F. C. MORROW.

SEPARATOR.

APPLICATION FILED APR. 14, 1913.

1,082,352.

Patented Dec. 23, 1913.

3 SHEETS—SHEET 1.

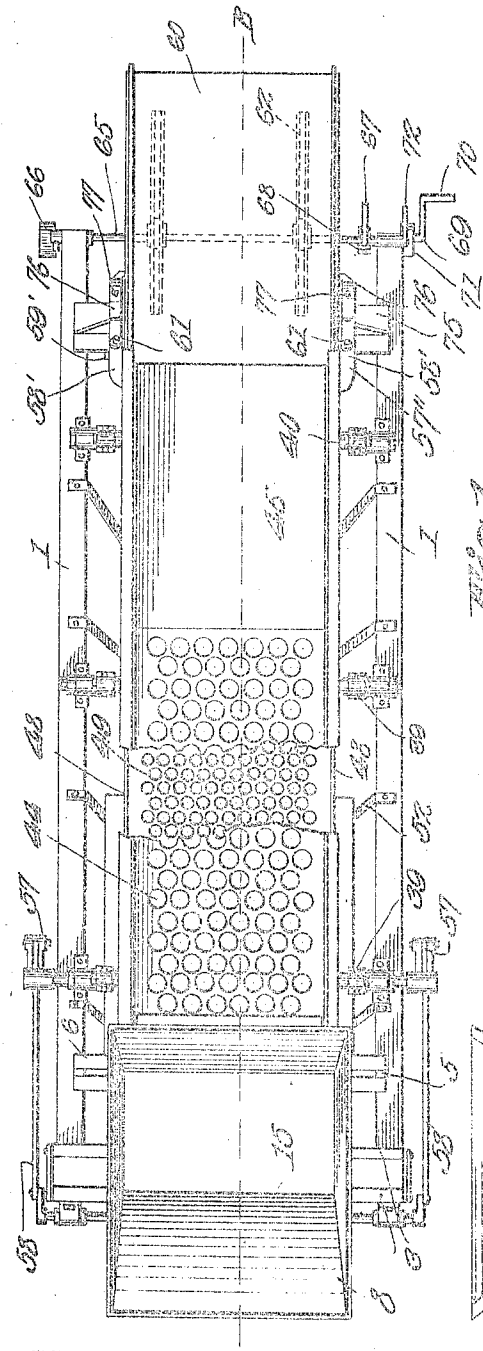


Fig. 1.

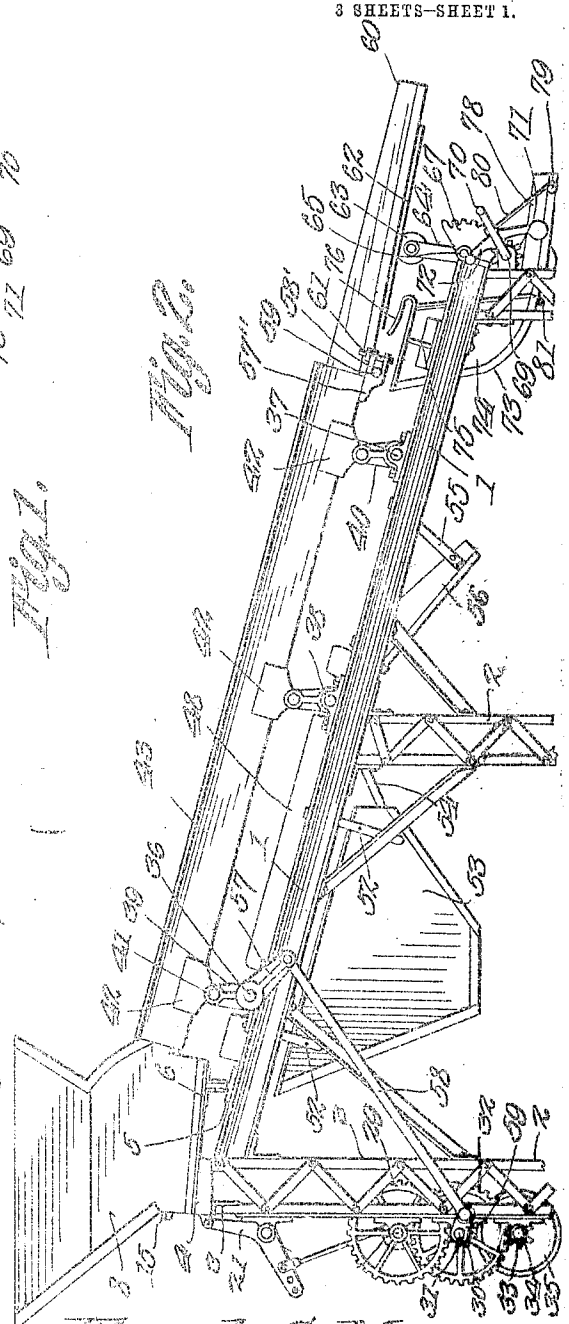


Fig. 2.

Witnesses

J. R. Jones

S. Williams

Frank C. Morrow

Inventor,

by Church & Co.

Attorneys.

F. C. MORROW.

SEPARATOR.

APPLICATION FILED APR. 14, 1913.

1,082,352.

Patented Dec. 23, 1913.

3 SHEETS—SHEET 2.

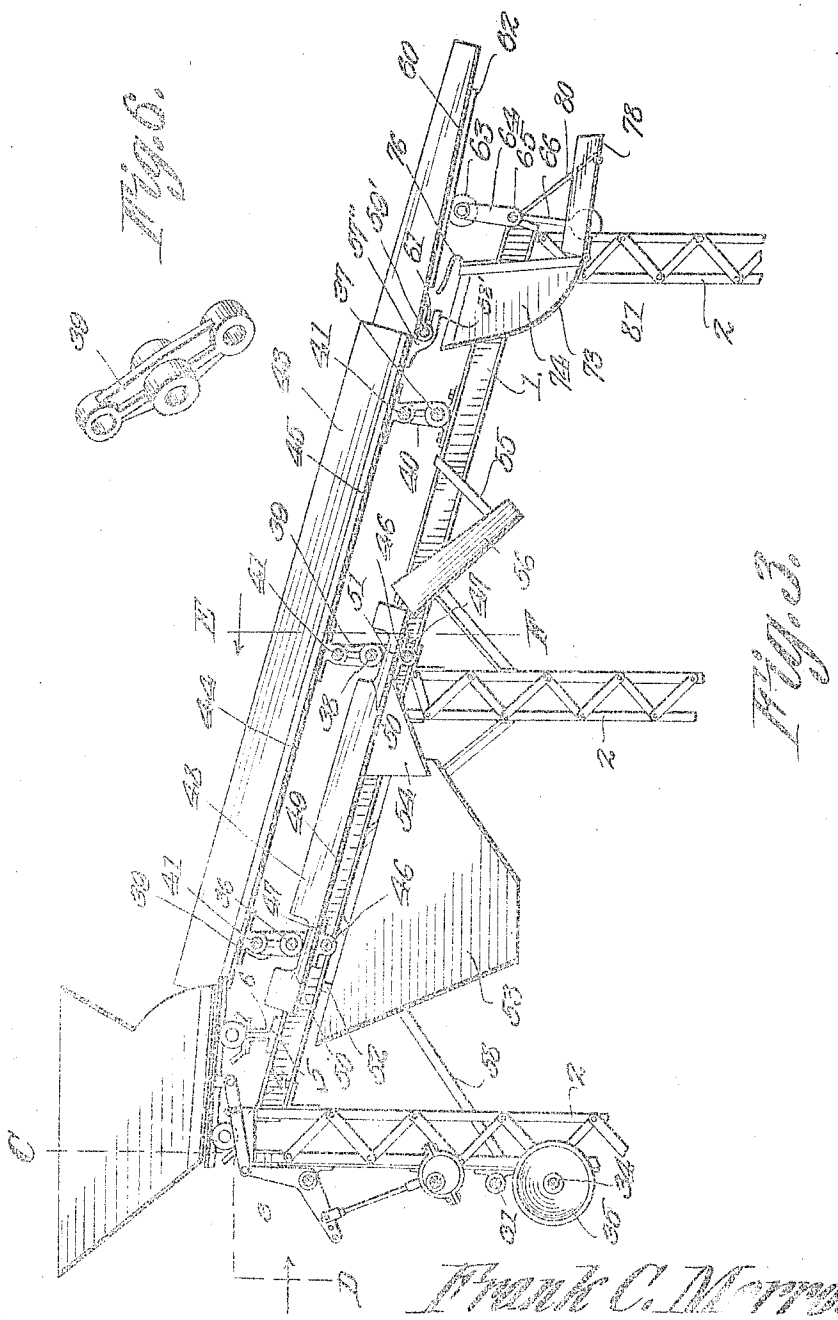


Fig. 2.

Witnesses

J. P. Lewis

L. Wilson

Frank C. Morrow

Inventor,

by Church & Co.

Attorneys.

F. C. MORROW.

SEPARATOR.

APPLICATION FILED APR. 14, 1913.

1,082,352. Patented Dec. 23, 1913.

2 SHEETS—SHEET 3.

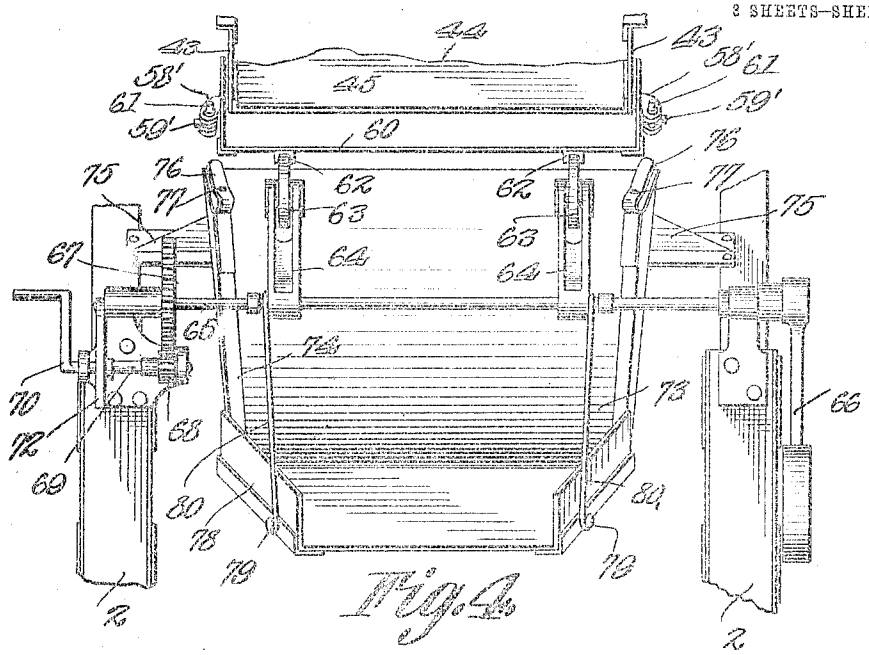


Fig. 4.

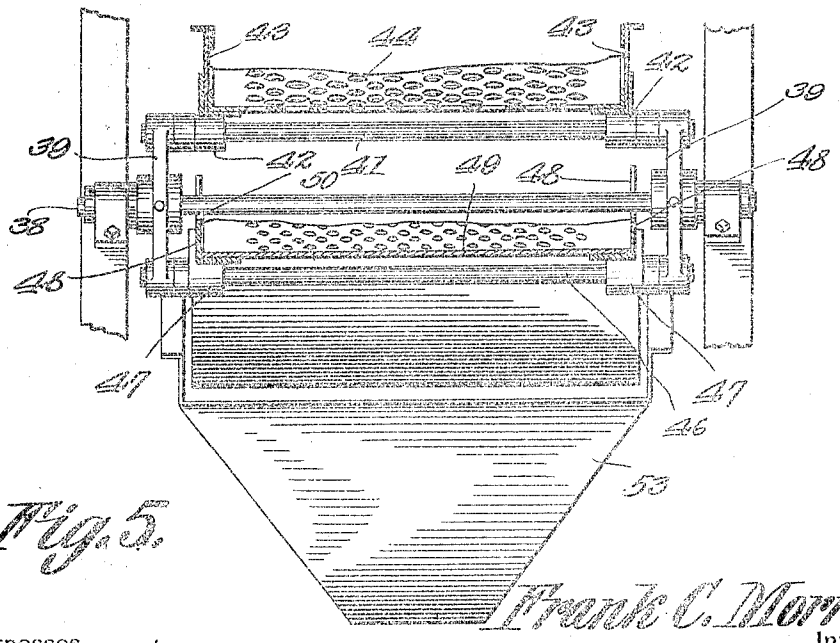


Fig. 5.

Witnesses

J. P. Lowen

L. Wilson

Frank C. Morrow

Inventor,

by Church & Co.

Attorneys.

UNITED STATES PATENT OFFICE.

FRANK C. MORROW, OF WELLSTON, OHIO.

SEPARATOR.

1,082,352. Specification of Letters Patent. Patented Dec. 23, 1913.

Application filed April 14, 1913. Serial No. 761,110.

To all whom it may concern:

Be it known that I, FRANK C. MORROW, a citizen of the United States, residing at Wellston, in the county of Jackson and State of Ohio, have invented a new and useful Separator, of which the following is a specification.

This invention relates to separators and more particularly to machines of this character designed for screening coal so as to separate it into different sizes, means being provided whereby the different grades of coal may be directed into cars arranged to receive the same.

One of the objects of the present invention is to provide a separator or screen of this character which is adapted to be built independently of and separately from the coal tipple.

A further object is to provide improved means for mounting upper and lower screens so that they will reciprocate in opposite directions, thus reducing vibration to the minimum.

A further object is to provide a novel arrangement of chutes whereby the different grades of coal can be directed into the cars, means being provided whereby the large or lump coal constituting the first grade can be directed either into ordinary coal cars or into box cars.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a plan view of the separator or screen, a portion of the upper or main screen being removed. Fig. 2 is a side elevation. Fig. 3 is a vertical longitudinal section on the line A—B Fig. 1. Fig. 4 is an elevation of the front end portion of the machine and showing the superposed chutes and the adjacent mechanism. Fig. 5 is a section through the screens on the line E—F Fig. 3, adjacent parts being shown in elevation. Fig. 6 is a perspective view of one of the screen actuating levers.

Referring to the figures by characters of reference 1 designates inclined I-beams supported at suitable points in any preferred manner, as by means of columns 2 formed of structural steel or the like. The columns to which the upper ends of the I-beams 1 are attached may be connected by angle beams 3 on which are secured blocks 4. Additional T-shaped blocks 5 may be secured upon the I-beams 1 near their upper ends, these blocks being connected by transversely extending angle beams 6. These angle beams 6 and the blocks 4 support a hopper 8 having a bottom 15 which may be reciprocated by a lever 21. This lever may be driven by any suitable mechanism indicated generally at 29, this mechanism being actuated by a gear 30 secured to a shaft 31, there being another gear 32 secured to this shaft and which meshes with a gear 33 secured to a shaft 34 on which is arranged a fly wheel 35. This structure constitutes no part of the present invention but has been disclosed in detail in a copending application constituting a division of the present application.

Journaled upon the I-beams 1 at points between the ends thereof are end shafts 36 and 37 and an intermediate shaft 38. Secured to each of the shafts 36 and 38, close to the inner side of each I-beam 1 is an arm 39, said arm being secured to its shaft at a point midway between the ends of the arm and being adapted to rotate with the shaft. The arms on the two shafts 36 and 38 are parallel. Additional arms 40 are secured to the shaft 37 close to the inner sides of the I-beams 1 and these arms are parallel with the arms 39. The upper ends of the arms 39 and 40 are connected by transverse rods 41 which are parallel with the shafts 36, 37 and 38 and these rods project into castings 42 secured to the upstanding sides 43 of the upper or main screen 44. The upper end portion of this screen extends under the discharge end of the feed plate 15 and the sides 43 of the screen extend outside of the sides of the hopper 8. The screen 44 does not extend the full length of the upstanding sides 43 but extends up to an imperforate plate 45 extending up to the lower ends of the sides 43.

The lower ends of the arms 39 are connected by cross rods 46 extending through castings 47 secured to the upstanding sides 48 of a lower screen 49. These upstanding sides 48 are cut away, as shown at 50 so as to receive the shafts 36 and 38 and permit screen

49 to shift relative to the shafts. The screen 49 does not extend throughout the length of the upstanding sides 48 but extends up to an imperforate plate 51 located between the lower ends of the sides 48.

Hangers 52 extend downwardly and inwardly from the I-beams 1 and support a hopper-like chute 53 arranged under the screen 49, there being a supplemental chute 54 secured to the sides 48 of the screen and extending downwardly and rearwardly from the rear edge of the plate 51 so that any material passing through the lower end portion of screen 49 will be deflected rearwardly and downwardly by the supplemental chute 54 into the hopper-like chute 53. This supplemental chute 54 of course extends loosely into the chute 53 so as to be free to move relative thereto during the actuation of the screen 49.

Additional hangers 55 extend downwardly from the I-beams 1 and support a fixed chute 56 which extends under the discharge end of the plate 51 so as to receive tailings from the screen 49 and direct them downwardly into a car or other receptacle which may be arranged below the apparatus.

A crank arm 57 is secured to each end of the shaft 36 and these crank arms are connected by pitmen 58 to smaller crank arms 59 secured to the ends of the shaft 31. Thus it will be seen that as shaft 31 rotates, the crank arms 59 will work the pitmen 58 backwardly and forwardly so as thus to oscillate the crank arms 57 and cause the shaft 36 to rotate back and forth. As the arms 39 on shaft 36 are connected to arms 39 on shaft 38 and to the arms 40 on shaft 37, by the screen, it will be apparent that when shaft 36 is thus rotated, the screens 44 and 49 will be reciprocated, each screen moving in a direction opposite to the other screen. Thus it will be seen that as the coal is fed slowly and evenly from the bottom of the hopper by the slowly reciprocating feed plate 15, it will be deposited upon the upper portion of screen 44 and as this screen is worked back and forth rapidly by the mechanism described, the coal will be fed along the screen, the smaller portions dropping through screen 44 and onto screen 49 so that only the lumps or large pieces of coal will be discharged as tailings from the screen 44. The smaller grades of coal will fall onto screen 49 where a second separation will be effected, the fine coal and slack passing through the screen 49 and into the chute 53 while the larger pieces will be discharged as tailings into the chute 56.

For the purpose of directing the large coal or the coal of the first grade from the upper screen 44 into cars provided therefor, two different forms of chutes are provided, one chute being utilized for directing the coal into ordinary coal cars, while the other chute can be used for directing the coal into box cars. It will be noted by referring to the drawings that brackets 57′ are extended downwardly and forwardly from the sides 43 at the lower ends thereof, the projecting ends of these brackets being slotted so as to form forks 58′. These forks are adapted to receive a transverse rod 59′ on which is secured a flat discharge chute 60 the bottom of which extends under the lower end of plate 45. The ends of the rod 59′ are seated loosely in the forks 58′ and are held detachably by removable pins 61 extending through the forks. Channel strips 62 are arranged longitudinally under the chute 60 adjacent the sides thereof and receive rollers 63 which are journaled in the free ends of arms 64. These arms extend radially from a shaft 65 which is journaled upon the lower ends of the side beams 1. A counter-balance 66 is secured to shaft 65 so that the said shaft can be rotated easily.

A segmental gear 67 is secured to and rotates with the shaft 65 and meshes with a gear 68 secured to a shaft 69. This last named shaft is adapted to be rotated in any suitable manner, as by means of a crank 70 and thus it will be seen that gear 68 will be rotated and motion will be transmitted through the segmental gear 67 to shaft 65. Thus arms 64 can be caused to swing upwardly or downwardly, thereby adjusting the chute 60 angularly so as to discharge coal into cars of different heights. A ratchet wheel 71 is secured to shaft 69 and is adapted to be engaged by a dog 72 whereby shaft 69 is held against rotation.

When it is desired to discharge the tailings of the screen 44 into a box car, it is necessary to utilize a form of chute different from that disclosed at 60. This chute is fixedly mounted between the I-beams 1 and is curved downwardly and forwardly as indicated at 73, the sides 74 of the chute being provided with brackets 75 which are mounted on and secured to the side beams 1. Hooked extensions 76 are mounted upon the sides 74 and, by removing pins 61, rod 59′ can be withdrawn from the forks 58′ and its ends seated within the hooks 76. The pins 61 can then be inserted through openings 77 formed in these hooks and the rods thus retained in the hooks. Thus the upper end of chute 60 is spaced from the end of the plate 45 and material discharged from said plate is free to gravitate downwardly onto the curved bottom 73. Hingedly connected to the lower edge of the curved bottom 73 is a spaced chute extension 78 having laterally extending lugs 79 adapted to be engaged by supporting hooks 80 loosely mounted on the shaft 65. Thus it will be seen that when it is desired to load a box car, the chute extension 78 is adjusted to the position shown in Figs.

2 and 3 and the chute 60 is shifted away from plate 45 so as to permit the coal to gravitate onto the bottom 73 and into extension 78. When it is desired to load ordinary coal cars, the hooks 80 are disengaged from the lugs 79 and the extension 78 thus permitted to hang vertically from its hinge 81. The car to be loaded is then placed under the discharge end of chute 60 and said chute is connected to screen 44 and plate 45 as shown in Figs. 2 and 3. The coal will thus be discharged from chute 60 downwardly into the car.

It is to be understood that the structure herein described is complete in itself and is to be built separate from and independently of a tipple or other structure so that any vibration which may be produced by the operation of the screens will not be transmitted to any other structure.

What is claimed is:—

1. In a machine of the class described, the combination with a feed member, of a chute hingedly connected to the discharge end of said member, a shaft, adjusting arms radiating from the shaft, said arms engaging the bottom of the chute, means for rotating the shaft, and means for locking the shaft against movement.

2. In a machine of the class described, the combination with a feed member, of a chute for receiving tailings therefrom, means for detachably and pivotally connecting the chute to the feed member, a shaft, arms radiating therefrom, anti-friction devices carried by the arms, channeled members upon the bottom of the chute and engaging said devices, and means for rotating the shaft.

3. In a machine of the class described, the combination with a feed member, of a chute, means for detachably and pivotally connecting the chute to the member to receive material therefrom, a shaft, arms radiating from the shaft, means carried by the arms for engaging the bottom of the chute to adjust the chute angularly during the rotation of the shaft, means for rotating the shaft, and means for locking the shaft against rotation.

4. In a machine of the class described, the combination with a feed member, of a chute, means for detachably and pivotally connecting the chute to the member to receive material therefrom, a shaft, arms radiating from the shaft, means carried by the arms for engaging the bottom of the chute to adjust the chute angularly during the rotation of the shaft, means for rotating the shaft, means for locking the shaft against rotation, and a counter-balance for the shaft.

5. In a machine of the class described, the combination with a feed member, of a downwardly and forwardly inclined chute disposed therebelow and spaced therefrom, an extension hingedly connected to said chute, means for supporting the extension in active position, a second chute above said first named chute, means for detachably and pivotally connecting said second chute to the feed member to receive material therefrom, means for detachably and pivotally connecting said second chute to the first named chute and with its receiving end spaced from the feed member, and means for adjusting said second chute angularly relative to the feed member and the first named chute.

6. In a machine of the class described, the combination with a feed member, of a chute extending downwardly and forwardly therefrom, an extension upon said chute, means for supporting the extension in active position, a second chute, means for detachably and pivotally connecting said last named chute to the feed member for cutting off communication between the member and the first named chute.

7. In a machine of the class described, the combination with a feed member, of a chute extending downwardly and forwardly therefrom, an extension upon said chute, means for supporting the extension in active position, a second chute, means for detachably and pivotally connecting said last named chute to the feed member for cutting off communication between the member and the first named chute, and means for adjusting said last named chute angularly relative to the feed member.

8. In a machine of the class described, the combination with a feed member, of a chute extending downwardly and forwardly therefrom, an extension upon said chute, means for supporting the extension in active position, a second chute, means for detachably and pivotally connecting said last named chute to the feed member for cutting off communication between the member and the first named chute, and means for adjusting said last named chute angularly relative to the feed member, said means including a shaft, radially extending means upon the shaft for engaging the bottom of said second chute, means for rotating the shaft, and means for locking the shaft against rotation.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

FRANK C. MORROW.

Witnesses:
WM. F. SCHADEL,
M. E. MARTIN.