May 8, 1956 M. M. MOORHEAD, JR., ET AL 2,745,092

STROBOSCOPIC VISUAL INTELLIGENCE PRESENTER

Filed April 23, 1953 2 Sheets-Sheet 1

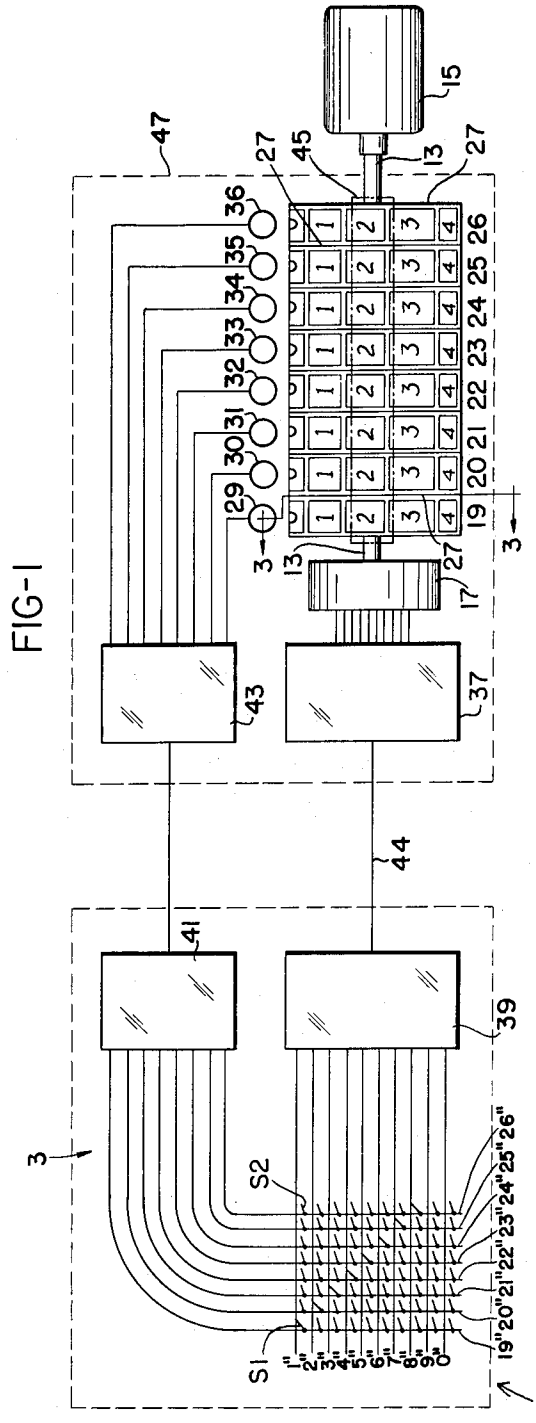


FIG-1

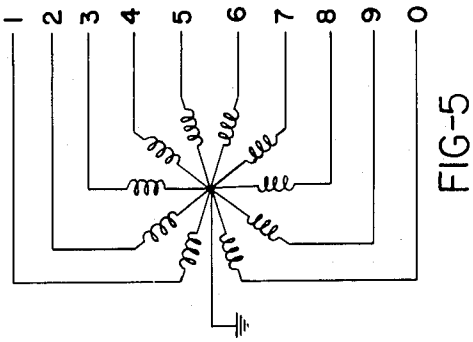


FIG-5

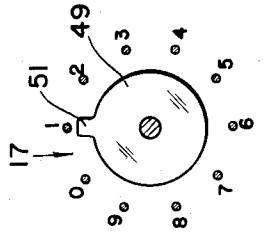


FIG-4

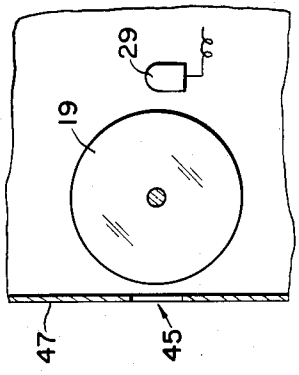


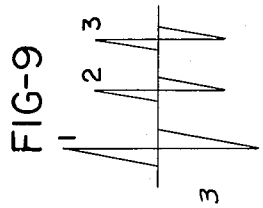
FIG-3

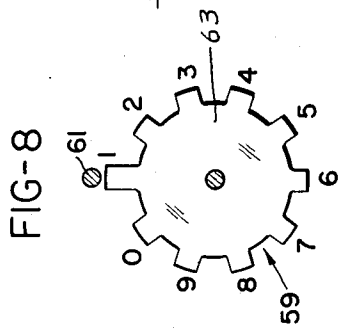
INVENTOR.
MILTON M. MOORHEAD JR.
JAMES C. PARKER
BY Toulmin & Toulmin
ATTORNEYS

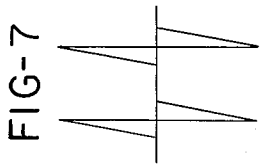
May 8, 1956 M. M. MOORHEAD, JR., ET AL 2,745,092

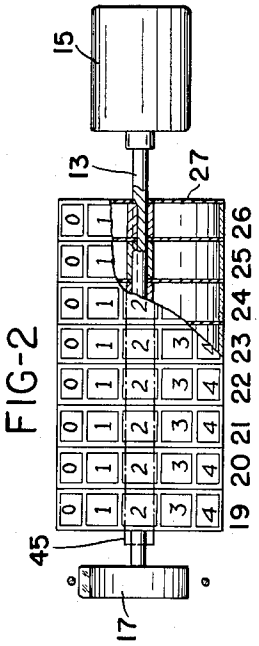
STROBOSCOPIC VISUAL INTELLIGENCE PRESENTER

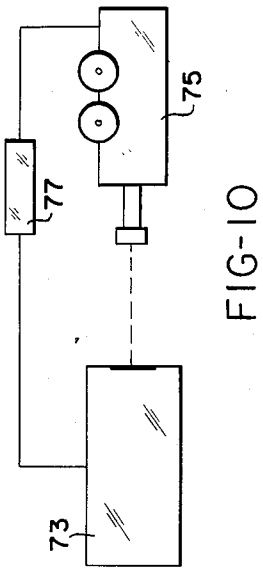
Filed April 23, 1953 2 Sheets-Sheet 2

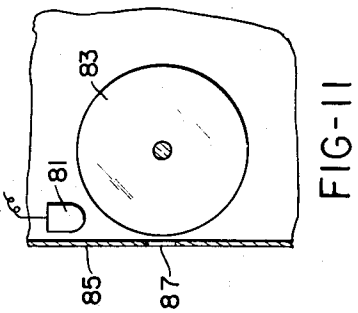


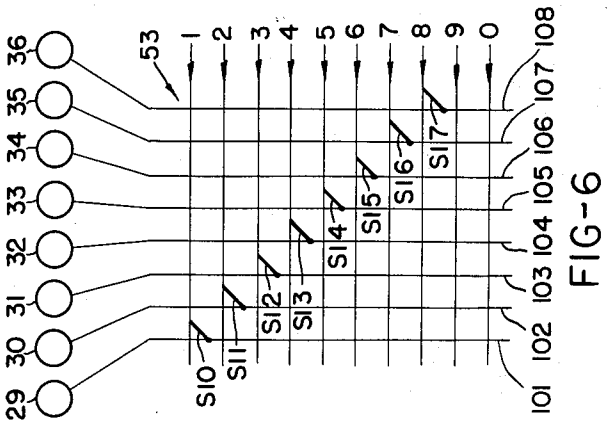












INVENTOR.
MILTON M. MOORHEAD JR.
JAMES C. PARKER
BY Toulmin & Toulmin
ATTORNEYS

United States Patent Office 2,745,092 Patented May 8, 1956

2,745,092

STROBOSCOPIC VISUAL INTELLIGENCE PRESENTER

Milton M. Moorhead, Jr., and James C. Parker, Dayton, Ohio, assignors to The Commonwealth Engineering Company of Ohio, Dayton, Ohio, a corporation of Ohio

Application April 23, 1953, Serial No. 350,708

2 Claims. (Cl. 340—318)

This invention relates to a visual intelligence presenter and particularly to an indicating system for the display or recording of indicia at a receiving station in response to the actuation of a suitable sending device at a distant point.

Many devices for the speedy transmission of intelligence are known and they include telephony machinery, Teletype systems, bar printing devices, facsimile transmissions, and so forth. One high speed electric counter system employs quick acting gas glow tubes positioned behind a translucent screen on which numbers are inscribed; the glow tubes are illuminated by signals received from a distant point and each glow tube illuminates one number. In this latter arrangement however the indicia appear scattered horizontally and vertically over the screen and reading thereof is accordingly difficult. In general it may be stated of all these systems that they are inherently limited in speed transmission and in some instances, as indicated above, the received intelligence is not well organized.

It is a primary object of this invention to describe a visual presenter system which presents the received intelligence in an organized arrangement and which is capable of presenting a very large amount of intelligence in a compact spacing.

It is an important object of this invention to describe a receiving system for intelligence which system is capable of accepting the intelligence at an extremely high rate of speed.

These and other allied objectives of the invention are attained by providing character wheels in the form of a series of aligned members having suitable indicia thereon; these members are mounted for rotation together, and adjacent each member and positioned to illuminate the indicia thereon is a glow lamp or stroboscopic light source and means are provided to selectively actuate the light source upon receipt of signals from the sending station.

The light source is energized selectively preferably through means of a pulse generator mounted for rotation on a shaft with the aligned members, and suitable switching or gating members are provided to direct the pulse to a proper light source; the shaft carrying the members and pulse generator is itself, in the preferred embodiment of the invention, rotated at a constant speed having, usually, a synchronous relation with the message sending apparatus.

The precise nature of the synchronizing means will vary with the nature of the sending apparatus and may involve transmission line equipment such as is employed in telephony; or in the case of signals to aircraft, a synchronous wave may be transmitted by a generator and utilized as a comparison voltage with one generated by a similar generator on a shaft in the airplane; the difference of the voltages then, for example, may serve as an input to a servo-mechanism system controlling the speed of the aircraft shaft; synchronous pulse transmission may also be employed in the manner known in the art in the practice of the invention. The glow lamps or light sources

may however be selectively energized, in response to pulse generator rotation, through simple wired connections without departing from the spirit and scope of this invention.

In a preferred embodiment of the invention the indicia on the multiplicity of the aligned rotating character wheels or members may be the ten numerals ranging from zero to nine; the corresponding numerals of each member are in lateral coincidence and each may be illuminated in response to pulses from the generator to the proper light source. The corresponding indicia, for example, all of the 9's may be illuminated at one time from the one pulse generator source. The speed of rotation of the members or character wheels bearing the indicia and accordingly the speed of the equipment at the transmitting station is high, that is, in excess of 100 revolutions per second and accordingly the pulse rate is high and when the light sources are actuated thereby the indicia appear steady since the eye is unable to distinguish the flashes.

With the apparatus of this invention it is also feasible to present the intelligence at such a rapid rate that the same would not appear for a sufficient length of time to be read by a human observer. In this instance a high speed camera synchronized for actuation with the presenter may be employed and the recorded intelligence may be later run at a slower rate to render the transmission intelligible.

The invention will be more fully understood by reference to the following detailed description and accompanying drawings wherein:

Figure 1 is a schematic arrangement illustrating the visual presenter system of the invention and a mode of operating the same;

Figure 2 is a view partially in section of a portion of Figure 1 illustrating the preferred embodiment of the invention;

Figure 3 is a side view of a character wheel and associated glow tube;

Figure 4 illustrates the pulse generator and coil arrangement thereof;

Figure 5 illustrates a circuit arrangement for the pulse generator;

Figure 6 illustrates schematically a manner of connecting the arrangement of Figure 5 to the glow tubes selectively;

Figure 7 illustrates the wave form of the pulse derived from the generator of Figure 4;

Figure 8 illustrates another form of pulse generator;

Figure 9 illustrates the wave generated by the generator of Figure 8;

Figure 10 illustrates an embodiment of the invention useful in conjunction with photographic recording; and

Figure 11 illustrates the positioning of the light source with respect to the character wheel when the latter is opaque.

Referring now to Figure 1 of the drawings there is indicated generally at 1 a transmitting station comprising any suitable distributor means 3 for energizing a line in response to the selection of indicia by an operator, tape, etc. Thus in simplified form the distributor 3 may comprise a series of conductors 19″, 20″, 21″, 22″, 23″, 24″, 25″, 26″, which are shown as vertical lines in the figure. Connectible to these lines at the election of an operator are the horizontal conductors 1″, 2″, 3″, 4″, 5″, 6″, 7″, 8″, 9″, 0″, the electrical connections being made through switches as at S1, S2, etc.

Shown to the right in Figure 1 is a receiving unit which comprises the visual presenter of this invention and includes a shaft 13 driven by a suitable source of power as motor 15; shaft 13 fixedly mounts a pulse generator 17 and a series of character wheels, eight in

number in the present instance. These character wheels numbered 19 to 26, inclusive, are solid and are of transparent plastic with the periphery thereof being inscribed with suitable indicia, for example, the numerals from zero to nine. The numerals appear sequentially on each wheel and corresponding numerals on adjacent wheels are in locked lateral alignment at all times. The lateral sides of these wheels as at 27 are treated with an opaque material to prevent passage of light between wheels.

Behind each character wheel is a stroboscopic light source or glow tube—as indicated at 29 to 36, inclusive. These tubes are electrically connected to be selectively energized upon the production of pulses by the pulse generator 17; the pulse energy may be fed selectively to the tubes through any suitable switching or gating system; in Figure 1 the generated pulses are fed from the generator through a suitable modulator 37, demodulator 39 at the transmitting station, modulator 41 and demodulator 43; connection between the sending and receiving stations being made through 44, the precise nature of which will depend upon the type of transmission, i. e. telephony, etc. Through this or a similar system (Figures 5 and 6) the pulses are directed to arrive at the proper glow tube at the correct time to illuminate the indicia of a given character wheel as it passes the window 45 in housing 47. The entire character wheel associated with the energized glass tube will be illuminated because the wheel is made from a solid translucent plastic which transmits light.

The pulse generator 17 which initiates the glow tube energization consists (Figure 4) of a rotor 49 having a single pole 51, and a stator having as many pick up coils as there are numerals on the character wheels, in the present case, ten. As indicated in Figure 5 these ten coils are star connected, and accordingly as the rotor moves under each coil a pulse will be generated at the tap corresponding to the coil. The pulse generated by each coil may be utilized to illuminate any one or all of the character wheels to present a single given numeral, as for example 9, at the viewing window.

Control of the numeral illumination is achieved as indicated in Figure 1 through any suitable switching arrangement or very simply when distance and the number of wires are not a material factor by the schematically illustrated arrangement of Figure 6. In the latter figure the ten taps 0, and 1 to 9, inclusive, are indicated as led on separate wires into a switching arrangement 53 wherein a group of vertical leads are indicated numbered 101 to 108, one lead for each tube 29 to 36, inclusive. The horizontal and vertical leads are connectible through switches, a few of which are indicated at S10, S11, S12, S13, S14, S15, S16, S17, etc., one switch for each of the star connected leads and each vertical lead, the switches being operable if desired by a human operator, or more preferably by an electrical or mechanical agency.

It is thus possible by employing 80 switches (not all shown for sake of clarity) to connect the pulse output of the tend leads of Figure 5 to any glow tube at the proper time to illuminate any numeral on any character wheel. Thus the numeral 12345678 may be shown in the window by simply rotating the shaft 13 at a high rate of speed, as 100 cycles per second, and maintaining the switches shown in Figure 6 closed. This high rate of speed makes the illumination of the numerals of the discs or wheels appear steady to the eye.

The pulses generated by the structure of Figure 4 will all be sharp and of equal amplitude as shown in Figure 7. However in some instances as, for example, when the multiplicity of leads from the pulse generator to the control switching arrangement becomes an undesirable factor as when these two units are widely separated, it may be desirable to count or monitor the pulses transmitted along a single lead in order to determine which character is in the proper viewing position, and the generator 59 of Figure 8 which includes a single pick-up coil 61 and a rotor 63, having as many poles as there are character positions on the wheel, is useful for this purpose. Rotor 63 movement furnishes on a single lead a series of pulses each revolution which is equal to the number of character positions on the wheel—however since the No. 1 pole is larger than the others the pulse generated thereby is larger and may be used to indicate rotor position and thereby to synchronize the distribution of pulses so that the proper characters are illuminated, as well as to control the number 1 position when desired. Such a pulse output is illustrated in Figure 9.

The visual presenter of the invention may also be employed at rates of speed of intelligence presentation which exceeds that which the eye is capable of capturing. Thus as shown in Figure 10 the incoming signal may be provided to the presenter 73 which is positioned before a high-speed camera 75 synchronized through motor drive 77 to film the rapidly changing intelligence on the presenter window. The film after development may be projected at a slow speed to render the transmitted intelligence understandable.

It is thus to be noted that the presenter of the invention provides a compact arrangement of light weight, capable of extremely high rotational speeds and operable to provide as many as 100 lines per second of intelligence. The discs or character wheels themselves since they may be very small, as may be the pulse generator, do not impose an important restriction on the rotational speed; if desired the numerals may be so small and compacted together as to require an optical system for viewing.

The presenter is responsive to signals, amplified preferably, transmitted through conductor lines, or even by radio waves, and the nature of the transmission does not alter the basic concept; it is to be noted, for example, that synchronous equipment common to telephony systems may be utilized and that the transmitting station may have suitable pulse generating equipment for controlling energization of the glow tubes of the receiver.

It is also to be noted that the character wheels need not be translucent but may be opaque in which case, as in Figure 11, the glow tube 81 is positioned to direct light to the surface of the character wheel 83 within the housing portion 85 to permit viewing of the indicia through window 87.

Fundamentally then the arrangement of invention comprises (1) means to position a series of similar numerals in alignment; (2) means to indicate to the operator or signal sending apparatus the particular numeral which is viewable; (3) means to apply pulse energy periodically in step with numeral movement to the desired tube or tubes to illuminate stroboscopically a numeral or numerals of the aligned similar numerals.

It will be understood that this invention is susceptible to modification in order to adopt it to different usages and conditions and accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

We claim:

1. An apparatus for visually indicating intelligence and comprising a plurality of coaxially aligned character wheels having contacting lateral surfaces, said wheels being solid and translucent with light being readily transmitted therethrough, there being means between said wheels to prevent the passage of light therebetween, there further being indicating characters on the peripheries of said wheels with corresponding characters on the several wheels being arranged permanently in lateral alignment and parallel to the common axis of said wheels, a housing enclosing said character wheels and having a window therein, said window extending across all of said character wheels and having a width sufficient to display only one character from each wheel, a separate flash light source positioned adjacent the periphery of each character wheel and coplanar therewith, means for rotating said character wheels at a rate greater than sixteen revolutions per second, a plurality of means corresponding to said

character wheels for selectively illuminating said flash lights when predetermined characters are aligned with said window whereby the several selected characters appear as a single stationary line of characters when the wheels are revolving at a speed greater than sixteen revolutions per second.

2. An apparatus as claimed in claim 1 with said means between the wheels comprising opaque material on the lateral sides thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

739,572	Armstrong	Sept. 22, 1903
1,933,650	Bascom	Nov. 7, 1933
2,214,209	Triplett	Sept. 10, 1940
2,278,993	Johnson	Apr. 7, 1942
2,440,797	Clough	May 4, 1949
2,561,881	Oetting	July 24, 1951
2,633,297	Quinby	Mar. 31, 1953
2,640,144	Levy	May 26, 1953