March 18, 1958 E. L. STROUP 2,827,114

UPWARDLY ACTING DOOR

Filed May 18, 1956 2 Sheets-Sheet 1

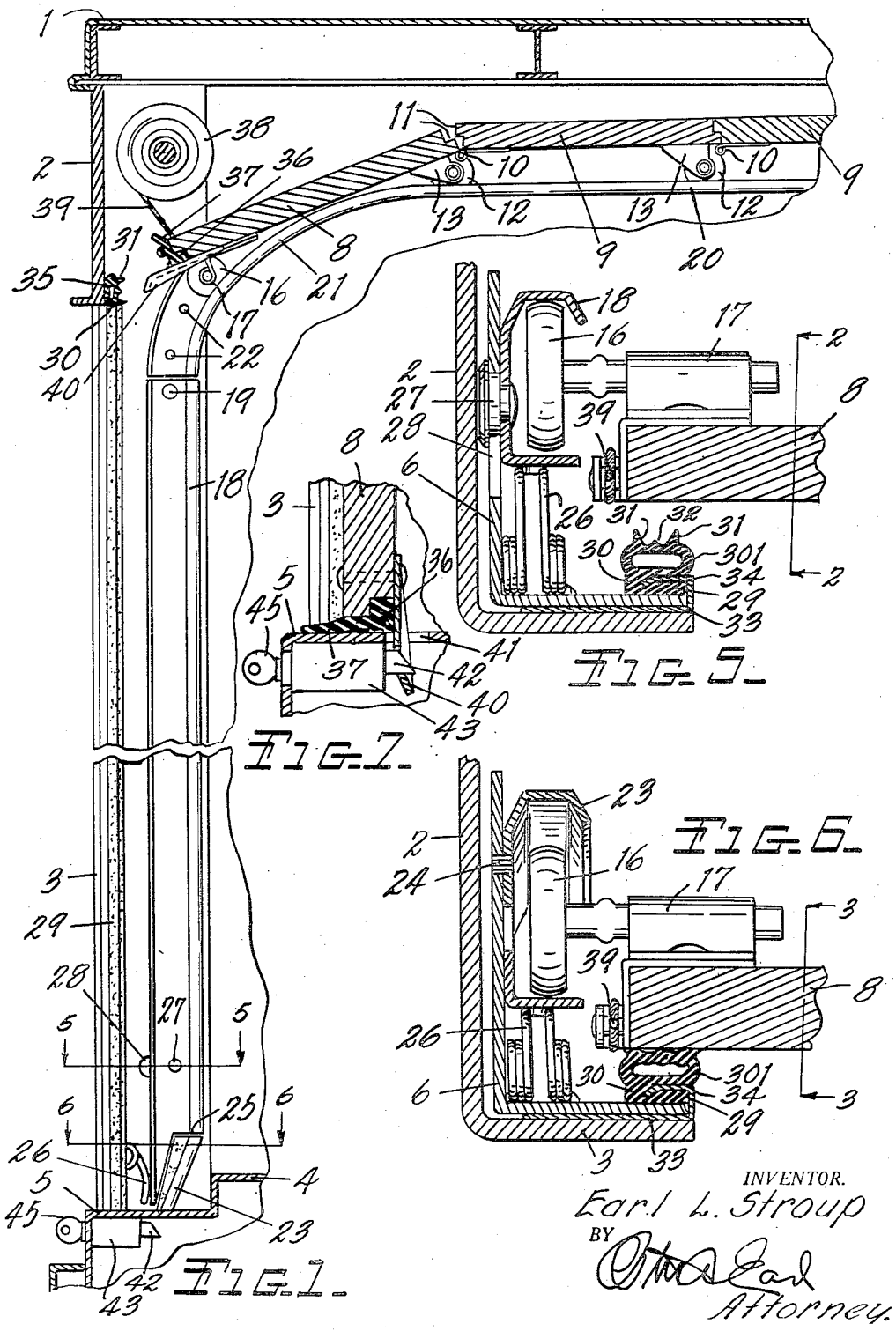


FIG. 1

FIG. 5

FIG. 7

FIG. 6

INVENTOR.
Earl L. Stroup
BY
Attorney.

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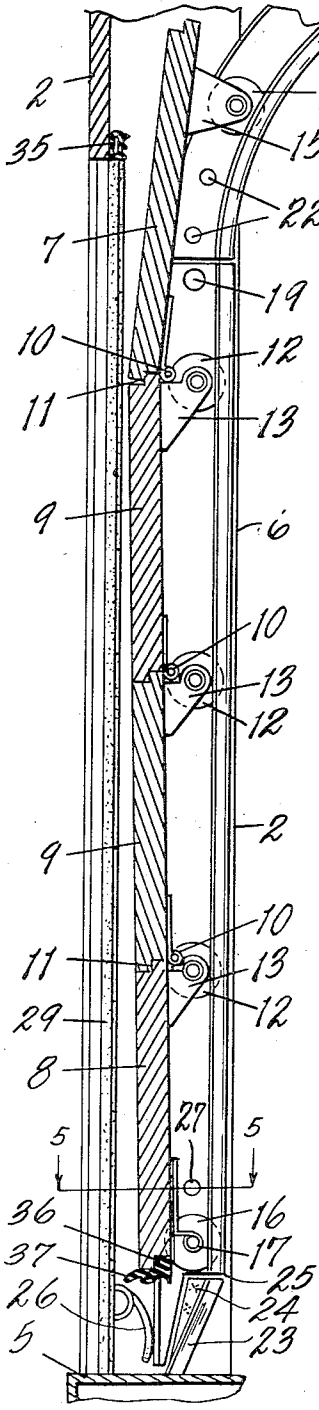


FIG. 2.

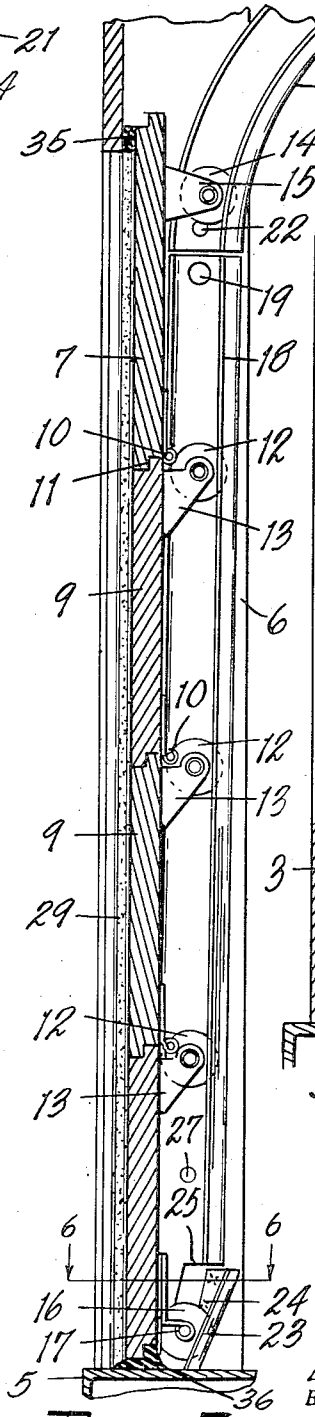


FIG. 3.

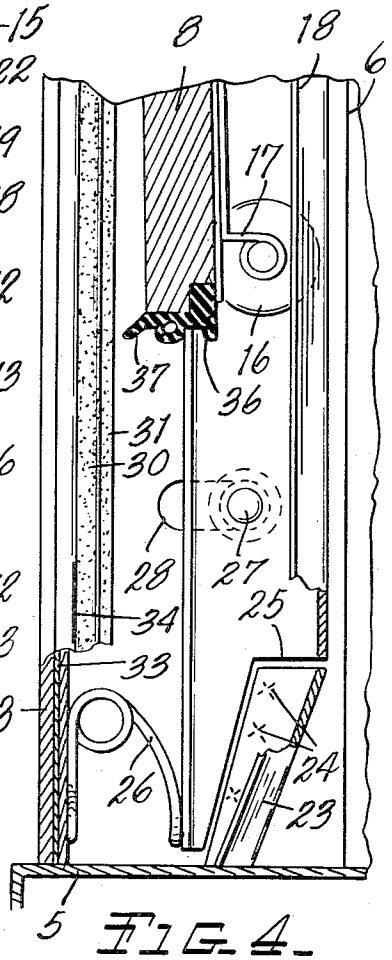


FIG. 4.

INVENTOR.
Earl L. Stroup
BY
Attorney.

United States Patent Office 2,827,114
Patented Mar. 18, 1958

2,827,114

UPWARDLY ACTING DOOR

Earl L. Stroup, Hartford City, Ind., assignor to Overhead Door Corporation, Hartford City, Ind.

Application May 18, 1956, Serial No. 585,738

10 Claims. (Cl. 160—209)

This invention relates to upwardly acting doors which are well adapted for embodiment in trucks, trailers, freight cars and the like.

The main objects of this invention are:

First, to provide an upwardly acting door provided with highly effective sealing means when the door is in closed position.

Second, to provide an upwardly acting door having these advantages in which the resilient seal members are under compression when the door is closed and at the same time the door is moved to and from sealing position with a minimum of frictional engagement with the seal members.

Third, to provide a door structure having these advantages that can be readily installed or embodied in trucks, trailers, freight cars, cold storage structures and the like without substantial structural modification of such structures.

Fourth, to provide a door assembly embodying these advantages which is relatively simple and economical in its parts and may be readily installed.

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 section of an upwardly acting door assembly embodying my invention, the door being shown in its open position.

Fig. 2 is a fragmentary vertical section corresponding to that of Fig. 1 and on a line corresponding to line 2—2 of Fig. 5 with the door in partially closed position.

Fig. 3 is a fragmentary view in section on a line corresponding to line 3—3 of Fig. 6 with the door in fully closed position.

Fig. 4 is an enlarged fragmentary view partially in vertical section showing the door in an intermediate position.

Fig. 5 is a fragmentary view in horizontal section on a line corresponding to line 5—5 of Fig. 2.

Fig. 6 is a fragmentary view in horizontal section on a line corresponding to line 6—6 of Fig. 3.

Fig. 7 is a fragmentary view partially in vertical section illustrating the lock for the door.

In the accompanying drawings I have illustrated my invention as embodied by me in a truck or trailer. It should be understood, however, that my invention is capable of a wide adaptation such for example as freight cars, cold storage buildings and to garages and the like where sealing of the door is important.

In the accompanying drawings 1 represents the roof of a truck or the like, 2 a portion of a wall thereof having a door opening therein, and 3 door frame side members. The bottom 4 is provided with a sill portion 5. These parts are shown more or less conventionally as they form no part of my invention except as hereinafter pointed out and may vary considerably in structure. The door frame side members 3 do form an important function in the embodiment illustrated as they provide supports for the angle

door side frame or jamb members 6 which are of angle section and disposed facing inwardly. I have illustrated only one side of the door assembly, but it will be understood that it is commonly duplicated on the other side of the door.

The members 6 are fixedly mounted but the details of such mounting are not illustrated. The door comprises horizontally articulated sections, the structures illustrated comprising the top section 7, the bottom section 8 and intermediate sections 9. These sections are desirably duplicates but they are designated by numerals 7, 8 and 9 for convenience in description. They are illustrated as being formed of wood and are hingedly connected by the hinges 10 and as having rabbeted meeting edges 11.

The door sections are provided with track engaging rollers 12 carried by the journal on the brackets 13 arranged so that the journals of the rollers are in approximate alignment with the joints of the sections. Upper guide rollers 14 are carried by the brackets 15 mounted on the upper or top section of the door adjacent its upper edge. Rollers 16 are mounted on the brackets 17 adjacent the lower edge of the bottom door section.

The track is of inwardly facing channel section and comprises the upright sections 18 which are pivotally mounted at their upper ends on the inner sides of the rearwardly projecting arms of the angle jamb members 6, the pivots 19 being closely adjacent the upper ends of the upright sections as is clearly shown on the drawings. The upper or horizontal sections 20 of the track have downwardly and forwardly inclined front end portions 21 desirably curved and fixedly secured at 22 with their lower ends in aligned relation to the upper ends of the vertical sections so that the rollers on the door may travel or pass from the upright to the upper sections, and vice versa, with the exception that the rollers 14 carried by the brackets 15 adjacent the upper edge of the top section of the door remain in engagement with the forwardly inclined ends of the upper sections when the door is fully closed as is shown in Fig. 3. It will be noted that in this position the rollers 16 at the lower edge of the bottom door section are in engagement with the downwardly and forwardly inclined thrust members 23 which are fixedly mounted on the rearwardly projecting arms of the jamb members 6 as is indicated at 24. These members 23 are in effect complementary to the upright track sections 18 which are notched or recessed at 25 to receive the same as is clearly illustrated in the drawing 6, particularly Fig. 4, but are in fixed relation.

The swingable upright track sections 18 are urged rearwardly by means of the springs 26 which are mounted on the inner sides of the inwardly projecting arms of the jamb members. Stops 27 on the swingable track sections coact with the slots 28 in the rearwardly projecting arms of the jamb members to limit the rearward swinging movement of the swingable upright track sections, see Figs. 4 and 5. With the parts thus arranged the door is automatically thrust forwardly towards the jamb when the door is in closed position, this resulting from the engagement of the rollers 14 with the downwardly and forwardly inclined front end portions of the upper track sections and the engagement of the rollers 16 with the downwardly and forwardly inclined relatively fixed thrust members 23 which are channeled to effectively engage and provide side thrust on the rollers 16.

To seal the door in closed position I provide seal members designated generally by the numeral 29 formed of compressibly resilient material such as rubber or certain resilient synthetic materials, some of which have certain advantages as compared to rubber. These seal members 29 comprise body portions 30 and tubular outer portions 301 of flattened section and have laterally spaced longitudinal fins 31 and 32 on the face thereof of out-

wardly tapering sections. The fins **31** are substantially wider than the intermediate fin **32** so that when the door is in closed position these fins are deflected and yieldingly engage the door as is illustrated in Fig. 6. The attaching strip **33** for the seal member **29** is disposed between the jamb members and the door frame side pieces **3** and has a flange **34** which is in embedding engagement with the body of the seal member. A similar member **35** is mounted in inwardly facing relation above the door opening. A seal member **36** is mounted on the bottom edge of the bottom section to coact with the sill when the door is in fully closed position. The means for attaching this seal member **36** is not illustrated, but it will be understood that it is fixedly attached to the door and desirably has a forwardly projecting sealing fin **37** which laps upon the sill when the door is in fully closed position, as is illustrated in Fig. 3.

With the parts thus arranged as the door approaches closed position it is forced against the seals **29** and **35** which, as stated, are resiliently compressible. The seal **36** on the bottom of the door is also resiliently compressible. The compressing engagement of the door with the seals and of the bottom seal with the sill occurs as the door reaches closed position so there is very little frictional engagement of the door with the seal members. On the initial opening movement of the door, as a result of the upright sections **18** being pivoted at their upper ends and urged rearwardly by the springs **26** and the fact that the rollers **14** are engaged with the forwardly and downwardly inclined portions **21** of the upper sections of the track, the door clears the seals with substantially no frictional movement thereon.

The details of counterbalancing the door are not illustrated other than the drum **38** for the cable **39** attached to the bottom section of the door.

The embodiment of my invention illustrated is provided with means for locking the door in closed position, the door being provided with a downwardly projecting keeper **40** which passes through the slot **41** in the sill **5** when the door is swung forwardly to closed sealing position. When the door is fully closed the keeper automatically engages the bolt **42** disposed in the casing **43**. The numeral **44** in Fig. 7 represents a bolt releasing key. I have not illustrated the details of the lock **43** as such details form no part of my present invention, and locks suitable for the purpose are commercially available. The providing of the door with a keeper on its lower edge passing through a hole or slot in the sill to engage a bolt when the door is moved to sealing position does, however, constitute a part of my present invention.

I have illustrated and described my invention in a highly practical embodiment thereof. The embodiment illustrated is especially designed for a truck or trailer structure but, as stated, may be embodied in various other relations. In trucks or trailers the effective sealing of the door is very important and they are operated under a wide variety of conditions.

The retracting movement of the door at the beginning of the opening thereof is highly important, not only in preventing frictional wear on the seals, but also breaking a bond of ice that may have been formed between the door and the parts against which it closes.

I have not attempted to illustrate other embodiments or adaptations as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described the invention, what is claimed as new and is desired to be secured by Letters Patent is:

1. A vertically acting door assembly comprising side frame members of angle section disposed with their angles facing inwardly, a sill member, horizontally articulated top, bottom and intermediate door sections provided with track engaging rollers, the top and bottom sections having track engaging rollers adjacent their upper and lower edges respectively, tracks of facing channel section comprising upright track sections swingably mounted at their upper ends on the inner sides of the rearwardly projecting arms of said side frame members, relatively fixed upper track sections having curved downwardly and forwardly inclined portions at their front ends registering with the upper ends of said upright track sections, resiliently compressible side seal members mounted on the inner sides of the laterally inwardly projecting arms of said side frame members, a resiliently compressible top seal member extending between the upper ends of said side seal members, downwardly and forwardly inclined thrust members fixedly mounted on the lower ends of the rearwardly projecting arms of said side frame members, said upright track sections having rearwardly facing recesses in their lower ends disposed to receive said thrust members and rearwardly facing portions on the front flanges of the tracks opposed to said thrust members, said thrust members being positioned to be engaged by said rollers adjacent the lower edge of the bottom door section as the door approaches closed position whereby the lower rollers are engaged and cammed forward by the thrust members and in turn engage and thrust forward the lower ends of said upright tracks, the rollers adjacent the upper edge of the top door section simultaneously engaging downwardly and forwardly inclined portions of said upper track sections spaced from the door frame so as to engage the upper edge of the upper door section with the seal at the top of the door frame, and a resiliently compressible bottom seal member mounted on the lower edge of the bottom door section to engage the sill when the door is closed.

2. A vertically acting door assembly comprising side frame members of angle section disposed with their angles facing inwardly, horizontally articulated top, bottom and intermediate door sections provided with track engaging rollers, the top and bottom sections having track engaging rollers adjacent their upper and lower edges respectively, tracks of facing channel track section comprising upright sections swingably mounted at their upper ends on the inner sides of the rearwardly projecting arms of said side frame members, relatively fixed upper track sections having curved downwardly and forwardly inclined portions at their front ends registering with the upper ends of said upright track sections, downwardly and forwardly inclined thrust members fixedly mounted on the lower ends of the rearwardly projecting arms of said side frame members, said upright track sections having rearwardly facing recesses in their lower ends disposed to receive said thrust members and rearwardly facing portions on the front flanges of the tracks opposed to said thrust members, said thrust members being positioned to be engaged by said rollers adjacent the lower edge of the bottom door section as the door approaches closed position whereby the lower rollers are engaged and cammed forward by the thrust members and in turn engage and thrust forward the lower ends of said upright tracks, the rollers adjacent the upper edge of the top door section simultaneously engaging downwardly and forwardly inclined portions of said upper track sections spaced from the door frame so as to engage the upper edge of the upper door section with the top of the door frame.

3. A vertically acting door assembly comprising side frame members of angle section disposed with their angles facing inwardly, horizontally articulated top, bottom and intermediate door sections provided with track engaging rollers, the top and bottom sections having track engaging rollers adjacent their upper and lower edges respectively, tracks of facing channel track section comprising upright sections swingably mounted at their upper ends on the inner sides of the rearwardly projecting arms of said side frame members, relatively fixed upper track sections having curved downwardly and forwardly inclined portions at their front ends registering with the upper ends of said upright track sections, stops limiting the rearward swinging movement of the lower ends of

said upright track sections, springs mounted on said side frame members to yieldingly urge the lower ends of said upright track sections rearwardly, downwardly and forwardly inclined thrust members fixedly mounted on the lower ends of the rearwardly projecting arms of said side frame members, said upright track sections having rearwardly facing recesses in their lower ends disposed to receive said thrust members and rearwardly facing portions on the front flanges of the tracks opposed to said thrust members, said thrust members being positioned to be engaged by said rollers adjacent the lower edge of the bottom door section as the door approaches closed position whereby the lower rollers are engaged and cammed forward by the thrust members and in turn engage and thrust forward the lower ends of said upright tracks, the rollers adjacent the upper edge of the top door section simultaneously engaging the downwardly and forwardly inclined portions of said upper track sections spaced from the door frame so as to engage the upper edge of the upper door section with the top of the door frame.

4. A vertically acting door assembly comprising side frame members, a sill member, horizontally articulated top, bottom and intermediate door sections provided with track engaging rollers, the top and bottom sections having track engaging rollers adjacent their upper and lower edges respectively, tracks comprising upright sections swingably mounted at their upper ends on said side frame members, relatively fixed upper track sections having downwardly and forwardly inclined portions at their front ends registering with the upper ends of said upright track sections, resiliently compressible seal members mounted on said side frame members in facing relation to the door, downwardly and forwardly inclined thrust members disposed at the lower ends of said side frame members, said thrust members being positioned to be engaged by said rollers adjacent the lower edge of the bottom door section as the door approaches closed position, the lower ends of said tracks having rearwardly facing portions opposed to said thrust member and engageable with said lower rollers when the rollers are engaged by the thrust members to swing said tracks forwardly, the rollers adjacent the upper edge of the top door section engaging the downwardly and forwardly inclined portions of said upper track sections to swing the upper portion of the door forwardly on closing, and a resiliently compressible bottom seal member mounted on the lower edge of the bottom door section to engage the sill when the door is closed.

5. A vertically acting door assembly comprising side frame members, horizontally articulated top, bottom and intermediate door sections provided with track engaging rollers, the top and bottom sections having track engaging rollers adjacent their upper and lower edges respectively, tracks comprising upright sections swingably mounted at their upper ends on said side frame members, relatively fixed upper track sections having downwardly and forwardly inclined portions at their front ends registering with the upper ends of said upright track sections, resiliently compressible seal members mounted on said side frame members in facing relation to the door, downwardly and forwardly inclined thrust members disposed at the lower ends of said side frame members, said thrust members being positioned to be engaged by said rollers adjacent the lower edge of the bottom door section as the door approaches closed position, the lower ends of said tracks having rearwardly facing portions opposed to said thrust member and engageable with said lower rollers when the rollers are engaged by the thrust members to swing said tracks forwardly, the rollers adjacent the upper edge of the top door section engaging the downwardly and forwardly inclined portions of said upper track sections to swing the upper portion of the door forwardly on closing.

6. A vertically acting door assembly comprising side frame members, horizontally articulated top, bottom and intermediate door sections provided with track engaging rollers, the top and bottom sections having track engaging rollers adjacent their upper and lower edges respectively, tracks comprising upright track sections swingably mounted at their upper ends on said side frame members, relatively fixed upper track sections having downwardly and forwardly inclined portions at their front ends registering with the upper ends of said upright track sections, stops limiting the rearward swinging movement of the lower ends of said upright track sections, springs mounted on said side frame members to yieldingly urge the lower ends of said upright track sections rearwardly, resiliently compressible seal members mounted on said side frame members in facing relation to the door, downwardly and forwardly inclined thrust members disposed at the lower ends of said side frame members, said thrust members being positioned to be engaged by said rollers adjacent the lower edge of the bottom door section as the door approaches closed position, the lower ends of said tracks having rearwardly facing portions opposed to said thrust member and engageable with said lower rollers when the rollers are engaged by the thrust members to swing said tracks forwardly, the rollers adjacent the upper edge of the top door section engaging the downwardly and forwardly inclined portions of said upper track sections to swing the upper portion of the door forwardly on closing.

7. A vertically acting door assembly comprising side frame members, a sill member, horizontally articulated door sections, the top door section having track engaging members adjacent its upper edge and the bottom section having track engaging members adjacent its lower edge, upright track sections swingably mounted at their upper ends on said side frame members, upper track sections having relatively fixed downwardly and forwardly inclined portions at their front ends aligned with upper ends of said upright track sections, downwardly and forwardly inclined relatively fixed members disposed at the lower ends of the upright track sections to be engaged by the track engaging members adjacent lower edges of the bottom door section as the door approaches closed position and acting to swing the upright door sections forwardly, the lower ends of said tracks having rearwardly facing portions opposed to said inclined fixed members to be engaged by said track engaging members when in contact with said fixed members to swing said tracks forwardly. said track engaging members adjacent the upper edge of the upper door section engaging downwardly and forwardly inclined portions of the upper track sections to swing the upper door section forwardly simultaneously with the swinging of the vertical track sections, resiliently compressible rearwardly facing seal members mounted on said side frame members in facing relation to the door, a rearwardly facing top seal member in facing relation to said top door section, and resiliently compressible bottom seal members mounted on the bottom door section to engage the door sill when the door is closed.

8. A vertically acting door assembly comprising side frame members, a sill member, horizontally articulated door sections, the top door section having track engaging members adjacent its upper edge and the bottom section having track engaging members adjacent its lower edge, upright track sections swingably mounted at their upper ends on said side frame members, upper track sections having relatively fixed downwardly and forwardly inclined portions at their front ends aligned with upper ends of said upright track sections, and downwardly and forwardly inclined relatively fixed members disposed at the lower ends of the upright track sections to be engaged by the track engaging members adjacent lower edges of the bottom door section as the door approaches closed position and acting through the lower of said track engaging members and said upright track sections to swing the upright door sections forwardly, said track engaging members adjacent the upper edge of the upper door section engaging downwardly and forwardly inclined portions of the upper track sections to swing the upper door

section forwardly simultaneously with the swinging of the vertical track sections.

9. A vertically acting door assembly comprising jamb members provided with rearwardly facing compressible seal members, horizontally articulated door sections, the top section having track engaging members adjacent its upper edge and the bottom section having track engaging members adjacent its lower edge, upright track sections swingably mounted at their upper ends, upper track sections having relatively fixed downwardly and forwardly inclined portions at their forward ends aligned with upper ends of said upright track sections, relatively fixed downwardly and forwardly inclined thrust members disposed at the lower ends of said upright track sections to be engaged by the track engaging members on the bottom section and acting to swing the upright track sections forwardly as the door approaches closed position, the track engaging members on the upper door section engaging the downwardly and forwardly inclined portions of the upper track sections to swing the upper door section forwardly so that the door as a unit is moved forwardly against said seal members.

10. A vertically acting door assembly comprising jamb members, horizontally articulated door sections, the top section having track engaging members adjacent its upper edge and the bottom section having track engaging members adjacent its lower edge, upright track sections swingably mounted at their upper ends, upper track sections having relatively fixed downwardly and forwardly inclined portions at their forward ends aligned with upper ends of said upright track sections, downwardly and forwardly inclined thrust members disposed at the lower ends of said upright track sections to be engaged by track engaging members on the bottom section and acting to swing the upright track sections forwardly as the door approaches closed position, the track engaging members on the upper door section engaging the downwardly and forwardly inclined portions of the upper track sections to swing the upper door section forwardly so that the door as a unit is moved forwardly against said jamb members.

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