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(54) **Milling template assembly.**

(57) Milling template assembly for use in milling recesses, openings etc. for mortise locks and lock plates in a door and/or door-frame, comprising a milling template defining at least one milling aperture corresponding to said recess, opening, etc., and means (2, 3; 12, 13, 14) for attaching the template means to a door or door-frame. The attaching means comprise adjustable gauge means (2; 14) provided with gauge indication and means for adjustably mounting the gauge means on the template, wherein the gauge means are provided with abutment surfaces for abutting against the abutting, closure edge of the door or door-frame in order to enable accurate positioning of the milling aperture with respect to that abutting closure edge. The milling template comprises a master milling template (1, 11) and an insert cassette (4;15.1, 15.2), wherein the milling template is provided with the attaching means and with an opening adapted to positively receive and accommodate the insert cassette, the latter being provided with and defining the milling aperture. The insert cassette (4) may be U-shaped and comprises an end plate (3) and side plates (4, 5) with work passages for router and mandrel hole augering and tapping tools for carving the openings required in the door. Alternatively, the insert cassette (15.1) may be shaped as a plate which is provided with an aperture corresponding to the contours of a locking plate. Moreover, the insert cassette (15.2) may be shaped as a plate that is provided with apertures for day and night bolts.

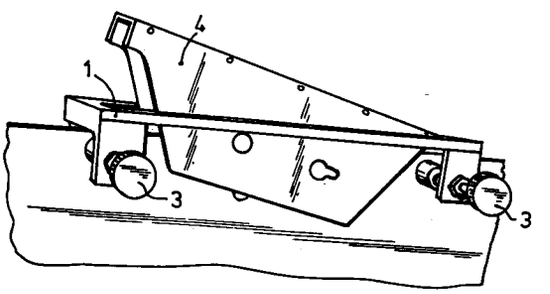

FIG. 3A

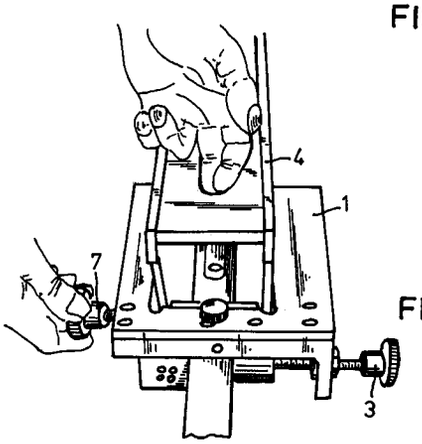

FIG. 3B

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This invention relates to a milling, cutting or routing template assembly, which is designed to be used for creating recesses, openings etc. for lock plates and locks in a door and a corresponding door-frame. Such a template assembly comprises a template means provided with an aperture corresponding to the recess, opening etc. to be milled for accommodation of e.g. a lock-plate in a door-frame, the bolt plate of a mortise lock in a door.

High demands are to be made with respect to the accuracy of the positioning of locks and lock-plates in door assemblies.

From experimental and practical data it appeared that with the presently existing equipment it is quite difficult and cumbersome to achieve correct adjustment since they are developed for a plurality of lock and locking-plate types. Because of the system, and the great diversity of door-locks and locking-plates, many misunderstandings will occur and unnecessary errors can be made. Due to all these rather complicated adjustments the costly time factor and thus higher wage-rates are at stake.

In view of the great diversity of various door locks and locking-plates the inventive idea arose and was realized according to the present invention to effect these unavoidable operations in a more simple but nevertheless more efficient manner.

According to the invention there is provided a milling template assembly for use in milling recesses, openings etc. for locks in a door and/or lock plates in a door-frame, said milling template assembly comprising: a milling template means defining at least one milling aperture corresponding to said recess, opening, etc.; and means for attaching said template means to said door or door-frame, said attaching means comprising adjustable gauge means provided with gauge indication and means for adjustably mounting said gauge means on said template means, wherein said gauge means are provided with abutment surfaces for abutting against the abutting, closure edge of said door or door-frame in order to enable accurate positioning of said at least one milling aperture with respect to said abutting closure edge, wherein the milling templates means comprises a master milling template and an insert cassette, said milling template being provided with said attaching means and with an opening adapted to positively receive and accommodate said insert cassette, said insert cassette being provided with and defining said milling aperture.

The provision of a master milling template and a separate insert cassette defining the milling aperture is advantageous since now there has to be made use of only one milling template of the invention for several different lock sizes, while for the required milling aperture only the appropriate insert cassette has to be inserted after the master template has been set accurately. Thus, there will be no need for a range of expensive milling template assemblies to be at hand, but only for a series of appropriate insert cassettes.

The operations are as follows:

The thickness of the door is measured and the gauge cubes are adjusted on the measured thickness and the cubes are aligned. The master template is clamped at the desired height on the door. The insert cassette, in which all the necessary hole patterns are provided which are required to rout that particular type of lock, is inserted in the master template. The types of cassettes are accordingly adapted to various types of locks. However, when there are locks which correspond as to their size rating then, with the same cassettes, a number of locks may be cut-in.

The master template for the door locks is constructed with the purpose of simplifying the adjustments which are often so complicated. On said master template two clamping blocks are provided as well as two gauge cubes so that the door (which may have a thickness of 40 mm) is always positioned accurately, e.g. centrally of the pattern to be cut. In case the doors have a different thickness, varying from 36 up to 56 mm, then by simply positioning the size cube on the figure corresponding with the thickness of the door, the pattern to be cut therein can always be located right in the middle of the door-edge, accurately positioned with respect to the door-edge facing the door-frame.

The above principle is also applicable on the creation of recesses for corresponding lock plates in associated door-frames. Here a cassette corresponding to the type of lock plate is arranged on a master milling template adapted to be positioned on the door-frame. The operation is as follows. The distance between the just installed door-lock bolt and the adjoining, abutting side of the door, i.e. the door-edge facing the door-frame is measured. This distance, e.g. 22 mm, is the measure on which the gauge cubes mounted on the master milling template are adjusted.

Then the gauge cubes are aligned and fixedly secured. The gauge cubes used for correct positioning of the master milling template are thus always related to the measured above-mentioned distance on the door. Then the door is hung up in the door-frame to indicate the level of the door-bolt. Subsequently, the master template with correct cassette is clamped on the door-frame while the gauge cubes are abutted against the adjoining counter edge at the door-frame. Finally, with the milling aperture accurately in the proper position, the recess for the locking plate in the door-frame can be milled. It is remarked that the insert cas-

settes may be designed for use for both left and right turning doors. With the correct insert cassette no unnecessary errors will occur.

The milling template assembly of the invention, based on the principle of the use of abutment gauges, enables the position of the milling aperture to be set while departing from e.g. the edge of the door side plane facing the door (entrance) opening (i.e. the edge which will abut against the counter-edge always provided in the door-frame) as a reference. After the milling aperture has been set with respect to said door-edge the setting of the gauge means can be read from the gauge indication. After the recess has been cut in the door by a milling machine the milling template means is disconnected from the door and subsequently the same milling template means or another, especially adapted milling template means is accurately positioned on the door-frame while again using the above-mentioned door-edge as a reference and setting the gauge means with respect thereto using the setting read from the gauge means on the door. Thus, both the setting of the milling aperture on the door and on the door-frame is carried out departing from a same, positive reference, in this example the abutting edge of the door. It will be clear that, depending on which one is handled first, the abutting counter edge in the door-frame could also be used as the reference.

According to a further development of the invention the insert-cassette is U-shaped comprising an end plate and side plates with work passages for router and mandrel hole augering and tapping tools for carving the openings required in the door or in the door-frame, as a rule a rectangular slot in the door to receive the lock case and one or more mandrel holes in the side faces of the door for the cylinder lock(s) and the door knob and furthermore fixation screw holes to be located.

This invention is described in more detail in the following specification in view of examples of embodiments thereof to which, however, no restrictive meaning should be attached as within the scope of the invention, as a matter of course, variations and modified embodiments thereof are possible.

Figures 1A-C, 2A-B, 3A-B, and 4A-C show a preferred embodiment of the milling template assembly of the invention designed for the use in milling recesses in a door for a mortise lock.

Figures 5A-C, 6A-B, 7A-C, and 8A-C show a preferred embodiment of the milling template assembly of the invention designed for the use in milling recesses in a door frame for a lock plate.

Figures 1A-C:

For a correct use of the milling template assembly a miller of 12 mm combined with a guiding ring of 17 mm is required.

1. The master milling template.
2. Two gauge cubes for enabling adjustment for variable door thickness.
3. Clamping knob with hollow bolt and nylon clamping sleeve or bush.
4. U-shaped insert cassette provided with apertures for door knob and lock cylinder in one of its side plates and with an aperture for a lock in its end plate.
5. Filling plates of 5 and 10 mm.
6. Gauge rod for correct height positioning.
7. Clamping knob for insert cassette.
8. Clamping knob for gauge rod.

Figures 2A and 2B:

The setting of the master milling template.

1. Measure the thickness of the door.
2. Mount the two gauge cubes 2 in the correct position or orientation onto the master template. The said gauge can be read at the outer end of the stripe extending towards the clamping knob 3. In the depicted arrangement is set at a door thickness of 38 mm.
3. The master template has a standard setting for a milling arbor size of 60 mm. By means of filling plates reduced milling arbor sizes of 55 (5 mm plates), 50 (10 mm plates) or 45 mm (5 mm + 10 mm plates) can be set.

The gauge cubes are provided with holes enabling a setting within the range 36-56 mm. As for doors having a thickness exceeding 56 mm, the gauge cubes may be mounted at a location spaced 10 mm therefrom. Then the range has become 46-66 mm. The necessitates the removal of the socket screws from the outer holes. In this way, 10 mm has to be added to the figures indicated on the cubes.

Figures 3A and 3B:

The mounting of the U-shaped insert cassette.

4. Take the set master milling template 1 and position it at the correct height onto the door. For a correct height positioning the gauge rod (6) of figure 1B can be used. This is advantageous in case this operation has to be performed repeatedly.
5. Fix the master milling template 1 by means of clamping knobs 3 .
6. Take the required U-shaped insert cassette 4.
7. Lower the U-shaped insert cassette into the opening in the master milling template 1. The side plates of this cassette become located at both sides of the door.

8. Fix the U-shaped insert cassette onto the master milling template by tightening clamping knobs 7. Be sure that the U-shaped insert cassette 4 lies flush with the master milling template.

Figures 4A, 4B, and 4C:

The milling operation.

9. Take the upper miller provided with a miller of 12 mm and a guiding ring of 17 mm.
10. Subsequently mill the contours of the door lock and the mandrel holes. To achieve an optimal result the mandrel holes are to be milled from both sides, thus preventing damage to wood, paint coating or the like.

Figures 5A, 5B, 5C,

in which the following parts of a milling template assembly for door frames are shown:
master milling template 11; clampling block 12; clamping knob 13 with threaded end, hollow bolt and nylon sleeve; abutment blocks 14 enabling a setting at different gauges, to be mounted by means of socket screws (The indication of the required gauge should always extend in the direction towards the clamping block 12); insert cassette 15.1 for locking plate contours; insert cassette 15.2 for dag and night bolt; two adjustment with lock nuts for support; locking knob 17 for gauge rod 18 for height positioning; and marks 9 on cassettes 15.1 and 15.2 and on master template 11 (these marks should always face each other).

Figures 6A and 6B:

The setting of the master milling template assembly.

1. Measure the distance between the locking side of the door and the locking side of the day bolt of the lock. In this case the distance is 26 mm.
2. Set the abutment blocks 14 at this distance. Be sure that the lines of the required gauge extend in the direction towars the clamping block 12.
3. Press the correct insert cassette 15.1 into the master template 11. The insert cassette is kept inside the opening of the master template by means of balls.
Be sure that the marks 19 on the master milling template 11 and the cassette 15.1 always face each other.

Figures 7A, 7B, 7C:

The milling of the locking plate contours.

4. Determine the height of the locking plate. If this operation has to be performed repeatedly, it is recommended to use the gauge rod 18 for height positioning of the assembly.
5. Position the master template together with the insert cassette against the door frame and fix it at the correct height by turning knob 13. The two set bolts 16 may provide for a support of the template in relation to the door frame (fig. 7B).
6. Take the upper miller with miller 12 mm and guiding ring 17 mm and mill the contours of the locking plate.
7. Remove the insert cassette 15.1 from the master milling template 11.

Figures 8A, 8B, and 8C:

The milling of dag and night bolt holes.

8. Insert the second cassette 15.2 into the master milling template 11. Be sure again that the marks 19 face each other.
9. Mill the holes 20 and 21 for the dag and night bolts.
10. Remove the template assembly and attach the locking plate 22 to the door frame.

Claims

1. Milling template assembly for use in milling recesses, openings etc. for mortise locks and lock plates in a door and/or door-frame, said milling template assembly comprising:
a milling template means defining at least one milling aperture corresponding to said recess, opening, etc.; and means for attaching said template means to said door or door-frame, said attaching means comprising adjustable gauge means provided with gauge indication and means for adjustably mounting said gauge means on said template means, wherein said gauge means are provided with abutment surfaces for abutting against the abutting, closure edge of said door or door-frame in order to enable accurate positioning of said at least one milling aperture with respect to said abutting closure edge, wherein said milling template means comprises a master milling template and an insert cassette, said milling template being provided with said attaching means and with an opening adapted to positively receive and accommodate said insert cassette, said insert cassette being provided with and defining said milling aperture.

2. Milling template assembly as claimed in claim 1, wherein said insert cassette is U-shaped comprising an end plate (3) and side plates (4, 5) with work passages for router and mandrel hole augering and tapping tools for carving the openings required in the door or in the door-frame, as a rule a rectangular slot in the door-edge to receive the lock case and one or more mandrel holes in the side faces of the door for the key cylinder(s) and the door knob and furthermore fixation screw holes to be located.

3. Milling template assembly as claimed in claim 1, wherein said insert cassette is shaped as a plate which is provided with an aperture corresponding to the contours of a locking plate.

4. Milling template assembly as claimed in claim 1, wherein said insert cassette is shaped as a plate which is provided with apertures for day and night bolts.

5. Milling template as claimed in any of the preceding claims, wherein said adjustable gauge means are formed as gauge plates, blocks or cubes.

6. Milling template assembly as claimed in claim 5, wherein said gauge blocks comprise several mounting holes for enabling mounting on said master milling template, said holes being arranged on various distances from the abutment surfaces of said gauge blocks thus enabling adjustment of the position of said opening in said master milling template and consequently the position of said milling aperture in said insert cassette with respect to the abutting closure edge of said door or door-frame.

7. Milling template assembly as claimed in claim 6, wherein said gauge means are provided with indication means corresponding to the door thickness.

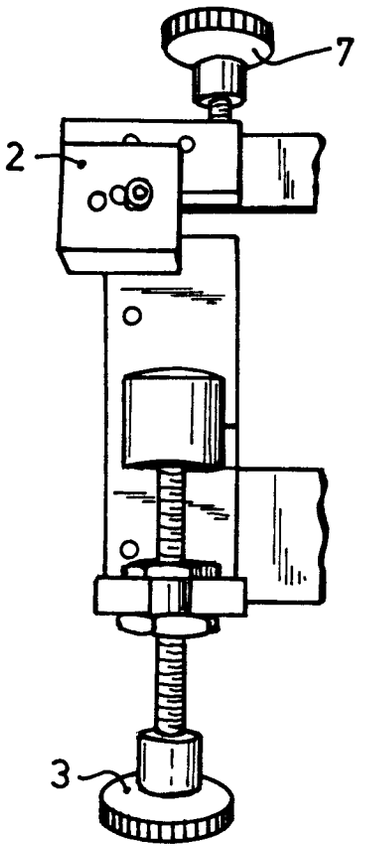

FIG. 1A

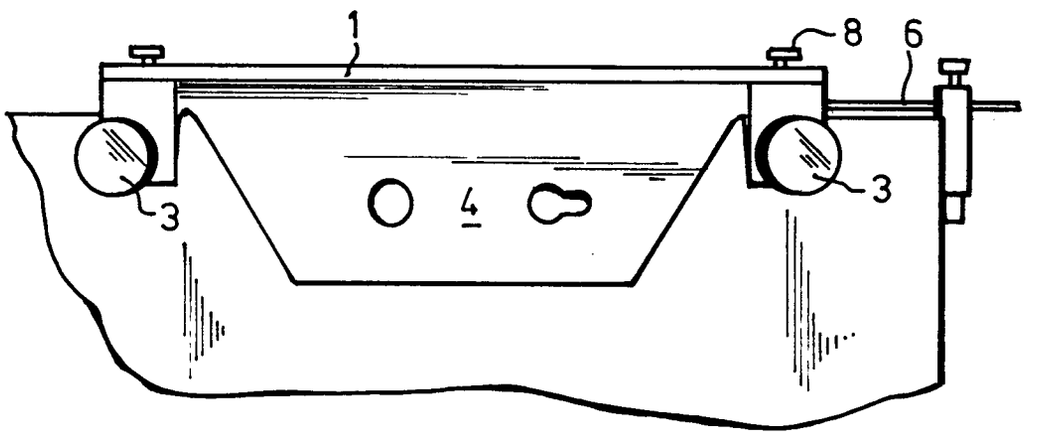

FIG. 1B

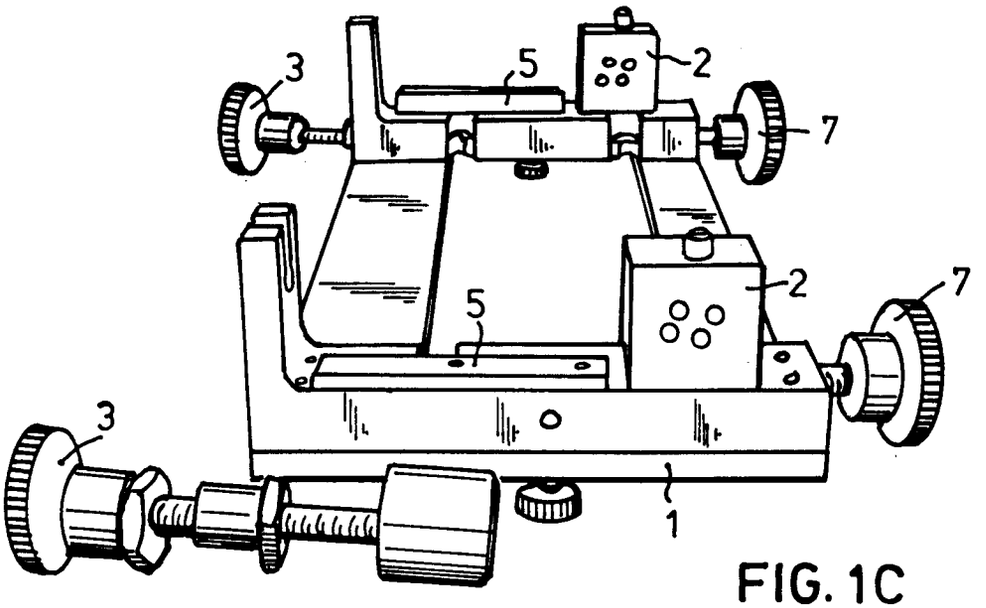

FIG. 1C

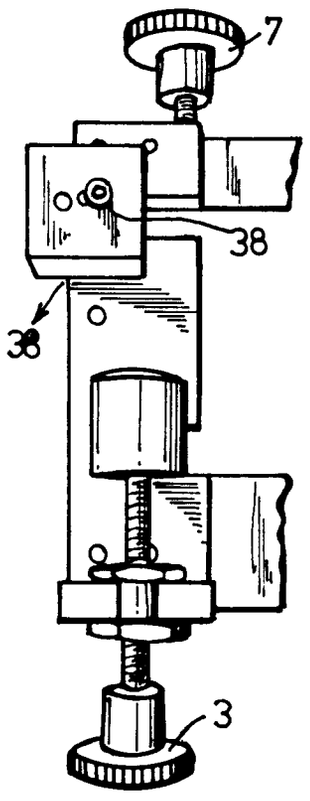

FIG. 2A

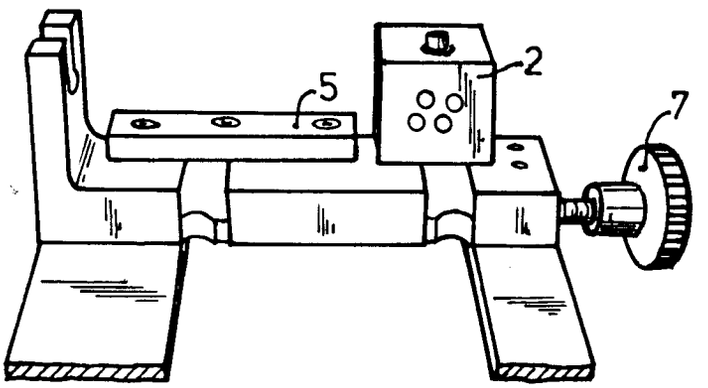

FIG.2B

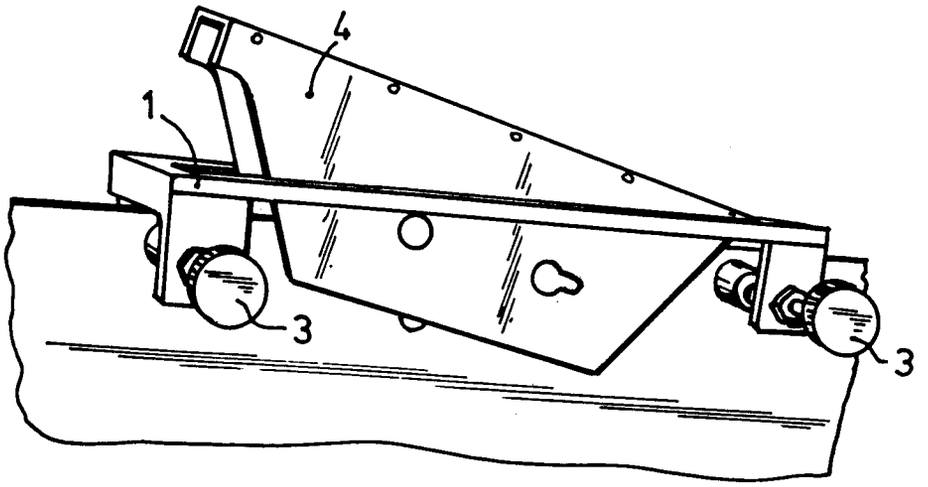

FIG. 3A

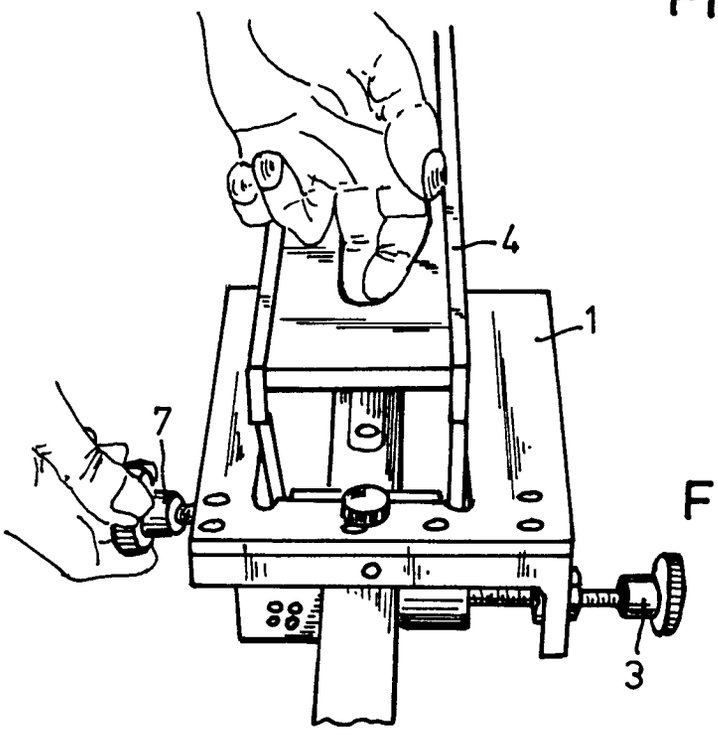

FIG. 3B

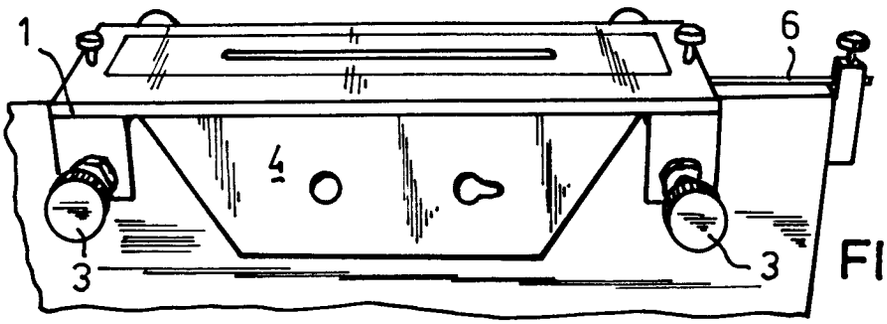

FIG. 4A

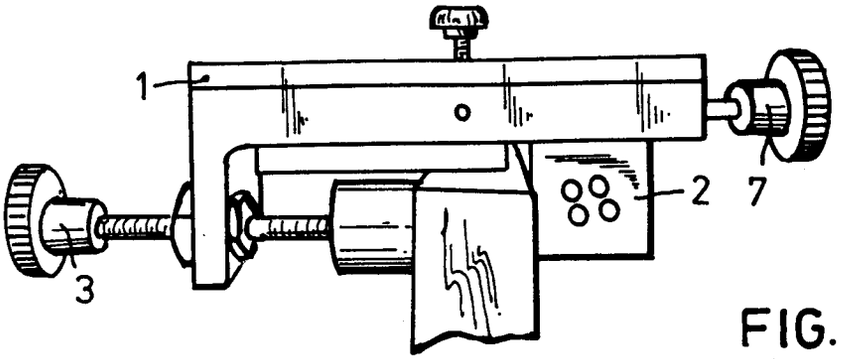

FIG. 4B

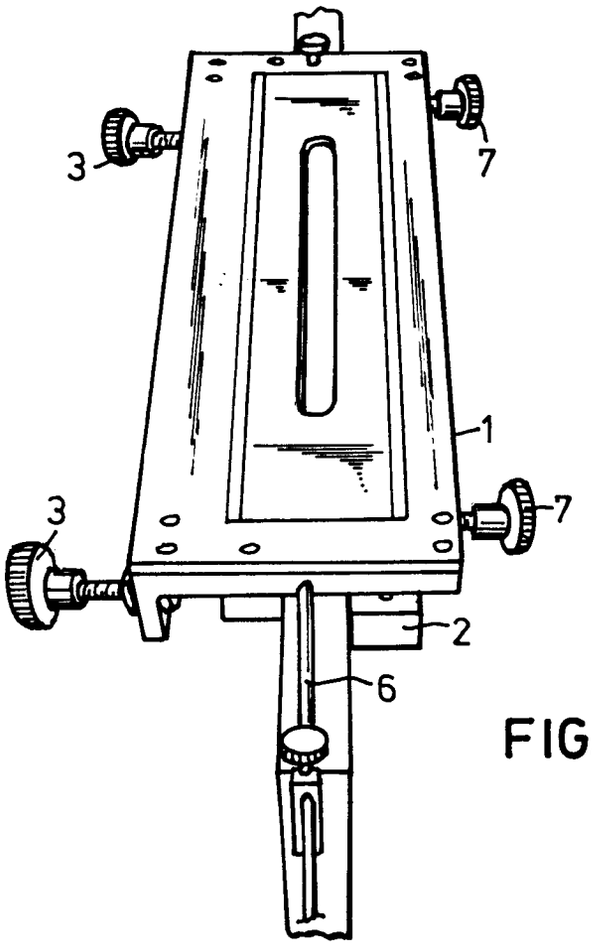

FIG. 4C

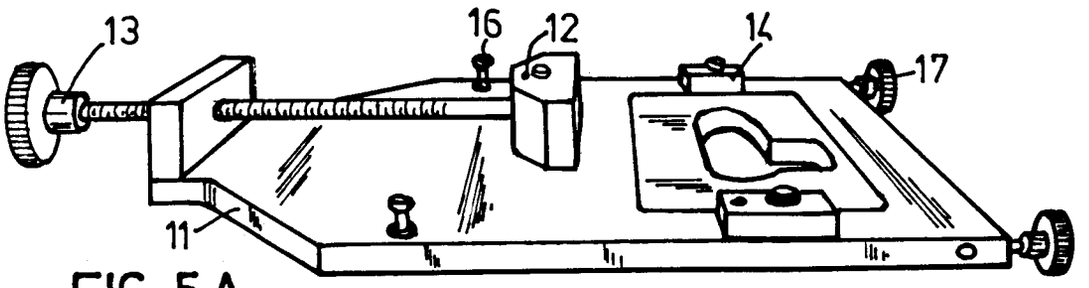

FIG. 5A

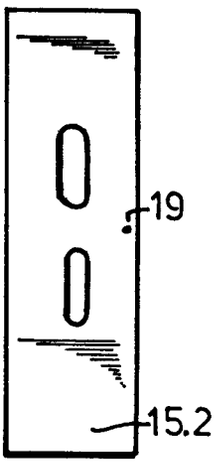

FIG. 5B

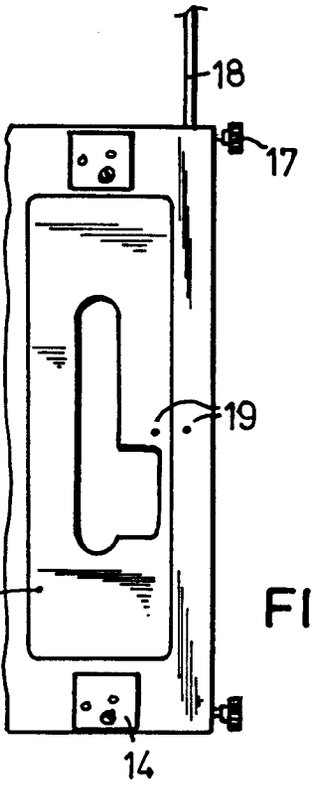

FIG. 5C

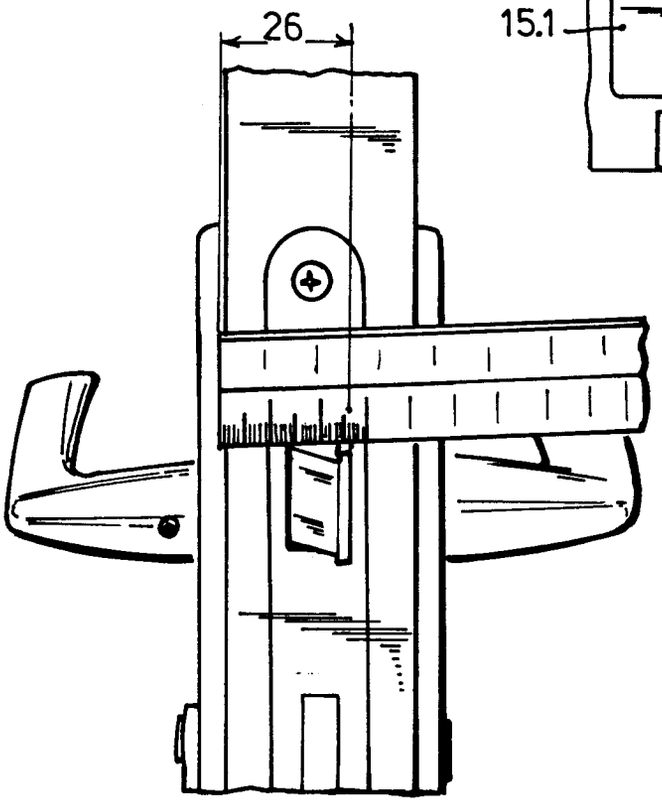

FIG. 6A

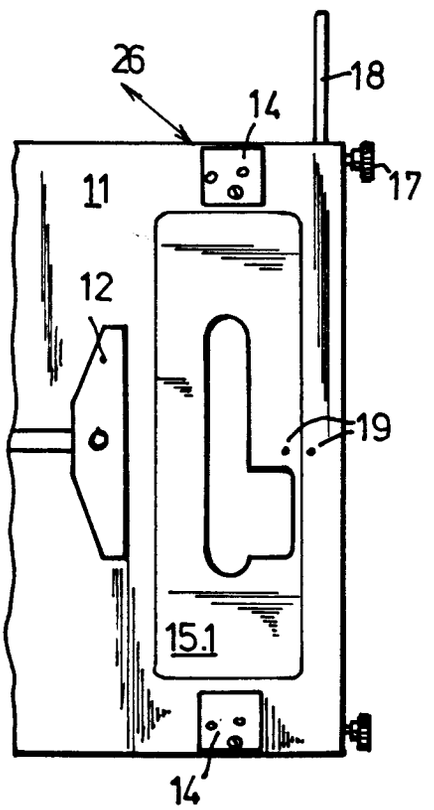

FIG. 6B

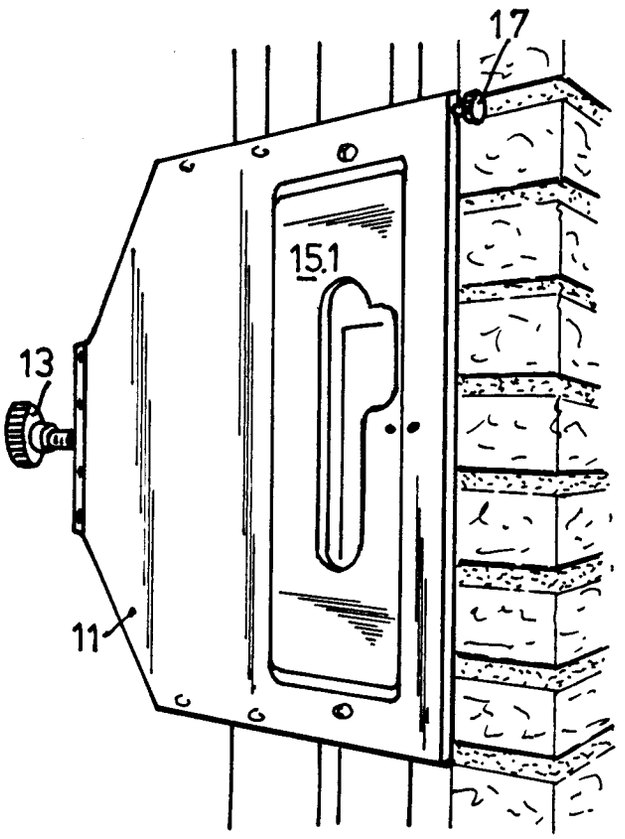

FIG. 7A

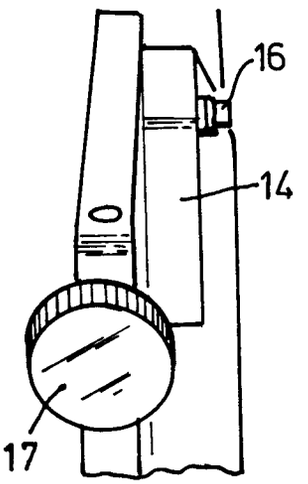

FIG. 7B

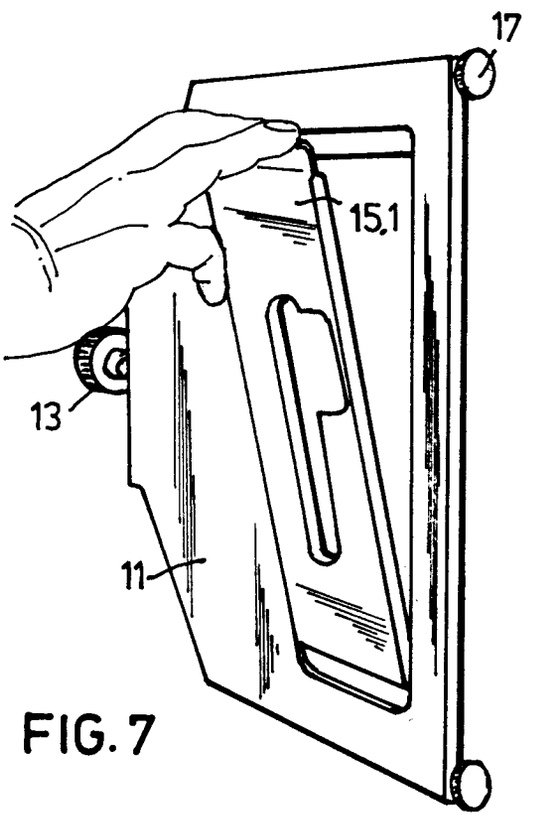

FIG. 7

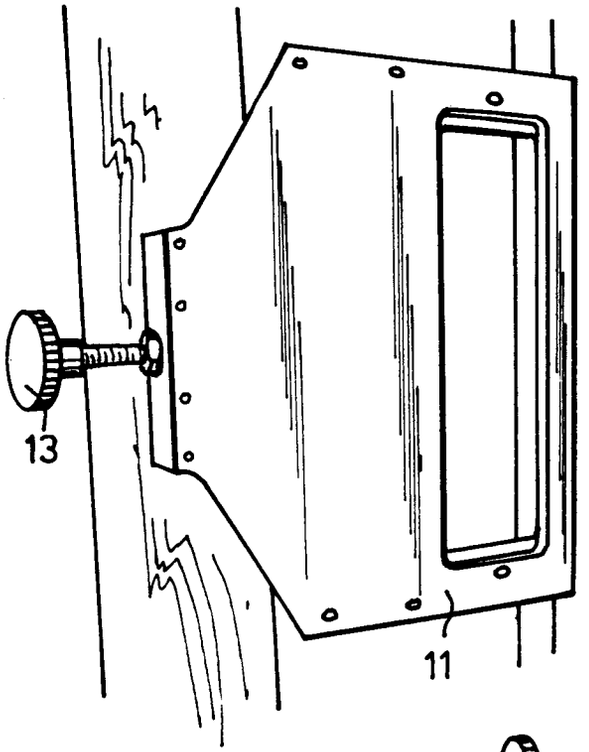

FIG. 8A

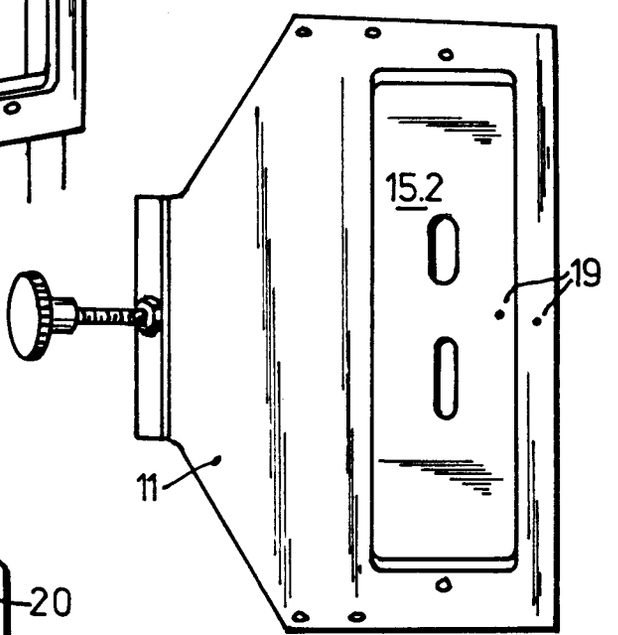

FIG. 8B

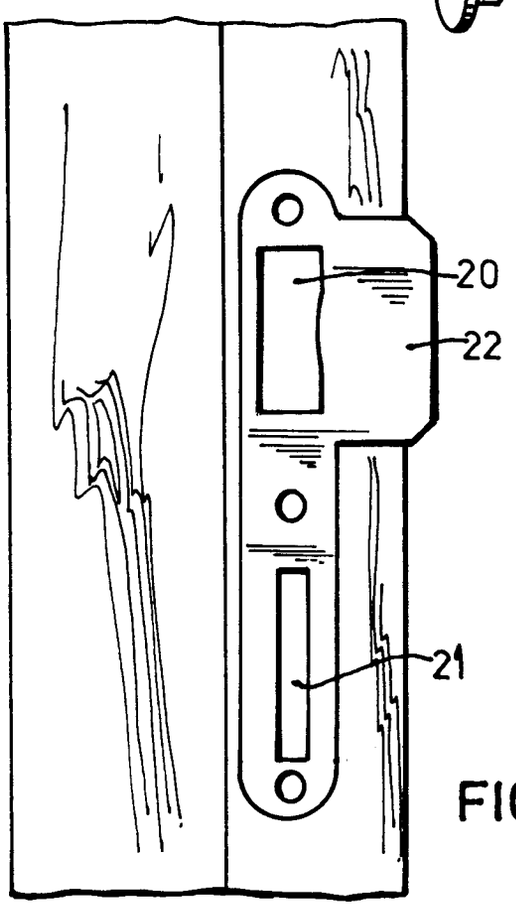

FIG. 8C

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 20 0335

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-4 815 215 (SAYLOR) * column 1, line 8 - line 25 * * column 1, line 48 - line 61 * * column 1, line 66 - column 2, line 7 * * column 2, line 52 - line 63 * * column 3, line 13 - line 45 * * column 4, line 57 - column 5, line 10; figures 1-10 *	1,3,5	B27F5/12 E05B17/06
Y	---	2,4	
Y	GB-A-2 229 391 (GOLDSEAM) * the whole document * ---	2	
Y	LOCKSMITH LEDGER vol. 45, no. 8, July 1985, DES PLAINES, IL, USA pages 70 - 75; KEEFE: 'THE VERSATILITY OF THE #800 INSTALL ALL' * figure 6 * ---	4	
A	DE-B-1 037 111 (SCHEER) * column 3, line 35 - line 44; figures 1,4 * ---	5-7	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	US-A-4 813 826 (RIEDEL) ---		B27F E05B B23B
A	DE-B-1 295 174 (LUTZ) -----		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07 MAY 1992	HUGGINS J.D.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)