MZL FULLER.

PHONOGRAPH.

APPLICATION FILED FEB. 24, 1913.

1,146,418.

Patented July 13, 1915.

2 SHEETS—SHEET 1.

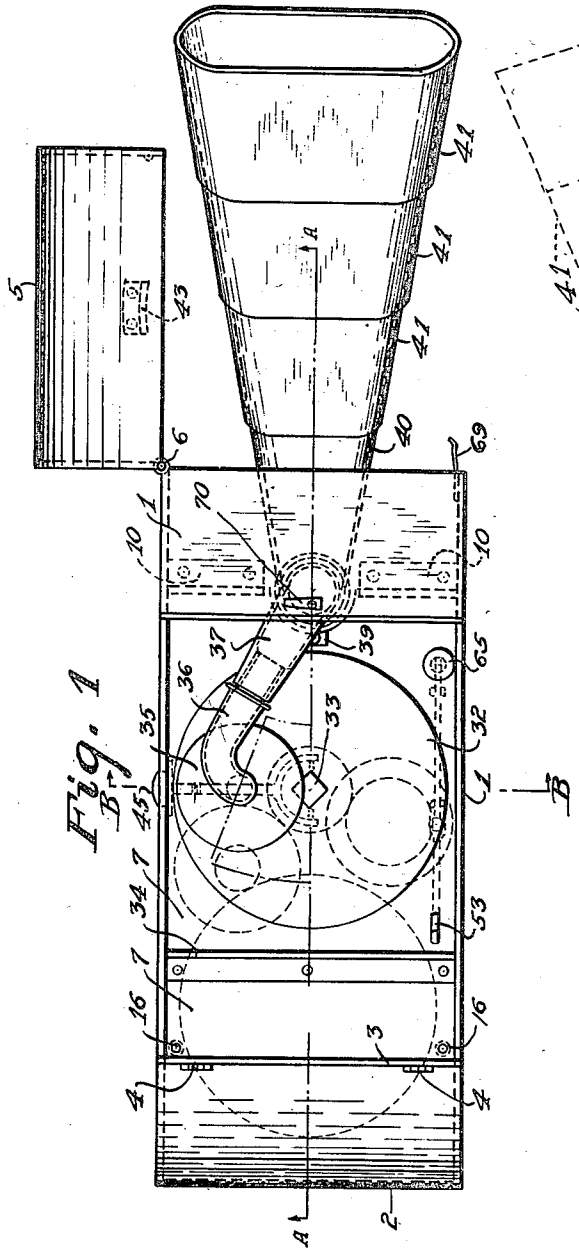


Fig. 1

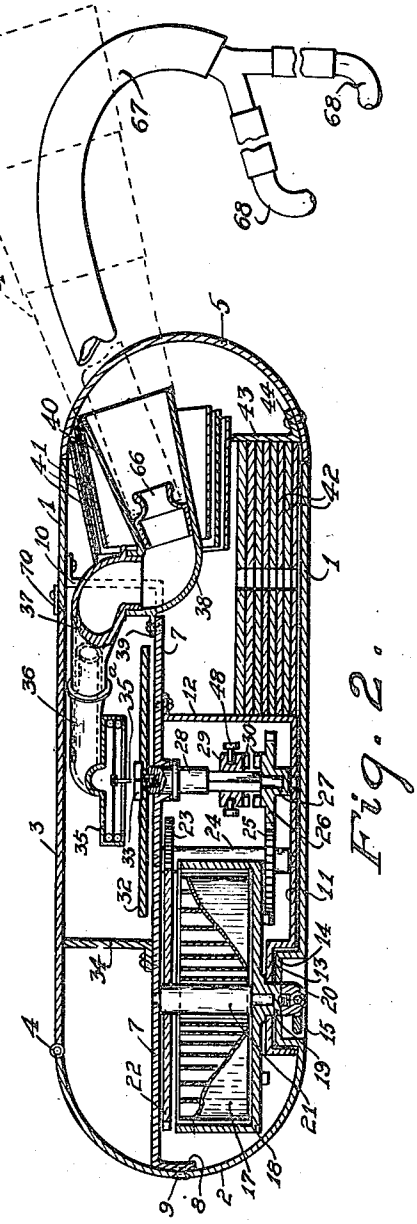


Fig. 2.

Witnesses

W.C. Brickett

Nonnie Welsh

Inventor

MZL Fuller.

By Ross D. Johnston Jr.

Attorney

MZL FULLER.

PHONOGRAPH.

APPLICATION FILED FEB. 24, 1913.

1,146,418.

Patented July 13, 1915.

2 SHEETS—SHEET 2.

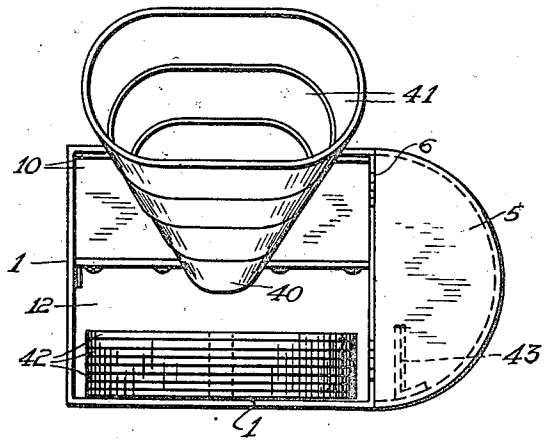


Fig. 3.

Fig. 4.

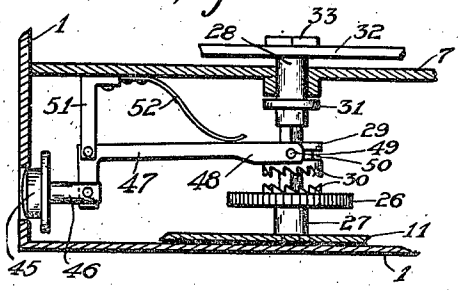


Fig. 5.

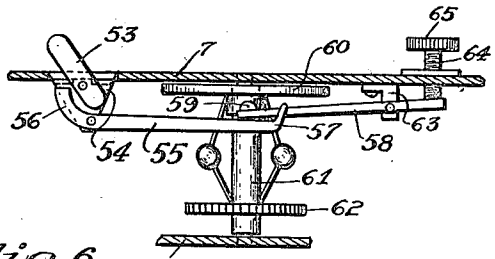
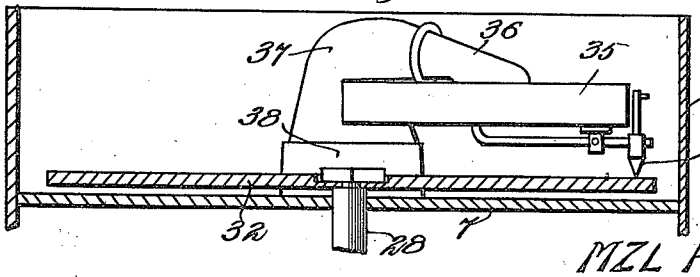


Fig. 6.



Witnesses

W. C. Prickett

Nomi Hebb.

Inventor

MZL Fuller

By Robt. D. Johnston

Attorney

UNITED STATES PATENT OFFICE.

MZL FULLER, OF BIRMINGHAM, ALABAMA.

PHONOGRAPH.

1,146,418. Specification of Letters Patent. Patented July 13, 1915.

Application filed February 24, 1913. Serial No. 750,240.

To all whom it may concern:

Be it known that I, MZL FULLER, a citizen of the United States of America, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

My invention relates to improvements in phonographs, or sound recording and reproducing apparatus, and its object is to simplify, lighten, and condense the apparatus so that it may be embodied in a small, compact and portable structure which can be conveniently carried in the pocket.

My present invention is especially adapted for use in connection with other inventions of mine, the object of all of which is to make it possible to conveniently and cheaply produce small, light records and reproduce from the same so that such records may be transmitted through the mails and interchanged to form a part of business and personal correspondence.

With such an end in view, one important thing is to so simplify and cheapen the means of making and reproducing the records that they can be made generally accessible, and that is the object primarily in view in my present invention which involves novel features in the construction of the casing or container for the recording apparatus; the tone arm and manner of mounting the same and attaching the sound box thereto; the arrangement and construction of the sound amplifying means; the manner in which the operating mechanism is detachably mounted in the container; and the provision for carrying a number of record disks in the phonograph casing.

These and other features which constitute my present invention are hereinafter more fully described and claimed, the same being illustrated in their preferred embodiment in the accompanying drawings, in which:—

Figure 1 is a top plan view of the phonograph mechanism with the end and top doors open and the amplifying horn extended and the sound box in its extreme inner position with its recording needle or stylus near the center of the turn table. Fig. 2 is a longitudinal cross-sectional view along the line A—A of Fig. 1, with the end door closed and the horn collapsed. Fig. 3 is a front elevation of Fig. 1. Fig. 4 is a detail view of the mechanism for stopping the record platform. Fig. 5 is a detail view of the mechanism for regulating and stopping the motor. Fig. 6 is a detail view taken on the line B—B of Fig. 1, showing the sound box in starting position.

Similar reference numerals refer to similar parts throughout the drawings.

My preferred form of casing is a light metal box 1 having a rounded end 2 and a top, vertically-opening door 3, which extends preferably across the entire width of the top and is hinged at 4. The other rounded end 5 of the casing forms a door which is hinged to the casing at one side by a hinge 6. The box is adapted to have inserted through its end door a metal frame in which the motor and the control mechanism are mounted. This frame comprises a top plate 7, the inner end of which is flanged at 8 and connected by screws 9 to the inner wall of end 2 of the box. The outer end of the plate extends beyond the opening for door 3 and is bent upwardly and flanged at 10 where it is fastened by screws to the top of the box. The bottom plate 11 of the frame likewise fits snugly in the box and has a vertical transverse end wall 12 which is flanged at its top and fastened to the underside of plate 7. Near its other end this plate has a socket 13 provided therein which is adapted to fit over a corresponding countersunk socket 14 formed in the bottom of the box and intended to receive the hinged finger piece 15 by which the motor is wound. The bottom plate at each side of its left hand end (Fig. 1) is rigidly braced to the top plate by rivet pins 16. The general motor and control mechanism is mounted between the plates 7 and 11 and though the same does not form a part of my present invention, it may be briefly and formally described as comprising a main spring 17 seated in a ratchet casing 18 which has a central depending boss 19. This boss is adapted to fit down through central alining openings in the sockets 13 and 14 and has a threaded end on which a sleeve 20 is screwed, the winding finger piece 15 being pivoted to it. The spring driven arbor 21 has its bearings in the top plate 7 and boss 19 and at its upper end has rigid thereon a gear wheel 22 which drives a gear 23 fast on an arbor 24 which has bearings in the plates 7 and 11. A second gear 25 on the latter arbor meshes with a gear wheel 26 which has a socketed boss

27, the lower end of which is turned to fit as a bearing in plate 11. A shaft 28 has its lower end rounded and seated to turn in the socket in gear 26, and its middle portion is squared to receive a sliding clutch member 29. The gear 26 and member 29 have teeth 30 (Fig. 4) adapted to interlock and cause shaft 28 to turn with gear 26. The shaft is provided with a collar 31 which engages the bottom edge of an annular flange surrounding a central opening in the plate 6 through which the top of the shaft projects and has a top threaded socket.

A turn table 32 is seated on the top of the arbor 28 and is held in position thereon by a screw 33 which passes down through the central opening in the turn table and is screwed into the top of the shaft. This central screw is provided with a square head which projects above the turn table but its head may be rounded if desired. The turn table leaves but a slight clearance between it and the sides of the box. The compartment in which the platform turns is divided off from the ends of the box by the upturned end of the plate 7 on one side and by a vertical partition 34 on the other, which partition extends transversely across the casing and has its bottom flange screwed to the plate 7. This partition extends up to the level of the door 3 and forms between it and the end 2 of the box a compartment which is accessible when the door 3 is open and which is adapted to receive the needles and small detachable parts of the apparatus.

All of the operating mechanism, thus fully described, is adapted to be readily inserted in the open end of the box and to be easily detached and withdrawn therefrom when repairs are required.

The sound reproducing and recording means are especially designed and arranged for being located within the small space which is provided therefor in the box. This mechanism comprises a sound box 35 of any standard construction having the customary arrangement of diaphragm and receiver for the recording stylus or reproducing needle 35^a which is disposed at the edge of the diaphragm shown at its inner position near the center of the turn table in Fig. 1. This sound box is disposed in horizontal position above the turn table as by this arrangement it requires about one-half of the vertical space which would be required for it if it were disposed in the customary vertical manner.

In order to enable the sound box to be turned up for changing needles, I connect to it at its center a tubular elbow 36, the inner end of which elbow extends radially and horizontally over the sound box nearly to its outer edge and is then bent horizontally at right angles and reduced to form a sleeve which will fit snugly in a socket therefor formed in the pivoted swinging tone arm 37. The long axis of the tone arm and elbow will pass over the sound box at a distance from its edge, diametrically opposite the needle point, which is slightly greater than the distance the under face of the sound box is spaced from the record. This arrangement permits the sound box when turned about the said long axis, to clear the record, and but for this arrangement it would be necessary to space the sound box from the record the distance of a radius of the box. This tone arm 37 has a downturned end which partly projects through the vertical extension of the plate 7 at the transverse center of the box and fits in a tubular elbow 38 which is set into a recess cut away therefor in the top plate 7 and in its vertical end wall, the elbow having a flange 39 which is bolted to the plate 7 and holds the elbow firmly in position. The tone arm 37 makes a joint with the elbow 38 which permits it to turn freely therein about a vertical axis and to permit the sound box to swing to the position shown in Fig. 1 with its needle near the center of the turn table after traversing the grooved surface of the records. The outer end of the elbow 38 terminates in an upwardly inclined flaring extension 40 which is preferably formed oblong in cross section with its greatest width in the transverse plane of the box. This extension 40 forms the inner or base member of an extension horn comprising a series of telescoping members 41 which gradually enlarge, as will be seen by reference to Figs. 1 and 2, and which are also oblong so as to provide the maximum size horn which can be fitted into the available oblong space in the open end of the box. It will be noted that the inclined position of the extension 40 causes the horn to project upwardly in convenient position when the phonograph rests on a table or is carried in the hand, for delivering the magnified sound from the sound box and also in the most convenient position to receive the voice when the instrument is used to reproduce sounds. It will be noted that the manner in which the sections 36 and 37 of the tone arm are joined permits the section 36 to be swung on a horizontal axis and to turn the sound box to present the needle or stylus in position for removal or inspection.

It will be evident from the shape and size of the box in the form illustrated that it has been designed and intended to be carried in the pocket, though obviously the general principles of construction are applicable to the larger types of apparatus.

In the pocket type it is particularly desirable to arrange the phonograph to carry a number of record disks and to this end I have arranged space for such records in the horn chamber formed between the vertical

wall 12 of the bottom plate 11 and the end door 5 of the box. As seen in Figs. 2 and 3, these record disks 42 are located below the horn members in their collapsed position and are adapted to be engaged at their outer ends by a curved holder 43 which is flanged at 44 and bolted near the lower edge of the door 5 at its center. The oblong shape of the horn lends itself especially to making provision for this storage space for the record disks.

In the pocket phonograph it is also especially desirable that the control means be so positioned that the box can be held in the hand of the operator and the several levers controlled by the fingers of the hand that holds the box. To this end control devices are provided on both sides of the box near the center. One control arrangement is that intended to temporarily disconnect the record supporting turn table without stopping the motor drive, the object being to permit the record to be cut in again at full speed, which is particularly desirable in dictation work. To this end I provide a push button 45 which projects through one side of the box and has a shank 46 which is connected to one arm of a bell crank lever 47, the other arm of which is provided with a yoke 48 having pins 49 which work in a groove 50 in the upper clutch member 29. A bracket bearing 51 for the bell crank is bolted to the underside of the plate 7 and a spring 52 is likewise connected to that plate and engages the bell crank near its yoke 48, tending to urge the clutch member 29 to interlock with the lower clutch element and also to hold the button 45 in its outer position. In other words the turn table is normally held in driving connection with the motor driven gear wheel 26. On the opposite side of the box is provided a pivoted button or arm 53, the upper end of which projects up through and above the plate 7 and is pivoted near its lower end in a depending plate 54, the upper end of which is rigidly attached to the plate 7 and the lower end of which has pivotally connected to it a horizontal lever 55. This lever has an upturned rounded end 56 which is adapted to be engaged and rocked by the inner end of the button 53 when pushed to the right from its position in Fig. 5. At its other end the lever 55 is bifurcated at 57 and between the bifurcations is adapted to receive an end of lever 58, which is provided with a button 59. When raised this button is adapted to frictionally engage a disk 60 mounted on the governor shaft 61 which is driven by a gear 62 that meshes with the gear 26. The lever 58 is pivoted to a bracket 63 and its end beyond the pivot is adapted to be engaged by a set screw 64 having a mill head 65 which is screwed down through the top plate 7 and is adapted to control the frictional engagement between parts 59 and 60 to regulate the speed of the apparatus. When the button 53 is thrown to the right, the lever 55 is rocked thereby to cause the lever 58 to immediately stop the operation of the motor. I provide the extension 40 with a nipple 66 which is designed to receive the inner end of a tube 67 which carries the ear pieces 68. Provision is thus made for either form of sound amplifying or condensing means.

Any suitable catch means such as the spring catch 69 is carried by the box and adapted to hold the door 5 in its closed position. A pivoted spring clip 70 serves to hold the door 3 in its closed position.

In operation, after the operating mechanism has been inserted into and fastened in box 1, the door 3 is raised and a record is placed on the turn table 32 with its center opening fitting over the head 33. The tone arm is adjusted from its inner position shown in Fig. 1 where its needle or stylus 35^a is near the center of the record to its starting position with its needle or stylus located at the outer edge of the record, as seen in Fig. 6. The end door 5 is then opened and the horn adjusted to its extended position, the button 53 is pressed to release the motor and the reproducing or recording operation takes place. New needles are inserted by swinging the tone arm 36 on its horizontal axis to bring the sound box 35 up into position where the needle or stylus can be inspected and removed.

The shape and arrangement of the tone arm and its elbow 38 are such that the whole phonographic apparatus can be condensed into a very small space without at all interfering with its normal and satisfactory operation.

The peculiar construction of the amplifying horn is best adapted for either receiving or giving out the sounds when the apparatus is lying flat on any suitable support.

The construction permitting the sound box to operate in a horizontal position with the needle at its edge is important in that it materially reduces the vertical height of the case and permits the casing to be made just wide enough to receive the turn table 32. The record disks before and after use can be conveniently stored in the box 1, which thus affords a very complete and compact phonographic equipment which can be produced in pocket size and conveniently transported.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a phonograph apparatus, an oblong casing having top and end doors, a motor driven sound reproducing apparatus disposed in one end thereof under said top door, a sound conductor leading from said apparatus toward the other end of the casing, a collapsible sound amplifying means

normally disposed within the other end of the casing between said conductor, to which its innermost member is attached, and said end door, said means being adapted, when expanded, to project through the end opening of said casing, as and for the purposes described.

2. In a phonograph, in combination, an oblong pocket size casing divided transversely by a vertical partition into two compartments, one having a top door and the other an end door, a motor driven sound reproducing apparatus in the first mentioned compartment, a tone arm leading therefrom into said other compartment, and a collapsible horn mounted on said tone arm in position to be housed in said other compartment when collapsed and when expanded to project through the open end door thereof, substantially as described.

3. In a phonographic apparatus, an oblong pocket size casing having at one end a sound reproducing mechanism including a tone arm and sound box, a transverse intermediate partition, a sound amplifying means in the other end of the casing, said means comprising a tubular elbow which is mounted in and projects through said partition, having its inner end connected to the tone arm of said mechanism and having a flaring oblong vertically inclined outer end which projects substantially to the end of the casing, a door to close said end of the casing, and a series of collapsible oblong members which fit over said flaring end of the elbow and when expanded form therewith a vertically inclined horn which projects through and beyond the casing.

4. A phonograph comprising, in combination, sound reproducing and recording mechanism, a casing therefor having an end door, an end chamber which is closed by said door, and a collapsible sound magnifying horn having its innermost member connected to said mechanism and disposed in said chamber, which completely houses said horn when collapsed on said member, said horn being adapted to be drawn out through said open end door and into expanded position.

5. In a portable phonograph, a casing having top and end openings, door means to close said openings, and a sound reproducing machine which is removably mounted in said casing under said top opening and makes a close fit therein except at the casing's open end where space is left to provide a horn and disk record receiving chamber which is accessible through the open end of the casing, and a collapsible horn permanently attached to said machine and disposed in the upper part of said chamber in position to be expanded beyond and collapsed behind the door that closes said end opening, substantially as described.

6. In a portable phonograph, an oblong casing having substantially the width of the phonograph and having an end door, a phonograph mechanism comprising a motor driven turn table, sound reproducing means and sound amplifying means all mounted in a frame, said casing having an opening over said turn table, said frame having a transverse wall which forms a vertical partition in the casing and separates the sound amplifying means from the reproducing mechanism, said wall having its lower part bent in under the turn table to receive disks to be held in place by said end door when closed, and said amplifying means being connected to and wholly supported by the frame above the disk receiving space, substantially as described.

7. In combination, a rectangular oblong casing open at one end, a metallic frame having mounted therein a complete phonograph mechanism, said frame being insertible through said open end of the casing, means to secure the frame in the casing, and a door for said end opening, said mechanism having attached thereto a collapsible horn which is disposed opposite said opening and above the bottom of the casing to provide a space to receive flat record disks to lie horizontally on the casing bottom, said door having a projection which both engages said disks and supports the loose collapsed horn sections above the disks.

8. In a phonograph of the character described, a horizontally disposed sound box, a tubular elbow connected substantially centrally to the sound box and extending radially thereof and horizontally approximately to its periphery and then being bent in a horizontal plane substantially at right angles, and a horizontally swinging tone arm on the free end of which said elbow is pivotally mounted and adapted to turn to move its angled end in a vertical plane and raise the sound box thereon bodily, said box carrying its recording or reproducing stylus at its side away from said elbow.

9. In a portable pocket sized phonograph, a flat oblong casing having a top door, a motor driven platform exposed below and adjacent to said door, a tone arm adapted to swing horizontally over the platform, an angled tubular extension swiveled in the outer end of the tone arm, a horizontally disposed sound box connected to the end of said extension and disposed relatively to the tone arm so that a vertical axial plane through said arm, when projected, will pass through and to one side of the center of said box, and a reproducing stylus connected to the sound box on the side opposite the tone arm, the distance between the projected center line of the tone arm and the adjacent edge of the sound box being less than the distance between such center line and the platform, substantially as described.

10. In combination, a casing having a socket formed by indenting a portion thereof, there being an opening in said socket, a frame carrying a phonograph mechanism which is insertible into said casing and has a seat which interlocks with said socket portion, a winding stem in said mechanism adapted to project through said opening in the socket, a key to turn said stem, and detachable means to hold the said frame and casing interlocked.

In testimony whereof I affix my signature in presence of two witnesses.

MZL FULLER.

Witnesses:
NOMIE WELSH,
W. C. PRICKETT.