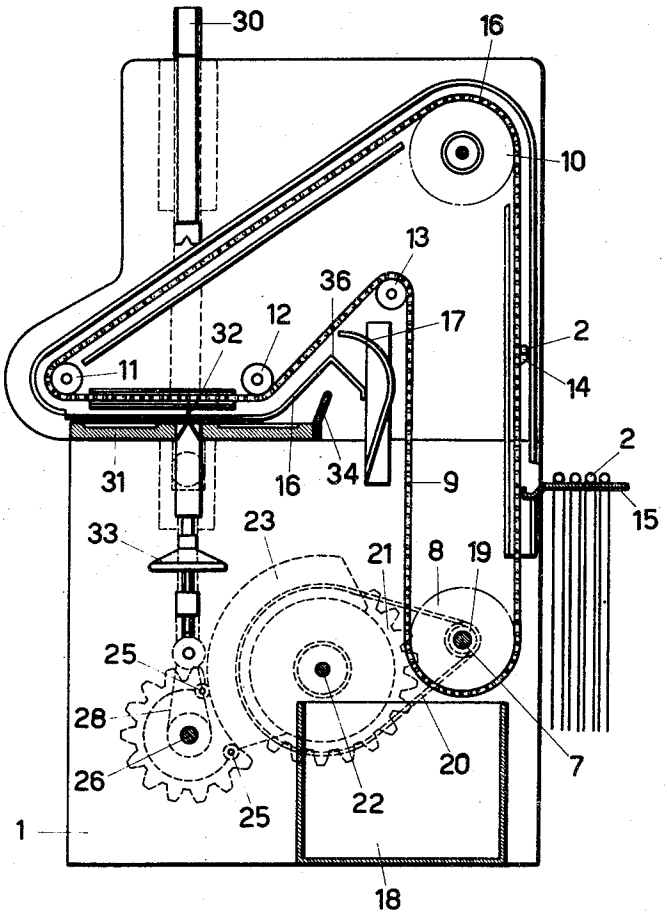
June 14, 1955 A. FAVA 2,710,583

MACHINE FOR BREAKING STRANDS OR FILAMENTS OF ALIMENTARY PASTE

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Fig.1



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MACHINE FOR BREAKING STRANDS OR FILAMENTS OF ALIMENTARY PASTE

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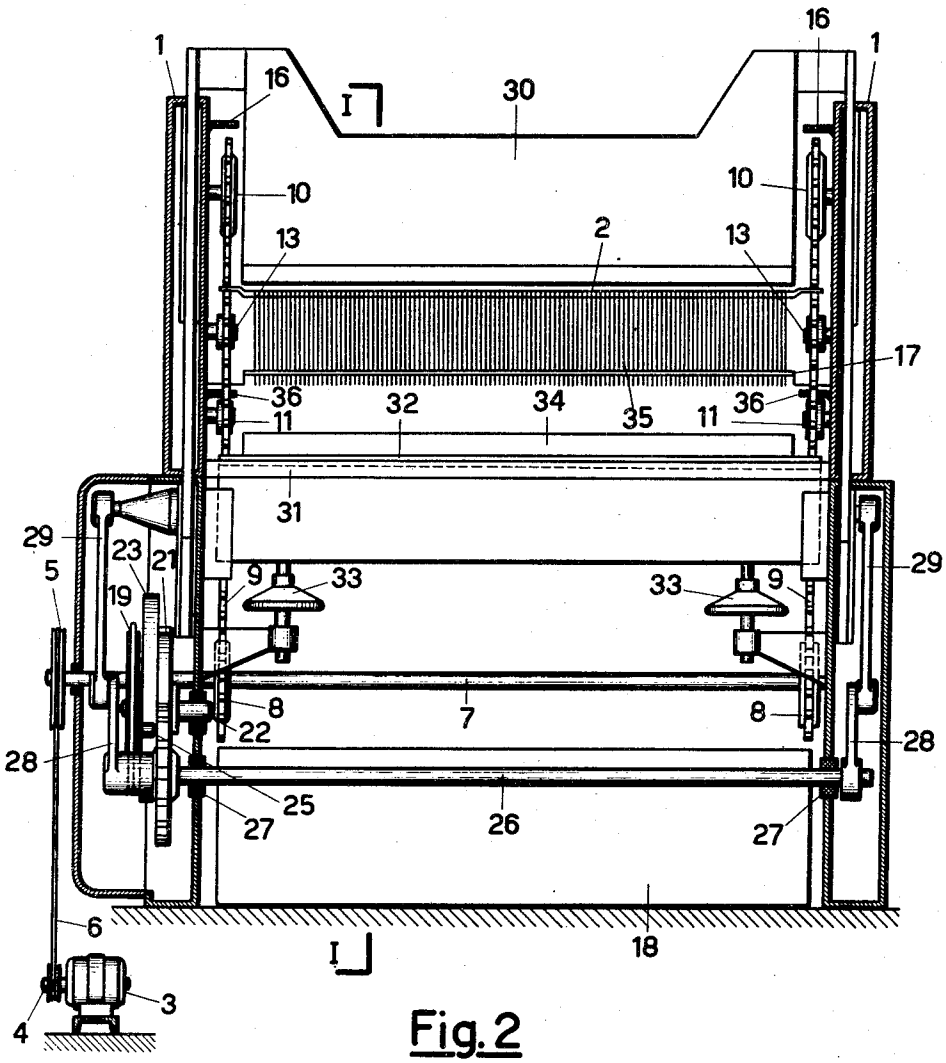


Fig. 2

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Fig.7

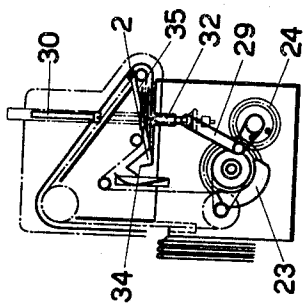


Fig.4

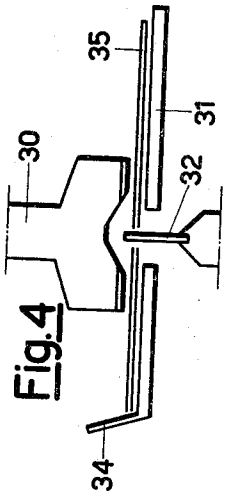


Fig.3

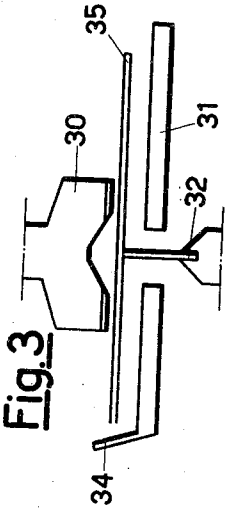


Fig.6

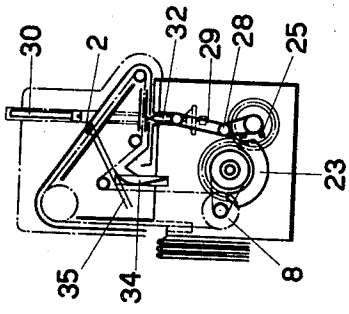


Fig.9

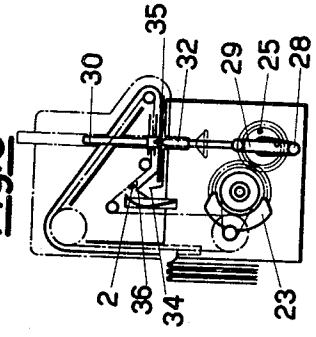


Fig.5

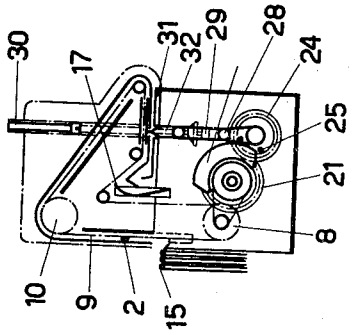
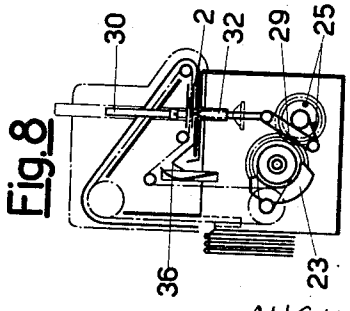


Fig.8



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2,710,583

MACHINE FOR BREAKING STRANDS OR FILAMENTS OF ALIMENTARY PASTE

Augusto Fava, Milan, Italy

Application March 19, 1953, Serial No. 343,473

5 Claims. (Cl. 107—7)

The invention relates to a device for breaking strands or filaments of alimentary paste and more particularly to an automatic machine for breaking elongated strands of alimentary paste which have been dried and laid out on canes, such breaking being effective after previous automatic extraction of said canes from said paste.

The problem is that packaging of strands of alimentary paste or dough, such as, spaghetti and the like, requires a length thereof that is about the half of that with which it is produced, for technical reasons.

Heretofore, the solution of this problem required a first operation of taking the paste from the canes over which it is laid or hung during the drying stage, and a subsequent operation of cutting it with mechanical disc saws. These operations are very burdensome because recourse must be had to the use of much labour for removing the paste from the canes, collecting it in stock and eventually grouping it in bundles to be cut. Moreover, during the various steps of handling inevitably waste is caused.

It is an object of the invention to dispense with all these manual operations by providing a device for taking up and forwarding the canes supporting the strands of paste and for laying the paste filaments or strands out on a table where they are broken after previous extraction of said canes.

The machine embodying the invention may be operated alone, the canes being loaded by hand into a device provided for this purpose, or it may be coupled with an automatic dryer at its outlet. In this way the double advantage is attained of reducing labour and of reducing waste as well.

The structure and operation of the machine according to the present invention will be apparent in the following description with reference to the accompanying drawings where one embodiment of the machine is shown by way of example:

Fig. 1 is a vertical, sectional view of the machine taken along the line 1—1 of Fig. 2.

Fig. 2 is a front elevational view of the machine, with the outer casing thereof being removed.

Fig. 3 and Fig. 4 show the punch used in the machine of the invention in two stages of its operation.

Figures 5, 6, 7, 8 and 9 diagrammatically illustrate various stages of operation embodying the machine of the invention.

The machine illustrated in the drawings includes two sturdy metal side frames 1 spaced from each other sufficiently so that the canes 2 carrying the strands or filaments of paste can pass through between them. The side frames serve to support all moving members of the machine. A motor 3 transmits motion by way of pulleys 4 and 5 and a belt 6 to a shaft 7 journalled in the side frames 1. On the same shaft 7 there are secured two sprockets 8 in the proximity of the side frames. Each of the sprockets 8 is in driving engagement with a continuous chain 9 which passes over the idler sprockets 10, 11, 12 and 13 to follow a closed path which is hereinafter described in detail. A carrier 14 is secured to each of the

chains 9 and serves to individually pick up the canes loaded with strands of paste from a magazine 15 and to carry the engaged cane along the path of the chain while supporting the cane at its opposite ends.

A metal track 16 follows a portion of the path of the chain 9 to prevent removal of the canes from the carriers 14 during movement of the latter along the tracks 16, that is, from the time the individual cane is picked up from magazine 15 until the cane is dropped from the carriers into a collecting receptacle 18.

A sprocket 19 fitted onto shaft 7 is coupled by way of a chain 20 to a sprocket 21 mounted on a shaft 22. On the same shaft 22 is fitted also a special wheel 23 which is toothed over two thirds of its circumference and carries a smooth projection over the remaining one-third. With its toothed portion the wheel 23 meshes with a related spur gear 24 carrying two axially extending pins 25 for slidable contact with the smooth projection of the wheel 23. The gear 24 is fitted on the shaft 26 which extends through both of the side frames 1 carrying its supporting bearings 27. At the two ends of the shaft 26 there are fitted two cranks 28, which by way of connecting rods 29 convert rotation of shaft 26 into reciprocating vertical motion of a punch 30.

A horizontal plate 31 extends from one side frame 1 to the other of the machine, having a width at least equal to the length of the paste filaments.

A laterally extending blade 32 extends upwardly through table 13 and the projection of the blunted top edge of the blade above the table is adjustable by means of the handwheels 33. On said table 31 there is a plate 34 projecting upwards along the border or edge of the table closest to magazine 15.

At the two sides of the table 31 the two guide members or tracks 16 follow the chains 9 as far as the points 36 whereafter they become spaced from the chains so as to permit the canes to leave the carriers 14.

In Figures 3 and 4 it will be seen how punch 30 works to break the paste filaments 35. The projection of blade 32 from the table 31 should be conveniently adjusted by means of the handwheels 33 (Fig. 1) so that the strands or filaments 35 are raised above the table surface at their centers and are there broken over the upper edge of blade 32 by the downward pressure of punch 30 on the strands in front and back of the blade.

Referring to Fig. 1 of the drawings, it will be seen that the sprockets 8, 10, 11, 12 and 13 are so arranged that the chains 9 follow a continuous path having a straight vertical run extending from sprocket 8 to sprocket 10 upwardly past the magazine 15. From the sprocket 10 each chain 9 follows a downwardly inclined path to the sprocket 11 which is disposed above the front edge of table 31. Sprocket 12 is disposed at substantially the same level as sprocket 11 but in back of the latter so that the chain 9 moves rearwardly from sprocket 11 to sprocket 12 over the upper surface of table 31. Sprocket 13 which is disposed rearwardly of sprocket 12 is located at a relatively high level so that chain 9 travels along an upwardly inclined run between the sprockets 12 and 13 and, after passing over the latter sprocket, travels downwardly to the sprocket 8. As previously noted, the tracks 16 extend from a location immediately above magazine 15 to a location above the rear edge of table 31 and are effective to hold the individual rods or canes 2 against the chains 9 to be propelled by the carriers 14 even during the movement of the carriers along the portion of the path between sprockets 11 and 12, where the canes 2 are disposed below the chains 9. As seen in Fig. 1, the terminal portions of the tracks 16 are inclined downwardly away from the path of the chains between the sprockets 12 and 13, as at 36, so that when the carriers reach the terminal portions of the tracks 16, the cane

or rod engaged thereby is free to drop into the collecting receptacle 18. Further, as seen in Fig. 1, a curved deflecting shield 17 extends laterally between the side frames 1 of the machine in back of the rear edge of table 31 with the curved upper portion of the shield extending well above the level of the table.

From the previous description of the mechanism for effecting the vertical reciprocation of punch 30, it is apparent that such reciprocation is effected intermittently in timed relationship to the movement of the chains 9 driven by the sprockets 8. Figs. 5, 6, 7, 8 and 9 of the drawings diagrammatically illustrate successive stages in the operation of the described machine and specifically indicate the relationship between the movement of the chains 9 and the reciprocation of the punch 30.

During the first phase of operation of the machine illustrated in Fig. 5, the carriers 14 on the chains 9 move upwardly with the latter from the sprockets 8 to the sprockets 10 thereby to pick up a cane or rod 2 having strands or filaments of paste suspended therefrom. While the carriers 14 are moving upwardly toward the sprockets 10, the smooth projection of wheel 23 engages the pins 25 on gear 24 to position the latter for holding or maintaining punch 30 in its elevated position. As the carriers 14 and the cane 2 move downwardly along the inclined chain path between the sprockets 10 and 11, as shown in Fig. 6, the lower end portion of the strands of paste suspended from the cane or rod engage against the shield 17 whereby the strands of dough are swung about the cane 2 toward a horizontal disposition. As the cane 2 moves downwardly toward the sprocket 11, the smooth projection of wheel 23 is disengaged from the pins 25 of gear 24 and the toothed portion of wheel 23 then meshes with the gear 24 to begin the downward stroke of punch 30. As the cane 2 is moved around the sprockets 11 by the carriers 14, as shown in Fig. 7, the free ends of the strands of paste or dough move over the upper edge of shield 17 and come to rest on the table 31 adjacent the rim or upstanding flange 34 along the rear edge of the table. When the cane is then moved rearwardly over table 31 by movement of the carriers between the sprockets 11 and 12, as shown in Fig. 8, the ends of the strands of paste engage against the rim or flange 34 at the rear edge of the table so that rearward movement of the strands of paste is prevented and the cane or rod 2 is moved out from between the strands of dough. During the phases of operation illustrated in Figs. 7 and 8, the punch 30 continues its downward stroke toward the table 31, and, after the cane or rod 2 has been moved out from between the strands of paste, punch 30 completes its downward stroke and bears downwardly upon the strands of dough at opposite sides of the blade 32 projecting slightly above the upper surface of table 31. This downward bearing of the punch 30 serves to break the strands of dough across the blunted upper edge of blade 32, as distinguished from the cutting action heretofore employed.

During the final downward movement of punch 30, as illustrated in Fig. 9, the cane or rod 2 is carried or propelled along the upwardly inclined run of the chain between the sprockets 12 and 13 past the terminal portion 36 of the tracks 16 where the cane or rod is released and is free to drop into the collecting receptacle 18. The carriers 14 then move downwardly from the sprockets 13 to the sprockets 8 for return to the positions occupied during the initial phase of operation, and during this return movement of the carriers, the punch 30 is again elevated, or stroked upwardly, and the broken strands of paste can then be manually removed from the surface of table 31. When the punch 30 has been returned to its elevated position, the smooth projection of wheel 23 again comes into engagement with the pins 25 on gear 24 thereby to hold the punch in its elevated position, as shown in Figs. 1 and 5.

From the foregoing, it is apparent that the described device automatically removes the successive canes 2 from the magazine 15, lays the strands of paste or dough across the table 31 over the blade 32, removes the supporting cane or rod from between the strands of paste, and then breaks the strands of dough or paste across the blade 32 thereby to avoid waste of the paste or dough and to minimize the manual operations required for preparing such products for packaging.

While an illustrative embodiment of the invention has been described in detail herein, and shown in the accompanying drawings, it is to be understood that the invention is not limited to this precise embodiment, and that various changes and modifications may be effected therein without departing from the scope or spirit of the invention as defined in the appended claims.

What I claim is:

1. A machine for breaking elongated strands of alimentary paste after such strands have been dried and suspended from supporting canes; said machine comprising a horizontal table having a length at least as large as the lengths of the strands suspended from the canes and a width at least as large as the lengths of the canes, a laterally extending blade projecting above the upper surface of said table at substantially the center of the latter, a laterally extending punch reciprocatable vertically above said blade and having spaced lower edge portions engageable in front and in back of said blade when said punch is stroked downwardly toward said table, means for conveying the supporting canes having strands of paste thereon one at a time over said table to lay the strands of paste longitudinally on the table and across the upper edge of said blade and then to remove each cane from the supported strands, and means actuating said conveying means and said punch to hold the latter in an elevated position during laying of the strands of paste on the table and removal of the cane and then to stroke the punch downwardly toward the table thereby to break the strands of paste across said upper edge of the blade.

2. A machine according to claim 1; wherein said table has an upstanding fixed rim along the rear, laterally extending edge thereof, and a laterally extending shield is disposed in back of said table and extends to a level above that of the upper edge of said rim; and wherein said conveying means includes two parallel chains moving in laterally spaced apart vertical planes at the opposite sides of said table, said chains having laterally aligned carriers thereon for engagement with the opposite ends of a cane to propel the latter with said chains, each of said chains following a closed path including an upwardly moving vertical run to the rear of said shield and extending above the level of the upper edge of said shield a distance less than the lengths of the strands suspended from the cane, a forwardly and downwardly inclined run extending from said upwardly moving vertical run to a location above and adjacent the front edge of said table, a rearwardly moving run extending from said downwardly inclined run over said table and then into an upwardly inclined section passing over said rim, and a downwardly moving run from said upwardlly inclined section to the lower end of said upwardly moving vertical run, and track means extending along said paths of the chains from the upper portion of said upwardly moving vertical run to a location intermediate said upwardly inclined section and operative to hold a cane in engagement with said carriers during movement of the latter along the related portions of said paths so that a cane having strands of paste suspended therefrom and taken-up by said carriers along said upwardly moving vertical run is carried up and over said shield and then forwardly to a location over the front edge of said table whereby the free ends of the strands slide over said shield and then drop onto said table in front of said rim, with the cane being removed rearwardly between the free ends of the strands by movement of the carriers along said rearwardly moving run and then dropping from the carriers at the end of said track means to again condition said car-

riers for the reception of a loaded cane at said upwardly moving vertical run.

3. A machine according to claim 2; wherein said carriers are projections extending outwardly from the related chains so as to depend from the latter during movement along said rearwardly moving run and upwardly inclined section, and said track means consists of a lateral strip parallel to, and spaced outwardly from, the related portions of said chain paths so that each cane is gravitationally removed from the carriers at the end of said track means.

4. A machine according to claim 2; wherein said actuating means includes a motor, a drive sprocket engaging each of said chains, transmission means between said motor and drive sprockets for continuously rotating the latter, a wheel, means transmitting the rotation of said drive sprockets to said wheel, means transmitting the rotation of said drive sprockets to said wheel, said wheel having a gear sector along a portion of the circumference thereof and a smooth arcuate radial projection along the remainder of said circumference, a drive gear disposed to mesh with said gear sector and having two spaced axial pins projecting therefrom for sliding engagement by the periphery of said radial projection whereby said drive gear is intermittently rotated and is held immobile during the periods between the intermittent rotation thereof, and means for converting rotation of said drive gear into reciprocation of said punch.

5. In a machine having a horizontal table and mechanism for laying dried strands of alimentary paste across the table after the strands have been suspended from a supporting cane and for removing the cane from the strands laid across the table; a device for breaking the strands laid across the table comprising a blade extending laterally with respect to the strands and projecting upwardly through the table above the surface of the latter, a punch laterally coextensive with said blade and having a central longitudinal groove in the lower edge thereof in vertical registration with said blade, and means for vertically reciprocating said punch between a raised position and a lowered position in which the portions of the lower edge of the punch at opposite sides of the groove extend below the upper edge of said blade thereby to break the dried strands of alimentary paste over said upper edge of the blade.

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