June 5, 1956 L. T. PRICE 2,749,009

FOLDING LADDER

Filed July 14, 1954 2 Sheets-Sheet 1

Fig. 1

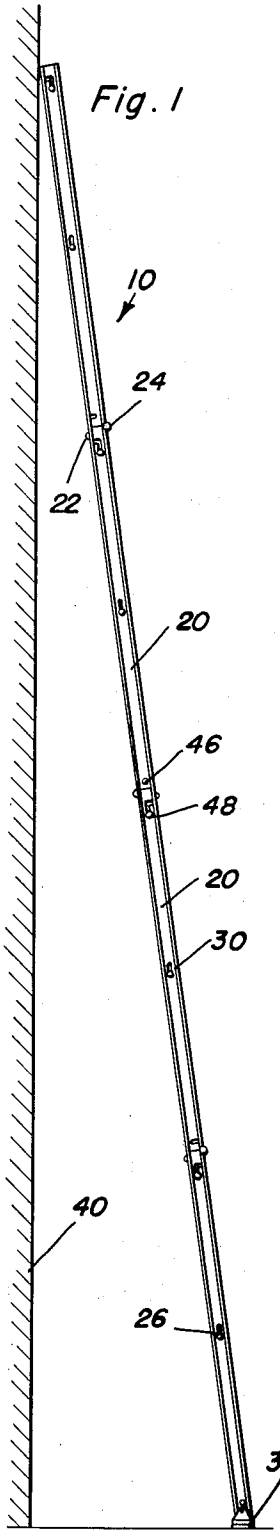


Fig. 2

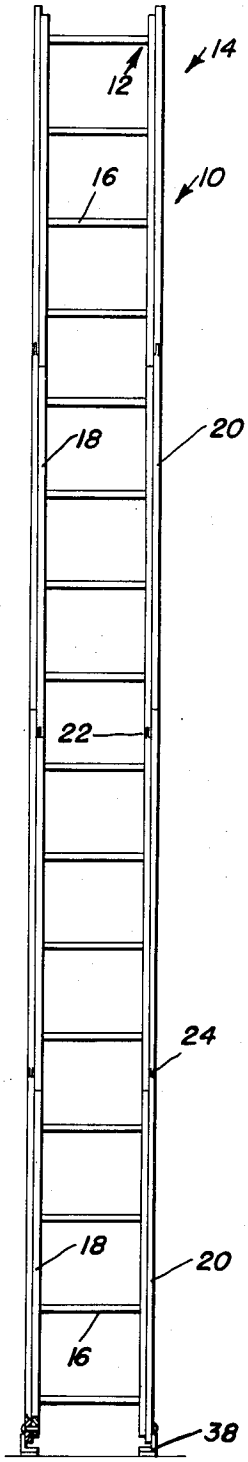


Fig. 3

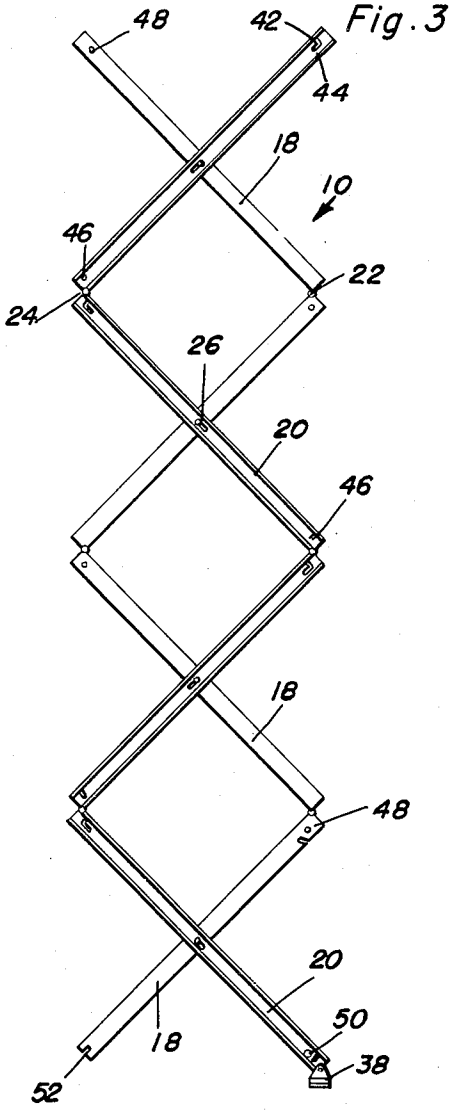
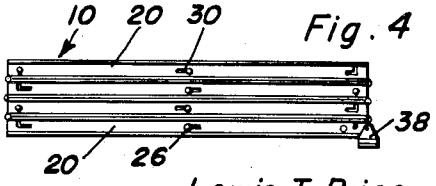


Fig. 4



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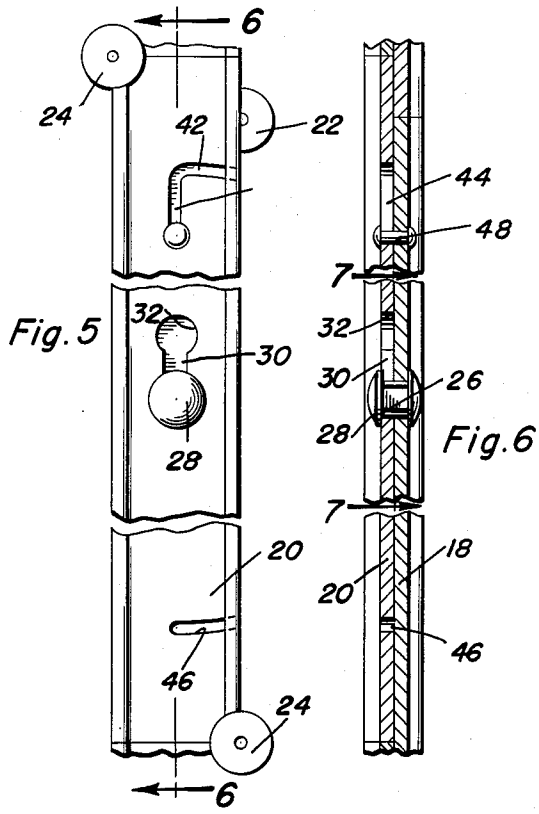


Fig. 5

Fig. 6

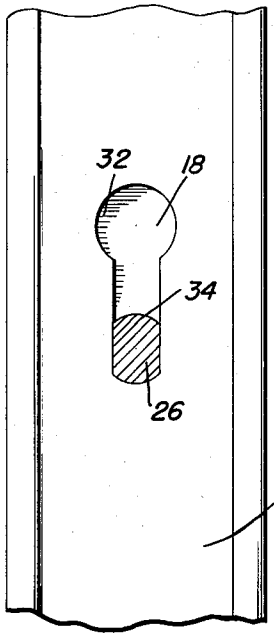


Fig. 7

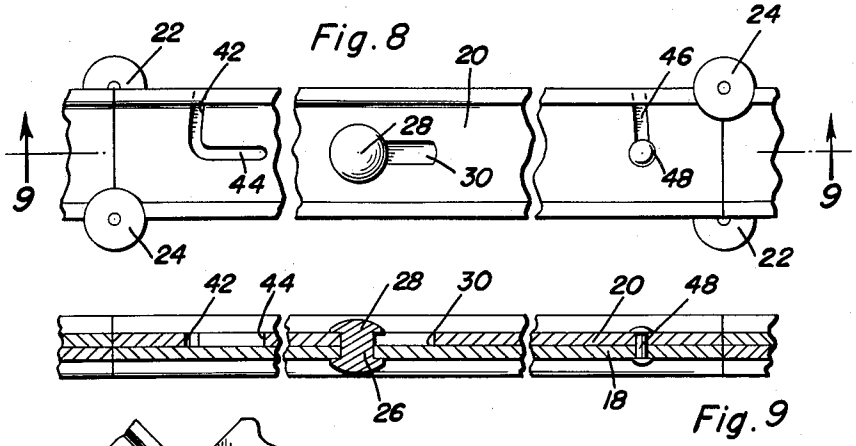


Fig. 8

Fig. 9

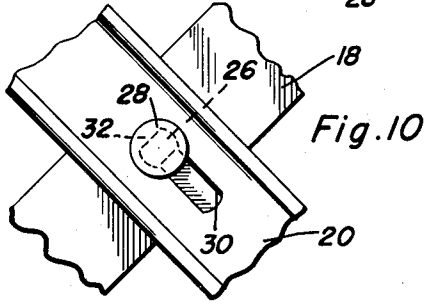


Fig. 10

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FOLDING LADDER

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6 Claims. (Cl. 228—19.2)

This invention relates to a folding ladder, and more specifically provides a ladder having stiles or side rails constructed of a plurality of sections that may be folded from an extended longitudinally aligned position to a folded parallel overlying position.

An object of this invention is to provide a folding ladder that is simple in construction, easy to fold into a compact condition for storage or transport and easy to unfold to an extended position, positively locked in its extended position, thereby preventing accidental folding, well adapted for its intended purposes and relatively inexpensive to manufacture.

Another object of this invention is to provide a folding ladder having side rails or stiles constructed of a plurality of hinged sections that form a lazy tong structure together with improved and novel locking means for rotaining the sections of the stiles in longitudinal alignment and permitting easy folding of the sections to a parallel overlying position.

A still further object of this invention is to provide a folding ladder wherein the side rails are constructed of a pair of longitudinally movable members wherein each of the members are constructed of sections hingedly interconnected together with means for preventing longitudinal movement of the side rail members except when the side rail members are disposed alongside each other with the sections thereof in longitudinal alignment.

Still another important object of the present invention is to provide a folding ladder constructed of a lazy tong structure wherein bayonet slot interconnecting means is provided for releasably locking the ladder in extended position.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a side elevational view showing the folding ladder of the present invention in extended position and in operative position against a wall of a building or the like;

Figure 2 is a front elevational view of the construction of Figure 1 showing the relationship of the hinge connection between the adjacent sections when the ladder is in extended position;

Figure 3 is a side elevational view showing the folding ladder of the present invention in partially folded condition, showing the relationship of the side rail sections as the ladder is being folded or unfolded;

Figure 4 is a side elevational view showing the folding ladder of the present invention in its folded position wherein the ladder is compact for easy transport or storage;

Figure 5 is an enlarged side elevational view showing the details of construction of adjacent sections of a portion of the side rails of the folding ladder;

Figure 6 is a longitudinal, vertical sectional view taken substantially along section line 6—6 of Figure 5 showing the details of construction and the relationship of the elements of the ladder side rails;

Figure 7 is a detailed sectional view taken substantially along section line 7—7 of Figure 6;

Figure 8 is a detailed and enlarged side elevational view showing one of the side rails when in its collapsed position, showing the relationship of the hinge connection between the adjacent section and the position of the hinge pin and locking projection;

Figure 9 is a longitudinal, vertical sectional view taken substantially along section line 9—9 of Figure 8 showing further structural details of the ladder side rail when in its folded position; and

Figure 10 is a detailed side elevational view showing the relationship of the pivot pin wherein the sections of the folding ladder are partially folded.

Referring now specifically to the drawings, it will be seen that the numeral 10 generally designates the folding ladder of the present invention wherein the ladder 10 includes side rails having inner stiles or members 12 and outer stiles or side members 14. The inner stiles 12 are spaced laterally from each other by a plurality of ladder rungs 16 which are preferably of cylindrical cross-section and connected to the inner stiles 12 in any conventional manner. The inner stiles 12 are constructed of a plurality of sections 18 and the outer stiles 14 are constructed of a plurality of sections 20 with the sections 18 connected by hinge members 22 and the sections 20 connected by hinge means 24 wherein the hinge means 22 and 24 are disposed on alternate sides of the stiles 12 and 14 wherein adjacent sections 18 of the inner stiles 12 and adjacent sections 20 of the outer stiles 14 may be folded to a parallel and overlying position. The central portion of the sections 18 is provided with a projecting pin 26 that is provided with a headed portion 28, and the central portion of the sections 20 are each provided with a slot 30 having a cylindrical portion 32 at its upper end, and the pin 26 is generally polygonal in cross-sectional area with arcuate side edges 34 which are substantially similar to the circular portion 32 of the slot 30.

As seen in Figures 1–3, a pivotally mounted foot 38 is pivotally mounted to the lowermost section 20 of the outer stile 14 for engaging a supporting surface, and it will be also seen that the outer stiles 14 are longer than the inner stiles 12 wherein the outer stiles 14 will actually engage the supporting surface and a building wall or the like 40 in order to assure that the inner stiles 12 will move longitudinally in relation to the outer stiles 14 in order to register the pivot pin 26 with the cylindrical portion 32 and the vertical portion of the slot 30. Adjacent one end of each of the outer sections 20 is a right angular slot having a horizontal portion 42 and a vertical depending portion 44. Adjacent the other end of each of the sections 20 is provided a horizontal slot 46 and at one end of each of the inner sections 18 is provided a projection 48 for a purpose described hereinafter.

Adjacent the lower end of the lowermost section 20 is provided a projecting stud 50 and the lower end of the lowermost section 18 is provided with a U-shaped notch 52 for a purpose described hereinafter.

In operation and with the device folded substantially as illustrated in Figure 4, it will be seen that the projection 48 on each of the sections 18 is received in the slots 46 wherein the adjacent sections 18 and 20 of the inner and outer stiles 12 and 14 are positioned in parallel overlying and engaging position. As the uppermost ends of the uppermost sections 18 and 20 are grasped and raised, the sections 18 and 20 pivot about pivot pin 26

until adjacent sections **18** of the inner stile **12** and adjacent sections **20** of the outer stile **14** are longitudinally aligned and coextensive. When this position is reached, the notch **52** is positioned directly over the stud **50** and the projection **48** on each section **18** is positioned in the horizontal portion **42** of the bayonet slot and the pivot pin **26** is disposed with the flat sides parallel to the vertical portion of the slot **30** wherein the inner stile **12** and the sections **18** will be moved longitudinally downwardly in relation to the outer stile **14** and the sections **20**. This moves the projection **48** into the vertical portion **44** of the bayonet slot and moves the polygonal pin **26** downwardly into the vertical portion of the slot **30** and engages the notch **52** with the projecting stud **50**, thereby securely locking the stiles **12** and **14** in extended position wherein the sections **18** and **20** are longitudinally aligned with the stiles **12** and **14** positioned alongside each other. As the stiles **12** move downwardly, the hinge connections **22** are misaligned with the hinge means **24** on the stiles **14** which also lock the ladder **10** in extended position. When it is desired to fold the ladder **10**, it will only be necessary to raise the inner stiles **12** in relation to the outer stiles **14** and pivot the aligned hinge connections **22** and **24** in opposite directions wherein the hinge pins **26** which have been raised out of the vertical portions of the slot **30** into the cylindrical portion **32** will pivot the sections **18** and **20** about each other, thereby removing the pins **48** from the horizontal portions of the bayonet slot, and moving the notch **52** away from the stud **50**. As the sections **18** and **20** are folded to the position substantially as illustrated in Figure 4, the projections **48** will engage the respective notches **46** in the end of the sections **20** remote from the bayonet slot wherein the adjacent sections **18** and **20** of the inner and outer stiles will overlie and engage each other wherein the device will be folded in a compact condition. Obviously, the various elements of the invention may be constructed of readily obtainable materials by well known manufacturing processes, thereby enhancing the economic feasibility of the invention.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A folding ladder comprising a pair of stiles interconnected by a plurality of longitudinally spaced rungs, each of said stiles formed of a plurality of terminally hingedly connected sections, a side member positioned alongside each of said stiles, each of said side members formed of a plurality of terminally hingedly connected sections of substantially the same length as the stile sections, the central portions of the side member sections and the adjacent stile sections being pivotally secured together thereby forming a lazy tong structure, and means for locking the lazy tong structure in extended position, said sections being provided with a centrally positioned pivotal and slidable connection wherein the stiles and side members are longitudinally movable in relation to each other, and said locking means including a projection on one section, and a bayonet slot on the other sections wherein the projection will be engaged with the entrance of the slot when the sections are moved alongside each other and locked in the slot when the sections are moved longitudinaly of each other, said projection and slot being spaced from the pivotal and slidable connection between adjacent side-by-side sections thereby locking said sections in side-by-side relation wherein the side members and stile are locked in extended position.

2. A folding ladder comprising a pair of stiles interconnected by a plurality of longitudinally spaced rungs, each of said stiles formed of a plurality of terminally hingedly connected sections, a side member positioned alongside each of said stiles, each of said side members formed of a plurality of terminally hingedly connected sections of substantially the same length as the stile sections, the central portions of the side member sections and the adjacent stile sections being pivotally secured together thereby forming a lazy tong structure, and means for locking the lazy tong structure in extended position, said sections being provided with a centrally positioned pivotal and slidable connection wherein the stiles and side members are longitudinally movable in relation to each other, and said locking means including a projection on one section, and a bayonet slot on the other section wherein the projection will be engaged with the entrance of the slot when the sections are moved alongside each other and locked in the slot when the sections are moved longitudinally of each other, said projection and slot being spaced from the pivotal and slidable connection between adjacent side-by-side sections thereby locking said sections in side-by-side relation wherein the side members and stile are locked in extended position, said sections being foldable for overlying each other, a slot on the other section receiving said projection when the sections are folded to a parallel overlying position.

3. A folding ladder comprising a pair of stiles interconnected by a plurality of longitudinally spaced rungs, each of said stiles formed of a plurality of terminally hingedly connected sections, a side member positioned alongside each of said stiles, each of said side members formed of a plurality of terminally hingedly connected sections of substantially the same length as the stile sections, the central portions of the side member sections and the adjacent stile sections being pivotally secured together thereby forming a lazy tong structure, and means for locking the lazy tong structure in extended position, said sections being provided with a centrally positioned pivotal and slidable connection wherein the stiles and side members are longitudinally movable in relation to each other, and said locking means including a projection on one section, and a bayonet slot on the other section wherein the projection will be engaged with the entrance of the slot when the sections are moved alongside each other and locked in the slot when the sections are moved longitudinally of each other, said projection and slot being spaced from the pivotal and slidable connection between adjacent side-by-side sections thereby locking said sections in side-by-side relation wherein the side members and stile are locked in extended position, each of said side members being provided with a stud projecting inwardly from the lower end of the lower section thereof the lower end of the lower section of each of the stiles having a longitudinally extending notch for receiving the studs whereby the sections will be retained in parallel position when the stiles move downwardly in relation to the side members after the side members and stiles are extended to a parallel position.

4. A folding ladder comprising a pair of stiles interconnected by a plurality of longitudinally spaced rungs, each of said stiles formed of a plurality of terminally hingedly connected sections, a side member positioned alongside each of said stiles, each of said side members formed of a plurality of terminally hingedly connected sections of substantially the same length as the stile sections, the central portions of the side member sections and the adjacent stile sections being pivotally secured together thereby forming a lazy tong structure, and means for locking the lazy tong structure in extended position, said side members being longer than the stiles and provided with a bayonet slot and a central pivot slot for permitting longitudinal movement of the stiles from an unlocked upper position, with the hinge connections

aligned to a lower locked position with the hinge connections misaligned and the projections on the stiles received in the longitudinal portions of the bayonet slots.

5. A folding ladder comprising a pair of inner and a pair of outer stiles, ladder rungs interconnecting the inner stiles, each of said inner and outer stiles constructed of a plurality of hingedly connected sections forming lazy tong stiles for folding to a parallel overlying position and extending to a longitudinally coextensive position with the inner and outer stiles positioned alongside each other, and means pivotally connecting the central portion of the sections of each of the inner stiles to the central portion of the sections of the adjacent outer stiles.

6. A folding ladder comprising a pair of inner and a pair of outer stiles, ladder rungs interconnecting the inner stiles, each of said inner and outer stiles constructed of a plurality of hingedly connected sections forming lazy tong stiles for folding to a parallel overlying position and extending to a longitudinally coextensive position with the inner and outer stiles positioned alongside each other, and means pivotally connecting the central portion of the sections of each of the inner stiles to the central portion of the sections of the adjacent outer stiles, and releasable interlocking means on the stile sections for locking the sections in longitudinal alignment and permitting folding of the sections to a parallel overlying position.

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