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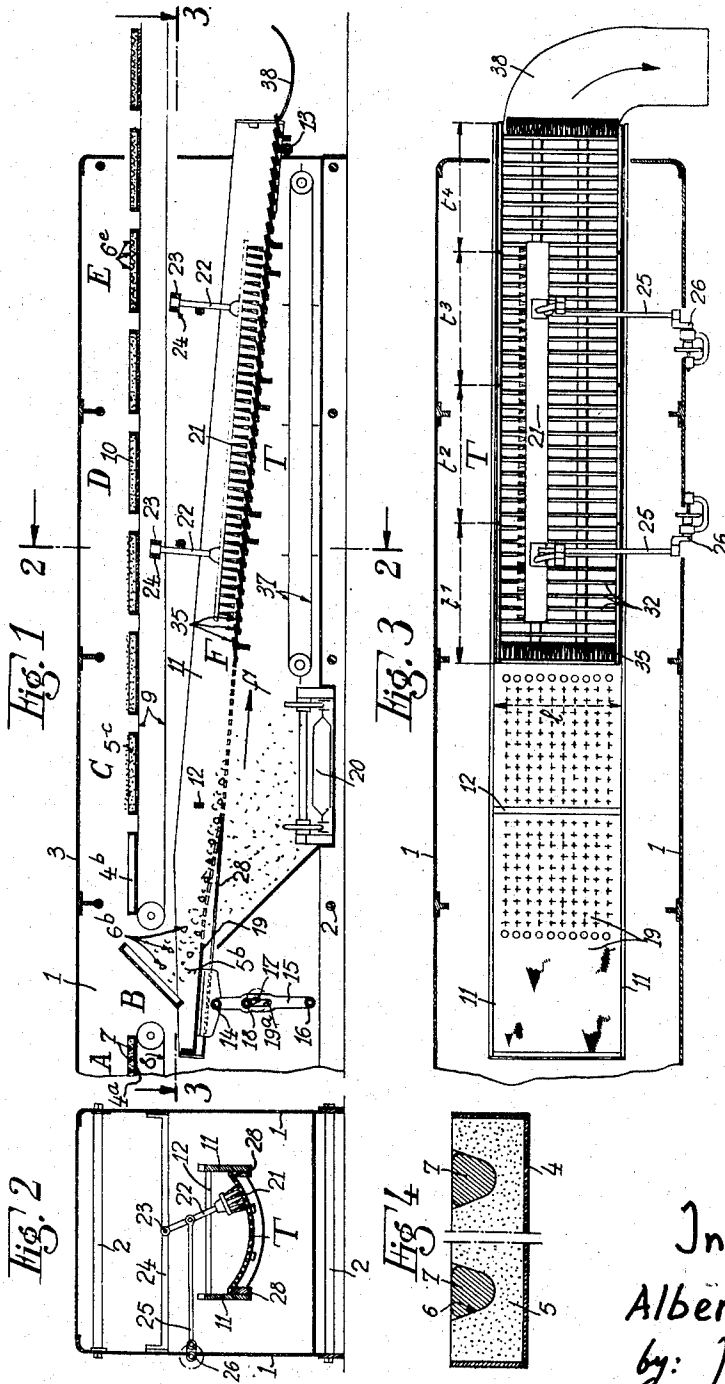
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2,801,598

BRUSH-SIEVE FOR CONFECTIONERY MACHINES

Filed July 17, 1953

3 Sheets-Sheet 1



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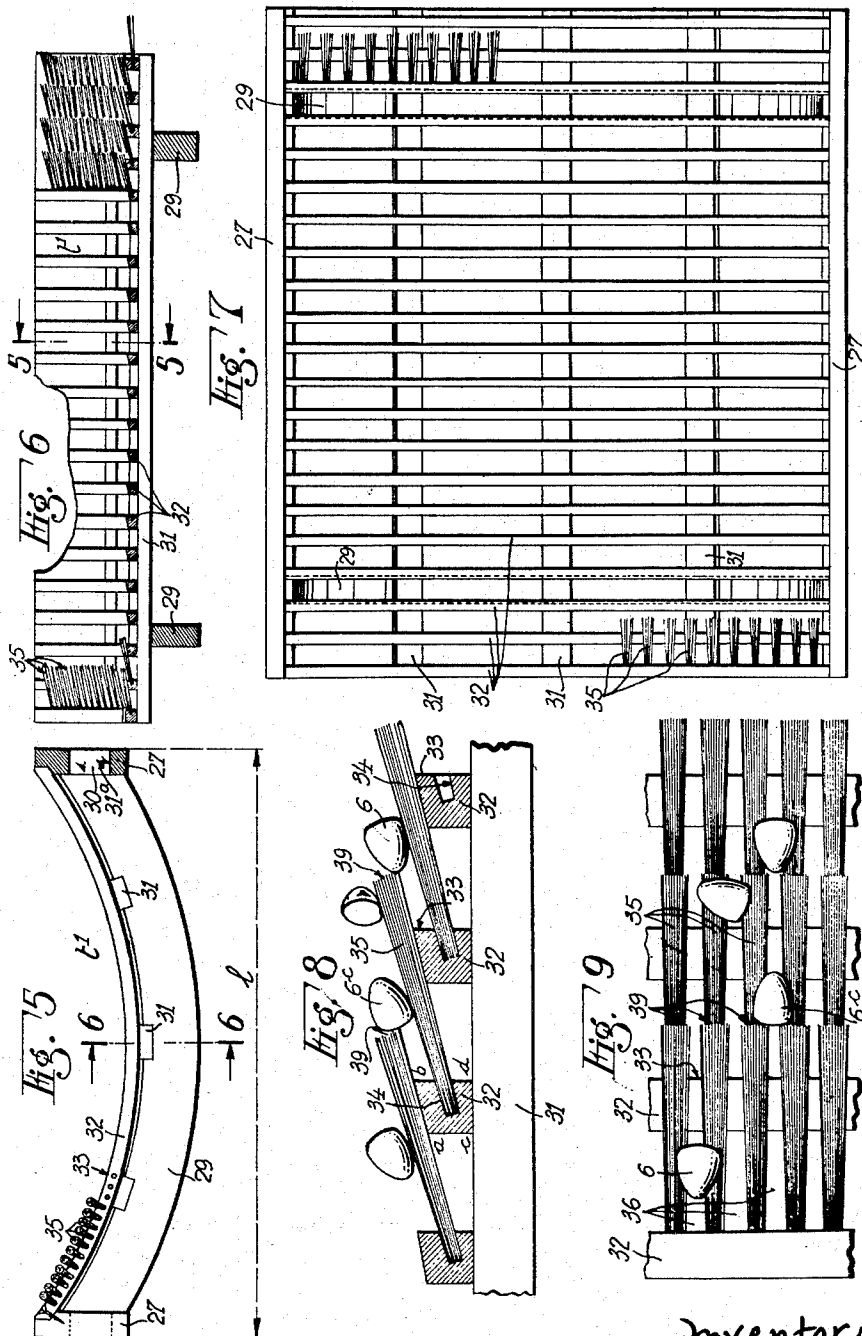
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Fig. 10

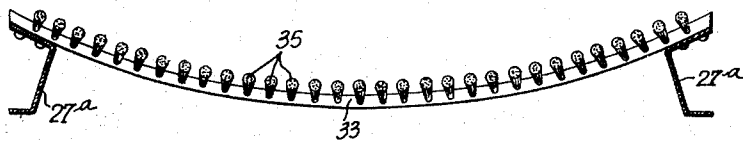
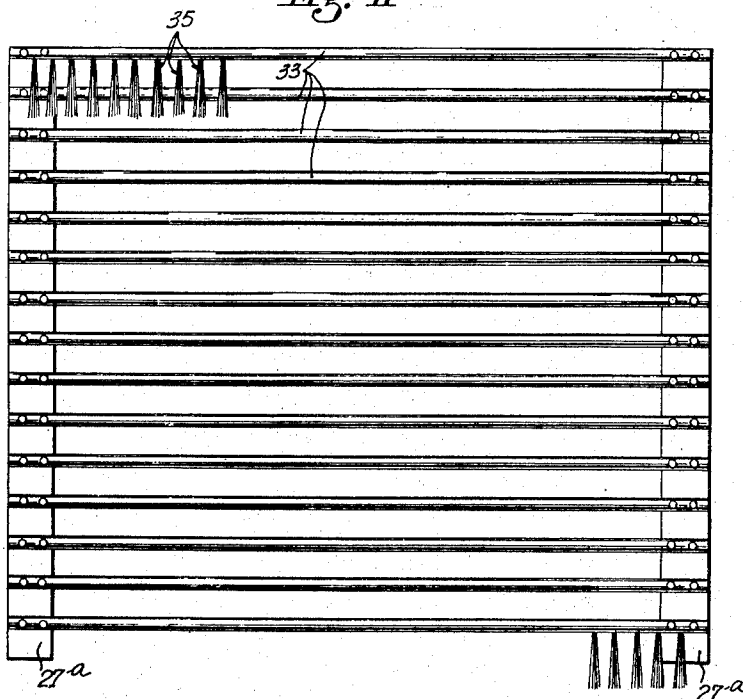


Fig. 11



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BRUSH-SIEVE FOR CONFECTIONERY MACHINES

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3 Claims. (Cl. 107—44)

This invention relates to the brushing of certain products from which it is necessary to remove a more or less continuous coating of a powdered product. This operation is required for example in the manufacture of certain confectionery products (gums, liquorices, lozenges, for instance) which are produced by molding in starch.

It is known that in the manufacture of such products a more or less viscous hot sirup is poured into impressions or cells previously formed in starch. The products or articles, so molded in molds arranged in stacks, solidify in the open air or in stoves. The molds are then overturned onto a sieve to separate the articles from the starch, the latter being used again.

To completely remove the starch adhering to the surface or in the crevices of the molded products, it is necessary to pass the latter through a special cleaning apparatus including generally, at its lower part, a vibrating brush-sieve and, at its upper part, a brush having a reduced area moving with reciprocating motion on that brush-sieve. The installation may be completed with a blower or suction device.

Brush-sieves in general use comprise a rigid perforated stand, the upper face of which extends in a direction parallel to the surface generated by the bristles of the moving brush (said surface being a segment of a cylinder if this brush oscillates about a fixed axis). The tufts of bristles of the brush-sieve protrude from the stand in a direction perpendicular to said face, each of these tufts extending through one of the meshes of a metal grid disposed parallel to and at a certain distance from said face. The generatrices of the brush-sieve surface as well as the axis of the swinging brush are inclined so as to obtain an automatic displacement of the brushed articles towards the discharge or output end of the brush-sieve.

Such a brush-sieve possesses very serious drawbacks and in particular the following:

1. The brushing surface defined by the ends of the bristles, are uneven owing to the gaps between the tufts to allow discharge of the starch; hence brittle articles are impaired when they strike the metal screen.

2. The tufts are too rigid and the surface formed by their adjoining ends is too hard and hence inefficient for the cleaning operation.

3. The sieve does not allow the starch to pass freely through, since the stand or the individual brush mountings and the tufts themselves offer too much obstruction to the passage of starch and hence frequent cleaning is required.

4. The rate of discharge of the products at the end of the brush-sieve is low; in spite of the inclination of the brushing surface the products move too slowly and accumulate in large numbers, which increases the number of collisions and diminishes cleaning efficiency.

5. The cost price of the machine is very high owing to the fact that the tufts are packed close together and

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to the provision of the grid through the apertures of which the tufts extend.

The invention has for its principal object to provide an improved brush-sieve, which is free from these drawbacks.

The invention has for further object to provide a brush-sieve which comprises inclined tufts which make an acute angle with the upper face of said brush-sieve and which are superposed in the manner of the cereal straws of a thatch roof.

Another object of the invention is to provide a machine for confectionery articles and the like, which includes a brushing device provided with a brush-sieve having inclined tufts.

The following advantages are afforded by the invention:

1. The brushing surface is more even than that of known brush-sieves, though it allows a higher rate of starch discharge therethrough owing to the gaps between the tufts.

2. The tufts are not associated with any grid and are in consequence much more supple; they do not retard or grip the products but on the contrary, due to their vibrations, assist the displacement of the products and direct them towards the output end of the brush-sieve.

3. The construction is very much simplified and in consequence the cost price of the machine is reduced.

Other features and advantages of the invention will be apparent from the following description.

In the appended drawings, given only by way of example:

Fig. 1 is a vertical, diagrammatic sectional view of a part of a confectionery product machine and more particularly the part thereof adapted to clean the molded product, this part including a brush-sieve embodying the invention;

Fig. 2 is a vertical, transverse sectional view on line 2—2 of Fig. 1;

Fig. 3 is a horizontal, longitudinal, diagrammatic sectional view on line 3—3 of Fig. 1;

Fig. 4 shows a partial longitudinal sectional view of a small mold, the confectionery products being shown embedded in the starch;

Fig. 5 is a vertical, transverse sectional view on line 5—5 of Fig. 6 of the brush-sieve, to a scale greater than that of Figs. 1 to 3;

Fig. 6 is a vertical, longitudinal sectional view of the brush-sieve on line 6—6 of Fig. 5;

Fig. 7 is a plan view thereof;

Fig. 8 is a partial longitudinal sectional view thereof, to a larger scale;

Fig. 9 is a corresponding plan view;

Fig. 10 is a vertical transverse sectional view of a modification of the brush-sieve, and

Fig. 11 is a plan view thereof.

Reference will first be had to Figs. 1 to 3 in which, in order to show better the advantages of the brush-sieve of the invention, this brush-sieve is shown in one of its applications, mounted in the cleaning part of a machine of known type adapted to produce confectionery products by pouring syrup into cavities formed in starch.

This machine includes a housing forming a tunnel, formed by two vertical longitudinal walls 1, connected by spacers 2 and covers 3.

At A, at the left end of the machine part shown in Fig. 1, is provided a loading station for the small chests or molds 4, filled with starch 5 (see Fig. 4) in which are formed cells 6; into each cell has been poured a product 7, confectionery for example. The full molds are received at 4^a by a first endless conveyor 8.

At B, the molds arrive, one by one, at a tipping station

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where a conventional mechanism, not shown, turns the molds upside down. The empty molds are automatically returned to their normal position at 4^b on a second endless conveyor 9^b which conveys the molds toward the right end of the machine as seen in Fig. 1 before a filling station C where they receive a new supply of starch 5^c, then through a shaving station where an upper plane surface 10 is formed on the starch layer, and finally through a station E where new cells 6^c are formed. The molds then leave the shown machine part and reach a pouring station adjacent the right end of the machine where the cells receive the sirup or other product which forms a new set of articles in the mould.

The starch 5^b and the articles 6^b unloaded in bulk at station B, fall on a vibrating table, which constitutes one of the devices of the cleaning part F.

This vibrating table comprises two longitudinal members 11 braced by cross members 12, so as to constitute a rigid frame. The latter is longitudinally inclined from the input end of the machine (left end in Fig. 1) to the output end where it lies on a roll 13. At the input end the frame is pivotally mounted on a shaft 14 carried by two twin levers 15 pivoted at 16 to the walls 1. Oscillatory motion is imparted to one of these levers 15 by a crank-shaft 17, the journal of which is supported in one of the walls 1. The crankpin 18, eccentric with respect to the axis of the shaft 17, is lodged in a hole 19^a of the lever. The vibrating table receives therefore reciprocating motion in the direction of arrow *f*¹ and in the opposite direction.

The frame (11, 12) of said vibrating table carries a well 19 which is solid and plane at the input end of the table and is thereafter progressively curved in the transverse direction, perforations being provided in this curved portion. On this wall takes place an initial separation of starch 5^b from products 6^b, which roll towards the lower part of the wall 19, while starch which passes through said wall is received by a device 20 which returns it to the loading station C.

The brush-sieve T according to the invention is located beyond the perforated wall 19 with respect to the direction of movement of the products. Said sieve is of general arcuate shape; it is placed in the prolongation of the wall 19. Above the brush-sieve T is disposed an oscillating brush 21 carried by arms 22, pivoted at 23 to fixed cross-members 24 and actuated by connecting rods 25 driven by crankshafts 26.

The brush-sieve T includes a certain number of independent sections *r*¹, *r*² . . . *r*⁴ (Figs. 1, 2) placed end to end between the vibrating table members 11.

Reference will now be had to one of the sections, for example section *r*¹ shown in Figs. 5 to 9.

This section consists of a rigid frame made of two longitudinal bars 27. The width *l* of the frame is equal, apart from a very little clearance necessary for assembly, to the distance between the inner opposite faces of the members 11 of the vibrating table, so that said section *r*¹ can be slid between those members, the bars 27 resting on brackets 28 (Figs. 1, 2) secured under said members 11.

Bars 27 are rigidly connected together by a number, for instance two, of arches 29, secured to bars 27 by mortise-and-tenon joints 31^a or otherwise.

On the arches 29 are fastened a number of longitudinal bars 31.

On said bars 31 are secured parallel to arches 29, brush mountings 32. Each of said mountings, made of wood or similar material, is shaped as an arch, with such radius that after assembly of the *r*¹ section between members 11 of the vibrating table, the arch centers of the said mountings are on the axis of oscillation of the brush 21.

The cross-section of mountings 32, *abcd* (Fig. 8), is trapezoidal, the larger side *bd* corresponding to the face 33 facing the output end of the machine, whilst the top

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side *ab* is oblique as shown, obliqueness is about ten degrees to the horizontal for instance.

Tufts 35, each made up of a certain number of bristles or hair, which can advantageously be made of nylon, are fastened to the face 33 of each mounting 32 by insertion in blind holes 34.

Each hole 34 runs parallel with the top side *ab* of the mounting 32, and so does the longitudinal axis of each tuft which is more or less divergent with respect to said axis. Each tuft has such length that said tuft extends beyond the following mounting, all the tufts of a given mounting leaning against the following mounting and partially covering the tufts fastened to said latter in the manner of the straws of a thatched roof.

Comprised between the tufts and the mountings 32 are spaces 36 (Fig. 9), the width thereof being, of course, less than that of the articles 6 to be cleaned.

Sections *r*¹, *r*² . . . *r*⁴ are slid one after the other between the members 11 of the table at its output end and locked into position.

As will be understood, when oscillations are imparted to the vibrating table by shaft 17 and when at the same time shafts 26 actuate in the same manner the brush 21, the articles are subjected to the brushing action of tufts 35 of the brush-sieve T as well as that of the swinging brush 21, and are cleaned of the starch which more or less covers their surface. The starch passes through the gaps 36 provided between tufts 35 and falls on the metal bottom and a conveyor 37 brings it back to elevator 20.

During that time, the cleaned articles roll toward the output end of the brush-sieve T and finally fall into a conventional chute 38 (Fig. 1).

The advantages of the brush-sieve according to the invention will now be much better understood:

1. The brushing surface of said brush-sieve is even or regular for it is purely and simply constituted by the tufts 35 considered in their length direction.

2. This surface works more progressively and less roughly on the articles than a surface obtained by standing the tufts 39 on end; it will be noticed that owing to the fact that the tufts are directed toward the output end of the machine the article such as 6^c (Figs. 8, 9) contacting the ends 39 of one or several tufts is not heavily pressed against the said ends.

3. Owing to resilience of the tufts which are extremely free and accordingly very supple, these tufts tend to repel the articles and thereby assist their progression towards output end of the machine.

4. The cost price of sections *r*¹ . . . *r*⁴ of the brush-sieve is very low, for each brush element (32—35) can be machine made and its assembly is very easy.

5. The brush units (32, 35) form themselves spacer elements between longitudinal bars 27, which permits decreasing the number of arches 29; further, the passage of starch is facilitated and the weight of the brush-sieve unit is lowered; now, lightening of the oscillating brush-sieve is of the utmost importance, since a decrease in the kinetic energy of the moving mass allows an appreciable decrease in the size of the stands and of the driving parts of the whole vibrating table.

In Figs. 10 and 11 is shown a modification of the brush-sieve, in which the weight is still more lowered, for the arches 29 and intermediate bars 31 of the foregoing embodiment are eliminated. Mountings 33, bearing the tufts 35, are directly fastened to both longitudinal bars 27^a constituted by two metal structures.

Of course, the invention is not limited to the embodiments shown and described since many changes and modifications may be made therein without departing from the spirit of the invention or the scope of the appended claims.

The brush-sieve according to the invention is, of course, utilizable in any type of machine other than the one shown.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a machine for confectionery articles and the like which must be cleansed by brushing of a layer of pulverulent product, these articles moving in a certain direction inside the machine; a brush-sieve support inclined downwards in said direction at an angle not exceeding 30°; at least one brush-sieve supported by said brush-sieve support, said brush-sieve comprising a rigid frame made of two longitudinal side bars and arcuate cross-members disposed in transverse parallel planes and connected together by said bars, and tufts engaged in holes provided on an arc of a circle in each of said arcuate cross-members, said arcs of circles being all disposed on a single geometrical part-cylindrical surface, the axes of said tufts being disposed in radial planes inside said part-cylindrical surface and inclined at an angle not exceeding 45° in relation with the longitudinal axes of said bars, each of the transverse arcuate rows of tufts thus formed, substantially in adjacent transverse parallel planes, being spaced from and partly overhung by the adjacent previous row and partly overhanging the adjacent next row; and an auxiliary brush mounted swinging about an axis fixed on said frame above said brush-sieve, said axis coinciding with the geometrical axis of said part-cylindrical surface.

2. In a machine for confectionery articles and the like which must be cleansed by brushing of a layer of a pulverulent product, these articles moving in a certain direction inside the machine; a brush-sieve support inclined downwards in said direction at an angle not exceeding 30°; at least one brush-sieve supported by said brush-sieve support, said brush-sieve comprising a rigid frame made of two longitudinal side bars and arcuate cross-members disposed in transverse parallel planes and connected together by said bars, the transversal section of these cross-members being a trapezium the upper side of which is inclined at an angle not exceeding 45° in relation with the longitudinal axis of said bars, and for each cross-member, tufts engaged in holes provided on an arc of a circle in its face corresponding to the larger base of said section said arcs of circles being all disposed on a single geometrical part-cylindrical surface, the axes of said tufts being disposed in radial planes inside said part-cylindrical surface and inclined in a direction substantially parallel to said upper inclined side, each tuft leaning on the oblique upper face of the adja-

cent cross member, and each of the transverse rows of tufts thus formed, substantially in adjacent parallel planes being spaced from and partly overhung by the adjacent previous row and partly overhanging the adjacent next row; and an auxiliary brush swinging about an axis fixed on said frame above said brush-sieve, said axis coinciding with the axis of said part-cylindrical surface.

3. In a machine for confectionery articles and the like which must be cleansed by brushing of a layer of pulverulent product, these articles moving in a certain direction inside the machine; a vibrating table inclined downwards in said direction at an angle not exceeding 30°; at least one brush-sieve supported by said vibrating table, said brush-sieve comprising a rigid frame made of two longitudinal side bars and arcuate cross-members disposed in transverse parallel planes and connected together by said bars, and tufts engaged in holes provided on an arc of a circle in each of said arcuate cross-members, said arcs of circles being all disposed on a single geometrical part-cylindrical surface, the axes of said tufts being disposed in radial planes inside said part-cylindrical surface and inclined at an angle not exceeding 45° in relation with the longitudinal axes of said bars, each of the transverse arcuate rows of tufts thus formed, substantially in adjacent transverse parallel planes, being spaced from and partly overhung by the adjacent previous row and partly overhanging the adjacent next row, said tufts pointing in said direction and being fastened in their upstream ends while their downstream ends are free; and an auxiliary brush mounted swinging about an axis fixed on said frame above said brush-sieve, said axis coinciding with the axis of said part-cylindrical surface.

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