(No Model.) 2 Sheets—Sheet 1.

I. LANCASTER.

ROLLER SKATE.

No. 321,227. Patented June 30, 1885.

Fig. 1.

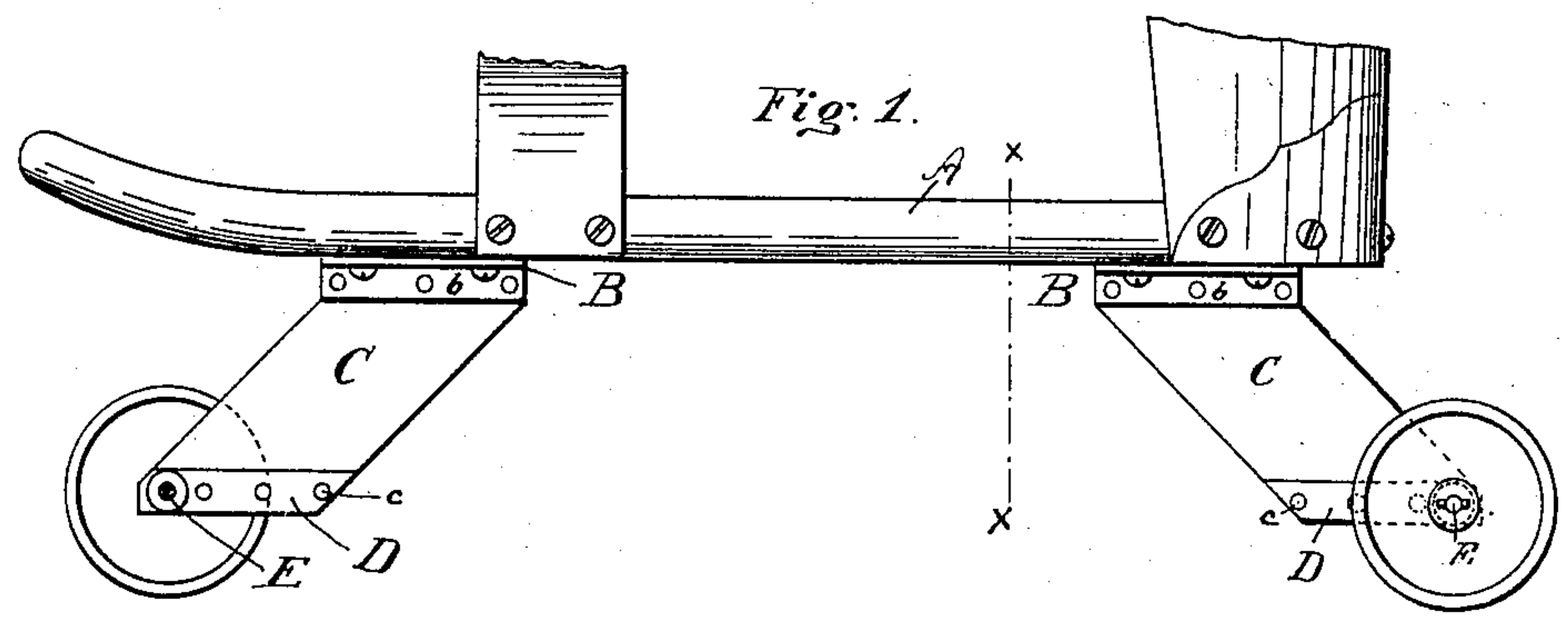


Fig. 2.

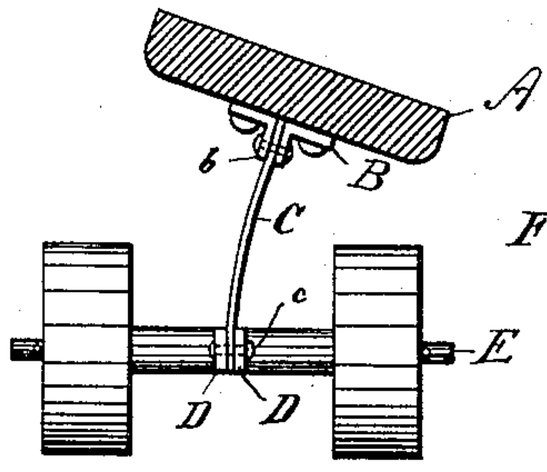


Fig. 3.

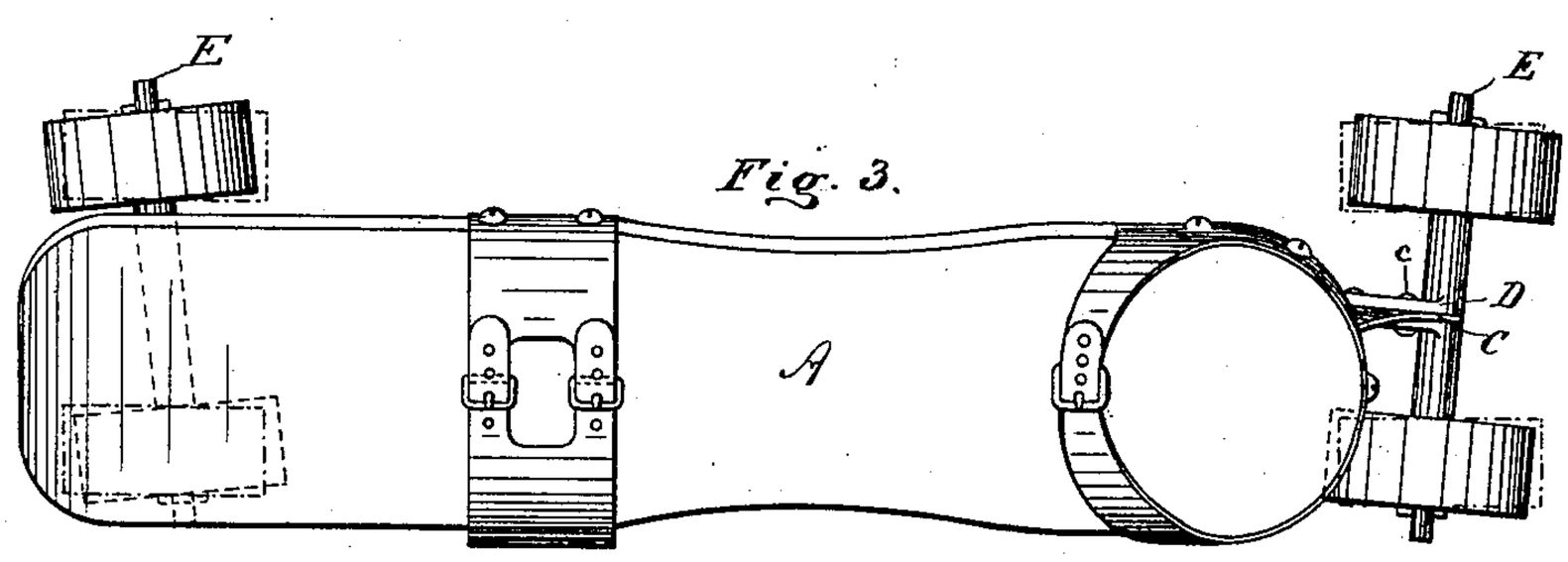


Fig. 4.

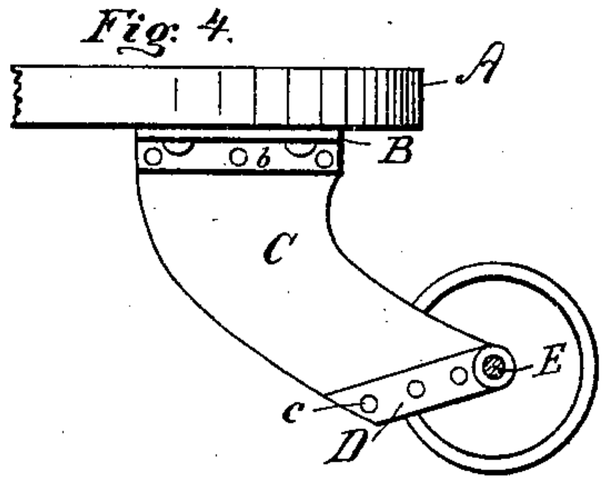
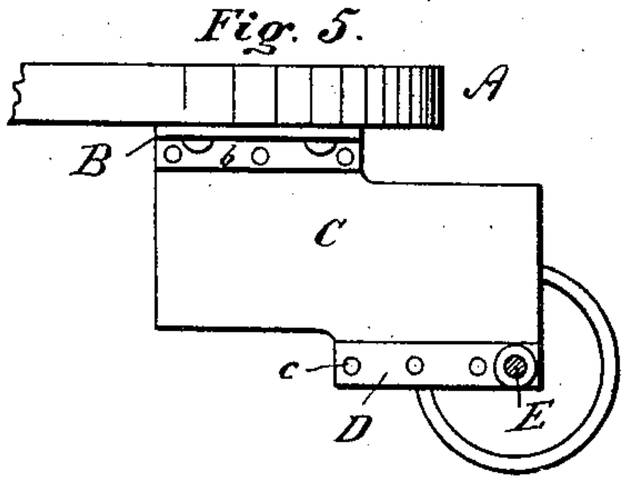


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

I. LANCASTER.

ROLLER SKATE.

No. 321,227. Patented June 30, 1885.

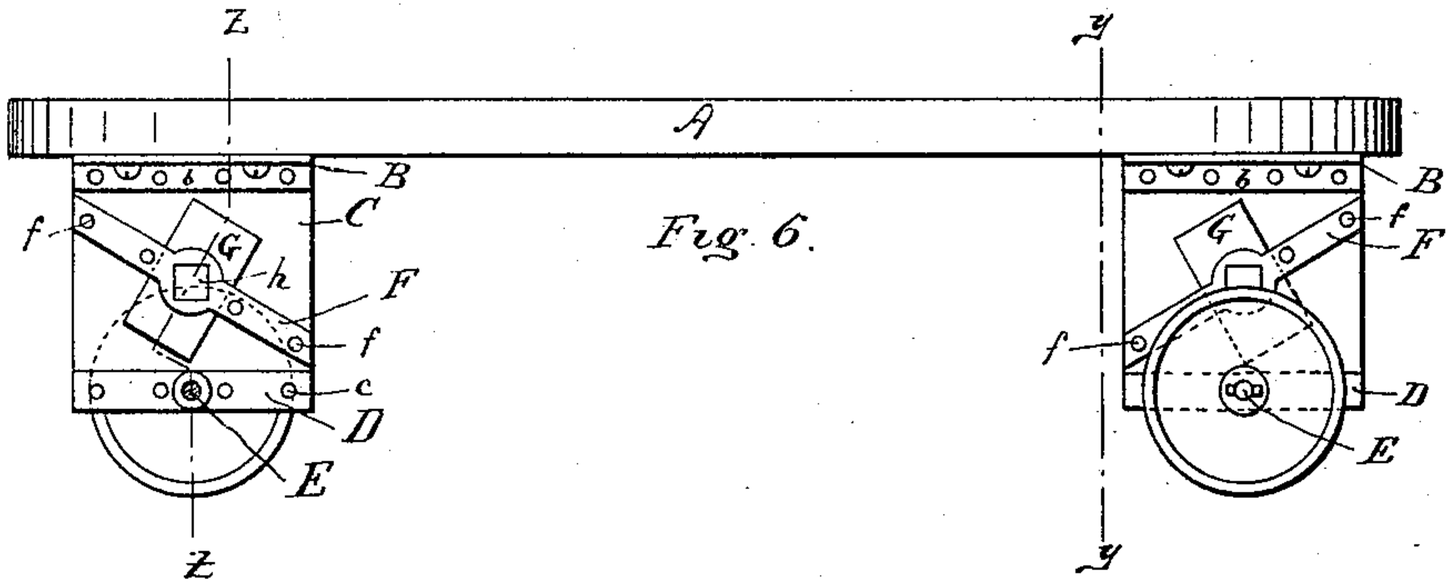

Fig. 6.

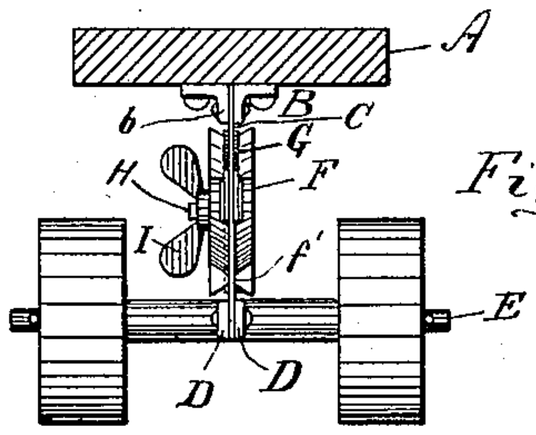

Fig. 7.

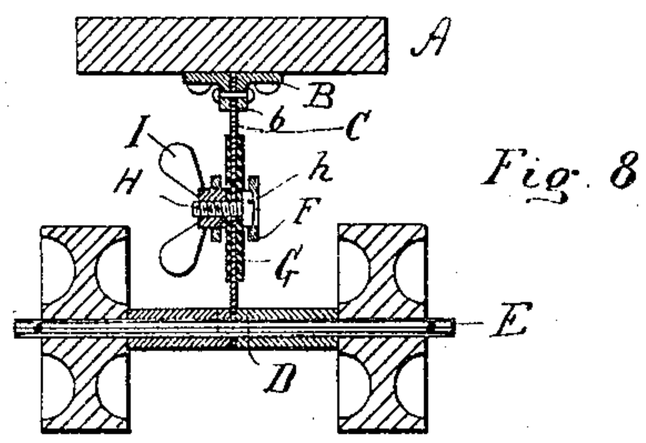

Fig. 8

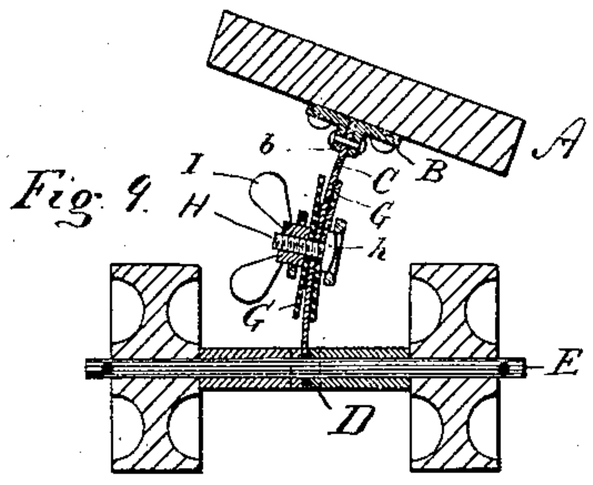

Fig. 9.

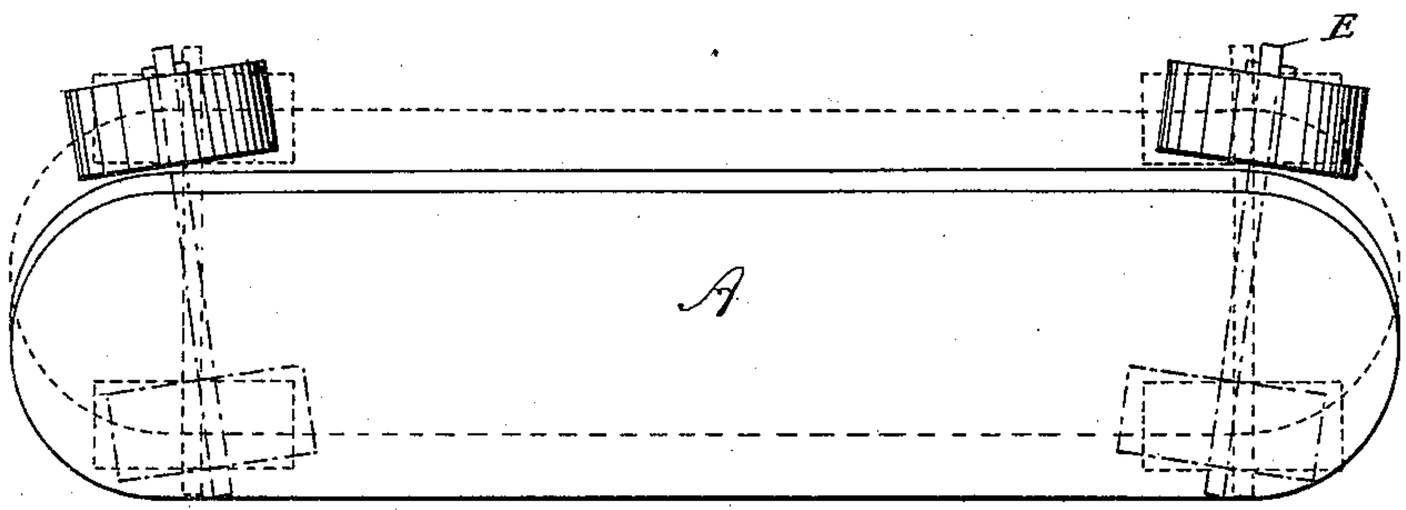

Fig. 10.

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UNITED STATES PATENT OFFICE.

ISRAEL LANCASTER, OF CHICAGO, ILLINOIS.

ROLLER-SKATE.

SPECIFICATION forming part of Letters Patent No. 321,227, dated June 30, 1385.

Application filed January 24, 1885. (No model.)

To all whom it may concern:

Be it known that I, ISRAEL LANCASTER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Roller-Skates, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

In the construction of a successful roller-skate it is necessary that the rollers and foot-plate be connected together in such manner that when the foot-plate is tilted sidewise by the movement of the foot of the skater the axles of the rollers will be deflected from lines parallel to each other, so that the rollers may move upon lines of greater or less curvature, according as the skater desires to make a more or less abrupt turn. In other words, it is required that there shall be two motions simultaneously made by the foot-plate and the roller-trucks—to wit, the foot-plate shall oscillate on a horizontal axis parallel to its length, and the roller-trucks shall rotate on the plane of the floor on a vertical axis, and it is necessary that the first of these motions shall produce the second. To effect this desideratum various modes of attaching the foot-plate and wheel-trucks together have been adopted. For example, the journal-bearings of the wheels or rollers have been united to hangers on the foot-plate by movable joints controlled in their action by rubbers or spiral springs. These have, however, been found defective in practice, for the reason that the joints and the springs become speedily worn and unfit for use without constant repair. It has also been heretofore proposed to connect the foot-plate and rollers of a skate by means of strips of rawhide held in diagonally-slotted hangers and journal-bearings; but such construction is open to the objection not only that the rawhide is apt to become rotten and lose its elasticity, but is also objectionable for the reason that unless the rollers are held so far from the foot-plate as to make the skate clumsy the arrangement of the hangers or journal-bearings in diagonal manner will preclude the employment of a spring connecting blade or plate of sufficient breadth to give the requisite elasticity of movement between the foot-plate and the wheel-trucks. It is very important that the space between the foot-plate hangers and the journal-bearings of the trucks should be such as to allow a strong and at the same time flexible spring-blade to be used, because if the space be small the spring-blade, if made sufficiently flexible, will necessarily be so thin as to endanger breakage.

My present invention has for its object to provide a simple, cheap, durable, and effective form of spring-blade connection between the foot-plate and wheel-trucks of the skate which will not be liable to get out of repair, and which will respond with certainty and ease to the movements of the foot of the skater when changing from a straight to a curved course.

To this end my invention consists, primarily, in connecting together the foot-plate and wheel trucks or rollers of the skate by means of laterally-elastic blades held by suitable castings or hangers on the trucks and foot-plate, said castings or hangers (one or both) having their points of attachment to the blade in substantially parallel and horizontal planes, and said rollers being journaled at one side of the line of the normal resultant of flexure, whereby ample space will be provided for spring-blades of suitable size, and the proper rotation of the axles will be effected.

My invention also consists in various details of construction and subordinate improvements, all of which will be hereinafter more fully defined, and particularly pointed out in the claims.

It is evident that if the connecting-blade and its attachments were so arranged with relation to the trucks that the axle of the wheels or rollers would be in the line of the normal resultant of the forces of flexure when the foot-plate was tilted there would be no rotation of the axle, as these forces would act uniformly on each part thereof. If, however, the axle of the wheels or rollers be placed at one side of the line of such normal resultant, the forces of flexure are resolved in part into forces of torsion, and there is a constant tendency to cause a horizontal rotation of the trucks or rollers. This rotation of the trucks may be accomplished in either of the two following ways, to

wit: first, the spring-blade may be symmetrical in shape and in its connection with the castings and hangers, in which case the truck-axle will be placed at one side of the axis of symmetry, and, second, the line of flexure of the spring-blade may be varied by destroying the uniform character of such blade, as by forming or placing ribs thereon, which will in part convert the forces of flexure into forces of torsion. Both of these ways, however, will be found to involve the broad principle of so disposing the truck-axle with relation to the spring-blade that in tilting the foot-plate there shall be both a flexure and a torsion of the spring-blade.

Figure 1 is a view in side elevation of a roller-skate embodying my invention, one of the rollers being removed for better illustration. Fig. 2 is a view in vertical section on line *x x* of Fig. 1, the foot-plate being shown slightly tilted. Fig. 3 is a plan view illustrating the relative position of the wheel-trucks when the foot-plate is tilted. Figs. 4 and 5 are detail views, each illustrating a modified form of spring connecting-blade. Fig. 6 is a view in side elevation of a roller-skate, the spring-blades of which are provided with deflecting-ribs, and with means for adjusting the elastic movement of said blades. Fig. 7 is a view in vertical section on line *y y* of Fig. 6. Fig. 8 is a view in vertical section on line *z z* of Fig. 6. Fig. 9 is a view similar to Fig. 8, but showing the relative position of parts when the foot-plate is tilted. Fig. 10 is a plan view similar to Fig. 3.

A designates the foot-plate of the skate, upon the bottom of which are bolted suitable hangers or castings, B, between the flanges *b* of which are fastened the upper edges of the elastic connecting-blades C, the opposite edges of said blades being held by screws or rivets *c* between the journal-castings D of the wheel-axles E. It will be noticed that the hangers B and the journal-castings D extend in planes practically horizontal and parallel to each other, the purpose of this arrangement being to allow space for a spring-blade of proper size without extending the wheel-trucks such distance from the foot-plate as to render the skate unsightly. It will be noticed that the truck-axles are journaled at the lower outer corners of the spring-blades, in which position they will be as far as possible from the line of the normal resultant of flexure of the blades. It will be readily seen that with the wheel-trucks in this position any tilting of the foot-plate will produce not only a flexure of the spring-blade, but also a torsional movement of the same, which will tend to throw the wheels into the position shown in Fig. 3. It will be readily seen that the farther the truck-axles are moved from the line of the normal resultant of flexure, the greater will be the torsional movement of the spring.

In the modification shown in Fig. 4 the spring-blade is of curved shape; but the principle of invention is the same as that above specified. The same also may be said with regard to the construction illustrated in Fig. 5, which differs only in the precise shape of spring connecting-blade employed.

In modified construction illustrated in Figs. 6 to 10, the spring connecting-blades have torsional movement imparted thereto by means of deflecting-ribs F, which extend diagonally across the connecting-blades C from the upper outer corners to the lower inner corners, and on each side of the blades, such ribs being fastened together and to the blades by means of suitable screws or rivets, *f*. The ribs F are preferably of prismatic shape in cross-section, as seen in Fig. 2, so that their bearing-edges *f'* will not in any wise detract from the elastic quality of the connecting-blades. The blades C are preferably of thin well-tempered steel, and by reason of the inclination of the deflecting-ribs any lateral tilting of the foot-plate will cause the connecting-blades to be bent in the direction of the rib, and consequently will force the wheels to be deflected from lines parallel to each other, so that their axles will point toward the center of a circle of greater or less diameter, on the circumference of which the wheels will be moving, as seen in Fig. 5. The deflecting-ribs F are cut away about the center of their inner portions to form spaces for the admission of the adjusting-plates G, the spaces being of sufficient size to permit a slight movement of the plates to and from the connecting-blades. The deflecting-ribs are also expanded somewhat at their central portions, and in such expanded portions of one set of ribs square openings are formed to admit the heads *h* of the adjusting-screws H. These adjusting-screws pass through the adjusting-blades and enter the threaded sockets of the thumb-nuts I, which fit within suitable openings in one set of the deflecting-ribs and bear against the corresponding set of adjusting-plates. The adjusting-plates will be formed preferably of steel, and by clamping them more or less tightly against the connecting-blades the degree of elasticity of such blades can be readily controlled. This is a feature of importance, as by such means the elastic movement of the skates can be readily adapted to suit the weights of different persons.

It will be readily understood that the elastic blades may be attached to the wheel-journal castings in any suitable manner without departing from the spirit of my invention, so long as the method of attachment employed be such that the castings and hangers extend in practically horizontal and parallel planes, so that ample space will be allowed for the spring-blade, and so long as the truck-axles are so placed as to convert in part the movement of flexure of the spring into a movement of torsion.

Instead of providing the connecting-blade C with the inclined deflecting-ribs separate therefrom, these blades may be formed with ribs integral therewith, and the ribs may be

disposed in any suitable manner upon the plate that will enable them to secure the proper rotation of the wheel-trucks.

It will be readily understood, also, that various forms of adjusting-plates may be employed for varying the elasticity of the connecting-blades without departing from the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a roller-skate, the combination, with the foot-plate and the rollers, of an elastic connecting-blade and suitable castings for the same, said castings (one or both) having their points of attachment to the blade in substantially parallel and horizontal planes, and said rollers being journaled at one side of the line of the normal resultant of flexure of the spring-blades, substantially as described.

2. In a roller-skate, the combination, with the foot-plate and the rollers, of an elastic connecting-blade and a deflecting-rib on said blade, substantially as described.

3. In a roller-skate, the combination, with the foot-plate and the rollers, of the elastic connecting-blades and the inclined deflecting-ribs having sharp bearing-edges, substantially as described.

4. In a roller-skate, the combination, with a foot-plate, the rollers, and an elastic connecting-blade, of adjusting mechanism for regulating the elasticity of said connecting-blade, substantially as described.

5. In a roller-skate, the combination, with the foot-plate, the rollers, and the elastic connecting-blades, of the adjusting plates and screws, substantially as described.

In testimony whereof I have hereunto set my hand.

ISRAEL LANCASTER.

Witnesses:

GEO. P. FISHER, Jr.,

JAMES H. PEIRCE.