My present invention is a novel and improved driver or bit to cooperate with a recessed head fastener of the type shown in application Ser. No. 246,119, filed September 11, 1951, now U. S. Patent No. 2,592,462 which is a refiled as a combination and continuation of my companion application Ser. No. 35,518 (series of 1948), filed July 13, 1948, now abandoned, and continuing application Ser. No. 772,481, filed February 8, 1947, on “Socket Head Fastener,” now abandoned.

As explained in said companion applications, hereunto, the usual type of driving tool or bit designed to cooperate with the recess or socket in the head of the fastener, particularly where a wedging action is provided in order to hold the fastener and bit temporarily united, relies on transmission of the driving force thru the wedged or bevelled faces and, hence, necessarily creates a tendency to separate the driver from the fastener axially or longitudinally of the same.

As explained in my said prior applications, I have devised a construction wherein the driving torque or force in rotating a threaded fastener by means of a bit or driver is exerted in a substantially non-axial thrusting direction and between a driving and a driven face or surface which direction will be at right angles to the axis of the fastener being driven and of the driver thru which the driving force is exerted. In combination with this feature, I have provided separate wedging, bevelled, or other cooperating faces to hold the driver and fastener temporarily united, but which do not exert any axial separating force during the rotative movement of the driver.

In my companion application filed July 13, 1948, I have disclosed and claimed a special form of recessed head fastener carrying out my invention of a direct driving force and separate wedging faces in a manner so constructed and arranged as to afford the direct driving both in a driving rotation and in a reverse drive, viz., clockwise and counterclockwise.

My present invention is a novel form of bit, tool, or driver which is designed to cooperate with such recessed head fastener and to also drive the same in a clockwise or counterclockwise direction, exerting all the driving thrust and force in either direction at right angles to the axis of longitudinal dimension of the driver and fastener. Thus, the non-axial driving thrust eliminates any tendency to cause the driver to slip up and out of the recess and, thus, also prevents mutilation, damage, burring, or turning over of the rim of the recess in the fastener, which was a danger and disadvantage in the driving force exerted on bevelled, slanting, or wedging faces. The wedging action I obtain is on a separate face for wedging only and not to receive the driving thrust in either a clockwise or counterclockwise direction.

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

Fig. 1 is a side view of the operative end of a bit, tool, or driver adapted to fit within a cooperating recess in the head of a fastener;

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

Fig. 3 is an end view looking from the point or bottom upward of the bit shown in Figs. 1 and 2.

Referring to the drawings, I designates a fragmentary part of the lower portion of the shank of a driver, which may be adapted as a bit to be attached to a power-driven spindle or hand-operated press, or a cooperating handle for manual operation. The lower end of the bit is preferably tapered to fit recessed heads of varying size, and is cut away or milled into alternate flutes and ribs, preferably four in number. The ribs and consequently the flutes are formed symmetrically and with a set of ribs in diametrical position, having alternate driving faces substantially parallel with the axis of the bit so that upon rotation, the driving thrust will be exerted at right angles with the axis or non-axially. One pair of these ribs has these driving faces to exert a clockwise rotation on the fastener, and the alternate pair of ribs in diametrically opposite alignment with each other for corresponding with a pair of faces to exert direct driving thrust in a counterclockwise direction on the fastener.

Cooperating with each pair are bevelled or wedging faces to also cooperate with the wedging faces in the recessed head of the fastener to provide a temporary union or fitting together of driver and fastener, units the same so that the fastener can be tilted on the end of the driver and then applied to the work.

The shank 1 being tapered, as above noted, terminates in an apex 2, with a series of grooves 4, 6, 8, and 10, defining between the same ribs 12, 14, 16 and 18. The ribs 12 and 14 are diametrically opposite and the milling of the flutes which forms the ribs is effected so as to provide perpendicular driving faces on each of the pairs for exerting a rotative force in opposite directions.

Thus the pair of ribs 12 and 14 have formed thereon, by the milling of the flutes 4 and 6, direct driving faces 20 and 21 for turning the fastener in a clockwise direction. Similarly, these flutes 4 and 6 form on the face of the ribs 16 and 18 perpendicular driving faces 22 and 23 for rotation in a contra-clockwise direc-
tion. The flutes 8 and 10 are formed to present bevelled faces for the wedging action, as best shown in Fig. 3. Thus, bevelled or wedged faces are formed on the ribs 12 and 14, as indicated at 24 and 25, to cooperate with correspondingly slanting faces in the recessed fastener to be actuated and to hold, wedge, or clamp the driver and the driving ribs 12 and 14 united to the fastener.

Similarly, for cooperation with the reverse driving faces 22 and 23, I form bevelled surfaces 26 and 28 on the opposite sides of the ribs 16 and 18. Thus, both the direct or clockwise driving action and contra-clockwise driving action through non-axial, force-transmitting faces in cooperation with separate and independent non-driving bevelled or wedge faces is provided to hold the driver and fastener united together.

Also, it will be appreciated that the construction for a clockwise and counterclockwise driving can be embodied in the forms of my said prior application Ser. No. 727,451, as well as in the driver or bit construction illustrated in my copending application Ser. No. 39,968, filed July 21, 1948, now U. S. Patent No. 2,601,468, dated June 24, 1952.

Thus, my present invention of a driving bit or tool to cooperate with a recessed head fastener having correspondingly socket drive and wedging surfaces formed therein comprises essentially alternate ribs and flutes on the driver, the ribs having direct right-angled driving thrusting faces to impart rotative action to the corresponding faces in the fastener, in combination with separate wedging faces to temporarily unite the 35 driver and fastener.

I claim:

1. A driving bit or tool of the kind described adapted for driving rotation in either clockwise or counter-clockwise direction alternately, said driver having a tapered end with a plurality of alternate ribs and flutes, each of said ribs being formed with a slanting bevel on the edge and provided throughout the depth of the flute separating the ribs with a wall face substantially parallel to a radial plane including the axis of the driver, and with the opposite face slightly inclined with respect to said plane, adjacent ribs having said driving face and inclined faces oppositely positioned for clockwise driving action on one set of ribs and counter-clockwise driving on the alternate adjacent ribs.

2. A driver construction as set forth in claim 1, wherein four ribs and four flutes are arranged in symmetrical relation, two ribs being positioned for the clockwise driving, two for the counter-clockwise, and all four bevelled faces on said ribs being arranged for wedging action with the fastener to be driven.

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