United States Patent

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[72] Inventor **Emilio Llovet Ricart**
Mataro, Spain

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[73] Assignee **Telares Circulares, S. A.**
Barcelona, Spain
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[33] **Spain**
[31] **363,632**

[54] **CIRCULAR KNITTING MACHINE**
4 Claims, 6 Drawing Figs.

[52] U.S. Cl. 66/8, 66/19
[51] Int. Cl. D04b 9/06
[50] Field of Search 66/8, 19, 149

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Primary Examiner—Wm. Carter Reynolds
Attorney—Parrott, Bell, Seltzer, Park & Gibson

ABSTRACT: The component parts of the knitting machine are distributed among a plurality of stacked subframes, each subframe comprising a support platform with a large circular opening and legs extending downwardly from each corner of the platform. A support ring is mounted in the circular opening of each platform and successive platforms are reduced in size from the bottom to the top, whereby the machine frame presents a stepped arrangement, in which part of the space enclosed by the lower subframes is taken up by cabinets housing diverse control and ancillary means of the machine.

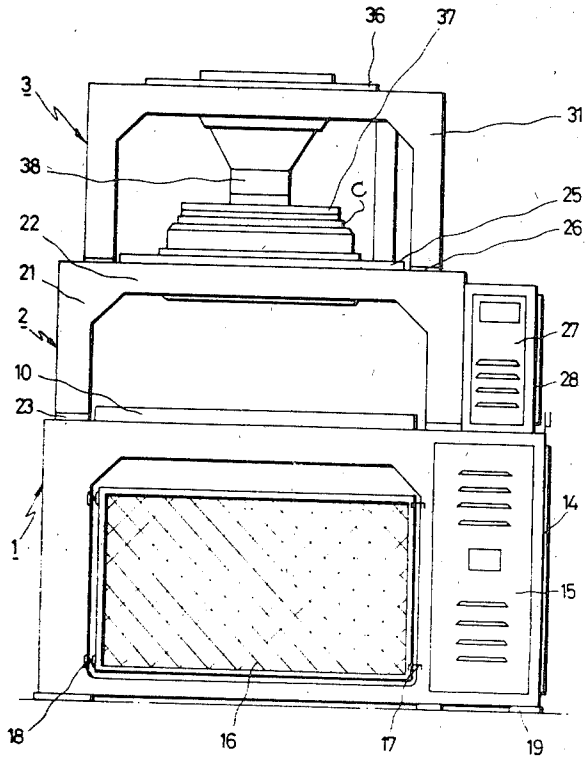


FIG. 1

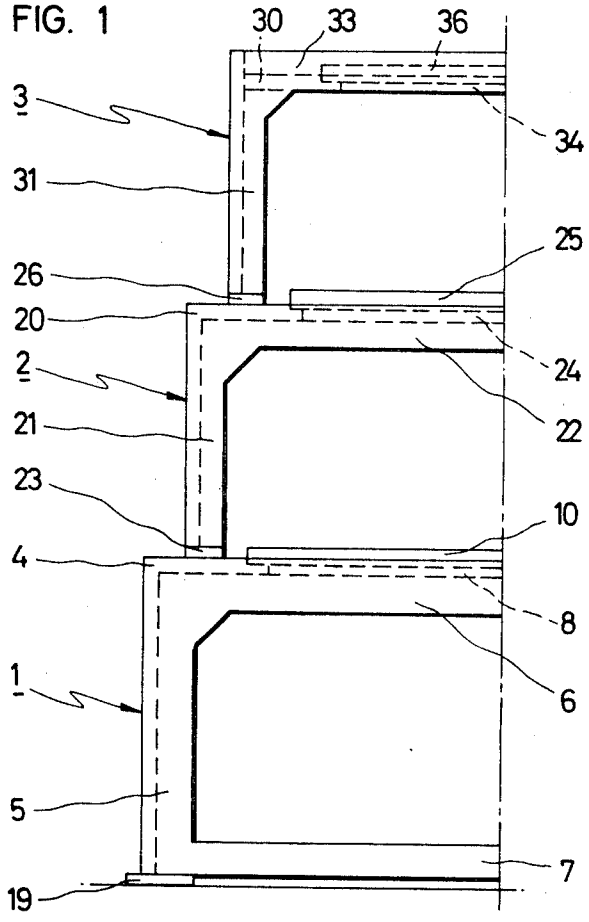
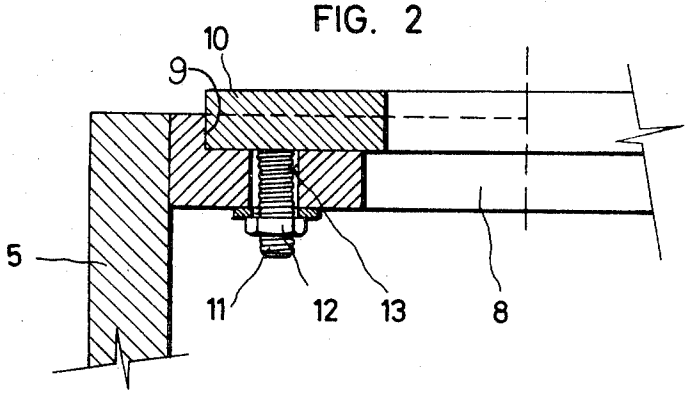
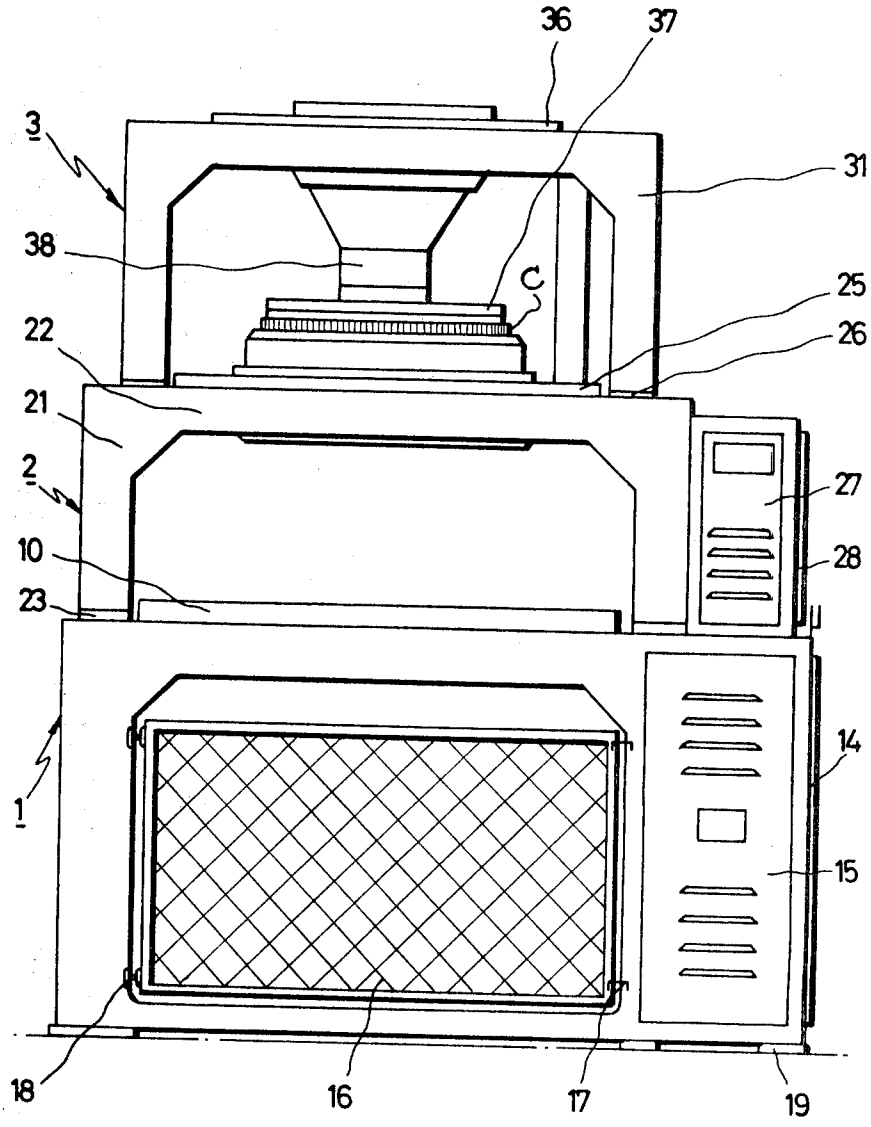


FIG. 2



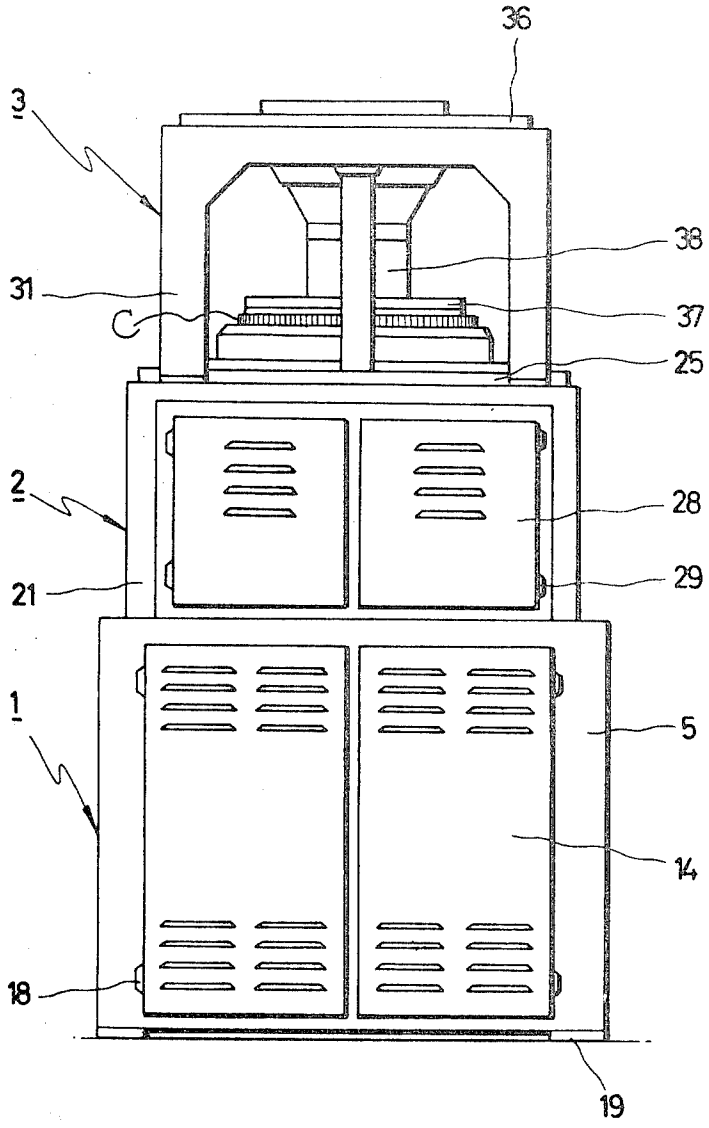
INVENTOR:
EMILIO LLOVET RICART
BY Parrott, Bell, Seltzer, Park & Gibson
ATTORNEYS

FIG. 3



INVENTOR:
EMILIO LLOVET RICART
BY Barrett, Bell, Seltzer, Park & Gibson
ATTORNEYS

FIG. 4



INVENTOR:
EMILIO LLOVET RICART
BY Parrott, Bell, Seltzer, Park & Gibson
ATTORNEYS

FIG. 5

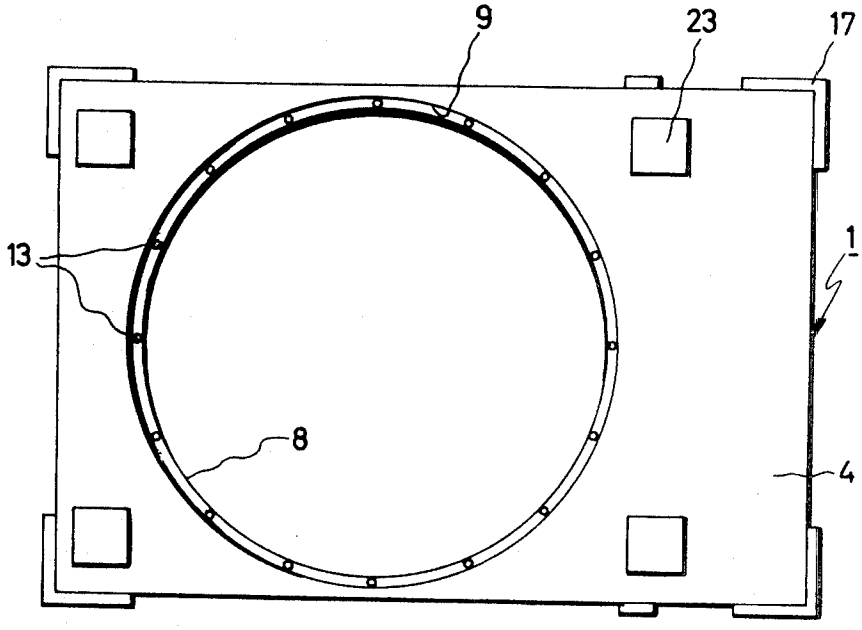
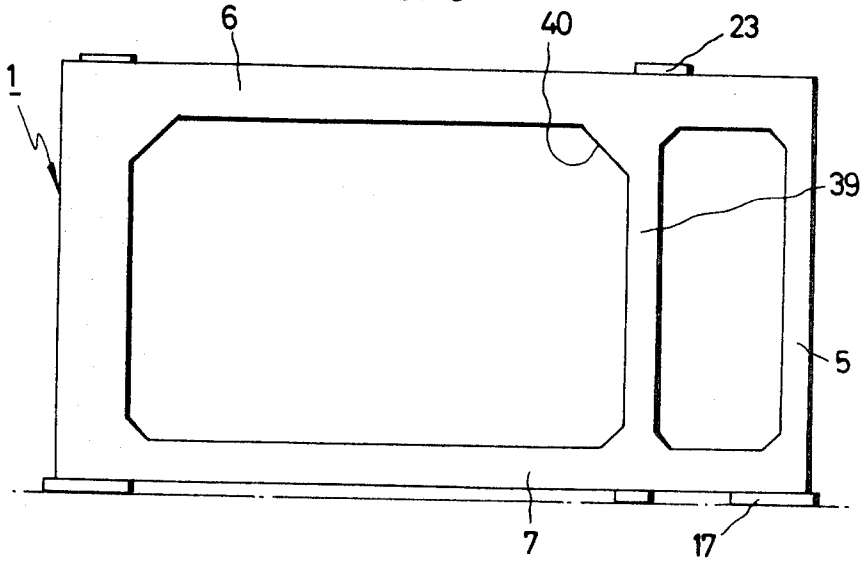


FIG. 6



INVENTOR:
EMILIO LLOVET RICART
BY Parrott, Bell, Seltzer, Park & Gibson
ATTORNEYS

CIRCULAR KNITTING MACHINE

The present invention relates to an improved support frame for a circular knitting machine which affords various advantages over the ordinary type of machine frame with reference to construction, operation and maintenance.

In conventional machines, the frame consists essentially of horizontal support rings positioned at different heights, and simultaneously acting as support and operative means. These rings are connected and supported at spaced positions and in a manner which makes certain repair or cleaning tasks extremely complicated, requiring on each occasion the complicated dismantling of a large number of members. Moreover, the support rings must be thick and extremely strong so as to enable them to perform the above-mentioned functions at one and the same time, especially when it is borne in mind that they are supported at spaced positions so that they require a thick section at each support point. A further disadvantage of these conventional support rings is the nature of the component material, in view of the fact that the ring must be able to support loads and withstand wear, something not easy to solve in view of the different nature of these requirements.

With reference to the manufacturing process, this type of conventional frame assembly requires that the active members of the machine must be assembled and adjusted together with the passive support members, which prevents the simultaneous performance of certain jobs and the application of production line assembly methods because each team of workmen performing an operation requires the presence of the whole machine. Thus, the remaining teams of workmen may not perform their tasks on the machine until the previous team has finished and, in view of the fact that the work times for each team are different, it is difficult to be able to work in series.

The machine frame of the present invention overcomes the above-mentioned disadvantages and contributes further new advantages, being characterized in that the diverse active and passive members are distributed among stacked subframes defined by a plurality of support platforms mounted one on top of the other. Each subframe comprises a flat, horizontal platform having downwardly extending support legs at each corner. A large circular opening is provided in each platform with an upper peripheral recess acting as a seat for a support ring. The subframes are connected to form successive stories of the complete frame assembly and each subframe rests on the support platform of the immediately lower subframes. It is possible to remove and replace the support ring by passing it between the legs of the immediately upper subframe and so that the aforementioned support and operative functions are allocated separately to the respective support platforms and rings.

The relationship between adjacent subframes and the respective platforms and rings of each subframe is maintained by means of suitable fastening means.

The structure of the assembled frame provides a stepped arrangement of the successive subframes, with reduction in width and length from the lowest to the uppermost.

Each subframe is preferably formed of cut, welded sheet metal in order to facilitate fabrication and reduce the weight and cost.

The rings are supported continuously around the whole of their circumference, thereby permitting a considerable reduction in their thickness.

Other aims and characteristics of the invention will be explained in detail in the following description, with reference to the attached illustrative drawings, in which:

FIG. 1 is a diagram of the front elevation of one-half of the assembled frame of the circular knitting machine;

FIG. 2 is a cross-sectional detail showing the manner in which a ring is attached to the corresponding support platform;

FIG. 3 is a front elevation of the knitting machine ensemble;

FIG. 4 is a side elevation of the same machine, looking at the right-hand side of FIG. 3;

FIG. 5 is a plan view of the top surface of the lowermost subframe of the machine; and,

FIG. 6 is a front elevation of the lowermost subframe of the machine.

The frame assembly of the circular knitting machine referred to herein comprises three stories, without the number thereof being limited to that of the present embodiment. These stories comprise respective subframes, such as a lower subframe 1, an intermediate subframe 2, and an upper subframe 3 (FIGS. 1, 3 and 4).

The lower subframe or base 1 comprises a rectangular support platform 4 (FIGS. 1 and 5) and downwardly extending legs 5 at right angles to the platform 4, forming a framework including an upper crossmember 6 and a lower crossmember 7. The subframe 1 is longer across the front and rear than along the sides because a space is provided adjacent the right-hand side leg (FIG. 6) to form a cabinet, to be presently described.

The platform 4 has a circular opening 8 (FIG. 2) with a peripheral recess 9 on the upper face, acting as seat for the outer peripheral edge portion of a support or operating ring 10. Between the platform 4 and the ring 10, there may be suitable fastener means, such as a bolt 11 with nuts 12 passing through holes 13.

The internal space of the subframe 1 is enclosed by means of doors 14 and 15 (FIG. 3) and grilles 16, fitted with closing means 17 and hinges 18. Part of this space is set aside for a cabinet to contain certain control or ancillary members.

The lower subframe 1 has its corners resting on plates 19. The ring 10 supports a toothed wheel on which conventional cloth takeup motion, not shown, is mounted. The same subframe 1 contains the slow-motion transmission-coupling means and the electrical panel installation, not shown, for general control of the machine, leaving available sufficient space for the remaining ancillary installations. The machine drive means is mounted on the platform 4.

The intermediate subframe 2 comprises a platform 20 and legs 21 with upper crossmember 22. These legs 21 rest on plates 23. The platform 20 has a circular opening 24 (FIG. 1) with a peripheral recess on the upper face acting as a seat for a ring 25. On the platform 20, there are plates 26. This subframe 2 has a cabinet at one end (FIG. 3) with a front door 27 and end or side doors 28 (FIG. 4) with hinges 29. The ring 25 supports a toothed wheel, not shown, on which a needle cylinder C is mounted, as well as the cam segments for operating the needles of the cylinder.

The upper subframe 3 comprises a platform 30 (FIG. 1) and legs 31, the platform 30 forming a tray by way of sidewalls 33 and having a circular opening 34 with peripheral recess on the upper face in which there is seated a ring 36. On this subframe there is housed a dial plate 37 with center support tube 38 acting as bearing for the dial drive shaft and its complement which form the cam segments for operation of the needles of the dial. At the upper end of the drive shaft, inside the tray, the gear wheel for driving the dial is supported.

All the component members of the present circular machine are mounted on and fitted to the subframe structure described and their assembly may be formed with the three subframes connected in tower form, without it being necessary to separate them, in view of the fact that the distance between the legs is sufficient to allow passage of the aforementioned component members. The subframes may be equipped with intermediate legs, such as illustrated at 39 in FIG. 6, to separate the spaces set aside for the machine members from those set aside for cabinets. The point of connection between the legs and crossmembers may form a reinforcement gusset, such as illustrated at 40 in FIG. 6.

The principal features of the metal frame structure of the present invention reside in the fact that it supports with maximum solidity all the essential mechanisms for the operations of producing knitted material and all members are fixed completely on a removable and replaceable support ring. This is not the case in conventional machines which are lacking in a basic structure, since they are formed by large support rings

resting directly on legs, said rings being fixed at three support points and, in some cases, at four points and their assembly must be performed in strict order from the base through to the upper body.

One feature of the present stacked subframe structure is the possibility of machining the openings and recesses of the support platforms by the simultaneous axial action of the tool used for this purpose, thereby facilitating the manufacture and fabrication. Also, the structure may be easily painted, independently of the remaining assembly, adjustment, etc. operations, all of which permits the use of production line methods without any of the constructional or assembly phases being dependent on any other.

I claim:

1. A frame for a circular knitting machine, said machine including mechanisms for the production of knitted fabric, said frame comprising a plurality of subframes mounted one on top of another and defining different operating levels, each subframe including a flat, horizontal support platform and support legs fixed thereto and extending downwardly therefrom, each platform having a circular opening with a peripheral recess on the upper face, and a nonrotating ring in each platform and having an outer peripheral edge portion seated in and supported solely by said peripheral recess of the circular opening of said platform, each ring providing the sole support for all mechanisms at that respective operating level, the diameter of each ring being less than the distance between the legs of the immediately upper subframe to afford ease of removal of the respective ring and the associated mechanisms between the legs of the immediately upper subframe.

2. A circular knitting machine frame according to claim 1 wherein fastening means is provided for connecting adjacent subframes and further fastening means is provided to connect said platform and ring of each subframe.

3. A circular knitting machine frame according to claim 1 in which the structure of the assembled frame presents a stepped arrangement of the successive subframes, with reduction in the width of said subframes from the lowermost to the uppermost.

4. A circular knitting machine frame according to claim 1 in which the support of said rings is continuous around the whole of their circumference, allowing thereby for a notable reduction in their thickness.