

(No Model.)

2 Sheets—Sheet 1.

G. T. GLOVER.
VEHICLE SPRING.

No. 440,403.

Patented Nov. 11, 1890.

Fig. 1.

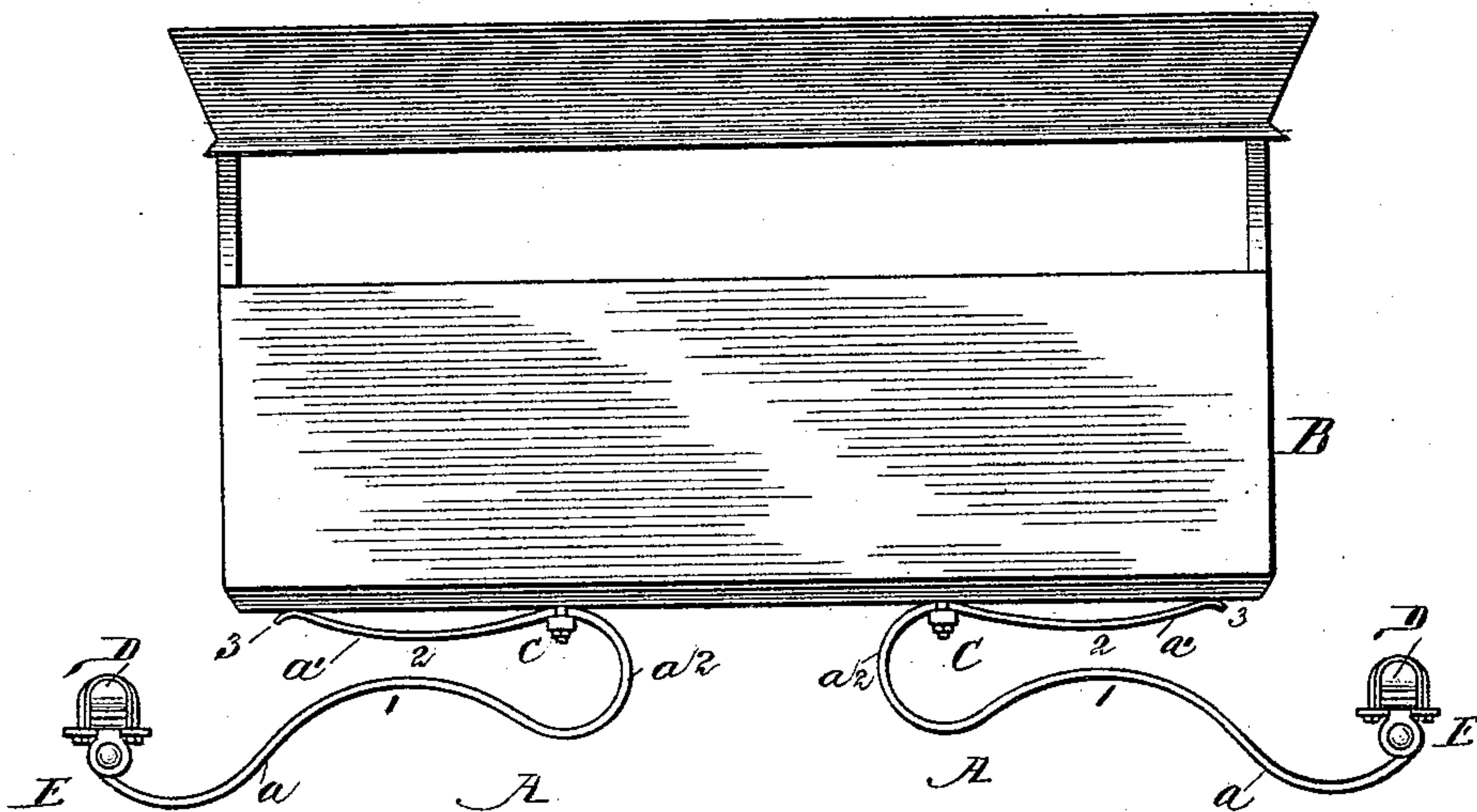


Fig. 2.

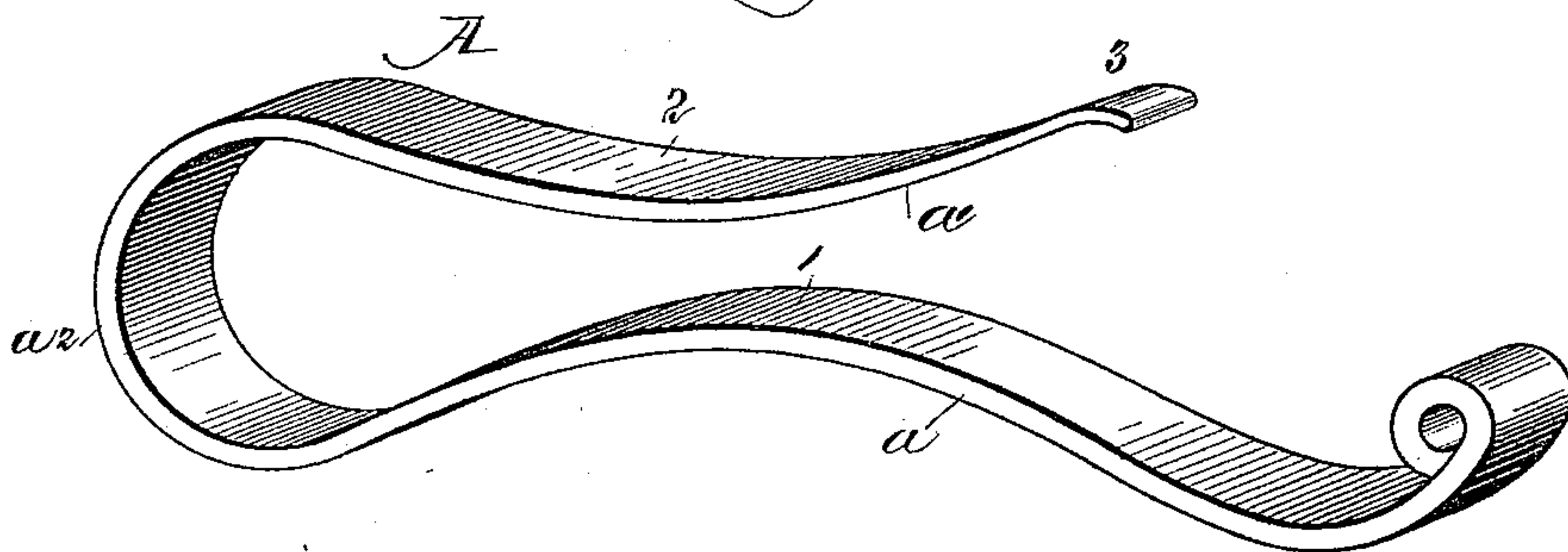


Fig. 3.

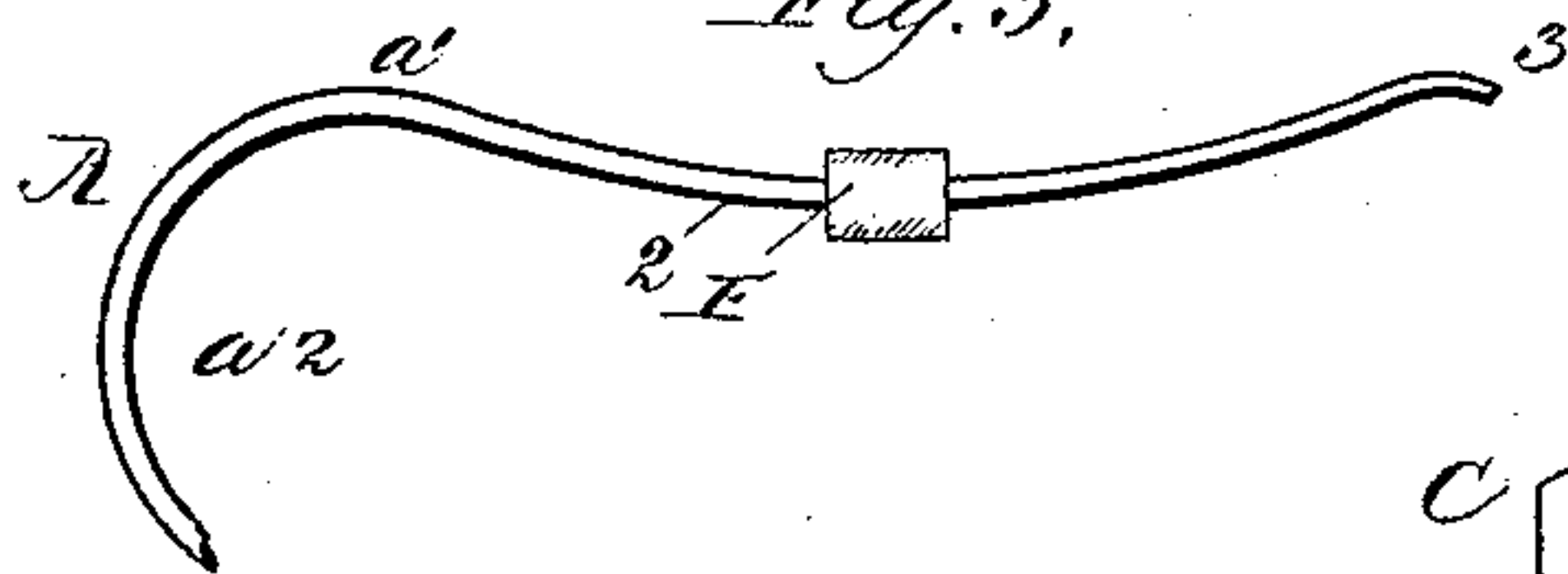
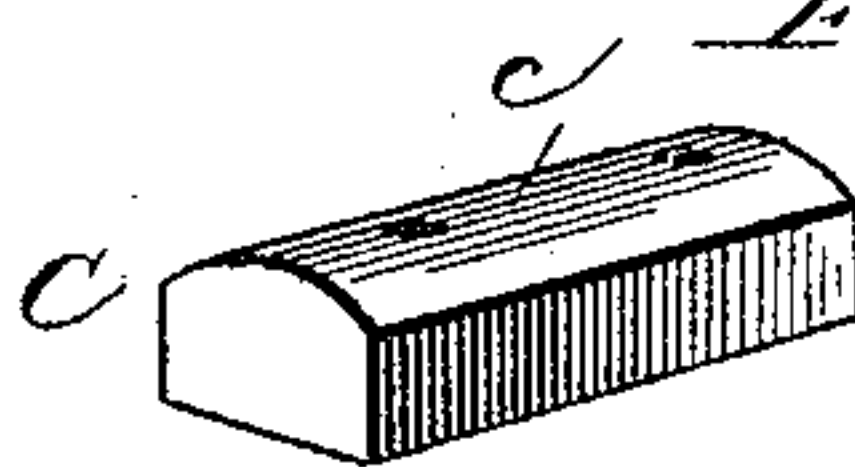


Fig. 4.



Witnesses
W. P. Foster
H. E. Kennedy

Inventor
George T. Glover,
By Chas. G. Page
Atty.

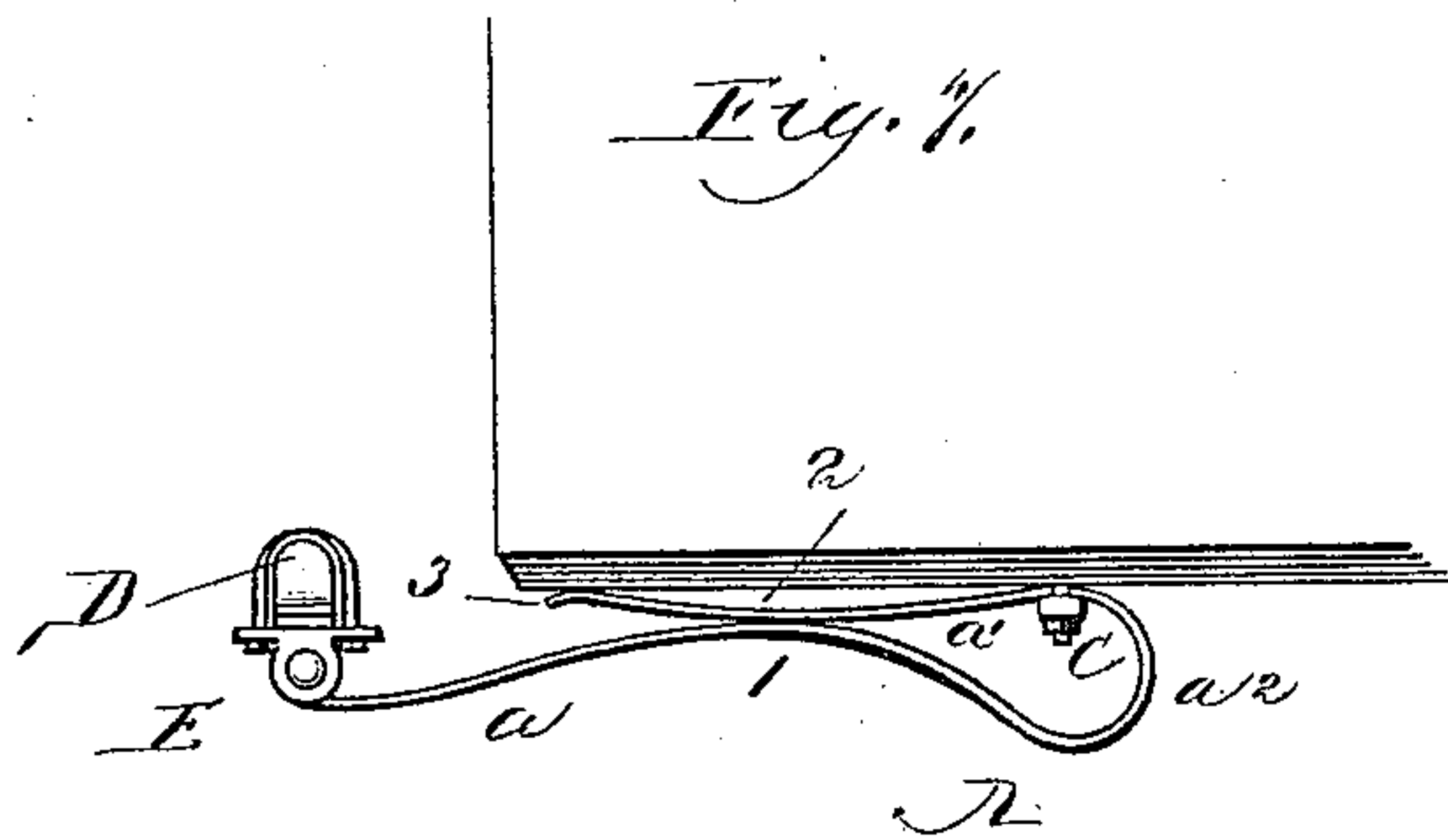
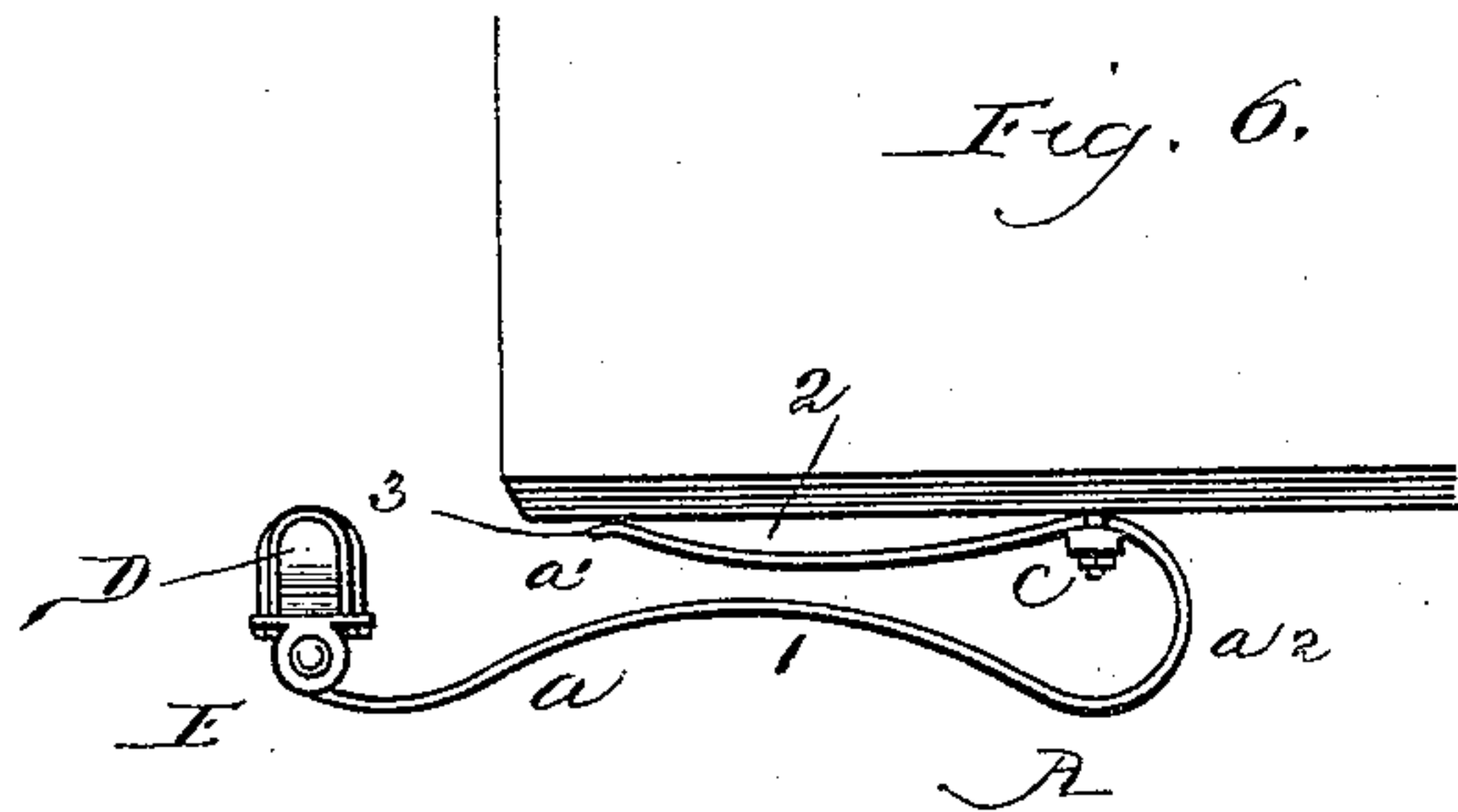
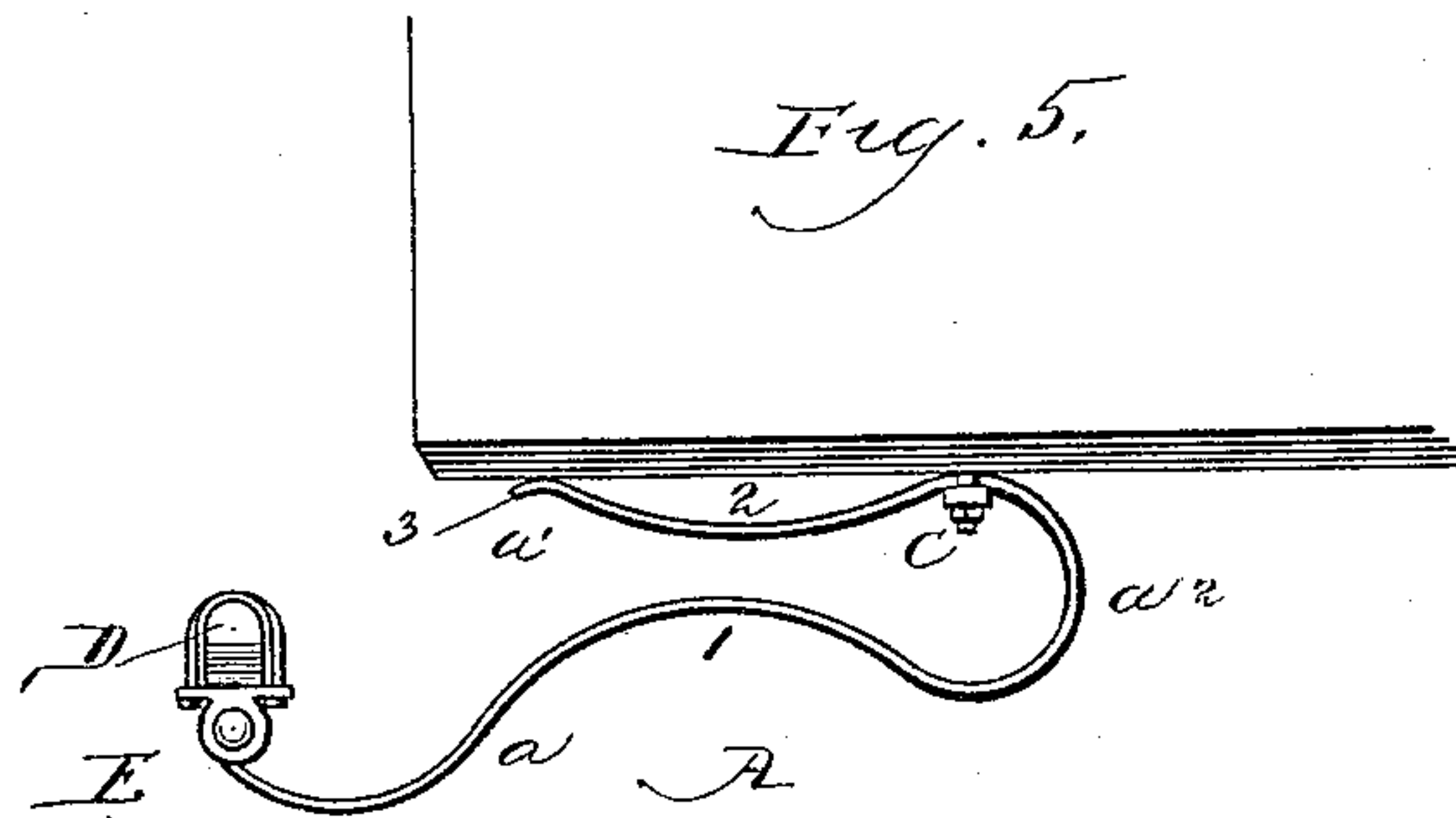
(No Model.)

2 Sheets—Sheet 2.

G. T. GLOVER.
VEHICLE SPRING.

No. 440,403.

Patented Nov. 11, 1890.



Witnesses.

W. Posner

Harry C. Kennedy.

Inventor

George T. Glover,

By Chas. G. Page

Atty.

UNITED STATES PATENT OFFICE.

GEORGE T. GLOVER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNITED STATES SPRING COMPANY, OF ILLINOIS.

VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 440,403, dated November 11, 1890.

Application filed October 11, 1890. Serial No. 367,839. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. GLOVER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Springs for Vehicles, of which the following is a specification.

The objects of my invention are to provide a compact, simple, economical, durable, and easy-riding vehicle-spring which shall automatically graduate itself to the weight, avoid breakage by opposing to the load certain spring resistances which are augmented or successively brought into active or increased active service under an increased load or severe jolt, to attain the maximum spring action in a spring formed from a comparatively short single bar of spring metal, and to utilize substantially the entire length of said spring-bar in a way to attain the aforesaid results.

To the attainment of the foregoing and other useful ends, my invention consists in matters hereinafter set forth, and particularly pointed out in the claims.

In carrying out my invention I bend a suitable strip or bar of spring metal at a point between its ends, so as to form a spring comprising a pair of spring-arms united by a curved spring bend, and I further bend or bow said arms toward one another at points between the aforesaid middle bend and their outer ends, and to such extent that under sufficient weight the spring bend or bow of one arm shall cushion upon the bend or bow of the other arm. The spring thus formed is clipped or clamped in any suitable bearing on the under side of the vehicle-body at a point between its middle bend and the bend in one of its arms, by which arrangement the arm thus secured to the vehicle-body constitutes the upper arm of the double-armed spring. The outer end of this upper spring-arm is, however, free to play along the under side of the vehicle-body, so as to permit the bent portion of said arm to have a free spring action. The outer end of the lower spring-arm is shackled to one of the side bars, so as to permit its bent portion to have suitable spring action. As a result of the foregoing, the bent portion of the upper spring-arm will have a spring action supplemental to or co-operative

with the spring action of the middle bend of the spring. When the load is sufficiently heavy to bring the spring-arms together, the downwardly-bent bowed portion of the upper spring-arm will meet and cushion upon the upwardly-bent bowed portion of the lower spring-arm, and as a result for such meeting the two bowed portions will straighten out proportionally to the weight sustained, as and for the purpose hereinafter more fully set forth.

In the accompanying drawings, Figure 1 represents in elevation a vehicle-body and a couple of springs constructed in accordance with my invention applied thereto. Fig. 2 represents the spring in perspective. Fig. 3 represents the upper arm of the spring provided with a pad. Fig. 4 represents a portion of a clip for holding the spring to the vehicle-body. Figs. 5, 6, and 7 are views illustrating the action of the spring under different conditions.

The spring A is formed from a bar or strip of spring metal, which is bent at a point between its ends, so as to provide a spring comprising the lower spring-arm a , the upper spring-arm a' , and a part circular or proximately circular spring bend a^2 intermediate of said two arms. The spring-arms a and a' are also bowed or bent toward one another at points between the bend a^2 and their outer ends, so as to provide them with spring bends 1 and 2. These spring bends 1 and 2 are formed opposite one another, so that under certain conditions during use they may meet—that is to say, under a heavy load or sudden jolt the depression of the upper spring-arm will cause its downwardly-bent portion 2 to be brought down upon the upwardly-bent portion 1 of the lower spring-arm. The upper spring-arm is attached to the vehicle-body B by a clip C at a point between its bend 2 and the bend a^2 which is intermediate of the spring bends 1 and 2, and the outer end of the lower spring-arm is connected with one of the end or side bars D by a suitable shackle, as at E. The free end 3 of the upper spring-arm bears against the vehicle-body (or what is the same thing, any suitable bar or plate or other bearing-surface on the body) and is free to slip or slide thereon.

The upper spring-arm is normally in contact with the body at two points—to wit, at its outer free end 3 and at the point where it is attached to the body by the clip C. When
 5 the weight tends to depress the upper spring-arm, the bent portion a^2 of the spring will oppose to the same a yielding spring resistance, which is supplemented by a general flexure on the part of the entire spring, and
 10 regardless of whatever flexure may take place in the lower spring-arm there will also be a distinct and serviceable flexure in the bowed portion 2 of the upper arm, which will commence to straighten out before it cushions
 15 upon said lower arm. This flexure of the downwardly-bent portion of the upper spring-arm is permitted by reason of its end 3 being free to play along the under side of the vehicle box or body, and is illustrated by a comparison of Fig. 6 with Fig. 5. Thus in Fig. 5
 20 the spring is shown in its normal condition, while in Fig. 6 the arms are somewhat closer together and the bowed portion of the upper arm is to some extent straightened out. This flexure of the bowed portion of the upper
 25 spring-arm will take place although the spring is at a point between its bends a^2 and 2 clipped tightly against the box or body. As a means for facilitating this flexure of the upper
 30 spring-arm, I prefer to round the side c of the clip, which is drawn against the spring, and hence while permitting the requisite movement of the spring at both sides of the point whereat it is clamped I also provide a bearing
 35 of suitable size for the fastening-bolts.

When the oppositely-arranged bends 1 and 2 of the spring-arms meet by reason of a sudden jolt or heavy load, each bend will tend to straighten out proportionally to the weight,
 40 and hence each bowed spring will form a spring-cushion for the other bowed spring-arm as illustrated in Fig. 7.

With a spring of the foregoing construction I am enabled to utilize the entire length of
 45 the spring and derive the maximum advantage from a comparatively short piece of spring metal. Breakage of said spring is practically impossible. Thus the weight of the load not sufficient to bring the cushioning
 50 portions 1 and 2 of the spring-arms together will be prominently opposed both by the resistance of the spring bend a^2 to flexure and the resistance of the spring bend 2 to flexure tending to straighten it out. These said portions of the spring will, however, both yield
 55 to a weight not sufficient to bring the spring-arms together. When, however, the spring is subjected to a heavier load, the bent portions 1 and 2 of the spring-arms will meet and
 60 cushion at a time proper to relieve the bend a^2 from such strain and flexure as might tend to break or impair it. Under these said conditions the spring portions 1 and 2 practically take the weight and straighten out to a degree proportionally to the same, thereby au-

tomatically increasing the spring resistance and supplementing the spring action of bend a^2 with a new development of spring resistance. It will also be seen that whether or
 70 not the load is sufficient to force the spring bend 2 of the upper arm down upon the spring bend 1 of the lower arm, so as to practically cushion one spring bend upon the other, the upper arm in place of remaining
 75 inert will supplement the bend a^2 by its individual spring action.

As a desirable arrangement, a pair of these springs can be arranged at each end of the vehicle-body and shackled to the side bars,
 80 as in Fig. 1, wherein two of such springs are shown. As a matter of course, however, the springs could be arranged longitudinally with relation to the length of the body-frame and the ends of their lower arms shackled to cross-bars at the ends of the vehicles. It will
 85 therefore be herein understood that the term "side bars" includes bars at either of the four sides of the vehicle.

In connection with the spring I may arrange upon either of the bends 1 and 2 a
 90 pad or cushion of leather, rubber, or the like, so as to receive the impact when the arms are brought together, and thus prevent any rattling sound which might otherwise be incident to frequent meeting of said arms. In
 95 Fig. 3 I have shown the upper arm of the spring A provided with a pad F of such character, although I may apply the same to the lower arm.

What I claim as my invention is—

1. A vehicle-spring formed with a pair of
 100 oppositely-arranged spring-arms which are bowed toward one another and a bend by which the two arms are united, said arms being normally positioned so that under a sufficiently-heavy load the bowed portion of one
 105 arm shall cushion upon the bowed portion of the other arm and both of said bowed portions straighten out proportionately to the weight sustained, substantially as and for the
 110 purpose set forth.

2. A vehicle-spring bent to form a pair of oppositely-arranged spring-arms which are bowed toward one another and attached to
 115 a vehicle-body at a point between the bowed portion of one arm and the bend by which the two arms are united, the outer end of said attached spring-arm being free, substantially as and for the purpose set forth.

3. The double-armed vehicle-spring A,
 120 formed with the bends 1 and 2 in its arms, and a bend a^2 between its said arms and having its upper spring-arm attached to a vehicle-body at a point between the bends 2 and a^2 , the outer end of the lower spring-arm
 125 being shackled to one of the side bars and the outer end of the upper spring-arm being free, substantially as and for the purpose set forth.

4. The double-armed vehicle-spring A, 130

formed with bends 1, 2, and a^2 and attached to a vehicle-body at a point between its bends 2 and a^2 by a clip having a rounded side bearing against the spring, substantially as and
5 for the purpose set forth.

5. The combination, with the spring A, provided with arms a and a' , having bends 1 and

2, of a pad arranged on one of said arms, as and for the purpose set forth.

GEORGE T. GLOVER.

Witnesses:

R. WAGNER,

HARRY COBB KENNEDY.