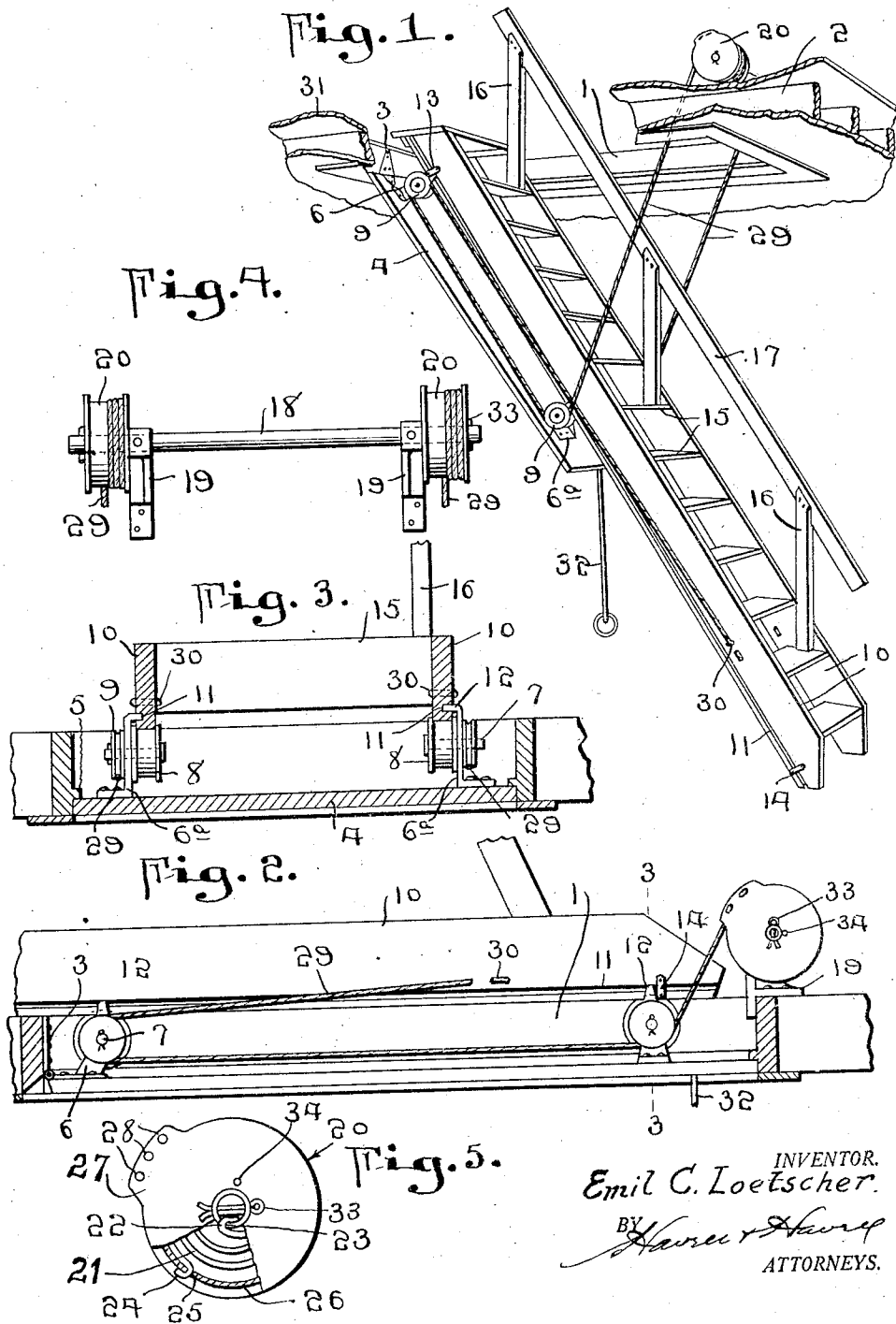


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DISAPPEARING STAIRWAY
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DISAPPEARING STAIRWAY.

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This invention relates to improvements in stairways and more particularly to movable stairways for dwellings and the like, in which it is desired to save floor space by having the stairway hinged so that it can be swung upward and made to disappear through a hatchway in the ceiling.

The primary object of the invention is to provide a construction of this character which will save the floor space usually occupied by a fixed stairway leading from the top floor of a dwelling to the attic.

Another object of the invention is to provide a combined stairway and hatchdoor, and means to permit the stairway to be moved upwardly above the door when the latter is closed.

A further object is to provide a combined hatchway door and movable stairway and means cooperating with the same to permit the door to be opened and closed and the stairway to be raised or lowered with very little effort on the part of the operator.

The invention consists essentially of a hinged door adapted to normally close the hatchway in a ceiling; a stairway slidably mounted on said door and adapted to either extend downwardly to a floor beneath the ceiling or to occupy a position above the ceiling when the door is closed; and spring operated means or the like to assist in raising the stairway and closing the door.

With the foregoing objects outlined, and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawing and more particularly pointed out in the appended claim.

Referring to the drawing:

Fig. 1 is a perspective view partly in section of the complete construction.

Fig. 2 is a side view partly in section with a portion of the stairway broken away for the purpose of illustration.

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is an elevation of the spring drums, their supporting shaft and the brackets which carry such shaft.

Fig. 5 is a side view partly in section of one of the spring drums.

In the drawing, 1 represents the frame of a hatchway provided in a ceiling 2. Hinges 3 are connected to one end of this frame and

these hinges carry a vertically swinging door 4 adapted to close the frame and to bear against an internal flange 5 in the frame when the door is closed.

Brackets 6 are preferably integral with the hinges 3 and similar brackets 6^a are arranged near the swinging end of the door. Each of these brackets supports a shaft 7 on which is mounted a flanged guide roller 8 and a grooved pulley 9. The flanged rollers 8 act as rollers or sliding means for the side bars or stringers 10 of the disappearing stairway, and to prevent the stringers from moving away from the rollers, each stringer is provided with a longitudinal groove 11 to receive a lug or hook 12 integral with the supporting bracket 6, 6^a. These grooves preferably extend the full length of the stringers to facilitate manufacture, and stops 13 and 14 cross the grooves near the ends of the same to prevent the stairway from sliding off of the hooks 12, and to also limit the upward and downward movements of the stairway relatively to the door 4.

The stairway, as is usual, includes treads 15 arranged between and secured to the stringers 10, and posts 16 are connected to one stringer and carry a hand rail 17.

From the foregoing description it may be seen that when the door 4 is closed, the stairway will be in its uppermost position and be housed above the ceiling 2, and when the doorway is opened, the stairway may slide downwardly until its lower end strikes the floor. To facilitate these movements, a shaft 18 is fixed to brackets 19 that are secured to the end of the doorway 1 opposite to that carrying the hinges 3. Loosely mounted on this shaft are drums 20. Each drum is hollow, as best shown in Fig. 5, and arranged within the drum, is a spring 21. This spring is coiled and its inner hooked extremity 22 is anchored in a slot 23 at the end of the shaft 18, while its outer hooked extremity 24 is anchored in a slot 25 in the periphery 26 of the drum. Each drum has flanges at its edges and one flange of each drum has an extension 27 provided with holes 28. A cable 29 cooperates with each drum and has one of its ends threaded through the holes 28 of that drum to fix that end of the cable to the drum. From each drum each cable is passed below the grooved pulley 9 carried by the bracket 6^a; then under and over the pulley 9 carried by

the bracket 6 and then has its other end anchored in one of the side stringers 10 of the stairway, as shown at 30.

The operation of the device is as follows.

Assuming that the stairway is in its lowered position, as when in use, the operator lifts the lower end off the floor and at the same time exerts sufficient pressure upwardly on the stairs to cause the stairway to roll or slide upward on the flanged wheels 8. When this motion is halted by the lower stops 14, the upper end of the stairway will project into the attic and tend to counterbalance the lower end and the door 4. This counterbalancing is augmented by the tension of the springs 21 acting on the cables 29 and is sufficient to overbalance the weight of the door 4 and stairway, so that the door automatically closes and the stairway disappears through the opening in the frame 1 and assumes an approximately horizontal position on the attic floor 31. To return the stairway to the lower position, shown in Fig. 1, it is only necessary to reverse the operation just described. This is accomplished by pulling on the member 32 and at the proper time taking hold of the lower end of the stairs and pulling the same down to the floor. During this operation, the springs 21 wind to increase their tension, so that they will function in returning the stairway to the upper position in the ceiling opening.

In order to prevent winding of the cables on the drums 20 in the wrong direction when installing the stairway and thus causing the breaking of one or both springs, the following method and means is used: The shaft 18 has cotter pins 33 at its ends which in addition to holding the drums 20 on the shaft are used initially to lock the drums against turning. To accomplish this purpose, apertures 34 are arranged in the outer side plates of the drum. Before the device leaves the factory, nails or the like are placed through the eyes of the cotter pins and through the holes 34 and these nails will prevent the drums from turning. Then when the goods are packed, the cables

are wound on the drums in the proper direction and fastened with wires or the like. When the stairway is being installed, the wires holding the cables on the drums are removed and the locking pins or nails are also removed from the eyes of the cotter pins and the apertures 34. The cables can then be unwound until sufficient tension is secured on the springs within the drums. The locking pins or nails are again inserted, so that the tension will remain on the springs until the cables have been passed about the pulleys 9 and secured at 30 to the stairway. This makes it easy to attach the cables on the stairs and ensures the cables being wound on the drums in the proper direction. After the work is finished, the locking pins are permanently removed to permit free rotation of the drums.

From the foregoing it is believed that the operation and advantages of the invention may be readily understood and it is apparent that changes may be made in the details disclosed without departing from the spirit of the invention as expressed in the claim.

What is claimed and desired to be secured by Letters-Patent is:

In a device of the class described, a horizontally disposed door frame, a vertically swingable door hinged at one end of the frame, spaced pairs of pulleys mounted on the door, one pair being arranged near the inner end of the door, and the other pair near the other end of the latter, a stairway slidably mounted on the door, said pulleys being arranged at opposite sides of the stairway, brackets mounted at the other end of the frame, a shaft carried by said brackets, spaced drums mounted at the ends of the shaft, a coiled spring in each drum having one of its ends connected to the shaft and its other end connected to the drum, and cables connecting the drums to opposite sides of the stairway, each cable extending from a drum under one pulley of each pair of pulleys, and from the pulley nearest the hinge of the door, to the stairway.

In testimony whereof I affix my signature.

EMIL C. LOETSCHER.