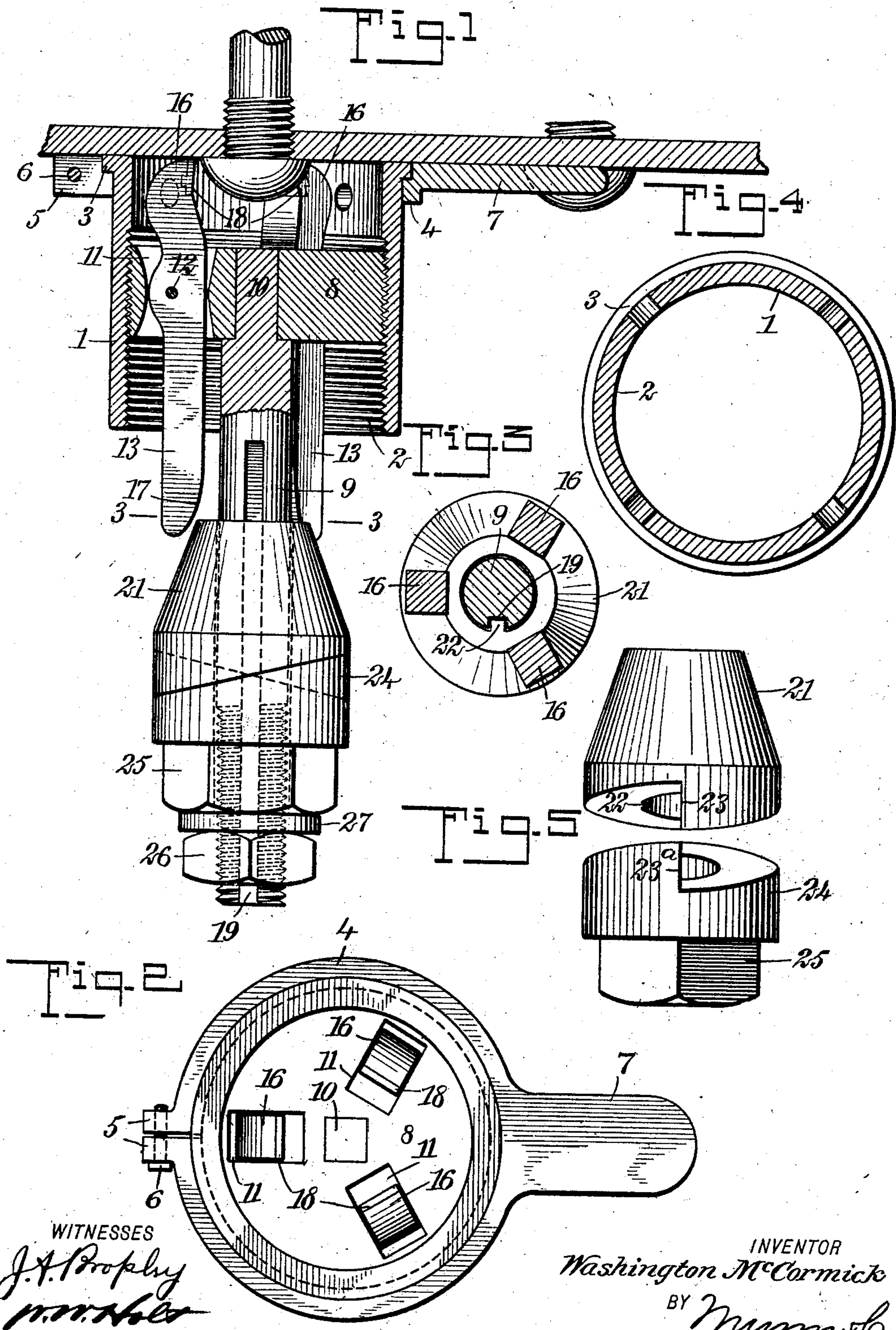


No. 840,233.

PATENTED JAN. 1, 1907.

W. McCORMICK.  
BOLT EXTRACTOR.  
APPLICATION FILED JULY 11, 1906.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

WASHINGTON McCORMICK, OF HILLYARD, WASHINGTON.

## BOLT-EXTRACTOR.

No. 840,233.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed July 11, 1906. Serial No. 325,587.

*To all whom it may concern:*

Be it known that I, WASHINGTON McCORMICK, a citizen of the United States, and a resident of Hillyard, in the county of Spokane and State of Washington, have invented a new and Improved Bolt-Extractor, of which the following is a full, clear, and exact description.

This invention is an improved bolt-extractor designed, primarily, for the removal of crown-bolts from the crown-sheets of locomotives, although its use is not limited to this particular class of work, since it will be found to be an effective means for removing bolts in other relations, especially those with round or other forms of heads on which an ordinary type of wrench cannot obtain a purchase.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the extractor, partly in central vertical section, as applied to a crown-bolt on the crown-sheet of a steam-boiler. Fig. 2 is an inverted plan view of the extractor. Fig. 3 is a transverse sectional view on the line 3 3 of Fig. 1. Fig. 4 is a transverse sectional view through the lower end of a tubular support forming an element of the device, and Fig. 5 is a side elevation of a detail of construction employed in operating the clamping means for unscrewing a bolt.

The invention comprises a tubular support 1, internally threaded at 2 for almost its entire length and provided with an external flange 3 at its base. Embracing the flange 3 is a clamping-ring 4, recessed on its bottom face to admit the flange 3, being disposed in said recess flush with the bottom face of the ring. This ring is split and formed with outwardly-turned lugs 5, through which a bolt 6 passes for drawing the two ends of the ring together and clamping the tube 1 thereto. Directly opposite the split portion of the clamping-ring 4 a handle 7 extends therefrom, which is designed to engage the next adjacent crown-bolt when the device is in use and prevent any relative rotation of the tube. Threaded into the tube 1 in engagement with the threads 2 is a disk 8, to which is vertically secured at its center a bolt 9, passing outwardly some distance beyond said tube. This connection between the disk and bolt is

preferably made by providing the inner end of the bolt with a squared portion 10, which may be positively fixed to the disk in any suitable manner. The disk has passing through it any desired number of apertures 11, contracted at their centers, as best shown in Fig. 1. In these apertures are pivotally mounted on pins 12 levers 13, carrying at their inner ends clamping-jaws 16, facing the center of the tube, and at their opposite ends cam-faces 17 for a purpose hereinafter made apparent. The jaws 16 are provided with removable faces 18, constructed of hardened steel, with serrations, if desired, and are held in place by the dovetailed arrangement, as shown. It is thus seen that by spreading the levers 13 outwardly the jaw-faces 18 are forced toward the center and into positive engagement with the bolt-head. The strain is almost entirely removed from the pivot-pins 12 by reason of the contraction at the center of the apertures 11 and the rounded back edges of the levers, forming a support at this point.

The outer end of the bolt 9 has cut into it a longitudinal keyway 19, on which is slidably mounted an apertured cone 21, formed with a key 22, preferably integral therewith, to mesh with the key-way on the bolt and prevent any relative rotation between them. The outer end of the cone 21 is constructed with a spiral face, providing a shoulder 23, as best shown in Fig. 5. This coöperates with a cylindrical member 24, having a spiral face of an exact counterpart forming a shoulder 23<sup>a</sup>, said member being integral with a polygonal member 25, which is, as also the member 24 and cone 21, freely slidable on the bolt 9. A nut 26 is threaded on the bolt 9 after the member 24 has been placed in position, said nut 26 engaging a washer 27 inserted between it and the polygonal member 25.

In the operation of the device the clamping-ring 4 is applied to the tubular support and the latter seated on a crown-sheet with the head of the crown-bolt concentric to the jaws 16 and the arm 7 at the left-hand side of the head of the next adjacent crown-bolt. The bolt 9 is then turned to carry the disk 8 and its attached levers 13 inward until the ends of the jaws contact with the crown-sheet. By now engaging the nut 25 with a wrench and turning it to the left the cam-faces between the cone 21 and the cylinder 24 will ride upon each other, forcing the cone in-



ward in contact with the cam-faces 17 of the levers 13, thereby causing the jaw-faces of said levers to tightly embrace the bolt-head. The more resistance that is offered to the turning of the bolt the more forcibly are the jaw-faces 18 engaged with its head, thereby at all times insuring its removal. The threads 2 in the tubular support are cut the same number per inch as are the threads on the crown-bolt, which causes the latter and the disk 8 to travel inward or outward at the same relative speed when they are rotated.

It is evident that various immaterial changes may be made in the details of construction hereinbefore described without departing from the spirit of my invention, and I consider that I am entitled to such modifications as fall within the scope of the annexed claims.

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

1. In a bolt-extractor, a tubular support, clamping-jaws carried in said support, means for adjusting the jaws in the support longitudinally thereof, and means for forcing said clamping-jaws inward to engage the bolt-head or the like, for the purpose described.

2. In a bolt-extractor, a tubular support having an internal thread at its outer end, means for holding the support in relative fixed position, a disk threaded into the support provided with clamping-jaws for engaging a bolt-head or the like, and means for forcing said jaws inwardly, for the purpose described.

3. In a bolt-extractor, a tubular support, a clamping-ring embracing said support having an arm extending therefrom, a disk threaded into the outer end of the support, levers pivotally mounted in the disk, clamp-

ing-jaws at the inner ends of the levers, and means for spreading the outer ends of the levers and revolving them, for the purpose described.

4. In a bolt-extractor, a tubular support, a disk threaded into the support, levers carrying clamping-jaws pivotally connected to the disk, and means whereby the strain is removed from said pivotal connections when the jaws are operated.

5. In a bolt-extractor, a tubular support, a disk threaded into the support, carrying clamping-jaws pivotally connected thereto, and means for operating the clamping-jaws to force them into engagement with a bolt-head or the like, whereby, as the bolt is unscrewed, the jaws and disk will travel outwardly at the same speed.

6. In a bolt-extractor, a tubular support, means for holding said support from relative rotation, a disk threaded into the support, carrying levers pivotally connected thereto, clamping-jaws at the inner ends of said levers, cam-faces at the outer ends of said levers, a bolt in fixed relation to the disk, a cone slidably mounted on the bolt, adapted to engage said cam-faces and operate the jaws, a spiral face at the outer end of the cone, and a member working freely on the bolt and having a spiral face, an exact counterpart of that of the cone, a washer engaging said latter-named member, and a nut threaded on said bolt and engaging said washer.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WASHINGTON McCORMICK.

Witnesses:

ALBERT E. WALETHOUN,  
MARTIN J. GUIRY.