

J. CURTIS.  
Carriage Springs.

No. 144,514.

Patented Nov. 11, 1873.

FIG. 1.

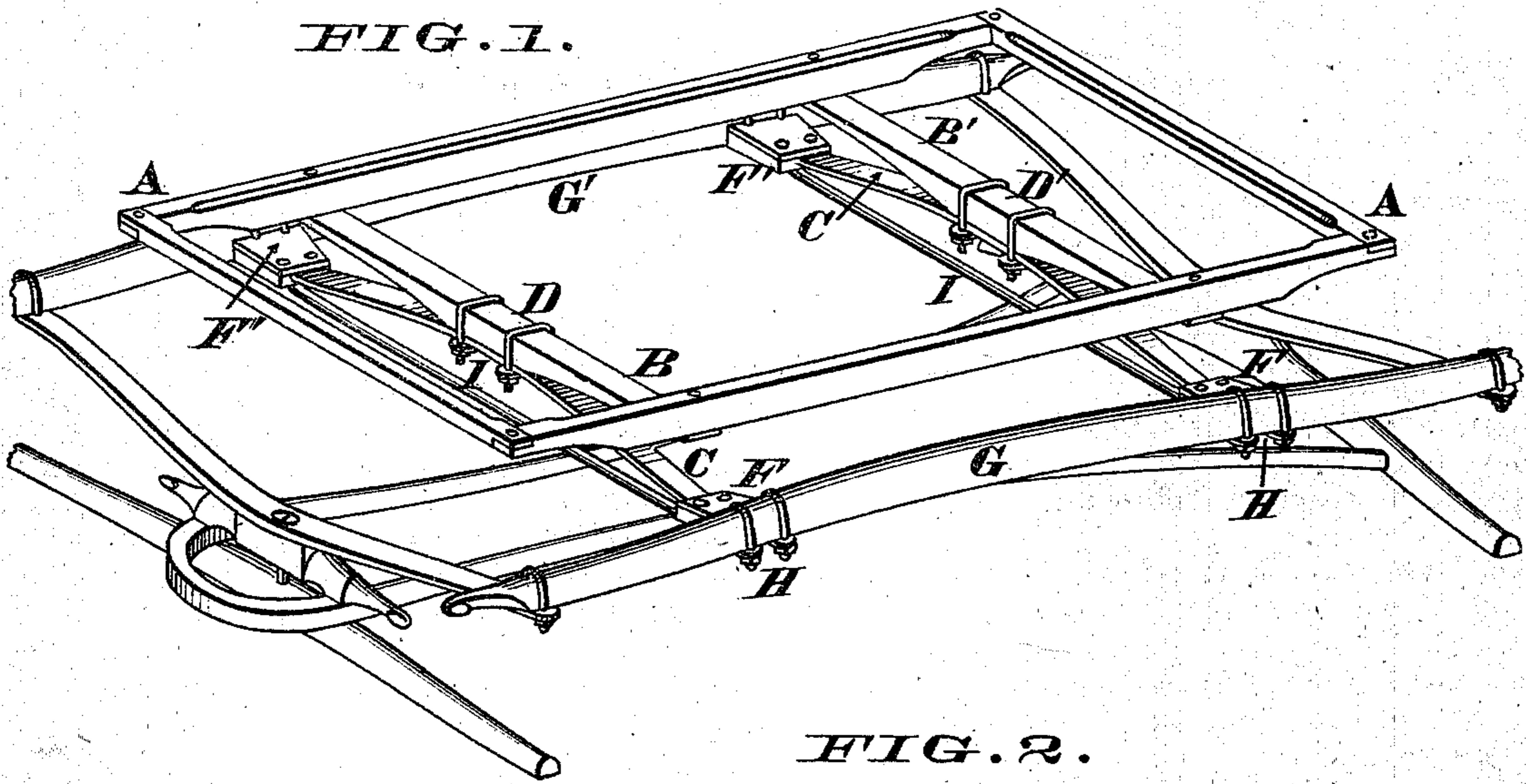


FIG. 2.

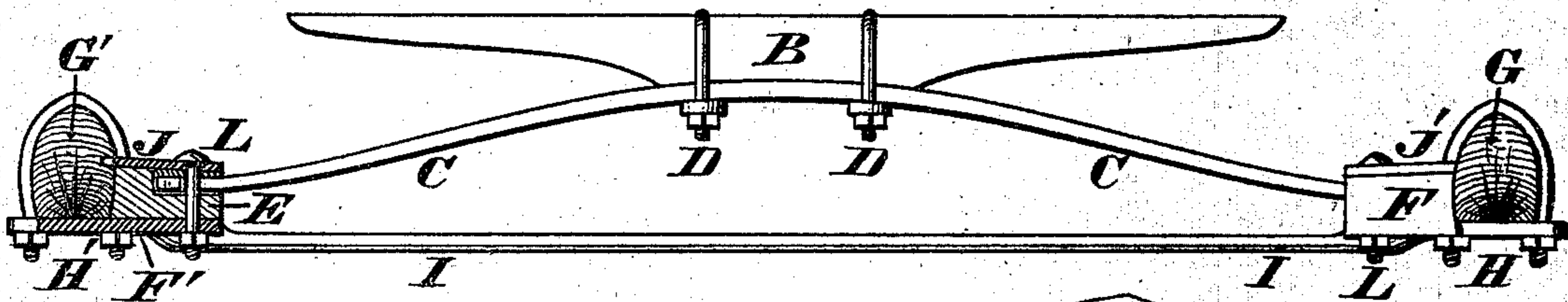


FIG. 3.

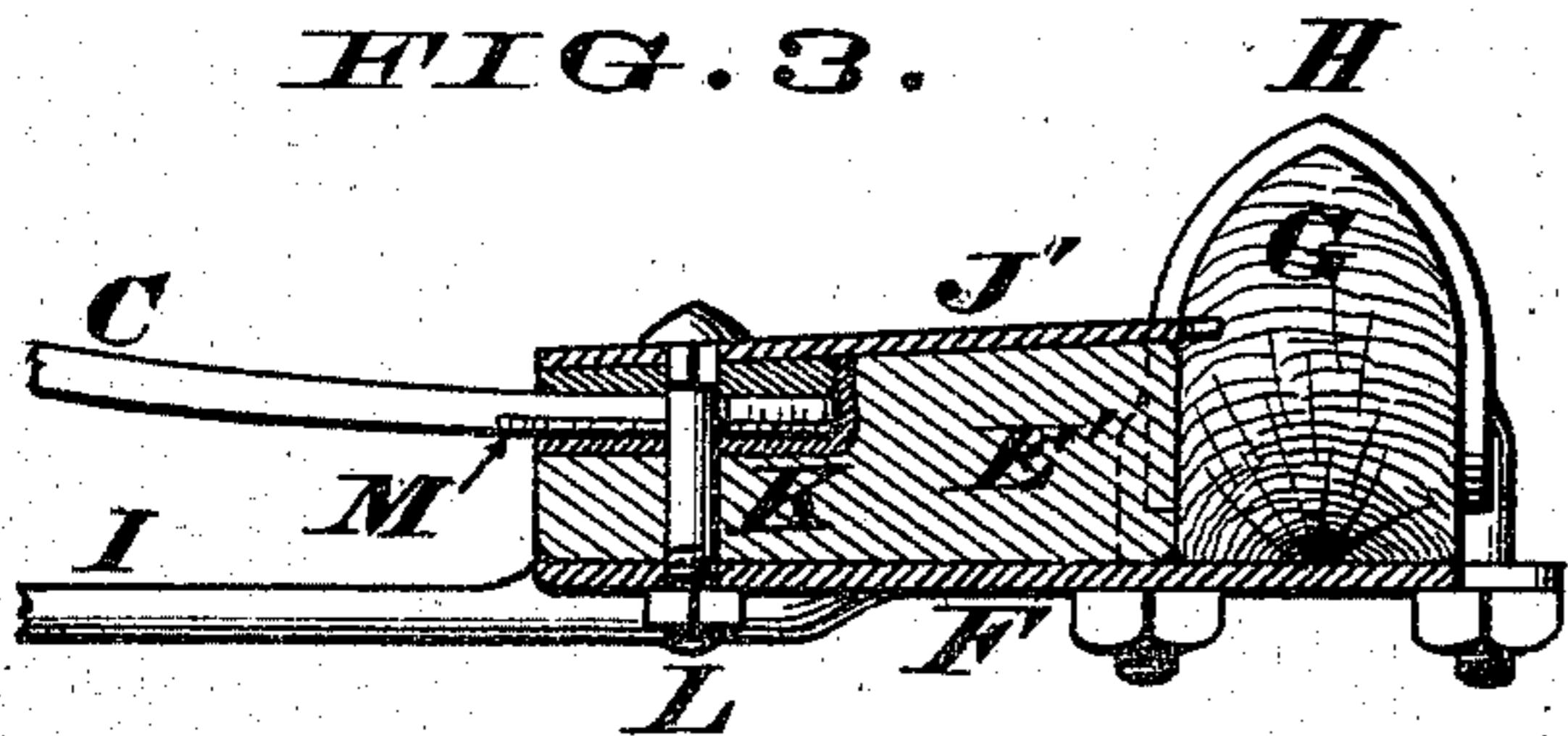
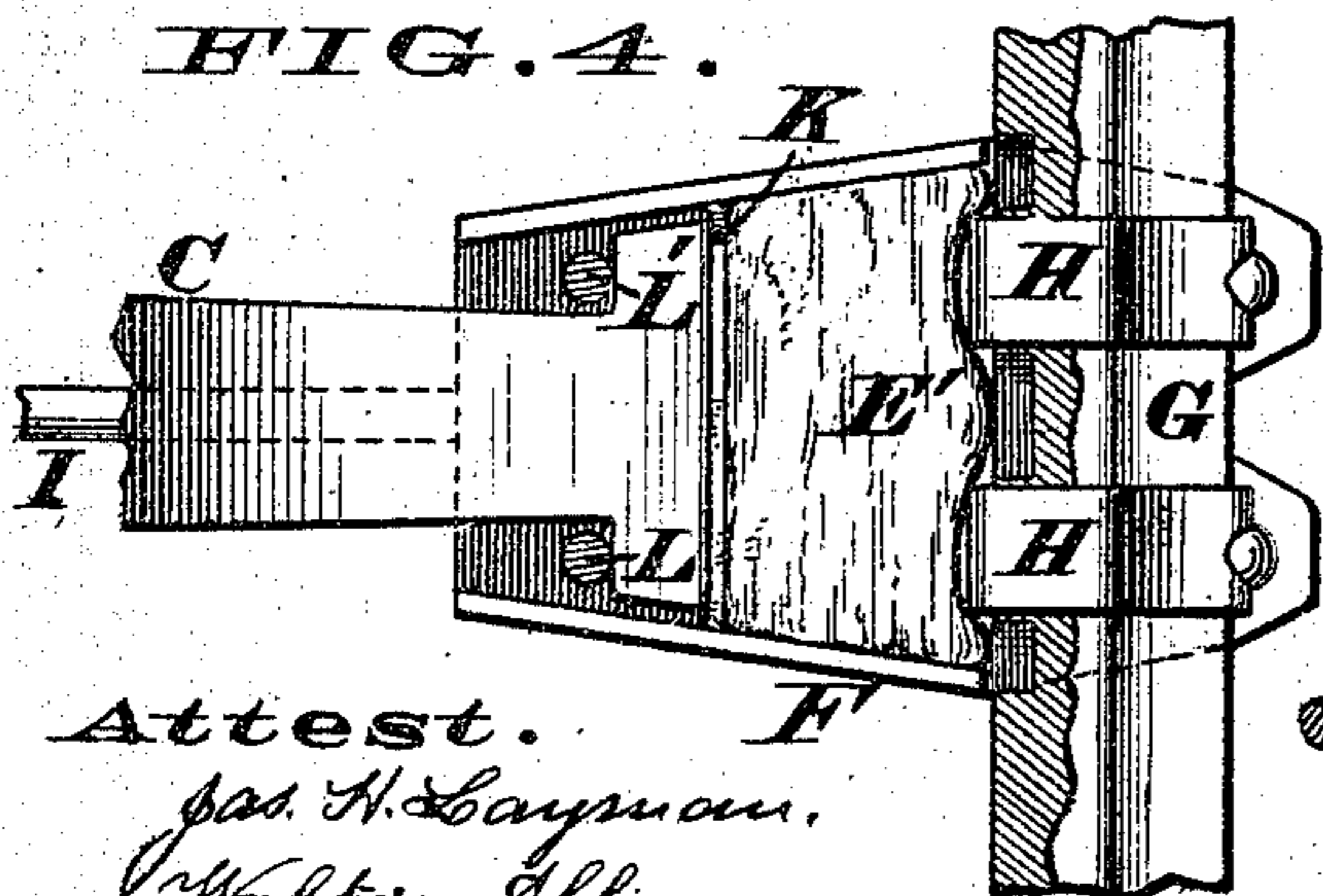
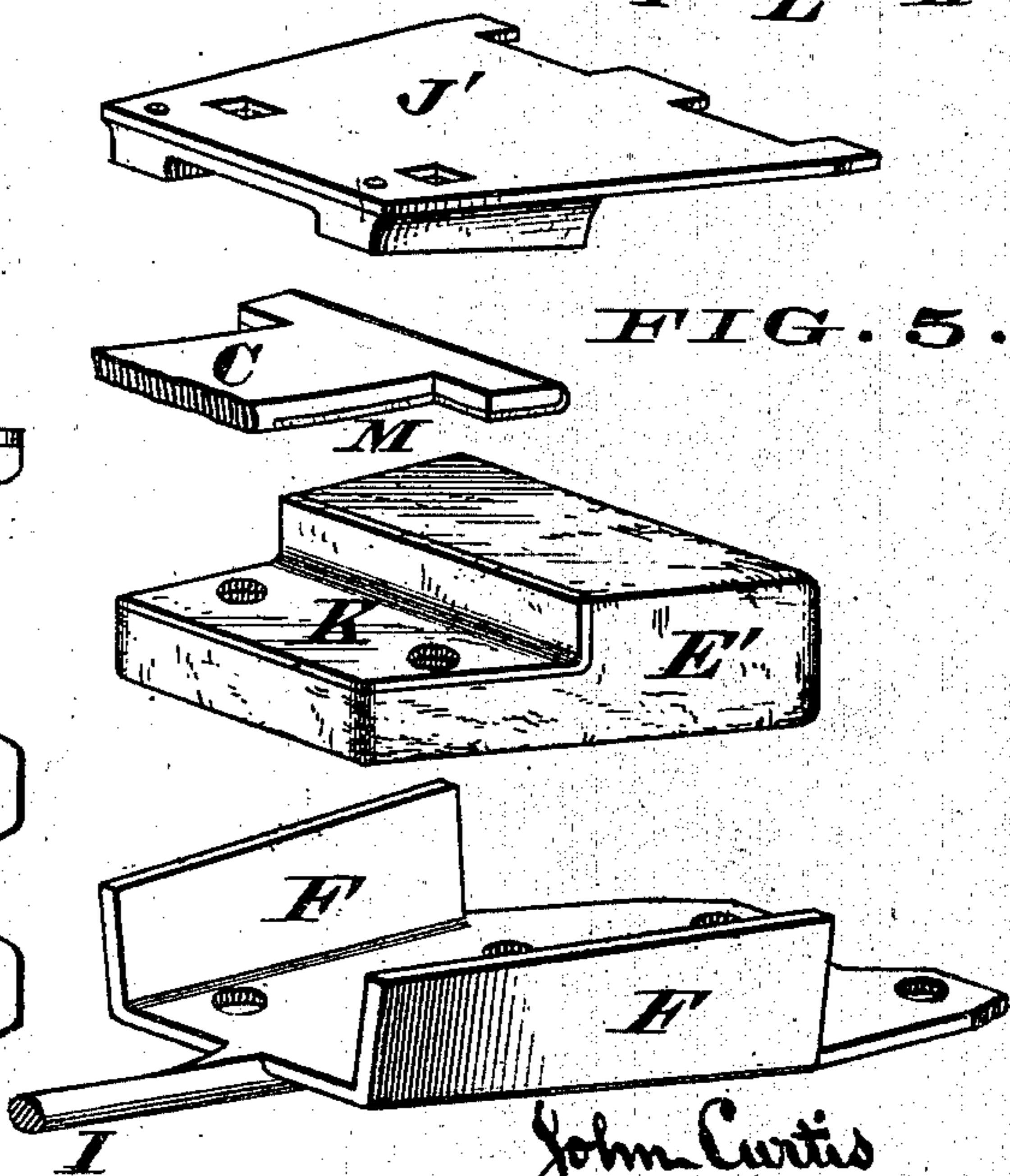


FIG. 4.



Attest.  
Jas. H. Layman,  
Walter Allen

FIG. 5.



John Curtis  
By Knight Bros.  
Att'ys.

# UNITED STATES PATENT OFFICE.

JOHN CURTIS, OF CINCINNATI, OHIO.

## IMPROVEMENT IN CARRIAGE-SPRINGS.

Specification forming part of Letters Patent No. **144,514**, dated November 11, 1873; application filed September 12, 1873.

*To all whom it may concern:*

Be it known that I, JOHN CURTIS, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Improvement in Carriage-Springs, of which the following is a specification:

The nature and objects of my invention are as follows: I produce a very strong, compact, and highly-elastic spring, of light weight and little cost, by firmly attaching to the under side of the carriage-body, and athwart the same, a steel plate or bar in the form of a compound curve, said bar or plate having T-formed terminations, which occupy and abut against rubber cushions supported upon and attached to suitable side bars, and prevented from spreading by a tie-rod, to which boxes which hold the said cushions are securely fastened.

Figure 1 is a general perspective view of a carriage part embodying my invention. Fig. 2 is a partially-sectionized elevation of my improvement. Fig. 3 is a vertical section, and Fig. 4 a top view, (omitting the cap,) of one end of my improvement. Fig. 5 shows an end portion of my spring with its cushion and box detached.

A represents a bed-frame for a buggy or other vehicle, having customary cross-timbers or "bolsters" B B', to whose middle portion my spring-plate C is securely fastened by means of clips, or by bolts or rivets, D D', which secure the said plate at or near its mid-length, in the manner represented. My said plate is somewhat tapered toward its extremities, and said extremities have the represented T form, and occupy rubber pads, blocks, or cushions E E', which occupy boxes F F', which are secured to side bars G G', of any customary form, by means of clips or their equivalents H H', and are connected by the tie-rod I. J J' are caps, by which the spring is re-

tained in its cushion. A cloth or leather lining, K, to those parts of the cushion and cap immediately in contact with the spring, may be provided to prevent adhesion of said spring and cushion, and for the same purpose the rubbing surface of the spring may be incased or plated with nickel M, or other non-corrosive metal. L L' are bolts, which, passing through cap, cushion, and casing, and behind the shoulders of the T, serve to hold the parts in proper relative position, and to prevent their displacement or disconnection.

The operation of the device is as follows: The weight of the load, depressing the middle of the spring-plate, forces its T ends into the cushions, which, being held from spreading by the tie-rods, operate as elastic abutments, which give a remarkably easy motion, free from all noise or jar.

For heavy vehicles, the spring C may consist of two or more plates or leaves, and bolts or other fastenings may be used instead of the clips.

I claim as new and of my invention—

1. A carriage-spring plate, C, attached at mid-length to the bed-frame, and resting by its ends in rubber cushions E E', with inclosing-boxes F F', connected by a tie-rod, I, substantially as set forth.

2. The spring-plate with T-formed extremities, in combination with the cushions E E' and with confining devices F F' J J' L L', substantially as set forth.

3. The combination of the lining K, cushions E E', and caps J J' with the spring C, substantially as set forth.

In testimony of which invention I hereunto set my hand.

JOHN CURTIS.

Attest:

GEO. H. KNIGHT,  
H. SCHOONMAKER.