

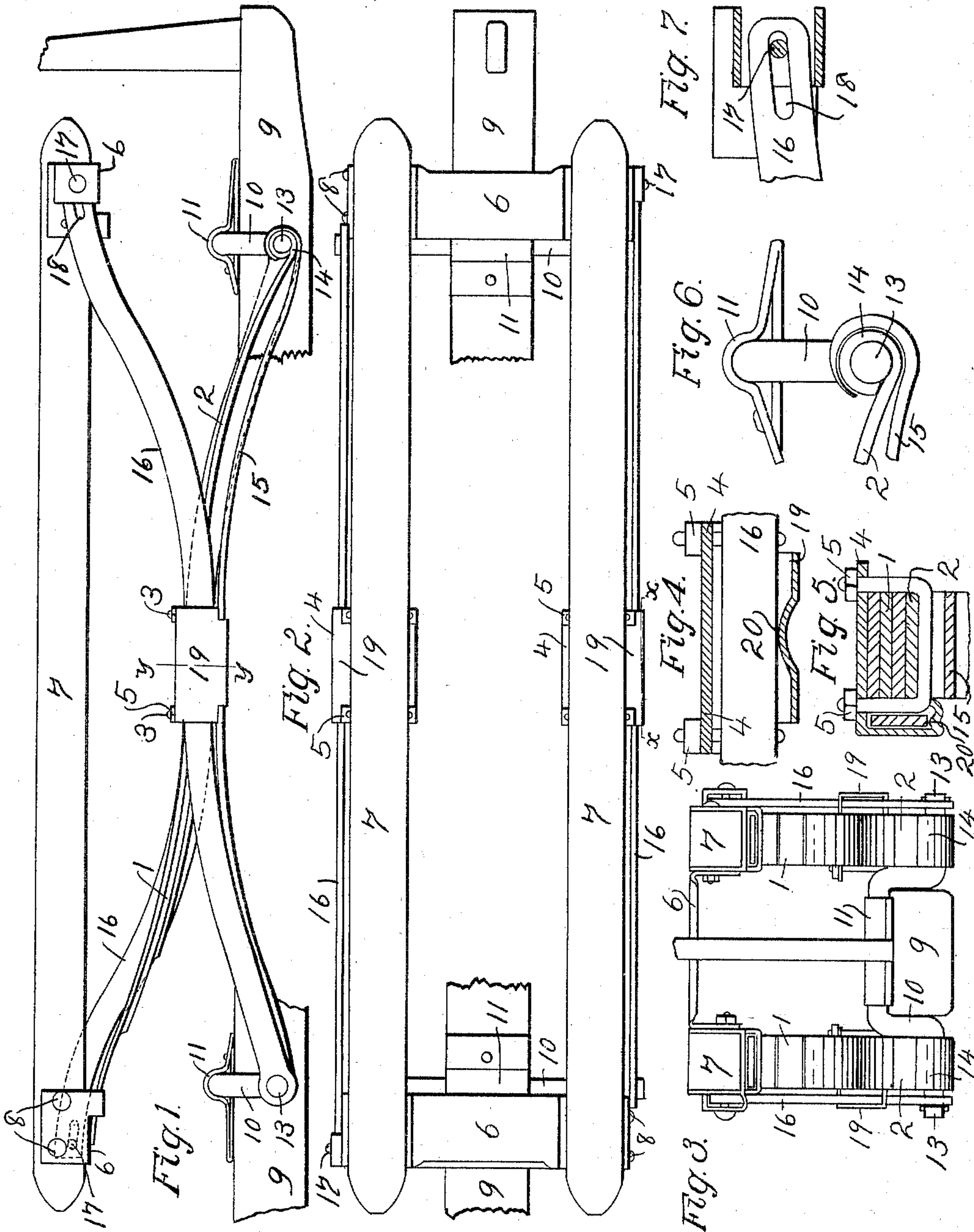
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PATENTED NOV. 29, 1904.

N. HALVORSEN.
VEHICLE SPRING.

APPLICATION FILED JAN. 9, 1904.

NO MODEL.



WITNESSES:

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VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 776,021, dated November 29, 1904.

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To all whom it may concern:

Be it known that I, NELS HALVORSEN, a citizen of the United States, residing at Stoughton, county of Dane, and State of Wisconsin, have invented new and useful Improvements in Vehicle-Springs, of which the following is a specification.

My invention relates to improvements in that class of vehicle-springs which are adapted to be temporarily used in connection with wagons and other vehicles and when thus used are interposed between the vehicle bolster and box, the springs being supported upon the respective bolsters, while the box is in turn supported upon the springs.

My invention pertains more especially to the peculiar construction and arrangement of two sets of inversely-curved springs, the spring-supporting bars, the means for connecting such parts together, and to the auxiliary reinforcing-springs which serve to relieve the lower springs of each set from the strain of excessive pressure when partially compressed.

The construction of my invention is explained by reference to the accompanying drawings, in which—

Figure 1 represents a front view of a set of my improved springs as supported from a vehicle-bolster. Fig. 2 represents a top view. Fig. 3 represents an end view, and Fig. 4 a longitudinal vertical section of a detail drawn on line *xx* of Fig. 2. Fig. 5 is a vertical section drawn on line *yy* of Fig. 1. Fig. 6 is a detail showing one end of the lower springs, and Fig. 7 represents a front view of one end of the diagonal brace-bar with the front plate removed to show the interior construction.

Like parts are identified by the same reference characters throughout the several views.

My invention comprises, among other things, two springs 1 1 of like construction, which are respectively connected at their centers with two inversely-curved springs 2 2 by a U-shaped stirrup 3, clamping-plate 4, and plate-retaining nuts 5. The ends of the upper springs 1 of both sets are connected with each other by the plates 6 6, and the upper ends of the springs of each set are connected with each other by the box-supporting bars 7 7 and bar-retaining bolts 8 8. The lower

ends of the respective sets of springs are connected with each other and the supporting-bolster 9 by the swinging stirrup 10. The central portions of the stirrups 10 are supported from the upper edge of the bolster 9 within the keepers 11, while the lower ends 13 of such stirrups are bent at right angles to their vertical portions and are pivotally connected to the respective ends of the respective lower springs 2 by the circular loops 14, through which they are inserted, as shown in Figs. 1, 3, and 6.

It is a well-known fact that when springs are made sufficiently heavy and rigid to support the heaviest loads to which they are subjected they are too rigid and stiff to be used with comfort with the lighter loads, while if the springs were made light enough to ride easily with a light load they would not be strong enough to sustain the heavier loads. To overcome this difficulty and to provide a spring that will accommodate itself equally to both light and heavy loads, I have made the upper springs 1 of each set sufficiently heavy to support the heaviest loads to which they are subjected, while the lower springs 2 of each set are made lighter to accommodate themselves to the lighter loads. In view, therefore, that the springs 2 are for the reasons given necessarily made too light to sustain the heavier loads to which the wagon is sometimes subjected I have provided the auxiliary reinforcing-springs 15, which are connected at their respective ends to the ends of said springs 2, the ends of said reinforcing-springs being bent in a circular shape and adapted to overlap and inclose the circular ends of the springs 2, said springs 15 being formed with a less curvature than that of the spring 2 above it, so that the central portions of said springs 2 and 15 are prevented when in their normal condition from coming in contact. When, however, the load is too great to be sustained by the springs 2 2 alone, said springs are reinforced by the auxiliary springs 15 beneath them. The springs 15 are of such length as to prevent the supporting-stirrups 10, to which they are attached, from being swung outwardly as far as they would otherwise do, whereby the springs 2

perform the function of an arch, their lower ends being prevented from spreading by the reinforcing-spring 15, whereby the load which would otherwise bend and break said springs 2 at the center if the ends of said springs were permitted to separate would be easily supported by said springs.

To prevent or limit the lateral movement of the springs toward the right and left as might occur when the wagon is being used on rough roads, I have provided the outer sides of each set of springs with diagonally-arranged brace-bars 16 16. One of the diagonal brace-bars 16 is supported upon the left at its lower end from one end 13 of the stirrups 10, while the opposite end of the other diagonal brace-bar is supported upon the right in like manner from the other stirrup. The opposite ends of said brace-bars are slidably connected with the upper end of the box-supporting bar 7 by the transversely-arranged bolts 17, which bolts 17 operate in slots 18, formed in the upper end of said bar. When said spring is thrown toward the right, its movement is resisted by one of said diagonal bars 16, and when thrown toward the left the movement is resisted by the other bar, said diagonal bars coöperating to retain said springs in their proper relative relation to each other. The diagonal bars 16 are also centrally connected with the sides of said upper and lower sets of springs 1 and 2 by the inclosing clasp or keeper 19, which clasp or keeper is rigidly secured to said sets of springs at their centers. The clasps 19 are loosely fitted to said diagonally-arranged bars 16 and permit of their slight longitudinal movement therein as said springs are compressed and expanded, while the center of said clasps beneath said diagonally-arranged bars is curved upwardly, forming a contact-bearing 20, upon which the center of said diagonal bars rest, said upper bends serving as a fulcrum to said diagonally-arranged bars, while said bars serve as a lever to prevent the tilting movement of said springs toward the right or left, as might otherwise be caused by the jostling of the load when a wagon is being driven over a rough or uneven surface.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of two sets of bolster-springs, each set comprising two reversely-curved springs arranged one above the other; means for securing the springs of each set together at their centers; means for slidably connecting the upper ends of the springs of the respective sets with box-supporting bars; a U-shaped bracket comprising a horizontal plate having its respective ends bent downwardly at right angles thereto and connected to the vertical opposing sides of the box-supporting bars; means for connecting the lower ends of the springs of the respective sets together and

for supporting the same upon the respective sides of the bolster.

2. A vehicle-spring of the described class comprising two sets of bolster-springs, each set comprising two reversely-curved springs arranged one above the other; means for securing the springs of each set together at their centers; means for connecting the upper ends of the springs of the respective sets with each other and with the box-supporting bars; means for connecting the lower ends of the springs of the respective sets together and for supporting the same upon the respective sides of the bolster in combination with a reinforcing-spring of less length and curvature connected with the lower ends of the lower springs of each set.

3. A vehicle-spring of the described class comprising two sets of bolster-springs, each set comprising two reversely-curved springs arranged one above the other; means for securing the springs of each set together at their centers; means for connecting the upper ends of the springs of the respective sets with each other and with the box-supporting bars; in combination with a reinforcing-spring of less strength and curvature connected with the lower ends of the respective springs of each set; a stirrup for connecting the lower ends of the springs of the respective sets and the ends of said reinforcing-springs together, centrally supported from the respective ends of the bolster and extending from thence downwardly on the respective sides of the bolster and horizontally therefrom, and means for attaching the respective ends of the lower springs of the respective sets and the ends of said reinforcing-springs to the horizontal projections of said stirrups, substantially as specified.

4. The combination of two sets of bolster-springs, each set comprising two reversely-curved springs arranged one above the other; means for securing the springs of each set together at their centers; means for connecting the upper ends of the springs of the respective sets with each other and with the box-supporting bars; means for connecting the lower ends of the springs of the respective sets together and for supporting the same upon the respective sides of the bolster, a reinforcing-spring of less length and curvature connected with the lower ends of the lower springs of each set; a diagonal brace-bar pivotally connected at its lower end with one of the lower ends of the lower springs of the respective sets and with the spring-supporting stirrup upon one side at one end of the bolster and slidably connected at its opposite end with the box-supporting bar, and another diagonal brace-bar pivotally connected at one end with one of the lower ends of the lower springs of the respective sets and with the spring-supporting stirrup upon the opposite side and opposite end of said bolster, the opposite end of

said diagonal brace-bar being slidably connected to the opposite end of said box-supporting bar and means for connecting both of said diagonal brace-bars at their centers to the centers of the respective sets of springs.

5 5. The combination of two sets of bolster-springs, each set comprising two reversely-curved springs arranged one above the other; means for connecting the upper ends of the
10 springs of the respective sets with each other and with the box-supporting bars; means for connecting the lower ends of the springs of the respective sets together and for supporting the same upon the respective sides of the
15 bolster; a reinforcing-spring of less length and curvature connected with the lower ends of the lower springs of each set; a diagonal brace-bar pivotally connected at its lower end with one of the lower ends of the lower springs
20 of the respective sets and with the spring-supporting stirrup upon one side at one end of the bolster and slidably connected at its opposite end with the box-supporting bar; and

another diagonal brace-bar pivotally connected at one end with one of the lower ends of
25 the lower springs of the respective sets and with the spring-supporting stirrup upon the opposite side and opposite end of said bolster, the opposite end of said diagonal brace-bar being slidably connected to the opposite end
30 of said box-supporting bar; a spring-inclosing clasp rigidly secured to the centers of the springs of the respective upper and lower sets and slidably inclosing the centers of said diagonal brace-bars, the lower wall of said inclosing clasp being provided with an upward
35 projection adapted to serve as a fulcrum upon which the lower edge of said diagonal brace-bars rest and slide, all substantially as, and for the purpose specified. 40

In testimony whereof I affix my signature in the presence of two witnesses.

NELS HALVORSEN.

Witnesses:

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