2 Sheets—Sheet 1.

W. W. WILLS.

Vehicle-Spring.

No. 202,390. **Patented April 16, 1878.**

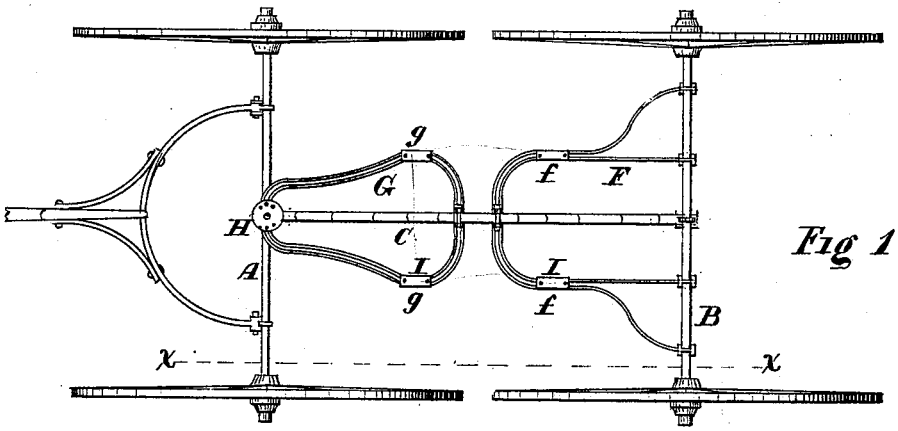

Fig 1

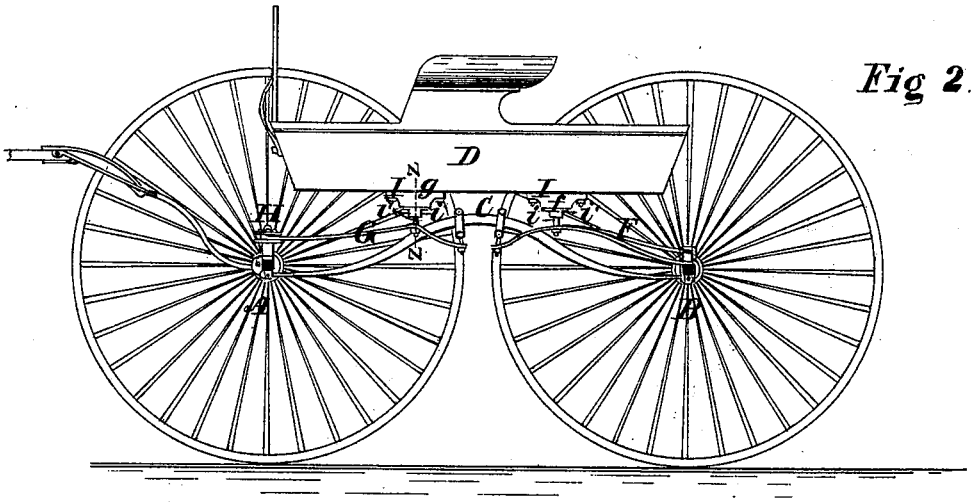

Fig 2.

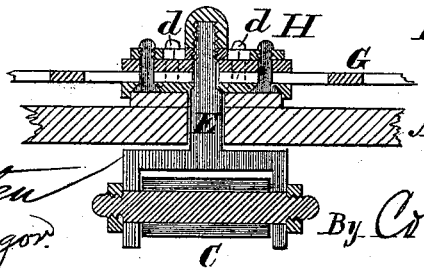

Fig 3

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2 Sheets—Sheet 2

W. W. WILLS.
Vehicle-Spring.

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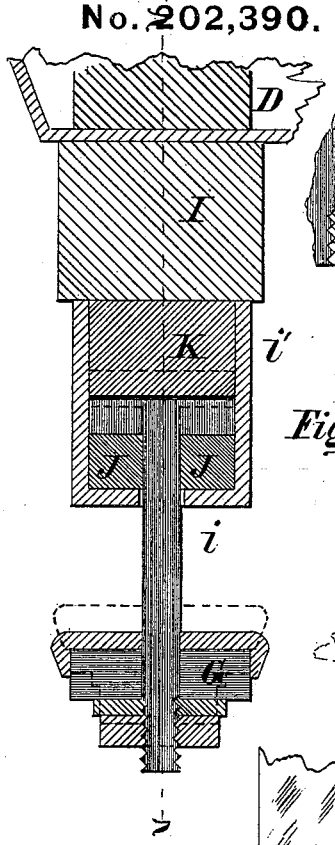

Fig. 4.

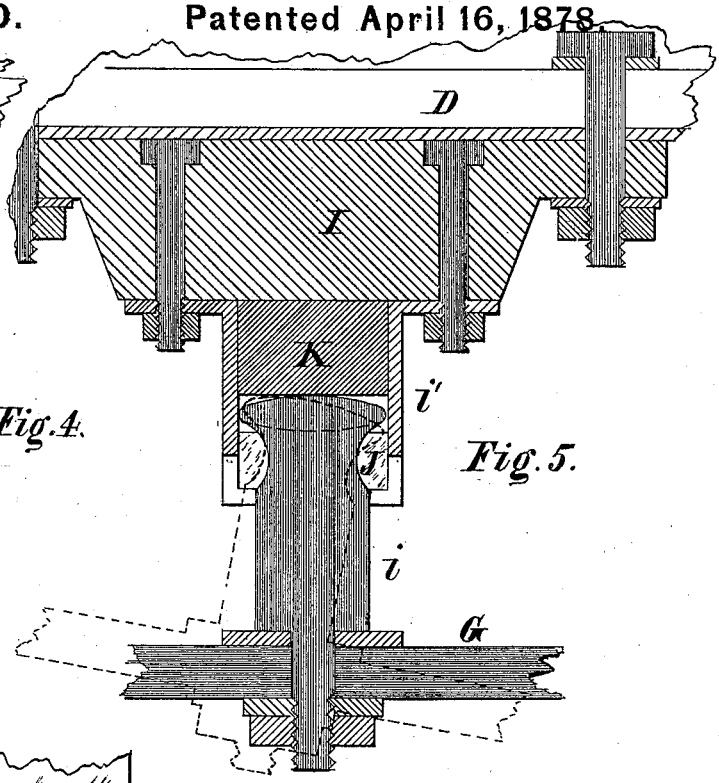

Fig. 5.

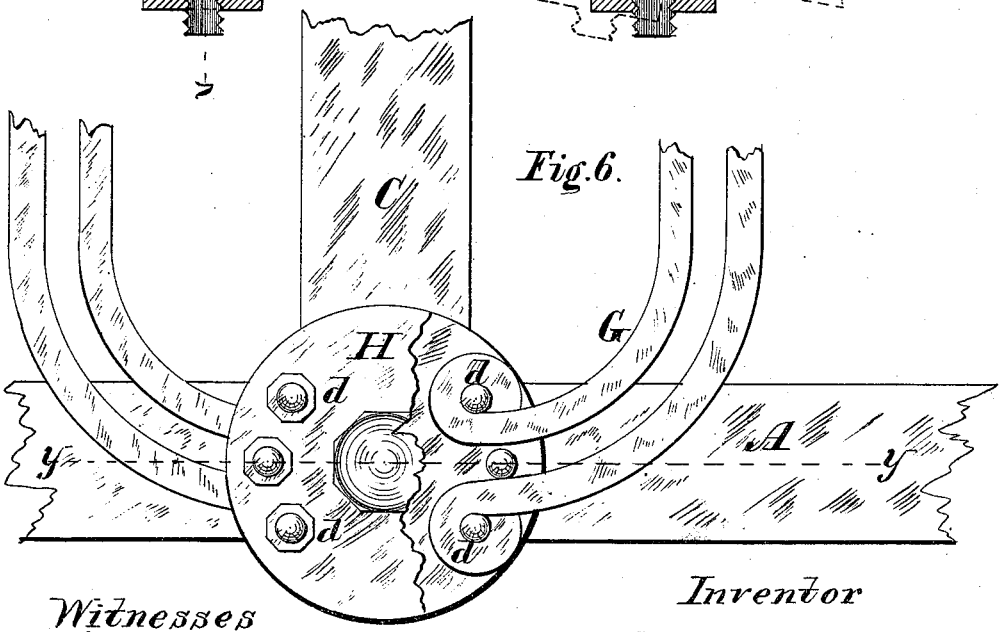

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM W. WILLS, OF JANESVILLE, WISCONSIN.

IMPROVEMENT IN VEHICLE-SPRINGS.

Specification forming part of Letters Patent No. **202,390**, dated April 16, 1878; application filed November 6, 1877.

To all whom it may concern:

Be it known that I, WILLIAM W. WILLS, of Janesville, in the county of Rock and State of Wisconsin, have invented a new and useful Improvement in Vehicles, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan view of the running-gear and spring-support for the carriage-body, constructed upon my improved plan; Fig. 2, a vertical section of my improved carriage, taken on the line *x x*, Fig. 1; Fig. 3, a detail sectional view taken through the fifth-wheel on the line *y y*, Fig. 6; Fig. 4, a detail sectional view, on an enlarged scale, of the device for attaching the body to the supporting-frame, taken on the line *z z*, Fig. 2; Fig. 5, a similar view taken on the line *v v*, Fig. 4; and Fig. 6, a plan view, on a similar scale, of the fifth-wheel and its attachments.

My invention relates principally to the method of arranging the spring-support for the body of a carriage and the devices by means of which the body is connected therewith; the object being to obtain a spring-support so constructed and arranged, in connection with the body, that the vertical movement of the latter will always be in the same plane, thereby preventing all tilting of the body and preserving a substantially level position.

The invention consists in connecting the front and rear axles by a single longitudinal spring, which also supports the body with which it is connected, by means of devices that hold the body in a level position.

It also consists in various devices and combinations of devices by means of which the spring is attached to the running-gear and connected with the body of the vehicle.

In the drawings, A represents the front axle, and B the rear axle, of a carriage, which are of any ordinary construction, and provided with wheels in the usual way. Instead of arranging the springs upon which the body is supported at the ends or sides of the latter, I employ a single spring, C, arranged centrally underneath the body D of the carriage, as shown in Figs. 1 and 2 of the drawings. This spring may be of any of the well-known forms and constructions, and is attached at its front and rear ends to the forward and rear axles, respectively, the connection being hinged, so as to permit the turning of the axles. In the drawings I have shown the forward end of the spring hinged to a loop at the lower end of the king-bolt E, as shown in Fig. 3 of the drawings; but this construction is not an essential feature of my improvement. A branching support or platform, F, is attached at the ends of its branching arms to the rear axle by rigid connections, so that when the support is depressed in front of the axle the latter will turn to accommodate the vibration of the support, the forward end of which is attached by a hinge or link connection to the spring C, at or near the middle thereof, as shown in Figs. 1 and 2 of the drawings.

A platform-support, G, of somewhat similar form, is connected at its forward end to the front axle or the fifth-wheel, and at its rear end to the central supporting-spring by hinge or link connections, the point of attachment being a little in front of the support F, as shown in the drawings. These supports, constituting what may be called the "platform," I prefer to make of double bars, as shown in the drawings, united at certain points, so as to make them substantially one and the same; but this is not an essential feature of my invention. In this case I prefer to bring the forward ends of the support G around to the fifth-wheel H, to which they are connected by eyes and bolts, as shown in Figs. 3 and 6 of the drawings.

The body D of the carriage is attached to the supports F and G at the points *f f* and *g g*, by means of connecting-pieces I, attached to both the body and the platform supports. These connecting-pieces are constructed so as to accommodate the vibration of the supports when the body is depressed. I effect this by making the lower part in the form of a short bar, *i*, secured to the platform at its lower end and provided with a T head at its upper end, which is inserted and held in a slotted box, *i'*, as shown in Figs. 4 and 5 of the drawings. Below the T-head rubber packing J is placed within the box or casing. Around the bar and

above the head, a solid piece of rubber-packing, K, is inserted, so that the bar is held firmly between the two pieces of elastic packing, and at the same time is permitted to yield sufficiently to accommodate the vibration of the supports, as shown in full and dotted lines in Fig. 5 of the drawings.

The box in which the T-head is held is fastened to a block, which, in turn, is secured to the carriage-body. The arrangement and attachment of the forward platform-support, above described, permits a vibration similar to that of the rear support when the body is depressed; and as these supports are connected to the axles in such a manner that they can vibrate in only one direction, it is evident that any pressure upon either of them will carry down the entire platform. Hence, if pressure is applied to any part of the body supported, as described, upon the platform, it must necessarily depress or vibrate at least one of the platforms, thereby depressing the spring, which, in turn, vibrates the other platform to the same degree, so that the body will be depressed in a level position. This will necessarily be the case whether the pressure or weight be at one end, one corner, or the middle portion of the body; and this movement is much easier to occupants of the carriage, and also prevents the unequal pressure upon one of the springs which always results with the usual side or end springs.

I attach the fifth-wheel of my carriage to the forward axle in a peculiar manner. As already stated, the forward ends of the platform G are secured to the fifth-wheel, which is made in two parts, embracing these ends. These parts are secured together by bolts *d*, which are countersunk in the lower face of the wheel, and are secured by nuts upon their upper ends, as shown in Figs. 3 and 6 of the drawings. The king-bolt passes up through the forward axle and fifth-wheel, and is secured by a nut turned upon its upper end, as is also shown in the same figures of the drawings.

I have described a construction of my invention above in which a single spring is used; but two may be employed, if desired, arranged one above the other, of any desired form; and in some instances in this construction it is preferable to hinge the platform-supports to the axles, instead of connecting them rigidly thereto, as described.

The hinge-connections between the platforms, spring, and body accommodate all the movements of the body; but I do not limit myself to a single spring, nor to the special mode of attaching the springs to the axles, nor the special devices for connecting the springs, platforms, and body, for it is evident that these special features of construction and arrangement may be modified without departing from the principle of my invention.

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

1. A single longitudinal spring, extending between the front and rear axles, and constituting the only connection between them, in combination with the vehicle-body D, supported entirely by the said spring and connecting devices, substantially as described, which hold it in a level position.

2. The platform-supports F and G, secured to the axles at one end, so as to prevent tilting sidewise, in combination with a longitudinal supporting-spring, centrally arranged beneath the body, and connected to the axles and the free ends of the platforms by joints or hinges, substantially as and for the purpose set forth.

3. The box or casing *i'*, secured to the body, in combination with the T-headed bars *i*, elastic packing J K, and platforms F G, substantially as and for the purpose set forth.

4. The fifth-wheel H, composed of upper and lower plates, secured together by bolts countersunk in the lower face of the under plate, in combination with the platform G, the forward ends of which are secured between the plates of the wheel, substantially as described.

WM. W. WILLS.

Witnesses:
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