

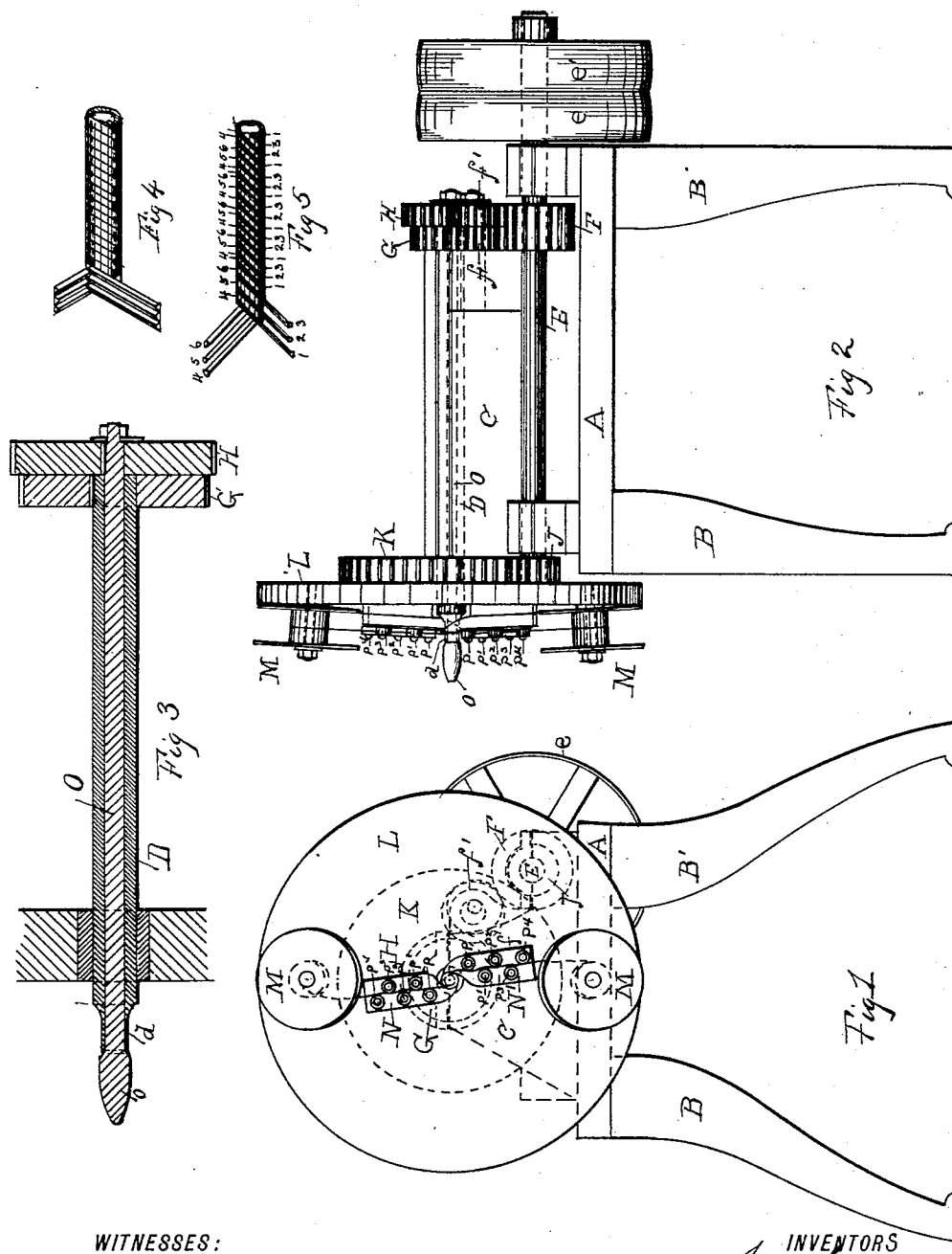
(No Model.)

J. S. WILSON & W. O. WEBBER.

MACHINE FOR FORMING HELICES OF RESILIENT RODS OR STRANDS.

No. 580,075.

Patented Apr. 6, 1897.



WITNESSES:

A. F. Williamson
Gordon A. Cain

INVENTORS

James S. Wilson
William O. Webber

BY

Wm. O. Webber

ATTORNEY.

UNITED STATES PATENT OFFICE.

JAMES S. WILSON, OF CHELSEA, AND WILLIAM O. WEBBER, OF BOSTON,
MASSACHUSETTS.

MACHINE FOR FORMING HELICES OF RESILIENT RODS OR STRANDS.

SPECIFICATION forming part of Letters Patent No. 580,075, dated April 6, 1897.

Application filed October 23, 1896. Serial No. 609,860. (No model.)

To all whom it may concern:

Be it known that we, JAMES S. WILSON, of Chelsea, and WILLIAM O. WEBBER, of Boston, in the county of Suffolk, State of Massachusetts, citizens of the United States, have invented new and useful Improvements in Machines for Forming Helices of Resilient Rods or Strands, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to machines for the production of spiral helices consisting of one or more rods or strands wound together in alternate circumvolutions; and the object of our invention is to produce a helix of two or more rods or strands in which there is a sufficient initial tension to keep the alternate rods or strands in close juxtaposition one to the other and in which there would be no tendency toward opening or uncoiling of the helices, so as to leave a space either diametrically or axially between the alternate convolutions thereof. We attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front vertical elevation of the machine. Fig. 2 is a side vertical elevation; Fig. 3, a section through the axes of the two winding-arbors. Fig. 4 is a side view showing a helix wound of six strands, three of which are carried side by side on one of the bobbins and guided by one set of pushing-fingers and the other three are carried on the opposite bobbins and other set of pushing-fingers, so that the second set are wound on top of the first set. Fig. 5 is a side view of another plan of winding by which three rods are carried by one bobbin and the other three rods carried by another bobbin and guided by alternate pushing-fingers and so arranged that the rods carried by one bobbin alternate with those carried by the other bobbin.

Similar letters refer to similar parts throughout the several views.

The table or plate A and its legs or standards B B' constitute the framework of the machine. On this table A is mounted the bearing C, which carries the two winding-arbors D O, the arbor D being hollow and the arbor O being within it. Mounted also on the table A is the driving-shaft E, which re-

ceives its motion from the tight and loose pulleys *e e'*. This shaft carries a pinion F, which imparts motion through two intermediate pinions *f f'* to the gears G and H, which are fastened, respectively, to the winding-arbors D and O. The driving-shaft E also carries a pinion J, which imparts motion through the gear K to the face-plate L, which is journaled on the winding-arbors D and O and in an opposite direction to these arbors. This face-plate L carries two similar spools or bobbins M diametrically opposite each other on its face, and also two guides and pushing-fingers N N', similarly placed. On these guide-fingers N are mounted the guide and tension rollers *p p' p² p³ p⁴*, &c., and the inner ends of these fingers are curved partly around the neck or the smaller diameter of the arbor D.

The operation of these mechanisms is as follows: The arbor D is given a certain rotary motion through the medium of the intermediate gear *f* and driving-pinion F from the driving-shaft E. The inner arbor O is given a slightly-slower motion through the intermediate gear *f'* from the same shaft, this difference in speed being in proportion or ratio as the circumference of the neck *d* of the arbor D and the enlarged end *o* of the inner arbor O and is accomplished by making the diameter of the gear G proportionally smaller than the gear H. The face-plate L, which receives its motion through the gear K and which carries the bobbins M and pushing-fingers N N', is given a rotary motion in an opposite direction to that of the arbors D and O, so that the ultimate production of winding is due to the sum of the revolutions of the arbors D and O in one direction and face-plate L in the opposite direction, thus enabling a much larger production without giving excessive speed to either part. On the bobbins M are wound the rods or strands of which the helical product is composed. These may be of any suitable cross-section, such as triangular or other shapes. These strands are then led through the tension and guide rolls *p p' p² p³ p⁴* and are wound in alternate convolutions on the smaller diameter *d* of the arbor D, which gives the rods or strands a certain curvature due to this diameter. As

these strands are wound they are crowded forward by the fingers or pushers N N' up onto the larger diameter and more slowly rotating arbor O, which gives the finished helix an inside diameter equal to its own outside diameter, but with an initial or hugging tension equal to the curvature first imparted to the strands by being wound on the smaller diameter d of the arbor D. As the strands from the bobbins are successively fed in by the pushing-fingers N and crowded up onto and over the enlarged end o of the arbor O the consequently-formed helix is pushed off of this arbor and received upon a table or other suitable platform.

While we have only described a machine for the production of a helix of two strands, we desire to cover the idea of a machine for producing helices of any number of strands, as it is readily obvious that this machine could be used with one strand and also by winding several strands side by side upon the bobbins and leading them through properly-grooved tension and guide rollers and guide fingers or pushers produce a helix of several strands, as shown in Fig. 4 or Fig. 5.

Having thus fully described the construction and method of operation of this machine, what we desire to secure by Letters Patent is as follows:

1. In a machine for the production of helices of resilient rods or strands, the combination of a mandrel of larger diameter, axially in line with a mandrel of smaller diameter, whose peripheral speeds are the same for the purpose set forth.

2. In a machine for the production of helices

of resilient rods or strands, the combination of a mandrel of larger diameter and a mandrel of smaller diameter whose peripheral speeds are the same.

3. In a machine for the production of helices, the combination of an outer mandrel and an inner mandrel having an enlarged end, greater in diameter than the outer mandrel, whose peripheral speeds are the same and axially in line with each other.

4. In a machine for the production of helices, the combination of an inner and an outer mandrel, and one or more pushing and guiding fingers in juxtaposition to the periphery of the outer mandrel, for the purposes set forth.

5. In a machine for the production of helices, the combination of an inner and an outer mandrel, pushing-fingers, and guiding and tension rollers, for the purpose set forth.

6. In a machine for the production of helices, the combination of an inner and an outer mandrel, pushing-fingers, tension-rollers, bobbins for carrying the strands of which the helices are to be formed, and means for revolving the mandrels on their own axis, and for revolving the bobbins and pushing-fingers about the axis of the mandrels in an opposite direction.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 20th day of October, A. D. 1896.

JAMES S. WILSON.

WILLIAM O. WEBBER.

Witnesses:

EDWARD H. MASON,

ANNA L. HARDY.