

Jan. 20, 1931.

E. M. KNABUSCH ET AL

1,789,337

RECLINING CHAIR

Filed Jan. 24, 1929

3 Sheets-Sheet 1

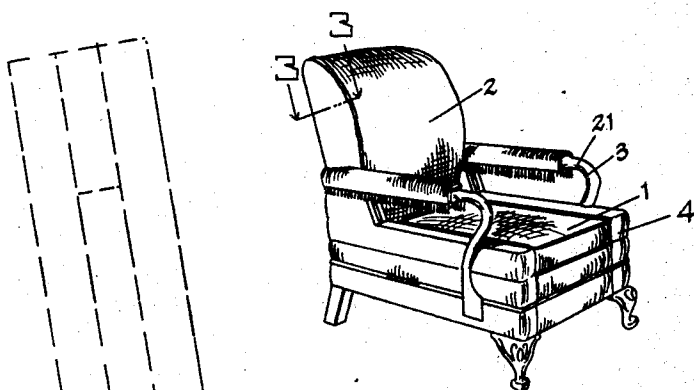


FIG 1

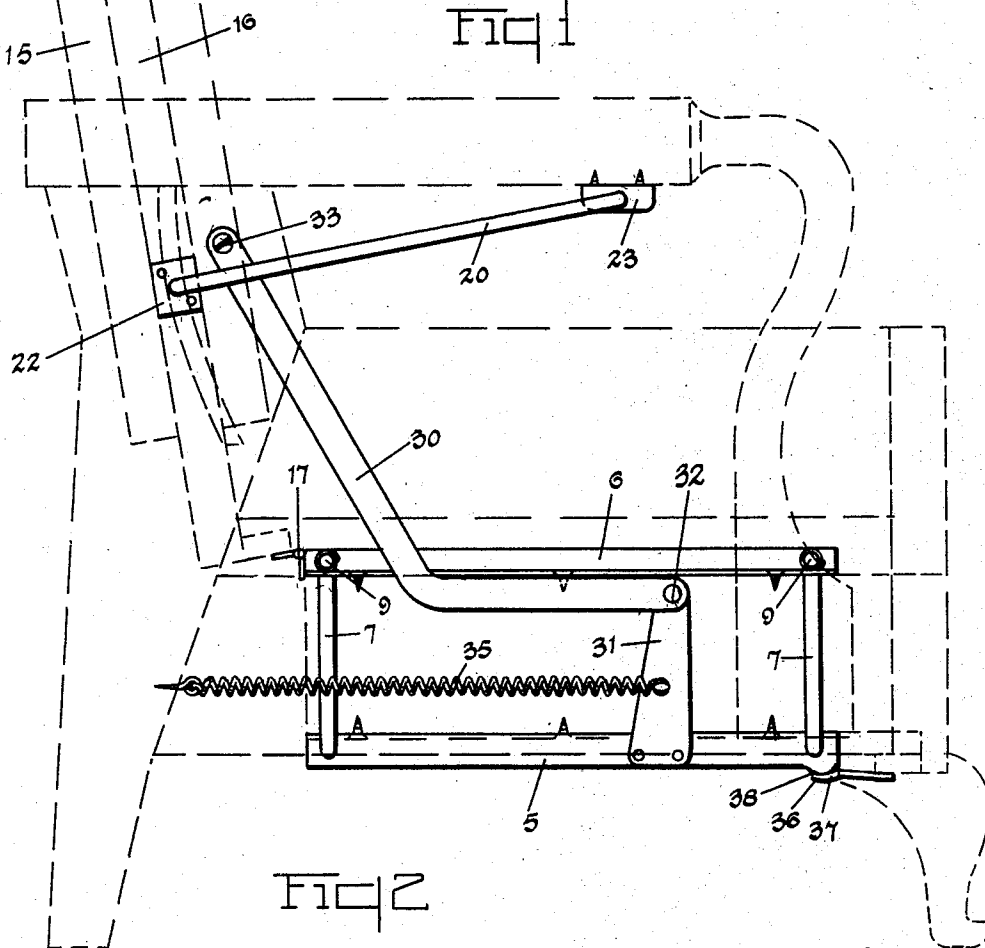


FIG 2

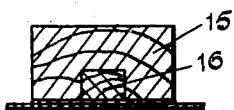


FIG 3

Inventor

Edward M. Knabusch and
Edwin J. Shoemaker
By *Faust F. Crampton*
Attorney

Jan. 20, 1931.

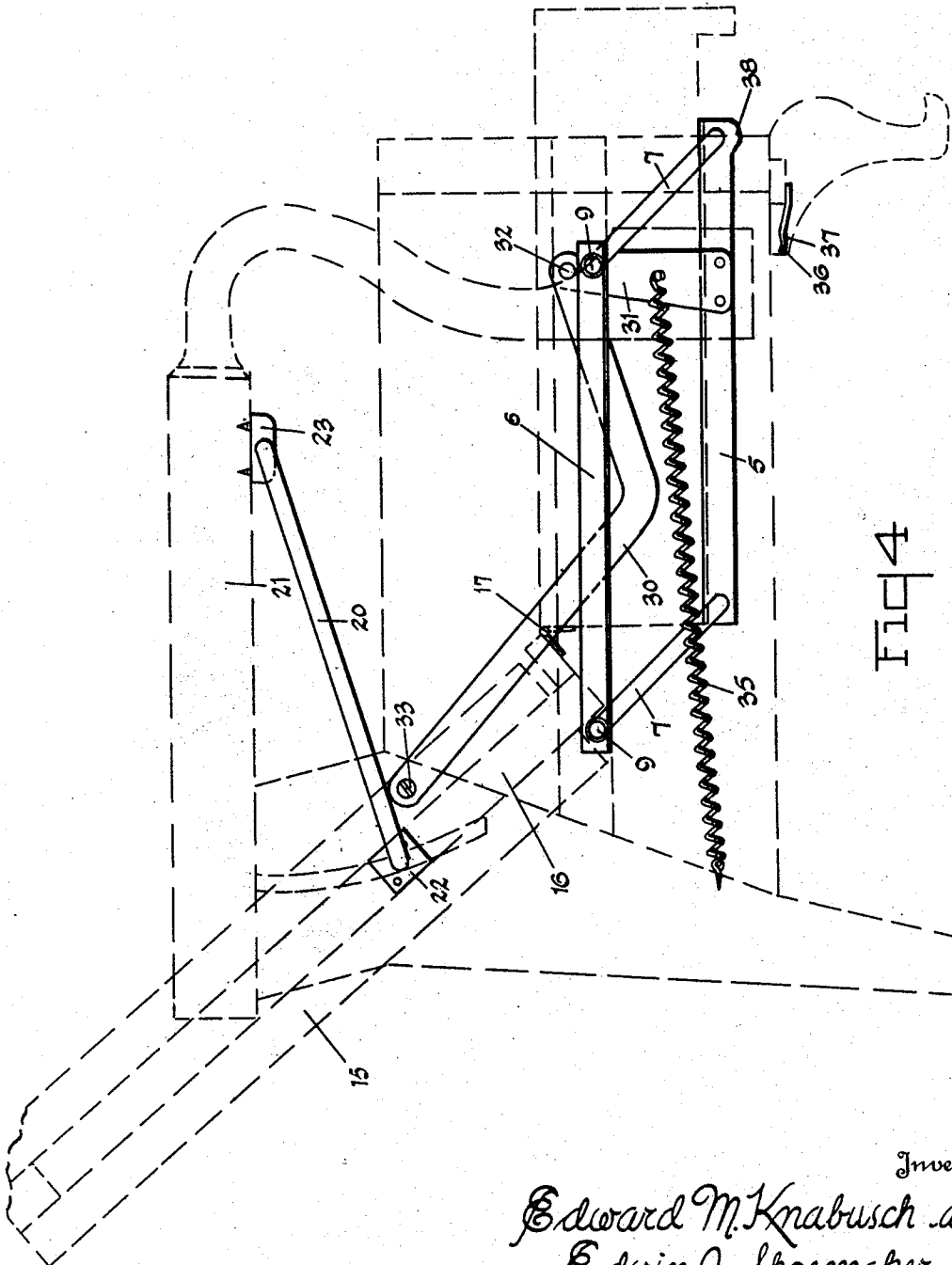
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3 Sheets-Sheet 2



Inventor
Edward M. Knabusch and
Edwin J. Shoemaker
By *Haust S. Crampin*
Attorney

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3 Sheets-Sheet 3

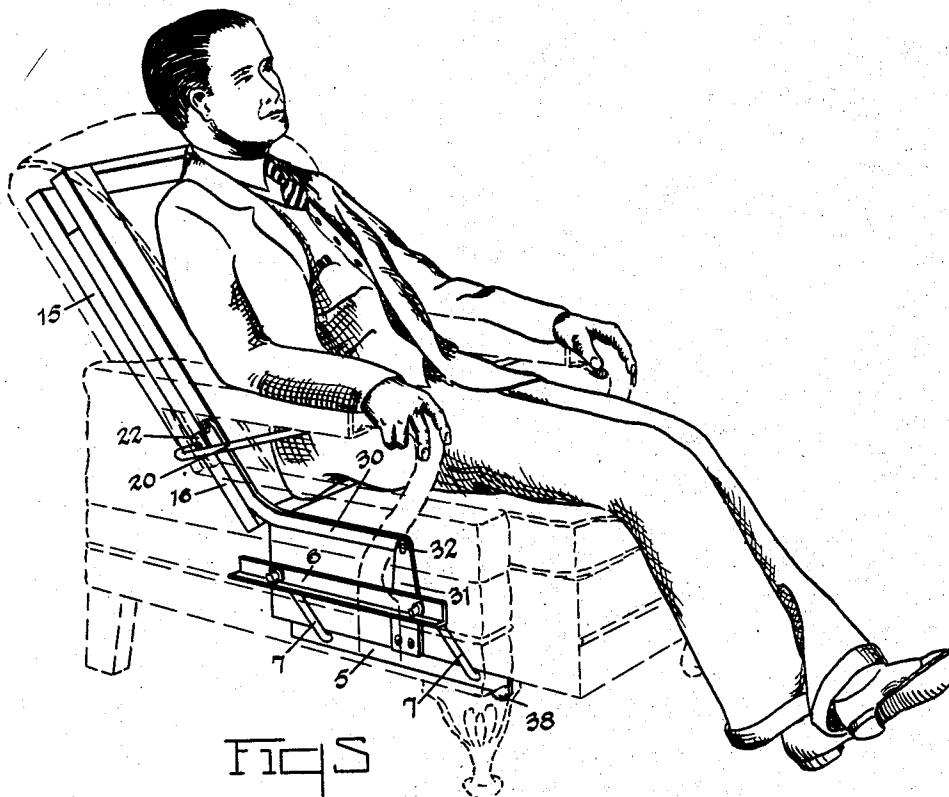
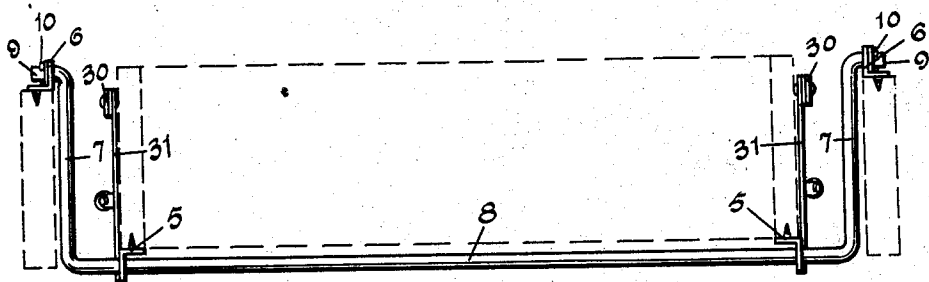
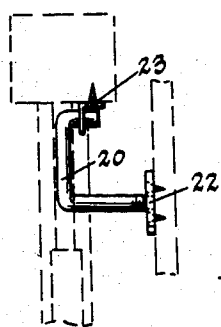


Fig 6

Fig 7

Inventor

Edward M. Knabusch and
Edwin J. Shoemaker
by *Paul F. Crampin*
Attorney

UNITED STATES PATENT OFFICE

EDWARD M. KNABUSCH AND EDWIN J. SHOEMAKER, OF MONROE, MICHIGAN, ASSIGNORS TO FLORAL CITY FURNITURE COMPANY, OF MONROE, MICHIGAN, A CORPORATION OF MICHIGAN

RECLINING CHAIR

Application filed January 24, 1929. Serial No. 334,630.

Our invention has for its object to provide a cushioned chair having a swinging back that is so constructed as to prevent the cushioned surface of the back from dragging the clothes of the user, located on or against the back of the chair, as the back is swung forward or backward relative to the seat. The invention also has for its object to provide in such a chair supporting parts for the back and seat that the back, by pressure but slightly greater than that of the pressure produced in normal resting of the back of the user against the back of the chair at any position of the back of the chair backward and any pressure, slightly less than that of the pressure produced in normal resting of the back of the user against the back of the chair, will cause the back of the chair to swing forward, whereby the user may readily change the chair to upright or reclining positions and at the same time, the clothes of the user of the chair will not be slid up or gathered at points of his back, nor will his clothes be drawn downward relative to his back either when the user reclines or sits upright. Our invention thus provides an exceedingly comfortable chair that is readily adjusted to any desired position or inclination of the back of the chair, relative to the seat, by merely varying the pressure on the back to slightly less or slightly greater than the normal pressure due to the weight of the trunk of the body of the user thereof, notwithstanding the variability of such normal pressure, which is due to the change of the angle of the back to the vertical, that is, the gravity line of the trunk of the user, and is due to the variation of the part of the weight of the body of the user supported by the back as the angle of the back is changed, part of the weight of the trunk being supported by the seat, which part becomes less and less as the user reclines, the other part of the weight of the trunk supported by the back, increasing also as the user reclines.

The invention may be contained in furniture of different forms and, to illustrate a practical application of the invention, we have selected a reclining upholstered chair

as illustrative of the various embodiments of our invention and shall describe the chair hereinafter. The chair referred to is shown in the accompanying drawings.

Fig. 1 is a perspective view of the exterior of the chair, the controlling parts being quite entirely covered by the upholstering material. Fig. 2 is a side view of the controlling parts, the chair itself being shown in dotted lines and indicating the relation of the parts to each other and to the chair. Fig. 3 is a view of a section of side parts of two frames that form supporting frames for the back and is taken on the plane of the line 3—3 indicated in Fig. 1. Fig. 4 is a view similar to that shown in Fig. 2, the parts being shown in position when the back is in a semi-reclined position. Fig. 5 illustrates the relative positions of the body of the user to the parts of the chair and particularly to the controlling parts. Fig. 6 is an end view of the link mechanism connecting the seat to the supporting frame. Fig. 7 illustrates an end view of one of the links that interconnect one of the frames of the back to the supporting frame.

In the particular form of construction shown in the drawings, the seat 1 and the back 2 of the chair 3 are upholstered and cushioned and are formed of frames for containing or supporting springs and for receiving tacks for securing the upholstering material in the manner well known in the art. The seat 1 may be provided with a pair of side angle bars 5 located along the lower edge of the frame of the seat. Also, a pair of side angle bars 6 may be located on the frame of the chair, preferably, along the upper edge of the sides of the frame that are located substantially at the level of the upper edge of the seat and the frames of the chair and the seat are interlinked by the links 7. The links 7 may be formed integral by bending the bars 8 that extend beneath the frame of the seat and then outwardly to form the engaging end parts 9. The bars 8 may extend through the angle irons 5 and the end parts of the bars may extend through the angle bars 6. Suitable securing pins 10 may be located in the ends 9 of the bars 8 to prevent the end parts of the bars 8 from slipping from the angle

bars 6. When the back of the chair is up-
right, or substantially so, the links 7 are in
vertical position. This position is the nor-
mal position of the chair. It is the location
5 when the weight of the body of the user is
quite entirely supported by the seat. When
the chair is reclined, the links 7 are swung
forward, which moves the seat forward and,
by reason of the link connections 7, the seat is
10 carried upward.

The back of the chair is formed of two
frames 15 and 16. The frame 15 is the frame
that is upholstered and is constructed to re-
ceive springs and for securing the upholster-
ing and covering material of the chair. The
15 frame 15 is slidably supported on the frame
16, which is hingedly connected to the seat
member of the chair by means of the hinges
17. The frame 16 is connected to the frame
20 of the chair, such as to the under side of the
arms 21, by means of the links 20. The links
20 are located so as to be covered as by a suit-
able upholstering material. A plate 22 is se-
cured to the frame 16 and is pivotally con-
25 nected to the link 20 and a bracket 23 is con-
nected to each arm 21 and one end of each
link 20 is pivoted in one of the brackets 23.
When, therefore, the back of the chair is
swung relative to the axis through the hinges
30 17, the seat member is moved forward or back
according to the direction of movement of the
back of the chair. The end of the link 20
that is connected to the bracket 22 operates as
a fulcrum and pressure against the upper
35 part of the back of the chair causes the lower
end of the frame 16 to swing the seat member
forward on the links 7. This, however,
causes an upward movement of the seat mem-
ber. The relation and interconnection of the
40 parts of the frame 16, the links 20, the links 7,
the seat member 1 and the supporting frame
of the chair, are such that as the back is swung
back at different angles, the seat is raised by
the links 7 to locate their lower ends at points
45 more remote from the vertical through their
supported upper ends and so that the weight
of the portion of the body supported by the
seat member 1 and the weight of the body sup-
ported by the back member 2, counterbalance
50 each other notwithstanding the changes in
pressure due to the changes in position of the
body of the user as the back is swung. To
increase the angle between the seat member 1
and the back member 2, a pressure, slightly
55 greater than the normal pressure due to the
weight of the part of the body against the
back, is easily applied by the user to the back
which moves the back angularly rearwardly
towards the horizontal. When this addi-
60 tional pressure is discontinued, the parts
counterbalance each other and remain in po-
sition in which they have been placed.
When it is desired to locate the back in an up-
right position, the trunk of the body of the
65 user is slightly raised from the back, or the

pressure on the back is reduced below that of
the normal due to the weight, and the weight
on the seat will raise the back until the pres-
sure on the back again reaches the normal
which occurs at the angle to which it has been
moved, whereupon the back will retain that
70 angle relative to the seat. Thus, by our in-
vention, the seat is so supported and the back
is so connected, that the chair may be readily
changed to any position.

The frame of the seat is, moreover, con-
75 nected by a link 30 to the frame 15 of the
back. The seat member 1 may be provided
with a pair of brackets 31 that extend from
the angle bar 5 to which they may be riveted.
80 The brackets 31 extend to a point near the
upper edge of the frame of the seat and the
links 30 are pivotally connected to the upper
ends of the brackets 31 by means of the rivets
32. The opposite ends of the links are con-
85 nected to the sides of the frame 15 by means of
suitable bolts or screws 33. The effective
length of the links 30 is the distance between
the pivot points 32 and 33, but the link 30 is,
preferably, bent to form parts at an angle to
90 each other, substantially as shown, in order
that the link 30 may be located within the con-
fines of the upholstering material and thus
may be completely enclosed within the uphol-
stering material. The forward end of the link
95 30 is located near the forward end of the seat
member of the chair, while the rear end of
the link 30 is located near the lower end of the
frame 15 and the lower end of the frame 15
is located a short distance from the lower end
100 of the frame 16. The point of connection of
the link 30 with the frame 15 is such that when
the said point is located over the axis of the
hinges 17, the back of the chair would be in
a vertical position and the lower ends of the
105 links 7 will be slightly raised and extend rear-
wardly and the link 30 will form an angle
of about 60 degrees with the frame 15. The
normal position of the back is slightly in-
clined and the normal position of the links 7
110 is the vertical. When the back swings back-
wards on the axis of the hinges 17, the frame
15 slides towards the seat member 1. It slides
along the frame 16 as the two sides of the
triangle, formed between the hinges 17 and
115 the pivot points 33 and 32, approach the side
of the triangle between the points 32 and 33.
The side between the pivot point 33 and the
hinge 17 is shortened, and is shortened at the
same rate as the clothes of the wearer at the
120 back approach the hip joints of the user of the
chair as the user of the chair bends backward
and so that the surfaces of the depressed
cushions of the back will not cause the cloth-
ing on the back of the user to be drawn upon
125 or gathered at points along his back, such
as below the arm pits. When, on the other
hand, the user leans forward from a reclin-
ing position and the back follows this upward
movement, the back member will be raised so
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that the upholstering material on the surface of the back will move upward substantially with the clothing of the user and thus dragging of the clothing of the user is again prevented.

5 When no one is in the chair, it may be desirable to maintain the back of the chair in the upright position. The seat is not heavy enough to overcome the friction of the parts sufficient to return the back in case 10 it is pushed from this position, and a spring 35 may be used for this purpose. The spring 35 interconnects the frame of the seat with the supporting frame of the chair. The 15 spring, however, does not alter the operation of the device as described above for obviously the tendency to return by reason of the weight of the person on the seat member, when the links 7 are swung from the vertical, predominates to maintain the seat in 20 counterbalancing relation against the pressure on the back. Also, if desired, a friction device 36 may be located on the supporting frame of the chair and on some part of the seat member 1. In the form of construction 25 shown, a spring 37 is connected to the supporting frame of the chair, while a knob 38, that is elastically engaged by the spring 37, is located near the forward edge of the frame of the seat member, whereby momentary 30 frictional engagement between the two may be used to yieldingly resist the rearward movement of the back member. This is also for the purpose of providing a temporary resistance for, in the use of chairs, one moves 35 back and forth when in an upright position and in order to free the chair from this unintentional pressure, a slightly greater pressure than that required to further tilt the chair is necessary in order to liberate the 40 chair from its starting position. Thereafter, the parts of the chair are moved by a slightly greater or slightly lesser pressure than that normally produced by the weights of the parts of the body on the parts, respectively, of the chair, as described above.

We claim:

1. In a chair, a supporting frame, a seat member, links interconnecting the seat member with the supporting frame, a back frame 50 hingedly connected to the seat member, links interconnecting the back frame to the supporting frame, a back member slidably supported on the back frame, and links interconnecting the back member with the seat 55 member.

2. In a chair, a seat member, a back frame hingedly connected to the seat member, a back member slidably supported on the back 60 frame, a supporting frame, links depending from the supporting frame and supporting the the seat member on the supporting frame, and causing its return when moved from its normal position, links interconnecting the 65 back member and the seat member, and links

interconnecting the back frame and the supporting frame for shifting the seat member from its normal position and sliding the back member on the back frame when the back frame is tilted backward relative to the seat member and moved about the connection of 70 the back frame with the last named links.

3. In a chair, a seat member, a back comprising a back frame and a back member, the back member slidably supported on the back 75 frame, a supporting frame, the back frame hingedly connected to the seat member, means for shiftably supporting the seat member for forward and backward movements relative to the supporting frame and for normally 80 moving the seat member rearward and the upper end of the back member forward, means for moving the back member relative to the back frame, the back pivotally connected to the supporting frame at a point 85 near the lower end of the back and maintaining the said parts in substantially counterbalanced relations in any and all positions in which the seat member and back member are 90 placed.

4. In a chair, a seat member, a back frame hingedly connected to the seat member, a back member slidably connected to the back frame, a supporting frame, a link connected 95 to the lower end part of the back frame and to the supporting frame and operating to swing the back frame rearward by the weight of the user, means for moving the back member relative to the back frame and a link for supporting the seat member and operating to 100 swing the back frame forward by the weight of the user of the chair.

5. In a chair, a seat member, a back frame hingedly connected to the seat member, a back member slidably connected to the back 105 frame, a supporting frame, links supporting the seat member on supporting frame and operating to raise the seat member when the seat member is shifted forwardly, means pivotally connecting the back frame with the 110 supporting frame for shifting the seat member, means for shifting the back member relative to the back frame, the weight of the seat member and the back frame and the back member with reference to the pivot point 115 substantially counterbalancing the pressure of the user on the back member and the seat member in different positions of the back member and the seat member.

6. In a chair, a seat member, a back frame hingedly connected to the seat member, a back member slidably connected to the back frame, a supporting frame, means for shiftably supporting the seat member on the supporting frame for forward and backward 125 movements of the seat member relative to the supporting frame, a link pivotally connected to the back frame near the lower end of the back member and to the supporting frame at a point substantially above the center of the 130

side of the seat member for producing forward and backward movements of the seat member relative to the supporting member.

7. In a chair, a seat member, a back comprising a back frame hingedly connected to the said member, a back member slidably connected to the back frame, a supporting frame, means for shiftably supporting the seat member on the supporting frame for forward and backward movements of the seat member relative to the supporting frame, a link pivotally connected to the back frame near the lower end of the back and to the supporting frame, a second link connected to the back member near the lower end of the back member and in proximity to the connection of the first named link with the back frame and to the seat member.

8. In a chair, a seat member, a back frame hingedly connected to the seat member, a back member slidably connected to the back frame, a supporting frame, means for shiftably supporting the seat member of the supporting frame for forward and backward movements of the seat member relative to the supporting frame, a link pivotally connected to the back frame at a point near the lower end of the back frame and to the supporting frame for producing forward and backward movements of the seat member relative to the supporting member, a second link for connecting the back member with the seat member, the ends of the links that connect with the back frame and the back member located in proximity to each other, whereby the point of connection of one of the links is adapted to pass the point of connection of the other of the links in changing the back from an upright to a reclining position.

9. In a chair, a seat member, a back comprising a back frame hingedly connected to the seat member, a back member slidably connected to the back frame, a supporting frame, means for shiftably supporting the seat member on the supporting frame for forward and backward movements of the seat member relative to the supporting frame, a link pivotally connected to the back frame and to the supporting frame, a second link connected to the back member and to the seat member, the points of connection of the first link with the supporting frame and the second link with the seat member being located substantially vertical one above the other when the back member is in substantially a vertical position, and the said links crossing each other.

10. In a chair, a seat member, a back frame hingedly connected to the seat member, a back member slidably connected to the back frame, a supporting frame, a link for supporting the seat member on the supporting frame, a link pivotally connected to the back frame at a point near the lower end of the back frame and to the supporting frame for producing

forward and backward movements of the seat member relative to the supporting frame, a second link for connecting the back member with the seat member the ends of the links that connect with the back frame and the back member located in proximity to each other and the other ends of the last named links located substantially one about the other and substantially in a line located at a central part of the side of the seat member.

In witness whereof we have hereunto signed our names to this specification.

EDWARD M. KNABUSCH.
EDWIN J. SHOEMAKER.

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