MEANS FOR SUPPORTING WIRE CLOTH

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My Invention relates to improved means for supporting screen wire cloth in commercial screening machines and the like.

The principal object of my invention is to provide means for prolonging the life of the wire cloth used in commercial screening machines.

An important object is to provide means for greatly prolonging the life of fine mesh wire cloth, and particularly of ultra wire cloth, used in commercial screening machines, thus rendering the use of such cloth economically feasible when used for industrial screening.

A further object is to provide a relatively soft supporting means for ultra wire screening cloth to greatly lengthen the life thereof by materially reducing the wear caused by the contact between the cloth and the supporting means therefor.

A further object is to provide satisfactory means for supporting ultra wire cloth in gyratory riddle screen pans.

Other objects and advantages of the invention will become apparent during the course of the following description.

In commercial screening machines it is customary to stretch a wire cloth so that a substantially taut surface, flat, cylindrical, or the like, is presented for screening. In the coarser meshes the cloth usually is of sufficient strength to require no support, but in the finer meshes, for example 100 mesh or finer, it is customary to provide a supporting means for the fine mesh cloth, usually a foraminite supporting means such as other wire cloth of relatively coarser mesh. Such supporting means serves to support the screening medium while at the same time permitting the passage of material therethrough.

For example, where 150 mesh wire cloth is used in a commercial screening machine, e.g. in the screen pan of a gyratory riddle, a supporting or backing wire cloth of 24 mesh is suitable for use. In order to provide as smooth a backing as feasible, it is customary to use rolled wire cloth as the backing.

The practice of using relatively fine mesh wire cloth superposed on coarser mesh wire cloth has proved satisfactory in practice, but when an attempt was made to employ this procedure with very mesh wire cloth, which as is well known is markedly less strong and less wear resistant as the very fine meshes are reached, it was found that such cloth wore out with extreme rapidity, and in fact so quickly as to make it utterly infeasible from an economic standpoint to employ it for screening.

In my copending application Serial No. 420,794, filed January 14th, 1930, I have disclosed a plated fine mesh wire cloth which I have termed "ultra wire cloth". This ultra wire cloth, (i.e. ultra wire screening cloth), although considerably more durable than ordinary very fine mesh wire cloth with openings of similar size, was also found to be comparatively short lived when employed with the usual supporting means (i.e. coarser wire cloth backing) in the customary manner in commercial screening machines, for example in a gyratory riddle screen pan or frame such as is disclosed in my copending application Serial No. 539,943, filed May 2nd, 1929.

A close examination of an ultra wire cloth so used until worn out, revealed the fact that the destruction of the cloth had not been brought about by the passage of material therethrough, but rather by the wearing effect of the backing wire cloth on the ultra wire cloth.

In an endeavor to lengthen the life of ultra wire cloth, such cloth was used without any support or backing wire, but the cloth did not prove strong enough for use in this manner and quickly split or tore, sometimes in the main part of the cloth exposed to the material screened, and sometimes at the line of attachment to the screening machine. It was manifest that an unsupported cloth was not sufficiently strong either to sustain for any length of time the weight of material therein under the influence of vibration or the strains at the line of attachment caused by such vibration.

After considerable experimentation it was found that by providing a support for the ultra wire cloth substantially softer than the ultra wire cloth the life of such cloth was greatly prolonged, so much so that it now becomes economically feasible to use ultra wire cloth for industrial screening. Examination of pieces of such cloth so supported and worn out in use, reveals the fact that the cloth actually has been worn out by the passage of material therethrough, and not as heretofore by wear from the supporting means.

There are a number of substantially softer supporting means that are suitable, such as relatively soft supporting metal. For example, if a nickel plated ultra wire cloth be used, a silver, or heavily silver plated, supporting means may be employed. Similarly, fibrous supporting means such as wood, cords, or textile fabric may be used, but I have found the most suitable supporting means to be a soft resilient material such as rubber, balata, gutta percha or the like, and of these materials it is preferred that rubber, preferably soft rubber, be employed. Several
specific means for employing such soft rubber will be referred to in detail later. In the accompanying drawing I have shown two advantageous means for supporting the wire cloth. In this showing,

Figure 1 is a central vertical sectional view of a gyrorathy screen pan,

Figure 2 is an enlarged fragmentary sectional view of one form of base material adapted for use in making the supporting means,

Figure 3 is a similar view showing the supporting means complete and in operative position with respect to the wire cloth,

Figure 4 is a view similar to Figure 3 showing a modified form of the invention, and,

Figure 5 is a fragmentary plan view of the modified form of the invention.

Referring to Figure 1, the invention has been illustrated in connection with a gyrorathy screen pan of the type disclosed in my copending application Serial No. 359,943, similar to Figure 10 therein except that the supply spout is arranged centrally of the cover and the distributing plate is arranged substantially horizontally, but it will become apparent that the invention is not limited in any respect to its use with this particular type of apparatus.

Referring again to Figure 1, the numeral 5 designates the pan of a gyrorathy, and this pan is surrounded in spaced relation thereto by an outer wall 6 which extends upwardly a substantial distance above the upper edge of the pan 5. The pan 5 and outer wall 6 are connected by a bottom wall 7, and the pan 5 and walls 6 and 7 define a trough into which rejected oversized material from the screen to be described overflows over the upper edge of the pan 5. The rejected material is discharged through an outlet spout 8.

The wall 6 is provided with a cover 9 having an opening 10 therein above which is arranged an inlet spout 11. Material to be screened is fed into the device through the spout 11, and a perforated spreader plate 12, preferably horizontally arranged centrally of the device is disposed beneath the spout 11.

A wire cloth 13 effects the desired screening action and is supported within the open bottom of the pan 5 by a supporting element indicated as a whole by the numeral 14. The cloth 13 and supporting means 14 are arranged between a gasket 15 and a ring 16, and the elements referred to are suitably secured by bolts or other fastening elements 17 to an invadably projecting flange 18 carried by the pan 5.

Whereas the numeral 5 represents the “pan” proper of the particular type of screen pan shown in Figure 1, the expressions “screen pan” or “screen frame” are used herein broadly to indicate a complete structure such, for example, as that shown in Figure 1, with the exception of the parts designated as the wire cloth 13, the supporting element 14, and the cover 9.

The limitations of the support 14 are disclosed in Figures 2, 3, 4 and 5, but it will become apparent that the invention may be embodied in a great number of mechanical forms with satisfactory results. It is to be understood therefore that the embodiments of the invention illustrated are to be taken merely as examples of means for accomplishing the desired result.

Referring to Figure 2 the numeral 19 designates a standard relatively coarse mesh wire screen, for example 2 or 3 mesh, in which strands of wire employed are circular in cross section as illustrated. The base material thus employed is subjected to a relatively heavy rolling action at the points 20 (see Figure 2) to flatten the protuberances of wire and thus provide flat surfaces of substantial area in parallel relation to the wire cloth to be supported, as indicated by the numeral 21 in Figure 3. The base material is then coated with a substantially uniform layer of soft rubber, preferably through a process of electrodeposition commercially known as the “anode process”. The outer surfaces of the rubber obviously will substantially follow the surface contours of the rolled base cloth, thus presenting substantially flat surfaces of substantial area for contact with the wire cloth to be supported.

A somewhat modified form of the invention is shown in Figure 4 in which there is employed a perforated metal plate 22 of appropriate thickness such as 20 gauge, with perforations of any suitable size, such as a half inch square. The perforated plate is similarly coated with soft rubber as at 24 and in each case, the rubber is applied to a suitable thickness such as 1/16”.

The supporting means employed may be of any suitable design or construction, providing it presents sufficient supporting surface in a plane substantially parallel to that of the ultra wire cloth, and of sufficient open area to allow the passage of material therethrough. Such supporting means are illustrated in the drawing, but other forms may be employed, as stated above. For example, a grid may be employed, with openings rectangular or otherwise, or with spiral openings, but I prefer to use a foraminated supporting means such as the woven or perforated means illustrated in the drawing.

In this connection it may be stated that a supporting means made of perforated sheet rubber has been employed by me, but I have found that such means, after a relatively short time, does not satisfactorily support the ultra wire cloth unless the rubber be suitably stretched, supported or reinforced. A foraminated or other suitable backing of rubber may be supported by an independent substantially non-stretching support, but I prefer to use a rubber supporting means suitably reinforced, and integrated with it if reinforcement, since such a construction is much simpler and easier to handle.

As previously stated, I prefer to employ a reinforced rubber coated foraminated supporting means of the character illustrated in the drawing. It is possible, of course, to apply rubber merely to surface areas on that surface of a foraminated metallic or other reinforcing means, which is to be in contact with the ultra wire cloth, but the use of such a construction is not preferred. With such a construction, it will be obvious that the size of the openings in the foraminated supporting sheet would not be reduced. With the preferred construction illustrated, the holes in the sheet are made somewhat smaller by rubber coating the portions of the metal formerly defining the holes, but the rubber coating does not change the essential foraminated nature of the reinforcing sheet.

In the preferred practice of the invention, therefore, a well rolled coarse mesh wire cloth or a perforated metal plate is coated with a thin layer of soft rubber, preferably by the process of electrodeposition referred to above. An ultra wire cloth is then superposed on the rubber coated foraminated sheet, and smoothed over it, but preferably not tightly stretched. The ultra wire cloth and its rubber coated foraminated support
are then placed in a suitable commercial screening device such, for example, as the gyratory riddle screen pan shown in Figure 1 of the drawing, and, after being suitably attached thereto, are ready for use in screening. In the embodiment of the invention shown in Figure 1, the screen pan is inserted into the gyratory riddle and the material to be screened is introduced into the pan through the spout 11 for distribution over the surface of the ultra wire cloth. The oversize material is rejected on the cloth surface, and the screened material passes through the cloth and through the openings in the supporting sheet, and thence out of the screening machine.

I have found that the herein disclosed means for supporting ultra wire cloth greatly lengthens the life of the cloth and makes economically feasible its use in industrial screening, particularly in the screening of liquid suspensions of finely ground solids.

It will be apparent that such supporting means also will serve to lengthen the life of other wire cloths or coarser mesh, which is now commonly employed with still coarser wire cloth backing, and I consider this use also to fall within the scope of the present invention. There is this difference, however, between the use of the invention with such coarser wire cloth, and its use with very fine mesh and ultra wire cloth: in the first instance the invention merely effects an economy, whereas in the second instance the invention is a necessary factor in the employment of very fine mesh and/or ultra wire cloth, as hitherto there has been no method available by which it was economically feasible to employ such cloths for industrial screening.

By a “screening device I mean a device for accomplishing a separation of material according to particle size by means of a screen or wire cloth.

Where in the claims I use the word “rubber” I mean to include within the scope of that word rubber and/or rubber like materials such, for example, as rubber, balata, gutta percha, or the like.

Whereas I have described in detail the preferred embodiments of my invention, the description is to be construed as illustrative only and not limiting, and as will be apparent to one skilled in the art numerous changes may be made therein without departing from the spirit of my invention or the scope of the subjoined claims.

I claim:

1. In a screening device, in combination, a wire screening cloth, and reinforced rubber foraminate supporting means for said cloth having areas of substantial size contacting with one face thereof.

2. In a screening device, in combination, a wire screening cloth, and reinforced rubber foraminate supporting means for said cloth having areas of substantial size contacting and substantially co-extensive therewith.

3. In a screening device, in combination, a wire screening cloth, and rubber coated foraminate supporting means for said cloth contacting therewith.

4. In a screening device, in combination, a wire screening cloth, and supporting means substantially co-extensive therewith and having spaces for the passage of material therethrough comprising a metallic reinforcing means having a soft rubber coating contacting with one face of said cloth.

5. In a screening device, in combination, a wire screening cloth, and supporting means substantially co-extensive therewith and comprising a foraminate metallic sheet coated with soft rubber on at least one face thereof to provide supporting areas of substantial size to contact with one face of said cloth.

6. In a gyratory riddle, in combination, a screen, a fine mesh wire cloth and a soft rubber coated metallic foraminate supporting means therefor attached to said screen frame.

7. A supporting device for wire screening cloths comprising a relatively rigid reinforcing structure having spaces for the passage of material therethrough, and a coating on at least one side of said reinforcing structure, said coating being formed of a material substantially softer than the screening cloth and having areas of substantial size adapted to contact therewith.

8. In a screening device, in combination, a wire screening cloth, and unitary sheet-like foraminate supporting means for said cloth lying face to face therewith, said supporting means having a substantially continuous periphery and being substantially no smaller in size than the effective screening area of the screening cloth, the material of the supporting face of said supporting means being substantially softer than the material of said cloth.

9. In a screening device, in combination, a wire screening cloth, and unitary sheet-like foraminate supporting means for said cloth lying face to face therewith, said supporting means having a substantially continuous periphery and being substantially no smaller in size than the effective screening area of the screening cloth, the material of the supporting means being substantially softer than the material of said cloth, and a reinforcing member for said supporting means.

10. In a screening device, a woven screening cloth, and a unitary sheet-like foraminate supporting structure adapted to lie face to face against the screening cloth, said structure having a substantially continuous periphery and being substantially no smaller in size than the effective screening area of the screening cloth, the material forming the supporting face of said structure being substantially softer than the material of said cloth.

11. In a screening device, a woven screening cloth, and a unitary sheet-like foraminate structure formed of a non-metallic material softer than the screening cloth and adapted to lie face to face therewith, said structure having a substantially continuous periphery and being substantially no smaller in size than the effective screening area of the screening cloth, and reinforcing means for said structure.

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