

[54] **RELEASABLE CONNECTION FOR INTERSECTING MEMBERS**

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[22] Filed: **June 15, 1972**

[21] Appl. No.: **263,299**

[52] U.S. Cl. **209/405**, 209/409, 287/20.92 G

[51] Int. Cl. **B07b 1/46**

[58] Field of Search 209/403, 405, 408, 402, 209/401, 409, 363, 364; 287/20.3, 189.36 A, 287/20.92 G; 52/365, 678, 126, 204, 52/640; 198/204

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Primary Examiner—Robert Halper

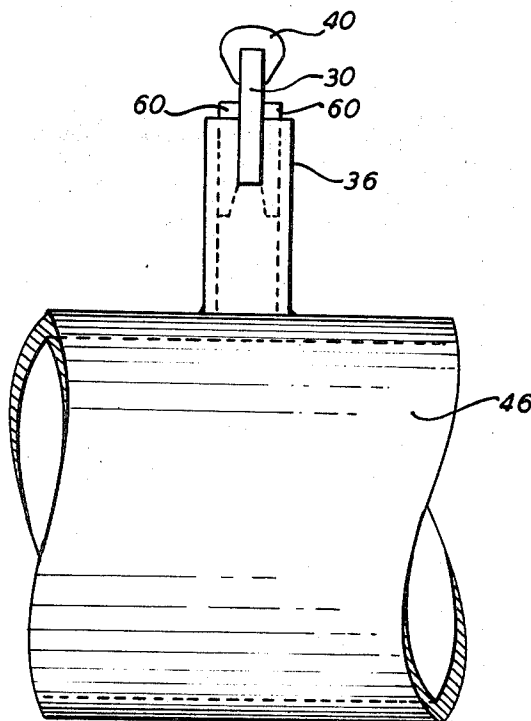
Attorney, Agent, or Firm—Morris I. Pollack

[57]

ABSTRACT

A pair of wedges are disposed in spaces appropriately provided between a pair of intersecting members in such a way that as the wedges are driven home sufficient forces are developed between the intersecting members to secure same to each other, but in such a manner that the application of sufficient force to one or both of said intersecting members, or to the wedges themselves, will release the wedges and permit separation of the intersecting members.

9 Claims, 16 Drawing Figures



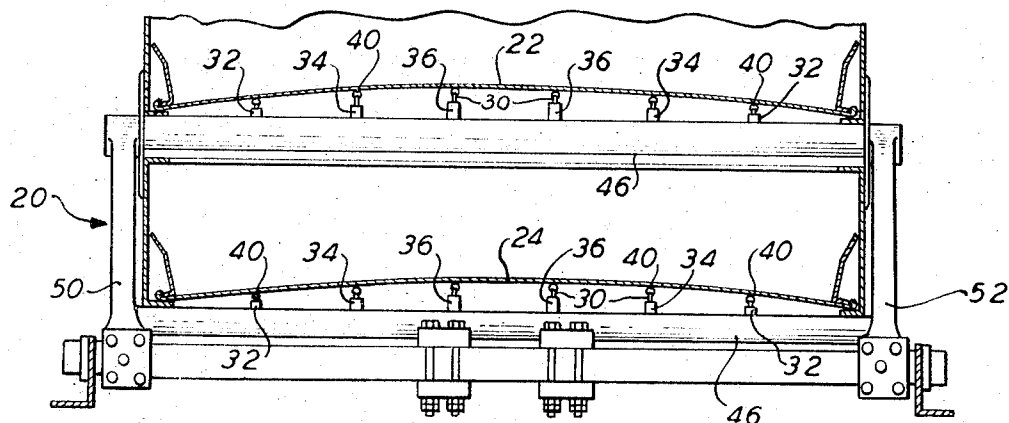


FIG. 1

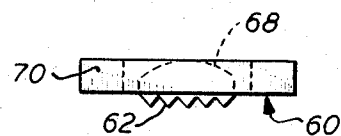


FIG. 5

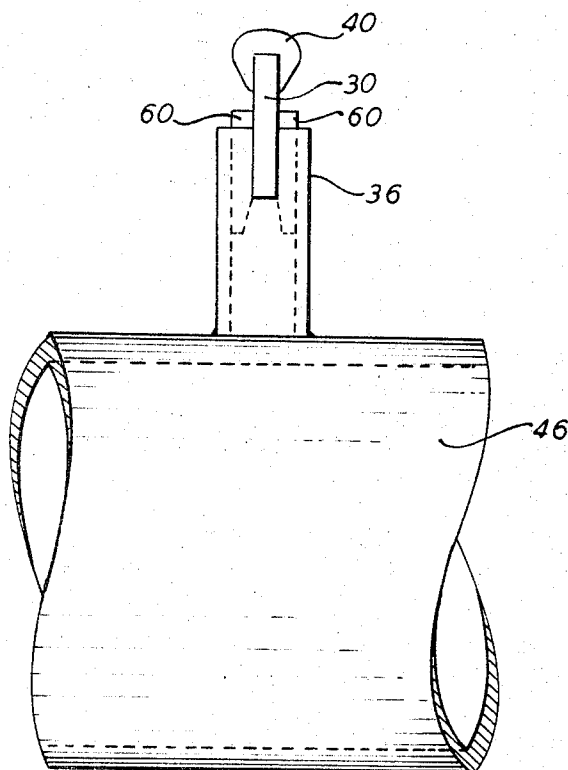


FIG. 2

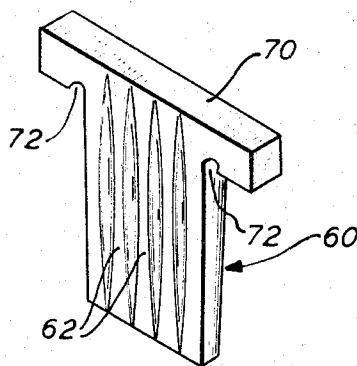


FIG. 4

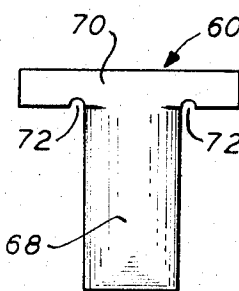


FIG. 7

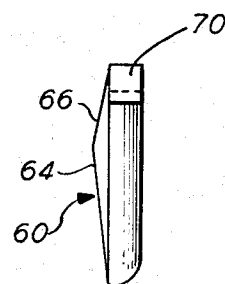


FIG. 6

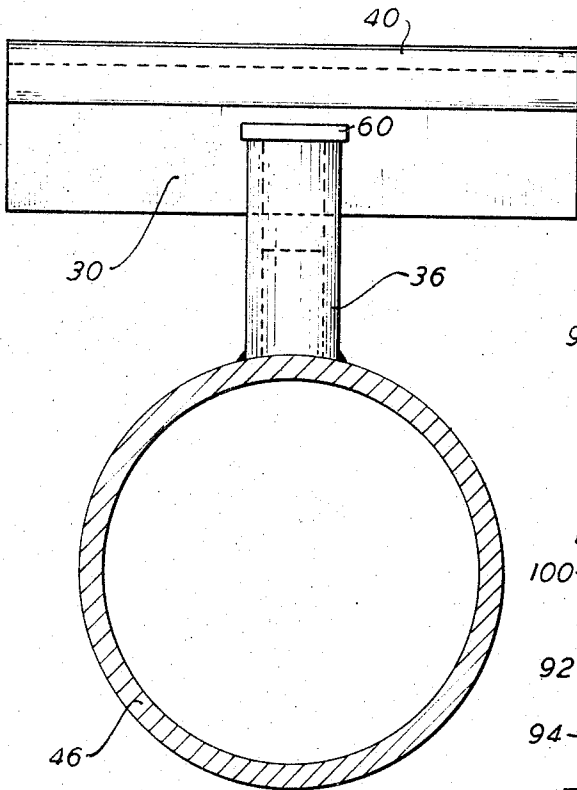


FIG. 3

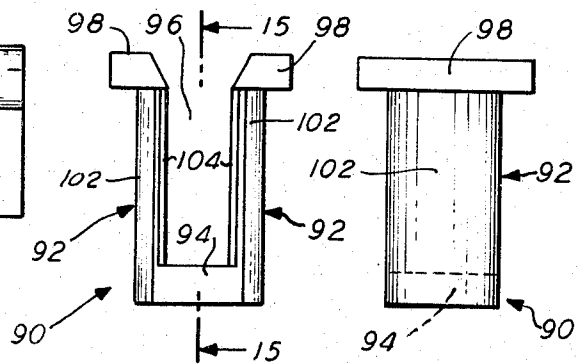


FIG. 12

FIG. 13

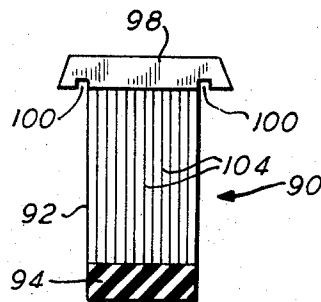


FIG. 15

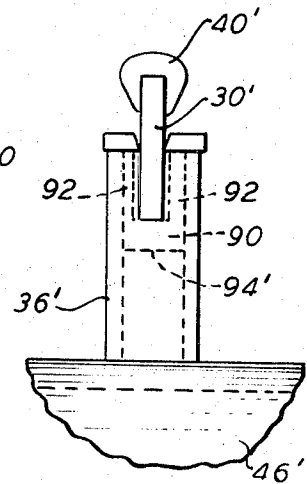


FIG. 16

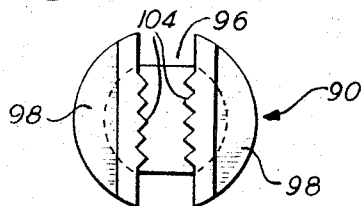


FIG. 14

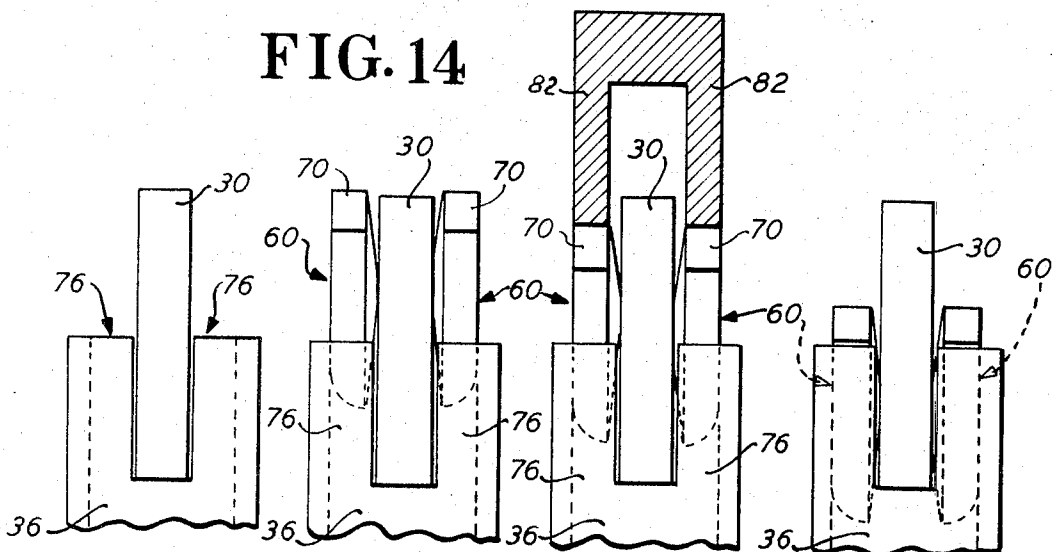


FIG. 8

FIG. 9

FIG. 10

FIG. 11

RELEASABLE CONNECTION FOR INTERSECTING MEMBERS

BACKGROUND OF THE INVENTION-FIELD OF APPLICATION

This invention relates to a releasable connection for a pair of intersecting members and more particularly to a system for releasably connecting intersecting members in bulk material feeding and screening equipment.

BACKGROUND OF INVENTION-DESCRIPTION OF PRIOR ART

It is often necessary to connect two intersecting members together in such a way that the connection be secure under the most adverse conditions but yet be releasable should either or both of the members require service, repair or replacement.

This is particularly true for bulk material feeding and screening equipment and most especially such equipment of the vibrating type. The construction of such equipment often entails the use of cross members spaced at intervals between and connected to the equipment side frames. The cross members in turn carry support elements extending longitudinally with respect to the direction of material flow. The support elements may in turn support and coact with the bulk material to be processed or they may support a screen structure which coacts with the material to be processed.

It has become common practice to weld such intersecting members together as shown for the cross members and support elements in U.S. Pat. No. 2,188,060 and 3,491,881. However, while welding provides for a secure interconnection and one which will withstand the most abusive treatment, it does not provide a connection that is easily released to permit service, repair and replacement of the interconnected members. In an environment such as bulk material processing the abrasive action of some materials upon the cross member and/or the support element dictates the necessity for such service repair and replacement and welded connections have made such difficult if not at times exasperating.

An alternative construction commonly resorted to for intersecting members requires the use of bolts such as in U.S. Pat. No. 3,195,815. But this too has been found undesirable especially in vibrating equipment because the vibrations quite often shake the bolts loose thus releasing the members when they should be secured together. In the alternative some environments rust, or clog the bolts in place, making release thereof difficult if not at times impossible.

SUMMARY OF THE INVENTION

It is therefore an object of this invention to provide an improved connection between intersecting members.

It is a further object to provide an improved system for releasably, but securely, connecting two members.

A still further object is to provide an improved system for connecting two intersecting members in bulk material feeding and screening equipment in such a way that the members are secured together during operation of the equipment but can be released one from the other to permit service, repair and/or replacement of either one or both of the members.

Yet still another object is to provide an improved connection between the cloth support bars and cross members of a vibrating screen.

This invention involves connecting intersecting members, such as the support bars and cross members of a vibrating screen; and contemplates providing a wedging type clamping interconnection between the members.

In carrying out the invention, according to the preferred embodiment, the intersecting members are formed such that spaces or pockets are provided proximate the areas of connection. Wedges are then disposed in the spaces or pockets and driven home to clamp the members together.

Other objects, features, and advantages of the invention in its details of construction and arrangement of parts, will be seen from the above, from the following description of the preferred embodiment when considered in conjunction with the drawings, and from the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings;

FIG. 1, is a somewhat schematic front elevational view of a unit of bulk material processing equipment, in the form of a vibrating screen, which incorporates the instant invention;

FIG. 2 is an enlarged view of a portion of the machine of FIG. 1 showing details of the interconnected members according to the instant invention;

FIG. 3, is a side view of the showing of FIG. 2;

FIG. 4, is a prospective view of a connecting wedge in the instant invention;

FIG. 5, is a top view of the wedge of FIG. 4;

FIG. 6, is a side elevation of the wedge of FIG. 4;

FIG. 7, is a rear elevation of the wedge of FIG. 4;

FIG. 8, is a schematic view showing a support member in place on a cross member prior to being secured;

FIG. 9, is a view similar to FIG. 8 but showing a pair of wedges in position prior to securing;

FIG. 10, is a view similar to FIG. 9 but showing a driving tool coacting with the wedges in the process driving same home;

FIG. 11, is a view similar to FIG. 10 but showing the wedges fully driven home so as to secure the support member and cross member in place;

FIG. 12, is a front elevational view of a modified form of wedging device adapted for use with the instant invention;

FIG. 13, is a side elevational view of the wedging device of FIG. 12;

FIG. 14, is a top view of the wedging device of FIG. 12;

FIG. 15, is a sectional view taken along line 15—15 of FIG. 12; and

FIG. 16, is a schematic view of a support member and cross member interconnected by the wedging device of FIG. 12.

DESCRIPTION OF THE PREFERRED EMBODIMENT

For convenience, the invention will be described as applied to a vibrating screen for bulk material processing with its screen cloth crowned at the center and supported on rubber strips carried by support bars disposed in tubular posts, of circular cross section, secured between the side frames of the machine; it being

understood nevertheless that without departing from the scope of this invention that the posts and cross members can be of my convenient cross section and need not necessarily be tubular, that the support bars need not carry rubber strips, need not form a crown configuration for the screen, and need not in fact support a screen, that the equipment can be other than of the vibrating type and need not be for processing bulk material.

With reference to FIG. 1 there is generally shown at 20 a vibrating screen of the type shown in U.S. Pat. No. 2,188,060 wherein agitation of bulk material deposited therein, due to vibrations imparted thereto by suitable means, effects a sizing of the bulk material dependant upon the size of apertures provided in wire cloths 22 and 24. A plurality of longitudinally extending support bars 30 (FIGS. 1, 2, and 3), carried by vertical posts 32, 34, 36, and carrying strips 40 of rubber or other resilient material support wire cloths 22 and 24 in the crowned configuration shown in FIG. 1. The crown is accomplished by making posts 32, 34, and 36 so that they increase in height according to the configuration of the desired crown.

Posts 32, 34, and 36 are formed with suitable tubular metal stock and are of circular cross section. They are appropriately positioned along a cross member 46, also formed from suitable metal stock and are also of circular cross section. Posts 32, 34, and 36 are secured to their respective cross members 46 by any suitable and permanent means such as welding. Cross members 46 are in turn connected to side frames 50 and 52 of screen 10 by suitable means permitting separation thereof such as bolting or the like (not shown).

A pair of wedges 60 (FIGS. 2-11) are utilized to secure each support bar 30 in position in its respective set of vertical posts 32, 34, or 36 with the number of such posts, and the corresponding cross-members 46 depending upon the length of screen 10. Wedges 60 are formed with ribs 62 (FIGS. 4 and 5) tapers 64, 64 (FIG. 6) a curved back 68 (FIG. 7) and an upper cross arm 70 with a pair of notches 72 (FIGS. 4 and 7). The configuration of the various elements of wedges 60 is such as to facilitate the insertion thereof in pockets 76 (FIGS. 8 and 9), provided therefore between support bar 30 and the inner walls of posts 32, 34, and 36; and the subsequent driving of wedges 60 (FIG. 10) into a home position (FIG. 11) wherein support bar 30 is firmly, but releasably clamped in place.

A substantially U-shaped tool 80, (FIG. 10) having a pair of legs 82 adapted for disposition with upper cross arms 70 of wedges 60, may be utilized to drive wedges 60 to their home position. The application of suitable force to tool 80 as by a hammer, sledge, or suitable impact tool will serve this purpose. If preferred, or if a tool 80 is not available, the driving force may be applied directly to upper cross arms 70 of wedges 60.

As wedges 60 are driven have tapers 66 thereof coact with the side walls of support bar 30 and backs 68 thereof coact with the inner walls of posts 32, 34, or 36 to develop the clamping forces. Notches 72 are provided in the under side of cross arms 70 to accommodate the side walls of posts 32, 34, and 36.

The relative, thickness of the wedges and posts and their respective materials, steel, etc. will depend upon the application and the forces required to secure support bar 30 in position during normal operation of screen 10.

Should service, repair or replacement be required for either support bar 30, or one or more cross members 46 connected thereto, one need only remove wedges 60 to separate bar 30 and posts 32, 34, or 36. Wedges 60 can be removed by application of suitable forces directly to support bar 30 or to the underside of cross-arm 70. This can be done by directly striking same with a hammer, sledge or suitable impact tool, by the use of an intermediately tool member, or by a special tool for developing an upward force thereupon sufficient to dislodge wedges 60.

The wedging action may also be accomplished by a single piece wedge 90 (FIGS. 12-16). Wedge 90 is formed from rubber or other suitable hard but, resilient material. It has a pair of legs 92 interconnected in U-shaped configuration by a cross piece 94 to form between a pocket 96.

Each leg 92 is topped by a cap 98 notched out at 100 to facilitate seating thereof upon the top of post 36'. Posts 36' are formed of various heights the same as posts 32, 34, and 36 and are appropriately secured to cross members 46' as in the embodiment of FIGS. 1-11.

Support bars 30', adapted to be capped by rubber strips 40' are disposed in pockets 96 and, when driven home as shown in FIG. 16, are securely disposed therein. Legs 92 are formed with back walls 102 and tapers 104 to facilitate the interaction of wedges 90 with the inner walls of posts 36' and the outer surface of support bar 30'. Their respective configurations are such as to produce the required forces to connect support bar 30' to posts 36' for normal uses but so as to permit separation thereof when required.

Support bar 30' may be connected to post 36' by first positioning wedge 90 fully on bar 30' and then driving the two to home position (FIG. 16) or by positioning wedge 90 in post 36' and then driving support bar 30' to home position. Separation is accomplished by the application of suitable forces to the underside of bar 30'.

From the above description it will thus be seen that a novel and improved system and mechanism has been provided for releasably connecting a pair of intersecting members.

It is understood that although I have shown the preferred form of my invention that various modifications may be made in the details thereof without departing from the spirit as comprehended by the following claims:

I claim:

1. Bulk material processing equipment: comprising
 - a. deck means for receiving bulk material;
 - b. a plurality of support members forming a support means for said deck means and extending in a predetermined direction;
 - c. a plurality of cross-members each extending beneath and across said support members;
 - d. a plurality of vertical posts carried by each of said crossmembers, in spaced relationship thereon, for coaction with and to support said support members; and
 - e. wedge means releasably connecting said crossmembers and said support members together.
2. Bulk material processing equipment: comprising
 - a. deck means for receiving bulk material;

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b. a plurality of support members forming a support means for said deck means and extending in a predetermined direction;

c. a plurality of cross-members each extending beneath and across said support members;

d. a plurality of vertical posts carried by each of said crossmembers, in spaced relationship thereon, for coaction with and to support said support members;

e. each of said vertical posts is formed with a notch adapted to receive a portion of said support member so as to provide at least one space between a side surface of said support member and an opposed side surface of said notch; and

f. wedge means releasably connecting said crossmembers and said support members together;

g. said wedge means being disposed in said notch and coaction with said side surface of said support member and the opposed side surface of said notch to provide said releasable connection.

3. The equipment of claim 2: wherein each of said vertical posts is formed of a regular configuration and so that said notch extends downward from the top and

across the width thereof.

4. The equipment of claim 3 wherein each said post is tubular.

5. The equipment of claim 4 wherein each said post is of circular cross section.

6. The equipment of claim 5 wherein said notch formed in said post is sufficient to provide a space to either side of said support bar and wedging means are disposed in each space.

7. The equipment of claim 6 wherein each wedging means is tapered on the face thereof disposed proximate said support bar and has its opposite surface conforming to that of the inner surface of said vertical post.

8. The equipment of claim 7 wherein said wedging means are inserted with sufficient force to develop clamping wedging forces between said support bar and vertical post to retain same interconnected throughout normal use of the equipment but so as to permit removal thereof to separate said support bar from said post.

9. The equipment of claim 8 wherein said deck comprises wire cloth.

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