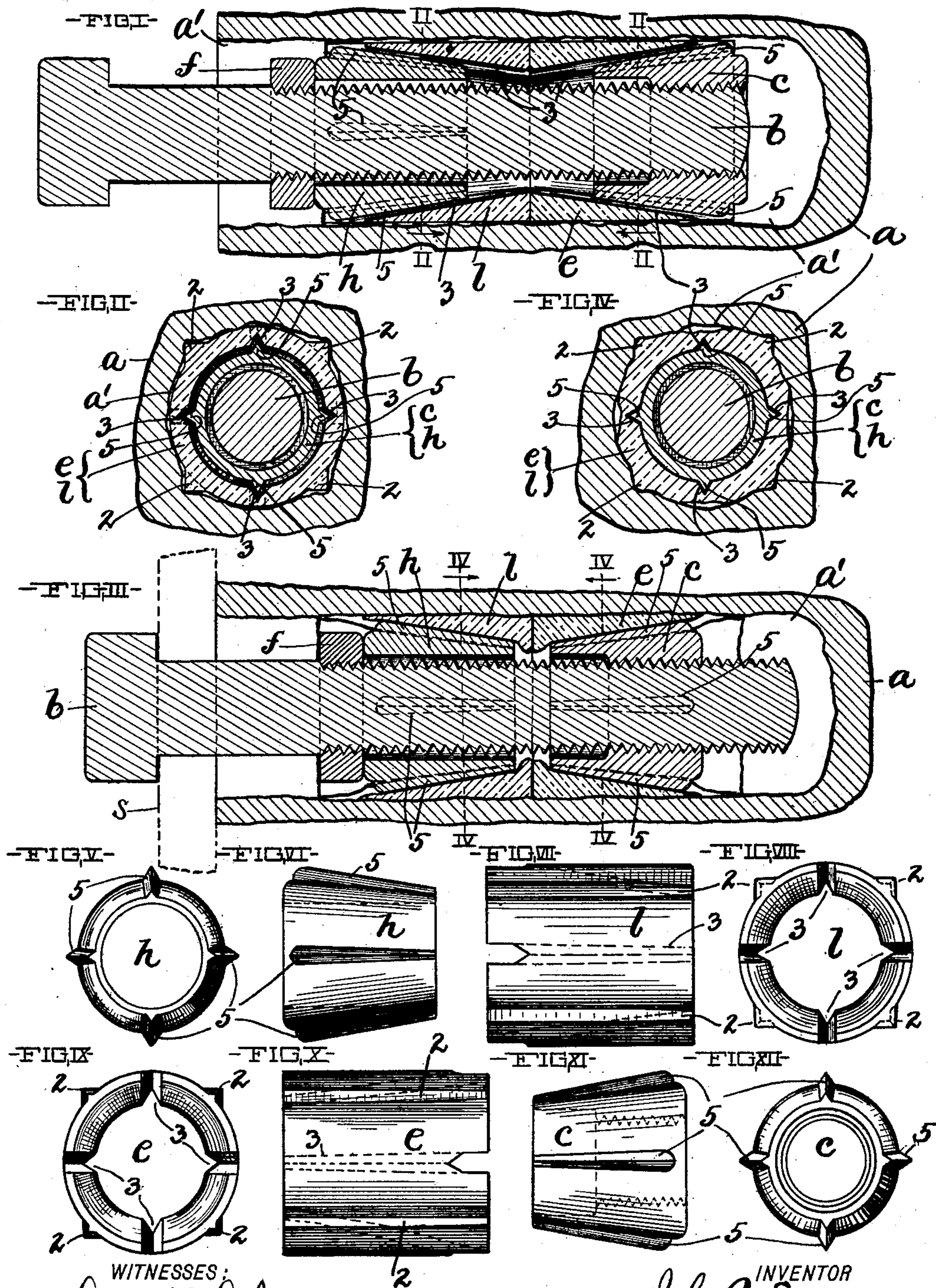


J. C. SUMMERER.
EXPANSION BOLT.

(Application filed June 30, 1900.)

(No Model.)



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JOHN C. SUMMERER, OF CLEVELAND, OHIO.

EXPANSION-BOLT.

SPECIFICATION forming part of Letters Patent No. 683,082, dated September 24, 1901.

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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 object of this invention is to provide a fastening device of the character indicated that is simple and durable in construction, that can be applied with facility, and that is exceedingly reliable in its operation.

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 either 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 and a sign-board is shown in dotted lines. Fig. IV is a transverse vertical section on either line IV IV, Fig. III, looking inwardly. Fig. V is an inner end elevation of the forward shell-expanding sleeve, and Fig. VI is a side elevation of the same. Fig. VII is a side elevation of the forward expansible shell or collar, and Fig. VIII is an outer end elevation of the same. Fig. IX is an inner end elevation of the rear expansible shell or collar, and Fig. X is a side elevation of the same. Fig. XI is a side elevation of the rear shell-expanding sleeve, and Fig. XII is an outer 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*, an 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 is composed of lead or other suitable compressible and displaceable material and embraces and is adapted to be expanded by the sleeve *c*, a sleeve *h*, loosely mounted upon the bolt's shank forward of the sleeve *c*, an expansible collar or shell *l*, composed of lead or other compressible and displaceable material embracing and adapted to be expanded by the sleeve *h*, 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 forward sleeve *h*. The surrounding wall of the bore of 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 2, 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 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 3, 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 2 and the grooves 3 of the shell *e* preferably alternate, as shown very clearly in Fig. IX, wherein the ribs 2 and the grooves 3 are arranged externally and internally, respectively, of the shell and alternately at equal intervals around the shell.

The nut-forming sleeve *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 *c* is provided upon its external surface with as many an-

gular or V-shaped ribs or tongues 5 as there are grooves 3 formed in the shell *e*, and the tongues 5 are preferably enlarged in thickness in the direction of the diametrically larger end of the said sleeve *c*. The ribs or tongues 5 are arranged, therefore, at equal intervals circumferentially of the sleeve *c* and extend longitudinally of the sleeve and normally engage the grooves 3 of the shell *e*, as shown in Figs. I and II.

The surrounding wall of the bore of the shell *l* flares toward the outer end of the shell, and said shell is cylindrical externally. The shell *l* corresponds in construction to the shell *e* already described; but the shells *e* and *l* are reversely arranged. The shell *l* is provided externally, therefore, with a plurality of ribs 2, preferably four in number, that are arranged at equal intervals circumferentially of the shell and extend longitudinally and from end to end of the shell. The bore of the shell *l* is gradually enlarged diametrically, as already indicated, in the direction of the head of the bolt, and the surrounding wall of the said bore is provided with four grooves or channels 3, that are V-shaped in end elevation and arranged at equal intervals circumferentially of the bolt and extending longitudinally of and from end to end of the shell. The ribs 2 and the grooves 3 of the shell *l* alternate, as shown very clearly in Fig. VIII, wherein the ribs 2 and the grooves 3 are arranged externally and internally, respectively, of the shell and alternately at equal intervals around the shell.

The sleeve *h* is gradually reduced diametrically in the direction away from the head of the bolt and extends normally into the shell *l*, as shown in Fig. I. The sleeve *h* is provided upon its external surface with as many angular or V-shaped ribs or tongues 5 as there are grooves 3 formed in the shell *l*, and the said tongues 5 are preferably enlarged in thickness in the direction of the diametrically larger end of the said sleeve *h*. The ribs or tongues 5 are arranged, therefore, at equal intervals circumferentially of the sleeve *h* and extend longitudinally of the sleeve and normally engage the grooves 3 of the shell *l*, as shown in Figs. I and II.

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 2 upon the shells *e* and *l* to become partially embedded within the surrounding wall of the hole during the said introduction of the device into the said hole. The shell *l* has its inner end engaging the outer end of the shell *e* and prevents outwardly 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 during the expansion of the said shell *e* subsequently. The nut *f* prevents out-

wardly-endwise displacement of the sleeve *h* during the introduction of the device into the hole *a'* and during the expansion of the shells *e* and *l* subsequently. The sleeve *h* prevents outwardly-endwise displacement of the shell *l* during the introduction of the device into the hole *a'*, and the shell *e* prevents inwardly-endwise displacement of the shell *l* during the introduction of the device into the hole *a'* and during the subsequent expansion of the said shell *l*. Obviously the embedding of the ribs 2 within the surrounding wall of the hole *a'* prevents the turning of the shells *e* and *l* circumferentially of the bolt during the operation of the nut-forming sleeve *c*. The engagement of the ribs or tongues 5 of the said sleeve *c* with the grooves 3 of the shell *e* prevents circumferential displacement of the said sleeve *c* independently of the shell *e*, and consequently the sleeve *c* is rendered stationary with the shell *e* so far as turning upon the bolt is concerned. The engagement of the ribs or tongues 5 of the sleeve *h* with the grooves 3 of the shell *l* prevents circumferential displacement of the said sleeve *h* independently of the said shell *l*, and consequently the sleeve *h* is rendered stationary with the shell *l* so far as turning upon the bolt is concerned.

The operation of my improved expansion-bolt is as follows: 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 nut-forming sleeve *c* outwardly—that is, in the direction of the head of the bolt—and thereby cause the said sleeve 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 2 of the shell to be still farther embedded within the surrounding wall of the hole *a'* and to cause the shell to conform to and tightly engage the said wall. The aforesaid turning of the bolt *b* will of course shift the said bolt inwardly, and thereby cause the nut *f* to force the sleeve *h* inwardly, so that the said sleeve *h*, simultaneously with the operation of the nut-forming sleeve *c*, will enter the shell *l* still farther and result in a lateral expansion of the said shell *l* circumferentially of the bolt and cause the ribs 2 of the said shell to be still farther embedded within the surrounding wall of the hole *a'* and to cause the said shell to conform to and tightly engage the said wall. The shells *e* and *l* are shown expanded in Figs. III and IV. Obviously my improved expansion-bolt, that comprises the two sleeves *c* and *h* and the sleeve-embracing shells *e* and *l*, will operate quickly and very positively, so that the shells will become very firmly fixed to the wall, 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 *s*, (shown in dotted lines, Fig. III,) that is to be secured to the wall. When the shells

e and *l* and the engaging sleeves *c* and *h* are fixed within the hole *a'*, as hereinbefore described, the bolt *b*, with the nut *f* upon it, is withdrawn from the hole by unscrewing the bolt from the nut-forming sleeve *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 sleeve *c*. 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 is returned to its former position 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 outwardly-endwise displacement of the sleeve *h*.

What I claim is—

1. A device of the character indicated, comprising a bolt, two reversely-arranged sleeves *c* and *h* mounted upon the shank of the bolt and tapering externally and arranged with their smaller ends adjacent to each other, the outer sleeve being loosely mounted upon the bolt and the inner sleeve being screw-threaded internally so as to form a nut engaging threads of the bolt's shank, an abutment upon the bolt at the larger end of the loosely-mounted sleeve and arranged to prevent endwise displacement of the said sleeve in the direction of the head of the bolt, and two shells *e* and *l* composed of displaceable material and embracing the nut-forming sleeve and the loosely-mounted sleeve, respectively, substantially as and for the purpose set forth.
2. A device of the character indicated, comprising a bolt *b*, two reversely-arranged sleeves mounted upon the bolt and arranged

with their smaller ends adjacent to each other, the sleeve next adjacent to the free extremity of the shank being screw-threaded internally so as to form a nut engaging threads of the bolt's shank, the other sleeve being loosely mounted upon the shank, a nut *f* upon the bolt's shank, at the larger end of the loosely-mounted sleeve, and arranged to prevent endwise displacement of the said sleeve in the direction of the head of the bolt, two reversely-arranged expansible shells mounted upon the different sleeves, respectively, and tapering internally, with the smaller ends of their sleeve-engaging bores adjacent to each other, substantially as and for the purpose set forth.

3. A device of the character indicated, comprising a bolt *b*, two reversely-arranged sleeves mounted upon the bolt and arranged with their smaller ends adjacent to each other, the sleeve next adjacent to the free extremity of the shank being screw-threaded internally so as to form a nut engaging threads of the bolt's shank, the other sleeve being loosely mounted upon the shank, a nut *f* upon the bolt's shank and preventing endwise displacement of the last-mentioned or loosely-mounted sleeve in the direction of the head of the bolt, tongues formed upon and externally of each of the sleeves, the expansible shells *e* and *l* embracing the different sleeves, respectively, and provided each with external ribs 2 and internal grooves 3, all arranged and operating substantially as shown, for the purpose specified.

Signed by me at Cleveland, Ohio, this 14th day of April, 1900.

JOHN C. SUMMERER.

Witnesses:

C. H. DORER,
A. H. PARRATT.