

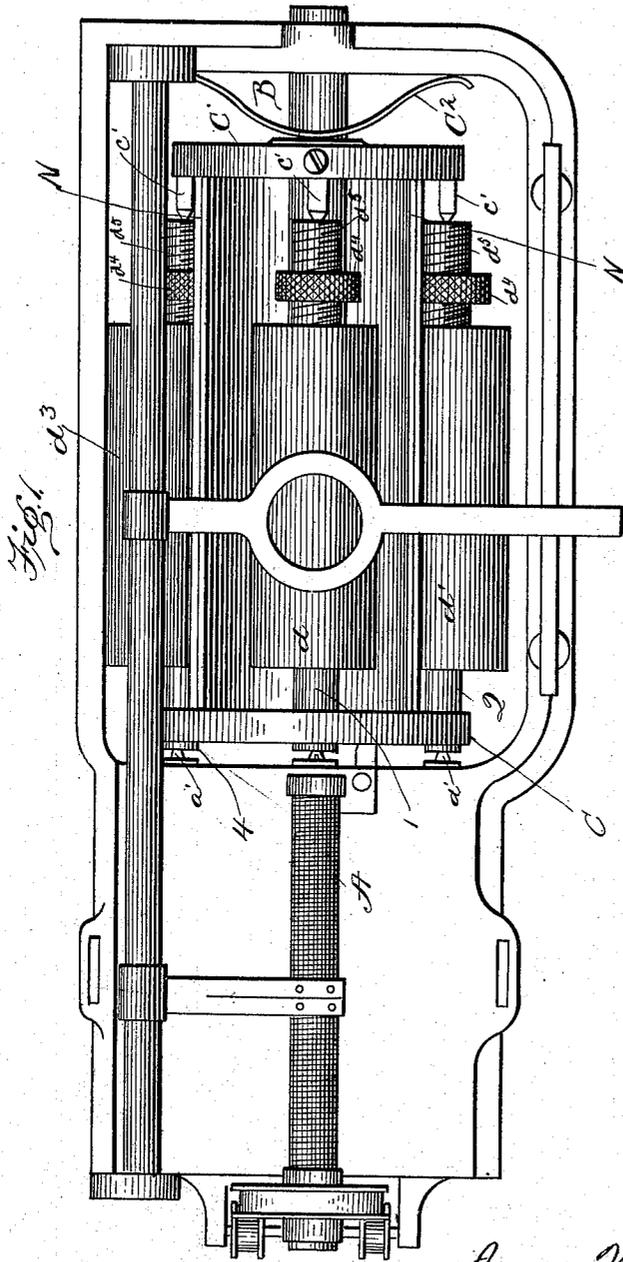
(No Model.)

3 Sheets—Sheet 1.

G. W. MOORE.
PHONOGRAPH.

No. 568,116.

Patented Sept. 22, 1896.



Witnesses.
J. M. Fowler Jr.
W. I. Castle

George W. Moore
 Inventor.

By Stockman & Welch
 Attorneys.

(No Model.)

3 Sheets—Sheet 3.

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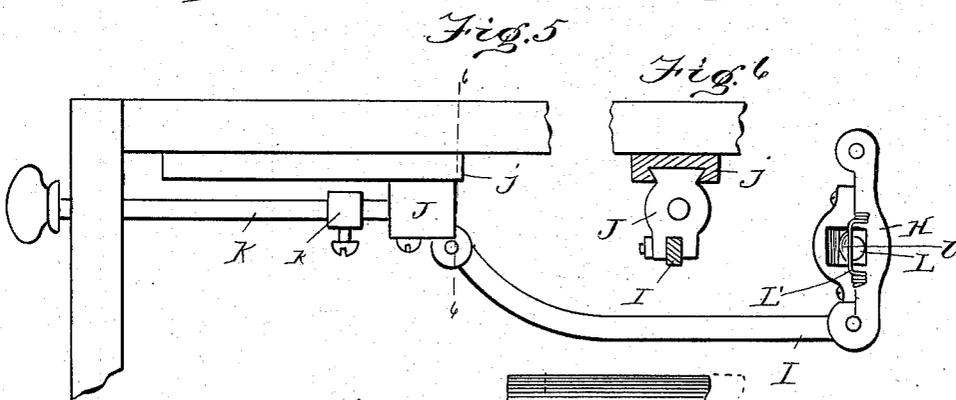
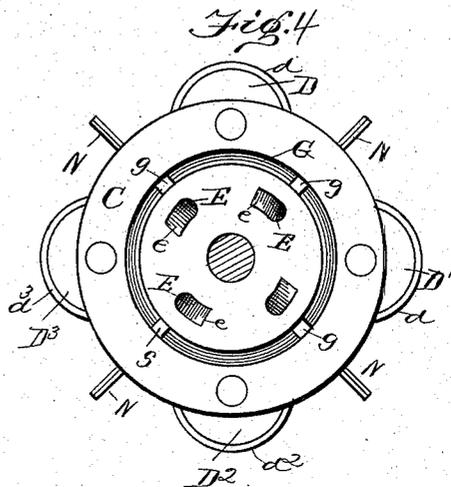
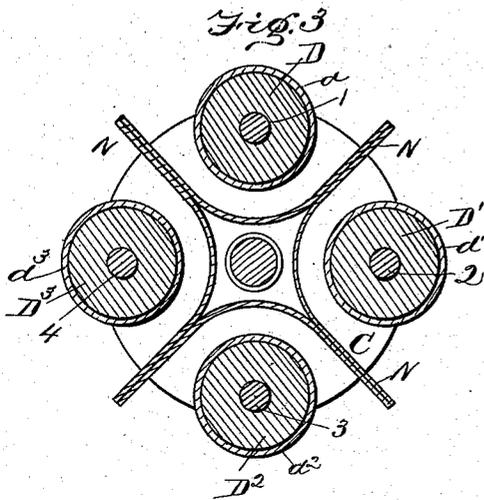


Fig. 6

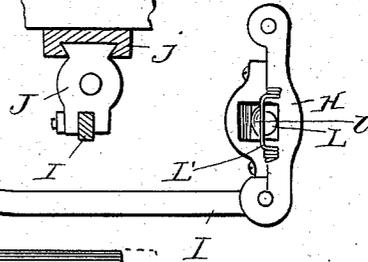


Fig. 7

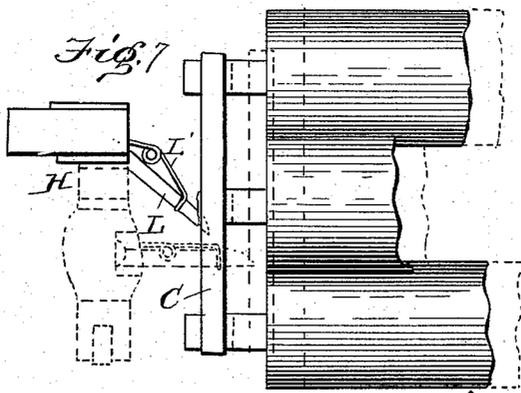


Fig. 8

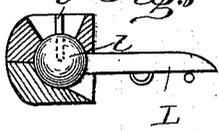
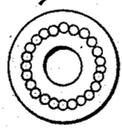


Fig. 9



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UNITED STATES PATENT OFFICE.

GEORGE WASHINGTON MOORE, OF ATLANTA, GEORGIA.

PHONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 568,116, dated September 22, 1896.

Application filed May 11, 1895. Serial No. 548,954. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WASHINGTON MOORE, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Phonographs; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention has relation to phonographs, graphophones, or other sound recording and reproducing instruments; and it has for its object, generally, to improve the construction of the means heretofore employed for supporting a plurality of phonogram-cylinders, so that any one of them may, by the movement of the lever, be brought into operative relationship with the rotary device of the apparatus and take the place of the one previously engaged herewith.

The specific objects and the advantages of the invention will readily appear from the following description.

The invention consists in certain peculiarities in the construction, arrangement, and combination of the several parts substantially as hereinafter described, and particularly pointed out in the subjoined claims.

In the accompanying drawings, illustrating the invention, Figure 1 is a plan view of part of a phonograph embodying my improvements with one of the shafts carrying the phonogram-cylinders in operative relationship with the main operating-shaft. Fig. 2 is a vertical sectional view thereof with all of the phonogram-cylinder shafts out of engagement with the main operating-shaft. Fig. 3 is a sectional view taken on the line 3 3 of Fig. 2. Fig. 4 is an end elevation of the forward disk and the cylinders and their shafts. Fig. 5 is a side view of the lever mechanism for operating the cylinders to bring one of the latter out and another into operative relationship with the main operating-shaft. Fig. 6 is a sectional view on the line 6 6 of Fig. 5. Fig. 7 is a detailed view of parts of the phonogram-cylinders and le-

ver mechanism therefor, showing in dotted lines the position of the parts when said lever mechanism has pushed said cylinders longitudinally upon shaft B. Fig. 8 is a detailed view showing the connection of dog L with lever H. Fig. 9 is an end view of one of the shafts supporting a phonogram-cylinder, showing the series of openings therein.

The same letters and figures of reference designate the same parts in the several views.

A designates the shaft of a phonograph, graphophone, or other sound recording and reproducing machine, which shaft is driven by the usual or any suitable means and revolves the phonogram-cylinder for the purpose of recording sound-waves thereupon or of reproducing the recorded sound-waves.

B designates a stationary bar or axle upon which is mounted a frame embodying two disks C and C', that are movable longitudinally upon, as well as being rotatable around, said bar or axle. These disks support the journaled shafts 1, 2, 3, and 4, to which are respectively secured the tapered cylinders D, D', D², and D³, which carry the tablets d, d', d², and d³, upon which the sound-waves are recorded. One end of each of said cylinders has a threaded engagement with its shaft, while its opposite end is provided with a split and tapered threaded thimble d⁴, which embraces the shaft and is held closely thereto by a threaded nut d⁵. This construction is very advantageous, because it enables the cylinders to be most nicely and accurately adjusted upon their respective shafts and rigidly held in their adjusted position. The extremities of the shafts are also formed with tapering recesses, of which those at one end receive the tapering ends of pins c' and those at the other end receive pins a and a', projecting from the adjacent end of the rotating shaft A. It will be obvious that when one of the shafts 1, 2, 3, and 4 is attached to the shaft A, the former with its cylinder and tablet is revolved with the latter, while the others of said first-mentioned shafts remain stationary. The pins c' serve as center-pins, and upon them the respective shafts 1, 2, 3, and 4 rotate, and said center-pins are removably attached to the disk C' by screws c². If it is desirable or necessary to change the cylinder, such change may be accomplished,

after the shaft and cylinder have been removed from the machines, by unscrewing nut d^5 and the cylinder in the order named, and by screwing another cylinder upon the shaft
5 and a nut upon the thimble thereof. The axle B is also removably supported in position, as will readily be seen by an inspection of the accompanying drawings.

To remove a cylinder and its shaft from
10 the machine, it is only necessary to release the center-pin engaging one end of said shaft from engagement with its screw c^2 by loosening the latter, and then to slide the cylinder and its shaft endwise until said shaft is dis-
15 engaged from the driving-shaft, which movement is permitted by reason of the fact that the center-pin may now slide outward within its opening in disk C' .

The series of circulary-arranged recesses
20 in the end of each shaft 1, 2, 3, and 4, that receive the pin a' , projecting from shaft A, are set closely together, as shown in Fig. 9, and they are preferably reamed out, so that the walls between them present sharp edges,
25 as by such construction the pin a' will be caused unfailingly to enter one of said recesses when the shaft provided with the latter is brought into operative relationship with the shaft A, provided with the former.

Disk C is provided with a plurality of recesses E, corresponding in number and position with the phonogram-cylinders, as clearly shown in Fig. 4. Said recesses receive, one at a time, a tapered projection F, extending
35 from the adjacent part of the frame of the phonograph. A suitable spring C^2 , preferably of the form shown, engages disk C' and exerts a pressure which keeps the pins and recesses above mentioned normally in engagement with each other. Arranging the
40 spring C^2 so that it presses the disks and the parts carried thereby toward the driving-shaft is productive of important advantages, in that with such construction one spring
45 only is necessary and the lever mechanism need only be of such nature that it will force the disks, &c., first longitudinally to disengage the pins and recesses from each other and then rotatively until the shaft of the desired
50 cylinder is opposite the main driving-shaft.

The means for effecting the combined movement of the disks and parts carried thereby will now be described.

Formed in the face of disk C is a circular
55 groove G, within which are a series of teeth g , corresponding in number with the number of phonogram-cylinders employed and relatively so arranged in the groove G as respectively to register with the space between two
60 cylinders.

H designates a normally vertical lever, the upper end of which is loosely sleeved upon a stud h , projecting from the phonograph-frame and the lower end of which is connected with
65 an approximately horizontal pivoted link I, having a slide J, which travels in guides j , secured to the under side of the phonograph

table or support, and is provided with the outwardly-extending operating-handle K. A dog L projects diagonally from said lever into
70 the groove G in the disk C, and a projection M enters a groove m in the phonograph-frame and guides the lever in its movement. The dog L is secured to the lever H by a ball-and-socket or other suitable joint l , which will
75 enable its free end to travel freely in the circular groove G, and to said ball is secured one end of a pin l' , the other end of which extends through a slit in the socket, so that the dog will thereby be prevented from turn-
80 ing out of position, which would disengage it from said groove. The dog is also engaged by a spring L' of suitable construction, which tends to hold its free end within groove G, so that it will accomplish its function more effi-
85 ciently, and at the same time permits it to move upon its joint l .

From the foregoing the operation of my invention will be readily understood to be as follows: In Fig. 1 shaft 1 is shown engaged
90 with shaft A. When it is desired to bring another shaft, as, for example, 2, into operative relationship with said operating-shaft, the operator pulls handle K toward him, thus turning lever H upon its fulcrum and causing
95 dog L first to traverse groove G until it is brought into engagement with the adjacent tooth g , and then gradually to overcome the power of spring C^2 and turn upon its joint l and assume a position at substantially right
100 angles with said lever H, thereby forcing said disks C and C' longitudinally upon axle B and disengaging said cylinder-shaft 1 from the driving-shaft and disk C from projection
105 F. Further outward movement of the handle rotates said disks around said axle and brings the next shaft 2 in line with the driving-shaft. At this point movement of the handle may be automatically stopped by any suitable means, such as the adjustable collar
110 k , arranged to engage the frame of the machine. A spring will preferably be provided, so arranged that the operator may now release the handle and the lever mechanism will automatically be returned to its original
115 position. During this return movement of the lever mechanism the free end of the dog moves backward in the groove G and rides over the next succeeding tooth g and stops in position which will enable it to engage said
120 tooth when another cylinder is to be brought into operation. When the handle is released, spring C^2 forces the disks longitudinally toward the driving-shaft and pins a , a' , and F are caused to engage their respective recesses
125 in the end of said shaft 2 and face of disk C.

The pin F and recess E above referred to are important and advantageous elements of my construction, as they coact to turn the
130 disks, &c., so as to bring the pins of shaft A into direct alinement with the recesses in the adjacent cylinder-shaft 1, 2, 3, or 4 when the latter is brought to within, say, one-sixteenth of an inch of its proper position by the means

above specified. In order to cause said pin F positively and properly to engage said recess E when the latter is brought to it by the rotation of the disk, said pin is made considerably longer than pin *a* on shaft A, and supplemental recesses *e* are formed in the face of disk C. These supplemental recesses are arranged concentric with recess G and communicate, respectively, with the recess E and are of gradually-increasing depth from their outer ends to the recesses E.

N designates shields which are arranged to partly encircle the cylinders and serve to keep the particles of wax cut from one cylinder from falling onto another. These shields extend throughout the whole length of their respective cylinders and empty their contents when their mouths open downward.

While I have shown four cylinders, I wish it understood that the use of any number more than one is contemplated by me. I also wish it understood that while the construction herein shown and described is preferred by me to all others with which I have experimented, yet many of its details may be varied without departing from the spirit of my invention, and the liberty to vary such details I therefore reserve to myself.

Having now described my invention, what I believe to be new, and desire to secure by Letters Patent, is—

1. In a sound recording and reproducing machine, the combination with the driving-shaft, having pins projecting from one end, an axle, disks rotatably and slidably mounted upon said axle and formed with recesses and supplemental recesses, said supplemental recesses communicating with said first-mentioned recesses and being of gradually increasing depth, a pin designed to engage said recesses, and the cylinder-shafts, carried by said disks and formed with recesses to receive the pins of the driving-shaft, substantially as described.

2. In a sound recording and reproducing machine, the combination with the driving-shaft, of the journaled cylinder-shaft, having means for locking it to said driving-shaft and exteriorly threaded near one end, the cylinder adjustably mounted upon said cylinder-shaft and revolved therewith, said cylinder having threads at one end engaging the threads of its shaft and being provided with a split and tapered thimble at its other end through which said shaft extends, and a threaded nut engaging said thimble and forcing the same against said shaft, substantially as described.

3. In a sound recording and reproducing machine, the combination with the driving-shaft, the cylinder-shaft, detachably engaged with said driving-shaft and threaded near one end, and the slidably-supported center-pin, of the cylinder, threaded at one end to engage said threaded end of its shaft and having its other end provided with a split tapered thimble having threads on its outside,

and the threaded nut engaging said thimble, substantially as shown and described.

4. In a sound recording and reproducing machine, the combination of a plurality of phonogram-cylinders, and shields partly encircling said cylinders and preventing the wax cut from one from dropping into another, substantially as described.

5. The combination with the driving-shaft of a sound recording and reproducing machine, of an axle, disks rotatably and slidably mounted upon said axle, one of said disks having a circular groove and teeth in said groove, a spring engaging one of said disks, cylinder-carrying shafts carried by said disks and provided with means for locking them to said driving-shaft, a dog the end of which is adapted to traverse said groove and to engage the teeth, and a lever to which said dog is jointed, substantially as described.

6. In a sound recording and reproducing machine, the combination with the driving-shaft, the rotatable and slidable disks, one of said disks having a circular groove provided with teeth, a spring engaging the other disk, and the cylinder-shafts designed to be detachably locked to said driving-shaft, of a pawl engaging said groove and teeth, and means for operating said pawl to move said disks and shafts away from the driving-shaft and then to rotate them, substantially as described.

7. In a sound recording and reproducing machine, the combination with the driving-shaft, an axle, a frame loosely mounted upon said axle, a plurality of phonogram-cylinders carried by said frame, and means for locking said cylinders one at a time to said shaft, of mechanism for bringing a different cylinder into operative relationship with said shaft, consisting of a lever mechanism for forcing the frame longitudinally upon the axle to disengage the cylinder from the shaft and then move it rotatively around said axle until the proper cylinder has been brought opposite said shaft, and a spring engaging the end of the frame remote from the driving-shaft and operating to press said frame toward said shaft, substantially as described.

8. The combination with the driving-shaft, having pins *a* and *a'* projecting from one of its ends, of the longitudinally-movable and rotative frame, and the phonogram-cylinder shafts carried by said frame and each having in one end a main recess to receive pin *a* and a circular series of closely-set recesses to receive pin *a'*, substantially as described and for the purpose specified.

9. The combination with the driving-shaft of a sound recording and reproducing machine, of the rotative and slidable plates carrying a plurality of phonogram-cylinders, one of said plates having recesses corresponding in number with the number of phonogram-cylinders, and also having supplemental recesses of gradually-increasing depth communicating with said first-mentioned recesses, a

projection from the phonograph-frame designed to enter said recesses, and means for pressing the plates toward said projection, substantially as described.

5 10. The combination with the driving-shaft of a sound recording and reproducing machine, disks rotatably and slidably mounted upon said axle, one of said disks having a circular groove and teeth in said groove, cylinder-carrying shafts carried by said disks and provided with means for locking them to said driving-shaft, a pivoted lever, a dog having a ball-and-socket connection with said lever, a spring engaging said dog, and an operating-handle connected with said lever substantially as specified.

10 11. In a sound recording and reproducing machine, the combination with a longitudinally-movable and rotative frame provided with plurality of cylinder-carrying shafts, of a lever mechanism for moving said frame longitudinally and rotating it, said lever mechanism embodying a dog having one end engaged with said frame, a pivoted lever to which the other end of said dog is jointed, and an operating-handle for said lever substantially as specified.

15 12. In a sound recording and reproducing machine, the combination with a rotative frame carrying a plurality of cylinder-supporting shafts, and with the phonograph-table having guides, a slide traveling in said guides, a lever connected with said frame, a link connecting the lower end of said lever with the slide, and a handle for operating said slide.

20 13. In a sound recording and reproducing machine, the combination of the table having a groove *m*, a frame carrying a plurality of cylinder-supporting shafts, said frame having one of its ends formed with a groove provided with teeth, an axle upon which said frame is loosely mounted, a lever having a projection extending into said groove in the table, a normally-inclined dog pivoted to said lever and extending into the groove in said frame, and mechanism operating said lever to cause the dog first to assume a horizontal position and then to turn, substantially as described.

25 14. In a sound recording and reproducing machine, the combination of a spring-pressed frame, provided with a plurality of cylinder-carrying shafts and rotatably and slidably mounted upon its support, said frame having

its end remote from the spring provided with teeth, a normally-inclined dog engaging said teeth, and means for causing said dog first to assume horizontal position and then to turn, substantially as described.

15. In a sound recording and reproducing machine, the combination of the frame, the driving-shaft, the revoluble disks, the journaled cylinder-shafts carried by said disks, and a projection from the frame, the inner ends of the cylinder-shafts being formed to present locking-surfaces to the adjacent end of the driving-shaft, and the inner of said disks having recesses coöperating with said projection to guide the cylinder-shafts into engagement with said driving-shaft.

16. In a sound recording and reproducing machine, the combination with the frame, the driving-shaft, the revoluble disks, the journaled cylinder-shafts, carried by said disks and having their inner ends formed to lock with the adjacent end of the driving-shaft, and a lever mechanism for bringing a different cylinder to the driving-shaft, of a spring and guiding means operating to cause the cylinder-shaft brought adjacent to the driving-shaft to engage the same.

17. The combination with the revoluble and slidable frame, the plurality of cylinders carried thereby, and the spring pressing said frame in one direction, of a lever, an operating-handle connected with said lever, and a dog, one end of which engages the end of the frame remote from the spring and the other end of which has a ball-and-socket connection with said lever, said dog having a pin extending through a slot in the wall of the socket, for the purpose specified.

18. The combination with the slidable and revoluble frame, the plurality of cylinders carried thereby, and the spring pressing said frame in one direction, of a lever, an operating-handle therefor, a dog one end of which engages the end of the frame remote from the spring and the other end of which has a ball-and-socket connection with said lever, a spring engaging said dog, and a pin extending from the ball through a slot in the wall of the socket, for the purpose specified.

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

GEORGE WASHINGTON MOORE.

Witnesses:

HENRY S. CAVE,
FRANK E. WELCH.