Feb. 11, 1930. C. C. TOMKINSON 1,746,326

SETTING TOOL FOR BOLT ANCHORS

Filed Feb. 11, 1928

Fig. 2.

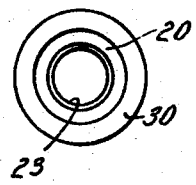


Fig. 1.

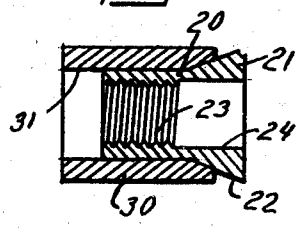


Fig. 3.

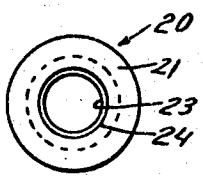


Fig. 4.

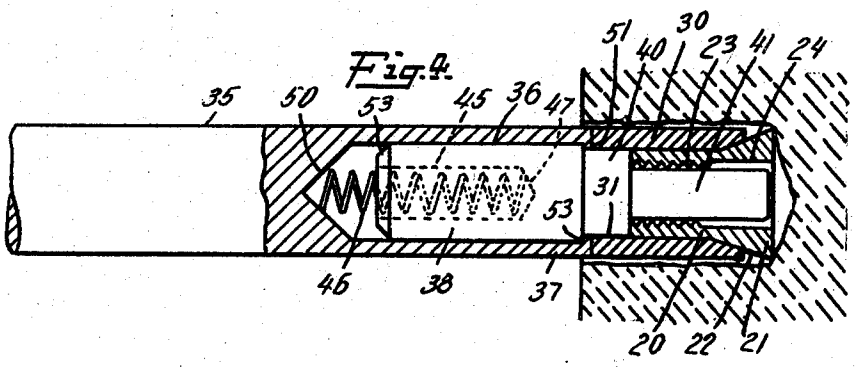
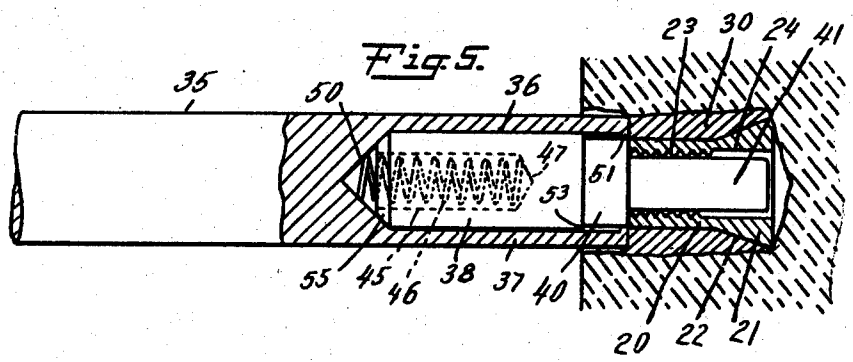


Fig. 5.



INVENTOR
Charles C. Tomkinson
BY
Marshall & Hawley.
ATTORNEYS

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UNITED STATES PATENT OFFICE

CHARLES C. TOMKINSON, OF PLAINFIELD, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO J. EDWARD OGDEN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

SETTING TOOL FOR BOLT ANCHORS

Application filed February 11, 1928. Serial No. 253,572.

This invention relates to a tool for setting bolt anchors.

It is well known that screw or bolt anchors are used for obtaining anchorage in walls of brick, stone, or cementitious material not adapted to directly receive a threaded element or bolt.

One type of anchor which is used for this purpose comprises an expansion member of relatively soft metal mounted on an expanding member of relatively hard metal. In order to expand or set the anchor, the soft metal member or sleeve is tamped on the hard metal member and is forced outwardly into firm gripping engagement with the wall opening.

It has been found that the tools now commonly used for expanding or setting anchors of the type specified often expand the soft metal sleeve to such an extent that the material within which the anchor is set or placed is over-stressed and cracks, thereby loosening the anchorage.

This invention has for its salient object to provide a tool for use with anchors of the type specified so constructed and arranged as to limit the expansion of the anchor by the tool.

Further objects of the invention will appear from the following specification taken in connection with the drawings, which form a part of this application, and in which

Fig. 1 is a sectional elevation of an anchor of the type comprising an inner expanding member of relatively hard metal and a soft metal outer sleeve;

Fig. 2 is an end elevation of one end of the anchor;

Fig. 3 is an end elevation of the other end of the anchor;

Fig. 4 is a sectional elevation showing the anchor in a wall opening and a tool in position to be driven in to expand the anchor; and

Fig. 5 is a sectional elevation similar to Fig. 4 but showing the anchor expanded by the tool.

The invention briefly described consists of a tool for use with anchors of the type specified, the tool having a body portion recessed at one end and having slidably mounted therein a plunger, a spring being interposed between the plunger and the inner end of the recess. The plunger has a cylindrical extension adapted to engage the outer end of the expanding member of the anchor and a pilot or shank which extends into the bore of the expanding member of the anchor. The outer end of the wall of the body member surrounding the recess is adapted to engage the outer end of the soft metal sleeve and expand this sleeve as the tool is driven into the hole.

In order to limit the driving movement of the tool into the hole the inner end of the plunger is adapted to engage the inner end of the recess when the annular wall surrounding the recess has been driven into the hole to a sufficient extent to expand the soft metal sleeve and in the form of the invention shown the expansion is stopped when the sleeve has been forced inwardly until the outer end of the sleeve is alined with the outer end of the expanding member.

Further details of the invention will appear from the following description.

Figs. 1, 2 and 3 illustrate one form of anchor particularly adapted for expansion by the tool. This anchor comprises an inner expanding member 20 having an inner portion 21 provided with a tapered outer surface 22. The expansion member 20 is preferably formed of relatively hard metal and has a longitudinal opening therethrough, a portion 23 of the opening being threaded and the remaining portion 24 being substantially cylindrical.

A sleeve 30 of relatively soft metal is mounted on the outer surface of the expansion member 20 and before the sleeve is expanded it overlaps the outer end of the expansion member, as shown at 31. The extension or mandrel 40 prevents the soft metal of the sleeve 30 from being forced inwardly toward the axis of the member 20 as the sleeve is expanded.

The expanding tool comprises a body portion 35 having a recess 36 extending longitudinally therethrough at one end thereof, the recess being surrounded by an annular wall 37.

A plunger 38 is slidably mounted in the

recess 36 and has a cylindrical etxension or mandrel 40 having an outside diameter substantially equal to the outside diameter of the cylindrical portion of the expansion member 20. A pilot or shank 41 extends beyond the mandrel 40 and is so dimensioned as to extend into the bore of the expansion member, as shown in Fig. 4.

The plunger 38 is recessed as shown at 45 to receive a spring 46 which engages the inner end 47 of the recess 45 at one end of the spring and engages the inner end 50 of the recess 36 at the other end of the spring. In order to limit the outward movement of the plunger under the action of the spring an inwardly extending annular flange 51 is formed on the annular wall 37. This flange, as shown in Fig. 4, engages the shoulder 53 at the junction of the plunger 38 and the mandrel 40.

When the bolt anchor has been positioned in a wall opening, as shown in Fig. 4, the tool is placed in a position also shown in Fig. 4 with the pilot or shank 41 extending into the expansion member 20, the end of the mandrel 40 abutting the outer end of the expansion member and the inner end of the wall 37 engaging the outer end of the soft metal sleeve 30. The outer end of the body portion 35 of the tool is then struck with a suitable instrument in order to drive the tool inwardly. As the tool is driven inwardly the sleeve 30 is forced inwardly onto the inclined or tapered surface 22 of the expanding member and is forced laterally, as shown in Fig. 5, into firm gripping engagement with the wall opening.

In order, however, to limit the expansion of the soft metal sleeve by the tool, means is provided to limit the movement of the tool body into the wall opening. This means consists of an end or stop surface 55 formed on the inner end of the plunger 38 and adapted to engage the inner end 50 of the recess 36, preferably when the soft metal sleeve has been driven in to a position in alinement with the outer end of the expansion member 20.

In order to stop the expansion at this point the distance from the end of the annular wall 37 to the inner end of the mandrel 40 will be substantially equal to the distance from the stop or end 55 of the plunger 38 to the portion of the inner end of the recess 36 engageable thereby. This is clearly shown in Fig. 4 and it should be understood that the foregoing statement applies to the position taken by the various parts prior to the expansion of the anchor.

It will be obvious that since the expansion member 20 cannot be forced into the hole and since one end of the mandrel 40 engages one end of the expansion member and the other end of the plunger 55 engages the inner end 50 of the recess 36, no further movement of the tool into the hole can be effected.

From the foregoing description it will be evident that the use of a tool of the character specified will effectively prevent any over expansion of an anchor of the type specified and, therefore, any tendency of the expansion of the bolt anchor to crack or break the surrounding wall surface will be prevented.

Although one specific embodiment of the invention has been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. A setting tool for use with a bolt anchor comprising an expanding member, an expansible sleeve of relatively soft metal surrounding said member, said tool comprising a body portion, a plunger slidably mounted in a recess in said body portion and having an extension adapted to engage the outer end of said expanding member, the wall of the tool surrounding the plunger being adapted to engage the soft metal sleeve, and stop means for limiting the sliding movement of the plunger into the recess in the body portion of the tool.

2. A setting tool for use with a bolt anchor comprising an expanding member, an expansible sleeve of relatively soft metal surrounding said member, said tool comprising a body portion, a plunger slidably mounted in a recess in said body portion and having an extension adapted to engage the outer end of said expanding member, the wall of the tool surrounding the plunger being adapted to engage the soft metal sleeve, and stop means for preventing the movement of the wall surrounding the recess to a position beyond the outer end of the extension of the plunger.

3. A setting tool for use with a bolt anchor comprising an expanding member, an expansible sleeve of relatively soft metal surrounding said member, said tool comprising a body portion, a plunger slidably mounted in a recess in said body portion and having an extension adapted to engage the outer end of said expanding member, the wall of the tool surrounding the plunger being adapted to engage the soft metal sleeve, and stop means for preventing the movement of the wall surrounding the recess to a position overlapping the outer end of the expanding member of the anchor.

4. A tool for setting bolt anchors comprising a body portion, a plunger slidably mounted in a recess therein, a spring tending to force the plunger out of the recess in the body portion, means for limiting the movement of the plunger by the spring, a mandrel carried by and extending beyond the plunger and having a shoulder or flat surface at its

outer end, and means for limiting the movement of the mandrel and plunger into the recess beyond a position in which the end shoulder of the mandrel is alined with the outer end of the recess wall.

5. A tool for setting bolt anchors comprising a body portion having an annular pressure surface at one end, a plunger slidably mounted within said end of the body portion and having an extension having a shoulder at the outer end thereof, and means for limiting the movement of said extension into the body portion to such an extent that the shoulder of the extension will not pass within the annular pressure surface.

In witness whereof, I have hereunto set my hand this 3d day of February, 1928.

CHARLES C. TOMKINSON.