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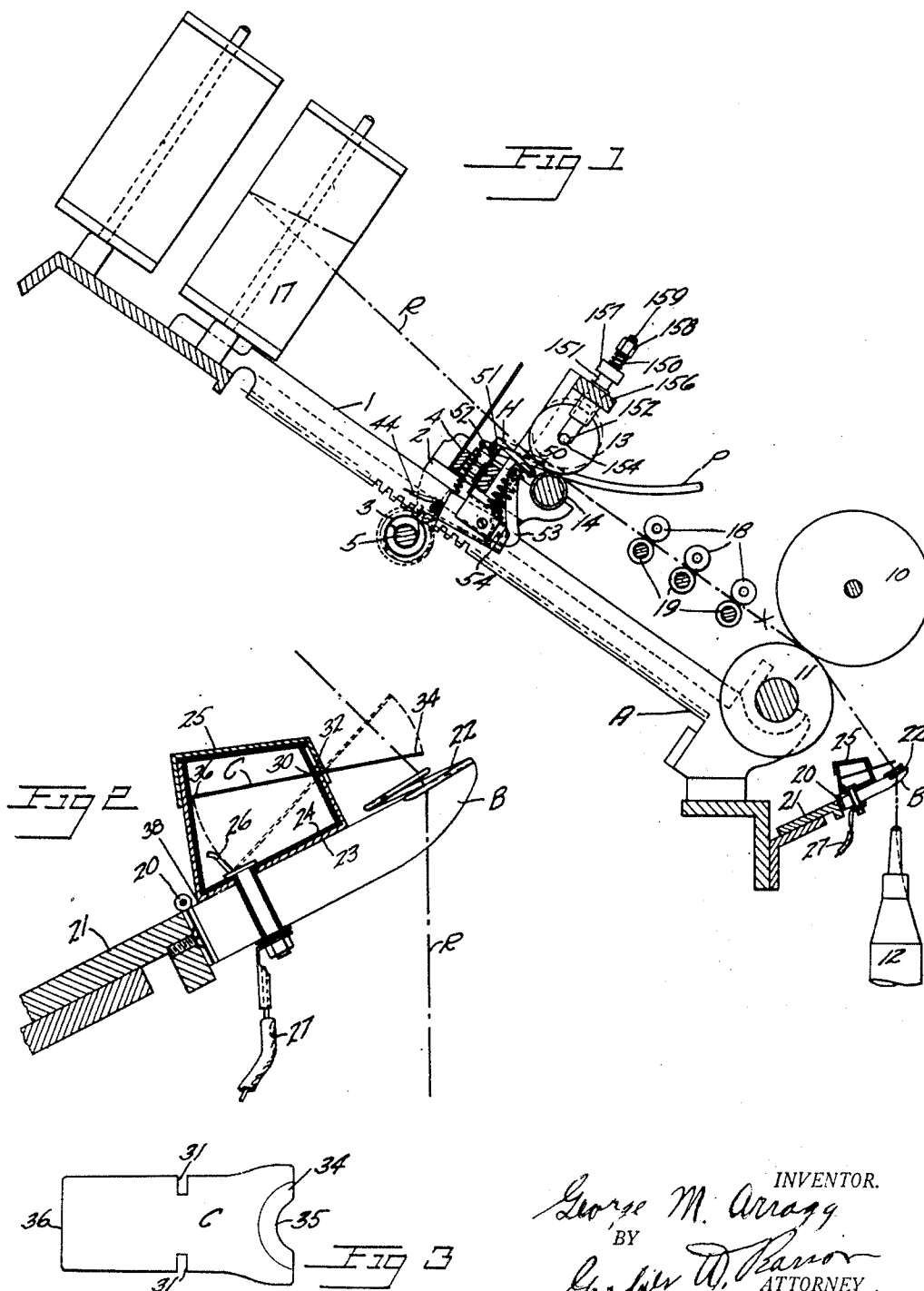
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ELECTRIC STOP MOTION FOR SPINNING MACHINES

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3 Sheets-Sheet 1



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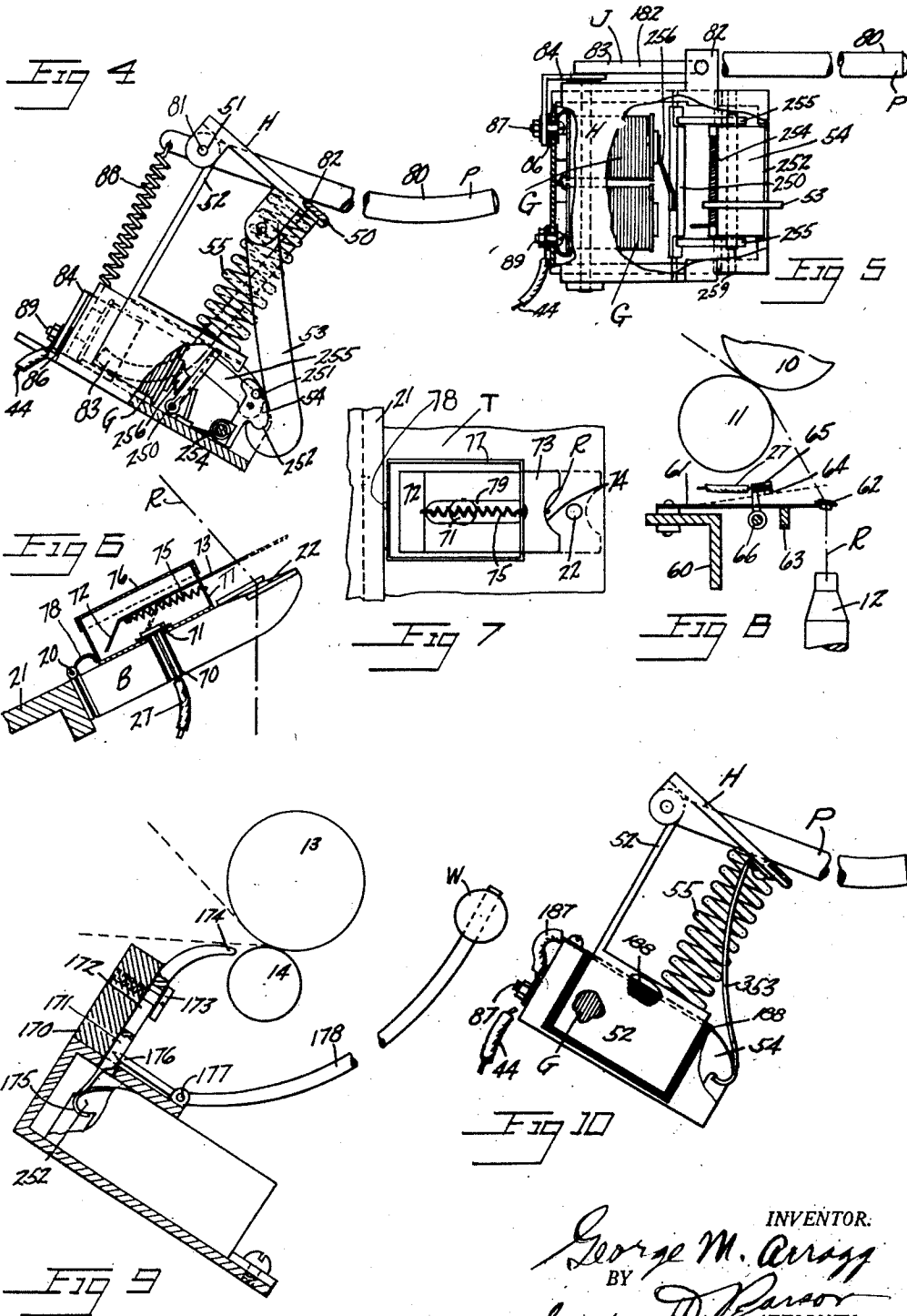
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3 Sheets-Sheet 2



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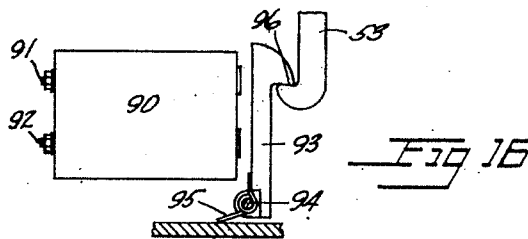
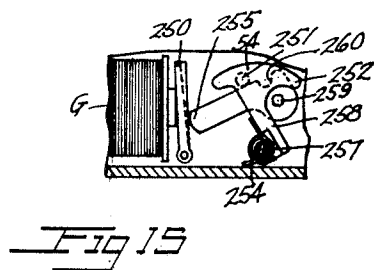
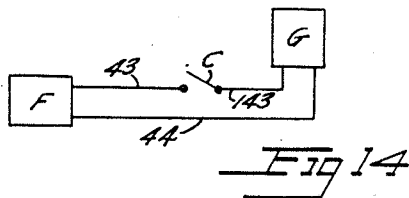
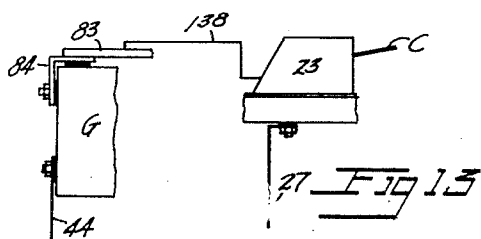
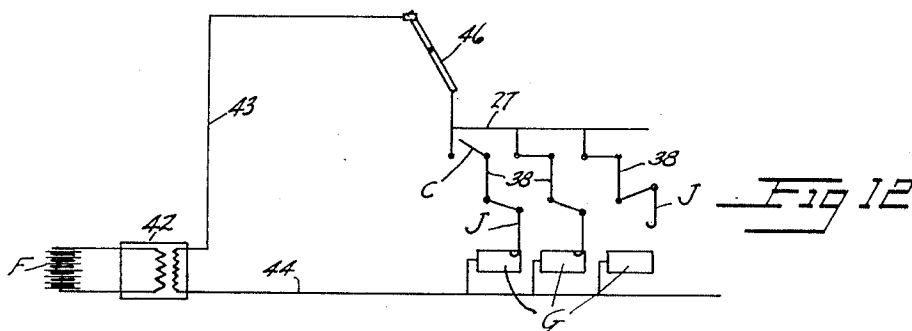
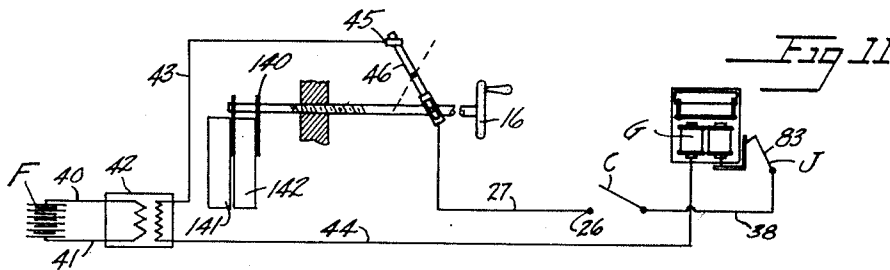
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3 Sheets-Sheet 3



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ELECTRIC STOP MOTION FOR SPINNING MACHINES

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This invention relates to stop motions for spinning frames. It is especially applicable to cap spinning frames which are generally used in spinning worsted yarn, but it may be used on other types.

Such spinning frames frequently include from one hundred to two hundred spindles each carrying a bobbin to which roving is delivered by means of a system of rolls.

It is the purpose of this device whenever there is a break in the roving for any particular bobbin, to stop one of the back delivery rolls for that particular bobbin, and to break and stop the roving for one bobbin only, without stopping delivery to any of the other bobbins. In this way, there is very little loss of production and the winding up of waste roving on the rolls and double spinning, which means the floating of a broken end over to an adjoining bobbin thereby causing defective yarn, is prevented.

To secure great production in a comparatively small space, the spindles carrying the bobbins on such spinning frames are positioned close together and usually are located back to back, half on the back and half on the front of the frame. In the modern frame there are one hundred in front and one hundred at the back.

I am aware that various types of mechanical stop motions have been invented but these generally are relatively bulky and expensive.

This device is an electric stop motion and comprises a feeler preferably of the rocking kind which engages the roving between the front delivery roll and the bobbin and is thereby held out of its normal position, such feeler being included in an electric circuit which also includes a fixed contact through which when the roving breaks the feeler completes the circuit. When this circuit is completed an electro-magnet is energized and this operates trigger or catch mechanism which normally holds a spring pressed lifter out of engagement with the frictionally driven spring pressed top back roll between which and the bottom back roll the roving must pass to the front delivery rolls and thence to the bobbin.

I also preferably include a circuit breaker to again open the circuit, operated by the lifter, so that current is not wasted, and also a make and break switch, interposed in the conductors, operable by the hand shipper so that when the whole frame is stopped the feelers cannot complete the circuit and the roving is not broken.

In the drawings, Fig. 1 is a side elevation showing part of a cap spinning frame with my device in position.

Fig. 2 is a side sectional elevation of the feeler and feeler box.

Fig. 3 is a plan view of the rocking feeler alone.

Fig. 4 is a side elevation, partly broken away, of my lifter plate and catch release mechanism.

Fig. 5 is a plan view of Fig. 4, parts being broken away.

Fig. 6 is a side sectional elevation of a sliding feeler.

Fig. 7 is a plan view of Fig. 6 with the box cover removed, but shown as attached to a fly board.

Fig. 8 is a side elevation of a modified form of feeler.

Fig. 9 is a side sectional elevation of another type of lifter and accompanying parts.

Fig. 10 is a side elevation of another type of lifter and accompanying parts.

Fig. 11 is a digram of the wiring of one spindle.

Fig. 12 is a digram showing a preferred form of wiring for many spindles.

Fig. 13 is a detail showing a complete wire system in place of grounds.

Fig. 14 is a diagram of a simplified wiring for one spindle.

Fig. 15 is a detail of my preferred type of catch release mechanism.

Fig. 16 is a detail showing a simplified type of catch release mechanism.

In the drawings, A represents a cap spinning frame having the positively driven front delivery rolls 10 and 11 which deliver roving to the bobbins such as 12 and back delivery rolls 13 and 14, of which the bottom one 14 is positively driven and the top one 13 is frictionally driven thereby, being

pressed thereon by a compression spring 150. 16 is a hand shipper for starting and stopping the frame, or rather for starting and stopping the rolls and other moving parts.

5 R represents the roving which is unwound from the spools 17 by the pull of the back rolls 13 and 14. It thence passes between the very light frictionally driven top carrier rolls 18 and bottom carrier rolls 19, the latter of which are positively driven and preferably from back to front at successively slightly higher speeds and then between the front delivery rolls 10 and 11, which preferably travel at a substantially higher rate of speed than the back rolls, thereby drawing out the roving in a well known manner.

I prefer to have a single top back roll 13 and a plurality of top carrier rolls such as 18 for each spindle.

20 B is a metal arm which takes the place of the fly board and is hinged at 20 to a bar 21 which extends along the front or back of the frame. There is such an arm for each bobbin 12 and each carries an eye or pig-tail 22 which is positioned directly over the axis of the bobbin and causes the roving R to bend at an angle as it comes from the front rolls 10, 11 to the bobbin.

As usually constructed, the back rolls and 30 the traversing mechanism 4 are carried on brackets 2 supported by sloping racks such as 1 and can be moved forward and back thereon by means of gears 3 carried on a shaft such as 5 which extends the whole or half the width of the machine. Thereby the distance between the front and back rolls can be altered in a well known manner.

To protect the parts from flyings and dust I prefer to provide a feeler box which is open at the top but includes four sides and the bottom 23 all lined with insulation 24. A removable cover 25 is also lined with insulation. Extending up through the bottom thereof is the fixed feeler 26 properly insulated from the other parts and being connected with the insulated wire 27 forming part of the electric circuit to be described.

40 C is a metallic rocking feeler pivoted in the box at 30, as shown having the cuts 31, 31, whereby it fits down into a depression 32, being held in position by the box cover 25.

Its exposed or front end 34 is preferably cut away at 35 to keep the roving from running over the side, and its inside end 36 is in such position that as the inside part is heavier than the outside part it will normally drop down forming a sliding contact with fixed contact 26. This rocking feeler being in contact with the metallic box and its cover 25, 60 which in turn are grounded to the metal part of the frame as shown at 38, is also in the same electric circuit spoken of above.

The feeler tip 34 is in such position with reference to its pivot 30 that the roving will 65 hold it down and therefore its other end 36

up thereby keeping the circuit normally broken.

F represents a battery which is a source of electric current and from this extend the conducting wires 40 and 41 which pass through the transformer 42 and from thence extend as 43 and 44. 43 extends through a contact 45 which engages the make and break knife switch 46 operable by the shipper 16 so that they engage whenever the belt fork 140 is caused to transfer the belt from the loose pulley 141 to the tight pulley 142. The other end of this make and break switch may be connected to the wire shown at 27 in the diagram.

The lifter H shown as pivoted and in position when it rises to pinch the roving between its padded end 50 and the top back roll 13, is pivoted at 51 to a part of the frame 52 and carries pivotally the hook 53 which extends downward in position to engage a catch 54, both forming part of the electrically operated trigger mechanism.

The lifter spring 55 tends to force the lifter H upward against the top back roll 13 and is more powerful than the compression spring 150 which tends to press the top roll 13 against the bottom roll 14.

The back rolls of cap spinning frames ordinarily are carried in pairs by suitable yokes but in this machine I find it desirable to provide for each top back roll such as 13 its own particular yoke 151 having at the end of each leg a bearing groove 152 into which fits the journal 154 for each roll 13.

Each yoke 151 is slidable through suitable bearings in a fixed rail 156 carried by the frame, and has a cross bar 157 against which spring 150 bears, the pressure being adjusted by a nut 158 on a spindle 159.

Catch 54 which holds hook 53 and lifter H down is normally held in position by spring 254 and pivoted latches 255 and armature 250 of electromagnet G to be hereafter described in detail.

Electromagnet G has one pole 89 connected to the wire 44 and the other pole 87 connected to the circuit breaker J also to be hereafter described.

When magnet G is energized by closing the circuit through feeler C, it attracts its armature 250 which releases catch 54 to such an extent that the pressure of spring 55 on hook 53 releases the hook from catch 54 allowing lifter spring 55 to raise the lifter H whereby its padded edge 50 raises the back roll 13 and also pinches the roving R, causing it to break at about the point indicated by X in Fig. 1.

What is left is not carried along by the carrier rolls and through the front rolls because their grip is not strong enough.

To reset the mechanism, I use a resetting device indicated by P which includes a handle 80, pivoted at 81 to the frame, which bears against an ear or projection 82 on lifter H in such manner that when the handle is de- 130

pressed, it forces the lifter plate down away from the top roll.

Hook 53 is so hung and formed that it re-engages catch 54 and so the trigger mechanism is reset.

Carried by ear 82 is a curved arm 182 in such position that when the lifter is set, its end 83 engages a plate 84 attached to the post 87 of magnet G and insulated therefrom by insulation 86 as shown in Figs. 4 and 5.

As lifter H and the other parts form part of the frame they are thereby included in the circuit which is made or broken by the end 83 in contact with 84 while any particular plate is depressed, but when lifter H is lifted as it is when the trigger mechanism is released, 83 separates from 84 thus breaking the circuit indicated in the diagram between 44 and 38.

Handle 80 is shown as being normally lifted by the tension spring 88.

Spring 88 may be omitted however and the handle used as a signal that its particular top roll has been stopped.

When the roving breaks between the front rolls and the bobbin, the feeler closes the circuit and the magnet releases the catch or trigger on the holding hook of the lifter and this lifter rises against the roving and the top back roll lifting the latter and stopping it and the roving. As the carrier rolls and the front rolls continue to revolve the pull of the front rolls breaks the roving directly in front of the carrier rolls which continue to revolve but do not have enough grip on the roving either to break it again or to pull it away from the grip of the lifter plate on the top back roll.

When the operator wishes to piece the end, he resets the trigger mechanism by the handle P and holds it until the back rolls again begin feeding. When this occurs, the carrier rolls carry this end along between the front rolls which grip it and deliver it to a point where it can be and is seized by the operator and brought down against the feeler thus breaking the circuit, thence into and through the eye such as 22 which directs it to the bobbin 12. As soon as the feeler C breaks the circuit, the handle P can be released and the ends pieced without danger of rebreaking.

When the frame is stopped for any reason by the shipper, the circuit is again broken by the make and break switch 46, so that there is no danger of the feelers working because the delivery of the roving has stopped.

There are numerous modifications of my device, some of which I will now explain.

In Fig. 8, I show a feeler which takes the place of the fly board. Fastened to a cross bar 60 of the frame is the springy feeler 61, having an eye 62 at its free end, in position just above a stop bar 63. Eye 62 is in front of a direct line between the bite of the front rolls 10 and 11 and the top of bobbin 12, and is therefore held down in the full line position

instead of in the dotted line position, while the roving R is whole. Feeler 61 is grounded on the frame and there is a fixed contact 64 insulated at 65 which connects with the wire 27. A plurality which may be the whole or half on one side of a frame of these contacts 64 are attached to a turning rod 66 by which they can be moved over and back so that even if feeler 61 rises no contact will be made. This device can take the place of the make and break switch attached to the shipper although the latter is preferable.

In Figs. 6 and 7, I show a sliding feeler which comprises a fixed contact 71 insulated at 70 from eye support B or T and connecting with wire 27 and also a sliding feeler 73.

In Fig. 6, I show box 77 attached to a metal support B but in Fig. 7 to a wooden fly board T.

Sliding feeler 73 is a strip of sheet metal having its back end 72 turned down so as to engage 71 and being slidable back and forth towards and from the roving R at a point a little above eye 22. Spring 75 in slot 79 tends to force the concaved or cut out end 74 towards the roving and when the roving breaks, it moves the feeler forward so that 72 engages 71, and as box 77 with its cover 76 are grounded as by a wire 78, the circuit is closed.

As shown in Fig. 9, instead of a rocking lifter, I can use a sliding lifter indicated by 171. This is slidable at a slant behind the bar 170 forming part of the frame, lifter 171 having a slot 172 and being fastened to 170 by means of a headed screw 173. At the top it has a lifting nose 174 and at the bottom an elastic hook 175 in position to engage catch 252 operated by an electromagnet as before described.

Instead of a lifting spring, I show a lifting arm 178 having a short member 176 the tip of which engages lifter 170, the arm being pivoted at 177 and having a long arm 178 at the end of which is a weight W. The tendency of weight W is to drop and thus lift short member 176 and lifter 171 when the catch 252 releases hook 175. For resetting, weight W and arm 178 are lifted instead of being pulled down.

In Fig. 10, I show the handle P integral with the lifter H so that spring 88 is dispensed with, and I also show the holding hook 353 as made of spring metal so that it will hook under catch 54 positively rather than by gravity.

In place of the circuit breaking device J, I show the box holding the electromagnets G insulated at 188 from the frame 52 and I show one of its poles 87 connected to the box by a wire 187, the other pole not shown being insulated and connected to the wire 44 as in the other constructions.

As the parts P, H and 353 are not insulated from the frame, the current grounds

through them and through 54 and 187 to the magnet G except when hook 353 disengages from catch 54 which acts as a circuit breaker.

Fig. 11 is a diagram showing the connections for a single spindle and lifter while Fig. 12 shows how the wiring can be accomplished, using the frame itself as a ground 38. This also shows in the left hand circuit, the circuit opened by feeler C while in the middle it is closed as when the roving breaks, and at the right it is again broken by the release of the circuit breaker mechanism J.

Fig. 13 shows how I can use a complete wire system, the connecting wire 138 taking the place of the grounded frame 38.

Fig. 14 is another diagram in which the shifter make and break is omitted and also the circuit breaker J, the wires 43 running directly from battery F to feeler C from whence wire 143 runs to the magnet G, the other wire 44 running directly back to battery F.

In Fig. 15 I show a detail of my preferred type of trigger or hook or catch release mechanism such as shown in Figs. 4 and 5.

250 represents the armature and 54 the catch having nose 252 and pivoted on a rod 257 and also provided with pins 251, its supports being indicated by 258.

The latches 255 are pivoted to the casing of the magnet box at 259 and have tails extending back proximate armature 250, and also recesses 260 which receive pins 251 when locked but which allow these pins 251 to slip out and down when the armature 250 releases them. This construction is well known and is very satisfactory.

As shown in Fig. 16 however, I can use a magnet 90 with posts 91, 92 having an armature 93 pivoted at 94 and having a nose 96 to hold hook 53 normally held in engagement therewith by spring 95. When the magnet is energized nose 96 releases hook 53.

I claim:

1. The combination with a spinning frame having front delivery rolls, bobbins, and back delivery rolls the bottom one of which is positively driven and the top one of which is spring pressed thereon and is driven thereby; and a shipper for starting and stopping said rolls and bobbins; of a fixed contact carried by the frame and insulated therefrom; a rocking feeler having one end adapted to normally be in contact with said fixed contact and its other end interposed in the course of the roving from the front rolls to the bobbin and adapted to be kept by such roving out of contact with the fixed contact; a source of electric current; conductors therefrom to the fixed contact and to the feeler; a magnet interposed in said conductors; a lifter for the top back roll including a lifter spring adapted to cause the lifter to engage the back top roll at the back and to lift it away from the bottom back roll and a holding

hook; a catch adapted to engage the holding hook and to keep the spring and lifter out of action, said catch being operable by the magnet whereby when the circuit is closed, the catch is disengaged from the hook and the spring and lifter are released; and means interposed in the conductors operable by the lifter to open the circuit when the back roll is lifted; together with a make and break switch interposed in said conductors and so operable with the shipper that it breaks the circuit when the shipper is moved to stop the rolls and bobbins.

2. The combination with a spinning frame having front delivery rolls, bobbins, and back delivery rolls the bottom one of which is positively driven and the top one of which is spring pressed thereon and is driven thereby; of a fixed contact carried by the frame and insulated therefrom; a rocking feeler having one end adapted to normally be in contact with said fixed contact and its other end interposed in the course of the roving from the front rolls to the bobbin and adapted to be kept by such roving out of contact with the fixed contact; a source of electric current; conductors therefrom to the fixed contact and to the feeler; a magnet interposed in said conductors; a lifter for the top back roll including a lifter spring adapted to cause the lifter to engage the back top roll at the back and to lift it away from the bottom back roll and a holding hook; a catch adapted to engage the holding hook and to keep the spring and lifter out of action, said catch being operable by the magnet whereby when the circuit is closed, the catch is disengaged from the hook and the spring and lifter are released; and means interposed in the conductors operable by the lifter to open the circuit when the back roll is lifted.

3. The combination with a spinning frame having a frame, front delivery rolls and bobbins and a frictionally driven back delivery roll; a fixed contact on the frame; of rocking feelers pivoted to said frame and insulated therefrom, each feeler having one end in position to normally cross the path of the roving from the front delivery rolls to a bobbin and the other end being so positioned as to engage said fixed contact when the front end is not in contact with the roving; a source of electric current; conductors between each fixed contact and said source of electric current; other conductors between such source and each feeler; a lifter for the back delivery roll; a spring therefor; trigger mechanism adapted to hold the spring under tension and the lifter out of contact with the back top delivery roll; an electromagnet positioned in the conductors between the source of electric current and the feeler adapted to release said trigger mechanism when the electric circuit is closed; and circuit breaking devices oper-

ative by the lifter to open the circuit when the back roll is lifted.

4. The combination with a spinning frame having front delivery rolls, bobbins, and back delivery rolls the bottom one of which is positively driven and the top one of which is spring pressed thereon and is driven thereby; of a fixed contact carried by the frame and insulated therefrom; a rocking feeler having one end adapted to normally be in contact with said fixed contact and its other end interposed in the course of the roving from the front rolls to the bobbin and adapted to be kept by such roving out of contact with the fixed contact; a source of electric current; conductors therefrom to the fixed contact and to the feeler; a magnet interposed in said conductors; a lifter for the top back roll including a lifter spring adapted to cause the lifter to engage the back top roll at the back and to lift it away from the bottom back roll and a holding hook; a catch adapted to engage the holding hook and to keep the spring and lifter out of action, said catch being operable by the magnet whereby when the circuit is closed, the catch is disengaged from the hook and the spring and lifter are released.

5. The combination with a spinning frame having front delivery rolls, bobbins, and back delivery rolls the bottom one of which is positively driven and the top one of which is spring pressed thereon and is driven thereby; of a fixed contact; a rocking feeler having one end adapted to normally be in contact with said fixed contact and its other end interposed in the course of the roving from the front rolls to the bobbin and adapted to be kept by such roving out of contact with the fixed contact; a source of electric current; conductors therefrom to the fixed contact and to the feeler; a magnet interposed in said conductors; a lifter for the top back roll including means adapted to cause the lifter to engage the back top roll at the back and to lift it away from the bottom back roll, and lifter holding means; a catch adapted to engage the lifter holding means and to keep the spring and lifter out of action, said catch being operable by the magnet whereby when the circuit is closed, the catch is disengaged from the lifter holding means and the lifter is allowed to rise and lift the top back roll.

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