

Jan. 4, 1938.

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2,104,173

BAKING MACHINE FOR TEXTILE MATERIALS

Filed Oct. 10, 1935

4 Sheets-Sheet 1

FIG. I.

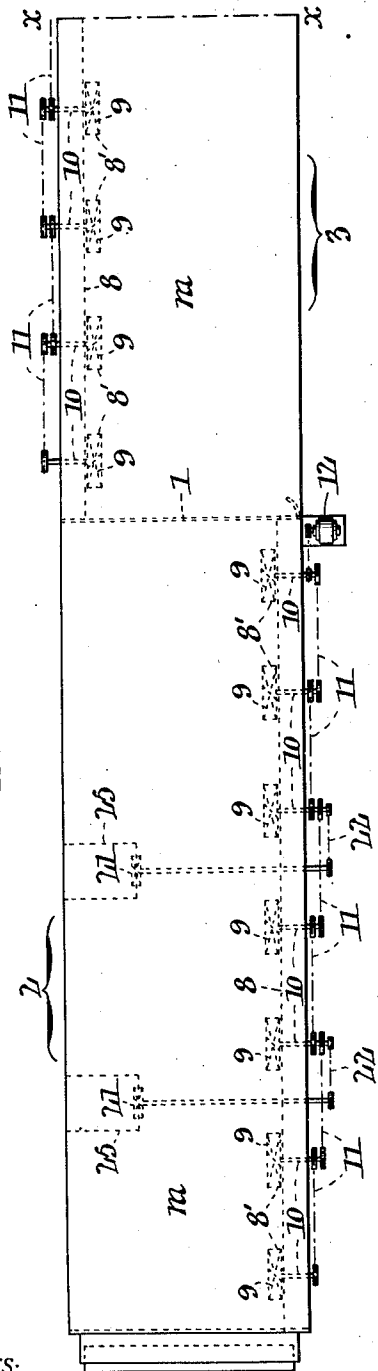
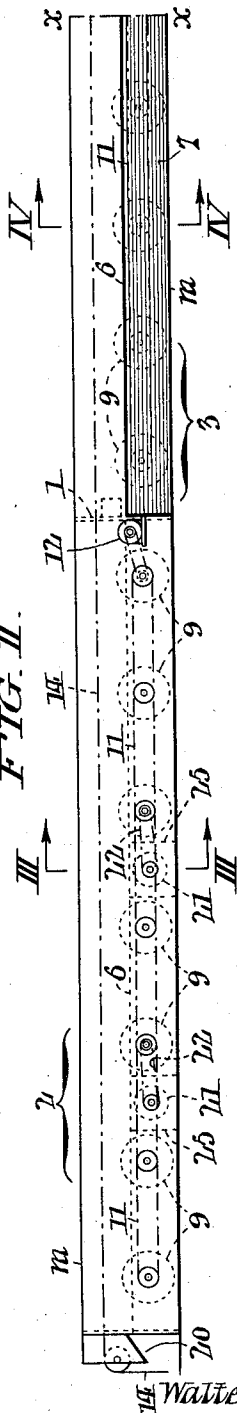


FIG. II.



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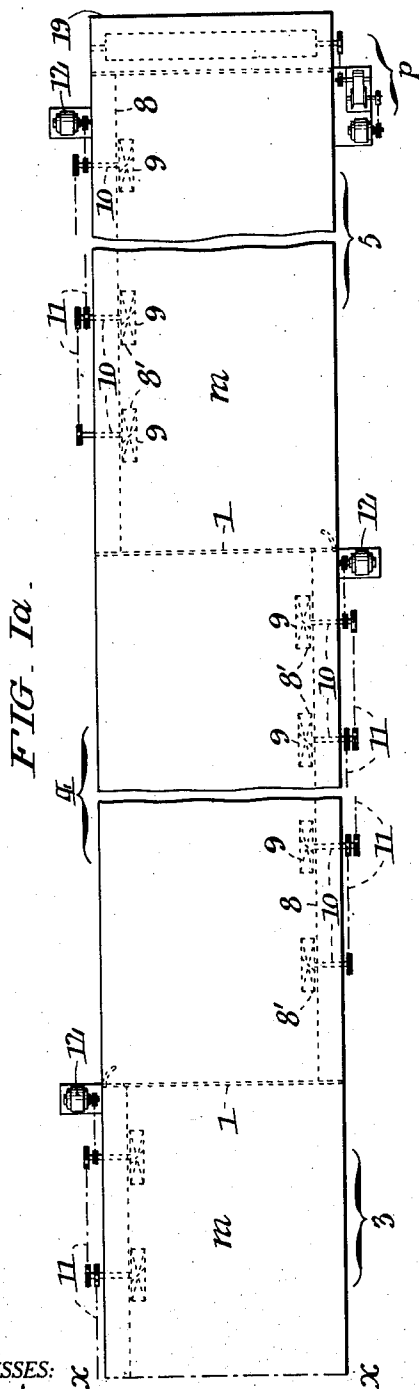
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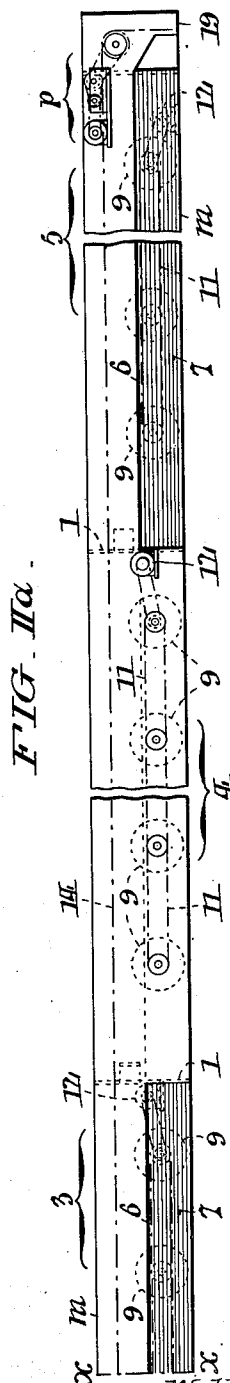
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FIG. III.

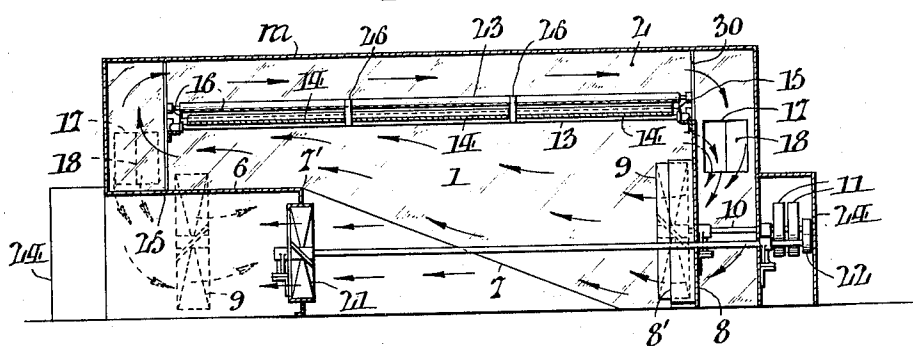


FIG. IV.

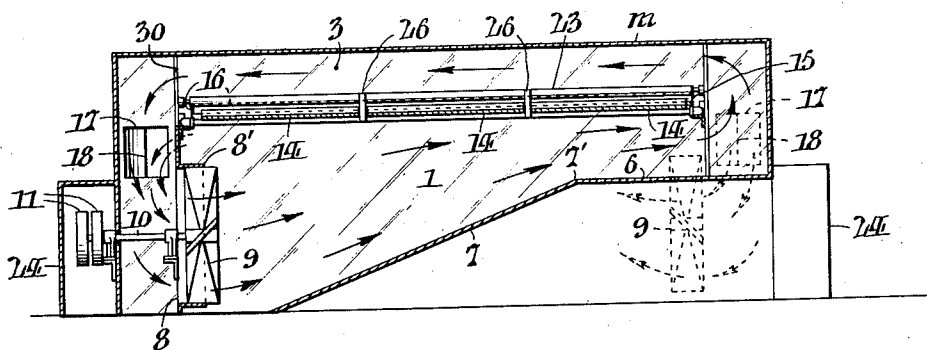
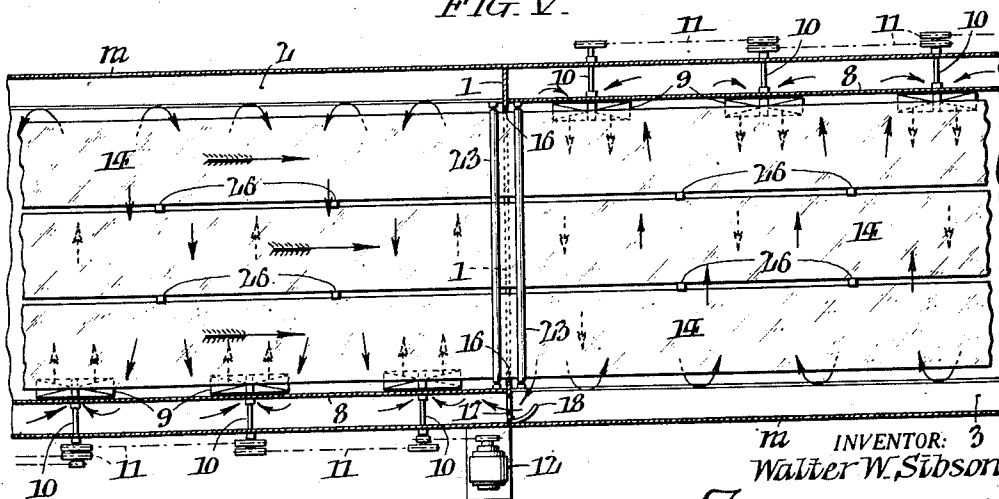


FIG. V.



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FIG. VI.

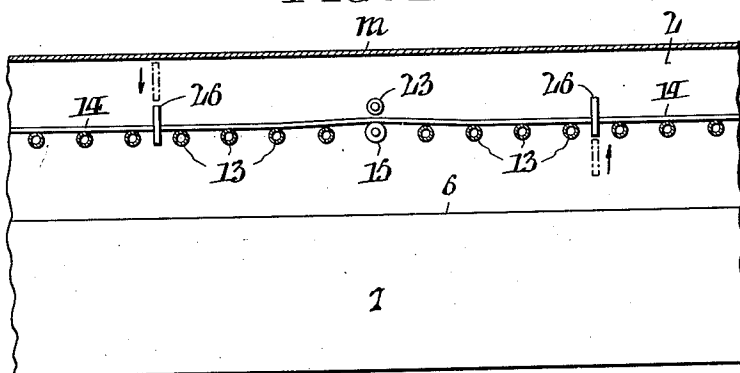


FIG. VII.

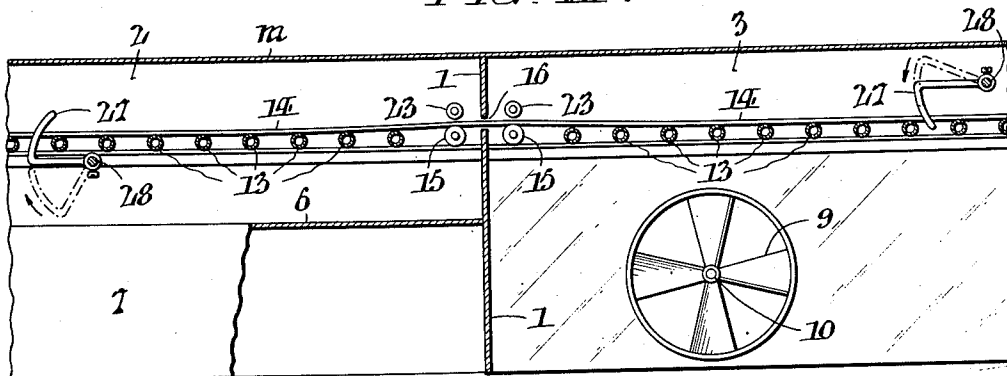
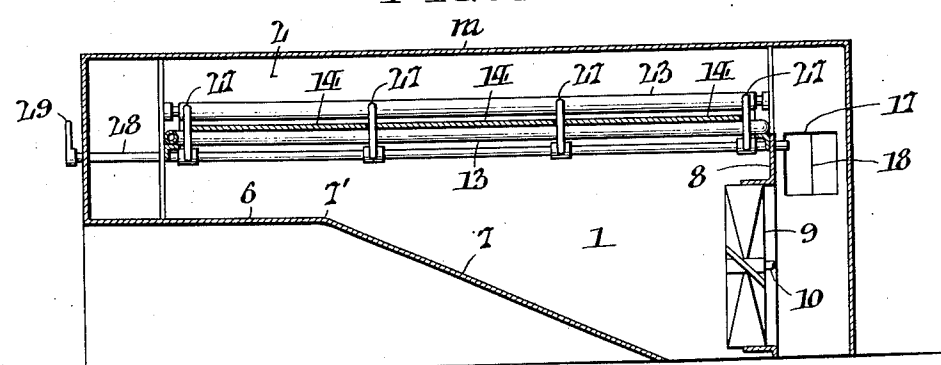


FIG. VIII.



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UNITED STATES PATENT OFFICE

2,104,173

BAKING MACHINE FOR TEXTILE MATERIALS

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Application October 10, 1935, Serial No. 44,360

8 Claims. (Cl. 34—48)

This invention has general reference to apparatus or machines and methods of drying or "baking" articles or materials coated with congealable solutions such as sizing of starch or the like, emulsions of latex or rubber, etc., which, when dried or baked, stiffens or strengthens the article whereby its durability is enhanced and preserved.

More particularly, the present improvements are concerned with a method and means for "baking" carpets, rugs, and similar textiles, sized on the back or ground surface, including pile fabrics in which the pile is anchored in the ground weave, by application of latex solutions or the like to the back. Hitherto, apparatus or machines for the stated purposes, and more commonly known as "Drag type machines", have been provided along one side only of the baking enclosure with air-circulating means, and, as a result, when handling other than full-width carpets or rugs, there has been considerable tendency for the circulatory pressure to lift the carpet or rug and cause objectionable overlaps, with consequent deposit of the coating from the back of one piece upon the face of an adjoining piece. This deposited size, being difficult to remove, causes disfigurement of the carpet or rug face and often entails an avoidable manufacturing loss.

Another disadvantage inhering to known practice in baking carpets and rugs is due to the prevailing practice of having the fans along one side of the apparatus or machine only, with the result that the heated air circulation is not uniformly distributed, and incidentally said carpets or rugs are dried considerably more along one side than the other. Such unevenly baked carpets or rugs do not lie flat on the floor, when laid, but have a tendency to curl-up.

The primary object of this invention is to effectively overcome the above noted disadvantages in a simple, efficient, and economical manner, by the provision of a "baking" machine in which the articles being treated pass through alternately-reversed diagonally-directed circulatory flows of a suitable drying medium which, incident to slow progression of the articles, thoroughly "bakes" said articles evenly, and so that, when laid, they will lie perfectly flat on the floor.

Another object is the provision of an improved baking machine, preferably for the treatment of carpets and rugs after sizing, which positively assures that said sizing will be uniformly baked smoothly and evenly into the ground weave, as well as in part penetrating the pile loops, so as to securely anchor or hold the latter in said ground weave against pulling-out when subse-

quently brushed, as by a vacuum sweeper for example; and in addition the formation of any roughness or "blisters" in the sized back of the goods is effectively prevented.

A further object of this invention is the provision of a baking machine of the type indicated which is adapted for the baking of carpets and rugs of different widths without any overlaps occurring; or, in other words, a machine in which spaced strips of narrow carpet and full-size rugs can be baked, with pre-assurance they will be progressed therethrough in proper alignment, and without coming in contact with each other.

A still further object of this invention is the provision of a carpet and rug baking machine in which the drying medium is caused to spirally travel from one end of said machine to the other in alternately-reversed successive stages.

Other objects and advantages of this invention will be pointed out in the detailed description thereof which follows, or will be apparent from such description.

In order that the invention may be readily understood and its practical advantages fully appreciated, reference will be had to the accompanying sheets of drawings, in which is depicted one form of embodiment thereof. However, it is to be understood that changes in the details of construction can be made, or other applications thereof consummated, within the scope of the claims, without departing from the fundamentals of this invention.

In the drawings:

Figs. I and Ia jointly show a top plan view of a baking machine for textile materials, such as carpets and rugs, embodying the present improvements, the plane of severance between the two illustrations being designated $x-x$; and parts being broken out in Fig. Ia to avoid a further extended showing.

Figs. II and IIa similarly show a side elevation of the machine.

Fig. III is a vertical section, on a larger scale, taken approximately as indicated by the arrows III—III in Fig. II.

Fig. IV is a like section, taken on the plane designated IV—IV in Fig. II.

Fig. V is a horizontal section of approximately that portion of the machine between the vertical plane-designating arrows III—IV in Fig. II.

Fig. VI is a fragmentary sectional view indicating how the separating guides, hereinafter more fully explained, are located between the heater pipes and adapted for upward or down-

ward movement into operative position when the machine is baking strip carpet or rugs.

Fig. VII is a similar illustration to the preceding one, but showing a modified form of the separating guides; and,

Fig. VIII is an end elevation of the same.

Referring more in detail to the drawings, the improved baking machine therein illustrated is comprehensively designated by the letter *m*, the same comprising a rectangular enclosure, of suitable construction and dimensions, which is subdivided by lateral partitions 1, into consecutive treating compartments 2, 3, 4, and 5, for example. Each compartment 2-5, as best shown in Figs. III and IV is provided with an inwardly-directed floor-section 6, at a suitable elevation with respect to the machine base or ground level; said section having an inclined portion 7, extending down to ground level, which serves to deflect the flow of baking medium diagonally upward against the material being treated, for flow across and over said material for return and recirculation, as later on explained. It is to be particularly remarked, at this juncture, that the floor-sections 6 and inclined portions 7 of the consecutive compartments 2-5 are alternately disposed in reverse directions; and that the meeting angular edges 7' thereof are, preferably, in equally spaced relation to each side of the longitudinal median of the machine *m*, as shown: or, said angular edges 7' may be located in direct alignment with such median, as will be obvious to those conversant with the art.

Each compartment 2-5 is also provided, at one side, with an inwardly-spaced vertical partition 8 remote from the angular edge 7' of the floor-section 6, said partition including suitable housings 8' for a series of vertically-rotative circulating fans 9, mounted on shafts 10 journaled intermediate the partition 8 and the proximate side wall of the machine *m*. Particular attention is directed to the fact that, in accordance with the instant invention, these series of circulating fans 9 are located at one side of the machine in the first, compartment 2, and at the opposite side of said machine in the next compartment 3, and so on alternately throughout the machine *m*, irrespective of the number of such compartments. Furthermore, the series of fans 9 individual to each compartment 2-5 are preferably coordinated, by appropriate means such as endless drives 11, for simultaneous rotation by aid of a suitable prime mover 12.

Supported in the several compartments 2-5 are aligned heaters 13, preferably banks of steam pipes, over the upper surface of which the carpet, runners or rugs 14 are "dragged", by any convenient progressing means, conventionally indicated at *p* in Figs. Ia and IIa, for the full extent of the machine *m*. At predetermined intervals along the path of such progression, round-section members or freely-rotative rolls 15 are located in spacial intervals, provided for the purpose, in the heater banks 13, said members or rolls having their top circumferential surface preferably at an elevation slightly above the upper level of said banks to relieve the latter of the weight of the goods. Pairs of such rolls 15 are preferably associated with each slot 16 in the respective partitions 1 to prevent the carpet or rugs 14 from "scraping" contact with the lower edges of said slots as the goods pass from one compartment 2-5 to the next.

Each compartment separating partition 1 is

furnished at one side with a suitable duct or communication orifice 17 under control of an adjustable deflector 18, whereby the circulating hot air, for instance, is lead from the pressure side of the fans 9 in one compartment to the suction side of the fans 9 in the adjoining compartment. By this means the hot air is drawn forwardly in a generally spiraling direction, from one compartment to another, from the "dry" or delivery end 19, of the machine *m*, and absorbs more and more moisture as it advances through the consecutive compartments 5, 4 and 3, into the compartment 2 at the feed or "wet" end 20 of the machine, from which it is exhausted by an appropriate fan or fans, conventionally indicated at 21 in Figs. I and Ia. Incidentally, it will be seen the exhaust fan, or fans, 21 is, or are, conveniently coordinated with one of the fan shafts 9 by a suitable drive 22.

Additional freely-rotating rollers 23 may be provided, adjacent the partition slots 16, as well as above all the rolls 15, to serve as guides for the carpet or rug ends into said slots, in addition to obviating any tendency of said carpet or rugs to "lift" incident to passage over the rolls 15. Suitable housings 24, Figs. III and IV, enclose the fan driving mechanisms 11, 22; while 25, Figs. I, II and III, indicate outlet conduits for discharge of the moisture-saturated air exhausted by the fans 21 from the "wet" or feed-in in compartment 2.

In order to positively ensure aligned progression of the strip carpet or rugs 14 through the machine *m*, as well as to prevent their longitudinal edges coming into contact or "overlapping" one another, separating guides are provided at intervals along the path of advancement. These separating guides may be in the form of vertically movable elements 26, Figs. III-VI, and they may be arranged for simultaneous or individual operation by any suitable mechanism. Or, as indicated in Figs. VII and VIII, the separating guides may be in the form of angular-arms 27 adjustably mounted on transverse shafts 28, having manipulators 29 exterior of the machine *m*. Furthermore, it may be desirable in some machines *m* to have the separator guides 26, or 27, located below the path of travel of the rugs or strip carpet 14 and arranged for upward projection into guiding position as indicated in dot-and-dash lines with associated arrows. In other machines, it may be more convenient for the separator guides 26, or 27, to be mounted above the path of material travel, for downward movement into guiding position. Obviously, in the event the machine *m* is to be used only for the baking of carpet or rugs 14 always of the same width, it is evident that the separator guides 26, or 27, can be permanently placed at the requisite distance apart. Usually, however, it is necessary to handle strips of different widths, consequently the guides 26, 27 are preferably made laterally adjustable of the machine, for variable setting at different distances apart, in order to properly space the respective widths of carpet or rugs 14 to be baked. 30 are openings in the partitions 8 affording passage for the circulating heated air from below the carpets or rugs 14 around their longitudinal edges and over the pile or top surfaces thereof, in an obvious manner.

From the foregoing description, read in conjunction with the drawings, it is believed the operation of the improved baking machine for textile materials, such as carpets, rugs and the

like, will be clearly understandable by those acquainted with the art, without further elaboration herein. However, particular attention is drawn to the general spiralizing flow of the heated air through the machine in a direction counter to the "drag" of the material being baked, said spiralizing flow being directionally-reversed in the successive compartments 2-5 so that, whatever tendency the rugs or strips of carpet 14 may develop to "lift" or to move laterally, out of their proper course through the machine *m*, due to the action of the air pressure and currents in the compartment 2 (for example), will be counteracted by an opposing action of the fans in the next compartment 3 (for example), as the air currents are being directed upwards in a diagonal direction from the series of fans 9 therein, while the air circulation is likewise the reverse of that in the compartment 2. In Figs. III-V, the direction of air flow in the respective compartments is indicated by solid and dotted arrows.

From the foregoing disclosure it will be readily appreciated that the present invention accomplishes all the hereinbefore recited objects, together with others apparent from an understanding of said disclosure, which is given merely by way of illustration and is not to be construed as limitative, the scope of said invention being defined by the following claims.

Having thus described my invention, I claim:

1. In a machine for baking articles coated with a suitable preservative, an enclosure subdivided by partitions into successive compartments, means for progressing the articles, rotary fans for circulating heated air through the machine with alternately-reversed individual diagonal circulation through the successive compartments, means controlling variable communication between adjoining compartments to effect a generally spiralized circulation of the air through the machine, and separator means movable in vertical planes whereby the articles are prevented from contacting and are alignedly-guided through the machine in spacial relation.

2. In a machine for baking piece or strip material coated on one face with a suitable preservative, an enclosure subdivided by partitions into successive compartments, means for progressing the material therethrough, rotary fans individual to the several compartments arranged in series at opposite sides of the machine for reversing the direction of air-circulation diagonally through the successive compartments, means controlling variable communication between adjoining compartments to effect a generally spiralized circulation of said air through the machine, and separator means movable in vertical planes and operative to prevent edge overlapping of the material during progression through the machine.

3. In a machine for baking sized carpets and rugs, an enclosure subdivided by lateral partitions into consecutive compartments, aligned banks of heater coils in the several compartments, means for dragging the carpets or rugs over said banks of heater coils, rotary fans for circulating heated air through the machines with alternately-reversed individual diagonal circulation in the consecutive compartments, orifices in the lateral partitions with associated adjustable deflectors for controlling variable communication between adjoining compartments to effect passage of the heated air from the pressure side of the fans in one compartment to the suction side of the fans in the next compartment, with production of a generally spiralized flow through the machine from the delivery to the wet ends thereof, rotary fans to exhaust the highly saturated air from the wet end of the machine, and separator means movable in vertical planes between the coils of the heater banks effective to prevent edge overlapping of the sized carpets or rugs during advancement through the machine.

4. A baking machine as defined in claim 3 wherein the consecutive compartments are provided with alternately-opposed inwardly-directed floor-sections below the plane of the banks of heater coils, and each said floor section embodies a downwardly inclined extension effective to direct the heated air diagonally-upwards from the rotary fans against the sized underside of the carpet or rugs and return circulation over the top surface thereof.

5. The combination individual to claim 3 wherein the rotary fans of each compartment of the baking machine are coordinated by appropriate means or simultaneous rotation, said coordinated fans being arranged at opposite sides of the machine in the consecutive compartments, and individual outer units to drive each series of said fans.

6. The combination of claim 3 wherein the separator guide elements movable in vertical planes are arranged at intervals along the path of the dragging means for the carpets or rugs.

7. The combination of claim 3, wherein the separator means consist of angular arms adjustably-mounted on transverse shafts arranged at intervals along the path of the dragging means for the carpets or rugs, and said arms being movable in planes at right angles to the associated shafts, and the latter being adapted for individual or collective rotation.

8. The combination of claim 3, wherein freely rotative rolls are located at intervals along the path of the dragging means for the carpets or rugs to relieve the dead weight thereof from the banks of heater coils.

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