

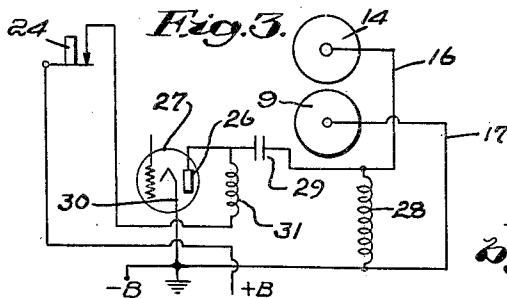
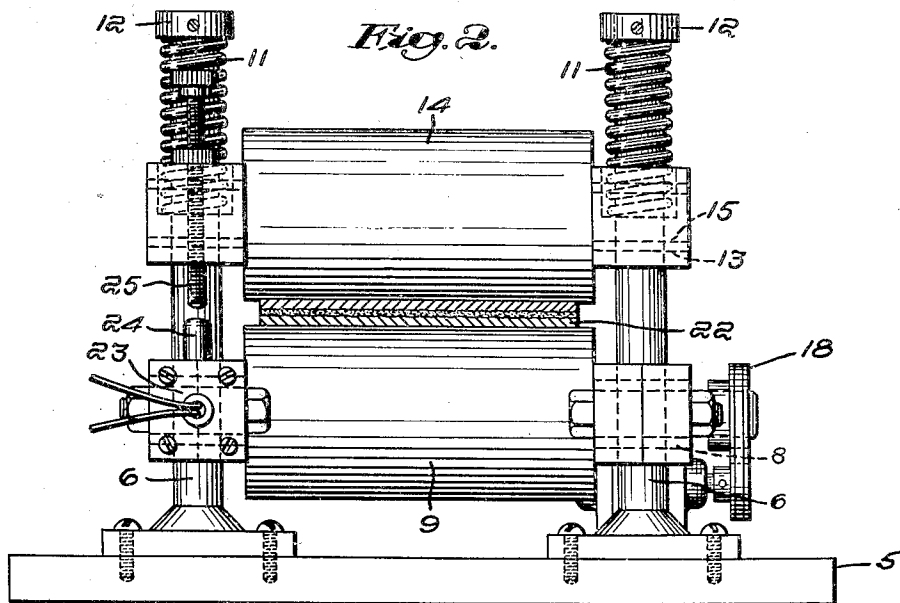
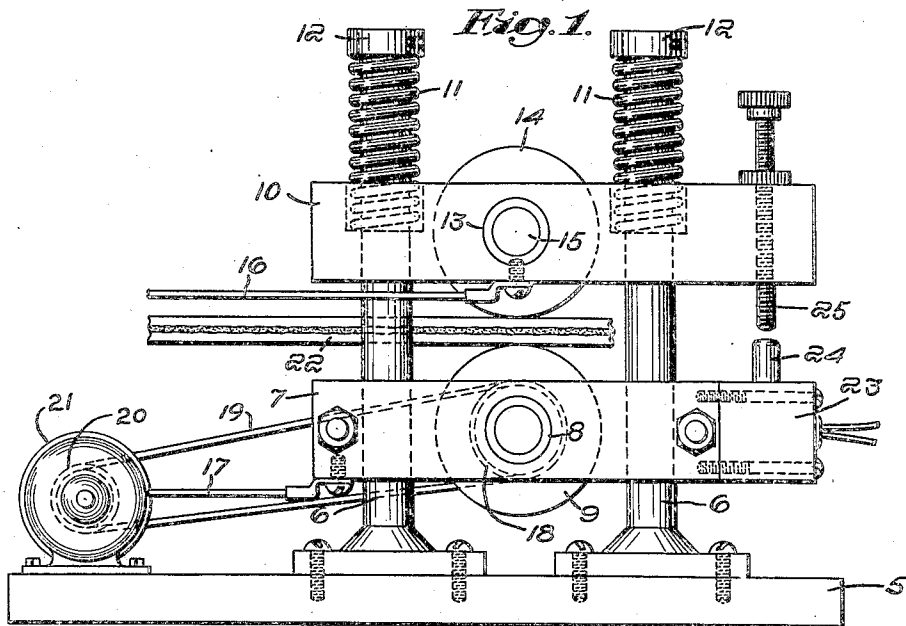
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ELECTROSTATIC BONDING APPARATUS

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ELECTROSTATIC BONDING APPARATUS

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2 Claims. (Cl. 154-1)

This invention relates to bonding apparatus and relates more particularly to bonding apparatus utilizing high frequency electrostatic fields for generating heat in materials such as plastics for softening same for bonding, and for generating heat in adhesives for cementing plies of material such as leather, together.

This invention provides a roller type press for bonding layers of material together, the bonding being accomplished by heat and pressure.

A feature of the invention resides in utilizing the pressure exerting rollers in a roller type press, as electrodes for the production of the electrostatic fields for heating.

Another feature of the invention resides in providing in the roller type press, an electric switch for opening the circuit supplying high frequency energy to the electrodes when a work surface has passed through the press.

An object of the invention is to utilize high frequency electric energy in a roller type press for the generation of heat in materials to be bonded.

The invention will now be described with reference to the drawing, of which:

Fig. 1 is an end elevation of a roller type press embodying this invention;

Fig. 2 is a side elevation of the press of Fig. 1, and

Fig. 3 is a diagrammatic view of a suitable high frequency electric source for supplying energy to the electrodes of the press.

The base 5 of the press has mounted thereon the four upright supports 6. The metal bars 7 are attached to the lower ends of the supports 6, and have journaled therein the bearings 8 which support the cylindrical, metal roller 9.

The bars 10 of electric insulating material are slidably positioned along the supports 6. The springs 11 have their upper ends attached by the clamps 12 to the upper ends of the supports 6 and are attached at their lower ends to the insulating bars 10, and serve to support the bars 10 on the supports 6 while at the same time, they bias the bars 10 towards the lower bars 7.

The bearings 13 of the cylindrical, metal roller 14 are journaled in the bar 10. The springs 11 thus act to force the rollers 9 and 14 together for exerting pressure on the work to be bonded as will be described.

The lower roller 9 is rotated through the pulley 18 and belt 19 by the pulley 20 of the electric motor 21 and acts to move the work piece 22 therethrough.

The work piece 22 illustrated comprises two plies of leather with an adhesive therebetween.

The roller 14 is connected through its bearing 13 and shaft 15 to the electric conductor 16 which is connected to the ungrounded side of a suitable high frequency electric oscillator.

The metal bar 7 is connected by the electric conductor 17 to the grounded side of the oscillator and serves to connect the roller 9 thereto.

The electric switch 23 is mounted on one end of one of the bars 7 and has the upwardly extending actuating plunger 24. The screw 25 is threaded through the bar 10 in alignment with the plunger 24 and its lower end is adjusted so that when the work piece 22 is between the rollers, it just clears the plunger 24, and when the work piece has cleared the rollers, the movement of the roller 14 towards the roller 9 by the springs 11, causes the lower end of the screw 25 to depress the plunger 24 of the switch 23 causing it to open the circuit from the high voltage direct current source to the anode 26 of the oscillator tube 27, this discontinuing the supply of electric energy to the rollers 9 and 14.

The oscillator circuit is a conventional one, the vacuum tube triode 27 having one end of the tank coil 28 connected through the blocking condenser 29 to its anode 26 and having its other end connected to the cathode 30 of the tube and to ground. The anode 26 is connected through the radio frequency choke 31 to a high voltage direct current source. The conductors 16 and 17 to the rollers 14 and 9 respectively, are connected to opposite ends of the tank coil and receive high frequency electric energy which may have a frequency for example, of 20 megacycles, therefrom.

In operation, the rollers 9 and 14 act as electrodes and establish a high frequency electrostatic field therebetween which heats the adhesive between the plies of the work strip 22 as explained in the Pitman Patent No. 2,087,480 for cementing the plies together. The rollers also press the plies of the work strip together for causing them to adhere.

Thermoplastic plies may be bonded together without the necessity for an adhesive therebetween, the plastic becoming softened under the influence of the heat as is well known. Heat is generated in plastics, adhesives and other substances having dielectric properties as explained in said Pitman patent and the plies referred to in the appended claims are plies, layers or strips of materials having such dielectric properties or are plies of other material having adhesives hav-

ing such dielectric properties interposed therebetween.

The invention has been found useful for cementing plies of leather together as in laminating outsole blanks with a skiving in order to thicken same.

While one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the exact apparatus and arrangement of apparatus illustrated, as modifications thereof may be suggested by those skilled in the art without departure from the essence of the invention.

What is claimed is:

1. Apparatus for bonding plies, comprising opposed rollers having metal ply contacting surfaces for exerting pressure upon the plies; resilient means urging said rollers towards each other; means for electrically insulating said rollers from each other; means forming a high frequency electric source; means connecting said rollers as electrodes to said source for the pro-

duction of an electrostatic field therebetween, and means including one of said rollers for advancing plies to be bonded between said electrodes.

5 2. Apparatus for bonding plies, comprising means including opposed rollers having metal ply contacting surfaces for exerting pressure upon the plies; resilient means urging said rollers towards each other; means forming a high frequency electric source; means insulating said rollers electrically from each other; means including said rollers forming electrodes connected to said source for providing an electrostatic field therebetween; means including one of said rollers for advancing plies to be bonded between said electrodes, and means including means actuated by movement of said rollers close together by removal of said plies, for discontinuing the supply of energy from said source to said electrodes.

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