April 21, 1953 A. J. ROUBAL 2,635,752

PARALLEL MOTION TRANSLATION DEVICE FOR VIBRATORY SCREENS

Filed March 20, 1950 3 Sheets-Sheet 1

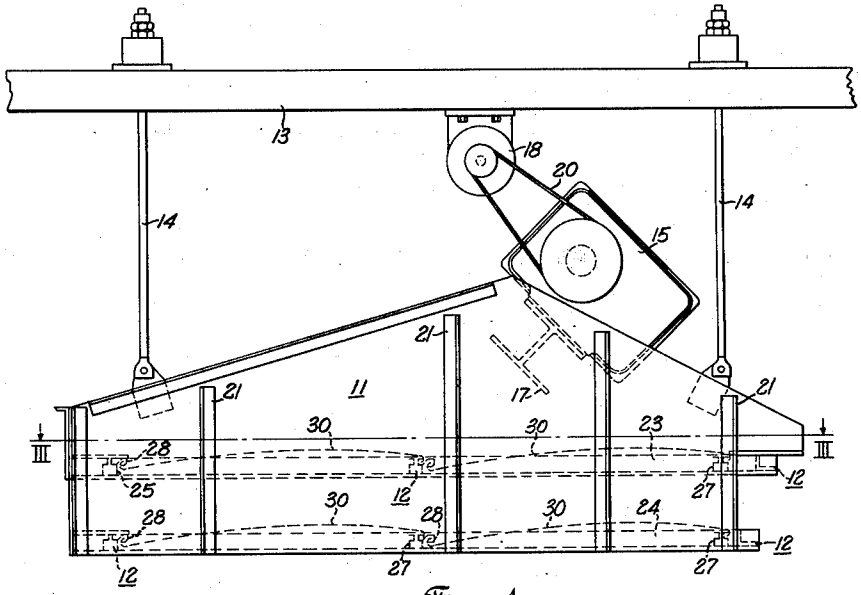

Fig. 1

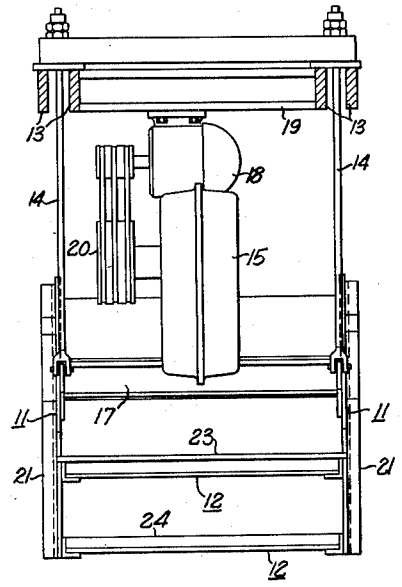

Fig. 2

Inventor
Alexander J. Roubal
by William L. Gates
Attorney

April 21, 1953 A. J. ROUBAL 2,635,752

PARALLEL MOTION TRANSLATION DEVICE FOR VIBRATORY SCREENS

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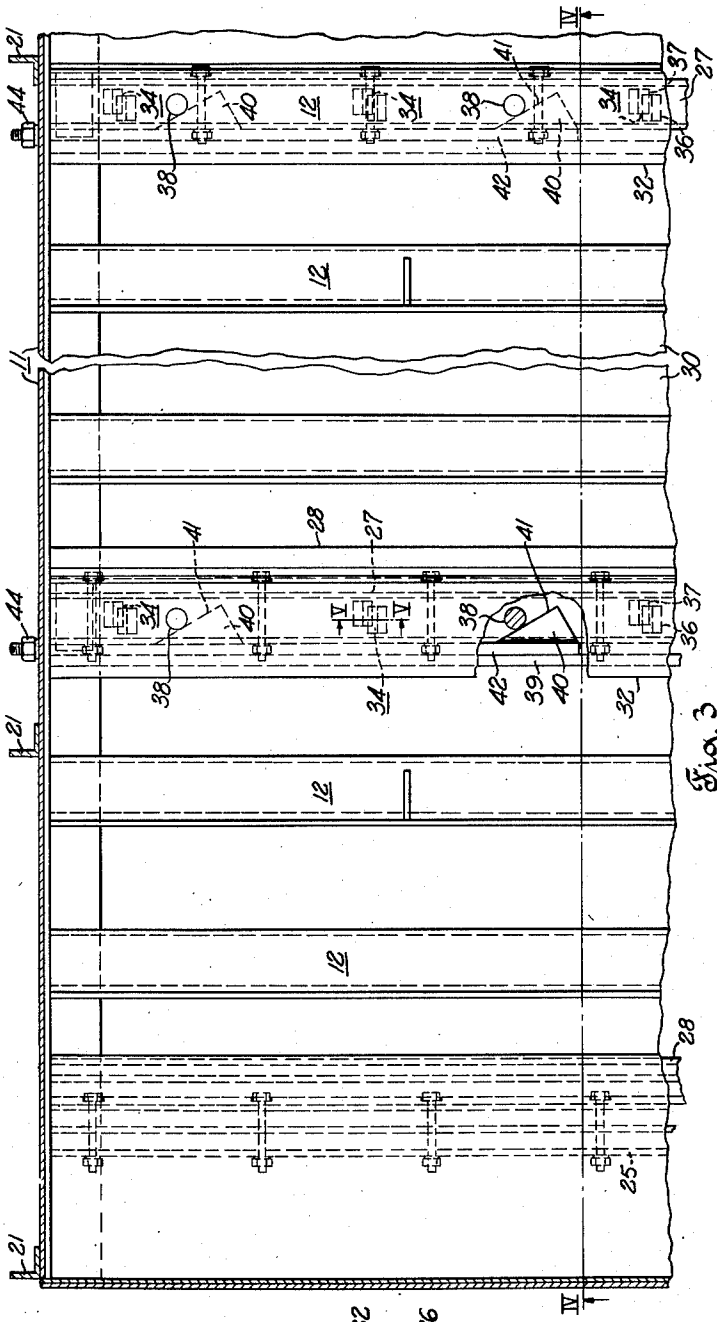

Fig. 3

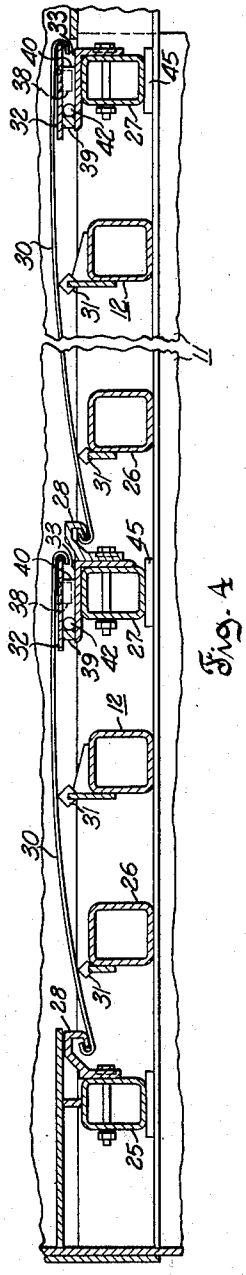

Fig. 4

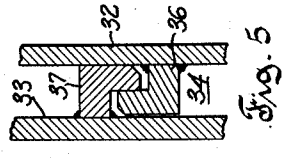

Fig. 5

Inventor
Alexander J. Roubal
by William L. Gates
Attorney

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PARALLEL MOTION TRANSLATION DEVICE FOR VIBRATORY SCREENS

Filed March 20, 1950 3 Sheets-Sheet 3

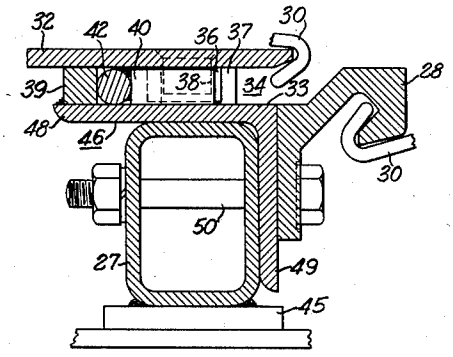

Fig. 6

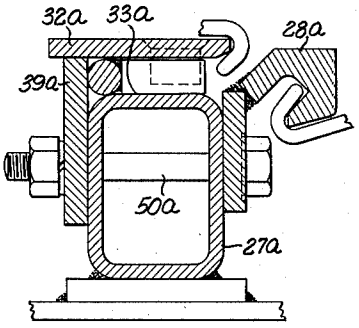

Fig. 7

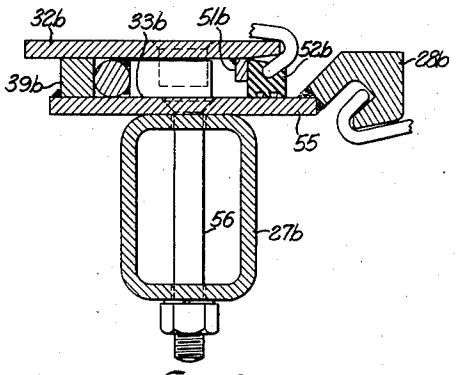

Fig. 8

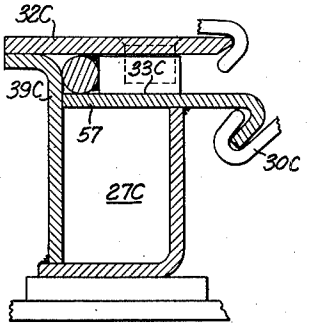

Fig. 9

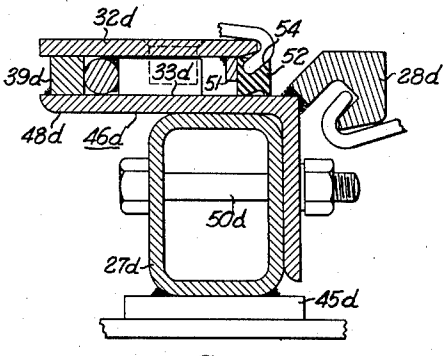

Fig. 10

Inventor
Alexander J. Roubal
by William Yates
Attorney

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UNITED STATES PATENT OFFICE

2,635,752

PARALLEL MOTION TRANSLATION DEVICE FOR VIBRATORY SCREENS

Alexander J. Roubal, Milwaukee, Wis., assignor to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Application March 20, 1950, Serial No. 150,650

2 Claims. (Cl. 209—395)

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This invention relates to the arrangement of screen surfaces on industrial screening machines, and more particularly to mechanism for tensioning a screen section on its frame.

Material separating screens have long been known and various devices are known for attaching screen cloth to a frame and applying tension thereto to create a firm screening surface. One manner of fastening a screen cloth section to its frame is shown in C. S. Lincoln, U. S. Patent No. 2,338,523, involving metal strips of hook like cross section on opposite ends of a screen cloth section and engaging edge presenting cross members which are relatively movable to apply tension and thus prepare the screen for service. With the structure shown in the Lincoln patent, however, certain difficulties have been experienced in tensioning screen sections, particularly of screen sections intermediate the ends of the screen deck. By the present invention applicant has made it possible to stretch or tension a screen cloth lengthwise of a screen deck frame with side walls, like that of Lincoln, by merely operating a single tensioning nut located outside the side wall of the screen body, thus avoiding the difficulties experienced with previously known devices.

An object of the present invention is to provide a practical structure for tensioning a screen cloth on a screen frame by operating a simple mechanism actuable from one side of the frame.

Another object of the invention is to provide a simple parallel motion mechanism for moving a screen tensioning bar in translation parallel to itself.

The invention resides in a novel mechanism for moving a straight bar like screen frame member in translation parallel to itself, relative to the screen frame by actuation of a simple control member located at one side of the screen side wall, and more particularly in the novel instrumentality through which the desired motion is obtained.

Other objects will appear hereinafter as the description of the invention proceeds.

The novel features of the invention and how the objects are attained will appear from this specification and the accompanying drawings forming a part of this application, and all these novel features are intended to be pointed out in the claims.

In the drawings:

Fig. 1 is a side elevational view of a screen embodying the invention;

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Fig. 2 is an end elevational view from the discharge end of the screen in Fig. 1;

Fig. 3 is an enlarged partial plan view of Fig. 1 looking in the direction of the line III—III with parts broken away and the screen cloth not shown to better show the construction;

Fig. 4 is a vertical sectional view taken on line IV—IV of Fig. 3 with the screen cloth positioned in place;

Fig. 5 is a sectional view taken on line V—V of Fig. 3;

Fig. 6 is an enlarged sectional view of the embodiment of the invention shown in Fig. 4; and

Figs. 7–10 are enlarged sectional views showing various other embodiments of the invention.

Figs. 1 and 2 show as an example, a vibratory screen mechanism embodying the invention hereinafter set forth. The mechanism comprises side members 11 vertically spaced parallel with respect to each other by transverse frame members 12 to form substantially a rectangular frame. The frame is preferably suspended from roof trusses 13 by suspension cables 14 secured thereto and to the side members 11. A vibratory device 15 is suitably located between the side members 11 on a supporting structure 17, toward the discharge end of the frame. A driving motor 18 secured to cross beam 19 is connected to drive the vibratory device 15 through such means, as for instance a V-belt drive system 20. Vertical reinforcing angle bars 21 may be secured to the side members 11 for increasing the rigidity of the frame. The screen mechanism herein shown comprises a two section top screen deck 23 and a similar lower screen deck 24. Any number of screen sections and decks, however, may be employed within a practical limit for the particular type of screening operation, but for the purpose of clearly showing an application of the invention to a vibratory screen mechanism, the structure herein shown is adopted.

Referring more particularly to Figs. 3 and 4, the transverse frame members 12 may be designated as feed end member 25, intermediate members 26 and base members 27, in spaced parallel relation to each other. The feed end member 25 as well as one of the base members 27, in the case of a two section screen, is provided with a hook-like element 28 for holding a hooked edge of a suitably hooked edged screen, such as a foraminous screen 30 of a known kind more fully described in U. S. Patent No. 2,338,523 (supra), whereas the intermediate members 26 are provided with an upwardly projected element 31 for giving the proper contour to the screen surface.

The opposite hooked edge of the screen 30 is held by a motion translation device adapted to stretch the screen cloth 30 on the screen frame as hereinafter described.

The motion translation device is essentially a means for converting straight line motion in one direction to straight line motion in another direction to tension the screen cloth 30. Such a device is carried by each of the base members 27 and comprises a screen holding element 32 with a free edge spaced substantially parallel to a flat surface 33 of or comprising a portion of the base member 27, which surface in turn is parallel to the general plane of the screen frame. The screen holding element 32 is connected to the base member 27 by guide means 34 interengaged for the displacement of the screen holding element in a direction longitudinally relative to the screen frame. Fig. 5 shows the guide means 34 as comprised of two L-shaped members 36, 37 secured respectively to the screen holding element 32 and the base member 27 or a portion thereof as hereinafter more specifically described. A small amount of clearance is allowed between the foot of the L-shaped member 36 and the flat surface 33 to assure support of the screen holding element 32 on the inverted foot of L-shaped member 37. Follower elements 38 project from the screen stretcher bar 32 at spaced intervals toward the base member 27, and are herein shown as short cylindrical members to effect transmission of motion forces imparted thereto, to the screen stretcher bar. Flange means 39 carried by the base member 27 in various ways as will more clearly appear in the specific embodiments hereinafter described, and fixed longitudinally with respect thereto extend toward the screen stretcher bar 32 above the flat surface 33 at a substantially uniform elevation. Mechanical means, such as wedge means 40 having a laterally inclined surface 41, are interposed between the flange means 39, and each follower element 38 within the space defined by the flat surface 33 and the screen stretcher bar 32. The inclined surfaces 41 face the side wall 11 toward which they are displaceable, and tangentially engage the elements 38 to impart to the screen stretcher bar 32 a force having components in two directions at right angles to each other. An actuator means such as a pull rod 42 is secured to the wedge means 40 and longitudinally abuts the flange means 39. One end of the pull rod 42 extends approximately to the center of the entire width of the screen frame, and the opposite end extends through an opening in the side wall 11 for manipulation outside the side wall.

Assuming that one hooked edge of the foraminous screen 30 is held in the hook like element 28, secured to the feed end member 25, and the opposite hooked edge of the screen is held by hooked engagement with the free edge of the screen stretcher bar 32 carried by the base member 27, the desired degree of tension may be placed upon the screen by urging the pull rod 42 laterally relative to side wall 11 as by adjustment means such as a nut 44 threaded to the portion of the pull rod extending beyond the side wall. The wedge means 40 are simultaneously moved longitudinally of flanges 39 to effect transmission of force longitudinally and laterally to the stretcher bar 32 through engagement of their inclined surfaces 41 with the follower elements 38. The engageable guide means 34, however, restricts motion of the screen

stretcher bar 32, to a path longitudinally of and parallel to the side plates 11 and transversely toward and away from the ridge or flange means 39. It is hence evident that the tension on the screen 30 may be easily varied from a position outside of the screen frame proper, thus obviating the difficulties heretofore experienced in prior screen tensioning means.

Fig. 6 more clearly illustrates the structural embodiment of the invention shown in Fig. 4 in which the base member 27 is constructed, as shown, as a hollow beam of rectangular cross section secured to short steps or brackets 45 of the side walls 11. An elongated angle bar element 46 provided with legs 48, 49 embraces the base member 27 within its included angle. This element 46, by means of leg 49, and the hook like element 28 are secured to the base member 27 by bolts 50 passed laterally therethrough. The uppermost surface of leg 48 forms the flat surface 33 of the screen stretching or motion translating device previously described. Flange means 39 and the L-shaped member 37 of the guide means 34 are secured to this surface 33.

Elements shown in Figs. 7, 8, 9 and 10 similar to those in Fig. 6 are designated by the same reference characters with the addition of respective suffix letters *a*, *b*, *c* and *d*.

Fig. 10 is structurally similar to Fig. 6, except that the hook like element 28*d* is not provided with a bolt receiving portion by means of which it could be bolted to the base member 27*d*, and instead is secured to the corner edge of the elongated element 46*d* as by welding. In addition, the screen stretcher bar 32*d* is provided with a fixed longitudinal shoulder 51 depending therefrom toward the surface 33*d*. A sealing strip of resilient material 52 abutting the shoulder 51 is disposed between the screen stretcher bar 32*d* and the leg 48*d* for preventing material from entering therebetween and causing an abrasive action on the surfaces of the contacting parts. The resilient strip 52 is also provided with a groove 54 for receiving an edge of the screen clothing, to effectively retain it in position.

In Fig. 7 the hook like element 28*a* is secured directly to the base member 27*a* by means of bolts 50*a*. The construction differs from the embodiments shown in Figs. 6 and 10 in that the angle elements (46, 46*d*) of those embodiments is eliminated and the uppermost surface of the base member 27*a* forms the flat surface 33*a*. The flange means 39*a* is therefore secured directly to the base member 27*a* by means of the bolts 50*a*, and extends upwardly in alignment with one side of the base member above the flat surface 33*a* toward the screen stretcher bar 32*a*.

The construction shown in Fig. 8 shows a base plate 55 secured to the base member 27*b* by means of bolts 56 to provide the flat surface 33*b* to which the flange means 39*b* and other elements of the screen stretcher device are held. The screen holding bar 32*b* is also shown as provided with a depending shoulder 51*b* and a resilient strip 52*b* similar to corresponding elements as shown in Fig. 10. The hook like element 28*b* in this instance is shown as welded to an edge of the base plate 55.

Fig. 9 differs substantially from the previous embodiments in that the base member 27*c* is comprised of elements performing two or more functions which as hereinbefore described were performed by separate elements. In this instance flange means 39*c* is extended below the flat surface 33*c* to form an integral side of the hollow

rectangular base member 27c, and extends transversely thereto above the flat surface to form a substantial support for the movable screen holding element 32c. The flat surface 33c is formed on one sid eof a hook plate 57 which comprises one side of the base member 27c, and furthermore constitutes a portion turned upon itself for holding one edge of the screen clothing 30c, heretofore secured to hook like elements 28, 28a, 28b and 28d.

The various structural embodiments shown in Figs. 7–10 are identical to that of the embodiment of Fig. 6 as to the operation of the motion translating device as hereinabove generally described. Accordingly it will be unnecessary to describe in detail the operation of each structural modification.

It will be obvious to those skilled in the art that the illustrated embodiments of the invention may be variously changed and modified, or the features thereof, singly or collectively, embodied in other combinations than that illustrated, without departing from the spirit of the invention, or sacrificing all of the advantages thereof, and that accordingly the particular embodiments illustrated and described herein are by way of example only, and the invention is not limited thereto, but is intended to include everything within the scope of the appended claims.

It is claimed and desired to secure by Letters Patent:

1. A screen cloth tensioning device for attaching a rectangular section of screen cloth to a vibrating screen frame having parallel side members and transverse members connecting the side members, comprising: a movable screen cloth holding bar operably mounted on said frame so as to extend transversely between said side members, guide means operably disposed between said frame and said screen cloth holding bar for guiding said screen cloth holding bar along a fixed path parallel to said side members, a pull rod operably mounted on said frame so as to extend transversely between said side members and so as to be movable in a transverse direction relative to said side members, follower means on said screen cloth holding bar, cam means on said pull rod cooperably engaging said follower means in abutting relation for urging said screen cloth holding bar to move along said fixed path parallel to said side members when said pull rod is moved in a transverse direction relative to said side members, and means for locking said pull rod in a selected position corresponding to the desired degree of tensioning of said screen cloth.

2. A screen cloth tensioning device for attaching a rectangular section of screen cloth to a vibrating screen frame having parallel side members and transverse members connecting the side members, comprising: a movable screen cloth holding bar operably mounted on a transverse member which connects said side members so as to extend transversely between said side members, guide means operably disposed between said transverse member and said screen cloth holding bar for guiding said screen cloth holding bar along a fixed path parallel to said side members, a pull rod operably mounted on said transverse member so as to extend transversely between said side members and so as to be movable in a transverse direction relative to said side members, follower means on said screen cloth holding bar, cam means on said pull rod having a surface inclined relative to said pull rod for cooperably engaging said follower means in abutting relation for urging said screen cloth holding bar to move along said fixed path parallel to said side members when said pull rod is moved in a transverse direction relative to said side members, and means for locking said pull rod in a selected position corresponding to the desired degree of tensioning of said screen cloth.

ALEXANDER J. ROUBAL.

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