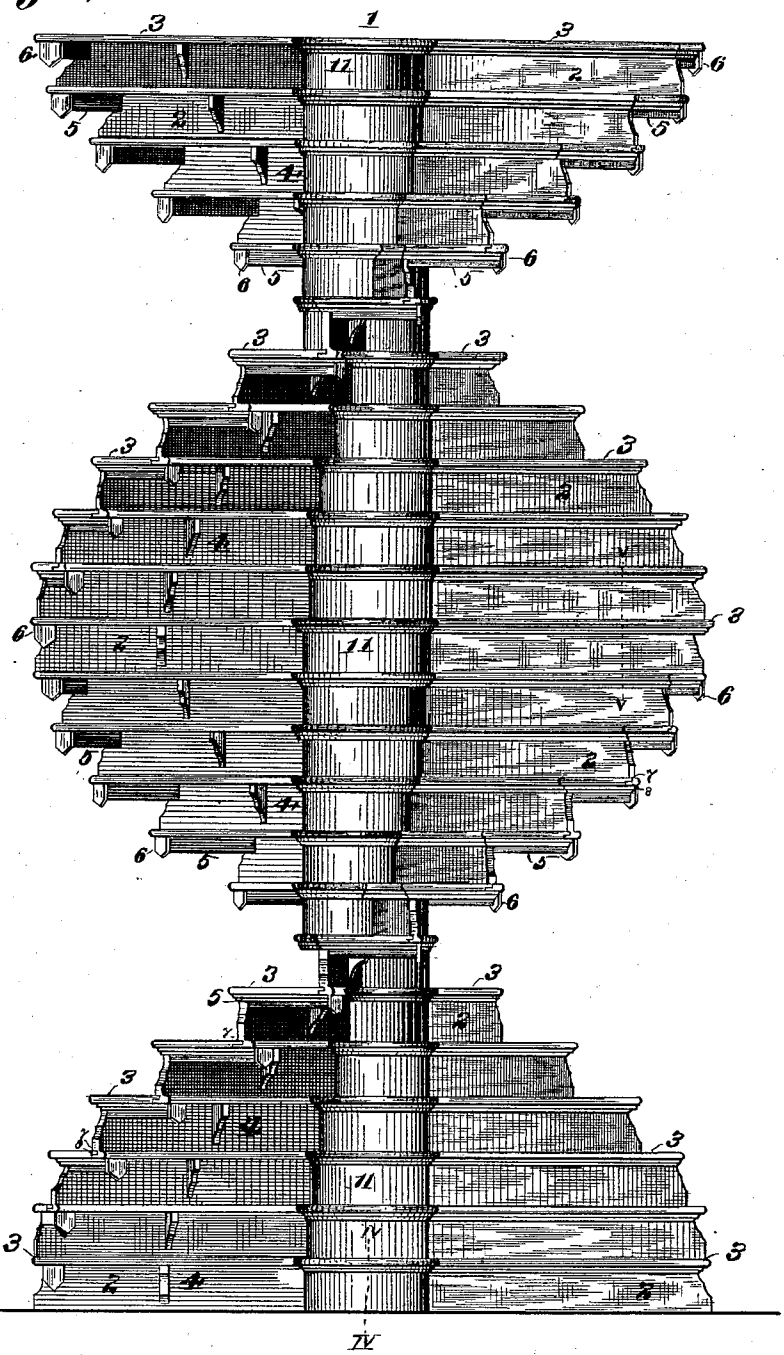
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F. HEIDLAND.

KNOCKDOWN SPIRAL STAIRWAY.

No. 367,296. Patented July 26, 1887.

Fig. I.



Attest;
G. N. Hinchman Jr.
Emma Arthur.

Inventor;
Friedrich Heidland
By Knight Bro's.
Atty's.

N. PETERS, Photo-Lithographer, Washington, D. C.

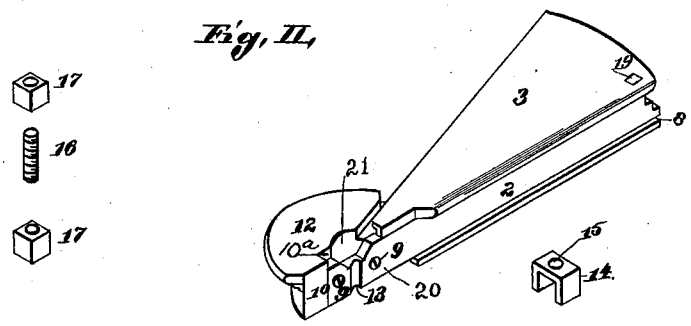
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Fig. II.



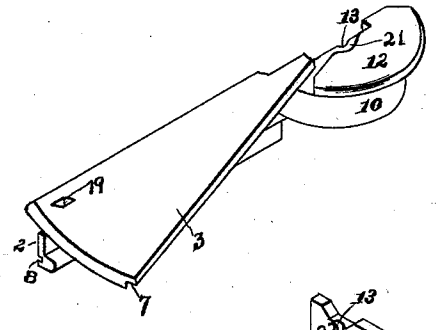
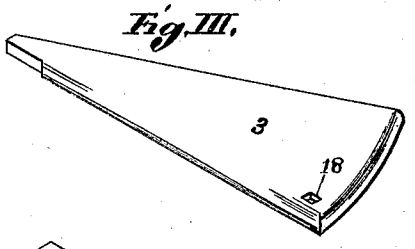


Fig. III.



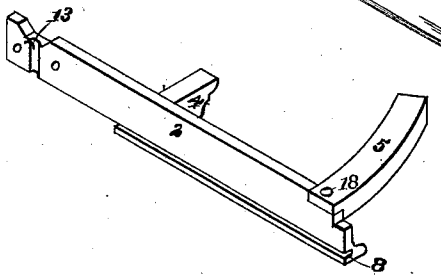


Fig. IV.

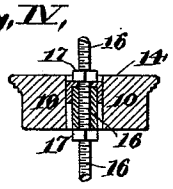
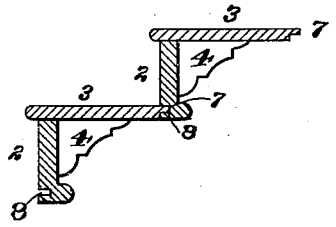


Fig. V.



Attest;
G. N. Hinchman Jr.
Emma Arthur.

Inventor;
Friedrich Heidland.
By Knight Bro's.
Atty's.

N. PETERS, Photo-Lithographer, Washington, D. C.

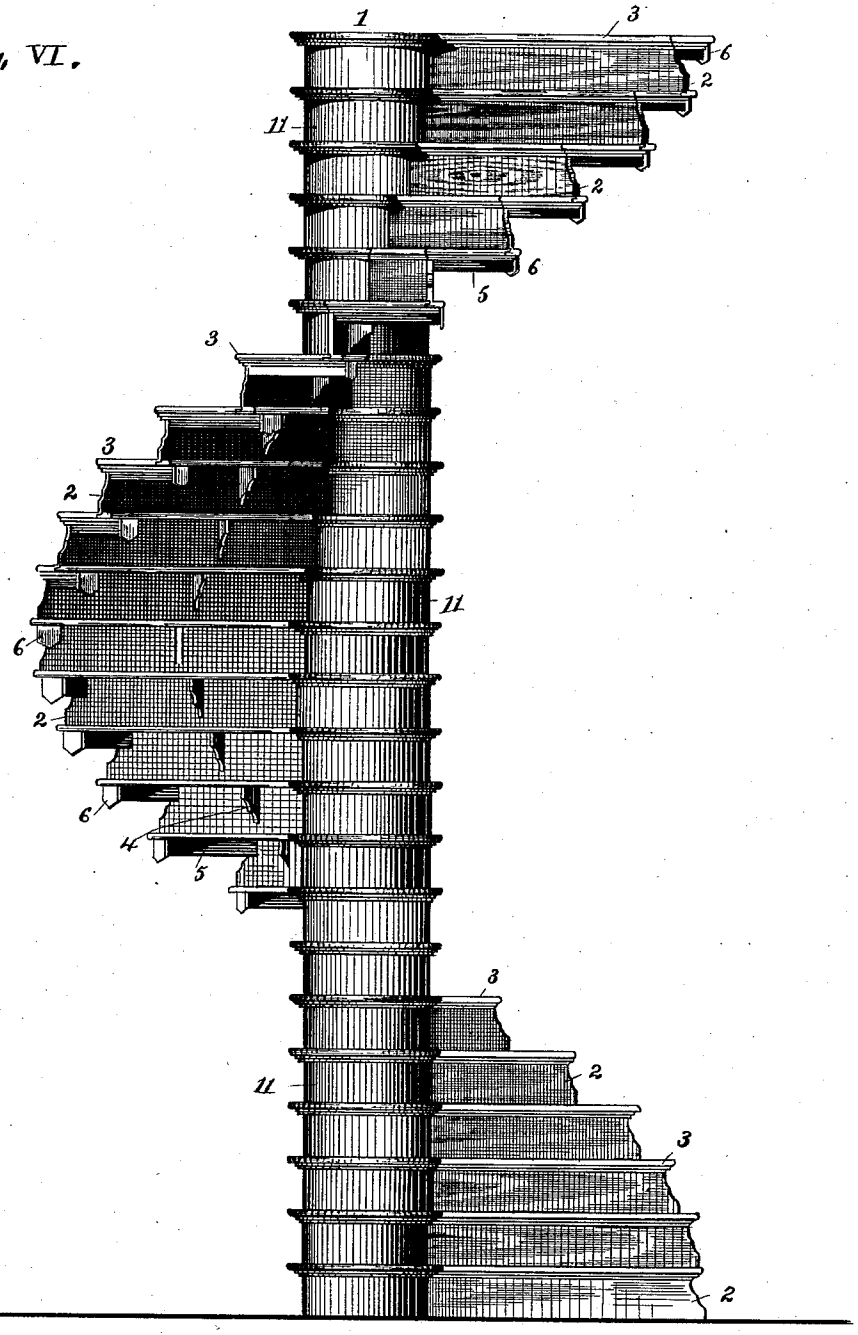
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Fig. VI.



Attest:
G. N. Hinderman Jr.
E. Arthur.

Inventor:
Friedrich Heidland
By Knight Bros.
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

FRIEDRICH HEIDLAND, OF ST. LOUIS, MISSOURI.

KNOCKDOWN SPIRAL STAIRWAY.

SPECIFICATION forming part of Letters Patent No. 367,296, dated July 26, 1887.

Application filed February 11, 1887. Serial No. 227,295. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH HEIDLAND, of the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Knockdown Spiral Stairways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure I is a view in elevation of my double-flight stairway. Fig. II is a detail perspective view of a pair of the counterbalancing-steps (which are the corresponding steps, one being shown in dotted lines, of the adjoining flights) in their knockdown condition, showing also the semi-disks and center-column sections, also the flanged clamp and screw, by which the several parts of the device are secured together. Fig. III is a detail perspective view of the riser and tread of the step, showing also the bearing-brackets attached to the riser that support the tread. Fig. IV is a section on line IV IV, Fig. I, showing a detail section of the central column, with the flanged clamp and sectional screws that bind said supporting-column of the stairway. Fig. V is a section on line V V, Fig. I, showing the tongue-and-groove junction of the tread of the step to the riser of the one that surmounts it, and the brace-brackets that connect the tread and the riser together; and Fig. VI is a modification showing my invention adapted to a single-flight stairway.

My invention relates to a double-flight knockdown spiral stairway; and the invention consists in features of novelty, hereinafter fully described, and pointed out in the claims.

Referring to the drawings, in which the figures of reference indicate like parts in all the views, 1 represents my knockdown double-flight spiral stairway, in which 2 is the riser that supports the angle-tread 3.

4 are angle-brackets that couple and brace the risers and treads, and 5 are the end bearers that underlie the wide end of the tread, and which have attached in any suitable manner to their inner ends a rosette or finishing-piece, 6.

The treads are provided with tongues 7, that engage grooves 8 in the adjoining risers of the steps above. Bolts 19, with their screw-nuts, bind the several parts of the step together at their outer ends, and as they pass through the holes 18 in the step, including the tongue-and-groove joint connecting it with the treads of the steps beneath, they enforce their integral connection and add greatly to the strength of the stairway. I prefer, as shown, to have the head of the bolt seated on the tread of the step above; but when it is preferred to hide the head it may be seated on the end bearer beneath said tread. The risers are secured by screws 9 to the semicircular sections 10 of the central column, 11. These semicircular sections 10 have on top flanged portions 12, which extend beyond the periphery of the solid line of the column and form circumferential diametric braces, adding to the lateral strength of the column. The semicircular sections 10 are rabbeted at 10^a to provide a recess wherein the inner end of each stair-tread is secured. Semicircular vertical grooves 13 are cut in the front faces of the risers between the attachment-screws in the overlaps of the two stair-risers in joint or coincident position, so as unitedly to make a circular aperture when the pair of steps shown in Fig. II are fitted together, said steps making a counter-balance to each other in the opposite flights.

14 represents a saddle-clamp that, when the last-mentioned parts are brought together, straddles the interlocking risers over the hole 13 that jointly perforates them. The said saddle-clamp is provided with a hole, 15, that coincides with the joint apertures through the risers beneath it.

16 represents the sectional screws that pass through the joint aperture of the overlapping stair-risers and the saddle-clamp that unites them. The said screw engages in deep-threaded nuts 17 at both ends, screwing into the nuts half-way, leaving the remaining half for the engagement of the adjoining section of the screw. (See Fig. IV.)

The individual parts of my stairway are machine-made, and in their knockdown condition, as shown in Figs. II and III, are shipped from the factory, ready on their arrival to be set up without delay.

The manner of construction and erection of the stairway is as follows: The step-risers 2, to

which have been attached the angle-brackets and end bearers, have the covers or treads secured thereto, and are screwed to the semicircular sections 10. The steps, with their semicircular sections, are now individually complete as steps, and in this condition are shipped from the factory, together with the saddle-clamps and sectional screws with their nuts, by which the separate parts of my double-flight spiral stair-case are firmly clamped and held together. It will be seen that the knockdown steps, as now set up in their condition for shipping and for erection, are exact counterparts of each other, and are alike available for either flight of the stairway.

The stairway can easily be erected in the location where it is intended to stand by a single mechanic, but much more rapidly by two, (one for each of the corresponding flights,) each taking hold of a step, as shown set up in Fig. II, placing the counterparts in engagement with the corresponding parts of the step in the hand of his assistant, bringing the semicircular sections of the column into complete relationship to each other, so as unitedly to make a perfect section of the column surmounted by a perfect disk and overlapping the inner ends of the step-risers, until the grooves 13 of the adjoining risers unite to form a circular aperture for the admission of the sectional screw. The saddle-clamp 14 is then made to straddle the overlap 20 of the adjoining risers, its arms engaging in cut-aways 21 in the semicircular sections 10 and its perforation being brought into coincidence with the perforation formed by the semicircular grooves in the risers beneath it. The sectional screw 16 is then passed through said perforations in the clamp and risers and the nuts 17 are screwed thereon. The bottom steps of the adjoining flights are thus tightly clamped and held together in the position in which it is intended for them to remain. The sectional screw engages in the nut to only half the thickness of the latter, leaving a threaded space above for the engagement of the next section of the screw. The second pair of steps are taken up simultaneously by the workmen, so that they hold against each other, and the grooves 8 in their risers are slid into engagement with the tongues 7 on the treads of the first pair, making a tongue-and-groove joint in the ascent from step to step, insuring their integral connection. The counterparts in the semicircular sections of the column are also thus brought into close relationship, as was done with the first pair and with its sectional column, and the second step makes the first spiral divergence in the ascent around the central column. The second sectional screw and saddle clamp are then brought into engagement in their respective positions and with the parts that they fasten and clamp, as described in setting up or coupling the first pair. The screw is turned within the upper joint-nut of the first section until it comes in contact with the sectional screw below it. When the nut above is screwed home on the top of the second sectional screw, the second pair of steps are located and securely fastened. The process is thus repeated, step after step, until the erection of the stairway is complete, either to surmount one story or a succession of stories, to any extent required.

I have shown and described my invention as it is constructed when a double-flight stairway; but it can also be set up, and is also designed so to be, as a single flight by simply omitting one step of the pair, as shown in Fig. VI. It will be understood that in the latter case the two parts of the sectional columns and their surmounting disks are used, minus only one of the steps attached to them.

I claim as my invention—

1. In a knockdown staircase, the combination of the central column, 11, composed of semicircular sections 10, having cut-away portions 21, risers 2, united by screws 9 to the latter, steps 3, surmounting the risers, and a coupling for the semicircular sections, consisting of perforated saddle-clamps 14, received by cut-away portions 21, sectional screws 16, passed through the perforations in the clamps and through perforations 13 in the overlap of the risers, and nuts 17 for securing the screws 16 together, substantially as set forth.

2. In a knockdown staircase, the combination of the steps provided with tongues 7 on their treads, the next surmounting steps provided with grooves 8 in their risers, which receive tongues 7, central column, 11, composed of semicircular sections 10, having cut-away portions 21, screws 9 for uniting the risers to said semicircular sections, to which the steps are secured, and a coupling for the semicircular sections 10, consisting of perforated saddle-clamps 14, received by cut-away portions 21, sectional screws 16, passed through the perforations in the clamps and through perforations 13 in the overlap of the risers, and nuts 17 for securing the screws 16 together, substantially as set forth.

3. In a knockdown staircase, the combination of the risers and treads respectively provided with grooves and tongues adapted to fit together, brackets and end bearers on the risers, on which are secured the treads, the central column composed of semicircular sections, to which the steps are united in counterbalancing pairs, and a coupling device for securing the pairs of steps in succession, substantially as set forth.

FRIEDRICH HEIDLAND.

In presence of—
EDW. S. KNIGHT,
JOS. WAHLE.