Oct. 2, 1923. 1,469,665

H. W. PLEISTER ET AL

BOLT ANCHOR

Original Filed June 17, 1922

Fig 2

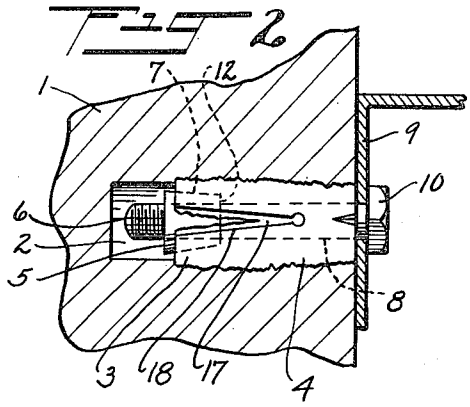



Fig 1

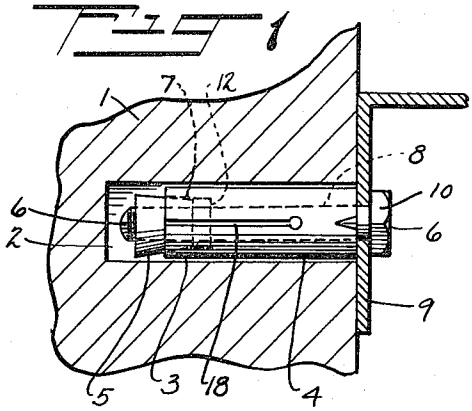



Fig 3

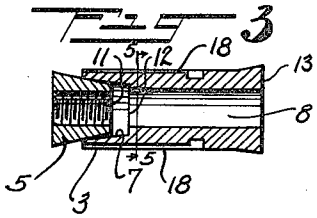



Fig 4

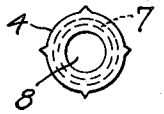



Fig 5

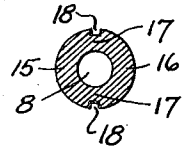



Fig 6

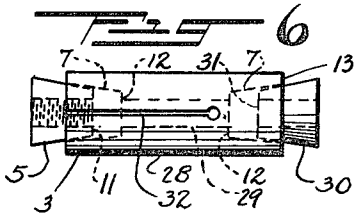



Fig 7

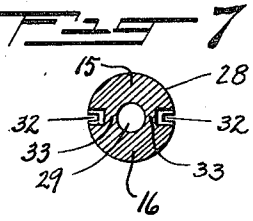
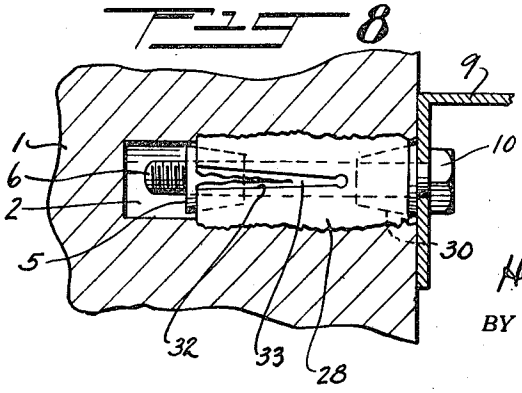



Fig 8




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# UNITED STATES PATENT OFFICE.

HENRY W. PLEISTER, OF WESTFIELD, AND JOHN KARITZKY, OF GARWOOD, NEW JERSEY; SAID PLEISTER ASSIGNOR TO HENRY B. NEWHALL AND SAID KARITZKY ASSIGNOR TO HENRY B. NEWHALL, AS EXECUTOR OF HENRY B. NEWHALL, SR., DECEASED.

## BOLT ANCHOR.

Original application filed June 17, 1922, Serial No. 569,129. Divided and this application filed June 2, 1923. Serial No. 642,930.

*To all whom it may concern:*

Be it known that we, HENRY W. PLEISTER, a citizen of the United States, residing at Westfield, in the county of Union and State of New Jersey, and JOHN KARITZKY, a citizen of the United States, residing at Garwood, in the county of Union and State of New Jersey, have made certain new and useful Improvements in Bolt Anchors, of which the following is a specification, taken in connection with the accompanying drawings.

This application is a division of our copending application Ser. No. 569,129 filed June 17, 1922, required by the Patent Office to be divided out of said parent application.

Our invention relates to bolt anchors. More particularly it relates to a ductile shield adapted to have a portion of the shield placed under tension, and another portion under compression so that the metal of the shield will flow into the voids and irregularities of the surface of the hole within which the shield is mounted.

Our invention further relates to a ductile shield provided with a tapered and a connected cylindrical bore there being a stop or shoulder between the two bores.

Our invention further relates to such a bolt anchor in which the shield and cone, or expanding member, are formed of materials of different strength, the expanding cone being of greater hardness and less ductility than the shield.

Our invention further relates to forming the shield of some ductile material, as aluminum, brass, fibre, lead or an alloy, so that when it is expanded the metal will flow, more or less, into the irregularities and voids of the wall of the hole. The expanding cone is formed of some harder material, as for example, iron, which may or may not be galvanized.

Our invention further relates to certain combinations, details of construction, and articles of manufacture, which will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings the same reference numerals refer to similar parts in the several figures.

Fig. 1 is a vertical section through a wall or other suitable support, showing one form of our bolt anchor located therein and prior to being expanded;

Fig. 2 is a view similar to Fig. 1, but showing the ductile shield after it has been expanded;

Fig. 3 is a horizontal section through the shield and expanding member shown in Fig. 1;

Fig. 4 is an end elevation of the shield shown in Fig. 1;

Fig. 5 is a cross-section on the line 5—5 of Fig. 3;

Fig. 6 is a side elevation of a modification in which two expanding members are used;

Fig. 7 is a vertical section;

Fig. 8 is a vertical section through a wall or other suitable support showing the bolt anchor of Fig. 6 in its expanded position.

Our invention broadly covers a ductile shield which is adapted to be expanded by placing a portion of the shield under tension and another portion under compression.

Our invention also broadly covers a ductile shield having a tapered bore and a cylindrical bore, there being a stop or shoulder or other member stopping the expanding member operating in the tapered bore, from cooperating with the cylindrical bore except under certain conditions. This insures that there will be first a tension of the metal and an expansion at the end of the ductile shield in which the tapered bore is located. This is usually at the inner end removed from the face of the wall or other suitable support 1. After a portion of the ductile shield has been expanded by the expanding member cooperating with the tapered bore, the ductile shield is then further expanded by placing another portion of the ductile shield under compression, which will cause the shield to be shortened in length but increased in diameter. This results in two separate and distinct expansions of the ductile metal both of which add to the hold or grip of the bolt anchor or shield within the hole 2 of the wall or other suitable support 1.

It is well known that in drilling a hole 2, in a wall or other suitable support 1, of

manufactured stone or brick, cement or natural stone, there is a certain dislodgment of pebbles or sand and hard particles constituting the mass. In our invention we insure that the inner end 3 of the shield 4 will fill up all these inequalities or voids in the surface of the hole 2 that lie adjacent the end 3. The expansion at the inner end may be made in any suitable manner, such as by the threaded cone 5 cooperating with the screw-threads upon the bolt or screw 6. This cone cooperates with a tapered bore 7 and with a screw or bolt 6 which passes through the cylindrical bore 8, after having been first passed through the work 9. The parts are then in the position shown in Fig. 1.

By rotating the head 10 of the bolt 6, in any suitable manner, the cone 5 is caused to cooperate with the tapered bore 7 by being drawn to the right of Fig. 1 or towards the work 9. This will then cause the cone 5 to place the metal at the end 3 under tension and expand the shield 4 at that end. The expansion of the end 3 continues until the end 11 of the cone 5 contacts with the stop or shoulder 12, Fig. 3. As soon as the cone 5 reaches the stop or shoulder 12 further rotation of the bolt or screw 6 places that portion of the metal of the shield 4 between the stop or shoulder 12 and the end 13, Fig. 3, under compression, which serves to slightly shorten the length of the shield 4 and at the same time increases its diameter, so that throughout practically the entire circumference of the shield, first by exerting tension and then compression, the metal will flow radially and fill up the voids and irregularities in the walls of the hole 2. The shoulder 12 normally prevents the cone 5 from working too easily into the cylindrical bore. When it is desired to get the maximum grip of the shield the shoulder 12 serves to retard the cone nut 5 from working into the cylindrical bore 8, but, when the maximum strain is thrown on the shield the nut will work into the cylindrical bore and add a wedging or expanding strain to the expansion of the shield, due to the conical nut cooperating with the tapering bore 7, and also due to compressing the shield longitudinally.

By forcing the metal of the ductile shield to flow into the inequalities or irregularities or voids we obtain a particularly strong union or hold with the wall or other suitable support, our bolt anchor making a much stronger union or hold than bolt anchors of the same size now on the market. In Fig. 2 the expansion or flowing of the metal of the shield into the inequalities or voids of the wall 2 has been purposely exaggerated to more clearly illustrate the invention.

The particular contour and shape of the ductile shield may vary. In the drawing, showing one form of our invention, the ductile shield 4 is provided with a plurality of integral members or tines 15, 16 connected together by integral members 17, 17 of less thickness than the tines 15 and 16 forming grooves 18, 18.

When the hole 2 is correctly drilled so that the ductile shield 4 will just fit the hole 2, the expansion shield may be expanded by simply stretching the webs 17, 17 to expand the integral tines 15 and 16. In other cases, when the hole 2 is a little large, or the walls or other supports 1 are soft, and full of irregularities or voids then, the webs 17, 17 will be fractured or broken when the tines 15 and 16 are expanded as shown in Fig. 2.

In Figs. 6, 7 and 8 we have shown a modification of our invention, in which the ductile shield 28 is formed with two tapered bores 7, 7 ending in stops or shoulders 12, 12 the two tapered bores being connected by a single cylindrical bore 29. Within the inner tapered bore 7, we mount the same conical screw-threaded cone 5. Within the other tapered bore 7 we mount an unthreaded cone 30. In this form of our invention, the bolt or screw 6 is passed through the work 9, thence through the unthreaded cone 30, cylindrical bore 29 and into the screw-threads of the cone 5. By rotating the head 10 of the bolt or nut 6, the cone 5 is caused to move down its tapered bore 7, which at the same time causes the ductile shield 28 to move up the cone 30, the work being held between the cone 30 and the head of the nut or screw 10. The effect is to cause the cone 30 to also move down or cooperate with its tapered bore 7. When the end 11 of the cone 5 reaches its shoulder or stop 12, and when the end 31 of the unthreaded cone 30 reaches the shoulder or stop 12 on the right of Fig. 6, further movement along the different tapered bores 7, 7 is arrested. Further rotation of the nut or bolt 6 will then cause the metal of the shield between the stops or shoulders 12, 12 to be compressed, which will tend to shorten the length of the shield 28 and at the same time increase its diameter, permitting the ductile metal to fill up all the voids and inequalities within the surface of the hole 2 in the wall 1.

The shoulders or stops 12, 12 normally prevent the cones from working too easily into the cylindrical bore 29. When it is desired to get the maximum grip of the shield, the shoulders 12, 12 serve to retard the cones 5 and 30 from working into the cylindrical bore 29, but when the maximum strain is thrown on the shield the cones will work into the cylindrical bore and add a wedging or expanding strain to the expansion of the shield, due to the conical nuts cooperating with the cylindrical bore 29, and also due to compressing the shield longitudinally.

In this particular form of shield 28, we

have shown it provided with a groove 32 and a breakable web 33, the same as shown in Figs. 1 and 2 of the drawings.

The expanding member or cone 5, or cones 5 and 30, can be securely held within the ductile shield by friction, by simply giving it, or them, a slight tap or blow, which insures that the cone or cones or expanding members will not become disconnected from vibration in transportation or through rough handling thereby obviating the necessity of the purchaser or jobber going over the shipment to see whether or not all the bolt anchors are properly assembled and held together and to reassemble such as have come separated during transit. While we preferably use our invention with such shields, it is, of course, to be understood that other forms of shields may be used and that our invention is not to be limited to those illustrated and described.

Having thus described this invention in connection with an illustrative embodiment thereof, to the details of which we do not desire to be limited, what is claimed as new and what is desired to secure by Letters Patent is set forth in the appended claims.

What we claim is:—

1. A bolt anchor comprising a ductile shield having a plurality of expansible parts having integral weakened connection and provided with a tapered and cylindrical bore having a stop between the two bores and an expanding member adapted to cooperate with the tapered bore and with said stop.

2. A bolt anchor comprising a ductile shield having a plurality of expansible parts having integral weakened connection and provided with a plurality of tapered bores, and a plurality of expanding members, a cylindrical bore, and a plurality of stops between the conical bore or bores and the cylindrical bore.

3. A bolt anchor comprising a ductile shield having a plurality of expansible parts connected together by an integral breakable web and provided with a tapered and cylindrical bore having a stop between the two bores, and an expanding member adapted to cooperate with the tapered bore and with said stop.

4. A bolt anchor comprising a ductile shield having a plurality of integral expansible parts connected together having an integral breakable web, and provided with a plurality of tapered bores and a cylindrical bore, with a plurality of shoulders between the tapered bores and the cylindrical bore, and a plurality of expanding members normally located in the tapered bores.

5. A bolt anchor comprising a ductile shield having a plurality of expansible parts having integral weakened connection and provided with a tapered and cylindrical bore having a stop between the bores to normally prevent the expanding nut from working too easily into the cylindrical bore, and an expanding nut.

6. A bolt anchor comprising a ductile shield having a plurality of integral expansible members connected together by an integral breakable web and provided with a tapered and cylindrical bore having a stop between the bores to normally prevent the expanding nut from working too easily into the cylindrical bore, and an expanding nut.

7. A new article of manufacture comprising a ductile shield having a plurality of integral parts connected together by breakable means and provided with a tapered bore and a cylindrical bore there being a shoulder between the two bores.

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H. M. WILLIAMS,

Witnesses as to Karitzky:
F. W. KARITZKY,
WM. NEILL.