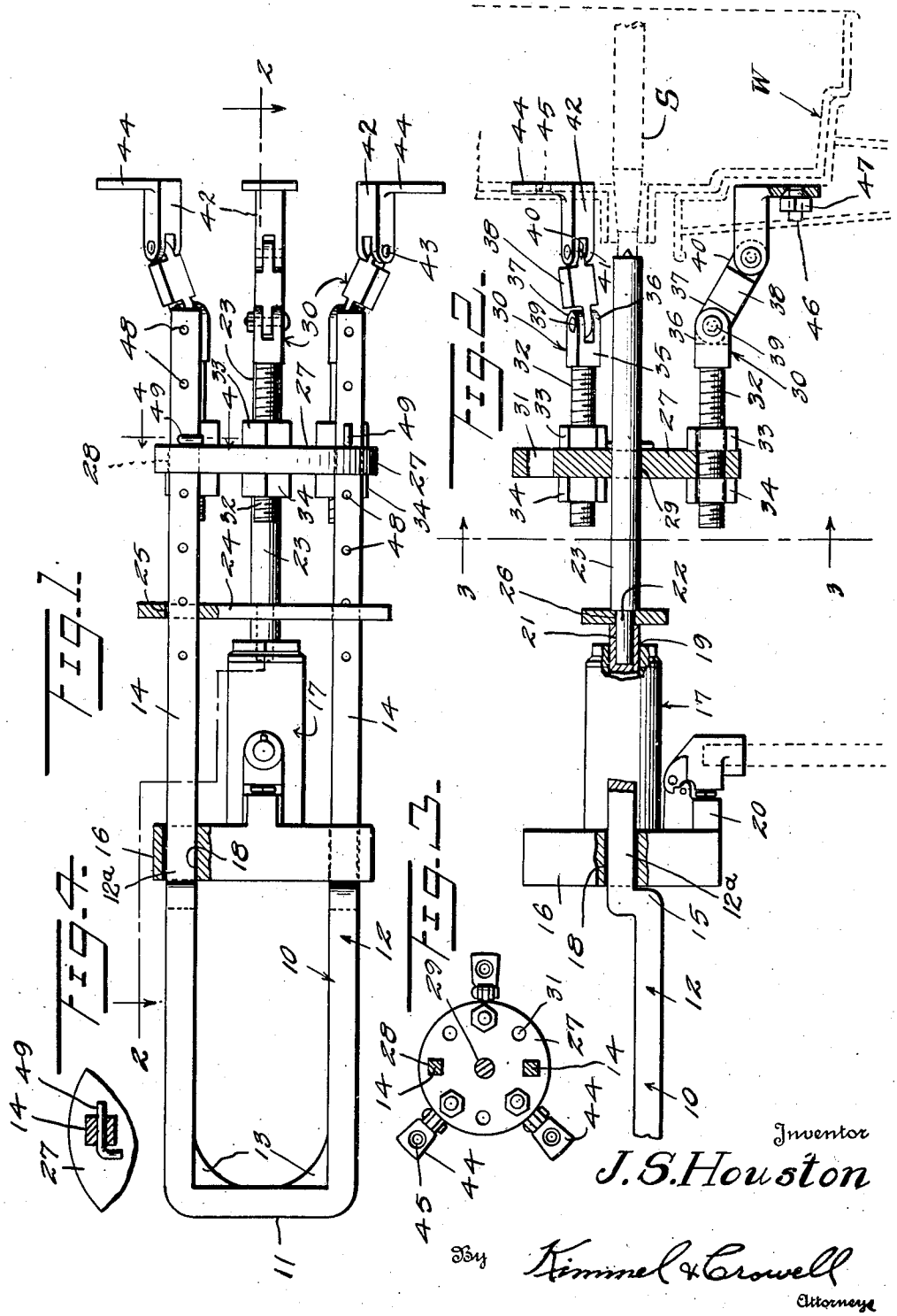
May 20, 1941. J. S. HOUSTON 2,243,006

WHEEL PULLING DEVICE

Filed Dec. 12, 1938



Inventor
J. S. Houston
By Kimmel & Crowell
Attorneys

Patented May 20, 1941 2,243,006

UNITED STATES PATENT OFFICE

2,243,006

WHEEL PULLING DEVICE

John S. Houston, Waverly, Ala.

Application December 12, 1938, Serial No. 245,291

7 Claims. (Cl. 29—85)

This invention relates to wheel pulling devices and more particularly to a fluid operated pulling device.

An object of this invention is to provide a fluid operating pulling device which is designed for pulling wheels, gears, sleeves or like elements from a shaft or the like which is so constructed that the device can be readily adapted to pull different articles without injuring the articles.

Another object of this invention is to provide a novel supporting means or frame for a pulling device which is capable of quick adjustment for use with different types of articles and which may be readily and easily handled by the worker so that the article in the form of a wheel or gear may be pulled or withdrawn from a shaft or housing without taking the entire article apart and transporting the article to a shop.

A still further object of this invention is to provide in a device of this kind a fluid operated pressure means which may be operated either by a liquid or by air, the pressure means being of a conventional type and mounted in a novel frame structure with which the pulling elements are associated.

To the above objects and to 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 drawing wherein is shown an embodiment of this invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawing:

Figure 1 is a detail side elevation partly broken away and in section of a wheel pulling device constructed according to an embodiment of this invention,

Figure 2 is a sectional view partly in elevation taken on the line 2—2 of Figure 1,

Figure 3 is a sectional view taken on the line 3—3 of Figure 2, and

Figure 4 is a sectional view taken on the line 4—4 of Figure 1.

Referring to the drawing, the numeral 10 designates generally a U-shaped frame which at the junction between the bight 11 thereof and the parallel arms 12 is provided with bracing members or webs 13. Each of the arms 12 is of rectangular cross section and it is formed of a front portion 12^a and a rear portion 14 offset with respect to the portion 12^a. The said portions are disposed in parallel planes. The outer terminal part of the lower face of portion 14 merges into the inner terminal part of the upper face of the portion 12^a whereby the arm 12 is formed intermediate its ends with a shoulder, abutment or stop 15 for a purpose to be referred to. The portions 14 of the arms 12 hereinafter will be termed extensions.

Slidably mounted on the extensions 14 is the base 16 of a fluid operated pressure member 17. The base 16 is formed with a pair of rectangular openings 18 through which the extensions 14 pass. The outward shift of the member 17 relative to the frame 10 is limited by the correlation of the shoulders 15 with the base 16. The base 16 is provided with a pair of openings 18 therethrough within which the extensions 14 slidably engage. The pressure member 17 in the present instance is disclosed as a hydraulic jack having a fluid operated plunger 19 which is actuated by means of a pump or pressure build-up member 20 forming part of the jack member 17. The jack 17 may be operated either by means of a liquid or if desired may be operated by air pressure which is adapted to be connected to a suitable source of air pressure supply.

The jack 17 herein disclosed is of conventional construction so far as the operation of the plunger 19 is concerned with the exception of the base 16 which is relatively wide so that the axis of the plunger 19 will be disposed substantially centrally between the two extensions 14.

The plunger 19 is provided at the forward end thereof with a socket or axially disposed recess 21 within which the reduced end 22 of a plunger extension or thrust rod 23 is adapted to engage. The rod 23 may be made any desired length and the forward end of the rod 23 is adapted to abut against an end of a shaft S carried by a wheel structure W. A guide plate or member 24 having a pair of openings 25 therein is slidably mounted on the extensions 14. The plate 25 is provided with an opening 26 aligning with the mouth of the socket 21 of the plunger 19 so that the reduced end 22 of the thrust rod 23 is adapted to pass through the opening 26 and the guide member or plate 24 is adapted to move longitudinally of the extensions 14 with the movement of the plunger 19 and the rod 23 relative to the extensions 14. The guide member 24 provides a means whereby the two extensions 14 are held against spreading and in addition the guide member 24 prevents the thrust rod 23 from being bent under pressure from the plunger 19.

A disc-shaped plate 27 having a pair of diametrically opposed openings 28 therein having their

walls loosely encompassing the extensions 14 and this plate 27 is provided with a centrally disposed opening 29 through which the plunger extension or thrust rod 23 is adapted to slidably extend through. The contour of the openings 28 will conform to the cross sectional contour of the extensions 14.

A plurality of wheel engaging members generally designated as 30 are adjustably mounted in selected openings 31 of a set of openings which are provided in the plate or disc 27 and in the present instance, there are three of these pulling arms or members 30 although I do not wish to be limted to the particular number of pulling members which may be attached to the plate 27. The openings 31 provided in the plate 27 are equally spaced apart between the openings 28 so that the pulling members 30 may be positioned in any selected openings which may be convenient for the particular article which is being worked upon.

The pulling members 30 comprise a threaded shaft or rod 32 engaging through a selected opening 31 and nuts 33 and 34 are positioned on opposite sides of the plate 27 and are threaded onto the rod or shaft 32 so as to hold the rod or shaft 32 in the desired position in the plate 27. The forward end of each member 32 is provided with a head 35 having a bifurcated portion 36 within which the reduced rear end portion 37 of a link 38 engages. The reduced end portion 37 is pivotally mounted on a pivot 39 extending through the bifurcated portions 36 and through the reduced portion 37. The forward end of each link 38 has a reduced portion 40 engaging between a pair of spaced apart arms 41 carried by a wheel clamping member 42. The reduced portion 40 is pivotally mounted on a pivot 43 engaging through the arms 41 and a reduced portion 40. In the present instance, the forward end of the pulling or clamping member 42 is provided with a right angularly disposed foot or extension 44 having an opening 45 therethrough which is adapted to engage about a bolt 46 carried by the wheel W. A nut 47 is adapted to be threaded onto the bolt 46 so as to firmly attach the leg or extension 44 against the adjacent face of the wheel W. It will be understood that the particular configuration of the clamping or pulling members 42 may be varied in accordance with the particular article which is being worked upon and I, therefore, do not wish to be limited to the specific configuration of the clamping member comprising the parts 42 and 44.

The frame extensions 14 are each provided with a plurality of longitudinally spaced apart openings 48 through a selected one of which a pin 49 is adapted to engage and the pin 49 is adapted to engage against the forward sides of the plate 27 so as to hold the plate 27 against forward movement relative to the arms 14 during the pulling operation.

In the use and operation of this device, the jack member 17 is slipped over the extensions 14 and with the base 16 thereof abutting against the shoulders 15 intermediate the ends of the frame 10. The plunger extension 33 is engaged with the plunger 19 with the reduced portion 22 extending through the opening 26 in the plate 24 and engaging in the socket 21.

The wheel clamping or gripping members 30 are positioned in selected openings 31 in the plate 27 and then fixedly secured onto the wheel W by means of the bolts 46 and the nuts 47. The stop pins 49 are then inserted in the selected openings 48 of the extensions 14 whereupon the pressure member or jack 17 may be operated to eject the plunger 19 and thereby move the plunger 19 and the thrust rod 23 relative to the frame 10. This operation will pull the wheel W from the shaft S.

What I claim is:

1. A pulling device comprising a U-shaped frame, laterally offset extensions integral with said frame and forming an abutment at the junction between said extensions and said frame, a fluid operated jack member disposed between said extensions, a base carried by said jack slidably engaging said extensions and engaging against said abutment, a plate loose on said extensions, said extensions having a plurality of spaced apart openings therethrough, pins engaging through selected openings in said extensions and against said plate to hold said plate against movement in one direction relative to said extensions, and means secured to said plate for securing said plate to an article to be worked upon.

2. A pulling device comprising a U-shaped frame, laterally offset extensions integral with said frame and forming an abutment at the junction between said extensions and said frame, a fluid operated jack member disposed between said extensions, a base carried by said jack slidably engaging said extensions and engaging against said abutment, a plate loose on said extensions, said extensions having a plurality of spaced apart openings therethrough, pins engaging through selected openings in said extensions and against said plate to hold said plate against movement in one direction relative to said extensions, said plate having a plurality of openings therethrough, and a plurality of article clamping members positioned in selected openings in said plate.

3. A pulling device comprising a stationary supporting frame including aligned abutments, a jack-structure mounted on said frame, bearing against said abutments and having the jacking part thereof disposed on the lengthwise median of the frame, a guide member slidably mounted on said frame, a thrust rod for bearing on the work to be acted upon and extending entirely through said guide into a recess provided in said jacking part and operated from the latter, said jacking part and rod having shoulders bearing against opposite faces of said guide member, an adjustable element mounted on the frame and having an opening for the passage of the thrust rod to the work, said element being formed with a row of openings, spaced coupling means for mounting in selected openings of said row extending forwardly from said element and providing for coupling the work to said supporting frame, means coacting with the frame to prevent said element, when adjusted for moving in a direction towards the work, each of said coupling means including a threaded rear part for extension through a selected opening, each of said coupling means further including a plurality of articulated parts extended from said threaded parts, and means for anchoring said threaded parts to said element.

4. A pulling device comprising a U-frame having its rear portion offset with respect to its front portion to provide it intermediate its ends with aligned abutments, means mounted on the rear portion of the frame, bearing against said abutments and including a jacking element disposed at the lengthwise center of the frame, a shiftable guide plate mounted on the rear portion of the frame, a thrust rod for engaging the work extending entirely through said guide plate into a recess provided in said element, said element and

rod having surfaces abutting opposite sides of said plate, a combined thrust rod guiding and work clamping supporting member adjustably mounted on the rear portion of the frame, means correlated with the frame for detachably securing said member in its adjusted position, a plurality of articulated work clamping devices, said member being formed with a set of openings, and means for securing said devices to said member in selected openings of said set.

5. In a pulling device for the purpose set forth, a frame having sides, an inner open end and aligned abutments intermediate its ends, means slidably mounted on the sides of said frame defining said inner open end and engaging said abutments and including a jacking element axially of said frame, a thrust rod for engaging the work and operated from said element, a combined thrust rod guiding and work clamping member loosely mounted on the sides of said inner open end between the extreme end thereof and said abutments and being adjustable longitudinally of the frame, means correlated with selectable points of the sides of the frame for detachably securing said member in adjusted relation relative to the frame, a guide plate shiftably mounted on the sides of the inner open end between the extreme end thereof and said abutments, said thrust rod extending entirely through said plate into a recess provided in said element to be operated thereby, said rod and element each having shoulders bearing against opposite faces of said plate, and work clamping devices adjustably connected to and extending rearwardly from said member.

6. In a pulling device for the purpose set forth, a frame having sides, an inner open end and aligned abutments intermediate its ends, means slidably mounted on the sides of said frame defining said inner open end and engaging said abutments and including a jacking element axially of said frame, a thrust rod for engaging the work and operated from said element, a combined thrust rod guiding and work clamping member loosely mounted on the sides of said inner open end between the extreme end thereof and said abutments and being adjustable longitudinally of the frame, means correlated with selectable points of the sides of the frame for detachably securing said member in adjusted relation relative to the frame, a guide plate shiftably mounted on the sides of inner open end between the extreme end thereof and said abutments, said thrust rod abutting and extending entirely through said plate into a recess provided in said element to be operated thereby, said member having an axial opening for the passage of said rod and a set of spaced openings surrounding said axial opening, articulated work clamping devices extended rearwardly from said member and mounted in selected openings of said set, and means for detachably securing said devices to said member.

7. In a pulling device for the purpose set forth, a frame having sides, an inner open end and aligned abutments intermediate its ends, means slidably mounted on the sides of said frame defining said inner open end and engaging said abutments and including a jacking element axially of said frame, a thrust rod for engaging the work and operated from said element, a combined thrust rod guiding and work clamping member loosely mounted on the sides of said inner open end between the extreme end thereof and said abutments and being adjustable longitudinally of the frame, means correlated with selectable points of the sides of the frame for detachably securing said member in adjusted relation relative to the frame, a guide plate shiftably mounted on the sides of inner open end between the extreme end thereof and said abutments, said thrust rod extending entirely through said plate into a recess provided in said element, said rod and element each having shoulders abutting opposite faces of said plate, said member having an axial opening for the passage of said rod and a set of spaced openings surrounding said axial opening, articulated work clamping devices extended rearwardly from said member and mounted in selected openings of said set, and means for detachably securing said devices to said member.

JOHN S. HOUSTON.