

Dec. 21, 1948.

J. W. WANTLING  
DE-WATERING SCREEN

2,457,018

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2 Sheets-Sheet 1

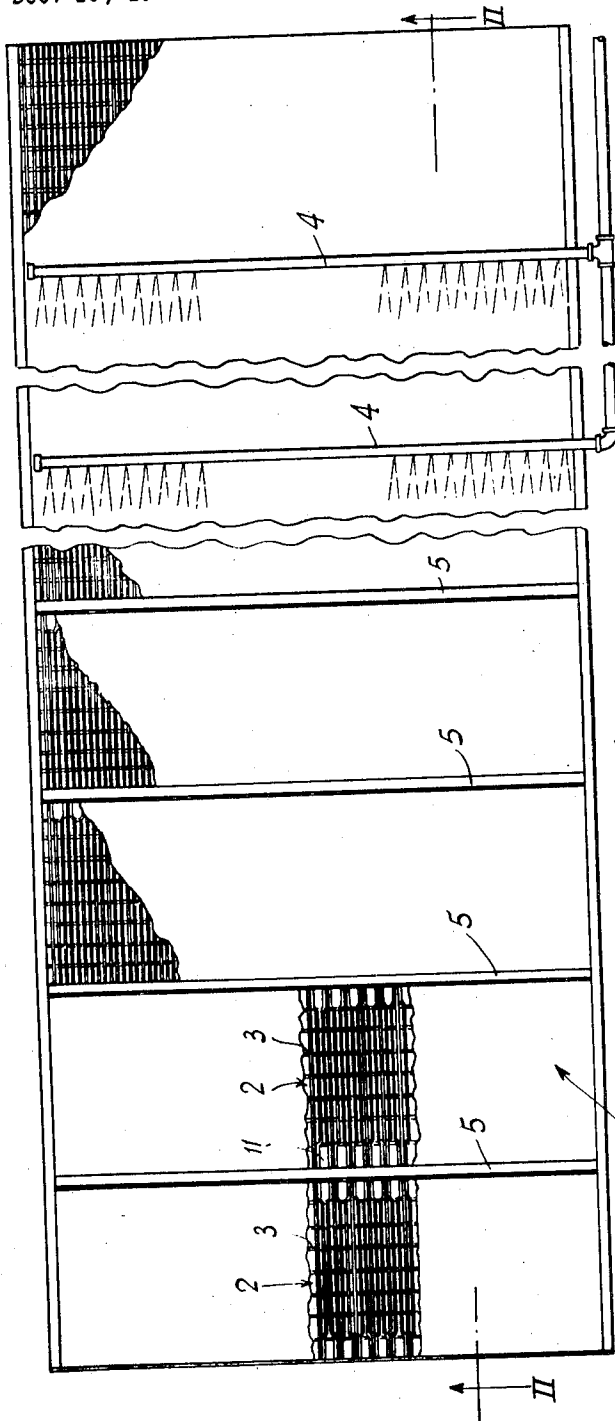


Fig. 1

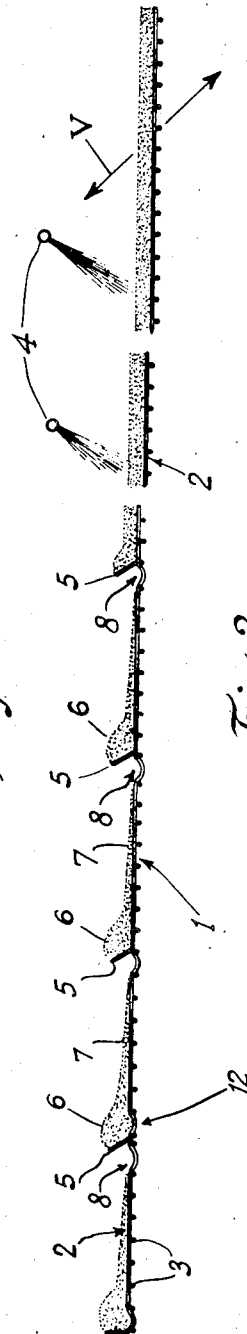


Fig. 2

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2 Sheets-Sheet 2

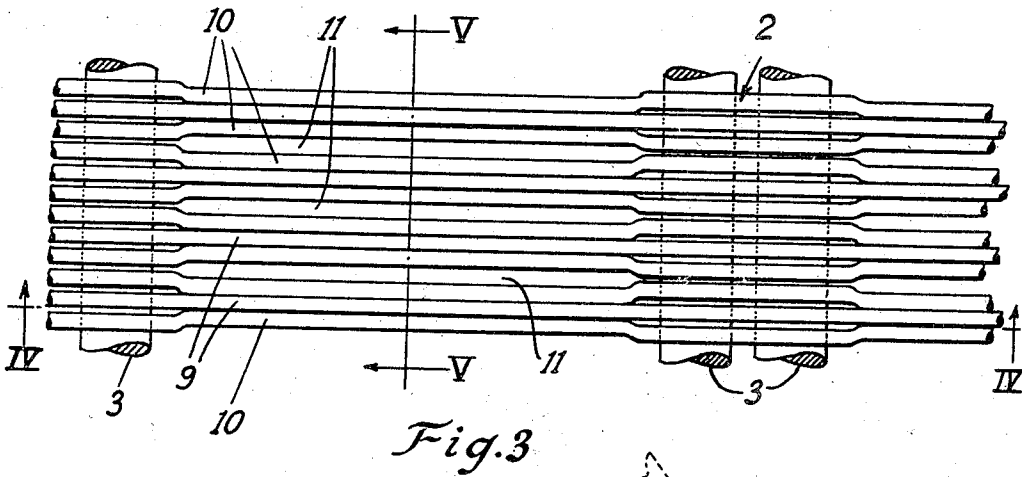


Fig. 3

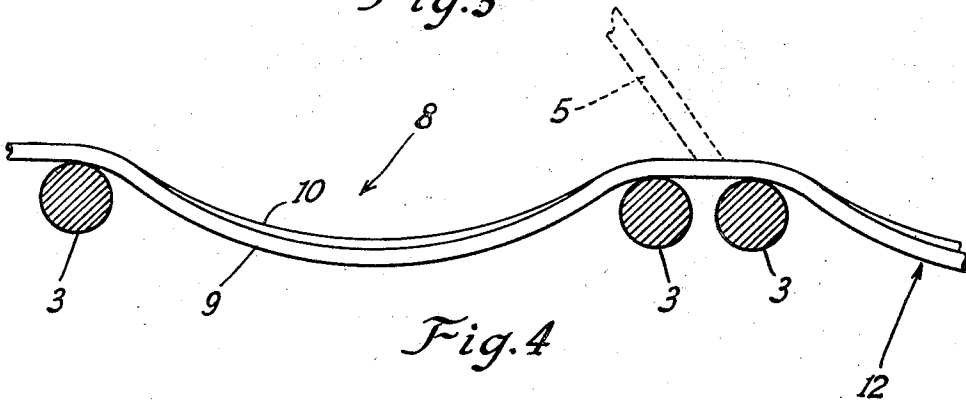


Fig. 4

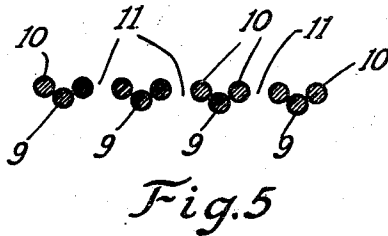


Fig. 5

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# UNITED STATES PATENT OFFICE

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## DEWATERING SCREEN

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a corporation of New York

Application December 16, 1944, Serial No. 568,432

8 Claims. (Cl. 209—267)

**1**  
This invention relates to screens of the kind used for the de-watering of coal and the wet screening of anthracite and bituminous sludge.

The principal object of the invention is a screen of greatly increased efficiency, particularly with regard to the amount of water removed from the material following the washing operation. The invention will be clearly understood from the ensuing description and accompanying drawings, from which other objects and advantages and particular features of the invention will also be apparent.

In the drawings, Fig. 1 is a broken-out, partially diagrammatic, plan view of a screen embodying the invention; Fig. 2 is a vertical section on the line II—II of Fig. 1; Fig. 3 is a much enlarged plan view of a portion of the screen of Fig. 1, with parts omitted; Fig. 4 is a vertical section approximately on the line IV—IV of Fig. 3; and Fig. 5 is a transverse vertical section, as on the line V—V of Fig. 3.

Screens of the kind referred to and to which the invention is applicable are comprised essentially of an elongated, foraminous deck adapted to be bodily vibrated to screen the coal or other material while causing it to progress from one end of the screen to the other, these functions being coincidentally achieved by vibrating the deck at a substantial angle to the horizontal, frequently of about 45°. Usually, also, such screens are themselves set at a slight angle to the horizontal, say, of the order of 2 or 3 degrees, so that the material being screened progresses slightly upgrade.

In the preferred form shown for purposes of illustration, the screen comprises a deck, generally designated 1, composed of a series of closely spaced bars, generally designated 2, extending longitudinally of the deck and supported and welded to cross-bars 3. As will be understood, the bars 2 are dimensioned and spaced appropriately for the particular material to be handled; for example, where it is desired to wash and screen out dust and fine particle size material, the bars 2 may be of a diameter of about  $\frac{1}{8}$  of an inch and their normal spacing about  $\frac{1}{1000}$  of an inch. As shown in Fig. 2, the deck is set at a slight angle to the horizontal, the material being supplied to it at the right-hand end as viewed in this figure and discharged from the left-hand end. The screen may be bodily vibrated, say, at an angle of 45° to the horizontal as indicated by the arrow V and at a speed of the order of one thousand or more vibrations per minute.

**2**  
Such washing of the material as takes place during the screening is effected during, say, the first half of the travel of the material over the deck and for this purpose there may be mounted above the screen a series of transversely extending water-spray pipes 4, as shown in Figs 1 and 2.

According to the present invention the upper surface of the screen is provided at spaced intervals with transversely extending baffles adapted to intercept the material as it progresses along the screen and so arranged as to overhang a portion of the deck surface on the far side of the baffles; that is to say, on the side toward which the material is moving. The effect of such baffles is to maintain on the far side of each of them and immediately adjacent the baffles a short transverse strip of screen surface substantially free of the material being screened. That is to say, by reason of the overhanging form of the baffles, they serve as a sort of shield. In the result, a considerable amount of water can and does pass freely through the screen at these points, the flow of such water into the clear space adjacent the baffles being accentuated by the incline of the deck as a whole.

In this illustrated preferred form each of the overhanging baffles comprises a transversely mounted plate 5 welded or otherwise secured to and upstanding from the screen surface and canted forwardly with respect to the direction of movement of the material being screened. As the result of this overhanging baffle arrangement, the material assumes a form similar to that indicated in Fig. 2, piling up behind the baffles as indicated at 6, and spread out as at 7 in a relatively thin layer extending rearwardly toward but terminating short of the previous baffle. It has been found that the width of the clear space on the far side of each baffle is appreciably greater than the actual overhang of the baffle.

In order further to facilitate the escape of water from the material, a transverse trough-like depression is formed in the deck adjacent the far side of each such baffle, the width of the depression, i. e. lengthwise of the screen, being roughly commensurate with the width of the clear space preserved as above described.

As shown particularly in Fig. 4, the trough-like depression generally designated 8 is formed by downwardly curving or depressing each of the longitudinal screen bars throughout a short portion of its length, two such bars specifically designated 9 and 10 being shown in this figure.

It will be recognized that the maintenance of the material-free space on the far side of each

3

baffle 5 makes it feasible to increase the screen openings in this space and thereby accelerate the escape of the water; and this result is conveniently accomplished in the form of screen illustrated by spreading as well as depressing the longitudinal screen bars in the formation of the trough-like depressions 8. As shown in Figs. 3, 4 and 5, every third bar 9 is deformed by being simply downwardly curved or depressed, whereas the intervening bars 10 are offset laterally as well as being depressed downwardly. As the result of this arrangement, the longitudinal screen bars in each depression 8 take the form shown in Figs. 3 and 5, providing screen openings 11 of very substantially greater spacing than the spacing of the bars throughout the remainder of the screen.

While all the reasons for the phenomenon are not entirely understood, it has been found to be feasible and advantageous to provide a similar trough-like depression by a second transverse series of bar deformations immediately ahead of, say, the last baffle, as shown at 12 in Figs. 1 and 2. By the time the material has progressed to this point on the deck, it is, of course, much drier than when it encounters the first baffle and it exhibits a tendency to cohere. Also, it appears to partake of a rolling motion as it moves up and over the last baffle and loses still more water in the process. The escape of this water, by way of the trough 12, is found not to be accompanied by any substantial loss of material in spite of the wider spacing of the bars in this trough.

The foregoing features result in a highly effective screening operation, and notwithstanding the washing which takes place throughout the initial stages, the water content of the discharged material is extremely low.

While the foregoing constitutes a detailed description of the preferred form, it will be understood that various modifications may be resorted to within the scope of the invention as defined by the following claims.

I claim:

1. A screen deck comprising a series of closely spaced, straight bars running lengthwise of the deck to provide a washing section followed by a de-watering section, said bars having, at intervals throughout the length of the de-watering section only, transversely aligned short lengths thereof downwardly depressed to form spaced shallow troughs extending transversely across the deck, the depressed portions of certain of the bars being laterally and oppositely deformed to bring certain of the trough portions of the bars closer together into groups, the groups thereby also being more widely spaced from each other than the adjacent straight portions of the bars, a transverse baffle plate upstanding from the deck at the entrance side of each trough and canted forwardly, with respect to the direction of movement of the material being screened, to overhang its adjacent trough, one of said troughs and baffles being located near the discharge end of the screen, and a supplementary, similar trough located immediately ahead of said last-mentioned baffle.

2. A de-watering screen deck comprising a series of closely spaced, straight bars running lengthwise of the deck, said bars having, at intervals throughout their length, transversely aligned short lengths thereof downwardly depressed to form spaced shallow troughs extending transversely across the deck, the depressed portions of certain of the bars being laterally and op-

4

positely deformed to bring certain of the trough portions of the bars closer together into groups, the groups thereby also being more widely spaced from each other than the adjacent straight portions of the bars, a transverse baffle plate upstanding from the deck at the entrance side of each trough and canted forwardly, with respect to the direction of movement of the material being screened, to overhang its adjacent trough, one of said troughs and baffles being located near the discharge end of the screen, and a supplementary, similar trough located immediately ahead of said last-mentioned baffle.

3. A de-watering screen deck comprising a series of closely spaced, straight bars running lengthwise of the deck, said bars having, at intervals throughout their length, transversely aligned short lengths thereof downwardly depressed to form spaced shallow troughs extending transversely across the deck, the depressed portions of certain of the bars being laterally and oppositely deformed to bring certain of the trough portions of the bars closer together into groups, the groups thereby also being more widely spaced from each other than the adjacent straight portions of the bars, and a transverse baffle plate upstanding from the deck at the entrance side of each trough and canted forwardly, with respect to the direction of movement of the material being screened, to overhang its adjacent trough.

4. A de-watering screen deck comprising a series of closely spaced, straight bars running lengthwise of the deck, said bars having, at intervals throughout their length, transversely aligned short lengths thereof downwardly depressed to form spaced shallow troughs extending transversely across the deck, the depressed portions of certain adjacent bars being more widely spaced from each other than the adjacent straight portions of such bars, and a transverse baffle plate upstanding from the deck at the entrance side of each trough and canted forwardly, with respect to the direction of movement of the material being screened, to overhang its adjacent trough to an extent sufficient to maintain such trough substantially free of solid material.

5. A screen deck adapted to be upwardly canted with respect to the direction of movement thereon of the material being screened and comprising a series of closely spaced, straight bars running lengthwise of the deck to provide a washing section followed by a de-watering section, said bars having, at intervals throughout the length of the de-watering section only, transversely aligned short lengths thereof downwardly depressed to form spaced shallow, open-topped troughs extending transversely across the deck, and a transverse baffle plate upstanding from the deck at the entrance side of each trough, each such baffle plate being canted forwardly, with respect to the direction of movement of the material being screened, to overhang its adjacent trough to an extent sufficient to maintain such trough substantially free of solid material.

6. A de-watering screen deck comprising a series of closely spaced, straight bars running lengthwise of the deck, said bars having, at intervals throughout their length, transversely aligned short lengths thereof downwardly depressed to form spaced shallow, open-topped troughs extending transversely across the deck, and a transverse baffle plate upstanding from the deck at the entrance side of each trough, each such baffle plate being canted forwardly, with respect to the direction of movement of the material being

5

screened to overhang its adjacent trough to an extent sufficient to maintain such trough substantially free of solid material.

7. In a de-watering screen comprising a flat, foraminous, material-supporting deck adapted to be tilted upwardly with respect to the direction of travel of material thereon and to be vibrated to advance a layer of wet, solid material longitudinally of the deck: said deck surface being bodily deformed at intervals to form transversely extending, shallow, trough-like depressions, each said depression merging into and having free surface communication with the deck surface on the exit sides of the depressions with respect to the direction of movement of the material, thereby permitting free gravity flow of liquid into the said exit sides of the depressions from the adjacent deck surface, and upstanding baffle means on the deck surface adjacent the entrance side of each depression, each said baffle means adapted to overhang its adjacent depression to an extent sufficient to maintain its substantially free of solid material.

8. In a de-watering screen comprising a foraminous, material-supporting deck adapted to be vibrated to advance a layer of wet, solid material longitudinally of the deck: said deck having a series of transversely extending, shallow, spaced troughs each in free surface communica-

6

tion with the adjacent deck surface on the exit sides of the troughs with respect to the direction of movement of the material, thereby permitting free, gravity-flow of liquid into the said exit sides of the troughs from the adjacent deck surface, and upstanding baffle means on the deck surface adjacent the entrance side of each trough adapted to maintain each said trough substantially free of solid material.

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