Aug. 15, 1939. J. M. DORTON 2,169,486

CONVERTIBLE FURNITURE

Filed June 4, 1937 2 Sheets-Sheet 1

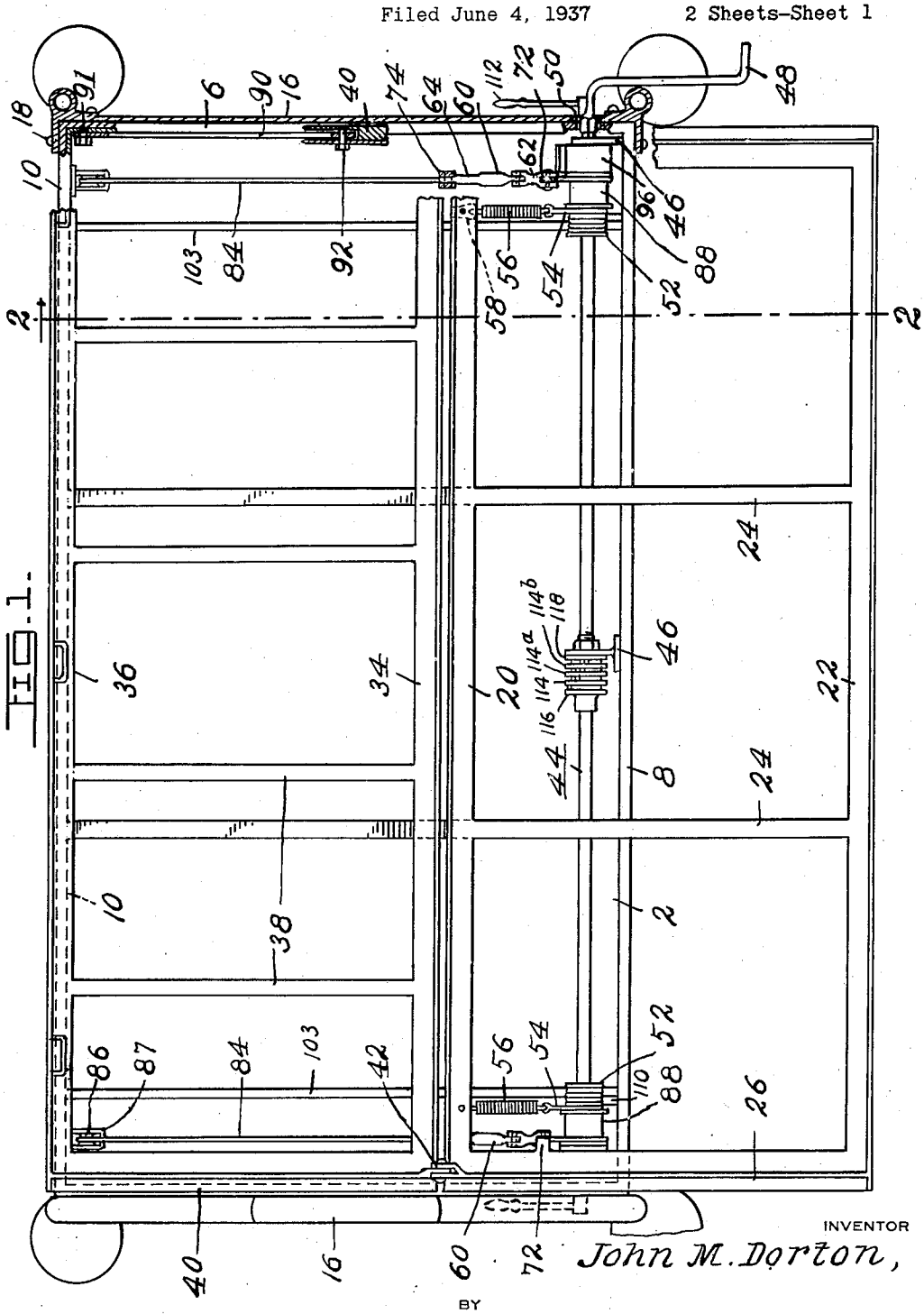


FIG. 1.

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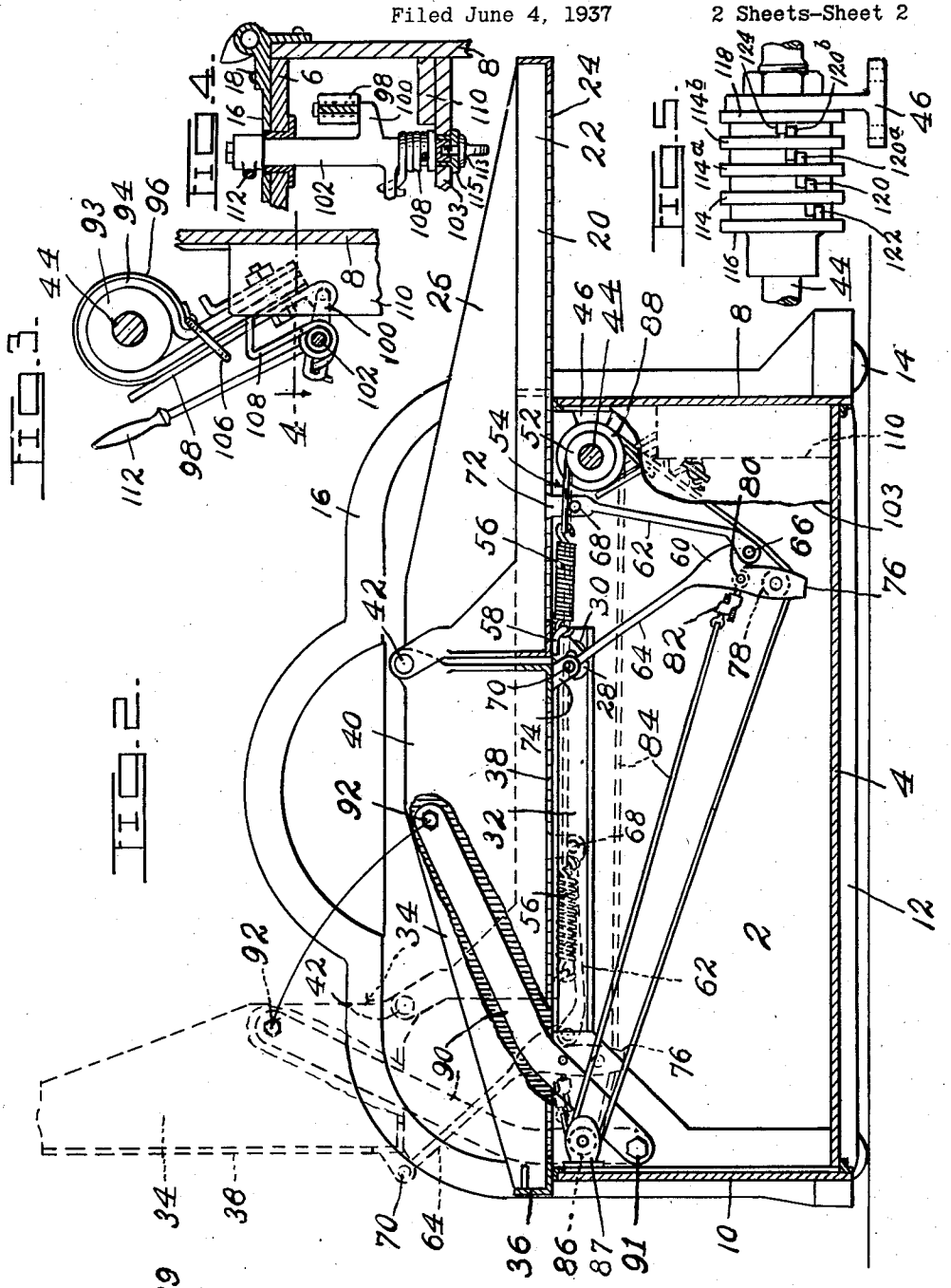


FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

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CONVERTIBLE FURNITURE

John M. Dorton, Bonner Springs, Kans.

Application June 4, 1937, Serial No. 146,473

9 Claims. (Cl. 155—45)

My invention relates to improvements in convertible furniture and one object is to provide a new and useful article of this character of the type which may be converted into a bed, a settee, or a chair, or their equivalents.

A further object is to provide a novel combination and arrangement of mechanical elements whereby the article of furniture may be readily adjusted to form a bed or a settee.

Another object is to provide novel brake means adapted to cooperate with the above mentioned elements in holding the back of the settee at any inclination to which it may be adjusted, so that it will not yield to such pressure as may be ordinarily applied thereto by an occupant of the settee.

A further object is to arrange the back controlling mechanism in such manner that the back may be lowered while close to the wall of a room and thus avoid the necessity of moving the article of furniture a considerable distance from the wall, as has heretofore been customary before the back could be lowered.

A further object is to provide a piece of furniture which is adaptable for use in numerous places such, for instance, as the home, house trailers, cabins, and the like.

Other objects will hereinafter appear and in order that the invention may be fully understood reference will now be had to the accompanying drawings, in which:

Fig. 1 is a plan view of the article of furniture with the upholstered mattress which covers the seat and back of the article, removed to show the working parts.

Fig. 2 is a vertical cross section on line 2—2 of Fig. 1 showing the article of furniture arranged in the form of a bed in full lines, and to form a settee in dotted lines.

Fig. 3 is a detail of a brake mechanism used in carrying out the invention.

Fig. 4 is a cross section on line 4 of Fig. 3.

Fig. 5 is a detail plan view of a device for limiting the rotation of a shaft employed in carrying out the invention.

Fig. 6 is a detail plan view of a modification.

In carrying out the invention I employ suitable supporting means arranged preferably in the form of a chest 2 in which bed clothes and other articles may be stored. In the present instance said chest comprises a bottom wall 4, end walls 6, and front and rear walls 8 and 10, respectively. When the article of furniture is to be used in a house trailer or other place where it will not be necessary to shift it around frequently, I provide the bottom wall 4 of the chest with a plurality of runners 12 on which it may be moved when necessary, but when the article of furniture is to be used in the home I prefer to mount it on casters 14 so that it can be readily moved around in a room, or from one room to another. Two pairs of casters 14 are employed each pair being mounted beneath the front and rear ends of a more or less ornamental end member 16. The end members 16 are removably secured to the respective ends of the chest 2 by suitable means such as screws 18.

20 designates a seat member mounted for forward and backward movement upon the chest 2. Said seat member may be of any suitable construction but in the present instance I have shown it comprising a rectangular frame 22 with spaced transverse members 24 and end members 26. In order to insure easy forward and backward movement of the seat member 20 I provide the rear corners thereof with lugs 28 on which are mounted rollers 30, arranged to traverse rails 32 secured to the side walls 6 of the chest 2. The rails 32 are preferably of channel bar formation to prevent upward or downward movement of the rollers 30, so that they will coact with the front wall 8 of the chest 2 in maintaining the seat member 20 in a horizontal plane.

34 designates a back member adapted to be lowered to a horizontal plane to rest upon the chest 2 and in line with the seat member 20 as shown by Fig. 2, when the article of furniture is converted into a bed, or raised to the dotted line position when the article of furniture is converted into a settee. The back member 34 is of similar construction to the seat member 20, it comprising a rectangular frame 36 with transverse members 38 and end members 40. In order that the back member 34 may move downward or upward while the seat member 20 travels in a horizontal plane, I connect the upper adjacent corners of said members with hinges 42.

Referring now more particularly to the mechanism for advancing the seat member 20 to provide a bed, 44 designates a shaft journaled in bearings 46 secured to the inside of the front wall 8 near the upper portion thereof. Each end of the shaft 44 is preferably of rectangular form to fit within the corresponding socket of a crank 48, Fig. 1, whereby said shaft 44 may be rotated in either direction. Apertures 50 are formed in the end walls 6 of the chest 2 for admission of the socket end of the crank 48, so that the same may be applied to either of the rectangular terminals of the shaft 44. With the foregoing ar-

rangement it is obvious that if either end of the article of furniture is placed next to a wall or another piece of furniture, access may be had to the other end of the shaft **44** for application of the crank **48**. It is also obvious that if desired the shaft **44** could be operated from the front of the chest **2**, by providing a stub shaft **39** with a bevel gear **41** to intermesh with a bevel gear **43** fixed to shaft **44**, as shown by Fig. 6.

Drums **52** are fixed upon the shaft **44**, near the ends thereof, to wind up cables **54** connected to coil springs **56** which in turn are connected to respective eyes **58** fixed to the lower rear portion of the seat member **20**. With the foregoing mechanism it is apparent that when the shaft **44** is rotated in a clockwise direction, Fig. 1, the drums **52** will wind up the cables **54** which in turn will advance the seat member **20** through the intermediary of the springs **56**. As the seat member **20** advances it will pull the back member **34** therewith and as the latter moves forward it also swings downward to a horizontal plane in line with the seat frame **20**. The coil springs **56** take up slack and keep the respective cables **54** taut.

Referring now more particularly to the mechanism for retracting the seat member **20** and raising the back member **34** to convert the article of furniture into a settee, **60** designates a pair of depending toggles each consisting of arms **62** and **64** operably connected at their lower ends by a pivot **66** and at their upper ends by pivots **68** and **70** to members **72** and **74** fixed to the under sides of the seat member **20** and the back member **34**, respectively.

Each toggle arm **60** is provided near its lower end with a downward extension **76** carrying an antifriction roller **78** and a transverse pin **80**, to which latter the forward end of a turn-buckle **82** is connected. Each turn-buckle **82** is adapted to take up slack in a cable **84** attached thereto. Each cable **84** extends upwardly and rearwardly from the turn-buckle **82** and passes around a sheave **86**, thence forwardly and downwardly beneath the roller **78** and upwardly to a respective drum **88**. The drums **88** are arranged beside the drums **52** and fixed upon the shaft **44**. The sheaves **86** are mounted in blocks **87** in the upper rear portion of the chest **2**.

A pair of arms **90** are adapted to coact with the toggles **60** in raising the back member **34** when the same and the seat member **20** are retracted. Each arm **90** is connected to the adjacent end wall **6** of the chest **2** and the back member **34** by pivots **91** and **92**, respectively.

With the foregoing arrangement it is apparent that when shaft **44** is rotated in a counterclockwise direction the drums **88** will wind up the cables **84** which in turn will retract the seat and back frames **20** and **34**, respectively, through the intermediary of the toggles **60**, which latter will cooperate with the arms **90** in raising the back frame **34**. As the back frame **34** starts to move upwardly at the same time it moves backwardly no part of it will move back of the rear wall of the chest **2** to any considerable extent and hence the article of furniture will not have to be moved away from a wall to any appreciable extent when being either raised or lowered.

When the article of furniture is adjusted to provide a settee and the same is occupied by a person leaning heavily against the raised back member **34**, accidental downward movement thereof beneath such pressure is prevented by the above described mechanism for raising and lowering said back member **34** and by means of a pair of friction brakes which hold the shaft **44** from accidental rotation in either direction.

Each friction brake includes a drum **93** fixed upon the shaft **44** and embraced by lining **94** secured in a brake band **96**, secured at one end to a reinforcement **98** having its lower end loosely embracing a crank **100** fixed to a shaft **102**, journaled in the adjacent end wall **6** of the chest **2** and a partition wall **103**, two of which latter are provided to prevent bed-clothes or other articles stored in the chest **2** from coming in contact or entangled with the machanisms above described. The other end of the brake band **96** is loosely connected to a loop **106** which loosely embraces the reinforcement **98**. Normally each brake is held in active position by a coil spring **108** one end of which is connected to the shaft **102** while the other end bears against a cleat **110** secured to the inner surface of the front wall **8** of the chest **2**. The outer end of each shaft **102** is provided with a hand lever **112** whereby the brake may be adjusted to inactive position so as not to retard rotation of the shaft **44** while being rotated in either direction.

By providing a friction brake at each end of the article of furniture one brake is accessible should either end of the article of furniture be placed close to a wall. As only one friction brake is necessary to hold the back member **34** in a raised or an inclined position either brake may be adjusted to inactive position and then secured in such position by tightening a thumb screw **113** threaded in one end of the shaft **102** and adapted to frictionally engage the adjacent end of a bearing **115** in which said shaft **102** is journaled.

In order that rotation of the shaft **44** may be checked after the article of furniture has been converted into either a bed or a settee I provide said shaft **44** with a group of loosely mounted disks **114**, **114***a* and **114***b* which are interposed between a disk **116**, fixed to the shaft **44**, and a stationary disk **118** fixed to the intermediate bearing **46**. The intermedial disks **114**, **114***a* and **114***b* have respective lugs **120**, **120***a* and **120***b* projecting from opposite sides thereof while the disks **116** and **118** have lugs **122** and **124**, respectively, projecting from one side only. With the foregoing arrangement it is apparent that when shaft **44** is rotated in a counterclockwise direction the lug **122** will contact the adjacent lug **120** and rotate disk **114** and after the same has described approximately one revolution its other lug **120** will contact the adjacent lug **120***a* and rotate the disk **114***a*. After the latter has traveled approximately one revolution it will rotate disk **114***b* until one of the lugs **120***b* contacts lug **124**, Fig. 5, on the stationary disk **118** which checks further rotation in a counterclockwise direction. Likewise when shaft **44** is rotated in a clockwise direction it will be checked by the disks and their respective lugs after the article of furniture has been adjusted to provide a bed.

It is to be understood that the completed article of furniture may be upholstered in any suitable manner to lend an attractive appearance thereto, but as such upholstery would hide a large proportion of the mechanism forming important features of the invention, I have deemed it best to leave it out of the accompanying drawings.

It is also to be understood that while I have referred to the article of furniture as being convertible to provide a bed, or a settee, that it may be made on a reduced scale to provide a reclining chair. Also that such other changes may be

made that properly fall within the spirit and scope of the invention as claimed.

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

1. An article of furniture comprising main supporting means, a seat frame mounted for forward and backward movement on said supporting means, a drum, a cable connected to said drum and adapted to advance the seat frame when said drum is rotated in one direction, a shaft mounted in the supporting means and upon which the drum is fixed, means for rotating said shaft, a member fixed upon said shaft to rotate therewith, a stationary member fixed to the supporting means and spaced from the rotatable member, a series of elements loosely mounted upon the shaft and interposed between the rotatable and stationary members, laterally projecting lugs on said members and said elements adapted to cooperate therewith in checking rotation of the shaft when the seat frame has been advanced or retracted a predetermined distance, and a back frame connected to the seat frame.

2. An article of furniture comprising a seat frame adapted to move forward or backward, a back frame connected to said seat frame to move therewith and which is also adapted to be lowered or raised to coact with said seat frame in forming a bed or a settee, supporting means for said frames, toggle means operably connected to said frames and adapted to retract the same, means for retracting said toggle means, and means operably connected to the supporting means and the back frame adapted to raise the latter as the toggle means is retracted.

3. An article of furniture comprising a seat frame adapted to move forward or backward, a back frame connected to said seat frame to move therewith and which is also adapted to be lowered or raised to coact with said seat frame in forming a bed or a settee, supporting means for said frames, toggle means operably connected to said frames and adapted to retract the same, means for retracting said toggle means, and arms operably connected to the supporting means and the back frame adapted to raise the latter as the toggle means is retracted.

4. An article of furniture comprising a seat frame adapted to move forward or backward, a back frame connected to said seat frame to move therewith and which is also adapted to be lowered or raised to coact with said seat frame in forming a bed or a settee, supporting means for said frames, toggle means operably connected to said frames and adapted to retract the same, cable means attached to said toggle means, means for winding up said cable means and thereby retracting said toggle means, and means operably connected to the supporting means and the back frame adapted to raise the latter as the toggle means is retracted.

5. An article of furniture comprising a seat frame adapted to move forward or backward, a back frame connected to said seat frame to move therewith and which is also adapted to be lowered or raised to coact with said seat frame in forming a bed or a settee, supporting means for said frames, toggle means operably connected to said frames and adapted to retract the same, cable means attached to said toggle means, drum means for winding up said cable means and thereby retracting said toggle means, and means operably connected to the supporting means and the back frame adapted to raise the latter as the toggle means is retracted.

6. An article of furniture comprising a seat frame adapted to move forward or backward, a back frame connected to said seat frame to move therewith and which is also adapted to be lowered or raised to coact with said seat frame in forming a bed or a settee, supporting means for said frames, toggle means operably connected to said frames and adapted to retract the same, cable means attached to said toggle means, drum means mounted at the forward portion of the supporting means for winding up the cable means and thereby retracting the toggle means, sheave means mounted at the rear portion of the supporting means and around which the cable means extends, and means operably connected to the supporting means and the back frames adapted to raise the latter as the toggle means is retracted.

7. An article of furniture comprising a seat frame adapted to move forward or backward, a back frame connected to said seat frame to move therewith and which is also adapted to be lowered or raised to coact with said seat frame in forming a bed or a settee, supporting means for said frames, a toggle having one arm operably connected to the seat frame and the other arm operably connected to the back frame to raise or lower the latter, and means arranged to pull backward and upward on said toggle and thereby retract the seat frame and raise the back frame.

8. An article of furniture comprising a seat frame adapted to move forward or backward, a back frame connected to said seat frame to move therewith and which is also adapted to be lowered or raised to coact with said seat frame in forming a bed or a settee, supporting means on which said frames are supported, a toggle having one arm operably connected to the seat frame and the other arm operably connected to the back frame to raise or lower the latter, a cable connected to the toggle to pull backward and upward thereon and thereby retract the seat frame and raise the back frame, a sheave mounted on the supporting means and spaced from the rear of the toggle and around which said cable extends, and a drum mounted on the supporting means and spaced in advance of said sheave and adapted to wind up the cable.

9. An article of furniture comprising a seat frame adapted to move forward or backward, a back frame connected to said seat frame to move therewith and which is also adapted to be lowered or raised to coact with said seat frame in forming a bed or a settee, supporting means for said frames, a pair of depending toggles each having one arm operably connected to the seat frame and the other arm operably connected to the back frame, a sheave mounted on the lower portion of each toggle, a cable connected at its rear end to the lower portion of each toggle to pull backward and upward thereon and thereby retract the seat frame and raise the back frame, means mounted at the rear portion of the supporting means and around which the cables travel, and drums mounted upon the supporting means and spaced in advance of the toggles and to which the forward ends of the cables are connected, said cables engaging the sheaves on the respective toggles.

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