

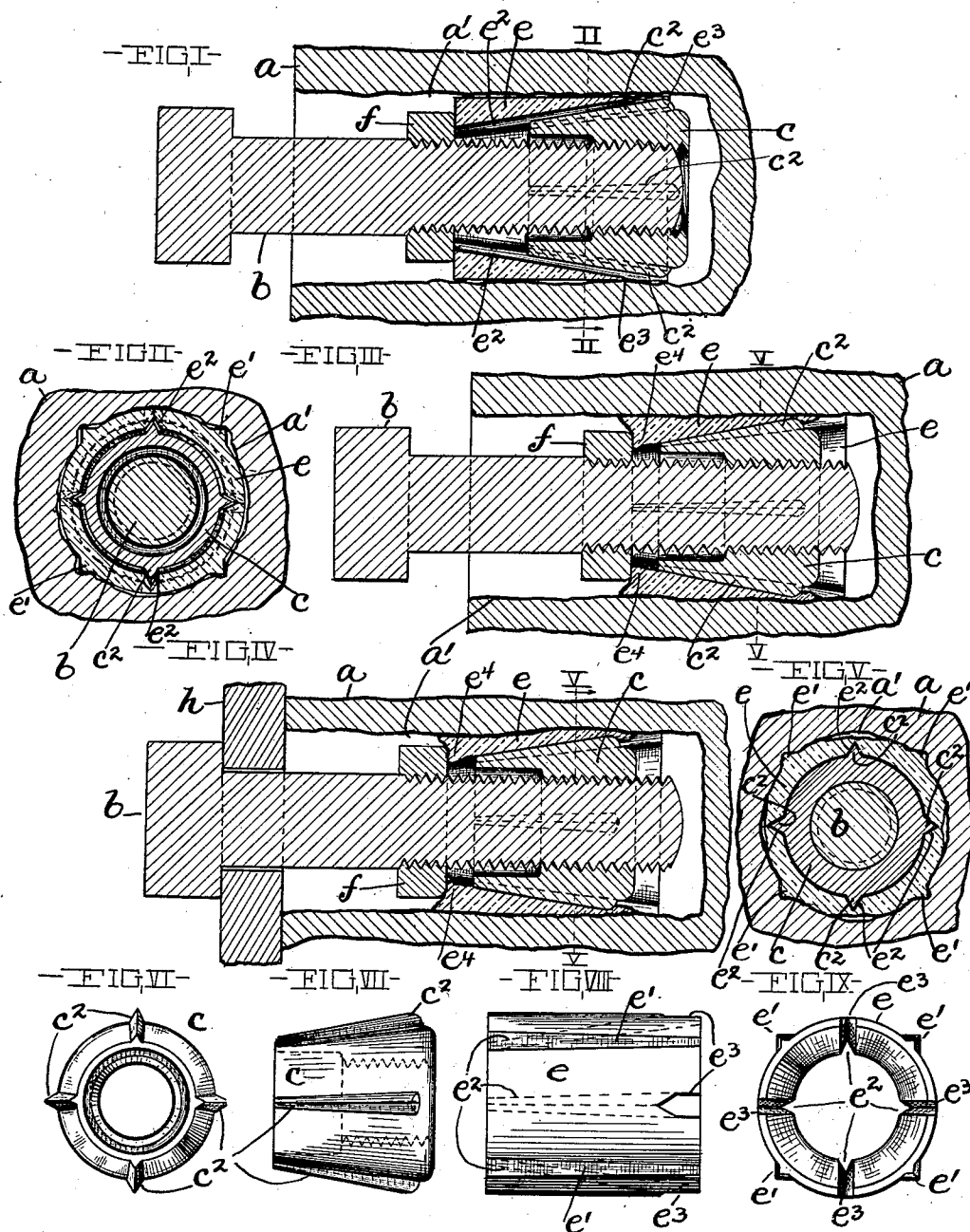
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Patented May 21, 1901.

J. C. SUMMERER.
EXPANSION BOLT.

(Application filed Apr. 14, 1900.)

(No Model.)



WITNESSES:
Daniel E. Daly.
Victor C. Lynch.

INVENTOR
John C. Summerer.
BY
Victor C. Lynch
his ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN C. SUMMERER, OF CLEVELAND, OHIO.

EXPANSION-BOLT.

SPECIFICATION forming part of Letters Patent No. 674,715, dated May 21, 1901.

Application filed April 14, 1900. Serial No. 12,808. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. SUMMERER, a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Expansion-Bolts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in expansion-bolts or fastening devices for attaching sign-boards, beams, and other objects to the wall of a building and necessitating only the making of a hole within the outer portion of the wall for the reception of the bolt or fastening device.

The invention relates also to the method of applying my improved fastening device.

The object of this invention is to provide a fastening device of the character indicated that is simple and durable in construction, that can be readily applied, and that is exceedingly reliable in its operation and in the performance of the function for which it is designed.

In the accompanying drawings, Figure I is a sectional view of a wall provided with a hole or aperture into which my improved expansion-bolt has been introduced, and in this figure the bolt is shown in central longitudinal section. Fig. II is a transverse vertical section on line II II, Fig. I, looking inwardly. Fig. III is a sectional view corresponding with Fig. I, except that in Fig. III the expansible collar or shell of the fastening device is shown expanded. Fig. IV is a sectional view corresponding with Fig. III, except that in Fig. IV a sign-board is shown held in place against the outer side of the wall. Fig. V is a transverse section on line V V, Figs. III and IV, looking inwardly. Fig. VI is an end elevation of the shell-expanding sleeve-nut of the fastening device, and Fig. VII is a side elevation of the same. Fig. VIII is a side elevation of the expansible shell or collar, and Fig. IX is an end elevation of the same.

Referring to the drawings, *a* designates a wall of cement, stone, or brick, that is provided within the outer side thereof with an aperture or hole *a'*, that in the case illustrated is open at the outer side of the wall.

The hole *a'* is made large enough to accommodate the reception of my improved expansion-bolt or fastening device that is employed in securing a sign-board or other object to the aforesaid side of the wall. The fastening device comprises an ordinary bolt *b*, a nut or internally-screw-threaded sleeve *c*, mounted upon and engaging the free end of the correspondingly-threaded shank of the bolt, an expansible collar or shell *e*, that embraces and is adapted to be expanded by the sleeve-nut *c*, and a nut *f*, that is mounted upon the inner end of the threaded portion of the bolt's shank, between the plain portion of the shank and the aforesaid shell or collar. The surrounding wall of the bore or the shell *e* flares toward the inner end of the shell, and said shell is cylindrical externally. The shell *e* is provided externally with a plurality of ribs *e'*, preferably four in number, that are arranged at suitable intervals circumferentially of the shell and extend longitudinally and preferably from end to end of the shell. The ribs *e'* are somewhat enlarged in thickness toward the outer end of the shell *e*. The bore of the shell *e* is gradually enlarged diametrically, as already indicated, in the direction of the free end of the bolt's shank, and the surrounding wall of the said bore is provided with a plurality of grooves or channels *e''*, that are preferably V-shaped in end elevation and arranged at suitable intervals circumferentially of the bolt and extending longitudinally of and preferably from end to end of the shell. The ribs *e'* and the grooves *e''* of the shell *e* preferably alternate, as shown very clearly in Fig. IX, wherein the ribs *e'* and the grooves *e''* are arranged externally and internally, respectively, of the shell and alternately at equal intervals around the shell.

Sleeve-nut *c* is gradually reduced diametrically in the direction of the head of the bolt and extends normally into the diametrically larger end of the bore of the shell *e*, as shown in Fig. I. The sleeve-nut *c* is provided upon its external surface with as many angular or V-shaped ribs or tongues *c'* as there are grooves *e''* formed in the shell *e*, and the tongues *c'* are preferably enlarged in thickness in the direction of the diametrically larger end of the said nut *c*. The ribs

or tongues c^2 are arranged, therefore, at equal intervals circumferentially of the nut c and extend longitudinally of the nut and normally engage the grooves e^2 of the shell e , as shown in Figs. I and II.

In the normal position of the parts, as shown in Figs. I and II, the nut c engages the larger end of the bore of the shell e , and the shell's outer end at the diametrically smaller end of its bore is engaged by the nut f , that is mounted upon and engages the threaded portion of the bolt's shank next to the plain portion of the said shank.

The hole a' , that is made in the wall a for the reception of the expansion-bolt, is just large enough to require force in the introduction of the device into the said hole—that is, the expansion-bolt must be driven into the hole a' so as to cause the ribs e' upon the shell e to become partially embedded within the surrounding wall of the hole during the said introduction of the device into the said hole.

The nut f prevents endwise displacement of the shell e in the direction of the head of the bolt during the introduction of the device into the hole a' and prevents bodily displacement of the said shell during the expansion of the shell subsequently. Obviously the embedding of the ribs e' within the surrounding wall of the hole a' prevents the turning of the shell e circumferentially of the bolt during the operation of the sleeve-nut c . The engagement of the ribs or tongues c^2 of the said nut c with the grooves e^2 of the shell e prevents circumferential displacement of the said nut c independently of the shell e , and consequently the nut c is rendered stationary with the shell e so far as turning upon the bolt is concerned. The shell e is preferably composed of lead or equivalent material that is readily expandable, although the said shell may be composed of any material—such, for instance, as malleable metal—especially when the said collar is slotted laterally and longitudinally at suitable intervals circumferentially of the bolt, as shown at e^3 in Figs. VIII and IX, wherein the said slots e^3 are formed in line with the grooves e^2 . A shell e , slotted laterally, as illustrated, would possess lateral expansibility.

The relative size and arrangement of the parts are such that when the expansion-bolt has been placed in position within the hole a' , as shown in Figs. I and II, the thereupon turning of the bolt in the required direction will result in the actuation of the sleeve-nut c in the direction of the head of the bolt, and thereby cause the nut c to enter the shell e still farther and result in a lateral expansion of the said shell in all directions circumferentially of the bolt and cause the ribs e' of the shell to be still further embedded within the surrounding wall of the hole a' and to cause the shell to conform to and tightly engage the said wall. The shell e will also be expanded somewhat longitudinally and over

the ends of the nut c , as shown at e^4 in Fig. III, and the engagement of V-shaped ribs or tongues c^2 upon the sleeve-nut c with the grooves e^2 in the surrounding wall of the bore of the shell e will during the tightening of the device facilitate the expansion of the shell e and be particularly instrumental in displacing material from the said shell in opposite directions, respectively, at opposite sides, respectively, of the grooves e^2 toward the ribs e' , and the result will be a very firm fixing of the device to the wall, and the nut c will be firmly fixed within the shell e , so as to accommodate the unscrewing or withdrawal of the bolt b preparatory to the placing in position of the sign-board or other object h (see Fig. IV) that is to be secured to the wall.

When the shell e and the engaging nut c are fixed within the hole a' , as hereinbefore described, the bolt c , with the nut f upon it, is withdrawn from the hole by unscrewing the bolt from the nut c , whereupon the sign-board or other object that is to be secured to the wall is placed in position, and thereupon the bolt is passed through the said object that is provided with a hole for the reception of the bolt and again introduced into the wall and screwed into the nut c , as shown in Fig. IV. The nut f is of course removed from the bolt preparatory to the passage of the bolt through the sign-board or object that is to be supported from the wall and may or may not be returned to its former position upon the bolt; but preferably the said nut is again placed upon the bolt, because the presence of this nut upon the bolt upon returning the latter into engagement with the sleeve-nut c will positively prevent any endwise displacement of the shell e during the reintroduction of the said bolt.

What I claim is—

1. A device of the character indicated, comprising a bolt, a nut engaging the threaded portion of the bolt and reduced diametrically in the direction of the head of the bolt, an expandable collar or shell embracing the said nut and having its bore enlarged diametrically in the direction of the larger end of the nut, tongue-and-groove connections formed upon and between the opposing surfaces of the nut and nut-embracing shell and arranged longitudinally of the said parts at suitable intervals circumferentially of the parts, and a removable abutment f upon the shank of the bolt for the end of the expandable shell at the smaller end of the bore of the said shell, substantially as and for the purpose set forth.

2. A device of the character indicated, comprising a bolt, a nut engaging the threaded portion of the bolt and reduced diametrically in the direction of the head of the bolt, an expandable collar or shell embracing the said nut and having its bore enlarged diametrically in the direction of the larger end of the nut, tongue-and-groove connections formed

upon and between the opposing surfaces of the nut and the nut-embracing shell and arranged longitudinally of the said parts at suitable intervals circumferentially of the parts, and the nut *f* mounted upon the shank of the bolt and forming an abutment for the end of the expansible shell at the smaller end of the bore of the said shell, substantially as and for the purpose set forth.

10 3. A device of the character indicated, comprising a bolt *b*, the externally-tapering nut *c* having the external tongues *c*², the expansible collar or shell *e* having the internal grooves or channels *e*² and the external ribs *e*¹, and the nut *f*, all arranged and operating substantially as shown, for the purpose specified.

20 4. A device of the character indicated, comprising the bolt *b*, the nut *c* having the external tongues *c*², the expansible collar or shell

e having the external ribs *e*¹, the internal grooves *e*² and the slots *e*³, and the nut *f*, all arranged and operating substantially as shown, for the purpose specified.

5. The combination with a wall *a* having a hole *a*¹, and the object *h* to be secured to the wall, of the bolt *b* extending through the said object *h* into the aforesaid hole, the nut *c* having the external tongues *c*², the expansible collar or shell *e* having the external ribs *e*¹ and the internal grooves *e*², and the nut *f*, all arranged and operating substantially as shown, for the purpose specified.

Signed by me at Cleveland, Ohio, this 12th day of March, 1900.

JOHN C. SUMMERER.

Witnesses:

C. H. DORER,

A. H. PARRATT.