(No Model.) 2 Sheets—Sheet 1.

A. D. RUFF.

CYCLOMETER.

No. 543,269. Patented July 23, 1895.

Fig. 1

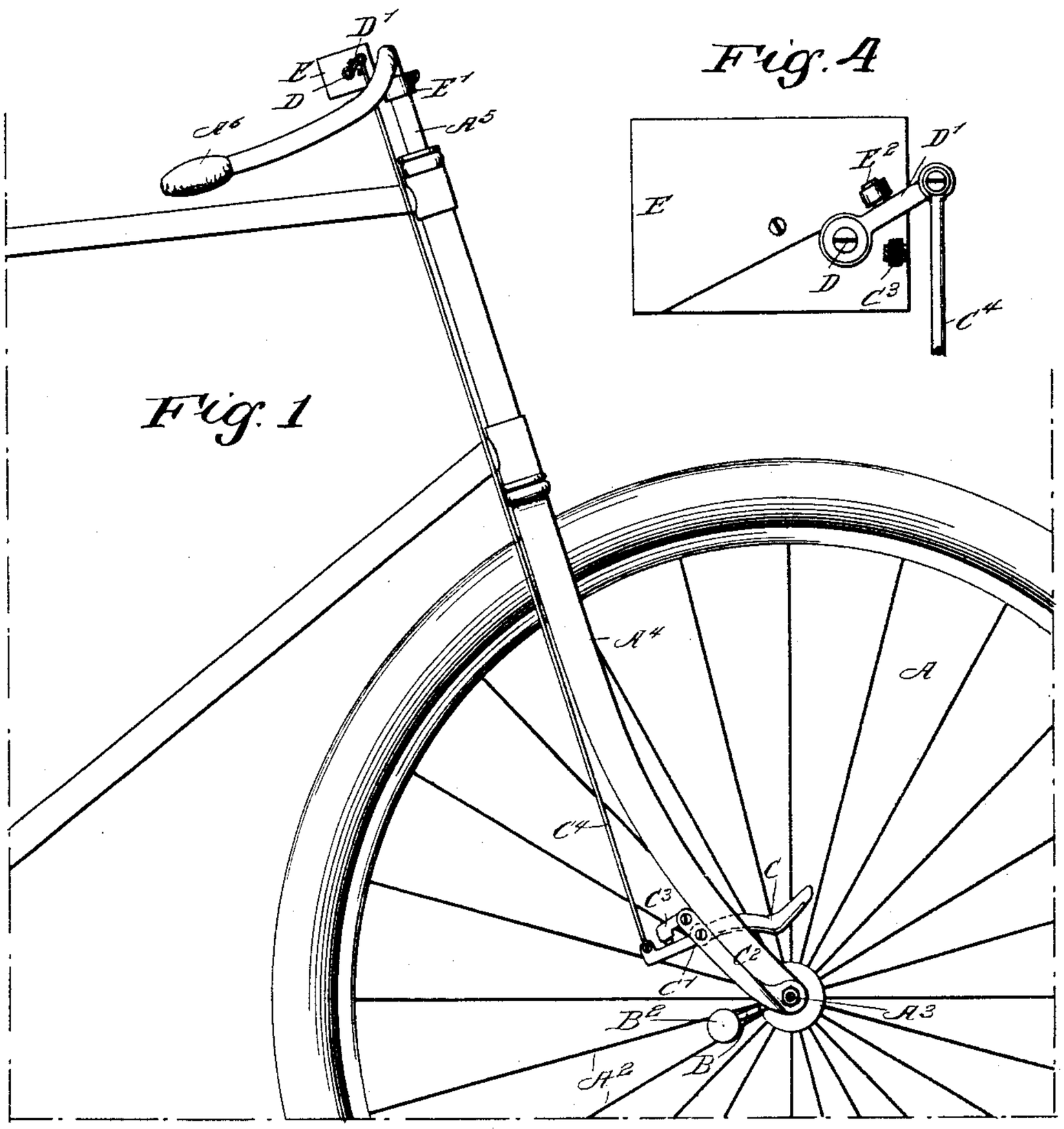


Fig. 4

Fig. 2

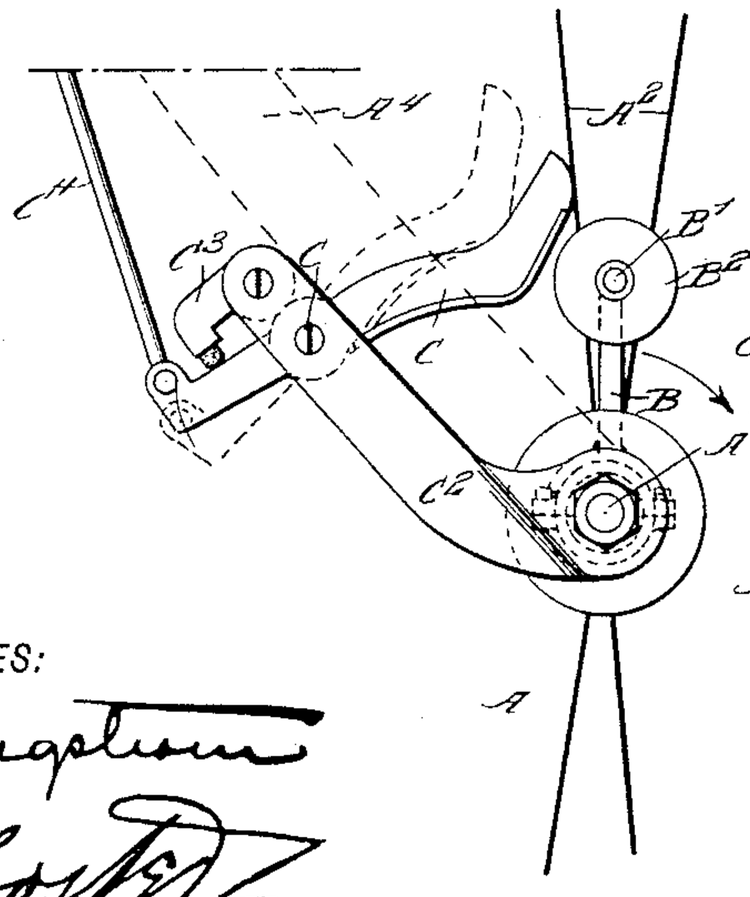
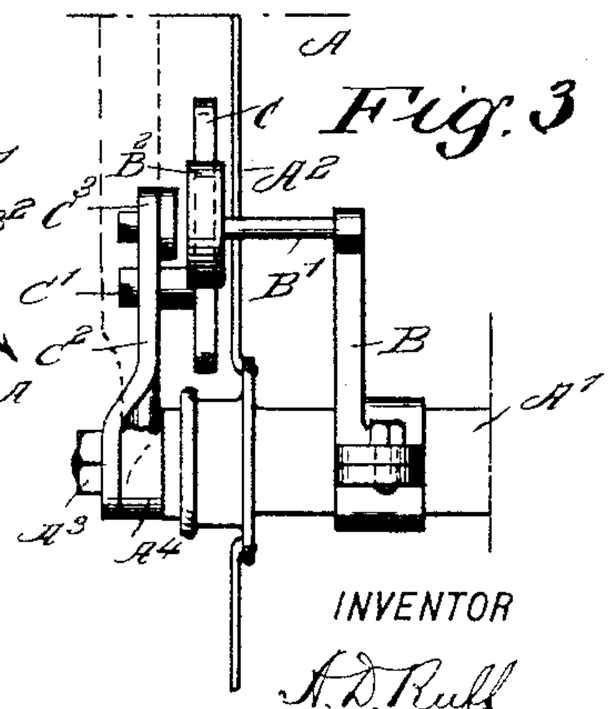


Fig. 3



WITNESSES:

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Theo. G. Hoostord

INVENTOR

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Munn & Co

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

A. D. RUFF.

CYCLOMETER.

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Patented July 23, 1895.

Fig. 10

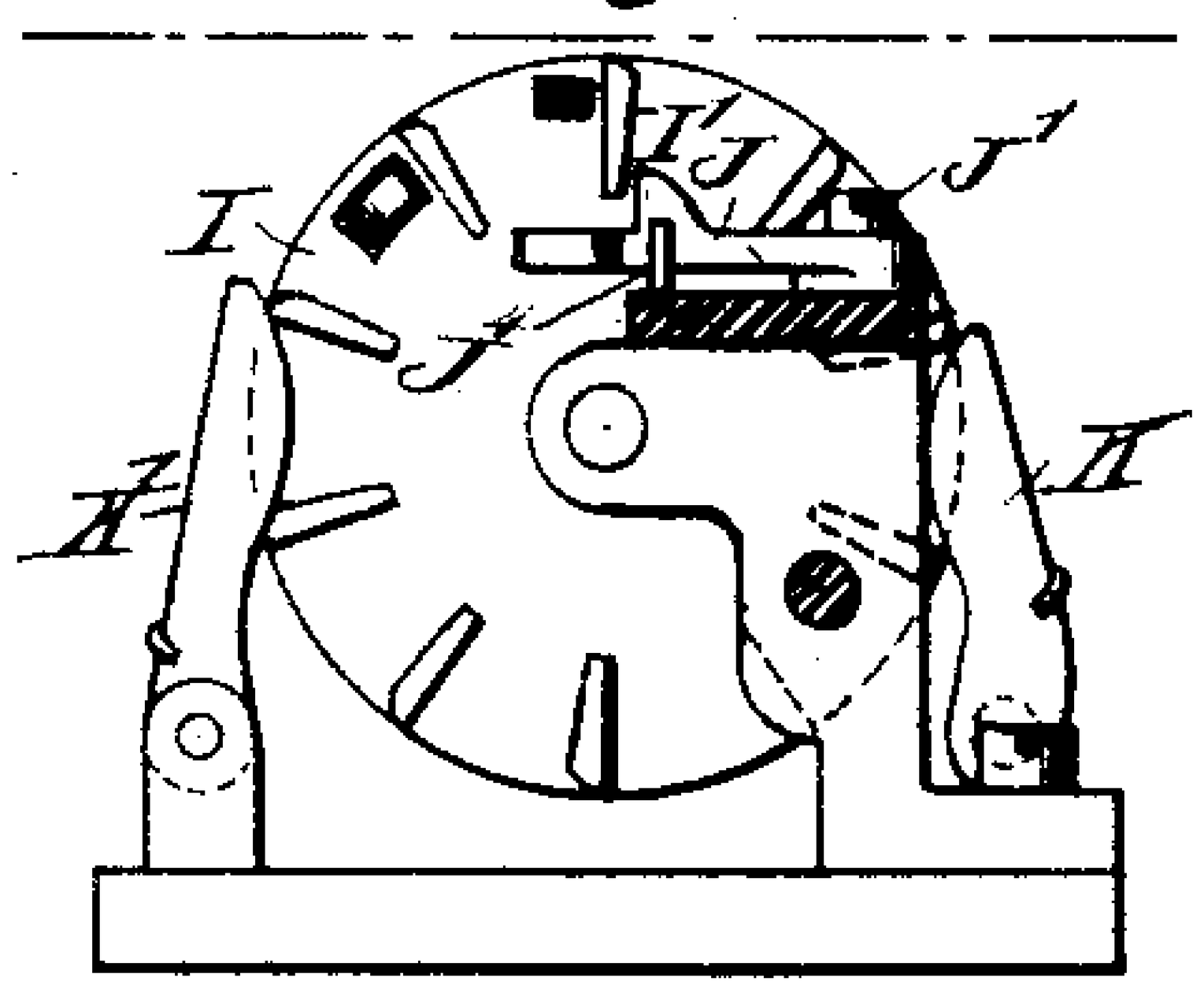


Fig. 5

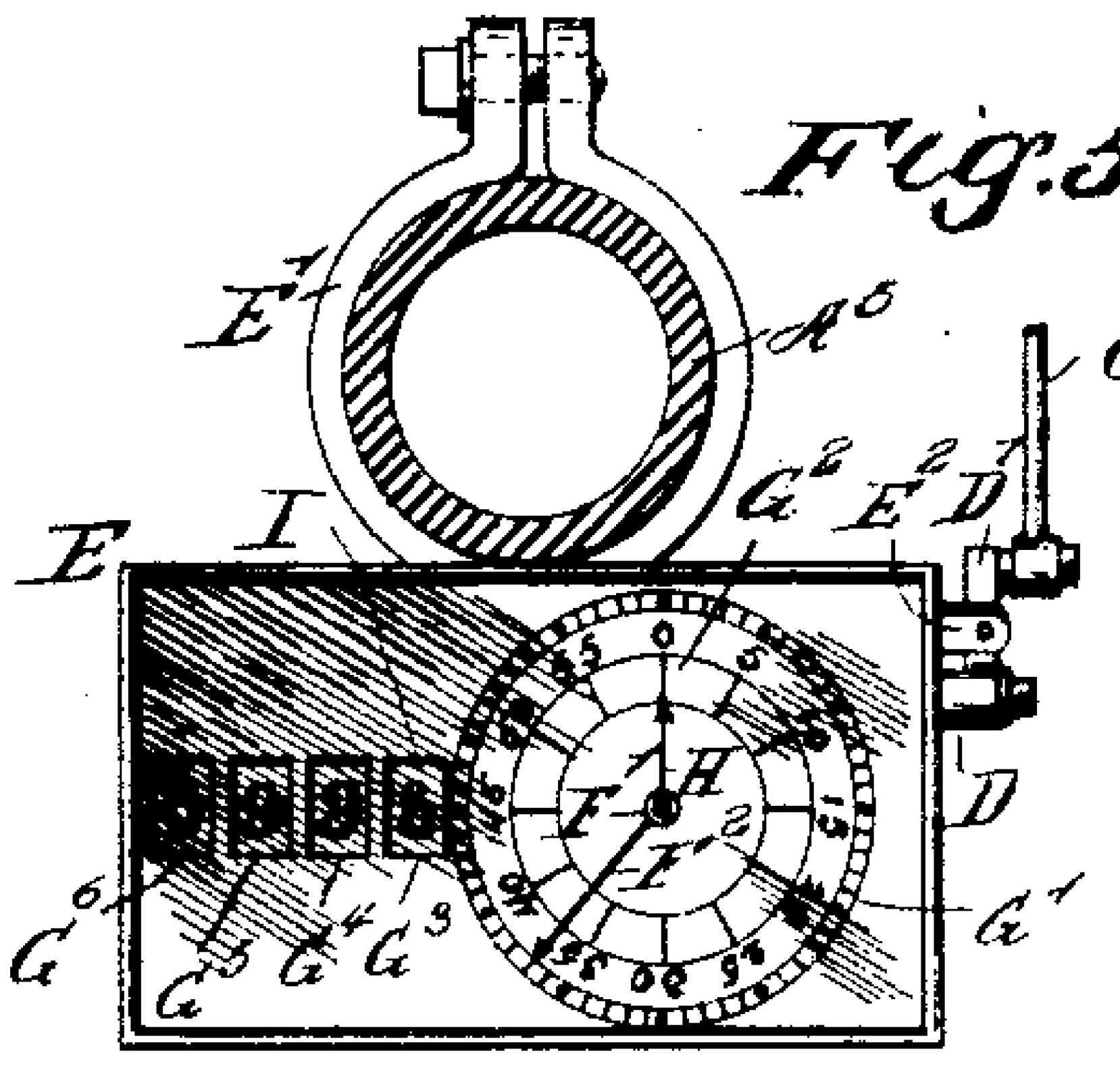
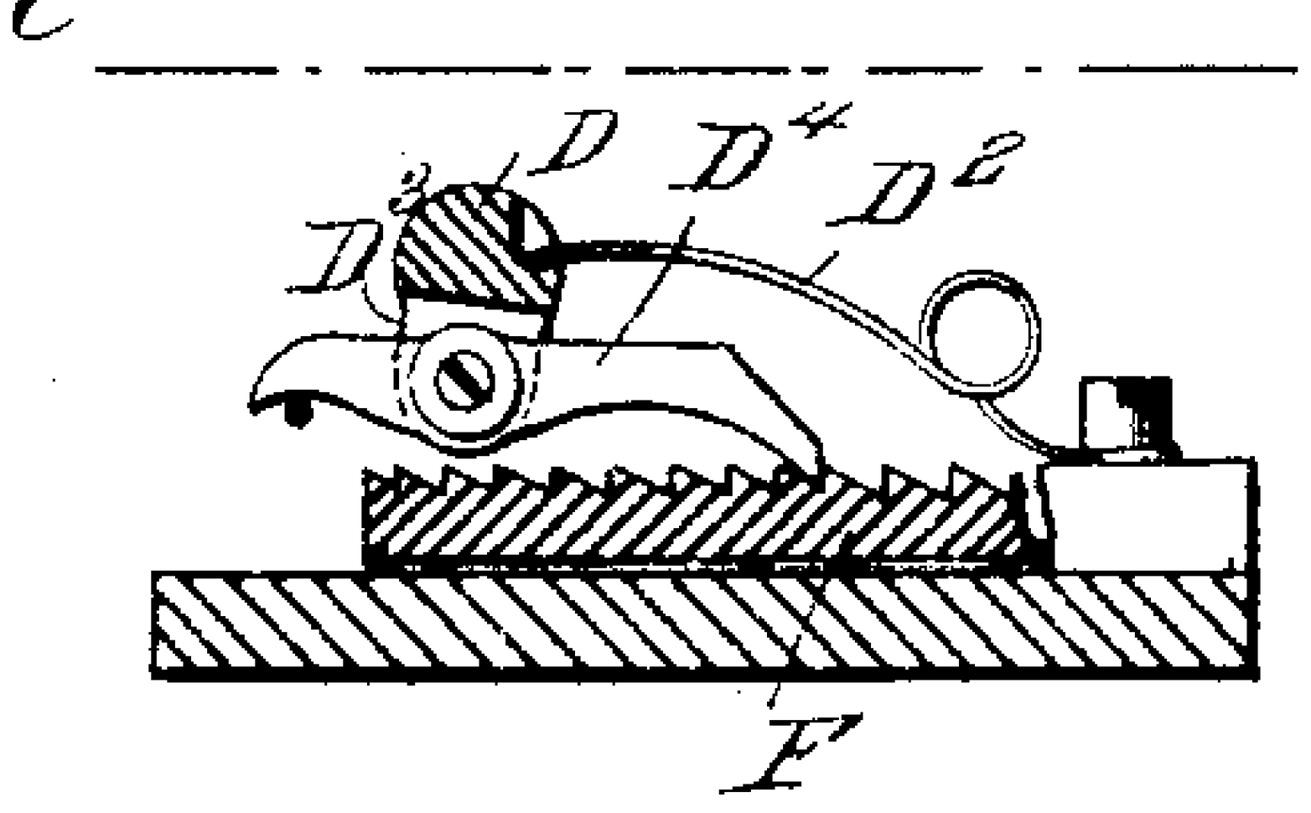
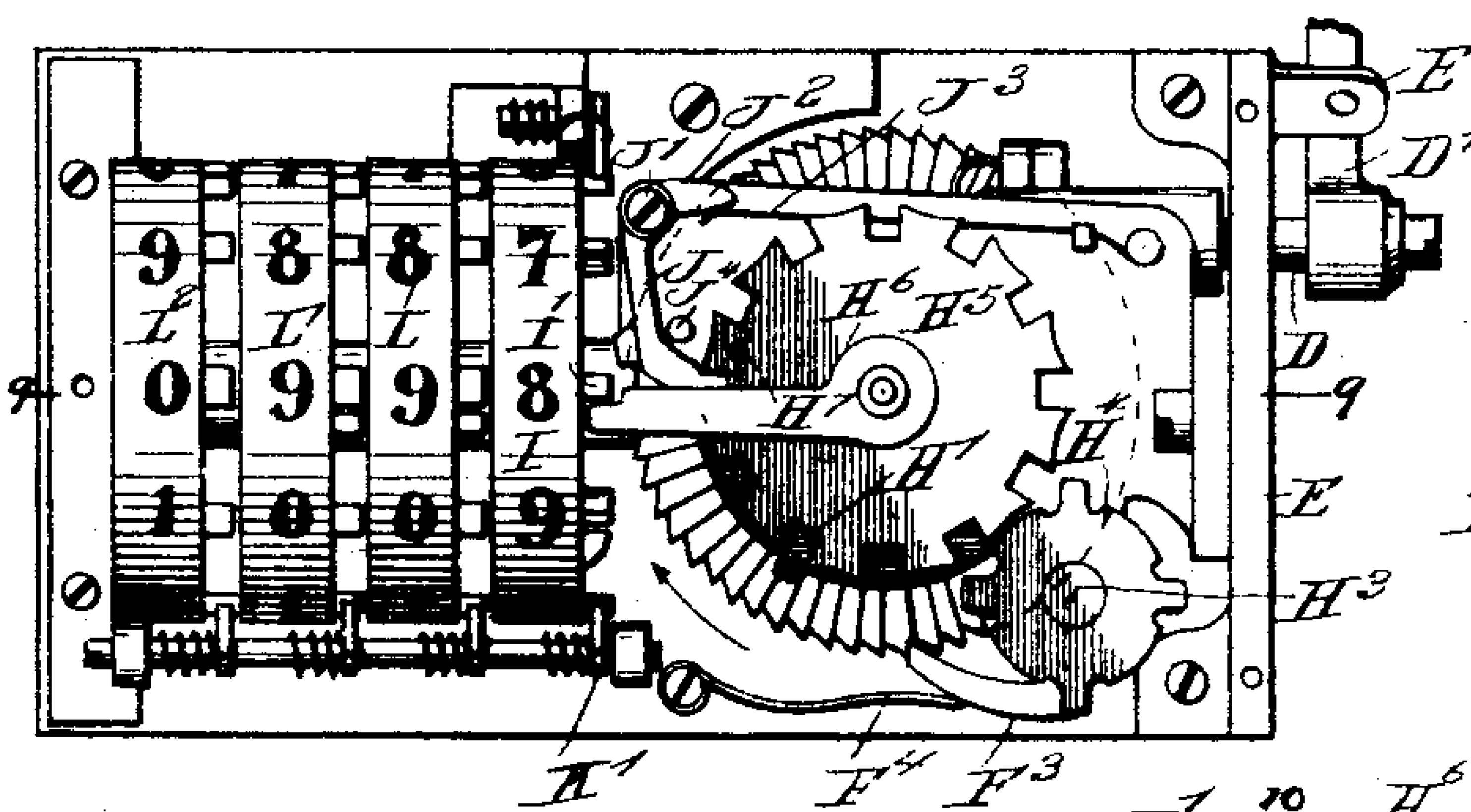


Fig. 11





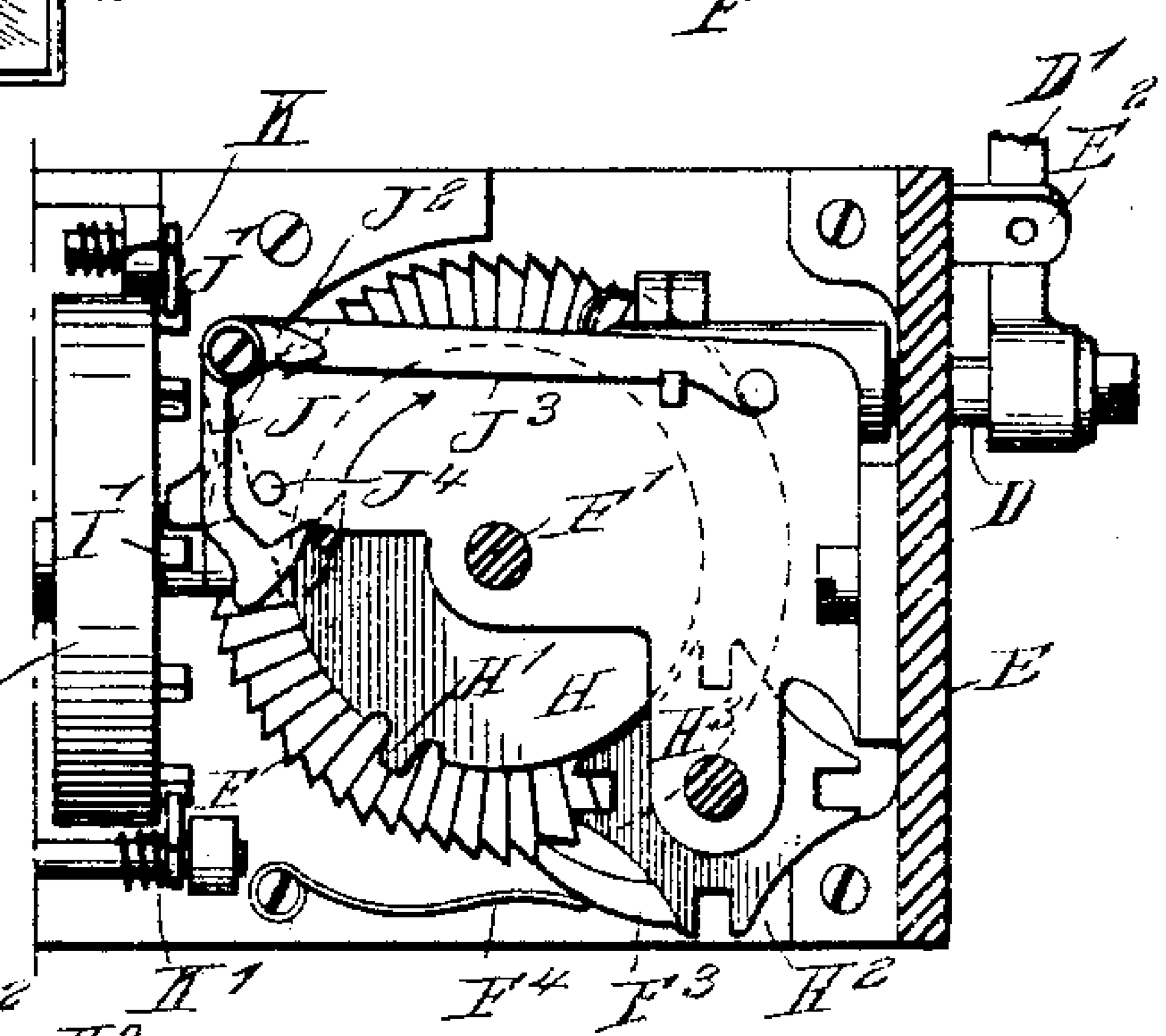


Fig. 6

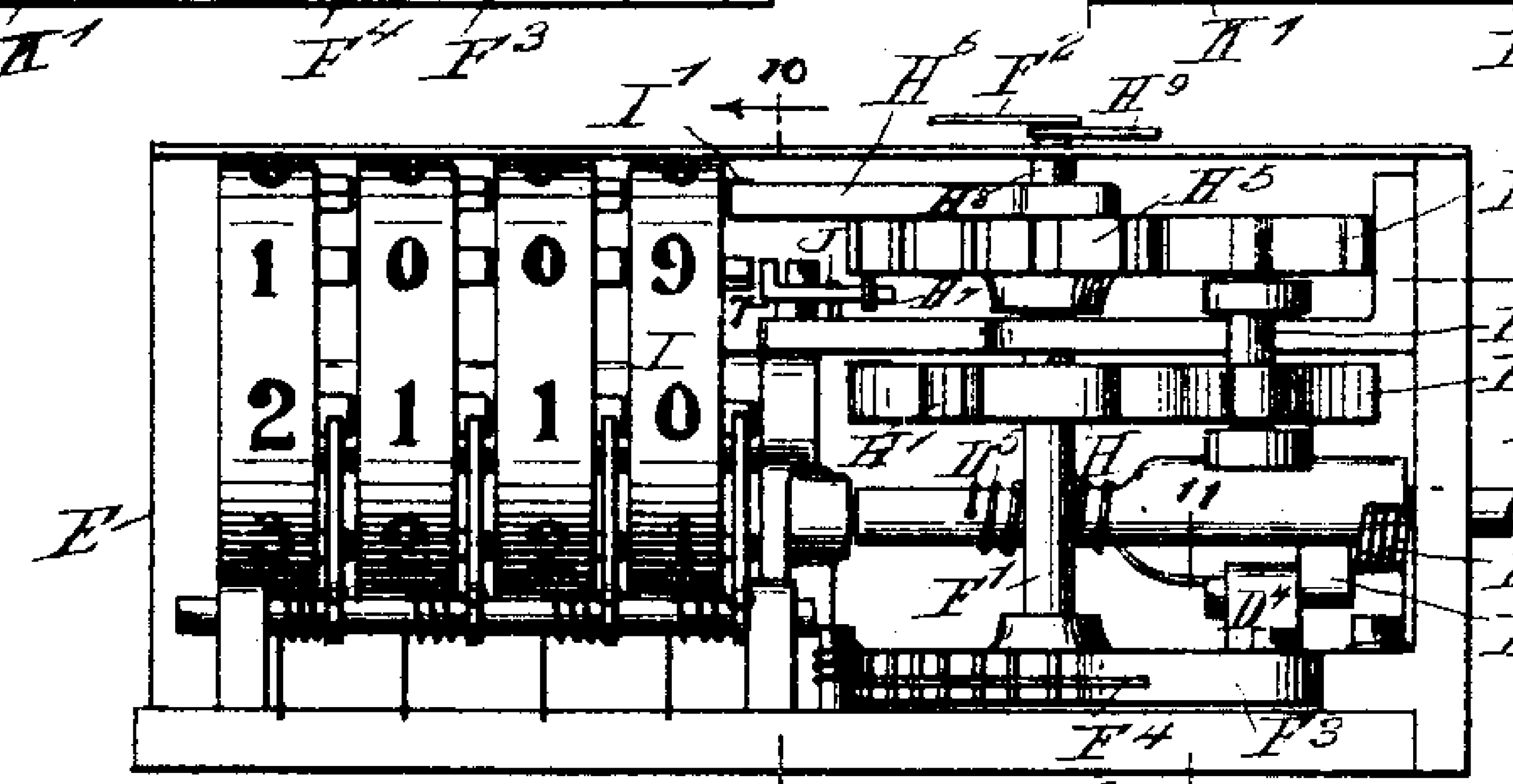


Fig. 7

Fig. 8

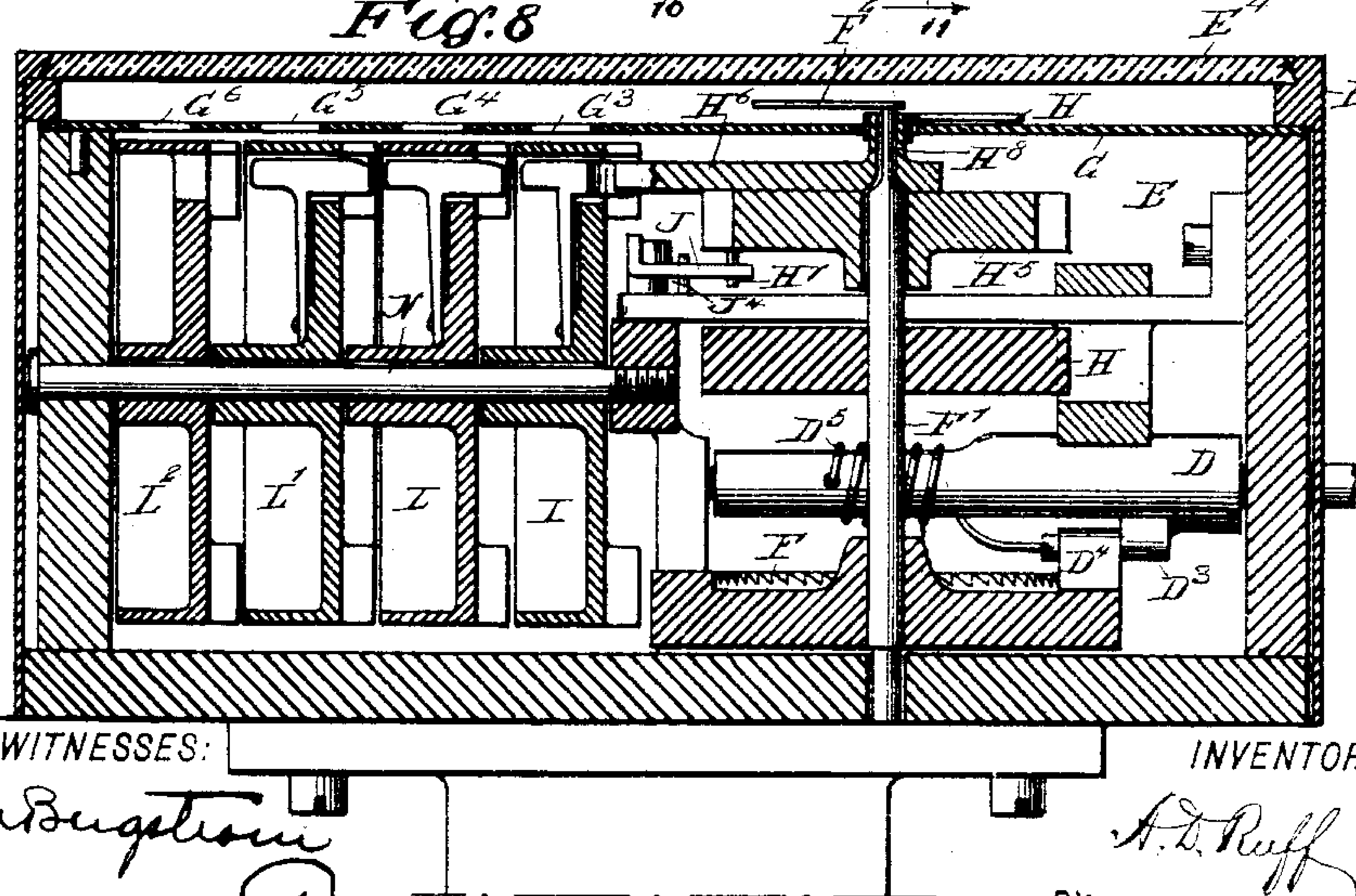


Fig. 9

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UNITED STATES PATENT OFFICE.

ALEXANDER D. RUFF, OF OWINGSVILLE, KENTUCKY.

CYCLOMETER.

SPECIFICATION forming part of Letters Patent No. 543,269, dated July 23, 1895.

Application filed October 5, 1894. Serial No. 524,950. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER D. RUFF, of Owingsville, in the county of Bath and State of Kentucky, have invented a new and Improved Cyclometer, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved cyclometer, which is comparatively simple and durable in construction, not liable to get out of order, and more especially designed for use on bicycles and similar machines to accurately indicate the distance traveled in miles and minute fractions thereof.

The invention consists, principally, of an operating crank-shaft for the hands and numbering-wheels, the said crank-shaft being connected by a rod with a lever fulcrumed at the front wheel, and a clamp-arm attached to the hub of the bicycle-wheel and carrying a friction-roller to engage the said lever.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement as applied on a bicycle. Fig. 2 is an enlarged side elevation of the actuating-gear. Fig. 3 is an end elevation of the same. Fig. 4 is an enlarged side elevation of the casing. Fig. 5 is a plan view of the same with the handle-post in section. Fig. 6 is an enlarged plan view of the same with the outer casing entirely removed. Fig. 7 is a sectional plan view of part of the same on the line 7 7 of Fig. 8. Fig. 8 is an end elevation of the same. Fig. 9 is an enlarged cross-section of the same on the line 9 9 of Fig. 6. Fig. 10 is a sectional side elevation of the same on the line 10 10 of Fig. 8, and Fig. 11 is a similar view of part of the same on the line 11 11 of Fig. 8.

On the hub A′ of the front wheel A of the bicycle is clamped an arm B, provided with a transversely-extending pin B′, passing between two adjacent spokes A^2 to the outside thereof, as is plainly indicated in Fig. 3, the said pin carrying on its outer end a friction-wheel B^2, preferably made of rubber or similar material, and adapted to engage and actuate the curved end of the lever C, fulcrumed at C′, on a small auxiliary frame C^2, having one end hung on the axle A^3 of the front wheel A and having its other end supported in the fork A^4 for the said front wheel.

On the frame A^2 is arranged a stop C^3 for limiting the swinging motion of the lever C, it being understood that on each revolution of the front wheel A the said friction-roller B engages the lever C and imparts a swinging motion thereto to actuate the cyclometer in the manner hereinafter more fully described.

The lever C is pivotally connected on the end opposite the curved end engaged by the friction-roller B^2 with a rod C^4, extending upwardly and pivotally connected with a crank-arm D′ secured on the outer end of the shaft D, extending transversely and mounted to turn in suitable bearings in the framework of the casing E, provided with a clamp E′ for fastening the said casing to the post A^5 of the handle-bar A^6, forming part of the front fork.

The crank-arm D′ has a limited swinging motion in both directions between the stop-pins E^2 E^3, preferably covered on their opposite faces with felt or other similar material, so as to deaden the sound of the crank-arm coming in contact with the said stop-pins E^2 and E^3. The shaft D is pressed on within the casing E by a spring D^2, so as to hold the crank-arm D′ normally in contact with the upper stop-pin E^2, as illustrated in Fig. 4, and in a like manner hold the lever C in contact with the stop-pin C^3 on the under side of the shaft D, and within the casing is formed a crank-arm D^3 on which is fulcrumed a pawl D^4, pressed on at its rear end by a spring D^5 secured on the shaft D. The free end of the said pawl engages a series of teeth formed on the upper flat face of a horizontally-disposed ratchet-wheel F, secured on the lower end of the shaft F′, extending vertically and journaled in suitable bearings in the casing E.

A dog F^3 pivoted in the casing and provided with a spring F^4 is adapted to engage a second series of teeth formed around the periphery of the ratchet-wheel F, as clearly seen in Figs.

6, 7, and 8, whereby backward or excessive forward movement of the said wheel is prevented.

On the shaft F′, a short distance above the ratchet-wheel F, is mounted a wheel H, having a single tooth H′ projecting from its periphery and adapted to mesh with the teeth of a star-wheel H^2, secured on a short shaft or spindle H^3, journaled in the casing E parallel to shaft F′, whereby a partial rotatory movement is imparted to said star-wheel once during each rotation of wheel F. A pinion H^4 is secured on shaft H^3 above the star-wheel H^2, and both the pinion H^4 and said star-wheel H^2 are provided with four teeth. The pinion H^4 gears with a wheel H^5, loosely mounted on shaft F′ above wheel H, and provided with twelve teeth, whereby it will be seen that said wheel H^5 is actuated and moved to the extent of one-twelfth of a rotation once during each complete rotation of wheel F. The wheel H^5 has secured to its upper face an arm or finger H^6, the end of which projects laterally beyond the periphery of said wheel for purposes to be hereinafter set forth, and said arm has a central boss H^8, having a bore of less diameter than the bore of wheel H^5, in order to fit the reduced upper end *f* of the shaft F′, whereby the said wheel is supported on said shaft.

The top of casing E is covered, as seen in the drawings, by a dial-plate G, having a glass cover E^4, and at one side of the said plate is formed a dial G′, similar to a clock-dial and having sixty graduations, over which plays a hand or index F^2, secured to the upper end of the shaft F′, each graduation corresponding to the one seven-hundred-and-twentieth part of a mile. This index F^2 moves at each rotation of the bicycle-wheel or operation of the rock-lever D and makes one complete rotation of the dial in sixty rotations of the bicycle-wheel, which corresponds to one-twelfth of a mile. A similar index H^9 is secured to the upper end of sleeve H^8 and plays over a series of twelve graduations G^2 inside the series G′ and corresponding to twelfths of a mile.

N indicates a shaft or bearing-stud having its outer end mounted in the end wall of the casing E and its inner end threaded to engage a threaded socket in the support for the inner end of shaft D, which extends parallel to the shaft or stud N, as seen in Fig. 8. A series of indicating-disks or crown-wheels I I′ I^2 I^3 are rotatively mounted on the bearing-stud N, each disk being numbered from 0 to 9 about its periphery and being arranged under an aperture (said apertures being lettered, respectively, G^3, G^4, G^5, and G^6 in Fig. 5) in the dial-plate G, whereat said numbers appear successively when the disks are rotated.

Each of the disks or crown-wheels is provided on one side with a series of ten teeth $I^\times$, between which engage the rounded faces of spring-pawls K′, suitably located in the casing, as seen in Figs. 6, 8, and 10, whereby the disks are held against accidental rotation, and each disk is provided with a hollow *i* on that side opposite to the teeth $I^\times$, in which hollow is arranged a T-shaped dog or catch L, having an elastic stem *l*, secured to the web of the disk near the boss thereof. One arm or branch *l′* of the head of this dog L projects through an aperture formed through the web of the disk and beyond the opposite side of the disk, as indicated at *x* in Fig. 6, being arranged between two of the teeth $I^\times$ thereof, and the other arm l^2 is arranged opposite to the teeth $I^\times$ on the next adjacent wheel, but is normally held within the hollow *i* out of engagement with said teeth $I^\times$ by the elasticity of the stem *l*.

As seen in the accompanying drawings, there are four indicating-disks, and three of these disks only are provided with the dogs L, for it is evident that no device of this character is needed on the thousands-disk.

The extremity of the branch *l′* of the dog L on disk I, which is the units-disk, is rounded, as indicated at *x* in Figs. 6 and 9, and is arranged in position to be engaged by the extremity of the arm H^6, before referred to, mounted on the wheel H^5, loose on the shaft F′, whereby as said arm H^6 turns, as indicated by the arrow at *y* in Fig. 6, said projecting end *l′* of dog L will be pushed over toward the left into position to engage the teeth of the next adjacent or tens-indicating disk I′, whereby the two disks I and I′ are locked together temporarily and caused to each move one-tenth of a rotation by the further movement of arm H^6. In order that this locking may be accomplished it is necessary that some positive means be provided for preventing rotation of disk I until the dog L has been pushed over to lock-disks I and I′ together, and for this purpose a detent J is provided, pivoted at J′, inside casing E with a nose $J^\times$, adapted to successively engage the rear faces of the teeth $I^\times$ of crown wheel or disk I, said detent being provided with a tail J^2, engaged by a spring J^3, whereby the nose $J^\times$ is normally held out of engagement with the teeth of crown-wheel I, as seen in Fig. 6. A pin H^7, carried on the under side of disk H^5, is adapted to engage the beveled end of said detent J and force the nose $J^\times$ thereof into position, as seen in Fig. 7, behind the adjacent tooth of wheel I, and this is effected once at each rotation of wheel H^5.

The pin H^7 is arranged in such a position that it acts on the detent J slightly in advance of the action of arm H^6 with the dog L, whereby the disk I is held against rotation until said dog is pushed over to lock the units and tens disks together. When this locking has been effected and the arm H^6 passed on and engaged the tooth of the disk I, while still holding disks I and I′ locked together, the pin H^7 will slip past the detent J and the spring J^3 will withdraw the nose $J^\times$ thereof out of engagement with the tooth $I^\times$ of disk I, whereby the disk will be free to rotate.

It will be readily understood that but one

dog L is provided on each disk I, I′, and I², and the dog L on disk I′ is adapted to be pushed over to the position seen in dotted lines in Fig. 9 by the engagement of the dog L of disk I therewith, whereby the three disks I I′ I² are locked together at the proper time. In like manner the dog L of disk I² is engaged when the disks are in proper position, by the dog L of disk I′, when said dog is pushed over, whereby all four disks are locked and caused to turn one-tenth of a rotation in unison.

It is understood that when the units-disk I has completed one rotation the arm H⁶ locks the tens-wheel I′ to the units-wheel, and then both are shifted to the next numeral, and when the tens-wheel has completed a full revolution it carries along the hundreds-wheel, and the latter, at each revolution, carries along the thousands-wheel, so that the full number of miles and subdivisions thereof are read on the dial-plate, the full miles by the numerals on the numbering-wheels, the one-twelfth mile by the hand H⁹, and the one seven-hundred-and-twentieth mile by the hand F².

The teeth of the ratchet-wheel F correspond to the individual graduations in the graduation G′—that is, to sixty, whereby each movement of the pawl shifts the ratchet-wheel F the distance between two teeth, so that the hand F² moves from one mark to the next succeeding one on the graduation G′.

Now, when the front wheel A of the bicycle is rotated, then every revolution of the said wheel causes the friction-roller B² to actuate the lever C, and the latter, by swinging downward at its rear end, exerts a pull on the rod C⁴, thus pulling the crank-arm D′ downward against the stop-pin D³. This downward movement of the crank-arm D′ causes a turning of the shaft D in the direction of the arrow *a′*, (see Fig 11,) whereby the pawl D⁴ acts on the engaged tooth of the ratchet-wheel F, so as to turn the latter and shift the hand F², as previously explained. As soon as the friction-roller B² has left the lever C, the latter, (the rod C⁴,) the crank-arm D′, the shaft D, and the pawl D⁴ are returned to their normal positions by the action of the spring D² on the shaft D. (See Fig. 11.) By this return movement the pawl D⁴ glides over the teeth of the ratchet-wheel F, as the latter is prevented from making a return movement by the pawl F³.

It will be seen that this device is comparatively simple, not liable to get out of order, and arranged to permit the rider on the bicycle to at all times read the exact distance traveled on the wheel.

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

1. A cyclometer attachment for bicycles and similar machines, provided with an actuating gear comprising a clamping arm adapted to be fulcrumed on the hub of the front wheel of the machine, a pin extending from the said clamping arm between adjacent spokes of said wheel, a friction roller carried at the outer end of the said pin, and a lever having a curved end adapted to be engaged by the said friction roller, as the latter is carried around by the said front wheel, substantially as shown and described.

2. In a cyclometer or the like the combination of a rotatively mounted "units" disk, a rotatively mounted "tens" disk, means for driving the "units" disk, means for locking the "tens" disk to the "units" disk, and a stop-device for holding the "units" disk while said locking mechanism is being actuated, substantially as set forth.

3. In a cyclometer or the like the combination of a rotatively mounted "units" disk, a rotatively mounted "tens" disk, means for driving the "units" disk, means actuated by the driving mechanism of the "units" disk for locking the "tens" disk to the "units" disk, and a stop-device for holding the "units" disk while the locking mechanism is being actuated, substantially as set forth.

4. In a cyclometer or the like, the combination of a casing, a shaft rotatively mounted therein, a "units" indicating disk, means for driving the same from said shaft, a "tens" indicating disk, a locking device for locking said "tens" indicating disk to the "units" indicating disk during one-tenth of a rotation and a stop device adapted to hold the "units" indicating disk against rotation while said locking device is being operated, substantially as set forth.

5. In a cyclometer or the like, the combination of a casing, a shaft rotatively mounted therein, a "units" indicating disk, means for driving the same from said shaft, a "tens" indicating disk, a locking device arranged between said disks and provided with means for holding the same normally out of operation, and means actuated from said shaft for holding said "units" disk against rotation while said locking device is being operated, substantially as set forth.

6. In a cyclometer or the like, the combination of a casing, a shaft mounted therein, a "units" crown-wheel, a "tens" wheel a locking device for locking the two crown-wheels together during one-tenth of each rotation of "units" wheel and an arm on the shaft to engage the teeth of the "units" wheel, whereby the same is actuated, said arm being also adapted to actuate the said locking device, substantially as set forth.

7. In a cyclometer or the like, the combination of a casing, a shaft mounted therein, an arm on said shaft, a "units" wheel having its teeth adapted to be engaged by said arm, a "tens" wheel, a locking device adapted to be operated from said arm once during each rotation of the "units" wheel and adapted to lock "units" and "tens" wheels together and a stop device for holding the "units" wheel against rotation while the locking device is being operated, said stop device being pro-

vided with means for holding it normally out of operation, substantially as set forth.

8. In a cyclometer or the like, the combination of a casing, a shaft mounted therein, an arm on said shaft, a "units" crown-wheel having its teeth adapted to be engaged by said arm, a "tens" crown-wheel, a movable dog having one end arranged in the path of said arm and its other end adapted, when moved to engage the teeth of the "tens" crown-wheel, whereby the same is locked to the "units" wheel, and means for holding said dog normally out of its locking position and in position to be engaged by said arm, substantially as set forth.

9. In a cyclometer or the like, the combination of a casing, a shaft mounted therein, an arm mounted on said shaft, a "units" crown-wheel having its teeth adapted to be engaged by said arm, a "tens" wheel, a movable dog having one end arranged in the path of said arm and its other end adapted, when moved, to engage the "tens" wheel, means for moving said dog whereby said wheels are locked together, and means for holding the "units" wheel against rotation during the movement of said dog, substantially as set forth.

10. In a cyclometer or the like, the combination of a casing, a shaft mounted therein, an arm mounted on said shaft, a "units" crown-wheel having its teeth adapted to be engaged by said arm and provided with a perforation, a "tens" crown-wheel, a dog mounted movably on the "units" crown-wheel with one branch extending through the perforation therein and having its other branch adapted, when the dog is moved, to engage the teeth of the "tens" crown-wheel, whereby the two crown-wheels are locked together, means for moving said dog, means for holding the "units" wheel against rotation while the dog is being moved and means for holding said dog normally out of engagement with the teeth of the "tens" crown-wheel, substantially as set forth.

11. In a cyclometer or the like, the combination of a casing, a shaft mounted therein, an arm on the shaft, a "units" crown-wheel having its teeth adapted to be engaged by said arm and provided with a perforation, a "tens" crown-wheel and a dog having an elastic stem mounted on the "units" wheel with a T-shaped head, one branch of which is beveled and extends through the perforation in the "units" wheel between two teeth thereof and in position to be engaged and pressed in by the arm on the shaft when the same engages the adjacent teeth of the said "units" wheel, the other branch of said T-shaped head being adapted when the head is pressed in, to engage the teeth of the "tens" crown-wheel, whereby the "units" and "tens" wheels are locked together, substantially as set forth.

12. In a cyclometer or the like, the combination of a casing, a shaft mounted therein, a wheel on the shaft, an arm on the wheel, a pin on the wheel, a "units" crown-wheel arranged with its teeth in position to be engaged by said arm, a "tens" crown-wheel, a dog movably mounted on the "units" wheel with one branch in the path of said arm and adapted to be pressed back thereby and its other branch adapted when the dog is moved, to engage the teeth of the "tens" crown-wheel, whereby the two crown-wheels are locked together, a detent adapted to hold said "units" crown-wheel against rotation, when the arm engages the dog and means for withdrawing the detent when the dog has been moved, whereby rotation of the two disks is permitted, substantially as set forth.

13. In a cyclometer or the like, the combination of a shaft, means for rotating the same, an arm on the shaft a "units" crown-wheel having its teeth arranged to be engaged by the arm, and having a perforation located between two of its teeth, a dog mounted on the "units" wheel with one end extending through the perforation and beyond the face thereof whereon said teeth are formed and adapted to be engaged and moved by the arm on the shaft when the same engages the teeth of the "units" crown-wheel, and a "tens" wheel adapted to be engaged by said dog when moved whereby the "units" and "tens" wheels are locked together, substantially as set forth.

14. In a cyclometer or the like the combination of a rotatively mounted "units" disk, a rotatively mounted "tens" disk, means for locking the "tens" disk to the "units" disk and a stop-device actuated by the driving mechanism of the "units" disk for holding the "units" disk while the locking mechanism is being actuated, substantially as set forth.

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