(No Model.) 2 Sheets—Sheet 1.

J. STANFORD.

SLED PROPELLER.

No. 433,829. Patented Aug. 5, 1890.

Fig. 1.

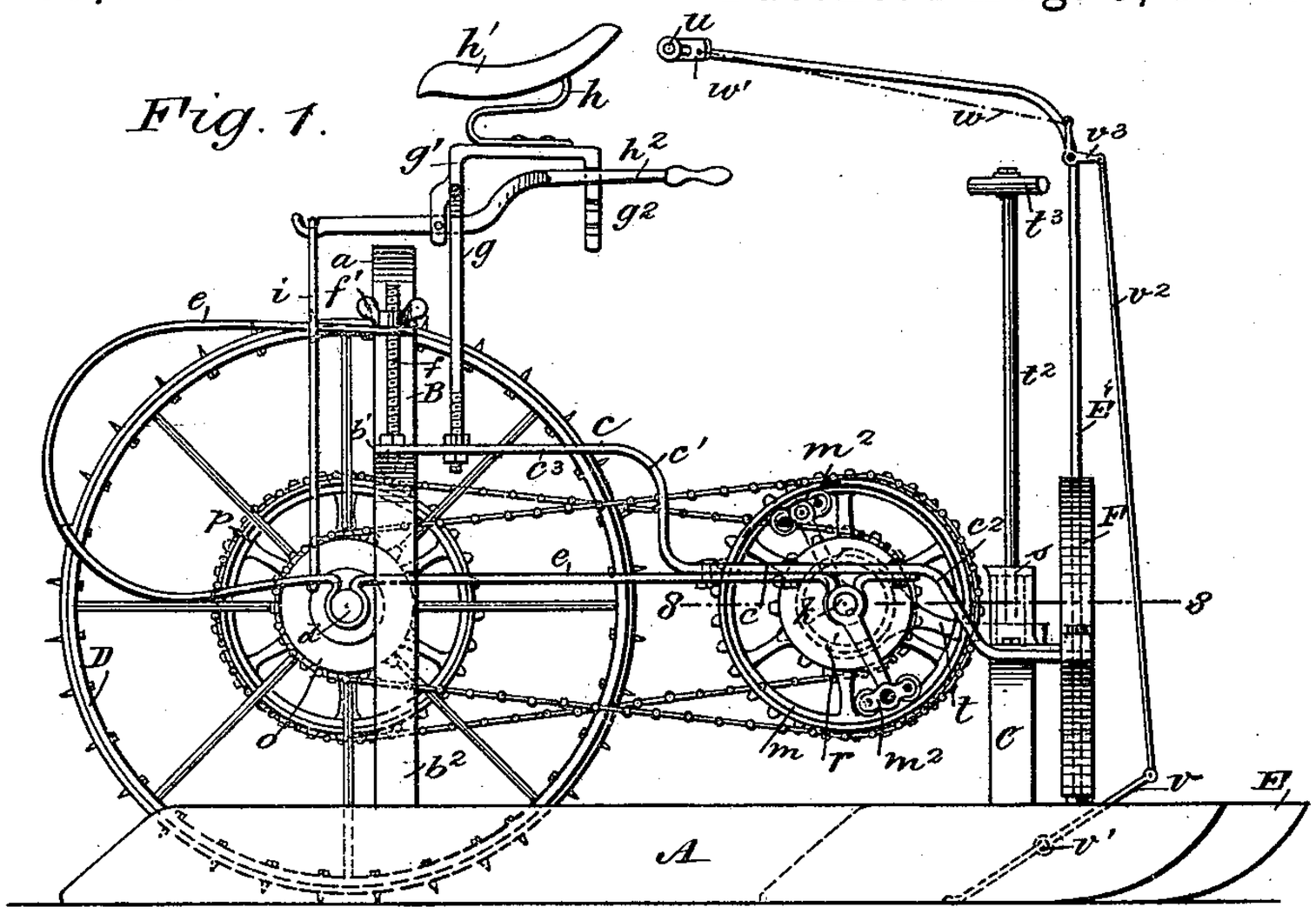
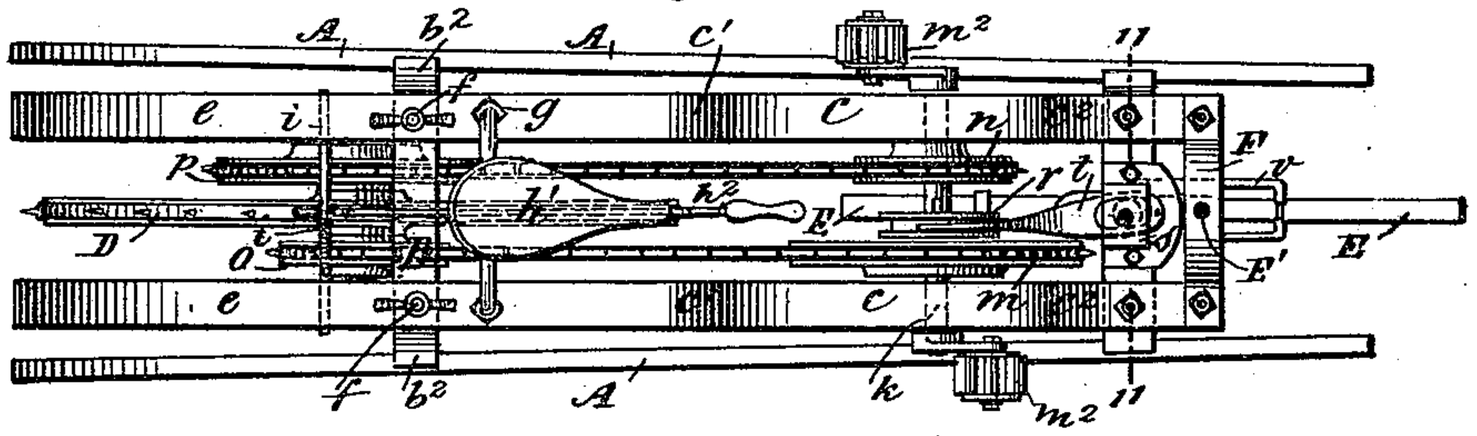


Fig. 2.



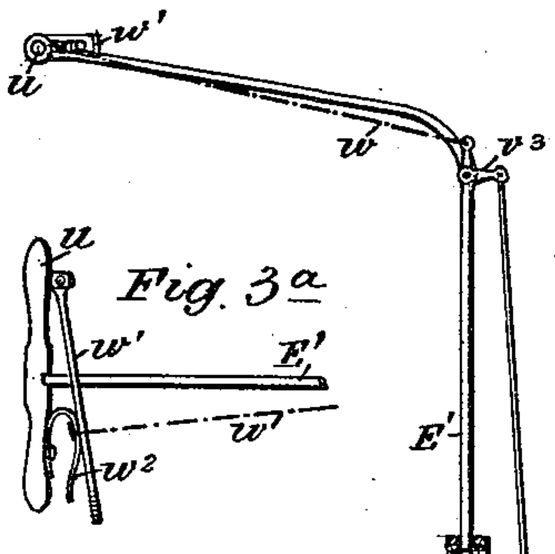
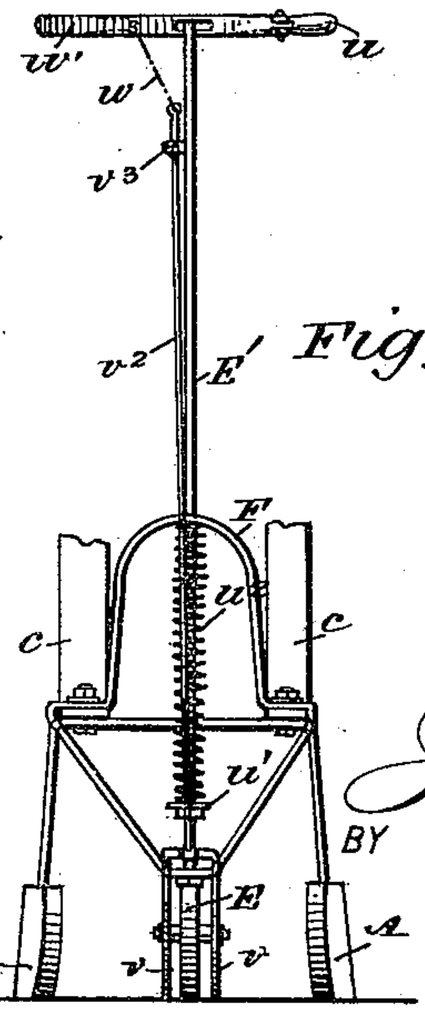


Fig. 3a

Fig. 3.

Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

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SLED PROPELLER.

No. 433,829. Patented Aug. 5, 1890.

Fig. 5.

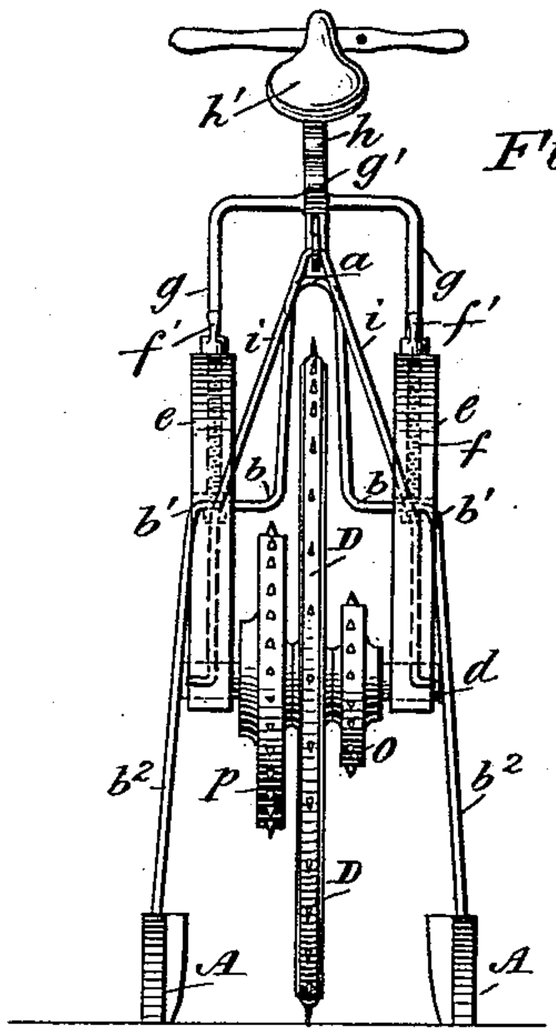


Fig. 6.

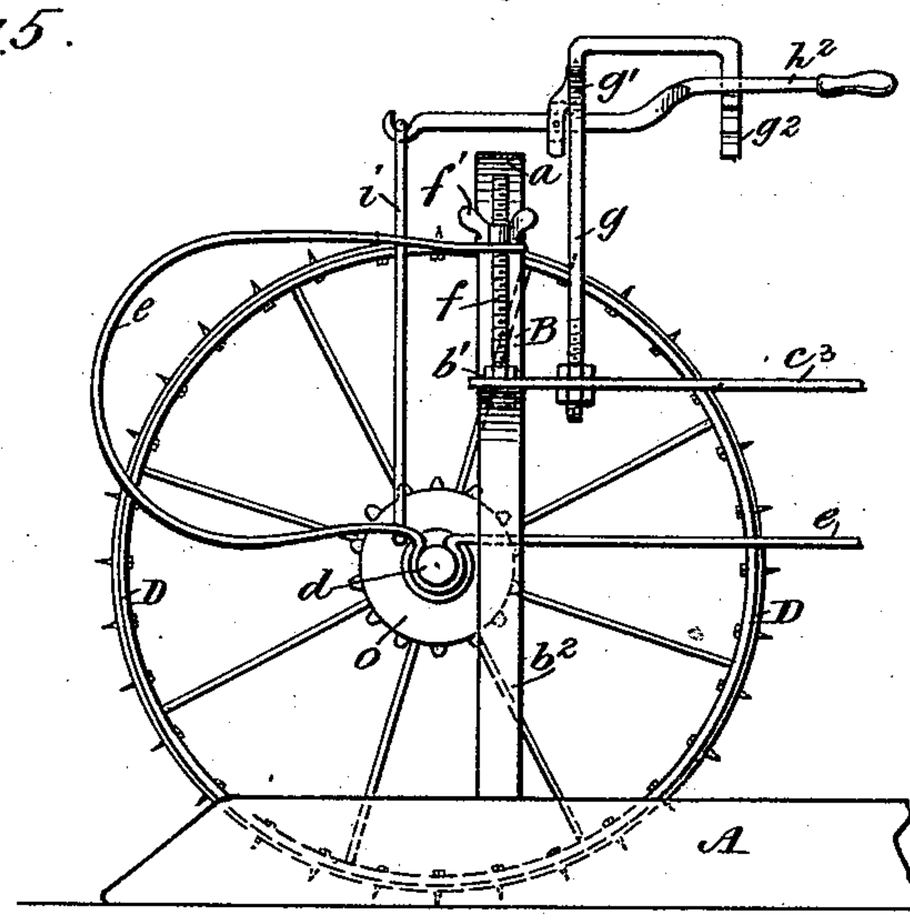


Fig. 7.

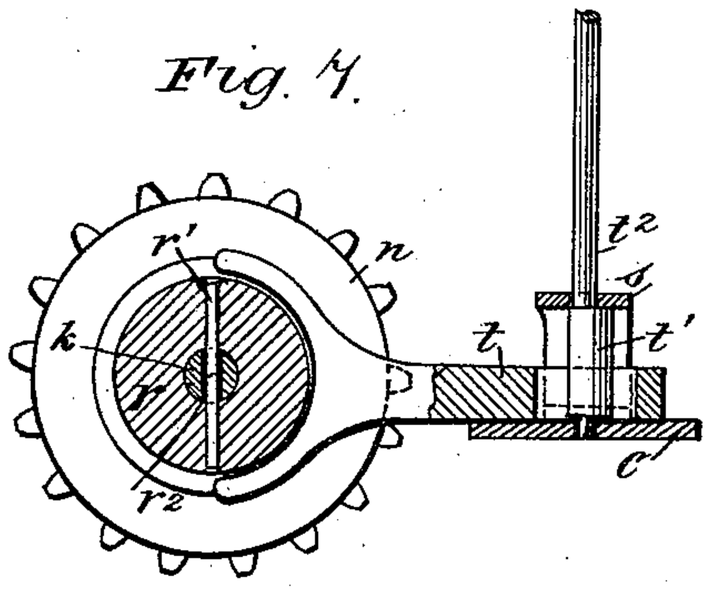


Fig. 9.

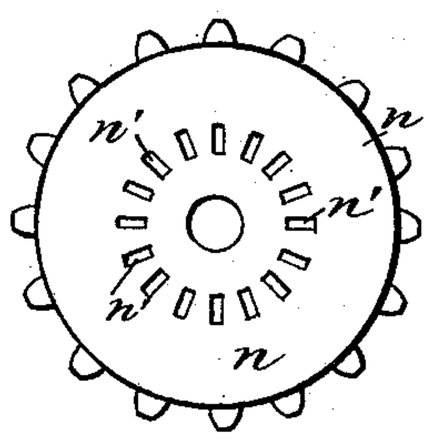


Fig. 8.

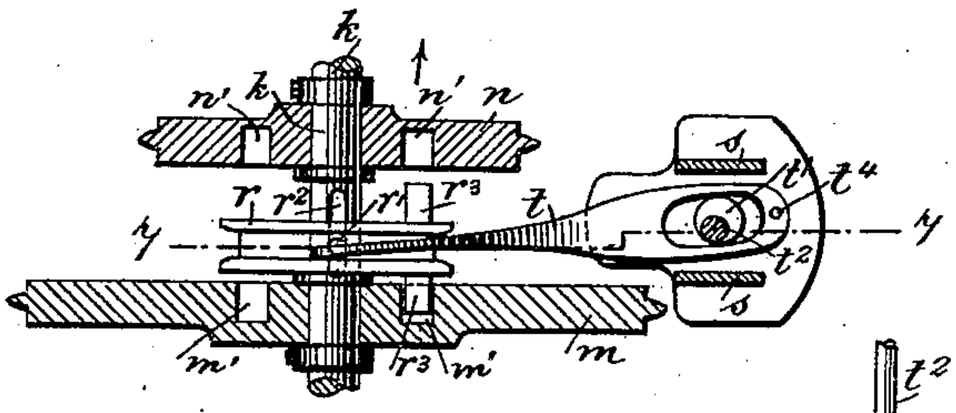


Fig. 10

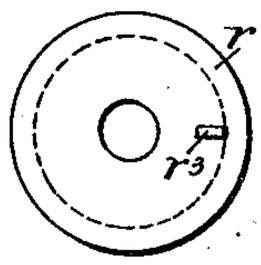
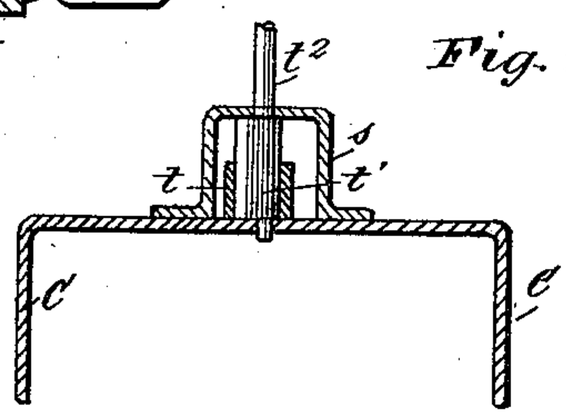


Fig. 11



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UNITED STATES PATENT OFFICE.

JOHN STANFORD, OF CHESTER, NOVA SCOTIA, CANADA.

SLED-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 433,829, dated August 5, 1890.

Application filed March 26, 1890. Serial No. 345,324. (No model.)

To all whom it may concern:

Be it known that I, JOHN STANFORD, of Chester, in the county of Lunenburg and Province of Nova Scotia, have invented a new and useful Sled-Propeller, of which the following is a full, clear, and exact description.

This invention relates to an improved means for manual propulsion of a sled over ice or hard snow, and has for its object to provide a device by which different speeds of locomotion may be secured and safety of travel afforded.

To these ends my invention consists in certain features of construction and combinations of parts, as is hereinafter described, and indicated in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the sled and its propelling mechanism. Fig. 2 is a plan view. Fig. 3 is a side view in section of the front runner and steering-gear thereon, enlarged and detached from the main portions of the device. Fig. 3^a is a plan view of the handle portion of the steering device. Fig. 4 is a front elevation of the steering-gear in position on the sled, other parts being removed. Fig. 5 is a rear end elevation of the sled-propeller. Fig. 6 is a side elevation of the rear portion of the sled-propeller with seat removed. Fig. 7 is an enlarged side view in section of the clutch-shifting mechanism, taken on the line 7 7 in Fig. 8. Fig. 8 is a plan view in section, detached and enlarged, of the clutch-shifting device, taken on the line 8 8 in Fig. 1. Fig. 9 is a side view of the smaller driving sprocket-wheel detached, viewed in the direction of an arrow in Fig. 8. Fig. 10 is a side view of the clutch-disk detached from other parts, and Fig. 11 is a transverse section, enlarged, of the clutch-shifting gear, taken on the line 11 11 in Fig. 2.

Two main runners A are employed to afford a sliding base for the device. These are held spaced apart a suitable distance by the yoke-frames B C, which are respectively secured to the runners near their rear and front ends. The rear yoke-frame B is bent from a flat bar of metal, which is folded at its longitudinal center flatwise. The upper portion of said frame near the bend *a* is contracted in width between its nearly-parallel limbs, and at *b* these limbs are oppositely bent at right angles to the upright portions, the horizontal extensions thus afforded terminating at *b'*, where the material is downwardly bent to produce nearly-upright standards b^2 for the yoke-frame, on the lower end portions of which the runners A are attached, as previously mentioned. The forward yoke-frame C has depending nearly-parallel limbs bent from a flat bar, the middle portion of which forms an integral horizontal spacing-bar for the limbs mentioned, which latter are attached to the forward end portions of the runners A. The two yoke-frames, which are of different heights, hold the runners spaced apart nearly parallel.

Upon the front and rear yoke-frames C B two similarly-formed side bars *c* are secured, nearly aligning their outer edges with the outsides of the standards b^2 and similar limbs on the front yoke-frame C. The side bars *c* are bent to produce offsets at *c'* and c^2, whereby level portions in different planes are produced on each that respectively provide supports for other parts of the device. Centrally between the runners A the propelling-wheel D is revolubly located, it being mounted upon a short transverse central shaft *d*, that is provided with journal ends, which are inserted in opposite bearings formed on or secured to the lower horizontal portions of the spring-bars *e*, which latter are rearwardly, upwardly, and forwardly curved, so as to project their free terminal ends above the rear yoke-frame B in alignment with the side bars *c*, to which the opposite ends of the spring-bars *e* are secured.

It is desirable that the propelling-wheel D be afforded as great proportionate diameter as is possible, so that it may by its revoluble movement propel the runners A with great speed. With this end in view the wheel D is made to project upwardly between the contracted limb portions of the yoke-frame B, its peripheral edge being furnished with projecting spike formations that embed in the surface of sheet-ice or a snow-covered road-bed, thereby insuring progressive movement of the sliding vehicle when said wheel is rotated. The upper terminal ends of the spring-bars *e*

are perforated vertically for engagement with the standing screw-bolts *f*, said bolts having winged nuts *f'*, that when placed on the bolts above the spring-bar ends and properly adjusted to have contact therewith serve to adjust the pressure upon the wheel D to give it more or less bite upon the ice. Directly forward of the standing bolts *f'*, upon the elevated portions c^3 of the side bars *c*, an arched seat-support is mounted, the parallel upright posts *g* of which are made adjustable for height on horizontal side-bar portions c^3 by threads formed on their terminal ends, on which set-nuts are placed that jam upon the top and lower surfaces of the side bars. The upper portions of the posts *g* are bent toward each other and unite with an upright integral standard *g'*, that is located in a vertical plane central between the runners A, said standard *g'* being forwardly bent at a proper point above the side-bar portions c^3 to afford a base-plate for the seat-spring *h*, that is secured on the same and in turn receives the rider's saddle *h'*, the base-plate being downwardly bent in front of the spring-foot to provide a depending locking-bar g^2, which is notched at spaced intervals on one side.

On the rear surface of the standard *g'*, near its point of junction with the arch of the seat-support, a bifurcated bracket-arm is formed or secured, to which a horizontal lever h^2 is pivoted. The portion of this lever that extends rearwardly of the bracket-arm has a loose connection with a pendent link-loop *i*, which has its limbs outwardly inclined to permit of their ends having hooked engagement with the spring-bars *e* near the journal-supports of the propelling-wheel D. The forwardly-extended portion of the lever h^2 terminates in a handle that is located near the saddle *h'* in front of the same convenient of access for the rider. When the handle of the lever h^2 is depressed and its body interlocked with one of the notches in the locking-bar g^2, there will be an upward movement of the link-loop *i*, which in turn will elevate the spring-bars *e* and propelling-wheel D, such an elevation being sometimes desired to remove the wheel from contact with the ice or road-bed if a downward grade is to be ridden over.

From opposite points on the side bars *c*, where these are engaged by the spring-bars *e* and secured thereto, said spring-bars are forwardly projected in contact with and below the side bars to a point properly advanced in front of the box-supports of the propelling-wheel-journal shaft *d*, where similar boxes are formed in the spring-bars *e* for reception and revoluble support of the treadle-shaft *k*, whereon the foot-treadles m^2 are secured, these engaging short projecting ends of the transverse shaft outside of the side bars *c*.

The shafts *d* and *k* are preferably located in the same horizontal plane when the propelling-wheel is in engagement with the ground surface to move the sled, and in order to communicate revoluble motion from the treadle-shaft to the propelling-wheel D and afford a change of speed to the latter without an acceleration of treadle movement two wheels *m n*, having sprocket-teeth on their peripheries, are placed on the shaft *k* a sufficient distance apart. The sprocket-wheel *m* is of greater diameter than the wheel *n*, and on the shaft *d* similar sprocket-wheels *o p* are secured on each side of the propelling-wheel D, the smaller wheel *o* aligning with the larger wheel *m* on the treadle-shaft, and the larger wheel *p* on the shaft *d* being opposite the small wheel *n* on the treadle-shaft. Both sets of sprocket-wheels are connected by proper chains to enable the wheels on the treadle-shaft to transmit motion to the propelling-wheel D.

Both of the sprocket-wheels *m n* are free to revolve on the shaft they are mounted upon, and are prevented from lateral displacement by adjustable collars, as shown in Fig. 8, or other equivalent means.

Between the wheels *m n* a clutch-disk *r* is located, which is locked to the shaft *d*, free to slide thereon by a transverse bolt *r'*, which is inserted through and loosely fits in the longitudinal shot r^2 in the shaft *k*, the bolt *r'* being firmly secured to the disk *r*, through which it is introduced across its diametrical center, as shown in Fig. 7.

A series of radial socket-perforations *m' n'* are made in the faces of the sprocket-wheels *m n* that are adjacent to the clutch-disk *r*, which latter has two oppositely-projected toes r^3 formed on its sides at points that will allow said toes to enter and lock in the mating perforations *m'*, or any one of the same that may be opposite a toe when the clutch-disk is shifted laterally.

On the upper surface of the forward yoke-frame C, central between the runners A, the bracket-frame *s* is secured, the top flat wall of which is perforated to align with a similar hole in the horizonal plate of the yoke-frame named.

The clutch-disk *r* is peripherally grooved for reception of a forked shifting lever *t*, which extends forwardly, and has a widened flat head formed on the front end that is longitudinally slotted to receive a cam projection *t'*, produced upon the body of the upright rod t^2, which rod engages with the aligning perforations in the yoke-plate and bracket-frame *s*, so that a revolution of the rod by its handle t^3 will revolve the cam *t'* and vibrate the shifting lever *t*, that is pivoted at t^4 on the yoke-frame top plate, and in consequence of such a vibration the clutch-disk *r* will be slid laterally to engage either of the wheels *m n*, and thus alter the speed of rotation given the wheel D.

As before stated, the treadles m^2 are attached outside of the side bars *c*, are provided with sufficient crank-leverage, are of ordinary approved form of construction, and project oppositely from the axial plane of the shaft *k*, to which they are attached to permit alternate de-

pression by the lower limbs of the rider in the usual way for propulsion of bicycles, and as there is provision made for the vertical adjustment of the seat the use of the treadles may be had by persons of different statures.

The steering mechanism consists in an intermediate runner E, which is secured near its longitudinal center to a vertical steering-rod E′, that at a proper height is bent rearwardly to locate its transverse handle *u* in a convenient position for use by the rider. Said steering-rod is revolubly supported upon a bracket-frame F, which frame is secured upon the front end portions of the side bars *c* in advance of the forward yoke-frame C, and projects above and below the side bars, as shown in Fig. 4, thus adapting it to support the steering-rod E′ at two points, where there are aligning perforations made to receive the rod and retain it upright.

An adjustable collar *u′* is placed upon the steering-rod E′ a proper distance above the lower end of the bracket-frame F, and a spiral spring u^2 is located on the rod between this collar and the lower surface of the top of the frame F. The strength of the spring u^2 is such that it will retain the runner E in contact with the surface it bears on when this is smooth; but when rough obstructions are encountered the runner may yield upwardly, and thus avoid improper percussion.

The lateral movement of the handle-bar *u* will swivel the runner E in a manner to direct the course of the sled, and in order to check the speed or arrest the motion of the vehicle a simple brake-rigging is furnished, which consists, essentially, of a loop-shaped bar, the limbs *v* of which loosely embrace the sides of the runner E, to which they are pivoted, as at *v′*, the parallel portions or limbs *v* extending from their slightly-bent lower ends upwardly and forwardly to be engaged by the upright rod v^2. Said rod v^2 serves as a link to connect the diagonally-inclined brake-arms *v* with a bell-crank v^3, the other limb of which crank is pivoted to a horizontal connecting-bar *w*, that is loosely secured at its opposite end to a brake-lever *w′*, which latter is hinge-jointed by one end to the handle-bar *u*, as shown in Fig. 3ª. A spring w^2 serves to hold the brake-lever *w′* normally projected, so that a movement of the free end of the lever toward the handle-bar will depress the pointed ends of the brake-bar limbs *v* and cause them to engage the road-bed, which will impede the forward motion of the sled in an obvious manner.

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

1. In a sled-propeller, the combination, with a pair of runners, parallel yoke-frames thereon, and side bars on the yoke-frames, of a propelling-wheel between the runners which is pivoted on spring-bars that are attached to the side bars of the frame, and an adjustable device to elevate the propeller-wheel by flexure of the spring-bars, substantially as set forth.

2. In a sled-propeller, the combination, with two spaced runners, yoke-frames and side bars which are erected on these runners, curved spring-bars which are secured by one end to the side bars of the frame and adapted to support revolubly a propelling-wheel, and a propelling-wheel on a journaled shaft which engages the boxes on the spring-bars, of an adjustable seat supported on the side bars, sprocket-wheels on the journal-shaft of different diameters mating sprocket-wheels on a forward revoluble treadle-shaft, a clutch device which is adapted to interlock with either sprocket-wheel on the treadle-shaft, chains to connect the sprocket-wheels on the treadle-shaft with those on the propelling-wheel-shaft, a steering device, and a brake-rigging, substantially as set forth.

JOHN STANFORD.

Witnesses:
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ROBT. STANFORD.