

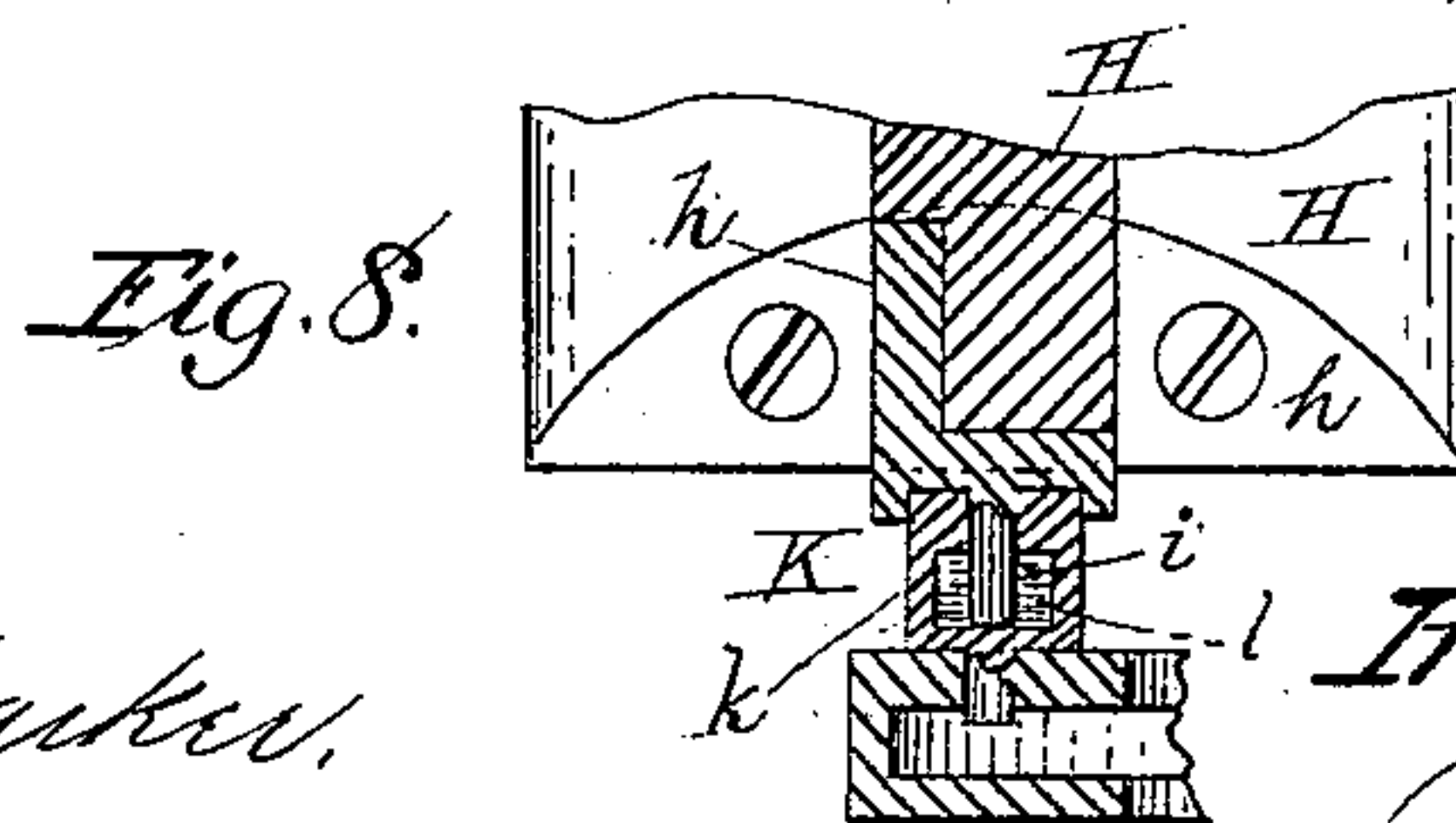
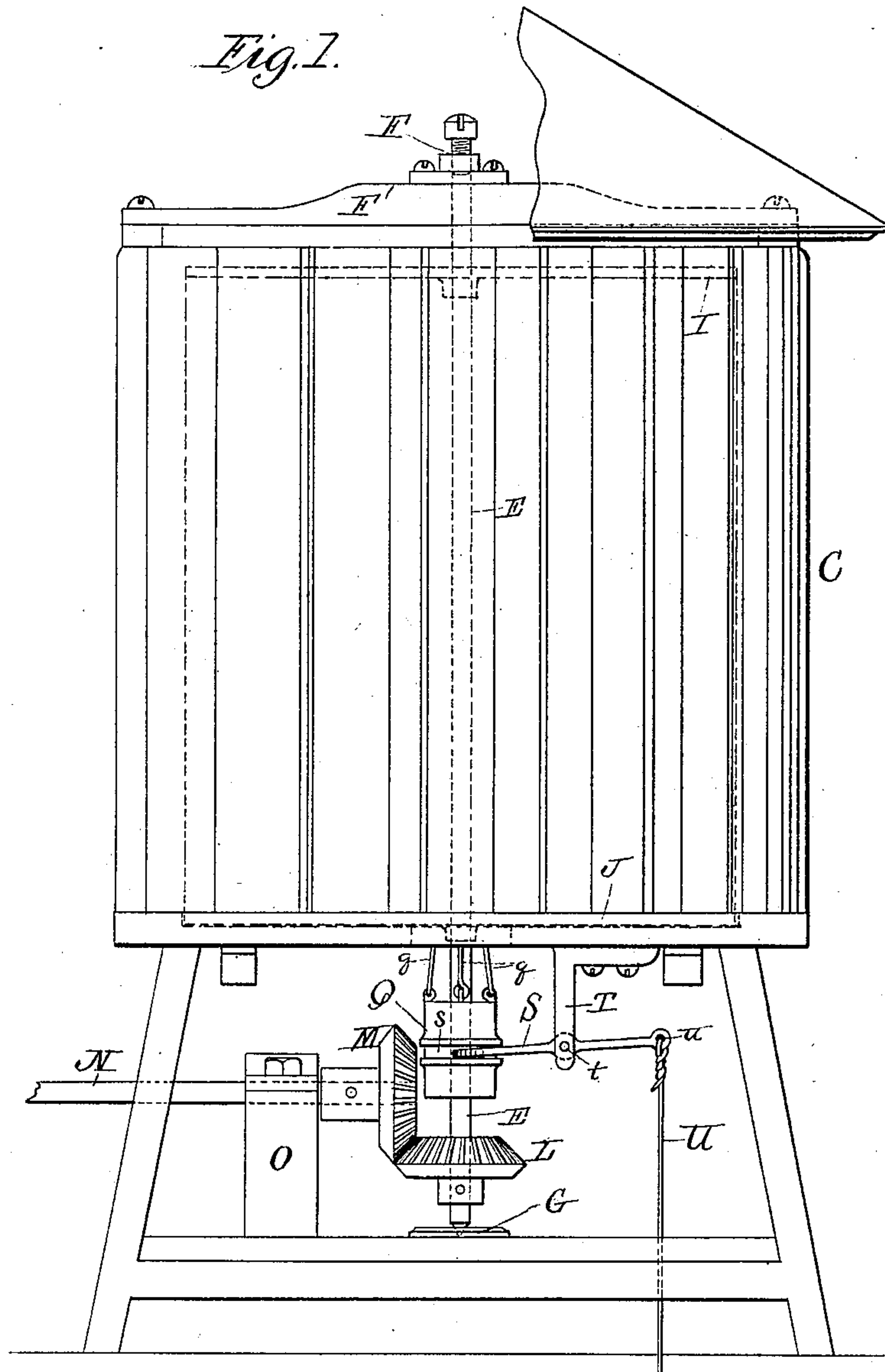
(No Model.)

3 Sheets—Sheet 1.

J. A. DEAN.
WINDMILL.

No. 266,352.

Patented Oct. 24, 1882.



Witnesses;
Albert A. Parker,
Walter B. Kourse;

Inventor;
John A. Dean

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Fig. 2.

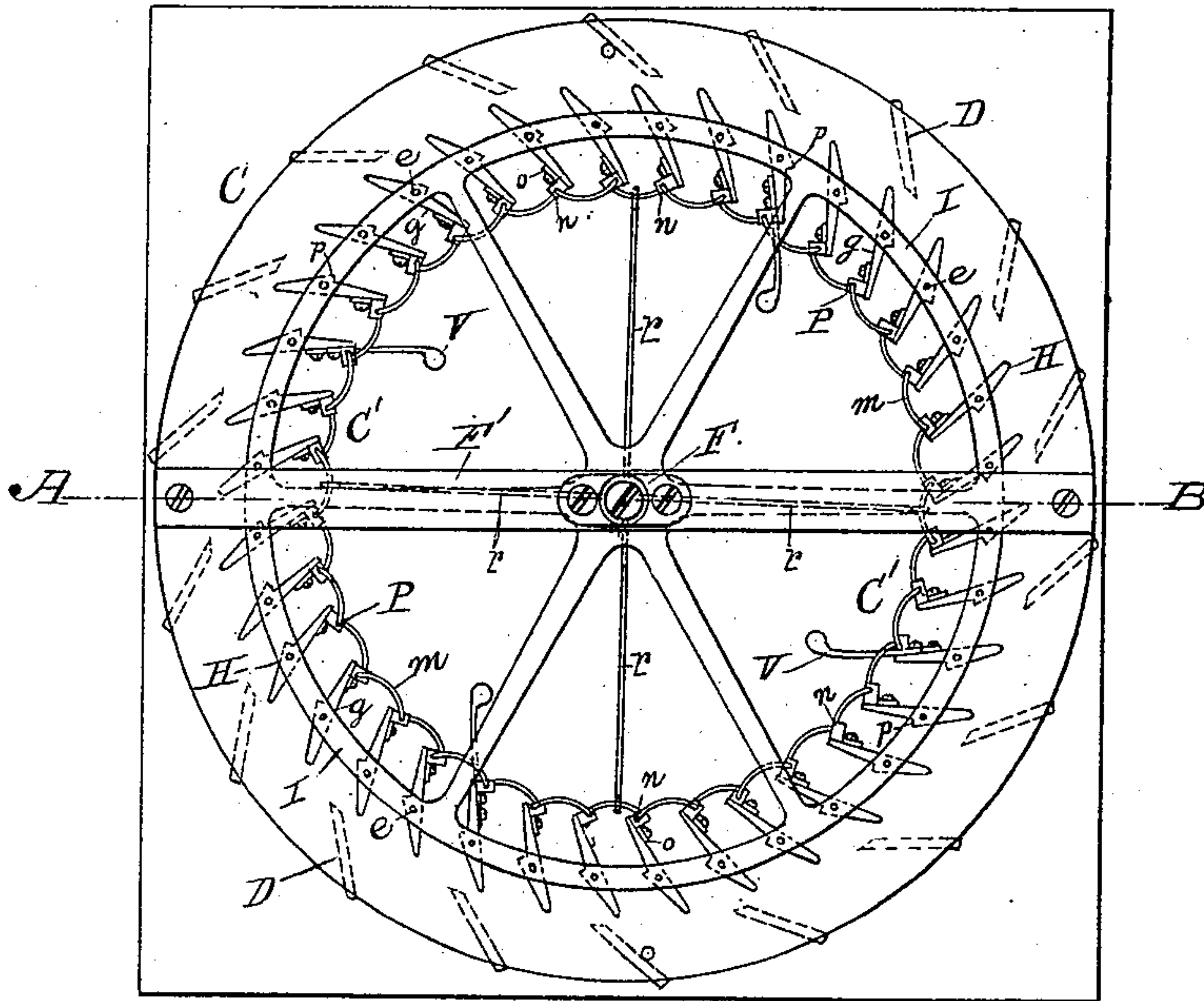
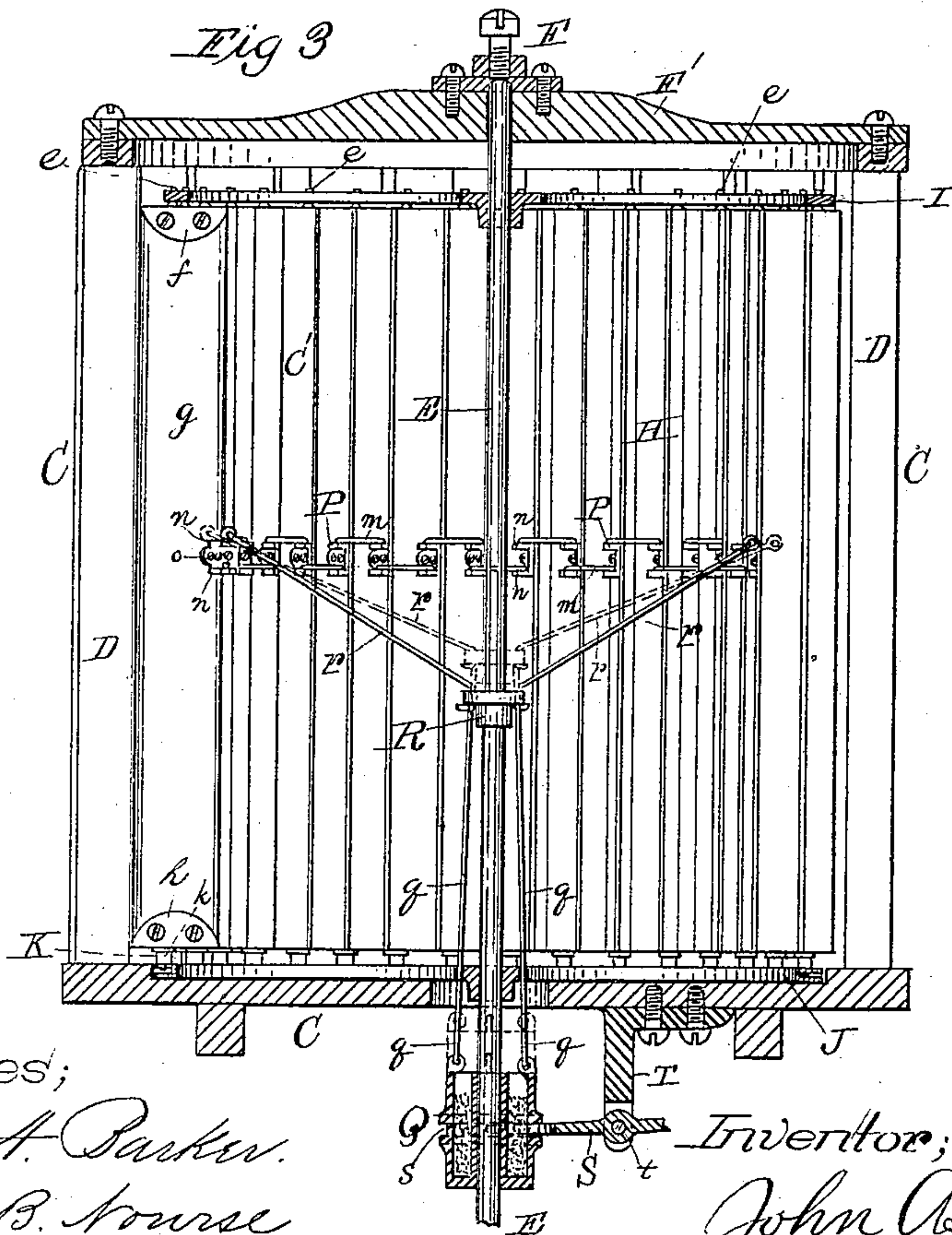


Fig 3



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Fig. 4

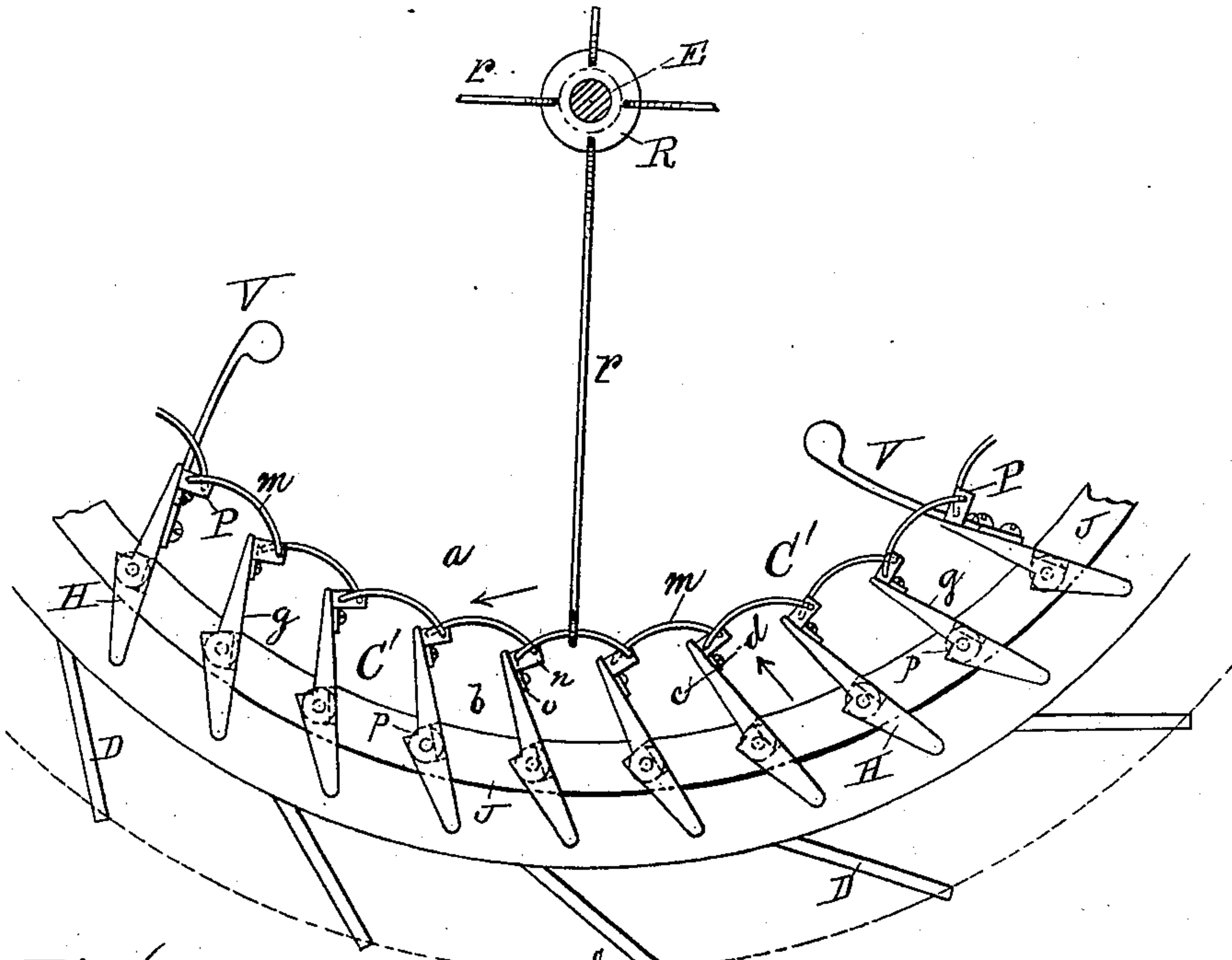


Fig. 6

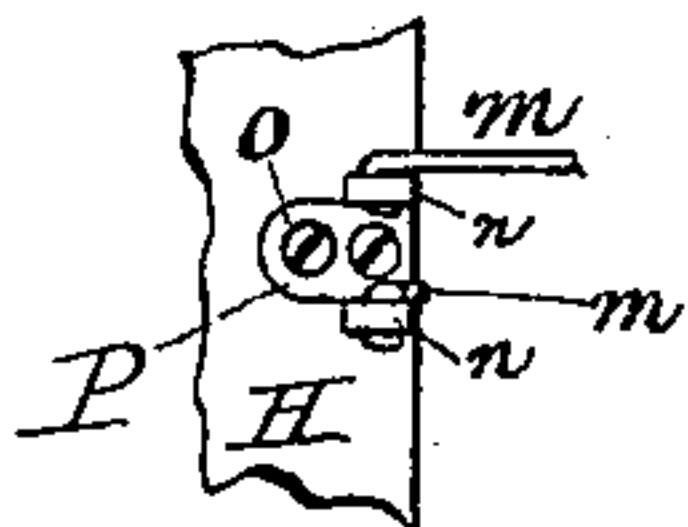


Fig. 5

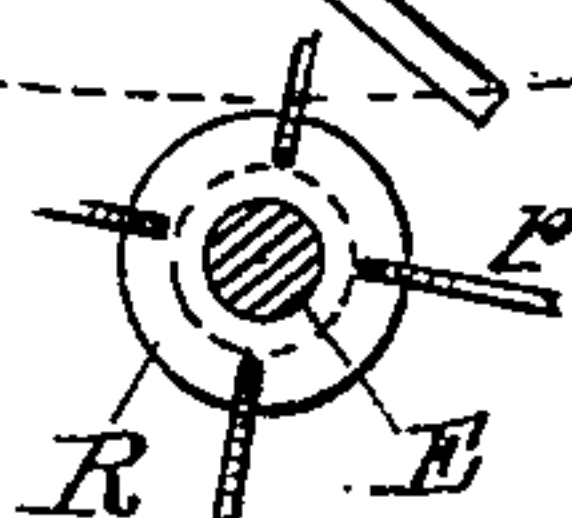
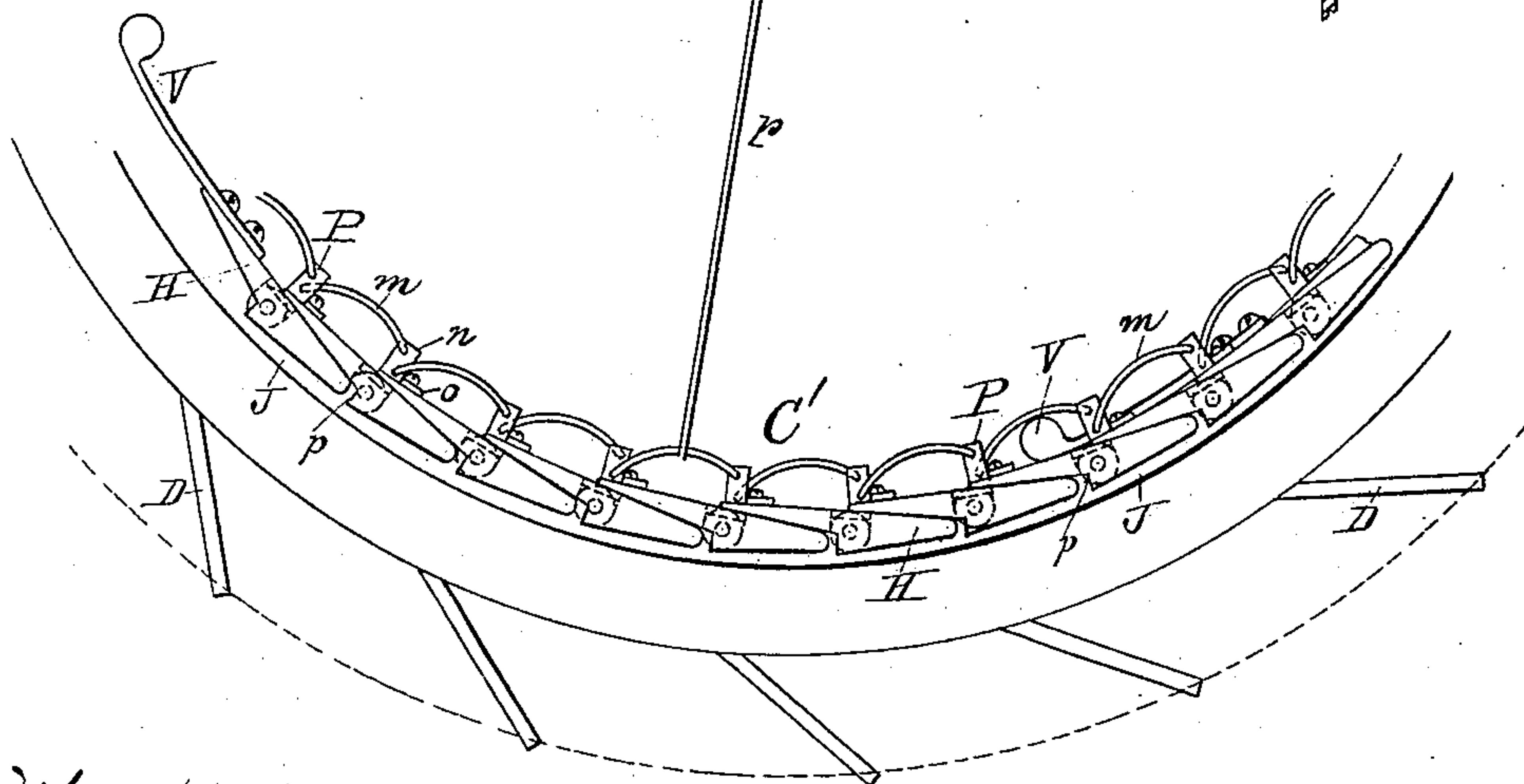
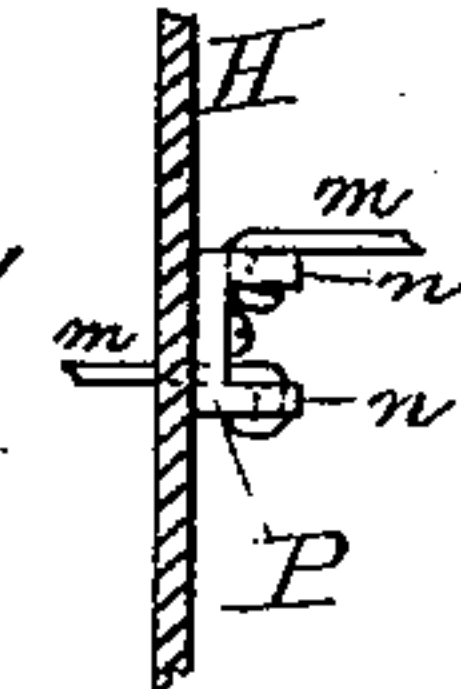


Fig. 7



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UNITED STATES PATENT OFFICE.

JOHN A. DEAN, OF WORCESTER, MASSACHUSETTS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 266,352, dated October 24, 1882.

Application filed July 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. DEAN, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Windmills; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a side view of a windmill embracing my improvements, a portion of the roof or covering of the mill being left off in this figure. Fig. 2 represents a top or plan view of the windmill shown in Fig. 1, with the roof entirely left off to more clearly illustrate my improvements. Fig. 3 represents a central vertical section through the mill, taken on line A B, Fig. 2. Figs. 4, 5, 6, 7, and 8 represent upon an enlarged scale different details of my improved windmill, which will be hereinafter more fully explained.

My invention relates to that class of windmills known as "horizontal windmills" or engines, in which the wheel revolves horizontally about a vertical axis.

It consists in making a continuous connection between the sails (by means of suitable link-sections) throughout the entire circumference of the mill.

It also consists in the combination, with said endless chain or sail-connection, of an automatic governing-weight, conveniently arranged by means of suitable rod-connections, and a collar fitted upon the central shaft or axis of the mill, as will be hereinafter more fully described.

It further consists in the construction and arrangement of the bottom pivotal bearings of the sail, whereby said bearings may be lubricated.

It still further consists in the combination, with one or more of the sails, of one or more governing-weights properly arranged and fastened upon said sails, as hereinafter more fully explained.

It also consists in the construction and arrangement of sails, being such as will admit of their overlapping each other one-half to two-

thirds of their width when closed, as hereinafter described.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the drawings, C represents the tower or supporting-frame of the mill, which is provided with vertical blinds or inclined wind-deflectors D, for guiding the wind to the windmill C', which is arranged inside of the tower and fitted to turn with the central vertical shaft, E. Said shaft E is fitted to turn in a proper box-bearing, F, arranged upon a cross-piece, F', at its upper end, and in a step-bearing, G, at its lower end.

The windmill C' may be arranged in a tower or cupola already erected, or within a frame, as shown in the drawings, mounted at any suitable and convenient place upon a building or upon a tower especially built for the purpose, as preferred. Said mill is provided with a series of swivel slats or sails, H, vertically arranged, being fitted to turn in suitable bearings in circular rims I J at their upper and lower ends. In this instance their upper ends are arranged to turn in the rim or wheel I by forming openings in said rim, into which are fitted pivot-pins *e*, formed on bearing-pieces *f*, which are fastened to the wind-deflecting sides *g* of the sails H, flush with said sides *g*. The bottom bearing-pieces, *h*, for the lower bearings, K, (see Fig. 8,) are similarly formed and fastened to the sails; but in this instance the pivot-pins *i* are fitted to turn in a lubricating part or oil-cup, *k*, which is fastened to the bottom rim or wheel, J. Said oil-cup *k* is fitted to the pivot-pin at its upper end, and made hollow below, as shown at *l*, to receive the oil. Thus it will be seen that as the pivot-pin turns with its lower end resting in the bottom of the cup the sails may turn easily without clogging for an indefinite length of time. If preferred, said bottom bearings, K, may be made adjustable.

Power may be imparted from the mill to a pump or machinery desired to be driven from it by fastening a bevel-gear, L, to the lower end of the shaft E, which engages with another bevel-gear, M, fastened to a horizontal shaft, N, which

turns in a bearing, O, at one end and a suitable bearing (not shown in the drawings) at its other end. Upon said horizontal shaft a suitable driving gear or pulley may be arranged and secured as required.

The swivel-slats H are each provided upon their inner edges, upon their wind-deflecting sides *g*, with angular parts P, which may be fastened to said sails in any convenient manner. To these angular parts P are hinged the ends of link-sections *m*, which connect one sail with another, and thus form a continuous chain throughout the entire circumference of the mill. Although in this instance the sails are linked together upon their inner edges, as described, they may be connected at any other desired point in a similar manner, and the form of the parts P and links *m* may be varied as required to suit the different positions in which they may be used. In this instance, as will be seen by the drawings, the parts P are provided with flanges *n n* and with a base-flange, *o*, by means of which the parts are secured to the sails, and the links *m* are hinged to said flanges *n* upon first the upper and then the lower one intermediately throughout the circumference of the mill; but I do not confine myself to this particular construction and arrangement, as before stated.

In practice I employ about thirty-six sails in an ordinary-size windmill and make said sails about double the width of the space between the pivots, as shown in the drawings; but, if preferred, any other number may be used and their widths also varied as desired. When thirty-six sails are used, as aforesaid, the width of each sail would be about one-sixth of the diameter of the mill. Said sails are cut away upon their outer sides, as shown in Figs. 2, 4, and 5, so that when they are closed, as shown in Fig. 5, they overlap each other and form close-fitting joints, the end of each preceding sail coming nearly or quite up to the shoulder *p* of the succeeding sail, as is fully shown in said Fig. 5. By thus overlapping the sails I am enabled to obtain a much larger surface for the wind to act upon than by the ordinary width of sails now in use, therefore obtaining much greater power from the same mill, which I have ascertained by actual practical tests.

The space between the blinds D may be made so as to guide the wind to only one of the sails or to any number more than one, although in practice I obtain the best effect and prefer to make the said space of sufficient width for the air to act upon two or more of the sails at once.

The opening and closing of the sails is governed so that a greater or less degree of power may be obtained from the wind by means of a governing-weight, Q, which is connected to said sails by means of connecting-rods *g*, which are hinged at their lower ends to said weight and at their upper ends to a collar, R, arranged to slide upon the central shaft or axis, E, and

connecting-rods *r*, which are hinged at their lower ends to collar R and at their upper ends to the link-sections *m*. In this instance I have adopted and shown four of these rod-connections, (see Figs. 2, 4, and 5;) but, if preferred, any other number may be used, if desired; and instead of making a continuous connection between the sails entirely around the circumference of the mill, they may be connected in sections and each section connected with the weight Q by means of one or more sets of rods, *g r*, and collars R.

Instead of hinging the upper ends of the connecting-rods *r* to the links or sail-connecting parts *m*, said rods may be hinged directly to the sails at or near the point of connection.

The weight Q is in this instance represented as being made hollow, so that a greater or less weight may be obtained by filling the same with more or less sand or other suitable weighty material; but, if preferred, it may be made solid of the proper weight required. Said weight is provided with a groove, *s*, around the same to receive the forked end of a hand operating-lever, S, hinged at *t* to a hanger, T, fastened to the under side of the frame C. The purpose of the lever S is to close the sails when required, by pulling down its outer end, a rope or chain, U, fastened at *u*, being provided for that purpose, which is extended down to any convenient place below the mill, where it may be operated.

Although I have in this instance shown the governing-weight Q below the mill for convenience in illustration, it may be placed at any point above the rim J, if desired. In practice I prefer to arrange it in the mill, with an opening for reaching it in the bottom of the frame. In either case it would be provided with a central vertical opening to allow it to slide upon shaft E.

Instead of the sails being connected at one place, as shown in Fig. 3, they may be connected by means of similar angular parts, P, and links *m* at two or more points in their lengths, if desired, in which case each connection would be connected by rods with a collar, R, and said collar with the next one under it, and so on, by means of rods, to the governing-weight Q, as before described.

In this instance governing-weights V are combined with the inner edges of four of the sails H, as shown in Figs. 2, 4, and 5, for acting as auxiliaries to the main governing-weight Q, to govern the opening and closing of said sails, as before described; but, if preferred, a greater or less number than this may be employed. The purpose of the main governing-weight Q is to draw the sails open while the mill is in operation, while that of the weights V is to produce the opposite effect—viz., to close the sails when the speed becomes too great—so that the two acting in conjunction will keep the sails in their proper position to obtain the desired speed.

I am aware that horizontal windmills have

heretofore been constructed wherein the wind blinds and sails are arranged vertically, said sails pivoted to swivel and adjusted so that they will be opened and closed by the wind, as required, by automatic governing mechanism, and therefore make no claim broadly to such features.

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

10 1. In a horizontal windmill having stationary outside wind-guiding slats, D, fastened to the frame of the tower in which the mill is arranged, and an inner revolving wheel, C', having swivel-slats H arranged upon the same, of
15 said swivel-slats H, in combination with connecting parts P m, for connecting or fastening one sail to another throughout the circumference of the inner side of the rotary wheel C', substantially as and for the purposes set forth.

2. The combination, with two or more of the sail-connecting parts P m, of connecting-rods q r, central shaft E, and governing-weight Q, substantially as and for the purpose set forth.

3. In a horizontal windmill, the combination, with the bearing-piece h, provided with pivot-pin i, and rim J, of lubricating-cup k, substantially as and for the purpose set forth.

4. In a horizontal windmill, the combination, with the circular rims I J and the wide overlapping swivel-sails H, of the inner rotary wheel, C', sail-connecting parts P m, connecting-rods q r, collar R, governing-weight Q, and central shaft or axis, E, substantially as and for the purposes set forth.

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Witnesses:

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