United States Patent [19]

Oberg et al.

[11] **3,808,406**

[45] **Apr. 30, 1974**

[54] **DATA SHEET TRIM MARKS**

[75] Inventors: **Gary R. Oberg**, Oronoco; **Michael Sokolski**, Rochester, both of Minn.

[73] Assignee: **Minnesota Mining and Manufacturing Company**, St. Paul, Minn.

[22] Filed: **Jan. 22, 1973**

[21] Appl. No.: **325,949**

Related U.S. Application Data

[63] Continuation of Ser. No. 17,475, March 9, 1970, abandoned.

[52] **U.S. Cl.** ..... **235/61.12 N**, 101/227, 33/12, 101/248

[51] **Int. Cl.** **G06k 19/04**, A41h 3/08

[58] **Field of Search** ..... 101/227, 248, 286; 33/11–15; 283/7; 235/61.12 N, 61.12 R

[56] **References Cited**

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[57] **ABSTRACT**

A plurality of trim marks having an elongated center line and portions thereof extending transversely outwardly in both directions from the center line a distance equal to the maximum allowable deviations of a reference edge. The trim marks are printed on a data sheet along with certain data or spaces for data and designate a reference edge a predetermined distance from the data, which edge may be utilized by automatic sensing apparatus to reference the sheet so the data can be accurately sensed.

3 Claims, 6 Drawing Figures

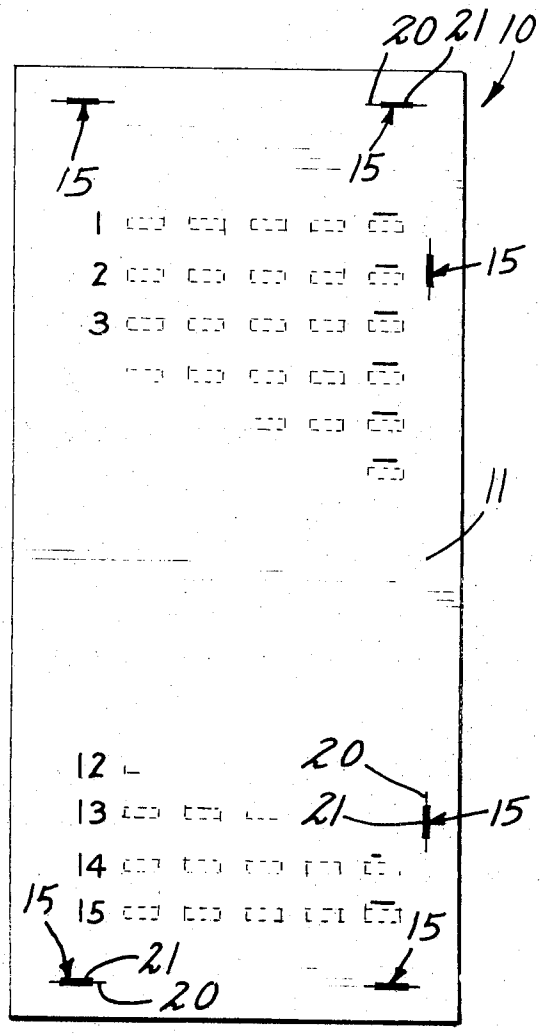


FIG. 1

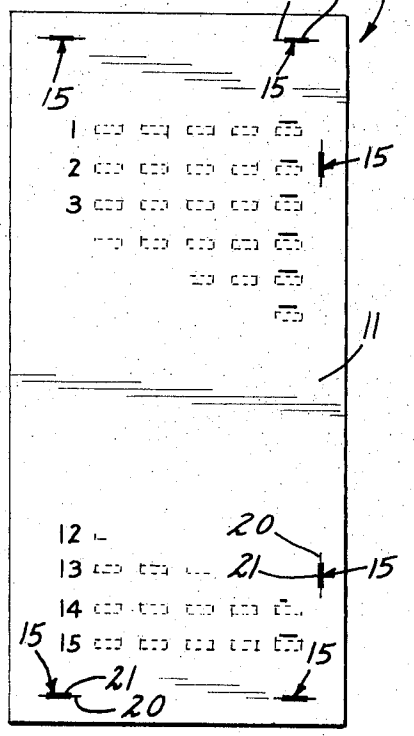


FIG. 3

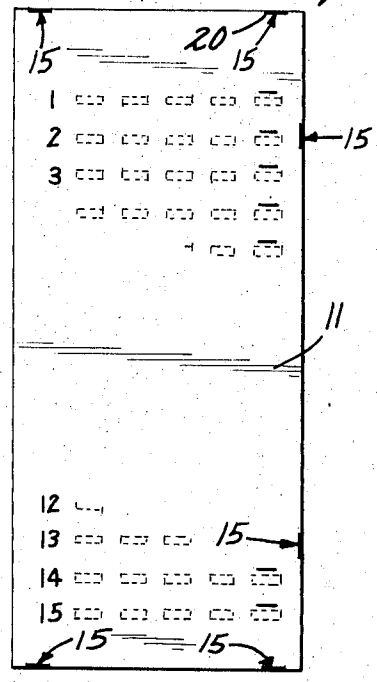


FIG. 4

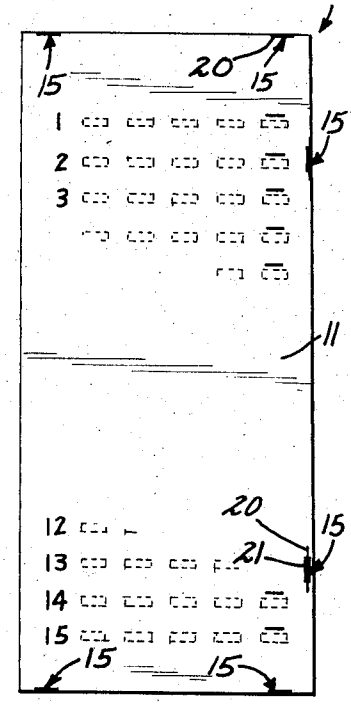


FIG. 2

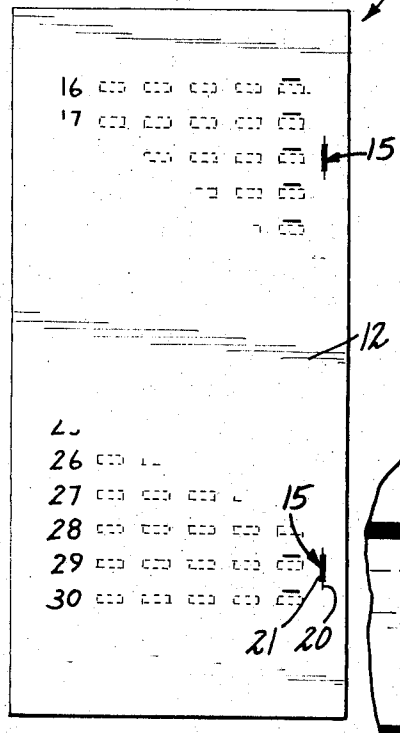
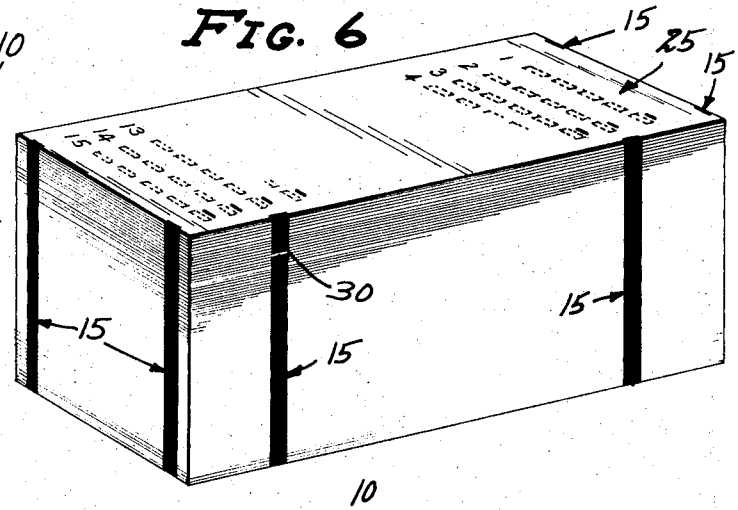


FIG. 6



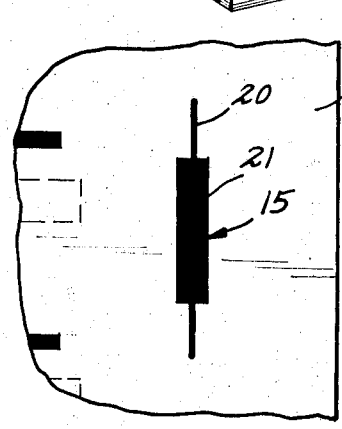


FIG. 5

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DATA SHEET TRIM MARKS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention pertains to marks on a data sheet, indicating a reference line, which may be real or imaginary, along which the data sheet may be trimmed to provide a reference edge for use in automatic sensing apparatus. The reference edge is utilized to correctly position the data sheet within the automatic sensing apparatus so that the data appears at the correct position in the apparatus and can be accurately sensed or read. In general, the reference edge must be relatively accurately positioned relative to the data on the sheet and trimming the sheet so that the edge is incorrectly positioned will result in incorrect reading of the data thereon.

2. Description of the Prior Art

In the prior art a single line or other indicating mark is printed on the sheet to indicate a reference line along which the sheet is to be trimmed. Unless the sheet is trimmed exactly on the reference line, there is no way of determining whether the sheet has been trimmed within the allowable limits or tolerances, except to measure or compare the sheet with other sheets.

SUMMARY OF THE INVENTION

The present invention pertains to improved data sheets including printed indicia and trim marks which trim marks include a first tolerance indicating portion centered on the trim line during printing and extending transversely outwardly on either side thereof a distance equal to the allowable trimming tolerance and an elongated line extending along the trim line and indicating the center of the tolerance indicating portion.

It an an object of the present invention to provide improved trim marks for data sheets.

It is a further object of the present invention to provide trim marks on data sheets automatically indicating whether the reference edge of the data sheet has been trimmed within allowable tolerances.

These and other objects of this invention will become apparent to those skilled in the art upon consideration of the accompanying specification, claims and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the drawings, wherein like characters indicate like parts throughout the figures:

FIG. 1 is a plan view of one side of an untrimmed data sheet having the improved trim marks printed thereon;

FIG. 2 is a plan view of the opposite side of the data sheet illustrated in FIG. 1;

FIG. 3 is a plan view of one side of a correctly trimmed data sheet;

FIG. 4 is a plan view of one side of an incorrectly trimmed data sheet;

FIG. 5 is an enlarged fragmentary view of an improved trim mark; and

FIG. 6 is a view in perspective of a stack of trimmed data sheets.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the figures, the numeral **10** generally designates a data sheet having a first side **11** illustrated in FIG. 1 and a second side **12** illustrated in FIG. 2. The particular data sheet illustrated is a multiple answer score sheet for tests and the like wherein the first side **11** has printed indicia defining five spaces indicating five different answer areas for each of 15 questions and the second side **12** has similar spaces for questions 16 through 30. The particular data sheet **10** is designed to be automatically scored or corrected by photoelectric sensing apparatus, such as described in the co-pending U.S. Pat. application entitled "Photoelectric Sensing Apparatus," Ser. No. 633,880, filed Apr. 26, 1967. So that the photoelectric sensing apparatus can properly align the five possible spaces of each answer with sensing devices therein, it is necessary to position one edge of the data sheet **10** a predetermined distance from the spaces, or data, and use this edge as a reference throughout the scoring procedure. In the photoelectric sensing apparatus described in the abovementioned copending application, the right edge of the data sheet **10** is utilized as a reference edge. The present data sheet **10** is described for convenience but it should be understood that the present trim marks might be utilized with any other type of data sheet which requires trimming or cutting to form a reference edge or reference edges.

The first side **11** of the data sheet **10** has a plurality of trim marks, generally designated **15**, thereon. Two of the trim marks **15** define an upper reference edge, two of the trim marks **15** define the right reference edge and two of the trim marks **15** define a lower reference edge. It should be understood that more trim marks **15** might be utilized in instances where the data sheet is extremely long, if desired, and the present number are utilized only for explanatory purposes. The second side **12** of the data sheet **10** has two trim marks **15** defining the right reference edge (the left edge of the first side **11**). In most instances it will be necessary to define only one reference edge and in some instances two. However, four reference edges are defined on the data sheet **10** to more clearly illustrate the invention and to illustrate a quick visual check of the trimming, which will be described presently.

Referring to FIG. **5**, an enlarged view of a trimming mark **15** is illustrated. The trim mark **15** includes an elongated line portion **20** positioned to define or extend along a reference line. In general, the trim marks **15** and the information or data on the data sheet **10** will be printed simultaneously and the line portion **20** of the trim mark **15** is positioned the required distance from the data by the printer. The line portion **20** of the trim mark **15** indicates the position of the reference line and the desired position of the reference edge and, ideally, the data sheet **10** should be trimmed exactly on the line portions **20** of cooperating trim marks **15.** However, because of semiautomatic trimming processes and because exact trimming is difficult at best, some tolerance is allowed and the difficulty arises in attempting to determine whether the data sheet has been properly trimmed when the reference edge does not coincide with the line portion **20** of the trim mark **15.**

A second portion **21,** or tolerance indicating portion, is formed in conjunction with the line portion **20.** The second portion **21** is an elongated rectangular portion positioned with the line portion **20** centered coaxially with the longitudinal axis of the second portion **21.** The second portion **21** extends transversely outwardly in both directions from the line portion **20** a distance

equal to the allowable cutting tolerance, or the allowable deviation of the reference edge from the exact position.

Referring to FIG. 3, a properly trimmed data sheet 25 is illustrated. On each of the upper, lower and right edges portions of a pair of trim marks 15 can be seen. Since each of these edges passes through both of the trim marks 15 thereon and a small amount of the trim marks 15 remain adjacent the edge, the position of the edge is within the required tolerance and the data sheet 25 is properly trimmed.

Referring to FIG. 4 an improperly trimmed data sheet 26 is illustrated. Portions of trim marks 15 can be seen adjacent the upper and lower edges and a portion of one trim mark can be seen adjacent the right edge while the lower trim mark 15 is not touching the right edge. Because the entire lower trim mark 15 adjacent the right edge is visible and a portion of the white data sheet can be seen between the trim marks 15 and the right edge, the position of the right edge is not within the required tolerance and the data sheet 26 is improperly trimmed. In a similar fashion, when too much of the data sheet is removed so that none of the trim mark 15 remains the edge is not within tolerance and the data sheet is improperly trimmed.

Because the printed trim marks 15 soak into the material forming the sheet at least partially and because of many other factors, including slightly different sized paper, slight spacing between adjacent sheets, etc., the phenomenon illustrated in FIG. 6 appears when a plurality of data sheets are stacked together. With all of the data sheets in the stack properly trimmed, the similarly positioned trim marks 15 cooperate to form a dark strip along the edge of the stack. This dark strip is broken, as at 30, whenever an improperly trimmed data sheet appears in the stack. Thus, by simply stacking the data sheets after trimming, large quantities can be checked for proper trimming simultaneously.

The data sheets illustrated with this disclosure are trimmed on all four sides but, as previously explained, in many instances it may be necessary to only trim one side of a data sheet. The present data sheets have information on both sides thereof so that the left and right edges must be trimmed to serve as reference edges.. The upper and lower edges are trimmed to aid in properly stacking the data sheets so that the trim marks 15 from a smooth continuous strip along the edge and even a single improperly trimmed data sheet can be quickly and easily discerned.

Thus, trim marks for data sheets adapted to be automatically sensed by electronic apparatus are disclosed. The trim marks define reference lines or edges and further provide indications as to whether the edge has been accurately trimmed. In addition to the above, because of the trim marks, large pluralities of data sheets can be simultaneously inspected for proper trimming. While a specific embodiment of a trim mark is illustrated and described, it should be understood that further modifications and improvements will occur to those skilled in the art. We desire it to be understood, therefore, that this invention is not limited to the particular form shown and we intend in the appended claims to cover all modifications which do not depart from the spirit and scope of this invention.

What is claimed is:

1. In a data sheet having indicia positioned thereon in which information is to be disposed to be detected by a sensing apparatus, the combination comprising:

trim marks positioned on said sheet with respect to said indicia for indicating a specific location for a trim line along which said sheet may be trimmed to form a reference edge to permit information disposed in said indicia to be accurately detected by said sensing apparatus, which trim marks include a tolerance indicating portion centered on the trim line and extending transversely outwardly on either side thereof a distance equal to an allowable trimming tolerance which cannot be exceeded without resulting in an inaccurate detecting of information disposed in said indicia;

said trim marks include a second portion associated with said tolerance indicating portion for indicating the position of the true reference edge; and

wherein the second portion is coaxial with the tolerance indicating portion.

2. In a data sheet having indicia positioned thereon defining spaces that serve as answer areas in which information is to be disposed to be detected by an automatic photoelectric sensing apparatus, the combination comprising:

trim marks printed on said sheet and positioned with respect to said indicia for indicating a specific location for a trim line along which said sheet may be trimed to form a reference edge to permit information disposed in said indicia to be accurately detected by said sensing apparatus, which trim marks include:

a tolerance indicating portion centered on the trim line and extending transversely outwardly on either side thereof a distance equal to an allowable trimming tolerance which cannot be exceeded without resulting in an inaccurate detecting of information disposed in said indicia; and

a second portion associated with said tolerance indicating portion for indicating the position of the true reference edge.

3. In a data sheet according to claim 2 wherein said printed trim marks are at least partially absorbed into the material forming said data sheet so that when a number of said data sheets are properly trimmed and stacked together, the trim marks of said sheets form dark strips along the edge of the stack.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,808,406 **Dated** April 30, 1974

Inventor(s) Gary R. Oberg and Michael Sokoloski

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the first sentence of the specification following the Title and Abstract add -- This is a continuation of application serial No. 17,475 filed March 9, 1970 --.

Signed and sealed this 11th day of March 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks