

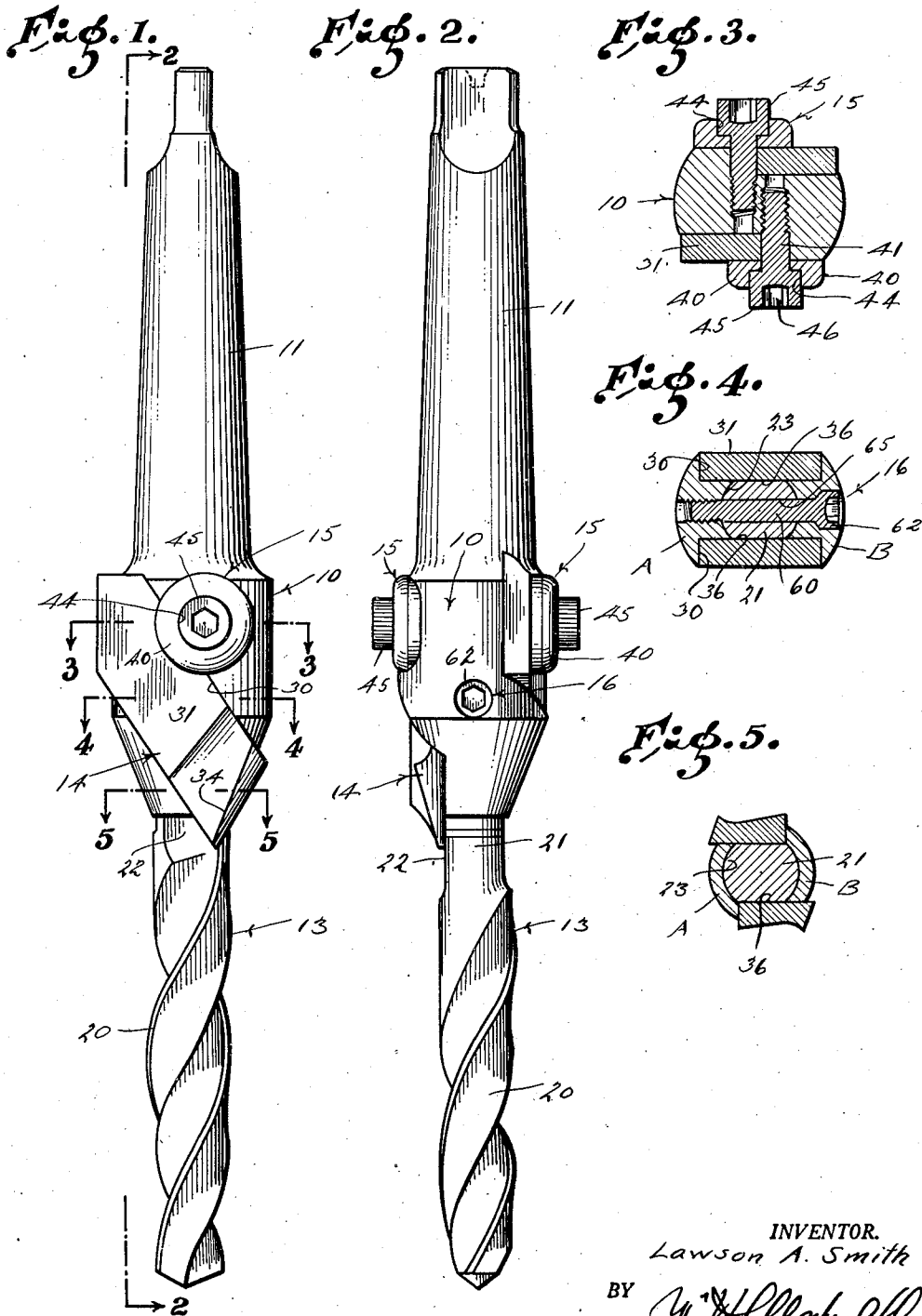
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DRILL AND COUNTERSINK TOOL

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DRILL AND COUNTERSINK TOOL

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This invention has to do with a tool and has particular reference to a tool which operates to both drill and countersink. It is a general object of my invention to provide a tool of the character described which is simple, effective, and sturdy and which also is subject to variation so that it can be used to drill various size holes and to have various countersinking actions.

It is desired in practice to provide holes in metal, or the like, which holes are counterbored or countersunk to receive parts such as the heads of screws, bolts, or other such parts. It is common practice to drill such holes with ordinary drills and then operate on them with devices known as countersinks. This involves two operations and, consequently, consumes considerable time and is costly.

It is an object of my invention to provide a practical and satisfactory tool which will perform in one operation a drilling operation and a countersinking operation.

Another object of my invention is to provide a tool of the character mentioned which is simple, compact and practical in form making it suitable for general use.

Another object of the present invention is to provide a tool of the character described which will handle standard forms or types of drills and in which the body is comparatively small and compact and is reinforced, making it strong and durable.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side elevation of the tool provided by my invention. Fig. 2 is a view taken as indicated by line 2-2 on Fig. 1. Fig. 3 is a transverse sectional view taken as indicated by line 3-3 on Fig. 1. Fig. 4 is a transverse sectional view taken as indicated by line 4-4 on Fig. 1, and Fig. 5 is a transverse sectional view taken as indicated by line 5-5 on Fig. 1.

The tool of my present invention involves, generally a body 10, a shank 11 carrying the body, a drill 13 carried by the body to project therefrom at the end opposite the shank, countersink cutters 14 carried by the body to cooperate with the drill, means 15 for retaining or holding the countersink cutters, and means 16 for reinforcing the body.

The body of the tool is the part which serves as the mounting or carrier for the various other

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elements and, in practice, may be varied in size and shape, as circumstances require. It is preferred to make the body as small in diameter as is consistent with strength and rigidity and to confine it in length so that it is as compact as possible lengthwise of the tool. The preferred form of body illustrated in the drawings is round in cross-section and is made just sufficiently long to adequately carry the various other elements, as will be apparent from the drawings.

The shank 11 projects from one end, for instance, the upper end of the body 10, and serves as a means for connecting the tool in a machine, or the like. In accordance with standard practice I have provided a tapered shank, it being understood that in practice the shank may be of any desired form, shape or type as circumstances require.

The drill 13 employed in carrying out my invention has a working end portion 20 which may be in the form of an ordinary twist drill familiar to those skilled in the art. The upper end or stem 21 of the drill is, in accordance with my invention, round in cross-section, except that it is provided with diametrically opposite flat sides 22.

The body 10 is provided with a bore or socket 23 which extends into it from its lower end to receive and carry the stem 21 of the drill. In practice the tool may be equipped with drills of various sizes so long as the stem thereof is of a size to be properly accommodated by the socket 23 of the body.

The countersink cutters, of which there are preferably two, arranged in diametrically opposite sides of the body, are alike and each is arranged in a channel 30 cut in the side of the body. Each countersink cutter, as shown in the drawings, includes a body portion 31 which is substantially rectangular in cross section and which fits the channel 30 in the body. The channels 30 are pitched or angularly disposed relative to the longitudinal axis of the tool and so that the cutters extend downwardly and outwardly as will be apparent from the drawings. The lower or projecting end portion of each cutter 14 has a cutting edge 34 faced in the direction of rotation of the tool and pitched relative to the axis of the tool or relative to the drill to have the desired countersinking action.

A feature of the present invention is the formation of the channels in the sides of the body or in opposite sides of the body so that they intersect the socket 23 in the body which carries the stem of the drill so that the inner sides 36 of the body

portions 31 of the cutters bear upon the flat sides 22 of the stem of the drill. Through this arrangement I obtain a compact construction and the cutters serve to prevent rotation of the drill stem in the body.

The means 15 provided for retaining the cutters in the channels 30 of the body may vary as circumstances require. In the preferred form of the invention each cutter is retained in its channel by a clamp plate 40 carried by a screw 41 threaded in an opening in the body so that the plate is clamped toward the body and overhangs the body 31 of the cutter to clamp it in the channel and against the stem of the drill. In the construction illustrated I have shown the clamp plates 40 countersunk at 44 to receive the heads 45 of the screws and the screw heads 45 have countersunk sockets 46 to receive a wrench, or the like. This provides an effective compact construction.

The means provided for reinforcing the body 10 is in the form of a tie pin 60 arranged to connect the two spaced side parts A and B of the body formed by the cuts made in the body to make the socket 23 and channels 30, as will be apparent from Fig. 4 of the drawings. The tie pin extends between the spaced body parts A and B and has one end threaded in the body part A and has a head 62 on its other end seated in a socket in the body part B. The tie pin may be arranged at a point where the stem of the drill occupies the socket 23, in which case an opening 65 is provided transversely through the stem of the drill to pass the tie pin as is shown in Fig. 4.

The lower end portion 50 of the body 10 is downwardly and inwardly tapered so it is in the form of an inverted truncated cone. The channels 30 continue into this portion of the body so that the lower or cutting end portions of the cutters bear on the sides of the stem 21 and are held by the body at points very close to the working or cutting edges, thus giving the cutters effective support. This is shown in Fig. 5 of the drawings.

With the construction provided by my invention a drill of suitable size is mounted in the body and countersink cutters 14 of the desired size and shape are arranged in the channels 30 so that their cutting end portions project from points close to the flattened sides of the drill stem and extend at the desired angles. By this construction or arrangement the path of cut of the drill is overlapped by the path of cut of the countersink cutters so that the tool operates to countersink the bore without leaving any burrs or rough edges. It will be apparent how the means 15 serve to firmly and effectively hold the countersink cutters in the channels of the body and how the cutters, in turn, bear against the flat sides of the drill stem to hold the drill against turning. The reinforcing means serves to tie the body parts A and B together and also serves to retain the drill in the body and to prevent its turning.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art or fall within the scope of the following claims.

Having described my invention, I claim:

1. A tool of the character described including, a body having a mounting shank at one end and having a diagonally disposed straight channel in

its side and a socket in it from its other end, a drill having a stem held in the socket and a cutting portion beyond said other end of the body, and a straight elongate countersink cutter held in the channel with a cutting part overlapping the drill and acting in a path overlapping that of the drill and projecting laterally outward from one side of the drill.

2. A tool of the character described including, a body having a diagonally disposed channel in its side and a socket in its outer end, a drill having a stem engaged in the socket, and a countersink cutter held in the channel with a cutting part acting in a path overlapping that of the drill and projecting laterally outward from one side of the drill beyond the said end of the body, the socket and channel intersecting so the cutter engages the stem within the body.

3. A tool of the character described including, a body having a diagonally disposed channel in its side and a socket in its outer end, a drill having a flat sided stem held in the socket, and a countersink cutter held in the channel with a cutting part projecting from one side of the drill, the socket and channel intersecting in the body so the cutter engages one of the flat sides of the stem within the body.

4. A tool of the character described including, a body with a downwardly and inwardly tapered lower end portion and having a diagonally disposed channel in its side and through said lower end portion, the body having a socket in its lower end, a drill having a stem engaged in the socket, and a countersink cutter held in the channel with a cutting part immediately below the said end portion of the body and projecting from one side of the drill.

5. A tool of the character described including, a body with a mounting shank at its upper end and with a downwardly and inwardly tapered lower end portion and having a diagonally disposed channel in its side and a central socket in its lower end, a drill having a stem held in the socket, and a countersink cutter held in the channel with a cutting part supported by the tapered portion of the body and projecting from one side of the drill immediately below the said portion of the body.

6. A tool of the character described including, an integral body having its lower end portion divided by a central socket and side channels that intersect the socket, a drill having a stem carried in the socket, cutters carried in the channels, and reinforcing means securing the lower end portions of the body together where it is divided.

7. A tool of the character described including, an integral body with a mounting stem at its upper end and having its lower end portion divided by a central socket entering it from the lower end and side channels that intersect the socket, a drill having a stem carried in the socket, cutters carried in the channels to bear laterally on the stem within the socket, and reinforcing means securing the lower end portions of the body together.

8. A tool of the character described including, an integral elongate body having its lower end portion divided by a central socket and side channels that intersect the socket, a drill having a stem carried in the socket, cutters carried in the channels, and reinforcing means tying the lower end portions of the body together including a pin arranged transversely of the body be-

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tween the divided parts of the body to connect them.

9. A tool of the character described including, a body having its lower end portion divided by a central socket and side channels that intersect the socket, a drill having a stem carried in the socket, the stem having an opening therethrough cutters carried in the channels at opposite sides of the stem, and reinforcing means securing the divided lower end portions of the body together including a pin arranged between the divided parts of the body and through the opening in the stem.

10. A tool of the character described including, a body with a mounting shank at its upper end and having a socket in it from its lower end to receive the stem of a drill and having a tapered lower end portion and having channels intersecting the socket bifurcating the body so it has spaced lower end parts, a drill having a stem engaged in the socket, cutters in the channels bearing on the stem, and means connecting the said spaced parts of the body tying them against spreading.

11. A tool of the character described including, a body with a mounting shank at its upper end and having a socket in it from its lower end to receive the stem of a drill and having a tapered lower end portion and having channels intersecting the socket bifurcating the body so it has spaced parts, a drill having a flat sided stem engaged in the socket, cutters in the channels bearing on the flat sides of the stem, and means connecting the spaced parts of the body against spreading.

12. A tool of the character described including, a body having a socket to receive the stem of a drill and having a tapered lower end portion and having channels in its sides and intersecting the socket dividing the body into spaced parts, a drill having a stem in the socket, cutters in the channels bearing on opposite sides of the stem, and a pin connecting the spaced parts of the body, the pin being threaded to one part and having a head bearing on the other part.

13. A tool including, a body with a mounting shank at one end and having a central socket entering it from the other end, there being a channel in the side of the body intersecting the socket within the body, a centrally disposed member with a stem portion engaged in the socket, and a cutter carried in the channel to have a part bearing on the side of the stem portion within the socket.

14. A tool including, a body with a mounting shank at one end and having a central socket entering it from the other end, there being a channel in the side of the body intersecting the socket within the body, a centrally disposed member with a stem portion engaged in the socket, a cutter carried in the channel to have a part bearing on the stem portion within the socket, and a single screw member retaining the cutter in the channel and in pressure engagement with the side of the stem portion to retain the stem in the socket.

15. A tool including a body with a mounting shank at one end and a central socket entering it from the other end, and a channel in the side of the body intersecting the socket within the body, a centrally disposed member having a flat sided stem received in the socket and having a part projecting from said other end of the body, and a cutter held in the channel and engaging the flat side of the stem to hold the stem.

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16. A tool including a body with a mounting shank at one end and a central socket entering it from the other end, and a diagonally disposed channel in the side of the body intersecting the socket within the body, a centrally disposed member having a flat sided stem received in the socket and having a part projecting from said other end of the body, and a cutter held in the channel and engaging the flat side of the stem to hold the stem and having a cutting part beyond the said other end of the body.

17. A tool of the character described including, an integral body having its lower portion divided by a central socket and side channels that intersect the socket, a drill having a stem carried in the socket, cutters carried in the channels, and means retaining the cutters in the channels and also in bearing engagement with the stem, and reinforcing means securing the lower end portions of the body together.

18. A tool of the character described including, an integral body having its lower end portion divided by a central socket and side channels that intersect the socket, a drill having a flat sided stem carried in the socket, cutters carried in the channels engaging the flat side of the stem, and reinforcing means securing the lower end portions of the body together.

19. A tool of the character described including, an integral body having its lower end portion divided by a central socket and side channels that intersect the socket, a drill having a stem carried in the socket, cutters carried in the channels, and reinforcing means tying the lower end portions of the body together including a pin arranged between the divided parts of the body to connect them, the pin having a head countersunk into one part of the body and having a threaded end engaged in the other part of the body, there being no part of the pin projecting from the body.

20. A tool of the character described including, a body with a mounting shank at its upper end and having a socket in it from its lower end to receive the stem of a drill and having a tapered lower end portion and having channels intersecting the socket bifurcating the body so it has spaced parts, a drill having a flat sided stem engaged in the socket, cutters in the channels bearing on the flat sides of the stem, a single means retaining the cutters in the channels and forcing them into bearing engagement with the stem, and means connecting the spaced parts of the body against spreading.

21. A tool of the character described including, a body having a socket to receive the stem of a drill and having channels at opposite sides intersecting the socket dividing body into spaced parts, a drill having a stem in the socket, cutters in the channels bearing on the stem, clamp means extending laterally of the body and engaging the cutters to hold them in the channels, and a pin at right angles to the clamp means and connecting the spaced parts of the body, the pin being threaded to one part and having a head bearing on the other part.

22. A tool of the character described including, an elongate body having a socket in its lower end to receive the stem of a drill and having side channels intersecting the socket dividing the lower end portion of the body into spaced parts, a drill having a stem in the socket, cutters in the channels bearing on the stem, clamp means holding the cutters in the channels, and a pin connecting the spaced parts of the body tying them together, the pin being axially removed from the

clamp means in the direction of the lower end of the body.

23. A tool of the character described including, an elongate body having a socket in its lower end to receive the stem of a drill and having side channels intersecting the socket dividing the lower end portion of the body into spaced parts, a drill having a stem in the socket, cutters in the channels bearing on the stem, clamp means extending transversely of the body and holding the cutters in the channels, and a pin connecting the spaced parts of the body, the pin being disposed at right angles to the clamp means and axially removed from the clamp means in the direction of the lower end of the body.

24. A tool including a body with a mounting shank at its upper end and having inclined channels in opposite sides, cutters in the channels to project down and out from the body, and screw

members threaded to the body adjacent the channels to clamp the cutters in the channels, the screw members being in a common transverse plane and being laterally offset and extending into the body to pass within the body.

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