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A.D. 1888, 5th JULY. N° 9762.  
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PROVISIONAL SPECIFICATION.

Improvements in Apparatus for the Automatic Reproduction of Sounds from Records.

CHARLES ADAMS RANDALL No. 15 Montpelier Square, Hyde Park W. Brompton London Electrical Engineer, do hereby declare the nature of this invention to be as follows :—

5 Firstly : The production of an Automatic sound reproducing apparatus, that, from a Phonautographic or Phonographic record of sound vibrations, shall in its operation, reproduce vibrations of the air corresponding to the recorded vibrations, undulations, or intermittencies, whether they represent the air vibrations, undulations or intermittencies of human speech or of music, vocal or instrumental, or other sounds or noises, of whatever name or nature, which apparatus, I term an Automatic
10 Pariophone.

Secondly. In constructing and arranging a sound reproducing apparatus—preferably, with interchangeable phonautographic or phonographic record cylinders, plates, disks or bands, provided with fixed or prearranged sound-vibrations thereon, representing short, amusing, instructive, entertaining recitations, ejaculations, inter-
15 rogations, vocal and instrumental music and other sounds,—for the purpose of automatically reproducing the same, to afford entertainment, amusement, and instruction, upon the prepayment of a fixed amount.

Thirdly. In arranging such, or similar sound-producing apparatus in a metal or other suitable case that will protect the operative parts from exposure or misuse
20 when placed out of doors, or in public places for the purposes of public amusement, entertainment and instruction upon the prepayment of the fixed amount ; and, generally, in certain means, devices and improvements for carrying out the invention in a practical, useful manner.

To this end the invention consists generally :

25 A.—In constructing and arranging an Automatic Pariophone, or sound producing apparatus, with a phonautographic record,—preferably, a permanent, durable record, that can be repeatedly used without impairment,—upon a Cylinder, disk, plate, band

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or other record-carrier, and arranging in proximity thereto, a tympanum or other vibrator, carrying or connected to, directly or indirectly, a tracer or traveller bearing properly upon the record-carrier and following in and upon the path, elevations and depressions, or indentations of the phonautographic or phonographic record, in such manner, that as the record-carrier is moved the action of the tracer or traveller over and upon the record, causes a movement, vibration, pulsation or undulation of the tympanum or other vibrator, in such manner, that the surrounding air shall be set into similar vibration, pulsation or undulation, and cause the production of sounds, represented by the phonautographic or phonographic record upon the record-carrier, and, in constructing such or similar sound reproducing apparatus to be operated automatically by a suitable, electric, mechanical, or other motor, such apparatus to be released and set in operation automatically by the depositing of a proper coin or coins into a receptacle provided for such coin or coins. 5 10

B.—In constructing and arranging such or similar apparatus for reproducing sounds, in such manner, that a predetermined arrangement of sound vibrations shall be reproduced upon the automatic starting and operating of the apparatus, and the record-carrier be returned automatically to normal position and there locked or held, until again automatically released by the deposit of the proper coin. 15

C.—In constructing automatically operated sound producing apparatuses, in such manner that the record-carriers are interchangeable from one instrument to another and readily and conveniently removed and replaced. 20

D.—In constructing a sound reproducing apparatus with a non-metallic tympanum or diaphragm, and preferably of wood, to prevent harsh metallic sounds, and in using in connection with the diaphragm or other vibrator, a tracing-roller or traveller that follows the path of the phonautographic record, said roller being preferably non-metallic and slightly yielding, the object of using a roller being to prevent or reduce the friction of the tracer or traveller upon the record-carrier, and to prevent any harsh, rubbing, scratching contact sounds at the reproducing diaphragm, such as are caused by the rubbing of a fixed style or pointer over or upon the record-plate as heretofore practiced in transmitting "Phonograms." 25 30

Dated this 5th day of July 1888.

CHARLES ADAMS RANDALL.

COMPLETE SPECIFICATION

Improvements in Apparatus for the Automatic Reproduction of Sounds from Records.

CHARLES ADAMS-RANDALL No. 16 Trevor Square Brompton, London, Electrical Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

- 5 This Invention consists generally :—
- First. In the production of an automatic sound reproducing apparatus—which I technically term a Pariophone—that, from a Phonautographic or Phonographic record of sound vibrations, shall in its operation, reproduce air vibrations corresponding to the recorded vibrations, pulsations, undulations or intermittencies of human speech, 10 or of vocal or instrumental music or other sounds or noises of whatever name or nature.
- Second. In constructing and arranging an Automatic sound reproducing Apparatus having Cylinders, plates, disks or other record-carriers, provided with a Phonautographic or Phonographic record of fixed or pre-arranged sound vibrations 15 representing amusing, entertaining or instructive recitations, sentences, ejaculations, vocal or instrumental music or other sounds, such apparatus being Automatically set in motion, and operated, upon the prepayment of a fixed amount.
- Third. In constructing and arranging such or similar apparatus within a metal or other suitable Case, that will protect same from exposure or misuse, when placed in 20 public places—(out of, or in doors) for the purposes of public use for entertainment, amusement or instruction upon the pre-payment of a fixed amount—and
- Fourth. In certain means & devices new and novel, for carrying out the invention in a practical and useful manner.
- To this end the invention consists more particularly.
- 25 (A) In constructing an Automatic sound producing apparatus, having a durable prearranged Phonautographic or Phonographic record, that can be used repeatedly without impairment, arranged upon a Cylinder, disk, plate, band or other record-carrier and arranged to be started automatically and to actuate a traveller or travelling arm, bearing properly upon such record-carrier & record, and following in and upon 30 the path, elevations and depressions of the record in such manner that as the record-carrier is moved it causes a movement-vibration, pulsation or undulation of the traveller, corresponding to the record, which movement I utilize to vibrate a tympanum directly, or for making and breaking or varying a current passing over or caused to pass over an Electro Magnet, arranged to actuate a tympanum, or diaphragm or 35 other vibrator whereby the recorded sound vibrations are reproduced ; and I preferably employ the Electro-mechanical method, substantially as shown in the drawings, to the purely mechanical method, as with a proper record, a greater energy may be given to the vibrations of the vibrator and louder and more natural tone obtained.

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(B) In constructing such or similar sound reproducing apparatus, in combination with a suitable Electric, Mechanical or other Motor, and means for automatically starting such apparatus by the depositing of a proper coin or coins into the apparatus, or a receptacle provided thereon, or thereto for such coin.

(C) In constructing and arranging such or similar apparatus, for automatically reproducing sounds, in such manner that a predetermined arrangement of sound vibrations shall be reproduced. 5

(D) In constructing and arranging such or similar automatic sound reproducing apparatus, in such manner that a predetermined arrangement of sound vibrations shall be reproduced, and the record carrier, or traveller or both returned automatically to normal position and there locked, or held, until again automatically released by depositing the proper coin. 10

(E) In means for automatically releasing, and starting the apparatus.

(F) In means for automatically locking the apparatus in normal position.

(G) In means for automatically closing the coin aperture of the apparatus, when once started, and means for indicating the closing and opening of the same. 15

(H) In means for automatically closing the electric circuit of the reproducing Electro-magnet, and for automatically breaking such circuit when the parts assume their normal position.

(I) In means for obtaining automatically the longitudinal to and fro movement of the traveller across the record-carrier; all of which will be more fully understood by reference to the accompanying drawings forming a part of this Specification. 20

IN THE DRAWINGS.

- Fig. 1. shows side view of internal parts of Box.
 „ 2. top view of electro-magnet and support, & diaphragm, and ring holding same. 25
 „ 3. top-plan view of cylindrical record-carrier &c.
 „ 4. front view of internal mechanisms of Box, showing section of front of Box & coin aperture &c.
 „ 5. shows closing slide. 30
 „ 6. returning weight & cord & support.

Like figures indicate same parts in drawings.

In the drawings the numeral 1. indicates the sides of the containing box, to the bottom of which, is secured the base plate 2, having uprights 3—3¹—4—4¹, carrying the shafts 5—6—7. The support 8, carrying the electro-magnet 9, 9¹ and the rings 10—11, that clamp & hold the diaphragm 12. The roller-bracket 13, supporting the cord 14 and weight 15, is also secured to the box. A cylindrical record-carrier, 16, is arranged upon the shaft, 5, together with a pulley or drive-wheel 17, & gear-wheel 18, all of which rotate together. 35

The record-carrier is provided with a stop-pin, 19. Upon the shaft 6, a feed screw 20, is fitted, which serves to give a longitudinal movement in one direction of the traveller-carrier 21 mounted upon the shaft or cross-bar 7, by means of the screw 22, bearing in and upon the thread of the feed-screw 20, where it is held normally by gravity or spring pressure.

A cord 14, carrying the weight 15, is attached at one end to the carrier 21, the supports for the cord being shown at 13, and 23, the support 13 being secured to the box 1, and 23 to the upright 4¹. A soft rubber cushion, or buffer 24, is provided on the crossbar 7, for the carrier 21 to abut against as it is returned to normal position by the weight 15. 45

To the carrier 21, is swivelled at 25, an arm 26, an insulated piece 27, carrying a flat spring 28, is also secured to the carrier 21, as well as a right angled projecting arm 29. The arm 26, carries at one end a traveller or tracer 30, that bears in and upon the record upon the record-carrier 16. Upon the opposite end of the arm 26, is secured a carbon button or other contact maker, 31 upon which impinges a second 50

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electrode 32 carried upon the spring-piece 28, the electrodes being so arranged, that by the movement of the arm 26, the current passing over the electrodes, is made & broken or varied, during the operation of the apparatus.

The arm 26, also carries a projecting piece 33, which serves to dislodge the coin—34, and deposit it into the box, upon the return of the carrier 21.

An arm or bar 35, is swivelled upon the stud 36, and held in normal position by a light spring 37, one end of which is secured to the crossbar 35, and the other to a hook 38, in the stud 36, the arm 29, passing upon the inner side of the bar 35, as the carrier 21, is moved in one direction, and upon the outside of the bar 35 as the carrier 21 is returned to normal position.

The shaft 6, carries a cam piece 39, which revolves with the feed screw 20, & which is arranged to lift the screw 22 out of the feed screw 20, and the record-traveller 30, out of the record 15^a, at a given time, when the carrier 21, is returned to place, the arm 29 passing outside of the cross-bar 35, the arm 33, contacting with the Coin 34 and depositing it. The revolution of the feed-screw 20 is obtained by the gear wheel 4^c, meshing into the gear wheel 18, and turning with it, the gear wheels 18 & 40, and the pitch of the feed screw 20, being made so that the longitudinal movement of the carrier 21, will be in exact relation to the spirally formed record, 15^a upon the record carrier 16. As shewn, the gear wheels have the same number of teeth, and make a revolution in the same time, while the pitch of the feed screw, is the same as the spiral of the record, so that the traveller changes longitudinally in unison with the record.

A lever 41 is fulcrumed to the frame, and carries an adjustable weight 42, by means of which it is properly balanced, a stop pin 43, is secured at one end, that normally contacts with the stop pin 19, on the carrier 16. A contact point 44 is also provided, that is normally out of contact with the contact point 45, upon the contact spring 46, attached to the insulated piece 47, secured to the box 1. To the opposite end of the lever 41, is swivelled at 48, the closing slide 49, (Fig. 5) which carries the indicating words "Closed" & "Open," showing whether the machine is in operation or not, and which also serves to close the coin aperture, by the flap 49¹ coming in front of the coin aperture when the machine is in operation. The coin aperture or slit is best seen in Figs. 1 & 4, where 50 represents a projection cast upon or secured to the outside of the box, provided with a coin slit 51 (Fig. 1.) which slit passes down through a guide 52, upon the inside of the box—the slit being shown by dotted lines—the bottom of the piece 52, being cut out at 52¹—shewn by cross-section, to permit coin or other pieces of improper size or weight to pass into the box without starting the apparatus, while the proper coin will pass to position, shown at 34, and depress the lever 41 disconnecting the stops 43 & 19, releasing and starting the apparatus & simultaneous closing the electric circuit at 44—45, and closing the coin aperture by means of the closing slide 49, 49¹.

The electro-magnetic vibrator consists as shewn, of an electro magnet 9, 9¹ having a metallic vibrator 12, secured to one leg of the magnet as at 54, the centre of the vibrator or diaphragm carrying an adjustable point 54¹ immediately over the other leg of the magnet, but it will be understood that there are many forms of construction, the important feature of this construction being the adjustable point secured to or upon the vibrator.

Any convenient form of sound conveyor can be used with the vibrator, a funnel shaped trumpet 55 being shown herewith.

It will be observed that the vibrating arm 26, is fulcrumed and arranged so that it will move to and fro in a plane parallel to the surface of the record-carrier, the object being to adapt this apparatus especially to the use of a Phonautographic record made in & upon the record surface, substantially in the manner of the well known Phonautograph of Leon Scott, that is, by forming the record in the side or sides of a groove or cut of uniform depth,—which method offers the least and a uniform resistance to the making of the record of sound vibrations, and consequently produces a more correct record, the record being formed preferably directly in a solid resisting material.

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I do not however limit myself to the use of any special record, as records of the Phonograph or Graphophone type can be used by simply changing the position of the arm 26.

It will be understood that any suitable motor may be used, and be connected to the apparatus by a belt from the pulley 17. 5

The electric-circuit is from the battery 56, wire 57 to spring 28, contact points, 31—32, to frame & lever 41, contact points 44—45, contact-spring 46, wire 58 electro-magnet 9—9¹, wire 59, back to battery.

The operation of the apparatus is substantially as follows; the battery being connected and the Motor attached ready for use, and all parts being in normal position 10 the depositing of the proper coin, say a "penny" into the coin-slit 51, it is passed to the position at 34, tilting the lever 41, to position shown by dotted lines, carrying the closing slide 49 & closing the slit 5¹, & exposing the word "closed," and simultaneous closing the electric circuit at 44—45 and disengaging the stop-pins 43 & 19, releasing and starting the apparatus, the Cylinder 16 & feed screw 20 revolving 15 in unison, the feed screw 20 carrying the carrier 21, to the left, the arm 29 passing inside of the cross-bar 35, gradually moving it to the position shown by dotted lines, Fig. 3. until it is passed, when the spring 37, returns it, 35, to normal position, the carrier 21 being carried until the screw 22 passes up the cam, 39 (Fig. 3) when it is freed from the feed-screw 20, & returned to normal position, the arm 29 passing 20 outside of the cross-bar 35, the arm 33, contacting with 34, and depositing it just as 21 passes 35, the depositing of the coin releasing the balanced lever 41, when it returns to normal position, opens the slit, & displays the word "open," breaks the circuit at 44—45, & arrests the cylinder 16 by the pins 19—43 engaging. During 25 the movement of 21 to the left, the lever 26 is being vibrated by the record, on 16, through the traveller 30 working in & upon the same, such vibration of the lever 26 causing the making & breaking and varying of the contact pressure, at the electrodes 31—32, which action affects the magnetic condition of the electro-magnet 9—9¹ changing its attraction for and influence upon the diaphragm or vibrator 12, causing it to vibrate in such manner as to reproduce sounds, corresponding 30 to the recorded sound vibrations upon the record-carrier.

It will be readily understood, that different devices for stopping and releasing the apparatus, may be employed, & that the motor may be stopped directly instead of the cylinder and that the vibrations of the lever 26, may be imparted directly to a diaphragm or vibrator without the intervention of electrical means, and other changes 35 and modifications may be made without changing the spirit of the invention.

Having now particularly described and ascertained the nature of my Invention and in what manner the same is to be performed, I declare that what I claim is;—

1st. An Automatic, sound reproducing apparatus provided with a prearranged 40 record or records of sound vibrations, as & for the purpose set forth.

2nd. An Automatic, sound reproducing apparatus provided with a prearranged record or records of sound vibrations, in combination with a motor, & means for releasing & permitting the operation of the same by the deposit of the proper coin or coins, substantially as shewn. 45

3rd. An Automatic, sound reproducing and repeating apparatus, arranged to employ a phonautographic record, formed in or upon the side or sides of a groove or channel of uniform depth.

4th. A sound reproducing apparatus, arranged to employ a phonautographic record formed in or upon the side or sides of a groove or channel of uniform depth, cut, 50 engraved, or made in solid resisting material.

5th. An Automatic, sound reproducing apparatus, having in combination, a record carrier and record, a traveller or tracer moving in and upon the record, a circuit closer controlled by the movements of the traveller, an electro magnet and magnetic vibrator, a battery and circuit connections therefor, a motor for actuating the apparatus, means 55 for stopping, locking or holding the apparatus in normal position, with means for

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- releasing & starting the apparatus by the depositing of proper coin or coins, substantially as shown.
- 6th. In an Automatic sound reproducing apparatus means substantially as shown for automatically moving the traveller or tracer to & fro.
- 5 7th. In a sound reproducing apparatus, a worm or feed screw moving the traveller in one direction, means for automatically removing the traveller out of the record, & means for returning the same to normal position by a weight or spring.
- 8th. In an Automatic sound reproducing & repeating apparatus, electro-magnetic means for actuating the reproducing vibrator.
- 10 9th. In an automatically operated sound reproducing apparatus, a combined indicating and aperture closing device, substantially as shown.
- 10th. In an automatically operated sound reproducing apparatus, the combination of a reproducing vibrator or diaphragm 12, having an adjuster 54¹ secured thereto, and an electro-magnet for actuating the vibrator, substantially as shown.
- 15 11th. In an automatically operated sound reproducing apparatus, set in operation by the deposit of coin or coins, means for automatically depositing the coin or coins into a proper receptacle, together with means for arresting and setting the parts in normal position, substantially as shown.
- 20 12th. In an automatically operated sound reproducing apparatus, the combination of means for obtaining a movement in one direction of the record-traveller, by a worm or feed-screw mechanism, means for automatically disengaging the record-traveller from the record, and means for automatically returning the record-traveller to normal position.
- 25 13th. In an automatic sound reproducing apparatus, the combination of a record-traveller-carrier 21, and means for moving the same in one direction, the arm 29, thereon, the tilting cross-bar 35, means for disengaging the record-traveller from the record, and the weight 15, or equivalent device for automatically returning the record-traveller-carrier to normal position.
- 30 14th. An automatic sound reproducing apparatus constructed and arranged within a suitable safety or protecting box or casing, having a funnel shaped or similar orifice for the delivery of sound.

Dated this 30th day of March 1889.

CHARLES ADAMS-RANDALL.

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1889.

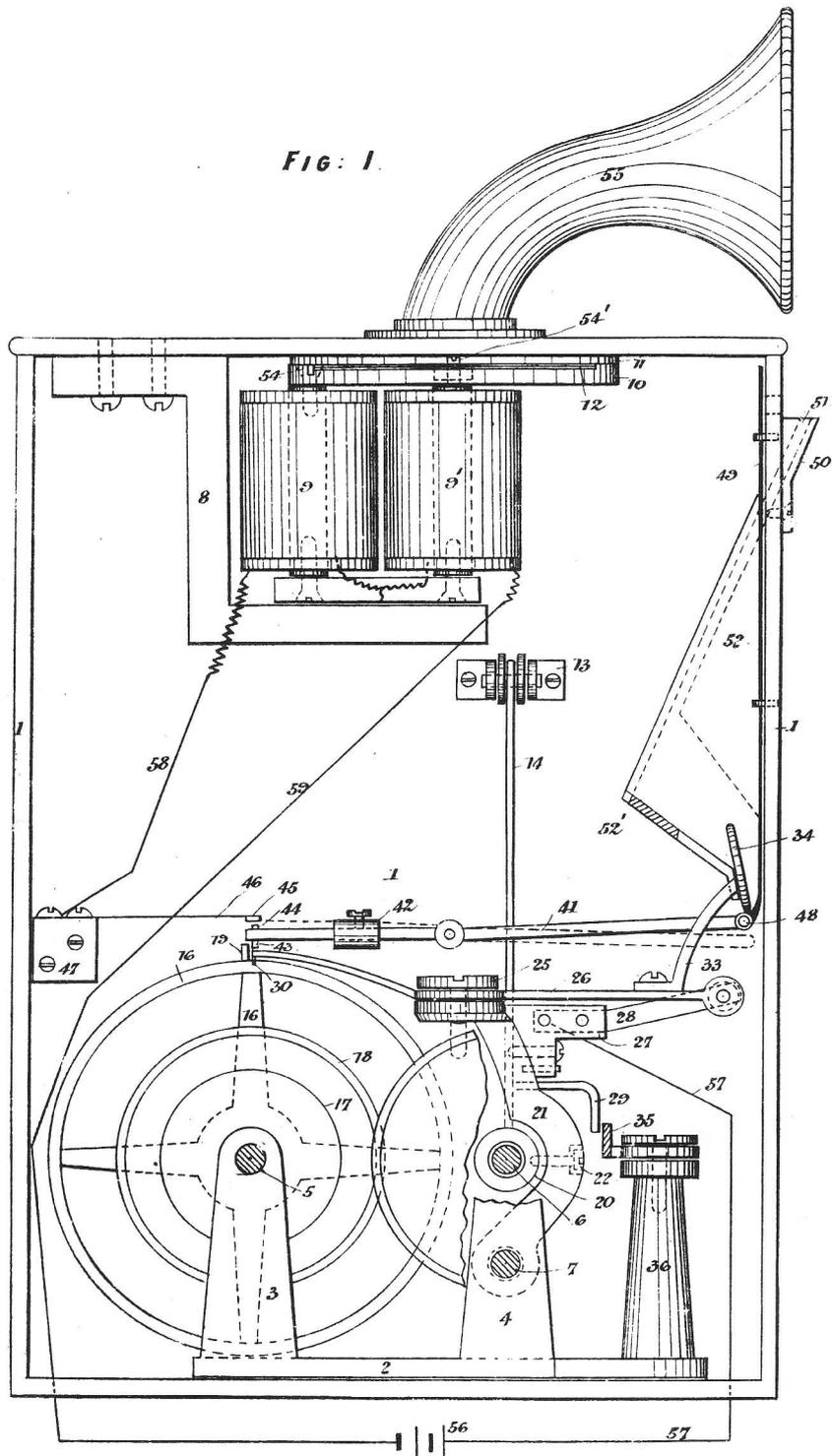


FIG. 1.

[This Drawing is a reproduction of the Original on a reduced scale]

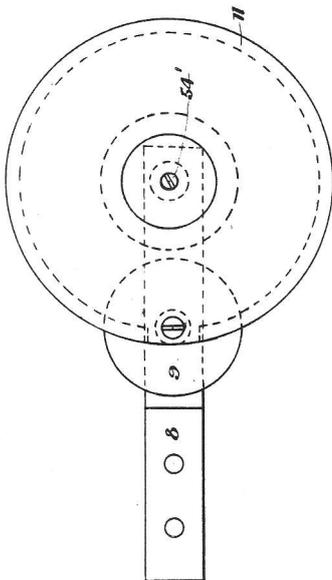


FIG: 2

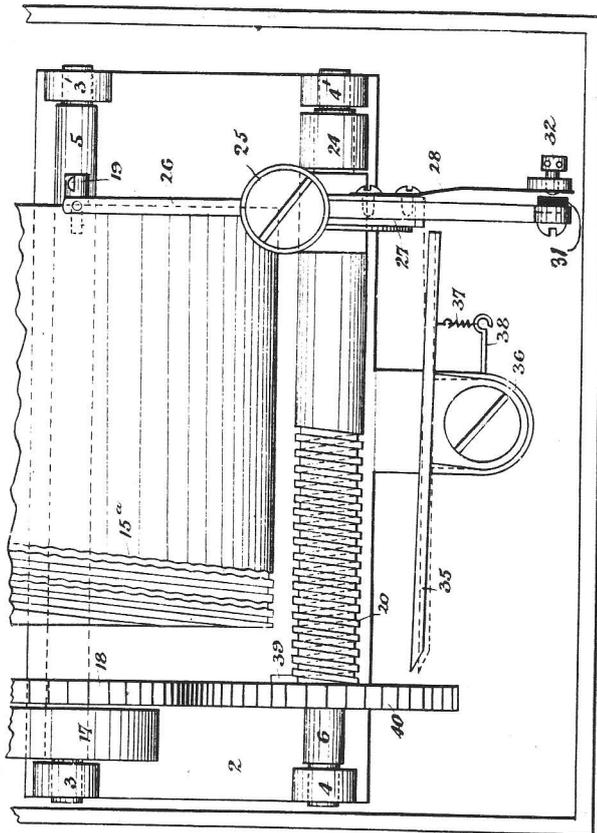


FIG: 3

FIG. 4.

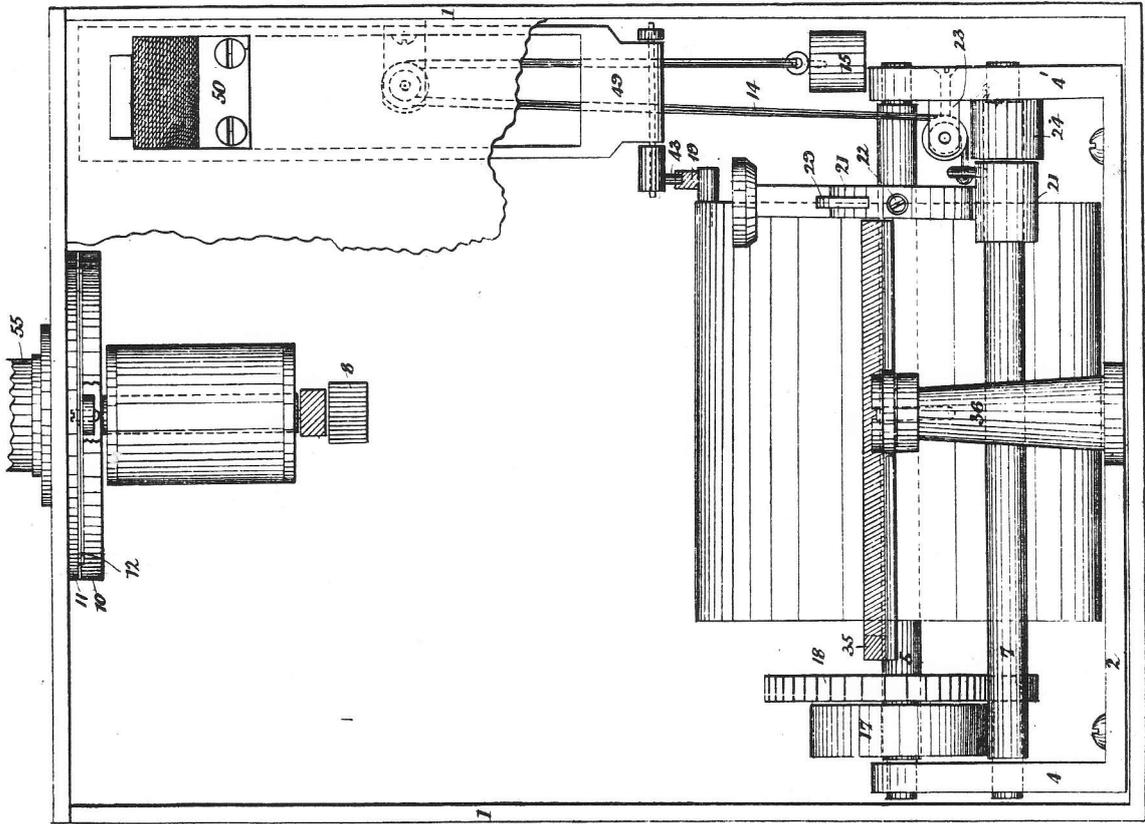


FIG. 5.

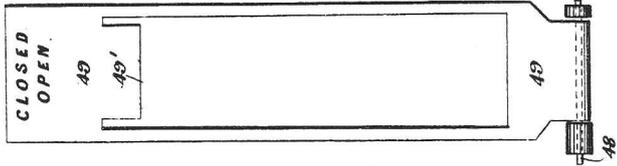


FIG. 6.

