

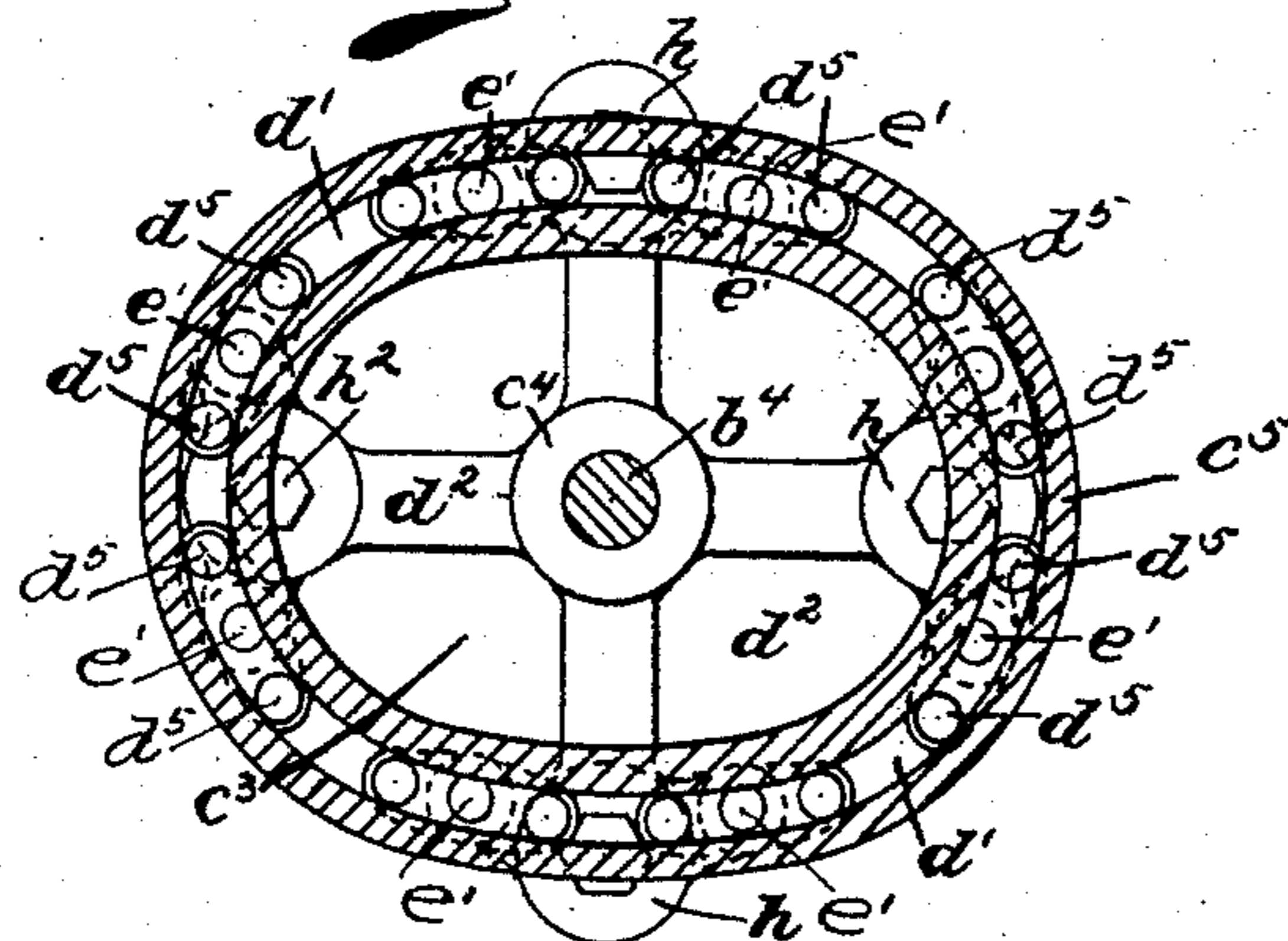
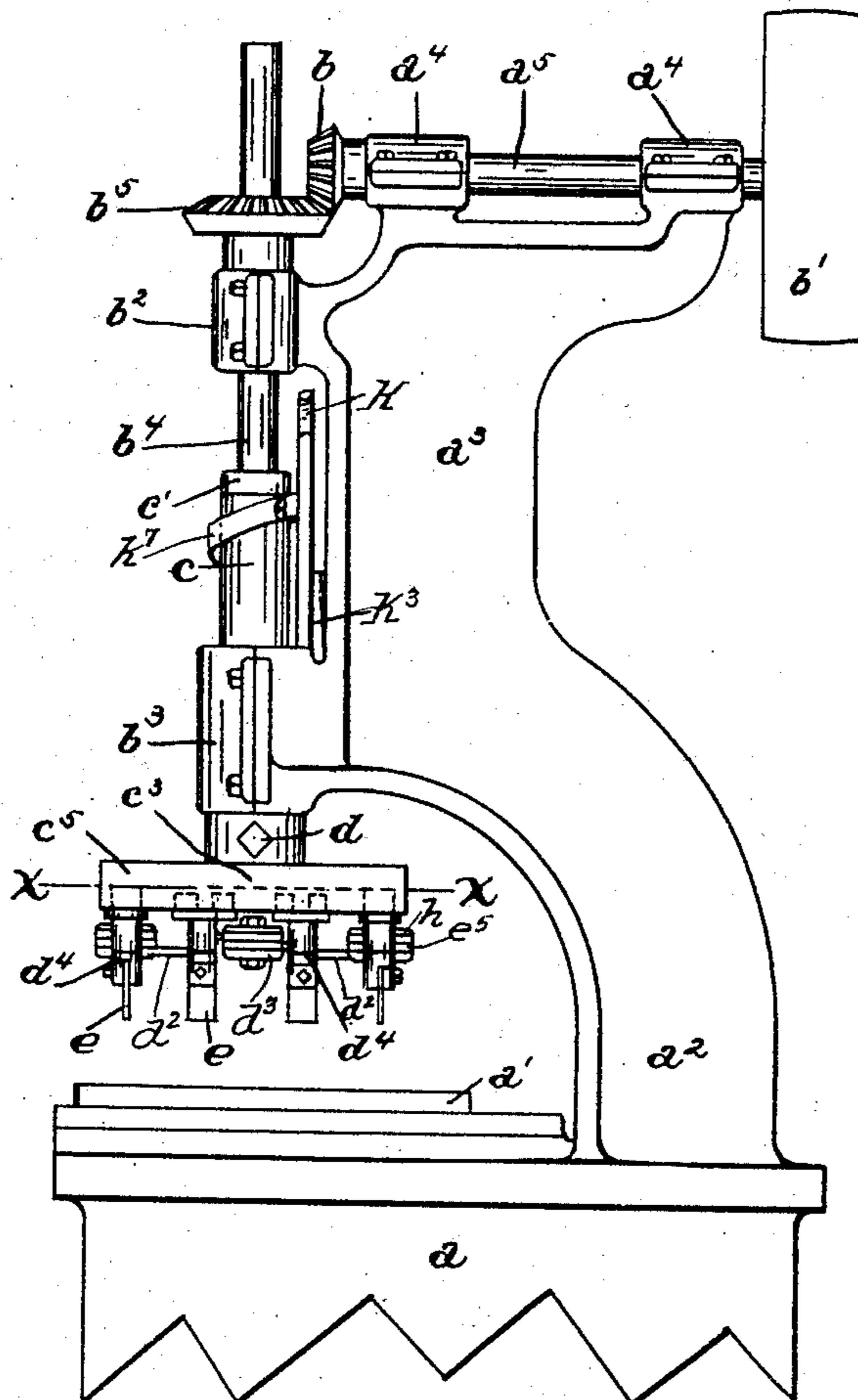
No. 781,569.

PATENTED JAN. 31, 1905.

J. F. STIERER.
MACHINE FOR SAWING MARBLE.

APPLICATION FILED DEC. 12, 1903.

3 SHEETS--SHEET 1.



Witnesses
L. Kemp
Henry Bauer

Fig. 2. *Inventor*
John F. Stier
per J. W. Thill
Attorney

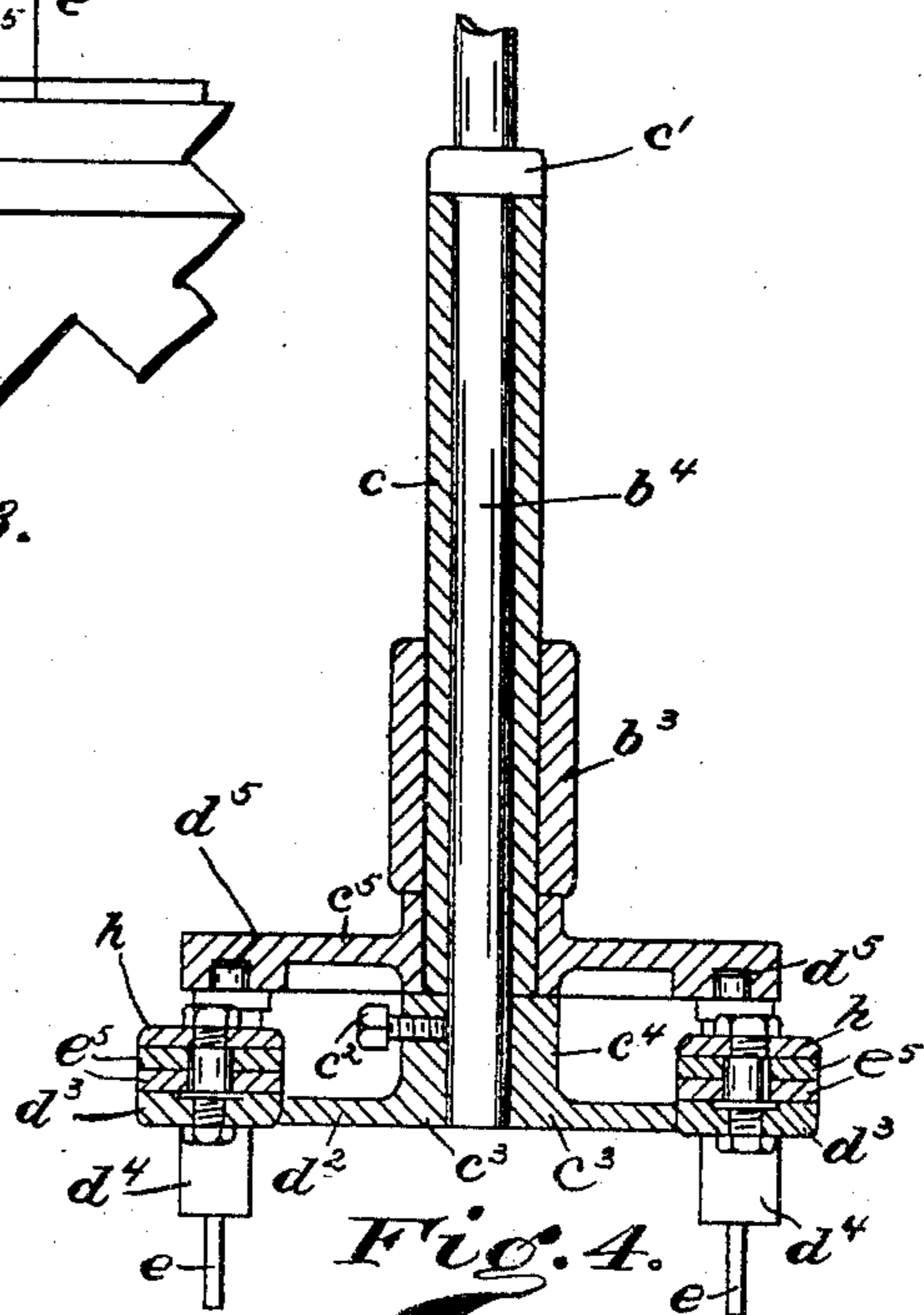
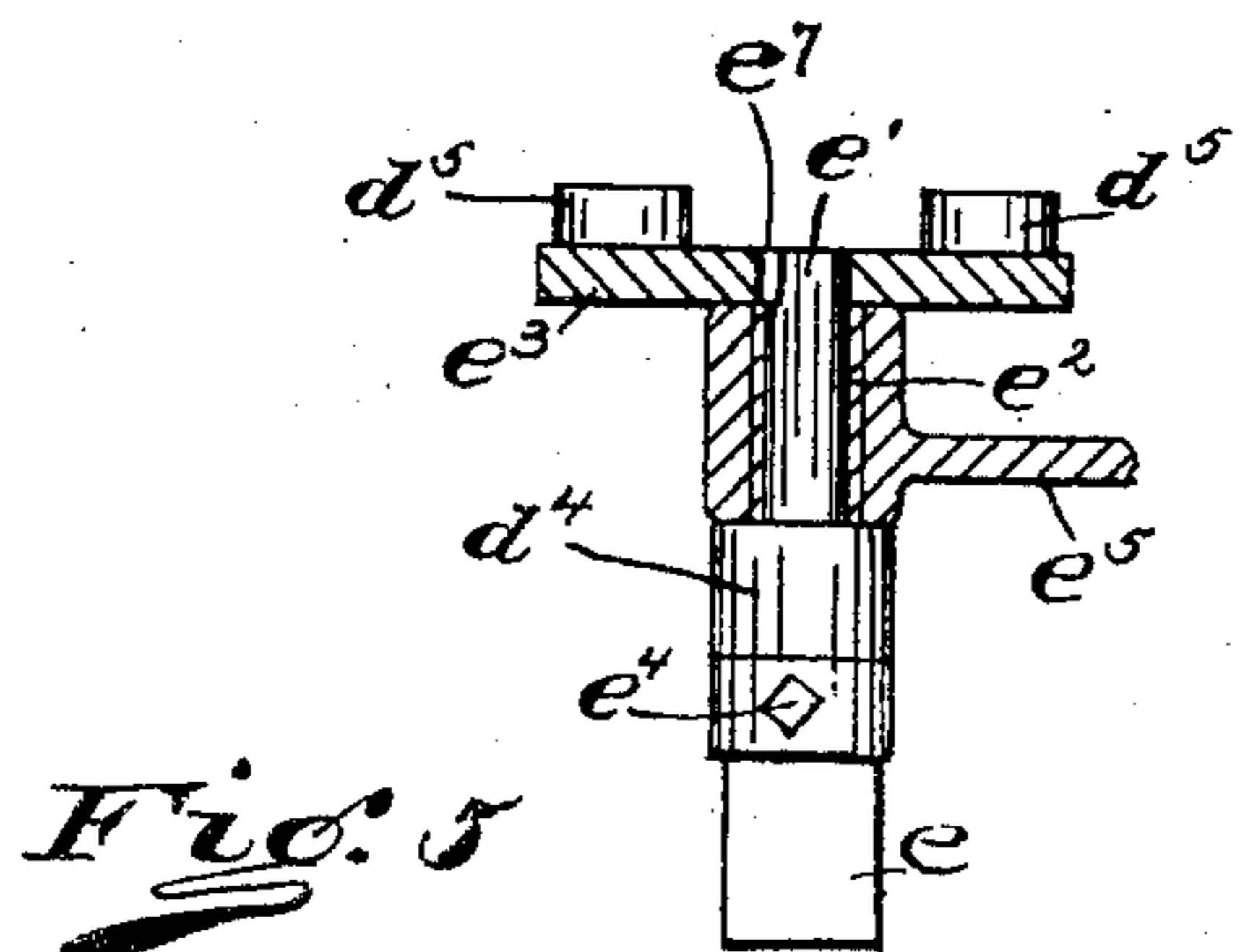
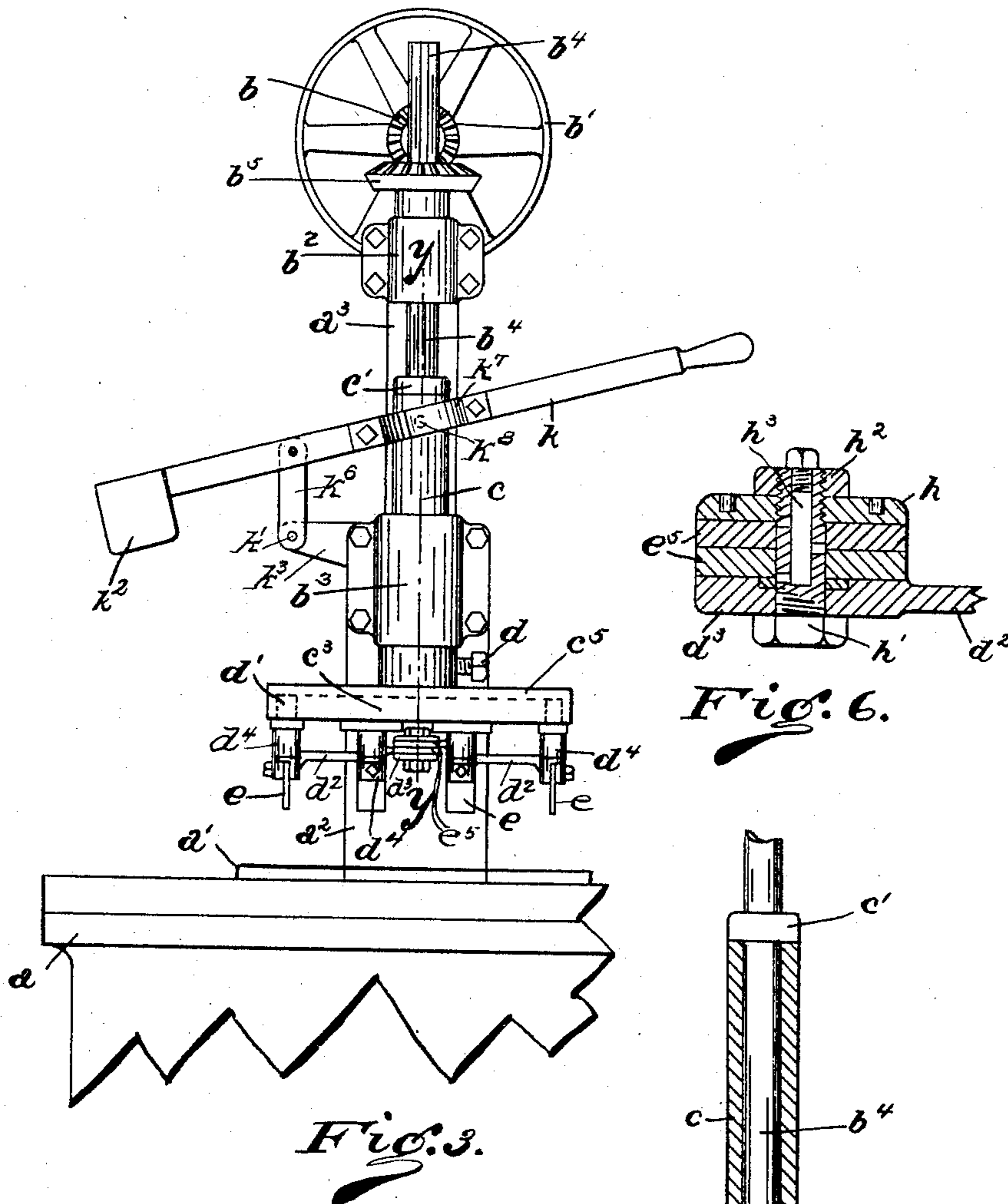
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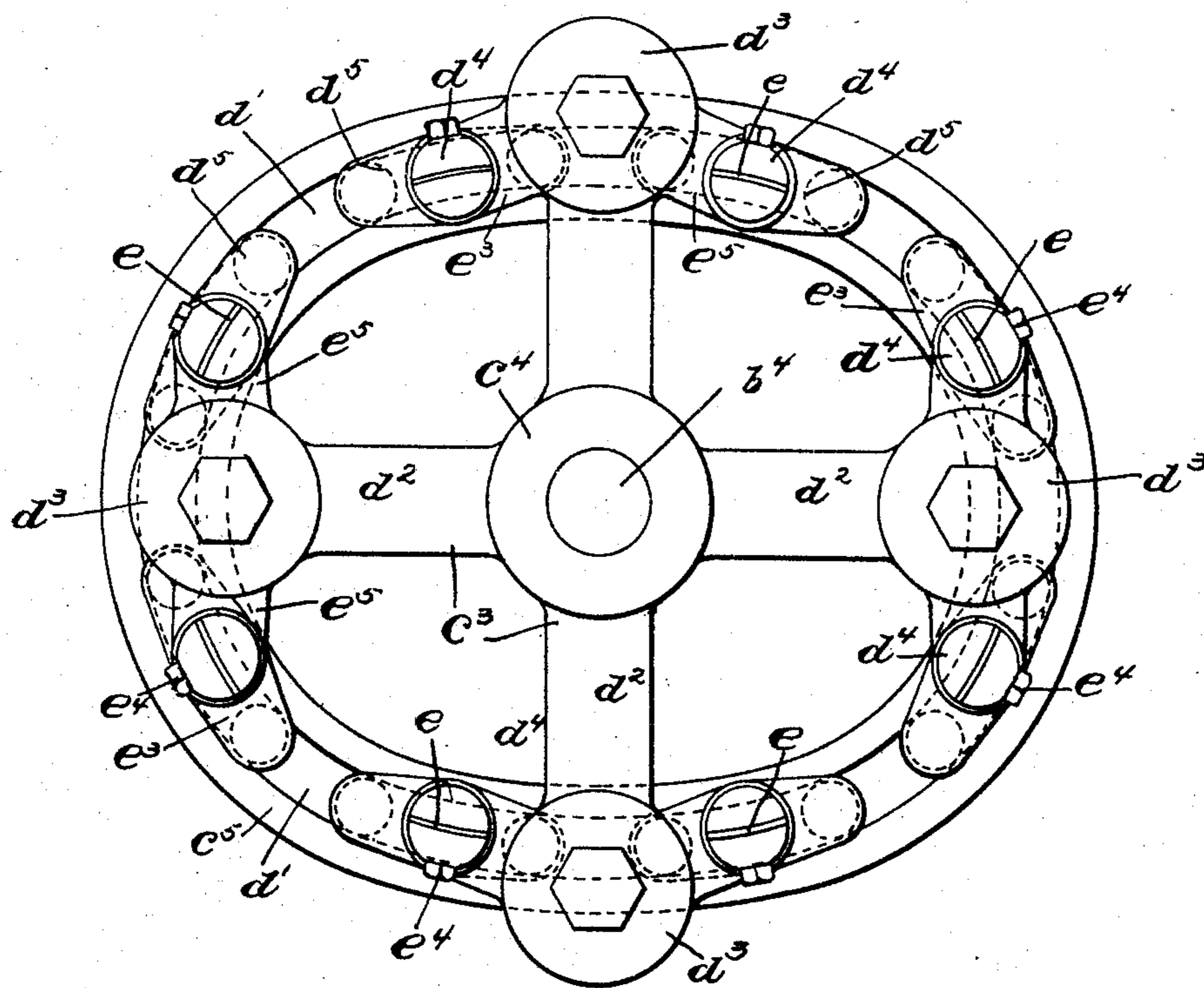


Fig. 7.

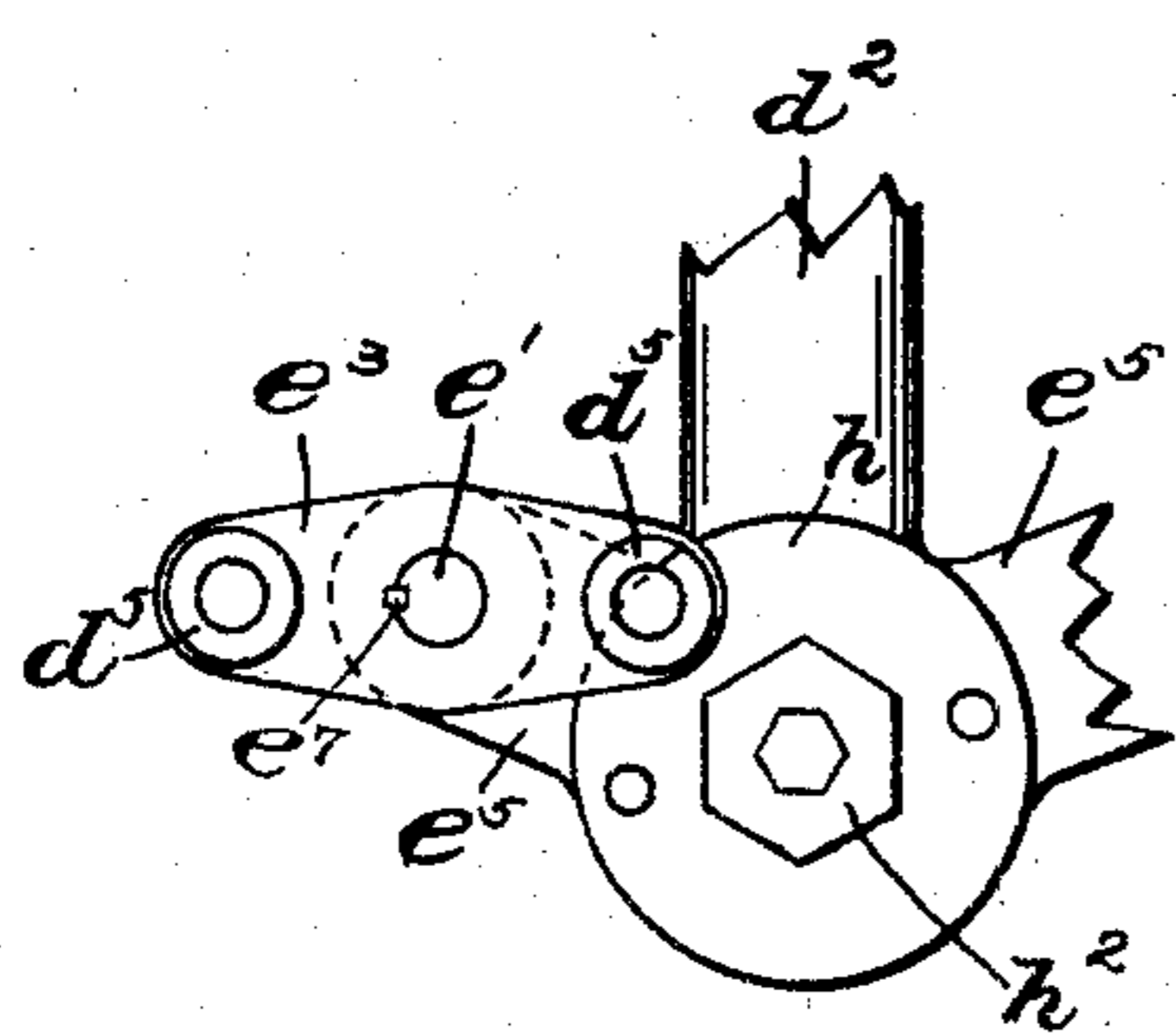


Fig. 8.

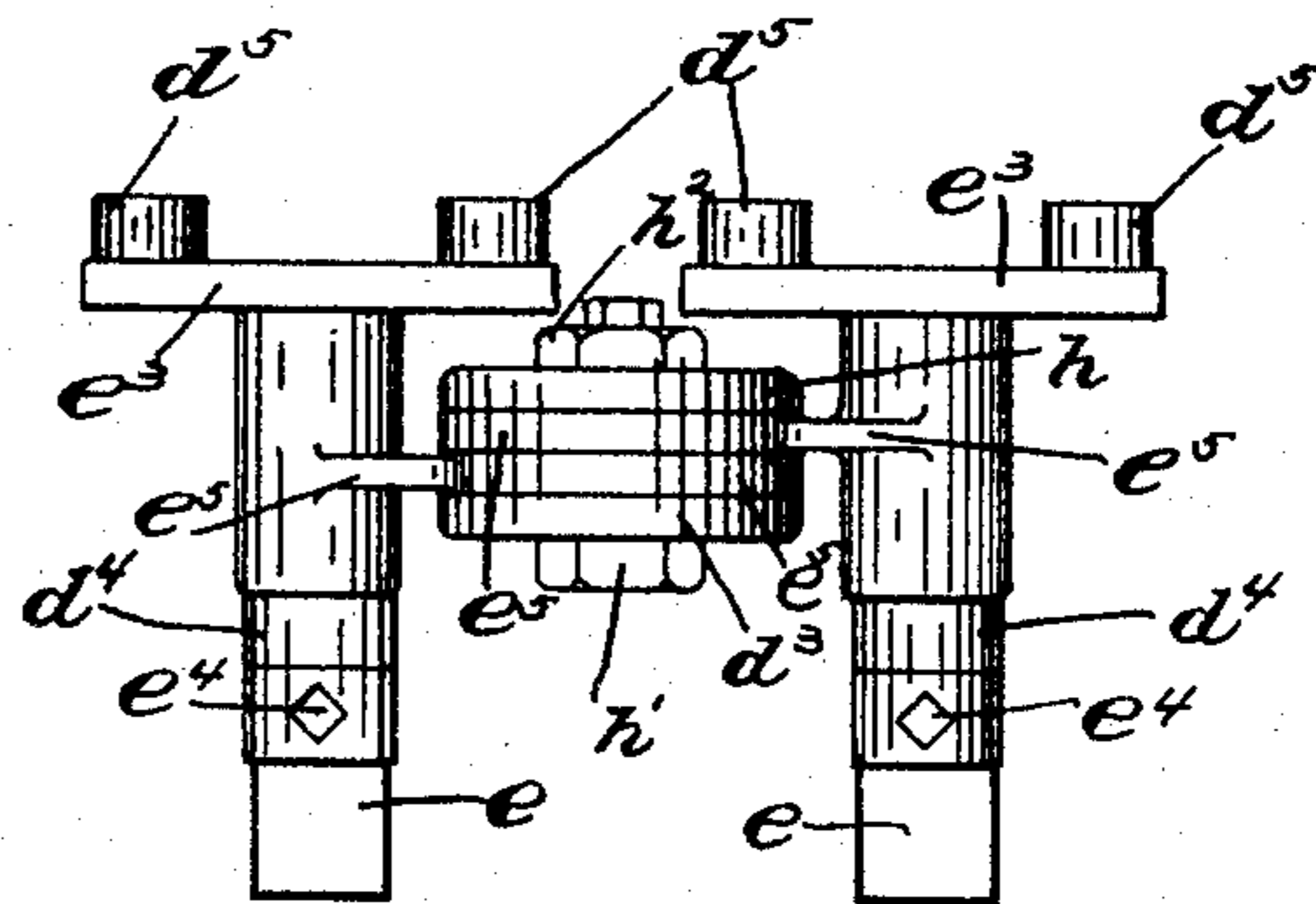


Fig. 9.

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UNITED STATES PATENT OFFICE.

JOHN F. STIERER, OF NEWPORT, KENTUCKY, ASSIGNOR OF ONE-HALF TO
MATTHEW L. McDONOUGH, OF CINCINNATI, OHIO.

MACHINE FOR SAWING MARBLE.

SPECIFICATION forming part of Letters Patent No. 781,569, dated January 31, 1905.

Application filed December 12, 1903. Serial No. 184,987.

To all whom it may concern:

Be it known that I, JOHN F. STIERER, a citizen of the United States, residing in the city of Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Machines for Sawing Marble, of which the following is a specification.

The object of my invention is to produce a cheap, simple, and efficient machine for sawing or cutting ovals or other shapes in marble slabs, thus leaving in the marble slab an oval or similar shaped opening or hole. These slabs are then used for washstands, in wash-basins, toilet-rooms, and the like.

My machine belongs to that class of marble-sawing machines in which a revolving cutter-head or saw-head holding saw blades or teeth revolves in a cam or guide, the saw blades or teeth being automatically kept in curvilinear motion to follow out the line of the oval or shape being cut.

The improvement consists, essentially, of a spider rigidly attached to the lower end of a revolving shaft, of pivoted swinging journal-bearing arms pivoted to said spider at one end and at the other or loose end forming journal-bearings for a short shaft, which shaft carries at its lower end a chuck, saw-head, or saw-carrier and at its upper end a flange, said flange carrying rollers, which rollers travel in a cam-groove in the cam, the swinging journal-bearing arms at their pivotal point being connected and built up to form a knuckle-joint mechanism between the sets of saw-carriers, said knuckle-joints acting as self-adjustments to automatically keep the saws in their proper oval, elliptical, or similar shaped course and in harmony with the groove in the cam.

In my machine friction is cut down to a minimum, and I provide oil-cups in the knuckle-joints, so that they are at all times properly oiled.

In the accompanying drawings, forming part of this specification, Figure 1 is a side view of the machine, the base upon which it rests being partly broken away. Fig. 2 is a section through the cam, taken at the lines x of Fig. 1 and looking down upon the cam

and connecting parts. Fig. 3 is a front view of the machine, the base upon which it rests being partly broken away. Fig. 4 is a central longitudinal section taken at the line $y y$ of Fig. 3, the view being on an enlarged scale. Fig. 5 is an enlarged view of the journal-bearing for the short shaft and part of the pivotal journal-bearing arm (these parts being in section) and a side view of one of the saw-carriers with saw attached, of the short shaft, of the supporting-flange for the rollers, and the rollers mounted thereon, the flange being shown in section. Fig. 6 is an enlarged sectional view of the knuckle-joint mechanism between the saw-carriers, where the swinging journal-bearing arms are pivoted together on the spider-arm, and of the oil-cup in said knuckle-joint mechanism. Fig. 7 is a bottom view of the cam, spider, saw-carriers or cutters, and connecting parts. Fig. 8 is an enlarged view looking down upon the pivotal meeting-point between the spider-arms and the pivoted ends of the swinging journal-bearing arms on the supporting-flange for the rollers and the rollers and the short shaft, the journal-bearing for short shaft being shown in dotted lines, the spider-arm and one of the journal-bearing arms being partly broken away. Fig. 9 is an enlarged view in elevation of two saw-carriers and saws of supporting-flanges for rollers and of the rollers of the enlarged heads on the journal-bearing arms, the journal-bearing arms, and of the knuckle-joint mechanism formed where the journal-bearing arms meet the spider-arms and are connected together.

The machine rests upon a base or table a or any proper support. The marble slab a' (to be cut or sawed) is placed upon the table a . The frame of the machine consists of an upwardly-extending curved arm a^2 , having an extension or head a^3 , carrying at its upper extremity bearings a^4 , which support a short shaft a^5 , carrying at the forward end a gear-wheel b and at its rear end a pulley b' . As above stated, the curved arm a^2 has an extension or head a^3 . This extension or head a^3 extends upwardly from the curved arm a^2 . From the upper forward part of the head or extension a^3 extends outwardly the housing or

sleeve b^2 , and from the upper forward part of the curved arm a^2 (where it meets the head a^3) projects outwardly the housing or sleeve b^3 . These housings or sleeves are split, so that they can be tightened to take up lost motion. Through these sleeves or housings $b^2 b^3$ passes the long upright shaft b^4 , carrying at its upper end the gear-wheel b^5 . This gear-wheel b^5 meshes with and is revolved by the gear-wheel b on short shaft a^5 , and in this manner the shaft b^4 is revolved. A long sleeve c passes over or encircles the lower half of the shaft b^4 , a collar c' on the shaft b^4 retarding any upward movement of the sleeve c . (See particularly Fig. 4.)

To the lower end of the shaft b^4 I rigidly attach, by means of set-screws c^2 , (see Fig. 4,) the cutter-head or saw-head c^3 . The sleeve c rests on the top of the central stem c^4 of the cutter or saw head c^3 . (See Fig. 4.)

Between the lower end of the housing or sleeve b^3 and the top of the central stem c^4 of the cutter or saw head c^3 is placed the cam c^5 , being rigidly held between them by set-screws d . (See Figs. 1 and 3.) The cam c^5 in the present instance is of an oval shape and carries in its lower face an oval-shaped groove d' . This cam may be of any other oval or elliptical contour or any shape possible to be followed by a set of saws or cutters to be used in sawing a peculiar-shaped opening in marble slabs, as may also be the groove in the face of the cam.

The cutter or saw-head c^3 consists of a spider, in the present instance formed by four arms d^2 , (see Figs. 2, 4, and 7,) integral with and extending out from central stem c^4 . As before stated, this spider is attached rigidly by set-screws c^2 to central shaft b^4 and is revolved by the said shaft. (See Fig. 4.) The arms d^2 extend out and at their ends form supports or a base d^3 for the knuckle-joints, which operate between the sets of saw-carriers d^4 , supporting-flanges d^3 for the rollers, the rollers d^5 , short shaft e' , and the saws or cutters e . In the present instance I use eight of these saw-carriers d^4 and their connections, two between each knuckle-joint. These saw carriers or heads d^4 are of the shape shown, (see Figs. 5 and 9,) having at their upper ends a short shaft e' , rigidly connected thereto or made integral therewith. This short shaft e' (in the present instance) is keyed at its top to the supporting-flange e^3 (which carries the rollers d^5) by key e^7 . The dotted lines in Fig. 8 show the top of the enlarged head at the loose end of the journal-bearing arms e^5 , in which the short shaft e' is journaled. The stem or short shaft e' turns in a bushing e^2 in the enlarged ends of the journal-bearing arms e^5 as the rollers d^5 travel in the groove d' in the cam c^5 , and in this manner the saws or cutters e , which are attached to the saw-carriers d^4 , are kept in the peculiar curvilinear motion in connection with the knuckle-joint mechanism, inasmuch

as the saw-carriers d^4 are secured to the short shafts e' , so as to turn therewith as the plate or flange e^3 and the shaft e' are turned by the tracking of the rollers d^5 through the cam-slot d' .

The cutter or saw blade e is slipped up into a recess in the lower part of the saw-carrier d^4 and held in place by a set-screw e^4 .

Each of the saw-carriers d^4 is supported by its short shaft e' in a bearing formed in the enlarged head of the outer end of the swinging journal-bearing arm e^5 , which is pivotally supported at its inner end upon a base d^3 at the outer end of one of the spider-arms d^2 , and the other arm e^5 of the next adjoining saw-carrier rests directly on the end of the arm e^5 first above mentioned, where they all meet on said base d^3 of spider-arm d^2 , (see Figs. 4, 6, 8, and 9,) so that when the washer h is placed on them at their juncture and bolt-and-nut connection $h' h^2$ put in place to hold them together (see Figs. 6 and 9) a knuckle-joint mechanism is formed.

The journal-bearing arms e^5 , base d^3 , and washer h properly connected together form the knuckle-joint mechanism between each set of saw-carriers, (two saw-carriers,) the arms e^5 furnishing swinging bearings for the short shafts e' , which are journaled in the enlarged free ends thereof. The bolt h' has a recess h^3 located therein, (see Fig. 6,) to be used for oil to lubricate the knuckle-joint. This knuckle-joint mechanism between the sets of saw-carriers d^4 of course also supports said saw-carriers through the medium of pivoted journal-bearing arms e^5 as well as furnish a swinging bearing for short shaft e' , and consequently the cutters or saws e , (which are on said saw-carriers d^4 ,) are kept in their proper traveling course, keeping them in harmony with the path described by the rollers d^5 in the cam-slot d' in the cam c^5 . To do this, the knuckle-joints are of course yielding—that is, working in and out at the ends of the oval—being all within the radius of a circle which would be described by the length of the oval and at the sides where a smaller circle would be described extending out, thus between these two points automatically adjusting and adapting themselves, and consequently the saws, to the varying distances of the center, naturally described by the oval or elliptical contour.

The sleeve c , cutter-head c^3 , cam c^5 , the spider formed of arms d^2 , saw-carriers d^4 , knuckle-joints, saws or cutters e , and connecting parts attached to the cutter-head and cam are raised off of the work by the lever k , fulcrumed at k' , through the medium of a link k^6 , carrying a weight k^2 and connected by a short arm k^3 to the sleeve or housing b^3 by means of a strap k^7 , which encircles the sleeve c and is held in place by a pin k^8 . The lever k is attached to the said sleeve c . (See particularly Figs. 1 and 3.) The weight k^2 acts

as a counterbalance when the parts are elevated, as shown in Fig. 1. When the lever k is pressed down, the counterbalance-weight k^2 is lifted, and the sleeve c , cutter-head, cam, spider, saw-carriers, saws or cutters, and the connecting parts are lowered down upon the work, the weight of all these parts being sufficient to hold them down upon the work and keep forcing the saws or cutters c down into the marble as they describe their course to cut the oval. When the saws or cutters have cut through the marble slab, the parts are raised by lifting the lever, the counterbalance-weight k^2 falling to the position shown in Fig. 3, thus holding the cam, cutters, and connecting parts off of the work.

The machine operates as follows: A slab of marble a' is first placed on the table or base a . The sleeve c , cutter-head, cam, spider, saw-carriers, saws and knuckle-joint mechanism and connecting parts above referred to are lowered upon the marble slab by pulling down on the lever k , thus raising the weight k^2 . The belt is thrown on the pulley b' , which operates the short shaft a^5 , carrying at its end gear-wheel b . This gear-wheel b meshing with gear-wheel b^5 on shaft b^4 imparts motion to said shaft and revolves it. The cutter or saw head which is rigidly attached to the revolving shaft b^4 , (see Fig. 4,) revolves with it, the rollers d^5 traveling in the groove d' of the stationary cam c^5 , forcing the saw carriers d^4 to move in the path of the oval contour, the short shaft e' turning in the enlarged head or journal-bearing at the loose ends of the arms e^5 in which the short shaft e' is journaled. The saws or cutters c of course moving always with the saw-carriers d^4 , are forced deeper into the marble, the knuckle-joints between the sets of saw-carriers d^4 supporting the saw-carriers and saws and guiding them by their yielding in-and-out movement to conform to the elliptic or oval shape being sawed, the heavy weight of the sleeve, spider, cam, saw-carriers, and connecting parts of course keeping the saws or cutters down to their work. Water and sand are used with the sawing device. When the cut is finished, the parts are raised and the marble pieces removed.

The saws or blades are slightly concaved according to the oval to be described. Each different-sized oval or contour to be sawed requires a different-sized cam and cutter or saw head.

I may use as many saws or cutters as de-

sired and connect them in any manner to the arms. I may use as many arms on the spider as desired and change its form and shape. The cam may be differently formed, as may also the saw-carriers and roller-supporting flanges. I may connect this cam, cutter or saw head, and connecting parts to any other form of machine different than the form herein specifically set forth.

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

1. In a machine for sawing marble, a revolving shaft, a stationary cam provided with a cam-groove, a spider on said revolving shaft, to revolve therewith, pivoted journal-bearing arms, saw-carriers, said saw-carriers journaled in the free ends of said journal-bearing arms, and means for operating said saw-carriers to travel in the cam-groove, all combined and operating as set forth.

2. In a machine for sawing marble, a revolving shaft, a stationary cam provided with a cam-groove, a spider on said revolving shaft to revolve therewith, swinging journal-bearing arms pivoted to said spider, saw-carriers, said saw-carriers journaled in the free end of said journal-bearing arms, means for connecting said arms together to form a knuckle-joint, flanges and saws carried by said saw-carriers, and rollers carried by said flanges to engage said cam-groove, all combined and operating as set forth.

3. In a machine for sawing marble, a revolving shaft, a stationary cam provided with a cam-groove, a spider on said revolving shaft to revolve therewith, swinging journal-bearing arms pivoted to said spider, saw-carriers, said saw-carriers journaled in the free ends of said journal-bearing arms, means for connecting said arms together to form a knuckle-joint, an oil-cup in said knuckle-joint, flanges and saws carried by said saw-carriers, and rollers carried by said flanges to engage said cam-groove, all combined and operating as set forth.

4. In a machine for sawing marble, a revolving shaft, a stationary cam provided with a groove, a spider carried by said revolving shaft, saw-carriers, means for operating said saw-carriers in combination with pivoted journal-bearing arms, all combined and operating as set forth.

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Witnesses:

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REUBEN ROSTERT.