

J. W. MILLER.
TENSION APPLIANCE FOR BALE TIE MACHINES.
APPLICATION FILED SEPT. 29, 1910.

1,029,078.

Patented June 11, 1912.

2 SHEETS—SHEET 1.

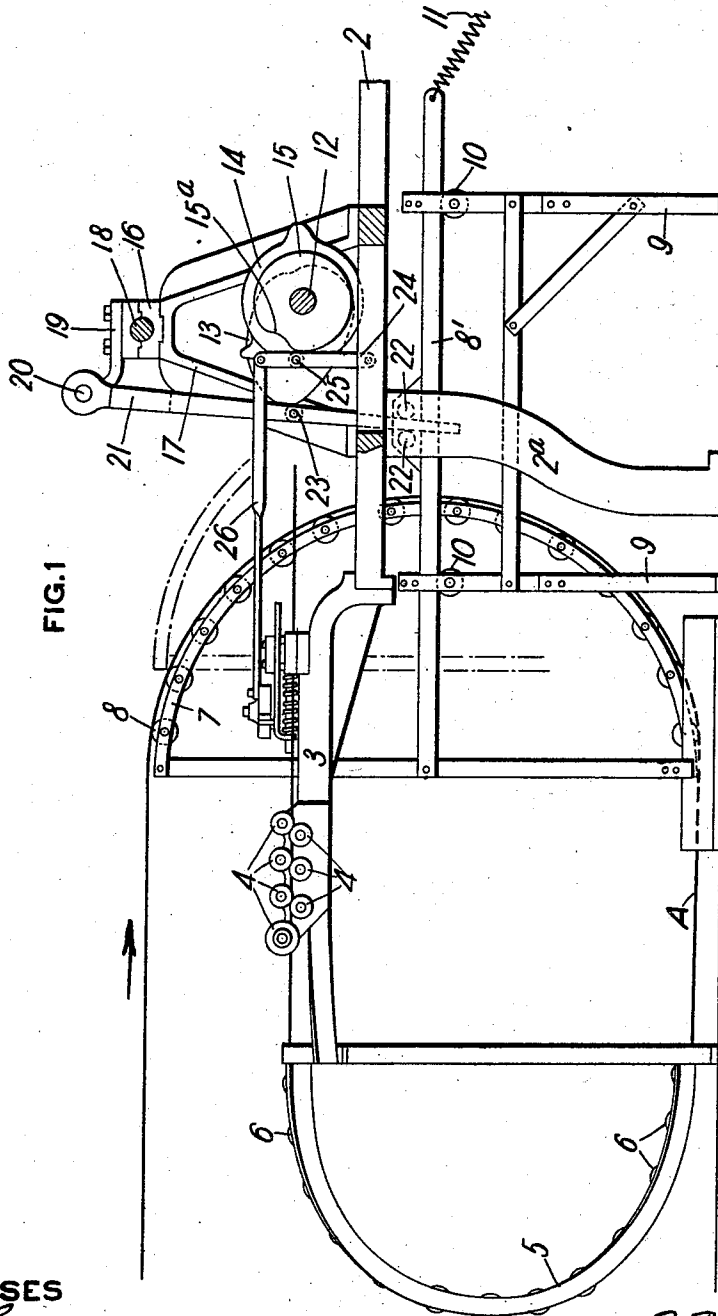


FIG. 1

WITNESSES

R. Little
Chas. Foxterman

INVENTOR

J. W. Miller
by Leithicum Belt & Fuller
his Attorneys.

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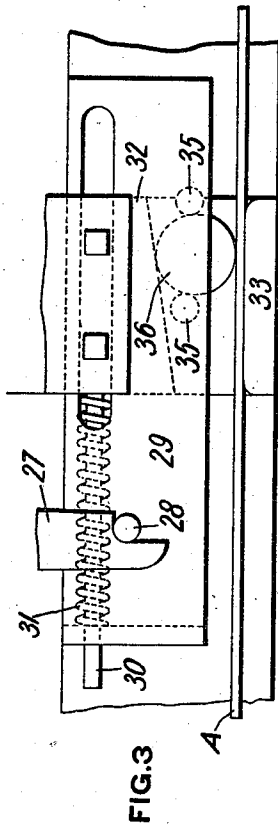


FIG. 3

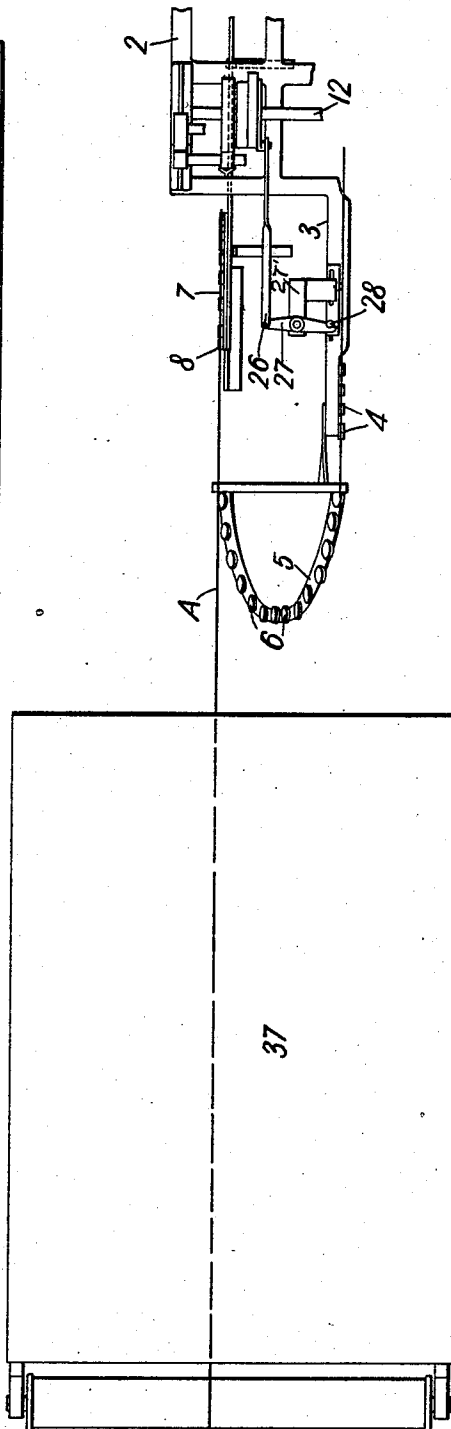


FIG. 2

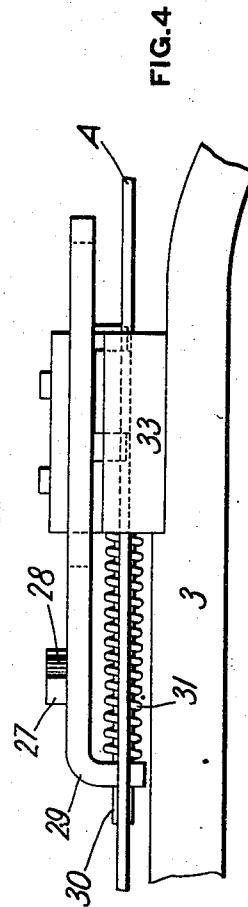


FIG. 4

WITNESSES

R. D. Little
Chas. Soderman

INVENTOR

J. W. Miller.
by Leitchman, Bell & Fuller
his Attorneys

UNITED STATES PATENT OFFICE.

JOHN W. MILLER, OF WAUKEGAN, ILLINOIS, ASSIGNOR TO THE AMERICAN STEEL & WIRE COMPANY OF NEW JERSEY, OF HOBOKEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TENSION APPLIANCE FOR BALE-TIE MACHINES.

1,029,078.

Specification of Letters Patent.

Patented June 11, 1912.

Application filed September 29, 1910. Serial No. 584,545.

To all whom it may concern:

Be it known that I, JOHN W. MILLER, of Waukegan, in the county of Lake and State of Illinois, have invented a new and useful
5 Tension Appliance for Bale-Tie Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 My invention relates to apparatus for making bale ties of the class shown and described in Patent No. 803,499 granted to me on October 31, 1905, for a bale tie machine, and more particularly relates to a tension
15 appliance for such machines, the apparatus forming this invention being applicable, among other uses, to the bale tie machine of the aforesaid patent.

One object of my invention is to provide
20 apparatus for feeding the wire stock, which is a continuous length of wire, into such bale tie machines having tension means arranged to cause the strand of wire from which the bale ties are formed to travel forwardly constantly and move uninterruptedly at a uni-
25 form speed through an annealing furnace into a bale tie machine in which movement of the forward end of the wire stock is intermittent and is interrupted during the intervals in which the forward end of the
30 strand is at rest while a piece of the wire is severed from the strand and the hooks or loops are being formed on the ends of the severed piece forming the wire bale tie by
35 the bale tie forming apparatus.

Another object of this invention is to provide improved means for securing and holding the forward end of the strand stationary against backward movement during the intervals in which pieces are being severed
40 from the strand and formed into completed bale ties, and while the strand is being continuously moved through the annealing furnace by the tension appliance forming part
45 of this invention.

A further object of the invention is to provide a feeding appliance for bale tie machines constructed and arranged to permit
50 of the wire stock being drawn intermittently into the bale tie machine without interruption of the constant forward movement of the stock fed into the bale tie machine prior to its entrance into the bale tie machine.

A still further object of this invention is to provide a feeding appliance for a continuous length of wire having means for
55 feeding the front end of the wire intermittently forward after successive stops in which the forward end of the coil of wire is brought to rest while intermediate portions
60 of the length of wire or wire stock enter into engagement with the feeding appliance at a constant rate of speed.

In the accompanying drawings, Figure 1 is a side elevation of the tension appliance
65 as constructed and arranged and applied for use on a bale tie machine, such as, for example, the bale tie machine shown in my aforesaid patent. Fig. 2 is a plan on a
70 smaller scale of the apparatus shown in Fig. 1. Fig. 3 is a detail plan, and Fig. 4 is a side elevation of the gripping mechanism forming part of the apparatus as constructed in accordance with my invention.

Referring to the drawings, 2 designates
75 the rear end of the frame of a bale tie machine, such as, for example, is shown in my aforesaid patent. On this end of the frame 2, which is supported upon standards or legs
80 2^a, is a support 3 having mounted thereon a series of rollers 4 forming a wire straightening apparatus by which the wire strand A is straightened and kinks removed therefrom just prior to entering the bale tie
85 machine.

Secured to the rear end of the bale tie machine is a stationary semi-circular guide 5
90 having a series of idler guide rollers 6 mounted thereon, around which the strand A is passed in being fed into the apparatus forming the bale tie machine. Opposite the
95 guide 5 and located between this guide and the frame 2 of the bale tie machine, is a similar semi-circular guide 7 which is arranged to reciprocate horizontally and
100 which also is provided with a series of idler guide rollers 8, about which the wire strand is passed in being delivered to the bale tie machine. The reciprocating guide 7 is
105 secured upon a horizontally extending sliding support 8' by which it is mounted on the supporting frame formed by the legs or standards 9. The guide 7 with its idler
110 guide rollers 8 is arranged to automatically move backwardly and forwardly with its support 8' on the frame formed by the

standards 9, anti-friction rollers 10 being provided on the standards to form a track for the support 8'. One end of the reciprocating support 8' for the guide 7 is attached to one end of a helical spring 11, the opposite end of this spring being secured to the floor or a suitable portion of the stationary frame of the bale tie machine, for a purpose described later.

Mounted in suitable bearings secured upon the rear end of the main frame 2 of the bale tie machine is a power driven shaft 12 having the cam 13, cam 14, and the cam 15, secured thereon, so as to be rotated by the shaft. Above the shaft 12 in the bearings 16 on the pedestal or stand 17 is a shaft 18 by which the reciprocating knives of the bale tie forming apparatus are actuated, and secured to the bearing 16 by the dead eye 19 is a pin 20 upon which the upper end of the downwardly extending lever 21 is pivoted.

The lower end of this lever 21 extends between antifriction rollers 22 on the reciprocating support 8' for the guide 7, this lever 21 serving to positively reciprocate the movable guide 7 and its support 8' in a direction toward the stationary guide 5 when the apparatus is in operation. Mounted at a suitable point in the length of the lever arm 21 is an anti-friction roller 23 which is arranged, when being rocked, to contact with the cam surface of the cam 13. It will be seen by reference to Fig. 1 that when the shaft 12 is rotated the surface of the cam 13 will by contact with the roller 23 move the lower end of the lever arm 21 from right to left and that after the cam 13 has passed its point of greatest movement, the spring 11 will by its pull upon the support 8' cause the guide 7 to move from left to right from the position shown in full lines into that shown by broken lines, the tension of this spring 11 acting at all times to keep the anti-friction roller 23 in contact with the face of the cam 13 on the lever 21.

Pivoted by its lower end to the frame 2 of the bale tie machine is a lever arm 24 having an anti-friction roller located at an intermediate point in its length so as to contact with the cam surface of the cam 15 which is also rotated by the shaft 12 upon which it is mounted.

The upper end of the vertical lever arm 24 is connected by the link 26 with one end of the horizontal lever arm 27 pivoted intermediate of its ends upon the bracket 27' which is secured to the supporting bracket 3 for the straightening rollers 4. The opposite end of the lever 27 is arranged to contact with the vertically extending pin 28 on the reciprocating member 29 of the wire gripping mechanism forming part of this invention. This gripping mechanism, (shown in detail in Figs. 3 and 4) com-

prises the sliding member 29, having one of its ends bent at right angles and provided with an opening through which extends the supporting rod 30 for the helical spring 31 by which the reciprocating member 29 is moved in one direction. Secured to the under side of the member 29, are a pair of studs projecting downward on either side of an idle roller 36, which is located between the flange 33 and the member 32, having an inclined side, both the member 32 and flange 33 being rigidly fastened to the frame 3. The position of the roller 36 is therefore controlled by the reciprocating movement of the member 29, allowing the wire A to pass forward or to be gripped as predetermined by the movement of the cam 15.

As shown in Fig. 2, the tension appliance, constructed and arranged in accordance with my invention, is attached to the rear end of a bale tie machine, the tension appliance being located between the bale tie machine and the delivery end of an annealing furnace 37, in which the strand to be cut up and formed into bale ties is annealed just prior to being straightened and severed into pieces which are then provided with loops on their ends in being formed into bale ties by the bale tie forming machine.

In the operation of my improved apparatus, the strand of wire A from which the bale ties are formed, is passed through the annealing furnace and upon emerging from this furnace is passed around the reciprocating guide 7 and the stationary guide 6 so as to form a loop, the anti-friction rollers 6 and 8 supporting the strand in position upon the guides during the operations of the tension device. The front or forward end of the strand A is then passed beyond the stop formed by the lug 33 and pin 36 into the bale tie machine, the forward end of the wire then being in position in the bale tie machine, to be severed from the wire or strand and have the loops formed on its opposite ends, which operations being old and not forming part of this invention need not be described in detail.

As is described in my aforesaid patent, the feeding mechanism of the bale tie machine, at intervals draws the strand into the bale tie machine, as is required in the operations of the apparatus, further movement of the end of the strand being interrupted until after a piece of the strand is severed therefrom and provided with loops on its ends in completing a bale tie. When a length of the strand is drawn inwardly the pin 36 of the gripping mechanism is free to rotate and move so as to permit of the wire strand being freely drawn into the apparatus by the feeding mechanism of the bale tie machine. The tension on the wire strand

extending through the heating or annealing furnace being greater than that required to reciprocate the movable guide 7 when the forward end of the strand is being drawn into the bale tie machine, this guide 7 will be shifted from the position shown in broken lines in Fig. 1 into that shown by full lines during such movement of the end of the strand, in this way lessening the length of the wire which then extends around the guides 6 and 7. The forward end of the wire is then brought to rest and remains stationary while the bale tie machine is severing a piece of wire from the stock and is completing the bale tie by forming the loops on its ends.

The spring 31 forming part of the gripping mechanism is contracted while the anti-friction roller 23 rides on the greater part of the circumferential cam surface of the cam 15 and no clamping effect is produced on the wire during this time by the pin 36 on the lug 33. After a length of wire has been severed from the wire stock by the bale tie apparatus, the recessed or hollow portion 15^a in the face of the cam 15 will be opposite the anti-friction roller 25 on the lever 24, so as to permit the spring 31 to reciprocate the movable member 32 of the gripping mechanism and wedge the strand A so as to prevent backward movement of its end by the looping mechanism.

When the forward end of the strand is at rest and the movable guide 7 is acting to move the strand between the bale tie machine and annealing furnace, backward movement of the forward end of the wire is prevented by the action of the gripping mechanism formed by the inclined surface on the member 32, the pin 36, and the lug 33 on the stationary member 3 of the gripping mechanism, the cam 15 moving the reciprocating member 29 through the lever 24, link 26 and lever 27, so as to wedge the pin 36 against the part of the strand A then situated between the pin 36 and the lug 33.

While the forward end of the strand or wire stock is held stationary, the tension on the spring 11 which is secured to the support 8' for the guide 7, causes this guide to gradually approach the position shown by broken lines in Fig. 1, in this way causing the strand beyond the guide 7 to be moved forwardly through the furnace 37 at an unchanged rate of speed. The above described operations are then continued as is desired in carrying out the operations of forming the bale ties.

The advantages of my invention will be apparent to those skilled in the art.

By the use of my improved tension mechanism the annealed wire is intermittently supplied to the bale tie machines as is required, while the rear end of the wire stock is continuously drawn through the anneal-

ing furnace so as to subject all parts of the strand of wire to the same degree and extent of heating and cooling in annealing. The tension mechanism prevents objectionable jerking of the apparatus and liability of consequent damage to the mechanism.

The gripping mechanism automatically operates to grip and hold the forward end of the wire or strand of wire and prevent backward movement of the wire, while permitting the wire to be drawn forwardly through the gripping mechanism at all times.

Modifications in the construction and arrangement of the parts may be made without departing from my invention. The tension device may be employed upon bale tie machines located remotely from the annealing furnace and may be applied to uses other than the one shown and described and other changes may be made within the scope of the appended claims.

The apparatus is adapted for use in taking wire from reels to prevent and avoid jerking of the wire by the bale tie machine.

I claim:—

1. In a bale tie machine having an intermittent wire feeding mechanism, a tension appliance comprising means for forming a loop in the strand wire being fed into said bale tie machine, and mechanism for moving the loop-forming mechanism to vary the size of the loop in the strand wire.

2. In a bale tie machine having an intermittent wire feeding mechanism, a tension appliance comprising means for forming a loop in the strand wire being fed into said bale tie machine, and means operatively connected to the bale tie driving mechanism for moving the loop-forming mechanism to vary the size of the loop in the strand wire.

3. In a bale tie machine having an intermittent wire feeding mechanism, a tension appliance comprising means for forming a loop in the strand wire being fed into said bale tie machine, mechanism for moving the loop-forming mechanism to vary the size of the loop in the strand wire, and means for preventing backward movement of the strand wire between the loop-forming means and the bale tie machine.

4. In a bale tie machine having an intermittent feed mechanism for the strand wire from which the bale ties are formed, a tension appliance comprising means for maintaining a loop in the strand wire, and means for increasing the size of said loop during the bale tie forming operations.

5. In a bale tie machine having means for intermittently feeding the strand wire from which the bale ties are formed into said machine, the combination with means arranged to form a loop in the strand wire being fed into the machine, and means for increasing the size of the loop, of a stop

arranged to grasp and hold the forward end of the strand wire against backward movement when the size of the loop is being increased.

5 6. In apparatus for making wire bale ties, the combination with a bale tie machine having an intermittent wire feeding mechanism and an annealing furnace for the strand wire from which the bale ties are
10 formed, of a tension appliance between the furnace and bale tie machine arranged to engage with the strand wire and cause a constant travel of the wire through the furnace, and means arranged to permit inter-
15 mittent feeding of the strand wire into the bale tie machine.

7. In apparatus for making wire bale ties, the combination with a bale tie machine to which the strand wire is supplied intermit-
20 tently and an annealing furnace through which the strand wire from which the bale tie is formed is constantly passed at a substantially uniform rate of speed, of a tension appliance between the furnace and bale
25 tie machine arranged to form and maintain a loop of varying size in the strand wire, and means operatively connected with the bale tie driving mechanism adapted to increase the size of said loop when the end of
30 the strand wire in the bale tie machine is stationary.

8. In a bale tie machine having an intermittent feed mechanism for the strand wire from which the bale ties are formed, a ten-
35 sion appliance on the feed-in side of the bale tie machine comprising oppositely facing semi-circular guides arranged to form a loop in the strand wire being fed into the machine, and means for causing relative
40 movement of the semi-circular guides to vary the size of the loop in the strand wire during the intermittent feeding movements of the strand wire into the bale tie machine.

9. In a bale tie machine having an inter-
45 mittent feed mechanism for the strand wire from which the bale ties are formed, a tension appliance on the feed-in side of the bale tie machine comprising oppositely facing semi-circular guides arranged to form
50 a loop in the strand wire being fed into the machine, a plurality of anti-friction rollers on said guides engaging with the strand wire, and means for causing relative movement of the semi-circular guides to vary the
55 size of the loop in the strand wire during the intermittent feeding movements of the strand wire into the bale tie machine.

10. In a bale tie machine having an intermittent feed mechanism for the strand wire
60 from which the bale ties are formed, a tension appliance on the feed-in side of the bale tie machine comprising oppositely-facing semi-circular guides arranged to form a loop in the strand wire being fed into the
65 machine, and means for reciprocating one

of said guides to vary the size of the loop in the strand wire during the intermittent feeding movements of the strand wire into the bale tie machine.

11. In a bale tie machine having an inter-
70 mittent feed mechanism for the strand wire from which the bale ties are formed, a tension appliance on the feed-in side of the bale tie machine comprising oppositely-facing semi-circular guides arranged to form
75 a loop in the strand wire being fed into the machine, and means for reciprocating one of said guides to vary the size of the loop in the strand wire during the intermittent feeding
80 movements of the strand wire into the bale tie machine, said means being operatively connected to the bale tie driving mechanism.

12. In a bale tie machine having an intermittent feed mechanism for the strand
85 wire from which the bale ties are formed, a tension appliance on the feed-in side of the bale tie machine comprising oppositely facing semi-circular guides arranged to form a loop in the strand wire being fed into the
90 machine, means for causing relative movement of the semi-circular guides to vary the size of the loop in the strand wire during the intermittent feeding movements of the strand wire into the bale tie machine, and
95 locking means for preventing backward movement of the end of the strand wire in the bale tie machine when the loop is being increased in size.

13. In a bale tie machine having an inter-
100 mittent feed mechanism for the strand wire from which the bale ties are formed, a tension appliance on the feed-in side of the bale tie machine comprising oppositely facing semi-circular guides arranged to form a loop
105 in the strand wire being fed into the machine, means for causing relative movement of the semi-circular guides to vary the size of the loop in the strand wire during the intermittent feeding movements of the strand
110 wire into the bale tie machine, and wire locking means operatively connected to the driving mechanism of the bale tie machine for preventing backward movement of the end of the strand wire in the bale tie machine
115 when the loop is being increased in size.

14. In a bale tie machine having an intermittent feed mechanism for the strand wire from which the bale ties are formed, a ten-
120 sion appliance on the feed-in side of the bale tie machine comprising oppositely-facing semi-circular guides arranged to form a loop in the strand wire being fed into the machine, means for causing relative movement of the semi-circular guides to vary the
125 size of the loop in the strand wire during the intermittent feeding movements of the strand wire into the bale tie machine, wire locking means for preventing backward
130

movement of the end of the strand wire in the bale tie machine when the loop is increasing in size, and means operatively connected to the driving mechanism of the bale tie machine for actuating the reciprocating guide and wire locking mechanism.

15 In a bale tie machine, the combination of intermittent wire feeding mechanism, and means cooperating with said intermittent feeding mechanism for imparting to the wire a constant forward movement into the machine.

16 In a bale tie machine, the combination with intermittent wire feeding mechanism, of means cooperating with said intermittent feeding mechanism for imparting to the wire a constant and uninterrupted movement at uniform speed into the machine.

17 In a bale tie machine, the combination of intermittent wire feeding mechanism, and means operating while said intermittent feeding mechanism is at rest to feed the wire, whereby the wire is fed forward constantly into the machine.

18. In a bale tie machine, the combination of intermittent wire feeding mechanism, 25 guiding means around which the wire is fed, and means for expanding said guiding means while said intermittent feeding mechanism is at rest and cooperating with said intermittent feeding mechanism to impart to the wire a constant feeding movement into the machine. 30

19. In a bale tie machine, the combination of intermittent wire feeding mechanism, means for forming a loop in said wire as it 35 is fed into the machine, and means for enlarging said loop to thereby feed the wire into the machine while the intermittent feeding mechanism is at rest.

In testimony whereof, I have hereunto 40 set my hand.

JOHN W. MILLER.

Witnesses:

FRED WINTERS,
N. D. SULLIVAN.