



## Description

This invention relates to a method and apparatus useful in the manufacture of an architectural covering, especially a covering for an architectural opening, such as a window blind or shade. The invention particularly relates to a method and apparatus for routing or threading and then finishing the lift cords of window blinds and shades. Lift cords in a blind or shade need to be of a particular length, corresponding to the width and vertical drop of the blind or shade, so that the blind or shade can be fully lowered. US patent 2 703 447 discloses an apparatus for measuring and cutting the proper length of cord for a venetian blind. The correct length is obtained by adjusting the apparatus in accordance with the width and drop dimensions of the blind.

Although the apparatus of US patent 2 703 447 may be useful to some extent, it still requires the threading of a cord through the blind and the finishing of the cord in separate steps.

In order to improve the routing and finishing of lift cords of architectural coverings such as blinds and shades, this invention provides a method comprising the steps of:

- \* positioning a head rail, a blind or shade element, and a bottom rail in parallel juxtaposed relationship;
- \* threading a first end of a first length of a cord from one end of the head rail or the bottom rail through a first routing path in the head rail, bottom rail and optionally the blind or shade element, so that the first end of the first length extends from an opposite end of the bottom rail or the head rail, respectively;
- \* threading a first end of a second length of cord from the other end of the head rail or bottom rail through a second routing path in the head rail, bottom rail and optionally the blind or shade element, so that the first end of the second length extends from the other opposite end of the bottom rail or head rail, respectively;
- \* routing each first end of each length of cord through a cord-guiding structure attachable to the head rail after each first end is threaded through its routing path; and
- \* restraining the first end of each length of cord at a predetermined distance from the head rail after each first end is routed through the cord-guiding structure.

Advantageously, a second end of each length of cord is unwound from a continuous length of cord while threading and routing the first end of the length of cord, and the second end of the length of cord is advantageously cut from the continuous length of cord and then restrained at a predetermined distance from the head rail after threading and routing the first end of the length of cord.

This invention also provides an apparatus for rout-

ing and finishing lift cords of an architectural covering, comprising:

- \* a frame having an elongate longitudinally-extending horizontal support member;
- \* an upstanding abutment surface on one longitudinal end of the support member;
- \* a first cord-finishing station, slidably movable along the longitudinal length of the support member to define, between the first cord-finishing station and the abutment surface, an accommodation space for a head rail, a blind or shade element and a bottom rail of the architectural covering in parallel juxtaposed relationship; confronting lateral ends of the first cord-finishing station and the abutment surface, on the longitudinal ends of the accommodation space, being adapted to engage the longitudinal ends of the head rail and bottom rail;
- \* a second cord-finishing station, slidably movable along the longitudinal length of the support member, in parallel to the first cord-finishing station, alongside the accommodation space; and
- \* each of the first and second cord-finishing stations comprising means for temporarily restraining cords, means for affixing the cords to each other, and means for cutting the cords; and
- \* wherein the second cord-finishing station is additionally provided with means for temporarily holding and positioning a cord-guiding structure of the architectural covering, to be attached to its head rail.

Further aspects of the invention will be apparent from the detailed description below of a specific embodiment and the drawings thereof, in which:

Figure 1 is a perspective view showing an apparatus of this invention with a partially finished shade in position above the apparatus, just before placing the shade on the apparatus;

Figure 2 is a schematic top plan view of the right side of the apparatus of Figure 1, with a first lift cord in position in the left side of the partially finished shade; and

Figure 3 is a schematic top plan view, similar to Figure 2, but with a second lift cord and a third lift cord also in position in the middle and left side of the partially finished shade.

Figure 1 shows an apparatus, generally 1, of this invention. The apparatus comprises a frame 2, on which are provided an elongate longitudinally-extending horizontal support member 3 and an elongate longitudinally-extending rail member 5 on the front of the support member 3.

Mounted on top of the support member 3 is a first cord-finishing station 7 which can slidably move along the longitudinal length of the support member 3. At the right end of the support member 3 is an upstanding abut-

ment surface 9. The rear and front of the abutment surface 9 and the rear and front of the adjacent longitudinal end of the first cord-finishing station 7 are each provided with confronting longitudinally-extending tongues 11 and 13, 15 and 17, respectively, which can engage and position the longitudinal ends of a head rail C and a bottom rail D of a partially finished shade or shade precursor, generally A.

In Figure 1, the partially finished shade A is a semi-finished pleated shade which has its pleated shade element B juxtaposed between its head rail C and bottom rail D. Such a shade is described, for example, in US patent 5 058 650. The partially finished shade A is shown just above the support member 3 of the apparatus 1, prior to the shade's being positioned on the support member 3 in the accommodation space (generally indicated by arrow 19) with its head rail C, blind or shade element B and bottom rail D in parallel juxtaposed relationship between the first cord-finishing station 7 and the abutment surface 9 on the support member 3 and preferably with its bottom rail D in front of its head rail C.

Once positioned in the accommodation space on the support member 3, the first cord-finishing station 7 is slid towards the partially finished shade A, so that the tongues 11, 13, 15 and 17 engage the rear and front of the adjacent longitudinal ends of the head rail C and bottom rail D.

The partially finished shade A, as shown in Figure 1, may already have been provided with openings E-E5 and F-F2 for the routing of lift cords (not shown), or such lift cord openings E-E5 and F-F2 may be formed after the partially finished shade A has been positioned on the apparatus 1. The head rail C and bottom rail D of the partially finished shade A can be supported on the support member 3 of the apparatus 1 at a distance from one another much smaller than the intended full drop of the resulting shade. Preferably, however, this distance is slightly in excess of the stack size of the resulting shade.

Figure 1 also shows that a longitudinally-extending, frontally-facing measuring scale 21 is provided at the rear of the rail member 5.

Figure 1 further shows that, mounted on top of the rail member 5, in front of the measuring scale 21, is a second cord-finishing station 23 which can slidably move along the longitudinal length of the rail member 5. In this regard, the second cord-finishing station 23 can slidably move in front of the support member 3, in parallel to the first cord-finishing station 7, alongside the accommodation space (below arrow 19).

The second cord-finishing station 23 is provided with a pointer 25 which can be lined up with a particular index on the measuring scale 21. The measuring scale 21 is preferably calibrated to correspond to the drop height of the partially finished shade A, under construction, so as to avoid the need to refer to reference tables or make calculations concerning lift cord lengths.

The first and the second cord-finishing stations 7

and 23 are each provided with means for cutting lift cords, such as the first and second cord-cutters 27 and 29, respectively, shown in Figure 1. The cord-cutters 27 and 29 can be conventional lift cord cutters such as are described in US patent 2 726 448.

Each of the first and second cord-finishing stations 7 and 23 are also provided, adjacent to the means for cutting lift cords, with means for temporarily restraining lift cords, such as the first and second cord clamps 31 and 33, respectively, shown in Figure 1.

The first and second cord-finishing stations 7 and 23 are also each provided, adjacent to the means for cutting lift cords 27 and 29, with means for affixing lift cords together, such as the first and second crimping tools 35 and 37, respectively, shown in Figure 1. Such crimping tools can be manually operated by a lever as shown in Figure 1 or by other mechanical, pneumatic, electrical or hydraulic means. Usually lift cords are affixed to one another by crimping a small metal tubular element (not shown) around them.

Preferably each of the first and second cord-finishing stations 7 and 23 is further provided with means to lock the station in an adjusted position, such as the first and second clamp screws 39 and 41, respectively. The first cord-finishing station 7 is also preferably provided with a supply of a continuous length of cord, such as a spool 43 of cord.

As also shown in Figure 1, the second cord-finishing station 23 is provided with means 45 for temporarily holding and positioning a cord-guiding structure, such as a cord lock (not shown), in which all the lift cords are to be received and which is thereafter attached to the head rail C of the finished shade A. Such temporary holding and positioning means 45 can be in the form of a U-shaped bracket for holding and positioning the cord-guiding structure of the shade A before the cord-guiding structure is attached to an end of the head rail C.

Finally, Figure 1 shows that the support member 3, close to the abutment surface 9, is also provided with cord guides 47 and 49.

The operation of the apparatus 1 of Figure 1 with respect to the threading of a first length G of a lift cord in the left side of the partially finished shade A will now be described by reference to Figure 2, and the operation of the apparatus 1 with respect to the threading of second and third lengths G1 and G2 of the cord in the middle and right side of the partially finished shade A will then be described by reference to Figure 3.

Figure 2 shows that a first length G of lift cord is unwound from the spool of cord 43. The forward end of the first length G of lift cord is then threaded from the left end of the bottom rail D of the partially finished shade A through its routing path through a first opening E in the bottom rail D and from there towards and through a first opening E1 in the head rail C of the partially finished shade A. Between the two first openings E1 and E2 in the bottom and head rails, the first length G of lift cord extends through several first openings F (shown in Fig-

ure 1) in the pleated shade element B of the partially finished shade A, through which openings F the first length of lift cord G has been threaded. From the first opening E1 in the head rail C, the first length of lift cord G is then guided in its routing path around the cord guides 47 and 49, towards the second cord-finishing station 23. The forward end of the first length G of lift cord is then guided through the bracket 45 and the cord-guiding structure therein and is temporarily held by the cord clamp 33 of the second cord-finishing station 23, and the rearward end of this first length G of lift cord is cut with the first cord-cutter 27 from the spool 43 and clamped by the cord clamp 31 on the first cord-finishing station 7.

Figure 3 shows that two additional lengths G1 and G2 of lift cords are then routed through their respective cord paths in the same way described above. In this regard, the additional lengths G1 and G2 of lift cords are unwound from the spool of cord 43. Then, the forward end of the middle length G1 of cord is routed through its routing path through the second openings E2 and E3 in the bottom rail and head rail D and C and through the second openings F1 in the pleated blind member B, between the second openings E2 and E3, and the forward end of the right length G2 of cord is routed through its routing path through the third openings E4 and E5 in the bottom rail and head rail D and C and through the third openings F2 in the pleated blind element B, between the third openings E4 and E5. From the second and third openings E3 and E5 in the head rail C, the forward ends of the additional lengths G1 and G2 of lift cord are then each guided in their routing paths around the cord guides 47 and 49, towards the second cord-finishing station 23. The forward ends of the additional lengths of lift cord G1 and G2 are then each guided through the bracket 45 and the cord-guiding structure therein and temporarily held by the cord clamp 33 of the second cord-finishing station 23, and the rearward ends of these lengths G1 and G2 of lift cords are each cut with the first cord-cutter 27 from the spool 43 and clamped by the cord clamp 31 on the first cord-finishing station 7.

Once all the lengths G, G1 and G2 of lift cords have been routed, cut and clamped as shown in Figure 3, their ends are finished by cutting them to length, particularly by cutting their forward ends with the second cord-cutter 29, using measuring scale 21 (Figure 1). Then, the rearward ends of the lengths G, G1 and G2 of lift cords can be moved from the first cord clamp 31 into the first crimping tool 35, and their forward ends can be moved from the second cord clamp 33 into the second crimping tool 37. By this procedure and due to the accuracy of the measuring scale 21 and the exact location of both crimping tools 35 and 37 with respect to the pointer 25 indexed along the measuring scale 25, all lengths G, G1 and G2 of lift cords can be cut and affixed to each other, with each lengths G, G1 and G2 having exactly the proper length.

In routing the lengths G, G1 and G2 of lift cords

through the openings E-E5 and F-F2 in the partially finished shade A, a conventional lacing needle 51 (shown in Figure 3) can be used. Such a lacing needle is described, for example, in US patent US 2 698 116.

The cord ends extending from one end of the bottom rail D will usually be attached to an end cap structure (not shown) which can thereafter be attached to the bottom rail once it has been removed from between the first cord-finishing station 7 and the abutment surface 9. Likewise, the cord-guiding structure (not shown) can be taken from bracket 45 and be inserted, with all the lengths G, G1 and G2 of lift cords, in the opposite end of the head rail C once the head rail is removed from the apparatus 1.

The cord ends extending from the cord-guiding structure can additionally be finished by attaching them to a cord connector, ending in a common draw cord and tassel depending therefrom. In this way, a shade can be obtained, such as is described in US patent 5 058 650.

This invention is, of course, not limited to the above-described embodiment which may be modified without departing from the scope of the invention or sacrificing all of its advantages. In this regard, the terms in the foregoing description, such as "front", "right", "left", "longitudinal", and "horizontal", have been used only as relative terms to describe the relationships of the various elements of the apparatus and method of the invention.

## Claims

1. A method of routing and finishing lift cords in blinds or shades, comprising the steps of:

- \* positioning a head rail, a blind or shade element, and a bottom rail in parallel juxtaposed relationship ;
- \* threading a first end of a first length of a cord from one end of the head rail or the bottom rail through a first routing path in the head rail, bottom rail and optionally the blind or shade element, so that the first end of the first length extends from an opposite end of the bottom rail or the head rail, respectively;
- \* threading a first end of a second length of cord from the other end of the head rail or bottom rail through a second routing path in the head rail, bottom rail and optionally the blind or shade element, so that the first end of the second length extends from the other opposite end of the bottom rail or head rail, respectively;
- \* routing each first end of each length of cord through a cord-guiding structure attachable to the head rail after each first end is threaded through its routing path; and
- \* restraining the first end of each length of cord at a predetermined distance from the head rail after each first end is routed through the cord-

guiding structure.

structure is a cord lock.

2. The method of claim 1 wherein a second end of each length of cord is unwound from a continuous length of cord while threading and routing the first end of the length of cord. 5
3. The method of claim 1 or 2 wherein the second end of the length of cord is cut from the continuous length of cord and then restrained at a predetermined distance from the head rail after threading and routing the first end of the length of cord. 10
4. The method of any one of claims 1-3 wherein the cord-guiding structure is a cord lock. 15
5. The method of any one of claims 1-4 wherein the bottom rail is positioned closer than the head rail to the cord-guiding structure when routing and restraining the first end of each length of cord. 20
6. An apparatus for routing and finishing lift cords of an architectural covering, comprising:
  - \* a frame (2) having an elongate longitudinally-extending horizontal support member (3); 25
  - \* an upstanding abutment surface (9) on one longitudinal end of the support member;
  - \* a first cord-finishing station (7), slidably movable along the longitudinal length of the support member (3) to define, between the first cord-finishing station (7) and the abutment surface (9), an accommodation space (19) for a head rail (C), a blind or shade element (B) and a bottom rail (D) of the architectural covering in parallel juxtaposed relationship; confronting lateral ends of the first cord-finishing station (7) and the abutment surface (9), on the longitudinal ends of the accommodation space, being adapted to engage the longitudinal ends of the head rail and bottom rail; 30 35 40
  - \* a second cord-finishing station (23), slidably movable along the longitudinal length of the support member (3), in parallel to the first cord-finishing station (7), alongside the accommodation space (19); and 45
  - \* each of the first and second cord-finishing stations comprising means (31 and 33) for temporarily restraining cords, means (35 and 37) for affixing the cords to each other, and means (27 and 29) for cutting the cords; and 50
  - \* wherein the second cord-finishing station (23) is additionally provided with means (45) for temporarily holding and positioning a cord-guiding structure of the architectural covering, to be attached to its head rail (C). 55
7. The apparatus of claim 6 wherein the cord-guiding
8. The apparatus of claim 7 wherein longitudinally extending tongues (11, 13, 15 and 17) are provided on the confronting lateral ends of the first cord-finishing station (7) and the abutment surface (9).

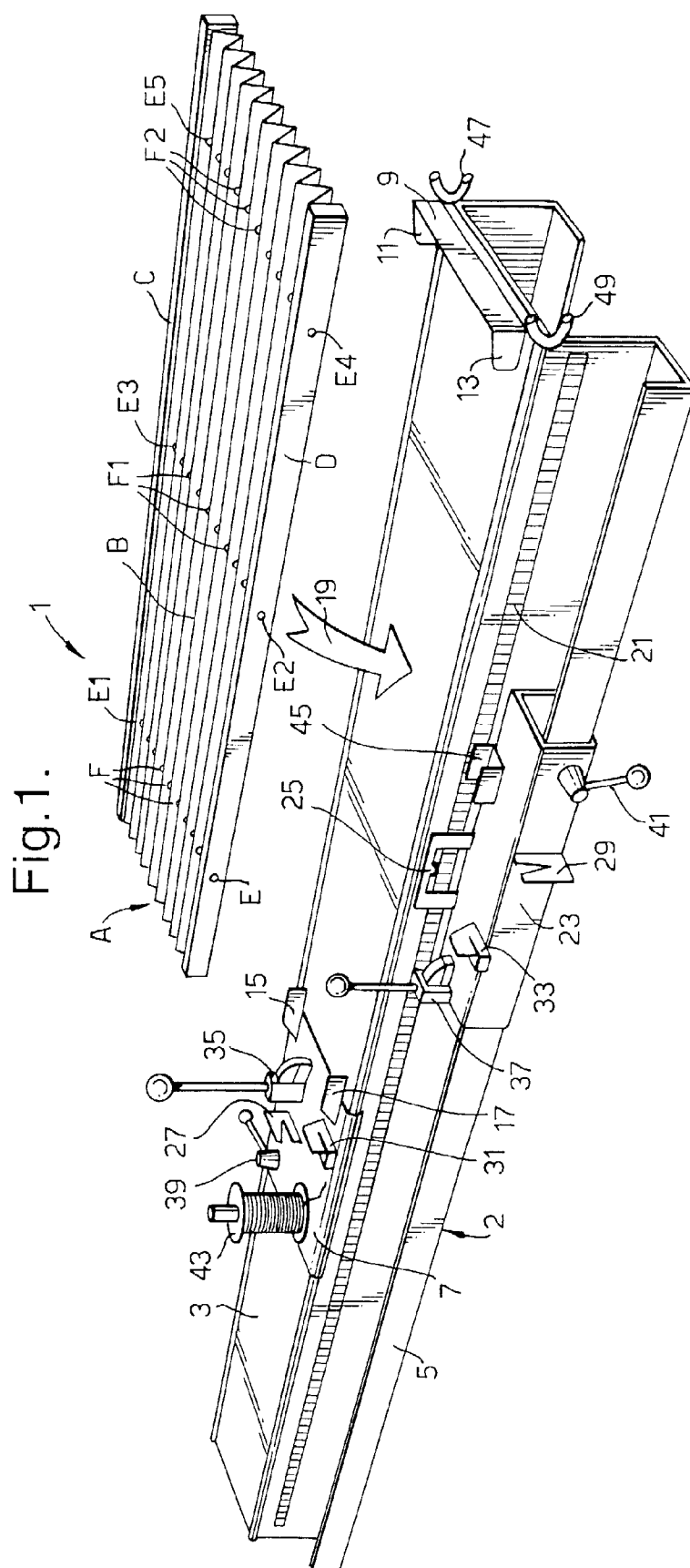


Fig.2.

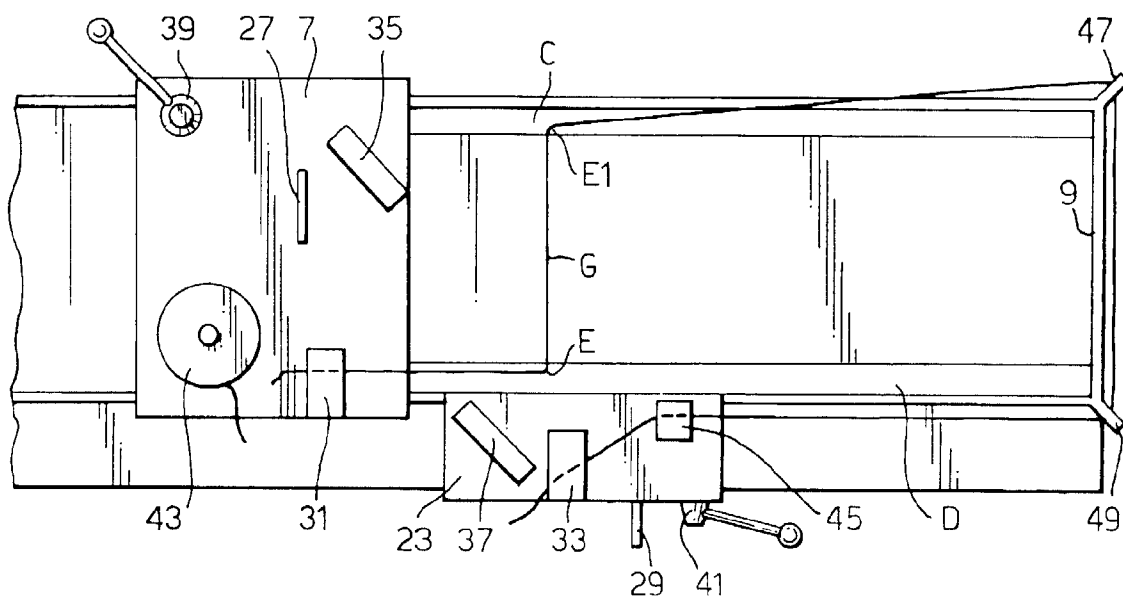
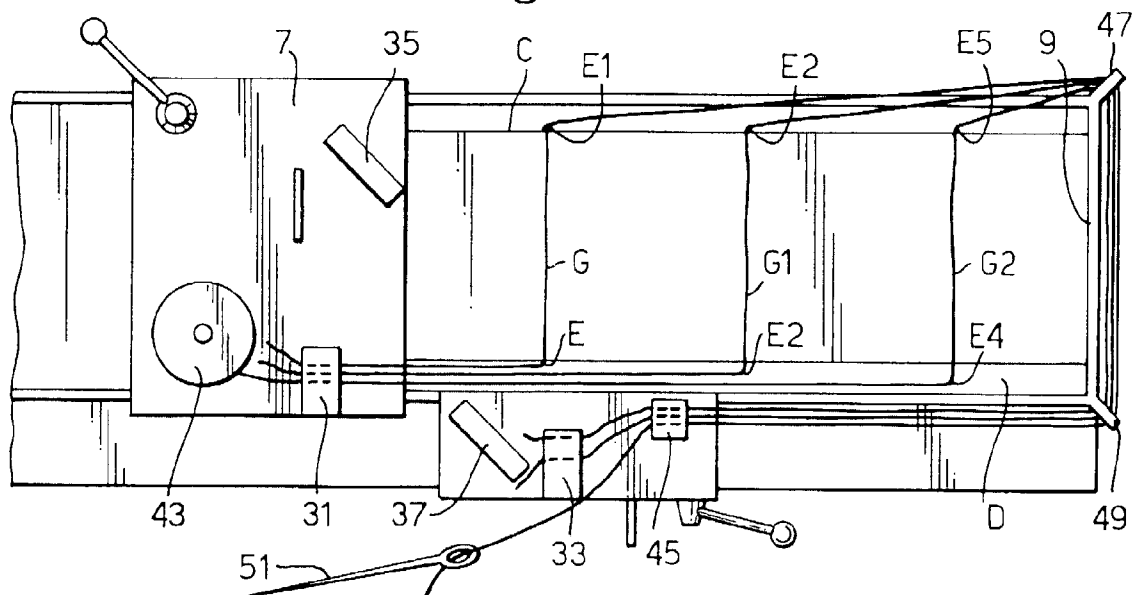


Fig.3.





European Patent  
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## EUROPEAN SEARCH REPORT

Application Number  
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| 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.6) |
| D, A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 2 703 447 A (ROSENBAUM) 8 March 1955<br>* the whole document *             |                                                    | E06B9/266                                    |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | US 4 730 372 A (TACHIKAWA) 15 March 1988<br>* the whole document *            |                                                    |                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                               |                                                    | TECHNICAL FIELDS SEARCHED (Int.Cl.6)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                               |                                                    | E06B                                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                               |                                                    |                                              |
| Place of search<br>MUNICH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                               | Date of completion of the search<br>7 October 1998 | Examiner<br>Knerr, G                         |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/> Y : particularly relevant if combined with another document of the same category<br/> A : technological background<br/> O : non-written disclosure<br/> P : intermediate document</p> <p>T : theory or principle underlying the invention<br/> E : earlier patent document, but published on, or after the filing date<br/> D : document cited in the application<br/> L : document cited for other reasons<br/> &amp; : member of the same patent family, corresponding document</p> |                                                                               |                                                    |                                              |

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