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(71) Applicant: Mollificio Cappeller S.p.A.
36050 Cartiglano VI (IT)

(72) Inventor: Cappeller, Alessandro
36056 TEZZE SUL BRENTA VI (IT)

(74) Representative: Modiano, Micaela Nadia
Modiano & Partners
Via Meravigli 16
20123 Milano (IT)

(54) Screw feeder for the support and movement of products for automatic vending machines

(57) A screw feeder (10) for the support and movement of products for automatic vending machines, char-

acterized in that it is made from a longitudinally extending tubular body (11), which is curved so as to form a series of coils in the manner of a helical spring.

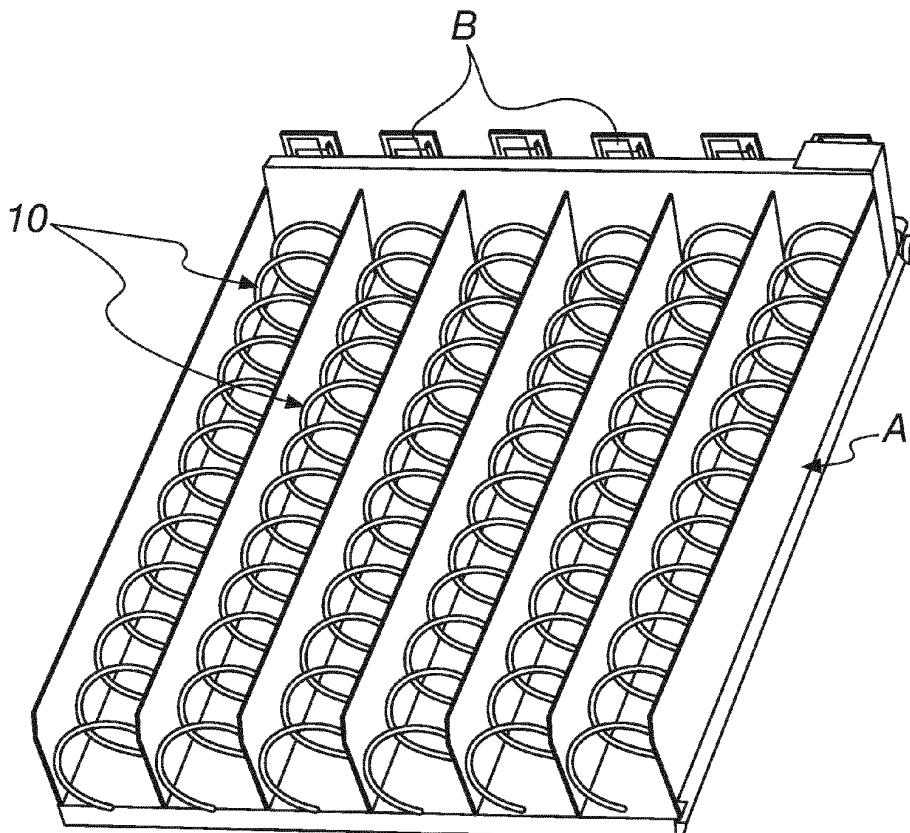


Fig. 1

Description

[0001] The present invention relates to a screw feeder for the support and movement of products for automatic vending machines.

[0002] Nowadays, inside automatic vending machines, for example for snacks, drinks in bottles or cans, cigarettes and the like, there are systems for moving the products which comprise for each type of product a helix, between two successive coils of which a specimen of the preset product is arranged.

[0003] Each helix is rotated by an electric gear motor, the actuation of which is made possible by payment of the amount by the purchaser and by the pressing of a corresponding button which is selected from a plurality of buttons.

[0004] The work of the gear motor causes the rotation of the helix by one step, with the advancement of the products along a resting surface, until the release of the product supported between the two coils formed at the free end of the helix to a fall zone, from which the released product arrives in an adapted receptacle below, which is accessible by the purchaser. Simultaneously all the other identical products carried by the same helix are pushed forward by one step, so as to move them so that they will be accommodated between the next coils of the screw feeder.

[0005] In order to advance products the packaging of which has a particularly wide base, some vending machines have pairs of screw feeders which are arranged side by side and operate by rotating in opposite directions.

[0006] Such support and movement helices are nowadays made of metallic wire, generally 4 millimeters in diameter. The metallic materials used are predominantly austenitic steel, spring steel and, sometimes, aluminum.

[0007] The cost of such helices is strongly correlated to their weight, i.e. to the quantity of metallic material used, and represents a major cost category in determining the sales price of the vending machine.

[0008] Moreover, the weight of the single helix directly influences the electricity consumed by the corresponding electric gear motor for making that helix rotate.

[0009] The aim of the present invention is to provide a screw feeder for the support and movement of products for automatic vending machines, which makes it possible to build automatic vending machines that are lighter and more economical than conventional automatic vending machines.

[0010] Within this aim, an object of the invention is to provide a screw feeder with mechanical and functional properties at least as good as those of conventional helices.

[0011] Another object of the invention is to provide a screw feeder that can be installed in conventional vending machines without necessitating modifications thereto.

[0012] A further object of the invention is to provide a

screw feeder the movement of which requires less electricity than conventional helices.

[0013] Another object of the invention is to provide a screw feeder for the support and movement of products for automatic vending machines that is structurally simple and easy to use, and which can be produced using known systems and technologies, and at low cost.

[0014] This aim and these and other objects which will become more apparent hereinafter are achieved by a screw feeder for the support and movement of products for automatic vending machines, **characterized in that** it is made from a longitudinally extending tubular body, which is curved so as to form a series of coils in the manner of a helical spring.

[0015] Further characteristics and advantages of the invention will become more apparent from the description of two preferred, but not exclusive, embodiments of the screw feeder according to the invention, illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is a perspective view of an exemplary product movement system comprising screw feeders according to the invention;

Figure 2 is a perspective view of a portion of a screw feeder according to the invention in a first embodiment thereof;

Figure 3 is a schematic diagram of a cross-section of the tubular body of a screw feeder according to the invention in a second embodiment thereof;

Figure 4 is a perspective view of a portion of a screw feeder according to the invention in the second embodiment thereof.

[0016] With reference to the figures, a screw feeder for the support and movement of products for automatic vending machines is generally designated with the reference numeral 10.

[0017] Figure 1 shows a drawer of products A, of the conventional type, which contains a plurality of screw feeders 10, each one rotated by a corresponding gear motor B.

[0018] The particularity of the invention lies in the fact that each screw feeder 10 is made from a longitudinally extending tubular body 11, which is curved so as to form a series of coils in the manner of a helical spring.

[0019] The use of a tubular body 11 in place of a solid metallic wire of identical outer diameter, as in the known art, makes it possible to considerably reduce the weight of the screw feeder 10, with evident benefits in terms of cost, both in the saving of raw materials, and in the saving of electricity for moving the screw feeder 10, in that the gear motor has to rotate a lighter body than conventional screw feeders.

[0020] In the first embodiment in Figure 2, the longitudinally extending tubular body 11 has a transverse cross-section 12 with a substantially circular profile.

[0021] In the second embodiment shown in Figures 3

and 4, the section of the longitudinally extending tubular body 111 has a transverse cross-section 112 with a profile which is such that the polar axis X1 of the transverse cross-section 112 is closer to the intrados line X2 of the screw feeder 10 than to the extrados line X3.

[0022] In such particular non-limiting embodiment of the invention, the transverse cross-section 112 has a substantially trapezoidal profile.

[0023] In the present particular case, the profile is substantially pentagonal with two opposite sides, first and second, 113, 114, of a first equal dimension L1, and two further sides, third and fourth 115, 116, which are contiguous and have a second dimension L2 which is smaller than the first dimension L1.

[0024] One example of a method for providing a screw feeder 10 according to the invention involves forming the longitudinally extending tubular body 11 or 111 by way of folding and welding a ribbon of metallic material, and its subsequent curving.

[0025] By way of example, with a tubular body having an outer diameter of 4mm and an inner diameter of 3.1 mm a reduction in weight is obtained of approximately half, with the evident economic advantages mentioned above.

[0026] In fact, with each screw feeder 10 and 110 having an average weight of 150 grams, and if there are between 30 and 40 helices in each vending machine, weight between approximately 2 and 3 kilograms is saved.

[0027] In practice it has been found that the invention fully achieves the intended aim and objects.

[0028] In particular, with the invention a screw feeder for the support and movement of products for automatic vending machines is provided which makes it possible to build automatic vending machines that are lighter and more economical than conventional automatic vending machines.

[0029] Moreover, with the invention a screw feeder is provided with mechanical and functional properties at least as good as those of conventional helices.

[0030] What is more, with the invention a screw feeder is provided which can be installed in conventional vending machines without necessitating modifications thereto.

[0031] Moreover, with the invention a screw feeder is provided the movement of which requires less electricity than conventional helices.

[0032] In addition, with the invention a screw feeder for the support and movement of products for automatic vending machines is provided that is structurally simple and easy to use, and can be produced using known systems and technologies, and at low cost.

[0033] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0034] In practice the materials employed, and the con-

tingent dimensions and shapes, may be any according to requirements and to the state of the art.

[0035] The disclosures in Italian Utility Model Application No. PD2011U000050 from which this application claims priority are incorporated herein by reference.

[0036] Where technical features mentioned in any claim are followed by reference signs, such reference signs have been inserted for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

15 Claims

1. A screw feeder (10) for the support and movement of products for automatic vending machines, **characterized in that** it is made from a longitudinally extending tubular body (11), which is curved so as to form a series of coils in the manner of a helical spring.
2. The screw feeder according to claim 1, **characterized in that** the section of said longitudinally extending tubular body (11) has a transverse cross-section (12) with a substantially circular profile.
3. The screw feeder according to claim 1, **characterized in that** the section of said longitudinally extending tubular body (111) has a transverse cross-section (112) with a profile which is such that the polar axis (X1) of said transverse cross-section (112) is closer to the intrados line (X2) of said screw feeder (10) than to the extrados line (X3).
4. The screw feeder according to the preceding claim, **characterized in that** said transverse cross-section (112) has a profile that is substantially trapezoidal, or pentagonal with two opposite sides, first and second, (113, 114) of a first equal dimension (L1) and two further sides, third and fourth (115, 116), which are contiguous and have a second dimension (L2) which is smaller than said first dimension (L1).
5. The screw feeder according to one or more of the preceding claims, **characterized in that** said longitudinally extending tubular body (11, 111) is provided by way of folding and welding a ribbon of metallic material, and its subsequent curving.
6. The screw feeder according to one or more of the preceding claims, **characterized in that** said tubular body (11) has an outer diameter of 4 mm and an inner diameter of 3.1 mm.

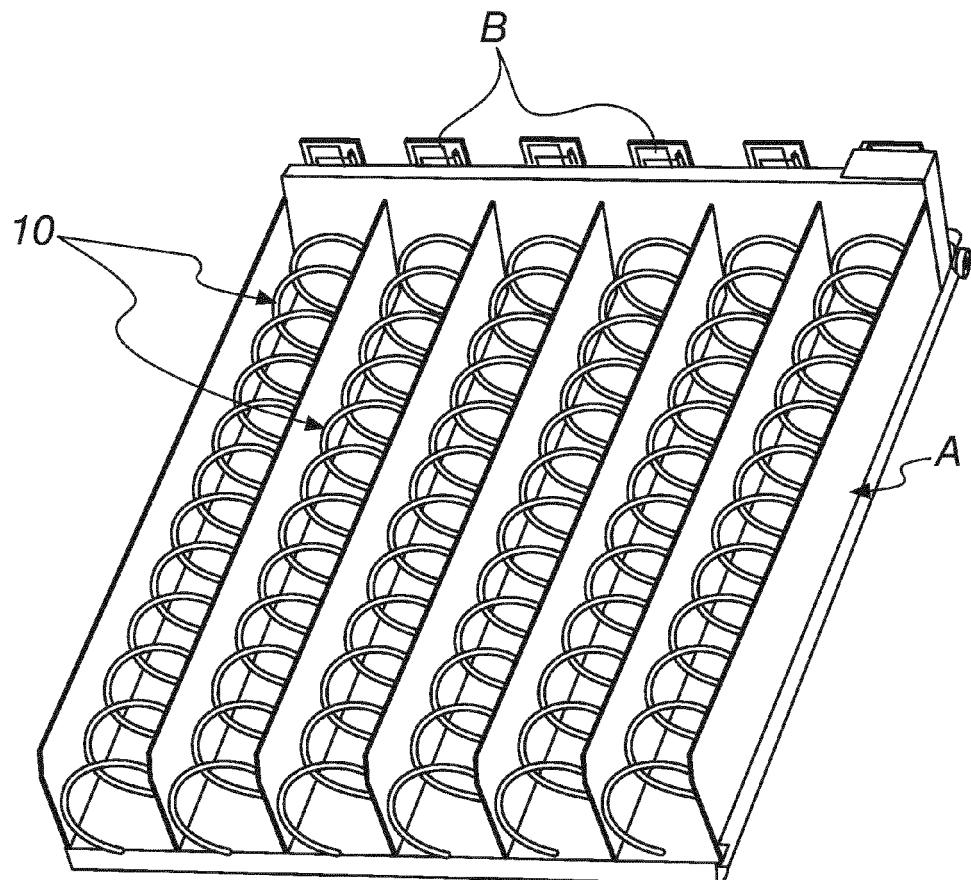


Fig. 1

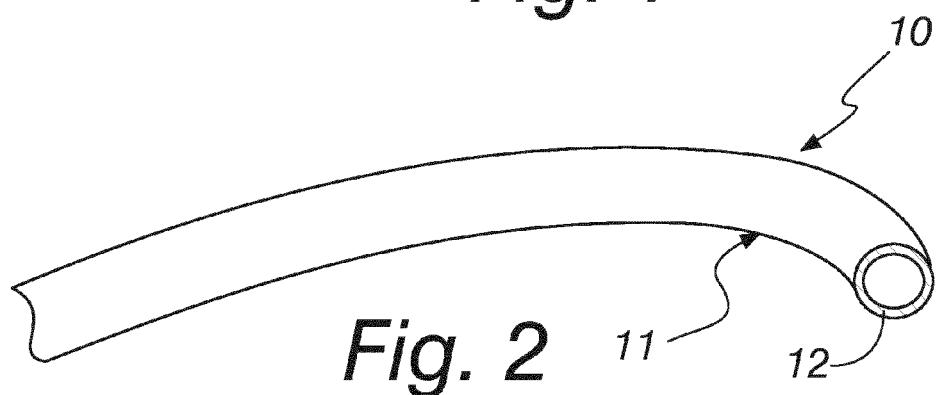
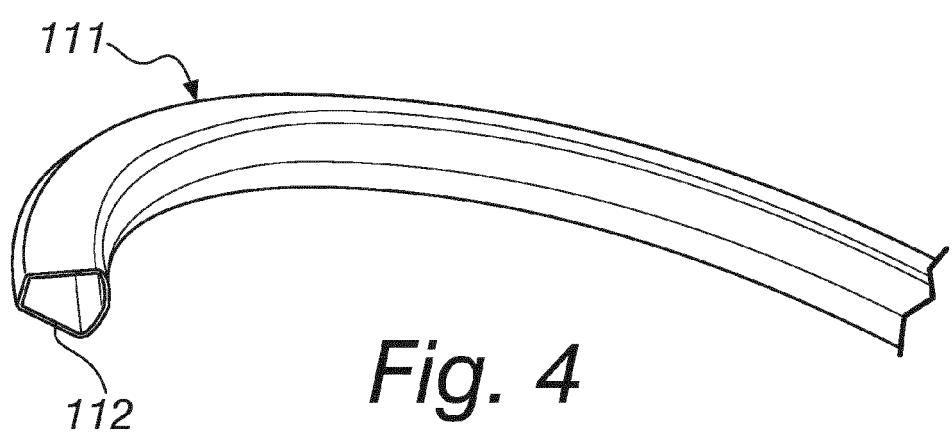
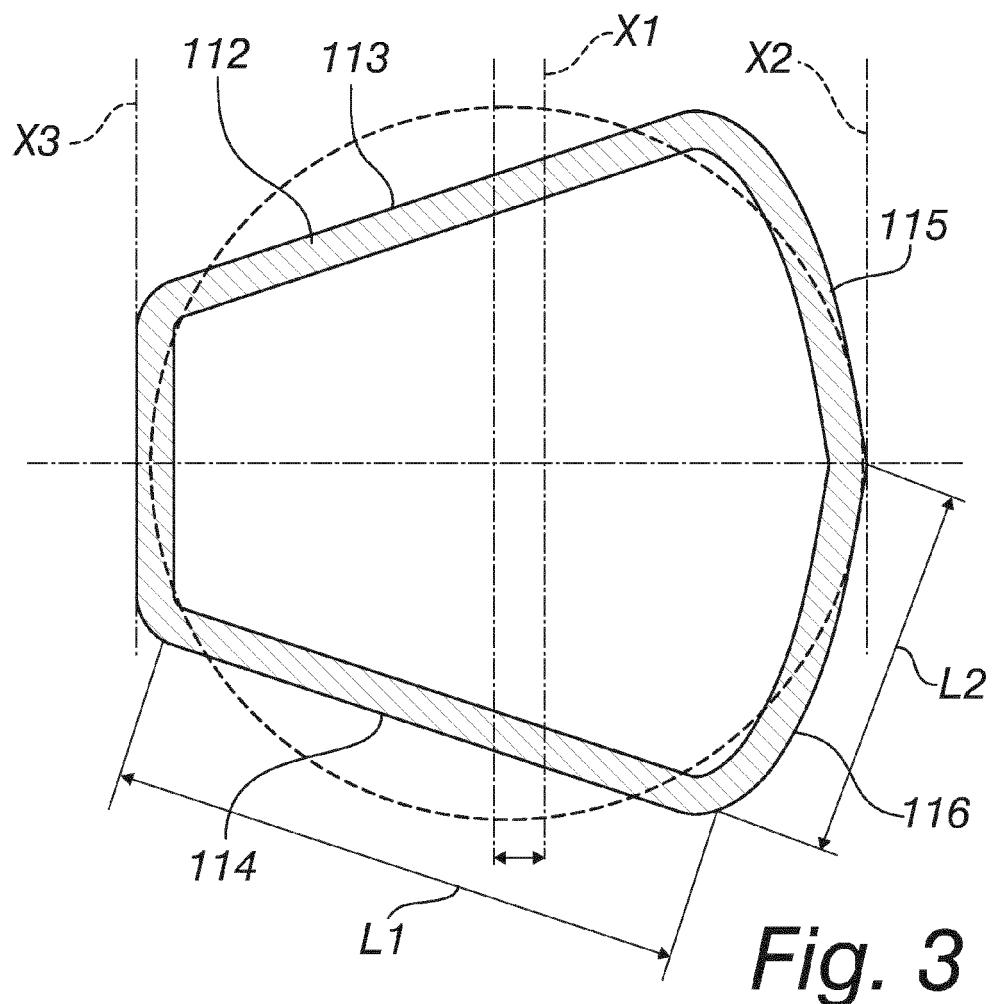


Fig. 2





EUROPEAN SEARCH REPORT

Application Number

EP 12 18 3252

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	WO 95/26541 A1 (PEPSICO INC [US]; MILNE CAMERON [GB]; MILNE DAVID THOMAS [GB]) 5 October 1995 (1995-10-05) * abstract * * page 1, line 1 - page 2, line 29 * * page 4, line 7 - page 4, line 12 * * page 5, line 28 - page 5, line 35 * * page 6, line 8 - page 6, line 11 * * page 6, line 36 - page 6, line 37 * * page 7, line 8 - page 7, line 13 * * page 9, line 22 - page 9, line 31 * * page 11, line 7 - page 11, line 9 * * page 12, line 23 - page 12, line 27 * * page 16, line 18 - page 16, line 20 * * page 21, line 10 - page 21, line 12 * * figures 1a, 1b, 2, 4, 5a, 5b, 9 *	1-6
X	WO 01/01359 A1 (AUTOMATED MERCHANDISING SYSTEM [US]; POLLOCK RICHARD A [US]; STEELEY R) 4 January 2001 (2001-01-04) * abstract * * page 1, line 6 - page 1, line 9 * * page 3, line 11 - page 3, line 16 * * page 4, line 6 - page 4, line 8 * * page 5, line 10 - page 5, line 16 * * page 6, line 15 - page 8, line 23 * * page 20, line 4 - page 20, line 8 * * page 19, line 6 - page 19, line 15 * * figures 1,2 *	1-6

The present search report has been drawn up for all claims		
1	Place of search Munich	Date of completion of the search 28 January 2013 Examiner Melis, Caterina
EPO FORM 1503 03.82 (P04C01) CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document		

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 12 18 3252

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-01-2013

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT PD20110050 U [0035]