W. O. TAYLOR.

STOP MOTION FOR KNITTING MACHINES.

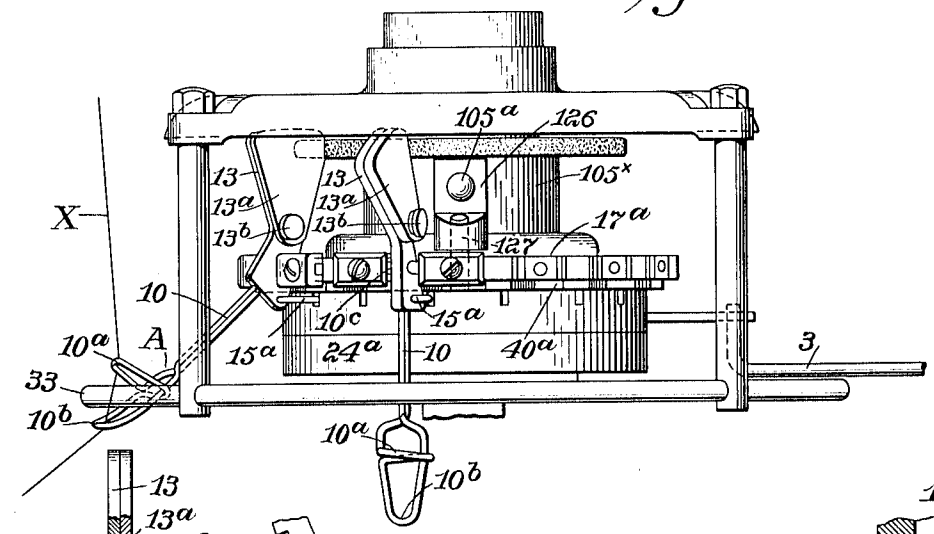
APPLICATION FILED AUG. 29, 1916.

1,316,929.

Patented Sept. 23, 1919.

2 SHEETS—SHEET 1.

Fig. 1.



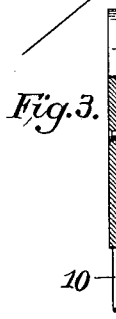


Fig. 3.



Fig. 5.

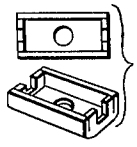


Fig. 4.

Fig. 2.

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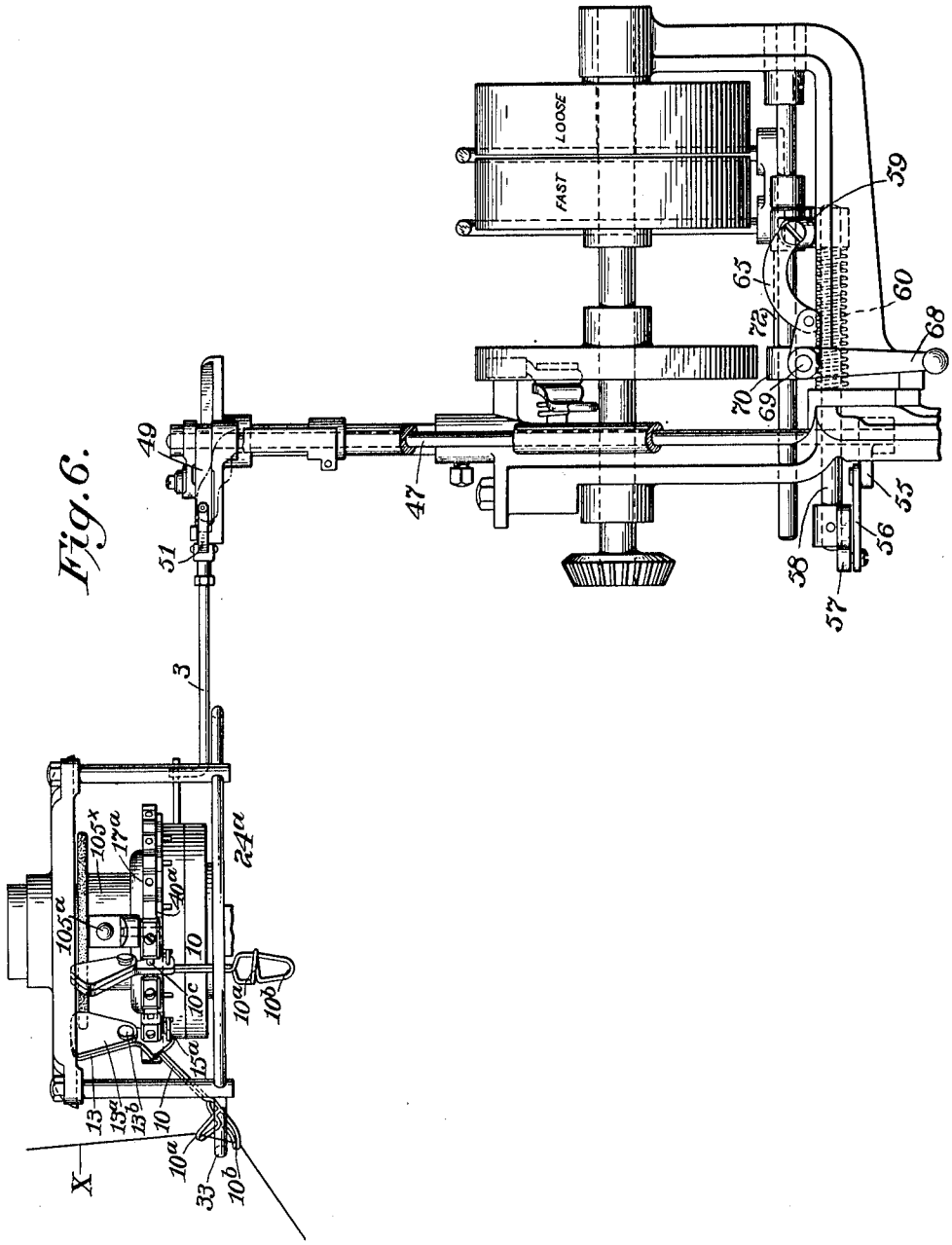
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2 SHEETS—SHEET 2.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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STOP-MOTION FOR KNITTING-MACHINES.

1,316,929. Specification of Letters Patent. Patented Sept. 23, 1919.

Application filed August 29, 1916. Serial No. 117,490.

To all whom it may concern:

Be it known that I, WILLIAM O. TAYLOR, a citizen of the United States, and resident of Limerick, Pa., have invented certain new and useful Improvements in Stop-Motions for Knitting-Machines, of which the following is a specification.

My invention relates to a stop motion for knitting machines of the type described in another application for Letters Patent of the United States filed August 29th, 1916, Ser. No. 117,489, in which drop fingers are employed which are held up by the draft of the yarn and in which a friction member is employed to create a frictional restraint on the yarn when the drop finger falls, due to the existence of temporary or passing abnormal conditions, said resistance to the free running of the yarn serving to place sufficient tension thereon to effect the restoration of the yarn drop finger to normal position without operating the trip mechanism, which the drop fingers are designed to control and operate when the drop fingers fall through a certain predetermined angle.

In carrying out my present invention I aim to provide an arrangement by which a heavier drop finger may be employed for a given gage or quality of yarn than is possible in the arrangement disclosed in my said other application, this heavier drop finger contributing to certainty and quickness of operation of the trip mechanism and I have sought to simplify the construction, render it more compact, and of less height than the other form of apparatus referred to above.

Other objects of my present invention will appear hereinafter.

The invention consists in the features and combination and arrangement of parts hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings;

Figure 1 is a side view of the stop motion with some parts omitted.

Fig. 2 is a sectional view of part of the head.

Fig. 3 is a detail view of the upper weighted end of the drop finger.

Fig. 4 shows a detail.

Fig. 5 is a view of a part of the toothed controller disk.

Fig. 6 is a view of the stop motion head and let off mechanism.

The drop fingers 10 are pivotally mounted at 10^c to a supporting ring 17^a suitably supported by its hub or sleeve 17^b on post 1 arranged above the knitting head. The yarns X come down from an overhead guide or drop-off finger of suitable form, not shown, and pass through guide eyes or loops on the drop fingers, there being one of these fingers for each yarn, only two of which fingers are illustrated in Fig. 1 and one of these at A is in its elevated position being held up by the draft of the yarn running through its eyes or bearings while the other finger is shown down in position assumed by it when its yarn fails and the trip mechanism is operated by the fall of the drop finger. This trip mechanism is arranged in a casing 24^a located below the plane of the pivot support or plate 17^a for the drop fingers. The trip mechanism itself is not shown, it being substantially the same as that disclosed in the application above referred to. This trip mechanism is operated by radial rods or wires 15^a, which extend directly from the drop fingers or their main body portions close to and below the pivots thereof to the trip mechanism. This trip mechanism when operated actuates any suitable let off mechanism through the lever 2 and rod 3 in substantially the same manner as is described in the application referred to. The upper parts of the drop fingers constitute weight members 13 for causing the fall of the drop fingers when the yarn fails.

These weight members carry supplemental weight members 13^a pivoted thereto at 13^b and held in position by a friction washer 13^c and a shouldered pin 13^d, Fig. 3. By turning the supplemental weight member the center of gravity of the weight member as a whole may be varied to suit different working conditions.

A toothed disk or cam member 40^a, which is like the disk 40 of the application referred to, in all essential respects, is arranged to act directly on the drop fingers or rather on the weight members thereof, instead of on the levers, 15 of the form shown in the application, this cam ring or disk having high parts which when the cam ring is turned act upon and lift the drop fingers to their elevated positions, as shown at A, this taking place before the machine is started in the present instance, the said cam ring being manually operated as will be described.

This toothed disk or cam acting as it does

directly on the drop fingers is arranged below the ring support 17^a on which the drop fingers are pivotally mounted, instead of above it, as in the form of the application mentioned.

Furthermore, as before stated, the trip mechanism instead of being in a casing, arranged above the plane of the drop fingers and above the cam plate 40^a, as in said application, is located in the present invention in a casing 24^a arranged below the said parts. The cam or toothed ring 40^a rests upon this casing, being guided by a shoulder 24′ of the ring 17^a and it lies directly against the under face of the said pivot support or ring 17^a for the drop fingers. This arrangement of parts materially reduces the height of the stop motion head and renders the construction more simple and compact and permits the overhead parts to be of less height.

In order to control the action of the cam or toothed ring 40^a by hand I provide above the plate or ring 17^a a collar 105^x under tension of a spiral spring 105^b and having a handle 105^a by which said collar may be turned against the tension of its spring. The collar has an arm 126 with a pin 127 depending therefrom through an opening 128 in the plate or ring 17^a and into a notch in the cam or toothed ring 40^a. By turning the handle the ring 40^a will be turned to make the high parts of the teeth act on the drop fingers and hold them all up in operative position while the machine is being started up and after the drag or draft of the yarn becomes sufficient to alone hold the drop fingers up the spring 105^b returns the collar 105^x to normal position, thus returning the cam or toothed ring to such position that the low parts of its cams or teeth are opposite the drop fingers and therefore any one or any number of said drop fingers can fall freely when such abnormal conditions exist in the yarn fed therethrough, as amount practically to failure of the yarn to feed.

The spring 105^b is seated in a recess within the collar or hub 105^x, one end of said spring being held by the plate 17^a and the other end entering an opening in or being attached to the collar 105^x.

I have also made an improvement in the yarn guide ends of the drop fingers. This consists in providing two bearings or engaging points 10^a, 10^b or eyes for the yarn and when the drop fingers are in working position one of these bearings 10^a is above the yarn friction ring or controller 33 and the other is below it and both are close to said ring. The yarn passing from one bearing to the other just touches or barely touches the friction ring 33 or it may be just free therefrom. Because of the employment of these two bearings, I can employ a drop finger having greater weight for a given grade of yarn than is the case where only one bearing or eye for the yarn is employed, that is to say, a comparatively heavy drop finger can be employed and yet it will work with fine or tender yarn, the lifting power of the yarn being exerted at two different points and thus securing a double purchase on the drop finger. A greater run of yarn is required to move the drop finger outward through a given distance than is the case with a single bearing on the drop finger for the yarn, say two inches of yarn for a one inch movement of the drop finger. With the two bearings 10^a 10^b for the yarn and with a given amount of slack in the yarn the drop finger will only move one-half the distance in taking up this slack as would be the case if only one bearing for the yarn were employed, or in other words the movement of the finger in taking up a given amount of yarn would only be half as fast when two bearings are employed as would be the case with only one bearing.

This will prevent excessive vibration or chattering of the drop finger, due to slack in the yarn.

Another advantage of the two bearings 10^a, 10^b is that the yarn is brought into contact with a greater length of friction surface on the ring 33 when the drop fingers falls than with a single bearing, because the yarn wraps, as it were, around both the upper surface and the lower surface of the ring 33 as shown in dotted lines in Fig. 2 at the time the drop finger falls.

This materially increases the tension on the yarn and the quick restoration of the drop finger to raised position results in responding to changing conditions in the yarn which are of temporary or passing character not sufficiently extensive to require the operation of the let-off mechanism.

It will be understood that while I have shown herein a form of the apparatus in which the cam or toothed ring 40^a is operated by a handle 105^a and without an automatically operating connection extending to the ring such connection can be used of substantially the form described in the application referred to involving the link 97, 98 therein shown with its yielding connection 99 and with the bell crank 96 and link 41 the handle 105 being omitted and the handle 105^a being employed instead to hold the cam ring in position with its high parts holding the drop fingers up in operative position. It may be noted in this connection that to move the cam ring 40^a in position to lift and hold the stop fingers up the handle 105^a is pressed leftward from the position shown in Fig. 1, the position shown in Fig. 1 being that in which the cam ring presents its low parts opposite the drop fingers as to permit their operation under the draft or lack of draft of the yarn. The disposition and direction

of the teeth of the cam ring 40ª is shown in Fig. 5.

With this stop motion head the let off mechanism described in the application before referred to may be employed, but in this present form the automatically operating connections for the controller ring 40ª is omitted and the control of this ring may be effected entirely by hand. The form of the other application differs from the above in that while the cam or toothed ring may be operated by hand through the handle 105 it is also operated automatically.

While as above mentioned various forms of let-off mechanism may be used with the stop motion mechanism above described, I illustrate herein the same form as that disclosed in the case above referred to. The rod 3 leading from the main trip mechanism is connected with supplemental trip mechanism which includes a catch lever 51 engaging a lever 49 on the upper end of a shaft 47, the lower end of which is connected through arm 55, link 56 and arm 57 with a rod 58, which is fixed to a slidable or shiftable member or cross-head 59 pressed by a spring 60. This cross-head is connected through links 65 to handles 68 pivoted at 69 to a slidable belt carrying frame 70, 72. By the operation of the handle 68 the cross head 59 can be shifted toward the left against the pressure of the spring 60, so that the supplemental trip mechanism 49, 51 will be set, provided the drop fingers are held in their working positions and as above described the holding of the drop fingers in their elevated or working positions is effected by turning the toothed ring or cam by means of the handle 105ª to bring the high parts of the cam to act on and raise and hold the drop fingers.

It will thus be seen that in setting the stop motion and let-off the operator manipulates two handles, namely, the handle 105ª to move and hold the drop fingers in their elevated positions and then by operating the lever or handle 68 the supplemental trip will be set and the let-off mechanism will be set in position to drive the machine.

As in the application above referred to the setting of the let-off involves the turning of the handle 68 upwardly from the position illustrated and then turning the handle down again in the reverse direction the first movement moving the cross-head 59 to the left against the pressure of spring 60 and thereby setting the supplemental trip and the reverse movement of the handle causing the shifting of the belt fork frame or slide 70, 72 to the left to shift the belt onto the fast pulley.

What I claim is:—

1. In combination in a stop motion for circular knitting machines, a drop finger pivotally mounted and depending from its pivot and swinging in a plane radial to the axis of the knitting head, trip mechanism at the axial center of the machine and a wire or rod connection extending directly from the depending drop finger at a point intermediate the upper and lower limits thereof and horizontally and radially inward to the trip mechanism, substantially as described.

2. In combination in a stop motion for circular knitting machines, a ring supported above and coaxially with the knitting head, a series of drop fingers pivotally mounted at the edge of the ring and inclining outwardly and downwardly from said edge when in normal position, trip mechanism arranged centrally in respect to the drop fingers and radial rods extending directly from the depending drop fingers to the trip mechanism, substantially as described.

3. In combination in a stop motion for knitting machines, drop fingers pivotally mounted and depending below their pivots for engaging with the yarn, said fingers moving radially in respect to the knitting head, trip mechanism and rods connected with and extending from a point below the pivots of the drop fingers radially of the knitting head and in a horizontal plane intermediate the upper and lower ends of the fingers to the trip mechanism, substantially as described.

4. In combination in a stop motion for circular knitting machines an annular series of pivotally mounted drop fingers each consisting of a rod depending below its pivot and engaging the yarn at its free lower end and a conrtoller for restoring all or any one of the annular series of drop fingers to raised position, said controller consisting of a rotary plate having its edge directed horizontally and provided with a plurality of high and low parts, said drop fingers depending across the edge of said plate, said controller engaging the drop fingers directly and close to and below the pivot bearings thereof, substantially as described.

5. In combination in a stop motion for knitting machines, an annular series of drop fingers consisting of arms, pivotally mounted and depending below their pivots and engaging the yarn at their free lower ends, and a circumferentially movable controller ring having high and low portions on its outer periphery directed outwardly to directly engage the drop fingers below their pivots, substantially as described.

6. In combination pivoted drop fingers depending below their pivots and engaging the yarn at their lower ends, trip mechanism, radial rods connected with the drop fingers at a point below their pivots and extending to the trip mechanism for operating the same, and a controller ring or plate circumferentially movable and having high and low parts, to coöperate with the drop fingers,

said ring or plate engaging the drop fingers below their pivots, substantially as described.

7. In combination in a stop motion for knitting machines, a supporting ring, drop fingers pivoted thereto, a casing for trip mechanism below the ring, and a controller ring having high and low parts on its periphery directed outwardly, said drop fingers depending from their pivots across the periphery of said controller, said controller ring being held and guided between the said casing and the supporting ring and acting on the drop fingers below their pivots, substantially as described.

8. In combination an annular series of drop fingers, an annular support therefor to which the drop fingers are pivoted and from which they depend, a controller ring having high and low parts to coöperate with the drop fingers, and restore and hold them in elevated position, said controller lying below the said support and rotatable about the axis of said support, a handle arranged above the support, a connection from said handle to the controller extending through the support and a spring for returning the handle to normal position, substantially as described.

9. In combination a pivot support, drop fingers pivoted to said support and depending therefrom, a controller ring for the drop fingers having high portions to engage the same and lift them to working position, a collar arranged above and coaxially with the pivot support, and having a connection extending through said support to the controller ring, a handle for operating the collar with the ring in one direction and a spring for returning the collar with the ring in the other direction, substantially as described.

10. In combination, stop motion mechanism having a plurality of drop fingers engaged by the yarn and held in elevated position by the draft of the yarn and dropping when the yarn fails, a drop finger restoring member circumferentially movable and adapted to move the drop fingers to and hold them in elevated position, and trip mechanism controlled by the drop fingers, a let-off mechanism controlled by the trip mechanism independently of the said restoring member, and a handle connected with the let-off mechanism for resetting it to be held by the trip mechanism, said circumferentially movable restoring member being manually operable to move the drop fingers to and hold them in elevated position while the let-off mechanism and trip are being reset, said restoring member having high and low parts so disposed that all the drop fingers will be free to drop when the member is in one position and all will be held up when the member is in another position, substantially as described.

11. In combination in a stop motion for knitting machines, a plurality of drop fingers, trip mechanism controlled thereby, let-off mechanism controlled by the trip mechanism, a handle for resetting the let-off mechanism to be held by the trip, and hand operated means common to and for moving all of the drop fingers to elevated position and holding them in this position while the let-off is being reset by the other handle and until the draft of the yarn is sufficient to hold the drop fingers in their elevated positions, said hand operated means, when in normal position, leaving all the fingers free to fall and means for insuring the return of said hand operated means to normal position, substantially as described.

WILLIAM O. TAYLOR.