

No. 705,331.

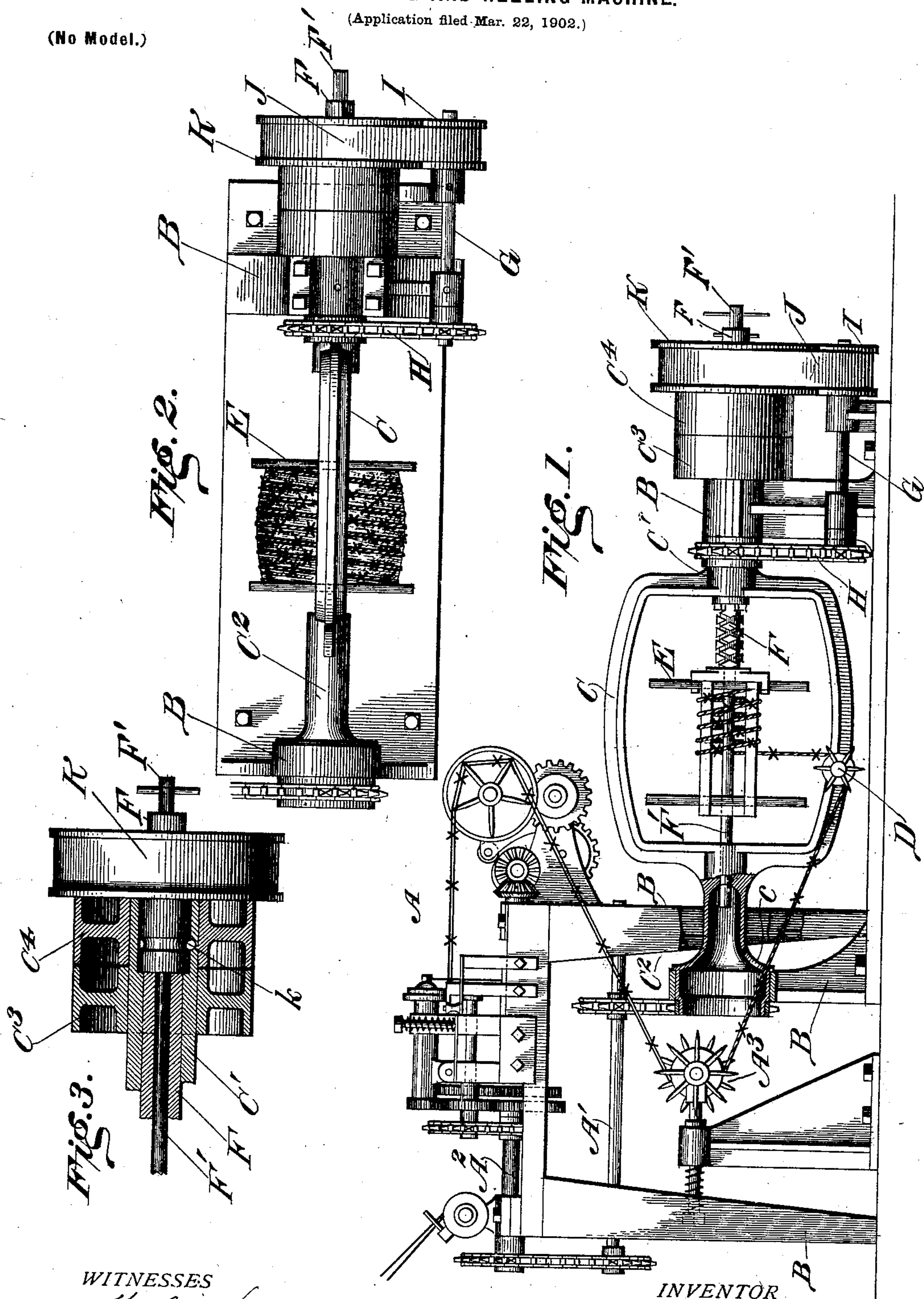
Patented July 22, 1902.

W. EMERY.

WIRE TWISTING AND REELING MACHINE.

(Application filed Mar. 22, 1902.)

(No Model.)



WITNESSES

W. Lee Atkins.  
Agnes M. Dowell

INVENTOR

Wilber Emery  
By Julian C. Dowell  
his Attorney



# UNITED STATES PATENT OFFICE.

WILBER EMERY, OF ASHLAND, KENTUCKY.

## WIRE TWISTING AND REELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 705,331, dated July 22, 1902.

Application filed March 22, 1902. Serial No. 99,517. (No model.)

*To all whom it may concern:*

Be it known that I, WILBER EMERY, a citizen of the United States, residing at Ashland, in the county of Boyd and State of Kentucky, have invented certain new and useful Improvements in Wire Twisting and Reeling Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to wire twisting and reeling mechanism of the class employed in connection with barbed-wire or other wire-working machines; and the principal object is to provide a simple and highly-efficient device which will twist and take up the wire with easy and uniform tension instead of the jerky and unsteady pulling incident to many prior devices.

The invention will hereinafter be first fully described with reference to the accompanying drawings, which form a part of this specification, and then more particularly pointed out in the following claims.

In said drawings, in which corresponding parts in the several views are designated by like letters of reference, Figure 1 represents, in side elevation, a barbed-wire-making machine and coöperating twisting and reeling mechanism embodying my invention, a portion of said latter mechanism being broken away to illustrate its construction. Fig. 2 is a top plan view of said twisting and reeling mechanism; and Fig. 3 is a detail view, partly in section, of a portion of said mechanism, showing the reel-shaft-driving pulley and its bearing in the hollow spooler-shaft.

Referring to the drawings by specific letters of reference, A represents a wire-barbing machine of the type shown and described in United States Patent No. 689,712, granted to me on December 24, 1901. In this machine the strand wire or wires are drawn intermittently through the barbing mechanism to permit the necessary stops for affixing the barbs, but are paid out continuously from the machine by suitable motion-converting mechanism described in said patent for uniform take up by the reel. It will be understood, of course, that my present invention is independent of the particular barbed-wire

or other machine with which it is employed, the machine above referred to serving merely to illustrate a useful application of the invention, though it is preferable that the wire be paid out to the twisting and reeling mechanism at a suitable rate to properly supply the same and at a substantially uniform speed.

In the construction herein illustrated my invention is embodied in a twisting and reeling mechanism somewhat similar to that disclosed in the above-mentioned patent, though it will be understood that the invention or certain features thereof may also be embodied in mechanism of different types. The said twisting and reeling mechanism may be arranged in any suitable relation to the barbing-machine, but preferably at the rear, as shown, so that the operator will not be endangered by breaking of the wire.

The letters BB designate supporting-standards mounted at opposite ends of a suitable bed-plate, and C denotes a rotatable twister and spooler frame carried by axles or supporting-shafts C' and C<sup>2</sup>, journaled in bearings on said standards. The rearward axle C' is in the form of a sleeve, and mounted thereon are friction-pulleys C<sup>3</sup> and C<sup>4</sup>, one of which is loose and the other fast for the application of power to drive the machine. The opposite axle C<sup>2</sup> is preferably formed with a hollow enlarged or flaring open-ended extremity (shown in the drawings at the journal portion thereof) and with an opening c at the rear of said enlarged portion, so as to permit the passage of the barbed wires therethrough for a purpose which will appear hereinafter.

One arm of the frame C carries an idler D. The barbed strands paid out by the barbing-machine are passed around said idler, which by rotation of the frame C twists said strands and winds the finished barbed wire around an axially-disposed reel E, the extremities of the strands being of course previously connected with said reel. The reel is secured to the front end of a hollow shaft F and also loosely mounted or supported upon a shaft F', which is journaled in the axle C<sup>2</sup> and passed through and splined within the shaft F to rotate in unison with the latter, being adapted to be withdrawn to permit insertion and removal of the reel. The shaft F is journaled within the axle or sleeve C' and is formed



with a right-and-left screw portion, as shown in Fig. 1, which is engaged by a fork rigidly secured upon or within said sleeve, so as to reciprocate the reel, and thereby distribute the wire evenly thereon.

In the arrangement illustrated the spooler shaft or axle  $C^2$  drives through suitable sprocket-and-chain connections a longitudinally-disposed idle shaft  $A'$ , which drives through similar chain-and-sprocket gearing the main shaft  $A^2$  of the barbed-wire machine, by which the barbing and strand pull-out mechanisms are operated at constant speeds. An idler  $A^3$  is preferably interposed between the barbed-wire machine and the spooler, around which the barbed strands are passed, said strands being thus held from turning between the barbed-wire machine and the idler, but twisted between said idler and the idler  $D$  of the twister and spooler by reason of the revolution of the latter around the reel.

Assuming for a moment that the reel does not rotate, it is evident that a length of wire equal to the circumference of the reel or the bale thereon must pass over the winding-idler  $D$  during each revolution in order to wind the wire with uniform and proper tension. If the delivery or feed of the wire is more or less than this amount, the reel must of course be correspondingly turned in the opposite direction to the rotation of the frame  $C$  to take up the extra length or in the same direction to compensate for insufficient length, as the case may be, it being remembered that the frame  $C$  rotates at constant speed and the wire is paid out from the barbing-machine at a uniform rate. Whether the delivery of wire at the outset is only sufficient to supply the reel or is more or less than necessary the reel must be turned at a variable speed to compensate for the gradually-increasing size of the bale thereon and to permit winding or take-up of the wire with uniform tension; but the reel-shaft must be turned at a different speed from that of the spooler shaft or axle to bring into operation the interengaging fork and right-and-left screw above mentioned, and thereby to reciprocate the reel. In this class of machinery the rate of delivery of wire from the barbing mechanism is usually greater or less than that which is necessary to supply the empty reel, considered as stationary, so that the reel must be continuously rotated from the outset. In certain prior mechanisms of this character in which the delivery of wire to the spooler is less than necessary to supply the reel the reel-shaft has been driven by suitable frictional connection with the spooler-shaft or other driving-shaft and continuously retarded to reciprocate and to wind the wire with proper tension by means of braking devices—as, for instance, by application of a suitable friction-brake to a friction-pulley on the reel-shaft, as described with reference to the reeling mechanism illustrated in my aforesaid patent. Such con-

structions are inefficient and objectionable on account of wearing and heating of the friction-leathers or other braking-surfaces and unsteady tension and spasmodic pulling of the wire.

In my present invention, as embodied in the twisting and reeling mechanism of the type illustrated, the reel-shaft is driven by a slipping differential connection with the spooler shaft or axle, thus properly reciprocating the reel, and is preferably driven at a different speed than necessary to take up or receive the wire with proper tension, so that the wire being wound is constantly drawn taut and by reason of its pull is caused to turn or hold the reel independently of its driving connections. In the construction illustrated the reel is turned in the same direction as the spooler and twister frame to compensate for slow delivery of wire and the gradually-increasing size of the bale. Referring to said construction, the sleeve or hollow spooler-shaft  $C'$  drives a counter-shaft  $G$  by means of a chain  $H$ , passing around sprockets on the said spooler-shaft and counter-shaft, and said shaft  $G$  carries a flanged pulley  $I$ , connected by a belt  $J$  with a similar pulley  $K$ , which is secured by a feather-key on the reel-shaft  $F$  to permit the latter to reciprocate through said pulley. The hub of pulley  $K$  is preferably laterally extended and journaled in the front end of the sleeve  $C'$ , as shown in Fig. 3, and formed with an annular groove  $k$ , engaged by a pin rigidly secured within the sleeve, thus permitting rotation of the pulley while preventing longitudinal movement. The sprockets on the spooler-shaft and counter-shaft are in a different ratio from that between the pulleys  $I$  and  $K$ , whereby the spooler-shaft and reel-shaft are driven at different speeds and the reel reciprocated, and the difference between said ratios is made slightly greater than necessary, so that the reel-shaft is continuously retarded or driven at less than the speed required to permit winding or take-up of the wire with proper tension. The wire is thus kept taut and by reason of its constant pull gradually turns the reel independently, the belt slipping on the pulleys or the smaller pulley. The action of the differential driving connections resists the pull of the wire being wound. By these means the wire is wound steadily and with uniform tension, while the defects incident to the use of brakes or other retarding devices are obviated.

As before mentioned, the invention or certain features thereof may be embodied in twisting and reeling mechanisms of other types than the one illustrated. For instance, the well-known type in which a rotating winding-reel is mounted transversely in the rotating frame of the twister, an example of which is shown and described in United States Patent to O. J. Ziegler, No. 359,485, dated March 15, 1887. In a mechanism of this type the reel would resist the action of such driv-



ing connections and be driven by suitable slipping differential connections at a greater speed than required against the pull of the wire, which would retard the reel as the tension attained an undesirable limit.

The mechanism described is also susceptible of various modifications in details of construction and arrangement without departing from the scope of my invention.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a twisting and reeling mechanism, the combination with a reel and a continuously-revolving twister around which the wire is passed on its way to the reel, of slipping driving connections between the twister and the reel, arranged to rotate the reel at a speed different from that required for take-up, so as to resist the pull of the wire; and adapted to slip as the tension attains a certain limit; substantially as described.

2. In a twisting and reeling mechanism, the combination with a reel and a continuously-revolving twister around which the wire is passed on its way to the reel, of driving and driven friction-pulleys suitably connected respectively with the twister and reel, and a belt passing around said pulleys adapted to drive the reel to take up or receive the wire with uniform tension and to slip as the tension attains a certain limit; substantially as described.

3. In a twisting and reeling mechanism, the combination with a reel and a continuously-revolving twister, of a driving-shaft having a friction-pulley thereon, a friction-pulley suitably connected with and driving the reel, and a belt passing around said pulleys adapted to drive the reel to take up or receive the wire with uniform tension and to slip as the tension attains a certain limit; substantially as described.

4. In a twisting and reeling mechanism, a reel, a continuously-revolving twister around which the wire is passed on its way to the reel, means for distributing the wire evenly on the reel actuated by a differential rotation of the reel and twister, and differential slipping driving connections between the twister and the reel; substantially as described.

5. In combination with a reel and a continuously-revolving spooler adapted to wind the wire thereon, slipping driving connections between the spooler and the reel adapted to rotate the latter at a speed different from winding-speed and adapted to slip to permit independent action of the reel when the tension of the wire attains a certain limit; substantially as described.

6. In combination with a reel and a revolving spooler adapted to wind the wire thereon, a driving-shaft having a friction-pulley thereon, a friction-pulley suitably connected with the reel, and a belt passing around said pulleys, the arrangement being such that the reel

is driven thereby at less than winding-speed, whereby the reel is continuously turned independently by pull of the wire and the belt caused to slip; substantially as described.

7. In combination with a reel and a continuously-revolving spooler carried by coaxial shafts, a counter-shaft driven from the spooler-shaft, and frictional connections between said counter-shaft and the reel-shaft driving the latter at less than winding-speed and slipping to permit independent turning of the reel by pull of the wire; substantially as described.

8. In combination with a reel and a continuously-revolving spooler carried by coaxial shafts, a counter-shaft driven from the spooler-shaft and having a friction-pulley thereon, a second friction-pulley on the reel-shaft, and a belt passing around said pulleys adapted to rotate the reel to take up the wire with uniform tension and to slip to permit independent action of the reel when the tension attains a certain limit; substantially as described.

9. In a reeling mechanism, a rotary reel and a continuously-revolving spooler having coaxial shafts, connections between said shafts for reciprocating the reel when the shafts are differently rotated, and differential driving connections between said shafts; substantially as described.

10. In a reeling mechanism, a rotary reel and a continuously-revolving spooler having coaxial shafts; connections between said shafts for reciprocating the reel when the shafts are rotated at different speeds, and differential slipping driving connections between said shafts normally rotating the reel-shaft at a different speed from that required for take-up and slipping to permit independent action of the reel to take up the wire with uniform tension; substantially as described.

11. In a reeling mechanism, a rotary reel and a continuously-revolving spooler having coaxial shafts, connection between said shafts for reciprocating the reel when the shafts are rotated at different speeds, a counter-shaft driven from the spooler-shaft having a friction-pulley thereon, a friction-pulley connected to the reel-shaft, said pulleys being in a different ratio from the driving connections between the spooler-shaft and counter-shaft, and a belt passing around said pulleys adapted to turn the reel to take up the wire with uniform tension and to slip to permit independent action of the reel when the tension attains a certain limit; substantially as described.

12. In a reeling mechanism, a rotary sleeve or hollow shaft carrying a revolving spooler, a reel-shaft journaled within said sleeve carrying a reel in proper relation to the spooler, connection between said sleeve and shaft for reciprocating the reel when the shafts are rotated at different speeds, a counter-shaft driven by suitable connections with the spooler-shaft, friction-pulleys on the reel-

shaft and counter-shaft in a different ratio from that of the driving connections between the spooler-shaft and counter-shaft, the reel-shaft pulley being slidably but non-rotatably secured thereon and having a journal in the outer sleeve or spooler-shaft, and a belt passing around said pulleys driving the reel to take up the wire with uniform tension and slipping to permit independent action of the

reel as the tension attains a certain limit; so substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILBER EMERY.

Witnesses:

PROCTOR K. MALIN,  
ELIZABETH H. MURPHY.