

U. S. DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office

June 14, 1982  
(Date)

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office  
of the Printed Specification and Drawings of U. S. Patent  
893,650.



By authority of the  
COMMISSIONER OF PATENTS AND TRADEMARKS

*A. L. Jackson*  
Certifying Officer.

**TENSION ATTACHMENT FOR PORTO POWER**

Inventor: Frank W. Turben, Columbus, Pa.

Assignee: Frank D. Turben, Columbus, Pa.

Filed: June 17, 1974

Appl. No.: 480,008

U.S. Cl. .... 254/93 R  
 Int. Cl. .... B66f 3/24  
 Field of Search..... 254/51, 93 R, 93 H;  
 72/373, 305, 453

**References Cited**

**UNITED STATES PATENTS**

564	11/1937	Mandl et al.....	254/93 H
154	5/1958	Geller.....	254/51
566	3/1961	Elsner.....	254/93 R
730	12/1965	Fischler.....	254/93 R

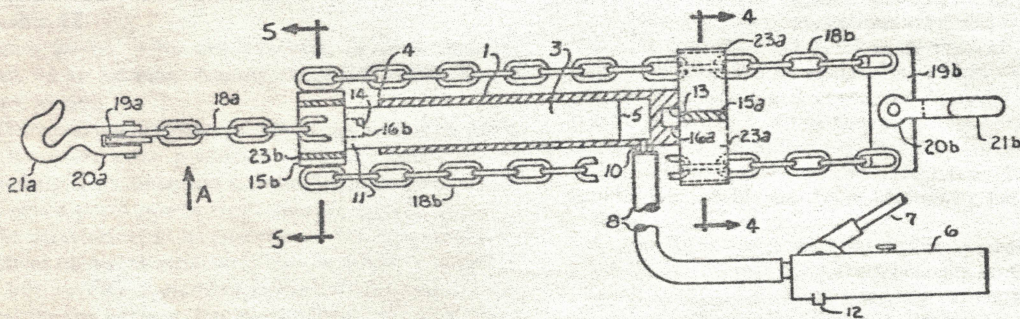
Primary Examiner--Othell M. Simpson  
 Attorney, Agent, or Firm--Ralph Hammar

[57]

**ABSTRACT**

A unitary tension attachment for converting the compression force of a body shop compression ram to a tension force. The attachment has two loops in planes transverse to each other and extending along the axis of the tension force. Each loop has two chains spaced on opposite sides of said axis with one end of the chain fixed to an equalizer bar and the other end of the chain fixed to a crosshead. Crosshead ends of the loops are linked together and the compression ram is arranged to exert a compression force pushing the crossheads apart and thereby pulling the equalizer bars together. The equalizer bars each have a hook for connection to the device to be tensioned.

**1 Claim, 5 Drawing Figures**



## ATTACHMENT FOR PORTO POWER

Every body shops a species of hydraulic ram plus a pump or other source of pressure known as a porto power is used for pushing things apart. This invention converts the ram from pushing to pulling without loss of force and without complicated installation.

In the drawing,

FIG. 1 is a plan view, partly in longitudinal section, of a porto power equipped with a preferred form of attachment;

FIG. 2 is an elevation looking in the direction of arrow A of the left element of the attachment;

FIG. 3 is a top plan of the right element of the attachment;

FIG. 4 is a section on line 4—4 of FIG. 1;

FIG. 5 is a section on line 5—5 of FIG. 1; and

FIG. 6 is an operational diagram.

A porto power as available from several manufacturers has a hydraulic ram 1 closed at end 2 and a piston 3 movable out of cylinder end 4 by hydraulic pressure between end 5 of the piston and the closed end of the cylinder. The hydraulic pressure is derived from any source such as a portable hand pump 6 operated by lever 7. Each stroke of the lever adds an increment of liquid which is fed to the cylinder by line 8 and quick disconnect fitting 10. Other sources of hydraulic pressure may be used. The porto power may be used as illustrated for pushing things apart, the thrust being exerted by direct contact with the closed end of the cylinder and with the outer end 11 of the piston. Adapters of various lengths may be connected to the piston or cylinder or both to extend the pushing range. The sockets 13, 14 receive complementary locating pins on the adapters. Other units use screw threads for connecting the adapters to the piston and cylinder. In use, the ram is arranged in thrust relation between the parts to be pushed apart and hydraulic pressure is built up by reciprocating the lever 7 until the parts have been moved the desired distance after which the pressure is relieved by valve 12.

Porto power units are available in sizes exerting thrust up to 10 tons. Almost every body shop has at least one unit.

While many body shop problems are solved by pushing, there are many problems which are better solved by pulling. This invention is a simple attachment which converts a porto power from pushing to pulling.

The attachment in its preferred form comprises two identical elements separately shown in FIGS. 2 and 3. The left, or FIG. 2 element indicated by numerals followed by the letter *a*, has a crosshead 15*a* with a pin 16*a* receivable in socket 13 or 14 and with thrust surfaces 17*a* engageable with end 2 of the cylinder or with end 11 of the piston. The outer ends of a crosshead are connected to one end of a pair of chains 18*a* and the other ends of the chains are connected to an equalizer bar 19*a*. At the center of the equalizer bar is a tension connection such as clevis 20*a* and hook 21*a*. In use, the hook 21*a* would be suitably connected to one part to receive a pulling force by any suitable means such as a chain clamp, etc. The hook 21*a* might be omitted and the tension connection made directly to the equalizer bar 19*a* or to the ends of chains 18*a*.

For use with porto power rams having threaded connections to perform the functions of the pin and socket connections adapters may be made with one side of the adapter screw threaded to fit the ram and the opposite

side of the adapter provided with a socket to receive the pins 16*a*, 16*b*.

Welded connections 22*a* are shown between the chains 18*a* and crosshead 15*a*. These connections permit equalizing the effective length of the chains.

The right hand element shown in FIG. 3 has corresponding parts identified by the same reference numerals followed by the letter *b*.

When assembled as in FIG. 1, the FIG. 3 element is in the plane of the paper and the FIG. 2 element is in a plane transverse to the plane of the paper. The FIG. 2 and FIG. 3 elements are closed loops linked together with adjacent ends of the loops in compression thrust relation to the ram and with the remote ends of the loops in tension relation to the parts to be pulled apart. The porto power pushes the adjacent ends of the loops (crossheads 15*a*, 15*b*) apart and thereby pulls remote ends of the loops (equalizer bars 19*a*, 19*b*) together. This operation is diagrammatically shown in FIG. 6 where loops 24, 25 are linked together with a ram 26 between adjacent ends 27, 28 of the loops. When the ram is pressurized, the adjacent ends 27, 28 of the loops are pushed apart and remote ends 29, 30 of the loops are pulled together.

As a convenience for preventing tangling of the chains and for centralizing the chains and keeping the pins 16*a*, 16*b* in the sockets 13, 14 under load, the crosshead 15*a* is provided with guide loops 23*a* for the chains 18*b* and the crosshead 15*b* is provided with guide loops 23*b* for the chains 18*a*. These guides may consist of strips of steel bent in an arch with the ends welded to the crossheads. The length of the chains 18*a*, 18*b* is slightly more than the extended length of the ram, namely, the overall length of the cylinder 1 plus the stroke of the piston 3.

The installation of the attachment is easily made. With the ram in the retracted position, the chains 18*a*, 18*b* are flexible and easily spread apart enough to permit insertion of the ram between the crossheads 15*a*, 15*b* with the pins 16*a*, 16*b* received in sockets 13, 14 and with the crossheads in compression thrust relation to the end 2 of the cylinder and end 11 of the piston. The desired tension connections are made to the hooks 21*a*, 21*b* and the slack is taken up manually. The ram is then pressurized by successive strokes of the pump handle 7 producing a controlled increase in tension which is stopped when the parts connected to the hooks have been pulled together the desired distance. There is no loss of force. The compression force of the ram equals the tension force exerted by the hooks.

What is claimed is:

1. A unitary attachment for a porto power ram having spaced compression thrust exerting surfaces movable apart along an axis by hydraulic pressure and movable toward each other when the hydraulic pressure is relieved, first and second substantially identical closed loops extending along said axis with adjacent ends of the loops linked together to sustain axial tension, the plane of the first loop being transverse to the plane of the second loop, each loop having a pair of axially extending link chains spaced on opposite sides of said axis and having one end fixed to a crosshead in the plane of the loop and the other end fixed to an equalizer bar in the plane of the loop, the adjacent ends of the loops being the crossheads and the remote ends of the ends of the loops being the equalizer bars, said crossheads being in compression thrust relation to said thrust surfaces so that when said crossheads are pushed apart the equalizer bars are pulled together, and a hook at the center of each equalizer bar for making connections to parts to be tensioned.

\* \* \* \* \*

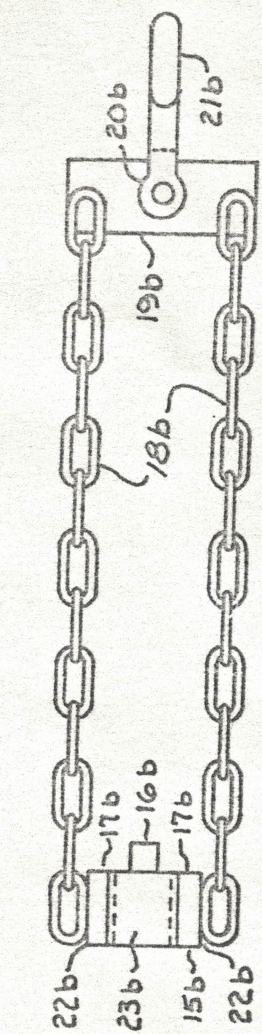
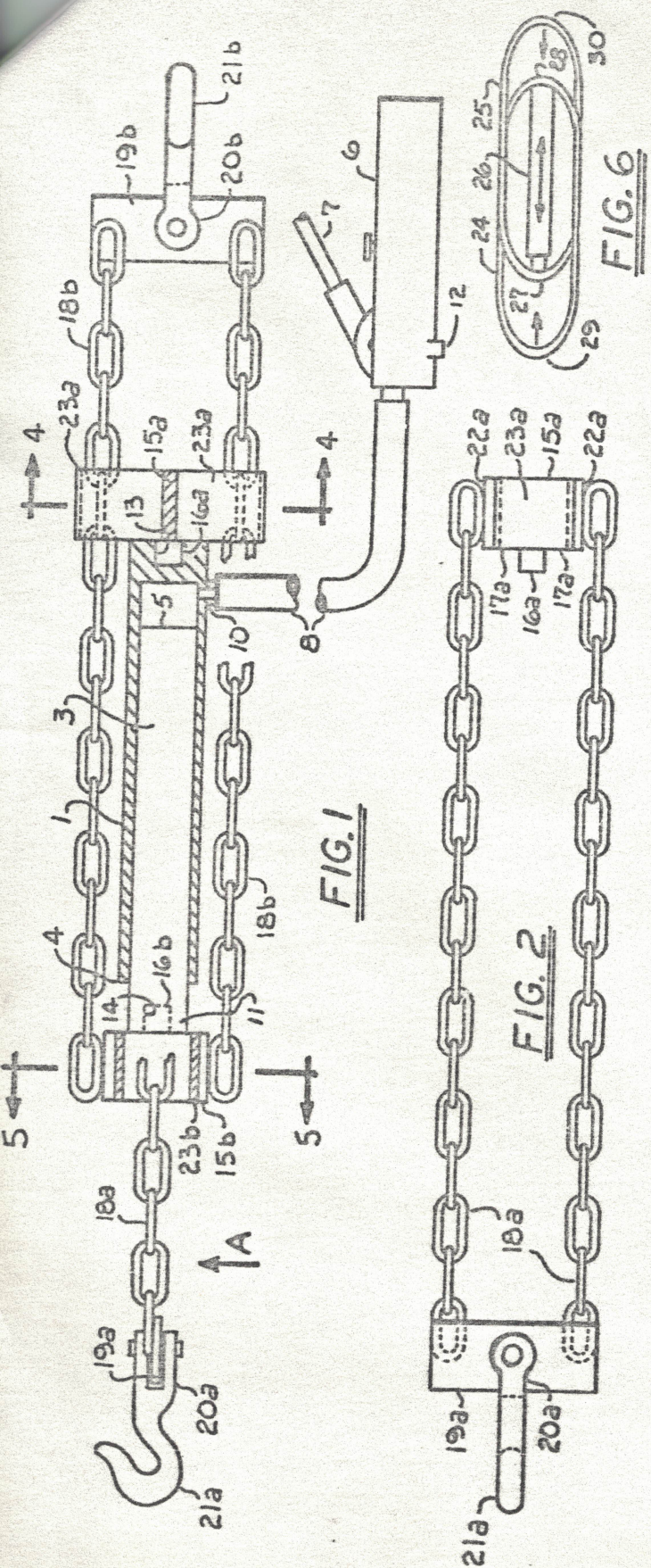


FIG. 3

FIG. 5

FIG. 4