

No. 711,998.

Patented Oct. 28, 1902.

R. B. MCCONNEY.

BUFFER DEVICE FOR ROCK DRILLS.

(Application filed Dec. 28, 1901.)

(No Model.)

Fig. 1.

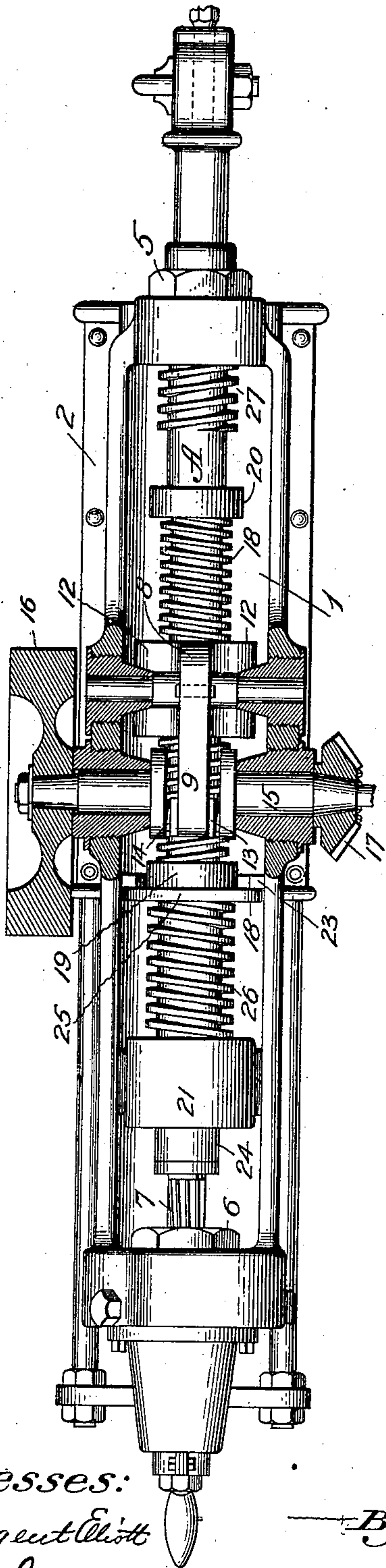
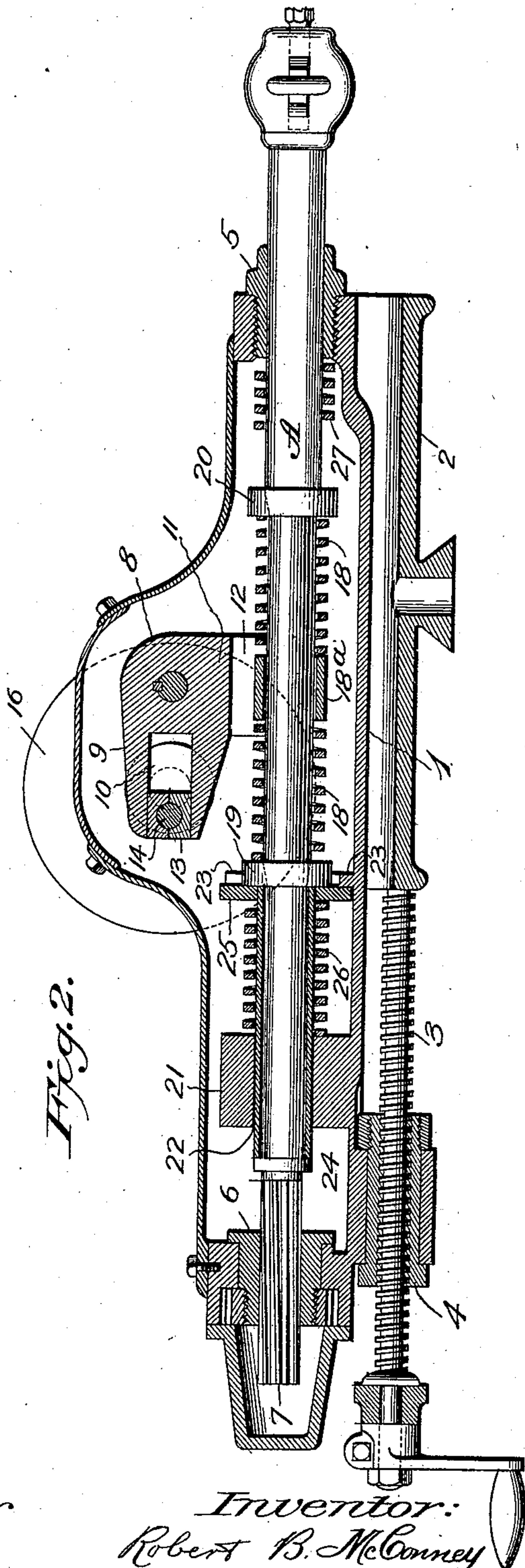


Fig. 2.



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UNITED STATES PATENT OFFICE.

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BUFFER DEVICE FOR ROCK-DRILLS.

SPECIFICATION forming part of Letters Patent No. 711,998, dated October 28, 1902.

Application filed December 28, 1901. Serial No. 87,572. (No model.)

To all whom it may concern:

Be it known that I, ROBERT B. McCONNEY, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Buffer Devices for Rock-Drills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in buffer devices for rock-drills, and my invention is designed more especially as an improvement on the buffer device of the drill-holding bar of the rock-drill patented on the 28th day of May, 1901, No. 675,202.

The object of this invention is to provide an improved means for cushioning the recoil of the drill-holder, and I attain this object by dispensing with the adjustable abutment shown in that patent, which was designed to receive the force of the recoil blow of the said drill-holder and in its place to form integral with the drill-casing a solid abutment-collar which is provided with a central bore to receive the rear end of the drill-holder and against which one end of the main buffer-spring, which encircles the drill-holder, bears, the other end of said buffer-spring bearing against a washer, which is held against the tension of the buffer-spring by an annular band or ring formed integral with the inner periphery of the drill-casing, against which the washer is normally pressed by the expansive force of the buffer-spring, the said washer being designed to be struck by an abutment-collar secured upon the drill-holder as the said drill-holder is caused to recoil from its forward blow, thus compressing the buffer-spring against the solid abutment or wall and cushioning the recoil of the drill-holder.

In the patent above referred to the main buffer-spring was shown as being shorter than the distance between the adjustable abutment and the abutment-collar carried by the

drill-holder. Hence the spring was normally relaxed, and it was found in the running of the drill that the spring's repeated compression movement against its abutment, which was caused by the repeated recoil blow of the drill-holder against it and against its adjustable abutment, acted as so many direct blows against the spring and caused the spring to rapidly crystallize and to break, necessitating the frequent replacing of the spring by a new one, which in its turn would last but a short time. In my improved arrangement the spring is normally held slightly compressed between a washer and a solid abutment-collar and the concussion of the drill-holder against it and of the spring against its abutment is entirely obviated, and consequently the liability of crystallization and subsequent breakage by the recoil movement of the drill-holder is practically obviated.

In the accompanying drawings, Figure 1 is a plan view of a rock-drill embodying my improvement, a portion of the casing being shown in section; and Fig. 2 is a vertical longitudinal sectional view thereof.

Like letters and figures of reference indicate corresponding parts.

Referring to the drawings, the numeral 1 indicates the drill-casing, and 2 the shell which supports the casing and in which the casing has an endwise-sliding movement. The casing is moved back and forth by a feed-screw 3, which revolves in an elongated nut 4, carried by the under side of the casing, the said screw being revolvably secured at one end to the shell, while the other end has clamped thereto a handle by which the said screw is revolved. The forward end of the casing has a central bore which is threaded and receives a nut 5, bored centrally to receive the forward end of the drill-shaft A. The rear end of the casing is centrally bored and receives a nut 6, having a central bore which is spirally fluted and in which reciprocates the rifle-bar 7, which is screwed into the rear end of the drill-shaft and which causes the intermittent revolution of the drill-holder, as will be fully understood by reference to the former patent. A crank-lever 8 is pivoted in the casing above the drill-

holder A and about centrally of the same. This lever is made up of a member 9, which is horizontally disposed and is provided with an open-ended slot 10, and a vertically-de-
 5 depending member 11, which is formed into a yoke, the members 12 of which straddle the drill-holder and are each provided with an open-ended slot. The slot 10 of member 9 carries a sliding box 13, in which revolves
 10 the wrist-pin 14 of a crank-shaft 15, the said shaft carrying a fly-wheel 16 at one end and a beveled pinion 17 at its other end, the said pinion being designed to receive motion from a corresponding beveled pinion on the end of
 15 a flexible shaft, which is driven by any preferred motive power, the pinion, shaft, and means for operating the same not being shown.

The drill-holder is provided centrally with a cross-head 18^A, having lateral trunnions
 20 which are housed in sliding boxes carried by the slots in members 12 of the crank-lever 8, and the cross-head is held centrally of the drill-holder by springs 18, which bear one on one side of the cross-head and one on the
 25 other side, their opposite ends bearing against collars 19 and 20, carried by the drill-holder A.

The parts thus far mentioned are all clearly shown and described in the patent above referred to, and a more extended description
 30 thereof is deemed unnecessary, as they form no part of my present invention, the object of which is to more gradually and effectively cushion the recoil blow of the drill-holder and at the same time prevent frequent breaking
 35 of the main buffer-spring.

Near the rear end of the interior of the drill-casing 1 is located an abutment collar or wall 21, which is formed integral with the casing. This abutment-collar is provided with a cen-
 40 tral bore 22, which is in axial alinement with the bores in the nuts 5 and 6 at the front and rear ends, respectively, of the casing, and within this bore 22 the rear end of the drill-holder is supported. At a suitable distance
 45 forward of the abutment the casing is provided with an annular projection or rim 23, which is formed integral with the said casing and which is for a purpose to be hereinafter explained.

The drill-holder A is of three different diameters. The forward portion, which is practically a third of its length, is of the greatest diameter, and at the junction of the forward and central portions, which is next in diame-
 55 ter, a short taper or shoulder is formed upon which the collar 20 fits. This collar 20 is held in place by the adjacent spring 18, which is held slightly compressed between the said collar 20 and one side of the cross-head 18^A.
 60 At the junction of the central and rear portions of the drill-holder a short taper or shoulder is formed upon which the collar 19 fits, and the collar 19 is held against rearward movement by a sleeve 24, which surrounds
 65 the drill-holder from the collar 19 to the rear end thereof, where it is held in place by a flange on the shank of the rifle-bar 7. A

washer 25 is slid upon the sleeve at the rear end of the drill-holder and lies normally against the annular rim 23, and between this
 70 washer and the abutment 21 is interposed a buffer-spring 26, which fits loosely around the sleeve 24 and is held slightly compressed. Now as the drill-holder is carried forward through the medium of cross-head 18^A, crank-
 75 lever 8, and crank-shaft 15 its rear end, which is surrounded by sleeve 24, will slide smoothly through bore 22 in abutment 21 and through buffer-spring 26 and washer 25, and when the drill-holder is carried to the limit of its for-
 80 ward stroke, as when the drill strikes a seam, the collar 20 will strike a spring 27, which loosely encircles the forward portion of the drill-holder and bears against the nut 5, and the stroke will thus be cushioned; but on the
 85 recoil the drill-holder is always carried to the limit of its movement and the stroke is cushioned in the following manner: When the drill-holder on its recoil has reached a point about midway between the limits of its for-
 90 ward and rear movement, its collar 19 will strike washer 25, which is normally held against rim 23 by buffer-spring 26, and the washer will be carried rearward against the expansive pressure of spring 26, thus com-
 95 pressing the said spring against the abutment collar or wall 21, which will effectively cushion the recoil of the said drill-holder. As the drill-holder moves forward again the expansion of spring 26 will force washer 25 for-
 100 ward until it is stopped by the rim 23, in which position it is held until struck by collar 19 at each recoil of the drill-holder.

It will thus be seen that in my improvement I have provided a very simple, effective,
 105 and inexpensive means for cushioning the recoil of the drill-holder, and while I attain this object in the manner described I also reduce the breakage of the buffer-springs to a minimum, as when the said spring is normally
 110 held under pressure, as in the present invention, it is far less liable to be broken when suddenly compressed by the recoil of the drill-holder than when normally relaxed, as shown in the patent above referred to. 115

Having thus fully described my invention and the manner of its operation, what I claim as new, and desire to secure by Letters Patent, is—

1. In a recoil buffer device for rock-drilling
 120 engines, the combination with the casing, the crank-arm and the drill-holder, of an abutment-collar mounted on said drill-holder, a sleeve mounted on said drill-holder and bearing at one end against said abutment-collar,
 125 means for securing said sleeve on said drill-holder and for holding said sleeve against said collar, a fixed collar extending transversely across said casing, an axial bore in said collar surrounding loosely said sleeve, a
 130 second transverse abutment in said casing adjacent to said drill-holder abutment-collar arranged to allow said drill-holder collar to pass it during the reciprocating action of said drill-

holder, a washer loosely mounted on said sleeve adjacent to said second-named abutment and a compressive coiled spring mounted loosely on said sleeve and arranged under slight expansive tension between said first-named collar-abutment of said casing and said washer, whereby said washer is held against the casing's second-named abutment in the path of the recoil movement of said drill-holder's abutment-collar, substantially as described.

2. In a recoil bumper device for rock-drills, the combination of the casing, the crank-arm, the cross-head, the drill-holder and the drill-holder's actuating-springs, and the actuating-springs' abutment-collars of the two transversely-arranged abutment-collars arranged at a short distance apart at the rear end of said drill-holder, and axial apertures arranged concentric to said drill-holder, the sleeve secured between the rear end of said drill-holder and the rear abutment-collar of said drill-holder, the washer mounted loosely on said sleeve and the coiled compression-spring arranged and adapted to bear at one

end against one of said casing's abutment-collars and to expansively hold said washer against the other, substantially as described.

3. In a recoil buffer device for rock-drills, the combination with the casing and the drill-holder having an abutment-collar adjacent to its rear end, of the two transverse abutment-collars cast integral with said casing and arranged a short distance apart and one of which is arranged adjacent to the normal position of said drill-holder's abutment-collar, the sleeve secured to said drill-holder and arranged to bear against said drill-holder's abutment-collar, the washer mounted loosely on said sleeves and the compressive spring arranged expansively between the rear abutment-collar of said casing and said washer, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT B. McCONNEY.

Witnesses:

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