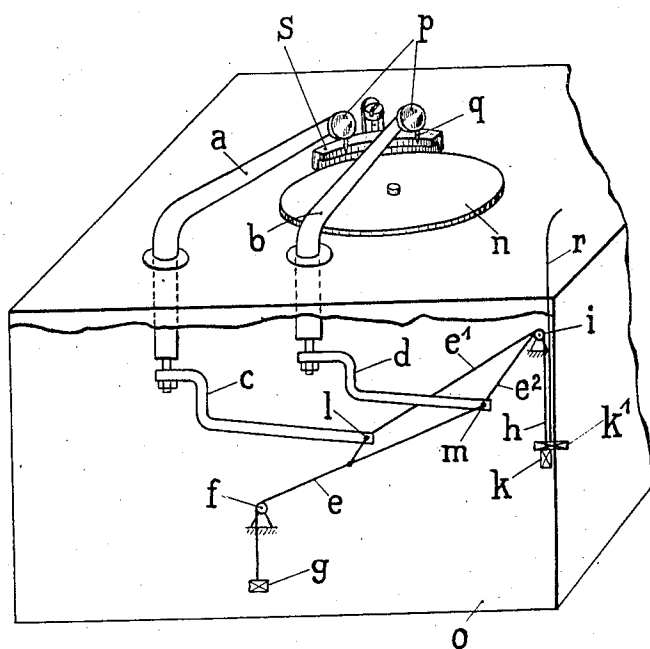


Nov. 15, 1927.

1,649,477

H. J. KÜCHENMEISTER
SOUND REPRODUCING MACHINE
Filed Feb. 28, 1925



Inventor:

Heinrich J. Küchenmeister

Patented Nov. 15, 1927.

1,649,477

UNITED STATES PATENT OFFICE.

HEINRICH J. KÜCHENMEISTER, OF BERLIN, GERMANY.

SOUND-REPRODUCING MACHINE.

Application filed February 23, 1925, Serial No. 12,263, and in Germany February 23, 1924.

My invention relates to improvements in sound reproducing machines, and more particularly in machines comprising a plurality of sound boxes. One of the objects of the improvements is to provide a machine of this type in which automatic means are provided for setting the styli of all the sound boxes into engagement with the record grooves. With this object in view my invention consists in connecting suitable parts of the carrier of the sound boxes with means for moving the sound boxes across the record disk, the styli being first placed on the portion of the disk having no record grooves formed thereon, and being gradually moved by the said means over the said portion of the disk and into position for engagement with the groove. Another object of the improvements is to provide means for preventing irregular movement of the sound boxes and styli over the record disk, and with this object in view I connect the carrier of the sound box with means for exerting equal and oppositely directed forces on the said carrier. For automatically throwing all the styli into position for engagement with the record groove I connect the said carriers of the sound boxes with each other so that all the sound boxes or styli perform corresponding movements.

For the purpose of explaining the invention an example embodying the same has been illustrated in the accompanying drawing showing a perspective view of the apparatus.

In the example shown in the figure the sound reproducing machine comprises a cabinet or casing *o* enclosing the usual horn and having a record disk carrier *n* mounted thereon. The said record disk carrier cooperates with two sound boxes *p* and styli *q*, which sound boxes are carried by the usual tone arms *a* and *b*. The latter are rockingly mounted in suitable bearings made in the top wall of the cabinet *o*, and to their bottom ends arms *c* and *d* formed at their ends with eyes *l* and *m* are secured. To the said eyes branches *e*¹ and *e*² of a string *e* are attached, which string is trained on rollers *f* and *i* and has weighted bodies *g* and *k*, *k'* attached to its ends. The weighted body *g* has the tendency to rock the arms *a* and *b* with their styli *q* from the outer margin towards the center of the record disk carrier *n*, while the weighted bodies *k*, *k'* when their weights are combined act in opposition to the body

g and tend to move the styli from the center of the carrier *n* towards the margin thereof. Preferably the combined weights of the bodies *k*, *k'* exceed that of the body *g*, and means are provided to compensate the difference of the weights, so that the weight of the body *g* may be made to move the styli from the margin of the carrier *n* towards the center thereof. Any known or preferred means may be provided for thus compensating the difference of the weights. To show what may be done the bodies *k*, *k'* are normally arranged one on top of the other so as to combine the same, in reality, into one weight, but the body *k'* is adapted to be raised by means of a string *r* from the body *k* and thus leave only the latter body to act upon the string *e*.

To prevent the styli from being moved by the weighted bodies *k*, *k'* away from the disk *n* a segmental margin stop *s* is secured to the top face of the casing *o*, which stop is formed with a stop face disposed concentrically of the disk *n*, the length of the said margin stop being at least equal to the distance between the styli.

In the operation of the apparatus the sound boxes *p* are moved outwardly and with their styli into engagement with the concentric portion of the margin stop *s*, whereupon the subsidiary body *k'* is lifted by means of the string *r*. Now the weight of body *g* overcomes that of the single body *k* and rocks the arms *a* and *b* with the styli *q* towards the center of the carrier *n* so that both styli are brought into engagement with the outermost groove of the record disk on said carrier. I have found that by thus mechanically moving the arms the styli are securely thrown into engagement with the proper portion of the record groove, and that in this respect the operation is more reliable than manually operated tone arms, the hand being not sufficiently sensitive to insure engagement of both styli with adjacent points of the record groove. While the record on the carrier *n* rotates and the styli are gradually advanced towards the center the arms *a* and *b* are acted upon by both weighted bodies *g* and *k*, and the said bodies steady the sound boxes and counteract any tendency thereof to leap in radial direction and from one spiral of the groove into the adjacent one.

While in describing the invention reference has been made to a particular example

embodying the same I wish it to be understood that my invention is not limited to the construction shown in the drawing, and that various changes may be made in the general arrangement of the apparatus and the construction of its parts without departing from the invention.

I claim:

1. In a sound reproducing apparatus, the combination with a cabinet, a record disk carrier and operating means therefor; of a plurality of sound boxes and their styli, and means within said cabinet for simultaneously moving the sound boxes from the margin of said carrier to engage said styli with the outer groove of a record disk on said carrier.

2. In a sound reproducing apparatus, the combination with a record disk carrier and its operating means; of a plurality of sound boxes and their tone arms, and flexible connections between said tone arms operable to move said sound boxes from the margin of said carrier toward the center thereof.

3. In a sound reproducing apparatus, the combination with a cabinet, a record disk carrier and means for operating the same, a plurality of sound boxes and their styli, tone arms carrying said sound boxes and mounted for movement transversely of said carrier, levers connected with said tone arms and located within said cabinet, flexible con-

nections between said levers, and means attached to said connections for swinging said tone arms and associated sound boxes transversely of said carrier to engage said styli with the outermost groove of a record disk on said carrier.

4. In a sound reproducing apparatus, the combination with a record disk carrier and its operating means; of a plurality of sound boxes and their styli, automatic means for simultaneously moving the sound boxes from the margin of said carrier towards the center thereof, and a margin stop secured to said apparatus and having a stop face disposed concentrically of said carrier.

5. In a sound reproducing apparatus, the combination with a disk carrier, a plurality of tone arms, and a sound box carried by each arm; of flexible connections between said tone arms, a pair of weighted bodies at one end of said connections for simultaneously moving the tone arms in one direction across the face of a disk on said carrier, one of said bodies being detachable from the other, and a single weighted body at the other end of said connections operable to move said tone arms in the opposite direction when the first named bodies are detached one from the other.

HEINRICH J. KÜCHENMEISTER.