

No. 696,841.

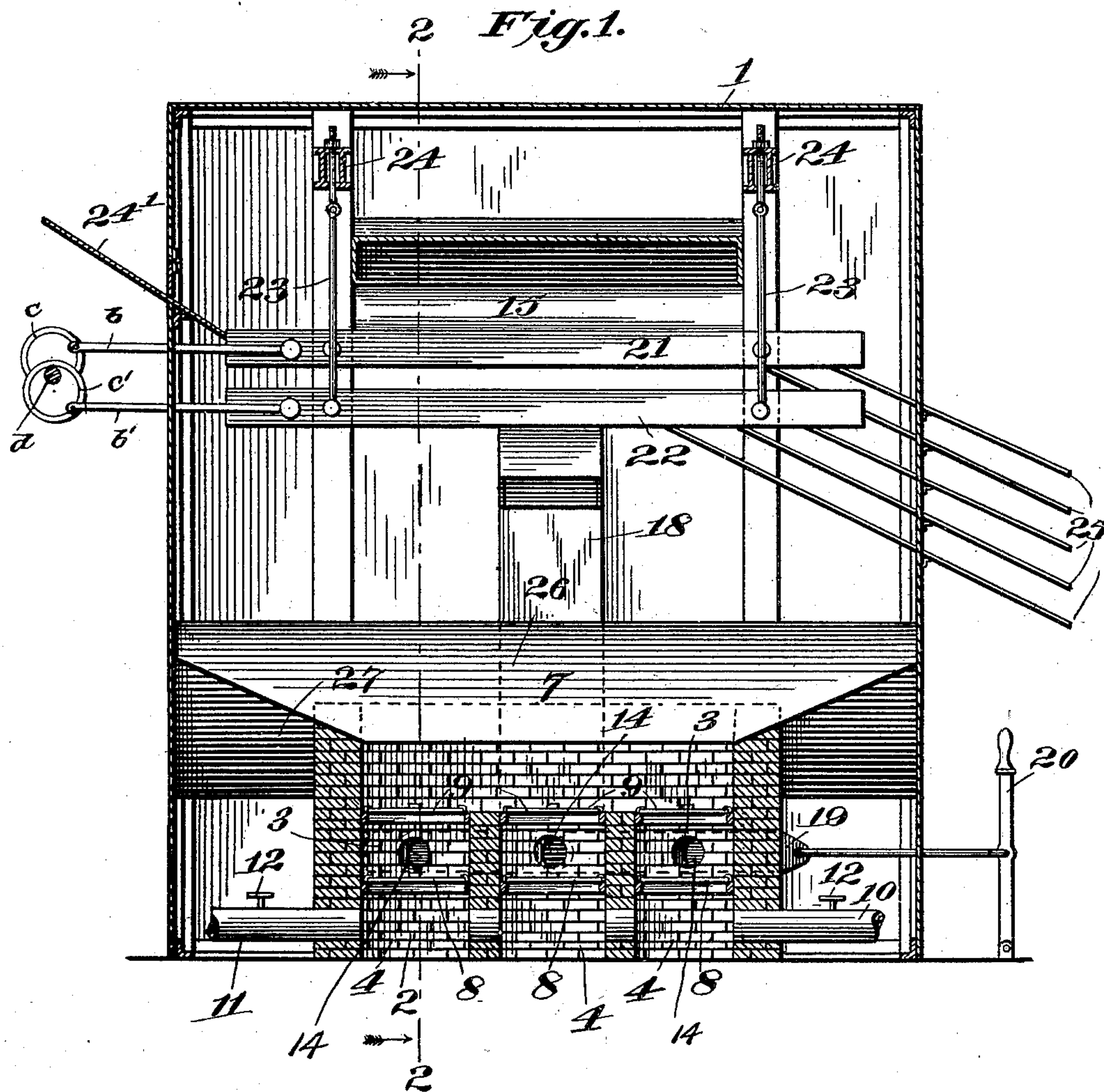
Patented Apr. 1, 1902.

J. W. PERRY.
CULM DRIER AND SEPARATOR.

(Application filed Apr. 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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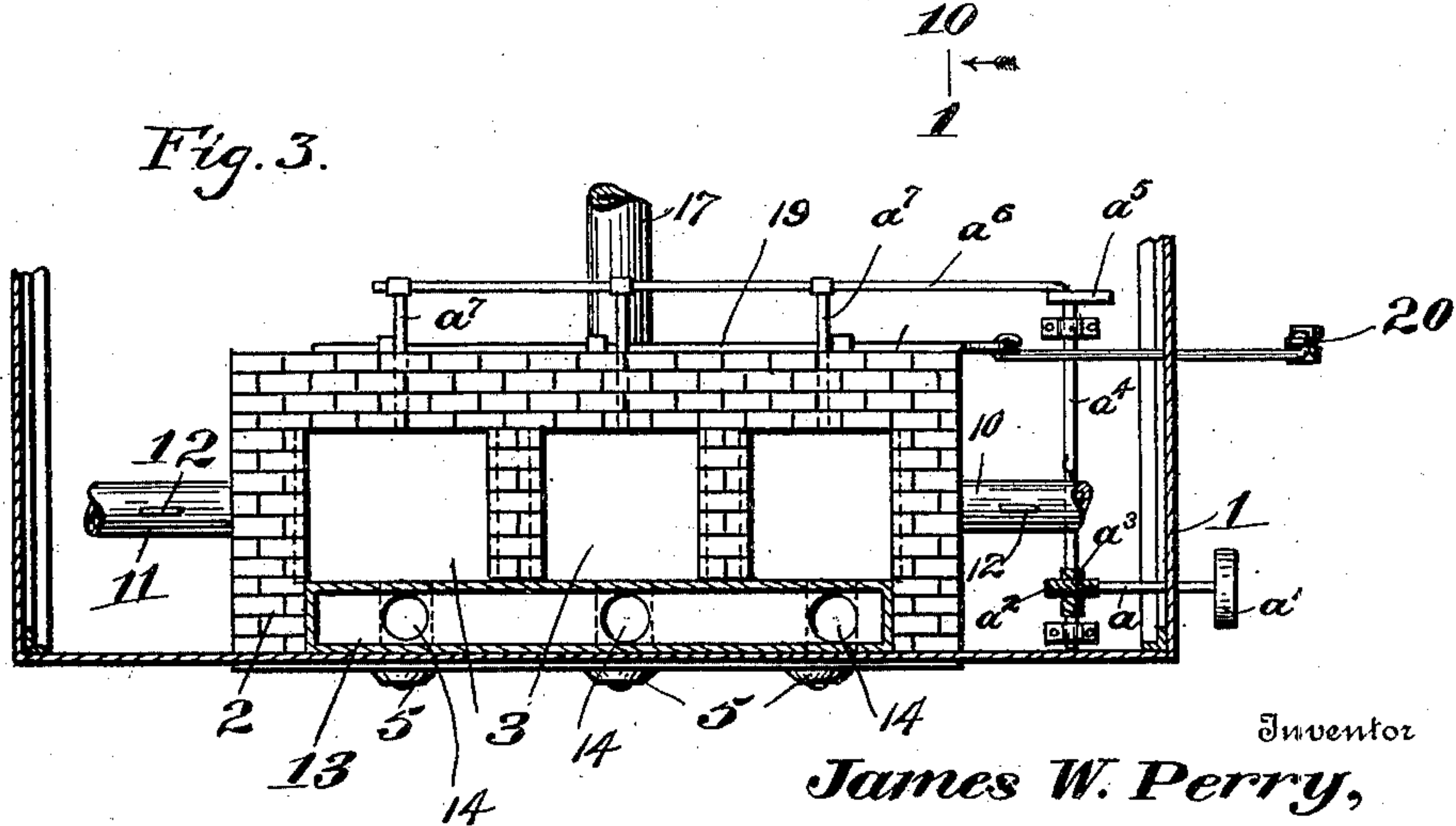
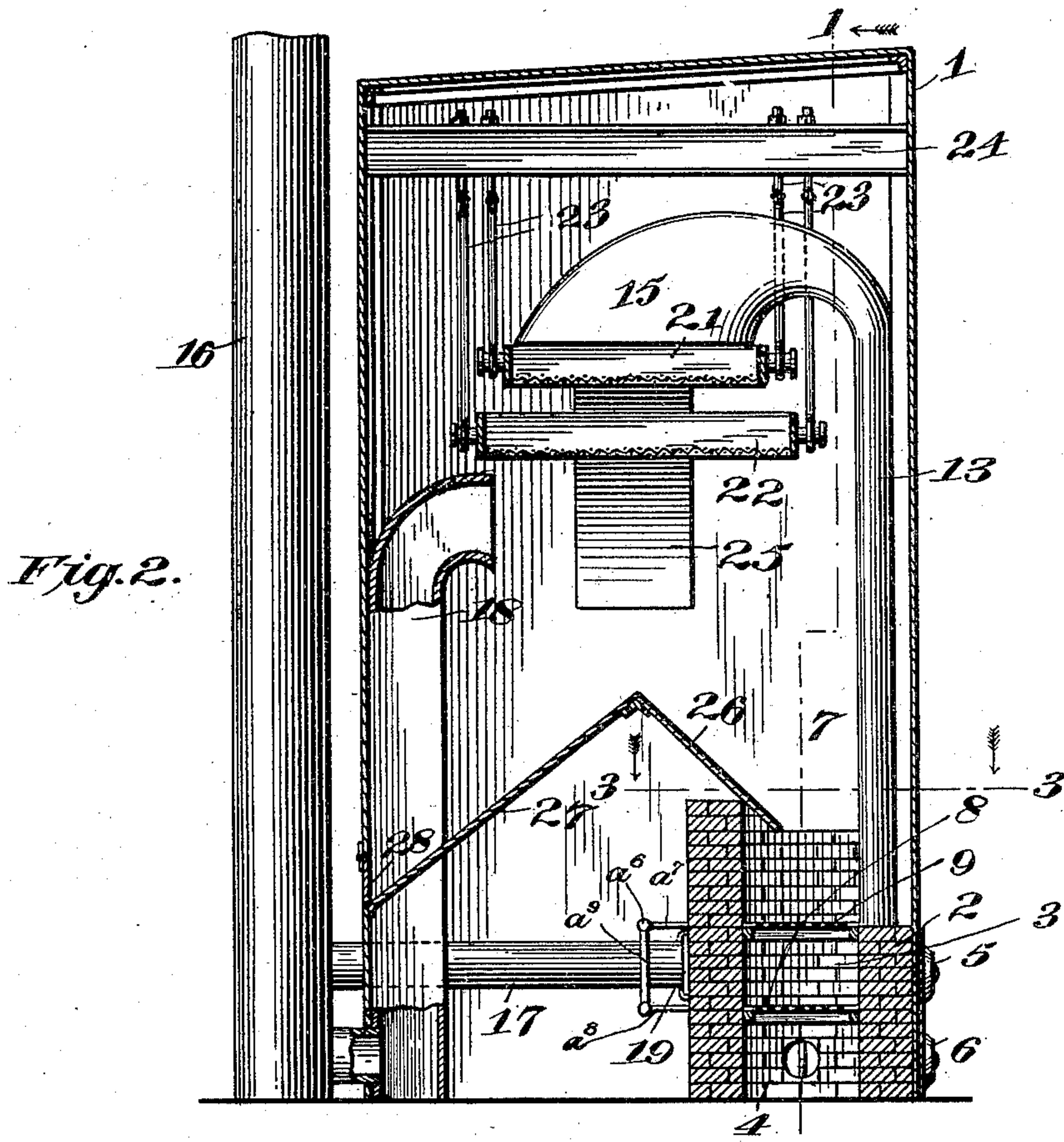
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

JAMES W. PERRY, OF SHAMOKIN, PENNSYLVANIA.

CULM DRIER AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 696,841, dated April 1, 1902.

Application filed April 18, 1901. Serial No. 56,415. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. PERRY, a citizen of the United States, residing at Shamokin, in the county of Northumberland and State of Pennsylvania, have invented certain new and useful Improvements in Culm Driers and Separators; 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.

This invention relates to a culm drier and separator designed for separating the larger particles of merchantable coal from the coal dust, dirt, and refuse of the culm and drying the coal to render it available for ready handling and use; and it consists in an apparatus of this character embodying certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly set forth in the appended claims.

In the accompanying drawings, Figure 1 is a central vertical front to rear section of the apparatus, taken on line 1 1 of Fig. 2. Fig. 2 is a vertical transverse section on line 2 2 of Fig. 1, and Fig. 3 is a sectional plan view taken on the line 3 3 of Fig. 2.

Referring now more particularly to the drawings, the numeral 1 represents the inclosing chamber or casing of the apparatus, which is constructed of some suitable fireproof material, such as metallic angle beams and plates, and 2 is a fire-brick furnace-wall located at the front and in the base portion of the casing and having one or more fire-boxes 3 and communicating ash-pits 4. Doors 5 and 6 in the front of the furnace-wall give access to each fire-box and ash-pit.

7 is a hopper located above the fire-boxes for the reception of the fuel, the feed of which to the grates 8 is controlled by a shaking-screen or foraminous feed-plate 9, which is reciprocated to loosen up the fuel and allow a definite quantity to fall through and down onto the grate or grates 8. The said grate or grates 8 are of the reciprocating type and are shaken by suitable mechanism to promote combustion and cause the ashes to drop down into the ash pit or pits 4.

In the present instance I have shown means for simultaneously reciprocating the feed-

plates and grates, the same consisting of a drive-shaft a , carrying at one end a pulley a^1 and at the other end a worm-wheel a^2 . This worm-wheel meshes with a worm-gear or worm-threads a^3 upon a shaft a^4 , which is provided with a crank a^5 , to which is connected one end of a rod a^6 . The feed-plates 9 are provided with outwardly-projecting arms a^7 and the grates 8 with corresponding arms a^8 . The arms a^7 are directly connected with the rod a^6 , while the arms a^8 are connected with said rod by stems or connecting-pieces a^9 . By this construction it will be seen that when the shaft a^4 is revolved through the instrumentality of the gearing connecting the same with the shaft a the pitman-rod a^6 will be reciprocated through the instrumentality of the crank a^5 , and thereby imparts a reciprocatory shaking motion to the feed-plates 9 and the grates 8.

10 is a blast-pipe communicating with the ash-pit on one side of the casing, and 11 a discharge-pipe in communication with the ash-pit on the other side of the casing. These pipes are provided with dampers 12, which may be opened to allow a blast of air from a suitable source of supply to enter the ash-pits through the pipe 10 and to blow the ashes out through the said discharge-pipe 11.

13 is a heat-conducting pipe or conduit extending vertically at the front of the furnace and in communication at its lower end with the fire-boxes 3 through flues 14. This pipe or conduit is provided at its upper end with an inwardly-projecting hood or nozzle 15, having its mouth or opening downwardly directed. In the normal operation of the apparatus the smoke, hot air, and products of combustion rising from the bed of fuel on the grate or grates pass upwardly through said pipe or conduit 13 and discharge through said nozzle into the upper portion of the casing to heat and dry the culm in the manner herein- after described.

16 represents a smoke-stack in direct communication with the fire-boxes through a draft-flue 17 and in communication with the upper portion of the casing through a draft-flue 18. A slide 19, operated by a hand-lever 20, controls the discharge of the products of combustion from the fire-boxes to the flue 17, so that by opening and closing said slide

the amount of heat passing upwardly through the pipe 13 may be conveniently regulated. Normally—that is, when the slide 19 is closed—all the heat passes into the flue 13; but by opening said slide to a greater or less extent some of the heat will be caused to pass into the flue 17 and thence to the stack 16, thereby reducing the amount of heat passing into the pipe 13, whereby the supply of heat to the upper portion of the casing may be readily controlled according to the condition of the culm.

21 and 22 are shaking-screens suspended one above the other in the upper portion of the casing from hangers 23, depending from cross-beams 24, which screens are automatically shaken simultaneously in reverse directions by means of pitmen or connecting-rods *b b'*, receiving motion from cams or eccentrics *c c'* on a suitably-driven shaft *d*.

24' is a feed-chute which enters the casing and delivers the culm to be dried and separated into one end of the upper screen 21, and 25 represents discharge-chutes which receive the screened coal from the opposite ends of the screens and convey the same to the exterior for discharge into a suitable receptacle.

I may employ any desired number of chutes 25, according to the number of lots into which the coal delivered thereto is to be separated. If desired, one or more of these chutes may also be perforated to serve the function of screens to separate the coal into lots of different degrees of fineness.

The hopper 7 has an upwardly and rearwardly projecting deflector-plate 26, which forms one wall thereof and connects at its outer end with a downwardly-inclined deflector-plate 27, leading thereto from the rear wall of the casing, in which is a door 28 for the discharge of the surplus screenings from the screens 21 22. These two plates 26 27 converge and form an inverted-V-shaped chute, having its point or vertex located centrally beneath the screens 21 22, so that the screenings falling therefrom will be directed partly into the chute 7 for use as fuel and partly onto the plate 27 for discharge through the door 28. When the chute is full, the surplus screenings fall over onto the deflector 27 and discharge by gravity through said door 28.

The operation is as follows: The movable parts of the apparatus are kept in constant motion and the culm is fed from the chute 24' into the rear end of the screen 21 and is fed forward under the shaking action thereof. The larger particles of coal are retained in said screen 21, while the finer particles (coal dust and dirt) drop through the meshes thereof onto the screen 22. The fine particles of coal are retained on this screen 22, which, together with the larger particles on the screen 21, are discharged onto the chutes 25 and conducted thereby into a suitable receptacle; but the coal dust, dirt, &c., drop through the screen 22 down onto the deflector-plates 26 and 27, which cause a sufficient amount of

the same for use as fuel to pass into the hopper 7, while the surplus or remainder of the screenings or refuse discharges through the door 28. The screenings in the hopper 7 are kept in a loosened state by the reciprocating feed-plate 9, and the fire having been previously started said plate feeds the screenings down onto the grate to serve as fuel. Inasmuch as a large amount of incombustible matter passes with the coal-dust onto the bed of fuel, the latter is constantly shaken up by the reciprocating action of the grate 8, through which the dirt and ashes are discharged down into the ash-pits 4, from which they are removed in the manner heretofore described. The hot air, smoke, and products of combustion from the bed of fuel pass upwardly through the pipe 13 and discharge from the hood or nozzle 15 down through the screens 21 22 and dry the culm thereon, this operation being facilitated by the constant turning over of the particles as a result of the shaking action of the screen. By this means it will be seen that all the merchantable particles of the culm are separated from the refuse matter, the mass of material dried, and a large proportion of the combustible elements of such refuse matter used as fuel. Through the medium of the slide 19 a greater or less amount of heat may be made to pass upward through the pipe 13, as will be readily understood.

If desired, the shaft *a* may be driven from the shaft *d* by any suitable construction and arrangement of connections.

Rotary screens may be used in place of the shaking-screens, if desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for separating and drying culm, the combination of an inclosing casing, one or more screens in the upper portion of the casing, feeding and discharge chutes cooperating with said screens, a fire-box in the lower portion of the casing, a hopper above the fire-box, a heat-conducting pipe leading from the fire-box to the upper portion of the casing adjacent to the screens, and means for conducting refuse material falling through the screens to said hopper, substantially as described.

2. In an apparatus for separating and drying culm, the combination of an inclosing casing having an outlet for refuse, a fire-box in the lower portion of the casing, one or more shaking-screens in the upper portion of the casing, a heat-conducting pipe leading from the fire-box to a point adjacent to the screens, a feed-chute for supplying culm to the screens, a discharge-chute to receive the coal therefrom, and means for conducting a portion of the refuse matter falling from the screens to the fire-box and the remainder to the refuse-outlet, substantially as described.

3. In an apparatus for separating and drying culm, the combination of an inclosing cas-

ing, a fire-box in the base of the casing, a
smoke-stack, a direct flue leading from the
fire-box to the smoke-stack, a second flue lead-
ing from the upper portion of the casing to
5 the smoke-stack, a damper controlling the di-
rect flue, a hopper above the fire-box, shak-
ing-screens in the upper portion of the cas-
ing, feed-discharge chutes coöperating with
the screens, a refuse-outlet, and converging
10 plates inclining downwardly to direct a por-

tion of the refuse to the hopper and a portion
to said outlet, substantially as described.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

JAMES W. PERRY.

Witnesses:

AMBROSE CAMPBELL,
BENJ. HAUPT.