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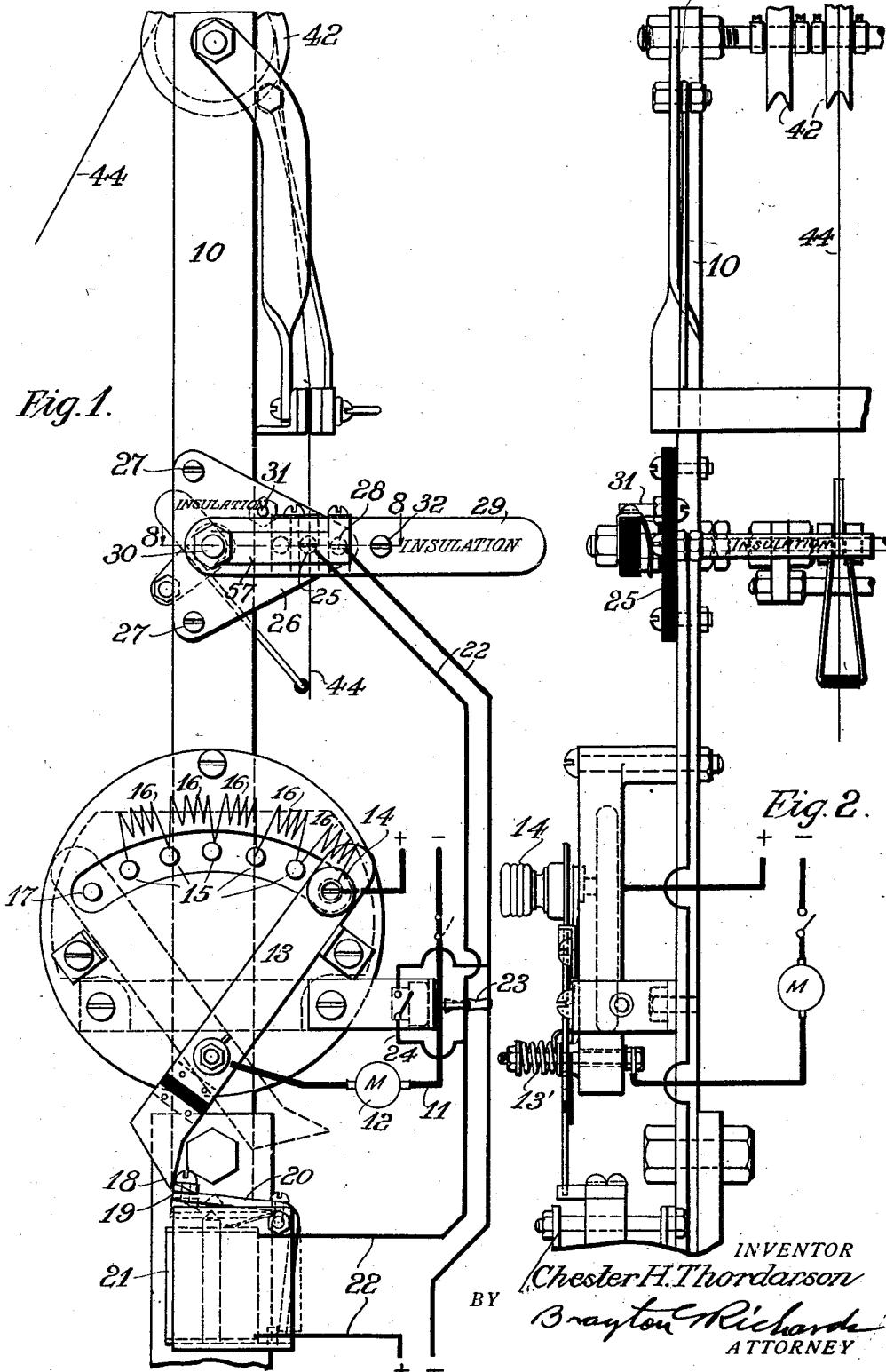
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CONTROLLING MEANS FOR COIL WINDING MACHINES AND THE LIKE

Filed April 25, 1929

3 Sheets-Sheet 1



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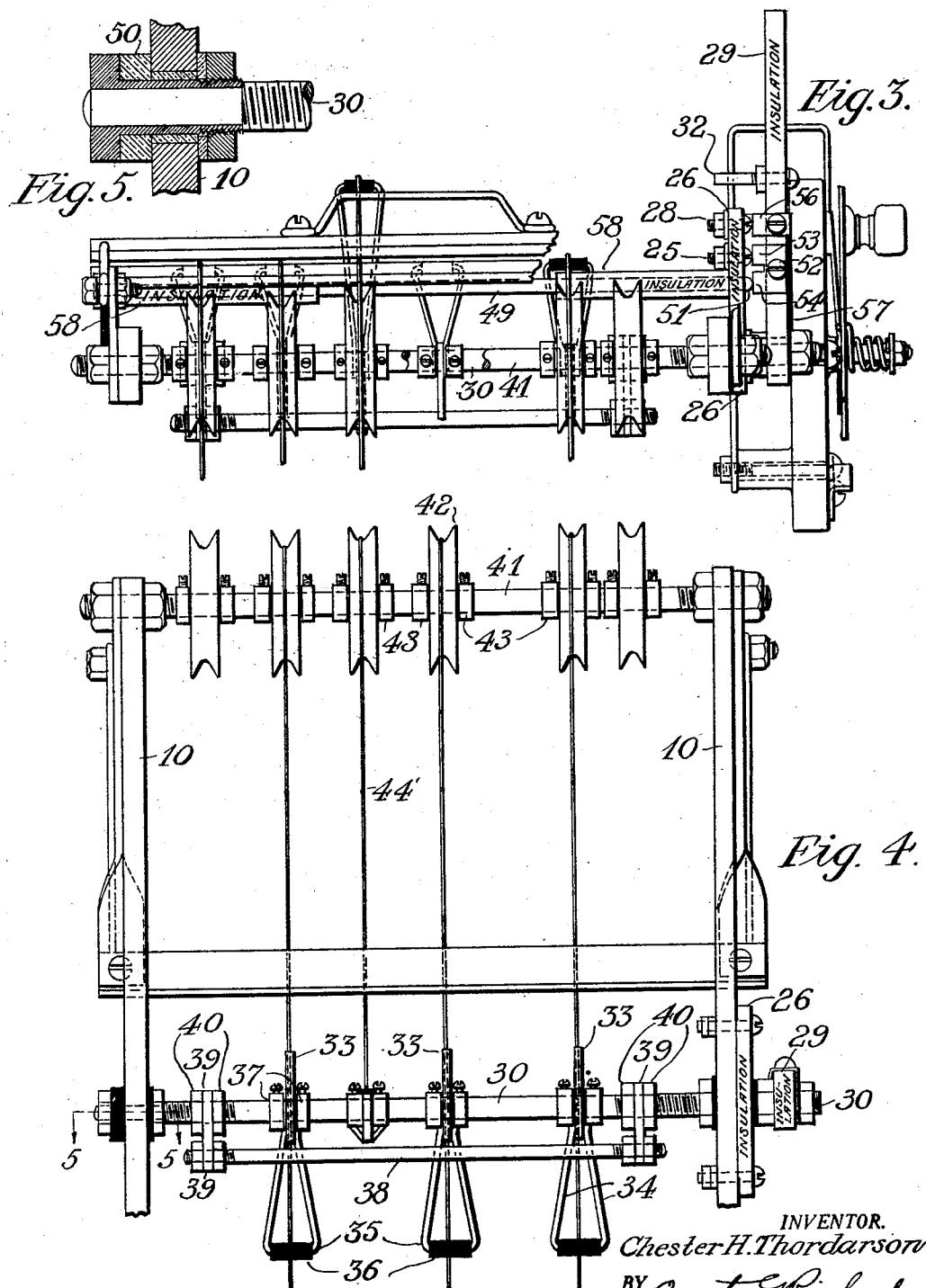
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3 Sheets-Sheet 2



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May 3, 1932.

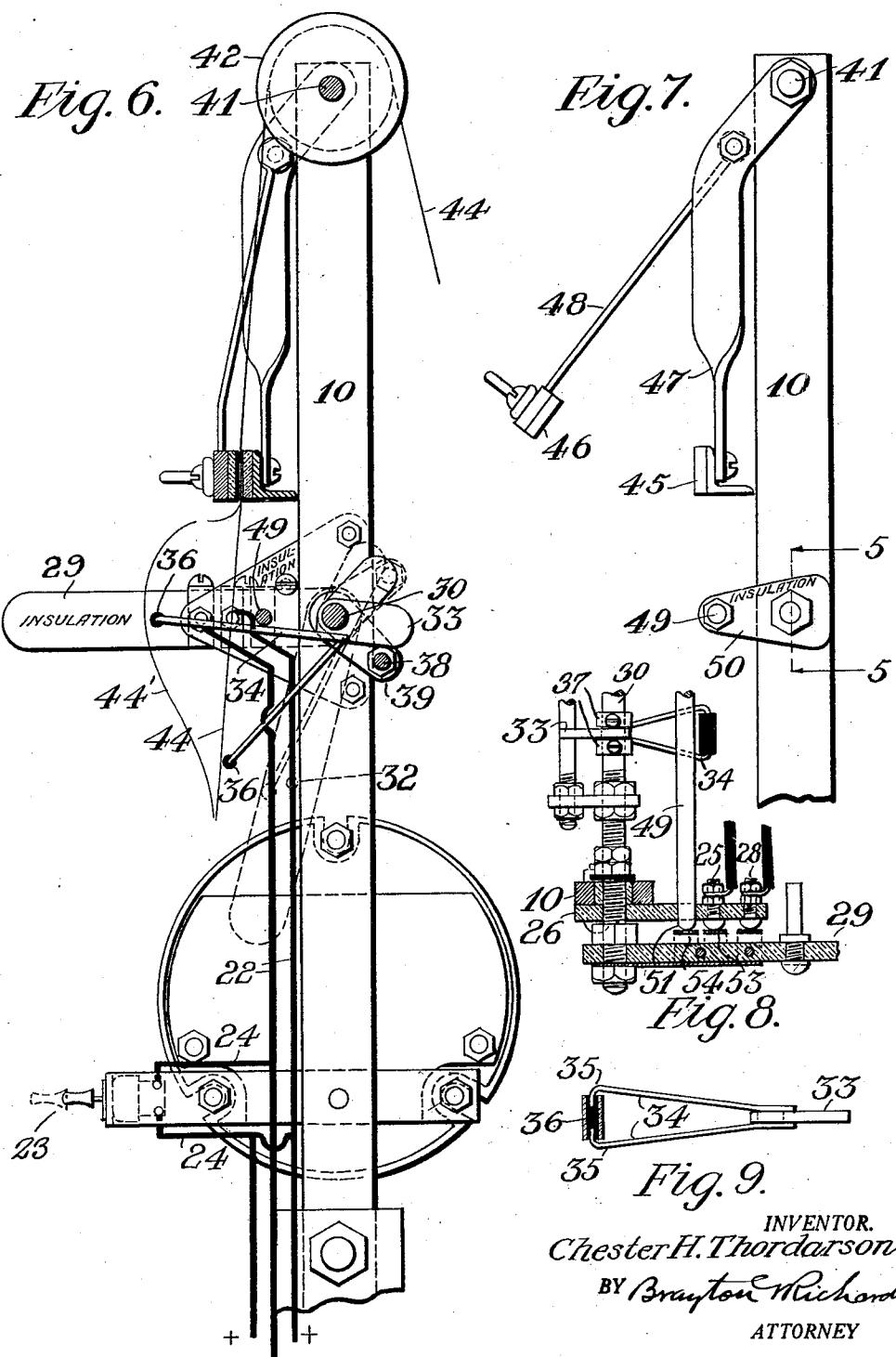
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UNITED STATES PATENT OFFICE

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CONTROLLING MEANS FOR COIL WINDING MACHINES AND THE LIKE

Application filed April 25, 1929. Serial No. 357,941.

The present invention relates to improved controlling means for coil winding machines and the like, and has for its primary object the provision of improved means for controlling the operation of such machines so as to prevent errors or imperfections in the output, the present invention being especially adapted and arranged for use in conjunction with such machines as are illustrated in my prior Patent No. 1,482,592, dated February 5, 1924.

Another object of the invention is to provide an arrangement for use in conjunction with such machines whereby breaking of one of the wires going into one of the coils being wound on said machine, will result automatically in stopping the machine and thereby prevent the forming of a defective or imperfect coil.

Another object of the invention is to provide a simple and efficient attachment for machines of this character which is capable of economical production and is highly efficient in use.

Another object of the invention is the provision of an improved switch lever for use in conjunction with machines of this character.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part hereof and in which—

Fig. 1 is a partial side view of an arrangement embodying the invention;

Fig. 2, a partial front elevation of the same;

Fig. 3, a partial top plan view of the same;

Fig. 4, a partial rear view of the same;

Fig. 5, an enlarged section taken substantially on line 5—5 of Fig. 4;

Fig. 6, another side view of the attachment;

Fig. 7, a detail view illustrating a wiper member employed in the machine;

Fig. 8, a section taken substantially on line 8—8 of Fig. 1; and

Fig. 9, a detail view of one of a plurality

of automatically operating switch levers employed in the attachment.

The preferred form of construction as illustrated in the drawings comprises a suitable supporting bracket 10, which may be a part of the main frame of the machine. The attachment is designed and intended for use in conjunction with a machine for winding coils and which is operated by an electric motor. In Fig. 1, I have illustrated diagrammatically the motor circuit for operating such a machine, said circuit being identified by the reference numeral 11 and including therein an electric motor 12 for operating the machine in the usual way, as will be readily understood by those skilled in this art. Included in the motor circuit, is a usual form of starting box or rheostat comprising a hand lever 13 having an operating handle 14 and cooperating with contact points 15 and resistance coils 16 to operate as a starting box or switch for the motor 12 of the machine. The rheostat is also provided with the usual dead or idle contact point 17 and the arrangement is such that when the lever 13 is over and in operative relationship with the contact 17, the motor circuit is broken and the machine stopped. The lever 13 is also provided with usual spring 13' by means of which said lever is thrown to open or circuit breaking position when released.

The lever 13 is also provided with a downwardly projecting detent nose 18 best shown in Fig. 1, and cooperating with a detent bar 19 on the spring held armature 20 of an ordinary electro-magnet 21. The arrangement is such that when the lever 13 is swung to the right or into operative position, the nose 18 engages the detent bar 19 and said lever is thus held in circuit closing position, but when the armature 20 is depressed, the lever 13 is released and is then thrown by the spring 13' into its extreme left hand position to break the motor circuit.

It will be noted that, by this arrangement, when the electro-magnet 21 is excited, lever 13 will be released and the motor 12 and the machine driven thereby, automatically stopped.

The electro-magnet 21 is included in an electric controlling circuit 22, as best shown

in Figs. 1 and 6. The circuit 22 also includes, in parallel with the electro-magnet 21, a push switch 23 connected in said circuit by means of the branch wires 24 and whereby, when 5 said push switch is closed, current will be caused to flow through the electro-magnet 21, the detent bar 19 withdrawn and the machine stopped. This furnishes a simple and convenient means for manually stopping the machine by the operator thereof when desired.

One of the wires 22 of said controlling circuit also leads to a binding post 25 on a triangular plate or bracket 26 of insulating material secured to the corresponding side 10 bar of the bracket 10, by means of screw bolts 27 as shown.

The other wire of the circuit 22 is connected with a binding post 28 also mounted on the insulating plate 26 closely adjacent to the 20 binding post 25.

Co-operating with the binding posts 25 and 28 is a handle lever 29, also of insulating material, and rigidly secured to one end of a metal rock shaft 30 mounted transversely in 25 the bracket 10.

The lever 29 co-operates with the stop pin 31 on the bracket 26 which limits upward swinging of said lever and another stop pin 32 on said lever is arranged to engage with 30 the corresponding side bar of the bracket 10 to limit downward swinging thereof. The upper position of the lever 29 is indicated in full lines in Fig. 6, and the lower position thereof is indicated by dotted lines in the 35 same view of the drawings.

A plurality of switch levers are loosely mounted on the rocker shaft 30, each of said switch levers comprising an oblong metal body 33 carrying two projecting co-operating oppositely disposed spring arms 34. At 40 their outer ends, the arms 34 are provided with inwardly extending points or projections 35, see Fig. 9, adapted and arranged to engage in the ends of a glass tube 36, thereby furnishing a simple and convenient means 45 for mounting said glass tubes in said switch levers. The metal bodies 33 are eccentrically mounted, as shown, on the rocker shaft 30 to rock loosely on said shaft being adjustably 50 held in position by means of collars 37 placed on opposite sides thereof, as best shown in Fig. 4.

The unbalanced weight of the body 33 of each switch lever is sufficient to cause upward swinging of the switch arms 34 when released.

The rocker shaft 30 also carries a setting rod 38 rigidly attached thereto by means of arms 39 imprisoned between lock nuts 40 and 60 whereby the setting rod 38 will be caused to rock with the shaft 30.

Arranged in the bracket 10 above the rocker shaft 30, is a supporting shaft 41, on 65 which is mounted a plurality of grooved guide pulleys 42 positioned between collars

43, and whereby said guide pulleys are adjustably mounted so as to be free to rotate on said supporting shaft.

The wires 44 for forming the coils in the coil winding machine, are led into the machine over the guide pulleys 42, there being one of said guide pulleys provided for each wire thus led into the machine. Obviously, the guide pulleys 42 may be adjusted as desired on the supporting shaft 41 to effect 70 various arrangements of the wires and also more or less of said guide pulleys may be provided so as to provide for more or less wires as desired. The wires 44 are led downwardly from the guide pulleys 42 to pass between felt wipers 45 and 46. The wiper 45 is supported on suitable brackets 47 from the supporting shaft 41 and the wiper 46 is supported on swinging arms 48 as shown and whereby the wiper 46 may be swung upwardly as indicated in Fig. 7 to facilitate the threading of the wires between said wipers.

As will be noted, the wires pass from the wiper members 45 and 46 substantially vertically downwardly into the machine. One 90 of the switch levers 33-34 is provided for each of the wires 44 and the glass tube 36 thereof is rested against the corresponding wire, so that the tension of said wire normally holds the switch lever in tilted position 95 with the glass tube 36 extending downwardly as shown in Figs. 1 and 6. The arrangement is such, however, that in case of breakage of any one of the wires 44, such, as for example, the wire 44', which is indicated as 100 broken in Fig. 6, the corresponding switch lever will swing upwardly, also as indicated in Fig. 6.

A stop bar 49 is mounted at one end in the bracket 26 and at its other end in the bracket 50 on the other side bar of the bracket 10, said stop bar 49 being mounted in position to limit the upward swing of the switch levers 33-34, as best indicated in Fig. 6.

The stop bar 49 is extended at one end 51 through the bracket 26 as best shown in Fig. 3. A metallic switch plate 52 is secured to the handle lever 29 as shown, and provided with switch contact members 53 and 54 arranged to engage the binding post 25 and the end 51 of the stop bar 49 when said handle is swung upwardly into horizontal position, as best shown in Fig. 3.

The contact member 56 is connected by a bar 57 with the rock shaft 30, as best shown in Figs. 1 and 3. By this arrangement, it will be noted, that as each switch lever 33-34 swings upwardly after being released by the breaking of the corresponding wire, it comes 120 into contact with the lower side of the stop bar 49. When the machine is in operation, the handle lever 29 is raised into its horizontal position, so that when one of the switch levers thus contacts with the stop bar 49, the 125 130

circuit 22 is completed through that switch lever and the bar 49 and the rock shaft 30 so that electro-magnet 21 will be excited to withdraw the detent bar 19 and thereby stop the machine. Thus, if one of the wires 44 breaks, the machine will be automatically stopped and the formation of a defective or imperfect coil prevented.

When it is desired to rethread one or more of the wires into the machine, the handle lever 29 is rocked downwardly, as indicated by the dotted lines in Fig. 6, whereby the switch levers are all depressed, thus facilitating the threading of the wires through the machine.

When the handle lever 29 is restored to horizontal position, the switch levers will be brought back again into contact with the wires 44 by which they are held until breaking of one of said wires as indicated above.

For convenience, two sleeves 58 of insulating material are provided for the rod 49 so that, when desired, said sleeves may be mounted on said rod to render the corresponding switch levers inoperative and thus permit the operation of the machine with a smaller number of wires and switch levers. Of course, when it is desired to employ these temporarily discontinued switch levers, the tubes 58 are removed from the machine.

The machine thus provided is capable of operation at high speed and will operate with great efficiency to stop the same automatically in case of the breaking of any one of the wires employed in the machine.

The specific form and arrangement of parts set forth is a convenient and efficient one for the purpose.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

I claim:

1. A machine of the class described comprising a motor circuit for operating the machine; a supporting bracket; a plurality of grooved guide pulleys mounted on said bracket; a corresponding plurality of flexible strands passing over said guide pulleys and into said machine along definite paths; a supporting rod in said bracket adjacent the paths of said strands and electrically insulated from the bracket; a plurality of weighted switch levers arranged to oscillate freely on said rod and each carrying a contact member of insulation material resting against one of said strands and held from oscillation thereby; a contact bar set to be engaged by swinging of any one of said switch levers upon release by breakage of its associated strand; a control circuit connected with said rod and bar to be closed by contact of any one of said levers with said bar; a spring operated controlling switch for said motor circuit; a detent normally holding said controlling switch closed against the resistance of said spring; an electro-magnet in said controlling circuit arranged to withdraw said detent upon closing of said circuit; and means for simultaneously withdrawing all of said switch levers from contact with said strands.

nected with said rod and bar to be closed by contact of said levers with said bar; and means operable by closing of said controlling circuit for breaking said motor circuit.

2. A machine of the class described comprising a motor circuit for operating the machine; a supporting bracket; a plurality of grooved guide pulleys mounted on said bracket; a corresponding plurality of flexible strands passing over said guide pulleys and into said machine along definite paths; a supporting rod in said bracket adjacent the paths of said strands and electrically insulated from the bracket; a plurality of weighted switch levers arranged to oscillate freely on said rod and each carrying a contact member of insulation material resting against one of said strands and held from oscillation thereby; a contact bar set to be engaged by swinging of any one of said switch levers upon release by breakage of its associated strand; a control circuit connected with said rod and bar to be closed by contact of any one of said levers with said bar; a spring operated controlling switch for said motor circuit; a detent normally holding said controlling switch closed against the resistance of said spring; an electro-magnet in said controlling circuit arranged to withdraw said detent upon closing of said circuit; and means for simultaneously withdrawing all of said switch levers from contact with said strands.

3. A switch lever for machines of the class described comprising a weighted body mounted to oscillate by gravity; a pair of spring clamping arms mounted on said body and projecting therefrom in co-operative relationship, the ends of said arms being turned inwardly toward each other to form short inwardly extending projections; and a non-conducting tube inserted between said arms with said projections engaging into the ends of the tube.

4. A machine of the class described including means to normally maintain under tension a plurality of strands while being individually supplied for coiling, a plurality of levers supported for rotation in a position to rest upon the strands under tension, a contact bar, supported to be engaged by any one of said levers when the tension on any strand is relieved to permit rotation of the lever associated therewith, a motor for operating the machine, circuits for said motor including said levers and contact bar, means in said circuits for deenergizing the motors when the tension is relieved on any strand to permit the corresponding lever to engage the contact bar and means for raising all of said levers to permit threading of the strands.

In witness that I claim the foregoing as my invention, I affix my signature this 19th day of April, A. D. 1929.