

March 14, 1944.

E. J. DOWNES
LAUNDRY DRYING MACHINE

2,344,135

Filed March 21, 1941

2 Sheets-Sheet 1

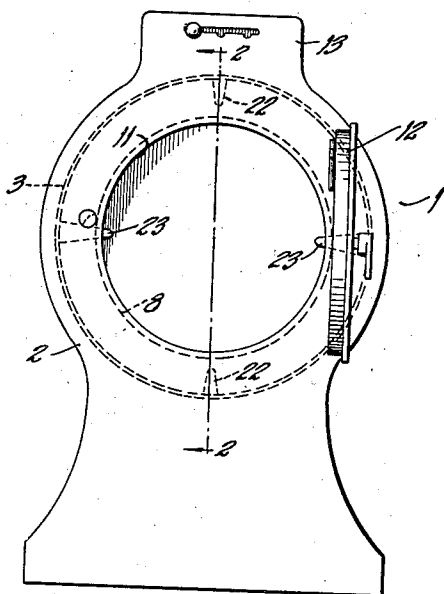


FIG. 1

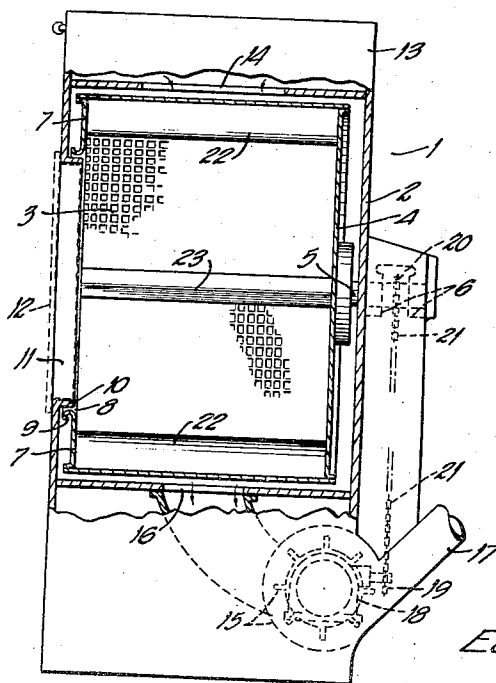


FIG. 2

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2 Sheets-Sheet 2

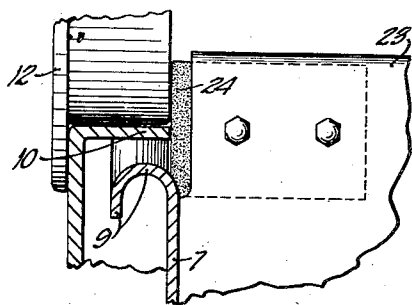


FIG. 3

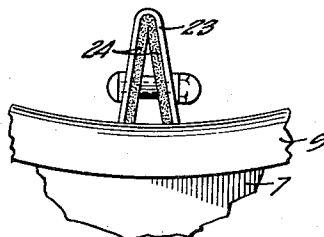


FIG. 4

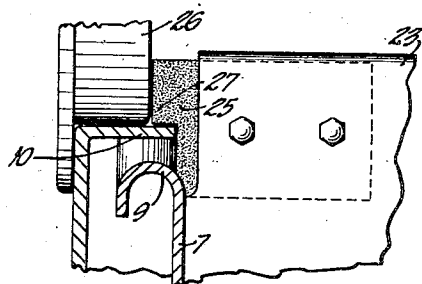


FIG. 5

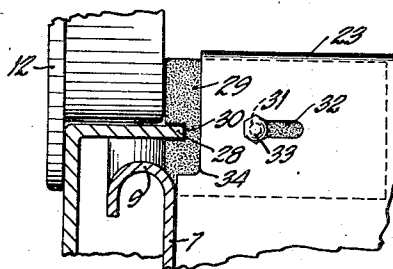


FIG. 6

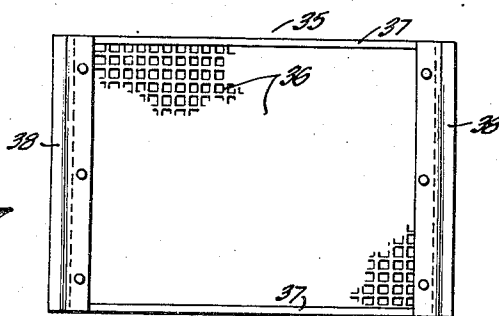


FIG. 7

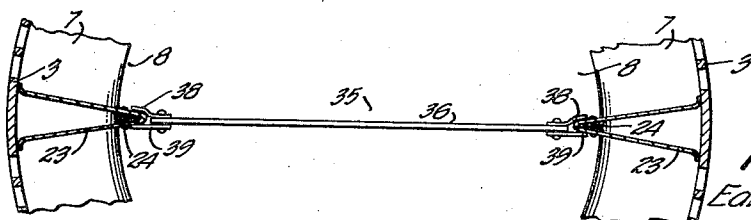


FIG. 8

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2,344,135

LAUNDRY DRYING MACHINE

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8 Claims. (Cl. 34—109)

The type of laundry drying machine to which my invention relates comprises a casing having rotatably mounted therein a foraminous cylinder adapted to receive the articles to be dried. The machine has associated therewith a heating device, such as steam coils and the like, for heating the air which is admitted to the interior of the casing and a blower for causing a flow of heated air through the casing and the drum therein. One end of the drum is formed with an opening therein through which the articles may be placed within the drum and taken therefrom, and the casing is provided with an opening arranged in registry with the opening in the end of the drum. Within the interior of the drum are arranged a plurality of pairs of diametrically opposed baffles which extend longitudinally of the drum and radially inwardly for a comparatively short distance. An electric motor, through a suitable driving mechanism, serves to rotate the drum within the casing and, as the drum rotates, the baffles serve to agitate the articles to some extent, turning them over and over or tumbling them to promote rapid drying.

Heretofore, the baffles of the drum, above referred to, have been of substantially equal radial lengths and extend radially inwardly short of the edge of the opening in the end of the drum. In practice, the inner edges of the baffles are spaced a substantial distance outwardly from the opening in the drum. For example, in one size of drying machines of the foregoing type, the interior of the drum is of a diameter of about 36" and the opening in the end of the drum is approximately of a diameter of about 24". In machines of these dimensions, the baffles have a radial length of about 4", leaving a clearance distance of about 2" between the inner edges of the baffles and the opening in the drum.

An appreciable spacing between the inner edges of the baffles and the opening in the drum has been considered essential in order to obviate any possibility of the articles, while being dried within the drum, as it rotates, from being caught between the movable and stationary parts of the machine and thereby torn and badly damaged. As a result, and because of the heretofore considered necessarily limited radial length of the drum baffles, the articles during the drying process are neither distributed nor agitated to an extent sufficient to prevent entwining or rolling up of the articles in a comparatively compact mass or ball. Hence, the design of machines of this character does not promote high drying efficiencies.

However, I have determined that the drum of a drying machine of the foregoing character may be provided with baffles of much greater radial length than heretofore considered practical and of such length that they extend inwardly beyond the edge of the opening in the end of the drum thereby, for various reasons, providing a machine of a pronounced and much higher drying efficiency than has heretofore been attainable.

It is, therefore, the primary object of my invention to provide a laundry drying machine, of the character above referred to, comprising a drum having an opening in the end thereof and provided interiorly thereof with baffles which extend radially inwardly and beyond the edge of the said opening in the end of the drum.

I have also determined that but one pair of diametrically opposed baffles should be of such radial length as to extend inwardly beyond the edge of the opening in the end of the drum in order to provide a drying machine which is highly efficient, and the others of said baffles may be of lesser radial length, or of a length similar to those heretofore used. The arrangement of the baffles in this manner provides very high drying efficiencies and is therefore preferable.

The efficiency of drying machines wherein the baffles extend inwardly beyond the edge of the opening in the end of the drum is higher than the efficiencies otherwise obtainable because, for one reason, the articles are more forcibly agitated and continuously more uniformly distributed over the interior, cylindrical surface of the drum and maintained in this relationship while being turned over or tumbled. In other words, the tendency of the articles to become rolled up in a ball, which is otherwise present when the drum rotates continuously in one direction, is entirely eliminated in a drum of the character herein contemplated.

However, as above indicated, the drying efficiencies become still higher when the baffles are of appreciable, unequal radial lengths and but one pair of diametrically opposed baffles extend, in the manner above pointed out, inwardly beyond the edge of the opening in the drum. The baffles, in this latter case, due to the appreciable difference in their radial lengths, subject the articles successively to agitation or tumbling to quite different degrees, thereby destroying any tendency of the articles to roll in a ball and producing a better distribution and redistribution of the articles within the drum as it is rotated.

A second object of my invention, therefore,

resides in providing a drying machine having a drum of the character above pointed out but in which one pair of the diametrically opposed baffles are of greater radial length than the other baffles; and it is a further object to provide a drum of this character in which the pair of opposed baffles of greatest length extend inwardly beyond the edge of the opening in the drum.

It is also an object of my invention to provide, in a drying machine, a drum having diametrically opposed baffles therein which extend radially inwardly beyond the edge of the opening in the end of the drum, which baffles, at the ends thereof, comprise or are provided with substantially flexible and yieldable elements which are arranged to extend between the ends of the substantially rigid baffles and the stationary parts of the machine thereby positively preventing articles within the drum from being caught, as the drum is rotated, between the baffles and stationary parts of the machine.

The arrangement of the baffles in the manner pointed out in the foregoing, alone, provides a drying machine having a much higher drying efficiency than previous machines. Furthermore, when a pair of diametrically opposed baffles extend inwardly beyond the edge of the opening in the drum, they afford a means whereby an inexpensive barrier element may be readily positioned within the drum for subdividing the interior thereof into two compartments. Hence, not only do the baffles, when arranged as above pointed out, provide a highly efficient drying operation when the drum constitutes a single compartment but also, since these baffles make possible the use of a simple and readily insertable partitioning element, the drum may be inexpensively and quickly converted into a two compartment element whereby two comparatively small washes may be placed, respectively, in the two compartments and dried simultaneously thereby still further increasing the efficiency of the machine in the sense that the time required simultaneously to dry the two washes is considerably less than that required successively to dry them.

It is, therefore, a still further object of my invention to provide, in combination, a drying machine including a drum having baffles therein of the character above pointed out and a partitioning member of simple and inexpensive construction which is adapted to be inserted through the openings in the casing and in the end of the drum and moved, in sliding engagement with the ends of the diametrically opposed baffles which extend inwardly beyond the edge of the opening in the drum, into drum-subdividing position.

I attain the foregoing and further objects of my invention, as will hereinafter appear, by employing the novel constructions and the combinations and arrangements of elements described below and illustrated in the accompanying drawings, in which—

Fig. 1 is a front elevation view of a laundry drying machine embodying my invention;

Fig. 2 is a fragmentary, sectional elevation view thereof taken in about the plane 2—2 of Fig. 1;

Fig. 3 is a fragmentary, sectional view of a detail;

Fig. 4 is a fragmentary, end elevation view of the drum and baffle of Fig. 3;

Fig. 5 is a fragmentary, sectional view, similar to Fig. 3 and showing a modification;

Fig. 6 illustrates a still further modification;

Fig. 7 is a plan view of a preferred form of partitioning element; and

Fig. 8 is a fragmentary, sectional view through the drum of the drying machine showing the partitioning element of Fig. 7 operatively supported therein.

Referring to the drawings and first to Figs. 1 and 2, 1 indicates generally a drying machine which comprises a casing 2 within which is rotatably mounted a foraminous cylinder or drum 3. One end plate 4 of the drum is fastened on a supporting and drive shaft 5 which is journaled in bearings 6. The other end plate 7 of the drum is provided with an opening 8 therein through which articles may be deposited within and taken from the drum. The edges of the end plate 7 surrounding the opening 8 therein are preferably curved outwardly and reversely as indicated at 9, and the curved flange so formed is adapted to extend about an annular flange 10 with which the casing is provided. Flange 10 defines an opening 11 in the casing which registers with the opening 8 in the drum. A closure element for the opening 11 in the casing, such as a door 12, may be hinged to the exterior of the casing 2 and is designed to be latched in closed position when the machine is in operation.

A suitable heating device, such as steam heated coils, is disposed in the top 13 of the casing from which heated air may pass downwardly through an opening 14 therein to the interior of the casing and the drum 3. Movement of the heated air through the drum is promoted by means of a suction device 15, mounted adjacent the base of the machine, which sucks the air from the interior of the casing through an opening 16 in the bottom thereof and discharges it through a pipe 17. The suction device is operated by means of an electric motor 18 which also, through a suitable speed-reducing mechanism and sprockets 19 and 20 and chain 21, serves to rotate the drum 3.

In the embodiment herein illustrated, the drum 3 is provided interiorly thereof with two pairs of diametrically opposed, preferably substantially rigid, baffles which extend longitudinally of the drum. In accordance with the preferred form of my invention, one pair of said baffles, indicated at 22, are of a comparatively short radial length and extend inwardly from the periphery of the drum short of the opening 8 in the end of the drum. However, the other pair of baffles, indicated at 23, are of greater length than the baffles 22 and extend inwardly beyond the edges of the openings 8 and 11 in the drum and casing, respectively, of the machine.

As hereinbefore pointed out, the baffles, when arranged in this manner, produce agitation of the articles, as the drum is rotated, to different degrees thereby overcoming any tendency of the articles to roll up in a mass and to maintain this condition. Furthermore, these baffles promote a better distribution and redistribution of the articles as the drum is rotated so that all portions thereof are continuously or successively exposed to the heated air passing through the casing.

In order positively to prevent articles which are placed within the drum from being caught between those portions of the baffles which extend beyond the inner edge of the end plate 7 of the drum and the stationary parts of the machine, it is necessary to provide each of the baffles 22 (see Figs. 3 and 4) with a preferably flexible and yieldable element 24 which may be formed of felt or like material and which preferably ex-

tends from the ends of the baffles and into substantial engagement with the edge of the flange 10 about the opening 11 in the casing, and from flange 10 to the curved edge 9 of opening 8 in the drum. In the embodiment illustrated in Figs. 1 and 2, the inner surface of the door 12 lies substantially flush with the inner edge of the flange 10 and, in this case, the yieldable element 24 substantially entirely fills the space between that end of the baffle which extends beyond the edge of the opening 8 in the drum and flange 10 and the inner surface of the door 12, as shown in Fig. 3. It is quite important that the element 24 extends beyond the end of the baffle and from adjacent the inner edge of flange 10 to the edge 9 in the end plate 7 of the drum since, otherwise, articles are very apt to wedge between the baffle and end plate 7 of the drum and the casing. With the above described arrangement, any articles, which by virtue of the extension of the baffles beyond the edge of the opening in the drum, slide on the baffles or gravitate toward the space between the end of the baffle and the stationary parts of the machine, will be positively prevented from entering therein and being caught and mutilated. Therefore, the provision of a yielding element of the above described character, which substantially fills in the spaces between the moving and fixed parts of the machine in the zones of the baffle ends, is considered of extreme importance.

The elements 24 when wiping the casing of the machine also serve another useful function. Apparently, as the drum of a drying machine of this character is caused to rotate an electrostatic charge is built up on the drum and baffles therein. When the baffles extend inwardly beyond the edge of the opening in the end of the drum, this charge will cause articles formed of silk and other materials having like electrical properties to gravitate toward the stationary flange 10 of the casing and they will be caught between the baffles and end of the drum and the casing and torn. In some instances, such article so caught between the drum or baffles and casing will stall the machine, and it has been observed that silks or articles of like material have the greatest tendency to segregate from the mass and be caught in the above manner. However, the elements 24, when allowed to touch or wipe the casing, serve to dissipate this electrical charge and segregation of the silks does not occur.

In Fig. 5, I have shown a modified form of yieldable element, indicated at 25. This element is adapted for use with a drying machine in which the inner edge of the door thereof when closed as indicated at 26, does not lie flush with the inner edge of flange 10 but is spaced therefrom as illustrated. In this case, the element 25 is provided with a lip 27 which is adapted to overlap the flange 10 and extend substantially into abutting relationship with the inner surface of the door.

In Fig. 6, I have illustrated a still further modified form of yieldable element for the ends of the baffles. This element is designed for use in drying machines wherein the inwardly extending flange 28, which defines the opening in the casing, extends within the drum and beyond the inner edge of the end plate 7 thereof. For adaptation to machines of this character, a yieldable element 29 is provided which is recessed as indicated at 30 to receive the end of the flange 28 therein. Preferably, all edges of the reentrant portion 30 are arranged substantially

to touch the sides of the flange adjacent thereto, and, otherwise, the element 29 serves substantially completely to fill the space between the end of the baffle and the end plate 7 of the drum, and flange 28, and the inner surface of the door 12.

The end of the baffle, in all cases, is preferably spaced from the flange about the opening in the casing a distance of the order of about $\frac{1}{2}$ inch so that the yieldable elements may perform their intended function of preventing the articles from being caught. In the embodiment shown in Fig. 6, the baffle 23 is cut away at the end thereof as indicated at 34 to a greater extent than in the other embodiments whereby both to enable the baffle to be readily positioned within the drum or removed therefrom and to afford proper functioning of the element 29.

In the embodiment of Fig. 6 and when the baffle 23 is removable, the element 29 is preferably provided with a bolt 31 which passes through and through slots 32 on opposite sides of the baffle 23. A nut 33 serves to clamp the element against movement relative to the baffle. However, the nut 33 may be loosened and the element slid substantially entirely within the baffle so that the baffle may be removed from the drum, and the element 29 may then be removed from the baffle.

My invention also contemplates the provision of a preferably flat and foraminous, substantially rigid plate-like element which, because the baffles 23 extend inwardly beyond the edges of the openings in the end of the drum and the casing, may be adapted to slide on the ends of the baffles 23 and to be supported thereon as a partitioning element, subdividing the interior of the drum into two compartments. A preferred partitioning element construction, indicated generally at 35 in Figs. 7 and 8, comprises a foraminous element 36 provided with overbent strips 37 which extend along the sides thereof as framing elements therefor. To each end of the element 36 are rigidly fastened strips 38 and 39 which extend therealong and cooperatively form a channel of sufficient width to receive therebetween the ends of the baffles 23. Preferably, of course, the ends of the baffles 23 will extend to a sufficient extent between the strips 38 and 39 as to adequately support the partitioning element thereon. The partitioning element preferably abuts the end plate 4 of the drum, when operatively positioned within said drum, and the other end thereof preferably lies in close proximity to the inner surface of the door 12. In practice, it is found that articles are never caught between the partitioning element and the door of the machine when arranged in the foregoing manner although, if desirable, a yieldable, flexible strip may be provided along that edge of the partitioning element which lies adjacent the inner surface of the door.

From the foregoing, it should be apparent that by virtue of the arrangement and correlation of elements hereinbefore described, I provide a drying machine of the open end type having extremely high drying efficiencies as compared to previous machines of this character; and one which may be quickly and inexpensively converted from a single compartment to a double compartment drier, or vice versa, and is of higher efficiency than former machines of this type when used in either capacity. For example, the amount of work which can be performed by the machine of my invention, in terms of pounds of

articles dried per day, or over any given period of time, is much higher than that which heretofore could be performed by machines of this general type and this is true even when used as a single compartment drier. However, when used as a double compartment machine and the customers' washes, which are never mingled in a drier, are, let us say, approximately one-half the weight of the loading capacity of the machine, two of such washes may be dried simultaneously and in a length of time not greatly exceeding that required alone to dry one of said washes.

While I have described my invention in its preferred embodiments, it is to be understood that the words which I have used are words of description rather than of limitation. Hence, changes within the purview of the appended claims may be made without departing from the true scope and spirit of my invention in its broader aspects.

What I claim is:

1. In a laundry drying machine of the character described, the combination with a casing having an opening therein and a closure element therefor, of a foraminous drum rotatably mounted within said casing, means for passing air through said casing and drum and means for rotating said drum; said drum having an opening in one end thereof and being positioned to rotate with its said opening in registry with the opening in said casing; and said drum being provided interiorly thereof with a plurality of pairs of substantially diametrically opposed baffles extending longitudinally of said drum, both baffles of one of said pairs extending inwardly from the periphery of said drum beyond the edge of the said opening therein whereby said baffles are of sufficient radial length to promote a highly exposed condition of the articles within the drum, as it is rotated, and compressible, yielding means disposed between the ends of said last mentioned pair of baffles and the casing of said machine for preventing the articles from wedging between the drum and casing.

2. In a laundry drying machine of the character described, the combination with a casing having an opening therein and a closure element therefor, of a foraminous drum rotatably mounted within said casing, means for passing air through said casing and drum and means for rotating said drum; said drum having an opening in one end thereof and being positioned to rotate with its said opening in registry with the opening in said casing; and said drum being provided interiorly thereof with a plurality of pairs of substantially diametrically opposed baffles extending longitudinally of said drum, both baffles of one of said pairs extending inwardly from the periphery of said drum beyond the edge of the said opening therein whereby said baffles are of sufficient radial length to promote a highly exposed condition of the articles within the drum, as it is rotated, and said last mentioned pair of baffles comprising compressible, yielding end portions in the zones thereof lying adjacent the opening in said casing and inwardly beyond the edge of the opening in said drum and said end portions lying closely adjacent the casing at said opening therein.

3. In a laundry drying machine of the character described, the combination with a casing having an opening therein and a closure element therefor, of a foraminous drum rotatably mounted within said casing, means for passing air through said casing and drum and means for rotating said

drum; said drum having an opening in one end thereof and being positioned to rotate with its said opening in registry with the opening in said casing; and said drum being provided interiorly thereof with a plurality of pairs of substantially diametrically opposed baffles extending longitudinally of said drum, both baffles of one of said pairs extending inwardly from the periphery of said drum beyond the edge of the said opening therein whereby said baffles are of sufficient radial length to promote a highly exposed condition of the articles within the drum, as it is rotated, and compressible, yielding means projecting beyond the ends of said last mentioned pair of baffles in the zones thereof extending inwardly beyond the edge of the opening in said drum and adjacent the opening in said casing, said compressible yielding means being adapted to prevent the articles from wedging between the drum and casing.

4. In a laundry drying machine of the character described, the combination with a casing having an opening therein and a closure element therefor, of a foraminous drum rotatably mounted within said casing, means for passing air through said casing and drum and means for rotating said drum; said drum having an opening in one end thereof and being positioned to rotate with its said opening in registry with the opening in said casing; and said drum being provided interiorly thereof with a plurality of pairs of substantially diametrically opposed baffles extending longitudinally of said drum, both baffles of one of said pairs extending inwardly from the periphery of said drum beyond the edge of the said opening therein, and a partition element for subdividing the interior of said drum into two compartments, said element being adapted to pass through the opening in said casing and drum and being provided with means slidably engageable with the said last mentioned pair of baffles for supporting said partition element therebetween whereby said partition may be slid into and operatively positioned within said drum.

5. In a laundry drying machine of the character described, the combination with a casing having an opening therein and a closure element therefor, of a foraminous drum rotatably mounted within said casing, means for passing air through said casing and drum and means for rotating said drum; said drum having an opening in one end thereof and being positioned to rotate with its said opening in registry with the opening in said casing; and said drum being provided interiorly thereof with a plurality of pairs of substantially diametrically opposed baffles extending longitudinally of said drum, both baffles of one of said pairs extending inwardly from the periphery of said drum beyond the edge of the said opening therein, and compressible yielding means disposed between the ends of said last mentioned pair of baffles and the casing of said machine for preventing the articles from wedging between the drum and casing, and a partition element for subdividing the interior of said drum into two compartments, said element being adapted to pass through the opening in said casing and drum and being provided with means slidably engageable with the said last mentioned pair of baffles for supporting said partition element therebetween whereby said partition may be slid into and operatively positioned within said drum.

6. In a laundry drying machine of the character described, the combination with a casing having an opening therein and a closure element

therefor, of a foraminous drum rotatably mounted within said casing, means for passing air through said casing and drum and means for rotating said drum; said drum having an opening in one end thereof and being positioned to rotate with its said opening in registry with the opening in said casing; and said drum being provided interiorly thereof with a plurality of pairs of substantially diametrically opposed baffles extending longitudinally of said drum, both baffles of one of said pairs extending inwardly from the periphery of said drum beyond the edge of the said opening therein, and said last mentioned pair of baffles comprising compressible, yielding end portions in the zones thereof lying adjacent the opening in said casing and inwardly beyond the edge of the opening in said drum, and said end portions lying closely adjacent the casing at said opening therein, and a partition element for subdividing the interior of said drum into two compartments, said element being adapted to pass through the opening in said casing and drum and being provided with means slidably engageable with the said last mentioned pair of baffles for supporting said partition element therebetween whereby said partition may be slid into and operatively positioned within said drum.

7. In a laundry drying machine of the character described, the combination with a casing having an opening therein and a closure element therefor, of a foraminous drum rotatably mounted within said casing, means for passing air through said casing and drum and means for rotating said drum; said drum having an opening in one end thereof and being positioned to rotate with its said opening in registry with the

opening in said casing; and said drum being provided interiorly thereof with a plurality of pairs of substantially diametrically opposed baffles extending longitudinally of said drum, both baffles of one of said pairs extending inwardly from the periphery of said drum beyond the edge of the said opening therein, and a partition element for subdividing the interior of said drum into two compartments, said element being adapted to pass through the opening in said casing and drum, and means for operatively supporting said partition element on said last mentioned pair of baffles in drum-subdividing position.

8. In a laundry drying machine of the character described, the combination with a casing having an opening therein and a closure element therefor, of a foraminous drum rotatably mounted within said casing, means for passing air through said casing and drum and means for rotating said drum; said drum having an opening in one end thereof and being positioned to rotate with its said opening in registry with the opening in said casing; and said drum being provided interiorly thereof with a plurality of baffles extending longitudinally of said drum, at least one of said baffles extending radially of said drum and inwardly beyond the edge of the said opening therein, a partition element for subdividing the interior of said drum into two compartments, said element being adapted to pass through the opening in said casing and drum, and means for operatively supporting said partition element on said last mentioned baffle and a second of said plurality of baffles in drum-subdividing position.

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