

(No Model.)

T. M. BELL.
GRADUATED CAR SPRING.

No. 406,697.

Patented July 9, 1889.

FIG. 1.

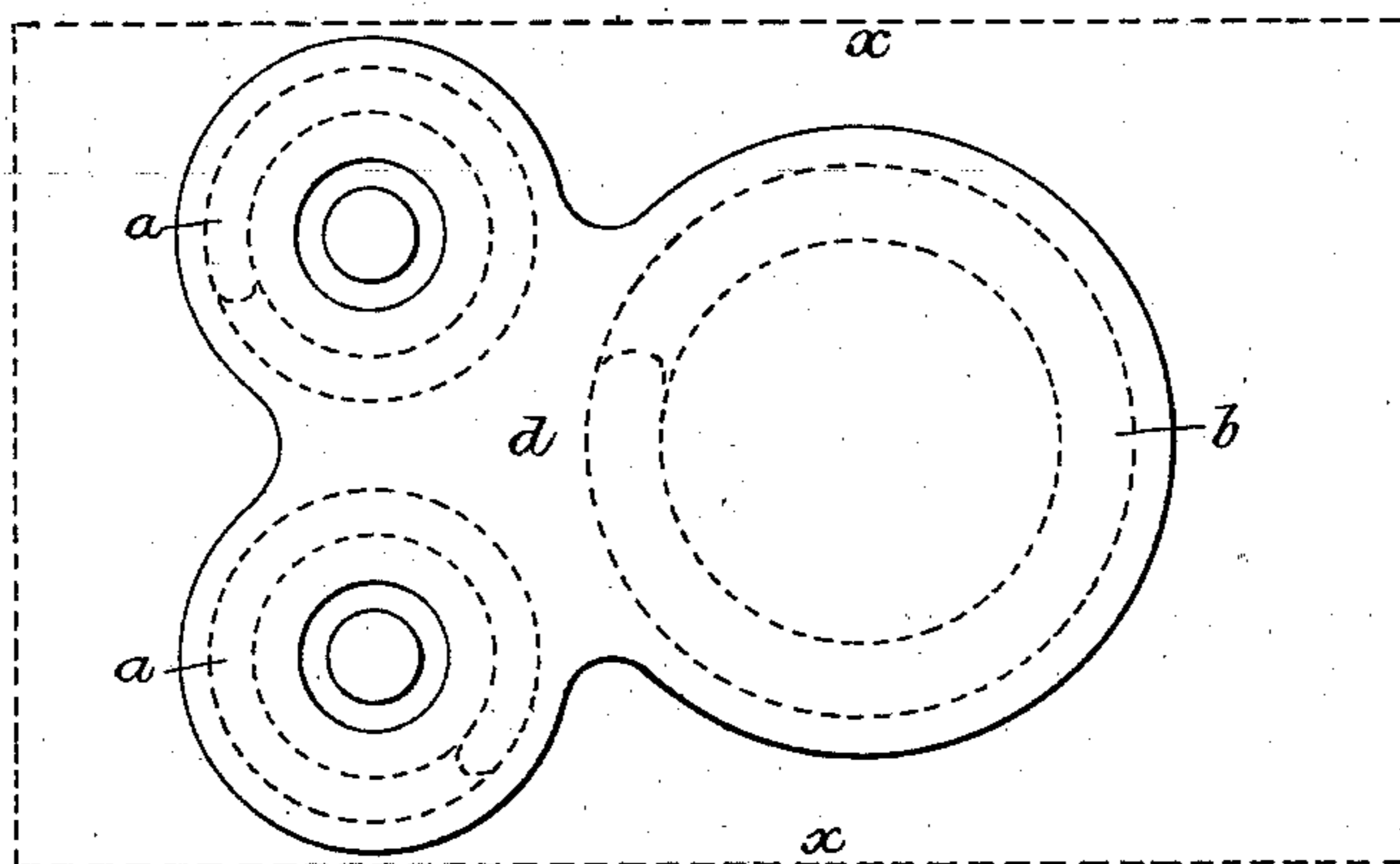


FIG. 2.

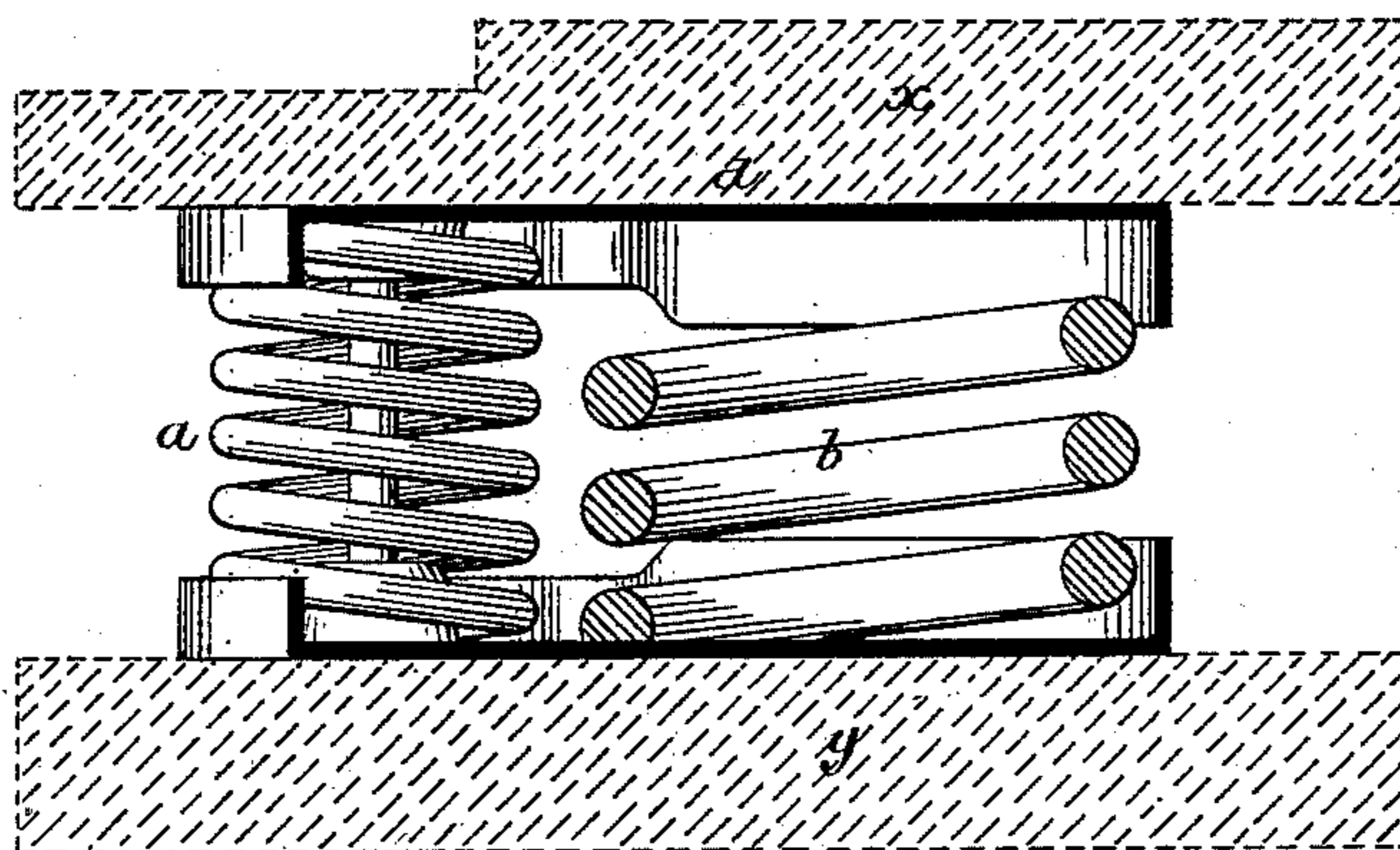


FIG. 3.

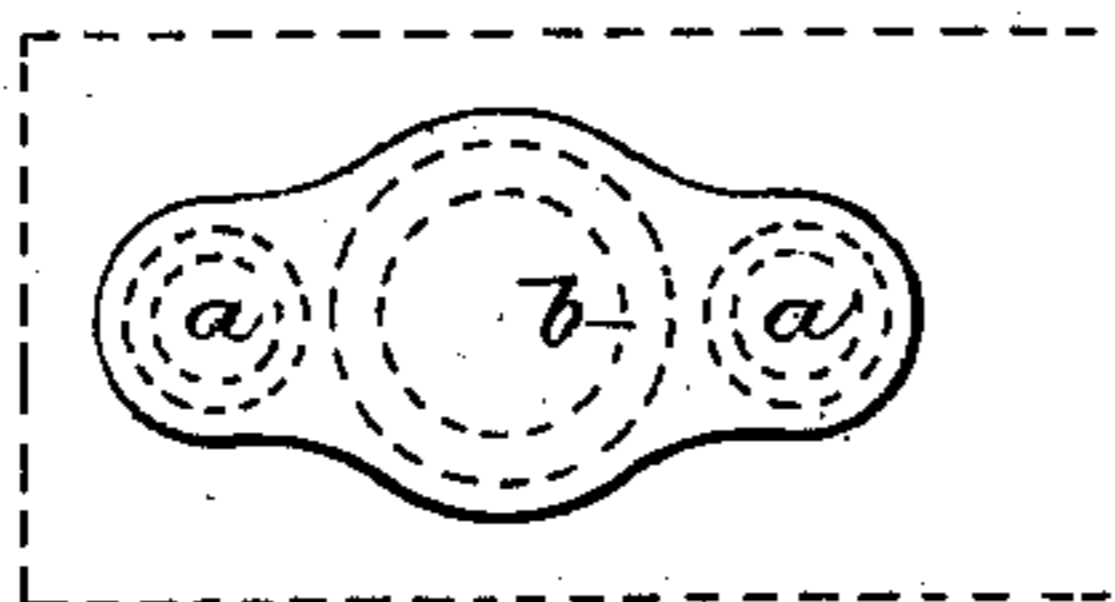
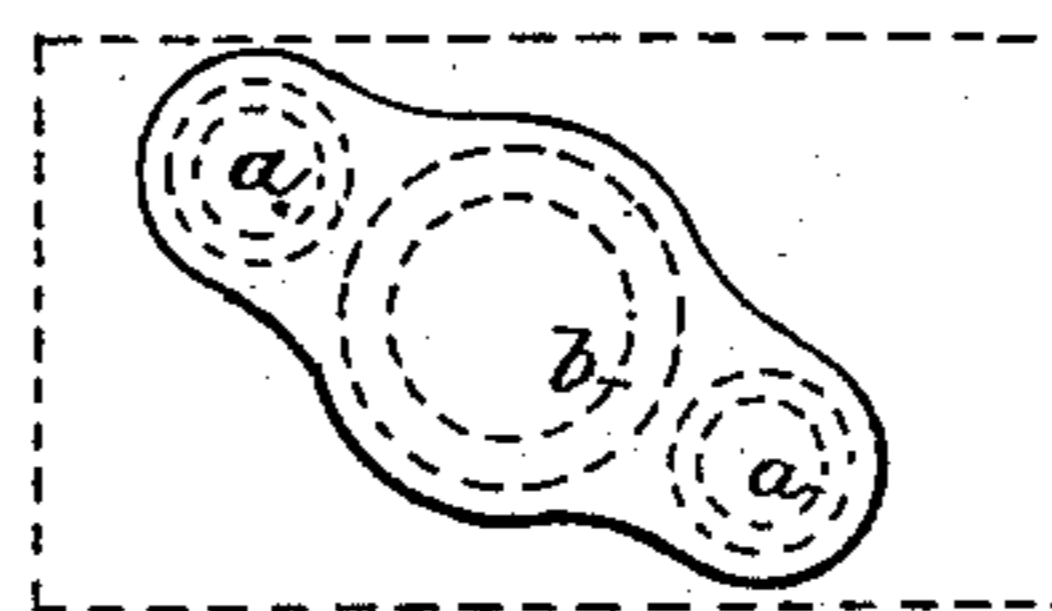


FIG. 4.



Witnesses
Alex. Parkoff
William D. Warner

Inventor:
Thomas M. Bell
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

THOMAS M. BELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
CHARLES SCOTT SPRING COMPANY, OF SAME PLACE.

GRADUATED CAR-SPRING.

SPECIFICATION forming part of Letters Patent No. 406,697, dated July 9, 1889.

Application filed December 14, 1888. Serial No. 293,561. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. BELL, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Graduated Car-Springs, of which the following is a specification.

My invention consists of certain improvements in graduated car-springs, such as that shown in Patent No. 255,200, dated March 21, 1882, in which there are primary and secondary springs, a light load being supported wholly by the primary springs and the secondary spring coming into action and aiding to support the weight in the event of the load being heavy.

The object of my invention is to prevent splitting and breaking of the spring-bolster when spring structures of this character are employed, and this object I attain by so arranging or locating the primary and secondary springs in the structure that the spring-plate or casing will effectually support the outer end of the spring-bolster throughout the whole, or substantially the whole, width of the same.

In the accompanying drawings, Figure 1 is a plan view of a graduated spring structure made in accordance with my invention, the outline of the spring-bolster being shown by dotted lines. Fig. 2 is a longitudinal section of the spring structure with spring-plank and spring-bolster shown by dotted lines, and Figs. 3 and 4 are diagrams illustrating the objection to springs of this class as heretofore made.

A graduated spring of the character to which my invention relates usually consists of a pair of light springs *a a* and a heavy spring *b*, the light springs being somewhat longer than the heavy spring, so as to serve as the primary support for the load, the heavy spring constituting the secondary support, which comes into action only when the load is so heavy as to cause such depression of the upper spring-plate *d* as will bring it into contact with said secondary spring.

Heretofore in springs of this class it has been considered necessary to locate the secondary spring in the center of the structure with a primary spring on each side of the same; hence the structure was of such length that it could not be placed transversely in re-

spect to the spring-bolster *x* and spring-plank *y*, and it has therefore been placed either longitudinally in line with the bolster, as shown in Fig. 3, or at an angle to the longitudinal line of the bolster, as shown in Fig. 4.

As the spring structure, especially at its opposite ends, is considerably less in width than the spring-bolster, the plan shown in Fig. 3 provides no support for the outer portion of said spring-bolster, except at and near the center of the same, and as a consequence the strain upon the bolster at the outer corners frequently causes the splitting and breaking of the bolster. The attempt to overcome this objection by placing the spring structure at an angle in respect to the longitudinal line of the bolster, as shown in Fig. 4, has not been attended with success, for while in this case the spring-support extends across the bolster from side to side the angle at which the spring structure is arranged necessarily leaves one of the outer corners of the bolster wholly without support, and there is quite as much splitting and breaking of the bolster as when the spring structure occupies the position shown in Fig. 3. I overcome these objections by disposing the springs in triangular form, a pair of springs being located at the outer portion of the spring structure, which thus extends across the whole, or substantially the whole, width of the bolster, while the single spring is at the inner portion of the spring structure and midway between the two outer springs. By this means the spring-bolster is so effectually supported at its outer end that the splitting and breaking of the bolster, due to lack of support for the outer corners of the same, is prevented. The outer pair of springs are preferably the primary springs, so that the outer end of the bolster carries the strain of a light load, an increase of load causing the secondary spring to come into play at a point farther from the end of the bolster, where there is greater strength to resist the strain. This arrangement of primary and secondary springs is not, however, absolutely essential to the carrying out of my invention, as the main object of the latter may be attained even if the inner spring forms the primary spring and the outer pair of springs form the secondary springs of the structure, for in this case

there will still be that effective support of the outer end of the bolster which has not hitherto been possible in springs of this class.

I am aware that spring structures having
5 three uniform and simultaneously-acting
springs arranged in the form of a triangle
have been heretofore proposed, and hence I
do not broadly claim this arrangement of
springs, my invention relating solely to grad-
10 uated springs, and involving a departure from
what has, in spite of its objections, been hith-
erto regarded as an essential arrangement of
the primary and secondary springs in struc-
tures of this class.

15 As the two springs *a a* of the graduated
spring structure can be of considerably less
diameter than is required for the individual
springs of a uniform spring structure of like
power, the placing of these two springs side
20 by side does not necessitate so wide a spring-
plate as would be required by the triangularly-
arranged uniform springs; hence the spring-
plates can be readily kept within the lateral
limits of the spring plank and bolster.

I therefore claim as my invention and desire 25
to secure by Letters Patent—

1. A graduated car-spring having the pri-
mary and secondary springs arranged in the
form of a triangle with a pair of springs at
the outer portion of the structure, so as to 30
provide a support for the outer end of a spring-
bolster throughout substantially the whole
width of the latter, as set forth.

2. The combination, in a graduated car-
spring, of a pair of primary springs, and a 35
secondary spring arranged in the form of a
triangle, the pair of primary springs being at
the outer portion of the structure, so as to
support the outer end of the spring-bolster,
all substantially as specified. 40

In testimony whereof I have signed my name
to this specification in the presence of two
subscribing witnesses.

THOMAS M. BELL.

Witnesses:

WILLIAM D. CONNER,
HARRY SMITH.