

(No Model.)

2 Sheets—Sheet 1.

J. JACOBS.
FEATHERING PADDLE WHEEL.

No. 527,991.

Patented Oct. 23, 1894.

Fig. 1

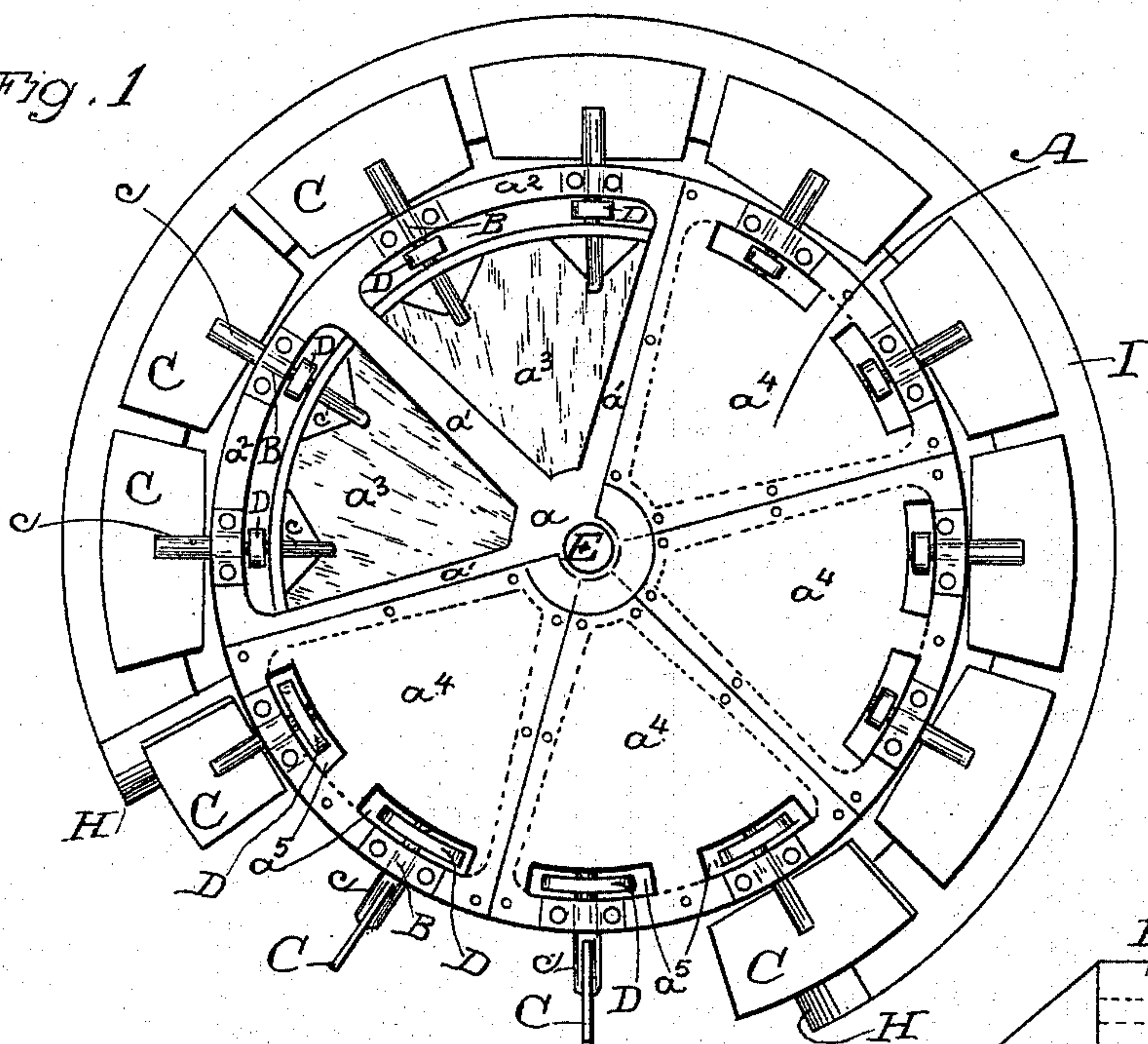


Fig. 5

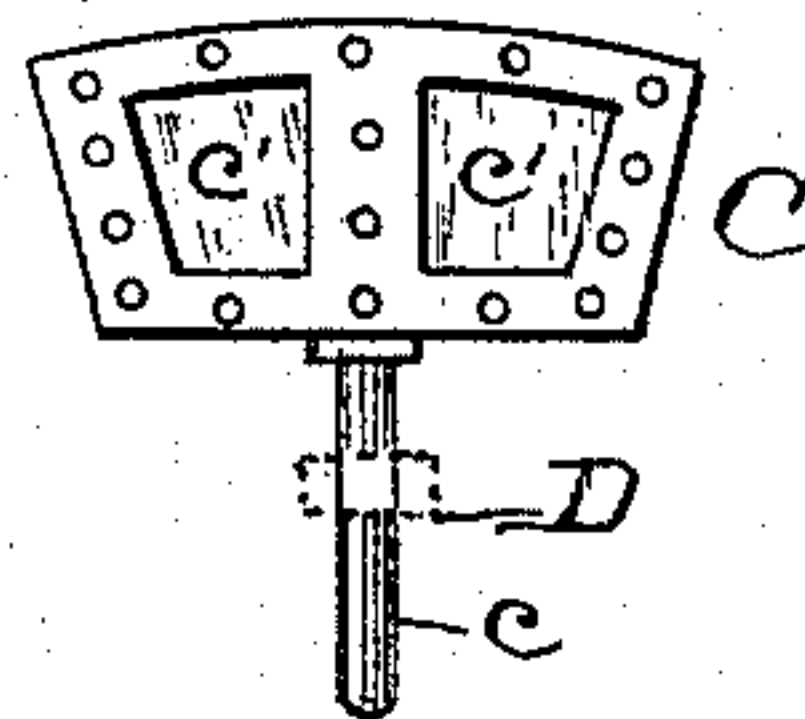


Fig. 6

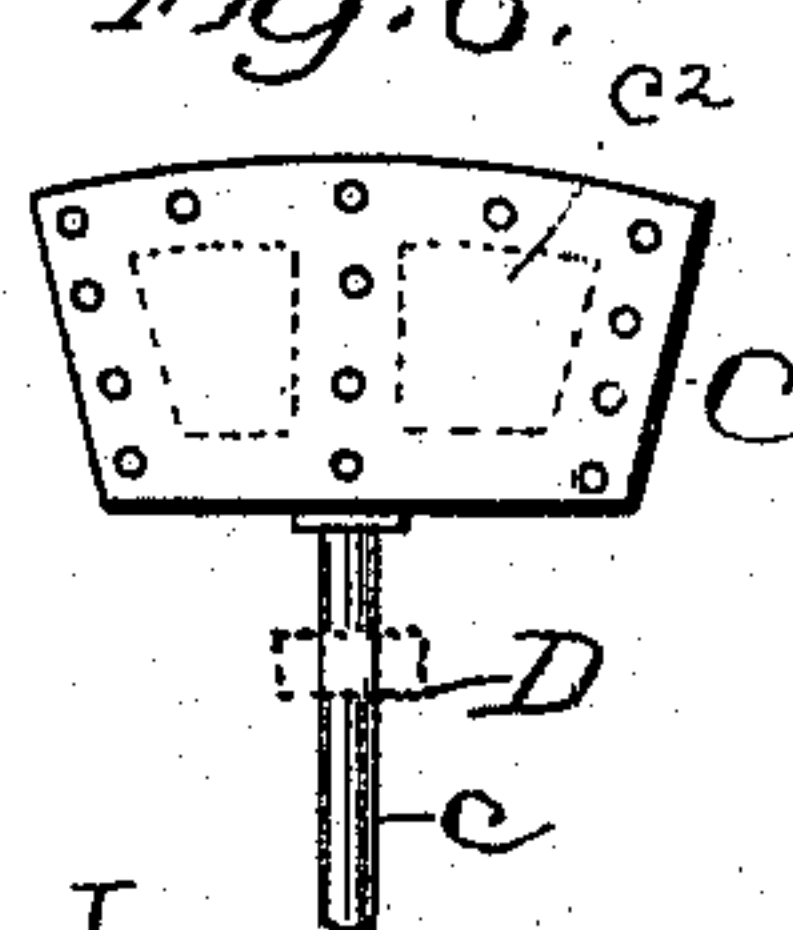
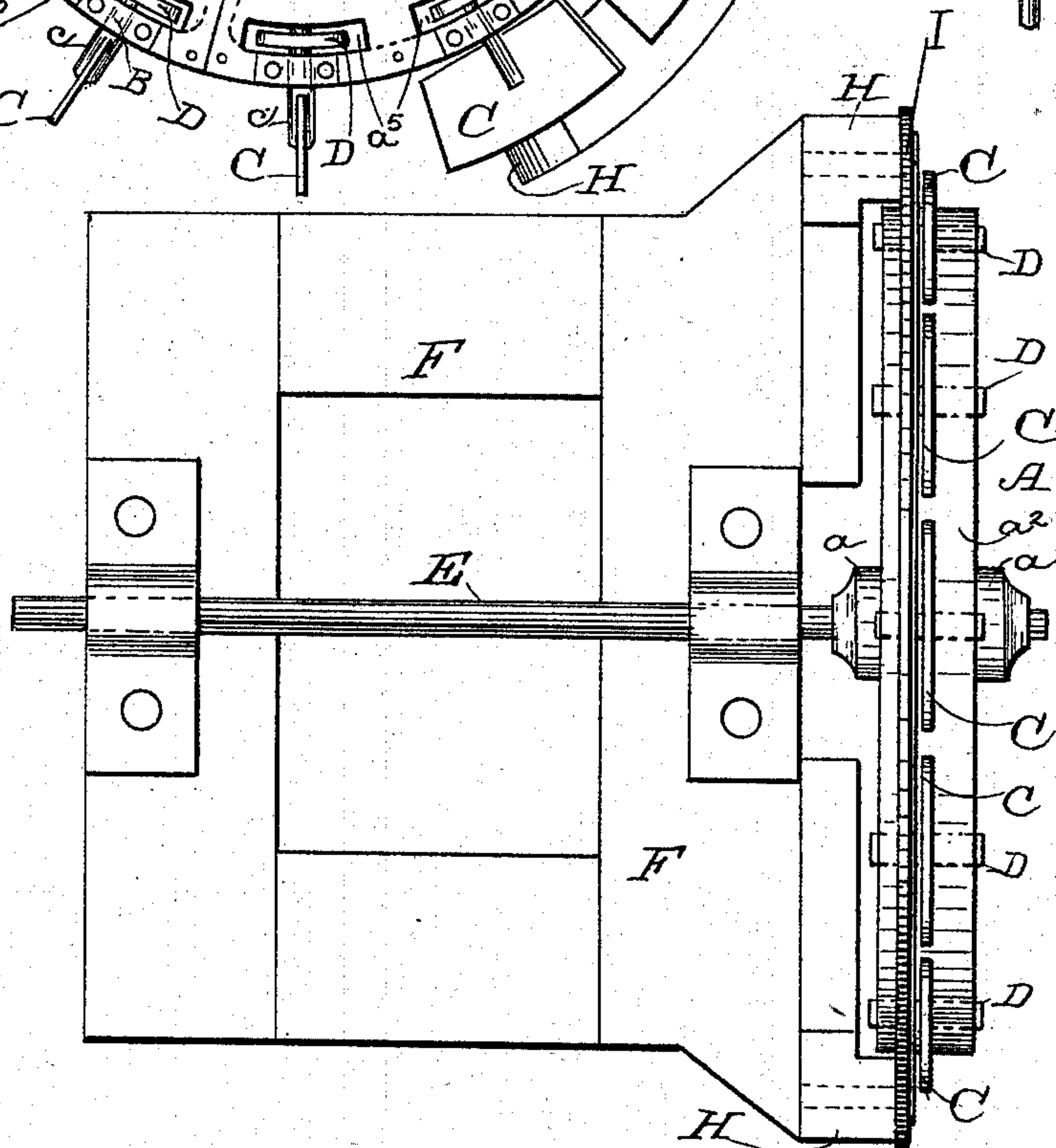


Fig. 2.



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Fig. 3

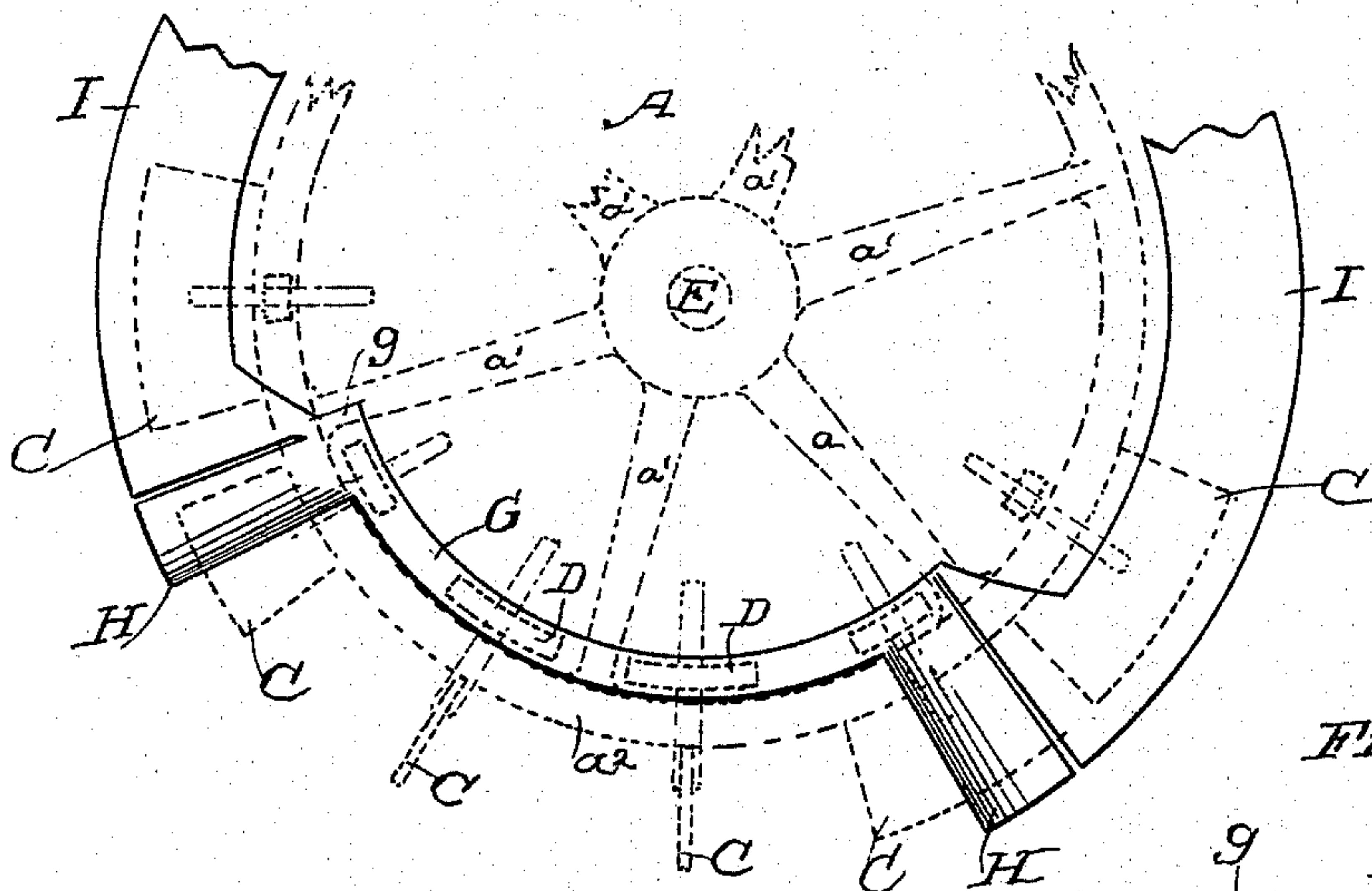


Fig. 7

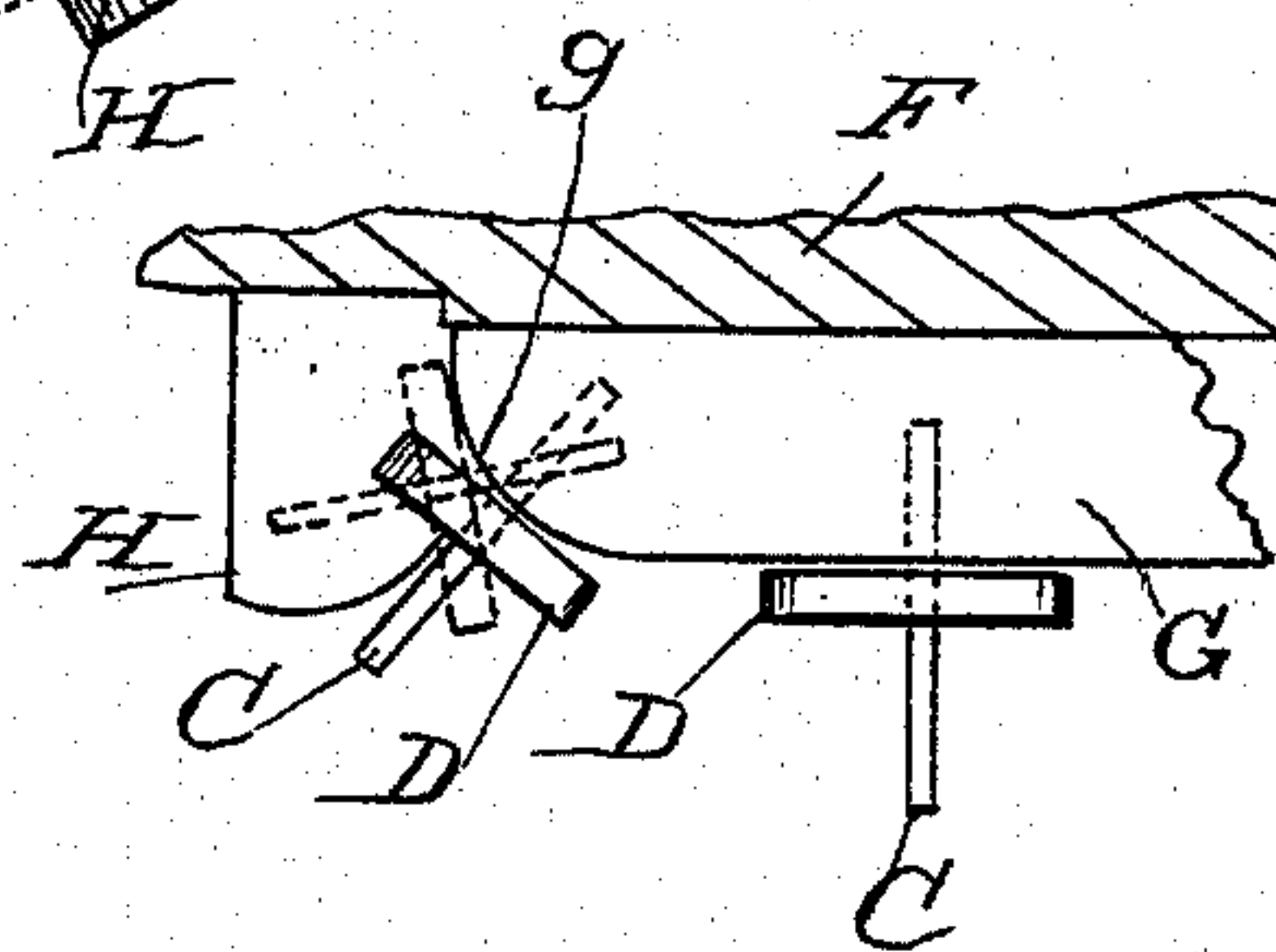
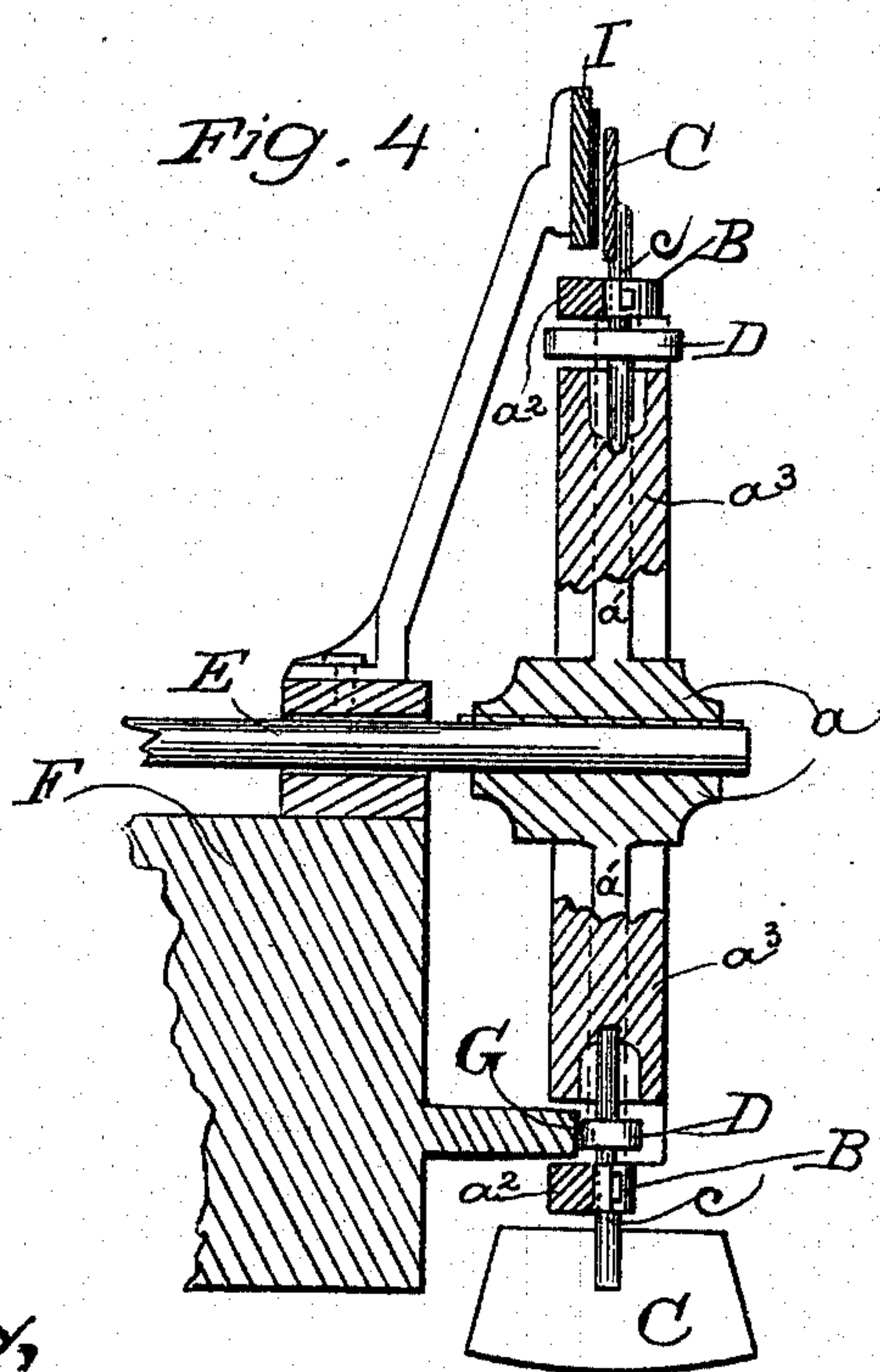


Fig. 4



Witnesses,
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UNITED STATES PATENT OFFICE.

JOSEPH JACOBS, OF NEVADA CITY, CALIFORNIA.

FEATHERING PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 527,991, dated October 23, 1894.

Application filed March 20, 1894. Serial No. 504,423. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH JACOBS, a citizen of the United States, residing at Nevada City, Nevada county, State of California, have
5 invented an Improvement in Propelling-Wheels; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of propelling wheels in which the driving blades
10 are adapted to be successively turned from the plane of rotation of the wheel to a plane at right angles thereto.

My invention consists in the novel construction of the wheel, its propelling blades
15 and the means for operating them, which I shall hereinafter fully describe.

The general object of my invention is to provide a wheel of this class of simple construction and effective in operation.

Particular advantages will appear in the course of the following description.

Referring to the accompanying drawings for a more complete explanation of my invention,—Figure 1 is an elevation of my propelling wheel. Fig. 2 is a top or plan view.
25 Fig. 3 is a front view of the cam track and guide, the wheel being shown in dotted lines. Fig. 4 is a vertical section. Fig. 5 shows the skeleton frame of a propeller blade. Fig. 6
30 is an elevation of the propeller blade finished. Fig. 7 is a plan view of one end of the cam G for turning the propelling blades.

The wheel A may be of any suitable construction consistent with lightness and strength.
35 The best form of its construction consists of a metallic skeleton composed of a hub a , radial arms a' and a rim a^2 . Between the arms are secured filling segments of wood a^3 ,
40 terminating just short of the rim leaving open spaces. Then over both sides of the wheel are secured metallic plates a^4 , having the small openings a^5 in their outer edges, just within the rim. This makes a strong and
45 light wheel with a smooth surface which offers the minimum resistance, and is capable of sustaining the pressure incident upon submerging the whole wheel. To the rim a^2 are secured the boxes B in which the short shafts
50 or short pivots c of the propelling blades C are mounted and adapted to turn. These pivots extend radially of the wheel, and the

propelling blades comprise or constitute a series extending around the entire periphery of the wheel. They are of a general sector
55 shape as shown, and the best form of their construction is that of a metallic skeleton, filled with wooden pieces c' and covered on both faces with metallic plates c^2 , thus presenting a smooth surface and having the same
60 advantages described in connection with the construction of the wheel itself. Upon each pivot c just below the rim a^2 of the wheel is mounted a cross arm D extending at right
65 angles to the length of the blade, and adapted to play through the openings a^5 in the wheel sides, and to be withdrawn therefrom and lie within and parallel thereto, in which position they practically close said openings thus reducing further the resistance.

The wheel is mounted upon a shaft E to which motion is imparted by any suitable means. This shaft is mounted upon any
70 suitable frame-work represented by F. Upon one side of this fixed frame-work is a cam track G in the form of an arc of a circle, and
75 lying opposite about the lower third of the wheel. The ends g of this track lie in the path of the cross arms D of the pivots of the blades C, when said blades lie in the plane
80 of revolution of the wheel, so that as the wheel turns, the inner end of the cross arm will come in contact with the end g of the cam track, and will be turned thereby at right
85 angles to its first position, which will have the effect of turning the driving blade to a plane at right angles to a plane of revolution of the wheel, and said blade will be held in
90 this position by the travel and contact of its cross arm with the face of the cam track during the whole length of said track. Upon the side of the fixed frame are fixed cam blocks
H, one on each side, and about opposite the ends of the cam track G. These fixed cam
95 blocks are preferably faced with a cushion material, and they lie in the path of travel of the propelling blades. There is one of these on each side.

It will now be seen that in whichever direction the wheel may be turned, the first effect
100 is that the cross arm D coming in contact with the end g of the cam track G, will turn the propelling blade at right angles to the wheel, and said blade will continue in this

position until it reaches the cam block H on the other side, whereupon coming in contact with said block, it will be turned once more into the plane of revolution of the wheel. In this latter position it presents its edge to the water and offers but slight resistance. In its former position, it presents its face to the water and offers the maximum resistance. This position of maximum resistance continues preferably through about one-third of the revolution of the wheel.

I is a fixed guide-plate, suitably cushioned or faced and against which the propelling blades, when in the plane of revolution of the wheel, travel, whereby they are guided and held accurately in position. Thus, but about one-third of the blades of the wheel present the driving portion or square front, while the other two-thirds move in planes at right angles to the driving third, thus presenting their thin portion. By this action I overcome and avoid all lifting of water also all resisting drag or dead water.

In most instances, it is intended to entirely submerge the wheel to the lowest portion of a ship or vessel, making it especially adapted for ships of war as it is liable to be disabled only by the destruction of the vessel. When used for river boats, yachts, and small craft, it may be only partly submerged.

This wheel, by reason of its general construction combining lightness with strength and the removal of all causes tending to offer resistance, and by reason of the positive and quick action of the means for turning the driving blades, is especially adapted for complete submergence, and is, therefore, particularly useful for tugs in towing boats on canals, and for the boats themselves, as the very slight disturbance of the water caused by its operation results in preventing washing and wearing of the canal banks.

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

1. A propelling wheel having a series of driving blades adapted to be turned from the plane of rotation of the wheel to a plane at right angles thereto and back again, the body

of said wheel being composed of a metallic skeleton, filled with wooden pieces, and having both faces covered with metallic plates whereby a light strong wheel with minimum resistance and adapted to be completely submerged is obtained, substantially as herein described.

2. A propelling wheel consisting of a body composed of a metallic skeleton filled with wooden pieces, leaving openings near the wheel rim and covered on each side by metallic plates formed with openings in their outer edges, and a series of driving blades having radial shafts pivoted in the wheel rim and provided with cross arms adapted to be acted upon by fixed cams, to turn the blades into and out of action, said arms playing in and out through the openings in the wheel plates, substantially as herein described.

3. A propelling wheel consisting of a body composed of a metallic skeleton filled with wooden pieces leaving openings near the wheel rim, and covered on each side by metallic plates formed with openings in their outer edges, a series of driving blades composed of metallic skeletons filled with wooden pieces and covered on each side with metallic plates, radial shafts carrying said blades and mounted in the wheel rim, cross arms on said shafts playing in and out of the openings in the sides of the wheels, the fixed cam track against the ends of which the said arms come in contact and against the body of which said arms travel whereby said blades are turned and held through a portion of the revolution of the wheel, and the fixed cam blocks adjacent to the ends of the cam track and lying in the path of said blades whereby through contact therewith said blades are returned, the whole wheel being adapted to be completely submerged, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOSEPH JACOBS.

Witnesses.

W. W. WAGGONER,
B. S. RECTOR.