

Dec. 25, 1956

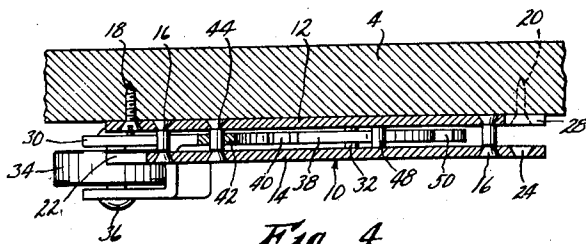
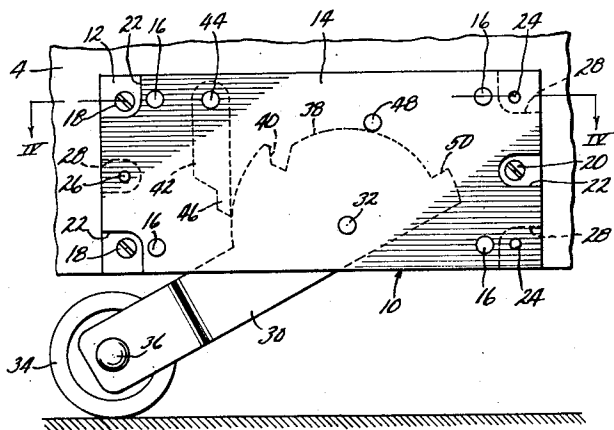
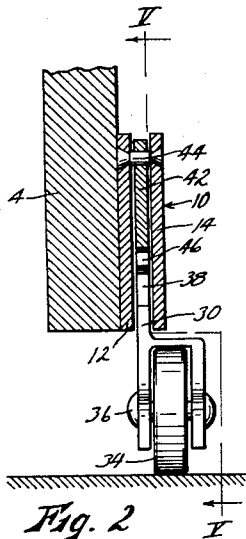
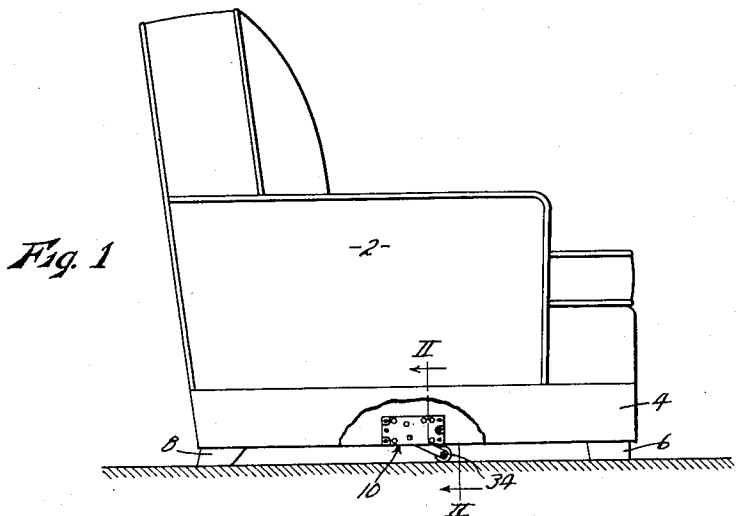
R. MOOREHOUSE

2,774,986

RETRACTABLE FURNITURE WHEEL

Filed April 30, 1954

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

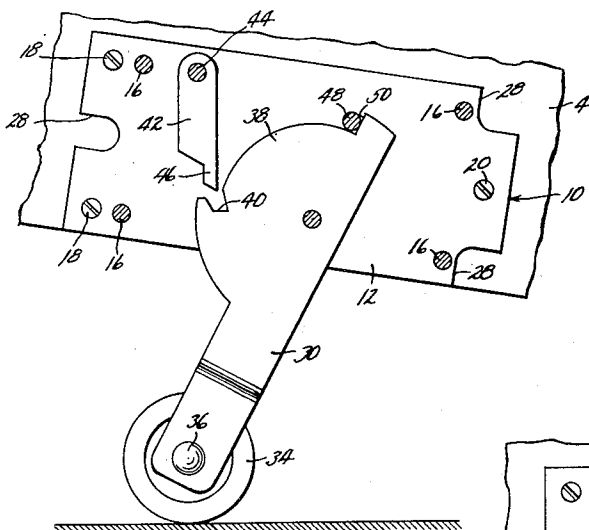


Fig. 5

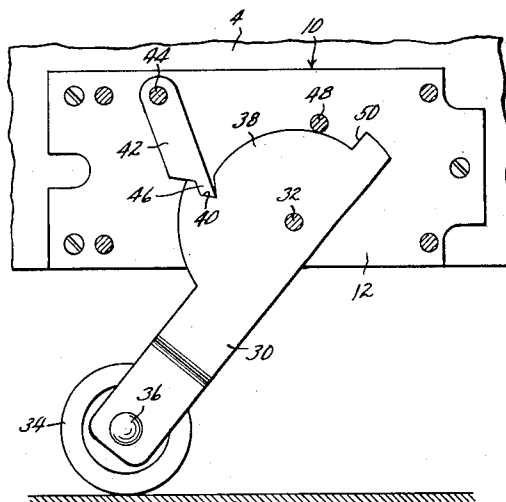


Fig. 6

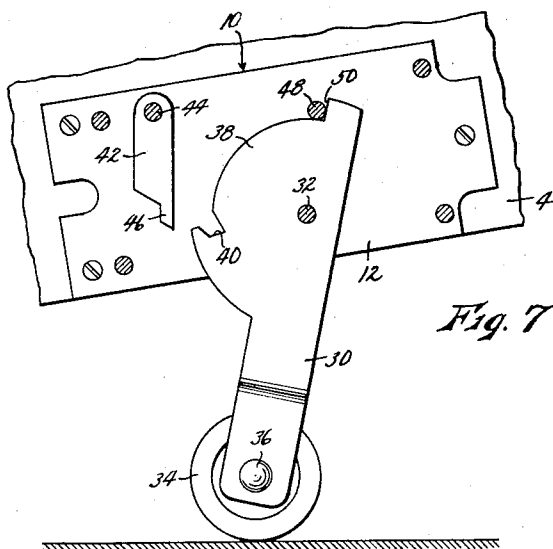


Fig. 7

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3 Sheets-Sheet 3

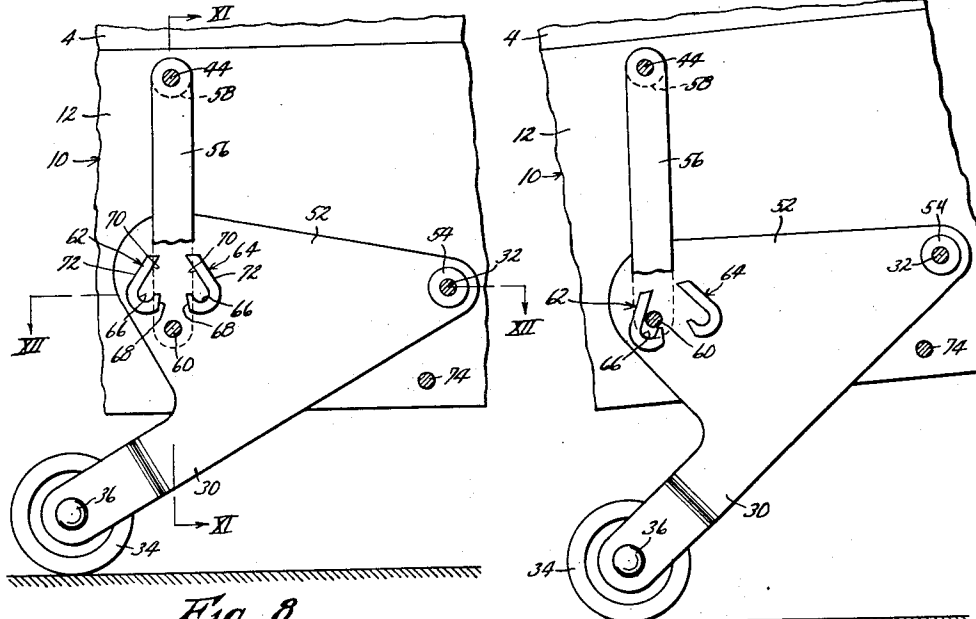


Fig. 8

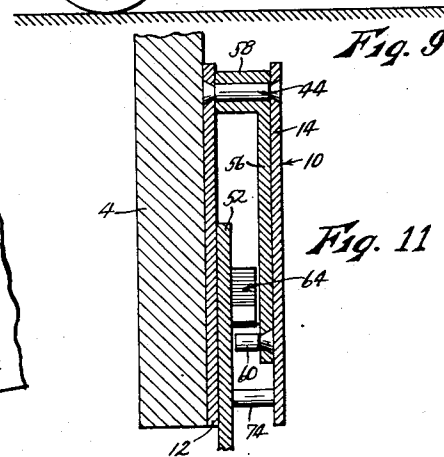


Fig. 9

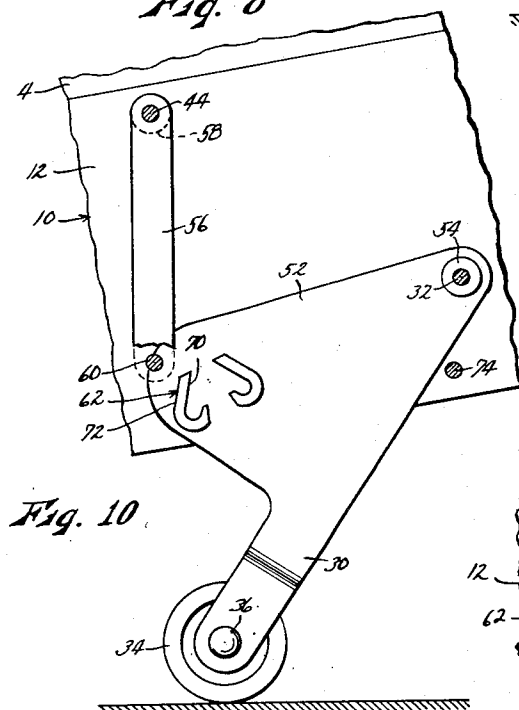


Fig. 10

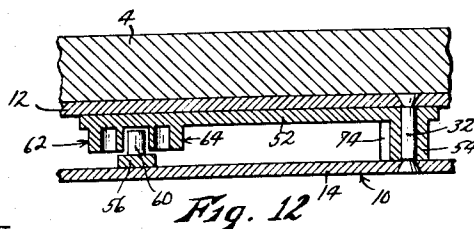
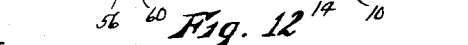


Fig. 11

⁰ Fig. 12

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RETRACTABLE FURNITURE WHEEL

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7 Claims. (Cl. 16—34)

This invention relates to new and useful improvements in furniture wheels, and has particular reference to furniture wheels of the retractable type.

It is of course common practice to attach casters or other wheels to furniture for supporting the furniture for easy movement over the floor. This practice has the disadvantage that since the area of contact between the wheels and the floor is inherently quite small and the unit loading consequently high, the floor is damaged by prolonged contact. This is particularly true where the casters contact floor coverings such as carpets or rugs, which are permanently matted or worn if a wheel carrying a heavy load rests thereon for long periods. Using furniture legs of relatively large area satisfactorily distributes the weight of the furniture over a larger area, but the furniture must then be lifted free of the floor before it can be moved, in order to avoid marring the floor by scraping. Ordinary furniture wheels or casters also have the disadvantage that they render the furniture too easily movable since it is desirable that most furniture, once in place, will not be moved accidentally by slight pressures thereagainst.

The principal object of the present invention is, therefore, the provision of a furniture wheel which is movably associated with a piece of furniture and which normally rests against the floor with only its own weight, but which may when desired be extended to project below the level of the furniture legs, and locked in said extended position.

Another object is the provision, in a furniture wheel of the character described, of means whereby the wheel may be extended or retracted by gravity-operable means actuated by tilting the piece of furniture to which the wheel is attached.

A further object is the provision of a furniture wheel of the character described wherein the wheel may be extended and locked, or retracted, by tilting the furniture in either of two directions, as may be most convenient according to the position of the furniture piece in the room.

Other objects are simplicity and economy of structure, efficiency and dependability of operation, and adaptability for use with virtually any type of furniture.

With these objects in view, as well as other objects which will appear in the course of the specification, reference will be had to the drawing wherein:

Fig. 1 is a side elevational view of a chair, partially broken away and having a retractable wheel embodying the present invention attached thereto, said wheel being shown in the retracted position.

Fig. 2 is an enlarged fragmentary sectional view taken on line II—II of Fig. 1.

Fig. 3 is a right-side elevational view of the parts shown in Fig. 2.

Fig. 4 is a sectional view taken on line IV—IV of Fig. 3.

Fig. 5 is a sectional view taken on line V—V of Fig. 2,

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showing the parts in the position assumed when the chair is tilted to extend the wheel.

Fig. 6 is a view similar to Fig. 5, with the wheel locked in its extended or load-carrying position.

Fig. 7 is a view similar to Fig. 5, with the parts in the position assumed when the chair is tilted to release the wheel.

Fig. 8 is a fragmentary view similar to Fig. 5, partially broken away, showing a modified form of the structure, with the wheel retracted and the chair in its normal position.

Fig. 9 is a view similar to Fig. 8, showing the chair tilted to extend and lock the wheel.

Fig. 10 is a view similar to Fig. 9, showing the chair tilted still further to release the lock.

Fig. 11 is a sectional view taken on line XI—XI of Fig. 8.

Fig. 12 is a sectional view taken on line XII—XII of Fig. 8.

Like reference numerals apply to similar parts throughout the several views, and the numeral 2 applies to a piece of furniture such as a sofa or couch having a frame 4, and a floor-engaging front leg 6 and rear leg 8. The retractable wheel forming the subject matter of this invention includes a body-member 10 secured to the frame 4 intermediate the front and rear legs. It is to be understood that each furniture piece will be provided preferably with two wheels, one at each side, but the wheels are identical and only one will be here described.

The body member 10 comprises a pair of rectangular flat plates 12 and 14 secured together in parallel, spaced apart relation by a plurality of shouldered rivets 16 extending therebetween. Plate 12 is secured to the inner surface of frame 4, in a vertical plane, by three screws, two of said screws 18 being disposed at the corners of one of the shorter edges of the plate, and the other screw 20 being disposed midway of the other shorter edge of the plate. Plate 14 is notched at 22 to provide access to the screws. Plate 14 is also provided, at the end thereof adjacent screw 20, with a pair of corner screw holes 24 and at its opposite end with a central screw hole 26, and plate 12 is notched opposite said screw holes, as at 28. Thus either of plates 12 or 14 may be utilized for securing the body member to the frame.

In the modification shown in Figs. 1 to 7, a wheel arm 30 is pivoted adjacent its upper end on a shouldered rivet 32 extending between and anchored in plates 12 and 14, said arm extending angularly downwardly from its pivot. At its lower end, arm 30 is bifurcated, and a wheel 34 is carried rotatably in said bifurcation on an axle 36. Said wheel rests against the floor by gravity, with arm 30 disposed angularly to the vertical. Arm 30 is provided along its upper edge with a segmental enlargement 38 concentric with rivet 32, and disposed between plates 12 and 14. Said enlargement has an upwardly opening notch 40 formed in the periphery thereof. Said notch is disposed at the same side of pivot 32 as wheel 34, so that said notch moves upwardly and downwardly with wheel 34 as arm 30 pivots. A pawl 42 is pivoted freely on a rivet 44 extending between and fixed in plates 12 and 14. It hangs vertically downwardly by gravity, and is provided at its lower end with a finger 46. When the chair is resting normally on the floor in a horizontal position, as shown in Fig. 3, the pawl hangs substantially tangentially to the segment 38 of arm 30, and the lower end of the pawl finger is disposed substantially beneath the level of notch 40. The pawl is also disposed at the same side of pivot 32 as wheel 34.

In operation, when it is desired to extend the wheel for supporting the couch with the legs thereof off of the floor, to permit easy movement of the couch, the operator merely tilts the couch by lifting one edge thereof (the forward

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edge as shown), the major portion of the couch weight then being supported on rear leg 8. Since wheel 34 rests on the floor and is freely pivoted at 32, tilting the couch as described causes wheel arm 30 to pivot downwardly, as in Fig. 5. This also lowers notch 40, and when the couch has been tilted sufficiently to cause the lip of said notch to move below the end of pawl finger 46, the pawl is swung by gravity to the right, as shown in Fig. 5, to bring the pawl finger into alignment with the notch. The operator then lowers the forward edge of the couch and the pawl finger enters the notch, locking the wheel arm against any further upward movement. The wheel is then locked in its extended position, as shown in Fig. 6. The couch may then be levelled as shown, and the couch will then be supported entirely on wheels 34. As stated above, the couch is preferably provided with at least two wheels, the pivotal axes of which should of course be coaxial. It will be noted that the end of pawl finger 46 is bevelled to facilitate its easy entry into notch 40.

When the couch has been rolled to the desired position, the operator lowers the front legs 6 into engagement with the floor, and tilts the couch forwardly on said legs. Arm 30, pivoting downwardly by gravity, lowers notch 40 out of engagement with finger 46, and the pawl swings by gravity away from the notch, as shown in Fig. 7, since the slope of the couch is then opposite to that shown in Fig. 5. When the rearward edge of the couch is then lowered, the parts will return to the position shown in Fig. 3, and the couch will be supported entirely on its legs.

It is of course apparent that wheel arm 30 must always slope to the same side of vertical, that is, to the left as shown in Figs. 3, 5, 6 and 7. To prevent any possibility of its swinging past vertical, as for example if the couch were to be tilted so far as to lift the wheels completely off of the floor, a stop pin 48 is provided in the form of a rivet extending between and secured in plates 12 and 14. Said stop pin cooperates with a shoulder 50 formed in arm segment 38 to limit the downward pivotal movement of arm 30.

In the modification shown in Figs. 8 to 12, the frame 10 is substantially similar to that in Figs. 1 to 7 except that the plates 12 and 14 are spaced farther apart. Wheel arm 30, and the upward planar enlargement 52 thereof lie in sliding engagement with plate 12, and an integral hub portion 54 thereof is pivoted freely on pivot pin 32. The pawl arm 56 is provided with an integral hub 58 pivoted freely on pivot pin 44, and lies slidably against plate 14. At its free end, the pawl arm has a finger 60 riveted therein, said finger extending parallel to pivot pin 44 and toward member 52, though terminating just short of member 52 so as not to interfere with the free movement of the pawl. Said pawl finger cooperates with a pair of lugs 62 and 64 formed integrally with enlargement 52 of arm 30 and extending toward plate 14. The inner or confronting faces of said lugs are each provided with a notch 66 capable of receiving pawl finger 60. Said notches open upwardly. Below said notches, the confronting faces of the lugs diverge downwardly as indicated at 68. Above said notches, the confronting faces of the lugs converge upwardly, as indicated at 70. The outer or distal faces of the lugs diverge downwardly, as indicated at 72. The lugs 62 and 64 are spaced apart sufficiently to permit the free passage of finger 60 upwardly therebetween.

It will be noted that when the parts are in their normal position as indicated in Fig. 8, with the wheel retracted, pawl finger 60 is disposed beneath the level of lugs 62 and 64, and the pawl may swing freely. When the body member is tilted as shown in Fig. 9, as by tilting the couch or other furniture piece, arm 30 pivots downwardly by gravity, lugs 62 and 64 passing downwardly respectively on opposite sides of finger 60. The divergent faces 68 of the lugs facilitate the entry of the finger therebetween.

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When arm 30 has pivoted sufficiently far to bring notches 66 below finger 60, pawl 56 will swing by gravity to the position shown in Fig. 9, with finger 60 thereof directly above the notch 66 of lug 62. Lowering the elevated edge of the furniture will engage the finger in the notch to lock the wheel in its extended position.

When it is desired to retract the wheel, the furniture may be tilted in the same direction as before until lug 62 passes entirely beneath finger 60, as shown in Fig. 10. During this movement, finger 60 first rides up the inclined inner face 70 of lug 62 until the lug passes below the finger, whereupon the pawl swings by gravity to the position shown in Fig. 10. When the elevated edge of the furniture piece is then lowered, the inclined outer face 72 of lug 62 engages finger 60, and said finger rides downwardly over the face 62 until it is beneath the lug. The pawl then swings by gravity to its normal intermediate position below and between the lugs, as shown in Fig. 8. A stop pin 74 extends between plates 12 and 14 below arm 30 for limiting the downward pivotal movement of said arm, similarly to pin 48 in the first modification.

If the furniture were initially tilted in the direction opposite to that shown in Fig. 9, the operation would be substantially identical except that pawl finger 60 would then cooperate with lug 64. Thus it is apparent that with the species shown in Figs. 8 to 12, the wheel may be extended by tilting the furniture piece either forwardly or rearwardly, and that it may then be released by tilting it in either direction. This is a feature of considerable convenience, since the relationship of the furniture piece to walls, other pieces of furniture, or the like, may render it inconvenient to tilt the furniture in one direction or the other.

While I have shown and described a specific embodiment of my invention, it is apparent that many minor changes of structure and operation could be made without departing from the spirit of the invention as defined by the scope of the appended claims.

What I claim as new and desire to protect by Letters Patent is:

1. A retractable furniture wheel comprising a body member adapted to be secured to a piece of furniture, an arm pivoted freely adjacent its upper end in said body member and sloping angularly downwardly from its pivotal axis, said arm having an upwardly opening notch formed therein intermediate its ends, a wheel rotatably mounted at the lower end of said arm and resting against the floor by gravity, and a pawl freely pivoted in said body member and normally hanging substantially vertically downwardly by gravity adjacent the arcuate path of said notch, said pawl being provided at its lower end with a finger normally disposed beneath the level of said notch, whereby as said body member is simultaneously elevated and tilted, said pawl finger is brought into alignment with said notch.

2. A retractable furniture wheel comprising a body member adapted to be secured to a piece of furniture, an arm pivoted freely adjacent its upper end in said body member and sloping angularly downwardly from its pivotal axis, said arm having an upwardly opening notch formed therein intermediate its ends, a wheel rotatably mounted at the lower end of said arm and resting against the floor by gravity, and a pawl freely pivoted in said body member and normally hanging substantially vertically downwardly by gravity adjacent the arcuate path of said notch, said pawl being provided at its lower end with a finger normally disposed beneath the level of said notch, whereby as said body member is simultaneously elevated and tilted, said pawl finger is brought into alignment with said notch, and said arm being provided with a wall rising from said notch at the side thereof opposite from the side thereof on which said finger is normally disposed, said pawl finger is prevented from swinging past said notch.

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3. A retractable furniture wheel comprising a body member adapted to be secured to a piece of furniture, an arm pivoted freely adjacent its upper end in said body member and sloping angularly downwardly from its pivotal axis, said arm having an upwardly opening notch formed therein intermediate its ends, a wheel rotatably mounted at the lower end of said arm and resting against the floor by gravity, and a pawl freely pivoted in said body member and normally hanging substantially vertically downwardly by gravity, said pawl being provided at its lower end with a finger disposed adjacent and in the plane of the arcuate path of said notch, but substantially beneath the level of said notch, whereby as said body member is simultaneously elevated and tilted about an axis parallel to the axis of said arm, said arm will pivot downwardly to lower said notch beneath said pawl finger, and said pawl will swing by gravity to position said finger above said notch.

4. A retractable furniture wheel comprising a body member adapted to be secured to a piece of furniture, an arm pivoted freely adjacent its upper end in said body member and sloping angularly downwardly from its pivotal axis, said arm having an upwardly opening notch formed therein intermediate its ends, a wheel rotatably mounted at the lower end of said arm and resting against the floor by gravity, and a pawl freely pivoted in said body member and normally hanging substantially vertically downwardly by gravity adjacent the arcuate path of said notch, said pawl being provided at its lower end with a finger normally disposed beneath the level of said notch, whereby as said body member is simultaneously elevated and tilted, said pawl finger is brought into alignment with said notch, and a stop member fixed to said body member to limit the movement of said arm so that said arm cannot swing downwardly to a vertical position.

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5. A retractable furniture wheel comprising a body member adapted to be fixed to a piece of furniture, an arm pivoted freely adjacent its upper end in said body member on a horizontal axis and sloping angularly downwardly from its axis, a wheel rotatably mounted at the lower end of said arm and resting against the floor by gravity, said arm having a pair of transversely extending, horizontally spaced apart lugs affixed thereto, a pawl pivoted at its upper end in said body member above said arm on an axis parallel to the axis of the arm and normally hanging vertically downwardly, a transversely extending finger secured to the free end of said pawl and projecting toward said arm to cooperate with said lugs, said finger being normally disposed entirely below and intermediate said lugs, and said lugs being spaced apart sufficiently to permit the upward passage of said finger therebetween to a position entirely above said lugs, the confronting faces of said lugs being each formed to present an upwardly opening notch.

6. The structure as set forth in claim 5 wherein the confronting faces of said lugs, both above and below said notches, converge upwardly and inwardly.

7. The structure as set forth in claim 5 wherein the confronting faces of said lugs, both above and below said notches, converge upwardly and inwardly, and wherein the distal faces of said lugs diverge outwardly and downwardly.

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