Aug. 29, 1939. J. M. MINKOW 2,170,830

WIRE FEED MECHANISM

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Fig 1.

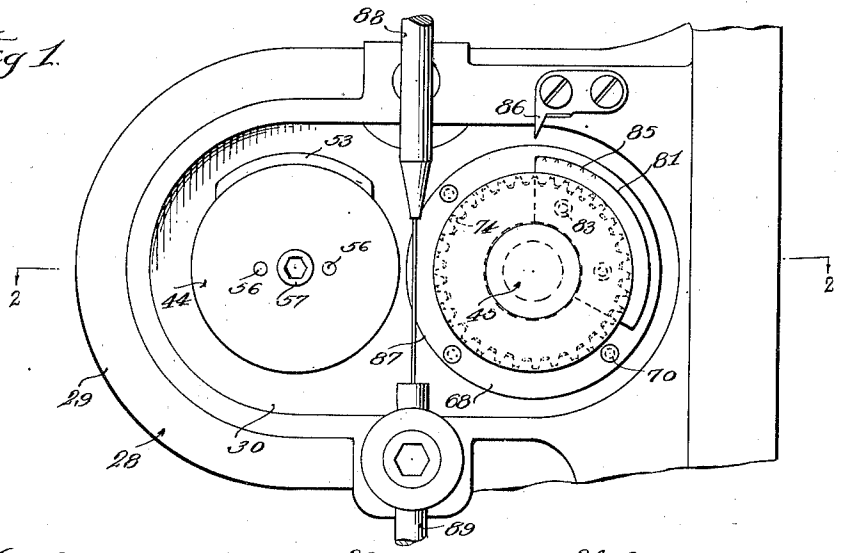


Fig 2.

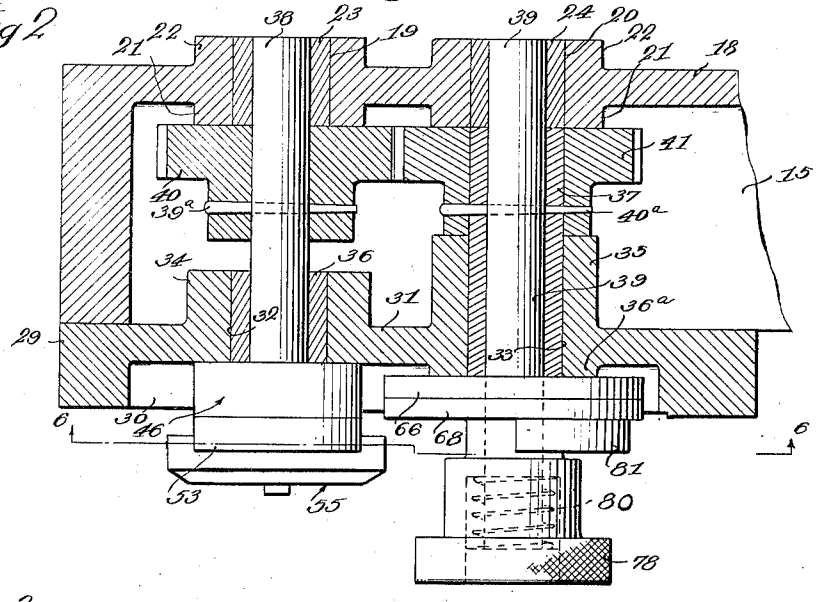


Fig 3.

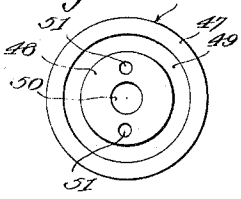


Fig. 4.

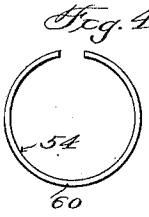
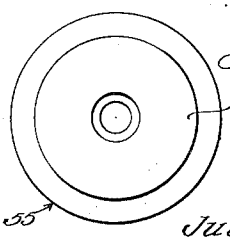


Fig 5.



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Fig. 6.

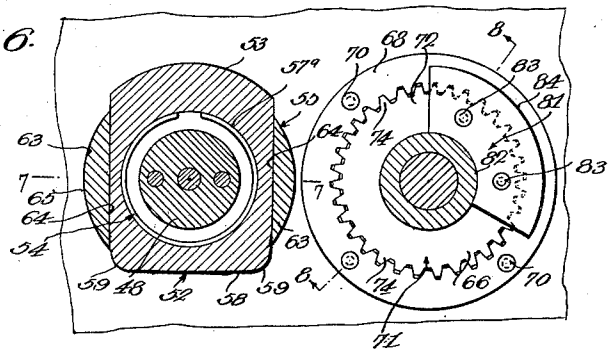


Fig 7.

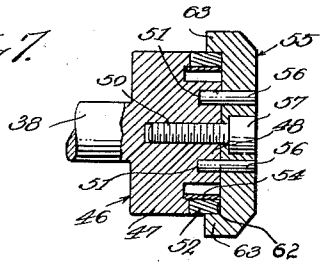


Fig 8

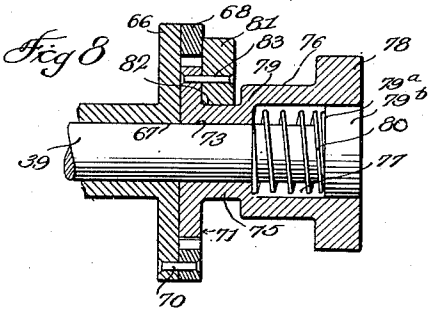
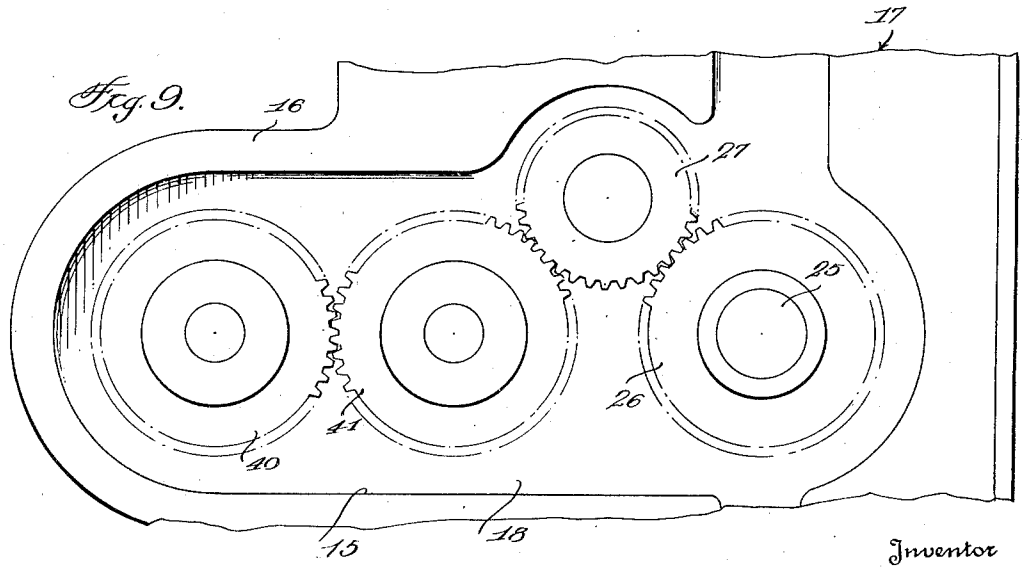


Fig. 9.



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2,170,830

WIRE FEED MECHANISM

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Application August 23, 1938, Serial No. 226,388

6 Claims. (Cl. 140—131)

This invention relates to a wire feed mechanism designed primarily for use in connection with machines for forming and driving wire staples, but it is to be understood that a feed mechanism, in accordance with this invention is for employment in any connection for which it may be found applicable.

A further object of the invention is to provide, in a manner as hereinafter set forth, a wire feed mechanism including a pair of rotatable wire grippers coacting for intermittently feeding successive lengths of the wire to be acted upon, one of the grippers being latched when active, and means whereby the latched gripper may be expeditiously adjusted independent of and relative to the other for varying the extent of the intermittent feed.

A further object of the invention is to provide, in a manner as hereinafter set forth, a wire feeding mechanism including a pair of rotatable roll structures having coacting means for intermittently feeding successive lengths of wire to be acted upon, and with one of said coacting means being spring controlled, capable of being shifted to and from gripping position, adjustable, when in non-gripping position relative to the other coacting means to subsequently provide, when coacting with the latter for the varying of the extent of the intermittent feed.

A further object of the invention is to provide, in a manner as hereinafter set forth, one of said roll structures aforesaid, with an adjustable wire gripper means, bodily moving with a slidable spring controlled carrier in the form of a gear adjustably intermeshing with a driving means therefor to releasably maintain the said gripper means in its adjusted position.

The invention has for its object to provide, in a manner as hereinafter set forth, a wire feed mechanism including a pair of rotatable roll structures having coacting gripping means for intermittently feeding successive lengths of the wire to be acted upon and with one of said means being slidable relative to the other and resiliently supported.

The invention has for another of its objects to provide a resilient support for the slidable gripping means aforesaid, said support being so formed and disposed in such relation to said means to prevent the discarding of the latter if the support becomes impaired and a new one substituted.

The invention has for another of its objects to provide, in a manner as hereinafter set forth, a wire feed mechanism including a pair of wire gripping means coacting with each other for intermittently feeding successive lengths of the wire to be acted upon, one of said means being spring controlled, bodily revoluble with and intermittently shiftable parallel to the axis of the roll structure with which it is associated during the revolving of such structure, and the other of said means being bodily revolving with and fixed stationary to that structure with which it is associated.

The invention has for another of its objects to provide, in a manner as hereinafter set forth, a wire feed mechanism including a pair of oppositely revoluble wire feed roll structures for intermittently feeding successive lengths of the wire to be acted upon, and with one of said structures capable of being adjusted independently of the other for varying the extent of the intermittent feed.

The invention has for another of its objects to provide, in a manner as hereinafter set forth, a wire feed mechanism for detachable connection to a machine of the type referred to and including a pair of oppositely revoluble wire feed roll structures, intermeshing driven gears fixed to said structures and a combined portable carrier and support for, common to and to which said structures are connected whereby the said mechanism may be bodily detached from the machine and expeditiously connected to another machine when desired.

The invention has for another of its objects to provide, in a wire feed mechanism, a pair of oppositely revoluble wire feed roll structures, one having fixed thereto a wire gripping means having a working surface in the form of a segment of a circle, and the other having slidingly connected thereon a resiliently supported hollow gripping means having a working surface in the form of a segment of a circle, said surfaces intermittently coacting during each revolution of said structure for intermittently feeding successively lengths of the wire to be acted upon.

The invention has for a further object to provide, in a manner as hereinafter set forth, a wire feed mechanism including a pair of oppositely revoluble wire feed roll structures for intermittently feeding successive lengths of wire to be acted upon and whereby one of said structures may be expeditiously adjusted relative to the other for varying the extent of the feed.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a wire feed mechanism which is comparatively simple in its construction and arrangement, strong,

durable, compact, expeditiously installed with respect to the machine with which it is to be associated, readily bodily removed from the machine when desired, thoroughly efficient in its use, conveniently repaired when occasion requires, and comparatively inexpensive to set up.

Embodying the foregoing aims and to others which may hereinafter appear, the invention consists of the novel construction combination and arrangement of parts as will be more specifically described and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a front elevation of the mechanism installed,

Figure 2 is a section on line 2—2, Figure 1,

Figures 3, 4, 5 and front elevations respectively of the head, resilient support for the gripping means and retainer of the non-adjustable wire feed roll structure,

Figure 6 is a fragmentary section on line 6—6, Figure 2,

Figures 7 and 8 are, respectively, sections on lines 7—7 and 8—8, Figure 6, and

Figure 9 is an elevation of the driving means for the mechanism.

With reference to Figures 1, 2 and 9 therein is shown by way of example, a chamber 15 formed in a portion 16 of a supporting structure 17 constituting a part of the machine with which the wire feed mechanism, in accordance with this invention is to be associated. The chamber 15 is open at its front. The rear or back wall of chamber 15 is indicated at 18 and it is provided with a pair of spaced horizontally aligned openings 19, 20. The wall 18 has integral therewith forwardly and rearwardly directed collars 21, 22 respectively, having their inner faces flush with the walls of the said openings. Mounted in the openings 19, 20 are bearing bushings 23, 24 respectively, which are also arranged within and flush with the free ends of the said collars. The operating shaft of the machine, with which the feed mechanism is associated is indicated 25 and extends into one end of the chamber 15.

That end of shaft 25 positioned within the chamber 15 carries a gear 26 which meshes with and drives a gear 27 suspended from the wall 18 of chamber 15 and which is of less diameter than the gear 26. The gear 26 is to operate in an anti-clockwise direction and the gear 27 in a clockwise direction. The purpose of the gear 27 will be presently referred to. The wire feed mechanism, generally indicated at 28 is to be detachably connected to the structure 17 at the front of chamber 15. The mechanism 28 includes a one-piece support 29 which, by way of example, forms a closure for the major portion of the open front of chamber 15. The support 29 provides a carrier for the other parts of such mechanism and is provided with an oval-shaped recess 30 in its front face. The base or inner wall of the recess 30 is indicated at 31 and it is formed with a pair of horizontally aligned openings 32, 33 arranged in spaced relation. The rear face of wall 31 has integral therewith rearwardly extending bosses 34, 35 having their inner faces forming rearward continuations of the walls of the openings 32, 33 respectively.

The boss 35 is of greater length than boss 34. Mounted in opening 32 and boss 34 is a bearing bushing 36 having its ends flush with the front face of wall 31 and the rear end of boss 34. Integral with the front face of wall 18 and forming a continuation of the wall of the opening 33 is a boss 36^a of materially less length than boss 35. Mounted in the opening 33, boss 36^a and extending rearwardly from boss 35 is a bushing or sleeve 37 having its front end flush with the front of boss 36^a. The bushing 37 is of a length to extend to the forward end of bushing 24.

Mounted in the bushings 23, 36 and extending into the recess 30 is a shaft 38. Mounted in the bushings 24, 37 and extending through and forwardly from recess 30 is a shaft 39. Fixed to shaft 38 by a pin 39^a is a gear 40. The latter is spaced from bushing 36 and is arranged in close proximity to a collar 21. Mounted on bushing 37 and fixed to the latter, as well as to shaft 39, by the pin 40^a is a gear 41 arranged in close proximity to bushing 35 and the other collar 21. The gears 40, 41 permanently mesh with each other. The mechanism includes a pair of revoluble feed structures 44, 45, operated by the shafts 38, 39 respectively. The shaft 38 and gear 40 form elements of structure 44. The shaft 39 and gear 41 form elements of structure 45. The structure 44 is non-adjustable. The structure 45 is adjustable for the purpose of varying the extent of the intermittent feed.

The outer end of shaft 38 has formed integral therewith a circular head 46 positioned against the outer face of the wall 31 and of greater diameter than opening 32. The head 46 is formed of an inner circular part 47 and an outer circular part 48 of less diameter than and concentrically disposed with respect to the part 47. The outer or front face of part 47 is provided with an annular groove 49 which surrounds the point of mergence between the parts 47, 48. The head 46 axially thereof is formed with a threaded socket 50 opening at the front of part 48. The part 48 is provided with a pair of diametrically opposed sockets 51 spaced adjacent to opposite sides of the mouth of the socket 50.

The feed roll structure 44 includes the head 46, a shiftable carrier 52 for a wire gripper or cam 53, a resilient support or tensioning element 54 for carrier 52, a retainer 55 for the carrier 53 positioning dowels 56 for the retainer 55 and a coupling screw 57 for detachably connecting the head 46 and retainer 55 together.

The gripper 53 is an integral part of the carrier 52 and bodily moves therewith. The carrier 52 is spring-urged by the element 54. Owing to the manner in which the carrier 52, gripper 53 and element 54 are correlated and their arrangement with respect to the head 46, the gripper 53 is not only spring-urged, but it is also slidably arranged relative to head 46.

The carrier 52 is substantially of rectangular contour and formed with a circular opening 57^a of materially greater diameter than the head part 48. The carrier 52 has its lengthwise or side edges straight and one of its end edges throughout of a contour corresponding to a segment of a circle and which provides the wire gripper or cam 53. The other end edge 58 of carrier 52 is straight and merges into the rounded corners 59. The length of the carrier 52 is greater than the diameter of and has its ends permanently disposed in extended relation with respect to head 46. The carrier 52 is arranged diametrically of head 46 and positioned against and is slidable relative to the front face of head part 47. The head part 48 is arranged in the

opening 57a and flush with the front of carrier 52.

The resilient support or tensioning element 54 for the carrier 52 is in the form of a split resilient ring 60 of an outer diameter substantially corresponding to the diameter of and having its outer face permanently bearing against the wall of opening 57a. The ring 60 seats in the groove 49 and its body is of a width to extend from the base of the groove 49 to the front face of carrier 52. The ring 60 normally tends to hold the carrier 53 in the position shown in Figure 6 and acts as a resilient abutment for the gripper or cam 53 when the latter is active.

The retainer 55 comprises a circular body part 61 formed axially thereof with a countersunk opening 62. Integral with the body part 61 is a pair of diametrically opposed inwardly extending spaced flanges or confiners 63 having straight inner edges 64 and outer edges 65 of arcuate contour. The carrier 52 is confined between the inner edges 64 of the flanges 63. Secured to the said body part 61 and extending inwardly therefrom are the positioning dowels 56 which engage in the sockets 51. The coupling screw 57 extends through and has its head countersunk in the opening 62. The screw 57 has threaded engagement with the wall of socket 50 and acts to connect head 46 and retainer 55 together whereby the carrier 52 is held on head part 43.

The feed roll structure 45, not only includes the shaft 39 and gear 41, but also the bushing or sleeve 37 and a disc 66 formed integral with the forward end of bushing 37. Disc 66 is provided with an axial opening 67 for the passage of shaft 39. The disc 66 operates in recess 38, has its rear surface bearing against boss 35a and is of materially greater diameter than shaft 39. Secured to the front face of disc 66, as well as being flush with the outer edge of the latter, is an annulus 68 having its inner edge 69 toothed throughout. The annulus 68 is in the form of an internal ring gear. The spaced holdfast means 70 are employed for securing the annulus 68 to the front face of disc 66. The disc 66 and annulus 68 coact to form a combined coupling and driving element for a revolubly adjustable wire gripper carrier 71. The latter is bodily shiftable lengthwise of shaft 39, is spring controlled and consists of a disc 72 of less diameter than disc 66, formed with an axial opening 73 for the passage of shaft 39, has its outer edge 74 toothed throughout and merges into an outwardly directed tubular hub 75 which terminates at its outer end into the inner end of an offset tubular grip 76 forming a socket 77. The outer end of grip 76 is formed with an external annular flange 78. The base 79 of socket 77 forms a shoulder which coacts with a shoulder 79a formed by the inner surface of a head 79b integral with the outer end of shaft 39. The grip 76 encompasses shaft 39 and within the socket 77 thereof is arranged a controlling spring 80 for the carrier 71. The spring 80 surrounds the shaft 39 and is interposed between the base of socket 77 and the shoulder 79a on head 79b. The structural arrangement aforesaid provides for the shifting of the carrier outwardly from disc 66 against the action of spring 80. The latter normally tends to maintain the carrier interengaged with the combined driving and coupling element, whereby the carrier will bodily rotate with said element on the operation of structure 45. The head 79b constitutes a guide for the grip 76, and further acts to maintain the grip and shaft in coaxial arrangement.

The wire gripper forming an element of structure 45 is indicated at 81, and consists of a place of segmental contour. The gripper 81 has a curved inner edge 82 for seating against the hub 75. The gripper 81 is positioned against the front face of carrier 71, and it is fixedly secured in such position by the spaced holdfast devices 83. The width of gripper 81 is such as to extend beyond the toothed edge of the carrier. The gripper 81 has its outer or working edge 84 spaced inwardly adjacent to the outer edge of disc 66. The carrier, hub and grip form an adjusting means for the gripper 81. The said adjusting means and the combined coupling and driving element have coacting parts, i. e., the teeth of said means and the teeth of said element for latching or detachably connecting said element and means together for moving in unison. The controlling spring 80 functions to maintain the said means and element latched together, whereby when the said means is driven from and in unison with said element, the gripper 81 will be held in its adjusted position.

The outer face of gripper 81 bordering its outer or working edge is formed with suitable indicia or graduations 85 for indicating the extent of adjustments relative to the gripper 81, and which are correlated with a pointer 86 secured to the support 29 over the roll structure 45. The gripper 81 is adjusted in the arc of a circle towards and from gripper 53 to increase or decrease the extent of that part of the working edge 84 of gripper 81 which coacts with the working edge of gripper 53 to provide the intermittent feed and the extent of such feed.

The gear 27 meshes with and on the operation of shaft 25 drives the gear 41 in an anti-clockwise direction and which in turn drives the gear 40 in a clockwise direction, the result being the revolving of the wire feed roll structures 44, 45 in opposite directions; the structure 44 clockwise and the structure 45 anti-clockwise. On the operation of the structures 44, 45, the grippers 53, 70 will coact to bite or grip the wire 87 which is positioned between said structures and intermittently feed successive lengths of the wire to be acted upon. The adjusting of the gripper 81 with respect to the gripper 53 is for varying the period of duration of the grip or bite had on the wire 87 by the grippers when intermittently feeding the wire whereby the length of that portion of the wire which is fed by the mechanism may be varied. The grippers coact to feed the wire during a part of each revolution of the structures 44, 45.

With reference to Figure 1, there is shown a guide means 88 for the wire 87 and a conducting-off means 89 for the successive lengths of the wire which are fed by the mechanism.

What I claim is:

1. In a wire feed mechanism, a pair of oppositely revoluble wire feed roll structures, each provided with a gripper, said grippers coacting on the operation of said structures for intermittently feeding successive lengths of wire to be acted upon, one of said structures including a revoluble slidably mounted carrier disposed for adjustment in an arcuate plane and to which the gripper of such structure is fixedly secured to, bodily carried with and disposed in extended relation thereto, and such structure including a revoluble driving element for the carrier, said element and carrier having coacting interengaging means for latching the carrier in its adjusted position to said element to be revolved by the latter, the sliding and adjusting of the carrier being relative

to said element, and the adjustment of the carrier providing for the adjustment of the gripper fixed thereto relative to the gripper of the other structure to vary the extent of the feed on the coaction of the grippers.

2. In a wire feed mechanism, a pair of oppositely revoluble wire feed roll structures each provided with a gripper, said grippers coacting on the operation of said structures for intermittently feeding successive lengths of wire to be acted upon, one of said structures including a revoluble slidably mounted carrier disposed for adjustment in an arcuate plane and to which the gripper of such structure is fixedly secured, bodily carried with and disposed in extended relation thereto, such structure including a revoluble driving element for the carrier, said element and carrier having coacting interengaging means for latching the carrier in its adjusted position to said element to be revolved by the latter, the sliding and adjusting of the carrier being relative to said element, and the adjustment of the carrier providing for the adjustment of the gripper fixed thereto relative to the gripper of the other structure to vary the extent of the feed on the coaction of the grippers, a controlling spring for the said carrier, the said controlling spring holding the latter and element normally in latching engagement.

3. In a wire feed mechanism, a pair of oppositely revoluble wire feed roll structures, each provided with a gripper, said grippers coacting on the operation of said structures for intermittently feeding successive lengths of wire to be acted upon, one of said structures including an operating shaft, a spring controlled adjusting, operating, and carrier means for the gripper of such structure and to which such gripper is fixedly secured, said means being slidably mounted on said shaft and adjustable in an arcuate path, and a combined coupling and driving element for and fixed to said shaft, said element arranged rearwardly of and opposing said carrier means, said element and said carrier means having coacting parts for latching the carrier in its adjusted position to said element to be operated by the latter, the controlling spring for the carrier means holding said means and element in latching engagement.

4. In a wire feed mechanism, a pair of oppositely revoluble wire feed roll structures, each provided with a gripper, said grippers coacting on the operation of said structures for intermittently feeding successive lengths of wire to be acted upon, one of said structures including a revoluble slidably mounted carrier disposed for adjustment in an arcuate plane and to which the gripper of such structure is fixedly secured, bodily carried with and disposed in extended relation thereto, and such structure including a revoluble driving element for the carrier, said element and carrier having coacting interengaging means for latching the carrier in its adjusted position to said element to be revolved by the latter, the sliding and adjusting of the carrier being relative to said element, and the adjustment of the carrier providing for the adjustment of the gripper fixed thereto relative to the gripper of the other structure to vary the extent of the feed on the coaction of the grippers, the coacting interengaging means of said element being arranged interiorly thereof, the coacting interengaging means of the carrier being arranged on the exterior thereof.

5. In a wire feed mechanism, a pair of oppositely revoluble wire feed roll structures, each provided a with gripper, said grippers coacting on the operation of said structures for intermittently feeding successive lengths of wire to be acted upon, one of said structures including an operating shaft, a spring controlled adjusting, operating and carrier means for the gripper of such structure and to which such gripper is fixedly secured, said means being slidably mounted on said shaft and adjustable in an arcuate path, and a combined coupling and driving element for and fixed to said shaft, said element arranged rearwardly of and opposing said carrier means, said element and said carrier means having coacting parts for latching the carrier in its adjusted position to said element to be operated by the latter, the controlling spring for the carrier means holding said means and element in latching engagement, said element having the coacting parts thereof being in the form of internally arranged teeth, said carrier means having the coacting parts thereof in the form of externally arranged teeth.

6. In a wire feed mechanism of that type including a pair of oppositely revoluble wire feed roll structures, each provided with a gripper, said grippers coacting on the operation of said structures for intermittently feeding successively lengths of wire to be acted upon, one of said structures including a horizontally shiftable, normally latched, adjustable, slidingly mounted, spring controlled, revoluble carrier having the gripper of such structure fixed thereto, bodily revolving therewith and disposed in extended relation thereto, said carrier being adjustable in an arcuate path to adjust the gripper fixed thereto in relation to the gripper of the other structure for varying the extent of the intermittent feed of the wire.

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