

April 4, 1967

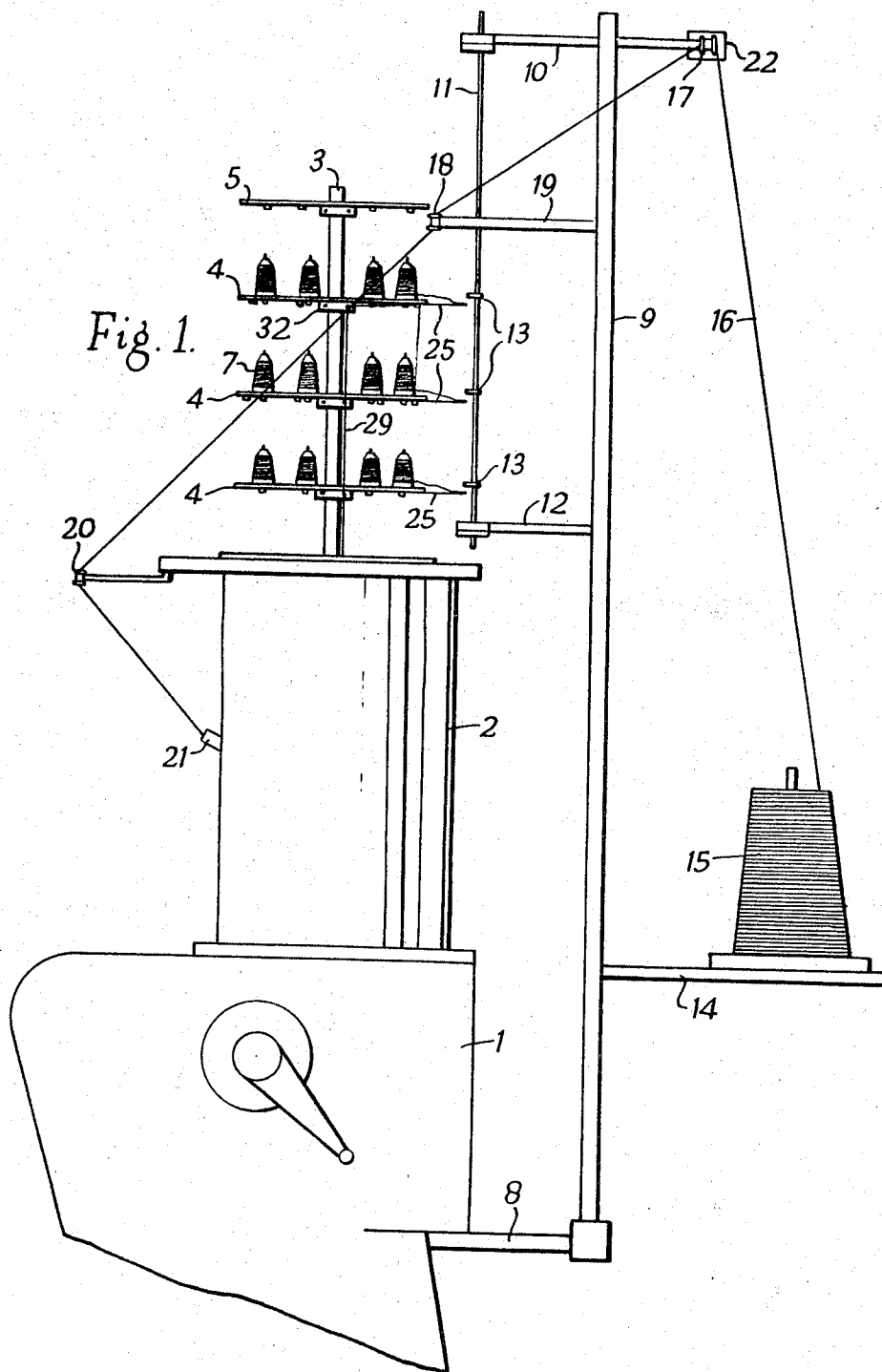
J. A. SHARP ET AL

3,312,084

STOP MOTION FOR KNITTING MACHINES

Filed July 6, 1964

2 Sheets-Sheet 1



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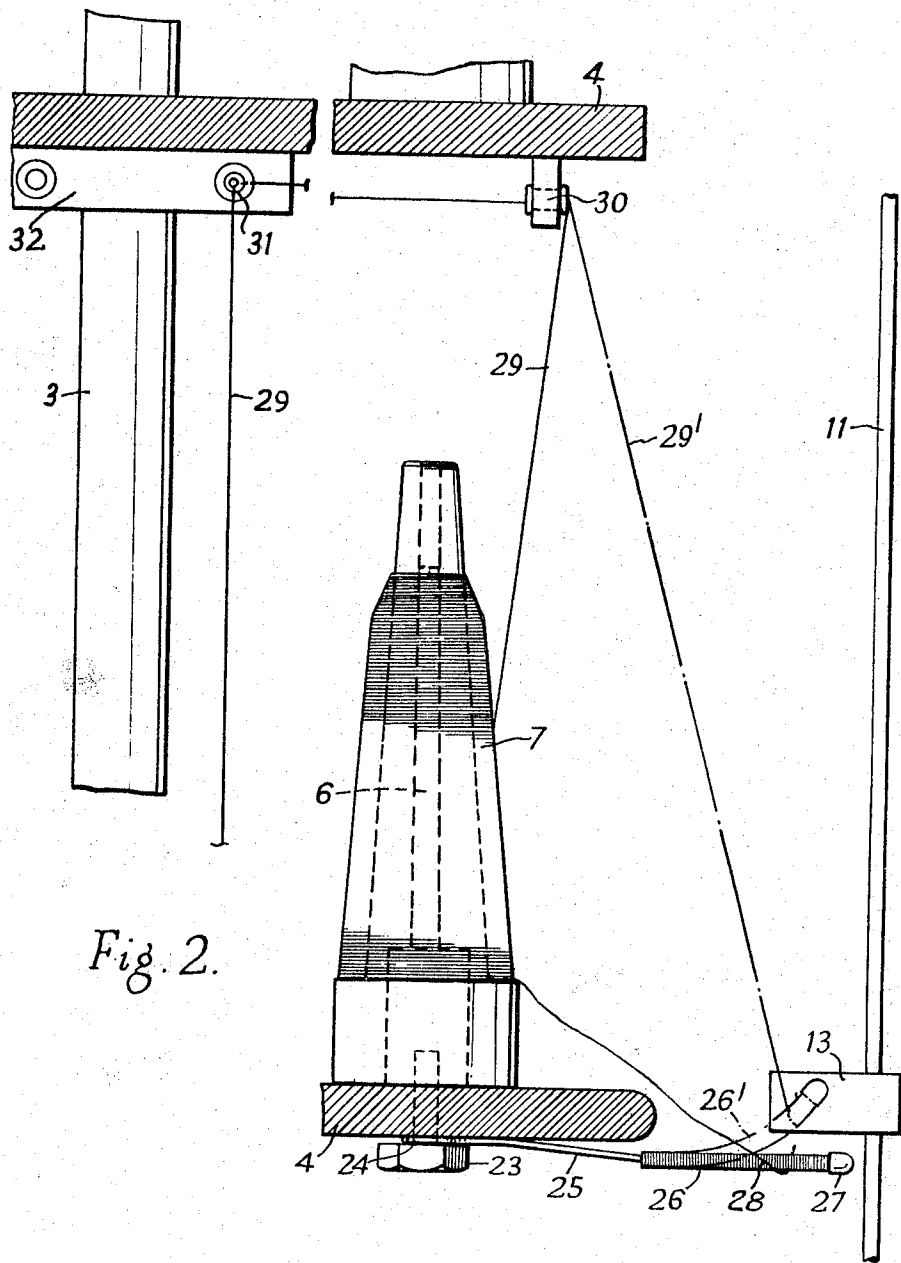


Fig. 2.

1

3,312,084

STOP MOTION FOR KNITTING MACHINES

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Filed July 6, 1964, Ser. No. 380,389

Claims priority, application Great Britain, July 5, 1963, 26,661/63

2 Claims. (Cl. 66-163)

This invention deals with the supply of yarn or thread from bobbins and the like wound packages to the feeders in circular knitting machines.

The invention has been particularly devised in connection with wrap thread machines, that is to say circular knitting machines in which embroidery thread is taken off bobbins in the knitting of articles with special effects, for example patterned socks. In such knitting, the actual consumption of individual thread may be comparatively small, despite a high overall rate of knitting by the machine.

Although the principles of the present invention may theoretically be applicable to other and analogous uses (which, it is to be understood, are therefore not excluded from the purview of the invention), its use in wrap thread machines appears at present to be the most advantageous, and the description of the invention from here on in this specification will be confined to this.

In a wrap thread machine, the embroidery threads are supplied from small bobbins which are mounted in concentric circular rows on one or more stands on the machine, these reciprocating at the same rate as the needle cylinder or dial, i.e. at a comparatively high rate. As stated above, the demand made on individual embroidery threads may, however, be quite small, and the bobbins concerned usually represent a package of substantially smaller size than those supplying the ground yard. Experience is that there is difficulty in this situation in supervising the exhaustion of embroidery thread from individual bobbins, especially where there are a large number of these bobbins arranged in a plurality of tiers in the machine (there may, indeed, be up to three tiers of 20 bobbins each). The difficulty in determining just how near to exhaustion any one embroidery thread bobbin is at a particular time is attributable to the generally slow rate of consumption, the fact that the bobbins are reciprocated at high speed and thus in any case difficult of observation, and the fact that they are of small size and arranged close together for the sake of compactness so that inner rows, at any rate, tend to be masked.

It is an object of this invention to provide an arrangement which will operate the stop motion of such a knitting machine automatically on exhaustion of any embroidery thread bobbin, thereby avoiding the wasteful and faulty knitting which can occur due to failure of an attendant to take timely note of the approaching exhaustion.

To this end, an individual bobbin is provided with an element which traps the run off end of the yarn or thread wound on the bobbin and is deformable or movable, under the pull on this yarn or thread from the knitting instruments at the time of exhaustion of the bobbin, and thereby brought into contact with means to actuate the stop motion of the machine.

In a preferred method of implementing this arrangement the means to actuate the stop motion are electrically-operable, and the trapper element is, or carries a part, of an electrically-conductive metal which is arranged in a control circuit of said means, said element being deformable by the pull of the exhausting yarn or thread so that the trapper element, or the said part carried thereby, is brought into a position for engagement with an elec-

2

trical contact of said control circuit to operate said control means.

One method of meeting this requirement is for the trapper element to be in the form of a straight spring which is arranged at the lower end of the bobbin so as to extend outwardly therefrom, allowing the run-off end of the embroidery yarn to be trapped between turns thereof. This run-off end being wrapped over by the turns of thread on the bobbin, the spring will remain in its initial radial position during normal knitting but, when the end of the embroidery thread is finally paid out from the bobbin, an immediate pull will be exercised on the spring to deform it and cock it at an angle for engagement with a brass collar mounted on an upstanding conductor rod at the appropriate part of the machine in the path of the cocked spring.

One such collar or equivalent contact piece can serve all the embroidery bobbins arranged at the same level in a machine, and where there is a multi-tier thread supply, then the corresponding rows of the several tiers can be serviced by a single conductor rod with a plurality of collars or contact pieces along it.

The invention is illustrated in reference to the accompanying drawings, in which

FIGURE 1 is a diagrammatic front elevation of a wrap thread knitting machine equipped in accordance with the invention.

FIGURE 2 illustrates, on an enlarged scale, a bobbin and associated parts of the machine illustrated in FIGURE 1.

The machine illustrated comprises a pedestal 1, which is mounted on the usual legs (not shown) and carries a normal cylinder 2 containing the knitting instruments. Passing concentrically through this cylinder and projecting upwardly therefrom is a shaft 3. This shaft is secured to the embroidery head within the cylinder 2 so as to rotate therewith during knitting. This head has not been shown as it forms part of a conventional knitting system. The shaft 3 has three circular plates or bobbin tables 4 secured therearound, and carries a yarn guide plate 5 at its upper end.

The tables 4 are provided in the usual way with spindles or spigots 6 which serve to receive embroidery thread bobbins 7, and the spindles 6, and hence bobbins 7, on each table are arranged in two concentric rings with the individual bobbins arranged at successive radial angles around the shaft 3.

The pedestal 1 also has extending laterally thereof at its lower end a bracket 8 supporting an upstanding mounting rod 9 which has a cross bar 10 at its upper end. This bar 10 serves to support, in insulated fashion, the upper end of an electrically conducting rod 11, the lower end of which is engaged, again in insulated fashion, by a further bracket 12 mounted on the rod 9. Disposed at intervals along its length at the approximate level of the tables 4 the rod 11 carries electrical contacts 13 in the form of circular discs.

The mounting rod 9 further has a lateral bracket 14 on which is mounted, by means of a spigot in the usual way, a bobbin 15 for the ground yarn, this yarn, denoted 16, passing upwards through a pot eye 17 mounted on the cross bar 10 and thence downwards through a further pot eye 18 on an arm 19 extending from the mounting rod 9. The yarn 16 is then guided through a further pot eye 20 mounted laterally of the cylinder 2 and thence passes through a guide 21 to the appropriate feeder in the cylinder 2.

The cross bar 10 also carries a stop motion means in a box which has been denoted 22 in FIGURE 1. This means can be one of the various known forms, but will include a simple electrical control switch arrangement with one pole connected to the conducting rod 11 and the

other to the ground, e.g. to the body of the machine through mounting rod 9.

As has been indicated above, the bobbins 7 are mounted in the usual way on spindles 6, the latter being secured by a screw 23 to the plate 4, the head of this screw serving to trap, against the underside of the table 4 concerned, a ring 24 formed at the end of an arm 25 of stout copper wire which extends outwards beyond the periphery of the table. This arm 25 has secured to its outer end a flexible compression spring 26 of conducting material furnished at its outer end with a tipped contact piece 27, also of electrically conducting material. In FIGURE 1 only one bobbin on each of the tables 4 has been illustrated as equipped with an arm 25, but it will be appreciated that all the bobbins 7 are so equipped, and that in the case of the inner circle of bobbins, these arms are of extended length so that all the arms will project by the same amount from the periphery of the table.

When a fresh bobbin 7 is placed on a spindle 6, the run out end 28 of the embroidery thread is pulled down by a quick tug so that it is caught and held between the turns of spring 26. In this condition (seen in FIGURE 2) the arm 25 and spring 26 extend substantially parallel to the bottom face of table 4. This condition prevails during normal knitting and whilst thread is drawn off bobbin 7. This thread has been denoted 29 in FIGURE 1, and it will be observed that when taken off the bobbin 7 it runs first through a pot eye 30 secured to the underside of the table 4 above it (or the plate 5 in the case of the upper set of bobbins 7) to a corresponding pot eye 31 mounted in a collar 32 around the shaft 3 immediately below the table 4 or plate 5 referred to. Thence the yard 29 descends vertically into the cylinder 2 and to the knitting instruments thereon. Only one yarn 29 has been illustrated in FIGURE 1 of the drawings, to avoid complexity of illustration, but it will be appreciated that there is one such yarn running from each of the bobbins 7 shown.

In the event that a bobbin 7 becomes exhausted, it will be seen from FIGURE 2 that the end of the embroidery thread will leave the bobbin and run straight from the trapped position in the spring 26 to the pot eye 30, i.e. in the path indicated at 29' in FIGURE 2. Under these conditions the spring 26 will be distorted by the pull of the yarn 29' into the position 26' seen in FIGURE 2, and the tip 27 thereof will be brought into engagement with the co-operating contact 13. This will complete a circuit through the arm 25, contact 13, rod 11 and cross bar 10 to the mechanism in the switch control box 22, and so actuate the stop motion so as to arrest the machine.

We claim:

1. In a knitting machine the combination comprising a knitting assembly, a stop motion mechanism controlling said knitting assembly, an electrical system controlling said stop motion mechanism, two electrical contacts connected in said electrical system, a bobbin support for supporting a plurality of bobbins, yarn guide means to guide yarn from each bobbin to said knitting assembly, and a resiliently deformable trapper element for each bobbin which is associated with the bobbin support and is constructed and arranged to permanently trap the run-out end of the respective bobbin yarn, said trapper element carrying one of said electrical contacts and being deformable under the pull of the bobbin yarn from the knitting instruments of the machine only at the time of exhaustion of the bobbin to bring the said electrical contact into engagement with the other electrical contact so that the stop motion is actuated.

2. In a circular knitting machine the combination comprising a knitting assembly, a stop motion mechanism controlling said knitting assembly, an electrical system controlling said stop motion mechanism, a number of rotatable superimposed coaxial tables, each table having means for supporting a plurality of bobbins of embroidery yarn arranged in circles thereon, yarn guide means to conduct yarn from each bobbin to said knitting assembly, a resiliently deformable yarn trapper element in the form of a coiled spring associated with each bobbin supporting means and carrying an electrical contact in said electrical system, the trapper elements of each table extending outwardly from the periphery of said table and being arranged in a circle around the table, a vertical conductor rod at the side of the bobbin tables, and a fixed electrical contact in said electrical system associated with each table, said fixed contacts being mounted on said conductor rod for engagement by the trapper elements, whereby the trapper element associated with any exhausted bobbin will be deformed by the pull on the bobbin yarn from said knitting assembly to bring its contact into the path of contact engagement with the fixed contact associated with the table concerned.

References Cited by the Examiner

UNITED STATES PATENTS

2,402,816	6/1946	Ingalls	200—61.18
2,704,445	3/1955	Baumber	66—163
2,754,382	7/1956	Francis	200—61.18
2,804,761	9/1957	Lebocey	66—163
3,016,725	1/1962	Kimrey et al.	66—140

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