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(71) Applicant : **OPEM S.r.l.**
Via G. Mercalli, 16/A,
Area Industriale SPIP
I-43100 Parma (IT)

(72) Inventor : **Binacchi, Fabio, c/o Opem S.r.l.**
Via G. Mercalli, 16/A,
Area Industriale SPIP
I-43100 Parma (IT)

(74) Representative : **Cicogna, Franco**
Ufficio Internazionale Brevetti
Dott.Prof. Franco Cicogna
Via Visconti di Modrone, 14/A
I-20122 Milano (IT)

(54) Machine for forming-filling packaging bags in particular for packaging food articles.

(57) The present invention relates to a machine for forming-filling packaging bags, in particular for packaging food articles, which comprises : a first section, provided with bag forming means, a second section, provided with bag filling means, and means for controlling the filling-in of the bags, and a third section, provided with means for vacuum sealing the filled bags.

The second section comprises a bag bearing carousel, having a vertical axis, for receiving the bags formed in the first section, and for sequentially sending the formed bags to filling-in stations arranged on the periphery of the carousel ; the third section being also constituted by a carousel which is provided with vertical axis sealed bell holders for vacuum forming and sealing the bags.

The second section is arranged on the top of the third section.

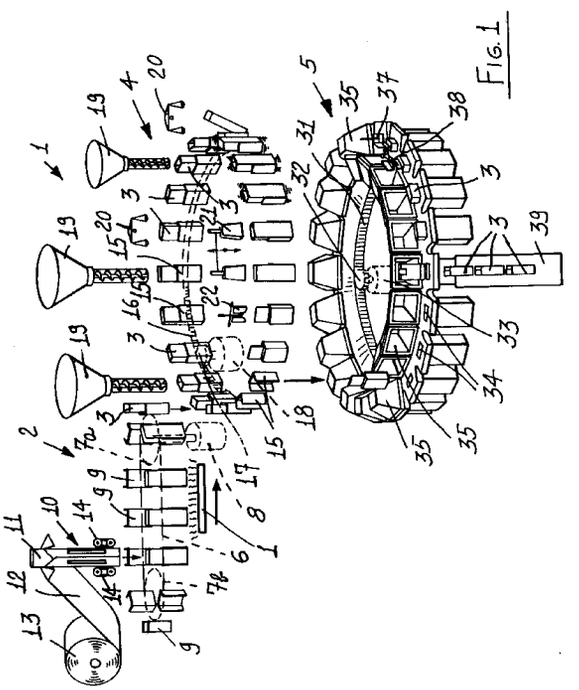

Fig. 1

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BACKGROUND OF THE INVENTION

The present invention relates to a machine for forming-filling packaging bags, in particular for packaging food articles.

In the field of the machines designed for forming and filling flexible material bags, are known several systems for handling a paper or the like material sheet, in order to form bags, which are made by winding a film about mandrels of a rotary turret, or which are made by winding the film directly on a single vertical mandrel and by transferring successively the made bag, in several manners, to subsequent stations for the filling-in operation.

The thus made bags, in particular, can be processed in several manners, by arranging said bags on supporting elements of carousels comprising chain elements, driven either with a continuous or an intermittent movement, which transport the bags for long linear distances, passing through processing stations, in which there are performed the filling and control operations on the bags; then, the filled bags are conveyed to further carousel assemblies, provided with bell elements, in order to evacuate the filled bags and sealing the thus formed packages.

The prior machines provided for performing sequentially the above disclosed operations, require great spaces and, moreover, include a lot of very complex mechanisms, which are susceptible to wear and require an expensive and frequent maintenance.

Another problem affecting the above discussed machines is that of the bag holder supporting chains which, because of the working stresses exerted thereon, are susceptible to be subjected to an increase of length, which requires a frequent maintenance for re-adjusting the bag supporting elements with respect to the fixed working stations.

The above mentioned length variations, in the time, can not be further adjusted, thereby the chain must be replaced together with its supporting guides.

In this connection it should be moreover pointed out that the chains of prior packaging machines usually conveys the bags to the several working stations by their supplying leg, whereas their return leg is usually devoid of any bags.

Because of this, the chain must have a comparatively great length which in actual practice is not exploited for making purposes, but merely for causing the bag supporting elements to be returned to their starting station.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned problems, by providing a machine for forming-filling bags for packaging products, which, while having a performance analogous to that of conventional packaging machines, has a very reduced size.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a machine which comprises very simple driving mechanisms so as to greatly reduce the wear of the mechanical parts of the machine, thereby also reducing the maintenance requirements.

Another object of the present invention is to provide such a machine which is specifically designed for optimizing all of the filling and vacuum sealing operations of the bags and which, in addition, is very safe and reliable in operation.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a machine for forming-filling bags for packaging products, characterized in that said machine comprises: a first section, including means for forming bags, a second section, including means for filling the formed bags and means for controlling the filling-in of said bags, and a third section, including means for vacuum sealing the filled bags, said second section comprising a bag holder supporting carousel, having a vertical axis, and provided for receiving the bags formed in said first section, in order to sequentially convey said bags to filling-in stations arranged on the periphery of said carousel, said third section comprising a vertical-axis tight bell holder carousel for evacuating and sealing said bags, said second section being superimposed on said third section.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will become more apparent hereinafter from the following disclosure of a preferred, though not exclusive, embodiment, of a forming-filling machine which is illustrated, by way of an indicative, but not limitative, example, in the accompanying drawing, where:

Figure 1 schematically illustrates, by a perspective view, the forming-filling machine according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the number references of the above mentioned figures, the bag forming-filling machine according to the present invention, which has been generally indicated by the reference number 1, comprises: a first section 2 provided with means for forming bags 3, a second section 4 provided, in a known manner, with means for filling-in the formed bags 3 and with means for controlling the performed filling-in operation and, finally, a third section or station 5, provided with means for vacuum sealing the fil-

led-in bags 3.

More specifically, the first section 2 comprises a carousel assembly 6, which can in turn comprise, for example, a chain, meshing with two gear wheels 7a and 7b, having parallel vertical axes, at least one of which is rotatively driven by a controllable electric motor 8.

Spaced along the chain of the carousel assembly 6, are arranged holder or supporting elements 9, provided for supporting the bags 3.

The forming of the bags 3 is performed in a forming station 10, which is arranged above the carousel 6 and substantially comprises a forming mandrel 11, having a vertical axis, on which is wound, in a known manner, a film 12 coming from a roll or coil 13.

The two vertical portions of the film 12, wound on the forming mandrel 11, are continuously sealed, so as to provide a continuous tubular body, which is cut in preset length portions and downwardly removed, for example by means of suitable crawlers 14, so as to progressively remove said tubular portions constituting the bags 3, from the forming mandrel 11, and so as to properly locate them on the holders 9 of the carousel assembly 6.

At the bottom of the carousel assembly 6 there are provided, in any known manner, sealing means 40, for sealing the bottom end portion of the tubular elements formed on the forming mandrel 11, so as to make, from the mentioned tubular portions, the bags 3 during the advancement thereof on the carousel assembly 6.

Laterally and at the bottom of the carousel assembly 6, is arranged the second section 4 also comprising a carousel assembly, on which there are arranged holders or supporting elements 15 provided for receiving the bags 3 from the carousel assembly 6 and for conveying said bags to the several processing stations, arranged along the periphery of the carousel assembly of the second section 4.

In particular, the carousel assembly of the second section 4 has a vertical axis and is rotatively driven, about this axis, by a disc of fifth wheel element 16, which is rigidly affixed to the carousel assembly, and therewith a pinion 17 meshes which is driven by a servomotor 18.

Along the path of the holders 15 of the carousel assembly of the second section 4, are arranged filling-in devices 19 for filling the bags 3, as well as weighing devices 20, for controlling the filled-in product weight.

Along the path followed by the holders 15 of the carousel assembly of the second section 4, are moreover provided devices for ejecting filled-in bags the weight of which does not correspond to a pre-set weight, as well as further devices 21 for compacting the product in the bags, and devices 22 for pre-closing the bags.

On the bottom of the second section 4 is provided the third section 5 which is constructionally and mechanically similar to the second section 4; in particular, the third section 5 is also constituted by a carousel assembly, which is coaxially coupled to a disc or fifth-wheel element 31, meshing with a pinion 32 driven by a servomotor 33.

On the periphery of the carousel assembly 30 of the third section 5 there are arranged holders 34, thereon there are provided sealed or tight bell 35 for evacuating the bags which are vertically conveyed from the holders 15 of the second section 4 to the holders 34 of the third section 5.

The bell 35, in particular, can be raised so as to allow for the operation of devices 37, of known type, by means of which the bags are sealed, as well as of cutting devices 38, for trimming the top end portion of the sealed bags.

Downstream of the sealing and cutting devices 37 and 38 is arranged a conveyor belt 39, by means of which the packaged bags 3 are removed from the forming-filling machine.

The holders 15 provided on the carousel assembly of the second section 4, are provided in a number which is equal to that of the holders 34 arranged on the carousel assembly of the third section 5.

Moreover, the pitch diameters of the carousel assemblies of the sections 4 and 5 supporting the respective holders 15 and 34 are substantially equal to one another, so as to afford the possibility of aligning the holders 15 on the top of the holders 34 during the transfer of the bags from the second to the third sections.

The servomotors 18 and 33, in particular, can be driven in an independent manner, so as to properly control the rotary movement of the carousel assembly of the second section 4, with respect to the carousel assembly of the third section 5, and so as to provide the possibility of properly programming the advancing movements of the two carousel assemblies, to properly finishing the bags.

The operation of the forming-filling machine according to the invention should be self-evident from the above description and illustration: in particular, it should be pointed out that the bags 3, formed in the forming station 10, are conveyed to the holders 9 of the first section 2, where they are closed at the bottom and then conveyed to the holders 15 of the second section 4 which, by rotating about the axis thereof, will progressively bring the bags 3 to the filling-in devices 19, and to the weighing devices 20 for controlling the weight of the product supplied by the devices 19.

Then, the filled-in bags are pressed and pre-closed, and then they are conveyed from the holders 15 to the holders 34 of the third section 5, where the filled-in bags 3 are evacuated and sealed, and then the sealed bags being removed by the conveyor belt 39.

From the above disclosure and from the figures

of the accompanying drawing, it should be apparent that the invention fully achieves the intended aim and objects.

In particular, the fact is to be pointed out that it has been provided a bag forming-filling machine, for packaging products, which has a very reduced size with respect to prior forming-filling machines.

Moreover, owing to the fact that the sections in which there are performed the filling and vacuum sealing operations on the bags are constituted by carousel assemblies, which are driven by gear wheels, it is possible to reduce to a minimum the maintenance requirements and, moreover, the operating sections must be driven in a more accurate manner.

The thus disclosed forming-filling machine is susceptible to several variations and modifications, all of which will come within the inventive idea scope.

Moreover, all of the details can be replaced by other technically equivalent elements.

In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending on requirements.

Claims

1. A machine for forming-filling bags for packaging products, characterized in that said machine comprises: a first section, including means for forming bags, a second section, including means for filling the formed bags and means for controlling the filling-in of said bags, and a third section, including means for vacuum sealing the filled bags, said second section comprising a bag holder supporting carousel, having a vertical axis, and provided for receiving the bags formed in said first section, in order to sequentially convey said bags to filling-in stations arranged on the periphery of said carousel, said third section comprising a vertical-axis tight bell holder carousel for evacuating and sealing said bags, said second section being superimposed on said third section.

2. A forming-filling machine, according to Claim 1, characterized in that said second section is coaxially superimposed on said third section.

3. A forming-filling machine, according to Claims 1 and 2, characterized in that said machine further comprises driving means for rotatively driving the carousel assembly of said second section and further driving means for rotatively driving the carousel assembly of said third section, said driving means being suitable to be operated in an independent manner.

4. A forming-filling machine, according to one or more of the preceding claims, characterized in that the driving means for driving the carousel assembly of said second section comprise a driving disc which is coaxially connected to said carousel assembly of said second section and a pinion meshing with said driving disc and driven by a servomotor.

5. A forming-filling machine, according to one or more of the preceding claims, characterized in that said driving means for driving the carousel assembly of said third section comprise a driving disc, coaxially coupled to said carousel assembly of said third section and a pinion meshing with said driving disc and driven by a respective servomotor.

6. A forming-filling machine, according to one or more of the preceding claims, characterized in that said first section comprises a bag forming station, provided with a vertical axis forming mandrel, with said forming mandrel being associated means for sealing the vertical edges of a film material, wound about said mandrel for forming a tubular body, and means for transferring tubular body portions to holder element associated with a translation element.

7. A forming-filling machine, according to one or more of the preceding claims, characterized in that, at the bottom of said translating element, there are arranged means for closing the bottom end portions of said tubular bodies, for forming, from each of said tubular bodies, a bag.

8. A forming-filling machine, according to one or more of the preceding claims, characterized in that said translating element comprises a carousel assembly, driven by a programmable servomotor.

9. A forming-filling machine, according to one or more of the preceding claims, characterized in that said carousel assembly is arranged on the top and laterally of said second section.

10. A forming-filling machine, according to one or more of the preceding claims, characterized in that said holders of said second section are provided in a number equal to that of said holders of said third section and are arranged on the same pitch diameter as said holders of said third section.

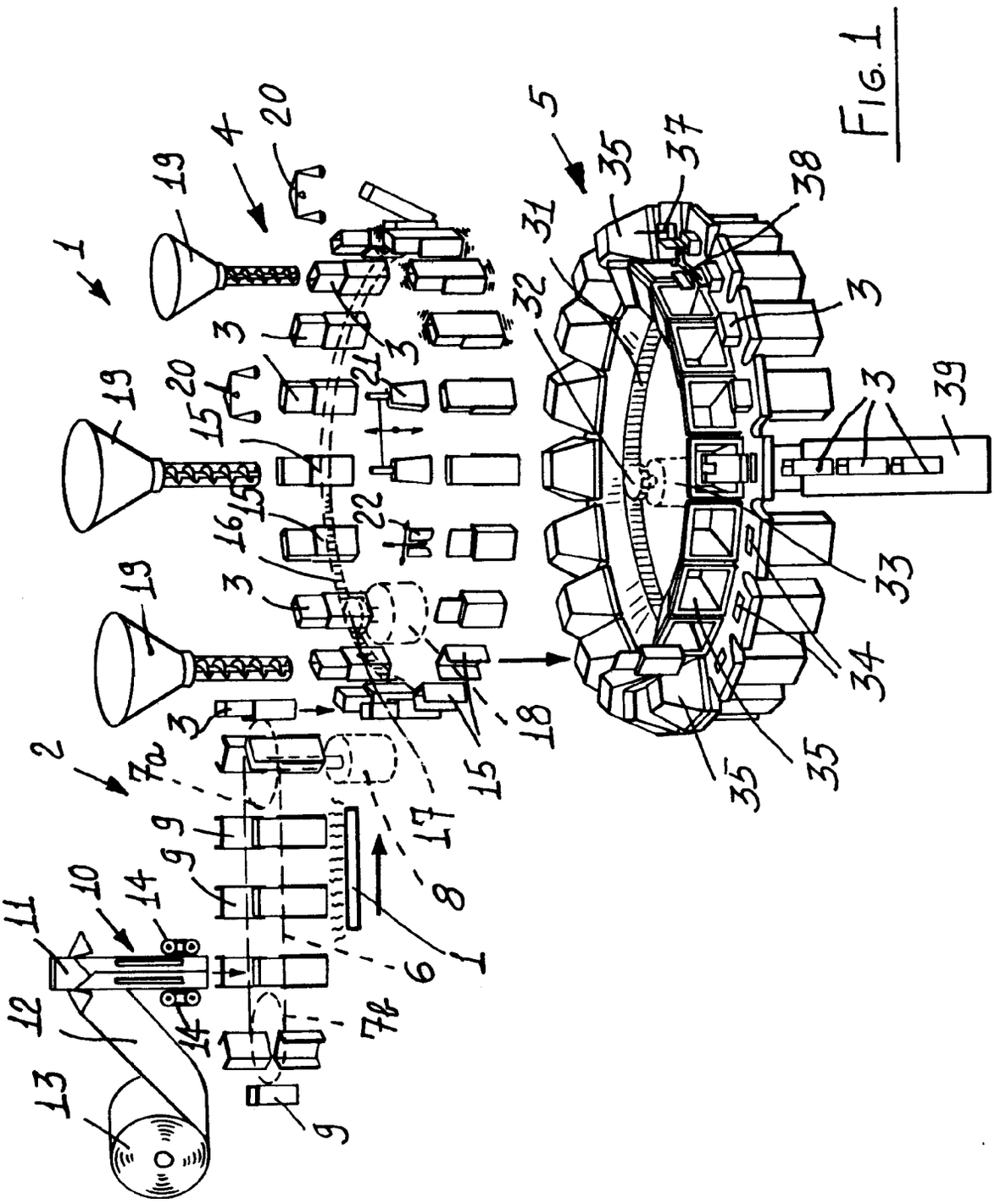

FIG. 1

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EUROPEAN SEARCH REPORT

Application Number EP 95830192.1

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
A	DE - A - 1 926 223 (C. QUADALTI) * Especially fig. 10 * --	1-10	B 65 B 1/02
A	DE - A - 1 586 078 (HESSER MB AG) * Claim 1 * --	1-10	
A	US - A - 4 117 649 (EGLI) * Totality * --	1-10	
A	FR - A - 1 281 258 (ZAVODY POTRAVINARSKYCH) * Fig. 1 * ----	1-10	

TECHNICAL FIELDS SEARCHED (Int. Cl. 6)

B 65 B 1/00
B 65 B 3/00
B 65 B 9/00
B 65 B 31/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	29-09-1995	MELZER

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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