May 21, 1963

E. L. STROUP ETAL

3,090,427

UPWARDLY ACTING DOOR ASSEMBLY

Filed April 12, 1957

2 Sheets-Sheet 1

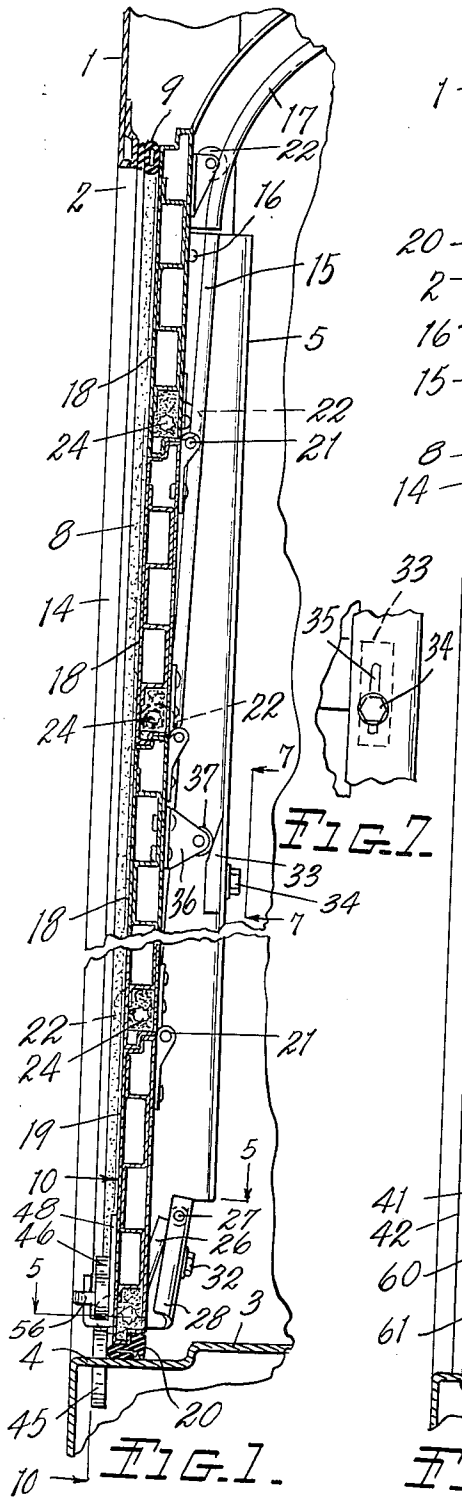


FIG. 1.

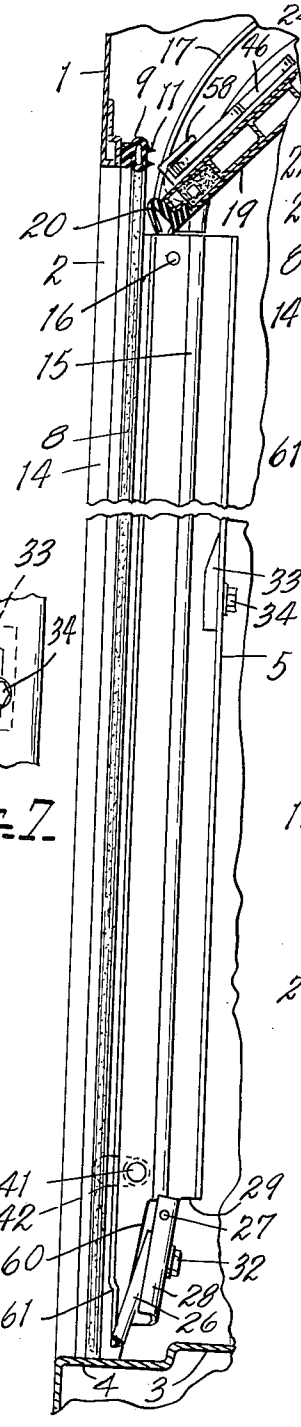


FIG. 2.

FIG. 7.

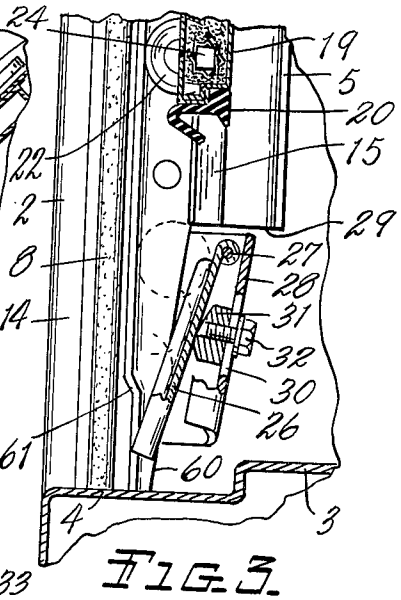


FIG. 3.

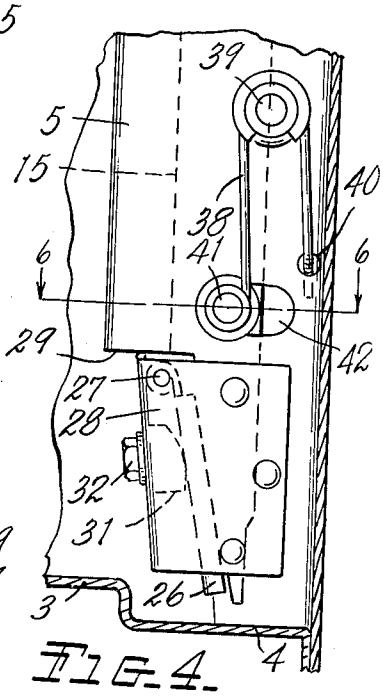


FIG. 4.

INVENTORS
Earl L. Stroup
Don P. Jones
BY
Earl
Attorney

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UPWARDLY ACTING DOOR ASSEMBLY

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2 Sheets-Sheet 2

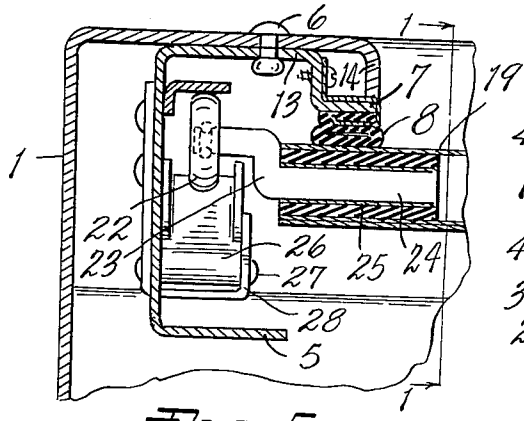


FIG. 5

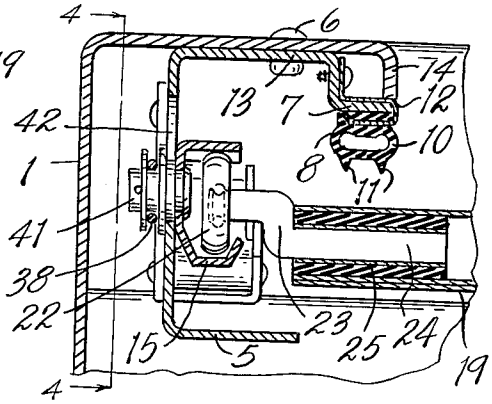


FIG. 6

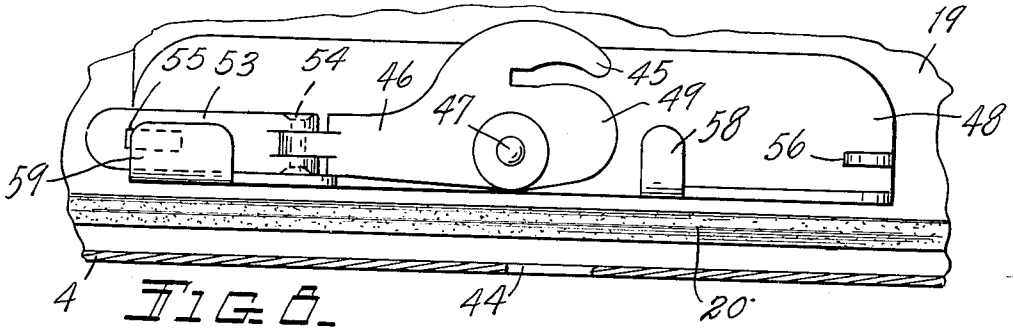


FIG. 8

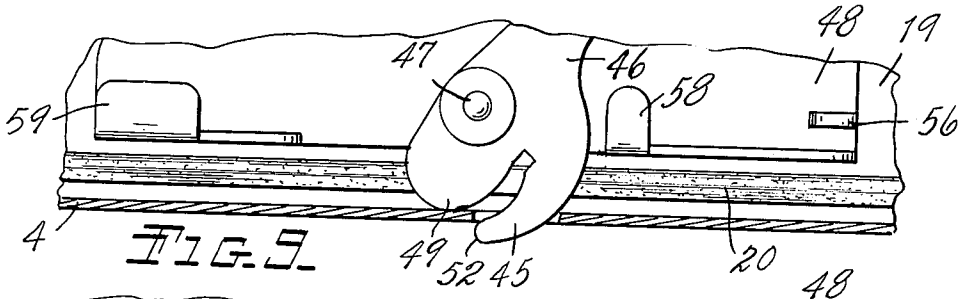


FIG. 9

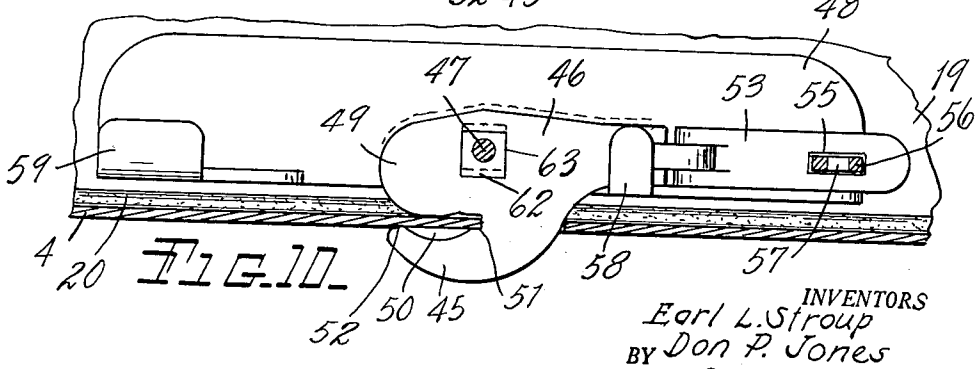


FIG. 10

INVENTORS
Earl L. Stroup
BY Don P. Jones
Earl
Attorney.

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UPWARDLY ACTING DOOR ASSEMBLY

Earl L. Stroup and Don P. Jones, Hartford City, Ind., assignors to Overhead Door Corporation, Hartford City, Ind.

Filed Apr. 12, 1957, Ser. No. 652,566
5 Claims. (Cl. 160—40)

This invention relates to an upwardly acting door assembly provided with means for seating a door relative to jamb and sill seals. The main objects of this invention are:

First, to provide an upwardly acting door with jamb and sill seals which are under substantial thrust engagement when the door is in closed position, and at the same time the door is easily operated to and from its fully closed position and without substantial frictional engagement with the seals.

Second, to provide a sectional vertically acting door in which all of the sections are in thrust engagement with jamb seals when the door is in closed position.

Third, to provide a door having the above stated advantages in which the means for automatically thrusting the door against the jamb seals are adjustable to compensate for substantial variations in the seal and door parts and for such wear on or decreasing resilience of the seal members as may result from use.

Fourth, to provide an upwardly acting door provided with a sill engaging seal and with means for clampingly locking the door and its sill seal to the sill.

Fifth, to provide an upwardly acting door structure having jamb and sill seals with locking means which clamps the sill seal against the sill, which clamping movement results in the final thrusting of the door against the jamb seals and also preventing edgewise shifting or vibration, the lock means also constituting means for initiating the opening of the door and the retraction thereof from the jamb seals, whereby positioning the door for free opening movement.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

FIG. 1 is a fragmentary vertical sectional view of an upwardly acting door on a line corresponding generally to line 1—1 of FIG. 5 with the door in closed position.

FIG. 2 is a similar view with the door in open position.

FIG. 3 is an enlarged fragmentary view partially in vertical section corresponding to that of FIG. 1 with the door in partially open position.

FIG. 4 is an enlarged fragmentary view in vertical section on a line corresponding to line 4—4 of FIG. 6.

FIG. 5 is a fragmentary view in horizontal section on a line corresponding to line 5—5 of FIG. 1.

FIG. 6 is a fragmentary view in horizontal section on a line corresponding to line 6—6 of FIG. 4.

FIG. 7 is a fragmentary view on a line corresponding to line 7—7 of FIG. 1.

FIG. 8 is a fragmentary outside elevational view of the bottom portion of the door with the sill engaging lock in fully retracted position, the sill being shown in vertical section.

FIG. 9 is a similar view with the lock in partially actuated position.

FIG. 10 is a view of these parts in fully closed and locked position.

The embodiment of our invention illustrated is well adapted for use in vehicles of various types such as

trucks, trailers, railway cars and the like, where it is desirable to provide effective sealing of the doors.

In the accompanying drawing 1 represents parts of a structure having a door opening 2 therein, the structure having a bottom 3 provided with a sill 4. These parts are conventionally illustrated as being formed of metal. Opposed support members 5 of channel section are fixedly mounted on the door frame desirably as illustrated in FIGS. 5 and 6 by means of rivets 6, although the parts may be spot welded if desired. The rivets, however, are preferred as it is sometimes desirable to disassemble these parts. The door jambs 7 are provided with seals 8 which preferably have portions 9 extending across the top of the door opening. These seals illustrated are resilient and have collapsible tubular portions 10 provided with projecting longitudinal fins 11. The seals are carried by channeled strips 12 which are clamped between the inwardly projecting flanges 13 of the support members 5 and the inturned edges 14 of the door frame, see FIGS. 5 and 6.

The vertical or upright track portions 15 are pivotally mounted at 16 at the upper ends of these supports. The track sections 17 curvedly merge with the upper ends of these sections 15. The door comprises a plurality of horizontally articulated sections 18 and 19, the bottom section 19 being of the same structure as the other sections of the door, but is designated by a separate numeral because it is provided with a sill engaging seal 20 on its lower edge.

The sections are hingedly connected, hinges being conventionally shown at 21. The sections are provided with track engaging rollers 22, the spindles 23 of which have offset shank portions 24 adjustably engageable with the sockets 25, the upper section having track engaging rollers adjacent the upper edge thereof and the lower section track engaging rollers adjacent the lower edge thereof.

The swinging of the upright track sections 15 on their pivots moves the door toward and from the jamb seals. In the embodiment illustrated, the door sections are forced against the jamb seals when the door is in fully closed position. This results from the bottom rollers of the door engaging the cams 26 which are pivotally mounted at 27 on the brackets 28 mounted on the lower ends of the supports 5 which are cut away or recessed at 29 to receive the brackets. The brackets are of generally outwardly facing channel section and have longitudinal slots 30 in the webs thereof, see FIG. 3.

The cam abutments 31 are supported for vertical adjustment by the screws 32 engaging these slots. Second cams 33 are provided and are adjustably mounted on the inner flanges of the support members 5 by means of the screws 34 engaging slots 35. One of the intermediate door sections is provided with brackets 36 having rollers 37 engageable with these cams when the door is in closed position. The purpose of these second cams is to insure that the intermediate portions of the door are in effective engagement with the jamb seals.

The door, made up of sections, may have substantial flexibility and there is normally some looseness in the engagement of the rollers with the track. With this arrangement the door is effectively thrust against the jamb seals when in its closed position. On the initial opening movement of the door, the lower ends of the track sections 15 are swung rearwardly by means of the springs 38 which are mounted on studs 39 on the supports with one arm thereof engaged in openings 40 in the supports, and the other engaging studs 41 on the track section disposed through the slots 42 in the support, see FIGS. 4 and 6.

The bottom door section is provided with a sill seal

20 fixedly secured to its lower edge and adapted to thrustingly engage the sill 4 when the door is fully closed. To insure complete closing of the door and also to secure it in closed position and lock it if desired, the sill is provided with a keeper opening 44 positioned to receive the jaw 45 of the lock 46 which is pivoted at 47 on the bracket 48 mounted on the bottom door section. The pivot 47 for the lock 46 is disposed so that the jaw or keeper engaging portion 45 may be swung through the keeper opening as the door approaches its final closed position, as is shown in FIG. 9.

The lock is provided with a cammed nose-piece 49 which is spaced from the jaw portion 45 to provide a slot 50 receiving the sill at one edge of the opening 44 therein when the lock is in fully closed position, as is shown in FIG. 10. The jaw 45 has a shoulder 51 on its inner edge which engages the edge of the opening 44 so that with the tip 52 and the shoulder 51 of the jaw engaging the underside of the sill and the cam 49 engaging the upper side, substantially all movement of the door relative to the sill is prevented. The cam 49 of the lock also serves as a camming leverage means for moving the door from its closed position, see FIG. 9. This is sometimes important to break ice which may form on the sill. This initial opening movement of the door also releases the jamb seals so that the door can be easily opened, and without any frictional wear on the seals.

The hand-piece 53 of the lock is pivoted at 54 and provided with a slot 55 engageable over the hasp 56 which has an opening 57 therein adapted to receive a padlock. The upwardly projecting lug 58 on the lock supporting bracket engages the lock at the inner side of the pivoted hand-piece thereof. This securely supports the lock in its locked position. When the lock is swung to retracted position, it is engaged behind the lug 59 as is shown in FIG. 8. This prevents the outward swinging of the pivoted grip portion of the lock and minimizes the likelihood of its being engaged by some exterior object. With the parts thus arranged, the door is effectively sealed when in its closed position and at the same time the only parts that require manual operation other than the raising and lowering of the door is the manipulation of the lock member which is effective in drawing the door to its finally closed lockable position and providing a levering means for breaking the seal.

The inner portions of the upright track members are cut away or recessed at 60 and the inner flanges thereof are provided with rearwardly facing offsets 61 which constitute cams with which the lower rollers engage as the door approaches its fully closed position, thereby further insuring the forcing of the door sections against the jamb sills, and this has the reverse effect on the initial opening movement of the door of releasing the pressure on the jamb seals. Further the keeper slot and the jaw 45 are positioned so that edgewise movement of the door is prevented thus minimizing wear on the door seals. This is of particular importance when the door is installed in a vehicle.

The lock pivot 47 is mounted on the block 62 in an off-center relation thereto so that by selectively positioning the block of the hole 63 in the lock 46, the relation of the pivot to the bottom of the door may be varied.

We have illustrated and described our invention in a highly practical embodiment thereof. We have not attempted to illustrate or described various possible modifications and adaptations which might be desirable for particular installations or adaptations to particular structural parts, as it is believed that this disclosure will enable those skilled in the art to embody or adapt our invention as may be desired.

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

1. A vertically acting door assembly comprising frame members provided with inwardly facing jamb seals, a door comprising a plurality of horizontally articulated sections, track support members mounted on said door frame members in spaced relation to the jamb seals thereof, tracks comprising upright sections swingably mounted at their upper ends on said track support members, said door sections being provided with rollers coacting with said track including rollers disposed adjacent the lower edge of the bottom door section, said track supports and upright track sections having rearwardly facing recesses at their lower ends, thrust member brackets of outwardly facing channel section mounted on the lower ends of said support members at the rear of the recessed ends of said track sections, downwardly and forwardly inclined thrust members pivotally mounted on said brackets rearwardly of said recessed ends of said track sections, said brackets having vertical slots in the webs thereof, abutments for said thrust members provided with supporting bolts adjustably engaging said slots in said brackets, and springs acting to bias said track sections rearwardly.

2. A vertically acting door assembly comprising side frame members provided with inwardly facing jamb seals, a door comprising a plurality of horizontally articulated sections, tracks comprising upright sections of channel section swingably mounted at their upper ends, said door sections being provided with rollers coacting with said tracks, said track sections having rearwardly facing recesses at their lower ends, thrust member brackets of outwardly facing channel section fixedly mounted in opposed relation to the lower ends of said track sections, downwardly and forwardly inclined thrust members pivotally mounted on said brackets rearwardly of said recessed ends of said track sections, said brackets having vertical slots in the webs thereof, abutments for said thrust members provided with supporting bolts adjustably engaging said slots in said brackets, and springs acting to bias said track sections rearwardly.

3. A vertically acting door assembly comprising side frame members provided with inwardly facing jamb seals, a door comprising a plurality of horizontally articulated sections, tracks comprising upright sections of channel section swingably mounted at their upper ends, said door sections being provided with rollers coacting with said tracks, thrust member brackets fixedly mounted in opposed relation to the lower ends of said track sections, downwardly and forwardly inclined thrust members pivotally mounted on said brackets, said brackets having adjustable abutments for said thrust members.

4. A vertically acting door assembly comprising side frame members provided with inwardly facing jamb seals, a door comprising a plurality of horizontally articulated sections, tracks comprising upright sections of channel section swingably mounted at their upper ends, said door sections being provided with rollers coacting with said tracks, thrust member brackets fixedly mounted in opposed relation to the lower ends of said track sections, downwardly and forwardly inclined thrust members pivotally mounted on said brackets, said brackets having adjustable abutments for said thrust members, and relatively fixed forwardly facing cams disposed in opposed relation to an intermediate door section when the door is in closed position, such intermediate door section being provided with rollers engageable with said cams as the door approaches closed position and coacting with said thrust members to urge the door against the jamb seals when in its closed position.

5. A vertically acting door assembly comprising a door frame and a sill provided with a keeper, a door having a sill engaging seal on the bottom edge thereof, tracks, said door being provided with rollers coacting with said tracks, a lock member mounting bracket mounted on said door adjacent the lower edge thereof, a lock member pivotally mounted on said bracket and provided with a pivoted grip piece having a hasp opening therein, said lock member having a sill engaging member and a keeper

engaging element spaced therefrom and engageable with said keeper when the lock member is adjusted to locking position to clampingly hold said seal in thrust engagement with said sill and coacting with said keeper to prevent lateral shifting of the door relative to the sill, said sill engaging member coacting to lift the door from its fully closed position when the lock member is swung to unlocked position and thereby lifting the door from the sill, said mounting bracket having a supporting lug behind which the lock member is disposed when in locked position to support the lock member at the side of its pivoted grip portion.

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