

No. 755,804.

PATENTED MAR. 29, 1904.

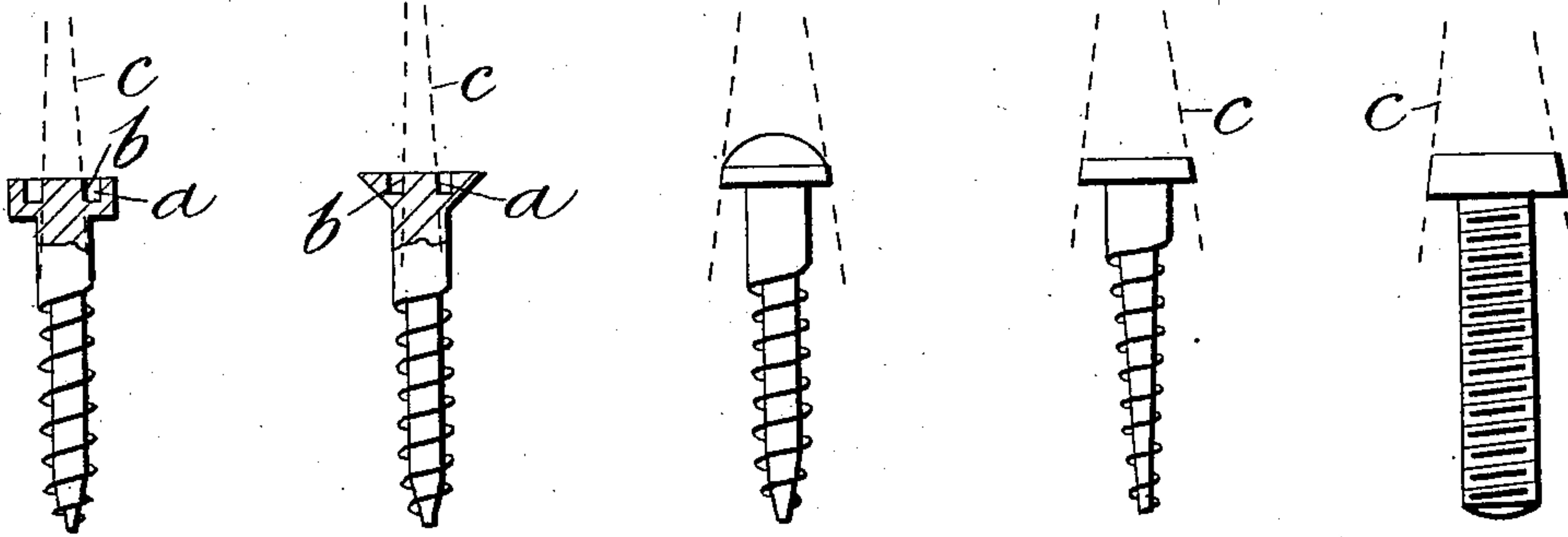
G. C. SMITH.

SCREW FOR METAL, WOOD, &c., AND MEANS FOR OPERATING SAME.

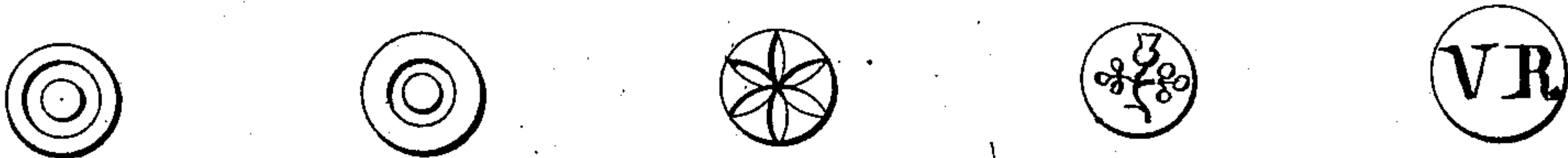
APPLICATION FILED MAR. 20, 1902.

NO MODEL.

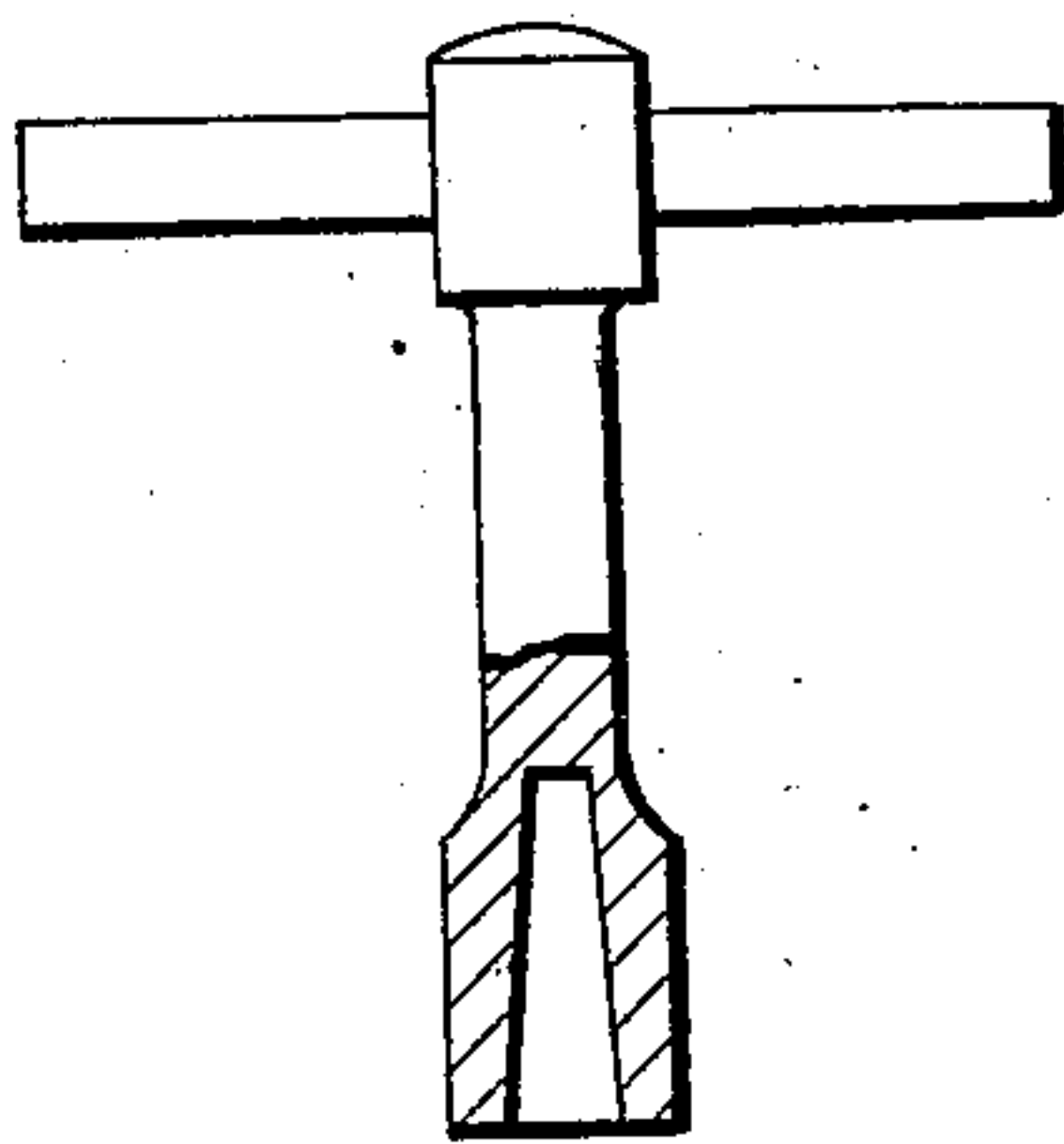
*Fig. 1.*    *Fig. 2.*    *Fig. 3.*    *Fig. 4.*    *Fig. 5.*



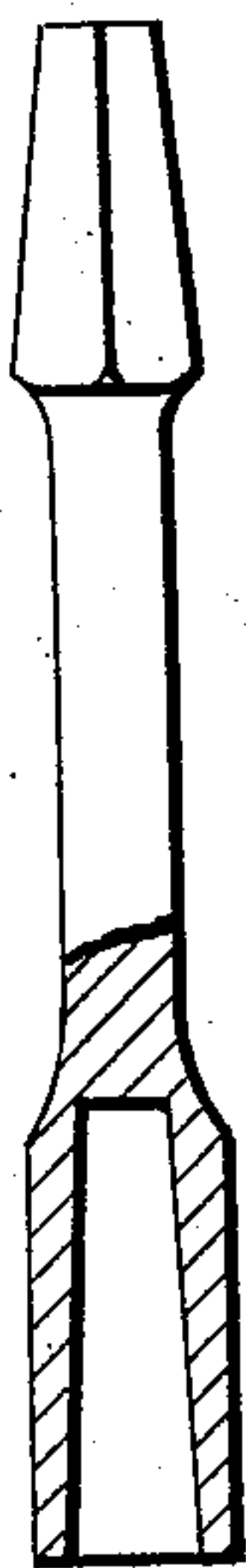
*Fig. 1<sup>a</sup>.*    *Fig. 2<sup>a</sup>.*    *Fig. 3<sup>a</sup>.*    *Fig. 4<sup>a</sup>.*    *Fig. 5<sup>a</sup>.*



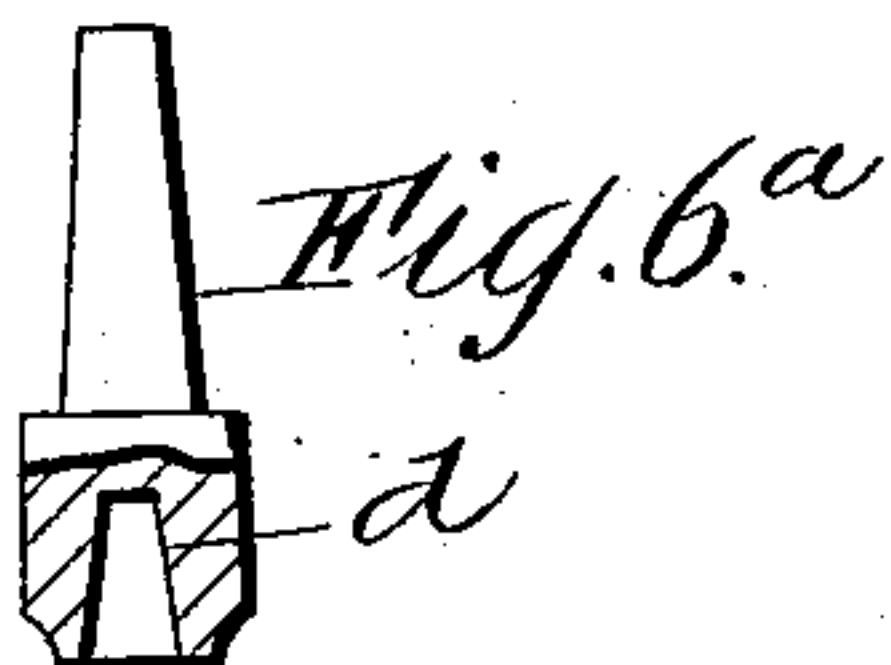
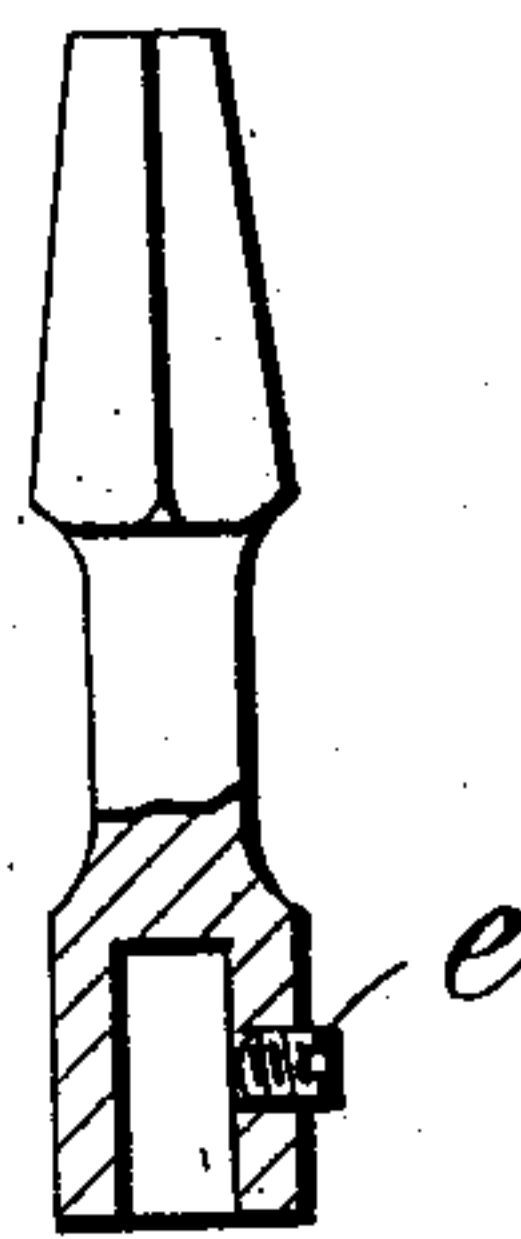
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



*Fig. 6<sup>a</sup>.*



*Fig. 8<sup>a</sup>.*

Witnesses.  
Percy J. Hedges.  
Hector Meggs.

Inventor.  
George Crocker Smith

# UNITED STATES PATENT OFFICE.

GEORGE CROCKER SMITH, OF ST. KILDA, NEAR MELBOURNE, VICTORIA,  
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## SCREW FOR METAL, WOOD, &c., AND MEANS FOR OPERATING SAME.

SPECIFICATION forming part of Letters Patent No. 755,804, dated March 29, 1904.

Application filed March 20, 1902. Serial No. 99,178. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE CROCKER SMITH, machinist, a citizen of the Commonwealth of Australia, residing at 67 Odessa street, St. Kilda, near Melbourne, in the State of Victoria, Commonwealth of Australia, have invented an Improved Screw for Metal, Wood, or General Purposes and Means for Operating Same, of which the following is a specification.

This invention relates to the construction of the heads of wood, metal, or other screws of various descriptions and to the means for operating them. Hitherto these heads have usually been constructed with a nick or saw-cut to receive the end of a screw-driver whereby they could be rotated for the purpose of either forcing them into or withdrawing them from the article or articles to be joined.

The object of this invention is to obviate the necessity for constructing or employing this nick or saw-cut, thereby effecting a saving in the cost of manufacture and providing a screw which while it can readily be inserted into or withdrawn from any article by those having the necessary appliance cannot be removed by an unauthorized person. This object I attain by providing the head of the screw with a conical gripping-surface for the application of a tool or driver having a complementary gripping-surface. The angle of the taper may, however, vary from five degrees to 0.18 degrees included angle—that is to say, the angle included between the two tapering sides of the conical gripping-surface in contradistinction to the angle between the said tapering sides and the axis of the gripping-surface—so that such a screw can neither be screwed into or out of parts to be joined or disjointed, except by a driver having a complementary gripping-surface, whereby the screw practically performs the function of a lock and the driver the key, since it is obvious that unless the driver fits the gripping-surface exactly the screw cannot be unscrewed.

As is well known, the gripping action of complementary taper surfaces is *nil* when the taper exceeds five degrees included angle,

while said gripping action becomes more intense or greater in proportion to the reduction of the angle of the taper and greatest at 0.18 degrees included angle or one-sixteenth of an inch to a foot, so that a simple means is here afforded to prevent manipulation of screws by unauthorized persons.

In order, however, that my invention may be clearly understood, I will describe it by reference to the accompanying drawings, in which—

Figures 1 to 5 are side elevations (some shown partly in section) illustrating a few modified constructions of screws embodying my invention. Figs. 1<sup>a</sup> to 5<sup>a</sup> are plans showing various devices for marking or ornamenting the heads of said screws. Figs. 6 to 8<sup>a</sup> are views illustrating the appliance used for operating screws constructed according to this invention.

The same letters of reference indicate the same or corresponding parts in all the figures.

Screws constructed according to this invention may be right or left hand threaded, and the root of the thread may be either parallel, as illustrated in Figs. 1, 2, 3, and 5, or tapering, as illustrated in Fig. 4, and the invention is equally adapted for screws for wood, as illustrated in Figs. 1 to 4, or for metal, as illustrated in Fig. 5.

The essential feature of this invention consists in forming the head of the screw with a slightly-tapering periphery or projection, the angle of which is very small, and in practice I have found that from two degrees to three and one-half degrees included angle is ample for the purpose. In the construction illustrated in Figs. 1 and 2 the screws are adapted to be driven or countersunk in flush with the surface of the work, the tapering projection above referred to being provided on the inner side *b* of a groove *a*, which is turned in the head of the screw, said inner side of said groove being slightly tapered, as indicated by the dotted lines *c*. The construction shown in Fig. 2 is similar, so far as this invention is concerned, to that illustrated in Fig. 1; but in Fig. 3 the outer periphery of the head of the screw is tapered. The head of the screw



may be convex, as illustrated in Fig. 3, or it may be concave or flat, as illustrated in Fig. 4. The tapered portion of the head of the screw need not exceed one-sixteenth of an inch in depth, that being quite sufficient to provide ample grip for the purpose of rotating the screw, as hereinafter described. The head of the screws may be stamped or formed with letters or other marks, as illustrated in Figs. 3<sup>a</sup> to 5<sup>a</sup>.

The appliance used for operating screws constructed as above described is formed with a socket or recess corresponding exactly in size and taper with the conical head or projection with which it is to engage. A simple form of the appliance is illustrated in Fig. 6 and is adapted to be used after the manner of an ordinary screw-driver, or it can be constructed, as illustrated in Fig. 7, to fit into a brace. The socket in its lower end may be used to receive a separate piece having a smaller socket, as illustrated in Fig. 6<sup>a</sup>, to suit smaller-sized screws, the taper  $\alpha$  of the sockets in the lower ends of the operating-tools being in all cases made to exactly correspond and closely engage with the corresponding taper on the heads of the screws. The appliance for operating these screws can be shortened, as indicated in Fig. 8, and the socket on its lower end may be provided with a set-screw  $e$ , whereby arbors of various sizes, as illustrated in Fig. 8<sup>a</sup>, may be secured in position therein.

The screws may be made in copper, gun-metal, iron, steel, or any suitable alloy, and the wood-screw will be found particularly valuable for furniture manufacturers, carriage builders, and the like.

The application of the appliance illustrated

in Figs. 6 to 8<sup>a</sup> does not injure the head of the screw in any way, and there is no risk of the work being damaged by the tools slipping off the head and coming in violent contact with it. The tendency of the tool on the tapering head or projection of the screw is to compress the metal thereof, and thereby insures a firm grip being maintained. Another important feature of this invention is that for certain purposes—as for instance, for railway work—a special angle or amount of taper for the tapering head or projection and appliance to be used therewith may be adopted exclusively, so that the tools in ordinary use would not fit the taper, and consequently could not be used for unfastening these screws, thereby considerably reducing the risk of the fittings of railway-carriages being removed or stolen.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A screw having a head provided with a conical gripping-surface of a given included angle for the purpose of preventing the driving or unscrewing of the screw except by a tool having a gripping-surface of the same given included angle.

2. A screw provided with a conical head of a given included angle not exceeding five degrees for the purpose of preventing the driving or unscrewing of the screw except by a tool having a complementary gripping-socket of the same given angle.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE CROCKER SMITH.

Witnesses:

PERCY T. HEDGES,  
HECTOR MEGGS.