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SAFETY DEVICE FOR COILING MACHINES

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Fig. 1.

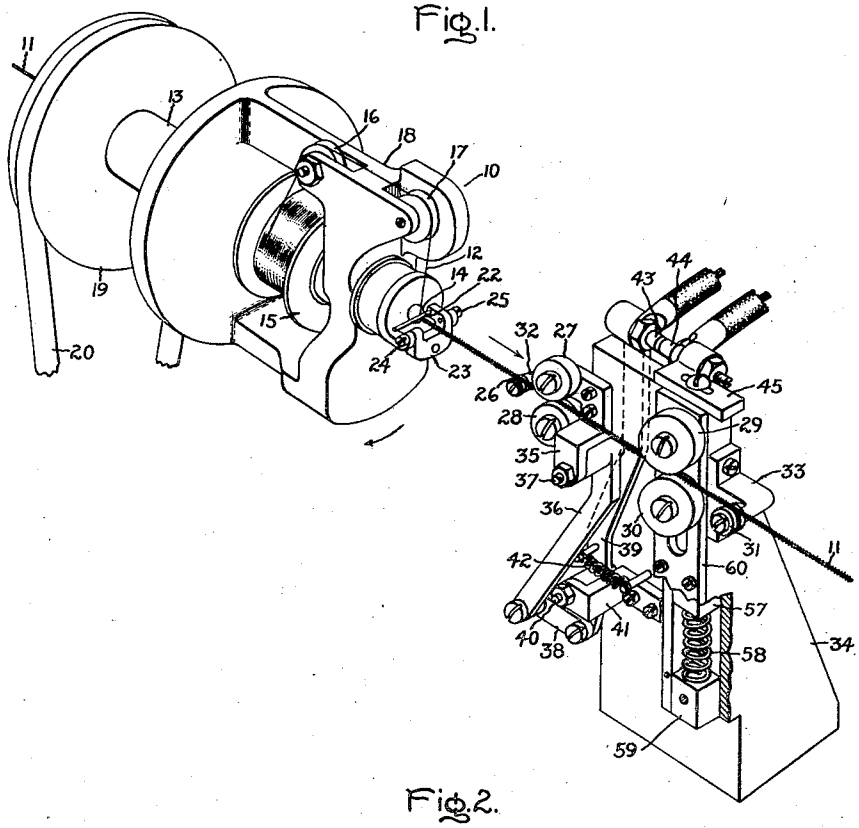
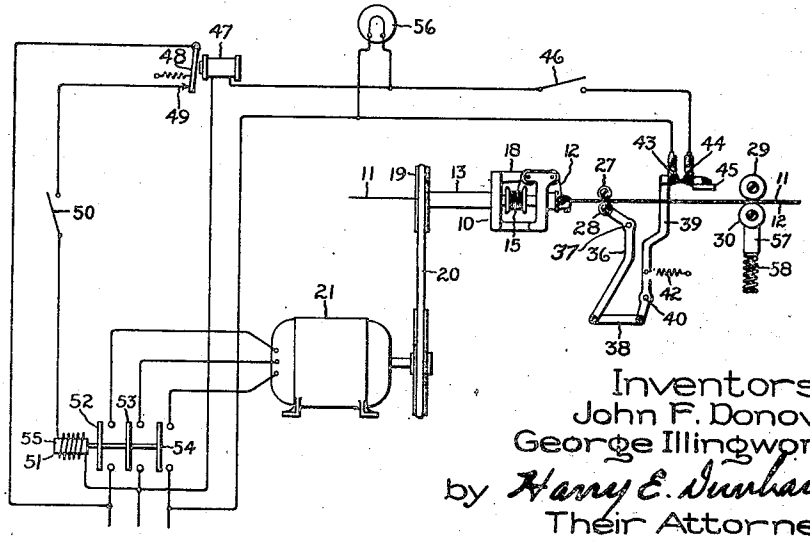


Fig. 2.



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SAFETY DEVICE FOR COILING MACHINES

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5 Claims. (Cl. 153—67)

Our invention relates to apparatus for coiling wire and more particularly to a device for detecting the interruption of the coiling operation of said apparatus. Devices for this purpose reduce the number of operators required to watch over a group of the coiling machines and they also reduce the losses resulting from the longer inactive period of the machine, the longer time required by the operator to remove the loose wire and the excessive amount of loose wire.

Our device is particularly sensitive and can be used with very fine wire such as used for the filaments of electric incandescent lamps which is usually coiled on a mandrel wire. According to our invention two members are provided which engage the wire coil from opposite sides as it passes from the coiling apparatus. The members are pressed against the wire coil and move inwardly closer together when the wire coil no longer passes therebetween due to a break or the end of the wire being reached. A system of levers attached to the members multiplies their movement sufficiently to bring a pair of contacts connected in an electrical circuit together. The contacts complete the circuit which includes means for shutting off the driving motor for the coiling apparatus and means for giving an alarm. The lever system is adjusted so that the contacts touch only when both members fall from the wire coil as normally one member rides on the outermost portion of the coil and the other member lies further inward and rides either on the sides of two adjacent coils or on the mandrel.

Other features and advantages of our invention will appear from the description which follows of one species thereof and from the accompanying drawing.

In the drawing, Fig. 1 is a perspective view of the coil detecting device of our invention in combination with coiling apparatus; and Fig. 2 is a wiring diagram therefor with the parts of our device and those of the coiling apparatus diagrammatically shown.

As shown in the drawing, our device is preferably combined with a coiling machine, being mounted adjacent the coiling apparatus 10 and being in position to intercept the mandrel 11 on which the wire 12 is coiled as it leaves said apparatus. In the coiling machine the mandrel 11 passes from left to right, first through the hollow shaft 13 and the die 14 to the coiling position and then through the device of our invention. The wire 12 is carried on a spool 15 mounted on shaft 13 and passes over sheaves 16 and 17 to the mandrel 11. The sheaves 16 and 17 are mounted on the coiling head 18 which is fastened to the shaft 13 and which is rotated thereby through pulley 19, belt 20 and electric motor 21. The wire 12 engages the mandrel 11 at a point between the die 14 which is located in the coiling head 18 and the bridge pin 22 which is supported by said coiling head through yoke 23. The yoke 23 pivots on pins 24 and 25 and is turned so that the bridge pin 22 engages the mandrel 11 and wire 12 coiled thereon by a spring (not shown) located between the coiling head 18 and the lower end of the yoke 23.

The mandrel 11 and wire coil 12 thereon pass from the coiling apparatus 10 onto the guide roll 26, between the feeler rollers 27 and 28, between the holding rollers 29 and 30 and over the guide roll 31. Rolls 26 and 31 are similar and are mounted on brackets 32 and 33 respectively which are attached to standard 34. Feeler roller 27 is attached to the bracket 35 extending from standard 34 and feeler roller 28 is attached to one arm of lever 36 which is pivoted between the cone pointed ends of a screw 37 extending from bracket 35 and a screw (not shown) extending from standard 34. The other arm of lever 36 is connected through link 38 to lever 39 which is pivoted between the cone pointed ends of a screw 40 of bracket 41 and on a screw (not shown) in the standard 34. Bracket 41 is attached to the standard 34. A spring 42 which extends between posts in lever 39 and standard 34 pulls the system of levers so that feeler roller 28 squeezes the mandrel 11 and wire coil 12 between itself and feeler roller 27.

Should the coiling apparatus run out of the wire 12 or should the wire 12 break so that it is no longer coiled onto the mandrel 11, the feeler rollers 27 and 28 will move closer together and the contact 43 carried by lever 39 will be brought against contact 44. Contact 44 is fixed and is mounted on the bracket 45 extending from standard 34. Contacts 43 and 44 are insulated from the machine and are connected in a circuit including switch 46 and the coil of the relay 47. The circuit is connected to two of the leads of the three phase line and is made through the coil of relay 47 when a faulty mandrel 11 and wire coil 12 combination passes between rollers 27 and 28. The armature 48 is pulled away from contact 49 thereby breaking the circuit which includes switch 50 and the solenoid 51. With this circuit open, the bars 52, 53, and 54 which connect the three phase line to the motor 21 are by mechanism (not shown) pulled away from their contact members shutting off the motor 21. If the circuit is com-

pleted through the armature of relay 47, the solenoid 51 will move the armature 55 so that the bars 52, 53, and 54 complete the circuit to the motor 21. Switch 46 permits the missing coil detecting device to be disconnected so that the motor 21 can be operated while threading up the machine, etc. Switch 50 is the starting switch for the motor 21 as it causes the bars 52, 53 and 54 to be moved into position. Lamp 56 is connected in the circuit operated by the missing coil detecting device and serves as a warning light.

The wire 12 coiled onto the mandrel 11 is likely to unwind for a considerable distance if the loose end is free to twist. To avoid this the feeler rollers 27 and 28 hold the wire 12 in place until the end passes from between them whereupon rollers 29 and 30 hold said wire 12 until the motor stops. Roller 29 is attached to the standard 34 but roller 30 is mounted on a block 57 slidably mounted in said standard. A spring 58 located between block 57 and block 59 keeps the roller 30 up against the mandrel and wire. Block 59 is attached to standard 34 and block 57 is kept within its ways in standard 34 by plate 60.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In an apparatus of the class described, the combination of means for coiling a wire, driving means for said coiling means, two members mounted adjacent said coiling means and adapted to engage the wire coil from opposite sides as it is produced, means for moving one of said members toward the other so that both of said members are pressed against the wire coil, means for causing the driving means to be inoperative when the members pass from the wire coil and are moved closer together on failure of the coiling operation and means located adjacent the two members and engaging the wire coil passing therefrom for keeping the wire coil from unwinding after the end of said wire coil passes therethrough.

2. In an apparatus of the class described, the combination of means for coiling a wire, driving means for said coiling means, two members mounted adjacent said coiling means and adapted to engage the wire coil from opposite sides as it is produced, means for moving one of said members toward the other so that both of said members are pressed against the wire coil, a system of levers connected to the movable member for amplifying the movements thereof, a pair of contacts, one attached to said system of levers and the other mounted stationarily adjacent thereto, and an electrical circuit including said contacts, means for causing an alarm and means for causing the driving means to become inoperative which is completed by movement of the contacts into engagement with each other when the members pass from the wire coil and are moved closer together on failure of the coiling operation.

3. In an apparatus of the class described, the combination of means for coiling a wire, a pair of rollers, means for urging one of said rollers toward the other, means for feeding the coiled wire between said rollers, and means operable upon movement of said one roller toward the other roller due to absence of the coiled wire therebetween for rendering the said coiling means inactive.

4. In an apparatus of the class described, the combination of means for coiling a wire, a pair of rollers, means for urging one of said rollers toward the other, means for feeding the coiled wire between said rollers, means operable upon movement of said one roller toward the other roller due to absence of the coiled wire therebetween for rendering the said coiling means inactive, and means for simultaneously causing an alarm signal to be given.

5. In an apparatus of the class described, the combination of means for feeding a mandrel and for coiling a wire around said mandrel, a pair of rollers located in the path of the coil on its mandrel so that said coil and mandrel are fed therebetween, means for urging one of said rollers toward the other, a second pair of rollers located adjacent to said first pair of rollers in the direction of travel of said coil and mandrel, and means operable upon movement of the said one of the first-mentioned pair of rollers toward the other roller due to absence of coiled wire on the mandrel for rendering the said mandrel feeding means inactive, said second-mentioned pair of rollers remaining in contact with the said coil on its mandrel until said mandrel feeding means has come to a stop to prevent the said coil from unwinding from said mandrel.

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