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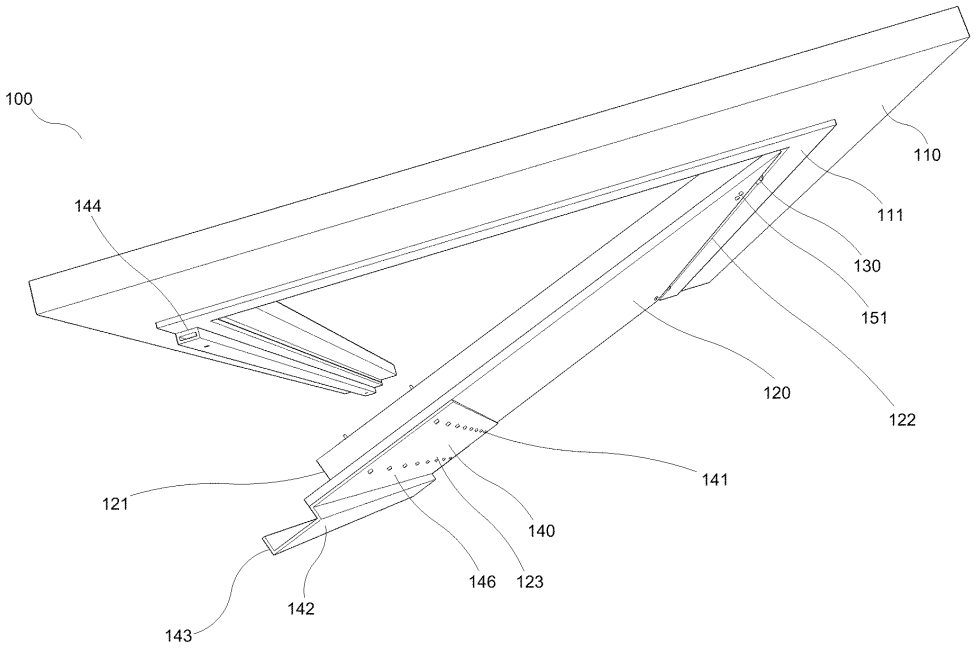
(54) BREAK-IN PROTECTION

(57) Break-in protection for a door (100) comprising a frame (110) and an outwardly opening door leaf (120), which door leaf comprises a first edge (122) provided with hinges (130) and an opposite second edge (121), which frame comprises a first frame part (113) and a second frame part (112), which break-in protection comprises a first elongated metal profile (140), which is disposed to be firmly mounted on the door leaf so that it projects a bit beyond said second edge in the principal plane of the door and covers both a door gap (103) and a portion of the second frame part.

The invention is characterized in that the profile shape of the first metal profile contains a first planar profile part (146), which is disposed to bear against the door leaf, and a second bent profile part (142), which is disposed to run around a projecting part (111,144) of the second frame part so that at least one lengthwise portion of said projecting part is concealed by said second profile part.

Fig. 1b



EP 2 990 580 A1

Description

[0001] The present invention pertains to a break-in protection for a door, as well as an existing door retrofitted with such a break-in protection. Moreover, the invention pertains to a method of providing an existing door with such a break-in protection.

[0002] When breaking into locked rooms, it is customary to break open the door with the help of a crowbar or the like. This means that the door leaf itself is broken loose from the door frame, and/or the lock itself is tampered with so that the door leaf can be opened.

[0003] Many different approaches have been proposed to lessen the possibilities of unauthorized persons accomplishing such a break-in. For example, the door leaf itself can be made of a high-strength material, such as a strong steel alloy. Furthermore, various types of break-in protection can be used, which are suitable to prevent the use of a crowbar to gain access by breaking open the door leaf. Thus, for example, it is known how to mount a metal strip which covers the area of the door gap where the lock and striker plate interact, and to mount various other types of strips along the frame in order to impede access with a crowbar. Moreover, it is known how to arrange pins which run from the frame into the door leaf, in the plane of the door leaf when the door is closed.

[0004] However, such designs have been found to be susceptible to force. For example, two persons each equipped with a crowbar can arrange for one person to pry up a protection strip so the other person can gain access to the door leaf itself while the strip is held in the pried up position.

[0005] The present invention solves this problem by providing a break-in protection which is much harder to force open.

[0006] Thus, the invention pertains to a break-in protection for a door comprising an inner side, an outer side, a frame, and a door leaf mounted in the frame and opening outward, which door is associated with a principal plane, said door leaf comprising a first edge provided with hinges and a second edge opposite the first edge, which frame comprises a first frame part, which in a closed position of the door leaf runs along the first edge of the door leaf, and a second frame part which in the closed position of the door leaf runs along the second edge of the door leaf, which break-in protection comprises a first elongated metal profile disposed to be mounted firmly to the door leaf so that in the mounted state it extends partly outside of said second edge in the principal plane of the door and in the closed state of the door leaf it covers both a door gap and a portion of the second frame part along the entire length of the second edge, and is characterized in that the profile shape of the first metal profile comprises a first planar profile part, which is disposed so that in the mounted state it is essentially parallel with and bears against the door leaf in its principal plane, as well as a second bent profile part, which is disposed so that in the mounted state and in the closed position of the door leaf it runs around a projecting part of the second frame part, whose surface in the closed position of the door leaf is facing away from the door leaf and whose second edge is hidden by said second profile part.

[0007] The invention shall now be described in detail, making reference to sample embodiments of the invention and the enclosed drawings, where:

[0008] Figures 1a, 2a, 3a, 4a and 5 show a door 100 with a break-in protection according to the present invention in a first, closed position of the door 100. Figures 3a and 4a show the door 100 revealing a cross section, where the upper part of the door 100 has been removed.

[0009] Figures 1b, 2b, 3b and 4b are corresponding views in a second, open position of the door 100.

[0010] All figures show the same door 100, and the same parts are given the same reference numbers.

[0011] Thus, the figures show a door construction 100, hereinafter called "door", comprising a frame 110 and a door leaf 120. The frame 110 can contain an add-on strip 111. The door 100 has an inner side 101 and an outer side 102 (see Fig. 1a), and moreover it is associated with a principal plane, which coincides with the principal plane of the door leaf 120 in the closed position of the door leaf 120 shown in Fig. 1a. The door 100 furthermore has hinges 130, by means of which the door leaf 120 is pivotably secured to the frame 110 in conventional manner. The door leaf 120 comprises a first edge 122 provided with the hinges 130 (see Fig. 1b), and a second edge 121 opposite the first edge 122. Preferably, the edges 121, 122 are disposed parallel and essentially vertical, and the door leaf 120 is rectangular. The frame 110 comprises a first frame part 113 (see Fig. 1a), which in the mentioned closed position of the door leaf 120 runs parallel along the first edge 122 of the door leaf 120, and a second frame part 112, which in corresponding manner runs along the second edge 121 of the door leaf 120 in the closed position of the door leaf 120.

[0012] As can be seen, the door 100 illustrated in the figures is simplified for sake of clarity. Thus, it has no lock or handle, even though a door according to the present invention can of course advantageously contain both a lock and a handle. Moreover, the connection of the frame 110 to the wall is not shown. In Fig. 1a the reference number 123 illustrates one possible placement of a handle, which is preferably mounted in the manner described below.

[0013] The break-in protection comprises a first elongated metal profile 140, which is disposed to be firmly mounted on the door leaf 120 so that in the mounted state as illustrated in the figures it projects a bit outside of said second edge 121 in the principal plane of the door 100, and so that in said closed position of the door leaf 120 it covers the door gap 103 (see Fig. 4a) between the door leaf 120 and the frame 110 at the second edge 121. Furthermore, in this position the metal profile 140 covers a portion of the second frame part 112 along the entire,

or at least substantially the entire length of the second edge 121.

[0014] According to the invention, the profile shape of the first metal profile 140 comprises a first planar profile part 146, which is disposed so that in said mounted state it is essentially parallel with, and bears against, the door leaf 120 in its principal plane. Moreover, the profile shape of the first metal profile comprises a second bent profile part 142, adjoining the first planar profile part 146, which is disposed so that in the mounted state and in the closed position of the door leaf 120 it runs around a projecting part of the second frame part 112, so that at least a lengthwise portion of said projecting part, whose surface in the closed position of the door leaf 120 is facing away from the door leaf 120 and its second edge 121 is hidden by said second profile part 142. Preferably, said first 146 and second 142 profile parts of the first metal profile 140 constitute the same piece of material, and the first metal profile 140 is configured as a single continuous and homogeneous metal profile.

[0015] By the part being "projecting" is meant here that it sticks out in a direction which is perpendicular to the principal plane of the door 100 in the closed position of the door leaf 120, preferably away from the door leaf 120. In the figures, such a projecting part is exemplified by both the strip 111 and by a second metal profile 144 (see below), which in the figures is mounted on the strip 111 but which can also be mounted directly on a portion of the frame 110 which is disposed so that its surface lies flush with the surface of the door leaf 120.

[0016] According to a preferred embodiment, the second bent profile part 142 in the mounted state and in the closed position of the door leaf 120 is disposed so as to entirely conceal said projecting part. This is preferably achieved with the help of a terminating flange piece 143 at the bent profile part 142, which terminating flange piece runs essentially perpendicular to the principal plane of the door leaf 120, to this principal plane, so that the bent profile part 142 thereby entirely conceals the projecting part. For example, the flange 143 can run so far that its terminal edge ends up essentially flush with the connection of the strip 111 to the rest of the frame 110, which is illustrated in the figures, or flush with the connection of the second metal profile 144 to its base. The bent part 142 of the first metal profile 150 thus runs in its mounted state from the plane profile part 146, preferably first away from the door leaf 120, essentially perpendicular to the principal plane of the door leaf 120 away from the inner side of the door 100, then further away from the door leaf 120 but essentially parallel to the principal plane of the door leaf 120, and then back toward the door leaf 120, toward the inner side of the door 100, in the form of the flange 143, essentially perpendicular to the principal plane of the door leaf 120.

[0017] According to a preferred embodiment, the second bent profile part 142 in the mounted state and in the closed position of the door leaf 120 is disposed to run around and past the projecting part, in a direction perpendicular to the principal plane of the door 100. This is illustrated in the figures in that the flange 143 in the closed position of the door leaf 120 runs past the second metal profile 144 in a direction perpendicular to and in a direction toward the principal plane of the door leaf 120.

[0018] It is furthermore preferably for the terminal edge of the flange 143 in the closed position of the door leaf 120 to be disposed to bear or substantially bear against the surface of the frame 110 or the wall, preferably along the entire or substantially the entire length of the flange 143.

[0019] According to a preferred embodiment, such a break-in protection furthermore comprises a second elongated metal profile 144, disposed to be mounted on the second frame part 112 so that it projects a bit from the second frame part 112 in a direction perpendicular to the principal plane of the door 100, such that the second metal profile 144 constitutes the aforesaid projecting part, or a portion of this projecting part. In this case, preferably the edge of the terminal flange 143 is disposed at least flush with, or entirely beyond the second metal profile 144 in a direction perpendicular to the principal plane of the door 100 in the direction of the inner side of the door 100.

[0020] A preferred configuration of the second metal profile 144 is one as illustrated in the figures, namely, a rectangular, hollow profile shape.

[0021] Preferably the play perpendicular to the principal plane of the door 100 between the second metal profile 144 and the first metal profile 140 in the mounted state and in the closed position of the door leaf 120 is at most 10 mm, even better at most 5 mm. The same holds for the play parallel to the principal plane of the door 100 between the flange 143 and the second metal profile 144 in the mounted state and in the closed position of the door leaf 120.

[0022] A break-in protection containing such a first metal profile 140 will be very hard to force open with a crowbar, since there are no effective purchase points for such a crowbar. In particular, the flange 143 is not an effective breaking point, since it does not expose the door gap even when pried up. This means that it is difficult to force the door 100 open even for two persons working together, each with their own crowbar. Along with the second metal profile 144, the strength is further increased, since the second metal profile 144 can be anchored in the door frame 110 in a very firm manner, and is thus in itself hard to force, which means that the purchase available to a crowbar is further strengthened.

[0023] Moreover, preferably the break-in protection furthermore contains at least two metal sheets 150, disposed to be firmly mounted on the inner side of the door leaf 120 and to stick out a bit in the mounted state and in the closed position of the door leaf 120, away from the door leaf 120, across the first frame part 113 in a plane which is parallel to the principal plane of the door 100. This is best illustrated in Fig. 2a, 2b, 4a, 4b and 5. In the preferred configuration illustrated, the metal sheets 150

have a stepped shape, comprising a planar first part, disposed to bear against the door leaf 120 in the mounted state, and a second part 152, which is parallel shifted in a direction away from the outer side of the door 100 as compared to the first part, and which runs for a bit over the first frame part 113 in the closed position of the door leaf 120. Preferably, in the closed position of the door leaf 120, the second part 152 lies against the frame 110, or has only slight play such as 5 mm at most relative to it.

[0024] Preferably at least one of said metal sheets 150, preferably at least two of the metal sheets 150, is disposed or arranged so that in the mounted state and in the closed position of the door leaf 120 they each cover one of said hinges 130.

[0025] It will be noted that, when the door leaf 120 is opened, the metal sheets 150 are turned outward, away from the first frame part 113, since they are mounted on the inner side of the door leaf 120, but that said second part 152 in the closed position of the door leaf 120 is disposed essentially parallel with the second frame part 113. Preferably the metal sheets 150 are configured as respective homogeneous bodies, preferably of high-strength steel.

[0026] In combination with the above described first and second metal profiles 140, 144, the metal sheets 150 constitute a very effective additional protection against break-in, since it is very hard to use a crowbar against the part of the door gap where the hinges 130 are located, since the metal sheets 150 present resistance to such tampering.

[0027] Both in regard to the first metal profile 140, the second metal profile 144 and the metal sheets 150 it is preferable for these parts to each be disposed to be firmly mounted on the door leaf 120, on the second frame part 112 and on the door leaf 120, respectively, by means of a bolt connection 141, 145 and 151 passing through them, which bolt connection comprises nuts arranged on the inner side of the door leaf 120, the second frame part 112 and the door leaf 120, respectively. The bolt connections 141, 145, 151 which are illustrated in the figures are only examples, and of course one can use more or fewer bolt connections, and also place them differently. For example, preferably the second metal profile 144 is disposed to be fastened with more connections 145 than the two which are illustrated, for example, at least one connection every twenty centimeters in the lengthwise direction of the door gap 103. The bolt connections 141, 145, 151 are preferably prepared, prior to installation, by suitable making of holes in the metal profiles 140, 144 or metal sheets 150, such as by drilling.

[0028] The invention also covers a door 100 having a break-in protection according to the invention, which break-in protection is mounted either in connection with the manufacture of the door 100 or is mounted afterwards as described below.

[0029] According to one method according to the invention for providing a break-in protection to an existing door 100, a break-in protection according to the above, comprising a first metal profile 140 and preferably also a second metal profile 144 and preferably also metal sheets 150, is mounted permanently on the existing door 100. Such mounting thus involve making holes, preferably by drilling, through the door leaf 120, and also through the second frame part 112 in order to fasten the second metal profile 144. After this, the various parts 140, 144, 150 are fastened with the help of the above described bolt connections 141, 145, 151.

[0030] According to a preferred embodiment, the first metal profile 140 is disposed so as to cover a door handle in the principal plane of the door leaf 120. In this case, it is preferable for said method to involve adapting the placement of a continuous hole in the first metal profile 140, which hole either exists in the metal profile 140 or is made in the process of the installation, to a position for the handle in question, and for the handle to be mounted such that the first metal profile 140 runs between the handle and the door leaf 120 so that a shaft of the handle running through the principal plane of the door leaf 120 perpendicular to said principal plane also runs through the plane profile part of the first metal profile 140.

[0031] Preferably the first metal profile 140, and if applicable also the second metal profile 144, are configured as cylindrical metal profiles which are fabricated from a preferably homogeneous body of high-strength steel alloy, and are provided with suitable drilled holes for the above-described mounting.

[0032] Preferred embodiments have been described above. However, it is obvious to the skilled person that many changes can be made in the described embodiments without leaving the concept of the invention.

[0033] For example, the detailed configurations of the metal profiles 140, 144, as well as the metal sheets 150, can differ from what is illustrated in the figures, in order to meet various requirements in regard to esthetics and other configuration of the door 100.

[0034] Thus, the invention shall not be limited to the described embodiments, but instead can be varied within the scope of the enclosed claims.

Claims

1. Break-in protection for a door (100) comprising an inner side (101), an outer side (102), a frame (110), and a door leaf (120) mounted in the frame (110) and opening outward, which door (100) is associated with a principal plane, said door leaf (120) comprising a first edge (122) provided with hinges (130) and a second edge (121) opposite the first edge (122), which frame (110) comprises a first frame part (113), which in a closed position of the door leaf (120) runs along the first edge (122) of the door leaf (120), and a second frame part (112) which in the closed position of the door leaf (120) runs along the second edge (121) of the door leaf (120), which break-in protection comprises a first elongated metal profile (140) dis-

posed to be mounted firmly to the door leaf (120) so that in the mounted state it extends partly outside of said second edge (121) in the principal plane of the door (100) and in the closed state of the door leaf (120) it covers both a door gap (103) and a portion of the second frame part (112) along the entire length of the second edge (121), wherein the profile shape of the first metal profile (140) comprises a first planar profile part (146), which is disposed so that in the mounted state it is essentially parallel with and bears against the door leaf (120) in its principal plane, as well as a second bent profile part (142), and wherein the break-in protection furthermore comprises a second elongated metal profile (144), disposed to be mounted on the second frame part (112) so that it projects a bit from the second frame part (112) in a direction perpendicular to the principal plane of the door (100), such that the second metal profile (144) constitutes or forms a portion of a projecting part (111,144) of the second frame part (112), which projecting part (111,144) comprising a longitudinal part whose surface in the closed position of the door leaf (120) is facing away from the door leaf (120) and its second edge (121), **characterized in that** the second bent profile part (142) is disposed so that in the mounted state and in the closed position of the door leaf (120) it runs around the projecting part (111, 144) and essentially conceals entirely the projecting part.

2. Break-in protection according to claim 1, **characterized in that** the second bent profile part (142) in the mounted state and in the closed position of the door leaf (120) is disposed so as to entirely conceal said projecting part (111;144).

3. Break-in protection according to claim 2, **characterized in that** the second bent profile part (142) in the mounted state and in the closed position of the door leaf (120) is disposed to run around and past said projecting part (111; 144), in a direction perpendicular to the principal plane of the door (100).

4. Break-in protection according to any one of the preceding claims, **characterized in that** the first metal profile (140) is disposed to be mounted firmly on the door leaf (120) with the help of a bolt connection (141) passing through it, comprising nuts on the inner side of the door leaf (120).

5. Break-in protection according to any one of the preceding claims, **characterized in that** the second metal profile (144) is disposed to be mounted firmly on the second frame part (112) with the help of a bolt connection (145) passing through it, comprising nuts on the inner side of the frame (110).

6. Break-in protection according to any one of the preceding claims, **characterized in that** break-in protection furthermore contains at least two metal sheets (150), disposed to be firmly mounted on the inner side of the door leaf (120) and to stick out a bit in the mounted state and in the closed position of the door leaf (120), across the first frame part (113) in a plane which is parallel to the principal plane of the door (100).

7. Break-in protection according to claim 6, **characterized in that** at least one of said metal sheets (150), preferably at least two of the metal sheets (150), is disposed or arranged so that in the mounted state and in the closed position of the door leaf (120) they each cover one of said hinges (130).

8. Break-in protection according to claim 6 or 7, **characterized in that** the metal sheets (150) are disposed to be mounted firmly on the door leaf (120) with the help of a bolt connection (151) passing through it, comprising nuts on the inner side of the door leaf (120).

9. Door (100), **characterized in that** the door (100) comprises a break-in protection according to any one of the preceding claims.

10. Method for providing a break-in protection for an existing door (100), **characterized in that** a break-in protection according to any one of claims 1-8 is mounted permanently on the existing door (100).

11. Method according to claim 10, **characterized in that** a handle is mounted so that its through shaft runs through the plane profile part (146) of the first metal profile (140).

Fig. 1a

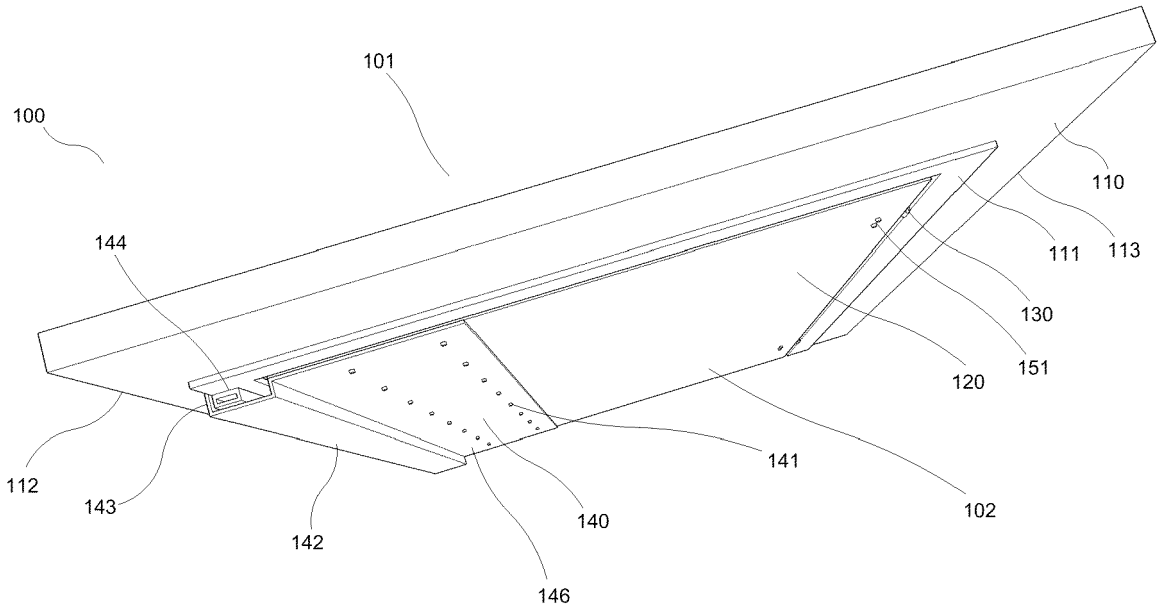

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Fig. 1b

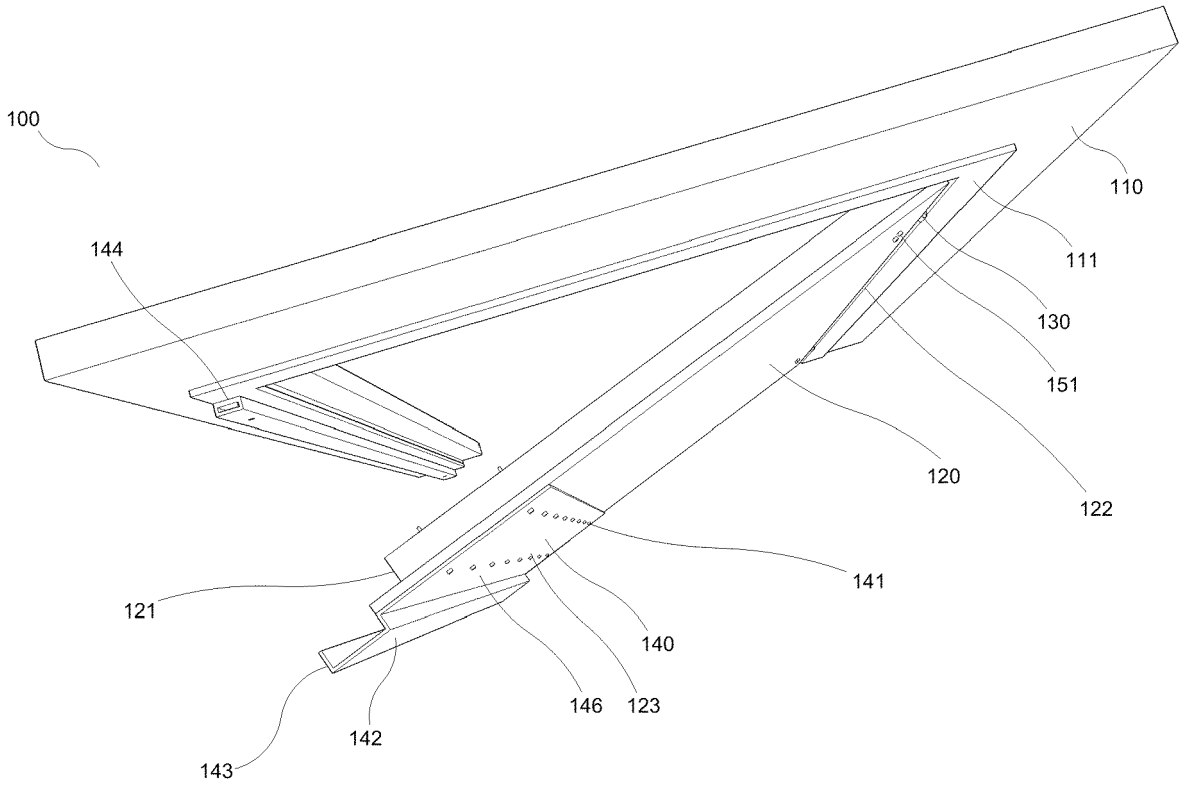
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Fig. 2a

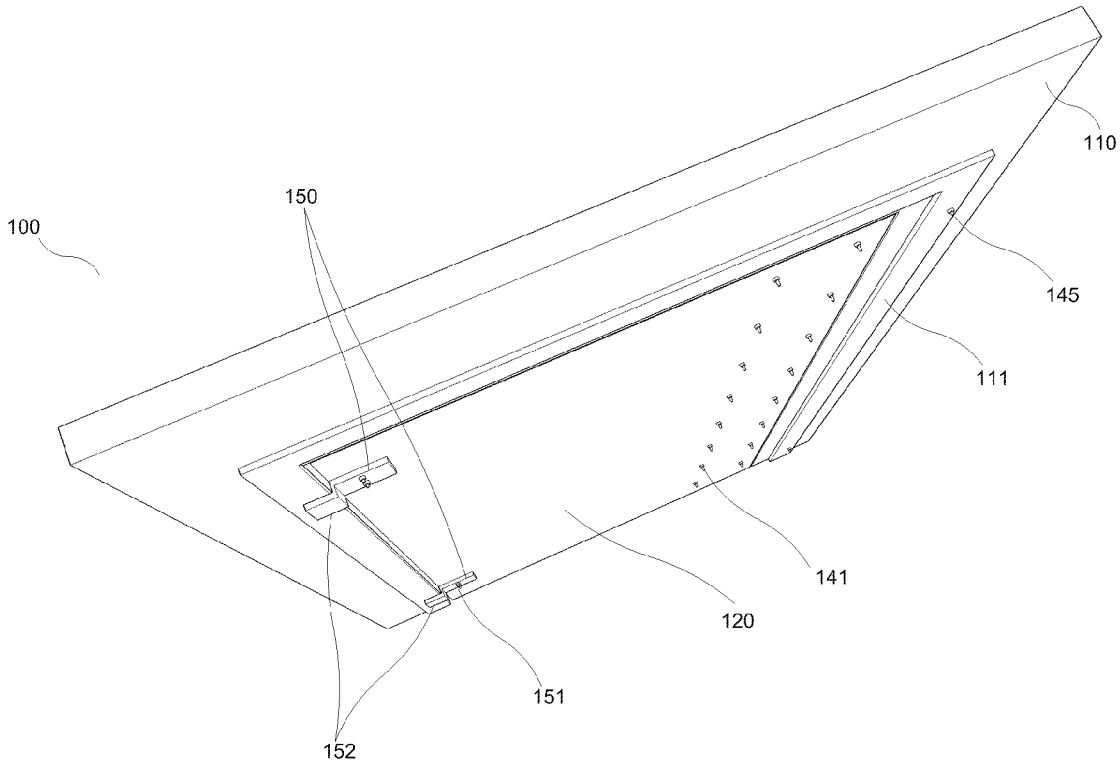
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Fig. 2b

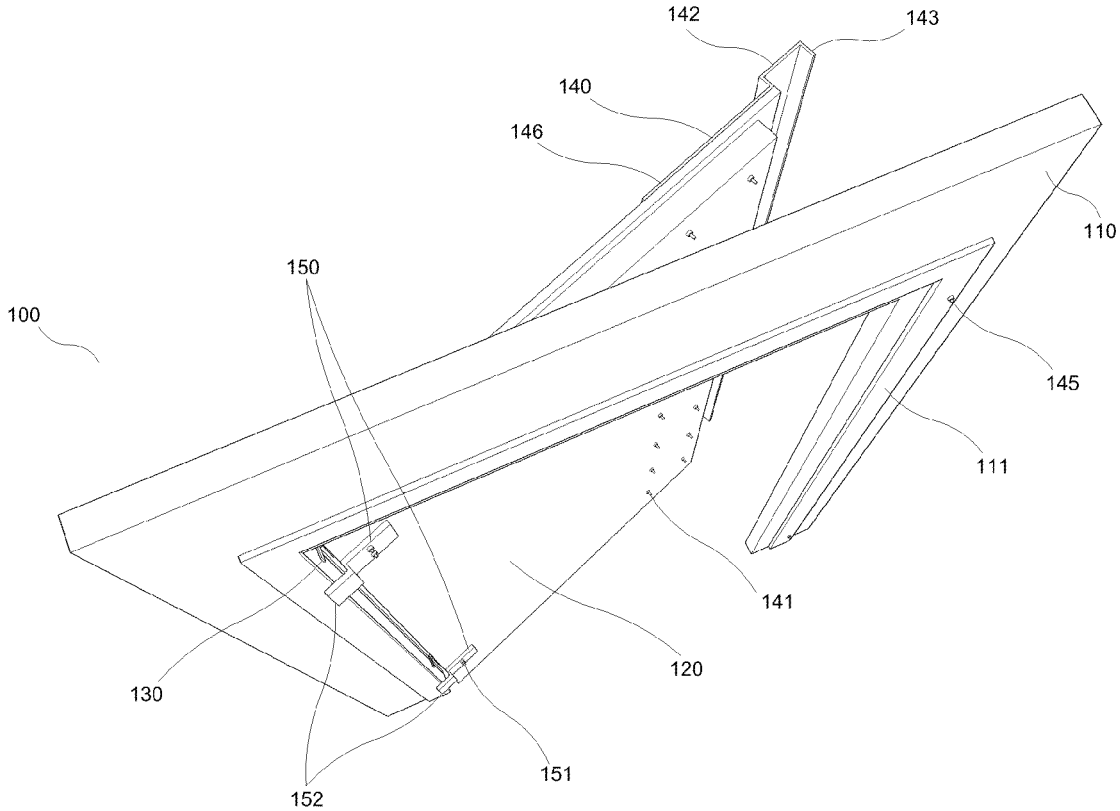
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Fig. 3a

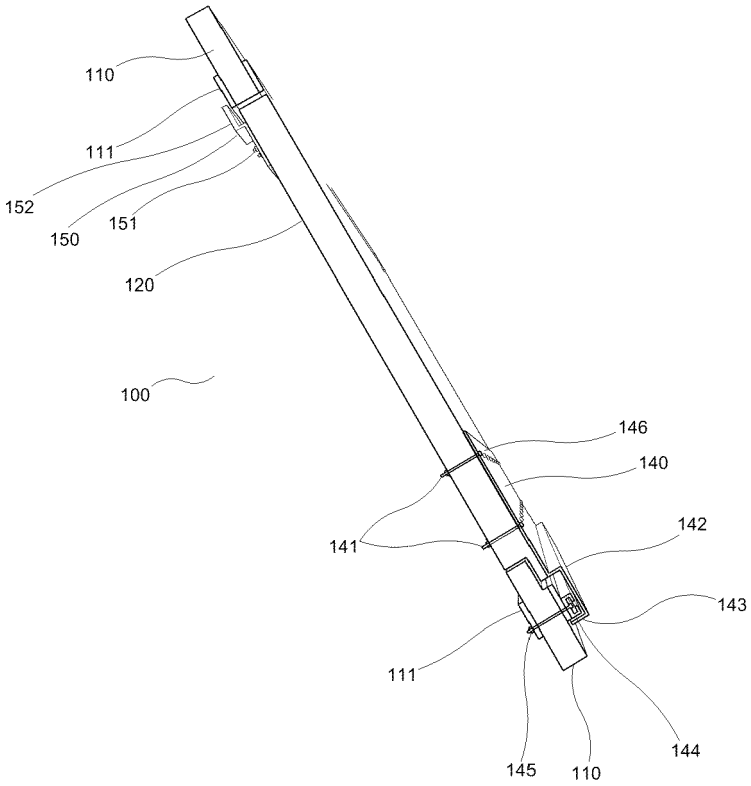
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Fig. 3b

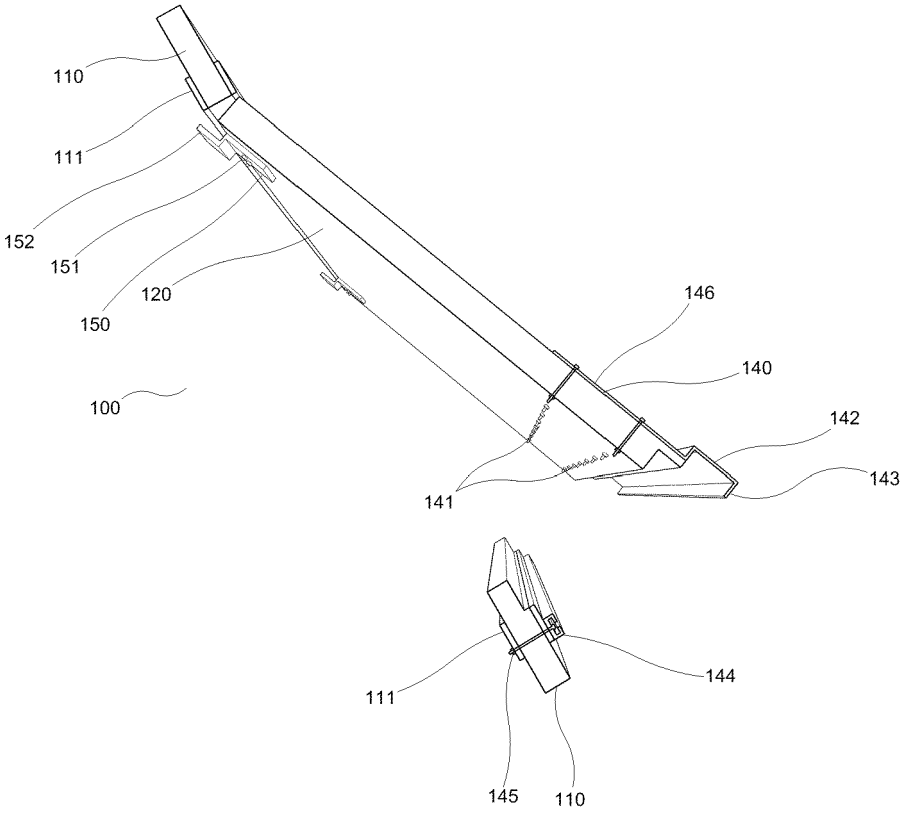
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Fig. 4a

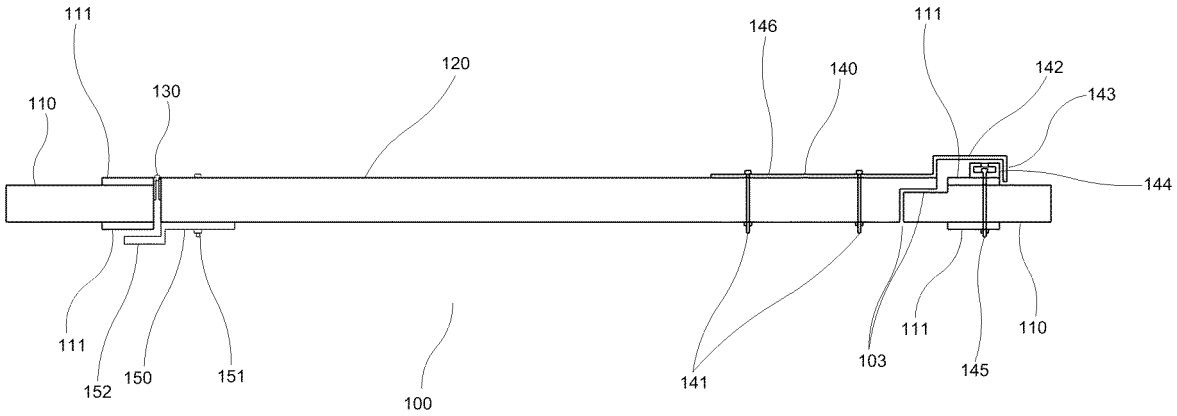
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Fig. 4b

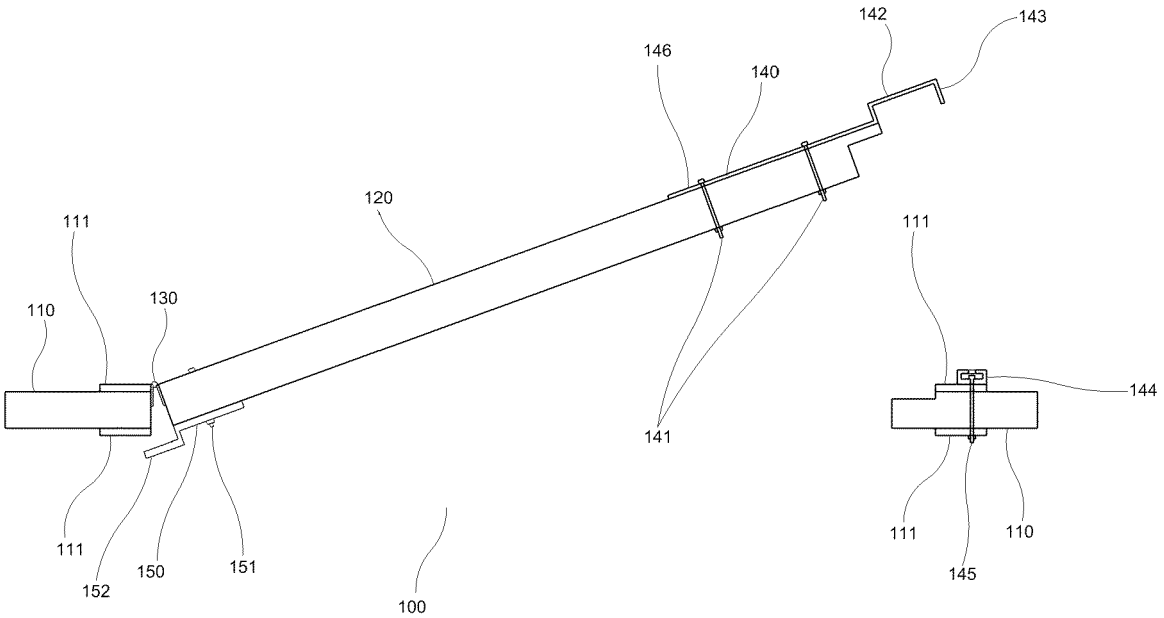
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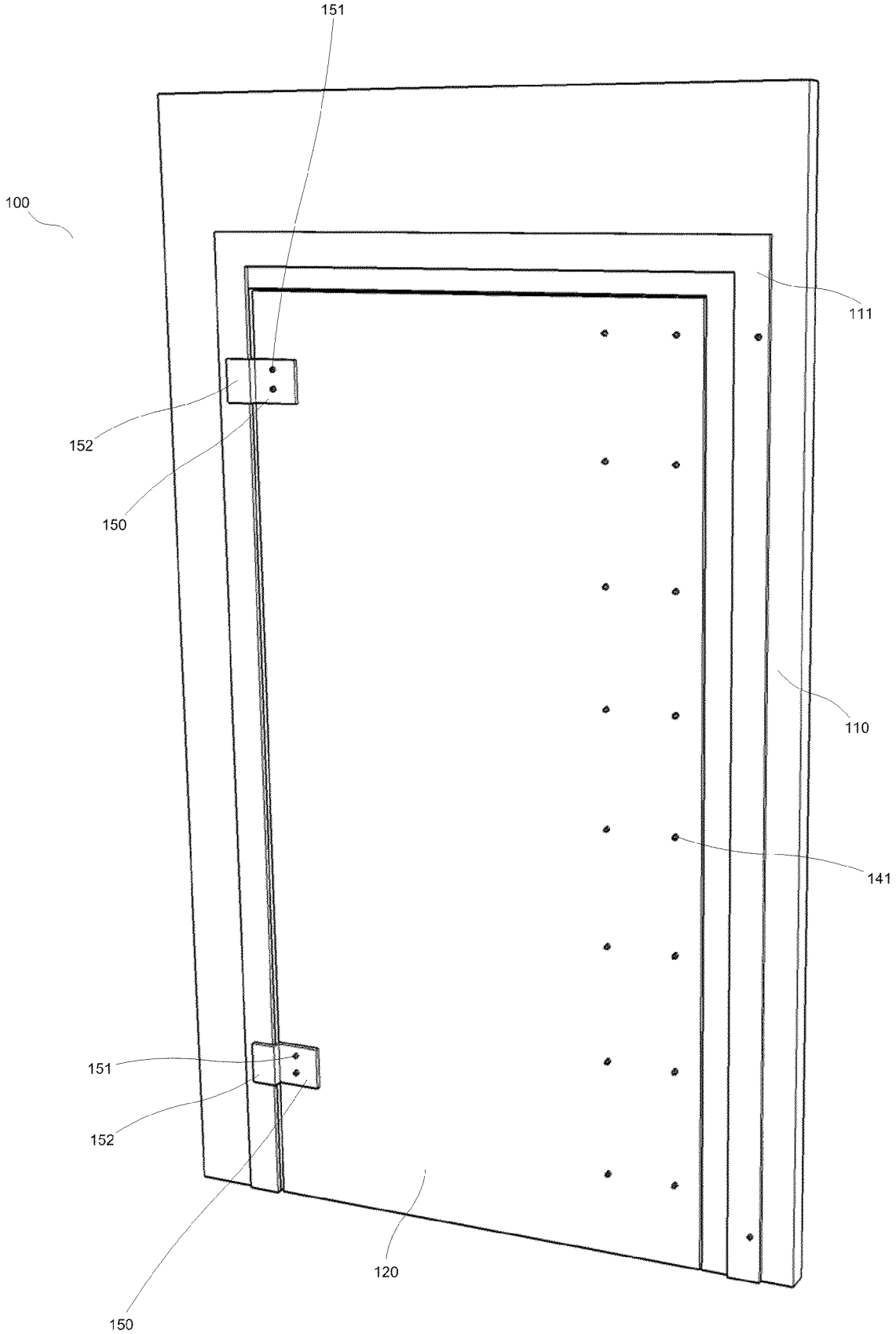
Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 1610

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	NL 8 800 517 A (SECU STRIP C V) 18 September 1989 (1989-09-18) * page 3, lines 1-28; figures 1,2,5 * * page 4, lines 4-9 * -----	1-5,9-11 6-8	INV. E06B5/11 E05B17/20 ADD. E05D11/00
X	EP 0 667 438 A1 (PRESSMETAAL B V [NL]) 16 August 1995 (1995-08-16) * column 3, line 18 - column 4, line 34; figures 1,5 * -----	1-5,9-11	
A	GB 2 069 565 A (SECR DEFENCE) 26 August 1981 (1981-08-26) * abstract; figure 6 * -----	4,5,8	
Y	US 3 911 622 A (PROHASKA PETER J H) 14 October 1975 (1975-10-14) * column 2, lines 3-49 * -----	6-8	

TECHNICAL FIELDS SEARCHED (IPC)

E06B
E05B
E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 January 2016	Hellberg, Jan

CATEGORY OF CITED DOCUMENTS

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21-01-2016

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