

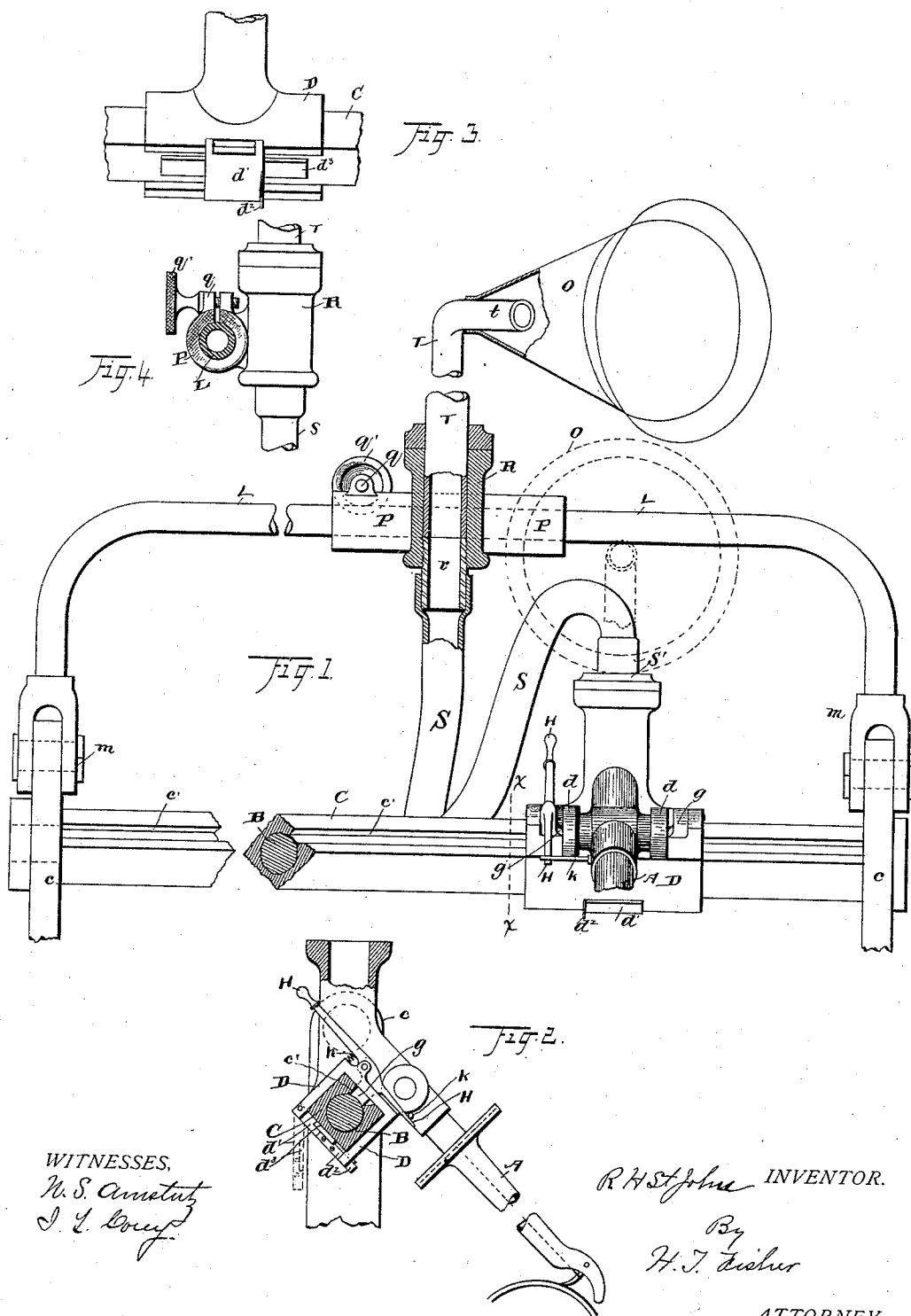
(No Model.)

R. H. ST. JOHN.

GRAPHOPHONE.

No. 430,759.

Patented June 24, 1890.



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GRAPHOPHONE.

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To all whom it may concern:

Be it known that I, ROSWELL H. ST. JOHN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Graphophones; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in graphophones; and it consists in certain novel features of construction appertaining more particularly to the reproducing mechanism, whereby the practical utility of the machine is materially enhanced and its operation is made more simple, convenient, and accurate, all as hereinafter fully described, and particularly pointed out in the claims.

To render the graphophone practicable for the transcribing of speech—say, for example, by means of a type-writer where the operator sits in a given position with his machine before him—it is necessary that there should be brought directly to the operator's ear, in a certain adjusted but fixed relation, a trumpet or its equivalent, which is connected with the reproducing mechanism and conveys the sound accurately and clearly to the point of delivery. Some attempts have been made to supply the demand for a device of this general relation—as, for example, one employing a flexible sound-conveying tube attached to the style-arm above the diaphragm which had connected with its free end two flexible tubes, each having a cup to fit upon the ear. The latter tubes were firm enough to press the cups against the ear and hold them there without further support, and rested upon either side of the face to be out of the way. The objections to this construction appear to be too obvious to need explanation. In the first place the pressure upon the ears always is disagreeable, and if long continued becomes painful. Then again as the operator of the type-writer has also to operate the graphophone and stop and start the same at frequent intervals, according to the sections of speech taken off to transcribe, he should have the machines conveniently in front of him side by side; but this brings the sound-conveying tubes leading to the ears directly

in his way, and they become a constant source of annoyance and an impediment to his work. The fixed end of the larger sound-tube being attached to the style-arm, it of course moves with it, so that in traversing the tablet from end to end the position of the tube is constantly changing and is more or less slack, according to its position. This adds to the objections already stated. By my invention these and other equally serious objections to the existing machines not necessary to enumerate are wholly overcome, and a sound-conveyer is produced which is entirely supported upon the machine itself rather than partly upon the operator's ears, and which by reason of its connections and varied adjustments may quickly and easily be fixed in any desirable position for use, whether for convenience in type-writing or for other purposes.

Another object of my invention is to provide the reproducer-arm with a bearing which will at all times hold the arm positively in its proper working position, and without danger of its working loose or in any way becoming displaced. In the arms as hitherto made and supported the bearing was such that it would frequently allow the arm to get partly loose, turn, and drop down a distance, so that excessive weight would come upon the style, and it would score into the wax and destroy the record. This objection is remedied by my construction, and the arm is made to move within fixed limits uniformly over the whole distance of its travel, and is not subject to accidental loosening or displacement. In this connection I add a feature of convenience which simplifies and facilitates the operation of the machine. Heretofore both hands were required to handle the parts and to move the reproducing-arm back and forth upon its supporting-shaft. I provide a small lever, which serves to throw the segmental feed-nut out of engagement and lift the style from the tablet with the same movement, as well as answering for a handle to carry the arm back and forth by one hand while the parts are thus disengaged, which leaves the other hand free to do something else. The construction whereby these and other objects of the invention are accomplished is found in the accompanying drawings, in which—

Figure 1 is a plain front elevation of a por-

tion of a graphophone containing my improvements, with a part of the sound-conveying tube in section. Fig. 2 is a cross-section of the feed-screw and its case on line x α , Fig. 1, and showing a side elevation of the reproducing-arm. Fig. 3 is a rear and bottom view of the bearing of the reproducing-arm. Fig. 4 is a sectional view showing the manner of connecting the sound-conveying tubes with the supporting cross-rod of the main frame.

The improvements herein described will be understood as being connected with the graphophone now in somewhat common use, and I have only shown such parts as are necessary to fully disclose the nature and scope of the invention.

A represents the reproducing-arm, which is of the usual form and has the usual attachments and sound-connections, and B is the feed-screw. Formerly this screw was inclosed by a cylindrical sleeve or tube having a slot longitudinally in its top and its ends firmly fixed in the standards of the frame. This form of sleeve being found objectionable for several reasons, already stated, I have devised a rectangular sleeve or case C, likewise fixed in the end standards c , and provided with a longitudinal slot c' along its upper inclined surface. The feed-screw is located in this casing, and may have the usual power-connections.

D is a three-sided bearing for the arm A, fitting somewhat snugly upon three sides of the casing C, but free to travel longitudinally thereon. This bearing has sufficient length to give it steadiness and accuracy of movement, so that the arm may be held faithfully to its working position and not have room to swing laterally at its point. Upon the bearing D are two ears d , in which the arm A is pivoted, forming an elbow, so to speak, and the weight of the forearm being supported at the elbow and on the style at its respective ends. The arm and its bearing, of course, are designed to travel together, and the necessary feed is obtained by means of a segmental nut g , which engages the feed-screw B through a suitable opening in the bearing D and the slot c' in the case C. This nut is controlled by a hand-lever H, pivoted on the bearing D at one end, the two parts being so connected that when the said lever is slightly depressed the nut will be raised out of engagement with the feed-shaft. The lever H is, however, extended beyond the feed-nut to and beneath the pin or short rod k , projecting laterally from the forearm below the elbow, so that when the lever is depressed to disengage the feed-nut it will also by the same movement lift the style from the tablet, and without releasing the hold, and with one hand, enable the operator to carry the parts back or forth along the feed-shaft to any desired position. In this manner the feed-nut and the style are thrown out of or into working position at the same instant, which enables

the operator to stop the reproduction and feed at any point of the operation even though the other part of the mechanism continues at work, and this also enables him to go back a distance (more or less) and reproduce any part of the speech without stopping the machine or doing anything more than manipulate the arm.

A spring h is placed beneath the lever H, back of its pivot, to hold the feed-nut normally in engagement with the screw, and this of course gives unobstructed action to the free arm, the same as if the lever H and pin or rod k were not used. It will be seen that the bearing of the reproducing-arm cannot possibly have a rotary or turning movement on its supporting sleeve or case, so that the danger of injuring the tablet by the dropping forward of the arm, as formerly, is wholly avoided. The bearing D, of course, is readily detachable, so as to facilitate exchange of arms, and for this purpose it is provided with a latch d' , adapted to swing down, as seen in dotted lines, Fig. 2, and having a spring catch or lock d^2 , Fig. 3, to hold it in closed position. The width of the latch relative to the length of the bearing may be about as seen in Fig. 3, which is wide enough to avoid binding upon the supporting-case.

L is the cross bar or rod socketed at its downwardly-bent ends in yokes m , which are pivotally attached to the end standards of the machine. The yokes and standards are connected by short screw-bolts, which are readily tightened or loosened, so that the rod or rail L may be laid down out of the way when the machine is covered, and as readily raised and fashioned when opened for use. The function of this rod is to support the sound-conveying tube S and the trumpet O. This trumpet in the organization here shown is designed to deliver the reproduced sound to the ear. It is variously movable and adjustable to make it accessible and convenient to one who may be occupied in transcribing the speech which the machine is reproducing, and should be so arranged that the trumpet can be moved to either end of the frame and turned up or down and at different angles, so that the mouth may be brought into position near the ear and remain stationary through all the movements of the machine. To this end we have a primary movement in the rod or bar L back and forth on its yoke-pivots. Next we have the trumpet supported on the bar L by a sleeve P, having a clamp q and thumb-screw q' at one end to lock it on the said bar. This sleeve, when released, is free to slide to either end of the machine, or may be turned on the bar to give the trumpet different elevations. Extending at right angles to this sleeve and integral therewith, at one side, is a socket R, through which the sound-tubing passes, and in which its connection with the stem of the trumpet is made. This tubing consists of a flexible elastic piece S, attached at one end to the reproducing-arm by

means of a section of metal tube S', which fits in the socket in said arm, and at its other end to the socket R by a tube-section τ , preferably screwed into socket R, the piece S being drawn over the ends of said sections, as shown. This piece S is long enough to permit the respective parts to which it is attached to be carried to the opposite extremities of their movements without being drawn taut. Of course the manner of connecting the piece S to the socket R and the reproducer may be varied from that here shown, if desired, as the form of connection is not material, provided it offers no impediment to the flow of the sound.

T represents the stem of the trumpet. This stem fits snugly in the socket R down against the tube-section τ , so as to make a smooth unbroken sound-channel, and is bent substantially at right angles to form an arm t for supporting the trumpet. The trumpet O is here shown as of conical outline with a wide flaring mouth, so as to give greater range to its delivery and tapers down to the dimensions of the arm t , upon which it is firmly secured at the elbow. It will be observed that the said arm projects into the end of the trumpet some distance—say about two inches. This is a very important feature of the invention, as it effectually prevents the resonance of the metal, which is unavoidable if the point of the cone comes immediately over the arm and the sound-waves strike the trumpet directly upon their leaving the arm. By extending the arm into the trumpet some distance an air-cushion forms behind its point of delivery, and the sound-waves spread upon a radius so much enlarged that resonance is wholly avoided, and the utterance is perfectly clear and distinct a considerable distance from the trumpet.

By the foregoing construction the trumpet is supported independently of the reproducer, and may be fixed anywhere along upon the rod or bar L; but, if desired, it may be placed directly upon the reproducer, as heretofore, by merely removing the short tube S'.

The same effect as is now obtained by the rectangular case for the feed-screw could be obtained by making said case or sleeve hexagonal or octagonal or of like outline, the object in any case being to avoid the circular form, which permits the arm-bearing to turn on the sleeve. The latch for the bearing D may have a block d^3 laid into it, and extend laterally upon either side to effectually prevent binding on the sleeve if any trouble were to arise from this cause.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a graphophone, a feed-screw and a sleeve therefor irregular in cross-section, in combination with a bearing for the reproducing-arm fitting said sleeve, substantially as set forth.

2. In a graphophone, a feed-screw and a sta-

tionary sleeve of irregular cross-section over the said screw and provided with a longitudinal slot opening to the screw, in combination with an arm, and a bearing therefor adapted to fit upon the said stationary sleeve, and a feed-nut, substantially as set forth.

3. In a graphophone, a feed-screw adapted to be turned and a fixed angular sleeve or case inclosing said screw, in combination with a bearing for the reproducer-arm, fitting closely upon said sleeve or case at its top and sides, with a latch connecting the sides of the bearing, substantially as set forth.

4. In a graphophone, a feed-screw and its case and a reproducing-arm and a bearing therefor, in combination with a feed-nut and a lever to operate said nut and the reproducing-arm jointly, the said lever having an extension beyond its pivot-point to engage said arm, substantially as set forth.

5. In a graphophone, a jointed reproducing-arm having a lateral projection below the joint and a bearing for said arm, in combination with a pivoted lever engaging said projection and serving to raise the arm, substantially as set forth.

6. In a graphophone, a jointed reproducing-arm having a laterally-extending projection below the pivot, a feed-screw, and a slotted sleeve surrounding the same, in combination with a feed-nut and a single lever connected with said feed-nut and engaging the lateral projection on the said arm, whereby the said arm and the feed-nut may be jointly raised, substantially as set forth.

7. In a graphophone, a feed-screw and a rectangular sleeve over said screw, provided with a longitudinal slot upon its top side, in combination with a reproducing-arm, a three-sided bearing for said arm fitted upon the rectangular sleeve and having a latch to lock it thereon, and a feed-nut projecting through the bearing and the slot in said sleeve, substantially as set forth.

8. In a graphophone, a rod or bar adjustably connected with the ends of the machine and a sound-delivery device adjustably attached to said rod or bar, substantially as set forth.

9. In a graphophone, a rod or bar extending between the ends of the machine and a sound-delivering device rotarily or longitudinally adjustable on said rod or bar, a reproducing-arm, and a flexible tube extending therefrom to the said sound-delivery device, substantially as set forth.

10. In a graphophone, a supporting rod or bar, a sleeve rotarily and longitudinally adjustable thereon, and a cross-sleeve for the sound-conveying tubing, in combination with a reproducer, a flexible tube extending therefrom to the said cross-sleeve, and a trumpet to deliver the sound, supported in said cross-sleeve, substantially as set forth.

11. In a graphophone, a sound-delivering device independently adjustable on the frame of the machine and a flexible tube connect-

ing the said device with the reproducing-arm, substantially as set forth.

12. In a graphophone, a sound-delivery trumpet and a rigid tube supporting said 5 trumpet, and having its end extending into the trumpet beyond the point of connection therewith, substantially as set forth.

13. In a graphophone, a trumpet and a tube 10 having a substantially horizontal arm upon which the trumpet is supported, the said arm extending into the trumpet and leaving an air-chamber therein behind its point of sound-delivery, substantially as set forth.

14. A reproducing-arm, sound-conveying 15 tubing having a flexible portion, a supporting-rod, a sleeve adjustable on said rod and supporting said tubing, a trumpet for deliv-

ering the sound, and an elbow-tube section having a horizontal arm upon which the trumpet is supported, substantially as set 20 forth.

15. In a graphophone, an adjustable rod extending between the ends of the machine, in combination with a sleeve adjustable on 25 said rod and provided with a right-angled sleeve for supporting the sound-conveying tubing, a trumpet, and an elbow-tube joint axially in the said right-angled sleeve, substantially as set forth.

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