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(54) **DISC FOR GRINDER AND METHOD OF CONSTRUCTION**

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(57) **ABSTRACT**

The method is for producing a disk of the type having a central hub surrounded by an abrasive material, the hub having an aperture of the type provided in abrasive discs sold by Robert Bosch GmbH under the trademark X-LOCK, the method comprising the steps:

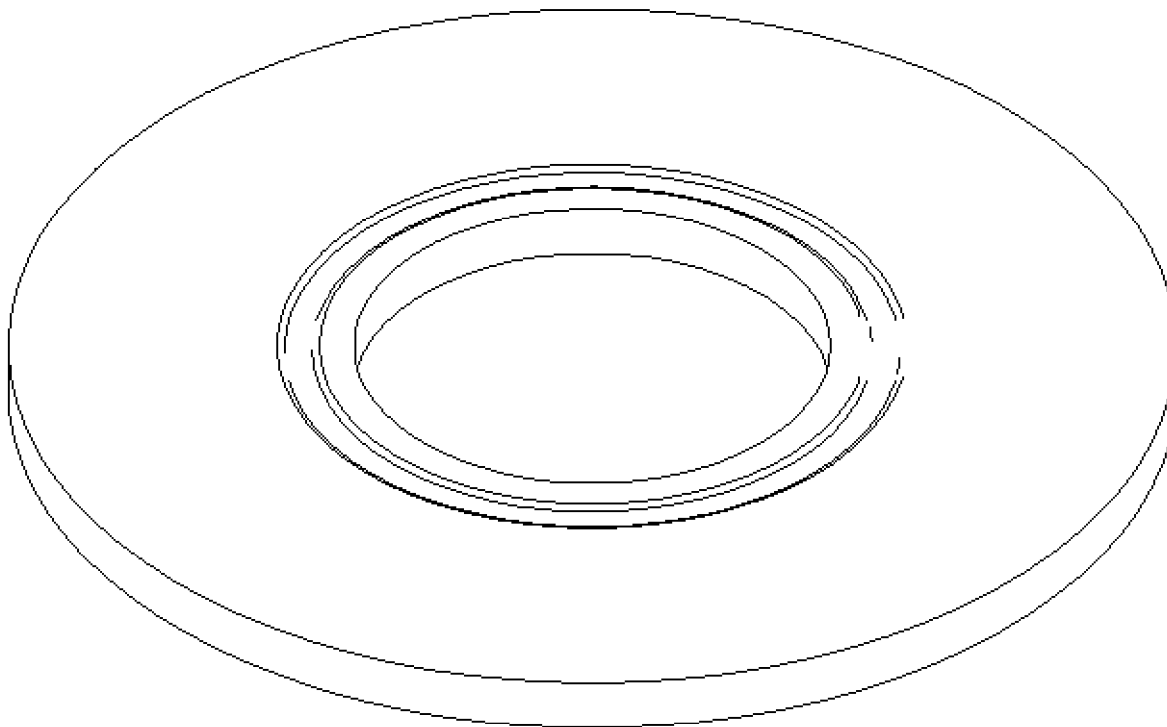
positioning a metal hub against an abrasive disc,

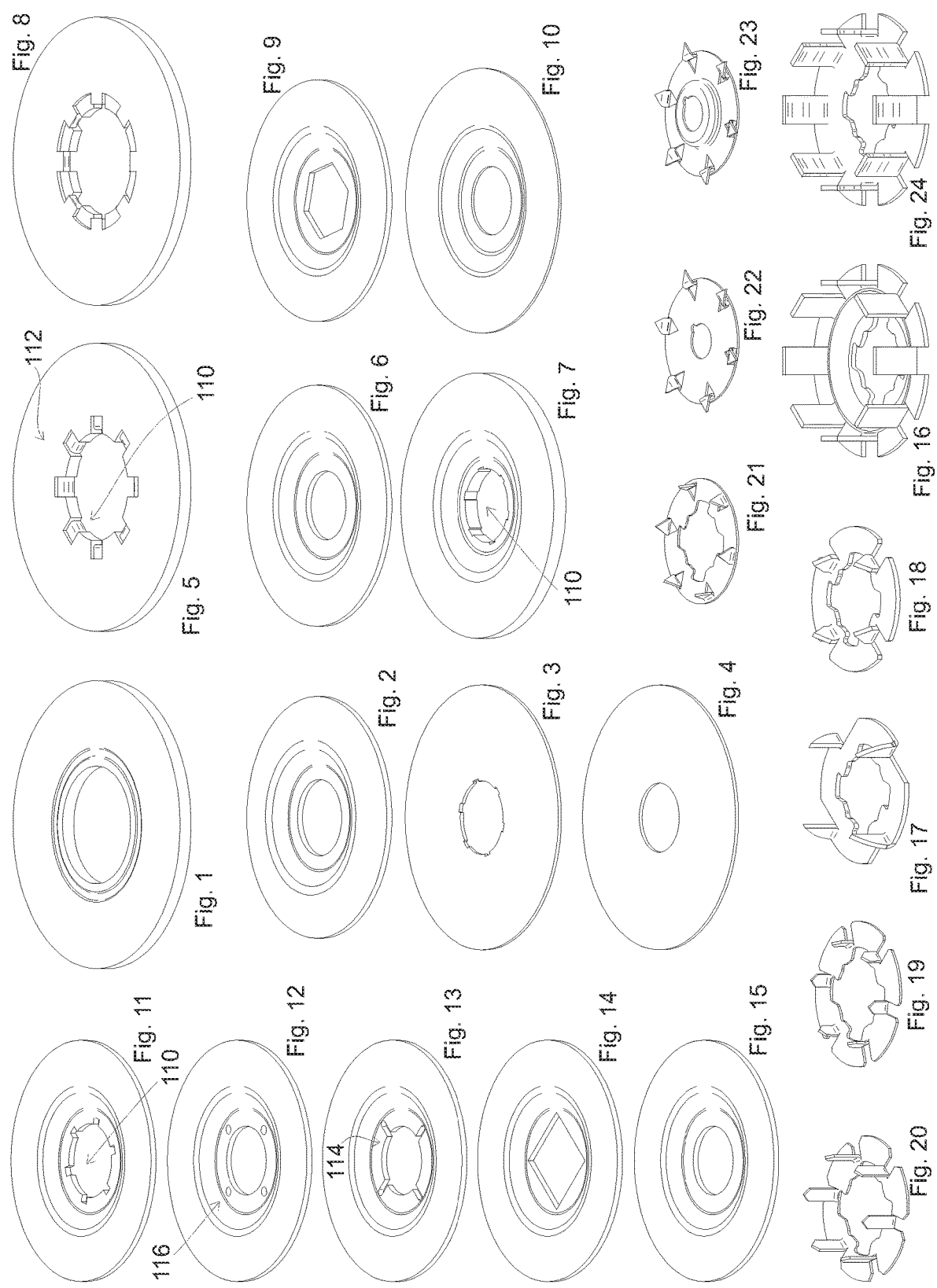
the metal hub having an annular portion and a plurality of tabs, the annular portion defining an aperture of the type provided in abrasive discs sold by Robert Bosch GmbH under the trademark X-LOCK and the plurality of tabs protruding from the annular portion, against an abrasive disc,

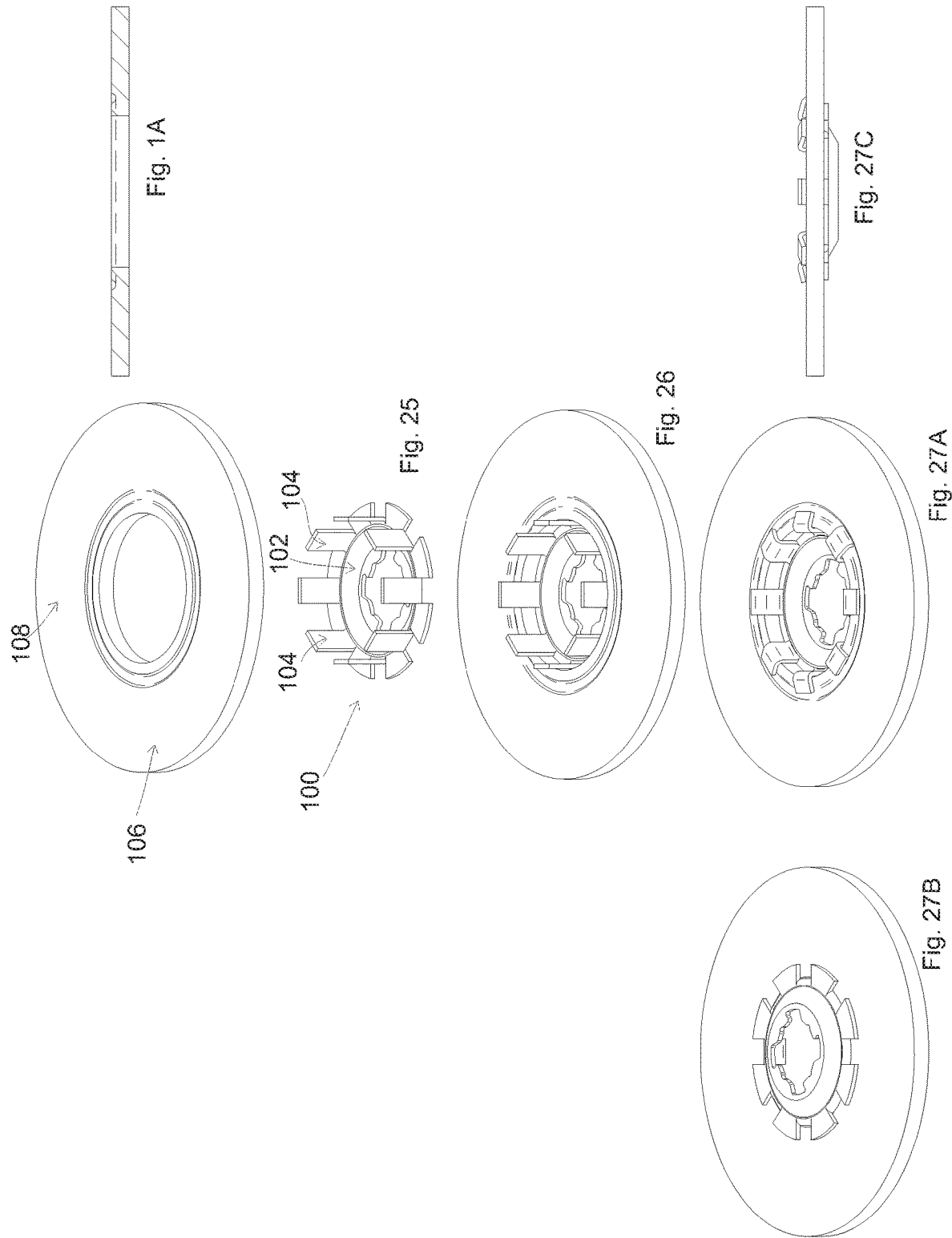
the abrasive disc having a central void, and

the positioning being such that the metal hub occludes the central void and the tabs protrude through the disc; and

bending the tabs such that the abrasive disc is gripped between the annular portion and the tabs.







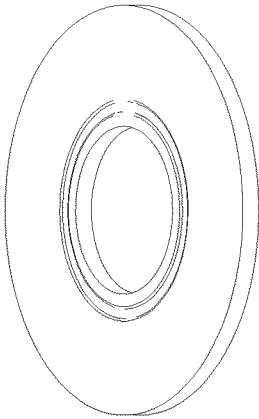


Fig. 28

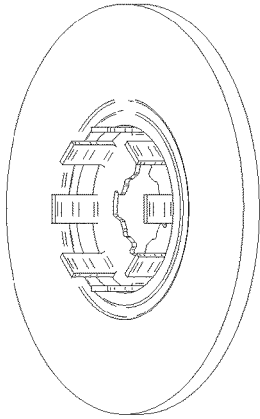
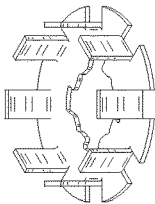


Fig. 29

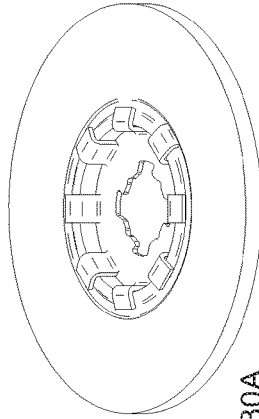


Fig. 30A



Fig. 30B

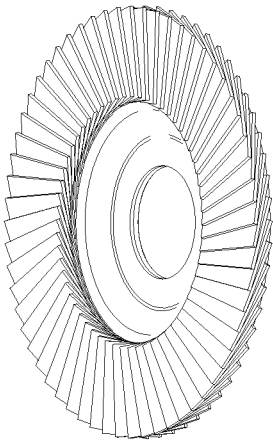


Fig. 31



Fig. 32

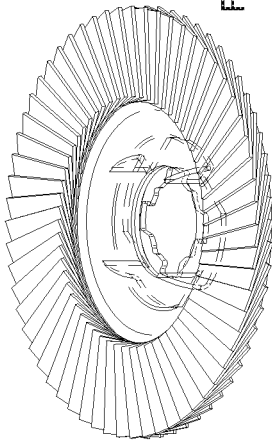


Fig. 33A

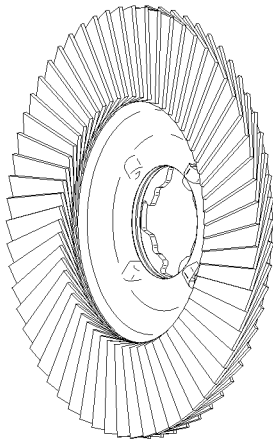


Fig. 33B

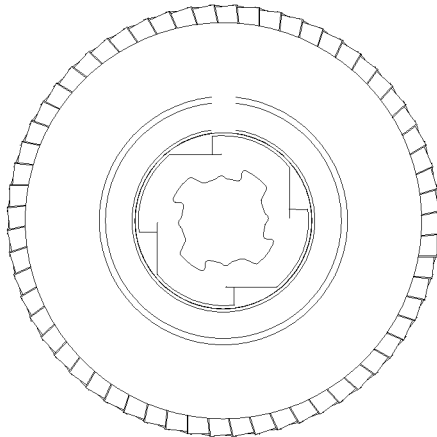
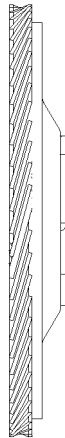


Fig. 33C



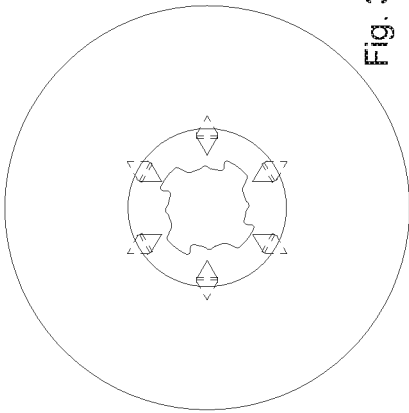
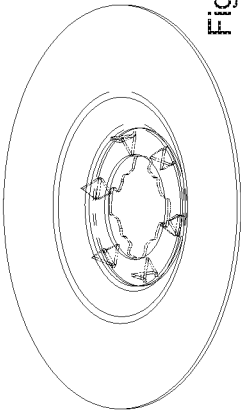
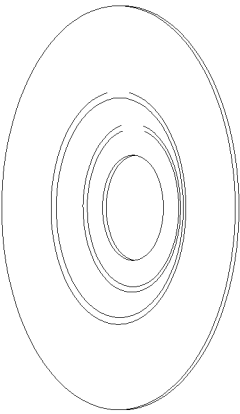
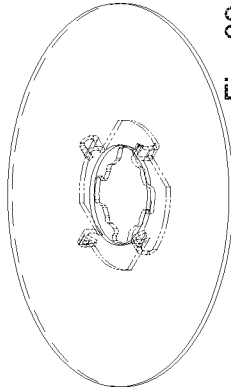
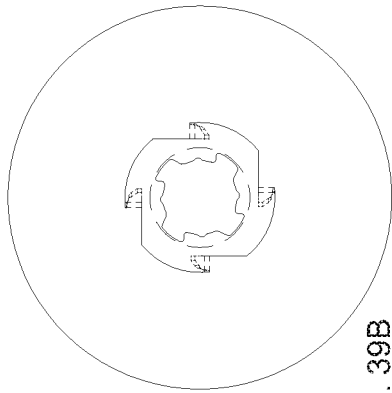
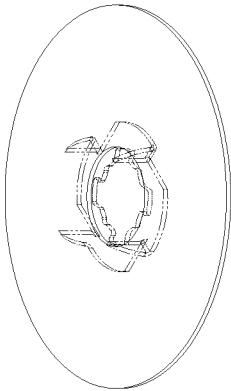
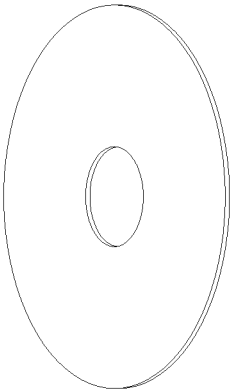


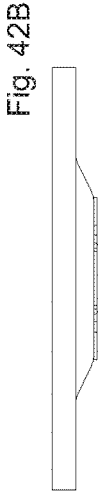
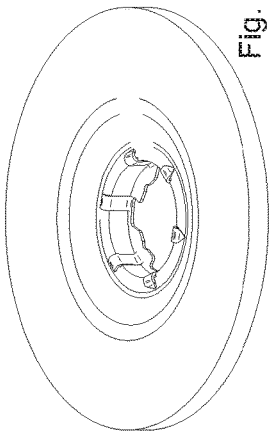
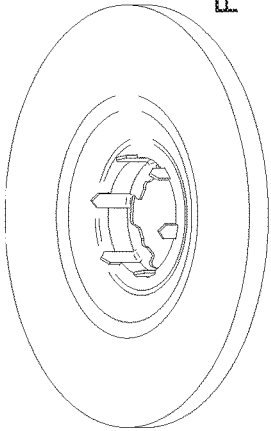
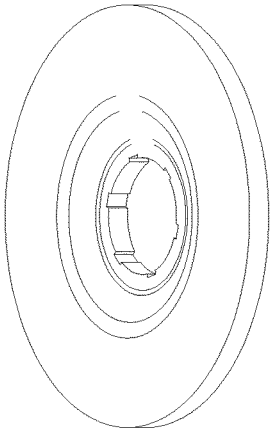
Fig. 34

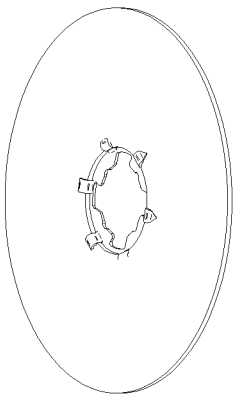
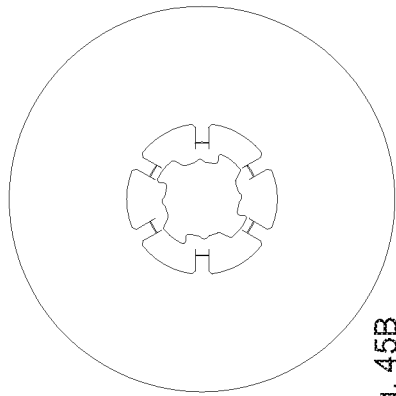
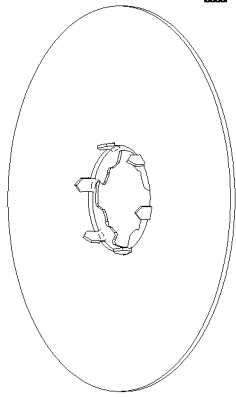
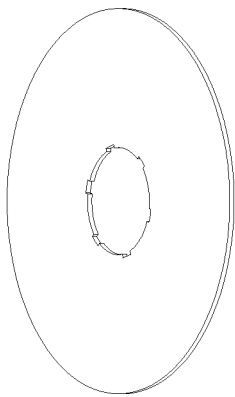
Fig. 35

Fig. 36A

Fig. 36B







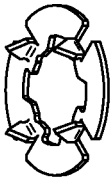
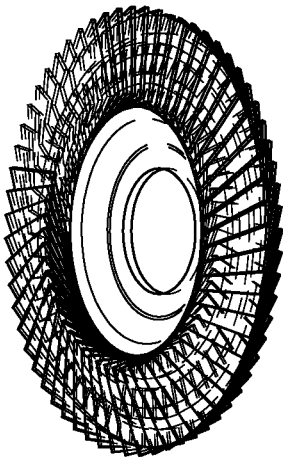


Fig. 46

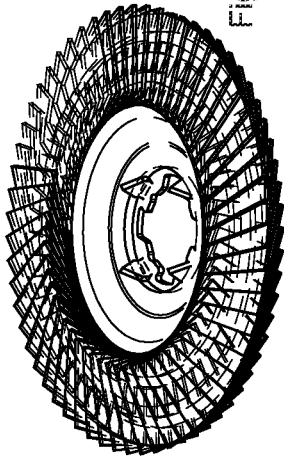


Fig. 47

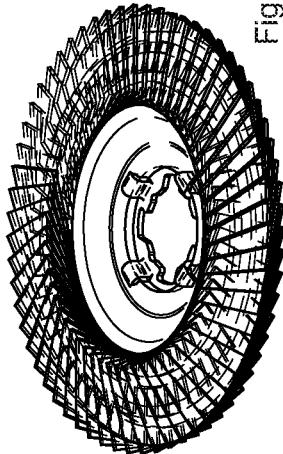


Fig. 48

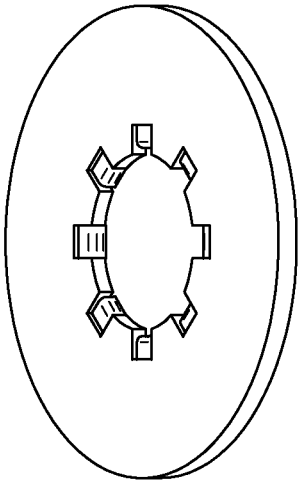


Fig. 49

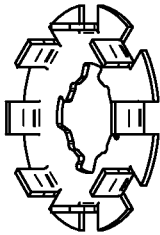
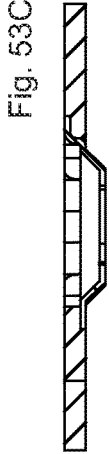
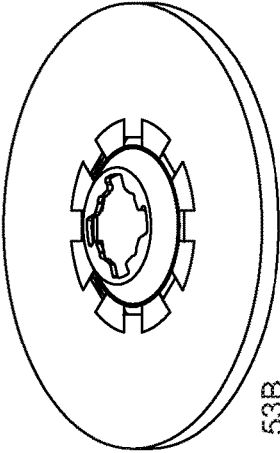
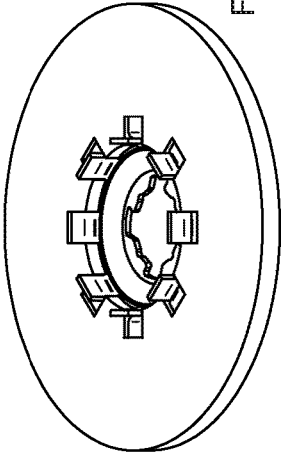
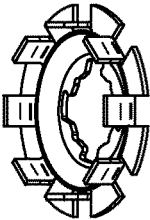
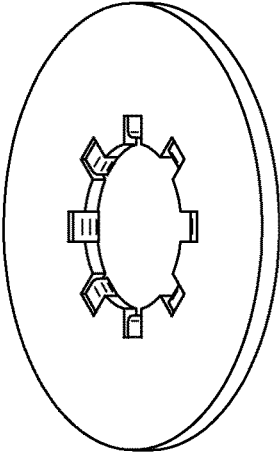
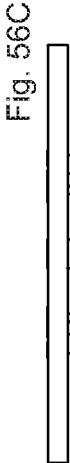
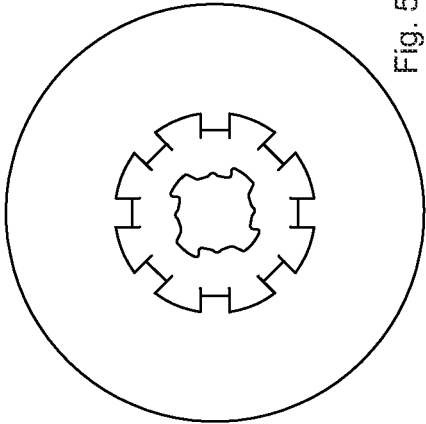
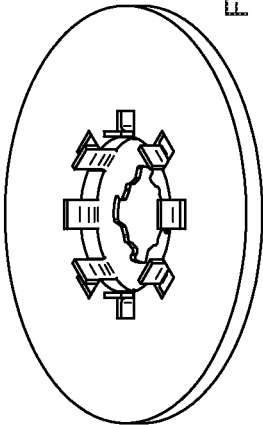
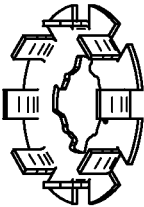
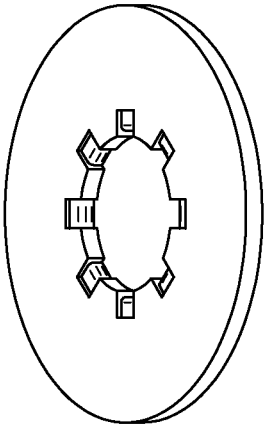


Fig. 50A



Fig. 50B





DISC FOR GRINDER AND METHOD OF CONSTRUCTION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Patent Application Ser. Nos. 62/851,236, filed May 22, 2019, and 62/859,752, filed Jun. 11, 2019, incorporated herein by reference.

FIELD

[0002] The invention relates to the field of hand grinders.

BACKGROUND

[0003] The X-Lock system of Robert Bosch GmbH allows for the cutting/grinding disk of a hand grinder to be quickly replaced without tools. The system includes disks having a specially-shaped aperture.

SUMMARY OF THE INVENTION

[0004] Forming one aspect of the invention is a method for producing a disk of the type having a central hub surrounded by an abrasive material, the hub having an aperture of the type provided in abrasive discs sold by Robert Bosch GmbH under the trademark X-LOCK.

[0005] The method comprising as steps:

[0006] positioning a metal hub against an abrasive disc,

[0007] the metal hub having an annular portion and a plurality of tabs, the annular portion defining an aperture of the type provided in abrasive discs sold by Robert Bosch GmbH under the trademark X-LOCK and the plurality of tabs protruding from the annular portion, against an abrasive disc,

[0008] the abrasive disc having a central void, and

[0009] the positioning being such that the metal hub occludes the central void and the tabs protrude through the disc; and

[0010] bending the tabs such that the abrasive disc is gripped between the annular portion and the tabs.

[0011] According to another aspect, the tabs can extend through the void.

[0012] According to another aspect, the disc has, for each tab, a recessed section which receives the tab after the bending step has been completed such that the disc and hub are mechanically locked together.

[0013] According to another aspect, the disc can have an opening for each tab and each tab can protrude through the opening provided therefor after the positioning step has been completed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIGS. 1-15 each show a disc for use in the method
[0015] FIG. 1A is a cross-sectional view of the structure of FIG. 1;

[0016] FIG. 16-24 each show inserts for use in the method
[0017] FIG. 25 shows the disc of FIG. 1 with the insert of FIG. 16;

[0018] FIG. 26 shows the structure of FIG. 24 fitted together;

[0019] FIG. 27A shows the structure of FIG. 24 in use;

[0020] FIG. 27B is another view of the structure of FIG. 27A;

[0021] FIG. 27C is another view of the structure of FIG. 27A;

[0022] FIG. 28 is a view of the structure of FIG. 1 and the structure of FIG. 24;

[0023] FIG. 29 shows the structure of FIG. 28 fitted together;

[0024] FIG. 30A shows the structure of FIG. 28 in use;

[0025] FIG. 30B is another view of the structure of FIG. 30A;

[0026] FIG. 31 is a view of an abrasive disc formed of the structure of FIG. 6 and the structure of FIG. 17;

[0027] FIG. 32 is a view of the structure of FIG. 31 fitted together;

[0028] FIG. 33A is a view of the structure of FIG. 32 in use;

[0029] FIG. 33B is another view of the structure of FIG. 33A;

[0030] FIG. 33C is another view of the structure of FIG. 33A;

[0031] FIG. 34 is a view of the structure of FIG. 6 and the structure of FIG. 21;

[0032] FIG. 35 is a view of the structure of FIG. 34 fitted together;

[0033] FIG. 36A is a view of the structure of FIG. 35 in use;

[0034] FIG. 36B is another view of the structure of FIG. 36A;

[0035] FIG. 37 is a view of the structure of FIG. 17 and the structure of FIG. 4;

[0036] FIG. 38 is a view of the structure of FIG. 37 fitted together;

[0037] FIG. 39A is a view of the structure of FIG. 37 in use;

[0038] FIG. 39B is another view of the structure of FIG. 39A;

[0039] FIG. 39C is another view of the structure of FIG. 39A;

[0040] FIG. 40 is a view of the structure of FIG. 7 and the structure of FIG. 20;

[0041] FIG. 41 is a view of the structure of FIG. 40 fitted together;

[0042] FIG. 42A is a view of the structure of FIG. 41 in use;

[0043] FIG. 42B is another view of the structure of FIG. 42A;

[0044] FIG. 43 is a view of the structure of FIG. 3 and the structure of FIG. 20;

[0045] FIG. 44 is a view of the structure of FIG. 43 fitted together;

[0046] FIG. 45A is a view of the structure of FIG. 44 in use;

[0047] FIG. 45B is another view of the structure of FIG. 45A;

[0048] FIG. 45C is another view of the structure of FIG. 45A;

[0049] FIG. 46 is a view of an abrasive disc formed of the structure of FIG. 15 and the structure of FIG. 18;

[0050] FIG. 47 is a view of the structure of FIG. 46 fitted together;

[0051] FIG. 48A is a view of the structure of FIG. 47 in use;

[0052] FIG. 49 is a view of the structure of FIG. 5 and the structure of FIG. 24

[0053] FIG. 50A is a view of the structure of FIG. 49 in use;
 [0054] FIG. 50B is another view of the structure of FIG. 50A;
 [0055] FIG. 51 is a view of the structure of FIG. 5 and the structure of FIG. 16;
 [0056] FIG. 52 is a view of the structure of FIG. 51 fitted together;
 [0057] FIG. 53A is a view of the structure of FIG. 52 in use;
 [0058] FIG. 53B is another view of the structure of FIG. 53A;
 [0059] FIG. 53C is another view of the structure of FIG. 53A;
 [0060] FIG. 54 is a view of the structure of FIG. 5 and FIG. 24;
 [0061] FIG. 55 is a view of the structure of FIG. 54 fitted together;
 [0062] FIG. 56A is a view of the structure of FIG. 55 in use;
 [0063] FIG. 56B is another view of the structure of FIG. 56A; and
 [0064] FIG. 56B is another view of the structure of FIG. 56A.

DETAILED DESCRIPTION

[0065] An exemplary method comprises fitting a metal hub 100 having the aperture 102 of the X-Lock system and a plurality of protruding tabs 104, as shown in FIGS. 16 and 25, into a disc 106 having a central void 108 as shown in FIGS. 1 and 25; and crimping the tabs around the disc, as indicated by the sequence of FIGS. 26, 27A. Details of the X-Lock system are shown in WO2018036831, incorporated herein by reference.

[0066] Other similar methods are shown by the following sequences:

[0067] FIGS. 28, 29, 30A
 [0068] FIGS. 31, 32, 33A
 [0069] FIGS. 34, 35, 36A
 [0070] FIGS. 37, 38, 39A
 [0071] FIGS. 40, 41, 42A
 [0072] FIGS. 43, 44, 45A
 [0073] FIGS. 46, 47, 48
 [0074] FIGS. 49, 50A
 [0075] FIGS. 51, 52, 53A
 [0076] FIGS. 54, 55, 56A

[0077] In these regards, some notable variations include:

[0078] the discs of FIGS. 5, 7 and 11 are provided with interior notches 110, to provide for a mechanical radial connection between the hub and disc;

[0079] the discs of FIG. 10 includes recesses 112 into which the tabs fold, to similarly provide a mechanical radial connection;

[0080] the disc of FIG. 13 has radial slots 114 through which the tabs project in use;

[0081] the disc of FIG. 12 has openings holes 116 through which the tabs project in use;

[0082] the disc of FIGS. 31 and 46 is provided with abrasive flaps; and

[0083] the system could be used with apertures of shapes differing from that of the X-LOCK system (not shown).

[0084] Further variations are of course possible. Accordingly, the invention should be understood to be limited only by the accompanying claims, purposively construed.

1. A method for producing a disk of the type having a central hub surrounded by an abrasive material, the hub having an aperture of the type provided in abrasive discs sold by Robert Bosch GmbH under the trademark X-LOCK, the method comprising the steps:

positioning a metal hub against an abrasive disc,
 the metal hub having an annular portion and a plurality of tabs, the annular portion defining an aperture of the type provided in abrasive discs sold by Robert Bosch GmbH under the trademark X-LOCK and the plurality of tabs protruding from the annular portion, against an abrasive disc,

the abrasive disc having a central void, and
 the positioning being such that the metal hub occludes the central void and the tabs protrude through the disc; and

bending the tabs such that the abrasive disc is gripped between the annular portion and the tabs.

2. A method according to claim 1, wherein the tabs extend through the void.

3. A method according to claim 1, wherein the disc has, for each tab, a recessed section which receives the tab after the bending step has been completed such that the disc and hub are mechanically locked together.

4. A method according to claim 1, wherein the disc has an opening for each tab and each tab protrudes through the opening provided therefor after the positioning step has been completed.

* * * * *