

No. 736,333.

PATENTED AUG. 11, 1903.

V. MEYER.  
COIL SPRING.

APPLICATION FILED DEC. 2, 1902.

NO MODEL.

Fig. 1

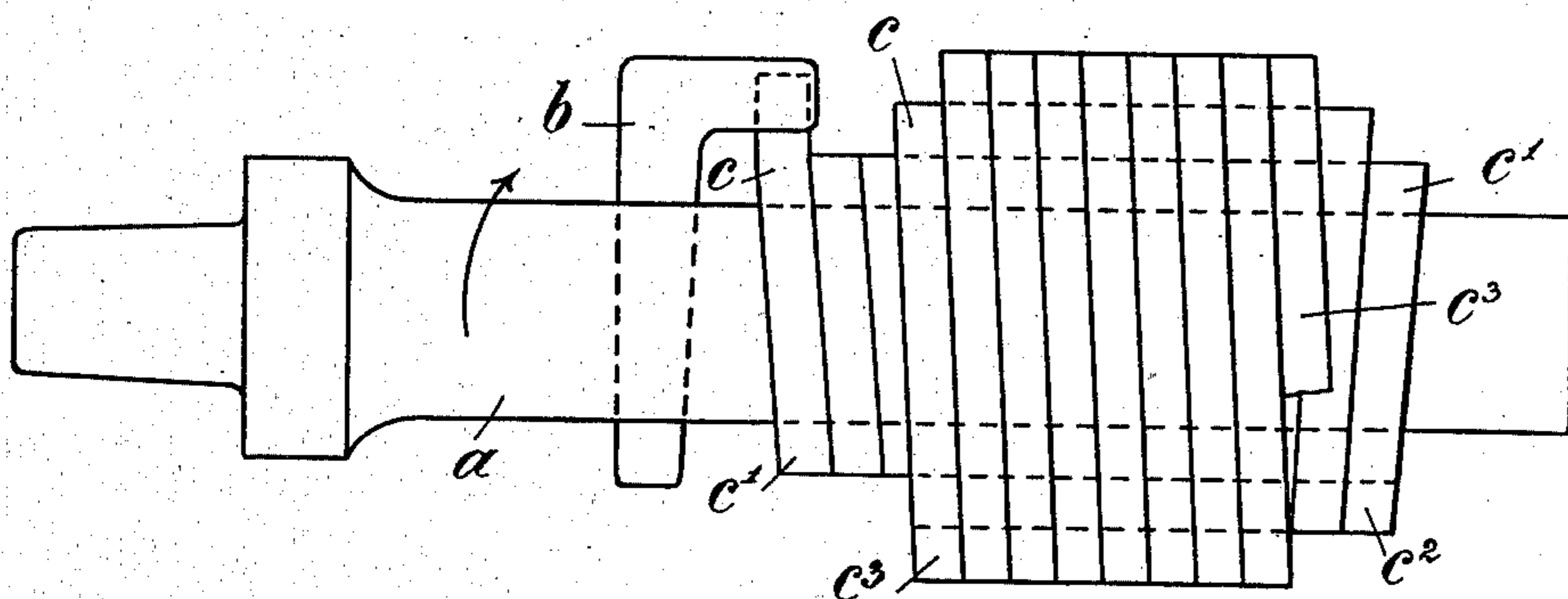


Fig. 2

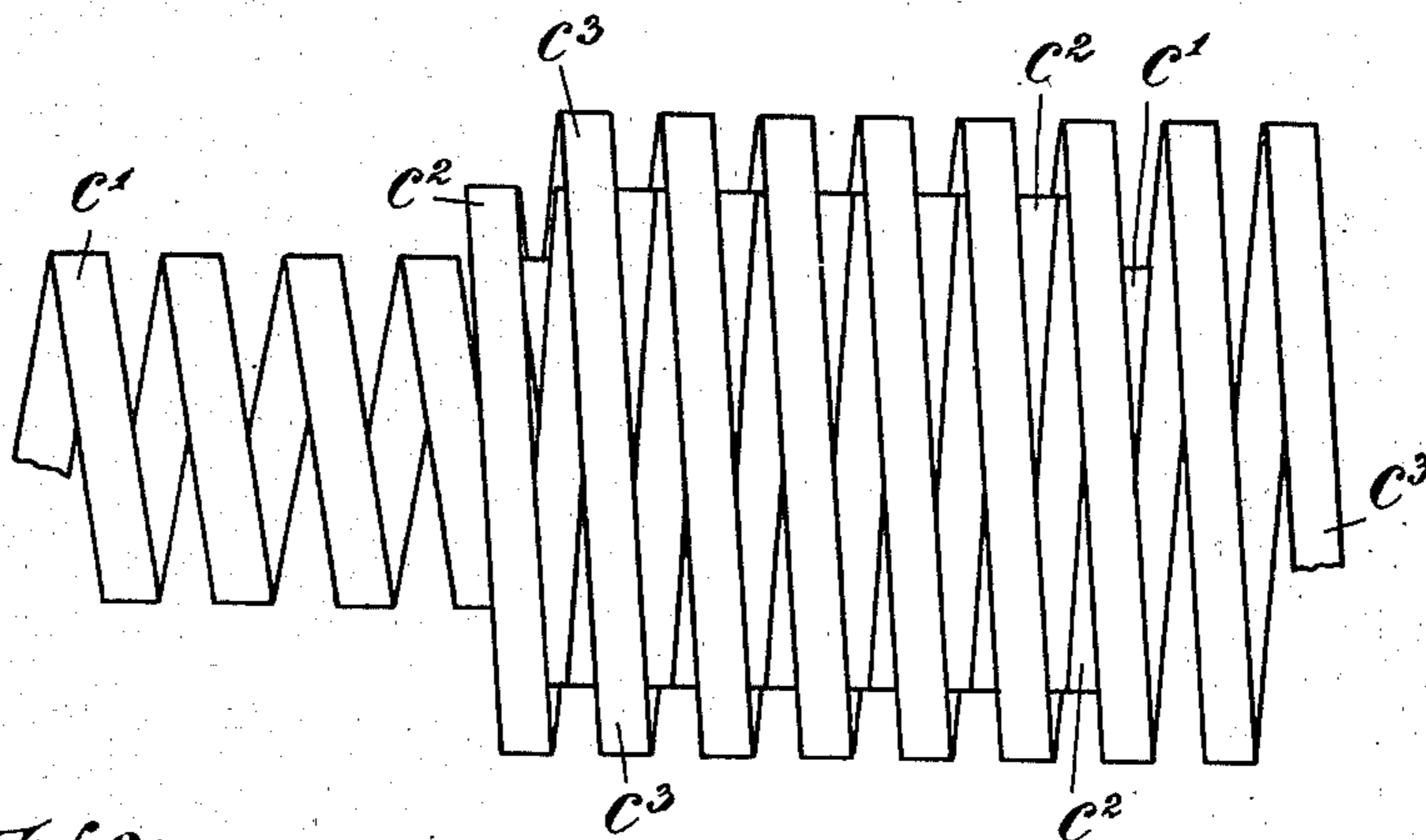
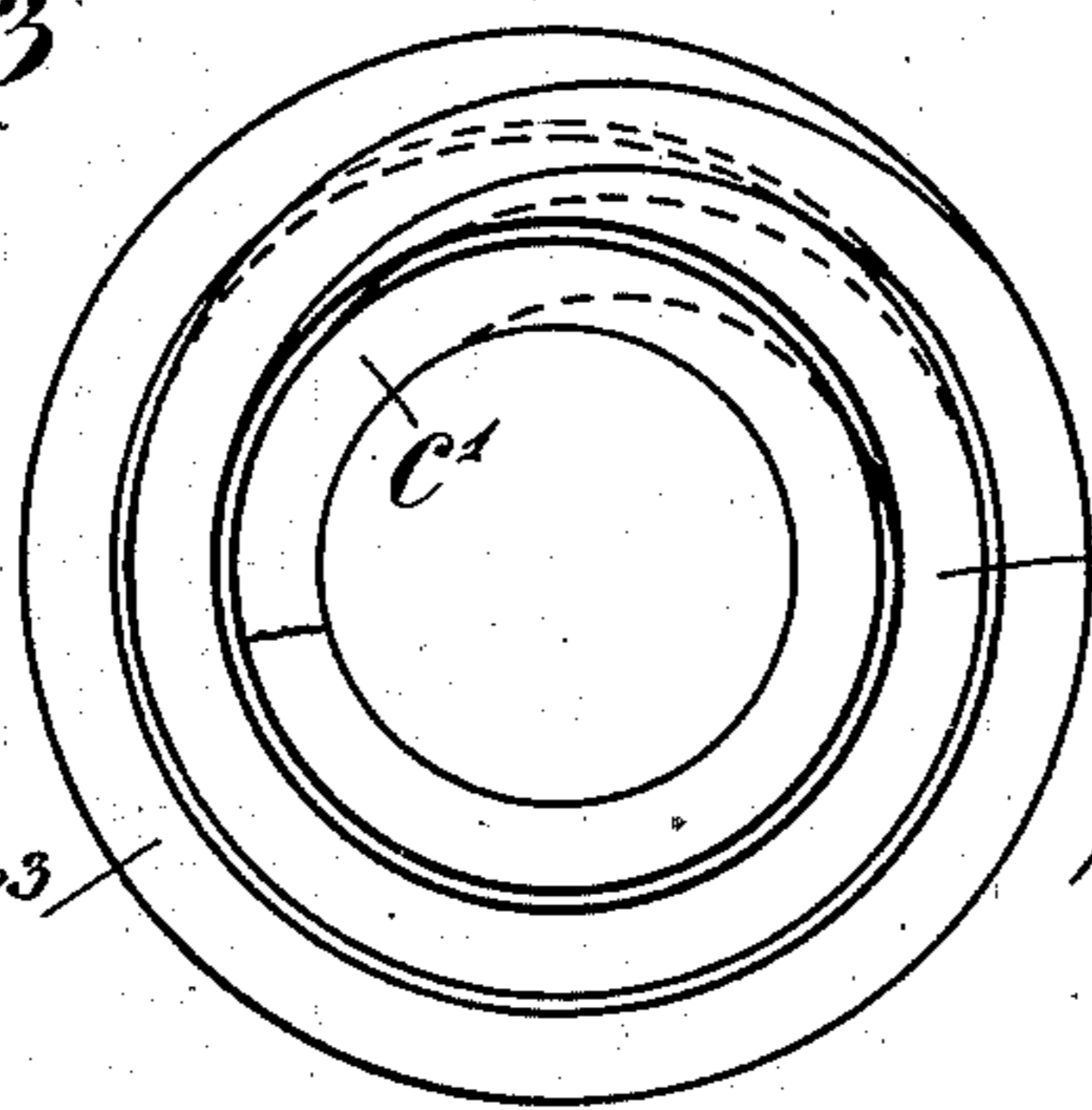


Fig. 3



Witnesses:

*A. H. Schaefer*

*E. O. Heidebrecht*

Inventor:

*Victor Meyer,*  
by *Max Imzli*  
his attorney.

# UNITED STATES PATENT OFFICE.

VICTOR MEYER, OF HAGEN, GERMANY.

## COIL-SPRING.

SPECIFICATION forming part of Letters Patent No. 736,333, dated August 11, 1903.

Application filed December 2, 1902. Serial No. 133,606. (No model.)

*To all whom it may concern:*

Be it known that I, VICTOR MEYER, civil engineer, a subject of the King of Prussia, German Emperor, residing at Hagen, in the Kingdom of Prussia, German Empire, have invented a certain new and useful Improvement in Coil-Springs, of which the following is a specification.

This invention relates to the manufacture of springs which consist of two or more portions located one inside of another, the several portions or parts of the whole spring being thus arranged telescopically and forming in their entirety a telescopic coil-spring adapted to sustain tensile and contractile strain.

One object of my invention is to decrease the dimensions or, more particularly, the diameter of such a spring as much as possible, and I attain that object in general by decreasing the annular space or spaces between the two or more portions of the spring and in particular by employing the first or innermost portion of the spring as a mandrel for the second or next portion of the same, and this second portion as a mandrel for the third portion, and so on, although my improved spring will generally not consist of more than three portions.

Another object of my invention is to produce a telescopic spring the portions of which form alternating tension-springs and compression-springs. I attain this object by drawing the convolutions of the first and third portions or of the second and fourth portions sufficiently far asunder, after the whole spring has been wound in the aforementioned manner, it being understood that the whole spring is wound of one continuous wire, preferably of quadrangular section. While I describe and illustrate my invention as having the adjacent series of coils formed integral one with another, it is not necessary that they be integral, but it is sufficient if they be rigidly connected. Therefore I do not produce separate tension-springs and separate compression-springs; but I produce a telescopic spring the portions of which are at first not suited either for tensile or for contractile strain and in which the connection between the consecutive portions is perfectly uninterrupted. Only after all the series of convolutions have been wound and the convolutions of alternating

series have been drawn asunder and the whole has been hardened, then the telescopic coil-spring is finished and complete.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts throughout the several views, and in which—

Figure 1 shows a telescopic spring on a mandrel, the convolutions of one or two of the three series being not yet drawn asunder. Fig. 2 shows the same spring after its completion, and Fig. 3 is an end view of the spring.

In carrying my invention into practice I make use of an ordinary lathe, (not shown,) by means of which an ordinary mandrel, such as *a*, Fig. 1, is rotated around its axis. The mandrel *a* is furnished with a driver *b*, by means of which one end of the wire *c*, from which the spring is to be wound, is held in the usual manner. I then wind upon the mandrel *a* the first series of convolutions, extending, for instance, from *c'* on the left side to *c'* on the right side. I then produce upon series *c'* another series, *c''*—that is to say, a series of convolutions extending from *c''* on the right side to *c''* on the left side, the direction of rotation of the mandrel *a* remaining unchanged, but the wire being guided not from the left to the right, as before, but reversely. If a series more is to be produced, I now guide the wire again from the left to the right, producing thereby upon the series *c''* a series *c'''*, extending from *c'''* on the left side to *c'''* on the right side, and this change of direction of the wire is repeated as often as more series are desired to be produced.

After the desired number of series of the desired number of convolutions has been wound the wire is cut off and all the convolutions allowed to voluntarily expand in consequence of the elasticity of the material, and owing to this voluntary expansion the small annular spaces requisite between the consecutive series are produced. The spring may now be taken off the mandrel *a*, and either the series *c'' c''* or the series *c' c'* and *c''' c'''* stretched—that is to say, the convolutions are drawn asunder—so that the respective portion or portions of the spring become adapted to sustain contractile strain, whereas the other portion or portions remain as before—that is to say, such portion or portions are

adapted for being exposed to tensile strain—  
so that portions adapted to be exposed to ten-  
sile strain alternate with portions adapted to  
be exposed to contractile strain. The last  
5 step of the process consists in hardening or  
tempering the spring after its ends have been  
suitably cut off with respect to the particular  
arrangement or employment for which the  
spring is intended.

10 Having now described my invention, what  
I desire to secure by a patent of the United  
States is—

1. A coil-spring consisting of a plurality of  
superimposed series of convolutions, the se-

ries being continuous one with another, and 15  
the convolutions of a portion of the series be-  
ing spaced apart.

2. A coil-spring consisting of a plurality of  
superimposed series of convolutions, the sev-  
eral series being continuous one with another, 20  
and the convolutions of alternate series be-  
ing spaced apart.

In witness whereof I have hereunto set my  
hand in presence of two witnesses.

VICTOR MEYER.

Witnesses:

OTTO KÖNIG,

EMIL BLOMBERG.