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METHOD OF AND APPARATUS FOR LOCATING AN IDENTIFICATION
MARK ATTACHED TO A WRITTEN OR PRINTED ITEM

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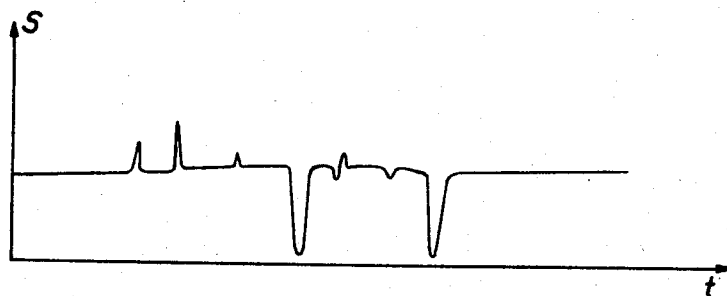


Fig. 1

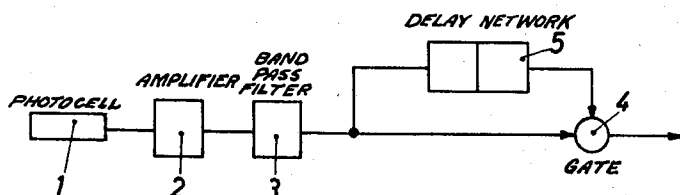


Fig. 2

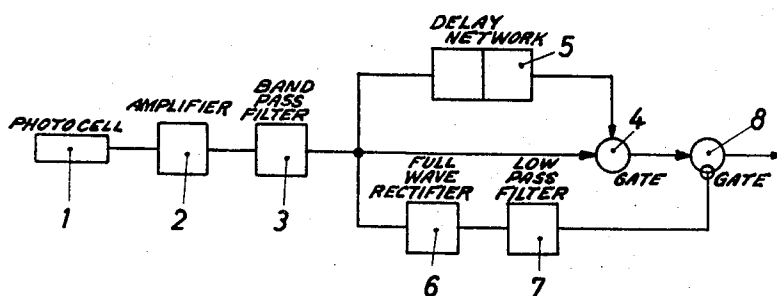


Fig. 3

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METHOD OF AND APPARATUS FOR LOCATING AN IDENTIFICATION MARK ATTACHED TO A WRITTEN OR PRINTED ITEM

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3 Claims. (Cl. 250-206)

The present invention relates to a method of and apparatus for locating an identification mark attached to a written or printed item. In the case of postage stamps affixed to mail items, for example, it is required to locate the stamps by a scanning operation in order to determine the position of the mail items. This determination of the position of mail items is necessary in the course of processes in which the items have to be sorted in accordance with their respective places of destination, because they are generally capable of assuming one of four different positions, and the sorting can only be performed when the mail items are in a proper readable position.

Various methods have already been suggested for sensing and locating the postage stamps, which are affixed to letters, by a mechanical scanning operation. Thereby, in one such known arrangement, the letters are e.g. led past a photo-electric scanning device, in which the scanning beam sweeps forwardly and backwardly vertically in relation to the direction in which the letters travel. As soon as the identification mark (stamp, etc.) is hit by the scanning beam, there is produced in the scanning device, e.g. in a photocell, an intensity fluctuation, which may then be used for characterizing the identification mark.

These intensity fluctuations of the photocell current may also be produced when the photocell is stationary and the mail item is continuously led past the cell. However, the evaluation of the intensity fluctuations in this way appears to be somewhat unreliable, because on the mail items there may also be other markings or signs (such as remarks regarding the address or sender, or the like), and which, under certain circumstances, may easily cause a similar intensity fluctuation as the identification mark itself.

An object of the present invention is the avoidance of faulty evaluations which may be caused by such other signs, etc. According to the invention, the items are scanned by means of one or more photocells respectively, and the photocell signal, which consists of impulses corresponding to the brightness variations on the front surface of the item, will be examined as to the presence of a double impulse, the pulse spacing of which corresponds to the width of the identification mark. The present invention results from the recognition that with the known methods of evaluating the difference of the direct-current portion during the scanning between the item and the identification mark, certain dark-colored letters etc. can not be reliably handled. Thus, for instance, with some letters the intensity difference between the dark-colored envelope and the postage stamps is very small. According to the invention, therefore, the edges or margins of the identification marks are evaluated, whereby, with a suitable design of the evaluating arrangement, there will be produced a double pulse with a defined space between the two pulses, which may then be used for identification purpose.

In some cases it may be appropriate to carry out the scanning line-wise, that is, the scanning is effected simul-

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taneously by a plurality of photocells arranged next to each other. The adjoining line signals may then be examined for double pulses, and the existence of such double pulses with equal spacings and at the same place in adjacent several lines, may be taken as a criterion or indication with respect to the location of the identification mark. By means of this method it is also possible to locate such identification marks which are stuck on oddly. In such a case the double pulses of adjoining lines do not start simultaneously with respect to the beginning of the item, but are staggered from line to line, whereby however, the inset points will lie on one straight line when they indicate an identification mark.

In the following, the invention will be particularly described by way of example; as an item, there was been chosen a letter, on which the location of the postage stamp is required to be determined. Fig. 1 shows the intensity fluctuations of the photocell current, which are likely to appear on the scanning of a dark envelope. The two large negative pulses correspond to the edges of the postage stamp. The appearance of such a double pulse is registered by a suitable arrangement or device. Preferably there may be employed a timing-gate circuit, which only produces a control signal, or permits the generation of such a control signal whenever two pulses of about the width of the postage stamp pass through the gate circuit. In Fig. 2, there is shown such a timing-gate circuit, which would meet this requirement, and in Fig. 3 an alternative arrangement.

Referring to Fig. 2, the photocell signals coming from the photocell 1 are fed via the amplifier 2 to the band-pass filter 3. This filter is so dimensioned that pulses, which correspond to the normal width of the stamp edges, are permitted to pass as strongly and as undisturbed as possible. The first pulse is fed at the same time to the gate 4 and to the delay network 5. The gate 4 is a coincidence gate having two inputs and requires the concurrent application of pulses of said inputs to cause it to open. At first the gate 4 is still closed, so that the first pulse is prevented from passing. In the delay network this first pulse is so delayed that the delayed pulse and the second pulse of the double pulse appear simultaneously at the gate 4, so that it will now open and, consequently, permit the second pulse to pass. The delay network is tuned or adjusted in such a way that in the delay time there are contained all stamp widths that are likely to occur. Of course, the delay time also depends on the speed at which the letters travel past the scanning device.

The delay network may be of any known type and may consist of e.g. two mono-stable flip-flops which are arranged in series. The first one of the flip-flops is excited by the first pulse and is thereby caused to tilt into its unstable position. After a delay determined by its time constant, it is tilted back to the stable position, and thereby, causes the second flip-flop to be tilted into its unstable position which also, after its respective time constant, is tilted back. While the second flip-flop is in its unstable position, the gate 4 is open. The time constants are so determined that there will also be obtained a widening or enlargement of the pulse. This is necessary because different widths of postage stamps are in use, and because the gate 4 is supposed to be reliably opened to all such widths. In Fig. 3 there is shown an arrangement differing from that of Fig. 2 in that there is provided an additional arrangement for eliminating the writing in the scanning results. Due to the fact that the scanning is effected with the aid of a gap-type photocell, also all signs etc., such as hand-writing or the like, will be scanned and fed to the evaluating device. Thereby it may happen that in the writing there appear two pulses which are spaced apart each other at a relation lying

within the range of the stamp width, and which may be so strong that they actually can energize the evaluating device. The arrangement for excluding the writing is now based on the experimental fact that the pulses generated by the writing are greater in number than those pulses which are generated by the stamp image.

The signals as coming from the band-pass filter 3 of Fig. 2 are fed also to the full-wave rectifier 6, Fig. 3, and to the low-pass filter 7. In this way, the incoming signals are integrated. Upon reaching a certain value the second gate 8 will be blocked. The gate 8 is a gate of known type having an enabling input and an inhibiting input. The input of gate 8 which is coupled to the output of gate 4 is the enabling input and the input to gate 8 which is coupled to the output of the filter 7 is the inhibiting input. This value is determined in such a manner that the integration of the signals produced by the scanning of the postage stamp will be insufficient for blocking or inhibiting the gate, while the integration of the writing signals for the width of a postage stamp will be sufficient to effect such blocking. Thus only a double pulse, corresponding to the edges of the stamp, is capable of transmitting a signal via both gates 4 and 8 to the indicating device, in which the recognition of a postage stamp is determined accordingly.

While I have described above the principles of my invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation to the scope of my invention as set forth in the objects thereof and in the accompanying claims.

What is claimed is:

1. Apparatus for determining the position of a written or printed item with respect to an identification mark applied thereto, for example, of a letter with respect to the postage stamp comprising light sensitive means for

scanning a surface of said item, means for deriving a wave-form line signal from said scanning means, gate means, time delay means intermediate said means for deriving said line signal and said gate means for delaying said signal a time approximately corresponding to the time taken to scan the width of said identification mark, means for integrating the signals derived from said means for deriving said line signal, said integrating means coupled to said gate means whereby signals corresponding to the edges and the area lying between of said identification mark are of insufficient value to prevent opening of said gate means upon application of said edge pulses through said delay means, but signals derived from extraneous marking on said item are of sufficient value to inhibit opening of said gate means.

2. Apparatus as claimed in claim 1 wherein said gate means comprises a first and a second electronic gate, said first gate comprising a two-input coincidence gate having an output, said second gate having an enabling input and an inhibiting input, the inputs of said first gate coupled to said means for deriving a wave form line signal and said time delay means, respectively, the enabling input of said second gate coupled to the output of said first gate and the inhibiting thereof coupled to the output of said integrating means.

3. An apparatus according to claim 1 wherein said integrating means comprises a full-wave rectifier and a low-pass filter connected in series.

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