Nov. 25, 1952 H. J. DROEGE 2,618,995

CHUCK WRENCH WITH AUTOMATIC RELEASE

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Fig. 1.

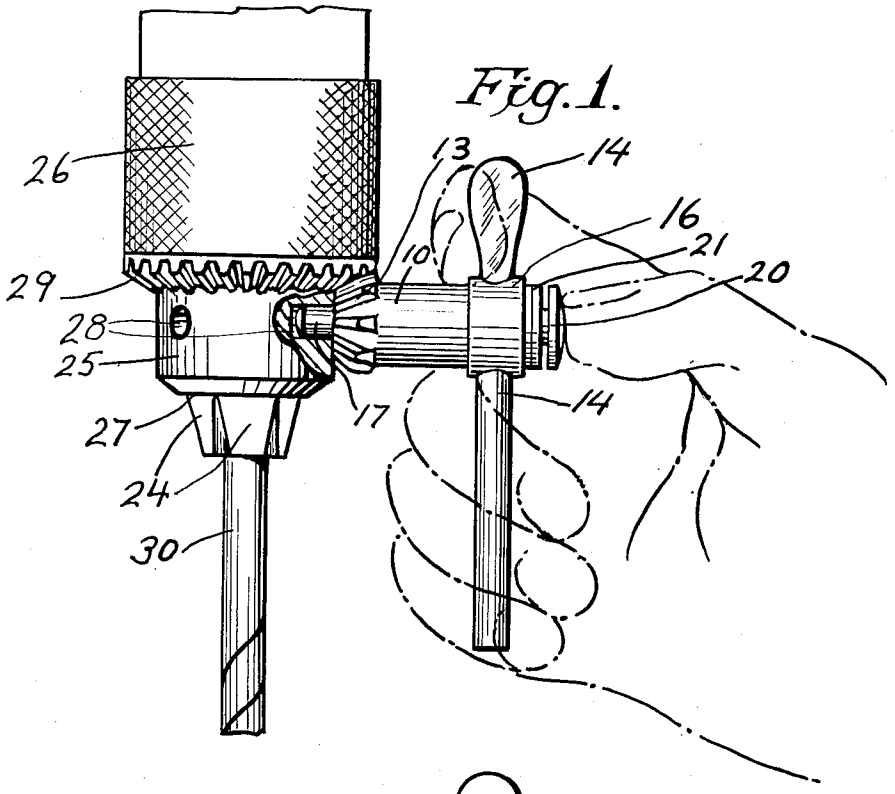
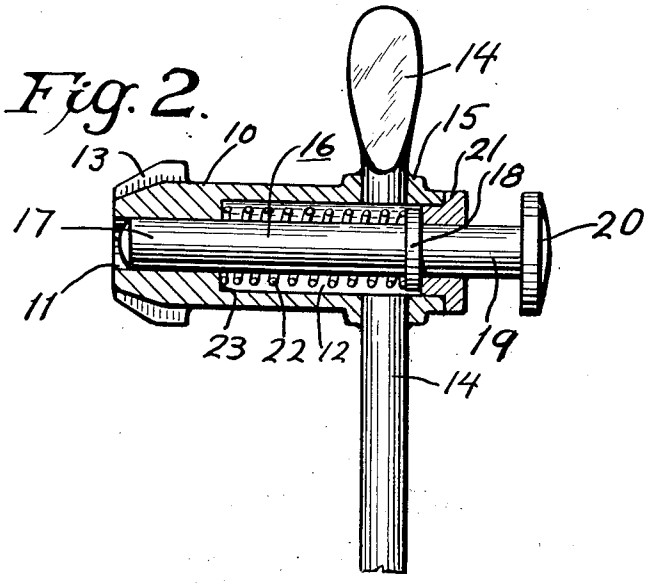


Fig. 2.



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CHUCK WRENCH WITH AUTOMATIC RELEASE

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2 Claims. (Cl. 81—90)

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The present invention relates to chuck wrenches or keys and it relates more particularly to safety wrenches or adjusting tools for rotary chucks and the like.

An object of the present invention is to provide a new and improved safety wrench or adjusting tool or key for rotary chucks and the like. Another object of the present invention is to provide a wrench or tool or key for use in tightening and loosening a rotary chuck or the like which will automatically and positively disengage itself from the chuck upon completion of the adjusting operation (so as to prevent it from inadvertently being left in the chuck and thereby to constitute a serious hazard, as a centrifugally-hurled missile, when power is applied to the chuck), without being forcibly ejected, bodily, from the chuck.

Other objects and advantages of the present invention are apparent in the following detailed description, appended claims and accompanying drawings.

In power-operated rotary drills and the like, the drill is releasably held by a plurality of gripping jaws which can be moved either to extended releasing position or to retracted gripping position by manual rotation of a camming sleeve mounted on the chuck somewhat above the jaws. In order to assure firm gripping action, the sleeve is customarily provided with a downwardly directed circular rack gear at its lower edge, which is adapted to be engaged and rotated by the pinion of an adjusting tool or wrench or key which can be rotatably fitted within one of a number of radial holes formed in the body of the chuck intermediate the jaws and the sleeve. If the tool is left in position, through inadvertence, at the end of the tightening operation, it represents a serious safety hazard, since, when power is applied to the machine, the centrifugal force generated by the rapid rotation of the chuck will hurl the adjusting tool outward at great velocity to cause injury to anyone it strikes.

In recognition of this problem, various suggestions have heretofore been made for tools which are forcibly ejected frm the chuck, by outward radial spring-pressure exerted thereon, as soon as the tool is released by the operator. This, too, has its disadvantages since the tool can easily be damaged or lost when thus forcibly thrown outward from the chuck.

Other suggested forms of safety adjusting tools have similarly had shortcomings in construction or mode of operation.

Accordingly, the present invention contemplates a new and improved adjusting tool or wrench or key which is of simple, inexpensive and strong construction; which has a positive and dependable disengaging action; which is less apt to be left in place at the end of the

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tightening operation; and which, when so left in place through inadvertence, will simply fall free of the chuck without being forcibly ejected therefrom.

In general, the novel safety chuck wrench of the present invention comprises a body or housing carrying a handle and having a pinion at one end for engagement with the gear rack of the chuck sleeve, and a pivot-pin axially movable relative to the body and normally spring-urged to retracted position in which its operating end is fully concealed within the body, the pivot-pin being movable to extended chuck-engaging position by finger-pressure exerted on a push-button provided on its opposite end, a release of said finger-pressure causing spring actuated retraction of the pivot-pin and automatic disengagement of the wrench from the chuck so that, if the operator lets go of the wrench it will simply fall away from the chuck.

For the purpose of illustrating the invention, there is shown in the accompanying drawings one form thereof which has been found in practice to give satisfactory results and which is presently preferred, it being understood, however, that the invention is not limited to the precise arrangements and instrumentalities disclosed.

Referring to the accompanying drawings in which like reference characters indicate like parts throughout, Fig. 1 is an elevational view of the safety wrench of the present invention as it appears in use in engagement with a chuck; and Fig. 2 is an enlarged cross-sectional view of the embodiment of Fig. 1 as it appears with its pivot-pin in retracted position.

The embodiment of Figs. 1 and 2 includes a one-piece body or housing 10 of metal or the like having a cylindrical, axially-extending bore 11 at its forward end and an enlarged counterbore 12 extending rearwardly therefrom. A driving pinion 13, having bevel gear teeth, is provided at the forward end of the body 10, in peripheral, radially-spaced relationship to the forward end of the bore 11. A two-piece handle or grip 14 is press-fitted or otherwise suitably secured within diametrically-opposed openings formed in an enlarged annular shoulder 15 of the body 10.

A pivot-pin 16 is mounted within the body 10 in axially-movable relationship thereto. The pivot-pin 16 includes a cylindrical forward portion 17 adapted to slide freely within the bore 11 and extending rearwardly therefrom into the enlarged counterbore 12. The portion 17 of the pivot-pin terminates in an enlarged cylindrical stop-shoulder 18 disposed within the counterbore; the pivot-pin also including a cylindrical rear portion 19 extending rearwardly from the stop-shoulder 18 and beyond the rear end of the

body 10. A push-button 20 is provided on the outer rear end of the portion 19.

The rear end of the counterbore 12 is closed by a plug 21 suitably secured therewithin (as, for example, by press-fitting, soldering or the like) and provided with a cylindrical opening through which the rear portion 19 of the pivot-pin extends in sliding relationship therewith.

Disposed within the counterbore 12 is a helical compression spring 22 which surrounds the portion 17 of the pivot-pin and has its front end seated against the annular front wall 23 of the counterbore and has its rear end bearing against the stop-shoulder 18, so as normally to urge the pivot-pin 16 to the position shown in Fig. 2, wherein the forward portion 17 is fully retracted and concealed within the body 10, the stop-shoulder being held against the plug 21 by the pressure of the spring 22. However, when the push-button 20 is moved forward by the thumb of the user as indicated in Fig. 1, the pivot-pin 16 is shifted forward, against the pressure of the spring 22, so as to cause the front end of the forward portion 17 to protrude appreciably beyond the front end of the bore 11. When the thumb is removed from the push-button 20, the pressure of the spring 22 immediately returns the pivot-pin 16 to its original retracted position of Fig. 2.

In Fig. 1, the wrench of the present invention is shown in conjunction with a conventional chuck having a plurality of adjustable gripping jaws 24 contained within the lower end of the chuck-housing 25, with a camming sleeve 26 disposed somewhat above the lower open end 27 of the chuck-housing 25 and with a plurality of circumferentially distributed radial sockets 28 formed in the chuck-housing 25 intermediate the lower end 27 and the sleeve 26. A downwardly directed circular rack gear 29 is formed on the lower edge of the sleeve 26, with bevel teeth capable of meshing with the teeth of the driving pinion 13.

In use, the wrench is held in the hand with the fingers gripping the handle 14 and with the thumb pushing the thumb-piece or push-button 20 to forward position, whereupon the extended front end of the portion 17 is inserted within one of the sockets 28 until the driving pinion 13 meshes with the rack gear 29 as shown in Fig. 1.

The wrench is then turned to rotate the sleeve 26 and thereby to cam the jaws into gripping (or releasing) relationship with the drill 30 or other suitable rotary tool. When the jaws have been sufficiently tightened (or loosened), the wrench is disengaged from the chuck by simply pulling it radially away therefrom.

However, should the operator forget to pull the tool free, and instead merely release it (intending to do something else), removal of the thumb from the push-button 20 causes spring-actuated retraction of the forward portion 17 of the pivot-pin 16 in the manner described above, so that there is no longer any engagement between the pivot-pin and the socket 28 and, since there is nothing to support it, the wrench falls more or less straight down and away from chuck. Since the work-supporting surface (not shown) of the drill-press or other tool is relatively close to the chuck, it is apparent that the wrench will fall only a short distance onto said surface, and the chances of damage to, or loss of, the wrench are minimized.

The fact that the forward portion 17 of the pivot-pin is fully retracted within, and concealed and protected by, the body or housing of the wrench when not in use further reduces the chances of damage should the wrench be dropped or fall to the ground during the automatic releasing action described above.

The present invention may be embodied in other forms and, accordingly, the above-described embodiment is to be considered merely as illustrative, and not restrictive, reference being made to the appended claims, rather than to the foregoing description, as indicative of the scope of the invention.

Having thus described my invention, I claim as new and desire to protect by Letters Patent:

1. For use with a rotary chuck having a body provided with a radial socket and having gripping jaws and having a jaw-actuating sleeve surrounding the body and provided with a peripheral bevel rack-gear in proximity to said socket; a safety wrench for rotating said sleeve to adjust said jaws, said wrench comprising an elongated housing having a generally cylindrical axial bore formed therein and having a handle for axial rotation thereof and having a rack-gear-engaging bevel pinion formed on its forward end peripherally of said bore, an elongated generally cylindrical pivot-pin slidably and rotatably mounted within the cylindrical axial bore of said housing with its rear end protruding therefrom, and a spring operatively disposed within said bore and urging said pivot-pin to rearward position wherein the front end of the pivot-pin is fully retracted within, and concealed by, the forward end of the housing, the protruding rear end of the pivot-pin being adapted to be pushed forward by thumb-pressure to move the front end thereof to extended position beyond the housing whereby said front end can be inserted within the socket of the chuck and serves to support the wrench for rotational movement thereabout, the housing being rotated by means of its handle independently of the pivot-pin with the pinion engaging and driving the rack-gear, release of the rear end of the pivot-pin by removal of thumb-pressure causing automatic spring-urged retraction of the pivot-pin disengaging it from the socket and permitting the wrench to fall free of the chuck.

2. A construction according to claim 1 wherein the housing has a cylindical bore in its forward end and an enlarged counterbore extending rearwardly therefrom and an apertured plug closing the rear end of the counterbore, and wherein the forward end of the pivot-pin slides within the bore and extends into the counterbore and terminates in an enlarged stop-shoulder within the counterbore, and wherein the rear end of the pivot-pin extends through the apertured plug and is provided with a push-button at its free end, and wherein the spring is a helical compression spring disposed within the counterbore and bearing against the shop-shoulder.

HENRY J. DROEGE.

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