J. A. BILTERMAN.

EXPANSIBLE SCREW.

APPLICATION FILED DEC. 13, 1920.

1,392,108.

Patented Sept. 27, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

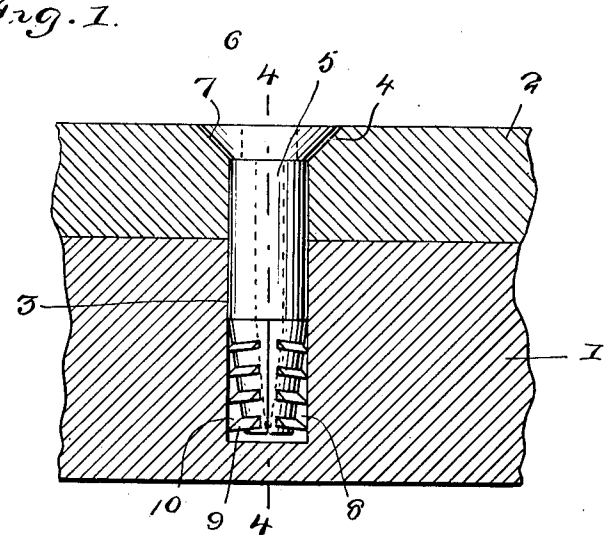
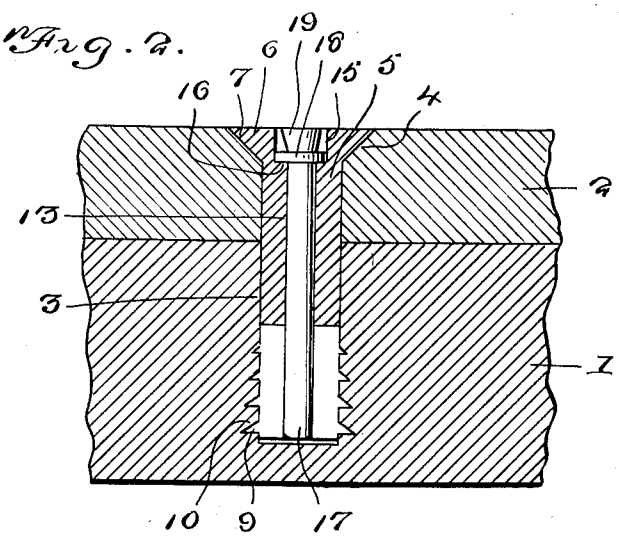



Fig. 2.




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2 SHEETS—SHEET 2.

Fig. 3.

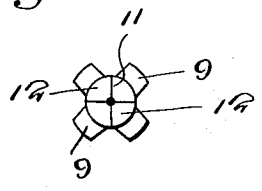



Fig. 4.

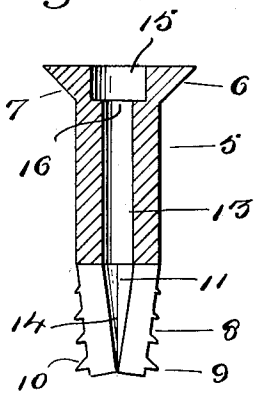



Fig. 5.

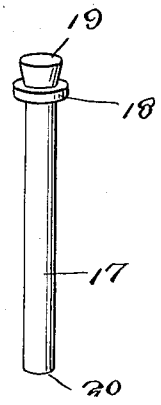
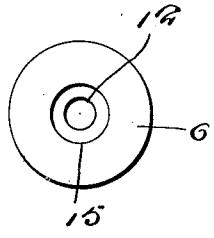



Fig. 7

Fig. 6.



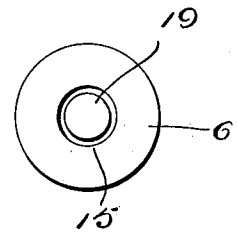
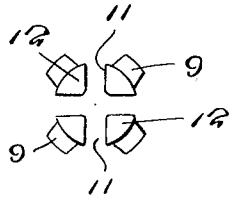




Fig. 8




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# UNITED STATES PATENT OFFICE.

JOHN A. BILTERMAN, OF ALBIA, IOWA.

## EXPANSIBLE SCREW.

1,392,108. Specification of Letters Patent. Patented Sept. 27, 1921.

Application filed December 13, 1920. Serial No. 430,330.

*To all whom it may concern:*

Be it known that I, JOHN A. BILTERMAN, a citizen of the United States, residing at Albia, in the county of Monroe and State of Iowa, have invented new and useful Improvements in Expansible Screws, of which the following is a specification.

It is the object of the present invention to produce an expansible wood screw whereby the employment of the usual screw driver will be entirely dispensed with.

A further object is the production of an improved wood screw designed to be received in a hollow which has been previously bored that has its entering end tapered and slitted and provided with teeth of a particular and peculiar formation, said screw having a central opening therethrough designed for the reception of a removable pin or key, which, when forced through the bore, will spread the slitted end of the screw, causing the teeth to bite into the wood provided by the opening and, incident to the peculiar formation of the said teeth, to draw the screw further into the opening.

The foregoing, and other objects which will appear as the nature of the invention is better understood, may be accomplished by a construction, combination and operative arrangement of parts, such as is disclosed by the drawings which accompany and which form part of this application.

In the drawings:—

Figure 1 is a view of a screw constructed in accordance with this invention, inserted in a bored opening, the wood plates to be connected by the screw being in section.

Fig. 2 is a substantially similar view, except that the screw is shown in section and expanded, the expanding pin or key being in elevation.

Fig. 3 is an end view of the screw looking toward the threaded portion thereof.

Fig. 4 is a sectional view on the line 4—4 of Fig 1.

Fig. 5 is a perspective view of the key.

Fig. 6 is a plan view looking toward the head of the screw when arranged in the position illustrated in Fig. 1.

Fig. 7 is a similar view looking toward the head of the screw, with the key therein as illustrated in Fig. 2.

Fig. 8 is an end view of the screw when the split or segmental end thereof is spread.

Referring now to the drawings in detail, the numerals 1 and 2 indicate two wooden plates to be connected in accordance with this invention. At the points where the connecting means are to be inserted I bore openings 3 through the said plates. Each of the openings 3, in the plate 2 has its outer end flared, by priming the said plate around the said opening, as at 4.

In each of the openings 3 there is loosely placed a screw or securing element 5, constructed in accordance with this invention Each of the elements 5 has its body portion or shank of a size to be snugly received in the openings 3, its outer end provided with a head 6 whose inner wall is flared inwardly, as at 7, the said head being snugly received in the reamed portion 4. The body or shank 5, at a point adjacent to the lower or outer end thereof is arranged at an inward inclination, as indicated by the numeral 8. On this reduced portion the body is provided with teeth 9 formed by annular flanges which gradually decrease in diameter from the outer to the inner plate. The teeth, it will be noted are not of a spiral formation, and each tooth is independent of the other. All of the teeth, however, have their peripheral edges in longitudinal alinement, and each is of a width approximately equaling that of the cross sectional diameter of the body or shank 5 of the device. Each of the circumferential teeth is beveled, on the face nearest the head in a direction away from the head, as at 10 and terminates in a sharpened point or edge. The inclined or flared end 8 of the shank 5, for a distance slightly greater than the space occupied by the disk-like teeth thereon, is slitted longitudinally, the said slits being arranged right angularly with respect to each other. These slits are indicated by the numeral 11 and divide the flared portion 8 of the shank into segmental sections, and on each of these sections the disk-like teeth 10 are formed. If desired, the teeth need not entirely surround the flared portion of the shank, but may be in the nature of spurs arranged in series on each of the segmental portions 12 of the shank. This last construction is preferable and is illustrated by the drawings.

The shank has a round bore 13 which has its lower portion flared inwardly, as at 14, at the flared portion 8 of the shank. The top or head 6 of the shank has a round opening 15 which terminates in a straight shoulder 16 at the juncture of the shank and head.

The spreader member is in the nature of

a key or pin, and in one form thereof has its shank straight, as indicated by the numeral 17, and of a cross sectional diameter to be snugly received in the straight portion of the bore 13. The pin or key has its outer end provided with a flange 18 and an inwardly inclined or beveled head 19 of a less diameter than the flange, extending outward of the flange.

They key is inserted in the bore 13 of the shank, until the lower and rounded end 20 thereof contacts with the flared portion 14 of the bore 13. Thereafter the key is subjected to forcible contact by a hammer or the like so that the key will spread the segmental portions 12 at the beveled end of the shank, away from each other, causing the said beveled portions to contact with the walls of the opening 3 in the chamber or plate 1, and also causing the teeth 9 to enter the said chamber. By beveling the teeth, as above described, the inclined portions thereof, when entering the chamber 1 will cause the shank to be moved longitudinally in an inward direction through the opening 3, and thus cause the beveled head to bind against the beveled wall provided by the reamed portion 4 in the outer plate or chamber 2. The socket portion 15 in the head 6 of the shank is of a sufficient area to permit of a suitable instrument being inserted therein to grip the head 19 of the pin 17 and thus remove the pin.

The pin remains in the screw as long as the screw is expanded, but is withdrawn from the screw when the screw is to be removed. From experience, I have found that the best results are obtained by the employment of flexible metal screws, as such metal permits of contraction at the slit portion thereof so that the same is easily removed when the pin is withdrawn.

Having described the invention, I claim:—

1. A wood screw designed to be received in an opening bored through plates to be connected, including a shank which is snugly received in the opening, a head on the one end of the shank, and an inwardly flared portion on the opposite end of said shank, said flared portion being slotted longitudinally and provided with spaced teeth all of an equal diameter and all beveled from their inner to their outer edges upon the inner faces thereof, said shank having a bore therethrough which is flared inwardly at the flared portion of the shank, and a spreader key designed to be inserted into the bore and forced against the flared portion thereof to spread the segmental sections at the end of the shank against the wall of the opening, and to also cause the teeth thereto to enter the said wall and incident to the formation of the said teeth to exert a longitudinal movement on the shank to bring the head thereof in tight engagement with the outer plate.

2. In combination with two wooden plates to be connected, and each of said plates having bored openings for the connecting means and the outer plate being reamed around the openings, of an expansible wood screw including a shank designed to be freely received in each of the openings, a beveled head on the shank to be received in the reamed portions of the openings, the body of the shank being flared inwardly from the end thereof opposite that provided with the head and being slit longitudinally for a distance slightly greater than the flared portion of the shank dividing said flared portion into segments, each of said segments having spaced teeth thereon which gradually decrease in length from the outer to the inner tooth, whereby the edges of all of the teeth are in alinement with each other and in alinement with the straight portion of the shank, said shank having a longitudinal bore therethrough which is flared inwardly at the flared end of the shank, the head of the shank having a socket surrounding the bore, a key for insertion in the bore having a flange adjacent to its outer end and an inwardly inclined head projecting from the flange, and of a less diameter than the flange, said key designed to be inserted in the bore and to be forced against the segmental portions of the shank to spread the latter against the wall of the opening and to force the teeth on the segments into the wall provided by the opening, and by virtue of the shape of the said teeth to move the shank longitudinally through the opening to bring the head thereof in tight engagement with the reamed wall surrounding the opening.

In testimony whereof I affix my signature.

JOHN A. BILTERMAN.