United States Patent

Jäger

[15] 3,659,753

[45] May 2, 1972

[54] STREWING APPARATUS, ESPECIALLY FOR BAKING INSTALLATIONS

[72] Inventor: **Hans-Joachim Jäger**, Burgdorf, Switzerland

[73] Assignee: **Gustave A. Seewer**, Burgdorf Canton of Berne, Switzerland

[22] Filed: **Mar. 25, 1970**

[21] Appl. No.: **22,604**

[30] **Foreign Application Priority Data**

Apr. 9, 1969 Switzerland 5363/69

[52] **U.S. Cl.** **222/199**, 209/236, 209/348

[51] **Int. Cl.** **A21c 1/00**

[58] **Field of Search** ..... 107/7 A, 7 R, 27, 28, 29, 43; 209/236, 346, 348, 448; 118/24, 25, 308, 312; 222/199, 200

[56] **References Cited**

UNITED STATES PATENTS

2,095,596	10/1937	Dixon	222/199 X
2,907,498	10/1959	Lely et al.	222/199
2,655,897	10/1953	Thompson	118/308
325,327	9/1885	Downie et al.	222/199

FOREIGN PATENTS OR APPLICATIONS

640,139	12/1936	Germany	107/7 A
980,790	1/1951	France	107/7 A
858,413	1/1961	Great Britain	222/199

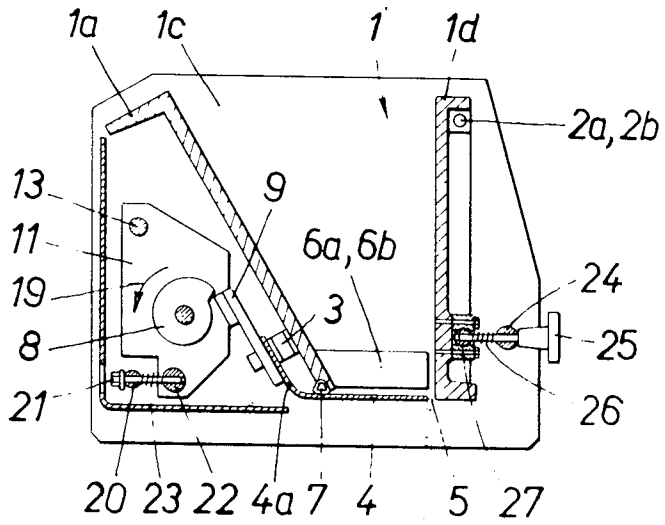
Primary Examiner—H. Hampton Hunter

Attorney—Werner W. Kleeman

[57] **ABSTRACT**

A strewing apparatus, especially for baking installations, which is of the type embodying a container for the material to be scattered or strewn which possesses a cross-sectional configuration which narrows towards the bottom end thereof, said container incorporating a forward wall and a rearward wall. A base plate which serves to close the major portion of the lower opening of the container is mounted via oscillating support elements to the rear wall of the container. An oscillating or vibration drive mechanism disposed behind the rear container wall serves to place the base plate into oscillatory movement. As a result of this oscillatory or vibratory motion imparted to the base plate, the marginal edge thereof which, together with the forward wall of the container forms a throughpassage slit for the material to be strewn, is primarily moved up and down, whereby the upward movement, at least at the start thereof, occurs in jerky fashion. Furthermore, additional means are provided for independently adjusting the basic width of the aforementioned throughpassage slot or slit.

7 Claims, 8 Drawing Figures



Patented May 2, 1972

3,659,753

2 Sheets-Sheet 1

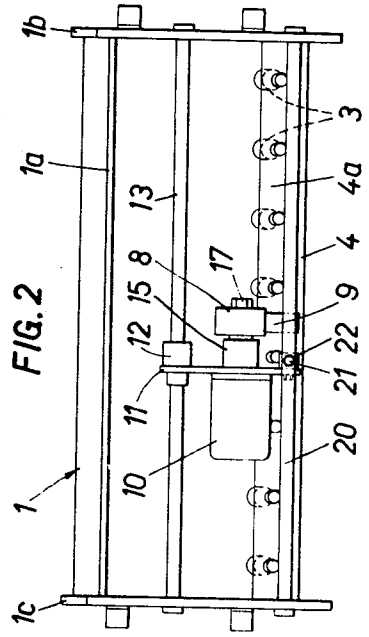


FIG. 2

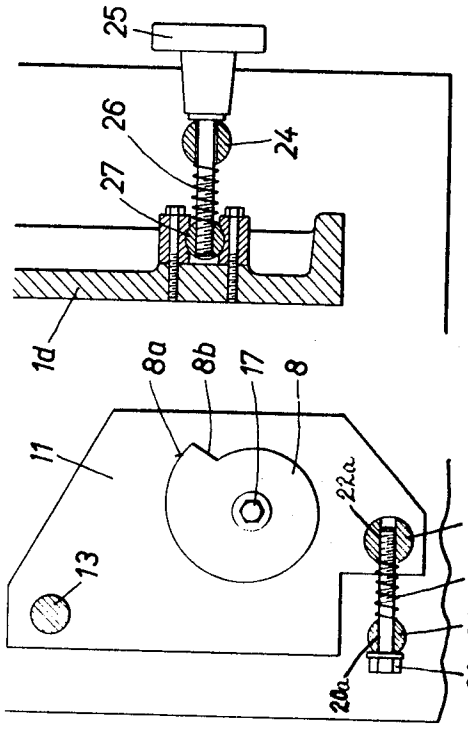


FIG. 5

FIG. 4

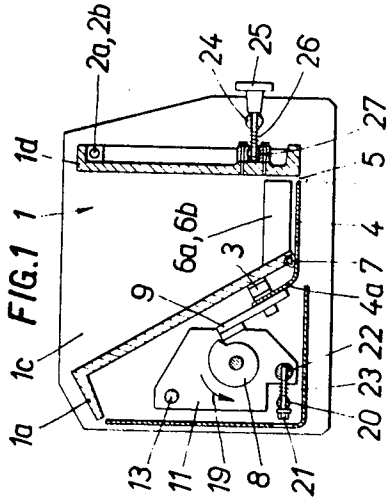


FIG. 1

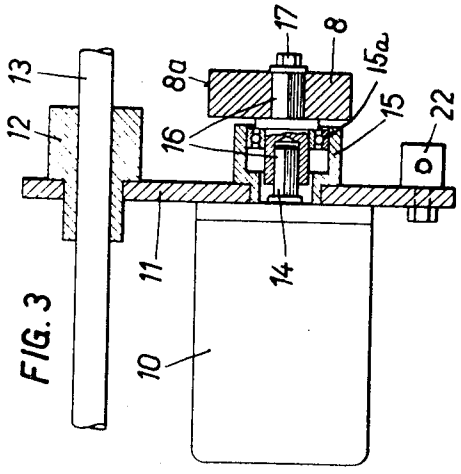
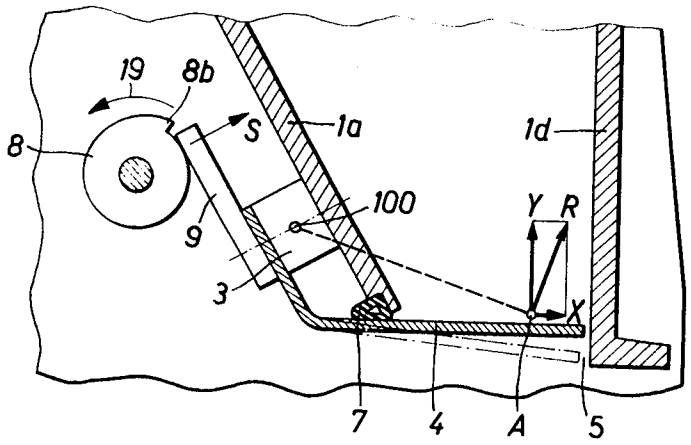


FIG. 3

FIG. 6



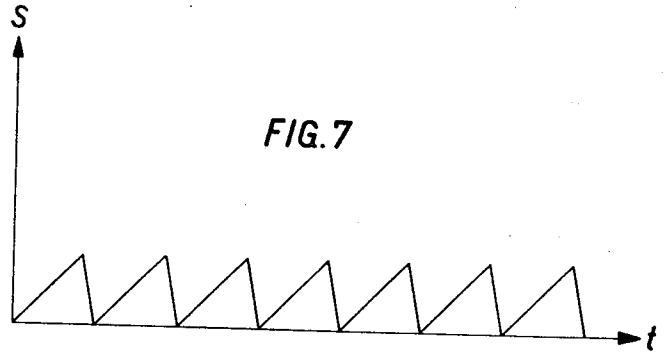


FIG. 7

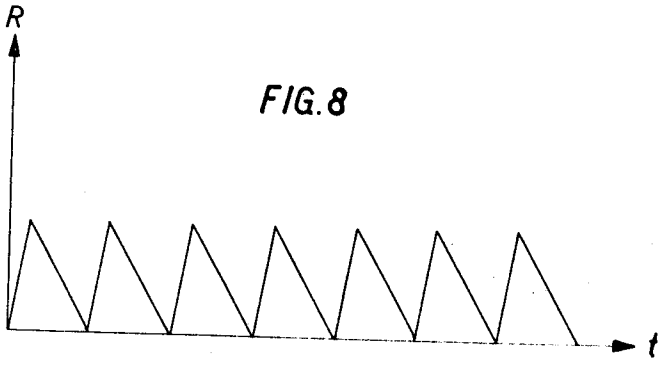


FIG. 8

STREWING APPARATUS, ESPECIALLY FOR BAKING INSTALLATIONS

BACKGROUND OF THE INVENTION

The present invention broadly relates to equipment utilized in baking operations and, more specifically, pertains to a new and improved strewing apparatus, especially for baking installations, which apparatus is of the type possessing a container for the material to be strewn which, in cross-section, narrows towards its bottom or lower end and incorporates a front container wall and a rear container wall.

Pastry dough of the most different composition nowadays, during the course of its processing into finished products, must be strewn with the most different type of fine-grained to coarse-grained materials. Thus, for this purpose there are available presently upon the market the most different types of apparatuses. As a general rule, the prior art constructions contemplate the provision of either to and fro moving components, or through the action of shaking or jarring movements, to rub or shake the material to be strewn through a horizontally arranged sieve-like surface. The quantity of material which is dispensed can be controlled by varying the employed type of sieve as well as by varying the intensity and the course of the previously mentioned rubbing or jarring movements.

Yet, all of the constructions of the aforementioned general type as known to the prior art generally have associated therewith the disadvantage that they can only faultlessly operate when working with specific predetermined types of strewable material. The prior art devices are quite sensitive with respect to the moisture content of the material to be strewn, as well as to its composition and the type of granulation or grain size.

SUMMARY OF THE INVENTION

Accordingly, it is a primary object of the present invention to provide an improved strewing apparatus of the mentioned type which does not have associated therewith any of the drawbacks considered above experienced with the prior art constructions, and which can reliably operate considerably independent of the type of material to be strewn, its moisture content or its grain size.

Yet another significant and equally noteworthy object of the present invention relates to an improved construction of strewing apparatus for scattering materials, particularly during baking operations, which apparatus is relatively simple in construction, extremely reliable in operation, not readily subject to breakdown, and can handle in extremely efficient and reliable fashion the most varied types of materials to be strewn.

Now, in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the inventive strewing apparatus is generally manifested by the features that a base plate which closes the major portion of the lower opening of the container is mounted by means of oscillatory or vibration mounting elements at the rear wall of the container, and this base plate can be placed into oscillatory or vibrational motion by means of an oscillation or vibration drive mechanism situated behind the rear container wall. Due to this oscillatory motion the marginal edge of the base plate which, together with the front container wall, forms a throughpassage opening or slot, can be primarily moved up and down, with the upward movement at least at the start thereof occurring in jerky-like fashion. Further, the invention contemplates that additional means are provided for independently adjusting the basic width of the throughpassage slot mentioned above.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is a cross-sectional view of a preferred embodiment of inventive material strewing apparatus;

FIG. 2 is an elevational view of the apparatus depicted in FIG. 1 as viewed from the left side thereof;

FIG. 3 is a partial sectional view, on an enlarged scale, of a detail of the apparatus structure shown in FIG. 2;

FIG. 4 is a detail of the apparatus structure shown in FIG. 1 on the same scale as in FIG. 3;

FIG. 5 is an enlarged detail of a further portion of the inventive strewing apparatus shown in FIG. 1;

FIG. 6 is an enlarged fragmentary sectional view of the lower region of the apparatus depicted in FIG. 1;

FIG. 7 is a graph illustrating the sawtooth-like movement of the free end of the feeler element imparting the jerky-like oscillatory movement to the base plate; and

FIG. 8 is a graph illustrating the sawtooth-like movement of a material particle subjected to the jerky-like oscillatory movement of the base plate.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Describing now the drawing, the exemplary illustrated embodiment of strewing apparatus which, in particular, is destined to be used in bakery and pastry operations, will be seen to comprise a housing **1** which at the same time forms a part of the container for the material to be strewn or scattered. When viewing this container from above, it will be understood that such possesses a substantially rectangular contour or configuration. The rear wall **1***a* of the container is inclined with respect to the vertical, as shown, in order that there results a container structure for the strewable material which tapers or narrows towards the bottom. Container sidewalls **1***b* and **1***c* are fixedly connected with this long container rear wall **1***a*. Additionally, the container has a front wall **1***d* which is pivotably mounted with the side walls **1***b*, **1***c* at its upper edge through the agency of the pins or journals **2***a*, **2***b*.

Continuing, it will be observed by referring to FIGS. **1** and **2**, that at the lower region of the rear container wall **1***a* there are mounted at the outside of such wall so-called oscillating or vibrating support elements **3**, at which there is mounted the portion **4***a* of the base plate **4**, with such portion **4***a* being flexed upwardly and extending parallel to the rear wall **1***a*, as shown best by inspecting FIG. **1**. This base plate **4** extends horizontally beneath the container opening up to the region of the lower edge of the front wall **1***d* while leaving a small throughpassage opening or slot **5** extending in vertical direction, with the width of such slot being disposed transverse to the downward discharge direction of the material. Any slots which might appear because of possible fabrication tolerances between, on the one hand, the side walls **1***b* and **1***c* and, on the other hand, the base plate **4**, are extensively eliminated by the cover members or covering pieces **6***a* and **6***b*. Further, the joint between the lower edge of the rear wall **1***a* and the base plate **4** is sealed by means of a hollow rubber sealing member **7**. As particularly well illustrated in FIGS. **1** and ' the pivot point for the base plate **4** is advantageously located at the region of the wall ia, namely the rear wall, and at a position approximately corresponding to the center of the elastic vibrating support elements **3**. This pivot point has been conveniently designated in FIG. **6** by reference character **100** and will be also seen to be located above the horizontal plane containing the body of the base plate **4**. Owing to this arrangement the effective width of the throughpassage opening or slot **5** remains substantially constant throughout the oscillatory up and down movement of the base plate **4**, this movement being substantially in the direction of discharge of the strewable material from the container housing **1** through the slot **5**.

It will be additionally observed that the inventive strewing apparatus depicted herein by way of example, also possesses a suitable oscillating or vibration drive mechanism, to be considered in detail shortly, and which is arranged behind the rear wall **1***a*. This vibrational or oscillating drive mechanism serves

to place the base plate 4 into oscillatory or vibrational movement, by means of which the marginal edge of this base plate 4 which is situated at the region of the throughpassage opening 5 is primarily moved up and down, the upward movement, at least at the start thereof, occurring in jerky-like fashion. Apart from the foregoing structure, there are additional means available for independent adjustment or regulation of the basic width of this throughpassage opening or slot 5.

By virtue of the particular character of the oscillatory movement of the base plate, as will be explained more fully shortly, there should not only be achieved that with different type of strewable material there is attained a continuous continuity and uniformity of the delivered quantity of material to be strewn, so that a "caking or baking together" is prevented, that is to say, there is obviated the formation of a compact strewable mass in the container, but additionally, there should be enhanced the migration of the strewable material to the throughpassage opening or slot 5, especially at the region of the base plate 4. To explain this more fully attention is now invited to FIG. 6 wherein a material particle A is shown located upon the base plate 4. During the oscillatory movement of the base plate 4 this material particle A, as well as the other material particles which are located in the pile of material on or around the base plate 4 are periodically subjected, at short time intervals, to a movement component R which can be resolved into an upward or vertical component Y and a horizontal component X directed towards the throughpassage slot 5. The vertical component Y serves to upwardly throw the material particle A, in other words for loosening the strewable material, while the horizontal component X serves to convey the material particle towards the throughpassage slot 5. Both of these components X and Y come into existence owing to the fact that the pivot point 100 of the base plate 4 is located behind the rear wall 1*a* above the horizontal plane containing this base plate 4.

Now, in the exemplary illustrated embodiment of the invention the oscillatory drive mechanism will be seen to embody as its primary element a cam disc 8 which can be placed into continuous rotation by means of a suitable electric motor drive. The driven cam disc 8 acts upon a feeler element 9 which is rigidly connected with the base plate 4. In the exemplary illustrated embodiment, the electric motor drive will be understood to embody a motor transmission block 10, the housing of which is secured to a plate member 11 which, in turn, is pivotably mounted upon a shaft member 13 through the agency of a sleeve member 12 secured to such plate member. The opposed ends of the shaft member 13 are fixedly seated in the side walls 1*b* and 1*c* of the container structure considered above.

Additionally, it will be observed that a bearing sleeve member 15 is secured to the plate member 11 coaxially with respect to the output shaft 14 of the motor transmission block 10, a shaft stub 16 being rotatably and non-displaceably mounted within such bearing sleeve member 15 by means of the roller bearing 15*a*. The shaft stub 16 includes a square portion upon which there is detachably secured by means of the screw 17, or other appropriate fastening expedient, the cam disc 8. Hence, there is possible the ready exchange of the cam disc 8 for a different cam disc having another cam profile.

The illustrated cam disc 8 will be seen to be of the type incorporating a profile section 8*a* which gradually ascends practically along the entire periphery of such cam member and a steep dropping or descending cam portion 8*b*, so that during one revolution of the cam disc or plate 8 in the direction of the arrow 19 and by virtue of the tangentially extending feeler member 9 the latter together with the base plate 4 is subjected to an oscillatory or vibratory movement, the displacement-time characteristic of which possesses a substantially saw-tooth-like character, as best seen by referring to FIG. 7. The nature of this oscillation can further be varied by adjusting the oscillating position of the plate member 11 by means of the mechanism depicted in greater detail in FIG. 4. More precisely, it will be observed that a rod member 20 which is secured at its ends in the housing or container side walls 1*b* and 1*c* is equipped approximately at its middle region with a transversely extending bore 20*a* through which piercingly extends the shaft portion of an adjustment screw 21. The threaded portion of this adjustment screw 21 engages with a threaded bore 22*a* of a pin member 22 which is secured to the lower extension of the plate member 11. A helical spring 23 subjected to compression is placed between the rod member 20 and the pin member 22, as shown. By actuating the just-described adjustment mechanism, in other words the screw member 21, it is possible to vary the vibration or oscillation amplitude of the feeler element 9 and the base plate 4 in accommodation to the characteristics or properties of the material to be strewn, among other things, the grain size of this material.

The previously mentioned means for adjusting the basic width of the throughpassage slot or opening 5 for the purpose of regulating the quantity of material dispensed and accommodating the size of such slot to the properties of the strewable material will be seen to incorporate a similar mechanism, wherein according to FIG. 5 there is provided a rod member 24 which is fixedly seated at its ends in the side walls 1*b* and 1*c* of the container structure. This rod member 24 likewise possesses a transverse bore which is pierced by the shaft portion of an adjustment screw 25, the threaded portion of which engages in a threaded bore of a pin member 27. The pin member 27 is mounted in a shoulder of the front wall 1*d*. A spring member 26 is placed between this pin member 27 and the rod member 24.

It is desirable for the upward movement of the base plate 4 to occur in a jerky-like fashion and very quickly. This is advantageously brought about through the combined action of the elastic vibrating support elements 3 and the design of the oscillatory drive mechanism incorporating the cam disc or plate 8. As previously mentioned the cam disc 8, which is scanned by the feeler element 9 rigidly connected with the base plate 4, possesses at least one steep descending cam portion 8*b*. Hence during rotation of the cam disc 8 in the direction of the arrow 19 the rigid unit composed of the feeler element 9 and the base plate 4 is "slowly" rocked or pivoted in the clockwise direction until base plate 4 has assumed approximately the position shown in phantom lines in FIG. 6. The elastic vibrating support elements 3 thereby store a certain amount of deformation energy. As soon as the descending cam portion 8*b* of the cam disc 8 moves past the upward free end of the feeler element 9 this deformation energy is released from the support elements 3 and thus the base plate 4 is rocked upwardly quite rapidly. The sealing member 7 located between the lower edge of the rear wall 1*a* and the base plate 4 is, as previously explained, hollow and formed of rubber, so that it does not appreciably hinder this movement. Owing to the jerky-like upward movement the material particles A are subjected to an impulse, whereas during the slower downward movement the surrounding air contributes to braking the fall of the material particles and thus also tends to promote breaking-up of any lumps or caked together particles which may exist. FInally, it is here mentioned that in the graphs of FIGS. 7 and 8 there is plotted along the abscissa the time, and in FIG. 7 along the ordinate the path S of the free end of the feeler element 9, while along the ordinate of the graph of FIG. 8 there is plotted the path R of a material particle A. Both graphs clearly illustrate the sawtooth-like character of the movement of the feeler element and the therewith connected base plate as well as the material particles.

Due to the unique, jerky-like oscillatory movement to which the base plate 4 is subjected by means of oscillatory or vibration drive mechanism, at least the strewable material which is located in the lower portion of the container is placed, as previously discussed, into such movement that it wanders towards the throughpassage slot 5 and drops therethrough as a dosed quantity. Furthermore, by means of the adjustment mechanisms described in conjunction with FIGS. 4 and 5, it is possible to influence the quantity of material strewn per unit of time and also to take into consideration the character or

property of the strewable material, among other things, its grain size.

It should be apparent that a large number of modifications can be made to the exemplary described embodiment of inventive strewing apparatus without departing from the basic concepts of the invention, apart from the fact that by virtue of the easy exchangeability of the cam disc, and additionally by installing a different cam disc which, for instance, has a number of steep portions or sections 8*b*, it is possible to influence or take into account the properties of the strewable material and the desired quantity of material to be strewn. Moreover, it would be possible, for example, to subdivide the front wall 1*d* of the container into a number of longitudinal sections and to associate with each such section an adjustment mechanism of the type shown in FIG. 5, so that for each longitudinal section mentioned above it would be possible to regulate the basic width of the associated portion of the throughpassage slot 5 thereof. Further, the housing could be provided at its lower end with oscillating-dampening leg members in order that the oscillations are not transmitted to other components which are connected with those upon which the strewing apparatus is secured by means of these legs.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims. Accordingly,

What is claimed is:

1. A strewing apparatus, especially for baking installations, comprising container means having an open lower end and narrowing in cross-section towards said open end, said container means incorporating a front wall and a rear wall, a base plate for closing the major portion of said lower open end of said container means, oscillating support elements for mounting said base plate at said rear wall of said container means for carrying out an oscillatory movement up and down substantially in a direction of downward feed of the strewable material through the open end of said container means, said base plate including a marginal edge portion spaced in confronting relationship from and cooperating with said front wall of said container means to provide therebetween a throughpassage slit for the material to be strewn, oscillating drive means arranged behind said rear wall of said container means for placing said base plate into oscillatory motion such that said base plate together with said marginal edge portion thereof which forms said throughpassage slit with said front wall is primarily moved up and down, said throughpassage slit extending substantially transversely with respect to said downward feed of said strewable material from said container means through said open end thereof, the upward movement of said base plate at least at the beginning of its motion occurring in substantially jerky-like fashion, and additional means for independently adjusting the basic width of said throughpassage slit.

2. A strewing apparatus as defined in claim 1, wherein said oscillating drive means incorporates cam disc means and electric motor drive means, feeler means fixedly connected with said base plate, said cam disc means acting upon said feeler means.

3. A strewing apparatus as defined in claim 2, wherein said electric motor drive means comprises a motor transmission block means.

4. A strewing apparatus as defined in claim 2, wherein said cam disc means possesses at least one gradually ascending cam profile section and a given number of steeply descending cam profile section means arranged in such a fashion that the oscillatory movement imparted to said base plate additionally favorably affects the migration of the strewable material located lowermost in said container means towards said throughpassage slit.

5. A strewing apparatus as defined in claim 1, wherein said container means further includes a pair of side walls fixedly connected with said rear wall, means for pivotably mounting the upper end of said front wall of said container means with said side walls, and wherein said additional means act upon said front wall of said container in order to adjust said basic width of said throughpassage slit.

6. A strewing apparatus, especially for baking installations, comprising container means having an open lower end and narrowing in cross-section towards said open end, said container means incorporating a front wall and a rear wall, a base plate for closing the major portion of said lower open end of said container means, oscillating support elements for mounting said base plate at said rear wall of said container means, said base plate including a marginal edge portion cooperating with said front wall of said container means to provide a throughpassage slit for the material to be strewn, oscillating drive means arranged behind said rear wall of said container means for placing said base plate into oscillatory motion such that said base plate together with said marginal edge portion thereof which forms said throughpassage slit with said front-wall is primarily moved up and down, the upward movement of said base plate at least at the beginning of its motion occurring in substantially jerky-like fashion, said oscillating drive means incorporating cam disc means and electric motor drive means, feeler means fixedly connected with said base plate, said cam disc means acting upon said feeler means, additional means for independently adjusting the basic width of said throughpassage slit, means for displaceably mounting said electric motor drive means together with said cam disc means at said container means in such a fashion that by changing the position of said electric motor drive means and said cam disc means it is possible to vary the amplitude of said base plate.

7. A strewing apparatus as defined in claim 1, wherein said oscillating support elements are positioned to mount said baseplate at said rear wall of said container means for oscillation about a pivot point which is disposed above the plane containing said base plate, said throughpassage slit for the material to be strewn remaining of substantially constant size throughout said oscillatory motion of said base plate.

* * * * *