Oct. 6, 1959 H. WÜSTENEY ET AL 2,907,823

START-STOP TELEPRINTER

Filed Jan. 25, 1956 3 Sheets-Sheet 1

Fig. 1.

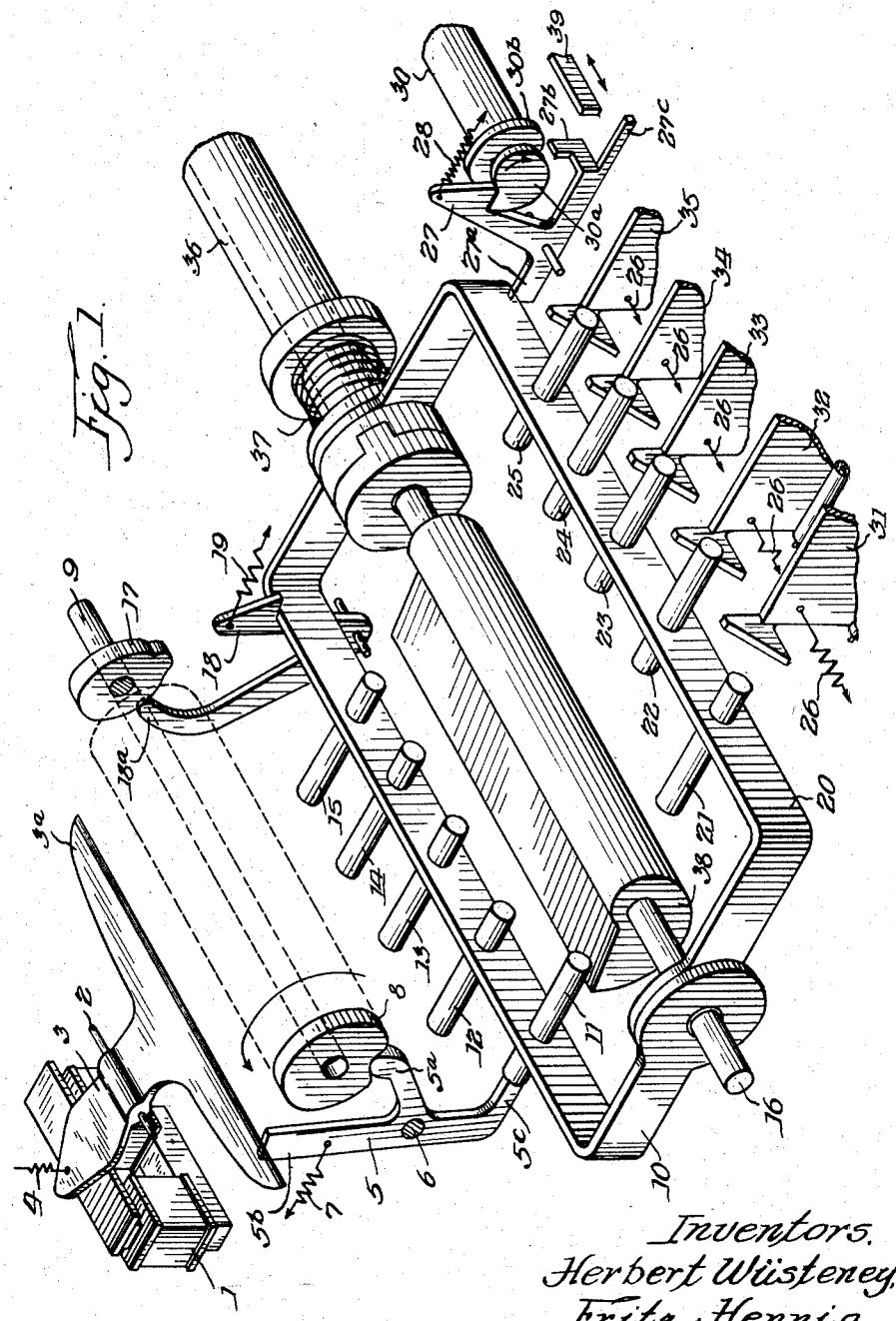

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Fig. 2.

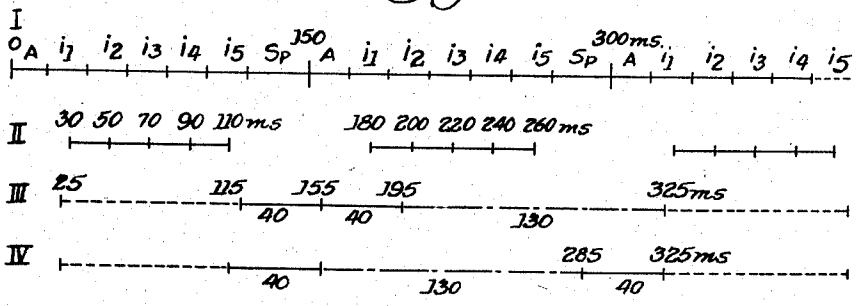

Fig. 3.

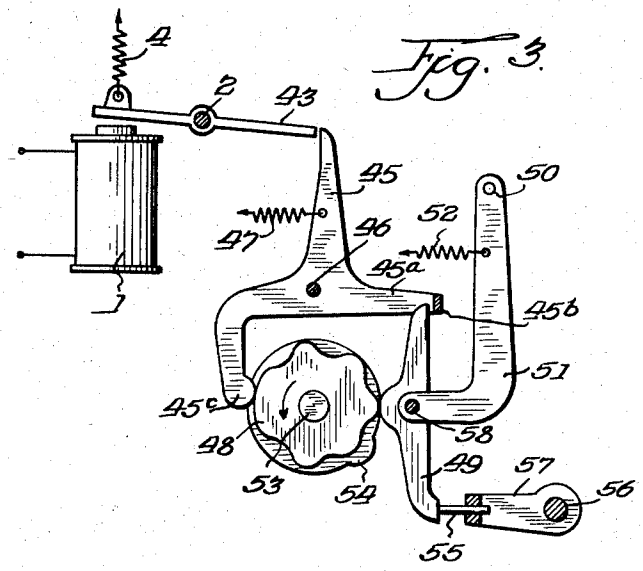

Fig. 4

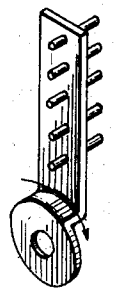

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Fig. 5.

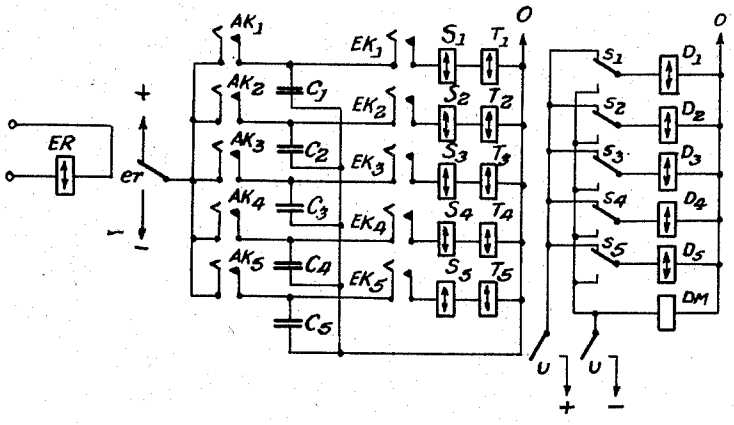


Fig. 6.

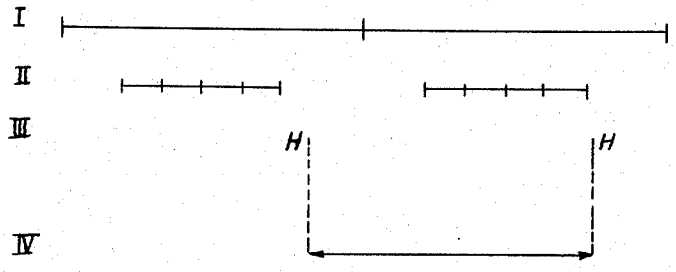
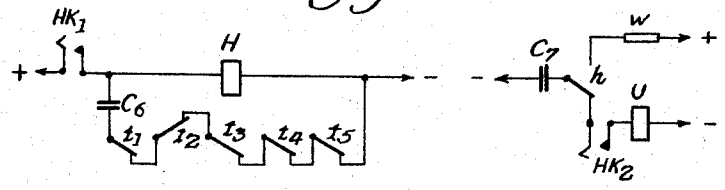


Fig. 7.



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2,907,823

START-STOP TELEPRINTER

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Application January 25, 1956, Serial No. 561,319

11 Claims. (Cl. 178—17.5)

This invention is concerned with start-stop teleprinter machines operating according to the principle of codelike distribution of the symbols to be transmitted in a row, for example, of five successive combination steps or elements. The converter means for the combination steps, contained in the receiver, preferably an armature actuated by a magnet, is in known teleprinter machines in engagement with a blockable scanning bar which is being scanned by plungers, the setting being first stored by the plungers and the selection elements, which affect the printer, being subsequently set thereby after completion of the scanning motions, for example, five scanning motions, belonging to a teleprinter symbol. The printing operation follows the receipt, and the next successive symbol may be recorded while the preceding one is being printed. It is clear that the identical time interval is available for the printing as well as for any other function effected by the printer, for example, the changing of letters or numerals, namely, the transmission interval for a symbol. It is customary to add upon carriage return the time interval for the successive symbol for line advance. This time interval of two symbol lengths duration is however rather short. The carrying out of relatively time consuming special functions is in such teleprinter machines very difficult, when high printing speeds are required, and may even be entirely impossible when it is desired to avoid with certainty loss of the first successive symbol.

The invention avoids these drawbacks by the provision, between the receiver and the printer, of a device, for example, formed as a mechanical plunger storing device or an electrical device comprising capacitors and storing relays, for storing more than one teleprinter symbol, cooperating with blocking elements which free stored symbols, for the setting of the printer, with different adjustable delay, depending upon completion of preceding operations released particularly by the printer shaft. In teleprinter machines in which plungers or corresponding elements are normally brought successively into waiting position, so as to operate in common for the setting of the selection bars after receipt of the last combination impulse, such a storing device may replace the indicated elements, that is to say, the storing of the teleprinter symbol may provide a greater time interval also during the receipt of the associated combination impulses. The beginning of rotation of the printer shaft is at the same time secured at the termination of the rotation of the receiver shaft. Auxiliary elements were previously required for effecting such improvement in the timing of the operations. Faster operation can be effected by means of the invention also in the case of type-wheel teleprinter machines operating in accordance with the so-called way-summation method, even with abandonment of prolonged functions, by allocating the largest motions of the type-wheel to symbols which occur as a matter of experience relatively rarely, and in tape printers, in which there is no carriage return, by basing the printing speed upon a somewhat shorter time than the longest setting path of the type-wheel.

The storage device comprises in accordance with another object and feature two or more parallel connected storing units for each teleprinter symbol, which are alternately used, or two or more serially arranged storing units for each teleprinter symbol, whereby each symbol passes on its way from the receiver to the printer through all storing units.

In accordance with a further object and feature of the invention, the instant of taking over of a symbol by the printer is controllable by means of switches controlled in a release circuit by a series circuit of a number corresponding to the number of teleprinter elements, for example, by relays, depending upon the kind of combination of the corresponding or of a preceding symbol.

The arrangement may thereby be such that the release of a relay disposed in the charging and discharge circuit of a storage capacitor is delayable, by means of the arrangement of the series circuit of the switches controlled by the teleprinted elements, depending upon the combination of the last received teleprinter symbol.

In the mechanical embodiment of the storage device, the storage means may comprise radially displaceable pins arranged for each teleprinter symbol essentially along a cylinder geneatrix, and one or more of the pin carriers may be rotatable about the cylinder axis. In accordance with still another object and feature a rotatable bracket is allotted to each row of pins as a carrier therefor, or the rows of pins are in known manner journalled in a rotating drum, and the angular distance of the elements, filling the storage device from the elements actuated thereby, is during the operation automatically adjustable in accordance with the storage time.

The storage pins, in accordance with another feature of the invention, may be axially movable and disposed side by side.

The storage device according to the invention may serve to prolong the time for the return of the carriage, which is even with normal operating speeds of teleprinter machines very short, without having to consider such prolonging in the transmission.

Such a prolonging gains decisive importance in connection with the increase of printing speed. The storage feature may also be utilized for the automatic carriage return which is initiated by a spacing signal received in the terminal region of a line; without the storage device, at least one signal element would fall within the carriage return motion and would be lost.

Considerable importance is to be attached to the invention in the case of teleprinter equipment operating according to the six code alphabet. The type carrier becomes considerably heavier because of the possibility of utilizing considerably more types, and carrying out the carriage return within the normal time interval is considerably more difficult than in the case of teleprinter apparatus operating in accordance with the five code alphabet.

The above indicated and further objects and features of the invention will appear from the description of embodiments rendered below with reference to the accompanying diagrammatic drawings, in which—

Fig. 1 shows a simplified perspective view of a teleprinter receiver comprising five scanning elements, distributor, storing device and convertor-selector elements;

Fig. 2 represents an operating diagram covering Figs. 1 and 3;

Fig. 3 shows in diagrammatic side view elements of a further teleprinter receiver comprising a scanning element, distributor and parts of a storing device essentially according to Fig. 1;

Fig. 4 is a perspective view of a modified mechanical storage element;

Fig. 5 represents a circuit of an electrical storage device;

Fig. 6 illustrates operating diagram for Fig. 5; and

Fig. 7 is a diagram supplementing Fig. 5, for storage purposes depending upon the kind of received impulse combination.

Referring now to the drawings, the arrangement according to Fig. 1 is intended for a page printer operating in accordance with the five code or element alphabet with high printing speed. It comprises a receiver magnet **1** with an armature **3** which is movable about an axis **2**, the armature **3** being biased to normal position by a spring **4**. In the illustrated position, the magnet is energized and holds the armature attracted against the action of the spring. The arm **3***a* of the armature, facing away from the magnet **1**, forms a knife edge and is wide enough to cooperate with five scanning members. Of there members, only the frontal one, designated by numeral **5** is shown, such member being allotted to the first combination step or element. The members such as **5**, are formed with three arms **5***a*, **5***b*, **5***c*, and are disposed rotatable about a common axis **6**. A spring **7** biases the arm **5***a* of each scanning member relative to a cam **8** disposed upon the receiver shaft **9**. The second arm **5***b* scans the position of the armature **3**, and the third arm **5***c* affects one of the pins **11** and **21**, respectively, arranged in two brackets **10** and **20** of the storage device. The remaining pins **12** to **15** and **22** to **25**, respectively, also form storage means; they are displaced relative to their brackets at the second to the fifth combination element into the position indicated for the pin **11**. The valleys or depressions of the cams **8** are in their angular positions mutually displaced so that the cams effect a rotary motion of the respectively associated scanning members successively, in step with the incoming impulses. If the armature **3** happens to be attracted, the lever arm **5***b* can move underneath the armature edge and the arm **5***c* shifts the associated pin in the direction of the fixed bracket axis **16**. If the armature is released, the arm **5***b* of the scanning member will hit the edge of the armature arm or extension **3***a*; the associated pin cannot be actuated in such case. Shortly before termination of the rotation of the receiver shaft **9**, the blocking or locking pawl **18** having the extension **18***a*, will be released by a cam **17** disposed upon the receiver shaft, the pawl **18** being normally held, by a spring **19**, in a position in which it holds the storage bracket in the scanning position. The pins **11** to **15** and **21** to **25** are axially movable within their brackets with noticeable friction so that they cannot be displaced inadvertently.

The storage brackets **10** and **20** are individually or simultaneously rotatable in clockwise direction by a bushing **36** rotating about the shaft **16**, through the medium of a friction clutch **37**. A restoring cam **38** carried by the stationary shaft **16** takes care of restoring the shifted pins into their normal positions before reaching the position in which the pins are again actuated responsive to the rotation of the receiver shaft **9**.

The second storage bracket **20**, in the illustrated position is in motion and the pins **22** to **25** which have not been displaced just touch the selection bars or members **32** to **35** for the purpose of transmitting thereto the new setting at the next instant. Each selection bar **31** to **35** is tiltable against a spring force. The bars are upon passage of the bracket set in accordance with the setting of the storage pins according to signals received, due to the sliding action of the pins that have not been axially shifted; in the assumed case, pins **22** to **25** are affected, whereby the bars are rearwardly rotated against the forces of springs such as **26**. The pin **21** moves in back of and passes the selection bar **31**. The bracket **20** engages at the same time the arm **27***a* of the pawl **27** and pulls it off from the blocking or locking cam **30***a* against the force of spring **28**. The printer shaft **30**, which is controlled by a suitable friction clutch or the like is thereby released. The printer shaft initially permits actuation of a known blocking bracket (not shown) which holds the actuated bars **32** to **35** in their set positions. At the end of rotation of the printer shaft, this blocking bracket is lifted again and all the bars **32** to **35** return to normal position by the force of their respectively associated springs **26**, unless they should have been set into working position by the pins of the following storage bracket.

The pawl **27** can however be actuated by one of the storage brackets when the printer shaft has concluded its rotation and when other functions that may disturb the sequential operation have terminated. For this purpose, the pawl is provided with an angular extension **27***b* which cooperates with the cam **30***b*, the latter being concentric and having formed therein only one notch which is in normal position of the printer shaft located opposite the extension **27***b*. In all other positions of the printer shaft, the pawl **27** cannot be actuated by either storage bracket; it will hold the storage bracket, engaging it until such a time when the cam **30***b* permits release by assuming normal angular position.

The arm **27***c* of the pawl **27** cooperates with a latch member **39** which can assume two terminal positions in which it either frees or blocks the arm **27***c*. The position of the latch **39** depends upon functions to be performed by the teleprinter and which may consume longer intervals, for example, carriage return in the case of a page printer. Accordingly, when the signal designating line advance is received, after initiation of the carriage return, and when the carriage goes through its return motion, the latch **39** will move into the left blocking position so that the next signal can be received only after the carriage has reached its normal position when the latch is shifted to free the pawl arm **27***c*.

The operation of the receiver and storage device according to Fig. 1 is as follows:

It shall be assumed that the selection bars **31** to **35** have not been displaced subsequent to a last received signal signifying type-change and that the printer shaft **30** has just concluded its corresponding rotation. The storage pins **21** to **25** are set according to the impulse combination + − − − −, which corresponds to the letter "*e*" of the telegraph alphabet No. 2. The receiver magnet has meanwhile received the first current element of the next impulse combination and the receiver shaft has begun another rotation. The arm **5***a* of the scanning member **5** can thereby follow into the valley of the cam **8** because the arm **5***b* moved by the force of spring **7** underneath the edge of the armature extension **3***a*. The arm **5***c* has at the same time moved pin **11** into the illustrated position. In the next instant, the pins **22** to **25** tilt the selection bars **32** to **35** and the printer shaft **30** is released by the lifting of the blocking lever from the blocking cam **30***a* against the force of the spring **28**, such operation being effected by the action of the bracket **20** which moves the lower pawl arm **27***a* of the blocking pawl **27**. The bracket **20** continues rotation in the direction of the arrow, by the action of the clutch **37**, and bushing **36** and is placed, after restoration of the pin **21**, into preparatory position with the aid of the restoring cam **38**, from underneath against the bracket **10**. As soon as the impulse combination initiated according to Fig. 1 is completely received, the arm **18***a* of the blocking pawl **18**, which is scanned by the cam **17**, will reach the crest of such cam, thereby tilting the blocking pawl **18** against the force of spring **19**, thereby releasing the bracket **10**. This bracket now rotates in the direction of the selection bars **31** to **35**, and the bracket **20** follows into the position in which the bracket **10** is shown in Fig. 1. The rotation of the two brackets is as previously mentioned effected by the bushing **36**.

It shall now be assumed that the rotation of the printer shaft is by 2 milliseconds faster than the operating interval of the receiver proper. It is moreover suitable to make the rotation time of the storage brackets **10** and **20** shorter than the time of rotation of the printer shaft, so that these brackets are held stopped as long as possible upon the printer side and still available at the proper instants at the receiver side, for the recording of the following symbol. In view of the small dimensions of these parts, it will be easily possible to bring this rotation time interval, for example, to 80 ms. as compared with 130 ms. in receivers with internationally adapted stepping speed of 50 Baud.

Fig. 2 shows in line I the timing of impulses transmitted from a teleprinter transmitter and incoming at the receiver. The impulses consist, as is known, of a starting element A, five symbol elements *i*1 to *i*5 each of 20 ms. duration, and a stop element S*p* of 30 ms. duration. Calculated from the instant 0 at the beginning of the first start element, the end of the first symbol will lie at 150 ms.; the end of the second symbol at 300 ms.; the end of the third at 450 ms.; and so forth. As indicated in line II, the receiver scans each symbol element centrally, that is, at the instants 30, 50, 70, 90, 110 ms. for the first symbol, etc. The pins of the storage device **10** are thereby set, and the corresponding storage bracket **10**, as shown in line III, accordingly must be available facing the receiver from an instant briefly preceding the scanning of the first to an instant shortly after the scanning of the fifth element. This stopping of the bracket **10** from the instant 25 ms. to the instant 115 ms. is indicated by a dash line. At the instant 115, the storing element **10** can begin to rotate. After one-half rotation which, in accordance with the assumed total rotation time of 80 ms., amounts to 40 ms., the storage element will arrive at the instant 155 ms. at the printer selection bars, setting such bars, and could again arrive at the receiver side at the instant 195 ms. However, shortly before the end position is reached, it will be stopped by the second bracket, which is in the receiver position, and can follow only when the other bracket has, after recording the second symbol, left such position shortly after the instant 260 ms. The storage element **10** is however, needed again, for the recording of the third symbol at the receiver side, at the instant 325 ms., that is, after a waiting time of 130 ms. indicated by the dot-dash line. As indicated in line IV, the function is not affected if the printer is blocked, at the instant 155 ms. after the start, so that the storage element must wait at this point for fully 130 ms. It is clear, therefore, that 130 ms. have been gained for the printing operation.

This gain in time could be effected only once and would from there on persist, provided that the receiver and printer would continuously operate with identical speed. In order to equalize the loss in time of the printer as compared with the receiver, the printer, as mentioned before, is given a shorter rotation time for the normal operation. This difference is to be of such magnitude that the loss of 130 ms. can be regained in a case where the carriage return for one line contains about 70 symbols. The printer accordingly must execute a normal operation sequence about 2 ms. faster than the receiver.

In practical application, this will hardly be necessary because the receiver runs, based on internationally adopted requirements, faster than the transmitter and has after each symbol a stopping interval of several ms. With the duration of a transmitted symbol, of 150 ms., and a customary rotation time of 130 ms. at the receiver and printer, the latter will have for each symbol a stopping interval of 20 ms., provided that the r.p.m. of the transmitting and receiving machines agree exactly. At a limit tolerance of ±0.75% rotation deviation, which is internationally adopted, the transmitter rotation time will in the most unfavorable case be reduced by 1.113 ms. and the rotation time of the receiver and printer will be increased by 0.98 ms. The stopping time for the receiver is accordingly reduced by 2.11 ms. to 17.89 ms. for each symbol. Over a line of 70 symbols can thus be gained 1.252 ms., that is, a multiple of the required value, without providing a rotation difference between the receiver and printer.

Irregular distortions and the interconnection of corrective repeaters may cause several symbols to follow at a spacing of 140 ms. which, however, can not become noticeably disturbing over 70 symbols.

The calculated great time gain also shows that it may be advantageous to equip the storing device with more than two elements. If there is, as compared with Fig. 1, one additional bracket provided, the instant at which the first used storage bracket must record another succeeding symbol will be shifted by one full symbol, that is, by 150 ms., and with each additional bracket there will be a corresponding gain. It is in this manner possible to carry out operations going far beyond the duration of a symbol, for example, automatic carriage return, or to prolong considerably the operation of functions which are in prior structures very fast, thus making it possible to reduce forces and stresses and to make the operations more secure and reliable.

Fig. 3 shows, in schematic manner for use with the storage device, parts of a receiver which is better suited for high operating speeds than the arrangement according to Fig. 1. It has only one scanning member **45**, and the armature **43** can accordingly be light and operate fast. The armature **43** is again rotatable about an axis **2** and is held retracted by a spring **4**, as in the arrangement according to Fig. 1. The scanning member or element **45** is disposed for rotation about an axis **46** and is by a spring **47** biased for engagement with a cam **48** provided with six depresisons or valleys. The receiver is intended for a six-code or element alphabet.

The scanning member **45** carries at its arm **45***a* a bar **45***b*, shown in section, such bar cooperating with six intermediate levers **49**. Each of these intermediate levers is at **58** linked to a further lever **51** which is movably journalled at **50**. The central portion of the lever **49** is biased by the force of a spring **52**, extending from the lever **51**, for engagement with a cam **54** disposed upon the receiver shaft **53** for rotation with the cam **48**. The parts **49** to **52** and **54** are shown only once; there are in reality six sets of such parts disposed side by side. The crests of the cams **54** are mutually angularly displaced.

During a rotation of the receiver shaft **53**, the arm **45***c* of the scanning lever **45** is by the force of spring **47** successively drawn into six cam valleys or depressions, it being assumed, of course, that armature **43** is attracted at such instances. One of the levers **49** is thereby, with attracted armature **43**, freed from the bar **45***b* and reaches at the next instant a crest of the respectively associated cam **54**. The storage pin **55** engaging the corresponding lever **49** is frictionally slidably disposed in an associated bracket **57** which is rotatable about an axis **56**, the sliding friction of pins **55** being such that the pin is at this time not displaced while the lever **49** is tilted about its axis **58**. However, if the armature is as shown retracted, it will prevent the engagement of the arm **45***c* of the scanning lever **45** into a cam depression, blocking with its bar **45***b* the rotation of the intermediate lever **49** in clockwise direction.

When the lever **49** is moved by engagement with the crest of the cam **54**, the associated storage pin will be displaced and set. The storage device may be structurally similar to that shown in Fig. 1 with the exception that there are six pins in a row.

The storage device may be formed differently within the scope of the invention. Fig. 4 shows as an example

a radial arrangement of the storage pins. In the arrangement according to Fig. 1, the stop pawl 27, instead of being operated simultaneously with the selection elements, may be actuated by the storage bracket or the like shortly thereafter. Ball bearings may be provided between the storage brackets at the journals thereof to reduce friction therebetween.

The storage elements or members may also be arranged one in back of the other, such, for example, that tilting or swinging brackets are used each provided with five pins, whereby the pins are set in one terminal position of the first bracket while the pins of a second likewise tiltably arranged bracket are displaced in the other terminal position thereof, and so forth.

Other mechanical storing means may be used, such, for example, as are known for teleprinter transmitters.

Fig. 5 shows an example of an electrical arrangement for the purposes of the invention. An electric receiver is thereby substituted for the mechanical receiver, wherein the position of a receiver relay ER is at its armature or converted into negative or positive chargers for five capacitors C1 to C5 by the actuation of successively operating scanning contacts AK1 to AK5. After receipt of the fifth element, discharge contacts EK1 to EK5 are simultaneously closed to set the storage relays S1 to S5. The relays T1 to T5 may be neglected for the time being. This arrangement is known in the teleprinter art.

Aside from the difference of electrical operation, as compared with mechanical operation according to Figs. 1, 3 and 4, Fig. 5 shows a further different arrangement so far as the two storage means are concerned. While the two storage devices of Figs. 1, 3 and 4 are disposed in parallel, each symbol running only through one of the two, the two storage devices in the example of electrical storage are serially disposed, each symbol running through both storage means. The arrangement is as follows:

The contacts of the storage relays S1 to S5 determine the positions of the printer relays D1 to D5. The instant at which the setting of the printer relays is effected is determined by the actuation of contacts *u*. This instant, as shown in the line diagram Fig. 6, may embrace nearly the range of an entire symbol. In line I in Fig. 6 is represented the progress of the current impulses; in line II are shown the scanning instants at which the capacitors C1 to C5 are charged in the receiver; in line III is indicated the brief interval required in each instance for the setting of the storage relays S1 to S5. The storage relays may, as shown in line IV (permissible range for the setting of the printer relay and printer release) transmit their setting immediately to the printer relay when the contacts *u* happen to be closed upon setting of the relays S1 to S5. The transmission to the printer relay may however be delayed to the instant in which the relays S1 to S5 are needed for the reception of the successive symbol.

This dependence may, in the case of carriage return, be obtained, for example, by means controlled by the moving carirage to hold the contacts *u* open until the carriage has assumed its normal position. It is, however, also possible to proceed directly from the received symbol and to actuate at a predetermined combination, for example, line advance, a relay which delays the contacts *u* as desired.

Fig. 7 taken in conjunction with Fig. 5 shows an example for obtaining the above-indicated operation. The contacts *u* in Fig. 5 are controlled by a relay U (Fig. 7) which energizes once for each symbol. Contact HK1 is closed from the start to shortly before the end of the rotation of the receiver shaft. Relay H is then energized in an obvious circuit over the HK1 contact and its contact *h* permits charging of the capacitor C7 over a resistor W. After receipt of the five signal elements, the relays S1 to S5 and T1 to T5 are set in circuits over the contacts EK1 to EK5. Immediately thereafter, contact HK1 opens and relay H deenergizes. If the printer is in normal position upon restoration of the contact *h*, the contact HK2 controlled by the printer will be closed and causes brief energization of relay U by discharge of the capacitor C7, thereby closing the contacts *u* for a brief interval and causing setting of the printer relays D1 to D5 and energization of the printer release magnet DM so as to carry out the printing operation. The contacts *t*1 to *t*5 of the relays T1 to T5 are in accordance with Fig. 7 in a series circuit which is closed only responsive to the combination indicating line advance. The capacitor C6 is in such case connected in parallel with relay H and is charged over contact HK1 thereby effecting subsequently a slow-to-release operation of relay H. The corresponding delayed release determines the transmission of the setting of the printer relays and the printer release with a selective delay interval. In case of the successive other symbols, the relay H will release without delay and the printer shaft will not yet be in normal position and accordingly will not be ready for processing a further symbol. Contact HK2 is accordingly open for an initial interval; and the discharge of the capacitor C7 will take place at the instant when the printer shaft has assumed its normal position thereby closing contact HK2.

In order to limit the time for the carriage return with certainty to the value that is permissible without disturbing a successive symbol, the carriage return was not effected as usual by a restoring spring but by a motor drive. It was found, however, that the drive motor for the teleprinter which took over this function had to be extraordinarily heavily rated, consuming even in normal operation a great deal of current causing increased heating of the machine and other inconveniences. The proposed storage procedure offers in this respect a considerable advance. If the time for the carriage return can be noticeably lengthened by the use of the storage arrangement, the input for the motor controlled carriage return will drop to a fraction and can be handled by the motor without causing any difficulties with respect to dimensioning or the operation.

If a signal received prior to the last one, for example, the signal for the carriage return, is to be used in the example indicated last above for the printing delay, the corresponding command signal will have to be additionally stored.

The features of the described examples, for example, mechanical or electrical operation of the receiver; mechanical or electrical storage; parallel or series connection of the storage means; predetermined delay for the successive printing actuation depending upon predetermined combinations or directly upon the progress of the operation, may of course be used in desired combination within the scope of the invention.

Changes may be made within the scope and spirit of the appended claims which define what is believed to be new and desired to have protected by Letters Patent.

We claim:

1. In a start-stop teleprinter machine having a receiver and drive means therefor, said receiver comprising a receiving element and means for setting it in accordance with signal element combinations received thereby, and having signal transmitting members controlled by said drive means for scanning the setting of said receiving element, and having a printer for printing symbols according to the signal element combinations received by said receiving element and scanned by said signal transmitting members, and having control means for effecting the operation of said printer; a signal element storage device arranged between said receiver and said printer, said device comprising means controlled by the receiver for storing received signal elements of more than one teleprinter symbol for ultimate delivery to said printer, locking means for temporarily blocking the delivery of said stored signal elements to said printer, and means governed by said printer upon completion of predetermined functions there-

of for releasing said locking means with predetermined delay to cause said storage device to release said stored signal element combinations with predetermined variable delay for evaluation by said printer in the operation thereof.

2. A structure and cooperation of parts according to claim 1, wherein said storage device is a mechanical device.

3. A structure and cooperation of parts according to claim 1, wherein said storage device is a mechanical device comprising storing elements in the form of pins.

4. A structure and cooperation of parts according to claim 1, wherein said storage device is an electrically operating electrically controlled device.

5. A structure and cooperation of parts according to claim 1, wherein said storage device comprises for operative use with each symbol signal combination at least two parallel disposed alternately operating storage means.

6. A structure and cooperation of parts according to claim 1, comprising a release circuit containing switching means for controlling the instant of transfer of stored signal element combinations to said printer, a series circuit cooperating with said release circuit, said series circuit comprising a number of switching means corresponding to the number of symbol signal elements in a combination.

7. A structure and cooperation of parts according to claim 6, comprising a delay circuit including said switching means and a relay, said relay controlling the charging and discharging of a storage capacitor, and a further capacitor in said delay circuit, said further capacitor being controlled by said switching means to provide a release delay for said relay depending upon the kind of the last received signal element combination.

8. A structure and cooperation of parts according to claim 1, comprising cam controlled scanning elements constituting said transmitting members for cooperation with said receiving element to ascertain the setting thereof, said

storage device comprising a plurality of intermediate elements corresponding in number to the number of signal elements in said combinations and controlled by said scanning elements, and cam means for additionally controlling said intermediate elements to effect operative actuation thereof in the sequence of signal elements respectively associated therewith.

9. A structure and cooperation of parts according to claim 1, wherein said storage device comprises rotatably disposed carrier means, and a pair of pins for each signal element movably disposed in said carrier means radially of the direction of rotation thereof.

10. A structure and cooperation of parts according to claim 9, comprising a rotatable drum constituting said carrier means, the angular spacing between pins feeding said storage device and pins actuated thereby being automatically regulable in accordance with the storing interval.

11. A structure and cooperation of parts according to claim 9, comprising a stationary cam for restoring said pins to normal position.

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