thus prevent the edge of one mat section being pushed below the edge of the adjacent mat section, and they are reinforced in this respect by reason of their firm connection to the bends 14 of the mat strands. Thus a prolific source of accidents resulting from weaker forms of connections is avoided. The transverse joints at 16-17-18 are not subjected to such great strains as are the longitudinal joints, since they extend crosswise of the line of travel upon the mat surface.

The panels of each mat section may conveniently be arranged in groups, at the factory, the panels of each group being connected by wires 22, to a suitable total length. The wires 16 and 17 may also be applied to the endmost panels of each group, at the factory, and the groups then connected together at the field, simply by inserting the rods 18.

Referring now to Figs. 6 to 9, the panels are each provided with plates 24 and 25 that correspond to the plates 10 of Fig. 1, but formed and arranged in a somewhat different manner. The plates 24 and their panels are offset longitudinally of the field, relative to the plates 25 and their panels, to divide the transverse joints and thus give a stiffer mat structure. Also, these joints are further strengthened and stiffened by connecting the plates of each section by the use of coils 26 and 27 which engage slots in the ends of the bars. The coils 26 connect the adjacent ends of the plates in each group of panels, while two coils 27 are provided for connecting the plates of one longitudinal group to the plates of the other group. A rod 28 is inserted to connect these coils and spiral wires 29 and 30 that correspond to the wires 16 and 17 but which have deep loops 31 formed thereon by stretching some of the turns after the spirals are in place on the panels.

The plates 24 have loops or knuckles 32 formed thereon, to snugly receive rods 33. The plates 25 have hooks 34 formed thereon or welded thereto, and provided with retaining springs 35, after the manner of harness snaps. In connecting one section to another the hooks are simply pressed down to bring them into hooked engagement with the rods 33.

In Figs. 10 and 11 I show a somewhat simpler form of connection for plates 37 and 38 that correspond to the plates 24-25. In this arrangement the plates each have hooks 39 and retaining springs 40. The hooks of each plate are engageable with slots 41 in the adjacent plate, to connect the mat sections together.

As to other uses for the mats, they may be employed as bomb protective screens and fragmentation protective screens—in some instances serving as a substitute for sand bags. Thus, they may be hung in proximity to airplanes on a field, to protect against missiles directed horizontally, or may be hung in inclined positions above the planes or above the deck of a ship. The yieldability of the paneled structure will reduce danger

of missiles tearing through the mats, as compared to mats that do not have hingedly connected panels. Also, the mat may deflect bombs and other missiles, and will in some cases cause the bombs to be exploded before contact with the protected object.

I claim as my invention:

1. A panel for use in forming a mat and adapted for connection to other panels, comprising a mesh having strand and stay wires, a plate extending transversely of the strand wires and provided with slots, portions of the strands adjacent to their extremities being deflected through the slots, from one side of the plate, and a retaining element located between the opposite side of the plate and said deflected portions, to thereby anchor the strand wires to the plate.

2. A panel for use in forming a mat and adapted for connection to other panels, comprising a mesh having strand and stay wires, a plate extending transversely of the strand wires and provided with slots, portions of the strands adjacent to their extremities being deflected through the slots, from one side of the plate, and a retaining element located between opposite side of the plate and said deflected portions, to thereby anchor the strand wires to the plate, the strand and stay wires being interwoven and having slidable engagement with one another.

3. A panel for use in forming a mat and adapted for connection to other panels, comprising a mesh having strand and stay wires, a plate extending transversely of the strand wires and provided with slots, portions of the strands adjacent to their extremities being deflected through the slots, from one side of the plate, and a retaining element located between the opposite side of the plate and said deflected portions, to thereby anchor the strand wires to the plate, the outermost edge of the plate being provided with knuckles or the like, which are spaced apart longitudinally of the plate and are adapted for connection to similarly arranged knuckles on an adjacent panel.

4. A panel for use in forming a mat and adapted for connection to other panels, comprising a mesh having strand and stay wires, a plate extending transversely of the strand wires and provided with slots, portions of the strands adjacent to their extremities being deflected through the slots, from one side of the plate, and a retaining element located between the opposite side of the plate and said deflected portions, to thereby anchor the strand wires to the plate, the outermost edge of the plate being provided with hooks which are spaced apart longitudinally of the plate and are adapted for connection to an adjacent panel.

5. A panel for use in forming a mat and adapted for connection to other panels, comprising a mesh having strand and stay wires, a plate extending transversely of the strand wires and provided with slots, portions of the strands adjacent to their extremities being deflected through the slots, from one side of the plate, and a retaining element located between the opposite side of the plate and said deflected portions, to thereby anchor the strand wires to the plate, the outermost edge of the plate being provided with hooks and slots which are spaced apart longitudinally of the plate and are adapted for connection to a similarly formed plate on an adjacent panel.

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