

E. T. BUSSELL.
Car-Springs.

No. 144,600.

Patented Nov. 18, 1873.

Fig. 1.

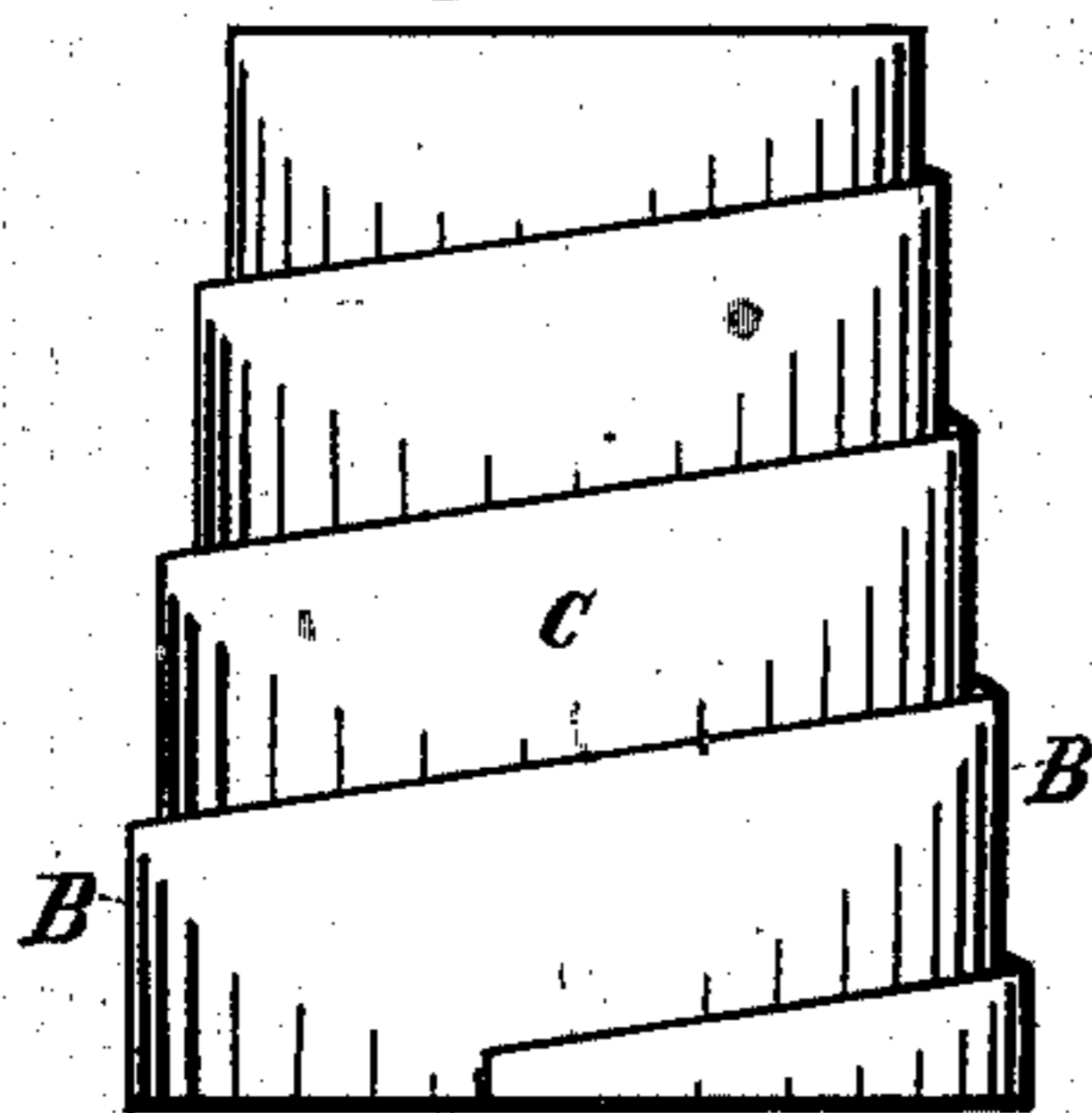


Fig. 2.

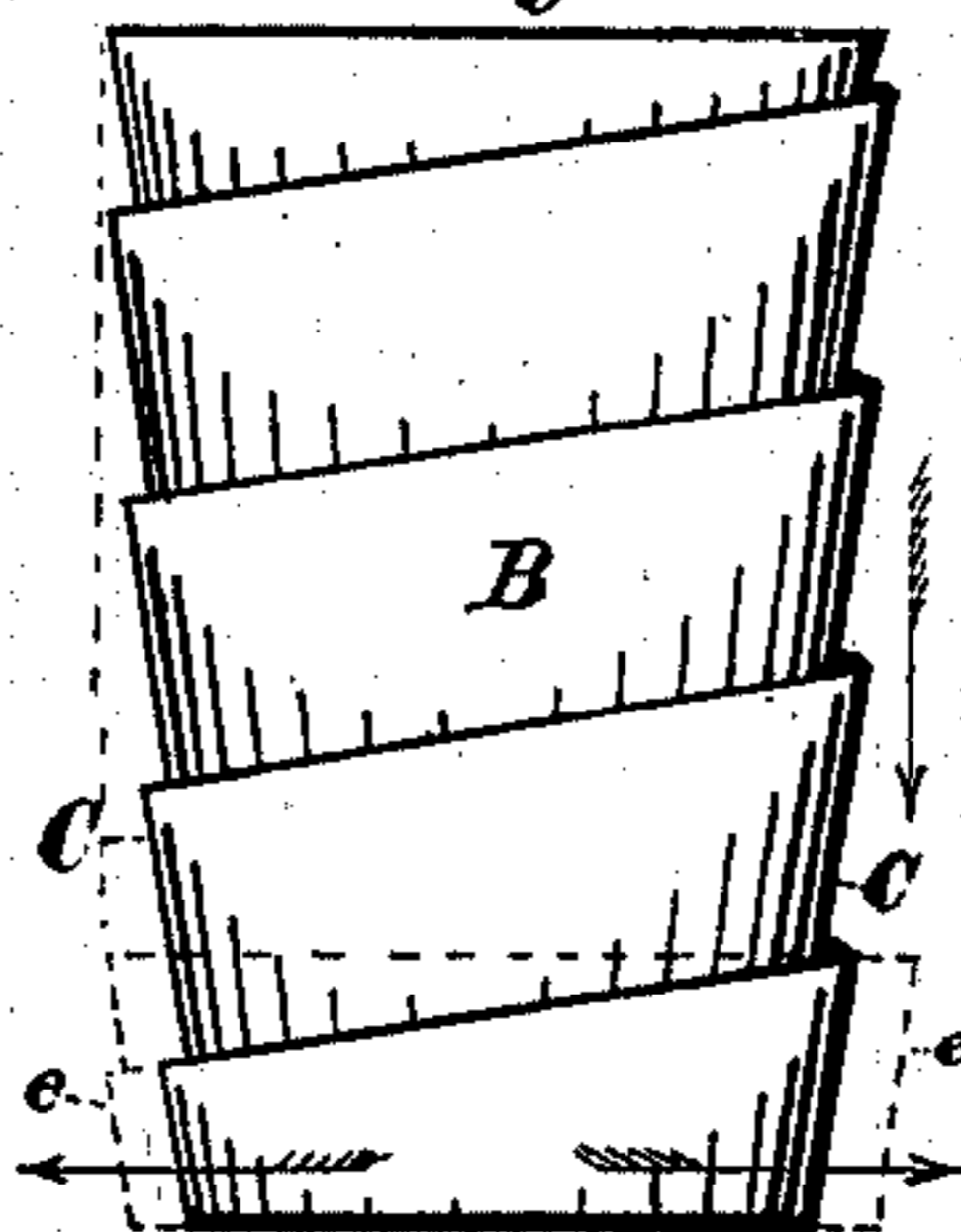


Fig. 5.

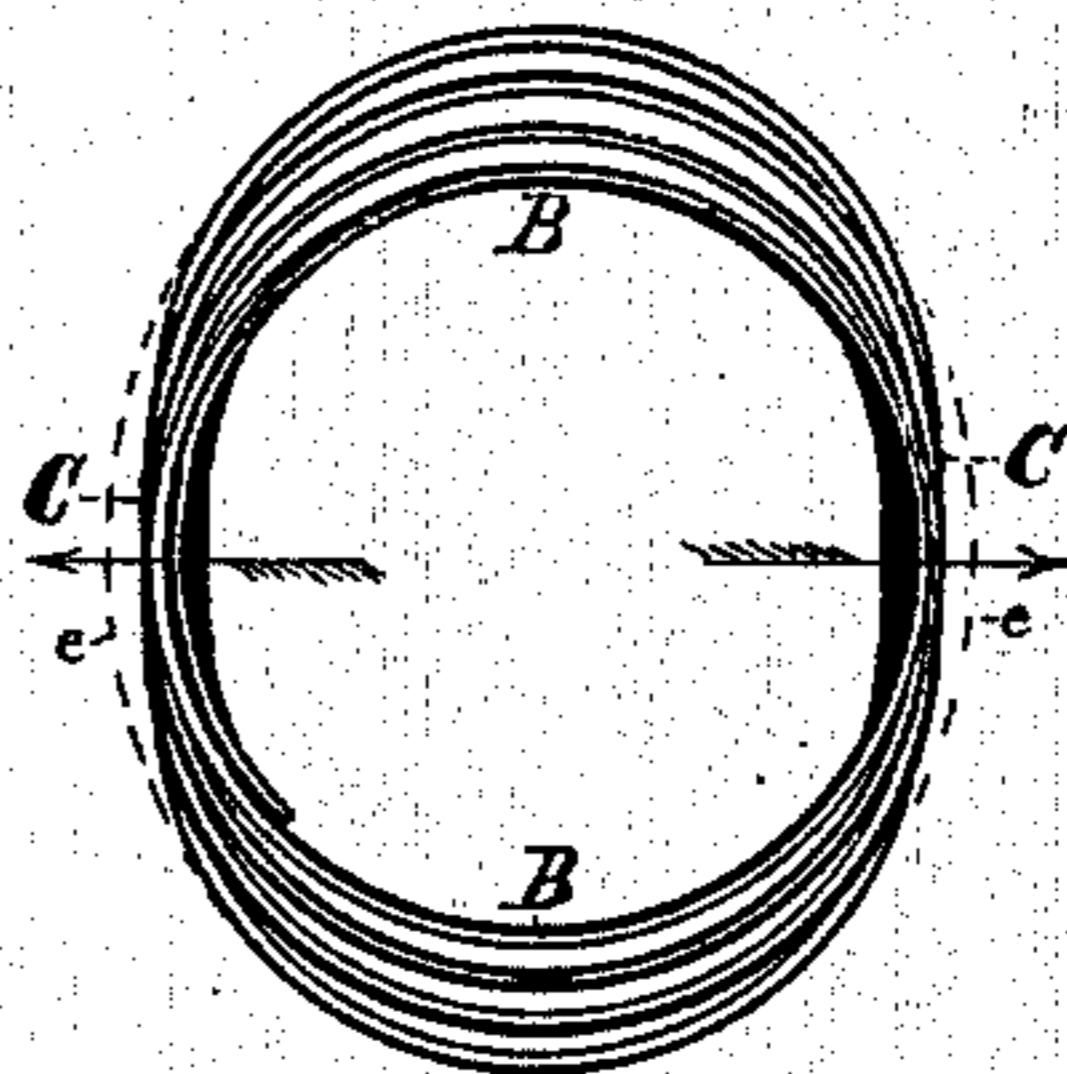


Fig. 3.

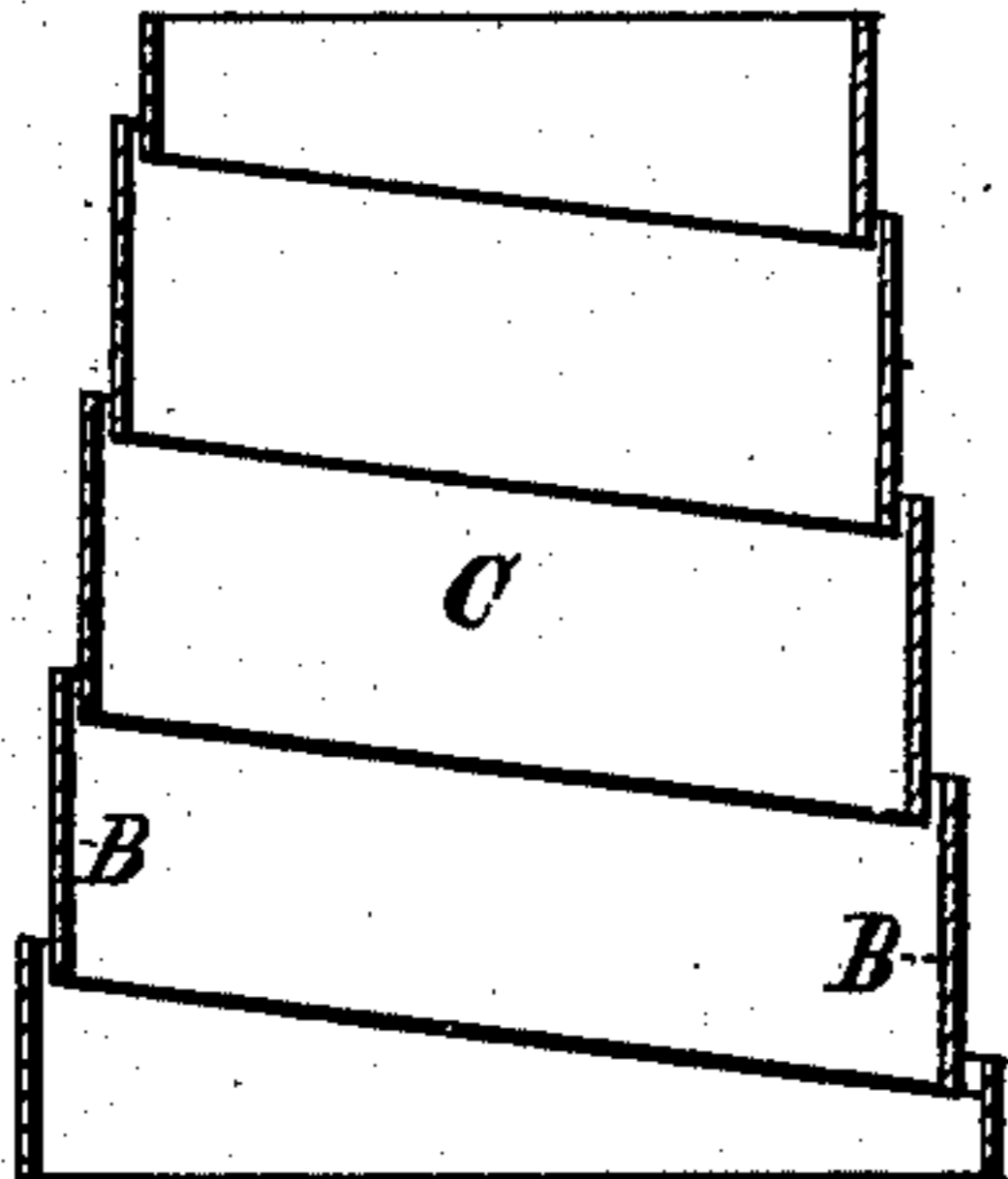


Fig. 4.

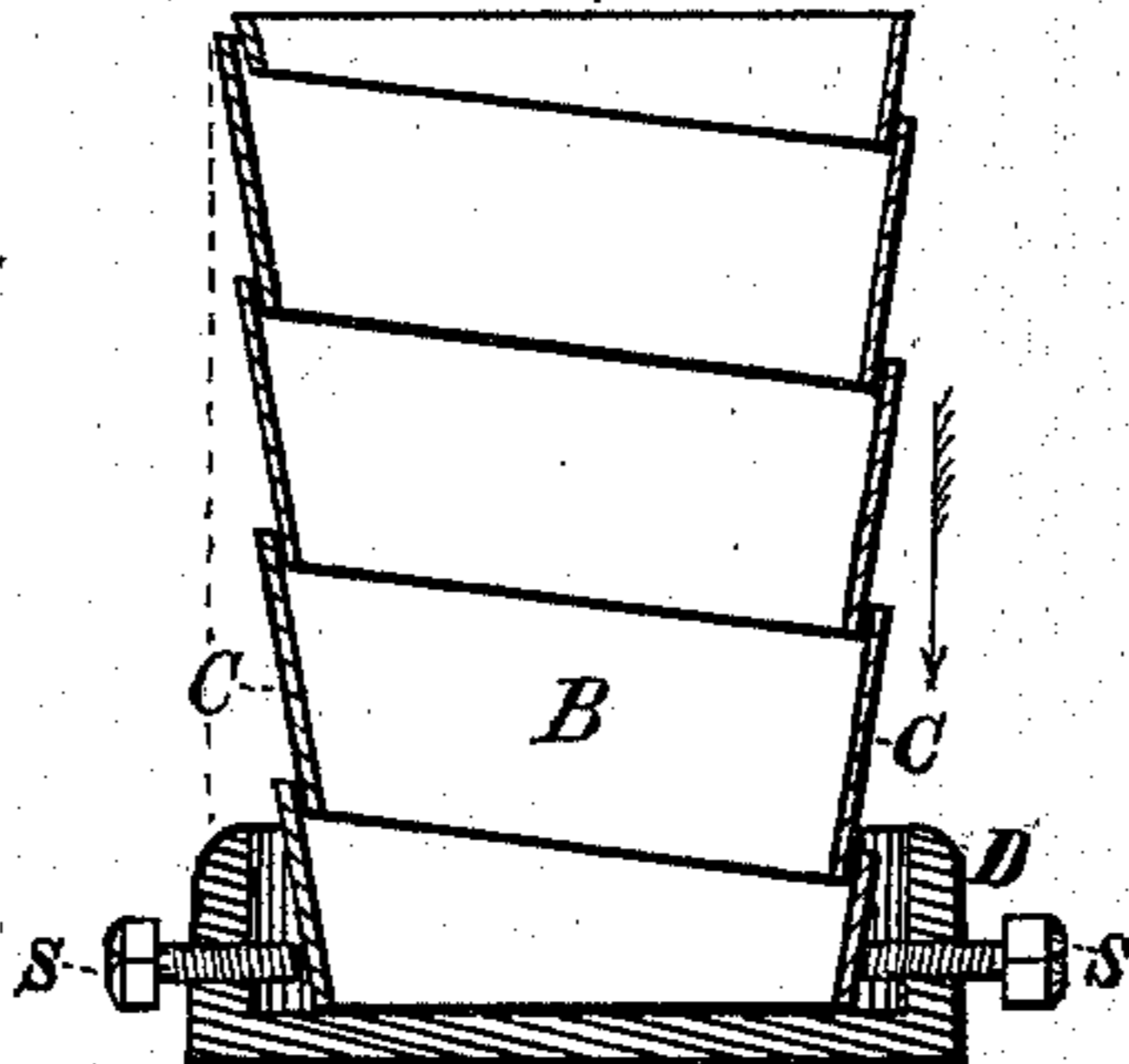
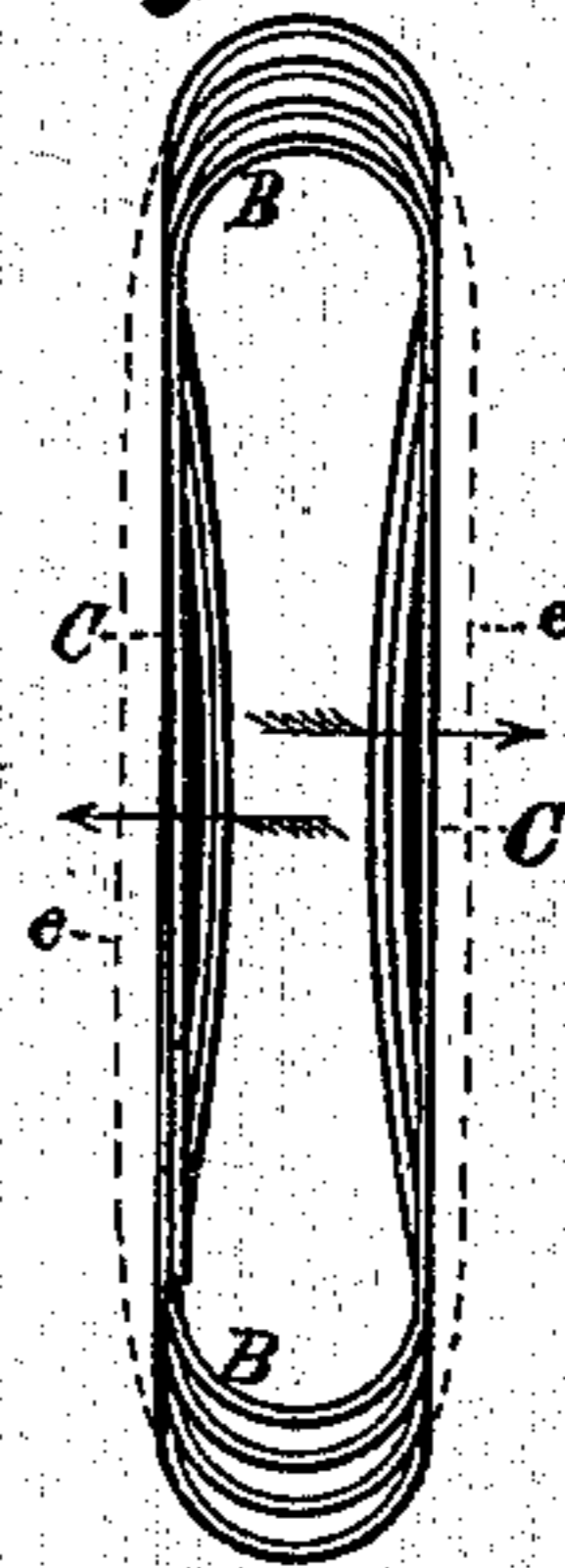


Fig. 6.



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UNITED STATES PATENT OFFICE.

ERASTUS T. BUSSELL, OF INDIANAPOLIS, INDIANA.

IMPROVEMENT IN CAR-SPRINGS.

Specification forming part of Letters Patent No. **144,600**, dated November 18, 1873; application filed April 25, 1873.

To all whom it may concern:

Be it known that I, ERASTUS T. BUSSELL, of Indianapolis, in the county of Marion, State of Indiana, have invented certain Improvements in Spiral Springs, of which the following is a specification:

My invention relates to a volute spring, to which is given an elliptical form, and so constructed that there is secured a useful frictional contact between the long side only of each coil and of the one next adjoining, and whereby, also, there is brought into action, when the spring is compressed, resistance to flexure both edgewise and side or flatwise of the bar of which the spring is made.

Figure 1 exhibits a side elevation of my invention. A is the bar of metal composing the coils, its sides being vertical at B, so they do not come in contact here when the spring is in motion.

Fig. 2 is an edge elevation of Fig. 1, showing a profile of the contracted sides of the spring at C, the points of frictional contact.

Figs. 3 and 4 are vertical transverse sections of Figs. 1 and 2, and clearly show the telescopic nature of the coils, and their freedom from contact at B, and their frictional impact at C, by reason of the wedge-like forms of each spiral at C, the contracted sides of the spring. The dotted lines at *e* show the extent of lateral flexure, and the arrows (below Figs. 2 and 4) show the direction of this flexure when the spring is shut up under great pressure. Each coil from above wedges into the next coil below at the sides C, forcing them outward. The friction thus engendered is cumulative, and endows this spring with the quality of gradual resistance to a blow, and when the blow is passed it serves the equally important purpose of preventing violent reaction or rebound, and also prevents the indefinite repetition of jerking oscillations before coming to rest. D, in Fig. 4, shows a partial section of the iron cap in which the spring rests, and S is a set-screw tapped through the flanged lip of this cap, so as to press the flat side or sides of the spring. By setting up these screws they narrow the spring and increase the friction, thus practically making a

stiffer spring, the converse obtaining on running the screws back. A bit of vulcanized india-rubber or other elastic material may be interposed between the points of these screws and the coil they press.

Fig. 5 is a plan or top view of Figs. 1 and 2. Fig. 6 is a plan and section of the same, flattened still further at its sides, and with a greater contraction of the lower edge of the coils at C. This form of the spring is preferable for sustaining light burdens, as in buggies and carriages.

When in use this invention will check momentum gradually with cumulative resistance, so that the least possible shock or jar is experienced. Its spirals, passing by each other, endow it with a wide range of motion, and its recovery from a blow is so effectually governed by the frictional element that the spring quickly comes to rest without repeating the original blow in a succession of jumps and reactional jerks, so characteristic of all known forms of simple spiral rubber and rubber center spiral springs. It is also obvious that each coil in this elliptical spring, being less in width through its short diameter than its adjoining superior coil, will be spread laterally in the direction of that diameter upon compression of the spring, thus bringing into action the resistance of the bar to flexure both edgewise and flatwise, or in the transverse direction, the ellipticity of the coil affording the opportunity for this lateral flexure, which does not exist in the common volute spring.

I have now described and shown a spring so constructed as to develop in action, as I believe, the best possible results; but in one respect the particular form described may be modified without departing from the spirit of my invention.

It will be observed that I have represented each of the coils in the spring as being somewhat more elliptical, or of less extent through its short diameter, than the coil next above it; but, if preferred, all the coils from apex to base of the spring may be made equally elliptical, with the sides of the exterior contour of the spring parallel, or the successive coils from apex to base may have increased short

diameters, as preferred; it being essential, however, that the spring be elliptical in form, as described and shown in the drawings, and that at the central portions of the sides of the ellipse the coils be closely in contact with one another, so as to secure the requisite friction to soften or modify the quick recoil after a blow, or the sudden removal of pressure from the spring.

I claim as my invention—

1. A volutespring, elliptical in form, the central portions of the long sides of the several

coils of which are closely in contact, constructed to operate substantially as and for the purpose specified.

2. The combination of the spring A and the set-screw S with an elastic substance between the point of the screw and the spring, as and for the purpose specified.

ERASTUS T. BUSSELL.

Witnesses:

REU. BUSSELL,
WM. M. BUSSELL.