May 21, 1929. J. J. THACHER 1,714,480

WIREWORKING MACHINE

Filed Feb. 16, 1927 4 Sheets-Sheet 1

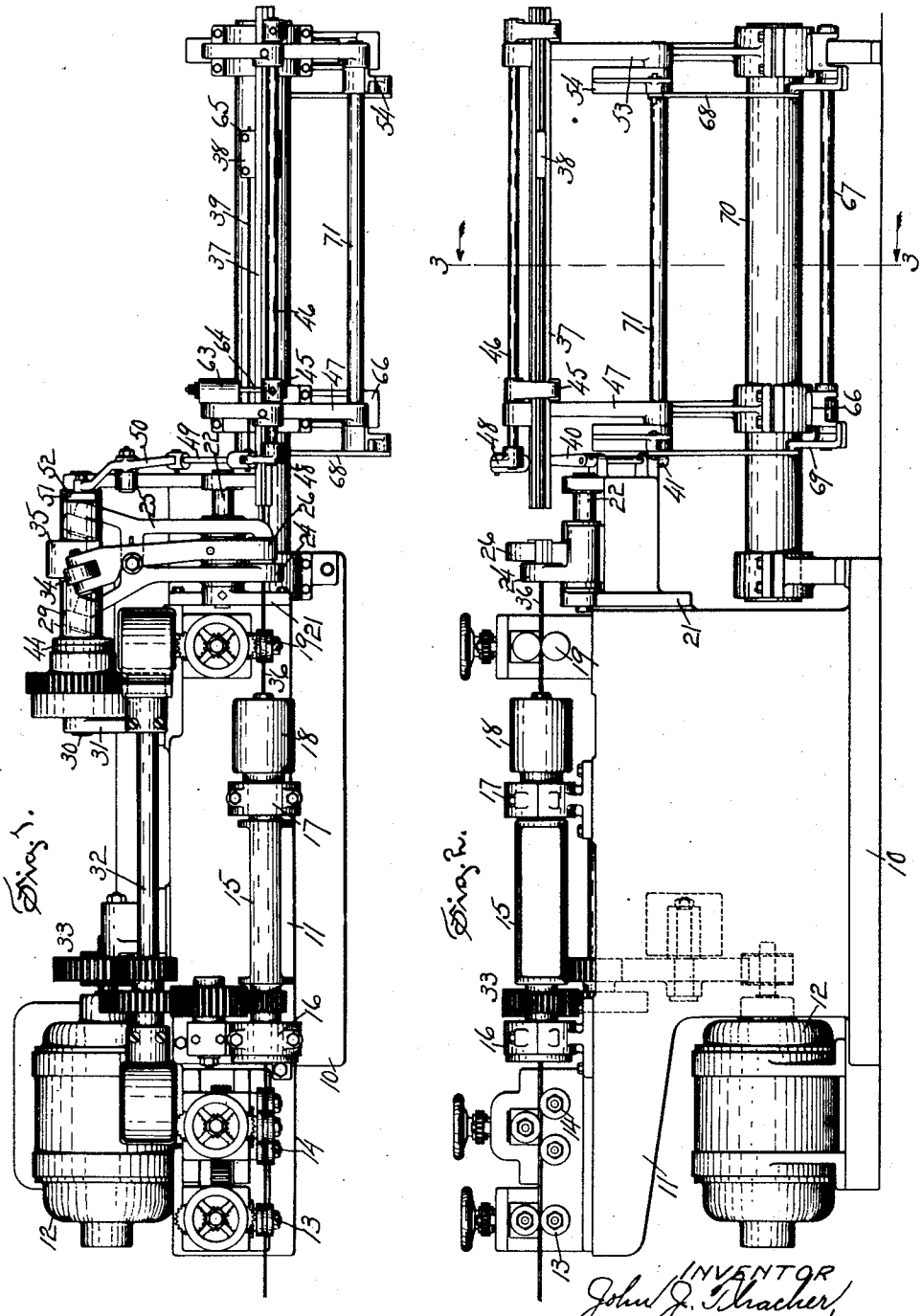


Fig. 1.

Fig. 2.

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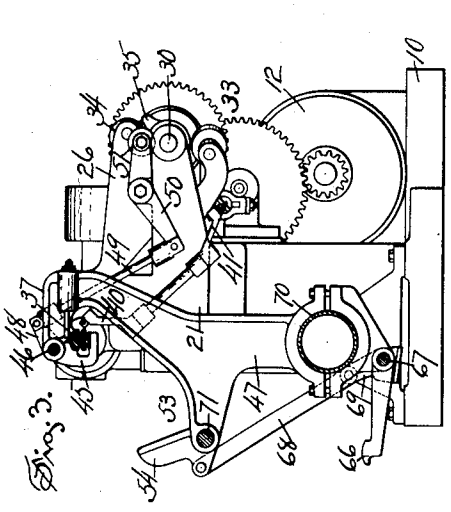


Fig. 3.

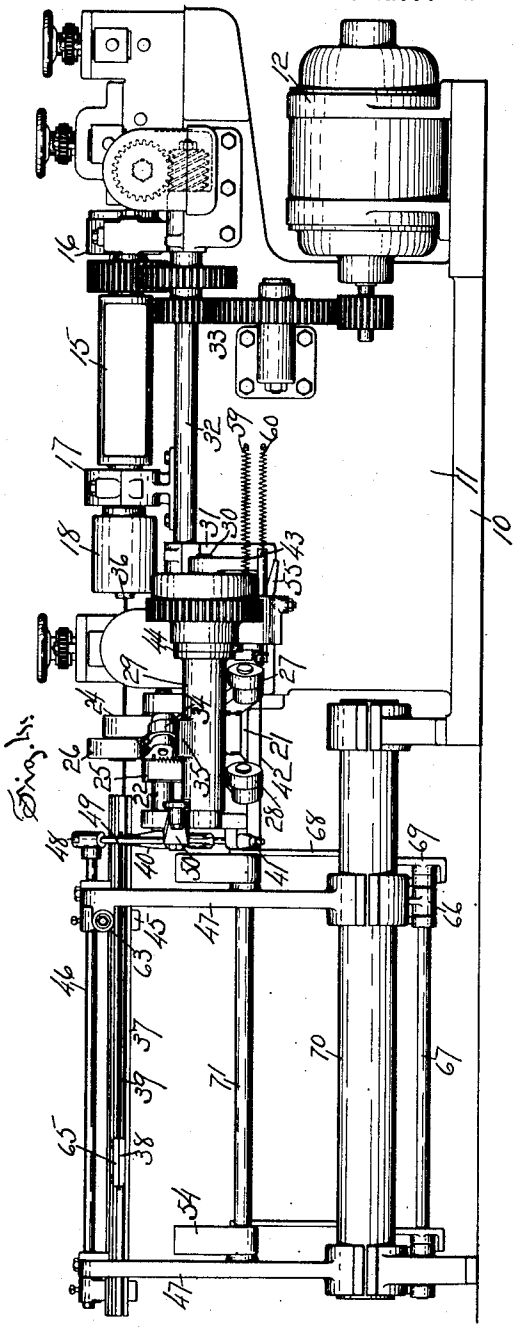


Fig. 1.

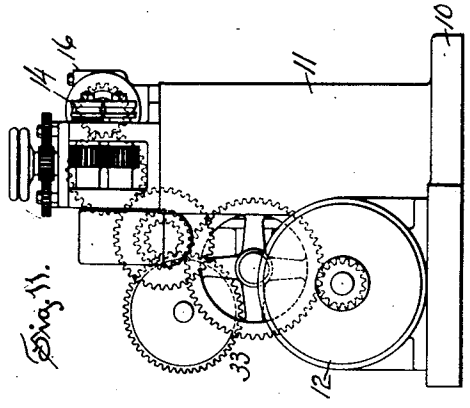


Fig. 11.

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WIREWORKING MACHINE

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Fig. 5.

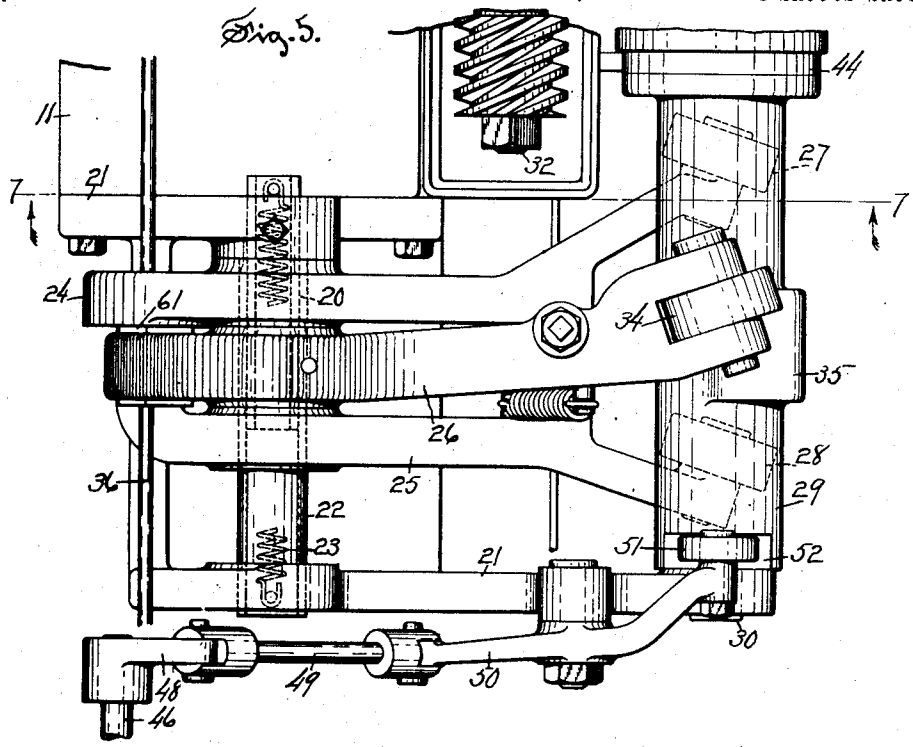
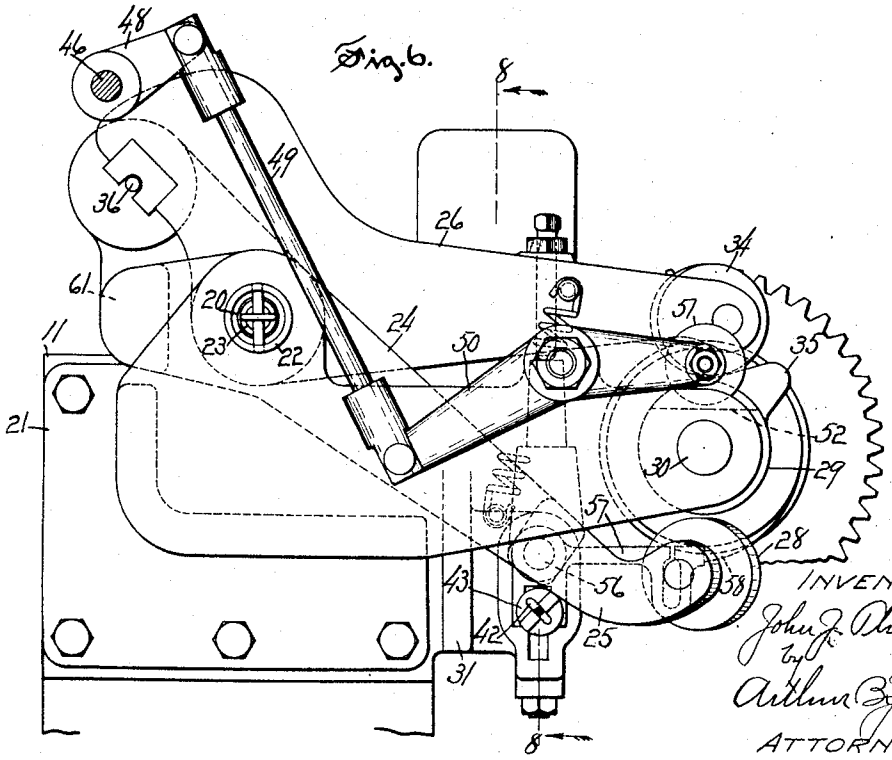


Fig. 6.



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Fig. 10.

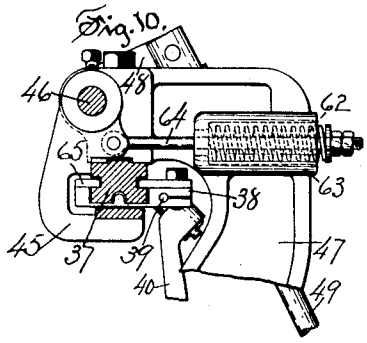
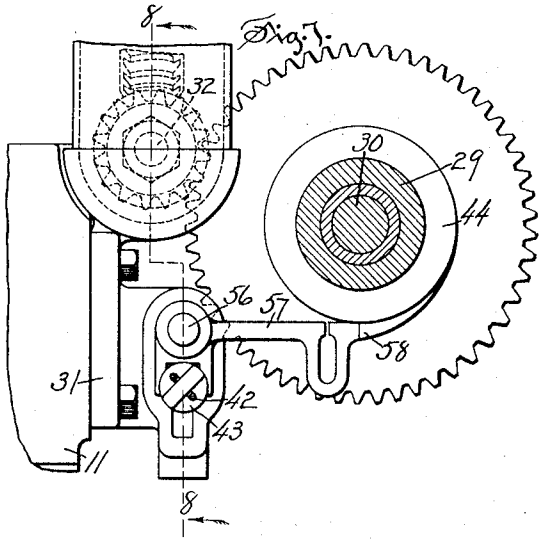


Fig. 7.



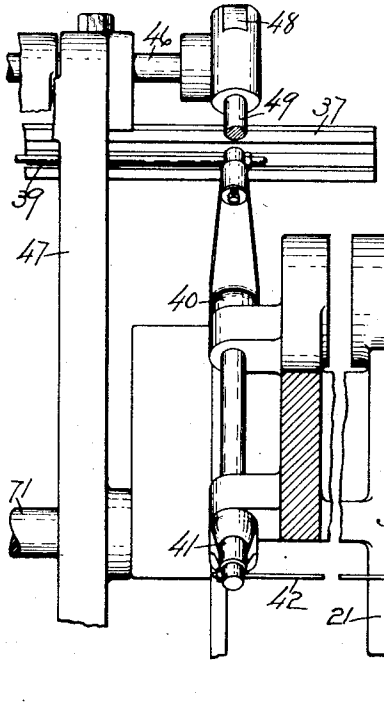


Fig. 8.

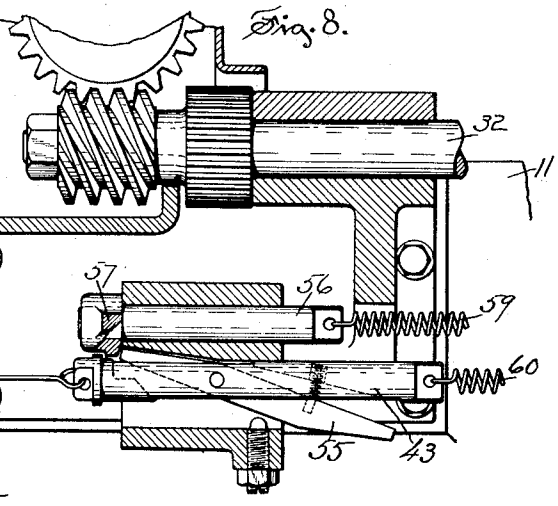
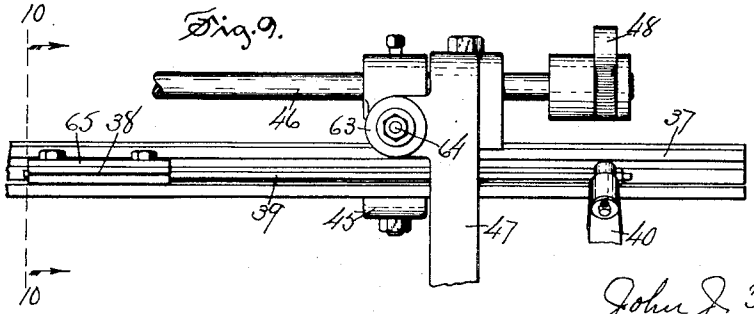


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN J. THACHER, OF WETHERSFIELD, CONNECTICUT, ASSIGNOR TO THE F. B. SHUSTER COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

WIREWORKING MACHINE.

Application filed February 16, 1927. Serial No. 168,684.

This invention relates to the class of machines employed for the purpose of straightening wire and for cutting it into definite lengths, and an object of my invention, among others, is the production of a machine of this class that shall be particularly efficient for performing the operations required of it.

One form of machine embodying the invention and in the construction and use of which the objects herein set out, as well as others, may be attained, is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of my improved machine.

Figure 2 is a view in front elevation.

Figure 3 is a view in cross section on a plane denoted by the dotted line 3—3 of Figure 2.

Figure 4 is a view in rear elevation.

Figure 5 is a view, scale enlarged, illustrating the construction of the cutter mechanism.

Figure 6 is an end view of the same.

Figure 7 is a view in section on a plane denoted by the dotted line 7—7 of Figure 5.

Figure 8 is a view in section on a plane denoted by the dotted line 8—8 of Figures 6 and 7.

Figure 9 is a detail view of a portion of the mechanism for receiving the wire after it has been cut.

Figure 10 is a view in section on a plane denoted by the dotted line 10—10 of Figure 9.

Figure 11 is a view in end elevation of the machine.

My invention has to do more especially with the cutting off and delivery of cut off lengths of wires from the machine, and, therefore, only a brief description of the machine in general and as shown in the drawings herein will be given, such machine comprising a bed 10 supporting a frame 11 upon the latter of which driving and operating mechanism is supported, this mechanism being of any ordinary type and construction and which may include a motor 12 for driving such mechanism with feed rolls 13 and breaker rolls 14 for supplying wire to a flier or straightening arbor 15.

The flier 15 is supported between bearings 16—17 and a burnisher 18 is located between the bearing 17 and a pair of feed rolls 19. This burnisher is not illustrated in detail herein but forms the subject matter of a separate application filed by me concurrently herewith and, therefore, no claims to the details of the construction are made herein.

My invention comprises a mechanism for cutting the wire into definite lengths as it passes from the burnisher and the feed rolls 19, this mechanism being caused to travel by and with the wire as the latter is moved.

This cutting mechanism comprises a supporting sleeve 20 secured within and projecting from the side of a bracket 21 attached to the end of the frame 11, a carrier sleeve 22 being mounted upon the sleeve 20 and movable lengthwise thereon, one end of this sleeve 22 being slidably supported in a side of said bracket opposite the end of the supporting sleeve 20. A retracting spring 23 is secured within the sleeves 20 and 22 and at opposite ends of each, so that when the sleeve 22 is moved in a manner to be hereinafter described it will, when released, be moved to its normal position by means of the spring.

A cutter frame is carried by the sleeve 22 and comprises a die carrying arm 24, a supporting arm 25 and a cutting arm 26. The arms 24 and 25 are secured to the sleeve 22 in a manner to prevent movement of said arms lengthwise of the sleeve, but to permit said sleeve to rotate within said arms, and the cutting arm 26 is secured to said sleeve that forms an immediate support for said arm and that is rotatable upon the sleeve 20.

The arms 24 and 25 are provided with actuating rollers 27—28 rotatably mounted on studs at the ends of the arms and in engagement with a cam sleeve 29 on a shaft 30 rotatably mounted in one of the sides of the bracket 21 hereinbefore mentioned and a bearing in a bracket 31 secured to the frame 11, and as shown in Figure 1 of the drawings. The shaft 30 is driven as by means of intermeshing pinions and gears from a shaft 32 connected by a train of gearing 33 with the motor 12, and as shown in Figures 3 and 4 of the drawings, said shaft also being connected by intermeshing gears to drive the breaker rolls 14 and feed rolls 19, in a manner that will be readily understood without further illustration and description herein. The cutting arm 26 also has a roller 34 in contact with a cutter operating cam 35 secured to the sleeve 29.

In the operation of this cutting mechanism a wire 36 is fed through the straightening arbor 15 and burnisher 18 by means of the feed rolls hereinbefore described, and

through a hole in a cutting die in the arm 24, and thence into a receiver 37. This receiver 37 comprises a bar with a groove in its under surface into which the wire passes and within which it engages a trip block 38 connected by a rod 39 with a clutch actuating lever 40 rotatably mounted on a wire receiving frame, to be hereinafter described. The lever 40 comprises an arm 41 having a connection 42 with a clutch actuator bar 43 appurtenant to a one revolution clutch 44 mounted on the shaft 30, and as shown in Figure 1 of the drawings.

This one revolution clutch may be of any ordinary construction well known to those skilled in the art and in the operation of which, when the bar 43 is actuated will make one complete rotation and then stop. When the bar is actuated by a length of wire passing along the receiver, as herein just described, the operation of the clutch will set the shaft 30 in motion thereby rotating the sleeve 29 and actuating the cam 35 to swing the arm 26 and the sleeve 22 on the supporting sleeve 20. As soon as the cutting device on the arm 26 encounters the wire the latter will move the sleeve 22 together with the arms 24—25—26, the cutting device thus moving simultaneously with the wire to sever the end thereof. The cam 35 is very short as shown in Fig. 6 and the action of the arm 26 is, therefore, comparatively quick. Consequently, as soon as the end of the wire is severed the arm 26 retracts and the spring 23 returns the sleeve 22 and said arms to their normal position, and as shown in Figure 1.

It will be noted that the arms 24—25—26 are partly supported by the sleeve 22 on the sleeve 20, and in order to prevent cramping action as force is applied to the cutter to move it with the wire the rollers 27—28—34 are so inclined on the sleeve 29 that rotation of said sleeve will tend to move these ends of said arms in the same direction as that in which the sleeve 22 is moving, and this construction enables the cutting apparatus to be supported on a single bearing.

Wire supports 45 in the shape of fingers are secured to a rocking bar 46 mounted on a receiving frame including supports 47. These fingers underlie the groove in the receiver 37 hereinbefore referred to and the wire in said groove rests upon these fingers. The bar 46 has a bar actuating arm 48 connected by a rod 49 with a wire releasing lever 50 pivotally mounted on the bracket 21 and having a roller 51 engaging a cam surface 52 on the sleeve 29, and as shown in Figures 5 and 6 of the drawings.

In the operation of the wire releasing mechanism just described, when the cam sleeve 29 has been set in motion by the operation of the clutch 44 as hereinbefore referred to, the releasing lever 50 will be operated to withdraw the wire supports or fingers 45 and permit the wire to drop on to wire rests 53 where they are retained by jaws 54. The cam 52 is so positioned that this release of the wire will take place just before the arm of the lever 26 is operated to sever the next succeeding length of wire.

The clutch actuator bar 43 has a latch 55 spring pressed to engage one end thereof with a clutch trip 56 having a stop arm 57 adapted to be interposed in the path of movement of a nose 58 of the clutch 44 hereinbefore referred to and of ordinary construction, and which will be set into clutching action when the arm 57 is moved from engagement with the nose 58 by operation of the bar 43 in a manner that will be readily understood, springs 59—60 returning the parts to their normal positions as soon as a wire has been severed as hereinbefore described, and the stop 57 being thus in position to engage the nose 58 and stop operation of the clutch at the end of each complete rotation thereof.

As hereinbefore noted the cutter mechanism is supported upon a single bearing, this being the sleeve 20 upon which it has an easy sliding fit, the opposite ends of the several levers with their diagonally arranged rollers aiding in the movement of the structure along said sleeve. The arms 24 and 25 are rigidly connected at their ends opposite the supporting rollers by a tie 61.

The wire supporting fingers 45 are held normally underneath the groove in the bar or receiver 37 by means of a spring 62 in a case 63 pressing against a rod 64 pivotally connected with the wire support 45, and as shown in Figure 10 of the drawings.

The trip block 38 has guide plates 65 slidably fitting grooves in the receiver 37, and as shown in Figure 10, and by means of which an easy sliding movement of said trip block is provided for.

A treadle 66 is attached near each end of a wire discharge shaft 67 rotatably mounted in the frame supports 47, said treadles being connected by bars 68 with each of the jaws 54, whereby upon pressure as of a foot upon either treadle said jaws will be swung downwardly to permit wires collected on the rests 53 to slide therefrom and be discharged from the machine.

In order to provide for a quick discharge of the wires from the jaws 54 the bar 68 is pivotally attached at its lower end to a toggle lever 69 loosely mounted on the shaft 67 and underlying the treadle 66, and as shown in Figure 2 of the drawings. When the jaws 54 are in their receiving positions, as shown in Figure 3, the pivot connecting the bar 68 and toggle 69 will be at one side of a line extending between the axes of the shaft 67 and the pivot connecting the bar 68 with the jaws 54, in which position the toggle rests against

a tube 70 forming a part of the wire discharge frame, so that pressure upon the jaws 54 will tend to force the toggle into contact with said tube. Pressure of the treadle 66 will move said pivot to the opposite side of said line, whereupon there being no further resistance to movement of the jaws 54 they will swing quickly downwardly by reason of the weight of the wires, thereby discharging the latter. It is here remarked that the jaws 54 are secured to a rock shaft 71 rotatably mounted in the frame supports 47.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim—

1. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a die carrying member mounted on said carrier and having a cutting die to receive a wire, a cutter lever pivotally supported on said carrier and having a die cooperating with that on said carrying member, means other than the pivot of said lever for slidably supporting it, a cutter lever actuating member, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

2. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a die carrying member mounted on said carrier and having a cutting die to receive a wire, a cutter lever pivotally supported by said carrier and having a cutting die to cooperate with that on said carrying member, a cutter lever actuating member, an antifriction device on said lever and engaged with said lever actuating member and arranged to aid in the sliding movement of said carrier, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

3. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a die carrying member mounted on said carrier and having a cutting die to receive a wire, a cutter lever pivotally supported by said carrier and having a cutting die to cooperate with that on said die carrying member, a rotatably mounted cutter lever actuating member, a roller on said cutter lever engaged with said actuating member and diagonally arranged in a direction to cause rotation of said actuating member to influence sliding movement of said carrier, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

4. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a cutter arm carried by said carrier and having a cutting die to receve a wire, a pivotally mounted cutter member having a die to cooperate with that on said arm, means for operating said cutter member, a rotatably mounted member, an antifriction device on said cutter arm engaged with said rotatably mounted member to aid in the sliding movement of said carrier, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

5. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a cutter arm carried by said carrier and having a cutting die to receive a wire, a rotatably mounted sleeve, a pivotally mounted cutter member having a die to cooperate with that on said arm, a cam on said sleeve to operate said cutter member, a roller rotatably mounted on said cutter arm and engaged with said sleeve and diagonally arranged in a direction to influence sliding movement of said carrier, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

6. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a cutter arm carried by said carrier and having a cutting die to receive a wire, a pivotally mounted cutter member having a die to cooperate with that on said arm, a rotatably mounted element located between the ends of said cutter arm and said cutter member and including means for operating the latter, antifriction members on the ends of said arms and diagonally arranged in a direction to influence sliding movement of said carrier, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

7. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a cutter arm carried by said carrier and having a cutting die to receive a wire, a rotatably mounted cutter member mounted on said carrier and having a die to cooperate with that on said arm, a rotatably mounted element located between the ends of said cutter arm and said cutter member and including a cam for operating said cutter member, rollers rotatably mounted on the ends of said cutter arm and member and diagonally arranged in opposite directions to influence sliding movement of said carrier, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

8. A cutter mechanism for a wire working machine including a carrier support, a carrier sleeve slidably and rotatably mounted on

said support, a die carrying member and a cutter member, one of which members is pivotally mounted on said sleeve and the other of which members is secured thereto, both of said members having cooperating dies to receive a wire, means for operating said cutter member, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

9. A cutter mechanism for a wire working machine including a carrier support, a carrier sleeve slidably and rotatably mounted on said support, a die carrying member pivotally mounted on said sleeve, a cutter member secured to said sleeve, said members having dies to receive a wire, means for imparting cutting movement to one of said members, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

10. A cutter mechanism for a wire working machine including a carrier support, a carrier sleeve slidably and rotatably mounted on said support, a die carrying member pivotally mounted on said sleeve, a cutter member secured to said sleeve, said members having dies to receive a wire, means for rocking said cutter member to sever a wire, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

11. A cutter mechanism for a wire working machine including a tubular carrier support, a carrier sleeve rotatably and slidably mounted on said support, a spring within said support and connecting the sleeve and support for causing sliding movement of one upon the other, cutter mechanism mounted on said carrier, means for operating said cutter mechanism, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

12. A cutter mechanism for a wire working machine including a frame, a tubular carrier support secured to and projecting from said frame, a carrier sleeve slidably and rotatably mounted on said support and having one end slidably supported by said frame, means for imparting sliding movement to said carrier in one direction, cutter mechanism mounted on said carrier, means for operating said cutter mechanism, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

13. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a cutter frame mounted on said carrier and including a supporting arm and a die carrying arm, the latter having a die to receive a wire, a rotatably mounted member, an antifriction device borne by each of said arms and engaged with said rotatably mounted member in a manner to influence sliding movement of said carrier, a cutter member carried by said carrier and having a die to cooperate with that on said die carrying arm, means for operating said cutter member, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

14. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a cutter frame mounted on said carrier and including a supporting arm and a die carrying arm, the latter having a die to receive a wire, a rotatably mounted member, a roller mounted on the end of each of said arms and engaged with said rotating member and diagonally arranged in a direction to influence sliding movement of said carrier, a cutter arm pivotally mounted on said carrier and having a die to cooperate with that on said die carrying arm, means for operating said cutter arm, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

15. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a cutter frame mounted on said carrier and including a supporting arm and a die carrying arm, the latter having a die to receive a wire, a rotatably mounted member including a cutter operating cam, a roller mounted on the end of each of said arms and engaged with said rotating member on one side thereof and diagonally arranged in a direction to influence sliding movement of said carrier, a cutter arm pivotally mounted on said carrier and having a die to cooperate with that on said die carrying arm and also having a roller engaged with said cam on the opposite side of said rotatably mounted member from the rollers on said arms, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

16. A cutter mechanism for a wire working machine including a carrier support, a carrier slidably mounted on said support, a cutter frame mounted on said carrier and including a supporting arm and a die carrying arm rigidly connected at one end, said die carrying arm having a die to receive a wire, a rotatably mounted member, antifriction devices borne by each of said arms and engaged with said rotatably mounted member in a manner to influence sliding movement of said carrier, a cutter member carried by said carrier and having a die to cooperate with that on said die carrying arm, means for operating said cutter member, and means for feeding a wire to said cutter mechanism whereby said carrier is slid upon its support.

17. A wire working machine including a cutter mechanism, driving mechanism therefor including a one revolution clutch, a receiver for wire cut off by said cutter mechanism, a trip block slidably carried by said re-

ceiver in the path of movement of said wire, a slidably mounted clutch actuating bar for controlling operation of said clutch, said block and bar having sliding movement in parallel paths, a clutch actuating lever transversely arranged with respect to said paths, a connection between one end of said lever and block, and a connection between the other end of said lever and bar.

18. A wire working machine including a cutter mechanism, driving mechanism therefor including a one revolution clutch, a receiver for wire cut off by said cutter mechanism, a trip block slidably carried by said receiver in the path of movement of said wire, a slidably mounted clutch actuating bar for controlling operation of said clutch, a rotatably mounted clutch actuating lever including actuating arms projecting in opposite directions, a connection between one of said arms and said block, and a connection between the other of said arms and said bar.

19. A wire working machine including a cutter mechanism, a receiver having a groove for wire cut off by said cutter mechanism, a wire support underlying said groove and upon which said cut off wire may rest, a rocking bar to which said support is secured, and means for rocking said bar to release said wire.

20. A wire working machine including a cutter mechanism, a receiver having a groove for wire cut off by said mechanism, a wire support underlying said groove and upon which said cut off wire may rest, a rocking bar to which said support is secured, yielding means for retaining said bar in one position, and means for rocking said bar to an opposite position to release said wire.

21. A wire working machine including a cutter mechanism, a rotatable member for operating said cutter mechanism, a receiver for wire cut off by said cutter mechanism, a wire support underlying said receiver and upon which said cut off wire may rest, a rocking bar to which said support is secured, a cam on said rotatable member, and a connection between said bar and cam for operation of the bar.

22. A wire working machine including a cutter mechanism, a rotatable member for operating said mechanism, a cam on said member, a receiver, a wire support acting in connection with the receiver to support a wire cut off by said mechanism, a rocking bar to operate said wire support, a wire releasing lever, an operative connection between said bar and lever, and means on said lever for engagement with said cam for operation of said lever.

23. A discharge apparatus for a wire working machine and comprising a pivotally mounted jaw, a treadle, a toggle lever located in the path of movement of said treadle, a bar pivotally connected with said toggle lever and jaw, and a stop to hold said toggle lever with its pivotal connection to said bar just at one side of a line passing through the pivotal point of support of said toggle and the pivotal point of connection of said bar with said jaw.

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