Dec. 12, 1944. E. W. NORTH ET AL 2,364,747

SELF-BALANCING LID SUPPORT

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Fig. 1.

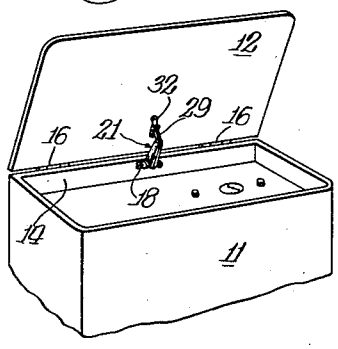


Fig. 2.

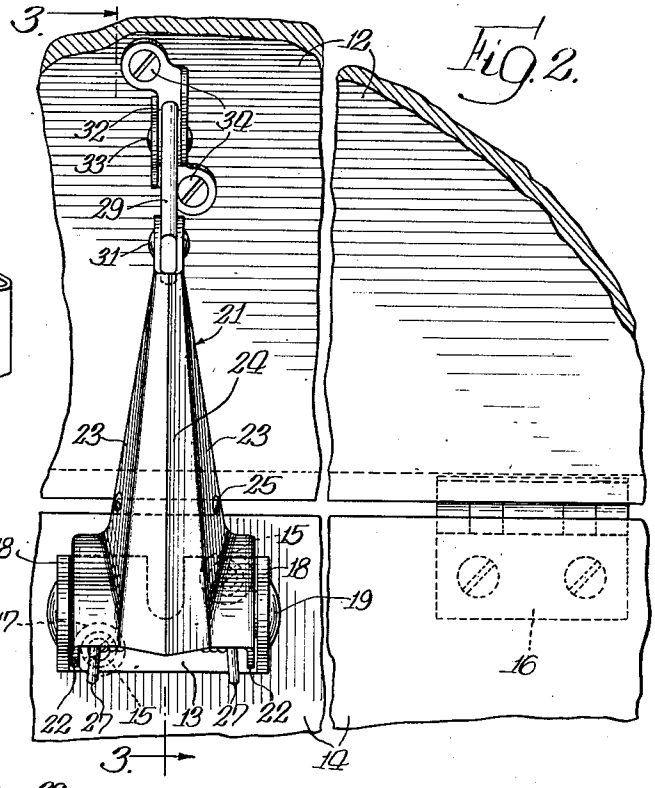


Fig. 3.

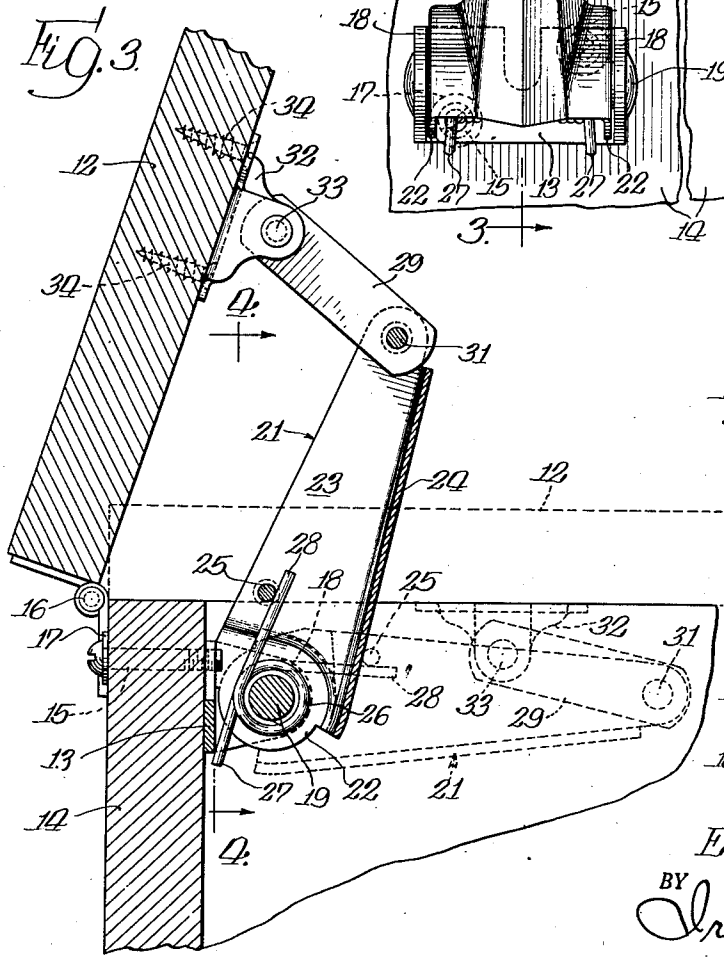
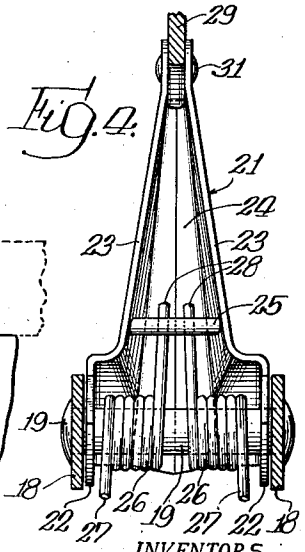


Fig. 4.



INVENTORS.
Edwin W. North.
Roy A. Stone,
BY Ira J. Wilson
Atty.

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Fig. 6.

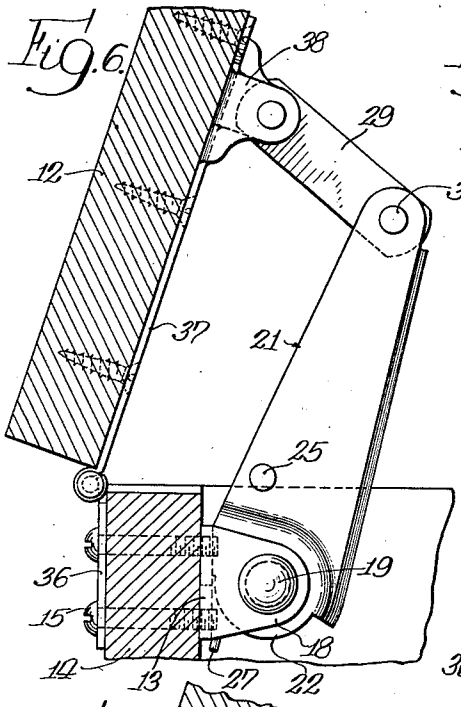


Fig. 7.

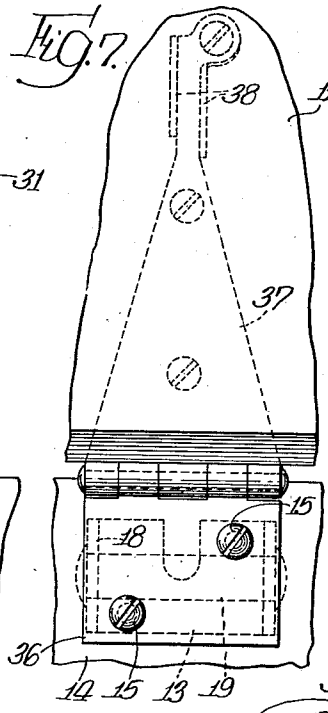


Fig. 5.

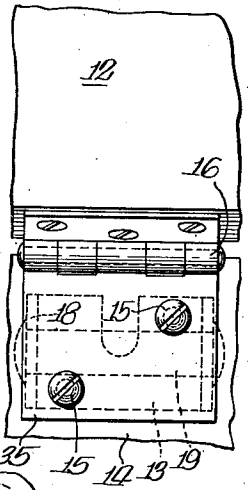


Fig. 8.

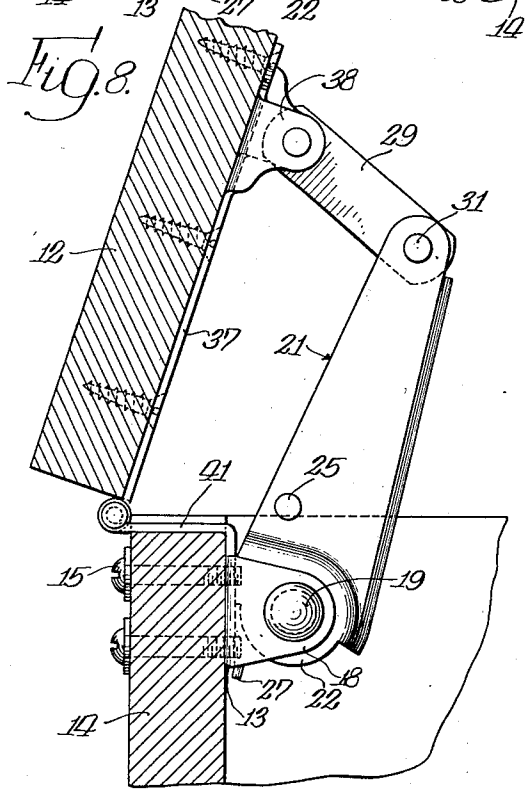
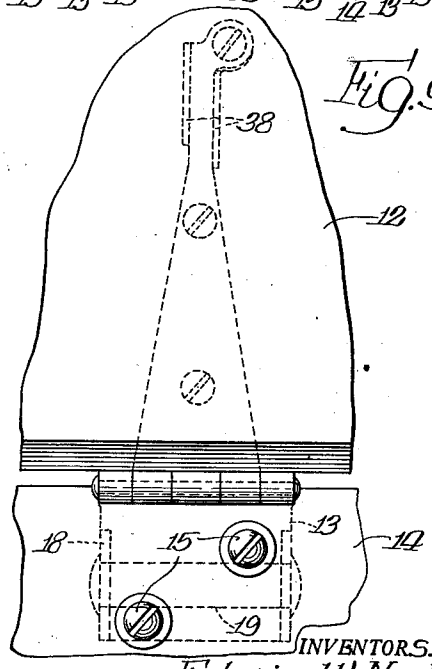


Fig. 9.



INVENTORS.
Edwin W. North
Roy A. Stone,
BY Ira J. Wilson
Atty.

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UNITED STATES PATENT OFFICE

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SELF-BALANCING LID SUPPORT

Edwin W. North and Roy A. Stone, Rockford, Ill., assignors to National Lock Co., Rockford, Ill., a corporation of Delaware

Application November 30, 1942, Serial No. 467,432

2 Claims. (Cl. 217—60)

This invention relates to a device for automatically supporting and balancing a cabinet lid such, for instance, as the lid of a radio or phonograph cabinet. The function of the device is to support the lid in substantially balanced condition in all positions between fully open and fully closed, so that the lid will not slam or be subject to injury in operation and can be opened and closed with a minimum of effort.

Supports for this purpose heretofore customarily used have a wide base plate carrying a long housing with the lever arm at one end thereof and designed to be mounted either upon one of the side walls or upon the motor board of the cabinet and in a predetermined set position. It is often inconvenient to apply such a support either to a side wall or to the motor board and, furthermore, its location or that of its lever arm sometimes obstructs or interferes with some of the moving parts of the cabinet instrument or with the manual manipulation of the controls.

One of the primary purposes of our present invention is to provide a small compact support which can be mounted upon the back rail of the cabinet where it is least likely to interfere with the operation or manipulation of the instrument mounted in the cabinet, and which, because of the central location of the lever arm, is capable of being mounted in any desired position lengthwise of the rail. The support, being symmetrical and capable of universal application, may be manufactured in quantities in standard form and mounted by the cabinet manufacturers in any position best suited to the requirements of the particular instrument installed in the cabinet.

Another purpose of our invention is to provide a support of the character indicated which can be readily and securely mounted without injury to the motor board or other portions of the cabinet and which will not only be strong, durable and reliable in operation, but at the same time will present an attractive and pleasing appearance.

Other purposes and advantages of the invention will be appreciated as the same becomes better understood by reference to the following description when taken in connection with the accompanying drawings.

Referring to the drawings,

Fig. 1 is a miniature view in perspective of a cabinet equipped with our invention;

Fig. 2 is a fragmentary view looking at the inner face of the back rail of a cabinet with our improved support applied thereto, the cabinet lid being shown in partially open position;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary view of a modified form in which the lower wing of the lid hinge and the base plate of the mounting are secured in position by the same bolts;

Fig. 6 is a view similar to Fig. 3 showing a modified form of our invention;

Fig. 7 is a fragmentary view looking toward the right at Fig. 6;

Fig. 8 is a sectional view similar to Figs. 3 and 6 showing another modification of our invention; and

Fig. 9 is a fragmentary elevation looking toward the right at Fig. 8.

Referring to the drawings more in detail, reference character 11 indicates generally a cabinet adapted to contain a radio, phonograph or the like, and provided with a hinged lid 12 which our self-balancing support is adapted to maintain in substantially balanced condition in all positions between fully open and fully closed.

The support comprises a base plate 13 adapted to be secured to the inner face of the back rail 14 by a plurality of bolts 15 extending through the back rail and the plate. In the form shown in Figs. 1 to 4, inclusive, the base plate of the support is positioned between the lid hinges 16 and the back rail is protected against injury by the bolt heads by means of washers 17 interposed between the heads and the base of the rail.

The base plate is provided at its ends with outwardly projecting ears 18 between which extends a connecting pintle 19. Lever arm 21, formed of heavy sheet metal, is shaped to provide a pair of ears 22 adapted to be positioned between the plate ears 18 and pivoted or fulcrumed upon the pintle 19. The lever, as will be observed, is of a generally trough shape and tapered from its pivoted end toward its free end so as to not only afford strength but also to present a pleasing appearance. Generally speaking, the lever comprises the side walls 23 joined by a connecting wall 24, the large ends of the side wall terminating in the ears 22 spaced apart to provide a broad fulcrum base for the lever.

An abutment pin 25 projects through and extends between the lever side walls 23, and a pair of coiled springs 26 is coiled around the pintle 19, one free end 27 of each spring being abutted against the plate 13 and the other end 28 being abutted against the pin 25 so that the tension of the springs tends to swing the arm in a counter-

clockwise direction viewing Fig. 3. It will be observed that when the lid is substantially open, as shown in Fig. 3, the springs are partially unwound and, therefore, under reduced tension, whereas, when the lid is swung toward closed position the tension upon the springs is increased, substantially in proportion to the increased leverage of the lid, so that in all positions of the lid it is substantially balanced by the springs and can be easily manipulated without danger of flying open or closed.

To the outer end of the arm **21** a link **29** is pivotally connected by a pin or rivet **31** and to the free end of the link a lid plate **32** is pivotally connected by a pin or rivet **33**. The lid plate is secured to the lid **12** by means of wood screws **34**, as shown.

It will be manifest that the form of the invention above described is capable of being mounted on the back rail in any desired position lengthwise of the rail, so that it may be located by any manufacturer in a position least likely to interfere with the instrument or its controls located in the cabinet. In other words, the structure of the support is such that no set mounting, such as is customary with supports with which I am familiar, is required.

In some instances it may be desirable to locate the base plate **13** in alignment with one of the lid hinges **16**, and in such event the fastening bolts or screws **15** may extend through the lower wing **35** of the hinge and through the base plate, thereby serving to mount both the hinge and the base plate on the back rail by means of the same bolts, as exemplified in Fig. 5. In such instances the hinge wing serves to protect the back rail against injury by the bolt heads, thereby eliminating the employment of washers **17**.

In the form of the invention shown in Figs. 6 and 7, the lower hinge wing **36** and the base plate **13** are mounted and held in position by common bolts, as in Fig. 5. The upper hinge wing **37**, however, in this instance is extended upwardly along the inner face of the lid **12** to provide an elongated lid plate which carries the ears **38** by which the link **29** is connected to the lid. If preferred, the ears may be struck out from the plate **37**, thus providing an integral structure. This construction is obviously stronger than the form shown in Fig. 3, and the proper location of the point of connection between the link **29** and the lid is insured.

In the form shown in Figs. 8 and 9 the upper hinge plate carries the connecting ears **38** in the same manner as in Fig. 6, but the lower hinge wing **41** in this instance is formed as an integral part of the base plate **13**, thus providing still stronger construction and insuring accuracy of positioning of the plate **13** and the ears **38**.

It will be apparent from the foregoing that we have provided a lid support which is not only self-balancing in its operation, but a support which in its various forms may be applied at any desired location to the cabinet back rail and which is strong and substantial while at the same time presenting an attractive appearance, since the spring and fulcrum pintle are housed within and entirely concealed by the enlarged base of the strong lever arm.

The structural details illustrated and described may obviously be varied within considerable limits without departing from the scope of our invention as defined in the following claims.

We claim:

1. A mounting for pivoted lids comprising a hinge having one leaf attached to the cabinet wall and the other leaf attached to said lid, a base plate secured to said wall and to said hinge, said base plate being provided with a plurality of ears projecting outwardly from said wall, a pintle extending between said ears, a tapered channel shaped lever comprising side walls and a connecting wall, the ends of the side walls extending beyond the end of the connecting wall, said extending side walls being pivotally mounted at one end upon said pintle, a coiled spring surrounding the pintle and engaged with said base plate and with said lever and biasing the lever in one direction, said lever forming a housing over said pintle and surrounding spring, a link pivoted at one end to the projecting ends of the lever side walls at the opposite end of the lever, and a lid plate pivoted to the other end of said link and attached to the inner face of said lid.

2. A balancing lid support, comprising a base plate adapted to be mounted upon the back rail of a cabinet so as to extend parallel with the pivot of the lid hinge, said plate being provided at each end thereof with an outstanding ear, a pintle connecting said ears, a channel shaped tapered lever including side walls projecting at one end beyond the wall connecting said side walls and pivotally mounted on said pintle, a coiled spring surrounding the pintle and having the ends thereof engaging said lever and base plate respectively so as to bias the lever in one direction, said lever forming a housing over said pintle and spring, a link pivotally connected at one end to the free end of said lever, and means whereby the other end of said link may be pivotally connected with a lid to be supported.

EDWIN W. NORTH.
ROY A. STONE.