March 30, 1965 P. LAUNAY 3,175,593

SCREWDRIVER BLADE

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Fig. 1.

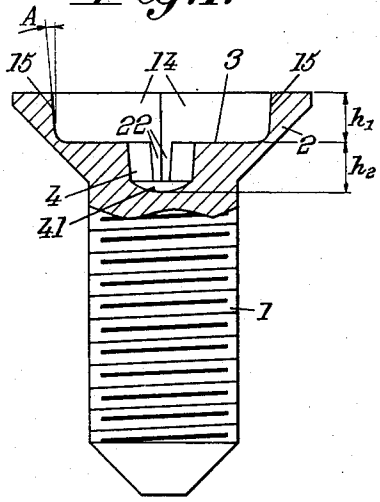

Fig. 2.

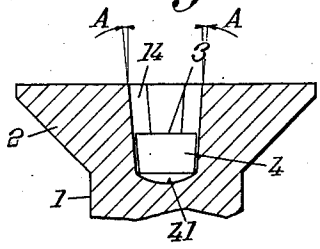

Fig. 3.

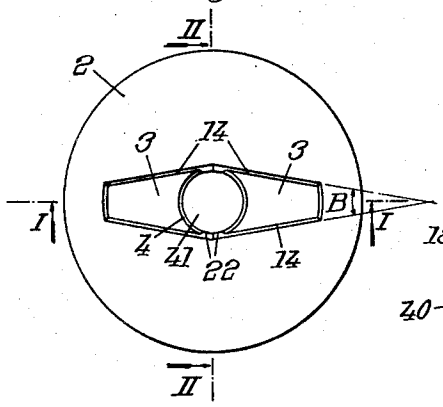

Fig. 10.

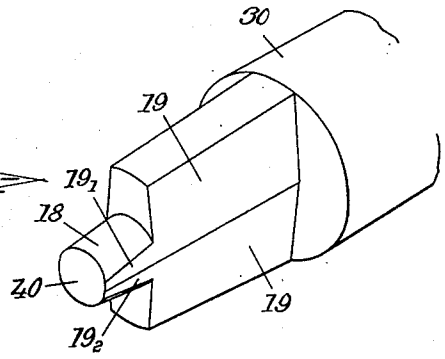

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Fig. 4.

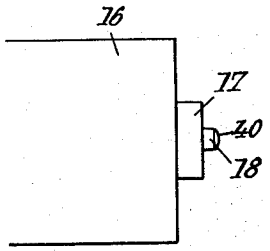

Fig. 5.

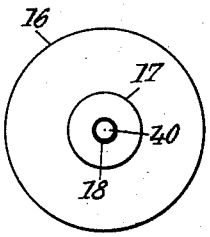

Fig. 6.

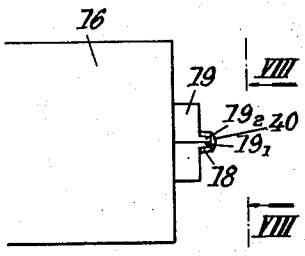

Fig. 7.

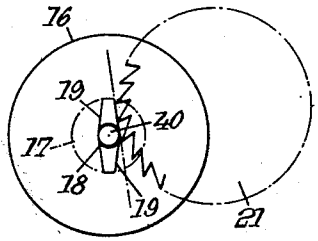

Fig. 8.

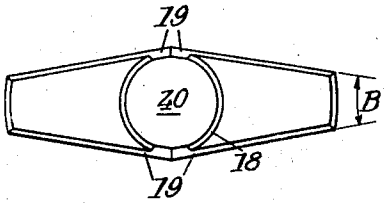

Fig. 9.

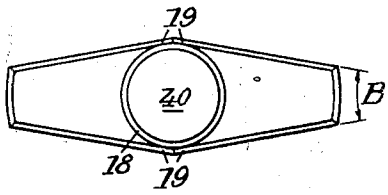

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Fig. 11.

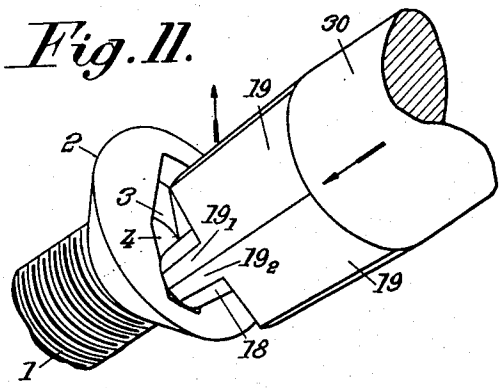


Fig. 12.

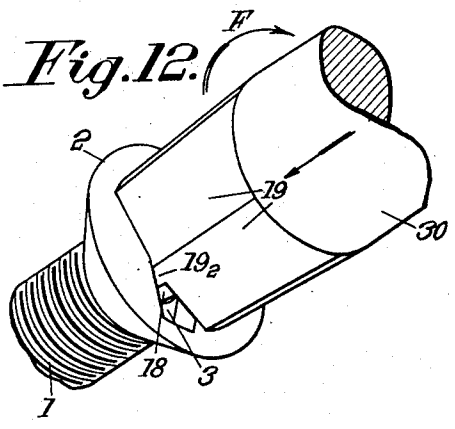
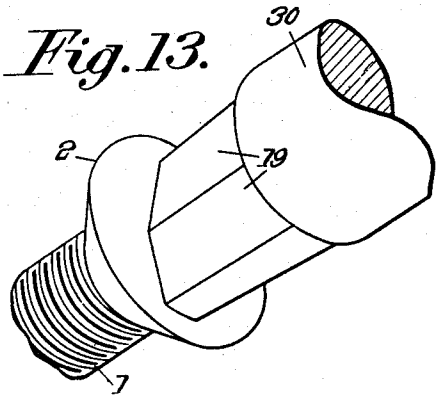


Fig. 13.



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3,175,593

SCREWDRIVER BLADE

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Claims priority, application France, Mar. 31, 1961, 857,520
4 Claims. (Cl. 145—50)

The present invention relates to screws and screwdrivers.

A characteristic feature of the invention resides in providing the head of the screw with a slot of substantially diamond-shaped cross section, with the side walls of this slot flaring outwardly at a small angle, the bottom of said slot being flat with the exception of its central part, where it is provided with a conical guiding axial hole the apex angle of which is at least approximately equal to said small angle, such a slot forming a female part adapted to cooperate with a male part consisting of a screwdriver blade of substantially diamond-shaped cross section and tapering at said small angle toward its end, said blade end being provided in its central part with a frusto-conical axial projection adapted to fit in said conical hole of the slot.

Such an arrangement makes it possible, on the one hand, to facilitate the formation of a slot in the screw head by stamping by means of a punch of the same shape as the above mentioned screwdriver and, on the other hand, to facilitate the holding of the screw by the end of the screwdriver, as will be hereinafter explained.

A preferred embodiment of my invention will be hereinafter described with reference to the appended drawings given merely by way of example and in which:

FIG. 1 is a sectional view on the line I—I of FIG. 3;

FIG. 2 is a sectional view on the line II—II of FIG. 3;

FIG. 3 is a plan view of the same screw;

FIG. 4 is a side view of a blank to be used for making a punch for obtaining, by stamping, the slot in the screw head;

FIG. 5 is an end view of the blank of FIG. 4;

FIG. 6 is a side view of the punch obtained from the blank of FIGS. 4 and 5;

FIG. 7 is an end view, corresponding to FIG. 5, showing the forming of the punch;

FIG. 8 shows, on an enlarged scale, the punch of FIG. 7;

FIG. 9 is a view similar to FIG. 8 but relating to a modification;

FIG. 10 is a perspective view of a screwdriver according to this invention; and

FIGS. 11 to 13 inclusive show, in three different positions, the engagement of the screwdriver into the slot of a screw according to this invention.

The screw of FIGS. 1 to 3 comprises a shank **1** and a head **2** provided with a slot **3**.

This slot has, in plan view and also in horizontal cross section, a diamond shape outline, preferably of a length smaller than the diameter of the screw head, as shown.

This slot has outwardly flaring side walls, with a small angle of inclination.

The bottom of slot **3** is flat, with the exception of its central part, which is provided with a blind hole **4**, this hole being of conical shape, with an apex angle preferably equal to the above mentioned small angle of inclination of the side walls of the diamond-shaped slot, the diameter of this hole **4** being such that it is substantially inscribed in the diamond-shaped bottom of the slot.

The first advantage of this arrangement is that it permits of easily obtaining the slot by stamping by means of a punch of corresponding shape. The flaring disposition of the walls of the slot facilitates stamping and the diamond shape ensures a great resistance of the punch and also a better distribution of the metal in the screw head during stamping. In particular, this stamping is advantageously performed on a screw blank the head of which has in plan view a slightly oval shape, the punch being disposed with the major axis of its diamond-shaped section in coincidence with the major axis of the oval. The distribution of the metal after stamping will be such as to transform the oval into a circle.

Secondly, this arrangement, in combination with the use of a screwdriver of a shape corresponding to that of the slot, will permit, when it is desired to put a screw into a desired place, of wedging the end of the screwdriver blade into the slot, thus ensuring a temporary holding of the screw by the screwdriver.

Thirdly, the fact that the screwdriver is provided with a conical projection adapted to fit into the central hole of the screw facilitates the positioning of the screwdriver with respect to the screw as it will be hereinafter explained with reference to FIGS. 11 to 13.

Slot **3** is of a length smaller than the diameter of the screw head. Its opposed side walls **14** and end walls **15** are slightly inclined with respect to each other at an angle 2A (FIGS. 1 and 2) equal to 8° but which may range from 6 to 10°.

Similarly, the guiding hole **4** has an apex angle at least approximately equal to this value.

The horizontal cross sections are diamond-shaped, as shown by FIG. 3, angle B having, for instance, a value of 20°.

The punch to be used for obtaining such a slot **3** in the head **2** of the screw by stamping is advantageously obtained (FIGS. 4 to 8) from a blank **16** including a cylindrical portion **17** and a conical projection **18** (intended to form the guiding hole **4**).

The side faces **19**, **19** of the punch are obtained by milling of part **17** by means of a milling tool **21** as shown by FIG. 7.

These faces **19**, **19** make an angle of 160° with each other.

Faces **19**, **19** may either be tangent to the conical surface of projection **18**, as shown by FIG. 9, or intersect this conical surface as shown by the other figures. In this last case the intersection with conical projection **18** produces two flat surfaces 19_1, 19_2 respectively in line with faces **19** and which intersect each other along a generatrix of conical surface **18** (FIG. 6).

Two small flat surfaces **22** formed in hole **4** (FIGS. **1** and 3) correspond to said surfaces 19_1, 19_2.

Of course, when the milling operation illustrated by FIG. 7 is being performed, the axis of milling tool **21** is suitably inclined to obtain angle B and angle A.

The screwdriver **30** (FIG. 10) to be used with screws made as above described has a shape analogous to that of the punch to be used for making the slots in the screw heads. The blade of this screwdriver comprises two faces **19** making an angle almost equal to 180° with each other and tapering toward the blade end, these faces **19** extending to form the small faces 19_1 and 19_2 on opposite sides of conical projection **18** of the blade.

The end of this projection **18** is given the shape of a convex portion of a sphere and the bottom **41** of hole **4** is of corresponding shape.

Screws according to the present invention can be manufactured in great quantities by stamping owing to the inclination of the slot side walls and also to the great strength of the corresponding punch which further produces a correct distribution of the metal of the screw head when it is deformed.

Furthermore the end portion of the screwdriver blade is of great rigidity owing to its diamond-shaped cross section.

The screw can be held at the end of the screwdriver owing to the wedging of the screwdriver blade in the screw head slot.

Finally, the insertion of the screwdriver blade into the screw head slot is very easy owing to the guiding of projection 18 in hole 4, as illustrated by FIGS. 11 to 13.

The operator can easily handle the screwdriver to introduce projection 18 therein into slot 3. This is made still easier by the convex rounded shape 40 of the end of projection 18. This operation is illustrated by FIG. 11 where the projection 18 is inserted at one end of slot 3.

If, now, the screwdriver is moved, projection 18 is guided in slot 3 and necessarily drops into hole 4 where it fits exactly (position of FIG. 12).

It remains only to pivot the screwdriver about its axis, for instance in the direction of arrow F (FIG. 12) and finally the end of the blade engages slot 3 where it fits exactly as shown by FIG. 13.

If the screwdriver is pressed with some force, the end of its blade wedges slightly in slot 3 so that the screw is held by the screwdriver.

The respective depths h_1 and h_2 (FIG. 1) of slot 3 and hole 4 have been supposed in the example shown to be of the same order of magnitude, but they might be different. In particular the depth h_2 of hole 4 (and the corresponding length of projection 18) might be greater than h_1. Furthermore, in all cases, when the screwdriver is engaged in the screw head slot so as to fit therein there is a very small clearance between the bottom of the slot and that of the hole on the one hand and the end 40 of projection 18 and the edge of the screwdriver blade on the other hand, so as to permit the wedging effect above referred to.

As a matter of fact, the punch for obtaining the slot in the screw head and the screwdriver will be made of the same dimensions and the retraction of the metal of the screw after heating due to the stamping operation will somewhat reduce the dimensions of the recesses formed in the screw head.

Of course, the shape of the screw head is not at all limited to the countersunk shape illustrated by the drawing.

In a general manner, while I have, in the above description, disclosed what I deem to be practical and efficient embodiment of my invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

What I claim is:

1. A screwdriver comprising a blade having an axis of symmetry in its longitudinal direction, said blade being of substantially diamond-shaped cross section in planes perpendicular to said axis, said blade having opposed side walls tapering at an acute angle toward an end thereof, said blade end including a centrally located frusto-conical axial projection the apex angle of which is at least approximately equal to the acute angle of taper between the opposed side walls, each of said side walls comprising two flat surfaces located in respective planes intersecting each other along a straight line having the same inclination with respect to said axis as the generatrices of the surface of said frusto-conical axial projection, said two planes intersecting said frusto-conical surface.

2. A screwdriver comprising a blade having an axis of symmetry in its longitudinal direction, said blade being of substantially diamond-shaped cross section in planes perpendicular to said axis, said blade having opposed side walls tapering at an acute angle toward an end thereof, said blade end including a centrally located frusto-conical axial projection the apex angle of which is at least approximately equal to the acute angle of taper between the opposed side walls, each of said side walls comprising two flat surfaces located in respective planes intersecting each other along a generatrix of the frusto-conical surface of said axial projection, said two planes intersecting said frusto-conical surface.

3. As a new article of manufacture, a blade for a screwdriver to be used with a screw having a head wherein is a slot having a diamond-shaped cross section and a centrally located conical hole in the slot and wherein the slot and hole are of a corresponding taper; said blade being of diamond-shaped cross section and tapering toward an end thereof, said end having a centrally located conical projection of a taper corresponding to that of said hole but with a range of diameters relative to that of said hole adapted to prevent the projection from being inserted fully into the hole and also the blade from seating fully in the slot, the walls of the blade defining the diamond-shaped cross section intersecting along a line having the same inclination with respect to the blade longitudinal axis as the generatrices of the conical projection.

4. As a new article of manufacture, a blade for a screwdriver to be used with a screw having a head wherein is a slot having a diamond-shaped cross section and a centrally located conical hole in the slot and wherein the slot and hole are of a corresponding taper; said blade being of diamond-shaped cross section and tapering toward an end thereof, said end having a centrally located conical projection of a taper corresponding to that of said hole but with a range of diameters relative to that of said hole adapted to prevent the projection from being inserted fully into the hole and also the blade from seating fully in the slot, the walls of the blade defining the diamond-shaped cross section intersecting along a generatrix of the conical projection.

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