A. A. SMITH.

Propeller Skate.

No. 211,867. Patented Feb. 4, 1879.

Fig 1.

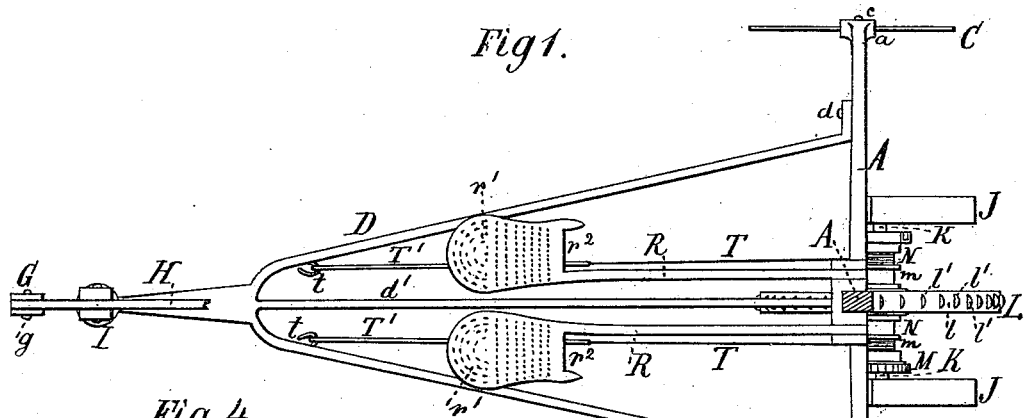


Fig 4.

Fig 2.

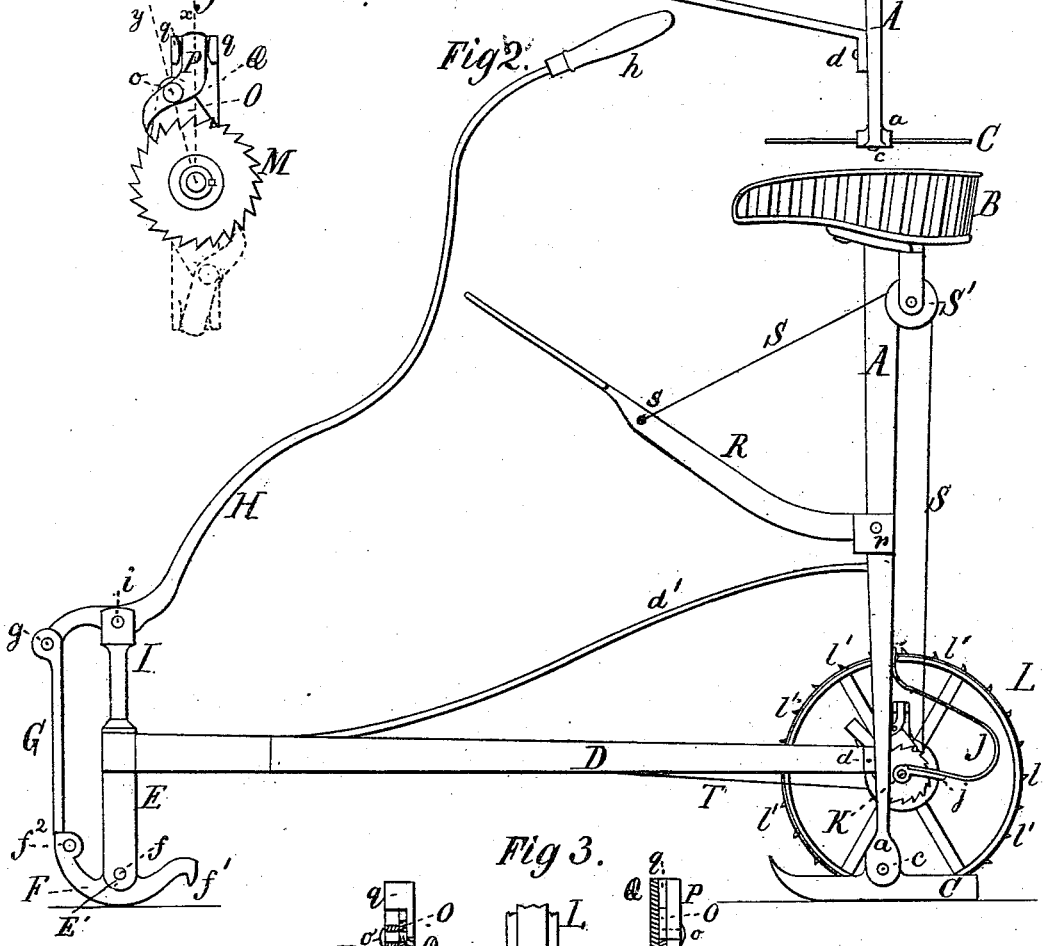
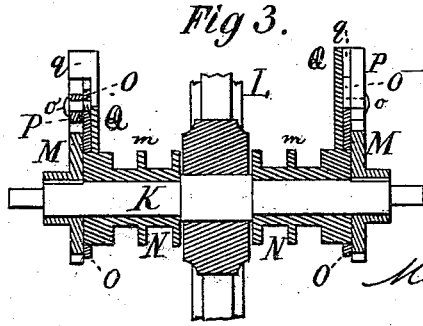


Fig 3.



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UNITED STATES PATENT OFFICE.

ANDREW A. SMITH, OF DENVER, COLORADO.

IMPROVEMENT IN PROPELLER-SKATES.

Specification forming part of Letters Patent No. **211,867**, dated February 4, 1879; application filed July 29, 1878.

To all whom it may concern:

Be it known that I, ANDREW A. SMITH, of Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful Improvement in Propeller-Skates, which improvement is fully set forth in the following specification and accompanying drawings, in which latter—

Figure 1 is a plan view of the same, wherein the operator's seat and two deflecting-pulleys are omitted, in order to more fully expose the parts below. Fig. 2 is an elevation of the same. Fig. 3 is an enlarged sectional view of the propelling mechanism on the main shaft, the right side representing a section in the radial line *x* of Fig. 4, and the left side a section in the radial line *y* of the same figure. Fig. 4 is an elevation of the same.

The nature of my invention consists in certain constructions, combinations, and arrangements of parts, hereinafter fully described and specifically claimed, whereby a propeller-skate is produced which is propelled by means of a propelling-wheel and treadle-motion of improved construction, and which rests upon three runners arranged in a triangle, of which runners the front one may be swung horizontally for the purpose of steering the propeller-skate, and vertically for the purpose of stopping the skate.

In the drawings, A represents an upright stand, to the top of which the operator's seat B is fastened in a suitable manner. The lower part of the stand A is forked, and terminates with two slotted heads, *a*, to which two runners, C, are attached by means of pivots *c*. At a suitable elevation the two ends of a V-shaped frame, D, are attached to the stand. An inclined brace-rod, *d'*, connects the solid part of the frame D with the stand A at a suitable distance above the ends *d*, and thus effects a strong and solid union of the two parts.

The front end of the frame is provided with a vertical standard, E, having a vertically-slotted swivel-head, E', to which a curved runner, F, is pivoted at *f*. The rear end of the runner F is provided with a downward hook, f^1, and the front end is, by means of a pin, f^2, pivoted to a connecting-rod, G, the upper end of which is pivoted, at *g*, to a hand-lever, H.

The standard E is, above the frame D, provided with a slotted head, I, through which passes the fulcrum *i* of the hand-lever H. The construction of the hand-lever H is such that its handle *h*, when in its normal position, is at a convenient distance from the operator's seat B.

Two curved springs, J, are fastened to the rear side of the forked part of the stand A, and are provided at their front ends with bearings *j* for a shaft, K, to the center of which a propeller-wheel, L, is fastened.

The periphery of the wheel L is provided with an india-rubber band, *l*, and a number of sharp projections, *l'*, which latter penetrate the rubber band sufficiently to get a good hold on the surface of the ice.

Near the bearings *j* the shaft K is provided with two ratchet-wheels, M, and two double-strap drums, N. The ratchet-wheels are rigidly fastened to the shaft, and the strap-drums run loosely upon it.

Upon each drum N, and close to the ratchet-wheel M, an arm, O, is loosely fitted, which, by means of a pivot-pin, *o*, carries a lever-pawl, P, whereby the ratchet-wheel M is operated.

At the inner side of the arm O each drum N is provided with a rigid arm, Q, having two flanges, *q*, between which the outer part of the pawl P extends, and by which the pawl is operated.

Two swinging treadles, R, are pivoted at *r* to the stand A, and are connected, by means of straps S, with the drums N. These treadles are provided with foot-plates r^1, which have roughened surfaces, to prevent the operator's foot from slipping, and which have slots r^2, wherein the operator inserts his heels, in order to keep his feet in the proper position. The straps S are fastened to the treadle-levers at *s*, and are passed over two deflecting-pulleys, S', fastened to the stand A, in order to operate with a full stroke of the treadles upon the drums below. The drums N are partitioned about the middle by means of central flanges *m*, on one side of which the straps S wind and unwind, and to the other side of

which two take-up straps, T, are fastened, which, by means of india-rubber or other suitable springs T′, fastened to the frame D at *t*, serve to reverse the motion of the drums after each stroke of the treadles, and keep the straps S taut.

Operation: When the skate is mounted by the operator, the runners C C, which have been partly elevated from the ice by the wheel L and springs J, are brought in contact with the ice, and the rubber band *l* of the wheel L rests upon the surface of the ice, while the projections *l′* penetrate the same. The operator with his feet alternately moves the treadles R down, whereby the drums N and arms Q are revolved forward, while the arms O have a tendency to the opposite direction, and thereby move the pawls P into the ratchet-teeth of the ratchet-wheel M and revolve the wheel L forward. The back strokes are effected by the springs T′, which unwind the straps T from the drums N, and revolve the latter in the opposite direction, thus causing the arms Q to take the pawls P along, while the arms O, by means of their backward tendency, lift the pawls out of connection with the ratchet-wheels, and so prevent undue wear.

The skate by this alternate operation of the treadles is continually propelled forward, while the front runner, F, is turned by means of the lever H, to change the direction of the skate whenever necessary.

When the skate is to be stopped, the operator moves the handle *h* down below its normal elevation, whereby the hook f^1 is lowered and forced into the ice, and the further progress of the skate arrested.

Upon hard ice the projections *l′* suffice for propelling the skate; but when the ice is slightly softened, the broad surface of the rubber band *l* comes in closer contact with the surface of the ice, and assists to move the skate by means of friction, in conjunction with the projections *l′*, which alone might, on account of the softness of the ice, slip, and work themselves down into it without moving ahead.

The rubber band *l* has also the advantage of lessening the noise of the wheel L to such a degree as to make it almost noiseless.

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

1. In a propeller-skate, the combination of the upright forked stand A, having runners C attached to its prongs directly, and the horizontal V-shaped frame D, attached also to the prongs above the runners, and having standard E, and a horizontally and vertically swinging runner, F, substantially as set forth.

2. In a propeller-skate, the combination of the guide-runner F, having a hook, f^1, the standard E E′ I, connecting-rod G, and hand-lever H, substantially as set forth.

3. The combination of the frame A D, supported by runners C F, the wheel L, having projections *l′*, and the tension-springs J, substantially as set forth.

4. The propelling-wheel L, having projections *l′*, and a perforated india-rubber band, *l*, through the perforations of which the projections *l′* pass, and are caused to project beyond the surface of the band more or less, substantially as and for the purpose set forth.

5. The combination of the frame A D E, having treadles and straps S, deflecting-pulleys S′, take-up cords T, the drums N, having arms O Q and pawls P, and the shaft K, having ratchet-wheels M and the propelling-wheel L, and the runners C C F, substantially as set forth.

6. The combination of the frame A D E, provided with runners C C F, springs J having bearings *j*, and propelling-wheel L, substantially as set forth.

7. The combination, in a propeller-skate, of the forked frame A, having a seat, B, and the V-shaped frame D, having a diagonal brace, *d′*, and standard E, substantially as set forth.

8. The combination, in a propeller-skate, of the operating-straps S, deflecting-pulleys S′, drums N, and take-up straps T, substantially as set forth.

9. The treadles R, provided with the heel-notches r^2, substantially as and for the purpose described.

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