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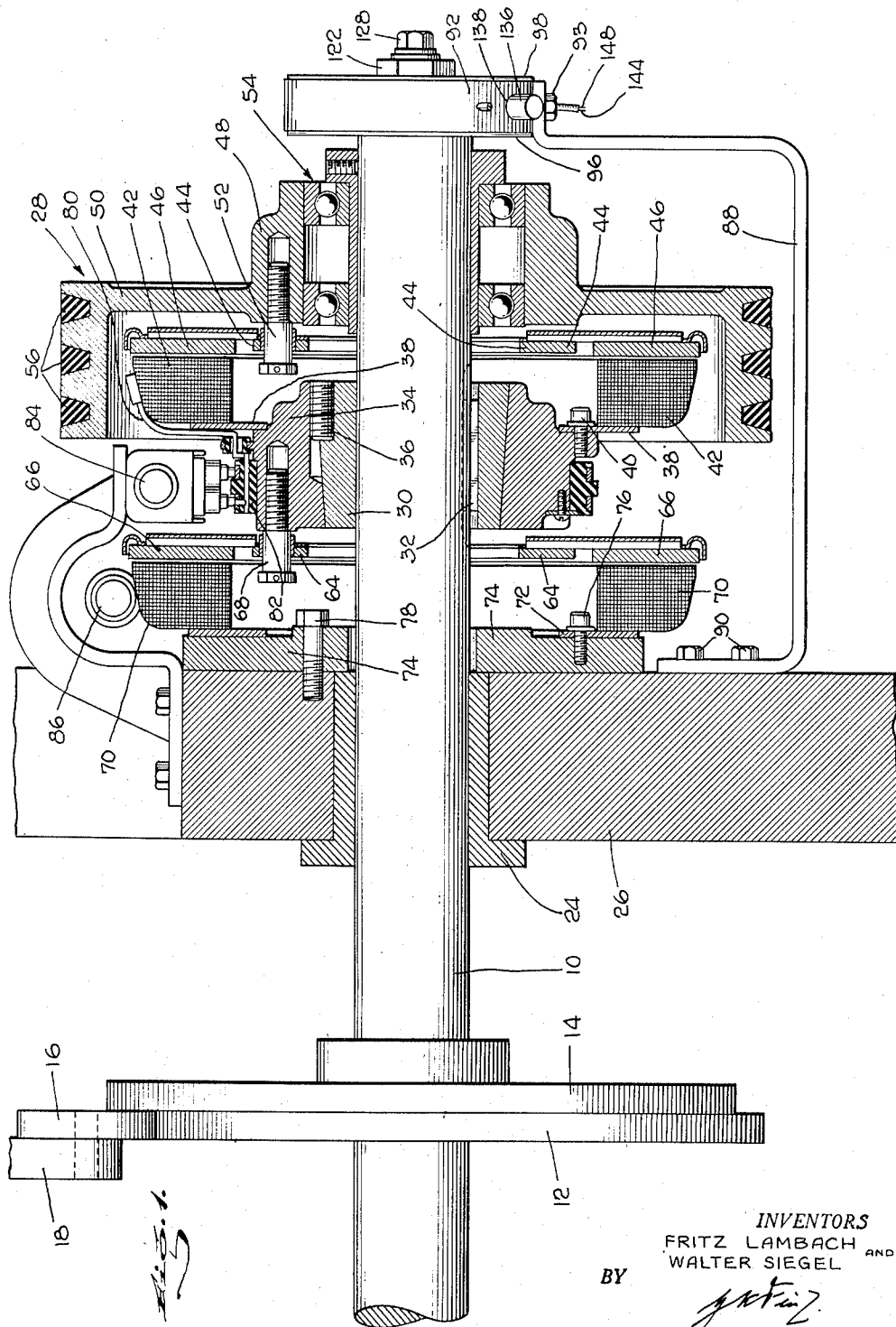
F. LAMBACH ET AL

2,779,448

CLUTCH AND BRAKE CONTROL FOR KNITTING MACHINE

Filed March 1, 1951

4 Sheets-Sheet 1



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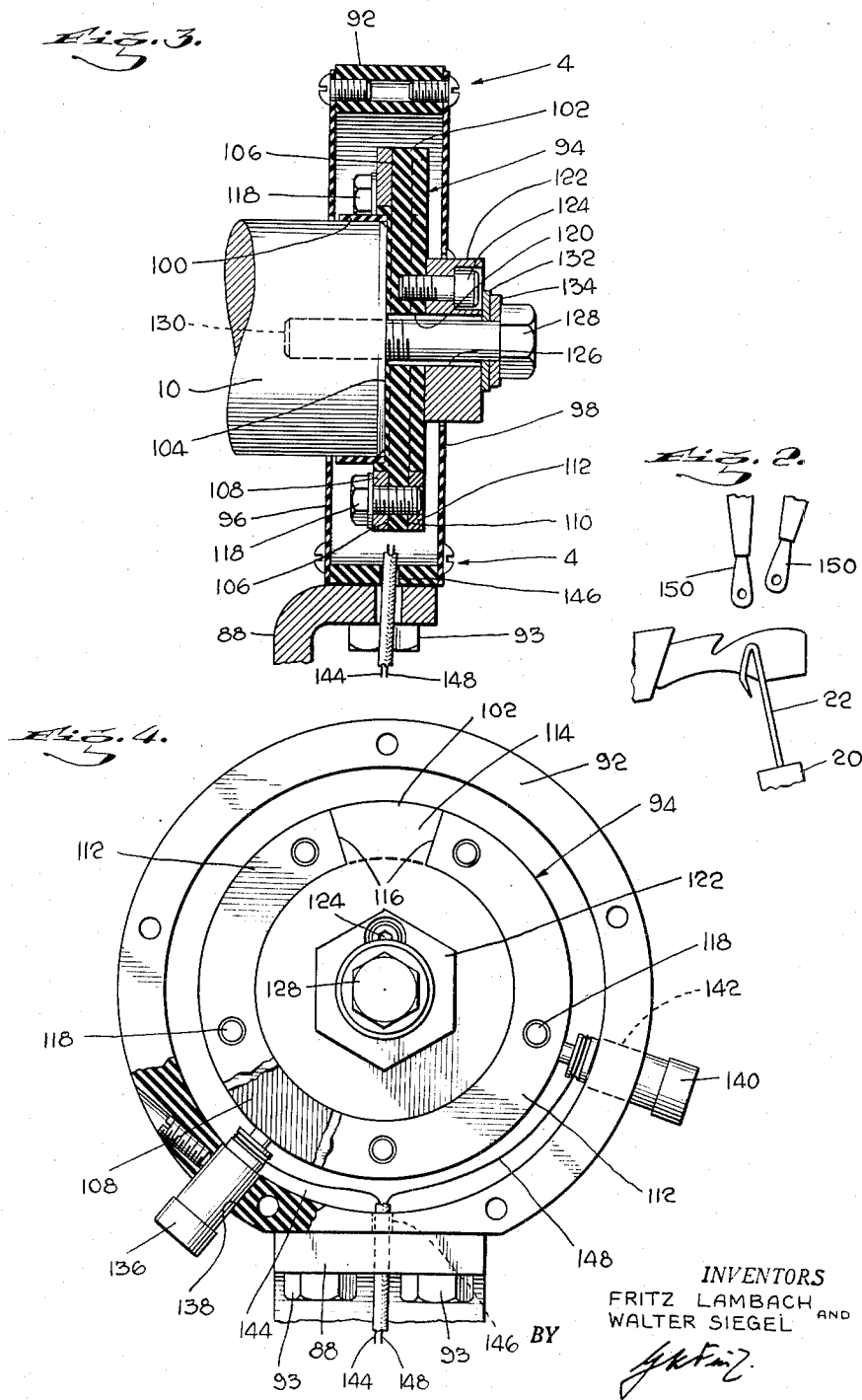
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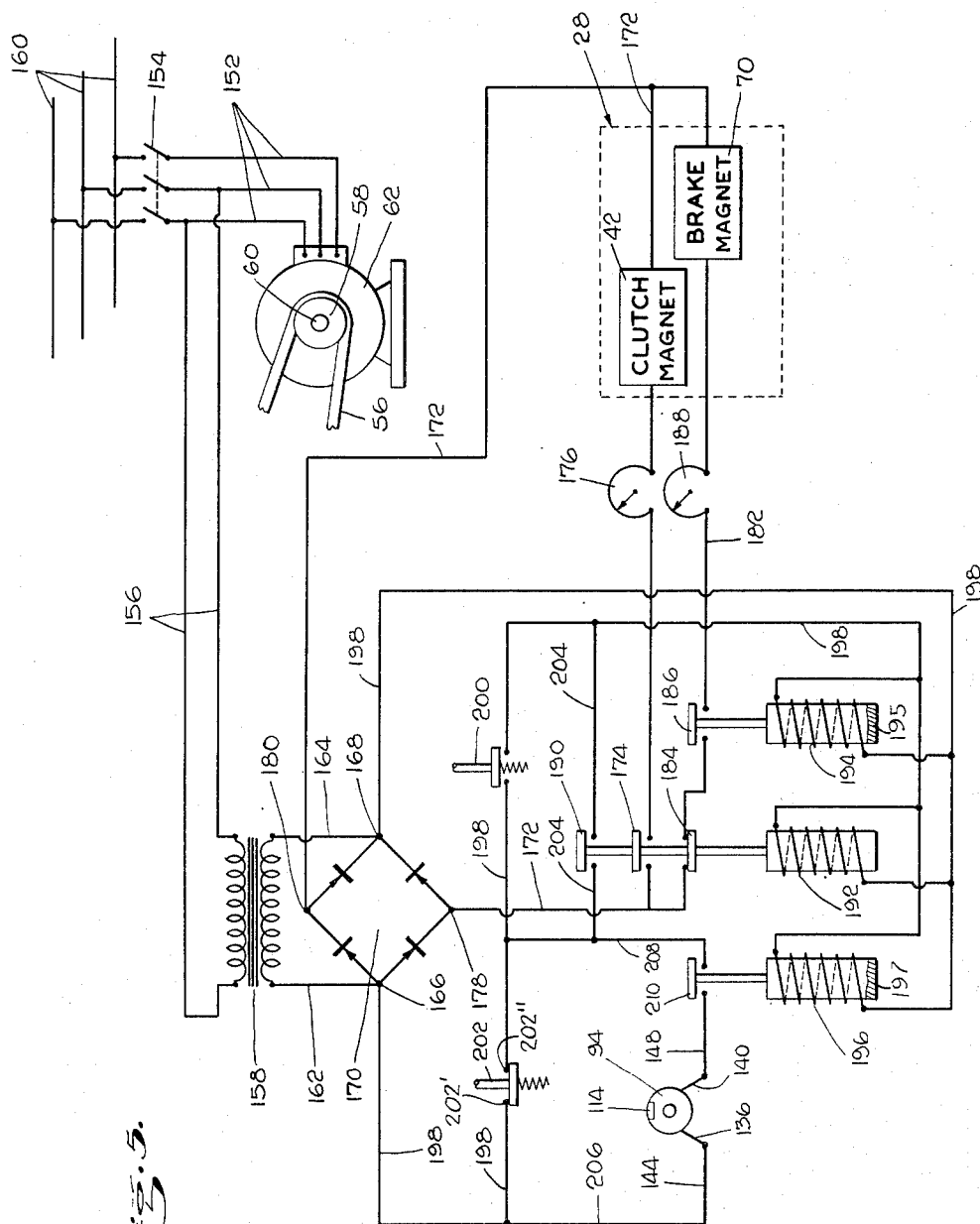
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4 Sheets-Sheet 3



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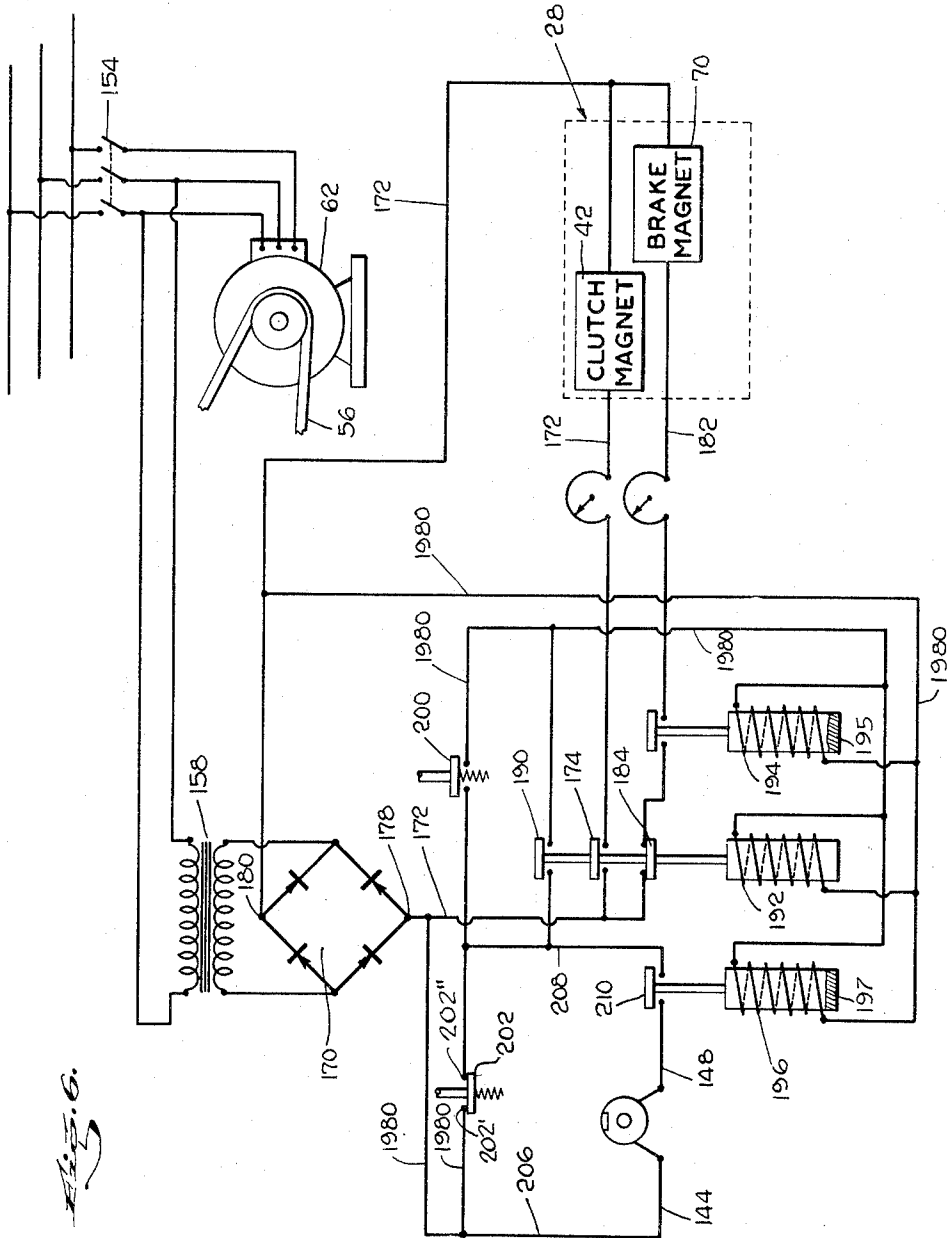


Fig. 6.

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2,779,448

CLUTCH AND BRAKE CONTROL FOR KNITTING MACHINE

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9 Claims. (Cl. 192—144)

This invention relates to knitting machines, and more particularly to an arrangement for stopping a knitting machine at a predetermined position of the knitting cycle.

An object of the present invention is to provide an arrangement for stopping a knitting machine at a predetermined position of the knitting cycle with great accuracy.

Another object the invention is to equip an arrangement for stopping a knitting machine at a predetermined position of the knitting cycle with auxiliary means permitting the stopping of the knitting machine at any desired position of the knitting cycle during the performance of an inching or jogging operation.

Another object of the invention is to provide a knitting machine with an automatic release of the brake after the machine has been stopped, so that the main shaft of the machine can be manually rotated, if so desired.

A further object of the present invention is to provide an electrical control system for controlling electrical means of a knitting machine so as to obtain a stopping of the machine at a predetermined position of the knitting cycle.

Another object of the invention is to improve on the art of warp knitting machines as now customarily made.

Other objects and structural details of the invention will be apparent from the following description when read in junction with the accompanying drawings, forming part of this specification, wherein:

Fig. 1 is a fragmentary sectional view of a warp knitting machine, illustrating an electromagnetic clutch-brake unit and a timing switch, attached to the end of the main cam shaft.

Fig. 2 illustrates the relative position of the needles, sinker and guides of the warp knitting machine at a predetermined position of the knitting cycle, when the needles are approximately in their lowermost position.

Fig. 3 is a vertical sectional view of the timing switch.

Fig. 4 is an end view, partly in section, of the timing switch shown in Fig. 3, said end view being seen in the direction of the arrows 4 of Fig. 3, the end cover, however, being removed.

Fig. 5 illustrates a wiring diagram of an electrical system for controlling the clutch and brake of the warp knitting machine, and

Fig. 6 illustrates a different embodiment of a wiring diagram of an electrical system for the control of the clutch and brake of the warp knitting machine.

Referring now to Fig. 1, 10 indicates a main cam shaft of a warp knitting machine, bearing a series of cams, only two cams 12 and 14 being shown. Cam 12 cooperates with a roller 16 carried by a cam follower 18, which, in a manner known per se, is connected through a linkage with a needle bar 20 (see Fig. 2) carrying the needles 22.

As shown in Fig. 1, the main cam shaft 10 is journaled in a bearing 24 arranged in the frame 26 of the warp knitting machine. The right-hand end (as viewed in

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Fig. 1) of the main shaft 10 projects from the frame 26.

A clutch-brake unit generally indicated by 28 is mounted on the projecting end of the main shaft 10.

A bushing 30 of this clutch-brake unit 28 is rigidly connected with the main shaft 10 by means of a key 32. A body 34 arranged on this bushing 30 is rigidly connected with the latter by means of a screw 36. A ring 38 secured to the body 34 by a series of screws 40 (only one being shown) carries the magnet 42 of the clutch portion of the unit 28. A ring 44 carrying the armature 46 of the clutch portion of the unit 28 is rigidly connected with the hub 48 of a pulley 50 by a series of screws 52 (only one being shown). The pulley 48 is rotatably arranged on the main shaft 10 through the medium of a ball-bearing generally indicated by 54. The pulley 50 is operatively connected through a series of belts 56 with a pulley 58 (see Fig. 5) carried by the shaft 60 of the main motor 62.

As shown in Fig. 1, a ring 64 carrying the armature 66 of the brake portion of the unit 28 is rigidly connected with the body 34 by means of a series of screws 68 (only one being shown).

A magnet 70 of the brake portion of the unit 28 is mounted on a ring 72 attached to another ring 74 by means of a series of screws 76 (only one of them being shown). The ring 74, in turn, is attached to the frame 26 of the machine by means of screws 76 (only one being shown).

Current may be supplied to the clutch magnet 42 by means of wires 80 (only one wire being shown), connected with contact rings of a collector ring 82 which, in turn, are in contact with brushes emanating from a wiring terminal 84.

The brake magnet 70 may be supplied with current by means of wires (not shown) emanating from a terminal box 86.

When both, the clutch magnet 42 and the brake magnet 70, are deenergized, the main cam shaft 10 is free for rotation by hand.

When the clutch magnet 42 is energized and the brake magnet 70 is deenergized, the clutch armature 46 is attracted and positively engaged with the clutch magnet 42, so that the rotating pulley 50 driven by the main motor 62 causes a rotation of the main cam shaft 10 through the medium of the energized clutch magnet, the body 34 and the bushing 30. The magnet 42 is termed hereinafter the first electrical control means associated with the clutch; it will be seen that the magnet 42 when de-energized disengages the driven member or armature 46 of the clutch and therefore the power drive formed by the main motor 62 from the main shaft 10.

When the brake magnet 70 termed hereinafter the second electrical control means is energized and the clutch magnet 42 is deenergized, the brake armature 66 is attracted to the stationary brake magnet 70, whereby the main cam shaft 10 is stopped through the medium of the body 34 and the bushing 30.

As shown in Figs. 1, 3 and 4 a bracket 88 secured to the frame 26 by screws 90 carries a ring 92 of insulating material surrounding a timing switch assembly, generally indicated by 94. The ring 92 is secured to the bracket 88 by means of screws 93. A cover 96 and a cover 98 are attached by screws to this ring 92 on each side thereof.

A ring 100 of insulating material is placed on the end of the main cam shaft 10. The timing switch assembly 94 comprises a disc 102 of insulating material having a recess 104 engaged with the end surface of the shaft 10 and said ring 100. The disc 102 of insulating material is provided at one of its sides with an angular groove 106 receiving a ring 108 of conductive material. Furthermore, the disc 102 of insulating material is pro-

vided at its opposite side with a groove 110 receiving a ring-sector 112 of conductive material. As best shown in Fig. 4, a portion 114 of the disc 102 of insulating material remains between the ends 116 of the ring-sector 112. If desired, however, the groove 110 could be in the shape of an angular groove and a separate piece of insulating material could be inserted into this groove between the ends 116 of the ring-sector 112 and could be held in place by a screw or the like. The ring 108 and the ring-sector 112 are connected with each other and to the disc 102 by means of screws 118 of conductive material passing through bores of the disc 102. Furthermore, the disc 102 has a center bore 120.

A setting element 122 having a hexagonal configuration is rigidly connected with a disc 102 by means of a screw 124. This setting element 122 is provided with a center bore 126 registering with the center bore 120 of the disc 102.

The threaded end of a tightening bolt 128 passing through the bores 120 and 126 of the disc 102 and setting body 122 is screwed into a threaded bore 130 of the main cam shaft 10 extending in the direction of the longitudinal axis of the latter. A pair of washers 132, 134 is placed between the head of the tightening bolt 128 and the setting body 122.

A brush or contact element 136 inserted into a radial bore 138 of the ring 92 of insulating material is in contacting engagement with the circumference of the ring 108 of conductive material. A second brush or contacting element 140 inserted into a bore 142 of the ring 92 of insulating material is in contacting engagement with the circumference of the ring-sector 112 of conductive material and with the circumference of the portion 114 of insulating material respectively. The end of a wire 144 passing through a bore 146 of the ring 92 is connected with the brush 136 by soldering, for example, and the end of a wire 148 also passing through this bore 146 is connected with the brush 140, by soldering for example.

As will be readily understood, as long as the brush 140 is in contact with the ring-sector 112 of conductive material, current may flow from the wire 144 through the brush 136, the ring 108, the screws 118, the ring-sector 112 and the brush 140 to the wire 148. If, however, the brush 140 is in contacting engagement with the circumference of the portion 114 of insulating material, the flow of current is interrupted.

In a manner to be described hereinafter the wires 144 and 148 are arranged in a circuit for causing a deenergization of the clutch magnet 42 and an energization of the brake magnet 70 at the moment when the circuit is interrupted upon a contact of the brush 140 with the interrupting element 114 of insulating material. As said before, this deenergization of the clutch magnet and energization of the brake magnet results in a stopping of the main cam shaft. The position of the main cam shaft in turn is in direct relation to the knitting cycle, so that by a proper setting of the disc 102 relative to the main cam shaft 10 the operation of the machine can be stopped at a predetermined position of the knitting cycle, for example, but not limited thereto, when the needles 22 (see Fig. 2) are in approximately their lowermost position, wherein they are moved away from the guides 150, so that the latter are readily accessible for threading.

In order to set the disc 102 in its proper relation to the main cam shaft 10, which depends on the speed at which the operation of the machine shall be stopped, the tightening bolt 128 is somewhat loosened, whereupon the setting body 122 together with the disc 102 secured thereto may be rotated relative to the main shaft 10, until the proper relative position between the disc 102 and the main shaft 10 is obtained. Thereafter, this position may be secured by tightening the tightening bolt 128.

The electric control system for the clutch-brake unit 28 is shown in Fig. 5.

Two lines of a polyphase circuit 152 including the main motor 62 and a main switch 154 are connected by lines 156 with the primary coil of a transformer 158. The polyphase circuit 152 is interconnected to a network 160 which is fed by an electric source (not shown).

The secondary coil of the transformer 158 is connected by lines 162, 164 with terminals 166 and 168 respectively of a rectifier 170. An actuating circuit 172 having in series a clutch control switch 174, an adjustable resistor 176 and the clutch magnet 42 is connected with the terminals 178 and 180 respectively of the rectifier 170.

A circuit branch 182 having in series a brake control switch 184, a brake release switch 186, an adjustable resistor 188 and the brake magnet 70 is connected in parallel with the clutch control switch 174 and clutch magnet 42.

The clutch control switch 174, the brake control switch 184 and a holding switch 190 are rigidly connected with the armature of a main relay 192. The brake release switch 186 is rigidly connected with the armature of a time delay relay 194. The main relay 192, the time delay relay 194, having a short circuit ring 195, and a second time delay relay 196 are arranged in a controlling circuit 198 having in series a spring-loaded start switch 200 and a spring-loaded stop switch 202 having a first terminal 202' and a second terminal 202". This controlling circuit 198 is connected with the secondary coil of the transformer 158 through the lines 162 and 164 respectively.

The holding switch 190 is arranged in a holding circuit 204 connected in parallel with the start switch 200.

A circuit branch 206, 144, 148, 208 comprising in series the timing switch 94 and a restraining switch 210 carried by the armature of the time delay relay 196 having a short circuit ring 197 is connected in parallel with the stop switch 202. The time delay relay 194 is designed for an immediate closing of the brake release switch 186 upon energization and for an opening of this brake release switch 186 only after a time interval of, for example, one second upon deenergization.

The time delay relay 196 is designed for closing the interruptor switch 210 after a time interval of, for example, two seconds upon energization and for an immediate opening of the interruptor switch 210 upon deenergization.

When the knitting machine is at a standstill, the various switches are in the position shown in Fig. 5, i. e. the main switch 154 is open, the start switch 200 is held in open position by its spring, the stop switch is held in a closed position by its spring, and the relays 192, 194, 196 are deenergized, so that the brake release switch 186, the clutch control switch 174, the holding switch 190 and the restraining switch 210 are open while the brake control switch 184 is closed.

Upon closing of the main switch 154, the main motor 62 is energized, so that the pulley 50 of the clutch brake unit 28 is rotated through the medium of the belts 56. The main shaft 10 of the knitting machine, however, is not yet rotated, as the clutch control switch 174 is still open, thus holding the clutch magnet 42 in deenergized condition.

Upon closing the start switch 200 against the action of its spring, the controlling circuit 198 is closed, whereby the relays 192, 194 and 196 are energized. The energization of the main relay 192 causes an immediate closing of the holding switch 190 and the clutch control switch 174 and an immediate opening of the brake control switch 184. The energization of the relay 194 causes an immediate closing of the brake release switch 186. The energization of the time delay relay 196, however, causes a closing of the restraining switch 210 only after a predetermined time interval, for example after two seconds.

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Owing to the closing of the holding switch 190, the controlling circuit 198 remains closed and the energization of the relays 192, 194 and 196 continues upon a release of the spring-loaded start switch 200.

The closing of the clutch control switch 174 causes a closing of the actuating circuit 172, whereby the clutch magnet 42 is energized, so that its armature 46 (see Fig. 1) is attracted and, consequently, the main cam shaft 10 is rotated by the rotating pulley 50.

Assume now, that the knitting machine is running for a period of time, more than the time (of, for example, two seconds) set for closing the restraining switch 210 by the time delay relay 196.

Now, when the stop switch 202 is opened against the action of its spring, while the timing switch 94 is in a position as shown in the drawings wherein current may flow from the wire 144 to the wire 148, the controlling circuit including the relays 192, 194, 196 is still closed, as current may flow from the rectifier terminal 166 through the circuit branch 206, 144, 148, 208 and holding circuit 204. Therefore, the clutch magnet 42 remains energized and the brake magnet 70 remains deenergized, so that the main cam shaft still rotates, although the stop switch 202 has been opened for presetting the clutch magnet 42 and brake magnet 70 in condition for actuation.

However, as soon as the disc 102 of the timing switch 94 reaches a position wherein its interrupting element 114 of insulating material comes into engagement with the brush 140, the controlling circuit is interrupted by this timing switch with the result that the relays 192, 194 and 196 are deenergized. The deenergization of the main relay 192 causes an immediate opening of the clutch control switch 174, whereby the clutch magnet 42 is deenergized; furthermore, the deenergization of the main relay 192 causes an immediate closing of the brake control switch 184, whereby the brake magnet 70 is energized; at the time of this closing of the brake control switch 184 the brake release switch 186 is still closed, as the deenergization of the time delay relay 194 causes an opening of this brake release switch 186 only after a predetermined time interval of, for example, one second. Thus, the main cam shaft 10 is disconnected from the main motor 62 and is immediately stopped by the electromagnetic brake 70, 66. It will be readily understood, that the timing switch 94 thus controls the initiation of the clutch magnet 42 and brake magnet 70, both preset by the opening of the stop switch 202 in condition for actuation. Thus, the disengagement of the clutch coupling members of the clutch occurs at a predetermined angular position of the main cam shaft 10, and the latter is stopped by the electromagnetic brake at a predetermined position of the knitting cycle when, for example, the needles 22 are in the position shown in Fig. 2.

It is understood, that, depending on the set relative position between the timing switch 94 and the main cam shaft 10 the latter may be stopped at any desired position of the knitting cycle which must not necessarily be the position shown in Fig. 2. Furthermore, if for knitting a certain type of fabric with a certain quality of yarns the knitting machine shall run at a higher or lower speed than during a previous operation, the relative position between the timing switch and the main cam shaft 10 may be readily reset by the mechanism described above, so that the main shaft 10 is stopped by the brake in the same position as during the previous operation.

The arrangement for stopping the main cam shaft operates with great accuracy, as the masses of the permanently rotating motor 62 and pulley 50 do not have to be retarded by the brake.

Of course, above described deenergization of the main relay 192 causes also an opening of the holding switch 190.

Of course, if at the time of opening the stop switch 202 the timing switch 94 is in such a position that the

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interruptor portion 114 of insulating material is in engagement with the brush 140, the clutch magnet 42 is immediately deenergized and the brake magnet 70 is immediately energized upon opening of the stop switch, as now the controlling circuit is also interrupted by the timing switch 94.

As soon as upon the deenergization of the time delay relay 194 after a predetermined period sufficient for stopping the main cam shaft, the brake release switch 186 is opened, the brake magnet 70 is again deenergized with the result that now the main cam shaft may be rotated by hand, if so desired.

The variable resistors 176 and 188 serve to adjust the actuation of the clutch magnet 42 and brake magnet 70 respectively.

Assume now, that an inching or jogging operation of the machine shall be carried out. In such an event the stop switch 202 is opened shortly after the closing and release of the start switch 200 and the procedure of closing the start switch 200 releasing same and opening the stop switch 202 may be repeated several times until the knitting implements are in a desired relative position. The opening of the stop switch 202 after the closing and release of the start switch 200 takes place within a short time, less than for example two seconds, the time required for closing the restraining switch 210 by the time delay relay 196 upon an energization of the latter by the closing of the controlling circuit 198.

Thus, when the stop switch 202 is opened, the circuit branch 206, 144, 148, 208 is interrupted by the restraining switch 210, irrespective of the condition of the timing switch. In other words, the open restraining switch 210 restrains the timing switch from becoming effective and the opening of the stop switch 202 causes immediately an interruption of the controlling circuit 198 with the result of an immediate deenergization of the relays 192, 194 and 196, so that the clutch magnet 42 is immediately deenergized and the brake magnet 70 is immediately energized for stopping the machine.

According to the embodiment of a control system shown in Fig. 6, the arrangement of the various electrical devices in the actuating circuit 172, in the circuit branch 182, in the controlling circuit 198 and in the circuit branch 206, 144, 148, 208, which is the same as described above in connection with the system shown in Fig. 5. Furthermore, the various circuits are connected with each other in the same manner as described in connection with the system shown in Fig. 5. However, contrary to the arrangement shown in Fig. 5, the controlling circuit 190 is also connected with the terminals 178 and 180 of the rectifier, so that D. C. is supplied to the relays 192, 194 and 196, whereby the consistency of action of these relays is improved.

The operation of the system shown in Fig. 6 corresponds entirely to the operation of the system shown in Fig. 5 and does not require a detailed description thereof.

We have described preferred embodiments of our invention, but it is understood that this disclosure is for the purpose of illustration and that various omissions or changes in shape, proportion and arrangement of parts, as well as the substitution of equivalent elements for those, herein shown and described may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

For example, the arrangement and system for stopping the machine is not restricted to the application of a warp knitting machine, it might also be applied to a different type of knitting machine.

Furthermore, instead of using a clutch-brake unit of the electromagnetic type as shown in the drawings, different types of clutches and/or brakes capable of operation by electrical means could be used.

Moreover, the timing switch 94 must not necessarily be arranged on the main cam shaft of the knitting machine; the timing switch could also be driven by a dif-

ferent element of the machine, the operation of which, of course, must be in a definite relation to the knitting cycle.

Furthermore, instead of a rectifier 170 different types of electrical means for converting A. C. into D. C. could be used. In the event of supplying all circuits of the electrical control system with D. C., as illustrated by Fig. 6, a converter could be entirely omitted and the circuits could be supplied with current from a D. C. network.

What we claim is:

1. In a knitting machine, the combination with a power drive, a rotatable main shaft, a clutch electrically actuable for releasably interconnecting said power drive and said main shaft, and an electrically actuable releasable brake on said shaft, of electrical control means comprising: a controlling circuit and an actuating circuit interconnected to an electric source, said actuating circuit comprising a first branch having in series connection actuating means for said clutch and a clutch control switch normally closed during operation of said machine, and a second branch arranged in parallel with said first branch and having in series brake actuating means and a brake control switch normally open during operation of said machine, said controlling circuit comprising a first circuit portion having in series a start switch for closing said first circuit portion and a stop switch for opening the same and being biased towards closure position, and relay means for said brake control switch and for said clutch control switch of said actuating circuit, and a second circuit portion in parallel with that part of said first circuit portion which includes said stop switch, said second circuit portion including a timing switch being operable for periodically interrupting said second circuit portion and being in driven connection from said main shaft.

2. In a knitting machine as claimed in claim 1, said electric source being a source of alternating current, a rectifier connected to said electric source, and at least one of said circuits being connected to said rectifier for receiving therefrom direct current.

3. In a knitting machine as claimed in claim 1, said electric source being a source of alternating current, a rectifier connected to said electric source, said actuating circuit being connected to said rectifier for receiving therefrom direct current, and said controlling circuit being connected to said electric source for receiving alternating current therefrom.

4. In a knitting machine the combination with a power drive, a rotatable main shaft, a clutch electrically actuable for releasably interconnecting said power drive and said main shaft, and an electrically actuable releasable brake on said shaft, of electrical control means comprising: a controlling circuit and an actuating circuit interconnected to an electric source, said actuating circuit comprising a first branch having in series connection actuating means for said clutch and a clutch control switch normally closed during operation of said machine, and a second branch arranged in parallel with said first branch and having in series brake actuating means and a brake control switch normally open during operation of said machine, said controlling circuit comprising a first circuit portion having in series a start switch for closing said first circuit portion and a stop switch for opening the same and being biased towards closure position, and relay means for said brake control switch and for said clutch control switch of said actuating circuit, and a second circuit portion in parallel with that part of said first circuit portion which includes said stop switch, said second circuit portion including a timing switch being operable for periodically interrupting said second circuit portion and being in driven connection from said main shaft, a brake release switch connected in series with said brake control switch in said second branch, said brake release switch being normally closed during operation of the machine and including a mechanism for delayed opening, and a relay for said

brake release switch being interconnected with said relay means in said first circuit portion.

5. In a knitting machine the combination with a power drive, a rotatable main shaft, a clutch electrically actuable for releasably interconnecting said power drive and said main shaft, and an electrically actuable releasable brake on said shaft, of electrical control means comprising: a controlling circuit and an actuating circuit interconnected to an electric source, said actuating circuit comprising a first branch having in series connection actuating means for said clutch and a clutch control switch normally closed during operation of said machine, and a second branch arranged in parallel with said first branch and having in series brake actuating means and a brake control switch normally open during operation of said machine, said controlling circuit comprising a first circuit portion having in series a start switch for closing said first circuit portion and a stop switch for opening the same and being biased towards closure position, and relay means for said brake control switch and for said clutch control switch of said actuating circuit, and a second circuit portion in parallel with that part of said first circuit portion which includes said stop switch, said second circuit portion including a timing switch being operable for periodically interrupting said second circuit portion and being in driven connection from said main shaft, a restraining switch connected in series with said timing switch in said second circuit portion, said restraining switch being normally closed during continued operation of the machine and including a mechanism for delayed closing, and a relay for said restraining switch being connected with said relay means in said first circuit portion.

6. In a knitting machine the combination with a power drive, a rotatable main shaft, a clutch electrically actuable for releasably interconnecting said power drive and said main shaft, and an electrically actuable releasable brake on said shaft, of electrical control means comprising: a controlling circuit and an actuating circuit interconnected to an electric source, said actuating circuit comprising a first branch having in series connection actuating means for said clutch and a clutch control switch normally closed during operation of said machine, and a second branch arranged in parallel with said first branch and having in series brake actuating means and a brake control switch normally open during operation of said machine, said controlling circuit comprising a first circuit portion having in series a start switch for closing said first circuit portion and a stop switch for opening the same and being biased towards closure position, and relay means for said brake control switch and for said clutch control switch of said actuating circuit, and a second circuit portion in parallel with that part of said first circuit portion which includes said stop switch, said second circuit portion including a timing switch being operable for periodically interrupting said second circuit portion and being in driven connection from said main shaft, a brake release switch connected in series with said brake control switch in said second branch, said brake release switch being normally closed during operation of the machine and including a mechanism for delayed opening, a first relay for said brake release switch being interconnected with said relay means in said first circuit portion, a restraining switch connected in series with said timing switch in said second circuit portion, said restraining switch being normally closed during continued operation of the machine and including a mechanism for delayed closing, and a second relay for said restraining switch being connected with said relay means in said first circuit portion.

7. In a knitting machine the combination with a power drive, a rotatable main shaft, a clutch electrically actuable for releasably interconnecting said power drive and said main shaft, and an electrically actuable releasable brake on said shaft, of electrical control means comprising: a controlling circuit and an actuating circuit interconnected to an electric source, said actuating circuit comprising a

first branch having in series connection actuating means for said clutch and a clutch control switch normally closed during operation of said machine, and a second branch arranged in parallel with said first branch and having in series brake actuating means and a brake control switch normally open during operation of said machine, said controlling circuit comprising a first circuit portion having in series a start switch for closing said first circuit portion and a stop switch for opening the same and being biased towards closure position, and relay means for said brake control switch and for said clutch control switch of said actuating circuit, and a second circuit portion in parallel with that part of said first circuit portion which includes said stop switch, said second circuit portion including a timing switch being operable for periodically interrupting said second circuit portion and being in driven connection from said main shaft, a brake release switch connected in series with said brake control switch in said second branch, said brake release switch being normally closed during operation of the machine and including a mechanism for delayed opening, a first relay for said brake release switch being interconnected with said relay means in said first circuit portion, a restraining switch connected in series with said timing switch in said second circuit portion, said restraining switch being normally closed during continued operation of the machine and including a mechanism for delayed closing, and a second relay for said restraining switch being connected with said relay means in said first circuit portion, said electric source being a source of alternating current, a rectifier connected to said electric source, said actuating circuit being connected to said rectifier for receiving therefrom direct current, and said controlling circuit being connected to said electric source for receiving alternating current therefrom.

8. A knitting machine comprising, in combination: a power drive, a rotatable main shaft, a clutch arranged between and operatively engaged with said power drive and said main shaft, first electrical control means associated with said clutch for rendering same ineffective so as to disengage said power drive from said main shaft, a braking device connected with said main shaft, a second electrical control means associated with said braking device for rendering same active so as to stop said main shaft, a rotatable timing switch driven by said main shaft, said timing switch including a member of insulating material attached to said main shaft, a ring of electrically conductive material attached to one side of said member, a ring sector of electrically conductive material attached to the other side of said member, a portion of insulating material between the ends of said ring sector, means electrically connecting said ring and said ring sector with each other, a first stationary contact element in contact-

ing engagement with said ring, and a second stationary contact element arranged for contacting engagement with said ring sector and said portion of insulating material, said second stationary contact element being operatively connectable to said first and second electrical control means, whereby said timing switch is opened when said second stationary contact element is in contact with said portion of insulating material, and closed when said second stationary contact element is in contact with said ring sector attached to the other side of said member attached to said main shaft so that said timing switch controls the initiation of said first and second electrical control means at the same predetermined angular position of said main shaft, and a manually operable stop switch having a first terminal and a second terminal being connected, respectively, with said first and second stationary contact elements of said timing switch, said stop switch presetting said first and second electrical control means in condition for an actuation by said timing switch when the latter is in position for actuation.

9. A knitting machine as claimed in claim 8, the free end of said main shaft being provided with a threaded bore extending in the direction of its longitudinal axis, said member of insulating material being designed as a disc-like member engaged with the end of said main shaft, a setting member secured to said disc-like member, said setting member and said disc-like members being provided, respectively, with center apertures in coaxial alignment with said threaded bore of said main shaft, and a tightening means passing through said apertures, said tightening means being screwed into said threaded bore and being engaged with said setting member for holding said disc-like member in a preset position relative to said main shaft.

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