No. 660,784.

Patented Oct. 30, 1900.

C. J. WOWRA.

ASH SIFTER.

(Application filed Nov. 22, 1899.)

(No Model.)

2 Sheets—Sheet 1.

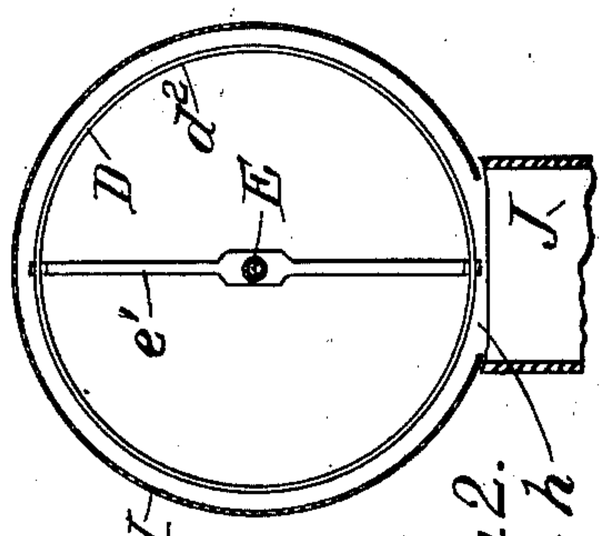

Fig. 2.

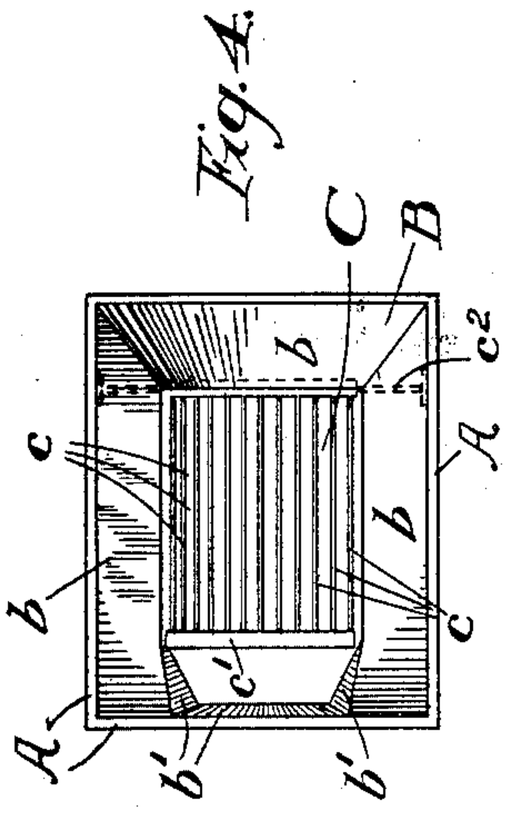

Fig. 4.

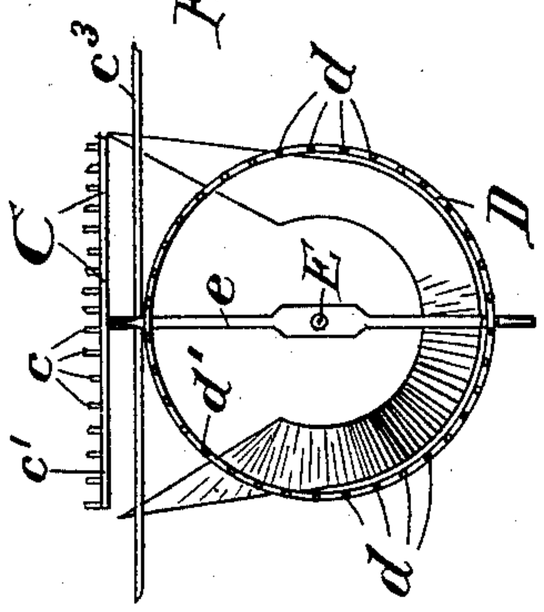

Fig. 3.

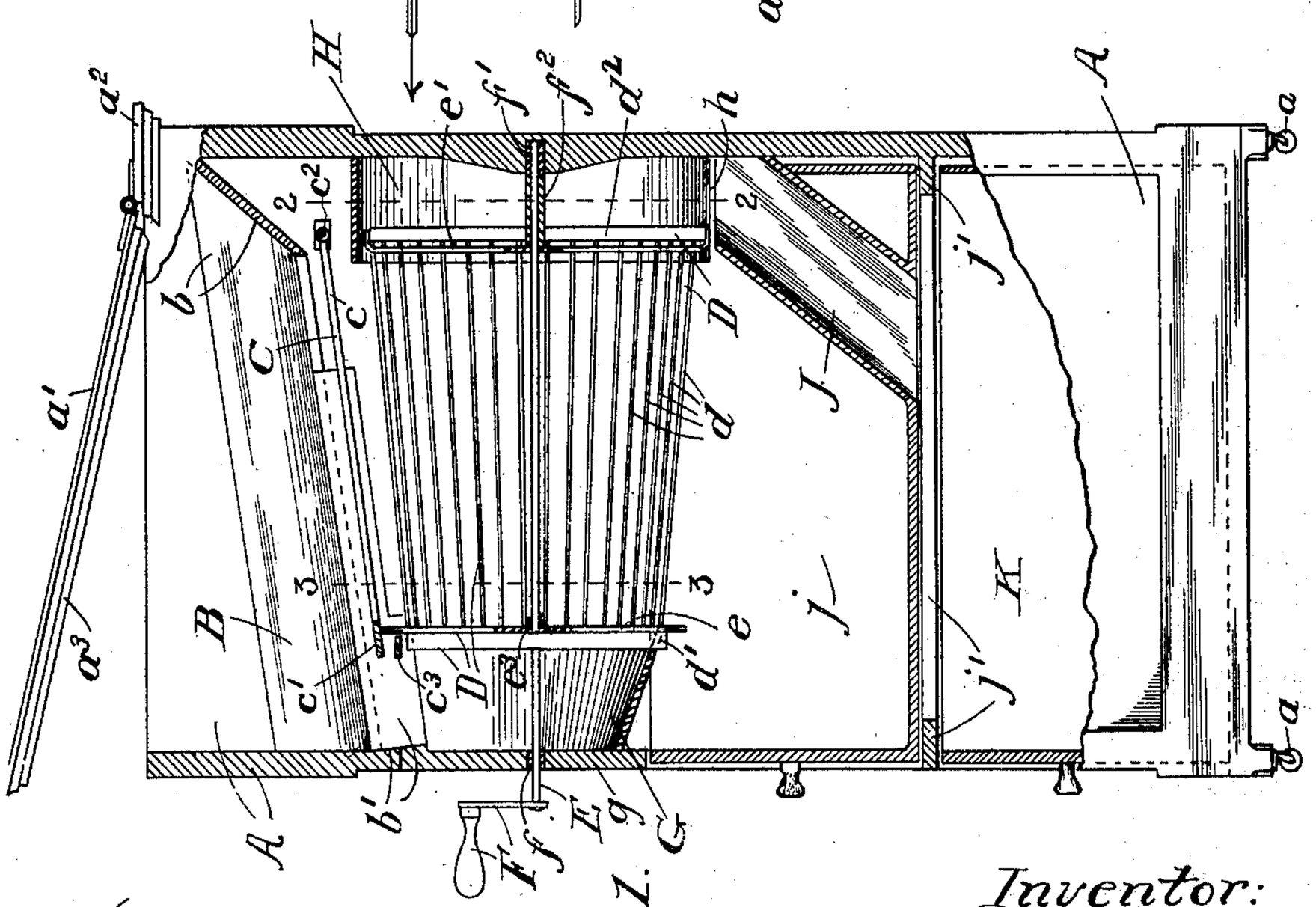

Fig. 1.

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2 Sheets—Sheet 2.

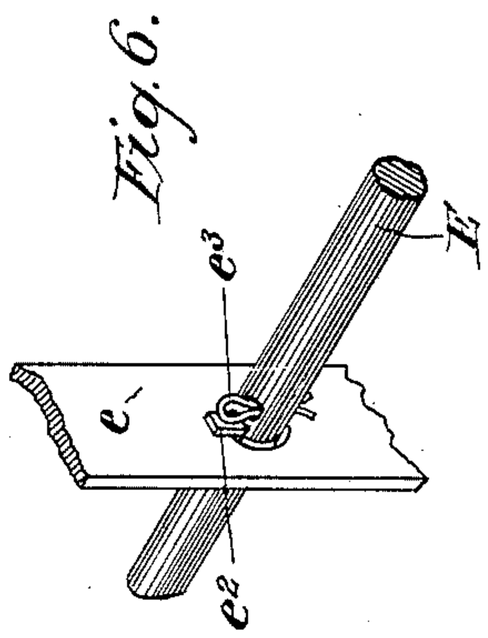

Fig. 6.

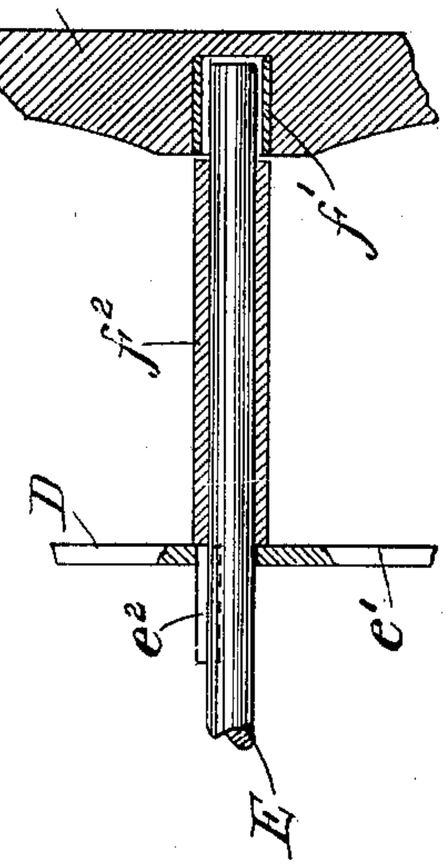

Fig. 7.

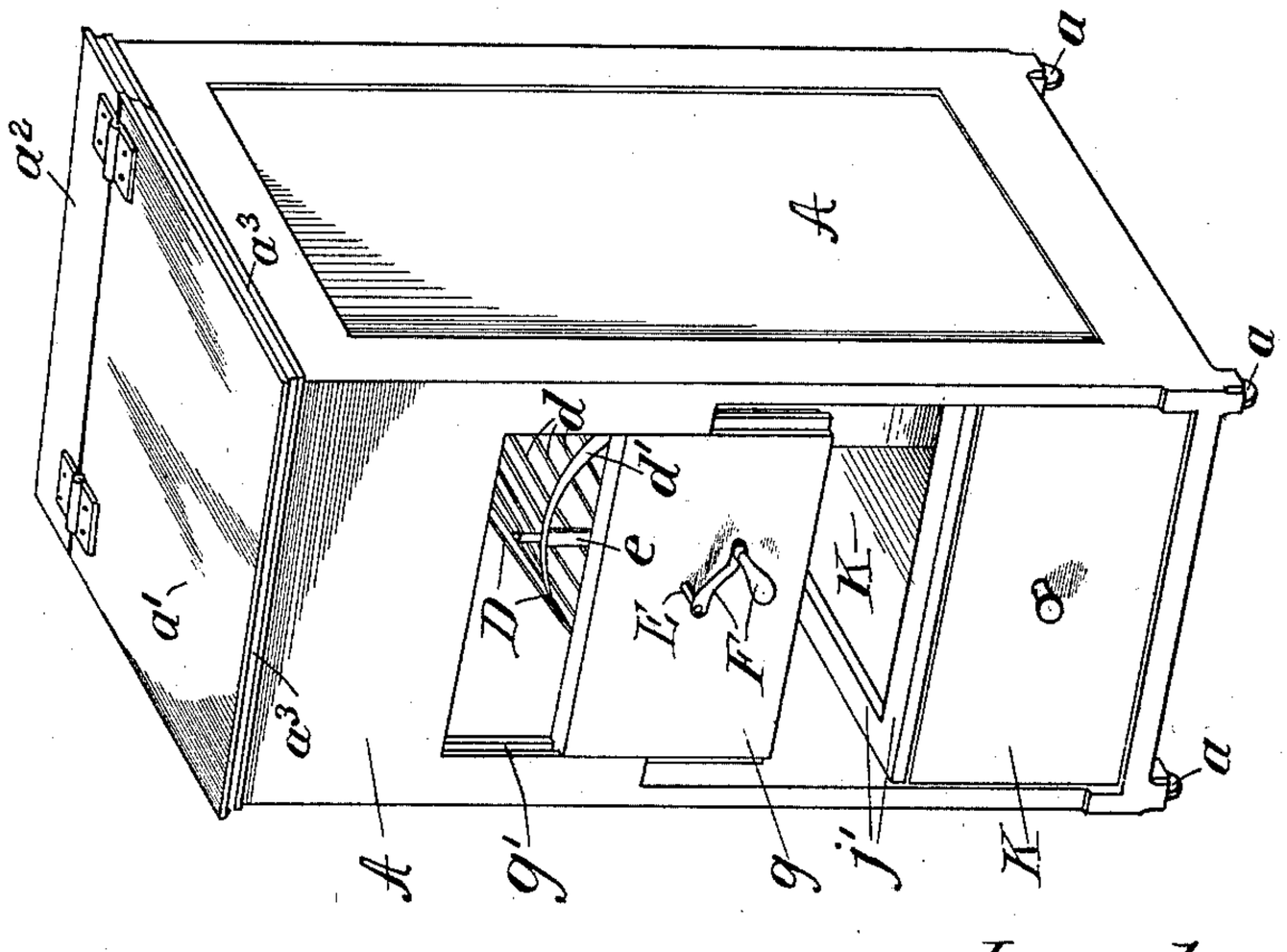

Fig. 5.

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UNITED STATES PATENT OFFICE.

CARL J. WOWRA, OF CHICAGO, ILLINOIS.

ASH-SIFTER.

SPECIFICATION forming part of Letters Patent No. 660,784, dated October 30, 1900.

Application filed November 22, 1899. Serial No. 737,867. (No model.)

To all whom it may concern:

Be it known that I, CARL J. WOWRA, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Ash-Sifters, of which the following is a specification.

My invention relates to portable ash-sifters for domestic use; and the object of my invention is to provide an ash-sifter having a rotary and an oscillatory screen and embodying improvements in the method of agitating said oscillatory screen and in the method of supporting said rotary screen. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view of the entire device, taken chiefly in central vertical section from front to rear or lengthwise of the main shaft. Said figure shows the cover partially raised upon its hinges and also shows the hopper, the shaking-screen, the revolving screen or barrel, the drawer forming the ash-receptacle, the drawer forming the coal-receptacle, and the several chutes. Fig. 2 is a sectional view of the rear fixed chute and ash-drawer chute, taken on the line 2 2, Fig. 1, and looking in the direction of the arrow in said figure. The rear hoop and supporting-arm of the revolving screen are also shown in their proper positions relatively to said chutes. Fig. 3 is a sectional view of the revolving screen and adjacent parts, taken on the line 3 3, Fig. 1, and looking in the direction of the arrow in said figure, Fig. 3 showing the relative positions occupied by the forward hoop and arm of the revolving screen, the front bar of the shaking-screen, the cross-rest for said bar, and the front chute, which is fixed to the removable portion of the front of the casing. Fig. 4 is a top view of the entire device, on a reduced scale, with the cover and fixed portion of the top removed and shows the hopper, shaking-screen, and front chute. Fig. 5 is a perspective view of the entire device and shows the method of removing a portion of the front of the casing together with the shaft and revolving screen, the ash-drawer being withdrawn from the casing to permit the removal of the parts. Fig. 6 is a perspective view in detail of portions of the main shaft and the front arm of the revolving screen, showing the split pin or stop for holding said arm in place upon said shaft. Fig. 7 is a detail view taken longitudinally with the main shaft of the rear bearing of said shaft and parts adjacent thereto.

Similar letters refer to similar parts throughout the several views.

The casing A A forms a shell or box wherein the working parts of the sifter are inclosed. Said casing is preferably a rectangular, wooden structure mounted upon casters $a\ a$, and is so constructed that when closed ready for use no dust can escape therefrom. The greater portion of the top of said casing is closed by means of the cover a', hinged upon the fixed portion a^2 of said top. When the sifter is being charged, said cover may be turned back upon and be supported by said fixed portion a^2. At the edges of said cover a' are the flanges $a^3\ a^3$, which fit closely over the sides and front of the casing and render said cover dust-tight. Within said casing and near the upper portion thereof is the hopper B, which consists of the partitions $b\ b\ b$, set at the sides and back of the casing A and extending obliquely downward toward the center of the sifter. Said partitions extend only part way to the center of the casing, leaving a preferably rectangular space or aperture, which is bounded on three sides by the inner edges of said partitions and on the fourth side by the front wall of the casing A. Said space or aperture furnishes means whereby the ashes may pass from said hopper B onto the shaking-screen C. At the forward portion of said hopper are the deflectors $b'\ b'$, which divert toward the center of the sifter such particles as may impinge upon them. Said screen C consists, preferably, of a series of small bars (marked $c\ c$) lying approximately in the same plane and so spaced that the smallest particles of coal which it is desired shall be retained may not pass through the interstices between said bars. The cross-bar c' constitutes the forward limiting edge of said screen and extends horizontally in a direction parallel to the front wall of the casing A and at a distance therefrom sufficient to allow the passage of the coal and ashes which do not pass through said screen. The extent and position of the said shaking-screen C is such that

the side and rear limiting edges thereof are adjacent to but lie slightly beneath and to the outside of the inner edges of the hopper-partitions *b b*. The rear extremity of said screen is pivotally supported upon the horizontal transverse shaft c^2, which latter is provided with suitable bearings in the side walls of the casing A. The screen C is so set as to have a downward pitch from rear to front in order that the particles not passing therethrough may pass off over the front extremity thereof. The cross-rest c^3 extends horizontally across the device parallel to the front wall of the casing and at a distance therefrom equal to the distance of the screen cross-bar c' therefrom. Said cross-rest lies beneath said screen cross-bar and forms a support whereon the forward portion of said screen may rest.

The revolving screen D consists, preferably, of approximately parallel bars (marked *d d*) attached at their extremities to the front and rear hoops d' and d^2, respectively. Said hoops are circular, concentric with the main shaft E, and extend in a direction transverse to said shaft E and parallel to the front and rear walls of the casing A. The said bars *d d* are spaced sufficiently close together to prevent the passage between them of particles the size of the smallest particle of coal which is to be retained. The rear hoop d^2 is somewhat larger in diameter than the front hoop d', thus giving to said revolving screen the configuration of a right-truncated cone. As said shaft E is horizontal, the uppermost ones of the bars *d d* have a pitch downward toward the front and the lowermost ones of said bars have a pitch downward toward the rear. By this construction particles which will not pass through the upper portion of said screen will tend to pass over the forward hoop d' thereof, and such particles lying within said screen will tend to pass over the rear hoop d^2 thereof. The said screen D is located closely beneath the shaking-screen C, the forward hoop d' lying vertically beneath the cross-rest c^3 and the rear hoop d^2 lying at a distance from the rear wall of the casing approximately equal to the distance of said front hoop d' from the front wall of said casing. The said hoops d' and d^2 are supported on the shaft E by means of the screen-arms *e* and *e'*, which bear on said shaft and are secured near their extremities to the hoops d' and d^2, respectively. Said arms are secured to the shaft E, preferably by means of the feathers e^2 e^2, (shown in Figs. 6 and 7,) which permit motion on said shaft lengthwise thereof, but transmit the rotary motion of said shaft to said arms. Said shaft E projects beyond the forward wall of the casing A, and the rotation of said shaft and of the revolving screen D is effected by means of the crank F, secured to said shaft at the forward extremity thereof. The stop e^3 is attached to the shaft E a short distance to the rear of the front arm *e*, as shown in Fig. 6, and thereby prevents said shaft from being withdrawn in a forward direction through said arm *e*. Said forward arm *e* projects at both extremities radially beyond the hoop d' and when in a vertical position extends above the cross-rest c^3. Said arm revolves in a vertical plane adjacent to the cross-rest c^3, and as the cross-bar c' of the screen C lies upon the said cross-rest said arm *e* when rotated to a vertical position comes into contact with said bar c' and raises it in the manner shown in Figs. 1 and 3. Therefore for each complete rotation of the revolving screen D the forward portion of the shaking-screen C is twice raised from and lowered onto said cross-rest. As the screen is pivotally supported at the rear extremity thereof, the rotation of the revolving screen imparts a vibratory or shaking motion to the screen C, thereby affording an opportunity for the smaller particles in the hopper B to drop through the interstices in said screen. Said vibratory motion also induces in the particles which are too great to drop through said shaking-screen a tendency to move forward and pass over the front cross-bar c'. The bushing *f* is fixed within the removable portion *g* of the forward wall of the casing A and forms the forward bearing for said shaft E. The rear bearing for said shaft is shown in detail in Fig. 7 and consists of a bushing f', fixed within the rear wall of the casing A. I prefer to construct said rear bearing in the manner shown, the diameter of said bushing being somewhat greater than the diameter of the shaft E, thereby permitting considerable lateral play at the forward extremity of the latter without said shaft becoming bound or cramped within said bushing. This lateral play at the forward extremity of the shaft E occurs during the removal of the revolving screen D in the manner hereinafter described. I also prefer to have the rear extremity of the said bushing f' closed in order to prevent the rearward motion of the shaft E. The proper distance between the rear wall of the casing A and the arm e' of the revolving screen D is maintained by the spacing collar or bushing f^2, which incloses said shaft and extends between said rear arm e' and rear wall of the casing A.

The removable portion *g* of the front wall of the casing consists of a sliding section which travels upon the vertical ways *g'*, located symmetrically at short distances from the lateral edges of the said front wall. In order to procure a tight joint between said removable portion *g* and said casing, said ways are preferably of the tongue-and-grooved type. The front wall of the casing A does not extend below the lower extremity of said removable portion *g*, and the aperture thus remaining is occupied by the fronts of the ash-drawer *j* and coal-drawer K when in position. As the distance between the ways *g'* is greater than the distance between the side walls of the casing A, the said removable portion *g* may be disengaged and removed by

being passed in a downward direction beyond the extent of said ways g' in the manner shown in Fig. 5. Between the forward extremity of the revolving screen D and the front wall of the casing A is placed the front chute G, which is rigidly secured to the said removable portion g of the casing A. The relative locations of the screen D, chute G, and removable portion g of the casing A are such that when said portion g is in place said chute G will receive material passing downward over the front cross-bar c' of the screen C and said material will be guided into the front lower portion of the revolving screen D. Said forward fixed chute G consists, preferably, of metal and flares toward the rear in the manner shown in Figs. 1 and 3. The lower portion of the said chute G therefore has a downward pitch from front to rear, so that material will not permanently lodge upon said chute, but will tend to move toward the said screen. The chute G extends at its lower portion from said front wall to a point adjacent to the forward screen-arm e, thus constituting a stop for preventing the motion of the arm e toward the front wall of the casing A.

The rear chute H is rigidly secured to the rear wall of the casing A and consists, preferably, of a sheet of metal bent into cylindrical form. Said chute H is concentric with the main shaft E and is of a diameter slightly greater than the diameter of the rear extremity of the revolving screen D. Said chute extends from said rear wall to a point somewhat forward of the rear extremity of said screen, thereby forming a hood and preventing material from the hopper from passing over the rear extremity of said screen. Said chute H does not make a complete circumference, but has at its lower central portion the aperture h, wherethrough material passing over the open rear extremity of the screen D may pass downward into the drawer-chute J. The said drawer-chute J constitutes an integral portion of the ash-drawer j and leads from the aperture h in the chute H to the coal-drawer K, located in the casing A beneath the said ash-drawer j. It is preferable that said chute J have a forward pitch in order that the coal passing therethrough may be better distributed in the lower drawer K. The horizontal guides or ways j' are built into the casing A and support the said drawer j. On account of its location beneath the screens C and D said drawer j receives the particles of ashes which sift through said screens. The drawer K occupies a position near the base of the casing A and constitutes the receptacle for the coal which is delivered thereto through the said chute J.

In the operation of my device the unsifted ashes containing particles of unburned coal are introduced into the hopper B through the top of the casing A and the cover a' is tightly closed to prevent the escape of dust. The drawers j and K are completely closed, so that the front faces thereof are substantially flush with the front wall of the casing A, and said casing is then dust-tight. When the crank F is turned, the shaft E and screen D are rotated, and said rotation brings the projecting extremities of the front arm e successively into contact with the lower face of the cross-bar c', thereby raising the latter from the cross-rest c^3. The continued rotation of the said arm and screen causes the projecting extremities to revolve past the arc of contact, and said bar c' falls again onto the rest c^3. This rising and falling of the front bar c' of the shaking-screen C imparts a vibratory or oscillatory motion to said screen through a limited arc about the shaft c^2 as a center. The vibration of the shaking-screen C causes the smaller particles of ashes to fall through said screen onto the revolving screen D. As there is a considerable forward pitch to the screen C, the larger particles of coal and ashes tend to move toward and drop over the cross-bar c'. The small particles which have passed through the screen C pass through or over the sides of the screen D and are collected in the upper drawer j. The particles which have passed over the front cross-bar c' drop into the chute G and are conveyed into the forward lower portion of the revolving screen D. The revolution of said screen D causes a tumbling of the inclosed particles both upon themselves and upon the bars d d, and the large particles of unburned coal are thoroughly freed from the fine dust and ashes, which latter pass between said bars d d and are collected in the said ash-drawer j. The particles which are too large to pass between said bars d d gradually move toward the rear of the screen D on account of the pitch of the latter and finally pass rearwardly over the hoop d', falling into the rear chute or hood H and chute J, whence they are conveyed into the lower drawer K.

Should any part of the coal or ashes be forced over the rear extremity of the screen C, such part of the coal or ashes would be prevented, by means of the chute or hood H, from entering the coal-chute J.

When it is desired to remove the revolving screen D and connected parts, the upper drawer j is first entirely withdrawn from the casing A. The shaft E is forced in a forward direction to the limit of its play—that is, until the stop e^3 thereon comes into contact with the front arm e and forces the latter against the front chute G. When in this forward position, the rear bearing f' of said shaft permits sufficient lateral play at the forward extremity of the latter to allow the removable portion g to slide downward on the tongue-and-grooved guides g until said portion g is free from said casing. The said portion g, together with the chute G, shaft E, and screen D, may then be withdrawn through the opening provided for the drawer j.

Although I have shown and described screens composed of bars which are parallel, or approximately so, I do not confine myself

to screens of such construction, and woven screens or screens composed of metallic sheets having apertures punched or drilled therein would lie within my invention.

I prefer to construct the casing A of wood protected in parts by sheets of metal; but it is evident that the entire structure may be metallic, if desired.

What I claim as new, and desire to secure by Letters Patent, is—

In an ash-sifter, the combination of a flat screen oscillating upon a horizontal axis and having a cross-strip upon the edge thereof opposite to said axis; a rotary screen below said flat screen; arms projecting radially beyond said rotary screen, said arms revolving in the plane wherein said cross-strip lies and being adapted to raise and lower said flat screen when said rotary screen is rotated; a shaft whereon said rotary screen is revolubly mounted; a casing inclosing said parts; a removable panel sliding in vertical guides in said casing, said panel supporting one extremity of said shaft and affording means whereby said rotary screen may be removed from said casing, and a drawer, which, when closed, serves to hold in place the panel and the screen.

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