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AUTOMATIC CLUTCH OPERATING MECHANISM OF KNITTING MACHINES.

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1,292,672. Patented Jan. 28, 1919.

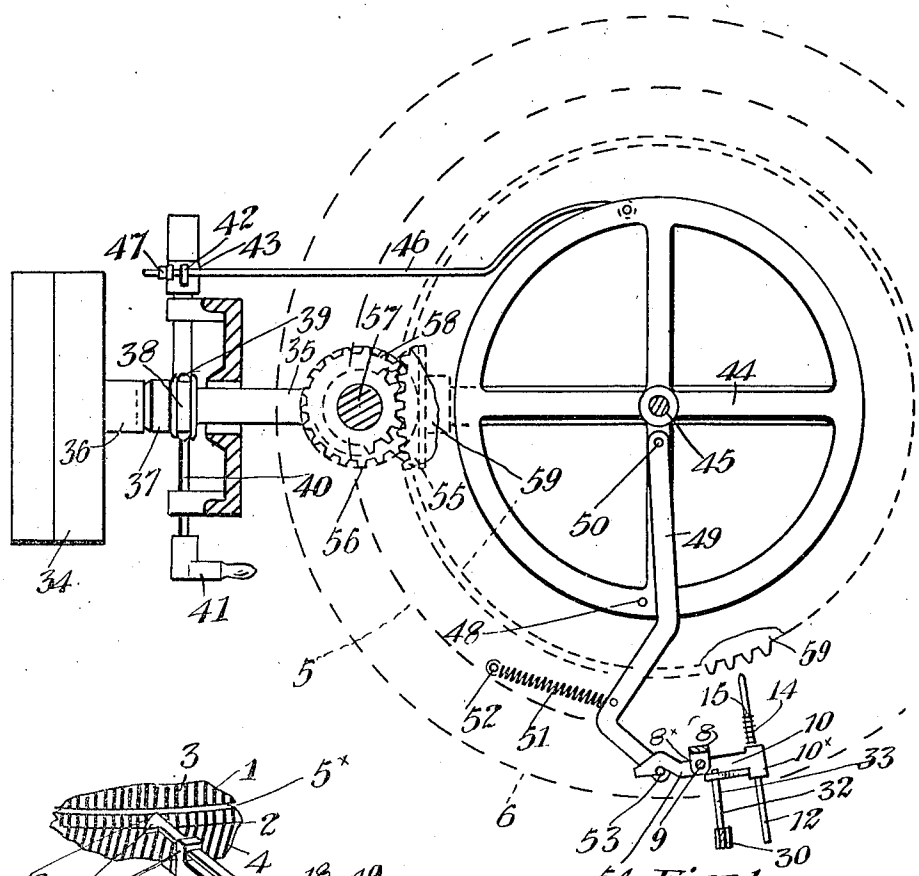


Fig. 1.

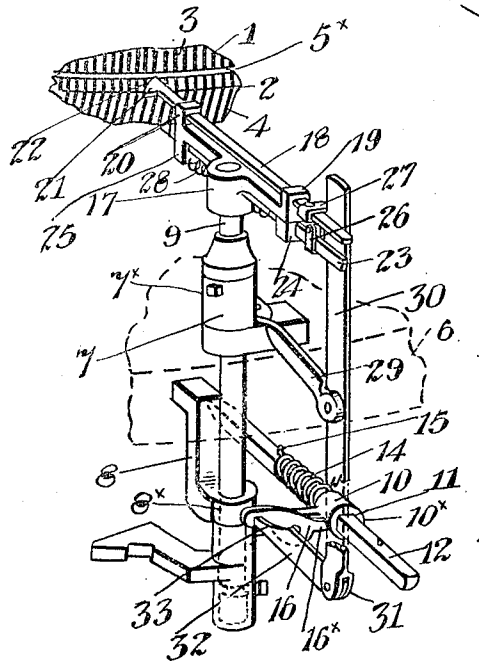


Fig. 2.

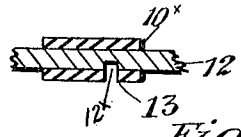


Fig. 3.

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UNITED STATES PATENT OFFICE.

ERNEST ALLWOOD, OF HAMILTON, ONTARIO, CANADA, ASSIGNOR OF ONE-THIRD TO ALEXANDER FRANKLIN ZIMMERMAN AND ONE-THIRD TO JOHN ELEY, BOTH OF HAMILTON, ONTARIO, CANADA.

AUTOMATIC CLUTCH-OPERATING MECHANISM OF KNITTING-MACHINES.

1,292,672. Specification of Letters Patent. **Patented Jan. 28, 1919.**

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To all whom it may concern:

Be it known that I, ERNEST ALLWOOD, of the city of Hamilton, in the county of Wentworth, in the Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Automatic Clutch-Operating Mechanism of Knitting-Machines, of which the following is the specification.

My invention relates to improvements in automatic clutch operating mechanism of knitting machines and the object of the invention is to provide simple positive means for automatically throwing out the main clutch of a knitting machine so as to stop the revolving of the cylinder holding the needles of the machine when an obstruction occurs in the path of the knitting needles where the web is being formed between the revolving cylinders of the machine and it consists essentially of the following arrangement and construction of parts as hereinafter more particularly explained.

Figure 1 is a sectional plan view through the main portion of a knitting machine showing my device applied thereto.

Fig. 2 is an enlarged perspective detail of my operating mechanism and two fragmentary portions of the upper and lower revolving cylinders of the knitting machine.

Fig. 3 is a sectional detail of the bearing holding the plunger rod and with a portion of the plunger rod extending therethrough.

In the drawings like letters of reference indicate corresponding parts in the various figures.

In Figs. 2, 1 and 2 indicate fragmentary portions of the revolving cylinders of the knitting machine, which are provided with needle holding grooves 3 and 4. The position of the cylinders in Fig. 1 is indicated by dotted line 5.

I do not describe these cylinders in detail as they are common to a knitting machine forming a cylindrical web.

Between the cylinders an intervening space $5^{\times}$ is formed across which the needles operate to knit the fabric web. It sometimes occurs that a knot or enlargement in the wool is formed in this space. If this knot were allowed to remain it would cause the loading up of the fabric and thereby breaking a number of needles before the machine could be stopped in the ordinary way. Sometimes also the beard or pointed portion of a needle breaks and projects across this space also causing the breaking of a number of needles before the machine can be stopped. In order to overcome this I have provided the following mechanism.

6 indicates the circular stationary table of the knitting machine, which surrounds the lower head. 7 indicates a bearing bracket carried by the table 6 provided with a vertical bearing portion $7^{\times}$. 8 indicates a bearing bracket depending from the table having a bearing portion $8^{\times}$ in vertical alinement with the bearing portion $7^{\times}$. 9 indicates a vertical shaft supported in the bearings $7^{\times}$ and $8^{\times}$.

10 indicates an arm mounted upon the shaft 9 and turnable thereon in a horizontal plane. The outer end of the arm is provided with a horizontal bearing portion $10^{\times}$ provided with a rectangular orifice 11 extending therethrough. 12 indicates a plunger rod provided with a notch $12^{\times}$. 13 indicates a slot formed in the sleeve portion $10^{\times}$ in alinement with which the notch $12^{\times}$ is normally held.

14 indicates a spring surrounding the plunger bar 12 and extending between the bearing portion $10^{\times}$ and a pin 15. 16 indicates a swinging arm provided with a tail piece $16^{\times}$ which extends through the slot 13 and into the notch $12^{\times}$. 17 indicates a horizontal member carried by the upper end of the shaft 9. 18 indicates a slide bar held in slotted bearing lugs 19 and 20. The inner end of the bar 18 is provided with a head 21 having an arc-shaped edge 22. 23 indicates a slide bar held in slotted lugs 24 and 25, such slide bar 23 being coupled to the slide bar 18 by a coupling member 26. 27 indicates a projection which extends outwardly from the slide bar 18 for a purpose which will hereinafter appear. 28 indicates a tension spring connected at one end to the bearing lug 25 and at the opposite end to the slide bar 23 and normally holding the slide bar in the inserted position. 29 indicates an arm extending from the bracket 7. 30 indicates a lever pivotally connected intermediately of its length to the arm 29. The upper end of the lever bears against the outer end of the projection 27. The lower end of the lever 30 is provided with a fork portion 31 between the members of which

is pivotally mounted a slide piece 32 having a downwardly inclined upper edge portion 33 which extends at its extreme end beneath the outer end of the swinging arm 16.

34 indicates the driving pulley of the knitting machine mounted upon a shaft 36 and provided with a clutch member 36. 37 indicates a clutch member slidably mounted upon the shaft 35, such clutch member being provided with an annular groove 38 with which the fork member 39 co-acts to move the clutch in and out of engagement, such clutch member being mounted upon a rocking rod 40, which is normally operated by a hand lever 41. 42 indicates an arm extending from the sleeve 43 mounted upon the rocking rod 40. 44 indicates a spider member mounted upon the lower head of the knitting machine at 45 concentrically therewith. 46 indicates a rod connected at one end to the spider member 44 and extending at its opposite end freely through the arm 42. 47 indicate nuts threaded upon the outer end of the rod 46. 48 indicates a pin extending from the spider member 44. 49 indicates an arm pivoted to the spider member at 50 and extending outwardly therefrom in close proximity to the pin 48. 51 indicates a tension spring connecting the arm 49 in proximity to its outer end to a stationary pin 52, which is preferably carried by the table 6. 53 indicates a pin extending upwardly from the outer end of the arm 49. 54 indicates a hook member carried by the shaft 9 as to be turnable thereon, the arm 10 and hook member 54 being so connected together as to turn in unison upon the shaft 9.

It may be stated generally that the main shaft 35 is in driving connection with the cylinders by means of a bevel gear 55 mounted thereon and in mesh with and driving the bevel gear 56 carried by a vertical shaft 57, which also carries a gear pinion 58 which is in mesh with an annular gear 59, which rotates the knitting heads.

I do not describe this drive any further in detail as it is common to this class of knitting machine.

Having described the principal parts involved in my invention I will briefly describe the operation of the same.

Should a knot or other obstruction form in the space 5^{x} so as to bridge the same it is carried into contact with the inner end of the slide bar 18 forcing such slide bar outwardly and carrying the projections 27 against the upper end of the lever 30, forcing such upper end outwardly and the lower end of the lever inwardly thereof carrying the inclined portion 33 of the slide piece 32 into engagement with the lower edge of the swingable piece 16 so as to carry the tail piece 16^{x} thereof out of engagement with the notch 12^{x} of the slide bar 12. The spring 14 then operates to carry the inner end of the bar 12 into engagement with the teeth of the revolving gear 59.

When the inner end of the rod 12 is brought into engagement with the teeth it is thrown outwardly thereby swinging the arm 10 upon the shaft 9 and carrying the hooked arm 54 connected thereto out of engagement with the pin 53.

As soon as the pin 53 is released the tension spring 51 carried the arm 49 sharply into contact with the pin 48 thereby revolving the spider member 44 a sufficient distance to draw the rod 46 longitudinally so that the nuts 47 thereof engage with the arm 42. As the nuts 47 engage the arm 42 they rock the clutch rod 40 in an inward direction so as to carry the clutch member 37 out of engagement with the clutch member 36 and thereby throw the machine instantaneously out of gear thereby obviating any danger of breaking a number of needles, which is always found to take place under these circumstances when a machine is manually thrown out of gear as it is seldom that an operator will notice the immediate formation of a knot or breaking of a needle in sufficient time to stop the machine before a certain amount of damage has been done. By my device immediately a knot is formed or a needle broken the obstruction so formed will automatically operate my mechanism to instantaneously throw the machine out of gear and thereby obviate damage to the needles of the machine and the consequent loss of time in replacing them with new ones.

What I claim as my invention is:

1. In a knitting machine, the combination with the main clutch and main gear and releasable mechanism for drawing the clutch members out of engagement, of a hook member engaging such mechanism in the locked position, a longitudinally movable spring held bar extending at its inner end between the cylinders of the knitting machine, a spring held plunger adapted to engage the main gear of the knitting machine when released, a lever pivoted intermediately of its length and with the upper end of which the longitudinally movable spring held bar is designed to engage when moved outwardly, a swingable member engaging the spring held plunger at one end for holding it in the withdrawn position, a slide piece carried by the lower end of the aforesaid lever and having a downwardly inclined upper edge portion at its free end extending beneath the opposite end of the swingable member, and means operated by the engagement of the plunger with the main gear of the knitting machine for carrying the hook member out of engagement with the clutch holding mechanism.

2. In a knitting machine, the combination with the main clutch and main gear and releasable mechanism for drawing the clutch

members out of engagement, of a hook member engaging such mechanism in the locked position, a vertical shaft supported in suitable bearings carried by the knitting machine, a longitudinally movable spring held bar carried by the upper end of the shaft so as to extend at its inner end between the cylinders of the knitting machine, a hook member carried by the lower end of the shaft so as to turn relatively thereto, an arm extending from the shaft connected to the hook member, a spring held plunger rod slidably held in such arm adapted to engage said main gear, means for locking the plunger rod in the withdrawn position, and means operated by the longitudinal movement of the spring held bar for releasing the plunger rod.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."