Sept. 8, 1936. D. D. JONES 2,053,833

AUTOMATIC MICROPHONE BOOM

Filed May 12, 1934 2 Sheets-Sheet 1

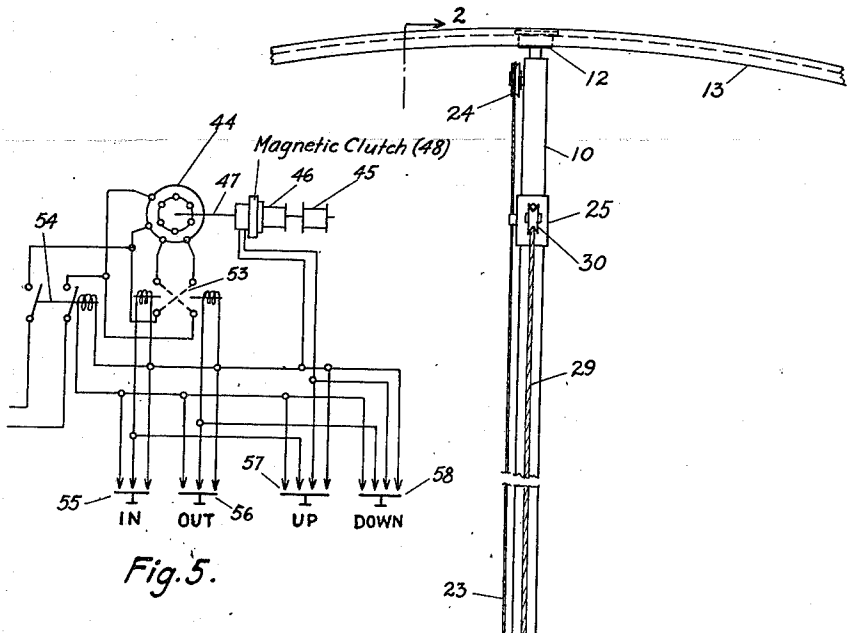


Fig. 5.

Fig. 1.

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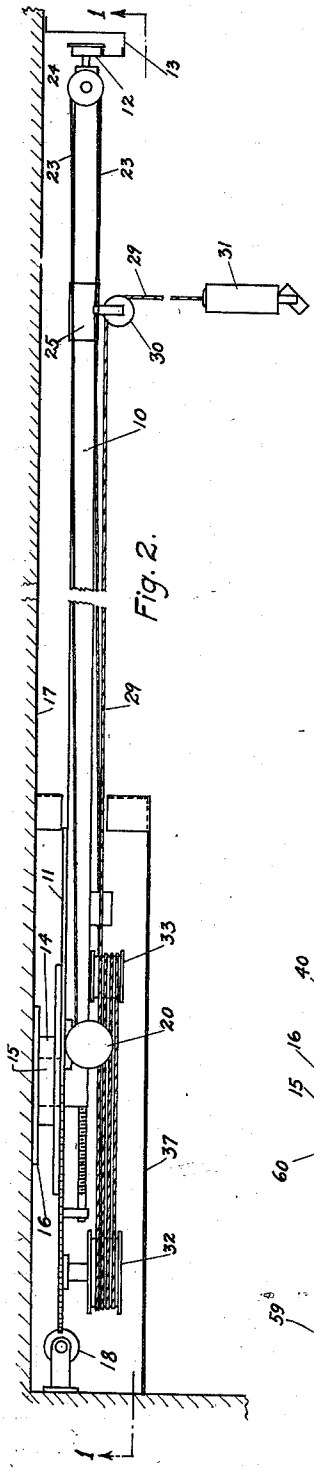


Fig. 2.

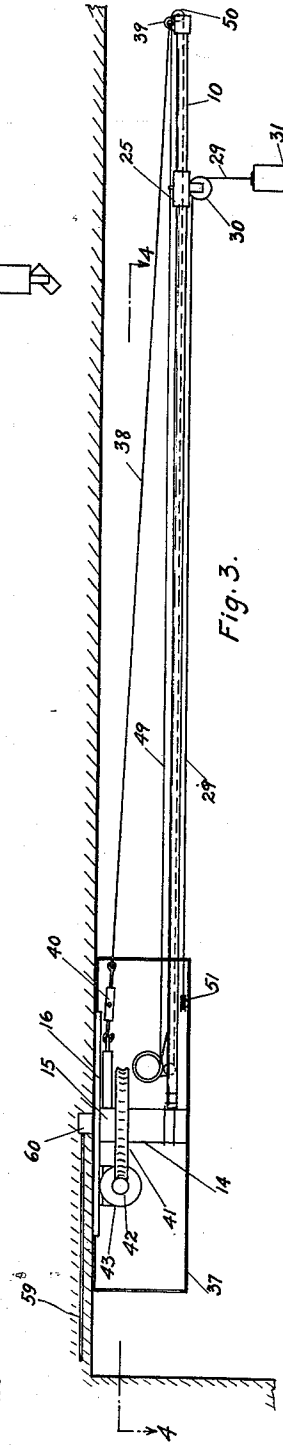


Fig. 3.

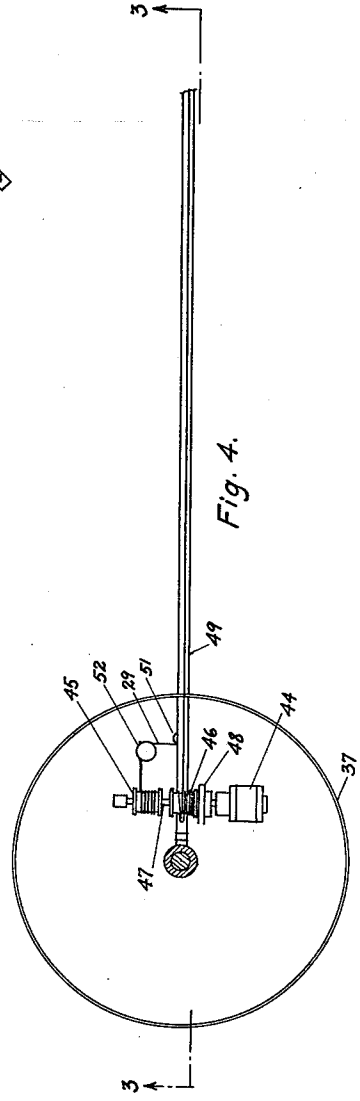


Fig. 4.

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UNITED STATES PATENT OFFICE

2,053,833

AUTOMATIC MICROPHONE BOOM

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Application May 12, 1934, Serial No. 725,233

6 Claims. (Cl. 179—149)

This invention relates to improvements in means for obtaining the correct location of the microphone in a broadcasting or sound recording studio. Heretofore it has been common to have the production man do this by moving the microphone around by hand. It is, however, the main object of the production man to represent the public and see to it that the program as it reaches the listener is of the highest possible quality. This he can not judge very well unless he receives the program transmitted by electrical means similar to those utilized by the ultimate listener. The correct position for the production man is therefore in the studio control room. It is, therefore, the object of the present invention to provide automatic means whereby the production man from his vantage point in the control room may by a touch of his finger direct the microphone to any position desired. From this point he may also supervise the mixing of the program and may thus obtain any effect desired. Further objects will be evident from the following specification and claims.

I attain these objects by mechanism illustrated in the accompanying drawings, in which:

Fig. 1 is a plan view of the device, viewing it from below along the line 1—1 in Fig. 2.

Fig. 2 is a sectional view along the line 2—2 in Fig. 1.

Fig. 3 is a sectional view of a microphone boom suitable for swinging in a complete circle, this section is taken along line 3—3 in Fig. 4.

Fig. 4 is a partial plan view of the boom shown in Fig. 3, seen from above along line 4—4 in Fig. 3.

Fig. 5 is a wiring diagram indicating schematically the connections for obtaining lateral and vertical movements by the use of one motor only.

Similar numerals refer to similar parts throughout the several views.

Referring to Figures 1 and 2, the boom 10 is at one end supported under the disc 11 while the other end is supplied with a wheel 12 riding on the track 13. The disc 11 is mounted on a hub 14 which is journalled on pivot 15 which is rigidly mounted on plate 16 supported from the ceiling 17. On part of the circumference of disc 11 is cut gear teeth which are in mesh with the worm gear 18 driven by motor 19 whereby said disc 11 may be rotated at will around pivot 15. On disc 11 is further mounted motor 20 driving shaft 21 carrying drum 22 upon which are several turns of the cable 23 which runs out along the boom 10 to a pulley 24 at the far end of same and returns again to drum 23. At one point said cable 23 is fastened to the trolley 25 which thus by starting the motor 20 may be made to move along the boom 10. Shaft 21 extends to bearing 26 and carries worm gear 27 driving drum 28 upon which is wound the cable 29 which runs to a pulley 30 on trolley 25 and in the end of which cable 29 hangs the microphone 31. The cable 29 upon leaving drum 28 goes around drums 32 and 33 in several turns before going to pulley 30. Drum 32 is mounted rotatably on a shaft supported on disc 11 while drum 33 is mounted on block 34 through which goes the lead screw 35 extending from the shaft of the geared head motor 36. By rotating this screw 35 one way or the other drum 33 may be moved along the screw 35 and thus shorten or lengthen the distance from drum 32. As the cable 29 is held taut by the weight of the microphone 31 any movement of the drum 33 will raise or lower the microphone.

The diameters of drums 22 and 28 and the ratio of the worm gear 27 are chosen in such relationship that turning the shaft 21 will move the trolley 25 laterally at the same time as the drum 28 will take up or give out of cable 29 so as to keep the microphone in the same elevation. To change the elevation of the microphone 31 it is necessary to start the reversible motor 36. All three motors may be controlled in known way by push button control from the control room. The disc 11 with the motors and drums are all covered by a cover 37 with the boom 10 extending radially through a slot in same.

In Figures 3 and 4 is shown a simplified modification of my invention in a form suitable for use where rotation in 360 degrees is desirable. In this case no track is employed, the boom 10 being supported by a stay 38 fastened at one end to the eye 39 and at the other end to the turn buckle 40 by which means a suitable tension may be obtained. The turn buckle 40 is fastened to a member supported from the hub 14 the lower end of which also supports the inner end of boom 10. On hub 14 is mounted a worm gear 41 driven by motor 43 supported on plate 16. Hub 14 further supports motor 44 the shaft of which carries drums 45 and 46. Drum 46 is connected to shaft 47 of motor 44 by means of an electrically operated clutch while drum 45 is rigidly connected to the shaft. Drum 46 carries several turns of cable 49 which is endlessly connected to trolley 25 over pulley 50 at the far end of boom 10 and the return of this cable 49 goes through the tubular part of beam 10 to drum 46.

The microphone cable 29 is rolled up on drum

45 from which it leaves through sheaves 51 and 52 and follows the boom 10 to pulley 30 and microphone 31 as explained above.

In Fig. 5 is shown the electrical hook-up for the control of motor 44 which in the latter embodiment of my invention serves to obtain both lateral and vertical movements of the microphone. The reversing switch 53 and the magnetic contactor 54 may be located in any convenient location while the push button switches 55, 56, 57, and 58 are located in the studio control room. The push button switches 55 and 56 serve to start the motor 44 in one or the other direction causing an inward or respectively outward movement of the trolley 25. The mechanism of this operation is much similar to that described for the first embodiment of my invention. The drums 45 and 46 are made of suitable diameter so that when both rotate at the same speed in one direction the trolley 25 is moved while the microphone is maintained on a fixed level. By pushing either one of the two push button switches 57 and 58 the magnetic clutch 48 will disengage the drum 46 from the shaft 47 and at the same time apply a brake to prevent the cable from rolling off. This will leave the trolley 25 in a fixed position while the microphone 31 may be raised or lowered at will by operating drum 45. It is thus seen that the four push button switches 55, 56, 57, and 58 will in turn respectively cause the following actions as shown in Fig. 5: "In", "Out", "Up", "Down". Two separate push button switches for the operation of motor 43 will enable the production man to turn the boom into any desirable position, these switches may suitably be marked "Left" and "Right." It is obvious from the foregoing that several movements may be done simultaneously. In the first described embodiment of my invention where three motors are used three separate movements may be done at one time, while in the latter case two may be carried out simultaneously.

In Fig. 3 is further shown the conduit 59 terminating in conduit box 60 directly above the end of the hollow pivot 15. Through this conduit may be brought in the required wiring for the operation of the motors. Separate conduits may be similarly placed to carry the heavily shielded microphone cable from the drum 45 to the control room. The cover 37, as shown in Figures 3 and 4, is mounted on the hub 14 and rotates with the boom 10, a slot for the boom is therefore not necessary. The cover 37 entirely encloses the operating mechanism and the unique compact construction produces a device which may be easily mounted under the ceiling and which is unobstructive and of pleasing appearance.

It will thus be seen that there has been provided a simple, relatively inexpensive, dependable and yet unique means for automatically locating the microphone in broadcasting and sound recording studios. This invention is of a novel and valuable type well calculated to attain its various objects. These objects have heretofore not been possible of attainment as no such apparatus was known which would fully meet all the requirements pertaining to the present invention. While various particulars of description, as to materials, parts and shapings have been hereinabove detailed, this has been done in aid of disclosing as clearly as possible an embodiment of the invention as now preferred; and it is to be understood that these can be varied, apparently to a large extent, within the appended claims, which define the scope of the protection contemplated.

I claim as new and desire to secure by Letters Patent of the United States:

1. In an automatic microphone boom the combination of a ceiling supported pivot; a horizontal radial beam supported at one end on said pivot; a wheel journalled at the opposite end of said beam, said wheel travelling on a circular track concentric with said pivot; a radially moveable trolley on said horizontal beam; microphone supporting means carried by said trolley; motor-driven take-up means for the microphone cable; motor-driven means whereby said radial beam, said trolley and said microphone may be moved at will.

2. In an automatic microphone boom the combination of a ceiling supported pivot; a horizontal radial beam supported at one end on said pivot; a wheel journalled at the opposite end of said beam, said wheel travelling on a circular track concentric with said pivot; a radially moveable trolley on said horizontal beam; microphone supporting means carried by said trolley; motor-driven means whereby the microphone may be held on a fixed elevation while trolley is moved.

3. In an automatic microphone boom the combination of a ceiling supported pivot; a horizontal radial beam supported at one end on said pivot; a wheel journalled at the opposite end of said beam, said wheel travelling on a circular track concentric with said pivot; a radially moveable trolley on said horizontal beam; microphone supporting means carried by said trolley; a circular disc mounted at the pivotal end of said horizontal beam, said disc having gear teeth cut on part of its circumference; a reversible motor-driven worm engaging said gear teeth whereby said disc and horizontal radial beam may be moved in a sweeping circular motion.

4. In an automatic microphone boom the combination of a ceiling supported pivotal arbor; a horizontal radial beam supported at one end on said pivotal arbor; a wheel journalled at the opposite end of said beam, said wheel travelling on a circular track concentric with said pivotal arbor; a radially moveable trolley on said horizontal beam; a circular disc mounted at the pivotal end of said horizontal beam; a motor-driven drum mounted on said disc; wire ropes from said drum running as an endless belt to a pulley on the track end of said horizontal beam; one point of said wire rope connected to said trolley whereby radial movements of same may be obtained by running the motor one way or the other.

5. In an automatic microphone boom the combination of a ceiling supported pivotal arbor; a horizontal radial beam rotatable around said arbor; a moveable trolley on said horizontal beam; remote controlled motor-driven cable drums supported by said pivotal arbor, microphone supporting and electric conducting means engageable on said drums and said trolley.

6. In an automatic microphone boom the combination of a pivotal arbor, a horizontal radial beam rotatably mounted on said arbor, a moveable trolley on said beam, a pulley supported from said trolley, a microphone cable running over said pulley and supporting a microphone at one end; take-up drums for said microphone cable mounted at the pivotal end of said radial beam; remote controlled motor driven means coacting with said take-up drums, motor driven means for turning said radial beam around said arbor thereby permitting three independent motions of the microphone at one time.

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