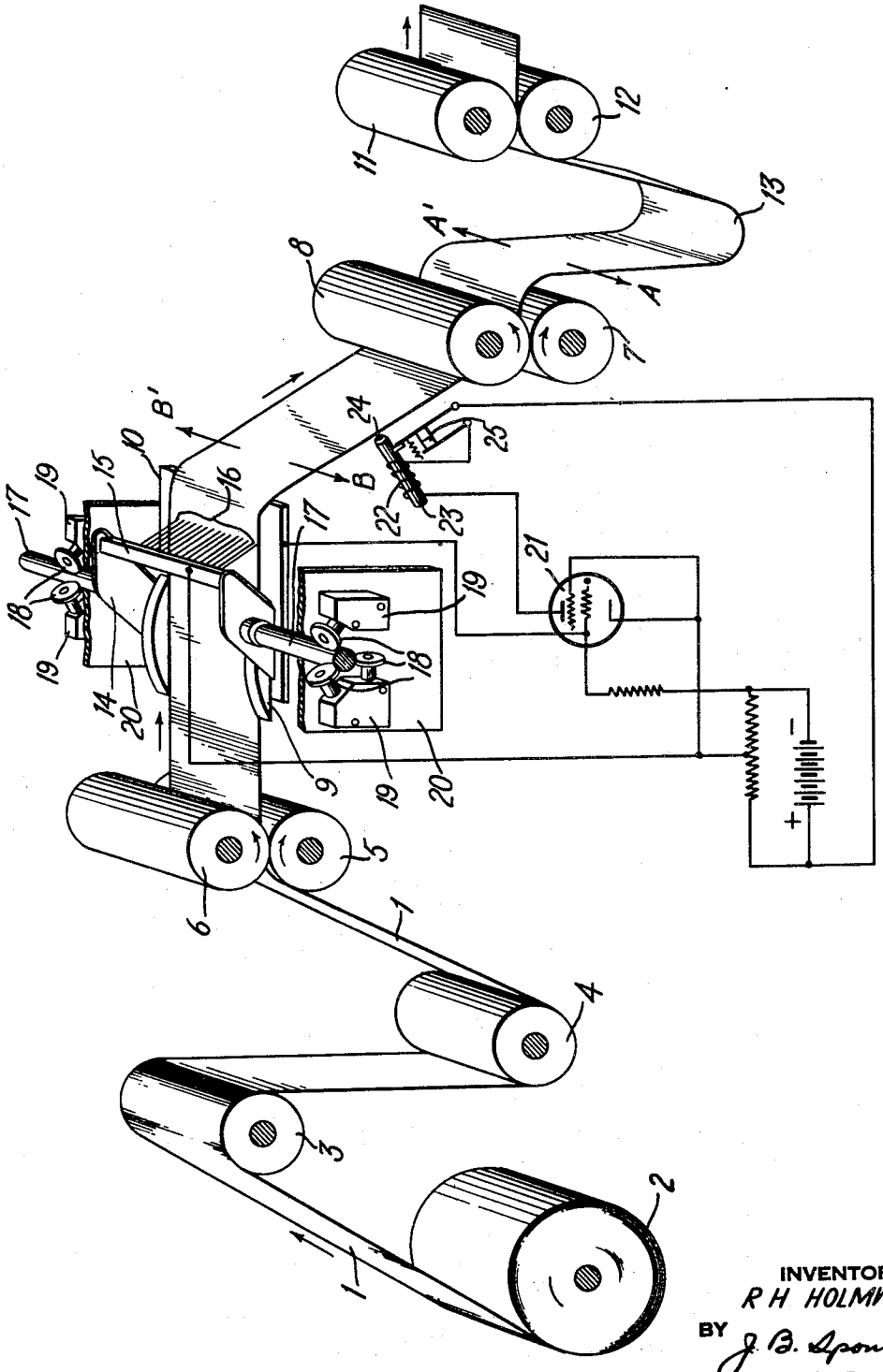
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RECORD MATERIAL INSPECTING DEVICE

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RECORD MATERIAL INSPECTING DEVICE

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This invention relates to devices for detecting imperfections in material from which record cards are made, and, particularly, is concerned with detecting conductive particles or perforations occurring in such material.

Record cards, as typified by the well known Hollerith record card, most frequently are used in tabulating machines, wherein data is sensed electrically by brushes completing circuits through differentially placed perforations in the record cards representative of the card data. It is obvious that in a record card where stray perforations or conductive spots are encountered by the data sensing devices in such machines, false data will be obtained and corresponding errors produced. To obviate such circumstances the record card stock may be run through a machine similar to that depicted in U. S. Patent 2,089,308, which has to do with apparatus for detecting record material flaws of the type previously referred to as applied to a slitting machine.

In the machine referred to in the patent cited above, an ink stripe is applied to the material whenever a flaw is detected, and thereafter, when the material is further cut into record cards, those having ink stripes are rejected and scrapped. When high speed slitting machines are used one minute imperfection may therefore cause a stripe to be placed upon the material extending over a length which encompasses many record cards subsequently cut from the material. Only one of these cards may contain a flaw yet all are scrapped, and since the material from which record cards are made is costly, needless waste is not only effected but also substantial financial losses may accrue over a period of production. Consequently in the manufacture of record cards the tendency exists to place material inspecting devices upon the handling machine in which the record card material moves with the slowest speed so that the striping mechanism will mark a minimum length of stripe.

Certain types of record cards are printed upon flat-bed presses wherein the card stock is fed constantly from a supply roll at a slow rate of speed and withdrawn from the feed mechanism intermittently between print impressions by the press. Normally a take-up loop is employed in such apparatus between the constant feed and the intermittent feed devices which tends to shift the web transversely as it is fed from the supply roll. A fixed brush plate (similar to that shown by reference number 41, Fig. 6, U. S. Patent 2,089,308) is ineffective in a press of this type

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to accurately detect flaws since a shift of the web may expose the contact plate to the brushes thereby falsely indicating a flaw in the stock.

The main object of this invention is to provide a flaw detecting apparatus for record card material processed by a flat-bed press.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawing, which discloses by way of examples, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawing:

The drawing represents diagrammatically a record card material feed mechanism, including the flaw detecting mechanism comprising the subject invention, together with a pair of feed rolls representing the feed mechanism of a flat-bed press wherein the material is fed to be printed and severed into card lengths. A web of material 1 is drawn from a supply roll 2 over an idler roll 3 and a tensioning roll 4 by a pair of feed rolls 5 and 6. The web 1 is pulled by a second pair of feed rolls 7 and 8 through a grooved block 9 and over a plate 10, tension being maintained between the two pairs of feed rolls 5 and 6 and 7 and 8. The web 1 is fed from the feed rolls 7 and 8 to a third pair of feed rolls 11 and 12, which are associated in feeding relationship with a flat-bed printing press (not shown). The feed rolls 11 and 12 operate intermittently (in synchronism with the rise and fall of the printing head in the flat-bed press) while the other feed rolls operate continuously, and a take-up loop 13 is formed in the web 1 to prevent damage to the web and to permit feeding of sufficient material to the flat-bed press.

The block 9 is mounted upon a frame 14 which carries a brush holder 15 having a plurality of brushes 16 sufficient to contact the entire width of the web 1. A rod 17 is connected to either end of the frame 14, the rods being supported freely at either side of the frame 14 by three rollers 18 mounted 120 degrees apart. The rollers 18 are mounted upon bearings carried by the blocks 19, which are made of insulating material and are attached to side plates 20 to which also is attached the plate 10.

The brushes 16 bear upon the web 1 so that when an imperfection occurs in the web under them, such as a perforation or a conductive speck, electrical contact will be made between the brushes 16 and the plate 10. Establishment of such electrical contact will cause a thyratron 21, which has its input connected with the

brushes 16 and the plate 10, to become conductive via the conventional circuit shown in the drawing, and a solenoid 22 connected in the anode circuit of the thyratron will be energized causing a plunger 23 carrying a marking device 24 at one end to contact and stripe the web 1, thereby indicating a flaw in the web. The solenoid is positioned along the web, so that its time of operation is compensated for, to mark or stripe the web to include that part of the web in which a flaw is detected at the brushes 16. A pair of contacts 25, which are opened by the plunger 23 at its maximum travel, serves to break the thyratron anode circuit, thereby restoring the circuit to operativeness for further flaws which are detected.

As previously noted the web 1 may be transversely shifted during the transition from constant to intermittent feed via the loop 13 feeding unevenly, momentarily, along the line A—A'. Any such shift is transmitted in moderation to other positions in the web such as a position along the line B—B'. It is obvious that under such a condition the web 1 might move from under the brushes 16 and expose the plate 10 to direct contact therewith, producing the action in the thyratron circuit just previously described and causing material to be marked for rejection or scrapping which in no way was imperfect. However, since the frame 14 which carries the brush holder 15 and the brushes 16 bears constantly against the web 1 through the grooved block 9, any shift of the web 1 will be transmitted to the frame 14, which being free to move via the rods 17 on the rollers 18, will realign the brushes 16 over the web 1 in its new position. Consequently false indications of flaws in the record material do not occur.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine of the class described, means for feeding a web, a sensing station having a fixed component and having a superimposed movable component arranged to be freely supported and capable of being laterally shifted in the plane of and at right angles to the feed path of the said web, and means coacting with the said web to position the said movable component in predetermined sensing relationship with the said web.

2. In combination with apparatus for sensing electrical imperfections in a web feeding machine wherein random lateral shifting of the web occurs, a sensing unit comprising a conductive plate of greater than web width over which the web is fed, a pair of supports fixed at opposite edges of the said plate and transverse to the feed path of the web, said supports substantially forming right angles with the said plate, a block having a groove cut therein of substantially web width into which the web is fed, a series of electrical contacting brushes mounted on the said block for bearing upon the said web where it passes over the said plate, a supporting rod fixed normal to each side of the said block having its axis perpendicular to the feed path of the web, an insulated bearing holder fixed to each said support, and a bearing upon each said holder slidably coacting with the said rods to position the said block above the said plate, whereby the said block is moved with each lateral shift of the web to prevent the said brushes from leaving the surface of the web to directly contact the said plate.

3. In combination with apparatus for sensing electrical imperfections in a web fed intermittently in a printing machine wherein the web is laterally shifted at random, a mounting for a sensing station coacting to follow lateral shifts of the web comprising, a grooved block through which the web is fed, a pair of shafts, one protruding from each side of the said block to have a common axis transverse of the feed path of the web for positioning the said block, a pair of fixed supports, one at each edge of the said web, and a tri-part bearing on each said support coacting to slidably hold the said rods.

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