Aug. 31, 1965 M. J. MILLER ETAL 3,203,016

LOCKING MEANS FOR MOVABLE SUPPORT PLATE

Filed Feb. 17, 1964

Fig.-1

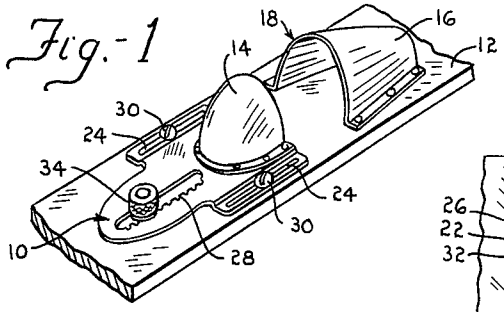
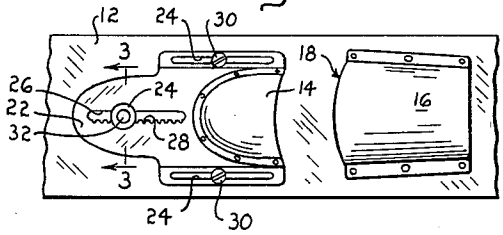


Fig.-2



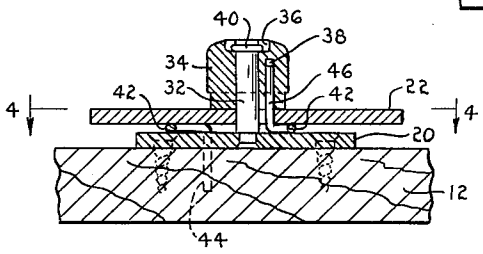


Fig.-3

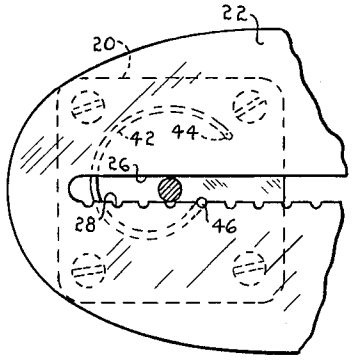


Fig.-4

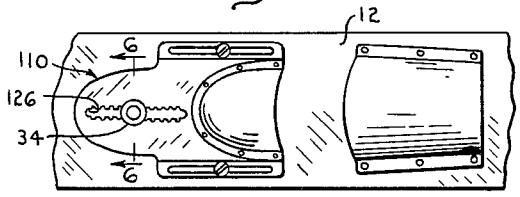


Fig.-5

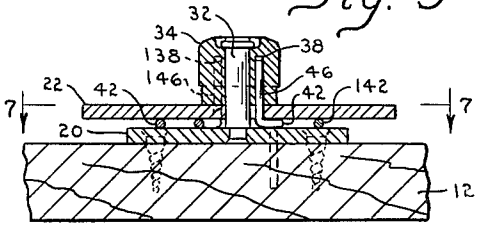


Fig.-6

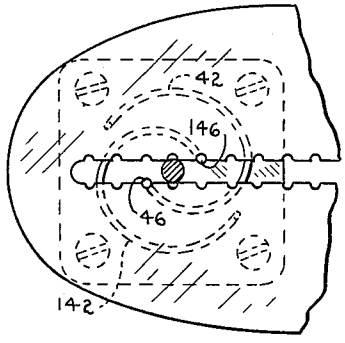


Fig.-7

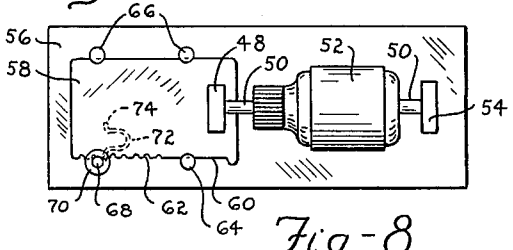


Fig.-8

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LOCKING MEANS FOR MOVABLE SUPPORT PLATE

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6 Claims. (Cl. 9—310)

This invention relates generally to locking devices and more particularly to a locking device for locking in place an adjustably positioned support member.

A particularly suitable application of this invention is for foot binders of water skis. Foot binders for water skis individually comprise a flexible instep binder fixedly mounted on the ski and a flexible heel cup spaced rearwardly from the instep binder and which is mounted on the ski for adjustable positioning thereon to accommodate different size feet and also to provide contracting and expanding action for inserting or removing the foot and to bind the foot to the ski.

An object of this invention is to provide a locking device for a movable suport member which provides a positive locking engagement.

Another object of this invention is to provide a locking device for a movable support member which includes parts and arrangement of parts which are simple in structure, easy and economical to manufacture and assemble.

Another object is to provide a locking device which operates easily and rapidly.

A further object is to provide a locking device for a movable support member which allows for small adjustments.

Other objects and advantages of the present invention will become more apparent from a careful study of the following detailed description taken with reference to the accompanying drawing in which is shown a preferred embodiment of our invention.

FIGURE 1 is a perspective view of the present invention as applied to foot binders for water skis;

FIGURE 2 is a fragmentary plan elevation of the water ski on which this invention is applied;

FIGURE 3 is an enlarged vertical transverse sectional view taken along line 3—3 of FIGURE 2;

FIGURE 4 is a horizontal sectional view taken along line 4—4 of FIGURE 3;

FIGURE 5 is a plan elevation of a modified locking device of the present invention;

FIGURE 6 is an enlarged vertical transverse sectional view taken along line 6—6 of FIGURE 5;

FIGURE 7 is a top view sectioned along line 7—7 of FIGURE 6; and

FIGURE 8 is another modified locking device of the present invention as applied for supporting an armature.

Referring now to the drawings, particularly FIGURES 1–4, numeral 10 designates the present invention generally as it is aplied to water skis 12. Its function is to movably support the heel portion 14 relative to the instep portion 16 of foot binder 18. The present invention comprises a base which in this application can be the water ski 12 or a base plate 20 as shown in FIGURES 3 and 4 connected to water ski 12. Slidably movable over said base plate member 20 is a support plate member 22 to which is connected a device such as heel binder 14 which is locked in place after being adjustably position. Support plate 22 is provided with laterally spaced trackways 24 and spaced therebetween is an elongated slot 26 extending longitudinally of said support plate 22. Slot 26 is formed with closely spaced notches 28 in one edge thereof. Base plate 20 is provided with guide pins 30 for engaging trackways 24 of support plate 22 and a

pivot post 32 extending upright through slot 26 of support plate 22 to constrain support plate 22 to uniaxial or forward and rearward sliding motion over base plate 20.

Knob 34 is mounted on pivot post 32 for rotational movement thereon. Knob 34 has a central bore 36 for receiving pivot post 32 and a hole 38 in the bottom end of said knob 34 which bears an eccentric relation to bore 36 to kinematically provide a ranking action therebetween. Knob 34 is connected to pivot post 32 by means of a spring washer 40 seated in a groove in post 32 or in any other convenient manner which will connect knob 34 to post 32 to prevent axial movement therebetween while permitting rotatable movement thereon.

Wire spring 42 serves as the locking member. One end thereof is anchored to base 20 as at 44 and the other end is upturned to provide a shaft means 46 which extends above support plate member 22. Wire spring 42 is curved and anchored at 44 so that upright shaft means 46 has a bias toward a notch 28 forward of pivot post 32 and in a generally tangential direction relative to knob 34. Shaft means 46 of wire spring 42 is moved to engage one of notches 28 in support plate 22 by rotating knob 34 against the bias of spring 42 to disengage shaft means 46 from one of said notches 28. Support plate 22 is adjustably moved forward or rearward to a desired position and upon releasing knob 28, the return bias of spring 42 will counter-rotate knob 34 and return shaft means 46 into one of said notches 28 aligned with shaft means 46. Support plate 22 is thereby locked in position against rearward movement relative to base 20.

Any rearward movement of plate 22 will be prevented since any movement of shaft means 46 which is eccentrically engaged to knob 28 forward of pivot post 32, will require said shaft means to follow a circular path which includes a lateral resultant against engaging notch 28. Since support plate 22 is restrained from being laterally displaced by guide means 30 and pivot post 32 engaging, respectively, trackways 24 and slot 26, a locking or binding engagement between knob 34, shaft means 46 and its engaging notch 28 is obtained. This locking engagement thus obtained increases in magnitude in direct proportion to the force acting to longitudinally displace support plate 22 rearwardly.

Since the effectiveness of the locking means of this invention requires that shaft means 46 engage a notch 28 which is positioned forward of pivot post 32, support plate 22 may be adjustably moved longitudinally forward without disengaging shaft means 46 from engaging notch 28 by manually rotating knob 34. A forward movement of support plate 22 will cause the notch engaging shaft means 46, because of its eccentric connection therewith, to rotate knob 34 and thereby be guided laterally away from its engaging notch 28 and thereby effecting a disengagement therebetween against the urging of wire spring 42 which repeatedly returns shaft means 46 to each succeeding notch 28 as support plate 22 is moved forward. In applications where a locking restraint of only unilateral movement is desired, the above described structure is sufficient. However, in application of the present invention where it is desired to provide a locking restraint to each of the bilateral movement of support plate 22, a modification of our invention will be required as shown in FIGURES 5, 6 and 7. This modified device of our invention is designated generally by numeral 145 and comprises an additional curved wire spring 142 anchored to base 20 as at 144. Wire spring 142 is similarly provided at its other end with an upturned shaft means 146 which is engaged to knob 34 by being received in a second hole 138 eccentrically located in knob 34 approximately diametrically opposed from hole 38 therein. Spring 142 is biased laterally toward the other side of elongated slot 126 in support plate 46. Said other side of slot 126 is formed

with a plurality of closely spaced notches 128 which are engaged by shaft means 146 of spring 142 to lock support plate 22 and thereby prevent said plate 22 from moving forwardly. Therefore, this modification of the device of our invention provides a locking means for preventing movement of support plate 22 in either forward or rearward direction. This locking engagement may easily be released for adjustable movement of plate 22 by merely rotating knob 34 to disengage shaft means 46 and 146 from notches 28 and 128, respectively, in support plate 22.

It is obvious from the above description that our invention comprises a novel structure and arrangement of parts by which a locking engagement may be obtained between a base plate and a support plate movable thereon which provides positive locking rapidly and with a single operation, and which is very economical to manufacture and assemble.

Though we have shown and described a single preferred application of our invention, it is realized that changed and modifications may be made by those skilled in the art in order to apply our invention to other applications which require a locking means for an adjustably movable support plate. For example, FIGURE 8 shows the device of our invention used to support a bearing mount 48 in which is journalled one end of shaft 50 of armature 52 which is supported for shop work thereon. The other end of shaft 50 is supported by stationary bearing mount 54 on base plate 56. Support plate 58 is movable thereon to adjust the position of bearing mount 48 to accommodate different length armatures. In this modification, a portion of side 60 of a generally rectangular support plate 58 is provided with a plurality of notches 62. Guide means 64 and 66 are provided in base plate member 56 to guide support plate 58 in its longitudinal movement. Pivot post 68 is provided in base plate 56 adjacently spaced from said notched portion of side 60 of support plate 58. Knob 70 is rotatably mounted on pivot post 68 and is constructed similar to knob 34 of FIGURE 3 in the manner of its connection to the shaft end of spring member 72. Spring member 72 is anchored to base plate 56 as at 74 and is formed so that the shaft end thereof is biased toward said notches 62 forward of said pivot post 68. The shaft end of spring member 72 is disengaged from one of said notches 62 by rotating knob 70. After support plate 58 is adjustably moved, it is locked in place by releasing knob 70. The bias of spring member 72 toward support plate 58 will return the shaft end of spring member 72 into one of said notches 62 aligned therewith and thereby lock support plate 58 in position relative to base plate 56.

Therefore, we intend to include changes which do not depart from the spirit and scope of our invention as defined in the appended claims.

We claim:

1. Means for locking a movable member comprising:
a base member, said base member being provided with a pivot post and laterally spaced guide means;
a support member slidably movable over said base member, said support member having laterally spaced trackway means;
said guide means of said base member connecting said trackway means of said support member to constrain said support member to uni-axial movement over said base member;
said support member having an elongated slot, said elongated slot receiving therethrough said pivot post, and one side of said slot being formed with a plurality of notches;
a flexible wire interposed between said base member and said support member, one end of said flexible wire being anchored to said base member, the other end of said flexible wire being upturned for engaging one of said plurality of notches in said support member and extending above said support member; and
knob means mounted on said pivot post for rotatable movement thereon, said knob means having a hole therein for receiving said upturned end of said flexible wire, and said upturned end of said flexible wire being guided by said knob means out of and into a selected notch forward of said pivot post against and with, respectively, the urging of said wire.

2. A locking device for sliding plate members comprising:
a base plate, said base plate being provided with a pivot post and laterally spaced guide means;
a support plate having laterally spaced trackways;
said guide means of said base plate connecting said trackways of said support plate to constrain said support plate to forward and rearward movement over said base plate;
said support plate having an elongated slot, one side of said slot being formed with a plurality of closely spaced notches, said slot receiving therethrough said pivot post;
a convolutely curved wire spring interposed between said base plate and said support plate, one end of said wire spring being anchored to said base plate, the other end of said wire spring being upturned to engage one of said plurality of notches forward of said pivot post and extending above said support plate; and
knob means mounted on said pivot post for rotatable movement thereon, and said knob means connecting said upturned end of said wire spring for guiding said upturned end out of and into a selected notch against and with, respectively, the urging of said spring.

3. A heel support for water ski comprising:
a plate member, said plate member having trackways and an elongated slot formed with a plurality of closely spaced notches;
pin means connecting said water ski and engaging said trackways of said plate member to constrain said plate member to slidable forward and rearward movement;
a pivot post connecting said water ski and extending upright through said elongated slot in said plate member;
a wire spring interposed between said water ski and said plate member, one end of said wire spring being anchored to said water ski and the other end of said wire spring being upturned for extending upright through said slot above said plate member forward of said pivot post; and
knob means mounted on said pivot post for rotatable movement thereon, said knob means having passageway therein for receiving said upturned end of said wire spring, and said upturned end being guided by said knob means out of and into a selected notch, forward of said pivot post, against and with, respectively, the urging of said spring.

4. A locking device for a movable support member comprising:
a movable support member, said support member being provided with trackways and an elongated slot having a plurality of notches in each elongated side of said slot;
a base member having means for connecting said trackways of said support member, and a pivot post extending upright thereon through said slot in said support member to constrain said support member to forward and rearward sliding movement over said base member;
a spring wire interposed between said base member and said support member, one end of said spring wire being anchored to said base member and the other end of said spring wire being angled, said angled upright end extending above said support member through said slot forward of said pivot post and engaging one of said notches in one side of said slot;

a second spring wire interposed between said base member and said support member, one end of said spring wire being anchored to said base member and the other end of said spring wire being angled upright, said angled upright end extending above said support member through said slot rearward of said pivot post and engaging one of said notches in the other side of said slot;

a knob means mounted on said pivot post for rotatable movement thereon, said knob means having a hole therein for receiving said upright end of said first named spring wire, said knob means having a second hole therein for receiving said upright end of said second spring wire, said first and second upright end being guided by the rotational movement of said knob means out of and into a selected notch in each side of said slot, respectively, forward and rearward of said pivot post, against and with, respectively, the urgings of said first and said second spring wires.

5. Means for locking a movable member comprising:

a base member, said base member being provided with a pivot post and laterally spaced guide means;

a support member slidably movable over said base member between said guide means;

one side of said support member being formed with a plurality of closely spaced notches;

said pivot post being adjacently spaced from said notched side of said support member;

a spring wire interposed between said base member and said support member, one end of said spring wire being anchored to said base member, the other end of said spring wire being angled upright, said upright end of said spring wire engaging one of said plurality of notches and extending above said support member; and

knob means mounted on said pivot post for rotatable movement thereon, said knob means having a hole therein for receiving said upright end of said spring wire above said support member, and said upright end being guided by said knob means out of and into a selected notch forward of said pivot post against and with, respectively, the urging of said spring wire.

6. In a device for locking a heel support member slidably movable for adjustment relative to a ski member and wherein guide means are provided on said ski member to constrain said heel support member to uni-axial movement thereover and wherein said heel support member has provided therein an elongated slot having formed in one side of said slot a plurality of closely spaced notches, the combination therewith of;

a spring wire interposed between said heel support member and said ski member;

one end of said spring wire being anchored to said ski member;

the other end of said spring wire being angled upright to engage one of said plurality of notches and extending above said heel support member; and

knob means pivotally mounted on said ski member engaging said other end of said spring wire extending above said heel support member to move said other end of said spring wire out of one of said notches against the urging of said spring wire.

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