Claims

1. A shutter curtain comprising:

at least two primary slats pivotally interlocked in a longitudinal-edge-to-longitudinal-edge arrangement one after another, wherein each of the at least two primary slats comprises an elongated primary-slat-body having a longitudinal axis, the elongated primary-slat-body being integrally formed with a first interlockable longitudinal edge portion and a second interlockable longitudinal edge portion, the first interlockable longitudinal edge portion and the second interlockable longitudinal edge portion of the elongated primary-slat-body being opposite each other on opposite sides of the longitudinal axis of the elongated primary-slat-body, wherein the first interlockable longitudinal edge portion of the elongated primary-slat-body of a first primary slat of the at least two primary slats is pivotally interlocked with the second interlockable longitudinal edge portion of the elongated primary-slat-body of a second primary slat of the at least two primary slats to form a pivotable joint between the at least two primary slats, wherein a pivot axis of the pivotable joint is parallel to the longitudinal axis of the elongated primary-slat-body;

at least two secondary slats unconnected from each other; and

at least two thermal insulating units respectively connected between the at least two primary slats and the at least two secondary slats to hold apart each of the at least two primary slats and a corresponding one of the at least two secondary slats in a manner so as to thermally insulate said primary slat from said secondary slat,

wherein the elongated primary-slat-body of each of the at least two primary slats further comprises a retaining arrangement to hold a portion of a corresponding one of the at least two thermal insulating units to the elongated primary-slat-body,

wherein the retaining arrangement of the elongated primary-slat-body comprises a pair of opposing lip formations extending towards each other respectively from the first interlockable longitudinal edge portion and the second interlockable longitudinal edge portion of the elongated primary-slat-body,

wherein each of the at least two primary slats further comprises a primary-slat-support-frame coupled to the elongated primary-slat-body, the primary-slat-support-frame having a pair of grooves directed away from each other along two opposite edge portions

of the primary-slat-support-frame, and a recess portion between the two opposite edge portions of the primary-slat-support-frame,

wherein the primary-slat-support-frame is coupled to the elongated primary-slat-body with the pair of grooves of the primary-slat-support-frame respectively slide over the pair of opposing lip formations of the elongated primary-slat-body,

wherein the portion of the corresponding one of the at least two thermal insulating units is inserted and retained in the recess portion of the primary-slat-support-frame.

2. The shutter curtain as claimed in claim 1, wherein each of the at least two secondary slats comprises an elongated secondary-slat-body having a longitudinal axis, the elongated secondary-slat-body being integrally formed with a first engagement longitudinal portion and a second engagement longitudinal portion, the first engagement longitudinal portion and the second engagement longitudinal portion of the elongated secondary-slat-body being opposite each other on opposite sides of the longitudinal axis of the elongated secondary-slat-body, wherein the elongated secondary-slat-body of a first secondary slat of the at least two secondary slats is stackable on the elongated secondary-slat-body of a second secondary slat of the at least two secondary slats with the first engagement longitudinal portion of the elongated secondary-slat-body of the first secondary slat in engagement with the second engagement longitudinal portion of the elongated secondary-slat-body of the second secondary slat.

3. The shutter curtain as claimed in claim 2, wherein the engagement between the first engagement longitudinal portion of the elongated secondary-slat-body of the first secondary slat and the second engagement longitudinal portion of the elongated secondary-slat-body of the second secondary slat is a mesh-type engagement which forms a separable lap joint or a separable overlap joint or a separable tongue-and-groove joint.

4. The shutter curtain as claimed in claim 2 or 3, wherein a cross-section of the first engagement longitudinal portion of the elongated secondary-slat-body of each of the at least two secondary slats comprises an insert profile and a cross-section of the second engagement longitudinal portion of the elongated secondary-slat-body of each of the at least two secondary slats comprises a complementary recess profile.

5. The shutter curtain as claimed in any one of claims 2 to 4, wherein the elongated secondary-slat-body of each of the at least two secondary slats further comprises a retaining arrangement to hold a ~~first~~ further portion of a corresponding one of the at least two thermal insulating units to the elongated secondary-slat-body.

6. The shutter curtain as claimed in claim 5, wherein the retaining arrangement of the elongated secondary-slat-body comprises a pair of opposing lip formations extending towards each other from opposite longitudinal edge portions of the elongated secondary-slat-body.

7. The shutter curtain as claimed in claim 6, wherein each of the pair of opposing lip formations of the retaining arrangement of the elongated secondary-slat-body is formed by folding over a corresponding segment of the elongated secondary-slat-body.

8. The shutter curtain as claimed in claim 6 or 7, wherein the ~~first~~ further portion of the corresponding one of the at least two thermal insulating units comprises a pair of transverse protrusions extending in opposite directions, the pair of transverse protrusions being respectively in engagement with the pair of opposing lip formations of the retaining arrangement of the elongated secondary-slat-body for connecting the ~~first~~ further portion of the corresponding one of the at least two thermal insulating units to the elongated secondary-slat-body.

9. The shutter curtain as claimed in claim 6 or 7,

wherein each of the at least two secondary slats further comprises a secondary-slat-support-frame coupled to the elongated secondary-slat-body, the secondary-slat-support-frame having a pair of grooves directed away from each other along two opposite edge portions of the secondary-slat-support-frame, and a recess portion between the two opposite edge portions of the secondary-slat-support-frame,

wherein the secondary-slat-support-frame is coupled to the elongated secondary-slat-body with the pair of grooves of the secondary-slat-support-frame respectively slide over the pair of opposing lip formations of the elongated secondary-slat-body,

wherein the ~~first~~ further portion of the corresponding one of the at least two thermal insulating units is inserted and retained in the recess portion of the secondary-slat-support-frame.

10. The shutter curtain as claimed in claim 9, wherein the secondary-slat-support-frame is made from a sheet of material roll-formed to bend the two opposite edge portions of the secondary-slat-support-frame to form the pair of grooves and to bend a region between the two opposite edge portions of the secondary-slat-support-frame to form an open channel defining the recess portion.

11. The shutter curtain as claimed in any one of claims 5 to 10, wherein the elongated secondary-slat-body is made from a sheet of material roll-formed to integrally form the first engagement longitudinal portion, the second engagement longitudinal portion, and the retaining arrangement.

~~12. The shutter curtain as claimed in claim any one of claims 1 to 10, wherein the elongated primary-slat-body of each of the at least two primary slats further comprises a retaining arrangement to hold a second portion of a corresponding one of the at least two thermal insulating units to the elongated primary-slat-body.~~

~~13. The shutter curtain as claimed in claim 12, wherein the retaining arrangement of the elongated primary-slat-body comprises a pair of opposing lip formations extending towards each other respectively from the first interlockable longitudinal edge portion and the second interlockable longitudinal edge portion of the elongated primary-slat-body.~~

~~14~~12. The shutter curtain as claimed in any one of claims ~~13~~1 to 11, wherein each of the pair of opposing lip formations of the retaining arrangement of the elongated primary-slat-body is formed by folding over a corresponding segment of the elongated ~~secondary~~primary-slat-body.

~~15. The shutter curtain as claimed in claim 13 or 14, wherein the second portion of the corresponding one of the at least two thermal insulating units comprises a pair of transverse protrusions extending in opposite directions, the pair of transverse protrusions~~

~~being respectively in engagement with the pair of opposing lip formations of the retaining arrangement of the elongated primary-slat-body for connecting the second portion of the corresponding one of the at least two thermal insulating units to the elongated primary-slat-body.~~

~~16. The shutter curtain as claimed in claim 13 or 14,~~

~~wherein each of the at least two primary slats further comprises a primary-slat-support-frame coupled to the elongated primary-slat-body, the primary-slat-support-frame having a pair of grooves directed away from each other along two opposite edge portions of the primary-slat-support-frame, and a recess portion between the two opposite edge portions of the primary-slat-support-frame,~~

~~wherein the primary-slat-support-frame is coupled to the elongated primary-slat-body with the pair of grooves of the primary-slat-support-frame respectively slide over the pair of opposing lip formations of the elongated primary-slat-body,~~

~~wherein the second portion of the corresponding one of the at least two thermal insulating units is inserted and retained in the recess portion of the primary-slat-support-frame.~~

~~17~~13. The shutter curtain as claimed in any one of claims ~~16~~1 to 12, wherein the primary-slat-support-frame is made from a sheet of material roll-formed to bend the two opposite edge portions of the primary-slat-support-frame to form the pair of grooves and to bend a region between the two opposite edge portions of the primary-slat-support-frame to form an open channel defining the recess portion.

~~18~~14. The shutter curtain as claimed in any one of claims ~~12 to 17~~1 to 13, wherein the elongated primary-slat-body is made from a sheet of material roll-formed to integrally form the first interlockable longitudinal edge portion, the second interlockable longitudinal edge portion, and the retaining arrangement.

~~19~~15. The shutter curtain as claimed in any one of claims 1 to ~~18~~14, further comprising insulating material inserted between each of the at least two primary slats and the corresponding one of the at least two secondary slats, wherein the elongated secondary-

slat-body of each of the at least two secondary slats further comprises an auxiliary retaining arrangement to keep the insulating material in place.

~~20~~16. A roller shutter, comprising

a drum; and

the shutter curtain according to any one of claims 1 to ~~19~~15, wherein the shutter curtain is attached to the drum in a manner so as to be capable of being rolled on and off the drum when the drum is being rotated.