3 Sheets—Sheet 1.

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Car Spring.

No. 45,329. Patented Dec. 6, 1864.

Fig. 2.

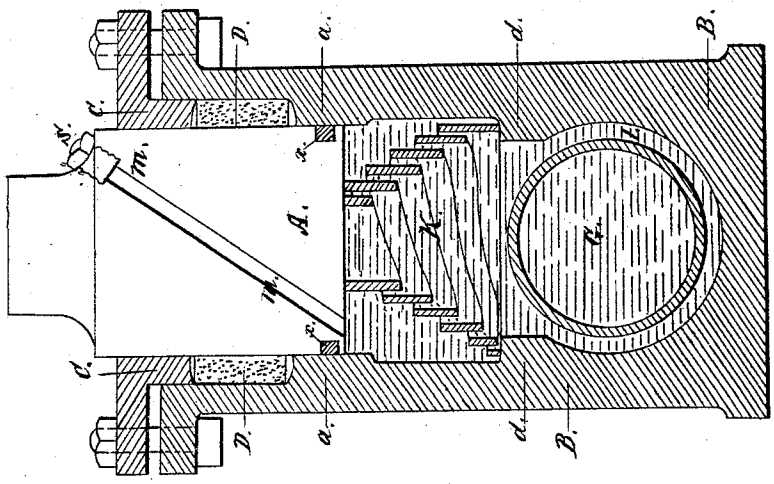

Fig. 1.

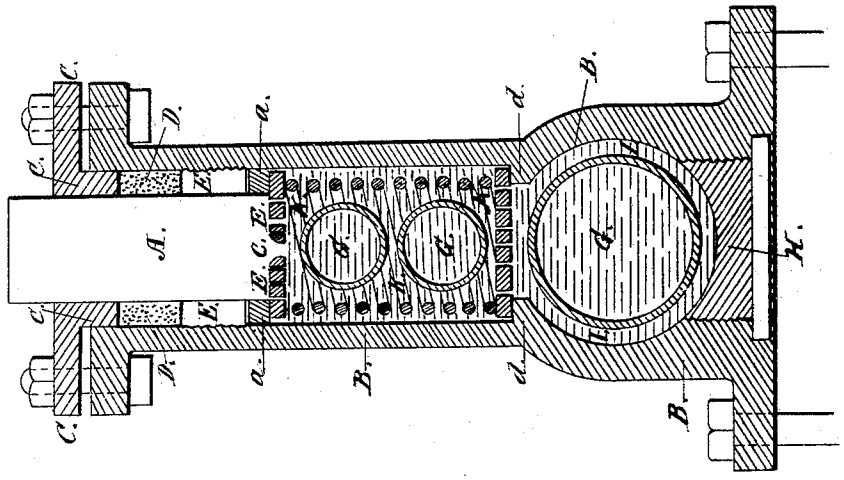

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Fig. 4.

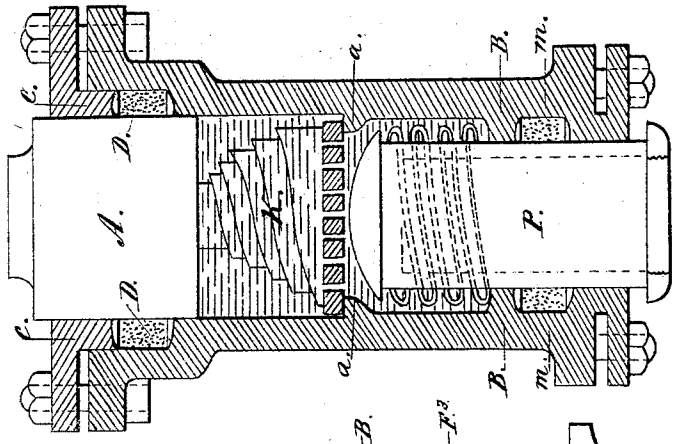
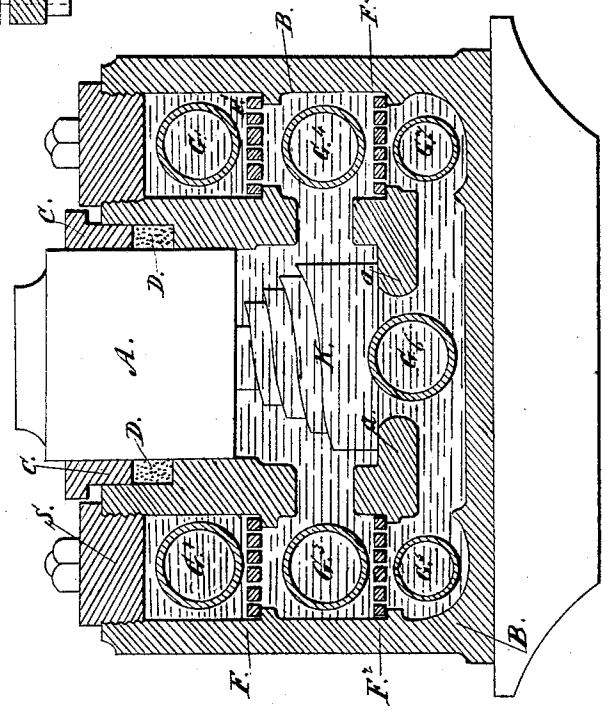


Fig. 3.



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3 Sheets—Sheet 3.

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No. 45,329. Patented Dec. 6, 1864.

Fig. 7.

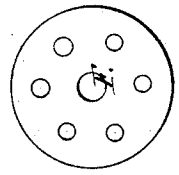


Fig. 6.

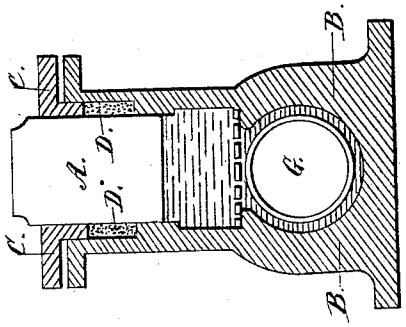
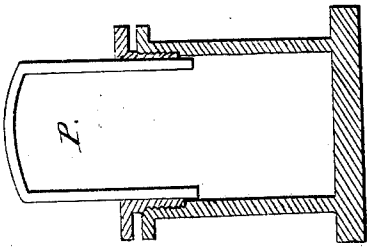


Fig. 5.



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UNITED STATES PATENT OFFICE.

EDWARD LINDNER, OF NEW YORK, N. Y.

IMPROVEMENT IN SPRINGS.

Specification forming part of Letters Patent No. **45,329**, dated December 6, 1864.

To all whom it may concern:

Be it known that I, EDWARD LINDNER, of New York, in the county and State of New York, have invented a new and useful Spring; and I hereby declare that the following is a full, clear, and exact description of the same.

The object of my invention is to construct a metallic spring not liable to break under whatever force of compression within the limits of resistance, or however suddenly it may be applied; and it consists in the construction of a metallic spring in the manner hereinafter described, surrounded with a fluid or elastic substance, and provided with a suitable packing under such an arrangement that an elastic aeriform fluid shall be confined therein, receiving a uniform pressure upon all sides without absorption or loss of elasticity.

In the accompanying drawings, Figure 1 is a sectional elevation of a spring constructed in accordance with my invention. Figs. 2, 3, 4, 5, and 6 are sectional elevations of modifications of the same.

A spring apparatus shown in Fig. 1 consists of a cast-iron box or case, B, provided on top with a stuffing-box, C, which is united with the case by means of screws passing through their respective flanges. In the stuffing-box is fitted a plunger, A, the upper part of which may be shaped to receive the load or blow, while its lower end is provided with a central pin, *c*, fitting in a perforated wrought-iron disk. (Shown in plan in Fig. 7.) Over and around the plunger there is an india-rubber ring, *a*, arranged to form a hermetic packing against the case. At *d* the case is provided with a shoulder, upon which rests another perforated disk, F, and between the two disks there is a steel spiral spring, K, the upper and lower ends of which rest against the two disks, respectively. The plunger playing on the upper disk will compress the metallic spring K. To properly guide the plunger A in its vertical up and down motions, I use an additional packing-sleeve, E. Beneath the shoulder D the case is enlarged, forming a chamber, I, which may be closed on the under side by means of a screw, H. In this chamber, as well as within the coil of the metallic spring K, I introduce india-rubber balls or other air-tight bags, G, which are filled with air, the balls in the spring being prevented from coming in contact with the balls in the chamber by the disk F, before referred to.

In this apparatus the balls and metallic spring are surrounded by a liquid fluid, so that they may be exposed, upon all sides, to a uniform pressure. I prefer to use molasses as the surrounding liquid of the springs. The liquid is introduced through the opening at H, care being taken to expel all the air from within the interior of the case.

The applications of this apparatus are too numerous to be enumerated. Its principal application, however, is to railway machinery, cars, &c. To adapt this spring to railway purposes it is important to provide for lateral action on the spring.

The operation of my improved spring will be understood to be as follows: Supposing the plunger to receive blows, or, on imparting pressure thereto, the spring K will be compressed as well as the fluid contained therein, and inasmuch as the liquid transmits pressure to all particles alike, it follows that the air-containing balls or bags G are equally compressed on all sides, causing the compression of the air therein, whereby the balls are contracted, and increased play-room is afforded to the metallic spring, and this will go on until equilibrium of pressure is established. It will be seen that the spring can never be entirely compressed, because of the limit of compressibility of the air. By this arrangement another important advantage is obtained, which consists in the doing away with the vibratory action on the metallic spring, which, it is well known, destroys the molecular arrangement of the metal and causes the spring suddenly to break. On releasing pressure from the plunger the particles of the aeriform and liquid fluid will resume their normal position.

The reason why I use molasses in preference to any other liquid fluid is, that it possesses a greater degree of elasticity, while it preserves india-rubber and prevents the escape of air from the balls, and is more easily packed than any other fluid less viscous and dense.

Fig. 2 represents a modification of my apparatus. The spring here shown is a tapering spiral volute, resting directly on the shoulders *d* of the case B. The latter has the air-chamber I closed on the bottom, receiving the mo-

lasses or other liquid fluid through an aperture or channel, *m*, cut diagonally through the plunger and closed by means of a screw, *s*. The same principle of construction is applied to the spring shown in Fig. 3. The spring-case in this instance consists of three chambers, intercommunicating by means of channels, so that the liquid may pervade the interior of the case. The plunger rests upon a taper volute spring, which in its turn is supported by the shoulder *d d*. Air-balls G G′ G^2 G^3 G^4 G^5 G^6 are arranged within compartments formed by perforated disks F F′ F^2 F^3, dividing the side chambers. These are open on top and closed by means of screws S, which are removed for the purpose of filling the apparatus with molasses. The operation of this spring is substantially like that of the former.

In Figs. 4 and 5 an arrangement of spring mechanism is shown in which the air-balls are dispensed with. In lieu of the air-balls, I use a second plunger, movable, if solid, in stuffing-boxes *m m*, in and out of the case, or, if hollow, in a fixed box attached to the case B, as shown in Fig. 5, which plunger is capable of receding as the plunger A compresses the spring K.

In Fig. 6 I have shown the spring mechanism without a metallic spring and with a compressible air-spring. It may be used with advantage on machinery in which a spring is used to counteract the vibration attending the operation of the machine.

Having thus fully described my invention, I claim—

The construction and arrangement of a spring mechanism substantially as described, consisting, essentially, of a plunger capable of a sliding motion within a vessel containing compressible fluid, surrounded by a non-compressible fluid, and whether combined or not with metallic springs, under the arrangement and for operation as herein set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

EDWARD LINDNER.

Witnesses:
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WM. H. HARRISON.