E. N. GARRISON.

METHOD OF MAKING HOLLOW SET SCREWS.

APPLICATION FILED FEB. 6, 1914.

1,098,716. Patented June 2, 1914.

Fig. 1.

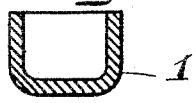


Fig. 2

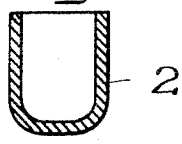


Fig. 3.

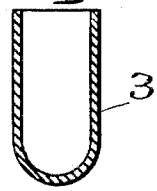


Fig. 4.

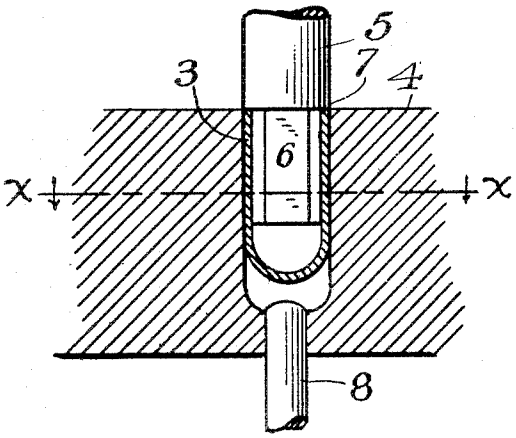


Fig. 5.

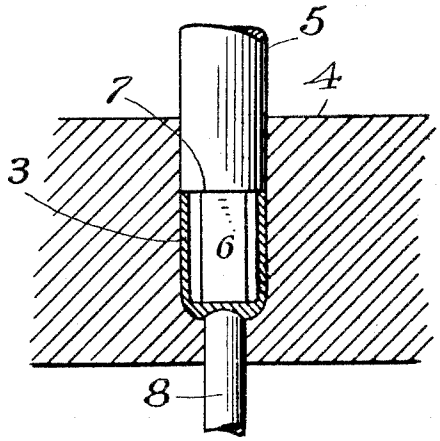


Fig. 6.

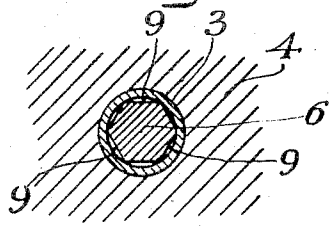


Fig. 7.

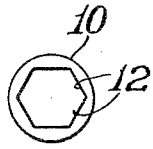
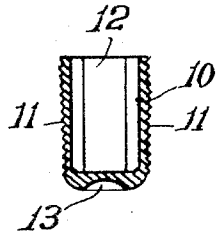


Fig. 8.



WITNESSES:

H. A. Lamb.

M. I. Loughan

INVENTOR

Edward N. Garrison.

BY F. W. Lamb & Co.

ATTORNEY

UNITED STATES PATENT OFFICE.

EDWARD N. GARRISON, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE BURNS & BASSICK COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

METHOD OF MAKING HOLLOW SET-SCREWS.

1,098,716. Specification of Letters Patent. **Patented June 2, 1914.**

Application filed February 6, 1914. Serial No. 816,932.

To all whom it may concern:

Be it known that I, EDWARD N. GARRISON, a citizen of the United States, residing in the city of Bridgeport, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Methods of Making Hollow Set-Screws; and I do 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 appertains to make and use the same.

My invention has reference to the method of making hollow screws, but more particularly refers to a new method of making hollow set screws whereby the completed article is rendered exceedingly strong and durable and is adapted to be operated by a suitable key or mandrel inserted therein.

In the drawings Figures 1, 2, and 3, represent successive stages in the drawing operations which are practised in carrying out my improved method—Fig. 4 is a sectional elevation showing the position of parts immediately prior to the swaging operation—Fig. 5 a view similar to Fig. 4 but showing the position of parts after the swaging operation has been effected—Fig. 6 a section at the line x, x, of Fig. 4—Fig. 7 a plan view of the completed hollow screw, and Fig. 8 a sectional elevation of the completed screw.

Similar numerals of reference denote like parts in the several figures of the drawing.

Heretofore hollow set screws have been made by forming the article by successive drawing operations, the final drawing operation not only reducing the outside diameter but also giving the interior a polygonal form in cross section, but this method of making set screws renders the metal the least dense in the completed article, and therefore a thread cut on the exterior of such article is necessarily not as smooth as it would be when the metal is dense and homogeneous.

My invention aims to make the set screw the strongest in its completed form, and the external diameter of the cup shaped blank remains unchanged by the final or swaging operation, all of which will be readily understood by the following description:—

In carrying out my improved method I draw a series of cup shaped blanks from flat sheet metal, these blanks in their various stages being shown at Figs. 1, 2, and 3, respectively, the cup shaped blank shown at Fig. 3 illustrating the final drawing operation, and these blanks shown at Figs. 1, 2, and 3, are respectively designated by the numerals 1, 2, and 3. After the final drawing operation, the cup shaped blank 3 is placed within a die 4 and a swaging tool 5, whose lower portion is preferably hexagonal in cross section as shown at 6, is inserted within this blank 3, and the size of the hexagonal portion 6 is such that the angular parts thereof fit snugly against the inner wall of this blank 3.

That portion of the swaging tool which is formed into the hexagonal member 6 is slightly reduced in diameter, so that a shoulder 7 is formed on the tool immediately above the hexagonal portion, and when the latter is contained within the blank 3, this shouldered portion will be abutted against the upper edge of said blank, the diameter of the swaging tool being such that when said tool is forced downwardly it will readily enter the die 4.

As the swaging tool is forced downwardly it will force the blank against a convex knock-out plug 8 which extends upwardly through the bottom of the die so as to form a portion of the floor of the latter, this knock-out plug being held in any suitable and ordinary manner. As the swaging tool is forced downwardly the bottom of the blank will be cupped inwardly owing to its contact against the plug 8, and the continued movement of the swaging tool will cause the metal of the blank 3 to be swaged so as to completely fill the spaces between the inner wall of the blank 3 and the flat surfaces of the hexagonal member, and at the same time the length of the blank 3 will of course be reduced and the bottom of the hexagonal form 6 will seat firmly against the bottom of the blank and will cause a thickening or swaging of the completed article. It will thus be observed that the outside diameter of the blank 3 has not been disturbed, while the swaging operation has caused the metal to flow freely around the hexagonal member and to thereby impart a hexagonal shape to the inner wall of the screw blank thus formed, as shown at 12.

When the swaging tool has been withdrawn, the knock-out plug 8 is thrust upwardly in any ordinary manner so as to discharge the completely formed screw blank from the die, and in the completed article

the bottom portion will have a concavity 13 whose walls meet the external walls of such article so as to form a sharp edge, this edge being very desirable in order to afford a proper bite of the set screw when the latter is driven home to perform its function.

The little spaces referred to between the inner wall of the blank 3 and the flat surfaces of the hexagonal member 6, which are filled in by the swaging operation above described are clearly shown at Fig. 6 and are designated by the numeral 9. At Fig. 7 the completed article is designated by the numeral 10, and the thickened portions of the screw will readily be perceived.

After the formation of the screw blank by the swaging operation above described, such screw blank is externally threaded as shown at Fig. 8, the threaded portion being designated by the numeral 11.

The article heretofore made, in its final form, is the same in all respects as the completed article formed by my method, but heretofore it has been necessary to employ much thicker metal in the drawing operation in order to produce the completed article by a final drawing and yet to preserve the proper thickness of such article. But in my improvement the drawing operation is greatly simplified, and less power is consumed because I am enabled to use a far thinner metal, since the proper thickness of the completed article is produced by a swaging operation which latter also makes the screw blank the densest and therefore the strongest in its completed form.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. The method of making hollow screws, which consists of forming a cylindrical shell closed at the bottom and with the outside diameter equal to that of the completed article, reducing the length of said shell by a swaging operation performed around a polygonal shaped member whose angular portions snugly fit within said shell, and finally externally threading said shell.

2. The method of making hollow screws, which consists in forming a cylindrical shell closed at the bottom and with an outside diameter equal to that of the completed article, reducing the length of said shell by a swaging operation performed around a polygonal shaped member whose angular portions snugly fit within said shell and simultaneously thickening the bottom of said shell and forming in the external surface thereof a concavity, and finally externally threading said shell.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD N. GARRISON.

Witnesses:

CHARLES E. WARD,

A. E. BELISLE.