S. BUTTERWORTH.

SPRING WINDING DEVICE.

APPLICATION FILED OCT. 7, 1909.

963,512. Patented July 5, 1910.

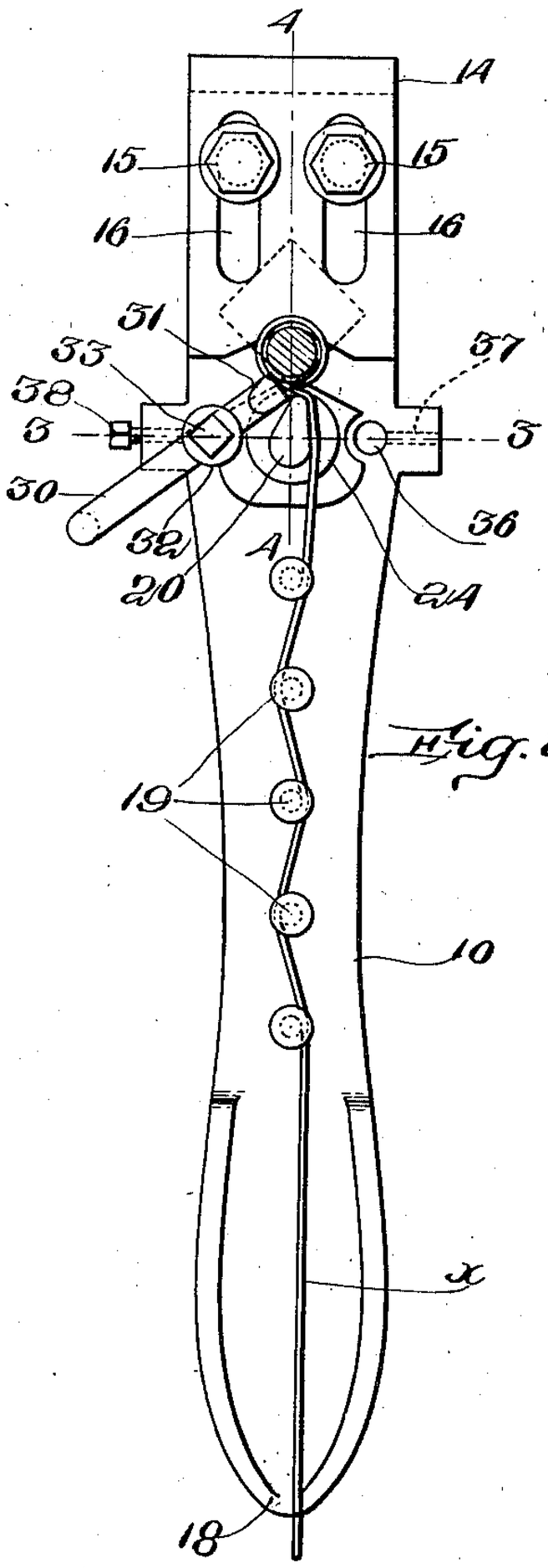

Fig. 2.

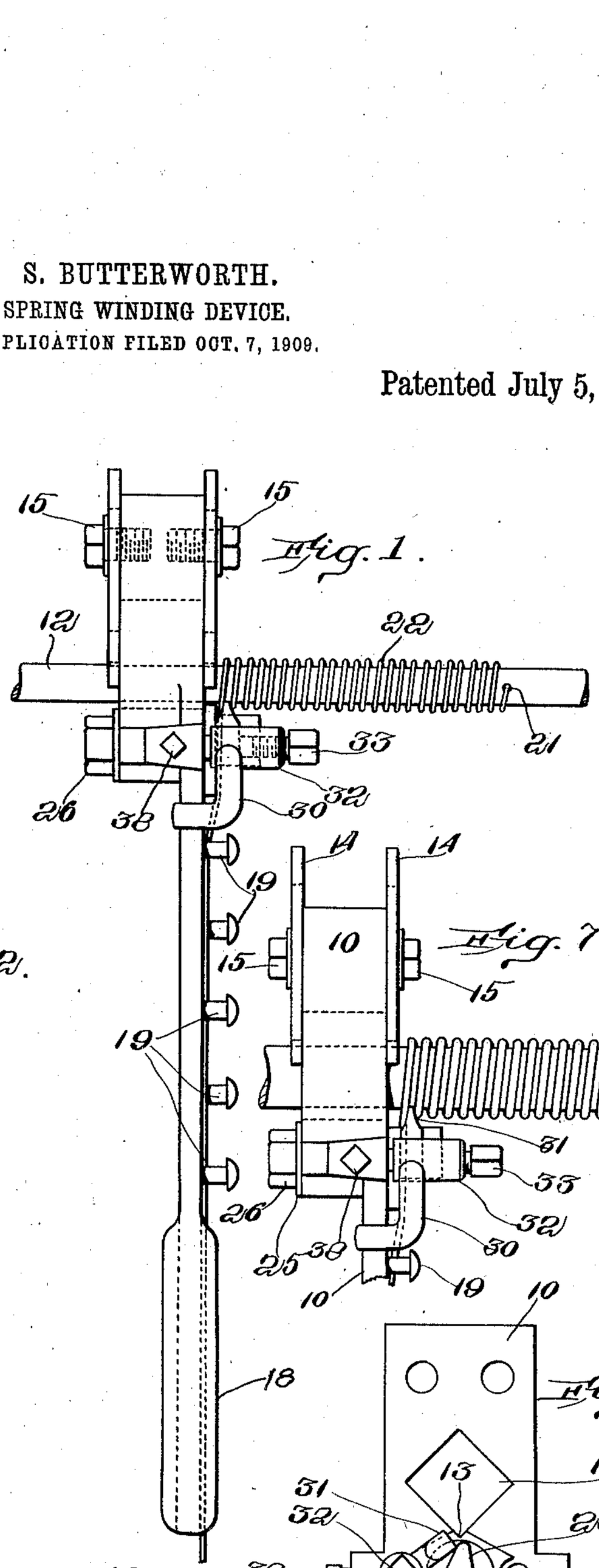

Fig. 1.

Fig. 7.

Fig. 5.

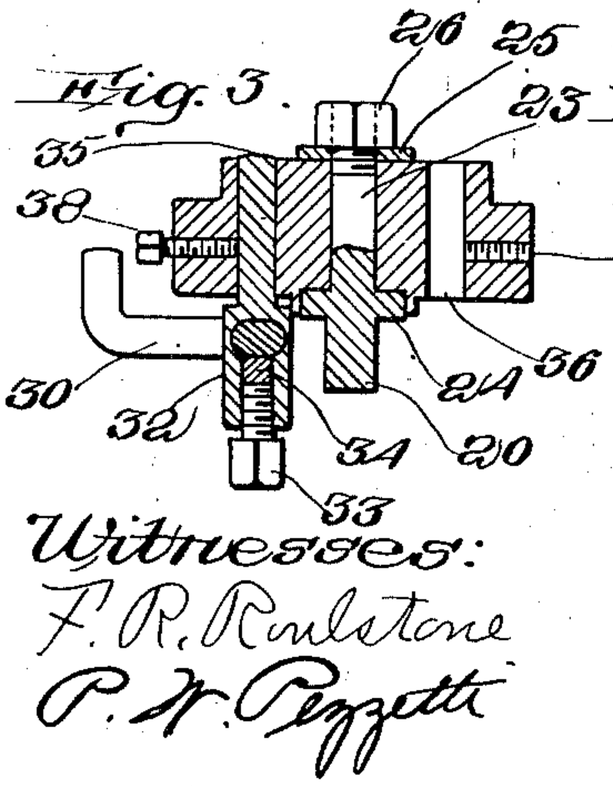

Fig. 3.

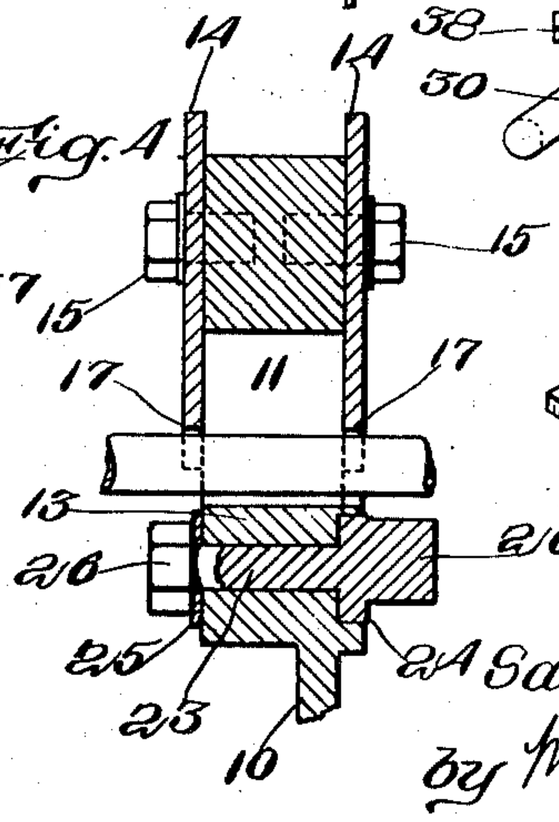

Fig. 4.

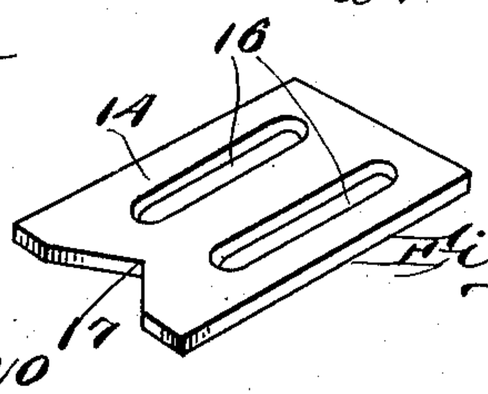

Fig. 6.

Witnesses:
F. R. Rulstone
P. H. Pezzetti

Inventor:
Samuel Butterworth
by Wright Brown Quinby & May
Attys.

UNITED STATES PATENT OFFICE.

SAMUEL BUTTERWORTH, OF SOMERVILLE, MASSACHUSETTS.

SPRING-WINDING DEVICE.

963,512. Specification of Letters Patent. Patented July 5, 1910.

Application filed October 7, 1909. Serial No. 521,465.

To all whom it may concern:

Be it known that I, SAMUEL BUTTERWORTH, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Spring-Winding Devices, of which the following is a specification.

This invention relates to spring winders and has for its object to provide a handle adapted to be combined with a revolving mandrel for winding a helical spring on the mandrel.

One of the principal features of the invention is a gage adapted to intervene between two convolutions of the spring and to separate them, and adapted to be adjusted to various positions so as to vary the amount of separation. The gage is otherwise adjustable and is adapted to be interposed between any two convolutions, preferably the last two. The handle is provided with means for adjustably supporting the gage on either side of the mandrel so as to adapt the device for winding either right or left hand springs.

Another feature of the invention is an adjustable tension device for guiding a wire to the mandrel and for imposing the desired tension thereon. By means of this device, various sizes of wire may be wound with equal facility and various diameters of helices may be produced by employing mandrels of different diameters. The device includes adjustable means for embracing mandrels of various diameters whereby it is adapted to produce helices of various diameters.

Of the accompanying drawings which illustrate one form in which the invention may be embodied, Figure 1 is an elevation of a spring winding device applied to a mandrel in the act of forming a helical spring thereon. Fig. 2 is a transverse elevation thereof. Fig. 3 is a section on line 3—3 of Fig. 2. Fig. 4 is a section on line 4—4 of Fig. 2. Fig. 5 is an elevation of the working end of the device without the adjustable mandrel-engaging members. Fig. 6 is a perspective view of one of the adjustable mandrel-engaging members. Fig. 7 is an elevation of a portion of the device similar to Fig. 1, as applied to a mandrel of larger diameter.

The same reference characters indicate the same parts wherever they occur.

On the drawings 10 represents a handle formed with an opening 11 extending therethrough for the reception of a mandrel 12. The opening 11 is preferably angular and arranged so that the angle 13 thereof is central. The opening is preferably of such diameter as to receive a mandrel of maximum diameter, and the device is adapted to embrace mandrels of various diameters by reason of being provided with one or more adjustable plates 14. In this form of the device, two plates 14 are provided and are clamped against opposite sides by means of clamping bolts 15. The plates are formed with slots 16 through which the shanks of the bolts 15 extend, and which render the plates adjustable toward and from the angle 13 of the opening 11. The plates are also formed with central angular notches 17 which register with the angle 13. The plates embrace the mandrel and center the device squarely with relation to the mandrel.

The wire of which the helical spring is to be formed is indicated at *x* and is drawn through between flanges on the grip of the handle from which it passes over a series of straightening pins 19 affixed to the handle, and then over an adjustable tension member 20 and thence to the mandrel. The mandrel may be provided with an aperture 21 for the reception of the starting end of the wire *x* for the purpose of firmly attaching the wire to the mandrel so that, when the mandrel is driven, it may draw the wire through the straightening pins and over the tension device 20. The member 20 is adjustable and may be positioned with relation to the mandrel so as to vary the tension of the wire and thereby cause the convolutions 22 to embrace the mandrel more or less closely as desired. The tension device is formed as a head at one end of a shank 23 which extends through the handle 10 parallel to the axis of the opening 11. Between the head 20 and the shank 23 is a flange or collar 24 adapted to clamp one side of the handle, while a washer 25 and a nut 26 screw-threaded upon the other end of the shank are adapted to clamp the other side of the handle and secure the tension device at any desired position about its axis. As shown by Figs. 2 and 5, the head 20 is of irregular outline and its point of contact with the wire *x* may be adjustable toward or from the mandrel by turning the shank 23 in the handle.

In order to produce what is sometimes called an "open spring", that is a spring

in which a space is provided between the convolutions 22, a gage is provided for determining the spacing of the convolutions. On the drawings, the gage is indicated at 30 and is formed of a rod or pin provided with a chisel-shaped end 31. The gage is adapted to be adjusted so that the end 31 may intervene between two convolutions of the spring, and for this purpose a holder 32 is provided and formed with an aperture for the reception of the gage and with a set screw 33 and clamping block 34 (see Fig. 3). The gage is adapted to be turned about its axis and clamped at any position by the screw 33 and block 34. Not only is the gage movable about its axis, but it is movable longitudinally thereof and is therefore adapted to be set at a greater or less distance relatively to the mandrel. The holder 32 is formed with a cylindrical shank 35 which may be inserted in either of two apertures 36 formed in the handle, one on either side of the longitudinal median line thereof. The handle is provided with screw-threaded holes 37 for the reception of a set screw 38 whereby the shank 35 may be adjustably secured in either of the apertures 36. The holder 32 may be turned about its axis and may be adjusted longitudinally thereof and is therefore adapted to position the gage 30 at various angles and at various distances with relation to the handle. In practice it is desirable to position the chisel-shaped end 31 so that it may intervene between the last two convolutions 22. The spacing of the convolutions may be determined in either of two ways, namely by turning it about its own axis, or by moving it longitudinally of its axis to give the effect of a wedge.

In practice the handle is fed longitudinally of the mandrel by coöperation of the gage with the previously formed convolution 22, and the degree of feeding movement is determined by the adjustment of the gage which determines the spacing of the convolutions. On the drawings, the gage is adapted for use in producing a helix of left hand lead, but it is adapted to produce a helix of right hand lead when transferred to the aperture 36 on the other side of the tension member 20.

It is apparent that the device herein described and claimed is adapted to produce a great many varieties of helical springs. The spacing of the convolutions is determined by one adjustable member. The diameter of the helix is to some extent determined by the diameter of the mandrel and is otherwise determined by the adjustment of the tension member while any desired size of wire may be employed and subjected to the desired degree of tension by various combinations of intertwining about the fixed tention pins 19.

I claim:—

1. In a device for winding helical springs on a mandrel, a handle adapted to loosely embrace the mandrel, and an adjustable member mounted on the handle and having a chisel-shaped end adapted to intervene between two convolutions on the mandrel and adapted to be turned about its longitudinal axis so as to cause said chisel-shaped end to variably separate the convolutions.

2. In a device for winding helical springs on a mandrel, a handle adapted to loosely embrace the mandrel, an adjustable gage on the handle, an adjustable tension member on the handle adapted to guide the wire to the mandrel, a series of pins on the handle adapted to guide the wire to the tension member, and a grip having flanges projecting beyond the plane of the wire, said flanges being on either side of the wire.

3. In a device for winding helical springs on a mandrel, a handle adapted to loosely embrace the mandrel, an adjustable detachable gage for spacing the convolutions on the mandrel, and means on the handle for affixing the gage on either side of the mandrel.

4. In a device for winding helical springs on a mandrel, a handle adapted to loosely embrace the mandrel, a rotatably adjustable tension member mounted on the handle to engage the wire in coöperation with the mandrel, and means on the handle for guiding the wire to said tension member.

In testimony whereof I have affixed my signature, in presence of two witnesses.

SAMUEL BUTTERWORTH.

Witnesses:
ARTHUR H. BROWN,
P. W. PEZZETTI.