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PLURAL CLOTH SCREENING APPARATUS

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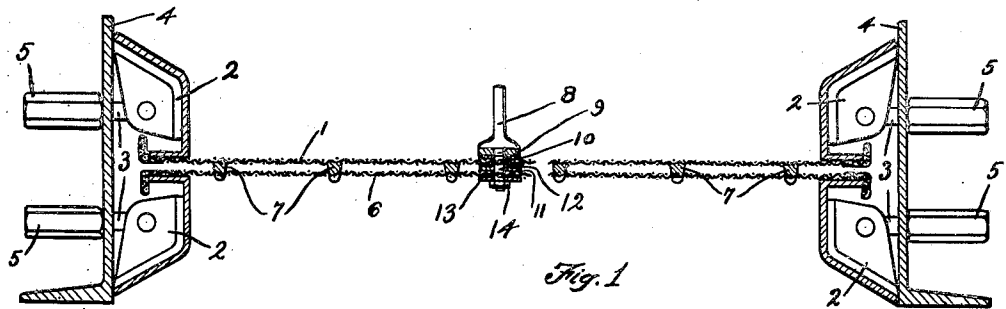


Fig. 1

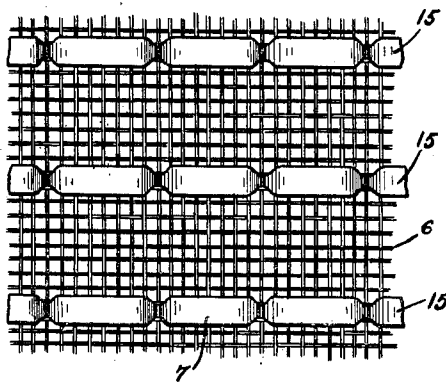


Fig. 2

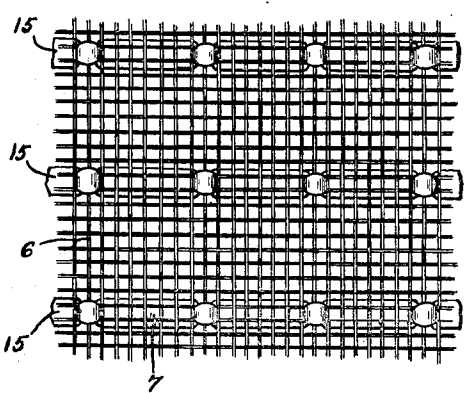


Fig. 3

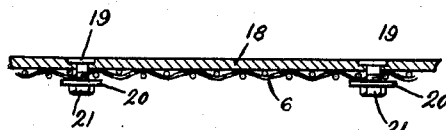


Fig. 4



Fig. 5

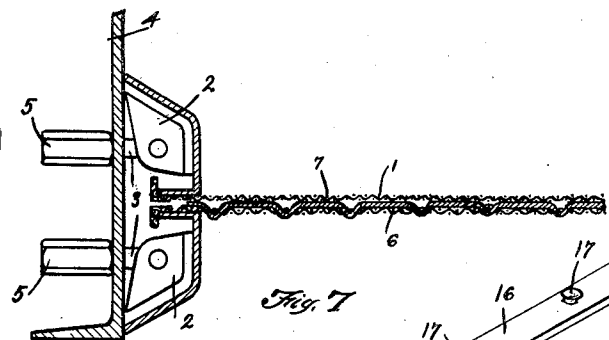


Fig. 7

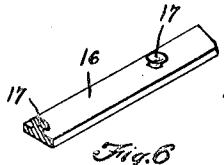


Fig. 6

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PLURAL CLOTH SCREENING APPARATUS

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1 Claim. (Cl. 209—403)

This invention relating as indicated to plural cloth screening apparatus has specific reference to a form of construction of screen apparatus in which a relatively strong web cloth is employed in association with a weaker screening cloth for the purpose of supporting the same as the material to be classified is passed thereover.

As is well known to those familiar with the art, certain screening cloths such as fine mesh and the like are incapable of being efficiently employed in large unsupported areas for the reason that the cloth does not have sufficient strength to evenly distribute vibrations imparted thereto when a heavy load of material is passing over the cloth. In order to cure this difficulty, it has been the practice in the past to place another screen cloth or a suitable supporting web underneath this fine cloth in order to provide suitable support and also so that the vibrations imparted to the cloths may be uniformly distributed over the screening surface.

These types of construction have only been moderately successful for the reason that as the superimposed cloths are vibrated during the screening operation, considerable relative movement occurs between the cloths and hence, one or the other, usually the finer cloth, is subjected to destructive wear, which may either be the abrading effect due to relative movement between the cloths or the irregularities in the surface of the coarser mesh supporting the cloth will puncture the finer cloth.

It is among the objects of my invention to provide a form of screening apparatus of the character described which shall have none of the above-named undesirable characteristics and which shall be capable of being employed with increased efficiency over the types of apparatus previously constructed.

It is a further object of my invention to provide a plural cloth screening apparatus in which the vibrations imparted to the supporting cloth or web will be more efficiently transmitted to the classifying cloth.

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

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claim.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various me-

chanical forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a fragmentary, broken transverse sectional view of a screening apparatus constructed in accordance with the principles comprising my invention; Fig. 2 is a fragmentary plan view drawn to an enlarged scale of a portion of the apparatus illustrated in Fig. 1; Fig. 3 is a bottom view of the structure shown in Fig. 2; Fig. 4 is a transverse sectional view through a screen cloth showing an alternative form of construction; Fig. 5 is a fragmentary transverse sectional view of a screen cloth showing a further alternative form of construction; Fig. 6 is a fragmentary perspective view of a separating element such as is illustrated in Fig. 5; and Fig. 7 is a fragmentary sectional view similar to Fig. 1 showing a different arrangement of the means for separating the cloths.

Referring now more specifically to the drawing and more especially to Fig. 1, a screening apparatus constructed in accordance with the principles comprising my invention consists of a screening cloth 1, which is employed for the purpose of classifying the material being treated. This cloth may be gripped along opposite edges by toggle members 2 which have pivotally secured thereto studs 3 which extend through the side frame members 4 and are secured and the screen cloth 1 accordingly tensioned by means of nuts 5. As the studs 3 move axially through the side frame members, the screen cloth 1 will be tensioned to a suitable degree.

Disposed beneath the classifying cloth 1 is a supporting web structure, such as a screen cloth 6, which will preferably be of greater mesh than the classifying cloth and also capable of supporting a greater load, either by virtue of a different type of material from which the same is formed or by having the strands of the cloth of larger cross sectional area. This lower cloth may be tensioned and accordingly supported by means such as have been described in connection with the upper cloth so that like reference characters will be applied to designate corresponding parts of such supporting means.

The upper and lower cloths 1 and 6, respectively, are maintained in slightly spaced relation by a plurality of members such as 7, the form of which is most clearly illustrated in Figs. 2 to 5, the construction of which will be hereinafter more fully explained.

Vibration may be imparted to the classifying cloth by means of any suitable vibratory mecha-

nism acting upon a rod 8 which may be, at its lower end, secured to the cloths in the following manner:

A strip 9 of flexible material, such as steel, is placed on the upper cloth and preferably extends throughout its length. In order that this strip will not deteriorate the fine mesh cloth, a buffer strip 10 of material, such as rubber, asbestos, etc., will be interposed between the flexible strip 9 and the cloth 1. A flexible strip 11 similar to strip 9 will be placed on the under side of the cloth 1 and a buffer strip 12 similar to 10 will be employed between a strip 11 and the cloth 1 for the purpose of protecting the cloth. Another flexible strip or a washer, generally indicated at 13, will be placed on the lower side of the supporting web against which will be drawn a nut 14 threaded on the stem of the rod 8. Another buffer strip such as 10 might be interposed between the strip 13 and the cloth 6 for the purpose of protecting such cloth against wear. It is to be noted also that a number of bolts will be employed at spaced points longitudinally of the strips 9 and 13 in order to maintain such strips in assembled relation throughout their length. Vibration of the rod 8 by suitable means will, therefore, effect a vibration in the first instance, principally of the supporting web 6, and such vibrations will thereupon be transmitted by means of the members 7 to the classifying cloth 1, although a part of the vibration of the cloth 1 may be received directly from the vibrator 8.

The means for maintaining the supporting web and the classifying cloth in spaced relation and for imparting vibrations from the former to the latter is illustrated in Figs. 2 and 3. As illustrated in these figures, the spacing and vibration transmitting members, previously referred to as 7, consisting of strips 15 of suitable material, such as rubber, asbestos, fibrous composition and the like, are woven into the screen in the manner illustrated in these figures so as to be permanently secured thereto and also present substantially continuous areas for the support of the classifying cloth.

Instead of weaving the strips 15 into the supporting web or cloth 6, as illustrated in Figs. 2 and 3, I may prefer to employ strips, such as 16, as illustrated in Fig. 5, which have projecting buttons 17 formed integrally therewith to project through the openings in the cloth 6 and thereby secure the strips 16 thereto. The strips, such as 16, if formed in this manner, may be applied to the cloth or web after the same has been woven, thereby facilitating replacement and repair after the cloth has been in use, or the buttons 17 may be secured in the cloth at the time the same is woven. The form of the strips 16, more specifically the buttons 17, are illustrated in perspective in Fig. 6.

For certain types of material, such as wood, fibrous composition, or metals, it may be found

more convenient to secure such spacing and/or vibration imparting elements to the supporting web or cloth in the manner most clearly illustrated in Fig. 4. In this form of construction, the strips 18 are secured to the cloth or web by means of studs 19 extending through the openings in the cloth or web and maintained in assembled relation by washers such as 20 and nuts 21. The form of construction illustrated in Fig. 4 makes possible the use of materials, such as wood, steel, and the like and for certain types of installation, I may prefer to form the strips 18 of suitable resilient material so as to more efficiently distribute the vibrations over the entire screen area which are imparted thereto by vibrating elements such as 8.

When operating upon certain classes of material, such as those containing considerable portions of liquid, it has been found advisable to arrange the spacing strips transversely of the screen cloth with respect to the direction of movement of the material thereover, as illustrated in Fig. 7. When the spacing strips are arranged transversely of the screen, then they will serve as means for preventing the liquid from running along on the under side of the cloth, which is objectionable to the efficient operation of the apparatus. As the material runs along the under side of the cloth, it strikes these transverse strips and is deflected thereby off from the cloth.

By the employment of apparatus, as above illustrated, a relatively fine and structurally weak classifying cloth may be employed and supported by a relatively stronger supporting web or cloth without having such supporting web or cloth damage the fragile structure of the classifying cloth. By the employment of apparatus comprising my invention, more efficient distribution of vibration over the entire screening area is effected, thereby adding to the efficiency of the operation of the apparatus.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by the following claim or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

In a screening apparatus, the combination with a screen frame, a coarse mesh screen, a finer mesh screen overlying said coarse mesh screen, means engaging said screens along opposite edges and supporting the same for uniform vibratory tension in said frame, means woven into said coarse screen and contacting the lower side of the fine screen to support the finer mesh screen out of contact with said coarse cloth, and means engaging both said screens for vibrating the same in unison.

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