

June 24, 1952

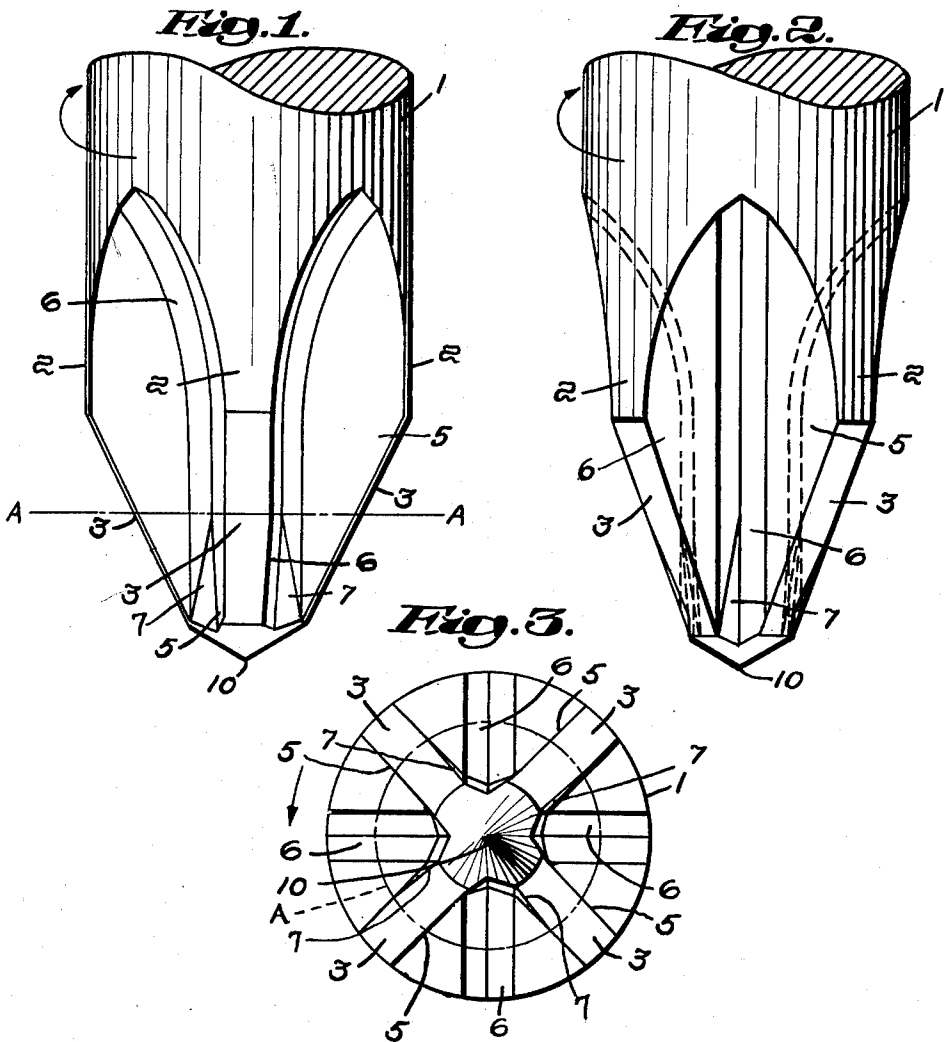
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2,601,453

DRIVING TOOL FOR SOCKET HEAD FASTENERS

Filed July 21, 1948

3 Sheets-Sheet 1



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Fig. 4.

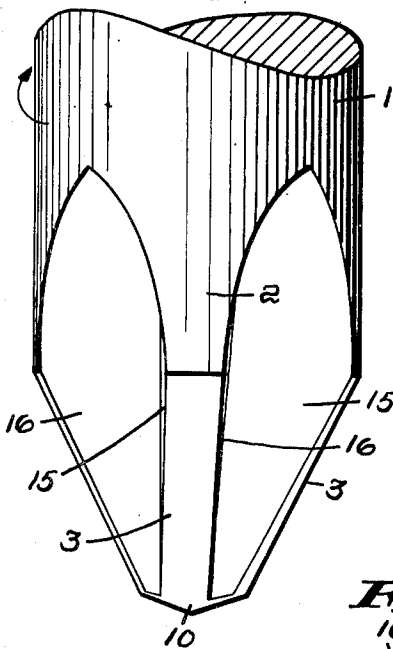


Fig. 5.

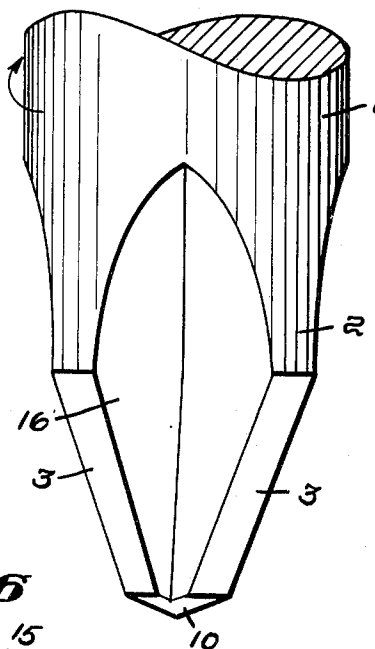
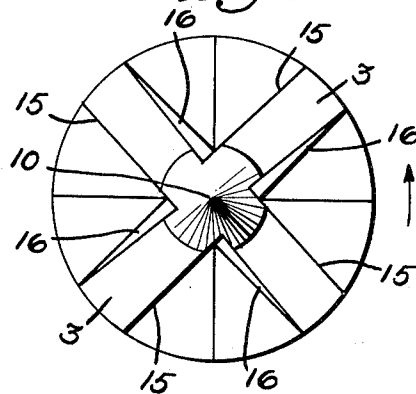


Fig. 6.



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Fig. 7.

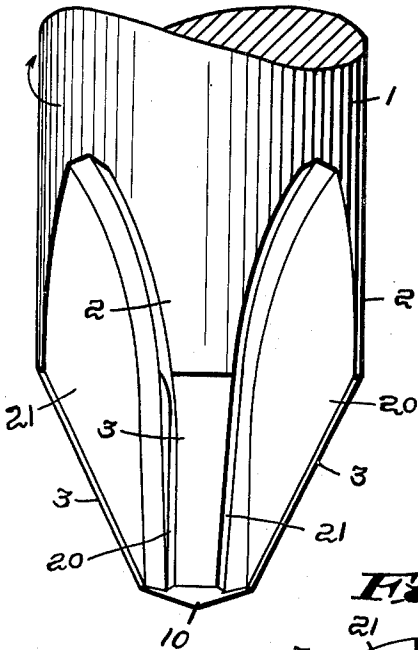


Fig. 8.

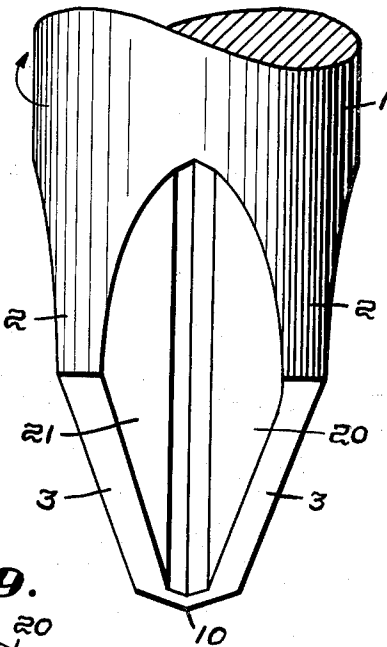
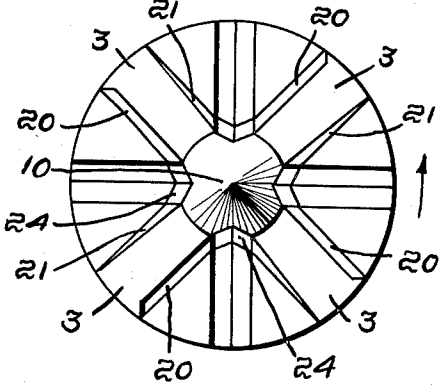


Fig. 9.



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UNITED STATES PATENT OFFICE

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DRIVING TOOL FOR SOCKET HEAD
FASTENERS

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1 Claim. (Cl. 145—50)

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My present invention is a novel and improved driver, tool, or bit primarily designed as a driving implement for socket fastener devices, as shown in my prior and copending application Ser. No. 727,451, filed Feb. 2, 1947, now abandoned.

My present improved construction is adapted for either hand use or as a power-driven implement and is constructed and arranged with a substantially perpendicular thrusting surface to impart a direct driving or contact face—or plurality of such faces—and with separately formed cooperating faces to effect a wedging action between the driver and the fastener being driven in order that they may be united temporarily when applying the fastener to the work.

Heretofore it has been customary, as explained in my said copending application, to form socket head fasteners with slanting or bevelled faces to turn or drive the same by means of a bit or driver having similar or bevelled slanting faces but formed at slightly different angles to obtain the advantage of a wedging action so that the fastener and driver could be temporarily united when being applied to the work.

Such prior constructions, however, necessitated the driving thrust or force from the driving to the driven element to be transmitted thru these bevelled surfaces and, hence, automatically and necessarily exerted a separating force, tending to cause the driver to slip out of the socket and separate the driver and bit axially or longitudinally. On the other hand, transverse and slotted or socket head fastening members with square, straight, flat, and non-wedging cooperating faces did not have the advantage of a temporary union between the fastener and driver.

My invention obviates these prior difficulties and enables a driving element and a driven element to be so constructed and arranged as to obtain the advantages incident to a direct or non-axial driving force without any tendency to cause separation between the driver and fastener, together with separate means to hold the driver and fastener temporarily united.

An important object of my present invention is to provide a direct substantially perpendicular driving thrusting surface on a driving tool or bit, which thrusting face or surface will be independent of a separately formed bevelled, slanting, or wedging surface, although said wedging surface will cooperate with the perpendicular or right-angled thrusting surface in the bit to hold the bit in contact with the correspondingly formed surface for such driving action in the fastener being driven. Thus, the transmission

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of power from the driving to the driven element is substantially in a non-axial direction, as a perpendicular thrust during the driving action, therefore, prevents the driving force from having any tendency to force the driving bit out of the socket in the fastener and, hence, prevents any mutilation, marring, damage, burring, or turning over of the rim of the socket in the fastener.

Thus I provide means for the transmission of a driving and rotating torque substantially perpendicular at a 90° angle, effecting a full 100% of driving thrust as distinguished from driving thru slanting or bevelled faces.

Heretofore, in construction of driving bits for socket head fasteners, in order to obtain a wedging action, the driving faces of both the driver and socket head have been slanted or bevelled in order to obtain the advantage of a wedging action and, hence, to hold the fastener on the point of the bit. In my present invention I provide a distinct thrusting face for both driver and socket, which face will give a substantially perpendicular line for transmission of force from the driver to the fastener, together with a separate bevelled slanting or angular face, which latter is so formed and constructed to hold the thrusting faces in contact and at the same time secure a wedging action so that the fastener and driver will be held united temporarily while the fastener is applied to the work, as well as during the driving of the fastener in the work.

A further important feature of my present and improved form and construction of driving bit is that the same will fit and operate on a considerably different range of sizes of socket head fasteners; whereas formerly a driver with slanting faces all around required a different driver for each different size of head. By means of my present novel and improved construction of a direct driving surface and a separate cooperating wedging face, my form of driver will automatically fit a considerable range of sizes, and as long as the driving faces are in contact for the thrusting action, the driver can be utilized and without any tendency to "jump out" or mar or mutilate the rim of the socket in the fastener.

Thus, a fastener can be applied, removed, and reapplied without injury and with greater facility.

While I have used straight or flat surfaces for the driver element in the embodiment of my invention herein, it will be appreciated that other forms of cooperating driving and driven surfaces can be employed so long as the driving force does not tend to separate longitudinally the driver and

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fastener being driven. Thus, cooperating curved or fluted surfaces can be employed, or a plurality of same, with the driving force so directed to prevent axial separation, viz., in a non-axial direction and at right angles or perpendicular to the longitudinal axis of the united driver and fastener.

Further advantages of my present driver or bit with a separate thrusting face and a separate wedging face will be hereinafter more fully pointed out and claimed.

Referring to the drawings illustrating a preferred embodiment of my present invention:

Fig. 1 is a side view of my improved driver;

Fig. 2 is a corresponding view at right angles to that of Fig. 1, and

Fig. 3 is an end view looking from the bottom of the driver.

Figs. 4, 5, and 6 are similar views of a modified form of driver, and

Figs. 7, 8, and 9 are similar views of a further modification.

As shown in the drawings, I have illustrated at 1 a fragmentary portion of the shank of the driver which may be adapted as a bit to be attached to a power-driven spindle or to the handle for manual operation. This bit is formed with its lower or driving end formed with alternate recessed or cut-way portions and intermediate projecting ribs.

These ribs may have the upper portions of substantially the diameter of the shank 1, as indicated at 2—2, and with the lower part of each rib conically formed as indicated at 3—3 substantially at an angle to fit the depth of the socket head in the screw, bolt, or article to be operated on by the driver. As herein shown, I have illustrated a plurality of such ribs and intermediate recesses, viz., four in number, although a different plurality can be utilized if desired.

Considering that the driver will be turned to the right, viz., in the direction of the arrows, the driving thrusting face of each rib is a substantially flat surface, as shown at 5, to give a direct perpendicular thrust to the correspondingly flat surface in the recessed head of the fastener being operated upon. Cooperating with each flat surface 5 is an angular or wedging face 7, being formed longitudinally or axially with the line of the bit and from the apex or bottom point 10 upwardly a substantial distance on the rib face 6 opposite to the flat driving face 5 to give a firm power-driving and wedging action of the bit into the socket head fastener being operated on. The apex 10 may be pointed substantially or may be in the form of a truncated cone, it being customary to form the bottom portion of the socket in an obtuse pointed form caused by the punching, heading, or forming tool.

I preferably make this driver by forming, swaging, heading, or milling the flutes or ribs in it, or by a coining operation after the blank is roughly formed to size, to give substantially perpendicular driving surfaces on both sides of all four flutes. After this operation, I would mill the driver a second time with a milling cutter, this second milling operation producing a slanting, wedging surface on the back sides of each of the four wings.

Preferably, I form the shank of the bit 1 of substantially greater diameter than that of the head of the fastener intended to be driven by

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the bit. Ordinarily, the bit would enter the socket head of the fastener no deeper on the larger size than as indicated on the dotted lines A—A of Fig. 1. It is, of course, feasible to have the slanting surface 7 extend entirely throughout the length of the rib or flute until the flute runs into the shank 1, but as the bit is intended to have its operative portion at the lowermost end, viz., from approximately the line A—A to the point 10, it is unnecessary to have this wedging face extend further than substantially as shown at 7 in the drawings.

As shown in Figs. 4, 5, and 6 the shank 1 has the ribs or flutes 2 formed as shown with a lower conical or beveled surface 3 terminating in a point 10, as already illustrated, and explained. In this form, I make the middle or flat driving faces 15 on each of the ribs 2 and an opposite wedging face 16 to cooperate therewith in engaging the socket head fastener of my said prior and pending application.

This is an extremely simple form of construction and is efficient in exerting a direct 90° driving thrust on my novel type of socket head fastener, as is shown in the first drawings.

Referring to the forms shown in Figs. 7, 8, and 9, I have herein illustrated the shank 1 with the flutes 2 and lower conical or bevelled portions 3 terminating in the point 10 as each are provided with the flat driving thrusting faces 20 corresponding to 5 in Figs. 1 to 3, and 15 in Figs. 4 to 6, together with the cooperating wedging face 21 with the triangular portions 24, as shown.

It will be appreciated that in the various forms and modifications as herein illustrated and described, I have provided a novel driving tool or bit which has a tapered end portion formed with a plurality of ribs or flutes, each rib having a substantially flat driving surface together with a cooperating slanting or bevelled surface, preferably on the adjacent flute, adapted to fit a recess in the head of the fastener to be driven by the tool or bit.

I claim:

A driving bit of the kind described, having a plurality of alternate ribs and flutes formed on a conical engaging end portion, constructed and arranged to cooperate with the correspondingly contoured socket in the head of a fastener, each rib being formed with one driving thrust face which exerts driving torque perpendicular to the longitudinal axis of the driving bit relatively with the direction of rotation of the bit, the opposite face of said rib being formed with a slanting surface to cooperate with the corresponding bevelled face in the socket to temporarily wedgingly unite the driver and fastener, wherein the driving thrust faces of the ribs are substantially parallel with the longitudinal axis of the driver.

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