

C. D. VERNON & J. P. MORNINGSTAR.

EXPANSION BOLT.

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939,457.

Patented Nov. 9, 1909.

Fig. 1

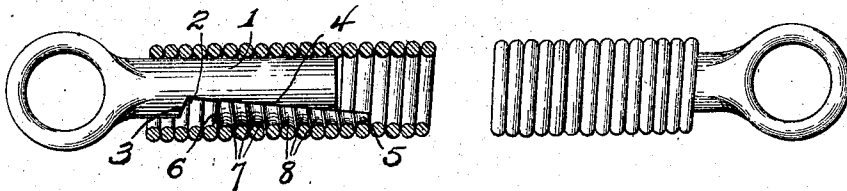


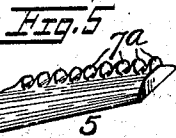
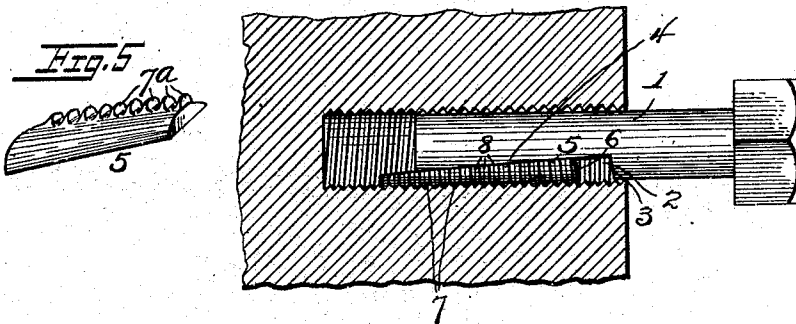
Fig. 2



Fig. 4



Fig. 3



WITNESSES:

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Fig. 5 7b



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EXPANSION-BOLT.

939,457.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CHARLES D. VERNON and JACOB P. MORNINGSTAR, citizens of the United States of America, and residents of Wheeling, county of Ohio, and State of West Virginia, have invented certain new and useful Improvements in Expansion-Bolts, of which the following is a specification.

This invention relates to improvements in expansion bolts, and more particularly to an expansion bolt which may be conveniently recovered when occasion requires.

The primary object of the invention is to provide an expansion bolt which is particularly adapted for use in threaded holes or sockets and which may be readily removed or recovered from its seated position.

A further object of the invention is to provide a device of the character mentioned by means of which a rigid hold may be secured upon a coil-spring, such, for instance, as a trolley-pole supporting-spring, for attachments of parts or objects thereto without unduly weakening the spring. And a still further object of the invention is to provide an expansion bolt the construction of which is such that when it has become seated with an expansion hold, it may be manipulated to effect the taking up of such slack as may exist.

With these and other important objects in view, the invention finally consists in the particular construction, arrangement and combination of parts which will hereinafter be fully described, reference being had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 is a view, partly in longitudinal section and partly in side elevation, illustrating the application of the invention to a spring; Fig. 2 is a perspective view of the key employed in connection with the spring; Fig. 3 is a view illustrating the bolt as employed for seating in a threaded hole or socket; Fig. 4 is a perspective view of the key employed in such hole or socket; Fig. 5 is a similar view of a slightly modified form of the key shown in Figs. 1 and 2; and—Fig. 6 is a similar view of a key still further modified in form.

Referring to said drawing, in which like reference-characters designate like parts throughout the several views—1 indicates a bolt-body having a recess 2 in one side

thereof, forming a shoulder 3 and an inclined face 4, the latter being inclined outward from said shoulder to or toward the point of the bolt. A wedge-like key 5, of substantially the size and shape of the recess 2 in the bolt, is adapted for mounting in said recess with its butt-end 6 against said shoulder 3. The face of said key is provided with a series of alternate cross-ribs or spines and notches which are spaced to correspond with the spacing of the threads of the hole or socket to be penetrated, in case the bolt is to be employed in a threaded hole or socket; or, in case of a coil-spring, the spines and notches are spaced to correspond with the spacing of the coils of the spring to be entered or penetrated.

The key may be provided with alternate spines 7 and notches 8 which extend across the face of the key from one lateral edge to the other, as shown in Figs. 1, 2, 3 and 4, in which case they have an inclination to correspond with that of the threads or coils to be engaged thereby; or, as shown in Fig. 5, the surface of the key may have formed integral therewith a plurality of spaced, upright, alined spurs 7^a which are adapted to enter the interstices between the coils of a spring while said coils closely embrace the convex surface of the key. The spines or spurs not only serve to engage the spiral interstices or grooves and thus effectually lock the key in position, preventing chance retraction of the bolt, but also serve to admit of the retraction of the bolt and key when the former is turned in a reverse direction, the spines or spurs following the spiral of the article penetrated. When employed in a socket, the key may have on its surface one or more studs 7^b, as shown in Fig. 6, for entering a pocket provided therefor at the side of the socket.

In practice, the key is inserted in the recess in the bolt with its butt-end 6 against the shoulder 3, and the bolt and key may then either be together forced directly into position in the hole, or be turned or screwed up in the hole with the spines or spurs on the face of the key meshing with the threads or spirals of the article penetrated, the outer end of the bolt being grasped for effecting such turning. When driven inward the desired distance, an outward pull on the bolt causes the inclined face 4 to slip or slide

slightly upon the coinciding face of the key, the latter remaining stationary, resulting in a wedging or gripping pressure being exerted upon the walls of the hole or socket which effectually holds the bolt against withdrawal. To take up the slack which exists after the outward pull on the bolt, the latter may be turned to screw the wedge forward into the hole. It is manifest that the grip of the bolt is increased proportionately with the tensile strain exerted thereon.

As is well known, much trouble is experienced with trolley-pole supporting springs for the reason that the usual hooks formed at the spring-terminals for attachment to other parts or devices break off readily. When the device illustrated in Fig. 1 is employed, said hooks are wholly dispensed with, a bolt being projected into each end of the spring, to the outer end of which such parts or devices may be attached. The strain of such bolt is more or less evenly distributed throughout the length thereof, resulting in little or no tendency on the part of the spring to break.

As is obvious, the bolt may be readily withdrawn by simply turning the bolt in a reverse direction so as to effect the turning of the key along the spiral path.

When the bolt is intended for use in a threaded hole or socket, the spines and notches are both of V-shape to correspond with the threads of such hole. When intended for use in a coil-spring, the spines or spurs are V-shaped and the intermediate notches are of rounded groove-shape to correspond with the size and shape of the coil of which the spring is formed.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination with an article whose interior wall or surface is provided with a spiral path, of a bolt having an inclined recess in its side, and slidable means in said recess whereby meshing engagement is had with said spiral path when the bolt is subjected to an outward pull, said means retaining said engagement when the bolt is turned forward and drawing said bolt farther into said article.

2. In a device of the character described, a bolt having a recess in the side thereof, forming a shoulder and an inclined face, the latter extending outward from said shoulder toward the point of the bolt, a tapered key

slidably mounted in said recess, and spaced transverse spines carried by the face of said key, said key and bolt being adapted for freely entering a threaded hole without turning, and said spines being adapted for meshing engagement with the threads of said hole when the bolt is partially withdrawn.

3. The combination with an article whose interior wall or surface is provided with a spiral path, of a bolt having an inclined recess in its side, a key slidably mounted in said recess, and spaced ribs carried by said key in mesh with the spiral path of said wall.

4. An expansion bolt adapted for mounting in the end of a coil-spring; said bolt comprising a bolt-body having a recess in its side which forms a shoulder and an inclined face, the latter extending from said shoulder toward the point of the bolt, and a tapered key slidably mounted in said recess, said key having on its surface spaced upright V-shaped ribs meshing with the coils of the spring.

5. An expansion bolt adapted for mounting within the end of a coil-spring, said bolt comprising an unthreaded bolt-body having a recess in its face which forms a shoulder and an inclined face, the latter extending from said shoulder toward the point of the bolt, a wedge-like key slidably mounted in said recess, and a plurality of cross-ribs in the face of said key adapted to seat in the spiral interstices of a spring whereby threaded engagement is had between said key and said spring, said bolt being adapted to be turned forward for increasing the depth to which it is seated in the spring, and vice versa.

6. The combination with an article whose interior wall or surface has a spiral path, of a bolt having an inclined recess in its side, a tapered key slidably mounted in said recess, and means carried by said key whereby meshing engagement is secured with said spiral path when the bolt is subjected to an outward pull, said means retaining said engagement and drawing the bolt forward when the latter is turned forward.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES D. VERNON.
JACOB P. MORNINGSTAR.

Witnesses:

E. A. LETARD,
H. E. DUNLOP.