Nov. 19, 1957 J. B. BRUGMANN 2,813,629

SCREEN SUPPORT

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FIG. 1.

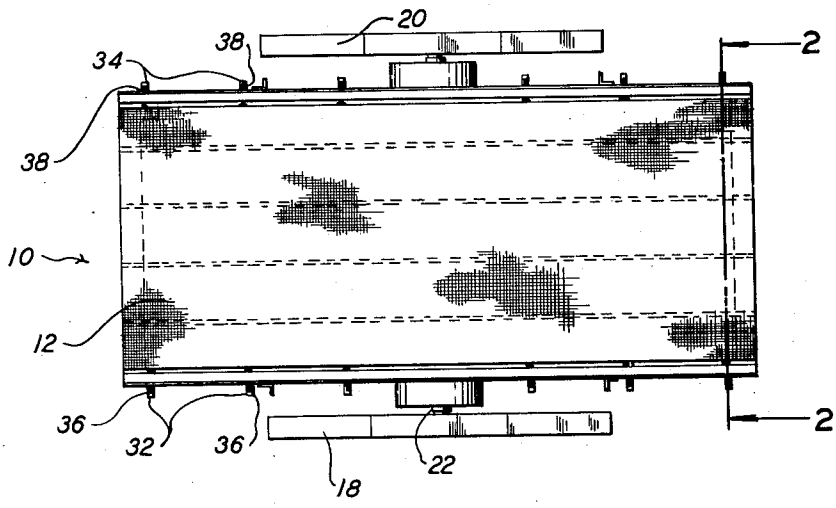
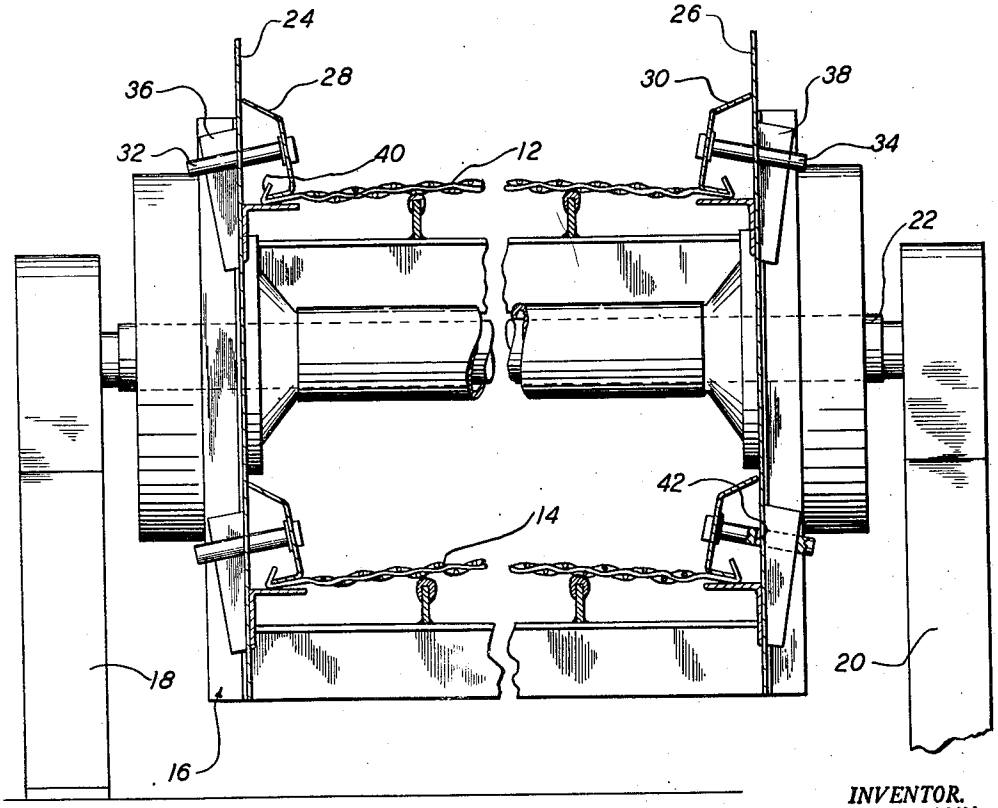


FIG. 2.



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SCREEN SUPPORT

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This invention relates to machinery for screening materials in which a screen is supported on opposite sides by a framework and means are provided for moving the framework so as to shake the screen. The invention has particular reference to improved structural inter-connection between the screen and the framework.

There are several important aspects to consider in connecting the screen to the framework. For best screening action the screen should be supported under tension. Since screens normally handle tons of material within short periods of time, they wear out at frequent intervals and have to be replaced. Any means for connecting the screen under tension to the framework must not become loosened by the vibration of the framework.

Conventionally, the screen is connected to the framework by a large number of bolts secured with nuts. The main disadvantage with this kind of connection is that it is a time-consuming task to take out a worn screen and put in a new one because of the number of bolts and nuts which must be loosened and re-tightened. The task of screen replacement is further complicated under crowded conditions where access to some of the nuts with a wrench is at best awkward. Although manufacturers have expended considerable effort, so far as is known, no better method for connecting the screen to the framework has been devised. So far, nuts and bolts have been the most convenient connection which would stand up under the vibration.

The difficulty of screen replacement is substantially overcome by the apparatus of the present invention. In the present invention each connection between the screen and the framework is made with a connecting member which extends through a portion of the framework, and means are provided for coupling the screen to one end of the connecting member. The connecting member has a slot extending through it which is spaced from its other end. A wedge-shaped member is inserted through the slot, and this wedge-shaped member exerts a force against the framework for providing tension on the screen and securing the screen and the connecting member to the framework.

A preferred embodiment of the invention includes a skirt member and means coupling the skirt member to one edge of the screen. A plurality of connecting members are rigidly coupled at spaced locations to the skirt member and extend through a portion of the framework. Each of the connecting members has a slot extending through it in a direction approximately transverse to its length, these slots being spaced from the ends of the connecting members remote from the skirt member. The skirt member and the connecting member are oriented so that all of the slots are approximately vertical. Each slot receives a wedge-shaped member which exerts a force against the framework for providing tension on the screen and securing the screen, the skirt member and the connecting members to the framework. Each of the wedge-shaped members is oriented with its wedge shape pointing approximately in the downward direction.

To remove a screen it is necessary only to knock the wedges out of the slots, as with a hammer. This is found to be far easier than unscrewing a nut, and considering the number of connections ordinarily involved, the saving in time and effort is substantial. To tighten a new screen in place, the wedge-shaped members are knocked downwardly into the slots whereupon the wedge-shaped members exert a force against the framework and tighten the screen.

It is notable that the apparatus of the invention stands up very well under the vibration of the framework. At first view, persons familiar with the vibration of a screening machine have suggested that the wedged members would work their way out of the slots because of this vibration. However, experiment has shown that the wedge-shaped members have very little tendency to work up in the slots and will maintain a tight connection.

The apparatus of the invention is explained in detail with reference to the drawings in which:

Fig. 1 is a top view of a materials-screening machine outfitted with the preferred embodiment of the invention; and

Fig. 2 is an enlarged fragmentary view taken along line 2—2 of Fig. 1 showing the preferred embodiment of the invention in greater detail.

Referring to the drawings, a materials-screening machine **10** includes an upper screen **12** and a lower screen **14**. The screens are supported on opposite sides by a framework **16**, the framework being secured to base supports **18**, **20** by means of a rotatable eccentric shaft **22**.

The shaft **22** is powered by a motor (not shown). The eccentricity of the shaft causes the framework to move in the orbit of a small circle. This movement serves as a shaking action for the screens and facilitates the sifting of materials through the screens. The framework includes a pair of side panels **24**, **26**, and it is the side panels to which the screens are coupled.

Each screen is typically connected to the side panels by means of a pair of skirt members such as the skirt members shown at **28**, **30** in cooperation with respective pluralities of connecting members **32**, **34** and respective pluralities of wedge-shaped members **36**, **38**. Each of the skirt members is roughly in the shape of a long channel. The upper edge of the channel presses against and pivots on the associated side panel of the framework and the movable lower edge of the channel is coupled along one edge of a screen to hold the screen in place and provide tension on it.

The opposite edges of each screen are turned upwardly as shown typically at **40**, and the coupling between the lower edge of a skirt member and the edge of a screen is made by hooking the upturned portion of the screen around the lower edge of the skirt member.

The connecting members are in the form of bolts having head portions rigidly coupled at spaced locations to the skirt member. The bolts extend through the side panels of the framework, and each bolt has a slot as shown typically at **42** extending through it in a direction approximately transverse to its length so that the end walls of the slots are disposed substantially perpendicularly with respect to the longitudinal axis of the bolts, these slots being spaced from the ends of the bolts remote from the skirt member. The orientation of each skirt member and the associated bolts is such that all of the slots are approximately vertical.

Each slot receives one of the wedge-shaped members, with the wedge shape of the member pointing approximately in the downward direction. The wedge shape of the member causes it to exert a force against the side panel which provides tension on the screen and secures the screen, the skirt member and the connecting member to the side panel. In a preferred embodiment of the inven-

tion, the connecting members or bolts **32, 34** extend through the framework **24, 26** at an acute angle with respect to the framework. The position of the wedge-shaped members in the slots in the bolts controls the tension on the screen by forcing the heads of the bolts toward the framework and changing the angle at which the body portions of the bolts extend through the framework to thereby force the movable lower edge of the skirt members toward the framework. The tension on the screen and the pivot action of the skirt members maintain the wedge-shaped members in place during operation of the machine. In order to remove one of the screens from the machine, the wedge-shaped members are knocked out of the slots in the bolts, as with a hammer; the skirt members are pulled away from the side panels of the framework sufficiently for the edges of the screen to be unhooked from the lower edge of the skirt members; and the screen is removed. To put in a new screen, the edges of the new screen are hooked around the lower edges of the skirt members; the skirt members are pushed against the side panels of the framework with the bolts extending through the side panels; and the wedge-shaped members are driven downwardly into the slots in the bolts until the screen is sufficiently tight. As shown in Fig. 2, the connection of the upper screen **12** and the lower screen **14** to the framework is identical.

The wedge-shaped members are found to remain in place despite the vibration of the framework providing that their wedge shape is not too sharp. The wedge-shaped members should fit snugly against the outer end walls of the slots **42** in the connecting members. This is achieved by making the angle which the outer end wall of the slot makes with respect to the longitudinal axis of the connecting member substantially equal to the angle at which the connecting member extends through the framework less the angle which is defined by the wedge-shaped member under normal operating conditions for the machine, as is evidenced from the orientation of the wedges and connecting members which are shown in Fig. 2. By experiment it is found that a wedge having sides converging approximately at an angle of 10° works satisfactorily. The angle of 10° is a reasonable compromise between making the wedge too sharp and making the wedge too long. If desired, washers or the like may be inserted onto the bolts between the wedges and the side panels so as to prevent the wedges from abutting against the side panels. This is a matter of choice and is not considered essential to the effective operation of the apparatus of the invention.

It is to be understood that the materials-screening machine shown in the drawings is highly simplified so as to avoid a morass of detail which would be confusing in the portrayal of the invention.

I claim:

1. In a machine for screening materials having a screen supported on opposite sides by a framework so that movement of the framework shakes the screen, and having at least one skirt member for coupling the screen to the framework, the skirt member having one portion which abuts against and pivots on the framework and having another portion which engages the screen and which is movable toward the framework to increase the tension on the screen, the improvement which comprises at least one connecting member coupled to the skirt member and having a slotted body portion which extends through an opening in the framework, and a wedge-shaped member extending through the slot in the connecting member on the side of the framework opposite the screen and disposed between the outer end wall of the slot and the framework so that the position of the wedge-shaped member in the slot controls the tension on the screen by controlling the location of the movable portion of the skirt member and so that the tension on the screen and the pivot action of the skirt member maintain the wedge-shaped member in place during the operation of the machine, the angle which the outer end wall of the slot makes with respect to the longitudinal axis of the connecting member being substantially equal to the angle at which the connecting member extends through the framework less the angle which is defined by the wedge-shaped member under normal operating conditions for the machine.

2. In a machine for screening materials having a screen supported and tensioned on opposite sides by a framework so that movement of the framework shakes the screen, and having at least one skirt member for coupling the screen to the framework, the skirt member having one portion which abuts against and pivots on the framework and having another portion which engages the screen and which is movable toward the framework to increase the tension on the screen, the improvement which comprises at least one connecting member having a head portion engaging the skirt member and having a slotted body portion which extends through the framework at an acute angle with respect to the framework, the slot extending through the connecting member and having end walls disposed substantially perpendicularly with respect to the longitudinal axis of the connecting member, and a wedge-shaped member extending through the slot in the connecting member on the side of the framework opposite the screen and disposed between the outer end wall of the slot and the framework so that the position of the wedge-shaped member in the slot controls the tension on the screen by forcing the head of the connecting member toward the framework and changing the angle at which the body portion of the connecting member extends through the framework to thereby force the movable portion of the skirt member toward the framework, the wedge-shaped member being oriented with its wedge shape pointing approximately in the downward direction, whereby the tension on the screen and the pivot action of the skirt member maintain the wedge-shaped member in place when the framework shakes.

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