May 16, 1950 J. A. VICTOREEN 2,507,743

METHOD AND APPARATUS FOR RECORDING OR INDICATING

Filed Jan. 23, 1946

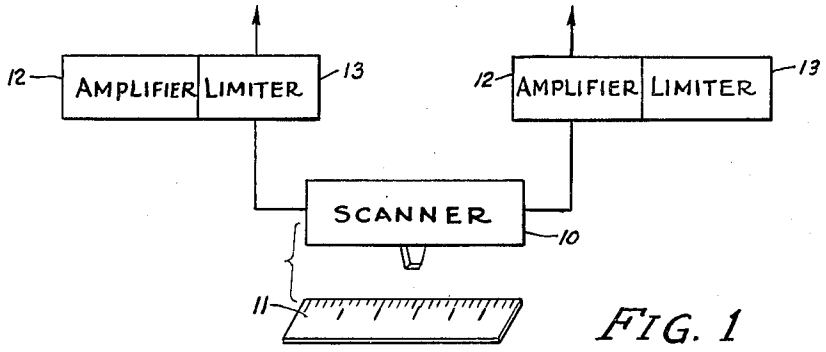


FIG. 1

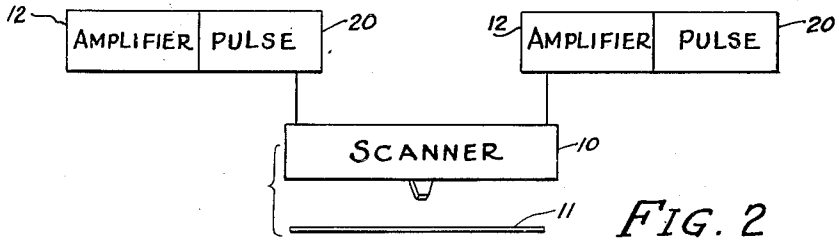


FIG. 2

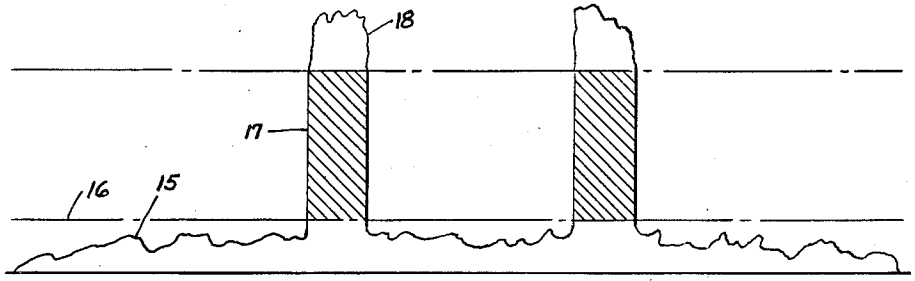


FIG. 3

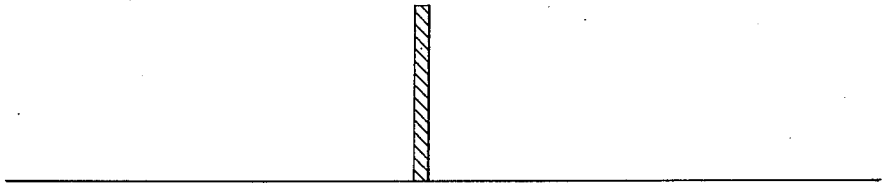


FIG. 4

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METHOD AND APPARATUS FOR RECORDING OR INDICATING

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Application January 23, 1946, Serial No. 642,815

5 Claims. (Cl. 250—219)

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This invention relates to improvements in apparatus for photoelectrically assorting, recording or computing from datum placed on cards, sheets or forms and is an improvement on that disclosed in my copending application, Serial No. 634,038.

In the above mentioned application, I have shown how one or more photocells can be made to scan a series of lines to cause a series of recurring impulses which actuates a means which is locked to indicate the desired intelligence by the placement of a coincident line relative to one of the regular series. The coincident lines may be manually placed on the cards to coordinate the desired intelligence or, as described, may be printed thereon.

The present invention contemplates means useful in the foregoing to more positively indicate the intelligence and to prevent the operation of the mechanism in the presence of matter not intended to effect the operation.

Still another advantage of the present invention resides in causing the indication to be effected only by marking, the density of which is between certain limits thus assuring the correct operation of the apparatus.

A still further advantage resides in providing a pulse which is independent of the width of the line and which permits operation with accuracy regardless of whether the control marking is wide or narrow.

Other advantages of the invention and the invention itself will become more apparent from the following description of an embodiment thereof which is illustrated by the accompanying drawings and forms a part of this specification.

In the drawings:

Fig. 1 is a block diagram of one embodiment of my invention;

Fig. 2 is a similar view of another embodiment;

Fig. 3 is a graphic chart showing the operation of Fig. 1; and

Fig. 4 is a similar view illustrating the action of Fig. 2.

As described in my above mentioned application, I provide a scanner which scans a series of recurring lines, which are indications of intelligence, to generate pulses which are locked or controlled by a second scanner which scans a line or lines coincident to the series of recurring lines to cause the indication or recording of intelligence.

In the drawings, the scanner is indicated at 10 and the card being scanned at 11. The scanner may be as described in my copending application wherein a series of lines are scanned to cause

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pulses of current to be provided by black lines. The duration of a pulse depends on the width of the line and the speed of scanning, while the amplitude depends on the strength or the degree of blackness thereof. It will be appreciated that in the case where the coincident marking, placed on the cards manually, there may be some variance in the marking which will cause variance in the current, depending on the blackness of the line and the width thereof. Furthermore, there may be times when the texture of the paper will vary in its reflecting properties to such a degree as to affect the accuracy of the operation. In some instances, the paper may be lined paper or paper in the form of the well known safety checks, either of which conditions are liable to affect the operation and the resultant accuracy. In this respect, I make provision for means which will eliminate accidental effects and only take into account the actual lines desired.

In carrying this out, the signals from the scanner are transferred to an amplifier circuit 12 where they are raised to a predetermined level. The amplifier circuit has coupled thereto a limiter circuit, which may be of any well known construction, and which is designed to eliminate all signals below a certain level and to reduce the other signals to a predetermined value; or if preferred, the amplifier may be biased to prevent amplification of all signals below a predetermined level and to only amplify signals above the desired level, which signals are fed to the limiter circuit that removes those portions of the signals above a predetermined level to provide a resultant pulse of current of square wave form.

The effect of such a circuit as determined and illustrated in Fig. 1 is shown in Fig. 3. Here the undesired signals or background noise is indicated by the irregular line 15 but is not recorded because it is eliminated in the circuit. The circuit is designed to cut out all signals below the threshold value as indicated by the line 16 and to transmit only such signals as have a greater value. The desired signal is illustrated at 17 and is a square pulse of current because the limiter circuit removes the top of the signal as indicated at 18 to provide the resultant square wave which is used to operate the indicator circuit.

By this combination, all the signal or background noises are removed and a clean cut square signal is provided which provides accuracy of recording.

It will be appreciated that due to the human

element, the coincident lines may vary between wide limits. For instance, they may not be of sufficient duration (thickness) to provide the desired operation. This might be due to the marking instrument showing too fine a line or because the line was not straight. In some instances, the line might be so wide as to cause a double indication.

In these instances, I provide an apparatus illustrated diagrammatically in Fig. 2 which includes the amplifier **12** that is connected to a pulse generator **20**. The scanning of a line causes a signal which is amplified in the amplifier **12** and triggers a pulse generator **20**. In this case, the output from the pulse generator is as shown in Fig. 4. It will be noted that the background signal is completely eliminated, and that a pulse of predetermined height is generated, which pulse is independent of the width, thickness or density of the line being scanned and of a value sufficient to assure the operation of the apparatus. The pulse generator after once being triggered provides a pulse of predetermined value and width independent of the triggering signal. It may be narrower than the triggering signal, thus assuring of a discrimination between the signals and preventing one signal from causing two pulses and hence an incorrect count.

It will, therefore, be seen that by my invention I have provided means whereby a high degree of accuracy may be maintained in the presence of extraneous markings that might have a tendency toward causing inaccurate readings, and that the tendency to error is decreased in the event of poorly or carelessly marked cards.

It has also been shown how the system can be made to discriminate between markings intended to indicate intelligence and markings which are merely incidental to the material marked upon. It should further be noted that the system also provides for a greater degree of accuracy in the presence of a wide variation in the speed with which the matter is scanned because in the case where the pulse generation is used, the size of the pulse is independent of the size of the mark, and there is no opportunity for one mark to cause the generation of two pulses as might occur for a very wide mark or a slow scanning speed.

Having thus described my invention, I am aware that numerous and extensive departures may be made therefrom without departing from the spirit or scope of my invention.

I claim:

1. An apparatus of the class described, including a scanning system adapted to scan a series of markings and to provide single impulses of current from each of said markings, amplifier means for amplifying said impulses and limiter means for limiting the amplitude of said impulses.

2. An apparatus of the class described, including a scanner for scanning a series of lines to generate a series of discrete impulses therefrom, said scanner being movable transversely to said lines, amplifier and limiter means for amplifying all impulses above a predetermined level and for limiting all of said transmitted impulses to a predetermined level.

3. An apparatus of the class described including scanning means for scanning a record and to produce impulses therefrom, a pulse generator connected to said scanning means and operated thereby to generate pulses as a result of said impulses, said generated pulses being independent of the amplitude or duration of said control impulses.

4. An apparatus of the class described including scanning means for scanning a record to produce impulses therefrom, amplifying means connected to said scanner for amplifying said impulses and a pulse generator connected to said amplifier adapted to be triggered thereby to generate pulses of predetermined level and duration, said generated pulses being independent of amplitude and duration of said triggering impulses.

5. The method of operating a recording or indicating mechanism which comprises scanning a record containing intelligence to remove said intelligence in the form of discrete impulses, utilizing said impulses to trigger a generator of pulses and generating discrete pulses corresponding to the discrete impulses of a predetermined value and duration independent of the amplitude or duration of the triggering impulse.

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