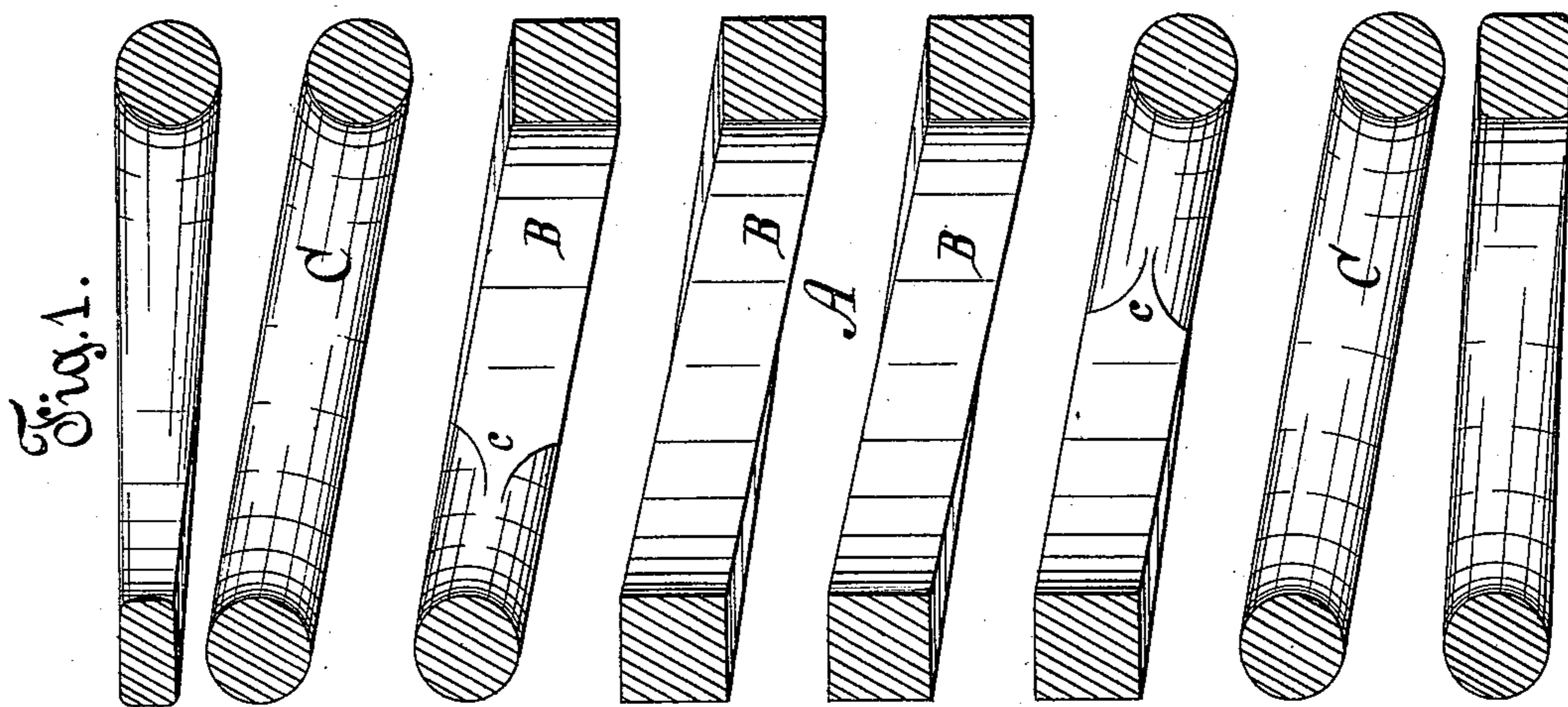
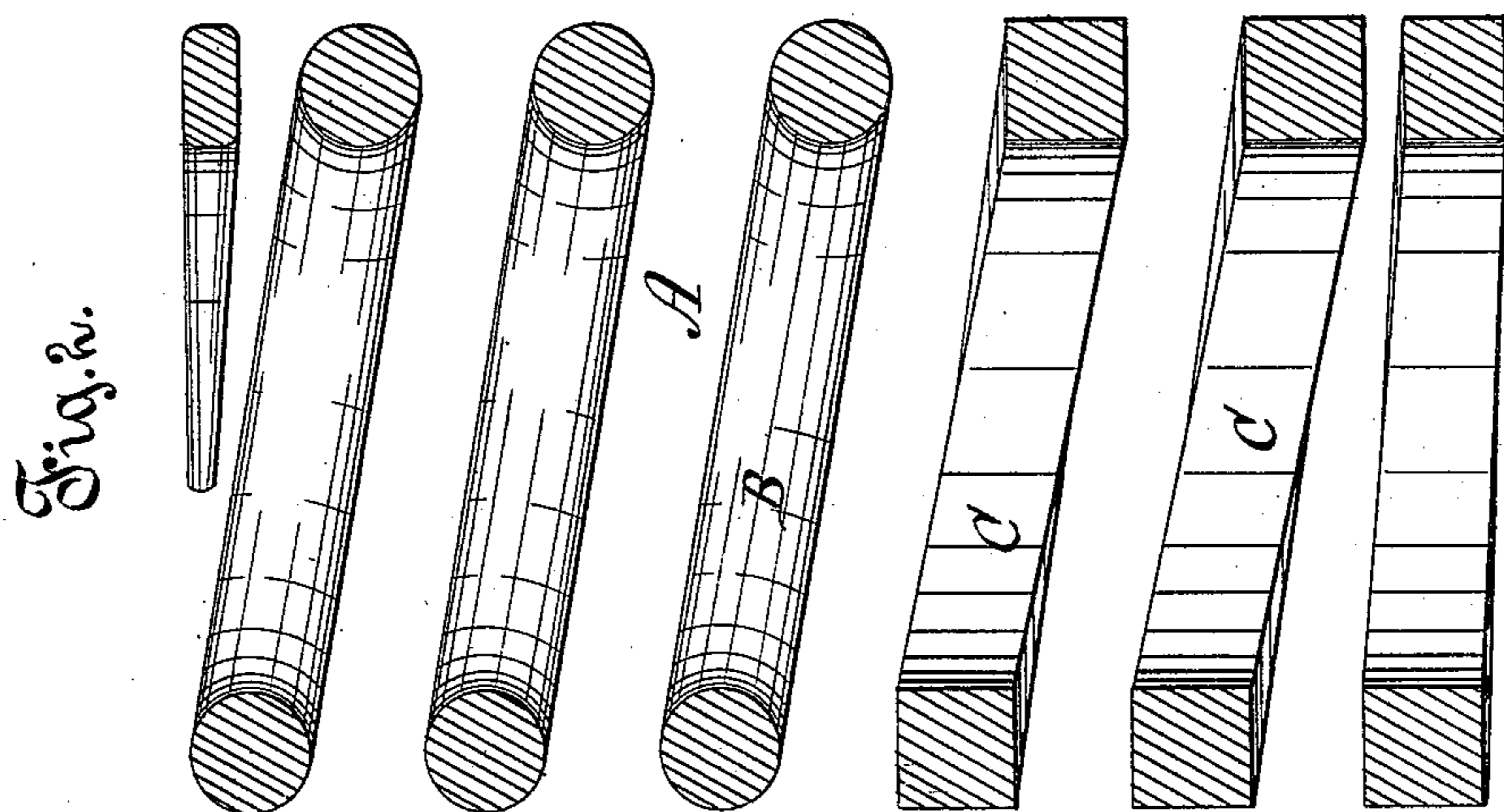


(No Model.)

E. CLIFF.
Car Spring.

No. 231,150.

Patented Aug. 17, 1880.



Witnesses:
Theo. Hoster,
Chas. R. Clarke

Inventor:
Edward Cliff
By P. S. Clark
his atty.

UNITED STATES PATENT OFFICE.

EDWARD CLIFF, OF NEWARK, ASSIGNOR TO CLIFF & RIGHTER, OF WEST
BERGEN, NEW JERSEY.

CAR-SPRING.

SPECIFICATION forming part of Letters Patent No. 231,150, dated August 17, 1880.

Application filed July 7, 1880. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CLIFF, a citizen of the United States, residing at Newark, in the county of Essex, in the State of New Jersey, have invented a new and useful Improved Car-Spring, of which the following is a specification.

My invention relates to an improved spring for cars and other purposes of like nature, so made and constructed as to make a strong graduated bearing-spring, and is done by using two different kinds of surfaces in the same bar, as hereinafter described.

In the drawings, Figure 1 is a sectional vertical view of my improved spring, showing in the same bar square surfaces in the center and round at the ends; and Fig. 2 is a like view, showing square surfaces at one end and round at the opposite in spiral springs.

A is the spring, which is formed of one continuous piece or bar of steel or metal. Before winding or coiling the bar is drawn out into a round part when it is desired to have the round surface, and, as the bar is cast square, that part not drawn out retains that shape, as shown in the drawings, where B indicates the square surface, and C the round. The drawing out into the round surface commences at any point desired. As shown in the drawings, it commences at *c*.

The bar of steel, after having been drawn

out into the section for round surfaces, is then placed in the usual coiling-machine, and, by means of the worm and mandrel in such machines, is coiled into a spiral coil of the size required.

It will be found that by means of this construction the combination of the two surfaces, round and square, in the same bar will form a strong bearing-spring, the pressure placed thereon first exhausting the round-surface part of the spring, and, the pressure being increased, the square surface is brought into action. Thus a light as well as a heavy draft auxiliary spring is constructed.

If a stronger spring is desired, one-half may be of the square surface, as shown in Fig. 2.

Any number of these springs may be grouped together to form what is known as "a group of springs."

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

A spring constructed of one piece or bar of steel, part of which bar is of a square and part of a round surface, substantially as described, and for the purpose specified.

Witness my hand this 2d day of July, 1880.

EDWARD CLIFF.

Witnesses:

B. S. CLARK,
THEO. G. HOSTER.