

Nov. 24, 1925.

1,562,973

H. KUESTER
WIREWORKING MACHINE
Filed March 6, 1924

4 Sheets-Sheet 1

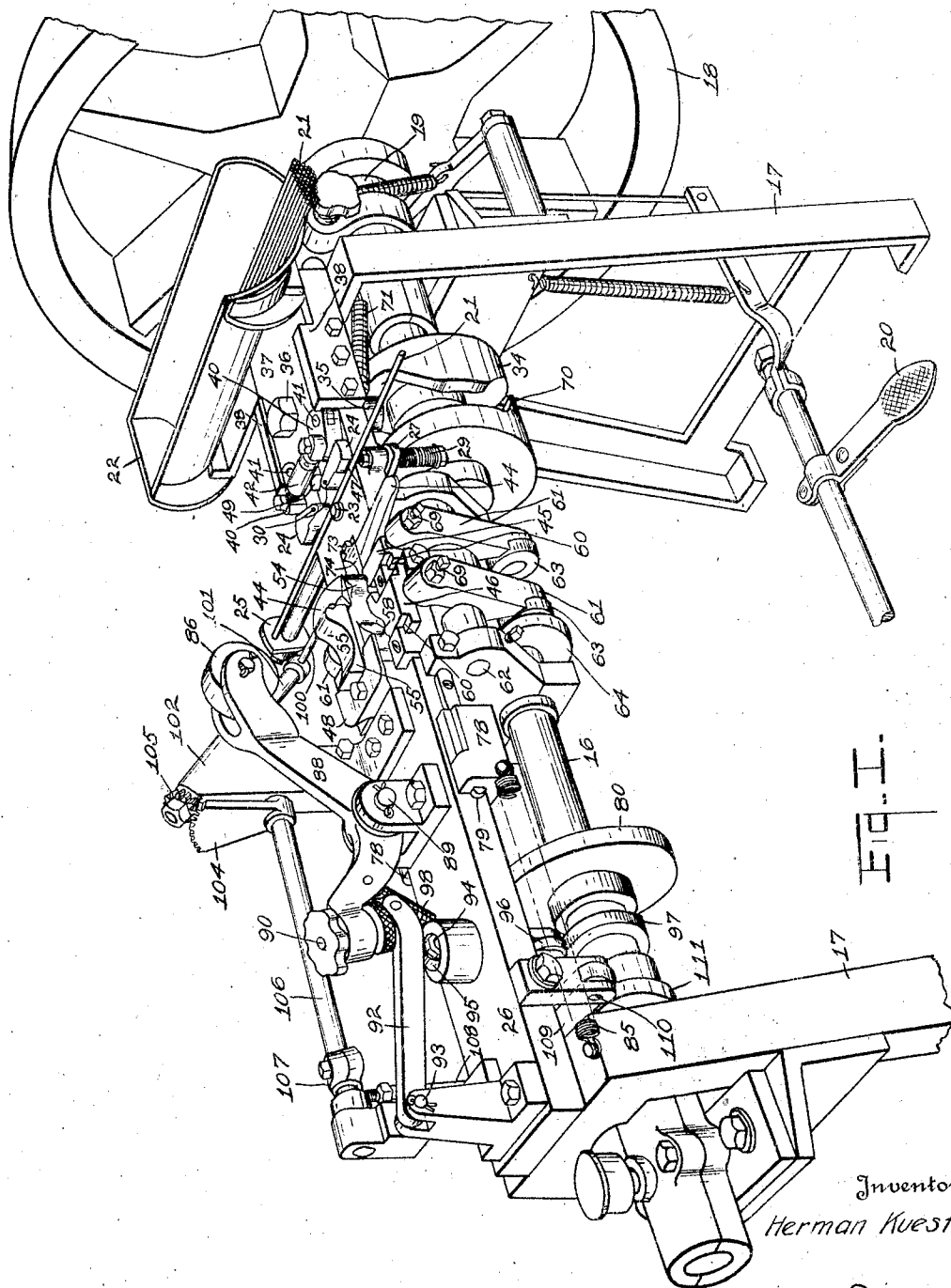


Fig. 1.

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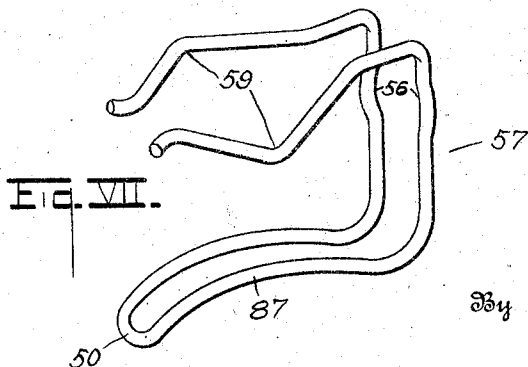
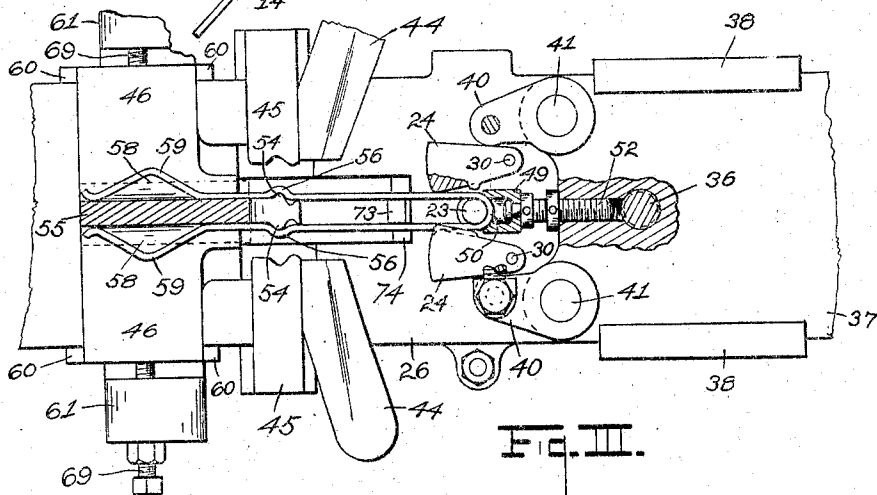
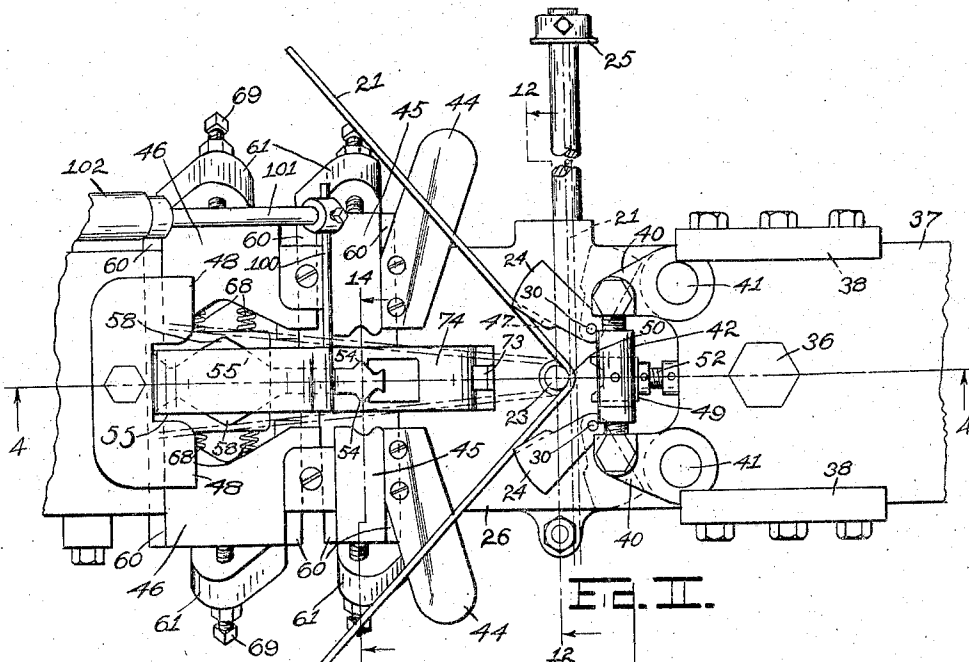
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H. KUESTER

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4 Sheets-Sheet 2



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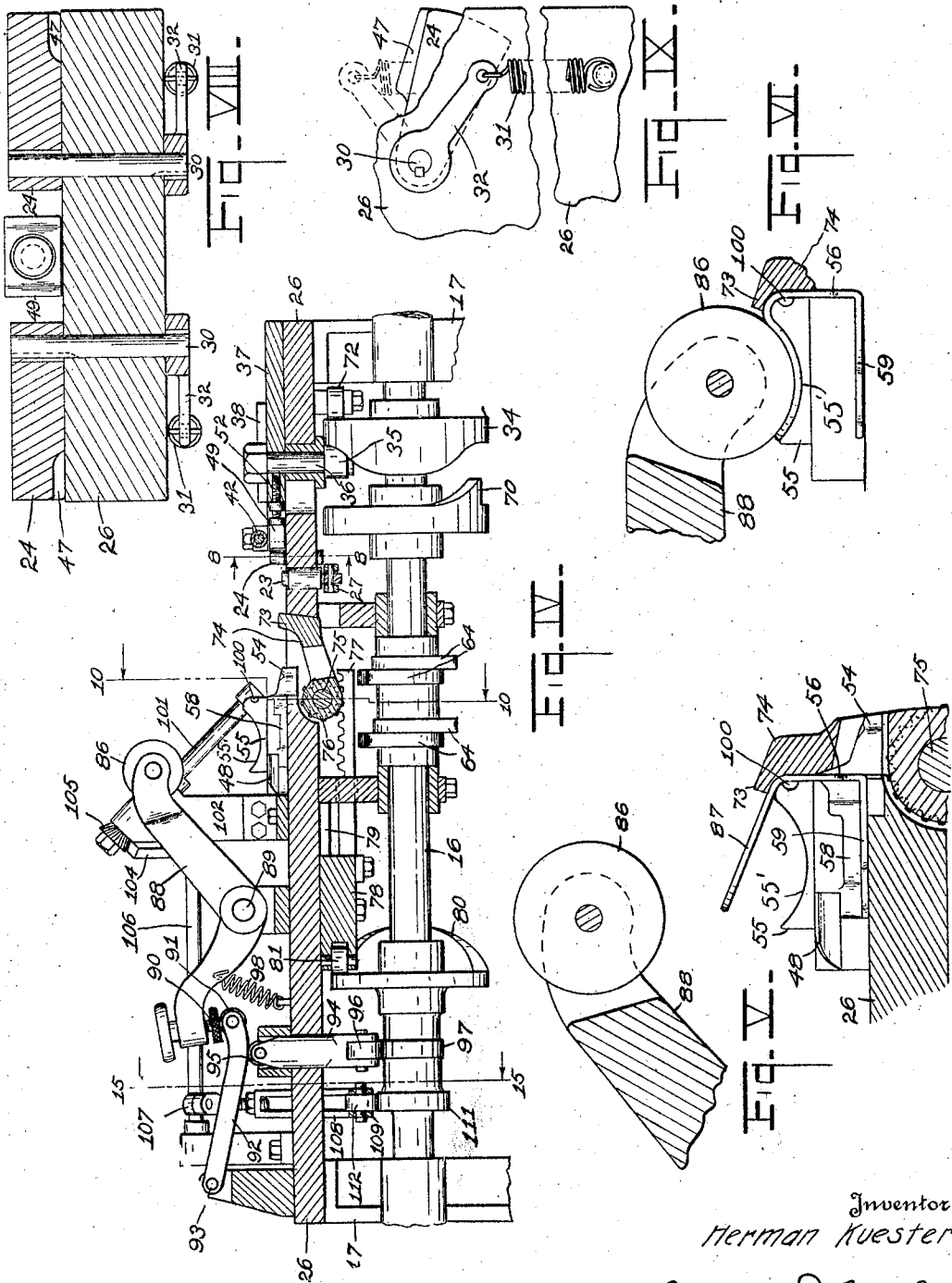
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H. KUESTER

WIREWORKING MACHINE

Filed March 6, 1924

4 Sheets-Sheet 3



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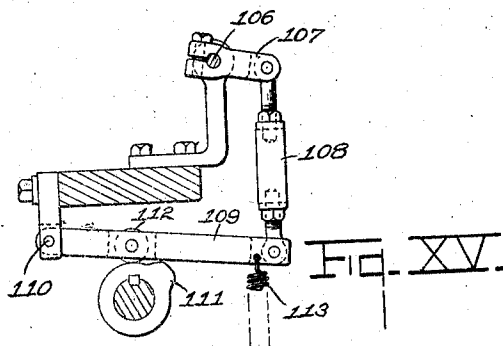
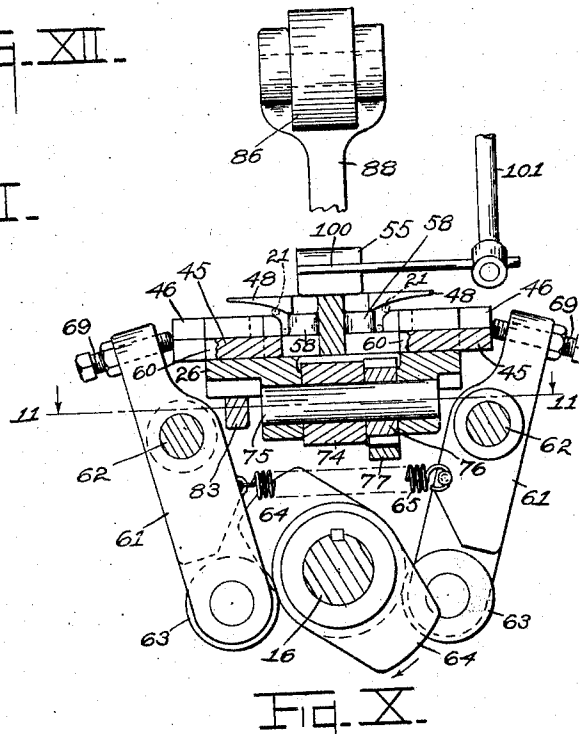
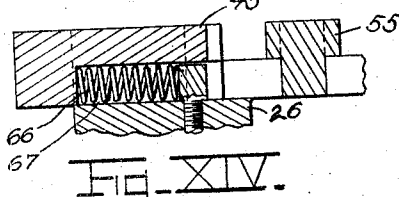
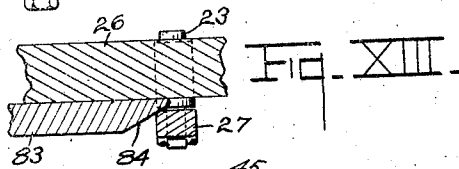
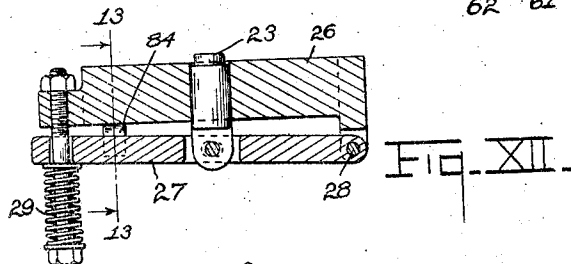
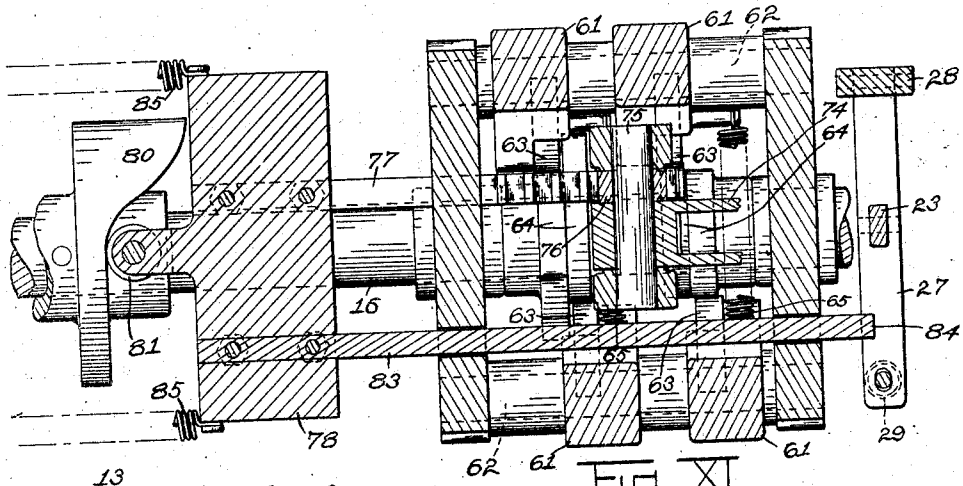
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H. KUESTER
WIREWORKING MACHINE
Filed March 6, 1924

4 Sheets-Sheet 4



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BY
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UNITED STATES PATENT OFFICE.

HERMAN KUESTER, OF DETROIT, MICHIGAN, ASSIGNOR TO L. A. YOUNG INDUSTRIES, INC., OF DETROIT, MICHIGAN

WIREWORKING MACHINE.

Application filed March 6, 1924. Serial No. 697,263

To all whom it may concern:

Be it known that I, HERMAN KUESTER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented certain new and useful improvements in Wireworking Machines, of which the following is a specification.

This invention relates to improvements in wire working machines.

My improved wire working machine is especially designed by me for the forming of holders for oil cans and the like, although readily adapted for performing other objects.

The main objects of this invention are.

First, to provide an improved wire working machine which is automatic in its operations except for the feeding of the pieces of wire thereto and the operation of the control clutch.

Second, to provide an improved wire working machine of the class described which is of very large capacity

Third, to provide an improved wire working machine which is compact in structure and very durable in its parts.

Objects pertaining to details and economies of construction and operation of my improvements will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing forming a part of this application, in which:

Fig. I, Sheet 1, is a perspective view of a structure embodying the features of my invention, parts of the driving pulley and one of the pedestals being broken away.

Fig. II, Sheet 2, is an enlarged detail plan view showing details of the forming dies and their relation.

Fig. III, Sheet 2, is a detail plan view similar to that of Fig. II with the parts in another position.

Fig. IV, Sheet 3, is a detail view partially in longitudinal section on a line corresponding to line 4—4 of Fig. II.

Fig. V, Sheet 3, is an enlarged detail ver-

tical section similar to that of Fig. IV showing the parts in another position.

Fig. VI, Sheet 3, is a detail section corresponding to that of Fig. V showing the top die in actuating position.

Fig. VII, Sheet 2, is a perspective view of the completed product of the machine illustrated.

Fig. VIII, Sheet 3, is a detail view mainly in transverse vertical section on a line corresponding to line 8—8 of Fig. IV.

Fig. IX, Sheet 3, is a fragmentary inverted view showing details of the parts shown in Fig. VIII.

Fig. X, Sheet 4, is an enlarged detail view partially in section on a line corresponding to line 10—10 of Fig. IV showing details of the die actuating mechanism.

Fig. XI, Sheet 4, is a detail view partially in section on a line corresponding to line 11—11 of Fig. X.

Fig. XII, Sheet 4, is a detail view partially in section on a line corresponding to line 12—12 of Fig. II showing the means for adjustably supporting the forming pin.

Fig. XIII, Sheet 4, is a detail view partially in section on a line corresponding to line 13—13 of Fig. XII.

Fig. XIV, Sheet 4, is an enlarged detail view partially in section on a line corresponding to line 14—14 of Fig. II.

Fig. XV, Sheet 4, is a detail section on a line corresponding to line 15—15 of Fig. IV showing details of the ejector actuating means.

In the drawing the sectional views are taken looking in the direction of the little arrows at the ends of the section lines and similar numerals of reference indicate similar parts in all of the views.

The several mechanisms of the machine are actuated from the shaft 16 which is disposed longitudinally in the frame 17 comprising a bed plate and supporting pedestals. The shaft 16 is provided with a driving pulley 18 connected to the shaft by means of the clutch 19 which is manually controlled by the pedal 20. Since the clutch may be of any suitable type I do not illustrate or describe it in detail herein.

The wire stock 21 is cut to suitable length and for convenience is stored in the hopper 22. The operator places the work 21 be-

tween the forming pin 23 and the wire bending jaws 24, an adjustable stop 25 being provided to assist in positioning the work, see Figs. I and II. The forming pin 23 is vertically reciprocable through the frame bed plate 26, it being supported by a lever 27 which is pivoted at 28. The pin is held in normally projected position by means of the spring 29 engaging the free end of the lever 27, see Figs. I and XII.

The bending jaws 24 are mounted on the vertical pivots 30 disposed through the bed plates and provided with arms 32 to which the springs 31 are connected so that these jaws are yieldingly held open, see Figs. VIII and IX.

After a wire has been placed in position as shown in Fig. I the clutch is actuated by means of the pedal 20 thereby connecting the pulley to the driving shaft. The shaft 16 is provided with a cam 34 coacting with a roller 35 on the pin 36 carried by the slide member 37, the slide member 37 being reciprocatingly mounted in guides 38 on the bed plate 26, see Figs. I and IV.

This actuating slide carries a pair of jaw actuating tappets 40, these tappets being pivoted on the slide at 41 and adjustably connected by the turn-buckle 42, see Fig. II. As the slide advances on its work stroke the tappets engage the jaws 24 swinging them forward with the work, bending it around the forming pin as shown in Figs. II and III, the jaws being completely closed in Fig. III.

As the wire is folded upon itself its arms are swung upon the guides 44 which are outwardly inclined so that the work is swung upwardly sufficient to clear the side forming dies 45 and 46. The jaws 24 have grooved faces so that the wire is prevented from slipping from the jaws. As the arms of the work swing over the dies 45 and 46, their ends are engaged by the downwardly facing inwardly inclined guides 48 which swings the arms downwardly so that, when they clear the inner ends of the guides 44 of the side die members, the work swings down on to the bed plate and into the range of the dies 45 and 46, see Figs. II and X. As the work comes to this position a jaw 49 carried by the slide member 37 clamps the bight of the work against the pin 23 holding it firmly while the dies 45 and 46 are operating upon the wire. The jaw 49 is supported by a screw 52 threaded into the actuating slide 37 providing means for adjusting the position of the jaw for different sizes of wire or different diameters of forming pin, see Fig. III.

In this position the arms of the wire lie at the sides of a form block 55 having side die faces or form members 54 and 58. The faces of the dies 45 and 46 are appropriately conformed to coact with the form-

ing members of the die block 55 to form the offsets 56 and 59 in the wire bracket shown at 57, see Fig. VII.

The die members 45 and 46 are reciprocated in guides 60 by means of pairs of rock levers 61 pivoted on shafts 62, rollers 63 on the lever being engaged by cams 64 on the shaft 16, see Figs. I, X and XI. Since the opposed levers are actuated simultaneously the shaft is provided with an individual cam for each lever and the levers occupy offset portions so that each roller is out of range of the actuating cam for the opposed lever, see Fig. X. The rollers are yieldingly held in contact with the cams by the springs 65, see Fig. X.

The dies 45 are returned to open position by springs 66 lying in recesses 67 of the dies, see Fig. XIV. The dies 46 are returned by similar springs 68, see Fig. II. The inward movement of the dies is determined by the tappet screws 69 on the actuating lever 61. After the actuation of the dies 45 and 46 the actuating slide 37 is retracted or returned to initial position thereby disengaging the bending jaws and the clamping jaw 49 therefrom. Since the tappets 40 engage the forming jaws with a wedging action considerable force is required to start the actuating slide on its return movement. Therefore, I provide a releasing cam 70, see Figs. I and IV. When in initial position the roller 35 is yieldingly held in contact with the cam 34 by the spring 71.

A thrust bearing roller engages the back of the cam 34 and supports the cam under the stress of the driving stroke of the slide. The dies 46 constitute work clamps holding the work to the form block 55 while the folder arm 74 folds the loop end of the wire upon the form as shown in Fig. V. The folder arm is provided with a spacer 73 which lies between the arms of the work holding them in alignment or preventing distortion thereof during this folding operation. The arm 74 is secured to the rock-shaft 75 which also carries the pinion 76, see Figs. IV, X and XI. A rack 77 meshes with the pinion 76, the rack being carried by a slide member 78 reciprocating on guides 79 on the under side of the bed plate.

A cam 80 on the shaft 16 coacts with the roller 81 on the slide to actuate the slide. To insure the disengagement of the wire from the forming pin the forming pin is retracted by means of a cam 84 on the bar 83 carried by the slide 78. The slide 78 is returned to initial position by the springs 85, see Fig. I. When the work has been folded upon the form as shown in Fig. V the top die member in the form of a roller 86 is actuated to conform the end of the work to the concaved top form member 55' of the form block 55, see Figs. V and VI, this being the final forming operation on the work.

The die member 86 is mounted on the lever 88 pivoted at 89 and carrying an adjustable thrust screw 90 coacting with the roller 91 on the arm 92 pivoted at 93. A plunger 94 reciprocates vertically in the bed plate and is provided with a roller 96 coacting with a cam 97 on the shaft 16. The lever 88 is returned to its initial position by means of the spring 98.

After this final forming operation the folder arm and side die members 46 return to their initial position, the folder arm and die members thus constituting work clamping means. The work is ejected from the machine by the ejector arm 100 carried on the rock shaft 101 rotatable in a bracket 102. The arm 100 normally lies in a recess in the face of the form block, the work being bent across the arm as it is formed around the die block, see Figs. V, VI and X. When the completed work has been released the shaft 101 is actuated causing the ejector arm to throw the work from the machine.

The shaft 101 is turned by a segment 104 meshing with the beveled pinion 105 on the shaft, see Figs. I and IV. The segment is secured to a shaft 106 provided with an arm 107 connected by an adjustable link to a cam lever 109 pivoted at 110. The cam 111 on the shaft 16 coacts with a roller 112 on the lever 109, thereby actuating the ejector, the parts being returned to initial position by the spring 113.

A machine embodying my improvements is of large capacity and is easily operated, I have illustrated and described my improvements as I have embodied them in a machine for forming a bracket or holder. My improvements are, however, readily adapted for use in other relations. I have not attempted to illustrate or describe such adaptations as I believe the disclosure made will enable those skilled in the art to embody or adapt my improvements as may be desired.

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

1. A wire working machine comprising a bed plate, a forming pin mounted to reciprocate through said bed plate, a pair of forming jaws pivotally mounted on said bed plate and adapted when actuated to fold the work around said forming pin, said jaws being provided with grooved faces, an actuating slide, a pair of tappets pivotally mounted on said slide to engage said jaws, a turnbuckle connecting said tappets whereby they are adjustably supported on their pivots, a clamping jaw adjustably mounted on said slide and adapted to clamp the wire to the pin when the actuating slide is in its actuated position, and means for retracting said forming pin.

2. A wire working machine comprising a

bed plate, a forming pin, a pair of forming jaws pivotally mounted on said bed plate and adapted when actuated to fold the work around said forming pin, an actuating slide, a pair of tappets pivotally mounted on said slide to engage said jaws, a turnbuckle connecting said tappets whereby they are adjustably supported on their pivots, and a clamping jaw adjustably mounted on said slide and adapted to clamp the wire to the pin when the actuating slide is in its actuated position.

3. A wire working machine comprising a bed plate, a forming pin mounted to reciprocate through said bed plate, a pair of forming jaws pivotally mounted on said bed plate and adapted when actuated to fold the work around said forming pin, said jaws being provided with grooved faces, an actuating slide, a pair of tappets pivotally mounted on said slide to engage said jaws, a turnbuckle connecting said tappets whereby they are adjustably supported on their pivots, and means for retracting said forming pin.

4. A wire working machine comprising a bed plate, a forming pin, a pair of forming jaws pivotally mounted on said bed plate and adapted when actuated to fold the work around said forming pin, an actuating slide, a pair of tappets pivotally mounted on said slide to engage said jaws, and a turnbuckle connecting said tappets whereby they are adjustably supported on their pivots.

5. A wire working machine comprising a bed plate, a forming pin mounted to reciprocate through said bed plate, a pair of forming jaws pivotally mounted on said bed plate and adapted when actuated to fold the work around said forming pin, an actuating slide, tappets adjustably mounted on said slide to engage said jaws, a clamping jaw adjustably mounted on said slide and adapted to clamp the wire to the pin when the actuating slide is in its actuated position, and means for retracting said forming pin.

6. A wire working machine comprising a bed plate, a forming pin, a pair of forming jaws pivotally mounted on said bed plate and adapted when actuated to fold the work around said forming pin, an actuating slide, tappets mounted on said slide to engage said jaws, a clamping jaw adjustably mounted on said slide and adapted to clamp the wire to the pin when the actuating slide is in its actuated position, a form block, the work being brought into co-operative relation with said form block by the forming of the work around the pin, and a die member coacting with said form block while the work is clamped by said jaws.

7. A wire working machine comprising a bed plate, a forming pin mounted to recip-

- rocate through said bed plate, a pair of forming jaws pivotally mounted on said bed plate and adapted when actuated to fold the work around said forming pin, an actuating slide, tappets adjustably mounted on said slide to engage said jaws, a form block with which the wire is brought into co-operative relation by forming around said pin, a die member acting upon the work while clamped around said pin by said jaws, and means for retracting said forming pin.
8. A wire working machine comprising a bed plate, a forming pin, a pair of forming jaws pivotally mounted on said bed plate and adapted when actuated to fold the work around said forming pin, an actuating slide, tappets mounted on said slide to engage said jaws, a form block with which the stock is brought into co-operative relation by forming around said forming pin, and a die member acting on the work while the work is clamped upon said pin.
9. In a wire working machine, the combination with a bed plate, of a forming pin mounted to reciprocate through said bed plate, forming jaws pivotally mounted on said bed plate to coact with said forming pin, an actuating slide reciprocating longitudinally of said bed plate, jaw closing tappets on said slide, a clamping jaw mounted on said slide to clamp the work to the forming pin when the slide is in its actuated position, means for retracting said forming pin, a form block provided with an upwardly facing form member and with oppositely disposed laterally facing form members, upwardly facing outwardly inclined guides disposed in front of said form block, downwardly facing inwardly inclined guides adapted to coact with the ends of the arms of the work, said guides coacting to guide the work to said laterally facing form members as the work is folded around said forming pin, transverse reciprocating die members coacting with the said laterally facing form members of said form block, a folder arm adapted to fold the looped end of the work upon said form block, a top die member adapted to coact with the top form member of said form block, and means for actuating said slide, forming pin, folder arm and die members timed so that the transversely reciprocating die members are actuated while the work is clamped to said forming pin, said transversely reciprocating die members constituting work clamping means while the work is acted upon by said folder arm and said top forming die.
10. In a wire working machine, the combination with a bed plate, of a forming pin mounted to reciprocate through said bed plate, forming jaws pivotally mounted on said bed plate to coact with said forming pin, an actuating slide reciprocating longitudinally of said bed plate, jaw closing tappets on said slide, a form block provided with an upwardly facing form member and with oppositely disposed laterally facing form members, transverse reciprocating die members coacting with the said laterally facing form members of said form block, a folder arm adapted to fold the looped end of the work upon said form block, and a top die member adapted to coact with the top form member of said form block.
11. In a wire working machine, the combination with a bed plate, of a forming pin, forming jaws pivotally mounted on said bed plate to coact with said forming pin, an actuating slide reciprocating longitudinally of said bed plate, jaw closing tappets on said slide, a form block provided with an upwardly facing form member and with oppositely disposed laterally facing form members, upwardly facing outwardly inclined guides disposed in front of said form block, downwardly facing inwardly inclined guides adapted to coact with the ends of the arms of the work, said guides coacting to guide the work to said laterally facing form members as the work is folded around said forming pin, transverse reciprocating die members coacting with the said laterally facing form members of said form block, a folder arm adapted to fold the looped end of the work upon said form block, and a top die member adapted to coact with the top form member of said form block.
12. In a wire working machine, the combination with a bed plate, of a forming pin, forming jaws pivotally mounted on said bed plate to coact with said forming pin, an actuating slide reciprocating longitudinally of said bed plate, jaw closing tappets on said slide, a form block provided with an upwardly facing form member and with oppositely disposed laterally facing form members, transverse reciprocating die members coacting with the said laterally facing form members of said form block, a folder arm adapted to fold the looped end of the work upon said form block, and a top die member adapted to coact with the top form member of said form block.
13. In a wire working machine, the combination with a bed plate, of a forming pin mounted to reciprocate through said bed

plate, forming jaws coacting with said forming pin to fold the work around the pin, a clamping jaw for clamping the work to the forming pin, means for retracting said forming pin, a form block provided with an upwardly facing form member and with oppositely disposed laterally facing form members, upwardly facing outwardly inclined guides disposed in front of said forming block, downwardly facing inwardly inclined guides adapted to coact with the ends of the arms of the work, said guides coacting to guide the work to said laterally facing form members as the work is folded around said forming pin, transverse reciprocating die members coacting with the said laterally facing form members of said form block, a folder arm adapted to fold the looped end of the work upon said form block, a top die member adapted to coact with the top form member of said form block, and means for actuating said folding and clamping jaws, forming pin, folder arm and die members timed so that the transversely reciprocating die members are actuated while the work is clamped to said forming pin, said transversely reciprocating die members constituting work clamping means while the work is acted upon by said folder arm and said top forming die.

14. In a wire working machine, the combination with a bed plate, of a forming pin, forming jaws coacting with said forming pin to fold the work around the pin, a form block provided with an upwardly facing form member and with oppositely disposed laterally facing form members, upwardly facing outwardly inclined guides disposed in front of said forming block, downwardly facing inwardly inclined guides adapted to coact with the ends of the arms of the work, said guides coacting to guide the work to said laterally facing form members as the work is folded around said forming pin, transverse reciprocating die members coacting with the said laterally facing form members of said form block, a folder arm adapted to fold the looped end of the work upon said form block, and a top die member adapted to coact with the top form member of said form block.

15. In a wire working machine, the combination with a bed plate, of a forming pin mounted to reciprocate through said bed plate, forming jaws coacting with said forming pin to fold the work around the pin, a clamping jaw for clamping the work to the forming pin, means for retracting said forming pin, a form block provided with an upwardly facing form member and with oppositely disposed laterally facing form members, transverse reciprocating die members coacting with the said laterally facing form members of said form block, a folder arm adapted to fold the looped end

of the work upon said form block, a top die member adapted to coact with the top form member of said form block, and means for actuating said folding and clamping jaws, forming pin, folder arm and die members timed so that the transversely reciprocating die members are actuated while the work is clamped to said forming pin, said transversely reciprocating die members constituting work clamping means while the work is acted upon by said folder arm and said top forming die.

16. In a wire working machine, the combination with a bed plate, of a forming pin, forming jaws coacting with said forming pin to fold the work around the pin, a form block provided with an upwardly facing form member and with oppositely disposed laterally facing form members, transverse reciprocating die members coacting with the said laterally facing form members of said form block, a folder arm adapted to fold the looped end of the work upon said form block, and a top die member adapted to coact with the top form member of said form block.

17. A wire working machine comprising a forming pin mounted to reciprocate through said bed plate, forming jaws coacting with said forming pin to fold the work around the pin, a clamping jaw for clamping the work to the forming pin, means for retracting said forming pin, a form block provided with laterally facing form members, upwardly facing outwardly inclined guides adapted to coact with the ends of the arms of the work, said guides coacting to guide the work to said laterally facing form members as the work is folded around said forming pin, and die members coacting with the said laterally facing form members of said form block and adapted to act on the work while it is clamped to said forming pin.

18. A wire working machine comprising a forming pin, forming jaws coacting with said forming pin to fold the work around the pin, a form block provided with laterally facing form members, upwardly facing outwardly inclined guides adapted to coact with the ends of the arms of the work, said guides coacting to guide the work to said laterally facing form members as the work is folded around said forming pin, and die members coacting with the said laterally facing form members of said form block and adapted to act on the work while it is clamped to said forming pin.

19. A wire working machine comprising a forming pin mounted to reciprocate through a bed plate, forming jaws coacting with said forming pin to fold the work around the pin, a clamping jaw for clamping the work to the forming pin, means for retracting said forming pin, a form block

provided with laterally facing form members, die members coacting with said form members timed to act while the work is clamped to said pin and guides disposed at the sides of said form block to guide the work over said die members and position it at the sides of said form block.

20. In a wire working machine, the combination with a bed plate, of a form block provided with an upwardly facing form member and with opposed pairs of laterally facing form members, means for supporting a looped wire with its arms at the sides of said form members, pairs of reciprocating die members coacting with said laterally facing form members, a folder arm adapted to fold the work upon said form block, a top die member adapted to coact with the top form member, and means for successively actuating said pairs of die members, said folder arm and said top die members.

21. In a wire working machine, the combination with a bed plate, of a form block provided with opposed pairs of laterally facing form members, means for supporting a looped wire with its arms at the sides of said form members, pairs of reciprocating die members coacting with said laterally facing form members, a folder arm adapted to fold the work upon said form block, and means for successively actuating said pairs of die members and folder arm.

22. In a wire working machine, the combination with a form block provided with an upwardly facing form member and side form members, of means for folding the work so that its arms are swung to operative relation to said side form members, die members coacting with said side form members, a folder arm adapted to fold the looped end of the work upon said form block, and a top die member coacting with said top form member while the work is clamped by said die members and folder arm.

23. In a wire working machine, the combination with a form block provided with an upwardly facing form member and side form members, of die members coacting with said side form members, a folder arm adapted to fold the work upon said form block, and a top die member coacting with said top form member while the work is clamped by said die members and folder arm.

24. In a wire working machine, the combination with a form block provided with an upwardly facing form member and side form members, of means for folding the work so that its arms are swung to operative relation to said side form members, die members coacting with said side form members, and a folder arm adapted to fold the

looped end of the work upon said form block.

25. In a wire working machine, the combination of a form block provided with an upwardly facing form member and with side form members, means for folding the work so that its arms are operatively disposed relative to said side form members, die members coacting with said side form members, a folder arm adapted to fold the work upon said form block, a top die member adapted to coact with the top form member of said form block, and means for actuating said side die members, folder arm and top die member timed so that they are operated successively.

26. In a wire working machine, the combination of a form block provided with an upwardly facing form member and with a side form member, a die member coacting with said side form member, a folder arm adapted to fold the work upon said form block, a top die member adapted to coact with the top form member of said form block, and means for actuating said side die member, folder arm and top die member timed so that they are operated successively.

27. In a wire working machine, the combination with a form block provided with side form members, of means for folding the work so that its arms are operatively disposed relative to said side form members, die members coacting with said side form members, a folder arm adapted to fold the work upon said form block, a pivotally mounted ejector arm, said form block being recessed to receive said ejector arm so that the work is folded across the ejector arm by said folder arm, and means for actuating said ejector arm after the die members and folder arm have been retracted.

28. In a wire working machine, the combination with a form block provided with side form members, of die members coacting with said side form members, a folder arm adapted to fold the work upon said form block, a pivotally mounted ejector arm, said form block being recessed to receive said ejector arm so that the work is folded across the ejector arm by said folder arm, and means for actuating said ejector arm after the die members and folder arm have been retracted.

29. In a wire working machine, the combination with a form block provided with side form members, of means for folding the work so that its arms are operatively disposed relative to said side form members, die members coacting with said side form members, a folder arm adapted to fold the work upon said form block, a pivotally mounted ejector arm disposed so that the work is folded across the same by said folder

arm, and means for actuating said ejector arm after the die members and folder arm have been retracted.

30. In a wire working machine, the combination with a form block provided with side form members, of die members coacting with said side form members, a folder arm adapted to fold the work upon said form block, a pivotally mounted ejector arm dis-

posed so that the work is folded across the same by said folder arm, and means for actuating said ejector arm after the die members and folder arm have been retracted.

In witness whereof, I have hereunto set my hand.

HERMAN KUESTER