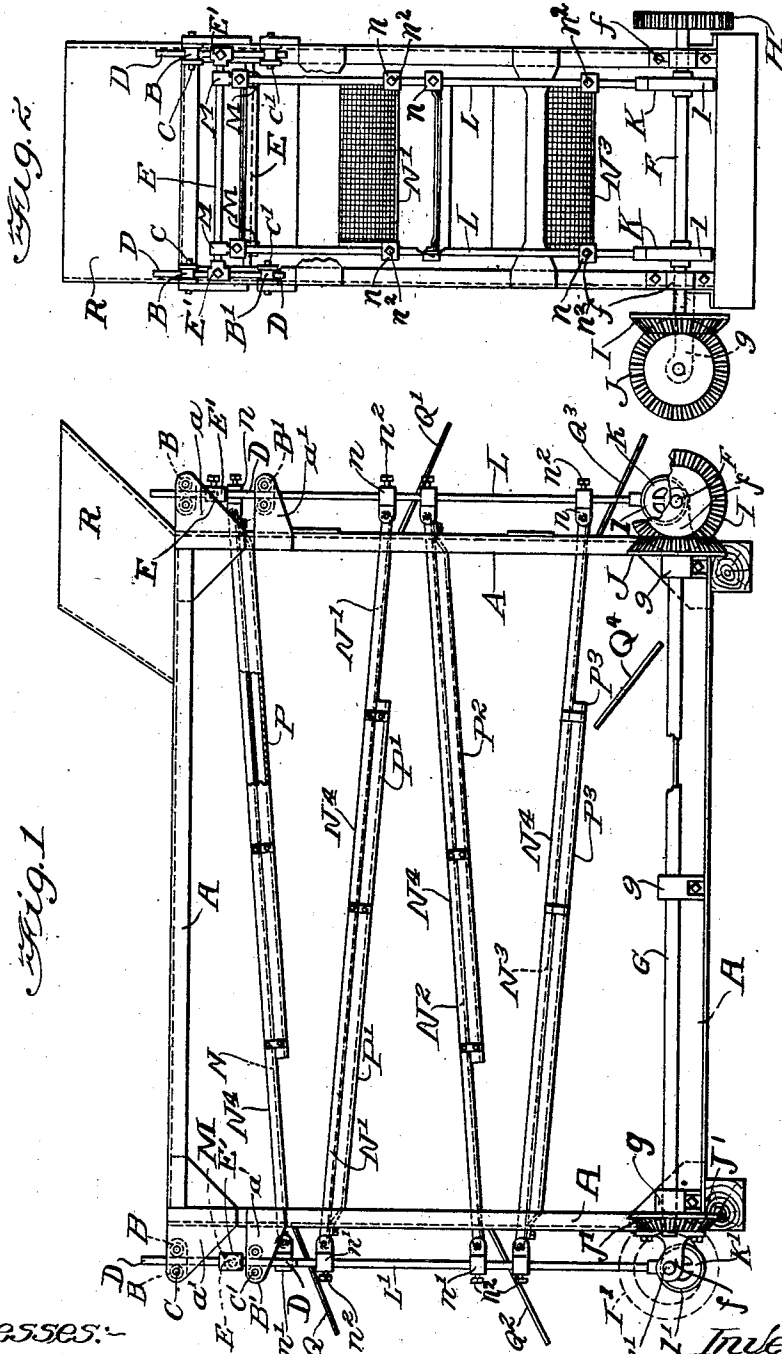


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SAND AND GRAVEL SEPARATOR.
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UNITED STATES PATENT OFFICE.

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SAND AND GRAVEL SEPARATOR.

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To all whom it may concern:

Be it known that we, HERBERT A. FRANKENSTEIN and FRANK H. AMOS, citizens of the United States, and residents of South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Sand and Gravel Separators, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a specification.

This invention relates to devices used for separating and grading gravel, sand, coal, and other like articles.

In this invention we seek to obtain a device which is economical in construction, compact in form, durable in use, and effective in operation.

Additional objects sought by us are hereinafter set forth and specifically claimed.

In the drawing referred to Figure 1 is a side elevation of a device embodying the invention, and Fig. 2 is an end elevation.

A reference letter applied to designate a given part is used to indicate such part throughout the several figures of the drawings wherever the same appears.

A is a frame made of angle iron, (or steel).

B, B', are rollers rotatably mounted on pins C, C', which are secured in brackets a, a'.

D, D, are vertical rods which are respectively mounted between the rollers B, B'.

E is a tie rod attached by the tees E' to vertical rods D, D, and joining a rod D on one side of frame A with a corresponding one on the opposite side of said frame. Vertical rods D, D, and tie rods E, E, move up and down, when the device is in operation.

F, F', are shafts rotatably mounted in bearing j, f.

G is a shaft rotatably mounted in bearing g, g.

H is a gear wheel rigidly secured on shaft G, by means of which said shaft is driven.

L, L', are beveled gear wheels which are respectively secured on shafts F, F'; and J, J', are beveled gear wheels which are secured on shaft G to intermesh with beveled gear wheels I, I'. Rotation in one direction of shaft F communicates rotation in the opposite direction to shaft F' by means of shaft G, and beveled gear wheels I, I', and J.

K, K', are eccentrics which are respectively secured to shafts F, F'.

L, L', are vertical rods secured at their lower ends to straps l, l', respectively. The straps l, l', fit the eccentrics K, K', so that said vertical rods L, L', rest on said eccentrics, the upper end of the rods L, L', are connected to cross bars E, E', by means of bearing M, M'. The vertical rods L, L', mounted as described are relatively associated, (by the setting the eccentrics K, K',) on shafts F, F', so that when one of said vertical rods is in its extreme upward position the other one thereof is in its extreme downward position. The lower ends of said vertical rods L, L', are not only moved up and down by the eccentrics K, K', but have also a side to side motion imparted to them by said eccentrics; while the upper ends of said rods have an up and down movement only, with the bearings M, M', which are rigidly secured to said vertical rods rotating slightly on said tie or cross rods E, E. The rotation of the eccentrics K, K', in opposite directions as described, causes the lower ends of said rods L, L', to move synchronously to the right and to the left so that said rods are at all times parallel.

N, N', N², N³, are screens which are, respectively, secured in a frame N⁴ and said frames are attached at one end to vertical rods L by the several fastenings n, n, and bolts o, o, and at the other end to vertical rod L' by the fastenings n', n', and bolts o, o.

n² are set nuts in fastenings n, n'.

P, P', P², and P³ are aprons which are respectively attached to the frame N⁴ of screens N, N', N², N³.

Q, Q', Q², and Q³ are discharge chutes which are attached to frames A to receive the material discharged from and not going through the several screens N, N', N², and N³, and Q⁴ is a chute which receives material passing through screen N³.

R is the receiving hopper into which the material to be screened is delivered and from which said material flows onto screen N.

The operation of the device is; the screens are respectively raised at one end and lowered at the other end, and at the same time are given an end to end motion by the rotation of the eccentrics. The material on the screens is thereby thrown from the upper to the lower ends of the screens.

Material which will pass through a given screen is received on the apron underneath said screen and is delivered from said apron

onto the next lower screen. The material which will not pass through a given screen is discharged therefrom onto the chute at the lower end of said screen and is fed to a suitable bin or other place of deposit. The
 5 finest material obtained by the use of this device is that which has passed through the screen N³, and is received on chute Q⁴. Any number of screens may be used which are
 10 desired.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is;—

1. A frame, shafts rotatably mounted in
 15 bearings on the frame, a connection between said shafts arranged so that rotation of one shaft synchronously rotates the other shaft in the opposite direction, eccentrics on said
 20 shafts, vertical rods resting on said eccentrics and actuated by the rotation of the eccentrics and connections between the upper ends of the vertical rods and the frame, in
 combination with frames, screens in said frames, said frames respectively attached to
 25 the vertical rods, and aprons attached to said frames, said aprons respectively positioned under the screens and arranged to deliver material discharged thereonto from a
 screen thereover onto a screen thereunder
 30 near the upper end of said screen.

2. A frame, shafts rotatably mounted in bearings on the frame, beveled gear wheels on the shafts, said gears intermeshing to make a connection between the end ones of

the shafts so that rotation of one of said 35 shafts rotates the other one synchronously but in the opposite direction, eccentrics on said end shafts, vertically mounted rods on the eccentrics, guides on the frame, additional longitudinally movable rods between
 40 said guides, tie rods joining the additional movable rods on one side of the frame with those on the opposite side of said frame, bearings connecting the first named vertically mounted rods with the tie rods, in
 45 combination with frames, means to connect the ends of said frames to the vertically movable rods, screens in said frames, and aprons respectively extending from underneath the upper end of a screen to near
 50 the lower end of said screen.

3. A frame, additional frames mounted in inclined planes one over the other, in the first named frame, the higher end of one of the additional frames being under the lower
 55 end of the frame next above it, screens in said additional frames, means to raise and lower synchronously opposite ends of all said frames, said raising and lowering means also arranged to impart an end to end mo-
 60 tion to said frames.

Signed at South Bend, Indiana, this 7th day of May, 1910.

HERBERT A. FRANKENSTEIN.
 FRANK H. AMOS.

In the presence of—

H. G. LANKFORD,
 EDWARD MARXMILLER.