

June 28, 1960

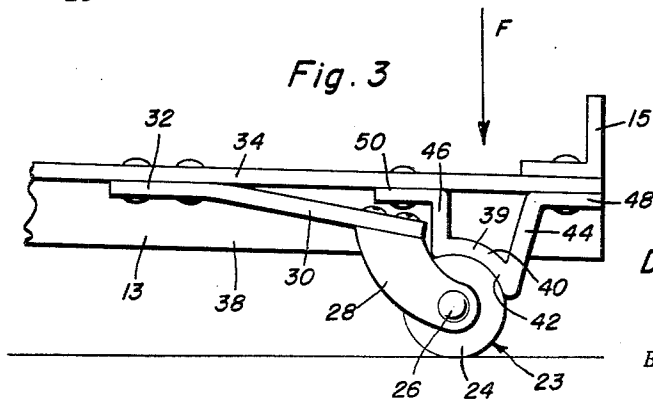
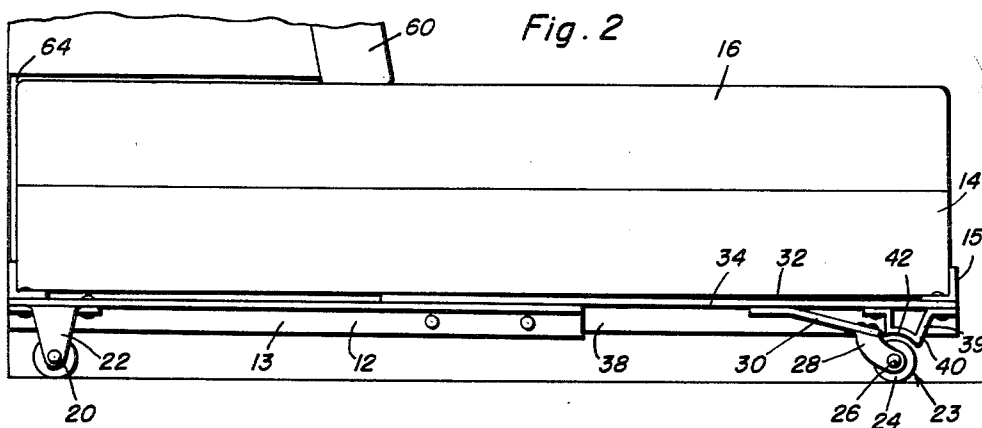
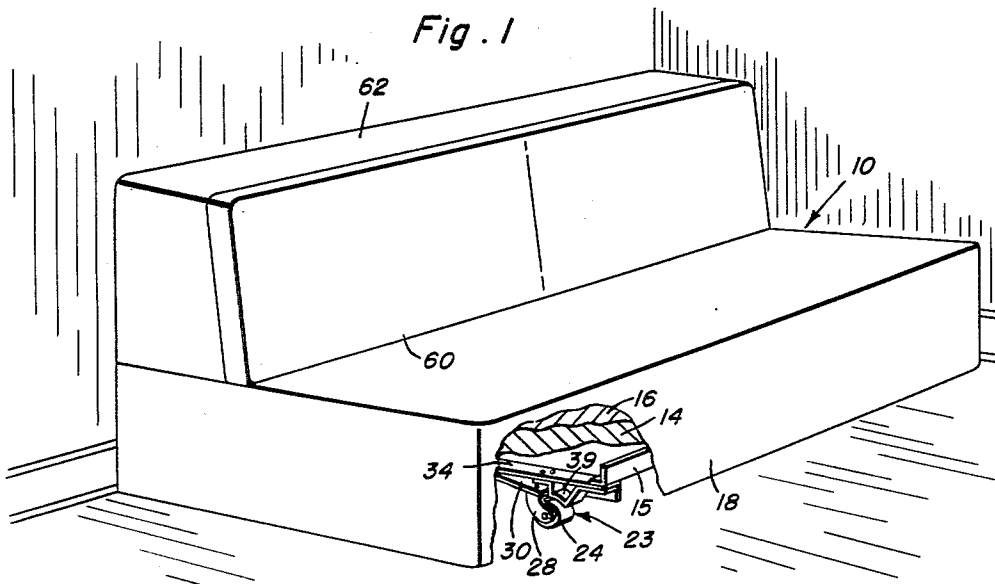
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2,942,698

WEIGHT OPERATED WHEEL BRAKE

Filed April 26, 1957

2 Sheets-Sheet 1



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Fig. 4

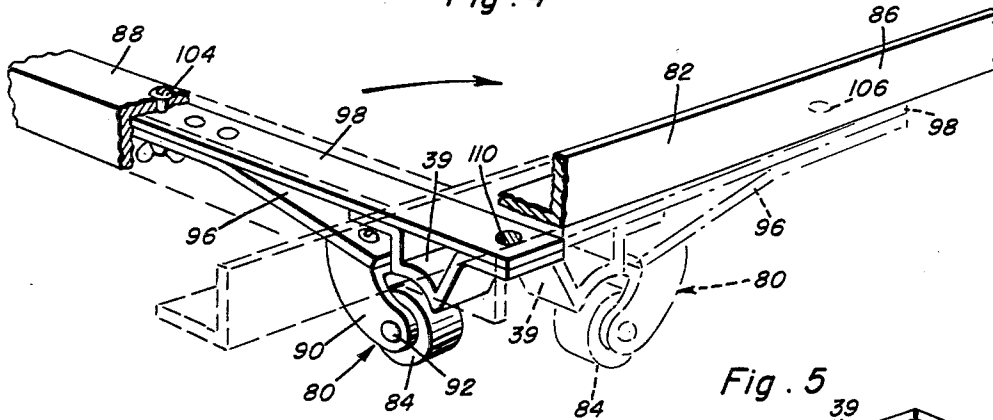


Fig. 5

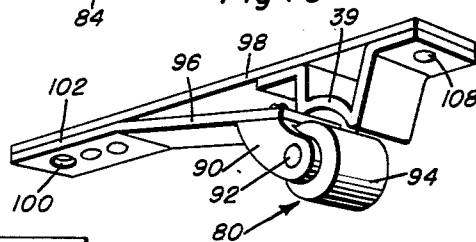


Fig. 6

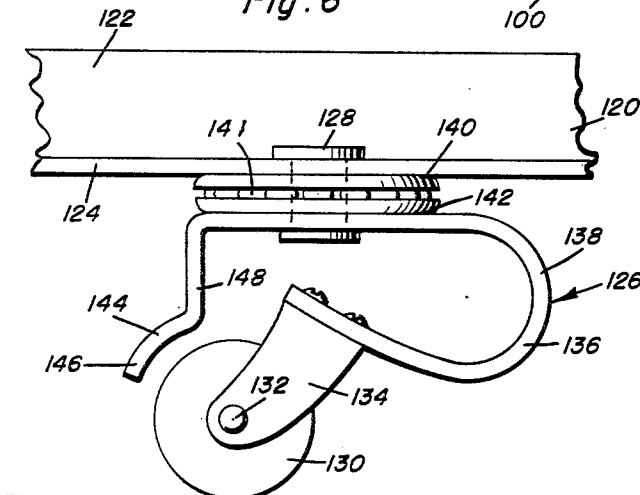
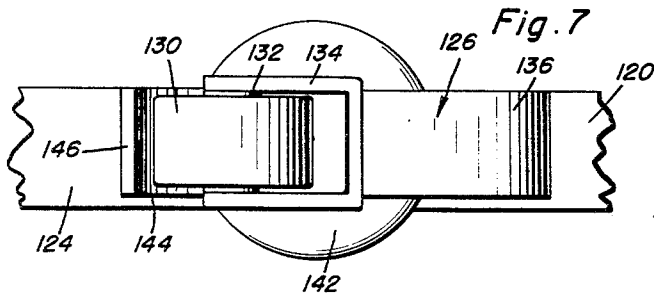


Fig. 7



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## WEIGHT OPERATED WHEEL BRAKE

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5 Claims. (Cl. 188—176)

This invention relates to furniture and more particularly to a locking device for the wheel of certain types of furniture.

The object of the invention is to provide in improvements in furniture of the type which is generally supported on wheels so as to be easily movable from one location to another. The invention permits easy movement of a furniture unit, for example a bed frame, but automatically locks so that the furniture will not slip or move when being used in the desired location. The locking is done automatically that is, in response to the weight load of the occupants or other user of the furniture.

A very important application of the invention is in connection with a metal bed frame or similar unit that supports a spring and mattress, the invention enabling the metal bed frame to remain freely movable while unoccupied but yet, firmly lock in place if an additional weight load beyond that for which the spring loading is set, is placed on the mattress. There is a demand for such furniture in university dormitories, hotels, motels where a wall mounted bolster is attached to the wall and the box spring and mattress are placed on a metal frame. The weight of the frame, box spring and mattress is carried by the spring loaded wheel, keeping the wheel clear from the braking device, but when a person sits or lies upon the bed, it locks in such manner that the box spring and mattress together with the frame which supports the same will remain firmly in place permitting the mattress to be used as a sofa.

When pushed under the bolster a person is able to sit on the bed, lean against the bolster and the unit will remain in place and will not slide from under the bolster. However, when a person wishes to sleep at night he may easily move the whole unit from underneath the bolster for sleeping. This is also true for cleaning under the bed.

A more particular object of the present invention is to provide an article of furniture or any other article having need for automatic locking in response to a load condition, the wheel being supported on a spring cantilever and the spring being so tensioned that the frame of the unit remains sufficiently elevated from the wheel so that the wheel rotates freely. But, when a predetermined loading is on the unit, a brake shoe attached to the bottom of the frame or if desired, the lower surface of the frame itself, comes in contact with the upper periphery of the wheel causing it to lock and the unit to remain stationary. This means, then, that light loads may be applied to the unit without the braking action. Therefore, the spring functions as a device to sense a predetermined heavier load and to cause the wheel associated with the spring to become locked.

A carrier box such as would support parts, parcels, etc., would be an example of an application of the invention on something which is not strictly an article of furniture and which would well take advantage of the spring rate or constant so that the spring flexes sufficiently to apply the brake action only under a predetermined loading.

A further object of the present invention is to provide

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a wheel controlled device for a wheeled unit, the device including a wheel mounted on a cantilever spring which is so constructed and arranged that the entire spring is capable of adjustment to new positions. In one form of my invention I am able to adjust the position of the wheel so that it is shifted to a position 90° removed from the original position. The result is that the unit is very quickly adjustable so that it is capable of sliding in another direction.

- 10 The preceding description relates principally to embodiments that have wheels on a fixed axis. A further object of the invention is to provide a caster type wheel with means for automatically braking the same. This is achieved by attaching the wheel to a cantilever made of
- 15 spring steel or like material whereby the cantilever is capable of being rotated about an axis. In the caster type, the wheel, cantilever and brake are capable of movement to new positions, and in the adjustable type, the same essential organization prevails. In the fixed type, the
- 20 cantilever will be attached directly to the frame and no adjustment is provided for, although the wheels in all embodiments may be removed and replaced by wheels of different types.

A further object of the invention is to provide a practical device of the nature to be described wherein the invention fulfills a definite need and by a structural organization which may be produced at a low unit cost, surplanting the legs of the furniture and serving the additional function which is not capable of performance by

- 30 ordinary legs of furniture.
- 35 Other objects and features of importance will become apparent in following the description of the illustrated form of the invention.

Figure 1 is a perspective view of a typical unit which is of furniture, practicing the principles of the invention, parts being broken away to illustrate otherwise hidden detail;

Figure 2 is an end elevational view of the unit in Figure 1 with a part of the covering removed to illustrate otherwise hidden detail;

Figure 3 is a fragmentary elevational view showing one of the wheels as it would appear when the unit is under a load condition sufficient to apply a braking action to that wheel;

Figure 4 is a fragmentary perspective view of a frame having another embodiment of the invention applied thereto, this embodiment being adjustable to a new selected position;

Figure 5 is a bottom perspective view of the embodiment of Figure 4;

Figure 6 is a fragmentary elevational view of a caster type wheel and brake assembly showing the same mounted on a part of a frame; and

Figure 7 is a bottom view of the assembly in Figure 6.

Unit 10 schematically represents an article with which the principles of the invention are applied. It has metal frame 12 which has frame members 13 and 15 and which is adjustable from a single bed to a double bed size. Frame 12 has dimensions to snugly accept box spring 14 on which mattress 16 is disposed. When in use unit 10 generally has a covering 18 thereon.

Two rear wheels 20 are carried on axles that are supported by wheel hangers 22 at the two rear corners of frame 12. Two front wheel assemblies 23 are identical. Each has a wheel 24 disposed on axle 26 which is carried by fork 28. Each fork is attached to an outer end of a cantilevered leaf spring 30, the inner end 32 thereof being slightly angulated and riveted or removably bolted to the undersurface of the horizontal flange 34 of frame member 13 of frame 12. The vertical flange of member 13 depends from the inner edge of the horizontal flange 34.

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Forks 28 may be bolted to springs 30 so that they may be replaced by forks supporting different wheels.

Brake 39 has a brake shoe 40 consisting of an arcuate plate 42, adapted to contact the upper periphery of one of the wheels 24. The brake shoe has upstanding sides 44 and 46 attached to the ends thereof to hold it supported at an elevated position above wheel 24. Mounting ears 48 and 50 protrude laterally from the upper ends of sides 44 and 46 and are riveted, bolted or otherwise secured to horizontal flange 34. There is one such brake shoe 40 provided for each wheel 24.

In use, the combined weight of the frame, box spring 14, mattress 16 and a reasonable complement of bedding or covering 18, is insufficient to cause the spring 30 to flex enough so that the brake shoe 40 would come in contact with the periphery of wheel 24. But, when loaded to the extent of supporting a person, or other loading, the force as indicated by the arrow F (Figure 3) causes the frame together with everything that the frame supports to move down so that brake shoe 40 contacts the periphery of wheel 24. This applies a braking action to the wheel 24, there being one at each front corner of the unit 10. Therefore, the unit is capable of being manipulated very easily but when it is in use, the two front wheels are braked. It is understood that if found necessary or desirable there may be similar brakes on the back wheels 20 of the unit, or any multiple of the four or more wheels on any unit.

As discussed previously the principles of the invention are applicable to a number of different units and one such unit is shown in the drawing. This unit could be used in conjunction with other structure and other furniture. For example bolster 60 may be applied to a cabinet 62 at the front thereof with the upper shelf of the cabinet adapted to accommodate knick-knacks, books, etc. The bolster may be hung on hinges so as to have additional storage behind it. However, it is to be vertically spaced from the floor to provide a cavity 64 thereunder. The unit 10 may be slipped into this cavity so that a part of it functions as a sofa seat. But, when the unit 10 is to be used as a bed, it may be pulled from beneath the bolster. During the time that the unit 10 is used as a bed, the brake action on wheels 24 will keep it from rolling or moving. The same benefit is obtained when the unit 10 is slid under bolster 60 and into cavity 64. As soon as a person becomes seated upon the unit 10, the wheels 24 are locked preventing the unit from moving in an undesired fashion.

As shown in Figures 4 and 5 it is within the purview of the invention to have the wheel assembly 80 adjustably attached to a frame, such as frame 82, whereby the position of wheel 84 with respect to the frame is alterable. The unit, then, is capable of rolling in one direction, but that direction may be selected in accordance with the prerogative of the owner by a simple adjustment. Frame 82 has a frame members 86 and 88 connected at right angles to each other and they function to support wheel assembly 80.

The wheel assembly has a fork 90 carrying axle 92 on which wheel 94 is mounted for rotation. Cantilevered leaf spring 96 is riveted, welded, or otherwise secured to the mounting plate 98, and either separably or permanently carries the fork 90. The mounting plate 98 is adapted to fit flush against the undersurface of the frame members 88 or 96 depending on the selected adjustment which is made. A hole 100 is formed in the angulated end 102 of spring 96 and in the mounting plate 98. Bolt and nut assembly 104 is passed through hole 100 and through a matching hole in frame member 88 or a corresponding hole 106 in frame member 86. The opposite end of the wheel assembly 80 has an aperture 108 through which pivot pin 110 is passed, this pin also being passed through a hole in the frame 82 in order to establish an axis of oscillation for the wheel assembly (Figure 4). Brake 39 is attached to the undersurface of mounting

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plate 18 and is constructed identically to brake 39 of Figure 3. It functions in the same wheel, coacting with wheel 94 instead of wheel 24.

In Figures 6 and 7 the frame is represented by frame member 120, the latter having an upstanding flange 122 and an approximately horizontal flange 124. Wheel assembly 126 is of the caster type since it is capable of being adjusted about the axis of pin 128 which is carried by flange 124. Assembly 126 has wheel 130 mounted for rotation on axle 132. This axle is carried by its fork 134 which is bolted or otherwise secured to the end of a cantilever leaf spring 136. The spring is formed with an open loop 138, fork 134 being attached to an end while spindle 128 is passed through an opening in the opposite side of loop 138.

Upper and lower support plates 140 and 142 bear against the lower surface of flange 124 and the upper surface of spring 136 and hold a plurality of balls 141 captive therebetween. Accordingly, spring 136 and wheel carried by it are capable of easy rotation about the longitudinal axis of spindle 128.

Brake 144 is made of a brake shoe 146 against which the periphery of wheel 130 is brought in response to the load condition as described previously in connection with the embodiment of Figure 3 and as applicable in connection with the embodiment of Figure 4. It is unnecessary to have more than one side and therefore only one is illustrated. This also applies to the embodiments of Figures 3 and 4 that is, either the side 44 or the side 46 may be omitted. Since side 148 is attached to the end of spring 138, the brake 144 is adjustable with the remainder of the wheel assembly, just as brake 39 of Figure 4 is adjustable with wheel assembly 80.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a unit which is adapted to be moved from one place to another and to be used at least temporarily in a fixed position, the combination of a frame, wheels supporting said frame, means operatively connected with at least some of said wheels for applying a braking action to said wheels in response to the application of a load beyond a predetermined weight limit on the unit, said means including for each wheel with which said means are operatively connected, a wheel support, a leaf spring attached at one end to said structure and supporting the wheel and structure in a cantilever fashion, said spring being sufficiently strong to support the weight of said unit and flexing in response to the application of said predetermined load, brake means in the path of movement of said wheel when said leaf spring deflects and against which the wheel is adapted to contact when said predetermined load or a greater load is applied onto the unit thereby causing the leaf spring to flex, and said brake means including a brake shoe plate having an arcuate surface against which the periphery of said wheel is engageable.

2. In a unit which has a frame provided with a frame member, means including at least one wheel assembly to support said frame, said wheel assembly comprising a spindle, a leaf spring having a cantilevered loop mounted on said spindle, and rotatable about the longitudinal axis of said spindle, a wheel carried at an end of said loop of the leaf spring, a brake carried at the other end of said loop of said leaf spring and adapted to contact the periphery of the wheel in response to a weight load applied to said frame which compresses the cantilever spring loop thereby bringing said wheel into engagement with the brake in all rotational positions of said leaf spring.

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3. The combination of claim 2 wherein said brake includes a shoe, said shoe having an arcuate surface adapted to be brought in contact with said wheel, and at least one side attached to said shoe and said cantilevered spring supporting said brake shoe above said wheel.

4. In a unit which has a frame, and means for supporting the frame on a supporting surface, said means including a wheel, supporting structure mounting said wheel for rotation, a single leaf spring, a spindle structure connected with said leaf spring intermediate the ends 10 thereof and with said frame and mounting said leaf spring for rotational movement about an axis established by said spindle, said wheel support structure attached to one end of said leaf spring, said leaf spring having a curved part between said end thereof and said spindle to 15 thereby position said wheel and wheel support structure at a level below said spindle, brake means at the opposite

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end of the same leaf spring and cooperable with said wheel to prevent rotation of said wheel.

5. The combination of claim 4 wherein said brake consists essentially of a portion of said leaf spring at the last mentioned end thereof and which is provided with a curved wheel periphery engaging surface.

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