April 15, 1930. A. H. STURGES 1,754,375

FIRE ESCAPE OF SLIDING TYPE

Filed Dec. 12, 1927 4 Sheets-Sheet 1

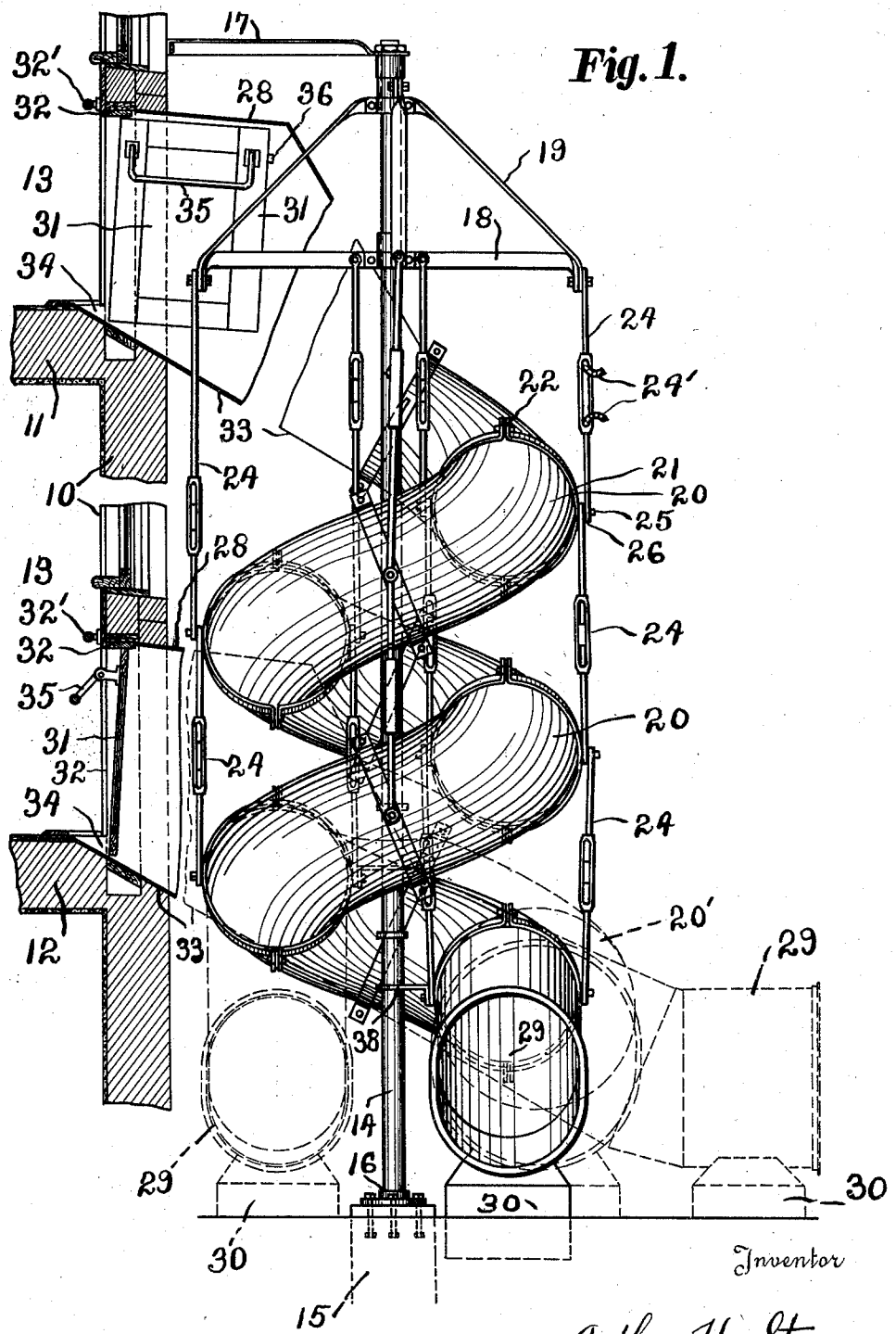

Fig. 1.

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FIRE ESCAPE OF SLIDING TYPE

Filed Dec. 12, 1927 4 Sheets-Sheet 2

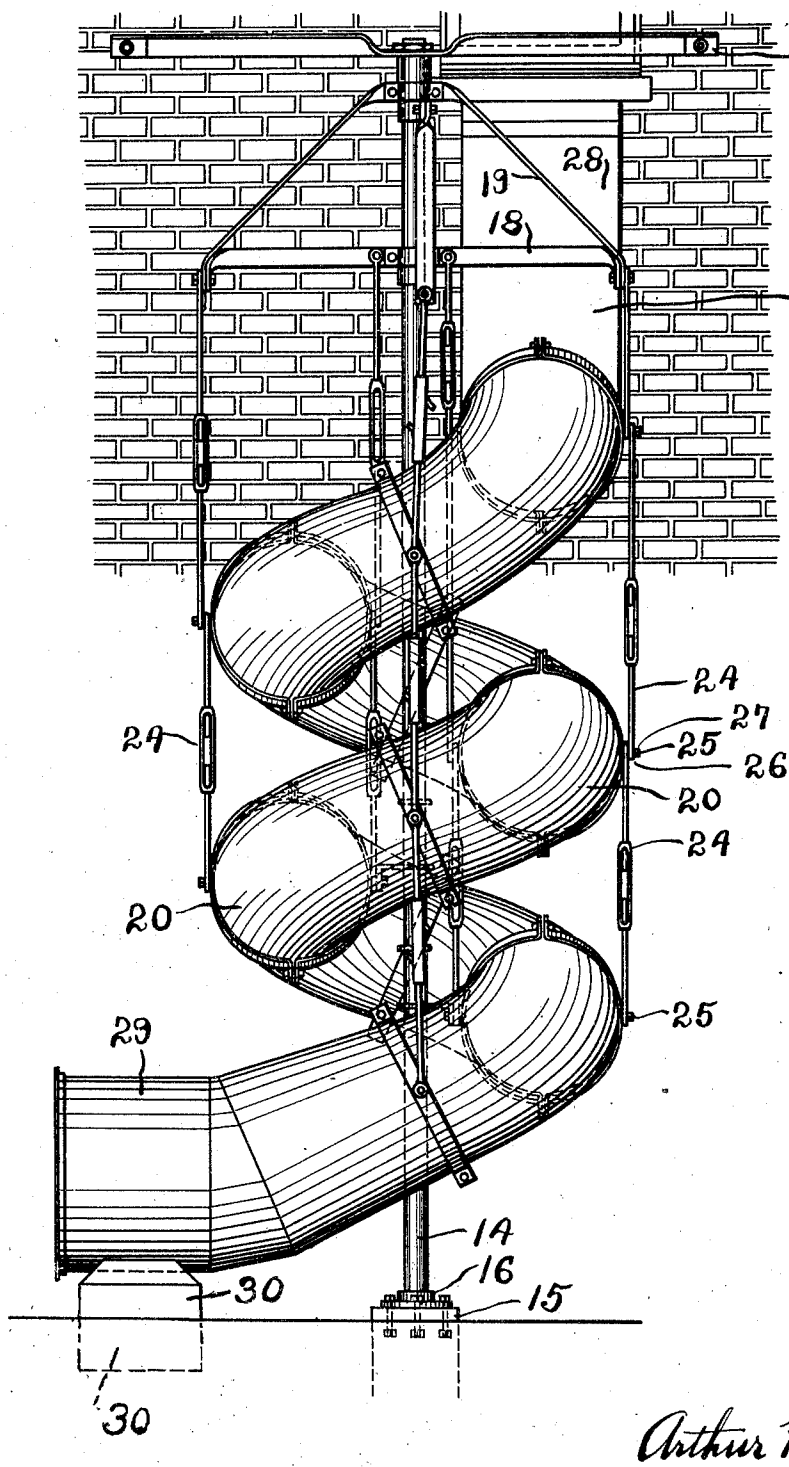

Fig. 2.

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FIRE ESCAPE OF SLIDING TYPE

Filed Dec. 12, 1927 4 Sheets-Sheet 3

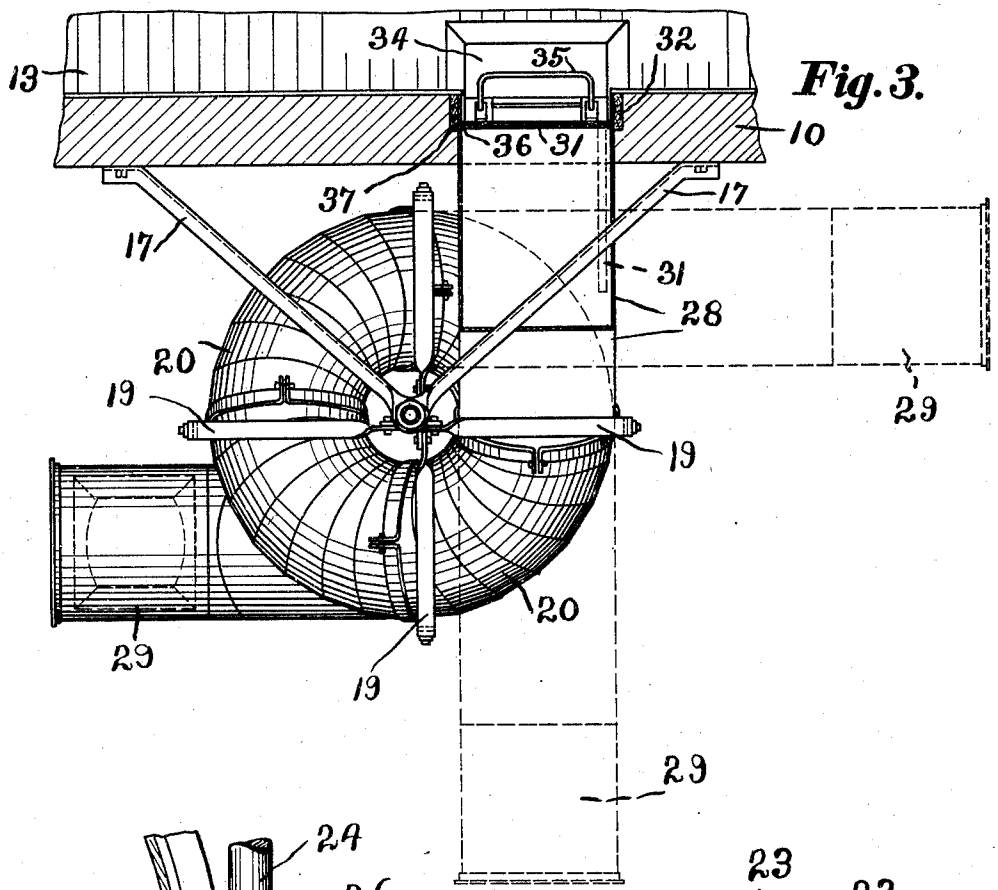

Fig. 3.

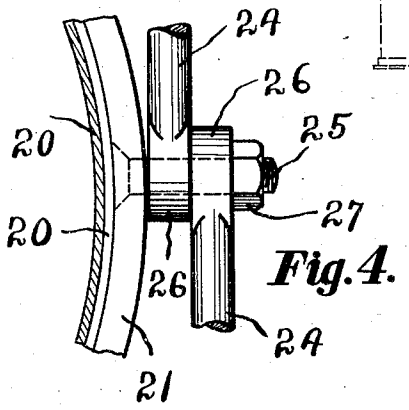

Fig. 4.

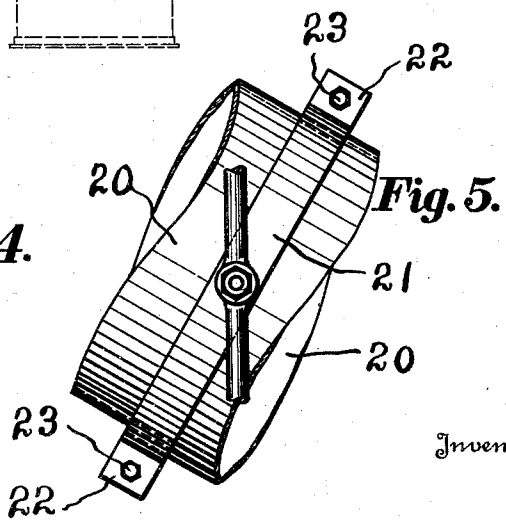

Fig. 5.

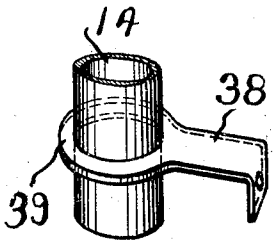

Fig. 6.

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FIRE ESCAPE OF SLIDING TYPE

Filed Dec. 12, 1927 4 Sheets-Sheet 4

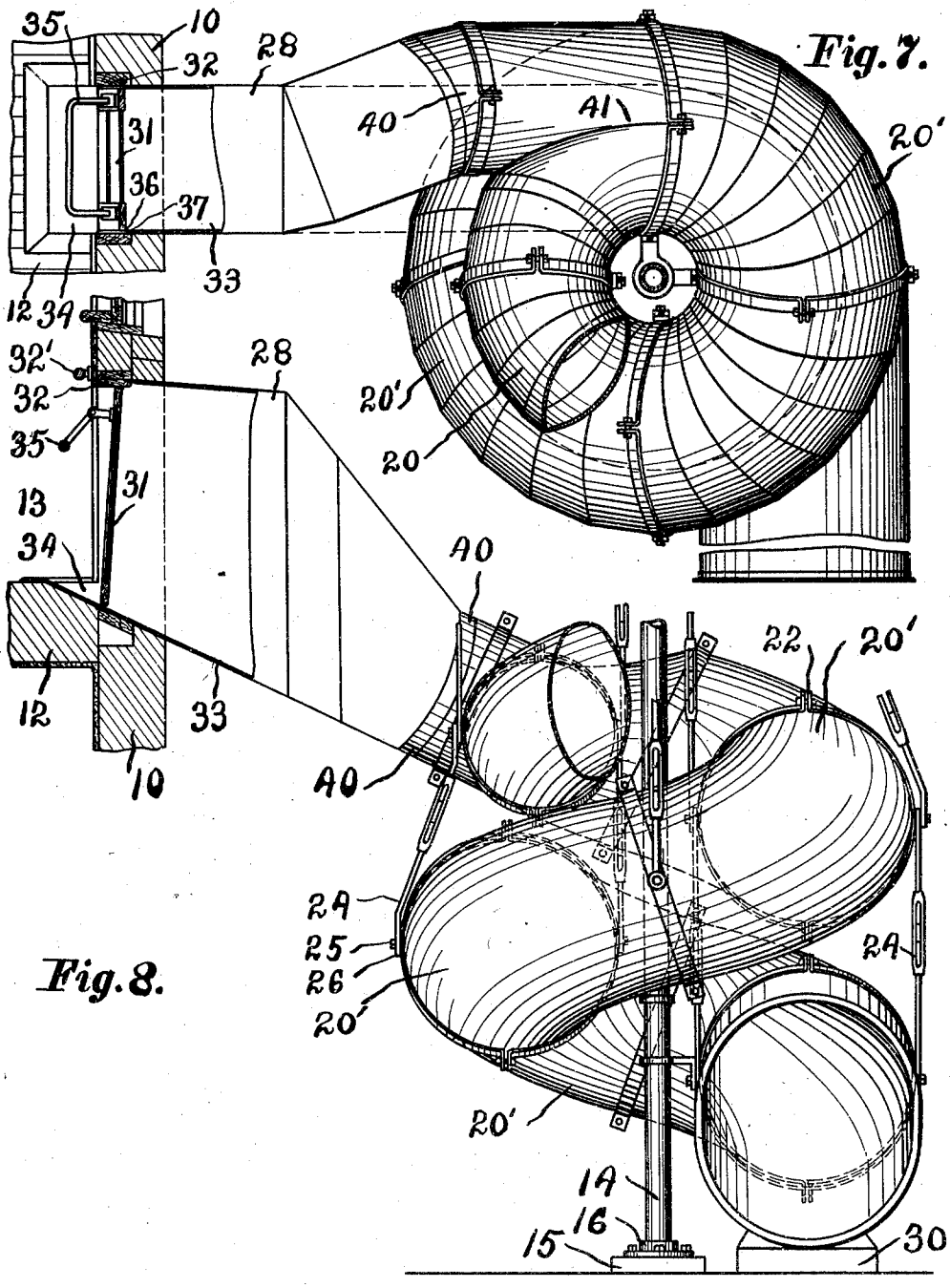

Fig. 7.

Fig. 8.

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Patented Apr. 15, 1930 1,754,375

UNITED STATES PATENT OFFICE

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FIRE ESCAPE OF SLIDING TYPE

Application filed December 12, 1927. Serial No. 239,415.

This invention relates to a fire escape for buildings, and has for its objects broadly to provide a spiral tube of such construction that it may be conveniently manufactured and assembled, will be durable, will be supported in a manner to resist stresses directed thereto by conditions of the weather or by use and will not materially obstruct light from the adjacent windows of the building.

One of the specific objects is to provide entrances to the spiral tube which will commence from the floor of the rooms inwardly of the door, so that quick and ready access to the fire escape may be attained by pupils or others while using the fire escape.

Another object is to provide an entrance having its floor commencing inwardly of the room of the building and a door hung therein, adapted to swing to open position by gravity, these features often permitting the entrance to be located beneath the window sill of a building.

The invention includes a spiral tube adapted to be disposed in a vertical plane with adjustable means for changing the inclination of parts of said tube to permit a suitable connection of an entrance member with the tube, this being of advantage since the floors of a building are not always disposed at a uniform distance from each other.

A further object is to provide a Y-branch member for the communication between lower inlet entrances and upper spiral tube portions.

Also the invention includes a central, vertical support for stabilizing the spiral tube and novel means for securing the central support to the building.

Other objects of the invention include such a construction that the exit tube may project in any desired direction and may have a lesser inclination than the spiral tube to operate as a brake and tending to cause a lesser speed of the pupils or others while sliding downwardly through the tube.

Also the invention includes such a mounting for the central support of the spiral tube that expansion or contraction by action of heat or cold will not cause injury to the metallic connections employed.

Other objects of the invention will appear in the following description.

In the accompanying drawing Fig. 1 is a view showing the wall of a building with the tubular spiral escape secured thereto, the entrances to the tube being in section with parts broken away, selective positions of exit members being shown in dotted lines, selective expanded lower tubular sections being likewise represented.

Fig. 2 is a front view of a single entrance spiral tubular escape.

Fig. 3 is a top plan view of the fire escape, the wall of a building being shown in section.

Fig. 4 is an enlarged broken away detail partly in section, showing parts of two segmental tubular sections, a band or hoop thereon, and bolt mounted in the hoop for the support of two opposed turn-buckles, the latter being broken away.

Fig. 5 is a view showing parts of two tubular segmental sections, a band or hoop encircling them and compressed thereon and showing a pair of opposed turn-buckles mounted in the hoop or band, this view showing the same parts as those illustrated in Fig. 4.

Fig. 6 is a detail showing rings slidingly mounted on the pole for supporting the tube.

Figs. 7 and 8 illustrate the connection of an upper spiral tube of lesser diameter with a lower tube of greater diameter. Fig. 7 is a plan view showing a lower entrance-way and a spiral tube leading therefrom and in communication with an upper spiral tube of lesser diameter, the latter being in section. Fig. 8 is a side view of the same.

Referring now to the drawing for a more particular description, the invention is shown and described in connection with the upright wall 10, together with the floors 11 and 12 and rooms 13 of a building.

In order that the objects first mentioned may be facilitated, I provide a pole or post 14, preferably of tubular construction adapted to be disposed vertically and having a length sufficient to extend from the ground to the uppermost room. In order that the pole may be suitably supported, it is secured to a base 15 preferably constructed of con-

crete adapted to extend into the ground beyond the frost line, a flange 16 being provided for the bottom of the pole so that, by means of bolts, which traverse the flange and are embedded in the concrete, the pole will be firmly grounded, the advantage being that when the ground becomes frozen, the pole and its connecting parts will not be appreciably elevated and injury from expansion or contraction avoided.

The upper end of the pole is firmly secured to the building by any suitable means, the means herein shown being a brace 17 of V-shape, its arms being secured to the building by bolts as best shown in Fig. 3 of the drawing and its apex being secured to the pole.

Numeral 18 indicates a pair of horizontal cross-braces which are secured to the pole below its upper end. Numerals 19 indicate a pair of inclined braces approximately of inverted V-shape, each being secured at its outer end to the ends of a horizontal brace with its apex secured to the pole, and as described, it will be understood that the mounting of the pole will prevent undue vibration thereof and that the braces 18 and 19 will, in part, operate as a support for the spiral tube to be described.

Numerals 20 indicate a plurality of tubular sections adapted to be secured end to end, the end of each upper segmental section being disposed in the end of the next lower section in interfitting relation. Numerals 21 indicate circular, bands or hoops each being disposed to circumscribe the end-portions of the sections thus described.

Each hoop or band 21 preferably consists of two semi-circular parts provided at its ends with lugs 22, and by means of bolts 23 which traverse the lugs. The lugs may be moved toward each other for pressing the end-portions of the sections, at each joint, against each other, one of the objects in view being to avoid the use of rivets, and to permit the parts to be conveniently assembled at the time the device is erected.

Numerals 24 indicate a plurality of longitudinally adjustable links tending to support each section 20 of a lower coil from that section of a coil immediately above it, said members 24 preferably consisting of turn-buckles.

While the turn-buckles may be secured to the hoops or bands 21 by any suitable means, I prefer the use of bolts 25 as best shown in Fig. 4 of the drawing, the heads of these bolts being countersunk in the hoops, and the bolts 25 providing a mounting for the terminal eyes 26 of the turn-buckles. It will be seen that by rotating the nuts 27 each being threaded on an end of these bolts, the eyes 26 may be pressed firmly against the hoops.

Numerals 38, best shown in Fig. 6 of the drawings, indicate stabilizing members for securing the hoops 21 to the pole, and any suitable number of said members 38 may be employed, their inner ends being provided with loops or rings 39 which are slidingly mounted on the pole.

One of the functions to be discharged by the turn-buckles is to assist in supporting the weight of the sections when the device has been assembled. The important function, however, for the use of the turn-buckles, is that they provide for certain adjustments which must be made in the inclination of the spiral tube, now to be described.

In order that the fire escape mentioned may be practically built, it is obvious that the several sections 20 should be prepared at the factory. These spiral fire escapes are very useful upon school buildings having three or more floors, each having an entrance thereto, and since the floors of a building may not be uniformly spaced apart, and since the particular sections of the tube which communicate with the entrances from the rooms must be prepared at the factory, it is obvious that the inclination of some of the sections must be changed so that each entrance may be suitably connected with its tubular section. For instance, if the spiral tube has a uniform inclination throughout its entire length, and it is found that the distance from an upper floor to the floor next below is a few inches greater than was expected, it is obvious that the sections may be adjusted and may provide a greater inclination for those sections. While this inclination will not interfere in the operation of the device, it will permit a proper joining of said lower entrance with its proper section.

Also if it is found, while the device is being installed, that the distance between two floors of the building is less than was expected, the tubular sections may be adjusted by means of the turn-buckles so that they will have a lesser inclination, and these slight changes in inclination will not interfere with the operation of the device.

Numeral 29 indicates a tubular exit member for the lower end of the spiral tube. It has a lesser inclination than that of the sections 20, and therefore it operates as a brake for retarding the movement of a person while using the fire escape. Numeral 30 indicates a block, usually constructed of concrete, which partially supports the lower end of this member.

This exit member may have any desired length and may extend in any suitable direction and may be secured to the lowermost section of the spiral tube by any suitable means, but, preferably, its inner end is secured by means of a circular band or hoop 21 in the manner already described.

The entrance members for the respective upper and lower floors 11 and 12 communicate with the spiral tube and are of similar construction in all respects. They each con-

sist of a casing 28 rectangular in form to permit the door 31 to swing from the door-jamb 32 outwardly from the room 13 into said casing or entrance-way.

It will be noted that the bottom 33 of each entrance-way or casing 28 has an inclination corresponding approximately to the inclination of the spiral tube and that it extends into the room 13 and occupies a part of the floor space and forms a depression 34 inwardly of the door.

The depression 34 and inclined bottom 33 leading into the room are important features of construction since it provides a more ready access to the fire escape from the room, and it provides a greater area beneath a window sill, the maximum height for the door often being no greater than the area below window sills.

The numeral 32′ indicates a swing-bar mounted upon the head casing of the door and above the entrances to the escape. These swing bars are adapted to assist persons in entering the escape since they may be grasped in the hands while the occupants swing their feet forwardly, said swing-bars are an advantage where it is not desired to extend the depressions 34 far into the rooms 13. It is obvious that in installations where the depressions 34 are of large horizontal length that swing bars may be dispensed with. It will be noted that the door 31 is inclined outwardly from the room 13 so that it will normally swing into the entrance-way and remain by gravity.

Numeral 35 indicates a releasing-bar which is mounted on the door, this being of such arrangement that when swung upwardly or downwardly, it will release the latch 36 from the catch 37 to cause the door to swing to open position.

Since the spiral tube thus shown and described may be coincidently used as a carrier for those who may escape from both the upper and lower floors of a building in case of a fire or panic, it is obvious that the diameter of each tube at and below an upper tube should in some instances be greater than the diameter of such upper tube to enable two persons to slide downward side by side, and therefore in Figs. 7 and 8 I have shown a modified form of the invention now to be explained.

In this modified form of the invention a short tubular section 40 is shown for connecting the entrance from a lower floor 12 with one of the sections 20′ of the lower part of the spiral tube, and it will be understood that all other parts of the fire escape shown in Figs. 7 and 8 are the same as heretofore described.

It will be seen that the part 40 and the section 20 with which it is connected approach each other at an acute angle and that a Y-shaped connection 41 is provided, and in operation, if a person moving through the entrance-way of the floor 12 should collide with a person who has been moving downwardly in the spiral tube from the floor 11, no injury or wedging of their bodies would occur for the reason that the sections 20′ are of greater diameter than the diameter of the sections 20.

Upon buildings having but two upper floors the expanded lower tube sections 20′ may be dispensed with and sections 20 of comparatively lesser diameter employed, the Y-branch member 41 also being of lesser diameter in such cases.

It is obvious that the horizontal brace pole 14 may be dispensed with if desired and the escape supported dependingly from the wall of the building by means of suitable bracket hangers above and attached to the members 18 or 19, the adjustable form sustaining means such as the turn-buckles or rods 24 being retained. After assembly the threaded portions 24′ of the rods may be bent outwardly as shown in Fig. 1, or otherwise mutilated so that unauthorized persons may not tamper with the adjustment.

I claim as my invention:—

1. In a fire escape for a building, a vertical form supporting member, a bracket for connecting said member with the building, a spiral tube connected with said member and consisting of curved sections, stabilizing-elements for connecting one section with another section and arranged for longitudinal adjustments, and a straight tube connected with one of the sections for a communication with said building.

2. In a fire escape for a building, an upright post, a spiral tube connected with the post and consisting of curved sections, bands surrounding and arranged to be pressed upon the sections, stabilizing elements each connecting one band with another band, and a plurality of tubes each being in communication with a straight section for a communication with said building.

3. In a tubular fire escape for a building, an entrance-member including door-jambs and a casing having an inclined bottom leading from a room of the building to said tube, a door mounted on the door-jamb to permit it to swing inwardly of the casing, the inclined bottom of the casing extending inwardly of the building to open upon the floor inwardly of said door.

4. In a fire escape for a building, said building having a wall provided with a support projecting outwardly therefrom, a spiral tube disposed in approximately a vertical plane secured to said support and consisting of interfitting sections, and a plurality of longitudinally adjustable form sustaining members each being connected with a section of a lower coil of said tube and connected

with a section of a coil adjacent to and above said lower coil.

5. In a fire escape for a building, a pole adapted to be disposed at the side with its upper end secured to the building, a spiral tube surrounding the pole consisting of interfitting connected sections, hoops encircling the sections, a plurality of vertically positioned longitudinally adjustable links connecting the hoops of the lower sections of the coils with the hoops of the upper adjacent coils of said tube, a tubular exit member connected with the lowermost section, and an entrance section leading from the building communicating with the uppermost section of said tube.

6. In a fire escape for a building, a pole adapted to be mounted at the side of the building, cross-braces mounted on the pole, a tube coiled spirally around the pole and secured to the cross-braces and consisting of sections, the upper end-portion of each lower section overlapping a lower end-portion of an upper section adjacent thereto, a plurality of hoops encircling the overlapping sections and arranged to compress the overlapping end-portions of said sections, vertically disposed longitudinally adjustable links connecting each hoop of a lower section of a coil with the hoop of a section of an adjacent upper coil, an exit-member communicating with said tube, and an entrance-member leading from the building in communication with said tube.

7. In a tubular fire escape for a building, an upper entranceway leading from the building, a lower entranceway leading from said building, an upright spiral tube communicating with the upper entranceway and a second spiral tube of greater diameter than the first named tube extending upwardly from the ground in communication with the lower entranceway and forming a Y-tube connection with said first named tube.

8. In a fire escape for a building, an upper, downwardly inclined entranceway for a communication with the building, a lower downwardly inclined entranceway for a communication with the building, a spiral tube communicating with the upper entranceway, a second spiral tube having a greater diameter than the first named tube and communicating with the lower entranceway and with said first named tube, said tubes near their junction being inclined toward each other at an acute angle.

9. In a fire escape for a building, a downwardly inclined chute formed of interfitting sectional members, an entrance-member including a door-jamb and a casing having an inclined bottom leading from a room of the building to said chute, a door mounted on the door jamb to permit it to swing inwardly of the casing, the inclined bottom of the casing extending inwardly of the building to open upon the floor inwardly of said door, and a swing bar carried by said jamb above said door.

10. In a fire escape for a building, an upper entranceway leading from the building, a lower entranceway leading from said building, an upright spiral tube communicating with the upper entranceway and a second spiral tube extending upwardly from the ground in communication with the lower entranceway and forming a Y-tube connection with said first named tube.

11. In a fire escape for a building having openings, a sectional spiral tube accessible from said openings, and means for the vertical adjustment of the sections with regard to said openings.

12. In a fire escape for a building, a spiral tube formed of sections, and means connected to said sections for changing the degree of inclination of the sections.

13. In a fire escape for a building, a spiral tube formed of curved sections throughout its entire length and adapted to be disposed in a vertical plane, a door jamb in the wall of said building, a straight member having its bottom inclined and lying above said jamb and having connection with the upper end of the spiral tube, and an exit member having a substantially horizontal portion and connected with the lower end of the spiral tube.

14. In a tubular fire escape for a building, an upper inclined entrance way leading from the building, a lower inclined entrance way leading from said building, an upright spiral tube communicating with the upper entrance way, and a second spiral tube extending upwardly from the ground in communication with the lower entrance way and forming a Y-tube connection with said first named tube.

15. In a fire escape for a building, a spiral tube formed of curved sections throughout its entire length and adapted to be disposed in a vertical plane, a door jamb in the wall of said building, a straight member having its bottom inclined and lying above said jamb and having connection with the upper end of the spiral tube, and an exit member connected with the tube and provided with a flaring mouth.

In testimony whereof, I have affixed my signature.

ARTHUR H. STURGES.