

[54] **APPARATUS AND PROCESS FOR DRYING SKINS, PELTS, HIDES, FURS, SOFT LEATHERS, AND THE LIKE**

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[58] **Field of Search**34/31, 127, 133

[57]

ABSTRACT

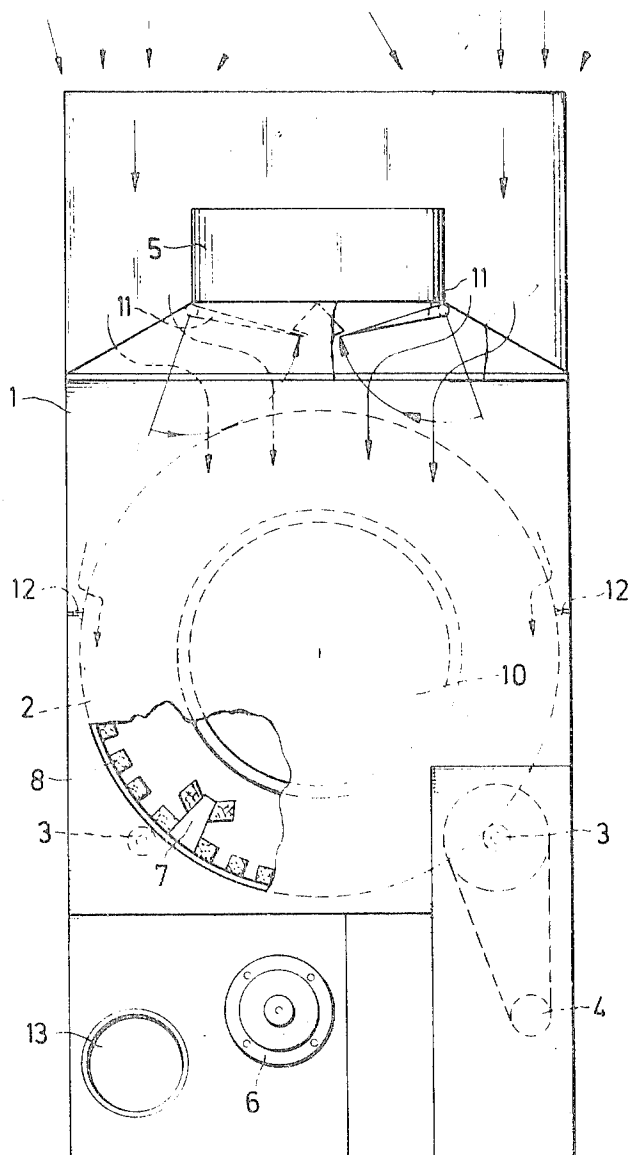
This disclosure teaches a dryer and related process for skins, pelts, hides, furs, soft leathers, and like materials, the dryer comprising a perforated drum mounted for reversible rotation in a housing through which heated air is circulated. The drum is lined with thermally nonconductive material (preferably hard wood) and has radial baffles to promote tumbling. The air is heated to a temperature exceeding 100° C. and preferably to a temperature from about 110° to about 160° C. for from about 10 minutes to about 240 minutes.

9 Claims, 3 Drawing Figures

[56] **References Cited**

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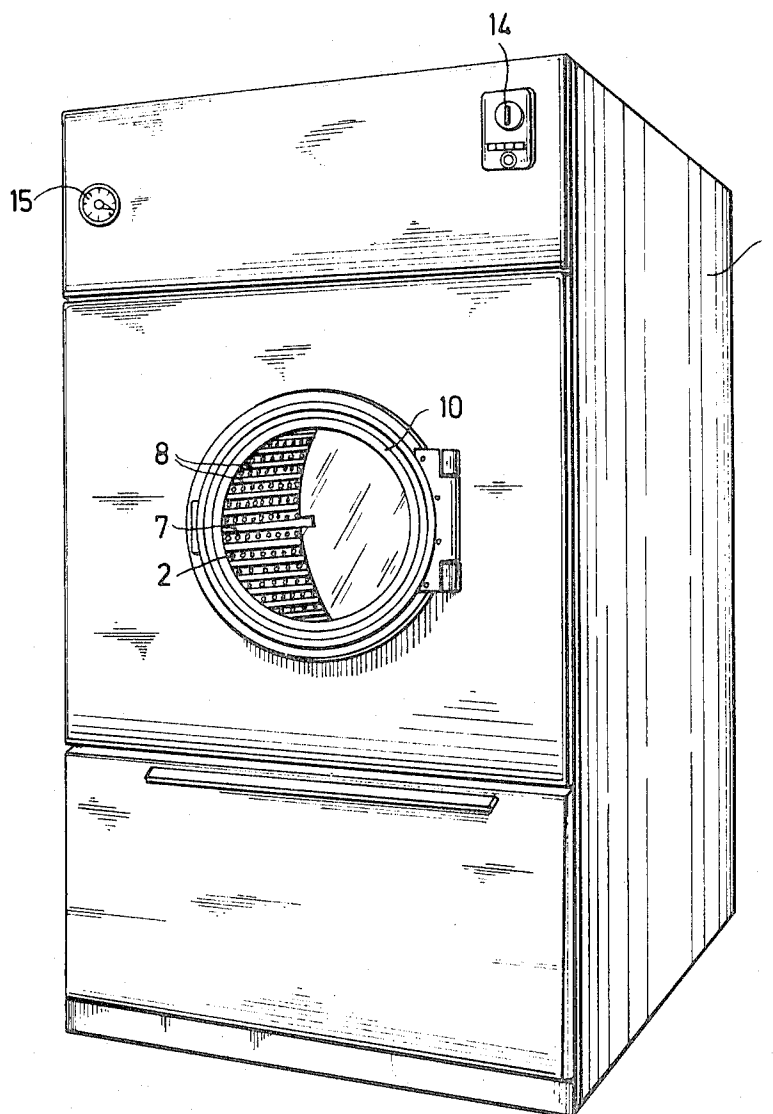


Fig. 1

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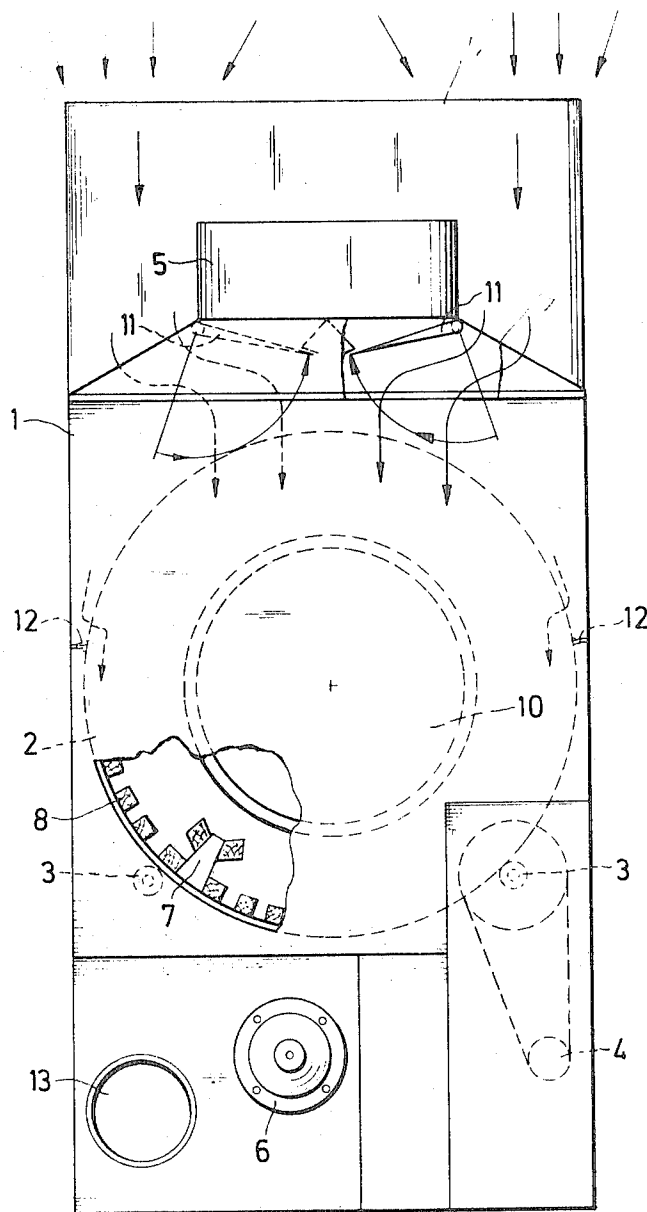


Fig. 2

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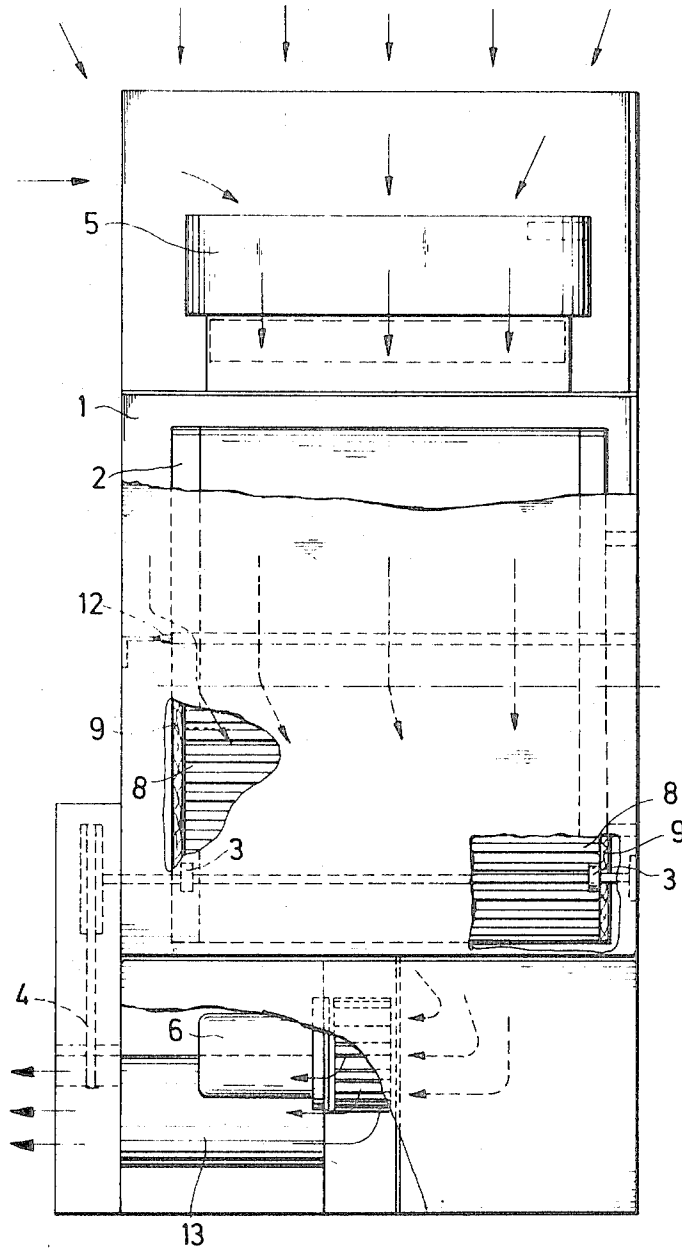


Fig. 3

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APPARATUS AND PROCESS FOR DRYING SKINS, PELTS, HIDES, FURS, SOFT LEATHERS, AND THE LIKE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an apparatus and related process for drying skins, pelts, hides, furs, soft leathers, and like material. More particularly the invention contemplates a rotary dryer and a related process of drying skins, pelts, hides, furs, soft leathers, and the like materials using such a rotary dryer.

2. Description of the Prior Art

Heretofore animal skins, pelts, hides, furs, soft leathers, and like materials were dried in tunnel dryers or in chambers provided with conveyor devices or in dry rooms by means of hot circulating air. In such installations the good were placed over sticks which were hung in the dry rooms or they were clamped to perforated racks which were placed in mechanical dryers. Thereby the goods were stretched and were at rest. Depending upon type and quality of the goods to be dried, these methods required between 6 hours and 24 hours for drying. Usually the drying temperature did not exceed about 45° C. because at higher temperatures the goods were damaged, became hard and inflexible, and/or underwent considerable shrinkage. It was not possible to shorten the drying time by increasing the temperature, because when drying goods at rest at a temperature exceeding 45° C. the pores of the skins, pelts, hides, furs, soft leathers, and like goods agglutinated and became closed. The evaporating residual moisture content within the inner dermis layers even caused formation of blisters, cracks, fissures, and separation of the upper layers carrying the hair.

SUMMARY OF THE INVENTION

It is one object of the present invention to provide a highly advantageous process of drying skins, pelts, hides, furs, soft leathers, and like materials which on drying tend to lose their flexibility. Said process is free of the disadvantages of prior known processes.

Another object of the present invention is to provide a highly effective rotary dryer of simple construction especially suited to drying such goods.

In principle the process according to the present invention comprises tumbling skins, pelts, hides, furs, soft leathers, and like goods in a rotating cylinder provided with heat-insulating interior surfaces and exposing such goods therein to a temperature exceeding 100° C. for from about 10 minutes to about 240 minutes, i.e., until the desired degree of dryness is achieved. The direction of rotation may be reversed repeatedly during drying. The preferred temperature is between about 110° C. and about 160° C. By drying such goods in this manner the disadvantages of the heretofore used drying processes are overcome. The drying time is very considerably reduced, thus the output of dried goods is increased. No hardening, shrinking, blistering, cracking, fissure formation, or separation of the upper hair-carrying layer of the skins, furs, pelts, hides, or like materials takes place. The skins, pelts, hides, furs, soft leathers, and like goods remain flexible. Other advantages achieved by the high-temperature drying process according to the present invention will become apparent hereinafter.

The apparatus for carrying out the drying process according to the present invention comprises a dryer with a rotating drum which can be aerated and which may be made of heat-insulating material. It is preferable to use a metallic drum, the interior surface of which is lined with heat-insulating material.

According to a preferred embodiment of the present invention, the interior surface of the rotating drum is equipped with axially arranged baffles for lifting and tumbling the goods to be dried. The inner lining of the drum and (if required) of the baffles consists most advantageously of wood laths, i.e., thin narrow strips of wood axially attached to the drum wall in slightly spaced relationship to each other. The walls of the drum preferably are permeable to air, for instance, by using a

metal drum with perforated walls. The dryer housing is preferably provided with throttle means such as flap valves for controlling airflow through a heater and for controlling a blend of heated air and fresh air.

When drying skins, pelts, hides, furs, pieces of soft leather, and like goods according to the present invention, the goods are caused to tumble in the rotating drum and to attain therein continually changing positions with respect to each other. As a result of such tumbling action, the pores of the goods (which otherwise would become closed) remain open, thus assuring uniform drying. The tendency of moist and greasy pieces of the goods to fold together at their ridge lines or to stick to other pieces is overcome because the moisture between adhering surfaces of the goods is converted into steam which causes these surfaces to separate. Formation of permanent pockets of steam is prevented by rotation of the drum. Rotation of the drum also results in a surprising uniformity of drying. Aeration of the goods during drying has the effect that the temperature within the cylinder which is increased (for instance by additional radiant heat from metal parts) does not exceed a permissible degree.

It has been found that the drying time is substantially dependent on the type of the goods to be dried and the thickness of their leather part. Their hair coat does not essentially affect the drying time. Drying time is mainly dependent on the material to be dried and to a much lesser degree on the drying temperature. The moisture content of the goods also has an effect. However, it is difficult to particularize more closely, because types of the goods here contemplated vary so as well as their thicknesses and pore characteristics.

The skins and like goods need no longer be smoothed and no crinkles or folds need be removed after a prior centrifuging step is completed. The centrifuged goods can be placed immediately into the dryer. Because the goods (after drying in this dryer) are soft, flexible, and elastic, it is possible to shorten considerably the time required for subsequent dressing and finishing. Heretofore dyed and heavily greased skins and like goods frequently had to be finished after drying in order to remove excess grease and/or uncombined dyestuff pigments, i.e., so-called stainers. Furthermore, it has been found that the goods need not be greased as thoroughly as required according to prior known processes of drying and finishing skins, pelts, hides, furs, soft leathers, and like goods.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features, and advantages of the present invention will be understood more readily from the following detailed description and examples taken with the accompanying drawings in which

FIG. 1 is a perspective frontal view of a preferred embodiment of a dryer according to the present invention;

FIG. 2 is a rear elevation of such a dryer partly broken away to illustrate its interior construction; and

FIG. 3 is a side elevation of such a dryer, also partly broken away.

Like index numerals in the figures indicate like parts of the dryer.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIGS. 1 to 3 perforated drum 2 is arranged in stationary boxlike housing 1 of the dryer. Drum 2 is mounted on rollers 3 and rotates thereon driven by reversible drive 4 (coupled to roller 3) which regulates speed and sense of rotation of drum 2. Radiator 5 supplies housing 1 with hot air which is conducted through drum 2 due to suction induced by fan 6 which draws air through and discharges it from housing 1. Baffles 7 are provided in the drum to produce tumbling of the goods. Said baffles 7 as well as the interior cylinder surface of the drum are lined with wood laths 8 which are spaced from each other. The terminal planes of drum 2 carry covering panels consisting of wooden plates completely covering said planes. A front wooden panel covers only partly the front end of the

dryer so as to permit opening of charging door 10 which in turn is also provided with a wooden covering panel. Flap valves 11 are provided in the air intake as shown in FIG. 2 for regulating hot airflow and for blending fresh air therewith. Brushes 12 are arranged between the inner wall of housing 1 and the outer wall of drum 2 to prevent hot air from flowing around the drum rather than through it and consequently through the goods. Furthermore, the dryer is equipped with air outlet 13, timer 14, and thermostat 15.

Radiator 5 can be heated, for instance, by steam or electrically. The skins, pelts, hides, furs, soft leathers, or like goods to be dried are introduced into drum 2 through charging door 10. Radiator 5 is then heated. Flap valves 11 are swung toward the sidewalls of housing 1. Blower 6 draws hot air into drum 2. Fresh air flows through openings provided in the top of housing 1 and thence into and through radiator 5 where it is heated to a desired temperature. The drying temperature must be above 100° C. and preferably above 110° C. and is adjusted according to the type and quality of the goods to be dried. The drying temperature may be up to 160° C. After drying the goods in rotating drum 2 for from about 10 minutes to about 240 minutes, flap valves 11 are swung toward each other so that they throttle the hot air supply from radiator 5 but allow fresh air directly to reach drum 2.

The goods to be dried are tumbled in rotating drum 2, the direction of rotation of which may be reversed from time to time. The speed of rotation depends upon the quality and type of the goods to be dried and on the diameter of the cylinder. At a cylinder diameter of 1.45 meters and a cylinder volume of about 2,000 liters, the speed of rotation is between about 27 r.p.m. and about 35 r.p.m. If larger skins are dried, a lower speed of rotation (say 13.5 r.p.m. to 14 r.p.m.) is preferred. Reversing the sense of rotation is advisable when drying larger skins. Such reversing is effected after every 10 to 12 revolutions. In general the speed of rotation is about half that used when drying laundry.

The air supply is also dependent on the type and quality of the goods to be dried. At a tumbler volume of 2,000 liters, 8,000 cubic meters per hour to 10,000 cubic meters per hour of air are normally supplied. As an average about five times the tumbler volume of air is supplied per hour to the dryer cylinder. This flow of air is about twice as much as that required for drying laundry. It is also possible to dry with a lower or higher flow of air.

The goods to be dried do not come in contact with metallic parts of drum 2 due to the provision of wood laths 8 and wooden end covers 9. Hard wood such as mahogany, oak, or the like (which do not substantially swell or shrink under the conditions encountered in this application) is used for the wooden lining 8 of drum 2. The wood is coated preferably with a suitable lacquer which seals its pores. Wood is the preferred lining material because it has a low grease-absorbing capacity. It is also possible to line the drum with plastic or asbestos. The drum 2 also could be made of the same material as laths 8; however, if asbestos were selected, additional supporting framework would be needed.

The examples which follow serve to illustrate the present invention without, however, limiting same thereto.

EXAMPLE 1

Six hundred greased Persian lamb skins of thick dermis were placed, after centrifuging and without smoothing, in a dryer as illustrated in FIGS. 1 to 3 of 2,000 liters volume and were tumbled therein at 110° C. for 120 minutes. In contrast thereto, drying of Persian lamb skins of comparable quality in a dry room required 8 hours. The dried skins were of such softness and flexibility that the time required for subsequent dressing and finishing could be shortened to 3 hours.

EXAMPLE 2

Seven hundred greased Persian lamb skins which were well centrifuged and, therefore, of low water content were dried in

a dryer as illustrated in FIGS. 1 to 3 of 2,000 liters volume at 120° C. for 50 minutes. In contrast thereto, drying of Persian lamb skins of comparable quality in a dry room required 7 hours.

EXAMPLE 3

One thousand well-centrifuged rabbit skins were dried in a dryer as illustrated in FIGS. 1 to 3 of 2,000 liters volume at 120° C. for 35 minutes. In contrast thereto, drying of rabbit pelts of comparable quality in a dry room required 12 hours.

EXAMPLE 4

Soft leather was dried in a dryer as illustrated in FIGS. 1 to 3 at 160° C. for 20 minutes.

In a similar manner the skins, pelts, or hides of muskrats, otters, beavers, seals, minks, sables, blue foxes, silver foxes, skunks, raccoons, hamsters, goats, nutrias, and others can be dried in an apparatus according to the present invention at a temperature above 110° C. within a surprisingly short period of time without any detrimental effects. Thereby the skins remain soft and flexible. The grease not only adheres to the surface of the skins but it penetrates deep into the skins and like goods. Thus it is not necessary to grease the skins, pelts, or hides as intensely as was necessary heretofore.

Drying in a dryer according to the present invention is carried out not only on raw skins or pelts to prevent decomposition thereof by micro-organisms but may also be employed after applying a mixture of barley and oats in salt water (known as "schrot") to the skins. Washed, tanned, bleached, dyed, and otherwise dressed and/or finished skins, pelts, or hides can also be dried advantageously in the dryer according to the present invention.

I claim:

1. In a process for drying animal skins, pelts, hides, furs, soft leathers, or like materials, a step which comprises subjecting said skins, pelts, hides, furs, soft leathers, or like materials, while tumbling in a space, the interior of said space being provided with a lining of a thermally nonconductive material, to the action of an air current passing through said space and the material, at a temperature above 100° C. for from about 10 minutes to about 240 minutes.
2. The process according to claim 1, wherein the temperature is above 110° C.
3. The process according to claim 2, wherein the temperature is between about 110° C. and about 160° C.
4. A dryer for animal skins, pelts, hides, furs, soft leathers, or like materials and comprising:
 - a housing which encloses a boxlike chamber having a top with an air inlet provided in the housing in the vicinity of said top, side and end walls, a bottom with an air outlet provided in the housing in the vicinity of said bottom;
 - a drum provided with a plurality of perforations and mounted in said chamber between said air inlet and said air outlet for rotation about a substantially horizontal axis;
 - air-heating means in the housing between the air inlet and the drum;
 - bypass means provided in said housing for bypassing air from said air inlet around said air-heating means and to said drum;
 - a fan operatively connected to said housing and arranged for moving air from said air inlet to said drum via either or both of said air-heating means and said bypass means, and to said air outlet;
 - selector means operatively arranged relative the air-heating means and the bypass means, to throttle flow of the one relative the other for delivery to the drum;
 - means for introducing said animal skins, pelts, hides, furs, soft leathers, or like materials into said drum;
 - drive means connected to the drum for rotating it about said axis and for reversing its sense of rotation;
 - the interior of said drum lined with a thermally nonconductive material.

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5. The dryer of claim 4 with the interior of said drum lined with wood laths arranged parallel to said axis of rotation of the drum, the wood laths spaced from each other to provide flow communication between the interior of the drum and said perforations.

6. The dryer of claim 5 with said wood laths of mahogany.

7. The dryer of claim 5 with said wood laths of oak.

8. The dryer of claim 5 with the drum cylindrical, and a plurality of baffles extending radially inward from the drum.

9. The dryer of claim 7 and the baffles lined with axially arranged wood laths.

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