Jan. 10, 1967 G. BILLI 3,296,836

ANNULAR RING CONTROL OF FEED STATIONS FOR CIRCULAR KNITTING MACHINES

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Fig.1

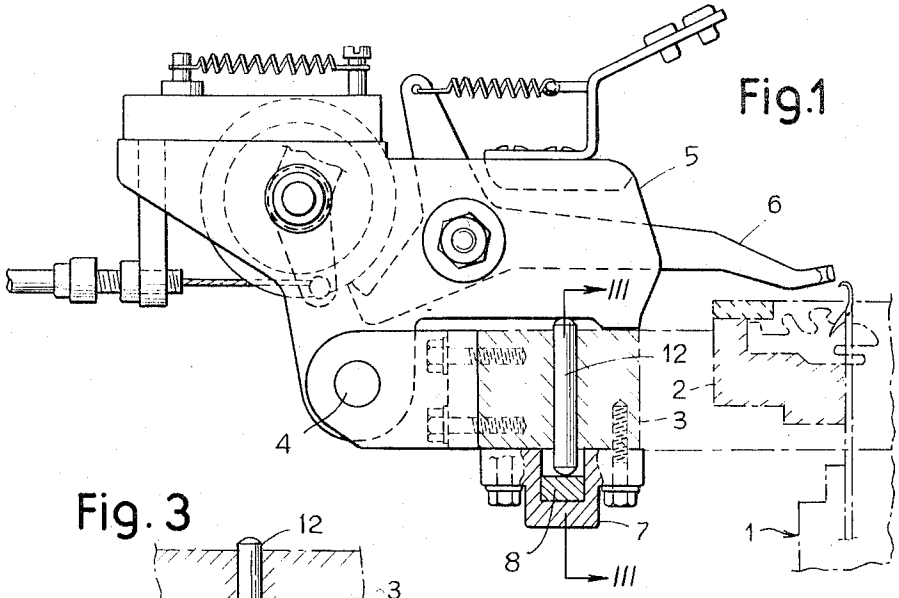


Fig. 3

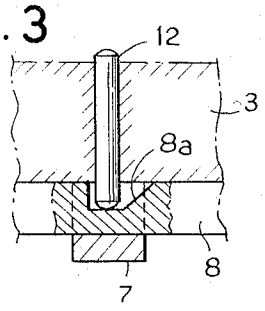
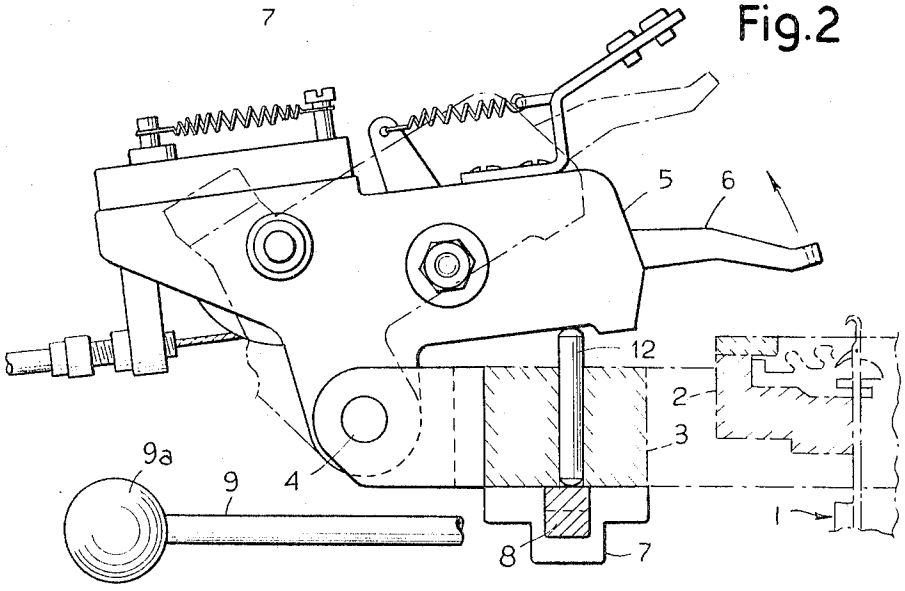


Fig.2



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Fig.4

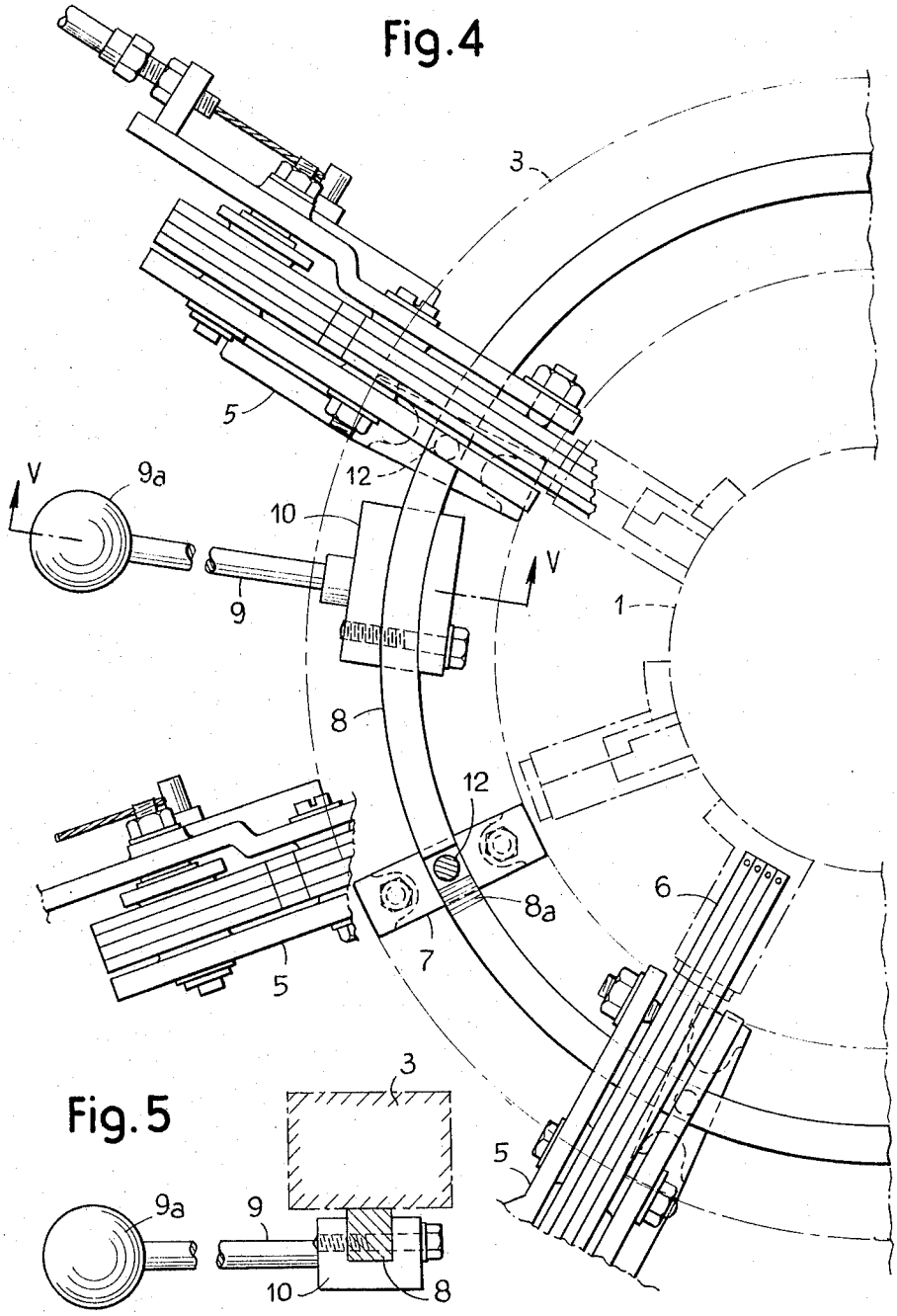


Fig.5

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ANNULAR RING CONTROL OF FEED STATIONS FOR CIRCULAR KNITTING MACHINES

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4 Claims. (Cl. 66—138)

The present invention relates to circular knitting machines and more particularly to machines of this character having a plurality of yarn feeding stations and a plurality of yarn guides at each station.

In accordance with the usual arrangement, the yarn guides at each station are selectively controlled by pattern control apparatus. The present invention provides a master control which simultaneously places all of the yarn guides at all of the stations in their inoperative positions. The arrangement, according to the invention, provides a fixed annular member on which the yarn guides are mounted. At each station, all of the yarn guides are mounted in a pivotal support. A cam ring located beneath the fixed annular member is movable through a small angular displacement coaxially with the needle cylinder to raise or lower all of the pivotal supports simultaneously. When the pivotal supports are raised, all of the yarn guides at all of the stations are held in their inoperative positions independently of the pattern control mechanism. When the pivotal supports are lowered by displacement of the cam ring, the yarn guides are individually controlled in the usual manner by the pattern control mechanism.

The invention will be described in greater detail in the following specification with reference to the accompanying drawing forming a part hereof.

In the drawing:

FIG. 1 is a fragmentary view in radial section of a rim structure including oscillatory yarn-guide, the guide being in its operative position;

FIG. 2 is similar to FIG. 1 but showing the support in its raised position;

FIG. 3 is a sectional view taken along the line III—III of FIG. 1;

FIG. 4 is a fragmentary plan view partially broken away to illustrate details of construction;

FIG. 5 is a sectional view along the line V—V of FIG. 4.

Referring to the drawing, a needle cylinder designated generally as **1** is provided with a sinker-carrying ring **2**. A fixed annular member **3** surrounds the upper end of the needle cylinder **1** and the ring **2**. Pivot pins **4** are provided for pivotally mounted supports **5**. The pins **4** are fixedly mounted by brackets secured to the annular member **3**. A suitable number of yarn guides **6** (four being illustrated) are mounted in each of the pivotal supports **5** and a support **5** is positioned at each of the feed stations around the needle cylinder **1**, the number of feed stations usually being four or six. The arrangement of supports **5** and yarn guides **6** described above is conventional in the art and does not require a more detailed explanation.

The invention involves means for moving all of the supports **5** together with their yarn guides **6** simultaneously from the operative position shown in FIG. 1 to the inoperative position shown in FIG. 2 independently of the usual means for selectively rendering a certain one or more of each group of yarn guides **6** operative and the others inoperative. For this purpose, U-shaped supports **7** are provided at regularly circumferentially spaced locations around the annular member **3**. As illustrated, a U-shaped support **7** is associated with each of the pivotal

supports **5**. A cam ring **8** is freely movably supported by the U-shaped supports **7**, the cam ring **8** being concentric with the needle cylinder **1**. The cam ring **8** is movable through a small limited angular displacement coaxially with the needle cylinder **1** by a radially extending manually operable lever **9** the free end of which is provided with a knob **9***a*. The lever **9** is secured to the cam ring **8** by a clamp member **10**.

In proximity to each of the U-shaped supports **7**, the cam ring **8**, which is of rectangular cross-sectional configuration, has an upwardly opening recess formed therein which is connected by an inclined plane cam surface **8***a* with the flat annular upper surface of the cam ring **8**. Directly above each U-shaped support **7** there is a freely vertically slidable cam follower pin **12** the lower end of which is selectively engageable either with the bottom of the depression at the lower end of the cam surface **8***a* or with the flat upper surface of the cam ring **8** by displacement of the lever **9**. The upper end of each pin **12** engages one of the pivotal supports **5**. In their operative positions, as illustrated in FIG. 1, the pivotal supports **5** all engage the upper surface of the fixed annular member **3** and the lower ends of all of the pins **12** are in the bottoms of the recesses adjacent to the lower ends of the cam surface **8***a*. Upon displacement of the lever **9** clockwise as viewed in FIG. 4, all of the pins **12** are simultaneously displaced upwardly in unison by the cam surfaces **8***a* and the pins **12** are thereafter supported by the upper surface of the cam ring **8**. When the pins **12** are supported by the upper surface of the cam ring **8**, all of the pivotal supports **5** are in the inoperative position shown in FIG. 2.

It will be appreciated that, because of the small angular displacement of the cam ring **8** which is required to move the pivoted supports **5** between their operative and inoperative positions, power operated means may be used instead of or in addition to the lever **9**.

While I have shown and described what I believe to be the best embodiment of my invention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. In a circular knitting machine of the type comprising a needle cylinder, a plurality of yarn feed stations, and a plurality of yarn guides at each station, each yarn guide being individually movable between operative and inoperative positions, the improvement which comprises the provision of a fixed ring member concentric with said cylinder; a pivotally mounted support member at each feed station, each support member being carried by said ring member and supporting all of the yarn guides at one of said stations, each of said support members being movable between an operative position wherein said yarn guides at each station are individually movable between said operative and inoperative positions and an inoperative position wherein all of said yarn guides at each station are held in their inoperative positions, a cam ring member carried by said fixed ring member concentrically with said needle cylinder for limited angular displacement coaxially with said cylinder, said cam ring member having a plurality of recesses formed therein each connected to one of the surfaces of said cam ring member by a cam surface, a plurality of cam follower members each engageable with one of said pivotal support members to displace the same between its operative and inoperative positions, each of said cam follower members being displaced by one of said cam surfaces in response to said angular displacement of said cam ring member, all of said pivotal members being displaced in unison be-

tween said operative and inoperative positions by said angular displacement of said cam ring member, and means for selectively causing said angular displacement.

2. The improvement according to claim 1, wherein said cam ring member is located below said fixed ring member, said cam ring member having a flat annular upper surface from which said recesses extend downwardly, in which each of said cam follower members is a pin vertically slidable through said fixed ring member, the upper end of each pin engaging one of said pivotally mounted support members for displacement thereof, and wherein the lower end of each pin is selectively and progressively raised or lowered by one of said cam surfaces to engage either said flat annular upper surface of said cam ring member or the bottom of one of said recesses.

3. The improvement according to claim 2, further comprising a plurality of U-shaped supporting members connected to the under side of said fixed ring member, said cam ring member being circumferentially slidable in said

supporting members, each of said supporting members being located directly below one of said pins.

4. The improvement according to claim 1, wherein said means for causing said angular displacement is a manually operable lever.

References Cited by the Examiner

UNITED STATES PATENTS

462,155	10/1891	Pearson	66—133
3,008,316	6/1958	Levin	66—138
3,048,990	8/1962	Moyer	66—138
3,101,601	8/1963	Tenconi	66—138
3,122,008	2/1964	Hanel et al.	66—138
3,201,957	8/1965	Levin	66—138

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