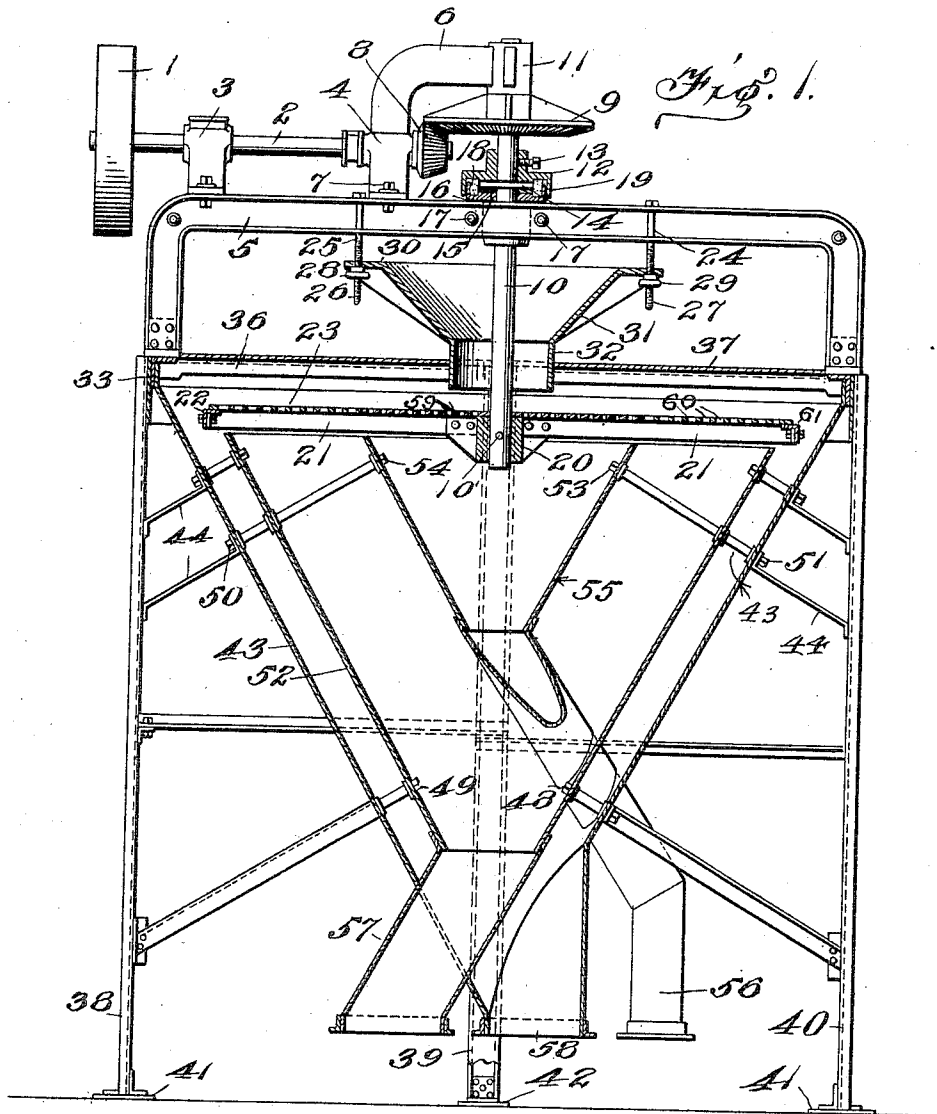


W. R. CUNNINGHAM.
CENTRIFUGAL SCREEN.
APPLICATION FILED MAY 10, 1909.

971,174.

Patented Sept. 27, 1910.
2 SHEETS—SHEET 1.



Inventor

Witnesses

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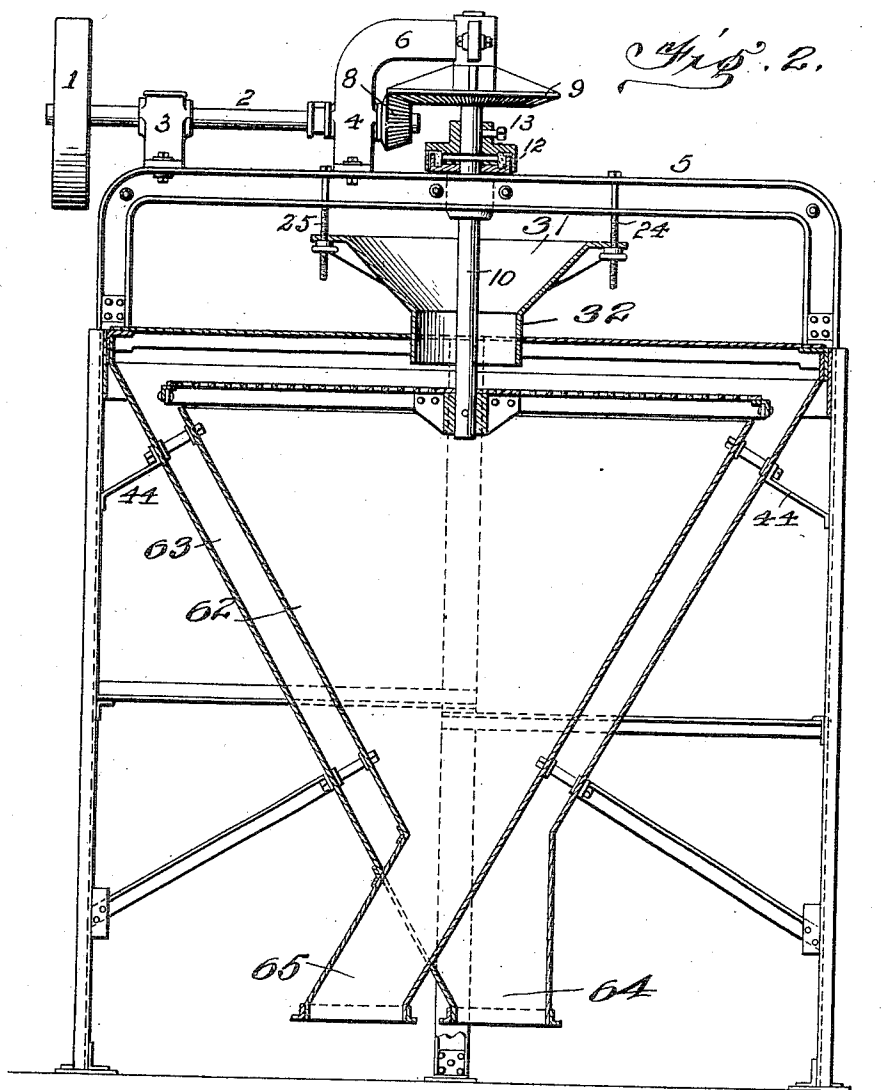
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UNITED STATES PATENT OFFICE.

WILLIAM R. CUNNINGHAM, OF BUCYRUS, OHIO, ASSIGNOR TO THE AMERICAN CLAY MACHINERY COMPANY, OF BUCYRUS, OHIO, A CORPORATION.

CENTRIFUGAL SCREEN.

971,174.

Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed May 10, 1909. Serial No. 495,094.

To all whom it may concern:

Be it known that I, WILLIAM R. CUNNINGHAM, a citizen of the United States, residing at Bucyrus, in the county of Crawford and State of Ohio, have invented certain new and useful Improvements in Centrifugal Screens, of which the following is a specification.

This invention relates to certain new and useful improvements in centrifugal screens designed particularly for screening clay to be used in the manufacture of brick, tiles and other clay products; and the invention consists of the parts, and the constructions, arrangements and combinations of parts which I will hereinafter describe and point out in the claims.

In many of the brick plants where dry press and wire-cut brick are made, it is necessary to have at least two grades of clay, as the dry-press brick requires finer ground material than the wire-cut or stiff clay; to make one screen machine provide clays for the two processes or two types of brick above mentioned, is the essential object of the present invention, the screen being designed to separate the material into different degrees of fineness and having separate hoppers and delivery spouts by which the different grades of material may be separately collected.

In the accompanying drawing forming part of this specification and in which similar reference characters indicate like parts in the several views: Figure 1 is a vertical sectional view, with parts in elevation, of a centrifugal screen embodying the salient features of my invention. Fig. 2 is a similar view of slightly modified form.

In the aforesaid drawing, 1, represents a driving pulley suitably mounted on one end of a horizontal shaft, 2, said shaft being appropriately journaled in bearings 3 and 4, the former of which is bolted or otherwise securely fixed to the top of a cross-frame, 5, surmounting the main frame or portion of the machine. The other bearing, 4, is formed as a part of a suitable gear-frame, 6, which is also bolted to the cross-frame, 5, as indicated by the bolts, 7, whereby the gear-frame is securely held in position on the cross-frame. The end of the horizontal shaft opposite to that carrying the drive pulley,

has fixed to it a bevel-pinion 8, which operatively meshes with a bevel-gear wheel, 9, fixed to a vertical shaft, 10, said shaft being turnably supported at its upper end in a journal bearing, 11, forming a part of the gear-frame 6.

On the upper part of the shaft, 10, between the bevel-pinion, 9, and the top of the cross-frame, 5, is fixedly secured a hub, 12, having a circumferential depending rim or flange, 19, hereinafter mentioned, said hub being secured to the shaft in any well known manner and herein shown as being secured by the set-screw, 13. The under side of the collar, 12, rests in contact with the upper surface of a collar, 14, which is rigid with the vertical shaft, 10, and forms a part thereof, said collar resting upon an anti-friction collar, 15, which in turn rests upon a cup-shaped step casting, 16, bolted to the cross-frame, 5, by means of bolts, 17, or equivalent fastenings. The step casting, 16, has a circumferential rim, 18, of slightly less diameter than the rim, 19, of the collar, 12, whereby the said rims are concentric with each other and form a running joint, the space included between the step casting and the collar, 12, being provided with a suitable packing material, and the combined structure forming a dust-proof step for the upper portion of the shaft.

To the lower end of the shaft, 10, is secured by means of a pin, 10', or by any well known fastening means commonly employed for such purposes, a driving spider, 20, to which is attached a structural framework including arms 21, to the outer ends of which are bolted or otherwise fixed a circular ring, 22, made preferably of angle-iron and whose upper horizontal flange forms a support for the outer edge of the screen plate 23. In Fig. 1, this screen is shown as consisting of an inner screen plate with relatively fine perforations or meshes and an outer screen plate having perforations or meshes coarser or larger than those of the inner screen plate, the two screen plates being associated with and adapted to discharge the screened material into separate receivers as I will presently mention.

Depending from the cross frame, 5, are suitable bolts, 24 and 25, these bolts having long threaded portions, 26 and 27, on which

are adapted to operate the hand nuts, 28 and 29, said bolts passing through a horizontal peripheral flange, 30, on the upper end of a suitable hopper, 31, said hopper 5 having its lower portion formed with a cylindrical vertical extension, 32, the lower end of which is disposed over the center of the screen. By reason of the aforesaid construction, the hopper may be adjusted up and 10 down by means of the said bolts and nuts, and its lower end may be caused to approach or recede from the receiving portion of the screen to thereby regulate the flow of the clay through the hopper and its tubular extension onto the central part of the screen 15 plate.

It will be noted that the cross-frame, 5, is formed with vertical ends which rest upon an annular ring, 33, preferably of angle-iron, and are secured thereto by rivets or 20 bolts as shown, suitable cross-pieces 36, being also riveted to the angle-iron ring, 33, and adapted to form a support for a metal cover, 37, the center of which is pierced by 25 the aforesaid extension, 32, of the hopper, said cover assisting in confining the dust and fine material within the machine and co-operating with other features hereinafter mentioned to form a substantially dust-tight inclosure for the material. I also rivet 30 or otherwise securely fix to the angle-iron ring, 33, suitable vertical legs, 38, 39, and 40, said legs forming a support for the machine, and the lower ends of the legs being provided with suitable foot-pieces, 41 and 42, 35 adapted to rest upon a suitable base or foundation. Below the screen are arranged the hoppers which receive the material passing through the screen and also over the edge 40 thereof, said hoppers being arranged concentrically and each having its own outlet whereby the coarse screened material and the fine screened material may be separated from each other and also from the tailings. That 45 this part of my invention may be readily understood, I will now refer to Fig. 1 where the exterior hopper, 43, composed of sheet iron or other suitable material is shown as having its upper end extending above the 50 plane of the screen and riveted or otherwise fixedly secured to the inner wall of the vertical flange of the angle-iron ring, 33; suitable bars, 44, with bent ends are secured to the sides of the hopper and to the vertical 55 legs, 38, 40, of the main frame to thereby brace and rigidly secure the hopper, 43, in its position.

Passing through the bent inner ends of the braces and also through the shell of the hopper, 43, are stay-bolts, 48, 49, 50 and 51, 60 which support a second hopper, 52, also composed of sheet metal, said second hopper having its walls thus separated from the walls of the outer hopper and having its 65 upper end terminating below and proximate

to the screen frame, the space between the two hoppers, 43, and 52, communicating with the space above the screen whereby the material carried over the edge of said screen and which may represent the tailings, will 70 be received into the outer hopper and be conducted through the spout 58, to any desired receiver; the second hopper, 52, is also provided with a discharge spout, 57, and this hopper is designed to receive that portion 75 of the material which passes through the outer or coarse portion of the screen. Suitable stay-bolts, 53 and 54, also pass through the hopper, 52, and through the wall of an inner hopper, 55, and thereby 80 space the latter hopper from the intermediate hopper, 52, and rigidly secure the hopper, 55, in its position under the central portion of the screen, said inner hopper, 55, having a spout, 56, which passes through 85 the sides of both of the hoppers, 52, and 43, and serves as a conductor for the fine screened material.

From this description, it will be observed that the clay is received into the feed hopper, 31, and passes therefrom through the 90 tubular extension, 32, and is received on the revolving screen at the center portion thereof, as shown at 59. As the screen, 23, revolves the finer particles pass through the 95 small openings in the central section or portion of the screen and enter the hopper, 55, and finally pass out of the spout, 56, into a bin or other place provided to receive this material. The centrifugal action of the 100 screen causes the coarser particles to move outwardly and as they pass over the coarse part, 60, of the screen the portion passing through the perforations or meshes of this part of the screen falls into the hopper, 52, 105 and finally passes out through the spout, 57, thereof as a coarse screened material. All of the particles that are too coarse to pass through the portion, 60, of the screen are carried by centrifugal action over the edge 110 of the revolving screen, as shown at 61, and are received into the hopper, 43, and pass down the same and out through the spout, 58, as tailings. Thus, I am enabled to provide at least two grades of clay, namely, a finer 115 ground clay for use in dry-press brick making, and a coarser screened clay for wire-cut brick making, and I do this by the employment of a single centrifugal screen machine wherein one part of the screen separates the fine material from the coarser and another part of 120 the screen separates the coarser material from the tailings, the whole product being thus acted on during one continuous operation.

The adjustable hopper, 31, with its extension, 32, is important in a machine of this type, because the extension serves to hold the clay substantially quiescent or in a state 125 of rest at about the point, 59, namely, at the 130

center of the screen where there is but slight movement, and as the screen revolves, it causes the particles of clay to roll outwardly, which action results in separating the fine from the coarse material.

In Fig. 2, I show a machine in all respects similar to the one found in Fig. 1, except that instead of three hoppers and their spouts, I employ two hoppers, namely, an inner hopper, 62, and an outer hopper, 63. This arrangement is desirable where the screen is made of substantially one mesh or size of perforations, for in this case all of the material passing through the screen enters the hopper 62, and is delivered as a screened product through the spout 65; the coarse material which is carried by centrifugal force over the outer edge of the screen falls into the hopper, 63, and is finally discharged, as a tailings, through the spout, 64. The machine of Fig. 2, is designed for use where only one grade of clay is required and in this respect only it differs from the construction shown in Fig. 1, the driving mechanism, adjustable hopper, and bracing for the several hoppers being substantially the same as before indicated. In both instances, the hopper, 31, delivers the clay on the central portion of the machine where it remains substantially at rest, but the revolution of the screen causes the particles of clay to roll over the screen by starting the clay from its position of rest, the finer particles passing through the openings in the screen plate and the coarser particles or tailings being carried out over the edge of said screen.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A centrifugal screen comprising a main frame; a horizontally disposed screen; a cross frame surmounting the main frame; a feed hopper adjustably suspended from the cross frame, having a delivery end piercing the top of the main frame and positioned above the screen so as to discharge the material upon the central portion thereof in substantially a state of rest; and means for revolving the screen to cause the said material to roll over the screen toward the periphery thereof.

2. A centrifugal screen comprising a main frame; a horizontally-disposed screen having inner and outer screen plates with perforations in the inner plates made finer than those in the outer plates; a cross frame surmounting the main frame; a feed hopper adjustably supported from the cross frame, having a delivery end positioned above the screen so as to discharge the material upon the central portion thereof in substantially a state of rest; means carried by the cross frame for revolving the screen to cause the said material to roll over the screen plates toward the periphery thereof; and an inde-

pendent hopper underlying the inner and outer screen plates and receiving screened material therefrom.

3. A centrifugal screen comprising a main frame; a horizontally-disposed screen having inner and outer screen plates with perforations in the inner plates made finer than those in the outer plates; a cross frame surmounting the main frame; a feed hopper adjustably supported from the cross frame, having a delivery end positioned above the screen so as to discharge the material upon the central portion thereof in substantially a state of rest; means carried by the cross frame for revolving the screen to cause the said material to roll over the screen plates toward the periphery thereof; an independent hopper underlying the inner and outer screen plates and receiving screened material therefrom; and an inclosure for said hoppers and screen having a cover pierced with a central opening for the admission of the lower end of the feed-hopper.

4. In a centrifugal screen, the combination with an inclosed screening chamber and a horizontal revoluble screen therein, of a support surmounting the screening chamber, a feed hopper having its lower end entering the screening chamber and positioned over the center of the screen whereby the material is delivered upon the central part of the screen in substantially a quiescent state, and manually-operated means outside the screening chamber for adjusting the delivery end of the hopper relatively to the surface of the screen.

5. In a machine of the character described, the combination of an inclosed screening chamber, a horizontal revoluble screen within said chamber having perforations in the central portion of smaller size than those in the outer portion, a feed hopper entering the screening chamber, means exterior to the screening chamber, and manually-controlled for raising and lowering the hopper relatively to the screen, a hopper underlying the portion of the screen having the smaller openings and adapted to receive the fine material passing therethrough, a second hopper concentric with the first hopper and disposed below the portion of the screen having the other openings and adapted to receive the material passing there-through, and a third hopper surrounding the second hopper and spaced therefrom and extending above the screen, and adapted to receive material discharged over the outer edge of said screen.

6. In a machine of the character described, the combination with an inclosed screening chamber, of a revoluble screen frame comprising a hub, radial extending arms, and a surrounding rim at the outer ends of said arms; a screen surface supported by said arms; independent hoppers con-

centric with each other and adapted to receive material discharged from different portions of the screen; a vertical shaft to which the screen frame is secured; means for rotating said shaft; a feed hopper adjustably suspended above the center of the screen and adapted to deliver the material upon the central portion of said screen in substantially a quiescent condition; and manually-operated means located outside of the screening chamber for raising and lowering the hopper and adjusting the delivery end thereof relatively to the surface of the screen.

7. In a machine of the character described, the combination with an inclosed screening chamber, of a revoluble screen frame comprising a hub, radial extending arms, and a surrounding rim at the outer ends of said arms; a screen surface supported by said arms; independent hoppers concentric with each other and adapted to receive material discharged from different portions of the screen; a vertical shaft to which the screen frame is secured; means for rotating said shaft; a feed hopper adjustably suspended above the center of the screen and adapted to deliver the material upon the central portion of said screen in substantially a quiescent condition; and manually-operated means located outside of the screening chamber for raising and lowering the hopper and adjusting the de-

livery end thereof relatively to the surface of the screen, said adjusting means including pendent bolts, and nuts adjustable thereon, said hopper having a peripheral flange through which the bolts pass and under which the nuts bear.

8. In a machine of the character described, the combination of a vertical rotatable shaft, a screen frame fixed thereto, a screen carried by said frame, independent concentric hoppers below the screen and adapted to receive material discharged from different portions thereof, spacing devices for separating one hopper from the other, each of said hoppers having a separate discharge spout, a frame in which the hoppers and screen are contained, a cross-frame surmounting said first named frame, a hopper below the screen frame having a tubular extension from its lower end positioned over the center of said screen, said hopper having a flanged upper end, threaded bolts depending from said cross frame and passing through said flange, and nuts on said bolts engaging said flange to adjust the extension of the hopper relatively to the central portion of said screen.

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

WILLIAM R. CUNNINGHAM.

Witnesses:

CHAS. D. DUMP,
CORA M. HOFFMAN.