

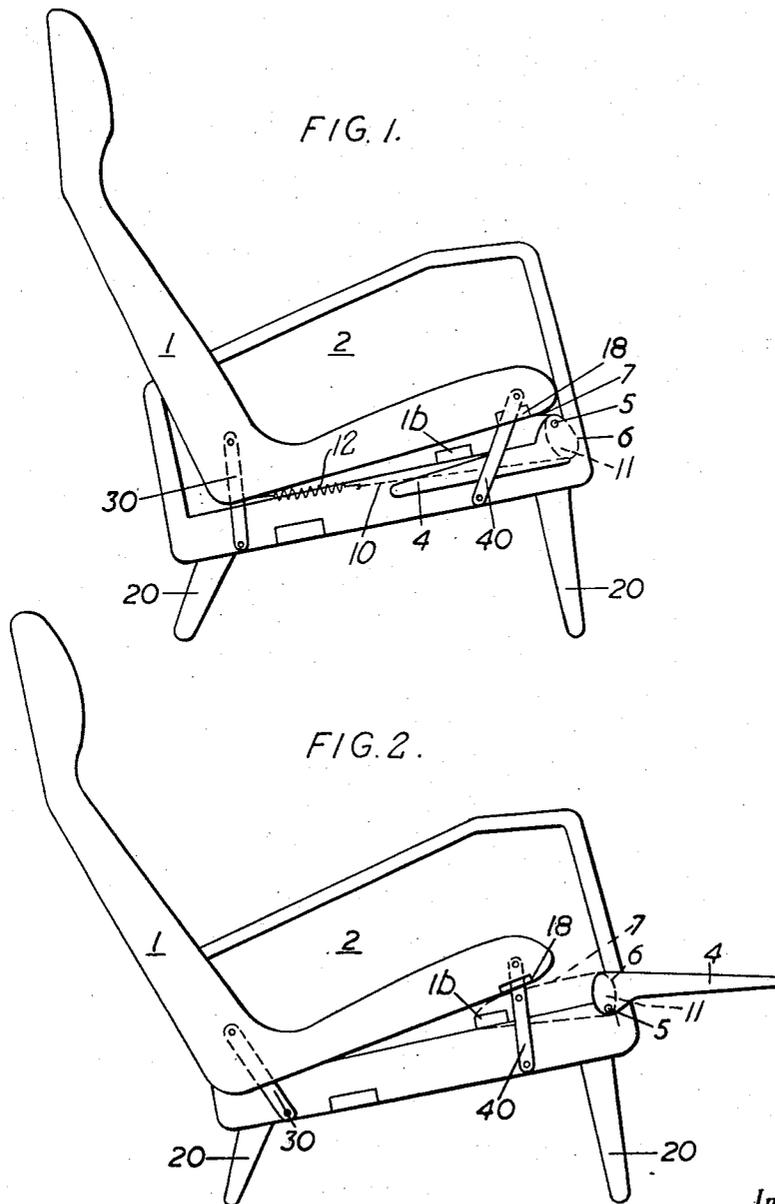
Jan. 9, 1962

W. R. COBB
CHAIRS

3,016,265

Filed Dec. 17, 1959

2 Sheets-Sheet 1



Inventor
WILLIAM REGINALD COBB,

By B. P. Fishburne, Jr.
Attorney

Jan. 9, 1962

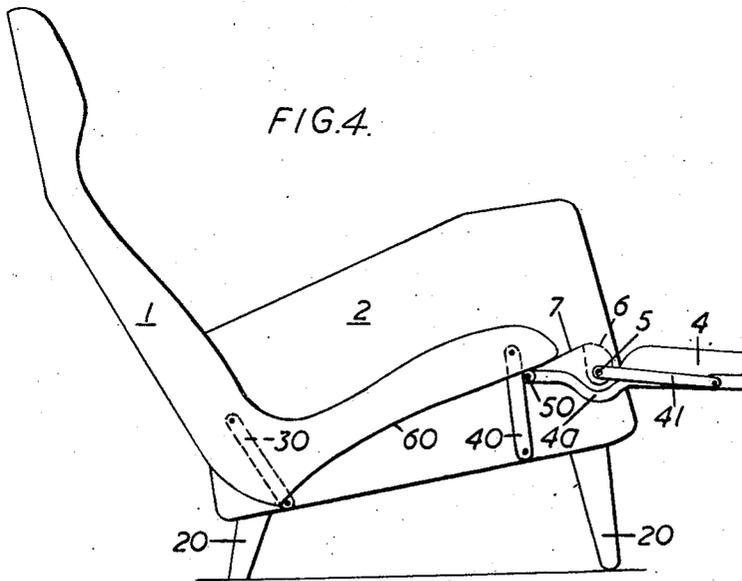
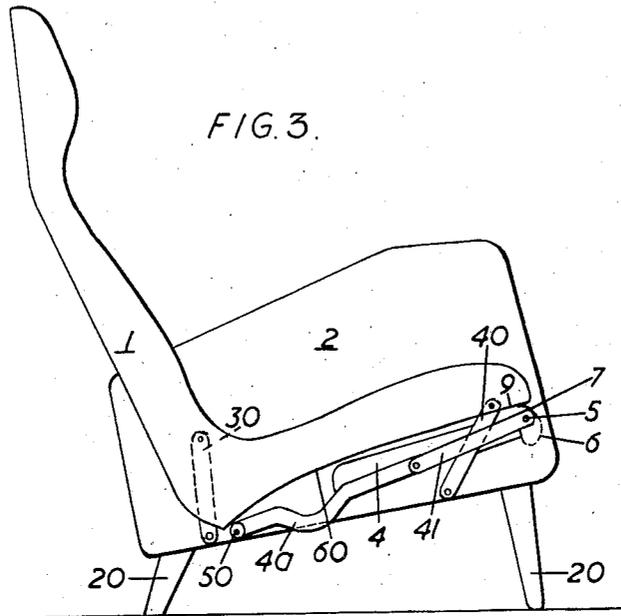
W. R. COBB

3,016,265

CHAIRS

Filed Dec. 17, 1959

2 Sheets-Sheet 2



Inventor
WILLIAM REGINALD COBB,

By B. P. Fishburne, Jr.
Attorney

1

3,016,265
CHAIRS

William Reginald Cobb, Harlow, England, assignor to Greaves & Thomas Limited, London, England
Filed Dec. 17, 1959, Ser. No. 860,219
Claims priority, application Great Britain Jan. 6, 1959
8 Claims. (Cl. 297-38)

This invention relates to the kind of chair with a retractable legrest or footrest (hereinafter simply termed footrest) movable between an out-of-use position beneath the chair seat and an in-use position where it projects forwardly from the front of the chair.

An object of the invention is to provide a chair of this kind with simplified means for operating the footrest automatically by adjustment of the seat and/or back when these members are movable.

Another object is to provide a chair of the aforesaid kind, in which the footrest in its out-of-use position is substantially parallel to the underside of the chair so as to be inconspicuous or out of sight.

A further object is to provide a chair of the aforesaid kind and having a movable back seat with a footrest the effective length of which is increased in its in-use position.

A still further object is to provide a chair of the aforesaid kind with a footrest of adequate effective length notwithstanding that the chair has such low seating that too little room is afforded beneath the seat and the floor to permit the use of a simple pivoted footrest of sufficient length.

Briefly, the invention provides in a chair of the kind having a retractable footrest movable between an out-of-use position beneath the chair seat and an in-use position where it projects forwardly from the front of the chair, the combination of a footrest support member pivotally mounted adjacent the front edge of the seat and affording a profile eccentric to its pivots, and at least one flexible connector attached to the profile of said member and extending rearwardly beneath the seat to a part of the chair, said part and said member being movable relatively to one another.

Many different constructional forms are possible within the scope of the invention a few of which are illustrated by way of non-limiting example on the accompanying diagrammatic drawings.

FIGS. 1 and 2 of the drawings show one form of the invention in a chair with a combined rearwardly movable tiltable back and seat, FIG. 1 being a side view (with the rear side frame member removed) showing the footrest in its out-of-use position, and FIG. 2 being a similar view with the back and seat tilted and moved rearwardly and the footrest extended for use;

FIGS. 3 and 4 are views respectively similar to FIGS. 1 and 2, of another form of the invention in a chair with a rearwardly movable back and seat.

Throughout the several figures the same references denote the same or similar parts.

In each instance reference 1 denotes the back and seat, 2 the side frames, and 20 the legs of the chair.

In the chair illustrated by FIGS. 1 and 2 the frames 2 carry the back and seat 1 through the medium of two links 30 near the rear of the seat and a further two links 40 towards the front of the seat. Each of these links is pivoted at its lower end to the chair frame and at its upper end to the seat. The two front links 40 are connected to each other by a torsion bar to ensure unity in operation. The angular relationship of the front links 40 and the back links 30 is such that when the seat-and-back 1 is moved rearwardly the front of the seat must rise by a small amount while the back of the seat falls by a slightly larger amount. This movement (see FIG. 2) produces a slightly more reclined angle for the sitter's

2

comfort than the position shown in FIG. 1, and also permits the centre of gravity of the occupied chair to fall sufficiently to counterbalance the weight of the user's legs upon the footrest 4. The footrest is rigid or integral with a transverse support member 11 pivoted at 5 to the chair frame and has a cam-like profile 6 eccentric to the pivots 5 and is turned about its pivot by a flexible connector 7, shown in dotted line, one end of which embraces and is secured to the eccentric and the opposite end of which is anchored to a cross member 13 of the seat. The arrangement is such that in the out-of-use position of the footrest 4 shown in FIG. 1 the belt 7 extends about the profile 6. The footrest may be urged toward its out-of-use position by a torsion spring (not shown), or by an extension of the flexible connector 7 as shown in FIG. 2. Here the flexible connector 7 is a continuous belt or chain which encircles and is anchored to the profiled cross rail 6 of the footrest 4 and which is also anchored to the cross member 13 and extends around a cross rail 1b extending between the side frames 2. This arrangement is a means of returning the footrest and is alternative to the above-mentioned torsion spring. The cross rail 1b may be used to limit the movement of the back and seat 1 in each direction by providing a stop for the under-surface of the seat shown in FIG. 1 and a stop for the front links 40 when the seat is retracted as shown in FIG. 2.

Either or both pairs of links 30 and 40 could be substituted by sliding engagement members co-operating between the back and seat 1 and the chair frame, or by roller and track means.

The effective length of the footrest may be greater than that of the footrests of chairs of the prior art because the back and seat moves away from the footrest. The user consequently has a generous length of footrest provided automatically as he or she moves the seat into position for comfortable relaxation as shown in FIG. 2. This movement increases the distance between the pivots 5 of the footrest 4 and the cross bar 13 so that the belt 7 applies tension to the eccentric profile 6 and imparts a turning movement to the footrest support member 11 and the footrest. As the radius to the profile 6 is small at the initial position the torque is of small value which increases as the member 11 and footrest swing around the pivots 5 and the effective radius between the profile 6 and the pivots 5 increases.

By suitably locating the pivots and arranging the profile 6 the position of the chair may be stable in any position between that shown in FIG. 1 and the fully reclining position illustrated in FIG. 2. Stability is assisted by a selected degree of friction which may be built into the pivot links 30 and 40 by means of fiber washers or the like.

The chair frame in the embodiment illustrated by FIGS. 3 and 4 comprises, as before, side members or arm rests 2 (only one of which is shown in outline form). The back and seat 1 is supported by links 30, 40 which are pivoted at their upper ends to the seat 1 and at their lower ends to the arm rest frames 2. Said links are arranged in this example so that as the seat is moved rearwardly (FIG. 4) in relation to the arm rest frames the back descends slightly and the front of the seat rises by a similar amount. Here the footrest 4 has side links 41 pivoted thereto towards its front end, these links being rigidly anchored at their opposite ends to an eccentric or cam 6 rigid with a transverse support member or cross rail 11 pivoted at 5 to the arm rest frames 2. A flexible connector 7 is anchored at its rear end to a cross member (not shown) of the seat and at its opposite end to the eccentric or cam 6 after partly encircling the same. The footrest 4 may be urged to the position illustrated in FIG. 3 by any convenient means, for example by a torsion spring on the eccentric or cam 6.

3

The footrest 4 has rearward extensions 4a carrying a guide roller or guide rollers 50 that co-operate with a track or guide surface 60 which is so formed beneath the seat as to afford safe clearance between the forward end of the footrest and the floor during movement of the footrest between its two positions shown respectively by FIG. 3 and FIG. 4.

From FIG. 3 it can be seen that in the out-of-use position the footrest is inconspicuously accommodated close up beneath the seat, as also is its described supporting mechanism.

FIG. 4 shows the back and seat 1 moved rearwardly by the user wishing to relax, the footrest 4 having been extended by tension upon the flexible member 7 which has caused the eccentric or cam 6 to pivot at 5 and swing the footrest supporting links 41 to the position shown, the angles assumed by the footrest throughout the movement being controlled by the guide roller 50 as it follows the track or guide surface 60.

The arrangement of the links in the construction described with reference to FIGS. 3 and 4 causes the centre of gravity of the occupied chair to descend sufficiently to counter-balance the weight of the user's feet upon the footrest so that a condition of stable equilibrium is obtained.

It will be understood that the rearward extension of the footrest 4 could be guided by means other than the roller or rollers 50; for example by a pin sliding in a grooved track. It will also be understood that the footrest may be moved towards its out-of-use position by various alternative means, for example by a further flexible connector. To return the footrest to its out-of-use position beneath the seat by means of another flexible connector or member shown in dotted lines at 10, in FIG. 1, the member at its forward end is anchored to the footrest support member 11 of the footrest at a convenient point below the pivots 5, extending around the opposite side of member 11 than that around which member 7 extends, and at its rearward end has a tensioned anchorage, through the medium of a spring 12, to the seat. As stated, alternatively torsion springs could be used around the pivots 5.

When the footrest 4 is fully extended the tension of the flexible connector 10 becomes ineffective provided the edge of the member 11 is substantially in axial alignment with the pivots 5. If the cross member 11 has a suitable cam form the spring 12 can be eliminated, but in our experiments we have found that this spring permits greater manufacturing tolerance and insures the firm support of the footrest in the position shown in FIG. 1.

Whereas in the constructions illustrated by FIGS. 1 and 2 the footrest in each case is pivotally reversed in moving between its out-of-use and its in-use positions, in the construction of FIGS. 3 and 4 the footrest moves through an arcuate path with the same surface always uppermost. This is an advantage with chairs having such low seating that too little room is afforded beneath the seat front edge to permit the use of a simple pivoted footrest of adequate length.

I claim:

1. A chair comprising in combination, a body supporting member having a seat portion and a back portion, a frame member for supporting said body supporting member, leg means for supporting said frame member, a foot rest adapted for movement relative to the seat portion about a pivot on the frame through an arc between two extreme positions one of which is beneath the seat portion, eccentric profile means operatively connected with said foot rest for rotative movement with respect to said supporting member and said frame, anchor means on said supporting member, at least one flexible connector having one of its ends attached to said anchor means and the other of its ends wrapped partly around and attached to said profile means for imparting rotative movement thereto, said flexible member extending be-

4

neath the seat portion of said supporting member and intermediate the side extremities of the seat portion, and being adapted to wrap a portion of said eccentric profile means when the foot rest is in one of its extreme positions, and means connected between said supporting member and said frame for permitting relative movement to be effected between said anchor means and said profile means whereby the foot rest may be moved from a position beneath the seat portion to an extended in-use position by said flexible connector and said profile means.

2. A chair comprising in combination a body supporting member having a seat portion and a back portion, a frame member for supporting said body supporting member, leg means for supporting said frame member, a foot rest support member adapted for movement relative to the seat portion about a stationary pivot through an arc of more than ninety degrees between two extreme positions one of which is beneath the seat portion, eccentric profile means operatively connected with said foot rest member for rotative movement with respect to said supporting member and said frame, anchor means on said supporting member, at least one flexible connector having one of its ends attached to said anchor means and the other of its ends wrapped partly around and attached to said profile means for imparting rotative movement thereto, said flexible member extending beneath the seat portion of said supporting member and intermediate the side extremities of the seat portion, and being adapted to wrap a portion of said eccentric profile means when the foot rest member is in one of its extreme positions, and means connected between said supporting member and said frame for permitting relative movement to be effected between said anchor and said profile means whereby the foot rest support member may be moved from a position beneath the seat portion to an extended in-use position by said flexible connector and said profile means.

3. A chair comprising in combination a body supporting member having a seat portion and a back portion, a frame member for supporting said body supporting member, leg means for supporting said frame member, pivot means connected between said body supporting member and said frame and defining a horizontal pivot axis, a foot rest adapted for movement relative to the seat portion about a pivot on the frame through an arc between two extreme positions one of which is beneath the seat portion, eccentric profile means operatively connected with said foot rest for rotative movement with respect to said supporting member and said frame, anchor means on the frame member, at least one flexible connector having one of its ends attached to said anchor means and the other of its ends wrapped partly around and attached to said profile means for imparting rotative movement thereto, said flexible member extending beneath the seat portion of said supporting member and intermediate the side extremities of the seat portion, and being adapted to wrap a portion of said eccentric profile means when the foot rest is in one of its extreme positions, and said pivot means connected between said supporting member and said frame permitting relative movement to be effected between said anchor and said profile means whereby the foot rest may be moved from a position beneath the seat portion to an extended in-use position by said flexible connector and said profile means.

4. A chair comprising in combination a body supporting member having a seat portion and a back portion, a frame member for supporting said body supporting member, leg means for supporting said frame member, means mounting the seat portion on the frame, said mounting means permitting lateral displacement of the seat portion relative to said frame member, a foot rest adapted for movement relative to the seat portion about a pivot on the frame through an arc between two extreme positions one of which is beneath the seat portion, eccentric profile means operatively connected with said foot rest for rotative movement with respect to said supporting member

5

and said frame, anchor means mounted on the frame member, at least one flexible connector having one of its ends attached to said anchor means and the other of its ends wrapped partly around and attached to said profile means for imparting rotative movement thereto, said flexible member extending beneath the seat portion and intermediate the side extremities of the seat portion, and being adapted to wrap a portion of said eccentric profile means when the foot rest is in one of its extreme positions, and said mounting means permitting relative movement to be effected between said anchor means and said profile means whereby the foot rest may be moved from a position beneath the seat portion to an extended in-use position by said flexible connector and said profile means.

5. A chair as set forth in claim 4 in which said mounting means include pivot links mounted between the seat portion and said frame member.

6. A chair comprising in combination a body supporting member having a back portion and a seat portion, a frame member for supporting said body supporting member, leg means for supporting said frame member, means mounting the seat portion of said supporting member on the frame, said mounting means permitting lateral displacement of the seat portion relative to the frame member, a foot rest adapted for movement relative to the seat portion about a pivot on the frame through an arc between two extreme positions one of which is beneath the seat portion, eccentric profile means operatively connected with said foot rest for rotative movement with respect to said supporting member and said frame, anchor means on the seat portion of said supporting member, at least one flexible connector having one of its ends attached to said anchor means and the other of its ends wrapped partly around and attached to said profile means for imparting rotative movement thereto, said flexible member extending beneath the seat portion of said supporting member and intermediate the side extremities of the seat portion, and being adapted to wrap a portion of said eccentric profile means when the foot rest is in one of its extreme positions, a foot rest support linkage connected with said foot rest, a guide track disposed at the underside of the seat portion, roller means mounted on said support linkage and adapted to engage said guide track, and said mounting means permitting relative movement to be effected between said anchor means and said profile means whereby the support linkage and roller means move along said guide track and the foot rest is displaced from a position beneath the seat portion to an extended in-use position by said flexible connector and said profile means.

6

7. A chair comprising in combination a body supporting member having a seat portion and a back portion, a frame member for supporting said body supporting member, leg means for supporting said frame, and means for increasing the effective length of the seat portion, said means including a foot rest adapted for movement relative to the seat portion about a pivot on said frame member through an arc greater than ninety degrees between two extreme positions one of which is beneath the seat portion, eccentric profile means operatively connected with said foot rest for rotative movement with respect to said supporting member and said frame, anchor means on the underside of the seat portion of said supporting member, at least one flexible connector having one of its ends attached to said anchor means and the other of its ends wrapped partly around and attached to said profile means for imparting rotative movement thereto, said flexible member extending beneath the seat portion of said supporting member and intermediate the side extremities of the seat portion, and being adapted to wrap a portion of said eccentric profile means when the foot rest is in one of its extreme positions, means connected between said supporting member and said frame for permitting lengthwise displacement to be effected between the seat portion of said supporting member and said frame member for effecting relative movement between said anchor means and said profile means whereby the foot rest may be moved from a position beneath the seat portion to an extended in-use position by said flexible connector and said profile means, and resilient return means connected between said eccentric profile means and said anchor means for returning said foot rest to the position beneath the seat portion.

8. A chair as set forth in claim 7 in which said flexible connector and said resilient return means comprise an endless belt.

References Cited in the file of this patent

UNITED STATES PATENTS

40	607,293	Streit	July 12, 1898
	1,421,260	Kurnick	June 27, 1922
	2,693,845	Hoffman	Nov. 9, 1954
	2,777,506	Martin	Jan. 15, 1957
	2,875,812	Schliephacke	Mar. 3, 1959
45	2,907,374	Glass	Oct. 6, 1959
	2,927,630	Schelschmidt	Mar. 8, 1960

FOREIGN PATENTS

	14,446	Great Britain	1887
50	792,585	Great Britain	Apr. 2, 1958