June 24, 1924.

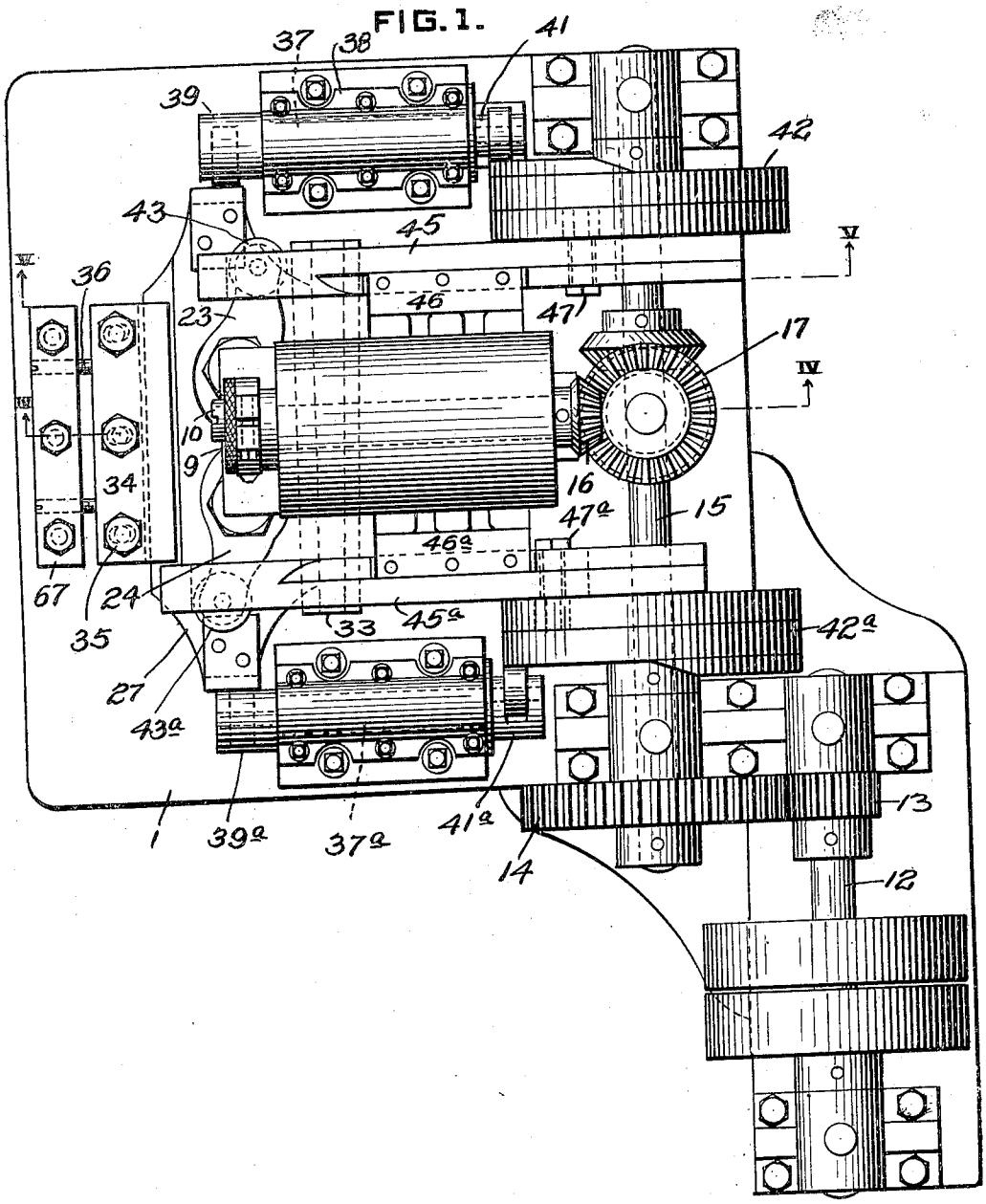
1,499,135

F. A. WOLF

WIRE FORMING MACHINE

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FIG. 1.



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WITNESSES

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WIRE FORMING MACHINE

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FIG.2.

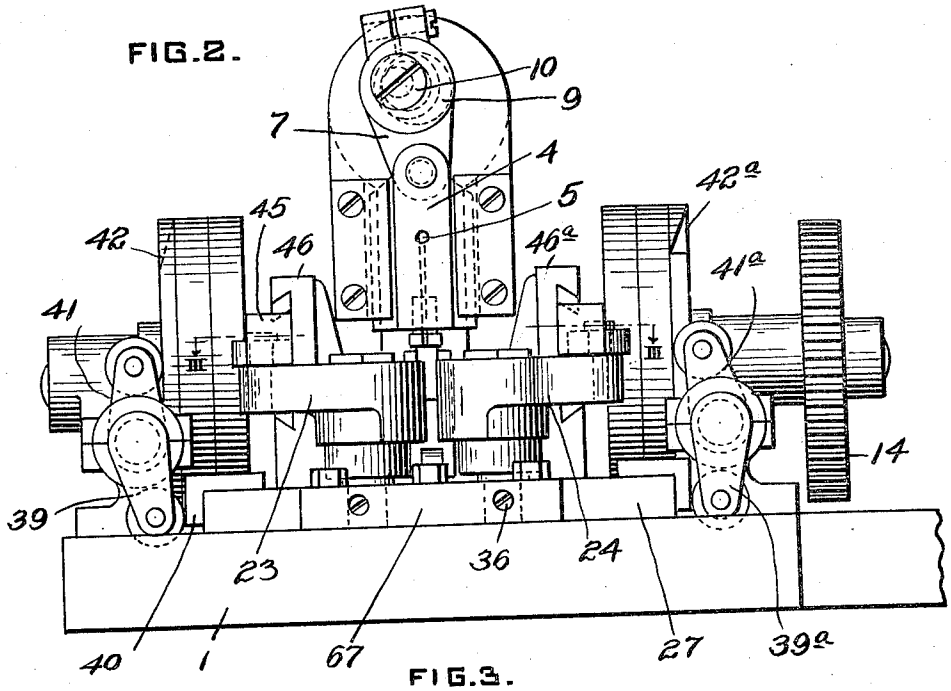
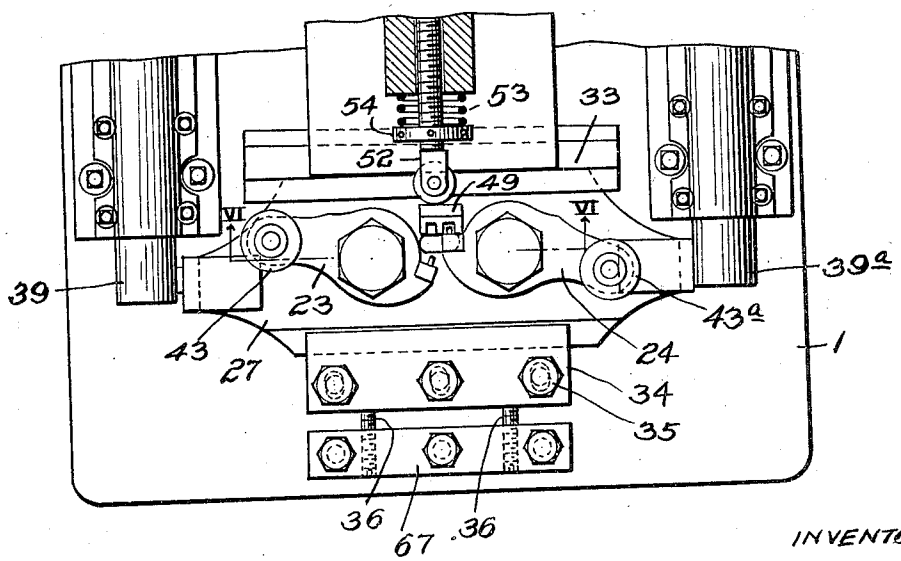


FIG.3.



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WIRE FORMING MACHINE

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FIG. 4.

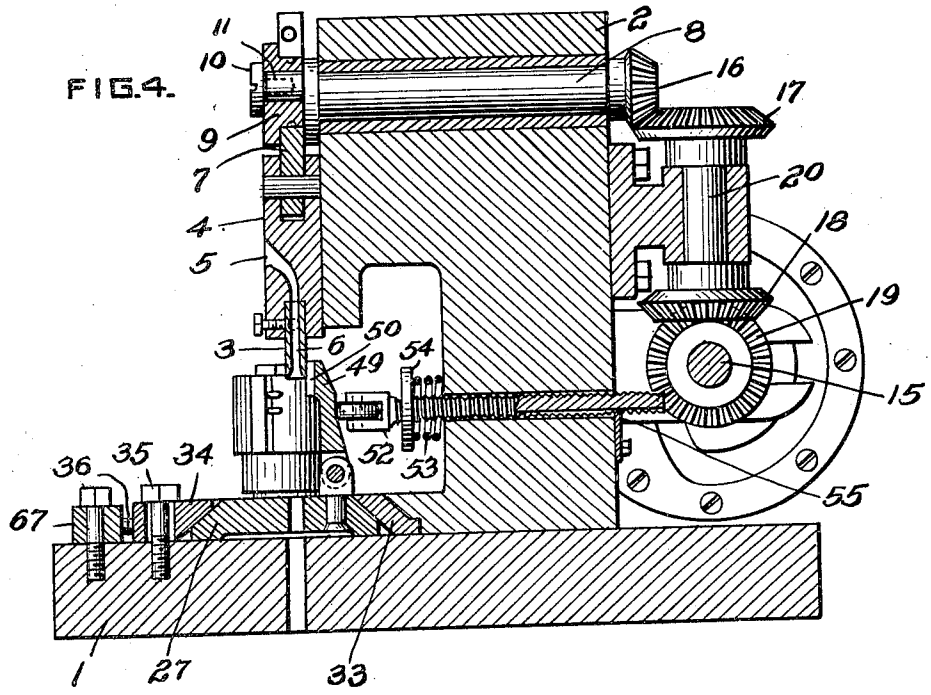
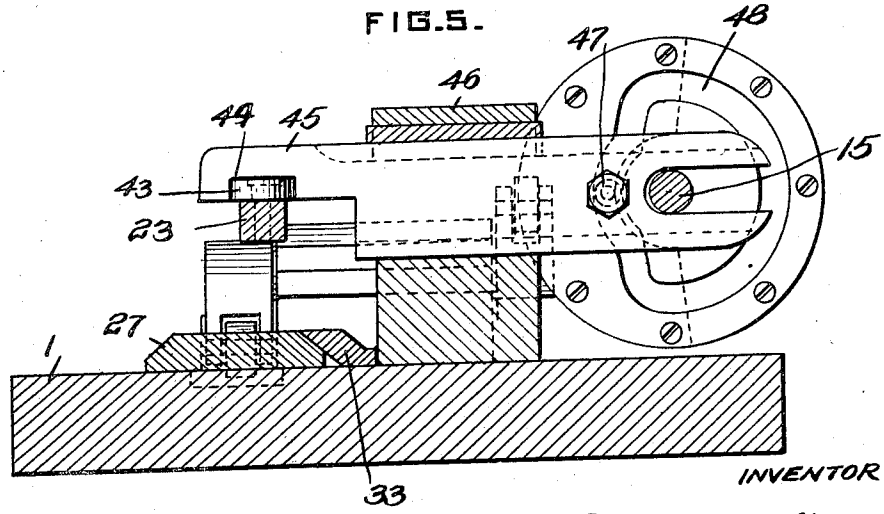


FIG. 5.



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WIRE FORMING MACHINE

Filed April 27, 1922 4 Sheets-Sheet 4

FIG.6.

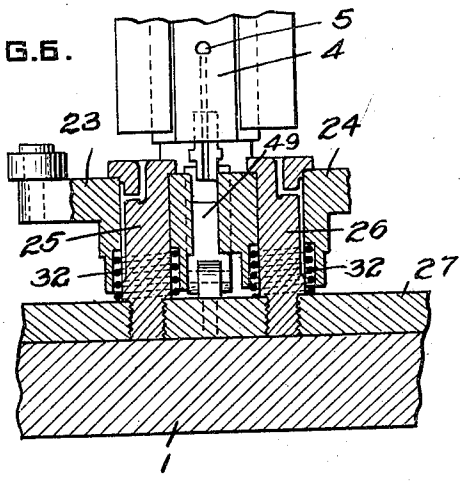


FIG.9.

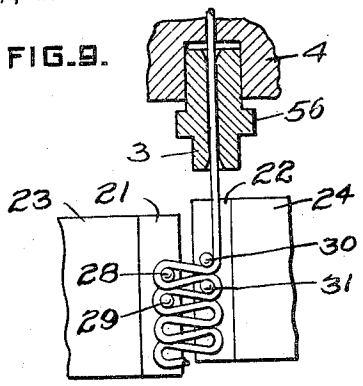


FIG.10.

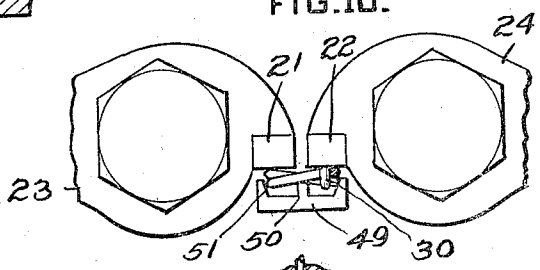


FIG.7.

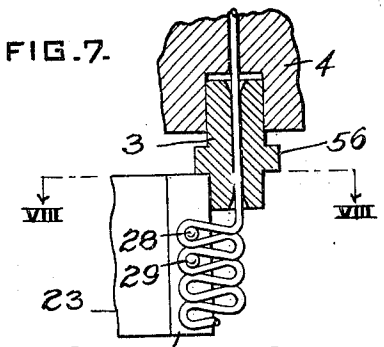


FIG.11.

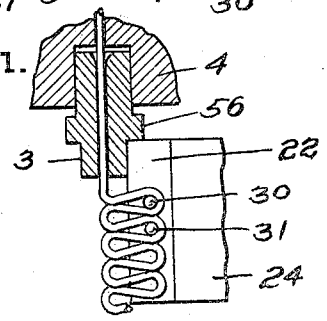


FIG.8.

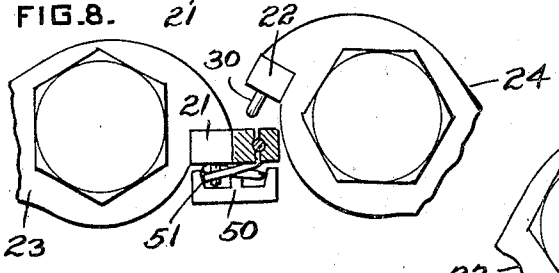
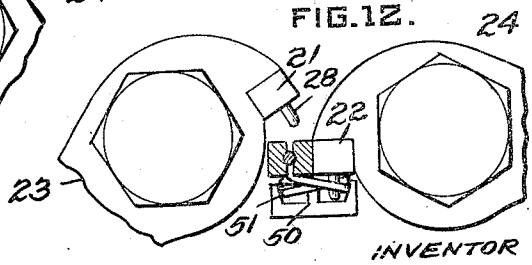


FIG.12.



INVENTOR

WITNESSES

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Patented June 24, 1924. 1,499,135

UNITED STATES PATENT OFFICE.

FRANK A. WOLF, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO THE SPIRELLA COMPANY, OF MEADVILLE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

WIRE-FORMING MACHINE.

Application filed April 27, 1922. Serial No. 556,860.

To all whom it may concern:

Be it known that I, FRANK A. WOLF, a citizen of the United States, and a resident of Niagara Falls, in the county of Niagara and State of New York, have invented a new and useful Improvement in Wire-Forming Machines, of which the following is a specification.

The invention relates to machines for forming looped wire strips or fabric, such for example as is frequently used for corset stays. In these machines one or more forming fingers cooperate with two sets of pins to loop a strand of wire alternately around the pins. The object of the invention is to simplify the construction and improve the operation of such machines to the end that better strips may be more rapidly formed.

The invention is illustrated in the accompanying drawings, of which Fig. 1 is a plan view of the machine; Fig. 2 a left end view of the machine as seen in Fig. 1; Fig. 3 a combined horizontal section and plan view of the front portion of the machine, the plane of view being indicated by the line III—III, Fig. 2; Figs. 4 and 5 vertical sectional views taken, respectively, on the lines IV—IV and V—V, Fig. 1; Fig. 6 a vertical sectional view of the pin blocks, the plane of view being indicated generally by the line VI—VI, Fig. 3; Fig. 7 a vertical sectional view through the forming finger and a front view of a pin block showing the relative position of these parts in one stage of the operation; Fig. 8 a combined sectional and plan view taken on the line VIII—VIII, Fig. 7; Figs. 9 and 10 views corresponding, respectively, with Figs. 7 and 8 showing the parts in the relative positions which they occupy in a second stage of the operation; and Figs. 11 and 12 views corresponding with Figs. 7 and 8 showing the relative positions of the parts in a third stage of the operation.

According to this invention, a forming finger is mounted to move to and from a pair of pin blocks which are movable in two directions substantially at right angles to each other. Preferably the forming finger is mounted for reciprocatory movements, the pin blocks pivotally mounted on carriers to oscillate substantially perpendicularly to their working faces, and the pin block carriers mounted to move the pin blocks in directions substantially parallel with their working faces. Coordinating driving connections are provided for reciprocating the forming finger and for effecting the two movements of the pin blocks, and means are provided to adjust the relative positions of the wire forming parts, namely the forming finger and the pin blocks. The mechanism for effecting the several movements of the wire forming parts thus briefly explained may assume a wide variety of forms.

For convenience in describing the machine, it may be considered as comprising three parts, the first being the former finger and the connections for moving it; the second, the construction of the pin blocks and carriers and the connections for moving the pin blocks in directions substantially parallel with their working faces; and the third, connections for oscillating the pin blocks.

The entire machine may be mounted on a suitable frame 1, provided at its central portion with a standard 2 for supporting the forming finger and its driving connections. The forming finger 3 is attached to a head 4 mounted for vertical reciprocation on the front of standard 2. This head is provided with a hole 5 which registers with a hole 6 in the forming finger, and through these holes a strand of wire passes to the forming pins. The upper end of head 4 is attached to a link 7 pivoted eccentrically to the end of a shaft 8. That the extent of vertical reciprocation of forming finger may be adjusted, the upper end of link 7 is mounted upon an eccentric sleeve 9, adapted to be held in a given position by a screw 10, the head of which engages the outer face of the sleeve and the shank of which engages a pin 11 which is eccentric to shaft 8.

A power shaft 12, mounted on frame 1 and adapted to receive power from any suitable source, is provided with a pinion 13 which meshes with a pinion 14 mounted on a shaft 15. The forming-finger driving-shaft 8 is provided at its rear end with a beveled pinion 16, which, through beveled pinions 17, 18 and 19 and shaft 20, is adapted to be driven by shaft 15. Through the

driving connections just described and clearly shown in the drawings, forming finger 3 is continuously reciprocated during the operation of the machine.

Having reference now to the pin blocks and the driving connections for moving them substantially parallel with their working faces, there are two pin blocks 21 and 22 mounted on arms 23 and 24 which are pivoted by means of pins 25 and 26 on a carrier plate 27. As seen to enlarged scale in Fig. 9, the working face of each pin block is provided with a number of forming pins, the pin block 21 with pins 28 and 29, and pin block 22 with pins 30 and 31. To the end that the pin blocks may be moved to feed the strip being formed, arms 23 and 24 are, by means of springs 32, held yieldingly upwardly against the heads of their pivot pins 25 and 26 (Fig. 6).

Plate 27, on which arms 23 and 24 are pivotally mounted, is slidably mounted on frame 1 for reciprocation in a direction which will move the pin blocks parallel to their working faces, and means are provided for adjusting the position of plate 27 in a direction at right angles to its line of reciprocation. The rear edge of carrier 27 is guided and positioned by a wedge 33 (Figs. 3 and 4) which is longitudinally movable to vary the position of the carrier. The front edge of the carrier is guided by a plate 34 held against longitudinal movement by means of pins 35 extending through slots in the plate and engaging frame 1. The position of guide plate 34 may be varied by set screws 36 mounted in bars 67 secured to the machine frame.

Carrier 27 is preferably reciprocated by rocking arm mechanism coordinated with that for reciprocating the forming finger. As seen in the upper portion of Fig. 1 and at the left of Fig. 2, a shaft 37, mounted in a housing 38, is provided at its front end with an arm 39 having a roller adapted to bear against a block 40 secured to carrier 27. The opposite or rear end of shaft 37 is provided with a second arm 41 having a roller adapted to bear against the face of a cam 42 secured to shaft 15. A similar rocking shaft 37^a provided with arms 39^a and 41^a and adapted to be operated by a cam 42^a is arranged at the other side of the machine to operate against the opposite end of carrier 27. Cams 42 and 42^a are so formed and mounted on shaft 15 that, through the rocker arm mechanism just explained, carrier 27 is caused to reciprocate in proper relation to the reciprocation of the forming finger.

Having reference now to mechanism for oscillating arms 23 and 24 to cause the pin blocks to move in directions substantially perpendicular to their working faces, the outer end of arm 23 is provided with a roller 43 arranged in a slot 44 formed in the lower face of a bar 45. This bar is mounted for reciprocation in a bracket 46 forming part of the machine frame, and is provided at its rear end with a laterally projecting pin 47 which is engaged by a cam slot 48 formed in the opposite face of cam 42. The rotation of shaft 15 causes bar 45 to reciprocate and in turn causes arm 23 to oscillate. On the other side of the machine a similar connection, indicated by the same numerals with subscripts "a," is provided for oscillating arm 24.

A die is provided to cooperate with the pin blocks in the formation of the loop strip. This die is preferably mounted on the outer end of a presser foot 49 (Fig. 4), and, as seen particularly in Figs. 8, 10 and 12, is a channel shaped member 50 having its inner sides 51 beveled for the purpose of holding the loops of wire in their looped positions and forms. The presser foot 49 is pivotally mounted on carrier 27 and is urged toward the pin carriers by a rod 52 mounted in standard 2 and acted upon by a spring 53 arranged between this standard and a collar 54 having screw-thread engagement with the rod. After rod 52 and collar 54 have been properly adjusted to exert the required pressure on the pressure foot, rod 52 may be held against turning by means of a key 55 engaging a slot formed in the rod.

In the operation of the machine the forming finger 3 is reciprocated, the pin blocks 21 and 22 oscillated and carrier 27 reciprocated by the mechanism previously explained and in such coordination as to form looped wire strips in the manner which will now be described with reference to Figs. 7 to 12 inclusive. It will be assumed as a starting point that the initial loop or loops of a strip have been formed by hand or by operating the machine solely by hand, and that the forming finger and pin blocks are in the positions indicated in Figs. 7 and 8. In this position of the parts carrier 27 has been moved to the left and forming finger 3 downwardly to bend the wire in proper position to be engaged by pin 30 of pin block 22 when arm 24 is oscillated. In the next step in the operation the forming finger is reciprocated upwardly, the wire being held in its formed position by inclined sides 51 of die 50, and after the forming finger is clear of arm 24 this arm is oscillated to bring pin 30 in a position to engage the wire. These positions of the parts are indicated in Figs. 9 and 10. Carrier 27 is then moved to the right and arm 23 oscillated to release pins 28 and 29 from the looped wire. After such oscillation of arm 23, the forming finger moves downwardly to bend the wire in form to be engaged by pin 28 of pin block 21. These positions of the parts are indicated in Figs. 11 and 12. The cycle of operations thus described is continuously repeat-

ed as long as the machine is in operation. Each time the forming finger moves downwardly a shoulder 56 projecting laterally from the finger engages the upper end of the pin block which then engages the looped wire and presses downwardly, against the resistance of spring 23, the arm 23 or 24 which carries this pin block. This is for the purpose of feeding the formed strip forwardly. The strength of each spring 32 is such that the arm which it acts upon will not be raised until after the pins are released from the formed strip.

It is characteristic of the machine that the forming finger moves only to and from the pin blocks, and that the pin blocks move in two directions, substantially at right angles to each other. A substantial advantage in the oscillation of the arms carrying the pin blocks is that the pins are moved towards the center of the formed strip while being released from it with the result that they do not tend to frictionally carry the looped wire with them, as is the case in machines where the pin blocks are caused to move at right angles to the plane of the formed strip.

According to the provisions of the patent statutes I have described the principle and operation of my invention, together with a machine illustrating its preferred embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced by other forms of machines, and by machines having different driving connections, than that particularly shown and described.

I claim as my invention:

1. In a machine for forming a looped wire strip, the combination of a pair of movably mounted pin blocks having working faces provided with forming pins, a forming finger mounted for longitudinal reciprocation toward and from said pins, means for reciprocating said finger, and means for alternately moving the pin blocks in directions substantially perpendicular to the working faces thereof and for moving the pin blocks simultaneously in a direction parallel to their working faces and transversely to the line of reciprocation of said forming finger.

2. In a machine for forming looped wire strip, the combination of a reciprocatory forming finger, a carrier mounted for reciprocation in a line transversely to that of said finger, a pair of pin blocks pivotally mounted on said carrier, and coordinated mechanism for reciprocating said finger and carrier and for oscillating said pin blocks.

3. In a machine for forming looped wire strip, the combination of a reciprocatory forming finger, a carrier mounted for reciprocation in a line transversely to that of said finger, pin blocks pivotally mounted on said carrier for oscillating movements, means for reciprocating said finger, rocker arm mechanism for reciprocating said carrier, and means for oscillating said pin blocks.

4. In a machine for forming looped wire strip, the combination of a reciprocating forming finger, a carrier mounted for reciprocation in a line transversely to that of said finger, means for adjusting said carrier transversely to its line of reciprocation, pin blocks pivotally mounted upon said carrier for oscillatory movements, and coordinated mechanism for reciprocating said finger and said carrier and for oscillating said pin blocks.

5. In a machine for forming looped wire strip, the combination of a forming finger mounted for vertical reciprocation, a pair of arms provided with pin blocks and pivotally mounted on vertical axes one on each side of said finger, and coordinated mechanism for reciprocating said finger and for oscillating said arms on said axes and for moving said arms transversely of the line of reciprocation of said finger.

6. In a machine for forming looped wire strip, the combination of a reciprocatory forming finger, a carrier mounted for reciprocation in a line transversely of that of said finger, pin blocks pivotally mounted for oscillatory movements upon said carrier, a driving shaft, rocker mechanism extending between said shaft and carrier for reciprocating the latter, and connections driven by said shaft for reciprocating said finger and for oscillating said pin blocks.

7. In a machine for forming looped wire strip, the combination of a reciprocatory forming finger, a carrier mounted for reciprocation in a line transversely of that of said finger, pin blocks pivotally mounted for oscillatory movements upon said carrier, a driving shaft, cams mounted on said shaft, rocker arms extending between said cams and carrier for reciprocating the latter, and driving connections extending from the said shaft for reciprocating said finger and oscillating said pin blocks.

8. In a machine for forming looped wire strip, the combination of a reciprocatory forming finger, a carrier mounted for reciprocation in a line transversely to that of said finger, pin blocks pivotally mounted on said carrier on axes perpendicular to the line of reciprocation of the carrier, a driving shaft provided with cams, connections between said cams and pin blocks for oscillating the latter in alternation, and connections extending from said shaft for reciprocating said finger and said carrier.

9. In a machine for forming looped wire strip, the combination of a reciprocatory forming finger, a carrier mounted for reciprocation in a line transversely to that of said finger, a pair of arms each provided

with a pin block and each pivotally mounted upon said carrier for oscillatory movements on an axis perpendicular to the line of reciprocation of the carrier, a driving shaft provided with cams, bars connecting said cams with said arms for oscillating the latter, and connections extending from said shaft for reciprocating said finger and said carrier.

In testimony whereof, I sign my name.

FRANK A. WOLF.

Witnesses:

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J. H. PARDEE.