J. T. BOUFFORD.

FIRE ESCAPE.

APPLICATION FILED DEC. 12, 1914.

1,162,679.

Patented Nov. 30, 1915.

3 SHEETS—SHEET 1.

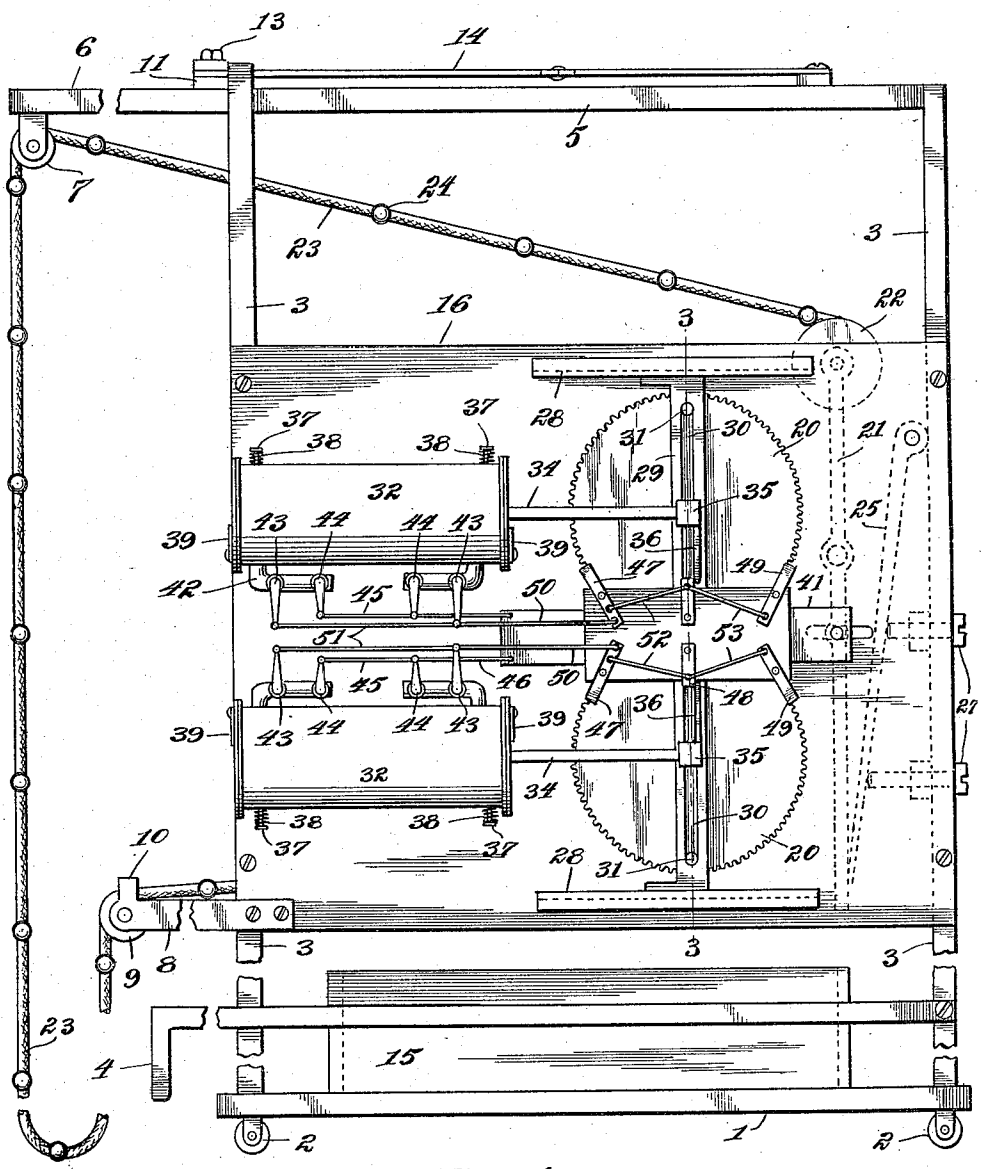


Fig. 1

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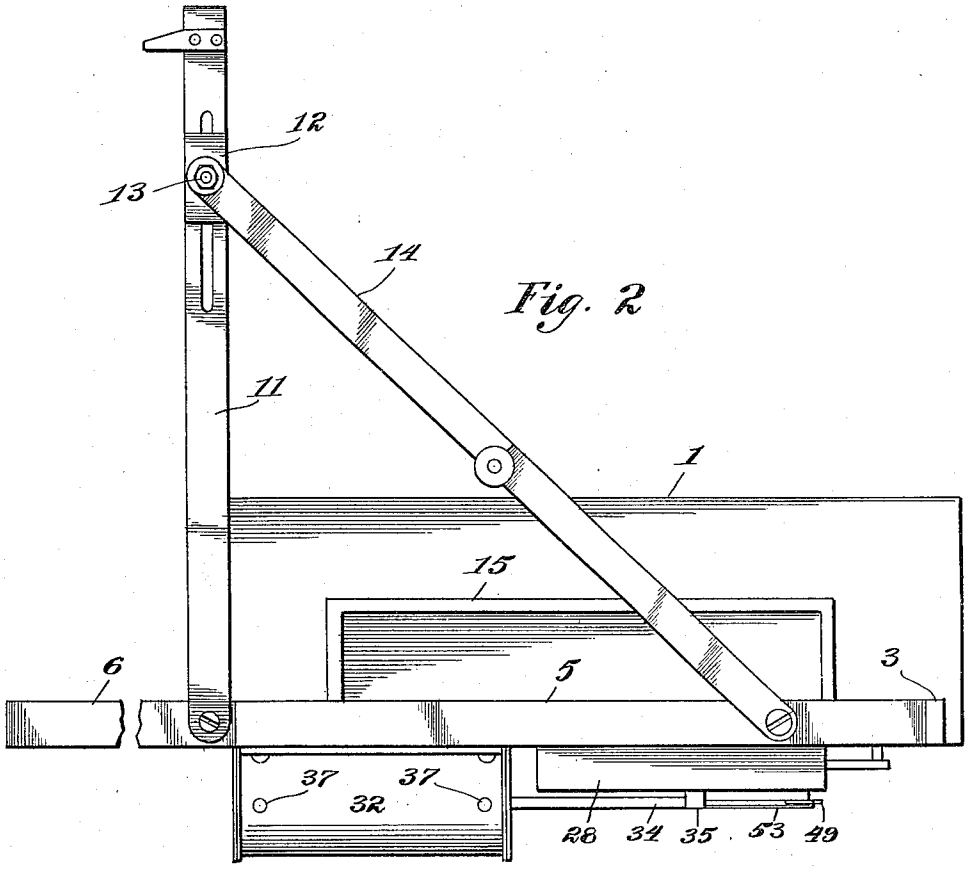


Fig. 2

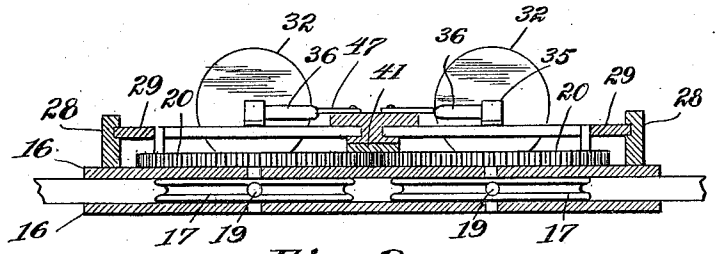


Fig. 3

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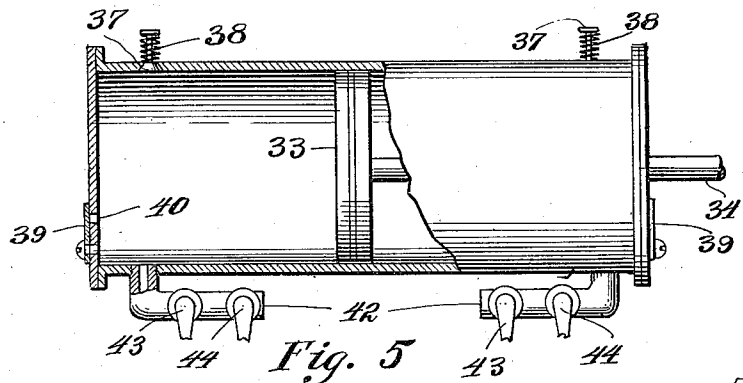


Fig. 5

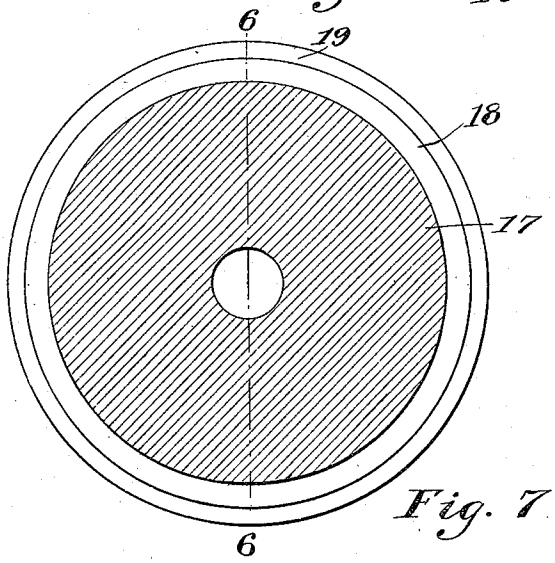


Fig. 7

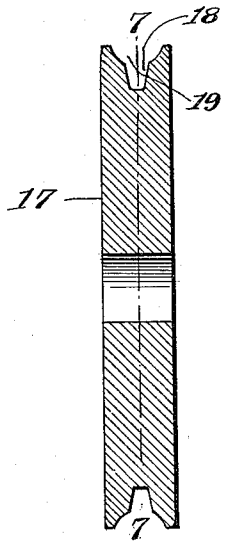


Fig. 6

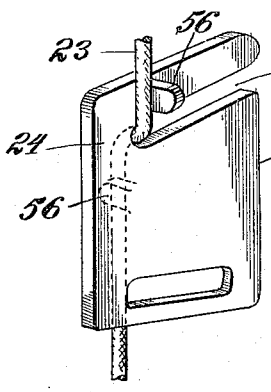


Fig. 4.

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UNITED STATES PATENT OFFICE.

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FIRE-ESCAPE.

1,162,679. Specification of Letters Patent. Patented Nov. 30, 1915.

Application filed December 12, 1914. Serial No. 876,913.

To all whom it may concern:

Be it known that I, JOSEPH T. BOUFFORD, a subject of the King of Great Britain, residing at Linwood, in the county of Worcester and State of Massachusetts, have invented new and useful Improvements in Fire-Escapes, of which the following is a specification.

This invention relates to fire escapes and it consists in the novel features hereinafter described and claimed.

An object of the invention is to provide a fire escape mechanism mounted upon a wheel supported truck or frame the said truck or frame being adapted to be moved to a window opening and having parts adapted to be passed therethrough for the purpose of supporting a cable when the fire escape is in use.

Another object of the invention is to provide upon the said truck or frame means for controlling the movement of the cable in order to regulate the rate of speed at which persons may descend along the fire-escape when the device is in use.

With the above objects in view the fire escape includes plates mounted upon the frame with rollers having grooves journaled between the same. Intermeshing gear wheels are mounted upon the shafts of the said rollers and the cable hereinbefore mentioned is passed over one roller and under the other. A spring pressed arm is pivotally mounted between the plates and carries a roller around which the said cable is trained. The said cable is also trained over rollers which are mounted at the parts of the frame projected through the window opening and means is provided for automatically controlling the turning movement of the rollers.

In the accompanying drawings:—Figure 1 is a side elevation of a fire escape showing parts in section and parts removed. Fig. 2 is a top plan view of the same. Fig. 3 is a transverse sectional view of the same cut on the line 3—3 of Fig. 1. Fig. 4 is a perspective view of a plate which may be used upon the cable of the fire escape. Fig. 5 is a side elevation of a cylinder used in the fire escape, showing parts broken away and parts in section. Fig. 6 is a transverse sectional view of a pulley used in the fire escape. Fig. 7 is a sectional view of the same cut on the line 7—7 of Fig. 6.

The frame of the fire escape includes a platform 1 which is mounted upon wheels 2. Uprights 3 are mounted upon the platform 1 and a hook member 4 is pivotally connected with one of the said uprights 3. The upper end portions of the uprights 3 are connected together by a bar 5 which is provided at one end portion with an extended portion 6. A pulley 7 is carried at the end portion of the bar 5. An arm 8 is mounted upon one of the uprights 3 and is provided at its outer end with a pulley 9 having a guide 10 located over the same. A cross bar 11 is pivotally connected with the bar 5 and a bar section 12 is adjustably connected with the cross bar 11. The bar section 12 may be adjusted longitudinally with relation to the cross bar 11 and when at a desired position with relation to the said cross bar may be secured by means of bolts 13 which pass transversely through the said cross bar and bar section. Brace sections 14 are pivotally connected together at their inner ends and the outer end of one plate section 14 is pivotally connected with the end portion of the cross bar 11 and the outer end of the other brace section 14 is pivotally connected with the bar 5 at a point between the uprights 3. A box or other receptacle 15 is mounted upon the platform 1.

The frame of the fire escape as above described may be moved over a floor until one of the uprights 3 is at the side of a window opening and then the hook member 4 may be passed through the said opening and caught over the window sill in order to hold the frame with relation to the sill and window opening. At the same time the cross bar 11 and bar section 12 extend transversely across the window opening and the said bar and bar section bear at their ends against the sides of the window opening. When the frame is so positioned the brace sections 14 are brought into longitudinal alinement with each other whereby the cross bar 11 is restrained against swinging or pivotal movement with relation to the bar 5. It is, of course, understood that when the frame is positioned against the window opening as described the end portion of the bar 5 and the arm 8 are projected through the window opening.

Plates 16 are secured at their ends to the intermediate portions of the uprights 3 and rollers 17 are journaled for rotation between the said plates. The rollers 17 are provided with grooves 18 of peculiar configuration,

one part being adapted to receive a cable, hereinafter described, and the other part 19 being adapted to receive enlargements on the cable also described hereinafter. The adjacent portions of the peripheries of the rollers 17 are spaced from each other and the said rollers 17 are provided upon their shafts with intermeshing gear wheels 20. An arm 21 is pivotally mounted between the plates 16 and is provided at one end with a journaled roller 22. A cable 23 is trained around the roller 22 thence over the pulley 7 and extends down and is carried up and back over the pulley 9 and under the guide 10 thence over the most remote roller 17 thence under the other roller 17 and back to the roller 22. The cable 23 lies in the groove 18 of the rollers 17 and the said cable 23 is provided at intervals along its length with buttons 24 which are adapted to enter the groove portions 19 upon the rollers 17 whereby the cable 23 is prevented from slipping with relation to the said rollers. A spring arm 25 is pivotally mounted between the plates 16 and bears at one end against the end portion of the arm 21 opposite the end thereof which carries the roller 22. Blocks 26 are located between the plates 16 and screws 27 pass through the said blocks and bear at their ends against the side of the arm 25. By adjusting the screws 27 in the blocks 26 the arm 25 may be caused to bear with more or less pressure against the end portion of the arm 21. Guides 28 are mounted upon one of the plates 16 and cross heads 29 are slidably mounted in the guides 28. The cross heads 29 are provided at their intermediate portions with slots 30 which receive pins 31 mounted upon the gear wheels 20. Cylinders 32 are mounted upon the plates 16 and pistons 33 are slidably mounted in the said cylinders. Piston rods 34 are connected at one end with the piston 33 and at their other ends with extensions 35 carried by the cross heads 29. The extensions 35 are provided with fingers 36 the object of which will be explained hereinafter. The cylinders 32 are provided at their opposite ends with valves 37 controlled by springs 38 which are relatively weak. The springs 38 normally hold the valves 37 closed against their seats on the cylinders 32 and when the valves 37 move to open positions they move inwardly with relation to the cylinders to uncover the said seats. Flexible valves 39 are also secured to the ends of the cylinders 32 and normally cover ports 40 provided at the ends of the cylinders. While the valves 39 are flexible it takes considerable internal pressure within the cylinders 32 to move the said valves away from the ports 40 to permit air within the cylinder 32 to escape. A bar 41 is pivotally connected with the intermediate portion of the arm 21 and is slidable under the intermediate guides 28. The cylinders 32 are provided at their ends with pipes 42 in which are located valves 43 and valves 44. Rods 45 connect the valves 44 at the opposite ends of the cylinder 32 together and rods 46 connect the rods 45 with the arm 41. When the arm 21 is swung the arm 41 is moved longitudinally whereby the rods 46 are moved and the valves 44 are turned to increase or diminish the capacity of the passage way through the pipes 42. Levers 47, 48 and 49 are pivoted upon the plates 16 and rods 50 connect the levers 47 with the stems of the nearer valves 43. Rods 51 connect the stems of the valves 43 upon the pipes 42 of the same cylinder 32 together. Rods 52 connect the levers 47 with the levers 48 and rods 53 connect the levers 48 with the levers 49.

The operation of the fire escape is as follows: When the cable 23 is removed from the receptacle 15 and thrown through the window opening and assumes the position substantially as shown in Fig. 1 of the drawings a person desiring to descend with the cable grasps the portion 6 and swings out of the window opening and grasps the other run of the cable 23. The weight of the said person causes the cable to move longitudinally and consequently the pulleys 17 are rotated. Inamsuch as the gear wheels 20 rotate with the pulleys the pins 31 are carried around the centers of the wheel 20 whereby the said pins cause the cross heads 29 to move along the guides 28. Thus the rods 34 are moved longitudinally and the pistons 33 are reciprocated in the cylinders 32. At the same time the weight which is applied to the cable 23 causes the arm 21 to swing whereby the arm 41 is moved and the valves 44 are partially closed as hereinbefore described. Therefore as the pistons 33 reciprocate in the cylinders 32 the air in the opposite ends of the said pistons is compressed and the turning movement of the pulleys 17 is retarded and the descent of the person having hold of the cable 23 is prevented from being too precipitous. As the cross heads 29 move the fingers 36 are carried in contact with either of the levers 47 and 49 and consequently the rods 50 are moved longitudinally whereby the valves 43 in the pipes 42 are closed or partially closed. When one valve is partially closed the other valve is moved to an open position so that the escape of air from the opposite end of the cylinder is restricted. Under normal conditions the air may enter the cylinder at that end thereof from which the piston 33 is moving by passing through the port usually closed by the valve 37. However if excessive weight is suddenly applied to the cable 23 the movement on the part of the frame 41 and the rod 45 completely close the valve 44 and during this time the air

can escape from the cylinders through the ports 40 only. Thus in the event that the fire escape is over loaded it is impossible for the load to fall swiftly to the ground. Plates 54 may be used in conjunction with the cable 23 the said plates being provided with slots 55 adapted to receive the cable and engage the buttons thereon the said plates 54 having at their opposite sides and beyond the opposite edges of the slot 55 outstanding lugs 56 which bear against the side edges of the cable and hold the plates in proper position thereon. The plates 54 may be applied to the belts of helpless persons and consequently as the said persons descend the plates 54 will remain in proper position upon the cable 23. When the said helpless persons reach the ground and the cable 23 begins to ascend the plates 54 twist or turn with relation to the cable 23 and the cable slips out of the plates through the slots 55. Thus means is provided for automatically disengaging helpless persons who are strapped to the cable, from the same.

Having described the invention what is claimed is:—

1. A fire escape comprising a pulley, a cable trained about the pulley, a cross head mounted for reciprocatory movement, means operatively connecting the cross head with the pulley, a cylinder mounted adjacent the pulley, a piston slidably mounted in the cylinder, a rod operatively connecting the piston with the cross head, a valve controlled pipe connected with the cylinder, a lever pivotally mounted and operatively connected with the valve and means movable with the cross head and engageable with the lever to move the said valve.

2. A fire escape comprising a pulley, a spring pressed arm pivotally mounted, a roller journaled upon said arm, a cable trained about said pulley and roller, a cross head mounted for reciprocatory movement, means operatively connecting the cross head with the pulley, a cylinder mounted adjacent the pulley, a piston slidably mounted in the cylinder, a rod operatively connecting the piston with the cross head, a pipe connected with the cylinder and having a plurality of valves, a lever pivotally mounted and operatively connected with one of the valves, means operatively connecting the other valve with the arm, and means movable with the cross head and engageable with the lever to move the valve connected thereto.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH T. BOUFFORD.

Witnesses:
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EDOUARD J. AUGÉ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."