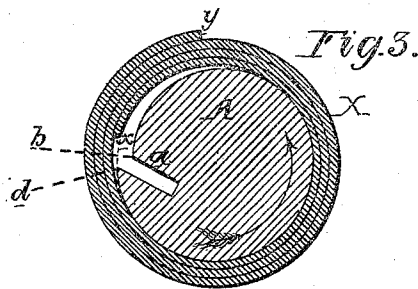
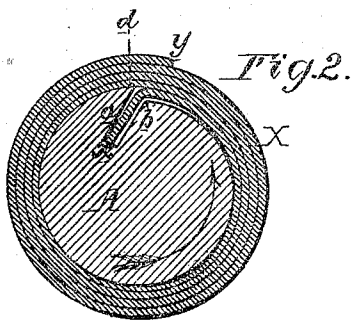
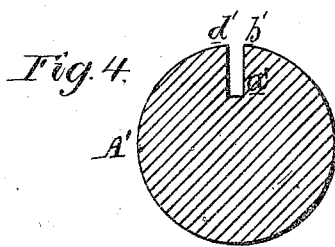
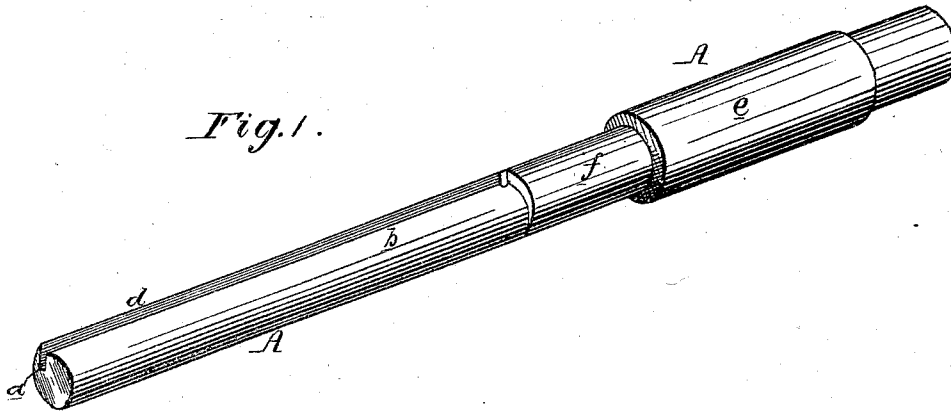


W. R. NICHOLS & C. W. PICKERING.
Mandrels for Coiling Metallic Springs.

No. 147,679.

Patented Feb. 17, 1874.



Witnesses, *Harry Smith*
Thomas M. Swain

Wm. R. Nichols and
Chas. W. Pickering
by their attys.
Horsens and Son.

UNITED STATES PATENT OFFICE.

WILLIAM R. NICHOLS AND CHARLES W. PICKERING, OF PHILADELPHIA, PA.

IMPROVEMENT IN MANDRELS FOR COILING METALLIC SPRINGS.

Specification forming part of Letters Patent No. 147,679, dated February 17, 1874; application filed January 17, 1874.

To all whom it may concern:

Be it known that we, WILLIAM R. NICHOLS and CHARLES W. PICKERING, of Philadelphia, Pennsylvania, have invented an Improved Mandrel for Coiling Car-Springs, of which the following is a specification:

The object of our invention is to facilitate the manufacture of coiled springs for railroad-cars, by coiling the hot spring-bar X upon the eccentric mandrel A, shown in the perspective view, Figure 1, and transverse sections, Figs. 2 and 3, of the accompanying drawing, the said mandrel having a longitudinal groove, *a*, cut obliquely for the reception and retention of the bent end of the spring-bar, and a shoulder, *b*, at one side of the said groove, lower than the opposite shoulder *d*, over which the said bent end may be drawn and straightened out by rotating the mandrel after the spring has been coiled, as hereafter described.

Car-springs are ordinarily coiled upon a cylindrical or nearly cylindrical mandrel, A', Fig. 4, having a radial groove, *a'*, and shoulders *b'* and *d'*, directly opposite each other. The end of the spring-bar, after having been bent and scored, is introduced into the groove *a'*, and is there retained until the bar has been coiled by the rotation of the mandrel, and after the coiling operation has been completed the spring is withdrawn longitudinally from the mandrel, and the bent and scored end which projected from the inner coil into the groove is broken off.

By the use of our improved mandrel, which we will now proceed to describe, this necessity of first bending and scoring the end of the spring-bar, and of afterward breaking it off is avoided, and a better finish is imparted to the inner coil. The mandrel has a cylindrical collar, *e*, and a reduced cylindrical portion, *f*, adjoining the eccentric portion, upon which the spring is coiled, the groove *a* extending throughout the entire length of this latter portion, and to the outer end of the mandrel. (See Fig. 1.) The groove *a* is so inclined in respect to the periphery of the mandrel as to form an

obtuse angle at the shoulder *b*, which may be slightly rounded, if desired, and the difference in height between the said shoulder *b* and the opposite shoulder *d*, owing to the eccentricity of the mandrel, is somewhat greater than the thickness of the spring-bar, which has to be coiled upon the said mandrel. In forming the spring, the bar X, which may be of the same width throughout, or tapered at the ends, is made red hot, and its end *x*, without previous bending or scoring, is introduced into the oblique groove *a*, after which the mandrel is turned in the direction of the arrow, Fig. 2, until the whole of the bar has been coiled upon the same. The outer end *y* of the bar is then held rigidly, and the rotary movement of the mandrel is continued in the same direction, the effect of which will be to draw the end *x* of the bar out of the groove *a*, and over the shoulder *b*, by which it will be straightened out, so as to form part of the inner coil, and this rotary movement of the mandrel is continued until the interior of said inner coil has been smoothed and made to conform with the adjoining coils. (See Fig. 3.) The spring when completed is withdrawn from the end of the mandrel in the usual manner.

In the ordinary mandrel, Fig. 4, the withdrawal of the end of the spring-bar from the groove would be prevented first by the acuteness of the angle *b'*; and, second, by the pressure upon the inner coil of that next succeeding it, which we avoid by reducing the height of the inner shoulder *b*.

We claim as our invention—

The within-described mandrel A, having an eccentric portion, with an oblique groove *a*, as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM R. NICHOLS.
CHAS. W. PICKERING.

Witnesses:

WM. A. STEEL,
HARRY SMITH.