Sept. 3, 1935. J. WACHSMAN 2,013,529

KNITTING MACHINE

Filed May 20, 1933 2 Sheets-Sheet 1

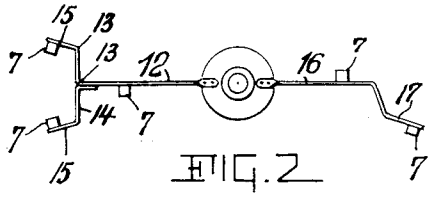


FIG. 2

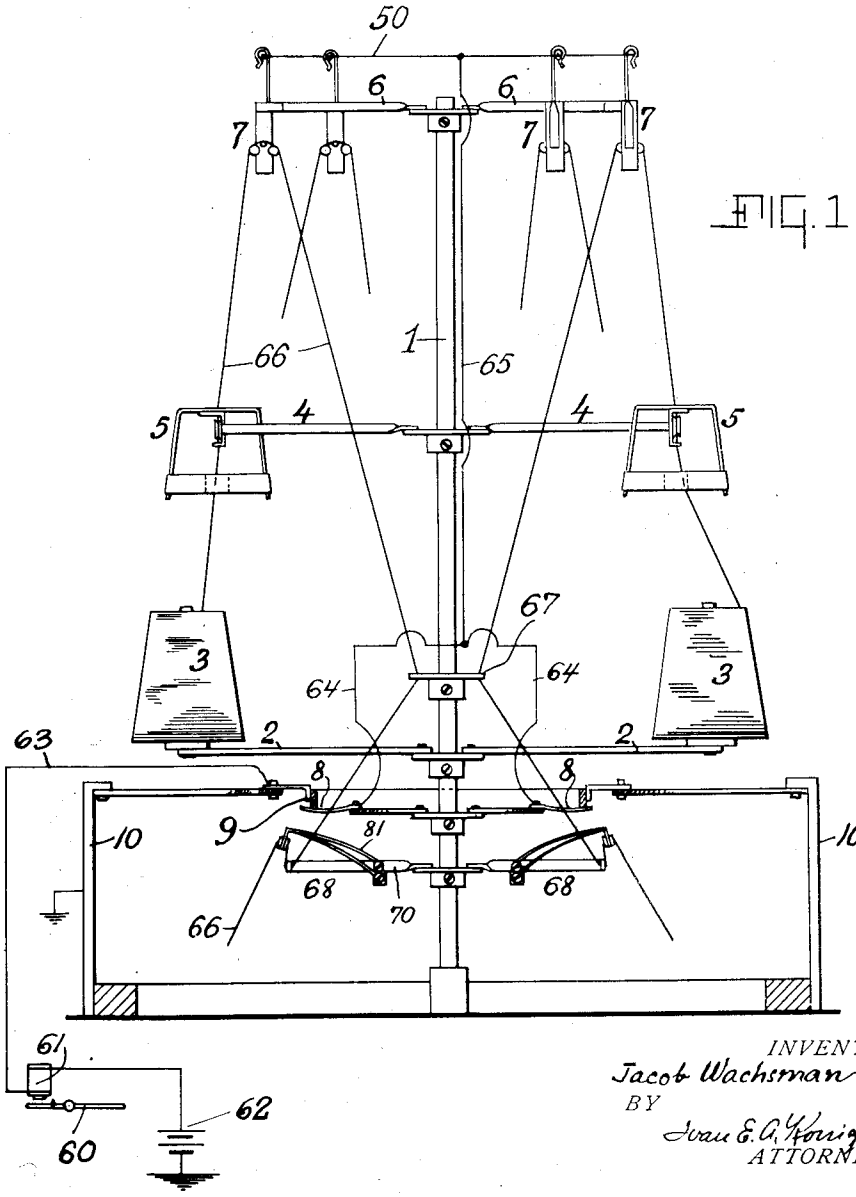


FIG. 1

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FIG. 8

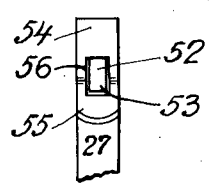


FIG. 3

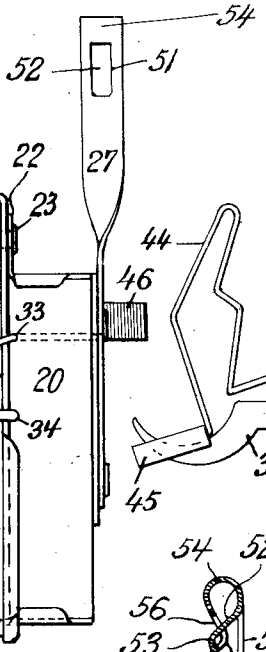
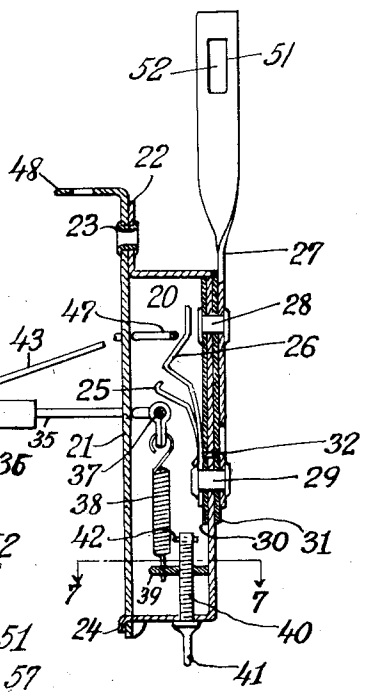


FIG. 4



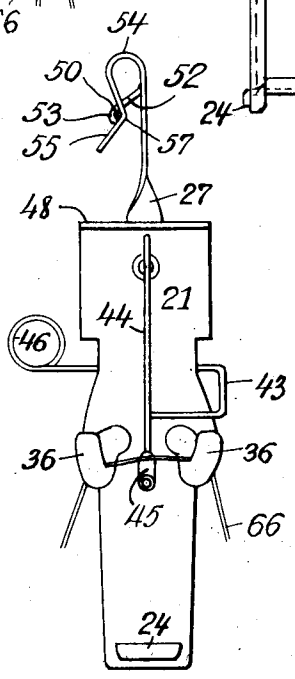


FIG. 5

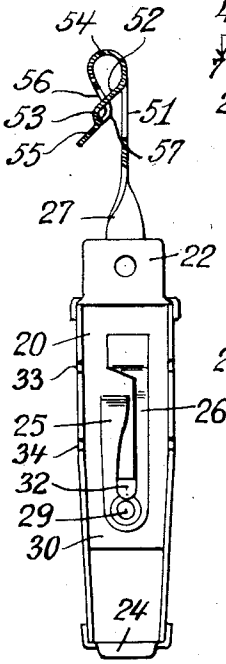


FIG. 6

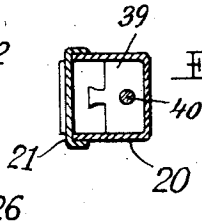


FIG. 7

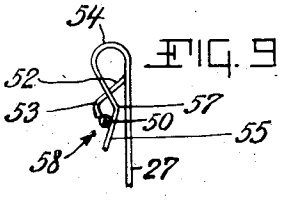


FIG. 9

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Patented Sept. 3, 1935

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UNITED STATES PATENT OFFICE

2,013,529

KNITTING MACHINE

Jacob Wachsman, Brooklyn, N. Y.

Application May 20, 1933, Serial No. 671,947

2 Claims. (Cl. 66—163)

This invention relates to improvements in knitting machines of the type disclosed in my United States Patent No. 1,775,298. The object of this invention is to provide certain improvements in the general arrangements of the several parts and submechanisms in a knitting machine as well as providing specific improvements in many of the individual parts, particularly the construction of the electric stop motions used in knitting machines.

Other objects will appear as this specification proceeds, while reference is had to the accompanying drawings in which

Fig. 1 is a view of a portion of a circular knitting machine to which my invention is applied.

Fig. 2 is a plan view showing novel forms of brackets for supporting the stop motions.

Fig. 3 is a side view of the improved electric stop motion.

Fig. 4 is a sectional view of the stop motion.

Fig. 5 is a front view of the stop motion.

Fig. 6 is an inside view of the stop motion box member.

Fig. 7 is a sectionaal view taken on line 7—7 of Figure 4.

Figs. 8 and 9 are views of the electrical wire terminal.

Referring to Figure 1, the reference numeral 1 denotes the centrally disposed rotatable shaft of the knitting machine suitably supported. The post carries a plurality of radial arms 2 on which the spools 3 are mounted. Above the arms 2 is another set of radial arms 4 which carry certain improved yarn guiding and tension devices 5. Near the top of the post there is mounted a plurality of arms or brackets 6, which support a plurality of stop motions on circuit closers 7.

Beneath the arms 2, the post 1 carries a number of electrically conducting fingers 8 which are in wiping contact with a fixed conductor ring 9, supported on suitable uprights 10. The fingers 8 and the ring 10 are suitably insulated from their supporting members.

Beginning at the top of the machine, it will be seen that there are provided several forms of brackets for supporting the stop motions 7. In practice it is necessary to form the brackets or arms 6, so as to be able to support the necessary number of stop motions corresponding to the number of spools. In the present instance two forms of brackets are shown. The one form shown to the left in Figure 2 consists of a radial arm 12 which is bent twice as at 13, 13, and provided with an extension 14 so as to form a bracket having a main stem 12 and two auxiliary outwardly pointing portions 15 and 15, adapted to support a plurality of circuit closers or stop motions 7. These latter are indicated diagrammatically. To the right in Figure 2 is shown a modication in which the bracket 16 has an offset portion 17 and supports two stop motions 7. The object of the brackets is to provide such spaced supports for the stop motions that entangling yarn runs are eliminated.

Referring now to Figures 3 to 9, inclusive, the improved stop mechanism 7 is constructed as a self contained unit ready for installation on the machine. The main supporting portion of the unit is in the form of an open box 20, formed from a blank and suitably folded as shown. The front of the box is closed by a front plate 21. The top of the box is bent to form an upstanding lip 22, to which the plate 21 is riveted by a hollow rivet 23. The bottom of the plate is secured by passing a lip 24 of the box through a slit in the plate and then bending the lip down firmly on the plate. In practice, the bottom of the plate will be secured first, and then the rivet 23 applied. Thus all the parts within the box are thoroughly protected against dust and dirt, and the box cannot be opened except by applying suitable tools. Thus skilled attendance in case of repairs or the like is assured.

Mounted within the box is a spring contact member forming a short and a long contact finger 25 and 26. On the back of the box there is mounted a terminal contact member or connector 27, by means of two rivets 28 and 29, insulating strips 30 and 31 being provided inside and outside the box to effectively insulate the electrical terminals and thus prevent the possibility of short circuits. A tongue 32 is cut out from the terminal 27 and is bent inwardly so as to lie between the contact fingers 25 and 26, Figure 6, and thus prevents these members from turning on the rivet 29. It must be remembered that in the operation of a knitting machine the parts are being continually shaken and vibrated, hence the utmost rigidity in construction is very important to insure uninterrupted operation.

In the sides or front edges of the box are formed bearings 33 and 34 for pivotally supporting two switch levers on the box. One lever 35 is formed with one or more curved porcelain covered hooks 36 in front of the box, while within the box the said lever has a heel 37 adapted to contact with the contact finger 25 when the lever is swung upwards by the spring 38, as will be explained hereinafter. The lower end of the spring is hooked onto a non-turnable keeper or guide 39 in thread-

ed engagement with an adjusting bolt 40, operable from the outside of the box by applying a slotted tool, not shown, to the flat head 41. Thus adjustment may be made by an operator standing on the floor out of ordinary reach of the stop motions. The bolt 40 has a pin 42 which prevents accidental withdrawal from the box.

The second switch lever 43 is formed with a bent up yarn guide 44, and a porcelain covered hook member 45, which is bent into cooperating relation with the first lever, as will be hereafter explained. The second lever is biased by a suitable weight 46 which may consist of a coil made of the wire from which the lever is fashioned. The weight tends to pull the switch lever hook 45 upwards. Inside the box the lever 43 has a heel 47 adapted to contact with the longer spring contact 26. The front plate 21 forms at its top an apertured lip 48 for mounting the stop motion on its supporting bracket or the apertured rivet 23 may be utilized for this purpose as is obvious.

The terminal member 27 has a connecting portion peculiarly well adapted for use with stop motions of the type and use herein disclosed. It will be seen from Figure 1 that the stop motions are connected serially by a wire 50. The stop motions are ordinarily out of reach and it is therefore of advantage if the connecting terminals are so arranged that the wire 50 may be snapped into place quickly and without requiring the use of special tools.

The end of the terminal 27, see Figures 3, 6, 8 and 9, is cut out as at 51. The cut out portion 52 is bent forwardly at an angle to the terminal and is formed with an inturned lip 53. This portion 52 is relatively stiff and may be termed a wire guiding portion or lip. Above the latter the terminal member is bent to form a yielding loop 54 with a downwardly extending spring clip portion 55, which is cut out or apertured as at 56, Figure 6. The aforesaid relatively stiff guiding portion 52 projects through the aperture 56 and the clip portion 55 is bent at an angle and its bend 57 lies between the body 27 and the guide lip 53.

This particular connector construction is believed to be broadly new and possesses the advantage that the wire 50 may be inserted and connected by a mere depression of the clip 55 caused by pressing the wire 50 against the same. Wire terminal connectors of a somewhat similar construction are known in the art. But so far as I know, the use of such prior connectors requires that the operator bends back or depresses the clip portion with the hand or a tool, and thereafter inserts the end of the wire by sticking it in from the side of the connector behind the other coopating part which corresponds to the lip 52. The present connector terminal differs from the aforesaid prior construction in that the wire may be inserted at a point remote from the ends of the wire by placing the wire transversely of the face of the connector, then sliding the wire downwards on the upper surface of the guiding lip 52 at the same time pressing back the clip 55. Thus the wire arrives in the position shown in Figure 9 and is then brought finally into place by an upward movement in the direction of the arrow 58. The clip 55 then snaps outward and the wire is held firmly between the guide lip 53 and the bend 57, see Figure 5. In other words, the wire is snapped into place by moving it in under the lip 53 against the clip 57. When the latter moves outward, it lifts, as it were, the wire into final position behind the lip 53. A terminal connector construction as herein set forth may of course be used wherever it is desirable to connect a wire at a point intermediate its ends.

Referring now again to Figure 1, the electric stop mechanism which is controlled by my circuit closers or stop motions may be of any suitable construction and as it forms no part of this invention, it is indicated diagrammatically by the stop motion actuating lever 60, operable by a magnet 61, connected to a battery 62, and to the stop motions. The circuit is as follows. One side of the magnet is connected by the wire 63 to the ring 9. Then via the wiping contacts 8 to wire 64, to wire 65, to the wire 50 which is common for the terminals 27 in the stop motions. The other side is of course grounded on the machine.

In operation the yarn 66 passes upwards through the devices 5, then to the stop motions 7, where the yarn is laid on top of the porcelain hooks 36 and 45. From thence the yarn passes downward through a yarn guide 67 and through certain other stop devices 68 to the place where the yarn is being knitted, not shown.

When the yarn is running through the machine it is under sufficient tension to hold the gravity operator lever 43 in substantially the positions shown in Figures 3 and 4. However, as soon as the end of the yarn runs off the hook 45, the weight 46 will swing the lever upwards and the heel 47 will contact with the long finger contact 26 to close the circuit. If undue tension is put upon the yarn, for instance by a knot causing stoppage before the yarn reaches the stop motion, the yarn will pull down the lever 35 and the heel 37 will make contact with the short finger contact 25, that is, both switch levers will act to close the circuit.

It will be understood without further showing that when the gravity operator lever is swung upwards, the guard portion 44 stops the upward swing by abutting the lip 48 and that the long downward slope of the guard portion facilitates the placing of yarn on the hook 45. It should also be noted that the hook 45 may be alongside a single hook 36 on the first lever 35. But this as well as other minor modifications is easily within the skill of a person acquainted with the art.

After passing through the stop motions 7 and through the yarn guides 67, the yarn passes to the stop motion devices 68 on arms 70, which are in the nature of the so-called end detectors. That is when the yarn runs off or breaks below the stop motions 7 or the yarn guide 67 or below the devices 68, contact fingers 81 in the devices 68 will act to close the circuit by contact with the ring 8.

I claim:—

1. In stop mechanism under control of a travelling thread, a circuit closer unit comprising a closed housing, a fixed contact member insulated from and mounted in said housing, a circuit terminal therefor mounted outside the housing, a lip on said terminal extended within the housing engaging said contact member to prevent rotation thereof, a lever pivoted in said housing and extending outside thereof and having a contact heel to engage said contact member, a spring for operating said lever to cause said contact heel to contact as aforesaid, a non-turnable guide to which said spring is attached, a bolt for adjusting said guide, said bolt having a flat head outside the housing, a gravity actuated second lever also pivoted in the housing having an arm extending outside thereof and having a contact heel to engage said contact member, a weight for operating said second lever to cause its contact

heel to engage said contact member, said housing consisting of an open box having bearings for the said two levers, a front plate for closing said box and maintaining the levers in their bearings, a lip on said box engaging a slit in the lower end of the plate and a rivet for securing the upper parts of the plate and box together.

2. In stop mechanism under control of a travelling thread, a circuit closer unit comprising a closed housing, a fixed contact member insulated from and mounted in said housing and forming a short and a long contact finger, a circuit terminal therefor mounted outside the housing, a lip on said terminal extended within the housing and engaging said contact member to prevent rotation thereof, a lever pivoted in said housing and extending outside thereof and having a contact heel to engage the said shorter contact finger of said contact member, a spring for operating said lever to cause said contact heel to contact as aforesaid, a nonturnable guide to which said spring is attached, a bolt for adjusting said guide, said bolt having a flat head outside the housing, a gravity actuated second lever also pivoted in the housing having an arm extending outside thereof and having a contact heel to engage the said longer contact finger of said contact member, a weight for operating said second lever to cause its contact heel to engage said contact member, said housing consisting of an open box having bearings for the said two levers, a front plate for closing said box and maintaining the levers in their bearings, a lip on said box engaging a slit in the lower end of the plate and a rivet for securing the upper parts of the plate and box together.

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