

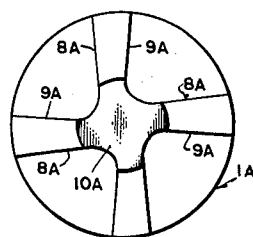
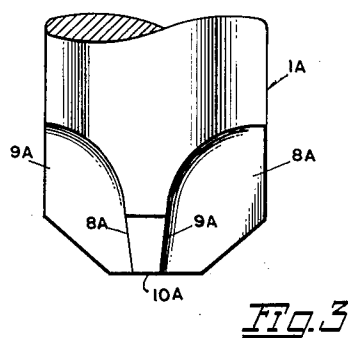
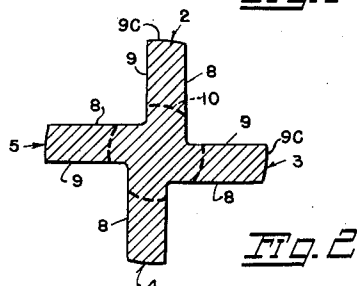
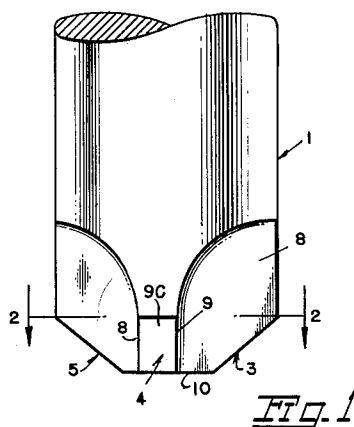
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R. K. JOHNSON ET AL

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DRIVING TOOL FOR RECESSED HEAD SCREWS

Filed Nov. 17, 1959



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DRIVING TOOL FOR RECESSED HEAD SCREWS
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1 Claim. (Cl. 145—50)

This invention relates to new and useful improvements in driving tools for recessed head screws, bolts and the like having right-hand threads only.

We are aware of developments in combination driving and driven elements wherein the driving torque capacity has been somewhat improved over slotted screws. We are also aware of other developments wherein attempts have been made to meet the demand for still greater torque capacity, but in all of these the deficiencies in their cooperating characteristics, and hence failure of attainment of maximum driving torque capacity, led to the development of the driving tool of the present invention, the principal objects of which are to:

Provide a driving tool wherein the transmission of power to the driven element is transmitted entirely by the clockwise or driving walls, which because of their novel arrangement relative to the axis of the tool shank present a much greater area than heretofore for the positive engagement thereof with the screw recess in optimum forcible turning moment and hence the achievement of maximum torque capacity.

The foregoing and other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawing forming a part hereof and in which:

FIGURE 1 is a fragmentary side elevational view of a driving tool made in accordance with our invention.

FIGURE 2 is a sectional plan view taken along the line 2—2 of FIGURE 1.

FIGURE 3 is a view similar to FIGURE 1 illustrating a modified form of the invention.

FIGURE 4 is a bottom end view of FIGURE 3.

With continuing reference to the drawing, wherein like references of character designate like parts, and particularly FIGURES 1 and 2 thereof, reference numeral 1 indicates the shank portion of the driving tool which may be of any desired length and adapted for manual or power tool operation.

Radiating from the bottom end of the tool shank are four identical flat straight-sided wings indicated generally at 2, 3, 4 and 5 and since they are identical a description of one will suffice for all. Each wing comprises what will be hereinafter referred to as a driving wall or clockwise wall 8, a back-out or counter-clockwise wall 9, an outside wall 9C, and a blunt bottom end 10. Both walls 8 and 9 are parallel to each other as shown. The wings extend upwardly and outwardly from the bottom end with increasing radial magnitude as shown in FIGURE 1 wherein it will also be seen that the overall area of the driving wall 8 is much greater than that of the back-out wall 9.

As best illustrated in FIGURE 2 the wings are radially offset relative to each other and the driving wall 8 of each wing is offset from a true radial plane, namely, the plane which also contains the longitudinal axis of the tool shank, and forwardly relative to the clockwise direction

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of rotation of the tool shank, while the back-out wall 9 of each wing is offset to a lesser extent from said plane containing the longitudinal axis of the tool and rearwardly relative to the clockwise direction of rotation of the tool shank. It will also be seen that the back-out wall 9 of one vane is disposed on a vertical plane medial of the diametrically opposed vane. The outside wall 9C of each vane is formed on a radius of curvature from the axis of the shank 1. All the vanes are of equal radial magnitude with the outside edge of the back-out wall of each vane being at a greater distance from a plane through the center of the shank at right angles to the parallel walls of the vane than the outside edge of its respective driving wall. This arrangement provides a cam-like characteristic which causes centripetal or introverted torque to effectively concentrate the pressures around the axis of the driver shank and the axis of a screw driven by the driver and thereby develops and transmits extraordinary torque values to the screw. These high torque values are evenly distributed over the entire screw multiplying the clamping action and holding power as much as 200% in excess of any screw of equal size and material. This feature results in the provision of a driving wall on the clockwise side of the wing from which a greater driving force per unit of area can be transmitted than that which could be transmitted by the opposite or back-out wall 9. As a consequence thereof we have provided a driving tool wherein the surfaces engaged with a screw recess in clockwise rotation are relatively greater than heretofore and result in the attainment of maximum torque capacity when heavy turning moments are applied.

In the modification shown in FIGURES 3 and 4 the driving or clockwise wall 8A of each wing tapers from the periphery of the tool shank toward the axis of the shank on an angle calculated to cause the driver to "cam out" when the torque load becomes equal to the capacity of the back-out wall 9A for the same load. Thus the driving torque and back-out torque are of equal values.

Moreover, the inclined driving wall 8A facilitates driver entry, which is desirable on production lines and the like where power drivers are used and the application of the screws to the driver is in such rapid succession that in many instances workmen attempt to apply the screw to the driver before the driver bit has come to a complete stop.

The blunt or squared bottom end 10 and 10A of both tool shanks serves the important purpose of preventing that end from "bottoming" in an accommodating screw recess.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

A tool for driving right-hand threaded screws having a centrally disposed recess, said tool comprising a shank terminating in a blunt end, vanes extending upwardly and outwardly from said end with increasing radial magnitude, each of said vanes having a straight flat driving wall, a straight flat back-out wall paralleling said driving wall, and an outside wall, each of said driving walls being of greater area than said back-out walls and offset from a longitudinal plane which contains the axis of the tool shank and forwardly of the clockwise direction of rotation of the tool shank, each of said back-out walls offset to a lesser extent from said tool axis-containing plane than said driving walls and rearwardly relative to the clockwise direction of rotation of the tool shank, the

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back-out wall of each vane disposed on a vertical plane medial of a diametrically opposed vane with the outside edge of the back-out wall of each vane at a greater distance from a plane through the center of the shank at right angles to the parallel walls of the vane than the outside edge of its respective driving wall, the outside wall of each vane being on a radius of curvature from the axis of the tool shank whereby cam-like characteristics of such curvature will cause introverted driving torque to concentrate the pressures around the axis of the tool shank and a screw driven thereby, and whereby clock-

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wise forces of the rotating driving tool transmitted to a screw recess will impart a greater driving torque load on the screw than if transmitted in a counter-clockwise direction by said back-out walls.

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