

J. M. TURNER.
COLLAPSIBLE STEP LADDER.
APPLICATION FILED JUNE 23, 1906.

898,706.

Patented Sept. 15, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

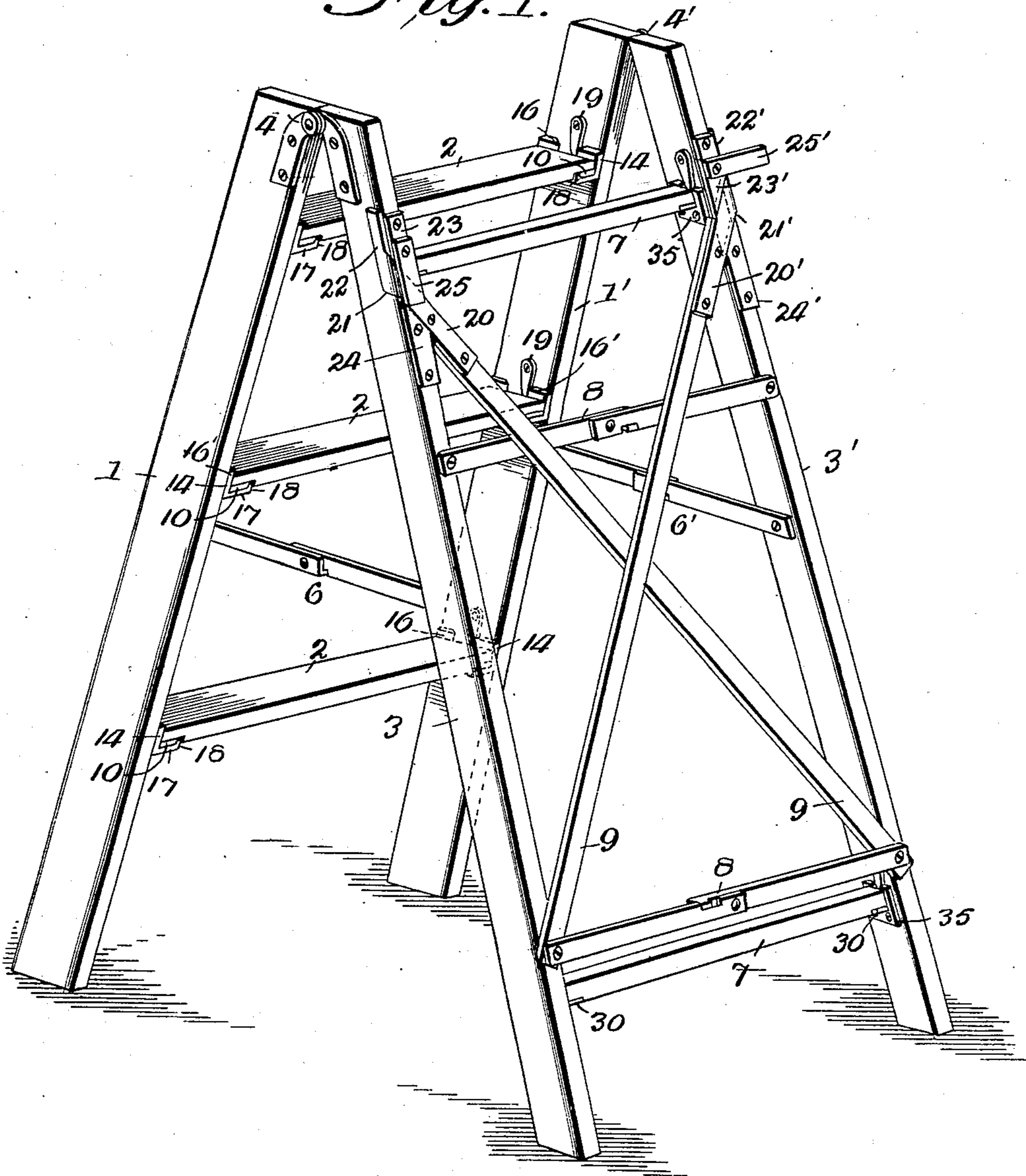
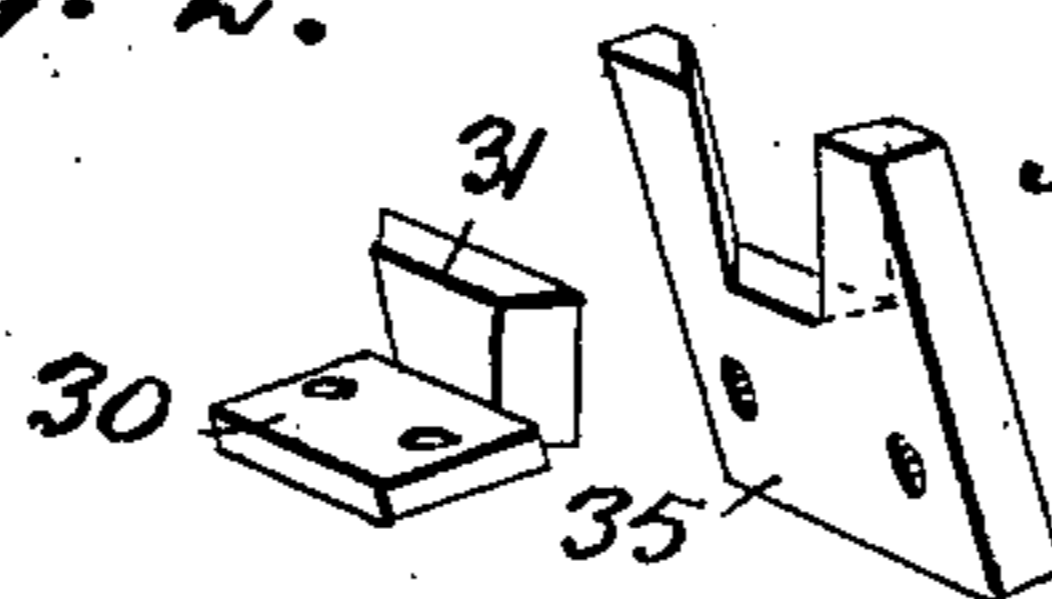


Fig. 2.

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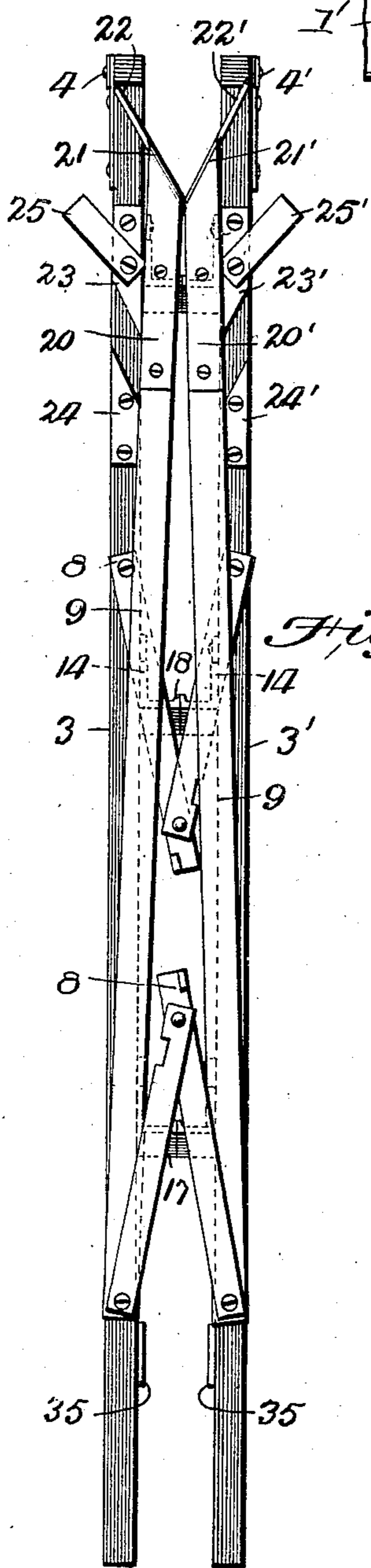


Fig. 3.

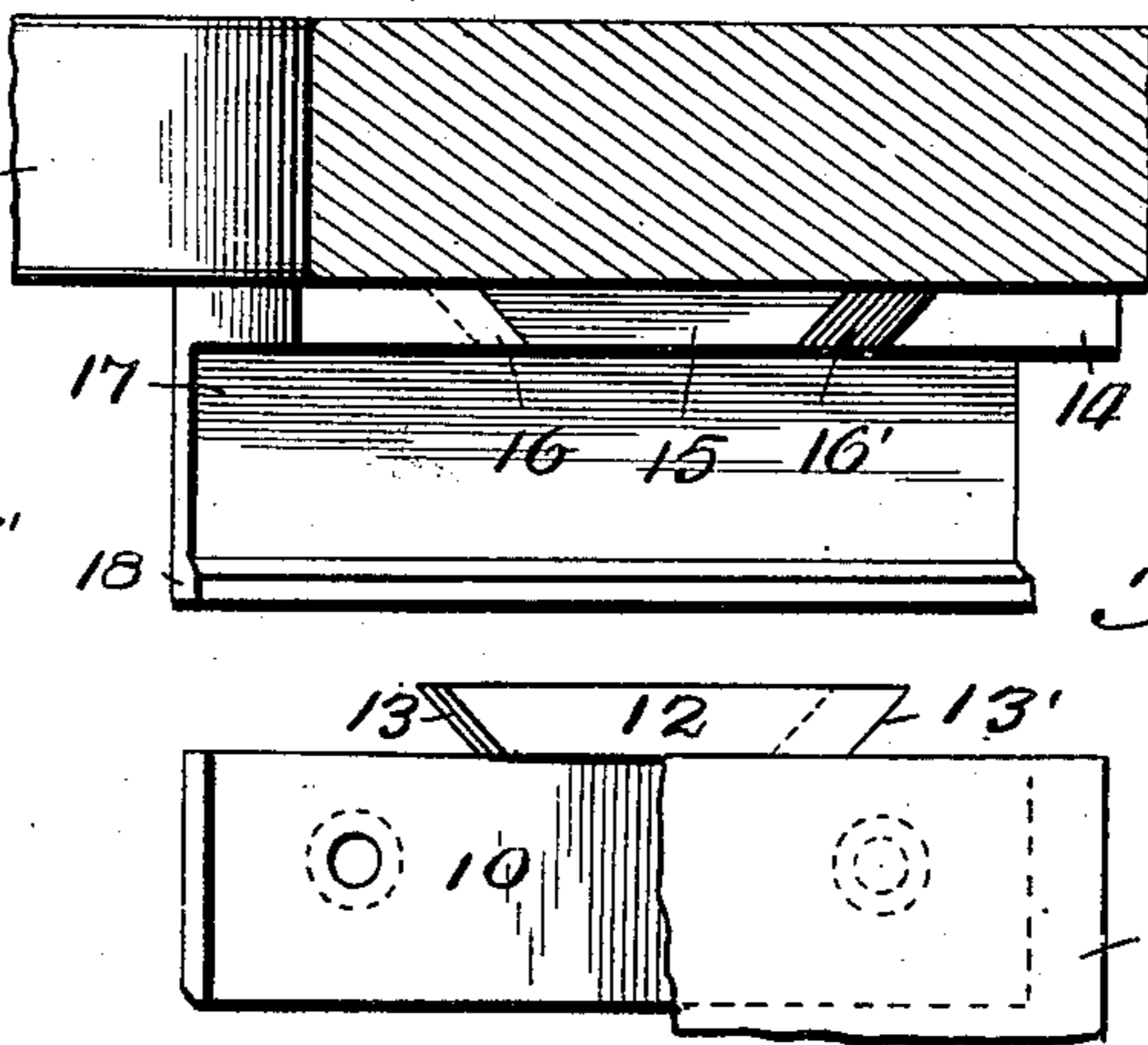


Fig. 4.

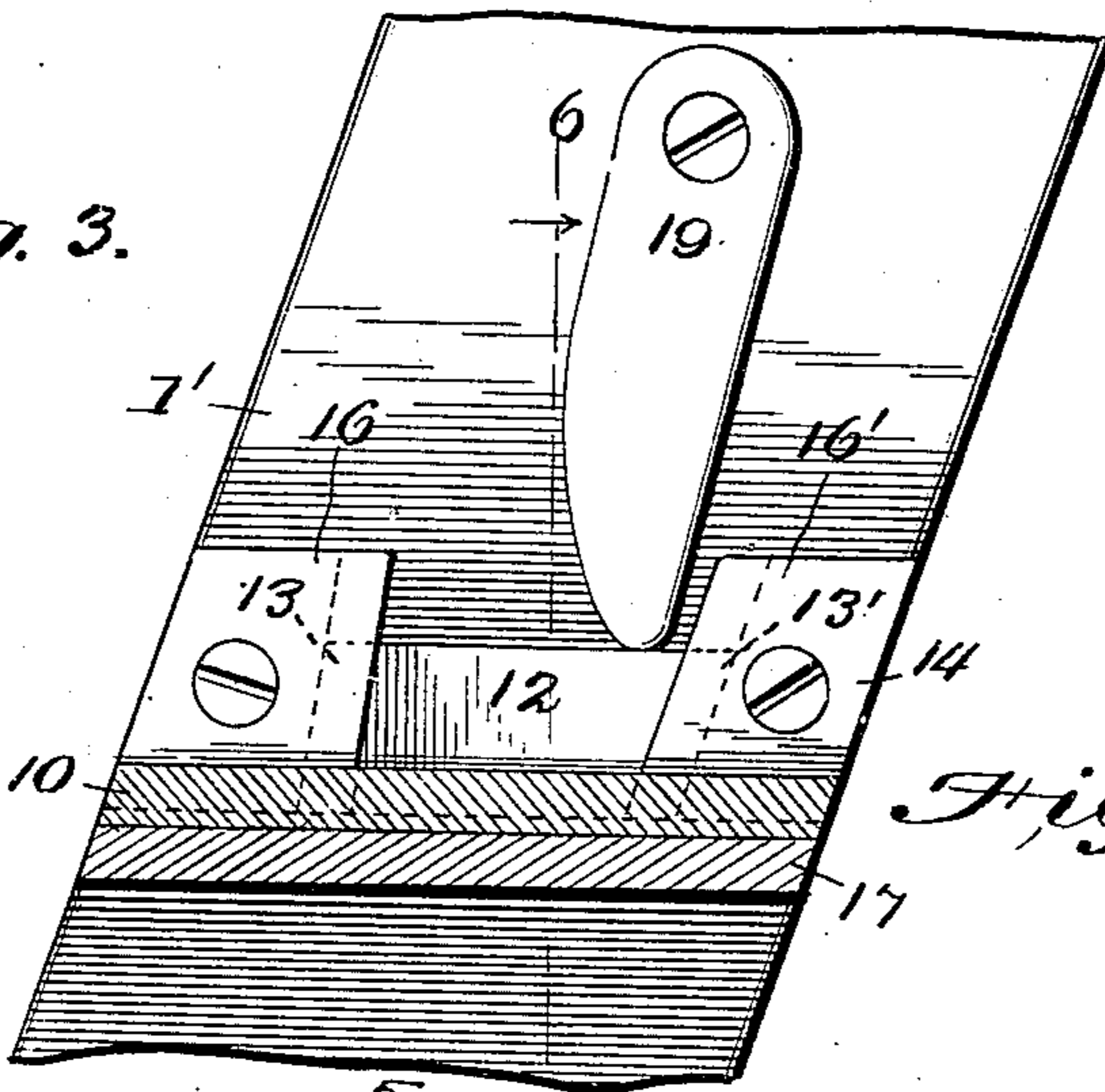


Fig. 5.

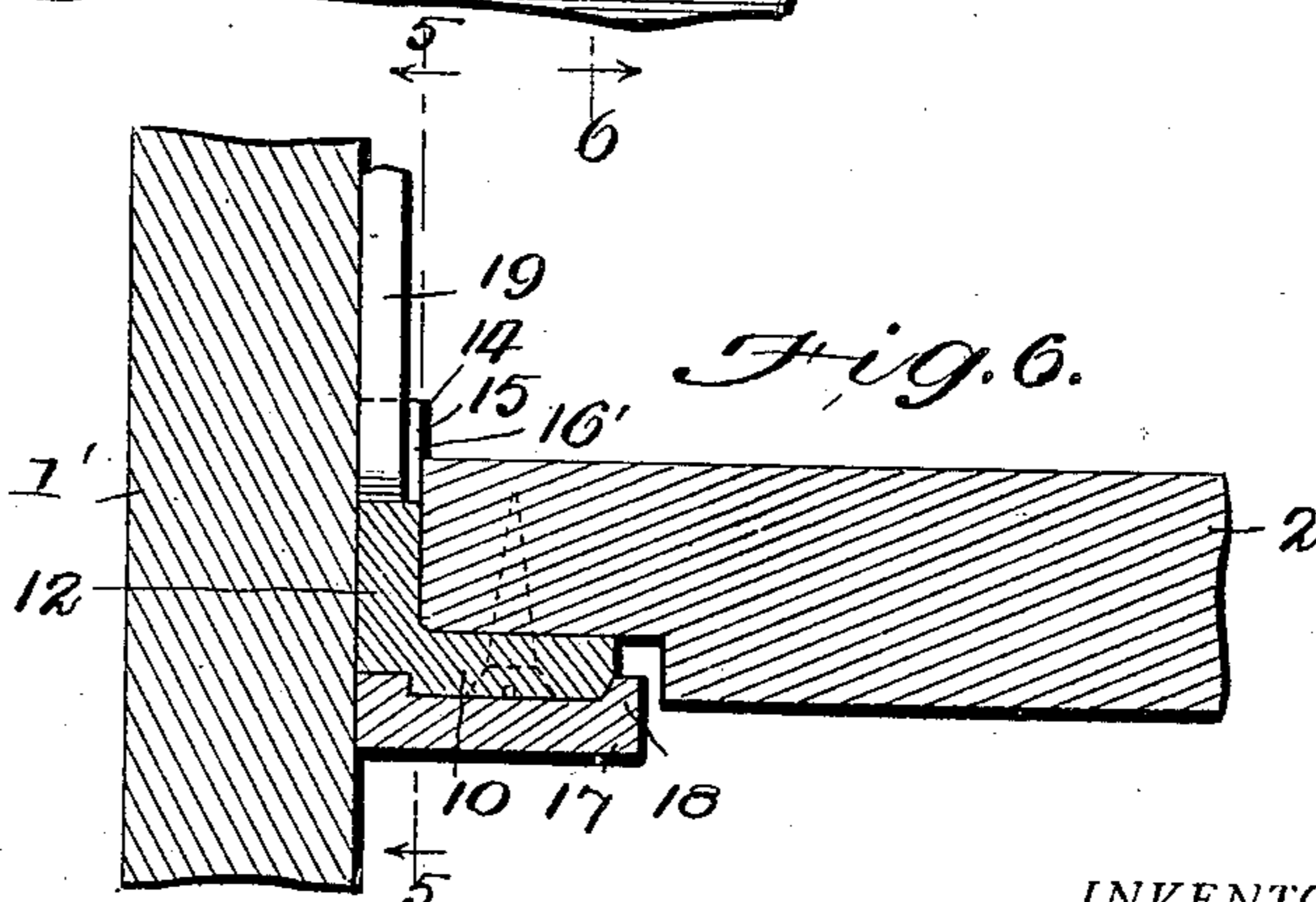


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOSEPH M. TURNER, OF PHILADELPHIA, PENNSYLVANIA.

COLLAPSIBLE STEP-LADDER.

No. 898,706.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed June 23, 1906. Serial No. 322,989.

To all whom it may concern:

Be it known that I, JOSEPH M. TURNER, a subject of the King of Great Britain, and a resident of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Collapsible Step-Ladders, of which the following is a full, clear, and complete disclosure.

My invention relates to ladders, and particularly to that class of the same which are collapsible, and the object of my invention is to produce such a ladder in which the steps are removable, and in which the rear braces may be readily locked in their position when the ladder is in use.

A further object of my invention is to provide a means for detachably holding together two parts of a ladder or other collapsible structure.

With these objects in view, my invention consists in the details of construction and manner of operation set forth in the following description, reference being had to the accompanying drawings, in which like reference characters refer to corresponding parts.

In the drawings: Figure 1 is a perspective view of a collapsible step ladder in its operative or braced position; Fig. 2 is a detail view of one of the fastening means; Fig. 3 is a rear view of the ladder in its collapsed position; Fig. 4 is a plan view of the detachable fastening means, showing a fragmentary portion of the step and stile of the ladder; Fig. 5 is a longitudinal section taken on lines 5—5 of Fig. 6 and Fig. 6 is a cross sectional view taken on lines 6—6 of Fig. 5.

Referring to Fig. 1, 1—1' indicates the stiles or sideboards of the ladder and 2 the steps thereof, which are removable in a manner which will be hereinafter described. The said stiles are supported in an inclined position by means of the legs or standards 3—3' pivoted at their upper extremities to the stiles by means of the hinges 4—4'. The ladder and standards are braced apart by means of the usual breakable bars 6—6'. Between the legs or standards 3—3' are detachably secured the removable brace bars 7—7 near the upper and lower extremities thereof, which bars are secured in position by a fastening means which will be hereinafter described. The legs or standards are further braced apart by means of the breakable bars 8—8 and the cross braces 9—9 which are pivotally secured together with the lower break-

able bar 8 to the rear of the standards in any suitable manner. The said brace bars are detachably fastened at their upper extremities by a means which will be hereinafter described.

Referring to the fragmentary detail views in Figs. 4, 5, and 6, 10 is a plate which is secured by screws or in any other suitable manner to the under side of each extremity of each step. Integral with this plate and projecting upwardly therefrom is a tongue 12 inclined relative to the surface of the step, and having its side portions 13—13' flared outwardly and converging downwardly. Secured to the inner face of each stile in a position corresponding to each end of each step is a plate 14, having a recess 15 therein, the sides 16—16' of which are inclined relative to the step, and are flared inwardly and converge downwardly to receive and support the tongue 12, which is locked in position by the pivoted lug 19. Projecting inwardly from the lower end of the plate 14 is a plate 17, having a countersunk portion, the outer end of which is formed by the inclined projection 18. The under side of the plate 10 is of the same configuration as the countersunk portion and will rest therein when the tongue is locked in the recess. When the ladder is in its braced position, the stiles are inclined, and likewise the side walls of the tongue and recess are inclined, the rear walls having a greater inclination than the front walls in order that they may converge towards each other. The said inclination of the walls enables the strain on the plate 14 to be more evenly distributed to its stile than in the case when the side walls are inclined in the opposite directions. The rearward inclination, however, is not essential, as the walls may be of any inclination, provided they support the step in a practical manner.

Referring to Figs. 1 and 3, the upper ends of the brace bars are shown abutting against the inner sides of the standards 3—3', and to the upper extremities of these cross bars 9—9 are fastened the lower arms 20—20' of the angle pieces 21—21'. The upper arms 22—22' of the angle pieces are bent to engage the outside of the legs or standards when the same are in their braced or operative position. The said upper arms 22—22' extend for a short distance upwardly to give a longer engaging surface. Where the arms 20—20' cross the rear of the legs or standards 3—3' are secured the upper and lower straps

23—24 and 23'—24' respectively. The adjacent edges of these straps are spaced apart to engage the arms 20—20' and are inclined to the direction thereof, thus forming recesses in which the said angle pieces may be secured and locked by means of the pivoted lugs 25—25'. When the said angle pieces are in the recesses, as shown in Fig. 1, they present a flush surface with the upper and lower straps.

Fig. 2 discloses a modification of the step fastening means applied to the brace bars 7, 7'. In this construction the inwardly projecting plate 17 is omitted. The plate 30 is fastened to the under side of the bar and has projecting from its outer end the tongue 31. The plate 35 receives and supports said tongue.

The above construction presents a ladder which is readily collapsible into a small amount of space, durable in construction and easy of operation. The tongues on the extremities of the steps being smaller at the lower portion than at the upper portion readily drop into the recesses, but do not make a snug fit until they are in their final position. The inclination of the walls of the recesses has a tendency to prevent any upward movement of the steps should the same accidentally become unlocked. The flaring of the walls and the recesses in the plate 17 form a dovetail-like construction, thus giving a tight and rigid engagement to the removable parts. The angle pieces 21 at the upper extremities of the cross braces on the legs or standards, by virtue of being confined in the inclined recesses formed between the upper and lower straps, give a tight, rigid, as well as removable fastening. The abutment of the upper extremity of the cross braces against the inside walls of the standards prevents an inward movement of the same, while the upper arms 22—22' of the angle pieces prevent any outward movement. The upper and lower brace bars 7—7' assist in keeping the standards apart when in their braced position.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:

1. In a step ladder having a pair of back legs hinged thereto, cross braces having their lower extremities pivoted to the said back legs, angle pieces each having one arm thereof secured and projecting beyond the upper end of each cross brace, the other arm of each angle piece being folded around to engage the side of its respective leg when the ladder is in its braced position, and means for locking the said angle pieces into engagement with said legs.

2. In a step ladder, back legs having recesses therein, cross braces pivotally secured at their lower extremities to said legs, angle pieces each having one arm thereof secured

to and projecting beyond the upper extremity of each cross brace, the other arm being bent at an angle to engage the side of its respective leg when the ladder is in its braced position, and means for locking said first mentioned arm in the recess of its respective leg.

3. In a step ladder having a pair of back legs, a pair of straps secured to each leg forming a recess between them, cross braces pivotally secured at their lower extremities to said legs, angle pieces each having one arm thereof secured to and projecting beyond the upper extremity of each cross brace, the other arm being bent at an angle to engage the side of said leg when the ladder is in its braced position, and means for locking said first mentioned arm in the recess of its respective leg.

4. In a step ladder having a pair of back legs, a pair of straps secured to each leg forming an inclined recess between them, cross braces pivotally secured at their lower extremities to said legs, angle pieces each having one arm thereof secured to and projecting beyond the upper extremity of each cross brace, the other arm being bent at an angle to engage the side of said leg when the ladder is in its braced position, and means for locking said first mentioned arm in the recess of its respective leg.

5. In a step ladder having a pair of back legs, a pair of straps secured to each leg forming a recess between them, cross braces pivotally secured at their lower extremities to said legs, angle pieces each having one arm thereof secured to and projecting beyond the upper extremity of each cross brace, the other arm being bent at an angle to engage the side of said leg when the ladder is in its braced condition, and pivoted lugs adjacent to each recess for locking the said first mentioned arm into engagement with its respective leg.

6. In a step ladder having a pair of back legs, cross braces each having one extremity secured to one of the back legs and the other extremity abutting the opposite leg on the inside, means attached to the latter end and extending over the outer face of the last mentioned leg for preventing movement of the braces inwardly, and means for locking the braces to said last mentioned leg.

7. In a ladder a joint for removably securing a horizontal to a vertical part comprising a vertical tongue projecting from the horizontal part and a plate secured to the vertical part and having a vertical recess to engage said vertical tongue, the lower end of said plate extending away from said vertical part, and having a horizontal recess to receive and support said horizontal part, and a button pivotally secured to said vertical part to lock the said horizontal and vertical parts together.

8. In a step ladder, a joint securing a horizontal

zontal to a vertical part comprising a horizontal plate having a vertical inclined tongue projecting from the one end thereof and a plate having a vertical inclined recess secured to the other part to receive and support said tongue, the lower end of said plate extending away from said other part, and containing a horizontal recess to receive and support said first mentioned plate.

9. In a ladder, the combination with a stile and a step, of a plate extending substantially the full width of the stile, and having a vertical portion attached to the inner surface of the stile, and provided with a central socket opening upwardly and having converging sides, and a horizontal portion extending the full width of the stile and projecting beneath the step, and having a recess in its upper horizontal surface, and a plate attached to the under surface of the step and extending the full width thereof and having a tongue projecting therefrom, said plate resting within the recess of the horizontal portion and said tongue resting in the recess of the vertical portion of said first mentioned plate.

10. In a step-ladder having a pair of back legs, cross braces each having one extremity secured to one of the said back legs, the other extremity abutting opposite leg on the inside, means attached to the latter end for preventing movement of said braces inwardly and means for locking the braces to said last mentioned leg.

11. In a ladder, the combination with a stile and a step, of a plate secured to said stile and having a vertical portion attached to the inner surface of said stile and provided with a central socket opening upwardly and having converging sides and a horizontal portion projecting beneath the step and having a recess in its upper horizontal surface and a plate attached to the end surface of said step and having a tongue projecting therefrom, said plate resting within the recess of the said horizontal portion and said tongue resting in the recess of the vertical portion of said first mentioned plate.

12. In a ladder, a joint for removably securing a substantially horizontal to a substantially vertical part comprising a vertical tongue projecting over the said horizontal part and the plate secured to the said vertical part and having a vertical recess to engage said vertical tongue, the lower end of said plate extending away from said vertical part and having a substantially horizontal recess to receive and support said horizontal part, and means secured to said vertical part to lock the said horizontal and vertical parts together.

In witness whereof I have hereunto set my hand this 20th day of June, 1906.

JOSEPH M. TURNER.

Witnesses:

ALSTON B. MOULTON,
JOHN B. RUTHERFORD.