

April 27, 1943.

A. L. AYERS ET AL
APPARATUS FOR SIZING AND CLASSIFYING
CRUSHED SLAG MATERIAL AND THE LIKE
Filed Aug. 4, 1940

2,317,430

FIG. 1.

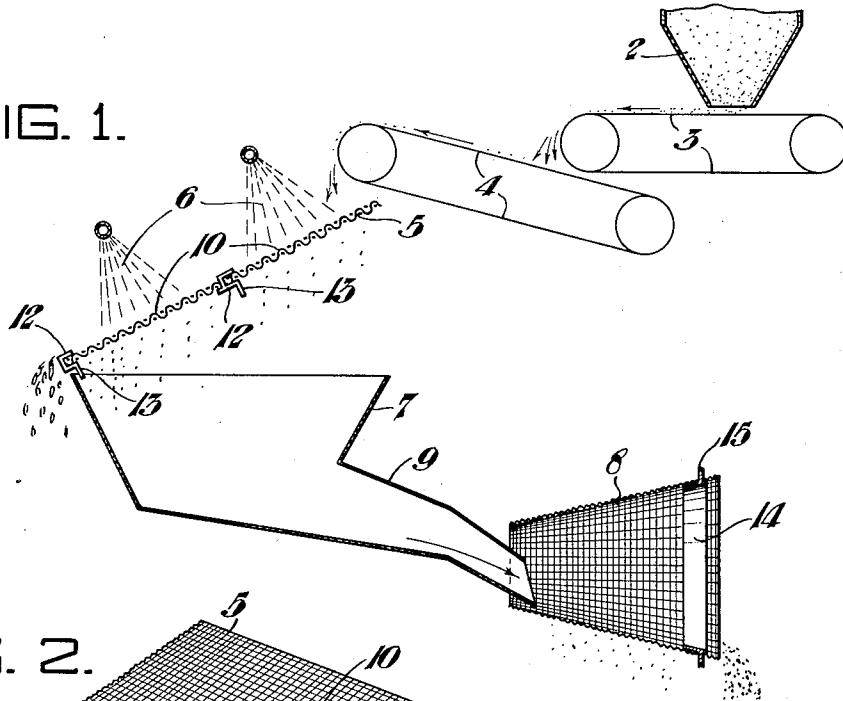


FIG. 2.

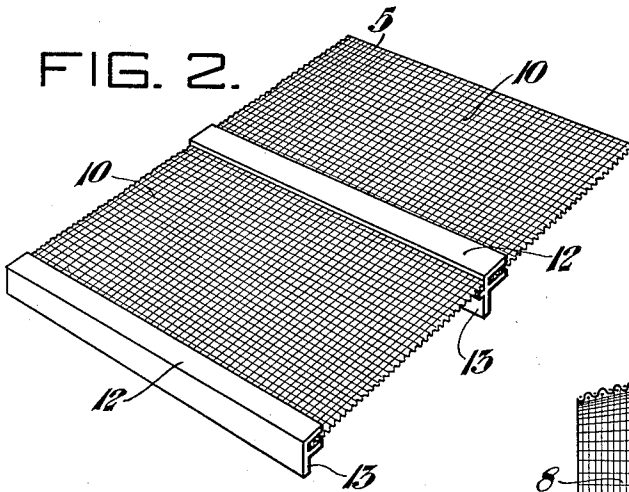
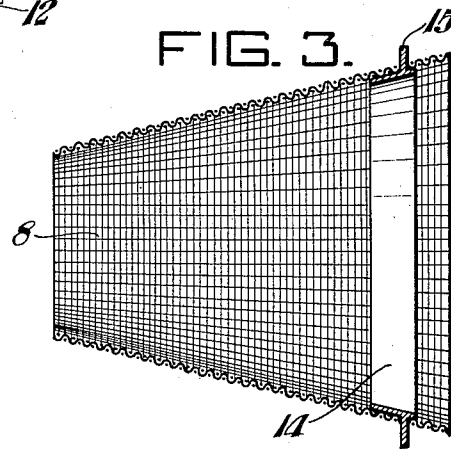


FIG. 3.



Inventors:
AUSTIN L. AYERS and
BURT E. PHENEGER.
by: *John E. Jackson*
their Attorney.

UNITED STATES PATENT OFFICE

2,317,430

APPARATUS FOR SIZING AND CLASSIFYING
CRUSHED SLAG MATERIAL AND THE LIKE

Austin L. Ayers, Cleveland, and Burt E. Pheneger,
Lakewood, Ohio, assignors to The American
Steel and Wire Company of New Jersey, a cor-
poration of New Jersey

Application August 4, 1940, Serial No. 351,336

2 Claims. (Cl. 209—268)

This invention relates to the sizing and classifying of loose materials and particularly to an improved apparatus for washing and screening crushed slag and the like.

It is important in providing washed slag, stone or like material for use as concrete aggregate, that it be relatively clean so that an effective bond is obtained between the bonding material and the slag aggregate.

The customary method of screening crushed slag for sizing, with the subsequent removal of small sizes and dust, is to pass the slag after crushing over stationary, moving or vibrating screens. This practice sizes the slag and usually removes enough of the smaller sizes so that the aggregate material separated therefrom is of the proper size, but such aggregate material possesses a very undesirable feature in that the slag aggregate is covered with a very fine dust or an impalpable powder. This condition is true especially when the slag is damp or wet from standing in the bank or from being rained upon. Such dust coating on the slag aggregate makes the same unsuitable for high grade concrete, and especially for mixing with tar, asphalt or other coatings for highway building, patching or surfacing. The facts presented apply also to crushed stone, as well as to slag.

The screening, sizing, cleaning and washing of the crushed slag, as proposed by the present invention, prepares and cleans the material so thoroughly, and successfully eliminates this coating of dust or powder therefrom, that it will pass all specifications for concrete aggregate, and all specifications required of this type of material for highway construction. It also permits the production of very desirable and valuable small sizes which were heretofore classed as impracticable.

Accordingly, it is the general object of our invention to provide in the sizing and classifying of loose materials such as slag and the like, an improved apparatus for washing and screening the same so as to provide a better and cleaner material.

It is another object of the invention to provide in the washing and screening of loose materials such as slag and the like, an improved sizing screen which will efficiently and effectively classify the material and at the same time prevent the water and slime collected thereby from passing into the large size aggregate, classified by the screen.

Various other objects and advantages of this invention will be more apparent in the course of

the following specification and will be particularly pointed out in the appended claims.

In the accompanying drawing there is shown, for the purpose of illustration, one embodiment which our invention may assume in practice.

In the drawing:

Figure 1 is an elevation partly in section showing the apparatus for sizing and classifying loose material in the practice of the present invention;

Figure 2 is an isometric view of the vibrating flat screen used in connection with the apparatus; and

Figure 3 is a vertical section through the barrel-shaped screen used in connection with the present invention.

Referring more particularly to the drawing, the improved apparatus of our invention for sizing and classifying loose materials consists of a bin or hopper 2 in which the material to be sized or classified is deposited with a belt conveyor 3 arranged directly therebelow. There is arranged forwardly of the belt conveyor 3, preferably an inclined belt conveyor 4 having its rear end extending thereunder. Forwardly of the inclined belt conveyor 4 and directly under the forward end thereof, there is disposed a substantially flat vibrating sizing screen 5 which is arranged preferably at an angle of approximately thirty degrees with the horizontal. There is arranged above the angularly or inclined arranged screen 5, preferably a high pressure water spray 6 for washing the dust and other foreign elements from the slag as it passes over the screen. There is positioned below the screen 5 a catch basin 7 preferably in the form of a hopper and there is arranged therebelow preferably a rotating barrel-shaped sizing screen 8. There is arranged below the catch basin or hopper 7 a trough or chute 9 which extends into the barrel-shaped screen 8 terminating therewithin. According to the present invention, the vibrating sizing screen 5 consists of a plurality of screen sections 10, namely, two in the present instance, which are separated by means of a metallic member, preferably a U-shaped member 12 or any other suitable member such as an angle iron member arranged transversely of the screen between each of the sections with the adjacent edges of the screened sections riveted, bolted or otherwise suitably attached to the metallic member 12 positioned therebetween. One of these transverse metallic members 12 is also arranged along the lower edge of the bottom and outermost section. Each of the transverse members 12 has a downwardly extending flange or lip portion 13 arranged integral therewith and

substantially perpendicular thereto. The flange 13 of each of the transverse members extends through the plane of the screen substantially perpendicular thereto so as to separate the adjacent ends of the screen cloth or sections whereby the continuity of the screen cloth is interrupted completely. There is arranged around the periphery of the barrel-shaped screen 8 adjacent the larger or lower end thereof, a metallic ring or annular member 14 having an outwardly extending lip or similar flange portion 15 integrally arranged therewith and extending outwardly substantially perpendicular thereto through the plane of the screen around the entire periphery of the screen so as to interrupt completely the continuity of the screen cloth. It will be understood that the transverse members 12 incorporated with the flat vibrating sizing screen 5 and the annular member 14 arranged around the periphery of the barrel-shaped sizing screen 8 are constructed and arranged so as to interrupt completely the continuity of the mesh of the screen and that these members may be arranged therein in any manner whatsoever as long as such continuity of the mesh is interrupted in order to obtain the desired result.

It will be understood that the apparatus thus described is primarily adapted for the purpose of sizing and classifying slag for use as concrete aggregate, but it can be used for sizing and classifying any other similar loose materials. In the present instance, the wet crushed slag is taken from storage and placed in the bin or hopper 2. The material falls from the hopper 2 upon the belt conveyor 3 which, in turn, conveys the slag onto the inclined belt conveyor 4 which, in turn, deposits the slag upon the flat vibrating sizing screen 5. While the slag is on the screen 5, jets of high pressure water 6 are directed upon the same and the large size aggregate rolls off the screen into a suitable container (not shown) and the smaller size aggregate, of course, drops through the screen into the catch basin or hopper 7. The water being played upon the material while on the screen to wash the same subsequently passes along the mesh of the screen until it reaches one of the transverse members 12 which disrupts the normal flow of the water and the slime collected thereby therealong, thereby causing it to flow downwardly along the lip or downwardly extending flange portion 13 and to drop into the catch basin or hopper 7 with the smaller size screened material.

The screened material together with the water and slime collected thereby passes from the catch basin or hopper 7 into and through the trough or chute 9 into the barrel-shaped sizing screen 8. As the barrel-shaped sizing screen rotates, the larger aggregate passes over the mesh thereof into a suitable container (not shown) positioned at the outer end of the screen, and the water and slime collected thereby in this instance will also tend to flow along the mesh of the screen and this normal flow thereof is interrupted by means of the metallic ring or annular member 14, thereby causing the same to flow along the flange or lip portion 15 carried thereby and to drop from the screen to a point directly therebelow.

As the result of our invention, it will be seen that the larger aggregate that is separated from the mass by the flat screen 5 and the barrel-shaped screen 8 will be free from any slime and consequently free from any dust when the same has dried, thereby producing relatively clean aggregate. That is to say, the metallic transversely extending members 12 disrupt the normal flow of the water and slime which tends to follow the mesh of the screen, thereby allowing the coarse material or aggregate to be screened over the top of the screen without the flow of free water and slime which ordinarily accompanies the same in such practice.

While we have shown and described one embodiment of our invention, it will be understood that this embodiment is merely for the purpose of illustration and description, and that various other forms may be devised within the scope of our invention, as defined in the appended claims.

We claim:

1. In apparatus of the class described for screening and washing crushed slag material and the like, an inclined continuous wire mesh screen over which the material is adapted to flow substantially from the upper end to the opposite lower end thereof and over that end, at least one member arranged transversely of said screen and extending substantially perpendicular to the direction of flow of the material thereover, said transverse member having a portion thereof disposed on the top surface of the screen directly next to the mesh thereof and another portion arranged integral therewith and extending through the mesh of the screen substantially perpendicular thereto and to said first mentioned portion so as to interrupt completely the continuity of the screen, and means for delivering a washing liquid onto the top of said screen and the material as it passes thereover, said transverse member adapted to disrupt the normal flow of the water and slime along the mesh of the screen so as to cause the same to drop therefrom to a point therebelow with the clean washed material passing over the transverse member and delivered over the lower end of the screen free from slime.

2. In apparatus of the class described for screening and washing crushed slag material and the like, as defined in claim 1, wherein the transverse member arranged transversely of the screen consists of a metallic plate-like portion which is disposed directly next to the top surface of the screen and a metallic flange portion arranged integral therewith and extending substantially perpendicular thereto and to the plane of the screen, said flange portion extending through the mesh of the screen so as to interrupt completely the continuity thereof and extending to a point below the bottom surface of the screen whereby the slime and water will be prevented from passing continuously along the screen by said transverse member and will flow downwardly along the flange portion thereof and drop to a point below the screen with the clean washed material passing over the transverse member and delivered over the lower end of the screen free from slime.

AUSTIN L. AYERS.

BURT E. PHENEGER.