June 1, 1943. A. W. VINCENT 2,320,899

TELEPHONE RINGER

Filed Sept. 8, 1941

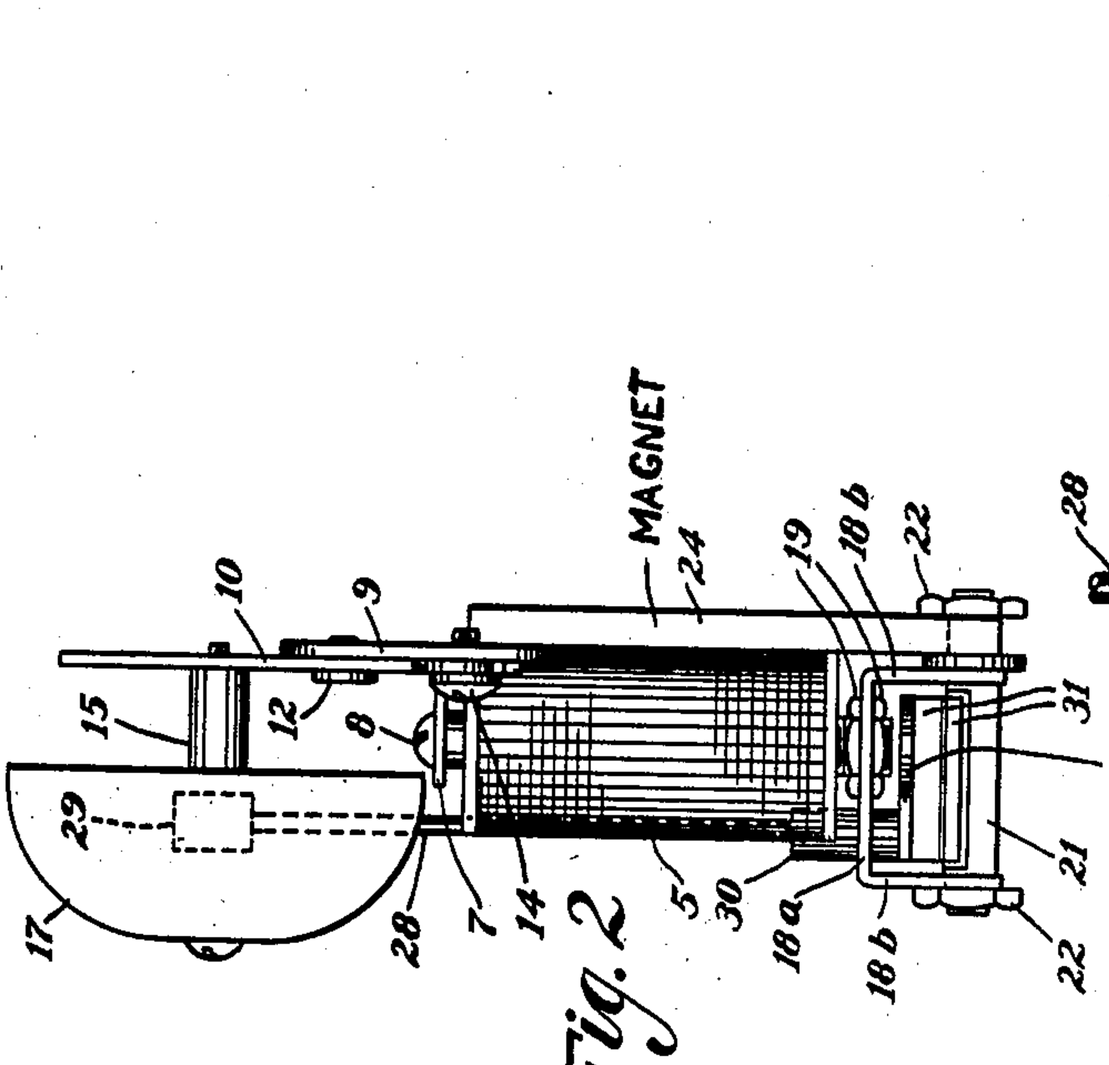

Fig. 2

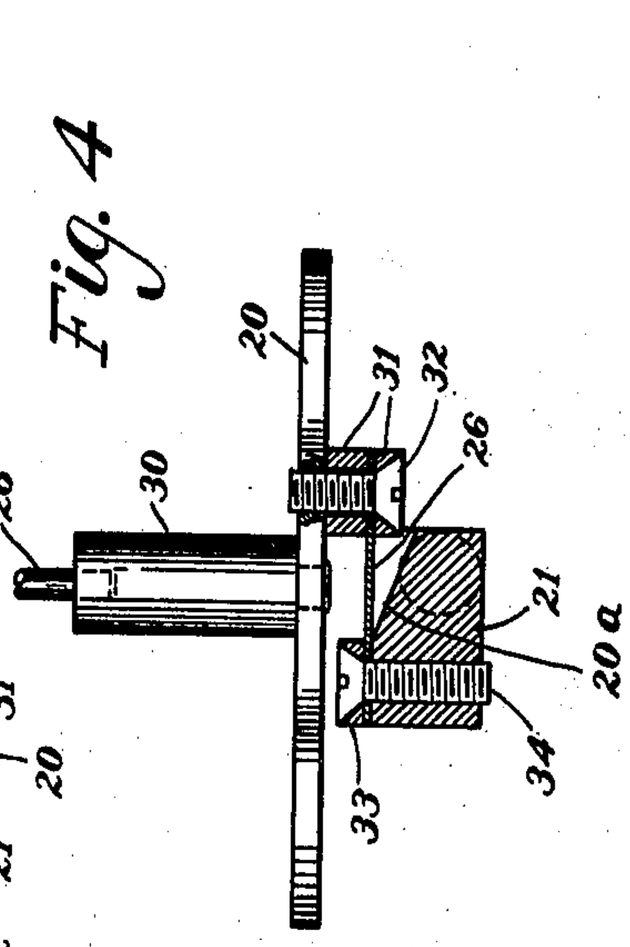

Fig. 4

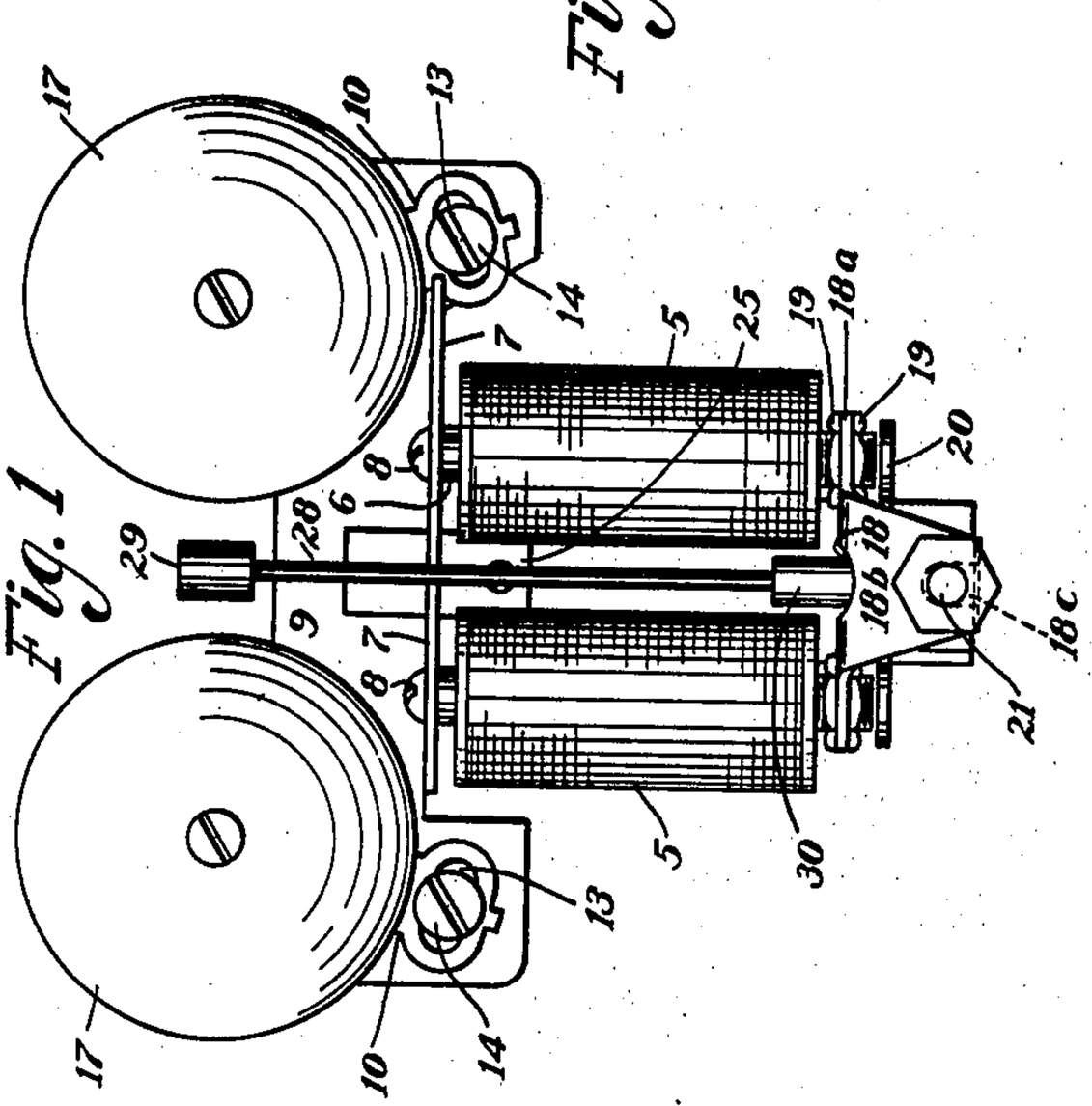

Fig. 1

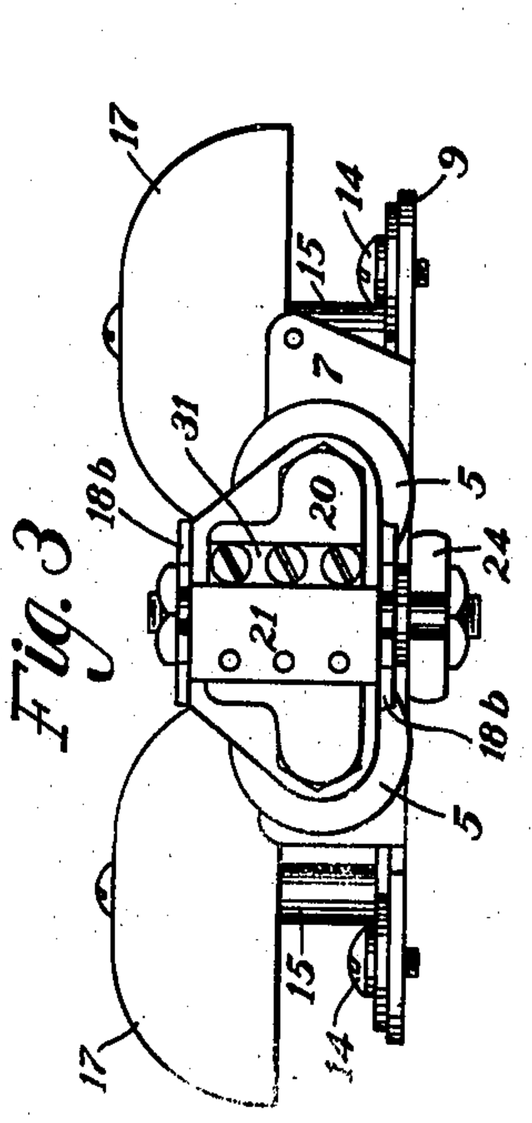

Fig. 3

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TELEPHONE RINGER

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Application September 8, 1941, Serial No. 409,918

4 Claims. (Cl. 177—7)

This invention relates to ringers and more particularly to tuned ringers for use in telephone systems.

The purpose of the present invention is to provide a ringer of improved construction which will be simple to manufacture, which can be quickly and accurately tuned to a desired frequency, and which will be relatively free from failures during service.

The various features and advantages of the invention will appear from the detailed description and claims when taken with the drawing in which:

Figs. 1, 2 and 3 are respectively, a front elevation, a side elevation, and a bottom view of the present ringer; and

Fig. 4 is a detailed view partially in section showing especially the novel arrangement for mounting the tuning reed and the armature in the ringer assembly.

In the drawing, the numeral 5 designates a pair of ringer coils, supported in spaced parallel relation by having one end of the core 6 of each coil secured to the yoke 7 by any suitable means such as by screws 8. The yoke includes an upright portion 9 on which there are mounted a pair of adjustable supporting arms 10. In the arrangement shown, each arm is mounted for rotary adjustment on a pivot 12, riveted in an opening in the upright 9. The lower end of each arm 10 is provided with a slot 13 to receive a clamping screw 14 which engages a tapped opening in the upright 9. The head of this clamping screw engages the lower end of the related arm 10 to lock it in its adjusted position. Each adjustable arm carries a right angular post 15 on the free end of which a gong 17 is mounted. It will be seen that there are a pair of spaced gongs mounted for adjustment toward and away from each other by means of the arms 10 just referred to.

The lower ends of the cores 6 extend beyond their related coils 5, as threaded extensions which support a U-shaped bracket of nonmagnetic material, such as brass. This bracket has a main portion 18*a* extending perpendicular to the cores 6, which portion is provided with two upright arms 18*b*. As herein illustrated, the main portion 18*a* of the bracket has spaced openings therein thru which the threaded extensions of the cores 6 project. Each extension has an adjusting nut 19 in threaded engagement therewith at each surface of the portion 18*a* of the bracket. Thus by adjusting the pairs of nuts on the threaded extensions of the cores 6, the bracket may be moved to position the armature 20 carried thereby, nearer to or farther from the ends of the cores 6, as desired. The arms 18*b* of the bracket are notched at 18*c* (Fig. 1) to receive an armature-supporting bar 21. The end portions of this bar are reduced to have a circular cross-section so that they can be received in the notches in the arms 18*b*, and so that they can be threaded to receive clamping nuts 22. As viewed in Fig. 2, the left hand arm 18*b* of the bracket is clamped between the nut 22 and the shoulder on the bar 21, while the right-hand bracket arm 18*b* as well as the lower end of the permanent magnet 24 are clamped between the nut 22 and the right-hand shoulder on the bar. The upper end of the magnet 24 is secured by a screw to a lug 25 (Fig. 1) struck out from the yoke, thereby completing the magnetic circuit.

The bar 21 provides a novel mounting for the tuned reed 26 which is a flat spring-like strip of metal. This reed has one of its ends attached to the bar at one side of the vertical axis of symmetry of the ringer and has its other end attached to the previously mentioned armature 20 at a point on the other side of said axis, said points of attachment being relatively close together and adjacent the intermediate portion of said armature (see Fig. 4). The respective end portions of the armature are thus supported in operative relation to the lower ends of the cores 6, with a suitable space normally existing between the armature and the core ends. At an intermediate point on the armature 20 there is mounted a rod 28 carrying at its upper end a clapper 29. This rod extends at right angles to the armature through an opening in the bracket 18 (Fig. 1) and in the space between the two coils 5 with the clapper adjacent the gongs 17. As herein illustrated the mounting of the rod on the armature includes a cylindrical piece 30 having a reduced end portion riveted in an aperture at an intermediate part of the armature 20. The other end of the cylindrical piece is drilled so that the lower end of the rod 28 can be driven therein with a tight fit.

This novel mounting causes the reed to extend in a plane with its principal axis parallel to that of the armature and permits the reed to flex about an axis extending at right angles to the length of the armature. This enables the reed to have substantial width thereby tending to reduce the strain on the reed to a small amount per unit area with the result that there are fewer reed failures during service. In this mounting, the end of the reed 26 which is secured to the arma-

ture is clamped between the rectangular blocks **31** by screws **32** passing through the blocks as well as through the reed and into the tapped openings in the armature **20**. The side edges of the blocks **31** can be carefully machined to grip the reed accurately and thereby accurately determine its effective length. The other end of the reed is clamped between a block **33** and a flat surface of the bar, the clamping screws **34** passing through openings in the block and the reed **26** to engage tapped openings in the bar **21**. The use of clamping screws **32** and **34** insure a more uniform clamping of the reeds **26** than is possible by the use of rivets since no two operators peen over a rivet the same amount. It will be noted from Fig. 4 that one portion of the bar **21** is cut away as indicated at **20***a* to afford clearance for the vibrating reed. In this instance also, the surfaces of the block **33** and of the bar surface **20***a* may be machined so that the clamping area between these parts may be accurately determined and thus the effective length of the reed can be accurately established thereby enabling the ringer to be accurately tuned.

What I claim is:

1. In a ringer, a yoke, at least one bell carried by said yoke, a pair of coils having cores supported at two of their ends on said yoke in spaced parallel relation, a fixed support adjacent the other ends of said cores, an elongated armature extending in a direction generally at right angles to the long axis of said cores with one end of said armature cooperating with one core end and the other armature end cooperating with another core end at said other ends of said cores whereby said armature ends can rock with respect thereto, a clapper in operative relation to said bell, said clapper being operated by said armature, means for mounting said armature in the position mentioned including a flexible reed-like strip extending lengthwise of said armature and in spaced parallel relation thereto and having an effective length substantially less than the distance between said cores, said strip having one end secured to said support and its other end secured to said armature, said reed being mounted to flex about an axis located adjacent the mid-portion of said armature and extending at right angles to the long dimension of said armature, and a magnet extending between said yoke and said armature to complete a portion of the magnetic circuit of said ringer.

2. In a ringer, a yoke, at least one bell carried by said yoke, a pair of coils having cores supported at two of their ends on said yoke in spaced parallel relation, a fixed support adjacent the other ends of said cores, an elongated armature extending in a direction generally at right angles to the long axis of said cores with one end of said armature cooperating with one core end and the other armature end cooperating with another core end at said other ends of said cores whereby said armature ends can rock with respect thereto, a clapper in operative relation to said bell, said clapper being operated by said armature, means for mounting said armature in the position mentioned including a flexible reed-like strip extending lengthwise of said armature and in spaced parallel relation thereto and having an effective length substantially less than the distance between said cores, said strip having one end secured to said support and its other end secured to said armature, said reed being supported within the projection of said armature to flex about an axis located adjacent the mid-portion of said armature and at right angles to the greatest dimension thereof, and a magnet extending between said yoke and said armature to complete a portion of the magnetic circuit of said ringer.

3. In a ringer, a yoke, at least one bell carried by said yoke, a pair of coils having cores supported at two of their ends on said yoke in spaced parallel relation, a fixed support adjacent the other ends of said cores, an elongated armature extending in a direction generally at right angles to the long axis of said cores with one end of said armature cooperating with one core end and the other armature end cooperating with another core end at said other ends of said cores whereby said armature ends can rock with respect thereto, a clapper in operative relation to said bell, said clapper being operated by said armature, means for mounting said armature in the position mentioned including a flexible reed-like strip extending lengthwise of said armature and in spaced parallel relation thereto and having an effective length substantially less than the distance between said cores, said strip having one end secured to said support and its other end secured to said armature, said reed being approximately equal in width to the width of the armature and flexing about an axis located adjacent the mid-portion of said armature and at right angles to the greatest dimension thereof, and a magnet extending between said yoke and said armature to complete a portion of the magnetic circuit of said ringer.

4. In a ringer, a yoke, at least one bell carried by said yoke, a pair of coils having cores supported at two of their ends on said yoke in spaced parallel relation, a fixed support adjacent the other ends of said cores, an elongated armature extending in a direction generally at right angles to the long axis of said cores with one end of said armature cooperating with one core end and the other armature end cooperating with another core end at said other ends of said cores whereby said armature ends can rock with respect thereto, a clapper in operative relation to said bell, said clapper being operated by said armature, means for mounting said armature in the position mentioned including a flexible reed-like strip having one end secured to said support and its other end secured to said armature and extending lengthwise of said armature, said means also including spaced clamping members extending across said reed near the intermediate portion of said armature and screw threaded elements passing thru said members respectively into said support and into said armature for clamping the ends of said reed respectively to said armature and to said support, and a magnet extending between said yoke and said armature to complete a portion of the magnetic circuit of said ringer.

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