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WIRE REEL CONTROL

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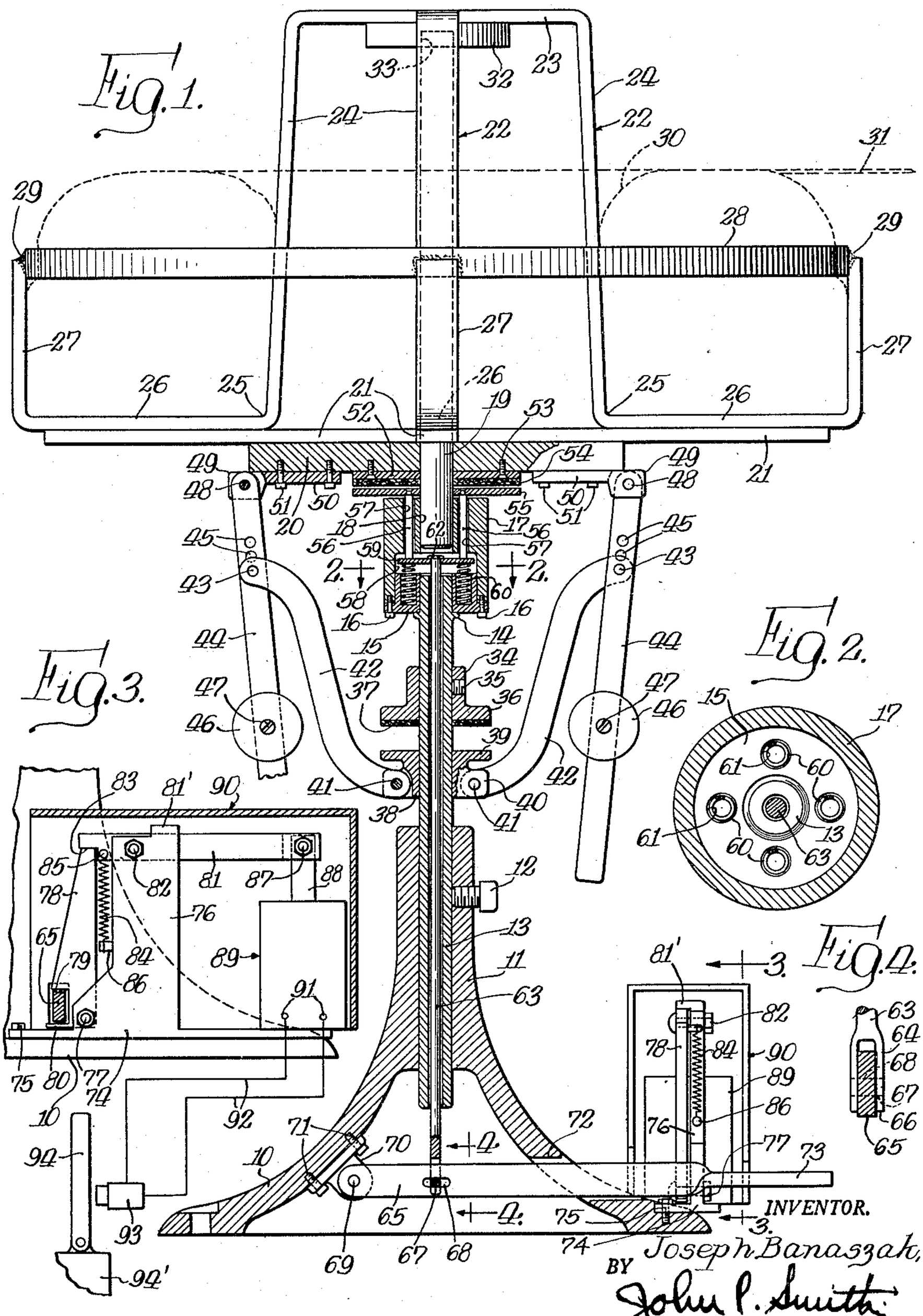
Fig. 1.



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WIRE REEL CONTROL

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The present invention relates generally to a wire reel control, but more particularly to a novel and improved device for automatically stopping and controlling the speed of an unwinding reel of wire.

The present invention has particular adaptation for controlling the speed of unreeling wire or wire reel for a variety of purposes, but has especial application in connection with controlling the supply of wire to a machine for making or forming coil springs and the like type of machines.

In supplying or feeding wire to this or other types of machines, the speed of the wire fed thereto is usually uniform, but when the wire is unwound or drawn from an uncontrolled revolving reel of wire, the momentum of the revolving reel of wire causes it to exceed its normal speed requirements, resulting in the feeding of an excess amount of wire, which usually becomes tangled and therefore interrupts and delays the efficient operation of the spring forming machine. Then too, occasionally the spring forming or spring coiling machines become jammed up and automatically stops and unless the unwinding reel of wire is simultaneously stopped with, the machine, the reel will continue to unwind the wire with the result that a mass of tangled wire is strewn about the place.

It is therefore the primary object of the present invention to not only overcome the difficulty hereinbefore pointed out, but to provide a simple and efficient control for the feeding of an unreeling roll of wire and will also automatically stop the rotation of the revolving reel simultaneously with the stopping of the machine to which the wire is fed.

A still further object of the invention is to provide a novel and improved adjustable governor control for uniformly feeding wire from an unreeling roll of wire in which a tubular standard forms the support for the automatic stop for positively stopping the rotation of the reel simultaneously with the stopping of the machine to which the wire is fed.

These and other objects are accomplished by providing a construction and an arrangement of the various parts in the manner hereinafter described and particularly pointed out in the appended claims.

Referring to the drawings:

Fig. 1 is a side elevational view of my improved unreeling wire control with a portion thereof shown in cross section;

Fig. 2 is an enlarged cross sectional view taken on the line 2—2 in Fig. 1 of the drawings;

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Fig. 3 is a cross sectional view taken on the line 3—3 in Fig. 1 of the drawings showing diagrammatically how the solenoid is connected through a wiring circuit to one of the control members of the spring forming machine; and

Fig. 4 is a fragmentary cross sectional view taken on the lines 4—4 in Fig. 1.

In illustrating one form which my invention may assume in practice, I have shown the same as comprising a substantially circular pedestal or base member 10 which is adapted to rest on and be secured to the floor. The base member is provided with a vertically and upwardly extending and centrally located sleeve portion 11. Secured by means of a set screw 12 in the sleeve portion 11 of the base 10 is a tubular or vertical standard 13. Secured to the upper end of the tubular standard 13 by being driven thereon and resting on an angular flange 14, is an inverted cap or support 15. Secured to the cap 15 by means of four equally spaced apart machine screws 16 is a hub or housing 17 which houses a portion of the emergency brake mechanism hereinafter more fully described. This hub 17 has a central and vertically extending bore 18 which is in axial alignment with the axis of the tubular standard 13. This bore receives and rigidly supports therein a vertically extending shaft 19. Journaled on the shaft 19 is a circular disc 20. Secured to the disc 20 are four radially projecting arms 21 arranged at right angles with respect to one another. Secured to the outer portion of each of these diametrally positioned arms 21 are reel supporting members, generally indicated by the reference character 22. These members 22 are preferably made of flat steel bars of identical configuration and include raised central and horizontally extending portions 23. Substantially vertically depending portions 24 which are equally spaced from the axial center of the shaft 19. The lower portions of these members 22 are bent in substantially right angles to the vertical portions as shown at 25 so as to form horizontally projecting portions 26. These portions 26 of the members 22 are welded to the adjacent radial arms 21. The outer ends of each of these members 22 are turned upwardly to form vertical supports, as shown at 27, for an annular or circular ring 28. The ring 28 is welded to the upper end of these supports 27 as shown at 29.

The construction thus far described forms the revolving reel in which a roll or reel of wire, as shown in broken lines indicated by the reference character 30, may be supported. The wire from this roll may be drawn off by a single strand

as shown at 31. Secured to the underside of the horizontal portion of each of the members 22 is a circular disc 32. Located in the axial center of the disc 32 is a circular or bearing recess 33 forming the journal connection between the upper end of the shaft and the revolving reel.

The mechanism for controlling the uniform feed of the unreeling wire includes a novel governor control which is provided with two types of adjustment so that the limit of the speed may be varied to meet the requirements of the machine to which the wire is being fed. This novel governor control includes a collar 34 which embraces and is secured to the tubular standard 13 by means of a set screw 35. The collar 34 is provided with an annular flange 36 on the lower face of which is secured a leather braking washer 37. Slidably mounted on and journaled on the tubular standard 13 is a rotatable braking member 38 which has an annular flange 39 whose upper face is adapted to move into engagement with the leather washer 37 to limit the speed of the revolving reel in the manner hereinafter disclosed. This braking member has oppositely disposed spaced apart apertured ears 40 to which are pivotally mounted, as shown at 41, oppositely disposed curved links 42. The upper ends of these links 42 are pivotally connected, as shown at 43, to oppositely disposed suspended governor arms 44. These governor arms 44 are provided with a series of spaced apart apertures 45 for adjusting the position of the upper ends of the links 42 to vary the limit of speed of the revolving reel. The governor arms 44 are each provided with the usual governor weights 46 which may be adjusted along the length of each of the arms and secured thereto by suitable set screws 47 to furnish another means for varying the speed limit of the revolving reel. The upper ends of the governor arms 44 are pivotally connected as shown at 48 to spaced apart apertured ears 49 of the oppositely disposed brackets 50. The brackets 50 are secured to the disc 20 by means of bolts 51.

From the above description it will be obvious that as the revolving reel reaches a predetermined speed or a speed in excess of that set by the adjustment of the governor, the centrifugal force of the revolving reel will cause the governor arms 44, together with their respective weights 46 to swing outwardly upon their respective pivots 48 on the bracket 50 and thereby cause the upper face of the flange 39 of the governor member 38 to engage the braking surface of the leather washer 37 to restrict the speed and maintain the unreeling of the wire at a uniform predetermined speed.

In combination with my improved means for maintaining a uniform speed of the revolving reel, I have employed common and associated parts to form a stopping mechanism to stop the reel simultaneously with the stopping of the machine with which my improved reel control is used. This novel means includes a disc or washer-like member 52 which is secured to the underside of the disc 20 by means of screws 53. Secured to the underside of the disc 52 is a leather or braking washer 54. Adapted to move into engagement with the braking washer 54 to interrupt or stop the rotation of the reel, is a braking disc 55. The braking disc 55 is rigidly secured to the upper ends of two oppositely disposed and vertically depending pins 56. These pins 56 are reciprocally mounted in oppositely disposed vertical bores 57 formed in the hub or housing member 17. The lower ends of the pins 56 project into an annular recess 58 formed in the lower half of the hub 17. Reciprocally mounted in the recess 58 of the hub 17 and adapted to engage the lower ends of each of the pins 56 is a plate or disc 59. The plate or disc 59 rests upon and is normally pressed upwardly by four uniformally spaced apart springs 60. The springs 60 are seated in four uniformally spaced apart sockets 61 formed in the cap member 15, as clearly shown in Figs. 1 and 2 of the drawings. Secured to the axial center of the disc or plate 59 by means of a nut 62 is a rod 63. The rod 63 is reciprocally mounted within the tubular standard 13 and extends into central hollow portion of the base 10. The lower end of the rod 63 has its lower end bifurcated as shown at 64 so as to straddle a lever 65. The bifurcated portion 64 of the rod 63 has aligned apertured ears 66 in which a pin 67 pivotally connects the lower end of the rod to the lever 65. The pin 67 extends through a horizontal slit 68 in the lever 65. The lever 65 is pivotally connected as shown at 69 to a bracket 70 secured to and within the base by means of screws 71. The free end of the lever 65 projects through a slotted opening 72 formed in the base member 10 and has its outer end twisted as shown at 73 to form a foot pedal. Secured to the base 10 adjacent the slotted opening 72 is a bracket 74, which is secured to the base by means of screws or bolts 75. The bracket 74 has vertically extending wall or flat portion 76 formed integrally therewith. Pivoted to the wall 76 as shown at 77 is a latch member 78. The lower end of the latch member 78 has a rectangular recess 79 for receiving and locking therein the lever 65 as clearly shown in Figs. 1 and 3 of the drawings. The recess 79 in the member 78 forms a laterally projecting finger 80 which normally engages the lower edge of the lever 65 when the foot pedal 73 is depressed to actuate the latch 78 to its normally locked position. The latch member 78 is normally held in the locked position, or the position shown in Fig. 3 of the drawings, by a lever member 81 which is pivoted at 82 to the vertical wall 76. One end of the lever 81 has a notch 83 formed therein to engage the upper end of the latch 78. The lever is normally actuated in a direction to engage the latch 78 by a tension spring 84 which has one end thereof attached to a pin 85 carried by the lever 81 and the other end thereof attached to a pin 86 carried by the wall 76. A laterally projecting lug 81' forms a stop for the lever 81. The other end of the lever 81 is pivotally connected as shown at 87 to a reciprocable member 88 of a conventional type of solenoid, generally indicated by the reference character 89. The solenoid 89 is mounted in any convenient manner on the bracket 74. The mechanism may be suitably housed by a sheet metal box, generally indicated by the reference character 90. The solenoid 89 is provided with the usual terminals 91 and electric circuit wire connections 92, the latter of which may be connected to a suitable switch or relay generally indicated by the reference character 93. The switch in this instance may be actuated by a lever 94 pivoted on a suitable port 94' of the machine to which the wire is being fed. The lever 94 in this instance may control the operation of any type of spring forming machine or the like, which is actuated to control the operation of the same. The lever 94 also may be automatically actuated, one for example, by an accumulation of springs which clog up the operation of the spring forming ma-

chine, to stop or interrupt its operation. It will therefore be seen that as the operation of the spring forming machine is interrupted or stopped by the actuation of the lever **94**, the switch **93** will also be actuated to close the circuit **92** and energize the solenoid **89**, thereby actuating the lever **81** downwardly to raise or release the notch **83** on the latch **78**. The latch **78**, in turn, releases the lever **65** from the recess or lock **79**. This permits the four springs **60** to actuate the disc **59** upwardly, which in turn, through the pins, forces the braking plate **55** against the leather brake **54** of the reel and thereby brakes or stops the revolving reel.

Summarizing the advantages and function of operation of my novel and improved control for the unreeling or unwinding of wire from a revolving reel, it will be readily seen that I have provided a device which will not only feed the wire at a uniform speed, but will also provide adjustment to vary such speeds and to permit a stopping of the reel simultaneously with the stopping or interruption of the machine to which the wire is fed. During the normal operation of the reel, the foot lever **73** is depressed and locked in the position shown in Figs. 1 and 3 of the drawings. In this position, this lever holds the rod **63** downwardly by compressing the plate **59** against the compression springs **61** and thereby holds the braking or stop plate **55** away from the braking leather washer **54** so that the reel proper is free to revolve on the shaft **19**. As the wire is unreeled within a predetermined speed, as determined by the adjustment of the governor control, the friction surface **39** of the collar **38** is held in close proximity to the braking disc **37** by the governor control and if the speed of the reel should be in excess of that set, the braking action will take place by reason of the centrifugal action of the governor to retard the speed in a manner similar to that of a conventional governor. However, if for any reason the machine to which the wire is being fed is accidentally interrupted or stopped, or for the reason that springs formed thereon accumulate in such a fashion as to actuate the control lever **94** carried by the machine, then and in that case the actuation of that lever **94** closes the circuit or switch **93** and thereby energizes the solenoid **89** which, in turn, through the connections hereinbefore described, releases the lever **65** and through it, the rods **63**. The releasing of the rod **63** permits the pressure springs **60** to actuate the braking disc **55** against the braking washer **64** to simultaneously stop the revolving reel with the stopping of the associated machine to which the wire is fed.

In this connection it will also be noted that I have not only provided an automatic means for stopping the rotation of the reel and a governor control for limiting the revolving speed thereof, but have also combined these two mechanisms so that they are embodied in and supported by a single standard or tubular member and are so cooperatively related that they form a unitary structure which is simple in construction and efficient in operation.

While in the above specifictaion I have described one embodiment which my invention may assume in practice, it will, of course, be understood that the same is capable of modification and that modification may be made without departing from the spirit and scope of the invention as expressed in the following claims.

What I claim as my invention and desire to secure by Letters Patent is:

1. A wire reel control mechanism comprising a base, a vertical tubular standard secured to said base, a reel journaled on said standard, a braking collar surrounding and secured to said standard, governor means carried by said reel and operatively related to said braking collar, a second braking member carried by said reel, a non-rotating member carried by said standard and adapted to move into engagement with said second braking member, a lever pivoted to said base, a rod extending through said standard for operatively connecting said lever with said non-rotating member, and means for normally pressing said non-rotating member into engagement with said second braking member for interrupting the rotation of said reel.

2. A wire reel control mechanism comprising a base, a vertical tubular standard secured to said base, a reel journaled on said standard, a braking collar surrounding and secured to said standard, governor means carried by said reel and operatively related to said braking collar, a second braking member carried by said reel, a non-rotating member carried by said standard and adapted to move into engagement with said second braking member, a lever pivoted to said base, a rod extending through said standard for operatively connecting said lever with said non-rotating member, and spring actuated means for normally pressing said non-rotating member into engagement with said second braking member for interrupting the rotation of said reel.

3. A wire reel control mechanism comprising a base, a vertical tubular standard secured to said base, a reel journaled on said standard, a braking collar surrounding and secured to said standard, governor means carried by said reel and operatively related to said braking collar, a second braking member carried by said reel, a non-rotating member carried by said standard and adapted to move into engagement with said second braking member, a lever pivoted to said base, a rod extending through said standard for operatively connecting said lever with said non-rotating member, means for normally pressing said non-rotating member into engagement with said second braking member for interrupting the rotation of said reel, and means responsive to the energization of a solenoid for controlling said last named means.

4. A wire reel control mechanism comprising a base, a vertical tubular standard secured to said base, a reel journaled on said standard, a braking collar surrounding and secured to said standard, governor means carried by said reel and operatively related to said braking collar, a second braking member carried by said reel, a non-rotating member carried by said standard and adapted to move into engagement with said second braking member, a lever pivoted to said base, a rod extending through said standard for operatively connecting said lever with said non-rotating member, means for urging said non-rotating member into engagement with said second braking member, a latch member pivotally supported on said base and engageable with said lever, a solenoid mounted on said base, and operatively related to said latch, and means responsive to the closing of an electric circuit for energizing said solenoid to render said braking mechanism operative to stop said reel.

5. A wire reel control mechanism comprising a base, a vertical tubular standard secured to said base, a reel journaled on said standard, a braking collar surrounding and secured to said standard,

governor means carried by said reel and operatively related to said braking collar, a second braking member carried by said reel, a non-rotating member carried by said standard and adapted to move into engagement with said second braking member, a lever pivoted to said base, a rod extending through said standard for operatively connecting said lever with said non-rotating member, springs carried by said standard and engageable with said non-rotary member for urging the same into engagement with said second braking member, a latch pivotally supported on said base and engageable with said lever, a second lever pivoted on said base and engageable with said latch, and a solenoid mounted on said base and operatively related to said second named lever.

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