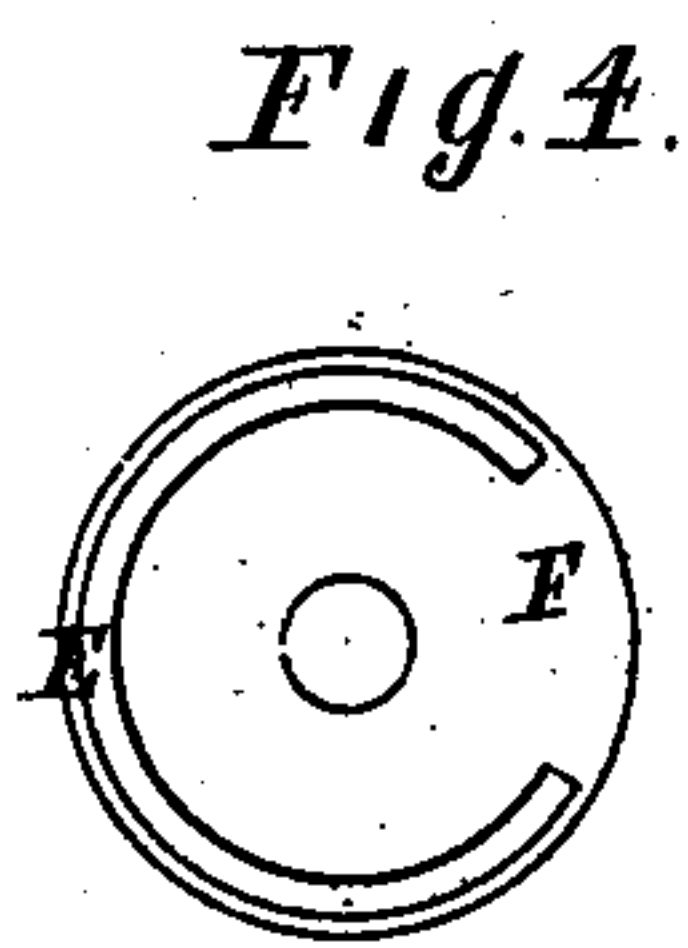
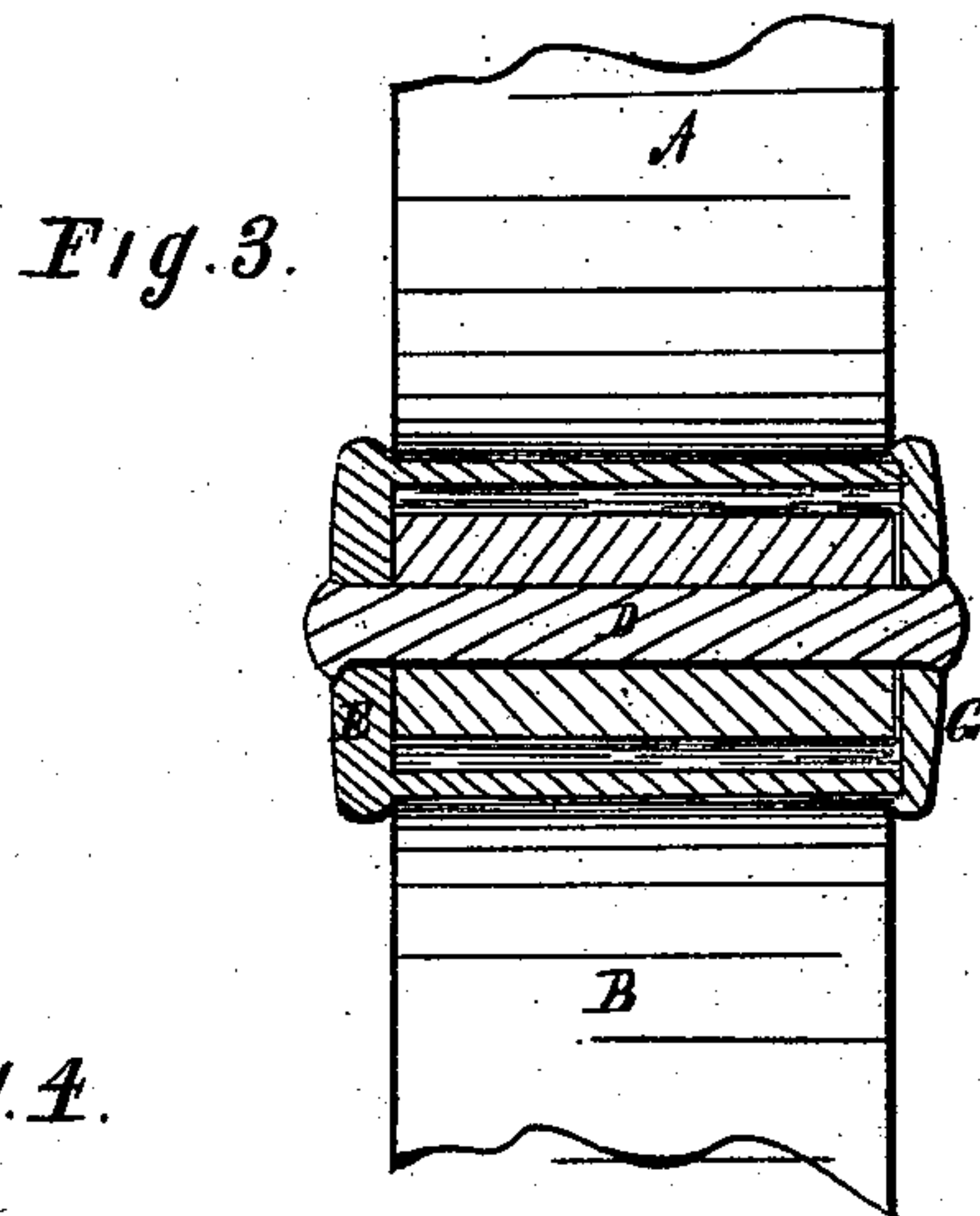
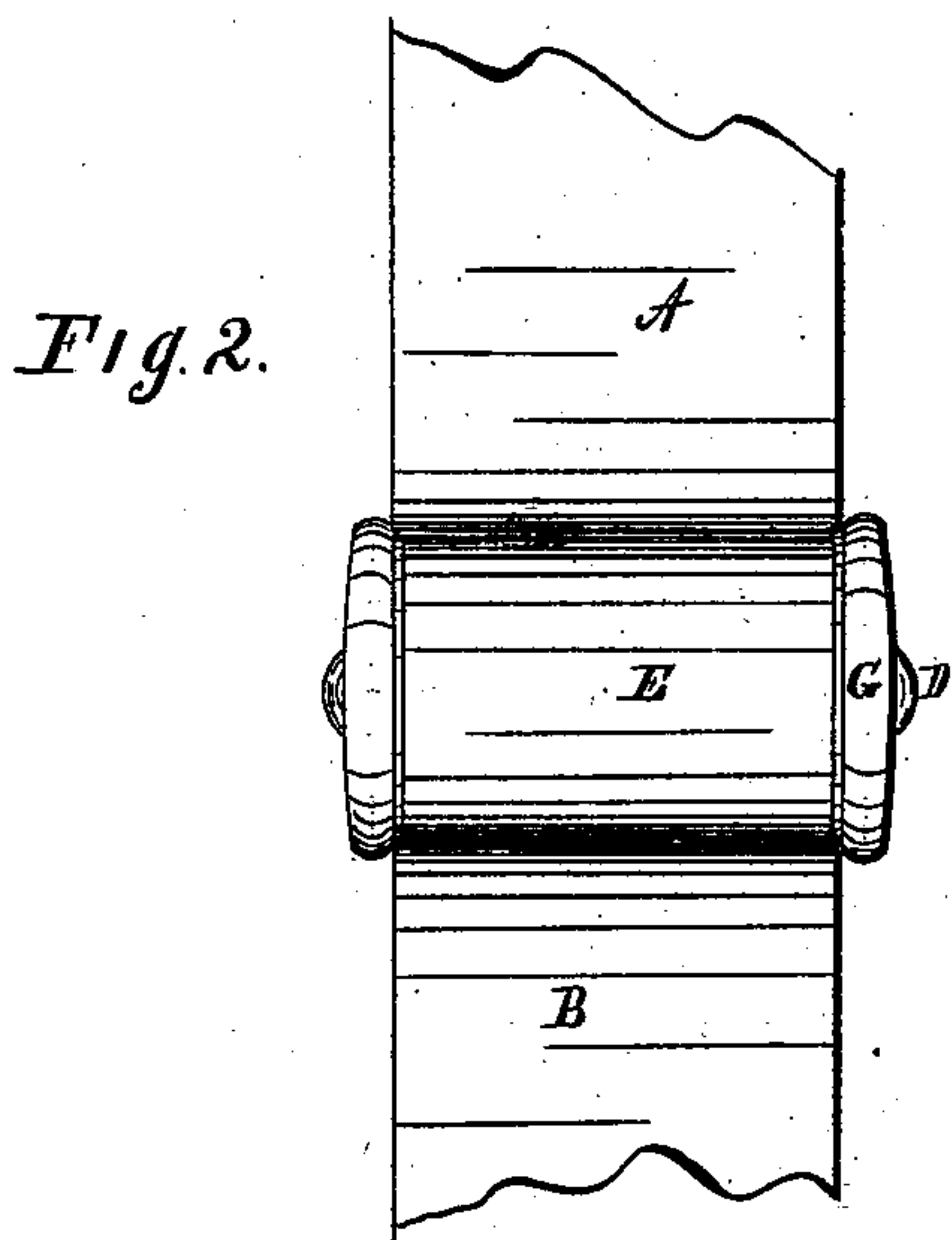
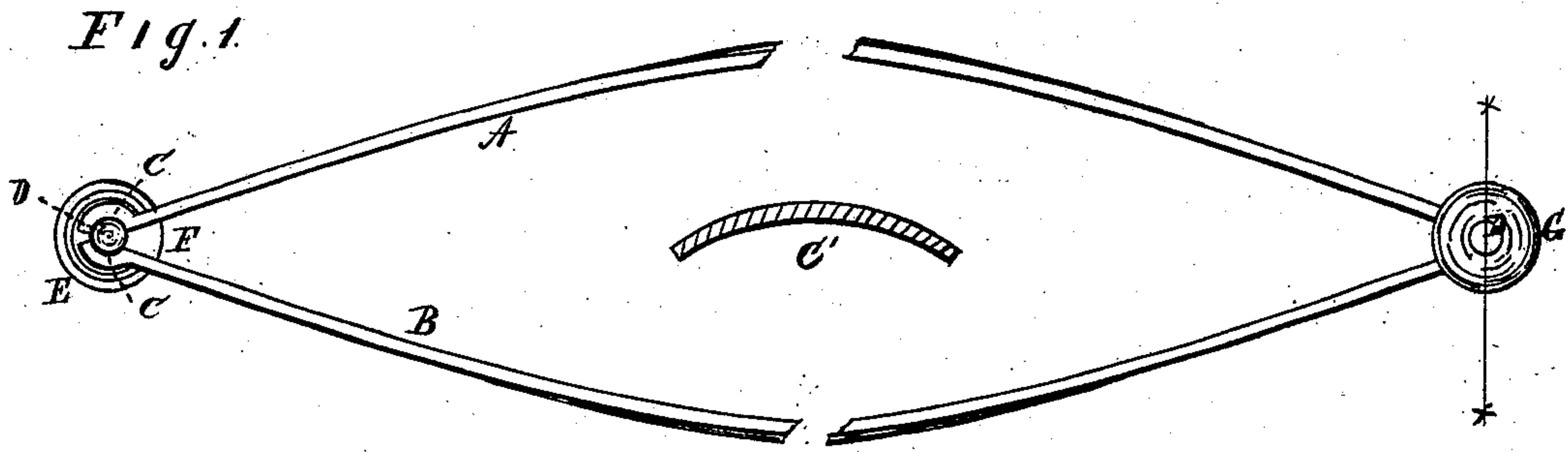


C. F. SHOEMAKER.  
Vehicle-Spring.

No. 209,988.

Patented Nov. 19. 1878.



Witnesses.

B. Rose  
J. Kitch

Inventor.

C. F. Shoemaker  
Per Burridge & Co  
attys

# UNITED STATES PATENT OFFICE.

CHARLES F. SHOEMAKER, OF CLEVELAND, OHIO.

## IMPROVEMENT IN VEHICLE-SPRINGS.

Specification forming part of Letters Patent No. **209,988**, dated November 19, 1878; application filed September 30, 1878.

*To all whom it may concern:*

Be it known that I, CHARLES F. SHOEMAKER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Carriage-Springs, of which the following is a description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view of the spring. Fig. 2 is an end view. Fig. 3 is a sectional view taken through the line *x x*. Fig. 4 is a detached section.

Like letters of reference refer to like parts in the several views presented.

This invention is a coupling for connecting the ends of an elliptic spring together, and which consists of a shell or thimble, to be slipped on over the two ends of the spring, said ends being so bent as to adapt them to the hollow of the thimble, wherein they are secured by a pin or bolt passing through said thimble and bent ends of the spring.

For a more full understanding of the invention, reference will be had to the following detailed description thereof.

The ends of the upper and lower leaves of an elliptic spring are usually connected to each other by forming a pair of ears on the end of one leaf of the spring, and an eye on the other adapted to fit between the ears alluded to. The two parts are then secured by a bolt passed through the ears and eye of the joint. This mode of connecting the two ends of the spring requires much care and skill to make, and is therefore expensive.

To avoid this expense, and at the same time secure a durable union of the two parts, is the purpose of this invention, and this is accomplished by forming at the ends of the leaves A and B of the spring a curve, C. This curving of the ends is done without reducing the thickness of the metal, the ends being simply placed in a form and bent so that it may fit around the pin or bolt D, thereby retaining the full thickness and strength of the metal. Over the two ends thus bent (on their being placed together) is slipped the thimble or

shell E. Said thimble consists of a short tube having a solid closed end, with a central perforation for the pin, as shown in Fig. 4, representing an end view of the thimble or shell.

The thimble is not entirely round, there being an opening lengthwise on one side for the admission of the leaves A and B of the spring, as seen at F in Figs. 1 and 4. The open end of the thimble, when slipped on over the ends of the spring, is covered by a cap, G, Fig. 3, corresponding to the solid end or head thereof. The pin D is now pushed through the thimble and ends of the leaves, as shown in Fig. 3, and is then riveted down to prevent it from coming out.

It will be observed that the pin fits closely in the curved ends of the leaves, thereby obtaining for the said ends a firm and secure abutment, on which to rest and sustain the end thrust of the spring, which may be composed of more or less number of leaves, as the strength of the spring may require.

It will also be observed that the thimble does not fit closely around the ends of the spring, there being a narrow annular space between the thimble and the ends to allow a free movement thereof on a compression of the spring; hence there can be no binding or cramping of the ends in the thimble.

The central portion of the leaves of the spring is fullered, as shown in the figure C', inclosed by Fig. 1, which represents a transverse section of the spring, taken through the middle.

It is not essential that the spring be fullered, as alluded to.

This spring is intended especially for wagon-seats. The leaves of such springs are usually connected to each other by turning the end of one leaf around that of the other, to form the union of the two parts. That this may be done the ends of the leaves are rolled down thin and tapering, that they may be easily bent, and not make the end or head too large and clumsy. This thinning of the metal weakens it at the ends, thereby reducing the strength of the spring.



By my improvement the full thickness of the metal is retained, and the spring is accordingly stronger.

What I claim as my invention, and desire to secure by Letters Patent, is—

In elliptic springs, the thimble or shell E, having a solid perforated end and an open end, and in the side of said shell a single opening for the admission of the ends of the spring, cap G, and pin D, in combination with

the spring, having the ends curved and of equal thickness with that of the rest part of the spring, as herein described, and for the purpose specified.

CHAS. F. SHOEMAKER.

Witnesses:

J. H. BURRIDGE,  
A. F. PARKER.