March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 1

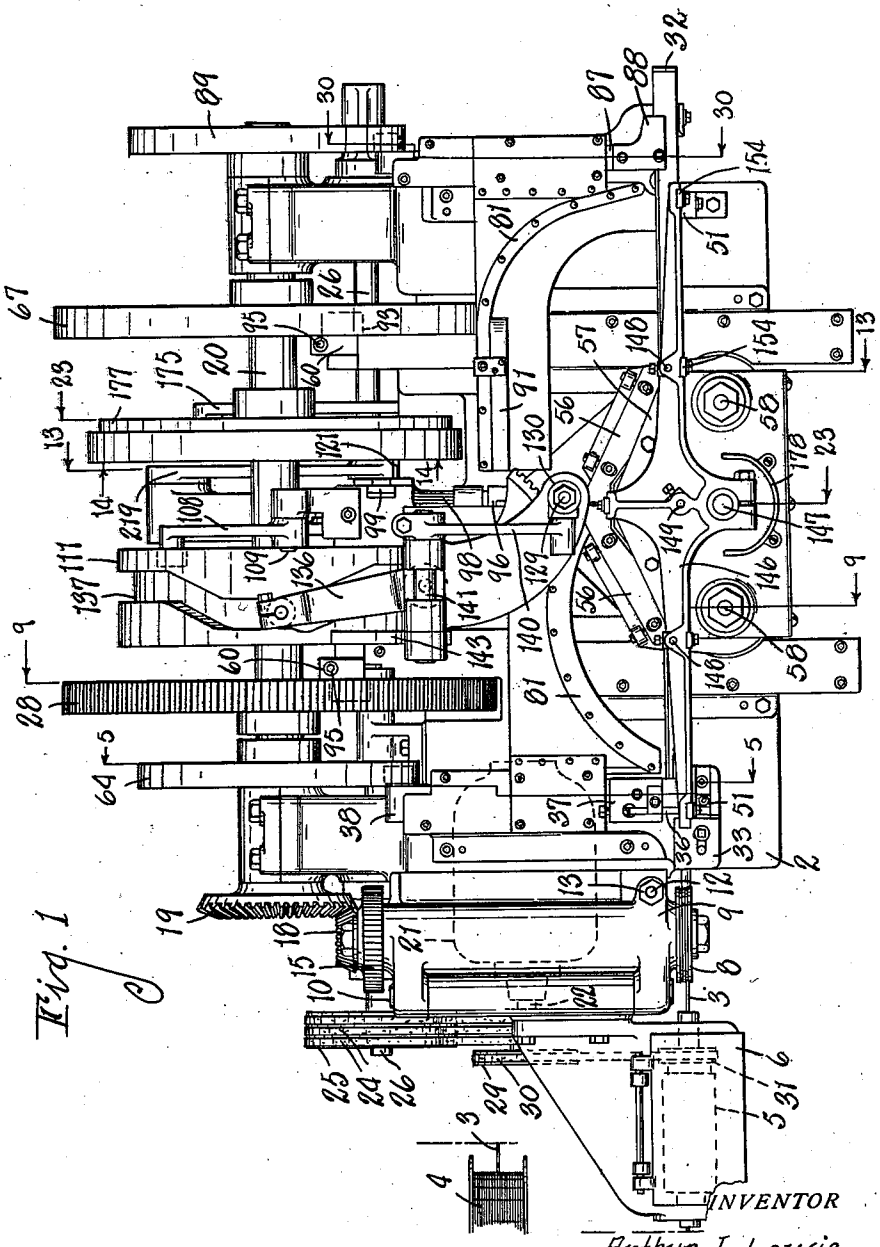


Fig. 1

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March 31, 1936. A. J. LEWIS 2,035,658

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Filed March 24, 1934 12 Sheets-Sheet 2

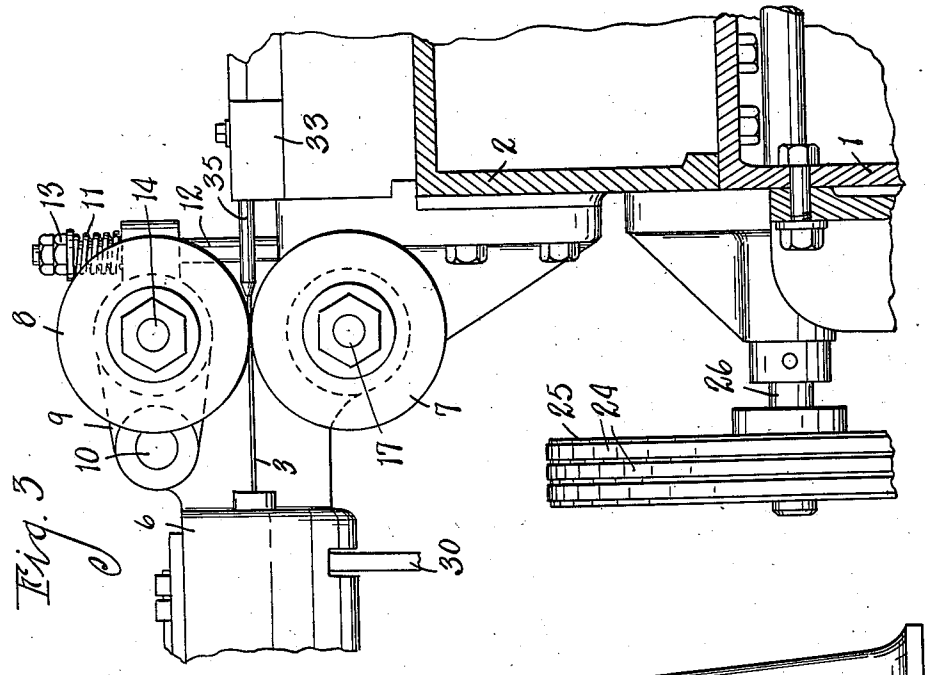


Fig. 3

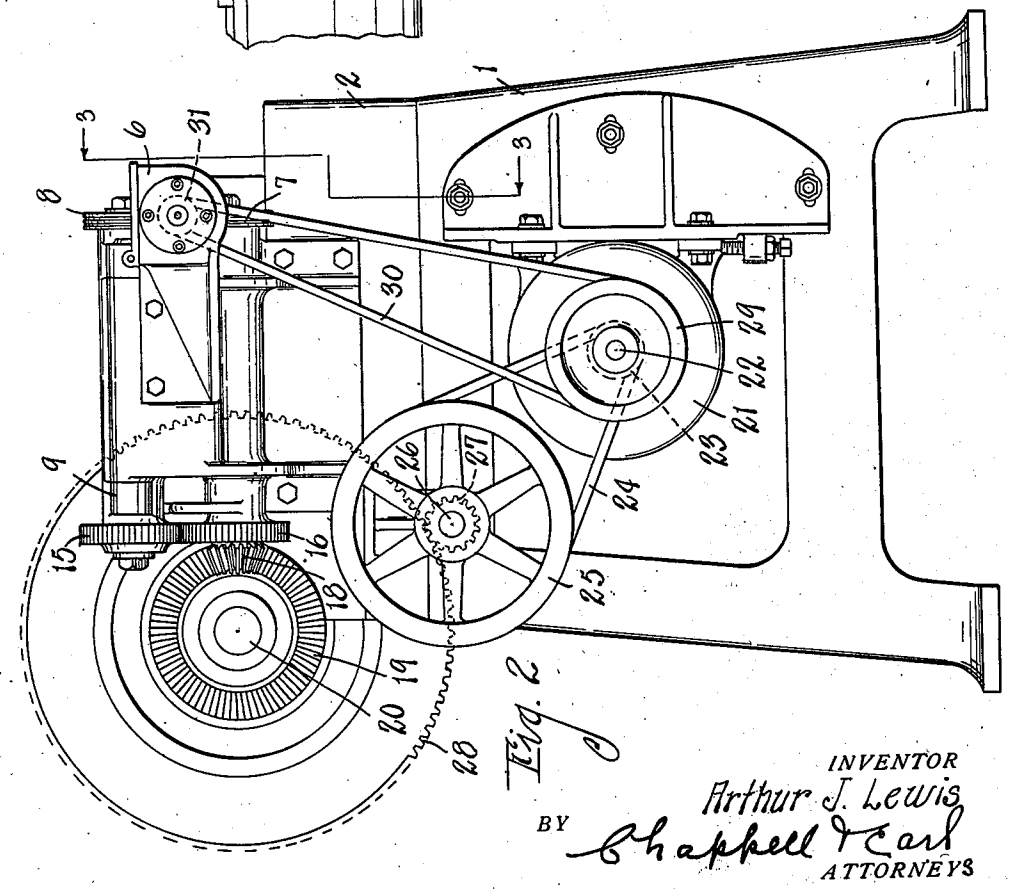


Fig. 2

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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 3

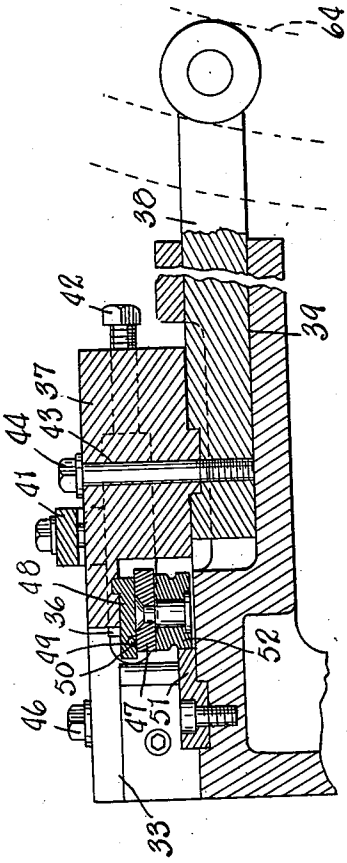


Fig. 5

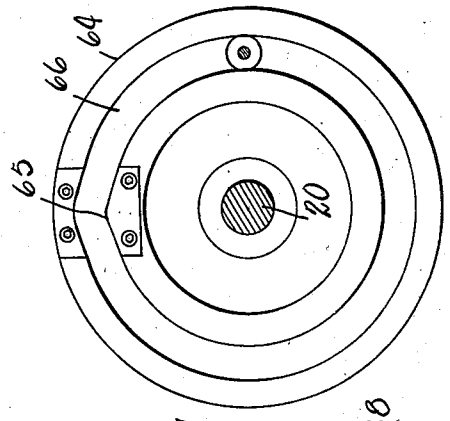


Fig. 7

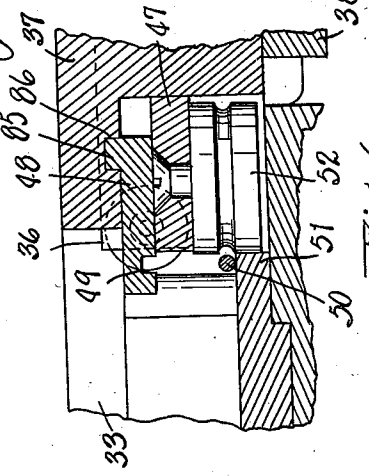


Fig. 6

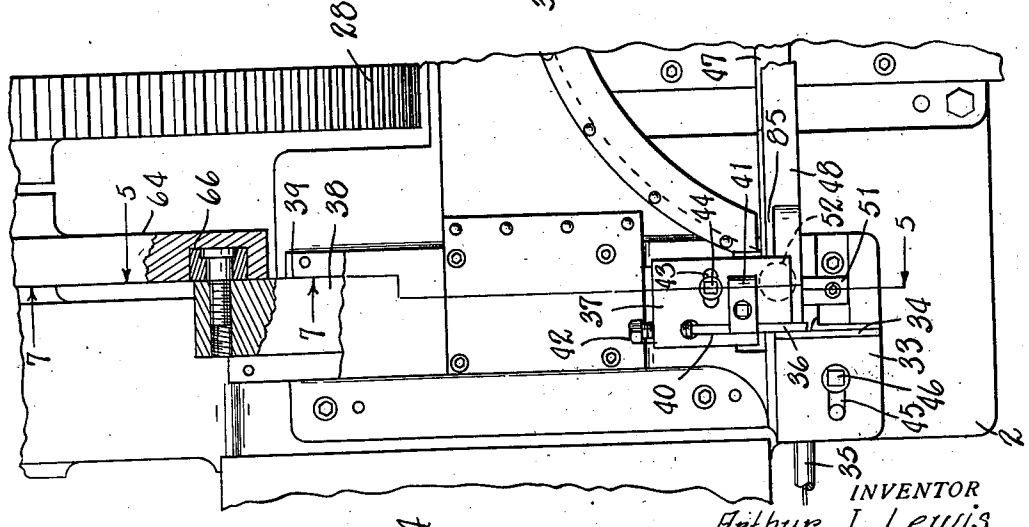


Fig. 4

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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 4

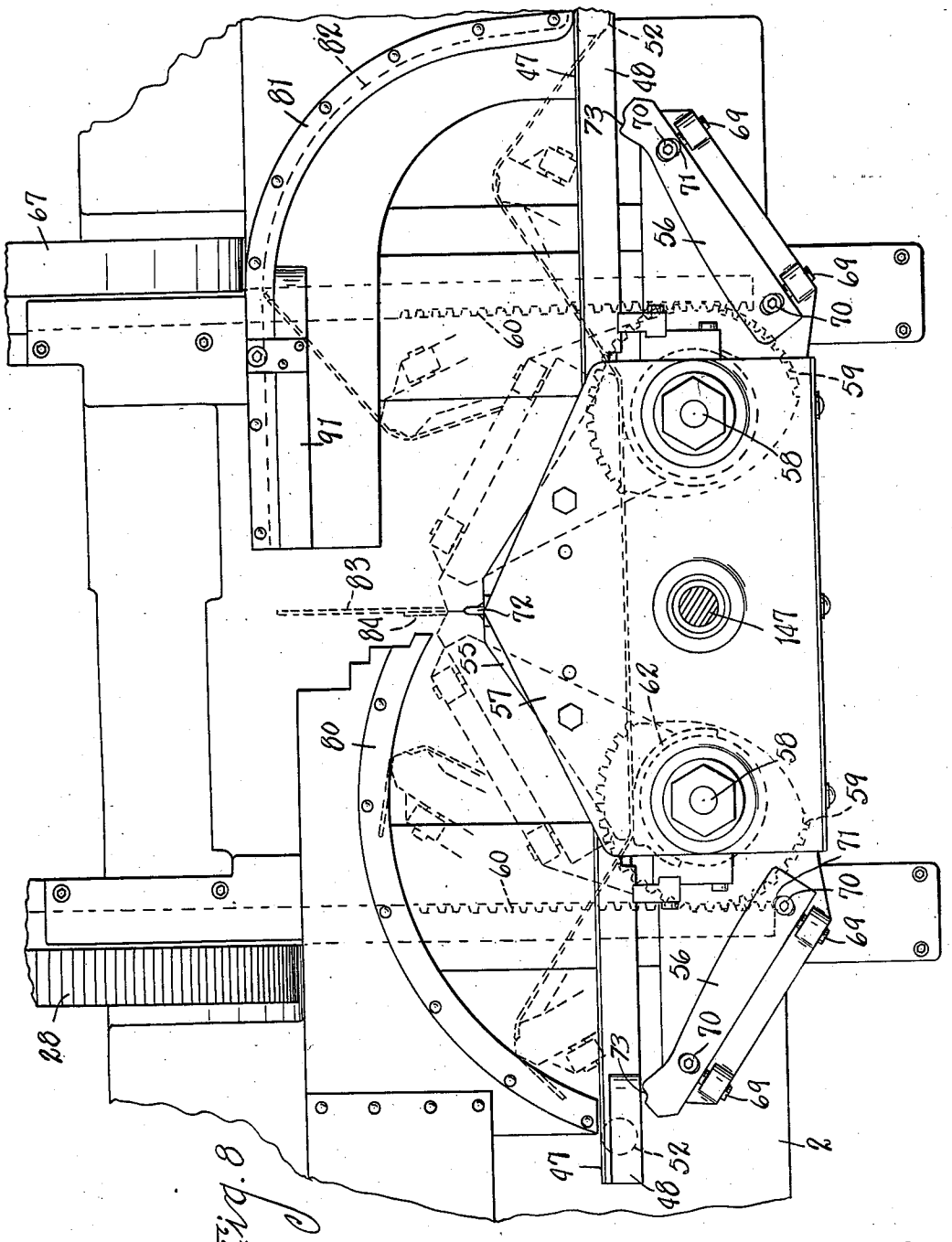


Fig. 8.

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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 5

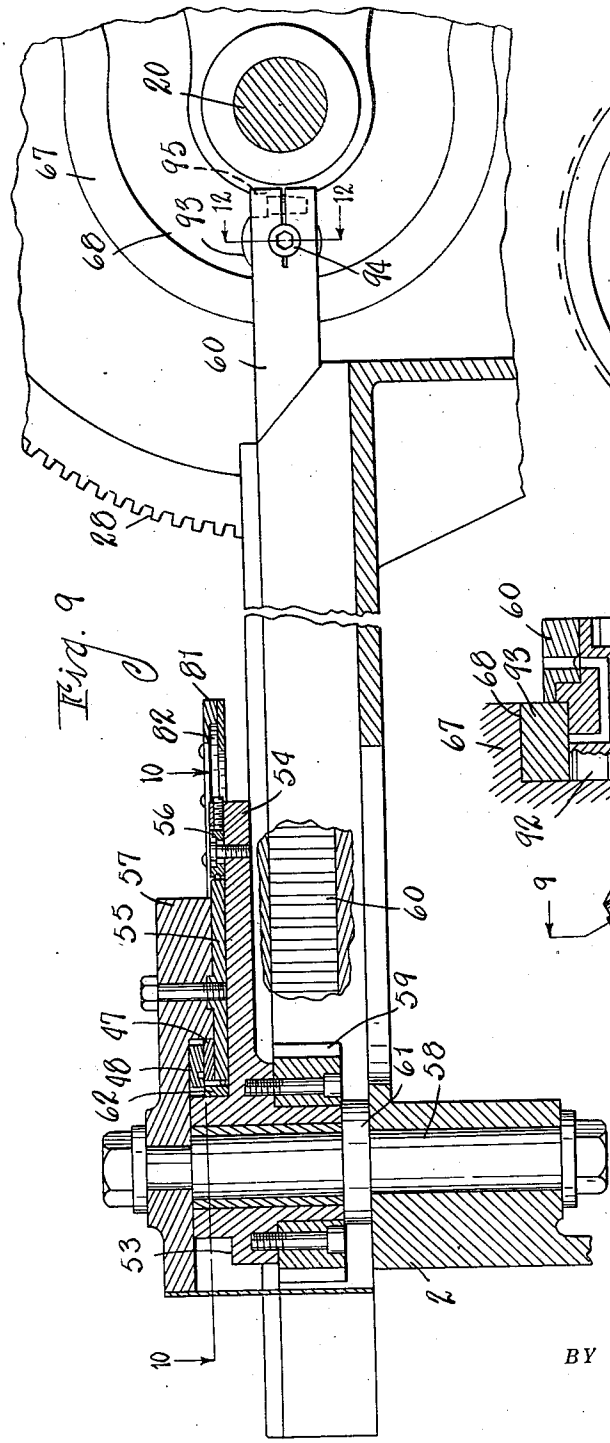


Fig. 9

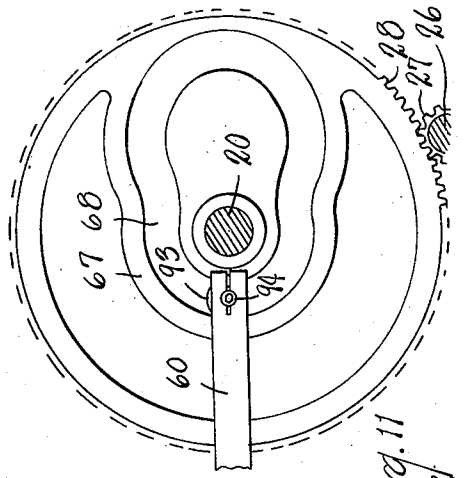


Fig. 11

Fig. 12

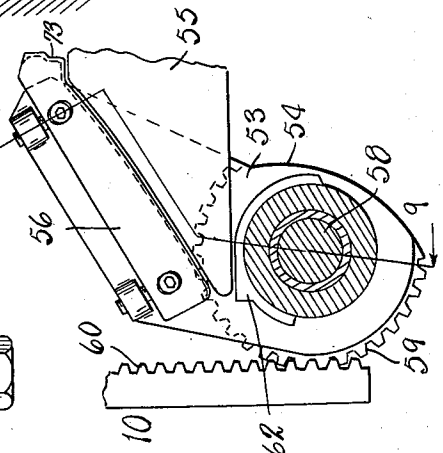


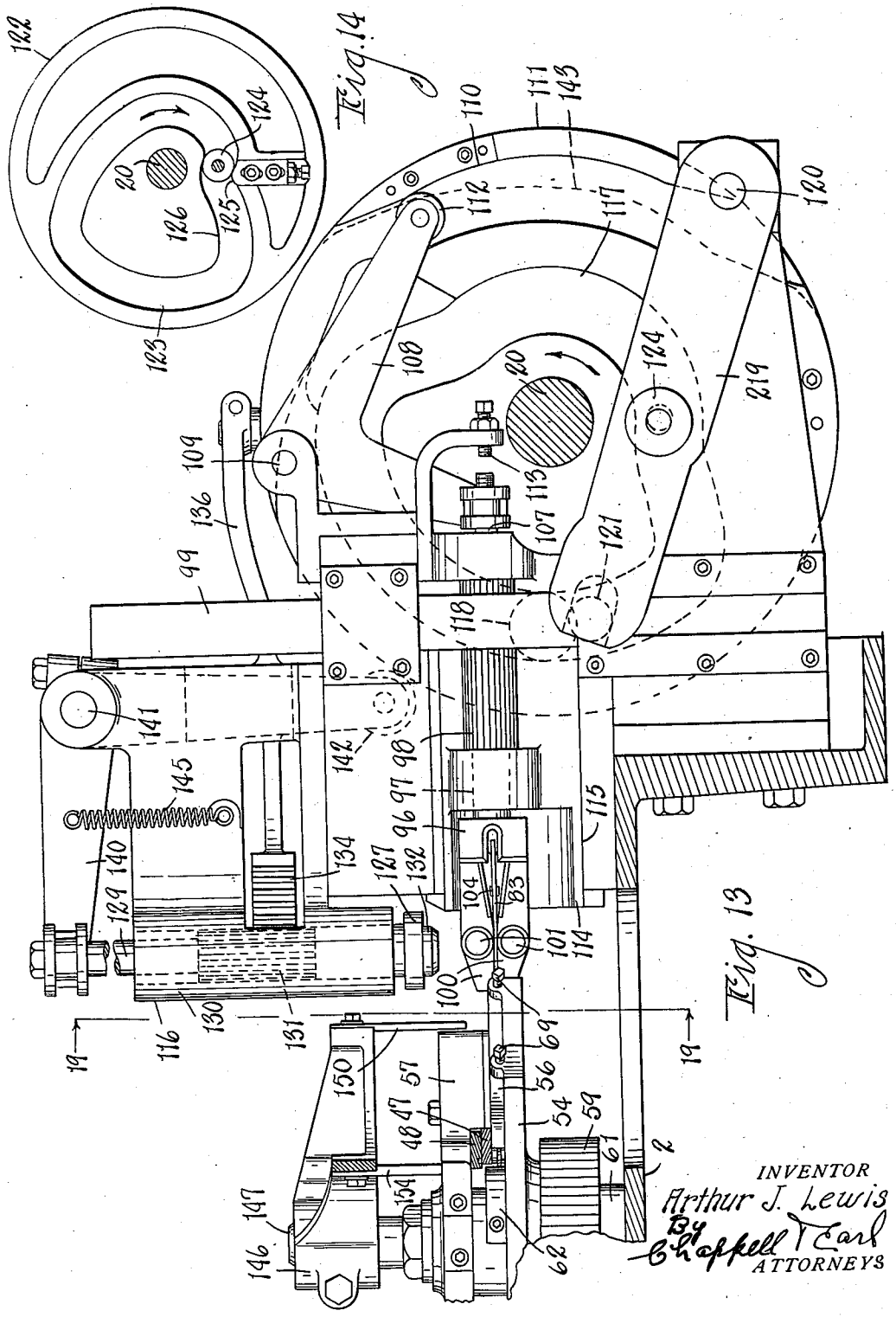
Fig. 10

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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 6



March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 7

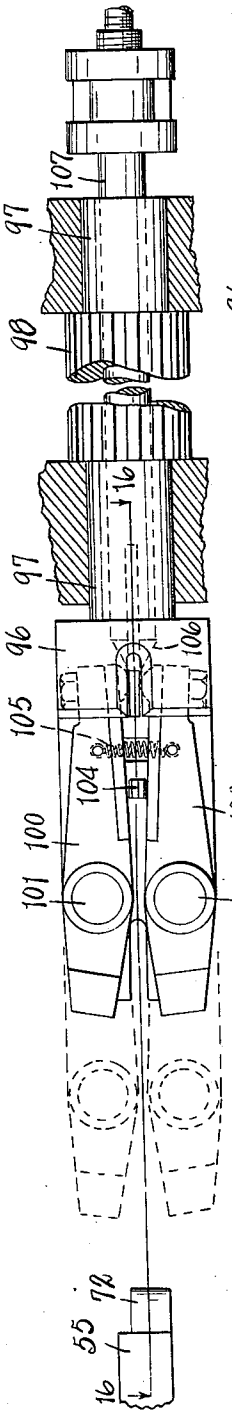


Fig. 15

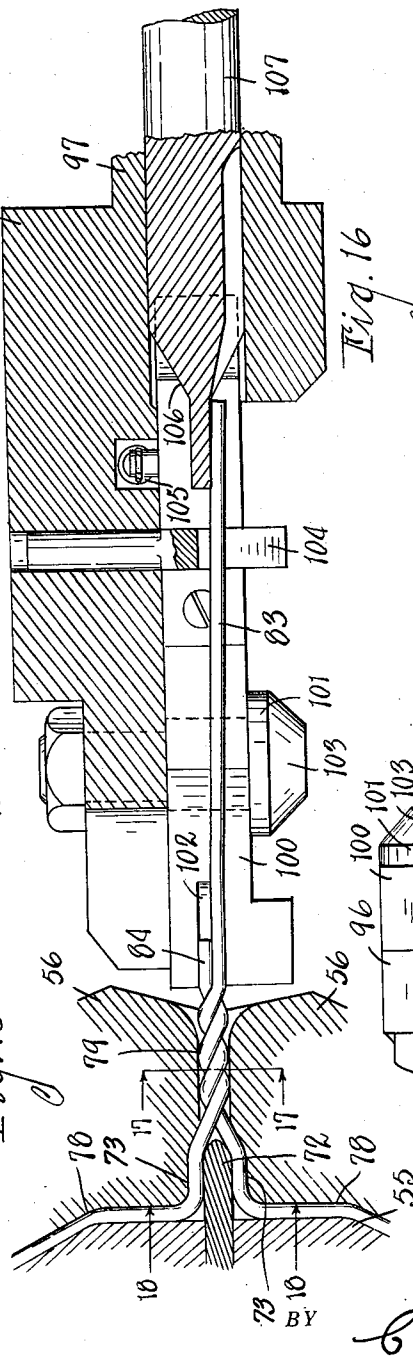


Fig. 16

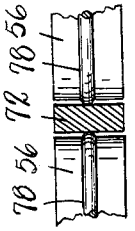


Fig. 18

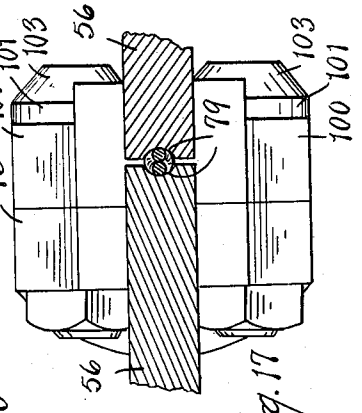


Fig. 17

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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 8

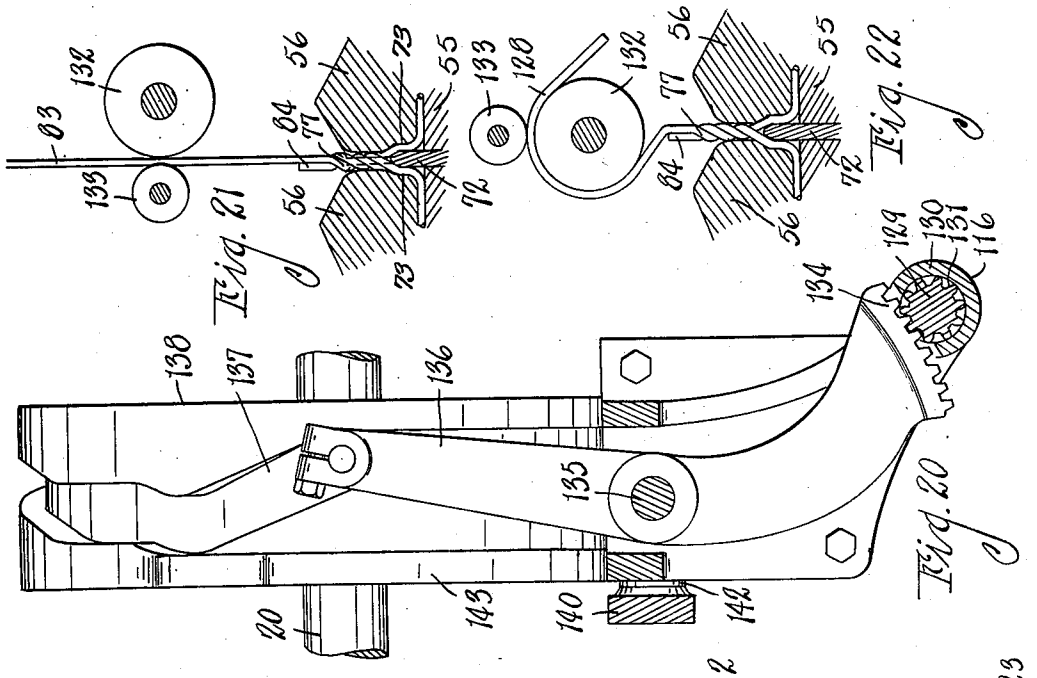


Fig. 21

Fig. 22

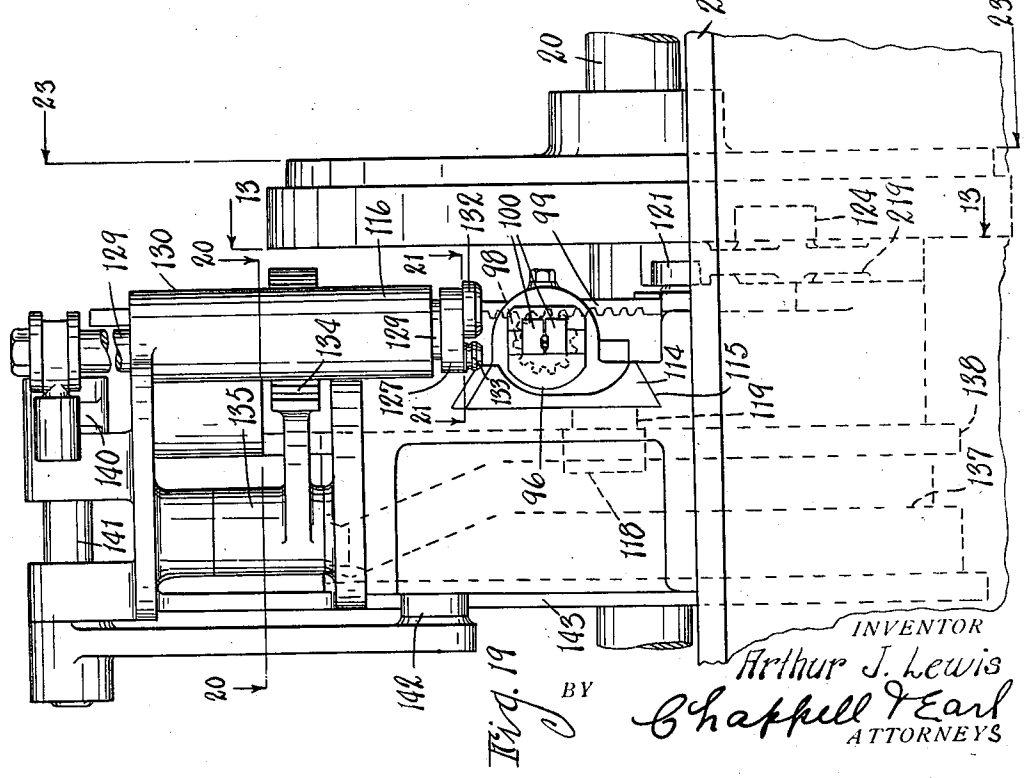


Fig. 20

Fig. 19

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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 9

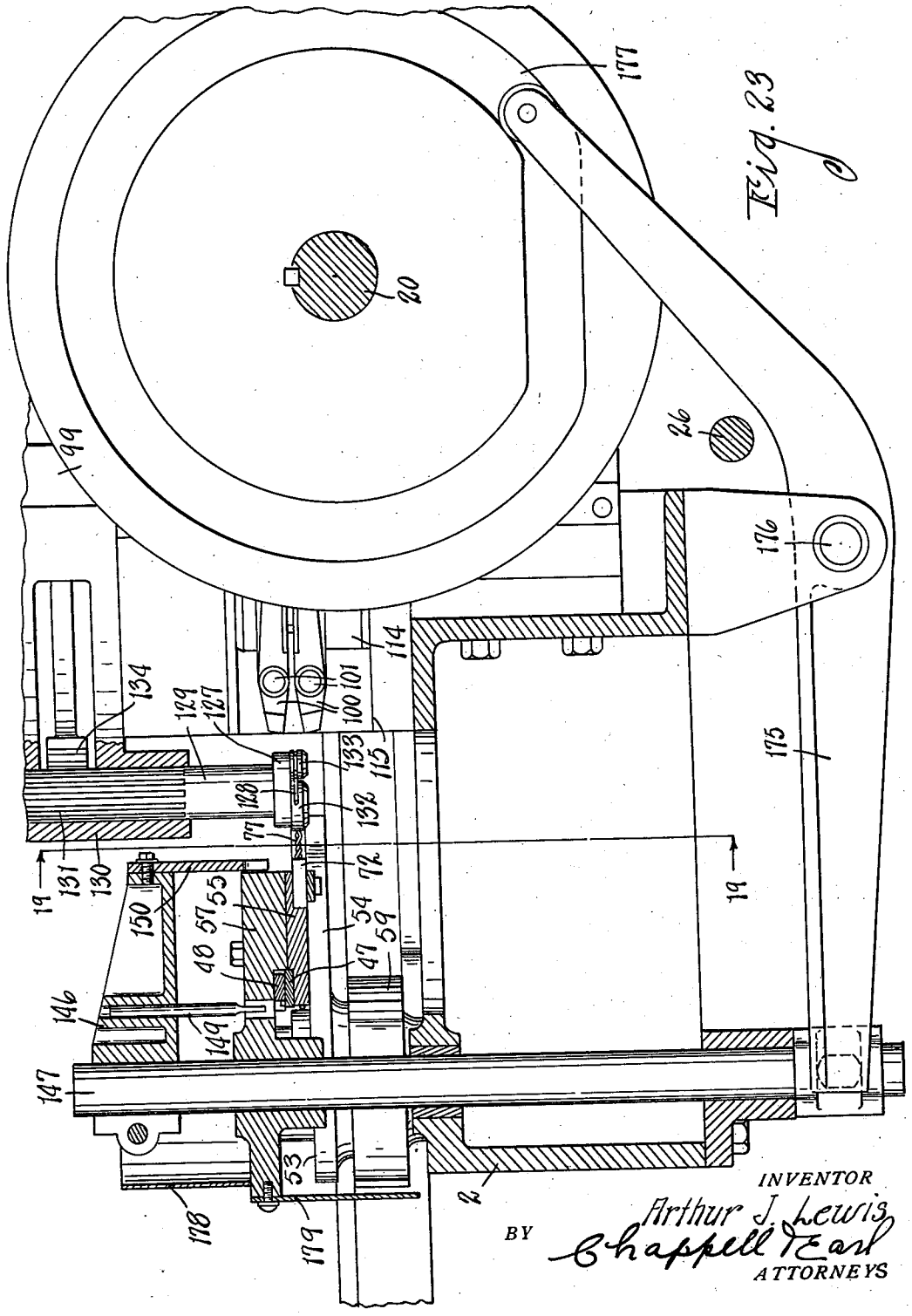


Fig. 23

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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 10

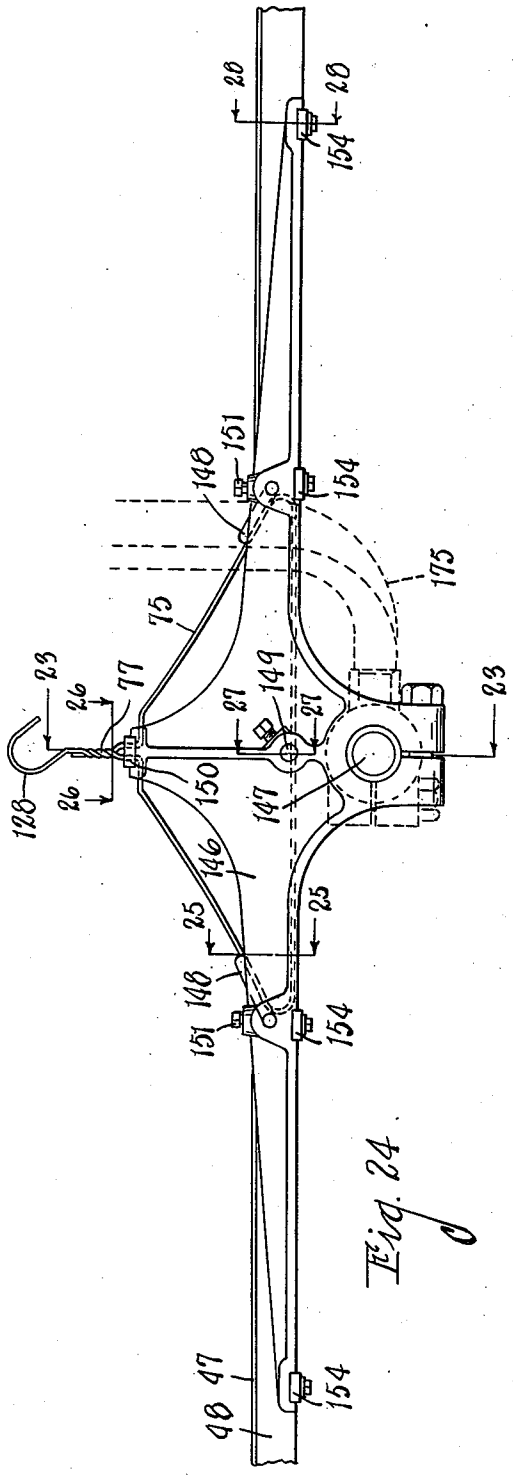


Fig. 24

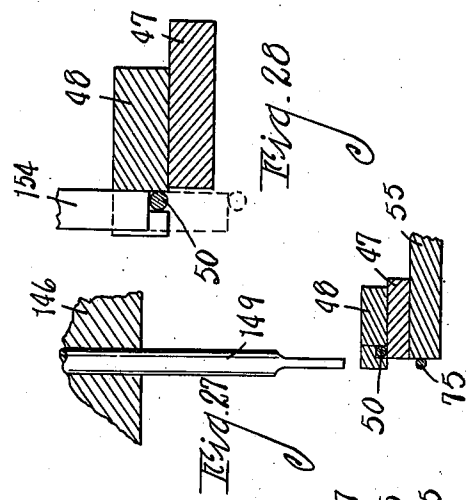


Fig. 28

Fig. 27

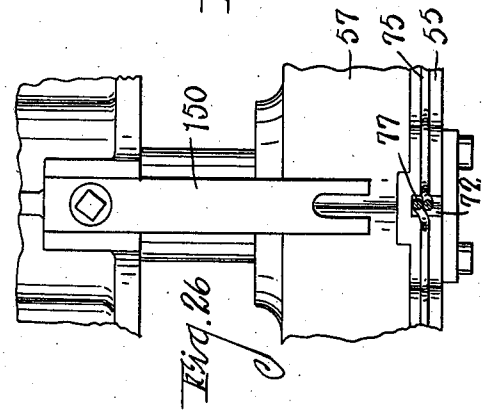


Fig. 26

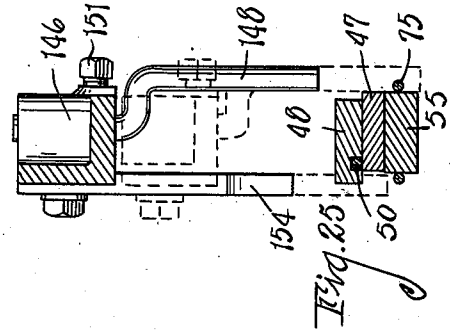


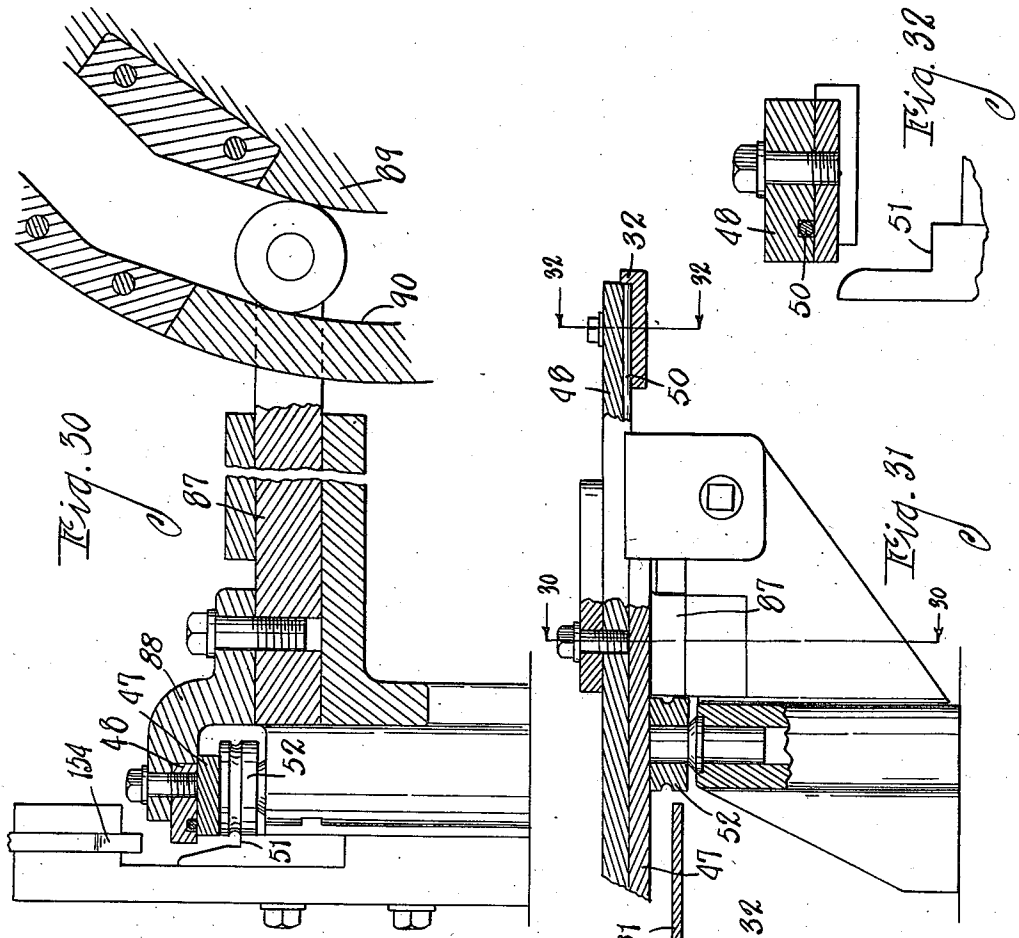
Fig. 25

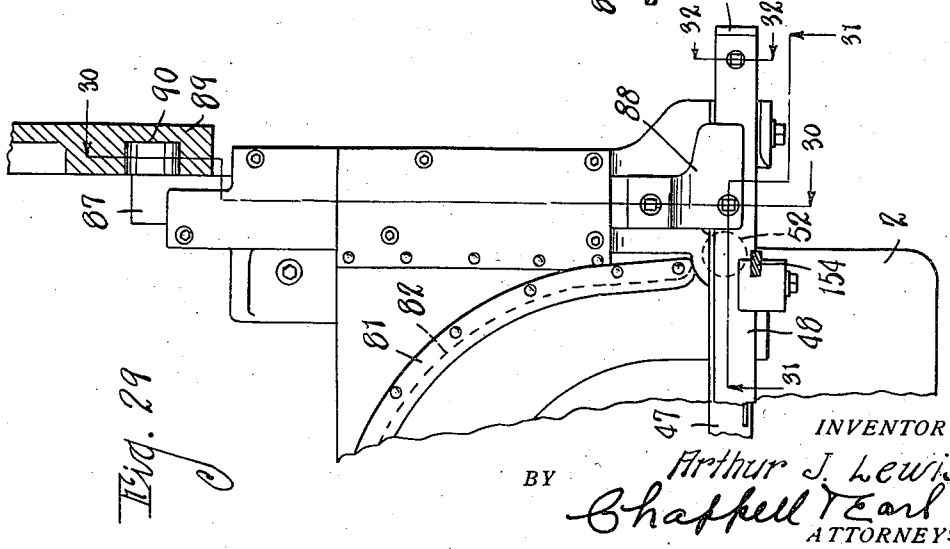
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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 11



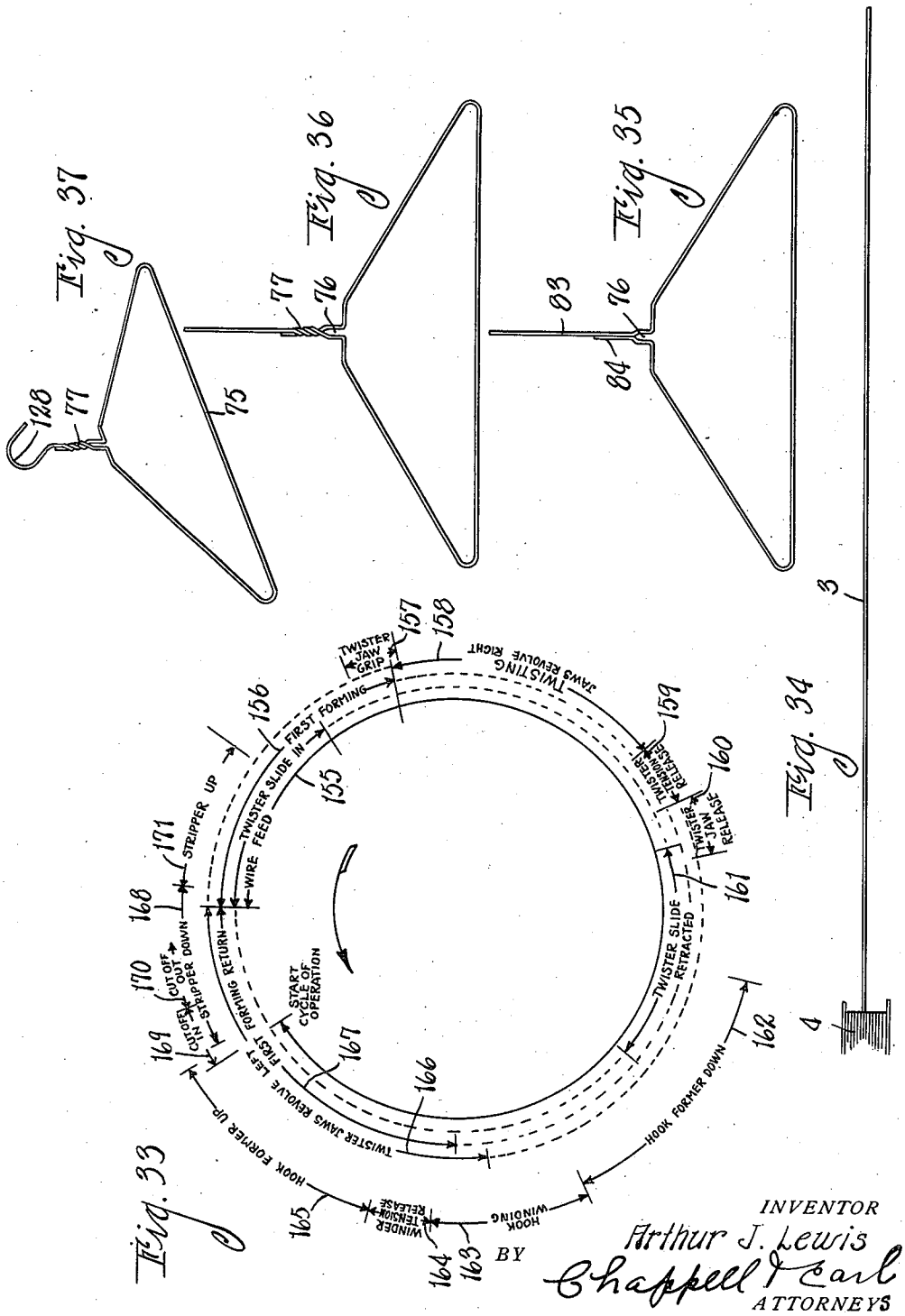


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March 31, 1936. A. J. LEWIS 2,035,658

WIRE WORKING MACHINE

Filed March 24, 1934 12 Sheets-Sheet 12



Patented Mar. 31, 1936 2,035,658

UNITED STATES PATENT OFFICE

2,035,658

WIRE WORKING MACHINE

Arthur J. Lewis, Stratford, Conn., assignor to The Baird Machine Company, Bridgeport, Conn., a corporation of Connecticut

Application March 24, 1934, Serial No. 717,183

59 Claims. (Cl. 140—71)

The main objects of this invention are:

First, to provide a wire working machine especially adapted for the manufacture of garment hangers which is of very large capacity.

Second, to provide a wire working machine which is entirely automatic in operation.

Third, to provide a wire working machine in which the wire is fed to the forming position by a continuously driven feed which operates to position a piece of wire in forming position while the forming operations are being performed on a previously fed piece.

Fourth, to provide a wire working machine which produces a very uniform product and one in which all parts are sturdy and, hence, rigid and durable.

Fifth, to provide a garment hanger forming machine in which the parts may be readily changed and adjusted to enable the production of hangers of different shapes.

Objects pertaining to details and economies of construction and operation of my improved hanger forming machine will definitely appear from the detailed description to follow. The invention is defined in the claims.

A machine embodying the features of my invention is clearly illustrated in the accompanying drawings, in which:

Fig. 1 is a plan view of a wire working machine, adapted for the forming of garment hangers, embodying my invention.

Fig. 2 is an end elevation looking from the left of Fig. 1.

Fig. 3 is an enlarged fragmentary view partially in vertical section on line 3—3 of Fig. 2 showing details of the wire feed means.

Fig. 4 is an enlarged fragmentary view showing portions of the left hand end of the machine, particularly the cut-off.

Fig. 5 is a fragmentary view sectioned on line 5—5 of Figs. 1 and 4.

Fig. 6 is a fragmentary section corresponding to that of Fig. 5 with the parts in another position, the piece of stock shown in Fig. 5 having been delivered to forming position.

Fig. 7 is a face view of the cut-off or shear actuating cam on a line corresponding to line 7—7 of Fig. 4.

Fig. 8 is a fragmentary plan view with parts omitted illustrating the forming die and coacting formers, the formers being shown in different positions by dotted lines.

Fig. 9 is an enlarged fragmentary view partially in section on a line corresponding to line 9—9 of Figs. 1 and 10 showing details of the actuating means for the formers.

Fig. 10 is a fragmentary view on a line corresponding to line 10—10 of Fig. 9.

Fig. 11 is a face view of one of the former actuating cams.

Fig. 12 is a fragmentary view in section on line 12—12 of Fig. 9 showing details of the adjustment for the rack thrust roller whereby the position of the rack may be adjusted to compensate for wear, stock variations, and the like.

Fig. 13 is an enlarged detail partially in section on line 13—13 of Figs. 1 and 19 showing details of the twisting and hook forming mechanism.

Fig. 14 is a face view of the twister actuating cam taken on line 14—14 of Fig. 1.

Fig. 15 is an enlarged detail elevation partially in section of the twister.

Fig. 16 is an enlarged detail section on line 16—16 of Fig. 15.

Fig. 17 is a detail section on line 17—17 of Fig. 16 showing the relation of the formers to the work.

Fig. 18 is a fragmentary view in section on line 18—18 of Fig. 16 showing further details of the relation of the formers to the work.

Fig. 19 is an enlarged fragmentary view on line 19—19 of Figs. 13 and 23 showing details of the hook former.

Fig. 20 is an enlarged fragmentary view sectioned on line 20—20 of Fig. 19 showing details of the actuating means for the hook former.

Fig. 21 is a detail view sectioned on line 21—21 of Fig. 19 showing the hook forming means in its initial work engaging position.

Fig. 22 is a detail section corresponding to that of Fig. 21 showing the hook forming means in fully actuated position.

Fig. 23 is an enlarged detail view mainly in section on line 23—23 of Figs. 1 and 24 showing the operative relation of the forming means, the twister and the hook forming means, the hook forming means being in actuated position.

Fig. 24 is a detail plan view showing details of stock positioning and stripper or work knockout means.

Fig. 25 is an enlarged detail section on a line corresponding to line 25—25 of Fig. 24, the parts being shown in retracted position by full lines and in actuated position by dotted lines.

Fig. 26 is an enlarged detail view on line 26—26 of Fig. 24.

Fig. 27 is an enlarged detail section on line 27—27 of Fig. 24.

Fig. 28 is an enlarged detail section on line 28—28 of Fig. 24.

Fig. 29 is a fragmentary plan view of means for actuating the right-hand end of the stock feed bar.

Fig. 30 is an enlarged detail view mainly in section on line 30—30 of Figs. 29 and 31.

Fig. 31 is an enlarged detail view mainly in section on line 31—31 of Fig. 29 showing further details of the stock feed means.

Fig. 32 is an enlarged detail section on line 32—32 of Fig. 31.

Fig. 33 is a diagram of the cycle of movement of the machine.

Fig. 34 is an illustration of the relation of the wire straightening means to the feed means.

Fig. 35 is a plan view of the work after the forming operations are completed.

Fig. 36 is a plan view of the work after the twisting operation.

Fig. 37 is a perspective view of the completed piece of work.

The embodiment of my invention illustrated is, as stated, a machine for making wire garment hangers.

The frame or pedestal 1 is of such design as to provide a rigid foundation and support for the various parts, the bed 2 being rigidly mounted on the frame. The stock 3 is fed to the machine from a bale or spool 4, the wire first passing through a wire straightening means of the rotary type indicated at 5 and disposed in the housing 6. The wire is drawn through the straightening means by the continuously delivering coacting feed rollers 7 and 8, the roller 8 being carried by the swinging bracket 9 pivoted at 10 and tensioned by the spring 11 on the rod-like support 12 arranged through the end of the bracket and having a spring tensioning nut 13 on its upper end. This bracket, see Figs. 1, 2 and 3, carries the driven shaft 14 for the upper feed roll. This shaft is provided with a pinion 15 at its rear end meshing with the pinion 16 on the shaft 17 of the lower feed roll. This shaft 17 has a beveled gear 18 meshing with the beveled gear 19 on the cam shaft 20 disposed in suitable bearings at the rear of the machine.

The machine illustrated has an individual driving motor 21, the shaft 22 of which has a pulley 23 connected by the belt 24 to a pulley 25 on the stub shaft 26 which is in turn provided with a pinion 27 meshing with the driven gear 28 on the cam shaft 20. The motor shaft 22 has a pulley 29 connected by the belt 30 to a pulley 31 on the rotary straightener 5, see Figs. 1 and 2. The driving belt 24 is of the multiple type.

With this arrangement the feed rolls are continuously driven advancing the stock until the front end thereof comes into contact with the stop 32 alined therewith, see Figs. 1 and 31. While the frictional engagement of the feed rollers with the stock is such as to positively advance it against the stop, the rolls slip during the period in which the stock is in position shown in Fig. 31, that is, with its end in engagement with the stock.

When the stock has reached this position it is cut off by a cutter comprising the shear block 33 having mounted on its front side the shear plate 34 to which the stock is advanced through the quill or guide 35. The cutter 36 which coacts with the shear plate is adjustably mounted in the reciprocating cutter head 37 mounted on and reciprocating with the slide 38. A suitable way 39 is provided for this slide, see Figs. 1, 4 and 5.

The cutter blade 36 is clamped in its holder 40 in the cutter head by means of the clamp or holder 41. An adjusting screw 42 is provided for adjusting the blade longitudinally.

The cutter head is mounted for transverse adjustment on the slide and has a slot 43 receiving the clamping bolt 44 as best shown in Figs. 4 and 5. This provides for very easy and accurate adjustment of the cutter. The shear block 33 is also mounted for adjustment and provided with a slot 45 receiving the clamping bolt 46, see Fig. 4.

When the wire is fed from the guide 35 it is delivered between the supporting bar 47 and the feed bar 48, the latter having a downwardly facing longitudinal slot 49, see Figs. 5 and 6. When the cutting mechanism described severs the stock the resulting work blank 50 is supported within this slot or between the feed bar and its coacting support, see Figs. 5 and 6. The severing movement of the slide 37, however, continues until the work is discharged upon the rests 51, dropping in front of the grooved rollers 52 disposed at the ends of the forming mechanism and upon the shoulders 53 of the former arms 54, which are positioned in cooperative relation to the form block or plate 55, see Figs. 9 and 10. The form plate 55 is of suitable size and shape to correspond with the body portion of the hanger which is to be formed thereon.

The former arms 54 carry the formers 56 which coact with the form block, bending the arms of the hanger around the form block. The from plate 55 is mounted on the under side of the supporting plate 57 which is mounted upon the shouldered upper ends of the fixed posts or shafts 58 supported on the bed of the machine. The purpose of thus mounting the form plate is to permit the work to be ejected downwardly through the bed or frame of the machine.

The former arms 54 are pivotally mounted on these shafts 58 and provided with pinions 59 coacting with the racks 60 for actuating the former arms, see Fig. 9. The hubs of the former arms rest upon collars 61 on the shaft or post 58, the top supporting plate 57 holding the parts in proper assembled relation. The hubs of the former arms are provided with cammed clamping members 62 which cooperate with the front side of the form plate in gripping the wire adjacent the ends of the form plate during the final forming of the hanger upon the form plate.

When the stock is discharged from the cutter the former arms are in the position shown by full lines in Fig. 8. This discharging position is momentary, and it will be noted by reference to the actuating cam 64 for the cutter head that the actuating ratchet 65 of the cam groove 66 is embraced by a relatively small portion of the circumference of the cam so that the feed bar 48 is quickly returned to its receiving position. As soon as the longitudinal slot or groove 49 is brought into register or alinement with the wire guide 35 the feeding of the wire is resumed.

The racks 60 for actuating the former arms are actuated in unison from the cams 67 on the main cam shaft, one of these cams being on the face of the gear 28 through which the shaft 20 is driven. These cams are formed with a considerable dwell portion 68, see Fig. 9, the purpose being to hold the former arms in their fully actuated position during the twisting and hook forming operations.

The formers 56 are adjustably mounted upon the former arms, adjusting screws 69 being pro-

vided. The formers are secured in their adjusted positions by means of bolts 70 engaging slots 71 in the formers. The form plate, which is of general triangular shape, is provided with a central tongue or projection 72 at its apex, which coacts with the conformed end portions 73 of the formers in providing the hanger, designated generally by the numeral 75, Fig. 37, with a loop 76 at the apex of the shank 77. This tongue further coacts in holding the ends of the wire during the twisting operation.

The formers have wire receiving grooves 78 in their inner faces and in their ends, see Figs. 16 and 17. The outer portions 79 of these grooves in the ends of the hangers are of such size as to permit twisting of the wire within the groove and while it is firmly clamped in the grooves 78 upon the form plate and its tongue 72.

The rollers 52 are positioned at the ends of the guides 80 and 81 which have undercut or grooved faces 82 receiving and guiding the ends of the stock as they are swept around by the closing actuation of the formers. The rollers 52 are positioned at the ends of these guides, and inasmuch as the ends of the stock project beyond these rollers, as the stock is delivered to forming position, initial bends or angles are formed in the arms of the stock as the ends are drawn around these rollers and guided thereby into the guides 80 and 81, see the several positions of the parts indicated in Fig. 8.

The bends formed in the arms of the stock are approximately right-angled bends as shown in the first dotted position in Fig. 8 so that as the work is carried to the completely formed position shown in that figure the ends are given a final set or forming operation as they are clamped upon the form and upon a tongue and brought into parallel relation as shown in Fig. 35. It will be observed that one end 83, see Fig. 35, is substantially longer than the other end 84, thus providing stock for the hook of the shank. The position of the stop 32 determines the length of the longer arm of the shank.

To operate the feed bar 48 one end is engaged as described with the cutter head 37, the feed bar having a lug 85 engaging a recess 86 in the head, see Figs. 5 and 6. The opposite end of the feed bar is actuated in synchronism by means of the slide 87 having an overhanging arm 88 to which the bar is secured, see Fig. 30. The slide 87 is actuated by a cam 89, the cam groove 90 of which corresponds to the cam groove of the cutter actuating cam 64. With this arrangement of parts the stock is accurately positioned relative to the form block and the former arms, the swinging movement of the former arms bending the ends of the stock and carrying them into the guides, as stated, and holding them around and upon the form block.

To provide further security in the retaining engagement of the guide 81 with the long arm of the shank, the guide is provided with a spring 91 which overlies the path of the wire, see Fig. 8. This insures the proper guiding of the shank ends of the stock to the twister. During the latter part of the stroke of the forming arms, the clamping member 62 on the former arms securely grips the work and prevents its sliding movement as the final forming stress is applied thereto.

In order to provide adjustment for the throw of the former arms the journals 92 of the cam engaging rollers 93 are eccentrically disposed relative to their supporting studs 94. These supporting studs are rotatable in the racks and are secured in adjusted position by means of the screws 95 engaging the split ends of the rack, see Fig. 9. This provides a fine adjustment, compensating for light inaccuracies in machining and those resulting from wear.

When the shank arms are brought into final position by the closing of the former arms or jaws, they are brought into operative relation to the twister, which comprises a twister head 96 supported for rotative and axial movement on the shaft 97. This shaft has an elongated pinion 98 driven from the vertically reciprocating rack 99, this arrangement being such that the shaft is rotated while it is being reciprocated.

On the twister head is a pair of jaws 100 mounted on opposed pivots 101 and lying, when in advanced position, so that the arms of the shank are swung between them during the final closing movement of the forming members. The faces of the jaws have longitudinal slots 102 at the outer ends of the jaws adapted to receive the wires when the jaws are closed thereon, thereby engaging and holding the wires in parallel relation with the jaws.

To facilitate the guiding of the long arm of the shank into the jaws, the pivots 101 are provided with beveled heads 103, and as a further guide means the twister head 96 is provided with a forked guide 104 projecting between the inner ends of the jaws. The jaws are urged to open position by means of the spring 105. They are closed upon the work by means of the wedge-shaped reciprocating cam 106 secured to the end of the push rod 107 arranged longitudinally through the shaft 97. This rod is actuated from the bent lever 108 pivoted at 109 and suitably connected to the end of the push rod at one end, the other end of the lever being operatively associated with an actuating cam 110 on the cam wheel 111.

It will be noted that the cam 110 is open at its ends, and to insure the roller 112 on the lever being picked up by the cam an adjustable stop 113 is provided limiting the outstroke of the push rod, see Fig. 13.

The twister head and its supporting shaft are mounted on the carriage 114 disposed in a suitable horizontally disposed slideway 115, see Figs. 13 and 19, which permits bodily retraction of the twister mechanism out of the path of the hook former designated generally by the numeral 116. This twister carriage 114 is actuated by the cam member 111, which is provided with a cam groove 117 cooperating with a roller 118 carried by the stud 119 projecting from the carriage.

The rack 99 is operated in proper timed relation to the hanger forming operations and the hook forming mechanism, the actuating means comprising the lever 219 pivoted at 120 and slotted to engage the pin 121 on the lower end of the rack which reciprocates in a suitable sli leway or guide, the lever being actuated by the cam 122 having a cam groove 123 in the face thereof and receiving the roller 124 on the lever 219. The cam groove 123 is provided with an adjustable ratchet 125 located at the end of the portion 126 of the cam groove which actuates the twister to twist the shank. The purpose of this is to compensate for the slight tendency of the twisted wires to react or untwist as a result of the twisting stresses placed thereon.

As the roller passes from this lift it imparts a slight reverse movement to the twister shaft and at this time the carriage is retracted, withdrawing the twister from the path of the hook former.

While the twister carriage is in retracted position the hook forming head 127 is actuated to operative position and rotated to form the hook 128.

The twister head is carried by the shaft 129 rotatively mounted in the vertical bearing 130 and provided with an elongated pinion 131. The hook forming head 127 is provided with a circular form member 132 disposed off center relative to the head and a cooperating bending roll 133 acting as the shaft is rotated to wrap the end of the shank around the form, the form 132 at the same time swinging to centrally position the hook as shown in Fig. 22, that is, to bring the hook into a balanced position relative to its shank. The roller 133 is preferably grooved to minimize the lateral slipping of the work.

When the hook forming head is advanced to work engaging position the circular form block and the forming roller are in the position shown in Fig. 21. The shaft 129 is then rotated to hook forming position shown in Fig. 22 and the shaft is then retracted. The shaft 129 is rotated by means of the segment 134 pivoted at 135 and having an arm 136 engaging the peripheral cam groove 137 in the cam member 138 on the shaft 20. This cam groove is so conformed that the hook forming end is rotated in its advanced or work engaging position; it is then retracted and rotated in the opposite direction to initial position.

The reciprocation of the head is effected through the bell crank lever 140 pivoted at 141 and provided with a roller 142 coacting with the cam 143 on the periphery of the cam member 138. The lever 140 is controlled by the cam 143 on the cam member 111, this being preferably shaped to synchronize the reciprocating movement of the hook forming head with its rotative movement and the reciprocating movement of the twister head. A spring 145 holds the roller 142 into engagement with the cam member. The elongation of the pinion 131 permits the rotative actuation of the shaft 129 as described at the ends of its stroke.

The form plate or block 55, as stated, is mounted on the under side of the support 57 so that the completed hangers are discharged downwardly through the bed of the machine. The work ejector consists of a crosshead 146 mounted on the reciprocating plunger rod 147 disposed centrally at the front of the machine, the crosshead having a pair of end knock-outs 148, a central knock-out 149 and a rear knock-out 150. These are supported for vertical adjustment in the crosshead, set-screws 151 being provided for securing them in their adjusted positions. When the crosshead is in its raised or normal position the lower ends of the tappets or knock-outs are above the work. As the crosshead is lowered the work is stripped from the form plate and, as stated, discharged downwardly through a central opening in the bed of the machine to a chute or guide, not illustrated. The tappet 150 is forked at its lower end to embrace the shank, see Fig. 26.

This crosshead also carries a series of stock positioning members or pushes 154 disposed in alinement and reciprocating at the front of the bar-like work rest 47 so that when the severed piece of stock is discharged by the feed bar 49 it is positively carried down upon the positioning supports as described. The details of the work ejector and stock positioning means are illustrated in Figs. 24–28, inclusive.

The plunger rod 147 is actuated by means of the lever 175 pivoted at 176 and controlled by the cam 177, see Fig. 23. A guard 178 is provided for the crosshead, see Figs. 1 and 23, and an apron-like guard 179 is provided for the pinions 59.

This arrangement permits substantially continuous feed of the stock and the finished work is discharged without necessitating retraction or positioning of the operating parts other than is necessary in their forming function and to receive the stock.

In Fig. 33 I have illustrated by chart or diagram the cycle of movements of the several coacting elements of the machine, these elements being illustrated by concentric circles and the period of their functioning relative to the other parts being shown by full lines. By reference to this diagram it will be noted that the wire fed, indicated by the line 155, is interrupted but a relatively short period.

The first forming step is indicated by the line 156; the twister jaw grip is indicated at 157; the succeeding twisting is indicated at 158, and the succeeding twister tension release is indicated at 159. The twister jaw release is indicated at 160 and the twister slide retraction is indicated at 160. The next step, the movement of the hook former into work engaging position, is indicated at 162; the hook winding or forming is indicated at 163 and the succeeding hook former tension release is indicated at 164. The hook former retraction or up movement is indicated at 165. The left or return movement of the twister jaw is indicated at 166 and the former return at 167, followed by a stripper down or discharge stroke 168. During this stripper down stroke the cut-off 169 in or work stroke and 170 out stroke occurs. The stripper up stroke 171 occurs during a portion of the first forming stroke. It will be noted that there is some overlapping in the operation of these various elements but they are synchronized with the purpose of securing maximum use.

My improved wire working machine is of very large capacity, results in a uniform product, and requires a minimum amount of attention. The parts are so formed and arranged that the stress thereon in operation is minimized, which results in durability.

I have not attempted to illustrate certain modifications and adaptations which might be desirable for particular work as it is believed that this disclosure will enable those skilled in the art to which my invention relates to embody or adapt the same as may be desired.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a wire working machine, the combination with a bed having a work discharge opening, continuously driven stock feed rolls, a cutter, a horizontally disposed work supporting bar to which said feed rolls deliver provided with a stop at its end opposite said feed rolls, a feed bar slidably mounted on said work supporting bar and grooved to receive the work delivered from said feed rolls, work rests to which said feed bar delivers, a form plate suspended above said discharge opening of said bed in operative relation to said work rests and having a central tongue on its rear edge, forming arms pivotally mounted at the front of said form plate, formers having grooved work engaging faces adjustably mounted on said forming arms to coact with said form plate and its said tongue, a twister means and a

hook forming means successively operating on the work while it is clamped upon said form plate by said formers, an ejector and work positioning means comprising a cross-head provided with a plurality of strippers for stripping the formed work from said form plate and with work positioning means operative to position the work discharged from said feed bar, and means for actuating said cutter, feed bar, former arms, twister means, hook forming means and crosshead in timed sequence.

2. In a wire working machine, the combination of a horizontally disposed work supporting bar, a feed bar slidably mounted on said work supporting bar for transverse movement and having a longitudinal work receiving groove facing said work supporting bar and adapted to be uncovered when the feed bar is advanced, work rests to which said feed bar delivers, and a form plate in operative relation to said work rests.

3. In a wire working machine, the combination of a horizontally disposed work supporting bar, a feed bar slidably mounted on said work supporting bar for transverse movement and having a longitudinal work receiving groove facing said work supporting bar and adapted to be uncovered when the feed bar is advanced, work rests to which said feed bar delivers, a form plate in operative relation to said work rests, and forming arms pivotally mounted at the front of said form plate and provided with work rests and with cammed work clamping members acting to clamp the work against the form plate when the forming arms are actuated.

4. In a wire working machine, the combination of a horizontally disposed work supporting bar, a feed bar slidably mounted on said work supporting bar for transverse movement and having a longitudinal work receiving groove facing said work supporting bar and adapted to be uncovered when the feed bar is advanced, work rests to which said feed bar delivers, a form plate in operative relation to said work rests and having a central tongue on its rear edge, forming arms pivotally mounted at the front of said form plate, formers having grooved work engaging faces adjustably mounted on said forming arms to coact with said form plate and its said tongue, grooved curved guide members for the ends of the work as it is bent around said form plate, grooved work engaging rollers arranged at the forward ends of said guides, and a twister means and a hook forming means successively operating on the work while it is clamped upon said form plate by said formers.

5. In a wire working machine, the combination with a bed having a work discharge opening, continuously driven stock feed rolls, a cutter, a horizontally disposed work supporting bar to which said feed rolls deliver provided with a stop at its end opposite said feed rolls, a feed bar slidably mounted on said work supporting bar and grooved to receive the work delivered from said feed rolls, work rests to which said feed bar delivers, forming means including a form plate suspended above said discharge opening of said bed in operative relation to said work rests, an ejector and work positioning means comprising a vertically reciprocating crosshead provided with a plurality of strippers for stripping the work from said form plate and with work positioning means operative to position the work discharged from said feed bar, and means for actuating said cutter, feed bar, forming means and crosshead in timed sequence.

6. In a wire working machine, the combination with continuously driven stock feed rolls, a cutter, a horizontally disposed work supporting bar to which said feed rolls deliver provided with a stop at its end opposite said feed rolls, a feed bar slidably mounted on said work supporting bar and grooved to receive the work delivered from said feed rolls, work rests to which said feed bar delivers, forming means including a form plate supported in operative relation to said work rests, an ejecto and work positioning means comprising a vertically reciprocating crosshead provided with a plurality of strippers for stripping the work from said form plate and with work positioning means operative to position the work discharged from said feed bar, and means for actuating said cutter, feed bar, forming means and crosshead in timed sequence.

7. In a wire working machine, the combination of continously driven stock feed rolls, a horizontally disposed work supporting bar to which said feed rolls deliver provided with a stop at its end opposite said feed rolls, a feed bar slidably mounted on said work supporting bar to receive the work delivered from said feed rolls, work rests to which said feed bar delivers, forming means including a form plate suspended in operative relation to said work rests, and an ejector for discharging the formed work downwardly from said form plate.

8. In a wire working machine, the combination of a horizontally disposed work supporting bar, a feed bar slidably mounted on said work supporting bar for transverse movement, the feed bar having a longitudinal way for receiving the work, and forming means including a form plate to which said feed bar delivers by transverse movement.

9. In a wire working machine, the combination of continuously driven stock feed rolls, a cutter, a horizontally disposed work supporting bar to which said feed rolls deliver provided with a stop at its end opposite said feed rolls, a slidable feed bar positioned to receive the work delivered from said feed rolls, a form plate to which said feed bar delivers, pivotally mounted forming arms provided with work rests and with work clamping members acting to hold the work against the form plate when the forming arms are actuated, formers having grooved work engaging faces carried by said forming arms coacting with said form plate, a twister means and a hook forming means successively operating on the work while it is clamped upon said form plate by said formers, and an ejector and work positioning means for stripping the formed work from said form plate and positioning the work discharged from said feed bar relative to said form plate.

10. In a wire working machine, the combination of continuously driven stock feed rolls, a cutter, a horizontally disposed work supporting bar to which said feed rolls deliver provided with a stop at its end opposite said feed rolls, a slidable feed bar positioned to receive the work delivered from said feed rolls, a form plate to which said feed bar delivers, pivotally mounted forming arms, formers carried by said forming arms coacting with said form plate, a twister means and a hook forming means successively operating on the work while it is clamped upon said form plate by said formers, and an ejector and work positioning means for stripping the formed work from said form plate and positioning the work discharged from said feed bar relative to said form plate.

11. In a wire working machine, the combination of continuously driven stock feed rolls, a cutter, a horizontally disposed work supporting bar to which said feed rolls deliver provided with a stop at its ends opposite said feed rolls, a slidable feed bar positioned to receive the work delivered from said feed rolls, a form plate to which said feed bar delivers, pivotally mounted forming arms, formers carried by said forming arms coacting with said form plate, guides for the ends of the work as it is bent around said form plate, work engaging rollers arranged at the forward ends of said guides, a twister means and a hook forming means successively operating on the work while it is clamped upon said form plate by said formers, and an injector and work positioning means for stripping the formed work from said form plate and positioning the work discharged from said feed bar relative to said form plate.

12. In a wire working machine, the combination of a form plate having a central tongue on its rear edge, pivotally mounted forming arms provided with work rests and with work clamping members acting to hold the work against the form plate when the forming arms are actuated, formers having grooved work engaging faces carried by said forming arms coacting with said form plate and its said tongue, guides for the ends of the work as it is bent around said form plate, work engaging rollers arranged at the forward ends of said guides, a twister means and a hook forming means successively operating on the work while it is clamped upon said form plate by said formers, and a combined ejector and work positioning means for stripping the formed work from said form plate and positioning the work relative thereto.

13. In a wire working machine, the combination of a form plate, pivotally mounted forming arms provided with work rests and with work clamping members acting to hold the work against the form plate when the forming arms are actuated, formers carried by said forming arms coacting with said form plate, guides for the ends of the work as it is bent around said form plate, work engaging rollers arranged at the forward ends of said guides, a twister means and a hook forming means successively operating on the work while it is clamped upon said form plate by said formers, and a combined ejector and work positioning means for stripping the formed work from said form plate and positioning the work relative thereto.

14. In a wire working machine, the combination of a form plate having a central tongue on its rear edge, pivotally mounted forming arms provided with work rests and with work clamping members acting to hold the work against the form plate when the forming arms are actuated, formers having grooved work engaging faces carried by said forming arms coacting with said form plate and its said tongue, a twister means and a hook forming means successively operating on the work while it is clamped upon said form plate by said formers, and a combined ejector and work positioning means for stripping the formed work from said form plate and positioning the work relative thereto.

15. In a wire working machine, the combination of a form plate supported to permit the discharge of the work downwardly therefrom, a feed means including continuously driven feed rolls adapted to feed the stock in a plane above the form plate, means for supporting the stock delivered from said feed means and discharging it downwardly into operative relation to said form plate, pivotally mounted forming arms provided with stock rests and with work clamping members acting to hold the work against the form plate when the forming arms are actuated, formers on said forming arms coacting with said form plate, a twister means and a hook forming means operating successively on said work while it is clamped upon said form plate by said formers, and a vertically reciprocating stripper for discharging the work downwardly from said form plate and provided with work positioning members operative on the work ejecting stroke of said ejector.

16. In a wire working machine, the combination of a form plate supported to permit the discharge of the work downwardly therefrom, pivotally mounted forming arms provided with stock rests and with work clamping members acting to hold the work against the form plate when the forming arms are actuated, formers on said forming arms coacting with said form plate, a twister means and a hook forming means operating successively on said work while it is clamped upon said form plate by said formers, and a vertically reciprocating stripper for discharging the work downwardly from said form plate and provided with work positioning members operative on the work ejecting stroke of said ejector.

17. In a wire working machine, the combination of a form plate supported to permit the discharge of the work downwardly therefrom, pivotally mounted forming arms provided with stock rests and with work clamping members acting to hold the work against the form plate when the forming arms are actuated, formers on said forming arms coacting with said form plate, grooved curved guide members for the ends of the work as it is formed around said form plate, said guide members being provided with work engaging rollers at their forward ends, a twister means and a hook forming means operating successively on said work while it is clamped upon said form plate by said formers, and a vertically reciprocating stripper for discharging the work downwardly from said form plate and provided with work positioning members operative on the work ejecting stroke of said ejector.

18. In a wire working machine, the combination of a form plate supported to permit the discharge of the work downwardly therefrom, a stock feed means delivering the stock downwardly into operative relation to said form plate, pivotally mounted formers coacting with said form plate and provided with work rests and with work clamping means acting to hold the work against one side of the form plate when the formers are actuated to form the work upon and clamp it to the form plate, and a stripper for discharging the work downwardly from said form plate.

19. In a wire working machine, the combination of a horizontal form plate supported to permit the discharge of the work downwardly therefrom, a stock feed means delivering the stock downwardly into operative relation to said form plate, pivotally mounted formers coacting with said form plate, and a stripper for discharging the work downwardly from said form plate.

20. In a wire working machine, the combination of a horizontal form plate supported to permit the discharge of the work downwardly therefrom, a stock feed means delivering the stock downwardly into operative relation to said form

plate, pivotally mounted formers coacting with said form plate, guide members for the ends of the work as it is wrapped around said form plate, and a stripper for discharging the work downwardly from said form plate.

21. In a wire working machine, the combination of forming means operating in a horizontal plane, a stock feed means including continuously driven feed rollers adapted to feed the stock in a plane above said forming means, a cutter operated in synchronism with said forming means, and a stock straightening means disposed in advance of said feed rollers whereby the stock may be fed from said feed rollers to its initial position within the machine during the forming operations on a previously fed piece of stock.

22. In a wire working machine, the combination of forming means operating in a horizontal plane, a stock feed means including continuously driven feed rollers adapted to feed the stock in a plane above said forming means, and a cutter operated in synchronism with said forming means whereby the stock may be fed from said feed rollers to its initial position within the machine during the forming operations on a previously fed piece of stock.

23. In a wire working machine, the combination of a horizontal form plate, a stock feed means delivering the stock into operative relation to said form plate, and pivotally mounted formers coacting with said form plate and provided with work rests and with work clamping means acting to hold the work against one side of the form plate when the formers are actuated to form the work upon and clamp it to the forming plate.

24. In a wire working machine, the combination of forming means operating in a horizontal plane, a friction stock feed means delivering the stock in a plane at one side of the plane of said forming means, a cutter operated in synchronism with said forming means, and a stock straightening means disposed in advance of said feed means whereby the stock may be fed from said feed means to its initial position within the machine during the forming operations on a previously fed piece of stock.

25. In a wire working machine, the combination of continuously driven friction stock feed means, a stop for the stock operatively associated therewith, a forming means including a horizontal form plate from which the work may be discharged downwardly disposed in a plane below the plane in which the stock is fed from said feed means, means cooperating with said form plate to form the work thereon, and an ejector engaging the work from above to discharge it from said form plate, said ejector also being provided with means for positioning the work relative to said form plate prior to forming operations thereon.

26. In a wire working machine, the combination of a form, pivotally mounted forming arms, pinions on said forming arms, racks coacting with said pinions, and actuating cams for said racks, said racks being provided with cam engaging rollers adjustably mounted on the racks.

27. In a wire working machine, the combination of a horizontal form, forming arms pivotally mounted at the front of said form and provided with work rests and with work clamping members acting to hold the work against one vertical side of the form while the forming arms are actuated to fold the work upon the form, and means for simultaneously actuating said arms.

28. In a garment hanger forming machine, the combination of a horizontal triangular form plate having a centrally disposed tongue at its apex, pivotally mounted formers provided with work holder means for holding the work against the edge of the form plate while they are actuated to wrap the work around and clamp it upon the form plate and upon its said tongue, guide members for the ends of the work as it is wrapped around said form plate, a twister means comprising jaws mounted for rotative and longitudinal reciprocating movement, said twister means being actuated so that the ends of the wire are carried into the jaws by said formers, means for rotating and reciprocating said twister, and a hook forming means mounted for reciprocating movement in a path transverse to the path of travel of said twister jaws and timed in its movement to engage the work while the twister is retracted.

29. In a garment hanger forming machine, the combination of a triangular form plate, pivotally mounted formers actuated to wrap the work around and clamp it upon the form plate, a twister means comprising jaws mounted for rotative and longitudinal reciprocating movement, said twister means being actuated so that the ends of the wire are carried into the jaws by said formers, means for rotating and reciprocating said twister, and a hook forming means mounted for reciprocating movement in a path transverse to the path of travel of said twister jaws and timed in its movement to engage the work while the twister is retracted.

30. In a garment hanger forming machine, the combination of a triangular form plate having a centrally disposed tongue at its apex, pivotally mounted formers provided with work holder means for holding the work against the edge of the form plate while they are actuated to wrap the work around and clamp it upon the form plate and upon its said tongue, guide members for the ends of the work as it is wrapped around said form plate, a twister means comprising jaws mounted for rotative and longitudinal reciprocating movement, said twister means being actuated so that the ends of the wire are carried into the jaws by said formers, and means for rotating and reciprocating said twister.

31. In a garment hanger forming machine, the combination of a horizontal triangular form plate having a centrally disposed tongue at its apex, pivotally mounted formers provided with work holder means for holding the work against the edge of the form plate while they are actuated to wrap the work around and clamp it upon the form plate and its said tongue, guide members for the ends of the work as it is wrapped around said form plate, and a twister means adapted to receive the ends of the wire wrapped around the form by said formers.

32. In a wire working machine, the combination of a triangular form plate provided with a central tongue at its apex, pivoted formers having grooved work engaging faces operatively associated with said form plate to fold and clamp the work thereon and upon said tongue, said formers having opposed recesses in the ends thereof beyond the end of the tongue permitting the twisting of the ends of the work therein, a twister means comprising a twister head mounted for rotative and reciprocating movement, a pair of twister jaws rotatably mounted on said head and adapted when the head is in advanced position to clamp the ends of the work, and a reciprocating hook forming means operating upon the work while it is clamped upon said form plate by said formers.

33. In a wire working machine, the combination of a triangular form plate provided with a central tongue at its apex, pivoted formers having grooved work engaging faces operatively associated with said form plate to fold and clamp the work thereon and upon said tongue, said formers having opposed recesses in the ends thereof beyond the end of the tongue permitting the twisting of the ends of the work therein, and a twister means for twisting the ends of the work together while clamped upon said form plate.

34. In a wire working machine, the combination of a form plate, formers operatively associated with said form plate to fold and clamp the work thereon, a twister means comprising a pair of twister jaws mounted for rotative and reciprocating movement and adapted when in advanced position to receive the ends of the work side by side as they are wrapped upon the form plate, and means for closing the jaws, then rotating them and then retracting them, and a reciprocating hook forming means operating upon the work while the twister is in retracted position and the work is clamped upon said form plate by said formers.

35. In a wire working machine, the combination of a form plate, formers operatively associated with said form plate to fold and clamp the work thereon, a twister means comprising a pair of twister jaws mounted for rotative and reciprocating movement and adapted when in advanced position to receive the ends of the work side by side as they are wrapped upon the form plate, and means for closing the jaws, then rotating them and then retracting them.

36. In a wire working machine, the combination of a reciprocating twister carriage, a twister head provided with a shaft mounted on said carriage and having an elongated pinion, a pair of twister jaws pivotally mounted on said head, a form, formers coacting to bend the work around the form and position end portions thereof within the jaws in side by side relation with one end extending substantially beyond the other, the forward end of the twister head being slotted to permit the shorter arm of the work to enter the jaws, the jaw pivots having conical heads constituting guides for the longer arm of the work, a forked guide projecting between the rear ends of the jaws to receive the longer end of the work, a spring acting to open the jaws, a jaw closing cam reciprocating longitudinally of the twister head shaft, a rack cooperating with said pinion of said twister head shaft, and cam means cooperating with said twister carriage, rack and jaw closing cam for actuating them in timed relation.

37. In a wire working machine, the combination of a reciprocating twister carriage, a twister head provided with a shaft mounted on said carriage and having an elongated pinion, a pair of twister jaws pivotally mounted on said head, a form, formers coacting to bend the work around the form and position end portions thereof within the jaws, a spring acting to open the jaws, a jaw closing cam reciprocating longitudinally of the twister head shaft, a rack cooperating with said pinion of said twister head shaft, and cam means cooperating with said twister carriage, rack and jaw closing cam for actuating them in timed relation.

38. In a wire working machine, the combination of a reciprocating twister carriage, a twister head provided with a shaft mounted on said carriage and having an elongated pinion, a pair of twister jaws pivotally mounted on said head, a form, formers coacting to bend the work around the form and position end portions thereof within the jaws, a spring acting to open the jaws, a jaw closing cam reciprocating longitudinally of the twister head shaft, a rack cooperating with said pinion of said twister head shaft, and cam means cooperating with said twister carriage, rack and jaw closing cam for actuating them in timed relation, the rack actuating cam being operative to rotate the twister head to impart a twist to the work and then to impart a relatively slight reverse movement thereto while the head is in its forward position and to complete the reverse movement when the head is in its retracted position.

39. In a wire working machine, the combination of a reciprocating twister carriage, a twister head provided with a shaft mounted on said carriage and having an elongated pinion, twister jaws pivotally mounted on said head, forming means acting to position end portions of the work within the jaws, a spring acting to open the jaws, a jaw closing cam reciprocating longitudinally of the twister head shaft, a rack cooperating with said pinion of said twister head shaft, and cam means cooperating with said twister carriage, rack and jaw closing cam for actuating them in timed relation, the rack actuating cam being operative to rotate the twister head to impart a twist to the work and then to impart a relatively slight reverse movement thereto while the head is in its forward position and to complete the reverse movement when the head is in its retracted position.

40. In a wire working machine, the combination of a reciprocating twister carriage, a twister head provided with a shaft mounted on said carriage and having an elongated pinion, twister jaws pivotally mounted on said head, forming means acting to position end portions of the work within the jaws, a spring acting to open the jaws, a jaw closing cam reciprocating longitudinally of the twister head shaft, a rack cooperating with said pinion of said twister head shaft, and cam means cooperating with said twister carriage, rack and jaw closing cam for actuating them in timed relation.

41. In a wire working machine, the combination of a reciprocating twister carriage, a twister head rotatably mounted on said carriage, twister jaws mounted on said head, a jaw closing member, means for rotating said twister head when the twister head is in its advanced position and for reversely rotating it when the twister head is in its retracted position, said means being adapted to impart a relatively slight reverse movement to the twister head while in its advanced position, and means for actuating said twister head rotating means, twister carriage and jaw closing member in timed relation.

42. In a wire working machine, the combination of a reciprocating twister carriage, a twister head rotatably mounted on said carriage, twister jaws mounted on said head, the jaws being uncovered at their sides to receive the work while the jaws are open and in their advanced position, a jaw closing member, means for rotating said twister head when the twister head is in its advanced position, and means for actuating said twister head rotating means, twister carriage and jaw closing member in timed relation.

43. In a wire working machine, the combination of a reciprocating twister carriage, a twister head rotatably mounted on said carriage, twister jaws mounted on said head, work forming means acting to position end portions of the work within the jaws in side by side relation with one end

extending substantially beyond the other, a jaw closing means, means for rotating said twister head when the twister head is in its advanced position and for reversely rotating it when the twister head is in its retracted position, said means being adapted to impart a relatively slight reverse movement to the shaft while in its advanced position, a hook forming head provided with a shaft mounted to reciprocate transversely to the path of travel of the twister carriage and having an elongated pinion, a segmental rack coacting with said pinion, a cam for actuating said rack, and a cam for reciprocating said hook forming head shaft, said cams being timed so that the hook forming head is advanced to work engaging position and the shaft rotated to form the hook and a slight reverse movement imparted thereto while in engagement with the work, the shaft retracted and its reverse rotation completed while in retracted position, the hook forming cams being timed with the twister means so that the hook forming head is advanced while the twister head is retracted.

44. In a wire working machine, the combination of a reciprocating twister carriage, a twister head rotatably mounted on said carriage, twister jaws mounted on said head, work forming means acting to position end portions of the work within the jaws in side by side relation with one end extending substantially beyond the other, a jaw closing means, means for rotating said twister head when the twister head is in its advanced position and for reversely rotating it when the twister head is in its retracted position, a hook forming head provided with a shaft mounted to reciprocate transversely to the path of travel of the twister carriage and having an elongated pinion, a segmental rack coacting with said pinion, a cam for actuating said rack, and a cam for reciprocating said hook forming head shaft, said cams being timed so that the hook forming head is advanced to work engaging position and the shaft rotated to form the hook, the shaft retracted and its reverse rotation completed while in retracted position, the hook forming cams being timed with the twister means so that the hook forming head is advanced while the twister head is retracted.

45. A wire working machine comprising a reciprocating twister means, work forming means acting to position end portions of the work to be twisted and formed into a hook, a hook forming head provided with a reciprocatingly mounted shaft having an elongated pinion, said head being provided with a cylindrical form block disposed at one side of the axis of the shaft and with a coacting concentrically disposed grooved bending roller, a segmental rack coacting with said pinion, means for actuating the rack, and means for reciprocating said hook forming shaft, the hook forming means being timed with the twister means so that the hook forming means is advanced and actuated while the twister means is retracted.

46. A wire working machine comprising a reciprocating twister means, work forming means acting to position end portions of the work to be twisted and formed into a hook, a hook forming head provided with a reciprocatingly mounted shaft having an elongated pinion, a segmental rack coacting with said pinion, means for actuating said rack, and means for reciprocating said hook forming shaft, the hook forming means being timed with the twister means so that the hook forming means is advanced and actuated while the twister means is retracted.

47. A wire working machine comprising a reciprocating twister means, work forming means acting to position end portions of the work to be twisted and formed into a hook, a hook forming head provided with a reciprocatingly mounted shaft having an elongated pinion, a segmental rack coacting with said pinion, means for actuating said rack, and means for reciprocating said hook forming shaft, said means being timed so that the hook forming head is advanced to work engaging position by the axial movement of the shaft and then the shaft rotated to form the hook and a slight reverse movement imparted thereto while in engagement with the work, the shaft retracted and its reverse rotation completed while in retracted position, the hook forming means being timed with the twister means so that the hook forming means is advanced and actuated while the twister means is retracted.

48. A wire working machine comprising a hook forming head provided with a reciprocatingly mounted shaft having an elongated pinion, said head being provided with a cylindrical form block disposed at one side of the axis of the shaft and with a coacting eccentrically disposed grooved bending roller, a rack coacting with said pinion, a cam for actuating said rack, and a cam for reciprocating said hook forming shaft, said cams being timed so that the hook forming head is advanced to work engaging position by the axial movement of the shaft and then the shaft rotated to form the hook and a slight reverse movement imparted thereto while in engagement with the work, the shaft retracted and its reverse rotation completed while in retracted position.

49. A wire working machine comprising a hook forming head provided with a reciprocatingly mounted shaft having an elongated pinion, a rack coacting with said pinion, a cam for actuating said rack, and a cam for reciprocating said hook forming shaft, said cams being timed so that the hook forming head is advanced to work engaging position by the axial movement of the shaft and then the shaft rotated to form the hook and a slight reverse movement imparted thereto while in engagement with the work, the shaft retracted and its reverse rotation completed while in retracted position.

50. A wire working machine comprising a hook forming head provided with a reciprocatingly mounted shaft having an elongated pinion, said head being provided with a cylindrical form block disposed at one side of the axis of the shaft and with a coacting eccentrically disposed grooved bending roller, a rack coacting with said pinion, a cam for actuating said rack, and a cam for reciprocating said hook forming shaft.

51. A wire working machine comprising a hook forming head mounted for axial and rotative movement, said head being provided with a form block and with a coacting bending member acting to bend the work around the form block when the head is rotated, means for reciprocating said head, and means for rotating said head timed so that the hook forming head is advanced to work engaging position by the axial movement of the head and the head then rotated in one direction to completely form the hook and a slight reverse movement imparted thereto while in engagement with the work to release the latter, the head retracted and its reverse rotation completed while in retracted position.

52. In a wire working machine, the combina-

tion of a work forming means acting to position end portions of the work in side by side relation with one end extending substantially beyond the other, a reciprocating twister means adapted to engage the work and twist the said ends together while the work is supported by said forming means, said twister means having a slight reverse movement when in work engaging position and then retracted and its reverse rotation completed while in retracted position, and a hook forming head operatively associated with said work forming means and twister means to operate in synchronism therewith and reciprocating in a plane transverse to the path of travel of the twister means and forming the hook by a rotative movement of the forming head while in work engaging position, the head having a slight reverse rotation while in forming position, its reverse rotation being completed while in its retracted position.

53. In a wire working machine, the combination of a work forming means acting to position end portions of the work in side by side relation with one end extending substantially beyond the other, a reciprocating twister means adapted to engage the work and twist the said ends together while the work is supported by said forming means, a hook forming head operatively associated with said work forming means and twister means to operate in synchronism therewith and reciprocating in a plane traverse to the path of travel of the twister means and forming the hook by a rotative movement of the forming head while in work engaging position, the head having a slight reverse rotation while in forming position, its reverse rotation being completed while in its retracted position.

54. In a wire working machine, the combination of a work forming means acting to position end portions of the work in side by side relation with one end extending substantially beyond the other, a reciprocating twister means adapted to engage the work and twist the said ends together while the work is supported by said forming means, said twister means having a slight reverse movement when in work engaging position and being then retracted and its reverse rotation completed while in retracted position, and a hook forming head operatively associated with said work forming means and twister means to operate in synchronism therewith and reciprocating in a plane transverse to the path of travel of the twister means and forming the hook by a rotative movement of the forming head while in work engaging position.

55. In a wire working machine the combination with a bed having a central opening through which the work may be discharged downwardly, of a form plate suspended above said opening, a cam shaft arranged at the rear of the machine, formers mounted on vertical shafts at the front of said form plate and provided with pinions, racks operatively associated with said pinions, a twister reciprocatingly mounted at the rear of said form plate to coact with the work while clamped upon the form plate by said formers, a hook forming means comprising a vertically reciprocating shaft, a work ejector carried by a plunger rod disposed vertically at the front of said form member, a stock feed means comprising continuously driven feed rolls, a reciprocating cutter, a feed bar to which said rolls deliver, and cams mounted on said cam shaft for actuating said cutter, feed bar, formers, actuating racks, twister, hook former and ejector plunger rod.

56. In a wire working machine the combination with a bed having a central opening through which the work may be discharged downwardly, of a form plate suspended above said opening, a cam shaft arranged at the rear of the machine, formers mounted on vertical shafts at the front of said form plate and provided with pinions, racks operatively associated with said pinions, a twister reciprocatingly mounted at the rear of said form plate to coact with the work while clamped upon the form plate by said formers, a hook forming means comprising a vertically reciprocating shaft, a work ejector carried by a plunger rod disposed vertically at the front of said form member, and cams mounted on said cam shaft for actuating said formers, actuating racks, twister, hook former and ejector plunger rod.

57. In a wire working machine, the combination with a bed having a central opening through which the work may be discharged downwardly, of a forming means above said opening, a cam shaft arranged at the rear of the machine, a twister means at the rear of said forming means to coact with the work while supported by said forming means, a hook forming means, a work ejector, a stock feed means comprising continuously driven feed rolls, a cutter, a feed means to which said rolls deliver, and cams mounted on said cam shaft for actuating said cutter, feed means, forming means, twister, hook former and ejector.

58. In a wire working machine, the combination with a bed having a central opening through which the work may be discharged downwardly, of a forming means above said opening, a cam shaft arranged at the rear of the machine, a twister means at the rear of said forming means to coact with the work while supported by said forming means, a hook forming means, a work ejector, and cams mounted on said cam shaft for actuating said cutter, feed means, forming means, twister, hook former and ejector.

59. In a wire working machine of the character set forth, the combination with a horizontal work supporting bar having a positive stop secured to one end thereof, of a feed bar slidingly mounted on said work supporting bar for transverse movement and having a longitudinal work receiving groove facing said work supporting bar and adapted to be uncovered by the advance of the feed bar to feed the work, and means for feeding the work to said work receiving groove when said feed bar is in retracted position, said means including a pair of feed rollers frictionally engaging the work, a spring tensioning said rollers so that they are adapted to slip relative to the work when the latter engages said positive stop, and a cutter operable on the advance of said feed bar to sever the work to be advanced thereby from the work remaining between said rolls.

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