

April 4, 1944.

W. J. PARKS

2,345,947

SCREENING APPARATUS

Filed March 5, 1942

3 Sheets-Sheet 1

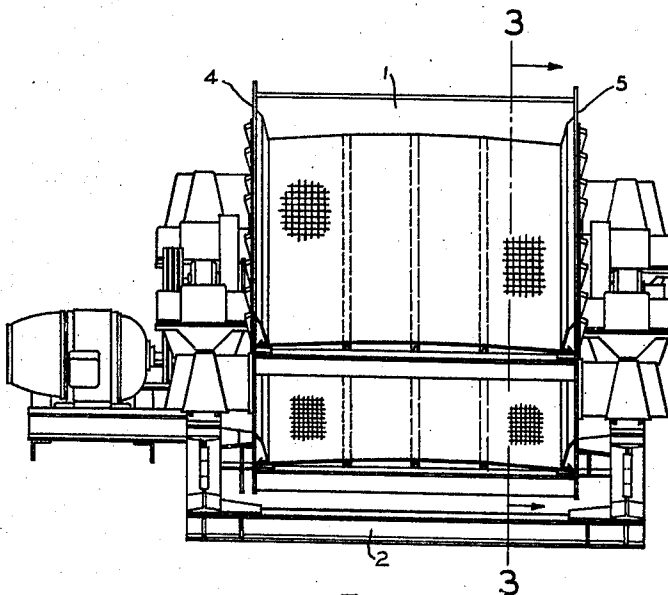


FIG. 1.

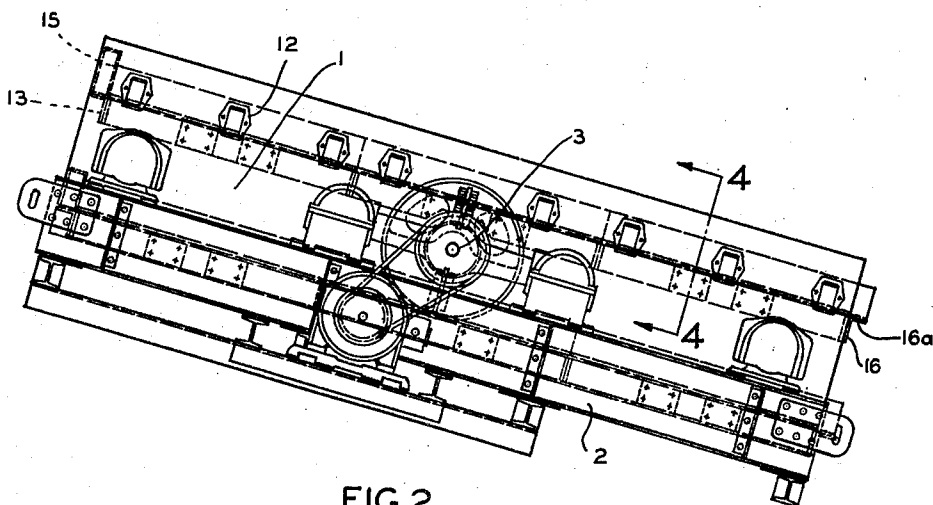


FIG. 2.

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3 Sheets-Sheet 2

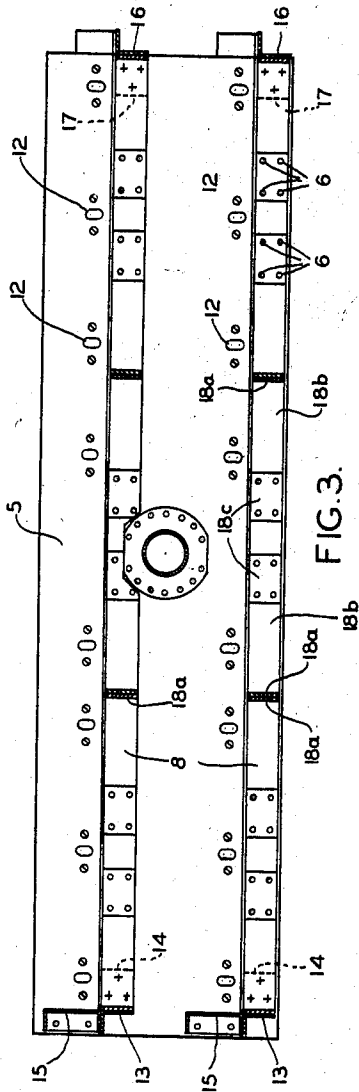


FIG. 3.

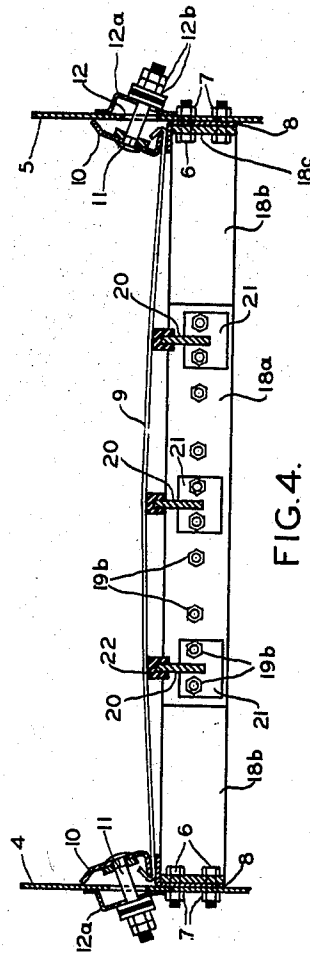


FIG. 4.

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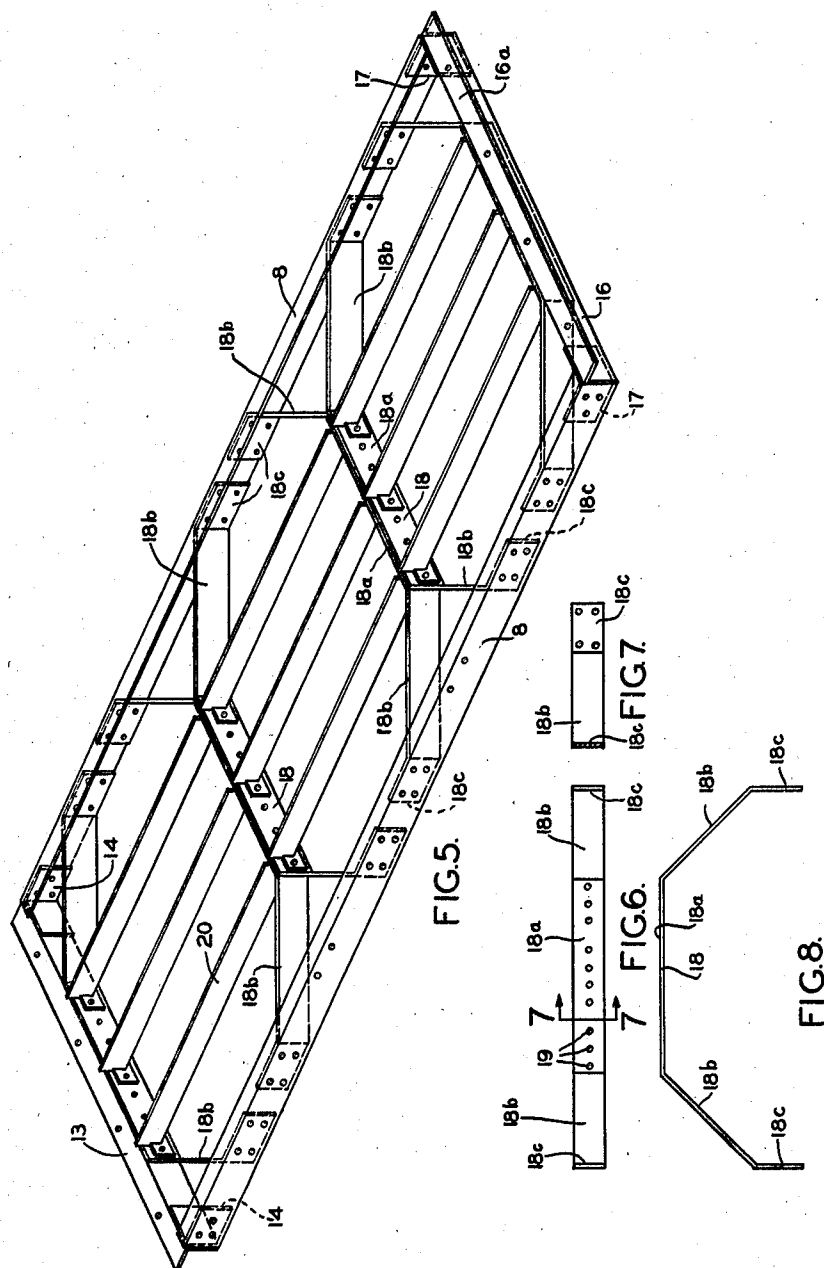
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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,345,947

## SCREENING APPARATUS

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Application March 5, 1942, Serial No. 433,415

5 Claims. (Cl. 209—408)

This invention relates, as indicated, to screening apparatus, but has reference more particularly to the construction of the screen supporting structure of such apparatus.

It has heretofore been customary to construct the screen decks or screen supporting frames of screening apparatus of angles, channels and H-beams, extending continuously from side plate to side plate of the apparatus, the particular structural section selected with a view to the necessary strength and stiffness required by the width of the screen and the loads to be carried. This required the stocking of a wide variety of different sections, as will be evident from the fact that the stiffness and strength required for any given installation increases very rapidly, i. e., as the fourth power of the width of the screen.

Moreover, each of the structural sections referred to has a flange or leg of considerable width, which, when disposed immediately below the screen cloth, blocks off a considerable portion of the effective screening area. The material which passes through the screen cloth causes rapid wear at the outer, and usually thinner, edges of such flanges, resulting in a notching of the flanges, and causing premature fatigue failure of the entire structural member.

It has also been customary to incorporate these transversely extending structural members into a welded frame or panel by adding thereto side members, which are secured to the side plates of the screen, as well as bridge rails or members which extend longitudinally of the structure and serve to support the intermediate portions of the screen. This construction requires considerable labor in the laying out and fabrication of the individual members, as well as a great deal of time for assembling, welding and straightening the panels after welding. The panel has a great number of welds incorporated therein, and if the metal is burnt or otherwise damaged at any one weld, and a failure occurs at this point, it causes failure at adjacent points in the panel, requiring replacement of the entire panel.

The present invention has as its primary object the provision of a screen supporting structure which overcomes all of the foregoing disadvantages and defects of existing structures, which provides a maximum of open space for screening purposes which is wear-proof and distortion-proof, and which is effective to prevent movement of the side plates of the screen relatively to one another, as well as buckling or bending of the side plates.

Another object of the invention is to provide a structure of the character described, which is made up of basic elements or units, so constructed as to facilitate arrangement thereof to form screen decks of any desired length.

Other objects and advantages of the invention

will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same.

In said annexed drawings:

Fig. 1 is a front end elevation of a screening apparatus embodying the invention;

Fig. 2 is a side elevation of the screening apparatus;

Fig. 3 is a longitudinal cross-sectional view of the apparatus, taken on the line 3—3 of Fig. 1;

Fig. 4 is a transverse cross-sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is an isometric view of one of the screening decks of the apparatus;

Fig. 6 is a front elevation of one of the principal structural elements of the deck;

Fig. 7 is a cross-sectional view, taken on the line 7—7 of Fig. 6; and

Fig. 8 is a top plan view of the structural element.

Referring more particularly to the drawings, the screening apparatus comprises, in general, a gyrating screen body 1, resiliently supported upon a stationary base frame 2, and adapted to be gyrated by means of an eccentric shaft assembly 3, the construction and operation of which is substantially the same as that described in my Patent No. 2,066,362.

Although the invention is shown as embodied in a gyratory screening apparatus of the type referred to, it will be understood that it may be incorporated in other types of screening apparatus having a gyratory or vibrating movement.

The screen body 1 consists of a pair of transversely spaced side plates 4 and 5, to which are secured, as by means of bolts 6 and nuts 7, side rails 8, which serve to stiffen or reinforce the side plates and provide supports for the edges of the screen cloth 9. In this particular application, the screen cloth has hooked edges which are engaged by packing strips 10, these strips being in turn engaged by bolts 11 which extend through elongated openings 12 in the side plates and through angle boxes 12a, the bolts being retained in position by means of nuts 12b. The strips, bolts and nuts thus serve to stretch the screen cloth.

Extending transversely of the screen body at the feed end thereof is an angle beam 13 having welded to the ends thereof angle clips 14, which are secured to the side rails 8 by bolts and nuts which secure the ends of the side rails to the side plates. Secured to the horizontal flange of the beam 13 is a back plate 15, which serves to prevent the material being screened from spilling over the rear end of the screen body.

Extending transversely of the screen body at the discharge end thereof is an angle beam 16 having welded to the ends thereof angle clips 17,

which are secured to the side rails 8 in the same manner as the clips 14, the beam 16 having a horizontal flange 16a extending forwardly of the screen body to provide a discharge lip for the material being screened.

Secured to the vertical flanges of the side rails 8 at longitudinally spaced points intermediate the beam 13 and 16 are a plurality of structural elements 18, each of which consists of a central or body portion 18a, which extends normal to the vertical flanges of the rails 8, portions 18b which extend angularly to the portions 18a, and end portions 18c, which are perpendicular to the body portions 18a and parallel with the vertical flanges of the side rails 8, being secured to such flanges by means of the bolts 6 and nuts 7.

The element 18 at the feed end of the screen body has the portion 18a thereof secured to the beam 13 by means of bolts which pass through the perforations 19 (see Fig. 7). Similarly, the element 18, at the discharge end of the screen body, has the portion 18a thereof secured to the beam 16 by means of bolts which pass through the perforations 19.

Extending longitudinally of the screen body at transversely spaced points are bridge rails 20, provided at their ends with flanges 21 secured to the portions 18a of the elements 18 by means of the same bolts which are employed to secure these elements to the rails 13 and 16 and to each other.

Mounted on the bridge rails 20 are suitable coverings or strips 22, of rubber or like material, which serve as supports for the intermediate portions of the screen cloth 9, maintaining such cloth in a bowed condition, as shown in Fig. 4.

It will be noted in Fig. 5 that the elements 8, 13, 16, 18 and 20 form a unitary rigid structure, which is characterized by the following advantageous features: (a) The structure provides a maximum of open space for screening purposes, being substantially free from flanges or legs which might obstruct the flow of screened material therethrough. (b) The X-beam units consisting of the back-to-back elements 18, as well as the end elements 18 in association with the beams 13 and 16, are effective not only to resist weaving of the structure, that is, movement of one side of the structure relatively to the other in the plane of the structure, but also to prevent distortion of the structure, that is to say, movement of one portion of the structure in a direction normal to the plane of the structure. By preventing such weaving and distortion of the structure, movement of the side plates relatively to one another is effectively prevented. These advantages are particularly desirable in a long screen of single deck construction. (c) The truss-like structures formed by the elements 8, 18b and the outermost bridge rails 20, and which structures extend substantially the entire length of the structure, are effective to prevent buckling or bending of the side plates. This is especially important in long screens of 18 to 20 feet in length.

Using the elements 18 as a basic unit, and arranging them in various multiples and spacings, screen decks of any desired length can be built up. For screens of different widths changes in the depth and weights of the elements 18 will, of course, be required, but the elements will, in all cases, be of substantially the same construction. In the present case, the angle between the portion 18a and the portions 18b of the elements 18 is approximately 45°, but other angles may be used, if desired. Moreover, instead of forming the ele-

ments 18 from plain bar stock, they may be formed from laminated bars or a series of nested bars, or, if desired, they may be formed from channels or other structural sections. In the latter case, however, there would of necessity, be some sacrifice in the effective open area of the structure for screening purposes. Furthermore, instead of bolting the various elements of the structure together, the elements could, after being assembled, be welded, riveted or otherwise secured together, or the structure could be made up in sections, portions of which have previously been assembled into units.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a screening apparatus, a screen supporting structure comprising spaced side rails, and a plurality of longitudinally spaced beams interconnecting said side rails, each of said beams comprising a pair of elements having central portions in back-to-back relation with the backs disposed in a plane substantially perpendicular to the general plane of said structure, and diverging portions extending angularly to said central portions and connected to said side rails.

2. In a screening apparatus, a screen supporting structure comprising spaced side rails, and a plurality of longitudinally spaced beams interconnecting said side rails, each of said beams comprising elements arranged in back-to-back relation and having portions extending angularly to the back-to-back portions and portions parallel with and secured to said side rails, said back-to-back faces being disposed in a plane substantially perpendicular to the general plane of said structure.

3. In a structure, as set forth in claim 2, bridge rails interconnecting the back-to-back portions of said beams.

4. In a screening apparatus, a screen supporting structure comprising a rectangular frame, including spaced side rails, and a plurality of longitudinally-spaced beams interconnecting said side rails, each of said X-beams comprising a pair of elements having central portions of substantial length in back-to-back relation and extending substantially perpendicular to said side rails, and diverging portions of lesser length than said central portions extending angularly to said central portions and to said side rails, said back-to-back faces being disposed in a plane substantially perpendicular to the general plane of said frame.

5. In a screening apparatus, a screen supporting structure comprising a rectangular frame, including spaced side rails, and a plurality of longitudinally-spaced beams interconnecting said side rails, each of said beams comprising a pair of elements having central portions of substantial length in back-to-back relation and extending substantially perpendicular to the side rails, and diverging portions extending angularly to said central portions and to said side rails; said central portions having a cross-section presenting a short dimension and a long dimension, the long dimension extending substantially perpendicular to the plane of said frame and the short dimension adapted to support thereon a screen.

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