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E. O'TOOLE

CLEANING AND SIZING APPARATUS

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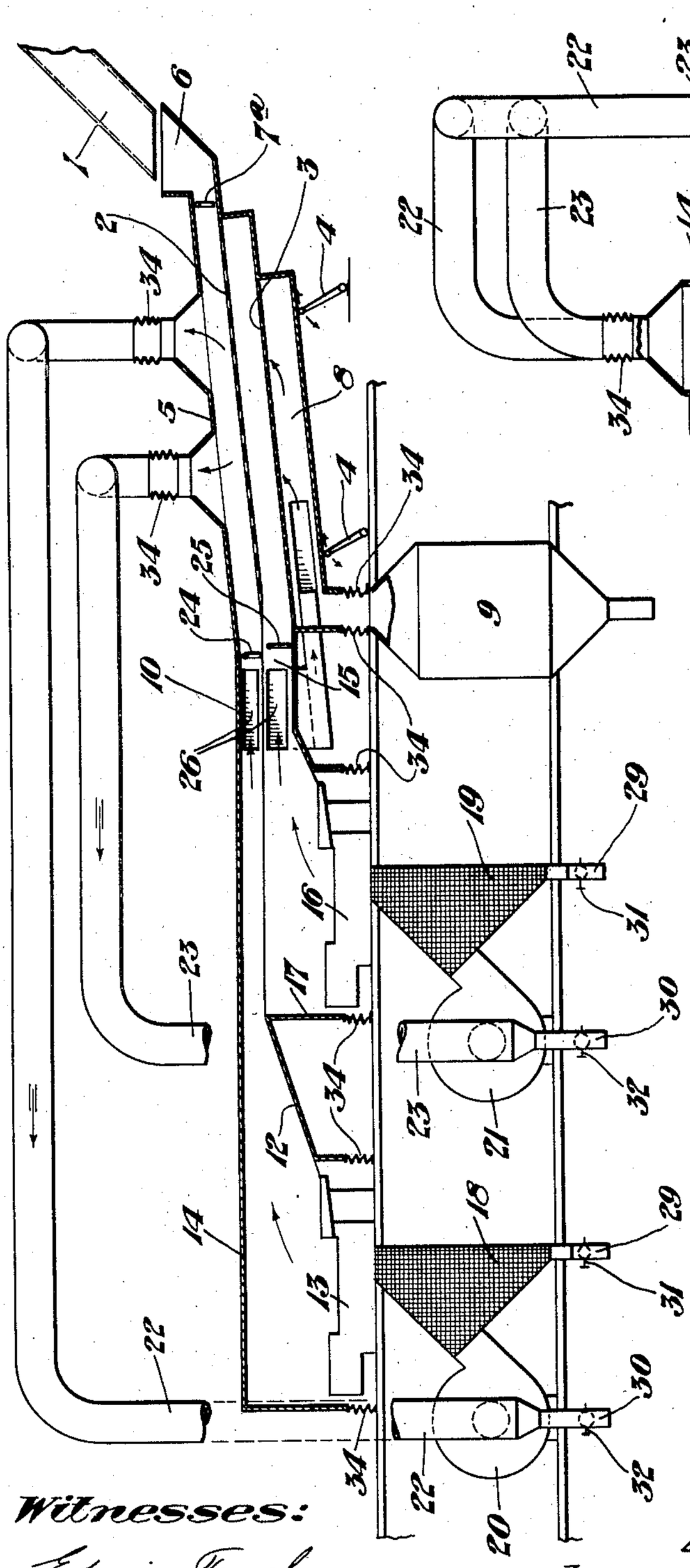

Fig. 1.

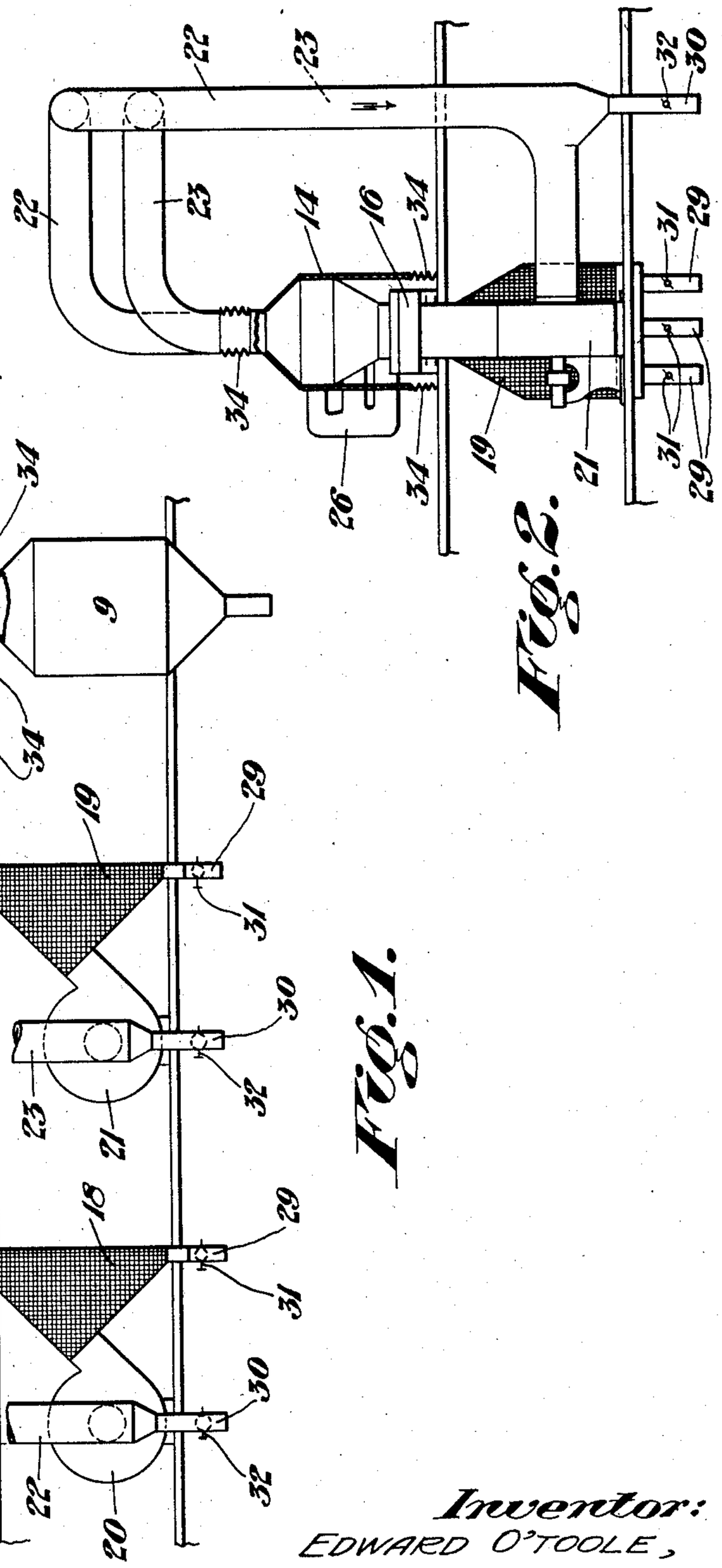

Fig. 2.

Witnesses:

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UNITED STATES PATENT OFFICE.

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CLEANING AND SIZING APPARATUS.

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This invention relates to cleaning and sizing apparatus for coal and similar material and has for its object the provision of a novel apparatus in which air under pressure is forced through the material being cleaned and sized so as to remove the dust, dry the material and serve to stir up the material.

Another object is to provide a novel apparatus which will be more efficient in operation due to the effect of the air in preventing clogging of the screen.

A further object is to provide means for trapping the dust from the air after it has passed through the material being cleaned and sized.

A still further object is to provide apparatus having the novel design, combination, and arrangement of parts hereinafter described and illustrated in the accompanying drawings.

In the drawings—

Figure 1 is a side elevation partly in section of the apparatus constructed in accordance with this invention.

Figure 2 is an end elevation thereof.

Referring more particularly to the drawings, the numerals 2 and 3 designate the upper and lower sizing screens, respectively, arranged one above the other. The screens 2 and 3 are of coarse and fine mesh respectively and are mounted as a single jigging unit on mountings 4. Any well known mechanism may be used to jig the screen unit and since such mechanism is common in the art, it will not be shown or described.

A hood 5 is mounted over the screens to prevent the escape of dust from the screens into the atmosphere. A receiving hopper 6 is formed at the entering end of the screen 2 to receive the uncleaned and unsized coal from a supply chute 7. A swinging gate 7^a is mounted at the point of entrance of the hopper onto the screen 2 and is adapted to permit the coal to enter onto the screen 2 and to prevent the free flow of air through the hopper and into the space over said screen.

A combined wind box and undersize coal receiving chute 8 is mounted under the screen 3 and communicates with a bin 9 for the undersized coal.

The upper screen 2 and hood 5 communicate with a conduit 10 which communicates with a delivery chute 12 and forms a closed passageway for the screened coal leading to a pneumatic cleaning table 13, which table is covered by a hood 14 to prevent the escape of dust into the atmosphere.

The lower screen 3 communicates with a conduit 15 which forms a closed passageway for the screened coal from the screen 3 to a second pneumatic cleaning table 16, which table is also covered by a hood 17 to prevent the escape of dust into the atmosphere.

The tables 13 and 16 are of well known construction and include a perforated bottom plate through which air is forced to clean the coal. Combined wind boxes and expansion chambers 18 and 19 are connected to the under-side of the tables 13 and 16, respectively, to deliver air upwardly through the tables.

The boxes 18 and 19 have fabric side walls and are connected to the blowing ports of fans 20 and 21, respectively. The inlet or suction ports of the fans 20 and 21 are connected to one end of conduits 22 and 23, respectively, the other ends of which communicate with the hood 5.

The conduits 10 and 15 which communicate with the screens 2 and 3, respectively, and with the tables 13 and 16, are provided with swinging gates 24 and 25, which permit the sized coal to pass freely therethrough but which prevent the free passage of air therethrough, and by-pass conduits 26 are provided between the conduits 10 and 15 and the wind box 8 below the screens 2 and 3 to permit the air to pass freely from the hoods 14 and 17 over the tables 13 and 16, to the wind box 8, under the screens 2 and 3.

The combined wind boxes and expansion chambers 18 and 19 are provided with fine coal and dust hoppers 29 and the conduits 22 and 23 are also provided with a fine coal and dust hopper 30. The hoppers 29 and 30 are provided with valves 31 and 32 and are adapted to deliver the fine coal and dust into bags or other receptacles.

The tables 13 and 16 are adapted to have a jigging motion, similar to the screens, to aid in the cleaning operation. In order to permit the jigging of the tables and screens suitable flexible joints 34 are provided throughout the apparatus to permit relative movement of the stationary and jigging parts.

In operation the coal to be cleaned will be delivered by the chute 7 into the hopper 6 and onto the screen 2. The largest sized pieces of coal will remain on the screen 2 while the smaller pieces will fall through

the screen 2 and onto the screen 3, where the coarse and fines will be separated, the coarse coal remaining on the screen 3 and the fines passing through the screen and into the chute 8.

The screens 2 and 3 are inclined and this coupled with their jigging motion will cause the screened coal to pass from said screens into the conduits 10 and 15, respectively.

From the conduits 10 and 15 the screened coal will pass onto the pneumatic cleaning tables 13 and 16, respectively, where all remaining fines, dust and slate will be removed by the operation of such tables.

During the operation of the tables and screens air will be forced by the fans 20 and 21 through the wind boxes 18 and 19, respectively, and upwardly through the cleaning tables 13 and 16. The air blown upwardly through the tables 13 and 16 will be trapped in the hoods 14 and 17, and will be drawn from the hoods 14 and 17 and through the conduits 10 and 15 by passes 26, wind box 8, and up through the screens 2 and 3, then into the hood 5 and returned through the conduits 22 and 23 to the fans 20 and 21, and again blown into the system through the combined wind boxes and expansion chambers 18 and 19. When the returned air from the system is blown into the chambers 18 and 19 it will be suddenly expanded and the dust will therefore settle out in the chambers and such dust may be discharged through the outlets 29.

Some of the heavier dust particles carried by the air will fall out of the air by gravity in the conduits 22 and 23, and such dust will be trapped in the hoppers 30 of said conduits and may be discharged therefrom.

The hinged gates 24, 25 and 7^a are adapted to prevent the free drawing of air over the screens 2 and 3. However, some air will leak or be drawn into the system past the gate 7^a and other air will enter the system at other points and, therefore, the combined wind boxes and expansion chambers 18 and 19 are provided with the fabric sides to permit the escape of excess air and prevent the building up of extreme pressures in the system.

While I have shown and described one specific embodiment of my invention it will be understood that I do not wish to be limited thereto since various modifications may be made without departing from the scope of my invention, as defined in the appended claims.

I claim:—

1. A sizing and cleaning apparatus for coal and the like comprising, in combination, a sizing screen and a cleaning table, a wind box connected to the under-side of said table, a fan having its blowing port connected to said box, a hood over said table adapted to receive the air blown upwardly through said table from said wind box, a wind box under said screen, means connecting said hood over said table with said wind box under said screen, a closed passage above said screen and connected to the upper side of said table through which the screened coal is delivered to said table and into which air passing upwardly through said screen is trapped, means for preventing the free passage of air from said table through said closed passage, and a conduit connecting said closed passage to the intake port of said fan whereby a suction is created in said closed passage above said screen and said hood above said table and the air passing upwardly through said screen is returned to said fan.

2. A sizing and cleaning apparatus for coal and the like comprising, in combination, a sizing screen and a cleaning table, a wind box connected to the under-side of said table, a fan having its blowing port connected to said box, a hood over said table adapted to receive the air blown upwardly through said table from said wind box, a wind box under said screen, means connecting said hood over said table with said wind box under said screen, a closed passage above said screen and connected to the upper side of said table through which the screened coal is delivered to said table and into which air passing upward through said screen is trapped, a swinging gate in said closed passage at a point between said screen and said table adapted to permit the screened coal to pass therethrough and to prevent the free passage of air from said table into the portion of said passage over said screen, and a conduit connecting the portion of said closed passage over said screen to the intake port of said fan whereby a suction is created in said closed passage above said screen and said hood above said table and the air passing upwardly through said screen is returned to said fan.

3. A sizing and cleaning apparatus for coal and the like comprising, in combination, a sizing screen and a cleaning table, a combined wind box and expansion chamber connected to the under-side of said table, a fan having its blowing port connected to said box, a hood over said table adapted to receive the air blown upwardly through said table from said wind box and expansion chamber, a wind box under said screen, a closed passageway above said screen and connected to the upper side of said table through which screened coal is delivered to said table and into which air passing upwardly through said screen is trapped, a swinging gate in said closed passageway at a point between said screen and said table adapted to permit the screened coal to pass therethrough and to prevent the free passage of air from said table into the portion of said passageway over said table, a by-

pass conduit connecting said passageway at a point between said cleaning table and said swinging gate with said wind box under said screen, and a conduit connecting the portion of said closed passageway over said screen to the intake port of said fan whereby a semi-closed air circuit is formed by which a suction is created in said closed passageway above said screen and in said hood above said table and the air and dust is withdrawn therefrom by said fan and blown into said combined expansion chamber and wind box below said table to permit the dust to settle out.

4. A sizing and cleaning apparatus for coal and the like comprising, in combination, a sizing screen and a cleaning table, a combined wind box and expansion chamber connected to the under side of said table, said chamber being provided with fabric side walls whereby excess air may filter therethrough, a fan having its blowing port connected to said box, a hood over said table adapted to receive the air blown upwardly through said table from said wind box and expansion chamber, a wind box under said screen, a closed passageway above said screen and connected to the upper side of said table through which screened coal is delivered to said table and into which air passing upwardly through said screen is trapped, a swinging gate in said closed passageway at a point between said screen and said table adapted to permit the screened coal to pass therethrough and to prevent the free passage of air from said table into the portion of said passageway over said table, a by-pass conduit connecting said passageway at a point between said cleaning table and said swinging gate with said wind box under said screen, and a conduit connecting the portion of said closed passageway over said screen to the intake port of said fan whereby a semi-closed air circuit is formed by which a suction is created in said closed passageway above said screen and in said hood above said table and the air and dust is withdrawn therefrom by said fan and blown into said combined expansion chamber and wind box below said table to permit the dust to settle out.

5. A sizing and cleaning apparatus for coal and the like comprising, in combination, a plurality of sizing screens, arranged one above the other, and a plurality of cleaning tables equal in number to said screens, a combined wind box and expansion chamber under each of said tables, a plurality of fans, each of said fans having its blowing port connected to one of said boxes, a hood over each of said tables adapted to receive the air blown upwardly through said table from the wind box and expansion table, a wind box under said screens, a hood over said screens for trapping the air passing upwardly through said screens, a separate passageway leading from each of said screens to one of said tables through which screened coal is delivered to said tables, a swinging gate in each of said passageways at a point between said screens and said tables adapted to permit the screened coal to pass therethrough and to prevent the free passage of air from said table, a by-pass conduit connecting said passageways with said wind box under said screens at a point between said cleaning tables and said gates, and a plurality of conduits connecting said hood over said screens with the intake ports of said fans, whereby a semi-closed air circuit is formed by which a suction is created in said hoods above said tables and said hood above said screen and the air and dust is withdrawn therefrom by said fans and blown into said combined expansion chambers and wind boxes below said tables to permit the dust to settle out.

In testimony whereof, I have hereunto set my hand.

EDWARD O'TOOLE.