

Dec. 2, 1941.

C. R. GUNDERSON

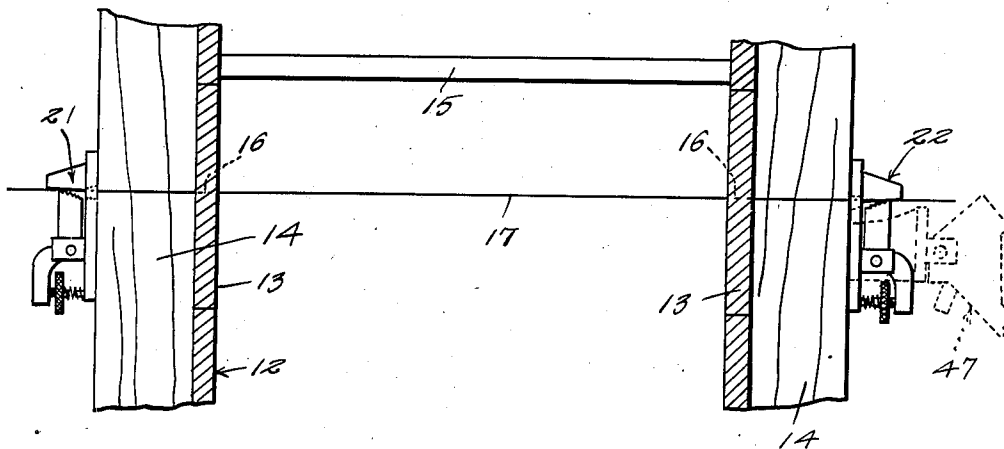
2,264,794

STRETCHING APPARATUS FOR WIRE TIES

Filed May 22, 1940

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Fig. 1.



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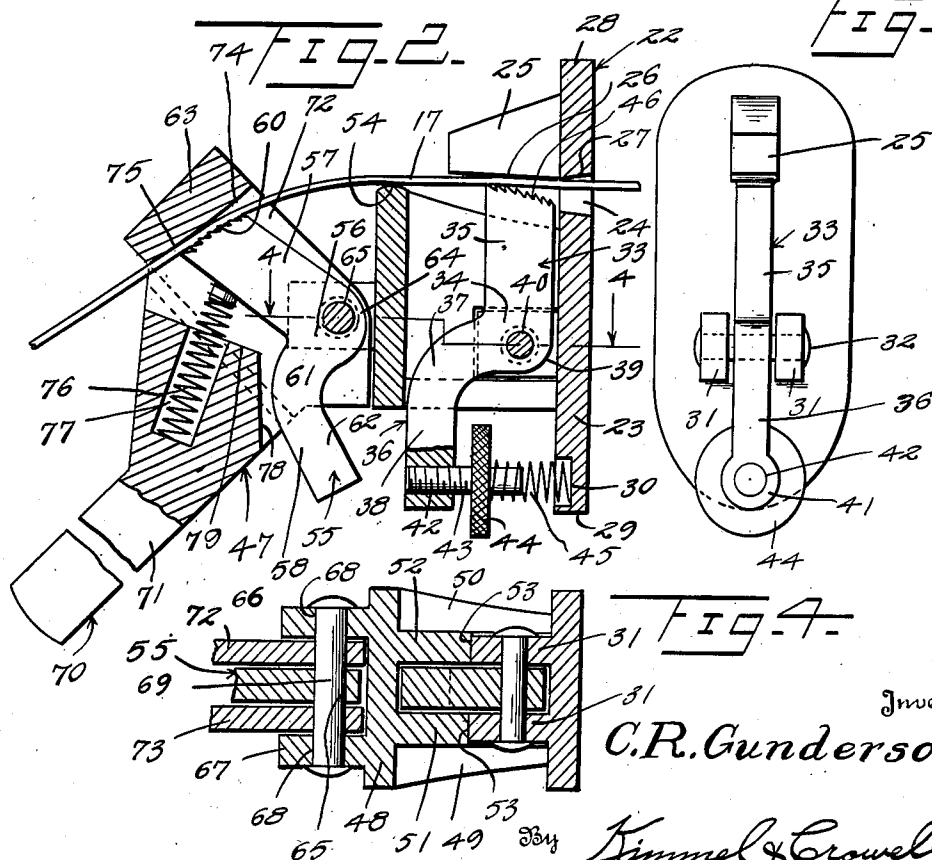


Fig. 3.

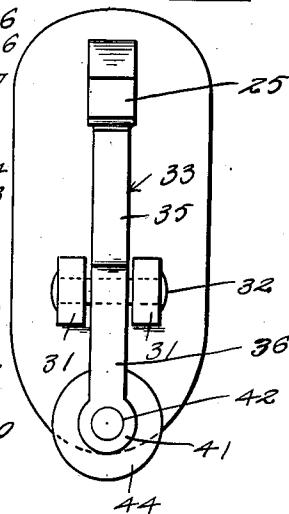
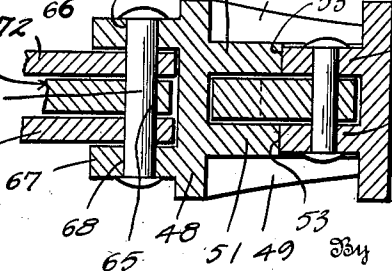


Fig. 4.



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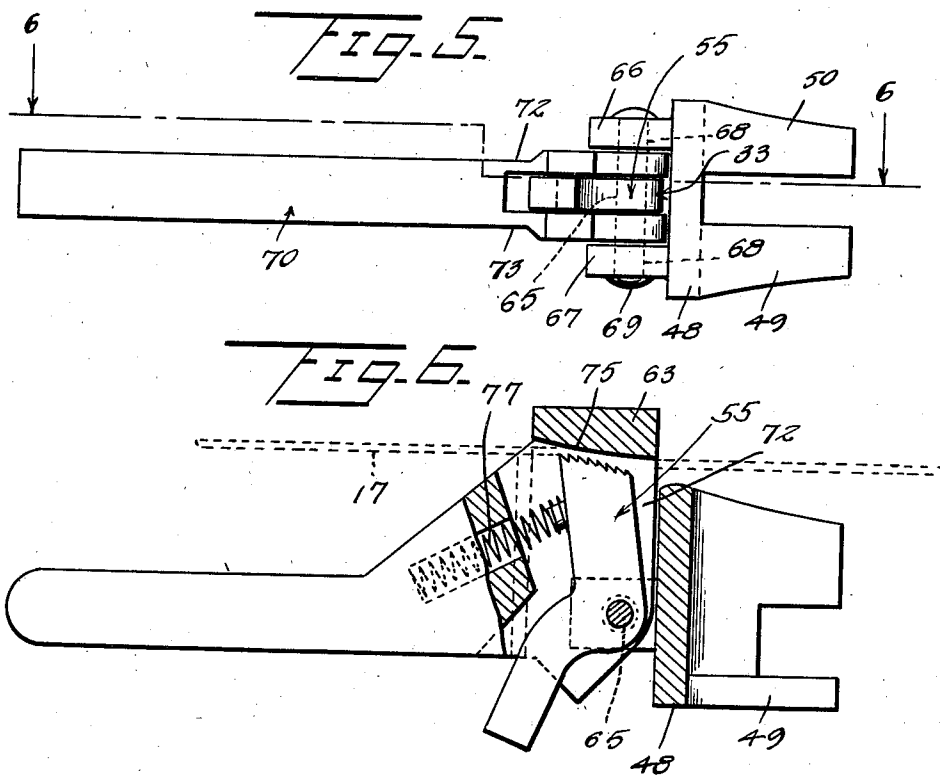
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STRETCHING APPARATUS FOR WIRE TIES

Filed May 22, 1940

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,264,794

STRETCHING APPARATUS FOR WIRE TIES

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Application May 22, 1940, Serial No. 336,681

17 Claims. (Cl. 254-73)

This invention relates to an apparatus designed primarily for use in connection with the wire ties employed for concrete forms, but it is to be understood that an apparatus in accordance with this invention is for employment in any connection for which it may be found applicable.

The invention aims to provide, in a manner as hereinafter set forth, an apparatus capable of expeditiously stretching a wire tie, employed in a concrete form for the purpose of maintaining the elements of the form in detachable clamped engagement.

The invention further aims to provide, in a manner as hereinafter set forth, an apparatus capable of expeditiously stretching a wire tie, employed in a concrete form for the purpose of detachably clamping the spreaders of the form between and against the form sheathings.

The invention further aims to provide, in a manner as hereinafter set forth, an apparatus for stretching a wire tie, for the purposes of detachably securing in position the temporary spreaders of a concrete form, between the sheathings of the latter.

The invention further aims to provide, in a manner as hereinafter set forth, an apparatus for the purpose referred to capable of pulling a stretched tie employed in a concrete form from a concrete body after the latter has been formed.

The invention further aims to provide, in a manner as hereinafter set forth, an apparatus capable of expeditiously forming from a single length of wire a twisted wire tie employed in a concrete form for the purpose of maintaining the temporary spreaders, providing elements of the form in position, and with the twisting of the tie being had exteriorly of the form.

The invention further aims to provide, in a manner as hereinafter set forth, an apparatus for the purpose referred to, which is comparatively simple in its construction and arrangement, strong, durable, readily installed relative to the form in tie stretching and twisting position, thoroughly efficient in its use, quickly assembled and comparatively inexpensive to manufacture.

Embodying the aims aforesaid and others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts, as will be more specifically referred to and illustrated in the accompanying drawings, wherein are shown embodiments of the invention, but it is to be under-

stood 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 fragmentary view in vertical section of a concrete form showing the adaptation therewith in full and dotted lines of an apparatus, in accordance with this invention for stretching a tie wire employed in a concrete form.

Figure 2 is a vertical section view, broken away of the wire stretching structure of the apparatus.

Figure 3 is a front elevation of the form of tie clamping dog employed.

Figure 4 is a section on line 4-4 Figure 2.

Figure 5 is an elevation looking towards one side of the wire stretching structure shown by Figure 2, and

Figure 6 is a section on line 6-6 Figure 5.

With reference to Figures 1, 7, 8 and 9, the sheathings, studdings and spreaders of a concrete form 12 are indicated respectively at 13, 14 and 15. The sheathings 13 and studdings 14 shown by Figure 1 are provided with aligned openings 16 for the passage of a piece of wire 17 of the desired length which constitutes the tie. The sheathings 13 shown by Figure 7 are formed with two aligned pairs of spaced openings 18 for the passage of the aligned lengths 19 of a piece of wire 20 which is to form the tie.

The wire 17 is to be stretched by a means to be referred to. The lengths 19 of the wire 20 are to be stretched and twisted together, exteriorly of the form 12 by a means to be referred to, to provide a tie.

With reference to Figures 1 to 6, the apparatus shown thereby is to stretch the tie formed by the wire 17. The said apparatus includes a pair of oppositely disposed wire holding elements or devices 21, 22 of like form which are positioned against the studdings 14 as shown and aligned with each other. Each of said elements includes a base plate or carrier 23 formed with an opening 24 for the passage of the wire 17. The outer face of plate 23 is formed with a stationary clamping member 25 having a straight surface 26 forming a continuation of the wall portion 27 of the opening 24. The member 25 is located in proximity to the end 28 of plate 23. The outer face of plate 23 in proximity to its end 29 is formed with a pocket or recess 30. The outer face of plate 23 is provided with a pair of spaced apertured parallel lugs 31 between opening 24 and pocket 30. The lugs 31 are dis-

posed relative to plate 23 between its transverse median and its end 29 and are disposed adjacent to opposite sides of the longitudinal median of the plate. Arranged between and mounted on a pivot 32, carried by the lugs 31 is a spring controlled wire holding dog 33 consisting of a central part 34, and a pair of oppositely disposed end parts 35, 36. The part 35 aligns with the central part 34 and correlates with the member 25 to hold one end of the wire 17 during the stretching operation. The part 36 is offset relative to the parts 34, 35 and includes a curved portion 37 merging into part 34 and a straight portion 38 extended laterally of portion 37. The portion 38 is disposed in a plane parallel to the plane of the part 35. The central part 34 is formed with a curved edge portion 39 to provide a clearance when the part 35 moves away from the member 25 to release wire 17. The part 34 is formed with an opening 40 for the passage of pivot 32. The part 36 has its outer terminal portion 41 enlarged and provided with a screw threaded opening 42. Threadedly engaging with opening 42 and extending towards the base plate is an adjustable threaded stem 43 provided intermediate its ends with an annular flange 44 of materially greater diameter than said stem. Arranged in the pocket 30 and abutting the flange 44 is a coiled controlling spring 45 functioning to permanently urge the part 35 towards the member 25. That portion of the stem 43 which extends from flange 44 towards the base plate 23 is encompassed by the spring 45. The stem 43 and flange 44, in connection with the threaded opening 42 correlate to form an adjustable means for increasing or decreasing the tension of the spring 45. The outer end edge of the part 35 of the dog 33 is of arcuate contour and serrated or toothed, as at 46, and said end edge from its outer to its inner end curves away from member 25. The latter is of greater length than the serrated or toothed edge 46 of said part 35.

The wire holding device 21 is to be arranged against the outer edge of one of the studdings 14 and the wire holding device 22 is to be arranged against the outer edge of the other stud 14. The openings 24 in the devices 21, 22 align with the openings 16 in the sheathings 13 and the studdings 14. With reference to Figure 1 the elements 21, 22 are disposed relative to the concrete form to provide when wire 17 is stretched, by a means to be referred to, that the spreaders 15 will be detachably clamped to the sheathings 13. When stretching wire 17 the element 21 will securely hold one end terminal portion of the wire while the other end terminal is being pulled through element 22 to stretch the wire, back slipping of the wire towards element 21 will be arrested by the element 22 as these elements are oppositely disposed.

The apparatus shown by Figures 1 to 6 includes a wire stretching structure 47, which also acts to prevent back slipping of the wire 17 during the stretching or pulling of the latter and which further functions to pull the tie through and clear of a body formed of concrete. The structure 47 is to be correlated with an element 21 or 22 and it is shown by way of example in correlation with element 22. The structure 47 comprises a base 48 formed on its rear face, at one side of the latter with a pair of spaced parallel legs 49, 50 and a pair of spaced parallel webs 51, 52 disposed at right angles to and formed integral with the inner sides of the legs 49, 50. The

length of the webs 51, 52 is the same as the length of the legs 49, 50. The webs 51, 52 are cutaway, as at 53, to provide for the webs seating against the outer ends of the lugs 31, when the structure 47 is in correlation relative to the holding element 22, and when so correlated the legs 49, 50 and webs 51, 52 abut the outer face of the base plate 23 of element 22. The space between the legs 49, 50 form a clearance for the part 36 of the dog 33 on the shifting of the latter in either direction on its pivot. The space between the webs 51, 52 form a clearance for the part 35 of the dog 33 on the shifting of the latter in either direction on its pivot. The base 48 has a curved edge 54 inwardly of the member 25 and aligning with opening 24. The wire 17 after passing in outward relation with respect to member 25 and dog 33 of element 22, travels over the edge 54 to a pivoted combined wire stretching, holding and pulling element 55, to be more fully referred to, of the structure 47.

The element 55 is what may be termed a dog of substantially V-form. The element 55 includes an apertured central part 56 and a pair of oppositely disposed end parts 57, 58 disposed at opposite inclinations with respect to the central part 56. The part 57 is of greater width than part 58 and has its outer end edge 60 of arcuate contour. The edge 60 is serrated or toothed and its curvature is such that it extends inwardly from its outer to its inner end. The part 59 is formed of a curved inner portion 61 merging into said part 57 and an inclined outer portion 62 which constitutes a handle for swinging the edge 60 of part 58 away from a clamping member 63 to be more fully referred to. The part 57 has a curved edge portion 64 to provide a clearance on the pivoting of the element 55. The aperture in part 57 is indicated at 65.

The base 48 is formed on its front face with a pair of spaced parallel lugs 66, 67 having aligned openings 68 in which is mounted a pivot member or shaft 69 for the element 55. The member 69 extends through the aperture 65 in the central part 57 of the element 55. The member 69 is so disposed relative to part 57 to space the latter from the front face of base 48.

The structure 47 includes an operating lever 70 for the element 55. The lever 70 includes a solid outer portion 71 constituting a handle and a bifurcated inner portion forming a pair of parallel spaced arms 72, 73. The space between the arms at their inner ends and at one side is opened. The other side of the space between said arms is partly closed by the clamping member 63 which is integral with a portion of the length of said arms and has its inner side face formed with a straight surface 74 and a surface 75 which inclines from its inner end to its outer end in a direction towards the outer side face of member 63. The inclined surface 74 of member 63 correlates with the serrated or toothed edge 60 of the part 57 of element 55 for stretching and holding the wire 17. The inner ends of the arms 72, 73 are pivotally mounted on the pivot member 69, between the curved part 56 of element 55 and the lugs 66, 67.

The space between the arms 72, 73 forms a clearance for the shifting of the element 55. The completely open side of the space between the arms 72, 73 permit of the part 58 of element 55 to project from the lever 70.

The element 55 is spring controlled and is normally urged towards the clamping member 69. The controlling spring 76 for element 55 is car-

ried by the lever 70, that is to say it is mounted in a socket 77 formed in lever 70. The spring 76 extends from socket 77 into the space between the arms 71 and 72, and permanently bears against the outer lengthwise edge of said element 55. The lever 70 in connection with the spring 76 provides for the correlation of element 55 and clamping member 69 for the purpose of gripping wire 17 and stretching or pulling the latter when lever 70 is moved in an anti-clockwise direction. The releasing of element 55 from the wire 17 is had against the action of spring 76. The movement of element 55 towards the clamping member 69 is limited by the coaction of the part 58 of element 55 with the part 78 of the base 79 of the furcation formed in the inner portion of lever 70.

The wire 17 is stretched or pulled by the lever 70 when the latter moves in an anti-clockwise direction and when moving in said direction, the element 55 and clamping member 69 will be carried therewith while in gripping relation with respect to the wire thereby stretching the latter as the wire will be free to move past the dog 33 of the device or element 22 as the pull on the wire will overcome the tension of the spring 45. At the end of the anti-clockwise movement of lever 70 the pull on wire 17 will be discontinued, and the dog 33 of the device 22 will coact with the clamping member 25 and tightly grip or clamp wire 17 to prevent it slipping in a direction towards the form 12 if the wire is released from element 55 and member 69.

It will be assumed that it is desired to pull the wire from out of the formed body of concrete, the wire 17 is released from the devices 21 and 22 and the lever 70 oscillated to an extent to completely remove the tie from the said body.

What I claim is:

1. In an apparatus for the purpose referred to, an oppositely shiftable wire tie stretching lever acting, when shifted in one direction to stretch the tie and including a bifurcated inner portion formed with a clamping member, a pivoted tie wire holding dog arranged within said inner portion and correlated with said member for clamping the wire to said lever whereby when the latter is shifted in the said one direction the tie will be stretched, a spring within the lever permanently acting to move the dog in a direction towards said member a base for said lever and a wire guide carried by said base.

2. In an apparatus for the purpose referred to, an oppositely shiftable wire tie stretching lever acting, when shifted in one direction to stretch the tie and including a bifurcated inner portion formed with a clamping member, a pivoted tie wire holding dog arranged within said inner portion and correlated with said member for clamping the wire to said lever whereby when the latter is shifted in the said one direction the tie will be stretched, a spring within the lever permanently acting to move the dog in a direction towards said member, and a pivot means common to said lever and dog.

3. In an apparatus for the purpose referred to, an oppositely shiftable wire tie stretching lever acting, when shifted in one direction to stretch the tie and including a bifurcated inner portion formed with a clamping member, a pivoted tie wire holding dog arranged within said inner portion and correlated with said member for clamping the wire to said lever whereby when the latter is shifted in the said one direction the tie will be stretched, a spring within the lever permanently acting to move the dog in a direc-

tion towards said member, a pivot means common to said lever and dog, and a stationary supporting means for said pivot means.

4. In an apparatus for the purpose referred to, an oppositely shiftable wire tie stretching lever acting, when shifted in one direction to stretch the tie and including a bifurcated inner portion formed with a clamping member, a pivoted tie wire holding dog arranged within said inner portion and correlated with said member for clamping the wire to said lever whereby when the latter is shifted in the said one direction the tie will be stretched, a spring within the lever permanently acting to move the dog in a direction towards said member, a pivot means common to said lever and dog, a stationary supporting means for said pivot means, a stationary anchoring device including a clamping member and a spring controlled pivoted dog correlating with the latter for anchoring one end of the tie wire, an inner holding device including a stationary carrier having therein a clamping element and a spring controlled pivoted holding dog correlated with said clamping element for holding an intermediate portion of the tie wire, said stationary carrier being spaced from said anchoring device, said supporting means abutting said carrier, and said dog of said inner holding device being arranged in and extended from said supporting means.

5. In an apparatus for the purpose set forth, a pair of spaced aligned spring controlled stationary releasable tie wire clamping devices, a pivoted tie wire stretching lever spaced from one of said devices and provided with a clamping element, a pivoted spring controlled tie wire holding dog correlated with the element for clamping the tie wire to said lever, and a supporting means provided with a pivot common to said lever and dog.

6. A means for holding a tie wire taut between a pair of form members comprising a pair of wire clamping members engageable on the outer sides of the form members, each clamping member comprising a base plate having an opening therethrough, a stationary jaw carried by said plate adjacent said opening, a toothed movable jaw, means pivotally mounting said movable jaw on said base in a position whereby pull in one direction on a wire extending through said opening will swing said movable jaw in the direction of said stationary jaw to thereby bind the wire therebetween, an arm carried by said movable jaw, and a spring constantly urging said arm in a direction to swing said movable jaw to a wire binding position.

7. A means for holding a tie wire taut between a pair of form members comprising a pair of wire clamping members engageable on the outer sides of the form members, each clamping member comprising a base plate having an opening therethrough, a stationary jaw carried by said plate adjacent said opening, a toothed movable jaw, means pivotally mounting said movable jaw on said base in a position whereby pull in one direction on a wire extending through said opening will swing said movable jaw in the direction of said stationary jaw to thereby bind the wire therebetween, an arm carried by said movable jaw, a spring constantly urging said arm in a direction to swing said movable jaw to a wire binding position, and means for tensioning said spring.

8. A means for holding a tie wire taut between a pair of form members comprising a pair of wire clamping members engageable on the outer

sides of the form members, each clamping member comprising a base plate having an opening therethrough, a stationary jaw carried by said plate adjacent said opening, a toothed movable jaw, means pivotally mounting said movable jaw on said base in a position whereby pull in one direction on a wire extending through said opening will swing said movable jaw in the direction of said stationary jaw to thereby bind the wire therebetween, an arm carried by said movable jaw, a spring constantly urging said arm in a direction to swing said movable jaw to a wire binding position, and means for tensioning said spring, said tensioning means carried by said arm.

9. A means for holding a tie wire taut between a pair of form members comprising a pair of wire clamping members engageable on the outer sides of the form members, each clamping member comprising a base plate having an opening therethrough, a stationary jaw carried by said plate adjacent said opening, a toothed movable jaw, a pair of outstanding ears carried by said base, means pivotally mounting said movable jaw between said ears, an arm carried by said movable jaw, and a spring between said arm and said base for constantly urging said movable jaw to wire binding position.

10. In combination, a pair of wire clamping members engageable on the outer sides of a form, each member including means for holding the wire against movement in one direction while permitting movement of the wire in the opposite direction, and means engageable with a selected clamping member for pulling the wire relative to the selected clamping member.

11. In combination, a pair of wire clamping members engageable on the outer sides of a form, each member including means for holding the wire against movement in one direction while permitting movement of the wire in the opposite direction, means engageable with a selected clamping member for pulling the wire relative to the selected clamping member, and interengageable means carried by a clamping member and said pulling means for holding said pulling means against movement relative to the selected clamping member.

12. In an apparatus for the purpose set forth, a pair of spaced aligned spring controlled stationary releasable tie wire clamping devices, a pivoted tie wire stretching lever spaced from one of said devices and provided with a clamping element, a pivoted spring controlled tie wire holding dog correlated with the element for clamping the tie wire to said lever, and a supporting means for said lever and dog.

13. In an apparatus for the purpose referred to, an oppositely shiftable wire tie stretching lever acting, when shifted in one direction to stretch the tie and including a bifurcated inner portion formed with a clamping member, a pivoted tie wire holding dog arranged within said inner portion and correlated with said member for clamping the wire to said lever whereby when the latter is shifted in the said one direction the tie will be stretched, a spring within the lever permanently acting to move the dog in a direction

towards said member, and pivot means for said lever and said dog.

14. In an apparatus for the purpose referred to, an oppositely shiftable wire tie stretching lever acting, when shifted in one direction to stretch the tie and including a bifurcated inner portion formed with a clamping member, a pivoted tie wire holding dog arranged within said inner portion and correlated with said member for clamping the wire to said lever whereby when the latter is shifted in the said one direction the tie will be stretched, a spring within the lever permanently acting to move the dog in a direction towards said member, pivot means for said lever and said dog, and a stationary supporting means for said pivot means.

15. A wire stretching apparatus comprising a body having an opening through which a wire may be extended, a stationary jaw carried by said body at one side of said opening, a second jaw, means pivotally mounting said second jaw for swinging movement relative to said stationary jaw, yieldable means constantly urging said second jaw in the direction of said stationary jaw, said jaws being so constructed and arranged to bind the wire against movement in one direction while permitting movement of the wire in the opposite direction, a wire pulling base member including a bifurcated portion engageable over said mounting means, a pulling lever pivotally carried by said base member, a wire pulling jaw fixed relative to said lever, and a spring-pressed dog pivotally carried by said lever and adapted to bind the wire against said pulling jaw.

16. A wire stretching apparatus comprising a body having an opening through which a wire may be extended, a stationary jaw carried by said body at one side of said opening, a second jaw, means pivotally mounting said second jaw for swinging movement relative to said stationary jaw, yieldable means constantly urging said second jaw in the direction of said stationary jaw, said jaws being so constructed and arranged to bind the wire against movement in one direction while permitting movement of the wire in the opposite direction, a wire pulling base member including a bifurcated portion engageable over said mounting means, a pulling lever pivotally carried by said base member, a wire pulling jaw fixed relative to said lever, and a spring-pressed dog pivotally carried by said lever and adapted to bind the wire against said pulling jaw, said base member including a wire guiding member disposed between said dog and said second jaw whereby upon rocking of said lever the wire will be guided in a straight line past said stationary jaw and said second jaw.

17. In a tie wire stretching device, a pivotally mounted dog having an outer curved surface inclined relative to a line radiating from the pivot center substantially through the center of the dog in the direction opposite to the tie wire stretching movement, a stationary member adjacent the outer curved surface of the dog, said member having a clamping surface inclined in the same direction relative to said radiating line.

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