

(No Model.)

W. FERRELL.  
MANDREL FOR BARREL SHAPED SPRINGS.

No. 477,525.

Patented June 21, 1892.

FIG. 1

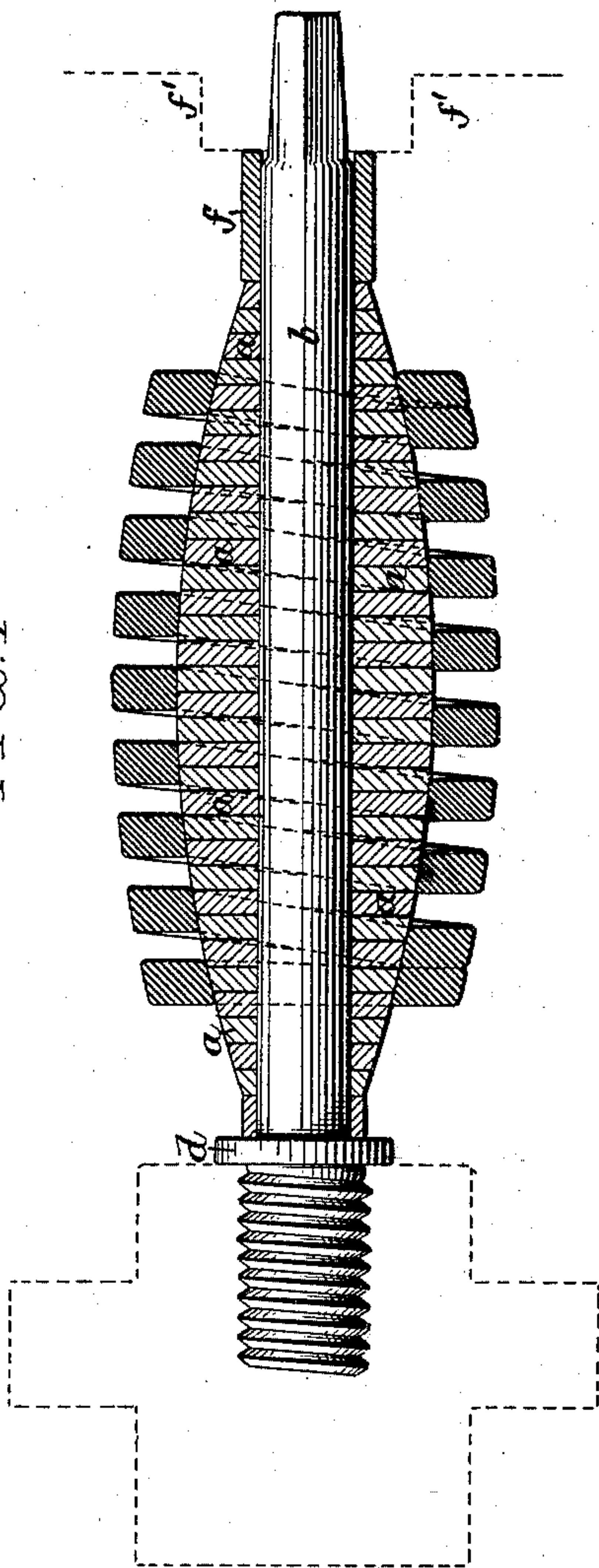


FIG. 2

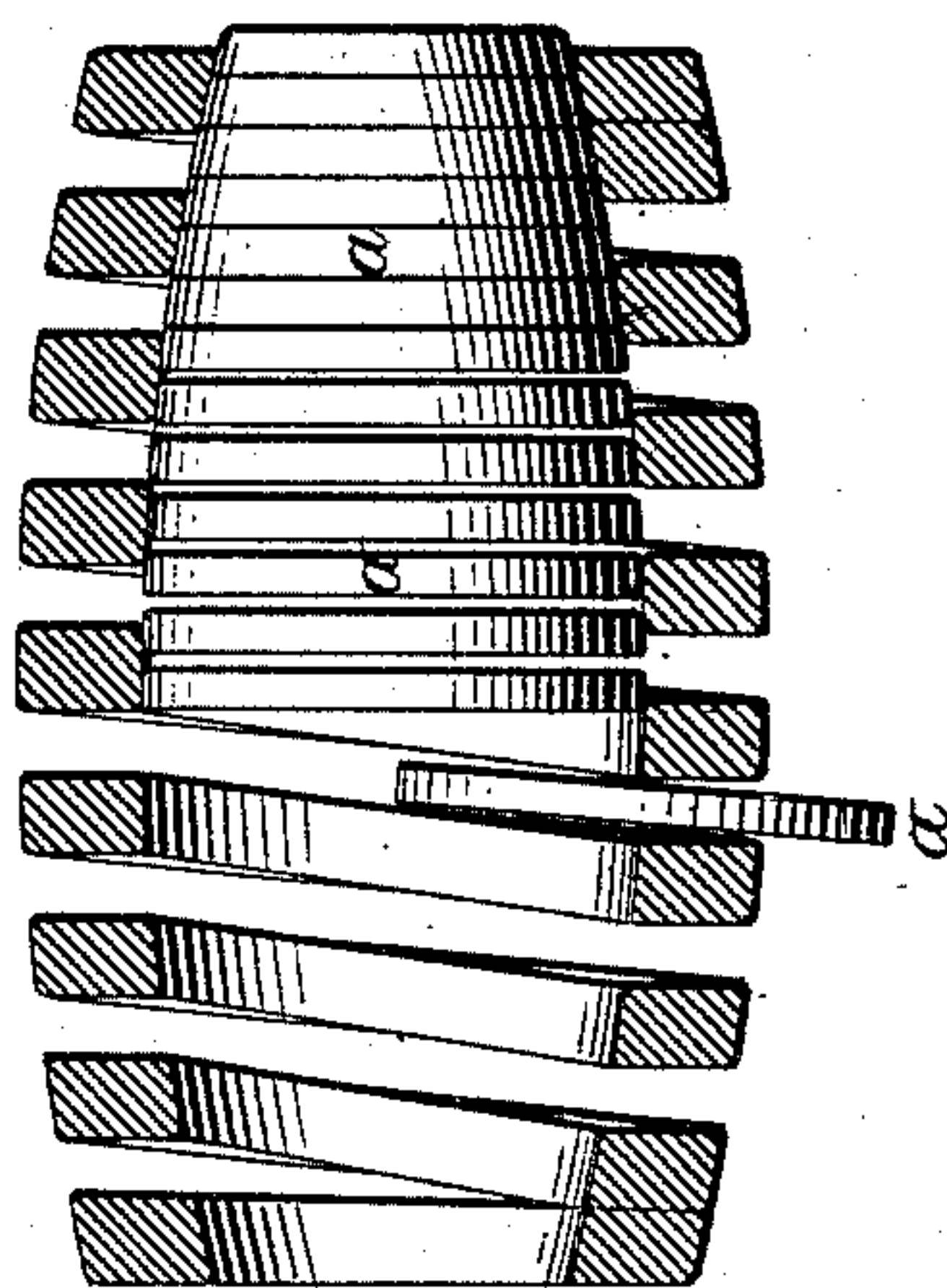
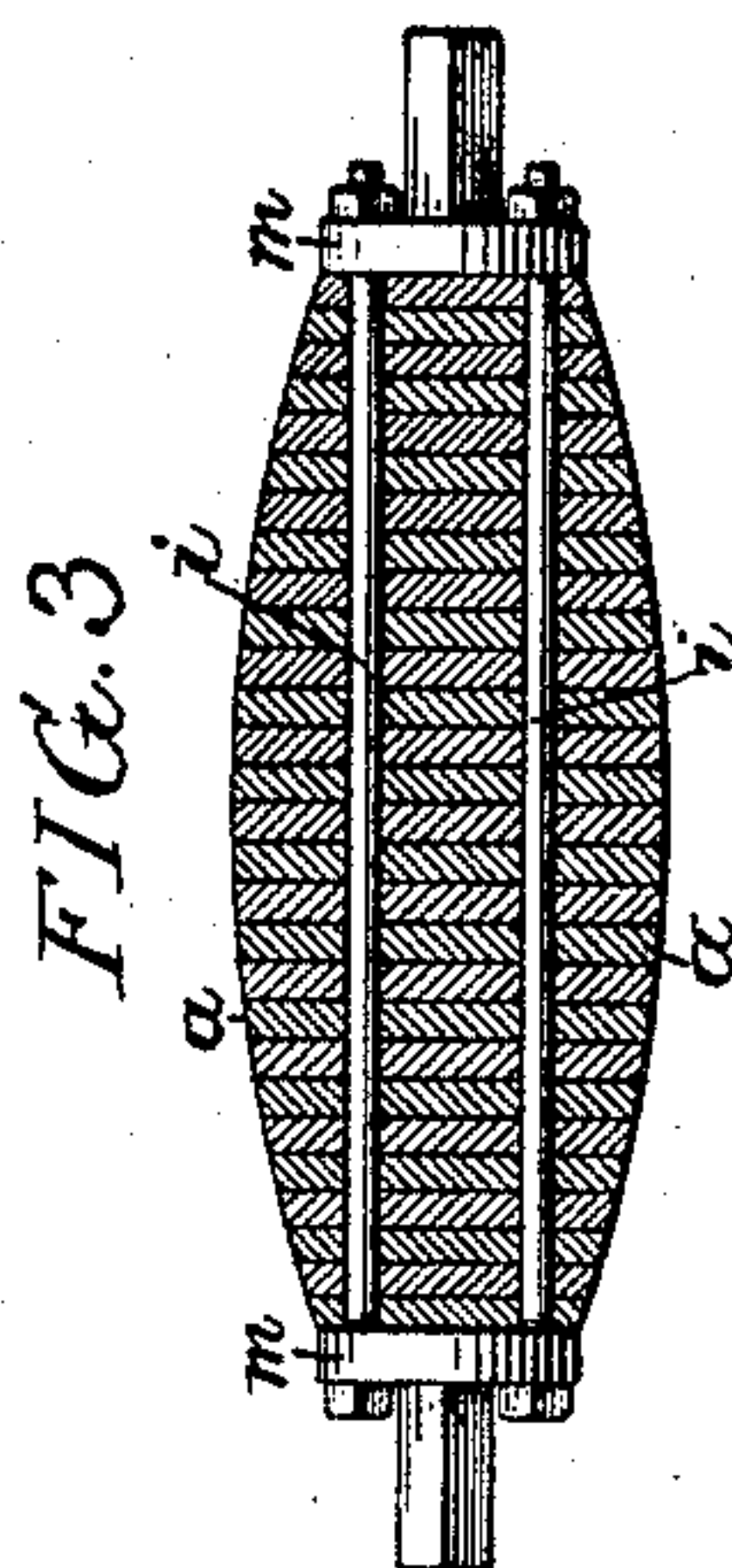
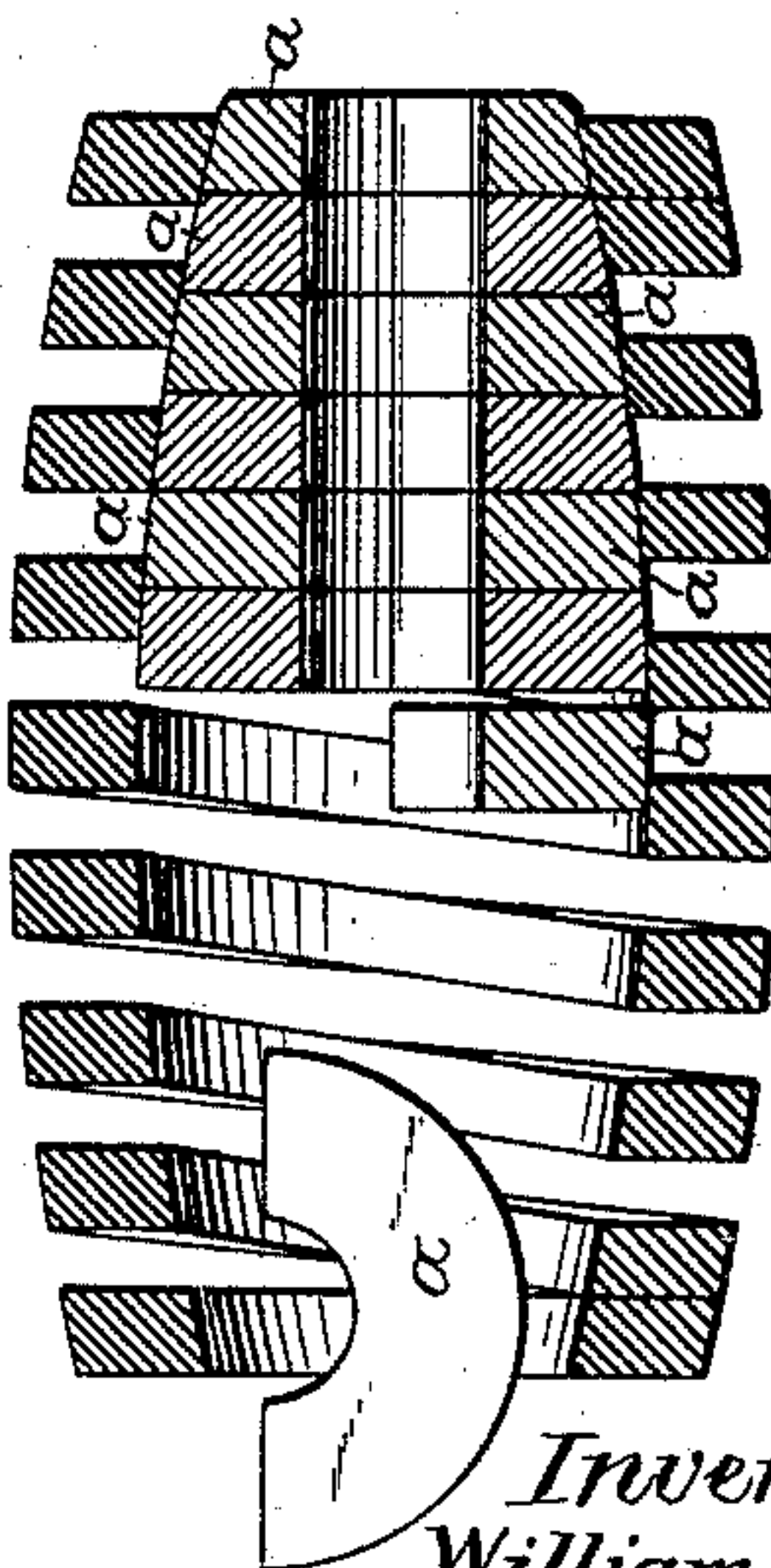


FIG. 4



Witnesses:  
A. V. Group  
J. D. Goodwin

Inventor:  
William Ferrell  
by his Attorneys  
Howson & Howson



# UNITED STATES PATENT OFFICE.

WILLIAM FERRELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE  
CHARLES SCOTT SPRING COMPANY, OF SAME PLACE.

## MANDREL FOR BARREL-SHAPED SPRINGS.

SPECIFICATION forming part of Letters Patent No. 477,525, dated June 21, 1892.

Application filed March 21, 1892. Serial No. 425,755. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM FERRELL, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Mandrels for Bowed or Barrel-Shaped Springs, of which the following is a specification.

My invention consists of a mandrel upon which to coil bowed or barrel-shaped springs, the object being to so construct such a mandrel that it can be removed from the spring after the latter is coiled and can thus be used indefinitely. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 represents a sectional view of my improved mandrel, showing a spring coiled thereon. Fig. 2 is a sectional view, partly in elevation, illustrating the manner of removing the mandrel from the spring, and Figs. 3 and 4 are sectional views illustrating modifications of the invention.

True bowed or barrel-shaped springs—that is to say, springs bowed both interiorly and exteriorly—are now formed by coiling the strip of metal upon a wooden mandrel of the proper shape, which is afterward burned out, so that a special mandrel is required for each spring.

In order to provide a mandrel which can be used repeatedly, I make the mandrel by preference as shown in Figs. 1 and 2, in which *a* represent a number of rings or washers largest in diameter at the center of the mandrel and gradually decreasing in diameter toward the ends of the same, so as to impart to said mandrel the desired barrel shape, these rings or washers being strung upon a central stem *b* and each of said rings or washers being of a thickness less than the space between the coils or convolutions of the spring to be wound upon the mandrel. When the spring is being wound the washers are held closely together by any suitable means—for instance, by being confined between a collar *d* on the central stem and a sleeve or collar *f*, interposed between the end of the mandrel and part of the fixed frame of the coiling-machine, such as the part represented by dotted lines at *f'* in Fig. 1; but when the coiling of the spring has been completed the central stem *b* is withdrawn from the washers, and such of

the latter as are contained within the spring are discharged with the latter from the machine. The spring does not press so closely upon the peripheries of the washers as to prevent the latter from being readily separated one from another. Hence the washers can be readily removed from the interior of the spring by slipping them through the spaces between the coils or convolutions of the spring, as shown in Fig. 2, the washers being then re-applied to the central stem or core *b*, so as to re-form the mandrel preparatory to the coiling of another spring.

While I prefer to form the mandrel of a series of rings or washers strung upon a central stem in the manner set forth, the mandrel can be otherwise formed without departing from the essential feature of my invention. For instance, said mandrel may consist of disks of varying diameter and may be secured by longitudinal bolts *i* to opposite heads *m*, constructed for application to the appropriate parts of the coiling-machine, an instance of such modified form of mandrel being shown in Fig. 3. The disks or washers need not in every case, moreover, be so thin as to be removed through the spaces between the coils of the spring. For instance, said disks or washers may be made in halves, as shown in Fig. 4, so that each half can be removed from the end of the spring. In this case one or more of the larger washers may be so thin as to be removed through the spaces between the coils of the spring, and thereby loosen the thicker washers and permit of the ready separation of the halves of the same.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The within-described mandrel for bowed or barrel-shaped springs, said mandrel consisting of a series of washers or disks decreasing in diameter from the center toward each end of the mandrel and removable from the spring after the latter is coiled, and means for retaining said washers or disks in position for use, substantially as specified.

2. The within-described mandrel for bowed or barrel-shaped springs, said mandrel consisting of a removable central stem or core, and a series of washers mounted thereon, said



washers decreasing in diameter from the center toward each end of the mandrel and removable from the spring after the latter is coiled, substantially as specified.

- 5 3. The within-described mandrel for bowed or barrel-shaped springs, said mandrel consisting of a series of washers or disks decreasing in diameter from the center toward each end of the mandrel, and each of a thickness  
10 which will permit of its withdrawal between the coils or convolutions of the spring, substantially as specified.

4. The within-described mandrel for bowed or barrel-shaped springs, said mandrel con-

sisting of a series of washers decreasing in diameter from the center toward each end of the mandrel and strung upon a removable stem or core, each washer being of a thickness which will permit of its withdrawal between the coils or convolutions of the spring, substantially as specified.

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

WILLIAM FERRELL.

Witnesses:

WILLIAM D. CONNER,  
HARRY SMITH.