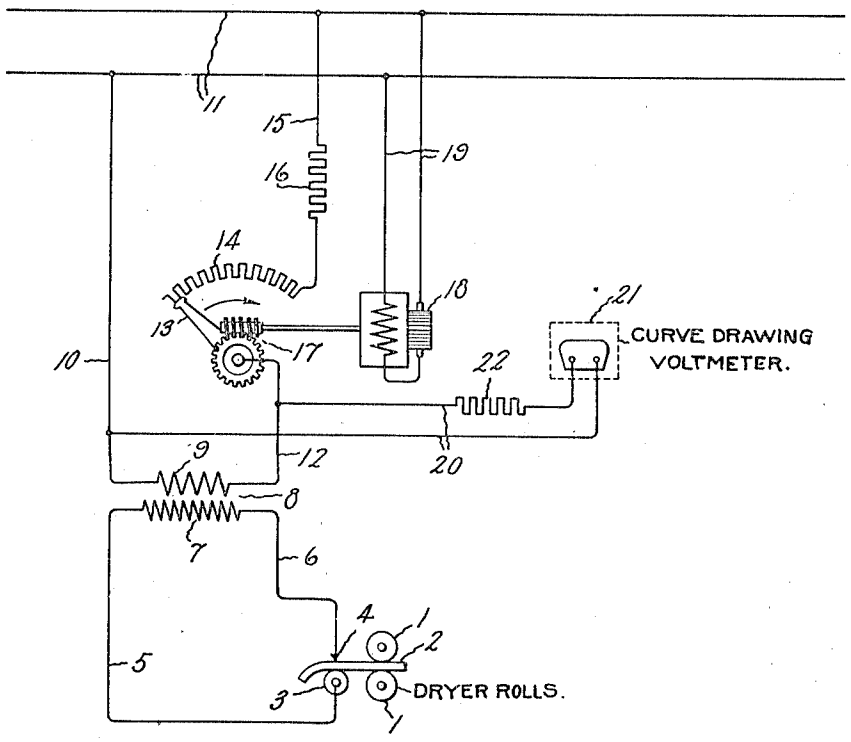
Oct. 11, 1927. 1,645,077

L. W. THOMPSON

MOISTURE METER

Filed April 1, 1925



Inventor:
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Patented Oct. 11, 1927. 1,645,077

UNITED STATES PATENT OFFICE.

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MOISTURE METER.

Application filed April 1, 1925. Serial No. 20,017.

In connection with certain manufacturing processes, it is desirable to measure continuously the amount of moisture in a material being operated upon. An instance of this is in the manufacture of paper wherein it is desirable to measure the moisture in the paper as it comes from the dryer rolls.

The object of my invention is to provide an improved moisture meter for continuously measuring the moisture in a substance such as paper, for example, and for a consideration of what I believe to be novel and my invention attention is directed to the following description and the claims appended thereto.

In the drawing, the figure is a diagrammatic view of a moisture meter embodying my invention, the same being illustrated as being used to measure the moisture in paper coming from the dryer rolls of a paper making machine.

Referring to the drawing, 1 indicates the dryer rolls of a paper making machine, and 2 indicates the sheet of paper passing between the rolls. Only a short length of paper is indicated in the drawing, but it will be understood that paper is continuously passing along between the rolls.

According to the embodiment of my invention illustrated in the drawing, I provide two electrical contacts 3 and 4 between which the paper passes which contacts may be of any suitable form. In the present instance contact 3 is shown as being in the form of a roller. Contact 4 may be a suitable sliding contact. Contacts 3 and 4 are connected by lead wires 5 and 6 to the secondary winding 7 of a transformer 8. The primary winding 9 of transformer 8 is connected by a lead wire 10 to one side of a source of alternating current potential 11 of suitable voltage, and by a lead wire 12 to a continuously rotating contact arm 13. Contact arm 13 moves over an arcuate resistance 14 which is connected by a lead wire 15 to the other side of potential source 11. In lead wire 15 is a suitable resistance 16. Contact arm 13 may be continuously rotated by any suitable means. In the present instance it is shown as being rotated by a worm gearing 17 driven by a motor 18 which is connected by lead wires 19 to source of alternating current potential 11. Connected across the primary winding 9 of transformer 8 by lead wires 20 is a suitable electrical measuring instrument 21, a curve drawing voltmeter being indicated in the present instance, this being a satisfactory form of measuring instrument to use. In lead wires 20 is a resistance 22.

The operation is as follows:—

Assume that paper 2 is passing continuously through the dryer rolls 1 and that contacts 3 and 4 are in engagement with the paper on its opposite sides. Assume also, that the circuit on the primary winding of transformer 8 has been open and that it has just been closed by contact arm 13 engaging the end of resistance 14, it being understood that the contact arm 13 is being rotated continuously in the direction of the arrow by motor 18. A potential is now impressed upon contacts 3 and 4 by the secondary winding 7 of transformer 8, but with all of resistance 14 in the circuit of primary winding 9, this potential is not sufficiently great to break down the resistance offered by paper 2. The circuit on secondary winding 7 is thus open. As contact arm 13 continues to move it gradually cuts resistance 14 out of the primary circuit thus gradually increasing the potential across contacts 3 and 4, and eventually this will reach a value such that it will break down the resistance offered by the paper 2. When this happens there will be a sudden rush of current in both the primary and secondary windings and the circuits connected to them, and this will effect a decrease in the drop in potential across winding 9. The point at which this drop in potential begins will be indicated by the curve drawing volt meter. After the breakdown of the resistance offered by the paper has occurred, the current then flowing will be limited by resistance 16.

Arm 13 continues to move and will finally move from engagement with resistance 14 whereupon both the primary and secondary transformer circuits will be opened.

This completes the cycle of operation, and as arm 13 continues to move this cycle will be repeated, the arm 13 being rotated at a speed such as to give indications at suitable intervals of time.

The potential at which the resistance offered by paper 2 breaks down is a measure of the amount of moisture in the paper, and measuring instrument 21 may be calibrated in terms of moisture or other suitable terms. By observing measuring instrument 21, the

operative may make adjustments of the paper-making machinery such as are desirable.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In combination, a transformer having a primary winding and a secondary winding, a pair of spaced contacts between which a substance is adapted to be passed continuously, a circuit connecting said contacts to the secondary winding, a source of potential, a circuit connecting it to the primary winding, a fixed resistance and a variable resistance in said primary circuit, means connected with said last-named resistance for alternately varying the resistance value thereof and opening said primary circuit, and a measuring instrument connected with the primary circuit.

2. In combination, a pair of spaced contacts between which a substance is adapted to be passed continuously, a source of alternating current, a normally open circuit connecting it to said contacts, a resistance in said circuit, a contactor for periodically closing said circuit through said resistance and then gradually cutting such resistance out of the circuit, and a measuring instrument connected to said circuit.

3. In combination, a transformer having a primary winding and a secondary winding, a pair of spaced contacts between which a substance is adapted to be passed continuously, a circuit connecting said contacts to the secondary winding, a source of potential, a circuit connecting it to the primary winding, means for periodically varying the resistance of the primary circuit, a measuring instrument associated with said primary circuit, and a current limiting resistance in said primary circuit.

4. The combination with a pair of spaced contacts adapted to be separated by a substance passed between them, of means connected with said contacts for impressing a voltage thereon to break down the resistance of said substance, said means having a winding through which it receives electric current, a source of current supply with which said winding is connected, means in circuit with said winding for periodically varying the current flow therethrough, said means being variable from a higher current limiting value to a lower current limiting value, whereby an increasing voltage is applied periodically to the spaced contacts, means in circuit with said winding for limiting the current flow therethrough, and an electrical measuring instrument connected with said first-named means for indicating a sudden change in current flow thereto accompanying a breakdown of the resistance between the contacts.

In witness whereof, I have hereunto set my hand this 31st day of March, 1925.

LOUIS W. THOMPSON.