

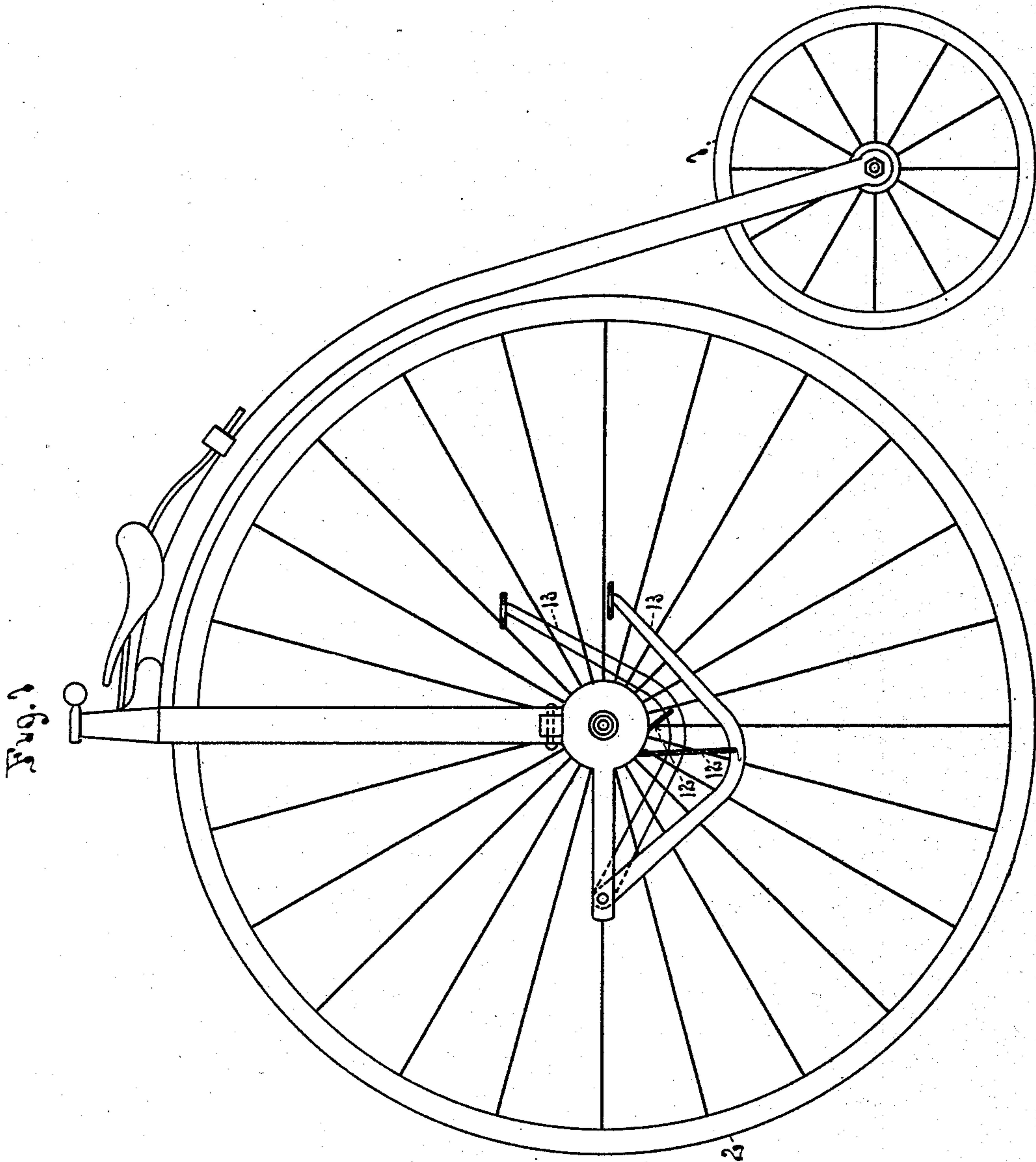
(No Model.)

3 Sheets—Sheet 1.

J. M. MARLIN.
VELOCIPEDE.

No. 388,427.

Patented Aug. 28, 1888.



Witnesses,
W. D. Brown
A. P. Ockington.

Inventor,
John M. Marlin.
By David H. Bee.
Atty.

(No Model.)

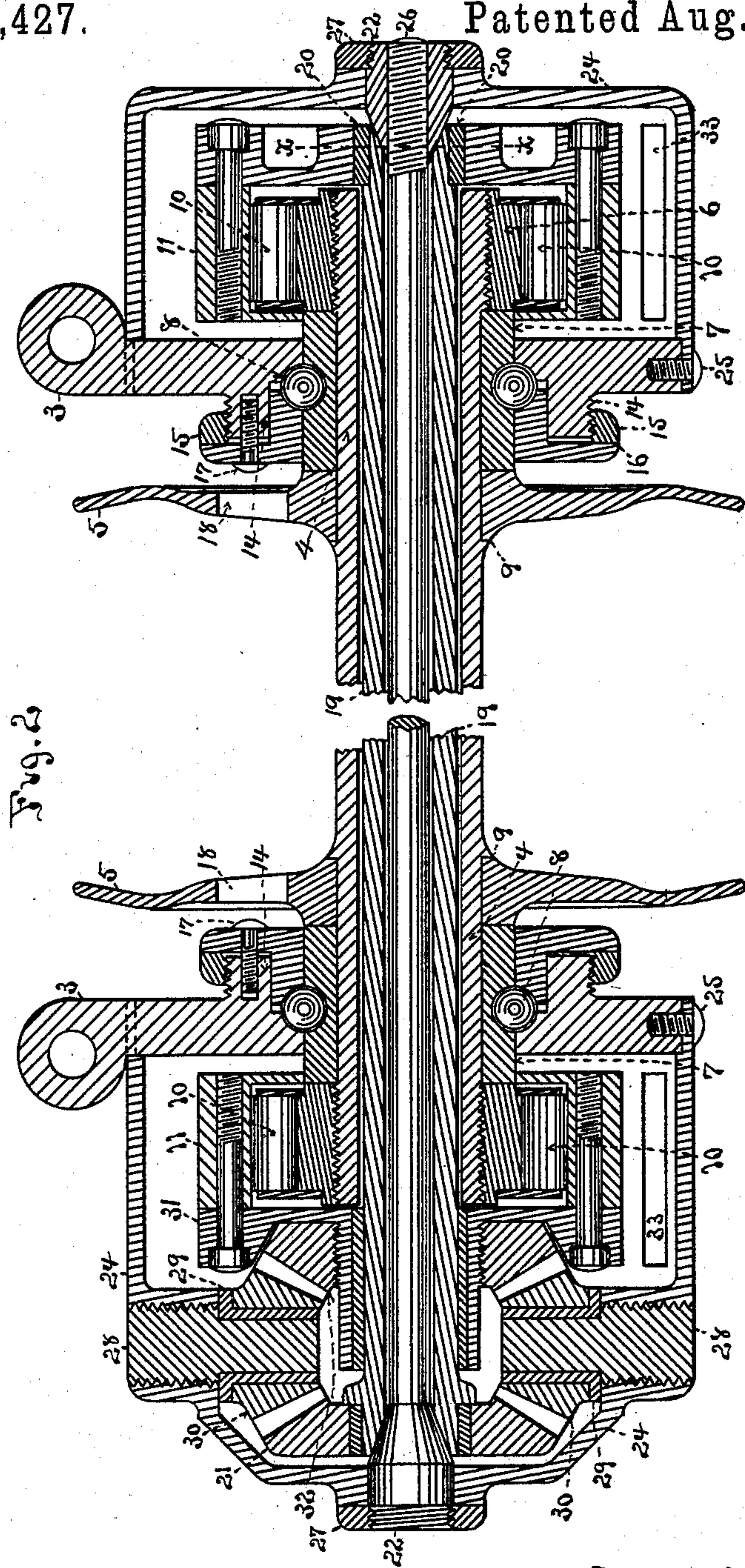
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No. 388,427.

Patented Aug. 28, 1888.



Witnesses,

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(No Model.)

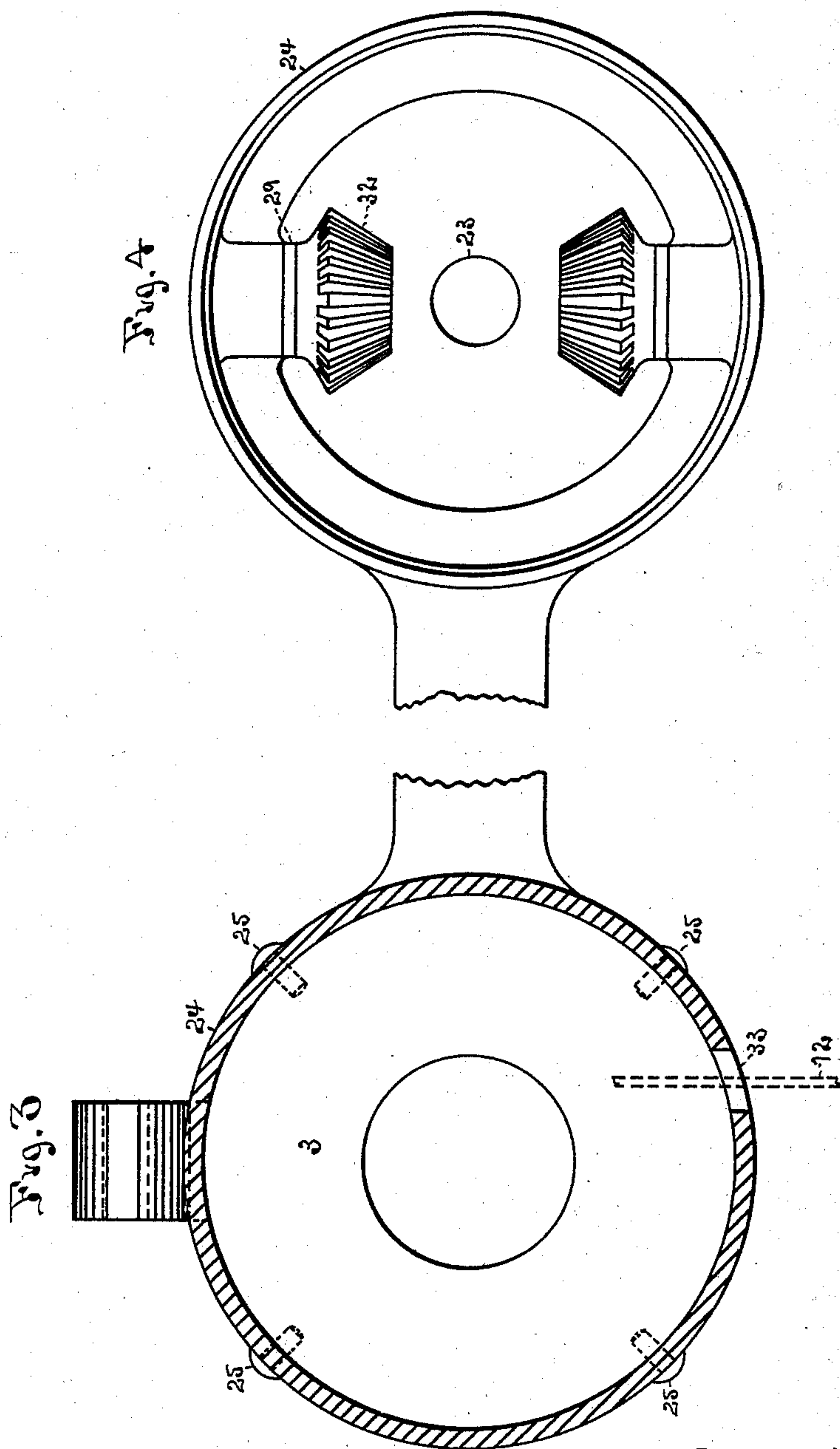
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VELOCIPÈDE.

No. 388,427.

Patented Aug. 28, 1888.



Witnesses,

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UNITED STATES PATENT OFFICE.

JOHN M. MARLIN, OF NEW HAVEN, CONNECTICUT.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 388,427, dated August 28, 1888.

Application filed May 25, 1888. Serial No. 275,021. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. MARLIN, of New Haven, in the county of New Haven and State of Connecticut, have invented a new and
5 useful Improvement in Velocipedes, of which the following is a specification.

My improvement relates to velocipedes, and especially to the mechanism patented to D. H. Rice and L. H. Rice, August 24, 1886, No.
10 348,057; and it consists in certain new and useful constructions and combinations of the several parts connected with the same, substantially as hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation
15 of a velocipede constructed according to my invention. Fig. 2 is a longitudinal vertical section through the hub of the wheel and fork, showing the connecting parts, ball-bearing arrangements, &c. Fig. 3 is a detached view of
20 the ball-bearing part of the fork, which is attached to its lower end, showing the cap in section around it. Fig. 4 is a face view of the inner end of the cap and brace which fits over the same and carries the reversing-gearing.

25 The small wheel 1 of the velocipede is placed in rear of the large wheel 2, the latter being connected to the backbone by the usual fork and steering-handles. To the lower ends of the fork are pivoted on each side the ball-
30 bearing disks 3 3 by bolts in the usual way. These disks are made annular in shape for attaching the other supporting parts of the mechanism more conveniently, as hereinafter described.

35 The wheel 2 has an extension, 4, upon each end of its hub, which passes through the disk 3 on that side. The flanges 5 5 of the hub carry the spokes in the usual manner. Upon the extensions 4 of the hub are cut screw-
40 threads, and on these are fitted collars 6 6, by internal threads, which enable them to be screwed on like nuts. Between each collar 6 and each flange 5 of the wheel-hub a sleeve, 7, of hardened steel, is slipped over the hub-extension, having in its periphery a groove fit-
45 ted to receive the balls 8 of the ball-bearing, as shown. When the collar 6 is screwed up tightly, it clamps the sleeve 7 between it and the flange 5 and secures the parts solidly to-
50 gether. The wheel-hub is formed by making it and its extensions of a single long sleeve and turning shoulders 9 on its circumference, against which the flanges 5 5 bear after being

slipped over the extension. The flanges are brazed on in this position, and the shoulders 55 prevent their being moved by the pressure of the sleeves 7 7. The collars 6 6 carry in recesses in their outer peripheries the clutch-rollers 10 10, which alternately grip and re-
60 lease the clutch-drums 11 11 as the latter are revolved reciprocally around the same. These rollers and their recesses in collars 6 6 are formed, in the usual and well-known construction of roller-clutches, so that as the clutch-
65 drums 11 11 are revolved forward in the direction in which wheel 2 runs they will grip the collars 6 6 and drums 11 11 together, and when the drums are turned in the opposite
70 direction they will release the latter from the collars and allow them to turn backward freely. The clutch-drums 11 11 are driven in a forward direction by straps or cords 12, secured to and wound around their exterior periph-
75 eries, and attached to foot-levers 13 13 in the usual manner, Fig. 1.

The adjustable part of the ball-bearing is a modification of that shown in the Letters Patent granted to David Hall Rice, July 21, 1885, No. 322,482, and to me December 8, 1885, No. 331,899, and is constructed as follows: The in-
80 ner periphery of disk 3 is grooved to inclose about one quarter part of the balls 8, as shown, and has a tubular projection, 14, on its inside face concentric with this groove. On the ex-
85 terior this tubular projection has a screw-thread cut to receive the gage-ring 15 of the bearing. This gage-ring is screwed on or off the projection 14 by means of a spanner, which is formed so as to reach in between the wheel-
90 hub and the disk 3. The other part, 16, of the ball-bearing is made to embrace the opposite side of the balls 8, and is sleeved into the projection 14, and is secured to the latter by three or more screws, 17, in the usual manner. Ac-
95 cess to these screws is obtained by the hole 18 made through the flange 5 of the hub. By revolving the wheel until this hole comes opposite a screw, 17, the latter may be set up by a screw-driver inserted through the hole, the gage-ring 15 regulating the adjustment of the
100 parts of the bearing upon the balls.

The clutch-drum 11 on one side of the wheel is attached directly to the tubular shaft 19 by means of the splines 20 20, while at the other end the bevel gear 21 is attached to this shaft
105 by splines in a similar manner. The tubular

shaft 19 is supported at the ends upon the cone-bearings 22 22. These cone-bearings are supported exteriorly in the central holes, 23, in the bottoms or outer sides of the cup-shaped metal caps 24 24. The larger open end of each of these caps fits closely over the exterior of the periphery of disk 3, being held thereto by the radial screws 25, and a recess being made in the edge of the cap to fit around the ear of disk 3, by which it is joined to the fork. The cone-bearings are thus held concentric with the ball-bearings, which support the fork upon the wheel, and the caps 24, while performing this function, also inclose the clutch-drums 11 11, so as to exclude dust, &c., from the working parts. The cone-bearings 22 are screwed upon the central stationary shaft, 26, and sustain it in place within the tubular rotating shaft 19, as shown, and on the external outer end of each cone-bearing is screwed the nut 27, which holds the whole frame together through the center of the wheel by means of shaft 26. It will be observed that this arrangement of parts permits of the cone-bearings 22 being adjusted to the tubular rotating shaft 19 by screwing them out or in on the stationary frame-shaft 26, and that the nuts 27 may also be used to adjust the longitudinal position of both the rotating and stationary shafts to the other parts, which is very important.

The cap 24, which incloses the bevel-gear 21, has two studs, 28 28, screwed into its circumferential wall, projecting radially inward. These studs are surrounded by tubular bushings, preferably of nickel-bronze composition, 29 29, and on these are mounted the bevel-pinions 30 30, engaging with the bevel-gear 21. The cover 31 of the clutch-drum 11 on this side of the machine has screwed upon its projecting hub the bevel-gear 32, which also engages with the pinions 30 30. A key or feather of ordinary construction locks gear 32 to cover 31 when it is screwed home, and the hub of the cover takes a steadying bearing upon the tubular shaft 19. The cover of the clutch-drum 11 is screwed in place on it by long screws, as shown. This construction and connection of the opposite clutch-drums with each other cause the revolution imparted to one drum in a forward direction to impart a rotation in a reverse direction to the other one, and vice versa, through the mechanism of the shaft 19, gear 21, pinions 30 30, and gear 32. These gears and pinions are all on the same side of the steering-fork or frame attached thereto, and are held firmly to the frame and in relation to each other by the construction of the parts supporting them, and covered and inclosed from dust and dirt in a neat and compact form.

It will be observed that the clutch-drums run partly on the projecting ends 4 4 of the wheel-hub and partly on the shaft 19, the one which carries the gear 32 being of course free to revolve on the latter. While the reversing action of one clutch-drum upon the other is

the same as that described in the patent of D. H. Rice and L. H. Rice referred to, it is more compact, and there is no pulley and cord connection between the drums to get out of order.

It will also be observed that by supporting the wheel by the fork inside of the clutch-drums and reversing-gearing there is less chance for its bearings to be sprung and heated than if the ends of the fork be attached to the wheel-support at some distance outside of it. The lower ends of the fork being pivotally connected to the bearing-disks 3 3, all twist or strain upon the extensions 4 4 of the wheel-hub is avoided, and consequently the clutch-drums 11 11 always run freely thereon, and this is especially advantageous in connection with the central adjusting-shaft, 26, which would tend to bind the bearings, if connected rigidly to the fork, by adjusting the nuts 27 out or in.

The cords or straps 12, which connect the clutch-drums 11 11 to the levers 13, are led inward to the drums through openings 33 33 in the lower parts of caps 24.

The sleeves 7 of the ball-bearings, being clamped, as described, to the wheel-hub extensions, can be adjusted longitudinally on the same by the introduction of washers either between them and the collars 6 of the clutches or the flanges 5 of the wheel, which is very convenient.

The pinions 30 30 must be mounted upon their studs 28 28 after gear 21 and its shaft 19 have been secured together and inserted into cup 24. To accomplish this the pivots 28, one or both, are made to be inserted from the outside, which allows of their being introduced into the pinions from that direction.

In a velocipede of this type, in which the small wheel is placed behind the large one, it is well known that a great part of the liability to take headers arises from the fact that when the rider is suddenly lifted out of the saddle to a position above the axis of the large wheel, or slightly forward of it, the wheel revolves backward and runs the machine out from under the rider, making it impossible for him to recover himself. My construction and positive connection of the clutch-drums by the central shaft and reversing-gearing effectually prevent this from happening, regardless of whether the weight of the rider is on the pedals or pedal or not. This is because it is an absolute necessity that when either clutch-drum runs backward the other shall go forward, and if the attempt be made to revolve both of them backward at the same time it cannot be done without breaking the shaft or gearing connecting them; but when the driving-wheel begins to run backward, as above described, the clutch-drums are simultaneously locked to the wheel-hub and the latter cannot revolve backward without carrying them both with it. As this is, however, impossible it follows that the wheel can never run backward, even when the rider has lost his foothold on the pedals, and thus throw him over it.

What I claim as new and of my invention is—

1. The combination of the wheel having hub projections 4 4 extending horizontally outward beyond its flanges 5 5, the steering-fork pivotally attached to the disks 3 3 at its lower end on each side of the wheel, the disks 3 3, supported upon the wheel-hub extensions by running-bearings, and the clutch-drums 11 11, supported on said wheel-hub extensions by running-bearings outside of the fork-bearings 3 3, and having clutches adapted to alternately connect them to and release them from the wheel-hub, substantially as described.

2. The combination of the wheel having hub projections 4 4 extending horizontally outward beyond its flanges 5 5, the steering-fork pivotally attached to its bearing-disks 3 3 at its lower ends, the disks 3 3, supported upon the wheel-hub projections by running-bearings, the clutch-drums 11 11, supported by running-bearings outside of the fork-bearings 3 3, and having clutches adapted to alternately connect them to and release them from the wheel-hub, and the central tie-rod or shaft, 26, connecting the opposite bearing-disks 3 3 together by frame-supports extending from its ends around and outside of the clutch-drums, substantially as described.

3. The combination of the wheel 2, having lateral hub-extensions 4 4, the fork-bearings 3 3, supported upon said hub-extensions, the clutch drums 11 11, provided with clutches arranged to alternately connect and disconnect them from said hub-extensions as they reciprocally rotate, the shaft 19, connected directly to one clutch-drum and extending thence through and beyond the opposite end of the wheel-hub, and the intermediate gears, 21 30 32, connecting said shaft to the other clutch-drum, substantially as described.

4. The combination of the fork-bearings 3 3, taking a running-bearing upon wheel-hub extensions 4 4, the clutch-drums 11 11, provided with clutches arranged to alternately connect and disconnect them from the hub-extensions, the tubular shaft 19, extending beyond the ends of the wheel-hub and connected to one drum 11 directly at one end, and to the other drum 11 by intermediate gears, 21 30 32, at the other end, and the tie-rod 26, extending through the center of tubular shaft 19, and sustained at the ends by frame-supports extending from bearings 3 3 around outside of said clutch-drums and gears, substantially as described.

5. The combination of the tubular wheel-hub, the fork-bearings 3 3, the clutch-drums 11 11, their connecting tubular shaft 19, extending through the wheel-hub, and the central tie-rod, 26, extending through the tubular shaft, provided with adjustable cone-bearings 22 22 for shaft 19, and sustained by frame-supports upon the fork-bearings, substantially as described.

6. The combination of the tubular wheel-hub, the tubular revolving shaft 19, extending

through the same, and the central tie-rod sustained at its ends by frame-supports and provided with cone-bearings 22 22 for shaft 19, and itself made adjustable in its frame-supports by the nuts 27 27, substantially as described.

7. The combination of the disk 3, the gage-ring 15, the collar 16, secured by screws to disk 3, and the separable grooved sleeve 7, surrounding the wheel-hub extension and clamped thereto and forming the ball-bearing, substantially as described.

8. The combination of the wheel-bearings 3 3, attached to the lower end of the steering-fork and formed in disk shape, the cup-shaped frame supports 24 24, having their open ends fitting around said disks and attached thereto, and the central tie-rod, 26, supported in said cup-shaped pieces and passing through the wheel-hub, substantially as described.

9. The combination, with the frame-support 24, of the stud 28, carrying pinion 30, and also the end of tie-rod 26, which passes through the wheel-hub, substantially as described.

10. In combination with the fork-bearing 3, the cup-shaped frame-support 24, attached thereto and passing around and inclosing clutch-drum 11 and supporting one end of tie-rod 26, whereby the same becomes both part of the supporting-frame and an inclosing dust cap or guard, substantially as described.

11. The combination, in the inclosing cup-shaped frame-piece 24, of the bevel-gear 21, attached to shaft 19, centrally located in said cup, and the pinions 30 30, mounted upon studs 28, one or both of which studs are arranged to be inserted radially through the outer wall of said cup from the outside, whereby the said pinions are enabled to be mounted on said studs after gear 21 is introduced into place in said cup-shaped support, substantially as described.

12. The combination of the wheel-hub having the spoke-flange 5 around it and supported by a shoulder of the tube upon its inside face, and also having the extension 4, the ball-bearing sleeve 7, taking a bearing against said spoke-flange, and the collar 6, screwed onto said extension and bearing against and clamping sleeve 7 against flange 5, substantially as described.

13. In a velocipede having the large wheel forward of the small one, and a seat for the rider over the same, the combination of the wheel-hub, clutch-drums arranged to simultaneously lock themselves to the hub when the latter turns backward, and the shaft 19, and reversing-gears connecting said drums positively together and preventing them from simultaneously turning backward, substantially as described.

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Witnesses:

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