

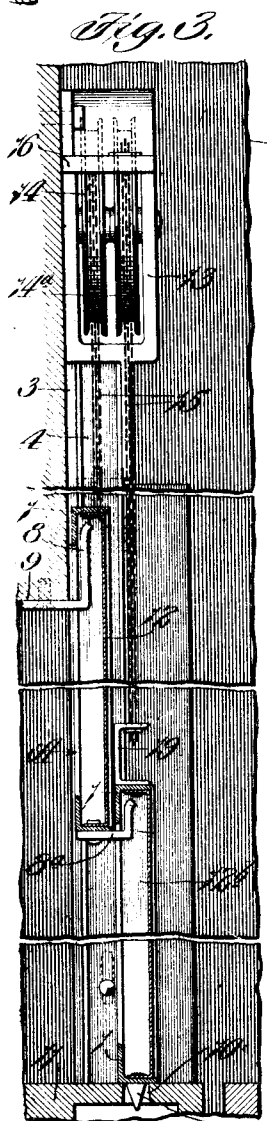
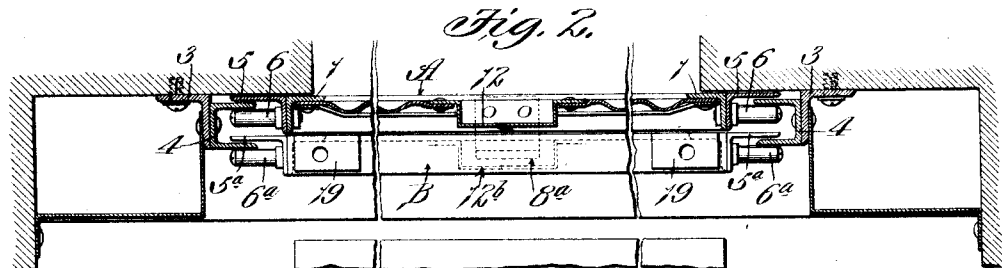
2 SHEETS--SHEET 1.

Herman C. Waldman.
By Bakerell & Church Attys.

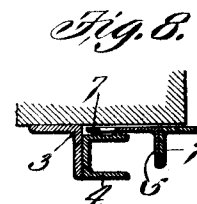
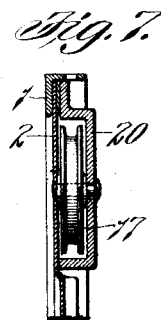
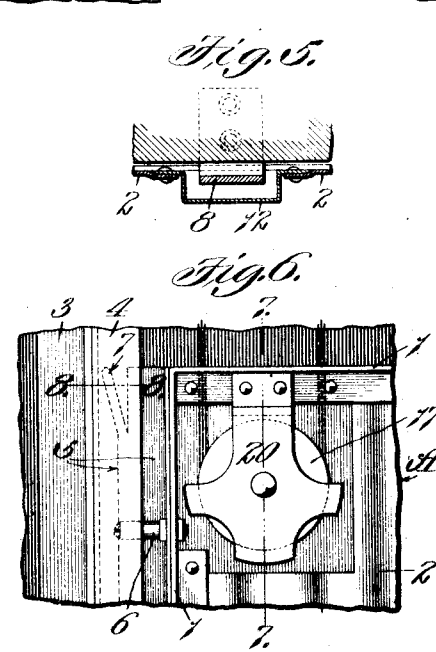
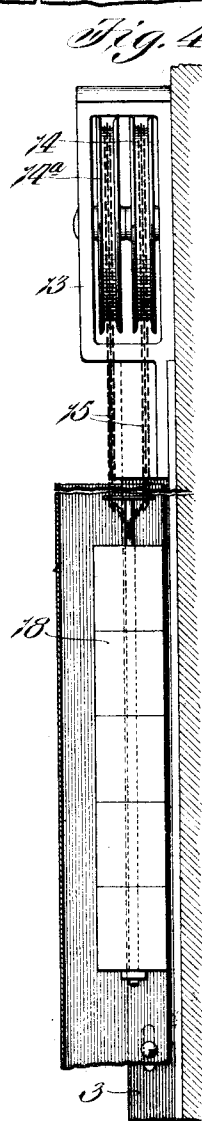
H. C. WALDMAN.
FIRE DOOR.
APPLICATION FILED FEB. 8, 1912.

Patented Aug. 6, 1912.
2 SHEETS-SHEET 2.

1,034,848.



Witnesses:
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UNITED STATES PATENT OFFICE.

HERMAN C. WALDMAN, OF ST. LOUIS, MISSOURI.

FIRE-DOOR.

1,034,848.

Specification of Letters Patent.

Patented Aug. 6, 1912.

Application filed February 8 1912. Serial No. 676,253.

To all whom it may concern:

Be it known that I, HERMAN C. WALDMAN, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Fire-Doors, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to metallic fire doors such as are used in elevator shafts and for closing various other door openings in buildings.

One object of the invention is to provide a fire-door structure that comprises only a few parts which are of such design that the door and the guides for the door can be installed easily.

Another object is to provide a fire-door composed of a plurality of sections, and means for holding said sections substantially rigid when the door is closed, thus producing a sectional door which is practically as efficient as a one-piece fire-door.

Another object is to provide a fire-door structure in which the housings for some of the sheaves of the door-operating mechanism are carried by the vertically disposed tracks or guides on which the door travels, and some of the other sheaves are connected to the upper section of the door. And still another object is to provide a fire-door structure in which the sections of the door are provided at their side edges with devices of novel construction that cooperate with stationary tracks of novel design which hold the door in position and guide the door vertically.

Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 of the drawings is a rear elevational view of a fire-door constructed in accordance with my invention; Fig. 2 is a transverse horizontal sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is an enlarged vertical sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is an enlarged vertical sectional view taken on the line 4—4 of Fig. 1; Fig. 5 is an enlarged transverse sectional view taken on the line 5—5 of Fig. 1; Fig. 6 is an enlarged detail view of one of the sheaves on the upper section of the door; Fig. 7 is a vertical sectional view taken on the line 7—7 of Fig. 6; and

Fig. 8 is a horizontal sectional view taken on the line 8—8 of Fig. 6.

Referring to the drawings which illustrate the preferred form of my invention, A and B designate the upper and lower sections of a horizontally divided fire-door, each of said sections preferably consisting of a rectangular-shaped frame 1 formed from pieces of angle-iron, and panels 2 of corrugated metal connected to the legs of said angles which form the front face of the frame. Said door is guided vertically by means of tracks which cooperate with laterally projecting devices on the side edges of the upper and lower sections of the door. In the preferred form of my invention, as herein shown, each of said vertically disposed tracks or guides consists of an angle 3 connected in any suitable manner to the wall of the building in which the door opening is formed, and a channel-shaped member 4 whose web is connected to the flange or leg of the angle 3 that projects laterally away from the wall, each leg or flange of the channel 4 acting as a track that cooperates with one section of the door. The upper section A of the door is provided at its side edges with laterally projecting flanges 5 preferably formed from pieces of angle-iron which lie between the wall of the building and the front legs or flanges of the channels 4 that form part of the vertical guides or tracks for the door. In addition to the flanges 5 the upper section A of the door is provided with rollers 6, as shown in Fig. 2, that lie on the opposite side of the front legs of the channels 4 with which the flanges 5 cooperate, said rollers 6 being preferably horizontally disposed and projecting laterally from the upper section A of the door although they could, of course, be arranged in other ways without departing from the spirit of my invention. The lower section B of the door is provided with similar flanges 5^a and rollers 6^a that embrace the rear legs or flanges of the channels 4 of the vertical tracks or guides. It will thus be seen that separate tracks or guides are provided for each section of the door, and that each of said sections is provided at its side edges with a pair of laterally projecting devices that embrace or lie on opposite sides of the track with which they cooperate, thus holding the side edges

of the door securely in position. Furthermore, a door of this construction will move freely and can thus be opened easily because it comprises horizontally disposed rollers which travel on the vertical tracks or guides for the door. In the embodiment of my invention herein shown the upper and lower ends of the laterally projecting flanges 5 and 5^a on the upper and lower sections of the door are split vertically and bent laterally at 7, as shown in Fig. 6, so as to take up any side motion of the door.

In order to eliminate any tendency of the upper and lower sections of the door to spring apart or to move away from the wall of the building intermediate the side edges of the door, as would be apt to occur if the middle portion of the door was subjected to inward or outward pressure, I have provided means for drawing the sections of the door together and for holding the top and bottom edges of the upper and lower sections, respectively, securely in position when the door is closed. Said means preferably consists of a plurality of angle-shaped devices 8 connected to the lintel 9 at the top of the door opening and cooperating with the top cross-piece of the frame 1 of the upper section A of the door, similar angle-shaped devices 8^a connected to the lower edge portion of the upper section A of the door and cooperating with the top cross-piece of the frame 1 of the lower section B of the door, and devices 8^b preferably of tapered or wedge-shaped form, on the bottom edge of the lower section B of the door that enter openings 10 formed in the sill-plate 11 that extends across the bottom of the door opening in the wall of the building. As shown in Figs. 1, 2 and 3, the upper section A of the door is provided with substantially channel-shaped housings or guideways 12 into which the devices 8 on the lintel project, and the lower section B of the door is provided with similar channel-shaped housings or guideways 12^b that receive the devices 8^a on the lower edge of the upper section A of the door. When the door is closed, or when the sections of the door are moved downwardly the vertical legs of the binding devices 8 on the lintel will strike against the depending flange of the top cross-piece of the frame of the upper section A and thus draw the upper section of the door toward the wall of the building. Likewise, when the lower section B of the door approaches its normal position the depending flange of the top cross-piece of the frame thereof strikes against the vertical legs of the binding devices 8^a, thereby causing the upper and lower sections of the door to be drawn together, the tapered or wedge-shaped members 8^b on the bottom of the lower portion B of the door entering the openings in the sill-plate and thus holding

the lower edge of the door securely in position.

A sectional door of the construction above-described is as efficient as a one-piece door for when the sections of the door are closed, or in normal position, they are held tightly together by means of the binding devices 8^a, and the binding devices 8 and the tapered members 8^b at the top and bottom edges of the door, respectively, hold the upper and lower edge portions of the door securely in position and thus prevent it from swaying or moving away from the wall of the building in case the door is subjected to pressure. While I have stated that the binding devices 8 on the lintel operate to draw the upper edge of the door toward the lintel and that the binding devices 8^a on the lower edge of the upper section A of the door operate to draw the two sections of the door together, it is not necessary that said devices 8 and 8^a be so adjusted that they have a positive bearing on the depending flanges on the sections of the door with which they cooperate for said devices can be set in such a manner that they merely act as keepers or stops for preventing the upper edge of the door from springing away from the lintel or the two sections of the door from springing apart in case they are subjected to pressure.

The two sections of the door are counter-balanced by means of weights connected to chains or other suitable flexible members passing over pulleys or sheaves and arranged in such a manner that the lower section B of the door travels upwardly at approximately twice the speed of the upper section A of the door. In the preferred form of my invention as herein shown, housings 13 are connected to the upper ends of the vertical tracks or guides for the door so as to support sheaves or pulleys 14 and 14^a over which chains 15 or other suitable flexible devices travel. The chains 15 are connected in any suitable manner to laterally projecting arms 16 on the housings 13 and pass under pulleys 17 on the upper section A of the door, thence upwardly over the pulleys 14 on said housings to weights 18 to which they are securely connected by clips or other suitable devices so as to prevent the weights from moving relatively to the chains. Said chains pass from the weights 18 upwardly over the pulleys 14^a on the housings 13 and thence downwardly to channel-shaped members 19 secured to the lower section B of the door, as shown in Fig. 1. When the door is opened the lower section B will move upwardly at approximately twice the speed of the upper section and finally come to rest in a position parallel to said upper section and above the lintel extending across the top of the door opening. While I prefer to use two continuous chains

for operating both sections of the door, it will, of course, be obvious that the same results could be accomplished with two separate chains for each door, the chains for the lower section B being connected at their lower ends to the devices 19 on said lower section and at their opposite ends to the weights 18, and the chains for the upper section A of the door being connected at one end to the arms 16 on the housings 13 and at their opposite ends to the weights 18. I prefer to use two continuous chains merely because such a structure can be assembled easily. The housings 13 that carry the sheaves or pulleys 14 and 14^a can be formed in various ways but I prefer to form them from malleable castings that are riveted or secured in any other suitable manner to the upper ends of the angles 3 and to the channels 4 which form the vertical guides or tracks for the door. A fire-door of the construction above-described is admirably adapted for elevator shafts because it is held securely at its top and bottom edges and at both of its side edges, and it is operated in such a manner that it will serve as a safety-gate, thus overcoming the necessity of using a separate safety-gate.

The pulleys or sheaves 17 on the upper section A of the door are arranged within the marginal edges of the door, as shown in Fig. 1, so that there are no projections or devices projecting upwardly from the top of the door, each of said pulleys being journaled on a pin carried by a bracket 20 which is riveted or connected in any other suitable manner to the top cross-piece of the frame 1 of the door, as shown in Fig. 7.

A fire-door structure of the character above-described comprises practically only four parts, namely, the upper and lower sections A and B of the door and the two tracks at the side edges of the door which guide the door vertically, the angles 3 and channels 4 which constitute said tracks being riveted together by the manufacturer and shipped to the point where the door is to be installed with the housings 13 connected to the upper ends of the tracks.

To erect the door, the workmen simply have to connect the angles 3 to the wall of the building and arrange the upper and lower sections of the door in operative position, and thereafter run the chains through the pulleys and connect them to the weights and to the laterally projecting arms 16 on the housings at the upper ends of the tracks. Furthermore, such a door is as efficient as a one-piece door because means is provided for preventing the sections of the door from springing apart, and as means is also provided for securing the top and bottom edges of the door in position the door is capable of withstanding great lateral pressure.

Having thus described my invention, what

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

1. A fire-door structure comprising a metal door composed of a plurality of sections, each of which is provided at its side edges with laterally projecting devices, tracks for said door, each of which comprises a part that is adapted to be connected to the wall of the building and a part provided with a plurality of vertically disposed flanges or guides that cooperate with the laterally projecting devices on the door sections, and housings carried by said tracks and provided with sheaves or pulleys that cooperate with a counterbalancing mechanism that is adapted to be connected to the door sections.

2. In a fire-door structure, a horizontally divided metallic door composed of a plurality of sections, tracks for said door, each of which is provided with a vertically disposed guide for each section of the door, flanges on said door sections which lie on one side of said guides, and horizontally disposed rollers projecting laterally from the door sections parallel to said flanges and arranged on the opposite side of said guides.

3. In a fire-door structure, a horizontally divided metal door composed of an upper and a lower section, tracks for said door, each of which consists of an angle that is adapted to be connected to the wall of the building in which the door is arranged and a channel whose web is connected to the flange of the angle that projects laterally from the wall, and devices projecting laterally from the side edges of each section of the door and embracing the legs of the channels which form part of said tracks.

4. In a fire-door structure, a horizontally divided metal door composed of a plurality of sections, and means cooperating with said door sections intermediate the side edges of same for preventing said sections from springing apart or from moving away from the wall in which the door opening is formed when the door is closed.

5. In a fire-door structure, a horizontally divided metallic door composed of a plurality of sections, a removable track structure comprising vertically disposed guides, means on the side edges of said door sections which cooperate with said guides to hold said sections in position, devices which prevent said door sections from springing intermediate their side edges, and housings or pockets in said door sections that receive said devices.

6. In a fire-door structure, a horizontally divided metal door composed of a plurality of sections, means for preventing the meeting edge portions of said door sections from springing apart when the door is closed, means for preventing the upper edge portion of the door from springing away from

the lintel or member at the top of the door opening, and means for preventing the lower edge portion of the door from swaying.

5 7. A fire-door structure comprising a horizontally divided metal door that consists of an upper and lower section, vertically disposed tracks, laterally projecting devices on the side edges of said door sections which cooperate with said tracks and thus hold the side edges of the door in position, and means for securing the door at its top and bottom edges and at the point where said sections meet so as to prevent the door from springing or swaying intermediate its side edges.

8. In a fire door structure, a horizontally divided door composed of a plurality of sections, said sections being provided intermediate their side edges with vertically disposed housings, a stationary binding device that projects into the housing of the upper section of the door and cooperates with a portion of said section to prevent the upper edge portion of the door from springing intermediate its side edges, and a binding device on the lower edge of said upper section which projects into the housing of the lower section of the door so as to prevent the meeting edges of said door sections from springing apart when the door is closed.

9. In a fire-door structure, a metal door provided intermediate its side edges with a vertically disposed housing, a binding member connected to the lintel or cross-piece at the top of the opening which the door closes and provided with an upwardly projecting portion that extends into said housing, and a part on the upper edge of the door that lies behind the upwardly projecting portion of said binding device when the door is closed.

10. In a fire-door structure, a horizontally divided door consisting of an upper and lower section, each of which is provided intermediate its side edges with a vertically disposed housing, said sections being arranged in different vertical planes, a binding device on the lintel or cross-piece at the top of the door opening which projects into the housing in the upper section of the door, a binding device secured to the lower edge of said upper section and projecting into the housing in the lower section of the door, members on said door sections which lie behind said binding devices when the door is closed, and tapered devices on the lower section of the door which project into openings in the sill-plate of the door opening when the door is closed.

11. In a fire-door structure, a horizontally divided metallic door composed of an upper and lower section, each of which is provided intermediate its side edges with vertically disposed housings of approxi-

mately channel shape in cross section, binding devices on the top cross-piece of the door opening provided with upwardly projecting legs that lie in the housings in the upper section of the door, binding devices of similar form on the lower edge portion of said upper section that project into the housings in the lower section of the door, members on said door sections which cooperate with said binding devices for the purpose described when the door is closed, means for preventing the lower edge of the door from swaying or springing intermediate the side edges of the door when the door is closed, and a guiding and retaining means for the side edges of the door comprising stationary tracks and friction-reducing rollers on the door sections that travel on said tracks.

12. In a fire-door structure, a horizontally divided metallic door composed of a plurality of sections, vertically disposed tracks or guides for each section of the door, and devices projecting laterally from the side edges of each of said sections and lying on opposite sides of the vertically disposed guides or tracks that cooperate with said section.

13. A vertically disposed track for a horizontally divided metallic fire-door, consisting of an angle that is adapted to be connected to the wall of the building, a channel whose web is connected to the flange of said angle that projects outwardly from the wall, and a housing permanently connected to the upper ends of said angle and channel and provided with pulleys that form part of a counterbalancing mechanism for the door.

14. In a fire-door structure, a horizontally divided metallic door, sheaves or pulleys connected to the upper section of the door and arranged within the marginal edges of same, and a counterbalancing mechanism cooperating with said sheaves.

15. In a fire-door structure, a metal door provided at its upper edge with a flange, a bracket connected to said flange and projecting downwardly from same, and a pulley mounted in said bracket.

16. In a fire-door structure, a horizontally divided metallic door composed of a plurality of sections arranged in different vertical planes, a removable track structure adapted to be connected to the wall in which the door opening is formed and comprising vertically disposed guides for each section of the door, and means for causing all of said sections to travel in the same direction when the door is opened.

17. In a fire-door structure, a horizontally divided metallic door composed of a plurality of sections, a track structure connected to the wall in which the door opening is formed and comprising vertically disposed guides for each section of the door,

5 housings or bearings on said track structure and provided with sheaves or pulleys that cooperate with a counterbalancing mechanism, and a sheave or pulley on the upper section of the door that cooperates with said counterbalancing mechanism.

10 18. In a structure of the character described, a fire-door consisting of a plurality of horizontally divided sections, side guides for guiding said sections, a sheave or pulley

secured to the upper section of the door, and a counterbalancing mechanism cooperating with said sheave.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, 15 this thirty-first day of January 1912.

HERMAN C. WALDMAN.

Witnesses:

GEORGE R. LADSON,
GEORGE BAKEWELL.