No. 798,554. PATENTED AUG. 29, 1905

W. WÜRTH.

CYCLE SKATE.

APPLICATION FILED FEB. 1, 1904.

2 SHEETS—SHEET 1.

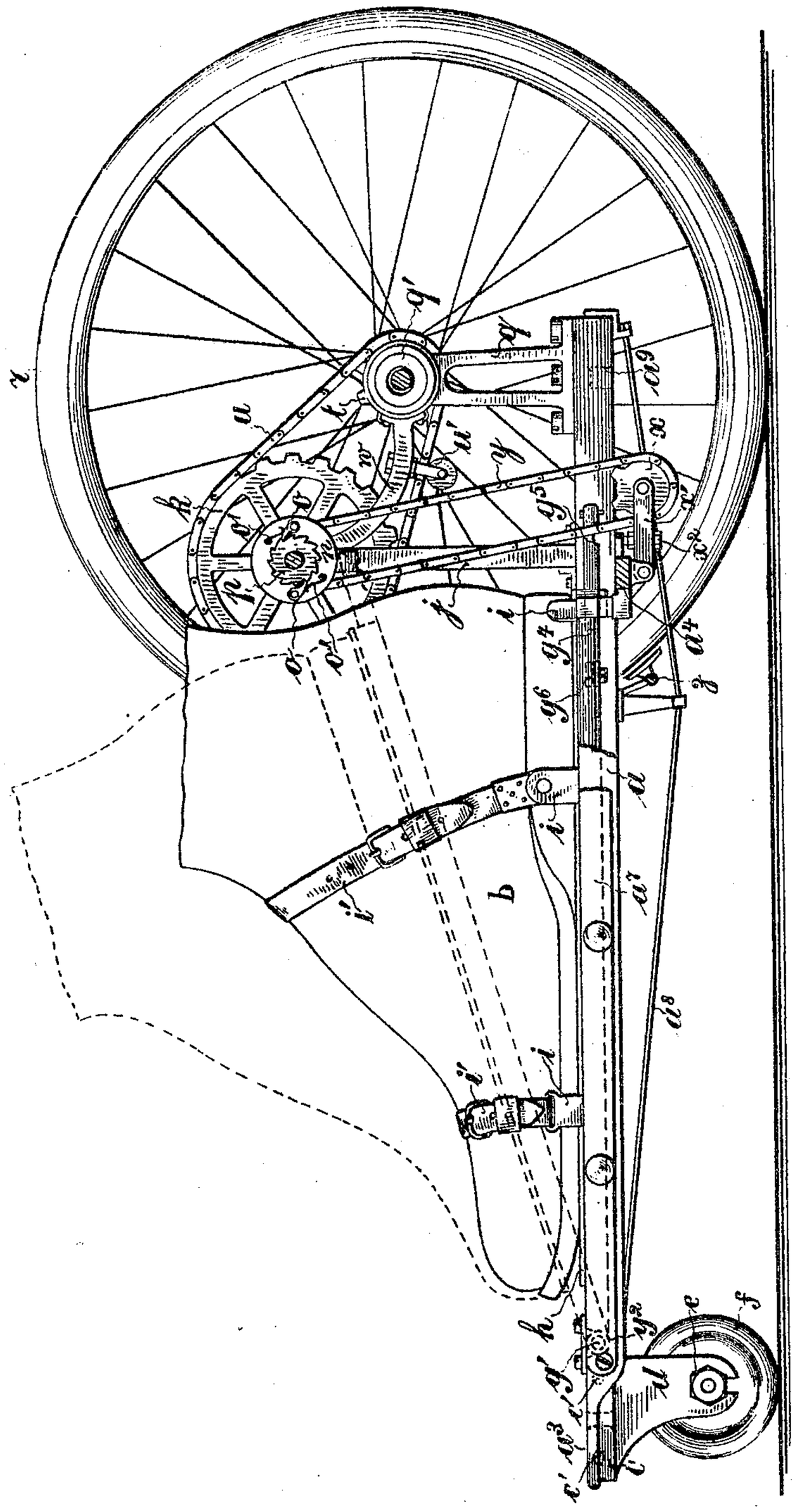

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2,

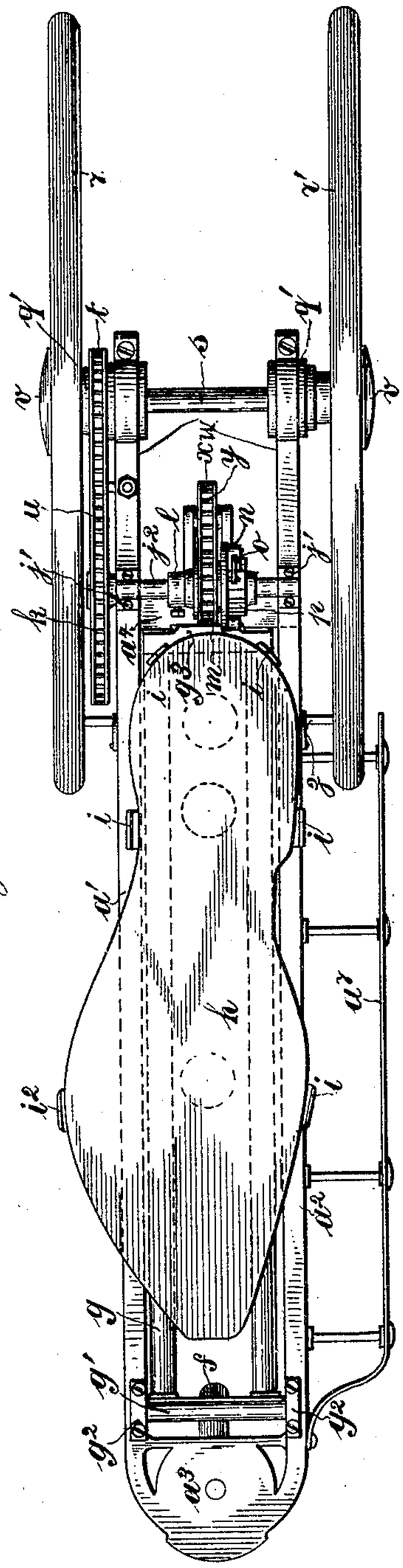


Fig. 4,

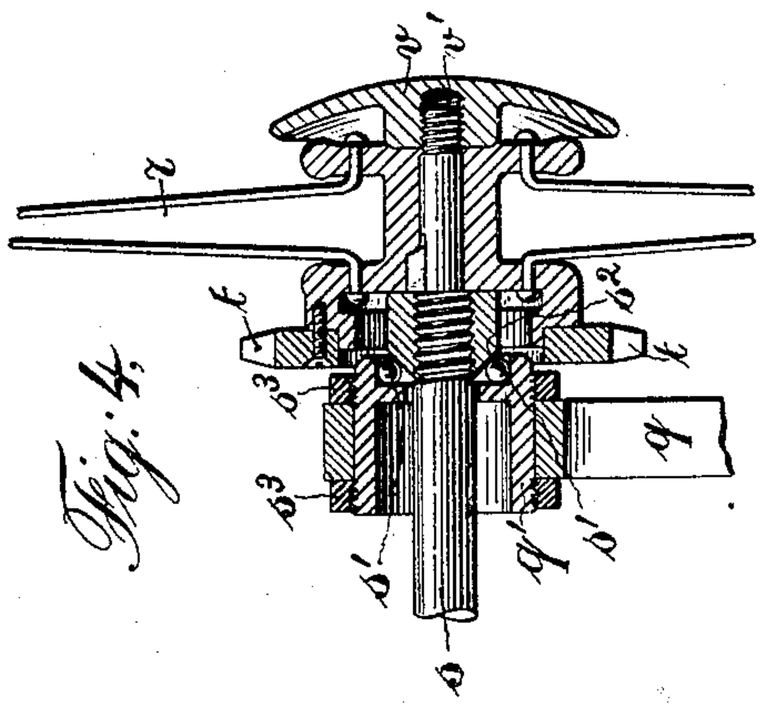
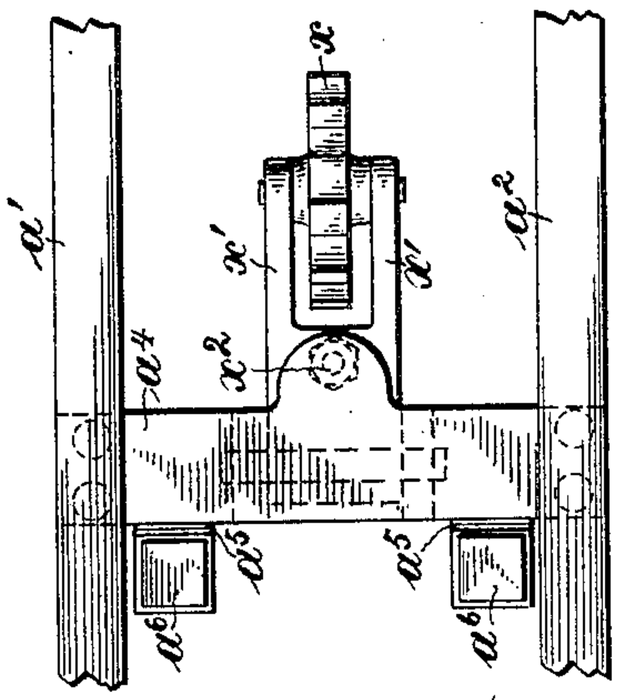


Fig. 3,



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CYCLE-SKATE.

No. 798,554. Specification of Letters Patent. Patented Aug. 29, 1905.

Application filed February 1, 1904. Serial No. 191,437.

To all whom it may concern:

Be it known that I, WILLIAM WÜRTH, a citizen of the United States of America, and a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Cycle-Skates, of which the following is a specification.

My invention has reference to cycle-skates which are adapted to be used in place of roller-skates and the like.

The novel skate pertains particularly to that type of skates in which the skater exerts power or force for actuating the mechanism by raising or lowering the foot, thereby effecting locomotion.

It is the particular object of this invention to provide a skate of that kind by means of which a larger distance is covered by raising or lowering the foot once than in former constructions.

Heretofore the distance covered by the skater during one operation of the mechanism was a relatively short one. With my improved construction I am able to cover a distance of from six to ten feet by one operation, according to the size of the skate.

The invention further consists in the particular construction of the cycle-skate and the arrangement of parts which render it possible to produce a skate that covers the desirable large distance during one operation.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents in side elevation a cycle-skate which embodies my invention with certain parts in the rear broken away. Fig. 2 is a top plan view. Fig. 3 is a detail view showing a sprocket-wheel with its support, and Fig. 4 is a detail section of the bearing of one of the rear wheels.

Similar characters of reference denote like parts in all the figures.

My novel cycle-skate consists, essentially, of a small front or steering wheel, two larger rear wheels substantially mounted on a frame or truck, a movable frame secured within the truck which carries the foot-plate, and the driving mechanism.

In the drawings, a represents the support or truck to which the wheels are secured. The truck naturally is in a horizontal plane and consists of the side rails a' a^2, made of metal and having an integral front portion a^3. In the rear portion of the truck the two side rails a' a^2 are substantially connected by a cross-bar a^4 (shown in detail in Fig. 3) and a cross-bar a^9 in the rear end of the truck. (Shown in Fig. 1.) There is further mounted in the rear portion of the truck a support and bearing on each side for carrying sprocket-wheels, &c., and in the rear end there are supports and bearings for the rear wheels. Below the front piece a^3 a circular plate c is pivotally secured thereto, which rests on ball-bearings c' and carries the supports d with bearings e for the front or pilot wheel f. The pivotally-secured plate c permits of a lateral movement of the pilot-wheel, which likewise moves on ball-bearings of usual construction. This enables the skater to steer and go to the right or left or make a circle, if desired.

The inner frame consists of the side members g. Two of these are shown in Fig. 2. These are preferably made of seamless steel tubing—the so-called "cold-drawn" tubes. In the front the tubes g are connected by a shaft g', whose ends are located in the bearings g^2. These bearings are secured on the truck. In the rear the steel tubes are substantially connected by a cross-bar g^3, which rests on the cross-bar a^4, which connects the two side rails a' a^2 of the truck. On the top of this inner frame a thin steel plate h is permanently secured, which constitutes the support for the shoe b of the skater. The plate h may be made of a continuous sheet of metal, and, if desirable, it may have perforations, some of which are indicated in dotted lines in Fig. 2, for the purpose of decreasing the weight. A number of shoe-supporting clamps i i^2 are secured to the plate h, the two front pairs of which have the usual straps i' for fastening the shoe b securely on the skate. One of the front shoe-supporting clamps, preferably the outer one, i^2, is made adjustable, so that any size of shoe may be secured therein.

It is plainly understood from the above description of the inner or shoe-carrying frame that the shoe b may be raised or lowered. The inner frame then swings up and down on the shaft g' in such a manner that the rear or heel portion of the shoe is raised or lowered while the toe portion practically remains in the same horizontal plane.

Behind the shoe-supporting inner frame there are mounted on the truck two supports j, one on each rail. The supports carry bearings j'. In the bearings there is a shaft j^2, which carries a sprocket-wheel k, permanently secured thereto near the outside rear wheel r. The shaft j^2 further carries a collar l, permanently secured thereto. Then follows a

sprocket-wheel m, which has on each side an extension for allowing the chain to pass freely over same. The sprocket-wheel m turns loosely on the shaft, so that it may run idle during certain phases of the operation of the skate. On the sprocket-wheel m there is an extension n, integral therewith, on which there are provided two pawls o. The shaft j^2 further carries a ratchet-wheel p, permanently attached thereto. The two pawls o engage at proper time the teeth of the wheel, arresting same. Then and during other phases of the operation of the mechanism the pawls are inactive, allowing the ratchet-wheel to turn freely. The pawls are pressed toward the ratchet-wheel in the usual manner by two small springs o'.

On the rear ends of the truck two substantial supports q are mounted, one on each side, which carry the bearings q'. A shaft s rests in the bearings. The two large rear wheels r r' are mounted thereon. The shaft s supports a sprocket-wheel t near the rear wheel r. The sprocket-wheel t is so secured to the shaft s that it is in line with the sprocket-wheel k. and a chain u runs over both, connecting thus the mechanism mounted on the shaft j^2 with the two rear wheels. The shaft s runs in ball-bearings on both sides, as shown in detail in Fig. 4. The journals for the ball-bearings are adjustable and may move to and fro for the purpose of adjusting the ball-bearings so that the shaft runs easily. The cone s^2 is permanently secured to the shaft, and the journals have the shape shown in Fig. 4, leaving a space between the journal and the cone for the balls. On each side of the journal there is a nut s^3, having a screw-thread for tightening and loosening the journals, whereby the space for the balls s' is somewhat enlarged or reduced in size, thus adjusting the bearing. On the outside of each rear wheel and secured to a short continuation of the shaft there is a knob v, which acts as a tightening-nut for the rear wheels, it being attached to a thread v' on the end of the shaft s. At the same time the knob v acts as a buffer when while skating, by accident or otherwise, the inner rear wheel of one skate should come into contact with the inner rear wheel of the other. As shown in Fig. 4, the knob is curved on the outside in order to answer the described purposes.

At the inner top portion of each support q a strengthening-bar w is permanently attached. Each of these cross-bars w runs over to the top portion of the corresponding support j, where it is again secured, thus strengthening both supports materially, especially the support j, which is so much higher. In order to take up any occurring slack of the chain u, an adjustable device u' is provided on the strengthening cross-bar w.

The chain y runs over the sprocket-wheel m down to and around the idler x. Any possible slack which may occur in this chain is taken up by means of an adjusting device. This device simply consists in flanges secured to the lower surface of the cross-bar a^4, and the support x' for the idler x is pivoted between the flanges. A set-screw x^2 serves for lowering or raising said support. Integral with the cross-bar a^4 two extensions a^5 are provided, as shown in Figs. 1 and 3. These extensions are hollow and contain small blocks of rubber a^6. These are located below the rear end portion of the inner frame and act as a buffer when the heel portion of the shoe descends, easing then the contact, and when the foot rests thereon during skating it takes up the vibration to a certain extent. A brake z is provided, which may be operated in any desirable manner.

For the purpose of preventing any collision between the right and left skate a guard-rail a^7 is permanently attached to the truck. This guard-rail is practically in line with the highest point of the knob v. In order to strengthen the whole truck, a brace-rod a^8 is provided in the center portion of each rail, running from the front to the extreme rear, as shown in Fig. 1.

Integral with the cross-bar g^3, connecting the steel tubes g in the rear, there is a bar or rod g^4 right in the center of same. This bar or rod is made of tempered steel and extends rearward, having at its end an incision g^5. The end of the bar g^4 extends through the opening in one link of the chain y, which rests in the incision g^5. In order to hold the bar g^4 securely, it extends forward and is fastened there by a cross-bar g^6, secured between the steel tubes g.

In the drawings a cycle-skate is illustrated to be applied to the right foot. It is of course understood that the skate for the left foot is so constructed that it is congruent with the skate of the right foot. The mechanism located on the outside portion of the right skate naturally is located on the outer portion of the left skate, while the guard-rail of the left skate likewise is on the inside of same. The proportions of the sprocket-wheels, the ratchet-wheel, and the rear or driving wheels are so selected that the desired large distance is covered by one operation of the foot.

The operation of the cycle-skate is as follows: Assuming that the skates have been applied and secured to the feet, then each shoe rests on the shoe-carrying plate h, which forms part of the movable frame. As described, the movable frame turns with the shaft g', and therefore the rear portion of the foot may be raised and lowered. When raising the heel portion of the foot, then the steel rod g^4, forming part of the movable frame and engaging one link of the chain y, is raised with it, whereby this chain is revolved around

the sprocket-wheels *m* and *x*. It must be remembered that the sprocket-wheel *m* is loosely secured to the shaft and has two extensions, which carry the pawls. Therefore said pawls move around with the sprocket-wheel *m* as long as the rear portion of the foot is raised. After the heel portion of the shoe has reached the top position (indicated in dotted lines in Fig. 1) then same descends. Now the chain motion naturally is reversed when the descent begins. The pawls hereby engage the teeth of the ratchet-wheel which is permanently fixed to the shaft j^2. The descending foot moving then, the ratchet-wheel certainly moves the sprocket-wheel *k*, which likewise is permanently secured to the shaft j^2, and by means of the chain *u* the motion of the wheel *k* is transmitted to the sprocket-wheel *t*. This latter being permanently mounted on the shaft of the rear or driving wheels turns same and locomotion is effected. Thus the skate and skater are moved forward by the descending weight of the body of the skater. When the rear portion of the foot reaches its lowest position, then the skate moves forward in the same manner as any other skate. This is the case because the chain *y* on the loosely-secured sprocket-wheel retains one and the same position as long as the foot is at rest in the movable frame. The ratchet-wheel, however, revolves as well as the sprocket-wheels *k* and *t* and consequently the rear or driving wheels *r r'*. This goes on until the momentum of the forward movement is exhausted. Upon raising and lowering the rear portion of the foot again new impulses are given, and when this is repeated at short intervals then high speed is attained.

It is plainly understood that there is very little resistance to be overcome when the rear portion of the foot is raised. In addition to the weight of the movable frame there is the friction of the chain *y* and of the small sprocket-wheel *m*, which carries the pawls. This latter offers very little resistance because it is loosely mounted on its shaft. For these reasons the use of a spring to aid in raising the heel portion of the foot could be entirely dispensed with. Such a spring tends to retard the downward movement of the foot, and thereby consumes power.

It is easily understood from the above that it is not necessary to raise the heel portion of the foot to its maximum height. It certainly can be raised any desirable distance—say from one inch to about four inches, which is practically the maximum height in a skate for a grown person.

The pilot-wheel in the front is located about two inches in front of the toe portion of the shoe. Therefore the skater cannot take a header and cannot fall forward. Likewise it is impossible to fall backward, because the location of the rear or driving wheels prevents this.

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

1. In a cycle-skate a driving mechanism comprising a truck, a movable frame with shoe-plate mounted therein and adapted to permit of lowering or raising the rear portion of the foot, a steel bar with incision in its lower rear end permanently fixed to the rear center portion of said movable frame, two supports with bearings secured to the truck behind the shoe-plate, a shaft in said bearings, a loosely-mounted sprocket-wheel on the shaft having an extension with two pawls, a ratchet-wheel permanently fixed to said shaft, a small support below the truck, an idler mounted therein, a chain connecting the loosely-mounted sprocket-wheel with the idler, one link of said chain being engaged by the steel bar of the movable frame so that the chain is actuated upon raising or lowering the rear portion of the foot, means for transmitting the motion of the driving mechanism to the driving-wheels of the skate.

2. A cycle-skate, comprising a truck with driving-wheels, a movable frame with shoe-plate mounted in said truck and adapted to permit of lowering or raising the rear portion of the foot, a steel bar with incision in its lower rear end permanently fixed to the rear center portion of said movable frame, two supports with bearings secured to the truck behind the shoe plate, a shaft in said bearings, a loosely-mounted sprocket-wheel on the shaft having an extension with two pawls, a ratchet-wheel permanently fixed to said shaft, a small support below the truck, an idler mounted therein, a chain connecting the loosely-mounted sprocket-wheel with the idler, one link of said chain being engaged by the steel bar of the movable frame so that the chain is actuated upon raising or lowering the rear portion of the foot, a large sprocket-wheel permanently fixed to the shaft, and means for transmitting the motion of this sprocket-wheel to the driving-wheels.

3. A cycle-skate comprising a truck, a movable frame with shoe-plate mounted therein and adapted to permit of lowering or raising the rear portion of the foot, a steel bar with incision in its lower rear end permanently fixed to the rear center portion of said movable frame, two supports with bearings secured to the truck behind the shoe-plate, a shaft in said bearings, a loosely-mounted sprocket-wheel on the shaft having an extension with two pawls, a ratchet-wheel permanently fixed to said shaft, a small support below the truck, an idler mounted therein, a chain connecting the loosely-mounted sprocket-wheel with the idler, one link of

said chain being engaged by the steel bar of the movable frame so that the chain is actuated upon raising or lowering the rear portion of the foot, a large sprocket-wheel permanently fixed to the shaft, two other supports with bearings near the rear end of said truck, a shaft in said bearings, a small sprocket-wheel on said shaft, a chain connecting the two last-named sprocket-wheels, and driving-wheels on said shaft.

Signed at New York, N. Y., this 30th day of January, 1904.

WILLIAM WÜRTH.

Witnesses:
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HATTIE B. LUEDERS.