

**March 7, 1944.**

H. H. BERNSTEIN

**2,343,739**

## WEIGHT ACTION FOR CHAIR BACKS

Filed Sept. 9, 1942

3 Sheets-Sheet 1

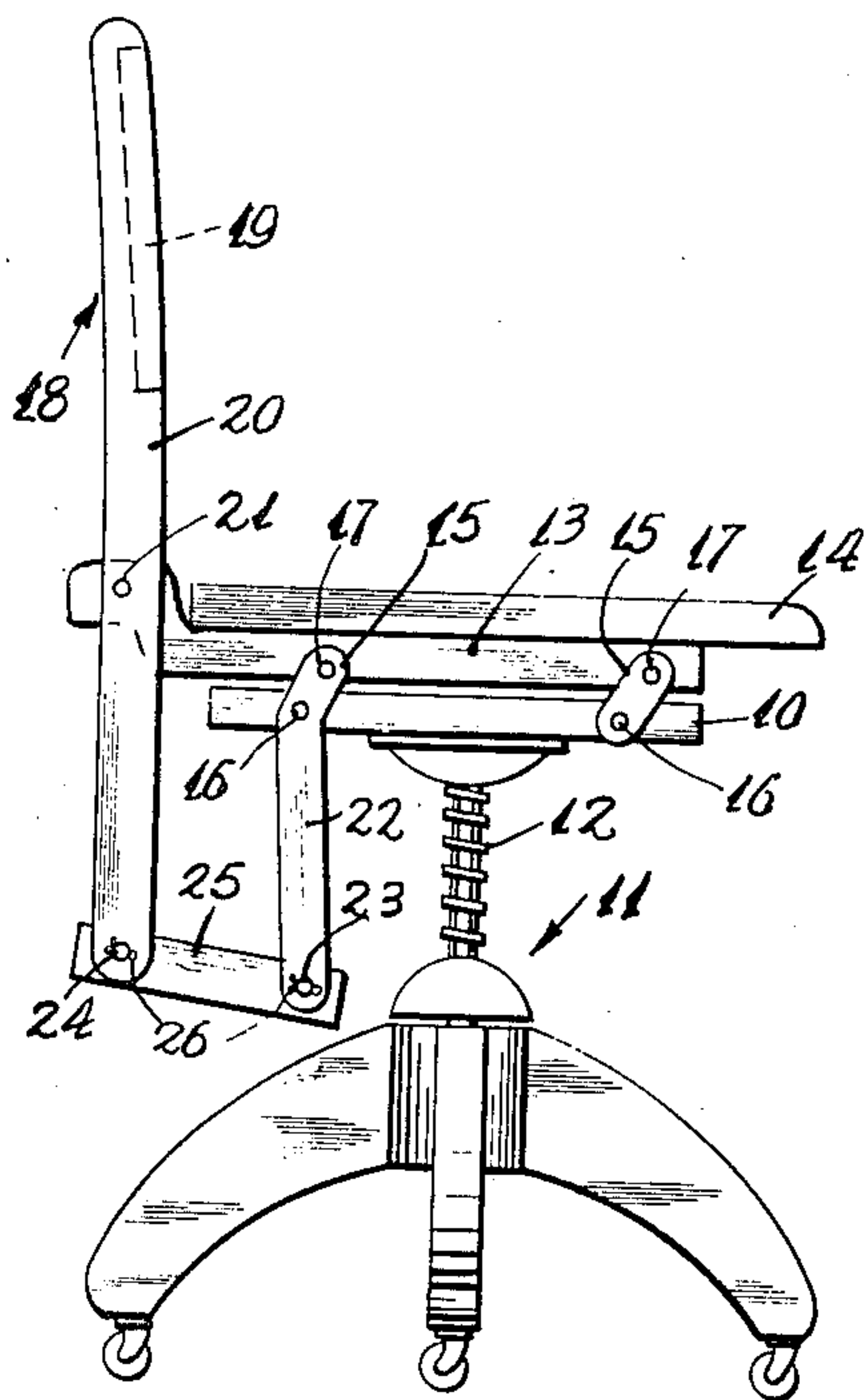


Fig. 1

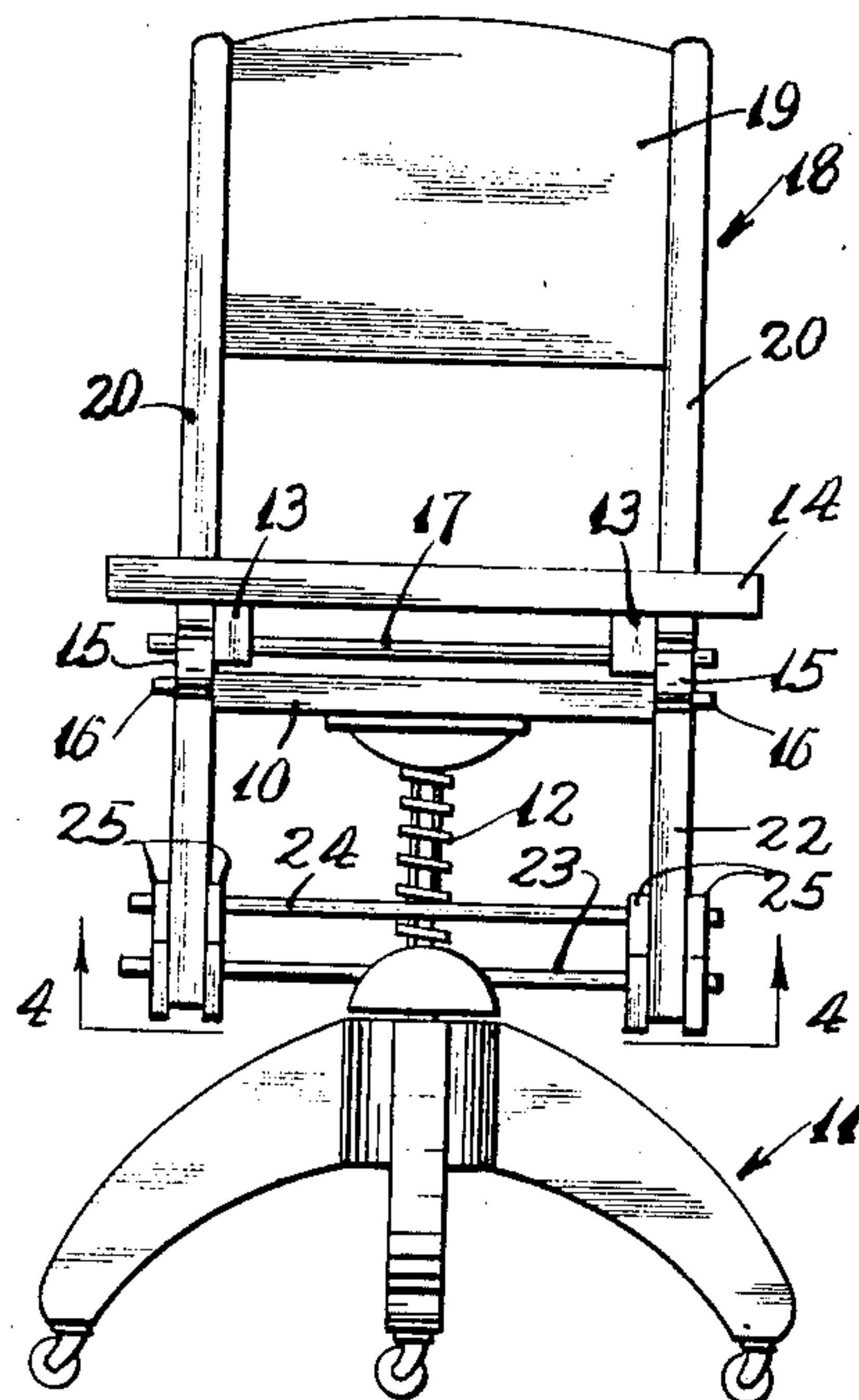


Fig. 3

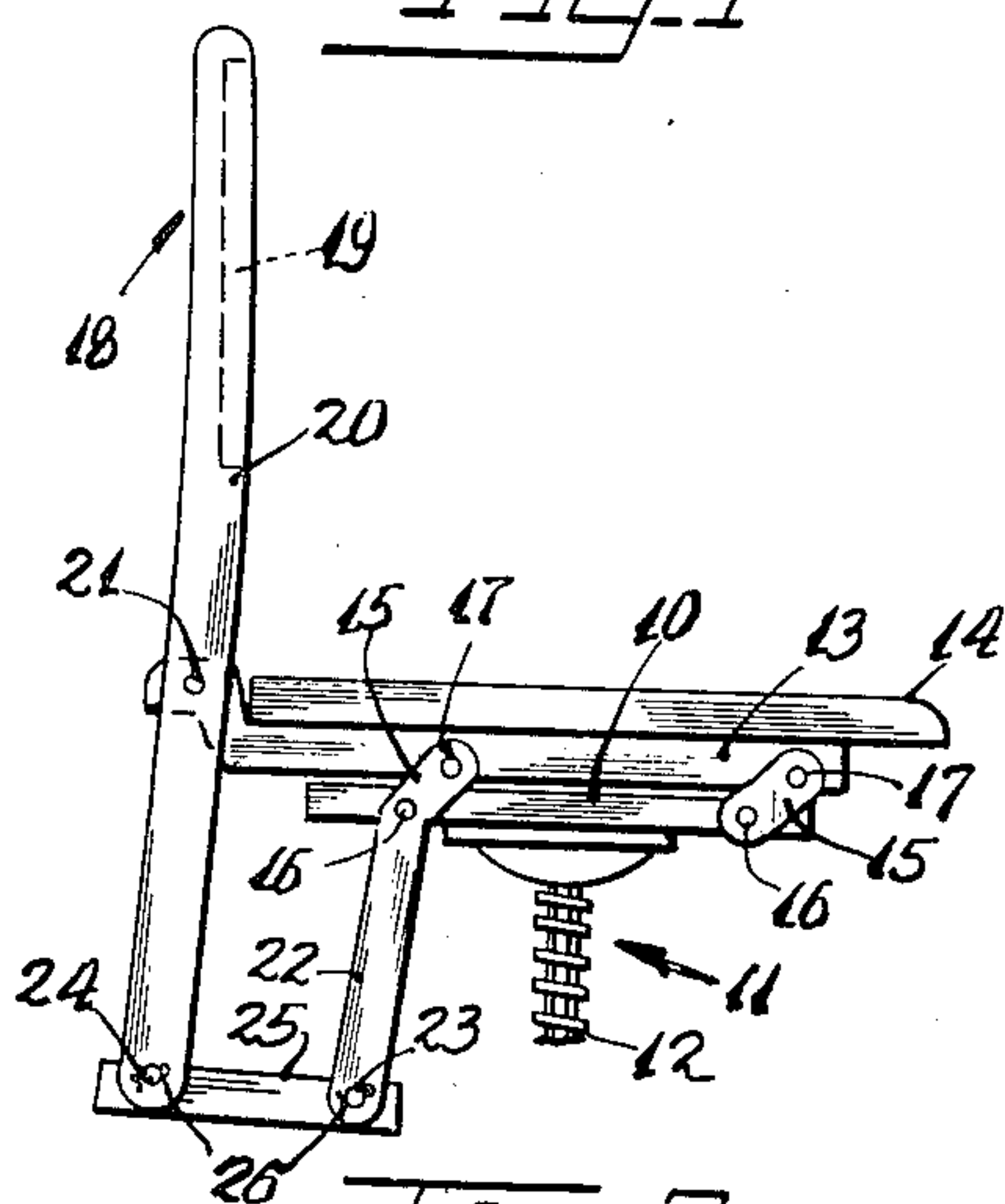


Fig. 2.

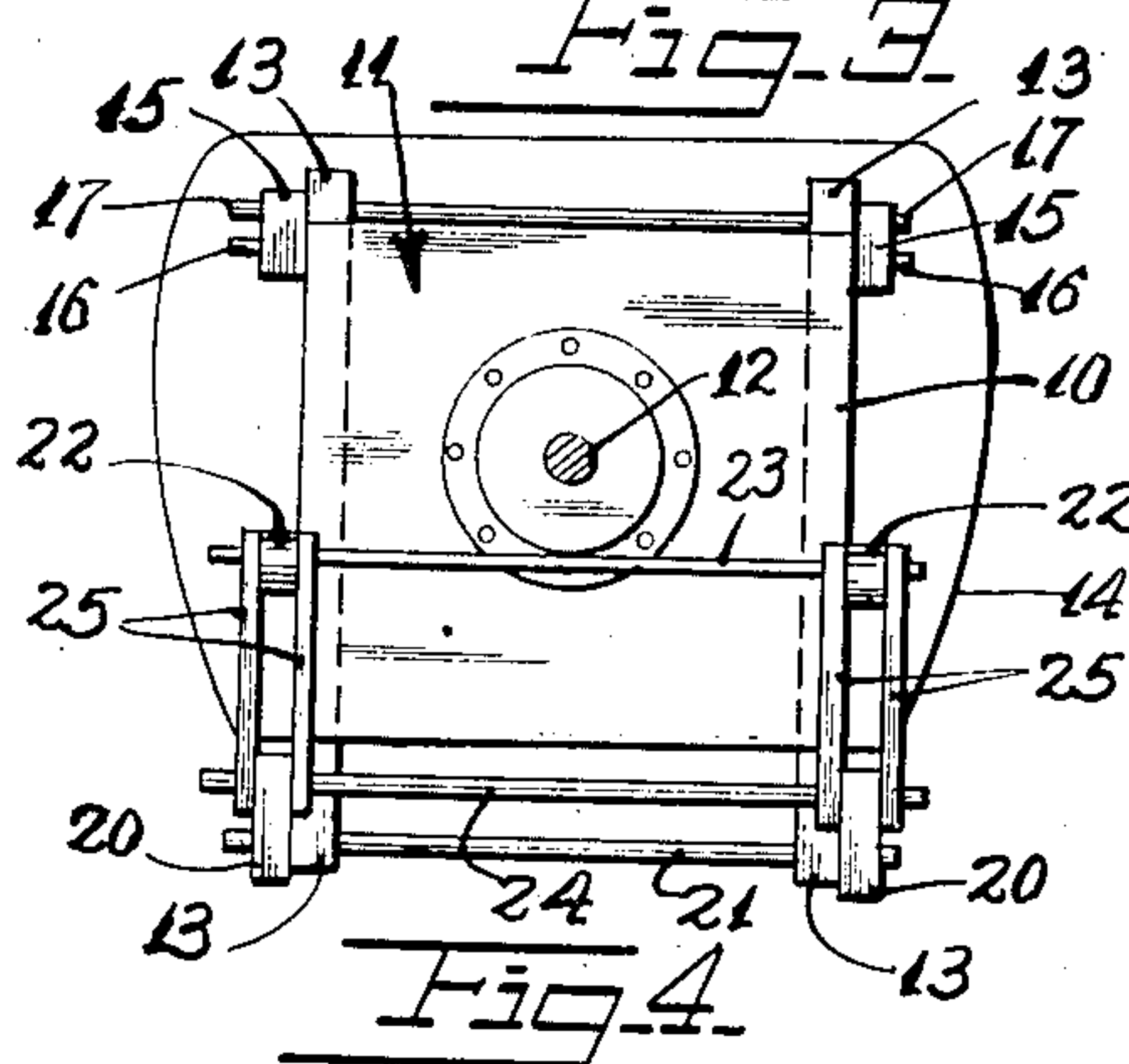


Fig. 4.

INVENTOR.

INVENTOR.  
*Herbert Henry Bernstein*

BY

Golden Polachsky  
ATTORNEY

ATTORNEY

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H. H. BERNSTEIN

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3 Sheets-Sheet 2

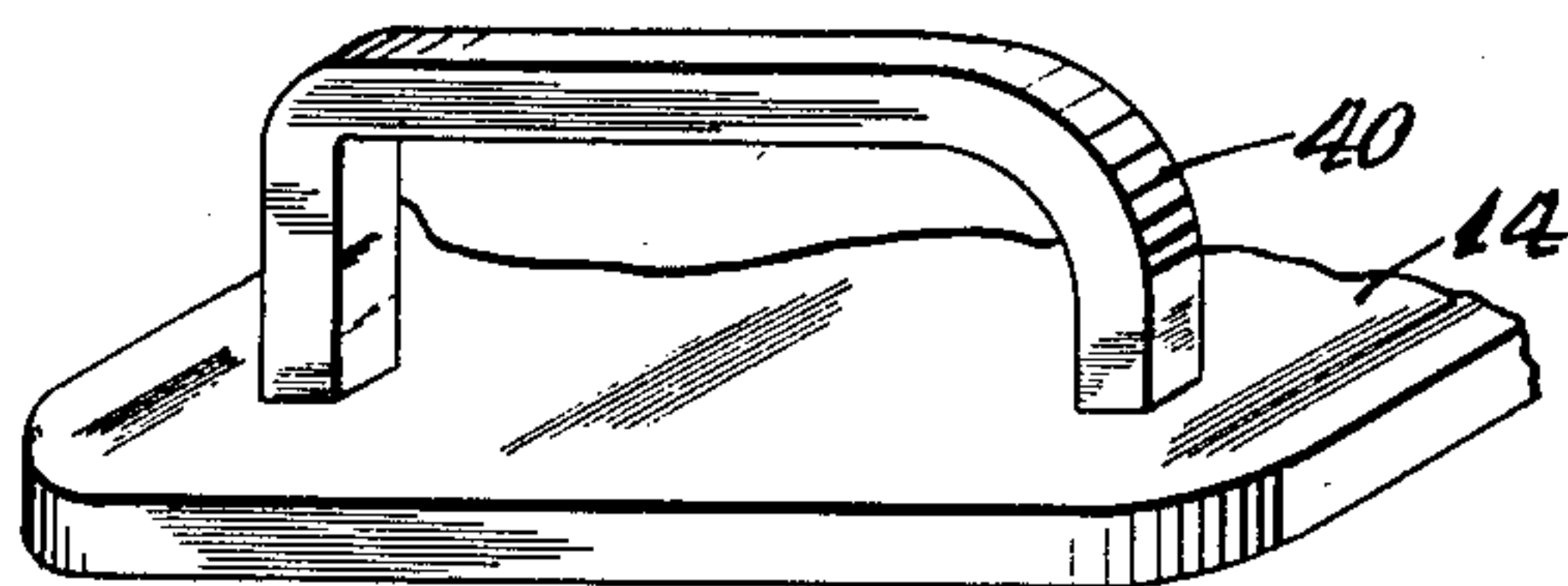
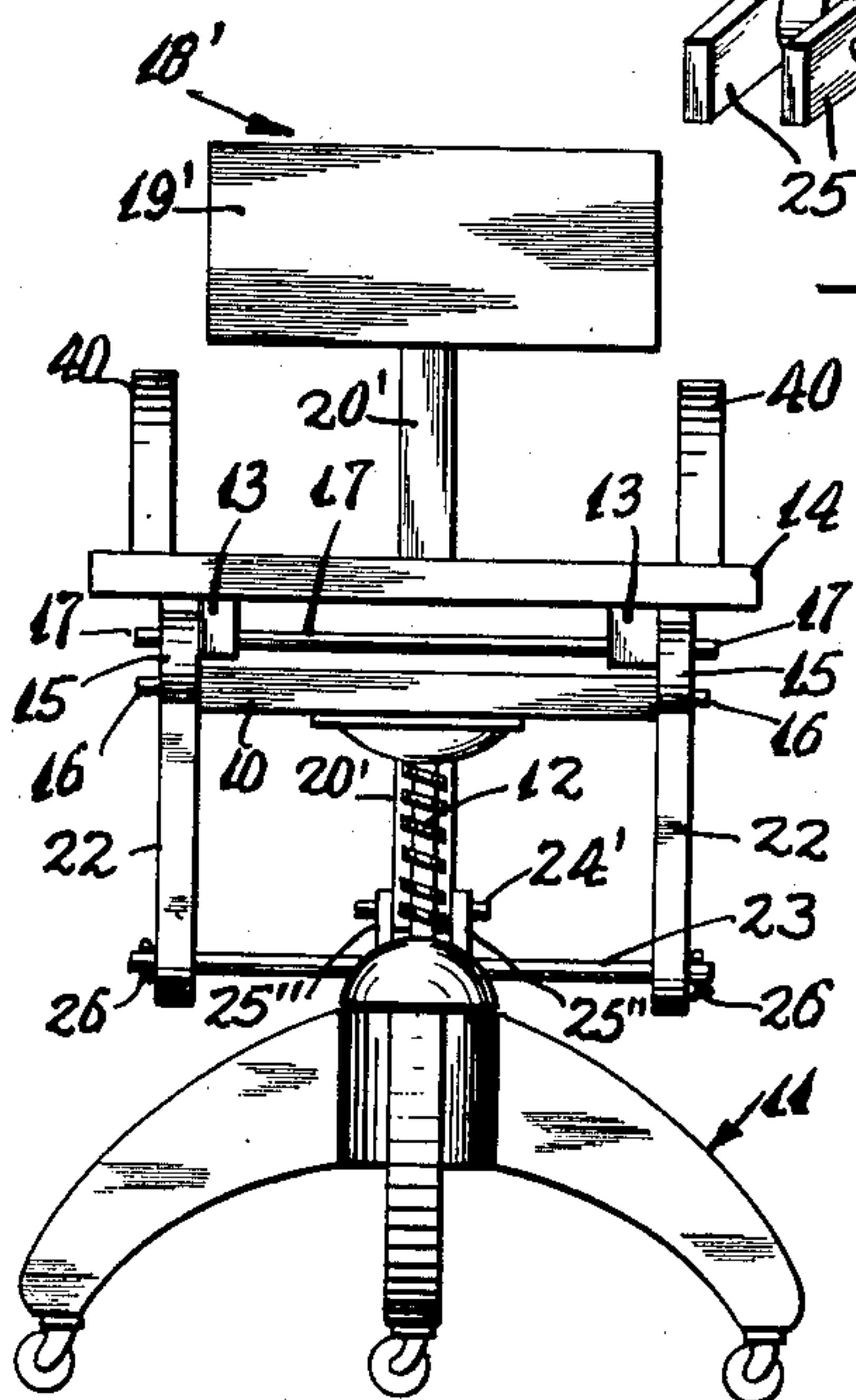
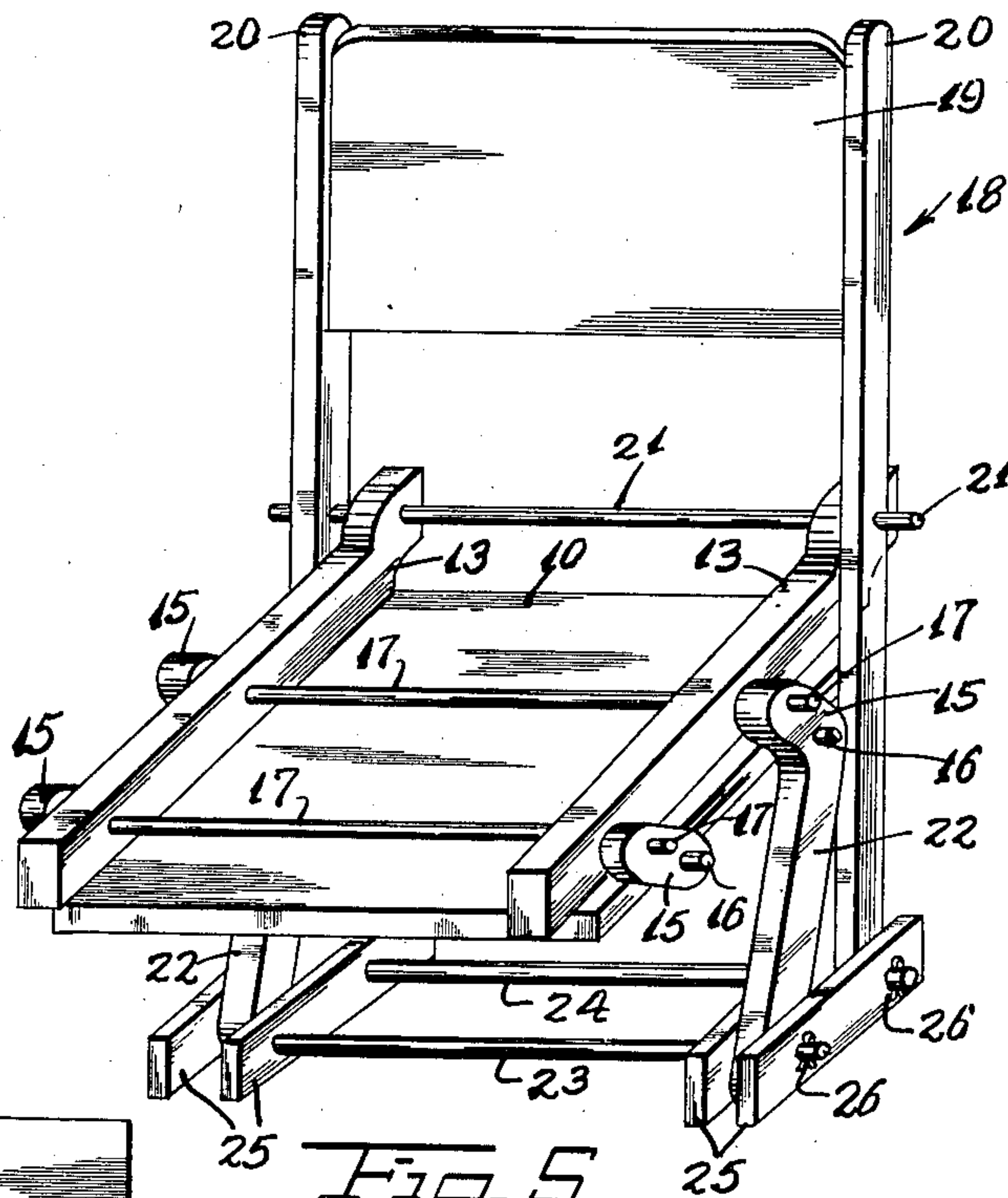


Fig. 11.

Fig. 12.

INVENTOR.

Herbert Henry Bernstein

Goldman Pollock & Peltz

ATTORNEY

BY

March 7, 1944.

H. H. BERNSTEIN

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WEIGHT ACTION FOR CHAIR BACKS

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3 Sheets-Sheet 3

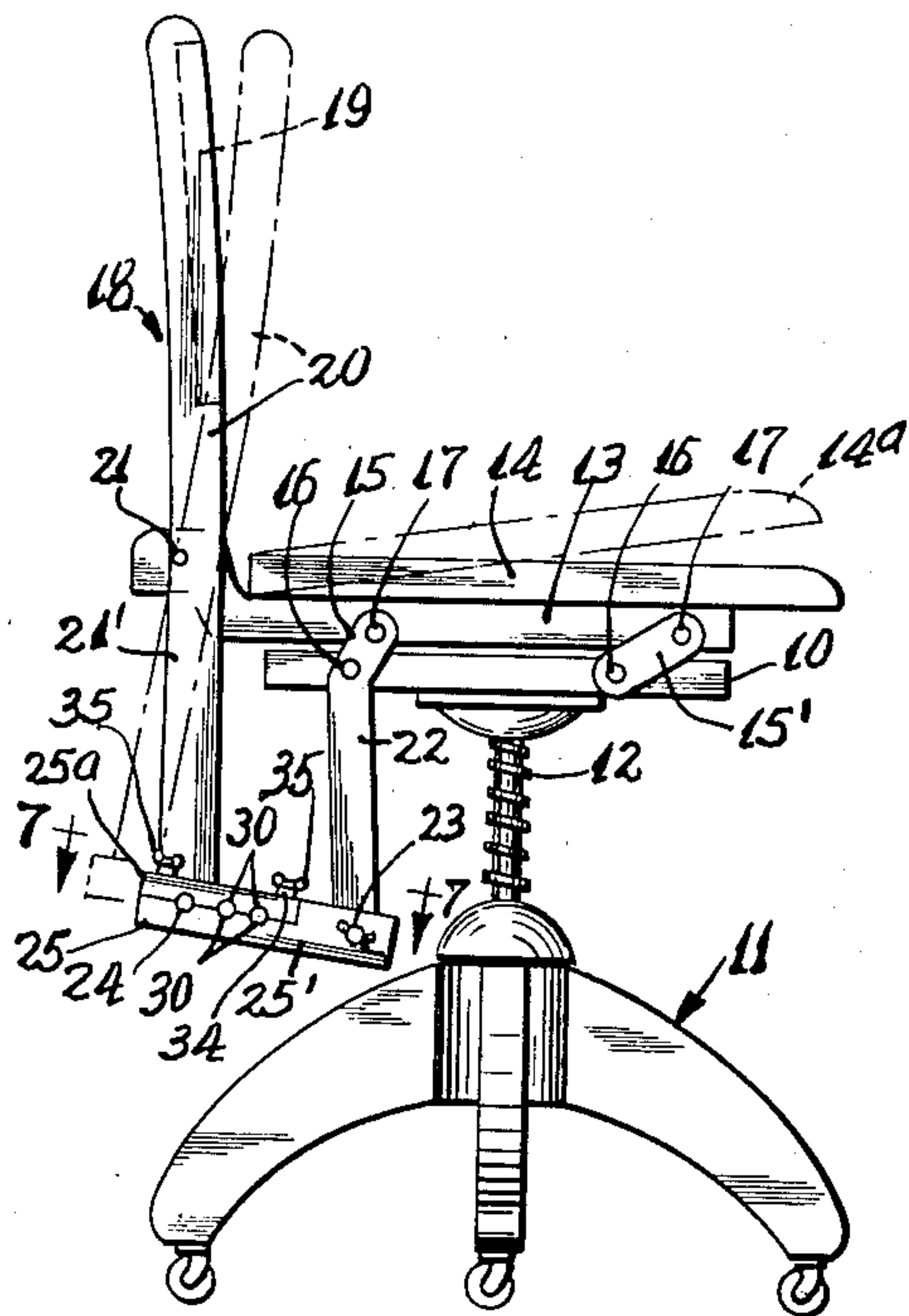


Fig. 6.

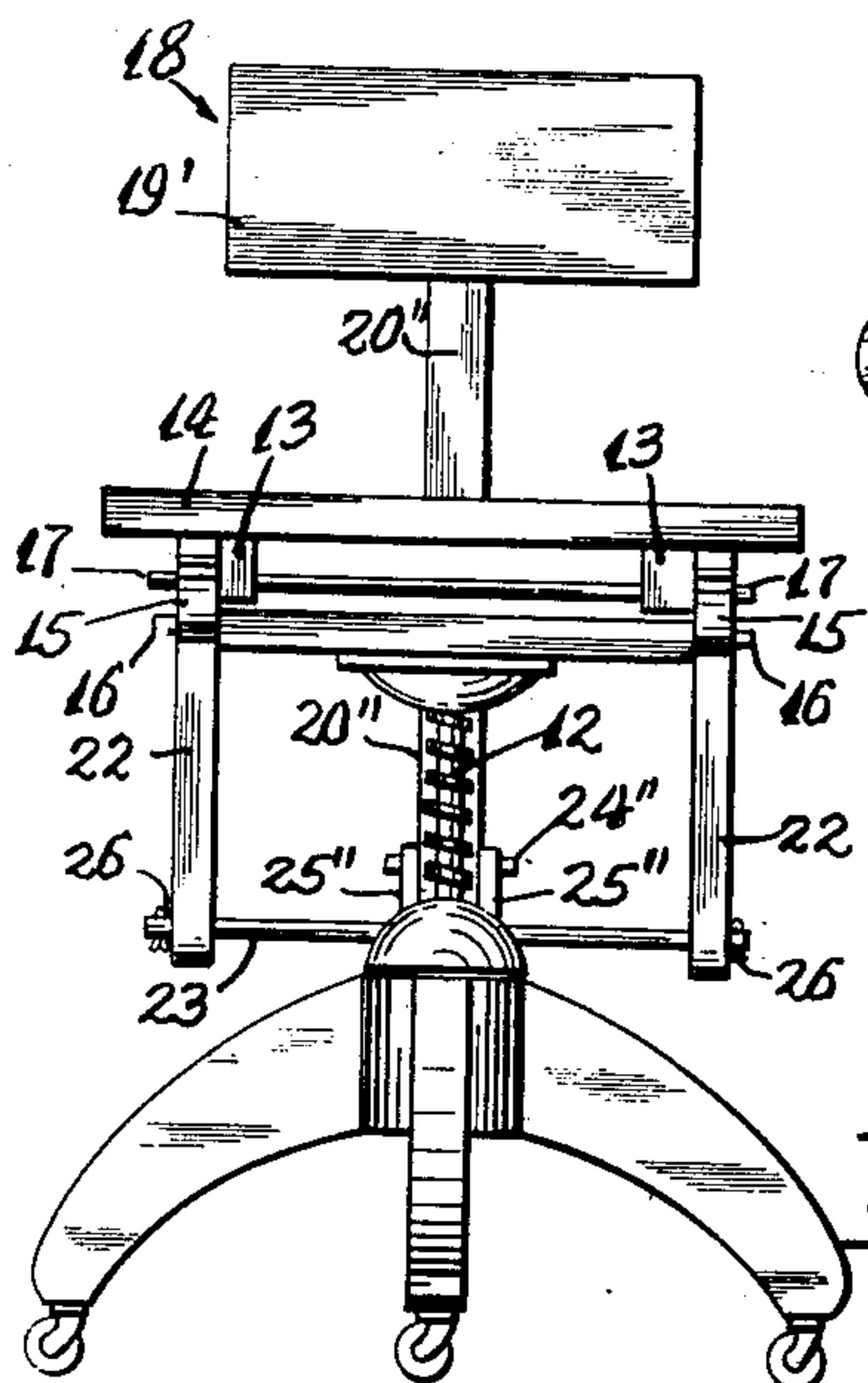


Fig. 9.

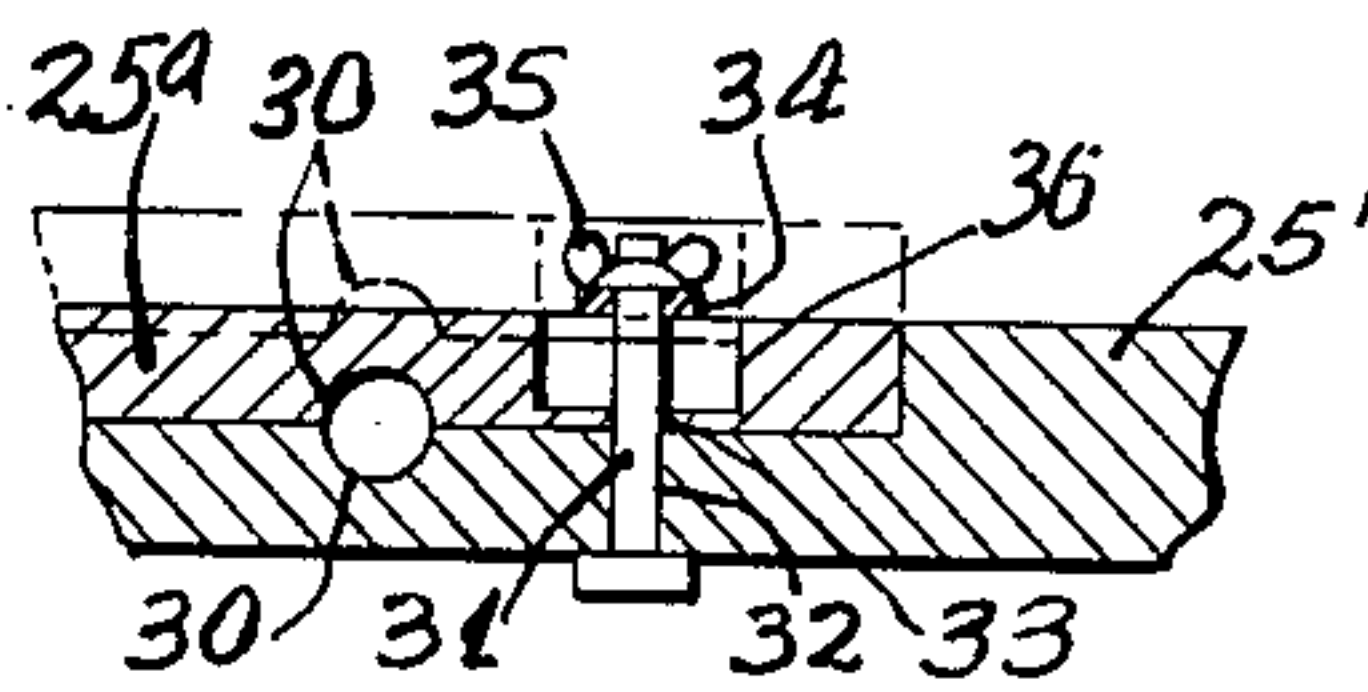


Fig. 8.

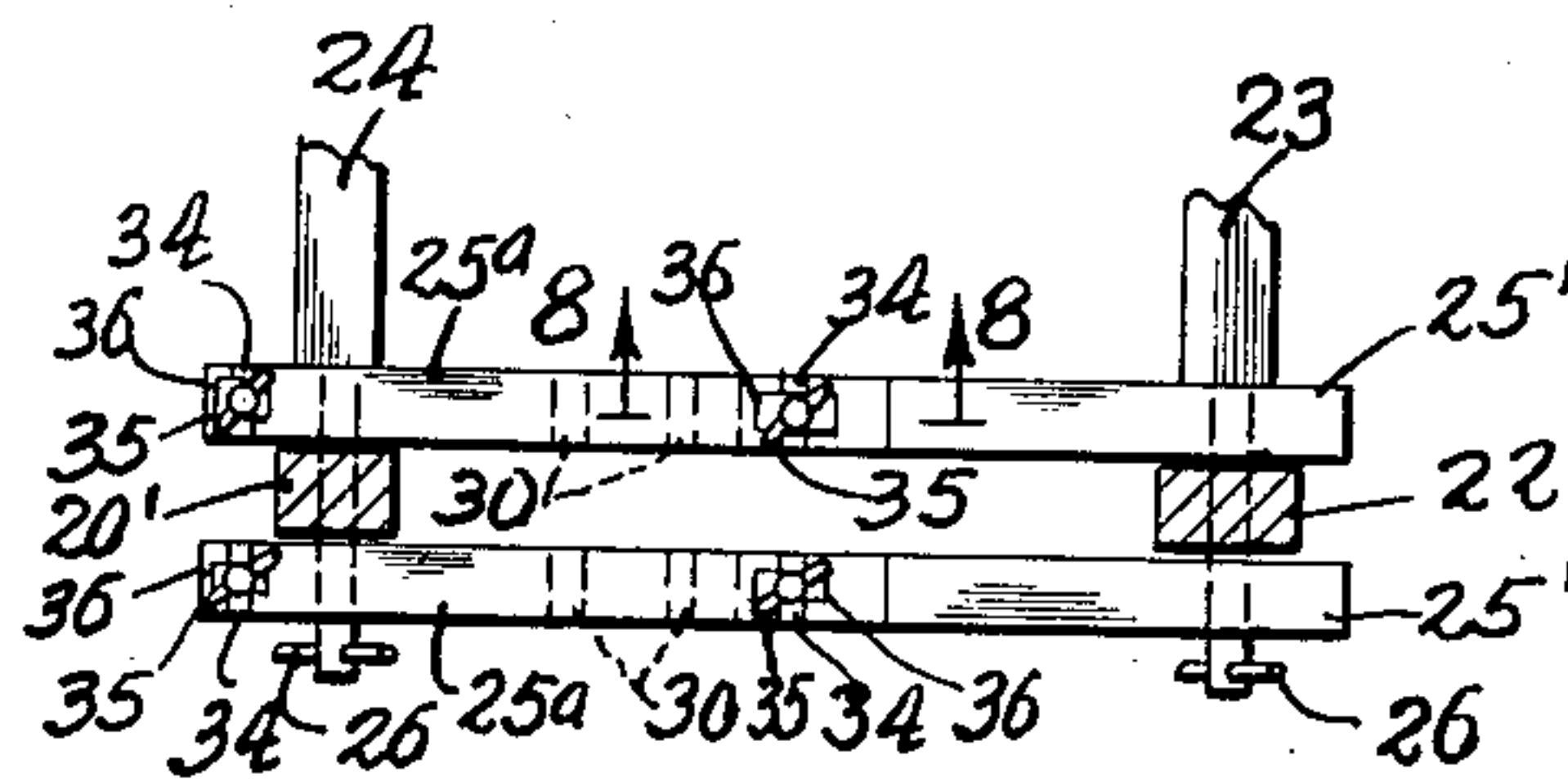


Fig. 7.

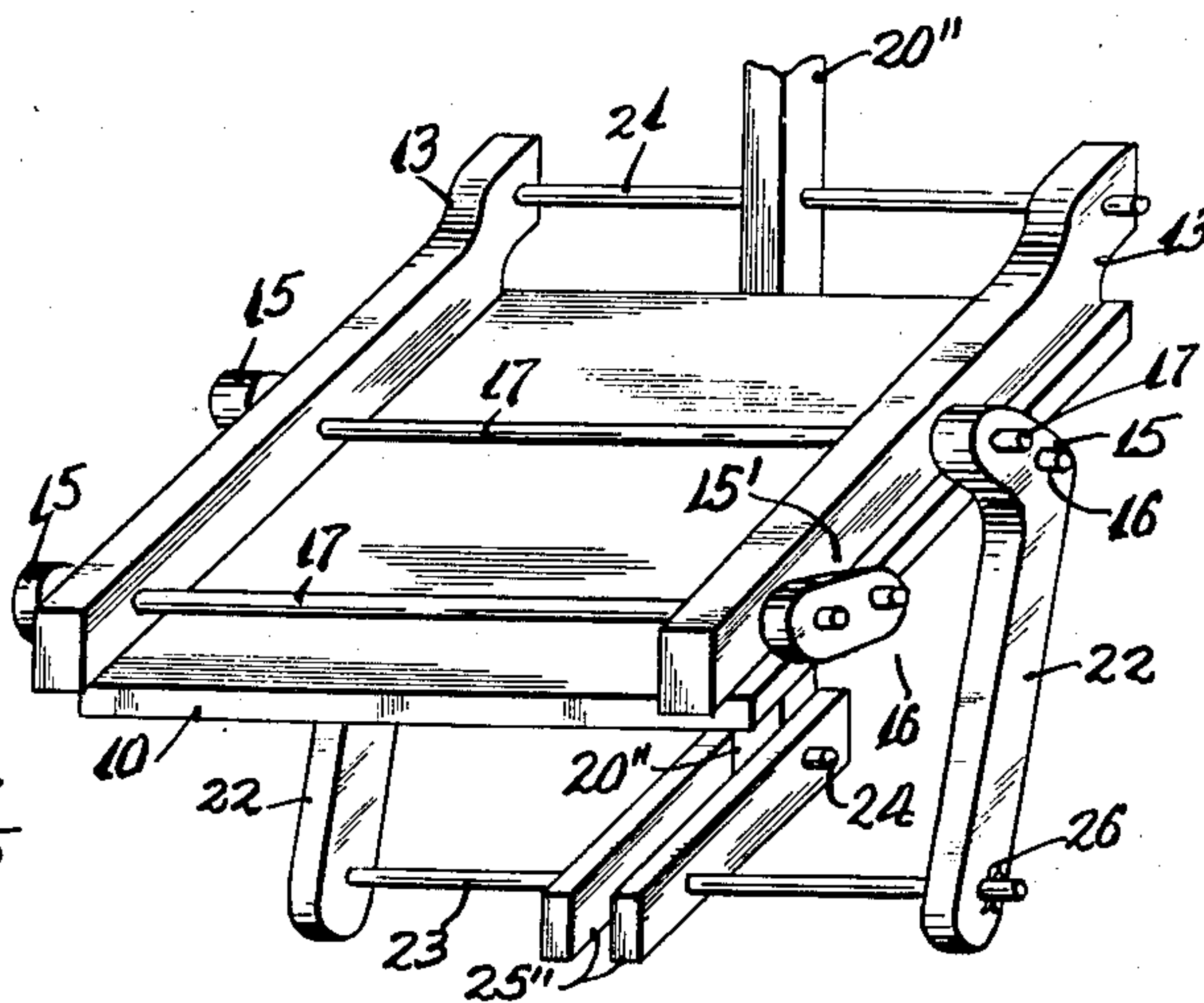


Fig. 10.

BY

INVENTOR.  
*Herbert Henry Bernstein*  
*Gottlieb Helmsch*  
ATTORNEY



## UNITED STATES PATENT OFFICE

2,343,739

## WEIGHT ACTION FOR CHAIR BACKS

Herbert Henry Bernstein, Brooklyn, N. Y., assignor of one-half to Kalmus-Golden, Inc., a corporation of New York

Application September 9, 1942, Serial No. 457,740

7 Claims. (Cl. 155-116)

This invention relates to new and useful improvements in a weight action for chair backs.

More specifically, the invention proposes the construction of a chair of the type wherein the back of the chair is pivotally mounted to move relative to the seat and which is provided with a new and novel means for pivotally supporting the back in a manner to eliminate springs and other metallic parts now commonly used in chairs of this type.

Another object of the invention proposes to characterize the chair by a support board mounted upon a leg structure and upon which a spaced pair of seat support arms are mounted in a manner to have a seat mounted thereon and connected with said support board by links with these parts simulating a parallelogram of arms so that the seat may assume various horizontal positions relative to the seat board.

Still further it is proposed to provide the chair with a back pivotally mounted upon the support arms and connected by means of a linkage with certain of said links in a manner to cause the back to rock forwards and rearwards as the seat moves vertically downwards and upwards.

Still another object of the invention proposes a means for adjustably connecting the chair back with its linkage in a manner to permit the angular position of the back relative to the seat to be adjusted in a manner to most comfortably meet the requirements of the person sitting on the chair.

It is a further object of this invention to construct a new and novel chair which is simple and durable and which may be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a side elevational view of a chair provided with a weight action in accordance with this invention.

Fig. 2 is a partial side elevational view similar to Fig. 1 but illustrating a different position of the parts.

Fig. 3 is a front elevational view of Fig. 1.

Fig. 4 is a horizontal sectional view taken on the line 4-4 of Fig. 3.

Fig. 5 is a perspective view of a portion of Fig. 1.

Fig. 6 is a side elevational view similar to Fig. 1, but illustrating a modification of the invention.

Fig. 7 is an enlarged horizontal sectional view taken on the line 7-7 of Fig. 6.

Fig. 8 is a vertical sectional view taken on the line 8-8 of Fig. 7.

Fig. 9 is a front elevational view of a chair constructed in accordance with a still further modification of the invention.

Fig. 10 is a perspective view of a portion of Fig. 9.

Fig. 11 is a front elevational view of a chair constructed in accordance with another modification of this invention.

Fig. 12 is a perspective view of a portion of Fig. 11.

The weight action for chair backs, according to this invention, includes a support board 10 mounted upon a leg structure 11. The leg structure 11 is of the type having a screw threaded vertical column 12 upon the top end of which the support board 10 is mounted. The column 12 is vertically adjustable in a manner to support the support board 10 at various elevations above the surface upon which the leg structure 11 is resting. Further details of the leg structure 11 will not be given in this specification as it forms no part of this invention and leg structures of this type are generally known to those skilled in the art.

Seat support arms 13 are superimposed upon the support board 10. These arms 13 are spaced laterally of each other and extend forwardly and rearwardly of the seat support 10. A substantially horizontal seat 14 is mounted upon the top faces of the support arms 13.

Links 15 pivotally connect the support board 10 and the support arms 13. The bottom ends of the links 15 are pivotally connected to the outer sides of the support board 10 by means of dowel pins 16. The top ends of the links 15 are fixedly attached to the outer ends of rods 17 which extend rotatively through the support arms 13. In the preferred construction the intermediate portions of the rods 17 are of a diameter greater than the ends forming shoulders which will abut the inner faces of the support arms 13 and serve to hold them spaced laterally of each other.

It will be noted that the support board 10, the support arms 13 and the links 15 simulate a parallelogram of arms so that the seat may assume various horizontal positions relative to the support board 10. This is so in view of the fact that the seat 14 is mounted upon the top faces



of the support arms 13 which form a portion of the simulated parallelogram of arms.

A back 18 is provided for the chair. This back 18 comprises a back member 19 fixedly mounted upon the top ends of a pair of laterally spaced vertically extending side members 20. The support arms 13 have their rear ends projected beyond the back edge of the seat 14 and a rod 21 is fixedly extended between the back ends of the support arms 13. The intermediate portions of the side members 20 are pivotally supported upon the rod 21.

Linkage is provided for connecting the simulated parallelogram of arms with the chair back 18 to cause the back to rock forwards and rearwards as the seat moves upwards and downwards. The linkage is characterized by downwardly extending portions 22 formed on the rear-most links 15. A rod 23 is extended between these downwardly extending portions 22. A similar rod 24 is extended between the bottom ends of the side members 20 of the chair back 18. Links 25 extend between the bottom ends of the downwardly extending portions 22 and the bottom ends of the side members 20 and are rotatively mounted upon the ends of the rods 23 and 24. Cotter pins 26 are used for retaining the portions of the linkage in position upon the ends of the rods 23 and 24.

The operation of the chair is as follows:

Normally the seat 14 is in the position shown in Fig. 1 with the support arms 13 spaced slightly above the top face of the support board 10. When a person sits upon the seat 14 it will move vertically downwards until the support arms 13 rest upon the top face of the support board 10. The position of the links 15 will have been changed and through the medium of the linkage the back 18 will have its top end pivoted forward causing the back member 19 to engage against the back of the person sitting upon the seat. This latter position of the parts is shown in Fig. 2.

The person sitting upon the seat 14 may shift his weight from the seat 14 against the back 18. This will cause the back 18 to be pivoted into a slightly rearwardly inclined position (not shown on the drawings) and raise the support arms 13 and seat 14 off of the support board 10. When the person gets out of the chair the parts will immediately pivot back to the position shown in Fig. 1.

In Figs. 6 to 8, the construction of the chair is similar to that previously described except for the provision of a means for adjustably connecting the bottom ends of the side member 21' of the chair back 18 with the rear ends of the links 25', so that the chair back 18 may be held in various pivoted positions relative to the seat 14.

In this form of the invention each link 25' has a portion of its top rear corner 25<sup>a</sup> cut away. The adjacent faces of the links 25' and their respective portions 25<sup>a</sup> are formed with aligned semi-circular openings 30 through which the outer ends of the rod 24 extend.

Bolts 31 or the like are rotatively extended through spaced openings 32 formed in the links 25'. The top ends of the bolts 31 are rotatively extended through complementary openings 33 formed in the ends of the portion 25<sup>a</sup>. The top ends of the bolts 31 carry elongated washers 34 which are mounted thereon and which normally extend across the top face of the portions 25<sup>a</sup> locking these portions in position upon the links 25'. A wing-nut 35 is mounted upon the top end of each bolt 31 above its respective washer

34. This wing-nut 35 permits the bolt 31 to be turned into a position in which the elongated washers 34 will be aligned with complementary elongated recesses 36 formed in the top face of the portion 25<sup>a</sup>. This will free the portion 25<sup>a</sup> to be raised vertically to the position illustrated by the dot and dash lines in Fig. 8 or until the bottom faces of the washers 34 strike the bottom walls of the recesses 36. This movement will separate the semi-circular openings 30 and permit the ends of the rods 24 to be aligned with a new set of semi-circular openings 30. When the new adjusted position is reached the portion 25<sup>a</sup> and the washers 34 are restored to the full line position shown in Fig. 8 and the back 18 will be locked in its new pivoted position relative to the seat 14.

In this form of the invention the front linkages 15' are shown to be longer than the rear linkages 15 to produce an upwardly sloping front 14<sup>a</sup> of the seat 14, when a person sits on the chair.

In other respects this form of the invention is similar to the previous form and like reference numerals identify like parts in each of the several views.

In Figs. 9 and 10 the chair back 18' is characterized by a back member 19' mounted at its center upon the top end of a single member 20''. The member 20'' has its center pivotally supported upon the intermediate portion of the rod 21. The bottom end of the member 20'' is pivotally attached to the back end of a pair of spaced links 25'' by means of a dowel pin 24'. The forward ends of the links 25'' are mounted upon an intermediate portion of the rod 23.

In other respects this form of the invention is similar to the first form of the invention and like reference numerals identify like parts in each of the several views.

In Figs. 11 and 12 the seat 14 is formed with arm rests 40. These arm rests are of inverted U-shaped construction and have the free ends of their side arms securely attached to the top face of the seat 14.

In other respects this form of the invention is similar to that shown in Figs. 9 and 10 and like reference numerals identify like parts in each of the several views.

While the weighted action for chair backs has been shown applied to chairs of the type generally used by typists, stenographers, school teachers and the like it may also be applied equally as well to other types of chairs.

It is to be understood that this arrangement may be used in connection with all type of chairs and that suitable means may be provided for raising and lowering the height of the seat of the chair, as for example, by placing spacing discs of various width between the support board 10 and the vertical column 12.

This automatic device may also be made of composition or any other suitable material and the dowel pins may be substituted by rivets, screws, etc.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. A weight action for chair backs, comprising



a leg structure, a horizontal support board mounted on said leg structure, horizontal seat support arms superimposed on said support board, a substantially horizontal seat mounted on said support arms, front and rear pairs of forwardly and upwardly inclined links pivotally connecting said support arms and support board, said support board, support arms and links forming a parallelogram of arms so that said seat may assume various horizontal positions, a chair back pivotally supported intermediate of its ends upon the rear ends of said support arms, downwardly extending portions formed on one pair of said links, and links connecting the bottom ends of said downwardly extending portions with the bottom end of said chair back to cause the back to rock forwards and rearwards as said seat moves downwards and upwards.

2. A weight action for chair backs, comprising a leg structure, a horizontal support board mounted on said leg structure, horizontal seat support arms superimposed on said support board, a substantially horizontal seat mounted on said support arms, front and rear pairs of forwardly and upwardly inclined links pivotally connecting said support arms and support board, said support board, support arms and links forming a parallelogram of arms so that said seat may assume various horizontal positions, a chair back pivotally supported intermediate of its ends upon the rear ends of said support arms, downwardly extending portions formed on one pair of said links, and links connecting the bottom ends of said downwardly extending portions with the bottom end of said chair back to cause the back to rock forwards and rearwards as said seat moves downwards and upwards, said support arms being laterally spaced and extended forwards and rearwards of said support board.

3. A weight action for chair backs, comprising a leg structure, a horizontal support board mounted on said leg structure, horizontal seat support arms superimposed on said support board, a substantially horizontal seat mounted on said support arms, front and rear pairs of forwardly and upwardly inclined links pivotally connecting said support arms and support board, said support board, support arms and links forming a parallelogram of arms so that said seat may assume various horizontal positions, a chair back pivotally supported intermediate of its ends upon the rear ends of said support arms, downwardly extending portions formed on one pair of said links, and links connecting the bottom ends of said downwardly extending portions with the bottom end of said chair back to cause the back to rock forwards and rearwards as said seat moves downwards and upwards, said downwardly extending portions being formed upon the bottom ends of the rear pair of links.

4. A weight action for chair backs, comprising a leg structure, a horizontal support board mounted on said leg structure, horizontal seat support arms superimposed on said support board, a substantially horizontal seat mounted on said support arms, front and rear pairs of forwardly and upwardly inclined links pivotally connecting said support arms and support board, said support board, support arms and links forming a parallelogram of arms so that said seat may assume various horizontal positions, a chair back pivotally supported intermediate of its ends upon the rear ends of said support arms, downwardly extending portions formed on one pair of said links, and links connecting the bottom

ends of said downwardly extending portions with the bottom end of said chair back to cause the back to rock forwards and rearwards as said seat moves downwards and upwards, and means adjustably connecting together the bottom end of said chair back and the adjacent ends of said latter links so that the angular position of said chair back may be adjusted relative to said seat.

5. A weight action for chair backs, comprising a leg structure, a horizontal support board mounted on said leg structure, horizontal seat support arms superimposed on said support board, a substantially horizontal seat mounted on said support arms, front and rear pairs of forwardly and upwardly inclined links pivotally connecting said support arms and support board, said support board, support arms and links forming a parallelogram of arms so that said seat may assume various horizontal positions, a chair back pivotally supported intermediate of its ends upon the rear ends of said support arms, downwardly extending portions formed on one pair of said links, and links connecting the bottom ends of said downwardly extending portions with the bottom end of said chair back to cause the back to rock forwards and rearwards as said seat moves downwards and upwards, and means adjustably connecting together the bottom end of said chair back and the adjacent ends of said latter links so that the angular position of said chair back may be adjusted relative to said seat, comprising a portion cut away from the top rear corner of each of said latter links, said links and their respective cut away portions having their adjacent faces formed with aligned semi-circular openings forming circular openings when these parts are in facial contact, a horizontal rod mounted on the bottom end of said chair back and having its ends rotatively supported in laterally aligned pairs of said circular openings, and means releasably clamping said cut away portions in position on their respective links, whereby said cut away portions may be freed to be raised freeing said rod to be shifted forwards and rearwards to be engaged with desired laterally aligned openings.

6. A weight action for chair backs, comprising a leg structure, a horizontal support board mounted on said leg structure, horizontal seat support arms superimposed on said support board, a substantially horizontal seat mounted on said support arms, front and rear pairs of forwardly and upwardly inclined links pivotally connecting said support arms and support board, said support board, support arms and links forming a parallelogram of arms so that said seat may assume various horizontal positions, a chair back pivotally supported intermediate of its ends upon the rear ends of said support arms, downwardly extending portions formed on one pair of said links, and links connecting the bottom ends of said downwardly extending portions with the bottom end of said chair back to cause the back to rock forwards and rearwards as said seat moves downwards and upwards, and means adjustably connecting together the bottom end of said chair back and the adjacent ends of said latter links so that the angular position of said chair back may be adjusted relative to said seat, comprising a portion cut away from the top rear corner of each of said latter links, said links and their respective cut away portions having their adjacent faces formed with aligned semi-circular openings forming circular openings when these parts are in facial contact, a horizontal rod



mounted on the bottom end of said chair back and having its ends rotatively supported in laterally aligned pairs of said circular openings, and means releasably clamping said cut away portions in position on their respective links, whereby said cut away portions may be freed to be raised freeing said rod to be shifted forwards and rearwards to be engaged with desired laterally aligned openings, comprising bolts rotatively extended through aligned openings formed in said latter links and cut away portions, elongated washers mounted on the top ends of said bolts to be extended across the top face of said cut away portions and hold them in facial contact with said latter links, and recesses conforming to the shape of said washers formed in the top face of said cutaway portions so that said bolts may be turned to align with said recesses.

7. A weight action for chair backs, comprising a leg structure, a horizontal support board mounted on said leg structure, horizontal seat support arms superimposed on said support board, a substantially horizontal seat mounted on said support arms, front and rear pairs of forwardly and upwardly inclined links pivotally connecting said support arms and support board, said support board, support arms and links forming a parallelogram of arms so that said seat may assume various horizontal positions, a chair back pivotally supported intermediate of its ends upon the rear ends of said support arms, downwardly extending portions formed on one pair of said links, and links connecting the bottom ends of said downwardly extending portions with the

bottom end of said chair back to cause the back to rock forwards and rearwards as said seat moves downwards and upwards, and means adjustably connecting together the bottom end of said chair back and the adjacent ends of said latter links so that the angular position of said chair back may be adjusted relative to said seat, comprising a portion cut away from the top rear corner of each of said latter links, said links and their respective cut away portions having their adjacent faces formed with aligned semi-circular openings forming circular openings when these parts are in facial contact, a horizontal rod mounted on the bottom end of said chair back and having its ends rotatively supported in laterally aligned pairs of said circular openings, and means releasably clamping said cut away portions in position on their respective links, whereby said cut away portions may be freed to be raised freeing said rod to be shifted forwards and rearwards to be engaged with desired laterally aligned openings, comprising bolts rotatively extended through aligned openings formed in said latter links and cut away portions, elongated washers mounted on the top ends of said bolts to be extended across the top face of said cut away portions and hold them in facial contact with said latter links, and recesses conforming to the shape of said washers formed in the top face of said cutaway portions so that said bolts may be turned to align said recesses, and wing-nuts mounted on the top ends of said bolts above said washers facilitating the turning thereof.

HERBERT HENRY BERNSTEIN.