

Aug. 20, 1946.

J. A. SPENCER ET AL

2,406,044

SELECTING MECHANISM

Filed June 30, 1944

3 Sheets-Sheet 1

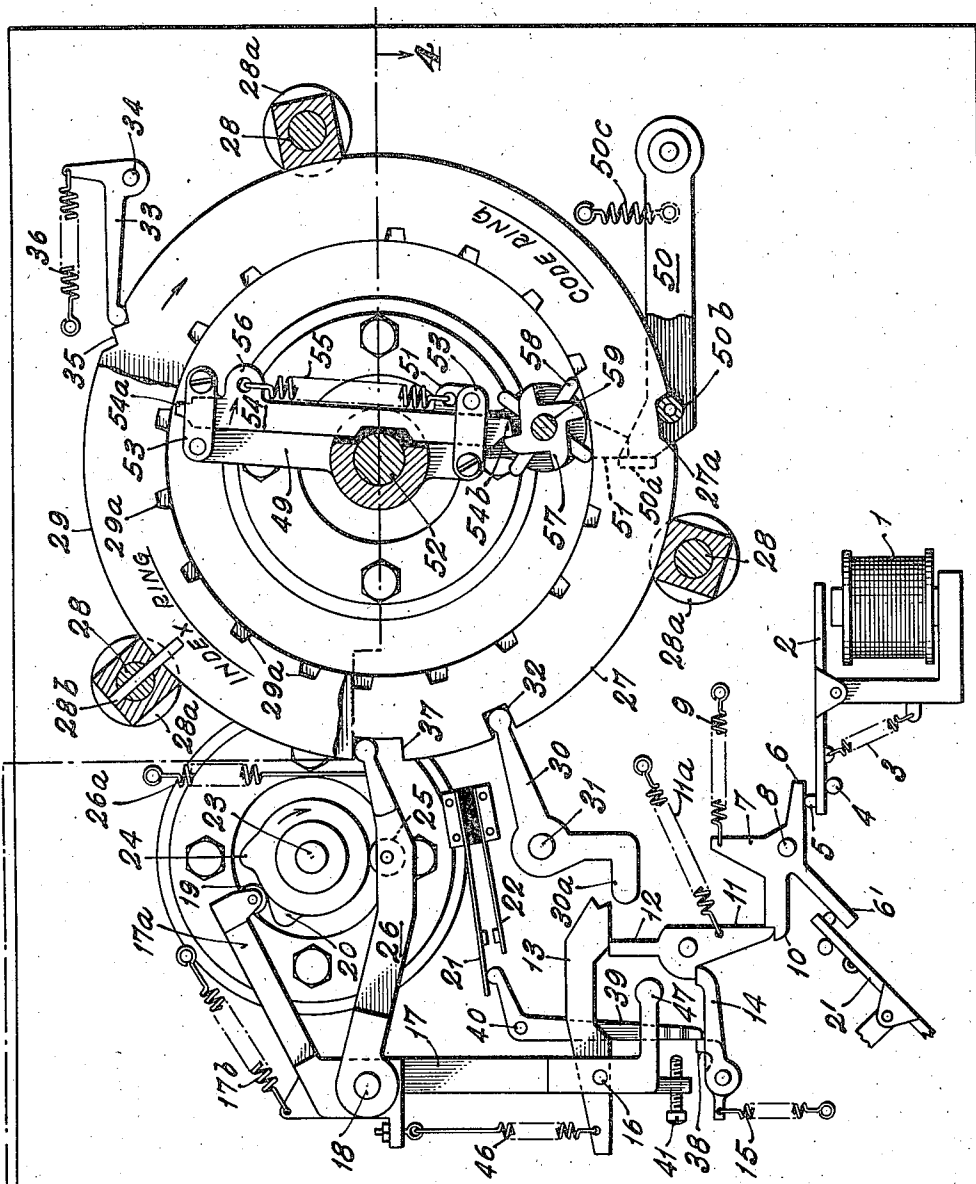


Fig. 1.

INVENTORS
LEONHARD F. REINHOLD
JAMES A. SPENCER
BY

H. S. Brown

ATTORNEY

Aug. 20, 1946.

J. A. SPENCER ET AL

2,406,044

SELECTING MECHANISM

Filed June 30, 1944

3 Sheets-Sheet 2

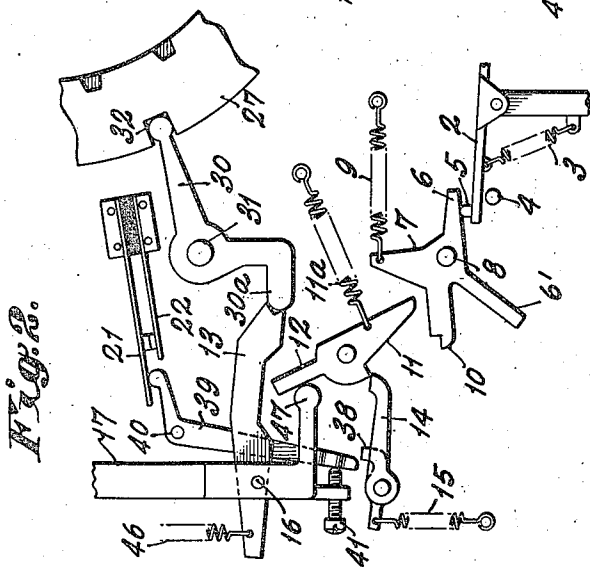
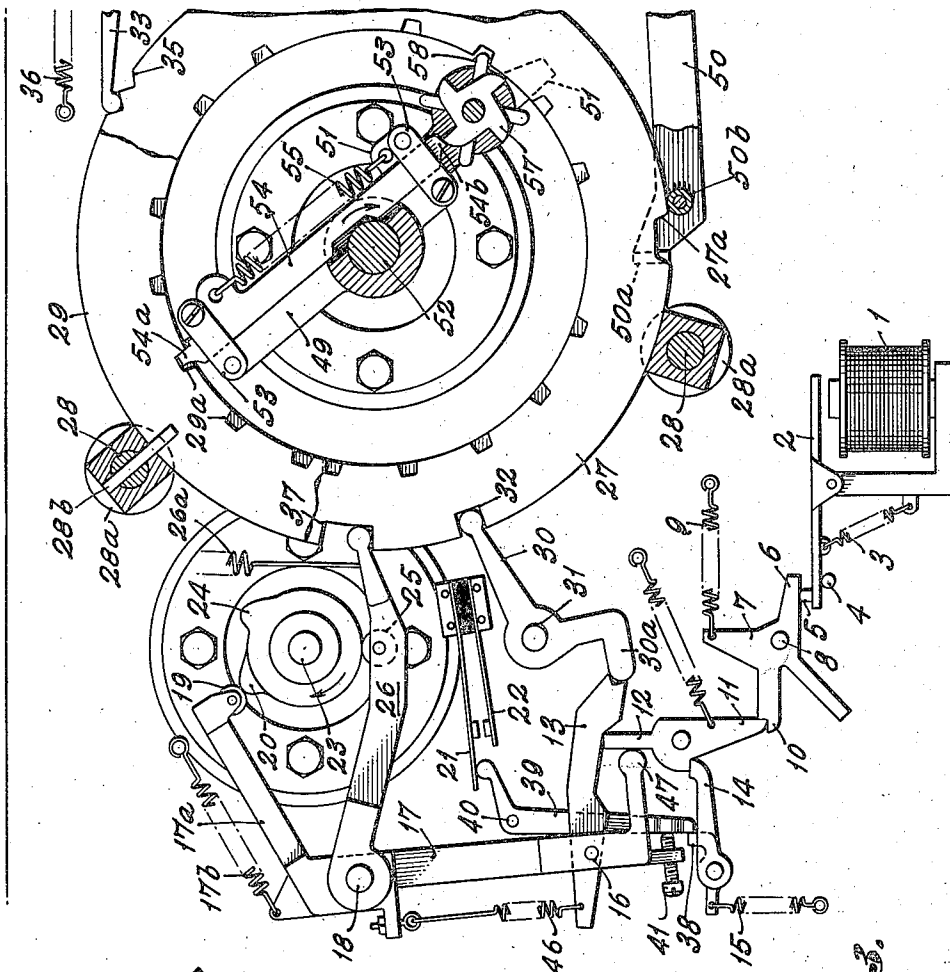


Fig. 3.

INVENTORS
LEONHARD F. REINHOLD
JAMES A. SPENCER
BY

H. S. Grover

ATTORNEY

Aug. 20, 1946.

J. A. SPENCER ET AL

2,406,044

SELECTING MECHANISM

Filed June 30, 1944

3 Sheets-Sheet 3

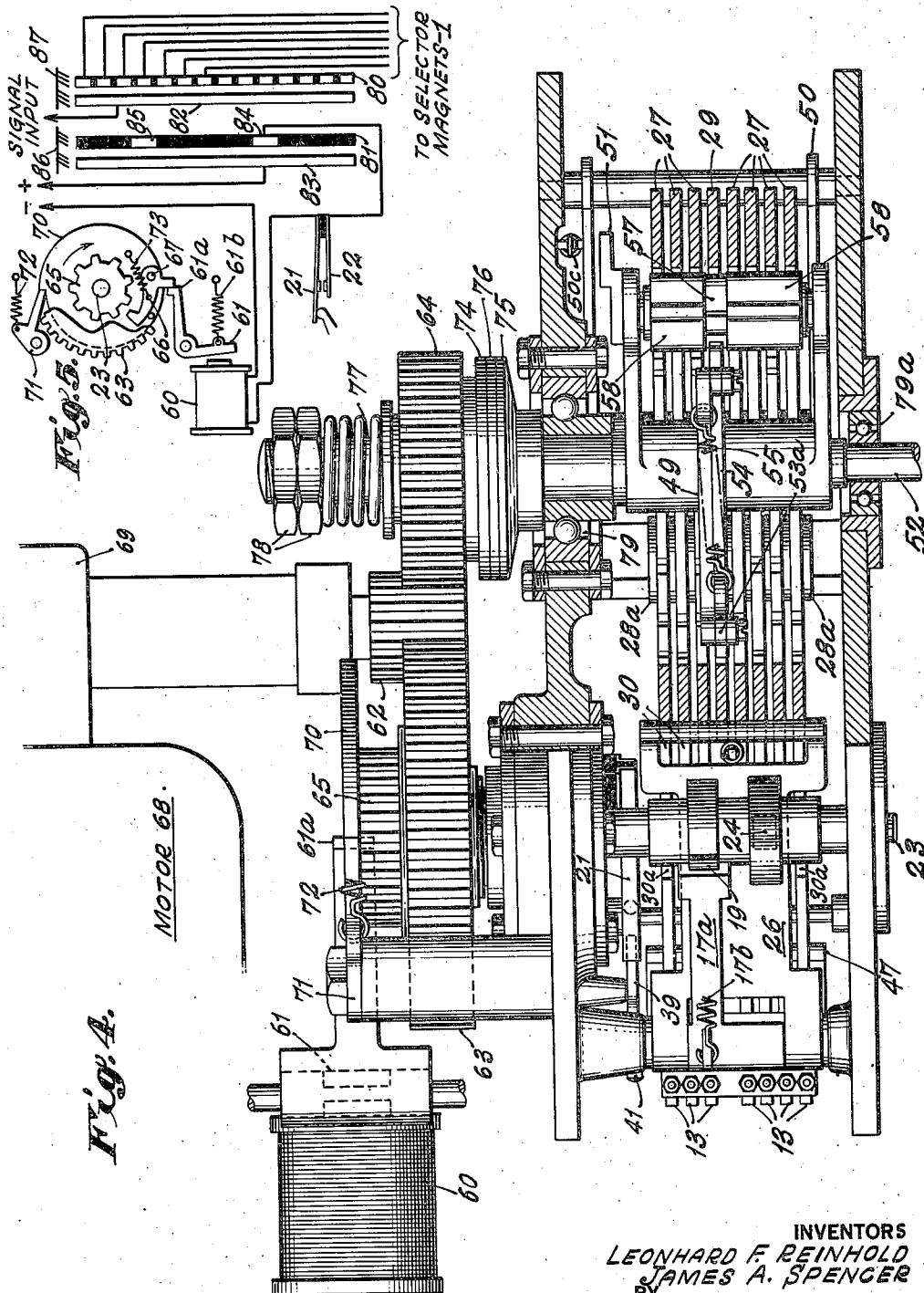


Fig. 4.

MOTOR 60.

TO SELECTOR
MAGNETS-1

INVENTORS
LEONHARD F. REINHOLD
JAMES A. SPENCER
BY

W. S. Brown
ATTORNEY

UNITED STATES PATENT OFFICE

2,406,044

SELECTING MECHANISM

James A. Spencer, Teaneck, N. J., and Leonhard F. Reinhold, Staten Island, N. Y., assignors to Radio Corporation of America, a corporation of Delaware

Application June 30, 1944, Serial No. 542,926.

19 Claims. (Cl. 178—34)

1

This invention relates to selecting mechanisms, such as used in printing telegraph receivers and the like.

Our invention is directed to certain improvements in selecting mechanisms, such as disclosed in our copending application Serial No. 485,186, which was filed April 30, 1943, now U. S. Patent No. 2,375,828, patented May 15, 1945. In the invention of that copending application we provided an arrangement of internally notched code rings in combination with an exploring member mounted on a rotatable shaft, the code rings being settable in accordance with the received code signals and the exploring member being arranged to seek an alignment of code notches arranged internally of the rings. When such alignment of code notches is reached by the exploring member, the latter acts as a stop to arrest the rotation of a shaft on which may be mounted a typewheel or other device to be selectively oriented.

Among the objects of our invention are the following:

1. To provide a selecting mechanism having positively actuated settable elements for storing the effects of received code signals.
2. To provide an improved means in said selecting mechanism for setting up a permutational arrangement of internally notched code rings in accordance with a received code signal.
3. To provide improvements in the design and operating characteristics of an exploring arm which serves to stop the rotation of a shaft in a selected position of orientation.
4. To provide improvements in the design of an exploring member mounted on a rotatable shaft, such that after the exploring member has been engaged with an alignment of notches in the associated code rings, disengagement may be effected without undue friction merely by upsetting the alignment of code notches upon restoration of the code rings to normal position.

Other objects of our invention as well as advantages of the improvements hereinafter described will appear to those skilled in the art. A detailed description of a preferred embodiment will now be set forth, reference being made to the accompanying drawings, in which:

Fig. 1 shows a front elevation of a selecting mechanism including signal storage elements, cam-driven devices for setting each of a plurality of internally notched rings according as they are selected by the marking elements of incoming code signals, an exploring arm, and other components of a complete selecting mechanism;

Fig. 2 shows a fragmentary front elevation of

2

the storage mechanism viewed as in an intermediate stage of its cyclic operation;

Fig. 3 shows still another front elevation of the selecting mechanism with parts represented as having actuated selected ones of the code rings;

Fig. 4 shows a plan view partly in cross-section of the apparatus, including gears and clutch members for driving the necessary cams and the rotatable shaft which carries the exploring member, the section line being indicated by 4—4 in Fig. 1; and

Fig. 5 shows somewhat diagrammatically a magnetic clutch release arrangement and circuit therefor, as used to control a cam shaft.

In order to briefly survey the mechanism which will hereinafter be described in full detail, it may be pointed out that the storage mechanism includes a number of signal responsive magnets arranged to release certain triggering levers so that at a particular point in the cycle of operation, a cam-actuated mechanism shall selectively actuate different internally notched code rings to rotate the same through a small angle. Upon releasing a clutch which rotates the cam shaft, the selected code rings are moved into position to set up an alignment of their internal notches. The necessary number of code rings being simultaneously moved into a selected position, the exploring arm is released for rotation from its homing position to whatever position is to be found having an alignment of code notches. The exploring arm is retarded just before being brought to a full stop. Assuming that a typewheel is mounted on the same shaft with the exploring arm, this typewheel will then be set for printing a selected character. After the printing operation, the code rings are restored to normal and this operation itself disengages the exploring arm for return to its homing position. At that point, it is again arrested by a stop member so that its driving clutch must slip until another selective operation takes place.

Referring now to Fig. 1, we show one of the impulse responsive magnets 1 having an armature 2. A spring 3 holds the armature away from the pole piece of the magnet. A stop member 4 determines the gap between the pole piece and the armature when the magnet is not energized. Mounted on the armature member 2 is a button 5 which engages with a lug 6 on a tripper member 7. Magnets for the different units of uniform length code signals are so arranged as to engage with different ones of a series of tripper members 7, where all of the latter are mounted on one spindle 8 for independent actuation. Ac-

cordingly, the tripper members 7 are provided with a plurality of actuating lugs 6 and 6', either of which may be kicked by one of the armatures 2 or 2'. Each tripper member 7 is held in normal position by a spring 9. A notched lug 10 on each tripper member 7 engages with the end of a settable lever 11 having an upstanding extension 12 for supporting a thrust bar 13. Each of the levers 11 is held in normal position by a spring 11a. An edge surface of each lever 11 acts as a cam in engagement with a single lever arm 14 which is common to all of the storage mechanisms for the different code rings. Lever arm 14 is held in normal position by a spring 15.

All of thrust bars 13 are pivotally mounted at 16 on a single cam-actuated lever 17, the latter being pivoted at 18 and having an extension arm 17a which carries at its upper end a roller 19 for engagement with a cam having a hump 20 on its periphery. A spring 17b causes the roller 19 to be pressed against the cam. Shaft 23 is intermittently driven and carries two cams, the humps on which are referenced 20 and 24 respectively. Alternatively, the two humps 20 and 24 if merged into one hump could be included in the peripheral surface of a single cam, whereby levers 17 and 26 would be actuated in succession.

The mechanism for driving shaft 23 intermittently through a positive clutch device powered by a continuously running motor 68 (Fig. 4) will be described in more detail hereinafter. The actuation of lever 17 by means of the cam hump 20 causes thrust bars 13 to move to the right in Fig. 1 and each of the thrust bars which is permitted to drop down into engagement with a toe-piece 30a on a lever 30 causes selected ones of the levers 30 to be rotated counter-clockwise on their common pivot shaft 31. The selection of thrust bars 13 for this operation is provided by counter-clockwise rotation of the settable levers 11 when released by their associated tripper members 7. Those of the levers 11 which remain in normal position after reception of a code signal continue by means of their extensions 12 to support the thrust bars 13 so that they ride over the tops of the toe-pieces 30a. The right-hand extension of each lever 30 has a rounded end seated in a peripheral notch 32 in an associated code ring 27.

An assembly of coaxially disposed code rings 27 is positioned and supported by at least three posts 28 having spacing members 28a thereon for suitable separation and individual holding of the code rings in parallel planes and in coaxial alignment. An index ring 29 is also provided, this ring being delineated as though broken away so that only about one-quarter of its full circumference is shown in Figs. 1 and 3. Each of the code rings 27 is rotated clockwise through a small angle by an individual setting lever 30. The selective engagement of individual thrust bars 13 with the toe-pieces 30a on levers 30 has been described above.

A plurality of detent levers 33 is mounted on a common spindle 34 and each of these levers engages with one or the other of two peripheral notches 35 in its associated code ring 27. The rounded end of the detent lever 33 is seated in one of these notches or rides over an intervening hump, exerting pressure thereon which results from the tension of a spring 36.

A positive clutch is shown in Fig. 5. This clutch is arranged to rotate shaft 23 intermittently for actuating the lever arm 17 (Fig. 1) after the code signal has been stored by the

selective mechanisms which are under control of the code signal responsive magnets 1. The first one of the levers 12 to be tripped in response to the reception of a marking code signal element actuates lever 14 so as to cause the release of lever 39 for clockwise rotation through a small angle. Lever 14 has a lug 38 for holding lever 39 in its normal position. Upon release, however, the lever 39 rotating on pivot 40 allows contact springs 21 and 22 to be closed. These contacts, as shown in Fig. 5, are in circuit with rings and brushes of a rotary distributor.

The distributor is composed of segmented rings 80 and 81 and slip rings 82 and 83. Slip ring 82 receives the code signals and distributes them through the segmented ring 80 to the several magnets 1. Slip ring 83 has D. C. potential supplied thereto from a local source. Segment 84 and brush 86 are used to time the actuation of clutch release magnet 60 when prepared by the closure of contacts 21 and 22. The distributor rings, as shown in Fig. 5, are designed for two-channel multiplex operation so that one-half of each ring is assigned to one channel and one printer, while the other half is assigned to a different channel and printer. The top half of the developed showing of distributor rings 80 and 82 is appropriate to the selecting mechanism and printer shown in the drawings. The bottom half of these rings would be serviceable in association with a second selecting mechanism and printer. In order to time the operation of the clutch release magnet 60 so as to follow the reception of the complete code signal combination, segment 84 is located in the lower half of the distributor ring 81. Segment 85 is reserved for use in association with a different clutch release magnet (not shown).

A pinion gear 62 is mounted on the shaft of a speed-reducing gear train 69 which is constantly driven by the motor 68. Hence, gears 63 and 64 meshing with pinion 62 are constantly driven. The hub of gear 63 has a fluted portion 65 which is positioned in coplanar relation to a pawl 66 pivotally mounted at 67 on a cam member 70. The cam member is keyed to the shaft 23. Its periphery contains one step for engagement of a back-lash pawl 71 which presses thereagainst by virtue of the tension of a spring 72. Pawl 66 is urged by a spring 73 to engage with one of the flutes in the hub 65.

The brushes 86 and 87 rotate synchronously over the distributor rings and when D. C. potential is applied to magnet 60 by closure of its circuit through the distributor segment 84 and contact segments 21 and 22, the armature 61 is attracted. This causes the extension arm 61a to be disengaged from a lug on the pawl 66. Spring 73 then moves the pawl into engagement with the fluted hub 65 and shaft 23 is thereby driven through a single revolution. Upon completing this cycle, the magnet 60 has already been de-energized so that the extension arm 61 is moved back into the path of the lug on pawl 66, thereby disengaging this pawl from the constantly rotating hub 65. The homing position of the cam 70 is thus reached whereat the back-lash pawl 71 rides over the step in the cam 70 and locks this cam in its normal position.

During the single revolution of the shaft 23, not only is the lever arm 17 actuated, but, as a restoring operation, lever arm 26 is subsequently actuated, its roller 25 being caused to ride over the hump 24 on one of the cams which are mounted on shaft 23. The function of the lever arm 26 is to restore the selected code rings to their

5

initial position. This is accomplished by a downward movement of the free end of lever 26. This free end of lever 26 spans all of the code rings 27 and engages with peripheral notches 37 therein. This restoring operation takes place after the exploring arm 49 has been rotated to its selected position as determined by an alignment of code notches in the code rings 29, and as will hereinafter be described.

Operation of the selecting mechanism

Having in mind that the selecting mechanism is designed to set up a permutational arrangement of code rings 37 so that at some point internally of the ring assembly their code notches 15 will be brought into alignment for arresting the exploring arm 49, we shall now describe the successive steps in the selecting cycle, reference being made to all of the figures, but especially to Figs. 1, 2, and 3 for showing different stages in the selecting cycle.

Magnet 1, when it is energized in response to a code signal impulse, attracts its armature 2 and rotates its associated tripper member 7 counter-clockwise against the tension of spring 9. Lever 11 is thereby disengaged from a notch in the lug 10 of the tripper member 7. Lever 11 also rotates counter-clockwise subject to the tension of spring 11a. The supporting extension 12 moves to the left and allows thrust bar 13 to be dropped into 30 position for engagement with the toe-piece 30a on the code ring actuating lever 30. The signals stored by tripping the levers 12 are thus translated into setting movements of the levers 30 and the code rings 27, all as previously described.

Lever 39 when tripped is moved by tension of spring 24 and is stopped by the end of a screw 41. The motion of lever 39 is sufficient, however, to close the contact points of springs 21 and 22, for actuating the clutch release magnet 60 in the 40 manner heretofore described.

Fig. 2 shows the positions occupied by the several portions of the selecting mechanism after storing the signal and just prior to the actuating movement of the code rings in response to the rotation of the cam shaft 23. This actuating movement rotates lever arm 17 counter-clockwise and causes the thrust bars 13 either to ride over the tops of the toe-pieces 30a, in which case there will be no setting of the associated code rings, or else, as when the thrust bars 13 have been 50 dropped, they cause counter-clockwise rotation of the lever members 30, thus producing clockwise rotation of each selected code ring 27.

The stop screw 41, being mounted on a lug at the end of lever arm 17, now pushes against lever 39 and causes the contact springs 21 and 22 to be separated, thus opening the circuit of the clutch magnet 60. The lower end of lever 39 now rides over and is cocked by the lug 32 on lever 14. The extension 47 on lever 17 restores levers 11 and 17 to their normal positions in which lever 11 is latched by the extension 10 on lever 7.

Friction clutch drive for typewheel shaft

The shaft 52, which carries an exploring arm 49 and a typewheel (not shown) or other member to be brought into any selected position of orientation, is driven through friction clutch plates 74 and 75 between which may be interposed a disk 76 of friction fabric. Clutch member 75 is keyed to the shaft 52, while clutch member 74 is constantly driven by its associated gear 64, this gear meshing with pinion 62 at the end of a shaft in the speed reducing gear 69. The clutch member 74

6

and gear 64 are loosely mounted on the shaft 52. Compression between the clutch plates 74 and 75 is brought about by means of a helical spring 77 which is backed up by nuts 78 threaded on to the end of the shaft 52. Ball bearing assemblies 79 and 79a are used as journals for the shaft 52.

It will be apparent from the description above and from the drawings that the shaft 52 is urged by the friction clutch mechanism to rotate whenever released by start-stop lever 50. The shaft 52 may also be arrested in any given selected position upon actuation of the exploring arm 49 now to be described.

The exploring arm

In selecting mechanisms of the prior art where an exploring arm was used, it has been found that the method of arresting the exploring arm suddenly was such as to impose severe mechanical strains upon the structure and to shorten the life of the apparatus. This was due to the considerable weight of the exploring arm and the typewheel or other element which was mounted on a friction driven shaft such as shaft 52 in Fig. 1. Accordingly, we have provided a means for retarding the exploring arm and whatever elements are rotated therewith on a common shaft before they are brought to a full stop.

Fig. 1 shows the exploring arm 49 in its homing position from which it is released for making a cyclic excursion. Fig. 3 shows the exploring arm 49 as it appears after being arrested in accordance with the position of alignment of code notches in the settable code rings 27. The exploring arm is started on its excursion by the actuation of a start lever 50 at the free end of which is a lug 50a normally engaging with a projection 51 at one end of the exploring arm 49. The start lever 50 is moved downwardly upon setting the code rings 27, since a cam follower roller 50b, normally seated in the code wheel notches 27a, is brought out to the main periphery of the code rings 27 and rests thereon subject to the tension of a spring 50c.

In order to present an edgewise view in Fig. 4 of the exploring arm 49 and to clearly depict the elements carried thereby, it should be assumed that the exploring arm 49 has been rotated until its longitudinal axis lies along the section line 4-4 of Fig. 1. Also, in Figs. 1 and 3, it will be understood that only the one code ring 27 which stands immediately behind the index ring 27 is shown.

A sliding index rod 54 is carried by the exploring arm 49 in position to be moved longitudinally with respect thereto. The index rod 54 is held in place by straps 53 screwed onto the exploring arm 49. Spacing bushings 53a (Fig. 4) surround the screws or studs by which the straps 53 are secured to the member 49. A spring 55 is attached at one end to the exploring arm 49 and at the other end to an ear-piece 56 on the index rod 54.

At the upper end of index rod 54 (as shown in Fig. 1) is a projection 54a which is arranged to seat itself in any one of the indexing notches 29a in the stationary index ring 29, this ring being held from turning by means of a pin 29b through one of the posts 28. The end 54b of the index rod 54 is suitably shaped to act upon the radial edges of a cam 57 (hereinafter referred to as a cloverleaf cam) and, after rotating this cam so that the integrally-formed paddle blades 58 drop into an alignment of code ring notches, further rotation of cam 57 reacts upon the index

rod 54 and against the tension of spring 55 to retard the shaft 52 until the indexing function is completed.

The cloverleaf cam 57 is pivotally mounted at 59. The four blades 58 of the paddle wheel device are disposed transversely of the inner edges of all the code rings 27. The exploring arm 49 while rotating to a point where an alignment of code ring notches is to be found allows the leading one of the paddle wheel blades 58 to graze the inner edges of the code rings 27. A rubbing pressure is also contributed by the action of spring 55 and the aforementioned cooperation between the index rod end 54b and the cloverleaf cam 57 so that the latter tends to rotate on its spindle 59 in a counterclockwise direction. When a blade 58 is engaged by an alignment of notches in the code rings 27 the cam member 57 becomes hypocycloidally movable to a selected point of arrest. The stiffness of the spring 55 is sufficient to produce a torque slightly less than the effective torque of the friction clutch 74, 76 through which shaft 52 is driven. The cloverleaf cam 57 and the paddle wheel blades 58, therefore, perform the function of retarding the exploring arm 49 prior to the entry of the index rod end 54a into the positioning notch 29a where it is fully stopped.

The position of arrest of the exploring arm 49 is shown in Fig. 3, where it appears that the index rod end 54a has been latched into a notch 29a, and where the index rod end 54b has mounted to the outer extremity of a leaf in the cam 57.

The restoring mechanism

As heretofore indicated, the restoring movement is brought about by control of the restoring lever 26 when its cam follower roller 25 rides over the cam hump 24 rotating on shaft 23. The peripheral notch 37 in each of the code rings 27 is sufficiently wide so that the free end of lever 26 normally occupies the relative position shown in Fig. 1 with respect to the rings that have not been set, and it occupies the relative position shown in Fig. 3 with respect to any of the rings which have been set. Accordingly, the selected rings are restored to normal by downward pressure applied by the restoring lever 26. This movement causes the alignment of code ring notches to be upset. The engaging paddle wheel blade 58 is thus lifted out of the code ring notches and the rotation of the cloverleaf cam 57 causes the index bar end 54b to ride over the highest part of one leaf. Spring 55 immediately contracts so as to disengage the index bar end 54a from the notch 29a in which it was latched. The exploring arm 49 is now free to rotate in response to the driving action of the friction clutch members 74, 75. Thereafter the exploring arm 49 rotates to its homing position where it is again brought to rest by engagement between the exploring arm projection 51 and the lug 50a on the start-stop lever 50.

It is within the scope of our invention to utilize its selecting mechanism in any apparatus which requires selective orientation of the shaft 52 and the arrest of that shaft for performing any subsequent operation. It is immaterial, therefore, whether this shaft carries a typewheel, the contact arm of a rotary switch, or other element to be oriented. For example, if the shaft 52 carries a typewheel, the associated apparatus would conventionally function to produce a stroke of an ordinary printing platen for printing a character. If, however, the selecting mechanism

is intended to be incorporated into a conventional selector switch, then the wiper arm of said switch may take the place of the typewheel and a circuit closure may be made through any selected contact segment in an arcuate bank of such segments.

It is, of course, to be understood that our invention is capable of modification in various ways and that the exact features of design of the particular embodiment herein shown and described need not be adhered to, but that the spirit and scope of the invention is much broader than merely to cover this illustrative embodiment.

We claim:

1. Orientation setting mechanism for a rotatable shaft, comprising a plurality of internally notched selector rings each corresponding to an element of a selective code signal, a motor adapted to run constantly during the operation of said mechanism, means for driving selected ones of said rings from an unselected to a selected position, said means including transmission gear and a positive clutch driven by said motor, tripping mechanism for causing the clutch to be engaged and to rotate through a single cycle, a cam rotatable with the intermittent element in said clutch, a reciprocating device including a plurality of coaxially pivoted thrust bars and a cam follower engaged with said cam, marking-code-signal-responsive storage means for selecting a permutational combination of said thrust bars, levers individually associated with said thrust bars and individually engaged with peripheral notches in respective ones of said code rings, control members in said storage means for selecting certain ones of said thrust bars for simultaneous actuation of said levers, an exploring arm mounted on said orientable shaft and arranged to seek and to be arrested by an alignment of code notches in said rings, a friction clutch driven by said motor for urging said orientable shaft to rotate, and a start-stop detent under control of the actuated code rings for releasing said exploring arm from a homing position, and for arresting the same after it has been arrested at, and been released from, a selected position of orientation.

2. Orientation setting mechanism in accordance with claim 1 and including a stationary index ring having internal notches, a slideable index bar mounted on said exploring arm, and means for causing one end of said index bar to be moved radially into engagement with a selected notch in said index ring for arresting the exploring arm in a desired position of orientation.

3. Orientation setting mechanism in accordance with claim 1 and further characterized in that said levers are formed with toe-pieces disposed in the path of selected thrust bars and underlying the path of non-selected thrust bars.

4. Mechanism for selectively orienting a rotatable shaft and for arresting the same in a predetermined position, comprising an exploring arm affixed to said shaft, a motor and friction clutch for causing intermittent rotation of said shaft, a release-and-stop detent for normally holding said exploring arm in a homing position and for releasing the same to be rotated by said friction clutch, a plurality of internally code-notched selecting rings, coaxially pivoted levers having rounded ends individually seated in peripheral notches of said rings and comprised in means for moving said rings from an unselected to a selected position, said means including thrust bars selectively and individually engageable with toe-

pieces on said levers and including a cam-actuated swing which provides pivotal support common to said levers, signal responsive storage means settable to predetermine which of the thrust bars shall engage with associated lever toe-pieces to actuate said code rings, means carried by said exploring arm for causing its arrest at a position determined by an alignment of code notches in said rings, means for causing the setting and restoration of said rings to control said release-and-stop detent, and a positive clutch driven by said motor and controlled by the times of reception of signals to which said storage means is responsive, said positive clutch being effective to operate said cam-actuated swing and also to cause the restoration of said rings.

5. In a device of the class described, a rotatable shaft, a plurality of selector disks for determining a position of orientation at which said shaft is to be stopped, means including an exploring arm mounted on said shaft and carrying a swiveled seeker which cooperates with said selector disks for arresting the rotation of said shaft, a friction clutch through which said shaft is power-driven, a latch member slidably mounted on said exploring arm and cooperating with said seeker, and a spring interconnecting said latch member and said exploring arm and constituting means for causing the latch member to so actuate said seeker that the rotation speed of said shaft is retarded as it approaches said position of orientation.

6. In a device of the class described, a power-driven friction clutch, a shaft arranged to be intermittently driven through said clutch, selector mechanism including a plurality of internally notched selector rings for determining different selected positions at which said shaft is to be stopped, a stop arm fixed to said shaft, an index rod longitudinally slideable with respect to said stop arm, a stationary index ring having internal notches with which said index rod may be engaged, and a seeker member swiveled on said stop arm, said seeker member having radial blades for engagement with the selector ring notches and a cloverleaf cam for cooperation with said index rod.

7. The combination as defined by claim 6 and including a spring for urging one of the radial blades of said seeker member to enter a transverse alignment of notches in said selector rings, which alignment results from the operation of said selector mechanism, and for causing the withdrawal of said index rod from a notch in said index ring upon upsetting the alignment of selector ring notches, the upset being inherent in the completion of operation of said selector mechanism.

8. In a printing telegraph receiver, a plurality of selectors, means for variably operating said selectors in accordance with received code combinations of impulses, a typewheel shaft subject to rotation through a motor-driven friction clutch, a stop arm carried by said shaft, a start-stop detent controlled by said selectors for releasing and restraining said stop arm, hypocycloidally movable means carried on said stop arm for causing its arrest in a position determined by the operation of said selectors, and resiliently acting means for impeding the rotation of said hypocycloidally movable means thereby to retard the typewheel shaft as it approaches the selected position of stoppage.

9. The combination according to claim 8 in which said hypocycloidally movable means possesses radial blades for engagement with said

selectors at points determined by their permutational setting when operated in response to said impulses.

10. The combination according to claim 8 and having a slideable index bar mounted on said stop arm, an internally notched stationary index ring being provided for locating said selected positions of stoppage of the typewheel shaft, and one end of said index bar being movable into and out of engagement with the index ring notches under control of said hypocycloidally movable means.

11. In mechanism for selecting a position of arrest of a rotatable shaft, a plurality of internally notched selector rings permutationally operable in accordance with received code combinations of impulses, an exploring arm fixed on said shaft, a stationary index ring having inner peripheral notches for locating different positions of stoppage of said exploring arm, an index bar slideably mounted on said arm and having one end movable into and out of latching engagement with any selected one of the index ring notches, a cam pivoted on said exploring arm and having peripheral cam faces engaging with the other end of said index bar for interaction therebetween, means rotatable with said cam for seeking an alignment of notches in said selector rings, and a resilient linkage between said exploring arm and said index bar for resisting the turning momentum of said shaft and what it carries, said linkage being effective by virtue of the facility of the last said means for rolling into a ring notch alignment, thereby to actuate said cam and index bar.

12. In mechanism for selectively orienting a rotatable shaft, a motor-driven friction clutch for urging said shaft to rotate in one direction, a stop-arm mounted on said shaft, a detent operable to hold said stop-arm at a homing position and to release the same for making a cyclic excursion, a plurality of internally notched code rings selectively movable through a limited arc for determining a position of arrest of said stop-arm during an excursion, said code rings being constructed and arranged to actuate said detent, an index bar carried by said stop-arm and movable radially in relation thereto, an index ring having its inner periphery notched for engaging said index bar at different selected positions, a member pivotally mounted on said stop-arm and having paddle-wheel blades for effecting engagement with an alignment of code notches in said code rings, thereby to retard the progress of said stop-arm, said member also having a cam portion arranged and adapted to cooperate with said index bar, and a spring for applying pressure between one end of said index bar and the periphery of said cam.

13. In a selecting mechanism, a stop-arm mounted on a shaft to be restrained from rotation after selecting one of a plurality of possible positions of arrest, power-driven friction clutch means for urging said shaft to rotate, a detent operable to release said stop-arm for cyclic rotation from and to a homing position, a plurality of internally notched code rings permutationally operable to set up an alignment of their code notches, thereby to select different positions of arrest of said stop-arm, an index ring having a notched internal periphery, a radially extendable index bar carried by said stop-arm, one end of said index bar being arranged to latch into any one of the notches in said index ring, and means controlled by the setting of said code rings, and carried on said stop-arm in cooperative re-

11

lation to said index bar for causing the motion of said stop-arm to be retarded as it approaches a selected full stop position which is determined by the entry of said index bar end into a notch of said index ring.

14. The combination according to claim 13 in which said means controlled by the setting of said code rings includes a swiveled member one portion of which possesses paddle-wheel blade elements engageable in an alignment of code ring notches, and another portion of which is formed as a cloverleaf cam against the peripheral edges of which an end of the index bar is pressed, the tension of a spring being supplied for exerting the pressure.

15. In a device for arresting a friction-driven shaft in a selected position of orientation, a search arm rotatable with said shaft, a seeker member pivotally mounted at one end of said search arm and arranged to explore an orbital path in search of a hindrance to its progress, means for producing said hindrance at a selected point along said path, and resiliently held means for causing said seeker member to move hypocycloidally between the position where it is first retarded by said hindrance and the position where it is finally arrested.

16. In a device for arresting a friction-driven shaft in a selected position of orientation, a search arm rotatable with said shaft, a seeker member pivotally mounted at one end of said arm and having a toothed gear portion and a cam portion, internally notched selector means surrounding the orbital path of said seeker member, the notches of said means being capable of alignment for causing a tooth of said seeker gear portion to mesh therewith, and means for engaging the cam portion of said seeker member thereby to impede the rotation of the seeker member on its pivot, and hence to produce a braking action prior to the arrest of said shaft.

17. A device according to claim 16 and includ-

12

ing a latch arm in said means for engaging said seeker cam portion, and a recessed stationary member with which said latch arm is engaged upon outward thrust thereof by said seeker cam portion.

18. In a device of the class described, a search arm mounted on a friction-driven shaft and arranged to explore an orbital path, a bladed member pivotally mounted at one end of said search arm and capable of hypocycloidal movement, an index arm slidably mounted on said search arm and having a contractile spring which links it to the search arm and urges it into engagement with a cloverleaf cam structure integrally formed with respect to said bladed member, means normally acting to restrain said bladed member from hypocycloidal movement, said means being selectively adjustable to introduce a hindrance into the region surrounding said orbital path, thereby to effect said hypocycloidal movement of said bladed member and thus causing its progress to be retarded by the extension of said spring, and means into which said index arm is caused to be latched upon extending the same against the contractile force of said spring.

19. In a device of the class described, a power-driven friction clutch, a shaft arranged to be intermittently driven through said clutch, selector mechanism including a plurality of notched selector rings for determining different selected positions at which said shaft is to be stopped, a stop arm fixed to said shaft, an index rod longitudinally slidable with respect to said stop arm, a stationary index ring having notches with which said index rod may be engaged, and a seeker member swiveled on said stop arm, said seeker member having members for engagement with the selector ring notches and a cam for cooperation with said index rod.

JAMES A. SPENCER.
LEONHARD F. REINHOLD.