May 9, 1933. M. TUPPER 1,907,686

WIRE PULLER

Filed Jan. 26, 1932

Fig. 1.

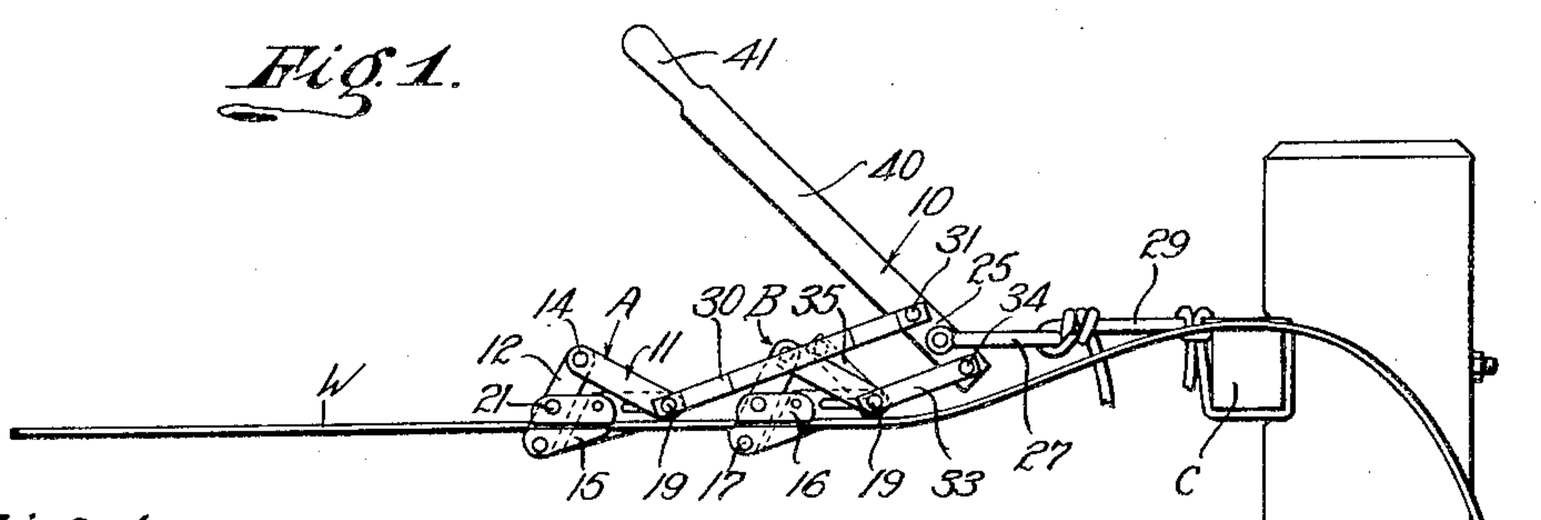
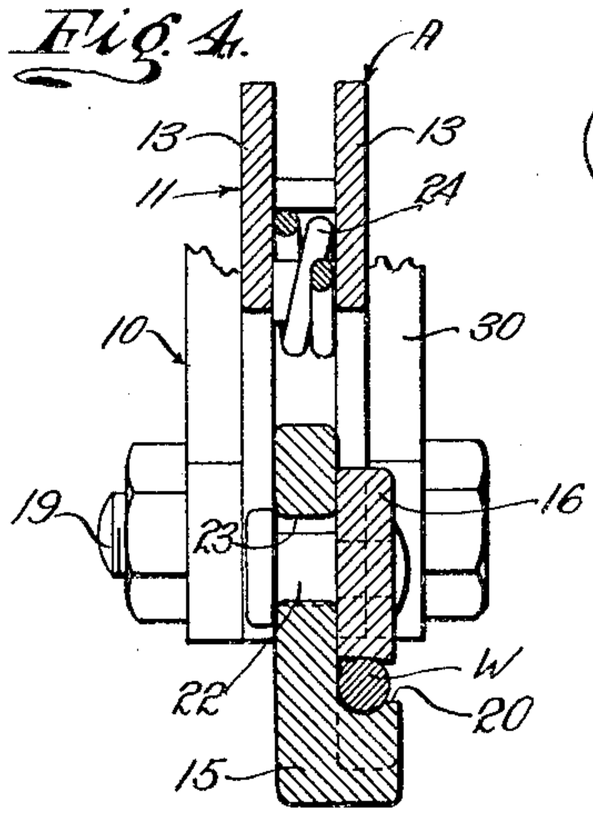


Fig. 4.



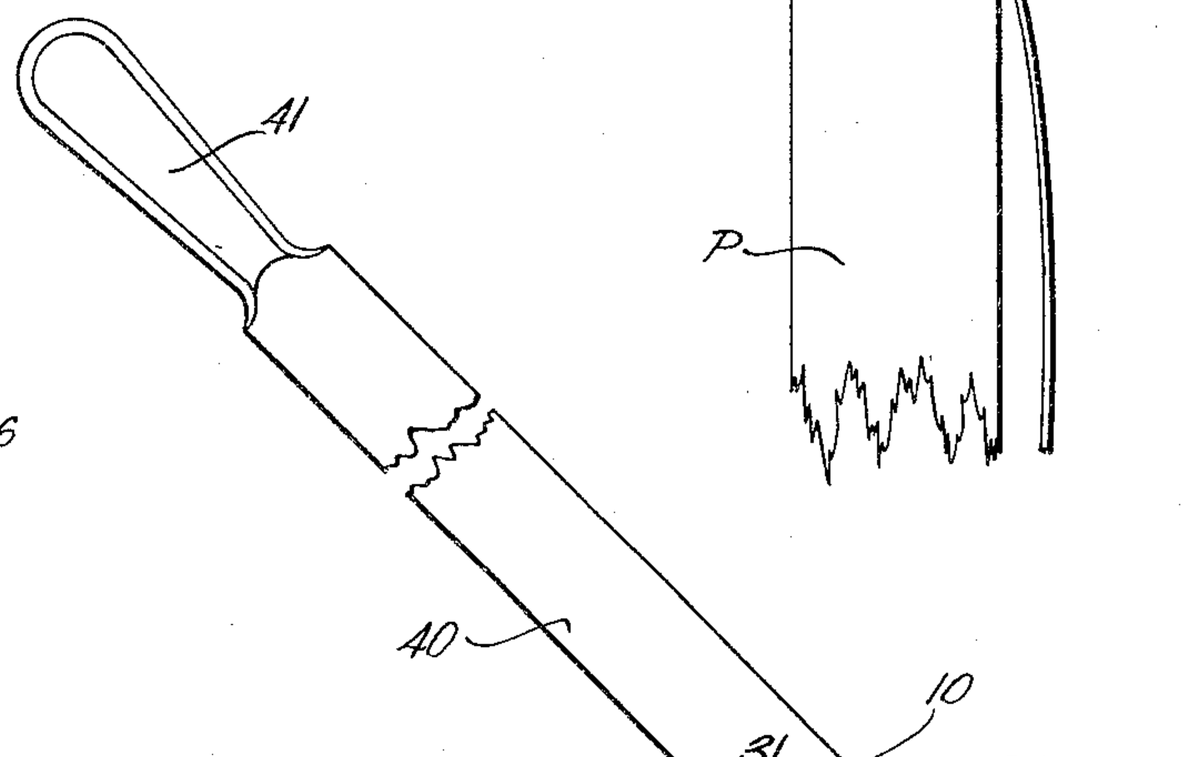


Fig. 2.

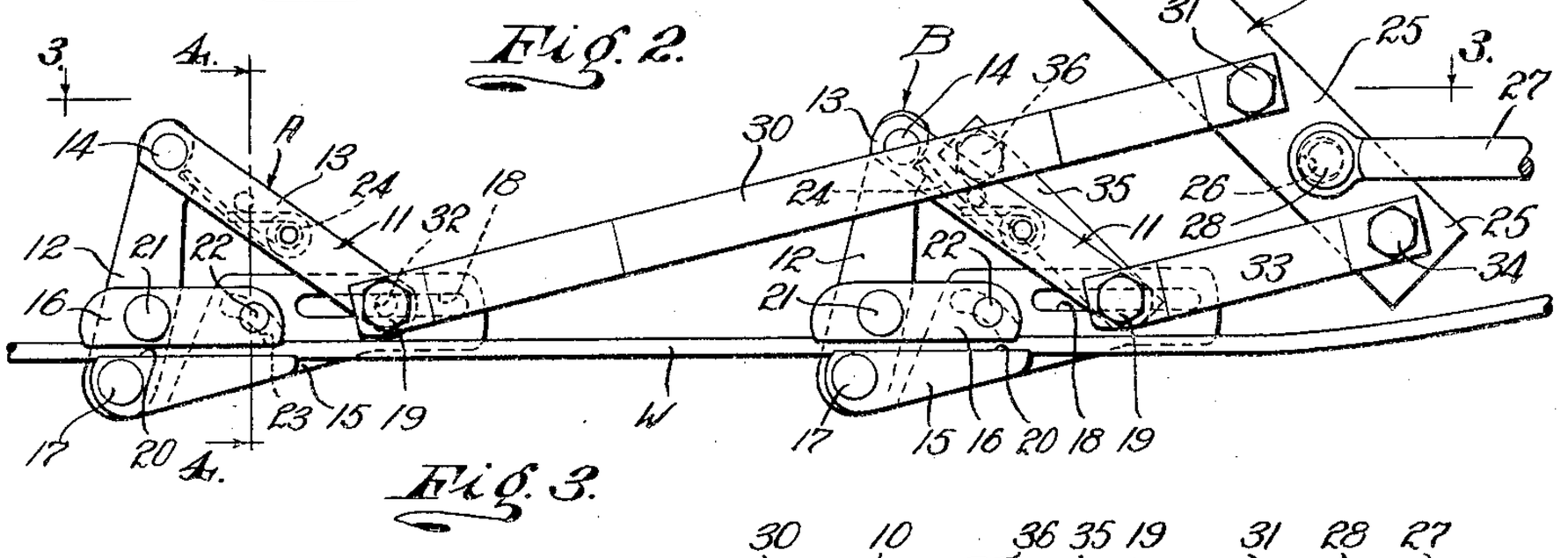


Fig. 3.

Inventor
Milo Tupper
By
Wm. H. Campbell
His Attorney

Patented May 9, 1933 1,907,686

UNITED STATES PATENT OFFICE

MILO TUPPER, OF DUCOR, CALIFORNIA

WIRE PULLER

Application filed January 26, 1932. Serial No. 588,879.

This invention relates to a device for handling wire and relates more particularly to a device for pulling or tightening wire, or the like. A general object of the invention is to provide a simple, practical and effective manually operable device for pulling wire, cable, and the like.

It is another object of the invention to provide a device for pulling or tightening wire, or the like, that is practical and useful under various conditions, that is, it may be effectively operated on the ground, on a pole or tower, in the vault of an underground conduit system, in a building, or in practically any situation where a length of wire or the like is to be tightened.

It is another object of the invention to provide a wire puller that is manually operable to obtain a comparatively heavy tensile strain on a wire or cable and to maintain such tautness or tension.

It is another object of the invention to provide a wire puller of the character mentioned that is manually operable with a minimum amount of effort.

It is another object of the invention to provide a wire pulling device of the character metioned that is small and compact and light in weight.

It is another object of the invention to provide a device of the character mentioned that does not crimp, bend, crush or otherwise distort the wire or cable.

A further object of the invention is to provide a wire pulling device of the character mentioned that is simple and inexpensive of manufacture and that may be easily and quickly mounted or arranged for operation.

Further objects and features of the invention will be best and more fully understood from the following detailed description of a typical form and application of the invention, throughout which description reference is had to the accompanying drawing, in which:

Fig. 1 is a side elevation of the device provided by this invention showing it in operative engagement with a wire, and illustrating it connected with the cross arm of a pole. Fig. 2 is an enlarged side elevation of the device. Fig. 3 is a horizontal sectional view taken as indicated by line 3—3 on Fig. 2, showing most of the parts in plan elevation. Fig. 4 is an enlarged detailed vertical sectional view taken as indicated by line 4—4 on Fig. 2.

The present invention may be embodied in forms for handling wire, cables etc., of different characters. Further, the invention is capable of embodiment in forms for use in any particular or specific situations, etc. Throughout the following detailed description, the invention will be disclosed in a single portable and manually operable wire puller suitable for general use, it being understood that the invention is not to be taken as limited or restricted by the specific structure and application about to be described, but is to be taken as including any features or modifications that may fall within the scope of the claims.

The wire handling device or wire puller includes, generally, two wire gripping devices or mechanisms A and B, each being operable to grip the wire W upon being actuated in one direction and operable to move along the wire W upon being actuated in the other direction, and operating means 10 for simultaneously and alternately operating the mechanisms A and B in opposite directions to advance or pull the wire W.

The grips or gripping mechanisms A and B are each individually operable to tightly grip the wire W when pulled or operated forwardly and to move along the wire W with little or no friction when moved or pushed rearwardly. The two mechanisms A and B are alike or identical in construction and operation, and I will proceed with a detailed description of one of the gripping mechanisms, it being understood that such description may apply to both of the mechanisms.

The gripping mechanisms A and B are link or toggle structures, each including two pivotally connected links 11 and 12. The link 11 is composed of two like parallel and horizontally spaced link members 13. A pivot pin 14 pivotally connects the links 11 and 12 adjacent their upper ends. The forward link 11 extends downwardly and forwardly

from the pin 14 to connect with the operating means 10, as will be subsequently described. The rear link 12 extends rearwardly and downwardly from the pin 14. Two gripping members 15 and 16 are pivotally attached to the lower end portion of the rear link 12. The lowermost gripping member 15 is in the form of a lever or link extending forwardly from the link 12 to be pivotally and slidably connected with the forward link 11. A pivot pin 17 pivotally connects the lower gripping member 15 with the lower end portion of the rear link 12. A horizontal elongated opening 18 is provided in the lower gripping member 15 and passes a pin or bolt 19 carried by the two members 13 of the link 11. A lateral projection along the lower end of the gripping member 15 presents an upwardly facing shoulder 20 for engaging the wire W. From the foregoing description, it will be seen that the links 11 and 12 and the gripping member 15, form a triangular link structure.

The upper gripping member 16 is pivotally connected with the rear link 12 at a point above and forward of the pivot pin 17, by a pin 21. The lower end of the gripping member 16 is straight and parallel with the shoulder 20 to engage the wire W. A laterally projecting pin 22 on the upper gripping member 16 cooperates with a curved slot 23 in the lower gripping member 15 to maintain the lower edge of the member 16 parallel with the shoulder 20. Means is provided for normally yieldingly urging the rear link 12 rearwardly to cause the gripping members 15 and 16 to tightly engage the wire W. A spring 24 carried between the two link members 13 bears downwardly and rearwardly against the link 12 at a point below its pivotal connection with the link 11. Forward movement of a mechanism A or B or a rearward pull or tension on the wire W causes the members 15 and 16 to more tightly grip the wire W, while rearward movement of a mechanism along the wire W, or forward movement of the wire W relative to the mechanism causes the gripping member 15 or 16 to loosen its grip on the wire. The wire gripping mechanisms A and B just described are commonly termed "grips" or "come-alongs".

The actuating means 10 is operable to simultaneously operate the mechanisms A and B alternately in opposite directions. In other words, it reciprocates the mechanisms A and B causing one mechanism to move forwardly during the rearward movement of the other mechanism. The means 10 is in the nature of a manually operable lever means operatively inter-connecting the two gripping mechanisms A and B. In accordance with the invention, the means 10 includes a principal or main lever 25. The lever 10 is adapted or intended to be connected to a suitable or available relatively fixed object. The lever 10 may be connected with the suitable relatively fixed object in any convenient or practical manner. In the drawing I have illustrated the lever 25 connected with the cross arm C of a pole P. A transverse opening 26 is provided in the lever 25 at a point spaced above its lower end. A clevis 27 pivotally supports or carries the lever 25 through a pin 28 passing through the opening 26. A rope 29 or the like, may be employed to connect the clevis 27 with the cross arm C. In the particular case illustrated in the drawing, the operating lever 25 is pivotal about a horizontal axis. It is to be understood that the invention is not to be taken as restricted to the particular mounting of the lever illustrated in the drawing, as the lever may be connected with the relatively fixed object in any suitable manner, and may be pivoted about an axis extending in any direction.

A pair of links 30 connects the gripping mechanism A with the lever 25. The links 30 are arranged at opposite sides of the lever 25 and are pivotally connected with the lever at a point spaced above the opening 26. A suitable bolt or pivot pin 31 may connect the two links 30 with the lever 25. The links 30 extend rearwardly and downwardly to the rear gripping mechanism A. The links 30 are bowed outwardly to pass the wire gripping mechanism B with suitable clearance. In the construction illustrated in the drawing, the links 30 extend at the outer sides of the two link members 13 and have openings 32 pivotally passing the bolt or pin 19. A pair of links 33 connects the forward wire gripping mechanism B with the lever 25. The links 33 are arranged at opposite sides of the link member 13 of the forward mechanism B and are connected with the mechanism B by the pivot pin 19. The links 33 extend at opposite sides of the lever 25 and are pivotally connected with the lever by a pin or bolt 34. The links 30 and 33 are pivotally connected with the lever 25 at opposite sides of the pivotal axis of the lever and equal distances from the axis of the lever. The operating lever 25 is thus an equal armed lever adapted upon each stroke or movement, to simultaneously operate the mechanisms A and B equal distances in opposite directions.

The invention includes means for interconnecting the two pairs of links 30 and 33 to maintain them in parallelism. A control link or member 35 extends between and is pivotally connected to a link of each pair of links 30 and 33. In the embodiment of the invention disclosed in the drawing, the pivot pin 19 of the forward gripping mechanism B pivotally connects the control link 35 with the lower pair of links 33. A suitable bolt or pin 36 pivotally connects the upper end of the control member 35 with one of the links 30. The control member 35 is parallel to the lever 25 so that it holds the pairs of links 30 and 33 substantially parallel at all times.

The operating lever 25 is adapted to be manually operated or operated in any other suitable manner. An elongated integral extension 40 is provided on one end of the lever 25. In the arrangement illustrated in the drawing, the extension 40 is on the upper end of the lever 25. The upper end portion 41 of the extension 40 may be shaped so as to be readily grasped and held by the operator.

In operation the device may be mounted as illustrated in the drawing or may be suitably mounted for convenient operation in any other desired manner. The wire W or other part to be pulled may be readily threaded between the gripping members 15 and 16 of the two mechanisms A and B. After threading of the wire between the gripping members the lever 25 may be operated or moved backward and forward to alternately and simultaneously actuate the mechanisms A and B in opposite directions. It will be apparent that the two gripping mechanisms, in being connected with the lever 25 at opposite sides of its pivotal axis, are moved in opposite directions during each stroke or movement of the lever. The links 30 and 33 are connected with the lever 25 at equal distances from its pivotal axis so that the members A and B are operated the same distance during each movement of the lever. The gripping members 15 and 16 of the forwardly moving gripping mechanism tightly grips and holds the wire W, while the gripping members of the rearwardly moving mechanism have slight frictional and pressural engagement with the wire. In this manner, one gripping mechanism is operable to pull the wire forwardly while the other gripping mechanism is being moved rearwardly to a position to grip the wire upon the lever 25 being moved in the opposite direction. The device has a ratchet action wherein both strokes of the lever 25 (that is, movement or strokes of the lever 25 in both directions), are work strokes causing advancement or tightening of the wire. When the desired tightness or tension has been obtained on the wire W, the device is operable to hold the tautness with little or no effort on the part of the operator. The gripping mechanisms A and B are at all times adapted to tightly grip the wire W and are connected with the lever 25 at equal distances at the opposite sides of the pivotal axis of the lever so as to equalize or counterbalance one another when in holding engagement with the wire so that there is little or no tendency for the lever 25 to pivot when the device is maintaining the tautness in the wire. It will be apparent how the wire may be readily connected to an insulator or other part while the device is holding the wire under tension.

The present invention provides a wire pulling device that is particularly simple and inexpensive of manufacture and that is readily operable and easily handled. As both strokes of the operating lever 25 are work strokes, the desired tautness or tension may be quickly put on the wire. The wire W is substantially continually acted upon or moved forwardly due to the alternate and simultaneous action of the gripping mechanisms A and B in opposite directions.

Having described only a typical, preferred form of my invention, I do not wish to limit myself to the specific details set forth, but wish to reserve to myself any changes or variations that may appear to those skilled in the art or fall within the scope of the following claims.

Having described my invention, I claim:

1. A device of the character described including, two gripping mechanisms each including a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and having a shoulder to engage the object to be handled, a shiftable pivotal connection between the gripping link and the forward link, a gripping member pivotally connected to the rear link and having a gripping face opposing said shoulder adapted to engage the object, and a pivotal connection between the gripping member and the gripping link, and means for simultaneously operating the mechanisms in opposite directions including members operatively connected to the forward links of the mechanisms.

2. A device of the character described including, two gripping mechanisms each including a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and being adapted to engage the object to be handled, a shiftable pivotal connection between the gripping link and the forward link, a gripping member pivotally connected to the rear link and having a gripping face adapted to engage the object at a point substantially opposite the point where it is engaged by the gripping link, and a pivotal connection between the gripping member and the gripping link, and means for simultaneously operating the mechanisms in opposite directions including, a lever, means for pivotally connecting the lever with a relatively stationary object, and links operatively connecting the forward links of said mechanisms with the lever.

3. A device of the character described including, two gripping mechanisms, each including a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and having a shoulder to engage the object to be handled, a shiftable pivotal connection between the gripping link and forward link, a gripping member pivotally connected to the rear

link and having a gripping face opposing said shoulder adapted to engage the object, and a pivotal connection between the gripping member and the gripping link, and means inter-connecting the forward links of the mechanism for simultaneously operating the mechanisms in opposite directions.

4. A device of the character described including, two gripping mechanisms each including a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and having a shoulder to engage the object to be handled, a shiftable pivotal connection between the gripping link and the forward link, a gripping member pivotally connected to the rear link and having a gripping face opposing said shoulder adapted to engage the object, and a pivotal connection between the gripping member and the gripping link, and means for simultaneously and alternately operating the mechanisms in opposite directions including operating members pivotally connected to the forward links of the mechanisms.

5. A device of the character described including, two gripping mechanisms each including, a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and having a shoulder to engage the object to be handled, a shiftable pivotal connection between the gripping link and the forward link, a gripping member pivotally connected to the rear link and having a gripping face opposing said shoulder adapted to engage the object, and a pivotal connection between the gripping member and the gripping link, and means for simultaneously and alternately operating the mechanisms in opposite directions including, a pivoted lever, and links connected to the lever at points spaced from its axis and pivotally connected to the forward links of the mechanisms.

6. A device of the character described including, two gripping mechanisms each including, a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and having a shoulder to engage the object to be handled, a shiftable pivotal connection between the gripping link and the forward link, a gripping member pivotally connected to the rear link and having a gripping face opposing said shoulder adapted to engage the object, and a pivotal connection between the gripping member and the gripping link, and means for simultaneously and alternately operating the mechanisms in opposite directions including, a pivoted lever, links pivotally connected to the lever at points spaced from its axis and pivotally connected to the forward links of the mechanisms, and a control member connecting the links which are connected to the lever to maintain them in parallelism.

7. A device of the character described including, two gripping mechanisms each including, a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and having a shoulder to engage the object to be handled, a shiftable pivotal connection between the gripping link and the forward link, a gripping member pivotally connected to the rear link and having a gripping face opposing said shoulder adapted to engage the object, and a pivotal connection between the gripping member and the gripping link, and means for simultaneously and alternately operating the mechanisms in opposite directions including, a lever having a relatively fixed axis spaced laterally out of alignment with the longitudinal axis of the object being handled, and links connected to the lever at points spaced from its axis and pivotally connected to the forward links of the mechanisms.

8. A device of the character described including, two gripping mechanisms each including, a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and having a shoulder to engage the object to be handled, a shiftable pivotal connection between the gripping link and the forward link, a gripping member pivotally connected to the rear link and having a gripping face opposing said shoulder adapted to engage the object, means normally yieldingly urging the gripping shoulder and the gripping face against the object, and a pivotal connection between the gripping member and the gripping link, and means for simultaneously operating the mechanisms in opposite directions including members operatively connected to the forward links of the mechanisms.

9. A device of the character described including, two gripping mechanisms each including a forward link, a rear link pivotally connected to the forward link, a gripping link pivotally connected to the rear link and having a shoulder to engage the object to be handled, a shiftable pivotal connection between the gripping link and the forward link, a gripping member pivotally connected to the rear link and having a gripping face opposing said shoulder adapted to engage the object, a pivotal connection between the gripping member and the gripping link, and a spring acting against the forward link and the rear link to yieldingly urge said gripping shoulder and gripping face against the object, and means for simultaneously operating the mechanisms in opposite directions.

MILO TUPPER.