

(No Model.)

J. H. SULLIVAN.  
SPRING.

No. 475,904.

Patented May 31, 1892.

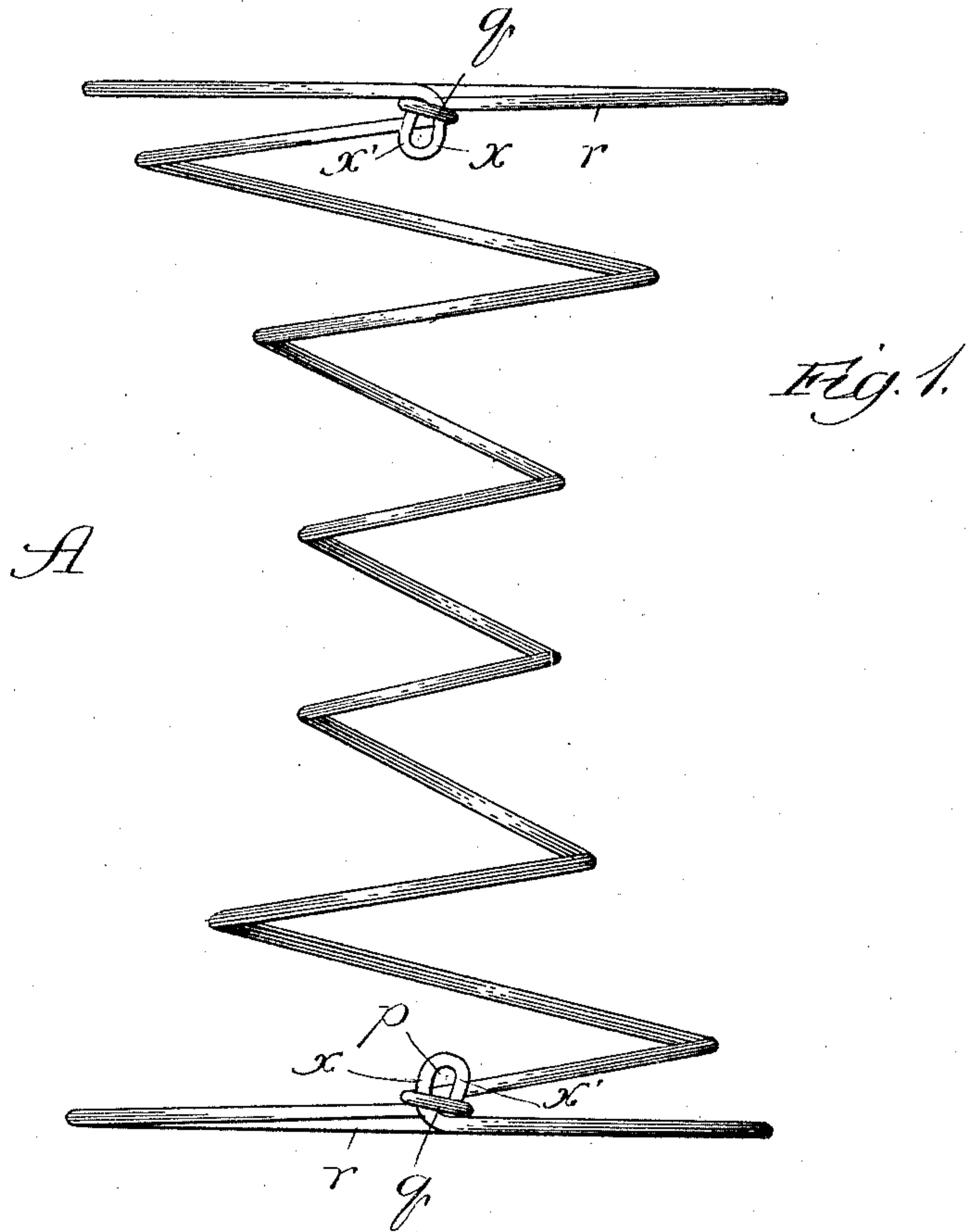
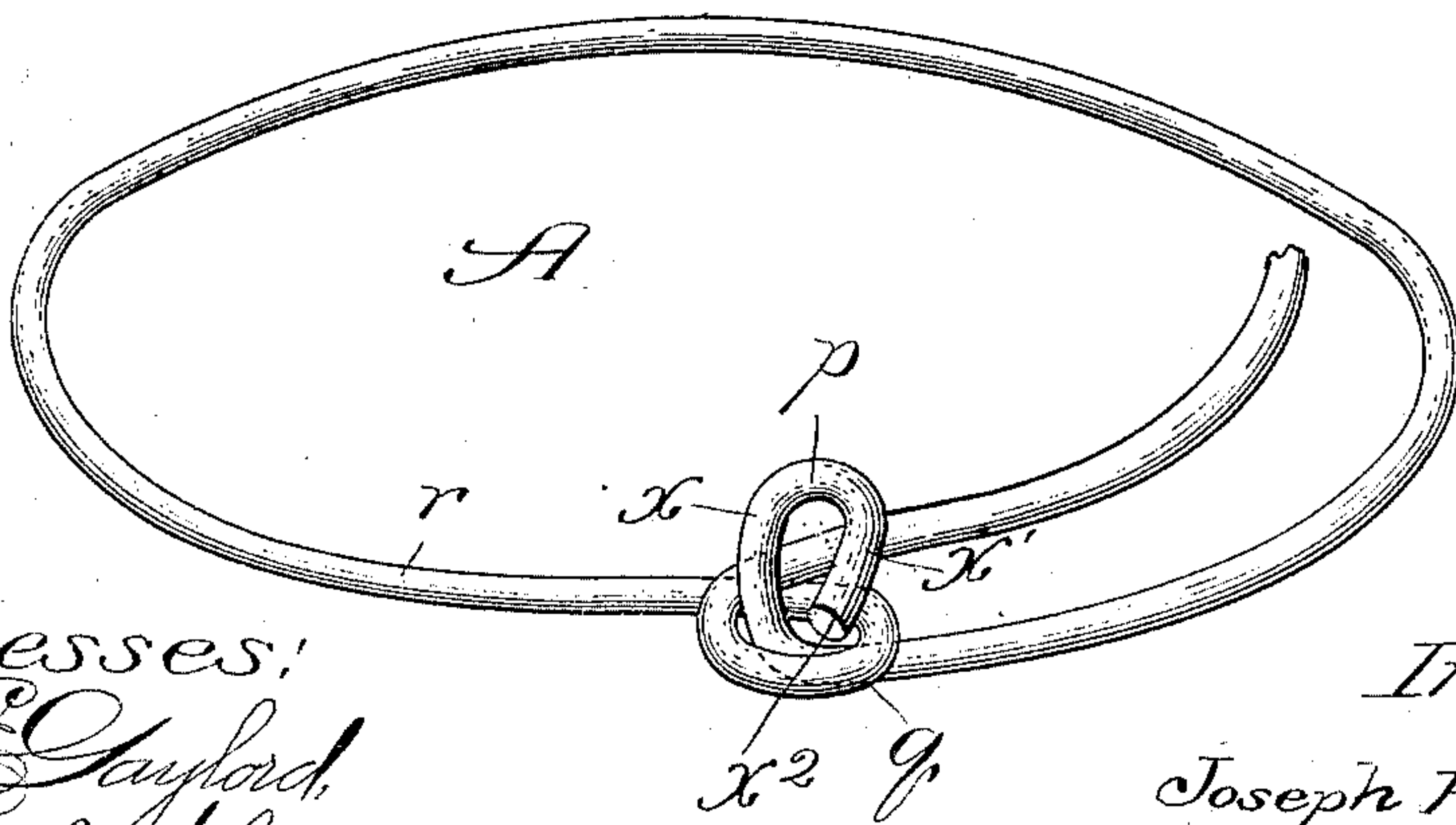


Fig. 2.



Witnesses:  
E. Gaylord,  
Clifford White.

Inventor:  
Joseph H. Sullivan,  
By Dymally & Dymally,  
Attorneys.

# UNITED STATES PATENT OFFICE.

JOSEPH H. SULLIVAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WILLIAM D. GIBSON COMPANY, OF SAME PLACE.

## SPRING.

SPECIFICATION forming part of Letters Patent No. 475,904, dated May 31, 1892.

Application filed November 17, 1891. Serial No. 412,144. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH H. SULLIVAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Springs, of which the following is a specification.

My invention relates to an improvement in the class of springs used extensively in spring-beds, mattresses, and the like, and commonly constructed of spring-wire in the form of a single or double helix.

More definitely stated my improvement relates to the fastening of one or of each end of the wire upon the adjacent end connection of the helix, my object being a twofold one—namely, to so fasten the end or ends as to prevent separation thereof by the spreading tendency induced by compressing the spring, and thereby prevent rubbing together of the parts at the junction to render the spring noiseless and to shield the extremity of the end or of each end against becoming caught in or abrading and injuring objects with which it comes in contact.

To accomplish my object I form in the end convolution a loop through which the end of the wire is passed and bent at its protruding extremity into a re-entrant spring-eye of a diameter too great to permit it to pass through the loop in the end convolution, thereby effectually preventing withdrawal of the end of the wire or such movement thereof as would cause noise, and at the same time shielding its extremity.

In the accompanying drawings, Figure 1 is a view in elevation of a spring in the form of a double helix having each end secured by my improved fastening means, and Fig. 2 is a perspective view of a broken portion of the base of the spring provided with my improvement.

A is the spring, shown as of the double-helix shape and formed of wire. The convolution  $r$  at each end of the spring is bent about midway of its circumference into a loop  $q$ , and the end of the wire at the end of the convolution is passed through the loop and formed beyond the same into a re-entrant spring-eye

$p$  by bending such end at an angle (by preference perpendicularly, as shown) in a manner to produce an outgoing curved side  $x$  of the eye adjacent to one inner side of the loop  $q$  and a returning oppositely-curved side  $x'$ , terminating in the loop at the opposite side thereof. Thus the eye  $p$  extends beyond the loop at an angle (as a right angle) thereto and is of sufficient diameter to prevent it from passing through the loop, whereby compression of the spring or other cause tending to separate the fastened end of the spring will be prevented from effecting its withdrawal or causing it to slip, and whereby, furthermore, the extremity  $x^2$  of the end of the wire is shielded by the loop into which it is returned, and thus prevented from catching into cloth and coming into contact with and marring or scratching the surface of any object.

It is my purpose to fasten each end of any spring of the nature of that to which my improvement relates by the particular fastening shown and described. As it may, however, be used to advantage for only one end, especially where but one end is fastened, as in the single-helix form of spring, I do not wish to be limited to the use thereof at both ends.

For convenience in the manufacture the eye  $p$  may be formed first and the loop  $q$  formed about it.

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

1. A spring formed with spiral convolutions and having an end convolution provided with a loop, and its end provided with a spring-eye protruding through and returned at its extremity into and shielded by the loop, substantially as described.

2. A helical wire spring A, having a loop  $q$  formed in each of its end convolutions and formed at each end into a spring-eye  $p$ , protruding through the loop, and having its extremity  $x^2$  returned into and shielded by the loop, substantially as described.

JOSEPH H. SULLIVAN.

In presence of—

M. J. FROST,  
A. P. COBB.