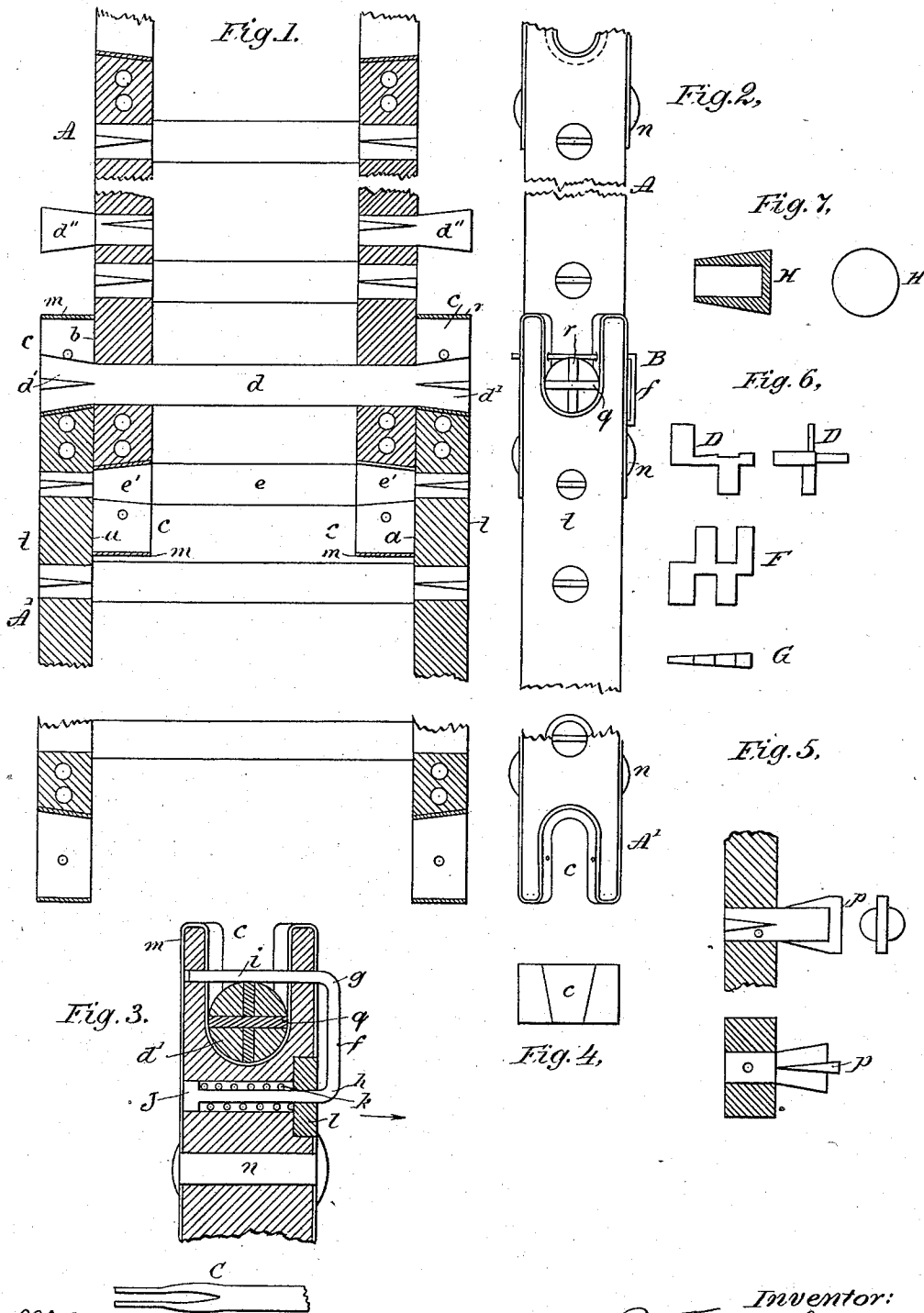


(No Model.)

P. T. GATES.
SECTIONAL LADDER.

No. 316,958.

Patented May 5, 1885.



Witnesses:
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UNITED STATES PATENT OFFICE.

PHILEMON TENNEY GATES, OF NEW YORK, N. Y.

SECTIONAL LADDER.

SPECIFICATION forming part of Letters Patent No. 316,958, dated May 5, 1885.

Application filed January 5, 1885. (No model.)

To all whom it may concern:

Be it known that I, PHILEMON TENNEY GATES, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Sectional Ladders, of which the following is a specification.

My invention relates more particularly to improvements in the construction of sectional ladders, whereby two or more short ladders may be securely fastened together to provide a continuous ladder of any desired length, and which may be readily put together or taken apart, although my said invention is as equally adapted for securing frames, platforms, screens, and so forth, together in like manner; and my improvements consist, essentially, in the novel arrangement of said ladders, frames, and so forth, and in the manner of locking or securing the several sections in position, all as will be hereinafter more fully described, and specifically designated in the claims.

In the accompanying drawings, Figure 1 represents the ladder in cross-section, showing two portions of the ladder joined together by means of my invention. Fig. 2 represents a side view of the same; Fig. 3, a detail and enlarged view of the locking mechanism of one of the joints; Fig. 4, an end view of one of the sides of the ladder; Fig. 5, a modification of the form of pin and wedge; Fig. 6, another modification of the same, and Fig. 7 a device which may be substituted for the wedge used in my invention.

Similar letters of reference occurring on the several figures represent like parts.

In carrying out my invention each of the short or sectional ladders A and A' may be of any desired length, and similar in all respects to each other, being preferably constructed broader at the lower extremities and gradually growing narrower toward the top, so that the inner sides, *a*, of the bottom of one ladder will fit smoothly against the outer sides, *b*, of the top of another ladder when the two are joined together, as fully shown in Figs. 1 and 2. The upper and lower ends of the sides of each ladder are provided with conical or dovetail grooves or notches *c*, as shown, so that when the two ladders or sections are joined together conical projections *d'* of the bottom

round, *d*, of the upper ladder fit snugly in the conical notches *c* of the lower ladder, and the conical notches in the bottom of the upper ladder rest over and upon the ends of the upper round, *e*, in the lower ladder. In order that the round *e* may fit snugly the conical notches in the ends of the ladder, it is turned in the lathe or by other means into a conical shape, as shown at *e'*.

I am aware that sectional ladders have before been locked together with the assistance of grooves or notches—for instance, as described in my Letters Patent dated July 15, 1884, and bearing number 301,980, and also in my Letters Patent dated August 19, 1884, and bearing number 303,721. It will be noticed, however, that in the present invention these grooves and the parts which fit therein are of a conical shape, so that when put together a dovetail joint is formed, one of which is shown at B, Fig. 2, and in cross-section in detail in Fig. 3, and which has already been described in the foregoing part of this specification, with the exception of one or two details, now to be described.

When the upper part is fitted as described, the dovetail-joint has strength in all directions, except that there is danger of the parts falling asunder in a longitudinal direction. To provide against this mishap, I provide a pin, *f*, which is shown at one joint only. This pin consists of a wire bent twice, at *g* and *h*, respectively, enlarged at *j*, and fitting into holes in the ladder-sides at such position, that, first, the portion *i* presses against the pin *d''* or round projection *d'*, holding the latter tightly in the groove, and that, second, the combined action of the helical spring *k* and fixed collar or bearing *l* prevents the wire or pin from slipping out of its intended position. When it is desired to take the sections of the ladder apart, this wire is pulled outward in the direction of the arrow against the resistance of the spring. In the place of this wire, held in place by the spring *k*, I sometimes prefer to use an ordinary split pin, a portion of which is represented at C.

To increase the strength and durability of the ladder ends, there is provided on each end, around the conical grooves, an iron or other metal band, *m*, held by the bolt *n*, and

fitted and pressed into the exact shape of the groove.

Modifications of the method of making the conical surface on the pins or plugs or round-projections are shown in Figs. 5, 6, and 7. In Fig. 5, *o* represents a pin similar to *d''*, or, as far as the present purpose is concerned, it may represent the projection *d'* of the round *d*. By driving in the wedge *p* it causes the surface to approximate to the shape of a cone. By driving in two wedges, as shown in Figs. 2 and 3 at *q* and *r*, the surface is practically a perfect cone. These wedges may be either wooden or metallic. Wood is preferable, according to the principle that ladders should always be made with a view to light weight. Should, however, it be desired for other reasons to introduce metal, then I would use a metal wedge, or I would drive upon the pin *d''* or projection *d'* of round *d* a cap, such as is clearly shown in section and end view by Fig. 7.

The wedges used may be of any material, or the caps may be of any material, so long as they form a permanent and strong conical surface to fit in the grooves *c*.

Some of the advantages of my form of ladder are the absence of wire springs and such auxiliary fixtures as are shown in my former patents, already referred to; the use of a dovetail joint to ladders, which joints are preferable in this department of industry, as in other departments—such as the manufacture of furniture—and more especially so on account of its reducing the weight of the ladder more than by the use of iron clamps, heavy springs, and so forth. The principal advantages, however, are the simplicity of construction, due to the use of the dovetail joint, and the strength capable of resisting equally strains in all directions.

I am aware that sections of ladders have heretofore been made with slots in the ends of the side pieces in such manner that the slots

of each section abut over the round of an adjacent section, and that said sections have been held together by suitable locking devices, and I do not therefore desire to claim broadly such construction; but,

Having thus described my invention, I claim as new and useful—

1. A detachable joint for sectional ladders, consisting in the combination, with the narrow and wide sections, respectively, *A* and *A'*, of the dovetail projections *d'* of the round *d* fitting snugly into the dovetail slots *c*, the said projections belonging to the narrow section, and the said slots to the wide section, and of the dovetail or beveled portions *e'* of the round *e* belonging to the wide section fitting into the dovetail slots *c* belonging to the narrow section.

2. A detachable joint for sectional ladders, consisting of the beveled projections *d''* of one section adapted to fit into beveled slots of another section, in combination with beveled projections of the second section adapted to fit into beveled slots of the first-named section.

3. A detachable joint for sectional ladders, consisting of the dovetail projections *d'* of the narrow section fitting into the dovetail slots of the wide section, and of the dovetail portions *e'* of the round *e* fitting into the dovetail slots of the narrow section, in combination with adjustable pins *i*, passing through perforations in the side rails of the ladder and fitting against said projections *d'* and said portions *e'*.

4. In sectional-ladder joints, the combination, with a dovetail projection fitting into a dovetail slot, of a pin located crosswise to the slot and touching the dovetail projection, said pin being adapted to be removable.

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Witnesses:

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