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2,824,903

METHOD OF AND APPARATUS FOR CONTROLLING A TYPE-IMAGE
TELEPRINTER SYSTEM BY A TYPE-PRINTER SYSTEM

Filed Aug. 10, 1954

2 Sheets-Sheet 1

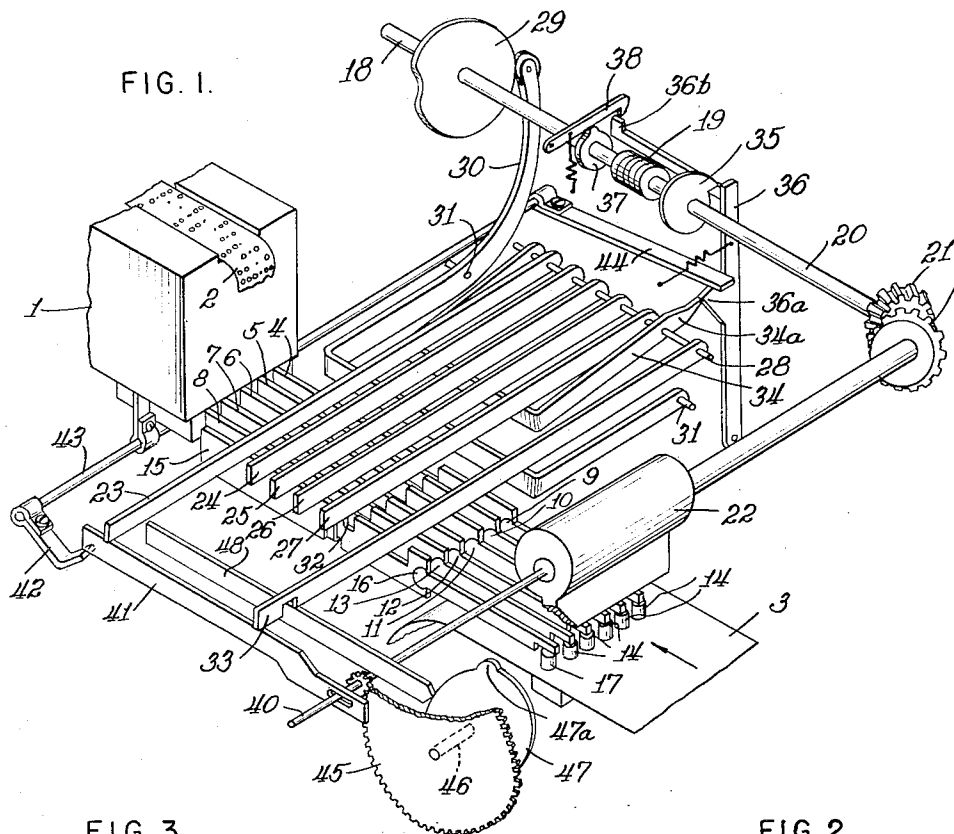


FIG. 3.

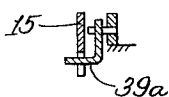


FIG. 2.

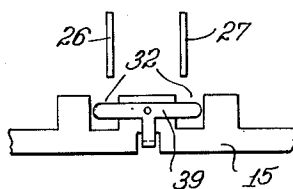


FIG. 4

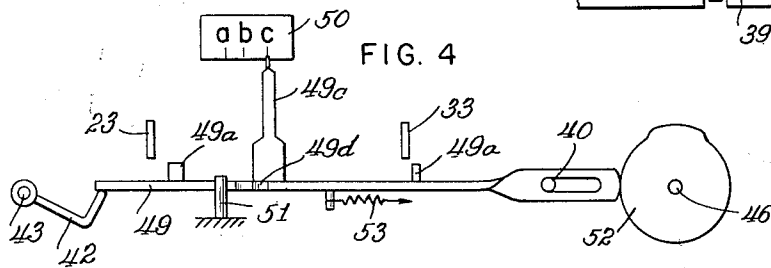
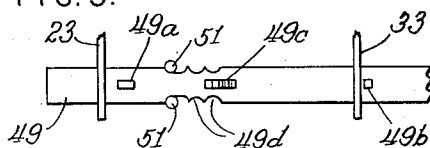


FIG. 5.



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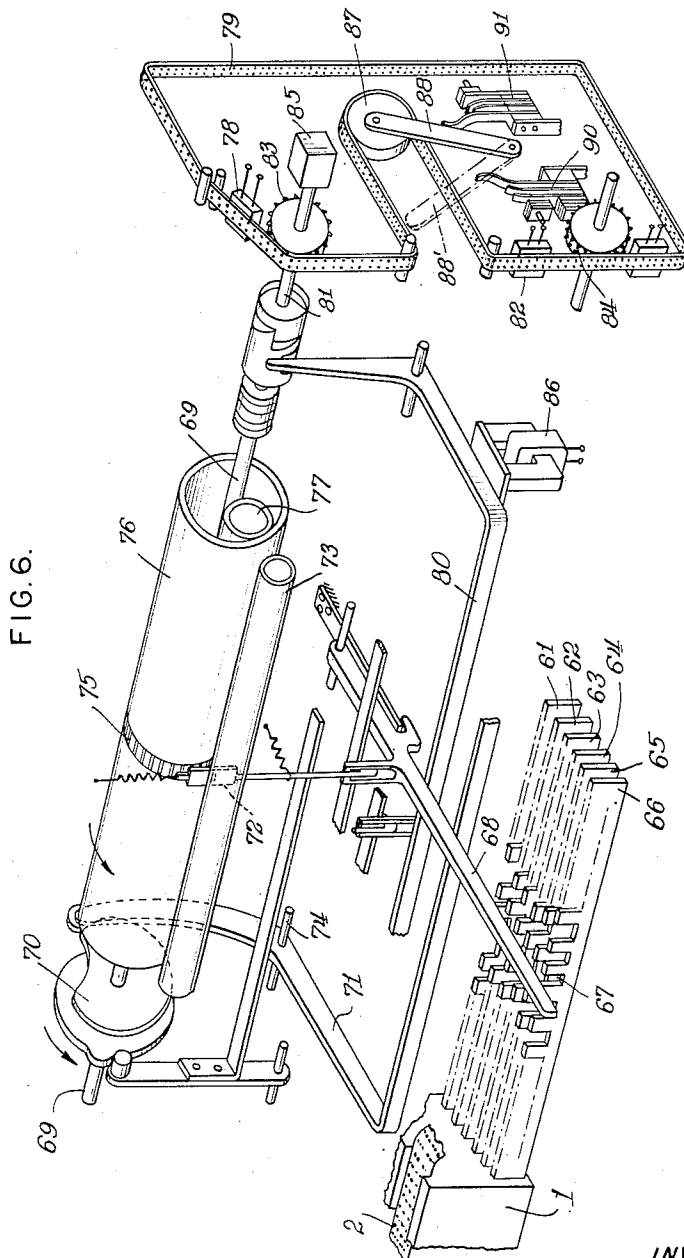
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2 Sheets-Sheet 2



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METHOD OF AND APPARATUS FOR CONTROLLING A TYPE-IMAGE TELEPRINTER SYSTEM BY A TYPE-PRINTER SYSTEM

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13 Claims. (Cl. 178—5)

This invention is concerned with a method of and apparatus for controlling a type-image teleprinter system by a type-printer system in which the teleprinter characters are transmitted spaced at any desired time intervals.

It is known to use for type-printer machines certain perforated tape in tape transmitters of a type-image system. Insofar as line printers or page printers without line synchronization are used in the receivers of the latter systems, perforated tape of the type-printer system will be suitable for the operation of type-image tape transmitters, but there are punch combinations contained in such perforated tape corresponding to special characters which are dispensable or rather undesired in the type-image system and should therefore be suppressed.

The invention is concerned with a control method of the kind mentioned before in which the teleprinter symbols or characters of the type-printer system are converted step-by-step into corresponding symbols of the type-image system, with suppression of the special dispensable or undesired symbols and by adding if necessary supplemental symbols required for the operation of the type-image teleprinter, and wherein the gaps resulting from the suppression of the special symbols are suppressed by recording the type-image symbols upon an intermediate storage device operating with corresponding stop intervals while providing for the continuous scanning of such intermediate storage for retransmission in the rhythm required for the type-image system.

It is in this way possible to suppress the impulse combinations of the special symbols which are associated with the type-printer system but dispensable or undesired in the type-image system and also to suppress the undesired gaps between two impulse combinations which result from the scanning of the impulse or punch combinations corresponding to the dispensable symbols or from any other cause, and to carry out the type-image transmission with a constant rhythm and free of undesired gaps. The corresponding type-image system may be controlled by a type-printer system operating if desired in start-stop manner and with desired spacing of the teleprinter symbols. It is however possible in accordance with the invention to use a type-printer system operating with constant rhythm and to operate the type-image system in such case or in the above explained case in start-stop manner.

A particular embodiment of the invention provides a converter device for the scanning of a perforated tape—especially a five-code tape—which is suitable for tape-printer apparatus and for the corresponding punching of a tape which is usable in a tape transmitter for type-image or picture printers and which is as compared with the tape to be scanned a multi-row tape, the converter comprising means for the gapless punching of the latter tape with type-group markers, especially letter- and numeral-exchange symbols in at least one auxiliary per-

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foration row and for the complete suppression of certain punch combinations scanned in the first noted tape.

A preferably mechanical transmission element, for example, a longitudinally movable bar, may be associated with the scanning device for each punch row of the first mentioned tape and such element may transmit the perforations of the scanned tape which are to be transmitted to the correspondingly positioned punch row of the second tape.

In accordance with another feature of the invention, scanning elements, preferably in the form of bars lying transverse to the transmission elements, are assigned to the impulse combinations which are to be suppressed, such scanning elements controlling means for suppressing during a scanning cycle the conversion of the last scanned punch combinations and the advance of the tape to be perforated or punched.

In order to avoid in the case of type-image page printers in which the characters or symbols are recorded in successive lines, interruption of the text at the ends of lines, under some circumstances in the middle of a syllable, thereby making the text difficult to read, there have been provided devices at the transmitting end, which take care of transmitting the characters in sensibly subdivided groups, with transmission intervals which are mutually always the same, corresponding to the scanning duration of a printing line of the printer and whose start is synchronized with the start of the printing lines.

A further feature of the invention makes it possible to provide a device for preparing for the line synchronization in facsimile page printer receivers with continuous recording of the text.

The corresponding apparatus may be constructed so that means are controlled by the scanning element which is operated upon scanning of the signal "line advance" and by a counting device counting the total number of punched perforation combinations, for controlling always after the scanning of the line advance signal the punching of a number of filler symbols corresponding to the filling of the line that is being transmitted.

In accordance with another feature of the invention, the device for preparing for the line synchronization contains means for controlling for the counting of the perforation rows of the tape which is to be punched in the conversion device, switching means, for example, a cam disk, for putting into preparatory position means for stopping the five-code tape after a number of punched perforation rows corresponding to the filling of the line after line start to a preselected fraction, said last named means becoming effective upon scanning of the impulse combination corresponding to the interval signal in combination with means for repeated punching of the second tape, with this impulse combination, until a number of perforation rows is punched which corresponds to the filling of the line.

The invention may also be practiced by using a device for the start-stop scanning of the perforated tape, especially a five-code tape which is suitable for type-printing systems, together with a device for converting all type-printer symbols or characters necessary for the type-image system into image symbols, and a storage device for receiving these type-image symbols in start-stop manner but retransmitting them continuously.

In accordance with another object and feature, the intermediate storage device comprises a preferably magnetizable carrier for erasable recordings.

It is possible in such a case to store in the conversion device type-image symbols in the form of optical tracks, assigning the resulting optical sound tracks upon conversion to the punch combination corresponding to the type-printing system, photoelectrically scanning such

tracks, and transmitting the resulting current impulse combinations to the intermediate storage device, for example, to a magnetizable tape which is operated in start-stop manner, and thereafter controlling by this intermediate storage device a type-image transmitter operating with constant rhythm. It is possible to use within the scope of the invention cam combinations assigned to the type-images, in combination with contacts controlled by the cams and disposed in the transmission circuit, or to use instead of optical sound tracks magnetic sound tracks and to take off impulse combinations by electromagnetic means and to conduct them to the intermediate storage.

Details of the invention will now be described with reference to the embodiments shown in the accompanying diagrammatic drawings. In these drawings:

Figs. 1 to 5 show an embodiment, and a modification thereof, for converting the perforation combinations of a normal perforated tape suitable for the operation of type-printing teleprinter machines into a six-row perforated tape for the loss-free control of a type-image printer; and

Fig. 6 illustrates a similar apparatus for the scanning of the five-code perforated tape and for the recording and continuous scanning of magnetic sound tracks for the loss-free control of a type-image teleprinter.

Fig. 1 shows the parts of a converter which are essential for the invention, for scanning a normal five-code perforated tape 2 which is suitable for the operation of type-printing teleprinter machines, to produce a six-row perforated tape 3 for the loss-free control of a type-image teleprinter. The scanning device 1 for the tape 2, which may be constructed in known manner, controls five longitudinally shiftable bars 4 to 8 which are respectively assigned each to one punch row of the tape 2. Each bar is operable by the scanning device to assume one of two operating positions. The term "punch row" or perforation row is intended to mean one of the five code forming rows assigned to a stepping group in a five-code tape. The right hand ends of the bars 4 to 8 are provided with tongue-like extensions 9 to 13 which are within small limits angularly displaceable in horizontal planes. These extensions are pulled upwardly by spring means omitted in the drawing so that they can pass the punches 14 in the resting position in which they are shown.

In parallel with the bars 4 to 8 is disposed a shorter bar 15 which does not extend to the scanning device 1. This bar 15 is also longitudinally displaceable and carries a tongue-like extension indicated by numeral 16. Associated with the extension 16 of bar 15 is a punch 17 for a sixth perforation row while the five punches 14 punch the first perforation rows of the six-row tape in step with the scanning of the five-code tape.

A motor-driven shaft 18 is provided with two cams (not shown) which take care of the advance of the tape 2 and of the transmission of the feeler-lever positions of the scanning device 1 to the bars 4 to 8. The punch eccentric 22 and other control elements which will be presently discussed are driven through the medium of the clutch 19, the shaft 20, and the gear 21. The tongues 9 to 13 are moved briefly downwardly in the direction of the punches once during each rotation of the eccentric 22 on the shaft 40. The free ends of these tongues are recessed for certain lengths so that they do not touch the punches upon downward motion of the eccentric 22 when they are in the position shifted to the left in which they are shown. However, if any of these bars 4 to 8 and 15 is displaced to the right, the associated tongue will come to lie with its wider portion between the eccentric 22 and the corresponding punch, and such punch will accordingly be pressed through the tape 3 responsive to the downward motion of the eccentric and will produce a perforation.

The converter shown in Fig. 1 also comprises means for automatically suppressing during the conversion certain punch or perforation combinations of the five-code alphabet which are superfluous and may even be trouble-

some in the control of a type-image printer by the six-row perforated tape.

In order to suppress, for example, five punch combinations, there are provided five special scanning levers 23 to 27 which are disposed above the bars 4 to 8 perpendicularly relative thereto and individually angularly displaceable about a common axis 28. A cam 29 carried on the shaft 18 which controls the scanning operation of the five-code perforated tape 2 swings the arcuate lever 30 upon each rotation in a certain phase position of the shaft briefly in counterclockwise direction. The five scanning levers 23 to 27 and a further scanning lever 33 lie in resting position with spring tension upon the arcuate lever 30 and these scanning levers are accordingly placed upon the bars 4 to 8 and 15, once with each rotation of the shaft 18, the bars 4 to 8 and 15 being provided with notches 32 in the manner of selector bars.

A bracket 34 which is also rotatable about the axis 28 is by a not illustrated spring slightly pressed against the levers 23 to 27. An extension 34a projects rearwardly from the bracket 34 beyond the axis 28. A locking cam 35 is provided on the drive shaft alongside of the clutch 19 for engagement by the locking pawl 36 carrying a tooth 36a which engages with spring pressure the end of the extension 34a, thereby preventing the pawl 36 from falling into the cam 35 so long as the bracket 34 is in the position shown.

When an impulse combination is scanned on the tape 2 which is to be suppressed in the six-row tape 3, for example, the combination signifying a buzzer tone, the notches 32 in the bars 4 to 8 and 15 will be positioned so that one of the levers 23 to 27, for example, the lever 25, can fall into such aligned notches after being freed by the lever 30. The bracket 34 is thereby depressed and the extension 34a frees the pawl 36 for falling into the locking cam 35. This interrupts the rotation of the shaft 20 by the shaft 18 and also the advance of the tape 3 which is derived therefrom in a manner not shown.

In order to maintain the locking condition upon lifting of the lever 25 by the lever 30 incident to the next rotation of the shaft 18, there is provided a further cam 37 on the shaft 18 for controlling the pawl 38 with respect to an ear 36b of the locking pawl 36. Only in the further course of the rotation of the shaft 18 will the cam 37 lift the pawl 38 and the free bracket 34 can now lift the locking pawl 36 from the locking cam 35 so as to free the shaft 20 for rotation.

The scanning levers 24, 26, 27, and under certain conditions also the lever 23, act upon the locking pawl 36 and therewith upon the advance of the tape 3 in the same manner as explained above with reference to the lever 25 as soon as the combinations are scanned on the five-code tape which are to be suppressed in the six-row tape.

The position of the bar 15, as shown in Fig. 1, is based upon the assumption that the scanned five-code combination represents symbols of the numeral group and that the last change-over signal was accordingly a numeral change-over signal. Since the recessed end of the bar 15 is now aligned with the punch 17, no hole will be punched in the front (sixth) row in the tape 3. However, if a letter change-over signal is transmitted, the scanning lever 26 will fall in, effecting not only the locking of the shaft 20 and the stopping of the advance for the tape 3, as described above, but also tipping the locally pivoted member 39 indicated separately in Fig. 2. This member has an extension 39a, illustrated separately in Fig. 3, for shifting the bar 15 to the right, as seen in Fig. 1, thereby causing the punching of an additional perforation in the sixth row of the tape 3, for each symbol of the five-code alphabet, and symbols of the letter side will therefore result upon scanning of the six-row tape. Only upon conversion of a numeral change-over signal will the lever 27 fall in to move the bar 15 again to the left. These numerical and letter changeover signals for convenience may be termed "type group" signals or in this particular instance "case

shift" signals. Consequently, the perforations in the additional row in the tape 3 may be generally termed "type group markers."

It will be seen that the conversion with the features so far described suppresses certain impulse combinations depending on the formation of the cutouts or notches in the bars 4 to 8. The arrangement may be extended to all symbols or characters which signify a transmission time loss for facsimile teleprinter installations.

One of the following auxiliary control devices may be used for the purpose of accomplishing in a facsimile page printer a teleprinting which corresponds with sensible subdivision of the text to that on a type-printing page printer. It shall be assumed that a perforated tape is used as a tape to be scanned which is suitable for type-printing page printer reception, such tape carrying at the start of each line a combination corresponding to the line advance symbol and immediately ahead thereof, that is, at the end of such a series of perforation combinations, punch combinations corresponding to the carriage return signal.

It shall further be assumed that a page printer is being used in the type-image teleprinter installation that is to be controlled by such perforated tape, in which a continuous text recording is effected, for example, by a steady line advance, and that the printing means moves slightly obliquely to the direction of the lines.

The signal "carriage return" can in such a case be suppressed in the previously described manner while the punch combination corresponding to the line advance signal is utilized for the line synchronization as explained below:

The scanning lever 23 assigned to the line advance signal "Z1" is extended, its free end lying above a lever 41 which is disposed in parallel with but spaced from the bars 4 to 8 and 15 and pivots about the axis 40 of the eccentric 22. As soon as a punch combination "Z1" is scanned, the scanning lever 23 will be able to fall into the cutouts such as 32 of the levers 4 to 8 and 15. The lever 41 is thereby tilted slightly downwardly causing brief clockwise rotation of the shaft 43 through the medium of the arm 42 to interrupt the advance of the tape 2 by suitable known means omitted from the drawing. The rearwardly extending shaft 43 carries a lever 44 which is displaced clockwise responsive to rotation thereof to act upon the ear 36a of the pawl 36, thereby preventing the pawl from falling into the locking cam 35. The bars 4 to 8 are at this instant set in accordance with the signal "Z1" and remain correspondingly set by the action of the shaft 43 on the advance of the tape 2, while the shaft 20 continues to rotate and the tape 3 will accordingly be provided, repeatedly under certain circumstances, with the punch combination "Z1" by the action of the eccentric 22.

The series of identical punchings of this kind is concluded as follows:

The shaft 40 of the eccentric 22 drives a gear 45 for rotating the shaft carrying a cam 47—47a. This cam goes through one revolution for each 69 punch combinations in the tape 3. After each complete revolution, corresponding to the length of a full line containing 69 symbols or characters, the cam 47a places the bar 48, which engages the cam with spring pressure, once in the path of the scanning lever 23 which is periodically displaced in step with the motions of the lever 30. This is a locking action and interrupts the pivotal displacement of the shaft 43. The tape 2 is now further scanned and all punch combinations except those that are to be suppressed are successively converted. By the use of tapes 3 prepared in this manner, and control means known in the facsimile teleprinter art, all line starts will appear accurately aligned upon the recording page of the facsimile receiver.

A somewhat modified arrangement which makes it possible to embrace selectively several types of tape perforation and recording procedures is shown in Fig. 4 in side view and in Fig. 5 in elevation. The lever 49 takes

the place of lever 41 of Fig. 1. The arrangement differs from Fig. 1 by the provision of a handle 49c for longitudinally adjusting the bar 49 with respect to a scale 50, the handle carrying an arrow-shaped pointer. The shaft 40 projects through an elongated hole in the lever 49 which also carries an ear 49a coacting with the lever 23 and an ear 49b for coaction with the end of the lever 33. Stops 51 for engagement with the recesses 49d secure the lever 49 in its adjusted positions including the position "c" on the scale 50 in which the lever is shown in Figs. 4 and 5. The spring 53 biases the lever 49 in resilient engagement with the counting cam 52 on the shaft 46.

In the position "a" of the lever 49, all impulse combinations assigned to the levers 23 to 27 will be suppressed in the tape 3. This position is especially suitable for the control of type-image teleprinters operating with tape receivers. The position "b" corresponds to the operation of Fig. 1, explained before, in which the symbol or signal "Z1" is in suitable manner transmitted for facsimile page printing. In the position "c," the converter arrangement is suitable for the control of type-image page printers from perforated tapes which are assigned to type-printer tape printers, that is, printers which receive neither the signal "carriage return" nor the signal "line advance." The line synchronization is in such case effected by means of the signal "interval," referred to in the following explanations as "Zwr." The lever 33 corresponds to this signal. The counting cam 52 on the shaft 47 shifts the lever 49 within the region of the 59th to 69th symbol so that the projection or ear 49b is placed underneath the lever 33. After this lever falls in within the portion of a series of punch combinations contained in the corresponding range, the tape 2 will be stopped and the impulse combination corresponding to the symbol "Zwr" will be punched in the tape 3, in the manner as described for the symbol or signal "Z1" until the lever 49 is freed by the cam 52 to return to its initial position. The line is then filled, for example, with 69 symbols or characters, including interval symbols, and the start of a new line is prepared with the next text symbol scanned on the tape 2.

A known device controlled in known manner by a tape scanning element may be in addition provided for automatically transmitting interval signals and for stopping the scanning device after the tape 2 is completely scanned. In order to avoid punching of all interval signal groups, there may be provided a device for also stopping in such a case the tape 3 after filling the line with a corresponding number of punch groups. The transmitter which evaluates such a punched tape is suitably so arranged that interval signals are automatically transmitted line-by-line until the start of the next message text. A new tape is inserted beginning with a signal "interval" or "line advance," and the scanning is started only in zero position of the counter which counts the symbols per line.

A converter apparatus modified in accordance with the invention is shown with its essential parts in Fig. 6. This apparatus is constructed as follows:

Numeral 1 designates any desired and suitable device for scanning a five-code or row perforated tape which is suitable for type-printer machines. The scanning device controls five longitudinally displaceable bars 61 to 65 each of which is assigned to a punch row of the tape 2 and adapted to be placed by the scanning device in one of two operating positions. The sixth bar 66 is similarly longitudinally movable and is placed by not illustrated means into the left hand terminal position at a time when a letter change-over signal is scanned as the last type group change-over signal; the five-code combinations just scanned accordingly representing signals of a letter or character group. The bar 66 will be in the right hand terminal position at a time when the last type change-over signal is a number change-over signal. The bars 61 to 66 are provided with cutouts or recesses such as 67. Extending perpendicular to these bars are a

number of scanning levers such as 68 corresponding to the number of symbols to be converted, only one of these levers being shown for convenience of representation. A shaft 69 is provided which is driven by a suitable motor. Two cams on the shaft (not shown) control the tape advance and the shifting of the bars 61 to 65 in known manner. Another cam 70 on the shaft 69 controls a yoke 71 which is pivoted on the axis 74. This yoke generally lifts all scanning levers somewhat above the bars 61 to 66 and sets them upon these bars once incident to each revolution of the shaft 69. Assuming the bars to be so positioned that a series of cutouts 67 are in alignment, the lever 68 which is correspondingly disposed will fall into these cutouts and will thereby shift or adjust an associated shutter gate 72 so that the light from an illuminating tube 73 falls through a fixed shutter slot rearwardly and through a shutter aperture in the gate 72 as well as a sound track 75 upon a sound film 76 and through the sound film upon a photo cell 77. The necessary optical means are known and have been omitted for the sake of simplification. The endless sound film 76 is carried by a drum and receives thus all type images or pictures in developed representation and the latter are by suitable known means modulated with an alternating voltage of about 1,000 cycles. Each sound track will have a length corresponding to the circumference of the endless film on the drum and can thus be scanned during one revolution thereof.

The modulated impulses transmitted by the photo cell in the course of such a revolution of the shaft 69 are in suitable manner amplified and directed to the magnetic head 78 for corresponding recording upon the magnetic tape 79. It must be observed in this connection, that a bracket 80 is tilted whenever one of the scanning levers 68 falls into aligned cutouts 67 in the bars 61 to 66 to effect the coupling of shaft 69 with the shaft 81 so as to release such shaft 81 and the sprocket 83 for one revolution and corresponding advance of the magnetic tape 79. The latter may be perforated so as to facilitate synchronization incident to sound reproduction.

Not illustrated scanning levers for letter- and numeral group change-over signals, respectively, of corresponding five-code combinations, do not affect the bracket 80; the tape advance shaft 81 therefore is not released for the corresponding signals. These last noted levers have no shutters associated therewith. They merely effect an adjustment of the bar 66 when needed.

A type group switching may take the place of the one described above, in which the shutter bar with a projecting slot is substituted by a bar with 32 apertures and intermediate portions therebetween which are of similar width. Such bar is axially movable incident to type group switching. A selection is in this manner accomplished between each two sound tracks upon the film 76 which are assigned to a punch combination of the five-code alphabet. The bar 66 can in such case be omitted. The punch combinations which belong to the signal "line advance" and "buzzer" have no scanning lever assigned thereto. They are suppressed completely.

It will be seen from the following explanations that the symbols provided in the perforated tape which are superfluous for the transmission of the type-image or picture combinations do not appear on the magnetic tape at all.

No advance of the magnetic tape is initiated in the scanning of these punch combinations and no gaps will accordingly appear thereon.

The transmission of the symbols assigned to the type-image or picture system takes place over a reproduce head 82 by the advance of the tape by a sprocket 84 which moves the tape with uniform speed, for example, five symbols per second.

If it is assumed that the scanned perforated tape can deliver more symbols than can be retransmitted by the type-image transmitter, a storage loop will be required.

With prolonged operation, a very long magnetic tape would in such case be necessary to provide the storage loop. In order to operate with a closed relatively short loop, a known device may be used for the purpose of stopping the perforated tape as needed at a time when no portion of the magnetic tape is available for recording.

The following apparatus may be provided if a line arrangement is desired corresponding to that in the customary typewriters:

The magnetic tape carries in such case visible markers corresponding to the line spacing, for example, in intervals of 69 symbols. The tape is inserted at the two advance sprockets 83, 84, when the symbol counter 85 on the shaft 81, which counts the symbols per line, is at "zero", and so that the markers on the tape are aligned with the magnetic heads 78 and 82. The line synchronization by means of the signal "line advance" may be carried out by stopping the perforated tape 2 upon scanning of a punch combination corresponding to the last scanned symbol while the magnetic tape continues to advance unmodulated up to the 69th symbol, within the line that is being recorded, such continuous advance being made possible by the energization of the electromagnet 86 for actuating the bracket 80. The advance of the perforated tape 2 is subsequently initiated again by suitable known means omitted from the drawing.

Another possibility for the line synchronization, which is suitably employed when the scanned perforated tape is one that is adapted for operation with type-printer tape printers, proceeds from the signal "interval." In such a case, the counter 85 tests responsive to the signal "interval," in each line, within the range lying between the 59th and 69th symbol. If a punch combination is scanned within this range which corresponds to the signal "interval," the perforated tape is stopped by suitable known means and the magnetic tape continues to advance unmodulated up to the 69th symbol of the corresponding line. The perforated tape is thereafter started again in a manner as explained in connection with the line advance signal. The control may be mechanical or electrical.

After the perforated tape has been completely scanned, interval signals will be transmitted by the operation of the scanning apparatus in conjunction with previously indicated means.

As soon as a certain part of the symbols stored on the magnetic tape 79 has been picked up and retransmitted by the reproduce head 82, the lever arm 88, carrying the tension roller 87, will be moved against the force of a spring (not shown) to assume the position indicated in the dotted line 88', so as to close a contact 90 while opening contact 91. The closure of contact 90 causes—suitably after termination of a line—interruption of the transmission for an interval not only long enough to permit storing of as many symbols as are necessary, so that the contact 90 can be opened again by displacement of the lever arm 88 to the right, but, to continue the transmission, until as many symbols are stored so that the lever arm 88 can actuate the contact 91. The operation prevents frequent interruption of the teleprinter image transmission in the case of brief trouble in the scanning of the perforated tape or in frequent scanning of symbols on the perforated tape 2 which are respectively undesired or unnecessary for the teleprinter image system.

Diverse changes are possible within the scope of the invention. For example, the transmission elements may be made in the form of pairs of tiltable rocker bars instead of in the form of longitudinally movable bars. The scanning levers and the remaining switching and control elements may likewise be differently formed. In place of the photoelectric control in the embodiment Fig. 6, there may be used a control comprising contacts governed by cam means. In such a case, the cam modulated signals will appear on the magnetic tape responsive

to scanning of a tone generator as they appear in the explained optical scanning. Upon scanning with direct current, short impulses of opposite polarity will be induced in the scanning head at the start and the end of current steps.

A selective scanning of magnetic recordings may be employed within the scope of the invention in place of the scanning of sound tracks.

It is understood, of course, that other modifications may be made. For example, if desired, more or fewer than 69 symbols may be assigned to a line and, similarly, more or fewer than ten symbols at the end of a line may be considered for the line synchronization by means of the interval signal.

What is believed to be new and desired to have protected by Letters Patent is defined in the appended claims.

We claim:

1. Apparatus for controlling a type-image teleprinter system by a type-printer system in which the teleprinter symbols are transmitted with desired spacing comprising a converter for start-stop scanning a first perforated tape adapted for type-printer operation, means in said converter responsive to said scanning for correspondingly punching a second multi-row tape adapted for use in type-image transmission and recording, said second tape having a number of code-forming perforation rows exceeding that of the first tape, means in said converter for punching in at least one row of said second tape type-group markers, and for completely suppressing certain impulses representing perforation combinations appearing on said first tape, with punched perforation combinations in said second tape appearing consecutively without gaps, a device for converting into type-image symbols all teleprinter symbols required for type-image transmission and recording, and an intermediate storage device for start-stop recording and continuously retransmitting said type-image symbols.

2. Apparatus for controlling a type-image teleprinter system by a type-printer system in which the teleprinter symbols are transmitted with desired spacing comprising a converter for scanning a first perforated tape adapted for type-printer operation, means in said converter responsive to said scanning for correspondingly punching a second multi-row tape adapted for use in type-image transmission and recording, said second tape having a number of code-forming perforation rows exceeding that of the first tape, and means in said converter for punching in at least one row of said second tape type-group markers, and for completely suppressing certain impulses representing perforation combinations appearing on said first tape, with punched perforation combinations in said second tape appearing consecutively without gaps, a device for converting into type-image symbols all teleprinter symbols required for type-image transmission and recording, and an intermediate storage device comprising a magnetizable carrier for start-stop erasable recording and continuously retransmitting said type-image symbols.

3. Apparatus for controlling a type-image teleprinter system by a type-printer system in which the teleprinter symbols are transmitted with desired spacing comprising a converter for scanning a first perforated tape adapted for type-printer operation, means in said converter responsive to said scanning for correspondingly punching a second multi-row tape adapted for use in type-image transmission and recording, said second tape having a number of code-forming perforation rows exceeding that of the first tape, and means in said converter for punching in at least one row of said second tape type-group markers, and for completely suppressing certain impulses representing perforation combinations appearing on said first tape, with punched perforation combinations in said second tape appearing consecutively without gaps, a device for converting into type-image symbols all tele-

printer symbols required for type-image transmission and recording, means in said last-mentioned device for the start-stop selection of type-image symbols corresponding to the symbols to be converted, and means for converting said symbols into impulse combinations to be recorded, and an intermediate storage device comprising a magnetizable carrier for start-stop erasable recording of said impulses and continuously retransmitting said type-image symbols.

4. Apparatus for controlling a type-image teleprinter system by a type-printer system in which means are effective for transmitting the teleprinter symbols with desired spacing comprising means for converting the transmitted teleprinter symbols step-by-step into type-image symbols while suppressing certain undesired symbols included therein and simultaneously adding thereto auxiliary control symbols required for type-image transmission and recording, means for recording the converted symbols for intermediate storage, means for continuously scanning the recorded symbols in the rhythm required for type-image transmission, and means for suppressing during such intermediate recording and continuous scanning, gaps resulting from the suppression of said undesired symbols.

5. The apparatus defined in claim 4, comprising means for interposing during said intermediate recording stop intervals for suppressing said gaps resulting from the suppression of said undesired symbols.

6. Apparatus for controlling a type-image teleprinter system by a type-printer system in which the teleprinter symbols are transmitted with desired spacing comprising a converter for scanning a first perforated tape adapted for type-printer operation, means in said converter responsive to said scanning for correspondingly punching a second multi-row tape adapted for use in type-image transmission and recording, said second tape having a number of code-forming perforation rows exceeding that of the first tape, means in said converter for punching in at least one row of said second tape type-group markers, and for completely suppressing certain impulses representing perforation combinations appearing on said first tape, with punched perforation combinations in said second tape appearing consecutively without gaps, and means operatively related to said second tape for preparing for line synchronization in conjunction with the use of said second tape for page type-image printers with continuous recording of the text.

7. The apparatus defined in claim 6, comprising a counter for counting the total number of punched impulse combinations belonging respectively to one line, and means controlled by said counter jointly with the scanning element which is operated upon scanning of the signal denoting "line advance" for effecting the punching of a number of filler symbols required for the filling of a text line containing symbols to be transmitted.

8. The apparatus defined in claim 7, comprising switching means controlled by said counting of said impulse combinations for placing in preparatory position control means for stopping the advance of said first tape after the punching of rows for filling a text line corresponding to a predetermined fraction, means for actuating said control means responsive to scanning of the impulse combination corresponding to an interval, means for repeatedly punching said impulse combination in said second tape until a number of punch groups have been punched which correspond to the filling of the text line, said converter including extended scanning bars, and link means controlled by said extended scanning bars for inhibiting the stopping of the advance of said first tape and the stopping of the advance of said second tape.

9. The apparatus defined in claim 8, comprising an intermediate element, and means for adjusting said intermediate element by said scanning bars to assume at least one of two of the following three positions, namely, a first position in which it is adjustable by the scanning

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bar corresponding to the signal "line advance"; a second position in which it is adjustable by the scanning bar corresponding to the "interval" signal depending on the position of an associated cam; and a third position in which it cannot be adjusted by any scanning bar.

10. The apparatus defined in claim 3, comprising means for recording said type-image symbols to form optical sound tracks therefor and for photoelectrically converting said optically recorded symbols into impulse combinations suitable for magnetic recording.

11. The apparatus defined in claim 3, comprising selectable cam combinations corresponding to said type-image symbols, and electromechanically operable means for converting said symbols into impulse combinations suitable for magnetic recording.

12. The apparatus defined in claim 3, comprising means for magnetically recording said type-image symbols, and means for electromechanically converting said magnetically recorded symbols into impulse combinations suitable for magnetic recording.

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13. The apparatus defined in claim 1, comprising a mechanically operable transmission element associated with the scanning of each punch row of said first tape, a number of selection rods corresponding to the number of the type of symbols to be converted cooperating with said last named elements, each of said selection rods selecting from a storage device the corresponding type-symbol impulse combinations.

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