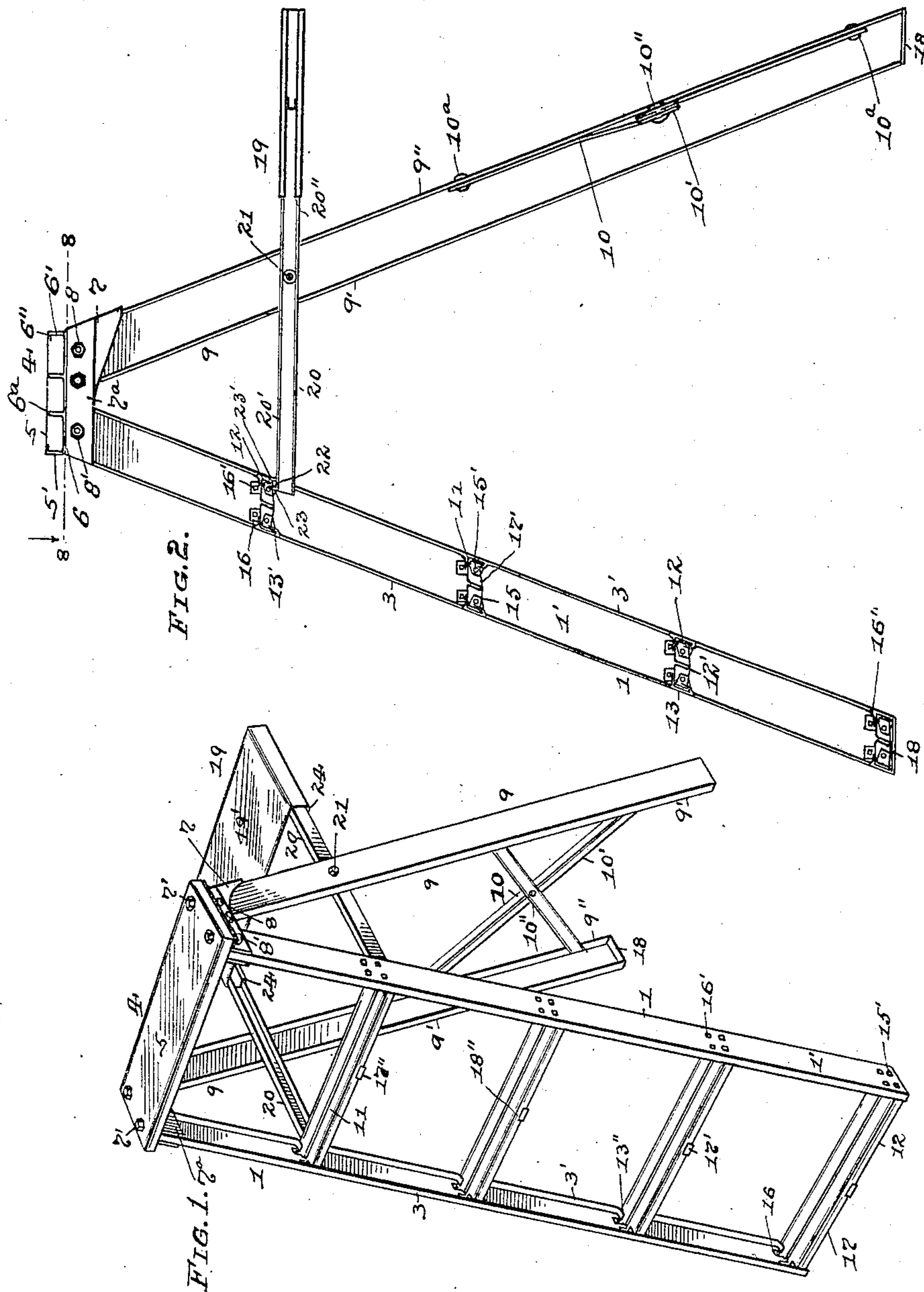


No. 870,334.

PATENTED NOV. 5, 1907.

H. ADLER.
METALLIC STEP LADDER.
APPLICATION FILED JULY 1, 1904.

2 SHEETS—SHEET 1.



WITNESSES

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2 SHEETS—SHEET 2.

FIG. 3.

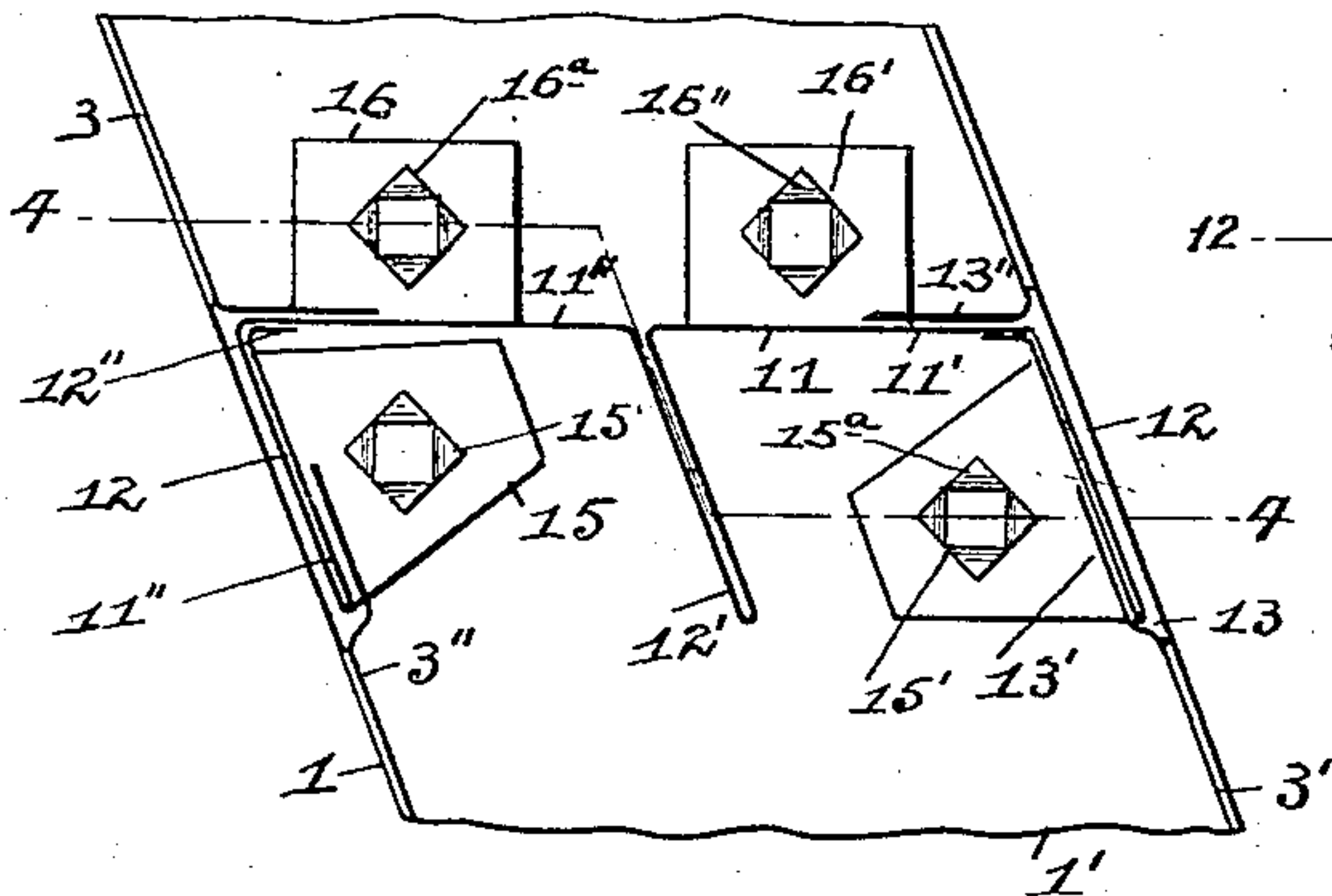


FIG. 5.

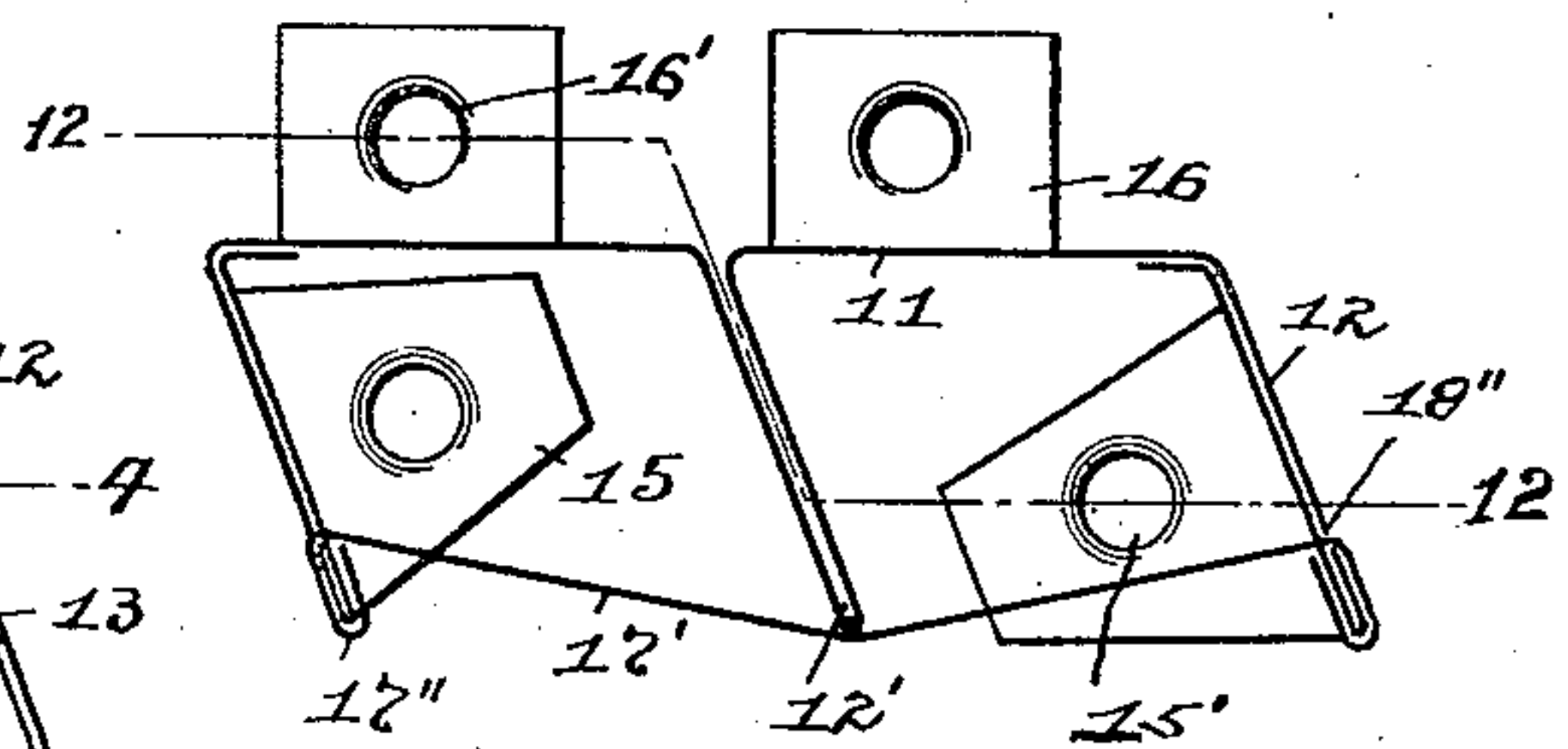


FIG. 6.

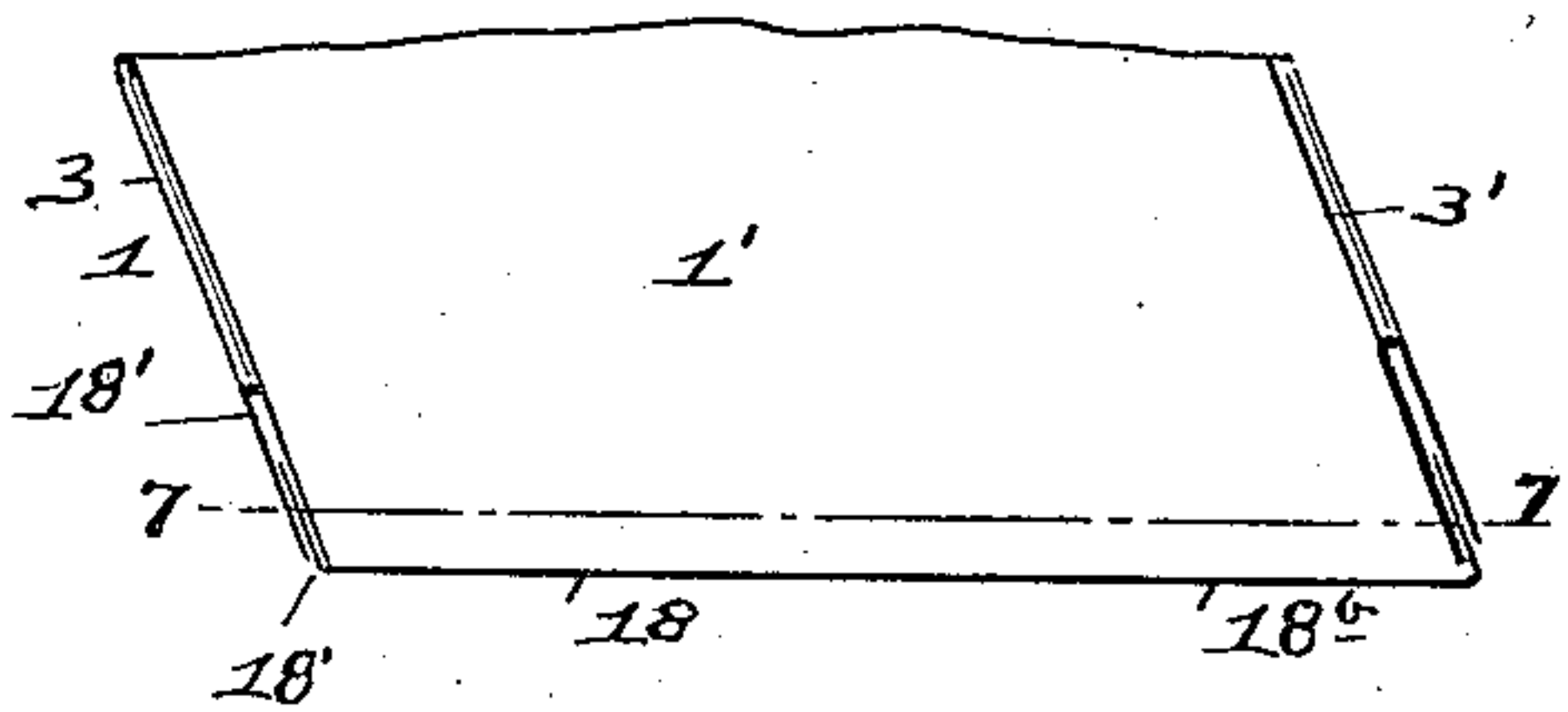


FIG. 4.

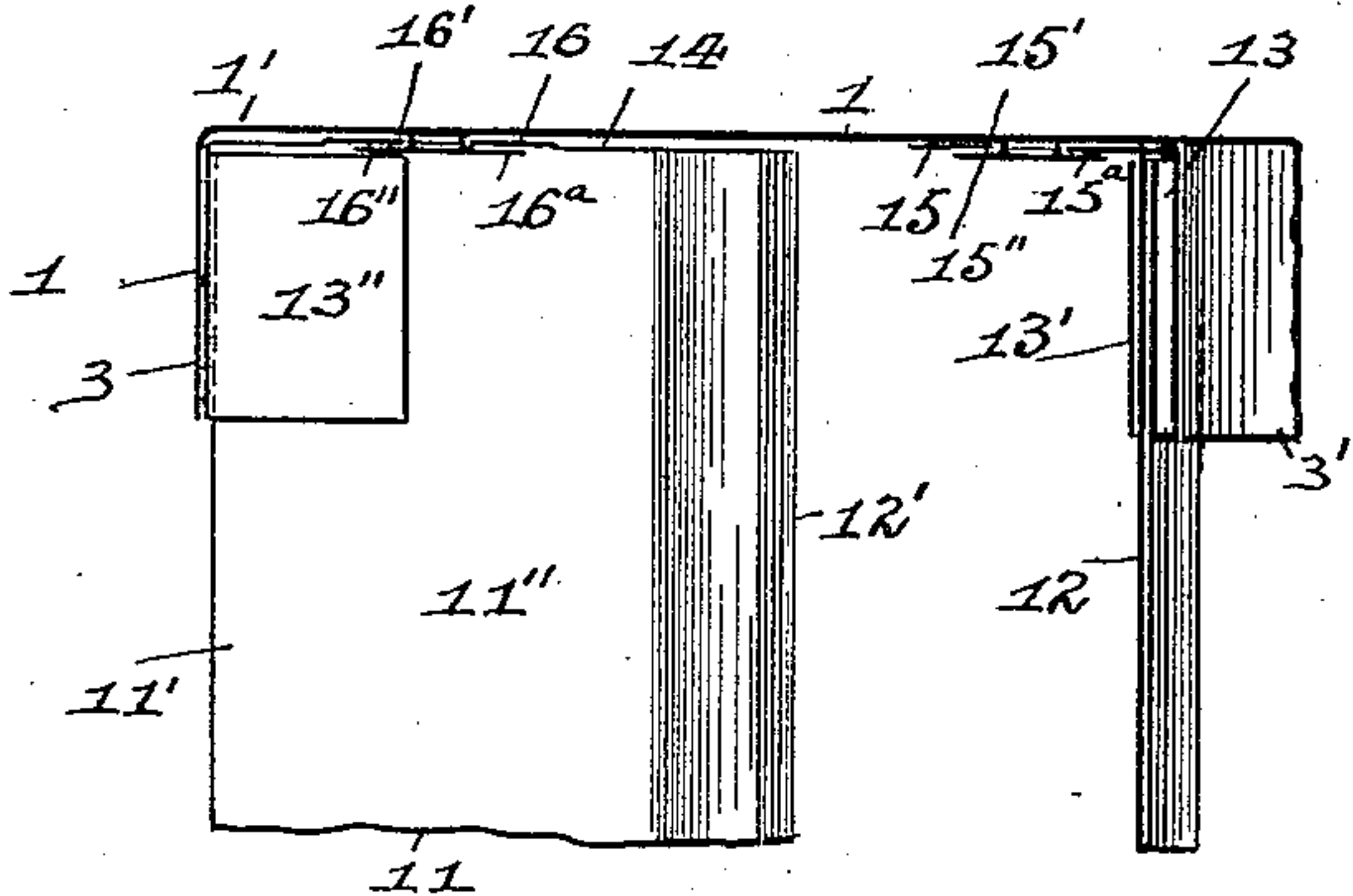


FIG. 7.

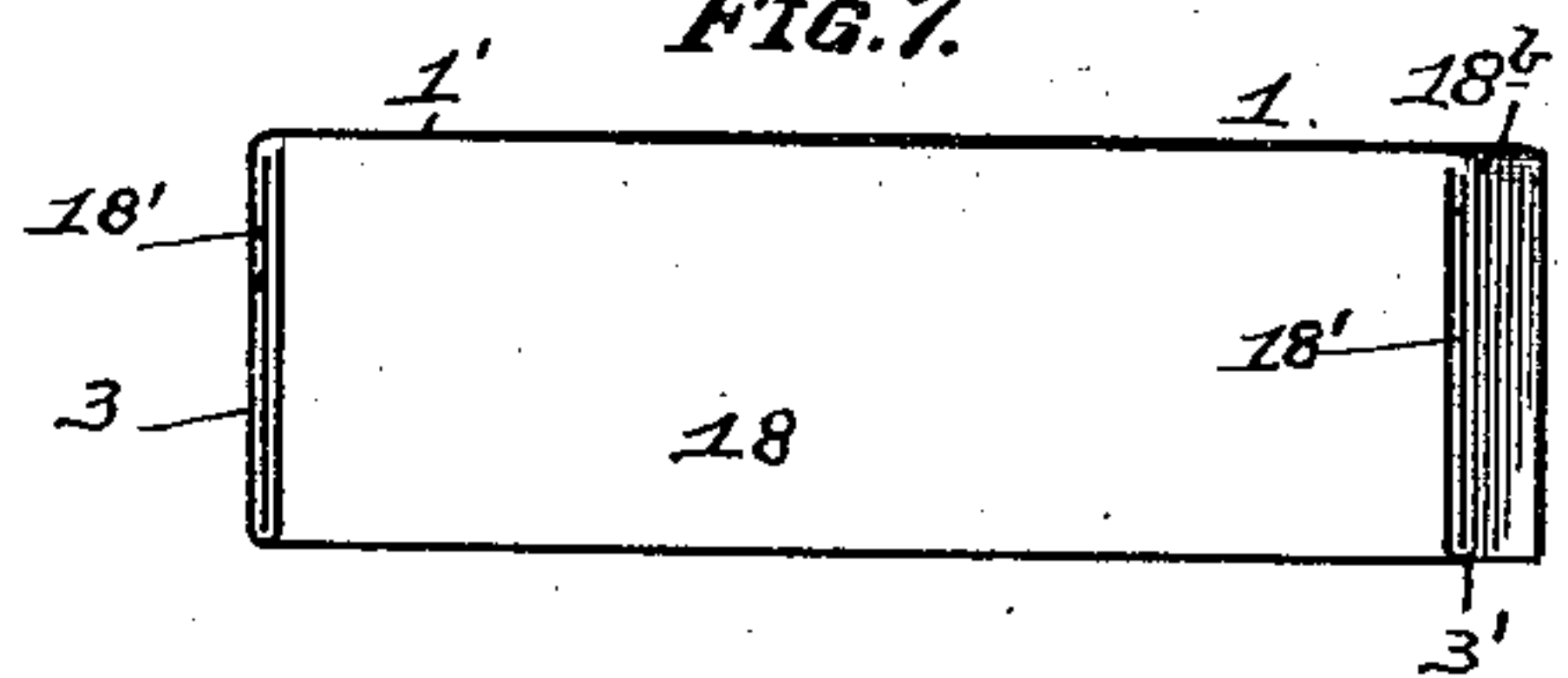


FIG. 8.

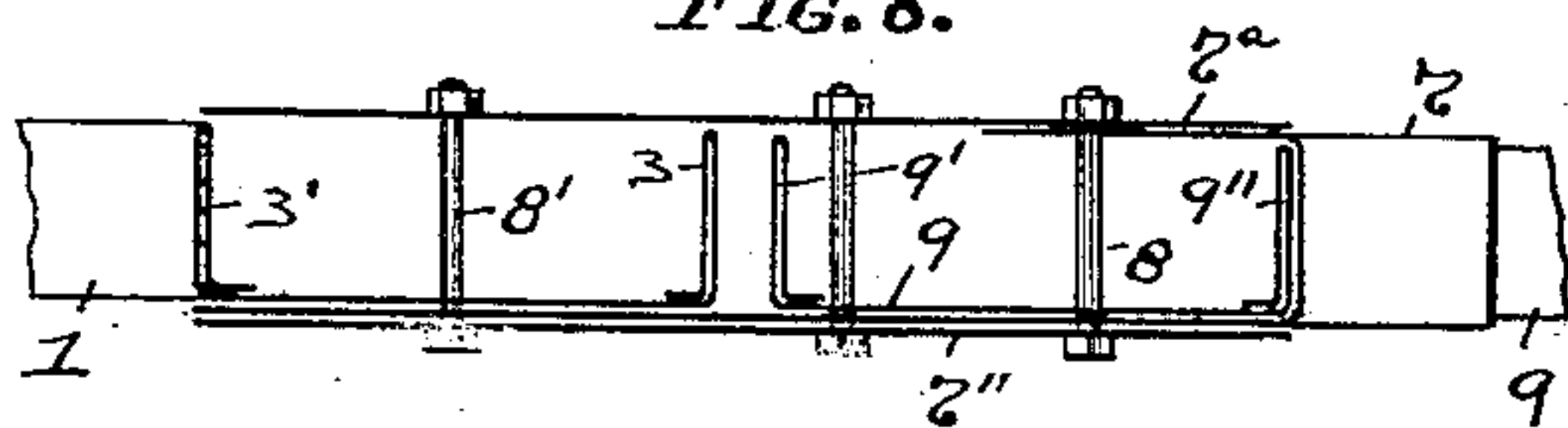


FIG. 10.

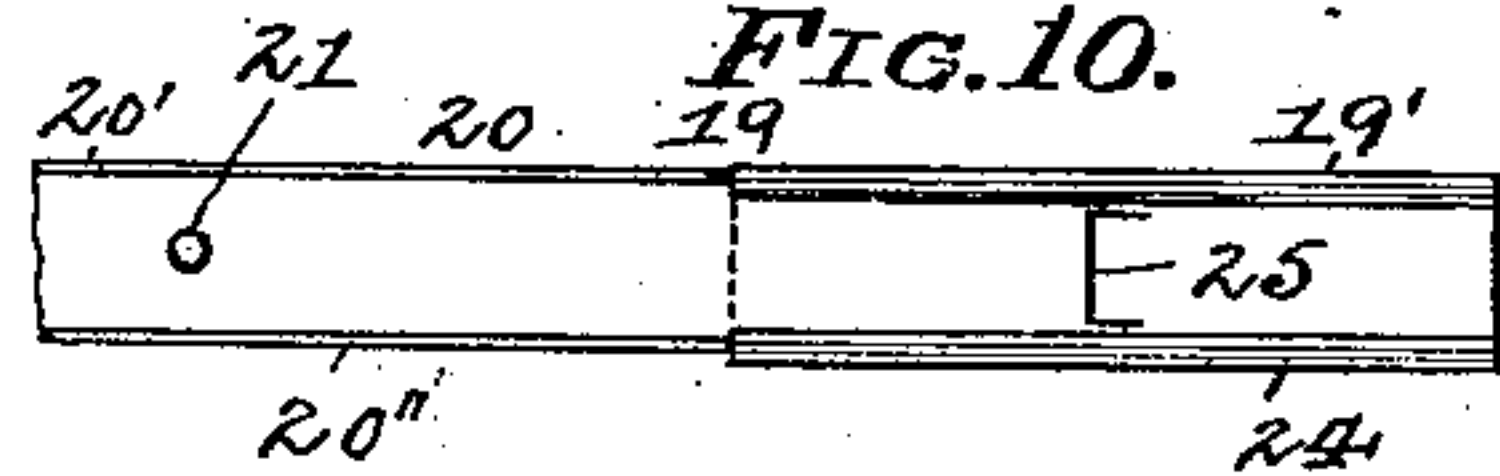


FIG. 9.

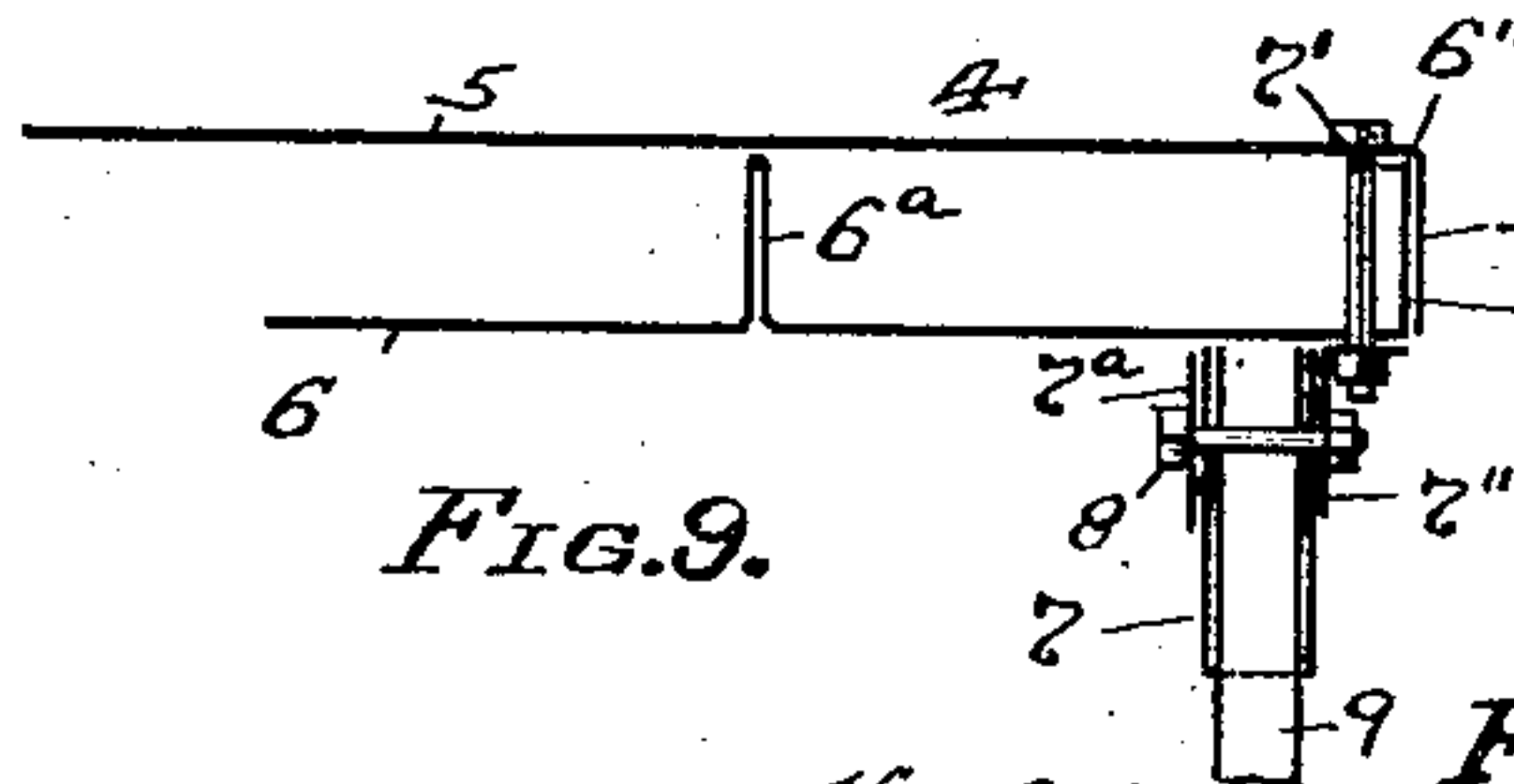


FIG. 11.

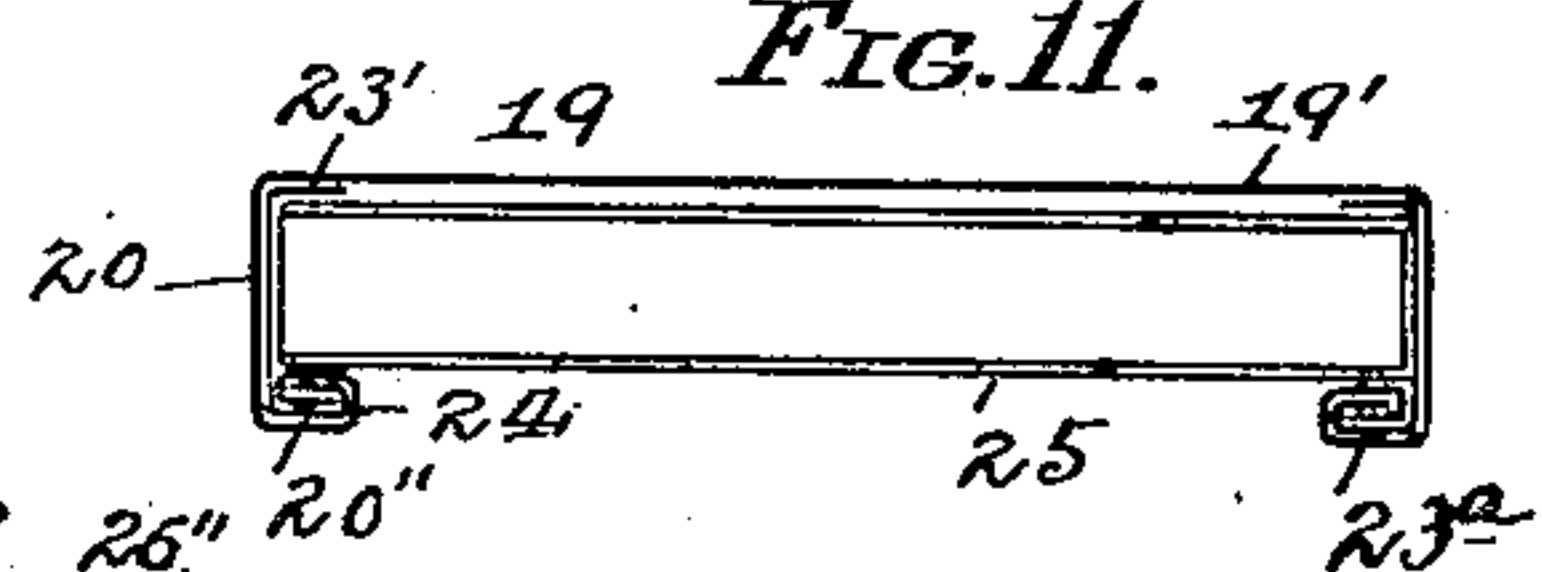
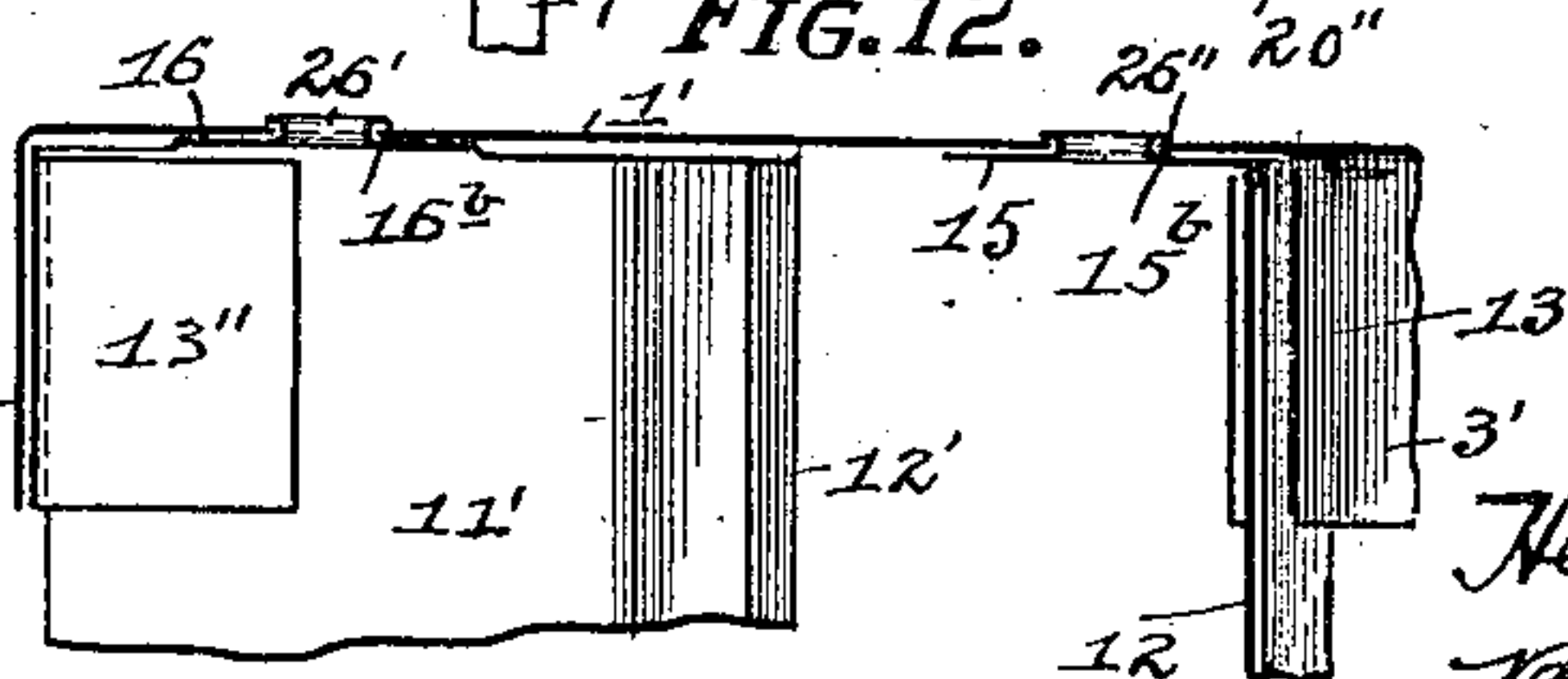


FIG. 12.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY ADLER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO H. ADLER COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

METALLIC STEP-LADDER.

No. 870,334.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed July 1, 1904. Serial No. 214,891.

To all whom it may concern:

Be it known that I, HENRY ADLER, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Metallic Step-Ladders; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to ladders, and has special reference to what are commonly known as "step-ladders."

10 The object of my invention is to form a ladder entirely of sheet-metal, thereby making the same light, strong and durable, as well as cheapening the cost of manufacture and rendering the same capable of easy handling and in folding when out of operation as in the ordinary step-ladders.

My invention consists, generally stated in the novel arrangement, construction and combination of parts, as hereinafter more specifically set forth and described and particularly pointed out in the claims.

20 To enable others skilled in the art to which my invention appertains to construct and use my improved step-ladder, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a perspective view of the ladder showing the same open and ready for use. Fig. 2 is a vertical central section of the ladder in the same position. Fig. 3 is an enlarged vertical section through one of the intermediate steps of the ladder and showing the manner of attaching the steps. Fig. 4 is a cross-section through one side of the ladder and on the line 4—4 Fig. 3. Fig. 5 is a central cross-section through one of the intermediate steps and showing another manner of attaching the same to the standards, as well as the bracing of the same. Fig. 6 is an enlarged view of the lower portion of one of the standards showing the manner of forming the supporting base on the standards. Fig. 7 is a cross-section on the line 7—7 Fig. 6. Fig. 8 is a section with the upper-step or platform removed and on the line 8—8 Fig. 2 looking in the direction of the arrow. Fig. 9 is a longitudinal section through one end of said platform. Figs. 10 and 11 are enlarged detail views of the shelf. Fig. 12 is a cross-section on the line 12—12 Fig. 5.

Like symbols of references herein indicate like parts in each of the figures of the drawings.

45 As illustrated in said drawings 1 designates the sides or standards which are formed or stamped from a piece of thin sheet metal and have each of their side edges 2 bent at right angles to the body 1' and in doubled shape to form the outer and inner side flanges 3, 3'. The upper step or platform 4 is formed or stamped from thin sheet metal and from two pieces composing the upper and lower portions 5 and 6 respectively, such upper portion 5 being provided with the downwardly bent angular flanges 5' around the same and the lower portion

6 being provided with the upwardly bent angular flanges 6' around the same which fit within the upper portion 5 and adjacent to the flanges 5' thereon, while the upper ends of these flanges 6' are bent inwardly so as to extend along the upper portion 5 and assist in supporting the same as at 6'. Doubled angular flanges 6^a are bent up from the lower portion 6 of the platform 4 and parallel with the flanges 6' so as to bear at their upper ends against the upper portion 5 of said platform and U-shaped clamping pieces 7 formed or stamped from a piece of thin sheet metal are secured at each end of said platform 4 by means of bolts 7' which pass through their upper and lower portions 5 and 6 forming said platform and through L-shaped pieces 7'' extending along said clamping pieces 7. The step standards or sides 1 are secured at their upper ends to the clamping pieces 7 by means of the bolts 8' which pass through the L-shaped pieces 7'' and through said pieces 7, standards 1 and pieces 7^a while the rear supporting standards or legs 9 are pivoted to and through said clamping pieces 7, 7^a and 7'' as at 8, such legs 9 being formed or stamped from a piece of thin sheet metal and bent to substantially the same shape in forming the flanges 9, 9' as the sides or step-standards.

Cross-braces 10 extend across and between the legs 9 and are secured to the outer flange 9'' at 10^a, each of said braces being formed from a piece of thin sheet metal and being bent to form the parallel flanges 10' thereon, while such braces 10 are connected together at their crossings by a rivet 10'' to hold them in place and give rigidity to the legs 8.

The intermediate steps 11 extend across and between the sides or standards 1 and are each formed or stamped in a similar manner from a single piece of thin sheet metal. Each of said steps 11 have their side edges and middle portions bent to form the doubled angular flanges 12 and 12' respectively, which extend down from the body portion 11' of said steps, and the inner portions 11'' of said side flanges 12 have their ends bent at an angle and parallel with said body portion, as at 12'' to assist in bracing and supporting said steps. The steps 11 are supported in the sides or standards 1 by means of the side flanges 12 which fit within pockets or seats 13 formed in said standards by slitting the inner portions 3'' of the inner and outer flanges 3, and 3' on said standards and bending outwardly the portions 13' of said inner portions 3'' below said slitting point in a slight degree and thereby form such seats 13, while the portions 13'' above the slitting point are bent outward at an angle to the inner portions 3'' of said flanges 3, 3' and are adapted to come against the top face of the body portion 11' of said steps 11. The ends 14 of said steps 11 are provided with the lower flanges 15 thereon which extend out from the said ends 14

and are formed as part of the inner portion 11'' on the side flanges 12 so as to be bent inwardly at an angle to said inner portions 11'' and come against the inner face of the body portion 1' of standards 1. In order to hold these angular flanges 15 in place on the standards 1 and assist in supporting and steadying the steps 11, the body portion 1' are provided with the cross-cuts through the same opposite square holes 15' punched through said flanges 15 so that the triangular flanges projections 15'' formed by said cross-cuts can be inserted through said holes 15' and be pressed down against said flanges 15 as at 15^a. The ends 14 of said steps 11 are also provided with the flanges 16 which extend out from the body portion 11' thereof, so as to be bent upwardly at an angle to said body portion and come against the inner face on the body portion 1' of said standards 1. These flanges 16 are held in place by cross-cutting the body portion 1' of the standards 1, opposite square holes 16' punched in said flanges projections 16, so that the triangular flanges 16'' formed by such cross-cutting can be inserted through said holes 16' and be pressed down against said flanges 16 as at 16^a, which will also further assist in supporting and steadying said steps 11. If desired these intermediate steps 11 can be further braced and supported by a thin metallic strip of sheet metal 17' which passes under and against the middle flange 12' on said steps 11, while the ends thereof pass through slots or slits 18'' in the side flanges 12 of said steps and are bent around said flanges 12, as at 17'' and shown in Fig. 5.

The bottom step 17 is formed of substantially the same shape as the intermediate steps and from a single piece of thin sheet metal and is secured to the standards 1 in like manner, except that the flanges 15 are dispensed with and the steps 17 rests directly by its flanges 12 and 12' upon the bottom cross-piece 18 which extends across and between the flanges 3, 3' of said standards 1 and is provided with the angular bent ends 18' thereon for passing through slits 18^a in the edges of the flanges 3, 3' and extend up in the space formed between the inner and outer portions of the flanges 3 and 3' on said standards. This piece 18 is preferably bent inwardly from the body portion 1 of the standards 1 as at 18^b in order to form a smooth base for said standards in moving along floors, etc.

The shelf 19 for holding a bucket or any other article or articles is formed or stamped from thin sheet metal and is pivoted by its arms 20 to the legs 9, as at 21, such arms being bent at their side edges to form the upper and lower flanges 20' 20'' and being provided with a seat 22 on their ends and formed between flanges 23 and 23' extending out an angle from the angular flange 20', so that said seat 22 will enable the inner flange 12 on one of the intermediate steps 11 to fit within said seat when the shelf 19 is in its operative position, as shown in Fig. 2 and hold said shelf in place while being used.

The upper flange 20' is bent at right angles to the arms 20 as at 23' and flange 20'' is bent to form the lip portions 23^a and fitting over the top of the arms 20 is the body portion 19' of the shelf 19, which is bent so as to pass around said arms and be connected to said lower flange 20'' by the lip portions 24 thereon which fit within the lip portions 23 on said flange 20'' thereby enabling said body portion 19' to have a sliding connection with

said arms 20 when put in place. An angular shape brace 25 extends across and between said arms 20 so as to rest between the lip portions 24 and flanges 20 in order to support said body portion 19'.

It will be evident that if desired the holes 15' and 16' in the flanges 15 and 16 respectively on the steps 11 and 17 can be made round or circular, as at 26 and shown in Fig. 5 and if desired the flanges 15 and 16 can be cut or punched through at a point opposite the holes 15^b and 16^b in the standards and such punched portions 26' bent or pressed down against said flanges 15 and 16, as at 26'' as shown in Fig. 12.

It will be also evident that in practice my improved step-ladders are formed from what is known as block thin sheet metal and after completed the ladders are galvanized, so that all the joints are filled up by such galvanizing process and the ladders are thereby rendered strong, steady and durable.

It will further be obvious that corrugated metal can also be used for said purpose, and that various modifications and changes of design and construction in the ladder may be made without departing from the spirit of the invention or sacrificing any of its advantages, as I do not limit myself to specific details of design or construction.

What I claim as my invention and desire to secure by Letters Patent is—

1. A ladder constructed of sheet metal, the sides or standards thereof having doubled flanged side edges and the steps being each provided with flanged side edges, and means for securing the flanges on the steps between the layer of the doubled flanged side edges on the standards.

2. A ladder constructed of sheet metal, the sides or standards thereof and the steps being each provided with doubled flanged side edges, and means for securing the doubled flanges on the steps between the layer of the doubled flanged side edges on the standards.

3. A ladder constructed of sheet metal, the sides or standards thereof being provided with doubled flanged side edges slit and bent on their inner portions to form seats, and the steps being provided with flanged side edges for fitting within said seats.

4. A ladder constructed of sheet metal, the sides or standards thereof being provided with double flanged side edges slit and bent on their inner portions to form seats, and the steps being provided with doubled flanged side edges for fitting within the seats.

5. A ladder constructed of sheet metal, the sides or standards thereof being provided with doubled flanged side edges slit and bent on their inner portions to form seats, and the steps resting upon the upper ends of the lower slit inner portions and being provided with doubled flanged side edges for fitting within said seats.

6. A ladder constructed of sheet metal, the sides or standards thereof being provided with doubled flanged sides slit and bent on their inner portions to form seats, and the steps resting upon the upper end of the lower slit inner portions while the upper slit inner portions rest against the top of said steps, said steps being provided with doubled flanged side edges for fitting within said seats.

7. A ladder constructed of sheet metal, comprising side standards, a series of steps, each constructed of sheet metal and provided with flanged side edges, and flanges on the ends of said flanged side edges for abutting the inner faces of said standards, and means for securing said flanges to said standards.

8. A ladder constructed of sheet metal, comprising side standards, a series of steps, each constructed of sheet metal and provided with flanged side edges, flanges on the ends of said flanged side edges for abutting the inner faces of said standards and having holes therein, and projections on said standards and adapted to engage with the

holes in said step-flanges for securing said steps to said standards.

9. A ladder constructed of sheet metal, comprising side standards, a series of steps, each constructed of sheet metal and provided with flanged side edges, flanges on the ends of said flanged side edges for abutting the inner faces of said standards and having holes therein, and a series of projections formed in said standards and passing through said holes and clenched against said step-flanges for securing said step-flanges to said standards.

10. A ladder constructed of sheet metal, comprising side standards, a series of steps, each constructed of sheet metal and provided with flanged side edges, flanges on the ends of the body portion of said steps and on the ends of said flanged side edges for abutting the inner faces of said standards, and means for securing said flanges to said standards.

11. A ladder constructed of sheet metal comprising side standards, a series of steps, each constructed of sheet metal and provided with flanged side edges, flanges on the ends of the body portion of said steps and on the ends of said flanged side edges for abutting the inner faces of said standards, said flanges being provided with holes, and projections on said standards engaging with the holes in said flanges and securing the same to said standards.

12. A ladder constructed of sheet metal comprising side standards, a series of steps, each constructed of sheet metal and provided with flanged side edges, flanges on the ends of the body portion of said steps and on the ends of said flanged side edges abutting the inner faces of said standards, said flanges having holes therein, and a series of projections formed in said standards and passing through said holes and clenched against said flanges for securing the same to the standards.

13. A ladder constructed of sheet metal comprising side standards provided with doubled flanged side edges, metallic steps secured between said standards, and a bottom cross-piece having flanged ends fitting and secured within said doubled flanged side portions.

14. A ladder constructed of sheet metal comprising side standards provided with double flanged side edges having slits at their lower ends, metallic steps secured between said standards, and a bottom cross-piece having flanged ends passing through the ends of slits in said doubled flanged side portions and secured thereto.

15. A ladder constructed of sheet metal comprising side standards, metallic steps secured between said standards, legs, arms pivoted to said legs having flanged side edges provided with intumed portions thereon, and a shelf composed of a body portion having flanged side edges provided with flanges thereon for fitting around the intumed portions on said arms.

16. A ladder constructed of sheet metal, comprising side standards, metallic steps secured between said standards, legs, arms pivoted to said legs having flanged side edges, a shelf composed of a body portion having flanged side edges fitting around and between the flanged side edges on said arms, and a brace having flanged side edges fitting under said body portion and between the flanged side edges of said arms and body portion.

17. A ladder constructed of sheet metal comprising side standards, steps provided with flanged side edges, and a cross strip extending across and under the step and connected to and between said flanged side edges thereof for bracing the same.

18. A ladder constructed of sheet metal comprising side standards, steps provided with flanged side edges and slits within the same, and a strip extending under the step and thereon passing through the slits in said flanged side edges and secured in place to brace said step.

19. A ladder constructed of sheet metal comprising side

standards, steps provided with flanged side edges and slits within the same, and a strip extending under the step and between said flanged side edges and having flanged ends passing through the slits in said flanged side edges and fitting around said edges to brace the step.

20. A ladder constructed of sheet metal comprising side standards, metallic steps secured between said standards, legs, arms pivoted to said legs having doubled flanged side edges, a shelf composed of a body portion having flanged side edges fitting around and between the doubled flanged side edges on said arms, and a brace having flanged side edges fitting under said body portion and between the side edges of said arms and body portion.

21. A ladder constructed of sheet metal comprising side standards, steps provided with doubled flanged side edges, and a cross brace extending under the steps and connected to and between said doubled flanged side edges for bracing the same.

22. A ladder constructed of sheet metal comprising side standards, steps provided with doubled flanged side edges and slits within the same, and a cross brace extending under the step and between said doubled flanged side edges and having flanged ends thereon for passing through the slits in said doubled flanged side edges to brace said steps.

23. A ladder constructed of sheet metal comprising side standards and legs provided with flanged side edges, metallic steps secured between said standards, and U-shaped clamping pieces fitting around the upper ends of said standards and legs for securing said standards and said legs being pivoted to said clamping-pieces.

24. A ladder constructed of sheet metal comprising side standards and legs provided with doubled flanged side edges, metallic steps secured between said standards, and U-shaped clamping pieces fitting around the upper ends of said standards and legs for securing said standards and said legs being pivoted to said clamping-pieces.

25. A ladder constructed of sheet metal comprising side standards and legs, metallic steps secured between said standards, metallic clamping-pieces fitting around the upper ends of said standards and legs for the securing of said standards and said legs being pivoted to said clamping-pieces, a platform above said clamping-pieces, and L-shaped pieces extending along and secured to said clamping-pieces for securing said platform thereto.

26. A ladder constructed of sheet metal comprising side standards and legs, metallic steps secured between said standards, metallic clamping-pieces fitting around the upper ends of said standards and legs for the securing of said standards and said legs being pivoted to said clamping-pieces, L-shaped pieces extending along and secured to said clamping-pieces, and a platform secured to said L-shaped pieces and formed of upper and lower portions having flanges around the same and fitting within each other.

27. A ladder constructed of sheet metal comprising side standards and legs, metallic steps secured between said standards, metallic clamping-pieces fitting around the upper ends of said standards and legs for the securing of said standards and said legs being pivoted to said clamping-pieces, L-shaped pieces extending along and secured to said clamping-pieces, and a platform secured to said L-shaped pieces and formed of upper and lower portions having flanges around the same and fitting within each other, and said lower portion having upwardly extending doubled flanges for supporting the upper portions.

In testimony whereof, I the said HENRY ADLER, have hereunto set my hand.

HENRY ADLER.

Witnesses:

J. N. COOKE,
E. B. ADLER.

It is hereby certified that in Letters Patent No. 870,334, granted November 15, 1907, upon the application of Henry Adler, of Pittsburg, Pennsylvania, for an improvement in "Metallic Step-Ladders," an error appears in the printed specification requiring correction, as follows: On page 3, the words "thereon passing through the slits in said flanged side," comprising line 69, should be stricken out and the following inserted instead, *between said flanged side edges and having flanged ends*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of November, A. D., 1907.

[SEAL.]

E. B. MOORE,
Commissioner of Patents.