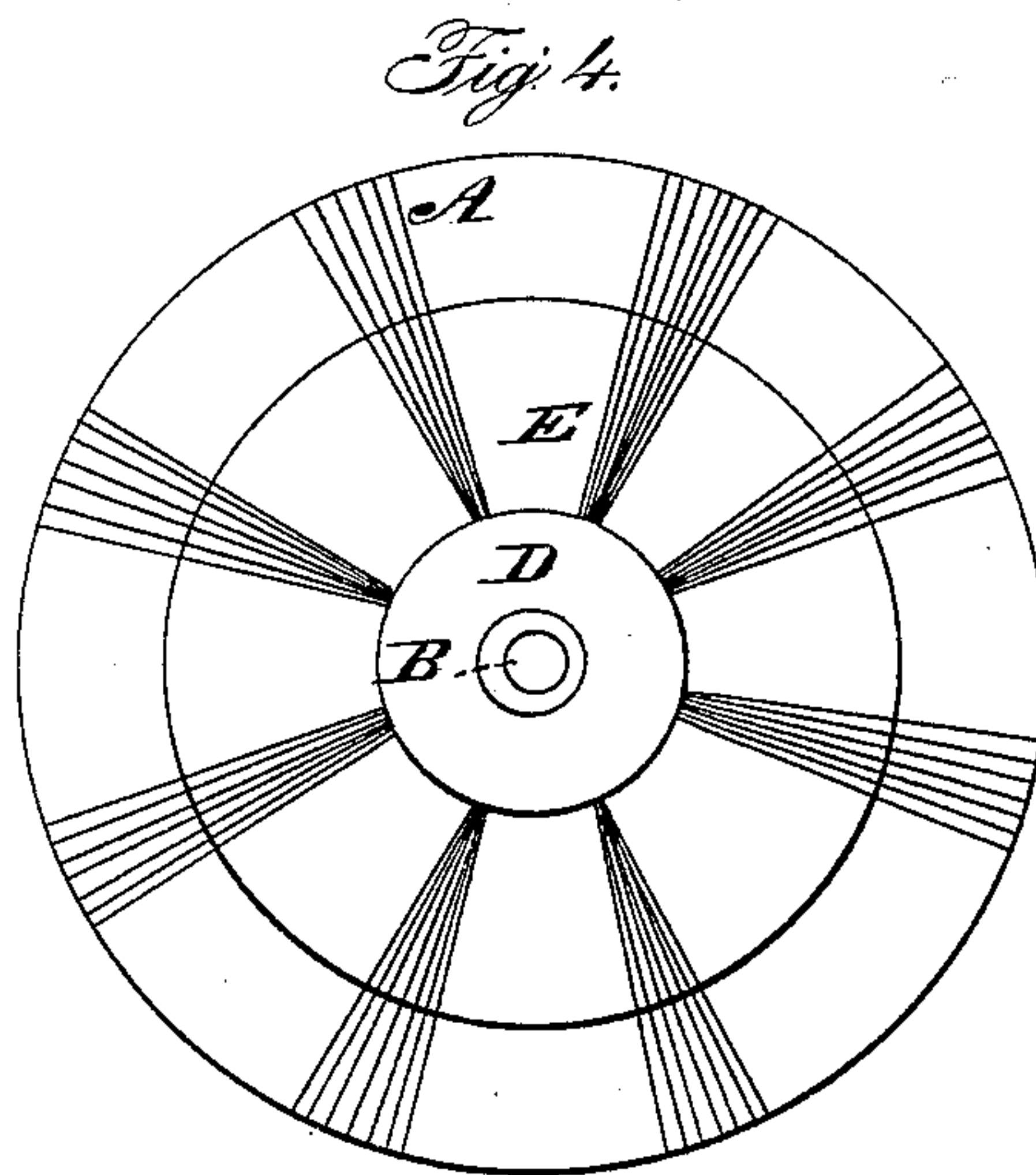
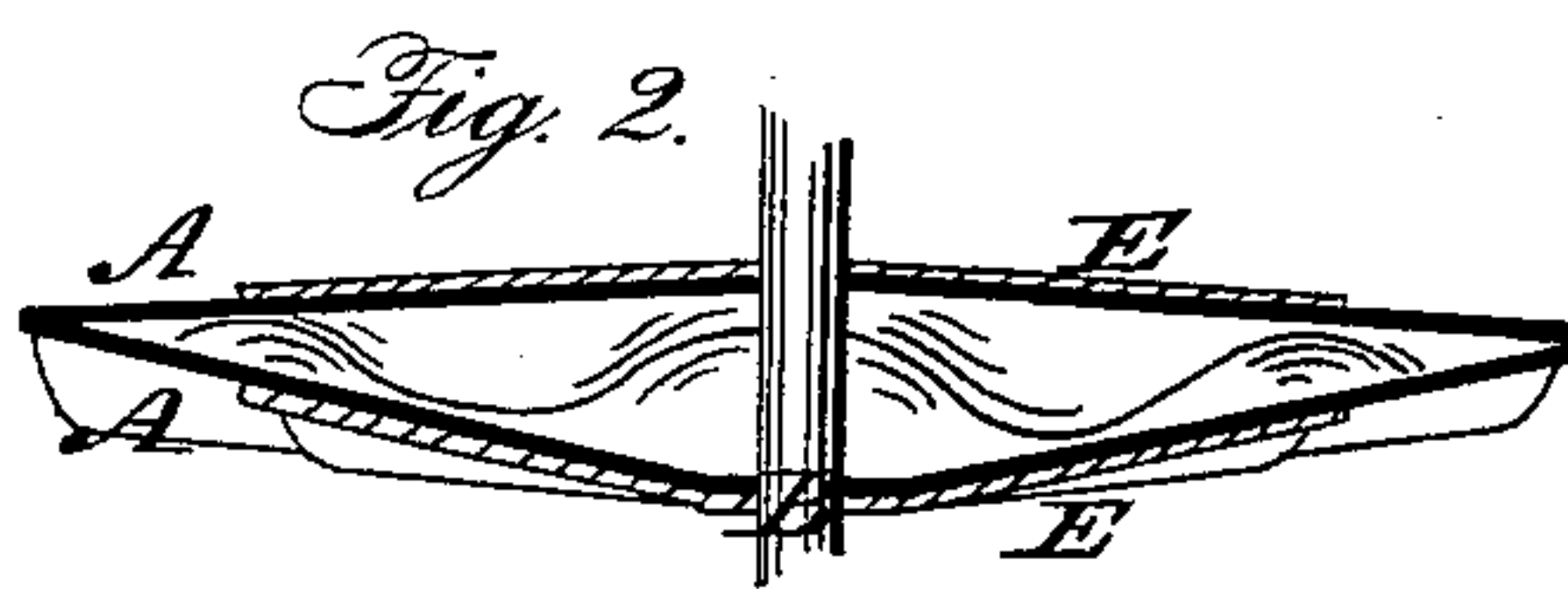
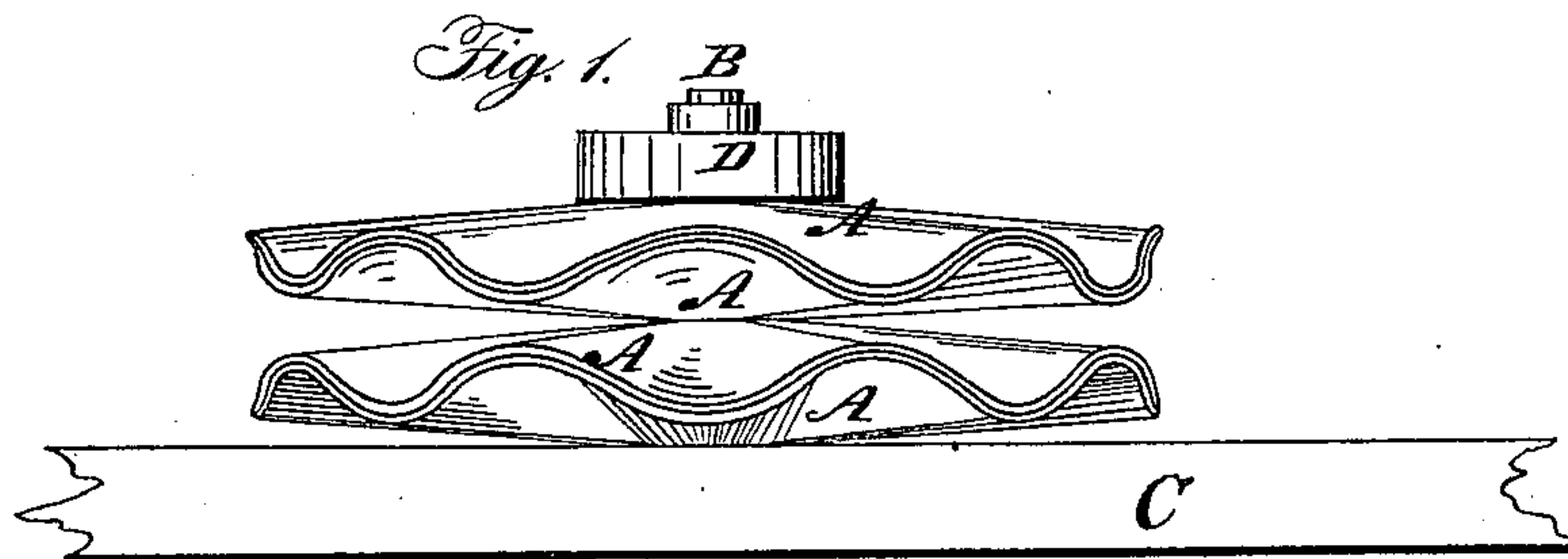


SPEED & BAILEY.

Car Spring.

No. 13,552.

Patented Sept. 11, 1855.



UNITED STATES PATENT OFFICE.

J. J. SPEED, JR., AND J. A. BAILEY, OF DETROIT, MICHIGAN.

CONICAL-PLATE RAILROAD-CAR SPRING.

Specification of Letters Patent No. 13,552, dated September 11, 1855.

To all whom it may concern:

Be it known that we, J. J. SPEED, Jr., and J. A. BAILEY, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Conical or Dish-Shaped Disk Car-Springs; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings making a part of this specification, in which—

Figure 1 is an elevation of our improvement. Fig. 2, is a vertical section of one set of plates. Fig. 3, is a diagram showing a position of the plates different to the position shown in Fig. 1. Fig. 4, is a plan or top view of one of the plates.

Similar letters of reference indicate corresponding parts in the several figures.

Our improvement has reference to the well known metallic conical or dish shaped disk spring that possesses many advantages over the "elliptic" or other "strip" spring for various constructions of cars, locomotives, and other carriages, but which have heretofore been held defective by reason of the tendency of the disks forming the spring when under compression to split or open at their edges in consequence of the plates or disks being restricted to radial construction and expansion and having no "circular" as it were compensating for the radial elongation of the fiber. To remedy this defect in this peculiar kind of spring, to which alone our invention has reference, the disks or conical plates have been made with a radial slot or opening in them for the one half of their diameter, which admitted of free "circular" compensation, but such a construction is bad, as the plate or disk being thus cut through or already broken for half its diameter is materially weakened and such a construction involves inequality in the elasticity of the disk all around, a feature of paramount importance and which affects the advantageous peculiarity of the disk spring. Our improvement on such springs effects the desideratum specified of providing "circular" compensation for the "radial" elongation or contraction of the fiber without weakening the plates by radial slot or otherwise, but rather, for the same weight of metal, giving increased strength, and without producing inequality of elasticity all around, and effectually preventing the splitting of

the plates or disks at their edges and strainage of them.

To enable others skilled in the art to fully understand and construct our invention, we will proceed to describe it.

A, represents conical or dish shaped plates constructed of steel of a suitable thickness. Each plate is corrugated in a radial manner. There may be more or less corrugations, eight are represented in the drawings. The corrugations should be regular on the prominences should correspond with the depressions so that the periphery of each plate will form a regular wave line, see Figs. 1 and 3.

The plates are placed upon a pin B, which passes through their cutters, the lower end of the pin being attached to the truck frame C, and the upper end passing through a bolster D, on which the car rests.

In Fig. 1, the plates are placed together in pairs, the edges of each pair being in contact and the prominences of one plate fitting in the depressions of the other forming a chamber or space between each pair to allow for the necessary depression or contraction of the plates, see Fig. 2. Two pairs of plates are represented in Fig. 1, one pair resting upon the other, but more may be used if necessary.

In Fig. 3, variation of the position of the plates is shown. The depressions at the edges of the plates are in contact. Each pair of plates A, vibrate or spring toward and from each other, in consequence of the weight upon them, and the corrugations allow the fibers of the metal plates to expand and contract so that the plates will not be broken or strained in consequence. If the plates were not corrugated, they would be liable to split or break at their edges.

Flat circular steel plates have been used for car springs but they are liable to break, for the reason above stated. Circular plates have also been used with a radial slot cut in them, but this destroys in a great measure their elasticity and causes an unequal pressure upon the fibers of the plates.

If the edges of each pair of plates are placed together as shown in Fig. 3, greater elasticity will be obtained, but the strength of the plates will be proportionally diminished, still, this mode may be preferable in some cases, for city cars which are comparatively small and light.

In some cases it may be necessary to increase the strength of the plates, when adjusted, as shown in Fig. 1, and smaller auxiliary plates E, may be used see Figs. 2
5 and 4, corrugated precisely similar to the plates A, and fitted on or over or between them forming a set of plates instead of a pair.

The above invention is designed to supersede the ordinary india rubber springs. They
10 can be made so as to occupy no more space, and they may be applied to the cars in much the same way, occupying the same position. The expense will be trifling and they will
15 not be affected by variations in temperature, as the india rubber springs, which are in general use, on account of their cheapness only.

As compared with other metal conical or
20 dish shaped disk springs similarly arranged, it is obvious that the corrugations (radial) in the plates do not simply affect the strength of the spring but give that free "circular" compensation for the "radial" contraction
25 or expansion of the fiber which is necessary to prevent the splitting of the edges of the disks in such springs, and this by strengthening, instead of weakening the spring

plates as has before been done by radial slots or a number of splits or openings made in
30 the edges of the plates.

We do not claim merely corrugating springs, as such has before been done; but

What we do claim as new and useful in metal conical or dish shaped disk car springs
35 arranged in sets or pairs one above the other as described is—

Preventing the splitting of the edges of the disks by expansion and effecting free
40 circular unbroken compensation or lateral play for the radial elongation of the fiber or fibers when the spring is exposed to sudden or heavy compression, and insuring
45 equality of elasticity all around, by making the disks with radial corrugations and arranging them for operation together substantially as specified.

JOHN J. SPEED, JR.
JOHN A. BAILEY.

Witnesses to J. J. Speed, Jr.'s signature:

J. G. MASON,
WM. TUSCH.

Witnesses to Bailey's signature:

CHAS. H. SPEED,
CHAS. CROSMAN.