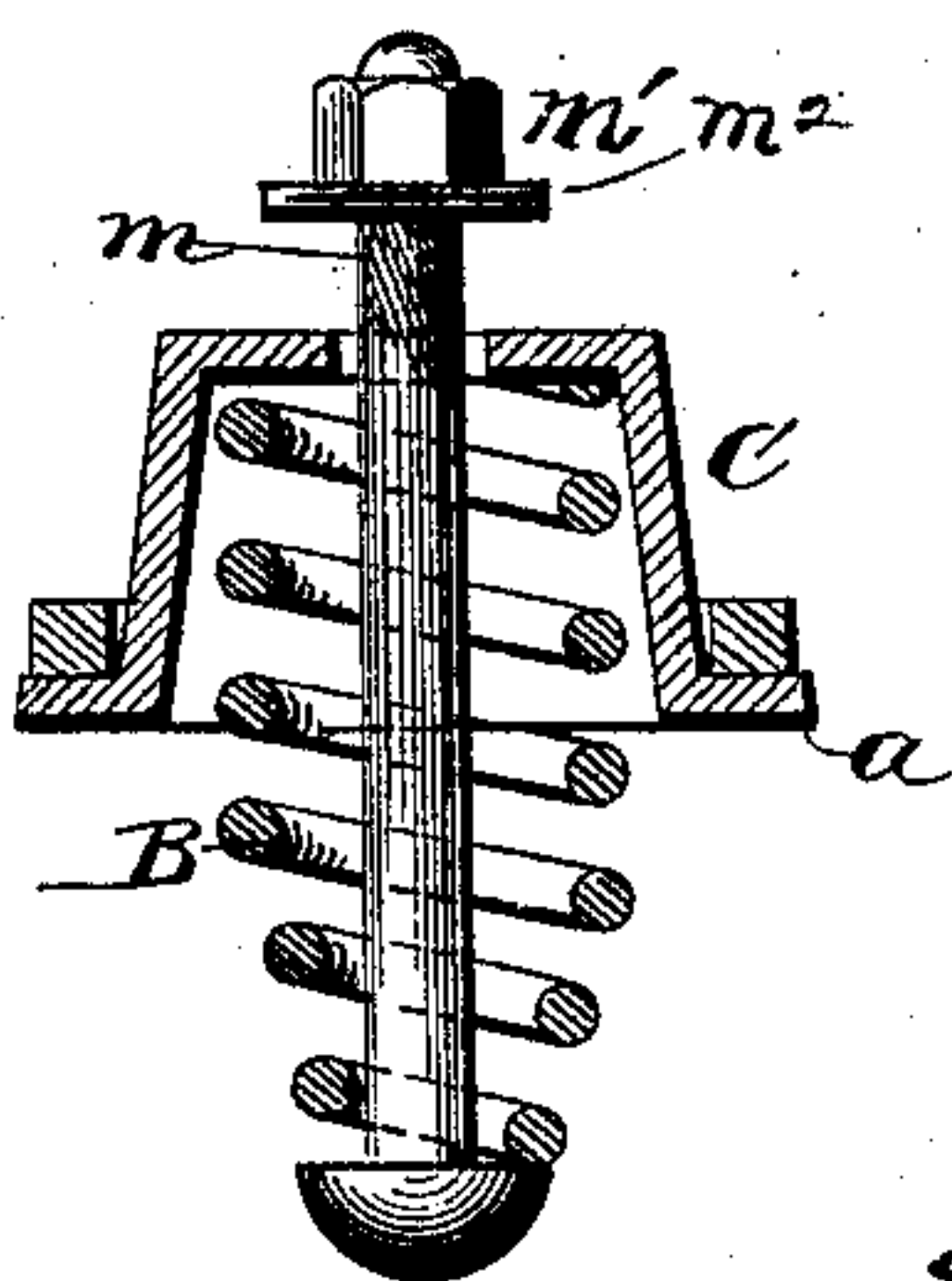
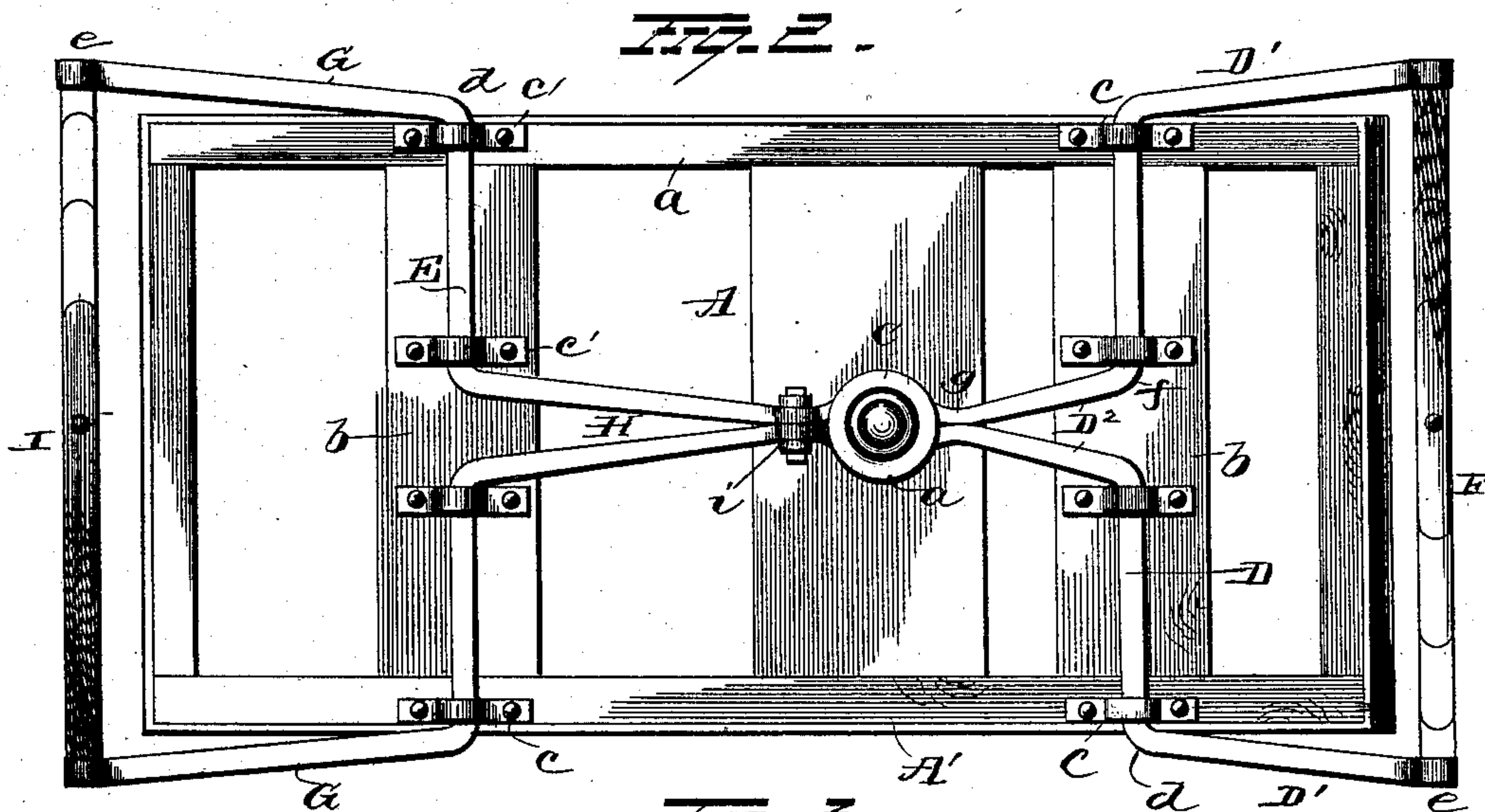
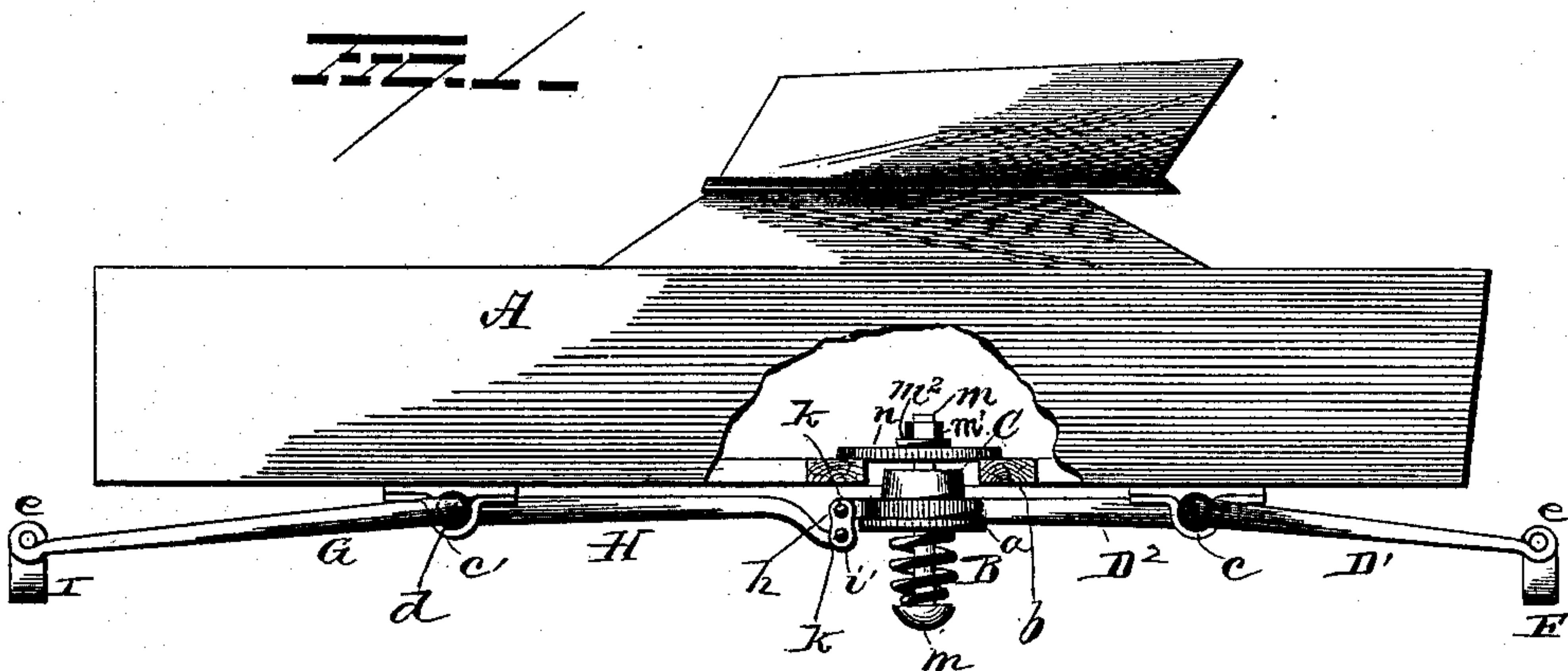


(No Model.)

H. C. SWAN.  
VEHICLE SPRING.

No. 393,796.

Patented Dec. 4, 1888.



Witnesses,  
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*H. A. Seymour,*



# UNITED STATES PATENT OFFICE.

HENRY C. SWAN, OF OSHKOSH, WISCONSIN.

## VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 393,796, dated December 4, 1888.

Application filed September 26, 1888. Serial No. 286,434. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY C. SWAN, a resident of Oshkosh, in the county of Winnebago and State of Wisconsin, have invented certain new and useful Improvements in Vehicle-Springs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in vehicle-springs of a style in which a spiral or volute spring is employed to elastically support a vehicle-body by proper connections to the vehicle-gears, and more particularly to a form of construction in which the spring is located in a central position below the vehicle-body, and is connected to it and the vehicle-gears by rock-shafts pivotally attached to plate-springs or side bars of said gears.

Heretofore the construction of parts in vehicle-gears adapted to utilize a spiral or volute spring for the elastic support of the body has been complicated, involving the use of a number of pieces jointed or clipped together, whereby cost of production is enhanced and noisy rattle from incidental wear increased to an objectionable degree.

The object of my present invention is to provide a vehicle-spring of spiral or volute form for vehicles, and so connect the same to half-elliptic transverse end springs or side bars of the vehicle-gears by rock-shafts that an easy elastic vertical movement of the body is assured, and a simple connection of few working parts afforded, whereby a superior spring appliance of comparatively low cost is produced.

With these objects in view my invention consists in certain features of construction and combinations of parts, that will be hereinafter described, and pointed out in the claims.

Referring to the drawings making a part of this specification, Figure 1 is a side elevation of a vehicle-body with the spring and its connections attached. Fig. 2 is a bottom plan view of a vehicle-body with spring and its attachments shown. Fig. 3 is a detached view of the spring and its cupped support.

A is the vehicle-body, B the spring, and C a metal cup in which the spring is seated.

The cup is of cylindrical form on its lower side and provided with a flange, *a*, that surrounds its lower edge, the use of which will be made apparent.

The form preferably given the spring B is spiral, with its lower end given a conoidal shape by contraction of its coils. This is optional, however, as it will operate freely if a cylindrical spiral form is given the spring.

Upon the side sills *A'* of the vehicle-body A, and also the transverse pieces *b*, that are attached to said side sills, which together form the bottom frame of the body, the boxes *c c'* are secured, so as to afford support to the rock-shafts D E.

The rock-shafts D, resting in the boxes *c*, are bent at *d* so that their limbs *D'* will lie nearly parallel with the side sills *a*, and are connected at their rear ends, *e*, to the eyes of a semi-elliptic spring, F, which are located over the front and rear axles of the vehicle, (not shown;) or said ends *e* of the rock-shaft limbs *D'* may be attached by shackles to the side bars of the vehicle in the usual manner. At *f* the rock-shafts D are bent to extend forwardly and toward each other, producing separate arms *D<sup>2</sup>*, which have contact at *g*, where they are bent to encircle the body of the cup C, so as to support said cup by the engagement of its flange *a* therewith.

The forward ends of the half-circular portions of the rock-shaft arms just mentioned are extended a short distance in front of the cup C, and are perforated laterally near the terminal ends *h* of the same, for a purpose that will be shown. Forwardly of the spring-cup C the rock-shafts E are supported, to have proper rocking movement in the boxes *c'*. These rock-shafts are provided with arms G and limbs H, similar in form to the limbs *D'* and arms *D<sup>2</sup>*, integrally produced on the rearward rock-shafts, D.

The arms H of the rock-shafts E approach each other until they have contact near the cup C, where there are flattened bosses *i*, formed on their terminal ends, which are perforated laterally to receive a bolt, *i'*. Between and upon the perforated bosses *i* and the adjacent perforated ends *h* of the arms *d<sup>2</sup>*, which lie directly above said bosses, the connecting-links *k* are adjusted pivotally by the bolts *i' k'*, so that a limited vertical move-



ment of the spring B is permitted, which spring has a connection effected between it and the vehicle-body A by the vertical bolt  $m$ , that is susceptible of adjustment for length  
 5 by provision of a nut,  $m'$ , which bears upon a washer,  $m^2$ , that is seated on the flat plate  $n$ , said plate covering an opening in the floor of the vehicle-body A, made to accommodate the metal cup C.

10 The limbs H of the rock-shafts E are forwardly extended to loosely engage the eyes of the half-elliptic spring I, or may be shackled to side bars of a vehicle, if preferred.

It will be seen that the construction and  
 15 connection of parts hereinbefore mentioned will afford free vertical action of the vehicle-body on the springs, and the conjoint operation of the semi-elliptic springs F I with the spiral spring B secures proper resilience, while  
 20 side sway of the body A is prevented.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a body and rock-  
 25 shafts journaled to the body and provided with bent portions that are adapted to support a spring-cup, of a spring-cup and a spiral spring, substantially as set forth.

2. The combination, with a pair of rock-  
 30 shafts bent to support a spring-cup, a spring-cup, and a spring, of a pair of rock-shafts that are shackled by adjacent ends to said first pair of rock-shafts, substantially as set forth.

3. The combination, with a body and rock-  
 35 shafts journaled on the body and provided with limbs, of integral arms formed on the rock-shafts, which are bent to support a spring-cup, and a spiral spring, substantially as set forth.

40 4. The combination, with a vehicle-body and journaled rock-shafts having limbs pro-

jecting nearly at right angles to the body of these shafts and arms projected oppositely to the direction of the limbs, said arms being bent to afford a support for the flanged spring-  
 45 cup, of a flanged spring-cup and a spiral spring, substantially as set forth.

5. The combination, with a vehicle-body, a spring-cup, and a spiral spring connected to the body, of two pairs of rock-shafts that are  
 50 secured by links or shackles together at the adjacent ends of their arms, the arms on one pair of rock-shafts being bent to afford support to the spring-cup, substantially as set forth.

6. The combination, with two pairs of rock-  
 shafts that are journaled on a vehicle-body and provided with limbs that are adapted to engage loosely the ends of plate-springs, and arms which project oppositely of the limbs to  
 60 be shackled together at their terminals, of integral bent cup-supports formed on the arms of one pair of rock-shafts, a spring-cup that engages the bent cup-supports, and a spiral spring seated in the cup and attached to the  
 65 vehicle-body, substantially as set forth.

7. The combination, with a vehicle-body, a spring-cup, a spiral spring, and a connecting-bolt, of two pairs of rock-shafts, each pro-  
 70 vided with oppositely-projecting arms and limbs, the arms of one set having integral bent cup-supports formed on them, the ends of both sets of arms being shackled together, substantially as set forth.

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

HENRY C. SWAN.

Witnesses:

F. C. STEWART,  
 FRED FELKER.