Sept. 2, 1924. 1,507,323

C. P. NELLIS

COILING MACHINE

Filed Aug. 29, 1923

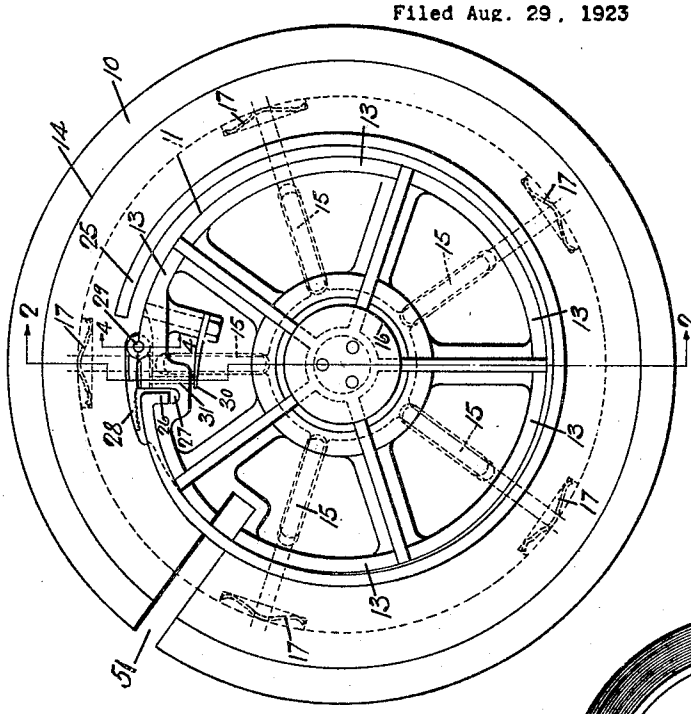


Fig. 1.

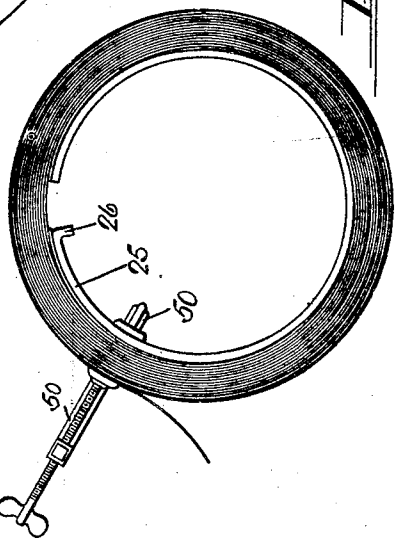


Fig. 3.

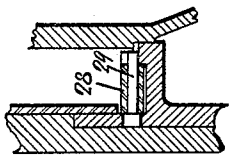


Fig. 4.

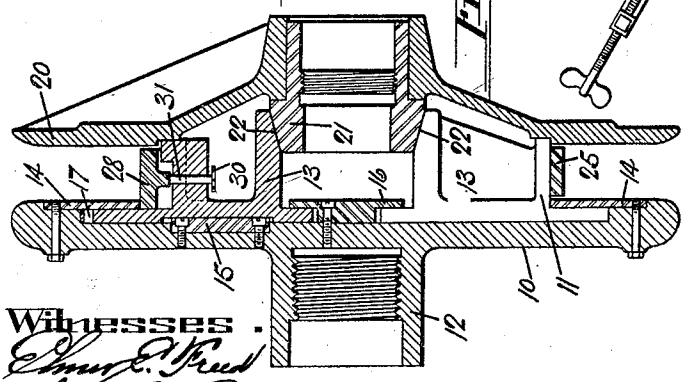


Fig. 2.

Witnesses.
Elmer E. Reed
Geo. E. Gases.

Inventor.
Charles P. Nellis
Ralph W. Chilton
his Attorney.

By

Patented Sept. 2, 1924. 1,507,323

# UNITED STATES PATENT OFFICE.

CHARLES P. NELLIS, OF DAYTON, OHIO, ASSIGNOR TO THE INLAND MANUFACTURING COMPANY, OF DAYTON, OHIO, A CORPORATION OF DELAWARE.

## COILING MACHINE.

Application filed August 29, 1923. Serial No. 660,052.

*To all whom it may concern:*

Be it known that I, CHARLES P. NELLIS, a citizen of the United States of America, residing at Dayton, county of Montgomery, and State of Ohio, have invented certain new and useful Improvements in Coiling Machines, of which the following is a full, clear, and exact description.

This invention relates to improvements in coiling machines used for coiling together one or more glued strips of fibrous material into a laminated annulus. for instance in machines used for coiling wheel rims or similar structures. Such a machine is illustrated and described in the pending application, Serial #623,592, filed March 8, 1923.

Heretofore in such machines the fibrous strips have been coiled upon a non-yielding central form which bears upon the inner periphery of the coiled annulus at spaced intervals and hence the radial pressure of the coiled annulus upon the central form is concentrated at certain points. This tends to press the coiled annulus out of round and also the increased pressure at certain points and the lack of pressure at other points prevents a uniformly strong glued joint between the laminae of the annulus. An object of this invention is to avoid these troubles by providing a yieldable central form upon which the strips are coiled, said form exerting an outward radial pressure throughout substantially the entire inner periphery of the coiled annulus. With this invention the central form is compressed during the coiling of the strips thereupon and hence after the coiled annulus together with the central form have been removed from the coiling machine a strong outward radial pressure will still be exerted upon the inner periphery of the annulus, which pressure holds the laminae of the annulus tightly pressed together independently of the pressure caused by the resistance of the strips to being bent around a circle. Therefore with this invention a high pressure between the laminae can be obtained with very flexible strips, which is not possible with a rigid central form.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein preferred forms of embodiment of the present invention are clearly shown.

In the drawings:

Fig. 1 is a front view of an expandable winding drum for a coiling machine adapted for coiling one or more strips of wood or other fibrous material into a laminated rim suitable for handwheels.

Fig. 2 shows a section on line 2—2 of Fig. 1 of the expandable winding drum together with the guide disk and expanding cone used for expanding the winding drum.

Fig. 3 shows a coiled annulus with the yieldable central ring and clamping means in place as it is taken from the coiling machine.

Fig. 4 shows a section through the pivot of the gripping pawl on line 4—4 of Fig. 1.

Similar reference characters refer to similar parts throughout the several views.

Numeral 10 designates the base plate of the expandable winding drum 11 and is provided with a boss 12 which is rigidly secured to its driving shaft (not shown) and is rotated by any suitable means. The expanding drum 11 is composed of five separate sectors 13 which are suitably mounted upon the base plate 10 by means of the splines 15 at the center of each sector and the outer flange ring 14 and the inner flanged disk 16. These five sectors 13 are urged to their contracted position by the springs 17 which are located in suitably formed recesses at the outer periphery of the sectors as clearly shown in Figs. 1 and 2. The guide disk 20 is rotatably mounted at its center upon a suitable reciprocating support (not shown) and is adapted to be moved into the position shown in Fig. 2 just before the coiling operation, or to a suitable distance to the right as viewed in Fig. 2 after the coiling operation is completed to permit the coiled annulus to be removed from the winding drum 11. The expanding cone 21 is reciprocated with the guide disk 20 and hence when the guide disk is moved to the left to the position shown in Fig. 2 the cone 21, acting upon the cam surfaces 22 of the sectors 13, causes the winding drum to expand the desired amount.

The mechanism described above is fully disclosed in the above mentioned pending application, Serial No. 623,592 and was not invented by this applicant. The present invention however relates, to the combina-

tion of the above described structure with the spring ring 25. This spring ring 25 is preferably formed of one piece of suitable material and assumes a spiral shape substantially as shown in Fig. 1 when it is free. A lug 26 is provided at one end thereof and is adapted to fit loosely within a suitable recess 27 in the periphery of the winding drum 11, whereby the ring 25 is rotatably secured to the drum 11. A gripping pawl 28 is pivoted at 29 to the drum 11 substantially in the position shown in Fig. 1. A light spring 30 acting upon the pin 31 serves to hold pawl 28 slightly raised to permit easy insertion of the end of the first strip which is to be coiled around the drum. The free end of the spring ring 25 preferably terminates just short of the pawl 28 whereby the top surface of the pawl 28 and ring 25 lie substantially flush after the ring 25 has been pressed in against the drum 11 by the coiling of the strips thereupon.

The operation of the device is as follows: The guide disk 20 is moved to the right a suitable distance and the ring 25 placed loosely in position around the drum 11, the projection 26 falling in recess 27. The end of the first strip is next inserted under the pawl 28. Guide disk 20 is now moved to the left to position shown in Fig. 2, thereby causing the drum 11 to expand as previously described. Power is now applied to the winding drum and the strip or strips are coiled upon the outer periphery of the spring ring 25, which is thereby pressed in against the drum 11 due to the tension with which the strips are coiled. After the winding operation is completed, the drum 11 is stopped and a C-clamp 50 or other suitable clamping means is inserted in the slot 51 provided for the purpose and the outer end or ends of the coiled strip or strips are clamped to the coiled annulus to prevent unwinding of the strips after the annulus has been removed from the machine. It is of course to be understood that the strips have glue or other adhesive means applied thereto before they are coiled together. The guide disk 20 is now moved to the right thus permitting springs 17 to contract the winding drum 11. The coiled annulus together with the spring ring 25 and clamp 50 may now be easily removed as a unit from the coiling machine, such unit being shown in Fig. 3. The coiling machine is now ready to have the operation repeated. These units are kept clamped together until the glue has dried sufficiently, after which the C-clamps are removed and the spring rings 25 pressed or knocked out laterally. As soon as the rings 25 are removed from the annulus they again take their spiral form and are ready to be used again. It is obvious that throughout the drying period of the annulus, the rings 25 exert a substantially uniform outward radial pressure around the inner periphery of the annulus and thus aid in obtaining a uniform glued joint throughout the annulus. The rings 25 also prevent the annulus from warping out of shape while drying.

While the forms of embodiment of the present invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow:

What I claim is as follows:

1. In a coiling machine for coiling a plurality of strips of fibrous material to form an annulus, a winding drum, a spring ring positioned upon the periphery of said drum and adapted to be compressed by said strips when they are wound thereupon so that said ring exerts a radial pressure upon said strips, said ring being adapted for removal from the machine along with the completely wound annulus.

2. In a coiling machine for coiling a plurality of strips of fibrous material to form an annulus, a winding drum, a one-piece spring ring positioned upon the periphery of said drum and adapted to be compressed by said strips when they are wound thereupon so that said ring exerts a radial pressure upon said strips, said ring being adapted for removal from the machine along with the completely wound annulus.

3. A coiling machine for coiling one or more strips of fibrous material, including, a winding drum, a ring yieldable in diameter positioned about the periphery of said drum and adapted to be compressed by having the strips wound thereupon, said ring being adapted for removal from said drum along with the coiled annulus.

4. A coiling machine for coiling one or more strips of fibrous material, including, a winding drum, a spiral spring attached at one end to said drum and positioned about the periphery of said drum and rotatable therewith, and means for coiling said strips upon said drum and spring whereby the spring is compressed to substantially circular form and exerts pressure upon the inner periphery of the coiled annulus.

In testimony whereof I hereto affix my signature.

CHARLES P. NELLIS.