Oct. 20, 1942. C. J. JANOUSEK 2,299,147

KEY PULLER

Filed Dec. 30, 1940

Fig. 1

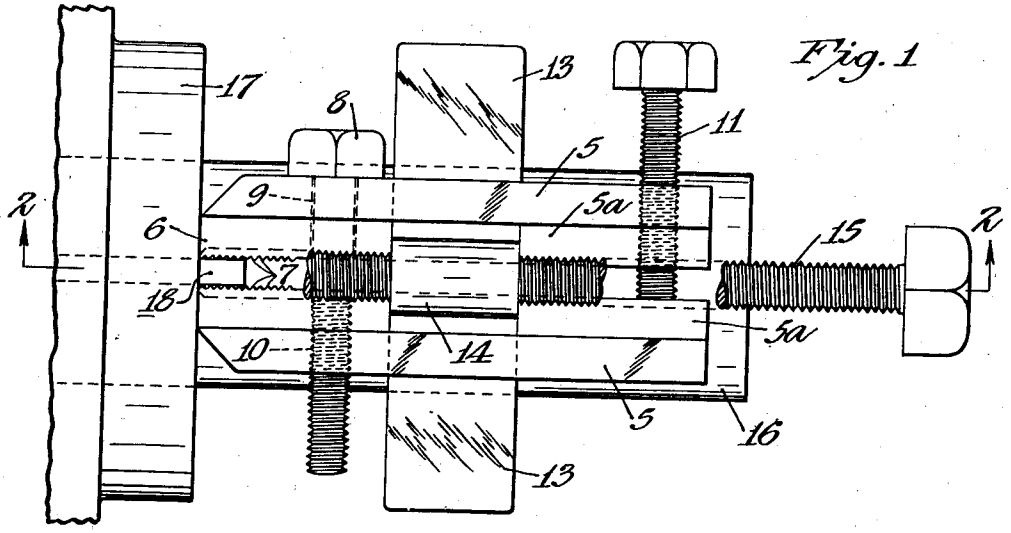


Fig. 2

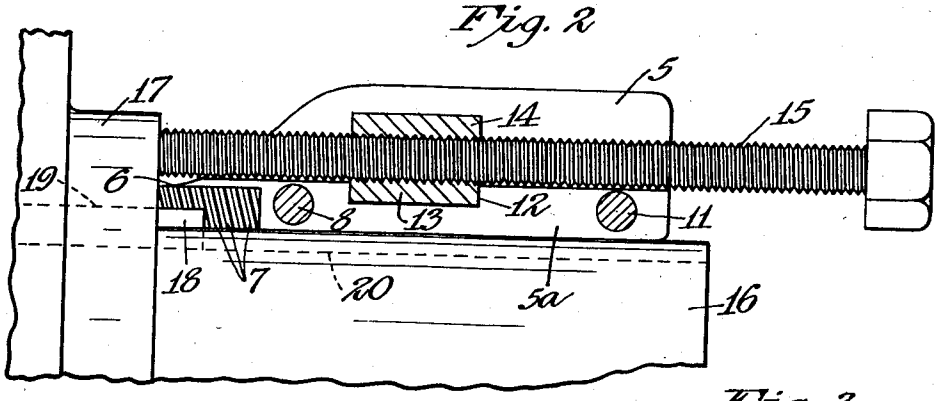


Fig. 3

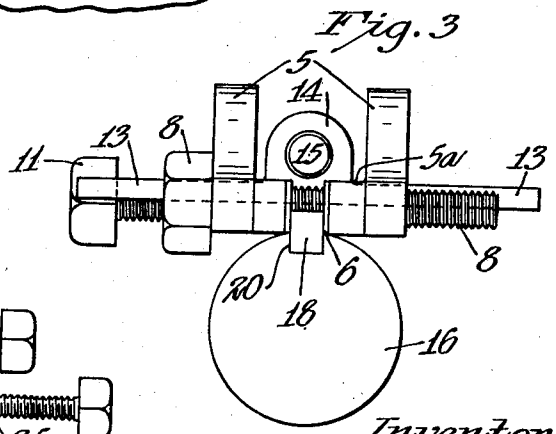
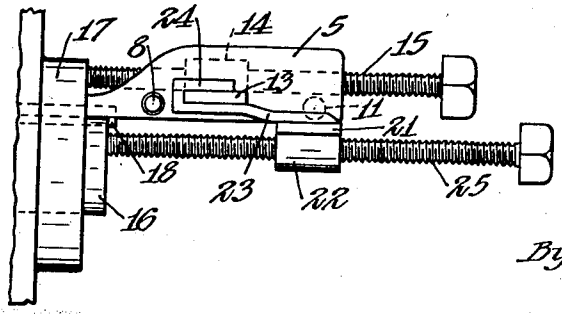


Fig. 4



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KEY PULLER

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2 Claims. (Cl. 29—86.1)

This invention relates to devices for removing wheel and pulley keys which are adapted to interconnect wheels and pulleys with shafts upon which they are mounted to prevent rotation thereof. Many types of machinery have keyed wheels, pulleys and gears. In some cases the keys extend entirely through the hubs of the elements mounted on the shaft and in those cases where there is sufficient space behind the wheel or pulley it is possible to draw the keys out of the keyways in the shaft and wheel by blows applied to the rear end of the key. In many other instances, however, it is impossible to operate behind the wheel or pulley and where the key is tightly set it is an extremely difficult job to remove it.

It is, therefore, a general object of my invention to provide a simply constructed and easily operated device for removing keys from keyways where the keys extend outwardly from the parts which they connect wherein means is provided for tightly gripping the key and additional means is provided for exerting a pulling force on the tool to remove the keys from the keyways in the connected parts.

Another object of the invention is to provide a device which will operate effectively under circumstances where the shaft is extended outwardly a considerable distance from the wheel or other part to which it is keyed to provide for correct alignment of the tool relative to the key.

Another object of the invention is to provide a tool for removing keys wherein the shaft terminates closely adjacent the part to which it is connected and wherein means is provided for properly supporting the tool to prevent it from sagging where it extends outwardly beyond the end of the shaft as well as to produce pressure against the end of the shaft to exert a pulling force on the tool and key.

A further object of the invention is to provide a key pulling tool with gripping jaws having gripping teeth which are slanted in such a manner that the jaws will not tend to slip upwardly off the key but will tend to press downwardly against the shaft in which the key is mounted.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawing, wherein like reference characters refer to the same parts throughout the views, and, in which:

Fig. 1 is a plan view of an embodiment of my invention with portions broken away and showing the hub of a wheel or pulley keyed on a shaft which extends outwardly a considerable distance beyond said hub;

Fig. 2 is a section taken approximately on the line 2—2 of Fig. 1;

Fig. 3 is an end view; and

Fig. 4 is a side view on a reduced scale showing means for adapting the tool to a keyed shaft and wheel where the shaft terminates substantially at the hub of the wheel.

In the drawing there is shown a pair of elongated elements 5 having angular offsets 5a. The members 5 at their left-hand or forward ends slant downwardly to provide gripping jaws 6 having downwardly and rearwardly slanting teeth 7. Immediately behind the jaws 6 a bolt 8 is extended through a smooth bore 9 in one of the lateral extensions 5a of an elongated member 5 and is threaded through a threaded opening 10 in the other of said laterally extending portions 5a. When the bolt 8 is rotated it will either draw the elongated members 5 and their jaws 6 toward each other or permit them to be pulled away from each other. As viewed in Fig. 1, the uppermost of the lateral extensions 5a of its elongated member 5 has a bolt 11 threaded therethrough and the threaded end of the bolt is adapted to abut the side wall of the lower extension 5a on the lower elongated member 5. The bolt 11 can be adjusted so that the rear ends of the elongated members 5 can be spaced approximately the same as the left-hand or forward ends of said members and the gripping jaws 6.

The elongated members 5 have opening 12 in their walls intermediate their ends and these openings slidably receive an elongated plate 13 having a central enlargement 14 through which is threaded a relatively long headed bolt 15. The bolt 15, as is best shown in Figs. 1 and 3, just clears the lateral extensions 5a of the elongated members 5 and also the transverse bolts 8 and 11. By rotating the bolt 15 it will, of course, move longitudinally of said elongated members 5 in a direction dependent upon the direction of rotation.

In Figs. 1 and 2 there is shown a shaft 16 upon which is mounted a hub 17 of a wheel, pulley or gear. The hub 17 is connected to the shaft 16 by means of a key 18 which lies partially in a keyway 19 in the hub 17 and a keyway 20 in the shaft 16. My key puller is placed in position by retracting the longitudinally disposed bolt 15 and placing the jaw members 6 at opposite sides of the key. The elongated members 5 along with their jaw members 6 are then drawn together by rotation of the forward bolt 8 and the right-hand or rear

ends of said elongated members 5 are prevented from pulling together more closely than said jaws by proper manipulation of the transverse rearwardly disposed bolt 11. The bottom portions of the elongated members 5, 5a are substantially straight, as illustrated in Fig. 2, and lie in contact with the shaft 16 which acts as a support to keep the tool in proper alignment relative to the shaft and the key 18. The elongated longitudinal bolt 15 is then rotated to move it forwardly against the side face of the hub 17, and as rotation of the bolt 15 is continued, a considerable amount of pressure will be applied against said hub 17 and cause the elongated members 5 and their jaws 6 to tend to pull away from the hub and draw the key 18 with them. Thus, the key is readily removed even when tightly locked in position.

Attention is called to the angular positioning of the teeth 7 on the gripping jaws 6, this position being best shown in Fig. 2. As a pull is exerted by the jaw members outwardly away from the hub 17 the downward and outward slant of the teeth 7 cause the jaws 6 to remain firmly in engagement with the upper portion of the shaft 16 and thus prevent any tendency of the gripping jaws 6 to slip upwardly under the pressure or pull exerted.

In Fig. 4 I have shown the device disclosed in Figs. 1 through 3 with an additional attachment for use with hubs and shafts where the shaft terminates approximately at the hub. In this view there is shown a transversely disposed plate member 21 having an enlarged central portion 22 with a threaded aperture therein. The plate 21 and its enlargement 22 are preferably formed the same as the transverse plate 13 and its enlarged plate 14 as described above. A pair of hook shaped arms 23 are rigidly connected to the ends of the plate 21 and their hooked portions 24 are adapted to be fitted around the ends of the above described transverse plate 13. The enlarged portion 22 of the plate 21 has an elongated longitudinally disposed bolt 25 threaded therethrough, and, as is clearly illustrated in Fig. 4, this bolt is adapted to bear against the butt end of the shaft 16. The bolt 25 serves two purposes. It acts as a stabilizing member for the entire unit to prevent it from dropping down since it has no support from the shaft 16 due to the fact that it lies outwardly from the end of the shaft. The bolt 25 in conjunction with the upper longitudinal bolt 15 also functions to move the unit away from the hub 17 and the end of the shaft 16 to cause the tool to pull the key 18 from the respective keyways in the shaft and hub. While both bolts may be used for this latter purpose it is, of course, possible to utilize only the bolt 25 although a more direct pull is secured if both bolts 25 and 15 are used.

From the foreging description, it will be seen that I have provided a simply constructed and easily operated tool for removing keys from connected parts where said keys extend outwardly from the parts connected. It is so arranged that a considerable gripping action can be exerted against the key and the threaded pressure members or elongated bolts 15 and 25 are capable of transmitting high pressures against a hub or shaft end so that the tool will pull the key 18 outwardly even though it is tightly seated and in some cases rusted in place.

It will, of course, be understood that various changes may be made in the form, details, arrangements and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

1. Apparatus for removing keys connecting shafts with wheels and pulleys and the like comprising, a pair of relatively movable jaw members, means interconnecting said jaw members for drawing them toward each other, said means being releasable from said jaw members, said jaw members having oppositely disposed apertures therein, said apertures being formed on axes transversely of said jaw members, a cross member having a threaded central aperture and having laterally extending arms slidably extending through the apertures in said jaw members, and a threaded pressure pin extending through the threaded aperture in said cross member and adapted to be moved longitudinally between said jaw members.

2. The structure in claim 1 and a second cross member having a threaded aperture therethrough to receive a second pressure bolt therein, and a pair of supports for said second cross member, said supports including means detachably securing said supports to said first mentioned cross member.

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