

No. 656,311.

Patented Aug. 21, 1900.

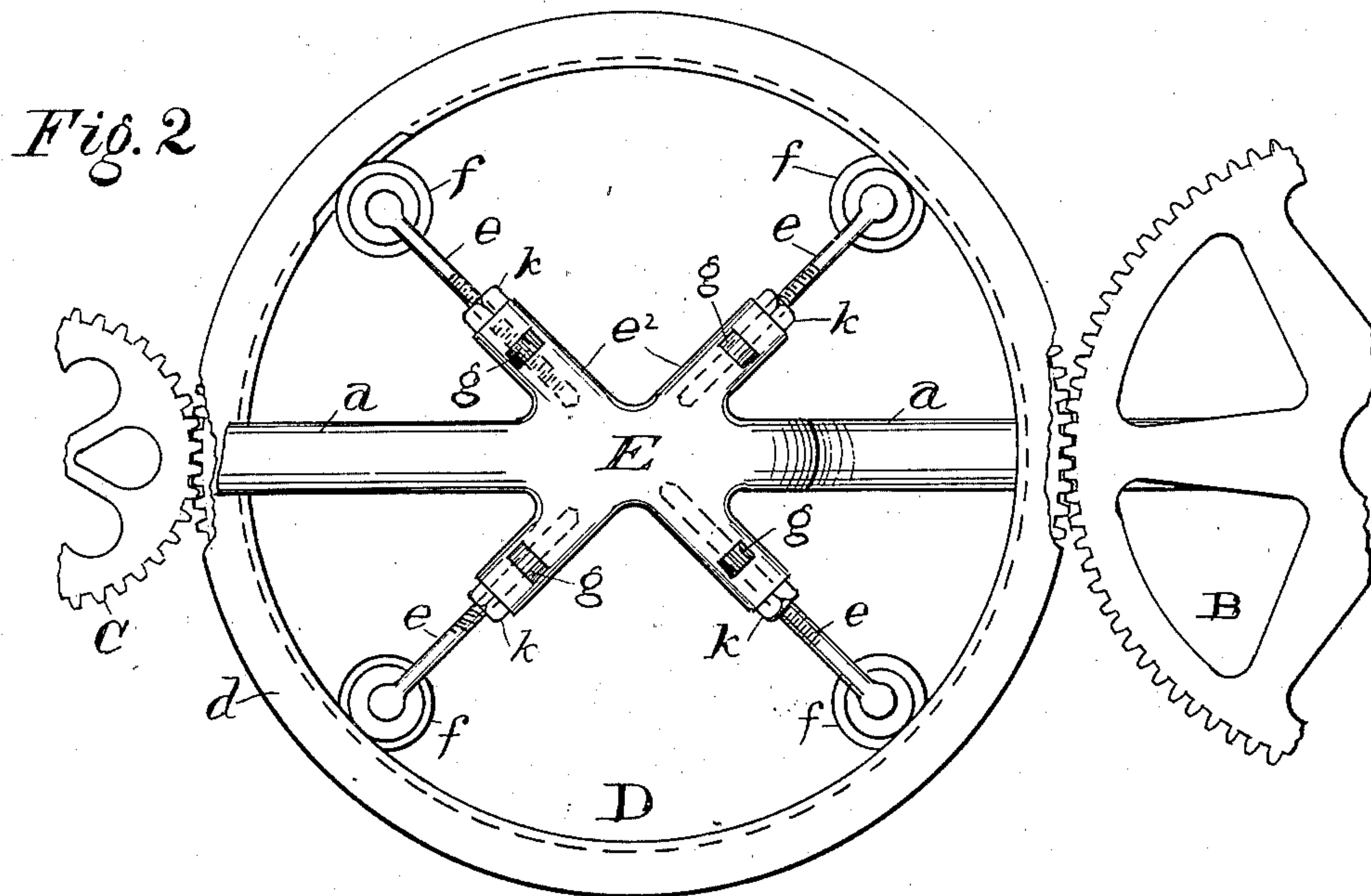
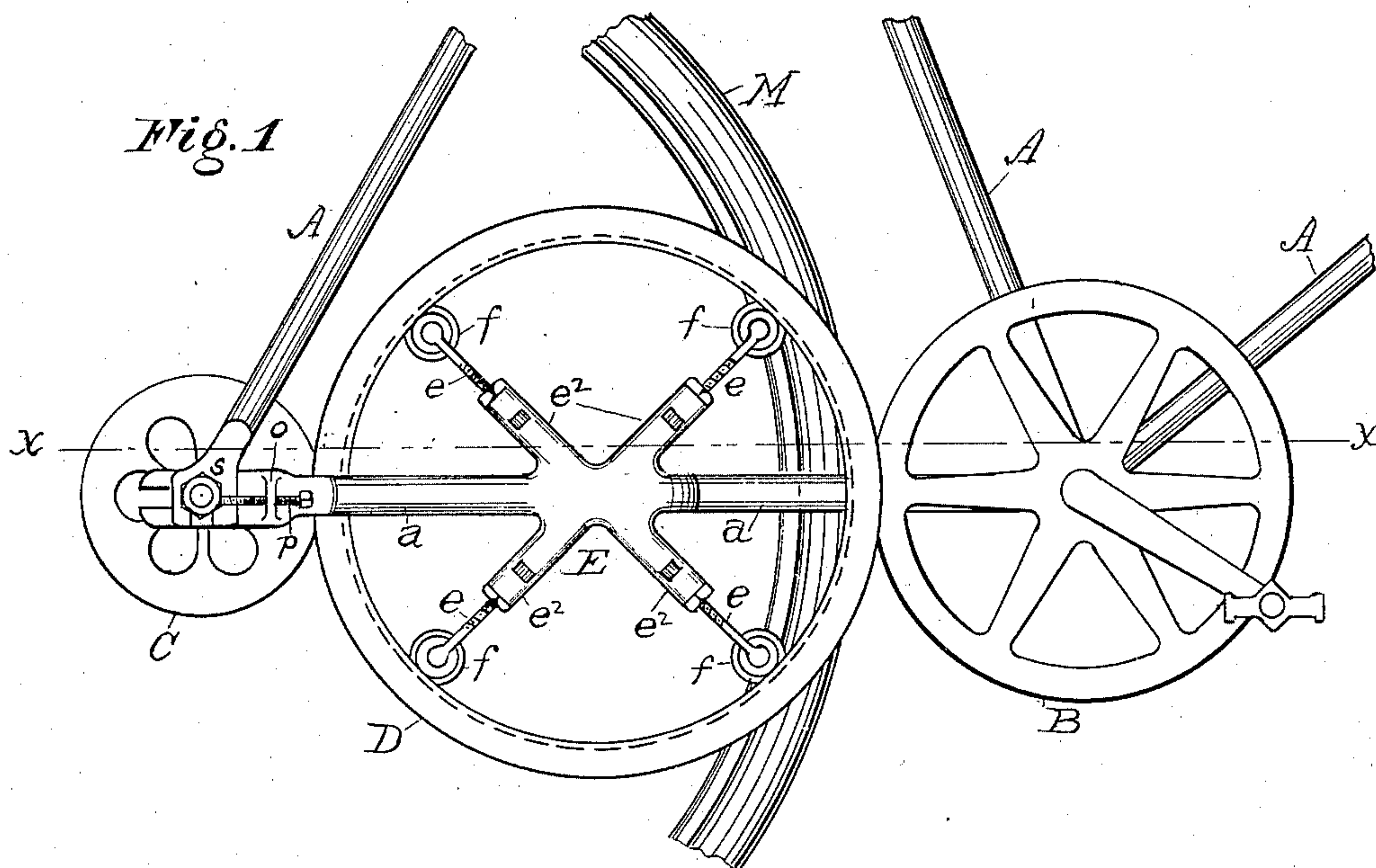
F. WEBER.

BICYCLE.

(Application filed July 27, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
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F. WEBER.
BICYCLE.

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2 Sheets—Sheet 2.

(No Model.)

Fig. 3

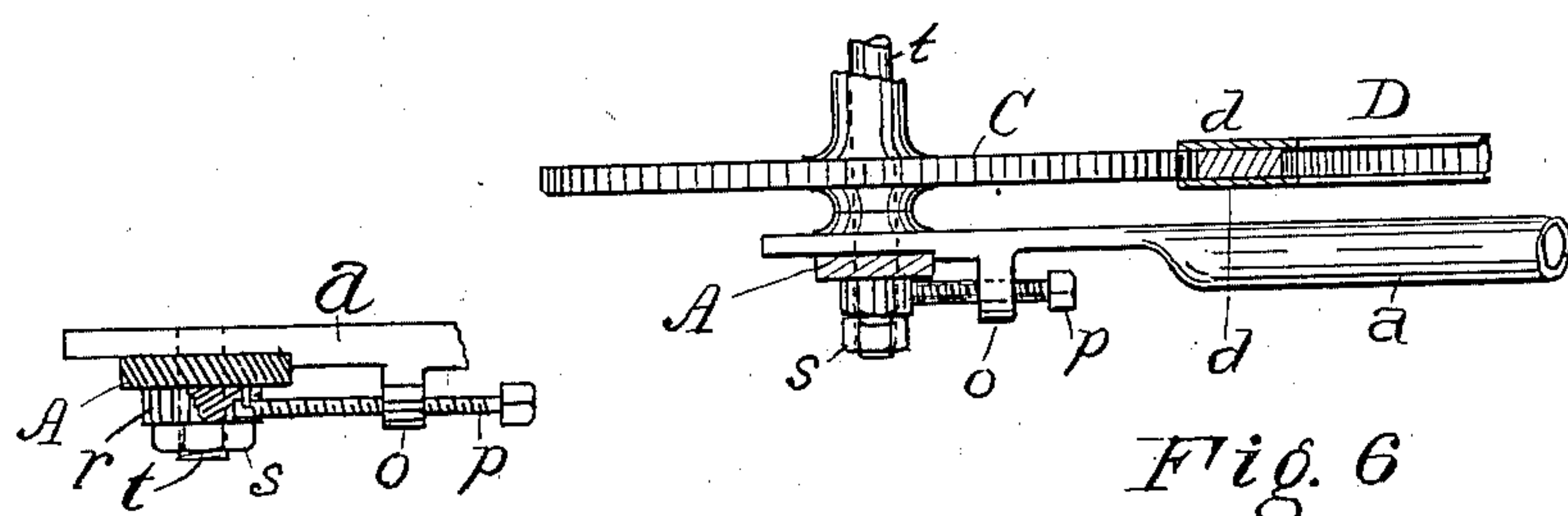
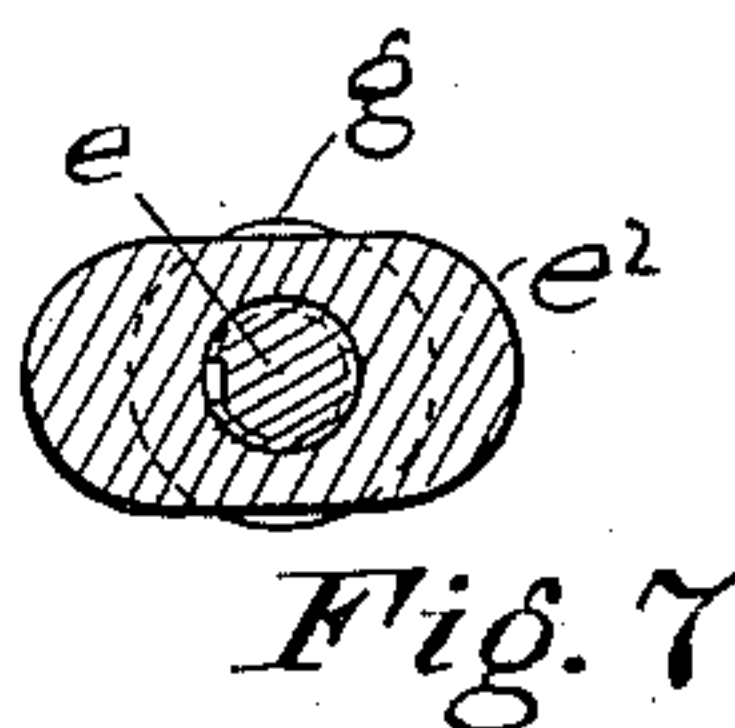
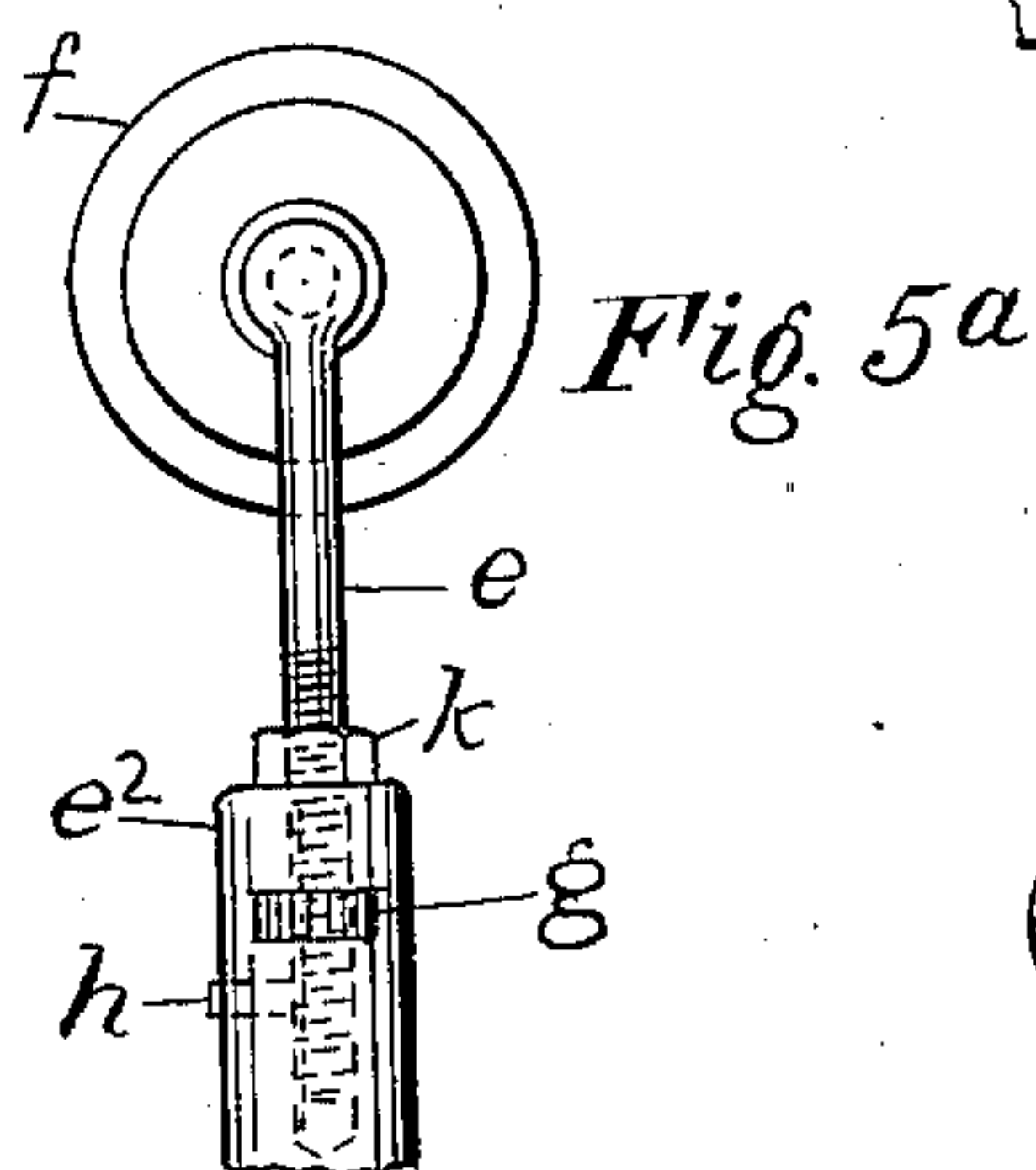
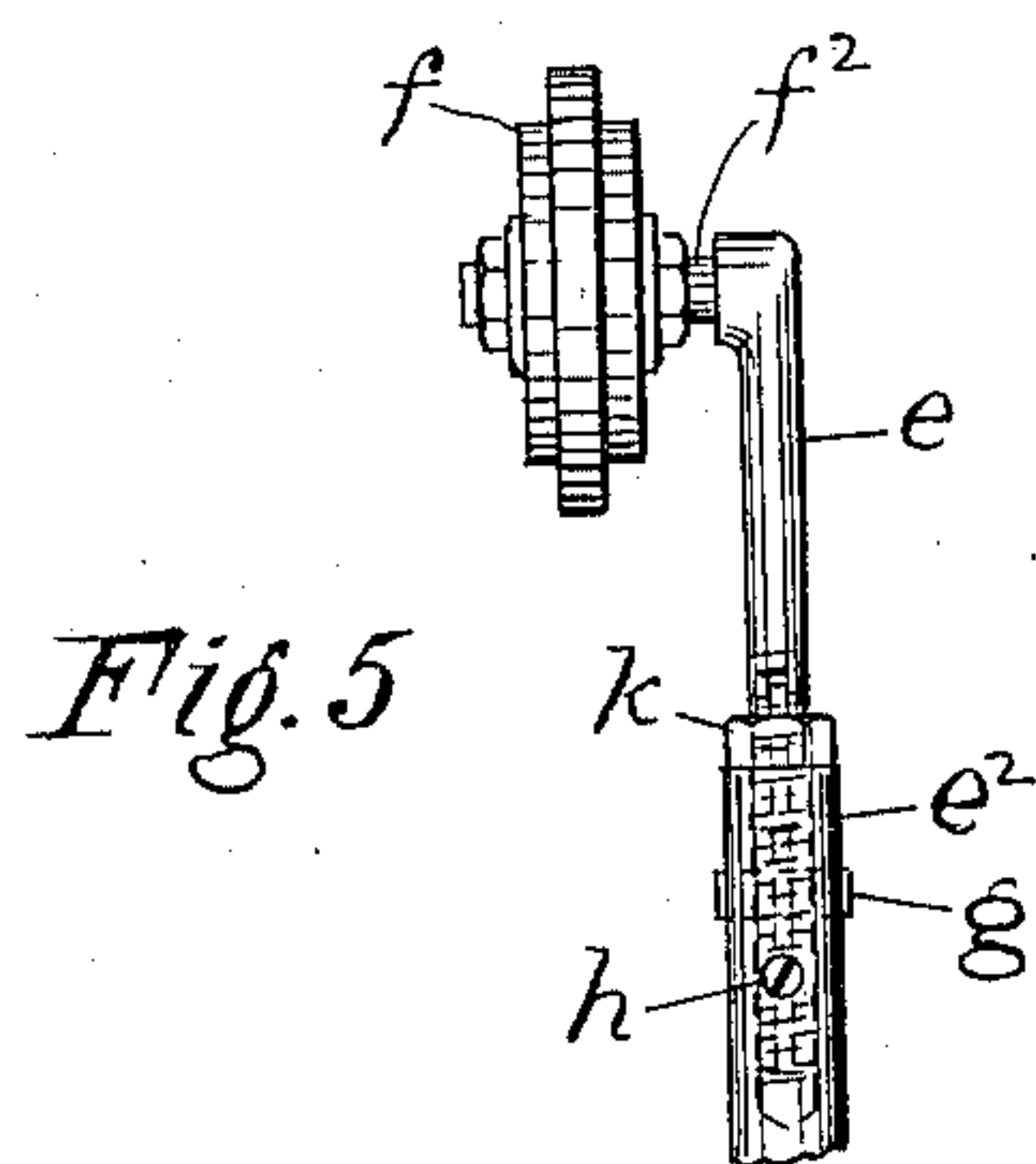
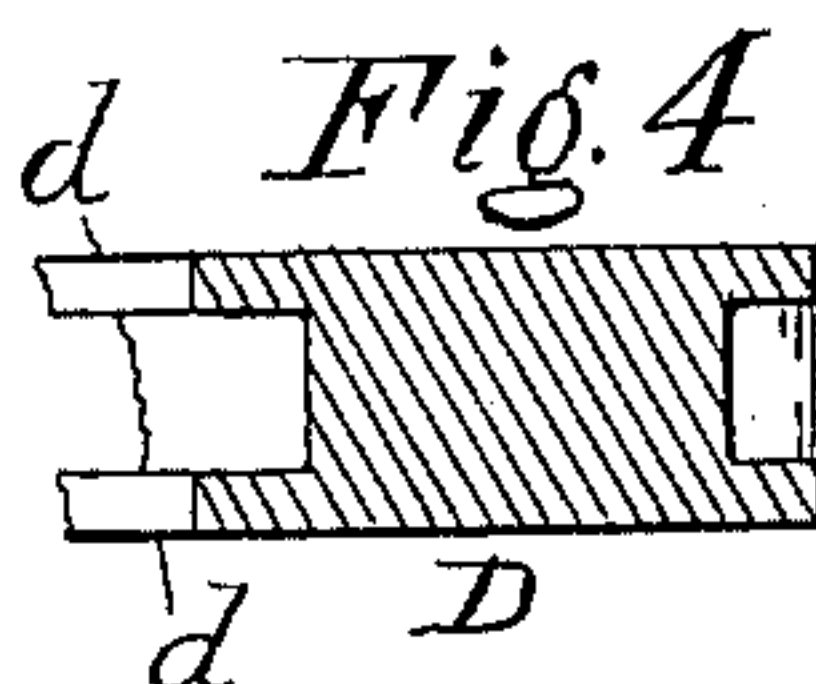
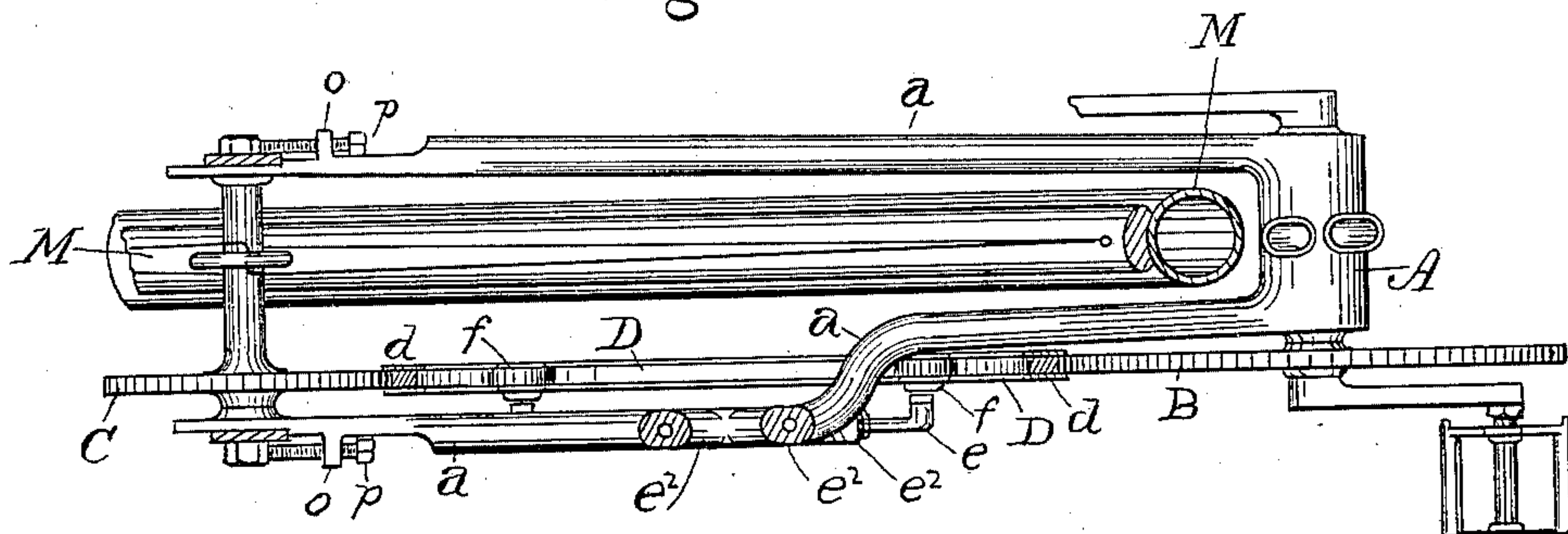


Fig. 6a

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UNITED STATES PATENT OFFICE.

FRIEDRICH WEBER, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO
WILLIAM CREEDMAN, OF SAME PLACE.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 656,311, dated August 21, 1900.

Application filed July 27, 1899. Serial No. 725,236. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH WEBER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Bicycles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in bicycles, its object being to provide a chainless wheel with changeable gear adjustably supported, so as to be also compensating for wear; and it consists in the novel arrangement, construction, and combination of parts, as hereinafter fully described, and set forth in the claims.

In the drawings, Figure 1 represents in side elevation my invention applied to an ordinary "safety-bicycle," so much only of the frame being shown as is required to illustrate the invention. Fig. 2 is a side elevation of the adjustable bearing for the intermediate gear on a larger scale than Fig. 1. Fig. 3 is a partial horizontal section on the line xx of Fig. 1, showing the construction of the rear fork and the arrangement of the gear and fork. Fig. 4 is a sectional detail of the intermediate gear D. Figs. 5 and 5^a are detached details of one of the rollers f , arm e , and sleeve e^2 . Figs. 6 and 6^a are details of the adjusting mechanism of the rear wheel. Fig. 7 is a sectional detail of the arm e and sleeve e^2 , showing means for preventing the rotation of the arm in the sleeve.

In general terms, my invention consists in providing and substituting gear-wheels for the usual sprocket-wheels of a chain-operated bicycle and interposing between them an intermediate gear which meshes with both and is supported by adjustable bearings which may be adjusted to carry gears of different sizes, thus enabling the so-called "gear" (or ratio of speed) to be changed, and also enabling all wear of the gears to be compensated, and at the same time keeping the intermediate gear so far above the ground as to obviate all danger of its striking obstructions.

Referring to the drawings, A represents a

portion of the frame of a common safety type of bicycle, and M its rear wheel.

B represents a gear-wheel on the crank-shaft operated by the pedals and occupying the place of the usual sprocket-wheel on the main shaft of a chain-wheel.

C represents a gear on the axle of the rear wheel M in the place of the usual rear sprocket-wheel.

D represents an intermediate gear meshing with both the wheels B and C and supported on an adjustable bearing E, comprising a number of rollers f , carried by arms e , which are adjustably supported in sleeves e^2 , integral with or affixed to one of the rear forks a of the frame A. Preferably the intermediate gear D is in the form of a ring-gear, as shown, and has its teeth sunk between the flanges d d , (see Fig. 4,) or the flanges may be separately formed and secured to the gear. The rollers f are shouldered on their periphery, as best seen in Fig. 5, and engage the inner edge of the ring-gear, as shown in Fig. 2, or the roller may be grooved and fit upon the gear. Being thus enmeshed with the gears B and C and with the rollers f by the flanges shown, the gear D is prevented from lateral motion and rolls smoothly and easily on its supporting-rollers f f f . The rollers f are journaled with ball-bearings on axles f^2 , carried by the arms e , which arms are threaded and inserted into the sleeve e^2 , passing through nuts g , seated in the sleeves e^2 , after the manner common in monkey-wrenches, the arms e being prevented from turning in the sleeves e^2 by any of the common means used for such purposes—such, for instance, as forming a flat side or groove i on the bar e and inserting a pin or screw h through the sleeve e^2 , as shown in Fig. 5. A check-nut k on the bar e serves to clamp the same rigidly at the desired extension.

By means of the construction above described the intermediate gear D is readily removed and replaced by another of a different size, thus changing the gear of the wheel. The check-nuts being slackened, the arms e can by means of the nuts g be drawn into the sleeves e^2 . The wheel M, with gear C, is then removed, which allows the gear D to be slipped

off over the end of fork *a*, another gear D being then put in place and the wheel replaced. Its gear C, gear D, and gear B being properly put in mesh, the arms *e* are extended by means of nuts *g* until the rollers *f* properly engage gear D, when the wheel M is fastened in place, the check-nuts *k* are tightened, and the bicycle is ready for use. Although it is in general preferable to have the centers of all the gears in line, the center of the intermediate gear may be set somewhat out of line with the others, if desired, without any trouble from that tendency to lift or bind under strain or to be twisted by heavy strain or lateral pressure, which most intermediate gears are subject to. Obviously the flanges *d d* on gear D might be omitted and flanges on the gears B and C substituted, or with a sufficiently-rigid construction of the arms *e*, sleeves *e*², and rollers *f* the latter might be relied on in place of flanges on the gear to keep the gears in line; but the construction shown I regard as preferable. Also it is evident that the arms *e* might be tubular and sleeved upon solid arms in the place of the sleeves *e*², if preferred. The number of the arms *e* and rollers *f* may vary, as may also the manner of supporting the sleeves *e*², which may be supported on the frame in any preferred manner; but I prefer the arrangement

shown, as involving the least change from the ordinary form of frame.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a bicycle having an intermediate gear meshing with gears on the pedal-crank shaft and on the rear-wheel axle, the combination of a hollow-armed spider upon the rear fork, adjusting-nuts seated in the spider-arms, threaded supporting-arms seated in the spider-arms engaging the adjusting-nuts and having check-nuts thereon, flanged rollers supported on the ends of said supporting-arms and engaging the inner periphery of the intermediate gear, whereby the latter is adjusted, laterally supported and kept in alignment, and can be interchangeably replaced by gears of different diameters, substantially as described.

2. The combination of the bent fork *a*, the spider E, arms *e*², arms *e*, nuts *g* and *k*, rollers *f*, and gear D, in combination with the gears B and C of a bicycle, substantially as described.

In testimony whereof I hereto affix my signature in presence of two witnesses.

FRIEDRICH WEBER.

Witnesses:

C. M. VORCE,

W. E. MORROW.