No. 639,710. Patented Dec. 26, 1899.

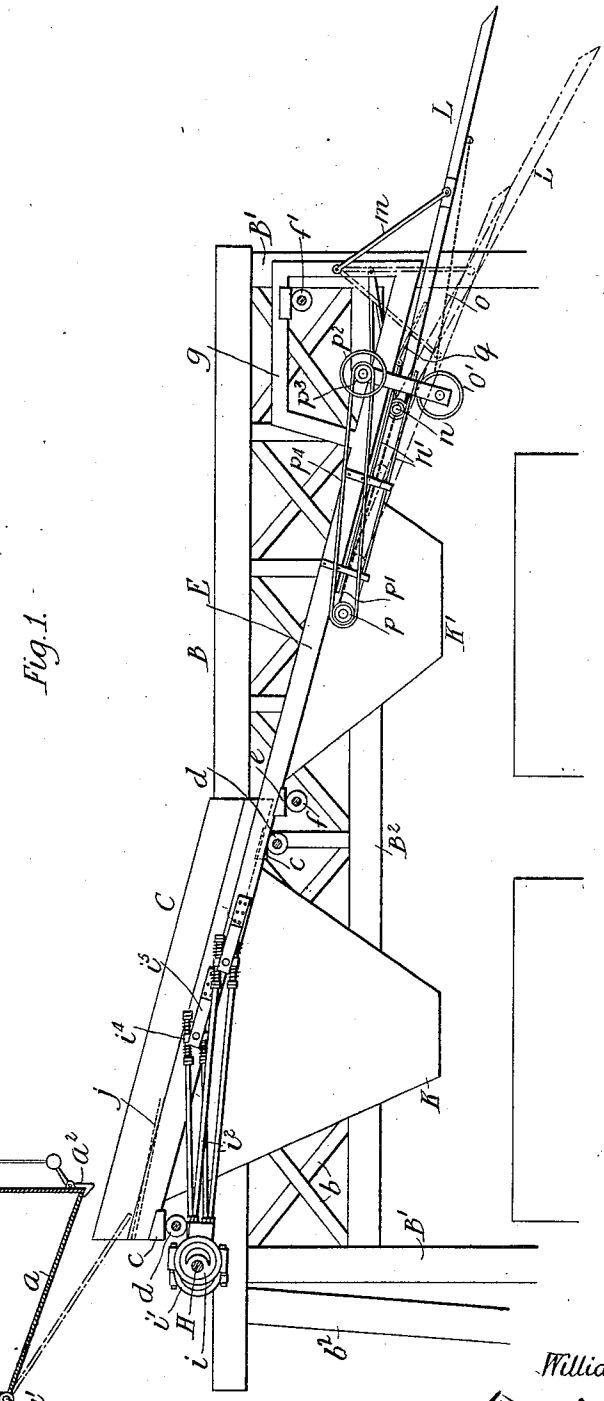
W. S. CHERRY.

SCREENING AND ASSORTING APPARATUS FOR COAL, &c.

(Application filed Feb. 24, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses

C. H. McEwen

S. E. Zimmerman

Inventor

William S. Cherry

By W. W. Dudley & Co.

his Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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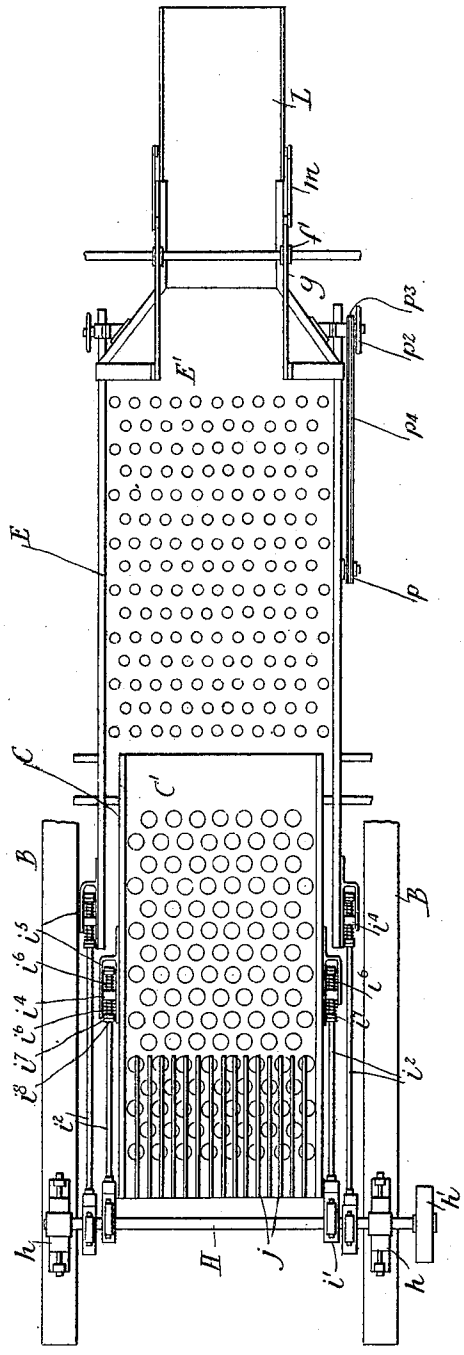
W. S. CHERRY.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.



Witnesses
C. F. McEwen
S. E. Zimmerman

Inventor
William S. Cherry
By W. W. Dudley & Co
his Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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W. S. CHERRY.

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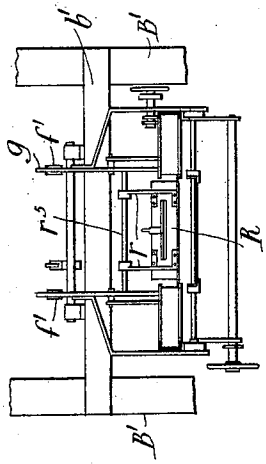


Fig. 3.

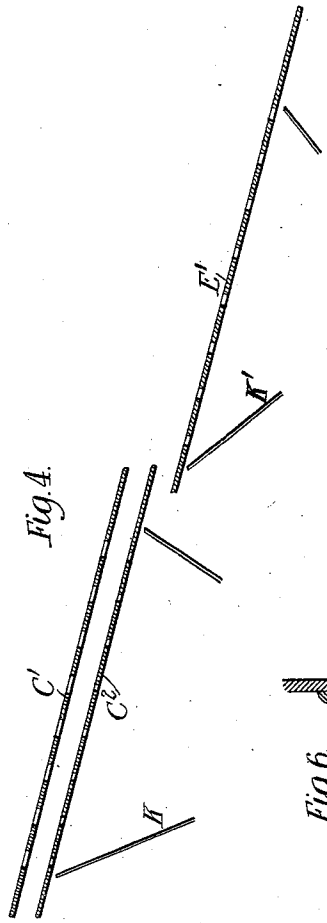


Fig. 4.

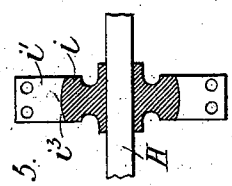


Fig. 5.

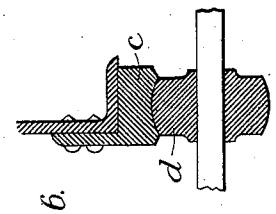


Fig. 6.

Witnesses

C. H. W. Evans

S. E. Zimmerman

Inventor

William S. Cherry

By W. W. Dudley & Co

his Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM S. CHERRY, OF STREATOR, ILLINOIS.

SCREENING AND ASSORTING APPARATUS FOR COAL, &c.

SPECIFICATION forming part of Letters Patent No. 639,710, dated December 26, 1899.

Application filed February 24, 1899. Serial No. 706,633. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. CHERRY, a citizen of the United States, residing at Streator, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Screening and Assorting Apparatus for Coal and the Like; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to screening and assorting apparatus for coal and the like, and has for its object the production of an improved appliance of this character by the operation of which the material in predetermined quantity is properly sorted and screened in a highly efficient and expeditious manner, the various assortments being separately conveyed to different receptacles.

The nature of the invention will be readily understood by reference to the following detailed description and to the accompanying drawings, in which—

Figure 1 is a side elevation of a screening and assorting apparatus embodying my invention, one side of the frame being removed. Fig. 2 is a top plan view. Fig. 3 is a front end elevation. Fig. 4 is a longitudinal section through the screen-plates. Fig. 5 is a detailed sectional view of one of the eccentrics. Fig. 6 is a detailed sectional view of one of the friction-rollers.

Referring to the said drawings by letter, A denotes a weighing-hopper supported at the rear end of the apparatus and provided with a bottom a, hinged at a' and normally held in raised position by a catch a^2. The coal or the like is deposited in this hopper and there weighed, suitable means (not shown) being provided for this purpose, after which the catch a^2 is moved to release the bottom to effect the discharge of the hopper. The bottom a is provided with a counterweight a^3 to restore it to its normal raised position after such discharge, and when so raised it is held by the catch a^2, which operates automatically to engage it, as will be understood. Any suitable means may be provided to effect the movement of the catch to release the hopper-bottom; but it is preferable that the means be manipulated at the weigh-office, where there is also located the indicator to denote the weight of material in the hopper.

The screening and assorting apparatus is mounted on a frame comprised of upper side beams B B, supported at their end on posts B′ B′, lower side beams B^2 B^2, truss-beams b b between the upper and lower side beams, and a cross-beam b', connected to the front posts B′. At the rear of the frame are brace-posts b^2.

The assorting-screens, of which there are two in number, but providing three screening-plates, are arranged in inclined position between the side members of the frame. The upper screen C is supported near its ends on friction-rollers d d, shoes or plates c c being interposed to prevent wear of the screen-frame. The screen-plate C′ of the screen C is provided with relatively large perforations, as shown, whereby all of the coal particles, except those designated as "lump," pass therethrough. Below the screen-plate C′ is a screen-plate C^2, having relatively small perforations for the passage therethrough of slack or fine coal. Below and forward of the screen-plate C^2 is a screen E, the plate E′ of which is perforated to sort coal of the grade known as "nut." This screen E is supported at its rear end on rollers f, wear shoes or plates e being interposed, and at its forward end it is provided with frames g, extending above it and suspended on other friction-rollers f'. The screens C and E are independently reciprocated to produce agitation of the coal particles through eccentric connection with a driving-shaft H, journaled in adjustable boxes h h on the upper frame-beams. The shaft carries a pulley h', which has belt connection with a suitable source of power. Each of the eccentric connections comprises a cam i, fixed to the shaft, an annulus or strap i', formed in two separable parts bolted together, and two rods i^2 i^2, connected at one end to the annulus and at the other end to the screen. By reference to Fig. 5 it will appear that the periphery i^3 of the cam is transversely convex and that the inner side of the annulus is correspondingly curved, whereby the parts of the eccentric

are maintained in proper relation. The curvature of the cam and annulus is produced on a radius common to one-half of the diameter of the cam. This construction, in addition to maintaining the proper relation of the parts of the eccentric, precludes binding and friction of these parts when, as will frequently occur, the screens are moved or shifted from their proper right-angled position with relation to the driving-shaft. This transverse movement of the screens is the more common in screens suspended from above, and I overcome this tendency in a measure by supporting the screens on the rollers *d*, which, as is shown in Fig. 6, are each transversely convex at its periphery and are engaged by grooves provided in the wear-plates *c*. The rods i^2 are at their outer end passed through an opening in a block i^4, which is pivoted in a bracket i^5, bolted to the side frame of the screen. The screens are, as before stated, reciprocated through the eccentric connection with the driving-shaft, and inasmuch as this movement may be temporarily checked by obstructions of the material I make the connection yielding by interposing a coiled spring i^6 between each end of the block and a shoulder i^7 on the rods. These shoulders are preferably screw-nuts for adjustment, and jam-nuts i^8 are provided to maintain their proper position. Obviously should the movement of the screens be interrupted temporarily the parts will not be subjected to undue strain, as the continued operation of the eccentric connections will result only in the alternate compression of the springs at each side of the block. Such a construction possesses advantages even under ordinary conditions, as by its use the shocks and vibrations of the apparatus under the rapid reciprocation of the screens are materially lessened and the durability of the structure thereby greatly enhanced.

The material discharging from the hopper falls upon a set of bars *j*, supported at the rear end of the screen C, above the plate C′. Contact with these bars causes the slack-coal to separate from the larger particles to which it adheres, and, moreover, as these bars are closely spaced they further operate to partially screen the lump and nut coal, which, passing from the bars, fall onto the upper screen-plate C′. The perforations in this plate are, as before stated, sufficiently large to admit of the passage therethrough of the nut and slack coal, and under the rapid reciprocation of the screen this separation takes place, the lump-coal passing over the surface, while the nut and slack coal pass through said plate and fall on the plate C^2, the perforations in which are of such size as will permit of the passage only of the slack-coal, which, entering a chute K below the screen C, finds its way to a bin, car, or other suitable receptacle. The lump-coal trails over the plate C′ onto and over the plate E′ of the screen E and is disposed of in a manner presently to be explained. The nut-coal moving over the plate c^2 falls onto the plate E′, which is perforated to allow this grade of coal to pass therethrough and by a chute K′ to its proper receptacle. Obviously by placing a blank or unperforated plate over the plate C′ separation of the slack from the nut coal will not take place, though the lump-coal will be sorted by the passage of the slack and nut coal through the plate E′.

The lump-coal passes from the plate E′ by way of a chute L, which is made to be adjusted in position in order to effect the delivery of the material into cars of different types—as, for instance, box-cars and gondola-cars. This chute is supported on the forward end of the screen E by means of link-rods *m*, connecting it at opposite sides with the frames *g*, and by means of flanged wheels *n* at the rear end which engage guide-tracks *n′ n′*. The extended position of the chute L (shown in full lines in Fig. 1) is maintained by tightening a chain *o*, which is connected at one end to the forward end of the chute and is passed at its other end around a windlass operated by a hand-wheel *o′*. Tension on this chain being relaxed, the chute is moved by its own weight to the position indicated by dotted lines, and its retracted position, also indicated by dotted lines, is effected through a windlass *p* and chain *p′*, the windlass being operated by a hand-wheel p^2, the shaft of which is geared by sprocket wheel and chain p^3 p^4 with the shaft of the windlass.

q is a drop-apron for the material, one end of which apron is pivoted to the end of the plate E′, while the other end rests in and therefore follows the movement of the chute L. This apron affords an easy fall for the coal and insures against breakage of the latter.

R denotes a gate employed for controlling and checking the discharge of the coal to the chute L. This gate is in the form of a plate and is pivotally connected by means of arms *r r* with a rod *r′*, extending between the frames *g*.

I claim as my invention—

1. In an apparatus of the character specified, the combination of a hopper having a catch-retained counterbalanced bottom, of two screens one of which is provided with bars arranged below the hopper-bottom and receiving the material, and below and beyond said bars with two screen-plates, the upper plate having relatively large perforations and the lower plate relatively small perforations, the other screen provided with a screen-plate arranged below and forward of the aforesaid plates and having perforations of a size intermediate of the perforations in the aforesaid upper and lower plates, a chute below each of the screens, and a longitudinally and vertically adjustable chute at the end of the forward screen.

2. In an apparatus of the character specified, a screen longitudinally inclined and having concave shoes supported on convex rollers and reciprocating means for the screen con-

sisting of a driving-shaft, a cam on the shaft the convex periphery of which is produced on a radius common to one-half of the diameter of the cam, an annulus correspondingly curved and mounted on the cam, a block pivotally secured to the screen, a rod connected at one end with the annulus and passed at its other end through the block, adjustable shoulders on each of the rods at each side of the block, and springs coiled around the rods and interposed between the block and shoulders.

3. In an apparatus of the character specified, the combination with a screen having at each side a pivoted block, cams on a driving-shaft, an annulus for each cam, two rods connected at one end with an annulus and passed at their other end through the block, adjustable shoulders on each of the rods at each side of the block, means for locking said shoulders, and springs coiled around the rods and interposed between the block and shoulders, substantially as described.

4. In an apparatus of the character specified, the combination with a reciprocated screen, of a chute carried by the screen and having guides for its rear end and a support for its forward end, means for longitudinally and vertically adjusting the discharge end of the chute, and a drop-apron between the screen and chute.

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

WILLIAM S. CHERRY.

Witnesses:

R. D. FLETCHER,

JAMES MORRIS.