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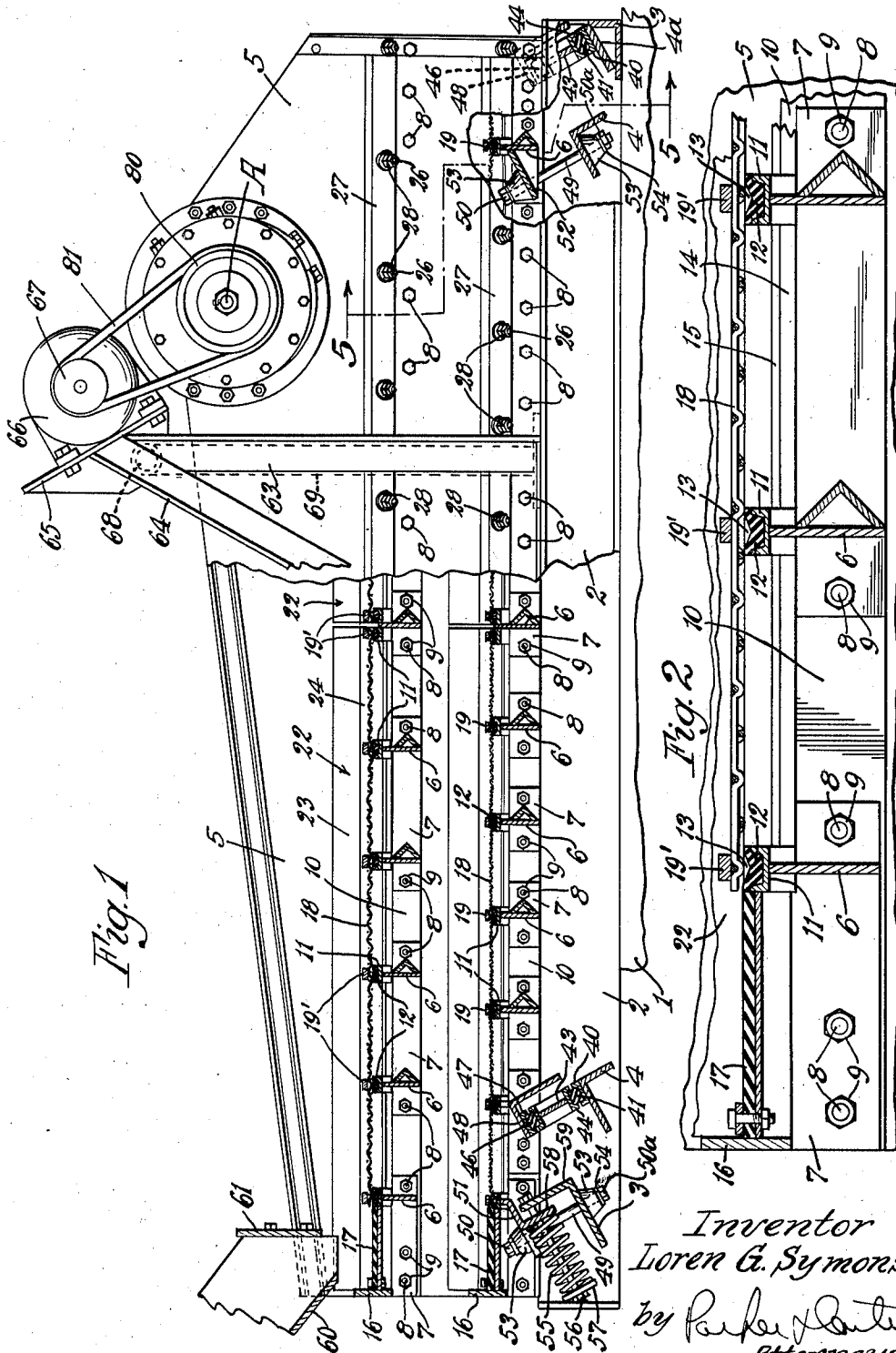
L. G. SYMONS

2,284,883

SECURING MEANS FOR SCREEN CLOTH

Original Filed Feb. 17, 1940

4 Sheets-Sheet 1



Inventor
Loren G. Symons
by Parker Porter
Attorneys.

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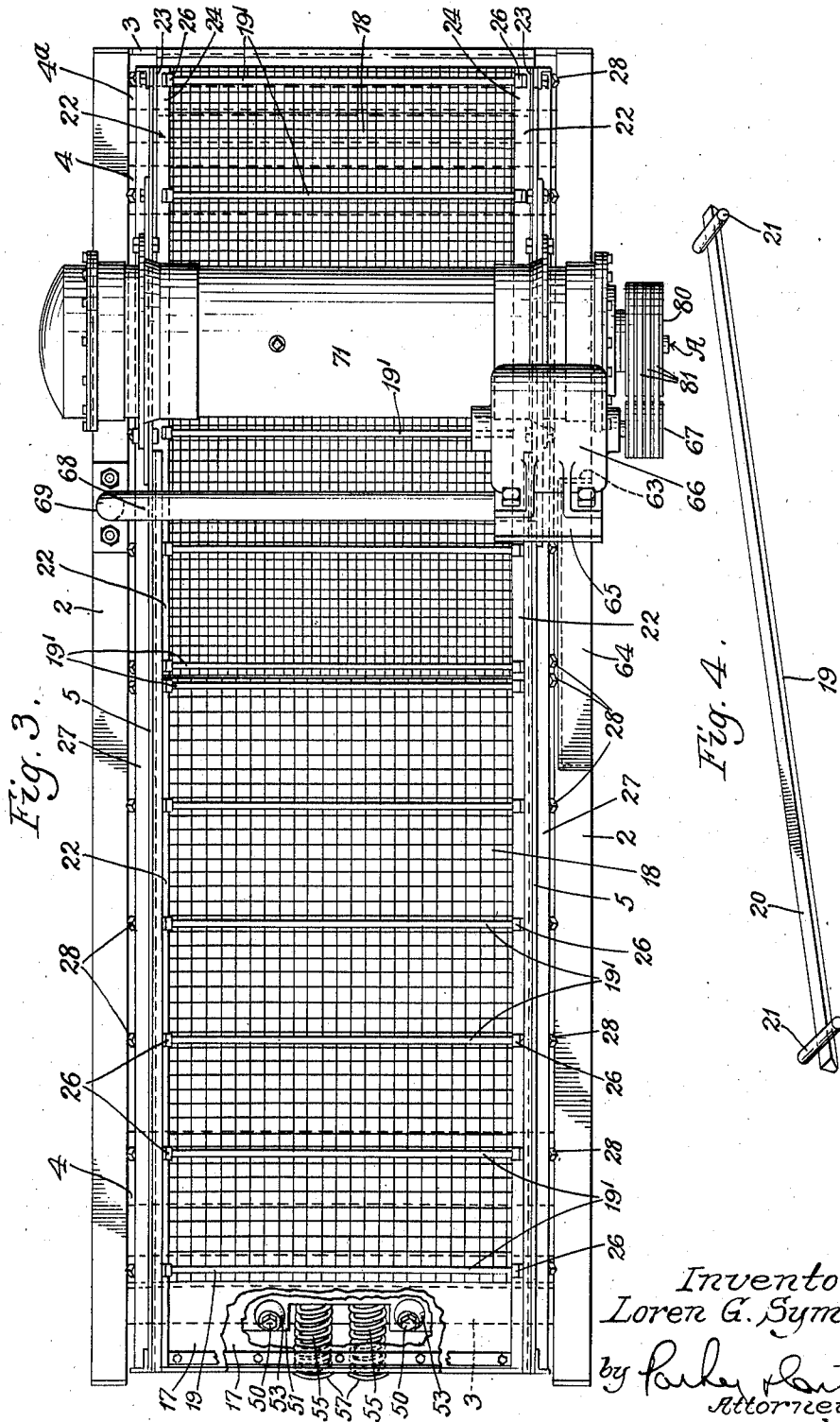
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4 Sheets-Sheet 2



Inventor.
Loren G. Symons.
by *Hubert R. Carter*
Attorneys.

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4 Sheets-Sheet 3

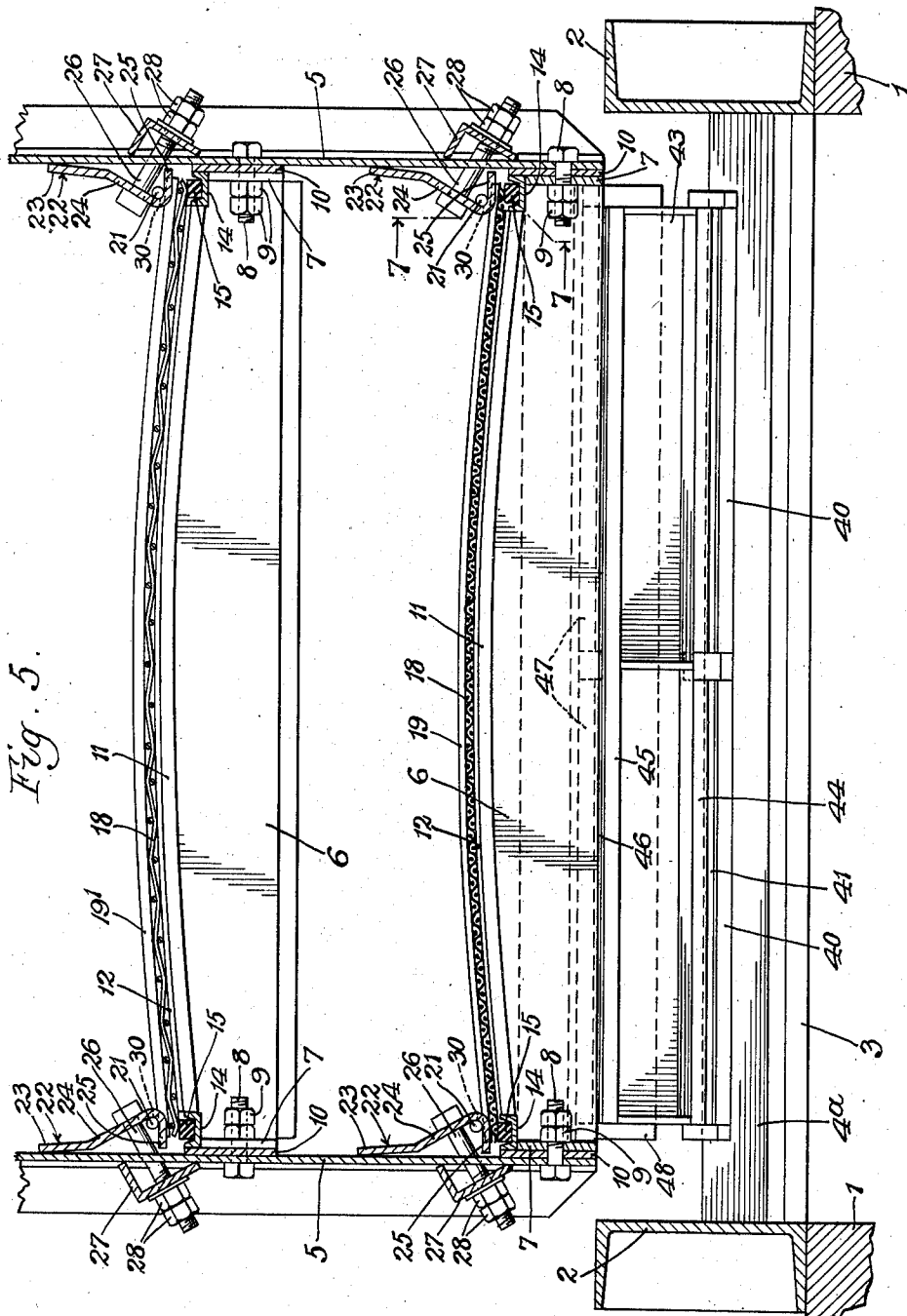


Fig. 5.

Inventor.
Loren G. Symons.
by Parker & Butler
Attorneys.

UNITED STATES PATENT OFFICE

2,284,883

SECURING MEANS FOR SCREEN CLOTH

Loren Glenn Symons, Hollywood, Calif., assignor
to Nordberg Manufacturing Company, Milwaukee,
Wis., a corporation of Wisconsin

Original application February 17, 1940, Serial No.
319,452. Divided and this application October
21, 1940, Serial No. 362,098

16 Claims. (Cl. 209—403)

My invention relates to an improvement in screens and has for one purpose the provision of an improved means for holding the screen cloth or mesh in position upon the deck.

Another purpose is the provision of means for applying tension to the screen mesh or cloth which is equally applicable, without change, to mesh of varying coarseness or fineness, from very fine screen cloth to very coarse.

Another purpose is the provision of means for permitting a very rapid application of or removal of the screen mesh or cloth from the screen deck.

Another purpose is the provision of efficient means for securing screen cloth or mesh to a deck without the necessity of any clamping means, bar means, binding, or the like, for the screen mesh itself, whereby all that is necessary so far as the mesh is concerned is to cut it to the proper length and lay it on the deck, and thereafter apply the mesh securing and tensioning means thereto.

Another purpose is the provision of means for tightening screen mesh and particularly fine screen mesh to drumhead tightness, without subjecting it to wear creating strain.

Another purpose is the provision of means for securing the screen mesh firmly in position by applying pressure thereto along the longitudinal edges and transversely thereacross.

Other purposes will appear from time to time in the course of the specification and claims.

The present application is a division of my co-pending application, Serial No. 319,452, filed in the United States Patent Office on February 17, 1940.

I illustrate my invention more or less diagrammatically in the accompanying drawings wherein:

Fig. 1 is a side elevation with parts in longitudinal vertical section;

Fig. 2 is a partial vertical longitudinal section on an enlarged scale;

Fig. 3 is a plan view;

Fig. 4 is a detail;

Fig. 5 is a section on the line 5—5 of Fig. 1;

Fig. 6 is a partial longitudinal vertical section on an enlarged scale; and

Fig. 7 is a section on the line 7—7 of Fig. 5.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, 1 indicates any suitable base upon which the screen is mounted. I illustrate a base frame which may include longitudinally extending parallel channel elements

2, 2. These channel elements may be connected by any suitable transversely extending end frame members or angles 3 and intermediate transversely extending angles 4. It will be observed that the intermediate frame elements and the left end members 3, referring to Fig. 1, are tilted somewhat from the horizontal, as shown for example in Fig. 1.

Vibratably mounted upon this base frame is any suitable deck, which may include for example parallel side plates 5, 5, which may be connected by transversely extending frame members 6, which in turn may be welded to side plates 7, which side plates may be bolted or otherwise secured to the side frame members 5, as by bolts 8 and nuts 9. 10, 10 indicate transversely extending reinforcing plates interposed between the side plates 5 and the plates 7.

Referring for example to Fig. 1, the plates 7 may be of sufficient length to carry a plurality of the transverse members 6, whereas in the lower part of the deck I illustrate shorter plates 7, each of which is shown as carrying a single transverse member 6. It will be understood, however, that this is a matter of detail and may be varied to suit conditions. It will be observed that the upper edges of the member 6 are shown as generally arcuate and as carrying upwardly extending channels 11, in which may be positioned blocks of rubber or the like 12, shown as centrally indented or concave as at 13. The purpose of the form of these blocks will later appear.

I also illustrate longitudinally extending channels 14, which may be welded or otherwise secured in relation to the plates 10 and which are made upwardly open to receive longitudinally extending rubber strips 15. I illustrate any suitable transversely extending end cross members 16.

It will be noted that at the feed end of each screening surface I illustrate generally flat horizontal rubber sheets or sections 17, which may be secured in any suitable fashion to the deck structure. 18 generally indicates the screen mesh, which may be applied, if desired, in a plurality of sections or lengths, as shown for example in Fig. 1. In order to clamp this mesh down I employ transversely extending rods 19, each of which may have a convex lower face and a flat or generally flat upper face 20. It will be understood, however, that the shape of these rods may be widely varied, but what is important is that the rod should be so shaped as to tend to penetrate or to force the mesh to penetrate

the apertures 13 in the upper surfaces of the transversely extending rubber pad 12.

Where heavy screen is employed, as shown in Fig. 2, a flat bar 19' may be employed in place of the convex surfaced bar or half round 19. Welded to each end of the members 19 or 19' are transversely extending pins 21.

In order to clamp the rods 19 or 19' against the mesh, I illustrate clamping plates generally indicated as 22, each of which has an upper edge portion 23 adapted to engage the inner face of the side plate 5 of the deck. Extending downwardly and inwardly from it is an inclined portion 24, as shown for example in Fig. 5, which terminates in an outwardly turned flange 25, adapted to overlie and engage the upper face of the mesh 18. Clamping bolts 26 extend through the portion 24 and through the side frame members or plates 5 and through inclined clamping angles 27. Any suitable means, such as nuts 28, may be employed to tighten the clamping bolts. It will be observed that the pins 21 are received in the bend formed by the members 24 and 25. Thus, when the clamping plates are tightened up, the entire rod 19 or 19' is subjected to tension and is firmly locked against the upper surface of the mesh 18. If the flat bars 19' are employed, the mesh will simply be locked against the upper surface of the members 12, engaging the upward extending edge portions, as shown in Fig. 2. If a thinner mesh is employed in connection with a downwardly concave rod 19, as shown in Fig. 6, the rod, and with it the mesh, penetrate the hollows 13 of the rubber members 12. It will be understood, of course, that in order to permit the bars 19 or 19' to pass through the clamping members, they may be slotted or cut away as at 30, as shown for example in Fig. 7.

In applying the mesh it is first superposed upon the members 12. The transversely extending bars 19 or 19' are positioned thereover, and the clamping members 22 are applied and then tightened up. In applying fine mesh, as in the form of Figs. 1 and 6, the end rods 19 may, if desired, be tensioned first, and the remaining rods may be tensioned thereafter, or this tightening may be made progressively along the extension of the mesh. In any event, the tightening or clamping action of the rods 19 firmly and evenly secures the mesh in position. The bend put on the mesh by forcing it into the hollows 13 puts a longitudinal tension upon the intermediate sections of the mesh which is independent of any longitudinal tensioning of the mesh as a whole.

It may be convenient to employ a plurality of panel sections, and I have shown two in each deck in Fig. 1.

It will be understood that the deck may be vibratably mounted in any suitable fashion and that my screen tensioning means may be applied to a wide variety of decks. As a matter of illustration I show a supporting link structure at each end. The structure shown in detail, for example in Fig. 6, illustrates one of the inclined transversely extending angles 4. A similarly inclined plate is illustrated at 4a, at the right-hand end of Fig. 1. It is understood that there is one such link structure at each end of the screen. The link structure proper is shown as including a bottom channel or abutment 40, mounted on the member 4 or 4a, and formed to receive the transversely extending rubber pad 41, which may be made in one or more sections, but which preferably extends transversely substantially or entirely across the width of the deck. The mem-

ber 41 is shown as having cutaway portions 42 at the sides.

43 is an intermediate web which carries at its lower end the channel 44, and at its upper end the channel 45. The lower channel 44 engages the upper portion of the rubber block 41. The upper channel 45 engages the lower portion of a similar rubber block 46, the upper portion of which in turn is engaged by a channel 47, which is secured to any suitable member, such as the transversely extending deck frame member 48.

Any suitable means may be employed for holding the deck down upon the base and for constraining the deck to a vibratory movement, which may be described as having a uniform radius. I illustrate for example compression bolts 49, headed at each end as at 50, 50a. The lower ends may pass, for example, through the transversely extending frame members 3, 4, on the base, whereas the upper ends pass through corresponding frame members 51, 52 on the deck. Any suitable pads 53 of yielding material may be compressed by the washers 54 against the lower faces of the members 3, 4, and the upper faces of the members 51, 52, respectively. Any suitable compression may be put upon the said compression members. It will be understood, of course, that the apertures through which the bolts 49 pass are of sufficient width to compensate for vibratory movement of the screen deck and to prevent a metal to metal contact.

I also provide means for normally tending to hold the screen in a predetermined neutral position, which preferably is a position in which the link structure, including the web 43, is generally perpendicular to the engaged faces of the members 4 and 4a. Such means may, for example, include a plurality of springs 55 mounted on the bolts 56, having end washers 57, the upper ends of the bolts passing through a web 58 on the member 51 and through a web 59 on the end member 3. It will be understood that the springs 56 resist the gravital tendency of the screen to tilt the members 43, and in effect push the deck against gravity into its predetermined neutral position, which is shown for example in Figs. 1 and 6.

Any suitable means for feeding material to the feed end of the screen may be employed. I illustrate for example a feed chute 50 with a feed limit plate 61. Any other suitable feeding means may be employed, and it will be understood that, if desired, the material may be fed simultaneously to the upper and lower deck, although such disposition is not shown in Fig. 1.

Any suitable means may be employed for vibrating the screen deck, but it will not be necessary to go into detail in connection with the vibrating means. I illustrate, for example, the following structure: Mounted upon the base is an upwardly extending frame structure, which may include for example the vertical frame element 63, the inclined element 64, the motor base 65, secured to the top thereof, the motor 66, and the drive pulley 67 thereof. As shown in Fig. 3, the motor is at one side of the screen structure, and the above described support may be stabilized or held in position by the transversely extending pipe 68, the far end of which extends down to the opposite base frame element as at 69.

80 illustrates a driven pulley, which may be driven from the motor pulley 67, as by any suitable belt structure 81, the end of which is generally indicated as at "A", and it will be understood that any suitable rotor means may be provided

within the housing 71, shown for example in Fig. 3 as extending between the side plates 5.

It will be realized that whereas I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

The use and operation of my invention are as follows:

I provide a plurality of tension rods 19, each of which may have a convex lower face and a flat or generally plane upper face 20, as shown for example in Figs. 4 and 6. Each of the rods 19 has at each end a cross bar or lateral extension 21, which may for convenience be formed of a short length of rod welded or otherwise secured thereto. It could, of course, be formed integral with the rod 19. The side clamping members 24, which extend along the deck, are notched to receive the ends of the members 19, and the transversely extending rods or pins 21 are received in the bottom toe of the member 24, as shown in Fig. 5. The lower flange 25 of the side clamp plates abut against the upper face of the edge of the screen mesh.

In applying screen cloth, and particularly fine mesh, all that is necessary is to cut the cloth the right length and lay it, either in a single sheet or separate panels, on the deck structure in such fashion that the edges rest on the rubber side pads 15 in the channels 14, and an intermediate portion rests on the transversely extending rubber pads 12. The side clamps 24 can then be dropped into place, with the rods or pins 21 hooked in. Each member 19 overlies one of the rubber transverse pads 12, which are shown as concave, as at 13 in Fig. 6, in order to receive the convexity of the lower face of the member 19. When the nuts 28 are tightened, the lower flange 25 of each side clamp 24 clamps the longitudinal edge of the screen against the rubber pad 15, and simultaneously tension is applied to the transverse rods 19, which draws them firmly downwardly against the upper face of the mesh of the screen cloth 18, and sinks the screen cloth into the concavity of the rubber pads 12, as shown in Fig. 6. Thus pressure is applied simultaneously directly to the screen edge and indirectly, through the tension on the rods, on the intermediate portions of the screen cloth, without throwing any substantial tensile strain on the cloth strip itself. The cloth may thus be applied very quickly and may be removed and changed very quickly, and no special attachments on or bending of the edge of the cloth is required. A worn section can be replaced by lapping.

The angle of the bolts 26 is important in determining the ratio of the down pressure on the edges to the pressure over the arch defined by the members 11, as shown for example in Fig. 5. The deflection of the mesh caused by its distortion to fit the concavity 13 of the pads 12 applies end to end stretch or tension of ample rigidity between adjacent pairs of supports 11.

In practice, with finer mesh, a drumhead tightness is obtained without any tensile strain on the mesh itself. This is important as, when the mesh is put under heavy tensile strain, it wears far more rapidly and may even tear. However, great tightness of the mesh or cloth is important since the vibration of the deck is im-

parted precisely to the cloth, with no looseness or whip or fluctuation. If the cloth is loose or floppy, the motion is not effective.

Note that no supplemental frame or fitting is needed for the cloth. It will be understood that the channels 14 may be made removable, an important factor in connection with two level decks, in order to permit the mesh to be dropped easily in position in the lower dack. The side bars or plates 7 may also be swung up about the pivots 8 in order to permit the cloth to be easily positioned on the lower level of the deck.

In applying the coarser mesh, such as shown for example in Fig. 2, and where the mesh cannot be and does not need to be tensioned as does the fine cloth, flat rods 19' may be substituted, but no change in the structure is necessary, as the securing means are equally applicable to the coarser cloth.

If a variation in the gauge is desired from end to end of the screen, or between the upper and lower decks, or both, no change is necessary in the securing means. All that is necessary is to cut the proper length panels of different mesh, drop them in position, set the transverse rods 19 or 19' in position, and then tighten the nuts 28 of the bolts 26.

I claim:

1. In a screen deck, side frame members, transversely extending cross members, pads of yielding compressible material mounted on said cross members, said pads having transversely extending concavities therein, said transverse supports and pads being upwardly arched across the screen deck, screen mesh superposed upon said pads, and means for securing said screen mesh in position, including convex tension members superposed on the screen mesh and aligned with said concavities, and means for applying tension to said members for thereby drawing said members and said screen mesh against said pads and into said concavities.

2. In a screen deck, side frame members, transversely extending cross members, pads of yielding compressible material mounted on said cross members, said pads having transversely extending concavities therein, said transverse supports and pads being upwardly arched across the screen deck, screen mesh superposed upon said pads, and means for securing said screen mesh in position, including convex tension members superposed on the screen mesh and aligned with said concavities, and means for applying tension to said members for thereby drawing said members and said screen mesh against said pads and into said concavities, including securing clamps having portions engaging the inner face of the side frame members and portions engaging the ends of said tension members, and means for drawing said clamps toward the inner faces of the frame members.

3. In a screen deck, side frame members, transversely extending cross members, pads of yielding compressible material mounted on said cross members, said pads having transversely extending concavities therein, said transverse supports and pads being upwardly arched across the screen deck, screen mesh superposed upon said pads, and means for securing said screen mesh in position, including convex tension members superposed on the screen mesh and aligned with said concavities, and means for applying tension to said members for thereby drawing said members and said screen mesh against said pads and into said concavities, including securing

clamps having portions engaging the inner face of the side frame members and portions engaging the ends of said tension members, and means for drawing said clamps toward the inner face of the frame members, said clamps being apertured to receive the ends of said tension members, said tension members being provided with lateral extensions adapted to be engaged by said clamps.

4. In a screen deck, side frame members, transversely extending cross members, pads of yielding compressible material mounted on said cross members, said transverse supports and pads being upwardly arched across the screen deck, screen mesh superposed upon said pads, means for securing said screen mesh in position, including convex tension members superposed upon screen mesh and aligned with said pads, and means for applying tension to said members and for thereby drawing said members and said screen mesh against said pads.

5. In a screen deck, side frame members, transversely extending cross members, pads of yielding compressible material mounted on said cross members, said transverse supports and pads being upwardly arched across the screen deck, screen mesh superposed upon said pads, means for securing said screen mesh in position, including tension members superposed upon screen mesh and aligned with said pads, and means for applying tension to said members and for thereby drawing said members and said screen mesh against said pads.

6. In a screen deck, side frame members, transversely extending cross members, screen mesh positioned above said cross members, means for drawing said screen mesh downwardly against said cross members, including individual transversely extending tension members superposed upon the screen mesh and opposed to and overlying the individual cross members, and means for individually applying tension to said members and for thereby drawing said tension members and said screen mesh against said cross members.

7. In a screen deck, side frame members, transversely extending cross members, screen mesh positioned above said cross members, means for drawing said screen mesh downwardly against said cross members, including individual transversely extending tension members superposed upon the screen mesh and opposed to and overlying the individual cross members, and means for individually applying tension to said members and for thereby drawing said tension members and said screen mesh against said cross members, said cross members being upwardly arched across the deck.

8. In a screen deck, side frame members, transversely extending cross members, screen mesh positioned above said cross members, means for drawing said screen downwardly against said cross members, including transversely extending tension members superposed upon the screen mesh, means for applying tension to said members and for thereby drawing said tension members and said screen mesh against said cross members, said cross members being upwardly arched across the deck, and side plate members located at the ends of the tension members and apertured to receive the ends of the tension members, and means for urging said side plate members apart.

9. In a screen deck, side frame members, transversely extending cross members, screen

mesh positioned above said cross members, means for drawing said screen downwardly against said cross members, including transversely extending tension members superposed upon the screen mesh, means for applying tension to said members and for thereby drawing said tension members and said screen mesh against said cross members, said cross members being upwardly arched across the deck, and side plate members located at the ends of the tension members and apertured to receive the ends of the tension members, and means for urging said side plate members apart, said tension members having convex lower portions, said cross members having concave portions opposed thereto, whereby crimping of the mesh is effected when the tension members are tightened.

10. In a screen deck, side frame members, transversely extending cross members, screen mesh positioned above said cross members, means for drawing said screen downwardly against said cross members, including transversely extending tension members superposed upon the screen mesh, means for applying tension to said members and for thereby drawing said tension members and said screen mesh against said cross members, said cross members being upwardly arched across the deck, and side plate members located at the ends of the tension members and apertured to receive the ends of the tension members, and means for urging said side plate members apart, said cross members including mesh contacting portions of flexible compressible material.

11. In a screen deck, side frame members, transversely extending cross members, screen mesh positioned above said cross members, means for drawing said screen downwardly against said cross members, including transversely extending tension members superposed upon the screen mesh, means for applying tension to said members and for thereby drawing said tension members and said screen mesh against said cross members, said cross members being upwardly arched across the deck, and side plate members located at the ends of the tension members and apertured to receive the ends of the tension members, and means for urging said side plate members apart, said cross members including mesh contacting portions of flexible compressible material, the lower faces of said tension members being convex.

12. In a screen deck, side frame members, transversely extending cross members, screen mesh positioned above said cross members, means for drawing said screen downwardly against said cross members, including transversely extending tension members superposed upon the screen mesh, means for applying tension to said members and for thereby drawing said tension members and said screen mesh against said cross members, said cross members being upwardly arched across the deck, and side plate members located at the ends of the tension members and apertured to receive the ends of the tension members, and means for urging said side plate members apart, said cross members including concave mesh contacting portions of flexible compressible material.

13. In a screen deck, generally parallel side frame members, a plurality of longitudinally spaced transversely extending upwardly arched cross members connecting said side frame members, mesh engaging contact strips of compressible material located on said cross members, and

tension members extending from side to side of the screen above the mesh and aligned with said cross members and including convex portions overlying said compressible contact members, and means for tensioning said tension members and for thereby drawing them downwardly against the mesh and into the compressible mesh supporting members.

14. In a screen deck, generally parallel side frame members, a plurality of longitudinally spaced transversely extending upwardly arched cross members connecting said side frame members, mesh engaging contact strips of compressible material located on said cross members, and tension members extending from side to side of the screen above the mesh and aligned with said cross members and including convex portions overlying said compressible contact members, and means for individually tensioning said tension members and for thereby drawing them individually downwardly against the mesh and into the compressible mesh supporting members.

15. In a screen deck, side frame members, transversely extending cross members, pads of yielding compressible material mounted on said

cross members, said pads having transversely extending concavities therein, said transverse supports and pads being upwardly arched across the screen deck, screen mesh superposed upon said pads, and means for securing said screen mesh in position, including tension members superposed on the screen mesh and aligned with said concavities, and means for applying tension to said members for thereby drawing said members and said screen mesh against said pads and into said concavities.

16. In a screen deck, side frame members, transversely extending cross members, pads of yielding compressible material mounted on said cross members, said transverse supports and pads being upwardly arched across the screen deck, screen mesh superposed upon said pads, means for securing said screen mesh in position, including tension members superposed upon screen mesh and aligned with said pads, and means for applying tension to said members and for thereby drawing said members and said screen mesh against said pads.

LOREN GLENN SYMONS.