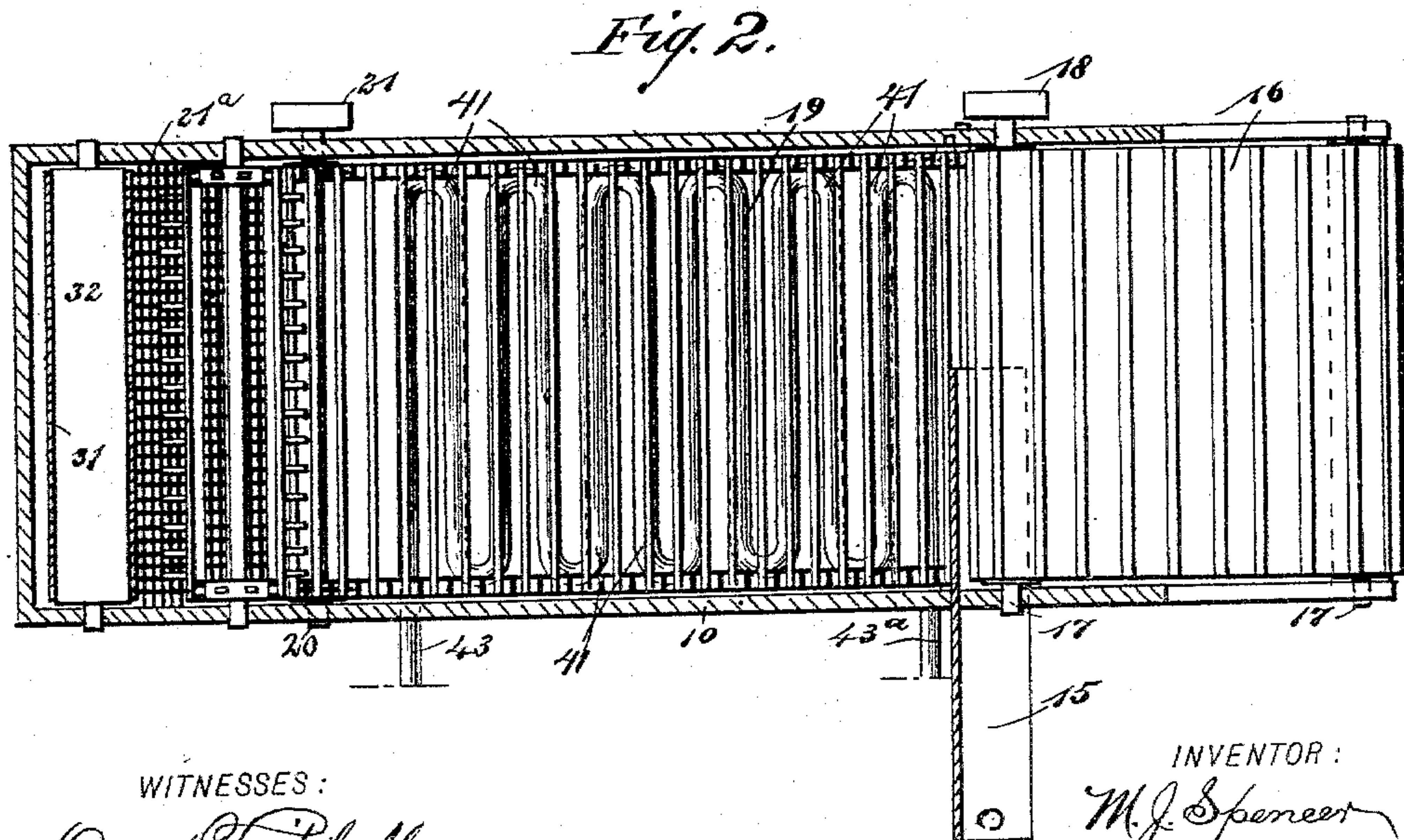
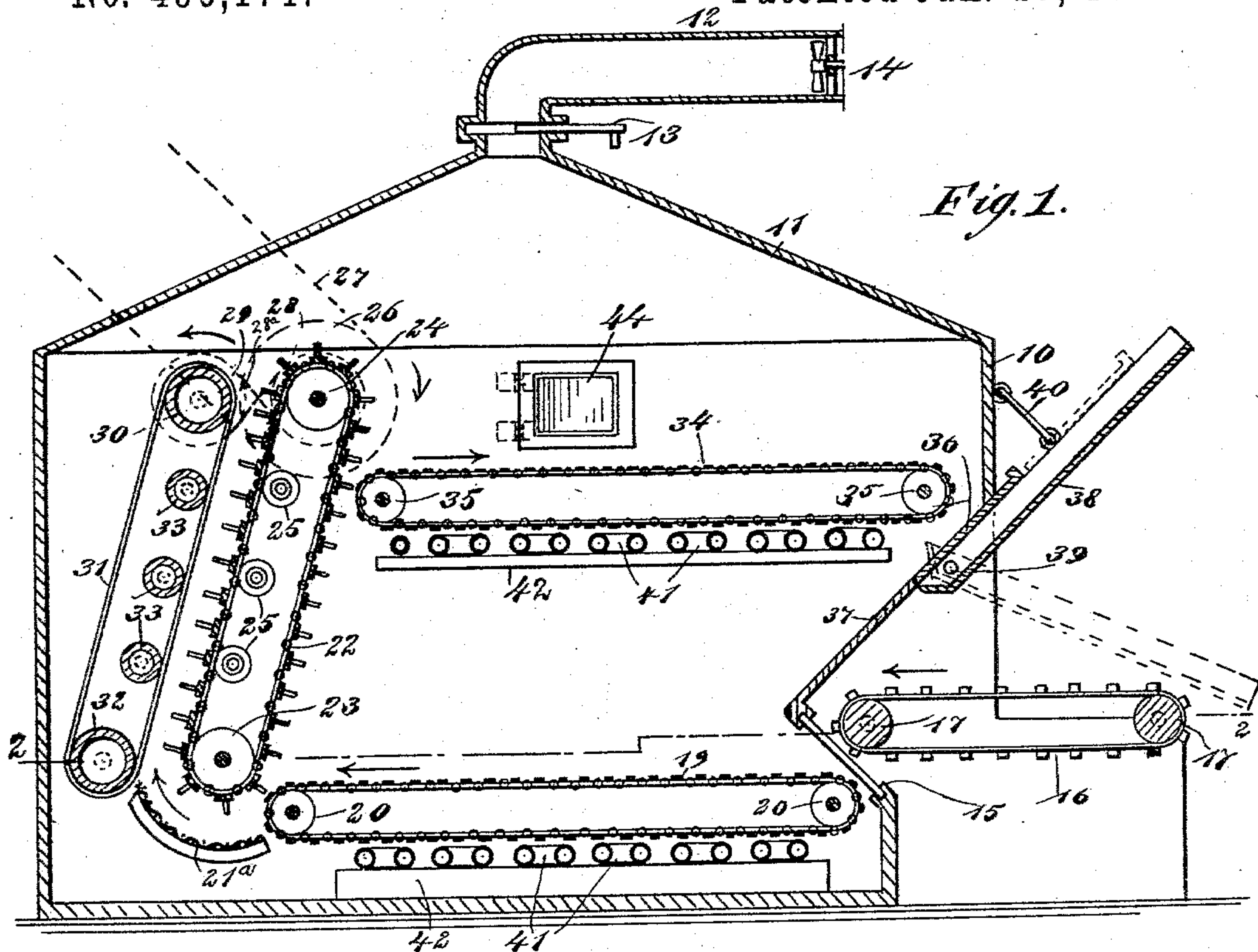


(No Model.)

M. J. SPENCER.  
DRIER AND CARBONIZER.

No. 490,171.

Patented Jan. 17, 1893.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

MICHAEL J. SPENCER, OF LAWRENCE, MASSACHUSETTS.

## DRIER AND CARBONIZER.

SPECIFICATION forming part of Letters Patent No. 490,171, dated January 17, 1893.

Application filed January 25, 1892. Serial No. 419,182. (No model.)

*To all whom it may concern:*

Be it known that I, MICHAEL J. SPENCER, of Lawrence, in the county of Essex and State of Massachusetts, have invented a new and  
5 Improved Drier and Carbonizer, of which the following is a full, clear, and exact description.

My invention relates to improvements in driers and carbonizers, and especially to that variety of machines which are adapted for  
10 use in drying and carbonizing wool or other fibrous material. The machines of this class are usually provided with an inlet in one portion of the case, an outlet in another portion, a heating apparatus within the case, and  
15 means for feeding the material to be dried or carbonized continuously through the case, that is to say, it is fed continuously in at one end and passes constantly out at the other end. In machines of this class it is necessary  
20 to preserve a very high temperature within the drier, in order to insure complete drying and for this and other reasons the machines are costly and more or less inefficient.

The object of my invention is to produce a  
25 simple and inexpensive machine for doing work of this kind, which is provided with a means for charging it with a certain quantity of material to be dried or carbonized, and which will continuously move the material  
30 therein until it is thoroughly dried, and will discharge it at any desired time. This enables the material to be thoroughly dried at a comparatively low temperature, and it also enables the material to be carbonized by dip-  
35 ping it in the proper solution and then retaining it for a sufficient time within the case under a sufficiently high temperature.

To this end, my invention consists in a drier and carbonizer, the construction of which will  
40 be hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar figures of reference indicate corresponding parts in both views.

45 Figure 1 is a vertical longitudinal section of the machine embodying my invention; and Fig. 2 is a sectional plan of the same, on the line 2—2 in Fig. 1.

The machine is provided with an inclosing  
50 case 10, which has a bell crown or top 11, opening from which is a pipe 12 controlled by a

slide valve 13, and connecting with any common form of fan or blower 14. The object of this pipe and fan is to exhaust the moist air from the case so as to insure rapid drying. 55 This however, is not a new feature in machines of this class, and I do not claim it as a part of my invention, although the peculiar shape of the case top is believed to be new. The bell shape of the case top has a tendency to  
60 concentrate the moist air in the case so that it may be rapidly exhausted.

The inlet to the machine is near the bottom and is controlled by means of an inclined door 15, the front portion of the case being  
65 bent inward at this point so that the wool or other material may be conveniently dropped through the inlet. The feeding is accomplished by means of a common form of carrying apron 16, which is carried by rollers 17  
70 aligning horizontally, one of the rollers being directly above the door 15, and having a driving pulley 18 at its outer end.

Near the bottom of the case is a horizontal endless carrying apron 19 of the usual kind, 75 which moves over rollers 20, one of which has a driving pulley 21 at its outer end, as shown in Fig. 2, and the front end of this apron 19 is arranged beneath the inlet so that it will receive the fibrous material discharged from  
80 the feed apron 16. At the rear end of the apron 19 is a concave guide 21<sup>a</sup>, which is preferably made of corrugated screening, and this receives the material from the apron 19 and delivers it to a spiked apron 22, which is of  
85 the usual construction, and is turned upon rollers 23 and 24 arranged in the lower and upper portions of the case, and near the rear carrying surface of the apron are bearing rollers 25, which hold it in proper position. 90

The roller 24 is placed nearer the front end of the case 10 than the roller 23, so that the apron 22 will be held at an inclination, as shown in Fig. 1, and thus enable it to deliver easily upon the top carrying apron as de- 95 scribed below. The roller 24 is provided at its outer end with a driving pulley 26, driven by a belt 27, as shown by dotted lines in Fig. 1, and has also a pulley 28 connecting by a cross belt 28<sup>a</sup> with a pulley 29 on the outer  
100 end of a roller 30, which roller carries the upper end of a smooth apron 31, which is ar-



ranged parallel with and in the rear of the apron 22, the lower end of said apron 31 being carried by a roller 32, and the inner face of the apron being held in position by rollers 33.

It will be noticed by reference to Fig. 1, that the pulleys 28 and 29 are of the same size, and consequently the aprons 22 and 31 will travel at the same speed, although their adjacent faces will move in the same direction. This prevents the tearing of the fibers.

Arranged in the upper portion of the case is a carrying apron 34, which extends horizontally and is exactly similar to the apron 19, being also of the same length, and it is carried by rollers 35, one of which is provided with a suitable driving pulley as is the case with the apron 19. The rear end of the apron 34 projects beneath the upper end of the spiked apron 22, so as to receive the material discharged by the spiked apron, and the front end of the apron projects over a sliding door 36, which is supported in the inwardly-inclined front wall 37 of the case 10 and slides upward, as shown in dotted lines Fig. 1.

Hinged to the case 10 beneath this door 36, is a chute 38, the chute being pivoted at its lower end as shown at 39, and the chute when not in use is held in a raised position so as not to interfere with the apron 16, by means of a hook 40, which is secured to the chute and engages an eye on the case 10, as shown in Fig. 1. When, however, the chute is to be used, it is dropped into the position shown by dotted lines in Fig. 1, and if the door 36 is opened, the material discharged by the apron 34 will pass outward through the chute 38.

Beneath the aprons 19 and 34, are coils of steam pipes 41, which are supported by the cleats 42, and these coils have suitable inlets and outlets 43 and 43<sup>a</sup>, which are shown in Fig. 2, and which may be controlled by valves in the usual manner. In one side of the case 10, above the apron 34, is a swinging door 44, which enables the interior of the case to be easily reached, so that the material being dried may be conveniently tested at any time to see whether it is in proper condition to be discharged.

The operation of the machine is as follows: When used as a drier, the steam is turned on, the exhaust fan 14 started, the valve 13 opened, the door 36 closed, and the material to be dried is fed upon the apron 16, which discharges it upon the apron 19, and the latter carries it to the guide 21<sup>a</sup>, from which place it is carried upward between the aprons 22 and 31, the apron 22 doing the carrying and the apron 31 serving as a moving abutment, and from the apron 22 the material is delivered upon the apron 34, and from thence upon the door 36, and inclined wall 37, so that it will slide from said wall upon the carrying apron 19, and be again carried around as above described; consequently, when sufficient material has been introduced into the

case the door 15 may be closed, and the material allowed to circulate in the manner described until it is thoroughly dried, at which time the door 36 is opened, the chute 38 lowered, and the dried material discharged upon the chute. When used as a carbonizer, the operation is substantially the same except that the material is first dipped in some proper solution, and the temperature in the case is made higher than when it is used as a drier. Having thus described my invention, I claim as new, and desire to secure by Letters Patent,—

1. A drier, comprising a casing having one end wall inclined inwardly and downwardly, an outlet door in the upper portion of the inclined wall and forming a continuation thereof to permit the descent of the material along said wall when closed and allow it to pass out of the casing when open, a lower inlet door beneath and in front of the lower end of the inclined wall to permit the entrance of the material to be dried, an endless carrier within the casing and having its receiving end extending under the lower end of the inclined wall to the inlet door, an upper endless carrier, the delivery end of which extends over the said outlet door to deliver the material thereon to return it to the lower carrier or to discharge it through the door opening, and an elevator within the casing to elevate the material from the lower to the upper carrier, substantially as set forth.

2. A drier, comprising a casing having an inwardly and downwardly inclined front wall, an outlet door for the material forming a continuation of the upper part of said inclined wall, an inlet door for the material beneath and in front of the lower edge of said inclined wall, an endless feeder outside of the casing with its delivery end extending over said inlet door, a lower endless carrier within the casing with its receiving end under the inlet door to receive the material from the endless feeder, an endless elevator extending upward from the delivery end of the said lower carrier, an upper endless carrier receiving the material from the elevator and extending at its delivery end over the said outlet door to deliver the material thereon when it is to be returned to the lower carrier or to discharge it through the door opening, and a trough or chute pivoted adjacent to the said outlet door to swing under the delivery end of the upper carrier when said door is opened and conduct the material beyond the endless feeder, substantially as set forth.

3. A drier, comprising the casing 10 having a top 11, an exhaust pipe 12 connected with the apex of the top and having a valve 13, the inclined end wall 37, a door 36 forming the upper portion of said wall, an oppositely inclined door 15 below and in front of the lower edge of said wall 37, the external endless feeder 16 and lower endless inclosed car-



rier 19 separated at their adjacent ends by  
said door 15, the vertically extending elevat-  
ing mechanism in the casing, the upper end-  
less carrier receiving the material from the  
5 elevator and delivering it upon the door 36  
for return to carrier 19 or to discharge the  
material through said door, and a hinged  
chute or trough pivoted adjacent to said door  
36 to swing under the carrier 34 when the  
door is opened and conduct the material be- 10  
yond the endless feeder 16, substantially as  
set forth.

MICHAEL J. SPENCER.

Witnesses:

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