Jan. 29, 1963 S. S. GOULD 3,075,612

EMERGENCY ESCAPE LADDER

Filed July 17, 1961

FIG. 3

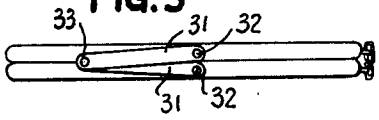


FIG. 2

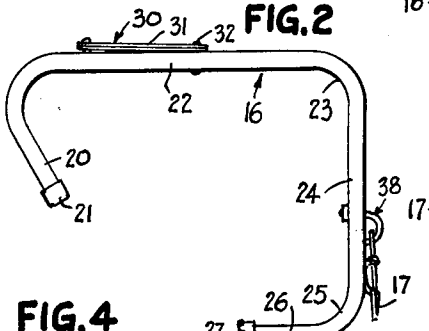


FIG. 4

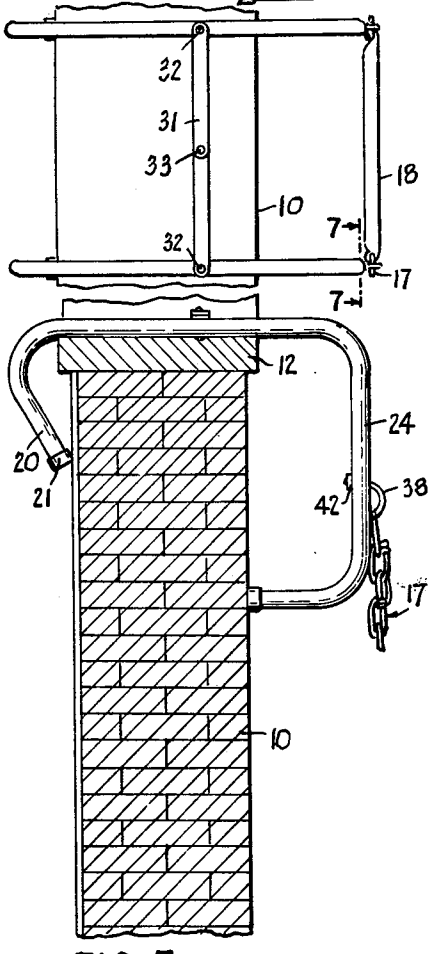


FIG. 5

FIG. 1

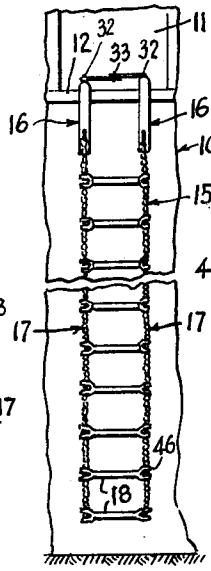


FIG. 6

FIG. 7

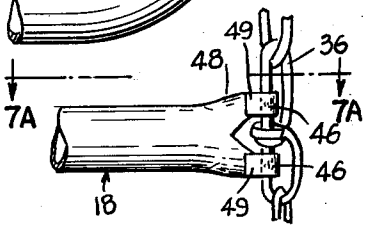
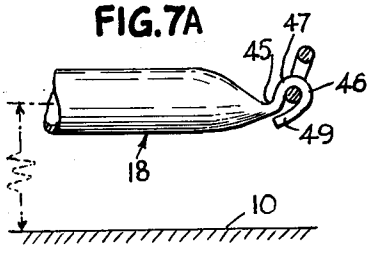


FIG. 7A



INVENTOR.
SIDNEY S. GOULD
BY
Percy Freeman
ATTORNEY.

United States Patent Office 3,075,612 Patented Jan. 29, 1963

3,075,612

EMERGENCY ESCAPE LADDER

Sidney S. Gould, Hewlett Harbor, N.Y., assignor to Combined Industries Inc., Far Rockaway, N.Y., a corporation of New York

Filed July 17, 1961, Ser. No. 124,482
3 Claims. (Cl. 182—196)

This invention relates generally to ladder constructions, and is especially concerned with a highly improved emergency escape ladder.

It is one object of the present invention to provide an emergency escape ladder which is readily collapsible to occupy a minimum of space in storage, and which can be quickly and easily placed in operative condition for use in an emergency.

It is a further object of the present invention to provide an emergency escape ladder of the type described which is entirely reliable in use, having simple suspension members adapted for quick and easy hooking engagement over a window sill, whereupon the ladder proper falls automatically to its extended length ready for use.

It is still a further object of the present invention to provide an emergency escape ladder having the advantageous characteristics mentioned in the preceding paragraph which is relatively light in weight for easy handling even by children, and which is rugged, durable and completely safe in use.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

FIG. 1 is an exterior elevational view showing an emergency escape ladder of the present invention in operative condition in conjunction with a building, being partly broken away to conserve drawing space.

FIG. 2 is a side elevational view of the suspension members of the instant invention adapted for engagement over a window sill, one suspension member being obscured behind the other.

FIG. 3 is a top plan view showing the suspension members of FIG. 2 in a closed or collapsed condition.

FIG. 4 is a top plan view showing the suspension members in an open, operative condition.

FIG. 5 illustrates the suspension members in operative association with a building wall.

FIG. 6 is a partial, enlarged elevational view showing certain details of the suspension members.

FIG. 7 is a sectional view, drawn to an enlarged scale, taken on line 7—7 of FIG. 4.

FIG. 7A is a sectional view taken substantially along the line 7A—7A of FIG. 7.

Referring now more particularly to the drawings, and specifically to FIG. 1 thereof, a building wall is there generally designated **10**, the wall being provided with a window opening **11** having a generally horizontal sill **12**. An escape ladder constructed in accordance with the teachings of the present invention is generally designated **15**, and includes a pair of suspension members **16** removably engaged in hook relation over the window sill **12**. Depending from each of the suspension members **16** is a flexible side piece, elongate member or chain **17**; and, a plurality of generally horizontal, vertically spaced rungs **18** extend laterally between and have their opposite ends connected to respective elongate members **17**.

The suspension members **16** may be substantially identical to each other, each being preferably formed from an elongate tube having one end region hooked, as at **20** and terminating in a free end preferably provided with an end cap **21**. As best seen in FIGS. 2 and 5, each suspension member **16** includes a generally horizontal portion **22** extending from the hooked end region **20** and adapted to project over and outward beyond a window sill **12**. The outer end region of the horizontal portion **22** is curved downward, as at **23**, and depends therefrom, as at **24**, to extend generally vertically exteriorly of a building wall **10**. The lower region of depending portion **24**, as at **25**, is smoothly bent or curved to form an inward projection **26** having its inner end free for abutting engagement with the building wall **10**, best seen in FIG. 5. The free inner end of the abutment projection **26** may be provided with an endpiece **27**.

The pair of suspension members **16** are arranged in side-by-side relation, as seen in FIGS. 1, 3 and 4, and may have their upper, horizontal portions **22** connected together by suitable means **30** for convenient movement toward and away from each other in substantially parallel planes. The connection means **30** in the illustrated embodiment consists of a pair of links **31** each having one end pivoted, as at **32** to a medial region of a respective horizontal portion **22**. The other ends of the links **31** are pivotally connected together as by a pivot **33**, so that the links are relatively swingable, as between the collapsed condition of FIG. 3 with the links lying in close relation with each other, and the extended or operative condition of FIG. 4 with the links extending in substantial alignment with each other in opposite directions from the pivotal connection **33**.

The flexible elongate members **17** are preferably each of a chain construction, as best seen in FIG. 6, and may advantageously be of the chain type wherein each link **35** is of an 8-shaped configuration having a pair of oppositely outwardly extending loops **36**. In operative condition in the instant invention, the loops **36** of each link **35** extend oppositely vertically, one loop extending vertically upward and the other extending vertically downward.

The upper end of each flexible elongate member or chain **17** is connected to a respective suspension member **16** by connection means, generally designated **38**, and best seen in FIG. 6. The connection means **38** may consist of a generally U-shaped rod or U bolt **39** having its bight region disposed generally vertically forward of a respective depending suspension-member portion **24**. The legs **40** and **41** of the U bolt **39** are thus spaced vertically from each other, the former being uppermost, and extend generally horizontal inward into the depending portion **24** with the upper leg projecting through the inner side of the depending portion and there secured by an internally threaded nut **42** or other suitable securing means. The lower leg **41** of U bolt **39** may extend through the upwardly extending loop of the uppermost link **35** into the depending portion **24**, having its inner end in abutting engagement with the inner surface of the depending portion. In this way, each chain **17** is anchored at one end to a respective suspension member **16** without the use of cross pins, which in the past were found to be unreliable.

The rungs **18**, best seen in FIGS. 7 and 7A, are each preferably fabricated of a generally cylindrical, hollow tubular member. Each tubular member or rung is preferably formed on one side only with a transversely extending indentation or crease **45** adjacent to and spaced inward from each end of the tubular member. The creases **45** are preferably formed on the inner side of each rung **18**, as best seen in FIG. 7A. Further, each

crease 45 extends generally normal to the axial dimension of its respective rung 18.

The end regions 46 of each rung 18, longitudinally outward beyond the creases 45, are preferably relatively flat and are arcuately curved or curled about an axis extending through and substantially normal to the axis of the tubular member or rung. More specifically, each tubular-member end portion 46 beyond an adjacent crease 45, see FIGS. 7 and 7A, may extend initially inward, as at 47 on the inner or same side as the crease 45, and then curves arcuately to extend on the outer or opposite side of the crease 45, there terminating to define approximately a single convolution having its axis substantially normal to and intersecting with the axis of the tubular member. As best seen in FIG. 6, the arcuately curved end portion 46 may be bifurcated, as by a longitudinally inwardly extending cutout 48 to define a pair of vertically spaced, axially aligned curled legs 49. It is preferred that each of the curled legs 49 of the end portion 46 extend through and in engagement with a respective upper and lower loop 36 of a single link 35.

By this construction, maximum strength of the rungs 18 is obtained, the creases 45 affording a reinforcing action in the nature of ribs or grooves, and bending being minimized by location of the curled end portion legs 49 on and normal to the axis of the respective rung. Further, the engagement of upper and lower legs 49 through respective upper and lower link loops 36 effectively distributes load and prevents high local stresses in the carrying link. Also, this construction is effective to prevent possible entangling of the chains 17 and rungs 18 in the collapsed condition.

While use of the instant emergency escape ladder is believed obvious from the foregoing description, it may be set forth briefly as follows. From the collapsed condition of suspension members 16, as seen in FIG. 3, it is only necessary to spread the suspension members apart to their parallel spaced condition of FIG. 4 and engage the suspension members through the window opening 11. With the upper horizontal portions 22 resting on the window sill 12, the hook regions 20 will engage on the inner side of the window sill to prevent outward withdrawal through the window of the suspension members. The elongate flexible members or chains 17 are dropped to assume the condition of FIG. 1, and the abutment portions 26 of the suspension members have their ends 27 engaging the building wall 10 by reason of the weight of the chains and rungs. In this condition, the rungs 18 and flexible members 17 are spaced amply outward from the wall 10, and one or more users may climb down the ladder. In collapse of the ladder, as for storage, it is only necessary to retract the elongate members 17, as by folding or winding, and move the suspension members into their adjacent relation of FIG. 3, whereupon the entire assembly requires but little space for storage.

From the foregoing, it is seen that the present invention provides an emergency escape ladder which fully accomplishes its intended objects and is well adapted to meet practical conditions of manufacture, storage and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A ladder comprising a pair of flexible elongate side pieces and a plurality of rungs extending from said side pieces, each of said rungs comprising a generally cylindrical tubular member having a transverse crease on only one side adjacent to and spaced inward from each end of said tubular member, the end region of said tubular member between each crease and the adjacent end being curled in engagement about the adjacent side piece for securement thereto, said end regions each being curled about an axis intersecting with and generally normal to the axis of said tubular member, said flexible elongate side pieces each comprising a chain having generally 8-shaped links and said rung end regions each being bifurcated and having its legs each curled in engagement about a different loop of the same link of the adjacent chain.

2. A ladder according to claim 1, further characterized by having the upper end of each of said flexible elongated side pieces connected to a generally hook-shaped suspension member for hooked engagement over a window sill, said hook-shaped suspension members being pivotally connected together by a foldable spreader member whereby said suspension members may be maintained selectively in spaced apart relation and in contiguous relation.

3. A ladder according to claim 1, said end regions each being curled approximately a single convolution toward the other side of said tubular member.

References Cited in the file of this patent

UNITED STATES PATENTS

146,274	Parent	Jan. 6, 1874
323,288	Arrowsmith	July 28, 1885
331,736	Rose	Dec. 1, 1885
406,257	Butler	July 2, 1889
656,732	Scott	Aug. 28, 1900
988,719	Keyes	Apr. 4, 1911
1,424,115	Nileon	July 25, 1922
1,608,054	Brighton	Nov. 23, 1926
1,872,680	Chiles	Aug. 23, 1932
2,187,633	Smith	Jan. 16, 1940
2,385,824	Margolin	Oct. 2, 1945
2,678,243	Masse	May 11, 1954
2,881,028	Baird	Apr. 7, 1959

FOREIGN PATENTS

853,337	France	Nov. 28, 1939