

T. J. STURTEVANT.

SCREEN.

APPLICATION FILED FEB. 6, 1917.

Patented Sept. 2, 1919.

3 SHEETS—SHEET 1.

1,314,547.

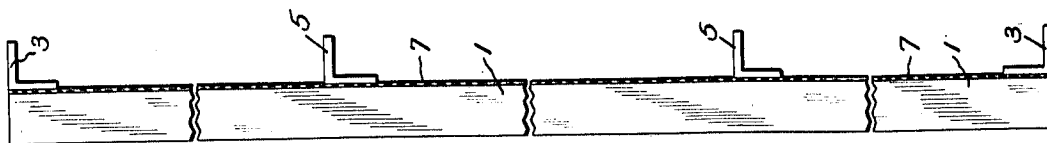


Fig. 5.

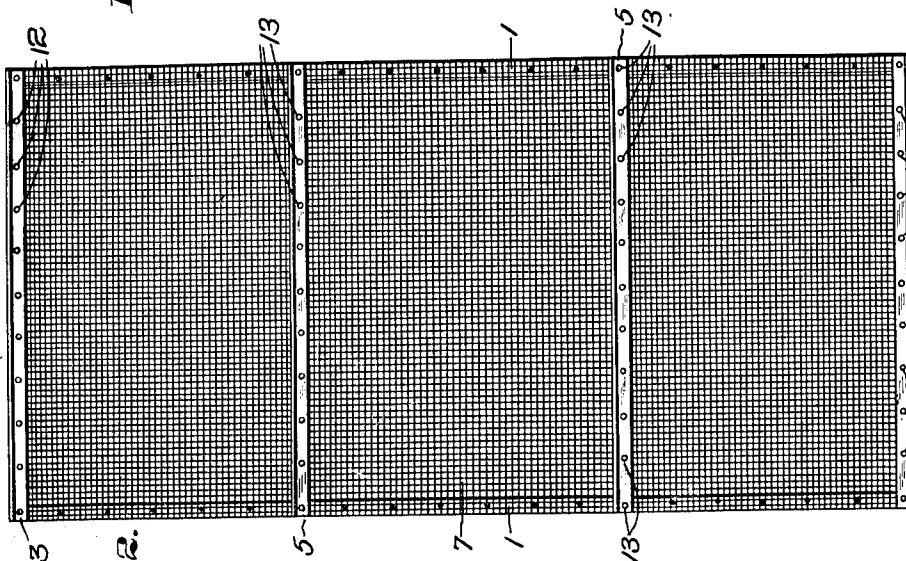


Fig. 2.

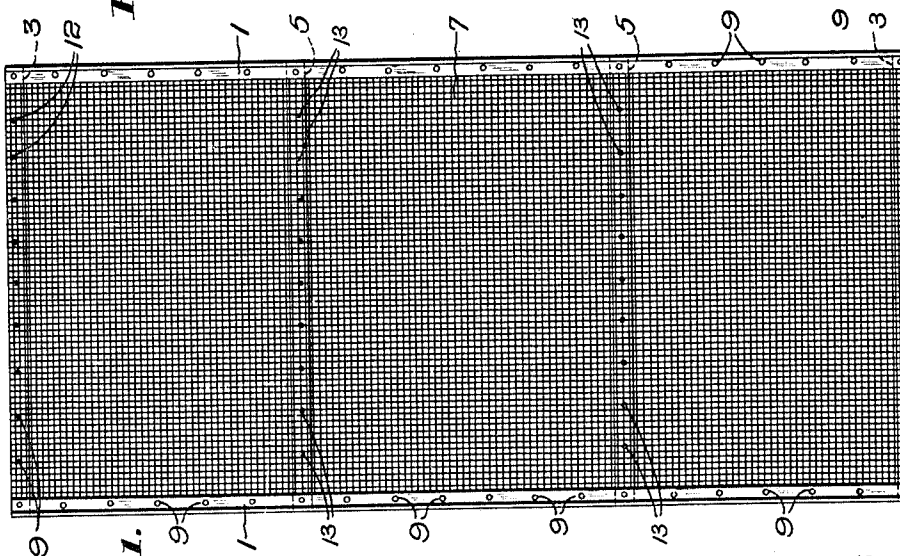


Fig. 1.



Fig. 4.

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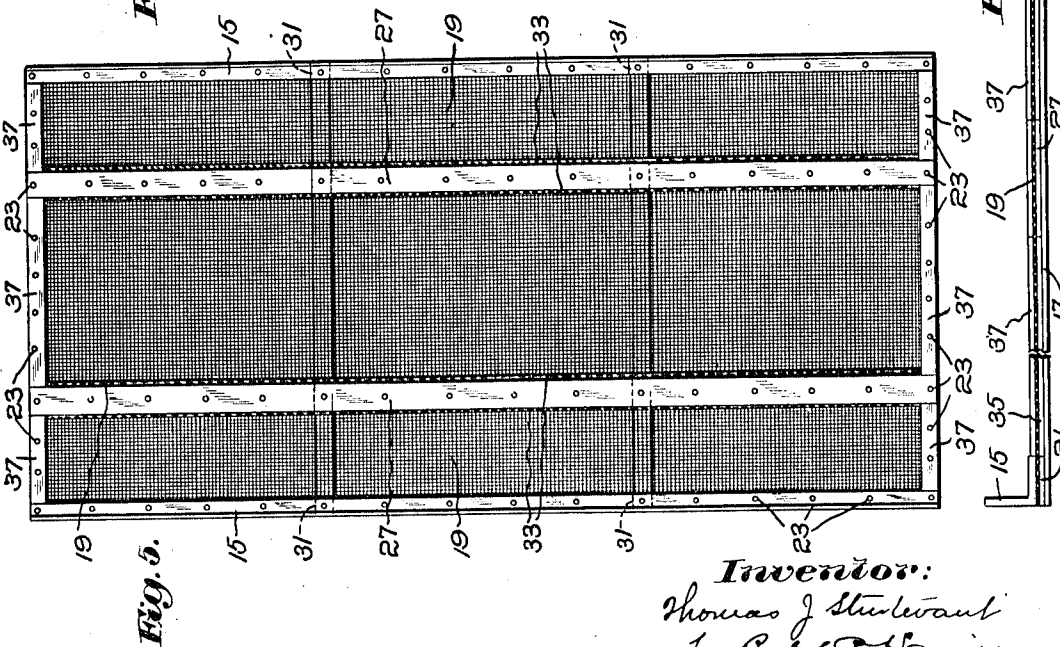
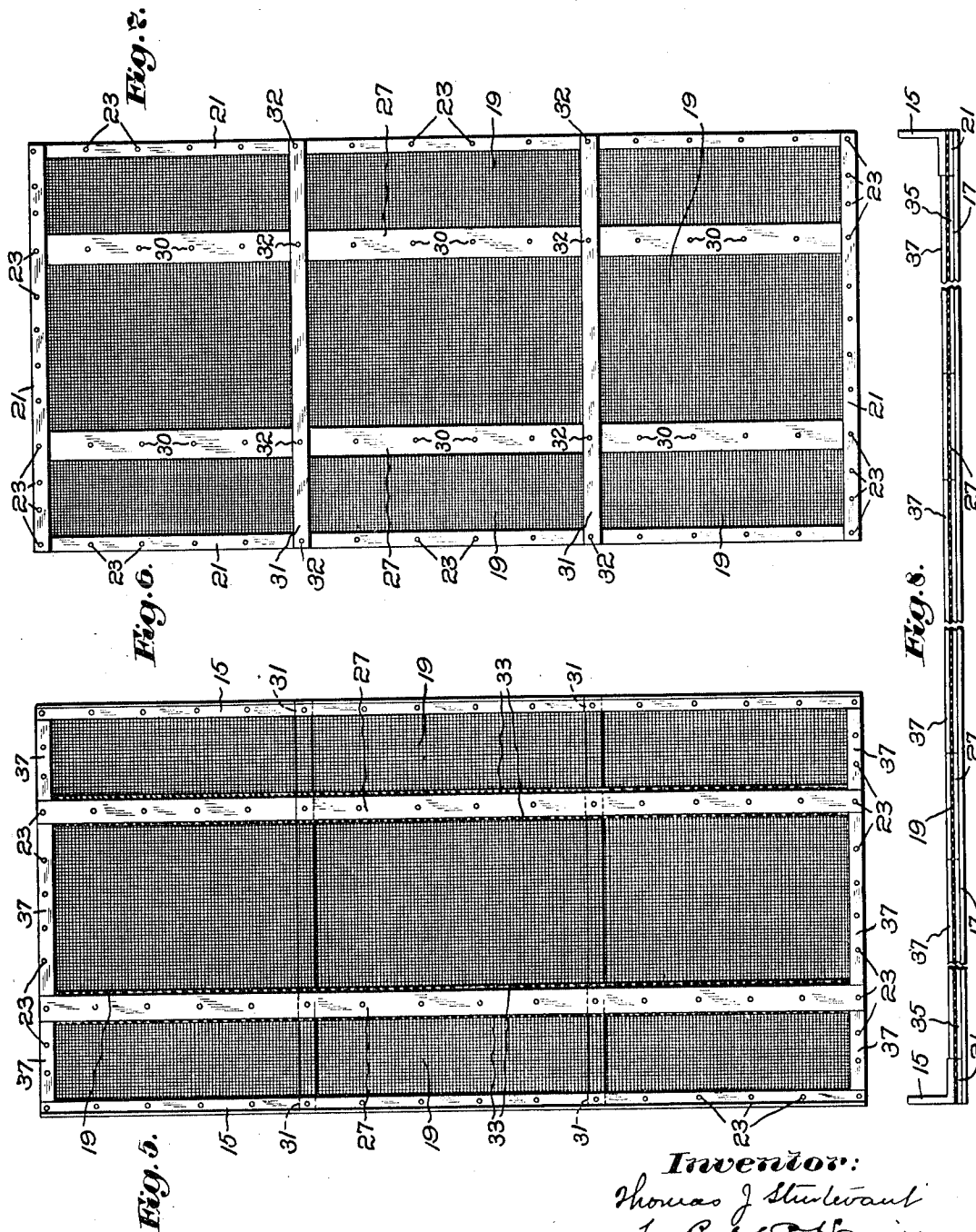
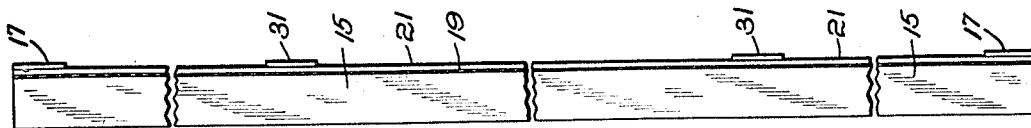
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3 SHEETS—SHEET 2.

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3 SHEETS—SHEET 3.

Fig. 9.

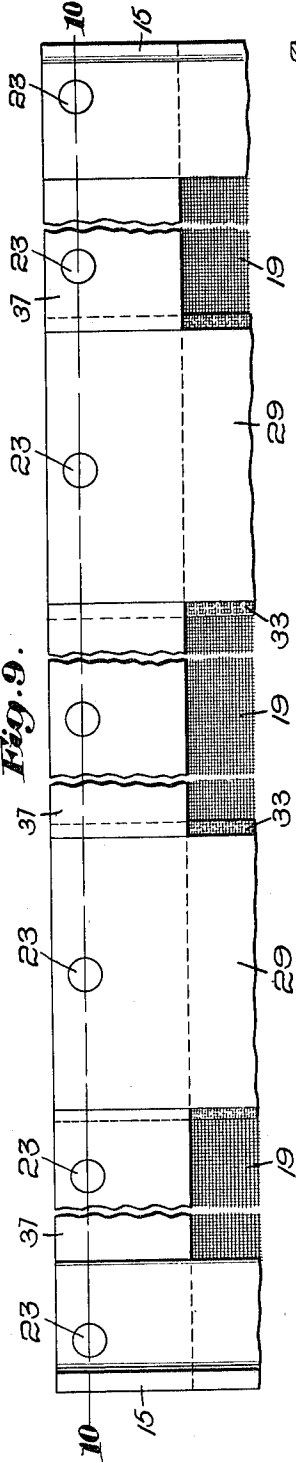


Fig. 10.

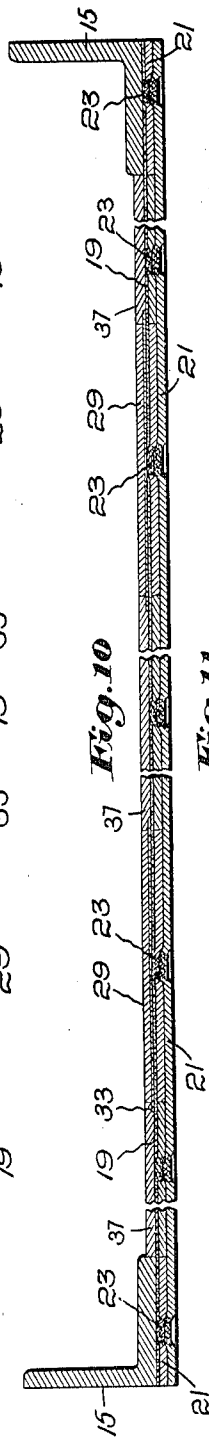


Fig. 11.

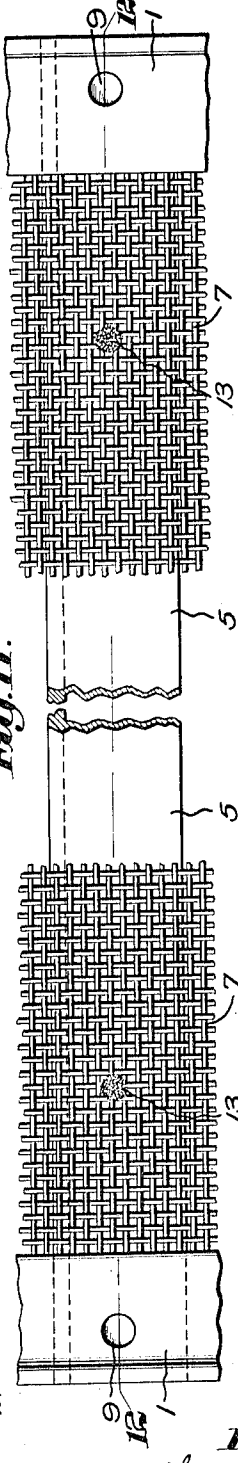
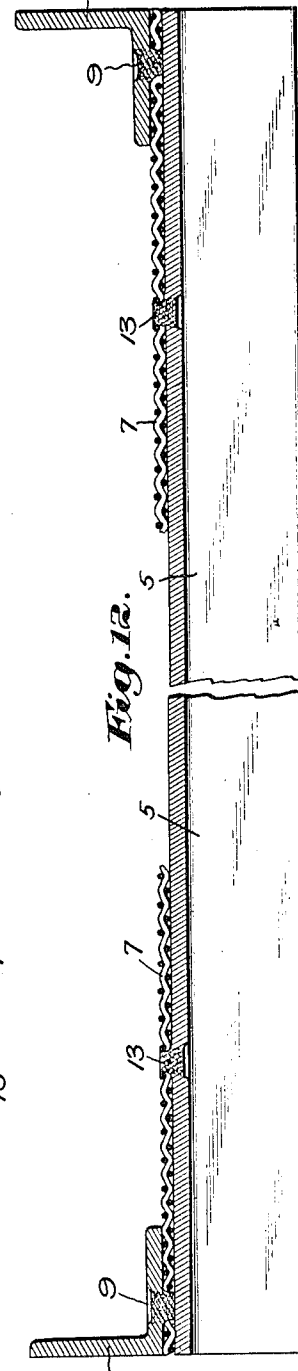


Fig. 12.



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UNITED STATES PATENT OFFICE.

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SCREEN.

1,314,547.

Specification of Letters Patent.

Patented Sept. 2, 1919.

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To all whom it may concern:

Be it known that I, THOMAS J. STURTEVANT, a citizen of the United States, residing at Wellesley, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Screens, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The invention to be hereinafter described relates to screens for grading materials, and more particularly to the type of screens employed in separators and acted upon by a jarring or vibrating mechanism to cause material to be graded to pass readily through the screen.

A usual form of screen hitherto used for this purpose comprises a rectangular metal frame having metal screen clothing stretched thereon and secured thereto by a multiplicity of rivets distributed at close intervals along the frame. These have been found to be objectionable for a number of reasons. Among others, manufacture of these screens was a very expensive process. A multiplicity of holes had to be located and drilled in the frame; the drilling of the holes consumed much time; the drills frequently became broken and required replacement; a great many rivets had to be used; the multiplicity of rivets in each frame had to be manually individually inserted in the holes in the frame; and the ends of the rivets had to be headed over individually and progressively in the riveting machine. All of this entailed great expense in time and labor and even then the rivets did not secure the screen to the frame with the desired tightness.

In use, the weight of the material to be graded on the screen, and the constant pounding and vibrating of the screens at points thereon intermediate the frame boundaries tended to pull the screen clothing from the rivets and to tear and cause it to bulge or sag objectionably downward. One object of the present invention is to cheapen greatly the cost of manufacture of the screen; another is to secure the screen clothing more tightly to its frame than hitherto; and still another object of the invention is to so weld the screen clothing to the frame that they are in effect an integral whole.

The character of the invention may be best understood by reference to the following descriptions of two good forms of the invention shown in the accompanying drawings, wherein:

Figure 1 is a plan of one form of screen embodying the invention;

Fig. 2 is a bottom view of the screen;

Fig. 3 is an end elevation, on an enlarged scale, of the screen shown in Fig. 1;

Fig. 4 is a side elevation, on an enlarged scale, of the screen shown in Fig. 1;

Fig. 5 is a plan of another form of screen embodying the invention;

Fig. 6 is a bottom view of the screen shown in Fig. 5;

Fig. 7 is a side elevation, on an enlarged scale, of the screen shown in Fig. 5;

Fig. 8 is an end elevation on an enlarged scale, of the screen shown in Fig. 5;

Fig. 9 is a plan of an end portion of the screen shown in Fig. 5;

Fig. 10 is a vertical transverse section taken on the line 10—10 of Fig. 9;

Fig. 11 is a plan on an enlarged scale, of a portion of the screen shown in Fig. 1; and

Fig. 12 is a vertical section taken on the line 12—12 of Fig. 11.

Referring to the drawings, and more particularly to Figs. 1 to 4, 11 and 12: The form of the invention shown therein comprises a frame of steel or other suitable metal, including longitudinal side frame members 1 of angle or other suitable form, and connected by transverse end members 3, of angle or other suitable form. The longitudinal side members may be stiffened by transverse stays 5 of angle or other suitable form, connected thereto at points intermediate the ends of the frame.

Preferably the end frame members are secured to the longitudinal members so that the flanges 3^a and 3^b of said end members are beneath the plane of the lower flanges of the longitudinal members, as will be noted in Fig. 4, thereby preventing obstruction to the free flow of material along and off from the end of the screen clothing.

Screen clothing 7 is stretched on the frame, and shown herein as a fabric woven from large gage wire (Fig. 11) with meshes of substantial size, suitable for grading coarse material.

Next will be described the new and improved means for securing the screen cloth-

ing to the frame. To accomplish this after the screen clothing is stretched and held taut on the frame, they are introduced into a welding machine which may conveniently be
 5 a well-known electrical spot-welding machine. The parts to be welded are placed between the electrodes of the welding machine and the electric current turned on either by hand or automatically, whereupon
 10 the metal of the parts included between the electrodes becomes heated to the welding point, at which time the metal is soft and that of the two parts readily caused to combine and integrate, the one with the other
 15 to thus form an integral union of the two. When the metals of the frame and screen are at welding heat, and consequently soft, the electrodes are forced in a direction of approach, the result being that the metal of
 20 the frame flows into the mesh of the screen, fills the mesh at the spot welded and forms a flush and positive union, not only with the metal strips or wires of the screen by integral
 25 union therewith, but by distribution of the metal throughout the mesh of the screen at the welded point. It is preferable to form the weld by electrodes of different size, one being smaller than the other, the effect being
 30 that the pressure exerted on the electrodes when the metal is at welding heat and soft, causes the metal to flow especially the metal of the frame which is of greater mass to
 35 cause spots 9 (Figs. 11 and 12) which extend from the frame into the mesh of the screen, producing in a sense what may be
 40 conveniently referred to as projections or studs of the metal frame, which are forced into the mesh or meshes of the screen clothing adjacent thereto and become welded to the adjacent wires of said clothing.

These spots are distributed at intervals along the side frame members. The screen may be similarly welded at spots 12 on end
 45 members. As a result, the screen clothing and frame are welded together so as to form in effect, an integral whole.

The metal of the frame thus forced toward the screen, and which for convenience of description I have called studs, is not only
 50 welded to the wires of the screen clothing, but as stated, projects into the meshes thereof, and thus obtain a positive engagement therewith to resist pulling of the clothing from the frame. Where the wires of the
 55 screen cross each other at the welding point, the wires themselves become welded not only to the frame but to each other and serve to hold the crossing wires of the screen in fixed relation. Inasmuch as the integration of
 60 the metal of the frame and screen is secured by welding the metals under pressure there are no projections formed beyond the surface or plane of the frame or screen, such as must of necessity be present where the screen
 65 and frame are secured by rivets, bolts, or

solder. This is an important feature in a screen employed in grading fine material and gives to the screen itself the advantage of permitting unobstructed flow of the material being screened. Thus the integration
 70 of the metal of the frame and of the screen by welding and pressing the metal parts between the electrodes, as described, gives a firm and positive union of the frame and screen and avoids all objectionable obstruction to the free flow of the material over the
 75 screen.

At the points where the side members cross and are superposed on the end and intermediate members of the frame, the
 80 screen clothing may be introduced therebetween, and when these points are spot-welded, the studs produced may connect and be integral with the superposed frame members. Thus, the studs not only serve to se-
 85 cure the screen clothing to the frame, but also to secure the frame members together at these points.

Preferably, the screen clothing is welded to the under sides of the longitudinal mem-
 90 bers and at points closely adjacent to the up-standing flanges of the side members, as will be noted in Figs. 11 and 12. Also, the screen preferably is welded to the end members adjacent the outer edges thereof. This
 95 location of the welding points is desirable since it prevents sharp flexion of the screen clothing at the edges of the side and end frame members, such as might abrade, weaken, and rupture the wires.
 100

The transverse stays referred to may be spot-welded to the side members of the frame, and to the screen clothing at points
 105 13 (Figs. 11 and 12) intermediate the side members, and serve to transmit vibrations from the vibrating mechanism to the clothing.

Referring now more particularly to Figs. 5 to 10: The form of the invention there shown comprises longitudinal side frame
 110 members 15 similar to those already described. The transverse end members 17, however, instead of being of angle form are of flat strip form.

Screen clothing 19 is stretched on this
 115 frame and may be of fine brass wire with small meshes, suitable for grading fine material. Since this screen clothing is more delicate than the coarse clothing first described, and its fusing point is lower, it is
 120 desirable to interpose the margins of the screen between the frame members and flat binding strips 21 or other suitable members.

The frame members and strips are pressed and welded together. This may be accom-
 125 plished conveniently by introducing the parts into the electric welding machine between the electrodes thereof. Spots 13 (Figs. 9 and 10) are engaged by said electrodes become highly heated and softened,
 130

and studs or projections 25 in the present instance of the invention, are forced from the lower binding strips through the screen and become welded to the frame members.

5 These spots may be distributed along the side and end frame members.

The pressure of the electrodes in the welding process serves conveniently to press the side and end frame members into intimate engagement with the screen clothing, and when the parts are welded together as described, the frame members and strips are permanently held in this close relationship. The screen clothing may be not only held frictionally, but also positively, by the studs or projections between the members.

To strengthen the screen and transmit and distribute the percussive vibrations thereto, longitudinal members 27 may be provided beneath the screen parallel with and intermediate the side members and welded to the end members. Strips 29 may be superposed on the screen above the longitudinal intermediate members and may be pressed toward and welded to the latter at spots 30 in a manner similar to that described for the screen frame.

To further strengthen the screen, transverse stay members 31 of flat strip or other suitable form may be connected to said side members intermediate the ends of the frame. These may be welded at spots 32 to the side members and the longitudinal members intermediate the latter.

To prevent abrasion and wear on the screen along the edges of the intermediate longitudinal strips, ribbons 33 of canvas or other suitable material, may be introduced between said strips and the screen clothing. These ribbons are somewhat wider than said strips and desirably serve to prevent engagement of the screen clothing with the edges of said strips.

The ends of the screen clothing may be mounted on short strips 35 (Figs. 8 and 10) superposed on the end members of the frame between the side and intermediate longitudinal members. Transverse binding strips 37 may be superposed on the screen above said short strips; and the end frame members, short strips and binding strips may be spot-welded together.

Heretofore it has been the practice to purchase new screen clothing and apply it to the screen frame when the screen clothing originally on the frame is worn out, but my new means for securing the screen clothing to the frame renders it cheaper to purchase a new frame with the clothing attached than to remove the old screen clothing from its frame and apply new clothing thereto. This great reduction in the cost is due, among other things, to the fact that by my invention, no holes are drilled in the frame; no drills are used and broken; no time is con-

sumed in boring holes; no rivets are used; no rivets are placed in holes in the frame; and no riveting and no riveting machine is required.

The screen clothing is not only secured to its frame by means much cheaper than formerly used, but also the welding process presses the screen clothing engaging parts much tighter together than in the riveting process, and thus a highly efficient clamping of the screen clothing to the frame is obtained. Furthermore, there are no rivet heads projecting from the frame or clothing, but on the contrary, their surfaces are smooth and uninterrupted throughout.

It will be understood that the frame may be of various proportions and sizes, its members may be of angle or other shapes, and its stay and vibration members may be variously constructed.

The expression "screen clothing" is not to be understood as limited to woven fabric, but is to be regarded as generic to any foraminous structure suitable for grading material.

Having described two forms of the invention for purposes of illustration, without limiting the invention thereto, what is claimed is:—

1. A screen for grading or separating materials by passing the latter over the screen, comprising a metal frame having side and end members, means for securing the side and end members together, and metal screen clothing stretched on said metal frame and welded thereto, the metal of the frame at the welding points being forced into the wire mesh of the screen and presenting no obstruction beyond the surface of the screen or frame.

2. In a screen for grading materials, the combination of a metal frame, a metal screen supported by said frame and welded thereto at intervals, the metal of the frame at the welding points being forced into the mesh of the metal screen and presenting no obstruction to the passage of material over the screen.

3. A screen for grading materials comprising a metal frame having side and end members, and metal screen clothing stretched on said frame, said members having studs of metal forced therefrom positively engaging said clothing and welded thereto for producing in effect an integral whole.

4. A screen for grading materials comprising a metal frame having side and end members, and metal screen clothing stretched on said frame, the margins of said clothing being welded permanently to said members and in effect integral therewith.

5. A screen for grading materials, comprising a metal frame, metal members extending along said frame, and metal screen

clothing stretched on said frame having portions interposed between said frame and members, said frame, screen clothing and members being welded together for producing in effect, an integral whole.

6. A screen for grading materials, comprising a metal frame, metal members extending along said frame, and metal screen clothing stretched on said frame having marginal portions interposed between said frame and members, said frame and members being welded together through said screen clothing.

7. A screen for grading materials, comprising a frame, members crossing said frame, and screen clothing stretched on said frame, said screen clothing being welded to said frame and crossing members by portions of metal forced from the frame and crossing members into the mesh of the screen.

8. A screen for grading materials, com-

prising a frame, vibration-transmitting members connected to said frame, and screen clothing having its margins spot-welded to said frame and portions intermediate said margins spot-welded to said vibration-transmitting members.

9. In a screen for grading granular material, the combination of frame members, a wire screen supported thereby, and means for integrally connecting the frame members and wire screen at intervals by portions of the frame members extending into the meshes of the wire screen and welded to the longitudinal and transverse wires of the screen.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

THOMAS J. STURTEVANT.

Witnesses:

BEATRICE I. SMITH,
NORMAN C. HUSSEY.