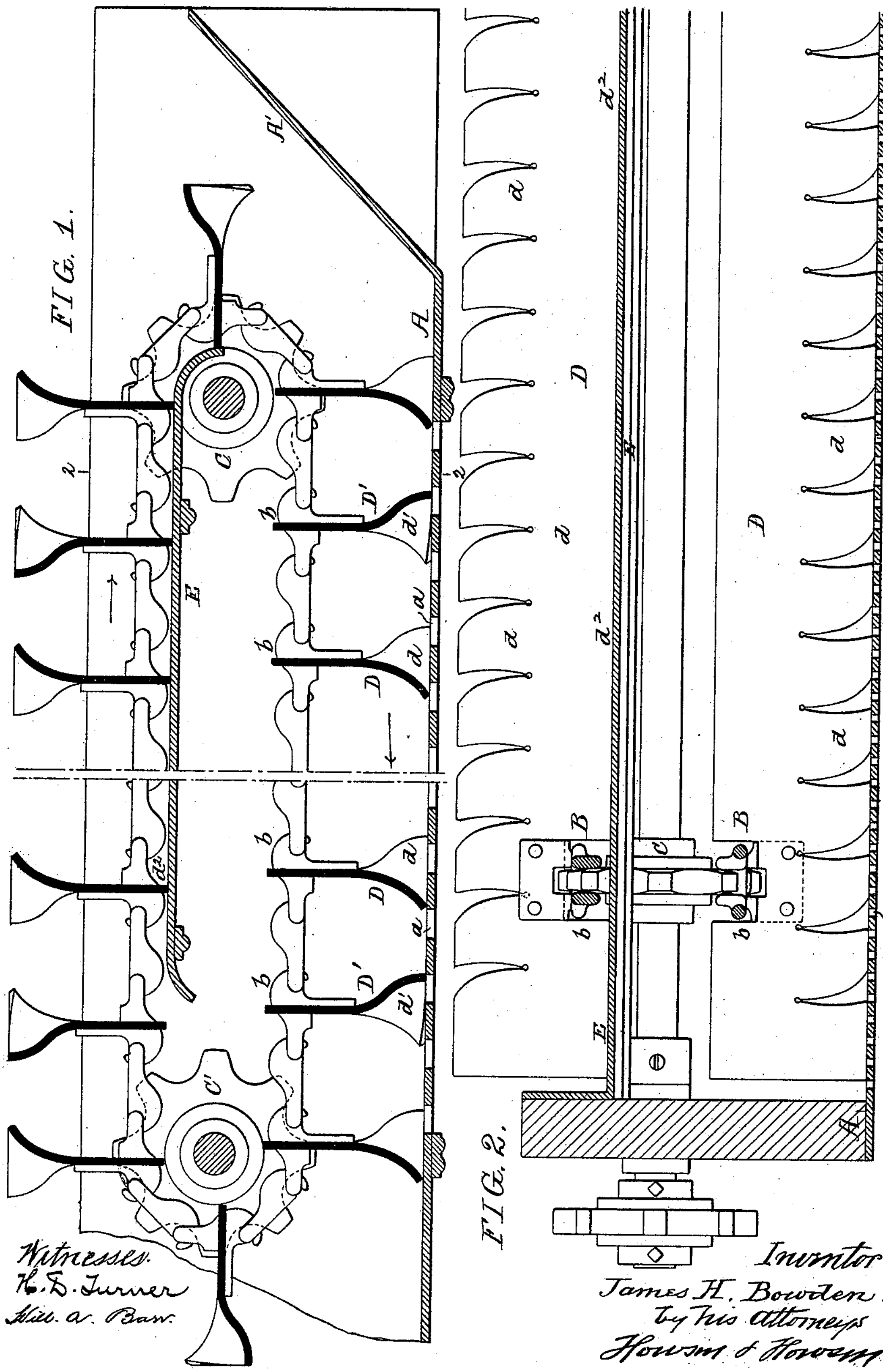
No. 621,744. Patented Mar. 21, 1899.

J. H. BOWDEN.

SCREEN SCRAPER.

(Application filed July 28, 1897.)

(No Model.) 3 Sheets—Sheet 1.



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(No Model.) 3 Sheets—Sheet 2.

FIG. 3.

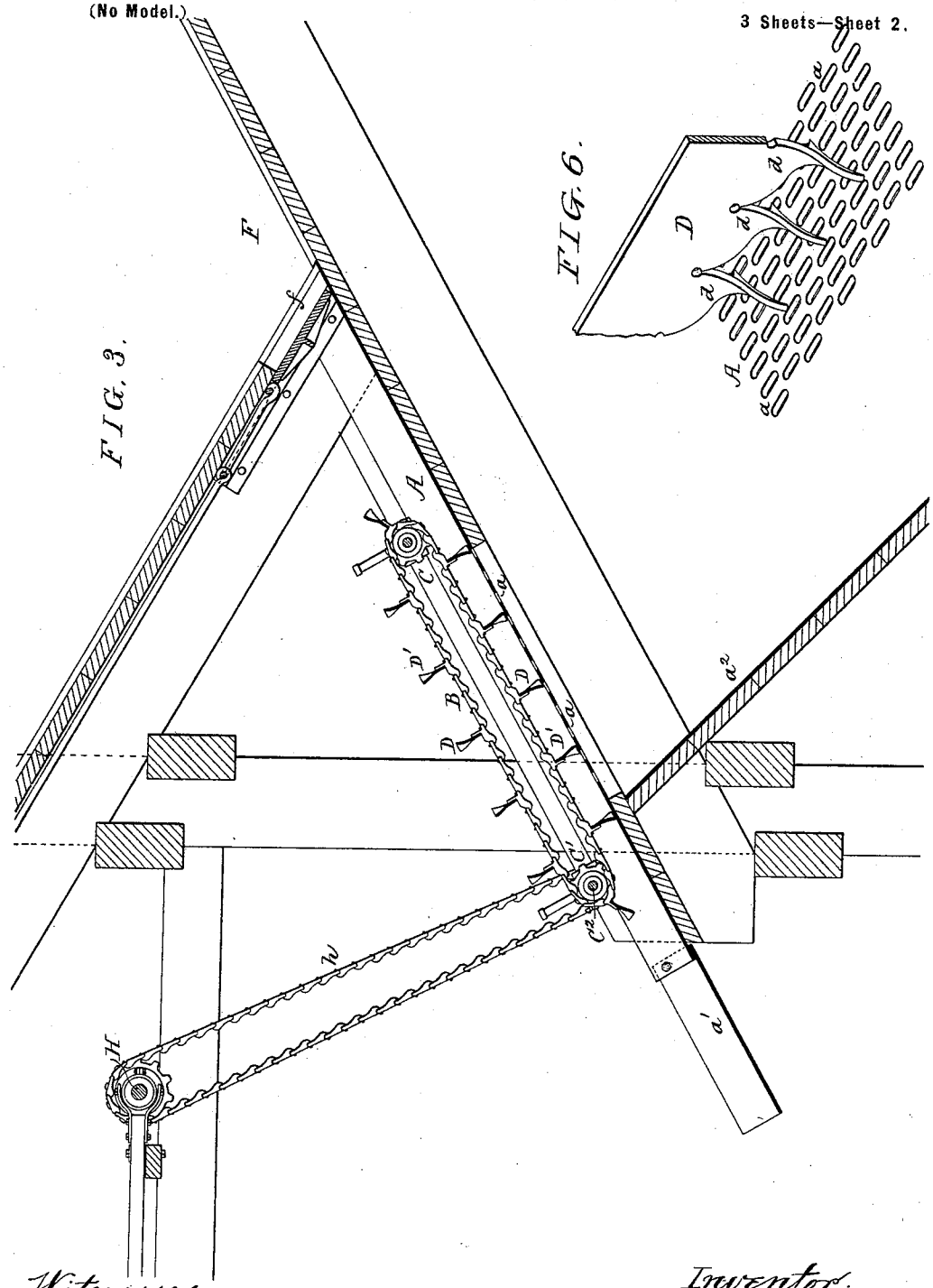


FIG. 6.

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FIG. 5.

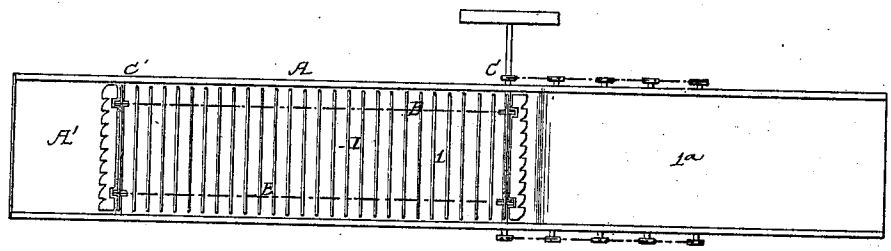
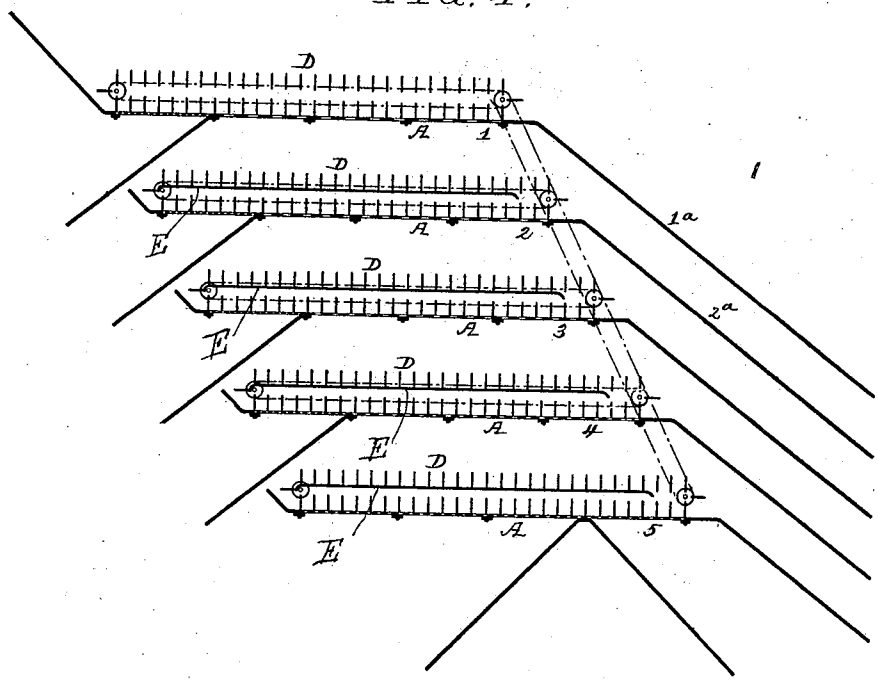


FIG. 4.



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UNITED STATES PATENT OFFICE.

JAMES H. BOWDEN, OF WILKES-BARRÉ, PENNSYLVANIA.

SCREEN-SCRAPER.

SPECIFICATION forming part of Letters Patent No. 621,744, dated March 21, 1899.

Application filed July 28, 1897. Serial No. 646,261. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. BOWDEN, a citizen of the United States, and a resident of Wilkes-Barré, Pennsylvania, have invented certain Improvements in Screen-Scrapers, of which the following is a specification.

The object of my invention is to construct a compact and economical screening apparatus in which the material will be thoroughly screened with a minimum abrasion of the material and which can be worked either on a horizontal plane, on an incline, or on a curve, as fully described hereinafter.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a single-screening apparatus, illustrating my invention. Fig. 2 is a transverse section on the line 2 2, Fig. 1. Fig. 3 is a longitudinal sectional view showing the screen arranged on an incline. Fig. 4 is a diagram view in elevation, showing a series of my improved screens arranged one below another. Fig. 5 is a plan view of Fig. 4. Fig. 6 is a perspective view of one of the blades.

Referring in the first instance to Figs. 1 and 2, A is a horizontal screen-bed having in the present instance elongated openings *a* of the size desired. B is an endless chain adapted to sprocket-wheels C C', one of which is driven, preferably in the manner shown in Fig. 3, and secured to each link *b* of the chain B are scrapers D D'. The scrapers D are what I term "right-hand" scrapers—that is, they turn the material to the right—while the scrapers D' are left-hand scrapers, their teeth or blades being so arranged as to turn the material to the left. The material may be carried to the screen on a chute A' or may be discharged onto the plate E, in which case the backs d^2 of the scrapers act as conveyers to convey the material in the direction of the arrow along the surface of the plate and discharge the material onto the screen A.

As more clearly shown in Figs. 1 and 2, the bodies of the scrapers are secured directly to the links *b* of the chain by suitable means—such as rivets or bolts b^2, passing through said bodies and lateral extensions *b'* on the links—the said bodies being recessed around the links to which they are attached and preferably so as to permit the backs d^2 to extend slightly beyond the links in order that they may travel in contact with the upper plate E in the way above described, and also thus provide a rigid and durable attaching means for securing the scrapers to the driving-chain. These bodies, it will be noted, extend at right angles to the line of movement of the chain over the screen-plates, so that there is no tendency to twist or distort the chain as the scrapers are subjected to the strain of moving the material over the screen-plates.

The scrapers have a series of blades *d d'*, as shown in Fig. 2, and these blades, as remarked above, are turned either to the right or to the left for the purpose of shifting the material being screened and at the same time to utilize the entire surface of the screen-plate.

In operation the endless chain with the scrapers thereon travels at a certain speed and the material—coal, for instance—to be screened is not conveyed at the same speed as the scrapers, but is moved forward in a diagonal line a short distance, so as to carry the material over the openings in the screen, allowing the smaller particles to pass through and turning the remainder of the bulk of material, so that any small particles that are prevented from passing through the openings in the screen will work their way onto the surface of the screen, so that the following blades as they push the material forward will carry these small particles to the openings, and this process is repeated throughout the entire length of the screen, so that all the particles that are smaller than the size of the openings in the screen-plate will pass therethrough, while the larger particles will be carried by the scrapers to the end and there discharged into any suitable receptacle or chute for further treatment or for delivery, as required.

In Figs. 4 and 5 I have shown a series of screens, one mounted below another, for use particularly in screening coal at the mines. In this instance I have shown five screens with their endless-chain scrapers, and on one side I have shown the screens provided with small openings for the screening of the culm from the larger particles of coal. The main portions of the screens are so perforated that screen 1 will only retain the larger coal, which will be discharged to the coal-pocket through the chute 1^a. The screen 2 has perforations

less in diameter than the screen 1 and will carry only the next size coal, which will be discharged at the end to a coal-pocket through the chute 2^a. The particles of coal which pass through the screen 1 will fall on the plate E of the screen 2 and will be conveyed by the scrapers on this plate and discharged onto the screen 2, as remarked above, and the particles passing through the screen 2 will fall onto the screen 3, and those passing through the screen 3 onto the screen 4, and those from the screen 4 onto the screen 5. This last screen simply separates the culm from the smallest coal, which passes to separate pockets, as indicated.

In Fig. 3 I have shown my improved screen arranged at an incline, so that material as it passes from the pocket F through the openings f onto the screening-plate A will be conveyed and turned upon the said plate by the driven scrapers, so as to thoroughly remove the finer particles from the coarse particles, the coarse particles passing from the plate at a', while the smaller particles pass away on the chute a^2. In this construction the endless chain is driven from a driving-shaft H through a chain belt h, which passes around a sprocket-wheel on the shaft C^2 of the wheel C'.

While I prefer to arrange the scrapers with right and left hand blades alternately and so space the blades that the blades of one scraper will be directly back of the openings of the scraper directly in advance, they may, however, be made all left-handed or all right-handed, and the size of the blades and the angle to which they are set may be varied according to the material acted upon.

The curve of the blades of the scrapers can be modified to give any desired speed to the material without reference to the speed of the scrapers.

In some instances the plate E above the screen-plate A may be also perforated to act as a screen-plate, so that a double screening will take place, one on the upper run of the chain and the other on the lower run.

By my invention the material is passed over the screening-surface in a continuous stream in thin layers, and as it is thoroughly stirred and turned it can be carried over the screening-surface at a high speed, giving a large capacity, at the same time thoroughly screening the material.

The construction of the apparatus, as well as the operation thereof, is economical and the device itself is compact, taking up very little room comparatively.

The material—coal, for instance—is not unduly broken, as is the case in other screens, as the material is simply moved intermittently forward and turned in its passage over the screening-surface.

I claim as my invention—

1. The combination, in a screening-machine, of a perforated screen-plate, an endless driving-chain, sprocket-wheels for driving said chain, means for operating the sprocket-wheels, scrapers secured directly to the links of said chain, each of said scrapers comprising a body extending at right angles to the line of movement of the driving-chain, and a series of blades formed on said body and bent at an angle thereto, said blades being adapted to move in contact with the screen-plate to feed the material forward and push it to one side over the screen-plate, substantially as described.

2. The combination, in a screening-machine, of a perforated screen-plate, an endless driving-chain, sprocket-wheels for driving said chain, means for operating said wheels, scrapers comprising bodies secured at their backs directly to lateral extensions on the links of said chain and extending at right angles to the line of movement of said chain, said bodies having blades set at an angle thereto, and adapted to move in contact with the screen-plate to feed the material forward and push it to one side over the screen-plate, substantially as described.

3. The combination, in a screening-machine, of a perforated screen-plate, an endless driving-chain, sprocket-wheels for driving said chain, means for operating said wheels, scrapers comprising bodies secured at their backs directly to lateral extensions on the links of said chain and extending at right angles to the line of movement of said chain, said bodies having blades set at an angle thereto, the blades on the scraper-bodies being turned alternately to the right and to the left and adapted to move in contact with the screen-plate to feed the material forward and push it to one side and then to the other side over the screen-plate, substantially as described.

4. The combination, in a screening-machine, of a lower perforated screen-plate, an upper plate, an endless driving-chain, sprocket-wheels journaled in bearings between said plates, means for driving said wheels, scrapers consisting of bodies secured directly to the links of the chain, and extending at right angles to the line of movement of the chain, said bodies having their backs extending slightly beyond the links to which they are secured, and blades set at an angle to said bodies, the whole arranged so that the backs of said scrapers will travel in contact with the upper plate and the blades in contact with the lower plate in reverse directions, substantially as described.

5. The combination of a series of screens mounted one above another, the openings in the screens gradually diminishing in size from the top to the bottom, a driven endless belt, scrapers each having a series of blades thereon for each screen-plate, means for driving the same, each screen-plate having a series of small perforations at one end for the passage of culm and having discharge-chutes for the passage of the screened material, substantially as described.

6. The combination in a screening-machine,

of two screening-surfaces one mounted above the other, with an endless belt having scrapers thereon adapted to travel over both screens in opposite directions, the faces of the scrapers being in operation on the lower screen and the backs of the scrapers being in operation on the upper screen so that the material will be moved in one direction on the upper screen-plate and in the reverse direction on the lower screen-plate, the body of the scrapers having blades set at an angle to the body thereof so as to agitate and convey the material on the lower screen-plate, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES H. BOWDEN.

Witnesses:
R. VAN A. NORRIS,
T. J. MCMAHON.