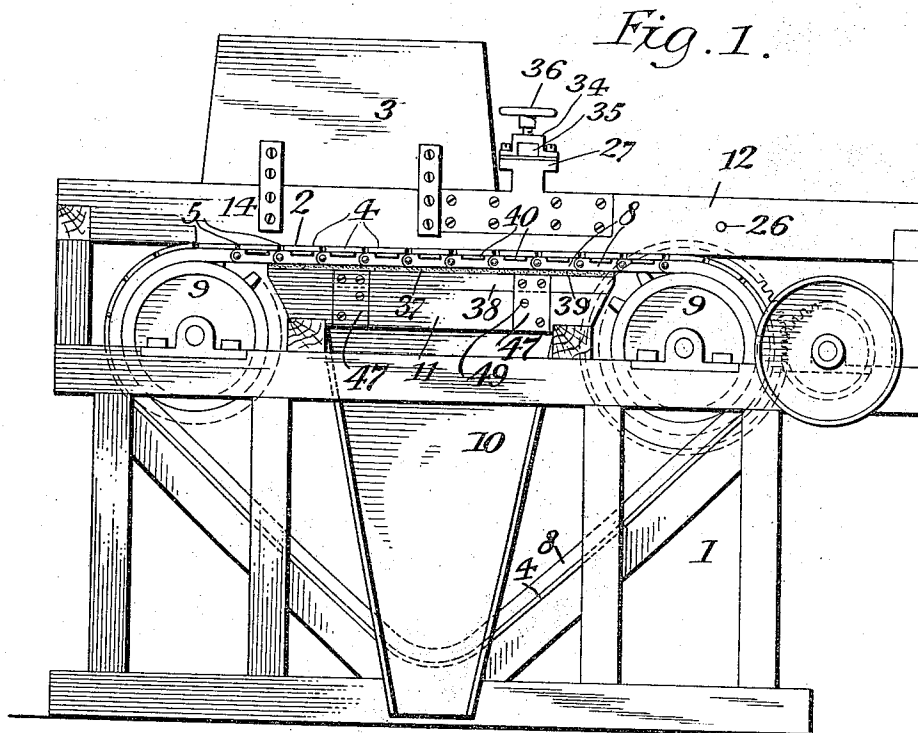
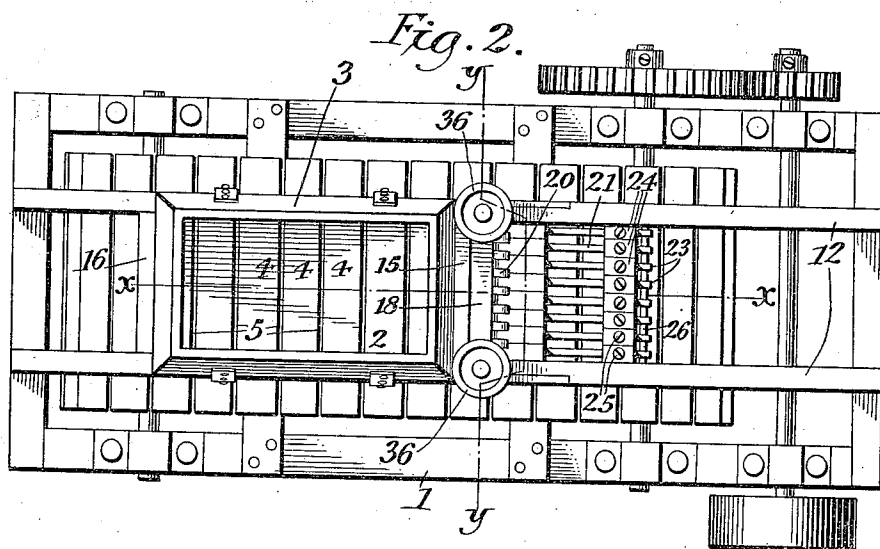


R. W. LYLE.
MACHINE FOR SEPARATING STONES FROM CLAY.
APPLICATION FILED DEC. 16, 1910. RENEWED JULY 3, 1915.

1,165,523.

Patented Dec. 28, 1915.
2 SHEETS—SHEET 1.



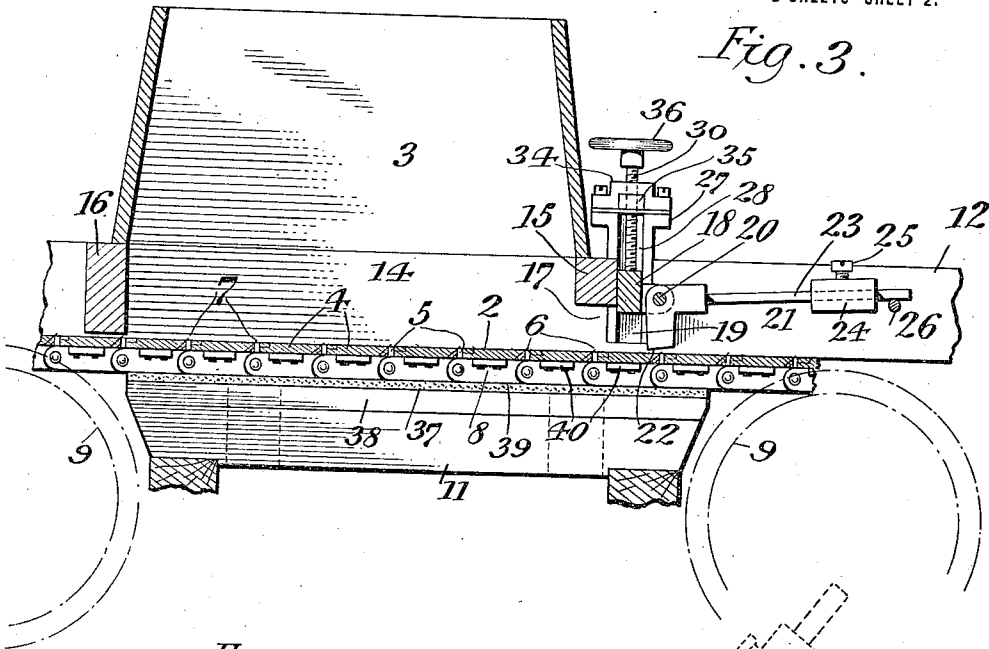
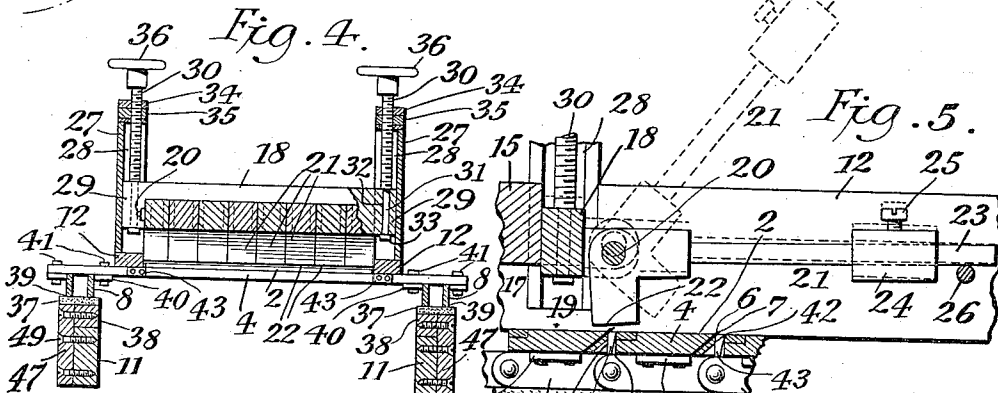
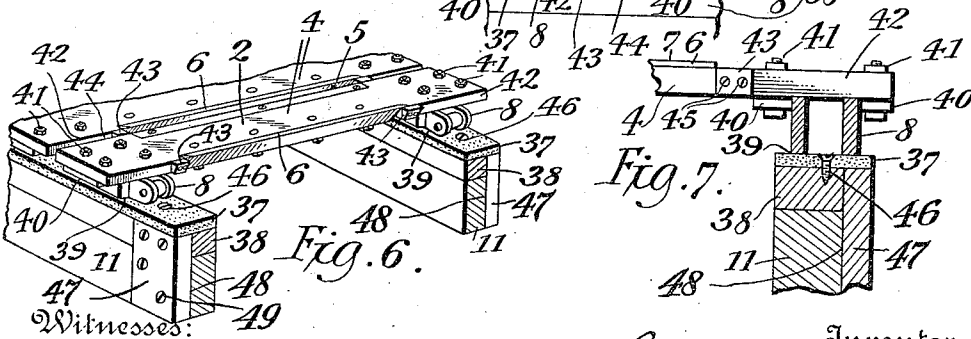
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UNITED STATES PATENT OFFICE.

ROBERT W. LYLE, OF SOUTH RIVER, NEW JERSEY, ASSIGNOR TO LYLE CLAY CLEANER COMPANY, A CORPORATION OF NEW JERSEY.

MACHINE FOR SEPARATING STONES FROM CLAY.

1,165,523.

Specification of Letters Patent.

Patented Dec. 28, 1915.

Application filed December 16, 1910, Serial No. 597,644. Renewed July 3, 1915. Serial No. 37,953.

To all whom it may concern:

Be it known that I, ROBERT W. LYLE, a citizen of the United States, and resident of South River, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Machines for Separating Stones from Clay, of which the following is a specification.

This invention relates to improvements in machines for separating stones from clay, and it has particular relation to an apparatus of the character shown in my co-pending application for patent, filed July 2, 1909, Serial No. 505,704, in which a moving cutter surface travels beneath a hopper carrying the crude clay and constitutes the bottom of the hopper, the clay being retained in the hopper for the action of the cutter surface by a trap-outlet mechanism mounted with relation to the cutter surface and at the front opening of the hopper immediately above said surface.

My present improvements are designed to provide improved trap-outlet means of the character above indicated, which will possess advantages in point of adjustability, effective operation and general efficiency, and to provide other improved features which will enhance the effective and economical operation of the apparatus.

In the drawings—Figure 1 is a side elevation of the machine, embodying my present improvements. Fig. 2 is a top or plan view of the portion of the machine adjacent the hopper, illustrating my improved trap-outlet means. Fig. 3 is a vertical longitudinal sectional view on the line $x-x$ of Fig. 2. Fig. 4 is a vertical transverse sectional view on the line $y-y$ of Fig. 2. Fig. 5 is a detail vertical sectional view, illustrating the adjustment and operation of the trap-outlets. Fig. 6 is a detail perspective view, illustrating the chain-links for carrying the knives or cutters and their fiber bearings. Fig. 7 is a detail cross-section through the chain-links and adjacent parts.

Corresponding parts in all the figures are denoted by the same reference characters.

Referring to the drawings, 1 designates the general frame-work, within which travels a moving cutter surface, 2, the active portion of which is beneath a hopper, 3, mounted immediately above the moving cut-

ter surface and having its bottom constituted thereby. The moving cutter surface, 55 in the construction herein shown, consists of cross-bars, 4, mounted in series successively and spaced to provide intervening openings, as at 5, for the passage of the cut clay, said bars carrying knife-blades, 6, having their cutting edges projecting at the front edge of the cross-bar above the plane of the top surface thereof, as at 7. The moving cutter surface constituted by the cross-bars 4 and knife-blades 6 is assembled 65 in an endless belt construction, by connection of the respective ends of the cross-bars with chain links, 8, and the action is such that the lumps of crude clay placed in the hopper 3 are retained upon the moving cutter surface so that the knives of the latter cut or shave the clay, during the travel of said cutter surface, and the cut clay passes through openings or spaces 5 between the cross-bars 4, while the stones and refuse matter are carried upon the moving cutter surface to a point of deposit after they have passed from the hopper. In the general assemblage of the parts of the machine, as herein indicated, the endless belt constituting the moving cutter surface passes around sprocket-wheels, 9, at opposite end portions of the framework 1, so that the active or operative portion of the moving cutter surface is sustained as a platform at the top between 85 said sprocket-wheels, and the hopper 3 is mounted over this active portion, while beneath said active portion extends a chute, as at 10, for the convenient deposit of the cut clay. 90

The general features of the hopper and moving cutter surface, comprising the parts above described, and the operative relationship thereof to the general parts of the complete machine, are fully shown and described in my previous application for patent Serial No. 505,704, above referred to, to which reference may be had for a detail understanding of the construction and operation of the character of apparatus to which 100 my present improvements relate, and I have herein shown a moving cutter surface of the construction illustrated and described in my co-pending application for patent, filed December 8, 1910, Serial No. 596,254, to which 105 reference may be had for a detail under-

standing of the structural characteristics of the cutter surface preferably employed in connection with my present improvements.

In the form of apparatus shown in my previous application for patent Serial No. 505,704, means were provided for retarding the passage of the clay upon the moving cutter surface and for retaining the lumps of crude clay within the hopper for the action of said cutter surface, while permitting the passage of the stones from the hopper and their carriage on the moving cutter surface to a point of deposit, such means consisting of trap-outlets constituted by independently-mounted traps arranged in a series extending transversely of the moving cutter surface and projecting downwardly to within a short distance of the top surface thereof, said independently-mounted traps being weighted to provide for an automatic gravity action and being hinged at their upper portions to a stationary part of the hopper so that they swing at a point a short distance in front of the transverse front opening at the bottom of the hopper and extending across the moving cutter surface and immediately above the same, and my present invention and improvements have particular relation to trap-outlet means of this character for retarding the passage of the clay upon the moving cutter surface and permitting the passage thereon of the stones and refuse matter.

I will now proceed to describe the particular features of my present improvements and the parts related thereto.

The general framework 1 comprises beams, 11—11, mounted in a longitudinal plane beneath the chain-links of the moving cutter surface, at the top portion of the machine, to sustain the active portion of the cutter surface in a horizontal or platform position, and above the moving cutter surface are provided side bars, 12—12, comprised in the framework, and extending longitudinally with relation to the moving cutter surface, which side bars are preferably respectively located at points within the plane of the ends of the cross-bars 4 which are connected to the chain-links and immediately above the top surface of said cross-bars and form upwardly-extending sides which operate to retain the stones and refuse matter in their carriage upon the cutter surface to the point of deposit therefrom. In the improved construction herein illustrated, said side bars 12 are preferably extended from end to end of the machine, so that they form the sides of the lower portion of the hopper 3, as at 14, and the front and rear lower portions of the hopper are formed by cross pieces, as at 15 and 16, respectively, extending transversely between the side bars 12. This construction enables the attachment of the hopper proper to the side bars

12 and said front and rear cross pieces 15 and 16, as shown.

The hopper 3 is provided at its bottom across the front with an outlet opening, 17, extending transversely immediately above the moving cutter surface 2, this outlet opening being constituted, in the construction as herein shown, by a space left beneath the front cross piece 15. With relation to said outlet opening 17, and extending transversely with relation to the lower portion of the hopper, is a cross-bar, 18, which carries the trap-outlet members. This cross-bar, in the present construction, is preferably located immediately in front of the front cross piece 15, so that, in conjunction with the latter, it extends over an outlet space, as indicated at 19, existing in front of the outlet opening 17 at the bottom of the hopper. Pivotally connected, as at 20, to the front of the cross-bar 18, are a series of traps, 21, which collectively form a wall extending across the moving cutter surface 2, the trap-outlets 21' being independently pivoted and fulcrumed at their upper portions while their lower edges, 22, extend with relation to the moving cutter surface. These trap-outlets are each weighted for gravity action, preferably by means of a forwardly-projecting arm, 23, carrying a weight or block, 24, which may be adjustable by means of a set screw, 25, and in practice all the parts or members of the traps 21 may be formed of metal. The outer weighted portions of the traps 21 are preferably supported in normal position by a cross rod 26, extending between the side bars 12, and upon which the outer ends of the arms 23 of the traps 21 are adapted to rest, which stop cross rod thus serves to limit the closing movement of the trap outlets beyond a normal position. For a general detail understanding of the operation and function of this trap-outlet mechanism reference may be had to my previous application herein mentioned, showing the type of clay-cleaning machine to which my present improvements especially relate, but it may be here stated that the action of the series of weighted and suspended trap-outlets 21' is such that the pressure of the crude clay will not actuate said traps to permit the release of the clay but the latter will be retarded until the knife-edges have fully operated upon the same, while any stones passing through the opening 17 and bearing against the trap-outlets 21', or any accumulation in rear thereof, will actuate said suspended traps by the bearing against the same of such hard substances carried along by the travel of the moving cutter surface and not soft enough to granulate against the resistance of the weighted traps, and the trap-outlets 21' will thus open against their weighted resistance sufficiently to permit the release of stones and their carriage upon the moving cutter

surface to a point of deposit therefrom and will automatically close when the resistance offered by the passage of the stones is released.

5 It is desirable in this class of machines to regulate the conditions of the closure effected by the trap-outlet mechanism at the hopper outlet opening 17, according to the character of the crude clay which is being
10 operated upon within the hopper, and for this purpose in my present invention and improvements the trap-outlet mechanism is vertically adjustable with relation to the moving cutter surface 2. The cross-bar 18,
15 which pivotally carries the entire series of traps 21 is adjustably mounted so that it may be moved vertically and carry with it in its adjustment the trap-outlet mechanism, and the preferred construction for effecting
20 this adjustment comprises standards, 27—27 mounted upon the side bars 12 and having at their inner faces vertical grooves, 28, within which are received and guided the ends, 29, of the cross-bar 18. Adjustment
25 screws, 30, are connected with the cross-bar 18 by means of reduced lower ends, 31, revolvably passing through openings or perforations, 32, in the ends 29 of the cross-bar 18 and headed, as at 33, at the under side
30 of the latter, whereby in their upward movement these screws lift said cross-bar and in their downward movement bear upon and lower the same. These adjustment screws
35 are operatively mounted to work through a boxing, 34, at the top of the standards 27, and in threaded connection with a nut, 35, retained in said boxing, and they are provided at their projective top ends with suitable hand-wheels, 36, by which they may be
40 conveniently operated. By means of the construction and arrangement just described, the trap-outlet mechanism may be conveniently and readily adjusted vertically and thus enable a variable relationship of
45 the lower ends 22 of the independently-operating trap-outlets 21' with respect to the moving cutter surface 2, according to the character and conditions of the clay which is being operated upon, whereby the most
50 effective and economical conditions of operation are secured.

The links of the endless chain by which the moving cutter surface is assembled and carried have a bearing with relation to the frame beams 11 in the support of the active
55 operative portion of the moving cutter surface, and it is therefore desirable to reduce the conditions of friction and wear at this bearing. In my present improvements a bearing strip, 37, is suitably carried by the
60 beams 11, at the top thereof, and constitutes the bearing surface for the chain-links 8. This bearing strip 37 preferably consists of a suitable fibrous material carried by a suitable
65 holder, as at 38, and adapted to retain

a suitable lubricant, by absorption or otherwise, whereby a lubricated anti-friction bearing surface is provided in the line of travel of the chain-links at all points with relation to the support of the active moving
70 cutter surface. The preferred construction of chain-links employed in adaptable relation to the bearing strip 37 and the cross-bars 4 of the moving cutter surface has a flat plane bottom surface as at 39, throughout
75 its length, which affords a uniform smooth bearing upon the fibrous bearing strip 37, and at its top the chain link 8 is provided with lateral wings or extensions, 40, at opposite sides, to which the end portions
80 of the cross-bars 4 are secured, by bolts, as at 41, or in any other suitable manner. The secured ends of the cross-bars 4, beneath which the chain-links are located, extend beyond the side bars 12, and the
85 knife-blades 6 carried by said cross-bars 4 extend on a transverse plane between the side bars 12 and terminate within the plane of these side bars, it being understood that the active operative portion of the moving
90 cutter surface is between said side bars 12 and that the operative extent of the openings at the cutting edge of the knife-blades and existing between the spaced cross-bars 4, for the passage of the cut clay, is thus
95 over practically the transverse extent of the space existing between said side bars 12. Under the practical conditions of operation, utilizing the maximum width of the cutting portion of the moving cutter surface, as just
100 indicated, it is desirable to avoid liability of the cut clay which passes between the spaced crossed-bars 4 contacting with the chain-links and their bearing strip 37 and thus clogging and interfering with the anti-
105 friction movement of the cutter surface, and for this purpose the space between the front and rear edges of the adjoining cross-bars 4 is closed at the terminal ends of the knife-blades 6. In the preferred construction for
110 the purpose just stated, the front edge, 42, of the cross-bar 4, is provided with a lug or projection, 43, at each terminal end of the knife-blade 6, against which the rear edge, 44, of the adjoining cross-bar 4 will bear.
115 These lugs or projections 43 thus close the intervening space between the cross-bars 4 at a point beneath the frame side bars 12 and between the terminal end of the knife-blade and the end portion of the cross-bar 4
120 which projects beyond said side bars 12 and is secured to the chain-links, and this closure effectively retains the cut clay from interference with the chain-links and their bearing. The lugs or projections 43 may be
125 a separate member secured to the cross-bar 4 by screws, as at 45, or they may be integral with said cross-bar if desired.

To enable convenient removal of the fibrous bearing strip 37, for purposes of sub- 130

stitution, without requiring dismemberment of the machine parts, the holder 38 is preferably detachable in its mounting and relation to the supporting frame beam 11. In the construction herein shown for this purpose, the holder 38 consists of a bar supported upon the beam 11 and having the strip 37 suitably secured to its top surface, for instance by screws, as at 46, and said bar 38 is carried and held in position by extensions or strips, 47, projecting downwardly and secured in recesses, 48, in the outer face of the beam 11, fastening screws, 49, being employed to secure the extensions 47 to said beam. Thus, by removing the fastenings 49, the holder 38 with the bearing strip 37 may be slid out from beneath the chain-links 8, and again restored to operative position, without dismembering the moving cutter surface or any of the machine parts.

The operation and advantages of my invention and improvements will be readily understood by those skilled in the art to which they appertain. The improved trap-outlet mechanism at the hopper opening secures a positive and effective operation by which variable action upon the crude clay is maintained and only the stones and refuse matter are permitted to pass beyond the trap-outlet mechanism, the adjustable characteristics permitting a convenient adaptability of the device to the various conditions and circumstances existing under different characteristics and qualities of clay in practical operation. The improved mechanism thus secures positive operation, with high efficiency and economy, in precluding the waste of any percentage of clay which might otherwise pass beyond the active conditions of the moving cutter surface in rear of the trap-outlets. The improved bearing conditions, and protected status thereof, with relation to the moving cutter surface, also assures the effective travel of said surface at all times, with maximum results in its cutting action and without liability to interference of the clay with its bearings.

I do not desire to be understood as limiting myself to the detail construction and arrangement of parts as herein shown and described, as it is manifest that variations and modifications therein may be resorted to, in the adaptation of my invention to varying conditions of use, without departing from the spirit and scope of my invention and improvements. I therefore reserve the right to all such variations and modifications as properly fall within the scope of my invention and the terms of the following claims.

Having thus described my invention, I claim and desire to secure by Letters Patent:

1. In apparatus for separating stones from clay, a moving cutter surface having openings for the passage of the cut clay, means for holding and retaining the crude

clay in contact with said cutter surface, trap means constituted by a series of independently-mounted members respectively operating independently for retarding the passage of the clay and for permitting the passage of the stones and refuse matter, and adjustable means collectively carrying said independently-operating trap-means members to adjust the position of the same as a unit with relation to said moving cutter surface.

2. In apparatus for separating stones from clay, a moving cutter surface having openings for the passage of the cut clay, the active portion of said cutter surface being horizontal, means for holding and retaining the crude clay in contact with said cutter surface, trap means constituted by a series of independently-mounted members respectively operating independently for retarding the passage of the clay and for permitting the passage of the stones and refuse matter, and a vertically adjustable member collectively carrying said independently-operating trap-means members to adjust the position of the same as a unit vertically with relation to the active horizontal portion of said moving cutter surface.

3. In apparatus for separating stones from clay, a moving cutter surface having openings for the passage of the cut clay, trap means for retarding the carriage of the clay upon said moving cutter surface and for permitting the passage thereon of the stones and refuse matter, said trap means being arranged in series to form a continuous wall and constituted by independently-operating members or elements, and means for adjusting said independently-operating trap-means elements as a unit with relation to said cutter surface.

4. In apparatus for separating stones from clay, a moving cutter surface having openings for the passage of the cut clay, means for holding and retaining the crude clay in contact with said cutter surface, and means adjustable to and from said moving cutter surface and operative in its adjusted positions to retard the passage of the clay and permit the passage of the stones and refuse matter.

5. In apparatus for separating stones from clay, a moving cutter surface having openings for the passage of the cut clay, a hopper mounted above said cutter surface and having its bottom constituted thereby and provided with an outlet opening at its lower portion, trap means constituted by a series of independently mounted members collectively extending across said opening and respectively operating independently for retarding the carriage of the clay and permitting the passage of the stones and refuse matter, and adjustable means collectively carrying said independently-operating trap-means members to adjust the po-

sition of the same as a unit with relation to said opening and to said moving cutter surface.

6. In apparatus for separating stones from clay, a moving cutter surface having openings for the passage of the cut clay, a cross member extending above said cutter surface and transversely thereof to form an outlet opening, a hopper mounted with relation to said cross member and having its lower front portion constituted thereby, a carrier member mounted in front of said cross member and transversely of said cutter surface, means for vertically adjusting said carrier member with relation to said cutter surface and said opening, and trap means pivotally connected to said carrier member and constituting a wall in front of said opening and operating to retard the carriage of the clay upon said moving cutter surface and to permit the passage thereon of the stones and refuse matter.

7. In apparatus for separating stones from clay, a moving cutter surface constituted by a series of successive transverse cutting members and having openings for the passage of the cut clay, an endless chain constituted by links respectively secured to said cutting members, means for supporting said chain links to maintain the active portion of said moving cutter surface in horizontal or platform status, and a supplementary absorbent bearing surface removably carried by said supporting means and constituting a bearing for the chain links thereon.

8. In apparatus for separating stones from clay, a moving cutter surface constituted by a series of successive transverse cutting members and having openings for the passage of the cut clay, an endless chain constituted by links respectively secured to said cutting members and having a plane bottom surface, and an absorbent anti-friction bearing surface removably underlying said links in their line of travel and constituting a bearing for the plane bottom surface of the links.

9. In apparatus for separating stones from clay, a moving cutter surface constituted by a series of successive transverse cutting members and having openings for the passage of the cut clay, an endless chain constituted by links respectively secured to said cutting members and having a plane bottom surface, and a fibrous surface carried by said supporting means and constituting a bearing for the plane bottom surface of the chain links.

10. In apparatus for separating stones from clay, a moving cutter surface constituted by a successive series of spaced transverse cutting members and having intervening openings for the passage of the cut clay, an endless chain constituted by links se-

cured to said cutting members, means for supporting said links to maintain the active portion of said moving cutter surface in horizontal or platform status and constituting a bearing for the chain links, and means for closing the intervening space between said cutting members at a point at the inner side of their point of attachment to the chain links.

11. In apparatus for separating stones from clay, a moving cutter surface constituted by a series of spaced successive transverse cross-bars carrying cutting edges, an endless chain constituted by links secured to said cross-bars beyond said cutting edges, means for supporting said links to maintain the active portion of said moving cutter surface in horizontal or platform status and constituting a bearing for the chain links, and means for closing the intervening space between said cross-bars at the terminal ends of said cutting edges at the inner side of their point of attachment to the chain links.

12. In apparatus for separating stones from clay, a moving cutter surface constituted by a series of successive transverse cutting members and having openings for the passage of the cut clay, an endless chain constituted by links respectively secured to said cutting members, means for supporting said chain links to maintain the active portion of said moving cutter surface in horizontal or platform status, a supplementary bearing strip for said chain links mounted at the top surface of said supporting means, and means for detachably securing said bearing strip in connection with said supporting means whereby it may be removed from beneath the chain links.

13. In apparatus for separating stones from clay, a moving cutter surface constituted by a series of successive transverse cutting members and having openings for the passage of the cut clay, an endless chain constituted by links respectively secured to said cutting members, means for supporting said chain links to maintain the active portion of said moving cutter surface in horizontal or platform status, a supplementary bearing strip for the said chain links mounted at the top surface of said supporting means, and a laterally-adjustable holder carrying said bearing strip, whereby said holder may be adjusted to adjust said bearing strip with relation to said supporting means.

14. In apparatus for separating stones from clay, a moving cutter surface constituted by a series of successive transverse cutting members and having openings for the passage of the cut clay, an endless chain constituted by links respectively secured to said cutting members, means for supporting said chain links to maintain the active portion of said moving cutter surface in hori-

zontal or platform status, and a supplementary bearing strip for said chain links mounted at the top surface of said supporting means, said bearing strip being laterally adjustable with relation to the chain links and said supporting means.

In testimony whereof I have signed my

name in the presence of the subscribing witnesses.

ROBERT W. LYLE.

Witnesses:

JOS. REED LITTELL,
BESSIE COSTIGAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."