

(No Model.)

2 Sheets—Sheet 1.

D. E. ROSS.
EXPANSIBLE WHEEL.

No. 577,323.

Patented Feb. 16, 1897.

Fig. 1.

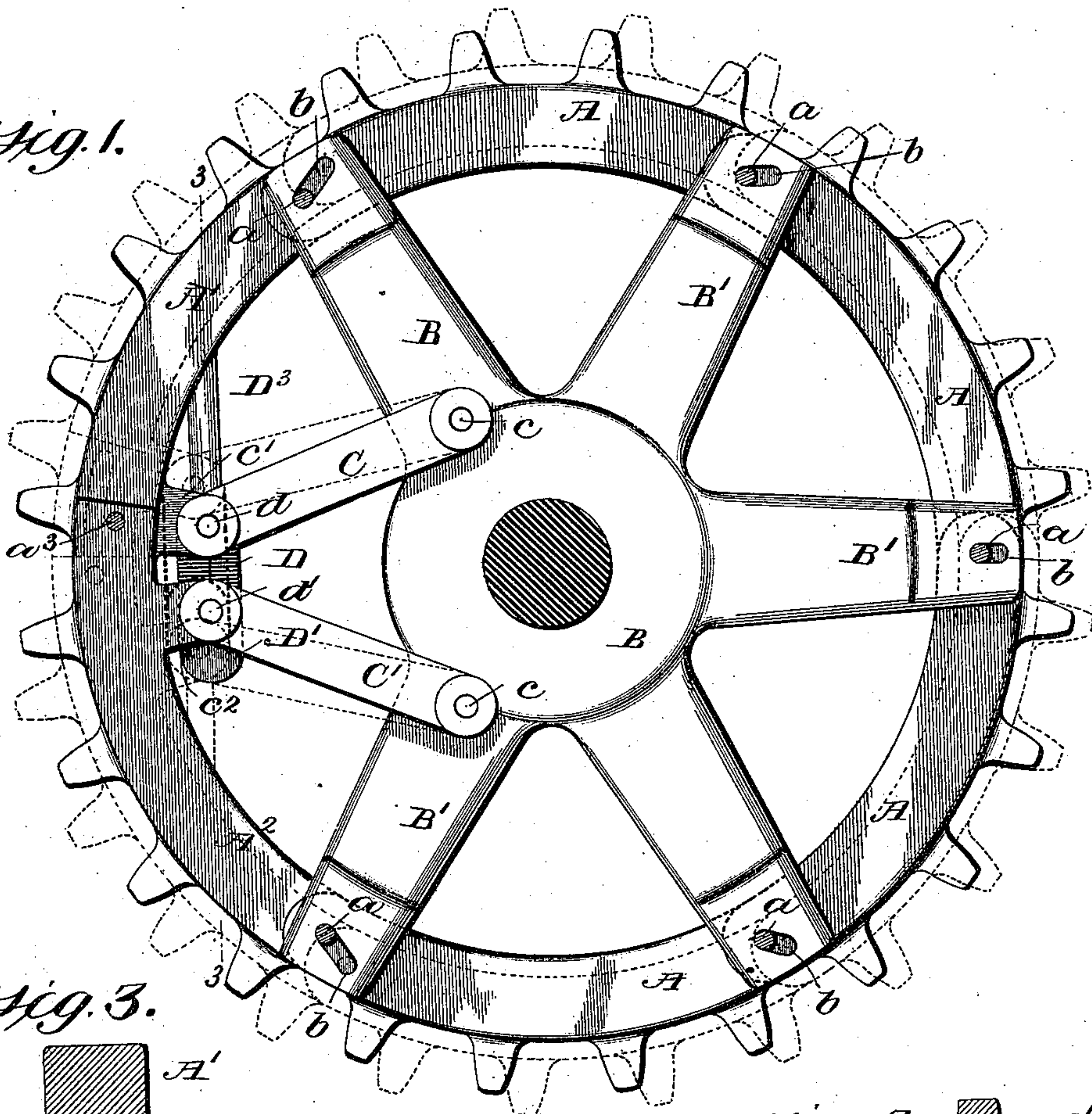


Fig. 3.

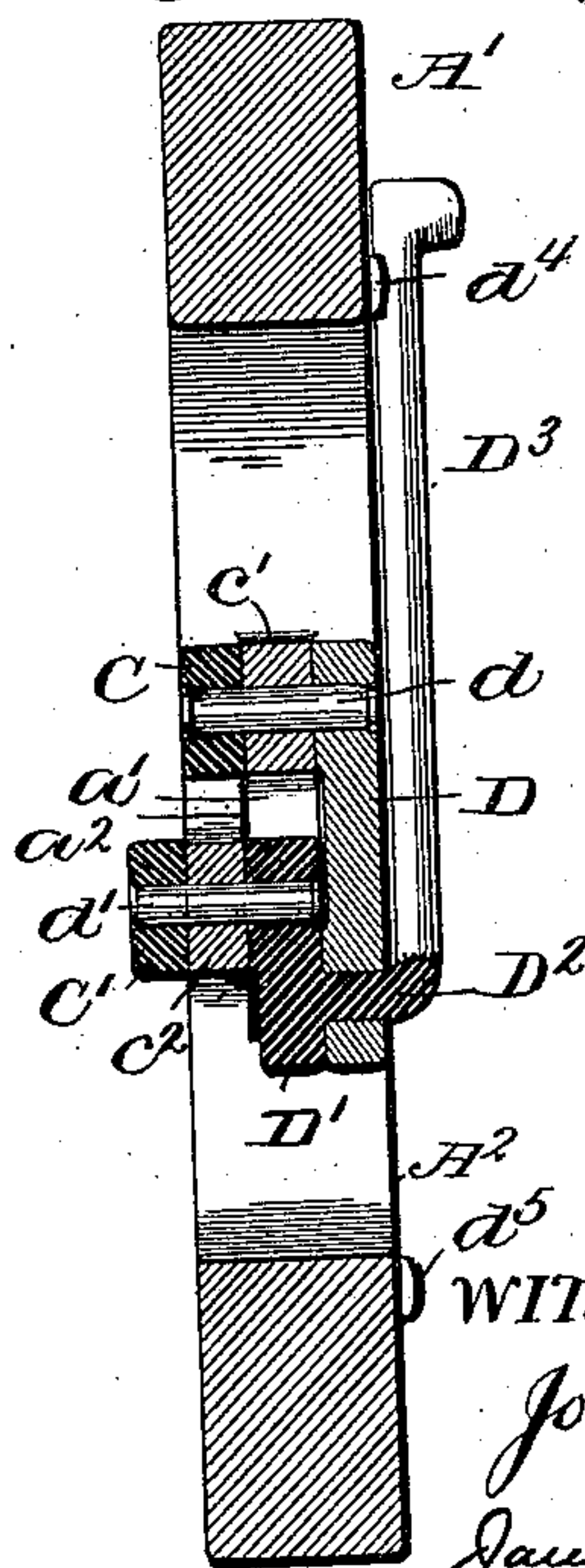


Fig. 2.

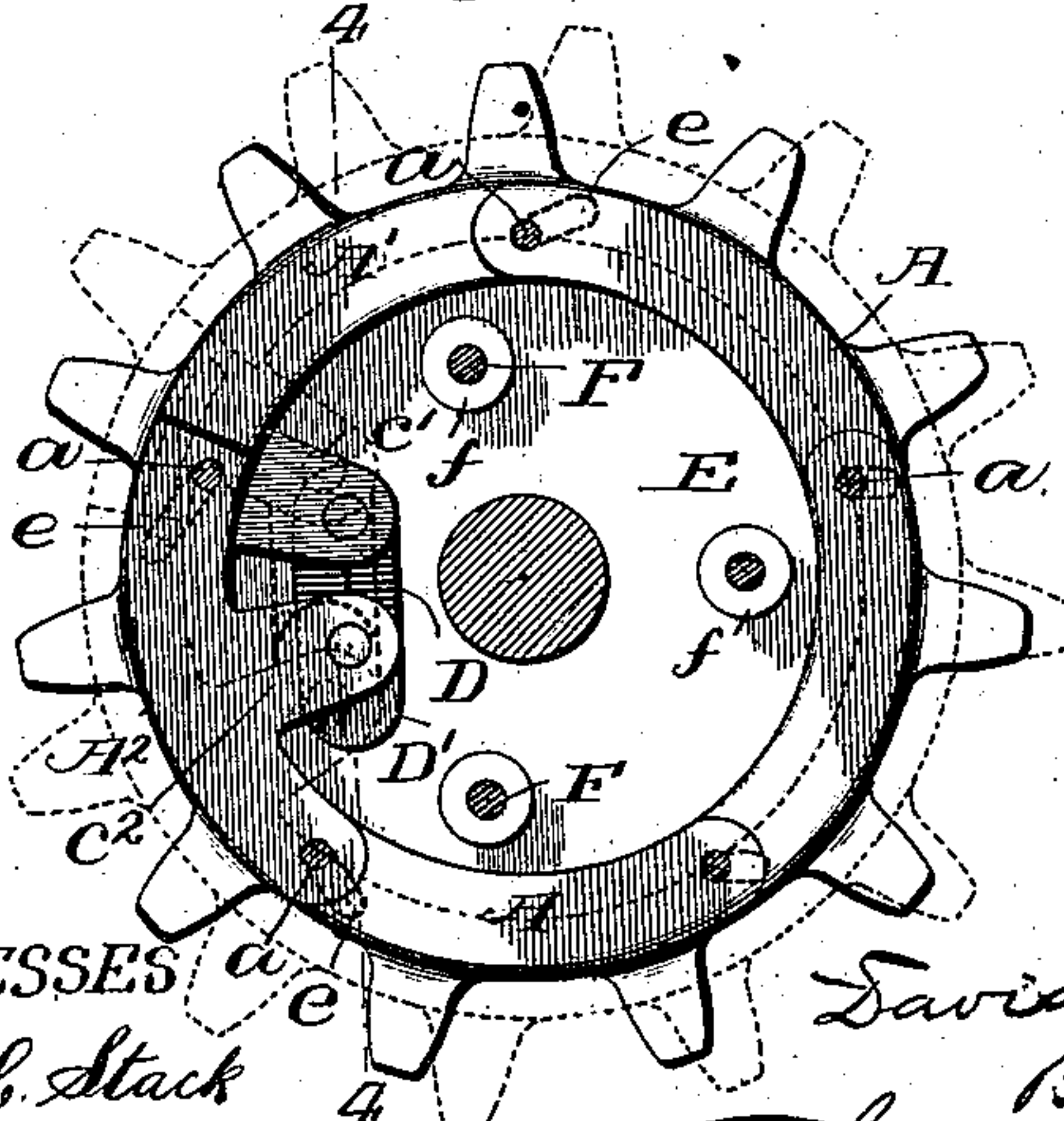
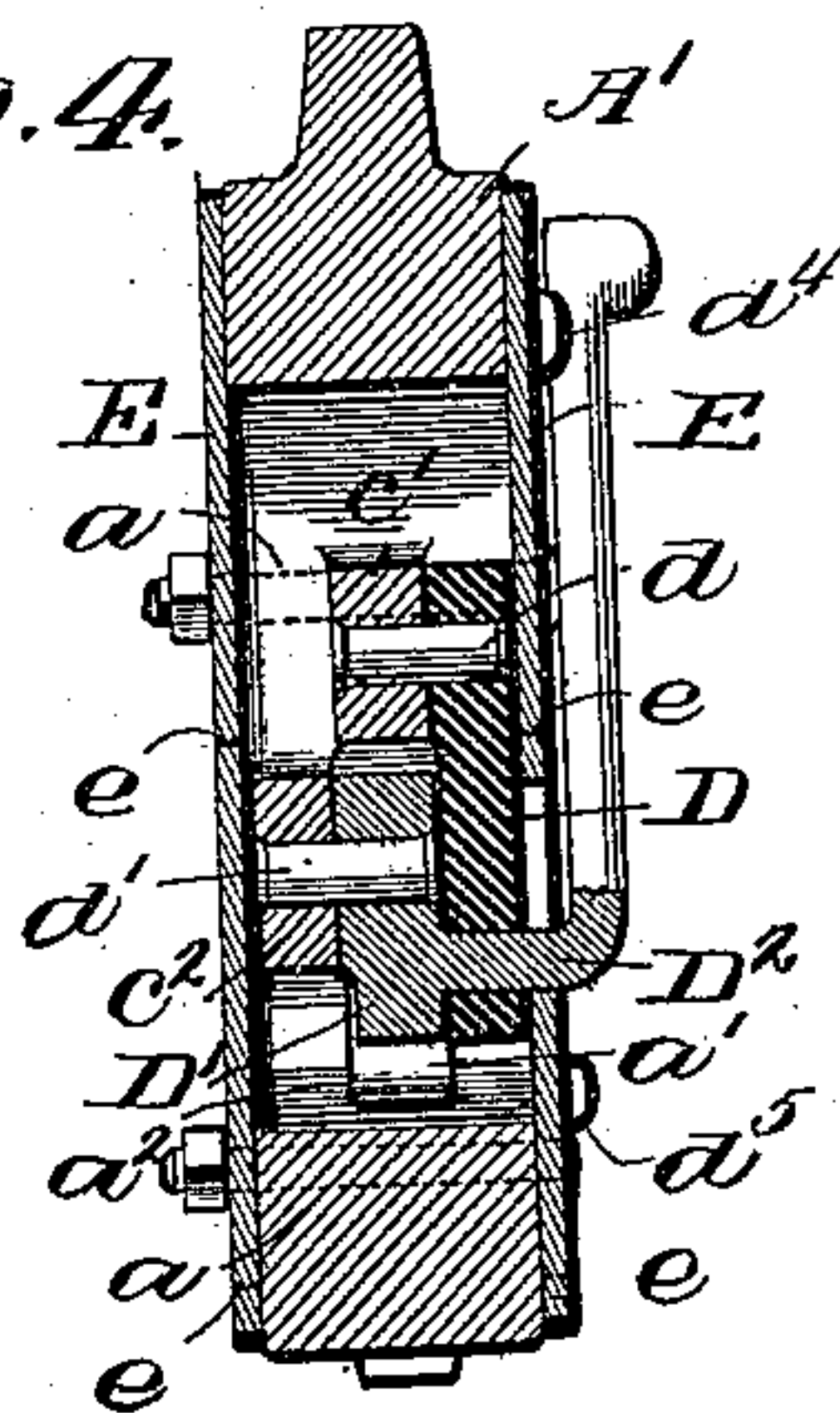


Fig. 4.



WITNESSES

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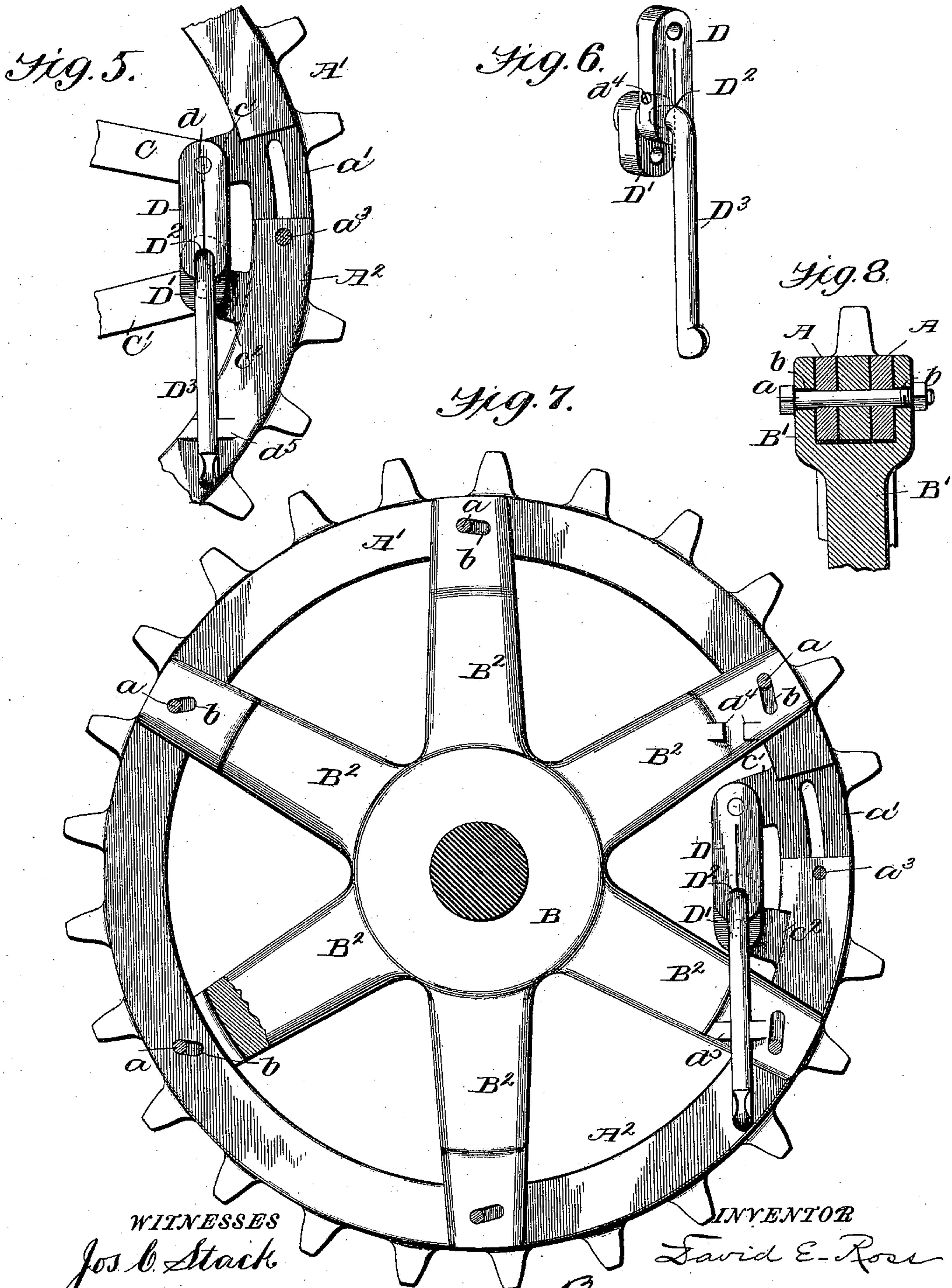
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

DAVID E. ROSS, OF BROOKSTON, INDIANA.

EXPANSIBLE WHEEL.

SPECIFICATION forming part of Letters Patent No. 577,323, dated February 16, 1897.

Application filed January 30, 1896. Serial No. 577,456. (No model.)

To all whom it may concern:

Be it known that I, DAVID E. ROSS, of Brookston, in the county of White and State of Indiana, have invented certain new and useful Improvements in Expansible Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention is an improvement in pulleys and sprocket-wheels; and its object is to so construct the same that they can be varied in size to a limited extent, and thus increase or diminish the power transferred by or imparted thereto by belts or chains. It is especially designed for sprocket-wheels of bicycles, where it is sometimes desirable to increase the speed by increasing the size of the driving-sprocket or decreasing the size of the driven sprocket, or to increase the power by decreasing the size of the driving-sprocket or increasing the size of the driven sprocket. I propose to make both sprockets adjustable, and by expanding one in proportion as the other is contracted be able to considerably vary the power transmitted from one to the other with little trouble, and also avoid the necessity for any chain compensating or tautening device.

In the drawings I have shown several sprockets embodying the principle of my invention, which is best summarized in the claims, and I will proceed with the description thereof.

Referring to said drawings, Figure 1 is a side view of a driving-sprocket having a sectional split rim, showing it expanded in dotted lines and contracted in full lines. Fig. 2 is a similar view of the driven sprocket, showing it expanded in dotted lines and contracted in full lines. Fig. 3 is a section on line 3 3, Fig. 1; Fig. 4, a section on line 4 4, Fig. 2. Figs. 5 and 6 are details. Fig. 7 is a detail view of a sprocket having one-piece split continuous rim. Fig. 8 is a detail.

The driving-sprocket.—As shown in Fig. 1, the split rim of the sprocket is composed of six sprocket-toothed segments A, hinged together. The two sections A' A², between which is the "split," instead of being connected by

a tight hinge-joint *a*, as are the other sections, are united by a sliding hinge-joint; that is, section A' has a tongue *a'*, which enters a slot *a*² in the end of section A² and is retained therein by a pin *a*³. The slot is of such length that the ends of sections A' A² can be separated as much as the distance between any two adjoining sprocket-teeth on the sections. When the rim is contracted so as to cause sections A' A² to abut, the adjoining teeth thereon are just the proper distance apart; but when the rim is expanded sections A' A² separate until their adjoining end teeth are separated by a space sufficient to admit of another tooth, if desired. I do not think it essential to provide this tooth, though it can easily be formed, for instance, upon the tongue *a'*, if desired, and telescope with the end tooth on section A² when the rim is contracted. The pins *a* by which the several sections A are hinged together pass through slots *b* in the extremities of spokes B', on a hub or web B, as shown, the extremities of spokes B' being preferably bifurcated, so as to partially embrace the rim and support the pins on both sides of the segments. (See Fig. 8.) The slots *b* are so formed as to allow the sections to accommodate for expansion or contraction of the rim while remaining concentric to the axis of the wheel.

CC' are lever-arms, the inner ends of which are pivoted at *c c* to the hub B. The outer end of lever C is pivoted to an inwardly-projecting lug *c'* on the tongue *a'* by a pin *d*, and the outer end of lever C' is pivoted to a corresponding lug *c*² on the segment A² by a pin *d'*. A link D is pivoted on pin *d* and a short link D' is pivoted on pin *d'*. The links D D' are also pivoted together, as at D², and the pivot-pin D² is extended and bent to form a short lever D³ by which link D' can be turned. When links D D' lie end to end, as in full lines, Fig. 5, the rim is circumferentially expanded, but when link D' is turned around under link D the rim is circumferentially contracted. The links may be locked in either position by engaging the end of lever D³ with retaining lugs or notches *d*⁴ *d*⁵ on segments A' A². The pivot-pins *d*, *d'*, and D² stand in line when the rim is fully expanded or contracted, and this effectually prevents casual shifting of the rim. This adjusting

device is very powerful and positive, but I do not consider it essential to the invention that segmental rims be used. In Fig. 7 the rim is made of one piece of resilient metal and expanded or contracted by means of the links D D', &c., as above described. Therefore I do not confine myself to segmental rims. For convenience link D may be split at one end, so it can be sprung on pin D², the split being closed by a nut or screw d⁴.

The driven sprocket.—The driven sprocket is constructed substantially like the driving-sprocket except that a less number of segments are employed, and instead of the hub and sprocket the rim is inclosed between two side plates E E, which are slotted, as at e e, to receive the ends of the hinge-pins a of the segments. The plates E E are connected firmly by transverse bolts F, passing through sleeves f. The small sprocket is expanded or contracted like the larger, and as similar letters of reference designate like parts in all the figures the foregoing description of the operation of expanding or contracting the larger wheel applies to the others also. It is to be noted, however, that no levers C C are employed in the small sprocket, Fig. 2, as they are unnecessary, the links D D' being pivoted solely to the lugs c' c². The same is true of Fig. 7, where the continuous rim is used, but in that figure the hub B is provided with spokes B² to support the segments A' A² like the others are supported. In Fig. 1 the levers C C take the place of spokes B².

It will be readily understood that the invention is not limited to sprocket-wheels, but is applicable to pulleys, &c.

When used on a bicycle, I propose to make both driving and driven sprockets adjustable. Then by contracting the driven sprocket one tooth when the driving-sprocket is expanded one tooth I maintain a proper tension on the chain and do not require any slack-take-up device therefor. The adjustment can be made easily by hand by simply swinging levers D³ around one hundred and eighty degrees.

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

1. In an expansible sprocket, the combination of a toothed split rim, a hub provided with rigid spokes attached to the rim by slots and pins, and means for simultaneously and uniformly expanding or contracting the rim, by distending or closing the split therein and locking the rim when it is expanded or contracted, substantially as and for the purpose described.

2. The combination of the split rim composed of a series of segments hinged together at their ends, a hub having rigid spokes loosely attached to the segments, and supporting them upon the hub, and means for simultaneously and uniformly expanding or contracting the rim by distending or closing the joint

between two of its segments, substantially as described.

3. In an expansible pulley or wheel, the combination of a split rim, with a pair of links respectively connected to the rim on the opposite ends of the rim, and to each other, and means for partially rotating one of said links, whereby the split is closed or distended and the rim contracted or expanded, substantially as described.

4. In an expansible pulley or wheel, the combination of the rim split at one side, and having inwardly-projecting lugs on its ends on opposite sides of the split, with the links pivoted to opposite lugs and to each other, one of said links being shorter than the other, and means for turning the shorter link, substantially as described.

5. In an expansible pulley or wheel, the combination of a split rim, with a pair of links respectively connected to the rim on the opposite ends of the rim, and to each other, and means for partially rotating one of said links, whereby the split is closed or distended and the rim contracted or expanded, and supports for the rim connected thereto so as to admit of the expansion or contraction thereof, substantially as described.

6. In a pulley the combination of the split rim having lugs c', c², on opposite sides of the split, the link D pivoted to lug c', the short link D' pivoted to lug c², and to lug D, and having a lever D³, substantially as described.

7. The combination of the hub having spokes provided with slotted ends; a split rim having pins engaging the slots in the spokes, the links connecting the split ends of the rim, and means for shifting said links so as to expand or contract the rim, substantially as described.

8. The combination of the split rim composed of segments hinged together, the links D, D', pivoted to the opposite segments at the split of the rim, and also pivoted to each other, and means for turning one of said links so as to distend or close the split in the rim, substantially as described.

9. The herein-described sprocket, consisting of toothed segments A, and segments A', A², the hub B, having bifurcated and slotted spokes B' the levers C pivoted to hub B, and respectively pivoted to a lug c' on segment A' and lug c² on segment A², the link D pivoted to lug c', and link D' pivoted to lug c², said links being pivoted together, and the lever D³ for turning and locking link D', all substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

DAVID E. ROSS.

Witnesses:

JAMES HAY,
LEVI MYERS.