Jan. 27, 1931. R. Q. KYLE 1,790,429

CLEANING, CLASSIFYING, AND GRADING APPARATUS FOR ASBESTOS AND OTHER MINERALS

Filed May 22, 1929 3 Sheets-Sheet 1

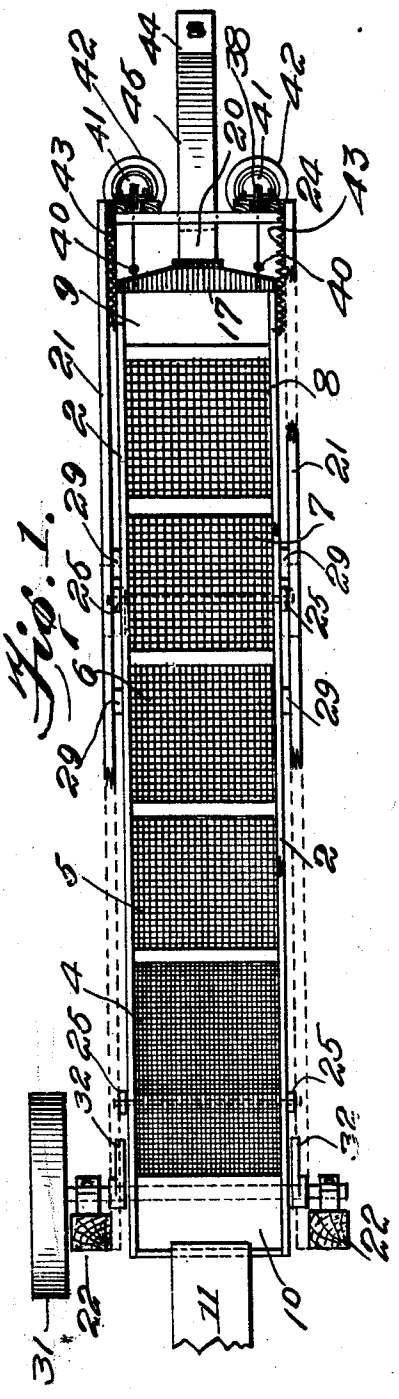


Fig. 1.

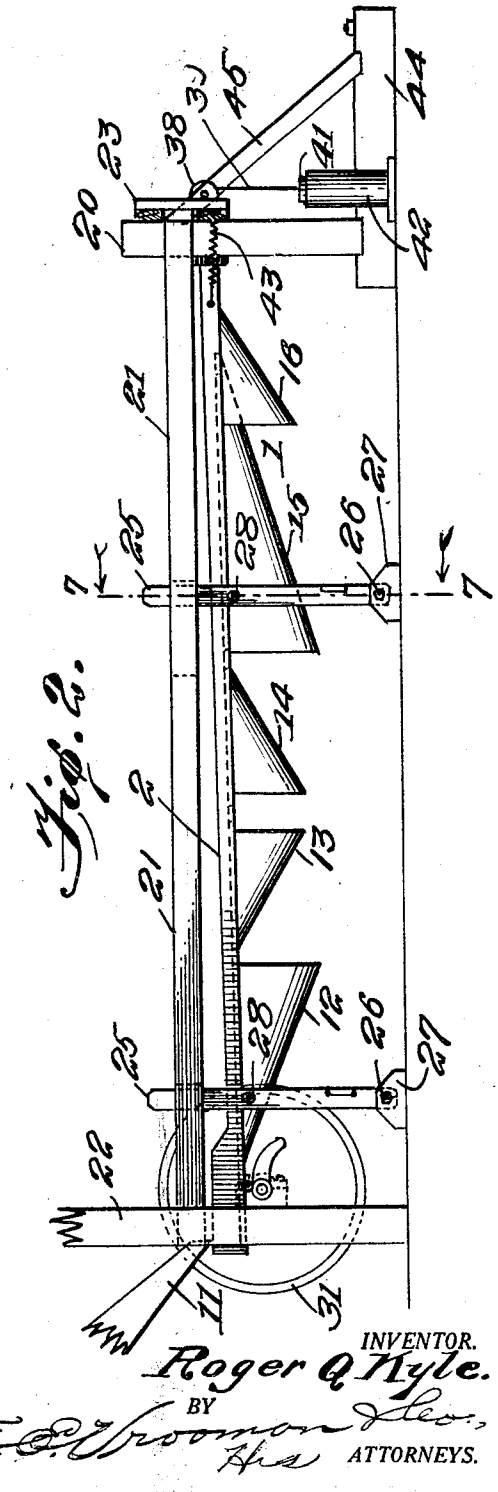


Fig. 2.

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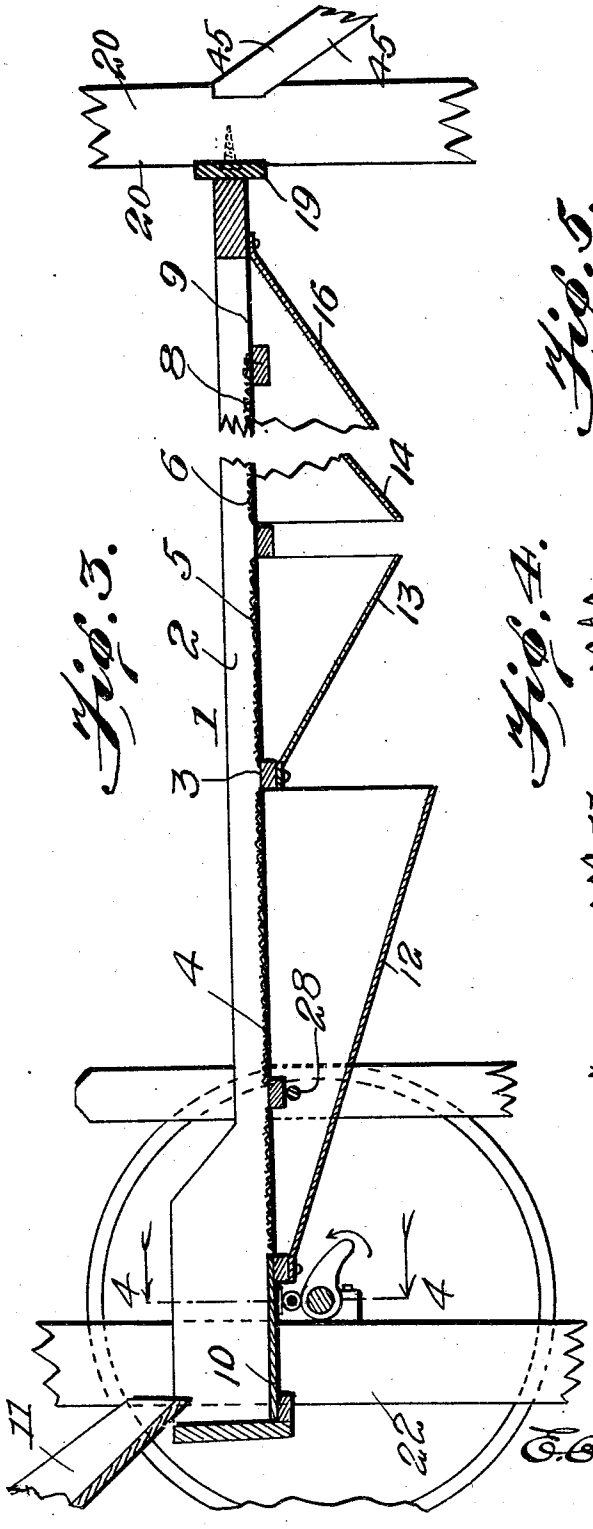


Fig. 3.

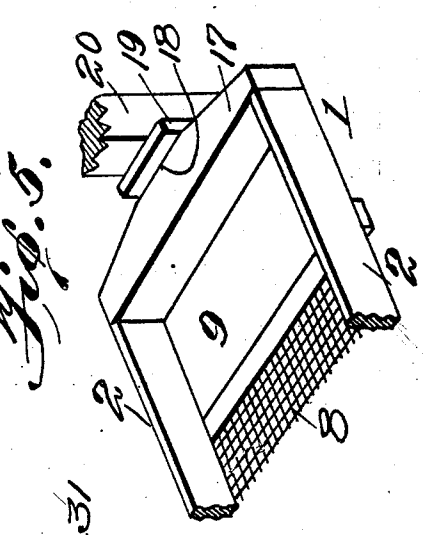


Fig. 5.

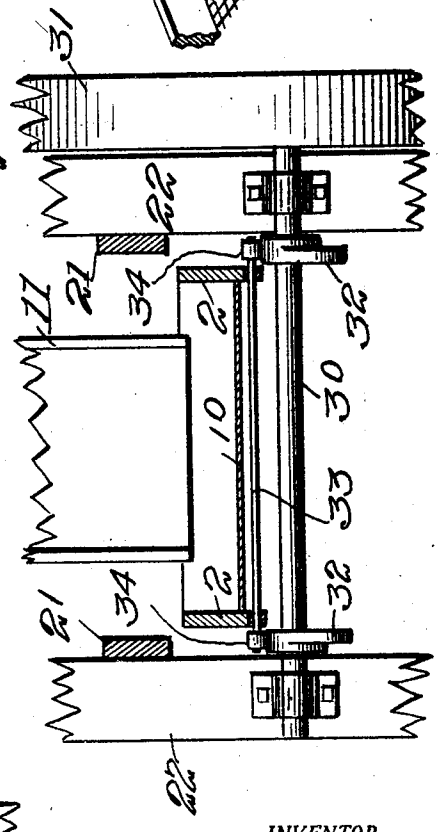


Fig. 4.

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Fig. 6.

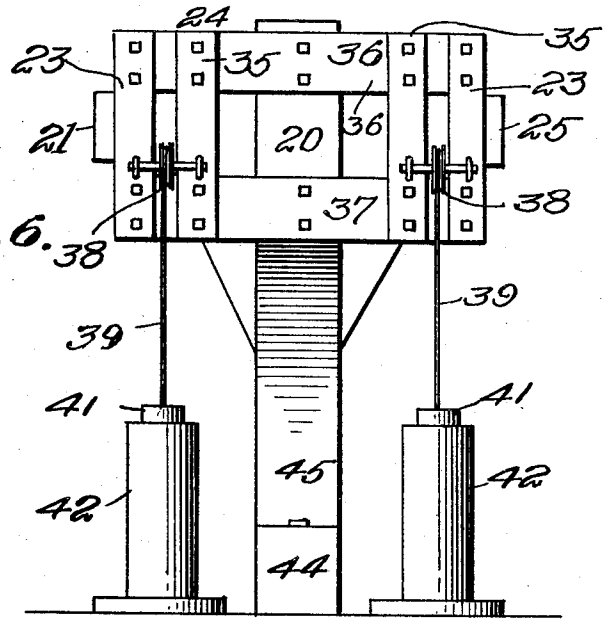
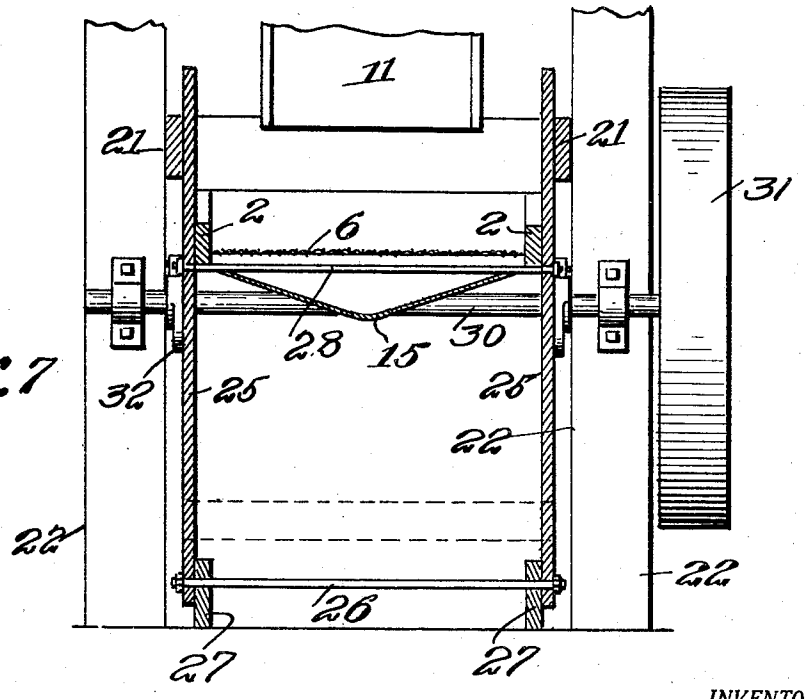


Fig. 7.



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Patented Jan. 27, 1931 1,790,429

UNITED STATES PATENT OFFICE

ROGER Q. KYLE, OF GLOBE, ARIZONA

CLEANING, CLASSIFYING, AND GRADING APPARATUS FOR ASBESTOS AND OTHER MINERALS

Application filed May 22, 1929. Serial No. 365,054.

This invention relates to a cleaning, classifying and grading apparatus for asbestos and other minerals.

The object of my invention is the provision of simple and efficient means for separating rock from the asbestos fiber and the grading of the fiber as to size.

Another object of my invention is the construction of a screening or separating apparatus, which is provided with an efficient bumper device, used in causing the fiber on the screen device of the apparatus to move forward and set up a vibration, aiding the screening.

With the foregoing and other objects in view, my invention comprises certain novel constructions, combinations and arrangements of parts as will be hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a top plan view of an apparatus constructed in accordance with the present invention, while

Figure 2 is a view in side elevation of the same.

Figure 3 is an enlarged, longitudinal, central sectional view of my apparatus, with the lower part removed.

Figure 4 is an enlarged, sectional view taken on line 4—4, Figure 3, and looking in the direction of the arrows.

Figure 5 is a fragmentary, perspective view of the screen device, showing the "outlet" end thereof.

Figure 6 is an enlarged view in elevation of the outer or discharge end of the apparatus.

Figure 7 is an enlarged sectional view taken on line 7—7, Figure 2, and looking in the direction of the arrows.

Referring to the drawings by numerals, 1 designates the screen device which comprises side pieces 2 and cross pieces 3. To the side pieces 2 and cross pieces 3 are suitably mounted or secured the mesh sections 4, 5, 6, 7 and 8. The meshes of these sections vary in size, the smallest mesh being at 4 and gradually increasing in size towards the open end 9 (Figs. 1, 3 and 5). These sections 4 to 8 are approximately five feet long and are of said various sized openings or mesh to conform to the grade or size of the finished product. On the first section 4, with small openings, the crushed rocks fall, first having struck plate 10 as the material is discharged from chute 11. The finest rock and dust fall through the screen onto apron 12, and the material that does not fall through the mesh 4 passes to the next section 5. The different grades follow in order until the end of the screen device is reached, and then the highest grade fiber is discharged through the opening 9. The dust and fiber after passing through the mesh or screen are caught on aprons 13, 14, 15 and 16, which aprons discharge into suitable bins or containers below the same, not shown. The screen device 1 slopes slightly upward in the direction of travel of the material. At the outer or discharge end of the screen device is a bumper head 17. This head is thickest at 18, giving strength thereto; 18 is straight across so as to give an efficient contact with the rubber sheet-like bumper 19 fastened to bumper post 20. The impact of the screen device against the rubber bumper causes the fiber to move forward on the screen device and set up a vibration, aiding the screening.

The screen device 1 is positioned between guard rails 21; these guard rails are fastened at one end to uprights 22 and at their opposite end to the outer vertical strips 23 of the bumper device 24 hereinafter specifically described. A plurality of sets of rocker arms 25 are pivotally mounted on transverse rods 26 (Fig. 7) which rods are carried by supports 27. These rocker arms 25 support rods 28 upon which rests the screen device 1. The

rocker arms extend up beyond the guard rails 21, engaging their inner faces; the rocking movement of said arms 25 is limited by strips or blocks 29 preferably fastened to the inner faces of the guard rails 21, Fig. 1. These guard rails prevent lateral movement of the screening device, thereby keeping the same in correct alignment for efficient results.

Suitably mounted on uprights 22 is a driving shaft 30 that carries a belt wheel 31; belt wheel 31 is connected to any suitable power source, whereby shaft 30 may be rotated, and the apparatus thereby actuated. Between the uprights 22 and fixedly fastened to shaft 30 are cams 32. Contiguous to the cams and fastened to the bottom of the screen device is rod 33; on the ends of rod 33 (Fig. 4) and in the path of movement of cams 32 are rollers 34; the cams press against the rollers 34 and in their travel cause the sceen device to be moved horizontally outwardly under chute 11, until the rollers pass over the outer ends of the cams, whereupon the screen device will be drawn forcefully in the opposite direction by the following described means.

The bumper device 24 has said outer vertical strips 23 and spaced inner strips 35 (Fig. 6). These vertical strips 23 and 35 are fastened at their top and bottom to horizontal strips 36 and 37. Sheaves or grooved pulleys 38 are suitably supported between each two contiguous strips 23 and 35. Passing over these pulleys 38 are cords or cables or chains 39; the inner ends of the cables 39 are fastened to eye bolts 40 (Fig. 1); these eye bolts are attached to the bumper head 17. The outer or lower ends of cables 39 are suitably fastened to weights 41. Weights 41 slide in weight receptacles 42; these weight receptacles 42 serve to guide the weights 41 in their vertical movement. Coil springs 43 are fastened at their inner ends to the sides 2 of the screen device and the outer ends are fastened in any suitable manner, to the inner faces of the vertical strips 23 (Figs. 1 and 2). The weights and springs serve to quickly draw the screen device from its outer "stroke" against the rubber bumper 19 and cause the impact, hereinbefore mentioned, to more efficiently move forward the fiber on the screen device and set up said vibration, materially aiding the screening. In other words, the cams 32 are instrumental in causing the outward movement or "stroke" of the screening device, whereas the springs and weight means cause the inward movement or "stroke".

The bumper post 20 is fastened on the plat form 44 and is provided with a brace 45.

The operation of the apparatus is as follows: Power is supplied by suitable means to drive the belt wheel 31, for rotating said shaft 30 and its cams 32, which cams are in contact with the rollers 34. The action is such that the screen is moved backward until the ends of the cams are reached, then upon the rollers passing over the ends of said cams, the screening device is released and is then jerked forward by means of the counterweights and springs. The crushed ore is fed from chute 11 onto the screen and is carried forward on the screens by its momentum when the bumper 17 strikes the rubber bumper 19 on bumper post 20. The impact sets up a vibration of the material on the screen device. This vibration aids the screening action as the mineral material passes forward over said screen. The rocker arms 25 are hinged at the top and bottom, so to speak, to allow for the movement of the screen device. In passing over the mesh of the screen device, the mineral is graded as to size by the various sized meshes, and on passing through the screen, said mineral is caught by the aprons, and by them is conveyed to the proper receptacles, placed thereunder.

While I have described the preferred embodiment of my invention and illustrated the same in the accompanying drawings, certain minor changes or alterations may appear to one skilled in the art to which this invention relates, during the extensive manufacture of the same, and I, therefore, reserve the right to make such changes or alterations as shall fairly fall within the scope of the appended claims.

What I claim is:

1. In an apparatus of the class described, the combination of a bumper post, a pair of horizontal strips fastened to said bumper post, sets of spaced vertical strips fastened to said horizontal strips, pulleys mounted between said vertical, spaced strips, an element mounted contiguous to said bumper post, cables passing over said pulleys and fastened at one end to said element, weight-guiding receptacles contiguous to said bumper post, weights fastened to the outer ends of said cables and slidably mounted within said guiding receptacles, whereby said element is drawn against said bumper post, during part of its movement, and means for moving said element away from said bumper post.

2. In an apparatus of the class described, the combination of a single vertical post provided with a vertical flat yieldable bumper secured to its inner face, an element provided with a horizontal protruding bumper head, said head being wider than said post and provided at its center with a flat vertical surface parallel with and of the same length as said flat yieldable bumper, and means for imparting reciprocal movement to said element for causing said parallel surface to strike against said yieldable bumper of said single post.

3. In an apparatus of the class described, the combination of a pair of vertical uprights, a bumper device spaced from said uprights, a pair of horizontal guard rails each

fastened at one end to an upright and at its other end to said bumper device, blocks spaced apart and fastened to the inner face of each of said guard rails, rocker arms supported between said blocks and against said guard rails and limited in their rocking movement by said blocks, and a screen mounted upon said rocker arms and adapted to strike against said bumper device, substantially as shown and described.

In testimony whereof I hereunto affix my signature.

ROGER Q. KYLE.

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