Oct. 8, 1940. R. A. BEDFORD 2,217,152

DEVICE FOR REMOVING DRILLS OR OTHER ARTICLES FROM THEIR SHAFTS

Filed Nov. 25, 1938 2 Sheets-Sheet 1

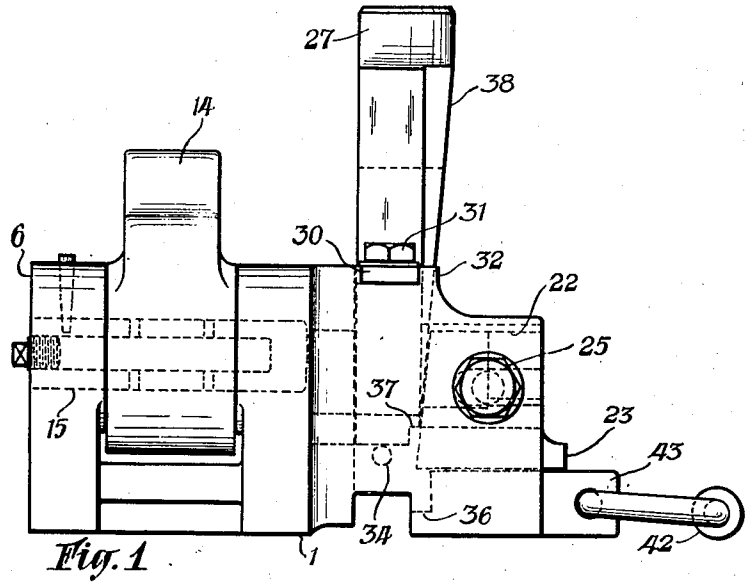


Fig. 1

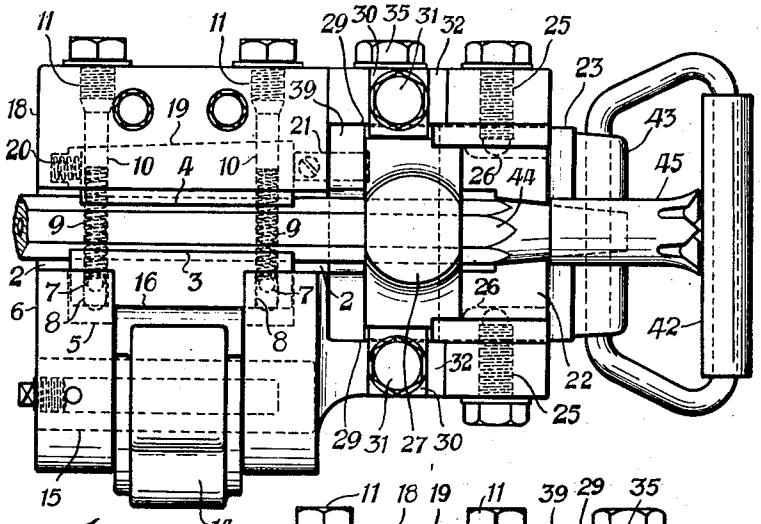


Fig. 2

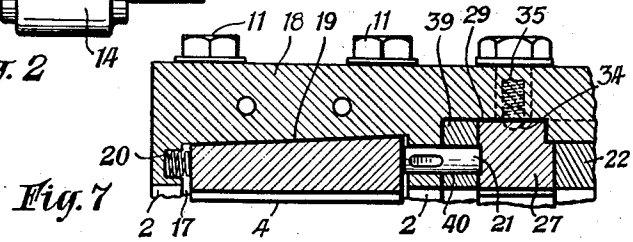


Fig. 7

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DEVICE FOR REMOVING DRILLS OR OTHER ARTICLES FROM THEIR SHAFTS

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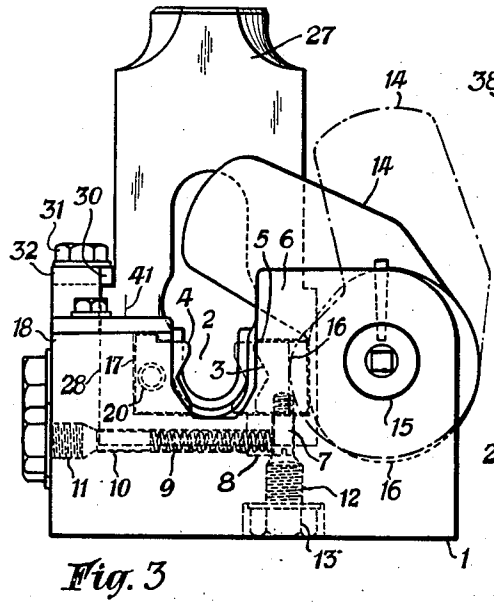


Fig. 3

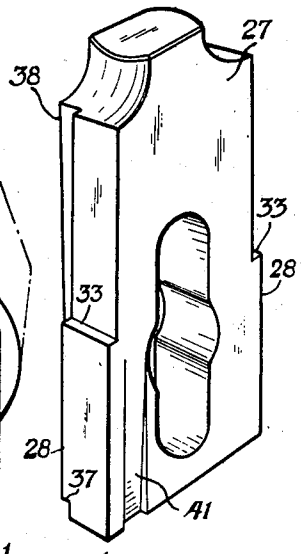


Fig. 5

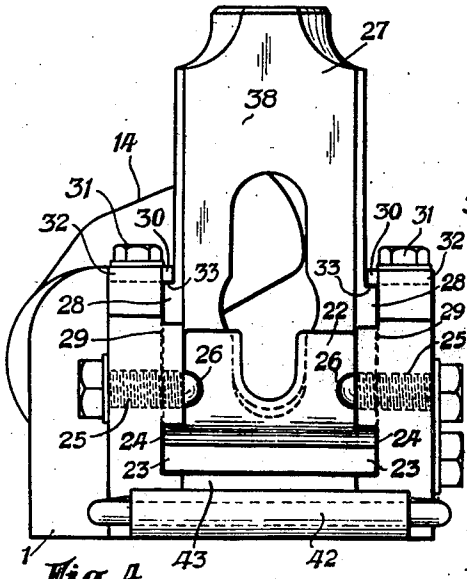


Fig. 4

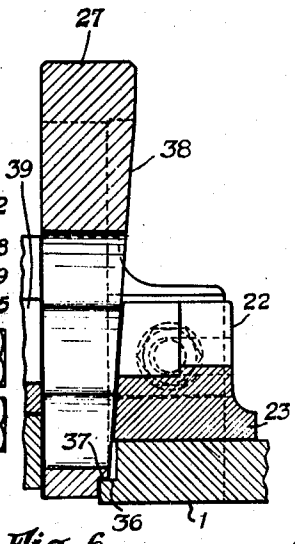


Fig. 6

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UNITED STATES PATENT OFFICE

2,217,152

DEVICE FOR REMOVING DRILLS OR OTHER ARTICLES FROM THEIR SHAFTS

Reginald Asline Bedford, Stumperlowe, Sheffield, England

Application November 25, 1938, Serial No. 242,254
In Great Britain December 7, 1937

9 Claims. (Cl. 29—85)

This invention relates to a device for separating joined components capable of being forced apart of the kind incorporating gripping means in the form of jaws for gripping one of the components and a slidable pusher member operable against the other component.

The object of this invention is to provide an improved device of strong construction which will be more efficient in use than such devices heretofore developed.

According to this invention a device for separating joined components capable of being forced apart and incorporating gripping means in the form of jaws actuable by movable jaw-operating members for gripping one of the components and a slidable pusher member operable against the other component by a pushing wedge is characterised in that the said wedge operating the pusher member is also operable simultaneously against one of the jaws to intensify the grip thereof upon the one component whilst the other component is being acted upon for removal by the pusher member.

The drawings filed herewith illustrate one form of the invention as applied to a device for removing detachable drill bits from their shafts.

In these drawings:

Fig. 1 is an elevation.

Fig. 2 is a plan showing a drill shaft gripped ready for removal of the drill bit therefrom.

Fig. 3 is an elevation looking at one end of the device.

Fig. 4 is an elevation looking at the opposite end.

Fig. 5 is a perspective view of the pushing wedge.

Fig. 6 is a detail vertical sectional view taken through the wedge shown in Fig. 5.

Fig. 7 is a horizontal detail sectional view taken through one of the jaws and the pusher member.

1 is a base block having a walled structure on its upper face whereby a longitudinal drill shaft receiving throat 2 is formed intermediate of the sides of the block and extending the whole length thereof, which throat is provided for accommodating various parts for gripping and acting upon a rock drill shaft adapted to be placed within the throat all as hereinafter described.

At one end of the throat 2 a pair of longitudinally disposed jaws 3, 4 are provided, the jaw 3 being mounted in a recess 5 in a wall 6 of the throat, the said jaw being movable transversely of the throat and mounted by depending pins 7 accommodated in slots 8 into which springs 9 project from lateral passages 10 for the purpose of contacting with the pins 7 whereby the jaw 3 is spring pressed. The outer ends of the springs 9 are contacted by screw threaded studs 11 which close the passages 10. Additional passages 12 in the underside of the block permit the fitment of the pins 7 in the jaw 3 and these passages are closed by screw threaded plugs 13.

For operating the jaw 3 a cam member 14 is mounted for rotational movement about a spindle 15 accommodated in the wall 6 and is provided with a cam face 16 which contacts with the rear face of the jaw 3, whereby on the cam member 14 being turned in one direction the jaw 3 closes into the throat 2 towards the jaw 4. Turning the cam member in the opposite direction permits return movement of the jaw 3.

Opposite to the jaw 3 and slidably accommodated in a recess 17 in the wall 18 is the jaw 4 the rear face of which engages the tapered face 19 of the recess 17, the said jaw being spring pressed at one end by the spring 20 and engaged at the other end by a non-rotatable plunger 21 slidably accommodated longitudinally in the wall 18 and adapted to operate the jaw 4 as hereinafter described.

At the other end of the throat 2 and horizontally slidable between the walls 6 and 18 is a grooved pusher member 22 the enlarged base 23 of which slidably engages a recess 24 in each of said walls and for limiting the outward slidable movement of the pusher member 22, set screws 25 provided in the opposing walls 6 and 18 engage grooves 26 in the sides of the said member, which grooves are closed at their inner ends to constitute stops for engagement by the set screws 25.

Adjacent the pusher member 22 and vertically slidable between the walls 6 and 18 is a slotted wedge member 27 (herein referred to as a pushing wedge) having integral side cheeks 28 in engagement with recessed guides 29 in the walls 6 and 18, retaining plates 30 secured by set screws 31 to heightened portions 32 of the walls 6 and 18 being provided for contacting with the shoulders 33 of the side cheeks 28 for preventing accidental withdrawal of the pushing wedge 27. The said wedge 27 is held in the raised and inoperative position by a spring pressed ball 34 carried in the end of a hollow screw threaded stud 35, the base of the pushing wedge resting upon the ball 34 and a transversely disposed lug 36 provided on the underside of the base block 1 coacts with a shoulder 37 on the lower end of the pushing wedge 27 to limit downward movement of the said wedge. That side of the pushing wedge adjacent the pusher member 22 is stepped to form an inclined face 38 operative between the walls 6 and 18 in contact with the pusher member 22 and at the opposite side the pushing wedge operates in contact with a grooved distance piece 39 accommodated in the recessed guides 29 in the walls 6 and 18 and secured to the base block.

The distance piece 39 is orificed at 40 to accommodate the passage of the jaw actuating plunger 21 which contacts with and is actuated

by a recessed inclined face 41 provided in the adjacent face of the pushing wedge 27.

A handle 42 is fitted to a lug 43 at one end of the base block.

The rock drill shaft 44 and its attached drill bit 45 is shown in Fig. 2 positioned and held ready for removal of the bit.

In use for removing the detachable bit 45 from its shaft 44 the said shaft is passed into position on the block 1 with the shaft portion resting between the jaws 3 and 4 and the bit 45 located at the outer side of the slotted pusher member 22 but with the inner end of the said bit 45 located adjacent the outer face of the pusher member 22, the shaft 44 being embraced by the grooved portion of the pusher member whereby the latter can engage the inner end of the drill bit immediately around the said shaft as shown in Fig. 2. The cam 14 is then turned to close the transversely movable jaw 3 upon the shaft 44 and thereby grip it. The slidable pushing wedge 27 is now struck downwardly and in descending it causes the engaging plunger 21 to actuate the jaw 4 which moves with a wedge action because of the tapered face 19 of the recess 17 whereby the jaw closes more tightly on to the shaft 44. At the same time the slidable pushing wedge 27 acts upon the slidable pusher member 22 which transmits shocks axially upon the drill bit 45 sufficient to remove it from the shaft 44.

For afterwards releasing the shaft the cam 14 is turned in a reverse direction so as to release the transversely movable jaw 3 which opens under the pressure of its springs 9.

What I claim and desire to secure by Letters Patent is:

1. A device for separating joined, coaxially disposed components capable of being forced apart, comprising a base block, gripping means, carried on said base block and operable upon and adapted to grip one of said components, operating means on said block coacting with said gripping means for causing the latter to preliminarily grip said one component, force generating means, coacting with said other component to push the same free, force generating means coacting with said gripping means for intensifying said grip and a second operating means for actuating both said force generating means simultaneously.

2. A device according to claim 1, the said gripping means comprising a pair of movable gripping members operable upon and adapted to grip one of said components, the said first-mentioned operating means coacting with one of said gripping members for causing said members to preliminarily grip said one component, and the said last-mentioned force generating means coacting with one of said gripping members for intensifying said grip.

3. A device according to claim 1, the said gripping means comprising a pair of movable gripping members operable upon and adapted to grip one of said components, the said first-mentioned operating means coacting with one of said gripping members for causing said members to preliminarily grip said one component, and the said last-mentioned force generating means coacting with the other of said gripping members for intensifying said grip.

4. A device according to claim 1, the said gripping means comprising two jaws having opposed gripping surfaces and being adapted to receive the gripped component therebetween, one of said jaws being wedge-shaped and movable as a wedge, substantially oppositely to the movement required to be imparted to the other component to free the latter, into an intensified engagement with the gripped component, the said last-mentioned force generating means and the said second operating means coacting with said wedge-shaped jaw to impart such wedging movement thereto.

5. A device according to claim 1, the said gripping means comprising two jaws having opposed gripping surfaces and being adapted to receive the gripped component therebetween, one of said jaws being wedge-shaped and movable as a wedge, substantially oppositely to the movement required to be imparted to the other component to free the latter, into an intensified engagement with the gripped component, the said last-mentioned force generating means and the said second operating means coacting with said wedge-shaped jaw to impart such wedging movement thereto, and a spring being provided, coacting with a portion of the base block and with said wedge-shaped jaw, whereby to hold the latter normally in a non-grip-intensifying position.

6. A device according to claim 1, the said separately mentioned force generating means comprising a wedge having a wedging surface coacting with said gripping means for intensifying the latter's said grip and a separate wedging surface coacting with the said other component to push it free, and the said second operating means comprising a portion of said wedge adapted to receive a force for actuating said wedge.

7. A device according to claim 1, the said separately mentioned force generating means comprising a wedge having a wedging surface coacting with said gripping means for intensifying the latter's said grip and a separate wedging surface coacting with the said other component to push it free, and the said second operating means comprising a portion of said wedge adapted to receive a force for actuating said wedge, the said device, further, comprising a force transmitting member, disposed between and coacting with said first-mentioned wedging surface and the said gripping means.

8. A device according to claim 1, the said separately mentioned force generating means comprising a wedge having a wedging surface coacting with said gripping means for intensifying the latter's said grip and a separate wedging surface coacting with the said other component to push it free, and the said second operating means comprising a portion of said wedge adapted to receive a force for actuating said wedge, the said device, further, comprising a slidable pusher member, disposed between and coacting with said last-mentioned wedging surface and said other component.

9. A device according to claim 1, the said separately mentioned force generating means and said second operating means commprising a vertically movable wedge, and a spring-pressed ball being provided upon said base block, and being adapted to yieldingly engage said wedge whereby to hold the latter in an inoperative position.

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