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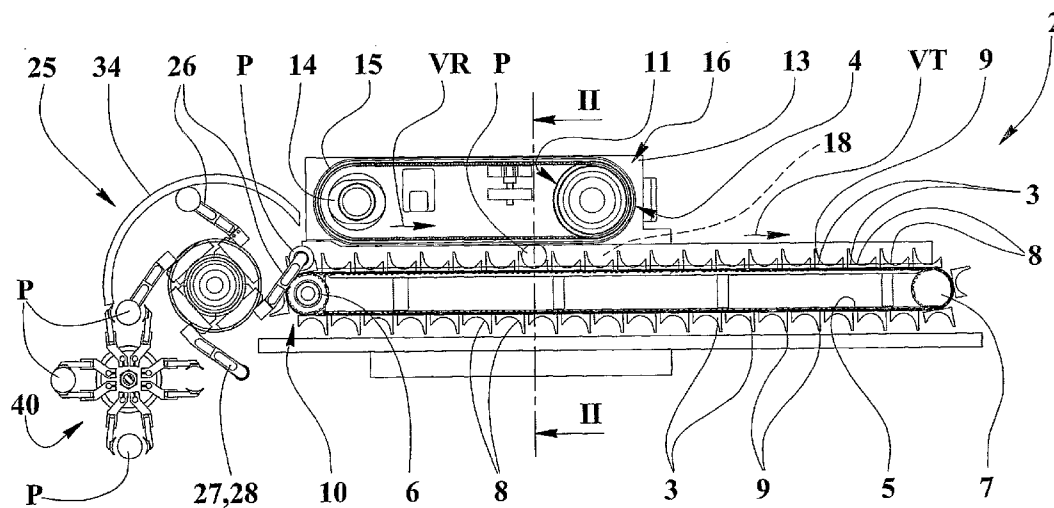
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Frabetti et al.(10) **Pub. No.: US 2008/0202074 A1**(43) **Pub. Date: Aug. 28, 2008**(54) **WRAPPING MACHINE AND METHOD FOR
OVATE ARTICLES**(86) PCT No.: **PCT/IB2006/001045**§ 371 (c)(1),
(2), (4) Date: **Oct. 19, 2007**(75) Inventors: **Fabio Frabetti**, Bologna (IT); **Luca
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Giovannini**, Rastignano (IT)(30) **Foreign Application Priority Data**

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B65B 11/06 (2006.01)(52) **U.S. Cl.** **53/461; 53/209**(57) **ABSTRACT**

A machine for wrapping ovate articles (P) comprises at least a conveyor mean (2), elongated and positioned horizontally in an operation condition, for the articles (P).

The machine (1) comprises also a feeding wheel (25) with rotation axis perpendicular to the conveyor mean (2) and fit to feed this latter with the articles (P) roughly rolled up in wrapping sheet.

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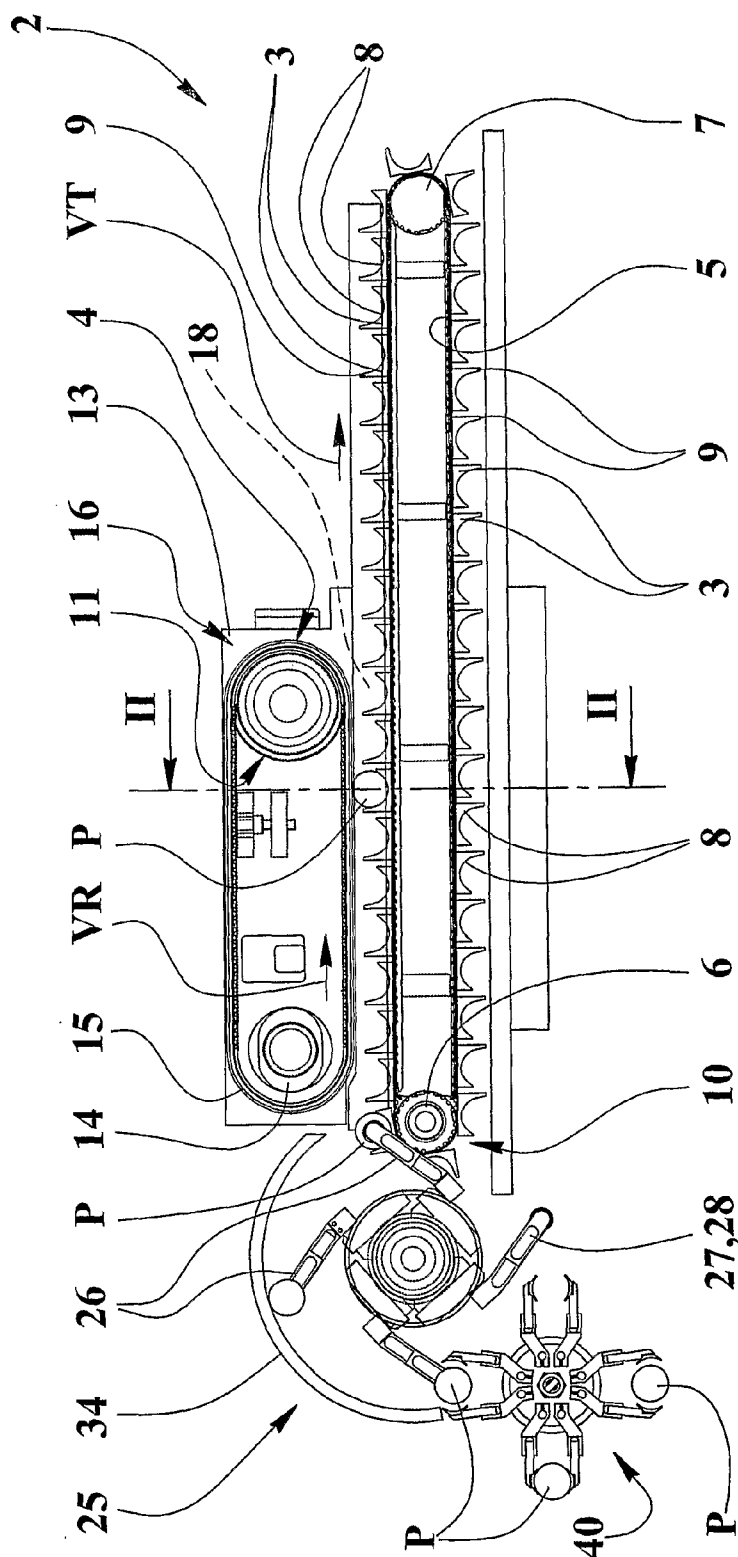


FIG. 1

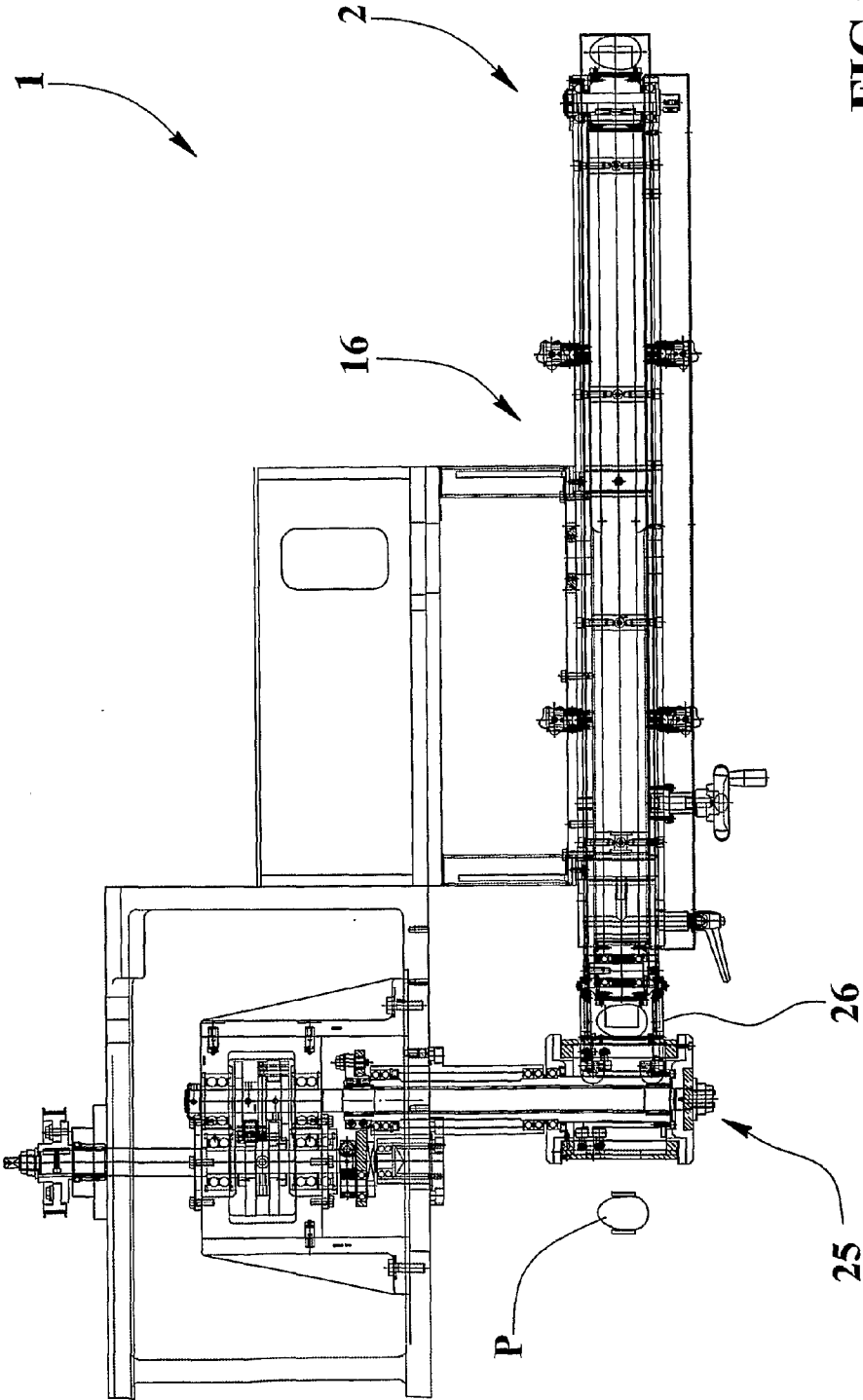
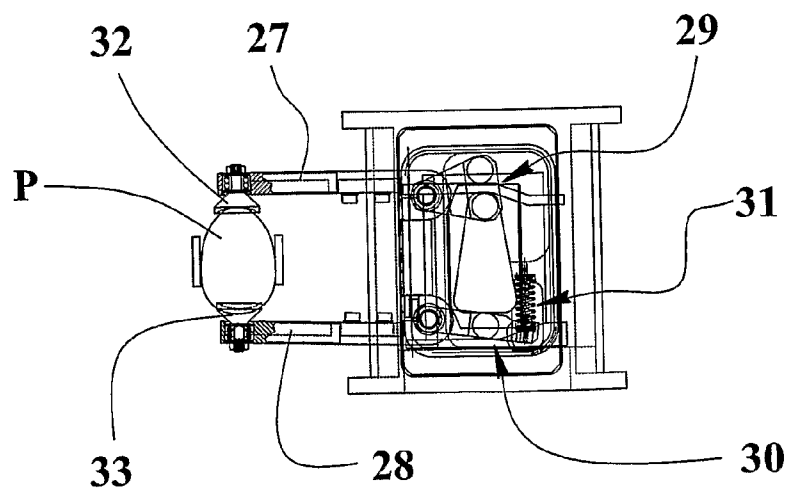
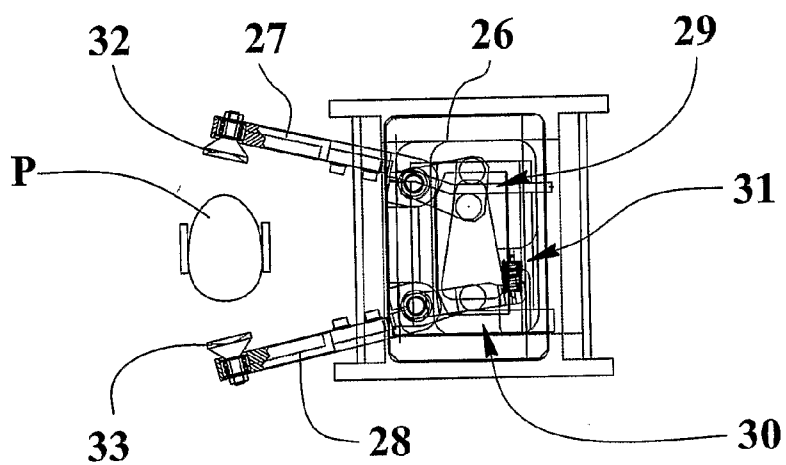
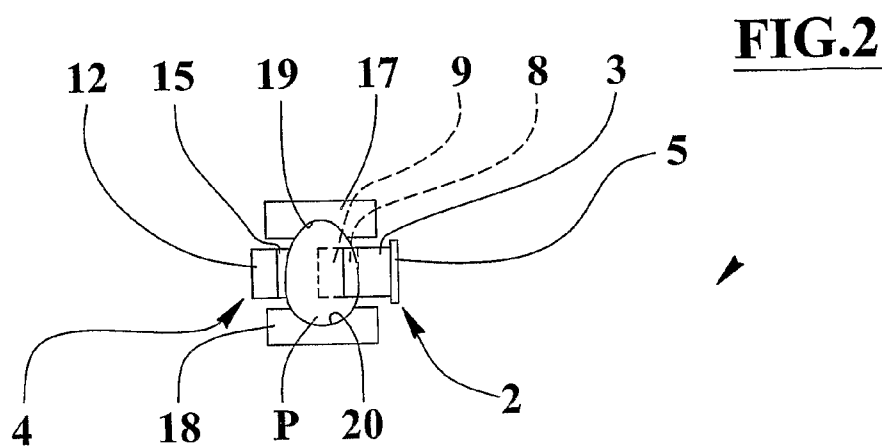


FIG.3



WRAPPING MACHINE AND METHOD FOR OVATE ARTICLES

TECHNICAL FIELD

[0001] The present invention refers to a wrapping machine for small articles of ovate or spheroidal shape, in particular for chocolate small eggs, chocolate balls and similar products, and relates to a method for wrapping said articles.

BACKGROUND ART

[0002] There are known machines for wrapping small curved articles, such as chocolates, in a sheet material, which is progressively folded and laid adherent to the articles by means of folder, pressure roller, pincers and the like tools of the machine.

[0003] A drawback of said known machines consists in that they can damage the products owing to the excessively energetic action. Particularly the egg-shaped products and other hollow or liquid filled products can be broken by the members, namely folder, pressure roller and the like, of the known machines even if they are adjusted at a low operation speed.

DISCLOSURE OF THE INVENTION

[0004] An object of the present invention is to propose a machine and a method for wrapping articles of ovate or spheroidal or almost cylindrical shape with an adherent sheet without damaging them.

[0005] Other object is to propose a machine and a method for wrapping ovate and similar goods avoiding bumps, excessive solicitations and damages also at the high operational speed.

[0006] Further object is to propose a reliable, fast and relatively simple machine.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The characteristics of the invention are highlighted in the following with particular reference to the attached drawings, in which:

[0008] FIG. 1 shows a schematic partial front view of the machine for wrapping ovate articles, object of the present invention;

[0009] FIG. 2 shows a section according at the line II-II of FIG. 1;

[0010] FIG. 3 shows a partial plane view of some elements of the machine of FIG. 1;

[0011] FIGS. 4 and 5 show side views of a second pincers of the machine of FIG. 1 respectively in opening and closure conditions.

BEST MODE OF CARRYING OUT THE INVENTION

[0012] With reference to the FIGS. 1-5, numeral 1 indicates the machine, object of the present invention, for wrapping articles of ovate, spheroidal, almost cylindrical shape or the like, for example chocolate or candy with the shapes of egg, ball, small ball, tassel, of mushroom or other articles. The machine is also fit for wrapping other non-food products.

[0013] The machine 1 comprises at least, positioned in series, an inlet wheel 40, a feeding wheel 25 and a conveyor mean 2.

[0014] In an operational condition of the machine, the wheels are positioned on a vertical plane and the conveyor mean 2 is on a horizontal plane.

[0015] The inlet wheel 40 is rotating and is fit to grasp the articles P together with the respective wrapping sheets adjacent thereto. Said wheel 40, during its rotation and in cooperation with folders, which are known and not shown, and with a guide 34 shaped as a sector of circumference, rolls up in roughly manner said sheets around the articles and transfers these latter to the feeding wheel 25.

[0016] The feeding wheel 25 includes a rotation axis perpendicular in respect to the conveyor mean 2 and it is fit to feed this latter with the articles P roughly rolled up in the wrapping sheets.

[0017] The conveyor mean 2 is equipped with a plurality of housings 3 made of material with low friction rate, each fit for housing an article P roughly rolled up in the wrapping sheet.

[0018] The machine also comprises a movable matching mean 4 faced to the conveyor and fit to match a portion of the articles rolled up in the sheets and contained in the housings 3.

[0019] In the operational condition, each article is moved by the conveyor mean 2 at an average transport vector speed VT and a portion of each article protruding on the upper part from the respective housing 3 is matched with a portion of the matching mean 4. Said portion of the matching mean is movable at a different respective average vector speed VR, provoking the rotation of the article in its own housing and the consequent adherence of the sheet at least to the portion of the article matched by the movable matching mean 4.

[0020] The conveyor mean 2 and the movable matching mean 4 are mutually parallel and provided with driving means 10, 11, preferably equipped with respective electric motors separately controlled by control and driving means of the machine, to obtain respective vector speeds VT, VR.

[0021] Said vector speeds have almost parallel directions and can point accordingly or oppositely; and can have the same or different speed modulus.

[0022] The conveyor mean 2 comprises one or several first ring means 5, for example of belt type band type or chain type, swiveling engaged with two or several respective pulley means 6, 7, for example consisting of pinions, rollers, pulleys or the like, of which at least one pulley mean 6 is motorized by means of a connection to the respective driving means 10. The external surface of the first ring mean 5 includes the housings 3, fixed at mutual regular distances.

[0023] Each housing 3 is provided with a seat 8, of almost cylindrical shape, with geometric axis approximately perpendicular to the direction of the transporting vector speed VT.

[0024] Each seat 8 is provided with an extension 9 of the portion of the housing 3 arranged downstream in respect to the direction of the transporting vector speed VT, in a manner that said extension pushes the article P released from the feeding wheel.

[0025] The movable matching mean 4 comprises at least a second ring mean 12, consisting of a belt, band or the like, swiveling engaged with at least two respective pulley means 13, 14 consisting of rollers, pulleys, pinions or the like, of which at least one pulley mean 13 is motorized by means of a connection to the respective driving means 11.

[0026] The external surface of the second ring mean 12 is provided with a resilience mean 15 consisting of a layer made

of foam rubber, neoprene, soft material or the like, that it adapts itself to the shape of the article P and it carries out a high friction.

[0027] The movable matching mean 4 are supported by translation means 16 for moving the matching mean 4 between an operational distance from the conveyor mean 2, in which the resilience mean matches the articles, and a maximum mutual distance from the conveyor mean to allow the cleaning or the maintenance of the machine.

[0028] The translation means 16 comprise a supporting frame for the movable matching mean 4 sliding along respective guides and raised by respective actuator means, consisting of, for example, an electric motor with transmission without possibility of retrograde motion or with safety stops to avoid risks to the operators during the maintenance.

[0029] The conveyor mean 2 protrudes downstream of the movable matching mean 4, in respect to the pointing direction of the transporting vector speed VT, and has a portion for taking the wrapped articles, for instance, by some packing machines.

[0030] The housings 3 have a transversal dimension, in respect to the transporting vector speed VT, smaller than that of the articles P.

[0031] Furthermore, the machine comprises two side guides 17, 18 fixed to the sides of the portion of the conveyor mean 2 faced to the movable matching mean 4.

[0032] The side guides 17, 18 have respective longitudinal concavities 19, 20 shaped in a complementary manner in respect to the portions of the article P protruding laterally from the housing. Said longitudinal concavities 19, 20 are fit to match, in sliding and swiveling manner, the portions protruding out of the article P in order to carry out the adherence of the sheet also onto said portions.

[0033] When the articles are of spherical shape, the longitudinal concavities 19, 20 they have respective sections with the same profile of circumference arc; when the articles are of ovate shape, for example an egg-shaped article, the longitudinal concavities 19, 20 are different because one concavity is fit to match the more acute end of the egg while the another concavity has to match the end of the egg with bigger curved rate.

[0034] The feeding wheel 25 is provided of a plurality of feeding pincers 26, each of them is fit to take an article and then to put it in a housing 3.

[0035] Each feeding pincers 26 comprises a pair of arms 27, 28 positioned roughly tangential in respect to the feeding wheel 25 and movable for opening and closing on a respective plane parallel to the rotation axis of the feeding wheel 25 and almost tangent to the feeding wheel.

[0036] To avoid interferences of the arms 27, 28 with the conveyor mean 2, said arms of each feeding pincers 26, after transferring the object to a housing 3 are opened at a mutual distance bigger than the width of the conveyor mean 2.

[0037] One of the arms 27 is driven for opening and closing by respective cam means 29 and the another arm 28 is driven for opening by a respective cam mean 30 and for closing by a spring mean 31, for instance of metallic helicoidal type, in order to limit the maximum clamping force for the articles to the force provided by the spring mean.

[0038] The external ends of the arms 27, 28 are provided with respective matching means 32, 33 for the article P fixed in free swiveling manner to allow the free rotation of said article P.

[0039] The circumference sector guide 34 is coaxial in respect to the feeding wheel 25 and it is fit to match the articles P fed by said wheel 25 to provoke the rotation thereof and to obtain the partial adherence of the wrapping sheets.

[0040] The circumference sector guide 34 can be provided with elastic fixings to the machine for reducing the risks to damage the articles.

[0041] The inlet wheels 40 and the feeding wheel 25 are adjacent and, as seen, are coplanar.

[0042] The inlet wheel 40 includes a set of radial pincers 41 each of them comprises a couple of jaws 42, 43 movable, to be opened and to be closed, on a plane perpendicular in respect to the rotation axis of the inlet wheel 40.

[0043] The wheels 25, 40 are driven by driving means controlled by the control means of the machine for synchronization with the conveyor mean 2 in intermittent or continuous motion.

[0044] The operation of the machine according to the method of the invention for wrapping an ovate article P provides:

[0045] to roll up roughly the article P in a wrapping sheet by means of a inlet wheel 40 provided with radial pincers 41 to grasp side portions of the article;

[0046] to grasp the upper and lower portions of the article P by means of feeding pincers 26 of the feeding wheel 25;

[0047] to transfer the article P and to release it in a corresponding conveyor mean 2 by rotating the feeding wheel.

[0048] The method also allows the free rotation of the article by means of swiveling matching means 32, 33 of the feeding pincers 26 and to make a side portion of the turning article to match with a circumference sector guide 34 during the rotation of the feeding wheel 25 to obtain at least the partial adherence of the sheet to said side portion.

[0049] Furthermore, the method provides the step to place the article P in a housing 3 of the conveyor mean 2 by opening the feeding pincers 26 and falling of the article when this latter is at the minimum distance from the housing.

[0050] It is important to observe that the configuration of the feeding wheel 25 and the method of the invention allow advantageously to carry out a taking, a transfer and a release of the product in a very gentle manner without bumps and excessive solicitations and furthermore, they allow to make maximum use of the circular trajectory of the product carried out by the feeding wheel to obtain a partial adherence of the sheet to the product simplifying advantageously the following wrapping steps.

[0051] An advantage of the present invention is to provide a wrapping machine and a method with an adherent sheet for articles of ovate, spheroidal or roughly cylindrical form, without damaging them.

[0052] Other advantage is to provide a machine and a method for wrapping egg-shaped and similar products without bumps, excessive solicitations and damages the products even in the operation at high production speed.

[0053] Further advantage is to provide a reliable, fast and relatively simple machine.

1) Machine for wrapping ovate shaped articles comprising at least a conveyor mean (2), elongated and positioned horizontally in an operation condition, for the articles (P), said machine (1) being characterized in that it comprises a feeding wheel (25) with rotation axis perpendicular in respect to the

conveyor mean (2) and fit to feed this latter with the articles (P) roughly rolled up in wrapping sheet.

2) Machine according to claim 1 characterized in that the feeding wheel (25) is provided with a plurality of feeding pincers (26), each of them being fitted to take an article and to put it in a housing (3).

3) Machine according to claim 1 characterized in that each feeding pincers (26) comprises a couple of arms (27, 28) positioned approximately tangential in respect to the feeding wheel (25).

4) Machine according to claim 1 characterized in that the arms (27, 28) of each feeding pincers (26) are movable for opening and closing on respective planes parallel to the rotation axis of the feeding wheel (25).

5) Machine according to claim 1 characterized in that the arms (27, 28) of each feeding pincers (26) are movable for opening at a mutual distance bigger than the width of the conveyor mean (2).

6) Machine according to claim 5 characterized in that an arm (27) is driven for opening and for closing by respective cam means (29) and that the other arm is driven for opening by a respective cam mean (30) and is driven for closing by a spring mean (31).

7) Machine according to claim 5 characterized in that the external ends of the arms (27, 28) are provided with respective matching means (32, 33) for the article (P).

8) Machine according to claim 7 characterized in that that the matching means (32, 33) are fixed in a free swiveling manner to the arms (27, 28) to allow the free rotation of the articles (P).

9) Machine according to claim 8 characterized in that it comprises a circumference sector guide (34), coaxial to the feeding wheel (25), and fit to match the articles (P) fed by said wheel (25) to provoke the rotation thereof and to obtain the partial adherence of the wrapping sheet to the articles.

10) Machine according to claim 1 characterized in that it comprises a rotating inlet wheel (40) fit to grasp the articles (P) together with the sheets, to roll up roughly, in cooperation with folders, said sheet around the articles and to transfer these latter to the feeding wheel (25).

11) Machine according to claim 10 characterized in that the inlet wheel (40) and the feeding wheel (25) are adjacent and coplanar.

12) Machine according to claim 10 characterized in that the inlet wheel (40) includes a set of radial pincers (41).

13) Machine according to claim 12 characterized in that the radial pincers (41) comprises a couple of jaws (42, 43) movable for opening and for closing on a plane perpendicular to the rotation axis of the inlet wheel (40).

14) Machine according to claim 10 characterized in that the wheels (25, 40) are driven by means of driving means in synchronous motion with the conveyor mean (2) in intermittent or continuous motion.

15) Machine according to claim 1 characterized in that the conveyor mean (2) is equipped with a plurality of housings (3) each of them fit to contain an article (P), roughly rolled up in a wrapping sheet, released inside it by the feeding wheel (25).

16) Machine according to claim 15 characterized in that it comprises a movable matching mean (4) faced to the conveyor mean (2) and fit to match a portion of the articles rolled up in the sheets and contained in the housings (3).

17) Machine according to claim 10 characterized in that each housing (3) is provided with a seat (8) roughly cylindrical, with geometric axis approximately perpendicular to the direction of the transport speed (VT).

18) Machine according to claim 17 characterized in that each seat (8) is provided with an extension (9) of the portion of the housing (3) arranged downstream in respect to the pointing direction of the transport vector speed (VT).

19) Machine according to claim 16 characterized in that the movable matching mean (4) is supported by translation means (16) for the moving of the matching mean (4) itself between an operation distance from the conveyor mean (2) and a maximum moving away distance from this latter.

20) Machine according to claim 19 characterized in that the translation means (16) comprises a supporting frame of the movable matching mean (4) sliding and driven by respective actuator mean and transmission means without retrograde motion or with safety stops.

21) (canceled)

22) A method according to claim 24, and further comprising the step of allowing the free rotation of the article by means of swiveling matching devices of the feeding pincers and setting a side portion of the swiveling article to match with a circumference sector guide during rotation of the feeding wheel to obtain at least partial adherence of the sheet to said side portion.

23) A method according to claim 24, and further comprising the step of placing the article in a housing of the conveyor by opening of the feeding pincers and depositing the article when the feeding pincers are at the minimum distance from the housing.

24) A method for wrapping an ovate shaped article by means of the machine of claim 1 comprising the steps of:

- a. rolling the article in a wrapping sheet by an inlet wheel provided with radial pincers to grasp side portions of the article;
- b. grasping the upper and lower portions of the article (P) by feeding pincers of the feeding wheel; and
- c. transferring the article (P) and releasing it in a conveyor by rotating the feeding wheel.

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