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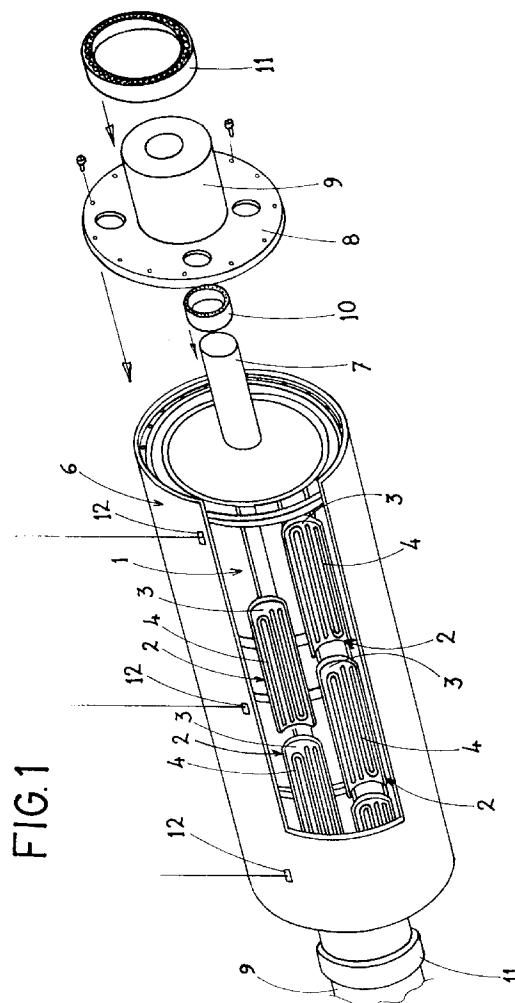
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(54) **Improvements in the procedure for heating calenders.**

(57) A plurality of electric heat sources (2) are arranged within a turning cylinder (6), and are controlled independently from each other by sensors (12) which keep the outer temperature of the calender (6) uniform, compensating the temperature variations that occur during its functioning.



The present invention refers to improvements in the procedure for heating calenders, especially but not solely appropriate for calenders destined to the plasticization of sheets of paper, cardboard and similar materials.

BACKGROUND OF THE INVENTION

One of the procedures used for plasticizing sheets of paper, cardboard and similar materials consists, firstly, in applying a coating of glue on the faces of the sheet to be plasticized. The sheet with the coating of glue incorporated is then subjected to a drying process. Subsequently, the sheet with the glue incorporated passes through a process of plasticization, which consists in juxtaposing a film of thermoplastic nature, at a suitable temperature, on the previously glued face or faces of the sheet, to achieve the plasticization thereof.

This process leads to the release of polluting vapours during the heating of the glue.

To avoid the release of this type of vapours and, in general, to improve the properties of the calender, a type of film of thermoplastic nature can be used in the plasticization process, which film presents an incorporated layer of glue in order to achieve the close union thereof on the face or faces of the sheet to be plasticized, at a suitable temperature without the release of polluting vapours.

In order to be able to use this type of thermoplastic film with the layer of glue incorporated, the calender surface must have a uniform temperature over its entire surface area.

At present, the heating of the calender used to implement the plasticization process is achieved by means of electrical resistors placed inside the calender, bathed in a heat-conducting liquid agent which transmits the heat to the surface of the calender.

The procedure described above for heating the calender does not achieve to keep a uniform temperature value over the entire surface area of the calender, because the zones through which the sheet to be plasticized passes undergo a major loss of temperature which cannot be compensated immediately.

DESCRIPTION OF THE INVENTION

With the aim of keeping the calender surface temperature uniform, the improvements object of the invention have been designed for calenders of the type which have inside them electrically connected heat sources destined to heat the surface of the calender. Said improvements consist in installing the various heat sources fed by as many electrical circuits, independent from each other and controlled by as many other temperature sensors linked to the electrical circuits, distributed facing the various zones of the outer surface of the calender. The sensors control the tem-

perature of the sources to which they are connected, in function of the temperature of the zone of the calender surface, to keep the temperature of the entire surface area uniform at a previously determined value.

The heat sources are mounted in fixed position, while the calender is mounted in turning position around the heat sources.

The heat sources are mounted forming longitudinal rows, with those of each row laid out alternately with respect to those of the rows immediately beside them.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of all that has been set forth in the present specification, there are attached some drawings in which, only by way of example, a practical case of embodiment of the procedure and the components for implementing it is shown.

In said drawings figure 1 is a partially cut out and partly exploded perspective view of a calender with the improvements of the invention, while figure 2 is a longitudinal section view of the calender in working position.

DESCRIPTION OF A PREFERRED EMBODIMENT

The improvements in the procedure for heating calenders according to the invention are shown in the drawing by a fixed inner structure, of general reference -1-, on which are mounted a plurality of heat sources -2-, formed by screens -3- and infrared ray emitting tubes -4-, which occupy an extensive longitudinal zone -5- within a turning cylinder -6-, which constitutes the calender as such.

The heat sources -2- are distributed forming longitudinal rows, in positions such that those of one row alternate with those of the other, so that as the cylinder -6- turns there are no cold zones on its surface.

The assembly of the structure -1- with the heat sources -2- within the turning cylinder -6- is carried out in a conventional way by means of a spindle -7- forming part of the structure, which passes through covers -8- fixed to the ends of the cylinder -6-, with coaxial sleeves -9-, through which the ends of the spindle pass, guided by bearings -10-. Around the sleeves -9- are arranged other bearings -11- for mounting the turning cylinder -6-.

Close to the outer surface of the cylinder -6- and distributed throughout the length thereof is a set of temperature sensor devices -12-, connected to the electricity supply circuits of the heat sources -2-, which control the temperature of those sources in function of the temperature of the zone of the cylinder -6- opposite which each sensor is placed.

These sensors keep a uniform temperature over the entire outer surface of the cylinder. The value of

this temperature is adjusted in advance, by known means which are not the object of the invention, so that when a reduction of temperature occurs in the zones of the cylinder which are in contact with a sheet -13- to be plasticized, the sensors send the corresponding signal to increase automatically the power of the involved heaters, placed facing those zones, raising them again to the preset temperature. Logically, the sensors also control the reduction of the power of the heat sources when the outer surface of the calender exceeds the preset temperature.

The described process of automatic compensation of temperature variations is automatic and immediate, so that with the improvements described the temperature of the calender is kept stable and uniform, with maximum differences of plus or minus one degree centigrade.

Thanks to the improvements in the process described for heating the calender, it is possible to use a thermoplastic film with an incorporated adhesive coating in the plasticization of sheets without leading to the release of vapours.

Furthermore, the improvements in question can be carried out in the heating systems of calenders destined to other processes which call for the application of uniform and regular heat to a sheet to be treated.

Independent of the object of the invention shall be the materials used in manufacturing of the components which take part in the improvements object of the invention, their shapes and dimensions and all accessory details which might be presented, as long as they do not affect its essential nature.

Claims

1. Improvements in the procedure for heating calenders, of the type which have inside them electrically connected heat sources (2) destined to heat the surface of the calender (6), characterized in that the various heat sources (2) are fed by as many electrical circuits, independent from each other and controlled by as many temperature sensors (12) linked to the electrical circuits and distributed facing the various zones of the outer surface of the calender (6), said sensors (12) controlling the temperature of the sources (2) to which they are connected, in function of the temperature of the zone of the calender surface, to keep the temperature of the entire surface area uniform at a previously determined value.
2. Improvements as claimed in claim 1, characterized in that the heat sources (2) are mounted in fixed position, while the calender (6) is mounted in turning position around the heat sources (2).

3. Improvements as claimed in claim 1, characterized in that the heat sources (2) are mounted forming longitudinal rows, with those of each row laid out alternately out of line with respect to those of the rows immediately beside them.

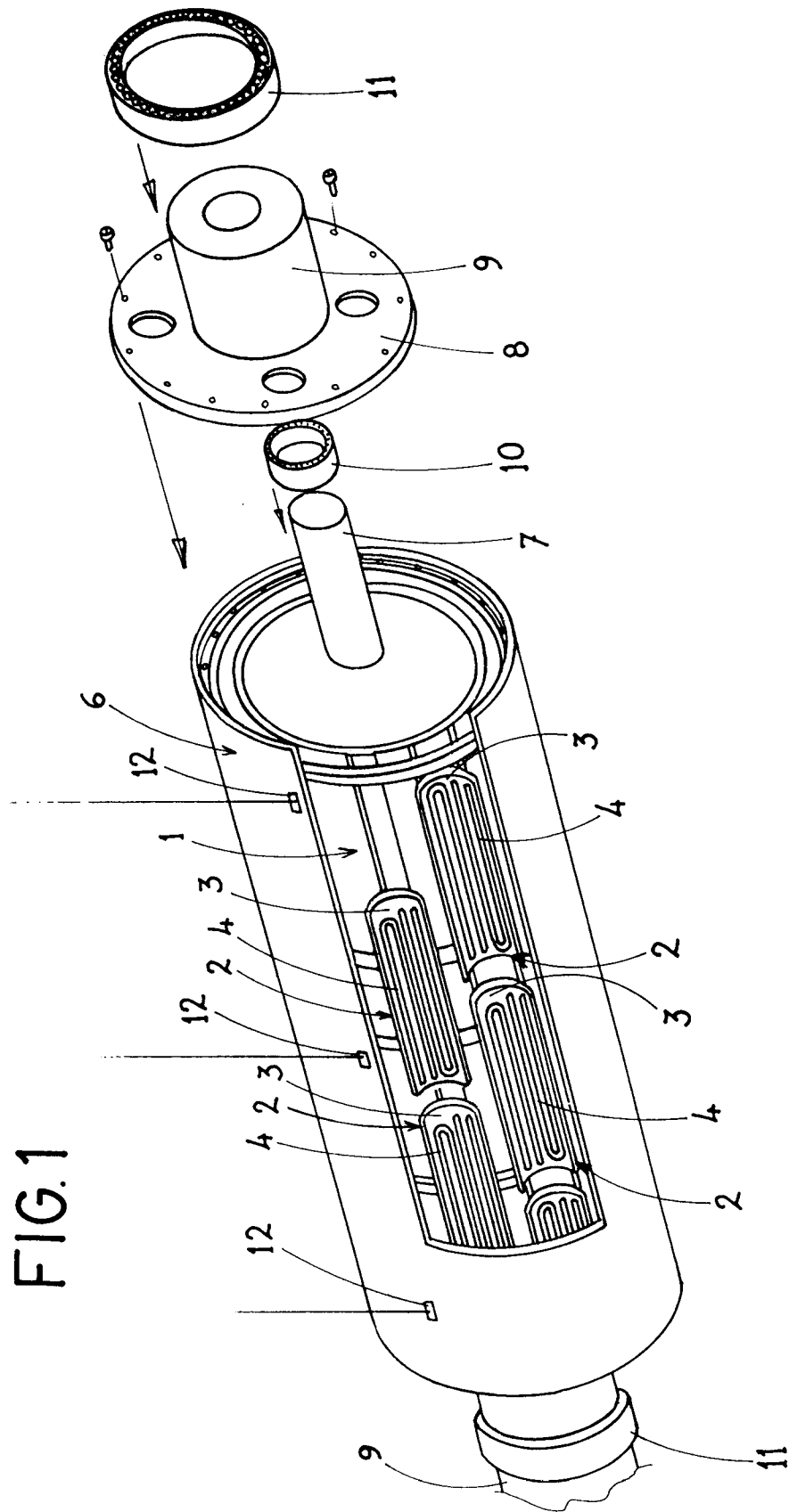
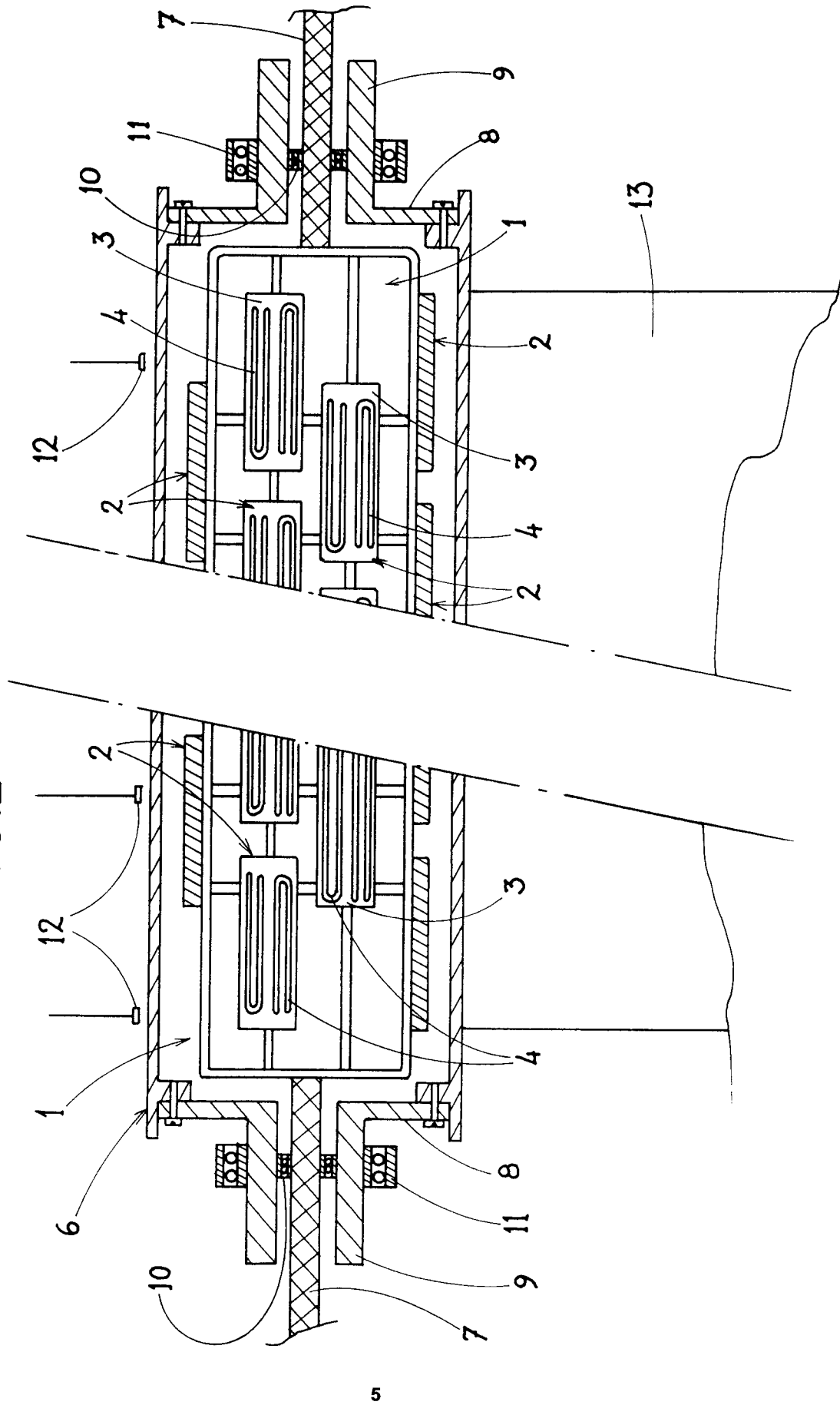


FIG.2





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 50 0062

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-3 182 587 (WOODHALL) * the whole document *	1	D21G1/02 D21F5/02
X	DE-A-3 400 087 (VOITH) * the whole document *	1	
A	EP-A-0 418 444 (S.E.M.T.I.) * the whole document *	1-3	
A	GB-A-2 077 315 (KUSTERS) * the whole document *	1	
A	US-A-3 216 489 (NORTON) * the whole document *	1	
P,A	EP-A-0 471 655 (VALMET PAPER MACHINERY) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D21G D21F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 AUGUST 1992	Examiner DE RIJCK F.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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