May 15, 1945. L. F. REINHOLD 2,375,829

MOUNTING FOR SWIVELED RINGS

Filed May 26, 1944

Fig. 1.

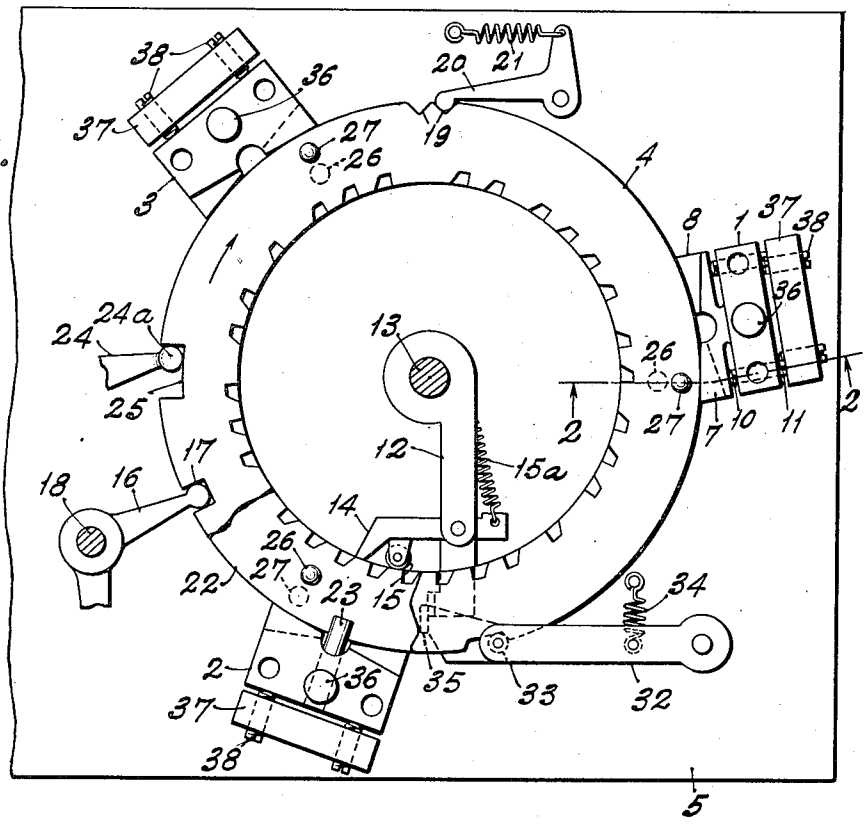


Fig. 2.

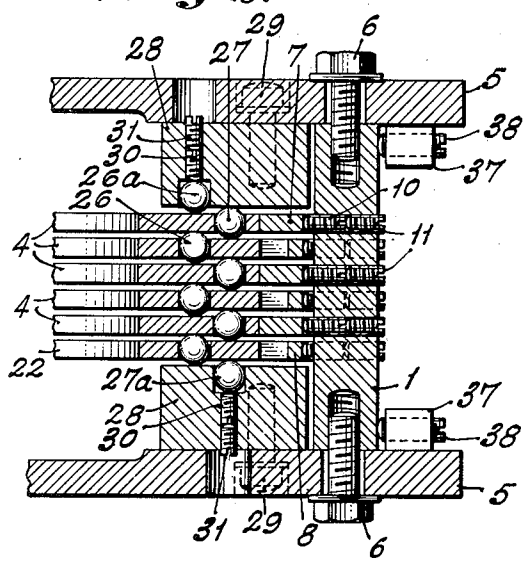
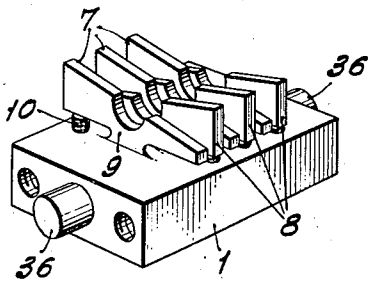


Fig. 3.



INVENTOR
LEONHARD F. REINHOLD
BY H. S. Grover
ATTORNEY

Patented May 15, 1945 2,375,829

UNITED STATES PATENT OFFICE

2,375,829

MOUNTING FOR SWIVELED RINGS

Leonhard F. Reinhold, Great Kills, Staten Island, N. Y., assignor to Radio Corporation of America, a corporation of Delaware

Application May 26, 1944, Serial No. 537,427

9 Claims. (Cl. 178—34)

This invention relates to mountings for swiveled rings and has for its principal object to provide peripheral support for an assembly of rings such as are commonly used in selecting mechanisms. Another object is to provide ball-bearing spacers whereby the rings are permitted to be suitably positioned for performing a selective function and may be individually oriented without undue friction whenever they are selectively set in accordance with different permutational combinations of code signals.

In a preferred type of printing telegraph apparatus the selecting mechanism includes internally notched code rings. These rings are coaxially disposed with respect to a typewheel shaft which also carries a seeker. Selected rings are rotated through a slight angle in order to bring their code notches into alignment in different positions about their inner edges. The seeker rotates when released after setting up a certain combination of the code rings. When the seeker finds an alignment of code notches it is arrested for performing a printing operation. The printing of a character follows and the rings are restored to normal position in readiness for the succeeding selective operation. The seeker is then permitted to resume rotation to a homing position.

More specific objects of the invention are:

1. To provide peripheral mountings for swiveled rings such that friction is minimized when rotating the rings.

2. To obtain individual clearance adjustment with respect to each of a bank of ring members having peripheral bearings, thereby to compensate for wear and for slight variations in the diameters of these rings due to manufacturing tolerances.

3. To obtain freedom of individual rotative movement of a plurality of juxtaposed ring members by the use of ball bearings which are caged in the rings.

4. To provide adjustability between base plates and mounting posts in a device for peripherally supporting swiveled rings.

5. To facilitate coaxial centering of a bank of code rings in a selecting mechanism.

The above and other objects of my invention will be brought out in detail in the description to follow. This description is accompanied by a drawing, in which:

Fig. 1 shows a front view of a selecting mechanism having internally notched code rings and having three-point peripheral supports for such rings

Fig. 2 shows a fragmentary section along the line 2—2 of Fig. 1; and

Fig. 3 shows in perspective a mounting post for retaining the swiveled rings in a proper position.

The selecting mechanism which has been chosen for illustrating a practical application of my invention has been completely described in a pending application filed jointly on April 30, 1943, by James A. Spencer and myself, Serial No. 485,186. Said joint application is expected to issue as a patent simultaneously with the issuance of the instant application. The instant application, however, discloses certain modifications and improvements of the apparatus previously disclosed.

In providing a suitable mounting for swiveled code rings, it has been found important to minimize the friction incident to the setting of these rings in different combinations, and also to provide a very exact centering of the rings as well as close "play" adjustment of the peripheral bearings by which the rings are held in place. Accordingly, I preferably employ three post members 1, 2, and 3 having specially designed bearing wedges 7 and 8 with which the peripheries of the code rings 4 are engaged.

At each end of these post members is a cylindrical lug 36 which fits into a hole in each one of the base plates 5. In radial directions from the axis of the code rings and beyond the seats for the posts 1, 2, and 3 are bosses 37 fixed to the base plates 5. These bosses are drilled and tapped for adjusting screws 38, by which the posts 1, 2, and 3 are oriented on the axis of their lug portions 36 before tightening up certain binding screws 6 which serve to fasten the posts firmly between the base plates. The screw holes in the plates 5 are, of course, somewhat larger than the diameter of the screws 6 in order to swing the posts slightly on the axes of the lugs 36. The adjustment thus provided enables the bearing edges of the wedge members 7 and 8 to be set substantially tangent to the peripheries of the code rings 4.

Referring to Fig. 3, it will be seen that opposed to each of the code rings there is a wedge 7 or 8 which is integral with the main block of the post 1 and is connected thereto by a narrow neck 9. The centers of the wedges are also milled out semi-cylindrically to reduce the cross-sectional areas where their wider ends are connected to the necks 9. The constricted shape, therefore, lends itself to slight flexure of the wedge when forced away from the block portion of the post

1 by means of a set-screw 10. Each of the set-screws 10 is threaded into the post 1 and is followed up by another set-screw 11. The design of the post 1 lends itself to milling or shaping out of a single piece of metal. Otherwise it may be die-cast. Furthermore, the assembly of wedge members 7 and 8, instead of being integral with the post block may be built up from punched laminations, if desired.

The wide ends of the wedges 7 are headed in the opposite direction with respect to the wide ends of the wedges 8 in order not to require too close centering of the screw holes for the screws 10 and 11. The cross-section of Fig. 2 is taken through the centers of three screw holes for screws 10 and 11. Screw holes for the set-screws pertaining to interventing wedges 8 are indicated by dotted lines.

The elasticity or flexibility of the material of which the post 1 is composed need be ever so small and yet be sufficient for adjustment of the wedges by means of the screws 10 and 11. Individual adjustment of the clearance between these wedges and the code rings is, however, provided in a very satisfactory manner.

A free swivel motion of each code ring is provided by the bearings of the three sets of wedges 7 or 8 spaced 120° apart. Slight variations in the diameters of the rings due to manufacturing tolerances or due to wear may be compensated by the adjustable arrangement of the wedge members 7 and 8 on post 1. This same mode of adjustment could, however, be provided on the wedges of posts 2 and 3, if desired, for the sake of more exact centering of the code rings. But in most cases this refinement is not necessary.

In selecting mechanisms where code rings are employed, it is important that these code rings shall be retained parallel to one another, in order to insure proper alignment of the code notches when the rings are set for arresting a seeker in a selected position of orientation. In Fig. 1 this seeker 12 is shown mounted on a shaft 13. At the end of the seeker arm 12 is pivoted a pawl 14 and on this pawl is mounted a roller 15. The seeker is disengaged from its homing position by movement of a detent lever 32 in response to the setting movement of any one or more code rings 4. A roller 33 engages with the rings 4 where the latter are peripherally notched. Spring 34 presses the roller 33 against the ring peripheries, but when a ring is swiveled clockwise, the roller rides out of the ring notch and a lip 35 on the detent arm releases the seeker. The shaft 13 is driven by a motor (not shown) working through a friction clutch.

The roller 15 on the pawl 14 sweeps around internally of the rings while being pressed against the inner edges under the pressure exerted by a spring 15*a*. An alignment of code notches is produced at any desired point depending upon the permutational arrangement of the rings as brought about in response to the receipt of a code signal.

As shown in the aforementioned copending application Serial No. 485,186, each code ring upon selection is subjected to a slight swiveling movement so as to bring into alignment a desired selection of code notches, depending upon the position in which the seeker 12 is to be arrested. Accordingly, I provide a plurality of lever arms 16 which are individual to the code rings and which engage in an external notch 17 on the periphery of each code ring. The lever arms 16 are all pivoted on a stationary post 18 and are actuated for setting the code rings in a clockwise direction. Each code ring is provided with two notches 19 for engagement with a holding pawl 20 so as to retain the rings in a normal position or in a set position. The pawl 20 is pressed against the periphery of its associated ring by means of a spring 21.

In Fig. 2 only five code rings 4 are shown, a sixth ring 22 being used as an index ring and having uniformly spaced notches therein for engagement with the tip end of the pawl 14 to arrest the same whenever the roller 15 finds an alignment of code notches in the rings 4.

In the embodiment of selecting apparatus herein shown, the index ring 22 is stationary, whereas the corresponding ring as shown in the aforementioned application Serial No. 485,186 was movable. This difference between the two embodiments is immaterial, however, in carrying out the instant invention. For holding the index ring 22 stationary, this ring only is provided with a peripheral notch into which a set-screw 23 or dowel pin may be inserted.

When the seeker arm 12 has been positioned by allowing the roller 15 to drop into an alignment of code notches in the several code rings, certain functions are performed by the apparatus to give effect to the selection thus made. For example, in a receiving telegraph printer a typewheel mounted on the shaft 13 may be arrested for just long enough to cooperate with an actuated printing platen and thus to print the character of the typewheel which is opposed to an intervening record sheet. Upon restoration of the actuated code rings the alignment of code notches is upset, thus driving the roller 15 inwardly and releasing the tip end of the pawl 14 from a notch in the index ring 22 in which it was engaged. This action is brought about by restoring the actuated code rings 4 to normal.

The code rings 4 are restored to normal by means of a restoring lever 24. At the end of this lever is a cross-arm 24*a*, which is shown in normal position at the top of certain peripheral notches 25 in the code rings. The cyclic operation of the selector includes a downward movement of lever 24 against the bottom end wall of the notches 25 in any of the code rings which have been subjected to a setting movement.

The details of the selecting mechanism necessary for actuating the levers 16 and 24 are of no importance to the instant disclosure and are, therefore, not shown.

Referring now to Fig. 2, I show a ball-bearing assembly which is useful in holding the code rings properly spaced apart and in parallel with one another, while at the same time providing freedom of individual setting movement with respect to each code ring.

Alternate rings acts as cages for the balls 26 in one row. Intervening code rings move in bearings produced by the balls of that row and also act as cages for balls 27 of another row. There are thus two rows of balls opposite each of the posts 1, 2, and 3. In addition to the balls which are caged by the code rings 4 and index ring 22, there are balls 26*a* and 27*a* caged in recesses of certain blocks 28. These blocks 28 are secured to the base plates by means of screws 29. Each of the blocks 28 is tapped with screw holes for set-screws 30 and 31.

It will be apparent that by loosening or tightening one of the screws 30, the line of balls 26 will allow just the desired amount of play in holding alternate ones of the rings 4 in place.

Also the remaining rings will be held in place with just the right amount of play by adjustment of the set-screw **30** which is associated with the other row of balls **27**. Each of the set-screws **30** is followed up by another set-screw **31**.

For the purpose of this disclosure the number of code rings to be employed in a particular assembly is immaterial. In the aforementioned application Serial No. 485,186, a selecting mechanism is shown which has a code ring corresponding to each baud unit in a seven-unit code signaling system. The embodiment herein illustrated is, however, suitable for signaling by means of the well-known five-unit code system. Any practical number of code rings may be employed. The number of rings to be used in a particular selecting mechanism depends upon the signal code for which the apparatus is designed. In addition to selectors adapted for codes having a uniform number of baud elements, selectors are known which are capable of response to continental Morse signals, or to three-element cable code signals, for example. From the above description, it will be apparent that the ball bearings for the code rings solve the problem of minimizing friction. The adjustment of the set-screws **30** provides the optimum clearance between ring faces and balls. The flexure of the wedges on post **1** under pressure of the set-screws **10** provides very exact individual adjustment of the play which is permitted for each individual code ring, thus minimizing friction against the peripheral bearings, while at the same time maintaining coaxial alignment of the rings **4** and **22**.

Modifications of my invention may, of course, be made without departing from the spirit and scope of the invention itself. Such modifications will, doubtless, be suggested to those skilled in the art in view of the foregoing description.

I claim:

1. A mounting for swiveled rings comprising two base plates, three positioning posts attached at their ends to said base plates, thus constituting spacer members between the base plates, the longitudinal axis of each post being offset from, and parallel to, the common axis of a plurality of said rings, wedge members formed on each of said posts so as to individually and tangentially engage the peripheries of said rings, said wedge members of at least one of said posts being undercut, thereby providing flexibility of adjustment with respect to a radius of said rings, and means for making and retaining said adjustment in such manner that said rings are peripherally borne and are freely swiveled.

2. A device in accordance with claim 1 and including adjusting screw means for orienting each of said posts on its longitudinal axis, thereby to adjust the tangential relation of said wedge members to the ring peripheries.

3. A device in accordance with claim 1 and including adjusting screw means for individually setting up the bearing edges of said undercut wedge members in opposition to the ring peripheries and with a minimum clearance to permit free swiveling of said rings.

4. A ball-bearing assembly for holding a plurality of flat rings in parallel planes and free to assume independent positions of orientation, said assembly comprising said rings each of which has three holes through its ring body spaced apart by arcs of substantially 120°, a plurality of balls each caged by the material of the ring surrounding a respective one of said holes, the ball diameter being greater than the thickness of the ring, the holes in alternate rings being located at one radial distance from the common axis of rotation of said rings, and the holes in intervening rings being located at another radial distance from said axis, and adjustable end bearings having balls caged therein, said ball-bearing assembly being further chaarcterized in that alternate rings act as thrust bearings with respect to the balls caged by the intervening rings.

5. A ball-bearing assembly in accordance with claim 4 and including adjusting screws threaded into said end bearings and contacting the balls caged by said end bearings, whereby the end-play of said rings is adjusted to an optimum value.

6. A ball-bearing assembly comprising a plurality of flat rings each having three holes in its ring body spaced apart by arcs of substantially 120°, adjacent rings having their holes located at different radial distances from the common axis of rotation of said rings, a plurality of balls each caged in a respective one of said holes, said balls being of greater diameter than the thickness of said rings, alternate rings constituting thrust bearings with respect to the balls caged by intervening rings, and, in combination with said ball-bearing assembly, a device for peripherally retaining said rings in coaxial alignment while affording freedom of independent rotation of each single ring.

7. The combination according to claim 6 and including means in said retaining device whereby certain of its surfaces having tangential contact with the peripheries of said rings are rendered independently adjustable to a value which allows a minimum of side-play for free swiveling of said rings.

8. A mounting for swiveled rings comprising two base plates, spacer posts attached to said plates and arranged to hold said plates in parallel planes, a plurality of said swiveled rings held in substantially coaxial alignment by peripheral contact with at least one of said posts, the remaining posts being also positioned for such peripheral contact and retention of said coaxial alignment, an assembly of ball bearings adapted to retain said rings freely swiveled in parallel planes, each ring constituting a cage for three balls and a thrust bearing for other balls disposed against opposite faces of said ring, and means attached to said base plates for caging certain balls disposed outwardly from the outer faces of the end rings.

9. The combination according to claim 8 and including means for independently adjusting the bearing faces of one of said posts which are tangentially positioned with respect to the periphery of each ring.

LEONHARD F. REINHOLD.