

No. 696,586.

Patented Apr. 1, 1902.

F. C. PALMER.

BOLT ANCHOR.

(Application filed July 9, 1901.)

(No Model.)

Fig. 3



Fig. 5

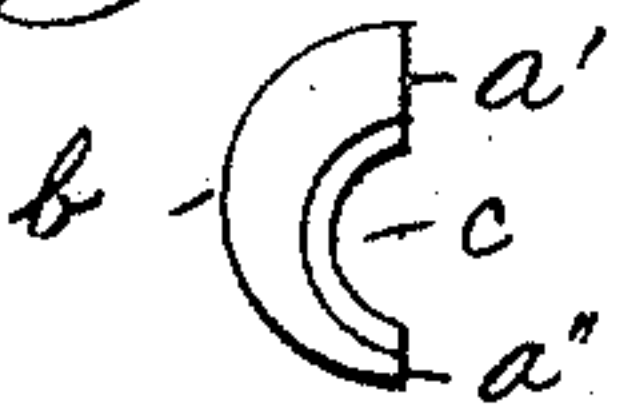


Fig. 1

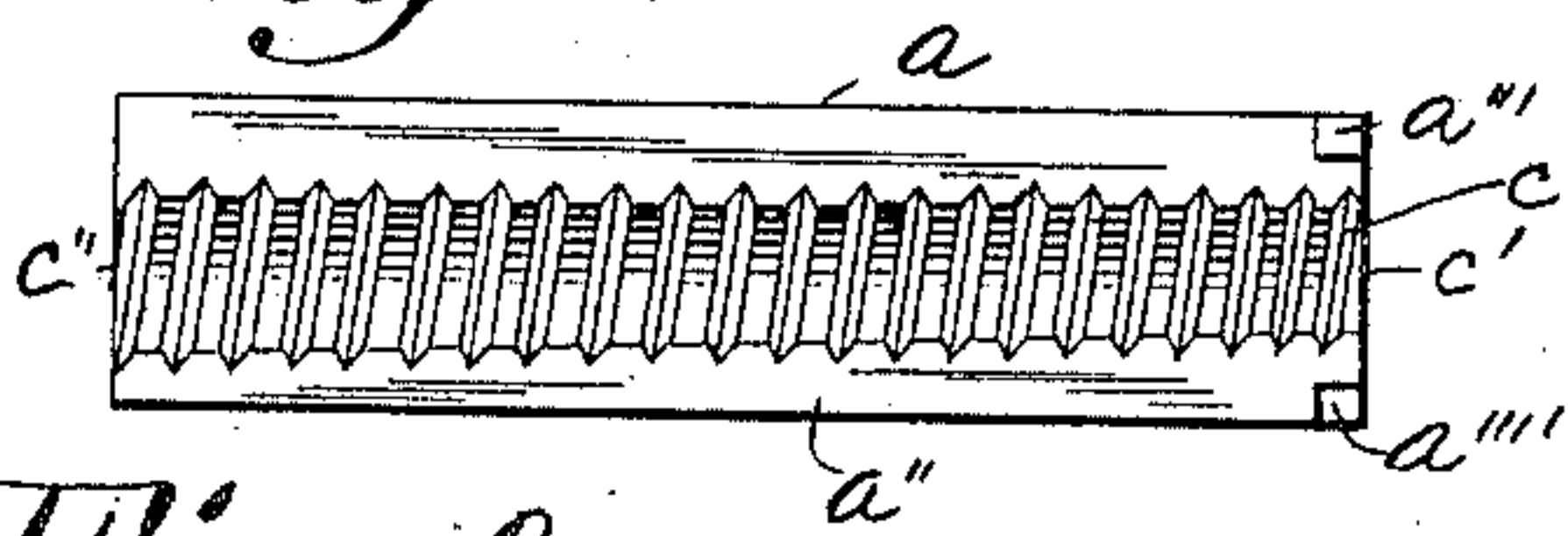


Fig. 2

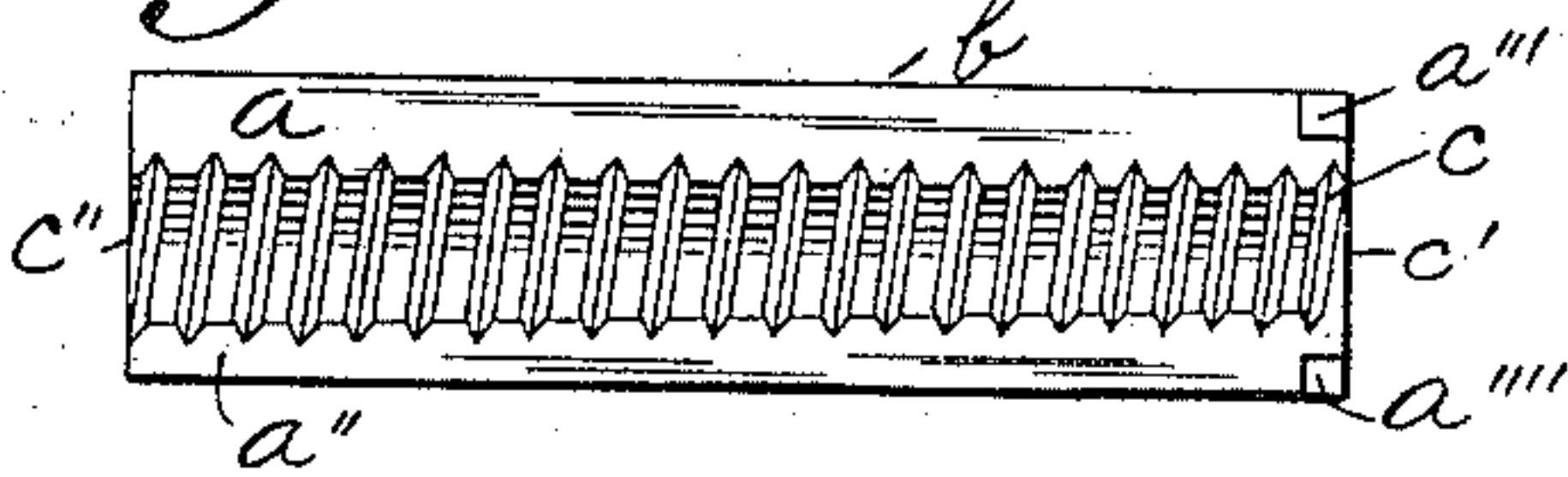


Fig. 4

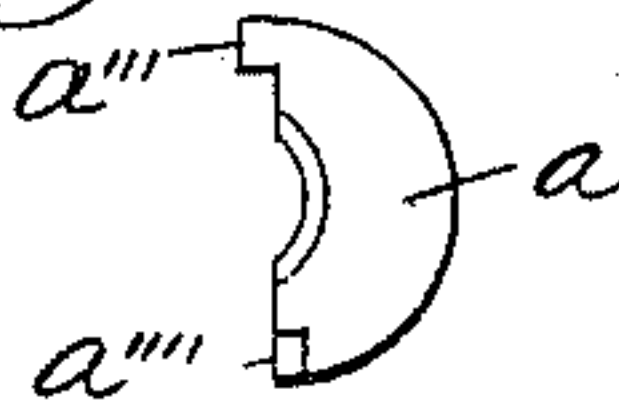


Fig. 6

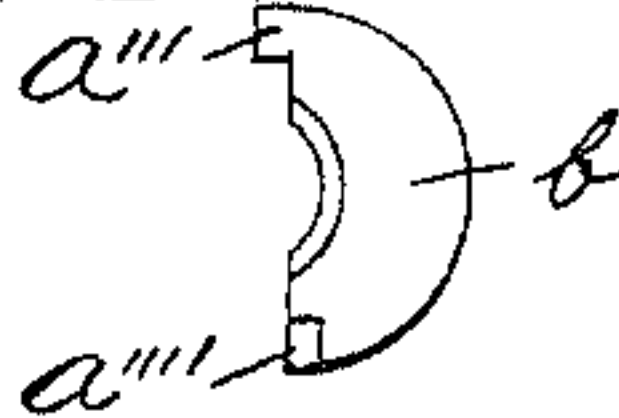


Fig. 7

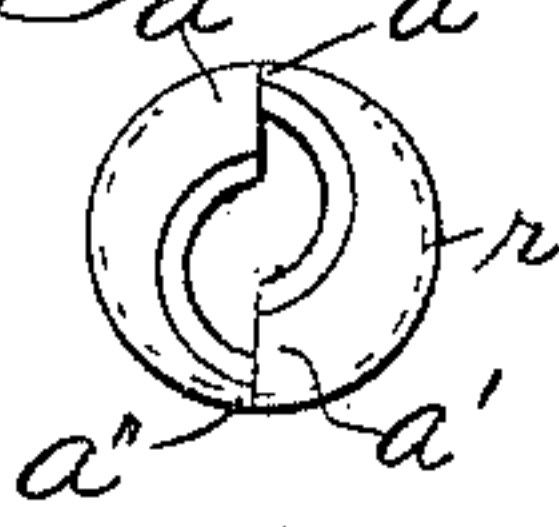


Fig. 14

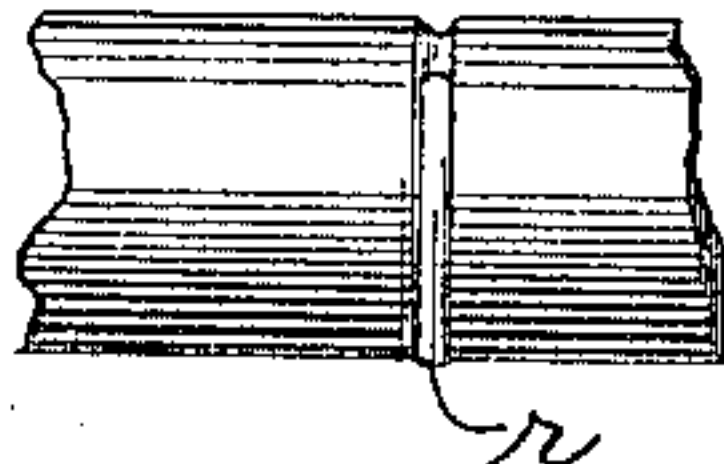


Fig. 9

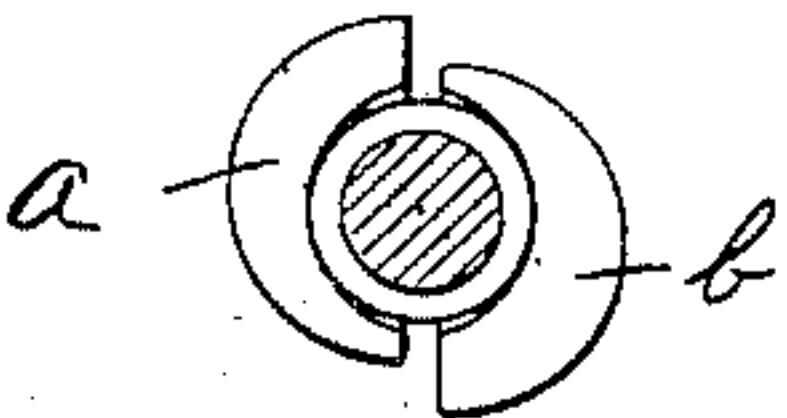


Fig. 8

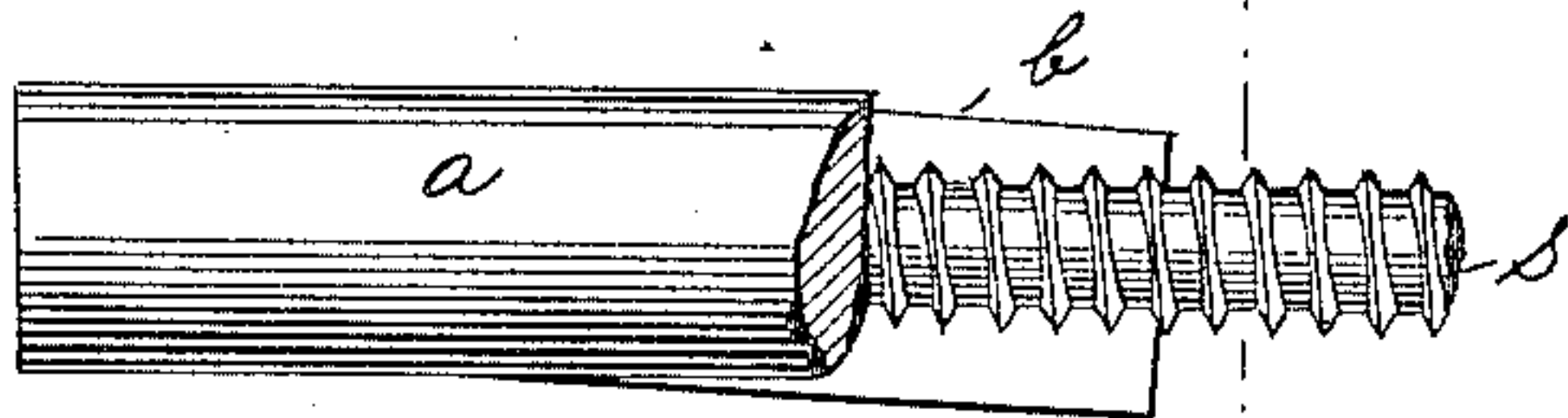


Fig. 11

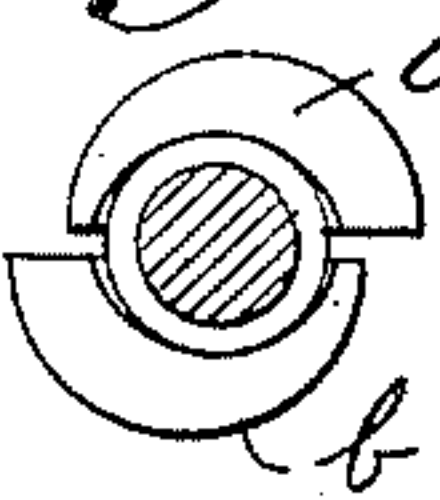


Fig. 10

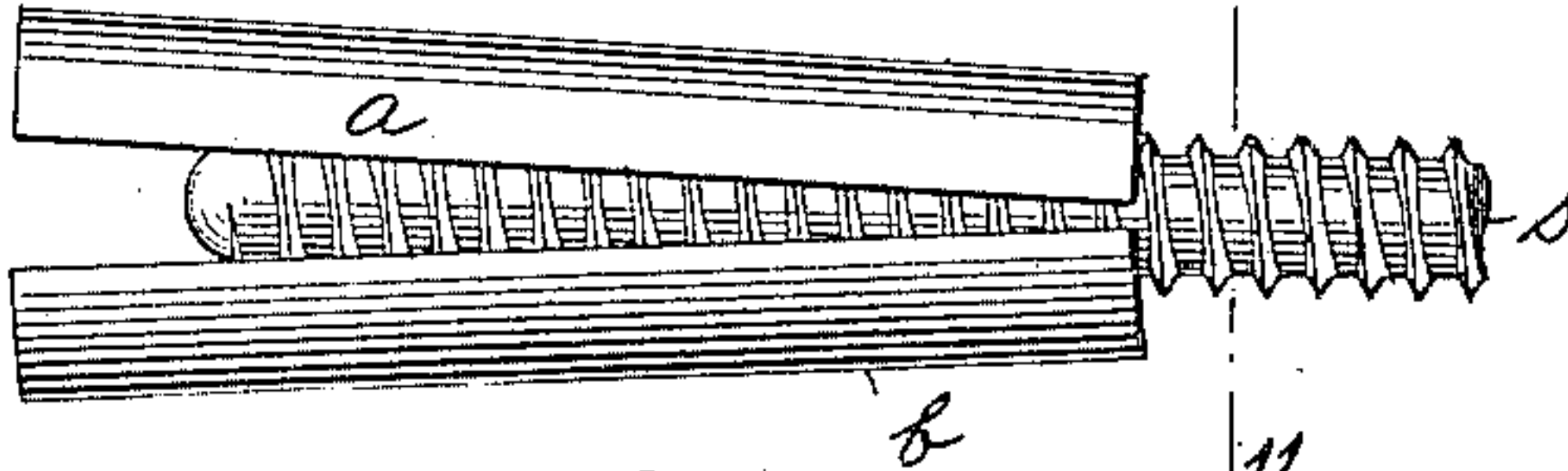


Fig. 13

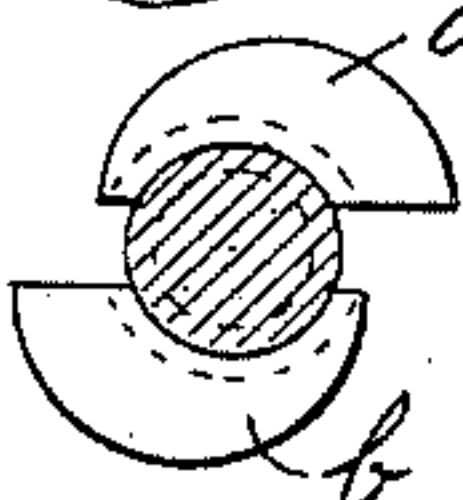
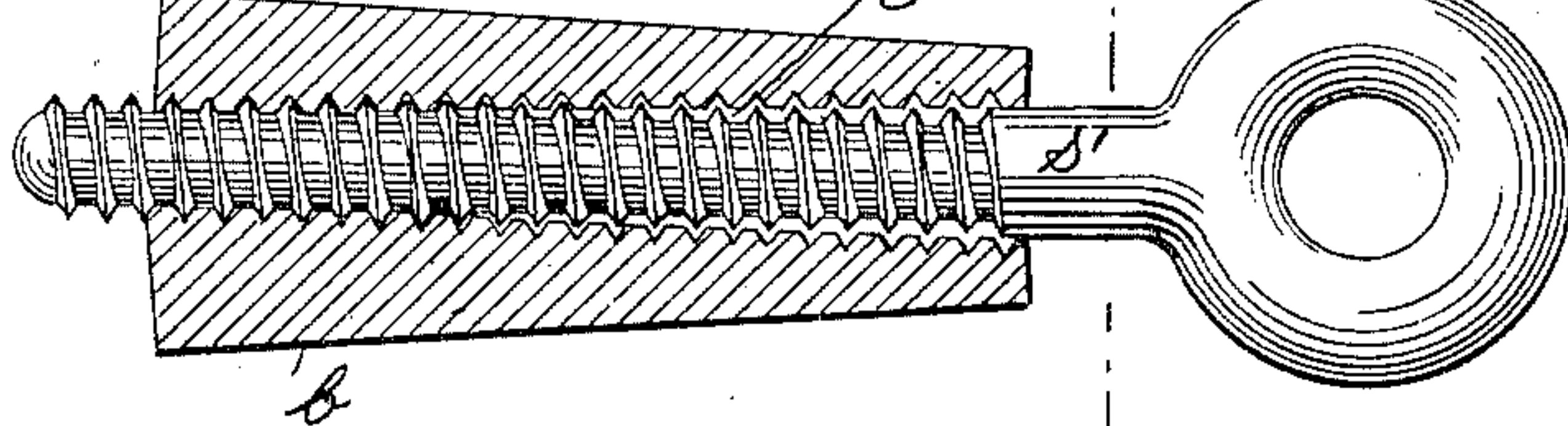


Fig. 12



WITNESSES:

L. N. Legendre

L. J. Coy

INVENTOR,

Frederick C. Palmer

BY

William R. Baird

ATTORNEY

UNITED STATES PATENT OFFICE.

FREDERICK C. PALMER, OF BROOKLYN, NEW YORK.

BOLT-ANCHOR.

SPECIFICATION forming part of Letters Patent No. 696,586, dated April 1, 1902.

Application filed July 9, 1901. Serial No. 67,610. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK C. PALMER, a citizen of the United States, residing in the borough of Brooklyn, in the city of New York, in the county of Kings and State of New York, have invented new and useful Improvements in Bolt-Anchors, of which the following is a specification.

My invention relates to bolt-anchors, and has for its object the production of a bolt-anchor which is easily inserted in place and capable of being expanded successively in more than one direction.

Heretofore bolt-anchors have commonly been made with a roughened exterior, upon the theory, possibly, that they are thus enabled to more firmly adhere to the internal surface of the aperture bored to receive them. This construction has necessitated the boring of a larger hole than was necessary to receive the body of the anchor and at the same time had the disadvantage that the points of adhesion between the exterior surface of the anchor and the interior surface of the aperture were few. To overcome these disadvantages by making a bolt-anchor which may have a smooth exterior and still be capable of expansion in such a manner as to cause a large surface of contact between the outer surface of the anchor and the inner surface of the aperture with an unusually firm hold between them. The means which I employ for expanding the anchor is an ordinary bolt adapted to fit into a tapering bore in the anchor; but my invention is distinguished from all others known to me in the fact that the tapering bore is placed at an angle to the longitudinal axis of the anchor. Usually the tapering bore is threaded internally and the bolt is threaded externally to fit therein; but smooth surfaces may be employed without materially departing from the spirit of my invention, although this construction is not so efficient as the threaded form, which I prefer.

My invention also consists in the means employed to retain the parts of the anchor in place for packing and for properly registering the same in position.

In the drawings, Figure 1 is a plan view of one piece of the anchor when the same is made of two pieces only. Fig. 2 is the same view of the second piece of the anchor. Fig. 3 is a

view of one end of the piece shown in Fig. 1, and Fig. 4 is a view of the other end thereof. Fig. 5 is a view of one end of the piece shown in Fig. 2, and Fig. 6 is the other end thereof. Fig. 7 is an end view of the anchor with the two parts placed in juxtaposition, the retaining-ring being shown in dotted outline. Fig. 8 is a partial longitudinal section and elevation of a part of the anchor and bolt, showing the position of the anchor in place and the effect of the first expansion. Fig. 9 is an end elevation and partial section on the plane of the line 9 9 in Fig. 8. Fig. 10 is a partial elevation of the anchor and part of the bolt, showing the second expansion; and Fig. 11 is an end elevation of the anchor and section of the bolt on the plane of the line 11 11 in Fig. 10. Fig. 12 is a longitudinal section of the anchor and elevation of the bolt, showing the third expansion; and Fig. 13 is an end elevation and partial section on the plane of the line 13 13 in Fig. 12. Fig. 14 is a side elevation of a part of the anchor, showing a part of the retaining-ring in place.

The device is shown in Figs. 8, 10, and 12 in reversed position from that of Figs. 1 and 2, the end of the anchor which first enters the aperture to receive it being on the right in Figs. 1 and 2 and on the left in Figs. 8, 10, and 12.

In the drawings, *a* represents one of the pieces of which my bolt-anchor is formed, and *b* represents the other. Each is provided with a centrally-threaded bore *c*, tapering from one end to the other. This bore *c* is placed at an angle to the longitudinal central axis of the anchor. For instance, in Figs. 1 and 2 it is shown so placed that the center *c'* of the smaller end of the bore *c* is coincident with the axis of the anchor and of each of the pieces *a* and *b* at that point; but its center *c''* at the larger end of the bore is eccentric to said axis, so that the axis of the bore makes an acute angle with the axis of the anchor and of each of the pieces *a* and *b*. Looking at the ends of the pieces *a* and *b*, where the bore is largest, it is seen that the surface *a'* is larger than the surface *a''*, owing to the diagonal position of the bore. At the inner ends of the pieces *a* and *b* each piece is provided with a projection, as *a'''*, and a corresponding depression, as *a''''*, adapted to cause the pieces

to accurately register with each other. When the anchor is placed in position for use, as shown in Fig. 7, the piece *a* is placed along-side of the piece *b*, so that the surfaces *a'* and *a''* in the piece *a* are opposite to the surfaces *a''* and *a'* in piece *b*. The retaining-ring *r*, which is made of metal or other suitable material and which only passes part way around the two pieces in a groove made for that purpose, serves to hold the two pieces in a proper adjacent position for service in the aperture formed in the piece of stone or other material adapted to receive them.

The method of using my anchor is shown in Figs. 8 to 13. Supposing the pieces *a* and *b* to have been held together by the retaining-ring *r* and inserted into the aperture formed to receive them, the bolt *s* is then introduced into the larger end of the bore *c*. Being rotated, this bolt *s*, accurately fitting into the threads of the bore *c*, causes a lateral displacement of the pieces *a* and *b*, as shown in Figs. 8 and 9. This displacement presents to the inner surface of the aperture in the stone two relatively broad surfaces which effectually prevent any rotation of the pieces *a* and *b* under the action of the rotation of the bolt. The rotation of the bolt *s* being continued, the forward motion of the same into the smaller part of the tapering bore causes an expansion of the pieces *a* and *b* at the inner end of the aperture, as shown slightly exaggerated in Fig. 10, the relative position of these pieces at the outer end of the aperture remaining the same as in Fig. 9. As the rotation of the bolt is further continued a point is finally reached where the shank *s'* of the bolt is forced in between the two pieces *a* and *b* and lifts them apart, thus forming an expansion of these two pieces at the outer end of the aperture. The bolt has thus been compelled to expand, first, in a lateral direction; second, at its inner end, and, thirdly, at its outer end, giving it a grip upon the interior surface of the aperture unique in its efficiency.

While I have described this bolt-anchor as being made of two pieces only, it is obvious that any convenient number of pieces may be employed, provided the principle of having the tapering bore at an angle to the axis of the anchor is retained. It is also obvious that a smooth tapering bolt and a smooth tapering bore will accomplish, in effect, the same purpose as is accomplished by the threaded bolt and the threaded bore, but with less efficiency.

The slight projections *a'''* and indentations *a''''* upon the pieces *a* and *b* suffice to register these pieces and to secure their easy adjustment in place; but of course any other means of registration accomplishing the same purpose may be substituted therefor. I may

also extend the principle of my invention one degree farther by making the center of the tapering bore at its middle point coincident with the middle point of the longitudinal axis of the anchor instead of coincident with the longitudinal axis of the anchor at the smaller end of the bore. In this case the expansion would be in four directions, as will readily be perceived.

Having described my invention, what I claim as new is—

1. A bolt-anchor having a tapering bore placed at an angle to the longitudinal axis of the anchor.
2. A bolt-anchor having a tapering threaded bore placed at an angle to the longitudinal axis of the anchor.
3. A bolt-anchor having a tapering threaded bore placed at an angle to the longitudinal axis of the anchor, but having the center of the smaller end of said bore coincident with said axis.
4. A bolt-anchor formed of a plurality of pieces and provided with a tapering threaded bore placed at an angle to the longitudinal axis of the anchor.
5. A bolt-anchor formed of a plurality of pieces and provided with a tapering threaded bore placed at an angle to the longitudinal axis of the anchor but having the center of the smaller end of said bore coincident with said axis.
6. A bolt-anchor having a smooth external surface and provided with a tapering threaded bore placed at an angle to the longitudinal axis of the anchor.
7. A bolt-anchor having a smooth external surface and provided with a tapering threaded bore placed at an angle to the longitudinal axis of the anchor but having the center of the smaller end of said bore coincident with said axis.
8. A bolt-anchor having a tapering threaded bore placed at an angle to the longitudinal axis of the anchor and provided with an external retaining-ring.
9. A bolt-anchor having a tapering threaded bore placed at an angle to the longitudinal axis of the anchor and provided with an external retaining-ring fitting into a groove provided therefor.
10. A bolt-anchor formed of a plurality of pieces and provided with a tapering threaded bore placed at an angle to the longitudinal axis of the anchor and provided with means for registering the pieces.

Witness my hand this 1st day of July, 1901, in the presence of two subscribing witnesses.

FREDERICK C. PALMER.

Witnesses:

HERMAN MEYER,
MABEL K. WHITMAN.