April 13, 1954 R. D. SALMON 2,675,425

PRINTING TELEGRAPH APPARATUS

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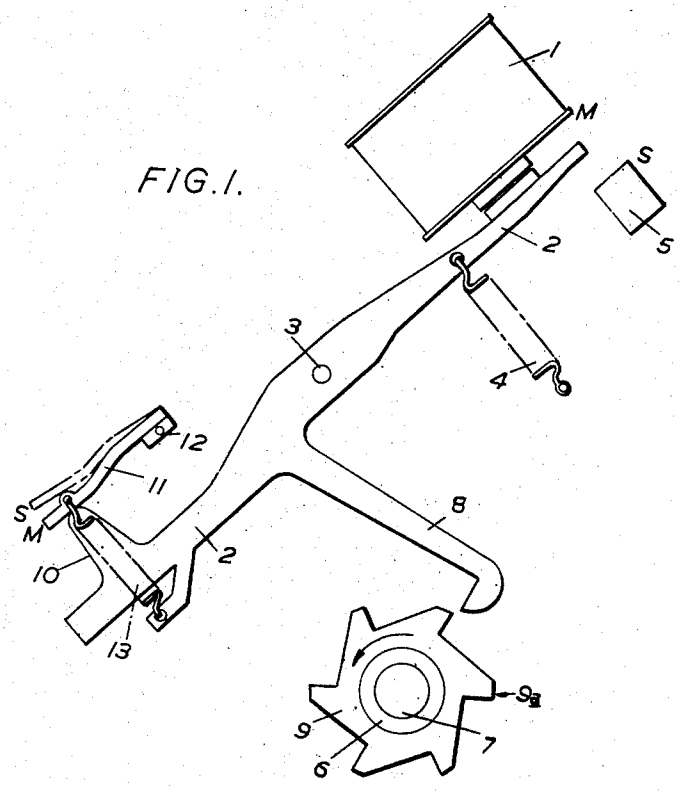
FIG. 1.



Inventor
REGINALD D. SALMON

By Percy P. Lantzy
Attorney

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PRINTING TELEGRAPH APPARATUS

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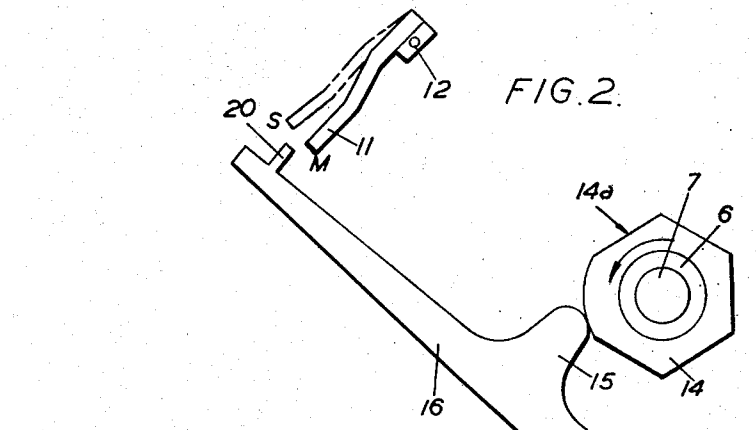

FIG. 2.

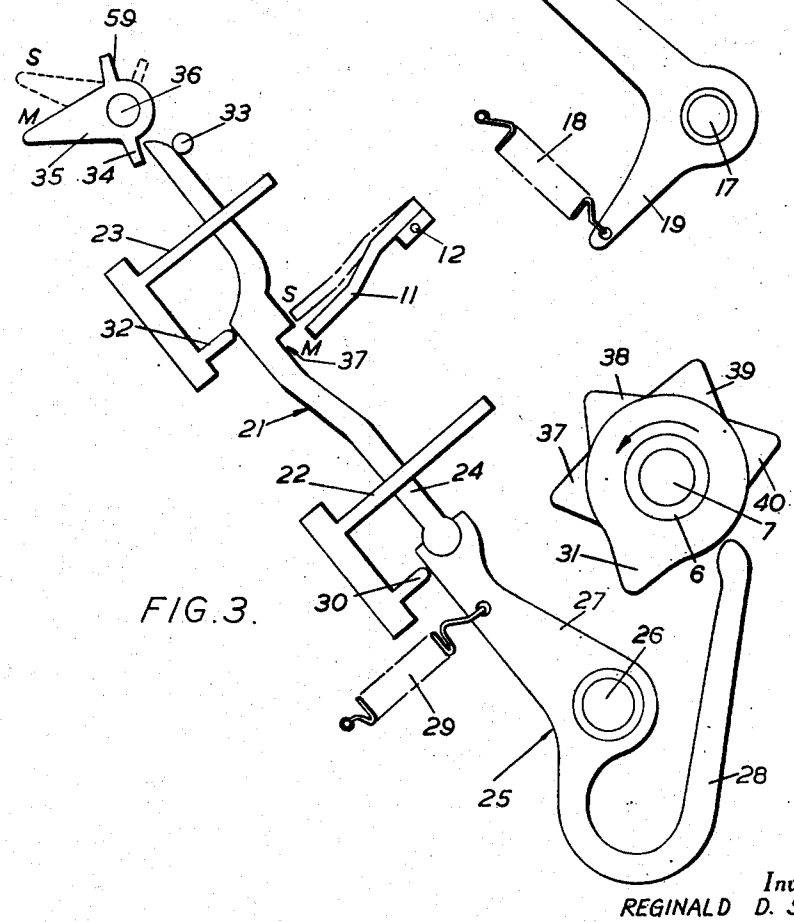

FIG. 3.

Inventor
REGINALD D. SALMON

By Percy P. Lantzy
Attorney

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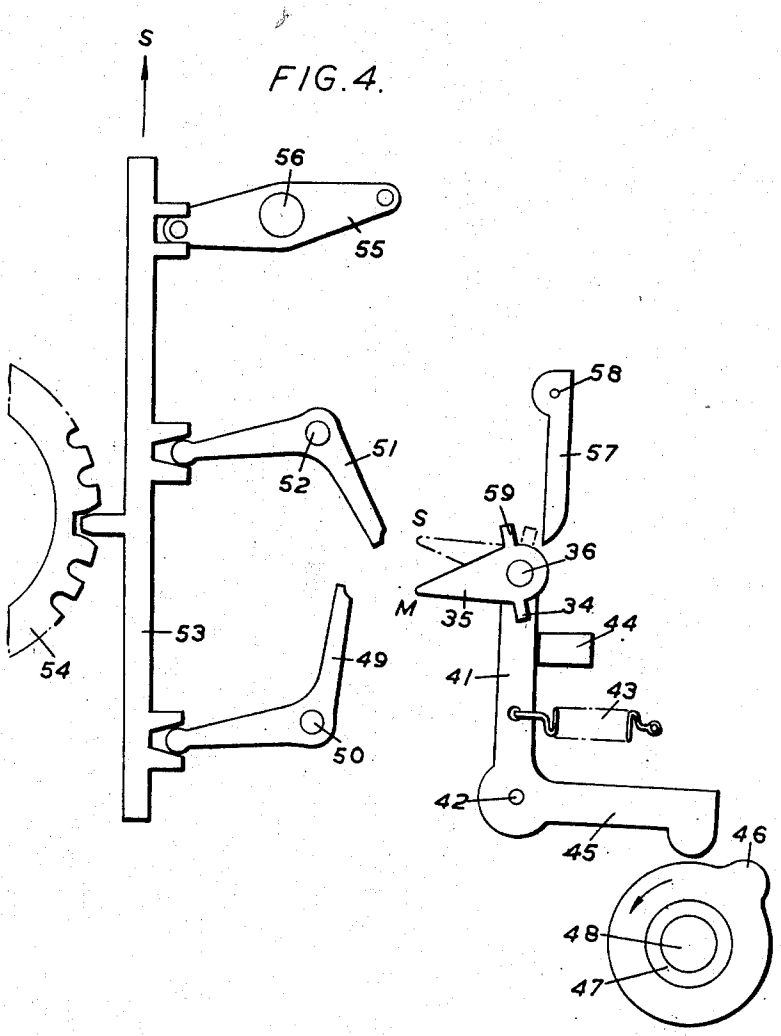
FIG. 4.



Inventor
REGINALD D. SALMON

By Leroy P. Lantzy
Attorney

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UNITED STATES PATENT OFFICE

2,675,425

PRINTING TELEGRAPH APPARATUS

Reginald Dennis Salmon, Croydon, England, assignor to Creed and Company, Limited, Croydon, England, a British company

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Claims priority, application Great Britain February 17, 1950

3 Claims. (Cl. 178—33)

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This invention relates to printing telegraph apparatus and more particularly to the selector mechanism for selectively positioning permutation members in a receiver according to the nature of the successive code elements to which the receiving magnet responds.

It has already been proposed to provide in a telegraph receiver, selector mechanism comprising a group of selector members, each member floating on a fixed bearing intermediate its two ends, a group of cams for operating the selector members in succession and in timed relation with the received signals, and magnet-operated means to change the point of fulcrum of the selector members in accordance with the nature of the received signals so as to position setting means for selecting and recording a character.

According to one aspect of the present invention there is provided a selector mechanism for a printing telegraph receiver comprising a group of selector members, a group of intermediate members each linked to a respective selector member, a group of cams acting through said intermediate members to operate said selector members selectively, and in timed relation with the incoming signals, an electro-magnet responsive to received signals, an armature for said electro-magnet and an interposing member controlled by said armature for changing the point of fulcrum of the selector members in accordance with the nature of the received signals so as to position setting means for selecting and recording a character.

According to another aspect of the invention there is provided a selector mechanism for a printing telegraphed receiver comprising a group of selector members, a group of resilient intermediate members each linked to a respective selector member, a group of cams acting through said resilient intermediate members to operate said selector members selectively and in timed relation with the incoming signals, an electromagnet responsive to received signals, an armature for said electro-magnet and an interposing member controlled by said armature for changing the point of fulcrum of the selector members in accordance with the nature of the received signals so as to position setting means for selecting and recording a character.

An embodiment of the invention will now be described with reference to the accompanying drawings in which are shown four different portions of a complete selector mechanism according to the invention. In the drawings:

Fig. 1 shows arrangements for positioning an interposing member in accordance with received signals;

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Fig. 2 shows arrangements for locking the interposing member when positioned;

Fig. 3 shows arrangements for using the interposing member to set storage members in accordance with the received signals, and

Fig. 4 shows arrangements for using the storage members to set permutation members in accordance with the received signals.

In the embodiment to be described, the invention is applied to a receiver operating in response to the standard five-element permutation code and employing a receiving electro-magnet with a mechanically assisted armature. It is to be understood that the invention is not restricted in its application to receivers operating in response to this type code or having this type of armature.

Referring to Fig. 1, an electro-magnet 1 responsive to received signals controls an armature lever 2 pivoted at 3. In the "stop" condition, a continuous "mark" signal is received so that current flows through the winding of electromagnet 1. As a result, armature lever 2 is retained in the position shown in Fig. 1 thus extending a spring 4 which is connected to armature 2 so as to normally urge it away from electromagnet 1.

Upon the receipt of a "start" (space) element, electromagnet 1 is deenergized and armature lever 2 is released to rotate in a clockwise direction about pivot 3 under the pull of spring 4 until its right-hand extremity comes up against a stop 5. This movement of armature lever 2 produces three results:

(a) A cam sleeve 6 (appearing also in Figs. 2 and 3) is clutched to a continuously rotating shaft 7 by mechanism not shown but well known in the art.

(b) The extremity of an arm 8 depending from armature lever 2 is brought into a position to follow the contour of a resetting cam 9 on cam sleeve 6.

(c) A projection 10 on armature lever 2 acts on an interposing member 11 (appearing also in Figs. 2 and 3) to rotate it clockwise about a pivot 12 into the position shown in broken lines.

As cam 9 rotates in the direction of the arrow, the first lobe 9a thereon acts on the extremity of arm 8 to rotate armature lever 2 in counterclockwise direction about pivot 3. This extends spring 4 and brings the right-hand extremity of the armature lever 2 up to the pole face of elec-

tro-magnet 1. At the same time a spring 13 resiliently coupling armature lever 2 and interposing member 11 causes the interposing member to follow projection 10 on armature lever 2 until it is restored to the position shown (in full lines) in Fig. 1. By this time, the electro-magnet 1 is responding to the first permutable element of the signal combination. In the first place, it will be assumed that this is a mark element so that the electro-magnet is energised. Accordingly, armature lever 2 is attracted by the electro-magnet 1 and remains in the position shown in Fig. 1 when the cam-following end of arm 8 comes off the first lobe 9a of the resetting cam 9.

Also carried by cam sleeve 6 is a locking cam 14 shown in Fig. 2. Following the contour of cam 14 is a projection 15 on a locking member 16 pivoted at 17. Projection 15 is held against the surface of cam 14 by a spring 18 acting on an arm 19 integral with locking member 16. By the time that interposing member 11 has been set as above described, projection 15 on locking member 16 has reached the first flat 14a on locking cam 14. As cam 14 further rotates, it allows spring 18 to rotate locking member 16 clockwise about pivot 17. This brings a locking projection 20 extending from one end of member 16, up on the left-hand side of interposing member 11 so locking the latter in the mark position.

Referring now to Fig. 3, interposing member 11 is in the form of a blade which is sufficiently broad to span five selector members lying parallel to each other. One of these selector members is indicated generally at 21, the others (not visible) being of identical construction. Each selector member is guided by respective vertical slots in two guide plates 22 and 23 and is pivotally connected at one end 24 to a corresponding one of five intermediate members in the form of bell-crank levers. One of these levers is indicated generally at 25. Bell-crank lever 25 is pivoted at 26 and comprises two arms 27 and 28. A spring 29 normally holds the extremity of arm 27 against a stop 30 which stop is associated with guide plate 22, and holds the extremity of arm 28 in the path of a cam 31 on cam sleeve 6. In this position of lever 25, selector member 21 is effectively locked between two fixed stops 32 and 33 disposed on opposite sides of the member. Stop 32 is associated with guide plate 23.

As soon as interposing member 11 has been locked in the mark position as previously described, cam 31 acts on arm 28 to rotate lever 25 clockwise about pivot 26 so extending spring 29 and moving the pivoted end 24 of selector member 21 up the slot in guide plate 22. It will be apparent from Fig. 3 that under these conditions, selector member 21 is no longer locked between the stops 32 and 33 and might, if left free, pivot about either of these stops. It is, however, constrained to pivot about stop 33 by the pressure of an arm 34 projecting from a storage member 35. There are five of these storage members all pivoted at 36 and each co-operating independently with a corresponding selector member. These storage members are frictionally held in such manner that while being free to take up either of two positions, they are held in the last position into which they were moved. Storage member 35 is shown as being in the mark position into which position all five storage members are returned before each selection. The space position of storage member 35 is shown in broken lines. The frictional loading on the storage member 35 in the mark position provides the force which constrains selector member 21 to pivot about stop 33.

As member 21 pivots about stop 33, its centre portion approaches the extremity of interposing member 11. However, the centre portion of the selector member is provided with a notch 37 which is opposite to the end of member 11 when the latter is in the mark position. Consequently, member 11 does not impede the movement of selector member 21 about stop 33.

After the crest of cam 31 has passed the end of arm 28, spring 29 acts on arm 27 to rotate bell-crank lever 25 once more in a counter-clockwise direction about pivot 26. This restores selector member 21 to its original position (as shown) through the pivotal connection between lever 25 and selector member 21 in which position it is again locked between the stops 32 and 33. The cycle of events just related has not resulted in any movement of storage member 35 which is thus left in the mark position.

It will be observed from Fig. 3 that the stop 30 is so positioned that a clearance is left between the cam-following extremity of arm 28 and the smallest diameter of cam 31 when member 25 is in its extreme anti-clockwise position as shown. This reduces wear on the two surfaces concerned. However, at the instant the end of arm 28 comes into contact with the cam surface there is a momentary shock which can hardly be prevented even by careful shaping of the cam. If lever 25 were of rigid construction or if cam 31 were positioned to act directly on selector member 21, the end 24 of the selector member would be given a very rapid acceleration away from the stop 30. It has been found that such an acceleration of the end 24 of selector member 21 tends to cause the latter to pivot about its own centre of inertia, i. e. somewhere about its mid-point. This in turn produces an approximately equivalent movement of the opposite end of the selector member away from stop 33, and so produces a false setting of storage member 35.

To minimise this effect, arm 28 of lever 25 is so proportioned as to offer some resilience while arm 27 is of comparatively rigid construction. By this means, most of the shock on striking the cam 31 is absorbed in overcoming the resilience of arm 28.

So far, it has been assumed that the first permutable element of the received signal combination was a mark. The case will now be considered of when the first element is a space.

During the receipt of a space element, no current flows through the winding of electro-magnet 1 (Fig. 1) and so when the cam-following end of arm 8 comes off the first lobe 9a of the resetting cam 9, armature lever 2 is free to be rotated clockwise about pivot 3 by the spring 4. This brings the interposing member 11 into the space position due to the action of projection 10, as shown in broken lines in Figs. 1, 2 and 3.

When locking cam 14 (Fig. 2) allows spring 18 to rotate locking member 16 clockwise about pivot 17, locking projection 20 comes up on the right-hand side of interposing member 11, so locking the latter in the space position.

When selector cam 31 (Fig. 3) acts through bell-crank lever 25 to move end 24 of selector member 21 away from stop 30, the portion of the selector member immediately beyond the notch 37 comes up against the end of interposing member 11. Continued movement of the end 24 of selector member 21 away from stop 30 now results in an equivalent movement of the opposite

end of the selector member away from stop 33. This acts upon arm 34 to rotate storage member 35 clockwise about pivot 36 until the storage member assumes the space position shown in broken lines in Figs. 3 and 4.

It has already been explained that there are a total of five storage members such as 35, five selector members such as 21 and five bell-crank levers such as 25. Besides selector cam 31 already referred to, there are on cam sleeve 6, four more selector cams 37, 38, 39 and 40 (Fig. 3) each positioned to act on a respective selector member through a respective bell-crank lever. These cams are angularly displaced as shown so as to act on their respective bell-crank levers in sequence and in timed relation with the received signal elements. By this means, the five storage members such as 35 are caused to assume settings in accordance with the five permutable elements of a received signal combination. The time intervals between the successive selecting periods being dependent on a single locking cam 14 (Fig. 2) are under very accurate control.

The spring 13 (Fig. 1) between armature lever 2 and interposing member 11 permits resetting cam 9 to bring armature lever 2 up against electro-magnet 1 even when the interposing member 11 is locked in the space position. If interposing member 11 is locked in the mark position, armature lever 2 is already up against electro-magnet 1 and the resetting cam 9 is not required to move the armature lever.

Referring to Fig. 4, the pivot 36 for the storage members 35 is carried in a frame 41 pivoted at 42. A spring 43 normally keeps frame 41 against a stop 44 and brings an extension 45 under the influence of a transfer cam 46 mounted on a cam sleeve 47. Shortly before cam sleeve 6 (Figs. 1, 2 and 3) is arrested at the end of its revolution a trip cam (not shown) acts through well known mechanism to clutch cam sleeve 47 (Fig. 4) to a constantly rotating shaft 48. After all five storage members 35 have been set as previously described, transfer cam 46 acts on extension 45 to rotate frame 41 counter-clockwise about pivot 42 against the pull of spring 43. This movement brings the tapered ends of those storage members that have been set in the mark position into contact with the bevelled ends of corresponding ones of a lower set of five bell-crank levers such as 49 pivoted at 50. At the same time, the tapered ends of those storage members that have been set in the space position are brought into contact with the bevelled ends of corresponding ones of an upper set of five bell-crank levers such as 51 pivoted at 52.

Bell-crank levers 49 and 51 are linked as shown to a code bar 53 which is capable of being moved longitudinally into one of two positions corresponding respectively to mark or space. The remaining bell-crank levers are similarly linked to four other code bars not visible in Fig. 4. Code bar 53 is shown in the lower of its two positions corresponding to a mark. Thus, no change will be made in the condition of code bar 53 when storage member 35 is in the mark position (shown in full lines).

If storage member 35 is in its space position (shown in broken lines) then bell-crank lever 51 will be rotated clockwise about pivot 52 to push code bar 53 up into the space position. It can be easily seen that transfer cam 46 causes the settings of the five storage members such as 35 to be transferred to the five code bars such as 53.

Linked with the respective code bars such as 53 are five notched permutation discs such as 54 which act in well known manner to select a character to be printed.

Also linked with the respective code bars such as 53 are five bail members one of which is shown at 55 pivoted at 56. These bail members effect the selection of notched function members (not shown) which act in well known manner to determine what function, if any, is to be performed.

After the transfer cam 46 has allowed spring 43 to return frame 41 carrying the storage members to its initial position, a restoring cam (not shown) also on cam sleeve 47 acts to rotate a frame 57 in a clockwise direction about a pivot 58. Frame 57 is sufficiently wide to span the upper arms (such as 59) of all five storage members. By this means, any storage member which has been set in the space position is restored to the mark position before the next selection takes place.

While the principles of the invention have been described above in connection with specific embodiments, and particular modifications thereof, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention.

What we claim is:

1. A selector mechanism for a printing telegraph receiver comprising a pair of fixed pivots, a group of selector members adapted to selectively pivot about a first of said pivots at one point along the length of said members, setting means adapted to be selectively set by said members, a group of resilient intermediate members each operatively linked to a respective of said selector members, each of said intermediate members rotatably mounted on said second pivot, a group of movable cams adapted to selectively actuate said intermediate members in timed relation with the incoming telegraph signals, an interposing member adapted to be selectively placed at another point along the length of said selector members in response to the incoming telegraph signals, whereby said selector members pivot about said interposing member in response to movement of said intermediate members under control of said cams, said resilient members and said second pivot adapted to absorb the shock of actuation of said resilient members caused by said cams, whereby said selector members are prevented from falsely actuating said setting means.

2. A selector mechanism as claimed in claim 1, wherein each of said intermediate members comprised bell-crank levers, having a first and a second arm extending from the point of rotatable mounting on said second pivot, said first arm adapted to be actuated by one of said group of cams, said second arm operatively linked with one of said selector members, said first arm of more resilient construction than said second arm.

3. A selector mechanism as claimed in claim 2, wherein each of said first arms is substantially J-shaped, the short portion thereof connected to said second arm and the long portion thereof adapted to cooperate with one of said group of cams.

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