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CONTINUOUS FACSIMILE SCANNER

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Fig. 1.

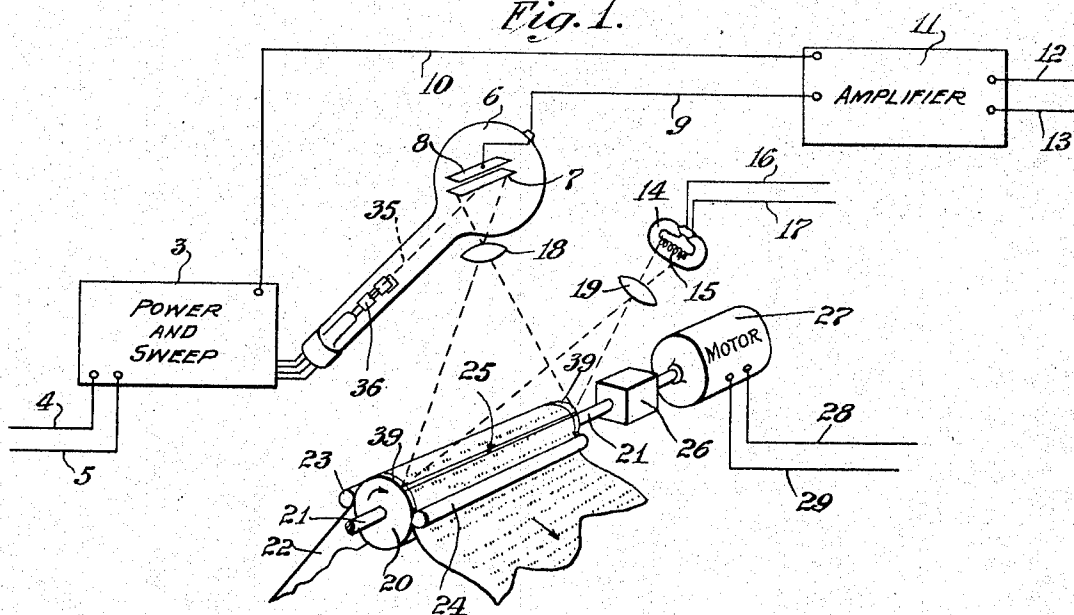
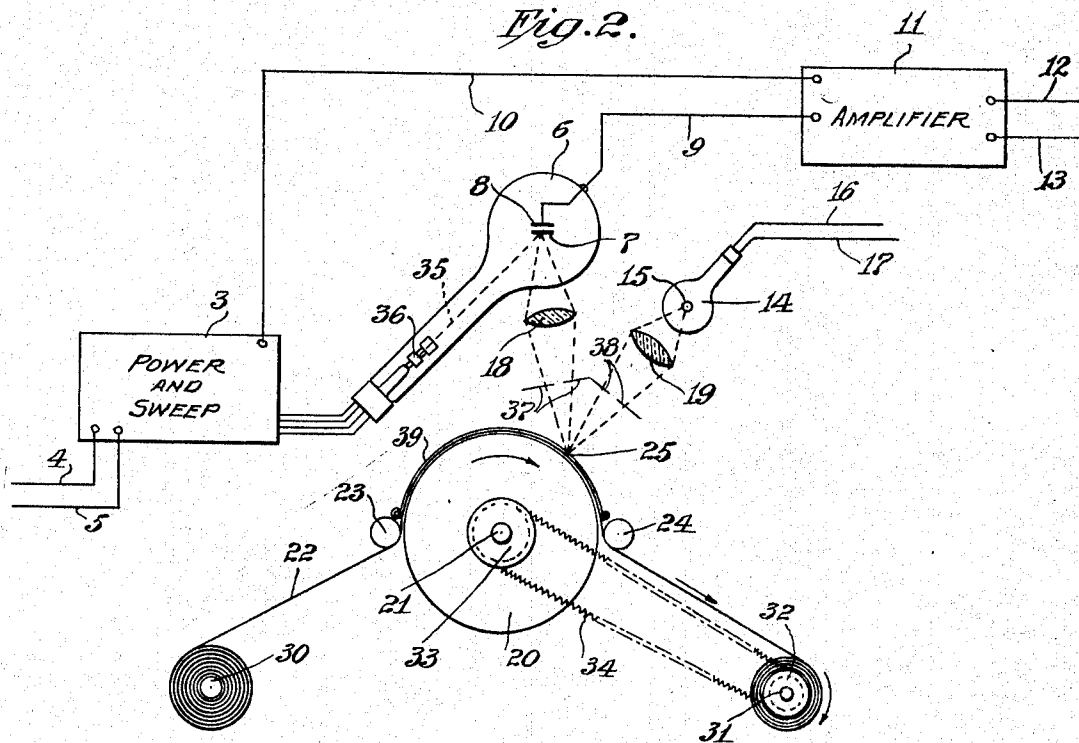


Fig. 2.



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CONTINUOUS FACSIMILE SCANNER

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1 Claim. (Cl. 178—7.2)

The present invention concerns facsimile scanners.

One object of the present invention is to provide an improved facsimile pick-up scanner.

A further object is to provide a facsimile pick-up scanner having greater signal-to-noise ratio than scanners hitherto available.

A still further object is to provide a simple and cheap pick-up scanner having great sensitivity and high signal-to-noise ratio.

Still another object is to provide a pick-up scanner capable of operating at high speed.

A particular object is to provide a simple pick-up scanner for scanning a continuous sheet.

These and other objects will be apparent from the detailed description of the invention given in connection with the drawing.

In the drawing is shown one form of the present invention.

Fig. 1 shows a view of one form of the invention in perspective, and Fig. 2 shows a side view of the same form of the invention.

In order to transmit a facsimile by wire or radio it is first necessary to scan the copy to be transmitted and by means of the scanning process to generate signals representing the variations in density of the various parts of the copy. One method of generating these signals is to scan the copy with a spot of light reflecting from the copy into a photo-electric cell. Single small pieces of copy may be scanned by attaching them to the surface of a drum which is rotated at a predetermined rate. This provides one dimension of the scanning while the other dimension may be provided by moving the drum along its axis or by moving the light source and photo-electric cell along the drum. It is often desired to transmit long sheets of copy and to transmit such copy continuously. Scanners previously designed to do this have been complicated, relatively expensive, and cumbersome.

According to the present invention, a continuous sheet of copy is passed at a constant rate under a linear light source. The light illuminates a line across the copy. The reflected light from the illuminated line is focussed on a linear screen photo-electric mosaic. The signal is picked off of the mosaic by a sweeping electronic stream and amplified. The amplified signals may be utilized in any of a number of conventional ways well known in the art. One way in which the signals may be utilized, for instance, is to mix them with synchronizing impulses generated at the end of each scanning line; modulate a radio transmitter with the composite signals; radiate

the modulated signals; pick up the radiated signals on a receiving system; and after amplification and rectification in the receiver, to operate the recording member in a helical facsimile recorder.

Fig. 1 shows in perspective one form of the present invention where 22 is a long sheet of copy to be transmitted, 14 is a linear light source and 6 is a linear screen photo-electric mosaic and electron beam scanner constituting an iconoscope. In detail, a power supply and sweep voltage generator 3, supplied with power over wires 4 and 5 supplies electron stream generating and sweep voltages to the iconoscope tube 6. Iconoscope tube 6 contains electron beam generating and deflecting elements 36 for passing an electron stream 35 across the long, narrow photo-electric mosaic 7 for scanning a picture image thereon. Behind the linear mosaic 7 is located a pick-off electrode 8 connected to amplifier 11 by means of lead 9. The low sides of the power source 3 and amplifier 11 are connected together by means of lead 10. The amplified signals are fed to any suitable further device over leads 12 and 13.

The image to be scanned may be illuminated in any suitable manner as, for instance, by means of lamp 14 having a long filament 15 supplied with electric current over wires 16 and 17. The light from lamp 14 is focussed on the copy sheet 22 by means of lens 19. The line across the copy thus illuminated is focussed on mosaic 7 by means of lens 18. Scanning along the line is accomplished electronically by swept beam 35. Line by line scanning is accomplished by moving the copy sheet 22 at a predetermined rate either in steps the width of a line or continuously by means of motor 27 turning shaft 21 of drum 20 thru a suitable gear box 26. Rollers 23 and 24 serve to keep copy sheet 22 in contact with drum 20 to prevent slipping of the copy sheet 22 as it is drawn along by drum 20. The contact arc should be sufficient to properly drive sheet 22 and has been shown as approximately 180 degrees, although not limited thereto.

Fig. 2 shows a side view of the same form of the invention. The same parts of the device are designated by the same numbers as used in Fig. 1. Fig. 2 shows in addition how the long copy sheet 22 may be unwound from a roll on shaft 30 and rewound in a roll on shaft 31. The roll may be formed on shaft 31 by driving it by means of a spring belt 34 passing around pulley 32 and driven by pulley 33 on shaft 21 of drum 20. While not intended to limit the invention, it has been found that glare from the copy sheet is re-

duced when either lamp 15 or iconoscope tube 6 is directed toward the copy at the point of scanning in a perpendicular direction while the iconoscope tube 6 or the lamp 15 is placed at approximately forty-five degrees. In place of, or in addition to the method of illumination described in connection with Fig. 1, the light from lamp 14 may be passed thru a long narrow aperture formed between plates 38 to form a narrow illuminated line on copy 22. A second aperture formed between plates 37 may also be used in place of, or in addition to, aperture between plates 38 or the method described above.

While the present scanner is particularly adapted to operate with long sheets of copy, it will handle short pieces equally well. Clamps 39 mounted between rollers 23 and 24 will serve to keep a short piece of copy in contact with the driving drum, permitting practically any length sheet to be scanned at will. Rollers 23 and 24 may be placed near together, one on each side of the scanning line, if desired, to handle short pieces of copy more readily.

Since the high speed scanning is accomplished electrically, this scanner is capable of extremely high speed operation. The charge storing characteristics of mosaic 7 provide a high degree of sensitivity and a high signal to noise ratio in the system. The simple and efficient manner in which the system operates will be apparent to those skilled in the art. It will be apparent that any length of copy may be handled and that any width up to the length of drum 20 may be used. Copy which is narrower than drum 20 is long may

be scanned by decreasing the sweep amplitude on beam 35. A margin of any desired width may be provided by sweeping beam 35 beyond the edges of the image of copy on mosaic 7. It will be evident that the aspect ratio or the relative horizontal or vertical enlargement of the reproduction may be controlled by the relative speeds of the beam 35 and drum 20. Distortion, focus and shading of the mosaic scanning may be corrected by means and methods well known in the art.

While only one form of the present invention has been shown and described, many modifications will be apparent to those skilled in the art within the spirit and scope of the invention, as set forth in the appended claim.

What is claimed is:

A facsimile pick-up scanner, including the combination of, a drum having a smooth surface, means for guiding a copy sheet over and in contact with at least a portion of said surface to provide an accurate scanning surface over at least a narrow strip extending across said sheet, means for rotating said drum at a substantially constant rate for advancing said sheet to provide one scanning dimension, means for evenly illuminating said narrow strip, an iconoscope having a long narrow signal generating screen, means for optically projecting said illuminated strip on said screen, means for scanning said screen with an electron beam along a longitudinal path to provide the second scanning dimension, and means for utilizing the signals generated by said screen.

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