Sept. 27, 1966 W. A. FERRIS 3,274,889

ROUTING ATTACHMENT ADAPTER FOR A POWER-DRIVEN HAND DRILL

Filed May 18, 1964

FIG. 1

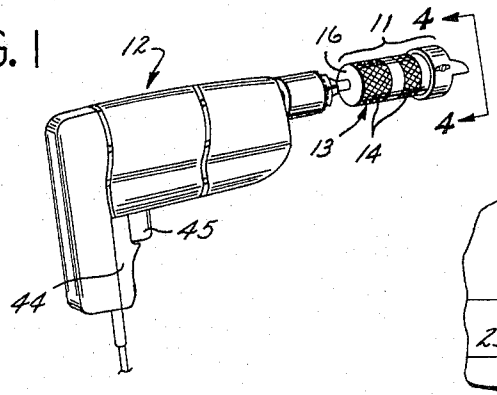


FIG. 6

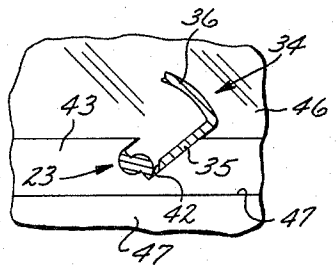


FIG. 2

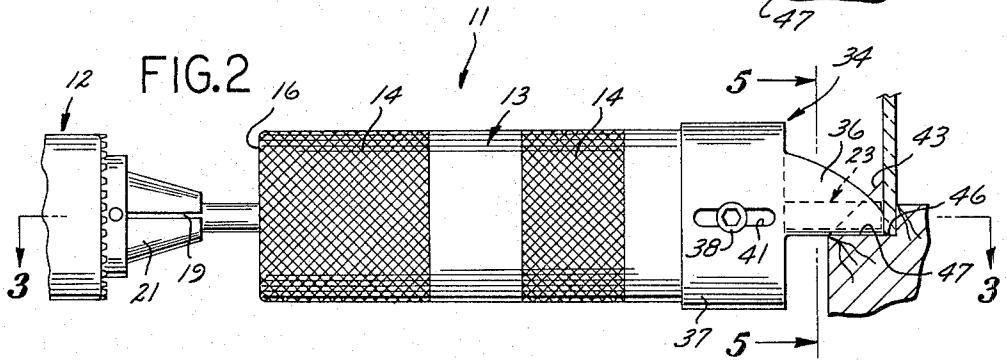


FIG. 3

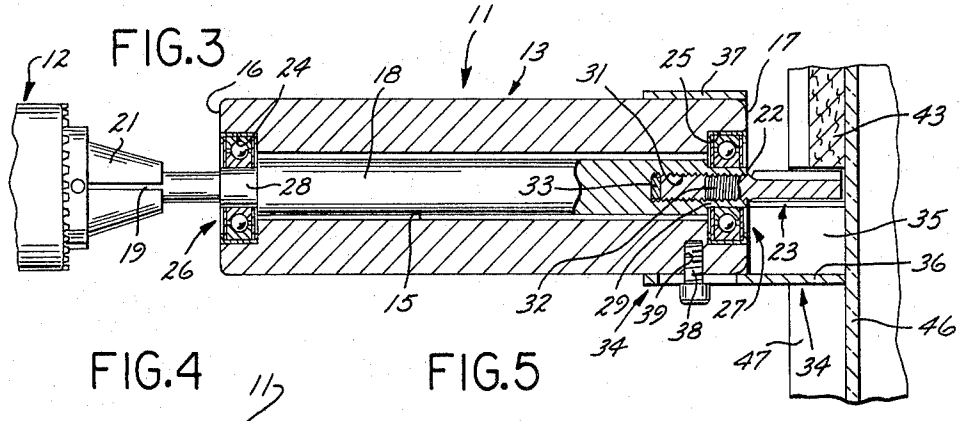


FIG. 4

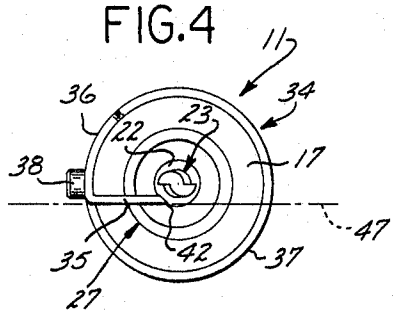
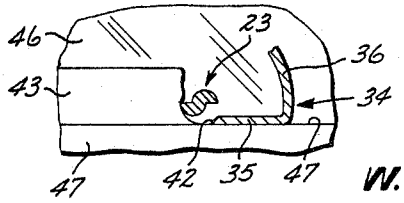


FIG. 5



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United States Patent Office 3,274,889 Patented Sept. 27, 1966

3,274,889

ROUTING ATTACHMENT ADAPTER FOR A POWER-DRIVEN HAND DRILL

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Filed May 18, 1964, Ser. No. 368,230
14 Claims. (Cl. 90—12)

Generally speaking, the present invention relates to a routing attachment adapter for a power-driven hand drill, which is usually an electric-motor-driven hand drill, although not specifically so limited in all forms of the invention.

The routing attachment adapter of the present invention is particularly well suited for removing dried and hardened putty from along the outside of the junction of a glass windowpane and the adjacent wooden window frame or sash portion when old or damaged windowpanes are to be removed and new glass windowpanes are to be installed. However, while this is one advantageous application of the apparatus of the present invention, it should be clearly noted that the invention is not specifically so limited and may be used wherever a routing operation is to be performed and wherever it is advantageous that this be done throughout the use of an attachment adapter which can be mounted on a conventional electric-motor-driven hand drill.

Such an attachment adapter is highly advantageous since a great many persons already own an electric-motor-driven hand drill but do not own a router or other apparatus capable of performing similar routing operations. Therefore, the novel attachment adapter of the present invention makes it possible to convert such a widely distributed type of electric-motor-driven hand drill into an effective routing device which may be used for the putty-removing operation referred to above or for various other routing operations. This is advantageous since it does not require that a person possess a router or a specialized power-driven putty-removing tool, but only requires that the person possess the novel routing attachment adapter of the present invention for use with his already owned electric-motor-driven hand drill.

With the above points in mind, it is an object of the present invention to provide a novel routing attachment adapter for a power-driven hand drill which, in one specific application thereof, is particularly well adapted for use in removing hardened putty or the like from the junction of a windowpane and the adjacent window frame or sash portion to allow the removal of the windowpane and the replacement thereof with a new windowpane, but which is not specifically limited thereto and may be employed wherever a routing operation is to be performed.

It is a further object of the present invention to provide apparatus of the character referred to above which is adapted to be attached with respect to the chuck or collet of a conventional electric-motor-driven hand drill and to effectively convert same into a router.

It is a further object of the present invention to provide novel apparatus of the character referred to herein and having any or all of the features referred to herein, generically and/or specifically, and either individually or in combination, and which is of relatively simple, inexpensive, easy-to-mount, and easy-to-dismount construction capable of mass manufacture at relatively low cost whereby to be conducive to widespread use thereof.

Further objects are implicit in the detailed description which follows hereinafter (which is to be considered as exemplary of, but not specifically limiting, the present invention), and said objects will be apparent to persons skilled in the art after a careful study of the detailed description which follows hereinafter.

For the purpose of clarifying the nature of the present

invention, one exemplary embodiment of the invention is illustrated in the hereinbelow-described figures of the accompanying single drawing sheet and is described in detail hereinafter.

FIG. 1 is a reduced-size, three-dimensional view of one exemplary embodiment of the invention, showing it in mounted relationship with respect to one exemplary form of electric-motor-driven hand drill whereby to effectively provide, define, and comprise a router.

FIG. 2 is an enlarged elevational view of the novel routing attachment adapter of FIG. 1, fragmentarily showing it in engaged driven relationship with respect to the electric-motor-driven hand drill and also showing it in operative routing putty-removing relationship with respect to the hardened putty positioned along the junction of a windowpane and adjacent window frame or sash portion (both shown fragmentarily).

FIG. 3 is a view, partly in section and partly in elevation, taken in the direction of the arrows 3–3 of FIG. 2.

Fig. 4 is an enlarged front elevational view taken in the direction of the arrows 4—4 of FIG. 1 and shows the exemplary form of the novel routing attachment adapter of the present invention drawn to substantially the same scale as FIGS. 2 and 3.

FIG. 5 is a fragmentary view, partly in elevation and partly in section, taken in the direction of the arrows 5—5 of FIG. 2 and shows in section the cutting tool and the guide and gauge means of the novel routing attachment adapter of the present invention in the operating relationship with respect to the windowpane, the window frame or sash, and the putty at the junction of same, for the purpose of removing said putty in the manner shown in FIG. 2.

FIG. 6 is a fragmentary view, partly in elevation and partly in section, and similar to FIG. 5, but shows the apparatus at the very beginning of the putty-removing operation shown in a subsequent stage in FIGS. 2 and 5—this view illustrating the angular downward and forward direction of the guide and gauge means and the cutting tool to allow entry into the putty which is to be removed, following which the apparatus is rotated into the position best shown in FIG. 5 for completion of the putty-removing operation.

Generally speaking, the exemplary form of the invention illustrated may be said to comprise a routing attachment adapter, such as is generally designated by the reference numeral 11, which is adapted to be engaged by a power-driven hand drill, such as the electric-motor-driven hand drill generally designated by the reference numeral 12.

In the exemplary form of the invention illustrated, the routing attachment adapter 11 comprises a longitudinally apertured substantially cylindrical body member 13 which is preferably provided with exterior frictional surface means, such as is indicated at 14, and which in the exemplary form of the invention illustrated is shown as comprising an exteriorly roughened and knurled surface portion 14 arranged in two circumferential strips. However, this may be modified substantially within the broad scope of the present invention.

In the exemplary form illustrated, the longitudinal body member 13 has a longitudinal substantially cylindrical bore 15 extending through the length thereof from a rear end 16 to a front end 17 thereof and adapted to rotatively receive therein a longitudinal shaft member 18 which has a rear torque-receiving end portion 19 adapted to be engaged and coupled to the coupling chuck or collet 21 of the electric motor driven hand drill 12. The shaft member 18 also has a forward end portion 22 which is effectively provided with a rotary cutting or rabbeting tool, indicated generally at 23, extending forwardly from said front end 22 of said shaft 18 and also extending

forwardly from said front end 17 of said longitudinal body member 13 and in substantial concentrically aligned relationship with respect thereto.

It will be noted that, in the exemplary form of the invention illustrated, the above-mentioned rotative mounting and reception of the longitudinal shaft member 18 within the longitudinal bore 15 is facilitated by the provision of enlarged counterbore or recess means 24 and 25 formed within the longitudinal body member 13 at the front and rear ends 16 and 17 thereof, respectively, and surrounding the front and rear ends of said longitudinal bore 15; said counterbore or recess means 24 and 25 receiving and mounting in press-fit (or other suitable retained) relationship therein corresponding rear and front bearing means generally designated by the reference numerals 26 and 27, respectively, which are press-fit mounted on annularly reduced shaft portions 28 and 29 at the rear and front ends of the shaft member 18. This provides a very effective and efficient rotary mounting of the shaft 18 within the bore 15. However, it should be clearly noted that this is one exemplary arrangement only and that various others are contemplated within the broad scope of the present invention.

Also, it should be noted that, in the exemplary form of the invention illustrated, the rotary cutting tool 23 is removably carried by the forward end 22 of the longitudinal shaft 18 by reason of the provision of a pair of mating engagement means, with one element thereof effectively carried by the forward end 22 of the longitudinal shaft member and with the other element thereof effectively carried by the rear end of the cutting tool. 23.

In the exemplary form of the invention illustrated, said first-mentioned engagament means element carried by the forward end 22 of the shaft member 18 comprises an interiorly threaded recess 31, while said second-mentioned engagement means element carried at the rear of said cutting tool means 23 comprises an exteriorly threaded screw member 32 integrally and coaxially carried at the rear end of the cutting tool 23 and adapted to be threaded into the interiorly threaded recess 31 and into abutment with a rotary disc-shaped abutment plug means 33 positioned at the bottom or left end as viewed in FIG. 3 of the blind interiorly threaded recess 31 for abutment with the end of said exteriorly threaded element 32 carried at the rear of the cutting tool 23. This makes it possible to thread the two elements 31 and 32 into the fully engaged relationship shown in FIG. 5 quickly and easily and without requiring the use of any tools. Then whenever it is desired to remove the cutting tool 23 for storage purposes or for interchanging same with a different type or size of cutting tool, it may be quickly and easily disengaged by merely unthreading the elements 31 and 32 by the manual application of torque to the cutting tool 23 in a counterclockwise direction as viewed in FIG. 4. In certain instances the abutment plug 33 may be eliminated.

It will be noted that the threads of the two threaded engagement elements 31 and 32 effectively comprise conventional right hand threads as viewed from the front in the manner of FIG. 4, and that this positively prevents accidental disengagement thereof during the operation of the entire assembled apparatus for routing or putty-removing purposes, since the electric-motor-driven drill 12 will normally rotate the shaft member 18 and the cutting tool 23 in a counterclockwise direction as viewed in FIG. 4 or a clockwise direction as viewed in FIGS. 5 and 6. This will merely tend to tighten the threaded engagement of the elements 31 and 32 rather than to loosen same. Of course, if the motor of the drill is of an unusual type adapted to rotate the longitudinal shaft member in the opposite direction, then it will be necessary to provide the engagement means elements 31 and 32 with left hand threads.

While the above-described controllably engageable and disengageable arrangement for removably mounting the cutting tool 23 with respect to the forward end of the longitudinal shaft member 18 provides a highly advantageous arrangement, it should be noted that the invention is not specifically so limited, and various modifications thereof and even the elimination thereof and the provision of an unthreaded, slide-fit, keyed, and/or direct coupled connection and drive therebetween are also contemplated within the broad scope of the present invention.

The longitudinal body member 13 is provided with a guide and gauge means adapted to be positioned adjacent to the rotary cutting tool 23 whereby to be cooperable for manually controlled guiding and sliding abutment with and along a solid surface for guiding the cutting tool 23 along a desired cutting path.

In the exemplary form of the invention illustrated, said guide and gauge means is generally designated by the reference numeral 34 and comprises a substantially planar guide tip portion 35 provided with a rearwardly extending connection portion 36 and a mounting and coupling sleeve portion 37 of substantially cylindrical configuration encompassing at least a portion of the front end of said longitudinal cylindrical body member 13 and being provided with fastening means, such as the exteriorly threaded socket head screw 38 threaded into an interiorly threaded hole 39 in the longitudinal body member 13.

In the exemplary form of the invention illustrated, the mounting and coupling sleeve portion 37 of the guide and gauge means 34 is provided with a longitudinal slot 41 which provides for relative longitudinal positional adjustment of the entire guide and gauge means 34 and for the locking of same in any such longitudinally adjusted position by tightening the fastening screw 38 after such adjustment of the guide and gauge means 34. This makes it possible to regulate the relative positions of the front end of the guide and gauge means 34 of the rotary cutting tool 23 whereby to control a cutting or routing operation. Incidentally, it should be noted that the planar guide tip portion 35 has a sharpened forward edge, as indicated at 42, to facilitate the movement of same through the putty designated at 43 in FIGS. 3, 5, and 6. However, this may be modified in certain forms of the invention.

The operation of the device may be briefly described as follows:

The collet or chuck 21 of the electric-motor-driven hand drill 12 is firmly fastened to the rear torque-receiving end portion 19 of the longtitudinal shaft 18 in any conventional manner. Then the handle 44 of the electric-motor-driven hand drill 12 is manually grasped by one hand of an operator of the apparatus (usually the right hand of said operator) for controlled energization and operation of the hand drill 12 by applying finger pressure to the operating trigger portion 45 thereof.

The other hand of the operator (usually the left hand) then grasps the roughened knurled frictional surface portion 14 of the longitudinal body member 13 and rotates same in a counterclockwise direction as viewed from the rear thereof until the planar guide tip portion 35 of the guide and gauge means 34 assumes a forwardly and downwardly angularly inclined position, such as is best shown in FIG. 6, after which the trigger 45 of the drill 12 is pressed with the finger of the other hand, and the routing operation begins in a downwardly forwardly inclined direction in the manner clearly shown in FIG. 6 so as to cut angularly forwardly and downwardly into the putty 43 until a sufficient depth of cut has been achieved, after which the operator's hand holding the longitudinal body member 13 rotates same slightly in a clockwise direction as viewed in FIG. 6 from the position illustrated in FIG. 6 toward a position such as illustrated in FIGS. 2, 3 and 5 (also generally similar to the position illustrated in FIGS. 1 and 4) so that no further downward cutting action of the cutting tool 23 will ensue, but such that only forward cutting action thereof will follow as determined by the position of the planar

guide tip portion 35 of the guide and gauge means 34. The position thereof can be controlled by turning the longitudinal body member 13 to any position between that shown in FIG. 6 and that shown in FIG. 5 so as to provide exactly the right depth of cut of the putty 43 which is to be removed from the junction of the bottom edge of the windowpane 46 and the window frame or sash portion 47. Such a removing operation is shown partially completed in FIG. 5 and clearly illustrates the optimum performance of the novel routing attachment adapter of the present invention which removes only the putty 43 without damage to adjacent window frame or sash portions 47 and also without damage to the windowpane 46.

It is apparent that the novel apparatus of the present invention provides a means for quickly, cleanly and precisely removing the putty 43 in the manner described above and without damage to adjacent structural elements and does so through the use of a very simple and novel adapter which can be fastened to a conventional electric-motor-driven-hand drill. However, it should be noted that, while the exemplary application and use of the novel apparatus of the present invention referred to above is a major usage of the invention, it is not specifically so limited, but may be employed wherever routing operations of a generally similar type are to be performed and where it is desirable that depth of cut be controlled and regulated easily and precisely.

It should be noted that the guide and gauge means 34 may be attached to the longitudinal body member 13 in various manners (and by various mounting means) somewhat different from that specifically illustrated at 37, 38, 39 and 41 in the figures and described hereinbefore and, in certain cases, may be fixedly and non-adjustably attached thereto. However, these modifications are intended to be included and comprehended within the broad scope of the present invention.

It should also be noted that, in the form of the invention best illustrated in FIG. 5, showing the removable mounting of the cutting tool 23 with respect to the longitudinal shaft 18, the relative position of the male and female threaded elements may be reversed, or various other types of engagement means may be employed, or, in certain forms of the invention, said engagement means may be eliminated entirely and the cutting tool 23 may be directly carried by the forward end of the longitudinal shaft member 18 in a non-removable manner. All of these modifications are intended to be included and comprehended within the broad scope of the present invention.

It should be understood that the figures and the specific description thereof set forth in this application are for the purpose of illustrating the present invention and are not to be construed as limiting the present invention to the precise and detailed specific structure shown in the figures and specifically described hereinbefore. Rather, the real invention is intended to include substantially equivalent constructions embodying the basic teachings and inventive concept of the present invention.

I claim:

1. A routine attachment adapter for a power-driven hand drill, comprising: a longitudinally apertured longitudinal body member having a rear end and a front end and having a longitudinal bore therein extending through the length thereof from said rear end to said front end thereof; and a longitudinal shaft member rotatively received within and mounted within said bore of said longitudinal body member and having a rear torque-receiving end portion adapted to be engaged and coupled to a torque-applying power-driven hand drill, said longitudinal body member being supported only by said longitudinal shaft member and being physically separate from the torque-applying power-driven hand drill when the hand drill is engaged and coupled to said rear torque-receiving end portion of said shaft member, said shaft member having a forward end effectively provided with a rotary laterally operable cutting tool extending forwardly from the front end of said longitudinal body member; said longitudinal body member being provided with a guide and gauge means adjacent to said rotary cutting tool and cooperable for manually controlled guiding abutment along a solid surface for guiding said cutting tool along a desired cutting path in a direction substantially transverse with respect to the longitudinal direction of said bore, said guide and gauge means comprising a guide tip provided with a mounting and coupling portion for coupling said guide and gauge means with respect to said longitudinal body member for mounting said guide tip in a desired laterally offset guiding relationship with respect to said cutting tool, said guide tip having a planar portion lying in a plane parallel to but slightly perpendicularly displaced from a longitudinal axis of said forwardly extending rotary cutting tool and being positioned in said parallel plane at one side of said cutting tool, thereby effectively providing and defining a laterally open cutting access region on the opposite side of said cutting tool from said planar portion of said guide tip.

2. Apparatus as defined in claim 1, wherein said mounting and coupling portion comprises controllably adjustable and lockable fastening means for fastening said mounting and coupling portion with respect to said longitudinal body member for mounting said guide tip in said desired controllably adjustable laterally offset guiding relationship with respect to said cutting tool.

3. Apparatus as defined in claim 1, wherein said mounting and coupling portion comprises controllably adjustable and lockable fastening means for fastening said mounting and coupling portion with respect to said longitudinal body member for mounting said guide tip in said desired controllably adjustable laterally offset guiding relationship with respect to said cutting tool, said controllably adjustable fastening means comprising a longitudinal slot provided in said mounting and coupling portion and fastening screw means mountable in said longitudinal slot and threadedly attachable with respect to said longitudinal body member in a controllably releasable and lockable manner with respect to said mounting and coupling portion whereby to provide for controllable longitudinal positional adjustment of said guide and gauge means to adjust the relative longitudinal positioning thereof with respect to said cutting tool.

4. Apparatus as defined in claim 1, wherein said guide tip is provided with a mounting and coupling sleeve portion encompassing at least a portion of the front end of said longitudinal body member and being provided with longitudinal slot and fastening screw means providing for longitudinal positional adjustment of said guide and gauge means to adjust the relative longitudinal positioning thereof with respect to said cutting tool.

5. Apparatus as defined in claim 1, wherein said longitudinal body member is provided with annularly enlarged recesses at front and rear ends thereof surrounding the front and rear ends of said longitudinal bore, said shaft member being provided with longitudinally spaced shoulders and rotary bearing means positioned thereon and mountingly and retainingly received within said front and rear annularly enlarged recesses at front and rear ends of said longitudinal bore for providing said rotative mounting of said shaft member within said longitudinal bore of said longitudinal body member.

6. Apparatus as defined in claim 1, wherein the exterior of said longitudinal body member is provided with frictional surface means.

7. Apparatus as defined in claim 1, wherein said cutting tool has a rear end provided with an engagement means portion, said shaft member being provided at its forward end with engagement means portion cooperable for engagement and disengagement with respect to said engagement means portion at the rear end of said cutting tool for mounting said cutting tool in said forwardly ex-

tending relationship with respect to the front end of said longitudinal body member.

8. Apparatus as defined in claim 1, wherein said cutting tool has a rear end provided with a rearwardly projecting exteriorly threaded engagement means element, said shaft member being provided at its forward end with an interiorly threaded blind recess cooperable for threaded receiving engagement with respect to said rearwardly projecting exteriorly threaded engagement means element carried by the rear end of said cutting tool.

9. Apparatus as defined in claim 1, wherein said cutting tool has a rear end provided with a rearwardly projecting exteriorly threaded engagement means element, said shaft member being provided at its forward end with an interiorly threaded blind recess cooperable for threaded receiving engagement with respect to said rearwardly projecting exteriorly threaded engagement means element carried by the rear end of said cutting tool, and further being provided with rotary disc-shaped abutment plug means positioned at the bottom of said blind recess for abutment with the end of said exteriorly threaded engagement means element carried by said cutting tool.

10. A routing attachment adapter for a power-driven hand drill, comprising: a longitudinally apertured substantially cylindrical longitudinal body member having a rear end and a front end and having a longitudinal, substantially cylindrical bore therein extending through the length thereof from said rear end to said front end thereof; said longitudinal body member being provided with annularly enlarged recesses at front and rear ends thereof surrounding the front and rear ends of said longitudinal bore; and a longitudinal shaft member rotatively received within and mounted wthin said bore of said longitudinal body member and having a rear torque-receiving end portion adapted to be engaged and coupled to a coupling chuck of a torque-applying power-driven hand drill, said shaft member being provided with longitudinally spaced shoulders and rotary bearing means positioned thereon and mountingly and retainingly received within said front and rear annularly enlarged recesses at front and rear ends of said longitudinal bore for providing said rotative mounting of said shaft member within said longitudinal bore of said longitudinal body member, said longitudinal body member being supported only by said longitudinal shaft member and being physically separate from the torque-applying power-driven hand drill when the hand drill is engaged and coupled to said rear torque-receiving end portion of said shaft member, said shaft member having a forward end effectively provided with a rotary laterally operable cutting tool extending forwardly from the front end of said longitudinal body member; said longitudinal body member being provided with a guide and gauge means adjacent to said rotary cutting tool and cooperable for manually controlled guiding abutment along a solid surface for guiding said cutting tool along a desired cutting patch in a direction substantially transverse with respect to the longitudinal direction of said bore, said guide and gauge means comprising a planar guide tip provided with a mounting and coupling sleeve portion encompassing at least a portion of the front end of said cylindrical longitudinal body member and being provided with longitudinal slot and fastening screw means providing for longitudinal positional adjustment of said guide and gauge means to adjust the relative longitudinal positioning thereof with respect to said cutting tool, said planar guide tip lying in a plane parallel to but slightly perpendicularly displaced from a longitudinal axis of said forwardly extending rotary cutting tool and being positioned in said parallel plane at one side of said cutting tool, thereby effectively providing and defining a laterally open cutting access region on the opposite side of said cutting tool from said planar guide tip.

11. Apparatus as defined in claim 10, wherein said cutting tool has a rear end provided with an engagement means portion, said shaft member being provided at its forward end with engagement means portion cooperable for engagement and disengagement with respect to said engagement means portion at the rear end of said cutting tool for mounting said cutting tool in said forwardly extending relationship with respect to the front end of said longitudinal body member.

12. Apparatus as defined in claim 10, wherein said cutting tool has a rear end provided with a rearwardly projecting exteriorly threaded engagement means element, said shaft member being provided at its forward end with an interiorly threaded blind recess cooperable for threaded receiving engagement with respect to said rearwardly projecting exteriorly threaded engagement means element carried by the rear end of said cutting tool.

13. Apparatus as defined in claim 10, wherein said cutting tool has a rear end provided with a rearwardly projecting exeriorly threaded engagement means element, said shaft member being provided at its forward end with an interiorly threaded blind recess cooperable for threaded receiving engagement with respect to said rearwardly projecting exteriorly threaded engagement means element carried by the rear end of said cutting tool, and further being provided with rotary disc-shaped abutment plug means positioned at the bottom of said blind recess for abutment with the end of said exteriorly threaded engagement means element carried by said cutting tool.

14. Apparatus as defined in claim 10, wherein the exterior of said cylindrical longitudinal body member is provided with frictional surface means comprising knurling.

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WILLIAM W. DYER, JR., *Primary Examiner.*

L. VLACHOS, *Assistant Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,274,889 September 27, 1966

Wallace A. Ferris

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, line 2, strike out "assignor to Stamicarbon N. V., of Heerlen, Netherlands," line 11, for "Stamicarbon N. V., its successors" read -- Wallace A. Ferris, his heirs --; in the heading to the printed specification, lines 4 and 5, for "Wallace A. Ferris, Huntington Park, Calif., assignor to Stamicarbon N.V., Heerlen, Netherlands" read -- Wallace A. Ferris, 2900 Flower Street, Huntington Park, Calif. --.

Signed and sealed this 31st day of January 1967.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents