G. L. BALLARD.

DIAL HOLDING DEVICE FOR KNITTING MACHINES.

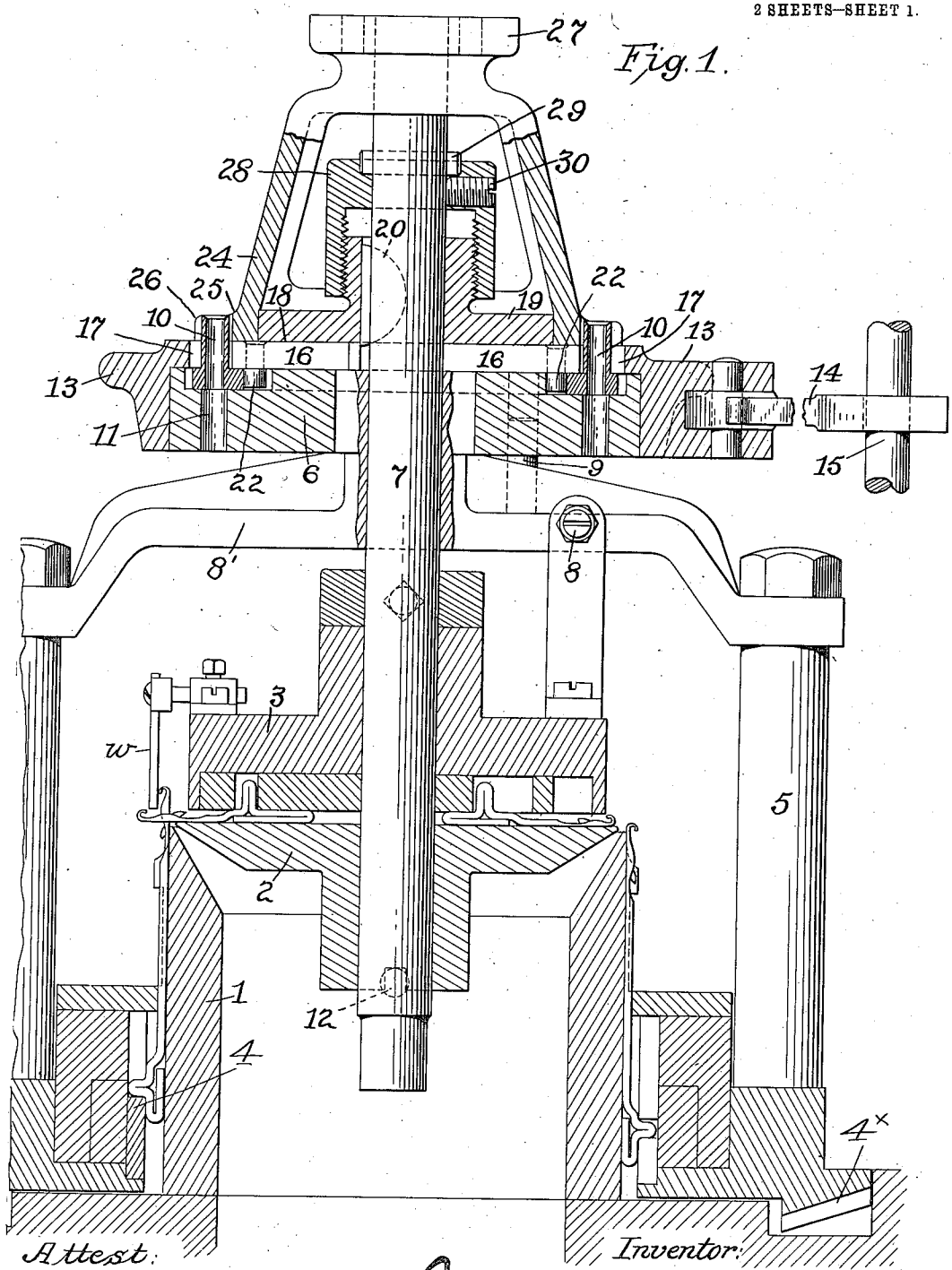
APPLICATION FILED APR. 25, 1911.

1,012,966.

Patented Dec. 26, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



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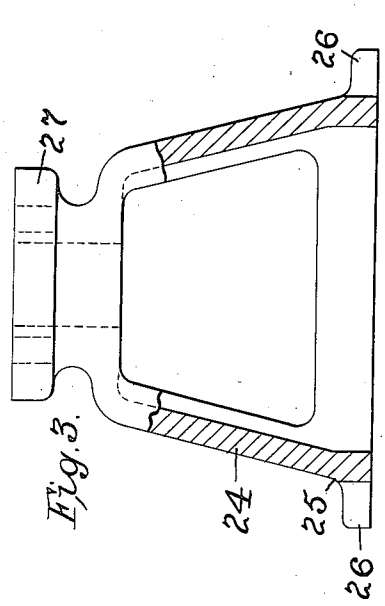
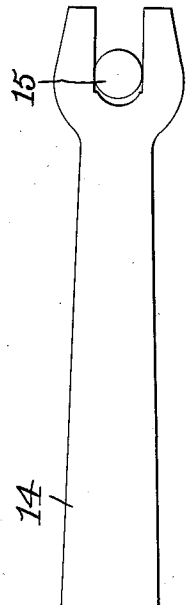


Fig. 3.



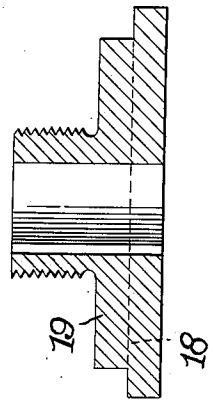


Fig. 4.

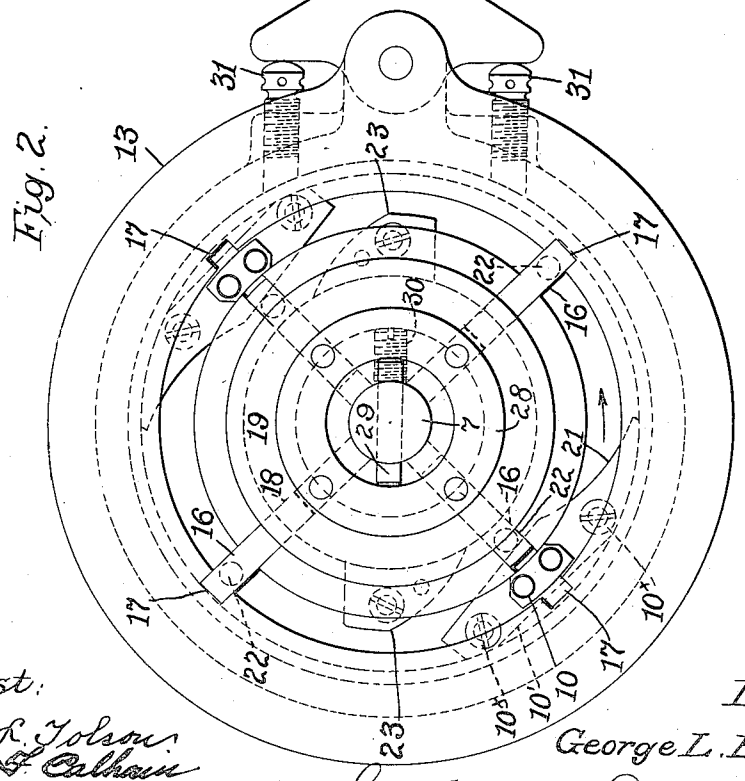


Fig. 2.

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UNITED STATES PATENT OFFICE.

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DIAL-HOLDING DEVICE FOR KNITTING-MACHINES.

1,012,966. Specification of Letters Patent. Patented Dec. 26, 1911.

Application filed April 25, 1911. Serial No. 623,327.

To all whom it may concern:

Be it known that I, GEORGE LAWSON BALLARD, subject of the King of Great Britain, residing at Norristown, Pennsylvania, have invented certain new and useful Improvements in Dial-Holding Devices for Knitting-Machines, of which the following is a specification.

My invention is an improvement in knitting machines of the type employing a fixed cylinder and dial, and revolving cams, and is designed to dispense with the dogs which hold the dial fixed in relation to the cylinder and to avoid the objections arising from their use resulting from the fabric having to pass between these dogs.

In carrying out my invention, I employ a plurality of locking devices between the dial post and an encircling fixed frame member which hold the dial post and the dial stationary, said locking devices being movable independently to permit the yarn to pass, for which purpose a traveling yarn guide is associated with a cam device for retracting the locking devices in succession for the passage of the yarn guide.

One feature of my present invention is the provision of a bobbin stand to rotate with the dial cap for feeding a plurality of yarns, and other features of the invention will appear from the following description and claims.

In the drawings Figure 1 is a central vertical sectional view of so much of a knitting machine as is necessary to a full understanding of my invention; Fig. 2 is a plan view of the fixed frame ring, the dial post and the locking devices between them, the bobbin stand being omitted; Fig. 3 is a view of the bobbin stand, and Fig. 4 is a detail view of the cap piece fixed to the dial post.

In the drawings, 1 is the cylinder and 2 the dial.

3 is the dial cap carrying the cams, and 4 the cams of the cylinder. The cap may be connected with one of the posts 5 of the revolving head to rotate therewith, or with the cross piece or yoke 8 as shown. Also rotating with the dial cap is a ring 6 surrounding the center dial post 7, and connected to the yoke 8 of the revolving head by any suitable means, as the pin 9, and this ring or plate supports the thread guides 10 consisting of the vertical tubes or members for directing the yarn down to the thread carrier, these tubular members having their openings communicating with the openings 11 through the ring 6 through which the yarn passes. The yarn guides are held to the rotating ring 6 by the screws $10^{\times}$ passing through their base plates 10′ into said ring.

The dial is held to the center post by a pin at 12, and for holding this dial against rotation in relation to the cylinder and for dispensing with the dogs which have been used heretofore I provide a ring or frame 13 surrounding the ring 6 and an arm 14 extending therefrom and connected with a fixed part of the frame at 15, so that this surrounding ring will be held stationary with the frame, and this ring is connected with the center post to hold the same stationary through radially sliding bolts 16 arranged to engage notches 17 in the said ring. These bolts are mounted in grooves or ways 18 in the under side of the cap piece 19 which is keyed at 20 to the dial post. The dial is thus held stationary while dispensing with the usual dogs between it and the cylinder through the described connections as follows: the post, the cap 19 keyed to the post, the radial locking bolts mounted in the cap and engaging the notches in the ring 13, and the arm 14 connecting said ring to the frame of the machine.

Now, as the thread guides must rotate, I provide cams associated with the said guides to retract the sliding bolts to allow the thread guides with the threads to pass by the same, it being understood, however, that this retracting of the bolts takes place in succession so that some one or more of the sliding bolts is always in engagement with the notched fixed ring, and thus the cap, the post and dial will be held stationary at all times. This cam comprises the curved end 21 of the base plates of the yarn guides adapted to engage a pin 22 projecting down from the sliding locking bolt, said curved end extending in advance of the thread guide so that just previous to the arrival of the thread guide at the locking bolt the said bolt will be retracted inwardly and held in this position by the edge of the cam during the passage of the thread guide past the locking bolt. While this is taking place at one pair of locking bolts, the other pair of locking bolts are holding the parts locked together to hold the dial stationary. A returning portion of the cam is also provided

at 23 fixed to the rotating ring 6 which cam portion, after the thread guide passes the locking bolt, will return said bolt outwardly by a positive movement to lock the parts together at this point while permitting the thread guide cam to release the next locking bolt in the series for the passage thereby of the thread guide. The locking bolts move outwardly to lock and thus engage the notches placed at the greatest distance practicable from the center, this being desirable to avoid multiplying any inaccuracies or wear which would be the case should the locking bolts lock on their inward movement and engage notches near the center of the machine.

Any number of guide openings or tubes may be used in a multiple feed machine. This, however, involves the use of a rotary bobbin stand where a number of threads are revolving with the machine, and for the purpose of this part of my invention I provide a stand 24 having a rim 25 surrounding the cap plate before described, and having notches or fingers at 26 engaging the tubes or guides for the yarn so that the stand will be carried around with said guides. The stand has an upper part 27 upon which the bobbin supports are supported.

For adjusting the dial vertically, a nut is provided at 28 the thread of which engages the threaded hub of the cap plate 19. The nut has an annular recess receiving a cross pin 29 on the center post. Now, by turning the nut, it will raise or lower on the hub of the cap piece and thus the dial post will move up or down. A set screw 30 holds the nut and dial post rigidly together. In this action the key 20 moves up or down in the key way of the hub of the cap piece.

For adjusting the dial circumferentially in relation to the needle cylinder, I pivot the arm 14 to the ring 13, and its end is forked where it engages the frame member 15 to permit slight longitudinal movement, and, at each side of the pivot an adjusting screw 31 is arranged in the ring 13, but with the head bearing against laterally extending arms of the arm 14 so that by adjusting these screws the ring 13 may be turned either one way or the other, and thus through the connections described the dial will be adjusted circumferentially in relation to the needle cylinder.

I claim as my invention:—

1. In a circular knitting machine, a fixed cylinder, a dial, a dial post, a plurality of independently movable locking devices disposed at different points about the dial post and locking the post against rotary movement in either direction, and cam means for positively retracting the locking devices independently and in succession for the passage of the yarn and for positively returning the locking devices independently and in succession into engaging position after the yarn has passed.

2. In a circular knitting machine, a fixed cylinder, a dial, a dial post, cams for the cylinder needles, cams for the dial needles, a fixed frame member furnishing a support at different points about the dial post, a plurality of locking devices movably connected with the dial post, and movable outwardly into locking engagement with the fixed frame member, and inwardly to disengage therefrom, a yarn guide and a cam revolving therewith for retracting the locking devices inwardly in succession from the outer frame member toward the dial post to permit the passage of said guide, substantially as described.

3. In a circular knitting machine, a fixed cylinder, a dial, a dial post, a cap fixed to the dial, cams for the cylinder needles, cams for the dial needles, a fixed frame member furnishing a support at different points about the dial post, a plurality of locking devices movably mounted in the cap and thereby connected with the dial post, and movable outwardly into locking engagement with the fixed frame member, and inwardly to disengage therefrom, a yarn guide and a cam revolving therewith for retracting the locking devices inwardly in succession from the outer frame member toward the dial post to permit the passage of said guide, said locking devices consisting of radially sliding bolts to engage notches in the frame member, substantially as described.

4. In a circular knitting machine, a fixed cylinder, a dial, a dial post, a cap fixed to the dial, cams for the cylinder needles, cams for the dial needles, a fixed frame member furnishing a support at different points about the dial post, a plurality of locking devices movably mounted in the cap and thereby connected with the dial post, and movable outwardly into locking engagement with the fixed frame member, and inwardly to disengage therefrom, a yarn guide, and a cam revolving therewith for retracting the locking devices inwardly in succession from the outer frame member toward the dial post to permit the passage of said guide, and a cam portion for returning the locking devices to engaging position by a positive movement, substantially as described.

5. In combination a cylinder, a dial, cams therefor, a dial post, a ring rotating about the dial post and carrying yarn guides, a fixed frame ring within which the movable ring rotates, a cap piece secured to the dial post, locking devices guided therein and movable outwardly to engage the fixed frame ring, cam means for retracting the locking devices for the passage of the yarn guides, and a bobbin stand supported on the cap piece and engaging the yarn guides to revolve therewith, substantially as described.

6. In combination a cylinder, a dial, cams therefor, a dial post, a ring rotating about the dial post and carrying yarn guides, a fixed frame ring within which the movable ring rotates, a cap piece secured to the dial post, locking devices guided therein and movable outwardly to engage the fixed frame ring, cam means for retracting the locking devices for the passage of the yarn guides, and a bobbin stand supported on the cap piece and engaging the yarn guides to revolve therewith, said bobbin stand having openings to fit over the yarn guides, substantially as described.

7. In combination in a knitting machine, a fixed cylinder, a dial, cams therefor, a dial post, locking devices disposed at different points about the dial post and individually movable to allow the yarn to pass, cam means for moving the locking devices individually and a ring shaped frame member with which the outer ends of the locking devices engage and from which they are withdrawn by the cam, substantially as described.

8. In combination a cylinder, a dial, cams therefor, a dial post, a fixed frame ring, a revolving yarn guide, locking devices between the fixed frame ring and the dial post, means for retracting the locking devices to allow the yarn guides to pass, and means for adjusting the fixed frame ring circumferentially to thereby adjust the dial, said means consisting of the arm pivotally connected to the fixed frame ring and pivotally and slidably connected with a part of the frame, and the adjusting means between the pivoted arm and the fixed frame ring, substantially as described.

9. In combination a cylinder, a dial, cams therefor, a dial post, a fixed frame ring, a yarn guide, a carrier therefor rotating with the cams, locking devices between the fixed frame ring and the dial post, a cap member splined to the dial post, a nut engaging the screw threaded portion of the cap piece, and a pin connecting the dial post with the nut, substantially as described.

10. In combination, a cylinder, a dial, cams therefor, a dial post, a cap secured to the dial post, a ring rotating about the dial post and connected with the cams to move in unison therewith, a fixed frame ring surrounding the dial post and within which the movable ring rotates, yarn guides on the movable ring, locking means between the fixed frame ring and the dial post mounted in the cap and cams on the rotary ring for operating the locking means, and a bobbin stand arranged concentric with the dial post and connected with the rotary ring to move therewith, substantially as described.

In testimony whereof, I affix my signature in presence of two witnesses.

GEORGE LAWSON BALLARD.

Witnesses:

OWEN BALLARD,

H. T. BALLARD.