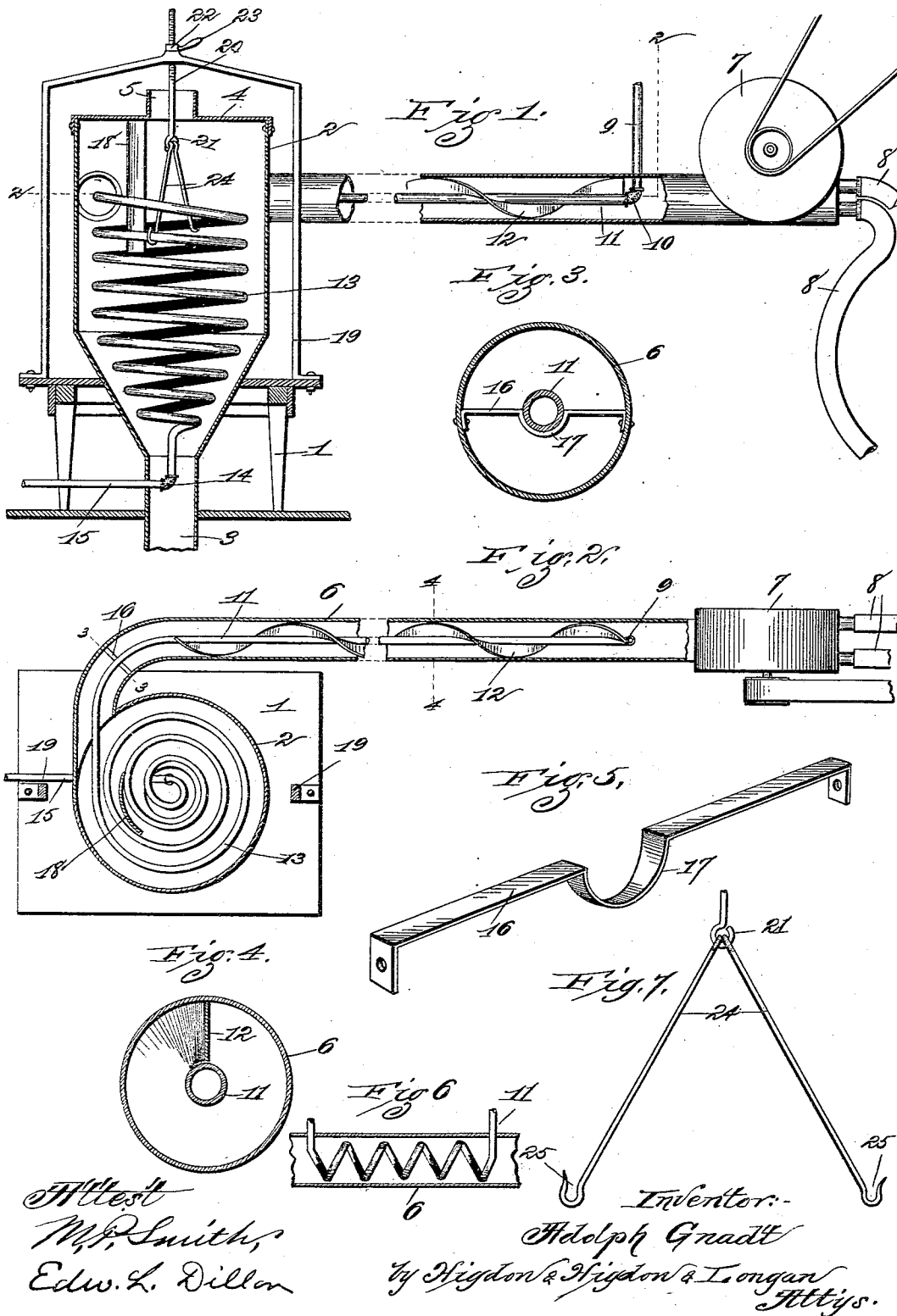


A. GNADT.
PNEUMATIC SEPARATOR AND DRIER.

No. 555,370.

Patented Feb. 25, 1896.



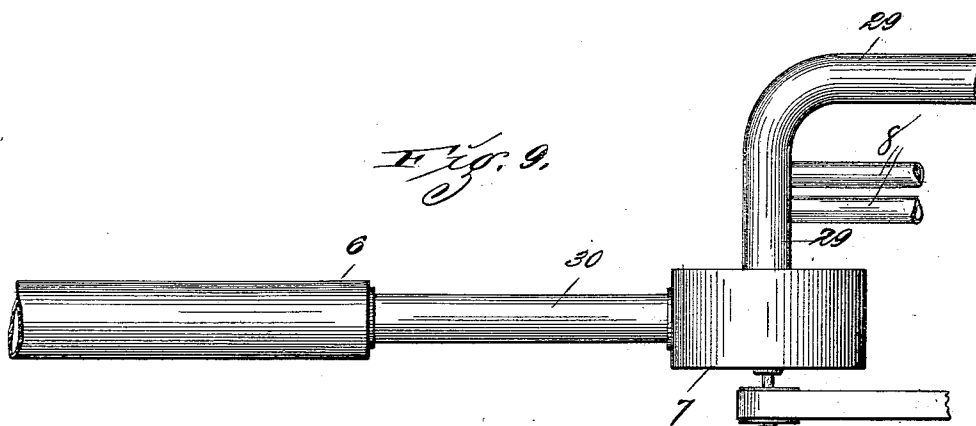
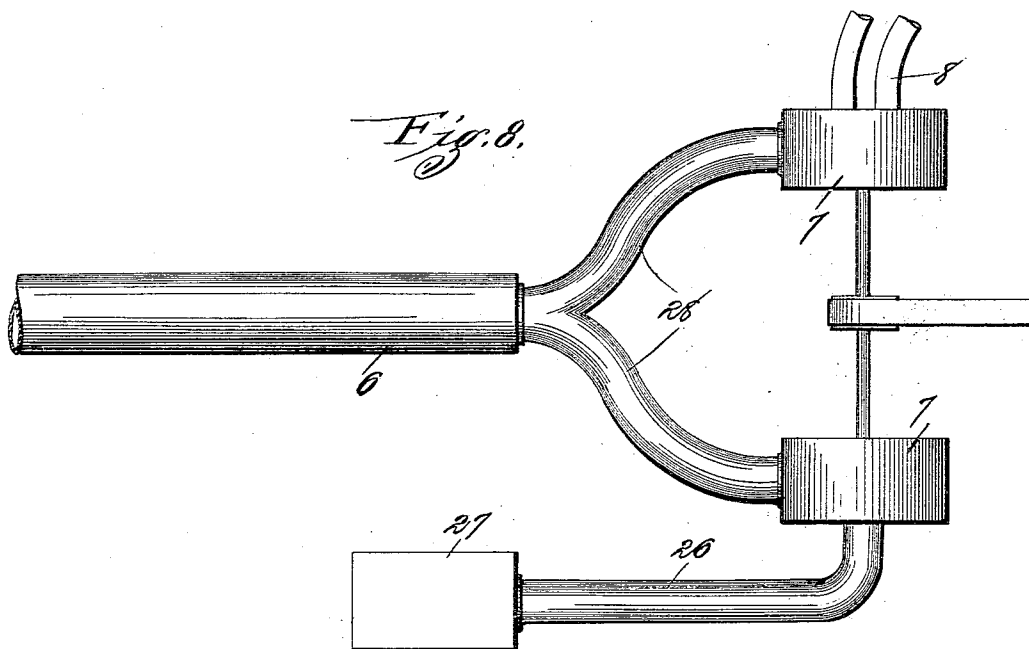
(No Model.)

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Attest
M. P. Smith
Edw. L. Dillon

Inventor:—
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Attys.

UNITED STATES PATENT OFFICE.

ADOLPH GNADT, OF ST. LOUIS, MISSOURI, ASSIGNOR TO WILLIAM B. TAMM, OF SAME PLACE.

PNEUMATIC SEPARATOR AND DRIER.

SPECIFICATION forming part of Letters Patent No. 555,370, dated February 25, 1896.

Application filed March 18, 1895. Serial No. 542,116. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH GNADT, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in a Combined Pneumatic Centrifugal Separator and Drier, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a combined pneumatic centrifugal separator and drier; and it consists in the novel construction, combination and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal sectional view of a drier constructed in accordance with my invention. Fig. 2 is a horizontal sectional view taken approximately on the indicated line 2 2 of Fig. 1. Fig. 3 is a cross-sectional view taken approximately on the indicated line 3 3 of Fig. 2. Fig. 4 is a cross-sectional view taken approximately on the indicated line 4 4 of Fig. 2. Fig. 5 is a view in perspective of a hanger of which I make use in carrying out my invention. Fig. 6 is a detail sectional view of a modified construction of the conveyer or blast pipe. Fig. 7 is a side elevation of a pair of suspending-hooks. Fig. 8 is a top plan view of a modified form of my separator and drier. Fig. 9 is a top plan view of a further modification of the drier.

In the construction of the preferred form of the separator and drier, 1 indicates a suitable supporting-framework that is located at any point desired, and mounted upon said framework in any suitable manner is a casing 2, the lower end of which is formed conical and provided with a discharge-pipe 3. The upper end of this casing is constructed with a cap or top 4, from which extends upwardly an air-exhaust outlet or pipe 5. Leading into the casing 2 near the top thereof is a conveyer pipe or tube 6 that extends a suitable distance away from the casing 2 and is provided at its end with an ordinary suction-fan 7. From said fan 7 and the end of the pipe 6 lead flexible suction-tubes 8.

Extending through the pipe 6 a slight distance in front of the fan 7 is a tube or pipe 9 that is provided on its end with an elbow 10, by means of which said pipe 9 is connected

to a pipe 11 that extends longitudinally through the diametrical center of the conveyer-pipe 6. Rigidly fixed to this tube or pipe 11 and extending approximately the entire length of the pipe or tube 6 is a continuous spiral wing or deflector 12. The pipe 11 extends into the casing 2 and is there connected to a pipe-coil 13, that extends downwardly throughout the entire length of the casing 2, and the lower end of said coil 13 is fitted, by means of an elbow 14, to an exhaust-pipe 15, that leads through the exhaust tube or pipe 3 at the lower end of the casing 2. Between the end of the wing or deflector 12 and the casing 2 on the interior of the pipe 6 may be located one or a series of hangers 16, the same extending transversely within the pipe 6 and being secured to the sides thereof by means of rivets, or in any suitable manner. In the center of these hangers are formed downwardly-pending semicircular bends 17, in which rests the pipe or tube 11.

Fixed to the under side of the top 4 of the casing 2 and extending downwardly therefrom in front of and to one side of the mouth of the conveyer-pipe 6 is a curved deflector 18, the curvature of which is in conformity with the curvature of the casing 2.

19 indicates a metallic frame of inverted-U shape, the lower ends of which are rigidly bolted to the top of the framework 1, said frame 19 extending upwardly and over the casing 2. Passing vertically through the center of the top of this frame 19 is a rod 20, the upper end of which is screw-threaded, and the lower end of which is formed into an eye 21. Located upon the screw-threaded upper end of this rod 20 and bearing upon the upper side of the frame 19 is a nut 22 provided with a manipulating-handle 23.

24 indicates suspending-rods that are looped at their upper ends to the eye 21 at the lower end of the rod 20, and the lower ends of these suspending-rods 24 are formed into hooks 25 that engage the pipe-coil 13 on opposite sides thereof.

In the modified form of device shown in Fig. 8 I make use of a pair of fans located upon and driven by a single shaft. Leading into one of said fans are the suction-tubes 8, and leading into the other one of said fans is a tube or pipe 26 that leads from a heater or

hot-air supply, such as 27. Leading from each one of the fans 7 are suitable pipes 28 that unite and enter the conveyer pipe or tube 6.

5 In the modified form of the device shown in Fig. 9 a single fan is made use of, and leading to said fan are suction-tubes 8 and a pipe or tube 29, that is in every way similar to the before-mentioned pipe 26, said pipe 29 leading from a heater or suitable hot-air supply. 10 From the fan 7 extends a single pipe 30, analogous to one of the pipes 28, that discharges into the conveyer-pipe 6.

The operation of the preferred form of my 15 device is as follows: The pipe 9 being connected to a suitable steam-supply, steam will pass through said pipe 6, through the longitudinally-extending pipe 11, through the coil 13, and from thence through the exhaust-pipe 15. As said steam passes through said pipes, the conveyer pipe or tube 6, and the casing 2, the air in said casing and tube will become heated. When the fan 7 is rotated at a high 20 rate of speed in the usual manner, a suction will be formed through the flexible tubes 8, and the air drawn through said tubes 8 will be forced through the conveyer pipe or tube 6 and from thence into the casing 2. By reason of the wing or deflector 12 said air will be forced 25 through the conveyer pipe 6 in a spiral path of travel, and in passing through said pipe 6 and the casing 2 will become heated. When the ends of the tubes 8 are placed adjacent the product that it is desired to dry, said product will be drawn through said tubes and 30 forced through the conveyer-pipe 6, and by reason of the deflector or wing 12 within said pipe 6 said product will follow a spiral path of travel therethrough. As said product is 35 discharged from the pipe 6 into the casing 2, it will pass between the deflector 12 and the wall of the casing 2, and thereby be given a centrifugal motion within said casing 2. Said product will, by reason of its own weight, 40 gravitate downwardly and discharge in a thoroughly-dried state through the discharge-pipe 3 at the lower end of the casing 2, while the heated air that has absorbed the moisture from the product will pass upwardly through 45 the exhaust pipe or aperture 5 in the upper end of said casing 2.

If desired, the wing or deflector 12 may be dispensed with and the product forced directly through the conveyer-pipe 6; but I find 50 that by locating a spiral wing or deflector within said conveyer-pipe 6 the product having the longer distance to travel will be retained a greater length of time within the conveyer-pipe 6 and thereby become more 55 thoroughly heated before it is discharged into the casing 2.

In the operation of the modification shown in Fig. 8 the product is drawn through the flexible tubes 8 by suction and forced into the 60 conveyer-pipe 6 through one of the connecting-pipes 28, while hot air is drawn from the hot-air supply 27 through the pipe 26 and

forced through the pipe 28 into the conveyer-pipe 6, there to commingle with the product and assist in heating and drying the same. 70

In the operation of the modification shown in Fig. 9 the product and hot air are drawn respectively through the tubes 8 and pipe 29 by means of the fan, and therefrom forced 75 through the pipe 30 into the conveyer-pipe 6.

A combined separator and drier of my improved construction is especially applicable for drying damp sawdust, grain, and salt, though it can be advantageously used in drying any product. Either live or exhaust 80 steam may be passed through the pipe 11 and coil 13, and the hot air used in the modified forms of my device may be obtained either from a heater or direct from the boiler-room.

The drier can be constructed of minimum 85 cost, saves time and labor in the operation of drying moist sawdust, grain, salt, &c., and possesses superior advantages in point of simplicity, durability and general efficiency.

In some cases, as illustrated in Fig. 6, I 90 may dispense with the spiral wing or deflector 12 in the conveyer or blast pipe 6 and locate in the latter a heating-pipe 11 in the form of a spiral and connect one of its ends to receive steam or hot air, and its opposite 95 end to discharge steam or hot air. By this construction I provide a heating-coil within the blast pipe or chamber of a fan, no matter what form said pipe or chamber assumes.

What I claim is— 100

1. In a device of the class described, a suitable casing, discharge-pipes located at the top and bottom of said casing, a heating-coil suspended within said casing, a deflector located within said casing, a conveyer-pipe 105 leading into said casing adjacent the top thereof, a heating-pipe passing through said conveyer-pipe and connected to the heating-coil, a spiral wing or deflector fixed to said heating-pipe and passing through the conveyer-pipe, a suction-fan located adjacent the 110 end of the conveyer-pipe, and suction-tubes located at the end of the conveyer-pipe adjacent said fan.

2. A combined pneumatic centrifugal separator and drier, comprising a suitable framework, a casing located upon said framework, discharge-pipes leading from the top and bottom of said casing, an inverted-U-shaped frame located upon the framework and extending over the casing, a heating-coil located 120 within said casing, a rod passing through the top of the inverted-U-shaped frame, suspending-hooks fixed to the lower end of said rod and engaging the heating-coil, a suitable inlet, a suction-fan, and suction-tubes located adjacent the fan. 125

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

ADOLPH GNADT.

Witnesses:

M. G. IRION,
JOHN C. HIGDON.