Our invention relates to improvements in folding stool-ladder, and more particularly to folding and locking structure thereof.

One object of our invention is to provide improved means for foldably connecting several elements of a stool and also locking them in any one of a plurality of predetermined relative angular positions.

Another object of our invention is to provide a stool-ladder which is foldable three-fold, and may be extended and held rigid for use as either a ladder or a stool.

There are other objects and particularities of our present invention, as will be hereinafter more fully described and claimed.

In the accompanying drawing; Fig. 1 is a general perspective view of our improved stool-ladder in a semi-extended position; Fig. 2 is a longitudinal sectional elevation of the stool-ladder in the same position as in Fig. 1; Fig. 3 is a partial sectional view, in an enlarged scale, taken at line III—III in Fig. 2; Fig. 4 is a partial sectional view, in an enlarged scale, taken at line IV—IV in Fig. 2; Figs. 5, 6 and 7 are perspective views showing the stool-ladder in various relative positions of its elements, respectively.

Referring to Figs. 1 to 4 inclusive, our improved stool-ladder comprises three ladder elements 1, 2 and 3. Each of these ladder elements are formed by a pair of side-bars 4 and a plurality of cross members or rungs 5 respectively fixed at the ends and bridging the corresponding side-bars 4.

The first ladder element 1 is provided, at one end, with a pair of segmental discs or ear-pieces 6, one secured to each side-bar, by means of, for example, an integral extension 7 and a screw 8 which extends through the extension 7 and the corresponding side-bar 4. Between the ear-pieces 6 are mounted a foot plate 9 suitably secured thereto at the ends.

The second ladder element 2 has, at its end adjacent to the first element 1, a pair of discs 10 which are secured to the respective side-bars 4 in a similar manner as hereinbefore described in connection with the ear-pieces 6, by means of integral extensions 11 and screws 12. A foot plate 13 is mounted between these discs 10, and suitably secured thereto at the ends.

The ear-pieces 6 and discs 10 are disposed so as to lap each other, and pivotally connected or hinged with each other, by means of a bolt or bar 14 which extends through suitable bores or perforations respectively formed in the ear-pieces 6 and discs 10 in alignment and held in position by suitable means, such as nut 15 engaging its ends. Consequently, the two elements 1 and 2 are pivotally connected with each other.

A tubular member or casing 16 is laterally disposed between the ear-pieces 6 and secured thereto. The casing 16 is provided with a pair of longitudinal slots or openings 17 and a stop 18 formed therein. Within the casing is mounted a pair of slidable members 19, a portion of each member 19 extending outside through each of said openings 17. Each member 19 has, fixed thereto, a laterally and outwardly extending pin 20 which extends through a corresponding perforation formed in the adjacent ear-piece 6, and is adapted to engage one of a plurality of perforations 21 formed in the adjacent disc 10, as will hereinafter be described.

A pair of coil springs 22 contained in the casing 16, and disposed between the stop 18 and respective slidable members 19, tend to bias the pins 20 to the outermost position as clearly shown in Fig. 3, thus forming resilient means for normally holding the pins in the position.

Each of the discs 10 are provided with a plurality of perforations 21 formed therein and circumferentially spaced from each other. The spacing may be either equi-distant or non-equidistant. The radial position of these perforations must correspond to the pins 20.

Thus, it will readily be understood that the ladder elements 1 and 2 are foldable with each other with the bolt 14 as a pivot. In order to enable such folding, the slidable members 19, 19 should be manually operated to compress the springs 22, for disengaging the pins 20 out of the cooperating perforations 21. With the pins 20 engaging any one of the perforations 21 in the pair of discs 10,
the ladder elements 1 and 2 are positively locked in a predetermined relative angular position. Any particular perforations 21 engaging the cooperating pins 20 determine the relative angular position as shown in Figs. 1, 5 and 7, respectively.

The second ladder element 2 is provided, at the opposite end, a pair of semi-circular ear-pieces 23, one secured to each of the side-bars 4, in a similar manner as hereinbefore described in connection with the ear-pieces 6, by means of extensions 24 and screws 25. Each of these ear-pieces 23 has a plurality of perforations 26 of equi-radial distance with respect to a bolt 27 which extends through suitable bores in the end portions of the side-bars of the ladder element 2 and the adjacent end portions of the side-bars of the third ladder element 3.

The bolt 27 serves to pivotally connect the two ladder elements 2 and 3 with each other, and is held in position by suitable means such as nut 28.

The third ladder element 3 is provided in its side-bars, at such portions as correspond to the radial distance of the perforations 26, bores or chamber 29 closed by leg portions of reinforcing cap members 30 secured to and partially covering the end portions through which the bolt 27 extends. A locking pin 31 is mounted through each bore 29, as well as the corresponding openings formed in the coverings 30. A coil spring 32 is disposed within each bore 29, with one end secured to the corresponding pin 31 and the other end resting against one inner wall formed by the covering 30, thus tending to bias the pin 31 to the outermost position shown in the drawing, in which the pin may engage one of the perforations 26 in the ear-piece 23. The particular perforation 26 engaged by the cooperating pin 31 determines the relative angular position of the second and third ladder elements 2 and 3, in which position the elements are positively locked by said pin and perforation engagement.

It will be seen that when the three ladder elements 1, 2 and 3 are semi-extended and locked in the relative angular positions by means of engagement of the locking pins and perforations, 20, 31 and 21, 26, as shown in Fig. 1, the apparatus may be used as a stool. When the main or the first and second elements 1 and 2 are brought to a smaller angular position as shown in Fig. 5 and locked therein, the foot plates 9 and 12 are brought into one plane, forming an ample total area for footing, and if the third or supplementary ladder element 3 is folded on to the second element 2 as shown in Fig. 6, the apparatus may be used as a ladder of another form.

When the three elements 1, 2 and 3 are extended entirely as shown in Fig. 7, and locked therein by the pin and perforation engage-
CERTIFICATE OF CORRECTION.

Patent No. 1,894,489.  

JUN HIROSE ET AL.

It is hereby certified that the name of the assignee in the above numbered patent was erroneously described and specified as "Kito Hirose" whereas said name should have been described and specified as "Mrs. Kito Hirose", and line 13, of the granting clause for the word "his" read "her"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of February, A. D. 1933.

M. J. Moore,  
Acting Commissioner of Patents.