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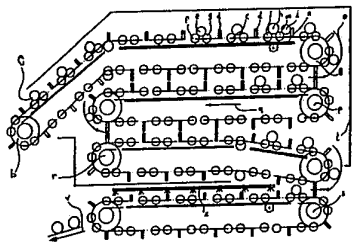
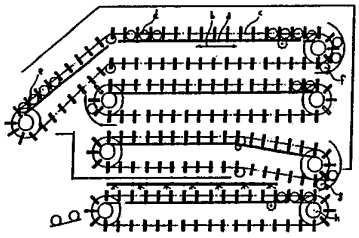
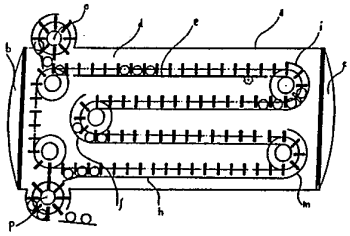
(54) Title: CONTINUOUS COOLER STERILIZER WITH ATMOSPHERIC AND ELEVATED PRESSURE WORKING WITH STEAM AND ALTERNATE ROTATION OF CANS







(57) Abstract

The machine in question has modular elements which consist, in a first version, of a conveyor-belt, consisting of some couples of cylindrical tubular rods, called rollers, delimited by tubular rods with rectangular section or of another suitable shape. These tubular rods are transversally assembled, parallely between one couple of rollers and another, to hold among the rods, the rows of differently shaped cans which are to be sterilized and that are placed on the couple of rollers. And as the rollers, which constitute the couples, are placed in rotation on themselves by a master-rack, which works in a continuous or alternate way, we'll find that the cans in question are placed in rotation on themselves by the rotation of the rollers, on which they like and they are carried forward by the movement of the conveyor-belt. At the end of the conveyor-belt, then, a curved way, of suitable sizes, guides the passing of the rows of cans from the upper modular element to the same lower element, and so forth in succession. Several modular elements on the vertical constitute the extent of the machine for a given output. A variant consists of an exactly alike belt of transversal rods with a rectangular section which flows above a conveyor-belt, manufactured by a net system or by

some transversal rectangular sections, therefore, the rows of cans are placed in rotation on themselves by the movement of the belt, where they like, and they are carried forward by the thrust of the transversal rods, which delimit the seat of the rows of cans and act as porters. The passage-system from the upper module to the lower one, and so forth, is exactly alike. These machines can work by steam, by atmospheric pressure in bottomless chambers; otherwise by under pressure steam, in horizontal autoclaves provided with drawer-valve, in entrance and exit, for the input and discharge of the rows of cans.

Continuous cooler sterilizer with atmospheric and elevated pressure working with steam and alternate rotation of cans

There are a lot of Kinds of machines, manufactured to sterilize different products, tomatoes, fruits, legumens, etc., in cylindrical metal cans, according to the characteristics by which, to quicken the sterilizing process, these cans are put in rotation on themselves, in different systems, while they are warmed in water bath, by steam under atmospheric or elevated pressure, so as to let the warmth reach speedier the center of the can and, meanwhile, kill speedier the germs, spores, etc. inside the product.

But if the function is common, the gears which realize the purpose are really different; so all the research concerns the realization of simpler and simpler systems, thrifty in the manufacturing and in the operating expenses.

The machine which is object of this patent, considerated as a whole and in the gears it is composed of, corresponds to the above-mentioned characteristics.

The machine consists of a modular element that, applied in different units, on the vertical, one

above another, in pile, allows in a simple way to abtain a fast sterilization and an adaptation to the different shapes and sizes of the cans to be sterilized. This element consists of a belt, made of couples of cylindrical tubular rods, called rollers, of suitable material and of appropriate length for the production to be realized. At their two ends, these rollers are provided with hubs and axle point, which are to be assembled in the drilled pins of the two side carrying chains, with which they constitute the belt-element.

Then the pitch of the carrying chains, because of the diameter of the rollers, is such as the space, the wheelbase between one roller and another, can hold not only cans of about 160 mm., relative to 03 kg. and 05 kg.; but also those cans of about 70 mm. minimum, relative to the diameter of the 1/2 kg. cans. Besides, the same chains are provided, by alternate pitches, with tongues; so, between a tongue of the left chain and the correspondent tongue of the right chain, we apply a transversal rod with rectangular section, or properly shaped, parallel to the rollers. So we find that these transversal rods delimit a space containing a couple of rollers, and within this space we can place the rows of cans of different sizes.

Meanwhile, as the rollers are provided, on one side, with sprocket-wheels, which interlock on a proper chain flowing in a guide, laterally put to the belt, along all its extent, we find that, while the belt moves at a proper speed to determine the sterilizing time and the stay time of the cans in the machine, the rollers are put in rotation on themselves by the thrust of the side chain which acts as master-rack, and at such a speed as to determine the rotation on themselves of the rows of cans which are placed on the respective couples of rollers, at the necessary speed. So we have a rolling rug belt, object of this also separately considerated patent, which constitutes the element of the machine to sterilize different products in cylindrical cans, with rotating box, object of this patent.

Actually, the machine consists of two or more above described elements, assembled on the vertical, one above another, with the respective transversal rods which delimit the couples of rollers and the space for the loading of the rows of cans, always in phase; to let understand better, we make an example: moving the first belt from right leftwards, the loaded rows of cans, arrived at the left end, follow the movement of the belt, from the

upper side to the lower one. So the rows of cans are obliged by proper guiding walls which copy, in proper distance, the bending radius of the guide roller of the belt; therefore, as the respective spaces and couples of rollers containing the rows of cans are in phase, the cans move from the upper belt to the lower one. The lower belt moves from left rightwards, and then, from this one to the next one and so forth, in succession, for so many elements as we want to assemble in battery for a more or less long machine.

This machine, so above-described in its structure, can work in water bath and operate in a boiler with hot water or with steam under more elevated atmospheric pressure.

In this case the container where the structure works, is watertight, so the input of the cans in the machine is realized by fitting big valves operating in entrance and exit.

These valves consist of some cylinders transversal to the direction of advancement of the belt, one in entrance and another in exit; within them are operating the wheels provided with chambers in longitudinal cups on the circumference, devoted to receive the rows of cans and to guarantee the holding by the packings applied properly along

the borders of the cups themselves.

These machines, in different elements, are described in the following lines, with reference to the drawing.

In the table A, the figure 1 shows a so conceived machine, in side view. In it the letter (a) shows, in side view, the propelling roller and (b) the roller guided by the first, rug belt with couples of rollers (c) intercalated by transversal rods (d); the letter (e) shaws the can in side view which is placed on the couple of rollers (f-g), in this case a can of a larger diameter, but each space or couple of rollers can hold even two raws of smaller cans (h-i) by the proper rollers (l-m), for example, but not contemporary with bigger cans. The letter (n) shows the side chain which acts as master-rack, where the roller pinons interlock. The letter (o) shows the guiding wall which allows the passing of the rows of cans from the upper side to the lower one, where they are unloaded on the lower belt (p) which is exactly alike to the first one and moves in opposite direction, according to the arrow (q) and so forth on the third element (r) and on the fourth one (s).

As we can see, this group of modular elements works inside the chamber (t) and the loading is

realized in (u) and the unloading in (v).

Besides, the element (s) is external to the chamber (t) and it is destined to the cooling which is realized as a shower by some sprinklers (z).

In the table B is illustrated a variant, characterized by the mather that the modular element doesn't consist of the couples of rollers, which act as support plane and as a means to make the cans, to be sterilized, roteate on themselves; but the modular element consists of a continuous belt, manufactured by net system or by elements profiled like an "u", like a shade, on whose level the belt of transversal rods, with shaped or rectangular section, moves and acts as porter; therefore the rows of cans, to be sterilized, are to be loaded among the rods of the porter-belt, and like on the shade - belt. The shade belt, by its movement, makes the cans roteate on themselves; meanwhile the porter-belt, by its speed of advancement, determines the movement of translation of the rons of cans and the stay time in the machine, necessary to the sterilization.

In the table B, fig. 1, the letter (a) shows the shade-belt, which moves in the direction of the arrow (b), while the letter (c) shows the porter-belt with the cans (d), which are carried for ward by the

thrust of the porter-rods; they roteate on themselves by the movement of the shade-belt, on which they are placed.

Exactly alike are the loading system in (e), the passing system from one modular element to another (f), the unloading system in (g), and the following cooling on the belt (h).

Finally, the table C, illustrates the under pressure running system. In this table C, fig. 1, the letter (a) shows the horizontal autoclave, with its two doors (b) and (c). Inside this cylinder of a suitable diameter and length, we find the realization of the structure (d) for the loading and advancement of the rows of cans to be sterilized. This structure (d) consists of one only catenary with closed ring, with transversal rods acting as porters.

The catenary runs on the planes e-f-g-h, and with the curved walls i.l.m, which allow the passing of the cans from the first plane to the second, third and, finally, fourth one.

As we can see, the loading and discharge are realized through the watertight big valves o/p, which consist of drawer-wheels, where the rows of cans are loaded. Then, cans are discharged on the catenary and, at the end of their course, they are

carried in the chambers of the unloading wheel, to be moved finally on the cooler element.

CLAIMS

1. System and gears for the realization of machines to sterilize different products, fruits, tomatoes, vegetables, legumens, etc., in metal cylindrical cans.

These machines are characteristical for having modular elements, consisting in a rug-belt, made of tubular cylindrical rods, called rollers, of fitting material and length for the production to be realized.

These rollers at their ends are provided with hubs and axle-points, which are assembled in the pierced pins of the two side carrying chains, by which they realize the roller-belt, representing the modular element. The pitch of the carrying chains is such as (because of the diameter of the rollers) the space between one roller and another can hold not only cans of about 160 mm. of diameter relative to 03 kg. and 05 kg. cans, but also the cans of about 70 mm. of diameter relative to 1/2 kg. cans.

Then, the carrying chains, are provided with tongues over alternate pitches; so, between the tongues of the left chain and the correspondent tongue of the right chain, we assemble some

tubular transversal rods, with rectangular section or properly shaped, of fitting height, which delimit the space between a couple of rollers and the following one. Besides, the rollers are provided, on one side, with sprocket-wheels which interlock on a lateral chain, along all the extent of the belt, acting as a master-rack which, by its running, makes the rollers roteate on themselves, and also the cans placed there.

The cans are cairried through a properly curved wall of a bending radius which has its center in the center of the crown gear. Then they are unloaded from the upper side of the belt to an identical modular element, which runs in opposite direction.

This carrying system completes the modular element.

2. Modular element which constitutes the machine to sterilize cylindrical cans of different products, according to the preceding claim, whatever may be the fastening system of the rollers to the two side chains, with which they constitute the roller rug belt, whatever may be the system that allows the rotation of the rollers which make the cans roteate, and whatever may be the system to put transversal rods between one chain and another to delimit the

couples of rollers.

3. Machine to sterilize different products in cylindrical cans, according to the proceding claims. Its characteristic is that the several modular elements are manufactured inside a properly boiler, with hot water, for a water bath sterilization. The rows of cans are loaded from upside and, after a course in profundity, they go up again to the outside, through an elevator.

4. Machine according to the proceding claims, characterized by its steam running, under atmospheric pressure in a chamber developping in height, with the rows of cans entering indo a low opening, after executed the whale course of the different modular elements, they come out through the low side for the following cooling process.

5. Machine to sterilize different products by under pressure steam, according to the proceding claims. Its characteristic is that one or more modular elements, assembled on the vertical, are closed in a watertight chamber, of fitting shape and structure for the pressures to be realized, by the valves of loading and discharge, consisting of two cylinders of properly diameter, placed transversally to the running direction of the belt

and, then, one at the beginning on the upper side, another at the end on the lower side. In the cylinders is operating a wheel with longitudinal cups, provided with fitting packings applied on the borders which guarantee the continuous holding during their rotation. Therefore, the rows of cans are loaded from the upper side and are unloaded on the roller-belt, among rods, and, at the end of their sterilizing process, through a properly guide wall, they are unloaded in the cylinder exhaust valve in the longitudinal cup of the wheel; then through this wheel they are carried to the outside for the following cooling process.

6. Machine to sterilize different products in cylindrical cans, according to the proceding claims. It's characteristical for the matter that to obtain the rotation of the rollers which make the cans roteate on themselves, there is a sprocket rod, then a stiff master rack that, running on fitting guides, moves alternately forward and backward, obliging the sprocket-wheels to interlock on itself, the rollers and, consequently the cans to move in an alternate rotation.

7. Machine to sterilize different products in cylindrical cans, according to the proceding claims. It's characterized by the matter that at the

end of the curved guide wall, which allows the passing of the cans from the upper belt to the lower one, to make easy the passing of the cans we have applied a hinged band acting as slipway, destined to put the cans on the lower belt, without shakes.

8. Machine to sterilize different products, according to the proceding claims, considerated as a whole and in its details, whatever may be its utilization, according to the description with reference to the drawing.

Fig. 1

Tavola "A"

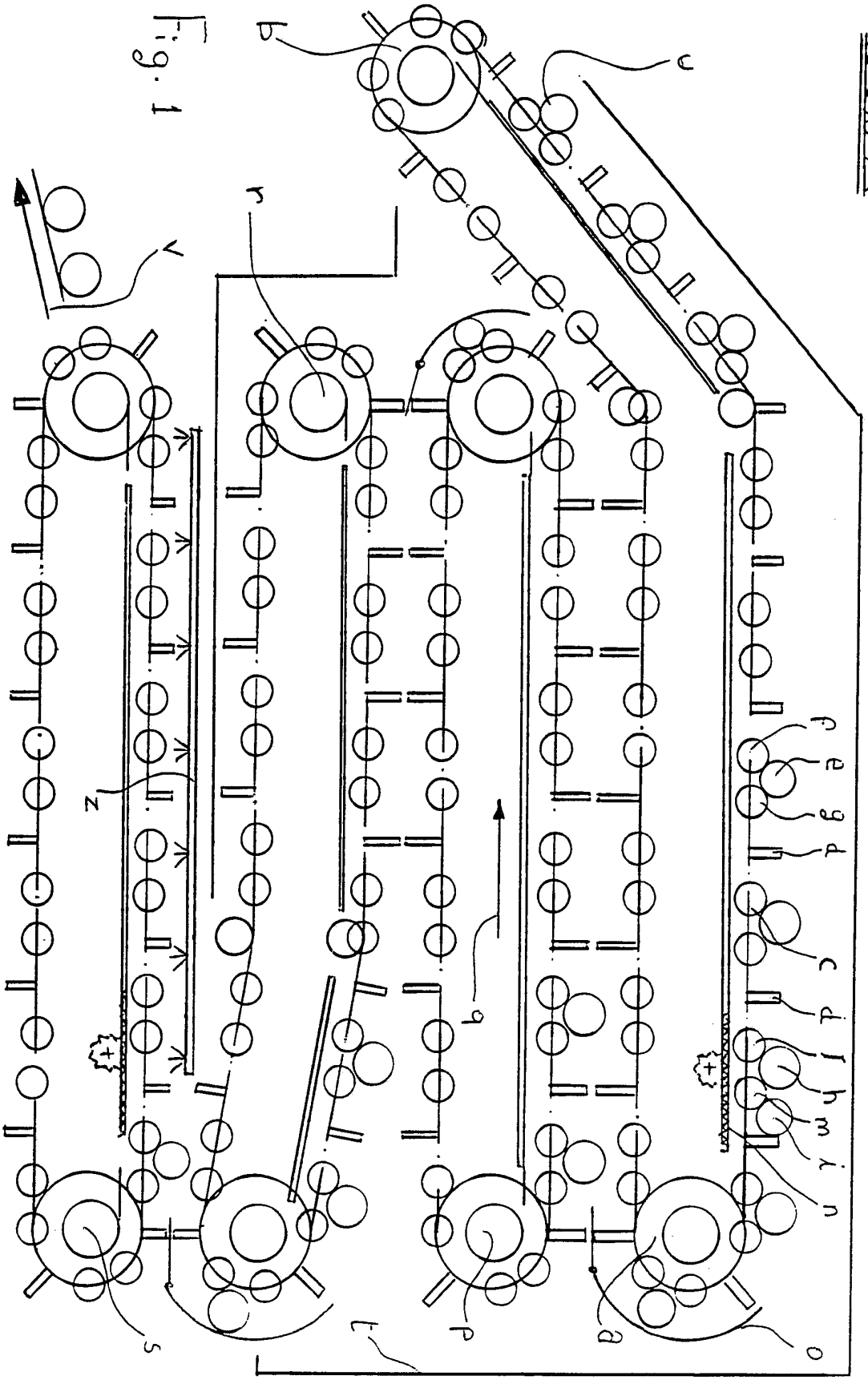


Fig. 1

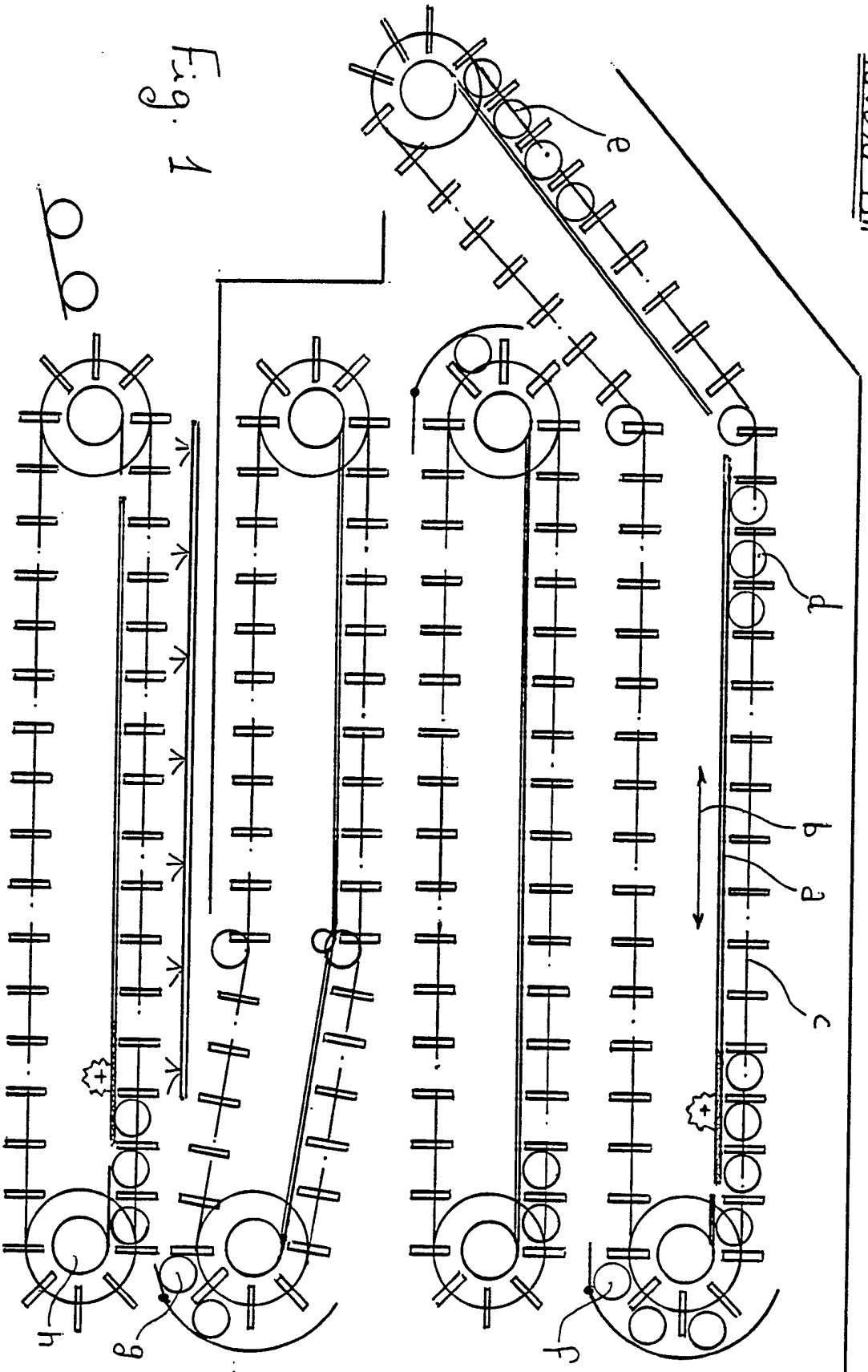


Tavola B"

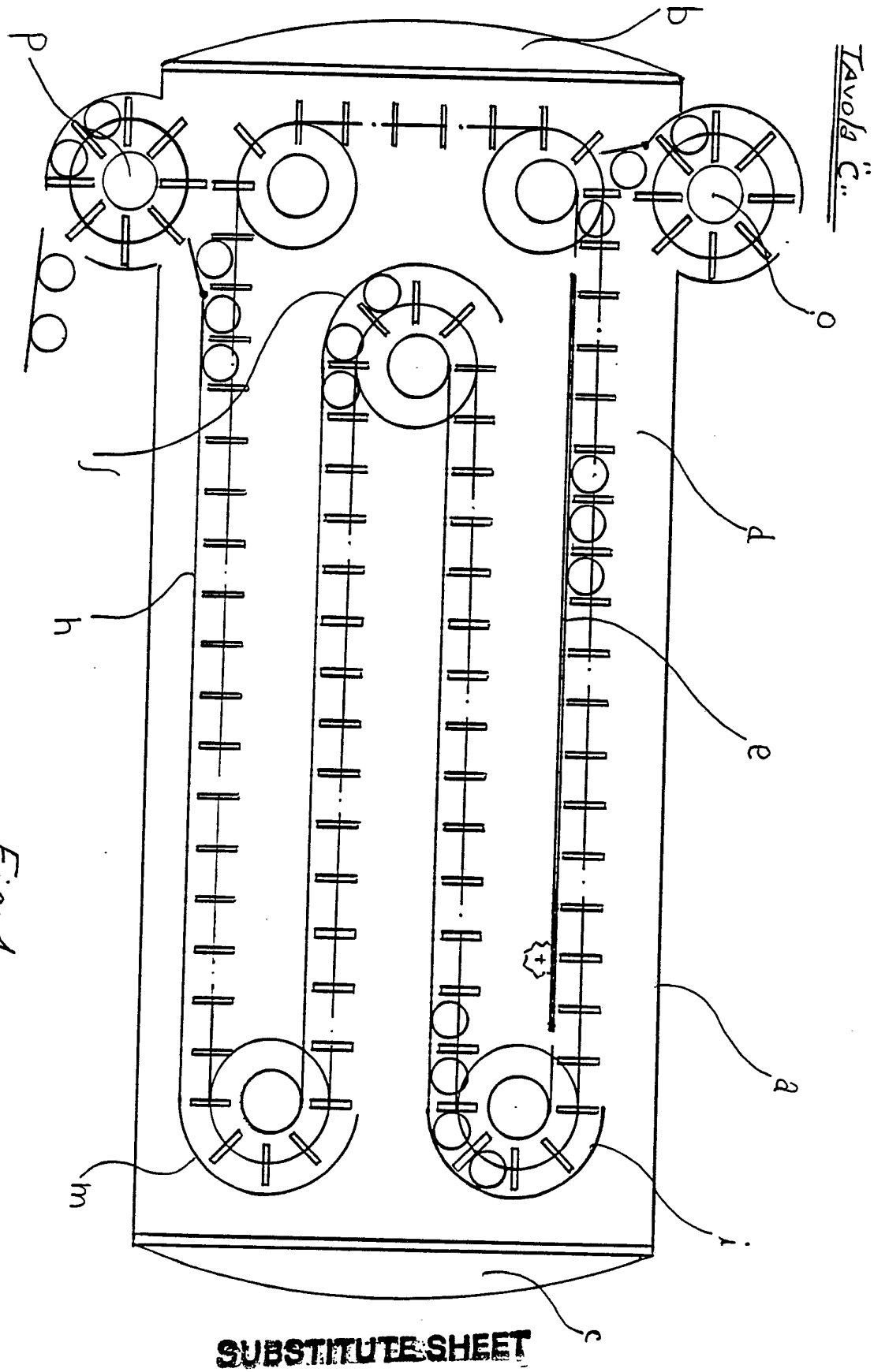


Fig. 1

INTERNATIONAL SEARCH REPORT

International Application No PCT/IT 89/00080

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC[5]: A 23 L 3/04, A 23 L 3/00

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC[5]	A 23 L

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 1478844 (J.A. ANDERSON) 25 December 1923 see figures 4,6,7; page 2, lines 27-51 --	2,5,6,7,8
X	FR, A, 1184416 (ET J.J. CARNAUD & FORGES DE BASSE-INDRE) 21 July 1959 see page 1, column 1, paragraph 2; page 2, column 1, paragraph 3 - column 2, paragraph 3; figures 1,2 --	7,8
X,Y	US, A, 3418918 (M. BEAUVAIS) 31 December 1968 see figures 1,4,5,6,9,10; claims 1-5 --	1,2-5,7,8
Y	FR, A, 1119418 (STORK & CO.) 20 June 1956 see figure 1; page 2, column 1, paragraphs 7,8 -- ./.	1

* Special categories of cited documents: [10]

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"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
24th April 1990	07. 06. 90
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	H. Daniels — H. DANIELS

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
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A	FR, A, 2221086 (TARAX) 11 October 1974 --	8
A	GB, A, 480456 (R. WALDO WEBSTER) 24 March 1938	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. IT 8900080 SA 33299

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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FR-A- 1184416		None	
US-A- 3418918		None	
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