No. 607,093. Patented July 12, 1898.

F. P. SNOW.

ELECTRICALLY HEATED ROLL.

(Application filed May 3, 1897.)

(No Model.)

Fig. 2

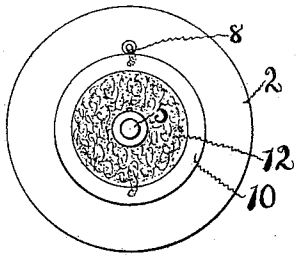


Fig. 1

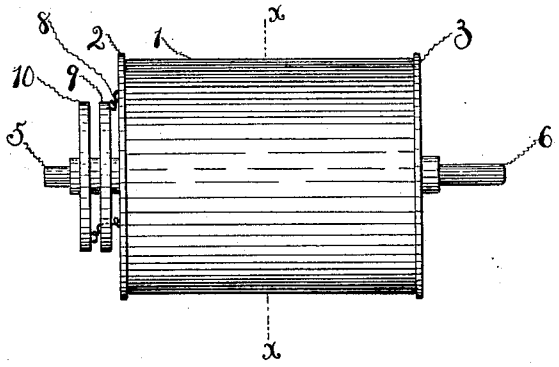


Fig. 4

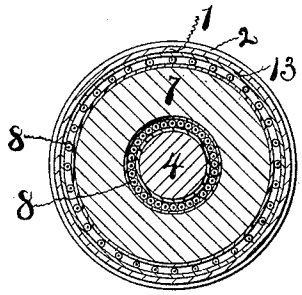


Fig. 3

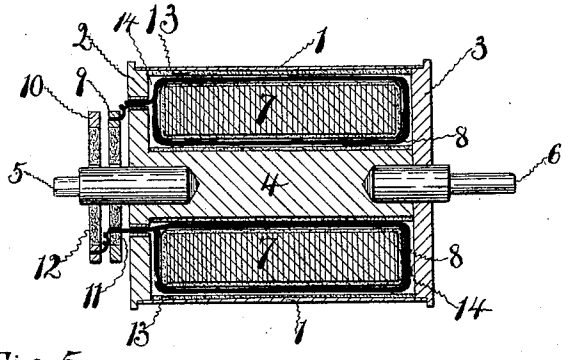
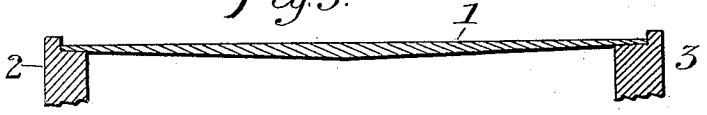


Fig. 5.



Witnesses
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UNITED STATES PATENT OFFICE.

FRED P. SNOW, OF LYNN, MASSACHUSETTS.

ELECTRICALLY-HEATED ROLL.

SPECIFICATION forming part of Letters Patent No. 607,093, dated July 12, 1898.

Application filed May 3, 1897. Serial No. 634,822. (No model.)

To all whom it may concern:

Be it known that I, FRED P. SNOW, of Lynn, Essex county, Massachusetts, have invented certain new and useful Electrically-Heated Rolls, which are described in the following specification and are illustrated by the accompanying drawings.

My invention relates to electrically-heated rolls that may be used for drying fabrics or paper for calendering and for other kindred purposes.

The object of the invention is to apply to the heating of such rolls the familiar principle of electrical induction. To accomplish this object, I use a hollow roll having an internal shaft which is encircled by an annular core wound with insulated conductor. By this arrangement a secondary circuit through and about the annular core is made to consist of the cylindrical wall, the heads, and the shaft of the hollow roll. By locating the principal resistance of the secondary circuit in that wall I cause heat to be generated in that part of the roll which needs to be heated.

The best manner in which I have contemplated applying the principles of my invention is illustrated by the accompanying drawings.

Figure 1 is a side view of an electrically-heated roll that is constructed in accordance with those principles. Fig. 2 is an end view of the same roll. Fig. 3 is a longitudinal axial section of Fig. 1, and Fig. 4 is a cross-section on line *x x* of Fig. 1. Fig. 5 is a detail.

The roll that is depicted in the views has a hollow cylindrical shell 1, which is formed of iron or of other metal of low electrical conductivity, is thickest at the middle, and diminishes in thickness gradually toward the ends of the shell, as shown in Figs. 3, 4, and 5. Fig. 5, being an enlarged detail from Fig. 3, is a longitudinal section through the wall of that shell.

The numerals 2 and 3 denote two parallel disks of copper or of other highly-conductive material, which constitute the heads of shell 1 and are united therewith by brazing or soldering. In the middle of the roll is a large shaft 4, which is made of copper or of other highly-conductive material and is integrally or closely united with the heads 2 and 3. Into the opposite ends of shaft 4 and through heads 2 and 3 are driven the gudgeon-like bearing-pieces 5 and 6, whereby the roll is mounted for rotation in suitable supports. (Not shown in the drawings.) In the annular space 14, that is included between the shell 1, the heads 2 and 3, and the shaft 4, is an annular laminated core 7, which is wound longitudinally in and out with an insulated copper wire 8. In the same annular space and next to shell 1 may be placed any necessary or convenient packing 13 of asbestos or other material. The ends of wire 8, which are led through insulating-bushings in head 2, are electrically connected, respectively, with collectors 9 and 10. These are rings of copper or like conductive material carried by insulating-disks 11 and 12, which are keyed to bearing-piece 5, as shown in Fig. 3.

Such being the construction of my improved roll, as shown in the said drawings, its mode of operation is easily understood. The entire described mechanism is rotated bodily by belt and pulley or by other suitable means, (not shown in the drawings,) and at the same time an electric current of the alternating type is supplied from any suitable generator to the collectors 9 and 10, and thence to the primary circuit 8. Thus a current is generated by induction in the secondary circuit through the shell 1, the heads 2 and 3, and the shaft 4. By this induced current the shell 1, having less conductivity than the other parts of the secondary circuit, is heated to any necessary or desired extent, the amount of heat being regulated and determined in view of the work to be done either by the regulation of the current that is supplied to the primary circuit or by other appropriate means. (Not shown in the drawings.) At the same time a uniform distribution of heat throughout the length of shell 1 results from the described form of that shell as being of greatest thickness at the middle and of diminishing cross-section toward the ends.

Such being the construction and operation of my improved roll, I claim as my invention—

1. A hollow cylindrical shell of iron, or of other material that has low electrical conductivity, two cylinder-heads of copper, or of other highly-conductive material, united with said hollow shell, and a shaft of copper, or of other highly-conductive material, uniting said

cylinder-heads, in combination with an annular core, formed of magnetic material, encircling said shaft, and wound with insulated conductor, all adapted to be rotated about a common axis, substantially as and for the purpose specified.

2. A cylindrical shell, formed of material that has low electrical conductivity, two cylinder-heads, formed of highly-conductive material, united electrically with that shell, and a shaft, formed of highly-conductive material, uniting said cylinder-heads, and provided with terminal bearing-pieces, in combination with an annular core, formed of magnetic material, wound with insulated conductor, and encircling said shaft, all arranged symmetrically about a common axis of rotation, substantially as and for the purpose specified.

3. A hollow shell, formed of iron, or of other material of low electrical conductivity, and having its wall of predetermined cross-sectional area, increasing toward the middle, and diminishing toward the ends of said shell, two cylinder-heads, formed of highly-conductive material, and electrically united with said hollow shell, a shaft, formed of highly-conductive material, and electrically uniting said cylinder-heads, and an annular core, formed of magnetic material, wound with insulated conductor, and encircling said shaft, in combination with current-collectors, connected with said insulated conductor, all being rotatable about a common axis upon suitable bearings, substantially as and for the purpose specified.

4. A hollow cylindrical shell, formed of material that has low electrical conductivity, two cylinder-heads that are formed of conductive material, and are united with said shell, a magnetic core, which is contained in said shell, and is wound with insulated conductor, in combination with a shaft, that is formed of conductive material, uniting said cylinder-heads and is provided with terminal bearing-pieces, and with rotary current-collectors, for supplying current to said insulated conductor during rotation, substantially as and for the purpose specified.

5. An annular core, wound with a primary conductor, and contained in a rotary shell, which forms the choking portion of a secondary circuit about the same core, substantially as and for the purpose specified.

In testimony whereof I hereunto set my name in the presence of two witnesses.

FRED P. SNOW.

Witnesses:
WILLARD EDDY,
RICHARD H. MATHER.