March 12, 1935. H. ST. PIERRE 1,994,408

FIRE ESCAPE LADDER

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Fig. 1.

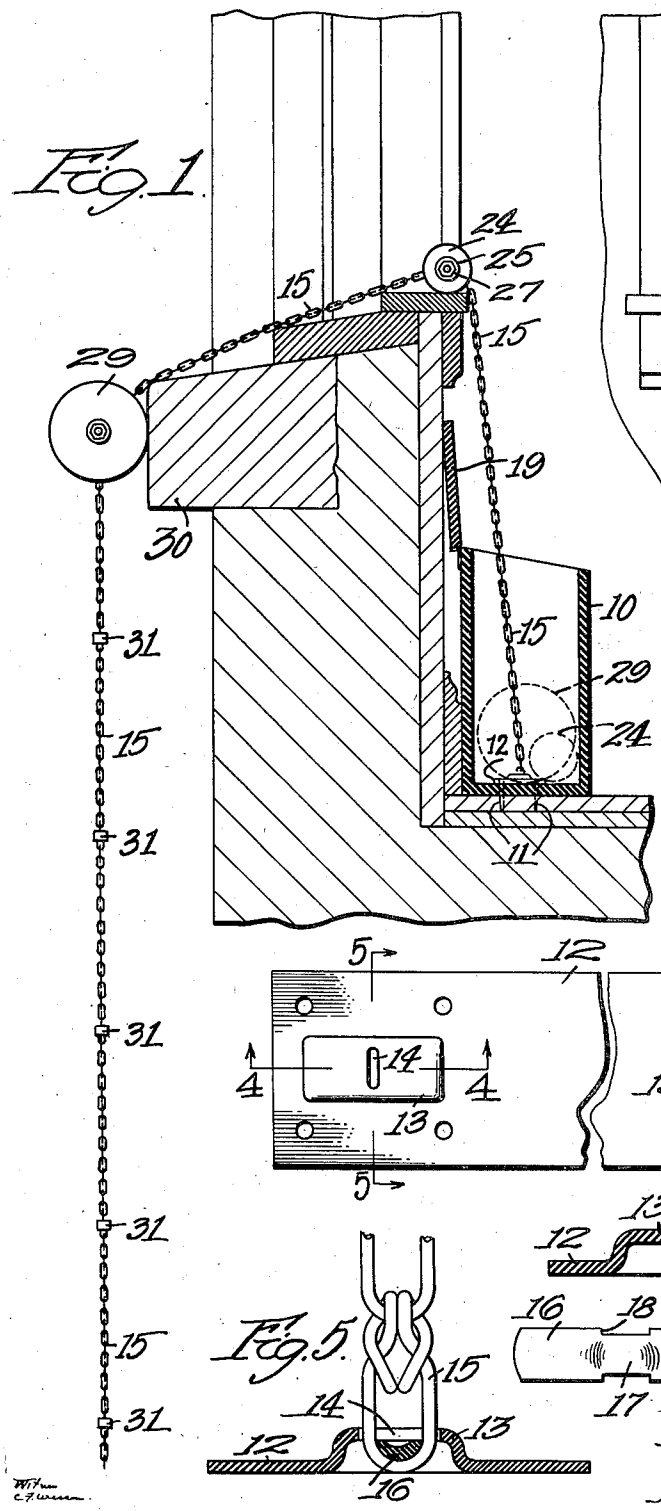


Fig. 2.

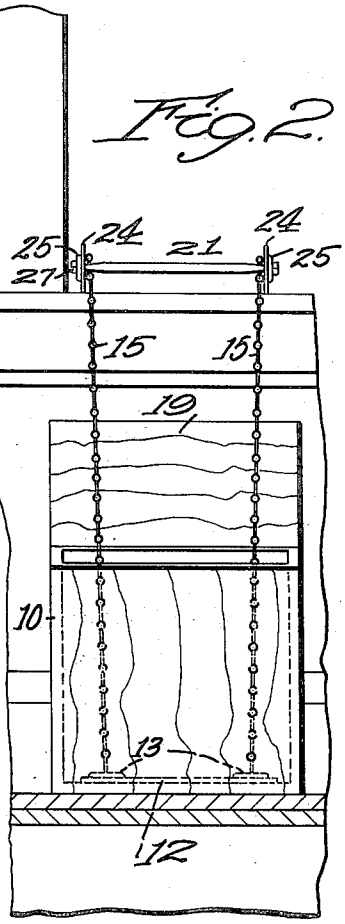


Fig. 3.

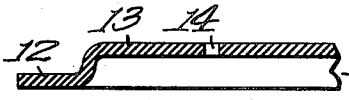


Fig. 4.

Fig. 5.

Fig. 6.

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FIRE ESCAPE LADDER

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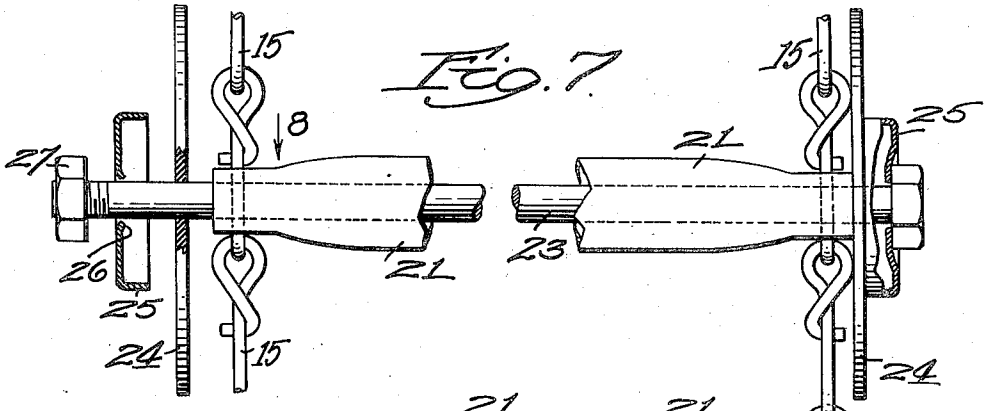


Fig. 7

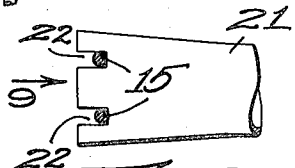


Fig. 8

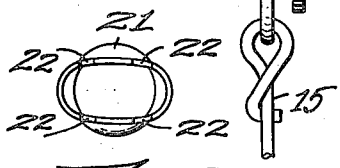


Fig. 9

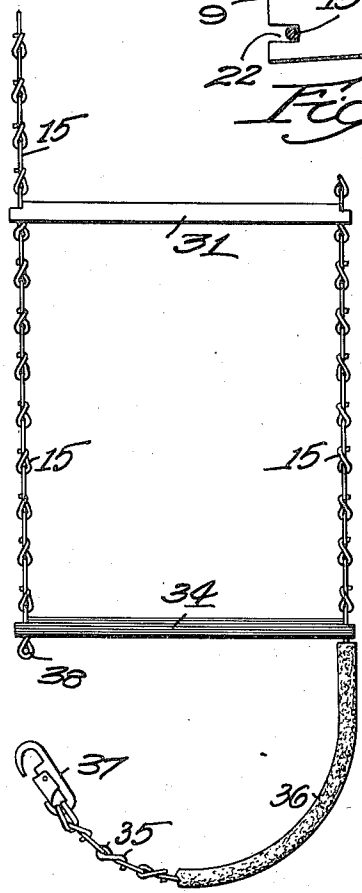


Fig. 11

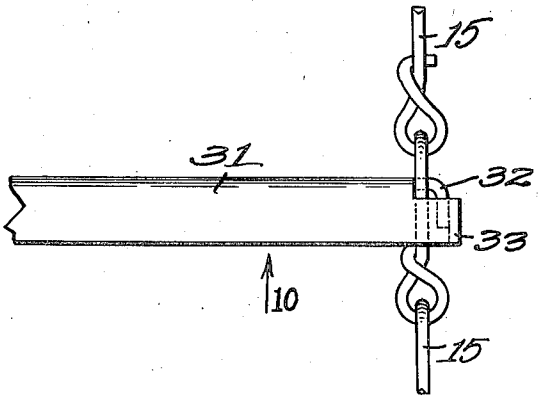
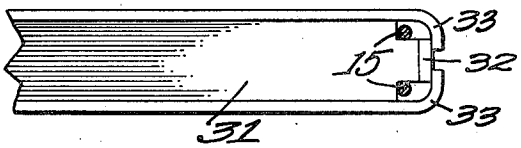


Fig. 10



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FIRE ESCAPE LADDER

Henry St. Pierre, Worcester, Mass.

Application July 2, 1934, Serial No. 733,352

6 Claims. (Cl. 228—42)

This invention relates to a flexible ladder for use in hotels, schools and other buildings to facilitate the escape of persons caught in the building in case of fire.

The principal objects of the invention are to provide a construction of a rung for a ladder which will eliminate the necessity of using pipes for that purpose and also eliminate the nuts and bolts ordinarily employed, thus reducing the expense and danger of their becoming loosened; to provide a construction which can be placed in a box conveniently and in such a way that the lowest rung of the ladder will be distinguishable so that the whole ladder can be removed without tangling; to provide an improved means for securely holding the upper end of the ladder in the box, and to provide a device at the lower end of the ladder for use in lowering a person who is somewhat incapacitated.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a sectional view through a window sill showing the box and ladder in extended position;

Fig. 2 is a side view of the same, looking toward the wall of the building from the inside;

Fig. 3 is a plan of a plate in the bottom of the box for holding the end of the ladder;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a transverse sectional view on the line 5—5 of Fig. 3;

Fig. 6 is a plan of the holding or locking pin for the end of the ladder;

Fig. 7 is an elevation, partly in section, showing the means for holding one of the wheels for keeping the ladder away from the building;

Fig. 8 is a side elevation of the same, looking in the direction of the arrow 8 in Fig. 7;

Fig. 9 is an end view of the same as indicated by the arrow 9 in Fig. 8;

Fig. 10 is a bottom view of one of the rungs of the ladder as indicated by the arrow 10 in Fig. 7, and

Fig. 11 is an elevation of the bottom of the ladder extended.

As fire escape ladders are ordinarily constructed they consist usually of two chains connected by ladder rungs which consist of iron pipes secured to the chains at both ends by bolts and nuts. This construction involves the expense of threading the pipes and the use of nuts and bolts as well as the necessity for assembling the same. All this involves considerable expense. One of the principal objects of this invention is to avoid this expense and it involves additional features as set forth above.

In its preferred construction the ladder is held in a box 10, prefereably of metal, which is screwed to the floor of the room and located under the sill of the window inside. The lag screws 11, which hold it in place, also pass through a plate 12, which thereby is fixed to the bottom of the box. This plate is held therefore firmly in fixed position and is capable of standing the weight of the ladder and the person descending it. It is provided with a pair of hollow elevations 13 which are perforated at 14 to admit the lower end of the bottom link of the chain. These projections furnish in each case a hollow space between the plate and the floor of the box. In fixing the end of the ladder in position, the end link of the chain 15 is put through the opening 14 vertically, as shown in Fig. 5 and a key 16, or locking pin, is inserted in the hollow space and over the lower portion of the link. This key is provided with a narrowed section 17, having notches 18 at its sides to receive the link and fit it so that it constitutes a perfect anchor for the chain. The box is provided with a cover 19 which can be swung up against the wall of the building. The top of the box is slanted so as to shed any water that may come in through the window.

The first feature on the chain after it is extended out the window is a rung 21 formed of pipe or the like and notched at 22 at both ends to receive a link of the chain 15. It is also flattened at this point to some extent. The whole structure 21 is hollow and it receives a single link of the chain at each end, the sides of the link being located in the notches 22. Through this ring passes a headed rod 23 on which are a pair of discs or wheels 24, each formed of a flat plate of thin metal. Outside these discs are caps 25 of thinner sheet metal perforated at the center to receive the rod, that perforation being provided with a depressed edge 26 to engage the rod. One end of the rod is threaded and provided with a nut 27 adapted to be screwed up to hold the rod in proper position and especially to hold the discs correctly.

These caps 25 are of thinner metal than the rest of the structure and the nut is intended to be screwed up hard enough to force the flat end walls of the nut and head inwardly so that they are practically embedded in the recesses thus formed. This holds these parts very

strongly and firmly in position. These parts are all spaced properly by the fact that each disc engages the flat end of the tube 21 and is in turn engaged on the other side by the cap 25 against which the nut 27 or head of the rod engages with the necessary pressure. These wheels 24 are intended to rest on the window sill, either in the position shown or farther out, and a pair of wheels or discs 29 are shown mounted on the chain in the same way and adapted to engage the vertical wall of the building or the vertical side of the projecting member 30. The disc 24 holds the chains away from the window sill inside to permit getting the fingers between the rod and the sill while the wheels or discs 29 space the chain from the outer wall of the building to provide space to receive the feet of the user. In certain cases either the discs 24 or 29 are not necessary.

From this part on to the end of the chain several rungs 31 are provided spaced equally apart. They are made of thin metal bent up to a trough shaped form having a horizontal top and vertical downwardly extending parallel side walls. At each end the top is bent down in the form of a downwardly extending hook 32 and two tongues 33 on the opposite side walls are bent inwardly over and outside the hook 32. This bending of the side tongues 33 is done after a link of the chain is inserted on opposite sides of the hook 32. The bending inwardly of the tongues 33 to the position shown, especially in Fig. 10, anchors this chain link permanently in position with respect to the rung of the ladder and permanently holds the two chains at the proper distance apart so that they will hold in the notches 22.

It will be noticed that the bottom rung 34 has an appearance contrasting with that of the other rungs. It is intended that the other rungs shall be of a metallic appearance or they may be painted a particular color but this rung 34 is painted with a contrasting color, as for example, dark red. When the chain is placed in the box it will be readily discernible and the operator can grasp it first and pull the whole chain out by the bottom rung. This avoids kinking of the chain and the catching of the different rungs. For this reason the chain will not get tangled up.

Another feature shown is the extension 35 of one of the chains 15 beyond the bottom rung to provide a support for a person partially disabled. This is covered with a rubber tube 36 to protect the person from the irregularity of the chain. On the free end this extension 35 is provided with a snap hook 37 adapted to engage in a loop 38 at the bottom of the other chain 15. The idea of this is that in case the person is disabled or partially so, he can have this extension 35 passed around him and the hook 37 caught in the loop 38 and be lowered without climbing down the ladder. He is free to hang to the chain or the rungs of the ladder above. This furnishes an additional safety feature.

It is thought that the method of operation for lowering the chain will be obvious. When the chain is to be placed in the box 10, it is, of course, lowered into it in substantially the proper order so that the bottom of the chain when extended will be at the top of the box. Therefore, the rung 34 will be easily within the sight of any person wishing to use the fire escape. The two sets of wheels or discs 24 or 29 will, of course, be located at the bottom of the box and, as the wheels of each pair are the same distance apart, one pair can be placed a little to the right or left of the other and they will go into the box substantially as indicated in Fig. 1. The rungs 31 and 34 are shorter than the distance between the two discs 24 or 29 so that they will be received between them when in the box. The rest of the chain is lowered down into the box on top of them.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. As an article of manufacture, a fire escape ladder comprising a pair of chains and rungs, each comprising a thin metal member having a top and two downwardly extending sides with the bottom open, the top being provided with an integral hook at each end extending through a chain link and then downwardly adjacent thereto and the sides extending beyond the hook and constituting tongues projecting inwardly and engaging the outside of the hook to hold it permanently in connection with the chain links.

2. As an article of manufacture, a fire escape ladder comprising a pair of chains, rungs for connecting them, a rod extending through two opposite links of the chains, a tube surrounding the rod having its ends flattened and having notches vertically in alignment for receiving the opposite sides of a chain link, a flat disc mounted on the rod and engaging the end of the tube outside the chains, caps on the rod for engaging the discs, and a nut on the rod for the purpose of forcing the discs firmly against the ends of the tube, said discs being adapted for contact with the building to space the ladder therefrom.

3. In a fire escape, the combination of a pair of chains, rungs connecting them, two rods connecting the chains above the top rung and spaced apart, and two discs on each rod for spacing the chains at two longitudinally separated points from the sill of the window in which the fire escape is used, said discs being of substantially larger diameter than that of the rods.

4. In a chain fire escape, the combination of a pair of chains having rungs for separating them and permanently connected thereto and a box adapted to be placed inside the building for containing the ladder, said box having a plate on the bottom with two perforations therethrough for receiving the end links of the two chains therein, keys adapted to be inserted through the said chain links under the plate, said plate being provided with elevations in which said perforations are located to provide a space under them for the ends of the chain links and the keys each having a narrowed portion at the center which, when the key is passed half way through the chain link, will furnish an anchor therefor and constitute the sole means for holding the chain to the plate.

5. In a chain fire escape, the combination of a pair of chains having rungs for separating them, a box adapted to be placed inside the building for containing the ladder, said box having a plate on the bottom with the perforations therethrough for receiving the end links of the two chains therein, said plate being provided with elevations in which said perforations are located to provide a space under them for the ends of the chain links, and keys below said perforations which will furnish an anchor there-

for and constitute the sole means for holding the chain to the plate.

6. As an article of manufacture, a fire escape ladder comprising a pair of chains, rungs for connecting them, a rod extending through two opposite links of the chains, a tube surrounding the rod having its ends flattened and having notches vertically in alignment for receiving the opposite sides of a chain link, a flat disc mounted on the rod and engaging the end of the tube outside the chains, and a nut on the rod for the purpose of forcing the discs firmly against the ends of the tube.

HENRY ST. PIERRE.