

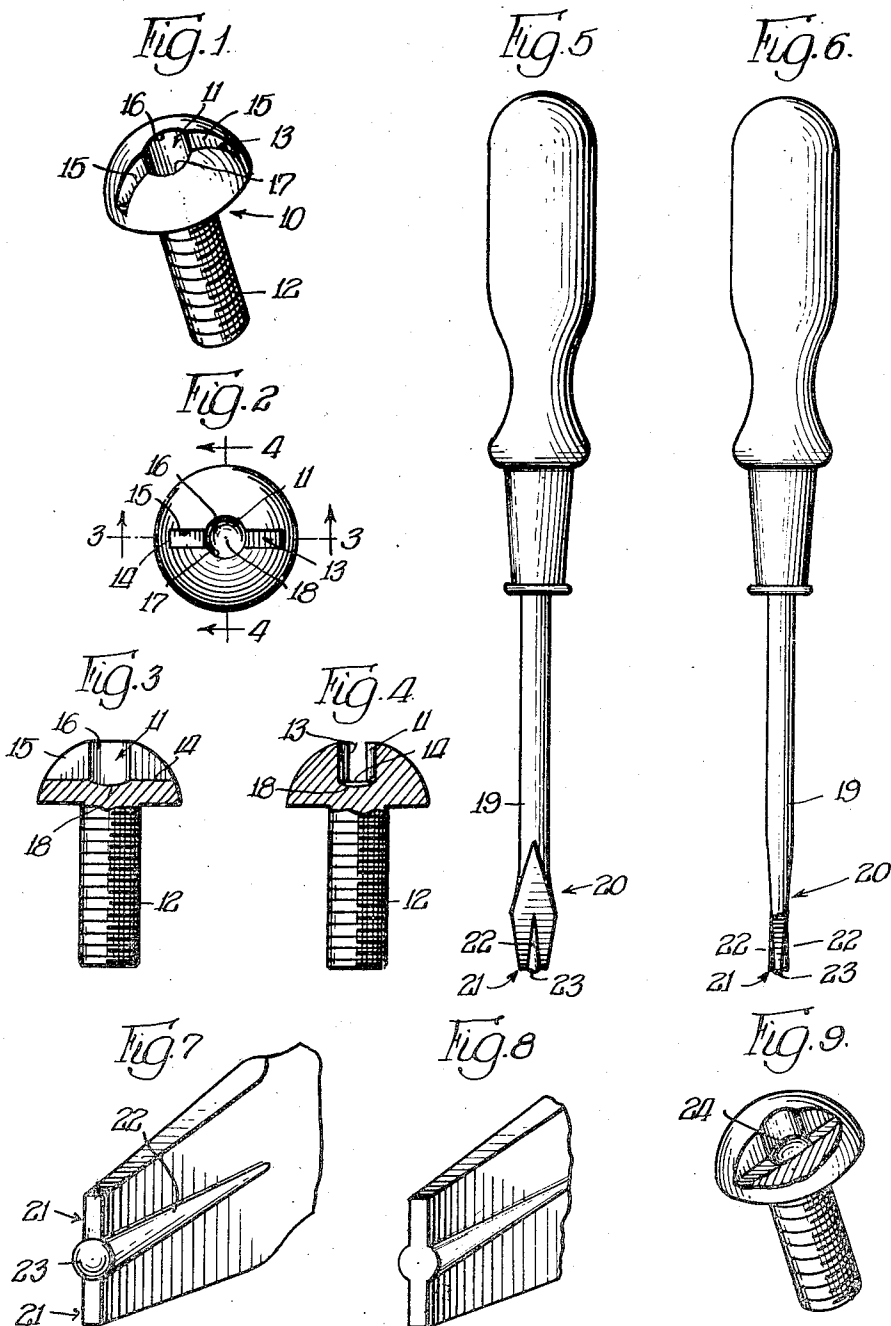
Nov. 25, 1947.

O. W. WAARICH

2,431,628

PILOT SLOT SCREW AND DRIVING TOOL

Filed July 27, 1942



INVENTOR.  
Otto W. Waarich,  
Cromwell, Geist & Warden  
attys

## UNITED STATES PATENT OFFICE

2,431,628

## PILOT SLOT SCREW AND DRIVING TOOL

Otto W. Waarich, Chicago, Ill., assignor to Pheoll Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application July 27, 1942, Serial No. 452,465

1 Claim. (Cl. 145—50)

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The present invention relates to improvements in the manufacture of screws and the like. More particularly, it pertains to screws having a novel arrangement of slotted pilot head usable with a conventional screw driver or a novel type of driving tool particularly adapted to receive such head, said screws separately and in combination with said novel type of driver having correlated improvements and discoveries whereby the utility of such screws is considerably enhanced.

Many types of screw heads have been suggested and designed for use by attempting to utilize numerous flutes, vanes, ridges, etc., in the heads of the screws, some of which penetrated beyond the base of the screw head and into the shank of the screw. Various ramifications and elaborations of such designs have appeared from time to time in an effort to secure a better means more effectively to receive the thrust and torque of screw drivers and heavier driving tools. Others were designed with a view to lending a sufficient frictional engagement between the screw and the driving tool so that the screw could be inserted into its mating receptacle while frictionally attached to the screw and without other manual intervention. However, such various and complicated designs often resulted in weakened and fragile screw heads and have brought about manufacturing and production problems which have been difficult to overcome.

Generally, therefore, it is an object of the present invention to overcome these and other of the foregoing disadvantages and difficulties and to provide a type of screw, as well as a suitable driving tool therefor when occasion requires, which is economic of manufacture, sturdy yet simple and durable of construction and which can be operated with freedom from mechanical as well as other difficulties by means of novel driving tool to be used in combination therewith.

A principal object of the invention is the provision of a screw which is centrally provided with a cavity preferably in axial alignment with the stem of the screw and which is bisected by a conventional slot so that a conventional type of driving tool can be used in conjunction therewith but more particularly, because of the cavity, a means is provided to receive a driving tool adapted therefor which will with greater efficiency and accuracy enhance the utility of such a screw.

Another object of the invention is the provision of a particular and novel driving tool which is simple in its construction and which is adapted

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to be used in conjunction with a novel screw of the type herein disclosed.

A further object of the invention is to provide a combination of means which include such a novel screw as well as such a novel driving tool as herein disclosed which readily and efficiently can be operated in conjunction with each other.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claim.

For a fuller understanding of the nature and object of the invention a reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a perspective view of an enlarged embodiment of a particular type of pilot slot screw illustrating one preferred form of the invention;

Fig. 2 is a plan view of a similar type of screw;

Fig. 3 is a transverse sectional elevation of a screw of the kind shown in Fig. 2 taken along the line 3—3 and looking in the direction of the arrow;

Fig. 4 is a view similar to Fig. 3 taken along the line 4—4 and also looking in the direction of the arrow;

Fig. 5 is a view illustrating a preferred form of pilot type screw driver to be used in combination with such a screw and is positioned so as to be inserted in a screw arranged as shown in Fig. 3;

Fig. 6 is a view similar to that shown in Fig. 5 except that it has been given a quarter turn and is adapted to be inserted in a screw positioned as shown in Fig. 4;

Fig. 7 is an enlarged fragmentary view in perspective of the blade of a driving tool similar to that illustrated in Figs. 5 and 6 and adapted for use in combination with the preferred type of screw as shown in Fig. 1;

Fig. 8 is a perspective view of a modified form of driving blade; and

Fig. 9 is a perspective view of a modified form of screw usable in combination with the type of driving blade shown in Fig. 8.

Referring more particularly to the drawing it will be seen from Fig. 1 that there is indicated generally a pilot slot screw 10 which has a central cavity indicated generally at 11 in its head 12 of

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the screw. Bisecting this cavity is a slot 13 having a bottom 14. The side walls 15 rise perpendicularly from the bottom. Having bisected the cavity 11 the slot 13 has divided the cavity into two separate portions in which the diameter of the cavity is greater than the slotted portion resulting in concave recesses 16 and 17 which are disposed oppositely of each other and equally spaced apart from opposite sides of the longitudinal axis of the stem. The walls of these recesses may be perpendicular with respect to the bottom of the slotted portion or they may be permitted to taper slightly downwardly and inwardly. The walls 16 and 17 need not necessarily terminate flush with the bottom 14 but as shown continue downwardly, resulting in a further concave portion 18 below the bottom 14 of the slot and may best be termed as being of spherical configuration.

In accordance with the principles of the present invention there have been devised screw drivers such as those depicted in Figs. 5 and 6 which are adapted to be engaged by this particular type of screw.

Such a screw driver has its shank 19 terminating at one end, indicated generally at 20, wherein the end portions are flattened extending from edges 21, indicated generally, inwardly toward the shank but outwardly tapered toward the edge much in the manner of conventional screw drivers. However, on each side of these edges, and diametrically opposite thereof, there are provided two pilot portions 22 which, when taken together with the material of the flattened portion between them, would constitute a cylinder but as presently appearing against each flat face of the blade might best be described as being a segment of a cylinder.

In the embodiment above shown these segments of cylinders which, as indicated, are disposed diametrically opposite on the flat faces of the end of the driving tool, protrude beyond the edges of the tool to form a protuberance which is itself a projecting segment of a sphere, as best seen in Fig. 7 at 23, and also as shown in Figs. 5 and 6. It will readily be apparent that a screw driver having that type of blade may readily be inserted into screws of the type shown herein and the flattened surfaces will be received by the perpendicularly spaced apart side walls of the slots whereas the segmental portion of the cylinder, that is, the pilot portion 22, will readily fit into the cavity indicated at 11 so that the segmental portions of the cylinder will be brought to bear against the recessed walls indicated at 16 and 17. The protruding segment of the sphere 23 of course will come to rest in the concave spherical portion 18. Under certain circumstances it is desirable to have the walls of the cavities or recesses 16 and 17 slightly tapered downwardly and inwardly so as frictionally to engage the walls of the segmental cylindrical portions 22. The screw can then readily be placed upon the end of the screw driver and efficiently inserted in the mating portion without other means of assistance. The flattened faces of the tapered end of the screw driver, of course, also materially aid in maintaining such a frictional engagement with the perpendicular walls of the slotted portion, but because of the fact that the cavities or recesses may also be tapered it will be appreciated that the frictional engagements are thereby considerably emphasized.

Referring more particularly to Figs. 8 and 9, there is shown another modification of a screw

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and driving tool. For example, in Fig. 9 the same slotted arrangement is shown, as well as the same cavity to provide recesses with the exception, however, that there is no concave depression between the recesses which falls below the bottom walls of the portion wherein the walls are perpendicular and in parallel spaced apart relationship. It will be seen from this figure that the bottom wall between the recesses 24 is flush with and in the same plane as the bottom portion on opposite sides thereof. The screw driver as indicated in Fig. 8 is substantially identical with that shown in Fig. 7 with the exception that the portions forming the segmental part of the cylinder do not extend beyond the edge of the blade to form a protruding segment of a sphere.

It will by now be apparent that many advantages and features accompany this type of screw and the type of driver to be used in combination therewith. For example, such driving tools, because of the particular arrangement of parts, cannot slip sideways out of the slot and mar or injure the surfaces immediately adjacent to the screw or bolt head. It will be seen that there is provided a novel means of holding the screw driver in the slot while the screw or bolt is being driven home. A provision for holding the screw or bolt along the same longitudinal axis as the driver has readily been accomplished so that the screw or bolt can be driven in a plane perpendicular to the surface of the mating part. The round pilot portion of the screw driver readily finds the circular hole in the screw or bolt head and efficiently locates the slot for the screw driver. With this type of screw or bolt the same may be readily driven or withdrawn from any type of an assembly with the ordinary type of conventional screw driver if the pilot point type of driver does not happen to be available. Again it will be apparent that a means of rapid assembly between the screw or bolt and the screw driver can be accomplished. It is also preferred that the corners which form the edges at the juncture of the recessed portions with the perpendicular side walls be rounded at these intersections and at the top of the head to prevent burring or marring of the cavity in subsequent manufacturing operations on the screw or bolt.

The combination of the slot and cavity in the head of this type of screw or bolt provides a product of attractive appearance and the screw or bolt can readily be used for most commercial applications without additional machining operation on the top of the head. The use of the cavity which extends substantially to the base of the screw head precludes the need of any special radial location of the slot in the head except that both the circular cavity and the slot shall be in a plane that will bisect the head on the shank of the screw or bolt. The use of the circular cavity, which extends preferably downwardly into the slot, and the slot itself does not impair the strength of the screw or bolt head any more than the ordinary straight slot and this is a particular feature of the invention. Because of such an arrangement various difficulties resulting from the more complicated designs which serve largely to weaken such screw heads have therefore been overcome.

As to the forming of the cavity it will be noted that this can either be done in the upsetting operation or the cavity can be drilled or machined into the top of the screw head in a subsequent manufacturing operation, or both the cavity and the slot may be formed in the head in the upset-

ting operation. This slot in the top of the head may be either milled with a circular cutter forming an arc in the bottom of the slot or the bottom of the slot may be milled parallel to the top or the base of the head, or both the slot and the circular hole may be formed in the head in the upsetting operation.

As heretofore indicated, a slightly tapered circular cavity can be used to insure the retention of the screw or bolt on the driver blade if so desired.

It will also be appreciated that screw drivers, slots and circular or cylindrical cavities may be designed so that one screw driver may be used to drive several sizes of screws or bolts so that each screw or bolt size does not require a special screw driver. The present combination of circular and cylindrical cavity may be used in headless screws or bolts, as well as the type herein illustrated.

With respect to the particular means of making such a screw driver, it will readily be seen by those skilled in the art that it can be forged, machined or otherwise swaged in any suitable manner providing it has a pilot point which extends at least flush or slightly below the end or edge of the blade or the pilot point can be formed with a hollow core of a size suitable for the insertion of a round pin to be used as a pilot point.

It will thus be seen that the objects hereinbefore set forth may be readily and efficiently attained, and since certain changes may be made in the above described article as well as the means for its use, and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claim is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

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

In combination, a screw or the like and a driving tool, said screw comprising a stem with a head, a single slot bisecting said head substantially perpendicularly to the axis of said stem and

extending substantially vertically to and short of the base of said head, said slot consisting of a bottom and having walls perpendicular to said bottom, said walls having concave recesses therein which are also perpendicular to said bottom, and said recesses being directly opposite and parallel to each other and equally spaced apart on opposite sides of the longitudinal axis of said stem, and the bottom of said slot between said recesses being slightly dished and continuous and uninterrupted and being substantially flush with the remaining portions of the slot bottom, which portions of the slot bottom have a flat surface normal to the longitudinal axis of said stem, and said driving tool having a shank portion terminating in a screw receiving end, said end having an edge and being flattened a substantial distance inwardly of the edge to provide flat bladed faces but outwardly tapered from the edge, each of said faces having at least one raised pilot portion thereon, and each of said pilot portions constituting tapered segments of a cylinder and terminating substantially flush with said edge on diametrically opposite sides of said faces, said tapered segments being broader where they terminate at said edge than at their opposite ends, and the slot in said screw frictionally engaging the blade of said driving tool and co-fitting therewith.

OTTO W. WAARICH.

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