

May 26, 1964

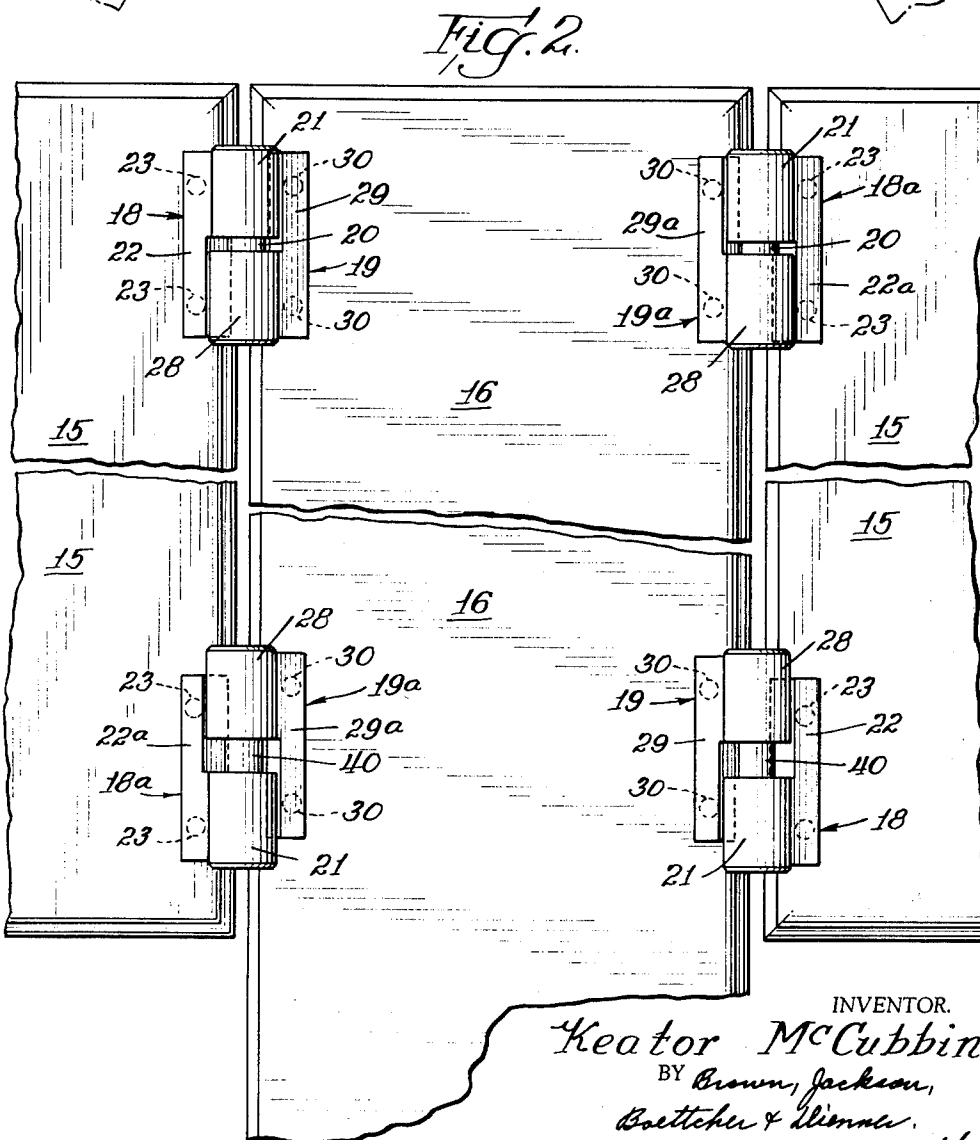
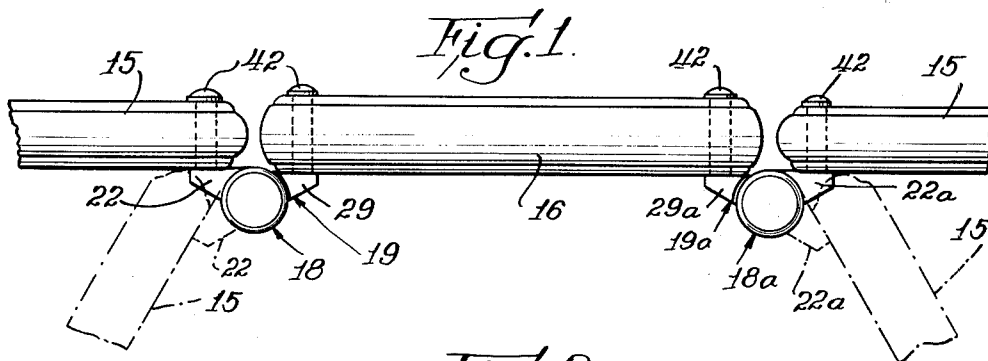
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HINGE ASSEMBLY

Filed Feb. 15, 1962

3 Sheets-Sheet 1



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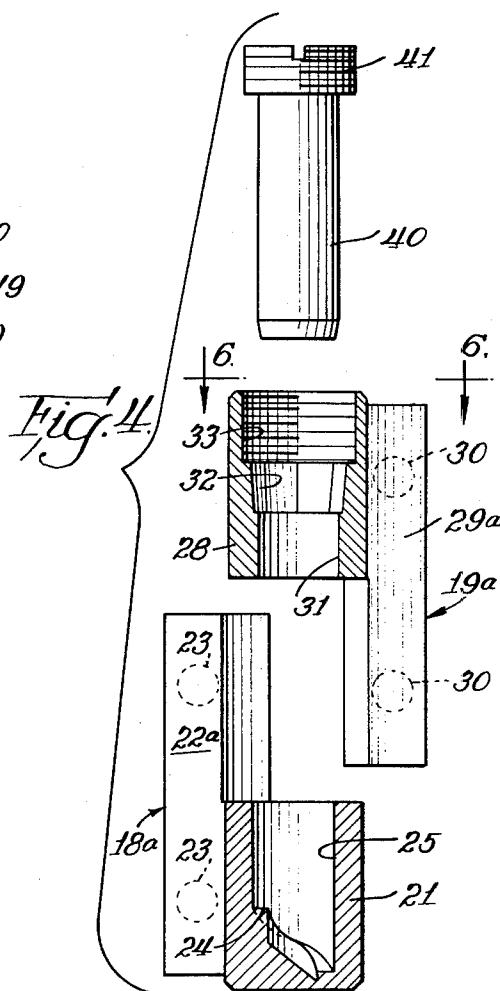
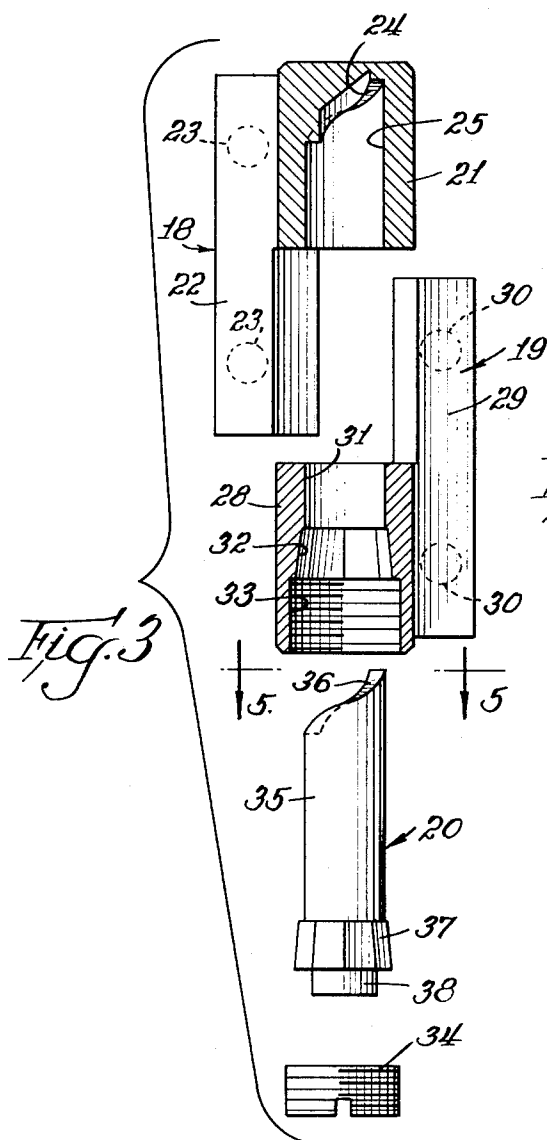
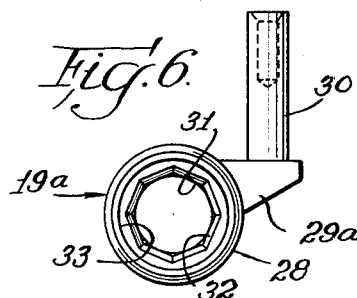
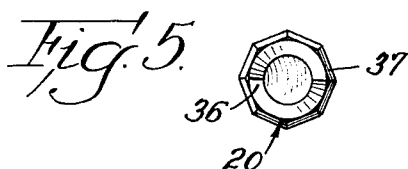
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HINGE ASSEMBLY

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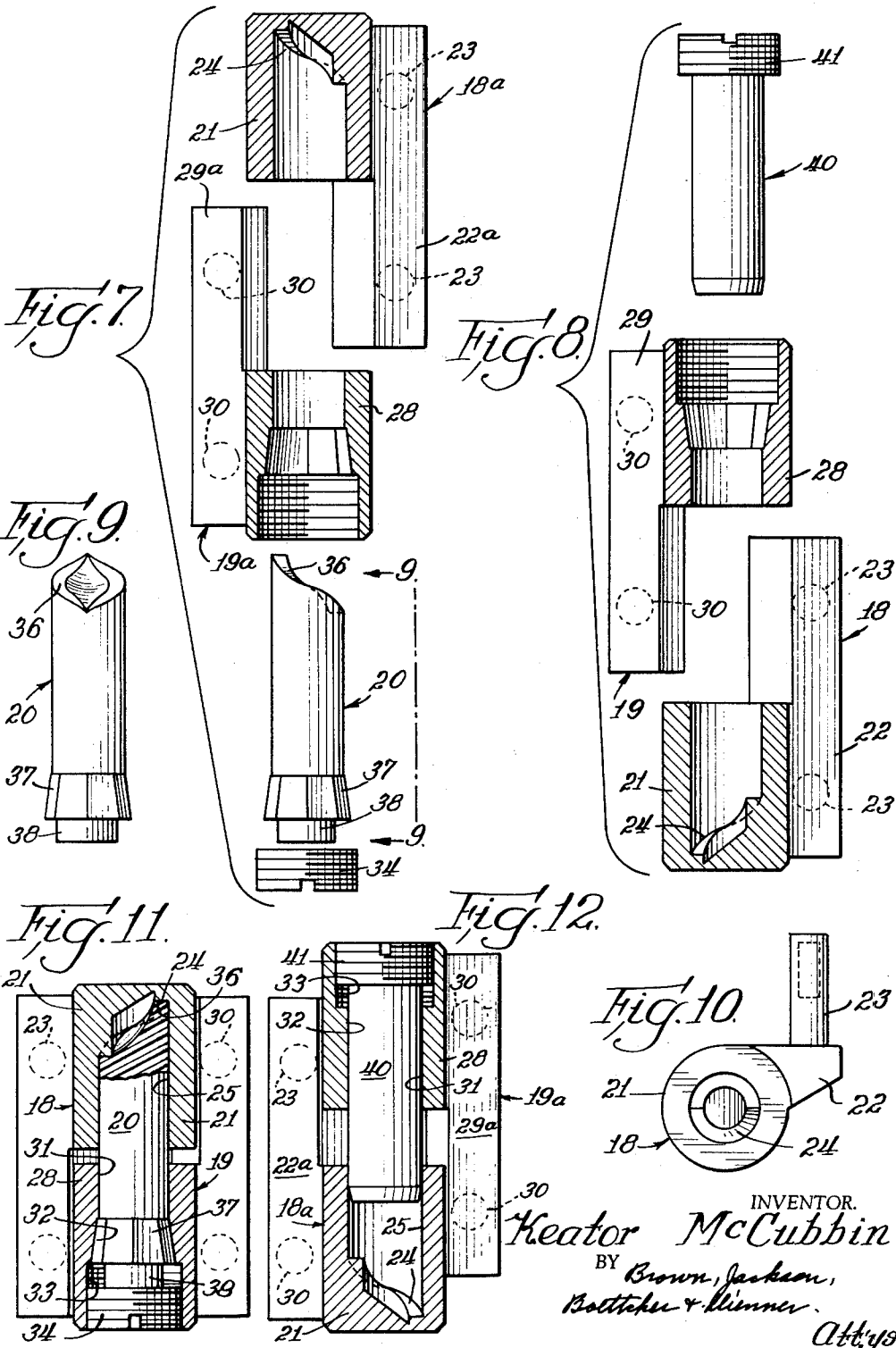
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HINGE ASSEMBLY

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2 Claims. (Cl. 16—153)

This invention relates to hinge means for mounting doors such as are used for toilet, shower, dressing and other analogous small compartments.

Doors for small compartments such as above mentioned may be mounted either left hand or right hand. In many cases adjoining compartments are separated by a partition extending from the midwidth of a stile anchored to a floor or a ceiling, and the doors for such compartments are hingedly mounted in a known manner on opposite sides of the stile. When a compartment is in use the door thereof may be secured closed by a latch of known type comprising a keeper and a bolt disengageable by relative upward movement. Doors for compartments of the character mentioned frequently are spaced a substantial distance above the floor. Difficulty has been experienced in many cases with young boys entering the compartments and latching the doors closed, and then crawling out under the door leaving it latched closed. It is often quite difficult and time consuming to release a closed and latched door which is hingedly mounted in the usual manner referred to above.

My invention is directed to hinge means such that if a door is left latched closed it may readily be released by raising the door a short distance, sufficient to disengage the latch means. A further and important object of my invention is to provide two hinge assemblies respectively comprising two members and which are adaptable to hingedly mounting doors at both sides of a stile or analogous support, thereby effecting a saving in cost of the hinge assemblies required for the two doors, while also accommodating raising of the door for the purpose stated. Further objects and advantages of my invention will appear from the detail description.

In the drawings:

FIGURE 1 is a top plan view of a stile and two doors hingedly mounted on opposite sides thereof by hinge assemblies comprising my invention, the doors being broken away in major portion and indicated in open position in broken lines;

FIGURE 2 is a front view of the stile and doors and hinge assemblies of FIGURE 1, the stile and doors being in part broken away;

FIGURE 3 is a disassembled sectional view, on an enlarged scale, of the left upper hinge assembly of FIGURE 2, parts being shown in elevation;

FIGURE 4 is a view similar to FIGURE 3 but of the left lower hinge assembly of FIGURE 2;

FIGURE 5 is an end view, taken substantially on line 5—5 of FIGURE 3, of the cam pin of that assembly;

FIGURE 6 is an end view, taken substantially on line 6—6 of FIGURE 4, of the upper hinge member of that assembly;

FIGURE 7 is a view similar to FIGURE 3, but of the right upper hinge assembly of FIGURE 2;

FIGURE 8 is a view similar to FIGURE 4, but of the right lower hinge assembly of FIGURE 2;

FIGURE 9 is a view of the cam pin of FIGURE 7, taken substantially on line 9—9 of that figure;

FIGURE 10 is a top plan view of the lower hinge member of the assembly of FIGURE 8;

FIGURE 11 is a sectional view, on an enlarged scale, of the left upper hinge assembly of FIGURE 2, certain parts being shown in elevation; and

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FIGURE 12 is a view similar to FIGURE 11, but of the left lower hinge assembly of FIGURE 2.

I have shown the hinge assembly of my invention as used, by way of example, for mounting two doors 15 on opposite sides of a stile 16. The doors 15 and stile 16 preferably, but not necessarily, are of known panel type though they may be of any suitable construction. The stile 16 is somewhat thicker than the doors 15 and may be either anchored to a floor (not shown) or to a ceiling (not shown) in any suitable manner, or anchored to both. The doors 15 may be spaced a substantial distance from the bottom of the stile, as shown in FIGURE 2, and suitable means (not shown) may be provided for latching the respective doors closed. The latch means used is of a type which may be disengaged by raising the door a short distance, such as disclosed in my copending application for Door and Mounting and Latch Means Therefor, Serial No. 109,685, filed May 12, 1961, though any suitable known latch means so disengageable may be used.

Referring to FIGURE 3, the left upper hinge assembly of FIGURE 2 comprises four parts—a door member 18, a stile member 19, a cam pin 20, and a cam pin retaining screw plug 34. The door member 18 comprises a sleeve 21 having at its left side an integrally attached lengthwise flange or leaf 22 of suitable length, approximately, though not necessarily, twice that of sleeve 21. The outer face of leaf 22 is inclined (FIGURE 10) and the inner face thereof is flat and tangent to sleeve 21, as shown in FIGURE 1. Two studs 23, integral with leaf 22, project from the inner face thereof perpendicular thereto for insertion through openings provided in the left door of FIGURE 2, upon which door the leaf 22 seats. The sleeve 21 is closed at one end and is there provided with an interior cam element 24, from which a cylindrical bore 25 extends to the other end of sleeve 21.

Still referring to FIGURE 3, the stile member 19 comprises a sleeve 28 and an attached lengthwise flange or leaf 29 similar to leaf 25 of door member 18, the flat inner face of leaf 29 being off-set inwardly of sleeve 28 as shown in FIGURE 1, to compensate for the increased thickness of stile 16. The leaf 29 is provided with two studs 30 extending from its flat inner face for insertion through suitably disposed openings in stile 16. The studs 30 are suitably bored and tapped from their outer ends, as are the studs 23 of leaf 22 of door member 18, for a purpose to be explained more fully presently. Sleeve 28 of member 19 is open at both ends. It is provided with a cylindrical bore 31 extending from its inner end and opening into an outwardly flaring inner socket 32 of polygonal cross section the inner end of which is of slightly greater diameter than bore 31. The outer end portion of sleeve 28 is bored and tapped to provide an interiorly threaded socket 33 of somewhat greater diameter than the outer end of the intermediate socket 32, for reception of the screw plug 34.

The bore 31 of sleeve 28 is of the same diameter as bore 25 of sleeve 21 of member 18 and is aligned with bore 25 in the assembled hinge, as will be understood and will appear more fully hereinafter. The aligned bores 25 and 31 receive the cylindrical body portion 35 of the cam pin 20. Cam pin 20 is formed at one end thereof to provide a cam element 36 which is complementary to the cam element 24 of sleeve 21 of member 18. Pin 20 is provided adjacent its other end with a locking element 37 preferably corresponding in cross section to socket 32 of sleeve 28 and adapted to seat snugly therein. The locking element 37 of pin 20 may be of circular or other suitable cross section. The cam pin 20 is further provided with a concentric stud 33, of reduced diameter relative to body 35, extending outward from locking element 37. In the assembled hinge, the cam pin 20 fits snugly in

sleeves 21 and 28 of members 18 and 19 with cam element 24 of sleeve 21 seating on cam element 36 of pin 20, and is secured in that position by the screw plug 34 threaded into bore 33 in pressure contact with stud 38. The pin 20 is effectively held against movement outward of sleeve 28 and is locked against turning movement by the locking element 37 seating snugly under pressure in socket 32. The locking element 37 and socket 32 provides means whereby the angular relation of cam pin 20 to sleeve 21 of member 18 may readily be adjusted, for a purpose to be described later. The cam pin 20 preferably is formed of nylon, but it may be formed of any suitable material. The cam pin retaining screw plug 34 has a binding fit in socket 32 to guard against loosening thereof due to vibration or other causes. It is provided in its outer face with a transverse slot or kerf for reception of the blade of a screw driver or other suitable tool for threading plug 34 into or out of socket 33 as required. The hinge members 18 and 19 are in the form of metal castings and are provided with a chrome or other suitable finish.

Referring to FIGURE 4, the left lower hinge assembly of FIGURE 2 comprises three members—a door member 18a, a stile member 19a and a pintle pin 40. The stile member 19a is the same as the stile member 19 of FIGURE 3 except that leaf 29a thereof is disposed at the opposite side of sleeve 28. The door member 18a is the same as the door member 18 of FIGURE 3, except that the leaf 22a is disposed at the opposite side of sleeve 21. In the assembly of FIGURE 4 the positions of the door and stile members 18a and 19a are reversed relative to FIGURE 3 and the same reference numbers have been applied to corresponding parts, except that the reference numbers for the hinge members and the leaves thereof have the exponent *a* added. The flat inner face of leaf 29a is off-set inwardly of sleeve 28 to compensate for the greater thickness of stile 16, in the same manner as leaf 29 of sleeve 28 of FIGURE 3 is off-set, as previously mentioned. Leaf 29a of sleeve 28 is provided with two studs 30 extending from its flat inner face perpendicular thereto. The studs 30 are of a length corresponding to the thickness of stile 16 and are bored and tapped from their outer ends for reception of suitable securing screws. The leaf 22a of door member 18a has its flat inner face disposed tangent to sleeve 21 and provided with two studs 23 perpendicular thereto and of a length corresponding to the thickness of door 15. The studs 23 are suitably bored and tapped from their outer ends for reception of securing screws. The pintle pin 40 is of proper diameter to fit snugly in the sleeves 28 and 21 and is provided at its upper end with a threaded head 41 adapted to screw into bore 33 of sleeve 28 with a binding fit therein. Head 41 of pin 40 is provided with a transverse slot or kerf for reception of a screw driver blade or other suitable instrument for screwing head 41 into and out of sleeve 28, as required.

As will be understood from the above, in mounting the left door 15 of FIGURE 2 on stile 16, the hinge members 18 and 19 and 18a and 19a are secured to the door and the stile by screws 42 of suitable known type threaded into the outer ends of the studs 23 and 30. The sleeve 21 of the door member 18 of the upper assembly is spaced a short distance above the sleeve 28 of the stile member 19 of that assembly, with cam element 24 of sleeve 21 seating upon the cam element 36 of cam pin 20 and the latter secured in sleeve 28 by screw plug 34; as shown in FIGURE 11. The hinge members 18a and 19a of the lower hinge assembly are disposed with the sleeves 28 and 21 thereof spaced apart a materially greater distance than the sleeves of the upper assembly, with pintle pin 40 secured in the upper end of sleeve 28 and extending into sleeve 21; as shown in FIGURE 12. When the door 15 is in open position the apex or point of cam element 36 of cam pin 20 engages in the vertex of cam element 24 of sleeve 21 of the upper hinge assembly, ef-

fective for retaining the door in that position supported on cam pin 20. The latter is adjusted about its axis to a position effective for holding door 15 in partially open position outwardly, as indicated in broken lines in FIGURE 1. By proper adjustment of pin 20 the door may normally be held in desired partially open position, either outward or inward as circumstances may require. When the door 15 is held in its partially open position it is also in its lowermost position and the lower end of pintle pin 40 is spaced a material distance above cam element 24 of sleeve 21 of the lower door hinge member 18a; the body portion of pintle pin 40 being of appropriate length to that end.

When the door 15 is swung from its normal partially open position of FIGURE 1 to full open position, it is raised by cam element 24 of sleeve 21 and cam element 36 of cam pin 20 of the upper assembly, the clearances between the sleeves 28 and 21 of the lower assembly and between cam element 24 and pintle pin 40 being adequate for that purpose. Upon swinging of door 15 to closed position, it is lowered to a position slightly higher than its normal position and may then be secured closed by latch means of the character previously mentioned. If the door is unlatched and swung to open position and then released, it will be returned to its normal partially open position by the cam element 24 of sleeve 21 in cooperation with cam element 36 of cam pin 20. In the event door 15 is latched closed, it may be opened by raising it a sufficient distance to release the latch, the spacing of sleeves 21 and 28 of the lower assembly and the spacing of the lower end of pintle pin 40 from cam element 24 of sleeve 21 being adequate for that purpose but such as to prevent removal of the door by raising thereof.

Referring further to FIGURES 2, 3 and 4, it will be noted that the hinge assemblies for the left door 15 comprise four castings 18, 18a, 19 and 19a. The castings 18 and 18a are the same except as to the disposition of the mounting leaves. Leaf 22 of casting 18 is disposed at the left of sleeve 21 thereof. Leaf 22a of casting 18a is reversed relative to leaf 22 of casting 18 and would be at the right of sleeve 21 if casting 18a were disposed with the open end of sleeve 21 directed downwardly. Both of the castings 18 and 18a are secured to door 15. They are the door members of the two left hinge assemblies and may be termed left hand and right hand, respectively. The two castings 19 and 19a are the stile members. They are the same except as to disposition of the mounting leaves. The member or casting 19 may be termed right hand and the casting 19a may be termed left hand. It will be seen that the two hinge assemblies at the left of FIGURE 2 comprise four castings—two right hand and two left hand—each assembly comprising a right hand casting and a left hand casting.

The upper right hinge assembly of FIGURE 2 is shown as disassembled in FIGURE 7. It is the same as that of FIGURE 4 but with the hinge members 18a and 19a reversed relative to FIGURE 4 and pintle pin 40 of the latter figure replaced by the cam pin 20 and its retaining screw plug 34 of FIGURE 3. The lower right hinge assembly of FIGURE 2, shown as disassembled in FIGURE 8, is the same as that of FIGURE 3 but with the hinge members 18 and 19 reversed relative to the latter figure and cam pin 20 and its retaining screw plug 34, of FIGURE 3, replaced by pintle pin 40 of FIGURE 4. In FIGURE 2 the castings of the upper right hinge assembly are the same as those of the lower left assembly and the castings of the upper left hinge assembly are the same as those of the lower right assembly.

It will be seen that but four castings—two left hand and two right hand—18 and 19a, and 18a and 19 are required to provide the four hinge assemblies of FIGURE 2. Accordingly, with but four castings, the two doors 15 may be hingedly mounted at the opposite sides of stile 16 in the manner above described. The four castings are produced in a single casting operation, in a common or

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family die, conducive to reduced cost of production. The interchangeability of the cast door and stile members thus effects a substantial saving in cost for mounting two doors right and left, compared to the cost of producing eight different hinge members for that purpose. Considering the fact that doors for small compartments of the character herein referred to are extensively used and are mounted left and right on stiles or analogous supports, the saving in cost effected by the hinge assemblies of my invention is substantial and of practical importance.

It will be understood that changes in detail may be resorted to without departing from the field and scope of my invention, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention has been disclosed.

I claim:

1. In a hinge assembly, a first hinge member comprising a first sleeve closed at one end and there provided with an interior cam element, said sleeve having a cylindrical bore extending from said cam element and opening through its other end and being further provided at one side thereof with a mounting leaf; a second hinge member comprising a second sleeve opposed to the open end of said first sleeve and having a bore opening through both its inner and its outer ends; and a cam pin and a pintle pin alternatively insertible into said second sleeve from the outer end thereof, said pins being respectively of a length to project beyond the inner end of said second sleeve when operatively mounted therein into said first sleeve and said cam pin having a cam element disposed to seat on said cam element of said first sleeve in co-operating relation therewith, when said cam pin is operatively mounted in said second sleeve, the latter and said pins respectively having cooperating means for interchangeably securing said pins in said second sleeve in operative position therein whereby said assembly may be

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used as a gravity hinge and as a non-gravity hinge optionally.

2. In door mounting means; a support; a door; and upper and lower hinge assemblies mounting said door on said support; each of said hinge assemblies respectively comprising a first hinge member and a second hinge member; one of said hinge members secured to said support and the other secured to said door; said first hinge member having a first sleeve closed at one end and there provided with an interior cam element and further having a cylindrical bore extending from said cam element and opening through its other end; said second hinge member having a second sleeve opposed to the open end of said first sleeve and being provided with a bore opening through both ends of said second sleeve; a pin removably secured in said second sleeve of each of said second hinge members and extending into said first sleeve of the corresponding first hinge member; one of said pin having a cam element seating on said cam element of the corresponding first sleeve and cooperating therewith for raising and lowering said door in the opening and closing movement thereof and said pins and first sleeves further providing a pivotal mounting for said door; said first and second hinge members of each of said hinge assemblies being reversed relative to said first and second hinge members of the other of said hinge assemblies.

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