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2,887,153

LIGHTWEIGHT ADJUSTABLE LOUVRES

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2 Sheets-Sheet 1

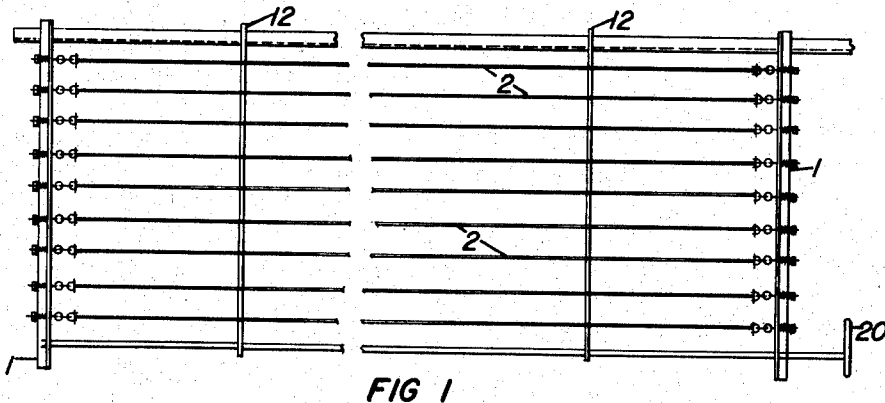


FIG 1

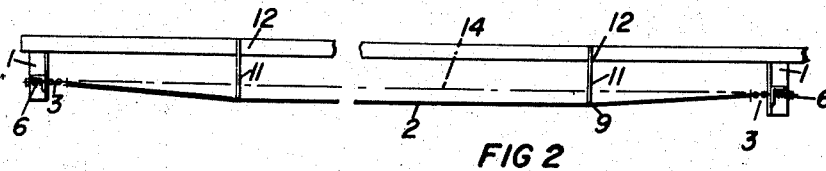


FIG 2

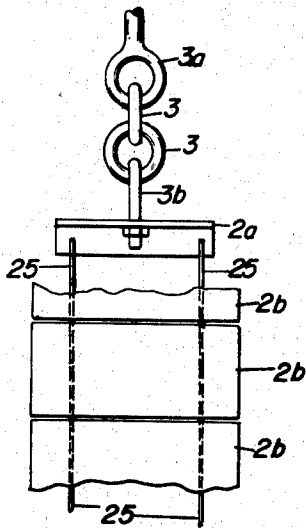


FIG 9

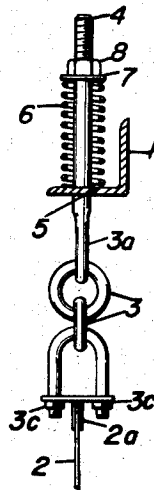


FIG 3

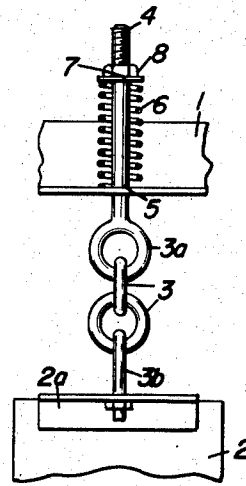


FIG 4

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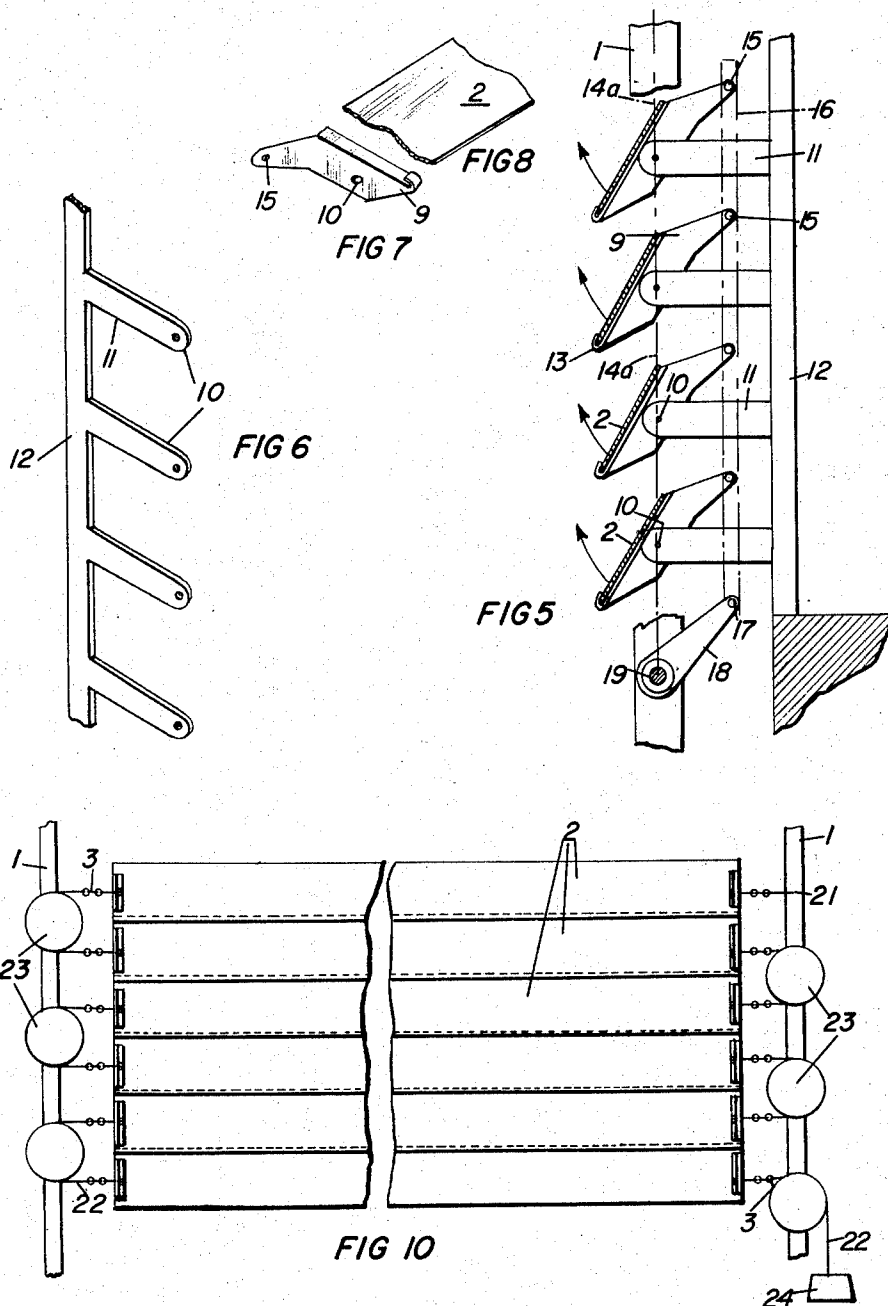
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LIGHTWEIGHT ADJUSTABLE LOUVRES

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LIGHTWEIGHT ADJUSTABLE LOUVRES

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11 Claims. (Cl. 160—166)

This invention relates to adjustable louvres, such as are fitted to windows and other openings in buildings and other places or structures, of the kind in which the louvre elements are rotatably mounted so that their angle of tilt is adjustable and in which the elements are mechanically coupled together for simultaneous operation for opening and closing the louvres. One form of louvre for which the present invention has especially, but not exclusively, been devised is that kind of adjustable louvre which finds service primarily as a sun shield for buildings in hot climates, and which is fitted to the exterior of the building and is controlled from inside the building so that it can be opened and closed to any extent necessary to obtain the desired shielding from the sun and control over the admission of light and air.

The principal object of the invention is to provide an improved louvre which is of comparatively light construction, even in the case of large adjustable louvre installations on buildings like those above-mentioned, while also producing a louvre which is efficient and durable in service.

With this object in view the invention provides a louvre having flexible louvre elements attached by their ends to end members which support said elements between them, and tensioning means arranged for applying tensioning to said elements through their attachments to said supports so as to hold said elements taut and thereby impart rigidity to them, said louvre elements being cambered to increase their rigidity.

The invention also provides a louvre having flexible louvre elements attached by their ends to end members which support said elements between them, and tensioning means arranged for applying tension to said elements throughout their attachments to said supports so as to hold said elements taut and thereby impart rigidity to them, said louvre elements being rotatably attached to their said end supports by round link chains which allow the elements to be maintained taut while allowing them to be turned for adjusting their angle of tilt.

The invention further provides an adjustable louvre having flexible louvre elements attached by their ends to end members which support elements between them, and tensioning means arranged for applying tension to said elements throughout their attachments to said supports so as to hold said elements taut and thereby impart rigidity to them, said louvre elements being rotatably attached to their said end supports by mountings which allow the elements to be maintained taut while allowing them to be turned for adjusting their angle of tilt, said louvre elements further being attached at one or more places along their length to pivoted keepers which are mechanically coupled to a common actuating member for turning the keepers, and thereby the louvre elements, simultaneously.

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In order that the invention may be more clearly understood and readily carried into practice, an embodiment and modifications thereof as applied to adjustable louvres suitable for buildings will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a diagrammatic front elevation showing louvres in open position.

Fig. 2 is a diagrammatic plan view.

Fig. 3 is a fragmentary view drawn to a larger scale showing the end mounting of the louvre elements in greater detail.

Fig. 4 is a front elevation view of the detail of Fig. 3.

Fig. 5 is a fragmentary end view drawn to a larger scale showing details of the guiding keepers and their operating mechanism.

Fig. 6 is an isometric view showing the upright intermediate member with projecting arms.

Fig. 7 is an isometric view of the louvre element guide keeper.

Fig. 8 is an isometric view of the louvre element.

Fig. 9 is an isometric view showing the construction of the louvre element with two parallel flexible wires held in tension.

Fig. 10 is a view similar to Fig. 1 showing a modified arrangement for tensioning the louvre elements.

Referring to the drawings, the louvre comprises a pair of upright angle irons 1, 1 intended for fixture to a building at a desired location and serving as end supports for the louvre elements 2. The latter are made of whatever length is desired, and of flexible material in accordance with this invention. They may be made of aluminium strip, for instance. These elements are held taut between the uprights 1, 1 so that rigidity is imparted to the otherwise flexible elements. Further, each element is rotatably mounted. In this embodiment the required swivel mounting for the elements are provided by round link chains 3 attaching each end of each element 2 to the adjacent upright 1, as shown in detail in Figs. 3 and 4. The end link 3a, adjacent the upright 1, of each chain 3 is provided by the eye of an eye bolt 4 which passes through a hole 5 in the upright 1 and is fitted with an encircling helical compression spring 6 which abuts at one end against the upright 1 and at the other end against an abutment 7 on the bolt. The abutment 7 is adjustable along the bolt 4 by means of a nut 8 screwed on the bolt end, whereby the power of the spring 6 may be adjusted. It will be evident that since the upright 1 is fixed the spring 6 acts against the abutment 7 to urge the bolt 4 away from the end of the element 2, thus applying tension longitudinally through the bolt and chain 3 and 3b to the louvre element 2. The U link 3B is passed around the link 3 and connected to the louvre element holder 2A (one at the top and one at the bottom) by means of the nuts 3C, as shown in Figs. 3 and 4. In the illustrated embodiment, each element 2 has such a spring tensioning arrangement as shown in Figs. 3 and 4 at each end of the element, as is indicated in Figs. 1 and 2. Each element 2 is thereby held taut while its attaching chains 3 allow it to be turned for adjusting its angle of tilt.

In this link chain bearing all the links while in tension are in point contacts against each other and thereby the turning friction is considerably reduced. At the time of closing and opening the louvres, the links 3 and 3B turn only while the link 3A although it does not turn, has a to and fro movement.

Referring to Figs. 2, 5, 7 and 8, at points along their length the elements 2 are attached to keepers 9 which are

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pivoted at 10 on projecting arms 11 mounted on suitably placed intermediate uprights 12 fixed to the building. The number of these intermediate uprights 12 may be two or more, as desired according to requirements and the length of the louvre elements 2. The elements 2 are attached to the keepers 9 in any convenient manner. For example, with elements 2 made of aluminum or other thin metal strip the keepers 9 may be provided with a lip or channel 13 (see Figs. 5, 7 and 8) receiving the edges of the elements 2 as shown. For each louvre element 2 the bolt holes 5 in the two end uprights 1, 1 (see Fig. 3) and the pivots 10 (see Figs. 5 and 6) of the intermediate keepers 9 are all aligned in a straight line as indicated by the chain-dotted line 14 in Fig. 2. Thus, the faces of the keepers 9 against which the element 2 bears are offset from the pivots 10, as is seen in Figs. 2 and 5, and hence the keepers hold the louvre element offset from the centre line 14 so that the element is cambered (i.e. slightly bowed outwardly) between the end uprights 1, 1 as is shown in Fig. 2. This camber increases the rigidity of the tensioned element.

The louvre elements 2 are mechanically coupled for simultaneous operation to adjust their angle of tilt. For this purpose, the vertical bank of keepers 9 carried by each upright 12 are linked at 15 to a common upright coupling bar 16. In turn, the coupling bars 16 of the respective banks of keepers are respectively linked at their lower ends at 17 to arms 18 fixed to a common horizontal operating bar 19 which is mounted for rotation on its axis. The pivot axes 10 of the keepers 9 and the axis of the bar 19 all lie in the same vertical plane 14a (see Fig. 5). By turning the bar 19 its arms 18 move arcuately up or down and thus turn the keepers 9 to open or close the louvre elements 2, as is indicated in Fig. 5. The bar may be rotated by means of a handle 20 (see Fig. 1) fitted to the bar, or any other convenient means may be provided according to requirements, such as for instance, any suitable mechanical transmission for operating the bar 19 from a remote point.

In the embodiment of Figs. 1 to 6, each louvre element 2 is tensioned by a spring 6 at each end of the element. Instead of this arrangement a spring 6 may be provided at only one end of the element and in that case the swivel chain 3 at the other end of the element would be fixed to a fixed anchorage on the adjacent upright 1 without provision of a tensioning spring at that place. Each louvre element 2 can be constructed of two parallel flexible wires 25 as shown in Fig. 9 and which are fixed to the louvre element holder 2A and held in tension in the manner already described, and which support between them sheets or strips 2B of any thin suitable flexible material attached to the said wires. As a further alternative, instead of providing each louvre element individually with a tensioning spring at each, or at one, of its ends as has been described above, tensioning means may be provided common to two or more or all of the louvre elements by connecting them in series and arranging for such tensioning means to act on all the louvre elements in the series. An example of such an arrangement is illustrated in Fig. 10 in which the uppermost louvre element 2 is attached by its swivel chain 3 at one end (the right hand end as seen in the figure) to a fixed anchorage 21 on the adjacent end upright 1. The swivel chain 3 at the other end of that topmost louvre element is attached to one end of a flexible connecting wire or the like 22 which passes round a pulley 23 mounted on the adjacent upright 1, the other end of the connecting member 22 being attached to the swivel chain 3 of the next element 2 below. This manner of connecting the elements is repeated at each end as shown in Fig. 10 so as to connect the elements in series by means of the connecting members 22 until at the bottom louvre element the last connecting member 22 in the series is attached to a weight 24. The latter thereby applies tension to each and all of the louvre elements 2 so that each of them is held taut. Naturally, instead of

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the weight 24 a spring or any other suitable tensioning device may be provided.

I claim:

1. An adjustable louvre comprising a plurality of flexible louvre elements, end support supporting said louvre elements between them, mountings on the end of said louvre elements rotatably attached to said end supports, said mountings comprising a plurality of round links in point contact against each other, tensioning means connected between said end members and said mountings for applying tension to said end members for holding said elements taut and thereby imparting rigidity to them, pivoted keepers to which said louvre elements are attached at at least one place along their length and a common actuating member to which said keepers are mechanically coupled for turning the keepers, and thereby the louvre elements, simultaneously.

2. An adjustable louvre as claimed in claim 1, wherein there are at least two keepers for each of said louvre elements and said keepers project beyond an imaginary line joining the mountings at opposite ends of said louvre elements, thereby cambering the louvre elements to increase their rigidity.

3. A louvre as claimed in claim 1, wherein said louvre elements are made of thin, flexible metal strip or sheet material.

4. A louvre as claimed in claim 1, in which said louvre elements each consist of two parallel flexible wires and strips of thin, flexible material attached between said wires, said wires being held taut to tauten the material attached to them.

5. An adjustable louvre as claimed in claim 1 for installation on the outside of a building and in which said end supports comprise upright end members attachable to the building and said keepers comprise at least one intermediate upright member for attachment to the building between said end uprights and on which said keepers are mounted.

6. A louvre comprising a plurality of flexible louvre elements, end members for supporting said louvre elements between them, mountings comprising a plurality of round links in point contact against each other connected between said louvre elements and said end members, tensioning means connected between said mountings and said end members for applying tensioning to said louvre elements for holding said louvre elements taut and thereby imparting rigidity to them, pivoted keepers to which said louvre elements are pivotally attached at at least one place along their length, said pivoted keepers projecting beyond the imaginary line joining the mountings at the opposite ends of said louvre elements, thereby cambering the louvre elements to increase their rigidity, and a common actuating member to which said pivoted keepers are mechanically coupled for turning the keepers, and thereby the louvre elements, simultaneously.

7. A louvre as claimed in claim 6, in which said tensioning means comprise spring means at each end of each of said louvre elements.

8. A louvre as claimed in claim 6, in which said tensioning means comprise spring means at one end of each of said louvre elements.

9. A louvre as claimed in claim 6, in which said louvre elements are aluminum strip.

10. A louvre as claimed in claim 6, in which said louvre elements each comprise two parallel flexible wires and sheets of thin, flexible fibrous material attached to the wires between them, said wires being held taut to tauten the material attached to them.

11. A louvre comprising a plurality of flexible louvre elements, end members for supporting said louvre elements between said end members, round link chains rotatably attached between said elements and said end members for holding said elements while allowing them to be turned for adjusting their angle of tilt, and tensioning means connected between said link chains and said

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end members for applying tensioning to said elements for holding said elements taut and thereby imparting rigidity to them.

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