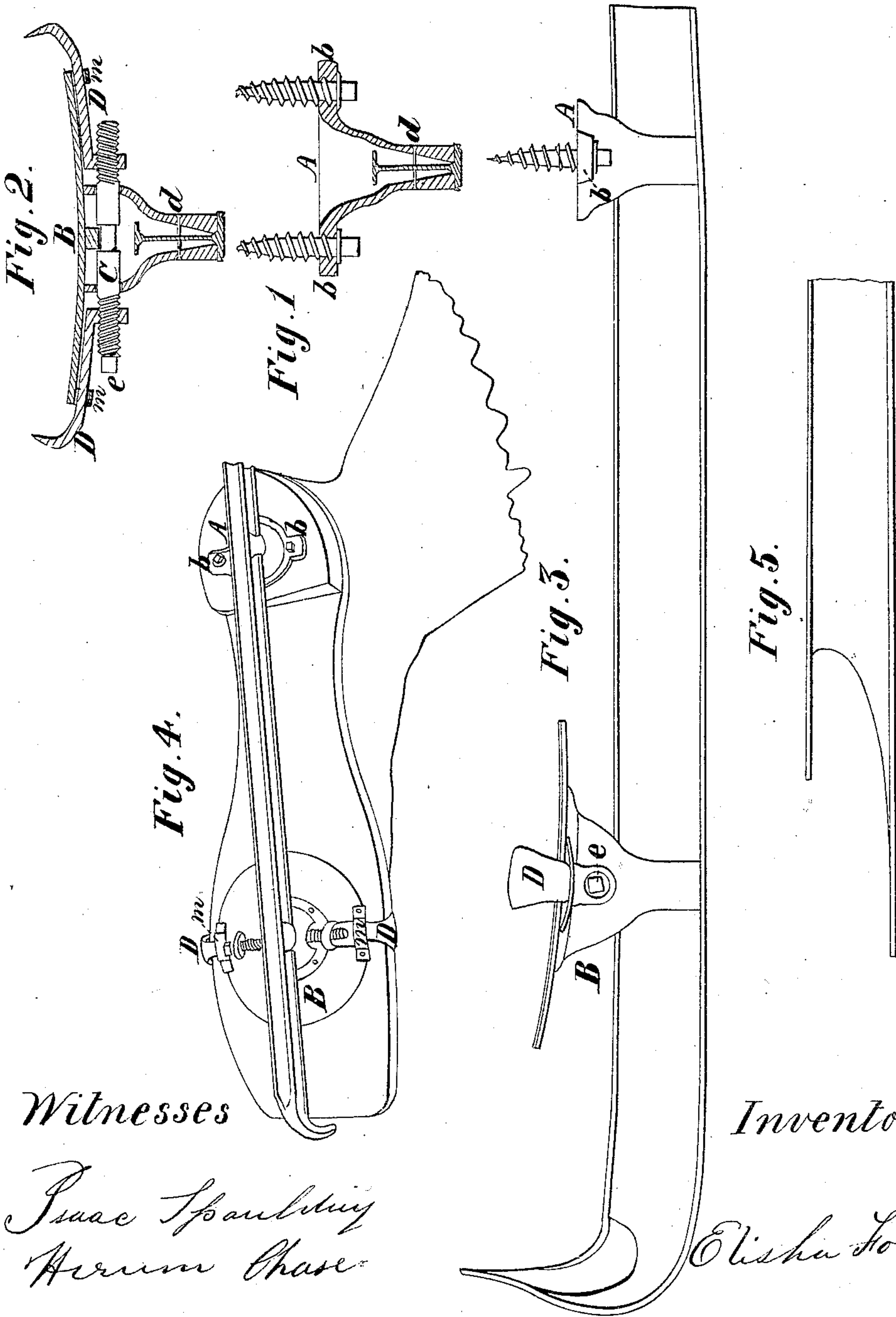


*E. Foote,*  
*Skate,*  
*No. 45,148, Patented Nov. 22, 1864.*



*Witnesses*

*Isaac Spaulding*  
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# UNITED STATES PATENT OFFICE.

ELISHA FOOTE, OF SARATOGA SPRINGS, NEW YORK.

## IMPROVEMENT IN SKATES.

Specification forming part of Letters Patent No. 45,148, dated November 22, 1864.

*To all whom it may concern:*

Be it known that I, ELISHA FOOTE, of Saratoga Springs, in the county of Saratoga and State of New York, have invented certain new and useful Improvements in Skates; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification.

Figure 1 is a section across the runner and through the middle of the standard which supports the heel. Fig. 2 is a like section across the runner at right angles to its length and through the middle of the standard which supports the ball of the foot. Fig. 3 is a side view of the skate, and Fig. 4 represents it attached to a boot. Fig. 5 shows the manner of preparing the plate in order to turn up the front end of the runner.

All the drawings, except the perspective one, Fig. 4, are of full size and represent the several parts in their proper proportions.

My first improvement is the form of the runner. It is best shown by its cross sections in Figs. 1 and 2, and consists, as there represented, of a thin upright rib with two flanges, one at the top and one at the bottom. The lower flange constitutes the bottom of the skate, and I am thus enabled to give to the bottom sufficient breadth and bearing upon the ice with greater lightness and economy of material. For the central rib a thickness of about one thirty-second of an inch is sufficient for men's skates. For ladies' and boys' skates it may be made much thinner. The top flange is made of the same thickness as the rib, and about two-thirds as wide as the bottom. The bottom is made as wide as it is desired to have the bearing upon the ice. It may be about twice as thick as the rib. It will be observed that this form of runner approaches very nearly to that of the greatest strength of an iron beam. The transverse strain upon the skate up and down is provided for by the thin upright rib; the strain sidewise by the flanges. The tendency to bend over around the lower flange is counteracted by the form and mode of attaching the standards, hereinafter described; and it is believed that the several strains to which a skate is subjected are thus provided for with the least possible expendi-

ture of material and with extreme lightness and neatness in the skate.

The steel may be rolled out or swaged into the proper shape in its cross-section for the runner. Then for turning up the front part a portion of the rib is cut out, as shown in Fig. 5. The flanges are then turned up and welded together and drawn into proper shape, as shown in Fig. 3.

A less perfect mode of making the runner consists in omitting the upper flange and having only the lower flange and upright rib to constitute the runner; but this is evidently a form of less strength, and it makes an inferior skate to that with two flanges, although it may, perhaps, be somewhat easier made.

To the runner are attached two standards, on which the boot bears in skating—one for the heel (shown at A Figs. 1, 3, and 4) and one for the sole of the boot, (shown at B, Figs. 2, 3, and 4.) They have usually been made of brass, cast hollow, as shown in the cross-sections and turned off so as to be quite thin and light. From the bottom of the standard extending upward through the middle a space is cut out corresponding in shape to the cross-section of the runner, and into this space the runner is inserted from behind. It is then riveted, as shown at *a*, and sometimes soldered to its place. The bottom of the standard rests upon the upper surface of the lower flange of the runner and is fitted to it, and every side of the runner above that portion is closely embraced by the standard. The runner is thus strengthened and the tendency to bend over around the lower flange prevented.

The standard for the heel has upon each side of it a projection, *b b*, through which the screws pass that screw into the bottom of the heel of the boot. The lower ends of these screws terminate in square heads to which a key like a common clock-key is fitted to turn them. Next above the square head is a shoulder to bear against the underside of the projection. Above the shoulder the screw is like the ordinary wood-screw, except that the thread is cut away for a distance equal to the thickness of the projection. The orifice through the projection corresponds in size to the body of the screw, and has a thread cut in it corresponding to the thread upon the screw. By



this arrangement these screws cannot be withdrawn from their orifices, except by turning them, and they are thus held in their places when not in use; but when screwed up so that the shoulder bears against the under side of the projection they turn without any action upon the thread in the orifice, and the skate may be drawn up firmly against the bottom of the heel of the boot by turning the screw. These two screws (instead of one, as heretofore used) not only attach the skate very firmly to the heel of the boot, but they counteract any tendency of the skate to turn or shift to one side at the toe.

On the top of the front standard is riveted a circular plate. It is best made of thin steel plate. It is made concave and fitted to the shape of the sole of a boot. Its diameter is from one-fourth to one-half of an inch less than the width of the sole, and the boot rests directly on this plate or on a piece of cloth, or some other good non-conducting material cemented to it. On each side of the same front standard is drilled a hole to fit and sustain the rod C at right angles to the length of the runner. The rod should be fitted to turn easily in these holes without unnecessary looseness. At about the middle of the rod a groove or recess in it is turned, as shown at *d*, Fig. 2. A fork fits this recess, and is attached to the plate, by which any side movement of the rod is prevented. Sometimes the standard is made so low that the groove in the rod embraces the upper flange of the runner, and thus the rod is held in its place. On each end of the rod, outside of the standard, a screw is cut—one right-handed, the other left—to operate the clamps D D. One end, *e*, is made square to fit the same key that turns the screws for the heel. These clamps are made to fit and slide out and in along the under side of the circular plate. One end is turned up to clamp the sole of the boot. The other is turned down and drilled and tapped to receive the screw on the rod. The clasps *m m*, embracing the clamps and riveted to the plate, hold the clamps to their places, and allow them to slide easily within them.

Clamps have heretofore been applied to

skates to clamp the sides of the sole of the boot, and they have been operated by right and left screws; but they have been defective in the manner of applying them, and their use has been quite limited. My improvement upon those heretofore used consists in attaching the clamps to the under side of the plate on which the sole of the boot rests, making the screws that operate them outside of the standard and securing the rods on which the screws are cut firmly in its place by orifices through the standard.

The several plans that have heretofore been devised for securing the skate to the boot by clamps have been also defective in not providing a sufficiently secure and firm fastening for the heel. Most of the strain upon the fastening comes at the heel, particularly in the act of pushing forward with the back foot. That being properly secured, the strain upon the forward part of the foot is comparatively light, and that consists mostly of a tendency to slip sidewise to the side of the boot. I have therefore taken particular pains to secure the heel very firmly by two substantial screws into the bottom of the heel, and with these a clamp upon the sole is sufficient to hold the skate firmly to the boot. The combination of the two modes of attachment—to wit, the clamp upon the sole, and a screw into the bottom of the heel—seems to be indispensable to this kind of fastening.

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

1. The form of the runner, as above set forth, consisting of a thin upright rib and one or two flanges.
2. The combination of such a runner with standards to prevent it from turning over sidewise, as described.
3. The use of two screws at the heel, constructed and arranged as described.
4. The improved mode of attaching and constructing the clamps and screws to operate them, as particularly set forth.

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Witnesses:

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