ISSN: 2776-0960 Volume 4, Issue 4 April, 2023

ResearchJet Journal of Analysis and Inventions
https://reserchjet.academiascience.org

MEASUREMENT OF GEOMETRIC PARAMETERS OF THE FABRIC AND THE SPEED OF ITS MOVEMENT

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Abstract

When measuring such geometric dimensions of tissue segments as width and length, the requirements for absolute measurement accuracy carried out by a photoelectric device are significantly reduced. These dimensions are such that they do not fit in the field of view of the photodetector, therefore, methods based on the assumption that some part of the size to be measured is already known exactly and with the help of a photoelectric device it is only necessary to either count the number of such parts or measure a relatively small deviation from this known size. Indirect measurement methods are also used, based on the connection of the movement of the tissue with the rotation of the shafts or the movement of special mechanical elements that are engaged with the moving tissue and are in the field of view of the photodetector, with the help of which the indirect measurement is thus carried out.

Keywords: photoelectric device, special mechanical elements, photodetector.

Introduction

When measuring such geometrical dimensions of tissue segments as width and length, the requirements for the absolute measurement accuracy carried out by a photoelectric device are significantly reduced [1-3]. These dimensions are such that they do not fit in the field of view of the photodetector, therefore methods based on the assumption that some part of the size to be measured is already precisely known and with the help of a photoelectric device you only need to either count the number of such parts or measure a relatively small deviation from this known dimension [4-7].

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Indirect measurement methods are also used, based on the connection of the movement of the tissue with the rotation of the shafts or the movement of special mechanical elements that are engaged with the moving tissue and are in the field of view of the photodetector, with the help of which indirect measurement is thus carried out [8-11].

Control of the position of the edges and the width of the fabric

For the automatic insertion of fabric into the die-stitching machines, two photodetectors are used with emitters located opposite them, which are installed / so that in the normal position of the edges of the fabric, both photodetectors are darkened [12-15]. When the fabric deviates to the side, one of the photodetectors receives a radiation flux from the corresponding illuminator. The resistance of this photoresistor decreases sharply, as a result, a relay is activated, giving a command to a device that corrects the position of the edges.

Materials and Methods

Control of the position of the edges and the width of the fabric For the automatic insertion of fabric into the die-stitching machines, two photodetectors are used with emitters located opposite them, which are installed / so that in the normal position of the edges of the fabric, both photodetectors are darkened [15-19]. When the fabric deviates to the side, one of the photodetectors receives a radiation flux from the corresponding illuminator. The resistance of this photoresistor decreases sharply, as a result, a relay is activated, giving a command to a device that corrects the position of the edges.

$$X = l + l_1 + \Delta l_2$$

Where Δl_1 and Δl_2 are the lengths of the sections of the surfaces of the photodetectors, respectively, determined from the output signals in the direction perpendicular to the edge of the fabric.

In cases where it is required not only to measure the width of the tissue in its individual sections but also to obtain more complex information about it, the output signals of photodetectors are processed in logic circuits.

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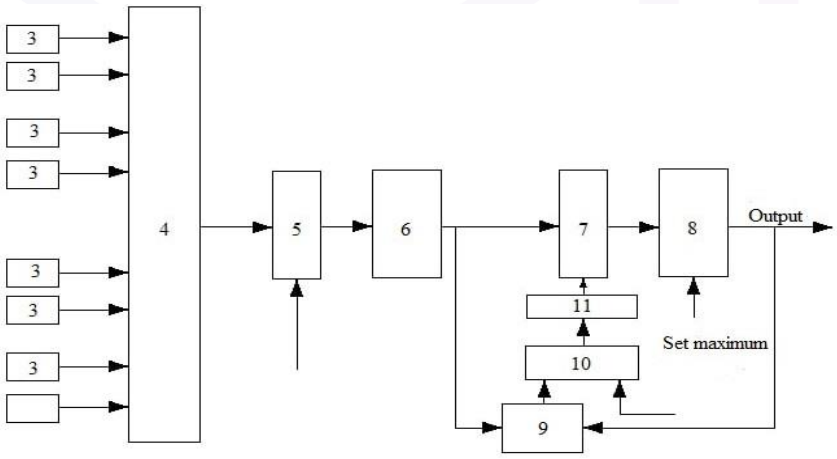
Results

So, in some cases, it is required to register the smallest width measured on a given piece of fabric. On fig., Figure 1 shows a block diagram of a device developed by KTILP that automatically performs such an operation [33].

The width of the fabric moving over the rulers with photosensors is measured according to the method described above. Before starting to measure the next piece of fabric, ruler 2 is set so that their middles are against the corresponding nominal edges. When the tissue moves in a direction perpendicular to these rulers, the signals transmitted to the counting-deciding unit 4 are periodically removed from the photodetectors 3, illuminated by the radiation source 1.

It uses these signals to calculate the width of the fabric. The code expressing the result of the calculation through the group of gates 5, when a clock pulse appears, is entered into the register of the current width 6. Before the start of measurements, a code is entered into register 8 that corresponds to the full filling of this register, i.e., the largest width of the fabric, which can be recorded in it at the input "Maximum setting".



After each survey of photodetectors on measuring rulers 2 and receipt of the corresponding code in register 6, block 9 compares the codes contained in registers 6 and 8. In this case, if the code contained in register 6 is equal to or greater than the code contained in register 8, by at the output of block 9, the pulse does not appear and the “AND” circuit 10 does not respond to clock pulses τ1. As a result, until the last poll of the photodetector arrays and the replacement of codes in register 6 with new ones, no operations are performed in the measurement results processing circuit.

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If the code contained in register 6 turns out to be less than the code contained in block 8, a pulse appears at the input of block 9, which arrives at one of the inputs of the "AND" circuit 10, as a result of which, when a clock pulse τ2 arrives at its other input at the output of the “AND” circuit, a pulse appears, which arrives through the delay circuit 11 at the input of the gate group 7. This leads to the rewriting of the code from register 6 into register 8. Thus, after pulling the piece of fabric in front of rulers 2 in register 8, the smallest width of the fabric of this segment will be recorded.

When measuring the width of tissue segments, one can also use the method of converting the measured size in a time interval using a photo sensor that scans the tissue at a constant speed.

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