April 7, 1953 G. G. HAYS 2,634,093

WIRE STRETCHER

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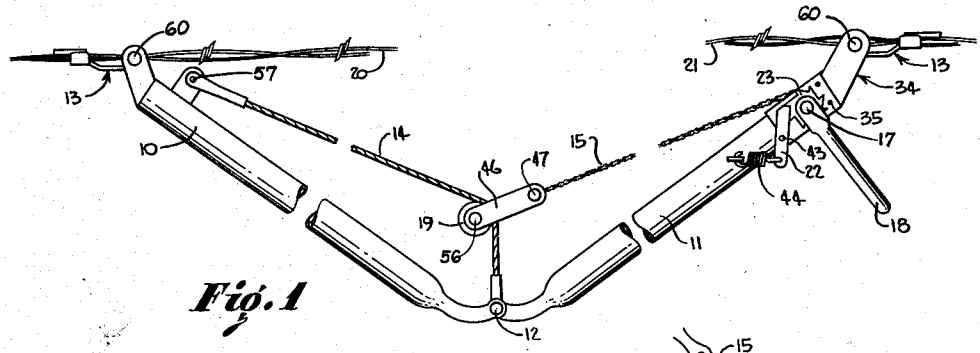


Fig. 1

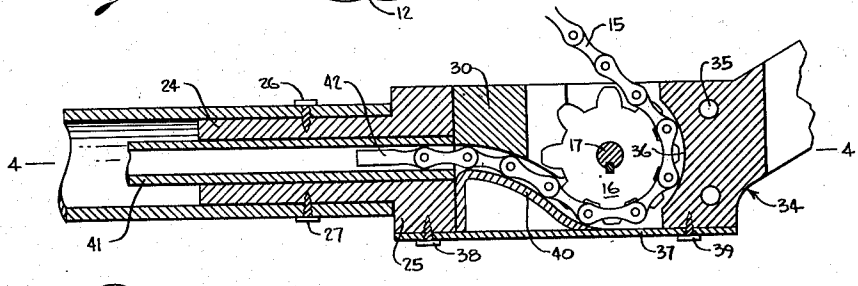


Fig. 2

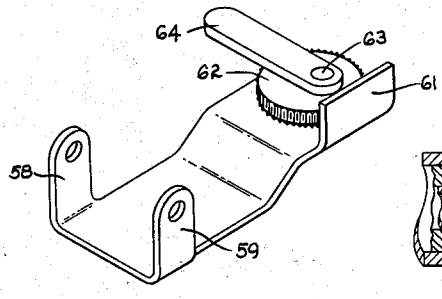


Fig. 3

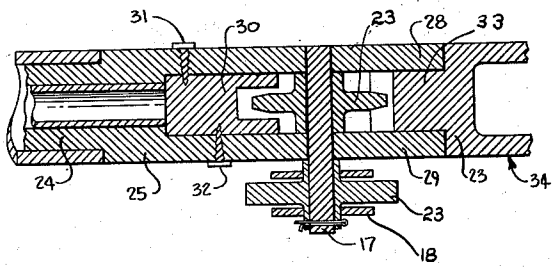


Fig. 4

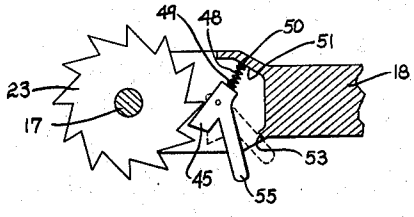


Fig. 5

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WIRE STRETCHER

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5 Claims. (Cl. 254—65)

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This invention relates to wire stretchers and its chief object is to provide a stretcher capable of grasping the two loose ends of a broken fence wire and of pulling those two ends together so that they can be clamped or otherwise secured together to repair the fence.

It is another important object to provide a stretcher of this type which is so constructed that no part of the mechanism itself obstructs the space between the two ends of the wire during the stretching operation, thus greatly facilitating the connection of the two ends together to effect the desired repair.

Another object is to provide a stretcher which eliminates the necessity of bending the parted ends of a broken wire in order to bring the ends together for connection, with the consequent elimination of additional breakage of the wire due to age and brittleness.

A still further object is to provide a stretcher which does not have to be anchored to any fixed object, such as a fence post, in order to exert the required pulling force on the parted ends of a broken wire.

Another object is to provide a stretcher which exerts its pulling force along a straight line connecting the two parted ends of a broken wire.

The invention, together with other objects attending its production, will be more clearly understood when the following description is read in connection with the accompanying drawings, in which:

Fig. 1 is a side view of a preferred embodiment of the invention illustrating its use as well as showing certain details of construction;

Fig. 2 is a detailed vertical sectional view through a part of the tool shown in Fig. 1;

Fig. 3 illustrates a preferred form of wire clamping unit which constitutes a part of the tool shown in Fig. 1;

Fig. 4 is a detailed lateral sectional view through a part of the invention shown in Fig. 1; and

Fig. 5 is a detailed view of the ratchet mechanism, with parts in section.

General description

By referring to the drawing it will be seen that the embodiment illustrated generally includes a pair of elongated rigid members 10 and 11 pivotally connected together at one end on a transverse axis 12, for movement toward and away from each other in the same plane or in closely adjacent parallel planes. The free end of each rigid member carries a suitable wire clamping unit 13, a preferred one of which is detailed in Fig. 3. Flexible, non-elongatable elements including a cable 14 and a chain 15 operably connect the free ends of the members. A sprocket 16, keyed on a transverse shaft 17 journaled near

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the free end of the member 11 receives the chain 15. A handle 18 operably connected to the shaft 17 by means of a conventional ratchet and pawl coupling, serves to rotate the sprocket to move the chain 15 and its attached pulley 19 toward the free end of member 11, thus forcing the free ends of members 10 and 11 toward each other, and simultaneously pulling the parted ends 20 and 21 of a broken wire into over-lapping closely adjacent relation so that they may be easily connected together by any suitable means (not shown). An auxiliary spring pressed pawl 22 cooperates with shaft attached ratchet wheel 23 to prevent reverse movement of the sprocket 16 during the stretching operation.

Construction Details

The rigid members 10 and 11 are preferably tubular except at their lower ends where they are provided with hinge brackets, welded in place. The upper end of the member 11 receives the reduced cylindrical end 24 of a sprocket housing 25, held in position by means of bolts 26 and 27. The opposite side walls 28 and 29 (Fig. 4) of this housing journal the shaft 17. The front bottom portion of the housing is provided with a substantially channel shaped chain guide 30, held in position by bolts 31 and 32. The outer end of this housing 25 is closed by the reduced shank 33 of a clevis 34, held in position by rivets 35. The inner end of the reduced shank 33 is arcuately formed, as at 36, to serve as an additional chain guide. The rear portion of the housing is closed by a plate 37, held in position by bolts 38 and 39. The inner surface of the plate carries an additional chain guide 40 which is arcuately formed as shown in Fig. 2, and which cooperates with the adjacent arcuate surface of the guide 30 to guide the free end of the chain 15 into the adjacent open end of a tube 41, which is pressed fitted into the cylindrical portion 24 of the housing. The inner end of the chain 15 is fitted with a dummy link 42 which will not receive a sprocket tooth, and which consequently wedges between the sprocket and the chain guide 40 and prevents the chain from passing entirely out of the housing.

As seen in Figs. 1 and 4, one end of the shaft 17 projects outward through a wall 29 of the housing 25. This projecting end of the shaft carries the ratchet wheel 23, fixed to rotate with the shaft. A pawl 22, mounted on the housing by pivot pin 43, is urged by spring 44 into contact with the ratchet wheel teeth to prevent undesired reverse rotation thereof, and of the sprocket. A shaft rotating handle 18 is pivotally mounted on the hub of the ratchet wheel 23, as in Fig. 4, and is operably connected to the ratchet wheel by means of a conventional spring pressed releasable pawl 45 (Fig. 5), pivotally mounted on

pin 54 between the parallel sides of the bifurcated end of the handle 18. A control handle 55 is made integral with this pawl, and projects outward for easy operation by the thumb. A spring 48 has one end encircling a small pin 49 formed integrally at the inner end of the pawl. The other end of the spring encircles a small pin 50 which projects inwardly from the angular shoulder 51.

When the pawl handle 55 is moved toward the ratchet wheel 23 the spring mount pin 49 moves to a position to one side of a line connecting the pin 50 and the pivot 54. In this position the spring tends to keep the opposite end of the pawl in operative contact with the teeth of the ratchet wheel. When the pawl handle is moved away from the ratchet wheel, the pin 49 and that end of the spring move to the opposite side of a line connecting the pin 50 and the pivot 54. In this position the spring tends to hold the end of the pawl out of contact with the ratchet wheel to rotate freely without affecting the handle 18. The shoulder serves as a stop to limit the travel of the pawl away from the ratchet wheel.

A clevis 46 has one end connected by pin 47 to the free end of chain 15. The other end of the clevis carries a pulley 19 on cross pin 56. A cable 14 is strung through the clevis and over the pulley 19, and has its opposite ends connected to one of the rigid members 10 by means of the pins 12 and 57. The cable is strung loosely between these two pins, and serves to maintain the free end of chain 15 out of the path of travel of wires held in the clamping units 13, during the wire pulling operation, thus leaving the space between the two ends of the wire clear to facilitate the application of a suitable wire repair link. Naturally the cable 14 also serves to transmit the pulling force from the free end of chain 15 to the outer end of rigid member 10. It will be understood that this transmission of power from the sprocket 16 to the free end of member 10, while maintaining the intermediate space clear of obstructions, may be accomplished by other chain and cable arrangements which will be suggested to those familiar with this art by the illustrated embodiment, and the invention is not limited to the particular arrangement shown, but is limited only by the appended claims.

As clearly shown in Fig. 3, a preferred form of wire clamping unit includes an elongated heavy gage sheet metal body having opposite integral upturned ears 58 and 59, with aligned perforations for receiving cross pins 60 for pivotally mounting the units at the respective outer ends of the members 10 and 11. Near its opposite end each wire clamping unit has an upturned integral lug 61. A wire gripping wheel 62, having a sharp toothed periphery is eccentrically mounted on a pivot pin 63, so that as it is rotated its periphery either approaches or moves away from the adjacent surface of lug 61. A handle 64 is rigidly secured to the wheel.

Operation

In operation one end of a broken wire is placed between the periphery of wheel 62 and the lug 61, with the extreme end of the wire projecting inward beyond the clamping unit, as shown. Handle 64 is then rotated toward the inner end of the wire until the toothed periphery of the wheel compresses the wire against the lug, effecting a tight grip. The other end of the wire is similarly placed in the other clamping unit, and a grip established. Pawl control handle 55 is then moved by thumb pressure toward ratchet wheel 23 until the inner end of spring 48 passes over center and maintains the working end of the pawl against the ratchet.

Handle 18 is now manually oscillated, rotating shaft 17 and sprocket wheel 16 by steps. Chain 15 is drawn into the upper end of member 11, and passes down into tube 41. Pulley 19 exerts a pull on cable 14, and the outer or free end of member 10 is moved toward the similar end of member 11. When the inner ends of the two wires 20 and 21 are sufficiently close together, the operator fastens them together with any suitable means, not shown, without any interference from the chain 15, clevis 46, or the cable 14.

The handle 18 is then rotated slightly to relieve the pressure on the working end of pawl 22, and that pawl is manually moved away from ratchet wheel 23. Pawl control handle 55 is then moved to free ratchet wheel 23, and the built up tension in the two stretched wires causes the outer ends of members 10 and 11 to move away from each other. Clamping unit control handles 64 are then rotated away from the point of wire repair, and the entire tool is free for transport to the next wire break.

Having described the construction and operation of one embodiment of the invention with sufficient clarity to enable those familiar with this art to construct and use it, I claim:

1. A wire stretcher comprising: first and second rigid elongated arms pivotally connected together at their inner ends to form an expansible and contractible V; a wire clamping unit on the outer end of each arm; a flexible cable having its opposite ends secured to the second arm near its respective ends, the length of said cable being only slightly greater than the distance between the points of its attachment to the arm; an elongated flexible element having one of its ends connected to said cable for slidable movement therealong; and mechanical advantage means mounted near the outer end of said first arm and operably connected to the other end of said flexible element for forcibly moving the said element longitudinally toward said first arm to force the outer ends of the two arms toward each other.

2. The invention described in claim 1 and locking means operatively associated with said mechanical advantage means to prevent movement of said flexible element in an opposite direction.

3. A wire stretcher comprising: first and second rigid elongated arms pivotally connected together at their inner ends to form an expansible and contractible V; a wire clamping unit carried by the outer end of each arm; a reeling member rotatably mounted near the outer end of the first arm; a flexible element having one end engaged with and movable longitudinally by the rotation of said reeling member; a flexible cable having its opposite ends secured to the second arm near its respective ends; the length of said cable being only slightly greater than the distance between the points of its attachment to the arm; means mounted on the opposite or free end of said flexible element slidably connecting said element to said cable; and means for rotating said reeling member to force the free ends of the two arms to approach each other through the cooperation of the flexible element and the cable.

4. The invention described in claim 3, and locking means operatively associated with the sprocket rotating means to prevent reverse rotation thereof.

5. In a wire stretcher which includes two elongated rigid arms pivotally connected together at their inner ends, and each having a wire clamping means on its outer end, mechanism for forcibly moving the outer ends of said arms toward each other comprising: a first flexible element having its opposite ends secured to one of said arms near its respective opposite ends; a second flexible element having one of its ends connected to the first flexible element for slidable movement therealong; a reel mechanism including a ratchet and handle carried by the other of said arms near its outer end; and means connecting the other end of the second flexible element to said reel mechanism.

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