June 6, 1939. P. BREZA 2,161,013

PIPE JACK

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Fig. 1.

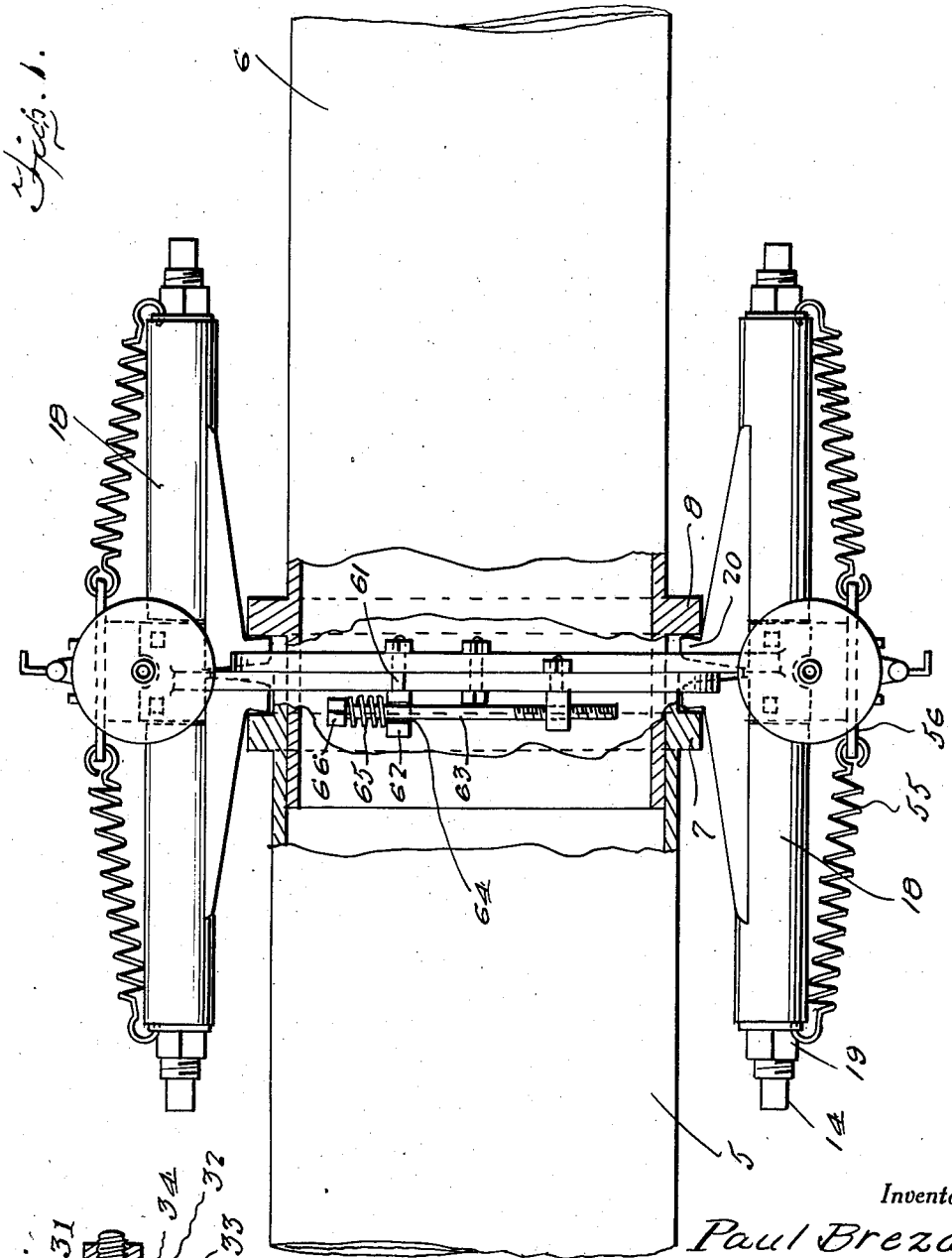
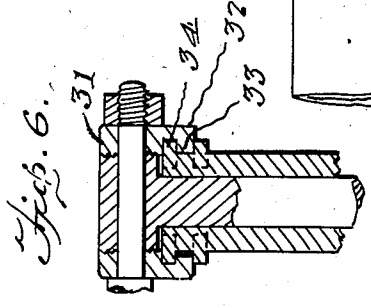


Fig. 6.



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Fig. 2.

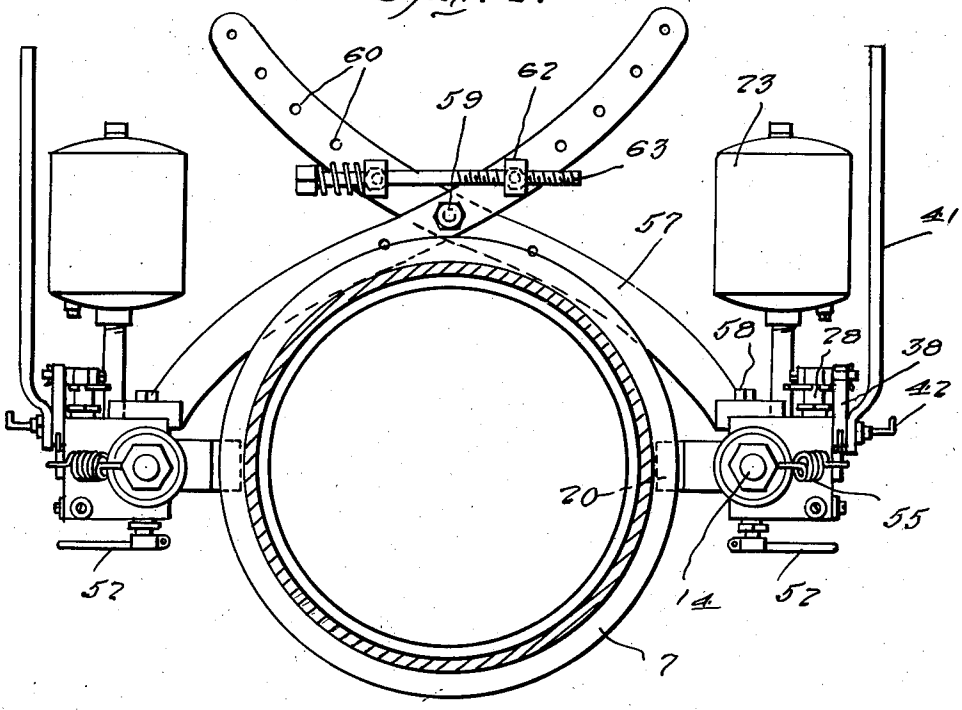
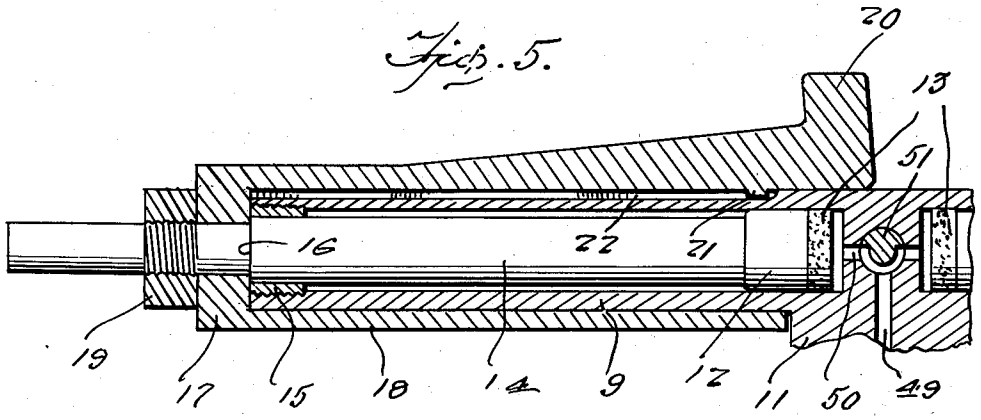


Fig. 5.



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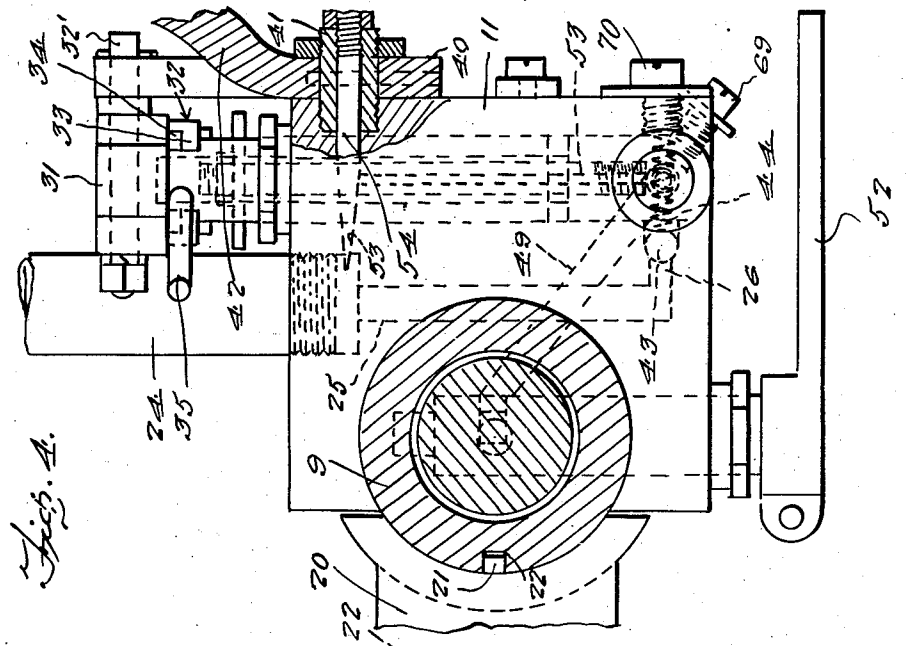


Fig. 4.

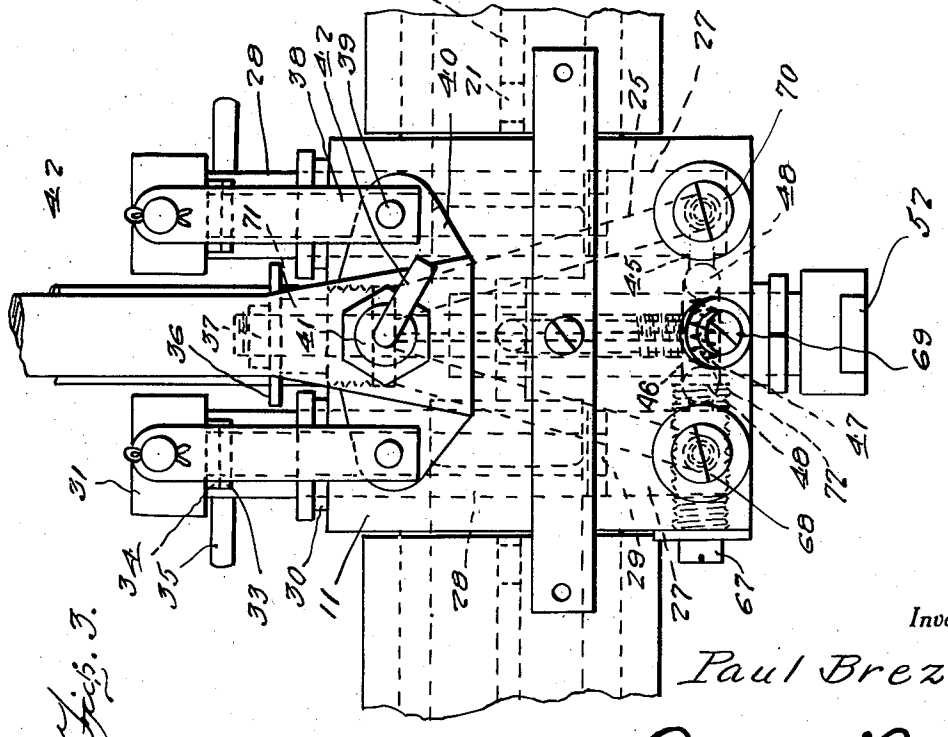


Fig. 3.

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UNITED STATES PATENT OFFICE

2,161,013

PIPE JACK

Paul Breza, Chesapeake City, Md.

Application February 28, 1938, Serial No. 193,202

12 Claims. (Cl. 254—29)

The present invention relates to pipe jacks designed primarily for use upon dredging pipes of relatively large diameter which are usually connected together in telescoping arrangement, the principal object of the invention residing in the provision of a portable fluid pressure operated jack unit adapted to engage the pipes to separate the same.

A further important object is to provide a jack unit embodying a pair of longitudinally alined cylinders and a confined fluid for operating pistons in the cylinders and to which the jaws of the jack are secured and a pair of manually operated pumps provided with a single operating lever to force the fluid under pressure to the cylinders, together with valve means controlling the fluid.

Another object is to provide a support for mounting a pair of the jacks at opposite sides of the pipe.

A still further object is to provide an apparatus of this character of simple and practical construction, which is strong and durable, efficient in performance, and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which

Figure 1 is a top plan view with parts broken away and shown in section.

Figure 2 is a transverse sectional view through the pipe showing the pair of jack units in end elevation.

Figure 3 is a front elevational view of the casting for the pumps and fluid ducts.

Figure 4 is an end elevational view thereof with parts shown in section.

Figure 5 is a longitudinal sectional view through one of the jack cylinders, and

Figure 6 is a sectional view through one of the pumps.

Referring now to the drawings in detail, the numerals **5** and **6** designate a pair of telescopically connected pipes, each of the pipes having annular ribs **7** and **8** respectively adjacent their ends, the end of the female pipe **5** abutting the rib **8** of the male pipe **6** to limit inward movement of the latter.

The pipe jack comprises a pair of longitudinally alined cylinders **9** and **10** connected at their inner ends by a lateral casting **11**, the cylinders being of identical construction and accordingly a detailed description of one will suffice for both. Each cylinder is provided with a piston **12** having a working fit therein and to the end of the piston is secured a leather washer **13**. A stem **14** extends from the piston outwardly through a plug **15** threaded in the outer end of the cylinder, a shoulder **16** being formed on the stem abutting the inner face of the end wall **17** of a sleeve **18** slidably mounted on the cylinder. The stem extends through an opening in the end wall **17** and is anchored to the sleeve by a nut **19** threaded on the outer end of the stem.

A jaw **20** projects laterally from one side of the sleeve at its inner end and an internal lug **21** is formed in the sleeve sliding in a longitudinal groove **22** in the outer surface of the cylinder to prevent rotation of the sleeve on the cylinder. As shown in Figure 1 the jaws **20—20** of the respective cylinders are adapted to be placed between the ribs **7** and **8** in a manner to spread the ribs apart whereby to separate the pipes.

A reservoir **23** is provided with a pipe **24** in its bottom which supports the reservoir in an upright position above the casting **11**, the lower end of the pipe communicating with a pair of vertical ducts **25—25** in the casting, the lower ends of the ducts divering toward the opposite sides of the casting and terminating in angularly extending ducts **26** leading toward the front of the casting (see Figures 3 and 4). The ducts **26** communicate with the bottom of a pair of vertical pump cylinders **27—27** having pistons working therein, each of said pistons comprising a sleeve **28** having a working fit in the cylinder and a pump rod **29** having a working fit in the sleeve, the sleeve and rod being coextensive and the sleeve being free from the rod. Both the sleeve and rod of each piston extend outwardly from the top of the casting through a packing nut **30** the top of each rod having a head **31** from the under side of which depends a projection **32** having an inturned flange **33**.

The upper end of the sleeve is provided with a lug **34** and a manipulating handle **35** by means of which the sleeve may be rotated to move the lug into and out of position overlying the flange **33** to secure the sleeve to the rod for reciprocation as a unit. A plate **36** is secured to the plug **14** by a nut **37**, the plate being spaced above the casting and also above the packing nut **30** and under which the lug **34** is adapted to be moved when the sleeve is detached from the rod to lock the sleeve against movement. As will be apparent from an inspection of Figure 3 the opposite ends of the plate **36** serve as a locking means

for the sleeves of the respective pumps. Accordingly the sleeve, when secured to the rod, provides a pump piston of increased diameter to produce an increased pressure during operation of the piston.

A pin 32' projects forwardly of each of the heads 32 on which is pivoted the upper end of links 38—38, the lower ends of said links being pivoted to pins 39—39 on a connecting member 40, said member being pivoted at its central portion on a hollow plug 41 threaded in the front of the casting. An operating handle 42 extends upwardly from the member 40, the center line of the handle passing through the axis of the plug 41 from which it will be apparent that the oscillating movement of the handle from side to side will cause an opposite operation of the pump piston.

Ball check valves 43 are yieldably maintained in closed position in the intake ducts 26 by springs 44 and discharge ducts 45—45 lead from each of the cylinders 27 to a common chamber 46 in which a coil spring 47 is arranged for yieldably maintaining a pair of ball check valves 48—48 in closed position in the respective discharge ducts. From the chamber 46 a duct 49 extends rearwardly of the casting to a pair of lateral ducts 50—50 communicating with the respective jack cylinders 9. A two-way rotary control valve 51 is mounted at the junction of the ducts 49 and 50 to selectively control communication to either or both of the jack cylinders, or to cut off both cylinders, said valve being operated through the bottom of the casting by a handle 52.

A fluid return passage 53 for the jack cylinders extends upwardly from the chamber 46 in which a needle valve 54 is arranged extending outwardly through the plug 41 and provided at its outer end with a handle 42.

To the outer end of each of the sleeves 18 is attached one end of a coil spring 55 the opposite end of the spring being connected to a plate 56 secured to the casting, the spring serving to yieldably urge the sleeves inwardly.

As illustrated in Figures 1 and 2, a pair of the jack units are employed for separating the pipes 5 and 6 in order to prevent binding of the pipes during separation, and for the purpose of supporting the pair of jacks at opposite sides of the pipe an arm 57 is secured at one end to each jack unit as at 58, the arms extending transversely above and resting on the pipe in crossed relation and pivotally connected to each other intermediate their ends at 59. The free ends of the arms are provided with longitudinally spaced openings 60 in which stems 61 of brackets 62 are adjustably secured, the brackets being in the form of eyes through one of which one end of a bolt 63 is threaded, the other bracket being open at one site as at 64, in which the opposite end of the bolt is seated, a coil spring 65 being interposed between the head 66 of the bolt and the adjacent bracket to yieldably urge the handle ends of the arms toward each other and thus secure the arms and jack units in a predetermined fixed relative position on the pipe.

The numerals 67, 68, 69 and 70 and 71 designate plugs threaded in the openings in the casting provided for drilling the several ducts, the inner end of the plug 67 being hollow and provided with a valve seat 72 for the valve 48.

In the operation of the device, the jack units are mounted upon the pipe in straddled position as shown, the valve 54 being closed and the valve 51 being opened to either or both of the jack cylinders as desired. The pump handles 42 of the respective jacks are then manipulated causing the pumps 28 upon their upstroke, to open the check valves 43 drawing the fluid from the reservoirs into the cylinders 27 and upon their downstroke closing the valves 43 and opening the valves 48 to force the fluid into the chamber 46 and through the ducts 49, into the jack cylinders to cause an expansion of the sleeves 18, thus spreading the jaws 20 and resulting in the breaking loose and separation of the pipes 5 and 6. The valve 54 is then opened and the springs 55 will move the sleeves 18 inwardly forcing the fluid back through the duct 49, chamber 46 and duct 53, into the reservoir.

It is believed the details of construction and manner of operation of the device will be readily understood from the foregoing without further detailed explanation.

Having thus described the invention, what I claim is—

1. A pipe jack comprising a pair of jaws arranged for opposite movement and adapted to engage a pair of pipe sections, fluid pressure means for expanding the jaws, spring means for contracting the jaws and valves selectively controlling the fluid pressure during the expanding and contracting movement of the jaws.

2. A pipe jack comprising a pair of jaws arranged for opposite movement and adapted to engage a pair of pipe sections, a jack cylinder for each of the jaws, pistons working in the cylinders said jaws projecting laterally at one side of the respective cylinders and rigidly connected to the pistons, a confined fluid, means for forcing the fluid into the cylinders to expand the jaws, spring means for contracting the jaws and valve means controlling the fluid during the expanding and contracting movement of the jaws.

3. A portable pipe jack comprising a pair of jaws arranged for opposite movement and adapted to engage a pair of pipe sections, a jack cylinder for each of the jaws, pistons working in the cylinders said jaws projecting laterally at one side of the respective cylinders and rigidly connected to the pistons, a confined fluid, a pump for forcing the fluid into the cylinders to expand the jaws, check valves maintaining the pressure in the cylinders, a valve adapted to release the pressure and spring means for contracting the jaws upon the opening of said last named valve.

4. A portable pipe jack comprising a casting, a pair of longitudinally alined cylinders, pressure responsive pistons working therein, jaws fixed to the pistons for expanding movement and projecting laterally from the cylinders, a confined fluid, a reservoir, ducts in the casting leading from the reservoir to the cylinders, a pump carried by the casting for forcing fluid from the reservoir to the cylinders, check valves in the ducts for maintaining pressure in the cylinders, a release valve controlling return of fluid from the cylinders to the reservoir and spring means for contracting the jaws.

5. A portable pipe jack comprising a casting, a pair of longitudinally alined cylinders, pistons working therein, jaws fixed to the pistons for expanding movement and projecting laterally from the cylinders, a confined fluid, a reservoir, ducts in the casting leading from the reservoir to the cylinders, a manually operable pump mounted in the casting for forcing fluid from the reservoir to the cylinders, check valves in the ducts for maintaining pressure in the cylinders, a release

valve controlling return of fluid from the cylinder to the reservoir and spring means for contracting the jaws.

6. A pipe jack comprising a casting, a pair of longitudinally alined cylinders having pistons working therein, a fluid intake port leading from the casting to the inner ends of the cylinders, sleeves slidable on the cylinders, jaws on the inner ends of the sleeves, means rigidly connecting the outer ends of the sleeves to the pistons, a reservoir, ducts in the casting connecting the reservoir with the intake port and a manually operable pump for forcing fluid from the reservoir to said cylinders.

7. A pipe jack comprising a casting, a pair of longitudinally alined cylinders having pistons working therein, a fluid intake port leading from the casting to the inner ends of the cylinders, sleeves slidable on the cylinders, jaws on the inner ends of the sleeves, means rigidly connecting the outer ends of the sleeves to the pistons, a reservoir, ducts in the casting connecting the reservoir with the intake port, a pair of pumps for forcing fluid from the reservoir to said cylinders, an operating lever for the pumps and means operatively connecting the lever to the pumps for opposite actuation.

8. A portable pipe jack comprising a plurality of jack units embodying pipe engaging and separating members and arms carried by the units and connected in crossed relation above the pipe for supporting the units at opposite sides of the pipe.

9. A portable pipe jack comprising a plurality of jack units embodying pipe engaging and separating members and arms carried by the units and connected in crossed relation above the pipe for supporting the units at opposite sides of the pipe, and means for adjusting the crossed ends of the arms relative to each other.

10. A portable pipe jack comprising a plurality of jack units embodying pipe engaging and separating members, arms carried by the units and extending in crossed relation above and resting on the pipe, means pivotally connecting the crossed ends of the arms and means yieldably urging the members into pipe engaging position at opposite sides of the pipe.

11. A pipe jack comprising a pump casing having a pump mounted therein, a pair of cylinders projecting from opposite sides of the casing, pistons working in the cylinders and having pipe engaging members rigidly connected thereto, a duct leading from the pump to the inner ends of the cylinders and valve means in said duct.

12. A pipe jack comprising a pump casing having a pump mounted therein, a pair of cylinders projecting from opposite sides of the casing, pistons working in the cylinders and having pipe engaging members rigidly connected thereto, a reservoir for a confined fluid connected to the pump, ducts in the casing leading from the pump to the inner ends of the cylinders and from the cylinders to the reservoir and valve means selectively controlling communication through said ducts.

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