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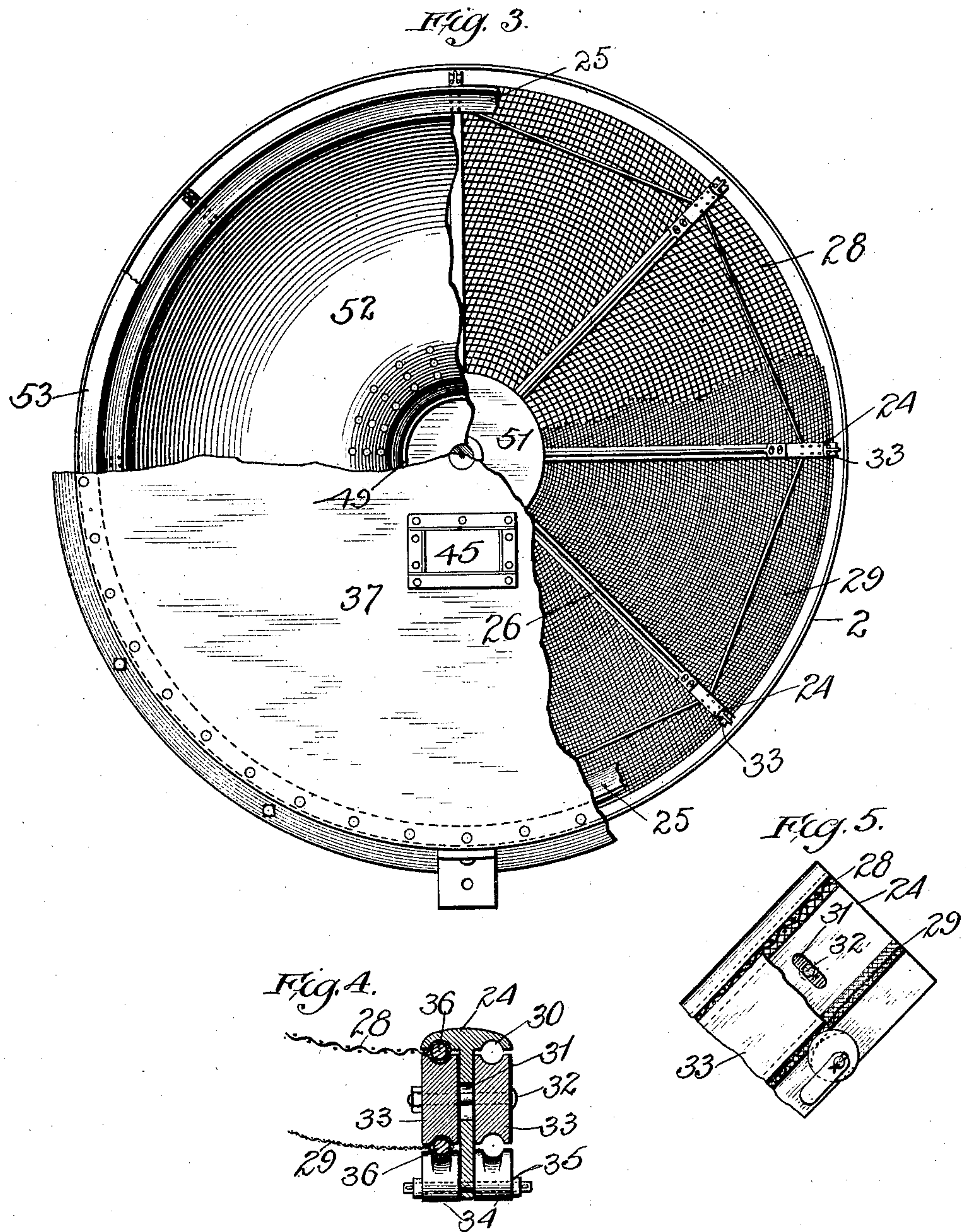
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APPLICATION FILED APR. 6, 1907.

903,609.

Patented Nov. 10, 1908.

2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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## SEPARATOR.

No. 903,609.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed April 6, 1907. Serial No. 366,686.

*To all whom it may concern:*

Be it known that I, CHARLES J. REILLY, a citizen of the United States, residing at Syracuse, in the county of Kosciusko and State of Indiana, have invented certain new and useful Improvements in Separators, of which the following is a specification.

My invention relates to improvements in separators, for separating or shifting comminuted substances, particularly abrasive materials such as cement.

Among the salient objects of my invention are, to provide a power machine of large capacity capable of continuous operation for long periods of time so as to handle material in quantities at low expense, of design conducive to durability and little wear, and of construction simple, practical and susceptible of easy replacement of the parts most liable to wear at low expense.

In the drawings, wherein I have illustrated an operative embodiment of my invention: Figure 1 is a central vertical section through the machine; Fig. 2 is a plan detail partly broken away, of the hopper head and associated parts; Fig. 3 is a plan view of the casing structure with parts broken away at different elevations; Figs. 4 and 5 are details of the screen holding devices of the screening hopper.

Throughout the drawings like numerals of reference refer always to like parts.

In the drawings 1 indicates in general a tapering casing, consisting of an upper cylindrical section 2, a lower conical section 3 and a bottom or base casting 4 provided with a discharge outlet 5, forming a continuation of the peripheral wall of the casting 4, and also provided with an additional discharge outlet 6, extending upward inside of the casing in the form of a throat 7 the free centered end 8 of which is embraced between interior and exterior walls 9 and 10 of a head 11, yieldingly supported from said throat upon a coiled spring 12 seated in the recess between the walls 9 and 10, and at its lower end bearing upon a collar 13 encircling such throat, 7, and vertically adjustable by means of cam slots 14 engaging pins 15 secured to the throat 8, the adjustment being fixed by a set screw 16 in the collar engaging throat 8.

17 indicates a lug on throat 8 coacting with stop-pin 18 on the casting 4 to prevent rotation of the head 11 past such point.

The head 11 is provided with an open pas-

sage 19, flaring in hopper-like form, as at 20, and having, spanning the opening, a bridge or spider 21 carrying a step 22 in which is secured a vertical central stem 23. 60

Within the conical section 3 of the casing 1, and substantially conforming thereto in shape, is arranged a screening hopper or hopper shaped screen having a frame provided by a series of inclined and radially diverging arms 24, of suitable construction, said arms 24 being at their lower ends connected to the flaring hopper part 20 of head 11, and at their upper ends, which terminate in close proximity to cylindrical wall 2 of the casing, connected together by a circumferential plate 25, which constitutes also a wear plate. The open end of such hopper frame is braced by tie rods 26, at their outer ends secured to the respective beams or T-irons 24, and at their inner end secured to a collar 27, encircling and made fast to the stem 23. 65 70 75

Between the frame arms 24 are secured the screens, preferably a coarse inner scalping screen 28, and a fine secondary or outer screen 29, spaced apart slightly and held in place by suitable means. Specifically I prefer that the arms 24 shall be T-irons, with the cross arms channeled, as at 30, the rib of the iron having therein cross-slots 31 through which take bolts 32 holding in place spacers 33, grooved on both edges. 80 85

Cams 34 having handles 35 are mounted on the rib to face the outer edges of spacers 33, at suitable points, and each screen is provided with an edge beading 36 formed by rolling the screen-fabric around a solid wire, so that the screen sections may be inserted, as shown in Fig. 4, and clamped by the action of cam 34. 90 95

The stem 23 extends upward through the top 37, of the casing, and finds bearing in the central part of a yoke 38 spanning the top of the casing, the end of the stem 23 being normally pressed by the action of spring 12, against an adjustable stop screw 38' closing the end of the stem bearing in the yoke 38. 100

The yoke 38 is provided with a base part 39 extending transversely across the top of the casing, and such yoke provides suitable bearings for a transverse drive shaft 40 bearing on its inner end a beveled gear 41, which meshes with the coacting horizontally disposed beveled gear 42 mounted on a suitable anti-friction bearing 43 provided on the 105 110



yoke base 39, and secured to a rotatable sleeve 44 surrounding the stem 23 and extending downward in the machine to a point contiguous to collar 27.

- 5 In the top 37 of the casing are provided inlet openings 45, opening to an annular, downwardly tapering feed spout 46 having an open mouth below which is arranged the rotary distributor 47, supported by and ro-  
 10 tatable with sleeve 44. In construction such distributor 47, preferably comprises a hub casting 48 having a crown flange 49 below the feed mouth 46, a skirt 50 sweeping downward and outward therefrom, and a  
 15 foot 51 having therein a recess slightly larger than the collar 27 which is disposed therebelow. To the skirt 50 is connected the distributing plate 52 which is preferably annularly concaved, that is to say, has in  
 20 cross section on any radius a compound curve, sweeping downward from its point of connection with the skirt 50 to a point approximately half way between its center and its tip, and then sweeping upward to  
 25 its periphery in the manner best indicated in Fig. 1, so that its periphery is approximately in line with its radially inner edge, in arrangement, with respect to the screening  
 30 hopper, at an elevation somewhat above the top edge of the wear ring 25. In radial dimensions the distributor 47 is somewhat smaller than the cylinder part 2 of the cas-  
 35 ing, and to the inner wall of cylinder 2 at a point below the peripheral plane of distributor 47, and above the plane of wear ring 25 I provide a flange 53 extending in-  
 ward past the outer edge of the ring 25.

- To the upper surface of collar 27 and within the recess in foot 51 of casing 48, are  
 40 secured similar ratchet toothed annuli, 54 and 55, secured to said respective members, the one for rotation with sleeve 44 and the other to be held stationary by stem 23. The  
 45 tooth arrangement of the said members is such that as the sleeve 44 is rotated the teeth of member 54 pass over and depress those of member 55.

- 56 indicates a packing ring of leather, or the like, secured to the collar 27 and extend-  
 50 ing up into the recess in the foot 51 to inclose and protect the ratchet parts 54 and 55.

- The operation of a machine as thus constructed is as follows; The material to be separated, such as cement or other abrasives,  
 55 for the handling of which my machine is especially adapted, is fed in through the openings 45 through the feed mouth 46, on to the rotating distributor 47, which together with the sleeve 44 is rotated at proper speed  
 60 by power applied to the shaft 40. Falling upon the distributor 47 the material fills the recess within the crown flange 49 so that after the first moment of operation the fresh incoming material cushions on that already  
 65 held within such crown flange and flows

down in a steady stream, across the downwardly curved part of the distributor, the downward trend of which causes the material to roll rapidly so that it is quickly gotten  
 70 beyond the point of greatest congestion out on the more expansive surface of the distributor. Now the material aided in its progress by centrifugal action, passes to the periphery of the distributor, its path curving  
 75 upward so that its velocity may be reduced to prevent too severe impact of the material against the casing wall. The material is evenly distributed at all points around the periphery of the distributor, being  
 80 thrown over the edge of the part 52 against the cylindrical wall 2 above the retaining flange 53. During the initial moments of operation of the machine, the material builds up upon the flange 53, as shown  
 85 in dotted lines in Fig. 1, so interposing at this point of relatively great wear a cushion of the material itself between the wall of the casing and the material in transit. From  
 90 this point the material drops on to the wear plate 25, which takes the slight impact of the falling material and prevents the upper end of the screen proper from being unduly  
 95 worn. The material, rising from the wear plate, is sifted as it travels down the tapering screening hopper, the coarsest particles  
 100 which cannot pass through the screen 28, rolling down within the screen hopper, and medium grades of the material, of size which may pass through the coarse screen 28 but  
 105 not through the fine screen 29, passing down from the passage between such screens, such bodies of material joining in the open head  
 110 17 and passing through the coarse material outlet 6, while the fine material passes through both screens and travels down the  
 115 inside of the cone section 3 and out through the outlet 5. To prevent the material from lodging on and clogging the screening fabric, the screening hopper should preferably be jarred, and it will be observed in the  
 120 construction described that rotation of the ratchet member 54 by sleeve 44 acts upon the lower non-rotatable ratchet member 55, to depress and then suddenly release the latter,  
 125 so that the stem 23 and the screening hopper are bodily moved downward against the tension of the spring 12 and then forced back by said spring until the upper end of the stem 23 strikes the stop 38' a sharp blow, so  
 130 jarring the screening hopper with a severity regulable by adjustment of stop 38'.

It will be observed that the construction of my machine is particularly adapted for the handling of materials of high abrasive  
 125 qualities, as certain of the points in the machine particularly subject to wear are so arranged as to be protected by bodies of the material lodging and remaining thereon, while other wearing parts of the machine  
 130 such as the feed mouth 46 and the wear



plate 25, are of simple construction readily removable and replaceable so that replacement thereof occasions little expense. The finer working parts such as the jarring ratchets are adequately protected by inclosure, and the screen arrangement is such that a relatively coarse screen, capable of standing considerable wear, handles the larger coarser particles which act most severely upon the screening hopper, while only the finer particles act upon the relatively fine screen necessary to produce the final separation required. Also I find that the inclined hopper of given mesh, rapidly jarred will screen evenly to a fineness equal to that secured by screening with a horizontal screen of much finer mesh, so that a heavier, coarser screen cloth may be used for a given product than in other types of separator. Furthermore it will be observed that the arrangement is designed to produce a machine of large capacity or output with respect to its size, expense and power requirements, the construction of the distributor being arranged with a special view to rapid and effective handling of large bodies of material, while the feed hopper is designed to offer its largest screening-surface area to the point on which falls the greatest amount of work, so that the chances of clogging of the screen are reduced to a minimum.

While I have herein described in some detail a specific embodiment of my invention, which I believe to be new and advantageous in its details of construction as well as in its broader features of combination and arrangement, it will be understood, that numerous changes may be made in the specific construction without departure from the spirit and scope of my invention, and I do not desire my invention in its broader aspect to be understood as limited to any particular construction shown or described.

Having thus described my invention, what I claim and desire to secure by Letters Patent, of the United States, is:

1. In a separator, a rotary plate distributor for centrifugally delivering material from its periphery, a downwardly tapering hopper-screen, arranged to initially receive at the periphery of its larger end the material delivered from the distributor, and means for jarring the screen operated by said distributor.

2. In a separator, a casing, a tapering hopper-screen, yieldingly supported, a rotary imperforate plate distributor supported independently of the hopper, and operative connections between the hopper-screen and distributor, whereby the former is jarred through the rotation of the latter.

3. In a separator, a tapering casing, a tapering screening hopper, a rotary distributing plate curved downward from adjacent its center of rotation, and then upward to

its periphery, means for rotating said plate, and means for feeding material to said plate adjacent its center.

4. In a separator, a casing having a top feed opening adjacent its center, a tapering screening hopper therein, a rotary distributor, comprising a center member affording a surface suitable to receive and hold a body of material, fed through the top opening of the casing, and from such central area extending outward in annular dished configuration, such distributor being arranged near top of the screening hopper.

5. In a separator, a casing having a conical bottom, and comprising a base fitting having an exterior member wherewith the conical bottom of the casing communicates, provided with an outlet, and an interior throat member provided with an independent outlet, a head loosely mounted on said throat member for vertical movement, and a screen hopper carried by said head communicating with the throat.

6. In a machine of the character described, a tapering casing, provided with a base fitting having an exterior passage communicating with the casing, and with an outlet, and an interior throat member opening to a separate outlet, a head mounted for vertical movement on said throat member, and having an opening therethrough to the throat, means for yieldingly holding the head in its uppermost limit of movement, a screen hopper carried by said head and communicating therethrough with the throat, a rotary distributor within the casing, means for rotating said distributor, and connections between the distributor-rotating-means and the screen-hopper-head, whereby rotation of the former alternately depresses and releases the latter.

7. In a machine of the character described, a casing, comprising a tapering bottom portion, a screening hopper within said casing, provided with a central stem extending above the hopper, a sleeve surrounding the stem, a distributing plate secured to the sleeve, means for rotating the sleeve and distributing plate, and ratchet connections between the sleeve and stem whereby rotation of the sleeve imparts vertical vibration to the stem and its associated hopper screen.

8. In a machine of the character described, a casing, a tapering screen hopper within the casing, yieldingly supported at its lower end, a stem projecting upwardly from said hopper, a ratchet member secured to said stem, a sleeve above said ratchet member, an upper ratchet member secured to said sleeve, an adjustable stop for limiting the upward movement of the stem, and means for rotating said sleeve in a direction to cause the upper ratchet member to alternately depress and release the ratchet member secured to the stem.



9. In a separator of the character described, a screen hopper comprising a plurality of radially diverging arms, superposed screen sections, each section formed around  
5 an edge beading at abutting edges and pivoted eccentric clamps for holding the superposed screen sections in proper relation to each other and the arms.

10. In a separator of the character described, a screen hopper comprising a plurality of radially diverging arms, each having a central rib and a transverse head, double-grooved clamping strips 33 carried by said  
15 ribs on each side thereof, superposed screens, one engaged by each edge of a strip, and clamping means for holding the screens and strips in proper relation on the arms.

11. In a separator, a casing having a feed opening, a rotary centrifugal distributing-  
20 plate therein, substantially fixed against vertical movement, arranged to receive adjacent its center the material fed through said feed opening, and to deliver said material from its periphery, and a vertically-reciprocable,  
25 non-rotatable, downwardly-tapering screening hopper, arranged to receive at its upper

larger end the material peripherally delivered from the distributing plate, and means whereby each rotation of the distributing plate vertically reciprocates the screening hopper numerous times. 30

12. In a separator, a casing having a feed opening, a rotary centrifugal distributing-plate suspended in said casing and maintained against vertical movement; a non-rotatable, downwardly tapering screening  
35 hopper, arranged to receive at its upper, larger end the material delivered from the distributing plate, said hopper being spring supported from below for limited reciprocation, and ratchet mechanism interposed between the distributing plate and the screening hopper, whereby each rotation of the distributor depresses and releases the hopper a  
40 plurality of times. 45

In testimony whereof I hereunto set my hand in the presence of two witnesses.

CHARLES J. REILLY.

In the presence of—

FORÉE BAIN,  
MARY F. ALLEN.