F. SCHAEFER.

TELEGRAPHONE.

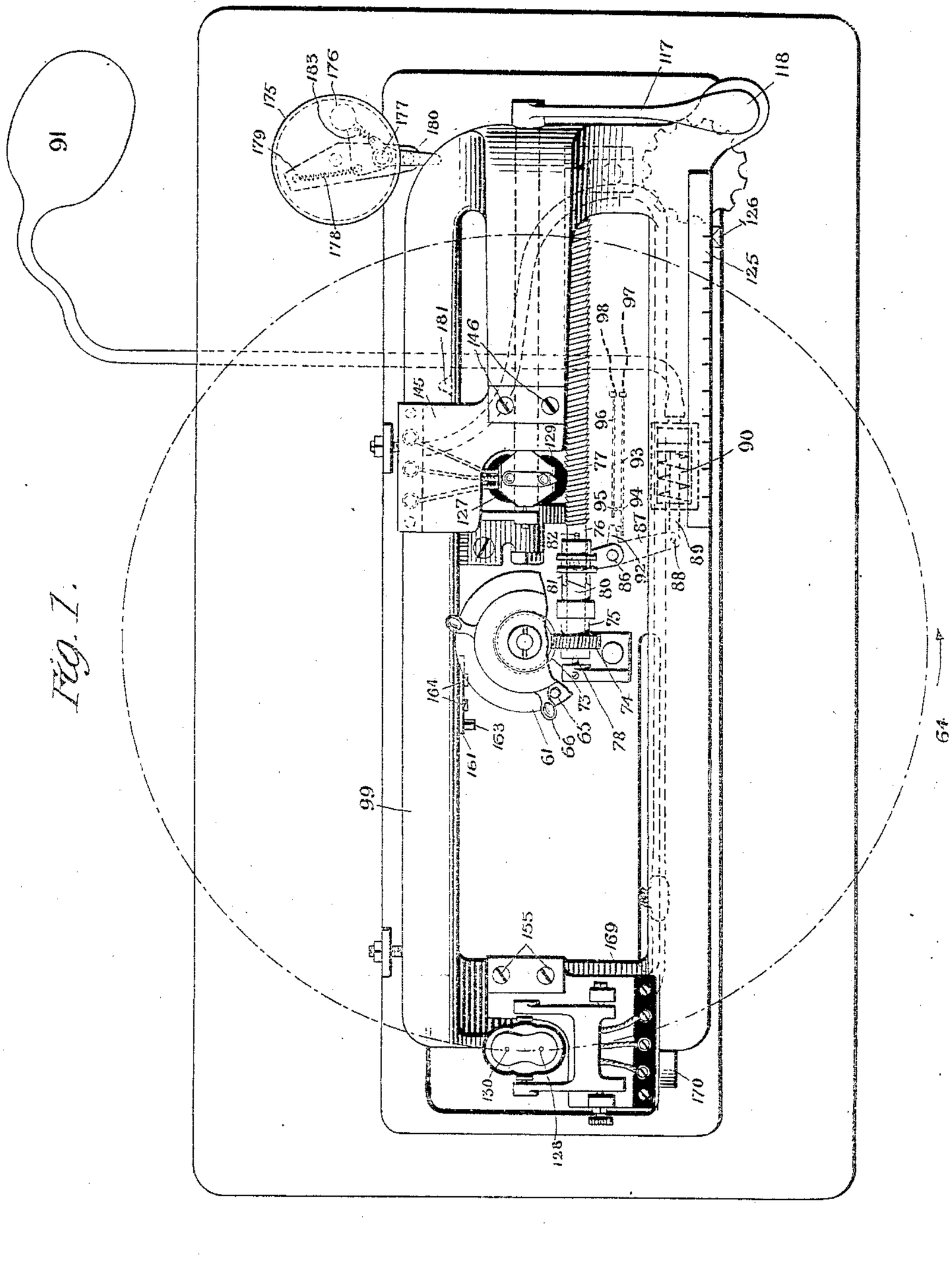
APPLICATION FILED APR. 8, 1908.

934,843.

Patented Sept. 21, 1909.

5 SHEETS—SHEET 1.

Fig. 1.



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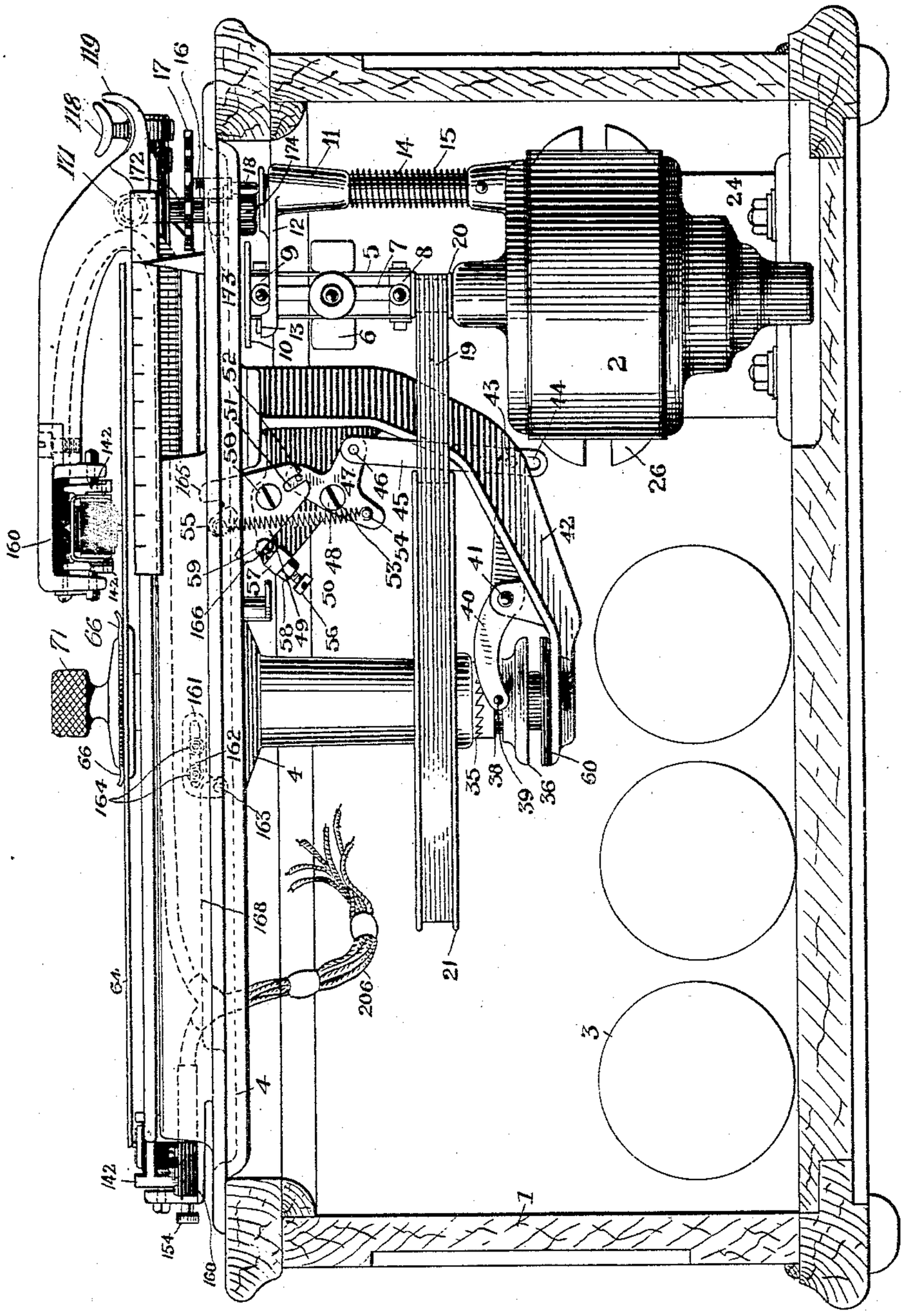
5 SHEETS—SHEET 2.

FIG. 2.



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5 SHEETS—SHEET 3.

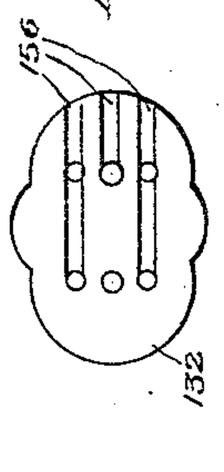

Fig. 14.

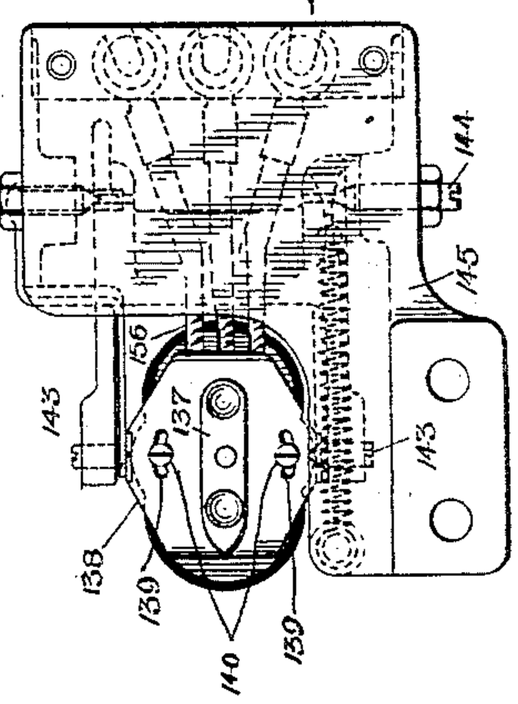

Fig. 11.

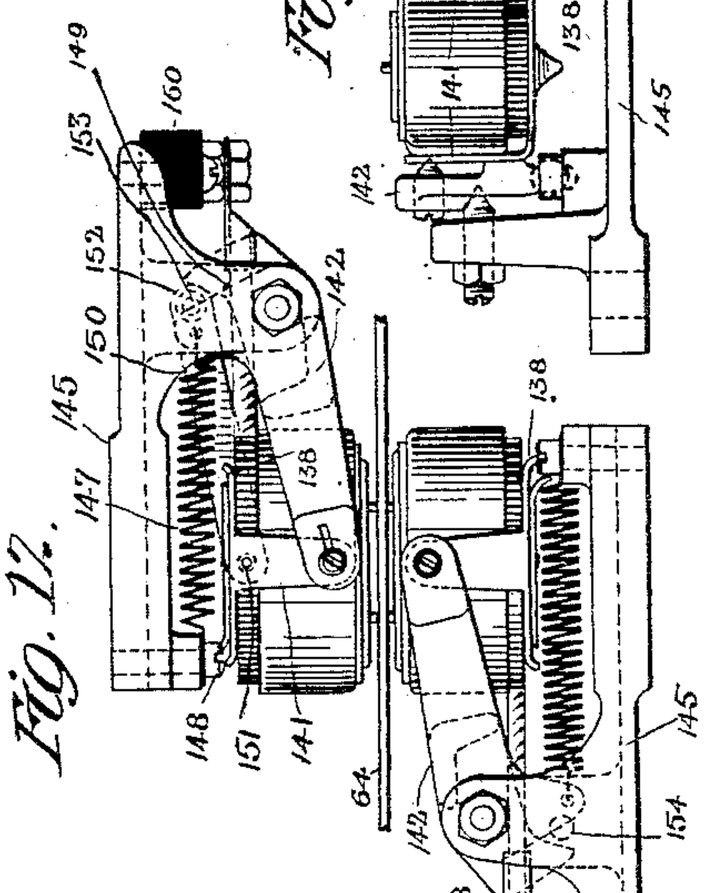

Fig. 12.

Fig. 13.

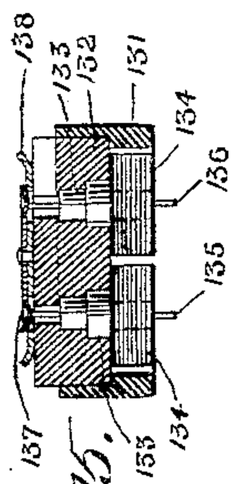

Fig. 15.

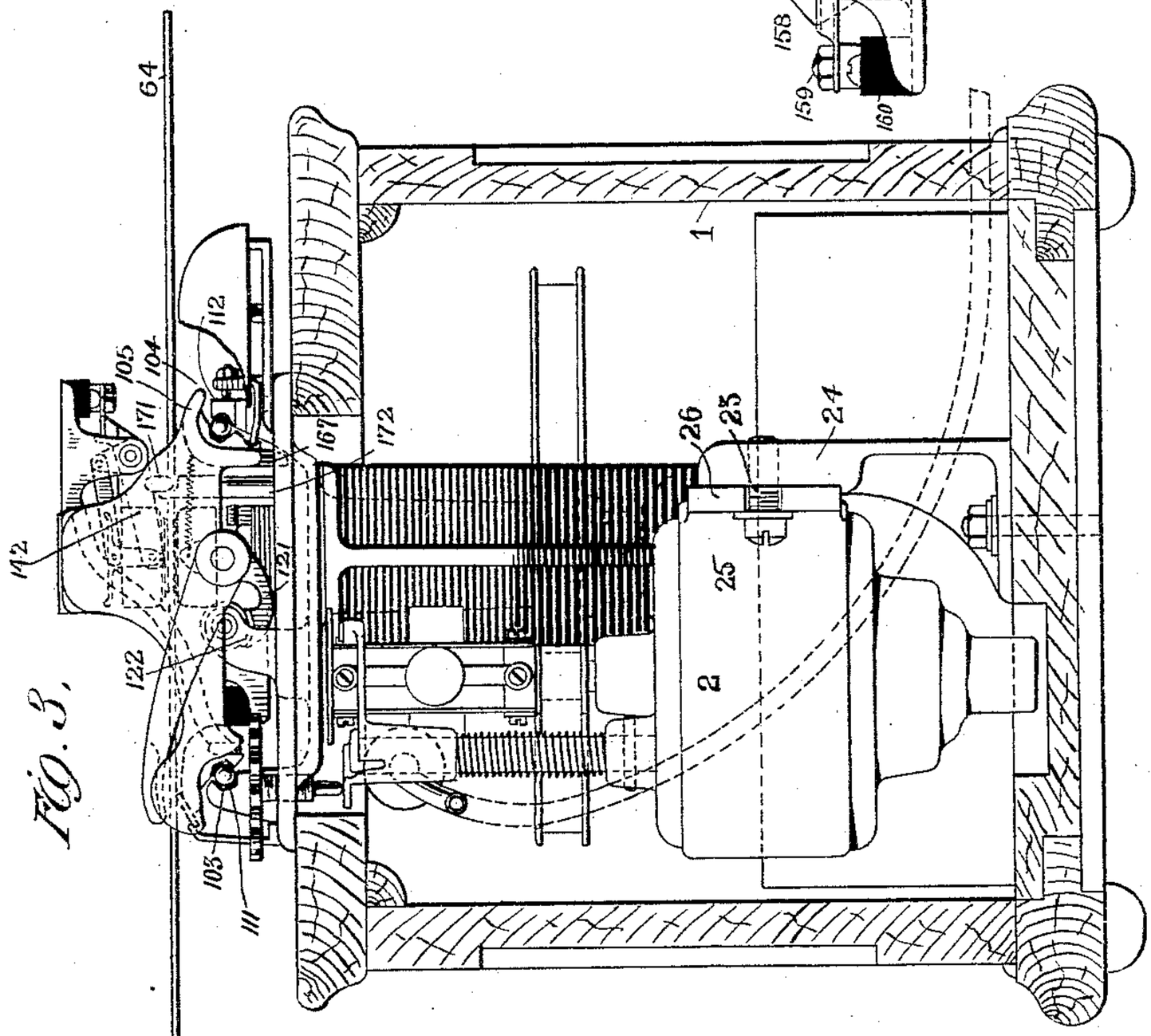

Fig. 3.

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5 SHEETS—SHEET 4.

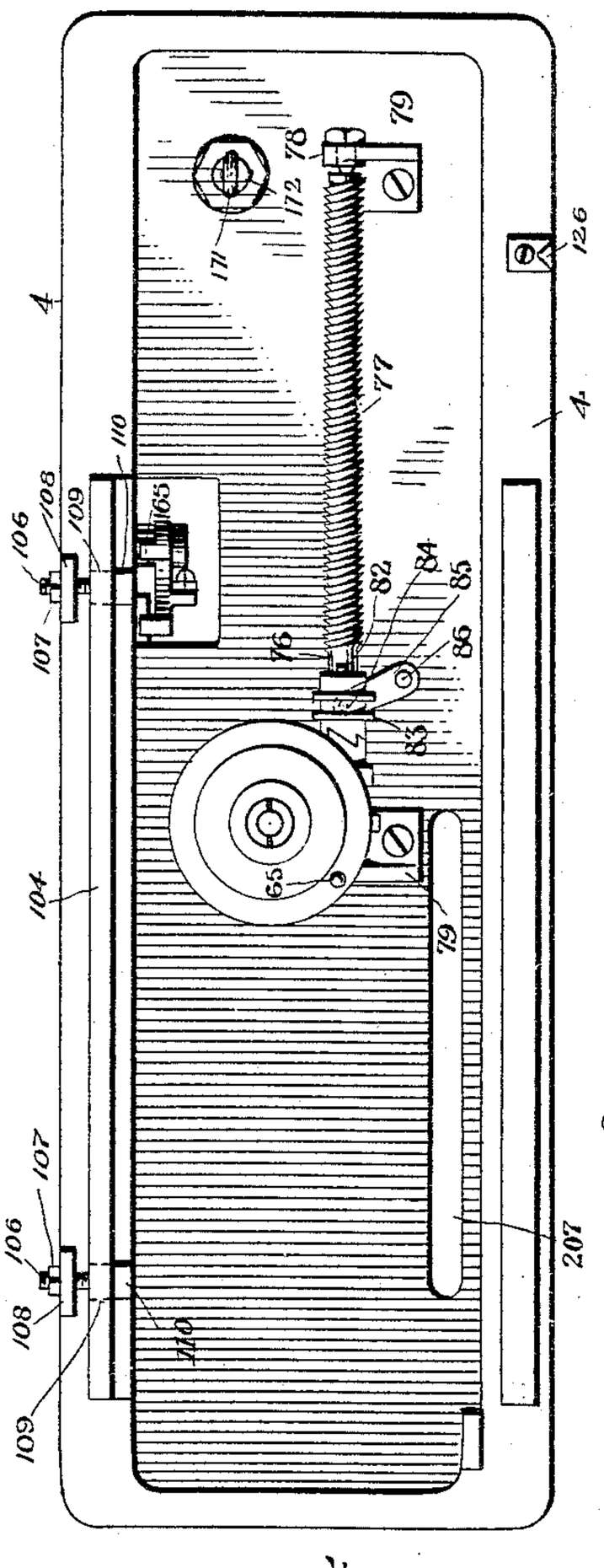

Fig. 4.

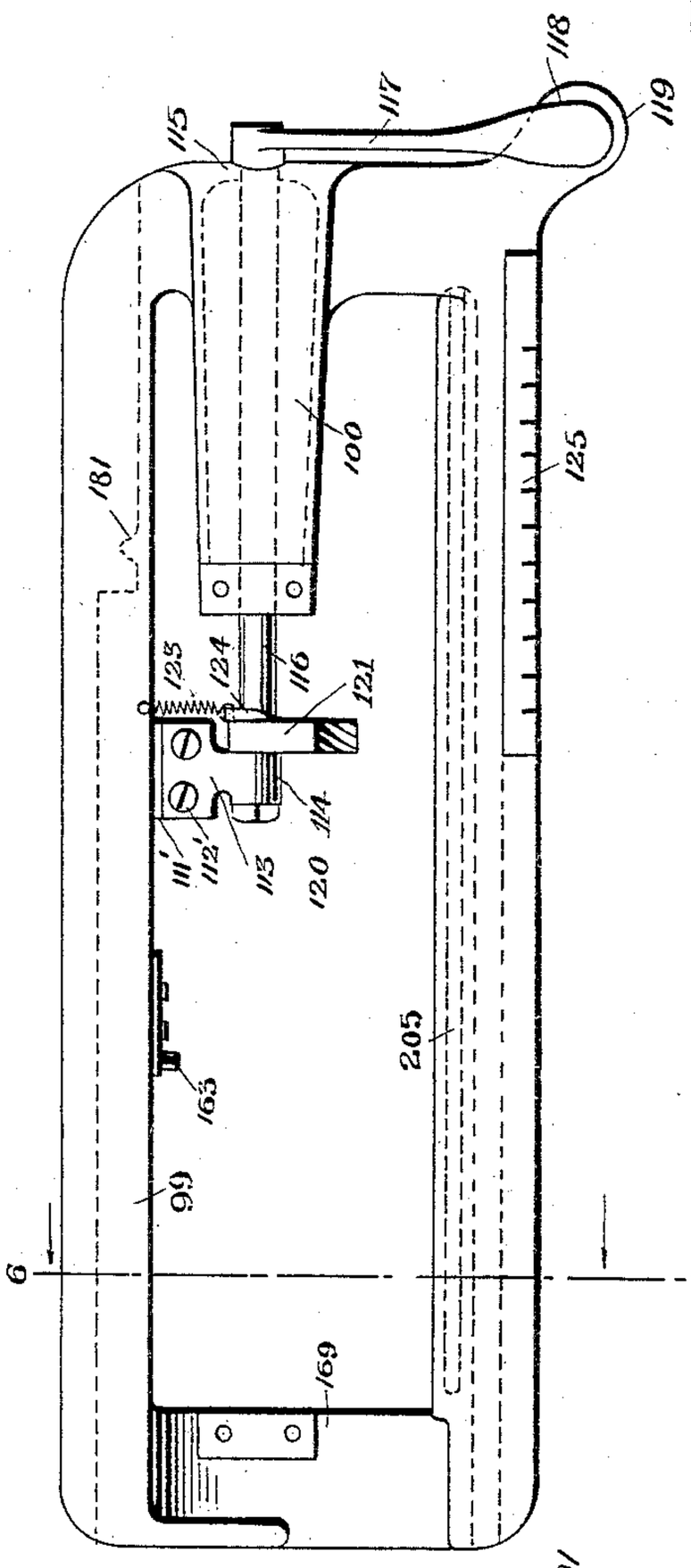

Fig. 5.

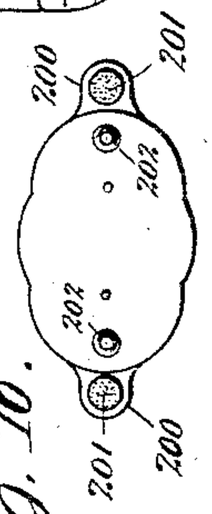

Fig. 16.

Fig. 18.

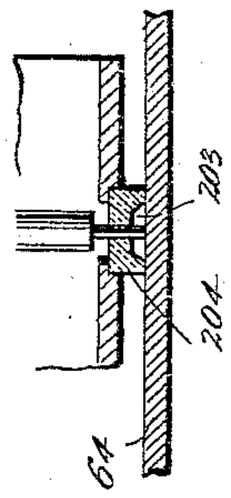

Fig. 6.

Fig. 17.

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5 SHEETS—SHEET 5.

Fig. 10.

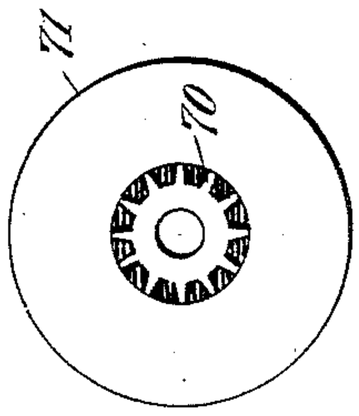


Fig. 8.

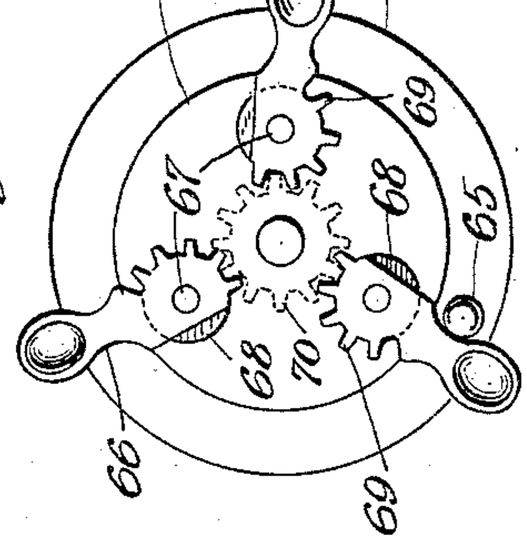


Fig. 9.

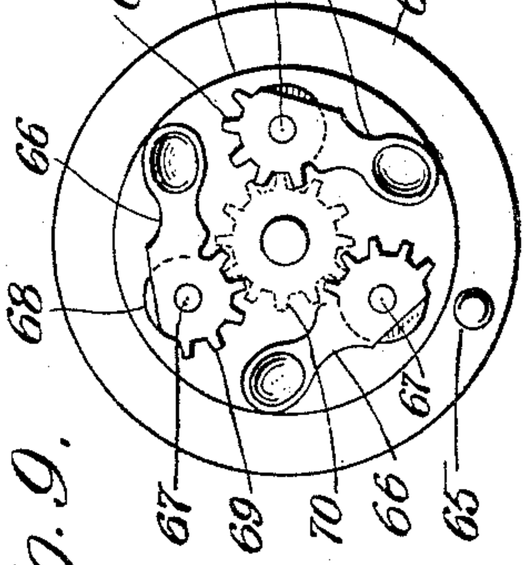
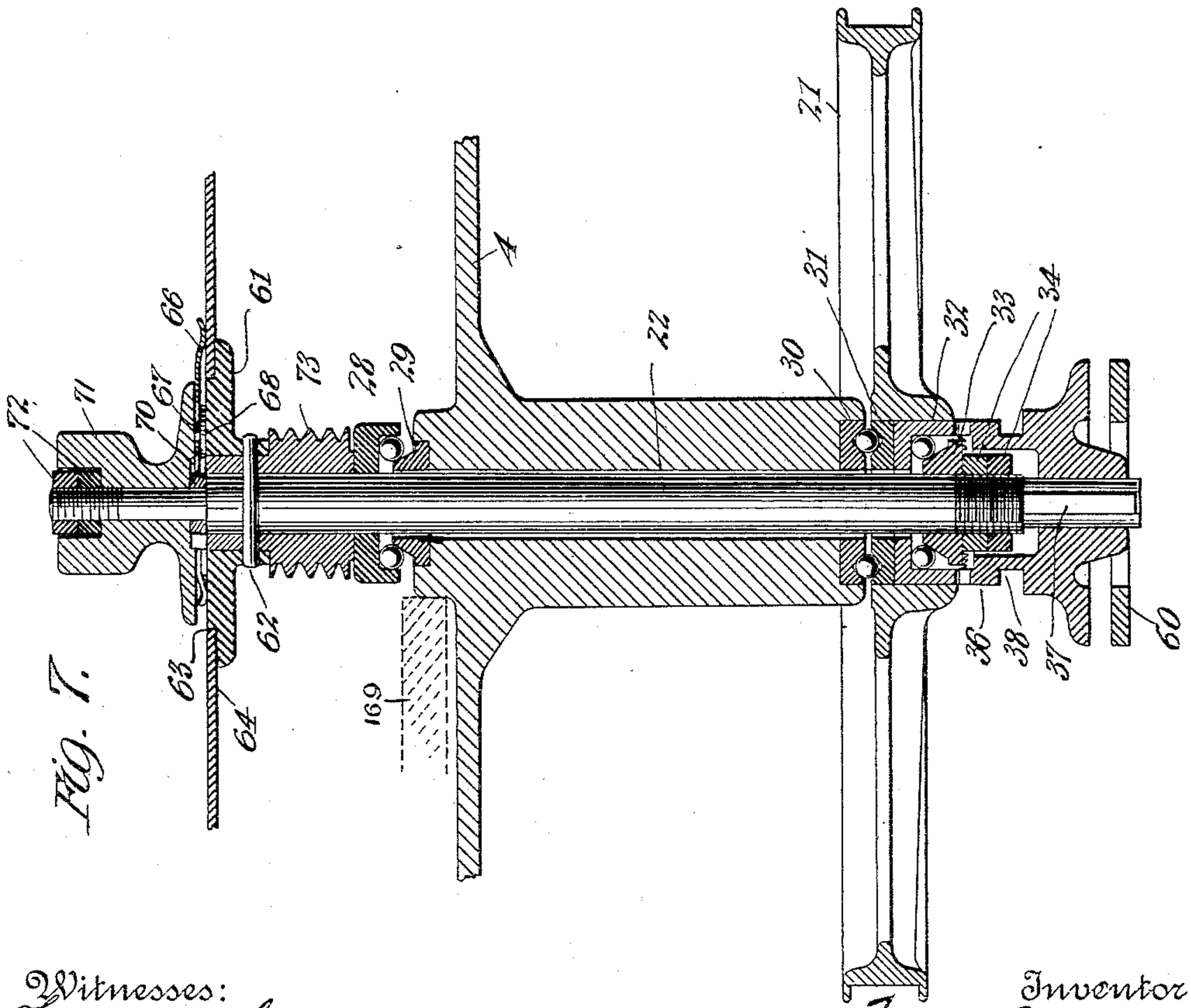


Fig. 7.



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UNITED STATES PATENT OFFICE.

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TELEGRAPHONE.

934,843. Specification of Letters Patent. **Patented Sept. 21, 1909.**

Application filed April 8, 1908. Serial No. 425,825.

To all whom it may concern:

Be it known that I, FREDERIC SCHAEFER, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented certain new and useful Improvements in Telegraphones, of which the following is a full, clear, and exact description.

My invention relates to telegraphones and has for its object the provision of a machine in which the record medium is in the form of a disk rotatively supported and is particularly adapted for commercial work of various kinds such as the dictation and transcribing of letters, etc.

My invention comprises various improvements in the means for supporting and rotating the disk, means for supporting and moving the magnets with respect to the disk, means for connecting and disconnecting the driving means with the disk support and with feed screw by which the carriage is moved, and various details of construction as will be fully set forth and claimed.

In order that the invention may be more fully understood, reference is hereby made to the accompanying drawing, of which—

Figure 1 is a plan view of the improved telegraphone. Fig. 2 is a front elevation of the same, the supporting cabinet being shown in section. Fig. 3 is an end elevation of the same, also showing the cabinet in section. Fig. 4 is a plan view of the body or bed plate with certain of the operating parts, the carriage being removed therefrom. Fig. 5 is a plan view of the traveling carriage upon which the magnets are supported. Fig. 6 is a section on line 6—6 of Fig. 5. Fig. 7 is a central vertical section of the means for rotatively supporting the record disk. Fig. 8 is a plan view of the table to which the said disk is applied and showing the movable spring arms for clamping the disk upon the said table, said arms being shown in their extended or clamping position. Fig. 9 is a plan view of the same with the arms retracted so as to permit a disk to be applied to or removed from the said table. Fig. 10 is a bottom plan view of the knob used for securing the said spring arms in position, and the gear for operating said arms. Fig. 11 is a plan view of the support secured to the traveling carriage and carrying the magnets which operate upon the upper surface of the record disk. Fig. 12 is a side elevation of said support and also of the corresponding support for the magnets which operate upon the lower surface of the disk. Fig. 13 is an end elevation of the lower magnets and support of Fig. 12. Fig. 14 is a detail plan view of the block to which the magnets are applied. Fig. 15 is a detail section of said block, showing the magnets applied thereto and the frame in which said block is supported, the bottom plate being omitted. Figs. 16 and 17 are a side elevation and bottom plan view, respectively, of a modified construction in which the magnet block is provided with feet or supports which rest upon the record disk to minimize the wear upon the pole pieces of the magnet, and with wiping pads to remove dust from the disk. Fig. 18 is an enlarged sectional detail of the lower end of the pole piece with the jewel or supporting foot applied thereto and of special construction.

In all the views corresponding parts are designated by the same reference numerals.

In the structure illustrated 1 is a cabinet, preferably of wood, within which is situated the motor 2 for driving the machine or instrument and the set of batteries 3 for furnishing current for the magnets which are carried by the traveling carriage. The bed plate 4 rests upon said cabinet and supports the various operating parts, with the exception of the motor 2 and its governor 5. This motor may be of any desired type, but I prefer to use an electric motor driven from any suitable source of current, the governor 5 being mounted directly upon the armature shaft of the motor and comprising the series of centrifugal weights 6 secured to the central portions of the springs 7, the latter being secured at one end to a collar 8 fixed on the motor shaft and secured at their opposite ends to a sleeve 9 slidable upon said shaft and provided with a friction disk 10. There is also a sleeve 11 formed with an integral arm 12 which carries at its extremity a pad 13 of felt or other suitable material situated in such position as to be frictionally engaged by the disk 10 in order to regulate the speed of the motor shaft. The sleeve 11 is slidable upon a pin 14 secured to the frame of the motor 2 and surrounded by a coil spring 15 which bears at its ends against said motor frame and said sleeve, respectively, and presses the latter against the

end of an adjusting screw 16 threaded in the bed plate 4 and provided with a circular notched head 17 for convenience in turning. When the screw 16 is turned so as to move the same downwardly, it will cause the sleeve 11, arm 12, and pad 13 to move downward and thereby permit of increase in the speed of the motor shaft, and conversely an upward movement of the screw 16 will cause the motor to rotate at a lower speed. The upper surface 18 of the sleeve 11 is of sufficient extent to provide an abutment for the end of the screw 16 in any position of lateral adjustment of the motor 2 for the purpose of tightening the driving belt 19 which passes over the drive pulley 20 mounted on the motor shaft, and the pulley 21 which is mounted upon a bearing concentric with the vertical spindle 22 and which will be described later. The lateral adjustment referred to is obtained by supporting the motor 2 by means of screws 23 (see Figs. 2 and 3), said screws being threaded in the upright 24 which is bolted to the bottom of the cabinet 1, the washers 25 upon said screws engaging the flanges 26 which are integral with the motor frame and are provided with notches 27 through which the said screws 23 pass. In previous constructions, the motor has been mounted with its shaft horizontal or at right angles to the spindle carrying the disk. This necessitates a turn in the driving belt and a special belt tightener and other complications which the present arrangement avoids.

The means for supporting and rotating the record disk comprise the vertical spindle 22 which is supported on a ball bearing of which the cup 28 is secured to said spindle, and the cone 29 is carried by the bed plate 4 and which also carries the cup 30 of a second ball bearing whose coöperating part 31 is carried by the pulley 21. Secured within the bore of this pulley is another bearing cup 32 which coöperates with the cone 33 secured to the spindle 22 to form a ball bearing, and the last mentioned bearing serves, not only to support the pulley 21 upon the spindle 22, but to support the spindle itself with respect to the bed plate 4, the adjustment of the cone 33 serving to take up wear in each of the three ball bearings. Thus three sets of balls are made to furnish the bearings for two rotating elements, the spindle and the pulley, which ordinarily would require four. Locking nuts 34 are provided for securing the cone 33 in position.

The rim of the bearing cup is formed with a series of teeth 35 which are adapted to be engaged by the teeth of a movable clutch member 36, said clutch member being slidable upon the spindle 22 and keyed thereto by a feather 37. A groove 38 is formed in said clutch member to receive the pins 39 which project inward from the arms of the operating yoke lever 40, said lever being pivoted at 41 to a lug or ear carried by the arm 42 which is secured to and depends from the bed plate 4. The lever 40 carries at its end a pin 43 which engages a slot 44 formed in the end of the link 45. The other end of this link is pivoted at 46 to the end of one arm of the T-shaped lever 47 which is pivoted on a screw 48 threaded on the arm 42. There is another lever 49 pivoted on the screw 50 also threaded in the arm 42, and said lever is provided with a slot 51 which receives a pin 52 carried at the end of one of the arms of the lever 47. The levers 47 and 49 are connected by a tension spring 53 the ends of which are secured, respectively, to the pins 54 and 55, whereby the said spring tends to draw said pins together and to rotate said levers 47 and 49 about their axes in either direction after said pins 54 and 55 pass the line connecting the axes of said levers. There is a stop for limiting the movement of said levers in one direction, in the form of a screw 56 threaded in a lug 57 integral with the arm 42 and held by a jam-nut 58, said screw abutting against a lug 59 integral with the lever 49. The movement of the levers 47 and 49 into the opposite position or the position in which the spring 53 is on the other side of the line connecting the axes of said levers from that which it occupies in Fig. 2, is effected in a manner hereinafter described, to cause the engagement of the lower face of the clutch member 36 with a friction disk or ring 60 rigid with the extremity of the arm 42 and which acts as a brake upon said clutch member and therefore upon the spindle 22 when engaged by said clutch member.

The upper end of the vertical spindle 22 is provided with a table 61 which is secured thereto by a pin 62 and is provided with a shoulder 63 the diameter of which is equal to the diameter of the central opening formed in the record disk 64 of suitable material for receiving a telegraphone record, hard steel being preferably used. There is a vertical pin 65 projecting from the table 61 and adapted to engage a notch or hole formed in the said disk in order to transmit the driving torque thereto. Means are provided for pressing or clamping the disk upon the table 61, consisting of a plurality of spring arms 66 pivoted at one end upon pins 67 rigid with the table 61, said arms resting upon washers 68 which surround said pins. Each of the arms 66 is provided with a segmental rack 69, the teeth of which mesh with a spur gear 70 secured to a knob 71 which is journaled on the upper end of the spindle 22 and secured against removal by the jam-nuts 72. The ends of the spring arms 66 are depressed, as shown, and, when the said arms are in the position

shown in Fig. 8, their extremities press downward upon the surface of the disk 64, thereby clamping the same upon the table 61, the movement of said arms being limited by the pin 65. It is evident that a rotary movement of the knob 71 and gear 70 causes the spring arms 66 to be retracted into the position shown in Fig. 9, the space between the lower surface of the knob 71 and the upper surface of the table 61 being sufficient to allow the spring arms to be housed therein. This retraction of the spring arms permits the disk 64 to be removed from the table 61 since the internal diameter of the central opening is slightly greater than the greatest diameter of the knob 71, so that all that is necessary, in order to remove the disk 64 from the table 61, is to rotate the knob 71 through a small angle in order to retract the spring arms 66, and the disk may then be removed from its support and a new disk applied thereto and secured by turning the knob 71 in a reverse direction so as to extend the spring arms 66 into clamping position.

Upon the upper portion of the spindle 22 and below the table 61 is fixed a worm 73 which engages a worm gear 74 carried by a sleeve 75 loosely mounted on a horizontal shaft 76 which is formed with a feed screw 77. This shaft is mounted on centers 78 carried by the brackets 79 secured to the upper surface of the bed plate 4. The sleeve 75 is provided with teeth 80 adapted to engage similar teeth formed on the clutch member 81 which is slidable upon the shaft 77 and adapted to drive the same through a spline 82.

The clutch member 81 is formed with a pair of collars 83 between which extends a pin 84 which extends upward from the end of a lever 85 secured to the upper end of a rock shaft 86, and to the lower end of said shaft is secured a lever arm 87 which is pivoted at 88 to the end of an operating rod 89 which may be controlled in any desired manner, but which is shown as being pneumatically operated, being connected to the piston of an air cylinder 90 and adapted to be operated by an air bulb 91 in one direction, and by a spring in the cylinder in the other direction. There is another arm 92 secured to the rock shaft 86 in such position as to engage the end of a spring 93 which carries an electrical contact 94 adapted to engage a similar contact 95 carried by a spring 96, said springs being electrically connected to wires 97 and 98, which wires form a part of the circuit of wires used in carrying the voice currents to the recording magnets and, in reproducing, carry the voice currents which are generated in said magnets so that an angular movement of the rock shaft 86 caused by the operating rod 89 simultaneously moves the clutch member 81, thereby releasing the shaft 76 from driving relation with the sleeve 75 and opening the circuit which includes the recording or reproducing magnets. These magnets are carried by a traveling carriage 99 which is preferably in the form of a hollow rectangle, as shown in Fig. 5, one end of which is formed with an integral arm 100 extending upward from the plane of the body of said carriage and inward toward the center thereof, the disk, when mounted, standing between the arm and the main portion of the frame. This carriage is formed with front and rear longitudinal ways 101 and 102, respectively. Upon the bed plate 4 is formed a way 103 extending parallel to 101 and, at the rear of the bed plate, is a strip 104 which is formed with a way 105, said strip being adjustable toward the carriage 99 by means of adjusting screws 106 provided with jam-nuts 107, said screws being threaded in lugs 108 projecting upward from the bed plate 4, said strip 104 being held against longitudinal movement by notches 109 formed in the lower surface thereof and engaging ribs 110 formed on the bed plate. Between the ways 101 and 103 are two steel balls 111, and between the ways 102 and 105 is a single ball 112, which balls receive the weight of the carriage 99 and allow the same to travel longitudinally with respect to the bed plate 4 with a minimum amount of friction. The adjustment of the strip 104 provides for the elimination of any looseness between the ways and the roller supports, and the use of three balls insures even support of the carriage at all times. There is a lug 111′ extending inward from the rear of the carriage 99, and secured thereto by screws 112′ is a block 113 having a bearing 114, and there is another bearing 115 formed at the end of the carriage 99, and within said bearings is journaled a horizontal rock shaft 116 upon the outer end of which is fixed an arm 117 having an enlarged end 118 adapted to be pressed by the thumb or finger of the operator, the downward movement of the same being limited by an ear 119 formed as an integral extension of one corner of the carriage 99, said ear also acting as a handle by which to move the carriage by hand. Upon the inner end of the shaft 116 is a securing nut 120, and adjacent the bearing 114 is an arm 121 which is rigid with said rod 116. The forward end of said arm is provided with a segmental nut 122 which is held in engagement with the thread of the feed screw 77 by a tension spring 123 one end of which (see Fig. 5) is secured to the carriage 99, and the other end of which is secured to the ear 124 formed integral with the arm 121. It is evident that, upon depressing the end 118 of the lever 117, the feed nut will be moved out of engagement

with the feed screw, and the carriage 99 can then be moved by hand either to the right or left throughout its full range of movement, and, upon releasing the arm 117, the spring 123 will cause the arm 121 to be restored to its initial position with the feed nut in engagement with the feed screw.

The forward edge of the carriage 99 is provided with graduations forming a scale 125, and there is an index or pointer 126 secured to the bed plate 4 in proper position to coöperate with the graduations of said scale in order to indicate the position of the magnets with respect to the record surface. When the carriage is at its extreme left-hand position the pointer 126 will be opposite the first mark on the scale 125 (see Fig. 1) and the magnet below the disk will be at its extreme edge and in proper position for starting to record upon the disk, the magnet above the disk being near the center thereof and also in proper position for starting to record. It should be noted that the disk, the outline of which is shown in dotted lines in Fig. 1, is of sufficient size to cover almost the entire extent of the carriage 99 and that the scale which is carried by the said carriage is, for the most part, below the said disk, but, as the carriage travels toward the right in making a record, the scale moves with it, and the portion which is opposite the pointer 126 will always be visible so that a reading may be taken at any time.

There are two recording magnets 127 and 128, respectively, and associated with each is an obliterating magnet 129 and 130, respectively, one set of magnets being situated above the disk 64 so as to operate upon the upper surface thereof, and the other set being located below the said disk so as to operate upon the lower surface thereof. The advantage of using two magnets for recording or reproducing in connection with a record in the form of a rotary disk is that the disk may be caused to rotate at a uniform speed and, by causing one of the magnets to move from a faster moving part to a slower moving part of the disk and the other magnet from a slower to a faster moving part, the sum total of the magnetic effects produced by the magnets or the electrical effects produced in their circuits by the magnetism of the disk is constant, because, as the speed of the record surface upon which one of the magnets is operating diminishes, the speed of the surface upon which the other magnet is operating increases at the same rate, so that the sum of the effects of the two magnets is always the same, and greater than the effect of either magnet acting alone at any time.

It has been proposed heretofore in Patent No. 893,277, granted July 14, 1908 to Harve R. Stuart, to obtain this advantage by mounting the two magnets upon separate carriages traveling simultaneously in opposite directions, but I have found that the same advantage can be obtained by supporting both magnets upon a single carriage in such positions that one of the magnets starts at the edge of the disk and travels toward its center and the other magnet starts from a point near the center and travels toward the edge of the disk along a radius which is removed 180 degrees from the radius along which the first magnet moves, so that I am enabled to obtain exactly the same effect as would be obtained by the use of two carriages traveling in opposite directions simultaneously, with the magnets moving along the same radial line, but with only a single carriage.

The construction of magnets is as follows: There is a supporting frame 131, preferably of hard rubber, within which is set a block 132 of the same material. Tightly fitted within the latter is a pair of spool centers 133 upon which are placed the spools or coils 134. The spool centers 133 are drilled to receive the magnet cores 135 and 136. These cores are of wrought iron, and there is a spring plate 137 which is secured at its center to a supporting plate 138 and presses at its ends against the upper ends of the cores 135 and 136, the opposite ends or pole pieces of the cores being adapted to contact with the record disk. The supporting plate 138 is provided with a pair of curved slots 139 through which pass the screws 140 for securing said plate to the block 132. Said connection provides a slight angular adjustment of the said block with respect to said plate around the centers thereof, whereby the pole pieces may be set exactly the same distance from the axis of the record disk, whereby they will trace the same path upon the surface. The plate 138 is provided with a pair of downwardly extending ears 141, and the lower extremities thereof are pivotally connected to the frame 142 by means of adjustable centering screws 143. These screws provide an adjustment by which the distance of the pole piece supporting block 132 from the axis of the record disk can be slightly varied, whereby the path traced by one recording magnet can be accurately determined or may be caused not to register with the path traced by the other recording magnet, if desired. The frame 142 is pivoted upon a pair of oppositely disposed centering screws 144 threaded in the frame 145, and the latter is rigidly secured to the arm 100 of the traveling carriage 99 by screws 146. There is a tension spring 147 secured at one end to the frame 145 by a screw 148 and, at the other end, to an arm 149 which is integral with the frame 142. This spring therefore tends to turn the frame 142 on its pivot,

thereby pressing the pole pieces of the magnets against the surface of the record disk, the said spring allowing the frame 142 to move up and down in order to accommodate itself to any irregularity which might be present in the shape of the disk. As the center of gravity of the magnets and their supporting block is above the centering screws 143, I provide a link 150 one end of which is pivotally secured at 151 to one of the ears 141, and the other end is formed with an opening 152 of somewhat greater diameter than the pin or screw 153 which passes through said opening and is rigid with the frame 145. This link therefore prevents the magnet from turning over when it is raised from the disk.

The magnets which operate upon the lower surface of the record disk are exactly similar to the upper magnets, and the supporting means therefor is exactly the same, except that the link 150 is omitted since the center of gravity of the lower magnet is below its centering screws.

The lower magnet and its support is clearly shown in Figs. 12 and 13, which views also illustrate a screw 154 which is threaded in the frame 145 and serves as a stop for limiting the pivotal movement of the frame 142 by engagement of an extension thereof, as shown. By removing screw 154 the magnet can be swung upward sufficiently to turn it upside down to facilitate the renewal of the magnet cores. The frame 145 which carries the lower magnet is secured to the carriage 99 by screws 155 (see Fig. 1). The block 132 which carries the magnets (see Fig. 14) is provided with horizontal channels 156, and the wires 157 which are electrically connected to the windings of the magnet coils occupy said channels. Said wires are flexible and their outer ends are provided with lugs 158 which are secured to the binding posts 159 carried by an insulating block 160 secured to the frame 145. This arrangement of the wires 158 allows greater flexibility in the pivotal movement of the magnet support 132 about the centering screws 143 than any other arrangement which I have been able to devise. From the binding posts of the upper frame 145, the conducting wires lead along the hollow underside of the arm 100 of the carriage and thence along a groove 205 (Fig. 6) in the front member of the carriage and finally join the wires from the lower frame 145 to form a cable 206 (Fig. 2). This cable passes through a slot 207 after which the individual wires lead to the battery, telephonic instruments and switches. The slot 207 permits the cable to move freely with the carriage without derangement.

In Figs. 16 and 17, a modification in the construction of the magnet frame is shown. At each end of the frame, pockets 200 are formed in which are placed wiping pads 201 adapted to rest upon the surface of the record disk and to clean said surface of any dust or foreign matter that may be thereon. These pads may be pressed toward the disk by springs placed above them in the pockets, or any suitable adjusting devices may be used to hold them in effective working position. These figures also illustrate supporting feet 202 in the form of jewels which are set in suitable sockets in the bottom plate of the magnet frame. These jewels are fixed at such a level that they will receive the larger part of the wear due to the pressure of the magnet frame against the disk, and at the same time permit the pole pieces of the magnets to make adequate contact with the disk without unduly wearing them. These jewels may be located at any suitable points on the frame to evenly support it.

In Fig. 18, the jewel is shown in the form of a collar surrounding the pole piece, the view being enlarged to show the formation of the jewel in which a cavity or annular space is afforded immediately around the extremity of the pole piece. This cavity, indicated by 203, formed in the jewel 204, receives any dust or foreign matter that may get between the surface of the pole and the disk, and become scraped off into the cavity. If the jewel did not have this cavity, but hugged the pole closely, there would be less escape for foreign particles, with the result that they would be retained under the pole piece and interfere with the proper magnetic action.

A small plate 161 is provided (see Figs. 1 and 2) which is formed with a slot 162 and a depending arm which carries a roller 163. This plate is secured to the carriage 99 by the screws 164 which permit a longitudinal adjustment of the said plate. The roller 163 is so situated as to strike the arm 165 formed on the pivoted plate 49, during the forward movement of the carriage, and to strike against the arm 166 during the return of the carriage in order to restore the plate 49 to its initial position. The latter arm extends rearward from the body of the plate 49 so as to be situated below the longitudinal flange or rib 167 (Fig. 3) which depends from the carriage 99. This rib prevents the pivotal movement of the plate 49 except when the carriage is in such position that the arm 166 is below that portion of the carriage where the said rib 167 is cut away, as shown at 168 in fig. 2. Therefore the plate 49 cannot be moved to throw the clutch member 36 until the carriage is near its extreme right-hand position. The movement of the carriage to the right is limited by the engagement of the cross member 169, of the carriage, with the head of the casting which

surrounds the spindle 22 (see Fig. 7), and the movement of the carriage in the opposite direction is limited by the engagement of the end of the carriage with a lug 170 formed integral with the bed plate 4.

The carriage travels a sufficient distance to the right (Fig. 1) to enable the upper magnets to pass beyond the surface of the record disk 64 and, in order to support the magnets and prevent the pivotal frame 142 from being depressed by the spring 147 when in this position, means are provided for supporting the said magnets in this position, which means, as shown, consist of a roller 171 (Figs. 2 and 3) mounted on the upper end of a rod 172, said rod being clamped to the bed plate 4 by a pair of nuts 173 and 174 threaded upon said rod. Obviously, the rod 172 may be adjusted longitudinally and secured to the bed plate by said screws in any desired position of adjustment. The roller 171 is so situated as to engage the lower surface of the frame 142 (see Figs. 3 and 12) as the carriage is fed in a forward direction. Said frame therefore rides upon the roller and the magnets are thereby prevented from dropping below the level of the disk. This construction therefore provides a support for the magnets when in this position and allows the disk to be removed from its support and be readily replaced by another disk, after which the carriage may be moved to its extreme left-hand position, which is the position which it occupies at the beginning of a record.

In order to afford an audible signal when the magnets are approaching the end of the record, a bell 175 is provided, the same being secured to the bed plate 4 and there is a hammer 176 which is pivoted at 177. A tension spring 178 is connected at one end to the base 179 of the bell and, at the other end, to the hammer 176, and the operating lever 180 is also pivoted upon the pin 177 and its forward end extends into the path of the projection 181 which is integral with the carriage 99 so that a movement of the carriage toward the right causes the long arm of the lever 180 to be moved toward the right and the short arm toward the left, which causes the pin 182 to press against the hammer 176 and turn it on its pivot, thereby raising the spring 178 under tension and, as soon as the projection 181 passes the lever 180, the spring 178 thrusts the hammer against the bell and sounds the same. Upon the return of the carriage the projection 181 moves the long arm of the lever 180 toward the left but does not alter the position of the hammer 176 and, as soon as the projection 181 clears the lever 180, the spring 183, which connects the lever 180 with the hammer 176, restores the lever to its normal position.

The operation of the instrument is briefly as follows: The record disk is applied to the rotary table 61 and the traveling carriage is brought to the position shown in Fig. 1, this being the extreme left-hand position of the said carriage. In this position the lower magnets are immediately below the outer edge of the disk and the upper magnets are as close to the center of the disk as will be effective. The motor 2 having been started, movement is imparted to the driving belt 19 and pulley 21, which, by its rotation, drives the clutch member 36 and, through it, the vertical spindle 22, table 61, and the record disk 64. The worm 73 imparts rotation to the gear 74 and sleeve 75, and the latter, through the clutch member 81, rotates the feed-screw 77 and thereby imparts a progressive movement at uniform speed to the carriage 99. If therefore at this time voice currents be applied to the magnets, a magnetic record in the form of a spiral of decreasing diameter will be made by the lower recording magnet, and a separate record in the form of a spiral of increasing diameter will be made by the upper recording magnet, said magnetic records being similar to each other but consisting of magnetic impressions differently spaced on account of the record surface operated upon by the two magnets, traveling at different speeds. These effects, however, can be added together when the records are reproduced, by connecting the reproducing magnets either in multiple or in series with each other or by connecting them in separate circuits connected with separate receivers, one of which may be applied to each ear of the listener. If at any time the person using the instrument wishes to stop the feed of the carriage 99, as when he is pausing to collect his thoughts or prepare for further dictation, all that is necessary to do is to press the bulb 91, thereby operating the rod 89 and arms 87, 92, and 85, and thereby throwing the clutch member 81 out of engagement with the driving sleeve 80, thereby stopping the rotation of the feed screw 77 and simultaneously opening the circuits which include the magnets of the machine. Upon releasing the bulb 91 the clutch 81 will be restored to its former position by the spring in the air cylinder, and the circuit to the magnets will be closed, so that the operator may resume his dictation. The opening of the magnet circuits is more especially useful when the record is being transcribed, for it avoids continued repetition of the last sounds or words in the ear of the typist while she is writing the sentence she last heard. The feed screw thereupon causes the carriage 99 to be fed farther toward the right until the projection 181 sounds the bell 175, whereupon a further movement of the carriage 99 causes the upper magnet to be raised from the surface of the disk by reason of the en-

gagement of the frame 142 with the roller 171. During the period when the upper magnet is raised, however, the lower magnet is still in operative relation with the surface of the disk and may be used for recording the finishing words of a sentence, although the record produced will be fainter than that which is produced as the resultant of the two magnets. Finally, the roller 163, which is in the path of the arm 165 of the pivotal plate 49, presses against the same and moves the latter to a sufficient extent to enable the spring 53 to throw the plate 49 in such a way as to throw the lever 40 to move the clutch member 36 out of engagement with the driving pulley 21 and apply the same to the friction brake 60. This removes the driving power from the vertical spindle 22, practically simultaneously brakes the same, and brings the said spindle to rest almost instantly, the motor 2 continuing to revolve and the pulley 21 rotating as an idler. The record disk and supporting table being now at rest, the disk may be removed and replaced by another disk. The lever 117 is then depressed by pressing with the finger or thumb upon its extension 118, whereby the feed nut 122 is moved out of engagement with the feed screw 77, and the carriage may then be moved very readily to its initial or extreme left-hand position, which movement, by reason of the engagement of the roller 163 with the arm 166 of the pivotal plate 49, restores the latter to its initial position, as shown in Fig. 2, and thereby operates the link 45 and lever 40 and moves the clutch member 36 from engagement with the braking ring 60 and into engagement with the clutch member of the drive pulley 21 so that the instrument is in position for starting a new record.

The operation of reproducing is carried on in a manner similar to that of recording, the only difference being in the well known change of connection by which the magnets used for recording are converted into reproducing magnets and the obliterating magnets being cut out of circuit so as not to efface the record.

It will be seen that in this machine, the disk may continue to run during the time that it is in use, and that it is stopped only to remove and replace it. During the operations of recording and reproducing, in the intervals when speech is not delivered, or when the record is not listened to, the radial feeding movement of the magnets is the only movement that is stopped. In this way, the normal speed of the disk is instantly available the moment the feed of the magnets is renewed, and effective recording and reproduction is assured over the entire available surface of the disk. In machines where either the motor or the disk, or both, are stopped and started at intervals during the recording or reproducing operations, time is consumed in getting up to normal speed, and if the dictation is commenced before normal speed is reached, the record will be weak or undiscernible.

What I claim, is:—

1. In a telegraphone or similar machine, the combination of a record medium support, a recording or reproducing device, feeding mechanism for the latter, a motor driving means operated thereby to drive the record medium support and feeding mechanism, and a clutch for connecting and disconnecting the feeding mechanism to and from the motor without affecting the driving means for the record medium support.

2. In a telegraphone or similar machine, the combination of a record medium, a recording or reproducing device in engagement with the surface thereof, a carriage in which said device is mounted, a feed mechanism for said carriage and means for connecting and disconnecting the carriage to and from the feed mechanism without displacing the recording or reproducing device.

3. In a telegraphone or similar machine, the combination of a rotary support for sustaining a disk record, a carriage having a recording or reproducing device and movable transversely with respect to the disk, and a scale carried by said carriage in such position that the greater portion thereof registers with the disk during a part of the travel of the carriage.

4. In a telegraphone or similar machine, the combination of a recording medium in the form of a disk, means for rotating said disk and means for automatically stopping the disk when its surface has been entirely traversed by the recording or reproducing device, said stopping means being reset by the return of said recording or reproducing device.

5. In a telegraphone or similar machine, the combination of a record medium, a recording or reproducing device adapted to act thereon, a screw for feeding said device across the record medium and means for stopping and starting the feeding screw without affecting the rotation of the disk.

6. In a telegraphone, a screw shaft adapted to feed the magnet across the face of the record medium, a motor adapted to drive said shaft, a clutch for connecting and disconnecting the shaft with the motor, an electric switch controlling the circuit of the magnet, and means for simultaneously operating the clutch and throwing said switch, substantially as described.

7. In a talking machine, the combination of a rotating record medium, a recording and reproducing device coöperating therewith, means for feeding the latter across the surface of the former, and means for stopping and starting the feeding means independent

of the record medium, and without removing the recording or reproducing device from operative position with respect to the record medium.

8. In a talking machine, the combination of a record medium in the form of a disk, a recording or reproducing magnet arranged to coöperate with one surface of the disk and a similar magnet arranged to coöperate with the other surface of the disk at a point not directly opposite the first magnet, a single carriage in which both magnets are mounted, and means for feeding said carriage so as to cause the magnets to move at equal speed across the respective surfaces of the disk.

9. In a talking machine, the combination of a recording medium in the form of a disk, a carriage having one portion extending along one face of the disk and another portion extending along the opposite face of the disk, a recording or reproducing device carried by each portion of the carriage and not in line with each other in a direction perpendicular to the disk, and means for feeding the carriage, substantially as described.

10. In a talking machine, the combination of a recording medium in the form of a disk, a recording or reproducing device located upon one face of the disk near its outer edge, a second recording or reproducing device located upon the opposite face of the disk near but on the opposite side of its center, a single carriage for supporting both recording or reproducing devices and means for feeding said carriage.

11. In a talking machine, a record medium in the form of a disk, a traveling carriage and a recording or reproducing device located upon each face of the disk and carried by said carriage in such positions that only one of the same is movable out of range of the disk to permit the removal of the latter from its supporting spindle.

12. In a talking machine, the combination of a record medium in the form of a disk, a carriage carrying a recording or reproducing device, means for normally forcing said device toward the surface of the disk, and a support for the recording or reproducing device when in proper position for the removal of the disk.

13. In a telegraphone, a recording magnet having a removable core and pole piece, a frame in which said magnet is mounted, and means for reversing the normal position of the magnet to facilitate the removal and replacing of the core and pole piece.

14. In a telegraphone, the combination of a record medium in the form of a disk, two electromagnets coöperating with said disk, a frame in which said magnets are mounted in a line with each other substantially coincident with the direction of rotation of the disk, and means whereby the direction of the line connecting the pole pieces of the magnets can be shifted, substantially as described.

15. In a telegraphone, the combination of a record medium in the form of a disk, a pair of magnets mounted in a single frame and adapted to coöperate with said disk, a carriage in which the magnet frame is supported, and means for adjusting the magnet frame and carriage so as to change the position of the magnets with respect to the disk in two directions.

16. In a telegraphone, a recording or reproducing magnet having a removable core in combination with a removable plate normally resting against the rear end of the core to prevent its removal.

17. In a telegraphone, a pair of magnets mounted in a single frame, each magnet having a removable core, and a spring plate pivoted at the rear of said magnets and normally preventing the removal of the cores, as described.

18. In a telegraphone, a frame, two electromagnets mounted therein, and a plate to which said frame is attached and on which it is supported, means for adjusting said frame in a rotary direction upon said plate, and a carriage in which said plate is mounted.

19. In a talking machine, a carriage for the recording or reproducing device, a bed plate along which said carriage moves in parallel bearings, said bearings each comprising a ballway or groove, one bearing containing a single ball and the other two balls and one of the grooves being adjustable in width for the purpose set forth.

20. In a telegraphone, the combination of a bed plate or base, a carriage movable thereon, telegraphone magnets carried by said carriage, and electrical conductors extending from said magnets through hollow portions of the carriage and thence through an opening in the base or bed plate in which the conductors have free movement during the traverse of the carriage.

21. In a talking machine, the combination of a record medium in the form of a disk, a rotating spindle upon which the same is carried, a motor for driving said spindle, a clutch for connecting the motor to the spindle, a brake for the rotating spindle, and means for automatically opening the clutch and applying the brake when the recording or reproducing devices have finished their traverse in one direction.

22. In a talking machine, the combination of a record medium in the form of a disk, a carriage carrying recording or reproducing devices adapted to coöperate with said disk, a rotating spindle carrying said disk, a driving motor, a clutch, a brake, a spring, means whereby the final movement of the carriage will store power in said spring and

then release the same, and means whereby the spring will successively actuate the clutch and brake.

23. In a talking machine, the combination of a record support, and means for retaining a record disk upon said support comprising a knob over which the opening at the center of the disk can be passed, a plurality of arms adapted to be housed within the diameter of the knob, and means for extending said arms to overlie the disk.

24. In a talking machine, the combination of a record medium in the form of a disk, a spindle on which the same is carried, and means for retaining the disk upon the spindle comprising a knob over which the opening at the center of the disk can be passed, a plurality of spring arms adapted to be housed within the diameter of the knob, and means for extending said arms to overlie the disk.

25. In a talking machine, the combination of a record medium in the form of a disk having an opening at its center, a spindle on which said disk is carried, and means for holding the disk on the spindle comprising a knob adapted to pass through said opening, a plurality of arms pivoted within the diameter of the knob, and means whereby the rotation of the knob will cause said arms to be thrown outward to overreach the disk or withdrawn to clear the opening in the disk.

26. In a talking machine, the combination of a record medium in the form of a disk, and provided with a central opening, a spindle upon which said disk is mounted, and means for holding the disk upon the spindle comprising a knob adapted to pass through the opening in the disk, a gear wheel mounted to turn with the knob and a plurality of pivoted arms each having gear segments in mesh with said gear wheel and adapted to be thrown outward and inward with respect to the axis of the disk by the rotation of the knob.

27. In a talking machine, the combination of a record medium, a carriage carrying a spring pressed frame, a recording or reproducing device carried by said frame, and a foot or support adapted to rest upon the surface of the record medium.

28. In a talking machine, the combination of a record medium, a spring pressed frame, a record or reproducing device, and a foot or support whose bearing surface is a jewel adapted to rest upon the surface of the record medium.

29. In a telegraphone, the combination with a telegraphone magnet having an iron core adapted to bear upon the record medium, said core being fitted with a jewel or other wear resisting material in the form of a collar, a cavity being formed between the extremity of the core and the adjacent portion of the refractive collar.

30. In a talking machine, a traveling carriage comprising a body in the form of a frame adapted to inclose the spindle of the record support, and an inwardly extending arm adapted to carry the reproducer or recorder at or near its extremity.

31. In a telegraphone, a magnet supporting block 132 having longitudinal grooves 156 for receiving the flexible supply wires of the magnets, said block being carried by a horizontal pivot transverse to said grooves.

32. In a telegraphone, a traveling carriage having a spring pressed horizontal rock shaft 116 journaled therein, and a handle 117 and feed nut rigid with said rock shaft.

33. In a telegraphone, the combination of a traveling carriage, a spring pressed frame carried thereby, and a magnet pivoted to said frame, said magnet being angularly adjustable about to an axis perpendicular to its pivotal axis.

34. In a telegraphone, the combination of a body and the vertically adjustable rod 172 adapted to receive and sustain the recorder or reproducer in one of the extreme positions of the traveling carriage.

35. In a telegraphone, a traveling carriage in the form of a rectangular frame, one of the sides of said frame being provided with a groove 205 for receiving the magnet supply wires.

36. In a talking machine, the combination of a record support and means for retaining a record disk upon said support comprising a handle over which the center opening of the disk can be passed, and one or more arms movable by said handle from a position bounded by said opening into a position overlying the disk.

37. In a talking machine, the combination of a record support and means for retaining a record disk having a central opening upon said support comprising one or more arms movable from a position bounded by said opening into a position overlying the disk.

38. In a talking machine, the combination of a record medium, a carriage carrying a spring pressed frame, a recording or reproducing device carried by said frame, and a foot or support and pad adapted to rest upon the surface of the record medium.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

FREDERIC SCHAEFER.

Witnesses:

WM. D. COOKE,

HARVE R. STUART.