

March 12, 1946.

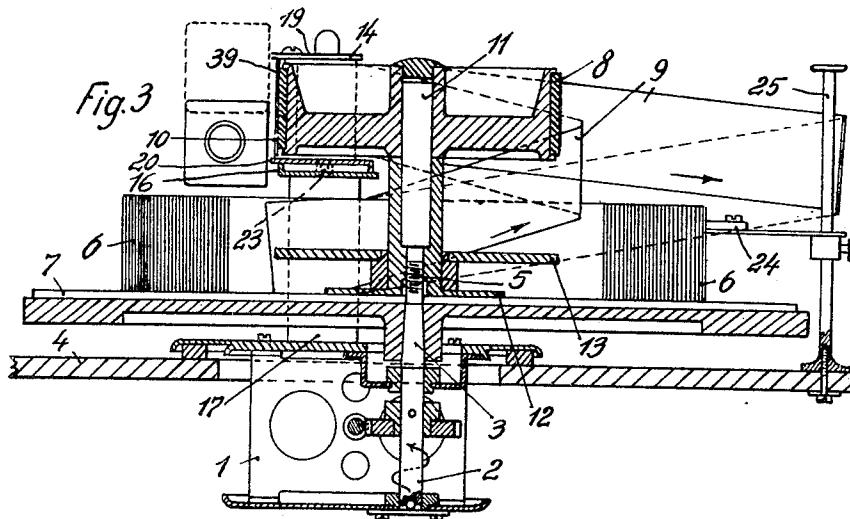
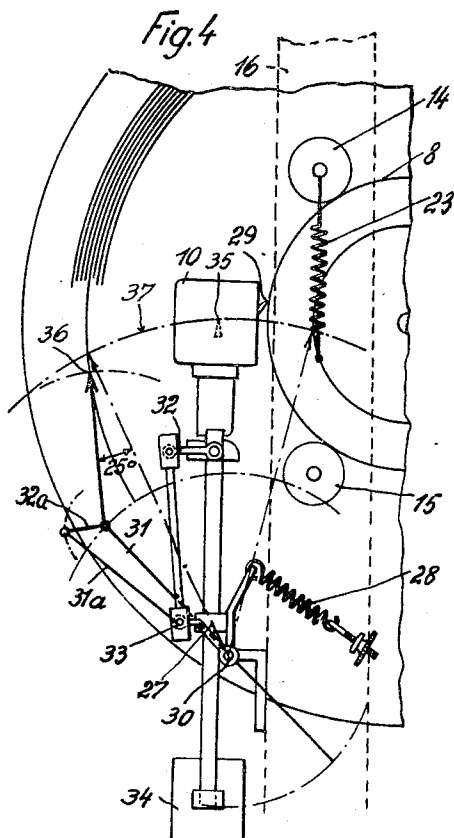
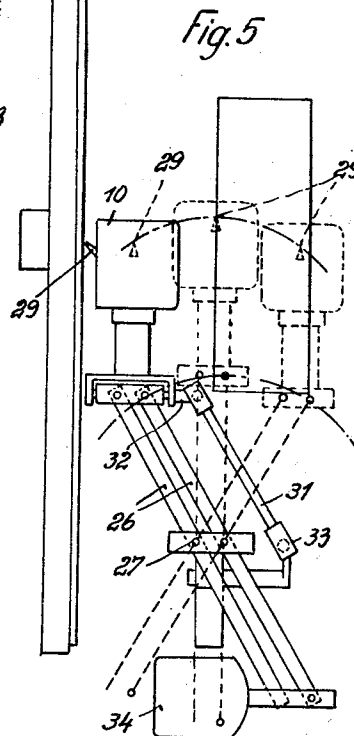
G. FRIES

2,396,563

SPEAKING MACHINE

Filed May 14, 1941

3 Sheets-Sheet 2



Inventor:

Gustav Fries

By: Stevens and Davis
Attys.

March 12, 1946.

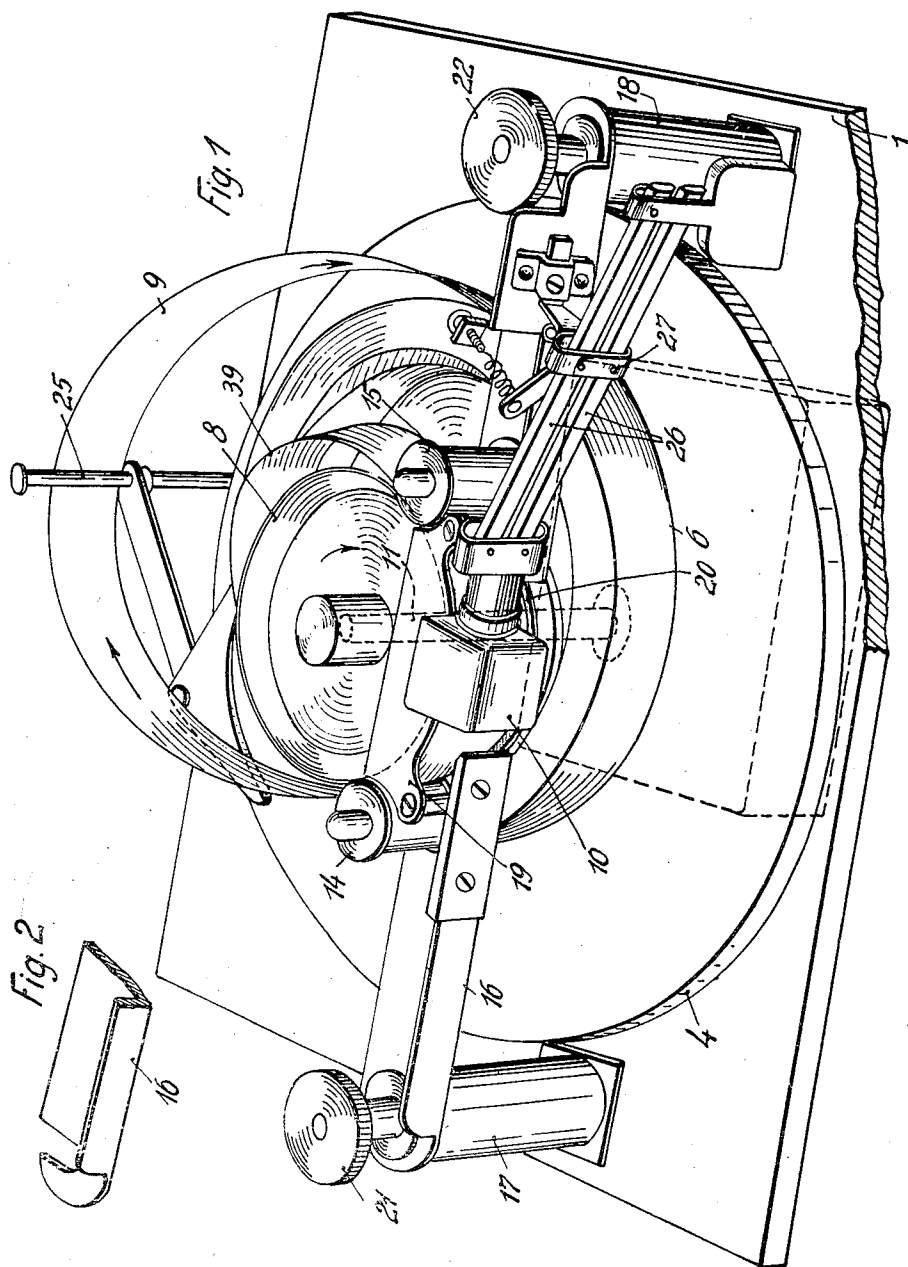
G. FRIES

2,396,563

SPEAKING MACHINE

Filed May 14, 1941

3 Sheets-Sheet 1



Inventor:

Gustav Fries

By: Stevens and Davis
Attys.

March 12, 1946.

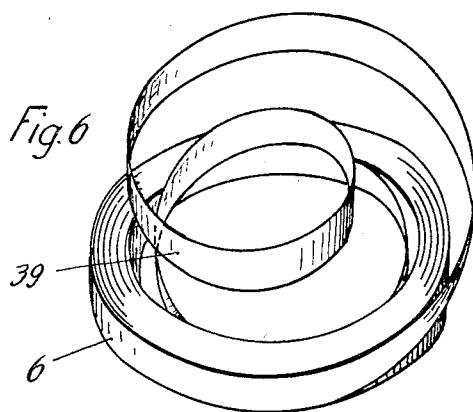
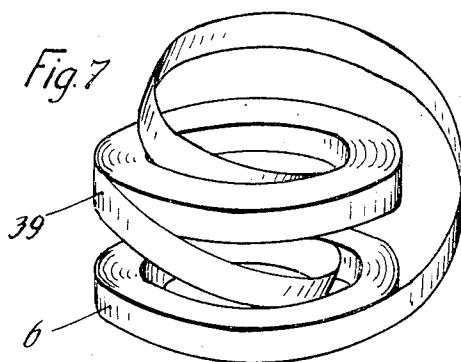
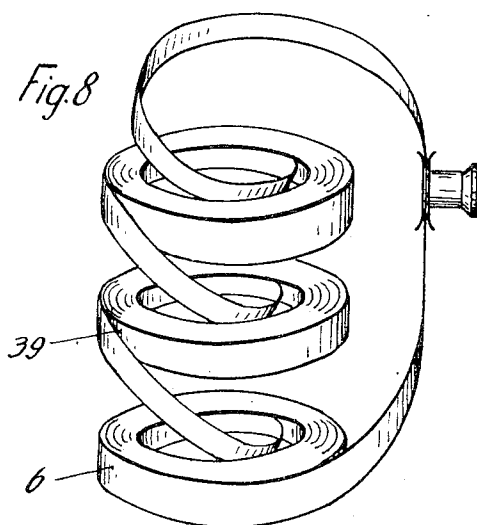
G. FRIES

2,396,563

SPEAKING MACHINE

Filed May 14, 1941

3 Sheets-Sheet 3



Inventor:

Gustav Fries

By Stevens and Davis
Attys.

UNITED STATES PATENT OFFICE

2,396,563

SPEAKING MACHINE

Gustav Fries, Berlin-Charlottenburg, Germany;
vested in the Alien Property Custodian

Application May 14, 1941, Serial No. 393,493
In Germany January 31, 1940

6 Claims. (Cl. 274—11)

The present invention relates to speaking machines or instruments provided with means for scanning a circular band.

It is already known to provide apparatus for the purpose of recording and reproducing acoustic events in connection with films, in which two reels of film are concentrically arranged one above another on the axis of a record reproducing machine and are driven for re-winding by means of said axis.

An object of this invention resides in the provision of a solution of the problem of readily re-winding circular film strips of considerable length for the purpose of their recording or reproduction.

Another object of this invention resides in the provision of an apparatus which makes it possible for effecting in a simple manner the re-winding operation of a circular film band of considerable length.

Still another object of this invention resides in the provision of an apparatus whereby substantially noiseless unwinding of the film at the controlling parts can be effected without the provision of safeguards to insure smooth running of the parts.

This invention also contemplates an apparatus that can be used for scanning either disk records or endless sound tracks on film.

The above objects are made possible by the new device which makes use of endless circular films having a plurality of sound tracks, which are driven directly, i. e. without reel cores, and are adapted to be scanned, while transferring from one sound track to the other by the parallel displacement of the scanning organ, in such a manner that the receiving drum, the guide members for the re-winding and the "speaking head" with vertical parallel guide are united in a single arrangement mounted on top or adjacent to the turntable of the speaking machine. The use of machines for other than circular film apparatus is already known, i. e., for record playing machines, reels of non-endless bands arranged coaxially one above another and to use as for re-winding the usual driving mechanism for the turntable of the record player. It is also known that reels without spools can be directly driven with a constant unwinding speed, while the winding-on spools having a varying diameter will result in a varying unwinding speed. However, the recording and reproducing apparatus, according to the present invention, makes it possible for the first time to effect in a simple manner the re-winding operation of a circular

film band of considerable length, for example 200 meters. At the same time there is obtained an almost noiseless unwinding of the film at the controlling parts, which makes it unnecessary to provide special safeguards to insure smooth running of the parts.

In the accompanying drawings one construction according to the invention is shown by way of example.

In these drawings:

Fig. 1 is a perspective view of the general construction of the device,

Fig. 2 is a perspective detail view of one end of a bridge shown in Fig. 1,

Fig. 3 is a vertical section on the line *a—b* in Fig. 1,

Fig. 4 is a plan view illustrating the movement of the control point in horizontal direction,

Fig. 5 is a view showing the movement of the control point in vertical direction, and

Figs. 6 to 8 show details of the reel formation.

As shown in Fig. 3 the plate 4, for supporting a disc record is fixed by a cone 3 upon the shaft 2 of the motor 1 of a driving gear of a phonograph. The prolongation of the shaft 2 has a left-hand thread 5 as is used in a manner known per se for fixing a record disc for the purpose of sound recording.

To reduce as far as possible the friction of the individual layers of the circular film reel 6 it is of importance to arrange upon the plate 4, and between the latter and the reel 6, a plate 7 of glass or other hard and polished material.

The drum 8, serving to lead the film 9 in front of the pick-up member 10, is, by means of the shaft 11 and the disc-like enlarged lower end 12 of the latter, fixed centrally by means of the left-hand thread 5 to the shaft 2 of the plate 4 so that it will be free of vibrations.

Besides the drum 8 a guide disc 13 is concentrically disposed with respect to the shaft 11, said disc being attached to the shaft 3 at a height which is about one half the width of the film. The disc 13 has about the same diameter as the drum 8 and serves to prevent the film 9, running out of the circular reel 6, from reaching the shaft 11 which in the present case might disturb the passage of the film.

Upon the bridge 16, carrying the rollers 14 and 15 and the control member 10 and resting upon the posts or uprights 17 and 18, guide members 19 and 20 are mounted (Fig. 1) which serve to guide the film 9 properly in front of and along

the control member 10 and prevent film 9 from sliding upwards or downwards.

After loosening the fixing screws 21 and 22, the bridge 16 may be turned around the post or upright 18 for the purpose of exchanging the film. As shown in Fig. 2 the bridge 16 is provided with a recess to allow removal from the post or upright 17. The lower film roll 6 then lies perfectly free and may be removed as easy as a disc record. The upper film reel is designated 39. The insertion is just as easy, because, after placing the film reel 6 upon the plate 4 carrying the disc 7, the film running out of the inner layers is, when the bridge is moved towards the operative position, arranged between the guide members 19 and 20 and on closing the bridge 16 is automatically brought into the proper position around the drum 8 by the rollers 14 and 15.

To ensure running the film off between the guide members 19 and 20 around the drum 8 without causing compression of the film material, and also ensuring that the film perfectly rests upon the drum, the roller 14 at the running off side is formed as a pressure roller which is drawn against the drum by a spring 23 connected between bridge 16 and said roller 14 (see Figs. 3 and 4), whereas the roller 15 serves to closely guide the film 9 towards the drum 8.

Preferably the upper surface of the drum 8 is coated with gum in a manner known per se to ensure good driving of the film.

To warrant a concentric rotation of the circular film reel 6 about the shaft 11 an adjustable finger 24 is provided against which the film reel bears with slight pressure during rotation. As the friction is very slight, the use of rollers is not necessary here.

As the control member 10 for scanning of films or disc records must be properly guided vertically as well as horizontally a specially constructed holder 26 is provided.

The holder 26 acts in the manner of a weighing arm for the vertical scanning. The pivot of the weighing arm is located at 27 and the weight of the control member 10 is balanced by the counterweight 34. By means of a spring 28, a needle 29 serving for film scanning is lightly pressed against the film and thereby is guided in the groove cut in the film.

For horizontal scanning, the control head 10 is rotated through 90° so that the needle 29 will come to rest upon the disc record. The pivot of the holder 26 is now located at 30 and a link 31 with a lever 32 at the control head 10 and the pivot 33 cause the needle 29 in the groove of the disc record to always be located in the direction of the tangent to the track of the disk, when moving over the record.

This is represented in Fig. 4 in which the needle 29 is shown at 35 in the position at the inner radius of the disc record, and indicated diagrammatically at 36 at the outer radius with the linkage 31a/32a. It is to be seen that in this way the correction of the position of the needle with regard to the tangent would amount to about 25° relative to the position over the way 37 which the needle would perform, with the pivot of the holder 26 at 30 and the holder rigidly connected to the control head 10.

The rectilinear guidance of the sound control point 10 along the film 9 is of particular importance, if magnetic or photographic records come into consideration, as these are effected by means of magnetic or optical gaps and hereby an inclined position of the scanning gap rela-

tively to a straight record would cause a considerable sound distortion. For scanning a sound groove by means of a needle it is not so critical, if the length of the way from the point of the needle 29 to the pivot 30 or 27 respectively is rather large, because the point of the needle is punctiformly guided in the groove. This is known from the usual sound take off device for disc records.

If the holder for the control head is positively guided, then by employing corresponding control heads, the device may be used for recording and reproducing acoustic events in accordance with all known methods of recording and reproducing.

A substantial advantage of the invention consists in the fact that practically no upper limit exists for the length of the reel as may be gathered from the following consideration.

In the drawings, in Figs. 1 and 3, the second reel 39 is located above the first reel. The reel 39 is concentrically located above the reel 6. This second reel 39 rolls off about the drum 8. It consists of one winding only which, when being considered from above, represents a closed winding and, therefore, technically must be designated as a reel, because a reel begins with the first layer and, therefore, may be of one layer only and yet be a reel. Fig. 6 represents this formation. Of course, this second reel may also be of several layers and yet the re-winding of the endless film is possible free of objections, as has been shown by tests (Fig. 7). From these tests the possibility results that reels of any desired number of layers may be arranged one above the other to re-wind endless films of any desired length, for instance to produce picture recording cameras in which a single loading with film in the dark room is sufficient for an uninterrupted time of taking pictures of several hours (see Fig. 8).

Finally, a special peculiarity in the concentric arrangement of reel layers of an endless film one above the other is, that even with films having an upper surface sensitive to friction, for instance a light sensitive layer, the upper surface is not subjected to the danger of wear and means for protecting such surfaces, such for instance, as forming the subject matter of older patents are rendered superfluous with the arrangement according to the present invention.

What I claim is:

1. In an apparatus for unwinding and winding, a frame, an endless roll of film to be scanned having a periphery and a center, a turntable rotating on said frame and presenting a substantially horizontal supporting surface upon which said roll of film is supported, a film handling assembly mounted on said turntable with its axis in alignment with the axis of rotation of said turntable, said film handling assembly comprising drum means of substantially cylindrical configuration positioned directly above said supporting surface, means rotatable inside the center of said film roll to guide the film from the center of said roll about said drum means, stationary means attached to said frame to press a portion of the film against said drum means, substantially vertical means mounted on said frame outside the periphery of said film roll to guide the film from said drum means to the periphery of said roll, and scanning means adjacent said portion of the film.

2. In an apparatus according to claim 1, wherein said means for pressing the film includes a

pair of rollers to press the film portion against said drum means at two sides of the point at which the film is scanned by said scanning means.

3. In an apparatus according to claim 1, where-
in a pair of posts is rigidly attached to said frame
on a line which is substantially tangent with re-
spect to said drum means and located at opposite
sides of said turntable, and a horizontal support-
ing member mounted at one end on one of said
posts and removably attached at its other end to
the other of said posts, said supporting member
providing a substantially rigid support for said
scanning means.

4. In an apparatus according to claim 1, where-
in said rotatable means inside the center of said
film roll comprises a disc-like member of approxi-
mately the diameter of said drum means, said
disc-like member being rigidly attached thereto
above said supporting surface and substantially
at the center of the width of said film.

5. In an apparatus for reproducing sound re-
corded on a sound track, a frame, a turntable as-
sembly rotating on said frame providing a sub-
stantially horizontal supporting surface for sup-
porting a sound record, a record handling assem-
bly removably mounted on said turntable, said
record-handling assembly comprising drum

means of substantially cylindrical configuration
positioned directly above and aligned with the
axis of said turntable, means to guide the record
from said horizontal supporting surface to said
drum means, stationary means attached to said
frame to press the record against said drum
means, substantially vertical means mounted on
said frame at the side of said turntable to guide
the record from said drum means to said hori-
zontal supporting surface, and a scanning assem-
bly movably mounted directly above said sup-
porting surface and associated with said drum
means, said scanning assembly being adjustable
to be associated with said horizontal supporting
surface, when said record-handling assembly is
removed.

6. An apparatus according to claim 5, said
scanning assembly including a scanning head
and a scanning arm, said scanning head being
supported at the free end of said scanning arm
and being adapted to be turned 90° on and with
respect to said arm in such a manner that, in
its one position, said scanning head is associated
with said drum means and in its other position,
is associated with said horizontal supporting sur-
faces.

GUSTAV FRIES.