May 26, 1931. R. E. OGDEN 1,806,640

EXPANSION SHIELD.

Filed June 12, 1926

Fig. 1.

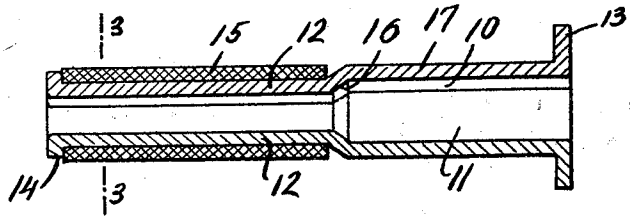


Fig. 2.

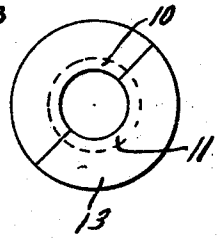


Fig. 3.

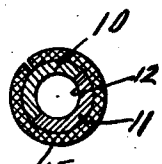


Fig. 4.

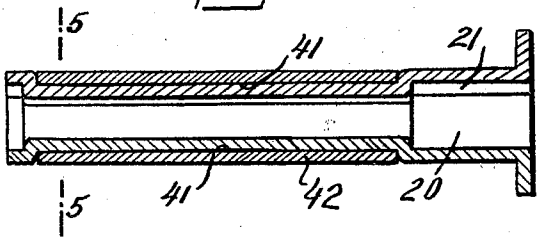


Fig. 5.

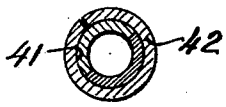


Fig. 6.

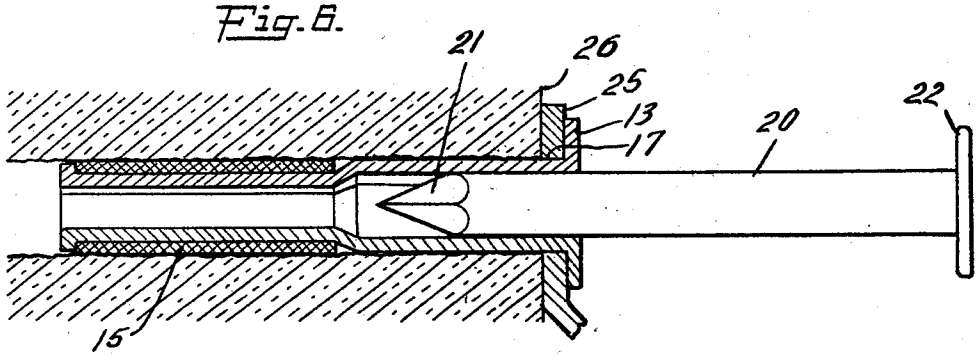
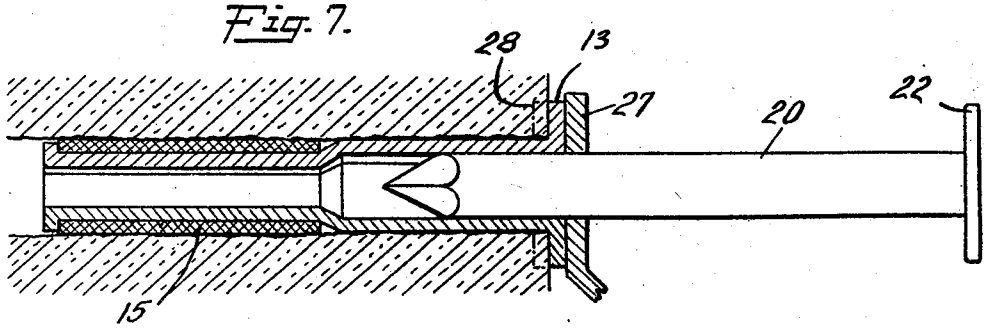


Fig. 7.



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1,806,640

UNITED STATES PATENT OFFICE

RALPH E. OGDEN, OF LAWRENCE, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO J. EDWARD OGDEN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

EXPANSION SHIELD

Substitute for application Serial No. 720,757, filed June 18, 1924. This application filed June 12, 1926. Serial No. 115,494.

This invention relates to improvements in bolt anchors of the character employed for obtaining anchorage in walls of brick, stone and cementitious material not adapted to directly receiving a threaded member.

One of the objects of the invention is to provide an expansion shield so constructed and arranged as to possess superior gripping qualities.

Another object of the invention is to provide an expansion shield adapted to be used with and expanded by a driven expanding member.

Another object of the invention is to provide a flanged expansion shield and an expanding element therefor having a flange adapted to coact with and reinforce the flange of the expansion shield.

Another object of the invention is to provide an expansion shield of relatively hard metal having relatively soft metal disposed on the outer surface thereof and adapted to be expanded into gripping contact with the wall of the opening in which the shield is mounted.

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 longitudinal section of a shield constructed in accordance with the invention.

Fig. 2 is an end elevation of the outer end of the shield shown in Fig. 1.

Fig. 3 is a transverse sectional elevation taken substantially on line 3—3 of Fig. 1.

Fig. 4 is a longitudinal sectional elevation of a slightly modified form of shield constructed in accordance with the invention.

Fig. 5 is a transverse sectional elevation of the structure shown in Fig. 4.

Fig. 6 is a longitudinal sectional elevation showing the shield of Fig. 1 mounted in the wall opening and illustrating an expanding element and an object retained between the shield flange and the wall of the structure in which the shield is mounted; and

Fig. 7 is a sectional elevation similar to Fig. 6, but showing the object to be retained supported on the expanding element and disposed outside of the flange of the shield.

This application contains certain subject matter disclosed in application Serial No. 636,390 filed May 3, 1923, the disclosure in Figs. 4 and 5 of this case being identical with the disclosure of Figs. 13 and 14 of said application, and is substituted for an application filed June 18, 1924 as Serial No. 720,757.

The invention briefly described consists of an expansion shield particularly adapted for use with a driven expanding element. The shield may be formed in one piece or may comprise two sections and is provided with an annular depression. A band is disposed in the annular depression and retains the sections together when the shield is formed in sections. This band forms excess metal on the outer surface of the shield and is preferably formed of soft metal, such as lead. The annular depression forms the internal annular shoulder which is engaged by the driven expanding element when this element is driven into the shield and as the expanding element is forced into the depressed portion of the shield, the excess metal is pressed outwardly into firm and gripping engagement with the interior of the opening in which the shield is inserted. Further details of the invention will appear from the following description.

In the particular embodiment of the invention shown the shield comprises a pair of sections 10 and 11. These two sections have formed therein depressed portions 12 which form an annular depression in the shield when the sections are secured together. The shield also has a laterally extending flange 13 at its outer end. A band 15 preferably formed of soft metal such as lead is wrapped around the annular depression of the shield and secures the sections together. It should be noted that this band 15 is disposed between an inwardly extending annular shoulder 16 formed by the depressed portion of the shield and the flange 14 formed at the inner end of the shield. The band is preferably of such thickness that the outer surface of the band substantially coincides with the cylindrical outer surface 17 of the shield.

Figs. 4 and 5 illustrate a similar construction in which the shoulder 18 is more abrupt or square than shoulder 16 of Fig. 1. The band 42 in Fig. 4 is shown as formed of the same metal as the shield. Figs. 4 and 5 are identical with Figs. 13 and 14 of application Serial No. 636,390 filed May 3, 1923 and as to this subject matter, this application is a continuation in part of said application.

The shield above described is used with a driven expanding element or nail 20 having a tapered inner end 21 and a flange or head 22.

In Fig. 6 the object 25 is shown as mounted on the outer surface 17 of the shield between the flange 13 and the wall 26 of the structure in which the shield is mounted.

In Fig. 7 the object 27 is mounted on the expanding element or nail 20 and is disposed outside the flange 13 of the shield.

When the nail is driven into the shield, the tapered end 21 will enter the restricted portion of the shield and will expand the soft metal 15 into firm and gripping engagement with the wall of the opening in which the shield is inserted.

With the object 27 mounted on the nail 20 as shown in Fig. 7, the flange of the shield will be driven into the wall 26 as shown in dotted lines at 28 and the object will, therefore, be flush with the wall surface.

It should be noted that the head 22 of the nail 20 serves to reinforce the flange 13 of the shield when the parts are arranged as shown in Fig. 6 thereby aiding in retaining the object 25 in position.

Particular attention is called to the fact that the flange at the inner end of the shield and the annular shoulder at the outer end of the depression serve to retain the metal 15 against longitudinal movement relative to the shield when the shield is expanded. The metal is, therefore, forced radially by the expanding element and secures a firm and rigid grip in the material of the wall.

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 pair of sections of relatively hard sheet metal of uniform thickness having depressed portions forming an annular substantially cylindrical depression in the shield and a band of relatively soft metal disposed in said depression and securing the shield sections together.

2. An expansion shield comprising a pair of exactly similar sections, each section having a depressed portion adapted to register with the depressed portion of the other section when the sections are secured together, said shield having an annular flange at its outer end, an annular flange at its inner end and an annular shoulder intermediate its ends and a band of relatively soft metal disposed in the depressed portion of the shield and securing the shield sections together.

3. An expansion shield comprising a pair of sections, said sections having depressed portions forming an annular depression in the shield and a band of relatively soft metal disposed in the annular depression of the shield, and having its outer surface substantially coinciding with the outer surface of the remaining portion of the shield.

4. An expansion shield comprising a tubular member continuous from end to end and having a constricted portion adjacent its inner end and relatively soft metal disposed on the outer surface of said constricted portion and having an outside diameter substantially equal to the outside diameter of the remaining portion of the shield.

5. An expansion shield comprising a tubular member continuous from end to end and having a constricted portion adjacent its inner end and relatively soft metal disposed on the outer surface of and surrounding said constricted portion and having an outside diameter substantially equal to the outside diameter of the remaining portion of the shield.

6. An expansion shield having a plurality of expansible portions and consisting of a tubular member continuous from end to end and reduced in section throughout a portion of its length, a shoulder being formed between the reduced portion and the remaining portion of the shield and a band of relatively soft metal disposed on the reduced portion of the shield extending longitudinally from the shoulder.

7. An expansion shield comprising a plurality of longitudinally extending laterally expansible sections and having an annular substantially cylindrical depression intermediate its ends and a shoulder at each end of the depression and an annular substantially cylindrical band disposed in the depression between said shoulders, and an expanding member having its outside diameter greater than the inside diameter of the depression.

8. An expansion shield comprising a plurality of longitudinally extending laterally expansible sections and having an annular substantially cylindrical depression intermediate its ends and a shoulder at each end of the depression and an annular substantially cylindrical band disposed in the depression between said shoulders and substantially filling the depression, and an expanding member having its outside diameter greater than the inside diameter of the depression.

9. An expansion shield of relatively hard

metal having an elongated constricted portion, a band of excess metal disposed on the outer surface of said constricted portion and having an outside diameter substantially equal to the outside diameter of the unconstricted portion of the shield, means for retaining said excess metal against longitudinal movement relative to the shield and an expanding element having a greater transverse dimension than the transverse dimension of the constricted portion adapted to engage the constricted portion and expand the shield, thereby forcing the excess metal radially into gripping engagement with the wall opening.

10. An expansion shield of non-uniform diameter continuous from end to end having a laterally extending flange at its inner end and a band of relatively soft metal mounted on a portion of the shield and having its inner end abutting said flange, the outside diameter of the band being substantially equal to the outside diameter of the remaining portion of the shield.

11. An expansion shield of non-uniform diameter continuous from end to end having a laterally extending flange at its outer end and having a plurality of laterally expansible portions, a shoulder intermediate its ends and a band of expansible excess metal encircling the shield and having its outer end abutting said shoulder, said flange having an outside diameter greater than the outside diameter of the remaining portion of the shield.

12. An expansion shield of non-uniform diameter having a laterally extending flange at its outer end and comprising a plurality of laterally expansible portions, an inwardly extending, annular shoulder intermediate its ends constricting the bore of the shield and a band of expansible excess metal encircling the shield and having its outer end abutting said shoulder, said flange having an outside diameter greater than the outside diameter of the remaining portion of the shield.

13. An expansion shield having a laterally extending flange at its outer end, a shoulder intermediate its ends constricting the bore of the shield and a band of relatively soft metal encircling the shield and having its outer end abutting said shoulder.

14. An expansion shield having a laterally extending flange at its outer end, an inwardly extending, annular shoulder intermediate its ends constricting the bore of the shield and a band of relatively soft metal encircling the shield and having its outer end abutting said shoulder.

15. An expansion shield comprising a pair of relatively hard sheet metal sections of uniform thickness, said sections being transversely bent so that when assembled, they form between them a longitudinal bore smaller at the inner end than at the outer end thereof, both ends of said sections being bent outwardly to form flanges and a band of relatively soft metal bent around said assembled sections to hold them together, one end of said band abutting against the flange at the inner end of the shield and said band extending longitudinally throughout a portion of the length of the shield.

16. An expansion shield having an annular substantially cylindrical constricted portion spaced from the outer end of the shield and forming a bore having a smaller diameter than the internal diameter of the remaining portion of the shield and a band of relatively soft metal disposed around the constricted portion of the shield.

17. In combination, an expansion shield having an annular substantially cylindrical constricted portion spaced from the outer end of the shield and forming a bore having a smaller diameter than the internal diameter of the remaining portion of the shield, a band of relatively soft metal disposed around the constricted portion of the shield, and an expanding member having an external diameter adapted to fit within the outer unconstricted portion of the shield but adapted to expand the constricted portion of the shield.

18. In combination, a sheet metal expansion shield having a flanged inner end, a metal band encircling the shield and abutting said flanged inner end, and a hammer driven expander adapted to expand the shield and the metal band.

19. In combination, an expansion shield having a laterally extending flange on its inner end, a metal band encircling said shield, and a hammer driven expander adapted to expand the shield, the flange thereon, and the metal band.

20. An expansion shield, continuous from end to end, having a laterally extending flange at its inner end, and a band of relatively soft metal having its inner end abutting the flange.

21. In combination, an expansion shield having a laterally extending flange at its outer end, an outer annular substantially cylindrical portion and an inner substantially cylindrical constricted portion forming a bore having a smaller diameter than the internal diameter of the outer portion of the shield, a band of relatively soft metal disposed around the inner constricted portion of the shield, and a cylindrical expanding member having an external diameter adapted to fit within the outer portion of the shield but adapted to expand the constricted portion of the shield and having a head adapted to overlap and reinforce said flange.

22. In combination, a sheet metal expansion shield having a flanged end and an expansible portion spaced therefrom, a metal band of relatively soft metal supported on the expansible portion of the shield by en-

circling the same, and a hammer driven expander adapted to expand the shield and the metal band, said expander having a head adapted to overlap and reinforce the flange.

23. An expansion shield comprising a laterally expansible tubular member having an abutment at its outer end and a band of relatively soft metal superimposed on the shield on a portion thereof spaced from said abutment and supported on the shield by encircling the same.

24. In combination, a sheet metal expansion shield, a band of relatively soft metal supported on the expansible portion of said shield by encircling the same, and a hammer driven expander adapted to expand the shield and the metal band.

In witness whereof, I have hereunto set my hand this 26th day of May, 1926.

RALPH E. OGDEN.