

May 1, 1945.

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2,374,861

PULLER TOOL

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2 Sheets-Sheet 1

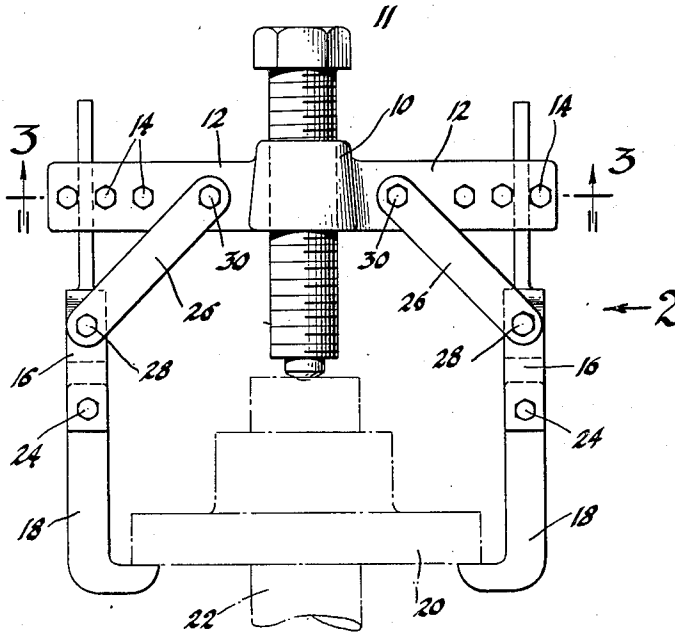


Fig. 1

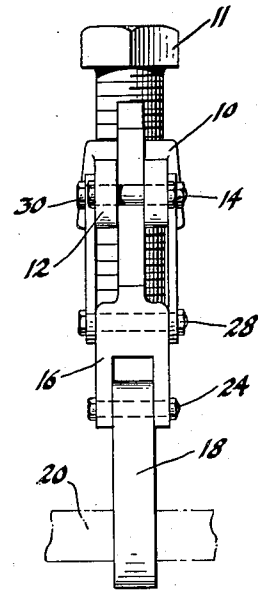


Fig. 2

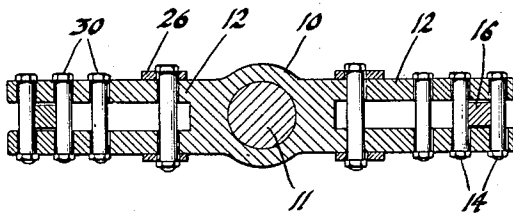


Fig. 3

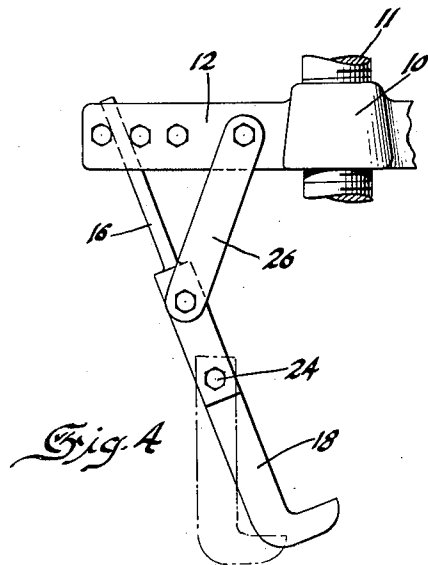


Fig. 4

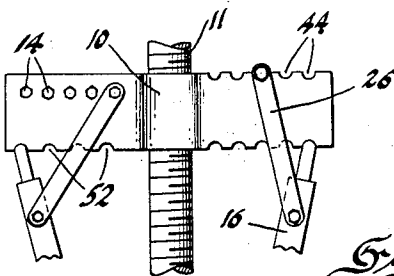


Fig. 11

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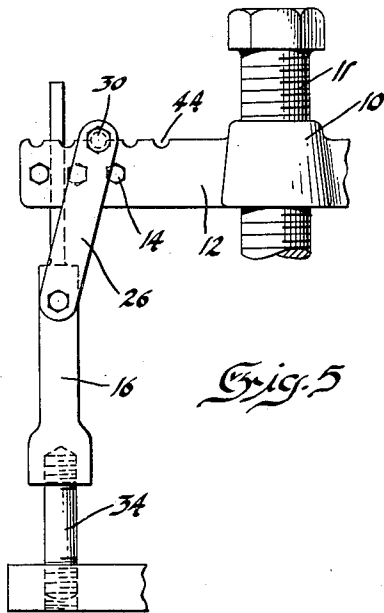
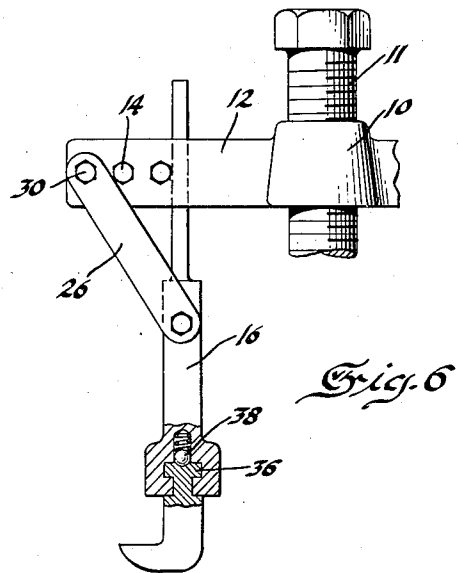
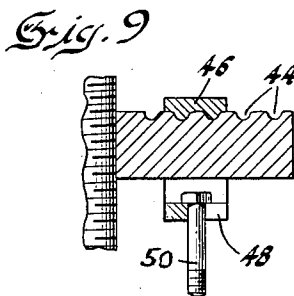
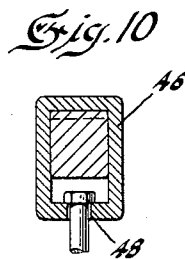
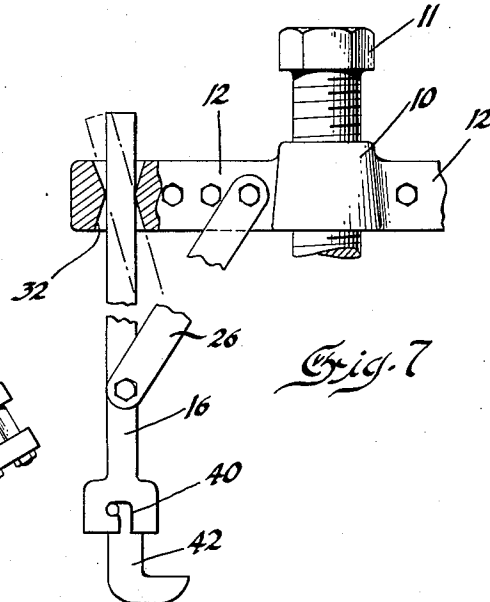
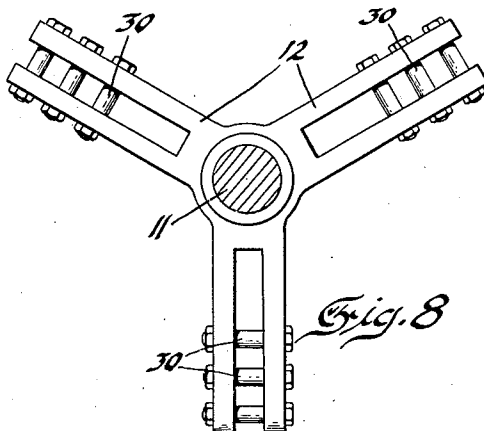
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2 Sheets-Sheet 2



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PULLER TOOL

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3 Claims. (Cl. 29—261)

This invention relates to an improved puller tool and is particularly adapted to pull gears, pinions or the like from a shaft.

An object is to provide a puller of the character described which is so constructed as to exert a contractile or expansible gripping pressure, whichever may be desired, upon the part to be pulled thereby.

Another object is to provide a puller which is readily adaptable to engage parts of different size and to engage said parts at different places and in different manners to exert pull upon the parts.

A further object is to provide a puller which includes a forcing screw adapted to engage a stationary member to actuate the puller to exert pull upon the part to be moved and which includes coupling means adapted to engage the part to be pulled and which coupling means is preferably in the form of toggle mechanism adapted to be coupled with the puller body in such a manner as to exert either a gripping or spreading pressure upon the part to be pulled as may be desired.

A meritorious feature resides in the provision of mechanism having a plurality of actuating devices adapted to be employed to pull different parts.

Other objects, advantages and meritorious features of the invention will more fully appear from the following description, appended claims and accompanying drawings, wherein:

Figure 1 is a side elevation of a puller, embodying my invention as the same may be used to pull a gear from the shaft,

Figure 2 is a side elevation of the puller shown in Figure 1 taken at right angles to the view of Figure 1,

Figure 3 is a sectional view taken on line 3—3 of Figure 1,

Figure 4 is an elevation of a fragment of the structure of Figure 1,

Figure 5 is an elevation of a fragment of the embodiment of the invention shown in Figure 1 illustrating a slightly modified form,

Figure 6 is an elevation of a fragment of the structure shown in Figure 1 slightly modified and with the puller connection shifted as to its location with respect to the body of the puller.

Figure 7 is an elevation of a fragment such as shown in Figures 5 and 6 but of a slightly modified form,

Figure 8 is a plan partly in section of a modified form of puller body,

Figure 9 is a fragmentary side elevation of a modification,

Figure 10 is a cross section of the view of Figure 9,

Figure 11 is another modification of an embodiment of my invention shown in side elevation,

My improved puller comprises a body portion 10 having a forcing screw 11 threaded therethrough. The body portion shown in Figures 1, 2 and 3 is provided with arms 12 extending radially in opposite directions away from the body. Each arm is provided with a plurality of pivot mountings 14. These pivot mountings are here shown as bolt apertures and four are illustrated in each arm.

A puller connection is carried by each arm. This puller connection is in the form of toggle mechanism. It comprises an adapter or coupling link 16 which is shown as provided at one end in Figure 1 with a jaw element 18 adapted to engage a gear and the like. The gear is indicated as 20 and is shown as mounted upon a shaft 22. This jaw element 18 may be pivotally connected by a bolt 24 to the adapter 16. The opposite end of the adapter or coupling link is slidably received within a guideway within the arm 12 for slidable, tiltable movement therethrough as shown.

This puller connection also includes articulating linkage 26. This linkage is here illustrated in the form of a pair of parallel links pivoted at one end as at 28 to an intermediate point of the coupling link 16. The opposite end of this articulating linkage is pivoted within a pivot mounting 14 of the arm 12 as shown upon a pivot bolt 30.

A plurality of bolts 30 may be provided extending through the pivot mounting apertures in the arms 12 as shown in Figures 1, 2, and 8. The spaces between these pins constitute guideways for the end of the coupling link 16 as shown in the drawings.

The articulating linkage 26 may be pivotally mounted in any one of the pivot apertures 14 as may be desired as shown in Figures 1 and 6, for example. The end of the coupling link 16 may extend through the arm to be guided by any one of the pins 30 mounted within a pivot pin aperture 14 in the arm, as shown, for example, in views of Figures 1 and 6.

As shown in the view of Figure 7 the guideway through the arm 12 may be formed by drilling a guideway therethrough of the character shown wherein the guideway is indicated as 32. The arms 12 in Figure 7 are provided with pivot mountings for the articulating linkage 26 as shown in the other figures and such linkage is

pivoted to the coupling arm 16 as shown in the other figures.

The body might be formed with any number of radially extending arms deemed necessary to mount the number of connectors required. In Figure 8, three such arms are shown. These arms are of the character hereinabove described and the device is otherwise similar to that hereinabove described.

In Figures 9 and 10 the arms 12 are provided with milled notches 44, as they are in Figure 5 and yoke type shackle adapters 46 are provided shiftable from one notch to another. In this modification no articulating linkage is provided.

In Figure 11 a modification is shown wherein the arms 12 may have apertures 14 and notches 44 or only either as may be desired. The articulating linkage 26 may be pivoted within the apertures or milled notches as shown. The adapter linkage 16 instead of extending through a guideway as shown in the other figures may have rounded ends adapted to seat within rounded grooves 52 to pivot therein as shown.

It will also be understood that the adapter links 16 might be provided at their outer ends with any type of suitable means for engaging a part to be pulled. In Figures 1, 4, 6 and 7, for example, a jaw element is illustrated. Such jaw element has a hook at the end to engage over the periphery of any edge surface to exert pull thereon. In Figures 5 and 9, instead of employing a jaw element, a threaded element 34 is employed.

Such part connecting element may be coupled with the adapter link 16 in any suitable manner. In Figures 1, 2 and 4 a bolt 24 is used to connect the hook 18 with the adapter 16. In Figure 5 the part 34 is threaded into the end of the adapter link 16. In Figure 6 the adapter link 16 is provided with a T-slot adapted to receive the T-end 36 of a hook, and a spring-pressed ball 38 is carried by the adapter link to hold the hook in place. In Figure 7 the adapter link 16 is provided with a bayonet type slot 40 adapted to receive the hook 42 which hook is provided with a bayonet joint connection. In Figures 9 and 10 the yoke type adapter link 46 is provided with a slot 48 adapted to receive the shank of a stud 50 threaded at its outer end to engage a threaded aperture in the part to be pulled as a threaded socket in a timing gear. This stud has a head at the opposite end seating within the shackle.

When the puller connection is mounted upon the arm of the body as shown in Figures 1 and 4 with the pivot mounting on the articulating linkage coupled with the arm between the screw and the slidable end of the coupling link 16 and the screw 11 is urged against the end of the shaft, the hooks 18 are urged inwardly as shown in Figure 4 to grip the periphery of the gear 20.

When the puller connection is mounted on the arm of the body as shown in Figure 6 with the pivot mounting on the articulating linkage 26 disposed outwardly beyond the slidable end of the coupling link 16, and a forcing pressure is exerted by the screw 11, the hook end of the coupling link will be spread outwardly. It will be apparent that it might be desired to employ the tool either where a gripping contractile pressure should be exerted to engage the part to be pulled or a spreading pressure exerted to effect such engagement.

It may be desired to exert a substantially straight line pull and in such case the pivot mounting of the linkage 26 will be positioned in close proximity to the guideway of the connecting link 16 through the arm as shown in Figure 5. To expedite such shifting engagement the arm 12 may be provided with notches 44 wherein the pivot pin 30 of the articulating linkage may seat rather than pass through the apertures 14 in the arms.

It will be evident that this pulling tool is one that is adapted for many uses and is readily adaptable to perform the operations hereinabove set forth in the manner described.

What I claim is:

1. A puller comprising in combination, a puller body, a forcing screw threaded therein, said body having a plurality of arms extending radially from said screw, each arm having a plurality of pivot mountings spaced radially different distances from the screw, the spaces between adjacent pivot mountings constituting guideways, a puller connection carried by each arm, each puller connection including a coupling link provided at one end with means adapted to engage a part to exert pull thereon and having its opposite end slidably received within a guideway between spaced pivot mountings of the arm and articulating linkage pivoted to an intermediate point of the coupling link and adapted to be pivoted to any mounting on the arm.

2. A puller comprising in combination, a puller body, a forcing screw threaded therein, said body having a plurality of radially extending arms, each arm provided with a plurality of pivot pin apertures and a plurality of pivot pin notches, pivot pins within the apertures defining guideways between adjacent pins, a puller connection carried by each arm, each puller connection including a coupling link provided at one end with means adapted to engage a part to exert pull thereon and having its opposite end received within a guideway in the arm for slidable tiltable movement therethrough and articulating linkage pivoted at one end to an intermediate point on the coupling link and pivoted at its opposite end to a pivot pin on the arm, said pivot pins shiftable from one pivot pin aperture or notch to another pivot pin aperture or notch on the arm.

3. A puller comprising in combination, a body, a forcing screw threaded therethrough, two toggle-like puller connections coupled with the body on opposite sides of the screw, each puller connection including two links, one of said links provided at one end with means adapted to engage a part to exert pull thereon and having its opposite end in pivotal thrust engagement with the body, the second link being pivoted at one end to the first link and having its opposite end pivotally supported upon the body, and means for relatively adjustably positioning the support of the second link upon the body with respect to the support of the other link thereon and with respect to the screw, said body provided with a plurality of seats spaced different distances from the screw to receive the end thrust of each first link.

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