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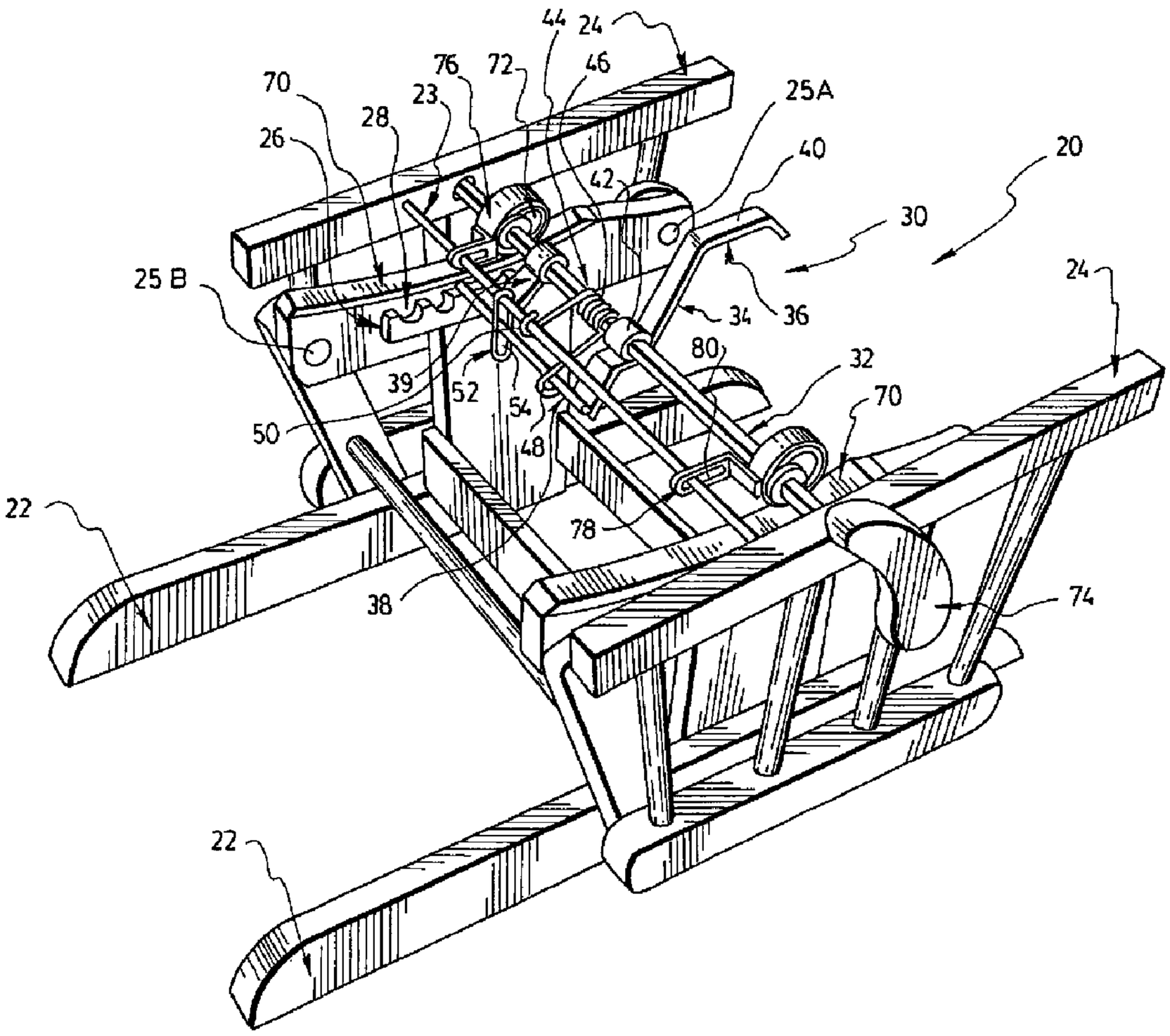
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(71) Demandeur/Applicant:
SHERMAG INC., CA

(72) Inventeur/Inventor:
BERGERON, SYLVAIN, CA

(74) Agent: ROBIC

(54) Titre : DISPOSITIF DE VERROUILLAGE POUR BERCEUSE
(54) Title: A LOCKING DEVICE FOR A ROCKING CHAIR



(57) Abrégé/Abstract:
The locking device is for a rocking chair. It has a stationary lower frame and an upper frame rockingly connected thereto, including a notched member fixed to the lower frame, and a lever assembly mounted to the upper frame, and including a lever arm pivoting

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(57) Abrégé(suite)/Abstract(continued):
about a support in response to a user sitting on the seat area, a spring urging a second end of the lever arm to engage with the notched member to lock the device when the user disengages the seat area, the second end disengaging when the user sits up. In a variant, the locking device includes a friction band mounted to the lower frame and a cam rotatably mounted to the upper frame, the cam being rotatable by a handle to thus engage the friction band and lock the upper to the lower frame.

ABSTRACT

The locking device is for a rocking chair. It has a stationary lower frame and an upper frame rockingly connected thereto, including a notched member fixed to the lower frame, and a lever assembly mounted to the upper frame, and including a lever arm pivoting about a support in response to a user sitting on the seat area, a spring urging a second end of the lever arm to engage with the notched member to lock the device when the user disengages the seat area, the second end disengaging when the user sits up. In a variant, the locking device includes a friction band mounted to the lower frame and a cam rotatably mounted to the upper frame, the cam being rotatable by a handle to thus engage the friction band and lock the upper to the lower frame.

A LOCKING DEVICE FOR A ROCKING CHAIR

FIELD OF THE INVENTION

This invention generally relates to the field of movable and lockable furniture, and more specifically concerns a locking device for locking a movable chair such as a rocking chair or rolling armchair.

BACKGROUND OF THE INVENTION

In the furniture industry, many pieces of furniture exist that include movable parts that rotate, slide, bend and/or swivel with respect o other parts of the furniture. Reclining chairs, rocking chairs and rolling armchairs are examples of such furniture. When producing furniture, mass production techniques are often used to fabricate durable, quality pieces of furniture. When producing a rocking chair, for example, the design of the chair is a major factor in determining not only its viability on the market but also its facility to be mass produced. In this sense, a rocking chair or another kind of mobile furniture containing a locking mechanism for locking the movable parts in place should be designed in order to be robust and easily assembled.

Rocking and other mobile chairs often have a locking mechanism incorporated therein. In fact, the locking mechanism is an important and desirable feature in many mobile furniture pieces. A locking mechanism stops the movement of the mobile parts, usually in response to a stimulus from the user. Lockability in moving parts that recline, slide, rock and/or pivot is often required feature.

There are many different mechanisms currently used to lock movable parts in fixed positions. However, a robust, quality, and efficiently assembled locking mechanism for locking a rocking chair in various fixed positions along its rocking path is lacking in the prior art.

In the prior art, various locking mechanisms exist for locking mobile parts of a chair in place. The United States patent No 5,121,966 (TISCHLER) describes an adjustable recliner chair including a locking mechanism. The locking mechanism principally enables the reclinable back of the chair to be locked in various positions. The mechanism has numerous working parts including a cam interconnected to a lever handle via a connecting bar, an arcuate member engaged by the cam and being pivotally attached to the base of the chair. The interaction between the cam and the arcuate member causes the latter, through a pivoting motion, to cause the chair to be locked in a certain reclining position. TISCHLER does not show how to lock a rocking chair and, furthermore, does not show a simple and robust assembly for doing so.

The United States patent No 6,406,095 B1 (BOUCHARD et al.) describes a self-locking chair. The locking mechanism described therein blocks all movement when an occupant desires to sit up from the chair. An actuator device is situated in the interior of the back, which is stuffed and padded, of the mobile chair and the locking mechanism is situated under the seat or its lateral sides. The locking action is thus actuated by a movement of the back of the chair, reacting to the movement of the upper part of the body of the occupant. The locking mechanism taught by BOUCHARD et al. includes levers, detectors, springs, actuators, force transmitters and a notch plates–all of which are interconnected to give a complicated and potentially costly locking mechanism. Also, in the case of BOUCHARD et al., a tubular metal chair is used and the mechanism requires a padded back to hide part of the mechanism. As soon as an occupant goes forward in the chair, that is, when his back in no longer pushing on the back cushion, the chair stops rocking or reclining. Furthermore, when the actuator to lock the chair in place is situated as in BOUCHARD et al., it requires a substantial force to lock the chair, for example, the force of a larger person sitting in the chair.

In summary, the prior art teaches various techniques and mechanisms for locking mobile chairs in various positions, but such mechanisms involve numerous disadvantages that could be overcome. There is therefore a need for a locking device alleviating the drawbacks of the prior art.

SUMMARY OF THE INVENTION

Accordingly, the present invention provides a locking device for a rocking chair. The rocking chair has a stationary lower frame and an upper frame rockingly connected thereto. The upper frame delimits a horizontal seat area for a user. The locking device includes a notched member mountable to the lower frame and having at least one notch. It also includes a lever assembly operatively connectable to the upper frame. The lever assembly includes a support mountable to the upper frame and a lever arm pivotally mounted to the support. The lever arm has a first end extending in the seat area and being engagable by the user when said user sits in the seat area, and a second end engagable with the at least one notch. The lever assembly also includes biasing means having a first portion resting on the support and a second portion for urging the second end of the lever arm against the notched member to lock the upper and lower frames together when the second end is engaged with one of said at least one notch. The second end disengages the one notch when the user engages the first end to pivot the second end out of said one notch, thereby unlocking the device.

The invention also provides a locking device for a rocking chair having a stationary lower frame and an upper frame rockingly connected thereto. The locking device includes at least one friction band mountable to the lower frame and a bar rotatably mountable to the upper frame about an axis thereof. The axis is substantially transverse with respect to a rocking path of the rocking chair. The device also includes at least one cam eccentrically and fixedly mounted to the bar, having a surface capable of cooperating respectively with said at least one friction band on any location of the rocking path of the upper frame. The device further includes a handle mounted to the bar, and rotatable by a user to thereby

rotate the cam via the bar between a first position where the surface of the at least one cam engages with the at least one friction band to lock together the upper and the lower frames in one of said locations of the rocking path, and a second position where the surface of the at least one cam disengages with the at least one friction band to unlock the upper frame from the lower frame.

The advantages and operation of the invention will become more apparent upon reading the detailed description and referring to the drawings that relate to preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG 1 is a perspective view of the locking device in relation to the lower and upper frames of a rocking chair, according to the present invention.

FIG 2 is a close up perspective view of the locking device in relation to parts of the lower and upper frames of a rocking chair, in a first locked position, according to the present invention.

FIG 3 is a close up perspective view of the elements shown in FIG 2, in a first unlocked position.

FIG 4 is a close up perspective view of the elements of the locking device in a second locked position in relation to parts of the lower and upper frames of a rocking chair, according to the present invention.

FIG 5 is a close up perspective view of the elements shown in FIG 4, in a second unlocked position.

FIG 6 is a perspective view of the locking device disconnected from the frames, according to the present invention.

FIG 7 is a perspective view of a rocking chair in which the locking device, according to the present invention, is preferably used.

While the invention will be described in conjunction with example embodiments, it will be understood that it is not intended to limit the scope of the invention to such embodiments. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included as defined by the appended claims.

DESCRIPTION OF PREFERRED EMBODIMENTS

In the following description, similar features in the drawings have been given same reference numerals.

A preferred embodiment of the present invention is shown in FIG 1. The locking device 20 is used to lock a chair, such as a rocking chair, in a variety of positions. The device may also be used to lock rolling armchairs or other similar pieces of mobile lockable furniture. The locking device 20 is preferably used with a rocking chair having a stationary lower frame 22 and a mobile upper frame 24. As can be appreciated in FIG 1, the lower frame 22 preferably contacts the ground and is stabilized by two leg members. The upper frame 24 preferably includes two vertically oriented pieces respectively pivotally mounted to opposite sides of the lower frame 22 and fixedly interconnected with a rod 23, which is preferably made of metal. The upper frame 24 is rockingly connected to the lower frame 22. By "rockingly connected" it is meant that the connection enables the upper frame 24 to be mobile relative to the lower frame in a rocking and/or pivoting manner. This is achieved by using connection means known in the art. In FIG 2, the connection means are shown to be two pivot points 25A, 25B. Other connection means may include bearings, rollers, curved members and/or pivoting or swinging means. Depending on the connection means a variety of rocking paths such as elliptical, arced, variable, etc.) may be enabled. Furthermore, the upper frame 24 preferably delimits a horizontal seat area for a user to sit in. The upper

and lower frames 22, 24 are advantageously made of wood, but can also be made of other materials known to a skilled workman.

The locking device 20 further comprises a notched member 26 mounted to the lower frame 22. The notched member 26 has at least one notch 28 and preferably a plurality of notches 28. As can be seen in FIG 2, the notched member 26 is preferably plate-shaped having a plurality of notches 28 machined therein and is fixed on the inside of the lower frame 22 so that the notches 28 face upward to be engaged. However, the notched member 26 may take a variety of forms and may be mounted anywhere and oriented anyhow on the lower frame 22 to be engagable. The notches 28 may also be angled or have particular shapes to ensure that the rocking motion is stopped when the device is locked.

The locking device 20 further includes a lever assembly 30 operatively connected to the upper frame 24. The lever assembly 30 includes a support 32 mounted to the upper frame 24. The support 32 preferably takes the form of a bar, as shown in FIG 2. The support 32 may be rotationally or fixedly mounted to the upper frame 24. The lever assembly 30 also includes a lever arm 34 pivotally mounted to the support 32 and having a first end 36 and a second end 38. The first end 36 extends in the seat area and is engagable by the user. Preferably, the first end 36 also includes a push plate 40 having a surface that is horizontal and comfortably engagable by the user. The length, shape and orientation of the first end 36 may be modified depending on the operating conditions and the expected weights to be involved. The second end 38 of the lever arm 34 is engagable with any of the notches 28 of the notched member 26. As seen in FIG 2, the lever arm 34 is preferably L-shaped, the second end 38 extending laterally away from the first end 36 to engage a notch 28. The second end 38 extending laterally away is preferably pivotally connected to the support 32 by means of an additional pivot arm 39, which helps to stabilize the second end 38 in its pivoting motion. preferably Furthermore, the lever arm 34 preferably includes a pivotal

fastener 42 provided between the first and second ends 36, 38 pivotally connected to the bar 32 to enable the lever arm to pivot thereabout. The pivotal fastener 42 preferably takes the form of a cylinder through which the bar 32 passes.

The lever assembly 30 further includes biasing means 44 to urge the lever arm 34 into the locked position. More specifically, the biasing means 44 have a first portion 46 resting on the support 32 and a second portion 48 for urging the second end 38 of the lever arm 34 against the notched member 26 to lock the upper and lower frames 24, 22 together when the second end 38 is engaged in one of the notches 28.

FIG 2 shows the second end 38 engaging a notch 28 and thus locking the device. Referring now to FIG 3, the first end 36 of the lever arm 34 is engaged by the user, which pivots the second end 38 out of the notch 28 and thereby unlocks the device 20. Preferably, the second end 38 is a horizontal bar-shaped element that is displaced up and down to unlock and lock the device.

Returning to FIG 2, the biasing means 44 are preferably preloaded when the device is in a locked position and are additionally loaded when, as in FIG 3, the second end 38 disengages the notch 28. The biasing means 44 preferably include a third portion 50 extending away from the first portion 46 and resting on the upper frame 24, advantageously on the rod 23 interconnecting the two parts of the upper frame 24. The third portion 50 of the biasing means 44 helps to stabilize and preload the latter. As can be seen in FIGs 2 and 3, the biasing means preferably take the form of a spring, and still preferably a torsion spring that is U-shaped. Thus, the first end 46 is a coil through which the bar 32 is passed and which enables the springing force of the spring 44. The coil 46 may have any number of windings according to the desired springing ability of the spring 44. The second and third portions 48, 50 define the two open ends of the U-shaped spring 44 and are provided with hooks for resting on the lever arm's

second end 38 and the rod 23, respectively. When the second and third ends 48, 50 are brought together, the tension in the spring 44 is increased.

The biasing means 44 may also take the form of other kinds of springs, pistons and/or urging mechanisms or actuators, and may be arranged on the rocking chair assembly so as to urge the second end 38 of the lever arm 34 toward the notched member 26. The biasing means 44 are preferably mounted to the support 32 but could also be operatively mounted to the upper frame 24 and the second end 38 for urging the latter. The first portion 46 (coil) of the spring 44 is preferably mounted to the support 44 to stabilize the spring 44 and to keep the latter tightly in place while enabling the biasing effect.

Referring back to FIG 1, the lever assembly 30 further includes a ring member 52 retainingly connecting the upper frame 24 and the second end 38 of the lever arm 34. The ring member 52 contains an orifice 54 through which the rod 23 of the upper frame 24 as well and the second end 38 are passed. By "retainingly connecting" it is meant that the ring member 52 delimits a maximum distance that the rod 23 and second end 38 can be from each other. Accordingly, the biasing means 44 are preloaded at any point on the rocking path. For example, if the upper frame 24 is rocked so that the second end 38 cannot, when urged, engage the notched member 26 because it is out of a lockable range, the second end 38 will only be urged until the maximum distance from the rod 23, as defined by the ring member 52, is obtained.

According to a preferable construction, the rod 23, the second laterally extending end 38 of the lever arm 34 and the support 32 (bar), are parallel with each other, and still preferably, are horizontal and perpendicular with respect to the rocking path of the upper frame 24.

As a variant to the locking device 20 described hereabove, the variant shown in FIGs 4 and 5, the support 32 is rotatably mounted to the upper frame 24.

Furthermore, the locking device further includes at least one friction band 70 mounted to the lower frame 22. Preferably, the friction band 70 is fixed to the lower frame 22, and is oriented upward to be engagable. They are preferably made of a rubber material. Also, the friction band 70 is advantageously curved according to the rocking path of the upper frame 24 so that is may be engaged at any point of the rocking path. The locking device 20 further includes at lest one cam 72 eccentrically and fixedly mounted to the support bar 32. Preferably, as shown in FIG 1, there are provided two friction bands 70 and two corresponding cams 72 for engaging the former. The cams 72 are provided with a surface capable of cooperating with the respective friction bands 70 on any location of the rocking path of the upper frame 24. Thus, the cam 72 may engage the friction band 70 at an infinite of individual locking positions to lock the upper frame 24 at any point. This variant thus provides continuous locking ability as opposed to the discrete locking ability of the preferred embodiment. Preferably, the cam 72 rotates and engages the friction band 70 from above, pushing downward thereon. A handle 74 is also provided, being mounted to the support bar 32 and being rotatable between a first position (as in FIG 4) where the surface of the cam 72 engages with the friction band 70 to lock together the upper and lower frames 24, 22, and a second position (as in FIG 5) where the surface of the cam 72 disengages with the friction band 70 to unlock the upper frame 24 from the lower frame 22.

Referring to FIGs 4 and 5, the cam 72 is advantageously provided with a covering guard 76 covering the cam 72 and operatively connected to the upper frame 24. The covering guard 76 is preferably rotationally slidable on the cam 72 and defines the surface for cooperating with the corresponding friction band 70. The covering guard 76 is also preferably translationally slidable with the upper frame along a guided path. As shown in FIG 4, the covering guard 76 further includes a guide member 78 extending away from the cam 72 and having a guide slot 80 provided therein. The guide member 78 guides the covering guard 76 when the latter engages the friction band 72 and is pinched thereagainst by the

rotating cam 72. Preferably, the rod 23 is passed through the guide slot 80 and slides therein when the cam 72 is rotated. In FIG 4, the rod 23 is shown to be at the extremity of the guide slot 80 before the handle is rotated, while in FIG 5 the rod is shown to have moved within the guide slot 80.

The handle 74 is preferably curved and is of a length and shape suitable for a user to rotate by applying the necessary force known to a skilled workman. It should be noted that the handle is easily accessible for the user, while the rest of the locking mechanism is preferably hidden underneath the seat area of the mobile or rocking chair.

Referring back to FIG 4, the device 20 further includes a biasing unit 82 connected to the upper frame 24 and the cam 72. This unit 82 is used primarily to vary the resistance to rotating the cam 72 with the handle 74. The biasing unit 82 is preferably preloaded when the cam 72 is disengaged from the friction band 70,. The biasing unit is preferably mounted to the greater portion of the eccentrically mounted cam 72 and thus, when the said greater portion of the cam 72 rotates to engage the friction band 70 away from the opposite end of the biasing unit 82, the biasing unit resists the rotation. The response of the biasing unit 82 can be seen in FIG 5, where the unit 82 is additionally stretched.

As can be seen in FIG 6, the locking device can be arranged so that the second end 38 of the lever arm 34 extends to the right or to the left. Furthermore, the handle, shown in FIG 1, can be on the right or left side of the rocking chair.

The components shown in FIG 6 are preferably made of metal such as stainless steel, but could also be constructed using reinforced polymers, plastics, or wood.

As shown in FIG 7, the chair with which the locking device according to the present invention is used is preferably a rocking chair. The preferable type of rocking chair to be used with the current invention is a glider rocker that moves

frontward and backward while having upward and downward movements as well. The locking device is mounted underneath the seat area of the chair so that a person engages and unlocks it when they sit. An advantage of the present invention is that children of about six or eight years old can apply the necessary force to automatically unlock the locking device when they sit on the rocking chair. The device unlocks with an applied force of about 35 lbs, which is quite advantageous.

Although preferred embodiments of the present invention have been described in detail herein and illustrated in the accompanying drawings, it is to be understood that the invention is not limited to these precise embodiments and that various changes and modifications may be effected therein without departing from the scope or spirit of the present invention.

WHAT IS CLAIMED IS:

1. A locking device for a rocking chair having a stationary lower frame and an upper frame rockingly connected thereto, the upper frame delimiting a horizontal seat area for a user, the locking device comprising:

- a notched member mountable to the lower frame and having at least one notch; and

- a lever assembly operatively connectable to the upper frame, said lever assembly comprising:

  - a support mountable to the upper frame;

  - a lever arm pivotally mounted to the support, the lever arm having a first end extending in the seat area and being engagable by the user when said user sits in the seat area, and a second end engagable with the at least one notch; and

  - biasing means operatively connected to the upper frame and resting on the second end for urging the second end of the lever arm against the notched member to lock the upper and lower frames together when the second end is engaged with one of said at least one notch, said second end disengaging said one notch when the user engages the first end to pivot the second end out of said one notch and thereby unlocking the device.

2. The locking device according to claim 1, wherein the support comprises a support bar mounted to the upper frame, and wherein the lever arm comprises a pivotal fastener provided between the first and second ends thereof, the fastener being pivotally connected to the support bar to enable the lever arm to pivot thereabout.

3. The locking device according to claim 2, wherein the support bar is rotatably mounted to the upper frame, the device further comprising:

-at least one friction band mountable to the lower frame;

-at least one cam eccentrically and fixedly mounted to the support bar, having a surface capable of cooperating respectively with said at least one friction band on any location of the rocking path of the upper frame (22); and

-a handle mounted to the support bar, and rotatable by the user to thereby rotate the cam via the support bar between a first position where the surface of the at least one cam engages with the at least one friction band to lock together the upper and the lower frames in one of said locations of the rocking path, and a second position where the surface of the at least one cam disengages with the at least one friction band to unlock the upper frame from the lower frame.

4. The locking device according to claim 1, wherein the biasing means further comprise a first portion resting on the support bar and a second portion resting on the second end of the lever arm for urging the same against the notched member.

5. The locking device according to claim 4, wherein the biasing means further comprise a third portion extending away from the first portion and resting on the upper frame to stabilize and preload the biasing means.

6. The locking device according to claim 4, wherein the first portion of the biasing means defines a coil mounted to the support, and the second portion defines a hook engaging the second end of the lever arm.

7. The locking device according to claim 1, wherein the biasing means is a spring.

8. The locking device according to claim 7, further comprising a ring member retainingly connecting the second end of the lever arm and the upper frame so that the spring remains preloaded.

9. The locking device according to claim 1, wherein the lever arm is L-shaped, the second end extending laterally away from the first end to engage the notch.

10. A locking device for a rocking chair having a stationary lower frame and an upper frame rockingly connected thereto, the locking device comprising:

- at least one friction band mountable to the lower frame;

- a support bar rotatably mountable to the upper frame;

- at least one cam eccentrically and fixedly mounted to the support bar, having a surface capable of cooperating respectively with said at least one friction band on any location of the rocking path of the upper frame; and

- a handle mounted to the support bar, and rotatable by a user to thereby rotate the cam via the support bar between a first position where the surface of the at least one cam engages with the at least one friction band to lock together the upper and the lower frames in one of said locations of the rocking path, and a second position where the surface of the at least one cam disengages with the at least one friction band to unlock the upper frame from the lower frame.

11. The locking device according to claim 10, wherein the upper frame delimits a horizontal seat area for the user, the locking device further comprising:

-a notched member mountable to the lower frame and having at least one notch; and

-a lever assembly operatively connectable to the support bar, said lever assembly comprising:

- a lever arm pivotally mounted to the bar, the lever arm having a first end extending in the seat area and being engagable by the user when said user sits in the seat area, and a second end engagable with the at least one notch; and

- biasing means operatively connected to the upper frame and resting on the second end for urging the second end of the lever arm against the notched member to lock the upper and lower frames together when the second end is engaged with one of said at least one notch, said second end disengaging said one notch when the user engages the first end to pivot the second end out of said one notch, thereby unlocking the device.

12. The locking device according to claim 10, further comprising at covering guard covering each of the at least one cam and being rotationally slidable thereon, the at least one covering guard defining the surface capable of cooperating with the at least one friction band to lock the upper and the lower frames together.

13. The locking device according to claim 12, wherein the at least one covering guard is operatively connected to the upper frame to be translationally slidable threrewith and thus guided along a guiding path with respect thereto.

14. The locking device according to claim 13, further comprising a guide member operatively connecting each of the at least one covering guard to the upper frame to guide the at least one covering guard along the

guiding path when the at least one cam is rotated to engage the at least one friction band.

15. The locking device according to claim 14, further comprising a rod fixed to the upper frame horizontally and perpendicularly with respect to the rocking path of the upper frame, and wherein the at least one guide member each has an orifice with the rod passing therethrough to allow the at least one guide member to slide radially with respect to an axis of the rod.

16. The locking device according to claim 10, wherein the at least one friction band comprises two friction bands respectively mounted to opposite sides of the rocking path on the lower frame, and the at least one cam comprises two cams respectively mounted above the two friction bands.

17. The locking device according to claim 16, wherein the friction bands are upwardly concave to correspond to the rocking path of the upper frame.

18. The locking device according to claim 10, further comprising a biasing unit operatively mounted to the upper frame and the cam to resist when the cam is rotated to engage the friction band.

19. The locking device according to claim 12, wherein the at least one covering guard is made of a plastic material.

20. The locking device according to claim 19, wherein the friction bands are made of a rubber material to be frictionally engaged by the plastic covering guard.

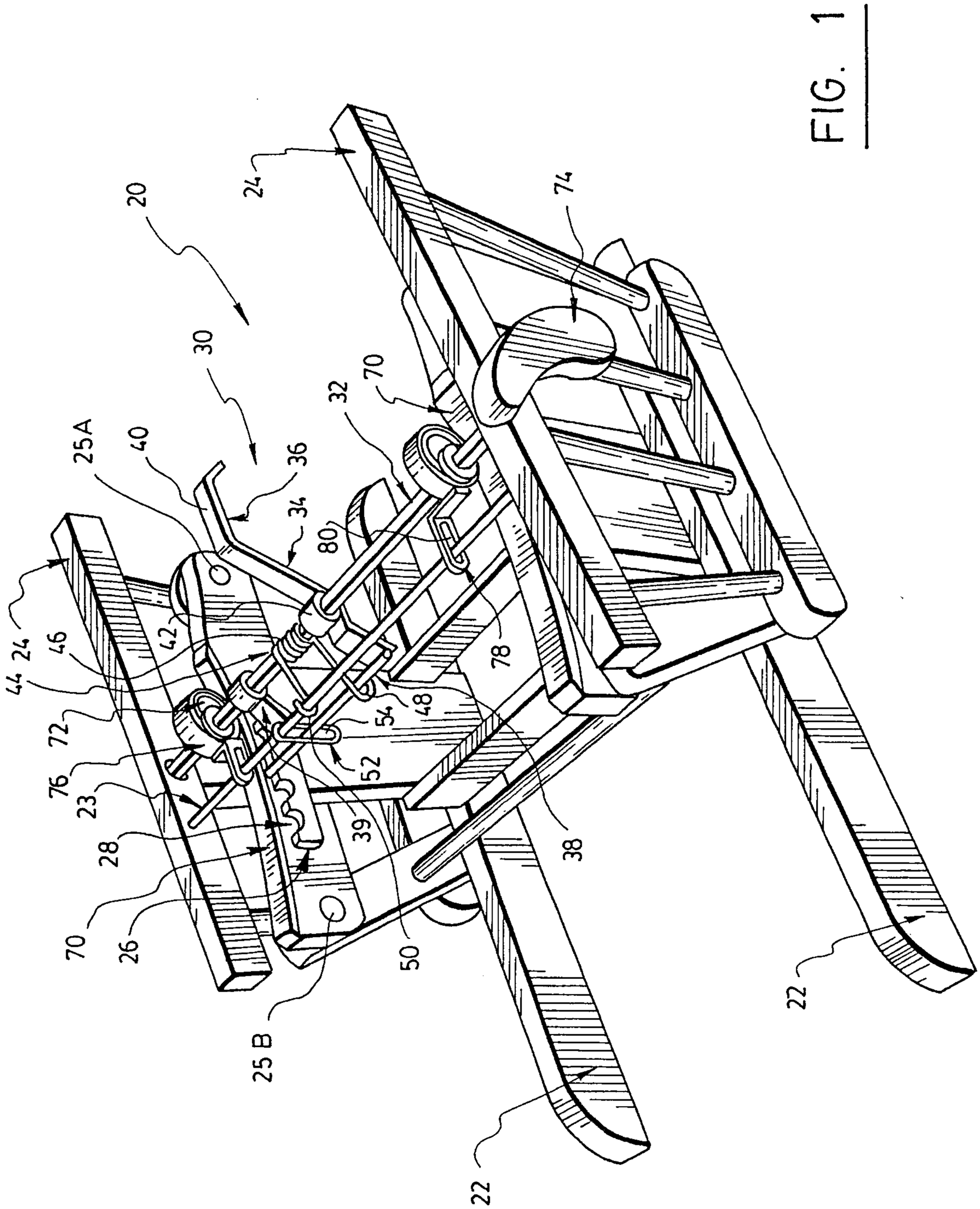
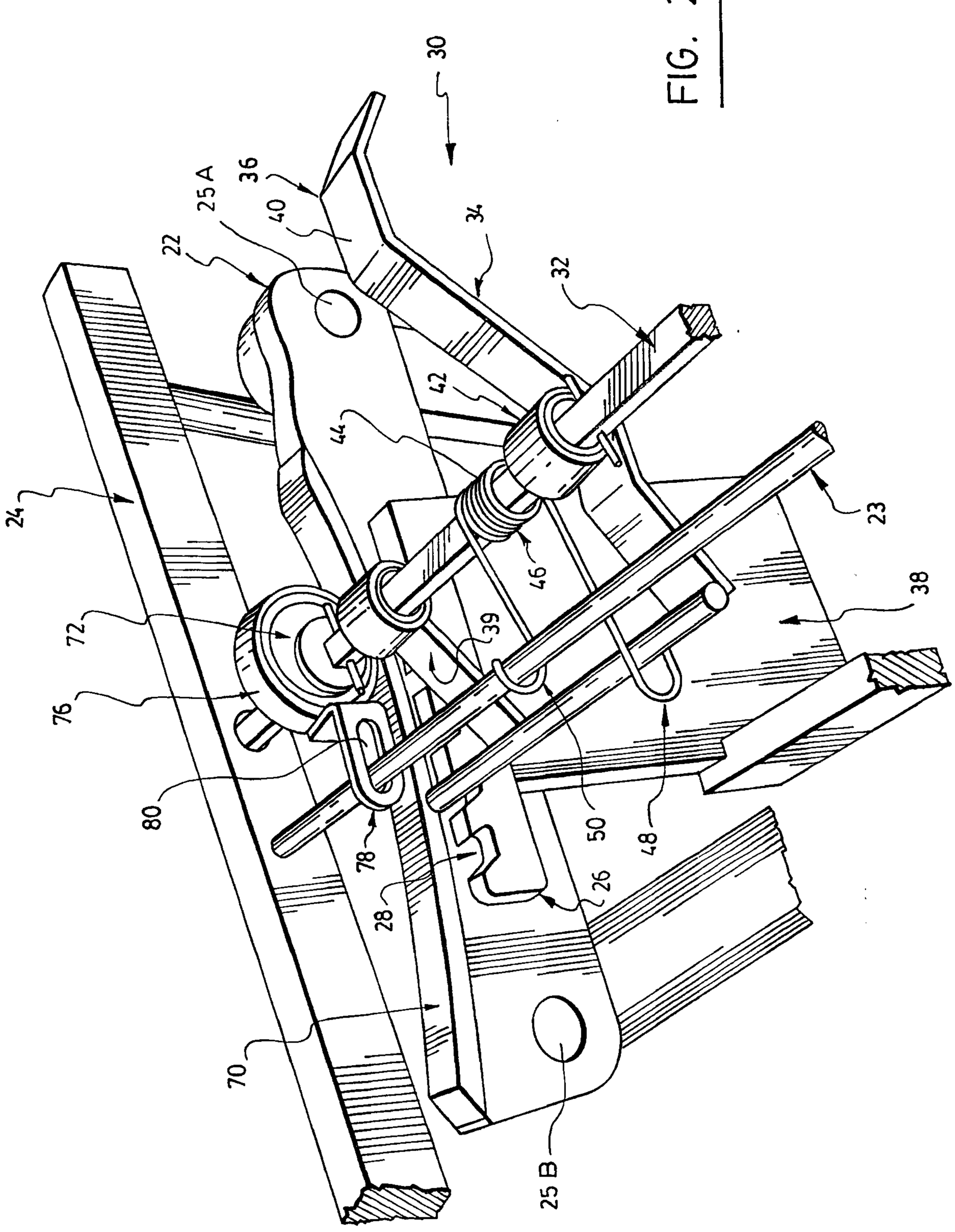

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FIG. 1

FIG. 2


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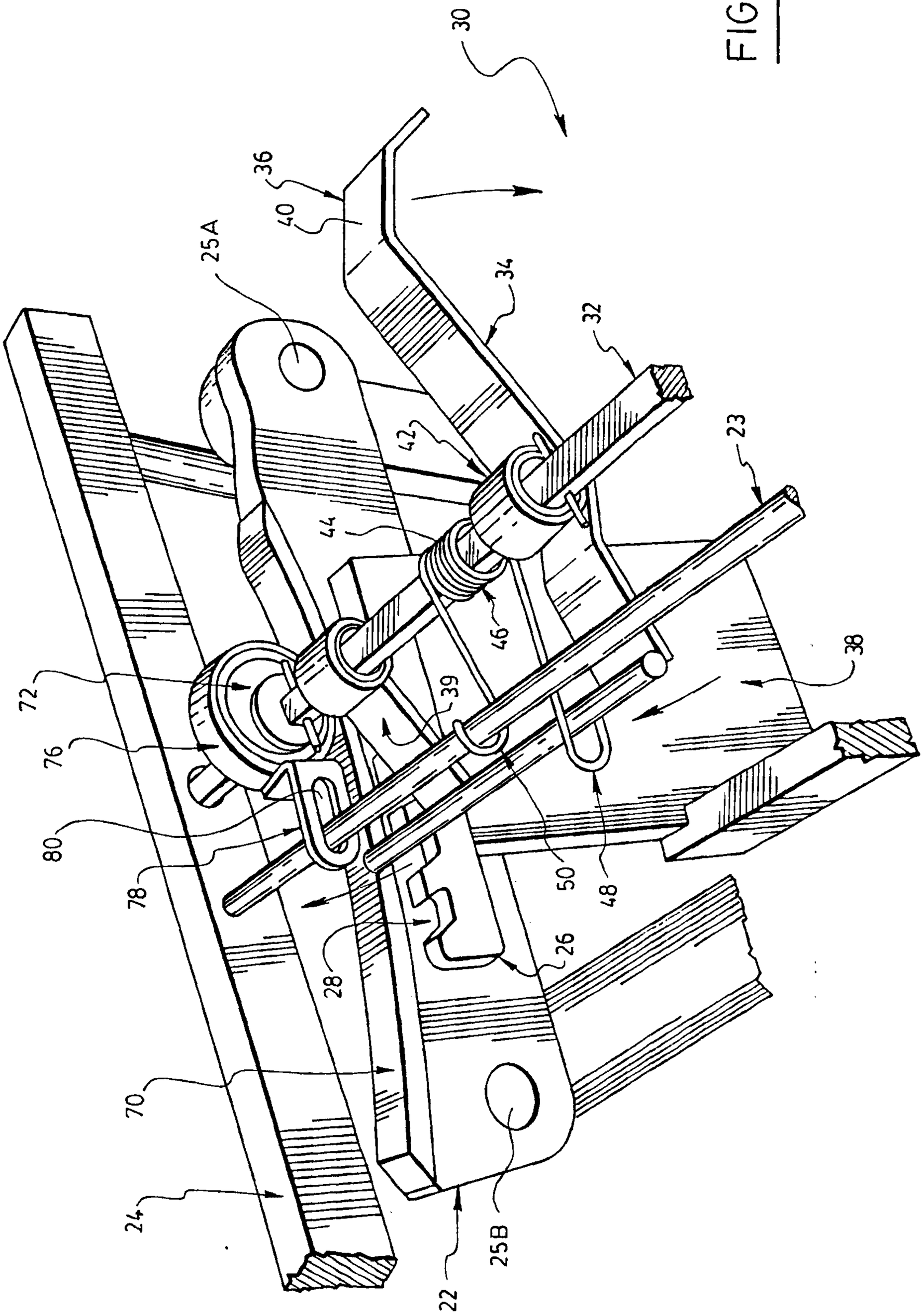

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FIG. 3

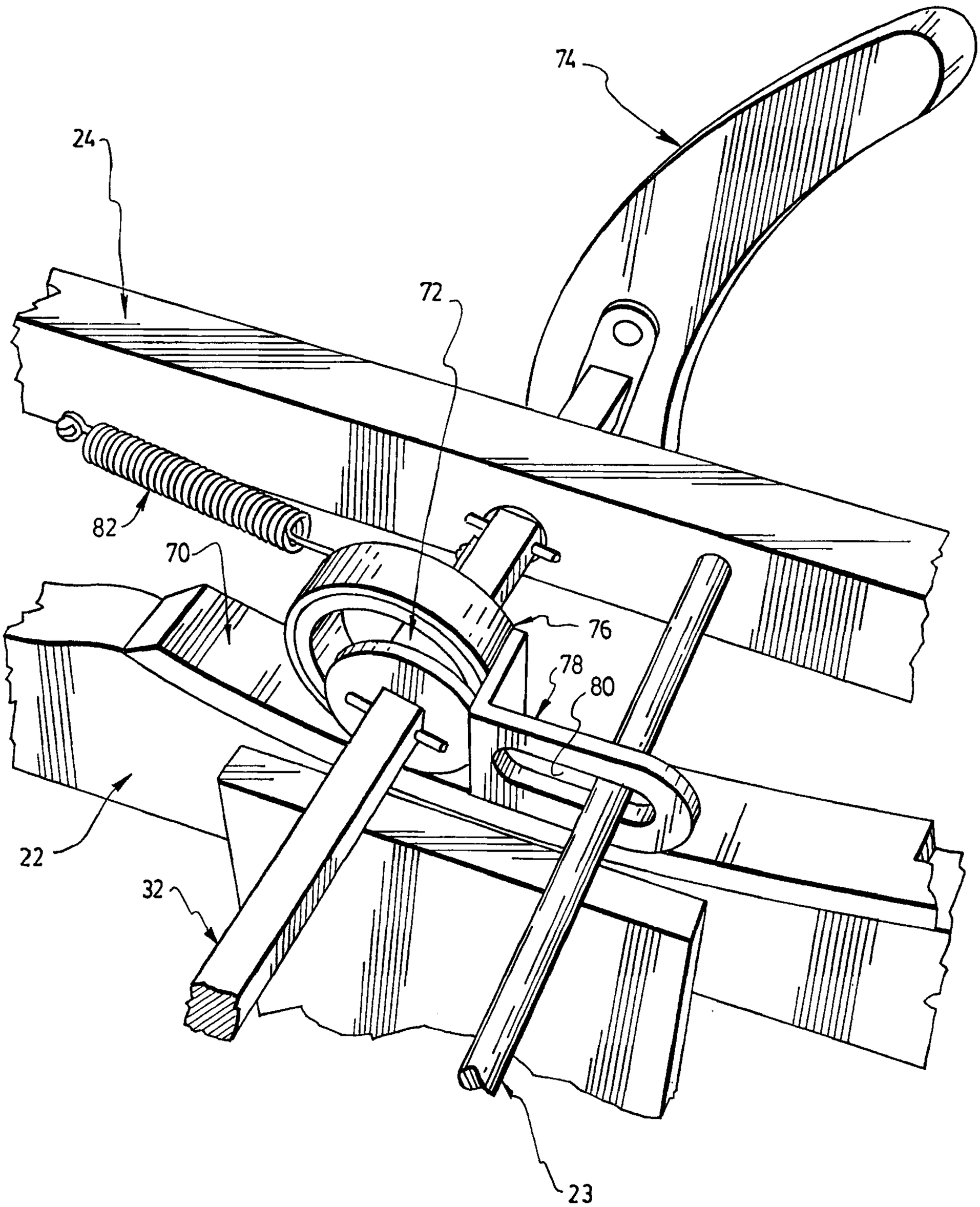


FIG. 4

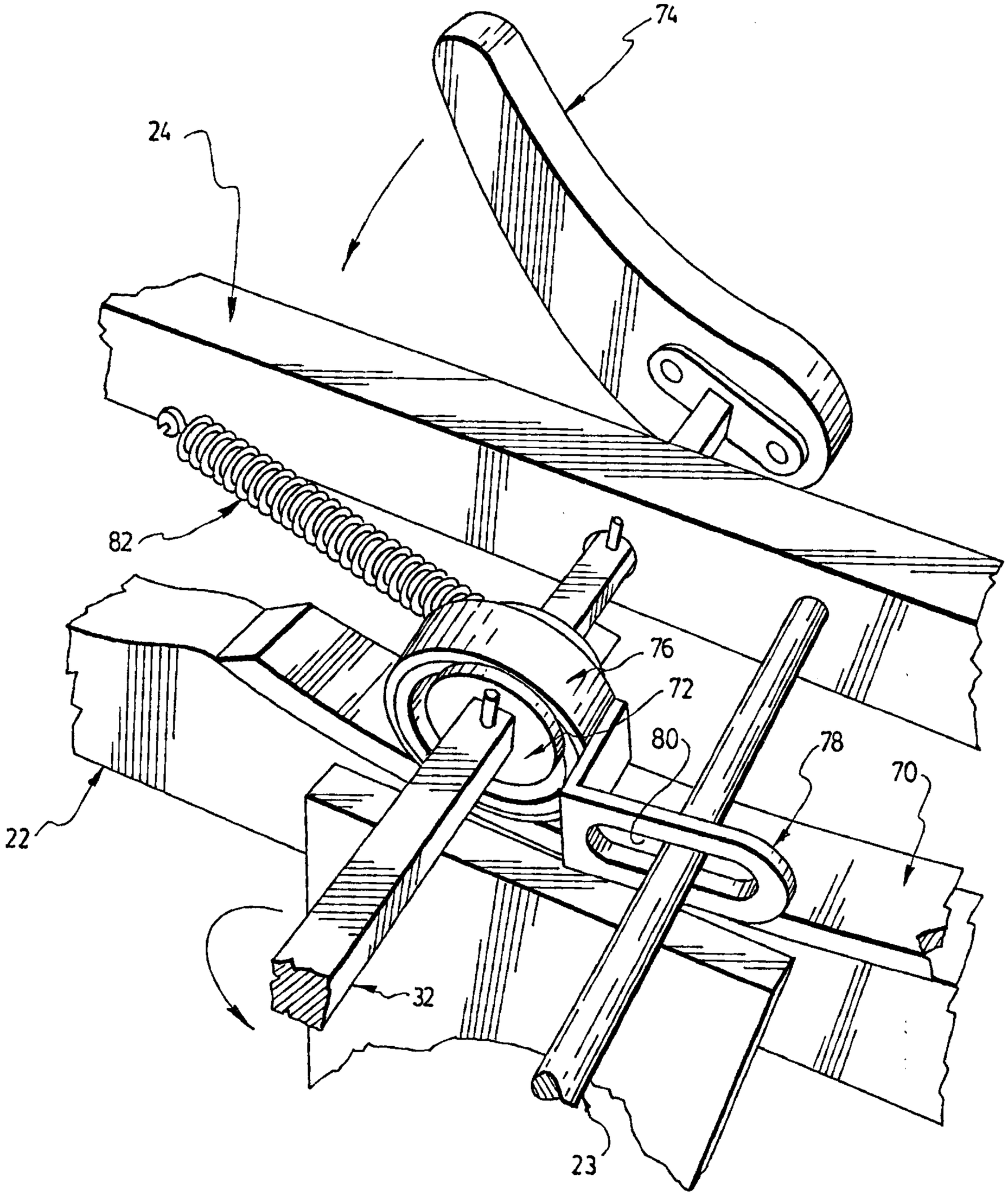


FIG. 5

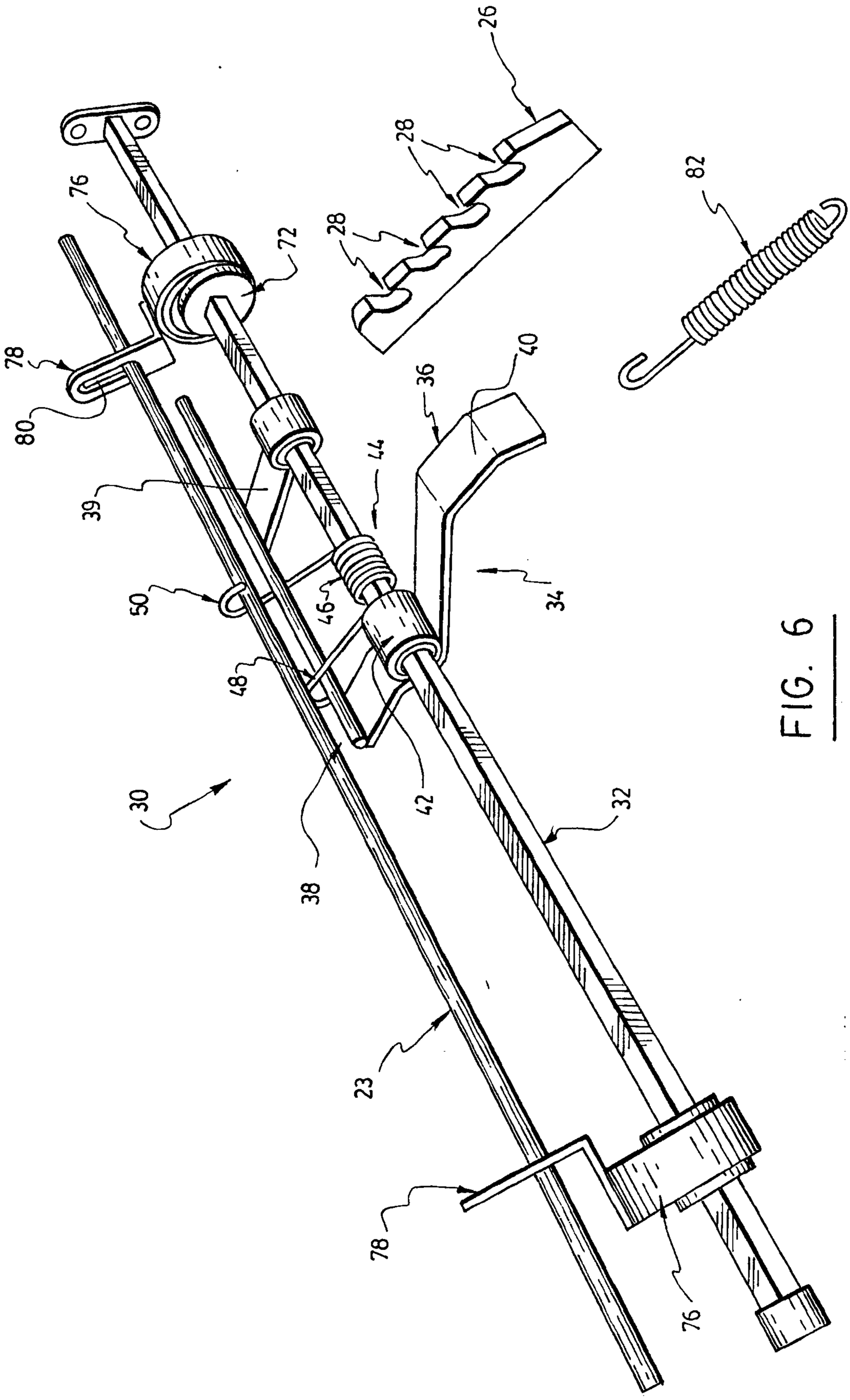


FIG. 6

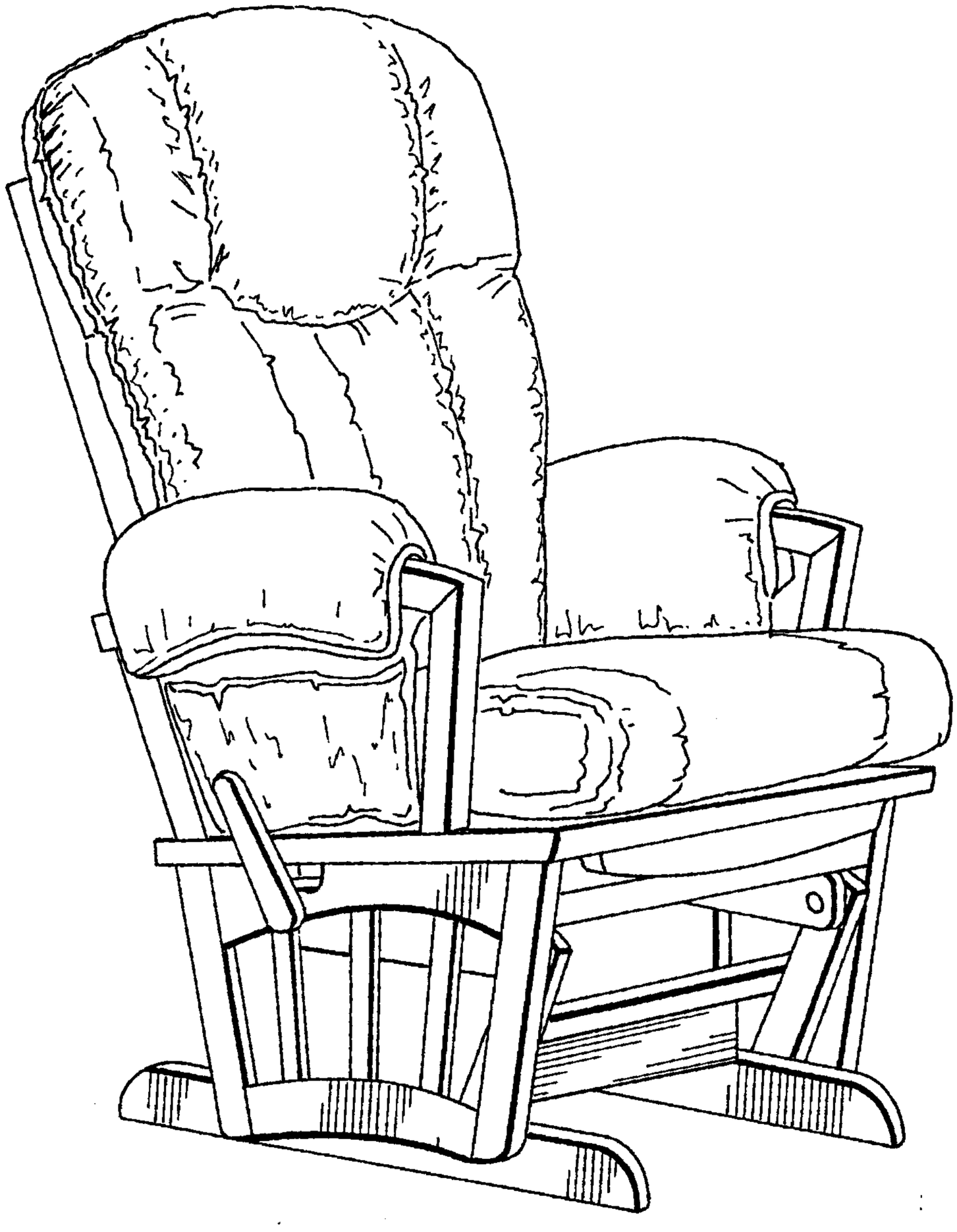
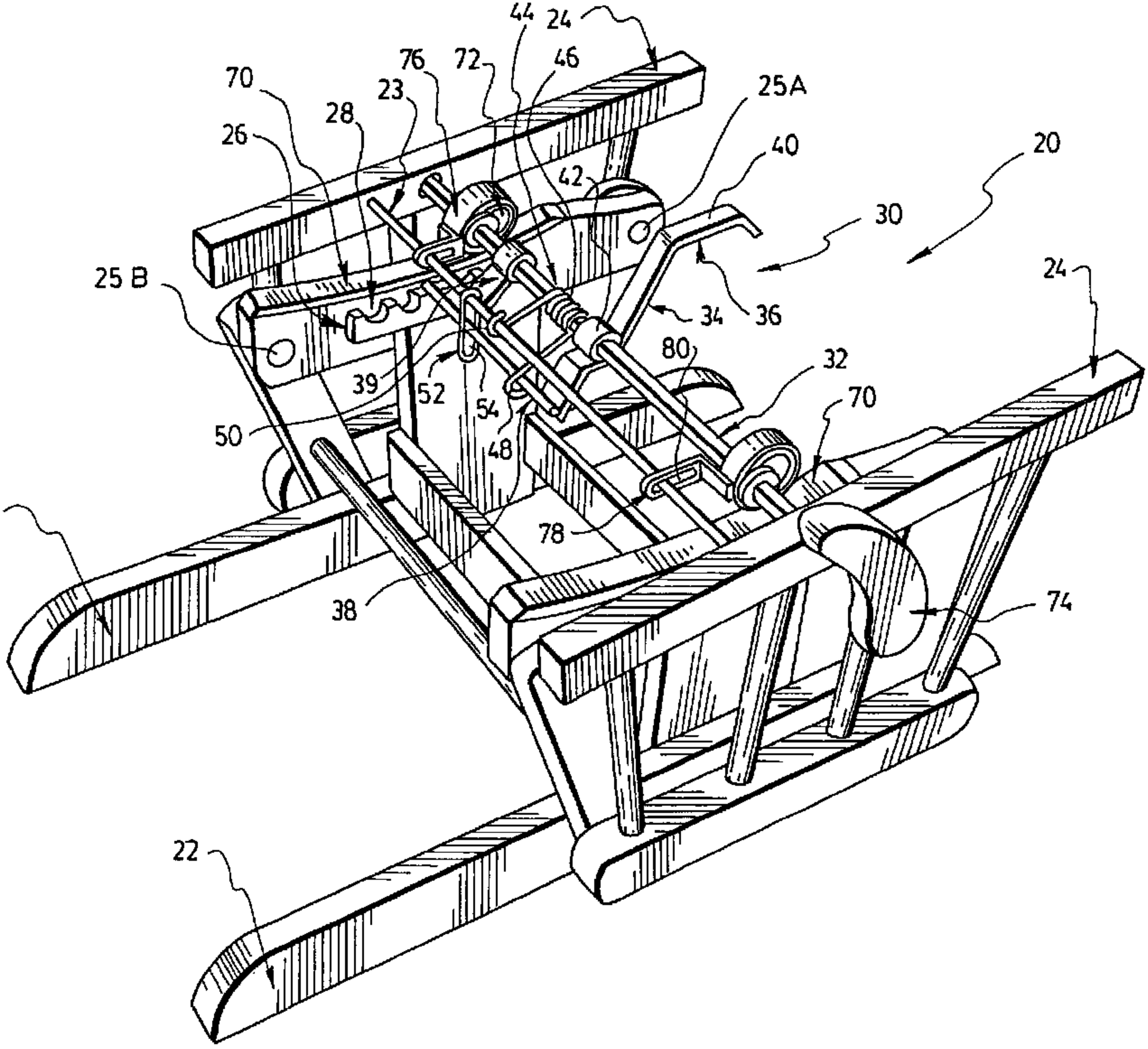


FIG. 7


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