Feb. 19, 1935. A. G. BOUHUYS 1,991,785

STOP MECHANISM FOR KNITTING MACHINES

Filed June 30, 1934 2 Sheets-Sheet 1

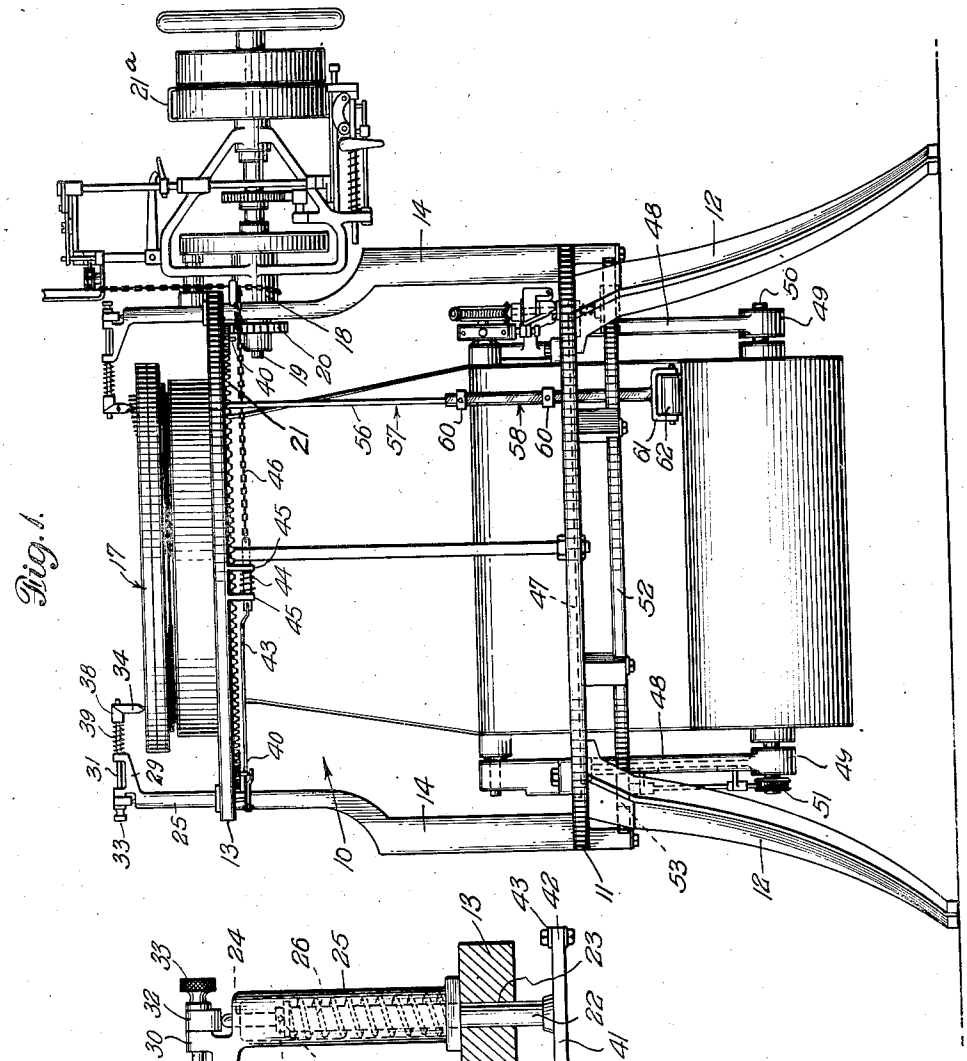


Fig. 1.

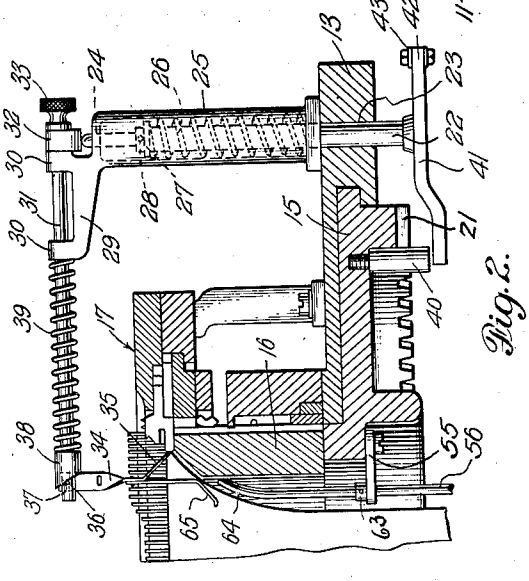


Fig. 2.

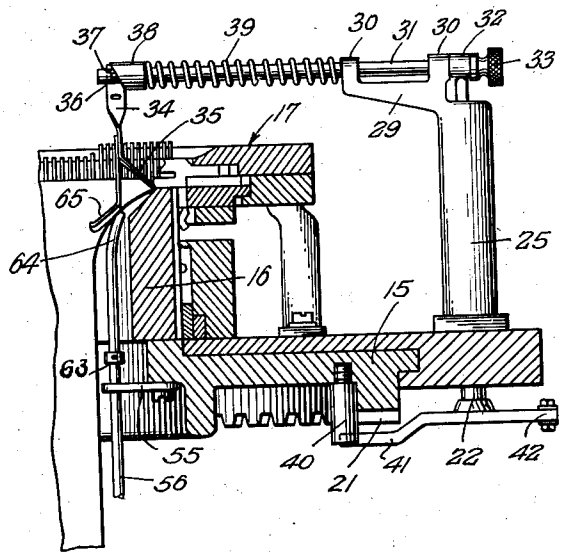
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Filed June 30, 1934 2 Sheets-Sheet 2

Fig. 3.



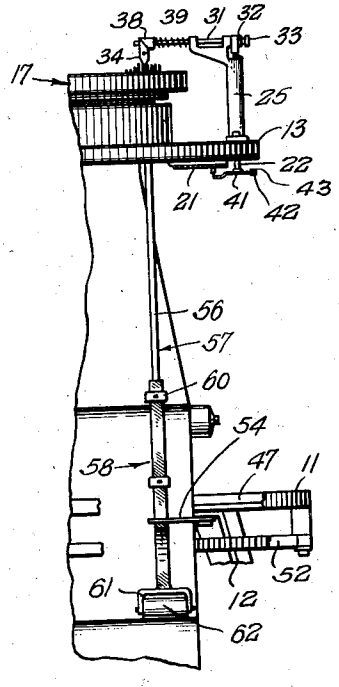


Fig. 4.

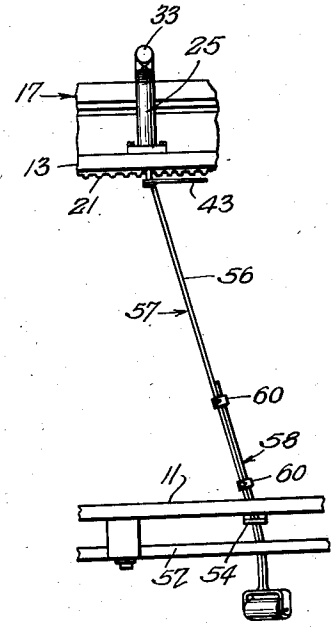


Fig. 5.

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STOP MECHANISM FOR KNITTING MACHINES

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9 Claims. (Cl. 66—166)

This invention relates to textile knitting apparatus and the like, and more particularly to automatic stop mechanism for such apparatus.

Mechanisms for stopping various types of knitting apparatus have been utilized for many years and such mechanisms are usually so constructed that they are rendered effective to cause the stopping of the apparatus when a hole occurs in the material as knitted, or when the effective operation of the needle mechanism of the apparatus is threatened due to the existence of lumps or knots in the thread being worked.

Certain types of knitting machines involve the use of rotary needle cylinders in which the tubular or circular cloth which has been formed revolves with the cylinder. In machines of this type it has previously been proposed to utilize a pivoted lever which controls a stop mechanism and such lever is normally held in a position below projections arranged for rotation with the needle cylinder. The pivotal movement of the stop mechanism actuating lever is transmitted to a power control device whereby the power for the operation of the knitting machine is interrupted when the lever is caused to be pivoted upon actuation of the remainder of the mechanism due to occurrence of a hole in the cloth or a lump in the thread.

This invention has as an object the provision of an attachment to the stop mechanism particularly of the type referred to in which the usual stop mechanism employed for stopping the apparatus is rendered operative upon the occurrence of a hole or other entanglement in the thread such as would normally injure the needle mechanism, in which the attachment effects the rendering of the stop mechanisms operative when the roll of cloth being produced on the machine reaches a predetermined diameter.

It is a further object of this invention to provide a stop mechanism for effecting the stopping of a knitting machine or the like when the roll of cloth being formed reaches a predetermined diameter, which mechanism may be constructed as an original part of the machine or may be applied thereto as an attachment.

Other objects and advantages will be apparent from the following detailed description when considered in connection with the accompanying drawings wherein;

Fig. 1 is an elevated view of a circular knitting machine of the type well known in the art as the Wildman Manufacturing Company machine, in which the machine itself is only generally illustrated, but in which an attachment produced in accordance with this invention is shown applied to the machine for the purpose of illustration and without the intent to limit the application of this invention solely to a machine of any particular manufacture;

Fig. 2 is a detailed view of a well known type of stop mechanism showing the engaging portion of the present attachment associated therewith;

Fig. 3 is a view similar to Fig. 2 with a stop mechanism shown in its operative position as a result of engagement with the present attachment.

Fig. 4 is a detailed view of the complete attachment, and

Fig. 5 is a view of the attachment taken at a right angle to the view shown in Fig. 3.

Now referring to the drawings in detail the knitting machine is designated generally at 10 and it is formed with a lower table 11 supported upon legs 12, and an upper table 13 supported upon the lower table by means of brackets 14.

Upper table 13 is provided with the usual rotating center portion 15 which carries a needle cylinder 16. As the particular needle constructions and its operating mechanism forms no part of this invention, such mechanism is designated generally by the numeral 17.

Arranged in one of the supports 14 is a bearing 18 through which a shaft 19 extends, the shaft 19 being provided with a gear 20 which engages with teeth 21 arranged on the lower portion of the rotating member 15. Means for applying power to cause the rotation of the member 15 is designated generally at 21^a and as this construction is well known in the art it will not be described in detail.

An actuating device for operating the single stop mechanism is arranged on opposite sides of the table 13 and each includes a shaft 22 arranged for rotary and vertical movement in an opening 23 provided adjacent the outer edge of the upper table. As one description suffices for both actuating devices only one thereof will be referred to. The upper end of said shaft 22 is secured in an opening 24 provided in a bracket 25 which is mounted upon the table 13. A coil spring 26 surrounds the shaft 22 for a portion of its length, and a flanged disk 27 is secured to the shaft by means of a pin 28 whereby the spring in bearing against the bottom of the bracket 25 and the disk 27 tends to urge the shaft in an upwardly direction. Bracket 25 is provided with an extension 29, which in turn is provided with bearings 30. Arranged within the bearings 30 is a horizontal shaft 31, and this

shaft has a cam member 32 arranged on its end above the shaft 22 which normally holds the shaft 22 in its lower position against the tension of the spring 26. Cam 32 is so constructed and fixed to the shaft 31 that rotation of the shaft 31 causes the portion of the cam arranged closest to the center of the shaft 31 to lie over the shaft 22 so that the spring in bearing against the disk 27 will elevate the shaft for the purpose to be hereinafter referred to.

Shaft 31 is provided at its extreme end with a knurled nut 33 screw threaded upon the shaft and adapted for holding the cam in an adjusted position with respect to the shaft. The opposite end of the shaft 31 is provided with a slot in which is arranged a finger piece 34. This finger piece 34 is formed at its lower end with an angular extension 35 which is adapted to be engaged in a hole occurring in the cloth or by any lumps occurring in the thread, and this operation is well known in the art. The finger piece is provided with a pin 36 which is engaged in a slot 37 in the shaft 31, said finger piece being adapted to be held in position within the slot by means of a slotted cam faced member 38. This cam faced member 38 is mounted for movement upon shaft 31 and is urged in position to hold the finger piece in place by means of coil spring 39 which surrounds the shaft 31 between the bracket 29 and the cam faced member. In addition to causing the securing of the finger piece through the medium of the member 38, the spring 39 also tends to frictionally hold the shaft 31 against rotation by causing the cam 32 to bear against bracket extension 29, so that the shaft is not readily rotatable but will be caused to be rotated by the finger piece when some obstruction is encountered.

Rotatable member 15 has on its under side a series of knock-off studs 40. When finger piece 34 is caused to be moved for either of the reasons set forth, the movement of the finger piece will cause a partial rotation of the shaft 31 with the resultant rotation of the cam 32, which rotation of the cam causes the portion thereof formed on the smallest radius to be moved for engagement with the top of shaft 22 whereupon the shaft 22 will be elevated by the spring 16 to a position where a lever 41 arranged on the bottom of shaft 22 is engaged by one of the knock-off studs 40. Engagement of lever 41 with one of the knock-off studs effects a rotation of the elevated shaft 22 and a similar movement of the lever itself. An extending portion 42 of lever 41, opposite to the portion adapted for contact with the studs, is connected by a link 43 to a bar 44, the bar being mounted in brackets 45. Bar 44 is resiliently held in the position illustrated in Fig. 1 but is adapted to be moved by the lever and linkage mechanism just described to a position against the tension of a spring and as it is moved to this position a chain 46 is similarly moved. The chain has its end connected to a braking mechanism and power transmission mechanism whereby the movement of the chain renders the power transmission mechanism ineffective and the machine is brought to rest by the application of the brake.

As previously set forth there are two detecting mechanisms provided with finger pieces 34 and the levers 41 for engagement with the studs and these are preferably arranged at opposite sides of the needle cylinder. They are each adapted to be actuated in the same manner but one of the mechanisms as shown has its lever 41 connected directly to the chain 46 whereby the actuation of the chain by this member will not affect the mechanism connected to and through the medium of the linkage 43 with the result that the actuation of one of the mechanisms will leave the other entirely intact and will therefore not require that it be reset when the defect is corrected and the machine again operated.

The lower table 11, like the upper table, is provided with a rotating member arranged centrally thereof. This member is designated by numeral 47 and it is provided with two downwardly extending supports 48 each of which is formed with a bearing 49 at its end. A shaft 50, upon which a roll of the knitted fabric is wound during the operation of the machine, is mounted in the bearings 49 and of course the shaft is removably mounted so that a complete roll of fabric may be removed. The shaft 50 is caused to be rotated through the medium of gearing 51 and the shaft and bearings will in turn be bodily rotated with the member 47. The lower table 11 has a stationary gear rack 52 depending therefrom and the rack is provided with internally arranged teeth which are arranged for engagement with a gear 53. The gear 53 is mounted on a shaft which is connected into the gearing 51 just referred to. A bracket 54 is attached to the rotatable member 47 and a similar bracket 55 is attached to the rotatable member 15 formed in upper table 13. In this type of machine the rotatable member 15 and the rotatable member 47 are caused to be rotated together by means of connecting brace bars.

Mounted in the brackets 54 and 55 is a reciprocating shaft 56 and this shaft is formed of two sections 57 and 58 which overlap and which may be adjusted so as to increase or decrease the composite length of shaft 56. The sections 57 and 58 are maintained in adjusted position with clamp rings 60 having set screws therein. Section 58 is provided at its lower end with a forked member 61 in which is mounted a roller 62. In use roller 62 is adapted to rest upon the uppermost portion of the roll of cloth being formed on the machine and to be forced upwardly with the resultant elevation of the entire shaft 56, as the diameter of the roll increases. An adjustable suspension collar 63 is provided on section 57 of the shaft 56 and this collar is adapted to be engaged with a bracket 55 when the shaft is in its lowermost position whereby this suspension collar will hold the roller 62 out of contact with the roll of fabric until the roll of fabric reaches a size generally approaching that at which the machine is to be stopped for removal of the fabric roll.

Upper end of section 57 of the shaft 56 is slightly curved as at 64, and this end lies between the needle cylinder 16 and the knitted fabric.

It will be seen that when the size of the roll of fabric increases to such extent that the upper end 64 of shaft 56 presses into the fabric so as to place a bulge in the same, the rotation of this mechanism including the upper end 64 of the shaft will cause the shaft to engage the lower end of an extension 65 which is attached to the detector finger 34 and such engagement will cause a movement of the finger 34 with a resultant movement of the shaft 31 which will produce the same effect as that previously described in connection with the movement of a finger 34 when the same engages in a hole in the fabric or engages against a lump in the thread being utilized in the knitting.

As the movement of the shaft 56 to the predetermined position causes a shutting down of the machine the attendant will readily detect that a roll of fabric of a predetermined size has been knitted upon the machine and he will then sever the fabric and remove the roller from the machine after which the resetting of the mechanism and the starting of a new roll will permit the machine to again be operated until a new defect is encountered or until the newly formed roll has reached the predetermined size.

What I claim is:

1. A circular knitting machine comprising a needle mechanism, a thread supply, power mechanism for causing actuation of the needle mechanism for operation on thread passed from the supply with the resultant production of knitted fabric, means for collecting the fabric, and stop mechanism for interrupting the operation of the needle mechanism, said stop mechanism being rendered effective upon a predetermined amount of fabric being collected by the collecting means as well as upon the formation of fabric in which a hole occurs.

2. A knitting machine comprising a needle mechanism, a thread supply, power mechanism for causing actuation of the needle mechanism for operation on thread passed from the supply with the resultant production of knitted fabric, means for collecting the fabric, and stop mechanism for interrupting the operation of the machine, said stop mechanism being rendered operative upon a predetermined amount of fabric being collected by the collecting means as well as upon the formation of fabric in which a hole occurs and being formed with a finger piece contacting with the fabric and being further formed with an extending portion adapted to be engaged for causing the actuation of the stop mechanism when a predetermined quantity of fabric is produced.

3. A knitting machine comprising a needle mechanism, a thread supply, power mechanism for causing actuation of the needle mechanism for operation on thread passed from the supply with the resultant production of knitted fabric, means for collecting the fabric in the form of a roll, stop mechanism for interrupting the operation of the machine, said stop mechanism being rendered operative upon the roll of fabric reaching a predetermined diameter as well as upon the formation of fabric in which a hole occurs and being formed with a finger piece which contacts with the fabric as produced so as to be engaged in any hole occurring in the fabric and being further formed with a portion extending adjacent the fabric beyond the place at which the fabric is engaged by the finger piece, and means for contacting with the surface of the roll of collected fabric including a rod which is moved into a position for contacting with the said extension when the roll of fabric is increased in size to the predetermined diameter.

4. A knitting machine comprising a needle mechanism, a thread supply, power mechanism for causing actuation of the needle mechanism for operation on thread passed from the supply with the resultant production of knitted fabric, means for collecting the fabric in the form of a roll, stop mechanism for interrupting the operation of the machine, said stop mechanism being rendered operative upon a predetermined amount of fabric being collected by the collecting means as well as upon the formation of fabric in which a hole occurs and being formed with a finger piece which contacts with the fabric as produced so as to be engaged in any hole occurring in the fabric and being further formed with an extending portion lying adjacent the fabric beyond the place of engagement with the finger piece, and a rod of adjustable length having a roller at the end thereof adjacent the collecting device for engagement with the surface of the roll of fabric, said rod having its end opposite to the roller lying in a plane below the finger extension but being arranged to be brought into the plane of the finger extension when the roll of fabric reaches a predetermined diameter, whereby the engagement of the extension with the rod will cause the movement of the finger piece and the rendering of the stop mechanism operative to stop the machine.

5. A rotary needle bed knitting machine comprising needle mechanism, a thread supply, power mechanism for causing actuation of the needle mechanism for operation on thread passed from the supply with the resultant production of knitted fabric, means for collecting the fabric, and stop mechanism for interrupting the operation of the machine, said stop mechanism being rendered operative upon a predetermined amount of fabric being collected by the collecting means as well as upon the formation of fabric in which a hole occurs and being constructed with a lever pivoted upon a stationary portion of the machine and a rod mounted for rotary movement with the needle bed, said rod being adapted to be moved to such position when the predetermined amount of fabric has been collected at the collecting means so that it will engage with and cause the pivotal movement of the said lever with the resultant actuation of the stop mechanism.

6. A rotary needle bed knitting machine comprising needle mechanism, a thread supply, power mechanism for causing actuation of the needle mechanism for operation on thread passed from the supply with the resultant production of knitted fabric, means for collecting the fabric in the form of a roll, stop mechanism for interrupting the operation of the machine, said stop mechanism being rendered operative upon a predetermined amount of fabric being collected by the collecting means and being formed with a finger piece extension lying adjacent the formed fabric, and a rod of adjustable length having a roller at the end thereof adjacent the collecting means for engagement with the surface of the roll of fabric, said rod having its end opposite to the roller lying in a plane below the finger piece extension but being arranged to be brought into the plane of said extension when the roll of fabric reaches a predetermined diameter, whereby the engagement of the extension with the rod will cause the movement thereof and the actuation of the stop mechanism to stop the machine.

7. A rotary needle bed knitting machine comprising needle mechanism, a thread supply, power mechanism for causing actuation of the needle mechanism for operation on thread passed from the supply with the resultant production of knitted fabric, means for collecting the fabric in the form of a roll, stop mechanism for interrupting the operation of the machine, said stop mechanism being rendered operative upon the roll of fabric reaching a predetermined diameter and being formed with a finger piece extension lying adjacent the fabric beyond the needle mechanism, and a rod of adjustable length having a roller at the end thereof adjacent the collecting means for engagement with the surface of the

roll of fabric, said rod having its end opposite to the roller lying in a plane below the finger piece extension but being arranged to be brought into the plane of said extension when the roll of fabric reaches a predetermined diameter whereby the engagement of the extension with the rod will cause the movement thereof and the actuation of the stop mechanism to stop the machine, said rod having an adjustable support provided for maintaining the roller out of contact with the roll of fabric until it approaches the said predetermined diameter.

8. An attachment for application to stop mechanism for a rotary needle bed knitting machine, having a trip lever adapted to be actuated upon the occurrence of a hole in the knitted fabric, comprising a connecting rod of adjustable length having a roller at its lower end for engagement with the surface of a roll of fabric being collected as the knitting is done by the machine to cause the operation of the stop mechanism when a predetermined amount of fabric has been knitted.

9. An attachment for application to stop mechanism for a rotary needle bed knitting machine, having a trip lever adapted to be actuated upon the occurrence of a hole in the knitted fabric rotating with the needle bed, comprising a connecting rod of adjustable length having a roller at its lower end for engagement with the surface of a roll of fabric being collected as the knitting is done by the machine, and guides for the rod, said rod being positionable so as to effect a movement of the trip lever and resultant actuation of the stop mechanism when the roll of fabric reaches a predetermined diameter.

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