

No. 667,887.

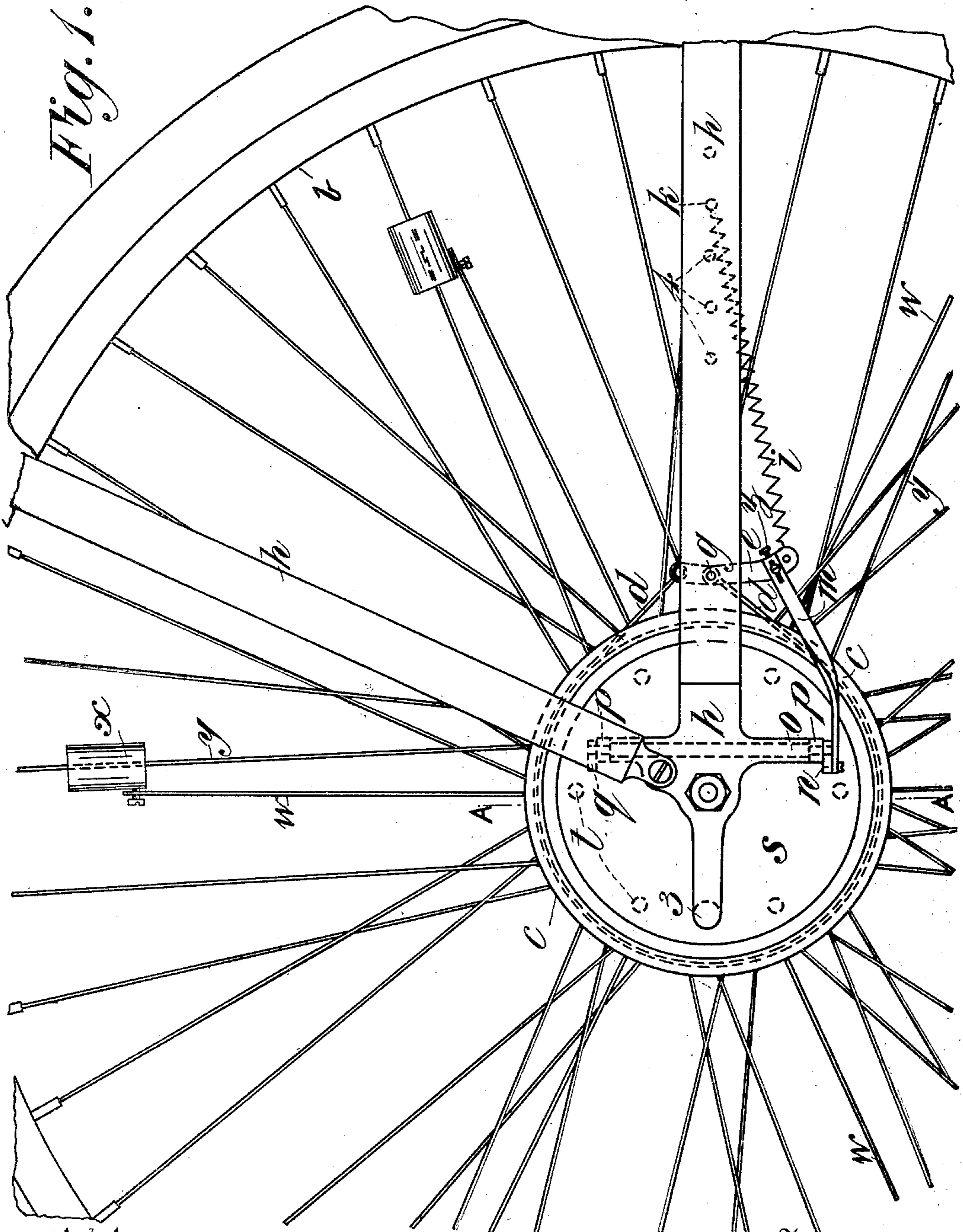
Patented Feb. 12, 1901.

E. L. MAYER.
BICYCLE BRAKE.

(Application filed Sept. 26, 1899.)

(No Model.)

3 Sheets—Sheet 1.



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Fig. 3.

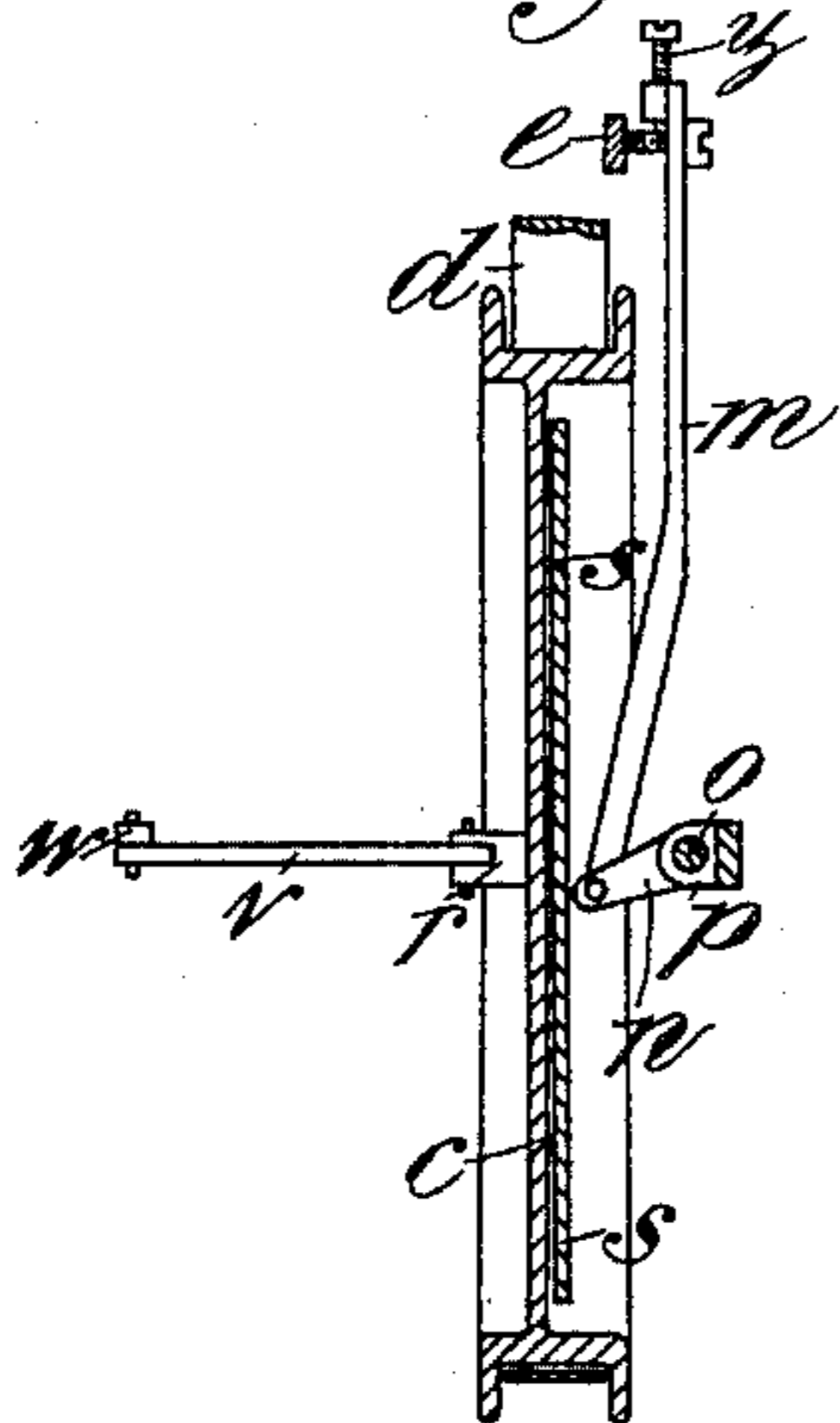
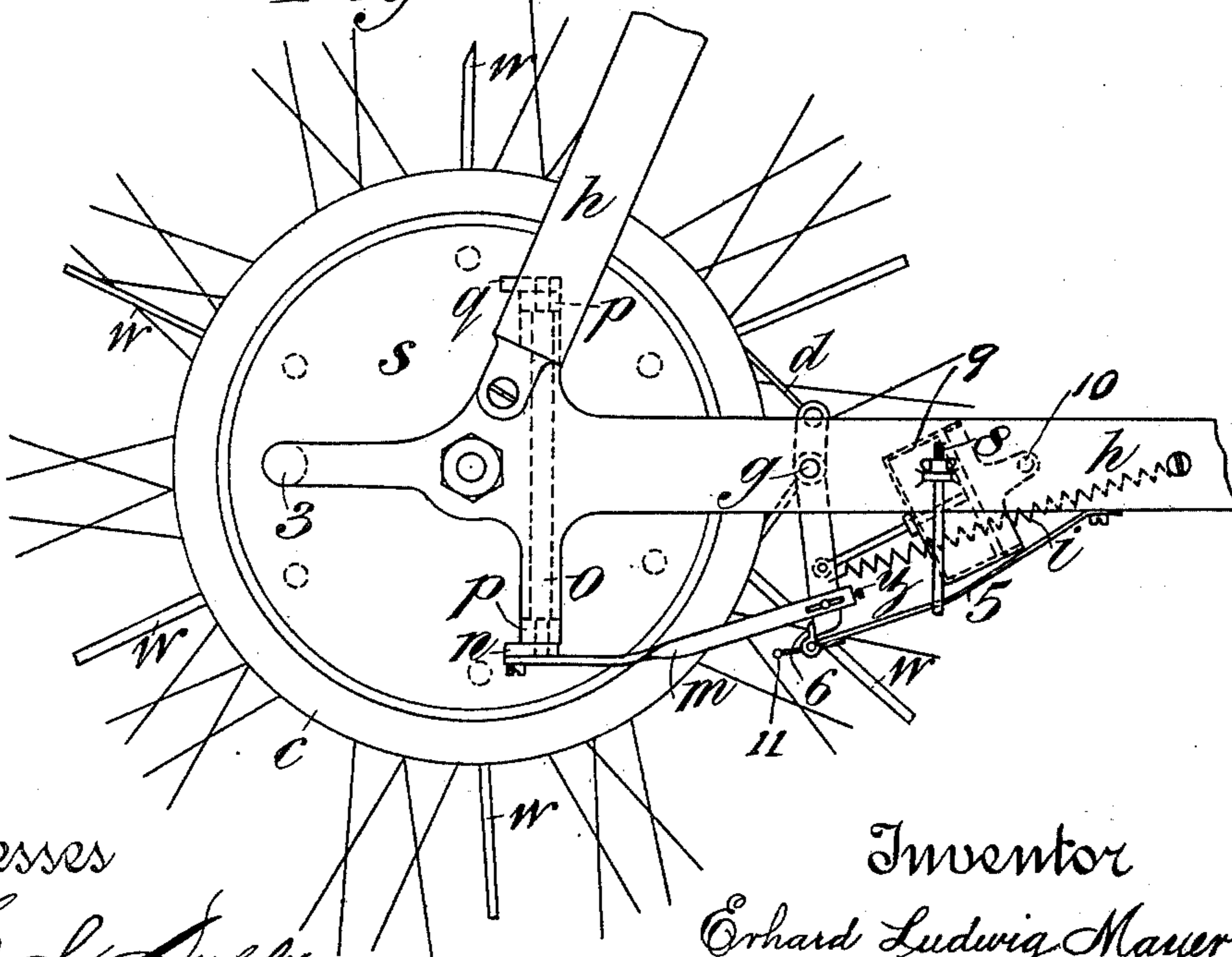


Fig. 4.



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ERHARD LUDWIG MAYER, OF LONDON, ENGLAND.

BICYCLE-BRAKE.

SPECIFICATION forming part of Letters Patent No. 667,887, dated February 12, 1901.

Application filed September 26, 1899. Serial No. 731,744. (No model.)

To all whom it may concern:

Be it known that I, ERHARD LUDWIG MAYER, a subject of the Queen of Great Britain and Ireland, residing at 11 Billiter Square, in the city of London, England, have invented Improvements in or Connected with Brake Apparatus for Cycles and other Vehicles, of which the following is a specification.

This invention has reference to improved constructions of brake apparatus for bicycles and other road-vehicles whereby upon the vehicle to which the apparatus is applied attaining or exceeding a given speed the brake will be automatically brought into action to retard the motion of the vehicle until the speed thereof is reduced below the given speed, whereupon the brake will automatically be taken off.

The invention consists in the novel features of construction and combinations of parts hereinafter set forth, and specially pointed out in the claims.

In the accompanying illustrative drawings, Figure 1 shows in side elevation a cycle-wheel provided with combined brake mechanism and centrifugal governing mechanism according to this invention. Fig. 2 shows the wheel with brake and governing mechanism partly in rear end elevation and partly in cross-section on the line A A of Fig. 1. Fig. 3 is a part sectional plan on the line B B of Fig. 2. Fig. 4 is a part side elevation showing a modified construction.

In the arrangement shown in Figs. 1, 2, and 3 there is fixed to the hub *a* of one of the traveling wheels of the vehicle—say, the driving-wheel *b* of a bicycle—a brake-wheel *c*, around which is placed a brake-strap *d*, the ends of which are fixed to oppositely-arranged portions of a lever or carrier *e*, that is pivoted at *g* to a fixed part of the frame *h* of the machine and is hereinafter called for distinction the “brake-lever.” In the example shown one end of the brake-strap *d* is fixed to the pivot *g* of the brake-lever *e*, the other end of the strap being connected to the movable free end of the lever. The other end of the brake-lever is connected to one end of a coiled spring *i*, the other end of which is connected, as at *k*, to a fixed part of the frame *h* of the machine, it may be in an adjustable manner, the said spring acting to normally hold the brake-lever in a position in which the brake-

strap *d* is loose on the brake-wheel *c*. To the same end of the brake-lever is also connected one end of a rod *m*, the other end of which is connected to a crank-arm *n*, fixed to one end of a spindle *o*, that is mounted in a bearing *p*, carried by the frame *h* of the machine, and to the other end of which is fixed a second crank-arm *q*. The crank-arms *n* and *q* are arranged to be operated so as to partly rotate the spindle *o* about its axis by an annular plate or ring *s*, mounted to be moved laterally on the boss of the friction-wheel *c* by pins *t*, that are arranged to work laterally through holes *u* in the body of such wheel and each of which is connected to or actuated by one end or arm of a lever *v*, pivoted to some rotary part in connection with the traveling wheel *b*—as, for example, to a lug *r*, fixed to the brake-wheel *c*. The other end or arm of each lever *v* is connected, as by a rod *w*, to a weight *x*, which is or may be mounted to slide inward and outward upon a rod or guide *y*, that is fixed to the driving-wheel *b* and may conveniently be one of the wheel-spokes.

The two crank-arms *n* and *q* and the rod *m* are so arranged, as shown in Fig. 3, that normally the two crank-arms bear nearly but not quite at right angles to the ring *s*, and as the said crank-arms are turned outward by the laterally-movable ring *s* their effective leverage gradually increases and the crank-arm *n* will be caused to pull on the said rod *m* and move it into a position in which it and the said rod become nearly but not quite parallel with one another, so that the brake-lever will be moved by a force that gradually increases from a small amount up to a very large one and applies the brake only when a predetermined speed has been exceeded.

As will be seen, the rod *m* and arm *n* together form a special construction of joint device that is operated by a force (in the example by the laterally-movable ring or plate *s*) applied to the jointed ends of the rod and arm. As will be seen, the arrangement is such that when the rod *m* and arm *n* are moved by the ring *s* the effective length of the said arm *n* is gradually increased, so as to move the brake-lever *e* with a force which rises gradually from a small value to a larger one, so that the brake is gradually applied with an increasing force when the vehicle at-

tains or exceeds a predetermined speed. It will be obvious that a joint device for applying the brake in the manner described can be constructed in various forms. The rod *m* 5 may be adjustably connected to the brake-lever *e*, so that the angle between the said rod and its crank-arm *n* when the brake is fully on can be varied to suit requirement. For this purpose in the example shown the brake-lever *e* is connected to the adjacent slotted 10 end of the rod *m* by a pin, upon which the end of the rod can be adjusted endwise by a set-screw *z*.

The arrangement of the apparatus is such 15 that normally the brake-strap *d* is held out of effective action by the spring *i*, which at the same time, through the rod *m* and crank-arms *q* and *n* and spindle *o*, forces the laterally-movable ring *s* against the pins *t* of the 20 levers *v*, connected to the centrifugal weights *x*, and holds all the parts firmly in position, and so prevents looseness and rattling of the said parts when traveling at slow speeds. When the vehicle is running, the centrifugal 25 weights *x* tend to move the ring *s* in the opposite direction and, through the crank-arms *n* and *q*, spindle *o*, and rod *m*, move the brake-lever *e* against the action of the spring *i* and in a direction (to the left in Fig. 1) to draw 30 the brake-strap *d* tightly around the brake-wheel *c*, and when the speed of the vehicle attains a predetermined amount, regulated by the said spring, the centrifugal weights *x* overcome the action of the spring and applies 35 the brake-strap to the brake-wheel, so as to retard the motion of the vehicle. When the speed is sufficiently reduced, the parts are moved in the opposite direction by the spring to take off the brake. The outward lateral 40 movement of the ring or plate *s* is or may be limited by a stop 3, (or there may be more than one,) fixed to the frame *h* of the vehicle.

The action of the coiled spring *i* can be adjusted so that the spring will allow the brake 45 to be applied at any desired speed. This may be done, for example, by adapting one end of the spring, as by forming it with a hook, as shown, to be engaged with one or other of a series of pins or projections 4 on the frame of 50 the vehicle.

Fig. 4 shows a modified arrangement in which the coiled spring *i* is made only sufficiently strong to move the brake-lever *e* and attached parts into the inoperative position 55 when the vehicle is at rest or moving slowly, and the brake-lever is held in the inoperative position against the action of the centrifugal weights *x* by an adjustable spring-blade 5, secured at one end to the framing of the vehicle and having at its other end a pivoted 60 hook or projection 6, which holds the brake-lever *e* in its inoperative position until the speed of the vehicle has attained a predetermined amount. When the speed exceeds the 65 predetermined amount, the connecting-rod *m* is caused to pull on the brake-lever *e* and bend and depress the spring-blade 5 sufficiently to

slip past the hook or projection 6 thereon and enable the brake to be applied by the rod *m* with nearly the whole effect of the centrifugal weights, the coiled spring *i* acting to move 70 the brake-lever in the opposite direction to take off the brake when the speed is sufficiently reduced. The hook or projection 6 is so pivoted to the end of the spring-blade 5, 75 as shown, that it cannot turn about its pivot in a direction to allow the brake-lever *e* to escape from it, but can turn in the opposite direction to enable the brake-lever, after this has been released by the bending of the spring-blade, to become reengaged with it when such 80 lever is moved back in the opposite direction to its original position. The hook or projection 6 is normally held in position by suitable means, such as a weight 11 or equivalent device. 85

The brake-lever *e* is or may be connected to a dash-pot comprising a piston 8, arranged to work inside a cylinder 9, that is pivoted at 10 to the frame *h* and from which the air can 90 escape only very gradually on compression, so as to form an air-cushion when the brake-lever suddenly slips past the hook or projection 6 and insure that the brake shall be applied gradually. 95

Antifriction devices may be applied to the movable parts in contact where it is desired to reduce friction and wear. Also the brake and governor mechanism may be more or less suitably inclosed to exclude dirt therefrom. 100 As will be obvious, changes can be made in the details of construction of the apparatus without departing from the spirit and scope of the invention so long as the relative arrangement of parts shown in the drawings or 105 the mode of operation described in the specification is preserved.

Brake apparatus such as described may advantageously be used in connection with bicycles of the kind in which the driving-wheel 110 is loosely mounted on its axle and is driven in a forward direction from a sprocket-wheel or equivalent device through a clutch, so that when desired the pedals may be held stationary and the driving-wheel allowed to rotate 115 in a forward direction independently of the driving mechanism, as well understood. Fig. 2 illustrates such an arrangement. It may also be applied in connection with motor-cars, tram-cars, and other road-vehicles. 120

What I claim is—

1. In a cycle or other vehicle, the combination of brake mechanism, centrifugal governing mechanism and a connecting-rod and crank-arm jointed together and so arranged 125 that the power of said governor is directly applied at the jointed ends of the rod and arm and tends to move the said rod and arm into parallelism with each other and operate said brake mechanism with a gradually-increasing force, substantially as described. 130

2. In a cycle or other vehicle, the combination of brake mechanism, centrifugal governing mechanism, two rods jointed together and

one of which is connected to the brake mechanism and the other is arranged to turn about a relatively-fixed axis, and operating means adapted to be actuated by said governing mechanism to act upon the jointed ends of said rods to cause them to become nearly parallel with one another and move said brake mechanism into the operative position.

3. In a cycle or other vehicle, the combination with one of the traveling wheels of such vehicle, of brake mechanism adapted to retard rotation of said wheel, governing mechanism actuated by a moving part of said vehicle, a connecting-rod and crank device arranged to be moved by said governing mechanism nearly into parallelism with one another and to apply said brake mechanism when the vehicle attains a predetermined speed, and a spring adapted to hold the brake inoperative until a predetermined speed is exceeded, substantially as described.

4. In a cycle or other vehicle, the combination with one of the traveling wheels of such vehicle, of brake mechanism adapted to retard rotation of said wheel, governing mechanism carried by said wheel and comprising one or more weights mounted to move outward from the center of said wheel, and a laterally-movable body acted upon by said governing mechanism, a connecting-rod and crank device arranged to be actuated by said body and connected to said brake mechanism, and a spring adapted to move the brake mechanism into the inoperative position when the speed is sufficiently reduced, substantially as described.

5. The combination with the driving-wheel of a cycle or other vehicle, of a governor having centrifugal weights carried by said wheel, a laterally-movable body arranged to be moved in one direction by said centrifugal weights, a brake-wheel connected to said driving-wheel, a brake-lever, a brake-strap extending around said brake-wheel and arranged to be tightened and slackened by said brake-lever, a spring connected to said lever and adapted to normally hold the same in the inoperative position, a connecting-rod connected to said brake-lever so as to pull thereon in opposition to said spring, and a crank jointed to said rod and arranged to be moved by said body so as to act on said rod and cause the rod and crank to move nearly into parallelism with one another, substantially as described.

6. In a cycle or other vehicle, the combination with one of the traveling wheels, of a brake arranged to act on said wheel, a spring adapted to hold said brake in the inoperative position until a predetermined speed is attained and then to release said brake, and a centrifugal governor operated by a moving part of the vehicle and connected to said brake so as to actuate the same in opposition to said spring when a predetermined speed is exceeded, substantially as described.

7. In a cycle or other vehicle, the combination with one of the traveling wheels, of a brake arranged to act on said wheel, a spring and pivoted catch adapted to hold said brake in the inoperative position until a predetermined speed is attained and then to release said lever, a centrifugal governor operated by a moving part of the vehicle and connected to said brake so as to actuate the same in opposition to said spring when a predetermined speed is exceeded, and a spring for moving the brake into its inoperative position when the speed is sufficiently reduced, substantially as described.

8. In a cycle or other vehicle, the combination with one of the traveling wheels, of a brake arranged to act on said wheel, a spring and pivoted catch adapted to hold said brake in the inoperative position until a predetermined speed is attained and then to release said lever, a centrifugal governor operated by a moving part of the vehicle and connected to said brake so as to actuate the same in opposition to said spring when a predetermined speed is exceeded, means adapted to prevent the governor acting too quickly when the brake is released by said spring, and means for returning the various parts to their inoperative position when the speed is sufficiently reduced, substantially as described.

9. In a cycle or other vehicle, the combination with one of the traveling wheels thereof, of a centrifugal governor mounted within and operated by said wheel, a brake-wheel fixed to said traveling wheel, a brake-strap for said brake-wheel, a brake-lever for operating said strap, an annular plate mounted on the hub of said brake-wheel and adapted to be moved laterally by the centrifugal action of said governor, a connecting-rod jointed to said brake-lever, two crank-arms and a spindle, carried by a bearing on the frame of the vehicle, said crank-arms being arranged to be acted upon and partly turned by said annular plate and one of them being jointed to said rod, and a spring connected to said brake-lever and tending to move the said parts into and hold them in their inoperative positions, substantially as described.

10. In a cycle or other vehicle, the combination with one of the wheels thereof, of a centrifugal governor, brake mechanism adapted to be actuated by said governor and to retard the velocity of said wheel when the speed thereof exceeds a predetermined amount, and an adjustable spring whereby the speed at which the governor will come into action to operate said brake mechanism can be varied, substantially as described.

Signed at 77 Cornhill, in the city of London, England, this 5th day of September, 1899.

ERHARD LUDWIG MAYER.

Witnesses:

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