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PATENTED JAN. 24, 1905.

H. A. HANSEN & D. N. SIRE.

FIRE ESCAPE.

APPLICATION FILED FEB. 24, 1904.

3 SHEETS—SHEET 1.

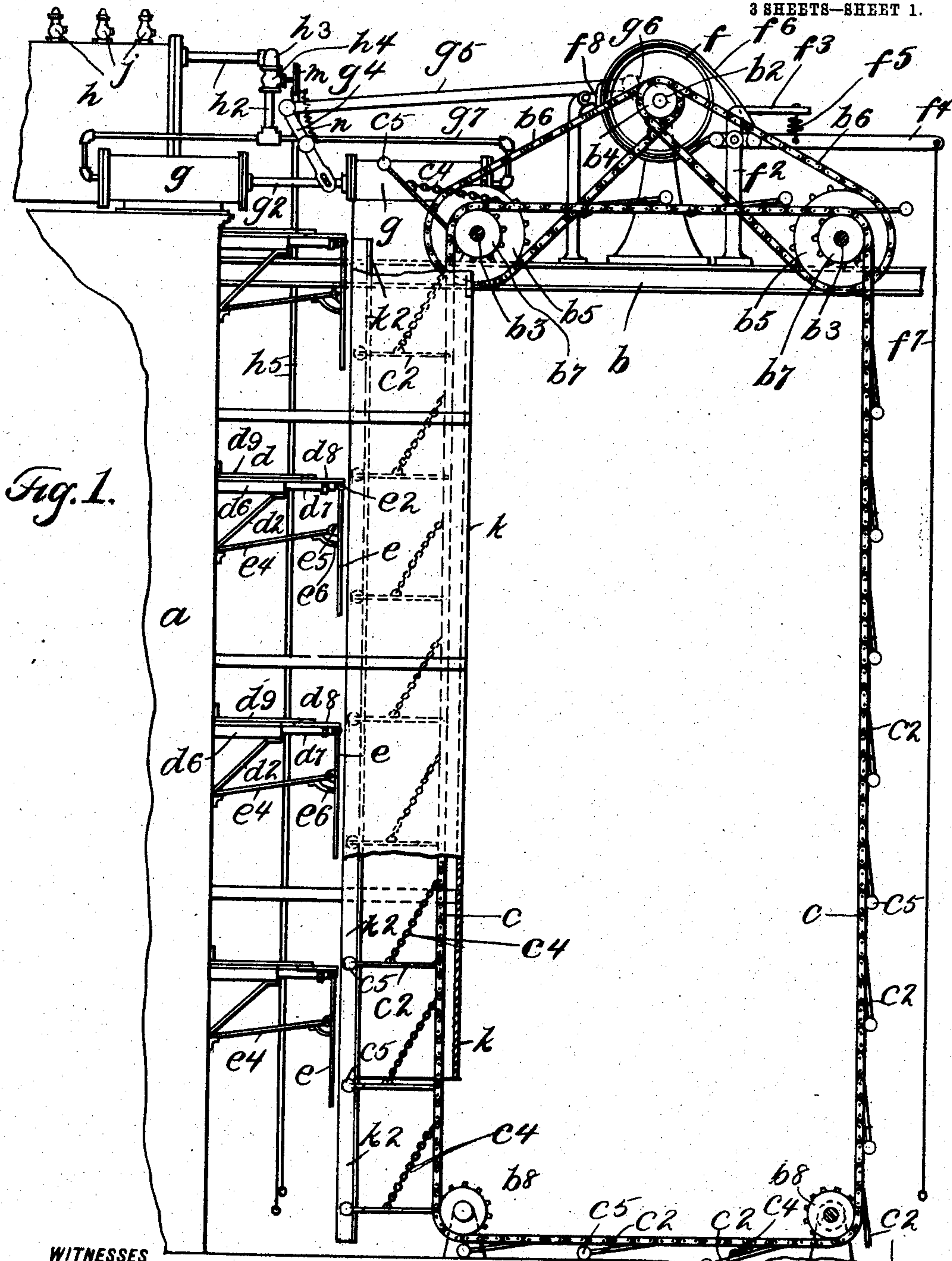


Fig. 1.

WITNESSES

W. B. Mattingly
J. A. Stewart

INVENTORS

Hans A. Hansen,
Didrik N. Sire,

BY

Edgar Tate
ATTORNEYS

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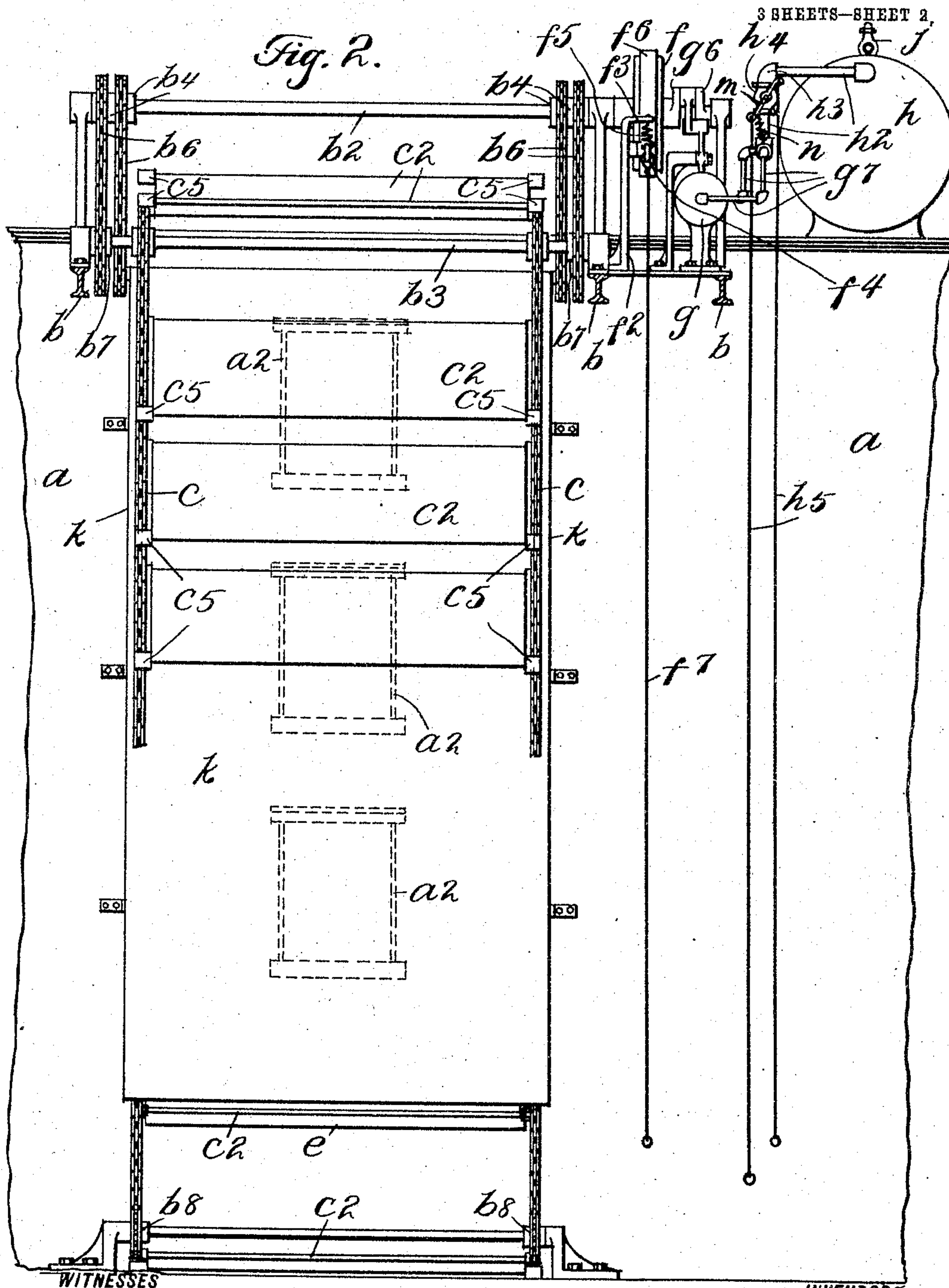
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3 SHEETS—SHEET 2.

Fig. 2.



WITNESSES
A. B. Mattingly
J. A. Stewart

INVENTORS
Hans A. Hansen,
Didrik N. Sire,
BY Edgar Tate & Co.
ATTORNEYS

No. 780,795.

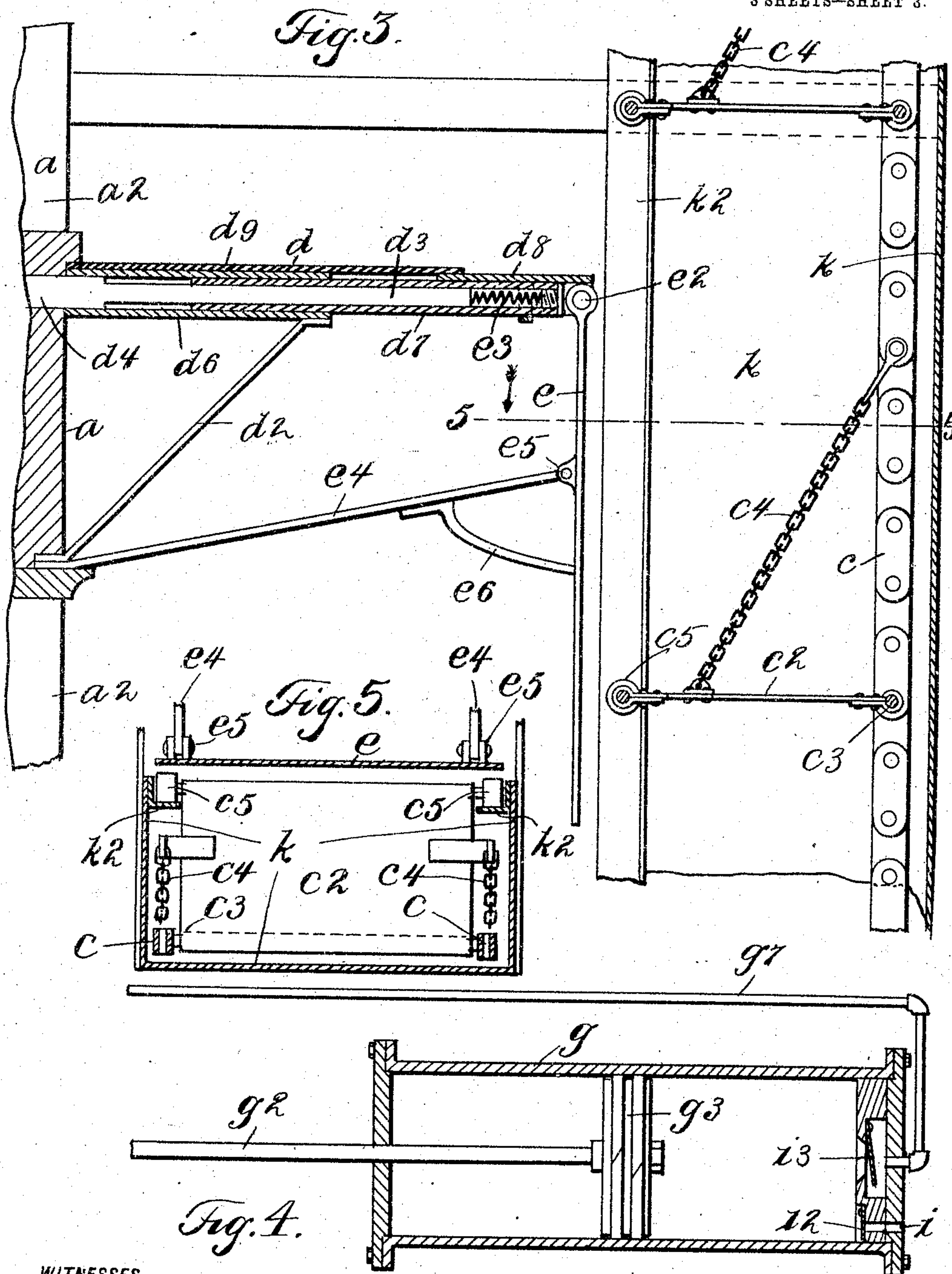
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3 SHEETS—SHEET 3.



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A. B. Mattingly
F. A. Stewart

INVENTORS

Hans A. Hansen,
Didrik N. Sire,

BY *Edgar L. L. Co.*

ATTORNEYS

UNITED STATES PATENT OFFICE.

HANS A. HANSEN AND DIDRIK N. SIRE, OF NEW YORK, N. Y., ASSIGNORS
OF ONE-THIRD TO CARL SPETLAND, OF NEW YORK, N. Y.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 780,795, dated January 24, 1905.

Application filed February 24, 1904. Serial No. 195,030.

To all whom it may concern:

Be it known that we, HANS A. HANSEN and DIDRIK N. SIRE, citizens of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Fire-Escapes, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to fire-escapes; and the object thereof is to provide an improved apparatus of this class which is designed to be connected with hotels, apartment-houses, and other buildings and by means of which any number of people may conveniently escape from such buildings whenever necessary.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of our improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a side view of our improved apparatus applied to a building for use, only a part of one wall of the building being shown; Fig. 2, a front view thereof with windows indicated in dotted lines; Fig. 3, a sectional side view showing a detail of the construction employed and a part of the wall of the buildings and parts of the window-openings therein. Fig. 4 is a sectional view of a part of an air-brake apparatus which we employ, and Fig. 5 is a section on the line 5 5 of Fig. 3.

In the drawings forming part of this specification we have shown at *a* a part of a wall of a building, and in Fig. 3 of the drawings two window-openings *a*² are shown, and in Fig. 2 windows are indicated in dotted lines.

In the form of construction shown the fire-escape is supposed to be applied to one of the outside courts with which large apartment-houses, hotels, and similar structures as now made are usually provided, and in the practice of our invention, as shown in the drawings, we secure in the top of such a court or space beams or bars *b*, over which are supported a main shaft *b*² and two supplemental shafts *b*³, which are in the same horizontal

plane and below the shaft *b*². The shaft *b*² has four sprocket-wheels *b*⁴, and the shafts *b*³ each have two larger sprocket-wheels *b*⁵, and the shafts *b*³ are geared in connection with the shaft *b*² by means of said sprocket-wheels and drive-chains *b*⁶, mounted thereon.

Each of the shafts *b*³ is provided with two similar sprocket-wheels *b*⁷, and at the bottom of the court or space over which the shafts *b*² and *b*³ are mounted are other wheels *b*⁸, similar to the wheels *b*⁷, said wheels *b*⁸ being arranged in pairs, as are also the wheels *b*⁷, and two of the wheels *b*⁸ are arranged directly under two of the wheels *b*⁷ on the corresponding ends of the shafts *b*³, and mounted on each set of the wheels *b*⁷ and *b*⁸ are similar drive-chains *c*, to which are pivoted at regular intervals steps or supports *c*², this connection being made by means of rods *c*³, which extend through both sets of the chains *c*, and the steps or supports *c*² are also connected with the chains *c* by means of supplemental flexible supports *c*⁴, which also preferably consist of small chains, and the free edges of the steps or supports *c*² are provided with antifriction-rollers *c*⁵, this construction being best shown in Fig. 3.

Below each of the window-openings *a*² in the wall of the building are secured horizontal platforms *d*, having braces *d*², and these platforms consist of a bar *d*³, secured to the wall of the building, as shown at *d*⁴, and provided with a sleeve *d*⁶, with which the brace *d*² is connected, and on the outer end of the bar *d*³ is a supplemental sleeve *d*⁷, which is free to slide on the bar *d*³ and in the sleeve *d*⁶. It will be understood that the bars *d*³ of the platforms *d* are arranged in pairs, and on the outer ends of the supplemental sleeves *d*⁷ are secured a plate *d*⁸, and the supplemental sleeves *d*⁷, together with the plates *d*⁸, are free to move inwardly and outwardly, and placed on the sleeves *d*⁶ and plate *d*⁸ is a main plate or board or boards *d*⁹, and suspended from the outer edge of the plate *d*⁸ is a hanger *e*, pivotally connected therewith, as shown at *e*², and placed in the outer end of the supplemental sleeve or sleeves *d*⁷ is a spring *e*³, which serves to force the said supplemental sleeve or sleeves *d*⁷ outwardly and to hold the parts

normally in the position shown in Fig. 3. A brace e^4 is also secured to the wall of the building and extends outwardly, and a hanger e is pivoted thereto at e^5 , and said brace e^4 is provided with an arm e^6 in the form of construction shown against which the bottom portion of the hanger e is adapted to abut, and said hanger is of a width equal to or substantially equal to the distance between the chains c , and said chains c , connected, as hereinbefore described, together with the steps or supports c^2 , make up an endless belt or member which is movable over the wheels b^7 and b^8 , as will be readily understood. The shaft b^2 is also provided with a brake-drum f , in front of which is a support f^2 , having an outwardly-directed arm f^3 , and to which is pivoted a lever f^4 , which is connected with the arm f^3 by a spring f^5 , and secured to the shorter end of the lever f^4 is a brake-spring f^6 , which passes around the drum f and is secured to the longer end of the lever f^4 , as shown in Fig. 1, and the lever f^4 is provided with a cord or wire f^7 , which depends therefrom, and by means of which said lever may be operated from the ground or from any desired point, and by pulling down on said lever the spring f^6 will operate on the drum f and control the movement of the shaft b^2 , and at the side of the drum f opposite the lever f^4 is pivotally supported a pressure-equalizing shoe f^8 , which when the lever f^4 is not depressed will serve to relieve the drum f from the pressure of the spring f^6 , and the object of the spring f^5 is to hold the lever f^4 out of operative position, or, in other words, to permit the drum f to turn freely, this construction constituting a hand-operated brake. We also employ an automatic brake for the shaft b^2 , and this brake is of the following construction: Suitably supported over the wall a and over the supports b or arranged at any desired point are two air-cylinders g , provided with a single piston-rod g^2 , with the opposite ends of which are connected pistons g^3 , one of which works in each of said cylinders, and connected with the rod g^2 is a crank-lever g^4 , with which is connected a crank-rod g^5 , which is connected with a crank g^6 on the shaft b^2 . Connected with the opposite ends of the cylinders g is a pipe g^7 , which is placed in communication with a tank h by means of connecting-tubes h^2 , connected by an elbow-joint h^3 , or in any desired manner, and one of said tubes h^2 is provided with a valve h^4 , adapted to be operated by cords or wires h^5 , a pull on one of which will open said valve and a pull on the other close it, and these cords or wires may be operated from the ground or from any desired point.

The cylinders g are provided in their outer ends with an air-inlet port or passage i , as shown in Fig. 4, which is controlled by a valve i^2 , which opens inwardly and closes outwardly, and each of said cylinders is also

provided in the same end with a valve i^3 , which opens outwardly and closes inwardly, and these valves i^3 form a communication with the pipe g^7 .

The tank h is provided with one or more pop-valves j , and the operation of this automatic brake is as follows: As the shaft b^2 is turned the air is automatically compressed in the cylinders g and forced through the pipe g^7 and its connections into the tank h , and the valves j may be so regulated as to produce in said tank any desired pressure. If at any time it is desired or becomes necessary, the valve h^4 may be closed by one of the cords or wires h^5 , and the communication between the cylinders g and the tank h will thus be cut off, and this will stop the shaft b^2 .

It will be understood that the endless belt or member formed by the chains c and the steps or supports c^2 is normally at rest and that portion of the steps or supports c^2 adjacent to the wall of a building are always held horizontally, as shown in Figs. 1 and 3, and ready for use, and if at any time a person or persons desire to escape from the building such party or parties pass through the windows a^2 out over the horizontal platforms or supports d and step onto the steps or supports c^2 . This at once puts the endless member, comprising the chain c and the steps or supports c^2 , into motion, and this motion is continuous, but may be controlled either by the hand-brake or by the automatic brake, as hereinbefore described, and the motion of the endless belt, comprising the chain c and steps or supports c^2 , is regulated at all times by the automatic brake and may be regulated by the hand-brake.

The hangers e (shown in Figs. 1 and 3) are intended to prevent a person or persons from falling backwardly after stepping on the steps or supports c^2 , and if said person or persons were to fall backwardly at such time the upper portion of the adjacent hanger e^2 would be forced inwardly and the bottom thereof outwardly and said person or persons would be prevented from dropping to the ground.

In the form of construction shown we provide for the inner reach of the endless member, comprising the chain c and steps or supports c^2 , a vertically-arranged casing k , that part of which adjacent to the building is open, and this casing may be suspended from the beams or bars b or in any desired manner, and said casing is provided at the sides thereof adjacent to the building with angular guides k^2 , in which the ends of the steps or supports c^2 and the antifriction-rollers c^5 move, and this casing when employed will prevent a person or persons from falling off of the steps or supports c^2 except in the direction of the building, and the hangers e will prevent such person or persons from falling in the direction of the building, and by reason of the particular manner in which said hangers

are suspended they also serve to prevent a person or persons from being caught between the descending steps or supports c^2 and the outer edge of the platforms or supports d , which are formed as hereinbefore described.

When the endless member, composed of the chains c and the steps or supports c^2 , is in operation, the steps or supports c^2 adjacent to the building are always in a horizontal position, while those at the top and bottom and at the opposite side of said member or belt are in the position shown in Fig. 1, and it will be apparent that any desired number of persons may escape from a building by means of our improved fire-escape, as the motion of the endless member may be continuous, as hereinbefore stated, and the motion thereof may be controlled, and parties desiring to escape from the building may step into said endless member continuously.

The cords or wires h^5 are connected with an arm m , secured to the valve h^4 , and by means of which said valve may be turned in either direction, and we also connect with this arm a spring n , which normally serves to hold the valve open, so that the air is free to pass from the cylinders g to the tank h , and by reason of this apparatus, which operates as an automatic brake, the movement of the endless member, with which the steps c^2 are connected, is maintained at an equal and even speed at all times when the apparatus is in use.

Although we have shown and described our invention as applied to windows of a building, it will be apparent that the same may be applied to vertically-arranged doors or to any other outlets, and our invention is not limited to the use of the casing h nor to the use of the horizontally-arranged platforms d across which those desiring to escape from the building pass, as it will be apparent that the endless movable member, composed of the chains c and the steps or supports c^2 , may be arranged closely adjacent to the building, and the chains c may be connected by a plurality of rods arranged closely adjacent and by means of which parties escaping from the building may hold themselves on the steps or supports c^2 , and the flexible supplemental supports c^4 , with which the steps or supports c^2 are provided, may also serve for this purpose, and many other changes in and modifications of the construction herein shown and described may be made without departing from the spirit of our invention or sacrificing its advantages, and we reserve the right to make all such alterations therein as fairly come within the scope of the invention.

The guides h^2 are so formed that the rollers c^5 operate in connection therewith to hold the supports or steps c^2 in proper position relative to the platforms d and prevent the said steps or supports from moving outwardly, and while a pull on the wire or cord h^5 will

close the valve h^4 and stop the motion of the endless member, with which the steps or supports c^2 are connected, the said valve will be automatically opened on releasing the cord or wire h^5 by the spring n and the apparatus will again operate, as hereinbefore described.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a fire-escape apparatus, a main shaft, supplemental shafts supported parallel therewith and thereunder and geared in connection therewith and provided with sprocket-wheels, an endless member mounted on said sprocket-wheels, other wheels supported below the supplemental shafts and around which the endless member passes, folding steps connected with said endless member, means for holding said folding steps in a horizontal position, and a brake device in operative connection with the main shaft for regulating the movement of the endless member, substantially as shown and described.

2. In a fire-escape apparatus, the combination with the top of the wall of a building, of supports, a main shaft supported thereby, supplemental parallel shafts supported at the opposite sides of the main shaft and below the same and geared in connection therewith and provided with sprocket-wheels, supplemental sprocket-wheels supported beneath the supplemental shafts, an endless member mounted on the supplemental shafts and passed around the supplemental sprocket-wheels and provided with folding steps, the wall of the building being also provided with extensible platforms, step-guides arranged between the walls of the building and the endless member and devices in operative connection with the main shaft for regulating the movement of the endless member, substantially as shown and described.

3. In a fire-escape apparatus, the combination with the top of the wall of a building, of supports, a main shaft supported thereby, supplemental parallel shafts supported at the opposite sides of the main shaft and below the same and geared in connection therewith and provided with sprocket-wheels, supplemental sprocket-wheels supported beneath the supplemental shafts, an endless member mounted on the supplemental shafts and passed around the supplemental sprocket-wheels and provided with folding steps, the walls of the building being also provided with extensible platforms, step-guides arranged between the walls of the building and the endless member and means for regulating the movement of the endless member, consisting of an air-brake device geared in connection with the main shaft, substantially as shown and described.

4. In a fire-escape apparatus, the combination with the top of the wall of a building, of supports, a main shaft supported thereby, supplemental parallel shafts supported at the op-

posite sides of the main shaft and below the same and geared in connection therewith and provided with sprocket-wheels, supplemental sprocket-wheels supported beneath the supplemental shafts, an endless member mounted on the supplemental shafts and passed around the supplemental sprocket-wheels and provided with folding steps, the walls of the building being also provided with extensible platforms, step-guides arranged between the walls of the building and the endless member, and means for regulating the movement of the endless member, consisting of an air-brake device geared in connection with the main shaft, the extensible platforms being also provided with hinged depending members with which are pivotally connected braces connected with the walls of the building, substantially as shown and described.

5. In a fire-escape apparatus, the combination with the top of the wall of a building, of supports, a main shaft supported thereby, supplemental parallel shafts mounted at the opposite sides of the main shaft and below the same and geared in connection therewith and

provided with sprocket-wheels, supplemental guide-wheels supported beneath the supplemental shafts, an endless member mounted on the sprocket-wheels of the supplemental shafts and passing around the supplemental guide-wheels and provided with folding steps, the walls of the building being also provided with platforms, step-guides arranged between the walls of the building and the endless member, and devices in operative connection with the main shaft for regulating the movement of the endless member, the platforms being also provided with hinged depending members with which are pivotally connected braces secured to the walls of the building, substantially as shown and described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of the subscribing witnesses, this 30th day of January, 1904.

HANS A. HANSEN.
DIDRIK N. SIRE.

Witnesses:

F. A. STEWART,
C. E. MULREANY.