Aug. 16, 1927. 1,639,231

J. E. OGDEN

BOLT ANCHOR

Filed May 19, 1923 2 Sheets-Sheet 1

Fig. 1

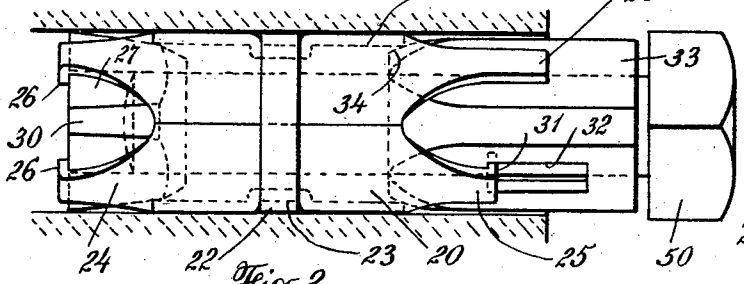


Fig. 2,

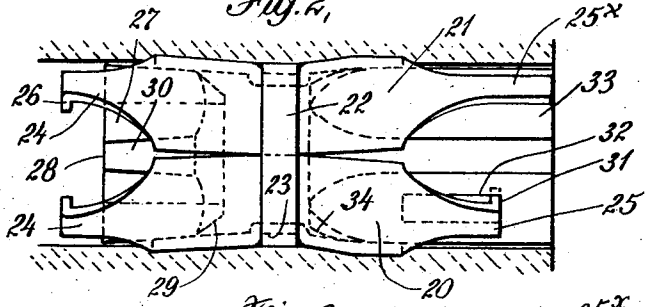


Fig. 3,

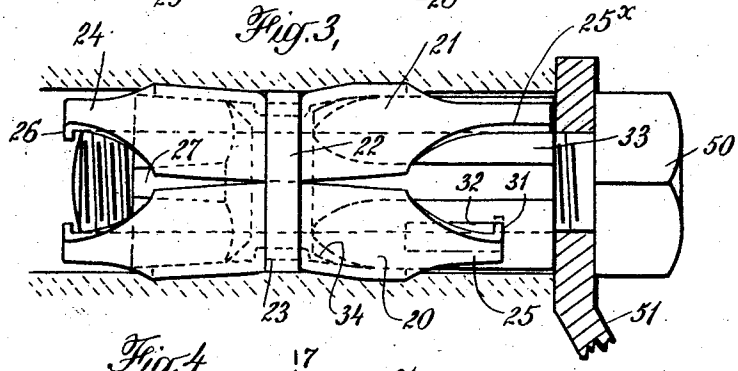


Fig. 4,

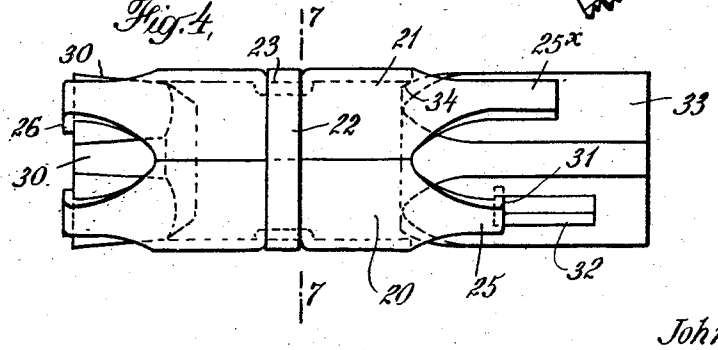


Fig. 5,

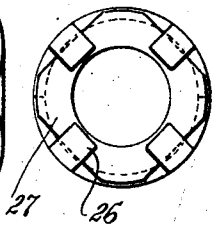


Fig. 6,

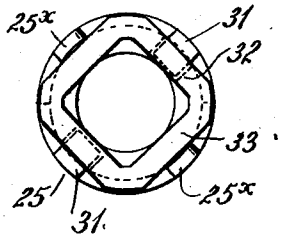
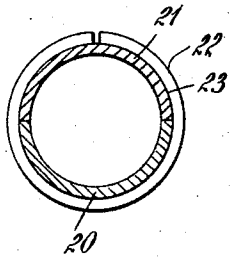


Fig. 7,



INVENTOR

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J. E. OGDEN

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Fig. 8

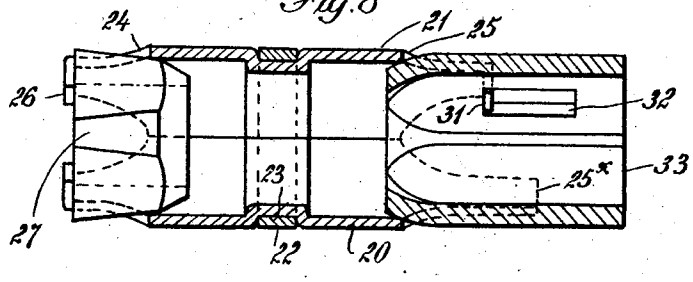


Fig. 12,

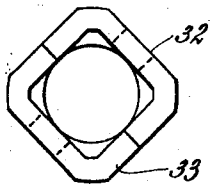


Fig. 10,

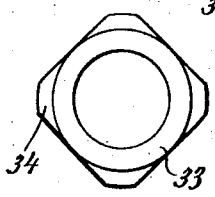


Fig. 9,

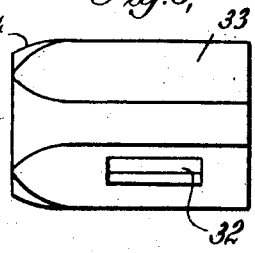


Fig. 11,

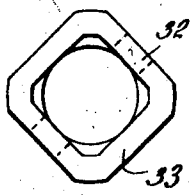


Fig. 13,

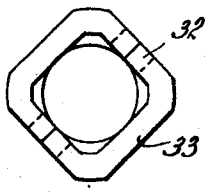


Fig. 14,

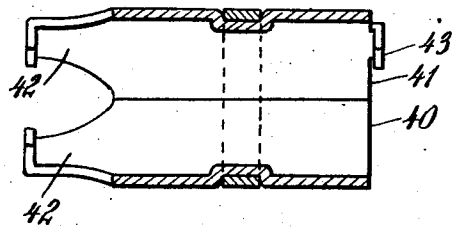


Fig. 15,

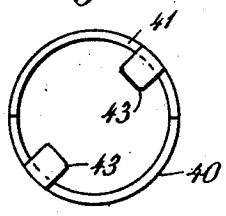


Fig. 17,

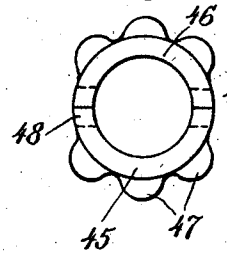


Fig. 16

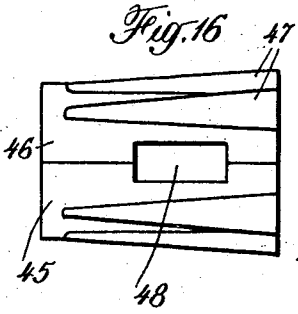
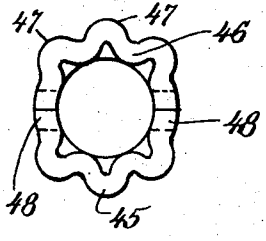


Fig. 18,



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Patented Aug. 16, 1927. 1,639,231

UNITED STATES PATENT OFFICE.

JOHN EDWARD OGDEN, OF MOUNTAINVILLE, NEW YORK.

BOLT ANCHOR.

Application filed May 19, 1923. Serial No. 640,097.

This invention relates to improvements in bolt anchors of the character employed for obtaining anchorage in walls of brick, stone or cementitious material not adapted to directly receive 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 a shield and expanding elements adapted to coact therewith, the shield and elements being so relatively constructed and arranged as to effect gripping connections at a plurality of different points or areas throughout the length of the shield.

Another object of the invention is to provide a bolt anchor that can be set deep in a wall opening or spaced inwardly from the outer edge of the opening whereby the expansion thereof will not spall the concrete.

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 an elevational view illustrating a bolt anchor positioned in a wall opening and constructed in accordance with the invention.

Fig. 2 is a view similar to Fig. 1 but showing the outer end of the shield expanded and the inner end partially expanded.

Fig. 3 is a view similar to Figs. 1 and 2, but showing both ends of the shield expanded.

Fig. 4 is an elevational view showing the shield and expanding elements.

Fig. 5 is an end elevation of the inner end of the bolt anchor illustrated in Fig. 1.

Fig. 6 is an end elevation of the opposite end of the bolt anchor.

Fig. 7 is a transverse sectional elevation taken substantially on line 7—7 of Fig. 4.

Fig. 8 is a longitudinal sectional elevation of a bolt anchor illustrated in Figs. 1 to 4.

Fig. 9 is an elevational view of the expanding sleeve used at the outer end of the shield.

Fig. 10 is an end elevation of the inner or tapered end of the sleeve.

Fig. 11 is an end elevation of the opposite end of the sleeve.

Fig. 12 is an elevational view similar to Fig. 11, but showing the sleeve as made up of a pair of sections.

Fig. 13 is a view similar to Fig. 12, but showing a pair of sections, the plane of division between the sections being at right angles to the plane of division between the sections of Fig. 12.

Fig. 14 is a sectional elevation of another form of shield constructed in accordance with the invention.

Fig. 15 is an end elevation of the right hand end of the shield shown in Fig. 14.

Fig. 16 is an elevational view of another form of sleeve constructed in accordance with the invention, and

Figs. 17 and 18 are end elevations of the sleeve shown in Fig. 16.

The invention briefly described consists of an expansion shield having expansible portions at both ends and expanding elements at both ends for expanding said portions. In the embodiment of the invention shown the expanding element for the inner end consists of a nut tapered longitudinally and adapted to travel longitudinally in the shield and force the expansible portions outwardly. The expanding element for the opposite end of the shield consists of a sleeve adapted to be positioned within the outer end of the shield. The sleeve and shield have coengaging portions such as an inturned tab on the shield disposed within an elongated slot in the sleeve. The shield is expanded by forcing the sleeve inwardly and by drawing the nut inwardly into the shield thereby pressing the expansible portions radially outward into firm gripping engagement with the wall opening. Further details of the invention will appear from the following description.

In the particular embodiment of the invention shown, the expansion shield comprises a pair of sections 20 and 21 which are secured together intermediate their ends by a split ring 22 seated in an annular depression 23. The shield is adapted to be expanded at both ends and is formed at its respective ends with a plurality of longitudinally extending, preferably tapered, fingers 24 and 25. The fingers 24 are inturned at their ends as shown at 26 and these ends 26 as shown in Fig. 5 overlap the outer end of the expanding nut 27 and retain the nut within the shield.

The nut 27 has a substantially square end 28 and a conical opposite end 29, these ends being connected by tapered portions 30 adapted to engage and expand the shield. The particular shape of the nut is not im-

portant and any desired form of tapered expanding element may be used.

Certain of the tapered fingers 25 at the opposite end of the shield are turned inwardly as shown at 31. These inturned ends are received in longitudinal slots 32 formed in a sleeve 33. The remaining fingers 25 which are indicated at 25× are not inturned but lie along the flat surfaces of the sleeve 33 and function as guides, and retainers for the sleeve and are made of the proper lengths to gauge the position of the shield in the hole. The sleeve 33 as particularly shown in Figs. 9 to 11 is tapered at one end as shown at 34 and is substantially square in section at the other end and attention is called to the fact that the sleeve 33 is formed of heavier stock or is thicker than the wall of the expansion shield.

When the bolt anchor is assembled the parts are disposed in the position illustrated in Figs. 4 and 8 where the nut 27 is disposed within the tapered fingers 24 at one end of the shield and the sleeve 33 is disposed within tapered fingers 25 and 25× at the other end of the shield. The inturned ends 31 of certain of the fingers 25 are located in the slots 32 in the sleeve 33 and the other fingers 25× as shown particularly in Fig. 6 extend along the flat outer faces of the sleeve 33.

The sleeve illustrated in Figs. 9, 10 and 11 is formed from a single piece of material but the sleeve may be sectional as shown in Figs. 12 and 13. In Fig. 12 the sections are divided in a plane at right angles to the center line of the slots 32 and in Fig. 13 the sections are divided in a plane coinciding with the center line of the slots.

In Figs. 14 and 15 the shield comprises a pair of sections 40 and 41 having tapered fingers 42 formed at one end only thereof. At the opposite end are formed inwardly extending tabs 43 adapted to be positioned in the slots of the sleeve.

In Figs. 16 to 18 inclusive a slightly different shape of sleeve is illustrated. The sleeve in this instance comprises a pair of sections 45 and 46 having longitudinally extending, tapered ridges or corrugations 47. Slots 48 corresponding to the slots 32 in the other form of sleeve are disposed with their center line coinciding with the plane of division between the sections 45 and 46.

The bolt anchor may be used in the following manner. The parts are first assembled as shown in Figs. 4 and 8 and the anchor is then inserted in the wall opening in the position shown in Fig. 1 wherein it will be seen that the fingers 25× which extend along the flat tapered faces of the sleeve form a gauge for determining the depth of the insertion of the shield in the hole. After the anchor has been so inserted, the nut 27 and the sleeve 33 can be drawn together lengthwise in the shield by means of the bolt 50 or in any other suitable manner a sufficient distance to cause the ends of the shield to expand into engagement with the wall opening as shown in Fig. 2. The bolt 50 can then be withdrawn and the sleeve can be driven in flush with the surface of the wall if this has not been accomplished by the previous operation, thereby expanding this end of the shield into firm gripping engagement with the wall opening. Attention is called to the fact that the expansible portions of the outer end of the shield are spaced inwardly from the outer edge of the wall opening and, therefore, the expansion of this end of the shield does not spall the concrete. The bolt can then be reinserted and the object 51 to be secured in position can be firmly supported. As the bolt 50 is turned in the nut 27, the nut will be drawn longitudinally in the shield to some such position as that illustrated in Fig. 3 if this end of the shield has not been fully expanded by the previous operation. In this figure it will be seen that the shield is expanded into firm gripping engagement with the wall opening by the nut and by the sleeve.

Another method of expanding this shield would be to place it within the hole so that the outer end of the sleeve 33 is flush with the surface of the wall or slightly protruding. The work 51 is then placed in position and the bolt 50 inserted. The bolt 50 when rotated will draw the nut 27 into the shield which in turn will move outward, wedging itself upon the sleeve 33, so that both ends of the shields 20 and 21, are expanded simultaneously. The guide fingers 25× by contact with the work 51 will limit the outward movement of the shield 21.

The forms of the invention illustrated in Figs. 14 to 18 inclusive are used in the same manner as those illustrated in the preceding figures and, therefore, a description of the use thereof is not deemed necessary.

The corners of nut 27 and of the sleeve 33 are drawn into the interior of the shield in the fully expanded positions and there is no tendency for them to be released when the bolt 50 is removed. The bolt can be removed at will without disturbing the shield.

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. In combination, an expansion shield comprising a plurality of sections, each section having a plurality of longitudinally extending fingers at each end thereof, said

fingers being tapered in width, and expanding elements disposed within said fingers.

2. In combination, an expansion shield comprising a plurality of sections, each section having a plurality of longitudinally extending fingers at each end thereof, said fingers being tapered in width, and expanding elements disposed within said fingers, one of said expanding elements having flat surfaces engaged by the inner surfaces of the fingers.

3. In combination, an expansion shield comprising a plurality of sections, each section having a plurality of longitudinally extending fingers at each end thereof, said fingers being tapered in width, and expanding elements disposed within said fingers, one of said expanding elements having flat surfaces engaged by the inner surfaces of the fingers and having portions disposed between said fingers.

4. A bolt anchor comprising a sheet metal expansion shield having longitudinally extending fingers with inturned end portions and a tapered sleeve for expanding said shield having slots receiving the inturned ends of the fingers, the ends of the slots limiting the movement of the sleeve relative to the shield.

5. A bolt anchor comprising an expansion shield having longitudinally extending fingers with inturned end portions and a tapered sleeve for expanding one end portion of said shield having slots receiving the inturned ends of the fingers, and a tapered expanding element for the other end of said shield.

6. A bolt anchor comprising a shield having expansible portions and a sleeve adapted to expand said portions and having a slot therein intermediate the ends thereof, said shield having a tab received in said slot and confined by the ends thereof.

7. In a bolt anchor, an expansion shield comprising a plurality of sections, each section having longitudinally extending fingers at each end thereof and a pair of tapered expanding elements adapted to travel longitudinally in said shield and expand said fingers, said expanding elements having flat surfaces engaged by said fingers.

8. A bolt anchor comprising an expansion shield having longitudinally extending tapered fingers at both ends thereof and expanding elements disposed within said fingers, one of said expanding elements consisting of an elongated sleeve extending beyond the end of the shield, said elongated sleeve being provided with longitudinal slots, and the ends of some of the tapered fingers at the end of the shield within which said sleeve is disposed being inturned to engage said slots.

9. A bolt anchor comprising an expansion shield having longitudinally extending tapered fingers at both ends thereof and expanding elements disposed within said fingers, one of said expanding elements consisting of an elongated sleeve extending beyond the end of the shield, said elongated sleeve being provided with longitudinal slots shorter than said sleeve, and the ends of some of the tapered fingers at the end of the shield within which said sleeve is disposed being inturned to engage said slots, the engagement of the inturned fingers with the ends of the slots being arranged to limit the longitudinal movement of the sleeve.

10. A bolt anchor comprising an expansion shield having longitudinally extending spaced fingers at each end thereof and an expanding element at each end of said shield having substantially flat surfaces engaged by the inner surfaces of said fingers and parallel to the shield axis.

11. A bolt anchor comprising an expansion shield having longitudinally extending spaced fingers at each end thereof and an expanding element at each end of said shield having substantially flat surfaces contacting with the inner surfaces of said fingers and parallel to the shield axis and having portions extending between said fingers.

12. A bolt anchor comprising an expansion shield having longitudinally extending spaced fingers at each end thereof and an expanding element at each end of said shield having substantially flat surfaces adjacent said fingers, one of said expanding elements having a slot therein and one of the fingers having an offset end received in said slot whereby relative movement between the said slotted element and the shield is limited.

13. A bolt anchor comprising an expansion shield having longitudinally extending fingers at each end thereof, a threaded expanding element disposed within said fingers at one end of the shield and a sectional hollow tubular expanding element at the other end of the shield, and means engaging the sections of the tubular element for limiting the movement of said element relative to said shield.

14. A bolt anchor comprising an expansion shield having longitudinally extending fingers and a hollow sleeve for expanding the shield and having flat surfaces contacting with said fingers, and means for limiting the movement of said sleeve relative to said shield.

15. A bolt anchor comprising an expansion shield having longitudinally extending fingers and a hollow sleeve for expanding the shield and having flat surfaces contacting with said fingers, and means for limiting the movement of said sleeve in both directions relative to said shield.

In witness whereof, I hereunto set my hand this 17th day of May, 1923.

JOHN EDWARD OGDEN.