

Nov. 15, 1938.

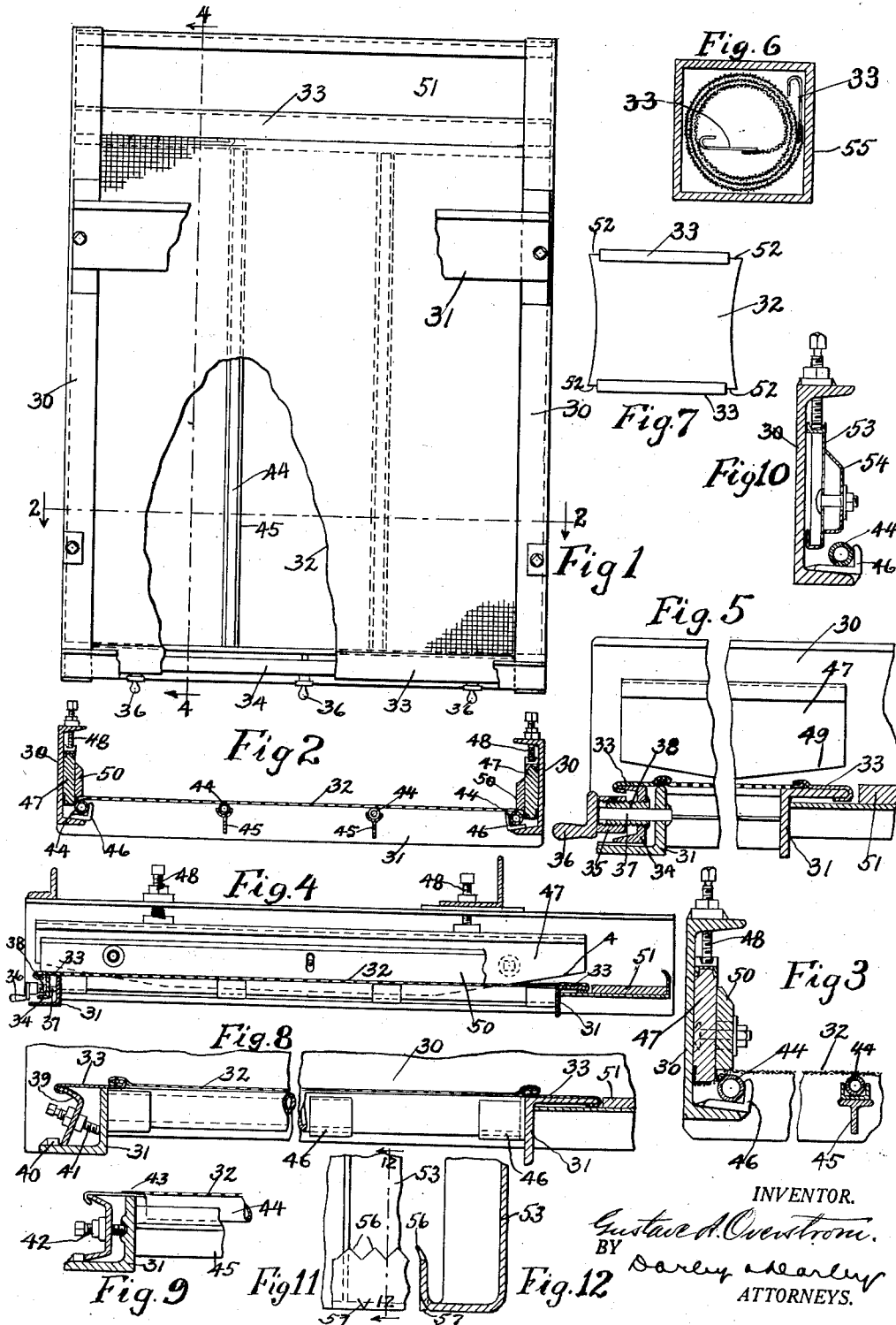
G. A. OVERSTROM

2,136,950

STRETCHING APPARATUS FOR SCREEN CLOTHS

Filed Dec. 20, 1935

3 Sheets-Sheet 1



Nov. 15, 1938.

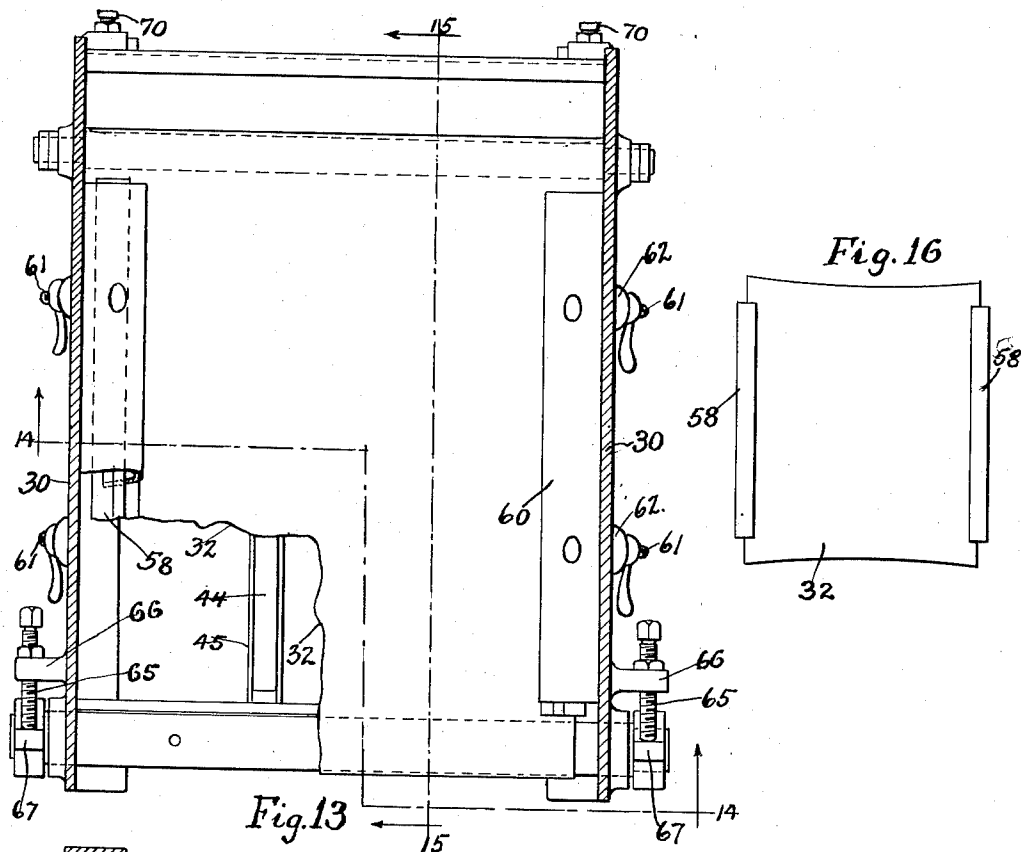
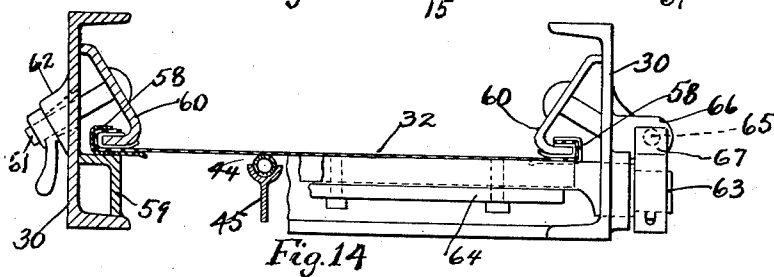
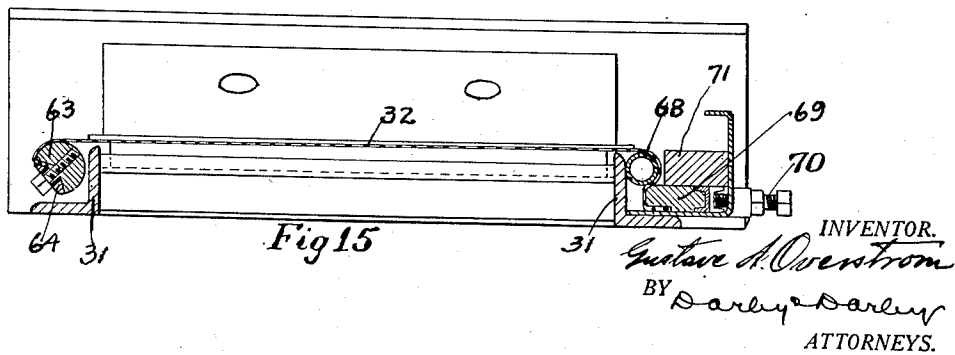
G. A. OVERSTROM

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3 Sheets-Sheet 2



INVENTOR.
Gustave A. Overstrom
BY *Darby Darby*
ATTORNEYS.

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G. A. OVERSTROM

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STRETCHING APPARATUS FOR SCREEN CLOTHS

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3 Sheets-Sheet 3

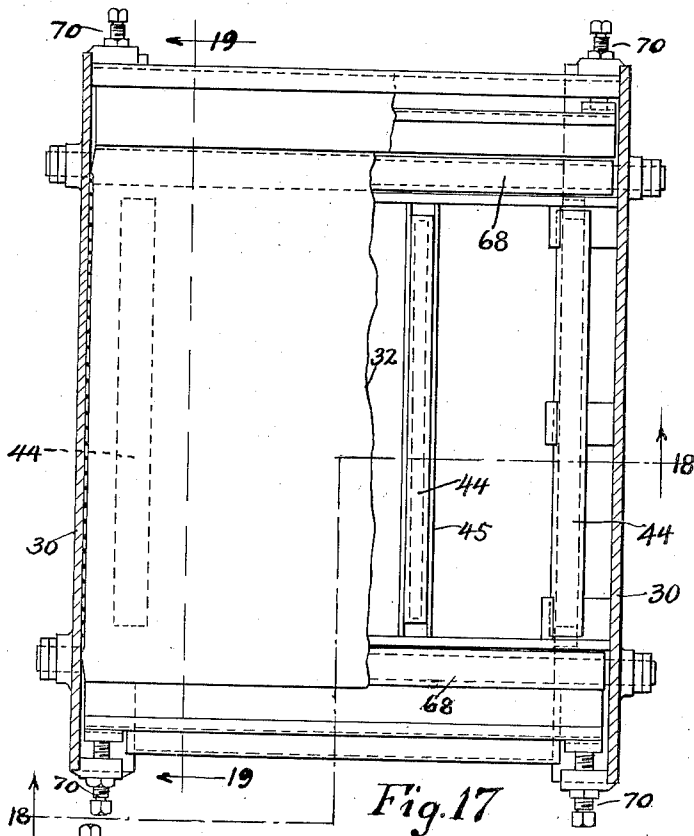


Fig. 20

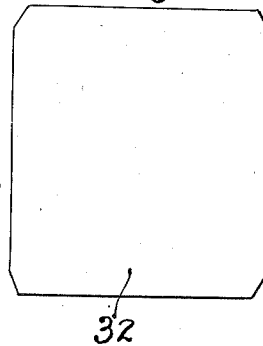
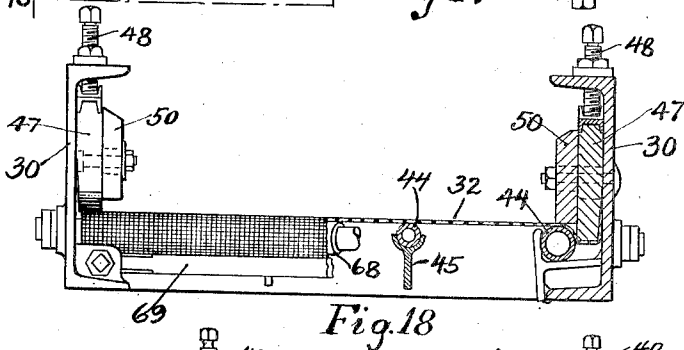
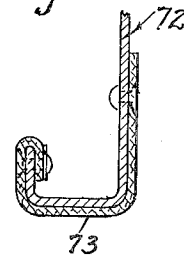
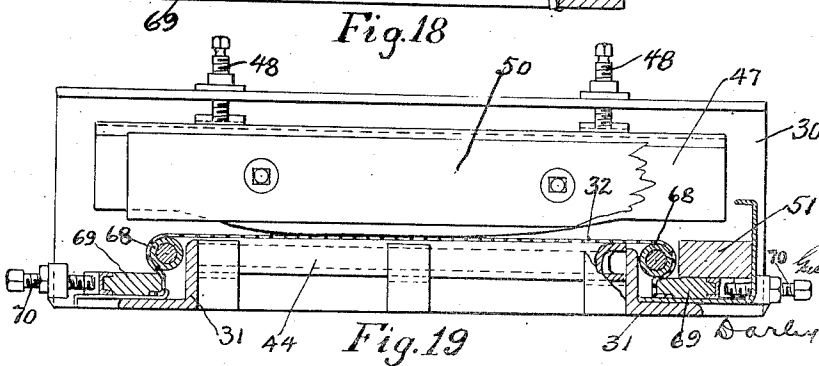


Fig. 21



INVENTOR.
Gustave A. Overstrom
Barley & Darby
ATTORNEYS.

UNITED STATES PATENT OFFICE

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STRETCHING APPARATUS FOR SCREEN CLOTHS

Gustave A. Overstrom, Big Sur, Calif.

Application December 20, 1935, Serial No. 55,350

5 Claims. (Cl. 209-403)

This invention relates to stretching apparatus for screen cloths.

The object of the invention is to provide means to efficiently stretch the screen cloth elements of screening apparatus of the vibratory type.

A further object is to provide means whereby screen cloths may be quickly, readily and easily installed in screen boxes in the field or at the location where the apparatus is in use, and by unskilled labor.

A further object is to provide means whereby screen cloths may be shipped from the factory in compact rolls and installed and properly tensioned or stretched in the screen box at the place of use of the screening apparatus.

A further object is to provide the screen boxes of vibratory screening apparatus with cloth stretching devices, as a part of the screen box equipment and structure, whereby the screen cloth may be applied thereto in the field, and quickly and efficiently stretched both longitudinally and transversely.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location, relative arrangement and cooperation of parts, all as will be more fully hereinafter set forth, as illustrated in the accompanying drawings and finally pointed out in the appended claims.

In the practical use of vibratory screen structures it becomes necessary to frequently replace the screening element or cloth in the screen box since that element is subjected to the destructive whipping action stresses, and strains of usage, and wear out or break down very quickly. In the installation or replacement of the screen element it is of vital importance to properly stretch or tension the cloth both longitudinally and transversely, otherwise there is not only a failure to secure efficient screening action but also the wear and tear of use becomes excessive, thereby quickly resulting in breakage requiring replacement of the cloth. It is a common practice to fabricate the screen elements or cloths at the factory and ship them to the user by whom they are installed in the screen box. This replacement usually is required at the location in the field where the apparatus is in use. Ordinarily the field operation of the apparatus is in charge of unskilled mechanics or laborers who are not competent to effect the replacement of the cloth in the screen box. This causes serious delays and interruptions to the screening operations with consequent expensive loss of time and use

of the apparatus. Moreover, according to the present practice, the screen cloths are frequently supplied with metal binder strips along their ends and sides which are intended to maintain the cloth under the desired tension in both directions, the stretching being accomplished at the fabricating plant before or during the application of the binder strips, so that further tensioning of the cloth is not required when a replacement in a screen box is to be made. This practice necessitates the shipment of the tensioned cloths in the flat, and usually crated, especially in the case of extra or spare cloths. In this form of package advantage cannot be taken of the lower transportation rates and quick deliveries of the parcel post, because of the size and bulk of the crated packages.

It is among the special purposes of my present invention to provide the screen box with simple and efficient devices by which screen cloths may be mounted in said box and properly and efficiently tensioned or stretched both longitudinally and transversely even by unskilled labor in the field, and whereby the screen cloths may be rolled into a compact roll capable of being encased in a suitable carton and shipped from the factory by parcel post, and at a greatly reduced cost of transportation. It will be understood, of course, that binder strips may be applied in the factory to one or both edges, or to one or both ends, and then formed into a roll and transported as above indicated.

Referring to the accompanying drawings,—

Fig. 1 is a view in top plan, parts broken out, of a screen box having means to apply a transverse tension to each of the two side edges of the cloth, and means also to apply a longitudinal tension to one end.

Fig. 2 is a view in vertical transverse section on the line 2, 2, Fig. 1.

Fig. 3 is a broken, enlarged view in vertical transverse section on the line 2, 2, Fig. 1 through one of the side edges of the screen frame.

Fig. 4 is a view in vertical longitudinal section on the line 4, 4, Fig. 1.

Fig. 5 is a broken view similar to Fig. 4, upon a larger scale.

Fig. 6 is a view in transverse section of a screen element or cloth in a roll and enclosed in a carton or casing ready for shipment.

Fig. 7 is a view in diagrammatic plan of a screen element or cloth showing binder strips applied to the ends thereof.

Fig. 8 is a broken view in longitudinal section, similar to Fig. 4, illustrating a slightly modified

structure for tensioning or stretching the screen cloth in the direction of its length.

Fig. 9 is a broken detail view in vertical section through the end of the screen box showing another modified structure for tensioning or stretching the screen cloth longitudinally.

Fig. 10 is a view in vertical transverse section through the side edge of a screen box showing a slightly modified structure for transversely stretching a screen cloth.

Fig. 11 is a broken detail view in side elevation of the form of stretching element shown in Fig. 10.

Fig. 12 is a view in section on the line 12, 12, Fig. 11.

Fig. 13 is a view similar to Fig. 1, illustrating a screen box having means for stretching the screen cloth longitudinally as well as transversely, the cloth being provided with binders along its side edges.

Fig. 14 is a view in transverse section on the line 14, 14, Fig. 13.

Fig. 15 is a similar view on the line 15, 15, Fig. 13.

Fig. 16 is a diagrammatic view in plan of a screen cloth having binders applied to its side edges, and adapted to be stretched both longitudinally and transversely by the apparatus shown in Figs. 13, 14 and 15.

Fig. 17 is a view similar to Fig. 1 of a screen box structure having devices for stretching a screen cloth both longitudinally and transversely, the cloth having no binder strips for either sides or ends.

Fig. 18 is a view in section on the line 18, 18, Fig. 17.

Fig. 19 is a similar view on the line 19, 19, Fig. 17.

Fig. 20 is a diagrammatic plan view of a screen cloth having no binder strips, and adapted to be stretched both longitudinally and transversely by the structure shown in Figs. 17, 18 and 19.

Fig. 21 is a broken detail view in transverse section of a modified tensioning or stretching element embodying my invention.

It will be understood that the screen cloth, although the most fragile of all the vital elements of a vibratory screen structure is subjected to the greatest degree of shock and jar when the screening operation is in progress. This is due to the fact that the cloth must support the weight of the material being treated and must also be subjected to violent whipping and rebounding movements produced by the means which impart vibratory action to the screen box. It is important, therefore, that the cloth be maintained under tension, both longitudinally and transversely, so as to reduce as much as possible the destructive action thereon of the load and the vibratory movements to which it is subjected, and also enable it to accomplish the very essential function of efficient screening action.

In the accompanying drawings I have shown various forms of screen cloth tensioning devices applied to screen boxes to secure the proper stretching action under varying conditions.

Referring particularly to Figs. 1, 2, 3, 4 and 5, I have shown a screen box structure equipped with means for tensioning or stretching a screen cloth both transversely and longitudinally, where the cloth is provided with binders along the ends thereof, as indicated in Fig. 7. In this arrangement the screen box may be of any desired or suitable structure. As shown this box consists of side members 30 and cross members 31, suitably connected together, thereby constituting a frame

within which the screening element or cloth 32 is to be mounted. The screen cloth, in this instance, is provided with a binder strip 33 applied along each end thereof, and attached thereto by welding or otherwise. With this form of screen cloth the tensioning of the cloth, longitudinally, offers no serious difficulty. The binder strip 33, at one end of the cloth is engaged over, a flange or edge of a box frame cross member 31, see Fig. 5, while the strip at the other end is similarly engaged over the flange or edge of a movable cross member 34. By adjustably sliding the member 34, in a direction away from the cross member 31, the desired longitudinal tensioning of the cloth is accomplished. One simple means to slidably adjust the member 34 is shown in Figs. 4 and 5, wherein a threaded sleeve 38 is attached to the slide member 34, and is engaged by a correspondingly threaded socket 35 having a handle 36 by which it may be rotated. A stud 37 connected to the box frame cross member 31, extends through the sleeve 38 and forms a limit stop for the socket 35. By rotating the socket 35, the desired sliding adjustment of the member 34 is accomplished thereby attaining the desired longitudinal tensioning of the screen cloth. These adjusting devices may be located at various points along the length of the cross members 31.

In Fig. 8 I have shown a slightly modified arrangement for tensioning the cloth longitudinally, wherein the binder strip 33 at one end of the cloth engages over the edge or flange of a rocking plate 39 which fulcrums about a stop 40, on the box frame cross member 31. Adjusting nuts on a threaded bolt 41 engaging the member 39 serve to effect the desired cloth tensioning adjustments. The screw bolt 41 takes endwise bearing against the cross member 31.

A similar arrangement is shown in Fig. 9 wherein the adjusting screw bolt 42 bearing against the box member 31, effects the desired longitudinal tensioning of the cloth. In this view the binder 33 is shown welded to the cloth, 32, as indicated at 43.

The body of the screen cloth may rest upon any suitable or convenient support carried by the box frame. I have shown supports for this purpose consisting of tubular members 44, which, in the arrangement shown, are carried in brackets 45. These tubular members may be of any desired material, metal pipes, rubber tubes or the like, or even solid rollers. If tubular supports be employed their ends should be closed to prevent water, sand, or other parts of the material under treatment, from entering the same, to cause rotting, rust, or the like, and, if desired, the tubular supports may be inflated with air or other medium to secure a desirable yielding support of the cloth, thereby relieving the same of destructive shocks. The screen supports are shown as extending lengthwise of the screen box, but it is obvious that, if desired, they may extend transversely. The extreme side supports 44, are shown as being held by retainers 46 mounted upon, and secured to the side members 30 of the box frame. In order to stretch the screen cloth transversely where the side edges thereof are not supplied with binders, I mount stretcher bars 47 to extend longitudinally of the screen box side members 30, and to slide vertically thereon. When the screen cloth is placed in position within the screen box frame, its side edges are extended over and outwardly beyond the extreme side supports 44. The stretcher bars 47, one at each side of the screen box, are then forced downwardly upon the

edge portions of the screen cloth which extend outwardly beyond the adjacent side supports 44. This movement of the stretcher bars causes the lower edges of said bars to engage the extending edge portions of the cloth and exert thereon a pull or stretching action tending to pull the same over the adjacent supports and to stretch the cloth transversely, the extreme edges of the cloth being received and held between the opposed surfaces of the stretcher bars and box side members, as clearly shown in Figs. 2 and 3. The stretching movements of the bars 47, may be effected in many different ways. A simple arrangement is shown wherein adjusting screws 48, are tapped through an upper flange of the screen box side member 30, and engage the upper edge of the stretcher bar. These adjusting screws are placed at desired intervals along the side members 30. In order to facilitate the stretching and clamping action of the stretcher bars 47, I prefer to bevel off the lower edges of said bars at the ends thereof, as indicated at 49. By this arrangement I am enabled to exert a smooth even stretching action upon the screen cloth, transversely thereof, and no great amount of skill is required to properly lay the cloth in position and then to turn up on the adjusting screws. Hence this work may be accomplished in the field by the unskilled labor usually available, and the replacement of a worn out or injured screen cloth effected quickly and easily. If desired, and in order to exclude water, or particles of the material under treatment, from the space occupied by the edge portions of the screen cloth, I mount liners 50 upon the inner faces of the stretcher bars 47. These liners fit down upon the screen cloth where it overlies the adjacent edge supports 44, and excludes access of water, or material to the edge portions of the screen cloth. At the end of the screen cloth remote from the stretching devices 36, a filler strip or plate 51 may be placed transversely across the screen box to prevent the material from gaining access to the space beneath the end of the screen cloth. In practice I prefer to terminate the binder strips short of the full width of the screen cloth, as indicated at 52, so as to leave sufficient extents of free side edge portions of the cloth to enable said free portions to extend outwardly and beyond the adjacent supports 44, to be engaged by the stretcher bars.

In Fig. 10 I have shown a slightly modified structure of stretcher devices. In this arrangement the stretcher bar 53 and the associated liner 54 are formed of suitably shaped metal sheets. In this case I prefer to form the outwardly and upwardly turned lower flange of the stretcher bar with teeth or prongs 56, 57 to enable said bars to more effectively engage the screen cloth and to be retained in adjusted position.

In Fig. 6 I have shown a screen cloth having end (or side) binder strips 33 and formed into a roll which is enclosed in a box or carton 55, ready for shipment.

In Fig. 16 I have illustrated a screen cloth having binder strips 58 applied to the side edges thereof; and in Figs. 13, 14 and 15, I have shown a structure of screen box equipped with devices for properly stretching such a cloth both longitudinally and transversely. In this case the edge binder strips 58, are channel shaped, and when the screen cloth is placed within the box frame, preparatory to stretching it, the side edges, with the binder strips applied thereto, are rested upon supporting bars 59. A tension plate 60, one at

each side edge of the cloth, is formed with a flange at the lower edge thereof, which is engaged in the open channel of the binder strip. The upper edge of each binder strip bears against the inner surface of the screen box side member 30. An adjusting screw 61, tapped through a lug 62 on the side member 30, engages the tension plate 60 and when turned up draws the lower edge of said plate outwardly, thereby stretching the screen cloth transversely. The longitudinal stretching of the cloth may be effected in various ways. I have shown a slightly different stretching means for each end of the cloth. At one end the cloth is led around an axially rotatable roller 63 which is kerfed longitudinally, the extremity of the cloth being received and clamped in the kerf by means of clamp strip 64. See Fig. 15. The roller 63 may be rotatively moved in many different ways. A simple arrangement is shown wherein threaded bolts 65 are tapped through lugs 66 on the side frame members 30, and bear against radial lugs 67 secured to the roller 63. By rotatively moving the roller 63, the desired stretching of the cloth is effected. The same cloth stretching structure may be applied at the opposite end of the cloth. I have shown a structure at that end, however, which is similar to that above described with reference to Figs. 2 and 3, but having a slightly different arrangement. In this case the screen end is led over a roller support 68, and is engaged by an adjustably slidable stretcher bar 69 which is actuated by set screws 70. A filler block 71 is disposed over the stretcher bar.

In Fig. 20 I have illustrated a screen cloth without any edge binders, and in Figs. 17, 18, and 19, I have shown a screen box equipped with stretching devices capable of effecting both longitudinal and transverse stretching action thereon. In order to effect the transverse stretching of the screen cloth I have shown a structure for each end edge of the cloth similar to that described in connection with the right hand end of Fig. 15, and consisting of a roller support 68, over which the end edge of the cloth is led, and a slidably adjustable stretcher bar 69 engages said edge and is adjusted horizontally upon the end member of the screen box, by means of set screws 70. The same stretching devices are applied to each end of the cloth. I have also shown the same structure of stretching means, for each side edge of the screen cloth, as that shown in and described in connection with Figs. 2 and 3, employing the same stretcher bars 47, adjusting screws 48, filler bar 50 and edge supporting roller or member 44.

The stretcher bar 47, 69, may be of wood, or metal, or other suitable material; or it may be of sheet metal formed into channel shape, as shown at 53, Figs. 10, 11 and 12. In Fig. 21 I have shown a form of stretcher bar, which in some cases I prefer to employ, wherein a sheet metal plate 72 is bent into channel shape, and is faced with a lining 73 of suitable yielding material, such as rubber, leather, cloth or other fabric, whereby when the stretcher bar is adjusted into tensioning position the mesh of the screen with which said facing contacts will more or less imbed itself into the facing thereby securing a more efficient stretching grip upon the cloth.

From the foregoing description it will be seen that I provide, in various forms of embodiment, a simple structure of cloth tensioning devices, which are incorporated into the screen box structure and supplied along with the box ready for

use in the field or wherever the screening apparatus is to be installed or operated, and wherein a worn or injured screen cloth may be readily and easily removed and replaced with a new one at the place of installation or use of the apparatus, and by unskilled labor, thereby enabling such replacement to be effected without substantial loss of time or interruption of the screening operation. It will also be seen that I am enabled to ship spare screen cloths from the factory in rolled up condition, and in comparatively small packages, thereby greatly reducing the time and cost of transportation.

Having now set forth the objects and nature of my invention, and various forms of embodiment thereof, it is to be understood that I do not wish to be limited or restricted, in the broader scope of my invention, to any specific details of structure. But what I claim as new and of my own invention is,—

1. The combination with a screen box, including side walls and a screen cloth, of a pair of transversely curved supports positioned in the screen box parallel to and spaced from the side walls, members slidably mounted on the inner faces of the side walls, and means for moving said members parallel to said side walls to project one side of said members into and out of the spaces between the supports and side walls, said members being substantially rectangular in cross-section and having a thickness substantially equal to the distance between each support and its adjacent side wall, the screen cloth extending between and overlying the supports having its edges lying between the side walls and said members, whereby when the members are moved into said spaces the screen cloth has no relative movement with respect to said members and is tensioned between said supports.

2. The combination with a screen box including side walls and a screen cloth, of a pair of transversely curved supports spaced from and parallel to the side walls, members slidably mounted adjacent the inner faces of the side walls, and means for moving said members parallel to said side walls to project one side of said members into and out of the spaces between the supports and side walls, said members being substantially rectangular in cross-section and having a thickness substantially equal to the distance between each support and its adjacent side wall, the screen cloth extending between and overlying the supports with its edges lying between the side walls and members whereby when the members are moved into said spaces the screen cloth will be forced into the space between said supports and members and drawn taut between said supports, the contacting edges of the members being so formed as to first engage the cloth intermediate their ends.

3. The combination with a screen box including side walls and a screen cloth, of a pair of

transversely curved supports parallel to and spaced from the side walls, members slidably mounted adjacent the inner faces of the side walls, and means for moving said members parallel to said side walls to project one side of said members into and out of the spaces between the supports and side walls, said members being substantially rectangular in cross-section and having a thickness substantially equal to the distance between each support and its adjacent side wall, the screen cloth extending between and overlying the supports with its edges lying between the side walls and members whereby when the members are moved into said spaces the screen cloth will be forced into the space between said supports and members and drawn taut between said supports, said members being wider in their direction of movement intermediate their ends so as to first engage the cloth intermediate their ends.

4. The combination with a screen box, including side walls and a screen cloth, of a pair of transversely curved supports parallel to and spaced from the side walls, a pair of crossbars supported adjacent the ends of the cloth, a pair of transversely curved supports spaced from said cross-bars, members slidably mounted on the inner faces of said side walls and said cross-bars, and means for moving said member parallel to the respective side walls and cross-bars to project one side of said members into and out of the spaces between the side walls and adjacent supports and cross-bars and adjacent supports, said members being substantially rectangular in cross-section and having a thickness substantially equal to the distance between each support and its adjacent side wall and cross-bar, the screen cloth extending between and overlying the supports having its edges lying between the side walls and adjacent members and cross-bars and adjacent members, whereby when the members are moved into said spaces the screen cloth is drawn taut between said supports.

5. The combination with a screen box, including side walls and a screen cloth, of a pair of transversely curved supports positioned in the screen box parallel to and spaced from the side walls, members slidably mounted on the inner faces of the side walls, and means for moving said members parallel to said side walls to project one side of said members into and out of the spaces between the supports and side walls, said members having a uniform thickness substantially equal to the distance between each support and its adjacent side wall, the screen cloth extending between and overlying the supports having its edges lying between the side walls and said members, whereby when the members are moved into said spaces the screen cloth has no relative movement with respect to said members and is tensioned between said supports.

GUSTAVE A. OVERSTROM.