United States Patent

Landis et al.

[15] **3,702,585**

[45] **Nov. 14, 1972**

[54] **PRINTING MECHANISM PRODUCING A RUBBING ACTION**

[72] Inventors: **Donald E. Landis; Mohanjit S. Sidhu,** both of Cambridge, Ohio

[73] Assignee: **The National Cash Register Company,** Dayton, Ohio

[22] Filed: **June 5, 1970**

[21] Appl. No.: **43,816**

[52] **U.S. Cl.**.....**101/1,** 101/93 R, 197/1

[51] **Int. Cl.**.....**B41f 17/00**

[58] **Field of Search**.....101/93 R, 93 MN, 19, 22, 1; 197/1

[56] **References Cited**

UNITED STATES PATENTS

1,202,393	10/1916	Joline	101/91
3,353,482	11/1967	Sariti	101/93 C
3,309,989	3/1967	Solheim et al.	101/93 C
3,128,694	4/1964	Kittler	101/93 C
2,935,934	5/1960	Williams et al.	101/93 MN

Primary Examiner—Edgar S. Burr

Attorney—Louis A. Kline, Wilbert Hawk, Jr. and Richard W. Lavin

[57] **ABSTRACT**

A printing mechanism which includes a spring-mounted platen on which are positioned a record member and a printing ribbon. A hammer having a face formed of a convex surface is mounted so as to engage the platen and deflect it in a direction which results in the movement of the convex face of the hammer over the face of the platen to produce a rubbing action which transfers the printing material from the ribbon to the record material.

5 Claims, 3 Drawing Figures

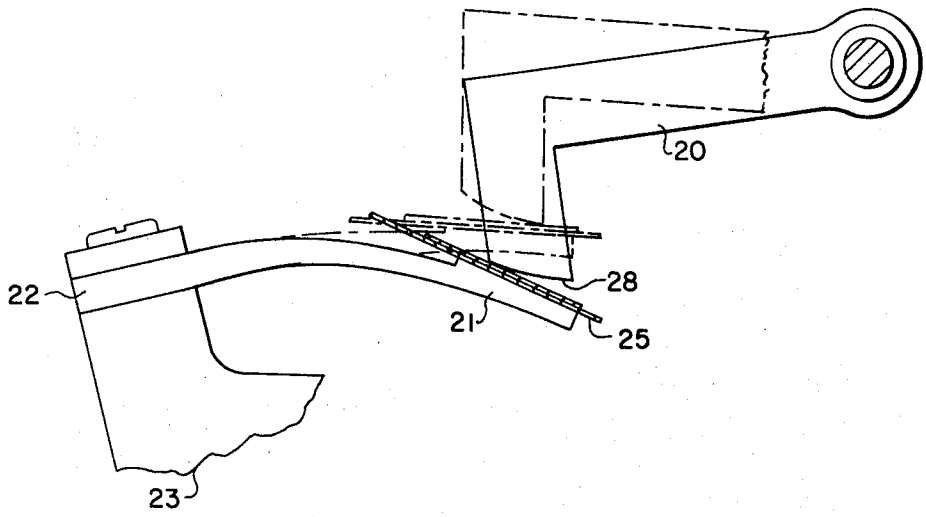


FIG. 1

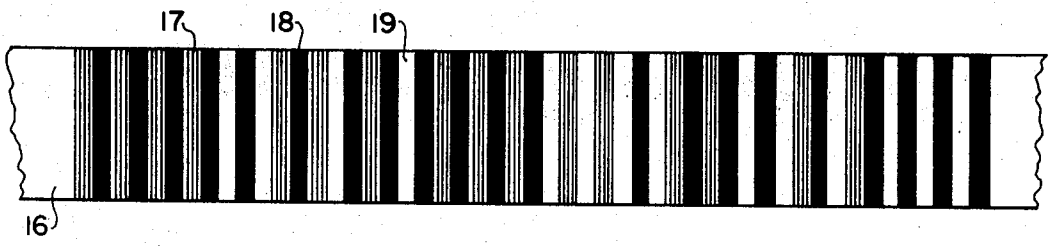


FIG. 2

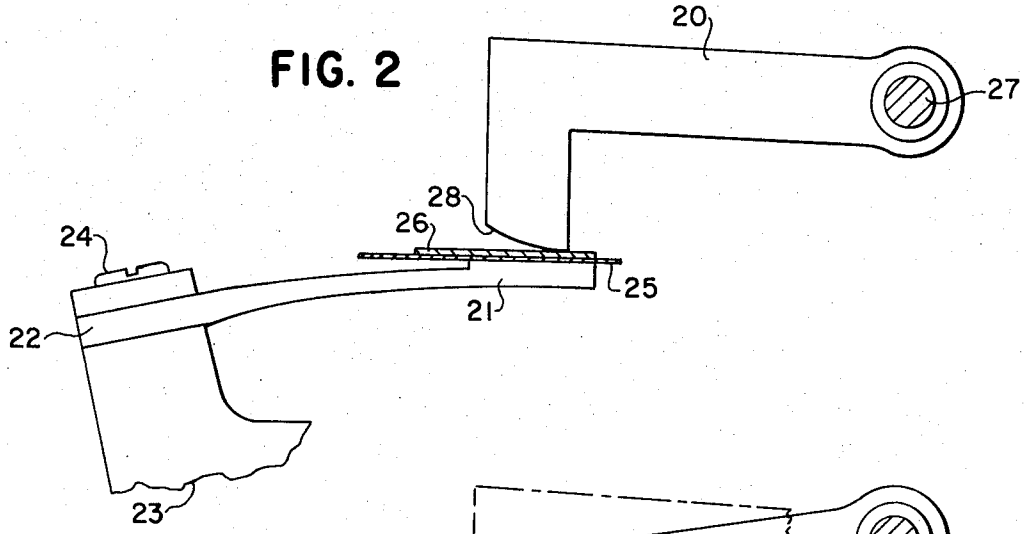
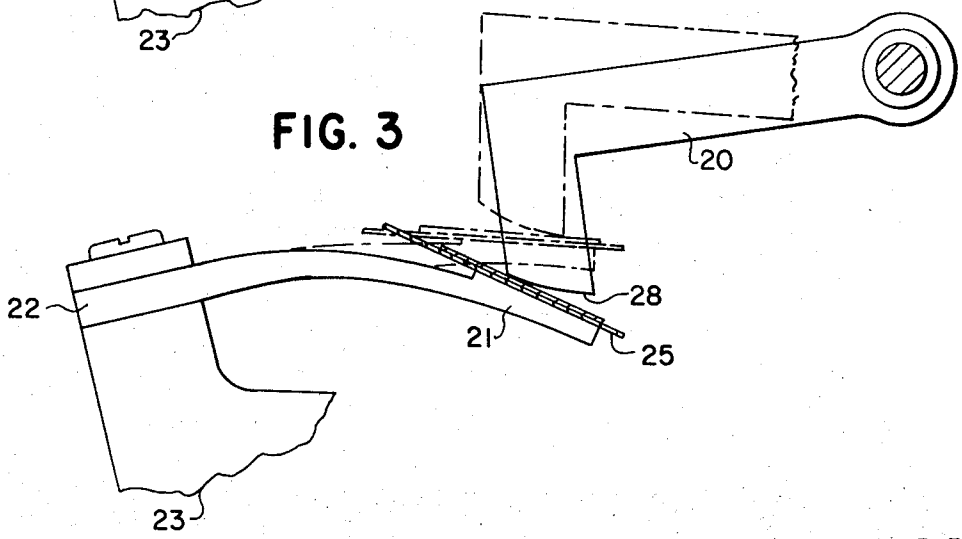


FIG. 3



INVENTORS
DONALD E. LANDIS &
MOHANJIT S. SIDHU
BY Louis A Kline
Wilbert Hawk, Jr.
Richard W Lewis
THEIR ATTORNEYS

PRINTING MECHANISM PRODUCING A RUBBING ACTION

CROSS-REFERENCE TO RELATED MATERIAL

United States Pat. No. 2,935,934, issued on May 10, 1960, on the application of Paul H. Williams et al.

BACKGROUND OF THE INVENTION

This invention is directed to a printing mechanism for printing color bars on a tag for use in semi-automatic, mark-sensing systems for check-out counter applications in super-markets and retail department stores, credit card and inventory control applications, and the like. The tag may be attached to an item to be sold, for example, and then read, during the sale thereof, by a hand-held, optical probe scanner, which is "scribed," or glided, across the tag. An example of an optical probe scanner is found in U.S. Pat. No. 3,238,501, issued Mar. 1, 1966, on the application of Stephen M. F. Mak et al.

In order to meet the printing quality of the bars demanded by the optical scanner, a dry ink transfer-type printing ribbon was required to be used. This type of printing ribbon has the advantage that, once the ink is printed, it is not easily scratchable. However, this type of transfer ribbon requires a high hammer pressure to transfer the ink from the ribbon to the tag. It was known in the prior art, as disclosed in U.S. Pat. No. 2,935,934, issued on May 10, 1960, on the application of Paul H. Williams et al., to provide a platen with a bevelled edge, the movement of the platen against a type wheel resulting in a rubbing action by the platen on the type wheel as the platen moves sideways, due to the action between the bevelled edge and the type wheel. This application could not be applied to the present situation, since the face of the hammer comprises the type figure to be printed, and the platen against which the hammer is struck is movable. Therefore, it is an object of this invention to provide a mechanism which will generate sufficient pressure between the hammer and a platen to print from a dry ink type of transfer ribbon which is simple in construction and very low in cost.

SUMMARY OF THE INVENTION

A printing mechanism for applying ink to a record member which includes a spring-mounted platen member and a hammer member having a type face composed of a convex surface. The hammer is so mounted that, as it travels through its path of movement, it will strike and deflect the platen in such a manner that the convex face of the hammer will move across the face of the platen, thereby producing a rubbing action which is sufficient to transfer the ink from a printing ribbon to a record member.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a plan view of a color-coded record tag, showing the arrangement of the various color bars which are utilized to store data on the tag.

FIG. 2 is a partial side view of the printing hammer and the platen, showing the hammer at the initial contact with the platen.

FIG. 3 is a view similar to FIG. 2 except that the hammer is shown at the bottom of its printing stroke, the deflection of the spring being greatly exaggerated for clarity.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is directed to a printing mechanism for printing data in the form of color bars on a tag or label. The data-encoded tag member **16** (FIG. 1) consists of a plurality of contiguous color bars, each color bar being one color of three or more colors and of a color different from the color of its neighboring color bars. The colors that are employed in the tag **16** are green **17**, black **18**, and white **19**. The green and black color bars are printed over a white background, so that the white color bars are defined by areas where no green or black colored bars are printed.

The drive mechanism for actuating the hammer is shown in U.S. Pat. No. 3,394,882, issued July 30, 1968, on the application of Joseph F. Cattorini et al. Since the drive mechanism is not necessary to an understanding of the invention, no further description of this mechanism will be given.

Referring now to FIG. **2**, there is shown a partial side view of the printing mechanism, including a hammer **20** and a platen **21**, which comprises the end portion of a cantilever leaf spring **22**, which is mounted to a support member **23** by a screw **24**. The tag member **25** and a printing ribbon **26** are positioned between the hammer and the platen. Both the tag member **25** and the printing ribbon **26** move in a direction perpendicular to the plane of rotation of the hammer **20**.

The support member, as shown in FIG. **2**, is mounted at an angle so as to provide a pre-load force between the platen **21** and the hammer **20** and also to insure that the face of the platen is in a horizontal plane. The hammer **20** is pivoted about a shaft **27**, which is mounted parallel to the direction of travel of the tag members. The movement of the hammer during a printing stroke follows a circular arc.

The face **28** of the hammer **20** is formed of a circular arc which provides a convex surface. The face of the hammer forms the bar type which is printed in one of the colors on the tag member **16** (FIG. 1). Another printing mechanism will print the bars in the second color. During a printing operation, the face **28** of the hammer **20** will initially contact the tag **25**, the printing ribbon **26**, and the platen **21** at one of its ends as shown in FIG. **2**. As the hammer moves through its printing stroke, it follows a circular arc which deflects the platen **21**. The deflection of the platen allows the convex face **28** of the hammer to move across the face of the platen, which produces a rubbing or shearing action between the hammer and the platen.

The cantilever leaf spring **22** (FIG. **2**) was designed to give a deflection curve which would have a slope equal to the slope of the convex surface **28** of the hammer at the final contact point of the face, as shown in solid lines in FIG. **3**. Due to the curvature of the hammer face **28** and the deflection of the spring platen **21**, the point of contact between the two moves across the hammer face during the print stroke, so that, at the end of the stroke, the point of contact is at the other end of the hammer. In this way, the entire bar is printed. This point of contact between the hammer and the platen produces a high printing pressure sufficient

to transfer the ink from the ribbon up to the tag with a relatively low hammer force. Rubber dampers (not shown) may be mounted below the spring platen **21** to support the platen against the action of the hammer in order to dampen any vibration which the platen might have due to the action of the hammer. Thus the color bars are printed on the tag in a manner which is relatively simple in its construction and also in its operation.

What is claimed is:

1. In a printing mechanism for transferring ink from an ink carrier to a record member

a. a hammer member comprising an elongated body portion pivotedly mounted at one end and having a portion offset in a generally perpendicular direction to said body portion at the other end, said offset portion having an end portion comprising a convex printing surface, said hammer member adapted for rotational movement during each printing operation;

b. and a support member mounted adjacent the convex printing surface of said hammer member, said support member comprising an elongated resilient member fixedly mounted at one end and having a free flat surface portion at its opposite end which end extends in a direction towards the pivoted end of said hammer member where the flat surface portion is juxtaposed with the convex printing surface for supporting a record member and an ink carrier in a blocking position with the movement of said convex surface, said support member mounted to position the record member and the ink carrier into engagement with the convex printing surface and in a plane parallel with the longitudinal axis of the elongated body portion of said hammer member whereby upon rotation of said hammer member during a printing operation, the flat surface portion of said support member is deflected by movement of said convex surface sufficiently to allow the convex surface to move across the ink carrier, thereby transferring ink from the carrier to the record member.

2. The printing mechanism of claim **1** in which the support member is mounted in a plane which forms an acute angle with the longitudinal axis of said elongated body thereby flexing said support member in a direction to allow that flat surface portion of said support member to exert a compression force on said convex printing surface when positioned in a plane parallel with the longitudinal axis of said elongated body.

3. A printing apparatus comprising

a. a hammer member consisting of an elongated body portion pivotally mounted at one of its ends for rotational movement and having a right-angle portion at the opposite end, said right-angle portion having an end portion in the form of a convex printing surface, said hammer member adapted to be rotated about its pivoted end during each printing operation to move the convex printing surface in a printing direction;

b. a platen mounted adjacent the convex surface of said hammer member, said platen comprising the free end portion of a cantilever leaf spring the other end of which is fixedly mounted, said free end portion extending in a direction towards the plane of the axis of rotation of said hammer member and in a juxtaposition with said convex surface normally blocking the printing movement of said surface, said leaf spring mounted to position the platen into engagement with one end of said convex surface and in a plane parallel with said elongated body;

c. a record member positioned on said platen;

d. and a dry ink transfer ribbon positioned on the record member whereby upon rotation of said hammer member during a printing operation, said record member and the transfer ribbon will be deflected by said convex surface in a direction away from the pivoted end of said hammer and against the action of the leaf spring to allow the convex surface to move across the transfer ribbon thereby producing a rubbing action to transfer the dry ink from the ribbon to the record member.

4. The printing apparatus of claim **3** in which the cantilever leaf spring is fixedly mounted in a plane which forms an acute angle with the longitudinal axis of said elongated body thereby flexing said leaf spring in a direction to allow the platen to exert a compression force on said convex printing surface when the platen is positioned in a plane parallel with the longitudinal axis of said elongated body.

5. The printing apparatus of claim **4** in which the convex printing surface of said hammer member is formed of a circular arc whereby upon deflection of said platen by the convex surface during a printing operation, the total surface area of said convex surface will engage the transfer ribbon.

* * * * *