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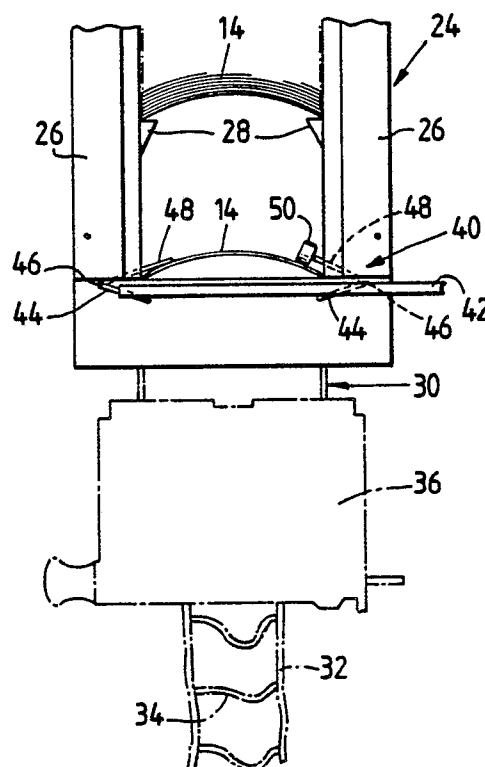
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Apparatus for mechanically assembling a venetian blind.

Apparatus for mechanically assembling a venetian blind in which the slat material (14), as it is assembled into the ladders (30), is prevented from kinking by a hold down member (40). This member (40) includes a first portion (44) located below a slat lift finger (42) and a second portion (48, 50) located above the upper surface of the slat material (14), the slat lifting finger (42) maintaining the hold down member (40) in this position. When the slat lift finger (42) is raised, it will disengage from its first portion (44) and allow movement of the hold down member (40) out of way of the rising slat thereby preventing scratching of the upper surface of the slat material (14).

Fig. 2.



APPARATUS FOR MECHANICALLY ASSEMBLING A VENETIAN BLIND

The present invention relates to an apparatus and method of mechanically assembling the slats of a venetian blind.

Venetian blinds consist of at least two ladders, either ladder cords or ladder tapes, each having laterally spaced side members and cross rungs defining openings to receive slats. The assembling can be done manually or by machine and in the latter case, the ladders are intermittently fed lengthwise of the side members and are guided so that two adjacent rungs of each ladder and the portions of the longitudinal side members at the location of the adjacent rungs are held apart, thereby to define a predetermined shape to the associated opening. Slat material is fed along a defined path through the opening.

With the more flimsy nature of recently employed narrow slat material and the increase in speeds of assembling machines, there is a danger of the slat material kinking or deflecting upwardly while being fed through the assembly stations. It is possible to retain the slat material against such movement, but this would normally require some elaborate and expensive structure moving out of the way every time a slat is lifted. A solution to this problem which has been used in practice for some time consists in the use of a spring biased wheel resting on the top of the slat material in the vicinity of each assembly station. Each slat is lifted against the spring bias of the successive retaining wheels which will then eventually move out of the way. There are a number of problems encountered. Firstly damage is often done to the painted slat material surface and the lack of rigidity of the slat material places limits on the level of spring bias force of the retainer wheels and thereby limits their ability to retain the slat material against upward deflection and therefore against kinking.

It is now proposed, according to the present invention to provide apparatus for mechanically assembling a venetian blind, said apparatus comprising means for guiding and feeding a length of slat forming material along a defined slat feed path, means for guiding and positioning at least two ladders, each comprising side members and cross rungs suitably held and spaced to define aligned openings for receiving the slats, means feeding slat material along said defined slat feed path through said openings, slat holder guides for guiding the slats which have been assembled in a direction transverse to said slat feed path, at least one slat lift finger movable over a distance effective to position a next cross rung at each ladder directly below said slat feed path to an upper position to lift and retain the slat that has been assembled in said

upper position along said slat holder guide and a hold down member engagable with the upper surface of the slat material as it is being assembled, characterised in that the hold down member is mounted for movement between first and second positions, said member including a first upper portion locatable, in said first position, immediately above the slat material being fed or positioned thereunder and a second lower portion engaged by a lower surface of said at least one slat lift finger in its lower position, to retain the member in its first position, the member being free to move to its second position in which the first portion is moved out of the way of the slat material by raising the at least one slat lift finger towards its upper position.

By having the hold down members mounted for movement between the first and second positions, in the first position the member can adequately retain the slat material and prevent it from becoming kinked and itself be held in position by the slat lift finger abutting the second portion. Immediately the slat has been assembled and the slat lift finger rises to move the assembled slat and its associated portion of the ladder upwardly, this releases the second portion of the hold down member which in turn releases the first portion which can move out of the way of the slat material as it is raised.

It is contemplated that the holding member could be slidable in a direction inclined to the direction of movement of the at least one lift finger from its first position to its second position, upward movement of the lift finger allowing raising the hold down member and causing its first upper portion to move upwardly and outwardly out of the line of movement of the slat material, when the latter is lifted by said at least one slat lift finger.

However, in the preferred construction, the hold down member is in the form of a lever which is mounted for rocking movement on a pivot between said first and second positions, said lever including a first upper arm on one side of the pivot which, in said first position, is locatable immediately above the slat material and a second lower arm on the other side of the pivot engaged by a lower surface of said at least one slat lift finger in its lower position, to hold the lever in its first position, the lever being free to rock to its second position in which the first arm moves out of the way of the slat material by raising of the least one slat lift finger towards its upper position.

A stop may be provided to limit the rocking motion of the lever so that it does not rock beyond the second position.

In order to reduce any possibility of scratching,

the upper portion or arm may include a roller. In an alternative and simpler construction the upper portion or arm may include a looped end locatable above the slat material.

Preferably the or each holder guide has associated therewith two hold down members, one positioned adjacent each edge of the slat material guided by said slat material guides.

In order that the present invention may more readily be understood, the following description is given, merely by way of example, reference being made to the accompanying drawings, in which:

Figure 1 is a schematic side elevation of one embodiment of venetian blind assembly apparatus according to the invention;

Figure 2 is an enlarged end elevation of one of the slat assembly stations shown in one position; and

Figure 3 is a similar view to Figure 2 shown in a second position. Referring first to Figure 1 there is illustrated therein a machine frame 10 carrying a reel 12 of slat material 14 which is fed via an accumulator 16 by feed rolls 18 to a cutting and punching station 20. Feed-on rolls 22 feed the cut material to first and second slat assembly stations 24. These are of a conventional design and details of them need not be described. The construction so far described, indeed, is more fully described in United States Patent 4073044.

If reference is now made to Figure 2 the assembly station indicated by the general reference numeral 24 includes two slat stacking guides 26 and support pawls 28 for supporting the slats 14 in a raised or upper position.

The lowermost slat 14 which is shown being fed in is laced into a ladder 30. The ladder 30 includes side members 32 and cross-rungs 34, the ladder passing through a conventional flap ladder guide 36 to spread the side members 32 and the rungs 34 to define an opening to receive the slats.

In order to prevent the slats material from kinking or buckling, a hold down member indicated by the general reference numeral 40 is provided, preferably one on one side and one on the other.

A lift finger 42 is provided to lift the slats from the lower position below the hold down members 40 to the upper position of the pawls 28.

The hold down members 40 each comprise a lower arm 44, a central pivot 46 and an upper arm 48. Normally the two hold down members will be identical but for illustrative purposes, the right hand hold down member 40 has been indicated as having a roller 50 at the free end of the upper arm 48 while the left hand hold down member has been shown as having a looped end of the upper arm 48. In fact the upper arm 48 or the roller 50 will be slightly spaced above the slat 14 which is being inserted to prevent this slat material upper surface

from being scratched. Nonetheless it is capable of preventing the slat material from buckling.

The lower arm 44 includes a portion extending under the lower surface of the lift finger 42 and this engagement with the lower surface of the lift finger 42 on a portion of the lower arm 44 retains the hold down member 40 in its first position illustrated in Figure 2, that is to say with the free end of the arm 48 or the roller 50 immediately above the upper surface of the lower slat 14. When it is desired to lift the slat to the raised position, the lift finger is simply raised as shown in Figure 3 so that the lower surface of the finger 42 no longer bears against the upper surface of a portion of the lower arm 44, thereby releasing the hold down member 40 for pivoting about its axis 46. The upper arm 48 and, where provided, the roller 50, can thus move readily out of the way of the upward movement of the slat material. A stop 52 is provided to prevent the hold down member 40 pivoting beyond this second position illustrated in Figure 3.

If desired, the hold down member may be spring urged lightly towards its first position where it may simply drop to its first position by gravity. Alternatively spring means may be provided to bias the upper portion of the hold down member out of the way of the slat material into said second position, by an amount allowing a return to said first position upon lowering of the slat finger.

Instead of having a pivotal arrangement, the hold down member could involve first and second parts which are movable divergently in a sliding manner with suitable divergent guides, a lower arm being positioned below the hold down member and an upper arm above the slat material. As the lift finger is raised, it will release the lower arm and allow the whole member to move upwardly and outwardly in a way to enable the upper arm to move out of the line of movement of the rising slat.

It is also contemplated that part of the second lower portion of the hold down member be magnetically adhered to the lower surface of the slat lift finger 42 to facilitate the upward pivoting motion and maintain the upper arm 48 or roller 50 out of engagement with the upper surface of the slat material, thereby further preventing scratching.

In the illustrated constructions, a hold down member has been provided on both sides of the slat material. In some instances it may only be necessary to provide a hold down finger on one side.

Claims

1. Apparatus for mechanically assembling a venetian blind, said apparatus comprising means for guiding and feeding a length of slat forming

material along a defined slat feed path, means for guiding and positioning at least two ladders, each comprising side members and cross rungs suitably held and spaced to define aligned openings for receiving the slats, means feeding slat material along said defined slat feed path through said openings, slat holder guides for guiding the slats which have been assembled in a direction transverse to said slat feed path, at least one slat lift finger movable over a distance effective to position a next cross rung at each ladder directly below said slat feed path to an upper position to lift and retain the slat that has been assembled in said upper position along said slat holder guide and a hold down member engagable with the upper surface of the slat material as it is being assembled, characterised in that the hold down member is mounted for movement between first and second positions, said member including a first upper portion locatable, in said first position, immediately above the slat material being fed or positioned thereunder and a second lower portion engaged by a lower surface of said at least one slat lift finger in its lower position, to retain the member in its first position, the member being free to move to its second position in which the first portion is moved out of the way of the slat material by raising the at least one slat lift finger towards its upper position.

2. Apparatus according to claim 1, characterised in that said holding member is slidable in a direction inclined to the direction of movement of the at least one lift finger from its first position to its second position, upward movement of the lift finger allowing raising of the hold down member and causing its first upper portion to move upwardly and outwardly out of the line of movement of the slat material, when the latter is lifted by said at least one slat lift finger.

3. Apparatus according to claim 1, characterised in that said hold down member is in the form of a lever which is mounted for rocking movement on a pivot between said first and second positions, said lever including a first upper arm on one side of the pivot which, in said first position, is locatable immediately above the slat material and a second lower arm on the other side of the pivot engaged by a lower surface of said at least one slat lift finger in its lower position, to hold the lever in its first position, the lever being free to rock to its second position in which the first arm moves out of the way of the slat material by raising of the least one slat lift finger towards its upper position.

4. Apparatus according to claim 1, 2 and 3, characterised in that means are provided to limit the rocking motion of the lever so that it does not move beyond said second position.

5. Apparatus according to any preceding claim, characterised in that said first upper portion of said hold down member includes a roller for engaging the upper surface of the slat material.

6. Apparatus according to any one of claims 1 to 4, characterised in that said first upper portion or arm includes a looped end locatable above the slat material.

7. Apparatus according to any preceding claim, characterised in that the or each holder guide has associated therewith two hold down members, one positioned adjacent each edge of the slat material guided along said slat feed path.

8. Apparatus according to claims 1, 2 and 3, characterised in that said hold down member is allowed to return to its first position under the influence of gravity.

9. Apparatus according to claims 1, 2 and 3, characterised in that said first upper portion of said hold down means is positively raised to its inactive position by said at least one slat lift finger.

10. Apparatus according to claim 9, characterised in that part of said second lower portion of said hold down member is magnetically adhered to the lower surface of said at least one slat lift finger.

Neu eingereicht / Newly filed
 n° de dépôt / No. of deposit

Fig. 1.

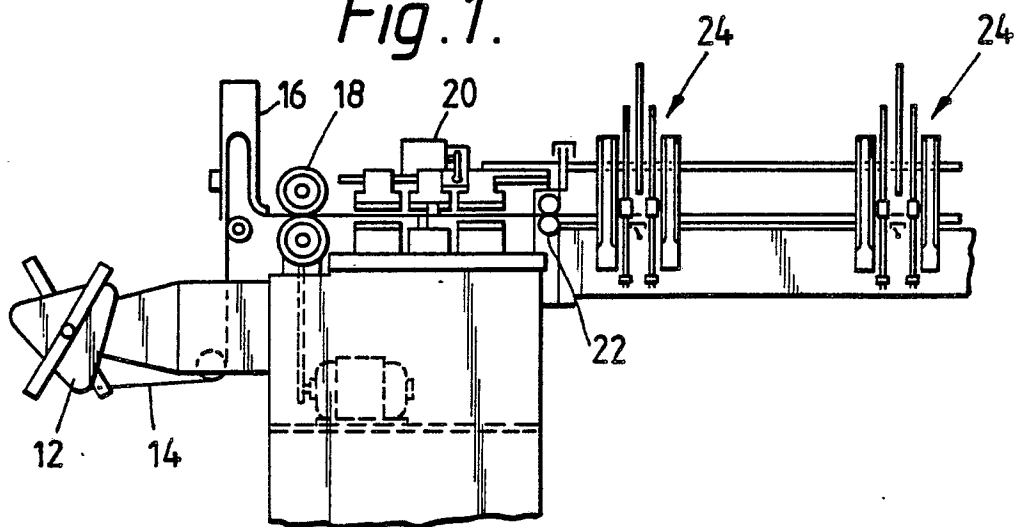


Fig. 2.

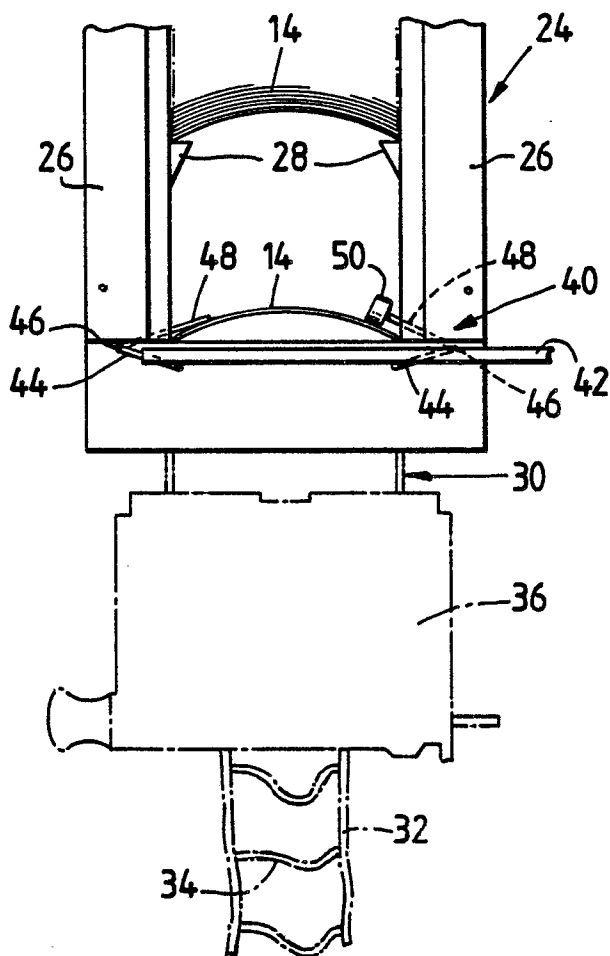
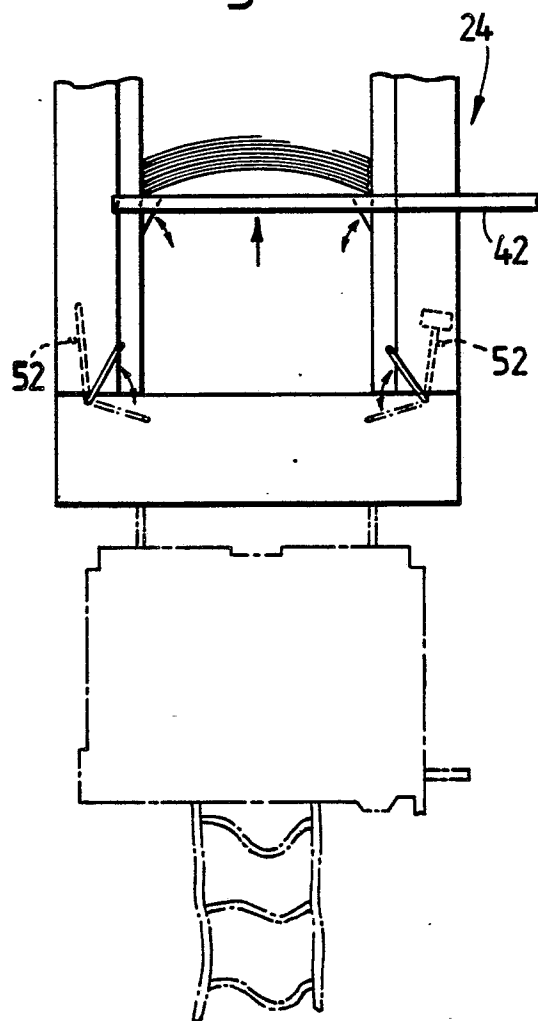


Fig. 3.





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 87 30 5845

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.3)
D,A	US-A-4 073 044 (G.H. EDIXHOVEN) * complete document *	1	E 06 B 9/266
A	GB-A-1 582 175 (HUNTER DOUGLAS INDUSTRIES B.V.) * complete document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.3)
			E 06 B 9/00
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 03-02-1988	Examiner KRABEL A.W.G.
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			