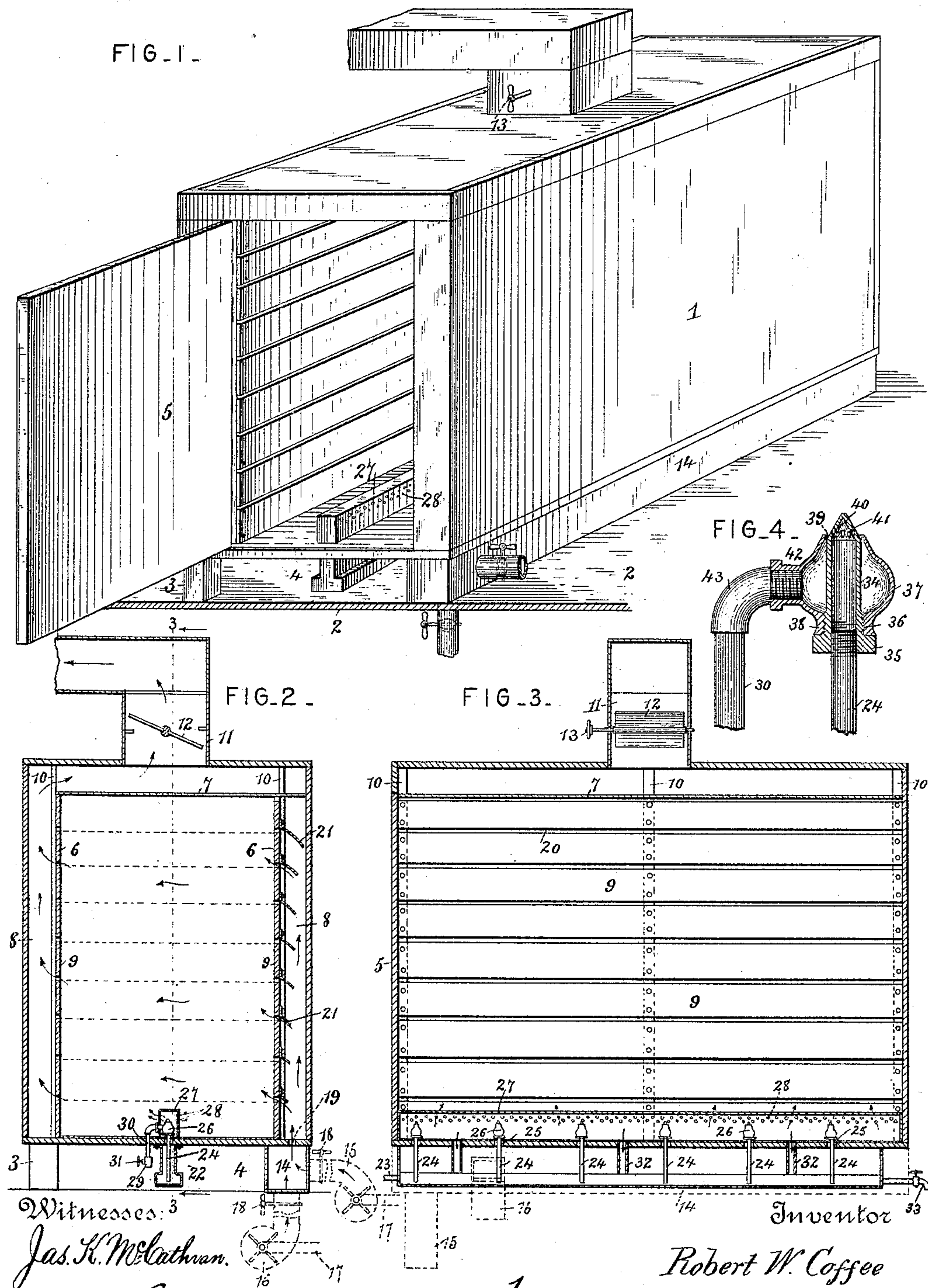


R. W. COFFEE.
TOBACCO DRIER.

Patented May 26, 1891.



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UNITED STATES PATENT OFFICE.

ROBERT W. COFFEE, OF BEDFORD CITY, VIRGINIA.

TOBACCO-DRIER.

SPECIFICATION forming part of Letters Patent No. 452,902, dated May 26, 1891.

Application filed March 18, 1890. Serial No. 344,392. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. COFFEE, a citizen of the United States, residing at Bedford City, in the county of Bedford and State of Virginia, have invented a new and useful Tobacco-Drier, of which the following is a specification.

This invention has relation to that class of driers intended for drying and curing tobacco; and among the objects in view are to provide a drier of the above class so constructed as to evenly distribute to all portions of the apparatus the hot and cold air discharged into the same, and to provide means for thoroughly dampening the tobacco by the use of steam, which steam has its temperature properly regulated, whereby the effect of the same upon the leaf does not prevent said leaf from a thorough absorption of the moisture discharged into the chamber.

With the above general objects in view the invention consists in certain features of construction hereinafter specified, and particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective of a drier constructed in accordance with my invention. Fig. 2 is a transverse vertical view. Fig. 3 is a longitudinal vertical central view. Fig. 4 is a detail in side elevation and partial section of the atomizer.

Like numerals of reference indicate like parts in all of the figures of the drawings.

1 represents the outer drier-case, which is supported in this instance above the floor 2 by supports 3, so as to leave a space 4 thereunder. The drier-case is provided with the usual door 5, through which the tobacco to be dried may be introduced and removed.

Near the opposite sides of the casing there are located vertical partitions 6, which are connected at their upper ends by a roof 7, extended beyond one of the partitions, so as to close the upper end of one of the passages 8 formed at outer sides of the partitions. The partitions 6 are in this instance formed by a series of horizontal parallel slats 9, the ends of which are secured to vertical strips 10, arranged at the ends of the case and also intermediate the same. The upper end of the case is provided with an uptake 11, in which there is mounted an ordinary cut-off or damper 12,

operated by a handle 13, projecting from the uptake.

Extending longitudinally under one side of the drier is a box or air-chamber 14, and communicating with the same is a pair of blowers 15 and 16, which blowers are operated by belts 17, leading from any suitable motor or otherwise. The blower 15 is in this instance connected with any hot-air supply, (not shown,) and the blower 17 either with the outer atmosphere or an artificial cold-air supply, (not shown;) or, if desired, the location of the blowers may be reversed. Each of the blowers is provided with a cut-off 18, whereby its supply may be either regulated or entirely cut-off. The box or passage 14 communicates with that chamber or passage 8 of the drier located at the same side thereof through a longitudinal slot 19, formed in the floor of the passage.

The partitions 6, as before stated, are each formed of a series of transverse slats 9, there being in this instance nine slats to each partition, and said slats are arranged a short distance apart, thus forming intermediate openings 20, those in one partition being opposite those in the other and said openings extending throughout the length of the drier. The lower edges of each of the slats comprising that partition forming the inner wall of that side space 8 with which the air-passage 14 communicates is provided with laterally-disposed and slightly inclined and curved deflecting-separators 21, which deflectors project into the space 8. Counting the top or roof 7 as a deflector, for the reason that it covers the space 8, it will be seen that in the present instance there are nine deflectors, and the width of the deflectors decrease as they near the bottom of the space. The upper deflector 21 will be in the present instance eight-ninths of the width of the space 8, the next deflector seven-ninths, and the next six-ninths, and so on down until we reach the last deflector of the series, which will be but one-ninth, so that the outer edge of each deflector will be one-ninth of the width of the space wider than is the deflector below. In this manner it will be seen that hot or cold air forced into the chamber 14 will pass through the openings 19 into the space 8, and that each deflector will deflect only its right-

ful proportion into the openings 20, over which it is located.

Located under the bottom of the drier and extending throughout its length is a tank 22, 5 T-shaped in cross-section, and with the same communicates a supply-pipe 23, connected with any suitable water-supplying source. At intervals short vertical pipes 24 project 10 into the tank, the upper ends of the pipes projecting through openings 25, formed in the bottom of the drier, and above said openings the pipes are provided with atomizers 26, a detailed description of which will be hereinafter given. By this arrangement it 15 will be apparent that a series of atomizers will be arranged for the bottom of the drier, and said series is covered by a hollow cap 27, extending from end to end of the casing, and the same is provided with a series of minute 20 perforations 28.

29 represents a steam-supply pipe leading from a boiler, and said pipe is tapped at points opposite the water-supply pipes 24, and connected to the atomizing chambers thereof by 25 short pipes 30. The supply of steam is regulated by a cut-off 31.

The bottom of the casing intermediate the atomizers is provided with two or a series of openings, from which depend drain-pipes 32, 30 which depend into the tank 22. The tank 22 is also provided with a cock 33 for drawing off the water from said tank. The atomizers in this instance consist of an atomizing-cylinder 34, terminating at its lower 35 end in a circular boss 35 and interiorly threaded and mounted on the upper end of the pipe 24. The cylinder is also exteriorly threaded, as at 36, and is encircled by a globular steam-chamber 37, the lower end of which 40 has an opening 38, interiorly threaded to receive the threads 36 of the cylinder. Diametrically opposite the opening 38 of the chamber said chamber is provided with a reduced conical opening 39, through which 45 extends the upper end of the atomizing-cylinder, which cylinder has its extremity cone-shaped to agree with the contour of the opening 39, as shown at 40, and provided with an annular series of discharge-orifices 41.

50 Between the openings 39 and 38 the chamber 37 is provided with an open neck 42, into which is threaded the coupling 43, which connects the pipe 30 with the steam-supply pipe 29, whereby it will be apparent that steam 55 entering the chamber 37 will be forced from the same through the opening 39 in an annular jet, the disposition of which is toward the apex of the cone-shaped extremity of the atomizing-cylinder. In this manner a vacuum is produced by the several atomizers in 60 the water-tank 22, and when that has been accomplished water from the tank is drawn through the several pipes 24 and vaporized and with the steam discharged through the 65 perforations in the cap or box 27. In this manner it will be apparent that the steam becomes thoroughly impregnated and soft-

ened by the water and its density greatly increased. Furthermore, it will be observed that it will to a great extent be robbed of its 70 caloric properties, whereby it is better adapted for the purpose in view, as I will now proceed to describe.

It is well known among those conversant with the drying of tobacco that when subjected to heat the minute cells with which 75 the leaves are provided become contracted, so as to close the openings communicating therewith. When these openings are closed, it is of course apparent that the leaf is not 80 in a prime condition for the absorption of the moisture necessary to properly order the same. If, therefore, steam were admitted direct from the boiler into the drier a great proportion thereof would be lost, in that the 85 leaves would refuse to absorb the moisture thus introduced and the steam would pass out through the uptake. By my invention, however, of subjecting the steam to the cooling effects of the water the temperature of 90 the steam is sufficiently reduced to avoid the objections above mentioned, thereby effecting a saving in the quantity of steam necessary, and in addition rendering the steam used 95 more dense and effective.

The operation of drying is as follows: The leaves having been suspended in rows or tiers opposite each of the openings 20, the valve 18, leading from the hot-air supply, is first 100 opened and a thorough drying of the leaves takes place. When the drying has been accomplished, the valve controlling the passage of heat is closed and the valve controlling the passage of cold air opened, and volumes 105 of cold air are forced through the drier in a manner described and as caused by the graduated deflectors 21. After a thorough cooling has taken place the cold air is shut off and the steam-valve 31 opened and water admitted 110 into the tank 22, at which time the operation of the atomizers heretofore described takes place, and the softened and dense volumes of steam are injected through the perforations of the cap or box 27 into the drying-chamber. If the steam should become 115 too warm and not be sufficiently cooled by the admixture of water, as heretofore described, the cold-air pipe may be opened and the drier thoroughly blown out or cooled by the admission of the cold air. Any water 120 not thoroughly vaporized which will pass from the atomizers is collected by the cap 27 and prevented from escape into the drier, and passes back to the drip-tubes 32 into the tank 22. By the cock 33 the tank 22 may be drained 125 of the water contained therein.

Having thus described my invention, what I claim is—

1. The combination, with the outer case of a drier, of opposite perforated partitions arranged near each of the side walls of the 130 drier and combining with the same to form intermediate spaces, an air-chamber located under and having perforations in its roof com-

communicating with but one of said spaces, and hot and cold air pipes provided with a valve communicating with said chamber, substantially as specified.

5 2. In a drier, the combination, with the outer casing, of opposite partitions forming in connection with sides of the casing intermediate spaces, an air-passage arranged under the perforated bottom of one of the spaces, 10 a pair of rotary blowers, pipes leading therefrom to the passage, and means for operating the blowers, valves mounted in the blower-pipes, and hot and cold air pipes leading to the blowers, substantially as specified.

15 3. The combination, with the casing of a drier, of a water-tank located under the same, atomizers projecting up through the floor of the drier and communicating at their lower ends with the tank, the floor being perforated 20 above the tank to form drip-passages, and a steam-supply pipe arranged adjacent to the tank opposite the atomizers and connected with the pipes of the atomizers, substantially as specified.

25 4. The combination, with a drier provided with a bottom, a water-tank arranged thereunder and having a water-supply and a perforated cap arranged above the water-tank, and drip-tubes leading from the cap to the 30 tank, of a series of water-pipes depending through the bottom of the casing and from the cap into the tank, atomizers mounted over the upper ends of the pipes, and steam-pipes connected with the atomizers and provided 35 with cut-offs, substantially as specified.

5. In a drier, the combination, with the outer case, the opposite longitudinally-slotted partitions combining to form an intermediate drying-chamber and combining with the sides

of the casing to form opposite vertical side 40 air-spaces, of a horizontal partition interposed between the roof of the casing and the upper ends of the partitions closing the upper end of the drying-chamber and one of the vertical air-spaces, an uptake located in 45 the roof of the casing and communicating with the space between the roof and horizontal partition, a series of graduated deflectors located above the slots in and secured to that partition forming the inner wall of 50 that vertical air-space closed by the horizontal partition, a chamber extending under and communicating with the said closed vertical air-space, and hot and cold air pipes leading to the chamber, substantially as specified. 55

6. The combination, with the outer casing of a drier, opposite partitions located near the opposite sides of the casing and combining therewith to form opposite air-spaces, said 60 partitions being provided with a series of longitudinal slots, and curved graduated deflectors secured to and extending from the partitions above the slots and into the spaces, of an air-chamber located under one of the 65 said spaces and communicating therewith, hot and cold air pipes leading to the said chamber, atomizers extending into the drier, and water and steam supply pipes leading to said atomizers, substantially as specified. 70

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

ROBERT W. COFFEE.

Witnesses:

J. H. SIGGERS,
R. W. DAYTON.