

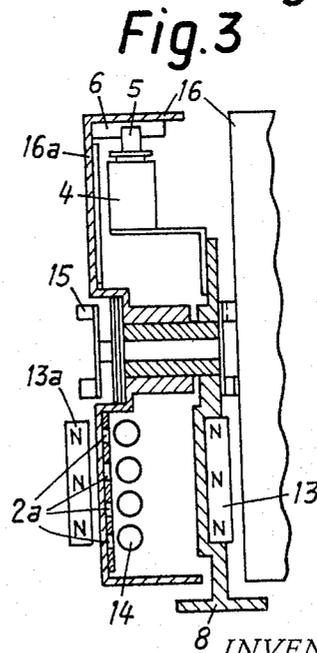
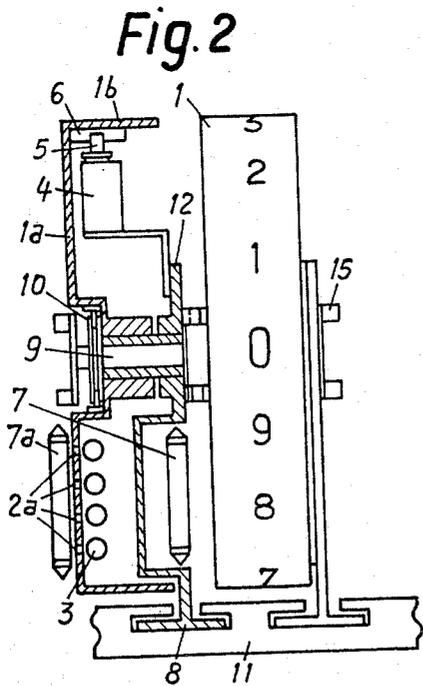
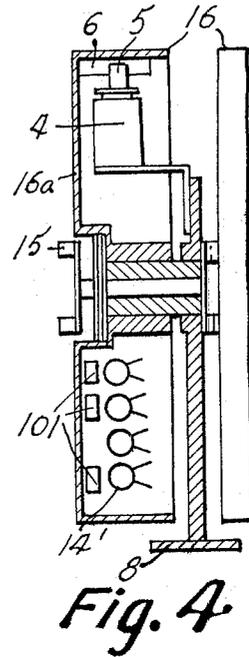
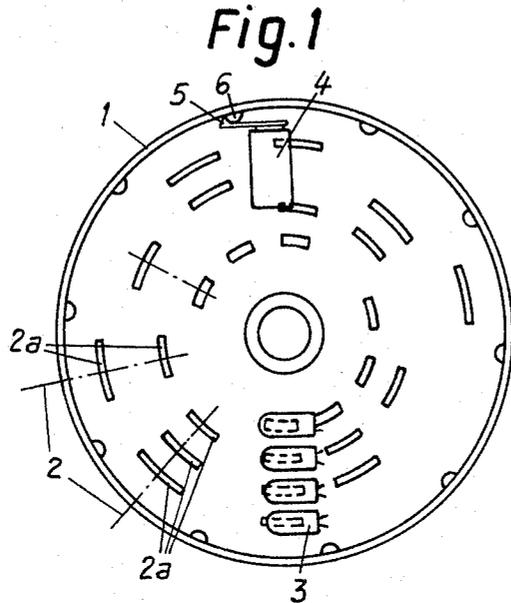
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3,281,819

TEMPLATE CONTROLLED FIGURE DISPLAY DRUM

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3,281,819
TEMPLATE CONTROLLED FIGURE
DISPLAY DRUM

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The present invention generally relates to counters and the like and, more particularly, to a readout system of the type employing one or more figure drums or rollers, on the periphery of which there are arranged symbols, figures, letters or markings which are to be indicated or read. The present invention is particularly adapted for reading-out symbols or the like at a location remote from the counter assembly which sends a control pulse or the like adapted to cause rotation of the figure drum into a position whereby the proper symbol or information transmitted can be easily read.

In order to permit the reading of counters at large distances, it is necessary to employ figure drums having correspondingly large symbols or figures. It is no longer possible to drive the figure drums or rollers directly by means of the counter if the rate or speed of the counting operation exceeds a predetermined value. Accordingly, there have already been provided figure drums which are continuously and remotely driven through the intermediary of friction or gliding coupling and provided with stopping or braking devices which are controlled from the sender counter and are adapted to hold the figure drums in their proper position. The heretofore known processes and arrangements have, however, been very complicated since it was necessary to provide for each symbol or figure of each roller a corresponding element, such as perhaps a locking magnet or a switch.

The present invention relates to a particularly simply controlled roller or figure drum which operates in the following manner: Each symbol or number from zero to nine is characterized by a combination of four switch or indexing positions. Sixteen combinations are possible, and the teachings of the invention also permits it to be applied to non-decadic rollers. If further combinations are desired then the principle of the present invention permits of such deviation or amplification. An easy manner of calculating the maximum number of symbols which can be handled with a particular combination of control cables or wires can be determined by the formula $y=2^x$; where x designates the number of control wires or switches associated in the control circuit between the sender and figure drum. Thus, for example, with five switches or indexing positions thirty-two combinations are possible which, accordingly, permit the transmission of thirty-two symbols or figures spaced about the periphery of the roller.

In the illustrated embodiments, the ten combinations conform to ten templates or stencils which are concentrically arranged about the axis of the figure drum or roller in such a manner that each combination represents one figure on the periphery of the roller.

The templates may be, by way of example, cams which are able to engage four switches, or also slotted holes or slits through which light may fall upon four photocells, or further, any other suitable devices by means of which an electric circuit may be closed. Particularly suitable for this purpose is magnetic controlling device which operates, for example, in such a manner that the lines of force of a stationary magnet are screened or adjusted by means of one of the templates made of soft iron forming the plate or sheave portion of the roller. Behind the template there are arranged four switches or the like which are able

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to be magnetically actuated. Such occurs when during the constant turning of the figure drum a notch or cutout of the template is interposed between magnet and switch. With the present day commercially available magnetic influenced vacuum switches the wear and tear is slight or negligible, so that a very long useful life of the arrangement results, while moreover, such magnetic switches are free from the danger of causing explosions when working in atmospheres containing explosive gases.

Naturally, the last-mentioned principle of operation of the present invention may also be reversed. In such an application, there is provided for each symbol of figure a combination of small permanent magnets which are arranged on a non-magnetic roller member, which magnets actuate the magnetic switches upon passing thereof. Such an arrangement permits dispensing with the soft iron shielding, although the consumption of magnets is naturally considerable.

The figure drums may advantageously be continuously driven in a manner known to the art via a friction or slipper clutch. As a result, the ten templates glide in a continuous manner past the switching arrangement. If the sender transmits a particular combination through the four control lines to the figure drum or roller, a current will only flow through the control circuit when exactly that template which represents this particular combination is positioned in front of the switching device. The current then energizes a suitable braking device which arrests the movement of the figure drum so long as such combination is present. Of course, as is readily evident to those skilled in the art, a reverse operation of the system is also possible such that the current for the braking means is interrupted thereby causing actuation of the braking device to carry out a corresponding braking of the figure drum. The blocking or braking action can be accomplished, by way of example, by providing the roller with ten projections or indentions, each of which is associated with one of the symbols or figures and that a magnet attracts a locking pawl or the like which engages with one of the projection or indentations. The exact manner in which input signals from a sender can control a switching arrangement in the receiver and circuitry suitable for such is well known to the art, one such possibility being described in United States Patent 2,676,289, invented by A. H. Wulfsberg et al. and granted April 20, 1954.

It is to be understood that the term "symbols" is used herein in its broader sense and encompasses letters, numbers, markings, and generally any information which it to be transmitted and read-out. Further, the term "counter" is to be understood as encompassing various types of senders suitable for transmitting the information to be read-out.

Accordingly, it is an important object of the present invention to provide means for reading-out symbols or the like in a reliable and accurate manner.

A further object of the present invention is to provide means capable of handling the read-out of a large quantity of symbols or the like in a safe and reliable manner, which means is of simplified construction and very economical in its manufacture.

Still further important object of the present invention is to provide a system for the read-out of symbols or information transmitted from a remotely positioned sender, such as a counter assembly, which system permits indexing of a figure-drum to the desired read-out position by suitable switching elements which do not physically contact the figure drum.

Yet a further noteworthy object of the present invention is to provide a read-out system readily capable of processing large quantities of information in a quick and

positive manner, which system is simplified in its construction and highly economical to manufacture.

Another important object of the present invention is to provide an improved arrangement for reading-out information employing one or more rotatable drum members carrying said information, and wherein a single brake member is provided for each drum member to arrest the latter in a desired read-out position.

These and still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

In the drawings:

FIG. 1 is a front elevational view of a first embodiment of the present invention illustrating a read-out figure drum controlled by photoelectric cells;

FIG. 2 is a side elevational view, partly in cross-section, of the arrangement shown in FIG. 1 and depicting two read-out figure drums arranged adjacent one another; and

FIG. 3 is a further embodiment of the present invention showing a read-out figure drum, such as illustrated in FIGURES 1 and 2, but employing magnetic switching means;

FIG. 4 illustrates still another embodiment of the present invention wherein the read-out figure drum uses small permanent magnets for actuating magnetic switches.

Referring now to the drawings wherein the same reference characters have been used throughout the different embodiments for the same or analogous elements and, more particularly to FIGURES 1 and 2, there is illustrated a first embodiment of a read-out system for a counter or the like employing one or more figure drums 1 which are operated in conjunction with photoelectric cell means 3. The figure drum or roller 1 is constructed in the form of a template or plate 1a which supports at its outer periphery 1b a plurality of symbols or figures which are to be read-out. For convenience in description, and by way of example, the numerals zero to nine are shown arranged at the peripheral surface of the figure drum 1, as best seen in FIGURE 2.

The vertically arranged plate or template portion 1a of the figure drum 1 is conveniently divided into a plurality of sectors 2 which correspond in number to the number of symbols or other information to be read-out. In the illustrated embodiment of FIGURES 1 and 2, where the numerals zero to nine are being processed, ten such sectors are provided, with each sector containing a particular grouping or arrangement of cutouts or slots 2a. As can clearly be seen from FIGURE 1, the arrangement of the slots 2a for the ten sector groupings differ from one another, such that the collective slots 2a of one particular sector designates one of the symbols to be read-out. During the rotation of the figure drum 1, the slots 2a of each sector move past a suitable switching arrangement consisting of the four stationary photoelectric cells 3 and are lit-up by the lamp member 7a. Thus, in operation, should a particular sector of the figure drum 1 move past the photoelectric cells 3 such that the arrangement of the slots 2a of said sector corresponds to the combination or signal transmitted from the sender (not shown), then the electromagnetic brake means 4 supported by the bearing portion 12 of the support bracket 8 for the figure drum 1 becomes energized. As a result, the braking means causes the locking pawl 5 to engage behind the associated locking cam surface or holding protrusion 6 provided for each of the sectors 2, with the result that the rotational movement of the figure drum 1 is arrested.

In FIGURE 2 there is illustrated a pair of juxtapositioned figure drums or rollers, with the left-hand roller member being shown in section to reveal the mounting

assembly therefor. As can clearly be seen from the drawing the figure drums 1 are each supported by the bracket means 8 attached to the base plate 11. The bracket means 8 are provided with a bearing portion 12 which rotatably support a shaft member 9 which carries the figure drums 1. The shaft member 9 supports at each of its ends a carrier plate or entrainment means 15 by means of which further roller units may be coupled thereto. Such an arrangement readily permits the exchange or replacement of any of the figure drums 1 in a relatively simple and quick manner. Naturally, it is also possible to dispense with the divided arrangement of the support shaft 9 and to support all the individual rollers 1 of the read-out counter on a continuous shaft arrangement.

Secured to the bracket member 8 are the four photoelectric cells 3 and the lamp member 7, while for the sake of clarity in illustration the details of the mode of fastening have not been shown. Moreover, the rays of light from the lamp member 7a may pass directly through the slots 2a onto the photoelectric cells 3, or else may be reflected with the aid of suitable mirror means as is known to the art. The arrangement of the read-out system is such that the lamp 7 supported by the bracket member 8 serves to illuminate the roller member 1 appearing at the right-hand portion of FIGURE 2, whereas the lamp 7a for the left-hand roller 1 of said figure may be carried by a similar bracket member not shown, or else in any other suitable manner. The individual figure drums 1 are continuously driven by a suitable motor known to the art through the intermediary of the shaft means 9 and the slip coupling means 10.

The embodiment illustrated in FIGURE 3 substantially corresponds to that illustrated in FIGURES 1 and 2, with like reference numerals generally denoting similar elements. The primary difference between the embodiment of FIGURE 3 from the preceding discussed embodiment resides in the feature that the lamps 7 and 7a are replaced by the permanent magnets 13 and 13a, which by means of the cutouts or slits 2a appearing in the magnetizable template or plate portion 16a of the figure drum 16 are adapted to actuate the vacuum-magnetic switches 14. The magnets 13a and 13 are thereby poled such that one pole, for example the north pole, is arranged at the top of the plane of the paper and the other pole at the bottom thereof. The operation of this system thus corresponds to an arrangement of four adjacently arranged magnets, with each magnet being associated with one of the four vacuum switches 14. Such an arrangement is shown in FIGURE 5 wherein it will be understood that for each individual grouping there is provided a maximum of four permanent magnets 101 secured to the template portion 16a of figure drum 16 and cooperating with the stationary magnetic actuated switches 14'. In all other respects the arrangement of FIGURE 5 substantially corresponds to that of FIGURE 3, for which reason like reference characters are again employed. Considering FIGURE 3 again it will be seen that the slits 2a of the plate or template 16a permit the magnetic lines of force to pass to the magnetic switches 14 to cause actuation of the braking means 4, much in the manner as previously described during the explanation of the embodiment shown in FIGURES 1 and 2.

In FIGURE 4 there is illustrated a further embodiment of a read-out figure drum 1, substantially similar to the embodiments of FIGURES 1 and 2, with like reference numerals again denoting similar elements. In this embodiment, however, the template 1b is provided with switch actuating means in the form of cam members, here illustrated as four individual cam plates 20, 21, 22, 23 each of which is adapted to actuate an associated switch member 24, 25, 26 and 27 respectively. The switch members 24 and 26 are arranged offset to the switch members 25 and 27, with each pair of switch members 24, 26 and 25, 27 being mounted to the bracket means 8 by a support member 28, only one of which is

shown. The individual cam plates 20, 21, 22 and 23 are each provided with a cam control surface 29 which is so designed that for a given angular rotation of the cam plates 20, 21, 22, 23 a predetermined group of the switches 24, 25, 26 and 27 are actuated. Thus, the arrangement of the cam plates 20, 21, 22, 23 with specially designed control surfaces is able to perform a selective switch actuating function, in a manner substantially similar to the selectively arranged groupings of slots of FIGURES 1 to 3. It will of course be apparent to those skilled in the art that in place of four cam plates 20, 21, 22, 23 it is equally possible to provide a single cam member provided with four control surfaces, whereby the operation is identical to that aforesaid.

It should thus now be readily apparent that the figure drum of the present invention is readily capable of providing for a positive and reliable read-out of information, and is relatively simplified in construction and operation in that only a single brake member is required for each figure drum. As will further be evident from the foregoing description, the switch actuating means of the template may conveniently be designed as selectively arranged groupings of slots or cam members.

Having thus described the present invention what is desired to be secured by United States Letters Patent is:

1. In a device for reading-out symbols or the like indicated by a sender adapted to control a figure drum, the combination of; at least one figure drum adapted to be rotated, each figure drum being provided with a plurality of symbols which are to be read-out, each said figure drum including a template portion provided with means adapted for actuating switching means associated with said figure drum, said switch actuating means defining distinguishable individual groupings, with each of said individual groupings designating one of said symbols of said figure drum to be read-out, a single brake member cooperating with each figure drum for braking the same at a desired position to indicate a particular symbol which is to be read-out, and switching means cooperating with each figure drum adapted to be actuated when said individual groupings are positioned in operative relation relative to said switching means, and when said thus positioned individual grouping of said switch actuating means corresponds to a control signal transmitted by said sender, said braking means is caused to carry out braking of said figure drum into said desired position to indicate said particular symbol which is to be read-out, said individual groupings designating one of said symbols to be read out comprising a plurality of individual permanent magnets, said switching means including a plurality of stationary magnetic actuated switches corresponding in number to the maximum number of permanent magnets of an individual grouping, said permanent magnets being supported for rotation on said template portion of said figure drum and being adapted to actuate said stationary magnetic actuated switches during movement therepast.

2. In a device for reading-out symbols or the like indicated by a sender adapted to control a figure drum, the combination of: at least one figure drum adapted to be rotated, each figure drum being provided with a plurality of symbols which are to be read-out, each said figure drum including a template portion provided with means adapted for actuating switching means associated with said figure drum, said switch actuating means defining distinguishable individual groupings, with each of said individual groupings designating one of said symbols of said figure drum to be read-out, a single brake member cooperating with each figure drum for braking the same at a desired position to indicate a particular symbol which is to be read-out, and switching means cooperating with each figure drum adapted to be actuated when said individual groupings are positioned in operative relation relative to

said switching means, and when said thus positioned individual grouping of said switch actuating means corresponds to a control signal transmitted by said sender, said braking means is caused to carry out braking of said figure drum into said desired position to indicate said particular symbol which is to be read-out, said template portion of each figure drum being divided into a plurality of sectors corresponding in number to the number of symbols to be read-out, each of said sectors being provided with slit means arranged in a definite pattern to define said individual groupings, each of which designates one of said symbols, said switching means comprises lamp emitter means and photoelectric cell means, said lamp emitter means and said photoelectric cell means being fixedly positioned on opposite faces of said template portion of said figure drum, said photoelectric cell means corresponding in number to the maximum number of slit means appearing in any individual sector.

3. In a device for reading-out symbols or the like indicated by a sender adapted to control a figure drum, the combination of: at least one figure drum adapted to be rotated, each figure drum being provided with a plurality of symbols which are to be read-out, each said figure drum including a template portion provided with means adapted for actuating switching means associated with said figure drum, said switch actuating means defining distinguishable individual groupings, with each of said individual groupings designating one of said symbols of said figure drum to be read-out, a single brake member cooperating with each figure drum for braking the same at a desired position to indicate a particular symbol which is to be read-out, and switching means cooperating with each figure drum adapted to be actuated when said individual groupings are positioned in operative relation relative to said switching means, and when said thus positioned individual grouping of said switch actuating means corresponds to a control signal transmitted by said sender, said braking means is caused to carry out braking of said figure drum into said desired position to indicate said particular symbol which is to be read-out, said template portion of said figure drum being divided into a plurality of sectors corresponding in number to the number of symbols to be read-out, each of said sectors being provided with slit means arranged in a definite pattern to define said individual groupings, each of which designates one of said symbols, said switching means comprising a stationary magnet arranged on one side of said template portion and magnetic switches arranged on the other side of said template portion, said template portion of said figure drum being formed of a magnetic conducting material, said magnetic switches being actuated wherever one of said slit means appears between said stationary magnet and one of said magnetic switches, while otherwise the lines of force of said stationary magnet are screened from said magnetic switches and pass through said magnetic conducting material of said template portion, said magnetic switches corresponding in number to the maximum number of slit means appearing in any individual sector.

4. In a device for reading-out symbols or the like indicated by a sender adapted to control a figure drum, the combination of; at least one figure drum adapted to be rotated, said figure drum including a plurality of symbols which are to be read-out, said figure drum including a template provided with switch actuating means, said switch actuating means defining distinguishable individual groupings, with each of said individual groupings designating one of said symbols of said figure drum to be read-out, a single brake member cooperating with said figure drum for braking the same at a desired position to indicate a particular symbol which is to be read-out, and switching means cooperating with said template and adapted to be actuated when said individual groupings are positioned

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in operative relation relative to said switching means, and when said thus positioned individual grouping of said switch actuating means corresponds to a control signal transmitted by said sender, said braking means is caused to carry out braking of said figure drum into said desired position to indicate said particular symbol which is to be read-out, said switch actuating means of said template comprising individual changes in the surfaces of said template whereby discrete control areas form said individual groupings, each of which designates one of said symbols to be read-out, said switching means comprising separate independent switches, said control areas cooperating with said independent switches to actuate said switches independent of electrical connection therewith.

5. The combination defined in claim 4 wherein said plurality of symbols consist of a maximum of sixteen differing symbols wherein said switch actuating means consists of a maximum of four individual switch actuating means and wherein said switching means consists of four independent separate switches.

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