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(52) UK CL (Edition X):
B3D DKR D201

(56) Documents Cited:
GB 2182589 A **GB 0693863 A**
GB 0537575 A **JP 060179175 A**
US 2902801 A **US 2703951 A**
US 2644279 A **US 1770538 A**
US 1297776 A

(58) Field of Search:
INT CL⁷ **B24B, B24D**
Other:

(54) Abstract Title: **Sharpening of cutting blades**

(57) Apparatus for sharpening a cutting blade 40 comprises a cutting blade holder and an abrasive support. The holder is formed from a frame 31, a roller 34 provided on one face of the frame 31 and a bolt 32 disposed on the opposite face of the frame 31 for clamping of a cutting blade 40. The abrasive support comprises a base 10 having a deck 11 with a plurality of locating elements 12 on each side of the deck 11. A removable plate 20 having substantially the same dimensions as the deck 11 is located between the elements 12. In a first embodiment a piece of emery cloth 21 lies on the plate 20, with the cloth 21 being held in place between the locating elements 12 and the plate 20. In a second embodiment (figures 9 and 10) the plate 20 comprises emery inlaid on the periphery of holes formed therein. The base 10 has a receptacle 17 for storing water at one end of the deck 11 and means 16 to set the angle of the blade 40.

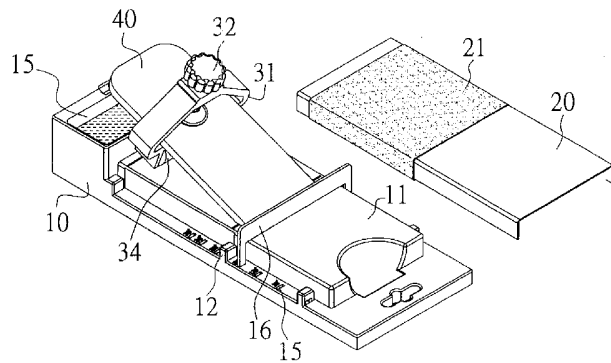


FIG. 5

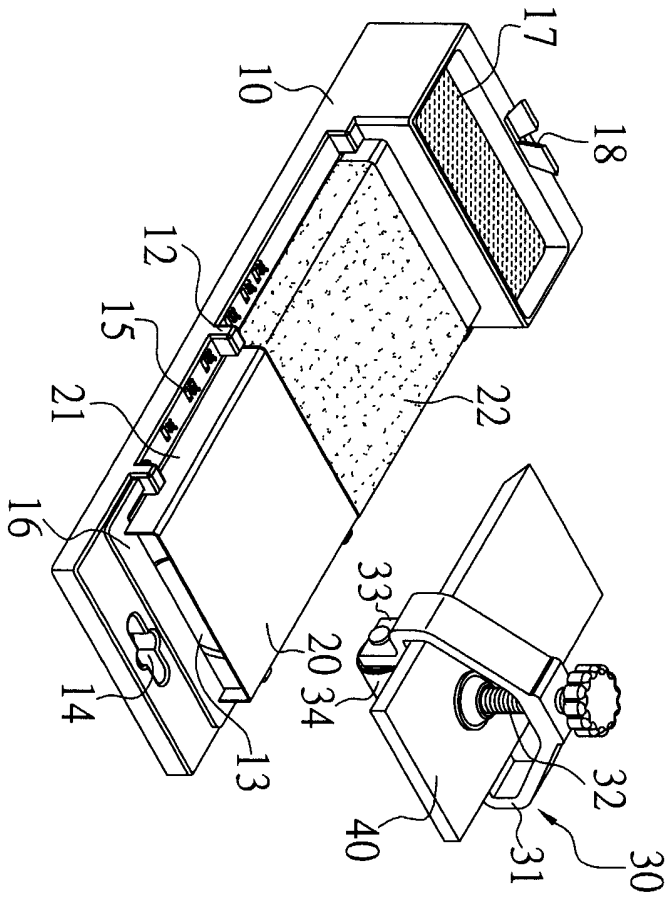


FIG. 1

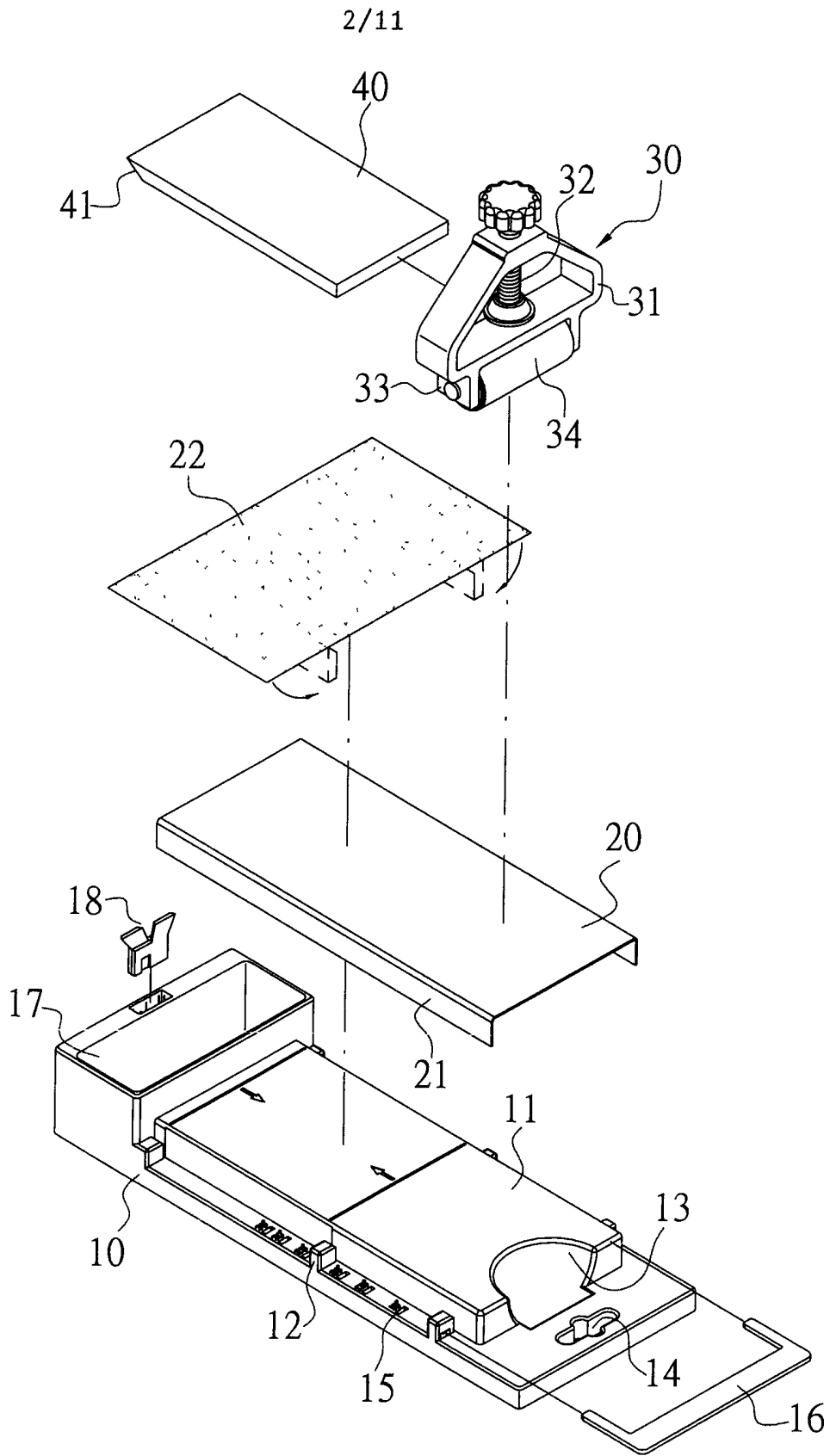


FIG. 2

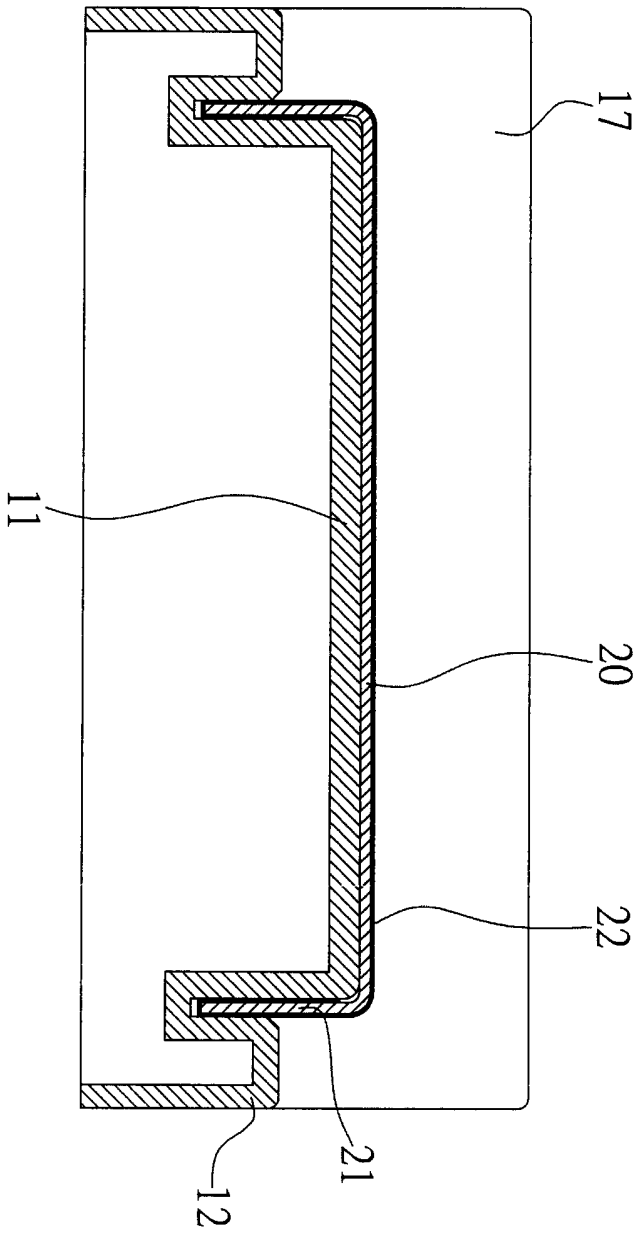


FIG. 3

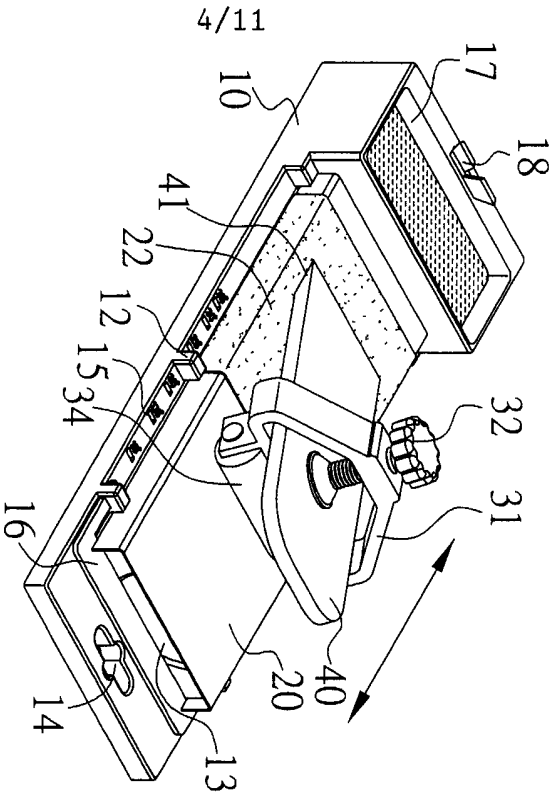


FIG. 4

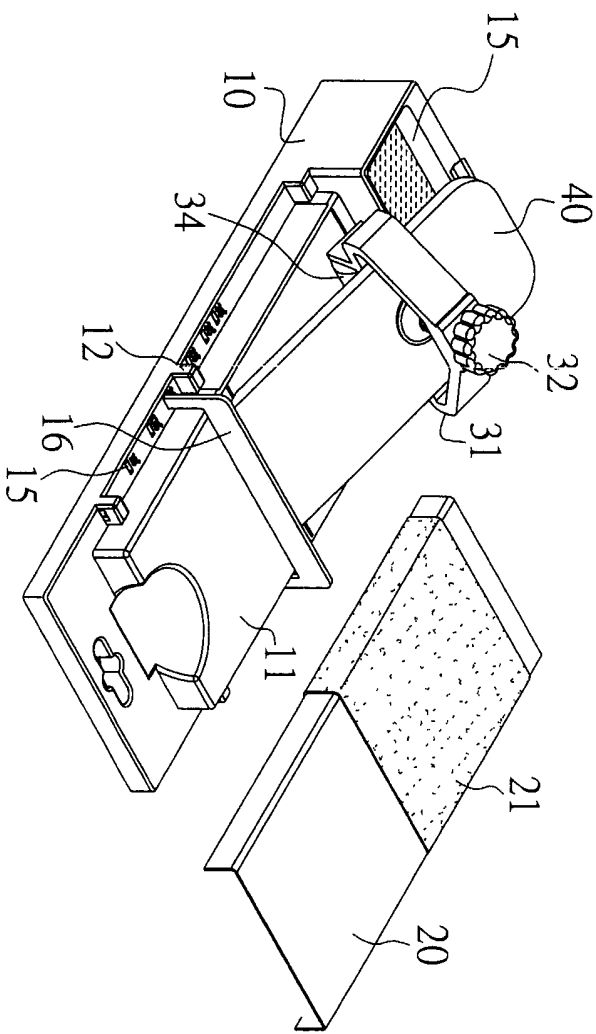


FIG. 5

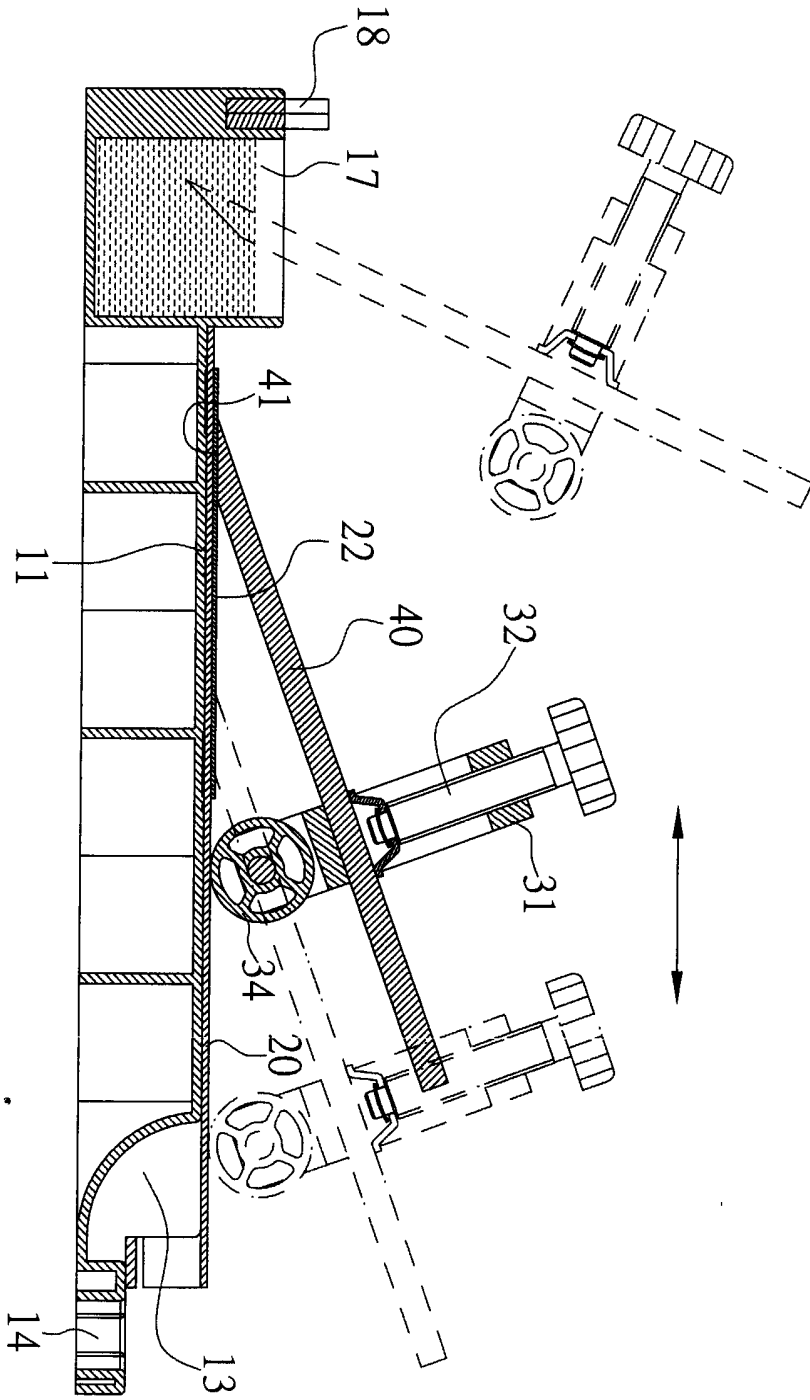


FIG. 6

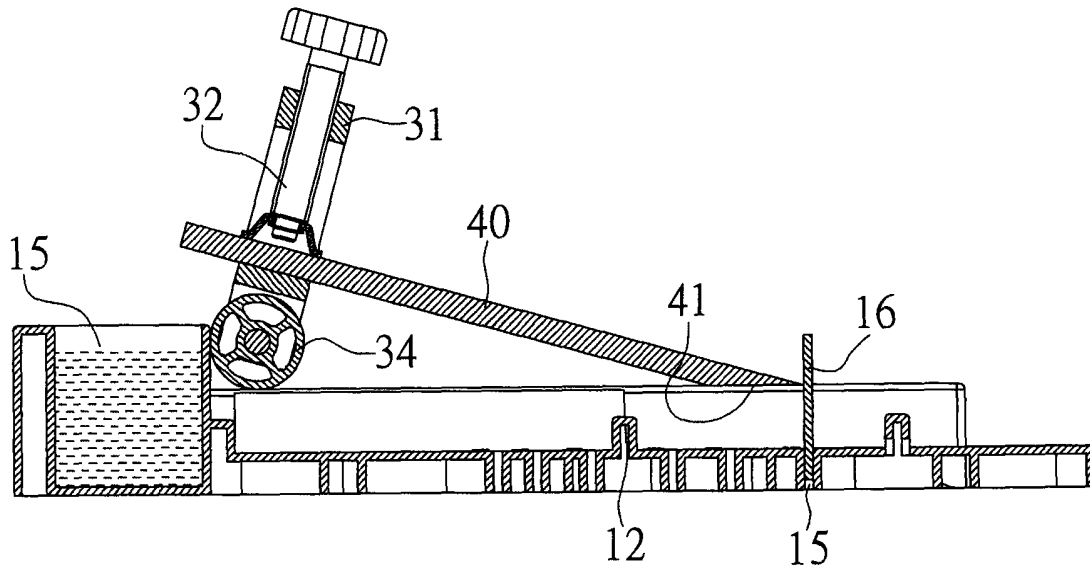


FIG. 7

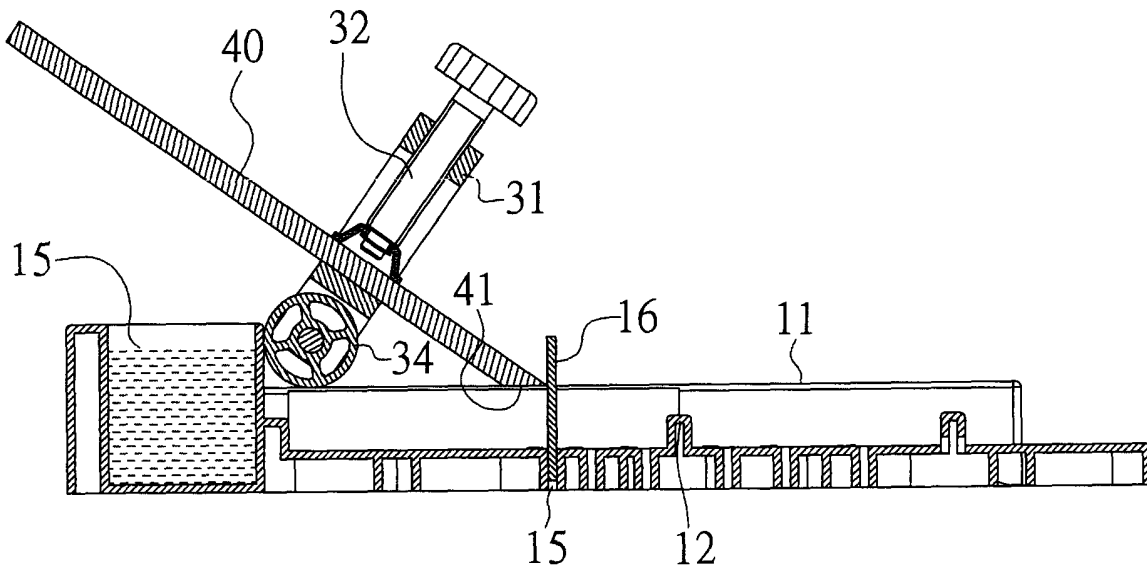


FIG. 8

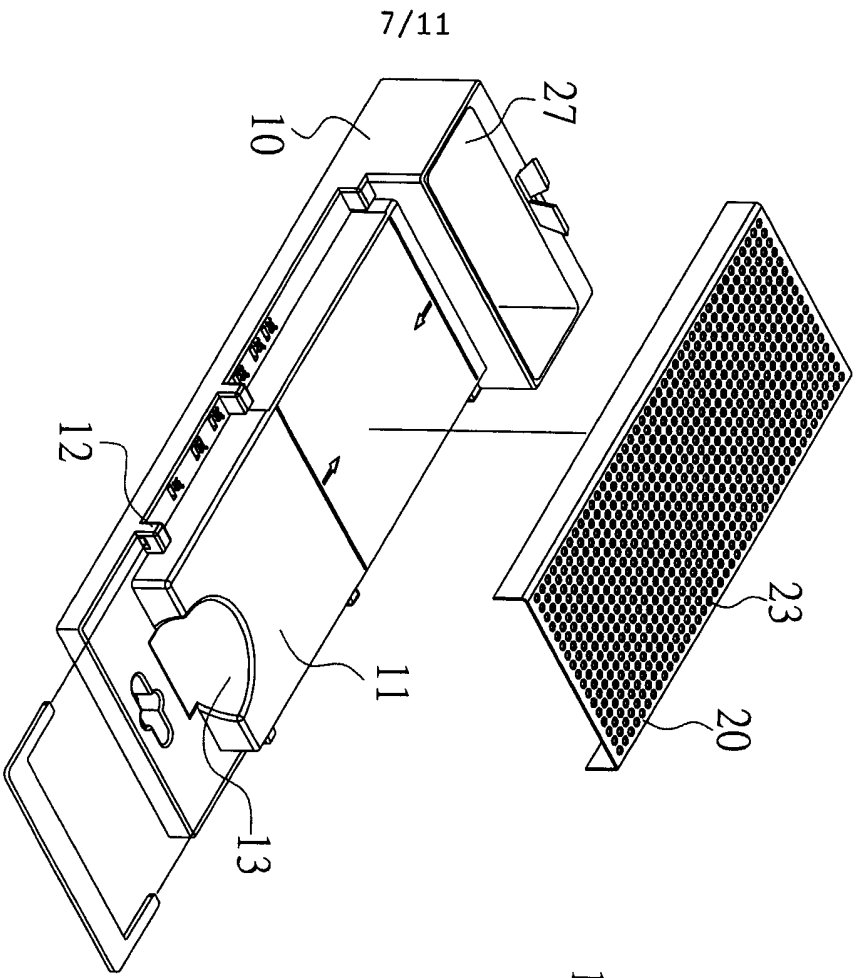


FIG. 10

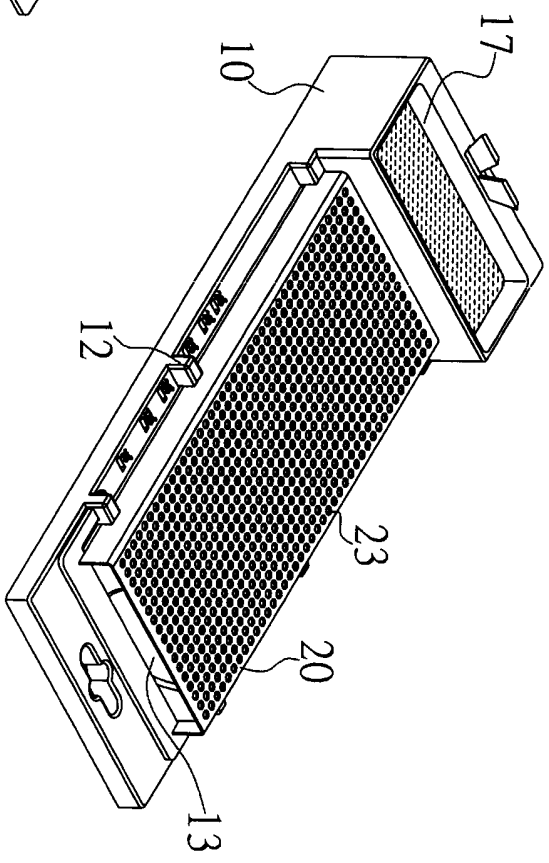


FIG. 9

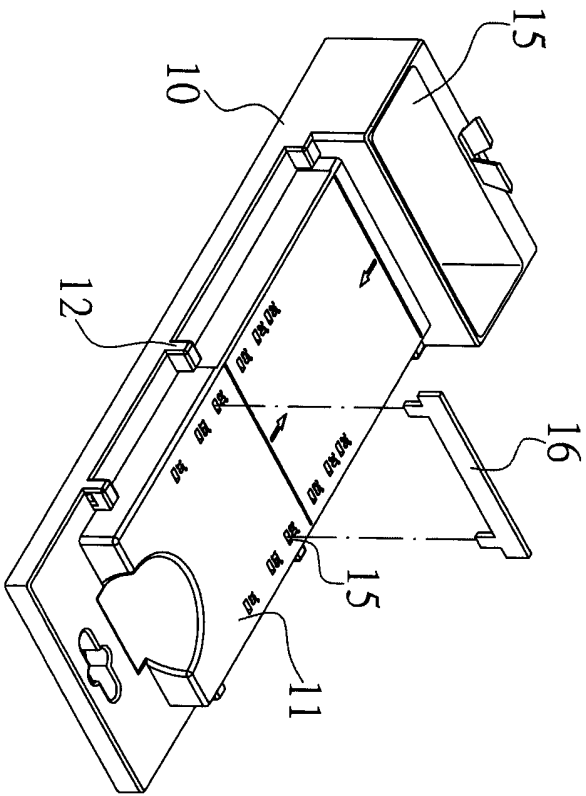


FIG. 11

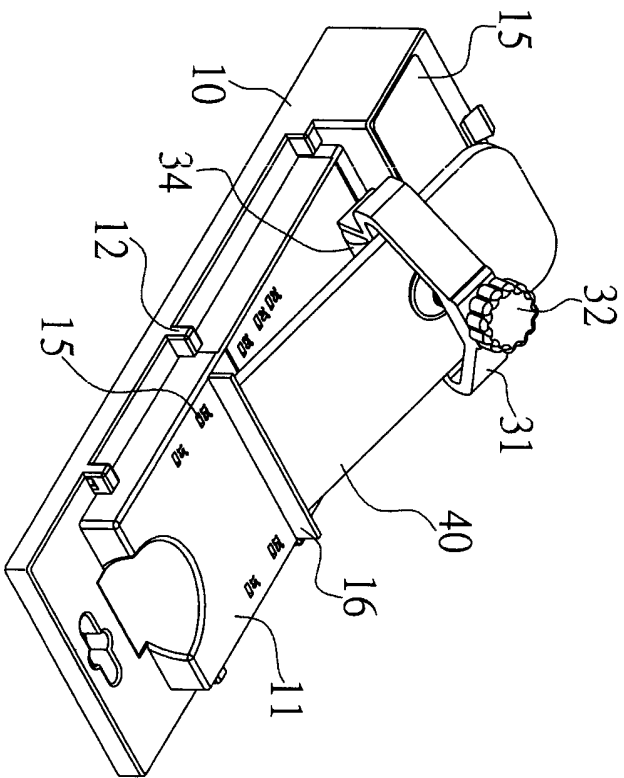


FIG. 12

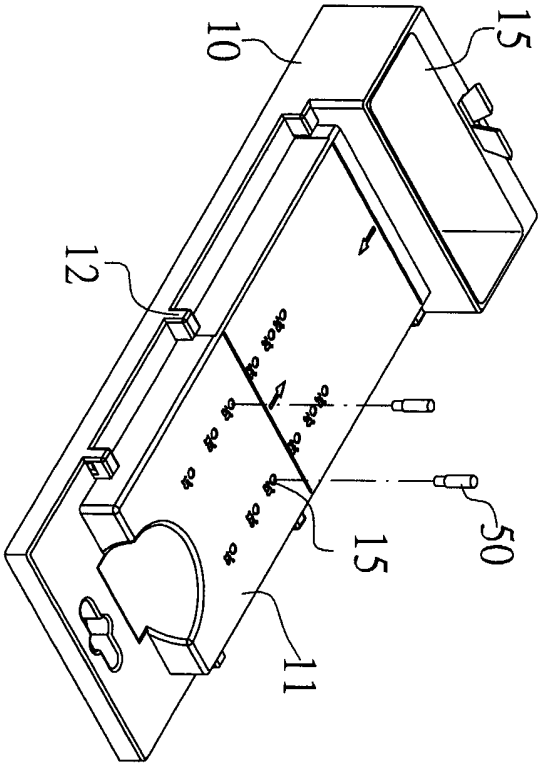


FIG. 13

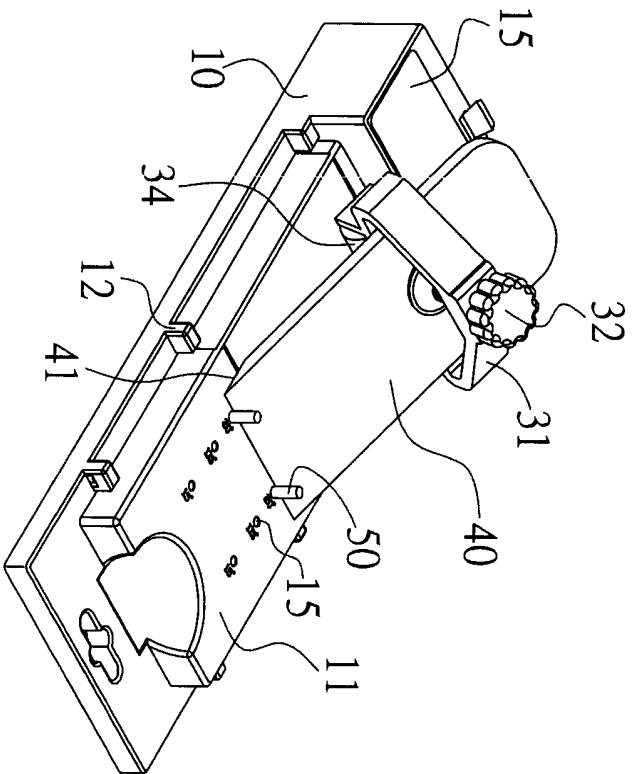


FIG. 14

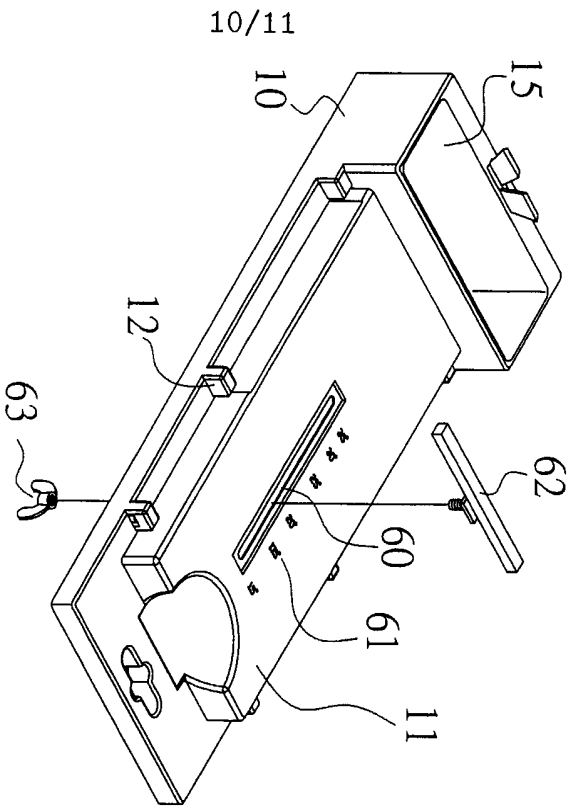


FIG. 15

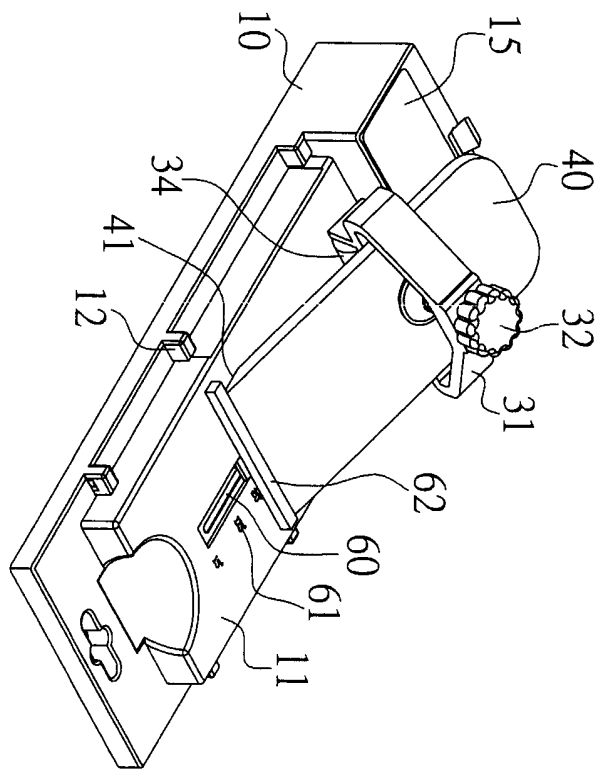


FIG. 16

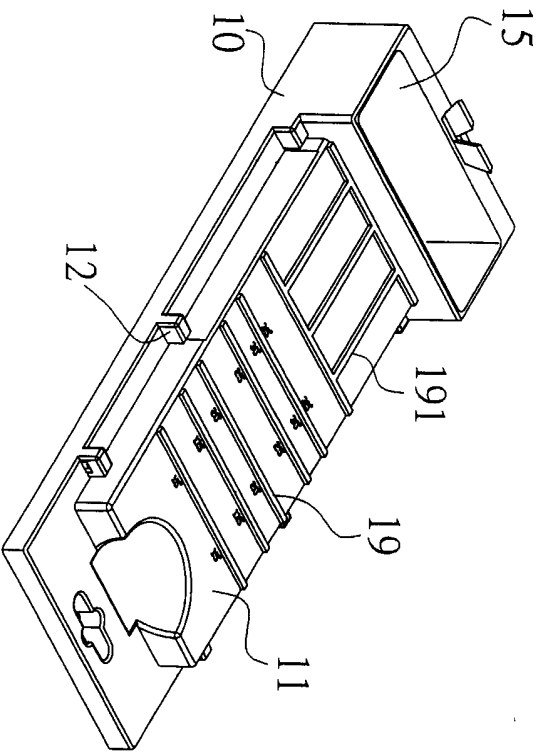


FIG. 17

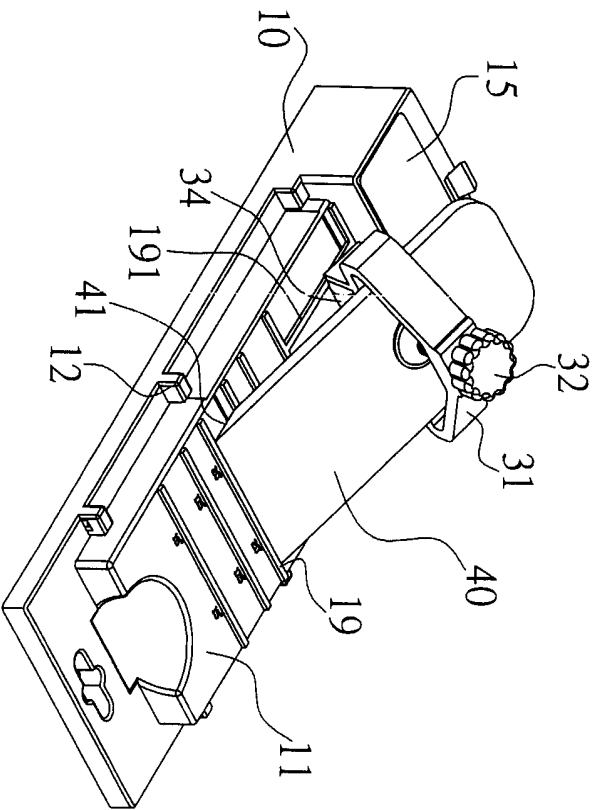


FIG. 18

TITLE: CUTTER-GRINDER**BACKGROUND OF THE INVENTION****(a) Field of the Invention**

5 The present invention is related to an innovative cutter-grinder, and more particularly to one allows safe grinding and adjustment of the angle of the blade of the cutter to be ground while maintaining good grinding quality.

(b) Description of the Prior Art:

10 Whereas after having been used for a certain time, the blade or the cutting edge of a cutter, e.g., the stock of a plane tends to get worn out or dulled; a grinder or a grindstone is usually needed to restore the blade to its sharp status.

15 However, inconsistent grinding quality due to failure in maintaining a firm contact between the blade and the surface of the grinder has been always the biggest problem found with the conventional grinder or grindstone. Furthermore, by holding the cutter to engage in reciprocal grinding motion increases the chance of contacting the grinder and the blade resulting in safety concerns of getting one's hand cut.

SUMMARY OF THE INVENTION

20 The primary purpose of the present invention is to provide a cutter grinder that is safe to use without compromising the grinding quality.

25 Another purpose of the present invention is to provide a cutter grinder that permits replacement of an emery cloth inside the grinder.

 Another purpose yet of the present invention is to provide a cutter grinder that provides safe grinding and better grinding quality. To achieve the purpose, a cutter holder adapted at its bottom a roller to allow the user executes firm and consistent reciprocal grinding by holding the

cutter holder to control the roller flushed against the surface of the grinder.

Another purpose yet of the present invention is to provide a cutter grinder that has disposed on both sides of a deck to the base of the cutter
5 grinder multiple slots to receiver insertion of an angle adjustment plates to adjust for the grinding angle as desired.

Another purpose yet of the present invention is to provide a cutter grinder that a sink containing fresh water is further adapted to either side of the grinder to dissipate the heat and wash away dusts generated in the
10 course of grinding.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic view showing the construction of a first preferred embodiment of the present invention.

15 Fig. 2 is an exploded view of the construction of the first preferred embodiment of the present invention.

Fig. 3 is a sectional view of a cut-away of the first preferred embodiment of the present invention.

Fig. 4 is a schematic view of the first preferred embodiment of the
20 present invention in use.

Fig. 5 is a schematic view showing the adjustment of a grinding angle in the first preferred embodiment of the present invention.

Fig. 6 is a schematic view showing the construction of the first preferred embodiment in use.

25 Fig. 7 is a schematic view showing the construction of the first preferred embodiment in adjusting the grinding angle.

Fig. 8 is a schematic view showing another construction of the first preferred embodiment in adjusting the grind angle.

Fig. 9 is an exploded view of a second preferred embodiment of the

present invention.

Fig. 10 is a schematic view showing the construction of the second preferred embodiment of the present invention.

5 Fig. 11 is a schematic view showing the construction of a third preferred embodiment of the present invention in adjusting the grinding angle.

Fig. 12 is a schematic view showing the status of adjusting the grinding angle in the third preferred embodiment of the present invention.

10 Fig. 11 is a schematic view showing the construction of a third preferred embodiment of the present invention in adjusting the grinding angle.

Fig. 12 is a schematic view showing the status of adjusting the grinding angle in the third preferred embodiment of the present invention.

15 Fig. 13 is a schematic view showing the construction of a fourth preferred embodiment of the present invention in adjusting the grinding angle.

Fig. 14 is a schematic view showing the status of adjusting the grinding angle in the fourth preferred embodiment of the present invention.

20 Fig. 15 is a schematic view showing the construction of a fifth preferred embodiment of the present invention in adjusting the grinding angle.

Fig. 16 is a schematic view showing the status of adjusting the grinding angle in the fifth preferred embodiment of the present invention.

25 Fig. 17 is a schematic view showing the construction of a sixth preferred embodiment of the present invention in adjusting the grinding angle.

Fig. 18 is a schematic view showing the status of adjusting the grinding angle in the sixth preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figs. 1 through 8, a first preferred embodiment of the present invention is essentially comprised of a plastic base (10) injection molded, a mobile base plate (20), and a cutter holder (30). A rectangular deck is disposed on top of the base (10), multiple positioning bits (12) are provided on both sides of the deck (11) and a proper spacing is reserved between each positioning bit (12) and the side of the deck (11) to limit the mobile base plate (20) covering upon the deck (11) in position. A gap (13) is reserved at one end of the deck (11) to facilitate the removing of the mobile base plate (20), and an eyelet (14) is provided on the base (10) at where close to the gap (13) to facilitate hanging the grinder when not in use. Multiple slots (15) are provided to the base on both sides of the deck (11) to receive insertion of an angle adjustment plate (16) to secure the grinding angle of the cutter. When not required, the angle adjustment plate (16) is stored in a place reserved on the top of the base (10). On the distal end of the base where the eyelet (14) is disposed, a sink (17) containing fresh water is provided and another grinder (18) intended for grinding a pair of scissors is disposed to the outer side of the sink (17) to provide additional function for the grinder (18) of the present invention.

The mobile base plate (20) is made of metal material molded by punching in a dimension approximately identical to that of the deck (11) of the base (10) so to place the mobile base plate (20) on the deck (11). An emery cloth (22) in a given size warps around the mobile base plate (20) and both sides of the emery cloth (22) are inwardly folded along both side plates (21) of the mobile base plate (20) to stay flushed against the inner side of both side plates (21). Accordingly, when the mobile base plate (20) covers upon the deck (11), the mobile base plate (20) and the

emery cloth (22) are secured in place by the spacing defined between those positioning bits (12) on both sides of the base (10) and both sides of the deck (11), and further to firmly secure the emery cloth (22) on the mobile base plate (20). The existing emery cloth (22) may be replaced
5 with a new one or another emery cloth (22) with different roughness as required.

The cutter holder (30) includes a frame (31) that can be easily held by one's hand. A cutter (40) is placed in the frame (31) and secured by means of a packing bolt (32) disposed at the top of the frame (31). An
10 axial base (33) extends from the bottom of the frame (31) and a roller (34) is axially provided to the axial base (33) for the cutter holder (30) to roll back and forth on the top of the mobile base plate (20) thus to grind a blade (41) of the cutter (40) against the emery cloth (22).

When assembled, the preferred embodiment of the present
15 invention is ready to grind the cutter (40). First, the cutter (40) is clamped and secured by the cutter holder (30). Before grinding, the roller (34) of the cutter holder (30) rests on the sidewall of the sink (17) containing the fresh water. The packing bolt (32) is loosened up to adjust the cutter (40) for its blade (41) to push against the angle
20 adjustment plate (16) secured in position by those slots (15) for the grinding angle desired. The grinding angle varies depending on the change of relative positions between the cutter (40) and the cutter holder (30) with an error not greater than one degree. The mobile base plate (20) is attached and the roller (34) of the cutter holder (30) is placed to
25 rest on the top surface of the mobile base plate (20) while leaving the blade (41) of the cutter (40) to stay flushed against the grinding surface of the emery cloth (22). The user then holds the cutter holder (30) to grind the blade (41) of the cutter (40) to sharpen it against the emery cloth (22) by following the reciprocal motion of the roller (34) on the top surface of

the mobile base plate (20).

In the structural design disclosed above, both of the emery cloth (22) and the mobile base plate (20) are retractable from the deck (11) of the base (10); therefore, once the emery cloth (22) is worn out or another
5 emery cloth with different roughness is required, the mobile base plate (20) can be easily removed from the gap (13) of the deck (11) to replace the existing emery cloth (22).

As illustrated in Figs. 9 and 10, a second preferred embodiment of the present invention is also essentially comprised of the base (10)
10 adapted with the deck (11), multiple positioning bits (12), the gap (13) and the sink (17), and the mobile base plate (20). Furthermore, multiple through holes (23) are directly and intensively disposed on the top surface of the mobile base plate (20) with each peripheral of each through hole (23) inlaid with emery to define a grinding surface in place
15 of the emery cloth (22) used in the first preferred embodiment. Whereas the mobile base plate (20) is also retractable, it can be easily replaced with a new one or another one of different roughness.

Furthermore, as illustrated in Figs. 11 through 18 for a plurality of preferred embodiments of the present invention showing the adjustments
20 of grinding angle. Referring to Figs. 11 and 12, those slots (15) to adjust the grinding angle are disposed on the top of the deck (11) of the base (10) while the size of the angle adjustment plate (16) is reduced as applicable; or as illustrated in Figs. 13 and 14, a pair of positioning bolts (50) are provided to inserted into the selected pair of those slots (15); or
25 as illustrated in Figs. 15 and 16, a longitudinal slot (60) is provided on the top surface of the deck (11) of the base (10) and both sides of the longitudinal slot (60) are provided with multiple grades (61), and a limit plate (62) adapted with a nut (63) to adjust the position of the limit plate (62) is provided; or as illustrated in Figs. 17 and 18, multiple positioning

ribs (19) are forthwith formed to adjust the grinding angle on the top surface of the deck (11) of the base (10) to permit the blade of the cutter (40) to hold against those positioning ribs (19) at an angle desired for the blade (41) of the cutter by having the roller (34) of the cutter holder (30) to hold against the sink (17), and multiple ribs (191) are provided vertical to and for a same height as that of those positioning ribs (19) are further disposed on the top surface of the deck (11) at where irrelevant to the adjustment of the grinding angle and closer to the sink (17) for providing consistent support in position when the mobile base plate (20) is placed upon the deck (11) to maintain a firm process of grinding. Now matter what form the angle adjustment plate (16), the positioning bolt (50), the positioning plate (60) the positioning rib (19) is provided for adjusting the grinding angle as described in those preferred embodiments, the relationship among members of the cutter holder (30), the cutter (40) and the angle adjustment plate (16) shall be adjusted by following the principle of trigonometric function for easy adjustment of the preferred grinding angle of the blade (41) of the cutter (40) in achieving consistent and reliable grinding quality.

The present invention by taking advantage of a mobile base plate that is retractable to be covered up with an emery cloth before being placed upon a deck of the base of the grinder to secure the emery cloth and permit easy replacement of the emery cloth; the cutter to be ground being clamped and secured by a cutter holder disposed at its bottom a roller for the user to grip the cutter holder in moving back and forth on the surface of the mobile base plate to grind the blade of the cutter against the emery cloth at a grinding angle as desired by having provided angle adjustment plate or positioning rib using the slots disposed on both sides or on the top surface of the deck of the base in making the grinding easier while maintaining grinding safety, maintains excellent grinding quality

for industrial purpose.

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CLAIMS

1. A cutter grinder intended to grind a blade of a cutter is essentially comprised of a base, a mobile base plate, and a cutter holder; the base being placed on its top a rectangular deck, multiple positioning bits being disposed on both sides of the deck; a certain spacing being reserved between those positioning bits and both sides of the deck, the mobile base plate covering upon the deck and being limited in position by both sides of the deck and those positioning bits to prevent it from being easily disengaged from the deck; the mobile base plate in a dimension substantially identical to that of the deck of the base covering upon the deck, the mobile base plate being covered up with a piece of emery cloth in a given dimension, both of the emery and the mobile base plate being held in position by the spacing between those positioning bits and both sides of the deck, the emery being firmly placed on the mobile base plate and allowed the replacement for a new one or another one with different roughness; and the cutter holder comprised of a frame allowing to be gripped, a cutter being placed in the frame, a packing bolt being disposed at the top of the frame; both of the cutter and the frame being relatively secured by the packing bolt, an axial base extending from the bottom of the frame, a roller being axially provided to the axial base, and the cutter holder moving back and forth on the top surface of the mobile base plate as driven by the roller to grind the blade of the cutter against the emery cloth.
2. A cutter grinder is essentially comprised of a base, a mobile base plate, and a cutter holder; the base being placed on its top a rectangular deck, multiple positioning bits being disposed on both sides of the deck; a certain spacing being reserved between those positioning bits and both sides of the deck, the mobile base plate

covering upon the deck and being limited in position by both sides of the deck and those positioning bits, a sink containing fresh water being disposed on one end of the deck of the base at a level higher than that of the deck, an angle adjustment plate or similar structure being disposed to the deck of the base, the roller of the cutter holder resting upon the sidewall of the sink on one side of the deck; and the preferred grinding angle being easily attainable by adjusting the way angle adjustment plate holding against the blade of the cutter; the mobile base plate in a dimension substantially identical with that of the deck of the base, the mobile base plate covering upon the deck, and a piece of emery cloth in a given size covering upon the mobile base plate to define a grinding surface; and the cutter holder comprised of a frame allowing to be gripped, a cutter being placed in the frame, a packing bolt being disposed at the top of the frame; both of the cutter and the frame being relatively secured by the packing bolt, an axial base extending from the bottom of the frame, a roller being axially provided to the axial base, and the cutter holder moving back and forth on the top surface of the mobile base plate as driven by the roller to grind the blade of the cutter against the emery cloth.

3. The cutter grinder of Claim 1, wherein the mobile base plate has on its top directly disposed of multiple and intensive through holes, emery is inlaid on the peripheral of each through hole to constitute the grinding surface in place of emery cloth.
4. The cutter grinder of Claim 2, wherein the angle adjustment plate mounted to the deck of the base is arranged depending on the trigonometric function value defined by the cutter holder, the cutter, and the deck.

5. A cutter grinder substantially as hereinbefore described with reference to the accompanying drawings.



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Application No: GB0512706.3

Examiner: Matthew Lawson

Claims searched: 1-5

Date of search: 11 October 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	GB 2182589 A (LEE) - figures 1-9.
A	-	GB 537575 A (ADDYMAN) - the whole specification.
A	-	JP 06179175 A (OZAWA) - the PAJ abstract and the figures.
A	-	GB 693863 A (VAFFIADAS) - the whole specification.
A	-	US 2902801 A (CALLAGHAN) - the whole specification.
A	-	US 2703951 A (SMITH) - the whole specification.
A	-	US 2644279 A (STANKOVICH) - the whole specification.
A	-	US 1770538 A (WARNER) - the whole specification.
A	-	US 1297776 A (AXLER) - the whole specification.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^x :

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Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

B24B; B24D

The following online and other databases have been used in the preparation of this search report

Online: EPODOC, WPI
