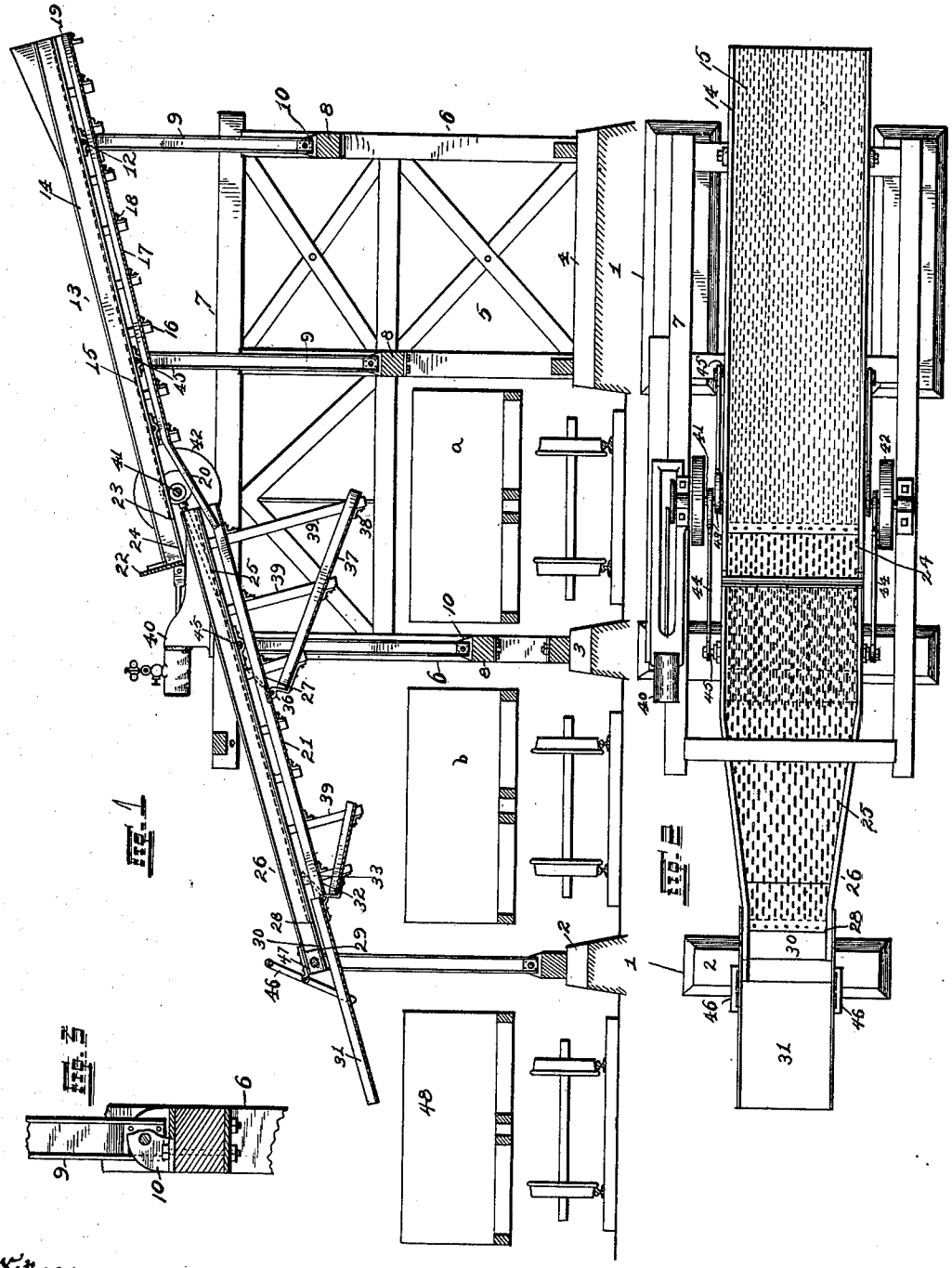
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SHAKER SCREEN.

(Application filed Sept. 11, 1899.)

(No Model.) 2 Sheets—Sheet 1.



Witnesses
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Inventor
Frederick W. Bond.
By Higdon & Longan, Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

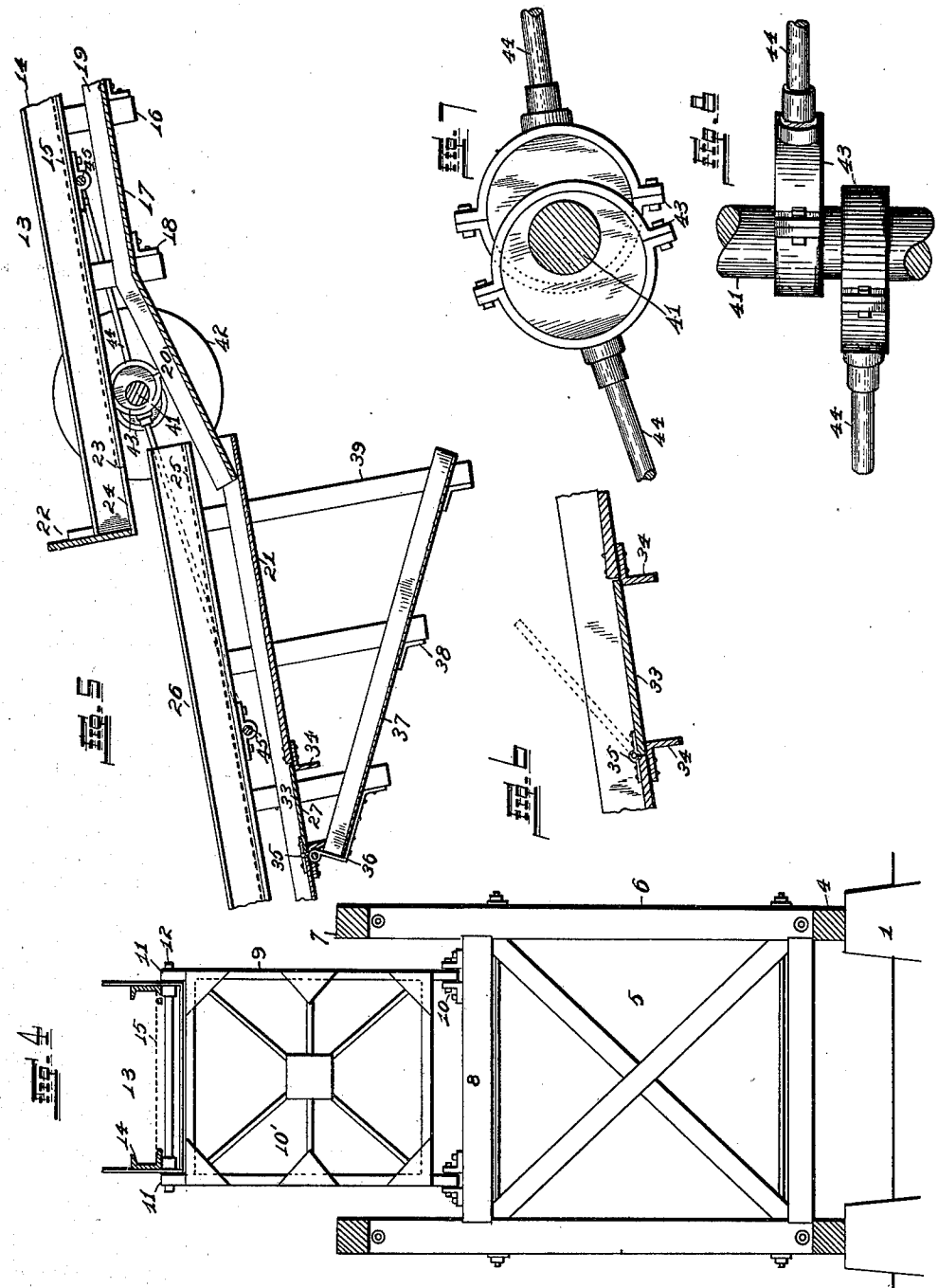
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UNITED STATES PATENT OFFICE.

FREDERICK W. BOND, OF ST. LOUIS, MISSOURI.

SHAKER-SCREEN.

SPECIFICATION forming part of Letters Patent No. 672,696, dated April 23, 1901.

Application filed September 11, 1899. Serial No. 730,105. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. BOND, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Shaker-Screens, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to shaker-screens; and it consists of the novel construction, combination, and arrangement of parts hereinafter shown, described, and claimed.

One object of this invention is to construct a device which is placed in communication with the mine-chute for screening coal as it is delivered from the chute.

Another object is that by manipulating various doors forming part of the invention the coal can be assorted to various grades, or the coal may be delivered into the car direct, making what is termed the "mine-run."

Figure 1 is a vertical sectional view of my complete invention, showing its construction and in the act of loading cars. Fig. 2 is a top plan view of the same. Fig. 3 is a side elevation, with parts broken away, of one of the pivotally-extending arms, showing its pivotal construction. Fig. 4 is an end view of my invention with a part in section. Fig. 5 is an enlarged detail vertical sectional view showing a portion of the screen mechanism and chutes and the arrangement of the eccentrics for oscillating the same. Fig. 6 is a detail vertical sectional view of the gate made use of in my invention, showing its construction. Fig. 7 is a detail side elevation of the eccentrics used in connection with my invention. Fig. 8 is a top plan view of the same.

In the construction of the device as shown I provide a suitable foundation 1, of concrete or analogous material, on which I mount foundation-blocks 2, 3, and 4. Upon the foundation-blocks 3 and 4 I mount a framework 5, which consists of uprights 6, having mounted on their top a horizontal framework 7. The uprights 6 are provided with cross-bars 8, on which are pivotally mounted vertically-extending arms 9. Said arms 9 are pivoted at their bottom to angles 10, secured in any desirable manner to the cross-bar 8. (See Fig. 4.) The vertically-extending arms 9, which are pivotally mounted upon the cross-bars 8, are arranged in pairs (see Fig. 4) and are supported one to the other by rods and plates 10'. Extending upwardly a suitable distance from the top of said vertically-extending arms 9 are the free projecting ends 11, which are for the purpose of supporting shafts 12, on which are carried the screening mechanism 13, which consists of channel-bars 14, carrying a screen 15, fastened in any desirable manner within its lower surface and held in position by strips 16, extending downwardly and secured to a chute 17 by means of angle-irons 18. The chute 17 is provided with vertically-extending sides 19 of suitable height and extends the entire length of said screen and has its end 20 formed at a downward angle, so arranged as to communicate with a like chute 21. The end 22 of the screen mechanisms is closed to prevent any coal from passing beyond the end of said mechanism, and the screen 15 has its end 23 bent slightly downward, forming a space 24, through which the coal is adapted to fall upon a like screen 25, formed in a like mechanism 26, a portion of which is located immediately under said opening 24. A portion of the screen 25 and the mechanisms 26, as will be seen in Fig. 2, is of the same construction as the screen 15, which is for the purpose of allowing the same-sized siftings of the coal to fall upon the chute 21 and move thereon to the opening 27. From that point to the end 28 the screen is of a coarser construction, which will allow larger-sized siftings to fall upon that portion of the chute 21. The screen 25 at its end 28 is also bent downwardly a suitable distance from the front end 29 of the mechanism, forming an opening 30 of sufficient size for the coal to pass downwardly therethrough and fall upon an apron 31, the construction of which will be hereinafter fully set forth.

The chute 21 is provided with two openings 27 and 32, which are closed by means of the hinged plates 33, mounted upon angles 34, secured to the under side of the chute. (See Figs. 5 and 6.) The lower ends of the plates 33 are hingedly secured to the chute by means of strap-hinges 35. It will be observed by referring to Figs. 5 and 6 that the bottom of the chute, at the point communicating with the free or open ends of the hinged plates, is of a greater thickness than the said plates, which

is for the purpose of allowing the coal to freely pass from said plates when they are closed, so as to prevent any coal from lodging against the ends of said plates, thereby obstructing the free passage within said chute. The hinges 35 are so arranged as to occupy a small space within said chute, and therefore will not cause any obstruction.

To the bottom of the chute, located at a point beneath the hinge 35, is mounted a support 36, which is fastened in any desirable manner to an apron 37, being supported by angles 38 to downwardly-extending straps 39, the said straps 39 supporting the screen mechanism and chute and also the apron 37. Both hinged plates previously mentioned are of similar construction.

Upon the horizontal framework 7 I mount a stationary engine 40, having its drive-shaft 41 extending the entire width of the framework and carrying fly-wheels 42.

Located upon the shaft on each side of the screen mechanism are eccentrics 43, which operate eccentric-shafts 44, having their ends pivotally secured to shafts 45, mounted to the under surface of the screen mechanism, two of said eccentrics oscillatory operating the screening mechanism 13 and two of said eccentrics oscillatory operating the mechanism 26. The arrangement of the eccentrics upon the driving-shaft is such that when the engine is operated the mechanism will oscillate the screening mechanism one against the other, yet will not allow the inclined end 20 of the chute 17 to come out of contact with the end of the chute 21, thus at all times allowing the siftings to pass from the chute 17 into the chute 21. The screening mechanism is allowed to oscillate by the pivotally-extending arms 9 being pivoted at both ends, one end to the framework and the other to the screen mechanism.

The construction of the pivotally-extending arms 9 of the screen mechanism 26 is the same as that described in the mechanism 15.

The apron 31 is hingedly secured to the end of the chute 21 and is adjustably held at any desirable angle by the use of the arm 46, pivotally mounted to the bar 47, formed on the end of the screen mechanism 26. By this device the apron 31 can be adjustably regulated and extends beyond the framework a suitable distance to allow the coal to be conveyed into the car 48. (Shown in diagram in Fig. 1.) The object of extending the apron 31 at such a length over the top of the car is for the purpose of allowing the coal to fall within the body of the car at all times while the apron and screen mechanism is in its oscillatory action, thus preventing any of the coal from falling on the outside of the car-body. The entire device is arranged at such height as to allow cars to pass under the same, as shown in Fig. 1, and the arrangement of the pivotally-extending arms 9 is such that while in action they will not in any way interfere with the car-body. By the arrangement of the screens I may assort the coal to any quality desired. This is done by simply removing the screens and replacing the same with screens of larger or smaller openings.

The operation is as follows: The top end of the screen mechanism 13 is placed in communication with the mine-chute. The engine is started and by the operation of its eccentrics the screen mechanism, together with the vertically-extending arms, is reciprocated in opposite directions. The coal is allowed to pass upon top of the screen 15, and while the same is in its oscillatory action it sifts the coal, allowing the slack or small portions to fall upon the chute 17, which is conveyed by the oscillatory action down over the inclined portion 20 and delivered upon the chute 21. At the same time the larger particles of the coal are allowed to pass downwardly through the opening 24 onto the screen 25 and are conveyed by its oscillatory action over the end 28 and delivered upon the apron 31 down into the car-body 48. When the gates of the chutes are in the closed positions, as shown in Fig. 1, the slack and coal are fed direct into the car-body 48, making what is termed the "mine-run." Should it be desired to assort the coal in various sizes, I then open the hinged plates 33 and allow the assorted coal to pass through the openings 27 and 32. The slack, which is conveyed from the chute 17 onto the chute 21, is passed through the gate-opening down upon the apron 37 and delivered into the car-body *a*, located under said opening, as shown in Fig. 1.

The screen 25 at the point from the lower side of the opening 27 to its opening 30 having larger reticulations than the screen 15 will allow larger or coarser particles of the coal to fall upon the chute 21, which by means of the oscillatory action will convey the same through the opening 32, allowing the same to fall upon the apron and be conveyed into the car-body *b*, which is located thereunder, while the larger particles or lumps pass through the opening 30 onto the apron 31 and thence into the car 48. By this action I obtain three grades of coal, which are termed the "slack," which will be conveyed into the car *a;* "nut-coal," in the car *b*, and "lump-coal;" in the car 48. I may by a matter of construction arrange my invention so as to assort the coal in other sizes than the three mentioned, and as many more cars can be filled by the same action and each be filled with a different grade of coal, and this will be done by the mere arrangement of the sizes of the reticulations of the screens and an additional number of aprons and openings formed in the chutes.

By this construction of the screen mechanism and chutes located thereunder the use of plates placed in the screen mechanism on the top of the screen in order to make what is termed a "mine-run" is entirely dispensed with, as in the devices now in use it is necessary to place plates upon the top of the

screen when such run is desired. This I overcome by the placing of the chute under the screens, as described.

I claim—

In a screening apparatus, an upper screen of uniform mesh and a chute having its lower end bent downward, rigidly carried by said screen, in combination with a lower screen of graduated mesh communicating with the first-mentioned screen, a chute formed with openings in its bottom rigidly carried by said screen, hinged plates for closing said openings, which plates open above the chute, aprons leading from said openings, and means for oscillating the said screens and chutes in opposite directions.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK W. BOND.

Witnesses:

JOHN C. HIGDON,

ALFRED A. EICKS.