Dec. 27, 1960 W. BESTER ET AL 2,966,547

RECEIVER-TRANSLATOR FOR TELEPRINTER MACHINES

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Fig.1

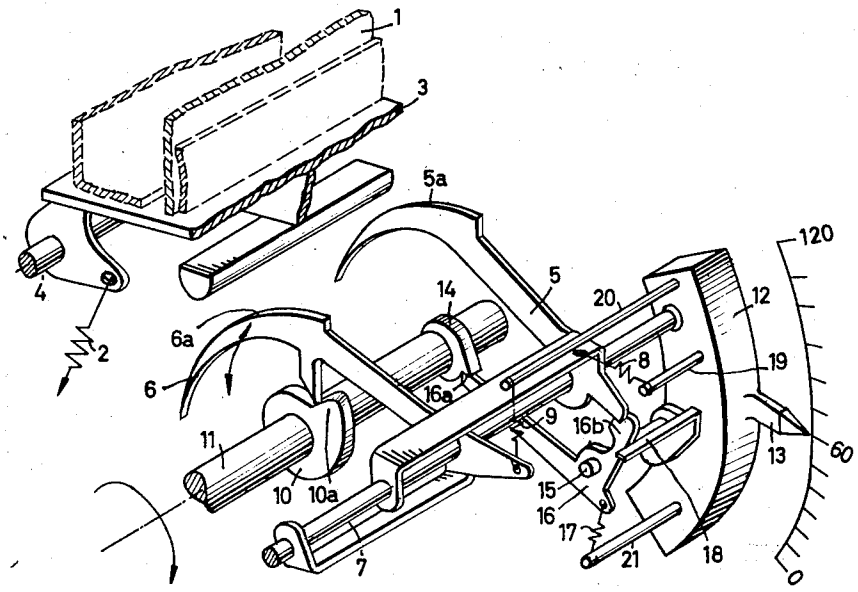

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Fig.2

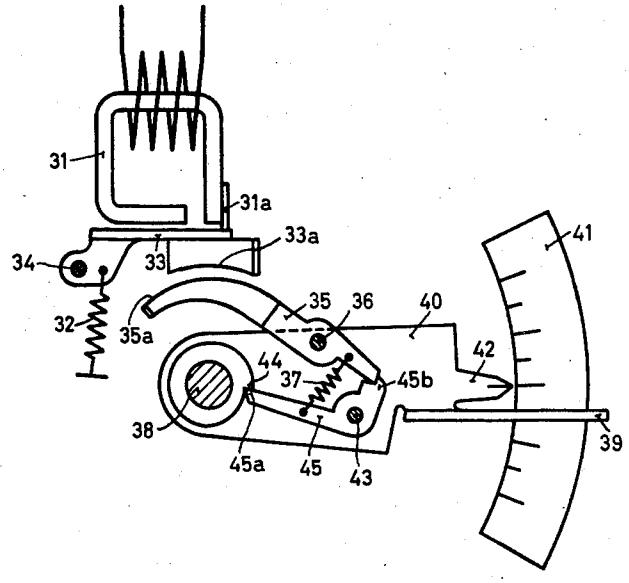
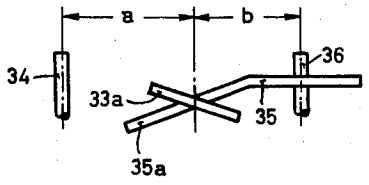


Fig.3



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RECEIVER-TRANSLATOR FOR TELEPRINTER MACHINES

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7 Claims. (Cl. 178—33)

This invention is concerned with a receiver-translator for start-stop teleprinter machines having a device for setting the angular position in which the selection cams are respectively started and stopped. Devices of this kind serve the purpose of timing the receiver-translator to the instants at which the teleprinter signal impulses are received.

Known setting devices for the indicated purpose require a subdivided cam-shaft, are difficult to produce with the necessary accuracy, and are subject to great wear.

Another solution of the problem posed by the existing situation proposes, in connection with teleprinter machines in which the armature of the receiver magnet is to be attracted from its released position, is to make a member which is to be manually set in its angular position, in the form of an arcuate plate carrying a two-armed lever rotatably journalled thereon, one arm being provided with a stop cooperating with a corresponding counter stop on a stop cam associated with the selection cams, and the other arm being controlled by the release lever which scans the armature of the receiver magnet, whereby the two-armed lever is rotated, separating its stop from the counter stop and thus providing for the rotation of the selection cams responsive to receipt of a start signal impulse.

Such a device is, however, unsuitable for teleprinter machines having therein an armature which is in normal or resting condition and for the start of its restoring motion free of all loads exerted by exterior forces and acts after deenergization of the receiver magnet with great excess of energy upon the members controlled thereby so as to facilitate and accelerate the impulse translating and the printing operation. It is, in such receiver-translators suitable and therefore generally customary to provide for mechanical means for effecting engagement of the armature of the receiver magnet with its magnet yoke after each combination step, such means being hereinafter referred to as "positioning" means or equivalent language.

In the case of a receiver-translator comprising in the setting or adjusting device for the start positions of the selection cams a setting or adjusting element carrying a lever which locks the cam shaft in stop position, there is for this purpose provided, movably journalled upon the setting member, a positioning lever controlled by a positioning cam, such lever cooperating with the armature along a control edge extending for a portion approximately concentric to the axis of the cam shaft, for the purpose of effecting its mechanical reengagement with the yoke of the receiver magnet.

It is in this way possible to operate with a unitary cam shaft in spite of abrupt release and automatic restoration of the armature, and to achieve with little wear of the parts satisfactory setting of the start position of the selector cams relative to the fixedly journaled selection members.

In accordance with a further feature of the invention, the setting member carries a release lever and an armature positioning lever, each lever forming a control edge for the armature, extending in operating position at least in part approximately concentric to the cam shaft.

In accordance with another feature of the invention, the release lever and the positioning lever are for executing their operating strokes operatively rotatable about a common axis formed by a shaft which is fastened on the pivotally mounted setting member and extends near the cam shaft in parallel therewith.

The anchoring points for the restoring springs of the levers journalled upon the setting member, such as the armature release lever, armature positioning lever and cam shaft stop lever, as well as a stop for the stop lever, are in accordance with a preferred embodiment also fixedly disposed upon the setting member.

The foregoing and other objects and features of the invention will appear from the description of embodiments which will be rendered below with reference to the accompanying drawings.

Fig. 1 shows in perspective representation parts of a receiver-translator which are important for an understanding of the invention;

Fig. 2 shows in side elevational view essential parts of a modification; and

Fig. 3 shows a top view of the release lever according to Fig. 2 and also part of the armature cooperating therewith.

Referring now to Fig. 1, numeral 1 indicates the lower part of the yoke of a receiver magnet constructed in customary manner. Numeral 3 indicates part of the armature attracted to the yoke 1 against the force of a spring 2. The armature 3 is tiltable about an axis 4.

It shall be assumed that there are provided adjustable selection members (not shown) for the scanning of the characteristic positions of a second armature (not shown). A release lever 5 and an armature positioning lever 6 cooperate with the armature 3. These levers are tiltable about a common axis formed by a shaft 7. The lever 5 is by means of a spring 8 biased in such a manner that it attempts to move with its control edge 5*a* clockwise in the direction of the armature. The armature positioning lever 6 is held by a spring 9 with its extension 6*b* in engagement with the positioning cam 10 provided on the receiver shaft 11 which rotates clockwise. The shaft 7 is fixedly connected with a manually adjustable setting member 12 which is tiltable about the cam shaft 11. This setting member carries a pointer 13 which is movable relative to a stationary scale and which may be locked in desired angular position. The setting member 12 also carries a bolt 15 extending just like the shaft 7 parallel to the cam shaft 11 and forming a pivot axis for a stop lever 16 which is effective to stop the cam shaft 11 by engagement with a stop cam 14. This stop lever is held in engagement with a stop 18 by the force of a spring 17, the stop 18 being carried by the setting element 12 and being adjustable with respect to the stop lever 16 so as to provide for the adjustment of the operation. The fixed points for the springs 8, 9, 17 are formed by members 19, 20, 21 which are likewise carried by the setting member 12 and extend in parallel with the cam shaft 11. In the illustrated preparatory position of the parts, the end 16*a* of the stop lever 16 is in engagement with the stop cam 14, the latter exerting counterclockwise pressure thereon. The extension 16*b* of the stop lever 16 is linked to the release lever 5 and is slightly lifted from the stop 18. The release lever and the armature positioning lever are arranged in two mutually parallel planes, the ends thereof lying opposite a member carried by the armature, these levers forming arcuate control edges 5*a* and 6*a*. The control edges extend in this manner approximately concentric to the cam shaft of the receiver.

The operation of the arrangement is as follows:

The armature 3 drops upon deenergization of the magnet, at the start of the receipt of the start element of a teleprinter signal, and engages the control edge 5*a* of the release lever 5 which is thus rotated counterclockwise, against the force of the spring 8, releasing the stop lever 16. The cam shaft 11 which is coupled over a friction clutch (not shown) with a continuously rotating shaft, thereupon presses with its cam 14 upon the end 16*a* of the stop lever, rotating such lever downwardly. The cam shaft 11 is now released for one revolution. Shortly before conclusion of the cam shaft revolution, the cam rise 10*a* of the positioning cam 10 lifts the armature positioning lever 6 against the force exerted by the spring 9. If the armature 3 has not been attracted at that instant, it will be in this manner mechanically placed in engagement with the magnet yoke 1 by the action of the control edge 6*a*.

Due to the arcuate shape of the levers 5 and 6, it is immaterial in what angular position the setting member 12 and therewith all structural parts connected therewith, including the levers 5 and 6, may be with respect to the cam shaft 11. The adjusting or setting member is shown in an intermediate position. The control edge 5*a* of the release lever 5 deviates in the preparatory position purposely to such an extent from an imagined orbit extending concentric to the cam shaft 11, that the release time is held substantialiy constant at all angular positions of the adjusting member, despite the variable lever arm with which the armature 3 acts upon the lever 5.

Referring now to Figs. 2 and 3, numeral 31 indicates the yoke of a customarily constructed receiver magnet provided with a nonmagnetic part 31*a* which prevents sticking of the armature. In the illustrated, energized condition of the magnet, there is attracted thereto, against the force of a spring 32, an armature 33 which is pivotally mounted on a shaft 34. A second armature may be provided for the selection operation, cooperating with selection members for scanning its characteristic positions, these parts having been omitted for the sake of clarity.

A release lever 35 and an armature positioning lever for controlling the engagement of the armature as in the arrangement according to Fig. 1, may also be provided for cooperation with the release armature. These levers are pivotally arranged on a common axis 36. The lever 35 is by means of a spring 37 biased clockwise, attempting to move with its control edge 35*a* in the direction of the armature 33. The end of the lever 35 which carries the control edge 35*a* is relative to the main part of the lever and its plane of motion angularly disposed, and the armature 33 carries an extension extending likewise oblique to its plane of motion and carrying a control edge 33*a*, these parts accordingly extending in crossing relationship as illustrated in Fig. 3.

An adjusting or setting member 40 is rotatably disposed about the receiver shaft 38, for manual setting by means of a handle 39. This setting member 40 carries a shaft 36 and terminates in a pointer 42 which is thus movable with respect to a fixed scale 41, being lockable in suitable manner, in any desired angular position thereof. The setting member 40 also carries a shaft 43 which extends just like the shaft 36 in parallel with the cam shaft 38, forming the axis of rotation for a stop lever 45 serving to stop the rotation of the receiver cam shaft 38. The stopping is effected by means of a stop cam 44. The stop lever 45 engages the stop cam 44 with its end 45*a* due to the force of the spring 37 which links it with the release lever 35.

In the illustrated preparatory position, the stop lever 45 is biased counterclockwise by the pressure of the stop cam 44, and is linked with the release lever 35 at its end 45*b*. The release lever 35 is arcuately shaped at the end thereof which faces the armature 33. The control edge 35*a* extends approximately concentric to the axis of the cam shaft 38. However, care is taken at the same time, by the formation of the parts 33 and 35, as shown in Fig. 3, to keep the ratio *a* to *b* of the operatively effective lever arms of the armature 33 and the lever 35 in all individual positions substantially identical or to provide alteration thereof according to a law which assures the application of the necessary release stroke for the lever 35 in all possible angular positions of the setting element 40.

The operation of the arrangement is as follows:

As soon as the receiver magnet becomes deenergized, at the start of the receipt of the start element of a teleprinter signal, armature 33 will restore and its control edge 33*a* will engage the control edge 35*a* of the release lever 35. The latter moves counterclockwise about the axis 36, against the force of the spring 37, thereby freeing the stop lever 45. The cam shaft 38 is coupled over a friction clutch with a continuously rotating shaft (not shown) and thereupon moves the lever 45 downwardly, counterclockwise, by engagement of the cam 44 with the end 45*a* of the lever. The cam shaft is now released for one revolution. The angular position of the adjusting or setting member 40 and therewith the angular position of all parts cooperatively connected therewith, including the lever 35 which is tiltable about shaft 36, relative to the cam shaft 38, is immaterial in view of the arcuate shape of the free end of the lever 35.

The setting member 40 is shown in an intermediate position. The control edge 35*a* of the lever 35 deviates in the preparatory position purposely to such an extent from an imagined orbit extending concentric to the shaft 38, that the release time is held substantially constant in all angular positions of the setting member despite the variable lever arm of the armature 33 acting upon the lever 35. The formation of the ends of the parts 33 and 35, as shown in Fig. 3, holds the ratio *a* to *b* of the operatively effective lever arms of the armature 33 and the lever 35 in all angular positions approximately identical or variable according to a certain law, to assure in all possible angular positions of the setting member 40 the required release stroke of the lever 35 and also the most favorable conditions for the operating forces to be applied. Putting it in other words, the release lever will always operate with substantially constant torque.

Changes and modifications are possible. For example, the free ends of the parts 33 and 35 or at least the free end of one of these parts, may extend along an arc instead of rectilinear as shown in Fig. 3.

Changes may be made within the scope and spirit of the appended claims.

We claim:

1. In a start-stop teleprinter receiver-translator having a receiver magnet and an armature therefor which is in normal condition and at the start of its restoring motion free of all exterior loads and acting with excess energy upon elements cooperating therewith, and having a rotatable cam shaft carrying selection cams; a device for setting the angular start-stop position of the selection cams, said device comprising an adjusting element, pivotally movable about the axis of said cam shaft, a stop lever carried by said adjusting element for locking said rotatable cam shaft in stop position thereof, a release lever carried by said adjusting element and controlled by said armature responsive to the release of said armature for causing said stop lever to effect operative release of said cam shaft for one revolution thereof, said release lever having an arcuate portion extending approximately concentric with the axis of said cam shaft for cooperation with said armature whereby the operative relation between the latter and the arcuate portion remains relatively uniform throughout the adjustable range of said release lever, a movable armature positioning lever carried by said adjusting element, and a positioning cam carried by said cam shaft for actuating said armature positioning lever incident to rotation of said cam shaft so as to move said armature mechanically from its released position

into its operated position with respect to the yoke of said receiver magnet, the force to move said armature responsive to actuation of said armature positioning lever being operative along a point of an arc extending approximately concentric to the axis of said cam shaft.

2. A structure and cooperation of parts according to claim 1 wherein said armature positioning lever has an arcuate portion for cooperation with said armature extending approximately concentric with the axis of said cam shaft.

3. A structure and cooperation of parts according to claim 1, wherein said armature has an arcuate portion extending approximately concentric with the axis of said cam shaft for cooperation with a similarly extending portion of said armature positioning lever.

4. A structure and cooperation of parts according to claim 1, comprising a common shaft for rotatably mounting said armature positioning lever and said release lever.

5. A structure and cooperation of parts according to claim 4, comprising restoring spring means for said armature positioning lever and for said release lever, respectively, said spring means being anchored on said adjusting element, and a stop for said stop lever also carried by said adjusting element.

6. A structure and cooperation of parts according to claim 1, wherein said arcuate portion of said release lever forms an edge for cooperation with said armature resulting in a ratio of idler stroke of said armature to operatively effective lever arm of said release lever producing in all angular positions of said adjusting element a substantially constant torque of the release lever.

7. In a start-stop teleprinter receiver-translator having a receiver magnet and an armature therefor which is in normal condition and at the start of its restoring motion free of all exterior loads and acting with excess energy upon elements cooperating therewith, and having a rotatable cam shaft carrying selection cams; a device for setting the angular start-stop position of the selection cams, said device comprising an adjusting element, pivotally movable about the axis of said cam shaft, a stop lever carried by said adjusting element for locking said rotatable cam shaft in stop position thereof, and a release lever carried by said adjusting element and controlled by said armature responsive to the release of said armature for causing said stop lever to effect operative release of said cam shaft for one revolution thereof, said release lever having an arcuate portion extending approximately concentric with the axis of said cam shaft for cooperation with said armature whereby the operative relation between the latter and the arcuate portion remains relatively uniform throughout the adjustable range of said release lever.

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