L. HORNOR.
STORM TOP FOR VEHICLES.
APPLICATION FILED JAN. 6, 1906.
To all whom it may concern:

Be it known that I, LEVI HORNOR, a citizen of the United States, residing at Wichita, in the county of Sedgwick and State of Kansas, have invented a new and useful Storm-Top for Vehicles, of which the following is a specification.

This invention relates to storm-tops for vehicles—such as buggies, express and other wagons, automobiles, and the like; and the principal objects of the invention are to provide simple and improved means whereby flexible side curtains may be manipulated and stored in a flat condition between the outer covering and the lining of the top where said curtains will be protected from exposure when not in use.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts, which will hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings have been illustrated several simple and preferred forms of embodiment of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations, and modifications may be resorted to within the scope of the invention when desired.

In the drawings, Figure 1 is a longitudinal sectional view of a wagon-top equipped with storm-curtains at the sides and at the front and rear ends and exhibiting different means for manipulating the curtains. Fig. 2 is a transverse sectional view taken on the plane indicated by the line 2 2 in Fig. 1. Fig. 3 is a transverse sectional detail view taken on the plane indicated by the line 3 3 in Fig. 1. Figs. 4, 5, and 6 are transverse sectional views illustrating modifications. Fig. 7 is a sectional detail view taken on the plane indicated by the line 7 7 in Fig. 6. Fig. 8 is a detail view, enlarged, illustrating a locking device applicable to the various forms of curtains.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

The curtains used in the several forms of the present invention are preferably made of flexible waterproof material. In the cheaper grades leather or textile material of various grades treated with rubber or a composition containing rubber will be preferably employed, and said curtains may be provided, if desired, with windows of transparent cellulooid or other suitable material. So-called "curtains," composed of wooden or metallic slats hingedly connected with each other along their edges, will, however, not be used, curtains thus constructed being objectionable on account of their excessive bulk and weight and because they are apt to produce unpleasant rattling noises. The flexible material of the curtains may, however, be reinforced at intervals by means of transverse stiffening-strips, as will be hereinafter more fully set forth.

In carrying the invention into practical operation the vehicle-body (represented at 1) is provided with bows, as 2 2, said bows supporting the stationary outer top covering 3 and the inner lining 4, between which there is an intervening space of suitable dimensions. It is to be distinctly understood that within the scope of the invention two or more bows may be employed and that these bows may be relatively arranged and spaced apart in any suitable manner, which is not regarded as being limited by the forms illustrated in the drawings.

Side curtains, as 5, are arranged to slide between a pair of bows 2 2, said bows being provided in their side edges with grooves, as 6, to accommodate the edges of the curtains. In the top members of the bows the grooves are made sufficiently wide to amply accommodate the two side curtains when lying flat one above the other, partition-danglers, as 7, being introduced to keep said side curtains properly spaced apart from each other.

In Figs. 1 and 2 of the drawings a dashboard 8 has been illustrated as being suitably connected with or located between the side members of the front bow, and between the upper edge of said dashboard at the top member of the bow there are supported vertical grooved frame members 9 9, affording guides for the front curtain 10. The spaces between the frame members 9 and the side members of the bow may be fitted with transparent or other permanent coverings. Horizontally-disposed grooved guides, as 11, for the reception of the front curtain are supported by the bows 2 2, carrying the side curtains between the permanent top-covering 3.
and the lining 4 and preferably beneath the supporting means for the side curtains. A roller 12 is suitably supported to guide the front curtain from the guide members 9 into the guide members 11.

Under the construction illustrated in Figs. 1 and 2 of the drawings the side curtains are operated by sliding them up or down in the grooves or passages provided for their reception, the natural curved configuration of the bows causing the curtains to be readily and naturally guided from the vertical into the horizontal grooves, and vice versa. Owing to the flexible and collapsible nature of the material of the curtains they are constructed it becomes necessary, however, to provide means whereby the curtains will be kept taut at all times, and for this purpose flexible elements, as 15, which may consist of cords, chains, wires, or the like, are employed, said flexible elements being guided in the guide-grooves provided for the curtains and extending through guide-grooves, as 16, extending transversely beneath the bottom of the vehicle-body, the two opposite edges of the curtains being firmly attached to said flexible elements. Guide-pulleys, as 17, may be provided for the flexible elements 15 at the lower edges of the vehicle-body, as will be clearly seen in Fig. 2 of the drawings, in order to prevent excessive wear upon said flexible elements. It will be seen that under this construction the side curtains, which are themselves flexible throughout, practically form parts of endless flexible elements that are guided along the bows and beneath the bottom of the vehicle-body. It follows that when the cords or connecting elements have been properly installed and tightened the curtains will remain stretched and taut at all times, so that by simply taking hold of the lower edges of said curtains they may be readily pushed up or down and will be guided by the grooves in the bows in the proper direction and into any desired position.

For the purpose of keeping the front curtain stretched and taut, so as to enable it to be, conveniently and efficiently manipulated, means of a different nature have been provided, said means consisting of weights 18, slidable in tubular guides 19, which are supported adjacent to the side members of one of the bows 2, said weights being connected with the upper corners of the front curtain by means of flexible elements 20, which may be guided over pulleys 21 to prevent their exposure to friction and undue wear. These weights will be made sufficiently heavy to keep the front curtain stretched and taut in any position to which it may be moved, thus enabling said curtain to be safely and efficiently moved in the guides provided therefor. The rear curtain 22, for which guide-grooves are provided in the side members of the rear bow 2 and between the top member of the rear bow and the adjacent intermediate bow, is connected, by means of flexible elements, such as cords 23, with a suitably-supported spring-actuated roller 24, whereby the said rear curtain is kept stretched and taut.

Under the modified form of the invention illustrated in Fig. 4 of the drawings the side curtains (here designated 27 and 28) are guided in separate grooves 39 and 36 in the bows, one of which is shown at 31. Each guide-groove includes a vertical portion in the side members 41 and 42 and a horizontal portion in the top member of the bow, the horizontal portions of the two grooves being separated by a partition-flange 32. Near the terminal ends of the grooves 29 and pulleys 32, and near the terminal ends of the groove 30, are pulleys 34. Flexible elements, as 35 and 36, are connected with the pulleys 32 and 34, respectively, and are guided over the pulleys 33 and 34, respectively. The curtains thus form parts of endless flexible elements guided over the respective pulleys, and thus kept stretched and taut, so that they may be conveniently adjusted to various positions.

Under the modified construction illustrated in Fig. 5 of the drawings, in order to provide means whereby the curtains will be kept taut at all times, and for this purpose flexible elements, as 43 and 44, are provided in the side member 41 and 42, and are guided in the groove 30 over the pulley 37. The extremities of said flexible elements are connected with the lower edge of one curtain and with the upper edge of the other curtain, the extremities of the member 43 being connected with the lower edge of the curtain 27 and with the upper edge of the curtain 28, while the extremities of the member 44 are connected with the upper edge of the curtain 34 and the lower edge of the curtain 35, it being obvious that the members 43 and 44 are duplicated at the end of the curtain opposite to the one which appears in Fig. 5.

Under this construction it is obvious that when one curtain is manipulated a corresponding movement is transmitted to the opposite curtain, so that said curtains will be operated simultaneously and in unison.

The construction of the modification illustrated in Fig. 6 of the drawings greatly resembles that shown in Fig. 4, and the same numerals are employed to designate the curtains and the flexible elements; but in this case the partition-flange, which in Fig. 4 is designated 32, is dispensed with and the top members of the bows afford bearings for two series of rollers 40 and 46, upon which the curtains 27 and 28 may be supported. These rollers obviously afford additional guiding as well as supporting means by the presence of...
which the operation of the device is rendered
more certain and its efficiency is correspond-
ingly increased.
In the several forms of the invention the
curtains may be provided with transverse re-
inforcing-strips, as 47; but these may be
dispensed with whenever desired. In each of
the several forms the lower edge of the cur-
tain may be provided with a locking device
including a tubular member, as 48, having
spring-actuated locking-bolts 49 adapted to
engage notches, as 50, in the grooves engaged
thereby, said locking-bolts being provided
with handles, as 51, whereby they may be
conveniently manipulated to release them
from locking engagement with the notches
50. These locking-bolts will be between
especially useful in connection with the forms
of the invention where the curtains are used
in connection with springs or counterweights;
but, as stated, the locking device may be ap-
plied to any or all the forms of the invention.
From the foregoing description, taken in
connection with the drawings, it will be ap-
parent that the object, advantages, and opera-
tion and advantages of this invention will be
readily understood. It is simple, inexpensive,
and easily applied to vehicles of all classes
where it is desirable to shield the occu-
pants or merchandise carried by the ve-
cles from the weather. In any of its sev-
eral forms this improved device is neat in ap-
pearance and free from bulkiness. The parts
employed are few and simple, and the
storm-top constructed accordingly to the prin-
ciples of the invention is light, convenient,
and easily operated.

Having thus described the invention, what
is claimed is:

1. A vehicle-top comprising a framework,
an outer permanent covering and an inner
lining supported by said framework, and
movable curtains guideable to a flat position and
disposable one over another in the intervening
space between the permanent top-cover and
the lining.

2. In a vehicle-top, a framework, an outer
permanent top-covering and an inner per-
manent lining supported by said framework,
guide-grooves in the framework hav-
ing horizontal strips between the tops and the lining, curtains arranged with their ends guided in
the grooves, means for keeping said curtains stretched and taut in any of the various po-
sitions to which they may be moved.

3. In a vehicle-top including bows having
guide-grooves, a permanent top-covering and
an inner permanent lining supported by said bows, side cur-
tains guideable between the bows and guid-
able to a flat position between the top and the
lining, and suitably-guided flexible elements
connected with the curtains and combining
with the latter to form endless flexible ele-
ments whereby said curtains will be main-
tained stretched and taut in any of the va-
erious positions to which they may be ad-
justed.

4. A vehicle-top including bows having
guide-grooves, a permanent top-covering and
an inner permanent lining supported by said
bows, storm-curtains guideable to a flat po-
sition between the top and the lining and
movable one at right angles to the other,
means for keeping the curtains stretched
and taut at any of the various positions to
which they may be adjusted, and locking
means for securing the curtains at various
adjustments.

5. A vehicle-top comprising a framework,
a covering and a lining suitably spaced apart,
a plurality of side curtains, means for guid-
ing the curtains to a horizontal position one
above the other in the space between the
covering and lining, an end curtain guideblo
a position under the side curtains, and a
second end curtain guideable between the
cover and lining and located at one side of
the side curtains.

6. A vehicle-top comprising a framework,
a covering and lining therefor suitably 95
spaced apart, a plurality of side curtains,
means for guiding the curtains to a horizon-
tal position one above the other in the space
between the covering and lining, a spring-
actuated roller located between the cover
and lining and at one side of the side curtains,
and an end curtain attached to the roller.

7. A vehicle-top comprising a framework,
a cover therefor, side curtains on the frame-
work which are guideable to a horizontal po-
sition under the cover, means for maintain-
ing the said curtains taut, an end curtain
guideable to a position under the cover,
weighted flexible elements connected with
the end curtain for holding the same taut, a
roller located adjacent the cover at one side
of the side curtains, and an end curtain at-
tached to the roller and guideable to a position
under the cover.

8. The combination of a vehicle-body hav-
ing vertically-grooved members, side and end
curtains arranged with their ends guided in
the grooves, means at the top of the body for
receiving the curtains, and means connecting
the side curtains together whereby they may
be raised or lowered simultaneously.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in
the presence of two witnesses.

LEVI HORNOR.

Witnesses:
F. R. Wright,
EDWIN W. GIBBS.