

[54] **PHOTOGRAPHIC PRINT MARKER**

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[51] **Int. Cl.**..... **G03d 15/04**

[58] **Field of Search** 346/141, 139 R, 33 F; 33/18 R; 83/365; 355/29, 28, 13; 118/241, 240, 256, 211, 11, 40, 242

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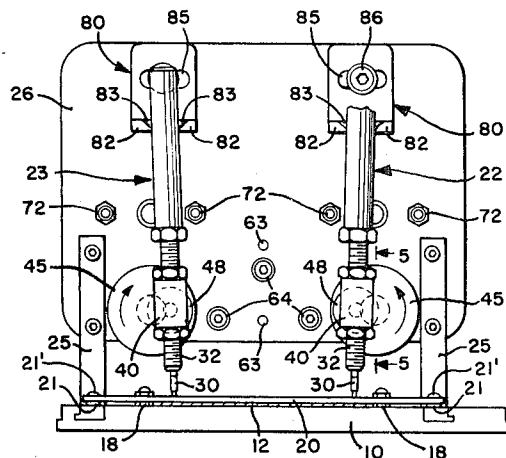
Primary Examiner—Joseph W. Hartary

Attorney, Agent, or Firm—Biebel, French & Bugg

[57] **ABSTRACT**

A photographic print marker for placing index marks on a strip of photographic paper, for use by an automatic trimmer, includes a pair of essentially identical markers, one of which forms marks corresponding to the location of the individual prints while the other forms index marks corresponding to the beginning or the end of an order. The print marker is particularly useful in the making of borderless color prints in automatic photographic printing apparatus, and incorporates ball point pens which are mounted on a drive mechanism. The drive mechanism employs an electric solenoid which brings the ball point pen into contact with the paper, in a cycle of operation, to provide an index mark on the back surface of the paper. The pen cartridge is mounted in a holder which provides for axial movement of the pen once it has come into contact with the paper, so that a straight line is made by a rotary drive apparatus. The marker also includes provision for adjusting the position of the pen in relation to the width of the paper, for adjusting the length of the mark which is made, and for adjusting the pressure of the pen on the paper.

6 Claims, 10 Drawing Figures



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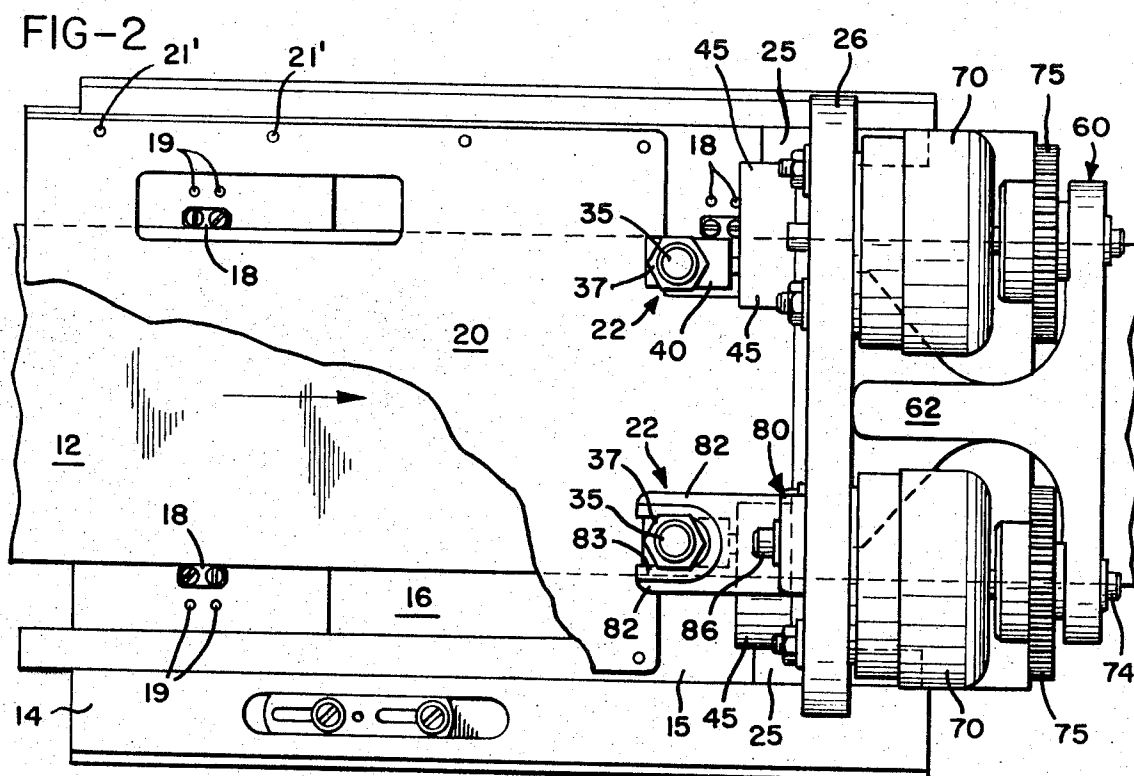
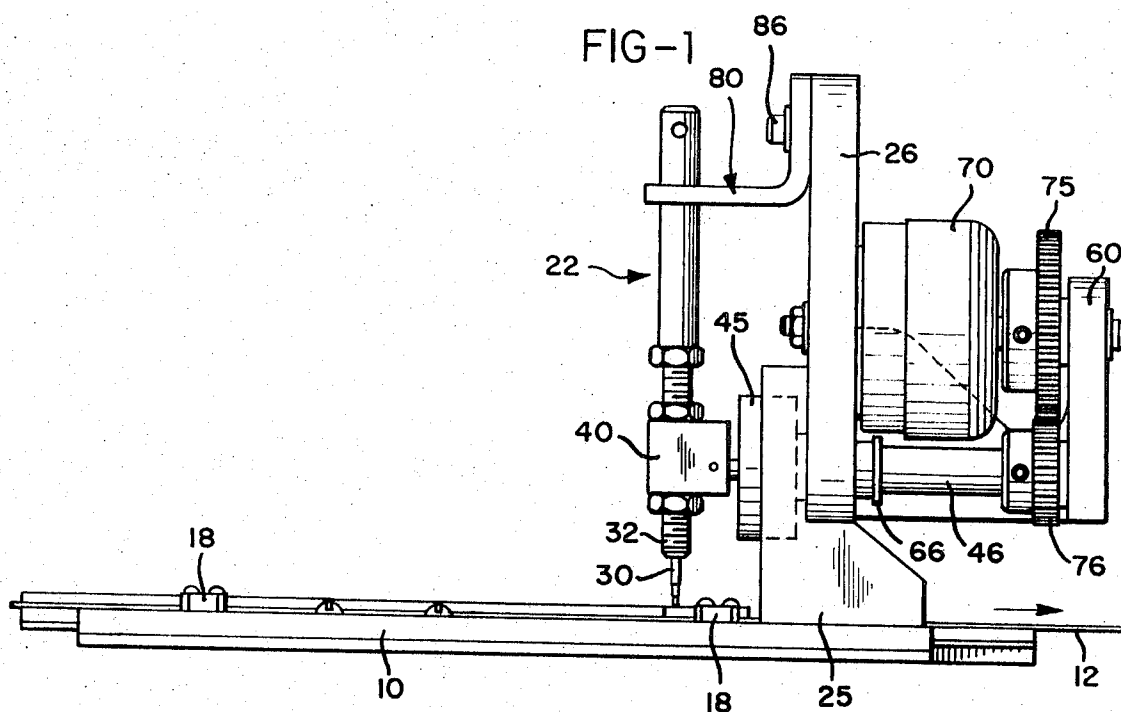


FIG-3

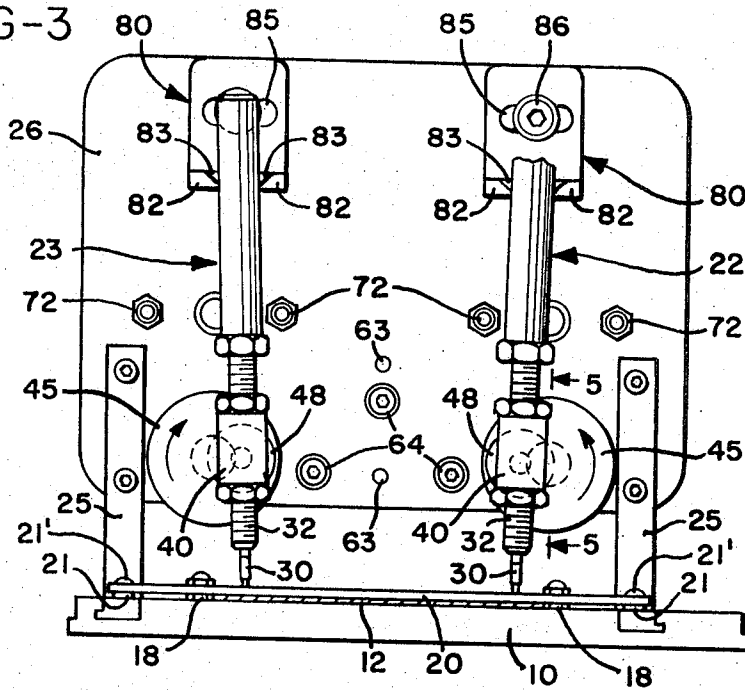


FIG-4

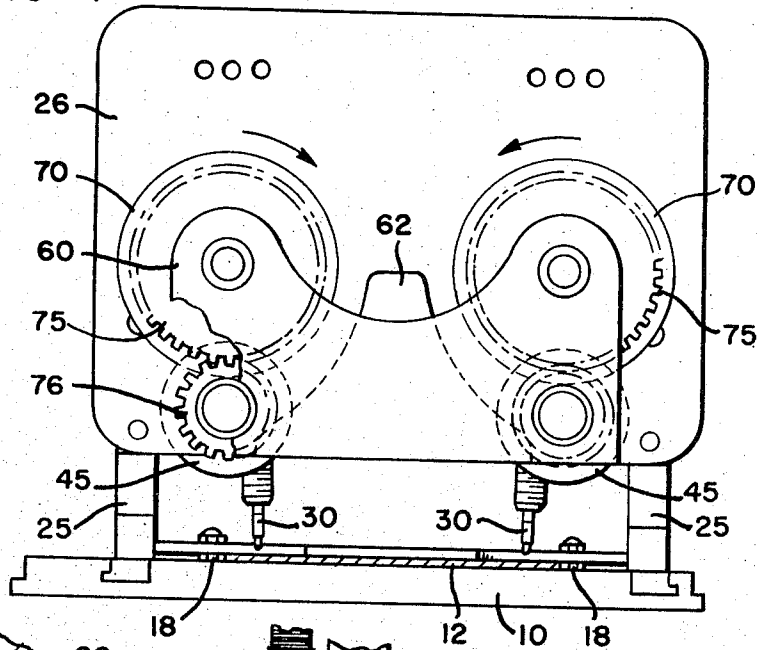


FIG-5

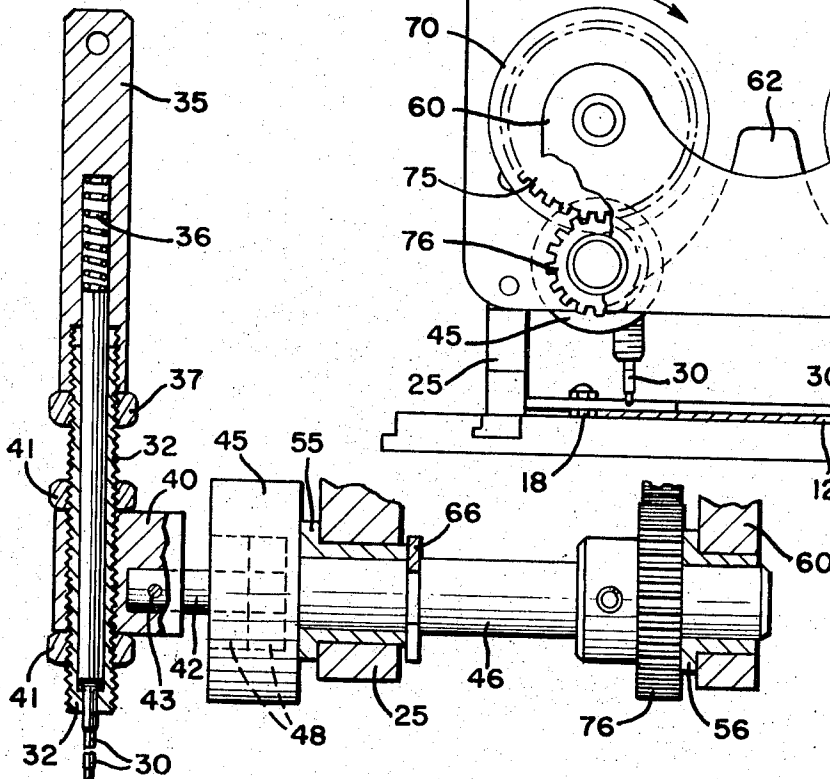


FIG-6

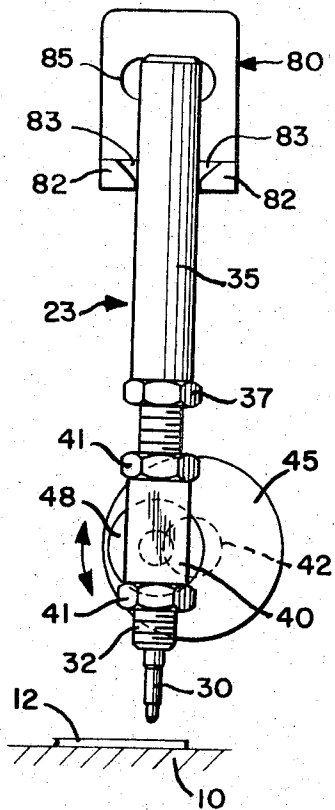


FIG-7

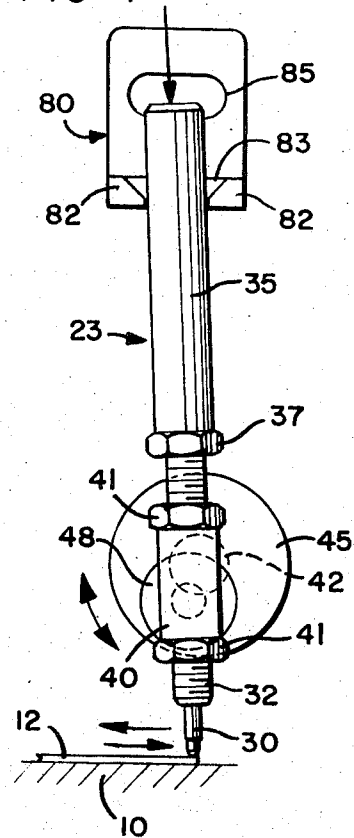


FIG-8

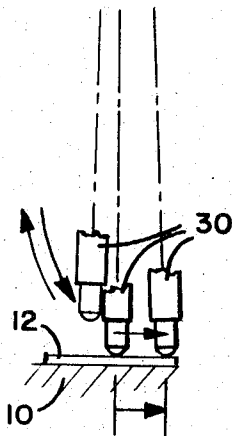


FIG-9

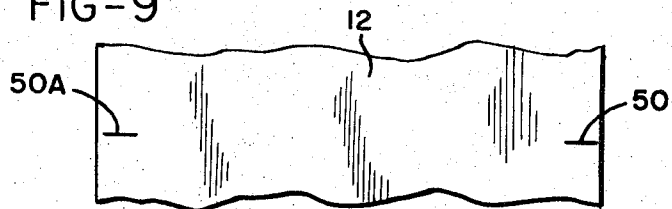
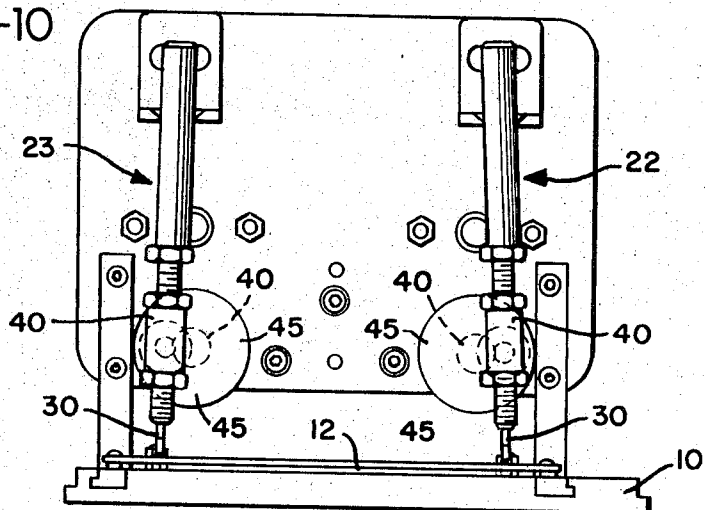


FIG-10



PHOTOGRAPHIC PRINT MARKER

BACKGROUND OF THE INVENTION

This invention relates to the art of automatic photographic printing machines and more particularly marking apparatus for providing index marks on photographic paper, for defining the position of the individual prints made on a continuous length or strip of paper, to provide a reference mark for the cutter or trimmer.

Automatic photographic print trimmers employ a photocell which picks up a mark on the continuous strip of exposed and developed printing paper in order to control the operation of a knife to sever the paper into the individual prints. Examples of machines which operate with such marks are Knobel U.S. Pat. No. 2,674,308 of 1954 and the roll paper cutters, Models 5K, 8K and 12K of Eastman Kodak Company, Rochester, N.Y.

The reference marks have been placed on the photographic paper in a number of ways. For example, a reference mark may be made by projecting a narrow beam of light on the margin of the sensitized surface concurrently with the exposure of the print, and in the development process a mark appears which is subsequently sensed by the photoelectric cell to operate the trimmer. While this system has been used extensively in the marking of conventional prints, it obviously cannot be used in marking of what is now termed "borderless" prints.

There is an increasing demand for color prints which are exposed completely to the edge of the paper, and trimmed to the edge of the print, to form a print free of any border. This provides the customer with a somewhat larger image. Printers making borderless prints customarily employ a device for making a mark on the backside of the paper concurrently with the exposure of each image on the sensitized side. Marking apparatus presently used for this purpose consists of a narrow rotating carbon wheel which is brought momentarily into contact with the paper. Carbon ribbon markers have also been used. The difficulty with these carbon marking systems is that they are not entirely trouble free. The carbon wheels and ribbons are easily broken. In addition, the carbon mark applied to the paper is not entirely permanent and may be washed out during the wet processing of the paper in the developer and fixer solutions, or rubbed off by physical contact. Also, the carbon markers are not versatile in that they are not easily adjustable for use with photographic paper strips of differing widths. Perforators have also been used in which round, square or rectangular holes are punched in the paper. This process is dirty because of dust or lint which is created by the paper being perforated. The projector lenses become fogged by this lint and must be cleaned often.

SUMMARY OF THE INVENTION

The present invention is directed to print markers which incorporate a ball point pen to make a short and welldefined mark on the paper, preferably adjacent one of the edges of the back surface of the paper, for use by the trimmer. While apparatus of this invention may be used for marking conventional prints having a border, it is particularly useful for marking the location

prints which are printed and trimmed without borders.

Preferably, a pair of markers are employed; one marker being used to identify the position of each print along the length of the strip of photographic paper and the other marker being used to designate the beginning or the end of a customer's order. A ball point pen is held by the marker in spaced relation to the paper, and when the printer is actuated, the pen is brought down into contact with the paper and is caused to move a short distance transversely of the length of the strip to cause an indelible mark on the back surface of the paper which will not be diminished or lost by the subsequent wet processing and drying of the paper. In making each mark, the pen moves first in one direction and then returns to its starting position in the opposite direction, in a cycle of operation, so that the line formed on the paper is traced over again by the return movement of the pen, thus ensuring that a well-defined index mark will be made.

The marking apparatus includes a provision for supporting a ball point pen and for causing it to move, in a cycle of operation, first against the surface of the paper and then for a short distance transversely to the length of the paper without puncturing the paper or causing an undesirable physical impression through the paper. This is accomplished by mounting the pen for movement with a rotating yoke, and at the same time, providing for restrained axial movement of the pen within its holder.

The marking apparatus includes a provision for adjustment of the pen in relation to the width of the paper and preferably includes a provision for use with rolls of paper of differing widths. Further, the marker may be used in any position, and in some printers this requires it to be operated in an inverted position. In this case, a pressurized ball pen cartridge is employed.

In the preferred embodiment, an electric rotary solenoid is caused to impart pen movement in one direction, and a return spring is used to bring the pen and the solenoid back to a starting position. However, it is within the scope of the invention to employ other types of motivating power, such as small clutch operated electric motors or the like.

It is accordingly an important object of this invention to provide a photographic print marker which employs a ball point pen for placing index marks on continuous lengths of photographic paper for use by an automatic trimmer in separating the individual prints.

Another object is the provision of a print marker which has particular utility in the forming of index marks on borderless prints.

Another object of the invention is to provide a marker which is easily and readily adjustable for marking prints in an automatic printer which is adapted for use paper of differing widths.

Another object of the invention is the provision of a print marker utilizing a ball point pen including a provision for adjusting the force of the pen against the paper as well as the length and position of the mark.

Another object of the invention is to provide an automatic print marker for borderless prints which operates rapidly and well within the cycle time of the printer to form an indelible mark on the back side of the paper which may then be utilized by an automatic trimmer after the paper has been chemically processed and dried.

These and other objects and advantages will be apparent from the following description, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of a marker according to this invention;

FIG. 2 is a plan view of the marker of FIG. 1;

FIG. 3 is a front elevation, partially broken away;

FIG. 4 is a rear elevation, partially broken away;

FIG. 5 is a section taken generally along the line 5—5 of FIG. 3;

FIG. 6 is an elevation of the pen holder assembly showing the position thereof just at the time of actuation;

FIG. 7 is a view similar to FIG. 6 but showing the position of the parts at the limit of travel of the pen;

FIG. 8 is a diagram showing the manner in which the tip of the pen is brought into contact with the paper to form an index mark;

FIG. 9 is a fragmentary view of the back surface of the paper illustrating a pair of index marks made by this invention; and,

FIG. 10 is an elevation similar to FIG. 3 showing the parts arranged for use with wider paper.

DESCRIPTION OF PREFERRED EMBODIMENT

A print marker according to this invention is illustrated in FIGS. 1 and 2 specifically adapted for use with a Model 5S printer of Eastman Kodak Company of Rochester, N.Y. The marker includes a base 10 which may form an integral part of the automatic printer with which the marker is associated. The base 10 includes means forming a guideway or track through which a strip of photographic paper 12 of indefinite length moves through a printing and marking station for subsequent chemical processing, drying, and trimming. The strip of paper 12 is shown in FIGS. 1 and 2 as having its sensitized or emulsion surface facing downwardly for exposure from below. The base 10 is formed with an outer generally U-shaped framing portion 14 which slidably receives another generally U-shaped inner framing portion 15. The portions 14 and 15 define an adjustable mask or aperture indicated by the space 16 by means of which the picture area may be conveniently framed.

The base 10 further includes paper guide means by which the paper is caused to move on the base along a predetermined path. Thus, the portions 14 and 15 each include a pair of identical paper guide blocks 18 which have inside surfaces adjusted to a close running fit with the edges of the paper strip 12. The paper guide blocks 18 may be selectively positioned width-wise to accommodate different widths of paper according to the use of the printer, and, as shown, the blocks are positioned in FIG. 2 to accept conventional 3½ inches paper but may be moved outwardly to the tipped holes 19 in the inner and the outer framing portions to accommodate 4 inches paper.

The base 10 further includes a backing plate 20 which is supported on the inner portion 15 in overlying spaced relation to the paper, thus forming a narrow slot through which the paper moves during exposure and marking, and providing a backup surface to hold the paper flat. The backing plate 20 is positioned in overlying relation to the aperture 16 and is supported in slightly elevated relation to the base by means of flat

5 rivet heads 21 along the sides thereof, as shown in FIG. 3. The backing plate is also provided with one or more pairs of pins 21A, one of which is shown in FIG. 2, for accurately locating the position of the plate 20 on the inner section 15 of the base 10.

The print marker constructed according to this invention includes a first marker illustrated generally at 22 for forming an index mark corresponding to the location of each individual print, and a second marker 23 10 for forming a second index mark corresponding to the beginning or the end of a customer's order. The makers employed are essentially identical in construction and operation, and accordingly the detailed description which follows may be considered as applicable to either.

The support structure for the markers includes a pair of upright supports 25 which are mounted on the inner base portion 15 and which support therebetween a vertical support frame 26. The markers are thus supported 20 on the frame 26 and on the inner base portion 15 in predetermined relation to the path of paper movement.

Each of the markers includes a ball point pen 30 which is normally supported in somewhat spaced relation to the paper strip 12. Preferably, the ball point pen has permanent black ink and may be pressurized as shown in Fisher, et al., U.S. Pat. No. 3,425,779 of 1969. In fact, a pressurized ball point pen is preferred whenever the pen is mounted in inverted relation to contact the paper, such as when the invention is used with the Model 2620 printer of the Eastman Kodak Company. However, when the pens 30 are operated in the conventional position, it is desirable but not necessary to use a pressurized cartridge.

The ball point pens 30 are supported within a holder assembly including a tubular threaded pen holder 32, as shown in section in FIG. 5. The holder 32 provides pen mounting means which permits limited movement of the pen cartridge in an axial direction along the length of the pen, and for this purpose, a holder cap 35 40 is threaded down on the opposite end of the pen holder 32, and a compression spring 36 is received within the cap 35 and bears on the upper end of the pen cartridge. The position of the cap is defined by a lock nut also threaded on the holder 32. The force of the pen against the paper may be regulated by suitably selecting the spring 36 and adjusting the cap 35 on the holder 32, to form an index mark with a minimum of pressure exerted against the back surface of the photographic paper, so that the image surface is not distorted.

The lower end of the pen holder 32 is mounted in a rotatable support in which the pen is in offset relation to the axis of rotation of the support. For this purpose, the lower end of the holder 32 is threaded through a block 40, as shown in FIG. 5 and is locked in adjusted position by a pair of lock nuts 41. The block 40 includes a shaft 42 which is secured to the block by a pin 43. The shaft is mounted in offset relation on a rotatable support and driving apparatus which includes a disc 45 60 mounted on or forming a part of a shaft 42. A pair of bearings 48 support the block 40 and its associated shaft 42 in offset relation to the axis of the disc 45 so that rotation of the shaft 46 causes the pen 30 to be brought down into initial engagement or contact with the back surface of the paper 12, and continued rotation of the shaft 46 causes the pen to be moved transversely on the paper in the manner illustrated in FIG.

8, accompanied by axial movement of the pen within the holder once the tip of the pen has come into contact with the paper.

The index marker includes drive means for causing the disc 45 and shaft 46 to move in a cycle of operation first in one direction, through approximately 40° of rotation as shown in FIG. 7, and then to return to its rest position as shown in FIG. 6. This results in the pen moving twice along the paper over the same path to form an index mark 50, as shown in FIG. 9.

The shaft 46 is mounted for rotation on a sleeve bearing 55 in the frame 26. Its opposite end is also supported on a sleeve bearing 56 in a subframe or yoke 60, in spaced relation to the frame 26. The subframe 60 includes a central portion 62, as shown in FIGS. 2 and 4 which is accurately located by pins 63 and supported by bolts 64 to the back surface of the frame 26 as shown in FIG. 3. A circle clip 66 on the shaft 46 accurately locates the axial position of the shaft, and in effect, locates the axial position of the pen 30.

The drive means also includes an electric rotary solenoid 70 which is mounted on the back surface of the frame 26 by mounting bolts 72 (FIG. 3). The solenoid shaft 74 is also rotatably supported on the subframe 60 and supports in turn a drive gear 75 in mesh with a driven gear 76 on the shaft 46. While an electric solenoid has been illustrated and is preferred for the motivating power due to its reliability and its speed of operation, it will be understood that other suitable drive means may be employed. One suitable solenoid is the Model 81840 of Ledex Incorporated, Dayton, Ohio, which drives through an angle of rotation of 20°, with a spring return. A 2:1 gear ratio is established between the gears 75 and 76 to impart a 40° rotation to the disc 45 when the solenoid is energized. It will be understood that the solenoid will be energized by the printer concurrently with the exposure of the portion of the paper within the aperture 16 to cause the index mark 50 to be placed on the paper.

Means are provided for adjustably supporting the upper end of the pen assembly, including a generally L-shaped bracket or guide 80 which is formed with a pair of forks 82 defining therebetween a slot 83 at its upper end and retained by a screw 86, and may be positioned both rotationally and transversely to position the tip of the pen in relation to the edge of the paper. Rotational movement of the bracket 80 takes up any play or slack between the fingers 82 and the cap 35.

The print marker of this invention is also adapted for use in marking wider strip material, as previously mentioned. FIG. 10 illustrates the arrangement in which the position of the pens supported on the discs 45 has been reversed with respect to the positions shown in FIGS. 1-7, to position the pens outwardly. The rotation of the solenoids is also reversed so that the respective pens are brought into play as previously described but first contacting the paper strip at the outer edge with inward and then return movement along the same track. The same parts are thus employed as previously described to effect marking of wider paper structure.

The apparatus is versatile in that the precise position of the pen and the resulting mark 50 may be adjusted by suitably positioning the pen holder 32 in the block 40. The force of the pen may be regulated by adjusting the compression of the spring 36 by suitably adjusting the cap 35 on the body 32. The height of the pen may also be adjusted by adjusting the driven gear 76 with

respect to the drive gear 75. The relative position of the pen point with respect to the paper may be controlled by suitable adjustment of the bracket 80 guiding the upper end of the pen assembly.

The operation of the invention is largely self-evident from the foregoing description. Either one of the identical marking means may be used for creating the index marks 50 at each of the prints while the other may be used to form the index marks 50A as in FIG. 9, signifying the start or the finish of a customer's order. The chemical impervious marks 50 and 50A which are formed are double-traced and provide an excellent reference for the trimmer. The use of the ball point pen provides a highly reliable marking system which is subject to a minimum of maintenance and upkeep. A single pen is good for marking up to 300,000 prints before replacement is required, and thus the apparatus has a relatively long service life.

It is within the scope of the invention to utilize the marking apparatus in combination with a trimmer or cutter alone and not with printer per se. This arrangement would be desirable where delicate glossy enlargements are being made, such as wedding pictures or the like, where any localized pressure applied to the back of the print prior to processing may form an objectionable crease on the sensitive surface. In this case, a pre-printed strip may be applied to a trimmer or cutter of the Kodak type or Model 5K as previously identified and the first few prints may be marked by hand until the sensor has picked up the marks. Thereafter, the trimmer advance mechanism is set to advance exactly one picture length and marking of the untrimmed strip is accomplished by operating the marker simultaneously with the operation of the cutter so that subsequent prints are marked and cut automatically.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention.

What is claimed is:

1. A photographic print marker for placing index marks on continuous lengths of photographic paper for use by an automatic trimmer in trimming the individual prints therefrom, comprising in combination means forming a path over which said paper moves during printing, a ball point pen, means supporting said pen in adjacent relation to said paper including a rotatable support in which said pen is mounted in offset relation to the axis of rotation, means connected to rotate said pen support to bring said pen into contact with the back side of said paper adjacent the edge thereof and to cause said pen to move in a direction transverse to the length of said paper to provide a trim index mark on the paper in relation to an image thereon, which mark is impervious to the developing chemicals.

2. The marker of claim 1 in which said mounting means provides for limited movement of said pen in a direction along the length of the pen when said pen comes into contact with the paper.

3. A photographic print marker for placing index marks on a continuous strip of photographic paper for use by an automatic trimmer to sever the strip into individual prints corresponding to the location of an image thereon, comprising in combination a ball point pen, mounting means for said pen including spring bias

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means urging said pen toward the back surface of said paper and resiliently providing for axial movement of said pen relative to said pen support, a rotating pen drive, said pen support being mounted in offset relation to the axis of said drive to be brought into contact with said strip and moved transversely of said paper with rotation of said drive, a rotary solenoid connected to rotate said pen drive upon energization in a cycle of operation to bring said pen into engagement with said strip followed by transverse movement of said pen against said strip to place an index mark thereon, said rotary solenoid being spring biased to return said pen to its rest position upon de-energization.

4. An automatic marker for marking borderless prints for use by a trimming apparatus comprising a ball point pen cartridge, a cartridge holder for supporting said pen cartridge with the ball thereof spaced from the back surface of the paper, means in said holder providing for axial movement of said cartridge therein, eccentric drive means for said holder including a block adjustable positioned on said holder, a drive shaft, means

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mounting said block in offset relation to said shaft to be driven by rotation of said shaft to bring the tip of said cartridge into contact with said paper followed by movement across said paper to form a mark thereon, and a rotary solenoid connected to rotate said drive shaft in a cycle of operation to bring the tip of said cartridge into contact with the paper and to return said holder to its starting position to form a double-traced index mark on said paper.

5. The marker of claim 4 further comprising cap means adjustably mounted on said pen holder, and a compression spring between said cap means and said cartridge urging said cartridge in a direction toward said paper while providing for said axial movement thereof.

6. The marker of claim 5 further comprising adjustable means engaging said cap means and providing for sliding movement thereof upon the operation of said solenoid.

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