O. A. SMITH.

SET SCREW.

APPLICATION FILED MAR. 25, 1916.

1,269,971. Patented June 18, 1918.

Fig. 1.

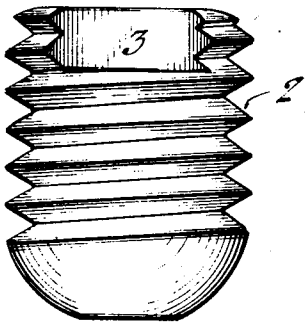


Fig. 2.

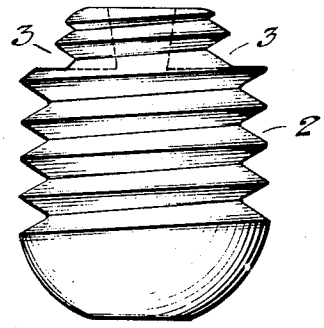


Fig. 3.

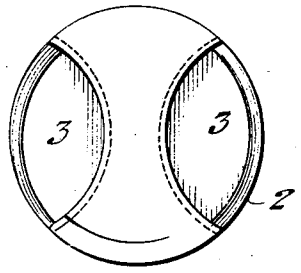
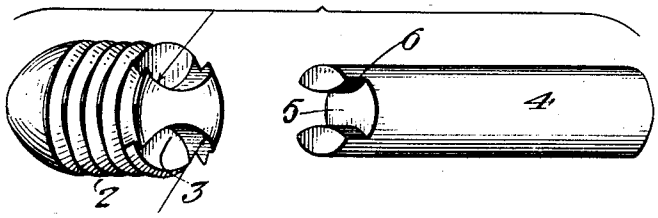


Fig. 4.



Witness:-

Inventor

Oscar A. Smith

By his Attorney

UNITED STATES PATENT OFFICE.

OSCAR A. SMITH, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL-ACME COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

SET-SCREW.

1,269,971. Specification of Letters Patent. Patented June 18, 1918.

Application filed March 25, 1916. Serial No. 86,561.

To all whom it may concern:

Be it known that I, OSCAR A. SMITH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Set-Screws, of which the following is a specification.

This invention relates to improvements in Set Screws, the object of the invention being to provide a set screw having a very strong "tang" or driving portion, for the reception of a suitable mating wrench therefor, and in which set screw there are no sharp corners to form a good starting point for breakage and which is extremely simple in construction and inexpensive to manufacture.

In the drawings accompanying and forming part of this specification, Figure 1 is a side elevation of my improved set screw; Fig. 2 is also a side elevation thereof taken at right angles to Fig. 1; Fig. 3 is a top plan view showing the construction of the improved tang or driving portion of the screw; and Fig. 4 illustrates in perspective the improved set screw and the mating end of its wrench.

Similar characters of reference indicate corresponding parts in the different figures of the drawings.

There are of course many forms of set screws in common use. For instance, the old headless or safety screw is made with a common screw driver slot, and of course could never be tightened or set home strong enough with a screw driver, and for this reason many attempts have been made to produce a practical set screw that could be sufficiently tightened, but all the forms with which I am familiar have proved very unsatisfactory in use. As instances of some of these attempts, there is a screw provided with a blind hexagon bore, and when tightening the same a hexagon shaped handle or wrench must be used, another style being practically the same with the exception that the hole is square, while still another form is provided with a series of dove-tail grooves for tightening or setting home the screw, the wrench being of course machined to suit. As stated, however, all these forms of set screws have been found very unsatisfactory in use, since they cannot be made strong enough to withstand the tightening strain of the wrench, the screws breaking rather than the wrench, and there is a tendency to open up the screw, in other words to crack it, and to avoid this it is impossible to tighten them up as they should be.

By means of the present improvement, however, the construction of the screw is such that an exceptionally strong "tang" or driving portion is provided, and while the wrench or driving tool is sufficiently strong to properly set the screw "home" for all practical requirements, the wrench is the weaker member, as it should be, or at least of substantially no greater strength than the driving portion of the screw, and there are no sharp corners either on the wrench or on the tang to afford opportunity for breakage.

The improved set screw shown in the drawings consists of the usual body 2, threaded throughout the major portion of its length, and provided at its top or rear end with an improved driving portion 3, which is formed by cutting out on opposite sides of the screw an approximately semi-circular or concave portion of sufficient depth to permit the wrench to properly grip such driving portion. This driving portion or tang 3 is formed with a slight "dish" or taper inwardly or toward the body of the screw, as shown in dotted lines in Figs. 2 and 3, whereby the wrench drives at the thickest portion of the tang, since this portion of the tang comes at the bottom of the groove in the wrench. The wrench 4 is provided with a groove 5 adapted to mate with the tang or driving member of the screw, the side walls 6 of such groove being straight in the direction of the length of the wrench, instead of tapered, so as to permit the same to pass over the larger portion of such tang.

From the foregoing it will be observed that the concave formation of the driving portion of the screw and the convex formation of the wrench or driving tool provides a very effective interlock between these two members, so that the possibility of twisting off the driving portion of the screw is eliminated. Not only this, but the turning movement of the wrench or driving tool, should there be any play between its driving portions and the tang of the set screw, will cause the interlocked portions to effectively engage each other to prevent slippage of

one relatively to the other and thus avoid the twisting off of the tang or the "eating" off of the edges thereof.

The gist of the present improvement is the provision of a headless screw having a reinforced driving portion. In other words a driving portion that will be at least as strong as the driving member. State factory laws now compel manufacturers to use what is known as a headless or non-protruding screw on revolving parts of machines or shafts wherever there is a possible chance of workman coming in contact with the same. As hereinbefore stated there are several different types of headless screws on the market such as the Hollow Hex screw having a hexagon bore used with a mating hexagon bar or key; another type have a square bore; still another has a bore with dove tail grooves, but all these screws fail in one vital point, namely the means for tightening the screw is much stronger than the screw, therefore the screw breaks off before the driver. The common standard slot has the opposite fault, the driver is much too weak to stand the strain.

Before the State factory laws referred to, it was possible to use a set screw having a projecting square head whereon a wrench could be used to bring it down tight, but these laws have made it impossible to continue the use of such a set screw and therefore it is now compulsive to use a headless screw, yet they must be tightened down just as firm as the projecting square headed screw. The common slot set screw does not meet this test, the driver being too weak. If the slot is widened so that the driver is stronger than the screw then the latter is weakened and breaks. In the present invention the screw and driver by means of the construction herein shown and described has substantially equal strength, in other words, one is as strong as the other as can be readily seen by a careful inspection of Fig. 4 of the drawings in which the arrows indicate the points where the greatest strain of the driver upon the screw comes. At this point the driving tang or portion of the screw is the thickest.

I claim as my invention:

1. A headless machine set screw having a portion of its threads cut away to form a driving portion or tang gradually thickening outward from the axis of the screw to the threads thereof carried by such driving portion or tang whereby the driving portion or tang is of greater width at the threaded periphery of the screw than it is at the axis thereof, thereby to bring the strain of setting the screw on the thicker portion of the tang.

2. A headless machine set screw having a portion of its threads cut away to form a driving portion or tang gradually thickening outward from the axis of the screw to the threads thereof carried by such driving portion or tang whereby the driving portion or tang is of greater width at the threaded periphery of the screw than it is at the axis thereof, thereby to bring the strain of setting the screw on the thicker portion of the tang, said driving portion also tapering slightly inwardly toward the body of the screw from the top of such driving portion whereby the driving portion at its top will be slightly thicker than at its bottom so that the strain on the driving tool constructed to conform to the driving portion or tang of the screw will come at the bottom of the groove thereof, and therefore at the strongest point of the driving portions of the driving tool.

3. The headless machine set screw of claim 1, in which the gradually thickening tang is of curved form at one or both sides thereof.

4. The headless machine set screw of claim 1, in which the tang thereof is of concaved form at both sides thereof the arc of each of which is longer than the convexed thread carrying portion of said tang.

5. The headless machine set screw of claim 2, in which the tang thereof is of curved form at one or both sides thereof.

6. The headless machine set screw of claim 2, in which the tang thereof is of concaved form at both sides thereof the arc of each of which is longer than the convexed thread carrying portion of such tang.

Signed at Cleveland, in the county of Cuyahoga and State of Ohio, this 21st day of March, 1916.

OSCAR A. SMITH.