Feb. 10, 1959 C. L. FRASER 2,872,728

DUAL PURPOSE GEAR PULLER AND DRIVER

Filed March 8, 1957 2 Sheets-Sheet 1

FIG. 1

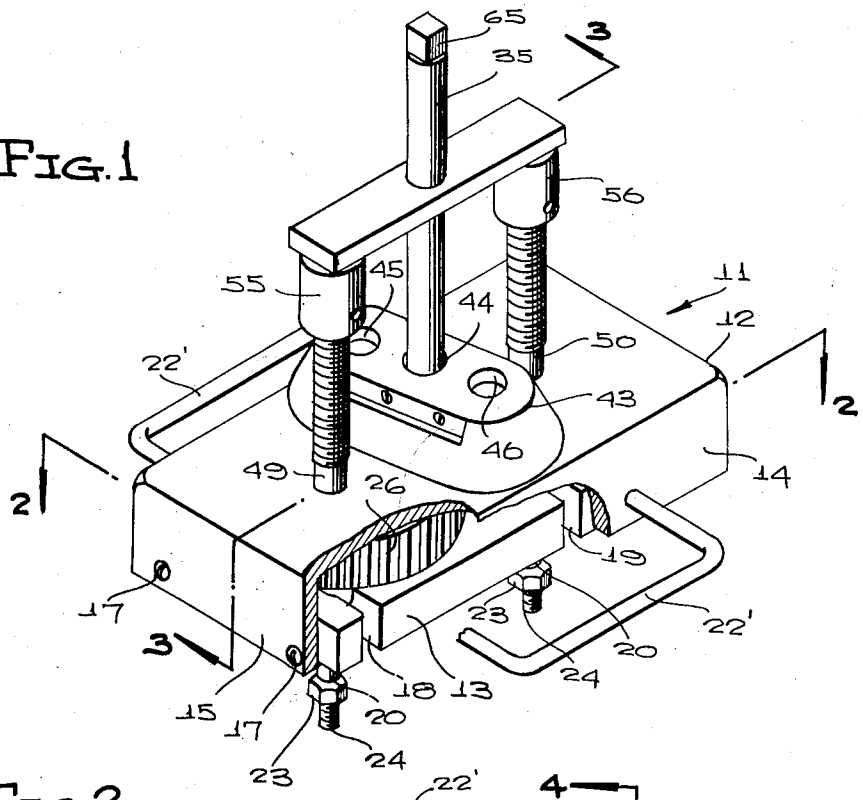
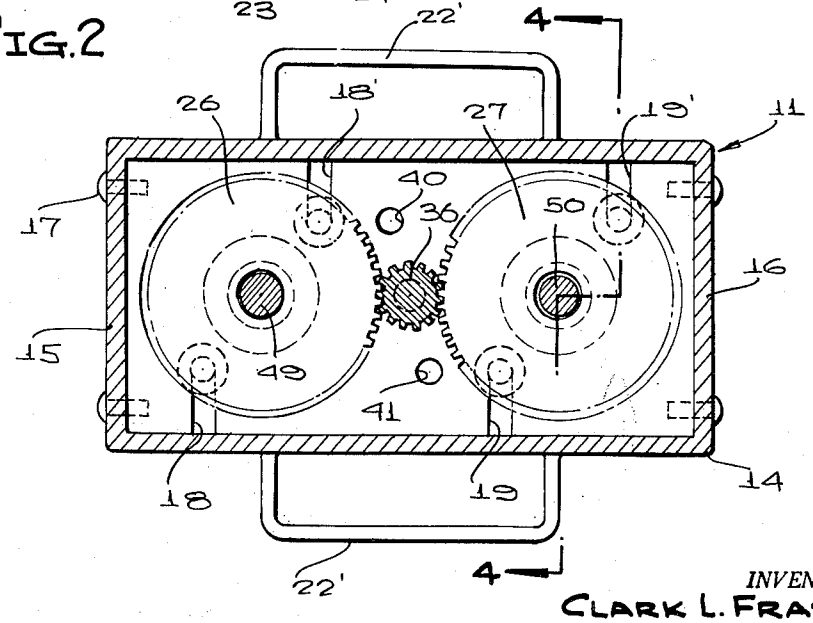


FIG. 2



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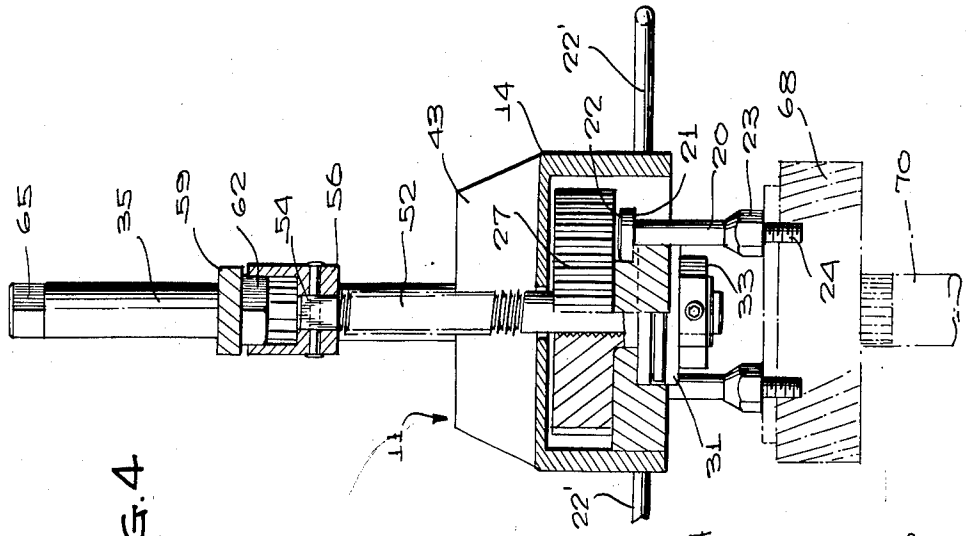


FIG. 4

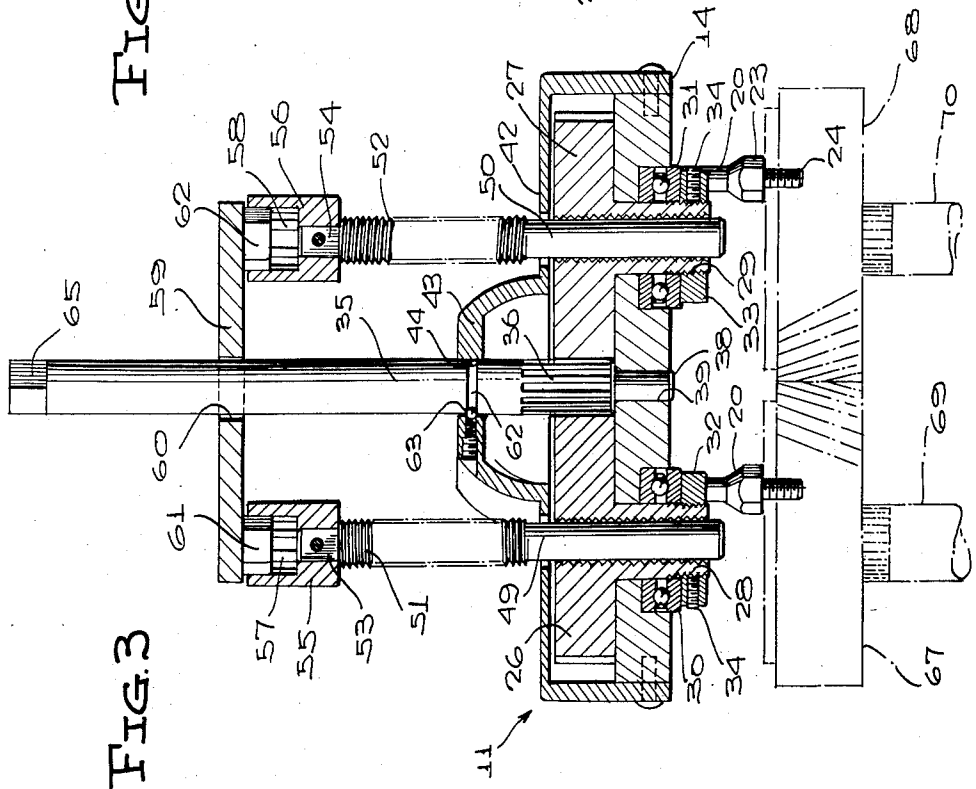


FIG. 3

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DUAL PURPOSE GEAR PULLER AND DRIVER

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2 Claims. (Cl. 29—256)

This invention relates to gear pulling and replacing implements, and more particularly to a device for simultaneously removing a pair of gears from a pair of parallel shafts or for replacing same.

A main object of the invention is to provide a novel and improved dual gear puller and driver which is simple in construction, which is easy to operate and which enables a pair of helical meshing gears to be simultaneously removed from their shafts or replaced thereon without jamming or damage to the teeth thereof.

A further object of the invention is to provide an improved gear puller and driver for removing a pair of gears from a pair of parallel shafts, or replacing same, the gear puller and driver being inexpensive to fabricate, being sturdy in construction, and being compact in size.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a perspective view, partly broken away, showing a dual purpose gear puller and driver constructed in accordance with the present invention.

Figure 2 is a horizontal cross sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a vertical cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a vertical cross sectional view taken on the line 4—4 of Figure 2.

Referring to the drawings, the improved dual purpose gear puller and driver is designated generally at 11 and comprises a frame 12 consisting of a base plate 13 of generally rectangular shape on which is secured a rectangular housing 14. Thus, the housing 14 is shaped to receive the base plate 13 in its lower portion, and the end walls 15 and 16 of the housing are secured to the end edges of base plate 13 by screws 17.

Each of the side edges of the base plate 13 is formed with a pair of spaced, transversely extending notches, shown at 18, 19 and 18', 19', and engaged in the notches are depending threaded stud members 20, the heads 21 of the studs being received in circular recesses 22 formed in the upper surface of the base plate 13 at the inner ends of the respective notches.

Rigidly secured to the side walls of the housing 14 are the respective outwardly projecting U-shaped handles 22', 22'.

As will be readily understood, the portions 21 cooperate with circular recesses 22 and slots 18 and portions 26 and 27 to retain the stud members 20 in the circular recesses 22 and slots 18, after the gear wheels 26 and 27 have been inserted and secured to the base plate 13. The studs 20 are formed with the enlarged hexagonal collar portions 23 and with the depending threaded bottom end portions 24 subjacent the hexagonal collar portions 23. The studs 20 are freely rotatable in the circular recesses 22 and are employer to transmit tension simultaneously to a pair of meshing gears to be pulled from their shafts, in a manner presently to be described.

Designated at 26 and 27 are a pair of gear wheels having depending axial sleeve portions 28 and 29, as shown in Figure 3, said sleeve portions extending rotatably through the base plate 13 and being journaled to said base plate, as by respective ball bearing units 30 and 31. As shown in Figure 3, the lower ends of the sleeves 28 and 29 have retaining collars 32 and 33 threaded thereon, said retaining collars being locked on the sleeves below the respective thrust bearing units 30 and 31 by set screws 34. Designated at 35 is a vertical shaft member having a lower end portion 36 formed to define a pinion gear, the teeth of the portion 36 being shaped to intermesh with the teeth of the respective gear wheels 26 and 27, whereby said gear wheels are simultaneously rotated responsive to rotation of the vertical shaft 35.

The bottom end of shaft 35 is formed with an axial, depending, reduced pivot stud 38 which is rotatably engaged in a pivot aperture 39 formed in the plate 13 midway between the gear wheels 26 and 27. Additional pivot stud apertures 40 and 41 are provided in the base plate 13, whereby the shaft 35 may be employed in conjunction with the aperture 40 so that the gear portion 36 of said shaft engages only the gear wheel 26, and the aperture 41 may be employed as a pivot bearing for the stud 38 to enable the gear portion 36 of shaft 35 to mesh only with the gear wheel 27, if so desired.

The top wall 42 of housing 14 is formed with the upwardly offset intermediate portion 43 formed with respective apertures 44, 45 and 46, the intermediate aperture 44 receiving the shaft member 35 when the stud 38 is engaged in the intermediate pivot aperture 39 of base plate 13, as shown in Figures 1 and 3. Aperture 45 receives the shaft member 35 when the pivot aperture 40 is employed, and aperture 46 receives said shaft member 35 when the pivot aperture 41 is employed.

The gear wheels 26 and 27 are formed with central, internally threaded bores, and engaged through the bores of the gear wheels are the respective abutment rods 49 and 50, said abutment rods having the respective externally threaded portions 51 and 52 which are threadedly engageable with the internally threaded bores of the respective gear wheels 26 and 27. The abutment rods are formed with the squared top studs 53 and 54 on which are secured the respective cup members 55 and 56, said cup members being formed with hexagonal recesses 57 and 58. Designated at 59 is a horizontal bar member centrally apertured at 60 to receive the shaft member 35, the bar member 59 being provided at its opposite end portions with the depending hexagonal bosses 61 and 62 shaped to slidably fit into the respective hexagonal recesses 57 and 58, to hold the abutment rods 49 and 50 against rotation.

The vertial shaft member 35 is formed with an annular groove 62 which is engaged by a ball detent 63 provided in the top wall of the upwardly offset portion 43 at the aperture 44. Similar ball detents may be provided at the auxiliary apertures 45 and 46 of the upwardly offset portion 43, to yieldably support the shaft member 35 and to yieldably retain said shaft member against axial displacement.

The top end of the shaft member 35 is formed with the squared portion 65 which may be engaged by a conventional wrench or other suitable implement for exerting torque on the shaft member 35.

As will be readily understood, the axes of the gear wheels 26 and 27 are spaced the same distance apart as the axes of the dual gears, shown in dotted view at 67 and 68 in Figure 3, to be pulled from their shafts, shown at 69 and 70. The gears 67 and 68 are provided with threaded bores spaced to receive the threaded lower

portions 24 of the headed studs 20. Thus, to remove the gears 67 and 68 from their shafts 69 and 70, the threaded portions 24 of the studs 20 are threadedly engaged in the threaded openings provided therefor in the gears 67 and 68, whereby the device 11 will be positioned with the abutment rods 49 and 50 above and in alignment with the respective shafts 69 and 70. With the apparatus arranged as in Figures 1, 2 and 3, when torque is applied to the shaft 35 with the threaded portions 51 and 52 of abutment rods 49 and 50 threadedly engaged in the gear wheels 26 and 27, the gear wheels are simultaneously rotated, urging the abutment rods 49 and 50 simultaneously downwardly. The simultaneous downward movement of the abutment rods 49 and 50 brings the rods into engagement with the top ends of the shafts 69 and 70. Since the gear wheels 67 and 68 are connected to the base plate 13 by the studs 20, the studs 20 are placed in tension and hold the gear wheels 67 and 68 while the abutment rods 49 and 50 exert downward force on the ends of the gear shafts 69 and 70. This provides simultaneous pulling forces on the gears 67 and 68 causing the gears to be simultaneously disengaged from their shafts 69 and 70, even with helical gears in mesh, without causing displacement of one gear with respect to the other, and therefore without causing the gears or related parts to rotate, jam or to be damaged.

The device may be converted into means for exerting a driving force on a pair of gears, that are normally put in place by threaded cap bolts, such as gears 67 and 68, onto shafts 69 and 70, by inverting abutment rods 49 and 50 and threading them flush against the lower portions of sleeves 28 and 29 and engaging recessed portions 57 and 58 onto matching hexagonal surfaces of the cap bolts. Then, by employing a related rotary motion to vertical shaft 35 through aperture 44, a simultaneous rotary motion is imparted to cup members 55 and 56 for rotating the cap bolts downwardly in an even simultaneous amount, forcing the gears 67 and 68 onto shafts 69 and 70, even with the helical gears in mesh, without damage to the teeth of the gears or related parts. As will be readily understood, motion may be imparted individually through aperture 45 or 46 for individual operation and ultimate advancement of either gear 67 or 68 onto its respective shaft 69 or 70.

It will be understood that the bar member 59 is removed when the device is employed to drive the axial cap bolts into the shafts, as above described, when the gears are replaced on the shafts.

While a specific embodiment of an improved gear puller and driver has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. Means for simultaneously removing a pair of gears from a pair of parallel shafts comprising a frame, a pair of gear wheels journaled in said frame on parallel axes spaced the same distance as said parallel shafts, means formed and arranged to secure said frame to said gears with the gear wheels in axial alignment therewith, respective abutment rods threadedly engaged axially through said gear wheels, means holding said rods against rotation relative to said frame, and a pinion gear member journaled in said frame and meshing with said gear wheels, said pinion gear member being provided with a shaft portion projecting externally from the frame for rotating the pinion gear member, said pinion gear member being arranged to rotate said gear wheels simultaneously in a direction to advance said rods, whereby said rods will be urged against the ends of the parallel shafts to exert axial pulling force on the gears relative to said shafts.

2. Means for simultaneously removing a pair of gears from a pair of parallel shafts comprising a frame including a base plate, a pair of gear wheels journaled in said base plate on parallel axes spaced the same distance as said parallel shafts, said gear wheels having internally threaded axial bores, said base plate being formed with a plurality of slots, respective headed threaded stud members engaged through said slots with their heads overlying said base plate and being threadedly engageable with said gears, said stud members and slots being located to secure said base plate to said gears with the gear wheels in axial alignment with the gears, respective threaded abutment rods threadedly engaged through the axial bores of said gear wheels, means holding said rods against rotation relative to said frame, and a pinion gear member journaled in said frame and meshing with said gear wheels, said pinion gear member being arranged to rotate said gear wheels simultaneously in a direction to advance said rods, whereby said rods will be urged against the ends of the parallel shafts to exert axial pulling force on the gears relative to said shafts.

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