F. A. SAWYER, 2d.
Carriage-Step.

No. 203,076. Patented April 30, 1878.

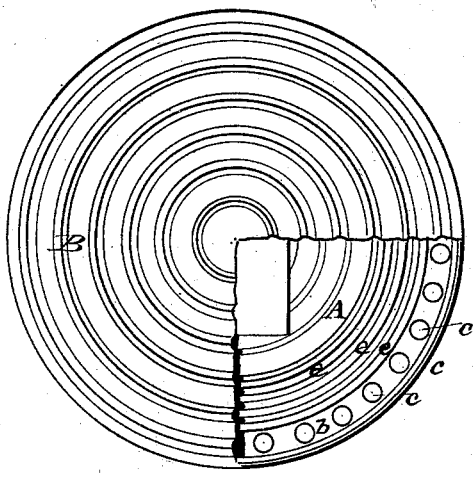

Fig. 1.

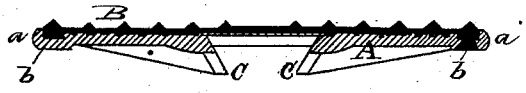

Fig. 2.

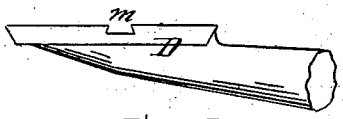

Fig. 3

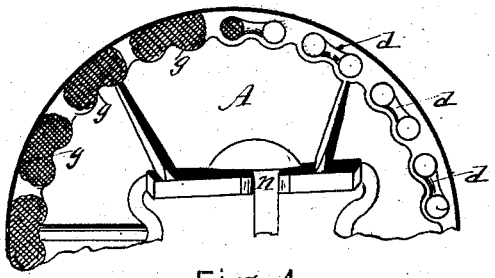

Fig. 4

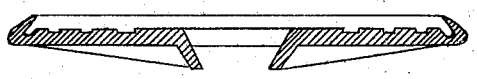

Fig 5

WITNESSES
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FRANCIS A. SAWYER, 2D, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN CARRIAGE-STEPS.

Specification forming part of Letters Patent No. **203,076**, dated April 30, 1878; application filed January 16, 1878.

To all whom it may concern:

Be it known that I, FRANCIS A. SAWYER, 2d, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Carriage-Steps, of which the following is a specification:

This invention relates to the class of steps known as "elastic steps;" and consists in the vulcanization of a resilient plating to a peculiar-shaped metal plate or pad, whereby the edge of the plating is fully protected, the plating thoroughly joined to the pad, and especial provision made for preventing the disturbance of the plating by lateral thrusts.

The step is intended more particularly for express and heavy wagons, drays, locomotives, and all classes of vehicles whose steps are subjected to hard wear.

In the drawing, Figure 1 is a plan of the step, with a portion of the plating removed, exposing the metal plate. Fig. 2 is a cross-section of a finished step. Fig. 3 is a side elevation of the end of a shank. Fig. 4 is a plan of a portion of the bottom of the step reversed; and Fig. 5 shows a modification of the metal pad, as hereinafter explained.

The metal pad A is formed preferably from malleable iron or cast-steel, with its outer edge *a* extended somewhat above the plane of the remainder of the upper surface, beveled or rounded on its exterior, and surrounding the depressed portion or channel *b* immediately adjacent thereto, and which preferably is somewhat lower than the plane of the surface it surrounds. This depressed portion or channel is provided with the holes *c*, which open on the under side of the plate, are gradually enlarged from the channel downwardly, and may be connected in pairs on the under side of the plate by the short channels *d*. The portion of the surface of the plate surrounded by channel *b* may have the concentric grooves and ridges *e* fashioned thereon; or the surface may be otherwise roughened by being shaped into alternate elevation and depression, arranged to act as abutments to prevent the displacement of the plating by lateral action thereon.

The plate, shaped essentially as above described, is covered on the upper surface, inside the projection *a*, by a plating, B, of india-rubber or other elastic or resilient material, or any composition, when resiliency is not required, like rubber and any earthy or mineral matter, or any compound that by heat and pressure, or by either heat or pressure, can be vulcanized or otherwise be permanently united to the metal-retaining plate, or packed therein, such as paper-pulp and any gritty material, diatite, bitumen, or celluloid, and sand or finely-pulverized mineral or earthy matter, or, in fact, any composition which is capable of being molded or packed upon the plate inside the retaining-wall, possessing a suitable frictional property combined with easily-molded compressible cement. In some instances the holes *c* in the channel could be dispensed with by inclining the outer wall *a* inwardly toward its top, as shown in Fig. 5.

I can also employ, when necessary, the strip of canvas *g*, woven in and out the holes, before the plating is applied, in such a way that the portion on the under surface of the plate shall be in the channels *d* only.

It will be observed that when the plating is united to the plate under heat and pressure, or by either, as above described, it is forced into all the grooves and channels and through the holes into the short channels on the under side of the step, so that the plating is solidly, firmly, and securely knit and joined to the plate.

It will also be seen that the retaining-wall *a* not only prevents the loosening of the plating from the plate by continued lateral displacement, but also prevents undue wear on the edge of the plating, and so disposes of it that the greatest value from the least plating-stock is obtained; further, that by weaving the plating into the pad at the base of a retaining-wall insures a very solid construction, because of the protection of the plating at that point from wear.

It will also be observed that the roughened surface of the pad is filled with the plating material, and acts to receive the strain of lateral pressure direct from the surface of the plating, thereby preventing any lateral thrust from extending beyond the particular portion of the plating subjected to that action.

The center of the pad, when cored to facilitate the casting of the wedge-shaped ribs *c*, is

covered with a thin metal plate, to prevent the oozing of the plating material from the surface while under pressure.

As the method of fastening the pad to the shank is somewhat different from that shown and described in the patent granted to me October 3, 1876, I will also explain that I now accomplish it by forming the recess *m* across the upper portion of the wedge-shaped end D, to correspond with the recesses *w* in the ribs *c*, midway the length, and by inserting a key therein after the pad has been driven onto the shank, so that the recesses in the ribs and that in the shank are on a line.

I am aware that the patent granted to F. B. Morse, August 29, 1871, No. 118,632, describes and claims a carriage-step with a grated or open-work surface of a peculiar pattern formed from wrought-iron on the end of a short unfinished shank, and re-enforced on its under surface by ribs extending from said shank; also, in combination with a step thus shaped, a detachable elastic pad, formed in such a way that it can be fastened thereto by being sprung into place between the gratings.

I am also aware that the patent granted Geo. A. Keene, January 12, 1875, Reissue No. 6,229, is the foundation patent on elastic steps, broadly covering the combination of a step or metal pad and an elastic plating or tread; but I am not aware that the said patents anywhere describe a carriage-step in which the treading-surface is permanently united to a metal pad by heat and pressure, or by either, within a metal retaining-wall forming the border of the step; and I do not describe nor claim a step with an open surface, a step with re-enforcing extensions of the shank, a step with a detachable elastic pad, or, broadly, the combination of a metal pad and an elastic plating or thread, for the same is not the spirit of my invention.

I claim—

1. A carriage-step consisting of a metal plate provided with an exterior retaining-wall and a plating of india-rubber or other suitable formative composition, permanently fastened to the plate within said wall by heat and pressure, or by either, substantially as and for the purpose described.

2. In a carriage-step, the combination of a metal pad provided with an exterior retaining-wall, with a plating of india-rubber or some other suitable formative material, vulcanized, molded, and permanently fastened under heat and pressure, or by either, to the plate within said retaining-wall, substantially as described.

3. In a carriage-step, the combination of a metal plate, provided with alternate grooves and ridges or other roughened surfaces, with a plating of india-rubber or other formative material molded thereon by heat and pressure, or either, substantially as described.

4. The combination, in a carriage-step, of a metal pad provided with perforations opening from the surface of the plate, or from a channel enlarged on the under side of said plate, as shown, with or without connecting-channel, with a plating of india-rubber or other formative material, united thereto by heat and pressure, or by either, and filling said holes and channels, or either, for the purpose set forth.

5. In a carriage-step in which the treading-surface of india-rubber or other plating is not extended over the edge of the metal-supporting plate or pad, the combination of the metal pad provided with perforations, and the said plating, substantially as described.

6. In a carriage-step, the combination of a metal pad provided with an exterior retaining-wall and the holes *b*, with a plating or tread of india-rubber united thereto by heat and pressure, or by either, substantially as and for the purpose described.

7. In a carriage-step, the combination of a plate provided with the holes *b* and a roughened surface, such as described, with a plating of india-rubber or some other suitable formative material united thereto by heat or pressure, or by either, substantially as described.

8. The combination, in a carriage-step, of a metal pad provided with the holes *b*, with a strip of fibrous material woven in and out of said holes, and a plating of india-rubber or other suitable formative material united to said plate, and incorporated in said step by heat, pressure, or either, substantially as described.

9. The combination of a metal pad provided with ribs, recessed as shown, a shank recessed on its upper surface, as described, and a key for locking said pad to the shank, as set forth.

FRANCIS A. SAWYER, 2D.

Witnesses:

F. F. RAYMOND, 2D,

A. J. OETTINGER.