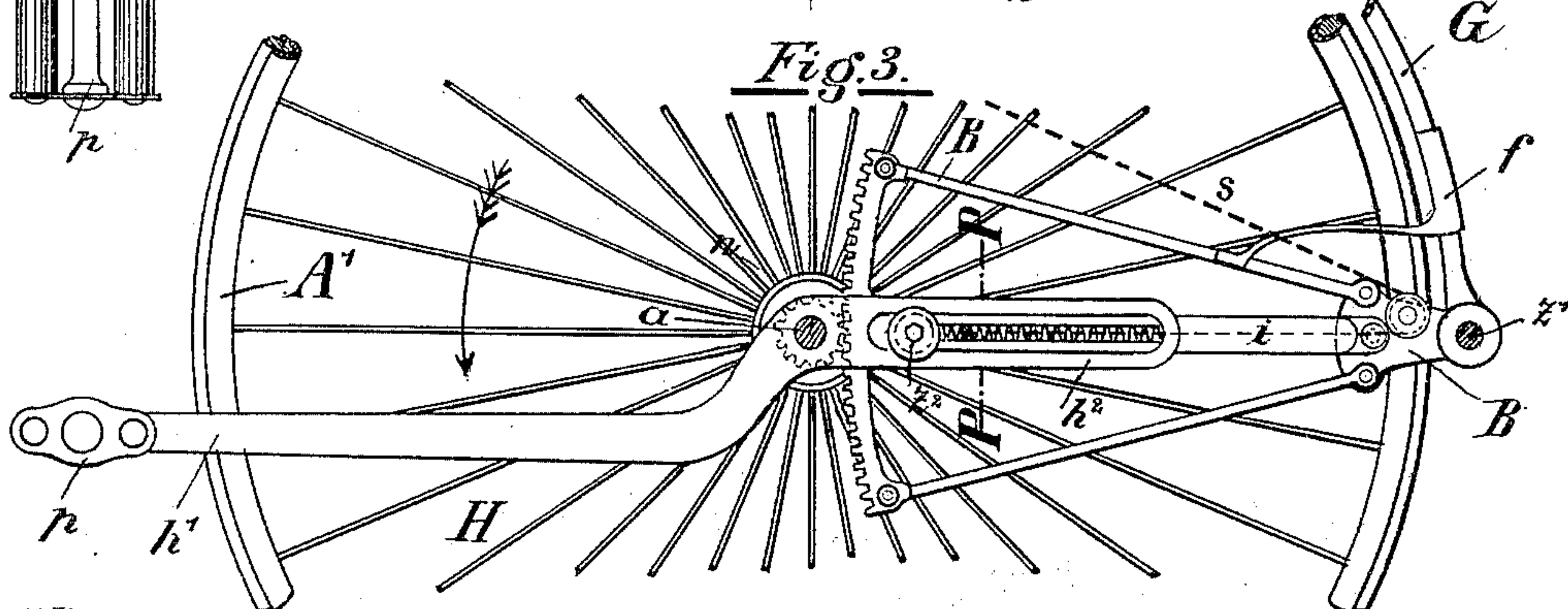
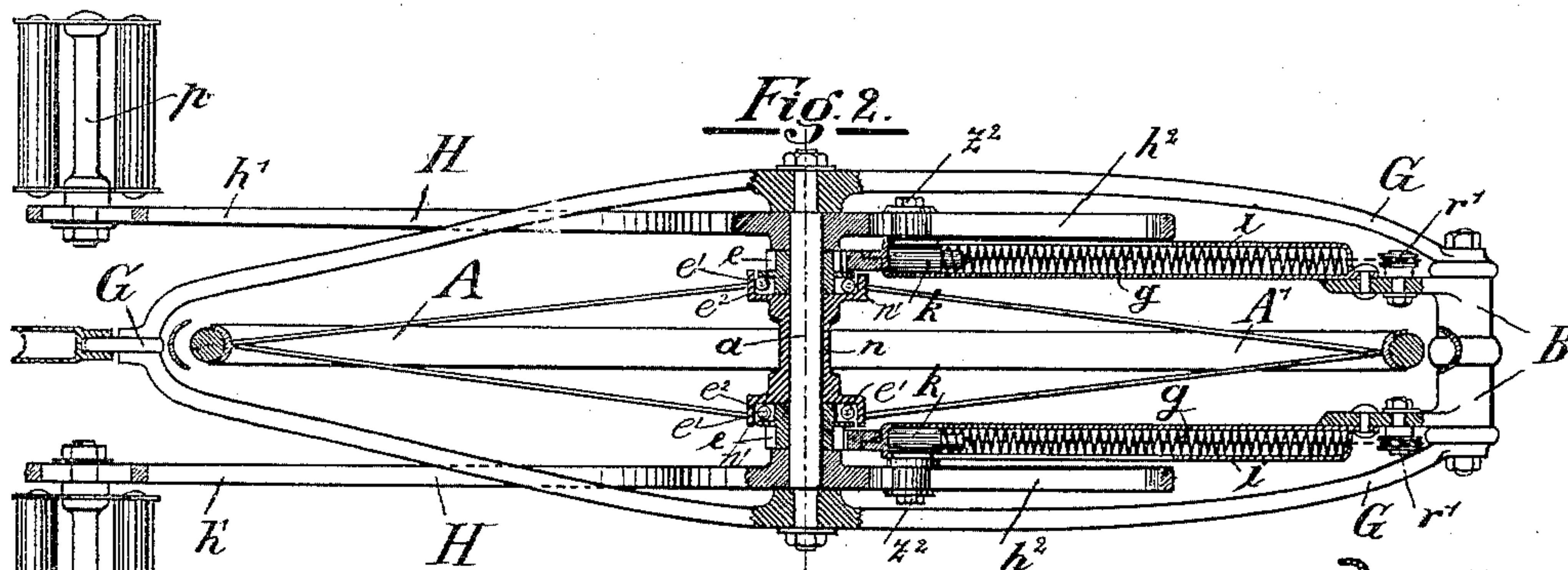
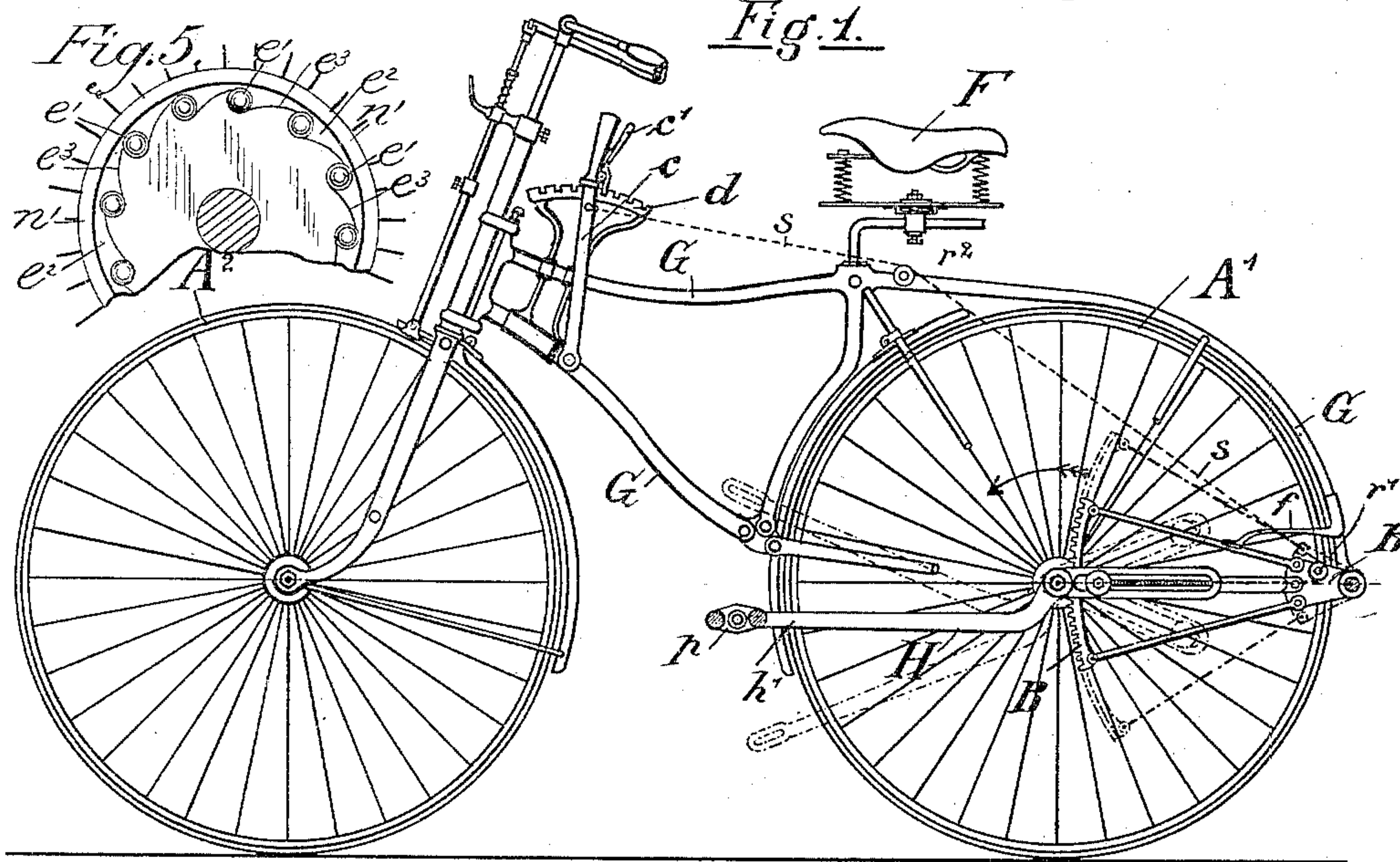


(No Model.)

M. SCHWERTFÜHRER.
VELOCIPÈDE.

No. 436,673.

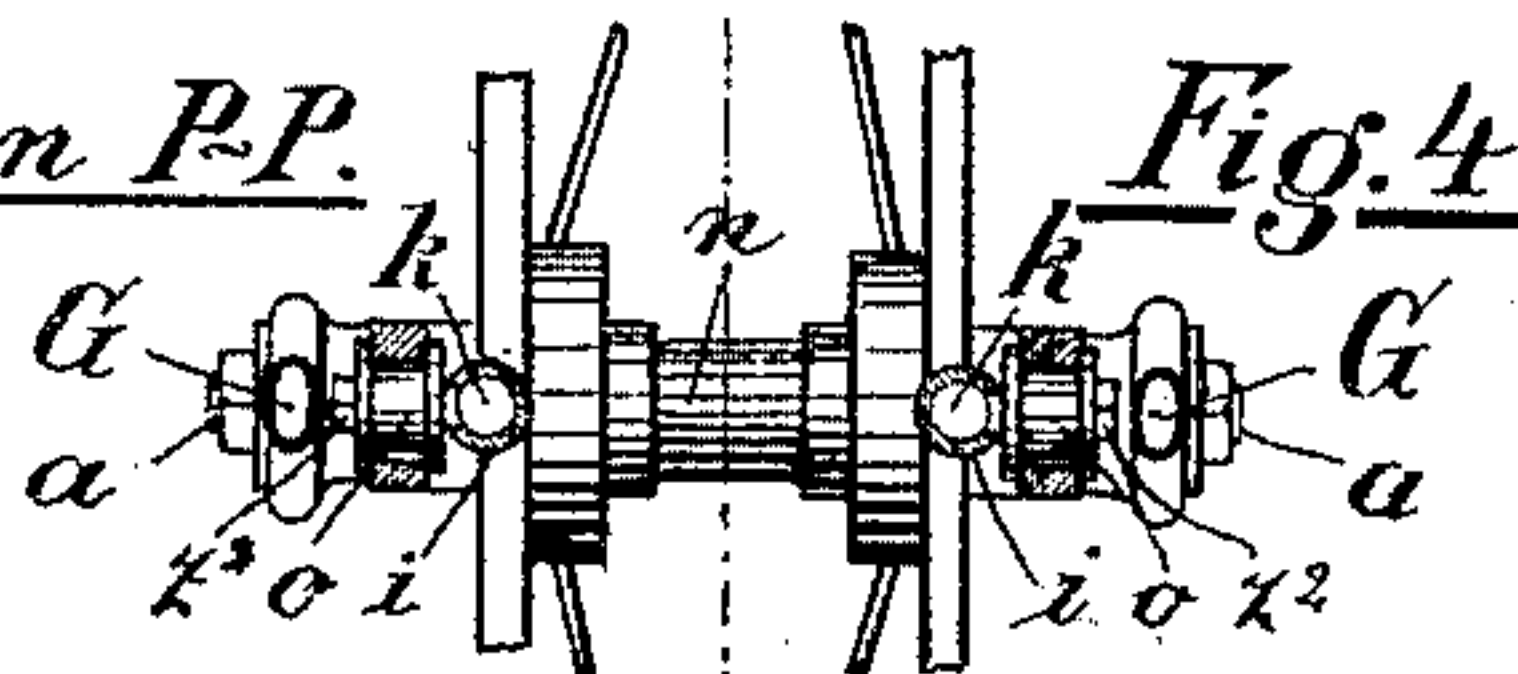
Patented Sept. 16, 1890.



Witnesses:

M. A. M. Frayser.
C. J. Hedrick

Section P-P.



Inventor:

Max Schwertführer,
by Max Georgi
his Attorney.

UNITED STATES PATENT OFFICE.

MAX SCHWERTFÜHRER, OF STUTTGART, WÜRTENBERG, GERMANY.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 436,673, dated September 16, 1890.

Application filed March 8, 1890. Serial No. 343,200. (No model.)

To all whom it may concern:

Be it known that I, MAX SCHWERTFÜHRER, a subject of the King of Prussia, residing at Stuttgart, in Würtemberg, Germany, have invented new and useful Improvements in Velocipedes, of which the following is a specification.

My invention relates to an arrangement in velocipedes whereby the velocity may at all times be varied within wide limits.

It also relates to means whereby this change in speed may be effected while riding and without changing the number or length of strokes.

It has long been the desire of riders and manufacturers of velocipedes and bicycles to produce a machine in which the speed could be varied from the saddle and while riding in order to pass over level stretches with greatly-increased speed, and to ascend hilly roads without increased exertion on the part of the rider. The aim has been to produce a bicycle which would admit of such variations without a change in the number of strokes. Experiments have already been made with a view to accomplish such adjustability of speed, but none of them, so far as I am informed, have been satisfactory, among others for the reason that they did not result in a structure which enabled the changes to be made while riding, and because the limits of change in speed were too restricted.

My invention as described below enables me to raise the speed of travel to twice or more the present speed, and (for climbing elevations) to reduce the same to one-third or less of the least at present obtained for the same length and number of strokes.

In the drawings, Figure 1 represents a side elevation of a velocipede embodying my improvements; Fig. 2, a sectional plan on an enlarged scale of the driving-wheel portion thereof; Fig. 3, an elevation on the same scale of the driving-wheel, a portion thereof being broken away; Fig. 4, a detail view showing a section on line P P, Fig. 5; and Fig. 5, a detail showing the ball-and-eccentric connection.

My velocipede is characterized among other

things by a peculiar motor consisting of two propelling-levers H, (instead of cranks,) which are provided and turn on the axle of the motor-wheel A', and which comprise two arms each, the longer of which h' carries the pedals p , while the other, the shorter arm h^2 , is provided with a slot carrying a roller o , turning on a pin z^2 , said pin forming part of and being attached at right angles to a sliding piece k . The latter is adapted to slide in the hollow slotted middle arm i of a toothed propelling-segment B, adapted to turn on a pivot z' in the frame G of the propelling-wheel A', and which is held in a normal (lowermost) position by a spring f when no exterior force is applied.

The two toothed segments B, for whose teeth a driving-chain might in some cases be substituted, mesh with two pinions e , which are loose in the axle a , and are so connected to the hub n of the wheel A'—for instance, by the balls e' , lying within the recesses e^2 of pinions e , as best shown in Fig. 5—that upon the upward motion of the segments B the said pinions e , the hub n , and consequently the wheel A' are revolved, while upon the downward motion of the segments B the pinions e turn loosely on the axle a , this action being caused by the eccentric curves e^3 , which cause the balls e' to bind against the rim n' of hub n , when the pinion e turns in the direction of the arrow, Figs. 1 and 3, and to release the same when turning in the opposite direction.

The segments B are actuated when pressure is applied to the pedals p , and the longer arm h is depressed and the shorter arm h^2 elevated, thereby carrying the roller o and the sliding piece k and with it the segment B upward. The wheel A' is thus urged to turn in the direction of the arrows, Figs. 1 and 3. As soon as the pressure is removed, the spring f returns the segment B to its normal position.

The change in velocity is effected by shifting the pivots z^2 , carrying the rollers o , by means of the two sliding pieces k , Fig. 2, which are urged forward by the springs g . Two cords or chains S are attached to these sliding pieces, said cords passing within the

coiled springs g , thence through the hollow arm i , and thence over the rollers $r^1 r^2$. Beyond the roller r^2 they are united to form a single cord which is attached to the speed-regulating lever c .

To the handle of the speed-regulating lever c is attached the spring-detent c' , adapted to engage with the notches of the regulator-support d , and thereby retain the lever c' in the desired position. When the lever c is pressed toward the front wheel A^2 , the sliding pieces k are forced toward the pivot z' of the driving-segment B by the cords S and against the stress of the spring g . The pivot z^2 and roller o are thereby shifted in the slot of the lever-arm h^2 and removed from the axle a of the propelling-wheel A' . The vertical stroke of the roller o increases in proportion to the increase of its distance from the axle, and since the radius of propulsion for the motor-segment B decreases with the increase of this distance—*i. e.*, the distance of the roller o from the axle—the path traversed by the peripheries of the toothed segment B on pinion e or of the chain-connection is increased to a further extent. I am thus enabled to increase the speed of the pinion e and with it of the wheel A' to three or more revolutions, as desired, so that when the two segments have acted the wheel A' will have made six or more revolutions. When the sliding piece carrying the pivot z^2 and roller o are shifted as close as possible to the axle a , the vertical stroke of the segment B is at a minimum and the speed may be reduced to one-third of the previous speed or less, always supposing that the number of strokes remains the same. I am thus enabled by my arrangement of propelling devices to adjust the speed without dismantling within limits of three times and one-third the ordinary speed, or still greater limits.

I claim—

1. In a velocipede, the combination of a slotted propelling-lever, a slotted arm, and connections, substantially as described, between the slotted arm and the propelling or driving wheel for imparting motion thereto, with an adjustable sliding piece engaging the slots of and connecting the propelling-lever and the slotted arm, substantially as described.

2. In a velocipede, the combination of a lever pivoted on the axle of the propelling-wheel and consisting of a forwardly-extending pedal-arm and a rearwardly-extending arm, a pivoted toothed propelling-segment and connections between the segment and the rearwardly-extending arm, with a pinion on the axle of and connected with the propelling-wheel, all substantially as described.

3. In a velocipede, the combination of a propelling-wheel, a pinion loosely mounted on the axle of the same and connected with its hub, so as to turn the same in one direction only, with a lever pivoted on the frame of the

velocipede, a toothed propelling-segment also pivoted on the frame and meshing with the pinion, and adjustable connecting means between the lever and the propelling-segment, all substantially as described.

4. In a velocipede, the combination of a propelling-wheel, a pinion mounted on the axle of the same and connected with its hub, so as to impart motion in one direction only, with a lever pivoted on the axle of the propelling-wheel and having a rearwardly-extending slotted arm, a toothed segment meshing with the pinion and pivoted to the frame, and an adjustable sliding piece connecting the segment and the lever, all substantially as described.

5. In a velocipede, the combination of the following parts: a slotted propelling-lever pivoted on the frame, a toothed propelling-segment also pivoted on the frame and having a hollow slotted arm, a pinion loose on the axle of and connected with the propelling-wheel, and a sliding angle-pin carried by the hollow slotted arm and passing into the slot of the propelling-lever, all substantially as set forth.

6. In a velocipede, the combination of the following parts: a slotted propelling-lever pivoted on the frame, a toothed propelling-segment also pivoted on the frame and having a hollow slotted arm, a pinion loose on the axle of and connected with the propelling-wheel, a sliding angle-pin carried by the hollow slotted arm and passing into the slot of the propelling-lever, a spring, as g , for urging forward the angle-pin and a cord for adjusting the position of the angle-pin, substantially as and for the purposes set forth.

7. In a velocipede, the combination of the following parts: a slotted propelling-lever pivoted on the frame, a toothed propelling-segment also pivoted on the frame and having a hollow slotted arm, a pinion loose on the axle of and connected with the propelling-wheel, a sliding angle-pin carried by the hollow slotted arm and passing into the slot of the propelling-lever, a spring, as g , for urging forward the angle-pin, a cord for adjusting the position of the angle-pin, guide-rollers for the cord, and a regulating-lever, all substantially as described.

8. In a velocipede, the combination of the following parts: a lever pivoted on the axle of the propelling-wheel and having a rearwardly-extending slotted arm, a toothed propelling-segment pivoted on the frame and having a hollow slotted arm, a pinion loose on the axle of and connected with the propelling-wheel, a sliding angle-pin carried by the hollow slotted arm and passing into the slot of the rearwardly-extending lever-arm, all substantially as described.

9. In a velocipede, the combination of the following parts: a slotted propelling-lever pivoted on the frame, a toothed propelling-segment also pivoted on the frame and having a hollow slotted arm, a spring, as f , for hold-

ing the segment in normal position, a pinion
loose on the axle of and connected with the
propelling-wheel, a sliding angle-pin carried
by the hollow slotted arm and passing into
5 the slot of the propelling-lever, substantially
as and for the purposes set forth.

In testimony whereof I have signed this

specification in the presence of two subscri-
ing witnesses.

MAX SCHWERTFÜHRER.

Witnesses:

AUGUST DRANTZ,

GUSTAV GROSS.