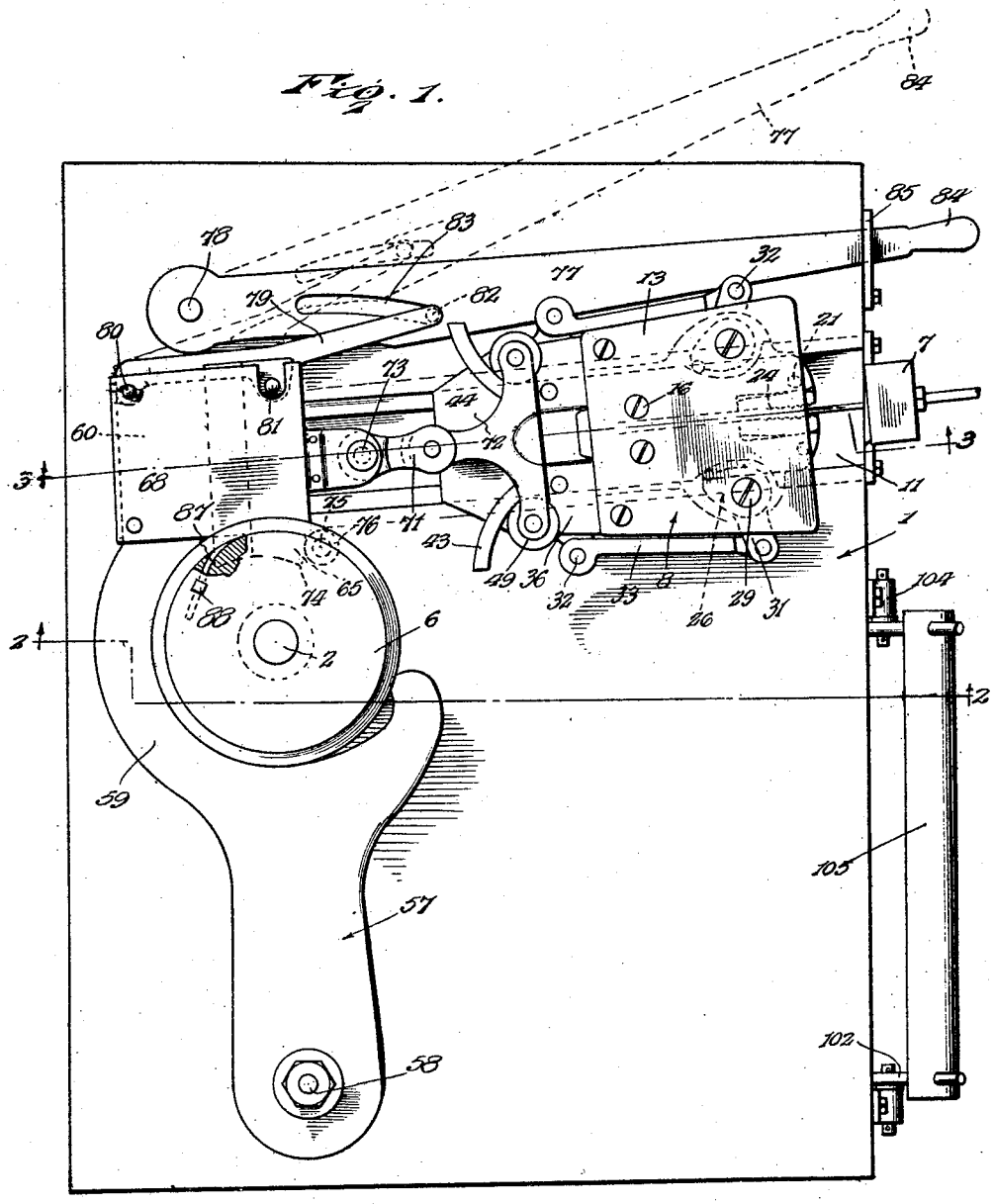
Sept. 11, 1928. 1,683,906

P. J. MAHONEY

WIRE DRAWING MECHANISM

Filed Aug. 27, 1925 3 Sheets-Sheet 1

Fig. 1.



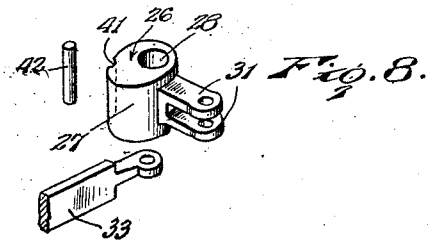


Fig. 8.

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Sept. 11, 1928. 1,683,906

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WIRE DRAWING MECHANISM

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Fig. 2.

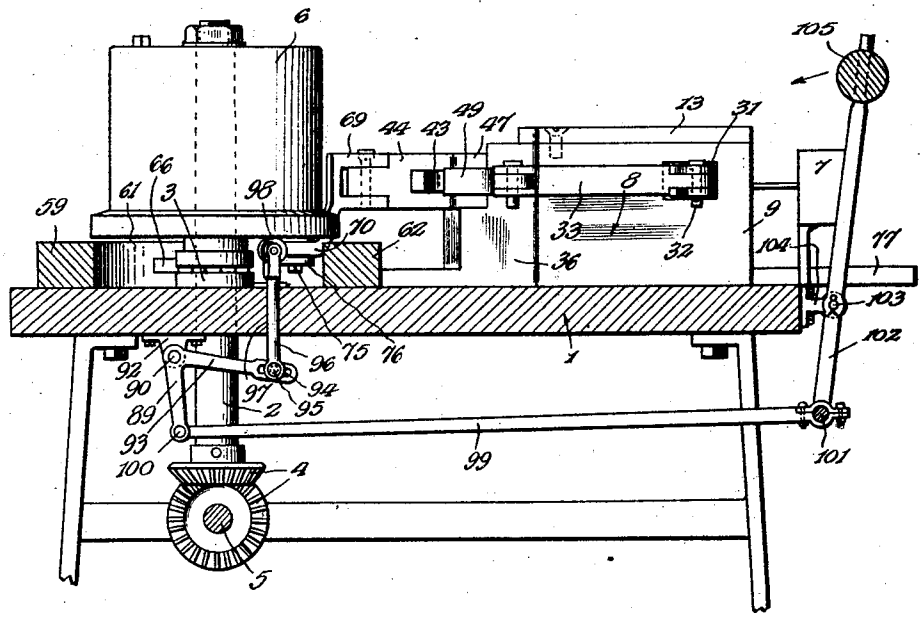
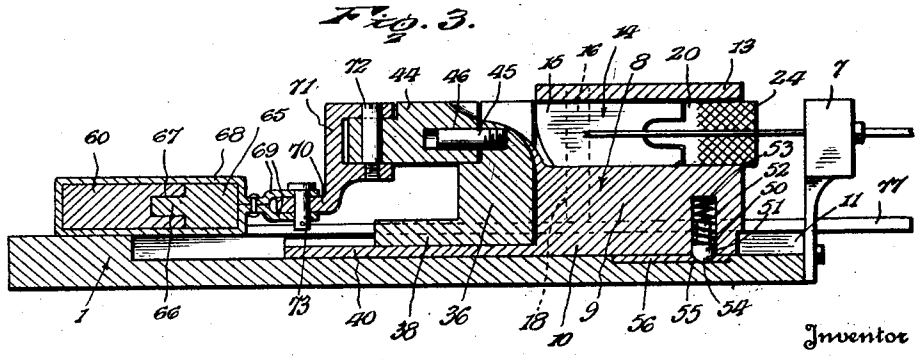


Fig. 3.



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WIRE DRAWING MECHANISM

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Fig. 4.

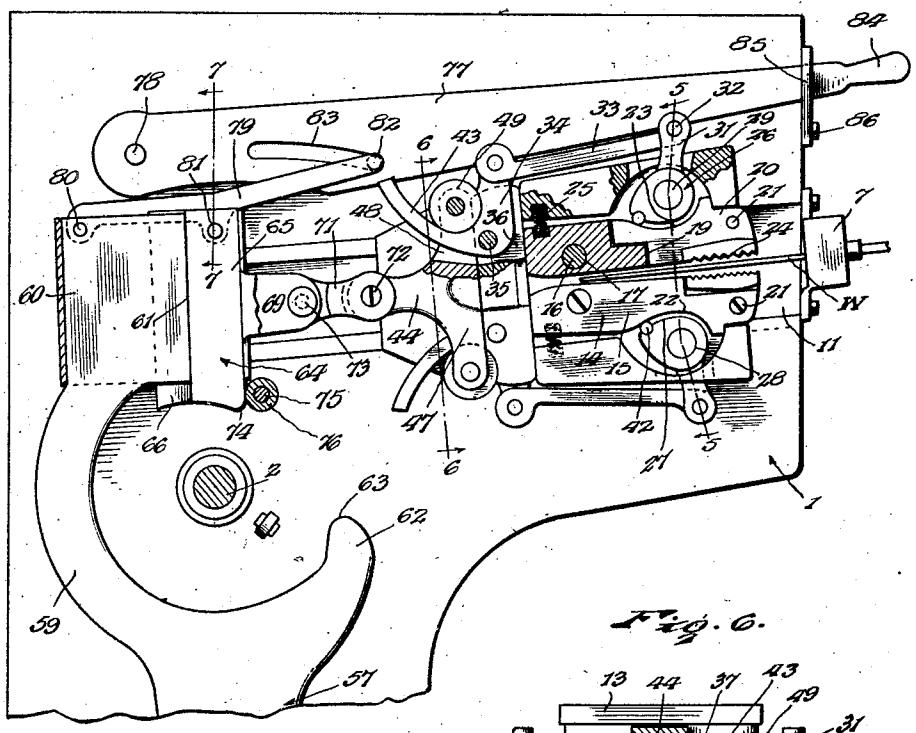


Fig. 6.

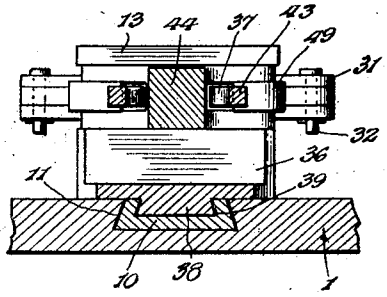


Fig. 5.

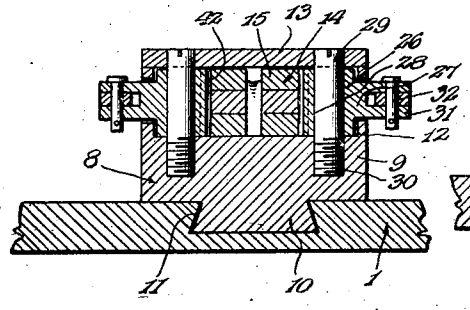
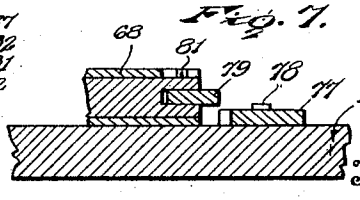


Fig. 7.



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Patented Sept. 11, 1928.

1,683,906

UNITED STATES PATENT OFFICE.

PATRICK J. MAHONEY, OF SHARON, PENNSYLVANIA.

WIRE-DRAWING MECHANISM.

Application filed August 27, 1925. Serial No. 52,886.

This invention relates to improvements in wire drawing machines and more particularly to a mechanism whereby the wire may initially be drawn through the reducing die and connected to the take-up reel of the machine with safety. It is well known that as this task is ordinarily performed, it is a precarious one, as the take-up reel of the wire drawing machine rotates at a high rate of speed and the wire is liable to be lashed about the limbs or body of the attendant at the machine, resulting in bodily injury, if not in death. Therefore, the present invention has as its object to provide automatic means for initially drawing the wire through the reducing die until a sufficient length thereof has been drawn through the die to permit of the end of the wire being connected to the take-up reel of the drawing machine, so that this operation may be performed with perfect safety to the attendant at the machine and much more rapidly than has heretofore been possible.

Another object of the invention is to provide means actuated through rotation of the take-up reel of a wire drawing machine, for automatically drawing an initial length of the wire through the die from the storage reel without the necessity of the attendant at the machine being required to grasp the wire with tools and pull the same through the die as has heretofore been customary, so that, through the operation of the mechanism embodying the invention, a length of wire sufficient to permit of connection of the end of the wire to the take-up reel, may be quickly and safely drawn through the die and connected to the reel.

Another object of the invention is to so construct the mechanism that as soon as a sufficient length of wire has been drawn through the die and the end of the wire connected to the take-up reel of the wire drawing machine, the attendant, by the mere adjustment of a hand lever, may render the device inactive and, at the same moment provide for continuous rapid rotation of the reel to effect continuous drawing of the wire through the die.

A further object is to provide, in connection with the mechanism, a device which will effectually insure against injury to the attendant at the machine at the time the wire end is connected to the take-up reel.

In the accompanying drawings:

Figure 1 is a plan view of the mechanism embodying the invention.

Figure 2 is a vertical front to rear sectional view taken substantially on the line 2—2 of Figure 1, looking in the direction indicated by the arrows.

Figure 3 is a similar view on the line 3—3 of Figure 1.

Figure 4 is a view similar to Figure 1, illustrating certain parts in section to better disclose the parts of the mechanism.

Figure 5 is a transverse sectional view taken substantially on the line 5—5 of Figure 4, looking in the direction indicated by the arrows.

Figure 6 is a similar view on the line 6—6 of Figure 4.

Figure 7 is a similar view on the line 7—7 of Figure 4.

Figure 8 is a group perspective view illustrating certain elements of the mechanism.

In the drawings, the numeral 1 indicates in general the table or bed of a wire drawing machine, only so much of the machine being shown, however, as is necessary to an understanding of the present invention, and it will be apparent as the description of the invention progresses, that the mechanism embodying the invention may be mounted in any desired manner directly upon the table or bed of the machine or upon some other support in juxtaposition thereto. A shaft 2 is rotatably and vertically slidably mounted in a suitable bearing 3 upon the table 1 and is driven through the medium of beveled gears 4, from a power shaft indicated by the numeral 5. This shaft 2 has removably fixed upon it the reel or drum 6 onto which the wire is wound as it is drawn from the storage reel (not shown) and through the reducing die which is indicated in general by the numeral 7. Heretofore it has been customary to pass the end of the wire through the die and then grip the wire and forcibly pull the same through the die until a sufficient length has been drawn through to permit of the end of the wire being connected to

the drum or reel, but as previously pointed out, this is a task which is performed only with difficulty and it is dangerous to perform. The mechanism embodying the invention and which mechanism will now be described, is, in a sense, interposed between the reducing die 7 and the take-up drum or reel 6 of the wire drawing machine. Therefore, so far as the present invention is concerned, the particular manner in which the mechanism is supported is immaterial.

Briefly stated, the invention contemplates the provision of reciprocatory gripping mechanism for gripping the wire and pulling the same intermittently through the die 7, means operating through rotation of the reel 6 to effect reciprocation of the gripping mechanism, and cause the same to automatically successively grip and release the wire, and means under the control of the operator of the machine for rendering the gripping mechanism inactive after a sufficient length of wire has been drawn through the die to permit of the end of the wire being connected to the reel. The gripping mechanism is indicated in general by the numeral 8 and comprises a head 9 having a dove-tail rib 10 formed upon its under side and fixed slidably in a dove-tail groove 11 provided in the upper side of the bed 1, the die 7 being located at the forward end of the said groove 11, the head being in this manner mounted for reciprocation toward and from the said die. The head 9 is recessed in its upper side as indicated by the numeral 12, and a cap plate 13 is secured upon the upper side of the head to close the recess and house the gripping members which are supported by the head. The gripping mechanism comprises a pair of jaws indicated by the numeral 14, and each comprising a rocker 15 mounted in a respective side of the recess 12 for limited oscillatory movement about a pivot pin 16 fitted through an opening 17 in the rocker 15 and threaded at its lower end into a threaded socket 18 formed in the bottom wall of the recess, the pivot pins 16 being located opposite each other, as clearly shown in Figures 4 and 5 of the drawings, and near the rear end of the head 9, the rockers extending substantially the entire length of said head within the said recess 12. Each rocker 15 is formed in its forward portion with a recess 19, and a jaw member 20 is mounted in the said recess of each rocker for limited pivotal movement about a pivot pin 21 fitted vertically through the forward recessed end of the rocker and through the corresponding end of the jaw member. Each rocker is recessed in its outer side to provide a concave cam surface 22 and each jaw member is formed with a similar surface 23. The opposing faces of the jaw members 20 of the gripping device are serrated at their forward portions, as indicated by the numeral 24, and by reference to Figures 1 and 4 of the drawings, it will be observed that the wire to be acted upon and which is indicated by the reference letter W, is led through the die 7 and longitudinally between the serrated faces 24 of the jaw members 20 and likewise between the rockers 15. Small compression springs 25 are interposed between the rear ends of the rockers 15 and the corresponding ends of the side walls of the recess 12 and yieldably hold the rockers swung to substantially the position shown in Figure 4 of the drawings, in which position the faces 24 of the jaw members 20 will be spaced apart a sufficient distance to permit of the passage of the wire to be drawn through the die. It will be evident, however, that the forward end portions of the jaw members may be swung toward each other about the pivot pins 16 against the tension of the springs 25 and this movement is effected through the medium of a pair of cams which are indicated in general by the numeral 26 and one of which is associated with each of the rockers. Each of the cam members 26 comprises a body 27 which is of approximately elliptical form and is provided eccentrically with an opening 28 through which is fitted a pivot pin 29, the pivot pin being threaded at its lower end into a socket 30 formed in the bottom wall of the recess 12 in the head 9, the body 27 being housed between the bottom wall of the recess and the cap plate 13. Each cam body 27 is provided at one side with a pair of laterally extending relatively short arms 31, through the outer ends of which are engaged the ends of a pivot pin 32 connecting, to the respective cam member, the forward end of a link 33 which, at its rear end is connected to a rocker 34. The rockers 34 are in the nature of small angle levers which are mounted upon pivot pins 35 in turn mounted upon a block 36 which is located immediately in rear of the head 9 and is provided upon its under side with a dove-tail boss or rib 38 slidably fitted in a dove-tail channel 39 formed in an extension 40 extending rearwardly from the said head 9 and constituting an extension of the rib 10. In this manner the block 36 is mounted for limited sliding movement with relation to the head 9. Each of the cam bodies 27 is provided at one side with an approximately semi-cylindrical vertically extending recess 41, and an anti-friction roller 42, preferably of hard steel, is disposed within the recess to ride against the cam surfaces 22 and 23 heretofore referred to, and it will be evident at this point that when pull is exerted upon the links 33 the cams 26 will be rotated about their axes so as to rock the rockers 15 about their pivot pins 16 and effect coaction of the serrated faces 24 of the jaw members 20 to grip the wire W.

Each of the angle levers 34 is provided at the opposite side of its pivot to that at which the respective link 33 is connected, with an arcuate finger indicated by the numeral 43, and the fingers of these two levers are curved rearwardly and laterally outwardly in opposite directions, as best shown in Figure 4 of the drawings. A draw head 44 is associated with the block 36 and is supported by a pin 45 which is preferably threaded into the block 36 at the rear side thereof and extends into a cylindrical socket 46 formed in the forward side of the draw head. The draw head is provided with oppositely laterally outwardly extending portions 47 which are recessed as at 48, and anti-friction rollers 49 are rotatably mounted upon the extensions of the said head. The fingers 43 project through the recesses 48 in the laterally extended portions 47 of the draw head 44 and the peripheries of the rollers 49 are designed to ride against the concave sides of the said fingers, as shown in Figures 1 and 4 of the drawings. At this point it will be evident that if a rearward pull is exerted upon the draw head 44, the fingers 43 will be swung inwardly toward each other, thereby rocking the levers 34 of which they constitute a part, and exerting a pull upon the links 33 to rotate the cams 26 and cause the jaws of the gripping members 14 to grip the wire to be drawn. It will likewise be evident that as the pull upon the draw head is continued, the gripping device as a whole will be shifted rearwardly, thereby pulling the wire for a portion of its length through the die 7. However, it is expedient to restrain the gripping device from rearward sliding movement until the jaws of the gripping members 14 have been brought firmly into gripping engagement with the wire W, and with this end in view, a yieldable restraining means is provided as clearly shown in Figure 3 of the drawings, and comprises a detent 50 in the nature of a small plunger slidably fitted in a cylindrical socket 51 formed in the under side of the head 9 of the device, the plunger having a stem 52 extending upwardly into the socket from the upper side of its head, and a spring 53 being arranged within the seat upon the stem 52 and bearing at its upper end against the upper end of the socket and at its lower end against the upper side of the head of the plunger. The under side of the head of the plunger is preferably rounded as indicated by the numeral 54, and is more or less firmly held, by the compressive action of the springs 53, in engagement in a concave recess 55 formed in the upper side of a plate 56 mounted in the bottom wall of the groove or channel 11 in the bed 1 of the machine. It will now be evident that before the gripping device can be moved bodily rearwardly to draw the wire, the resistance offered by the detent 50 engaging in the recess 55, must be overcome, and, therefore, the jaws of the gripping members will be brought into firm clamping engagement with the wire before the device is moved rearwardly.

The invention contemplates the provision of means for imparting reciprocatory movement to the draw head 44 so as to effect actuation of the gripping device to grip the wire to be drawn through the die and, in the reciprocation of said device, effect such actuation intermittently so that successive lengths of the wire will be drawn until the end of the wire can be brought into position for connection to the take-up reel 6. The means referred to is actuated through rotation of the drum 6 and comprises an oscillatory arm indicated in general by the numeral 57, which arm is pivotally mounted at one end as at 58, upon the upper side of the bed 1, substantially opposite the inner end of the groove or channel 11 in said bed. At its outer end the arm is provided with an arcuate extension 59 having its end portion formed with a flat substantially rectangular enlargement indicated by the numeral 60, one side 61 of which is presented toward the inner or rear end of the channel 11, as best shown in Figures 3 and 4 of the drawings. The arcuate extension 59 is located at one side of the longitudinal median line of the arm and at the other side of its longitudinal median line and at its said outer end, the arm is provided with an abutment 62 which has a rounded edge indicated by the numeral 63. An abutment member 64, in the nature of a block 65, is slidably disposed against the edge 61 of the enlargement 60 at the end of the arcuate extension 59, and has a rib 66 which works slidably in a groove 67 formed in the said edge 61 of the enlargement 60, the block 65 being, in this manner, movable back and forth along the said edge of the enlargement. A housing 68 of hollow rectangular form, and preferably of heavy sheet metal, is fitted upon and secured to the enlargement 60 of the extension 59 and houses the block 65 so that the block is held in position against the edge 61 of the said enlargement. The housing is provided at its side which is presented toward the draw head 44, with spaced ears 69 which receive between them one end 70 of a link 71 which is pivotally connected by a pin 72 with the said draw head 44, a pin 73 serving to connect the other end of the link with the said ears 69. It will be observed by reference to Figures 1 and 4 of the drawings, that the arcuate extension 59 of the oscillatory arm 57 partly surrounds the shaft 2 and that the diameter of the extension at its inner side is approximately the same as the diameter of the drum 6. It will likewise be observed by reference to Figure 4, that

that end of the abutment block 65 which is located next adjacent the shaft 2, projects inwardly beyond the inner side of the enlargement 60 at the outer end of the extension 59, and this end of the block is rounded to provide a nose indicated by the numeral 74. A small stub shaft 75 projects downwardly from the under side of the drum 6, and an anti-friction roller 76 is rotatably mounted upon the said shaft and, in the operation of the mechanism and as will presently be described, is designed to successively abut the abutment block 65 and the abutment 62 in the rotation of the drum, it being observed by reference to Figure 4 of the drawings, that when the abutment block is shifted to the limit of its movement in the direction of the shaft 2, it will be in the path of movement of the abutment roller 76, the arm 57 at such time assuming the position shown in Figure 4. As will be presently made clear, the successive engagement of the roller 76 with the nose 74 of the abutment block 75 and with the abutment 62, will effect reciprocation of the gripping mechanism, but after a certain length of wire has been drawn through the die 7 to permit of the end of the wire being connected to the drum 6, it is desired that the drum be permitted to rotate without coacting with the abutments 65 and 62. Therefore, means is provided operable to retract the abutment block 65 from the path of movement of the roller 76, and this means comprises a manually operable lever indicated by the numeral 77, which lever is pivotally mounted as at 78, upon the bed 1, at that side of the mechanism opposite the side at which the shaft 2 is located. An arm 79 is pivotally connected as at 80, with the enlargement 60 at the outer end of the arcuate extension 59 of the arm 57 and, at an intermediate point, is pivotally connected, as at 81, to that end of the abutment block 65 which is opposite the end at which the nose 74 is located. The other end of the said arm 79 is turned downwardly to provide a stud 82 working in a slot 83 formed in the lever 77. The lever 77 extends from its pivot 78, which pivot is located substantially opposite the enlargement 60 of the extension 59 of the arm 57, to the forward edge of the bed 1, and is provided with a hand grip 84 at its said end. A latch or detent 85 is swingingly mounted as at 86, upon the forward side of the bed 1 and, in the position of the lever shown in Figure 4 of the drawings, is engageable with the said lever near the hand grip 84, to hold the lever in different positions of adjustment, so that the lever cannot swing from this position to the dotted line position shown in Figure 1 of the drawings, until the latch 85 has been swung upwardly to inactive position.

In order that the end of the wire W may be connected to the drum 6, the drum is formed, preferably near its upper end with a socket 87 of dimensions to accommodate the end of the wire, the socket extending inwardly eccentric to the axis of the drum, and a clamping screw 88 being threaded into the upper end of the drum in position to bind at its lower end against the inserted end of the wire and thus secure the same within the socket.

The operation of the mechanism is as follows:

The end of the wire to be drawn is inserted into the die 7, and a sufficient length of the wire is pulled through the die, manually, by means of appropriate tools, and is disposed between the serrated faces 24 of the jaw members 20 of the gripping device, and the drum 6 is set in motion to revolve at a high rate of speed. As the drum rotates, the roller 76 will strike the nose 74 of the abutment block 65, thereby swinging the arm 57 rearwardly about its pivot and exerting a pull, through the medium of the link 71, upon the draw head 44. In the initial movement of the draw head, the fingers 43 of the rocking levers 34 are swung inwardly toward each other through the rolling engagement of the rollers 49 against their curved edges, thereby exerting a pull upon the links 33 and rotating the cams 26 so as to first cause coaction of the rollers 42 with the cam edges 23 of the respective jaw members 20 to cause the inner ends of the jaw faces 24 to grip the wire, and substantially simultaneously, coact with the cam edges 22 of the gripping members 15 to effect closing of the forward ends of these members against the wire to cause the serrated faces 24 of the jaw members to uniformly grip the opposite sides of the wire. During this momentary period of operation of the mechanism, rearward movement of the head 9 of the gripping device is prevented through the resistance offered by the engagement of the plunger 50 in its socket 55. The resistance offered by the detent plunger 50, through its engagement in the socket 55 in the plate 56, insures of firm gripping of the wire prior to rearward movement of the head 9, and when this resistance is overcome, the head 9 is pulled suddenly rearwardly, drawing a further portion of the length of wire through the die. As the arm 57 is swung rearwardly about its pivot through the action of the roller 76 against the nose 74 of the abutment block 65, the downturned end or stud 82 of the arm 79 will ride in the slot 83 and inasmuch as this slot is so arranged as to extend, in the position of the lever shown in Figure 4, in diverging relation to the line of movement of the gripping device 8, the arm 79 will be swung about its pivot in a direction to retract the abutment block 65 a sufficient distance to permit the

roller 76 to pass the nose 74 thereof when the gripping mechanism has reached the limit of its rearward movement. At this moment, the springs 25 will act to disengage the serrated faces 24 of the jaws 20 from the wire W, and, due to the rapid speed of rotation of the drum 6, the roller 76 will at the next instant strike against the abutment 62 and ride past the same, thereby swinging the arm 57 forwardly to return the gripping mechanism to its original position. Inasmuch as, in the forward swinging movement of the arm 57 to its original position, the abutment block 65 is shifted inwardly toward the shaft 2, through the travel of the stud 82 in the slot 83, the nose 74 of the abutment block will be immediately engaged by the roller 76 and the preceding operation will be repeated. Thus, in a few moment's time a sufficient length of the wire W will, in the operation of the mechanism, have been drawn through the die 7 to bring the end of the wire to position where it can be connected with the drum 6 to be wound thereon. The rotation of the drum is, of course, arrested while the wire end is being connected, and after the end of the wire has been connected with the drum, and before the drum is again set into motion, the latch 85 for the lever 77 is disengaged therefrom and the lever is swung toward the right to assume substantially the dotted line position shown in Figure 1 of the drawings. This effects a full retraction of the abutment block 65 so that its nose 74 is entirely out of the path of movement of the roller 76 and, inasmuch as in the position of the arm 57 shown in Figures 1 and 4 of the drawings, the abutment 62 is out of the path of movement of the said roller, the drum 6 is free to rotate without acting upon the drawing mechanism. Therefore, the wire will be continuously drawn through the die and rapidly wound about the drum.

Heretofore, in wire drawing machines, a foot pedal has been employed as a medium through which to arrest the operation of the winding drum, but many accidents have occurred through failure to properly operate this lever as, for example, due to the foot of the operator of the machine slipping from the pedal while he is engaged in connecting the end of the wire to the drum, thus permitting the drum to be instantly set in motion at a high rate of speed. Therefore, the present invention contemplates the provision of a means for arresting rotation of the drum 6 and which means will not present the disadvantage referred to above as attending the use of an ordinary foot pedal. The said means comprises an angle lever 89 pivotally mounted for rocking movement as at 90, upon a bracket 92 upon the under side of the bed 1, and having one of its arms, indicated by the numeral 93, formed with a slot 94 receiving a pivot pin 95 at the lower end of a plunger rod 96 slidably mounted through an opening 97 formed in the bed 1 beneath the drum 6 and displaced with relation to the shaft 2. The plunger rod 96 rotatably supports, at its upper end, a roller 98 designed to contact the under side of the drum 6. A rod 99 is connected at one end, as at 100, to the other arm of the angle lever 89, and at its other end to the cross bar 101 of a frame including spaced upright arms 102 pivotally mounted near their lower ends, as at 103, upon brackets 104 upon the forward side of the bed 1. A rod 105 extends between the upper end portions of the arms 102 and, in the normal position of the parts, the arms 102 are inclined slightly forwardly and upwardly so that the rod 105 is located slightly in advance of the forward side of the bed 1. It will be evident at this point that inasmuch as the shaft 2 is vertically slidable through the bearings 3, rearward pressure against the rod 105 in the direction indicated by the arrow in Figure 2 of the drawings, will result in the angle lever 89 being rocked so as to project the plunger rod 96 upwardly and thus elevate the drum 6 and shaft 2 to which it is secured, thereby disengaging the gears 4 and interrupting the transmission of power to the drum. As the operator will be leaning toward the drum in applying the end of the wire to the drum, his body will, of course, engage the rod 105 and there is, therefore, no likelihood that the drum will be thrown into gear until he has completed the attaching operation and stepped away from the machine.

Having thus described the invention, what I claim is:

1. Wire drawing mechanism, embodying a head mounted for reciprocation, coacting gripping members carried by the said head, a member supported upon the head to move therewith and adapted to receive a movement independently thereof, means upon the head operable with relation to the gripping members to effect mutual coaction thereof to grip the wire, angle levers upon the said member, operative connection between the angle levers and the actuating means upon the head, the said levers having arcuate fingers, a draw head supported for movement with relation to the last mentioned member, and rollers upon the draw head for coaction with the said fingers to actuate the angle levers and thereby actuate the actuating means for the gripping members to effect mutual coaction thereof to grip the wire, when the draw head is moved in one direction, movement of the draw head in the opposite direction serving to render the actuating means inactive, coaction of the said rollers with the said fingers of the angle levers serving to connect the draw head with the

last mentioned member to effect reciprocation of the first mentioned head when the draw head is reciprocated.

2. In wire drawing mechanism, the combination with a winding drum, and a die, of means for drawing an initial length of wire through the die for connection to the drum comprising a head mounted for reciprocation with relation to the drum, coacting gripping members carried by the head, a member supported upon the head to move therewith and adapted to receive a movement independently thereof, means operable through reciprocation of the said member with relation to the head to effect mutual coaction of the gripping members to grip the wire to be drawn, means resisting reciprocation of the head until the said member has been moved with relation to the head to actuate the means for effecting coaction of the gripping members, and means actuated through rotation of the drum to impart reciprocatory movement to the said member, said means for resisting movement of the head comprising a fixed member with relation to which the head is movable and which member is provided with a socket, and a spring pressed detent carried by the head and engaging in said socket to offer the required resistance, the said socket and detent having coacting rounded surfaces.

3. In wire drawing mechanism, the combination with a winding drum, and a die, of means for drawing an initial length of wire through the die for connection to the drum, said means comprising a head mounted for reciprocation with relation to the drum, coacting gripping members upon the head, an oscillatory member, operative connection between the same and the head for reciprocating the head and effecting mutual coaction of the gripping members in the movement of the head in one direction, spaced abutments upon the oscillatory member at opposite sides of the axis of the drum, and an element rotatable with the drum and engageable successively with the abutments to effect oscillation of the said oscillatory member.

4. In wire drawing mechanism, the combination with a winding drum, and a die, of means for drawing an initial length of wire through the die for connection to the drum, said means comprising a head mounted for reciprocation with relation to the drum, coacting gripping members upon the head, an oscillatory member, operative connection between the same and the head for reciprocating the head and effecting mutual coaction of the gripping members in the movement of the head in one direction, spaced abutments upon the oscillatory member at opposite sides of the axis of the drum, and an element rotatable with the drum and engageable successively with the abutments to effect oscillation of the said oscillatory member, one of said abutments being shiftable into and out of active position, and manually operable means for effecting adjustment of said abutment.

5. In wire drawing mechanism, the combination with a winding drum and a die, of means for drawing an initial length of wire through the die for connection to the drum, said means comprising a head mounted for reciprocation with relation to the drum, coacting gripping members upon the head, an oscillatory member, operative connection between the same and the head for reciprocating the head and effecting mutual coaction of the gripping members in the movement of the head in one direction, spaced abutments upon the oscillatory member at opposite sides of the axis of the drum, an element rotatable with the drum and engageable successively with the abutments to effect oscillation of the said oscillatory member, one of said abutments being shiftably adjustable into and out of the path of movement of the said element upon the drum, and means for automatically effecting shifting of the said abutment upon the oscillation of the oscillatory member in one direction, under the impulse of the drum-carried element.

6. A wire drawing machine including a vertically disposed shaft having the drum mounted thereon and movable vertically, drive gearing for the shaft separable by a vertical movement of said shaft whereby it is thrown out of gear, a vertically movable member having a roller at its upper end to engage the drum, an angle lever having an arm connected with the said vertically movable member, a rod positioned to be engaged by the operator, and connecting means between the said rod and the other arm of the before mentioned angle lever.

7. A wire winding machine including a winding drum, and intermittently operated wire gripping means, an operating member for the wire gripping means disposed below the winding drum and actuated by the latter, and means for lifting the drum to clear the said operating member whereby to throw the wire gripping means out of action.

8. A wire drawing machine, comprising a rotary member, intermittently operated wire gripping means, an operating member adapted to be oscillated by the said rotary member, an abutment movably mounted upon the operating member and extending into the path of the rotary member to be actuated thereby, and means actuated by the oscillations of the said operating member to alternately project and withdraw the said abutment into and out of the path of the rotary member.

9. A wire drawing machine, comprising

a reciprocating head, wire gripping jaws carried thereby, jaw operating means mounted on the head, pivoted members for actuating the jaw operating means movable with the said head, a draw head for operating the pivoted members and reciprocating the said head and means for imparting a reciprocatory movement to the said draw head.

10. A wire drawing machine, comprising a reciprocating head, wire gripping jaws carried thereby, jaw operating means mounted on the head, pivoted members for actuating the jaw operating means movable with the said head, a draw head for operating the pivoted members and reciprocating the said head, means for imparting a reciprocatory movement to the said draw head, including a rotary member, an oscillatory member and an abutment movably mounted upon the oscillatory member, a manually operable member, and connecting means between the abutment and the manually operable and oscillatory members for alternately moving the abutment into and out of the path of the said rotary member.

In testimony whereof I affix my signature.

PATRICK J. MAHONEY. [L. S.].