

Jan. 26 , 1926.

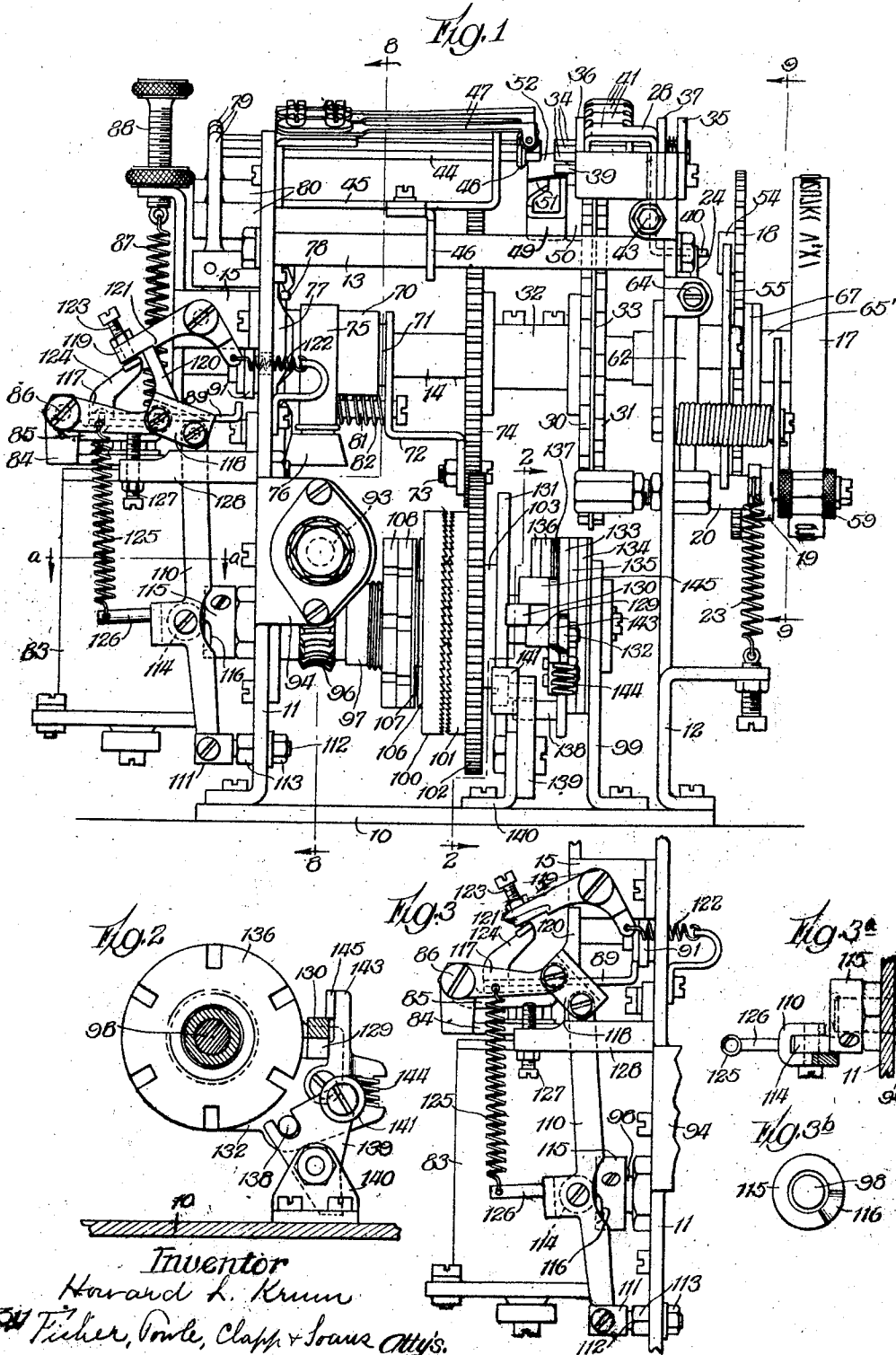
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H. L. KRUM

PRINTING TELEGRAPH RECEIVER

Filed June 13, 1921

3 Sheets-Sheet 1



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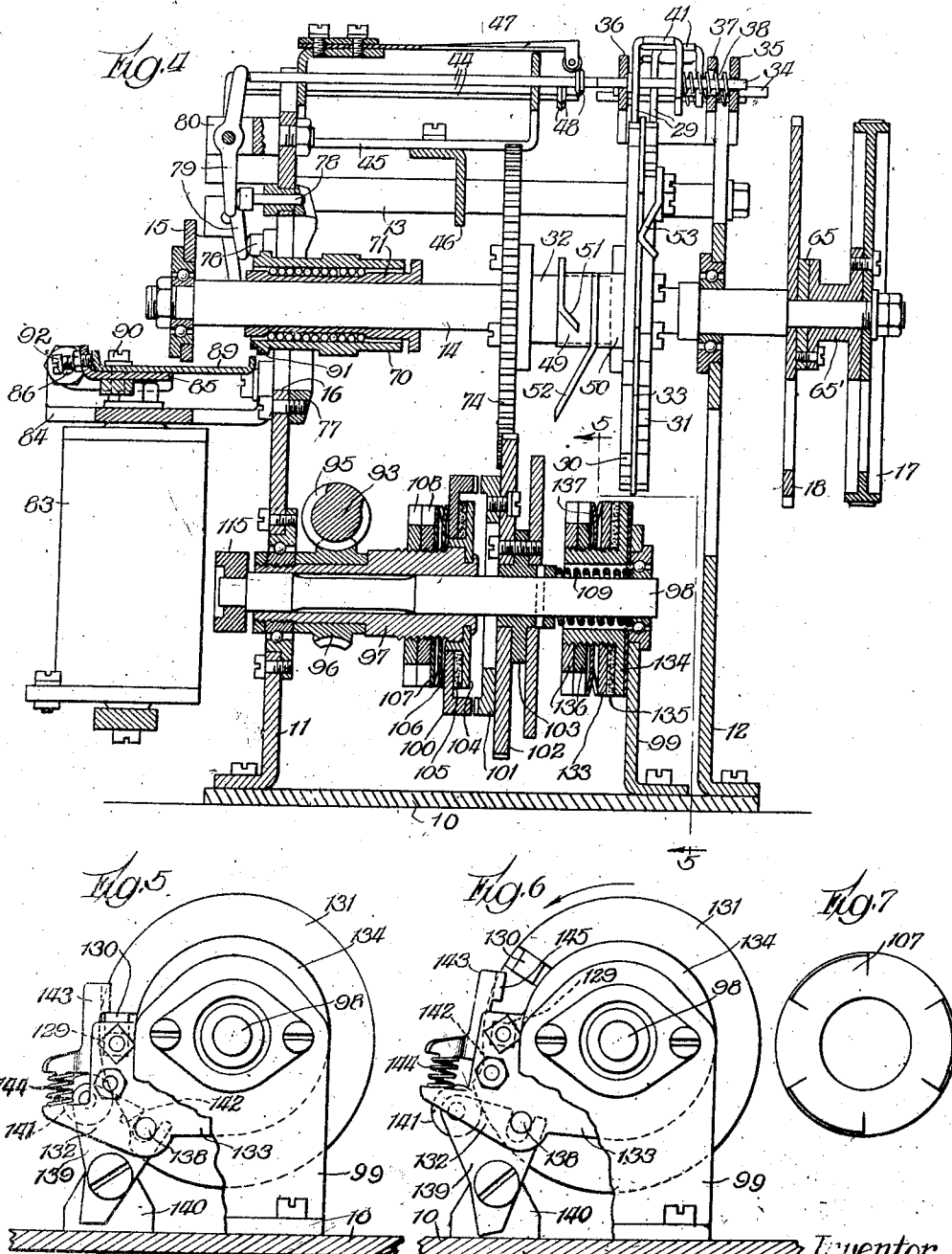
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PRINTING TELEGRAPH RECEIVER

Filed June 13, 1921

3 Sheets-Sheet 2



Inventor
Howard L. Krum
By Fisher, Poiré, Clapp & Sauer
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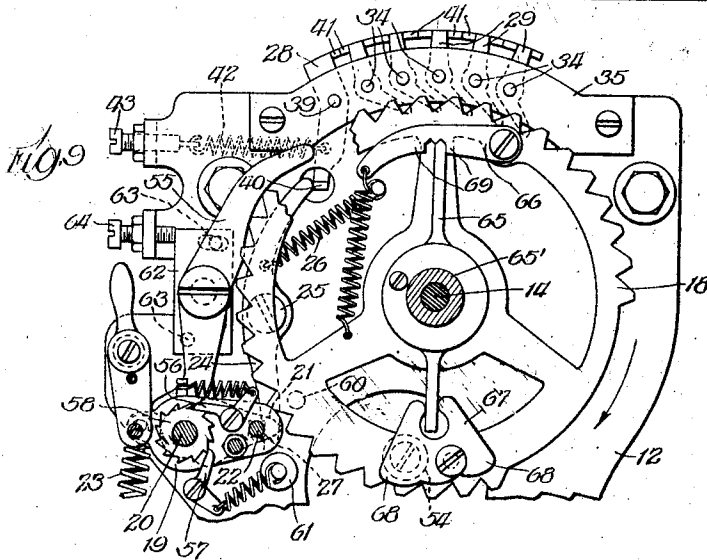
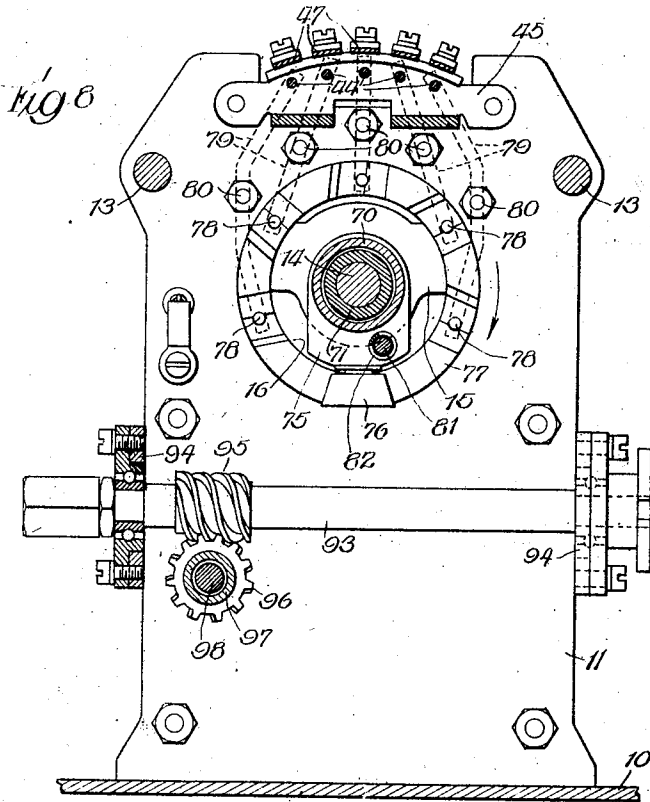
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H. L. KRUM

PRINTING TELEGRAPH RECEIVER

Filed June 13, 1921

3 Sheets-Sheet 3



Inventor
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Attys

Patented Jan. 26, 1926.

1,570,633

UNITED STATES PATENT OFFICE.

HOWARD L. KRUM, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
MORKEUM-KLEINSCHMIDT CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

PRINTING-TELEGRAPH RECEIVER.

Application filed June 13, 1921. Serial No. 477,012.

To all whom it may concern:

Be it known that I, HOWARD L. KRUM, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Printing-Telegraph Receivers, of which the following is a specification.

This invention relates to printing telegraph receivers having selector mechanism responsive to character signals that consist of permutations of positive and negative impulses or of current and no current, extending through a definite number, preferably five, time intervals or units. More particularly, the invention relates to printing telegraph receivers which are locally timed in operation during each signal interval and are kept in step or in phase with the received signals by suitable start and stop mechanism that arrests the receiver during spacing intervals at the end of each line signal, and again initiate its operation in response to starting intervals or units at the beginning of each signal. In its preferred embodiment, the invention relates to type wheel printers and to start and stop printing telegraph receivers in which the start and stop mechanism and the receiver selector mechanism are controlled by a single electro-magnet which responds to the line impulses. A printing telegraph receiver having the characteristics noted is shown in a prior application filed jointly by Charles L. Krum and myself in the United States Patent Office December 23, 1919, Serial No. 346,948.

The present invention seeks to simplify and improve printing telegraph receivers of the sort indicated, and further to provide improved start and stop mechanism therefor which will operate accurately and quickly and without undue strain upon the moving parts. Another object of the invention is to provide a start and stop mechanism which is adapted to be controlled by the same magnet which also controls the receiver selector mechanism, and with which only a relatively small amount of line current is required.

With these and other objects in view, the invention consists in the features of improvement hereinafter set forth, illustrated in the preferred form in the accompanying

drawings and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a view in elevation of the improved receiver.

Fig. 2 is a detail section on line 2—2 of Fig. 1.

Fig. 3 is a partial view in elevation of the parts controlled by the receiver magnet, these parts being shown in shifted position.

Figs. 3^a and 3^b are detail views of parts shown in Figs. 1 and 3, Fig. 3^a being a section on line *a—c* of Fig. 1.

Fig. 4 is a vertical section from front to rear of the receiver with the parts in shifted position.

Figs. 5 and 6 are detail sections on the lines 5—5 of Fig. 4, the parts being shown in normal or zero position in Fig. 5, and approaching this position in Fig. 6.

Fig. 7 is a detail view of one of the friction washers employed in the start and stop mechanism.

Figs. 8 and 9 are sections on the lines 8—8 and 9—9 respectively of Fig. 1.

The frame of the improved receiver comprises a base plate 10 and front and rear sheet metal brackets 11 and 12 secured to the base plate and connected at their upper ends by two horizontal brace bars 13. The main receiver shaft 14 is journaled in ball-bearings in the front bracket 12 and a yoke 15 mounted on the rear face of the rear bracket 11, the shaft, as shown, extending through an opening 16 in the upper portion of the bracket.

As in the construction set forth in the prior application referred to, the portion of the main shaft 14 in front of the bracket 12 is provided with a type wheel 17 and a toothed wheel 18. These wheels cooperate with a printing arm 19 pivoted on a stud 20, and having, at its inner end, a tooth 21 and a stud 22 carrying an impression roller, the tooth and roller being adapted to be engaged respectively with the toothed wheel 18 and the type wheel 17. These parts are engaged, when the inner end of the arm is lifted, by a spring 23 connected to its outer end, but normally the arm is held down with the spring under tension by a catch lever 24 which is pivotally mounted intermediate its ends and on the front face of the bracket 12 by a stud 25. A spring 26 holds the

catch lever in normal position with a shoulder on its lower end engaging a pin 27 on the inner end of the printing arm 19 and the upper end of the catch lever is adapted to be engaged and operated by the lower end of a trip lever 28.

The trip lever is controlled by a set of selecting fingers or seekers 29 that cooperate with two combiner discs 30 and 31 mounted on the main shaft 14 immediately in rear of the bracket 12. Disc 30 is fixed to a sleeve 32 on the shaft and disc 31 is annular in form and is secured to the outer portion of the disc 30 with a thin sheet metal separating flange 33 flat between the discs. The seekers or selecting fingers are formed of sheet metal stampings and have upper ends of inverted U-shaped fixed to short horizontal pivot pins 34 rotatably mounted in segmental front and back plates 35 and 36 which are fixed to the upper portion of the bracket 12, the rear plate having off-set spacing end portions. An intermediate stop plate 37 is arranged in front of the seekers and has large openings through which the pins 34 and light springs 38 thereon extend. The springs 38 extend between the front plate 35 and the seekers and tend to hold the same in their normal retracted or rearmost position. The trip lever 28 is also a sheet metal stamping and has an inverted U-shape upper end fixed to a pivot pin 39 that extends through the plates 35, 36, and 37. The lever extends downward from its pivot and has an outwardly off-set portion 40 that extends through an opening in the bracket 12 and is adapted to engage the upper end of the catch lever 24. The upper portions of the trip lever and of the seekers have integral contact heads 41 and these heads and the pivot pins are arranged in arcs concentric with the shaft 14. A spring 42 connected to the trip lever and to an adjusting screw 43 holds the heads in engagement and with the seekers resting upon the notched peripheries of the combiner discs.

The selecting fingers are adapted to be positioned in accordance with the setting of a series of selectors or plungers 44 which in turn are positioned in accordance with the permutations of the line signals. The selecting plungers corresponding in number to the selecting fingers or seekers, there being five in each set, and the plungers are arranged in line with the pivot pins 34 of the seekers and are slidably and rotatably mounted in the ends of a sheet metal bracket 45 which is secured to and projects forwardly from the upper end of the rear main bracket 11. A transverse brace 46 extending between the frame bars 13 is connected to and supports the front end of the bracket 45. A series of spring fingers 47 fixed to the rear end of the bracket 45 extend forwardly over the plungers 44 and are provided with

rollers which are arranged to engage circular beveled flanges 48 on the forward ends of the plungers to hold the latter either in retracted or in advanced position.

A U-shaped sheet metal member 49 affixed to a spacing block 50 on the rear face of the combiner disc 30 has oppositely inclined, transferring and restoring cam lugs 51 and 52 which are arranged to successively engage the flanges 48 of any of the advanced selecting plungers and further advance and then completely restore or reset same. When any of the plungers are thus advanced by the transfer cam 51, the corresponding seekers are moved from engagement with the combiner disc 30 through a gap in the flange 33 into engagement with the combiner disc 31. A sheet metal resetting cam 53 for the seekers is arranged opposite the forward portion of the gap in the flange 33 and slightly in advance of the transfer cam 51. At the end of each revolution of the shaft 14 the cams 53, 51, and 52 act successively to reset the selecting fingers, transfer the setting of the plungers to the fingers and restore the plungers. During the succeeding revolution the seekers cooperate with the combiner discs to print the selected character and the selectors or plungers are positioned to select the succeeding character.

The combiner discs are so notched that the seekers will drop and permit the trip lever to strike and disengage the catch lever, when the selected character is opposite the printing point. The spring 23 then lifts the inner end of the printing arm so that the engagement of the toothed wheel 18 will shift the latter and force the paper tape on the impression roller into engagement with the selected character on the type wheel. At the end of the revolution of the main shaft a roller 54 on the wheel 18 engages a resetting lever 55 and restores the printing arm and impression roller through blank portions of the toothed and type wheels 18 and 17 and into engagement with the catch lever. Pivoted spring-held pawls 56 and 57 cooperate with a ratchet 58 on the pivot of the printing arm to operate a feed roller 59 for the top so that the latter is advanced relatively to the impression roller during the backward movement of the printing arm.

To prevent overthrow of the printing arm 19 and the catch lever 24 when the machine is rapidly operated, stops 60 and 61 fixed to the front face of the bracket 12 are provided. As indicated in Fig. 9 there is a slight clearance between the stops and the printing arm and catch lever when the arm and lever are in normal position but, as stated, the stops serve to prevent overthrow. The direct operation of the catch lever by the pivoted trip lever which engages the seekers has been found to permit increased speed of operation. The catch lever spring

26 is relatively weak as compared with the trip lever spring 42. The resetting lever 55 is mounted on a block 62 which is fixed by screws 63 to the front face of the bracket 12.

One of these screws forms a pivot and the other extends through a slightly elongated slot in the block. By loosening the latter screw the block can be adjusted by a screw 64 to take up wear on the resetting lever.

The type wheel has two sets of type either one of which can be brought into operation by adjusting the wheel slightly relatively to the toothed wheel 18. The type wheel and arm 65 are fixed to a common loose hub 65' on the forward end of the shaft 14 and the ends of the arm respectively engage a spring-held latch 66 and a shifter 67 which are pivoted upon the wheel 18. The inner end of the shifter is notched to receive the arm and its outer portion has spaced lugs 68 which are arranged to be engaged by the rounded end of the printer arm 19 in response to special line signals and thereby move the type wheel to either one of two positions relatively to the toothed wheel. The latch 66 has beveled notches for engaging the correspondingly shaped end of the arm 65 to hold the type wheel against accidental movement relatively to the toothed wheel. Preferably also, as shown, the latch 66 has shoulders 69 which positively arrest the shifting movement of the arm 65.

The combiner discs 30 and 31 have blank portions which correspond with the blank portions of the type and toothed wheels 17 and 18. That is to say, when the blank portions of the combiner discs are opposite the selecting fingers and while the blank portions are so located, the operation of the setting and restoring cams 51, 52, and 53 are effected. When the printer is arrested at the end of each operation and again started in response to the first interval or unit of the next signal, it should be arrested while the printing arm is opposite the blank portions of the type and toothed wheels and while the blank portions of the combiner discs are in engagement with the seekers. Preferably the printer is arrested just as the lever 55 completes the resetting movement of the printing arm. In this zero position the cam 51 is moved slightly past the fifth selecting plunger and seeker and if the fifth seeker has not been again advanced it might be displaced by the vibration incident to stopping the printer. There is also some danger that the third and fourth pins might be displaced but the light coil springs 38 on the seeker pins 34 prevent the improper displacement of any of these seekers which have been reset and not again advanced.

The selectors 44 are preferably positioned by a rotary actuator on the shaft 14 under control of a single magnet. As in the con-

struction set forth in the application referred to, the actuator comprises an axially movable shuttle 70 keyed to a sleeve 71 on the shaft. An arm 72 fixed to the forward end of the sleeve is connected by a screw 73 to a gear 74, the latter being fixed to the rear end of the sleeve 32 on the shaft. The screw bolt 73 extends through an arc-shaped slot in the arm 72 so that the sleeve and shuttle can be rotatably adjusted on the shaft. The rear end of the shuttle carries an arm 75 having a roller 76 thereon which is adapted to engage the face of a cam ring 77 which is secured to the rear bracket 11 about the opening 16 therein. The cam ring is provided with a series of five notches through which pins 78 extend and the rear headed ends of the pins engage the lower ends of a series of five levers 79 that are centrally pivoted on studs 80, and the upper ends of which are arranged to engage the rear ends of the selecting plungers 44. A pin 81 fixed to the arm 75 extends through an opening in the arm 72 and a spring 82 on the pin normally holds the roller 76 in engagement with the face of the cam 77, the contacting faces of the roller and cam being conical to reduce the rolling friction. As the shaft rotates the roller drops into the notches of the cam ring successively and operates the corresponding pins and selectors unless at such times its axial movement is blocked by the armature of the receiver magnet 83. This magnet is preferably a double spool magnet and is suspended from a horizontal bracket 84 that is fixed to and projects rearwardly from the frame bracket 11. Its armature 85 is mounted on pivot studs 86 which extend through upturned ears on the outer portion of the bracket 84. A spring 87 for the armature is connected to an adjusting screw 88 which extends through a lug on the bracket 15 and a forwardly projecting finger 89 is fixed to the armature by screws 90. The forward upturned end of the finger 89 is adapted to engage the reduced rear end of the shuttle 70 in rear of a shoulder 91 thereon, to thereby block the axial, selector operating movement of the shuttle and variably control the setting of the selecting plungers 44. The finger 89 is preferably adjustable for wear and for this reason the screws 90 extend through longitudinal slots therein and a screw 92 is provided on the armature for adjusting the finger. The receiver magnet responds to all line impulses and can be interposed directly in the line circuit. Preferably the line circuit is normally closed and the magnet normally energized to hold its armature out of the path of movement of the selector actuator or shuttle. But if the magnet is deenergized while the roller passes through one of the notches of the cam ring, the actuator will not shift axially far

enough to move the corresponding selector.

The selector mechanism is adapted to respond to line signals each comprising a uniform starting interval or unit followed by five varied selecting intervals or units either positive and negative or current and no current with spacing intervals between these signals. In zero position the selector actuator roller 76 rests upon the wide space between the first and fifth selector operating pins 78. To insure the proper stopping and again starting of the receiver between signals, the receiver shaft 14 is preferably driven slightly faster than the distant transmitter which imparts the signals to the line, and the pins 78 are spaced to compensate for this difference in speed and are so located that the roller 76 will register with the notches during the mid-portions of the selecting intervals or units of the line signals. The elongated portion of the cam ring between the fifth and first pins 78 corresponds to the starting and spacing intervals of the line signals and the normal or zero position of the roller 76 can be varied by adjusting the connection between the arm 72 and the gear 74 to take care of the starting lag of the receiver, and the roller so set that it will probably register with the first notch and pin 78 driving the mid-portions of the first interval or unit of the line signals.

The main shaft 14 of the receiver is driven from a motor through suitable gearing and an improved start and stop mechanism. In the form shown, a transverse horizontal shaft 93 is journaled in ball-bearings carried by lugs 94 formed upon and projecting forwardly from the side edges of the bracket 11. This shaft is adapted to be coupled to the shaft of a small electric motor. A worm 95 on shaft 92 engages a worm wheel 96 which is fixed to a hub or sleeve 97 loosely mounted on a shaft 98. The shaft and sleeve are journaled in ball-bearings carried by the rear bracket 11 and a small front bracket 99. The sleeve 97 is threaded through the inner member of the ball-bearing on the rear bracket and has a lock nut on its rear end and the hub of the worm wheel 96 is clamped between this ball-bearing member and a shoulder on the sleeve. The sleeve and a driving clutch member 100 are thus held against longitudinal movement, but the shaft 98 and a driven clutch member 101 thereon can shift slightly in longitudinal or axial direction to engage and disengage the clutch members.

The clutch members are formed of metal and have annular flanges provided with a large number of fine radially extending teeth, so that they can be positively interlocked in a large number of different positions. The driven clutch member is annular in form and is secured to a gear wheel

102 which meshes with and is of the same size as the gear 74 on the main shaft 14. The driven clutch member and gear 102 are secured to a hub 103 that is pinned or otherwise fixed to the shaft 98, but the driving clutch member is not fixed to the sleeve 97. Instead it is connected thereto by a slip friction coupling. In the form shown, clutch member 100 fits upon the hub of a metal disc 104 that is fixed to the inner end of the sleeve and a washer 105 of fibre or other like friction material is interposed between these parts. A spring washer 106 is interposed between the clutch member and a washer 107 and adjusting and lock nuts 108 threaded on the sleeve are adapted to adjust the tension of the spring washer, so that the latter holds the parts of the slip friction coupling snugly in engagement. The spring washer 106 is preferably formed of a disc of spring steel having segmental edge portions bent in opposite direction, as indicated in Figs. 4 and 7. With this arrangement there is no slip and little wear of the toothed engaging faces of the clutch members, but, in starting the parts from normal position of rest, the driving clutch member can yield slightly, if necessary in order to overcome the inertia of the driving parts of the receiver and so start the same from a position of rest without jar or shock.

The shaft 98 is pressed rearwardly to close the clutch by a comparatively strong, quick acting spring 109 (see Fig. 4) interposed between the hub 103 and the inner member of the ball-bearing on bracket 99. Normally the clutch is held open with the spring 109 compressed, by a trip lever 110. This lever is pivotally mounted at its lower end on a yoke 111 having a screw stud 112 extending through and adjustably connected by nuts 113 to the lower portion of the rear bracket 11. A U-shaped portion of the lever carries a roller 114 which engages the rear face of an annular cam 115 fixed to the rear end of the clutch shaft 98. The working face of the cam has a short segmental recess 116 and is most clearly shown in Fig. 3^b.

The operation of the trip lever and the engagement and disengagement of the clutch members is controlled by an electro-magnet in response to the starting and spacing intervals of the line impulses, and preferably by the same magnet 83 which controls the selector mechanism. The armature of the magnet controls the trip lever 110 through an improved latch mechanism comprising toggle members 117 and 118 and a catch 119. The toggle member 117 is mounted upon one of the pivot pins 86 and the toggle member 118 is U-shaped as shown and extends over and is pivotally connected to the upper end of the lever 110 and the forward end of the toggle member 117. It is also provided with an upwardly and rearwardly

inclined lug 120 which is adapted to be engaged by a slight shoulder 121 on the catch 119. The latter is in the form of a bell crank lever, is pivotally mounted on the yoke 15 and a light spring 122 connected thereto tends to hold it in engagement with the lug 120. An adjustable abutment screw 123 mounted on the end of the catch is adapted to be engaged by the end of an offset arm 124 fixed to the armature 85 of the receiver magnet. A spring 125 connects the toggle member 117 and a rearwardly projecting arm 126 on the trip lever 110 and tends to hold these parts in normal position with the toggle member engaged in an adjustable top screw 127 carried by a lug 128 on the rear bracket 11.

Normally, as stated, magnet 83 is energized and holds its armature depressed and, in the normal or zero position of the receiver the latch mechanism and trip lever hold the shaft 98 and the driven clutch member in forward position (shown in Figs. 1 and 4) with the roller 114 engaging the high portion of the cam 115 and with the toggle members 117 and 118 slightly above a straight line or dead center position. When the magnet 83 is deenergized by the starting unit or interval of each signal, its armature is lifted by its spring and the catch 119 disengaged from the lug 120 so that the toggle members can be further flexed in upward direction by the pressure of the clutch spring 109 against the trip lever, and this spring quickly shifts the shaft 98 forwardly to a slight extent to engage the driven clutch member with the constantly rotating driving clutch member. While the toggle and catch resist the pressure of the relatively heavy clutch spring the leverage of the parts is such that the catch can be disengaged by a slight pressure and only a small amount of current is required to operate the magnet, so that the latter can be arranged directly in the line circuit without increasing the amount of line current ordinarily employed.

As the main and clutch shafts rotate the armature of the magnet controls the receiver selector mechanism, as described, and during this operation, the extended high portion of the cam 115 holds the latch mechanism in the position shown in Fig. 3, and the magnet armature is entirely relieved from any pressure due to the clutch spring 109 or the toggle spring 125. During the spacing interval at the end of each signal, the roller 114 on the trip lever 110 drops into the short notch or recess 116 of the cam and, since at this time the line is restored to normal, magnet 83 is energized and its armature depressed, the spring 125 moves the toggle members 117 and 118 back to normal against the stop 127 and into reengagement with the catch 119. The trip lever 110 is thus again locked in normal position

and, as the recess 115 of the cam 116 moves past the roller 114, the shaft 98 is forced forwardly against the pressure of the spring 109 to open the clutch.

As the clutch is opened, the moving parts are arrested by a stop lug 129 which is arranged to be engaged by a lug 130 on a disc 131 which is fixed to the hub 103 on the clutch shaft 98. Instead of being fixed in position the stop lug 129 is adapted to yield slightly. For this purpose it is mounted upon the projecting portion 132 of a disc 133 which loosely surrounds the sleeve-like hub of a disc 134. This disc is fixed to the rear face of the bracket 99 with its hub concentric and spaced from the shaft 98 and clutch spring 109. A disc 135 of fibre or other suitable friction material is interposed between the discs 133 and 134, and the sleeve hub of the latter disc is threaded to receive adjusting and locking nuts 136 which serve to adjust and hold a spring washer 137 against the inner face of the disc 133. This spring washer is similar in construction to the spring washer 106, and clamps the friction washer 135 between the movable disc 133 and the fixed disc 134.

The eccentric portion 132 of the disc 133 carries a laterally projecting pin 138 which engages a slot in an arm 139 that is pivoted to a small bracket 140 on the base plate. This arm carries a roller 141 which is arranged to engage the periphery of the disc 131. When the clutch is opened the lug 129 engages the stop lug 130. At this time the roller 141 (see Figs. 5 and 6) is opposite a recess 142 in the periphery of the disc 131 and the stop lug 129 and disc 133 are moved slightly against the resistance of the friction disc 135 to absorb the momentum of the moving parts. During this movement of the stop lug 129, the roller 141 moves into the recess 142 of the disc 131, as shown in Fig. 5, and by its engagement with the edge of the disc limits the movement of the stop 129. At the next succeeding operation, the cam disc 131 moves the roller 141 and upper portion of the arm 139 outwardly and thereby moves the disc 133 and stop 129 backward in readiness to again yieldingly arrest the moving parts. In this way the yielding stop is properly set at each operation to arrest the moving parts of the receiver at the same point. The lower end of the arm 139 projects downwardly below its pivot and its lower end is adapted to cooperate with the base plate 10 to prevent overthrow of the resetting movement of the stop.

In addition to the stop 129 the eccentric portion 132 of the disc 133 carries a pivoted catch 143 which is pressed by a spring 144 against the stop 129. The upper end of the catch has a laterally projecting part 145 which is arranged to be engaged and forced outwardly to a slight extent by lug 130 on

the disc 131 and as the lug 130 engages the stop 129, the catch part 145 snaps over the upper edge of the lug and prevents rebound of the driven parts.

8 The improved start and stop mechanism acts with certainty to quickly initiate and arrest the rotary receiver shaft and parts operated thereby, is not subjected to excessive wear, properly arrests the receiver parts
10 in the same position at the end of each operation and has means for absorbing the inertia of the driven parts both in starting and stopping the same, so that the start and stop operations are effected without shock or jar upon the parts, which would be apt
15 to disarrange them. The controlling trip mechanism for the start and stop clutch, while it permits the use of a relatively strong, quick-acting clutch spring, is so arranged that it imposes a slight load on the
20 armature of the receiver magnet, and which in consequence can be operated with a small amount of current.

Obviously changes may be made in the details set forth without departure from the essentials of the invention as defined by the claims.

I claim as my invention:—

30 1. In a start-stop printing telegraph receiver, a rotary selector member, printing means controlled thereby, a power shaft, a common clutch for operating said selector member and said printing means and comprising toothed driving and driven members,
35 a slip friction clutch yieldingly connecting said driven member to said power shaft, and electro-magnetic means responsive to line impulses for controlling said clutch and the operation of said selector member.

40 2. In a start-stop printing telegraph receiver, a rotary selector member, printing means controlled thereby, a power actuated, start-stop clutch for operating said selector member and said printing means, a yielding
45 stop for arresting said selector member, means actuated by said clutch at each operation thereof for restoring said stop to normal position, and electro-magnetic means responsive to line impulses for controlling said
50 clutch and the operation of said clutch and said selector member.

3. In a start-stop printing telegraph receiver, a rotary selector member, printing means controlled thereby, a power-actuated
55 start-stop clutch for operating said selector member and said printing means and comprising toothed driving and driven members, a yielding stop for arresting said driven member, means actuated at each operation
60 of said driven member for restoring said stop to normal position and electro-magnetic means controlling the engagement and disengagement of said clutch members and the operation of said selector
65 member.

4. In a start-stop printing telegraph receiver, a rotary selector actuator, printing means controlled thereby, a power shaft, a start-stop clutch for operating said selector
70 actuator and said printing means comprising toothed driving and driven members, said driving member being yieldingly connected to said shaft, a yielding stop for arresting said driven member, means actuated
75 by said driven member at each operation thereof for restoring said stop to normal, and electro-magnetic means controlling the engagement and disengagement of said clutch members and the operation of said selector member.

5. In a start-stop printing telegraph receiver, a rotary selector member, printing means controlled thereby, a power-actuated clutch for operating said selector member
85 and said printing means, a yielding stop for arresting the parts driven by said clutch, a friction brake controlling the movement of said stop, a cam actuated by said clutch at each operation thereof for restoring said
90 stop to normal position and electro-magnetic means for initiating and controlling the operation of said selector member.

6. In a start-stop printing telegraph receiver, a rotary selector member, printing means controlled thereby, a power shaft, a start-stop clutch for operating said selector
95 member and said printing means and comprising toothed driving and driven members, a yielding coupling for connecting said driving member to said shaft, a yielding stop for arresting said driven member, a
100 cam actuated by said driven member at each operation thereof for restoring said stop to normal position, and electro-magnetic means controlling the engagement and disengagement of said clutch members and the operation of said selector member.

7. In a printing telegraph receiver, a type wheel, a cooperating printing member, a set of selectors and a rotary selector actuator controlling the operation of said
110 printing member, a power shaft, a start and stop clutch for rotating said selector actuator and said type wheel, and comprising toothed driving and driven members, said driving member being yieldingly connected
115 to said shaft, a yielding stop for arresting said selector actuator and said type wheel, means operated by said driven member for restoring said stop to normal position and line controlled electromagnetic means for controlling the operation of said clutch and
120 said selector actuator.

8. In a printing telegraph receiver, a set of selectors, a rotary actuator for positioning
125 said selectors in different combinations, printing mechanism controlled by said selectors, a power shaft, a common start and stop clutch for operating said actuator and said printing mechanism and comprising
130

toothed driving and driven members, said driving member being yieldingly connected to said shaft, a yielding stop for arresting said driven member, means operated by said driven member for restoring said stop to normal position, a trip for engaging and disengaging said clutch members and an electromagnet responsive to line impulses for controlling said trip and the operation of said selector actuator.

9. In a printing telegraph receiver, a type wheel, a cooperating printing member, a set of selectors controlling said printing member, a rotary actuator for positioning said selectors, a power shaft, a start and stop clutch for rotating said type wheel and said selector actuator and comprising toothed driving and driven members, said driving member being yieldingly connected to said shaft, a yielding stop for arresting said driven member, said type wheel and said selector actuator, a cam operated by said driven member for restoring said stop to normal position and electromagnetic means responsive to line impulses for controlling said clutch and said selector actuator.

10. In a printing telegraph receiver, a set of selectors, a rotary actuator therefor, a start and stop clutch for said actuator, a trip for said clutch, toggle member controlling said trip, a latch for holding said toggle members in a slightly off-center position, and an electromagnet responsive to line impulses for releasing said latch and controlling the operation of said selector actuator.

11. In a printing telegraph receiver, a set of selectors, a rotary actuator therefor, a start and stop clutch for said actuator, a spring for closing said clutch, a trip for opening the same, a latch normally holding said trip in operative position, an electro-

magnet operative in response to line impulses to release said latch and control the operation of said actuator, and means for relieving the armature of said magnet from the pressure of said clutch spring during its selector controlling movements.

12. In a printing telegraph receiver, a set of selectors, a rotary actuator movable axially to set said selectors, a power actuator start and stop clutch for rotating said actuator, a spring for closing said clutch, a trip for opening the same, a latch for holding said trip in operative position, an electromagnet responsive to line impulses and having an armature arranged to release said latch and arrest the axial, selector operating movements of said actuator, and means for holding said trip and latch disengaged during the actuator controlling movements of said armature.

13. In a telegraph receiver, a type wheel, a cooperating printing arm, combiner discs connected to said type wheel, a set of seekers, a spring actuated trip lever holding said seekers in engagement with said combiner discs, and a pivoted latch lever directly engaged by said trip lever for holding said printing arm in normal position.

14. In a telegraph receiver, a type wheel, a cooperating printing member, a set of seekers and cooperating combiner discs to control said printing member, a set of selectors, cams for advancing and resetting said selectors and seekers, a power actuated start and stop clutch for rotating said type wheel, combiner discs and cams arranged to be arrested with said seekers upon blank portions of said combiner discs and springs tending to reset certain of said seekers.

HOWARD L. KRUM.