

(No Model.)

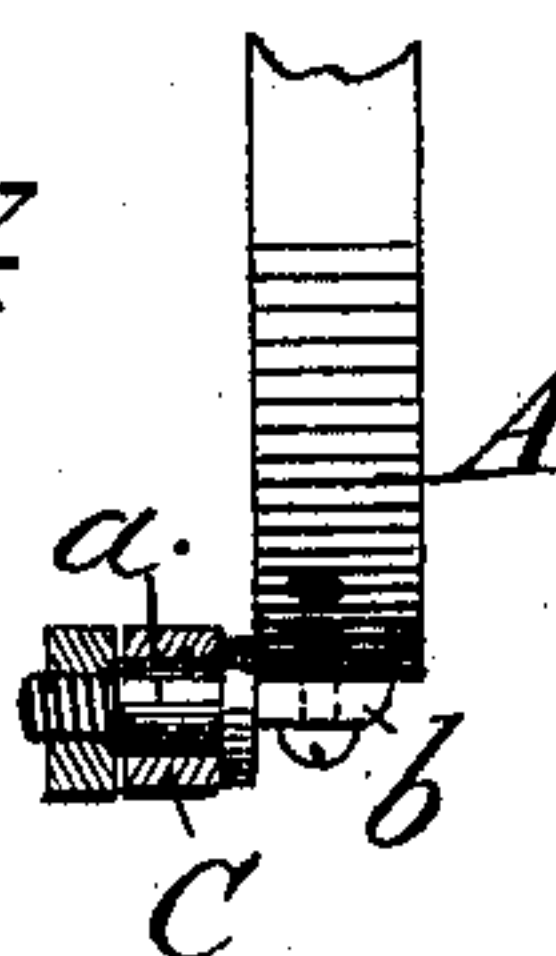
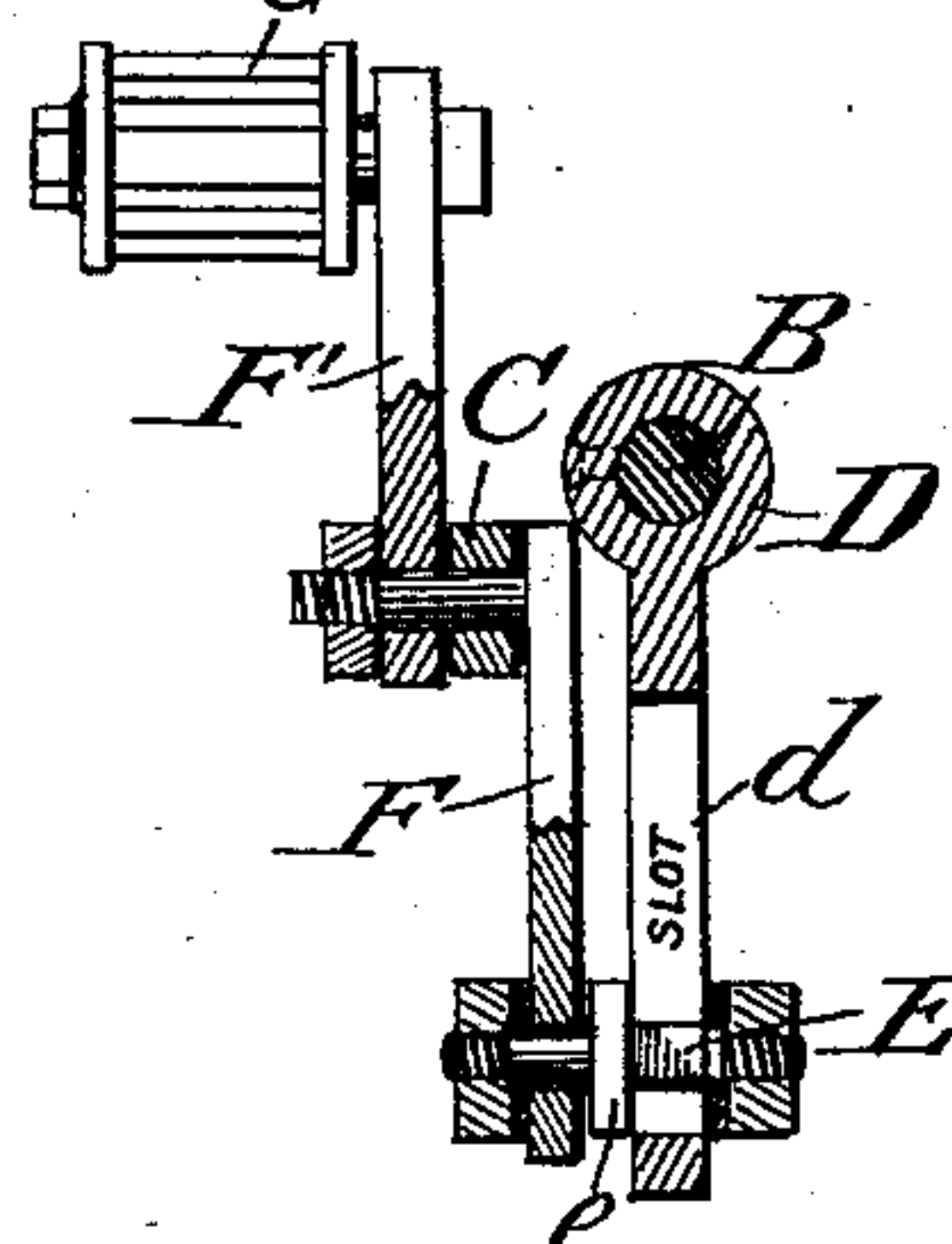
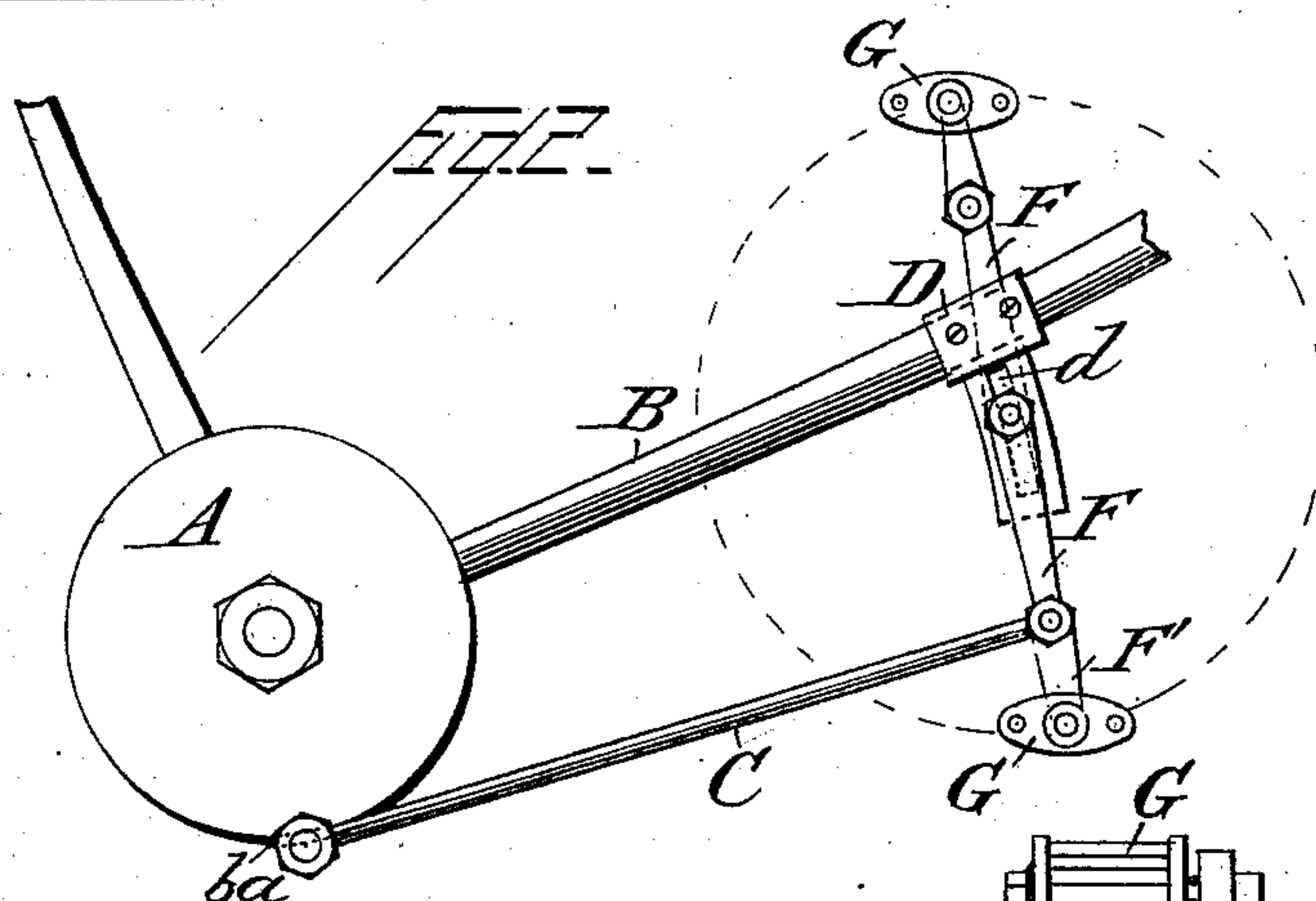
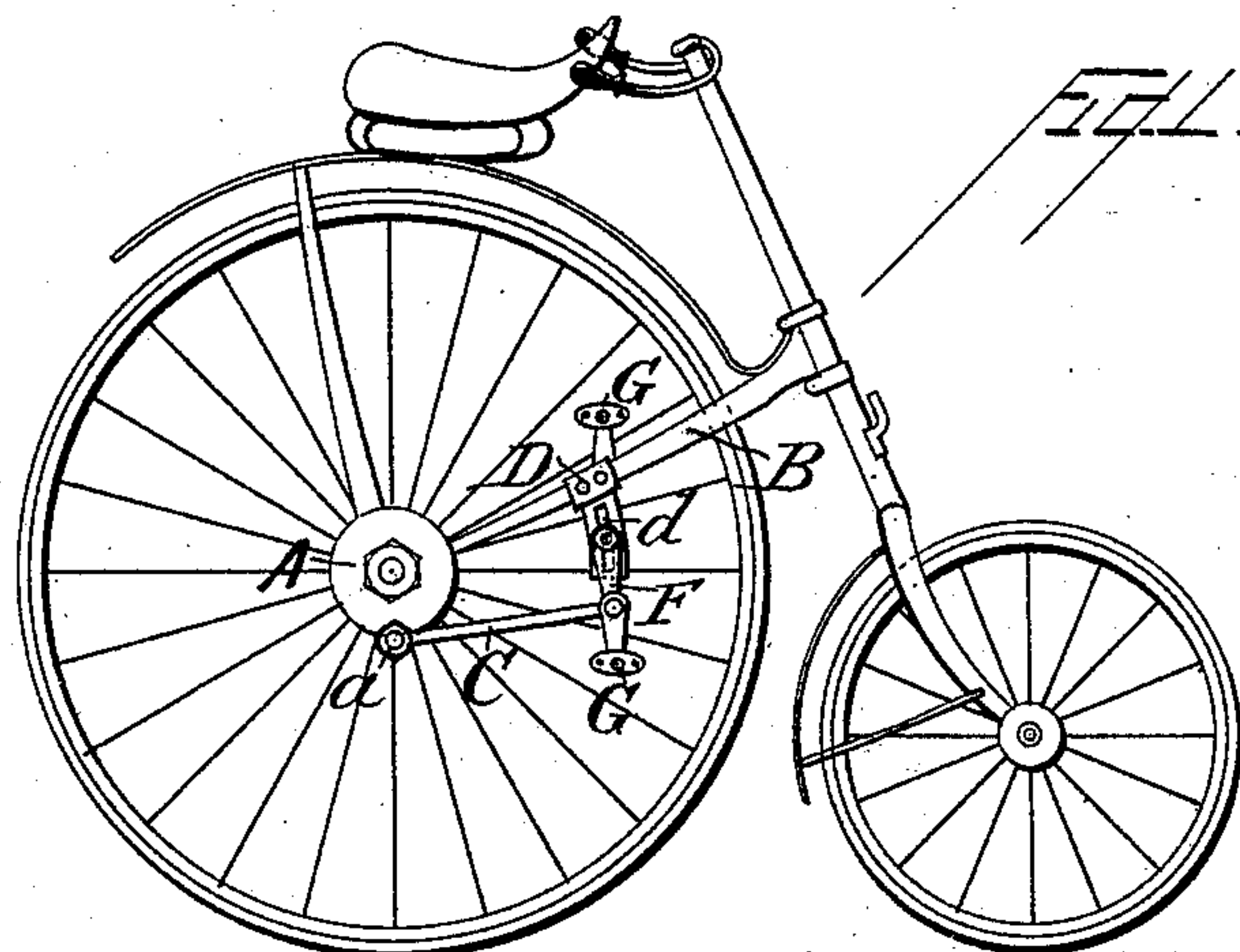
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G. KIBBE.

BICYCLE.

No. 393,837.

Patented Dec. 4, 1888.



Witnesses.

H. H. Schott.

Fred E. Tasker.

Inventor,

George Kibbe.

By *his* Attorney *John C. Parker.*

(No Model.)

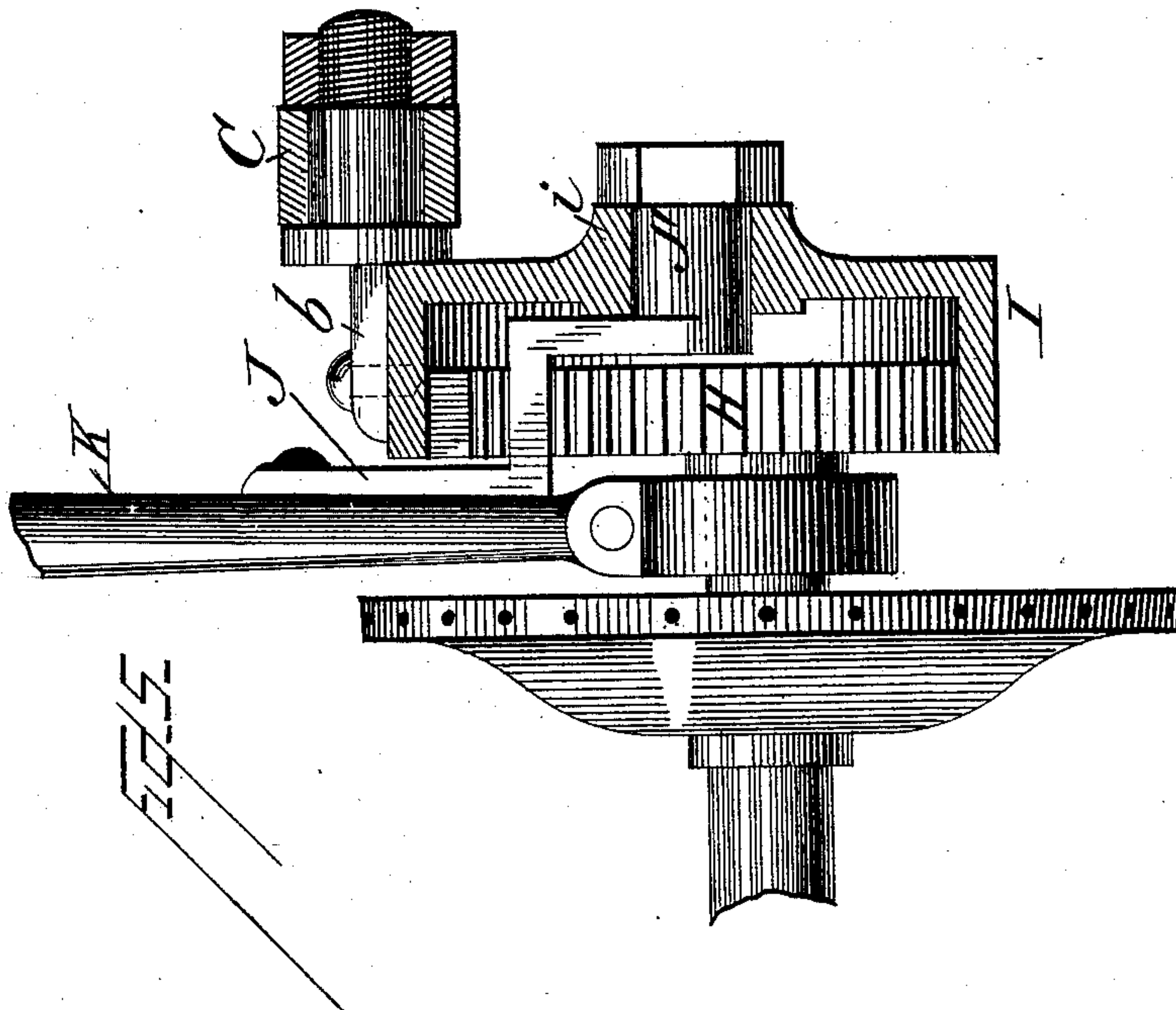
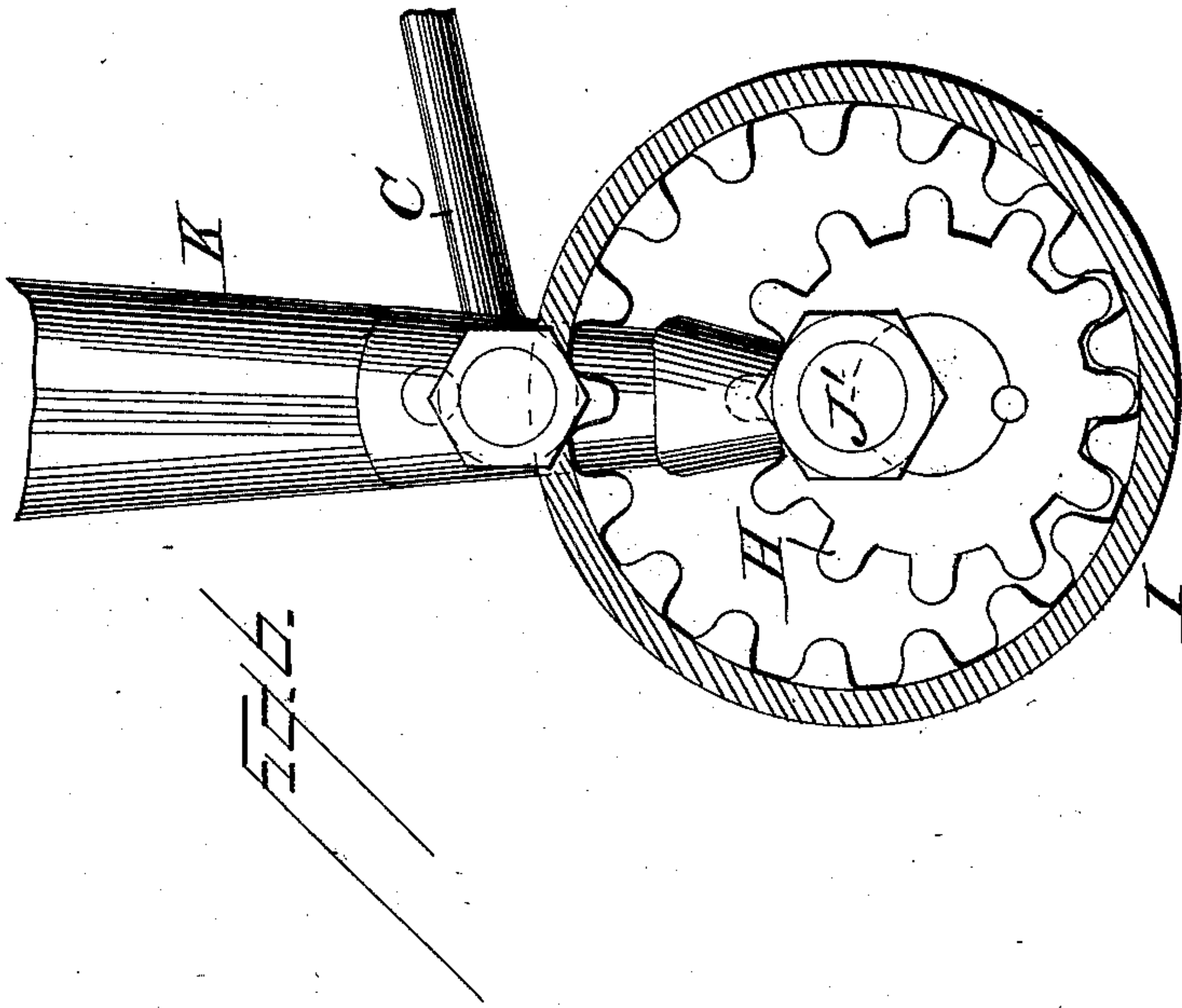
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Thos E. Parker.

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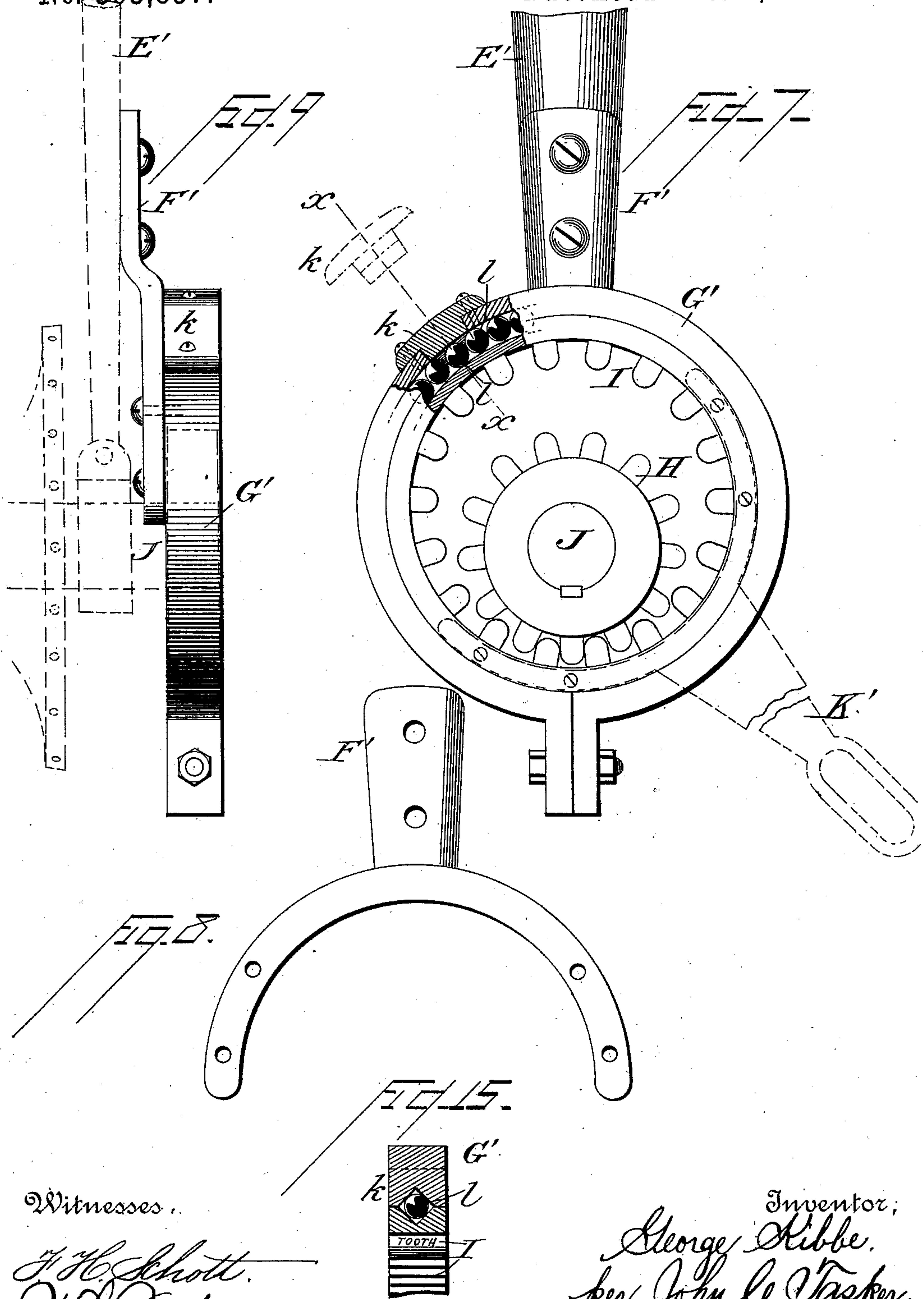
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Witnesses..

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Inventor;

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Attorney .

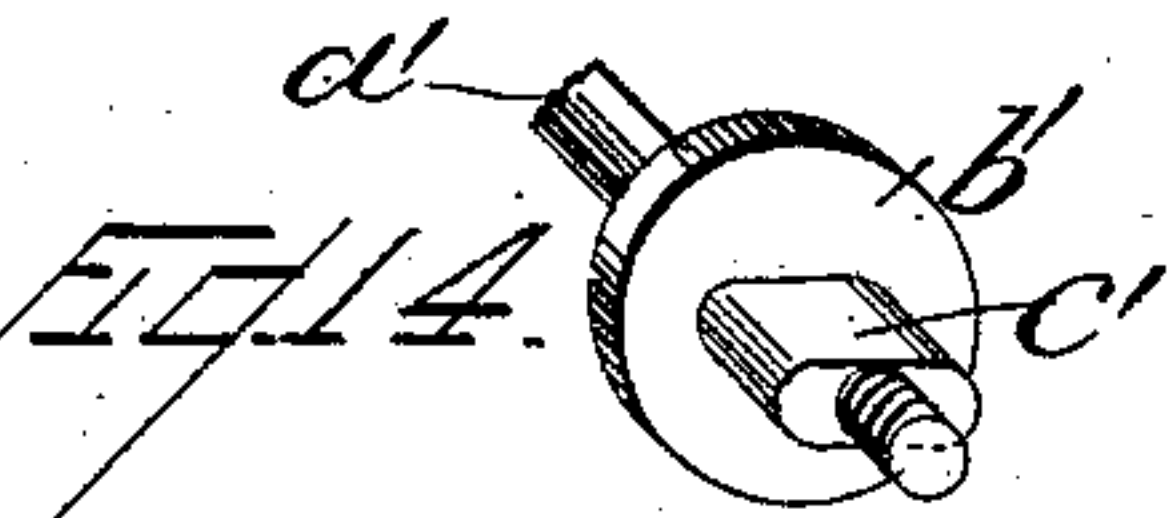
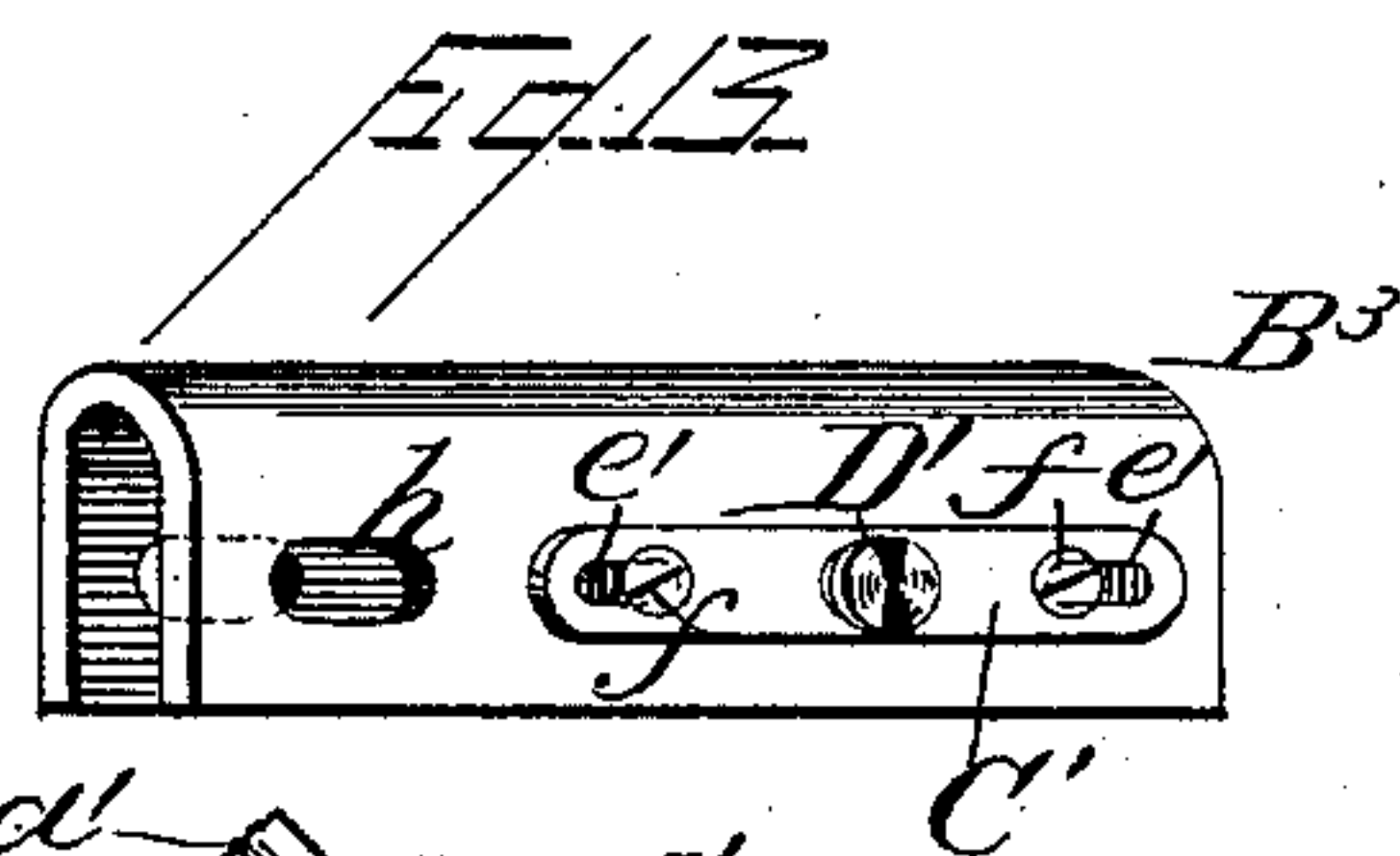
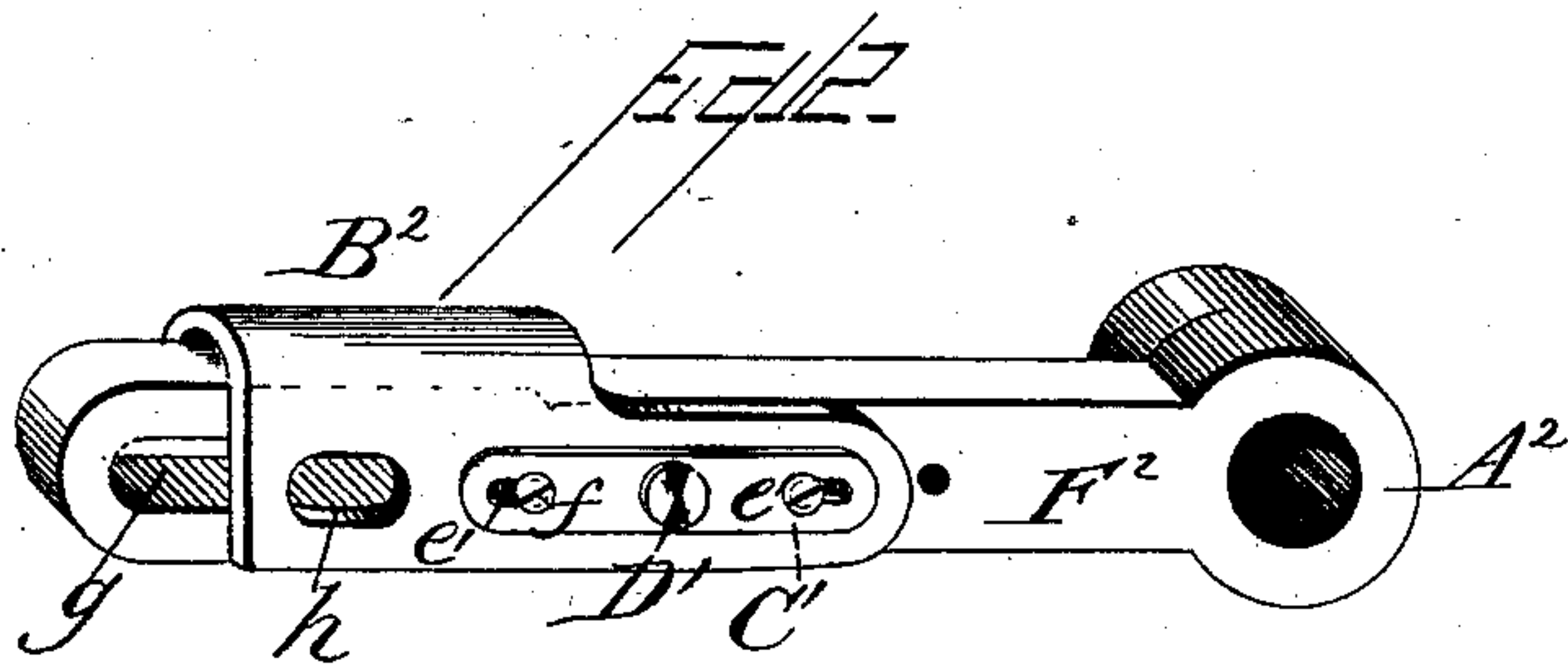
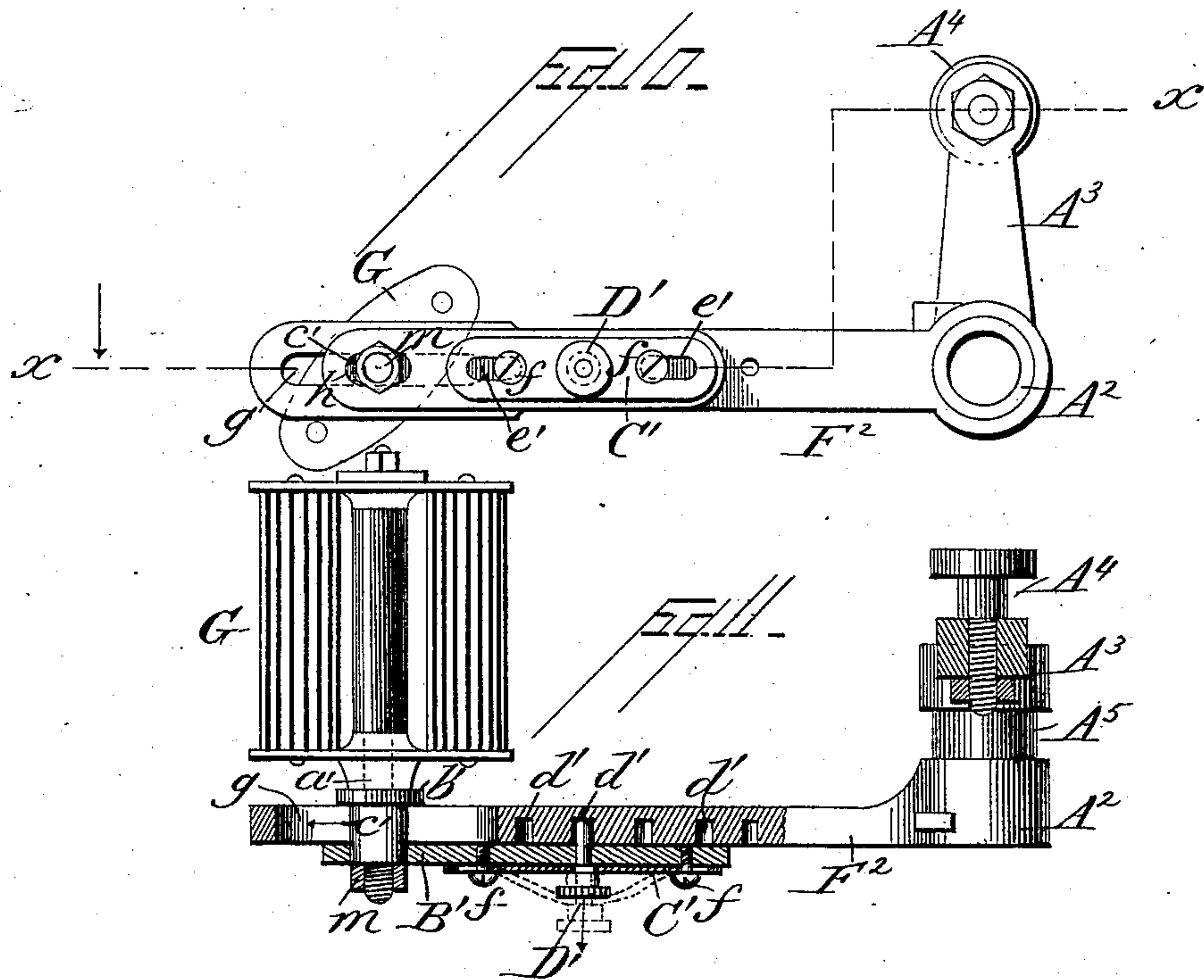
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4 Sheets—Sheet 4.

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UNITED STATES PATENT OFFICE.

GEORGE KIBBE, OF AMSTERDAM, NEW YORK.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 393,837, dated December 4, 1888.

Application filed June 30, 1888. Serial No. 278,633. (No model.)

To all whom it may concern:

Be it known that I, GEORGE KIBBE, a citizen of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, 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 has reference to an improvement in bicycles, the object thereof being to provide means whereby the pedals may be made adjustable to suit riders of different sizes, and also to so construct the actuating mechanism of the bicycle that great speed can be attained with the least expenditure of power; and the invention consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

In the accompanying drawings, illustrating my invention, Figure 1 is a side elevation of a bicycle provided with my improvements. Fig. 2 is an enlarged detail elevation of the actuating mechanism of my improved bicycle. Fig. 3 is a sectional view of one of the adjustable pedals. Fig. 4 is a detail view in partial section of one of the crank-disks attached to the axle of a driving-wheel. Fig. 5 is an enlarged sectional view of the gearing and accompanying parts, whereby the driver is caused to revolve more than once during a single revolution of the foot. Fig. 6 is a side elevation of said gearing and accompanying parts. Fig. 7 is a side elevation of a modification of the gearing and accompanying parts for actuating the shaft of the main driving-wheel, a portion of said view being broken away to show the ball-bearing between the larger gear and its surrounding casing. Fig. 8 is a detail view of the bracket shown in Figs. 6 and 7. Fig. 9 is a front or edge view of the same part shown in Fig. 6. Fig. 10 is a side elevation of a modified form of the pedal-crank and crank-arm. Fig. 11 is a horizontal sectional plan view on the line x of Fig. 10. Fig. 12 is a detail perspective view of the pedal-arm, certain parts being slightly modified from those shown in Figs. 10 and 11. Fig. 13 is a detailed perspective

view of the metallic sleeve which partially surrounds the pedal-crank arm, said metallic parts being slightly modified in construction from that shown in Fig. 12. Fig. 14 is a perspective view of the pedal-shaft which passes through the pedal-arm and the metallic piece that partially surrounds the same. Fig. 15 is a detail sectional view on the line x of Fig. 7, and shows the arrangement of the balls which constitute the ball-bearing between the larger gear and its surrounding casing.

Similar letters of reference designate corresponding parts throughout all the different figures.

On each end of the axle of the driving-wheel is rigidly secured a disk or small wheel, A, having at a certain point in its periphery a horizontally-projecting pin, a , so that the disk or wheel is in reality a crank-disk or crank-wheel.

For convenience in the description of the invention I have in the drawings represented only the disk that is located on one end of the driving-wheel axle. In general the structure of the frame of the bicycle is similar to that ordinarily employed in the construction of bicycles, and hence it will be unnecessary in this description to enter into any special detail of the arrangement of the parts of this frame.

On the part B of the frame which extends (on one side of the driving-wheel) from the axle to the main portion of the frame in the front of the driving-wheel is located at a convenient distance from the axle of the driving-wheel a downwardly-extending portion, D, having a socketed upper end that surrounds the frame B and slotted at d to receive the clamping-bolt E, which is adjustable therein, as will be presently more fully explained. The bolt or rod E has a central collar or flange, e . The portion of this bolt adjacent to the flange e , on one side thereof, is squared to enable it to fit closely within the slot d . Furthermore, said bolt is properly provided with washers and nuts to enable it to have the pedal-arm F properly attached to it in such a manner that said pedal-arm may easily revolve. The bolt E can thus be adjusted so as to occupy any desired position throughout the length of the slot, and can be firmly held.

in place by screwing tightly the nut on one end thereof, which will bind the collar *e* close against the side of the part D, and thus immovably secure the bolt. The pedal-arm F can easily revolve upon the other end of the bolt, as it is held loosely between a nut and washer on the outermost end of said bolt and the intermediate collar, *e*, as is clearly shown in Fig. 3.

The pedal-arm in reality consists of two parts—the part F, which is revoluble upon the bolt E, and the part F', which is bolted to the part F and which carries the pedal G. This construction of the pedal-arm is preferable for the purpose of enabling the connecting-rod C, which extends between the pedal-arm and the crank-disk A, to be easily connected to said pedal-arm, the connection being effected at the point where the portions F and F' of the pedal-arm are joined, as will be perceived upon inspection of Figs. 2 and 3. The connecting-rod C is attached to the crank-disk A by having the projection *a* pass through an eye in the end of said rod, the outer end of said projection *a* being provided with a nut to hold the connecting-rod in proper place. It will thus be evident that when the rider operates the pedal and causes it to revolve in the direction shown in dotted lines in Fig. 2 the connecting-rod C will operate upon the crank A, and thus communicate motion to the axle of the driving-wheel, and consequently to the wheel, which will be rotated and the bicycle propelled. Inasmuch as the bolt E is adjustable within certain limits in the slot *d*, the pedal G can be elevated or lowered to suit the sizes of different persons who may use the bicycle.

In Figs. 5 and 6 I have shown an improved arrangement of gearing for the bicycle, whereby the driving-wheel may be revolved several times while the foot is going once around its circle of movement. By this arrangement loss of speed is prevented. Said arrangement may be used in connection with the adjustable pedal mechanism already described, or may be used independently of it, as it will be clearly observed that the adjustable pedal may be used or not with different constructions of the mechanism for accelerating the speed of the bicycle without increasing the expenditure of power. With this arrangement a smaller driving-wheel may be employed.

The structure of my mechanism above described renders the bicycle safer than the ordinary bicycle, because it diminishes the liability of "headers;" but with the construction now to be described the safe use of the bicycle is increased to a still greater degree.

A small gear-wheel or pinion, H, is securely fastened to the axle of the driving-wheel. I denotes a larger internally-gear wheel whose teeth mesh with those of the pinion H, said internally-gear wheel I having a central bearing at *i*, which receives a horizontal journal, J', formed on the end of a frame, J,

which is supported by being attached to the frame K, whose lower end connects with the axle of the driving-wheel, said frame K being a portion of the frame of the bicycle. The part J is in reality a sort of a bracket, it being so formed, as shown in Fig. 5, that it will pass under the rim of the internally-gear wheel I and between said rim and the pinion H, and thus be permitted to hold the journal J' in proper position for the wheel I to revolve upon it.

The outer periphery of the wheel I is provided with a horizontally-projecting extension, *b*, which is properly screw-threaded to receive a nut at its outer end, between which nut and the collar on the said extension the connecting-rod C, or any other actuating-rod, may be located. By means of this rod it is evident that the internally-gear wheel I may be made to revolve, and since this meshes with the pinion H on the axle of the driving-wheel the revolution of said wheel I will actuate the driving-wheel and propel the bicycle; hence it is evident that this new arrangement of gearing may be connected with the pedal arrangement the same as the small disk A, which was above described as being connected to the axle of the driving-wheel. In fact, it will be clearly seen that this gearing arrangement may be substituted in the place of the crank A, and that good results may be obtained by using all the parts of the combination, both the improved gearing and also the adjustable pedal arrangement, although I by no means confine my invention to the use of all the parts of the combination at once, but think that it is broad enough to permit me to employ the adjustable pedal arrangement and the crank-movement in connection therewith independently of the gearing system, or to make use of the gearing independent of the improved pedal mechanism.

In Figs. 10, 11, 12, 13, and 14 is shown a modification in the construction of the pedal crank-arm. Here F² denotes the pedal-arm, and G the pedal, which is carried by said arm. One end of the arm F² is formed with a bearing, A², at which point the bearing is keyed to a journal or shaft, A⁵, on the crank A³, which has a bearing, A⁴, to which the connecting-rod is attached when the pedal and its crank-arm are located in operative position in a bicycle. It will thus be observed that the pedal crank-arm is fastened to the connecting-rod crank in a way similarly to that ordinarily employed with bicycle-cranks in common use. The pedal G is carried by the pedal crank-arm F², and is adjustable to different positions, so that it may suit riders of different sizes. The means by which the pedal is made adjustable relatively to the bearing of its crank-arm are as follows: The crank-arm piece at the end opposite to the bearing A² is formed with an elongated slot, *g*. Alongside the crank-arm is located a supplemental arm or strip, B', which may be of

various forms. It may have the form shown in Figs. 10 and 11, where it is simply a straight piece located alongside of the crank-arm, or it may have the form shown in Fig. 12, where it is formed with a sort of a sleeve portion which partially encircles the crank-arm, as at B^2 ; or it may be fashioned similarly to the part B^3 of Fig. 13, which part is a sort of a sleeve surrounding partially the crank-arm. These different forms may be employed at the pleasure of the person who constructs the bicycles, and various other modifications of these forms may doubtless be devised and used without departing from the spirit of my invention.

The supplemental piece B' , B^2 , or B^3 , as the case may be, is provided with a slot, h , which, when the said piece is in position relatively to the crank-arm, will be opposite the slot g in said crank-arm. The supplemental piece is adjustable endwise, so as to locate its slot h opposite different points in the length of the long slot g , and it is provided with a spring dog or catch, by means of which it is easily held in any one of the various positions to which it may be adjusted. This spring dog or catch consists of a spring-metal plate, C' , which is slotted near each end at $e' e'$, through which slots pass screws or pins $f f$, projecting outward from and rigid upon the strip B' . The metallic plate C' carries a pin, D' , which passes centrally through it, and is so connected to the plate that when the head of said pin is laid hold of it may be pulled outward, together with the spring-plate, in the manner shown in dotted lines in Fig. 11, and when the pin D' is released the resiliency of the plate C' will tend to carry it back into its former position.

The crank-arm F^2 is provided with a series of small holes, $d' d' d'$, which are adapted to be entered by the pin D' . It will thus be observed that the part B' , B^2 , or B^3 may be easily and quickly adjusted endwise upon the crank-arm F^2 , and that the spring dog or catch will serve to hold it firmly in any one of the several positions to which it may be adjusted. a' indicates the shaft of the pedal G . This shaft is formed with a disk or collar, b' , which rests in close contact with the side of the crank-arm opposite that where the supplemental part B' is located. The pedal-shaft has also a flattened journal portion, c' , lying next to the collar b' , and, also, it is formed with a screw-threaded end adapted to receive a nut, m . Thus it will be seen that when the pedal is properly located the flattened journal c' is passed through the slot h , which is of proper shape and size to receive said journal, and that then by the use of the nut m the pedal and its shaft are tightly fastened in position. By loosening the nut m and by properly manipulating the spring-dog the pedal may at any time be adjusted to suit riders of different sizes. The sleeved form of the part B' , with the form of B^2 and B^3 in Figs. 12 and 13, are doubtless preferable in

many cases to the simpler form of Figs. 10 and 11, for as the sleeve partially surrounds the crank-arm the parts are compacted more tightly together and the device is stronger and more secure. However, I do not intend to confine myself to any one of these forms, but describe and illustrate them all as indicating different ways in which the invention may be carried into practical effect, and I reserve the liberty of varying from them sufficiently to make my improved devices suitable for use in different situations.

In Figs. 7, 8, 9, and 15, I have shown a modified arrangement of the gearing and other mechanical parts for actuating immediately the driving-shaft of the main wheel. Here the pinion H meshes with the internally-gear wheel I , as above, which is located in a circular surrounding casing, G' , which is supported by being firmly fastened to a bracket, F' , that is attached to the frame E' , whose lower end connects with the axle of the driving-wheel, as shown in dotted lines in Fig. 9, said frame E' being a portion of the frame of the bicycle. The arrangement of the bracket F' and its manner of connection with the frame E' and the casing G' is clearly shown in Fig. 9. The rim or casing G' has at one point in its periphery a removable portion, k , (see Fig. 7,) which, when in place, is firmly fastened to the rim by means of pins or screws through projections or flanges thereon, and which, when removed, permits easy access to be had to the interior of the rim or casing for the removal and insertion of the balls which form the ball-bearing.

In Fig. 15 is shown a sectional view of the rim G' and the large internally-gear wheel I . Upon inspection of this figure it will be seen that the outer periphery of the internally-gear wheel I is formed with a medial V-shaped groove, and also that the inner face of the rim G' is likewise formed with a similar V-shaped groove. Between and within these two grooves is arranged a circular series of balls or rollers, $l l$. By the use of this ball-bearing and by the arrangement of the several parts of the machine in the manner above stated the device will be presented in its most useful and excellent form, and will be much more serviceable and a much more complete machine than that afforded by the ordinary construction.

The crank may be attached direct to the internally-gear wheel I . When this is done, use may be made of a sort of bracket or crank, K' , (shown in dotted lines in Fig. 6,) which is attached to the gear I similar to the mode of attachment employed with the bracket F' .

Various modifications may probably be made within wide limits in the arrangement of the several mechanical parts that constitute my invention as at present explained and illustrated, and I do not desire to confine myself to the exact location, size, form, or relation of the mechanical elements of the invention, but reserve the liberty of changing

and diversifying the same to suit the special circumstances of individual cases with which the invention may be employed.

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

1. The combination of the pedal consisting of the parts F F', the extension D, secured to the part B of the main frame of the bicycle and having a slot, *d*, and the adjustable bolt E, located in said slot, having a rigid collar, *e*, and suitable washers and nuts thereon, the said bolt carrying the part F of the pedal-arm, all arranged substantially as described.

2. In a bicycle, the combination of a pedal-arm having an elongated slot near one end, an adjustable device having a sleeved portion that partially surrounds the pedal-arm, said device being slotted opposite to the slot in the pedal-arm and having a dog or clutch for securing it in any position relatively to the pedal-arm, and the pedal connected to the adjustable device, substantially as described.

3. In a bicycle, the combination, with the pedal-arm, of an adjustable device carried thereby and provided with means for securing it in any position to which it may have been adjusted relatively thereto, and a pedal connected to said adjustable device, substantially as described.

4. The combination of the pedal-arm having a bearing at one end and the elongated slot near the other, and having the series of perforations, an adjustable device carried thereby and slotted at a point opposite the elongated slot, a dog or clutch for holding the adjustable device in the position to which it may have been adjusted, consisting of a spring-plate and a pin that enters the perforations in the pedal-arm, and the pedal whose shaft passes through the slots in both the arm and the adjustable part and is secured to the adjustable part, substantially as described.

5. The combination of the pedal-arm F², slotted at *g*, and having perforations *d' d' d'*, the adjustable part B', slotted at *h*, and having a spring-dog consisting of plate C' and pin D', and the pedal G, having shaft *a'*, with collar *b'*, flattened journal *c'*, and nut *m*, all arranged substantially as described.

6. In a bicycle, the combination of the pedal-arm F², slotted at *g*, and having perforations *d' d' d'*, the adjustable part B', slotted at *h*, the pedal G, having shaft *a'*, collar *b'*, flattened journal *c'*, and nut *m*, and a spring-dog for holding the adjustable strip in place when adjusted, consisting of the plate C', slotted at *e' e'*, through which slot pass pins *f f* on the strip, and the central pin, D', all substantially as described.

7. In a bicycle, the combination, with the pedal-arm slotted at *g*, the adjustable strip slotted at *h*, and a device for clutching or dogging the adjustable strip, of the pedal G, having shaft *a'*, with collar *b'*, flattened journal *c'*, which journal passes through the slots *g* and *h*, and the securing-nut *m*, all substantially as described.

8. The combination, with the axle of the driving-wheel having a pinion thereon, of an internally-gear wheel meshing therewith, a rim or casing surrounding the gear-wheel, a ball-bearing between the said casing and the wheel, a bracket supporting the casing, a pedal mechanism and a connecting-rod between the same, and a crank on the gear-wheel, all the parts being arranged for joint operation substantially as described.

9. The combination of the axle J of the driving-wheel, having thereon pinion H, the internally-gear wheel I, the rim or casing G', the bracket F', secured thereto, the frame E', to which the bracket is attached, and the ball-bearing between the casing G' and wheel I, substantially as described.

10. The combination of the pinion H, gear-wheel I, casing G', having removable part *k*, the series of balls *l l* in the groove between the casing and the wall, and the supporting-frame for said parts, all substantially as described.

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

GEORGE KIBBE.

Witnesses:

MARTIN S. STORER,
J. SPENCER FISHER.