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Applicant: **SASIB S.p.A.**
Via di Corticella, 87/89
I-40128 Bologna(IT)

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Inventor: **Cavazza, Roberto**
Viale della Resistenza 6
I-40065 Pianoro(IT)

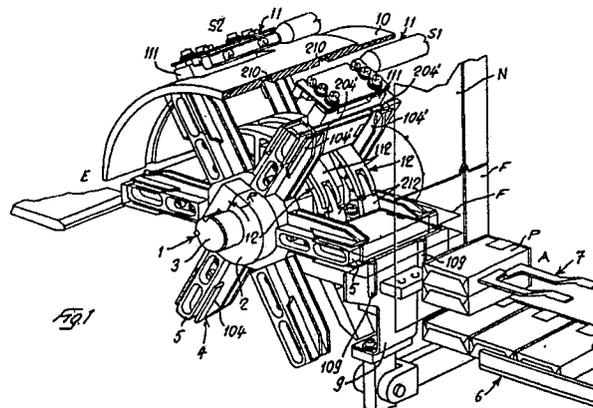
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Representative: **Porsia, Bruno et al**
c/o Succ. Ing. Fischetti & Weber Via Caffaro
3/2
I-16124 Genova(IT)

Wrapping apparatus, particularly for cigarette packs or the like.

The object of the invention is a wrapper apparatus for wrapping packs (P) substantially having the shape of a rectangular parallelepiped, particularly cigarette packs, or the like, to be wrapped each into a wrapper (F), which apparatus consists of a spider rotor (1) comprising a plurality of angularly equispaced radial pockets (4). In a pocket feeding station (A) a to-be-wrapped pack (P) is inserted through the radially outward pocket (4) opening into each of said pockets (4), along with the respective wrapper (F), which as a pack (P) is being inserted into the respective pocket (4), is folded in the form of a U around its pack (P), with both of its radially extending flaps formed by the free end portions of the U fold, remaining out of, and projecting from the pocket (4) opening. The one radially extending trailing flap of these two radially extending wrapper flaps, i.e., the flap lying on the pocket (4) trailing side (as considered with respect to the direction in which the spider rotor is indexed), is folded over against the respective radially outward side of pack (P) by a movable folder (9) which grazes the said radially outward side of pack (P), while the opposite radially extending other flap of the said two radially extending wrapper flaps, which is the leading flap (as considered with respect to the direction in which the spider rotor is indexed), is by a stationary folder (110) folded over the radially extending trailing flap,

against the respective radially outward side of the pack, as the spider rotor (1) is being subsequently indexed by one step.



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WRAPPER APPARATUS PARTICULARLY FOR CIGARETTE PACKS AND THE LIKE

The object of the invention is a wrapper apparatus for wrapping packs substantially having the shape of a rectangular parallelepiped, particularly cigarette packs, or the like, to be wrapped each into a wrapper made of an even soft sheet material, i.e., with a low stiffness and/or being easily chargeable with statical electricity, such as polyethylene or the like, which apparatus consists of a spider rotor comprising a plurality of angularly equispaced, outwardly open radial pockets that by the spider rotor being indexed, are moved the one after the other into a pocket feeding station, in which through the radially outward pocket opening a pack to be wrapped is inserted into each pocket, along with the respective wrapper, which as a pack P is being inserted into the respective pocket, is folded in the form of a U around its pack, with both of its radially extending flaps formed by the free end portions of the U fold, remaining out of, and projecting from the pocket opening, and the one trailing flap of these two radially extending wrapper flaps, i.e., the flap lying on the pocket trailing side (as considered with respect to the direction in which the spider rotor is indexed), is folded over against the respective radially outward side of the pack by a movable folder which is disposed in the pocket feeding station, and grazes the said radially outward side of the pack, while the opposite other flap of the said two radially extending wrapper flaps, which is the leading flap (as considered with respect to the direction in which the spider rotor is indexed), is by a stationary folder folded over the radially extending trailing flap, against the respective radially outward side of the pack, as the spider rotor is being subsequently indexed by one step.

In the known apparatus of this kind, the radially outward side of a pack to be wrapped, once it has been inserted into the respective pocket, slightly projects from the radially outward opening of this pocket, i.e., from the free edges of both walls which delimit the pocket at its trailing and leading side, as considered with respect to the direction in which the spider rotor is indexed, and which are preferably formed by two or more arms set in an equispaced relation. In these known apparatus, during the back stroke of the reciprocatingly operated folder provided in the pocket feeding station, and/or while the spider rotor is being subsequently indexed by one step, the radially extending trailing wrapper flap, which is first folded over against the radially outward side of a pack, tends to be drawn away therefrom owing to friction and/or to attraction by statical electricity, especially when the wrapper is made of a soft sheet material. Such a drawing away of the said trailing flap causes the pack

wrapping to become loose. In order to obviate to such a drawback, from Patent GB-A-2 003 817 is known to have both ends of the first folded, radially extending trailing wrapper flap held by flap-retaining vacuum means against the matching sides of the respective pocket. However, with this device the use of a vacuum generator and the provision of suitable suction ducts in the several pockets in the rotor spider are required, which results in the construction of the apparatus being rather complicated and expensive. Moreover, the radially extending trailing wrapper flap which is first folded over against the radially outward side of a pack, and is held by suction at both of its ends, tends to become cambered because of its stiffness, so that it may hamper the folding of the radially extending leading flap.

The invention seeks to eliminate the said drawbacks of the known prior art embodiments, and aims to provide an apparatus of the type as described at the outset, in which the radially extending trailing wrapper flap that is first folded over against the respective radially outward side of a pack, is effectively and simply prevented from being drawn away therefrom, so that the said flap will be held in a quite flat and outstretched condition.

This problem is solved by the invention thanks to the feature that each pocket is fitted at the trailing edge (as considered with respect to the direction in which the spider rotor is indexed) of its radially outward opening, with one or more flap retaining teeth slightly protruding beyond the radially outward side of a pack fully inserted into the respective pocket, and both the reciprocatingly operated folder for folding the radially extending trailing wrapper flap, and the successive stationary folder for subsequently folding the radially extending leading wrapper flap, are formed with a slot and/or groove which is in-line with each of the said flap retaining teeth, whereby the said folders are allowed to respectively graze the radially outward side of the pack. In this embodiment of the invention, the radially extending trailing wrapper flap can be folded over so as to be caused to well bear against the radially outward side of a pack inserted into the respective pocket, since the slot or slots, or grooves, formed in the reciprocatingly operated folder set in an aligned relation with the flap retaining tooth or teeth, on the trailing side of the pocket opening, permit the said reciprocatingly operated folder to be drawn quite close to the said radially outward side of this pack, and to graze the same, notwithstanding the provision of the said tooth or teeth. At the same time, the flap retaining tooth or teeth according to the invention, effectively prevent

the folded over trailing flap to be drawn away during the back stroke of the reciprocatingly operated folder and/or while the spider rotor is being indexed by one step. Any undesired cambering of the folded over trailing wrapper flap is also avoided, in that such a drawing away of the same is prevented not by fastening or firmly holding both ends of the folded over trailing wrapper flap, but by means of one or more abutment members formed by the said flap retaining tooth or teeth, which are caused to cooperate with the radially outward pack edge over which the said wrapper flap is folded, so that the folded over trailing wrapper flap is left entirely free, and is thus allowed to take a flat and outstretched position. Notwithstanding the provision of the said flap retaining tooth or teeth according to the invention, also the radially extending leading wrapper flap is by the stationary folder folded over the already folded, radially extending trailing wrapper flap, so as to be caused to perfectly bear against the radially outward side of the respective pack, in that the flap retaining tooth or teeth become engaged in the respective slot or groove in the stationary folder.

The flap retaining tooth or teeth according to the invention may be used also in wrapper apparatus of the kind as described at the outset, in which the two overlapped radially extending wrapper flaps that are folded over the radially outward side of a pack, are welded together by one or more welding devices arranged at the periphery of the spider rotor, in one or more positions downstream of the pocket feeding station (as considered with respect to the direction in which the spider rotor is indexed), and which must bear against the said radially outward side of each pack inserted into the respective pocket in the spider rotor.

In this instance, since the welding of the overlapped wrapper flaps must be with no solution of continuity whenever the tightness of the wrapping is wanted to be ensured, it is not possible to provide grooves or slots in the body of the welding device or devices for the passage of the flap retaining tooth or teeth provided on the trailing edge (as considered with respect to the direction in which the spider rotor is indexed) of each pocket opening. Therefore, according to a further feature of the invention, in the instance of any apparatus of the kind as described at the outset, provided with one or more welding devices arranged at the periphery of the spider rotor in one or more positions downstream of the pocket-feeding station, each pocket in the spider rotor has its radially inward end side delimited by a pack bearing bottom which at the pocket feeding station, and preferably also at the initial end of the successive stationary folder, is located in such a radial position that the flap retaining tooth or teeth provided on the trailing edge of

each pocket opening, will protrude beyond the radially outward side of a pack; the said pack bearing bottom is then caused to take in the direction in which the spider rotor is indexed, such a radial position at the welding device or devices that each pack accommodated in the respective pocket, is pushed radially outward, up to have its radially outward side projecting beyond the said flap retaining teeth. Thus, the welding device or devices are allowed to extend with no solution of continuity throughout the length of the radially outward side of a pack, whereby the wrapping will be tightly welded, notwithstanding the presence of the flap retaining tooth or teeth.

In one preferred embodiment of the invention, the said pack bearing bottom may consist of a stationary part for supporting on its surface the radially inward end sides of the packs and for causing the same to slide thereon, the said part extending over a certain angle around the axis around which the spider rotor is indexed, from the pocket feeding station to the welding device or devices, with its radial distance from the axis around which the spider rotor is indexed, being at the same time continuously and gradually increased in the manner of a cam, while a constant radial distance from the axis around which the spider rotor is indexed, is preferably maintained at the welding device or devices.

The invention also comprises an embodiment in which the said pack bearing bottom is formed by a plurality of radially movable bottom members which are each associated with a pocket in the spider rotor, and which are displaceable by any suitable means fit for this purpose, such as radially arranged cam followers and a fixed cam, provided about the axis around which the spider rotor is indexed.

These and other features of the invention, and the advantages arising therefrom will further appear from the following description of one preferred embodiment of the invention, which is very diagrammatically shown in the accompanying drawings, in which:

Figure 1 is a perspective view showing the spider rotor of an apparatus which is for applying wrappers made of a not much stiff sheet material, to cigarette packs.

Figure 2 is an elevational axial view with parts in section, of the spider rotor according to Figure 1.

The apparatus according to the invention, shown in Figure 1, comprises a spider rotor generally designated by numeral 1, which consists of a rotary drum 2 fitted on shaft 3, and the said drum 2 is provided with a plurality of angularly equispaced radial pockets 4 for cigarette packs P to be accommodated thereinto. Each radial pocket 4 consists

of two pairs of radially extending, spaced apart arms 104, 104' forming the leading and the trailing side of the respective radial pocket 4, as considered with respect to the direction in which the spider rotor 1 is indexed, indicated by arrow R, each arm pair 104, 104' being provided at one of the axially extending side ends of the respective pocket 4. The end sides of the radial pockets 4 are each delimited by a pair of folders 5.

In Figure 1 there clearly appears that the spider rotor 1 is so indexed in the direction of arrow R that each radial pocket 4 is in turn moved into the pocket-feeding station A, and the cigarette packs P are individually fed the one after the other to the pocket-feeding station A by a feeding device designated as a whole by numeral 6, and provided with pushers 7 for insertion of the respective pack P into the associated radial pocket 4.

In this case, a cigarette pack P is inserted into a radial pocket 4 formed by the two pairs of radially extending arms 104 and 104', with its narrow longitudinal side turned toward the axis of drum 2, so that the distance between each radially extending leading arm 104 and the associated radially extending trailing arm 104' (as considered with respect to the direction in which the spider rotor 1 is indexed) substantially corresponds to the thickness of pack P, and the two pairs of radially extending arms 104, 104' of each radial pocket 4 are so spaced apart from each other that the end sides of an associated cigarette pack P are received therein. Moreover, each radially extending trailing arm 104' (as considered with respect to the direction in which the spider rotor 1 is indexed) is fitted at its free radially outward edge with a flap retaining tooth 204'. This flap retaining tooth 204' is preferably so provided on the axially inward side of the said radially extending trailing arm 104' as to be as near as possible to the transversal median plane of drum 2.

Particularly in Figure 2, there clearly appears that a pack P is so inserted into a radial pocket 4 that its radially outward side will slightly project beyond the radially outward edge of arms 104', and the teeth 204' associated with each arm 104' will protrude beyond the radially outward side of pack P.

The wrappers F to be wrapped around packs P, are cut from a continuous sheet material web N being unwound from a bobbin (non shown) by a known cutting device arranged over the pocket feeding station A, with the roller 8 forming part of the said cutting device (see Figure 2). In the pocket feeding station A the wrappers F are each placed between that pocket 4 in the spider rotor 1 which comes to be located in station A and the respective cigarette pack P to be inserted into this pocket 4, so that as the pack P associated with this radial

pocket 4 is being inserted therein, a wrapper F is folded in the form of a U around the said pack P, with both of its flaps formed by the free end portions of the U fold, remaining out of, and projecting from the opening of pocket 4, which is delimited by the free edges of the radially extending arms 104, 104'. (On pack P being inserted into pocket 4, the first folds in wrapper F are formed by the pair of folders 5 against the end sides of pack P).

At station A the wrapper apparatus according to the invention, is fitted with a reciprocatingly operated folding blade 9 for folding over the projecting trailing flap of wrapper F (as considered with respect to the direction in which the spider rotor 1 is indexed) closely against the radially outward side of pack P. The free edge of the trailing flap-folding blade 9 so extends as to be substantially flush with the radially outward side of pack P. The said trailing flap-folding blade 9 is formed with two slots 109 which are respectively in line with each flap retaining tooth 204' on the radially extending trailing arms 104' (as considered with respect to the direction in which the spider rotor 1 is indexed), whereby the said trailing flap-folding blade 9 is allowed to graze the relative radially outward side of pack P.

Particularly in Figure 2 there is clearly shown that the projecting, leading flap of wrapper F (as considered with respect to the direction in which the spider rotor 1 is indexed) is afterward folded over as the spider rotor 1 is being subsequently indexed by one step, against the trailing flap of wrapper F (as considered with respect to the direction in which the spider rotor is indexed), by a stationary, leading wrapper flap-folder 110 formed by the free edge of a covering member 10 shaped like a substantially cylindrical sector, and arranged coaxially to drum 2 in a suitably spaced apart relation, such that the said leading flap of wrapper F can be folded over closely against the radially outward side of pack P, and the radial pockets 4 are each allowed to pass under the covering member 10. The said covering member 10 is also formed with a groove 210 for each flap retaining tooth 204' on the radially extending trailing arms 104' (as considered with respect to the direction in which the spider rotor 1 is indexed), and extends over about one half of the periphery of the spider rotor 1, particularly from the pocket feeding station A to a pack delivery station E.

Downstream of station A, as considered with respect to the direction in which the spider rotor is indexed, two successive stations S1 and S2 are provided, in which the welding is effected of a wrapper F leading and trailing flaps, which in the antecedent station A have been folded over against the radially outward side of pack P. A welding

device designated as a whole by numeral 11, is provided in each one of these stations, with its welding head 111 being directed parallel to the radially outward side of a pack P that comes to be respectively positioned in these stations S1 and S2, and protruding through slots 310 formed in the covering member 10, into the said covering member 10.

In the angular zone comprising the stations A, S1, and S2, two stationary parallel guides designated as a whole by numeral 12, which form the pack bearing bottom for the radial pockets 4 coming to be located in this angular zone of the apparatus, are provided between the pairs of radially extending arms 104, 104' forming the side ends of each radial pocket 4, for ensuring, notwithstanding the flap retaining teeth 204', a welding with no solution of continuity of the wrapper F flaps having been folded over the one against the other, lengthwise of the radially outward side of pack P. In Figure 2 it is apparent that the stationary parallel guides 12 extend over a certain angle around the axis around which drum 2 is rotated, from the pocket feeding station A to the successive welding stations S1 and S2, with their radial distance being continuously and gradually increased in the manner of a cam, from the axis around which drum 2 is rotated, while a constant distance of said guides from the said axis is preferably maintained at the welding stations S1 and S2.

Thus, as the spider rotor 1 is being indexed, a pack P accommodated in a pocket 4 that was initially located in the pocket feeding station A, is caused to slide on the surface of guides 12, and is radially pushed in the outward direction, in such a manner that in the welding stations S1 and S2 its radially outward side will slightly project beyond the flap retaining teeth 204', and will continuously bear against the respective welding head 111, which therefore has not to be formed with grooves for the passage of the said flap retaining teeth 204'.

Since cigarette packs P generally are not shaped like a perfectly rectangular parallelepiped, but are made in form of a frustum of pyramid with rectangular parallel bases, and since the frustopyramidal packs are inserted transversely with respect to their height, into the radial pockets 4, the two pack bearing guides 12 are not adjustable independently of each other, so that they are each formed by two comb-like interengaged sections 112 and 212. This guarantees that the radially outward side of packs P be always directed parallel to the welding heads 111, and be flush with the reciprocatingly operated folding blade 9 and with the stationary, leading wrapper flap-folder 110, so that a perfect adherence of wrapper F against a cigarette pack P is ensured.

The wrapper apparatus according to the inven-

tion, apart from being used for wrapping cigarette packs, may be used also for wrapping any other similar articles into wrappers.

Claims

1. A wrapper apparatus for wrapping packs (P) substantially having the shape of a rectangular parallelepiped, particularly cigarette packs, or the like, to be wrapped each into a wrapper (F) made of an even soft sheet material, i.e., with a low stiffness and/or being easily chargeable with statical electricity, such as polyethylene or the like, which apparatus consists of a spider rotor (1) comprising a plurality of angularly equispaced, outwardly open radial pockets (4) that by the spider rotor (1) being indexed, are moved the one after the other into a pocket feeding station (A), in which through the radially outward pocket (4) opening, a to-be-wrapped pack (P) is inserted into each pocket (4), along with the respective wrapper (F), which as a pack (P) is being inserted into the respective pocket (4), is folded in the form of a U around its pack (P), with both of its radially extending flaps formed by the free end portions of the U fold, remaining out of, and projecting from pocket (4) opening, and the one radially extending trailing flap of the said two radially extending wrapper flaps, i.e., the flap lying on the pocket (4) trailing side, (as considered with respect to the direction in which the spider rotor (1) is indexed), is folded over against the respective radially outward side of pack (P) by a movable folder (9) which is disposed in the pocket feeding station (A), and grazes the said radially outward side of pack (P), while the opposite radially extending other flap of the said two radially extending wrapper flaps, which is the leading flap (as considered with respect to the direction in which the spider rotor is indexed), is by a stationary folder (110) folded over the radially extending trailing flap, against the respective radially outward side of pack (P), as the spider rotor (1) is being subsequently indexed by one step, characterized in that each pocket (4) has its trailing edge (104') (as considered with respect to the direction in which the spider rotor (1) is indexed) of its radially outward opening fitted with one or more flap retaining teeth (204') slightly protruding beyond the radially outward side of a pack (P) fully inserted into the respective pocket (4), and both the reciprocatingly operated folder (9) for folding the radially extending trailing flap of wrapper (F) and the successive stationary folder (110) for subsequently folding the radially extending leading flap of said wrapper (F) are formed with a slot and/or groove (109, 210) which is in line with each of the said flap retaining teeth (204'), whereby the said folders (9, 110) are

allowed to respectively graze the radially outward side of pack (P).

2. The apparatus according to Claim 1, which is fitted with radial pockets (4) having their leading and trailing walls, as considered with respect to the direction in which the spider rotor (1) is indexed, each formed by at least one radially extending leading arm (104) and at least one radially extending trailing arm (104') (as considered with respect to the direction in which the spider rotor (1) is indexed), which are set in a spaced apart relation, characterized in that on the radially outward edge of each radially extending trailing arm (104'), which is the free radially outward trailing edge (as considered with respect to the direction in which the spider rotor (1) is indexed) of each pocket (4), at least two radially projecting flap retaining teeth (204) are provided, which are each arranged at one longitudinal end of said edge.

3. The apparatus according to Claim 2, characterized in that the two flap retaining teeth (204) on each radially extending trailing arm (104') (as considered with respect to the direction in which the spider rotor (1) is indexed) are set in a position that is shifted toward the median transversal plane of drum (2).

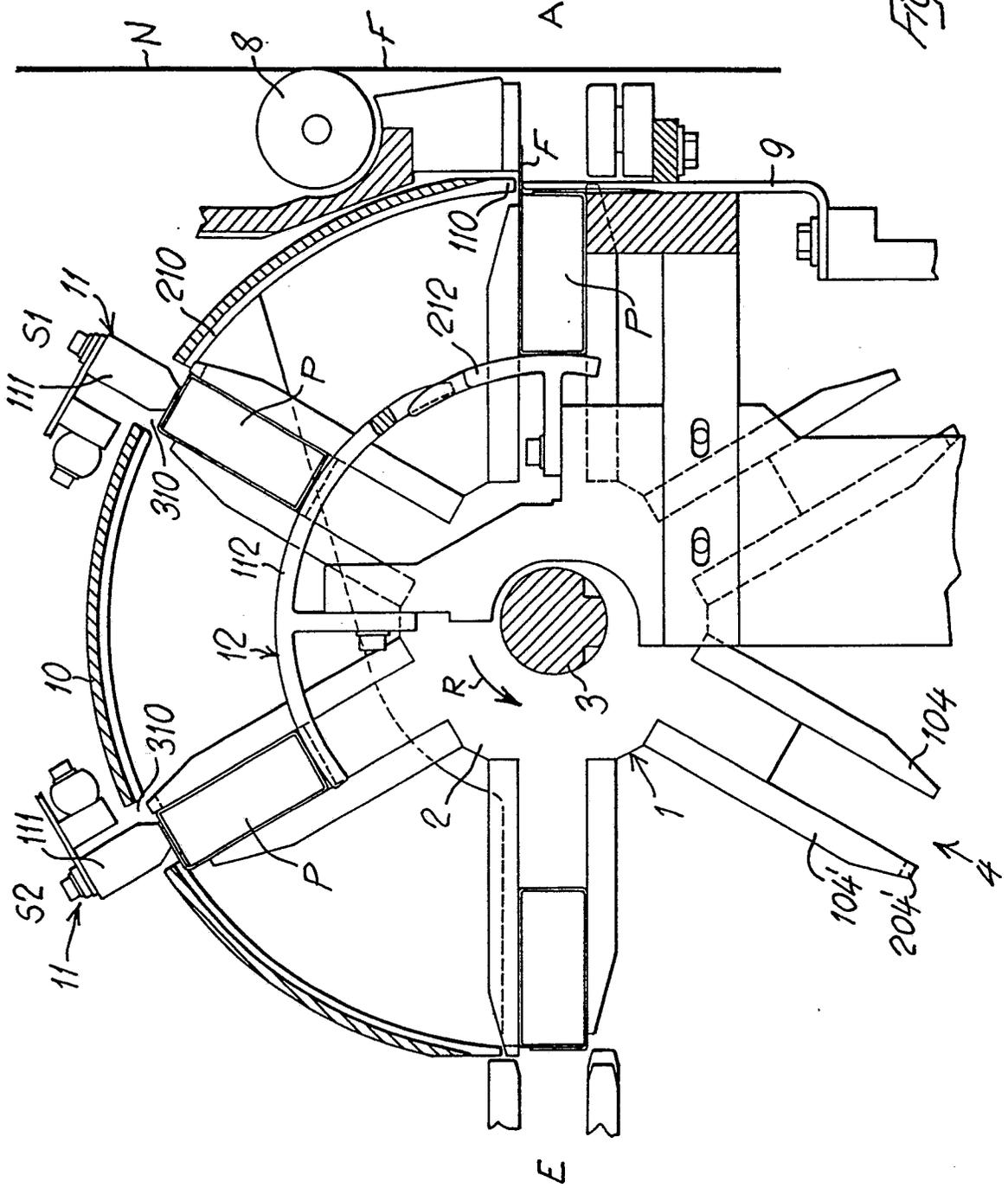
4. The apparatus according to Claims 2 and 3, characterized in that the leading wall (as considered with respect to the direction in which the spider rotor (1) is indexed) of each radial pocket (4) is formed by at least one pair of in-line radially extending arms (104) that are spaced apart from each other in the direction of the axis of drum (2), and are each provided in the region of one of the two respective pocket (4) sides that are directed transversely to the axis of drum (2), while the trailing wall (as considered with respect to the direction in which the spider rotor (1) is indexed) of each pocket (4) is formed by at least one pair of radially extending trailing arms (104') (as considered in the direction in which the spider rotor (1) is indexed) that are also in an in-line relation in the direction of the axis of drum (2), and are respectively in line with one of the said radially extending leading arms (104) of the associated radial pocket (4), the said radially extending trailing arms (104') (as considered with respect to the direction in which the spider rotor (1) is indexed) being each fitted on the inward side of their free radially outward edge with at least one flap retaining tooth (204').

5. The apparatus according to any one or more of the preceding Claims, which is fitted with one or more welding devices (11) arranged in one or more positions (S1, S2) on the periphery of the spider rotor (1), downstream of the pocket feeding station (A) (as considered with respect to the direction in which the spider rotor is indexed), characterized in

that each pocket (4) in the spider rotor (1) has its radially inward end side delimited by a pack bearing bottom (12) which at the pocket feeding station (A) and preferably also at the initial end of the successive stationary folder (110), comes to be set in such a radial position that the flap retaining tooth or teeth (204) provided on the trailing edge of each pocket (4) opening, will protrude beyond the radially outward side of pack (P), the said pack bearing bottom (12) being afterward caused to take in the direction in which the spider rotor (1) is indexed, such a radial position at the welding device or devices (11), that each pack (P) housed in the respective pocket, will be pushed radially in the outward direction, so as to have its radially outward side projecting beyond the said flap retaining teeth (204').

6. The apparatus according to Claim 5, characterized in that the pack bearing bottom may consist of a stationary part (12) for supporting the radially inward end sides of packs (P) on its surface and for causing the same to slide thereon, and the said part (11) extends over a certain angle around the axis around which the spider rotor (1) is indexed, from the pocket feeding station (A) to the welding device or devices (11), with its radial distance being at the same time continuously and gradually increased in the manner of a cam, from the axis around which the spider rotor (1) is indexed, while a constant radial distance from the axis around which the spider rotor (1) is indexed, is preferably maintained at the welding device or devices (11).

7. The apparatus according to Claim 6, characterized in that the stationary cam-like part for supporting the radially inward end sides of packs (P) on its surface and for causing the same to slide thereon, consists of two substantially parallel guides (12) which are so arranged as to extend over a certain angle around the axis of the spider rotor (1), and are placed between the radially extending arms (104, 104') on either radial pockets (4) side end, close to the pockets (4) end sides that are transversal to the axis around which the spider rotor (1) is indexed, the said guides being each formed by two comb-like interengaged sections (112, 212), and the distance of the one guide (12) from the axis of the spider rotor (1) being adjustable independently of the distance of the other guide (12) therefrom.





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.5)
A	EP-A-0 161 542 (SASIB) * Page 1 * -----	1	B 65 B 11/30 B 65 B 19/22
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-03-1990	Examiner SCHELLE, J.
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	

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