

E. SORENSON.
FOLDING METALLIC AWNING.
APPLICATION FILED MAY 18, 1911.

Patented June 25, 1912.

1,030,493.

7 SHEETS-SHEET 1.

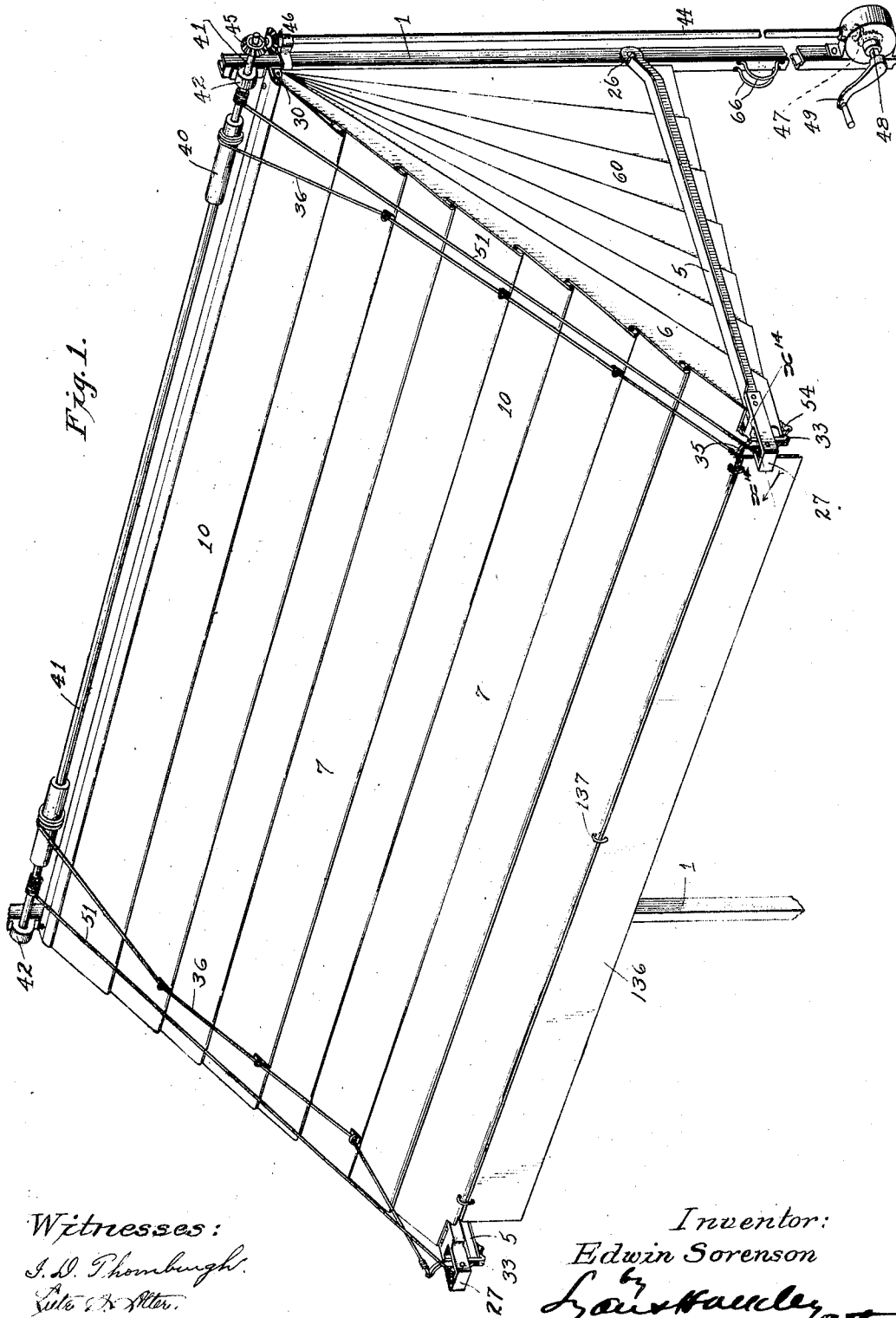


Fig. 1.

Witnesses:
J. D. Thornburgh.
J. L. H. Allen.

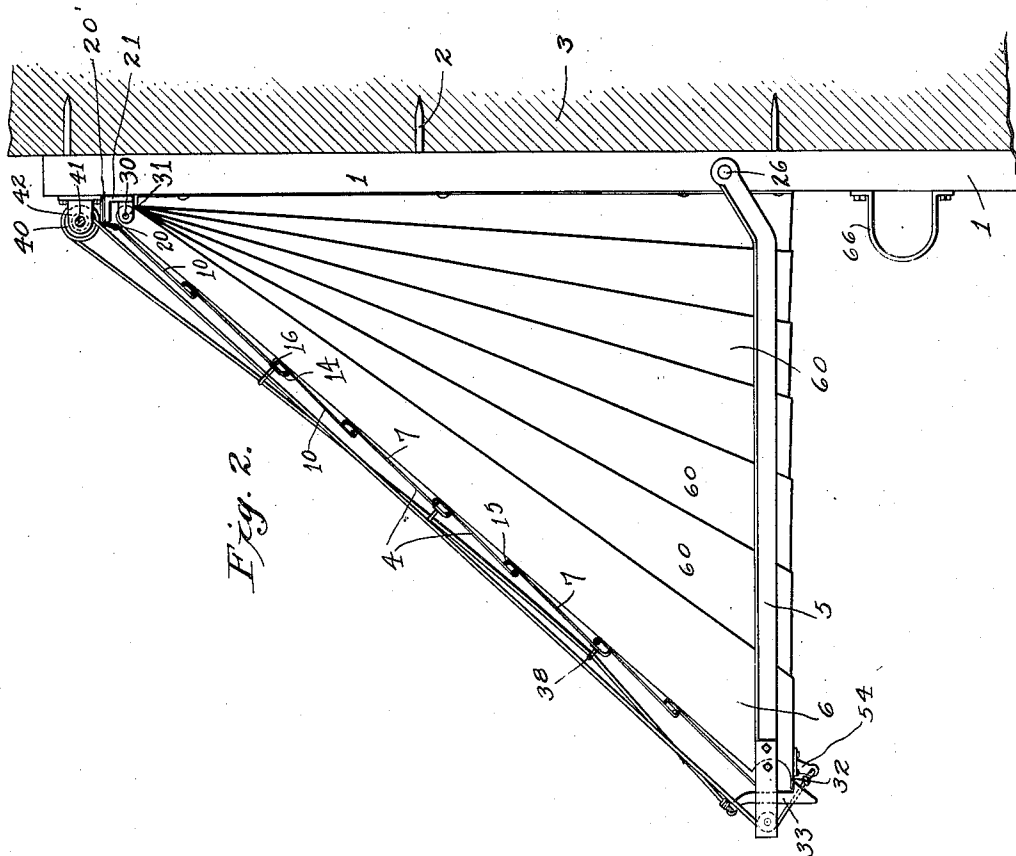
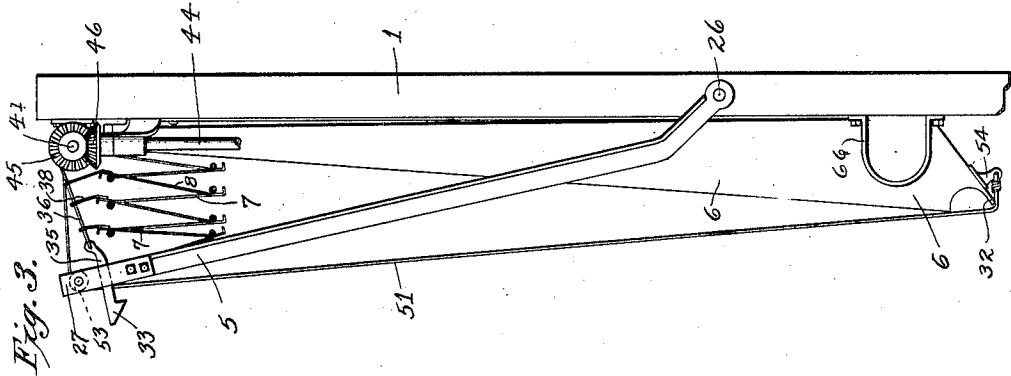
Inventor:
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7 SHEETS-SHEET 2.

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Witnesses:
J. D. Thornburgh,
Lito D. Alter.

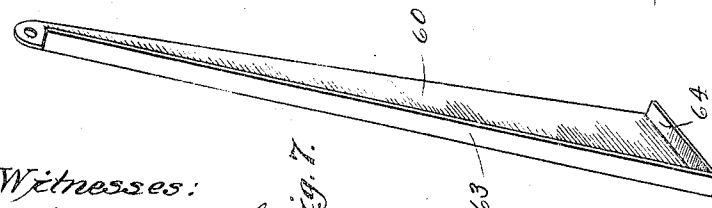
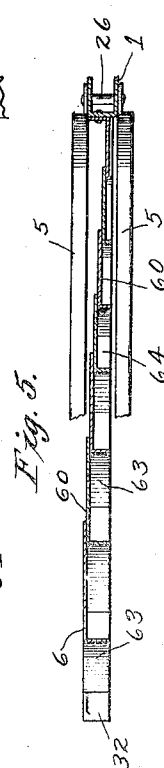
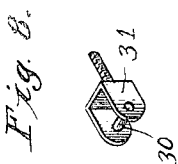
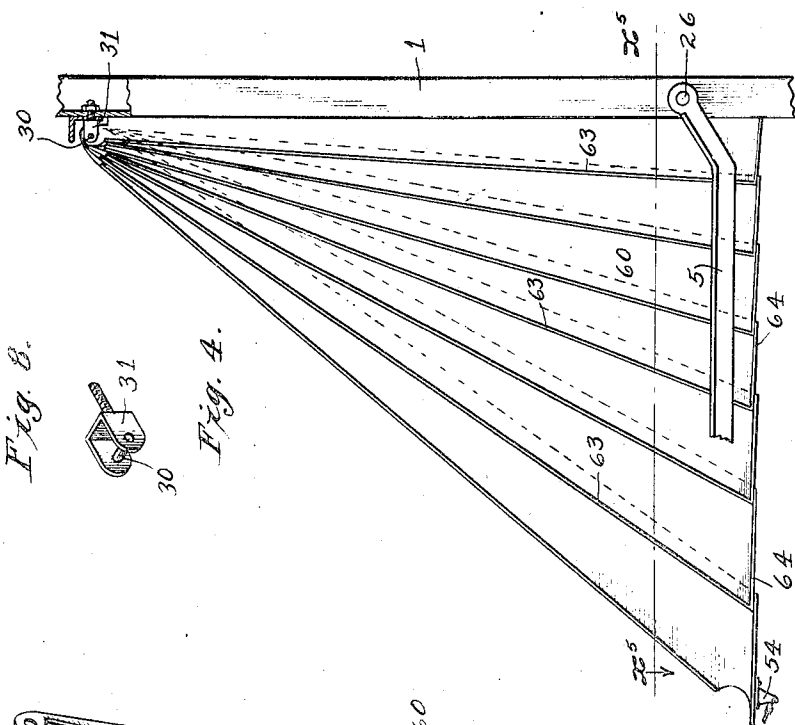
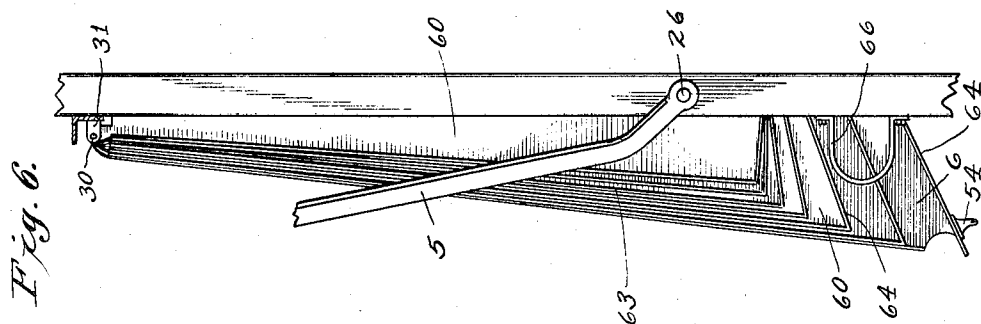
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7 SHEETS—SHEET 3.



Witnesses:
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7 SHEETS—SHEET 4.

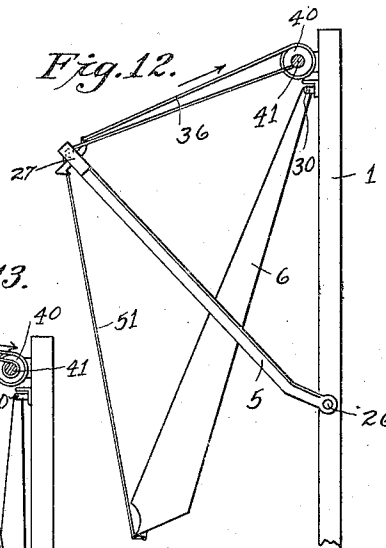
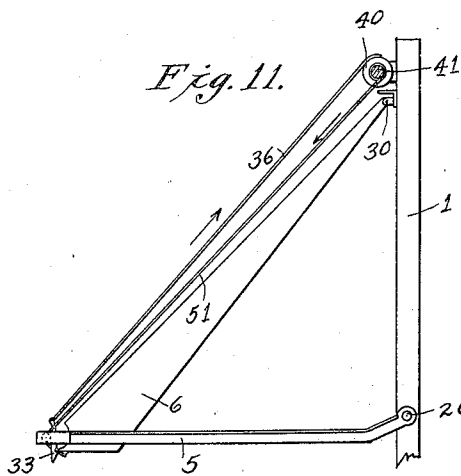
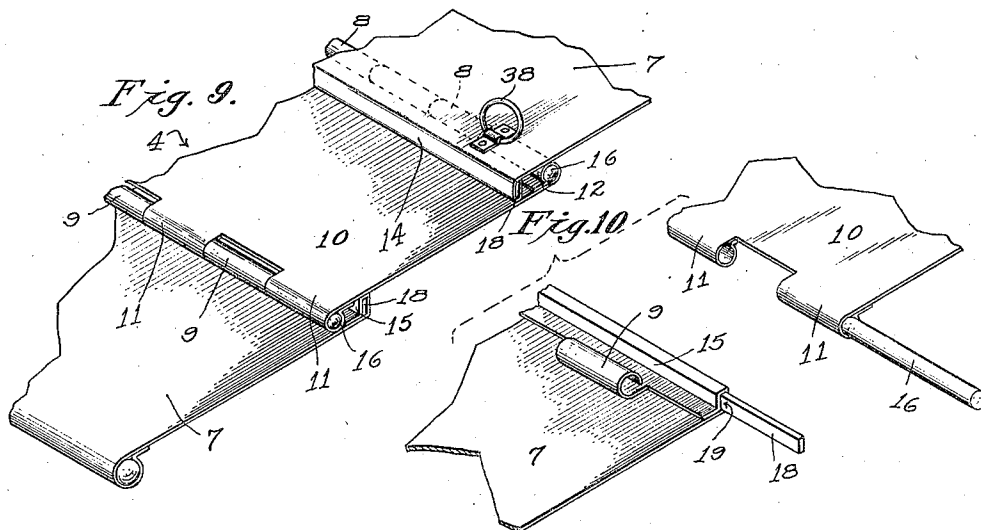
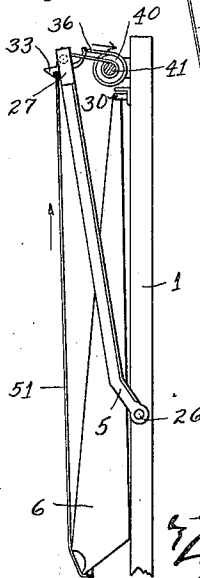


Fig. 13.



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J. D. O. Allen.

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APPLICATION FILED MAY 18, 1911.

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7 SHEETS—SHEET 5.

Fig. 14.

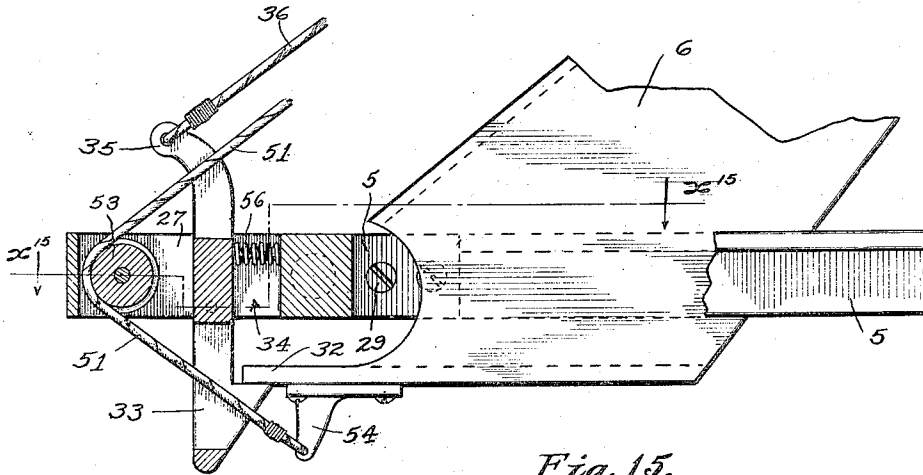


Fig. 15.

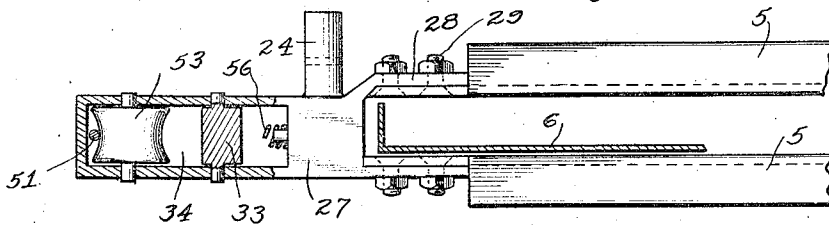


Fig. 17.

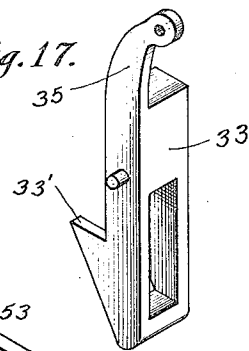
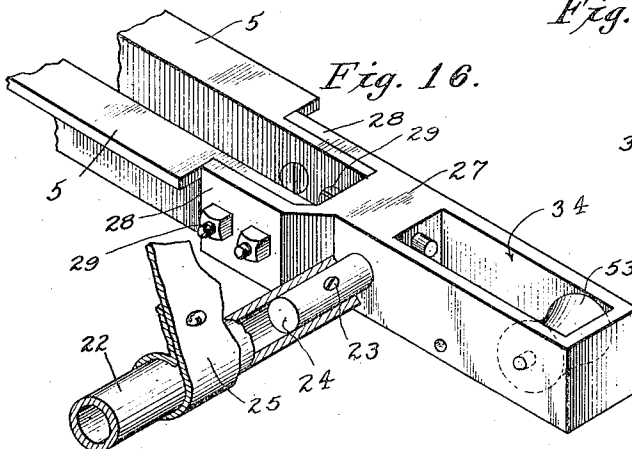


Fig. 16.



Witnesses:
J. H. Thornburgh.
L. O. Allen.

Inventor:
Edwin Sorenson.
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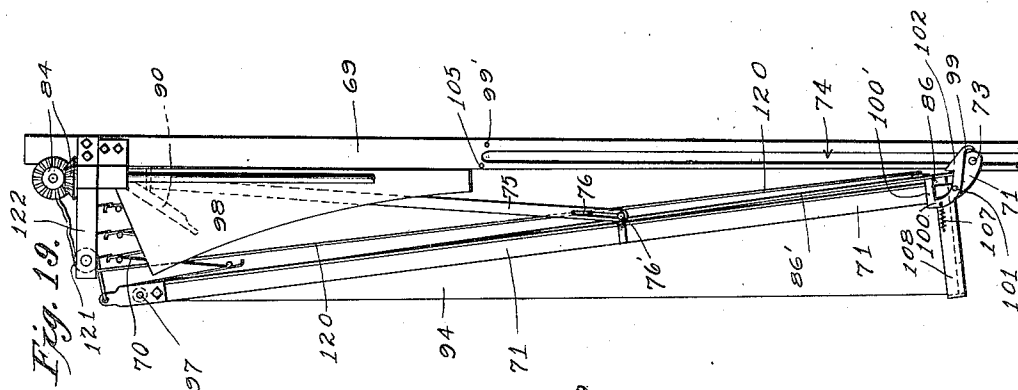


Fig. 18.

Fig. 21.

Fig. 20.

Fig. 22.

Witnesses:
J. D. Thornburgh.
Att. O. Allen.

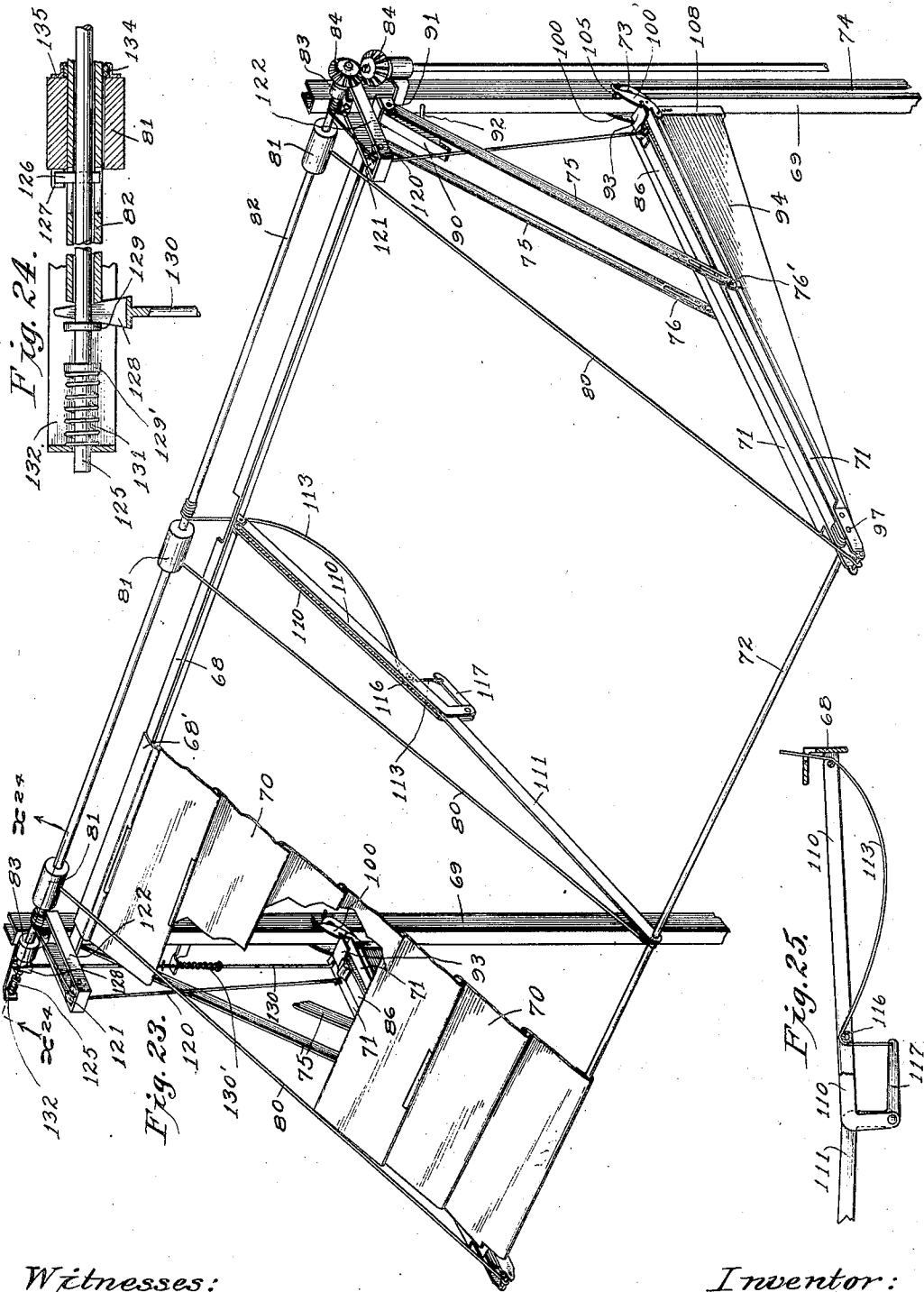
Inventor:
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James H. Allen
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7 SHEETS—SHEET 7.



Witnesses:
J. D. Thornburgh,
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Inventor:
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By *James H. Mackley*, atty.

UNITED STATES PATENT OFFICE.

EDWIN SORENSON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO
LAWRENCE L. STEVENS, OF LOS ANGELES, CALIFORNIA.

FOLDING METALLIC AWNING.

1,030,493.

Specification of Letters Patent.

Patented June 25, 1912.

Application filed May 18, 1911. Serial No. 628,129.

To all whom it may concern:

Be it known that I, EDWIN SORENSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Folding Metallic Awning, of which the following is a specification.

This invention relates to improvements in awnings for shading and protecting from the weather such exposed portions of buildings, as windows and other apertures, where awnings are adapted to be used.

The main object of the invention is to provide a metallic awning which can be folded against the building or support.

Another object of the invention is to provide an awning which will be fireproof.

Another object of the invention is to provide convenient means for simultaneous operation of the several parts or members of the awning.

A further object of the invention is to provide a construction adapted to shed the water effectually when in lowered position.

Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate the invention, and referring thereto: Figure 1 is a perspective of one form of the awning, this form being especially adapted to comparatively steep awnings. Fig. 2 is an end elevation of the awning shown in Fig. 1. Fig. 3 is an end elevation of the awning in folded position. Fig. 4 is an inside view of one of the end portions of the awning. Fig. 5 is a section on line x^5-x^6 in Fig. 4. Fig. 6 is an inside view of the end of the awning in folded position. Fig. 7 is a perspective of one of the sheets or sectors for the end portion of the awning. Fig. 8 is a perspective of the pivot or support for the end portion of the awning. Fig. 9 is a perspective of portions of several adjacent roof sheets. Fig. 10 is a perspective of adjoining portions of two roof sheets in separated position. Fig. 11 is a diagrammatical vertical section showing the position of the parts when the awning is down. Fig. 12 is a similar view showing the position of the parts when the awning is half raised. Fig. 13 is a similar view showing the posi-

tion of the parts when the awning is folded or completely raised. Fig. 14 is a vertical section on line $x^{14}-x^{14}$ Fig. 1. Fig. 15 is a section on line $x^{15}-x^{15}$ Fig. 14. Fig. 16 is a perspective of the supporting means for the catch device shown in Fig. 14. Fig. 17 is a perspective of said catch device. Fig. 18 is an end elevation of a form of the awning adapted for use where the outward projection of the awning is greater than its height, the awning being shown in lowered position. Fig. 19 is a similar view, the awning shown in raised or folded position. Fig. 20 is a section on line $x^{20}-x^{20}$ in Fig. 18. Fig. 21 is a section on line $x^{21}-x^{21}$ in Fig. 18. Fig. 22 is a perspective of two members of the end portion of the awning. Fig. 23 is a perspective of the form of the awning shown in Fig. 18, the awning being shown with the roof portion lowered and partly broken away, and with the end portion partly lowered. Fig. 24 is a vertical section on line $x^{24}-x^{24}$ in Fig. 23. Fig. 25 is a vertical section showing one of the intermediate braces for the awning, the same being shown in extended position.

Referring to the form shown in Figs. 1 to 17 the awning is preferably mounted on vertical supports or members 1, secured by means of nails 2, or otherwise, to a wall of a building, indicated at 3, or to posts, columns, etc., as the case may be. The awning comprises a folding roof 4, arms 5, mounted to fold on supports 1, and connected to the roof to hold the same in extended position, rafters 6, for engaging under the roof to support the same in straight extended position, and operating means connected to aforesaid parts for folding and lowering the awning. Roof 4 consists of a series of roof elements in the form of sheets or plates of sheet metal, each of said sheets being hinged or pivoted to the adjacent sheets. The roof sheets overlies the hinges so as to prevent water from running through the joints. Alternate sheets, indicated at 7, are made wider than the distance between the hinges, and hinge sleeves 8, are formed or secured to the lower face of said sheets 7, a short distance above their lower edges, and hinge sleeves 9 are formed on or secured to the upper face

of said sheets 7, a short distance below their upper edges. The intermediate sheets 10', alternating with the sheets 7, are formed with hinge sleeves 11, at their lower edges, and with sleeves 12 at their upper edges, sleeves 11 extending downwardly from the sheets 10, to lie in alinement with the upturned sleeves 9, on top of the next lower sheet 7, and sleeves 12, at the upper edges of sheet 10, extending upwardly into alinement with the downturned sleeves 8, of the next higher sheet 7. Each sheet 7 has its lower edge bent down to form a flange 14, extending downwardly into contact with the upper face of the next lower sheet 10, and each of said sheets 7 is formed at its upper edge with a flange 15, extending upwardly into contact with the lower face of the next higher sheet 10. Hinge pintles 16 in the form of rods or wires, extend through the alined sleeves 12 and 8, and hinge pintles 16, extend through the alined sleeves 11 and 9, connecting the sheets 7 and 10, together in a continuous chain that can be folded in the manner of an accordion, as in Fig. 3, or can be extended straight as in Fig. 2. In case the roof is sufficiently long to require it, a stiffening or reinforcing means, as shown in Figs. 9 and 10 may be provided consisting of a bar 18 slid into a slot 19, formed in the flange 14 or 15, the sheet metal being bent so as to form a hollow or tubular flange and its edge being extended farther and bent to form the sleeves 8 or 9. Each roof sheet or section 7 or 10 is connected to the adjoining sheets throughout its length by the hinged sleeves 11 and 9 and the pintle rods 16 engaging in said sleeves, which bind the roof into a mechanically continuous body so as to reduce to a minimum the sag, each section helping to support the adjacent sections. Moreover, the upturned and downturned flanges 18 on each sheet engaging with the adjoining sheet, serve to further brace the roof in a longitudinal direction and prevent sagging. The uppermost roof member or sheet 10, is hinged at 20 to top sheet 20' on angle iron 21 attached to support 1, and the lowermost sheet 7, is rolled over to form a sleeve 25 journaled on a longitudinal member 22, which for the sake of lightness, is preferably a pipe, having its ends fastened by screws 23, to studs 24 on arms 5, said arms 5 with the connecting pipe 22 form a rectangular frame adapted to swing in pivots 26, connecting the inner ends of arms 5 to supports 1. Fittings 27 may be provided at the outer ends of arms 5, for attachment of the parts, said fittings having arms 28 embracing the arms 5, and secured there by bolts 29 and said studs 24 being formed on and projecting from their fittings. The rafters 6 are preferably formed as plates constituting a portion of folding end for the awning,

said rafters 6 being pivoted at their upper ends at 30, on brackets 31, secured to supports 1, and each rafter 6 having a projection or shoulder 32 at its lower end adapted to normally rest on a shoulder or hook 33' of a catch member 33 pivoted on fitting 27. Said catch member may extend through a slot 34, in said fitting and is provided with an upwardly extending arm 35 connected to operating means hereinafter described. The rafters when supported by catch members 33 extend in an inclined direction directly under the series of roof sheets and engages and supports said sheets so as to keep the same from sagging. The length of the arms 5 and the location of their pivots 26 are such that when the arms are lowered, the roof is thereby held out at the required angle, and when the arms are raised, their upper ends come directly in front of the top connection for the roof and fold the roof back on itself toward the supports 1. The folding operation is effected by a cable or flexible connection 36 at each end of the awning, connected at its lower end to arm 35 of catch member 33, and extending through rings 38 on the roof plates 7, said cable being connected at its upper end to drum or roller 40 on a shaft 41, mounted in bearings 42 on supports 1. Said shaft is operated by any suitable means such as a vertical shaft 44, connected by bevel gears 45 and 46 to shaft 41, and connected at its lower end by gearing 47 to a shaft 48 adapted to be engaged by an operating crank or handle 49. Operating means are also provided for the rafters 6, consisting preferably of a cable or flexible connection 51 fastened to and winding on shaft 41 at each end of the awning and running over a pulley 53 on arm 5, the lower end of said cable being connected to a bracket 54 on rafter 6. Cables 36 and 51 wind in opposite directions on the respective members 40 and 41, so that as the roof is raised, the rafters are lowered and vice versa. Pulley 53 may be mounted in the slot 34 in fitting 27. A spring 56 seated on a pin 57 in said fitting engages the catch 33 to hold the same in engagement with the shoulder on the rafter. Folding end members are preferably provided for the awning, consisting of plates or sectors 6 and 60 mounted side by side on the pivot 30 at each end of the awning, and said sectors being adapted to fold on said pivots in the manner of a fan. Each of said sectors is provided with an inturned flange 63 along its edge which is farthest from the member 1 and with an inturned flange 64 along its lower edge, and each sector fits or nests within the flanges 63 and 64 of the next outer sector. The sector 6 which is outermost, also serves as a rafter for the roof, as above described. When these rafters are raised, the flanges 64 on each member 6 or 60

engage under the flange 60 of the next inner member to raise and sustain the same in open position as shown in Fig. 4, and when rafters 6 are lowered, the sectors 60 gravitate in folded position, shown in Fig. 6. Guides or brackets 66 are provided to receive and guide the sectors when they are lowered into closed position.

The operation is as follows: Assuming that the awning is in extended or raised position and that it is desired to fold or lower the same, the shaft 41 is operated, as by means of the operating means above described to turn drum 40 so as to wind cable 36 thereon, the pull on this cable first releasing catch from rafter 6, and then drawing the arms 5 and the lower end of the roof, upwardly, the roof members folding on one another as shown in Fig. 3. At the same time the cable 51 unwinds from the shaft 41 and allows the rafters 6, with the sector members 60 supported thereby, to descend to closed position as shown in Figs. 3 and 6. Referring to Figs. 11 to 13, it will be noted that as the arms 5 swing from the extending position shown in Fig. 11 to the folded position shown in Fig. 13 they pass through an intermediate position shown in Fig. 12 in which the suspending cable 51 is bent out at a considerable angle. In order to provide for paying out cable from the shaft 41 to permit of this bending of the cable and at the same time lowering the rafters, the said cable 51 is preferably wound on the shaft 41 and connected thereto in such manner that in the first part of the winding up movement of the other cable 36 for raising the arms 5, the said cable 51 is unwound until the position of Fig. 12 is reached, allowing the rafters 6 to descend and the cable to be bent by the outward projection of the arms 5 as in Fig. 12, and then in the further winding up movement of the cable 36 the rafter supporting cable 51 also winds up until the parts reach the position shown in Fig. 13. It will be noted that the movement required for cable 51 is less than for cable 36 and this is provided for by the difference in diameter between the shaft 41 and the drum 40. When the cable 36 is wound up on the drum 40 it supports the roof-sections by engaging in the rings 38 on said sections so as to keep the roof from sagging.

Where the outward projection of the awning is greater than its height so that it is not convenient or practicable to cause the extending arms to swing upward and inward to the supporting member, I prefer to adopt the construction shown in Figs. 18 to 25. Supporting members 69 are provided carrying a longitudinal bar or beam 68 to which the upper sector of the roof is hinged at 68'. The roof 70 in this instance is of similar construction to that described and

folds in the same manner, said roof being in this case supported by a folding frame consisting of a longitudinal member 72 connected to the outer ends of arms 71 whose inner ends carry pins 73 sliding in vertical slots 74 in the supporting members 69. Bars 75 pivoted at their upper ends to the bars or beams 68 which support the upper end of the roof are pivoted at their lower ends to said arms 71 by pins 76' on arms 71 engaging in slots 76 in bars 75. The arms 71 are preferably made in pairs with a supporting bar 75 at each side thereof, the space between the arms 71 serving to receive the sectors for closing the ends of the awning as hereinafter set forth. Cable or flexible connections 80 are connected at their lower ends to the outer ends of the arms 71 and are connected at their upper ends to drums 81 mounted on an operating shaft 82 journaled in bearings 83 on the supporting members 69, said shaft being operated through gearing 84 and manual operating devices as above indicated for shaft 41. In case the awning is so long that it is liable to sag between the ends, intermediate rafter means may be provided consisting, for example, of one or more sets of bars 110, 111, bars 110 being pivoted at their upper ends to the fixed bar 68 and bar 111 being pivoted at its upper end to the bar 110 and at its lower end to the longitudinal lower member 72 of the folding frame, these bars 110, 111 being extended to straight position directly beneath and engaging the roof when the awning is extended and folded to collapsed position when the awning is lowered. To raise these bars 110 and 111 to extended position, a cable 113 is provided, winding on shaft 82 and running over a pulley 116 on bar 110, and connected at its lower end to an extension 117 from the bar 111, so that as the shaft 82 is rotated to unwind the roof raising cables it will also draw on the bar 111 to pull the said bars 110 and 111 into straightened position. The sectors 86 and 94 are lowered and raised by means of a cable 120 connected at its lower end to the uppermost sector 86 and extending up over a pulley 121 on a fixed bracket 122 and winding over and connected to the shaft 82 aforesaid. In extending the awning it is desirable that the roof should be first lowered and the end sectors then raised so as to avoid interference of the sectors with the other parts, and to provide for this the operating drums for the roof raising cables are preferably mounted loose on the shaft 82 and are connected thereto by means which are automatically released when the roof is lowered. A rod 125 slides longitudinally in the shaft 82 and is provided with pins 126 engaging with projections 127 on the respective drums 81 to effect rotation of the

drums by rotation of the shaft. A wedge 128 engaging between the end of the shaft 82 and a collar 129 on said rod 125 operates to release the said pins 126 from engagement with the projections 127 on the said drums when the said wedge is raised, this raising of the wedge being effected by a stem 130 extending downwardly from said wedge and engaged by the arms 71 when the said arms are raised to horizontal position. A spring 130' tends to depress said wedge and a spring 131 engaging with the collar 129' on said rod 125 and with a fixed abutment 132 tends to hold the rod in such position as to effect rotative engagement between the shaft 82 and the drums 81. When the arms 71 are raised to horizontal position by the cable 120, the above described clutch means releases the shaft 82 from the drums 81 and allows said drums to lie idle while said shaft continues to rotate. Means such as a collar 134 engaging between the end of drum 81 and a flange 135 on said drum holds the drum from endwise movement in the operation of the clutching means. The rafters in this form of the invention preferably consist of sectors or plates 86 pivoted to the outer portions of the bars 71, said sectors being raised to position in which they extend directly under and engage with the roof by cables 120 connected to the upper end of said sectors and winding over the shaft 82 aforesaid. Bars 90 pivoted at 91 to the fixed bar 68 aforesaid extend over projections 93 at the upper ends of the said sectors 86 to form in connection therewith a continuous rafter for the roof when the sectors are raised. When the sectors are lowered, the said bars 90 swing down against stops 92. The end portions of the awning further comprise in this case, a series of sectors 94 pivoted on pivots 97 on arms 71 to fold fan-wise on one another and on the arms 71, the said sectors being provided with inwardly extending flanges 95 and nesting within one another when folded and each sector being provided with an arm or projection 96 extending around the end of the next higher sector and over the inwardly extending flange 95 on said next higher sector, so that each sector as it rises will pick up the next sector below it. These sectors being pivoted at the outer end of the arms 71, their inner ends swing in and out, and to close the space between the arc and the supporting member 69, plates 98 may be provided attached to the supporting members 69 which extend over the edges of the sectors 86 and 94. In raising the roof and the supporting arms 71 therefor, it is desirable that the fan-shaped end means should be maintained in folded position until the said supporting arms reach a horizontal position thereby preventing the said

end member from interfering with the supports. For this purpose catches 100 are pivoted at 101 on the said arms and are provided with hook-portions 102 adapted to engage over the projections 93 of the top sectors or rafters 86, this hook being released from such engagement at the proper time by a pin 105 on the supporting member 69 engaging with an inclined portion 106 of said catch. A spring 107 tends to draw the catch into position to engage over the rafter. A stirrup 108 on the inner end of the arms 71 is adapted to receive the several sectors when they are in folded position. When the awning is fully extended, the arms 71 settle into position with hooks 99 on the catches 100, engaging with pins 99' on supports 69, the slots in bars 75 permitting of this settling operation. When the end member is folded a projection 100' on catch 100 engages with the flange 86' on rafter 86 and lift the hook 99 off of pin 99'. A front plate 136 may be hinged on the lower end of the roof by eyes 137, this plate being adapted for use as a sign plate.

What I claim is:

1. In an awning, a roof composed of a plurality of sections formed as plates, each plate being hinged to the section next above the same, and hinged to the section next below the same to form a continuous chain of plates folding on one another, the hinged connections between the sections consisting of sleeves formed on adjacent sections and in alinement with one another and placed end to end to form a continuous hinged joint along the sections, and pintle rods extending in said sleeves.

2. In an awning, a roof comprising a plurality of sections formed as plates hinged together to fold on one another, forming a continuous chain of plates, alternate plates having eaves extending over the connecting hinges.

3. In an awning, a roof comprising a plurality of sections formed as plates hinged together to fold on one another, forming a continuous chain of plates, alternate plates having eaves extending over connecting hinges, said eaves being provided with flanges extending vertically to engage the adjacent roof plate.

4. An awning comprising supporting means, a roof composed of a plurality of sections connected to fold on one another, arms mounted to fold on said supporting means and connected to the lowermost of said roof sections, and means for closing the space between the roof and the supporting means at each end of the roof, comprising a plurality of sectors pivotally mounted on supporting means, one of said sectors being adapted to engage under said roof, when extended, to serve as a rafter therefor, and

means connected to said roof and supporting means to raise and lower said roof, and means connected to said sectors to move the same to open or closed position.

5 5. An awning comprising supporting means, a roof composed of a plurality of sections connected to fold on one another, the uppermost section being pivotally connected to said supporting means, arms
10 mounted to fold on said supporting means and pivotally connected to the lowermost of said roof sections, rafters mounted to fold on said supporting means, and means connected to said supporting means and to
15 the lower ends of said rafters to raise the rafters into extended position beneath the roof.

6. An awning comprising supporting means, a roof composed of a plurality of
20 sections connected to fold on one another, the uppermost section being pivotally connected to said supporting means, arms mounted to fold on said supporting means and pivotally connected to the lowermost
25 of said roof sections, rafters mounted to fold on said supporting means and catches on said arms for engaging said rafters to hold the rafters in extended position.

7. An awning comprising supporting
30 means, a roof composed of a plurality of sections connected to fold on one another, the uppermost section being pivotally connected to the supporting means, arms mounted to fold on said supporting means
35 and pivotally connected to the lowermost of said roof sections, rafters mounted to fold on said supporting means and adapted to extend under and support the roof-sections, catches on said arms engaging said
40 rafters to hold the rafters in extended position, and flexible means supported on said supporting means and connected to said catches to release the same from the rafters.

8. An awning comprising supporting
45 means, a roof composed of a plurality of sections connected to fold on one another, the uppermost section being pivotally connected to the supporting means, arms mounted to fold on said supporting means
50 and pivotally connected to the lowermost of said roof sections, rafters mounted to fold on said supporting means and adapted to extend under and support the roof of sections, catches on said arms for engaging
55 said rafters to hold said rafters in extended position, flexible operating means supported on said supporting means and connected to the said rafters, flexible operating means supported on said supporting means and
60 connected to said catches to release the catches and raise the arms, and means for operating both of said flexible operating means simultaneously.

9. An awning comprising supporting

means, a folding roof pivotally mounted at 65 its upper end on said supporting means, arms pivotally mounted on said supporting means and connected to the lower portions of said roof, rafters folding on said supporting means, a shaft extending at the upper 70 end of said roof, a flexible operating means winding on said shaft, means connecting the lower end of said flexible operating means to said arms, and a second flexible operating means winding on said shaft and connected 75 to said rafters, said arms having guide means over which said second flexible operating means pass and said shaft being provided with portions of different diameters over which said operating means are wound 80 to provide for differential movement of the operating means and of the roof and rafters operated thereby.

10. An awning comprising supporting means, a folding roof pivotally mounted at 85 its upper end on said supporting means, arms pivotally mounted on said supporting means and connected to the lower portions of said roof, rafters folding on said supporting means, a shaft extending at the upper 90 end of said roof, a flexible operating means winding on said shaft, means connecting the lower end of said flexible operating means to said arms and a second flexible operating means winding on said shaft and connected 95 to said rafters, said arms having guide means over which said second flexible operating means pass and said shaft being provided with portions of different diameters over which said operating means are wound 100 to provide for differential movement of the operating means and of the roof and rafters operated thereby, and sectors for closing the space between said roof and the supporting means, said sectors folding on one 105 another and said sectors and rafters being provided with inter-engaging flanges to extend the sectors by the extension of the rafters.

11. An awning comprising supporting 110 means, a folding roof pivotally mounted at its upper end on said supporting means, arms pivotally mounted on said supporting means and connected to the lower portions of said roof, rafters folding on said supporting means, a shaft extending at the 115 upper end of said roof, a flexible operating means winding on said shaft, means connecting the lower end of said flexible operating means to said arms, said means consisting 120 of a catch pivotally connected to said arms and engaging with said rafters, the upper end of said catch being connected to said flexible operating means, and a second flexible operating means winding on said shaft 125 and connected to said rafters, said arms having guide means over which said second flexible operating means pass and said shaft

being provided with portions of different diameters over which said operating means are wound to provide for differential movement of the operating means and of the roof and rafters operated thereby; and sectors for closing the space between said roof and the supporting means, said sectors folding on one another, and said sectors and said rafters being provided with inter-engaging

flanges to extend the sectors by the extension 10 of the rafters.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 11th day of May, 1911.

EDWIN SORENSON.

In presence of—

ARTHUR P. KNIGHT,
GLADYS RUSSELL.