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Quenot

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[54] MITRE-BOX

1,038,966 9/1912 Russel et al. 143/89

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[58] Field of Search 143/89 R, 87, 86,
143/90; 83/767, 761-766, 522

[56] References Cited

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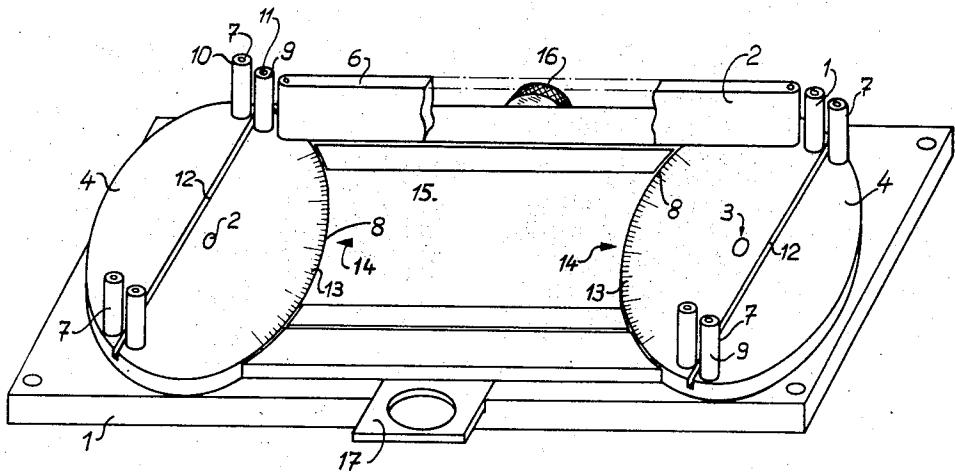
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ABSTRACT

This mitre-box comprises a base plate on which a pair of spaced platforms are pivotally mounted and provided each with pairs of free-rotating rollers disposed for guiding a cutting tool. A longitudinal guide member is pivotally mounted to said platforms for guiding a workpiece. A protractor is provided for adjusting the angular position of the platforms in relation to a fixed reference mark carried by said base plate, and means are provided for locking the platforms in a selected angular position.

10 Claims, 4 Drawing Figures

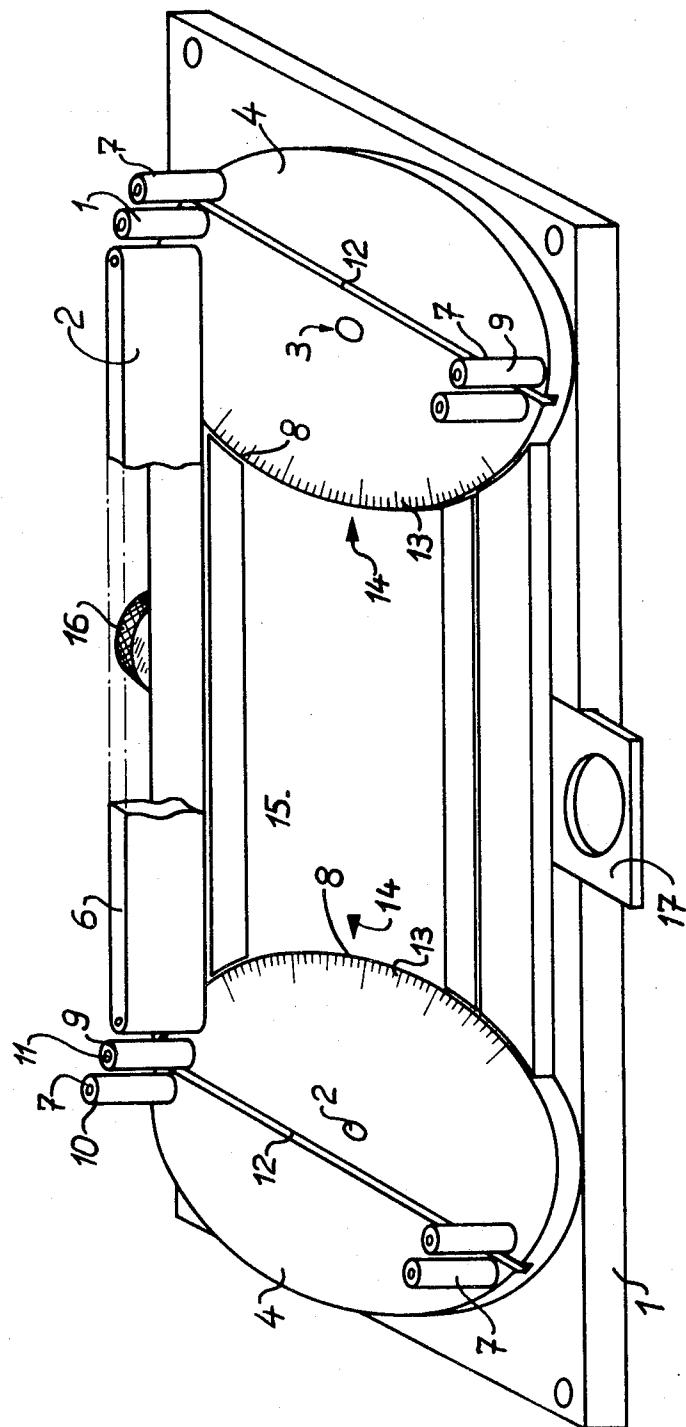


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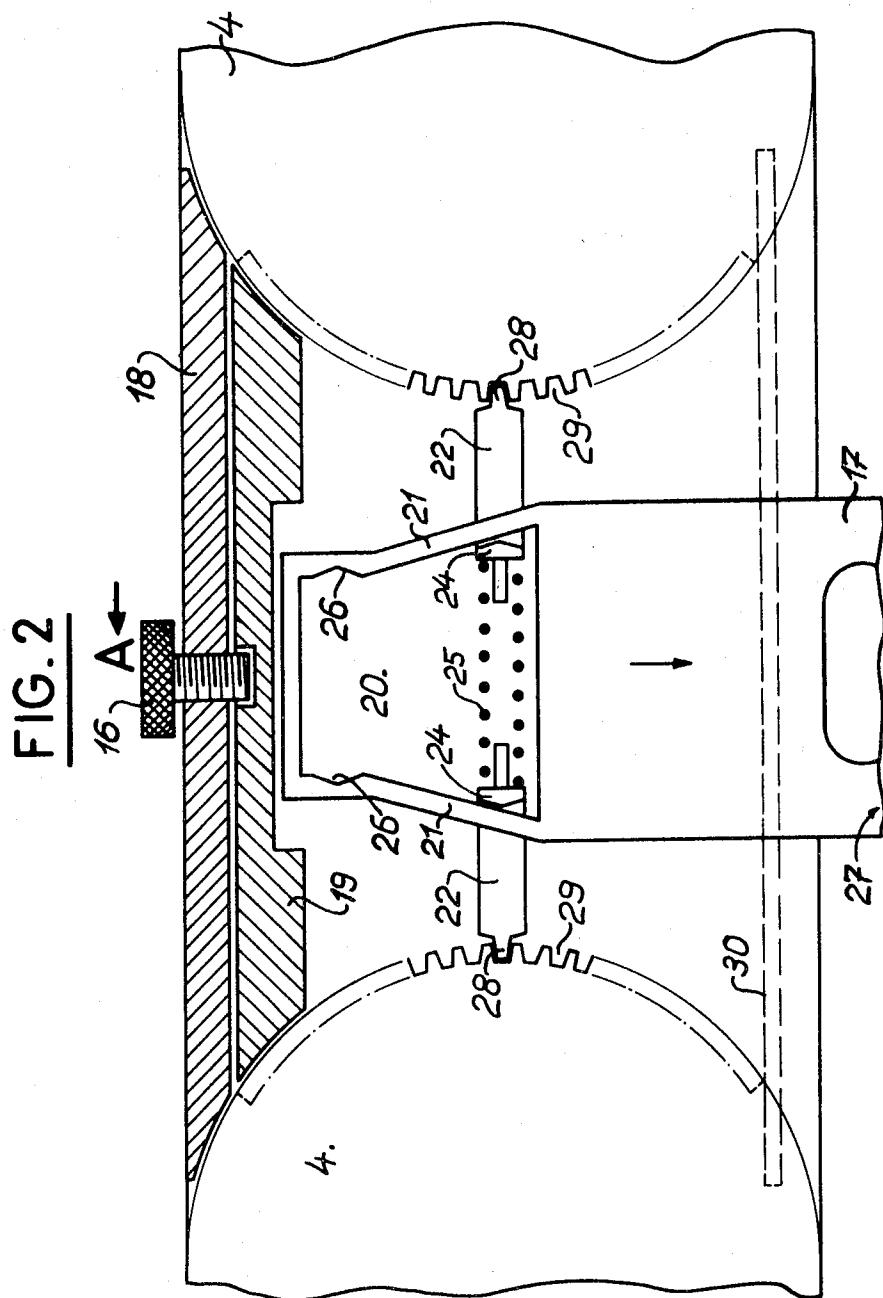
FIG.1



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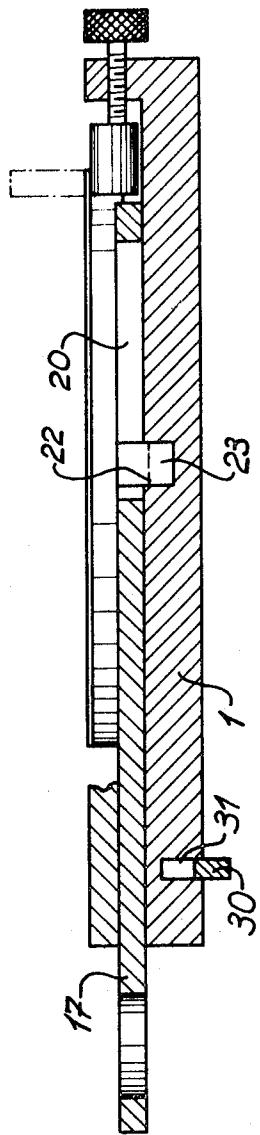


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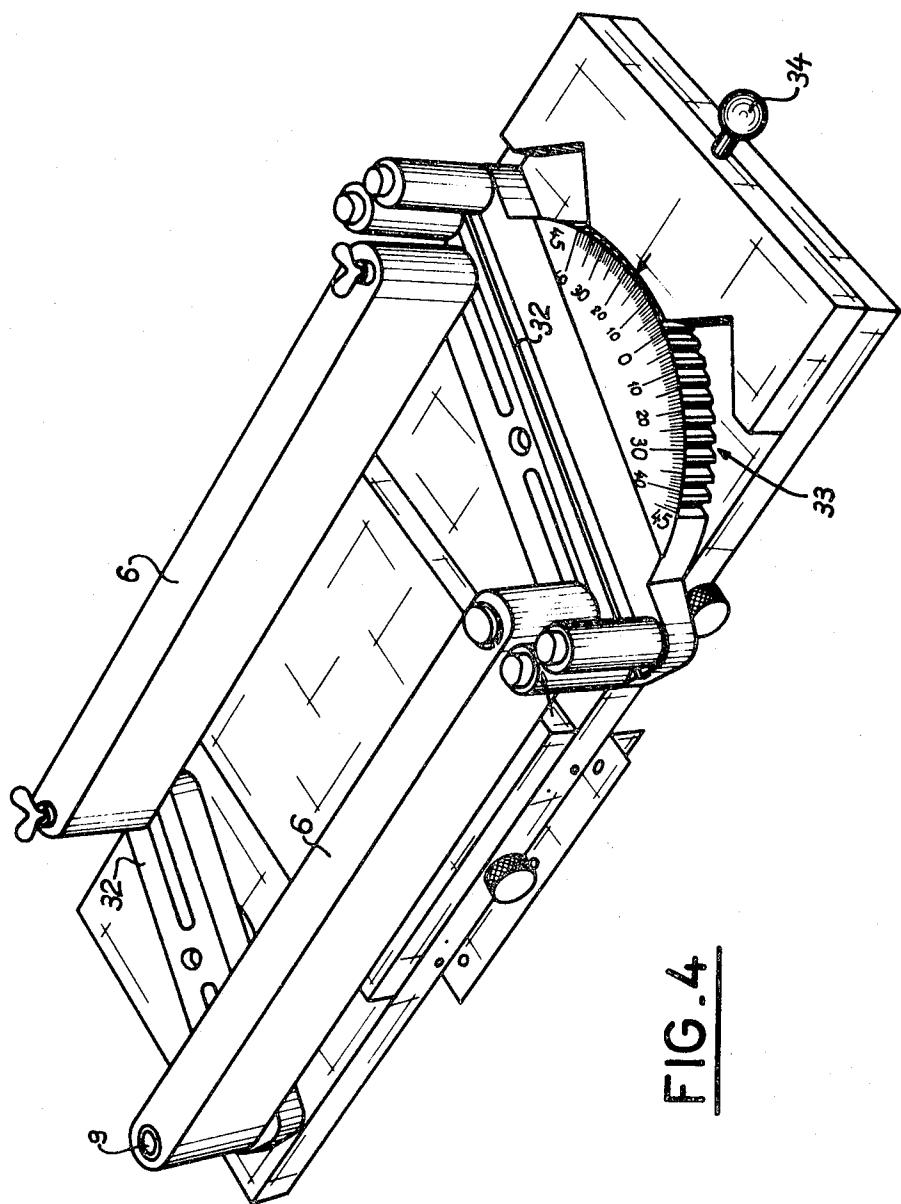
FIG. 3



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MITRE-BOX

The present invention relates in general to mitre-boxes of the type currently used by carpenters for joinery works, etc., for cutting according to predetermined angles the ends of pieces such as boards, sections, moldings, borders, etc.

Hitherto known mitre-boxes consist very simply of a pair of parallel spaced side walls interconnected by a base or distance-piece to constitute a guide channel for receiving the piece to be cut. At one end these side walls comprise registering vertical slits so disposed that the blade of the cutting tool, for instance a saw, is properly guided in an angular position in relation to a flat face of the piece to be cut which abutes or is wedged against one of said side walls.

These known mitre-boxes are obviously rudimentary and attended by major inconvenience due to their inherent construction and to the difficulty of adapting them to precision works.

In fact, only very few angle values can be obtained with these devices, for example 90-degree and right-hand or left-hand 45-degree cuts, since any increment in the number of saw-guiding slits formed for other angle values in the side walls of this device would be attended by an unavoidable weakening of the mechanical strength of the assembly, which cannot be contemplated for obvious reasons.

On the other hand, a prolonged use of these devices leads to a widening of the guide slits, due to the frequent to-and-fro movements of the saw therein, so that the initial angular precision is gradually impaired without any possibility of correcting or amending same. In the long run, the base or distance-piece itself may thereby further compromise the rigidity of the instrument.

The frequent necessity of wedging the workpiece against one of the side walls of the mitre-box, which is effected as a rule by makeshift means, also constitutes a source of inconveniences in the use of conventional mitre-boxes.

Attempts have already been made with a view to avoid the drawbacks set forth hereinabove, for example by proposing double-walled plastic mitre-boxes provided with locking means in the form of screws engaging the walls of the instrument. With this solution, only a slight extension of the useful life of the instrument is obtained, without permitting a more rational use thereof.

In fact, the above-listed inconveniences make it necessary for the user to possess several types of mitre-box, according to the cutting angle to be obtained in each case, and sometimes also according to the width of the piece to be cut. Moreover, these mitre-boxes must be replaced from time to time with new ones as a consequence of awkward saw strokes in the vertical lateral slits or in the base or distance-piece.

It is an object of the present invention to provide an improved mitre-box capable of avoiding or minimizing all the inconveniences set forth hereinabove, in which the various cutting operations can be performed by guiding the cutting tool in slits of such character that all frictional contacts are eliminated or at least minimized. Furthermore, simple yet efficient and quick-action locking means are provided for holding the workpieces to be cut, whenever these workpieces com-

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prise two parallel faces such as skirting-or washboards, moldings, sections and strips.

According to the invention, there is provided a mitre-box comprising a base plate and at least one longitudinal member for guiding a piece to be cut, said longitudinal member being pivotally supported by a pair of rotatable supporting members mounted on the top of said base plate and of which at least one is provided with means for guiding a cutting tool, said members being also provided with means for indicating the angle between said one supporting member and said longitudinal member, and means for locking said supporting members in a selected angular position.

According to another feature of the invention, said guide means consist of at least two slits each formed by the gap left between a pair of rollers rotating freely on metal or plastic pins or shafts. These rollers provide a substantial improvement over the prior art, notably in that they permit the manufacture of long-lasting mitre-boxes. In fact, since these rollers can rotate freely they facilitate greatly the movement of the cutting tool or saw, as their frictional resistance is reduced substantially to zero. However, in case of abnormal or unforeseen wear, they can be replaced instantaneously by simply substituting the plastic sleeves revolving about the shafts or pins.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which :

30 FIG. 1 is an isometric view of a mitre-box according to the present invention ;

FIG. 2 illustrates a mechanism for locking and braking the platforms ;

FIG. 3 is a cross-section taken along the line A—A of FIG. 2 and

35 FIG. 4 is a perspective view of a modified embodiment of mitre-box.

Referring first to FIG. 1, a mitre-box comprises a base plate 1 projecting from the top surface of which are a pair of fixed pins 2, 3 on which a pair of platforms 4 and 5 are rotatably mounted. These platforms have pivotally mounted thereon a longitudinal member 6. This member 6 constitutes a means for guiding a piece to be cut in a constant alignment, irrespective of the position of platforms 4 and 5.

These platforms 4 and 5 are provided with guide means 7 and alignment means 8.

The guidemeans 7 consist for each platform of two pairs of rollers 9. These rollers each comprises a detachable sleeve 10 of suitable anti-friction material, such as plastic material, rotating freely about a shaft or pin 11. The rollers 9 are disposed in pairs to provide therebetween a gap sufficient for inserting the blade of the cutting tool, for instance a saw blade.

55 In addition, these platforms 4 and 5 comprise in their top face a groove 12 permitting satisfactory completion of a cutting operation.

Each platform 4 or 5 further comprises along the edge of its top face alignment means 8 consisting of a vernier 13 movable in relation to a fixed mark or reference line 14 formed in a plate 15. This plate 15 is mounted with its top face level with the top faces of platforms 4, 5 and forms therewith a substantially continuous flat surface.

60 The plate 15 together with the base plate 1 have slideways and recesses formed in their exposed and concealed faces to permit the mounting of locking and

braking means controlled by members 16 and 17, respectively, as will be explained presently. Reference will now be made to FIG. 2 showing partly in horizontal section, and partly in plan view from above, the mitre-box of FIG. 1, from which the top plate 15 and the longitudinal member 6 have been removed for the sake of clarity.

The above-mentioned member 16 consists of a screw having a milled head and engaged in a tapped hole formed in an up-turned ledge 18 of base plate 1. This screw 16 is adapted to control the position of a brake shoe 19 engaging the platforms 4 and 5, for locking same in any selected angular position.

The member 17 engaging the slideways formed in plate 15 is adapted to control a device for locking said platforms 4 and 5. Now it is clear that this locking device cannot operate in conjunction or simultaneously with the aforesaid braking means. The member 17 is of flat, elongated configuration, and comprises at its end adjacent to said screw 16 an aperture 20 of substantially trapezoidal configuration.

The sides of this trapezoidal aperture 20 constitute a pair of opposite cam faces 21 adapted to actuate locking members 22 guided in a groove 23 formed in the base plate (FIG. 3).

To facilitate the action of said cam faces 21 on locking members 22, these locking members 22 are formed with a twin-faced bevelled inner projection 24. On the other hand, these members 22 are urged to their locking position with respect to platforms 4 and 5 by a spring 25.

The substantially trapezoidal aperture 20 comprises adjacent its minor base V-shaped notches 26 corresponding in shape to the bevelled end projections 24 of locking members 22.

When it is desired to release the platforms 4, 5 the control member 17 is moved in the direction of the arrow by pulling the end 27 of this control member 17, whereby the cam faces 21 engage one of the bevelled end projections 24 and move the locking members 22 towards each other.

This movement will thus release the teeth 28 of locking members 22 from corresponding notches 29 cut in the periphery of platforms 4, 5.

The angular spacing of these notches 29 may preferably be such that each of them corresponds to an angle of five degrees, so that the instrument can easily be set to any angular position constituting a multiple of 5°.

If, on the other hand, it is desired to cut an angle having a value other than a multiple of 5°, the member 17 is actuated in the direction of the arrow (FIG. 2) so that the bevelled faces of end projections 24 engage the notches 26 of said control member 17. Then the adjustment is made by using the brake shoes 19 as already explained hereinabove.

To facilitate the efficient use of the mitre-box of this invention, a groove 31 is formed in the underface of base plate 1 and adapted to receive a longitudinal rule 30 which can project from the base plate 1 (see FIGS. 2 and 3).

Thus, for example, when the mitre-box is laid on a flat surface, the rule 30 will recede into its groove 31 due to the pressure exerted by the weight of the mitre-box. However, if it is desired to hold the mitre-box against a vertical face of a table or work bench the rule 30 can be projected to abut the face of the table or work bench. This will greatly facilitate the cutting oper-

ation since it permits holding of the mitre-box and the work piece against undesired movement.

In addition, the mitre-box of this invention constitutes a substantial improvement over hitherto known instruments of this character, since it comprises pairs of saw-guiding rollers 9 on each platform 4, 5, thus enabling both right-handed and left-handed persons to use the instrument with the same ease.

Referring to FIG. 4 showing a modified embodiment of instrument according to the present invention, the platforms 4, 5 of the preceding structure are replaced by a pair of arms 32 provided at their ends with means for pivotally mounting thereon the ends of a pair of longitudinal members 6. One arm 32 comprises means for guiding the cutting tool or blade and a part-circular protractor or vernier for reading the adjustment angle. This protractor or vernier is associated with a notch 33 cut in an insert plate secured to base plate 1 and permitting locking of the arms 32 in a well-defined angular position with the assistance of a spring-loaded, piston-like locking member 34.

Although this invention has been described with reference to specific embodiments, it will readily occur to those conversant with the art that various modifications may be brought thereto without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is

1. A mitre-box comprising: a base plate; at least one longitudinal member for guiding a piece to be cut; a pair of rotatable supporting members pivotally supporting said longitudinal member and each mounted on the top of said base plate; means on at least one of said supporting members for guiding a cutting tool; means on said supporting members for indicating the angle between one supporting member and said longitudinal member; and means for locking said supporting members in a selected angular position.

2. A mitre-box as set forth in claim 1, wherein said means for guiding a cutting tool consists of a plurality of pairs of rollers, the rollers of each pair being spaced to ensure a reliable guiding action.

3. A mitre-box as set forth in claim 2, including fixed pins having said rollers detachably mounted thereon for free rotation.

4. A mitre-box as set forth in claim 1, wherein said means for indicating the angle between one supporting member and said longitudinal member comprises a fixed reference mark and a protractor bearing graduation lines movable past said fixed reference mark.

5. A mitre-box as set forth in claim 1, wherein said rotatable supporting members consist of arms provided at their ends with pivot means for pivotally mounting said longitudinal member.

6. A mitre-box as set forth in claim 1, wherein said rotatable supporting members consist of platforms each provided with guide means.

7. A mitre-box as set forth in claim 6, wherein said locking means consist of cylindrical peripheral wall portions of said platforms, brake shoes engageable with said cylindrical peripheral walls, and a screw for controlling the engagement of said brake shoes with said cylindrical peripheral walls.

8. A mitre-box as set forth in claim 1, wherein said locking means consist of means defining notches in the periphery of said supporting members, and movable members engageable in said notches.

9. A mitre-box as set forth in claim 8, including means for actuating said movable members comprising a manually movable plate having means therein defining a substantially trapezoidal aperture having control cam faces engageable with said movable members to move same in response to movement of said plate.

10. A mitre-box as set forth in claim 1, wherein said base plate includes means defining a longitudinal groove in its underface; and a detachable rule disposed in said groove for clamping and holding said mitre-box against a support surface.

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