May 22, 1934. R. E. McINTOSH 1,959,439

EXPANSION SHIELD OR BOLT ANCHOR

Filed Dec. 2, 1931

Fig. 1.

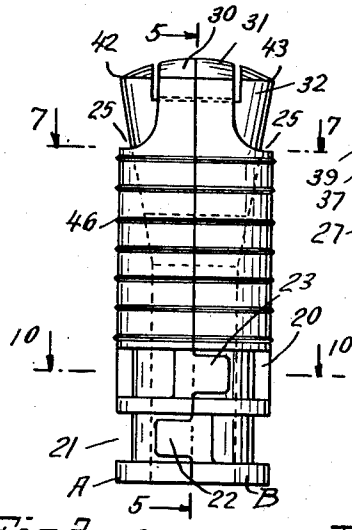


Fig. 4.

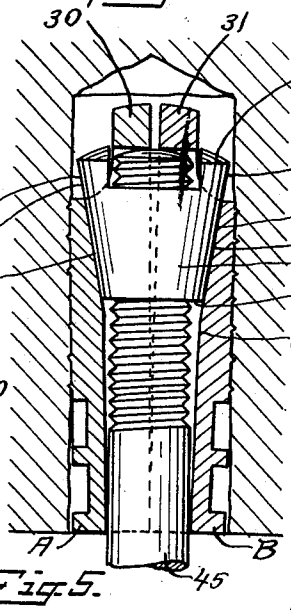


Fig. 3.

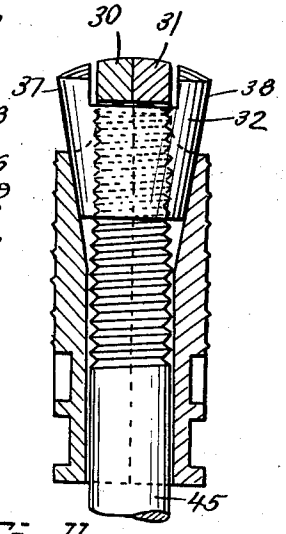


Fig. 2.

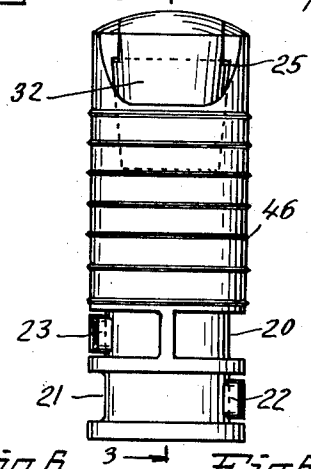


Fig. 5.

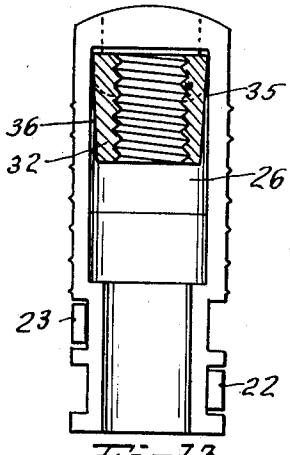


Fig. 11.

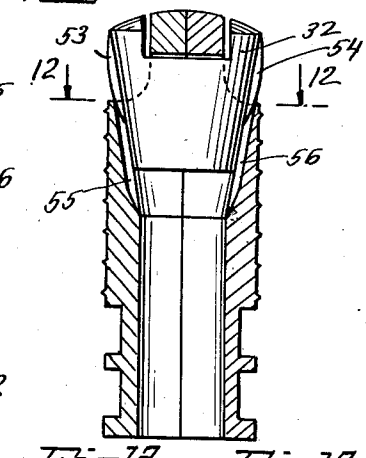


Fig. 6.

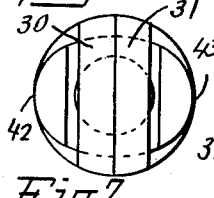


Fig. 8.

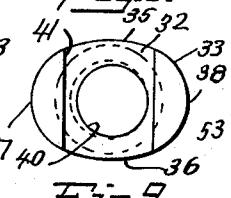


Fig. 13.

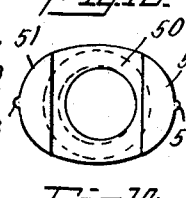


Fig. 12.

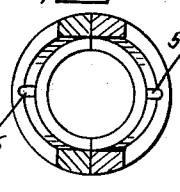


Fig. 10.

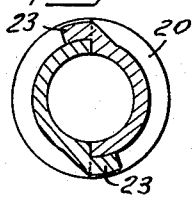


Fig. 7.

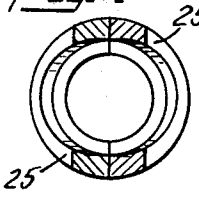


Fig. 9.

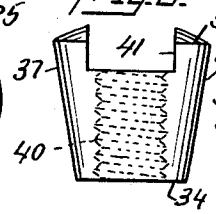
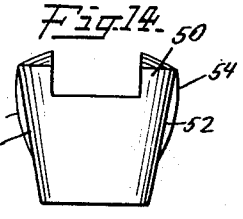


Fig. 14.



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UNITED STATES PATENT OFFICE

1,959,439

EXPANSION SHIELD OR BOLT ANCHOR

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Application December 2, 1931, Serial No. 578,422

6 Claims. (Cl. 85—2.4)

This invention relates to expansion shields or bolt anchors for use in forming anchorages in brick, stone or cementitious material, not adapted to directly receive and retain a threaded element.

More particularly stated, the invention relates to an expansion shield in which an expanding element is arranged to travel longitudinally therein and to expand the shield sections into firm gripping engagement with the wall opening.

The invention has for its salient object to provide a shield of the character specified so constructed and arranged that the action of the expanding element on the shield will effect a very material lateral expansion of the shield elements.

Another object of the invention is to provide a shield of the character specified having laterally expansible sections and furthermore so constructed and arranged that an abutment is formed at the inner end thereof for the purpose of holding the threaded rod or bolt against longitudinal movement in the shield as the expanding element is drawn longitudinally therein.

Another object of the invention is to provide a shield of the character specified that is simple in construction and can be economically manufactured.

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

Fig. 1 is an elevational view of the shield constructed in accordance with the invention;

Fig. 2 is a view similar to Fig. 1 but taken at right angles thereto;

Fig. 3 is a longitudinal sectional elevation taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a view similar to Fig. 3 but showing the shield disposed in the wall opening and expanded therein;

Fig. 5 is a longitudinal sectional elevation taken substantially on line 5—5 of Fig. 1;

Fig. 6 is an end elevation of the inner end of the shield shown in Fig. 1;

Fig. 7 is a transverse sectional elevation taken substantially on line 7—7 of Fig. 1;

Fig. 8 is an end elevation of the nut or expanding element;

Fig. 9 is a side elevation of the nut;

Fig. 10 is a transverse sectional elevation taken substantially on line 10—10 of Fig. 1;

Fig. 11 is a longitudinal sectional elevation similar to Fig. 3 but showing a slightly modified form of the invention;

Fig. 12 is a transverse sectional elevation taken substantially on line 12—12 of Fig. 11;

Fig. 13 is an end elevation of the expanding element or nut shown in Fig. 11; and

Fig. 14 is a side elevation of the nut shown in Fig. 13.

The invention briefly described consists of an expansion shield comprising a plurality of sections having bridges or bridging portions at the inner end thereof adapted to form an abutment to prevent travel of the threaded rod or bolt in the shield. The sections are, furthermore, provided with openings through which portions of the expanding element extend thereby providing for a relatively long travel of the expanding element into the shield and a material lateral expansion of the shield sections during the movement of the expanding element into and longitudinally of the shield.

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

In the embodiment of the invention illustrated in Figs. 1 to 10 inclusive, the shield comprises a pair of sections A and B having annular registering grooves 20 and 21 and provided with tabs 22 and 23 which are arranged to seat in said grooves and to prevent relative longitudinal movement of the shield sections.

Each of the sections is provided with an opening 25 at its inner end. the openings being disposed opposite each other.

The sections are tapered, as shown at 26 and 27, the tapered portions being disposed diametrically opposite each other and extending longitudinally, terminating at their inner ends at the openings 25 and at their outer ends at the junction with a cylindrical portion 28 of the shield.

The shield sections A and B have formed on their inner ends bridges or projecting portions 30 and 31 which extend diametrically across the inner end of the shield. Before the shield has been expanded the bridges 30 and 31 are disposed in contact with each other.

The shield is expanded by an expanding element or nut 32 which is substantially elliptical in outline at its inner end, as shown at 33, and is substantially circular in outline at its outer end, as shown at 34. The sides 35 and 36 of the nut at the ends of the minor axis are substantially parallel or slightly tapered, whereas the surfaces 37 and 38 at the ends of the major axis are tapered, as shown at 39, the taper corresponding in inclination to the tapered surfaces 26 and 27.

The tapered surfaces 37 and 38 of the nut are formed by cylindrical surfaces having the axes

of the cylinders converging and intersecting on the axis of the nut.

The nut 32 has a central threaded opening 40 therein and is recessed at its inner end, as shown at 41. The bridges or bridging portions 30 and 31 at the inner end of the shield are disposed in the recess 41 prior to the expansion of the shield and it will be noted from the showing in Fig 1 that the outermost peripheral portions 42 and 43 of of the nut are disposed substantially in alinement with the cylindrical outer surface of the shield prior to the expansion of the shield.

The shield above described is expanded in the following manner: The threaded element or rod 45 is threaded into the nut 32 and when the inner end of the rod 45 engages the bridging portions 30 and 31 the nut will start to travel longitudinally toward the outer end of the shield. The coaction between the tapered surfaces 37 and 38 of the nut and the tapered portions 26 and 27 of the shield sections will cause the sections to be forced radially or laterally into firm gripping engagement with the wall opening, as shown in Fig. 4. The shield sections are preferably provided with annular ribs 46 to increase the gripping action in the wall openings.

The construction shown in Figs. 11 to 14 inclusive is similar to that illustrated in Figs. 1 to 10, but differs therefrom in that the nut 50 is provided on its tapered portions 51 and 52 with longitudinally extending ribs 53 and 54 which coact with longitudinal grooves 55 and 56 in the shield to counteract any tendency of the nut to rotate during its travel longitudinally in the shield. When the shield is entered into a loose hole and the bolt 45 is turned to expand it, the friction of the bolt tends to turn the nut 32. The contacts of the ribs 53—54 with grooves 55—56 move the section of the shield into offset position, gripping the sides of the hole and prevent turning of the shield until the longitudinal movement of the nut has locked the shield firmly in place.

From the foregoing specification it will be evident that a simple, practical and efficient form of expansion shield has been designed and that the construction described will have a material range of expansion and will form a firm and efficient anchorage.

Although certain specific embodiments of the invention have 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. An expansion shield comprising a plurality of laterally expansible sections, each section having a portion at the inner end cut away to form an opening leaving an uncut portion, and an expanding member in the shield having portions of tapered outer surfaces projecting into said openings, said sections having tapered inner surfaces engaged by outer portions of the tapered surfaces of the expanding member, the uncut portions extending across the end of the expanding member.

2. An expansion shield comprising a pair of separable sections, each section having at the inner end thereof a bridge extending across the inner end of the shield, and an expanding member between said sections having portions overlapping said bridges.

3. An expansion shield comprising a plurality of sections having tapered inner surfaces, and an expanding member in the shield having correspondingly tapered outer surfaces, the maximum diameter of the expanding member being substantially equal to the outside diameter of the shield, said shield sections having openings and the inner end of said correspondingly tapered surfaces of the expanding member extending into said openings, the inner ends of the shield section having portions overlapping the end of the expanding member.

4. An expansion shield comprising a plurality of sections having bridging portions at the inner ends thereof, and an expanding member having portions embracing said bridging portions prior to expansion of the shield, the maximum diameter of the expanding member being substantially equal to the outside diameter of the shield.

5. An expansion shield comprising a plurality of laterally expansible sections, each section having a portion at the inner end cut away to form an opening and an expanding member in the shield having a threaded opening therethough and having tapered portions projecting into the openings in the shield sections, said expanding member and shield having other portions coacting to resist rotation of the expanding member during its longitudinal movement in the shield and said shield sections having end portions overlapping end portions of the expanding member and extending across the opening therethrough.

6. An expansion shield comprising a plurality of laterally expansible sections, each section having a portion of its inner end cut away to form an opening and an expanding member in the shield having a threaded opening therethrough and having tapered surfaces projecting into the openings in said shield sections, said surfaces being formed by cylindrical surfaces, said shield sections having end portions overlapping portions of the end of the expanding member and extending across the opening in said member.

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