

UNITED STATES PATENT OFFICE.

ALEXANDER SILVERMAN AND ROSWELL H. JOHNSON, OF PITTSBURGH, PENNSYLVANIA.

RECORDING DEVICE.

1,351,071.

Specification of Letters Patent.

Patented Aug. 31, 1920.

No Drawing.

Application filed June 7, 1918. Serial No. 238,797.

To all whom it may concern:

Be it known that we, ALEXANDER SILVERMAN and ROSWELL H. JOHNSON, citizens of the United States, and residents of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Recording Devices; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to a method of making records by means of which the same may be made automatically of temperature speed or power consumption, and for other recording purposes.

The method comprises, in the main, the utilization of an especially prepared record sheet or strip which has been treated chemically with a suitable substance. When a heated point, pen or other device is brought in contact with the surface of the treated sheet, the heat of the point or pen, acting upon the chemical, will produce a discoloration resulting in a record line being produced upon the sheet. In another aspect of the invention the chemical may be fed through the pen. Again, the composition of the paper may be such that it will be sensitive to heat below the normal scorching temperature of ordinary paper in producing the record.

The invention is not concerned particularly with any special form of apparatus by which the travel of the record sheet or strip may be accomplished, nor is it concerned with any particular means by which the recording point or pen may be heated, inasmuch as those features of the apparatus may be of any particular form.

For example: The recording sheet or strip may be properly ruled or divided to indicate any intervals of time and to indicate any variations in the conditions which are to be recorded in the given intervals of time. The sheet or strip may, for example, be mounted upon a suitable drum revolved by clock work or other impelling device, which will cause the surface of the sheet to travel a given distance in a given interval of time. The point or pen may be heated in any desired manner.

It should be borne in mind, however, that it is not the intention of the invention to burn a recording line through the recording sheet since the prepared condition of the

sheet, due to the chemicals with which it is treated, will effect the production of the recording line, even though the point or pen is slightly heated.

The desired result is accomplished by the particular treatment of the recording sheet or strip and by the heating, to greater or less extent, of the recording point or pen.

After an exhaustive series of tests, we have discovered that if the recording sheet or strip is treated with a solution of aluminum chlorid ($AlCl_3$) and the strip so treated is subjected to a point or pen comparatively slightly heated, (less than would normally burn the paper) a distinct dark line is produced upon the sheet by reason of chemical change taking place, due to the heat of the point acting upon the chemical of the sheet.

The object of the invention may be accomplished also by treating the sheet with certain combinations of chemicals in solution, such for example as aluminum chlorid ($AlCl_3$) and ammonium chlorid (NH_4Cl).

The same general effect may be produced by utilizing a solution of cupric ammonium chlorid ($CuCl_2 \cdot 2NH_4Cl \cdot 2H_2O$).

In each of the above instances the discoloration of the sheet along the line of contact of the point or pen therewith is readily produced without burning through or otherwise injuring the recording strip.

In treating the recording sheet or strip, the chemical solution may be painted on the paper, or the paper may be immersed in the chemical and the chemical permitted to soak in, or the paper may be treated in any other desired way to produce the desired condition.

Numerous chemical solutions may be employed to secure the desired result; for example a zinc chlorid ($ZnCl_2$) solution is found to be effective. Also aluminum sulfate ($Al_2(SO_4)_3$).

We have found in practice also that a dark line effect may be produced with ferric chlorid solution ($FeCl_3$) on a paper treated with tannin.

In every instance it should be noticed that the discolorations which result in the recording line are accomplished by causing slight chemical changes in the composition of the substance or substances with which the recording sheet is treated and the result is not necessarily accomplished by causing

a normal burning of the surface of the sheet, consequently a so-called hot point or pen, heated below the normal scorching point of the untreated sheet may be utilized.

- 5 While we have herein described particular embodiments of the invention and have specified certain chemicals which will be found to be effective, it is to be understood that the invention is not limited to the particular features mentioned, nor to the particular chemicals referred to, but the invention may be varied to any desired degree within the scope of the appended claims.

What we claim is:

- 15 1. The method of producing records which consists in treating a suitable record sheet or strip chemically to render the same susceptible to change under the influence of heat and causing a heated member to travel in contact with said sheet, whereby a contrasting record line is produced on the surface of the sheet.

- 25 2. The method of producing a record which consists in causing a warm or heated member to travel in contact with the surface of a recording sheet, after treating said sheet with suitable chemicals which will produce a change or discoloration under the influence of heat.

- 30 3. The method of producing a record

which consists in treating a recording sheet or strip with suitable chemicals in solution, whereby a record-taking surface is produced upon the sheet, and causing a warm or heated member to travel in contact with the surface of said sheet whereby the heat of the point or pen causes a chemical change in the chemicals with which the sheet is treated, thus producing a contrasting recording line on the surface of the sheet.

4. As a new article of manufacture, a sheet for receiving graphic records, the said sheet being treated with a substance capable of changing color when brought into contact with a heated recording instrument.

5. As a new article of manufacture, a sheet for receiving graphic records, the said sheet carrying a substance which, when brought into contact with a heated member insufficiently hot to char untreated paper, will change its color and produce a dark line.

In testimony whereof, we, the said ALEXANDER SILVERMAN and ROSWELL H. JOHNSON, have hereunto set our hands.

ALEXANDER SILVERMAN.
ROSWELL H. JOHNSON.

Witnesses:

JOHN F. WILL,
EDWARD POREMSKI.

Correction in Letters Patent No. 1,351,071.

It is hereby certified that in Letters Patent No. 1,351,071, granted August 31, 1920, upon the application of Alexander Silverman and Roswell H. Johnson, of Pittsburgh, Pennsylvania, for an improvement in "Recording Devices," an error appears in the printed specification requiring correction as follows: Page 1, line 82, formula, strike out the subscript "7" after the last symbol; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of November, A. D., 1920.

[SEAL.]

Cl. 234—1.

L. B. MANN,
Acting Commissioner of Patents.