

(No Model.)

4 Sheets—Sheet 1.

H. K. JONES.

MACHINE FOR SPIRALLY SCORING WIRE.

No. 315,144.

Patented Apr. 7, 1885.

Fig. 1.

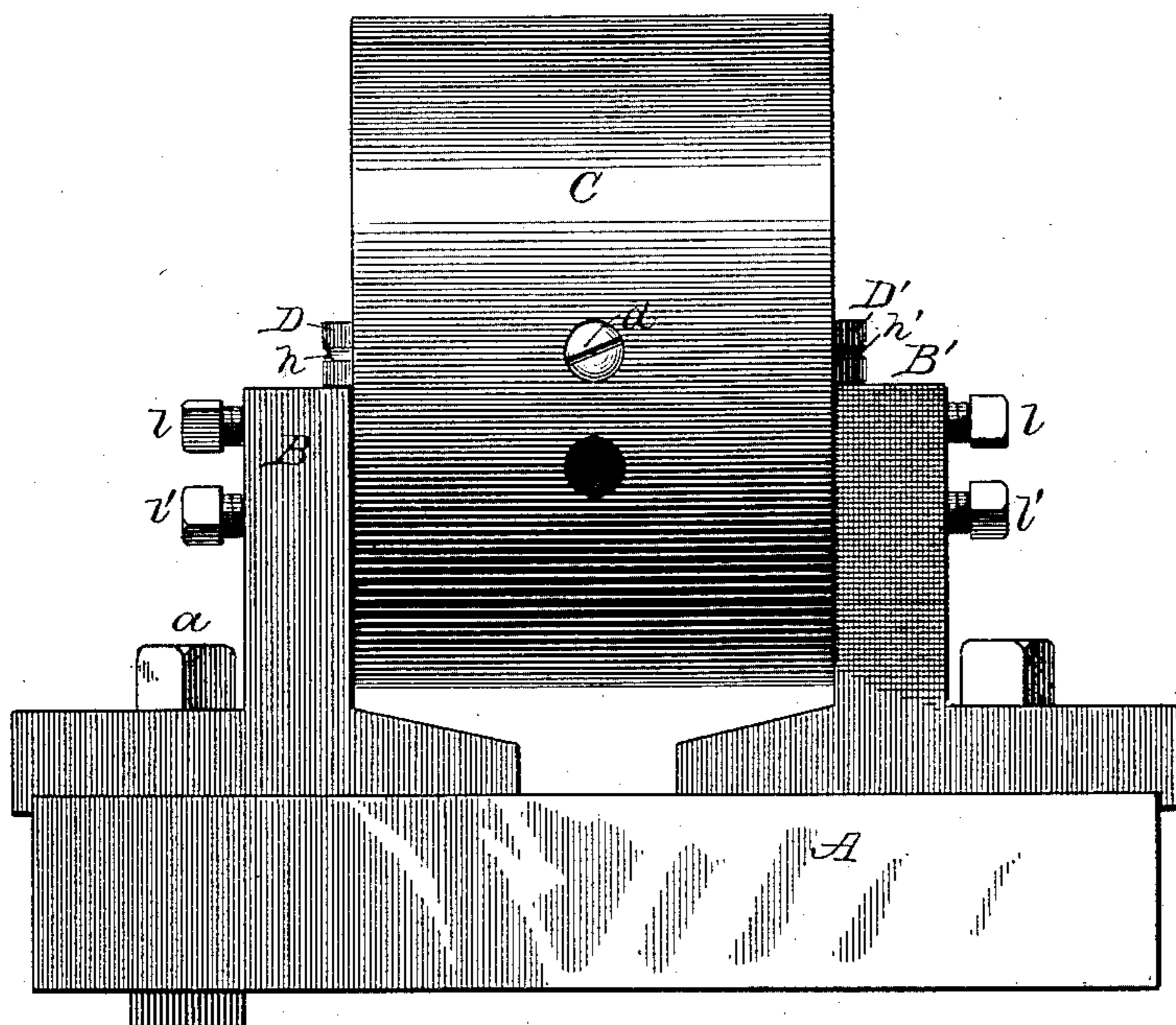


Fig. 2.

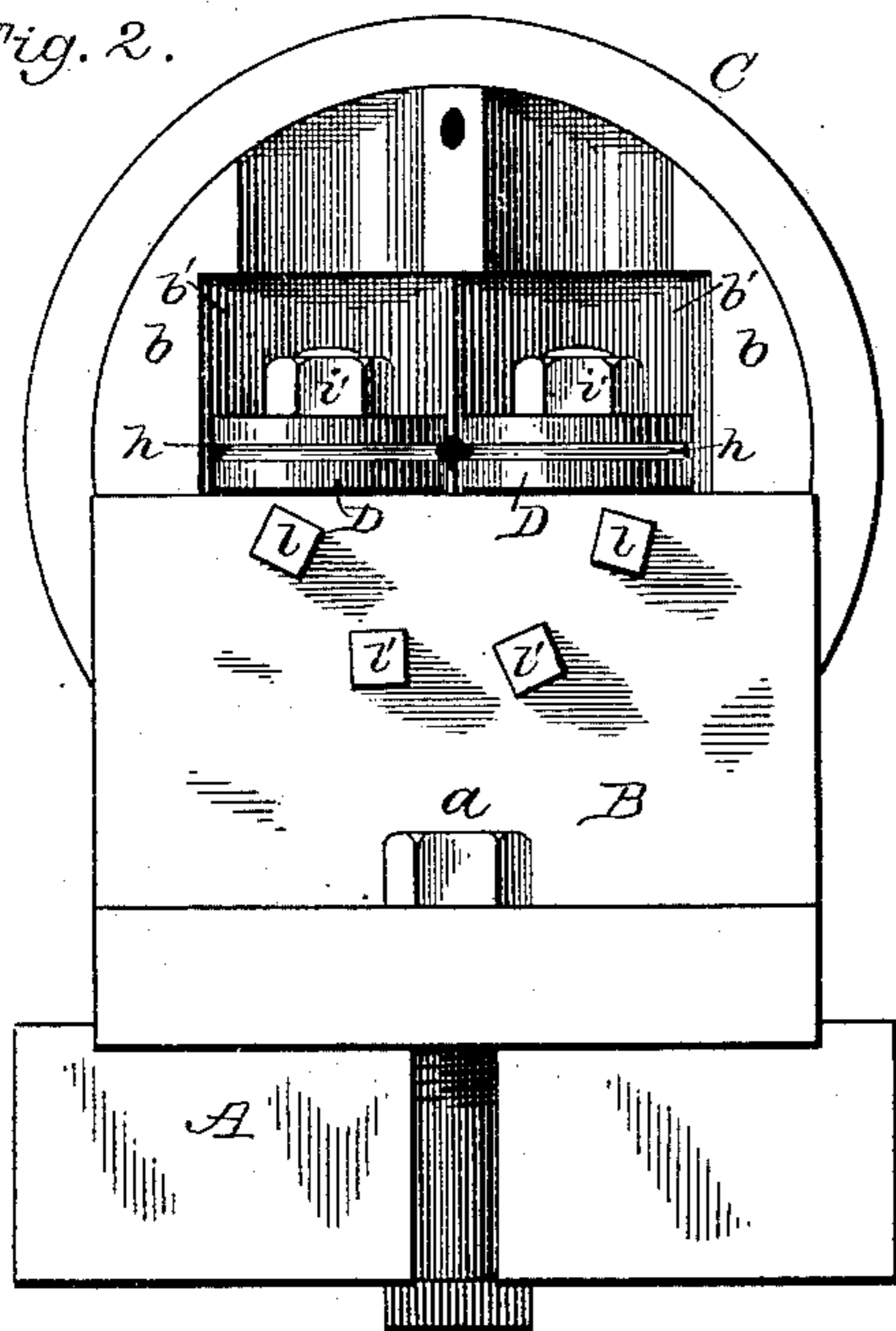
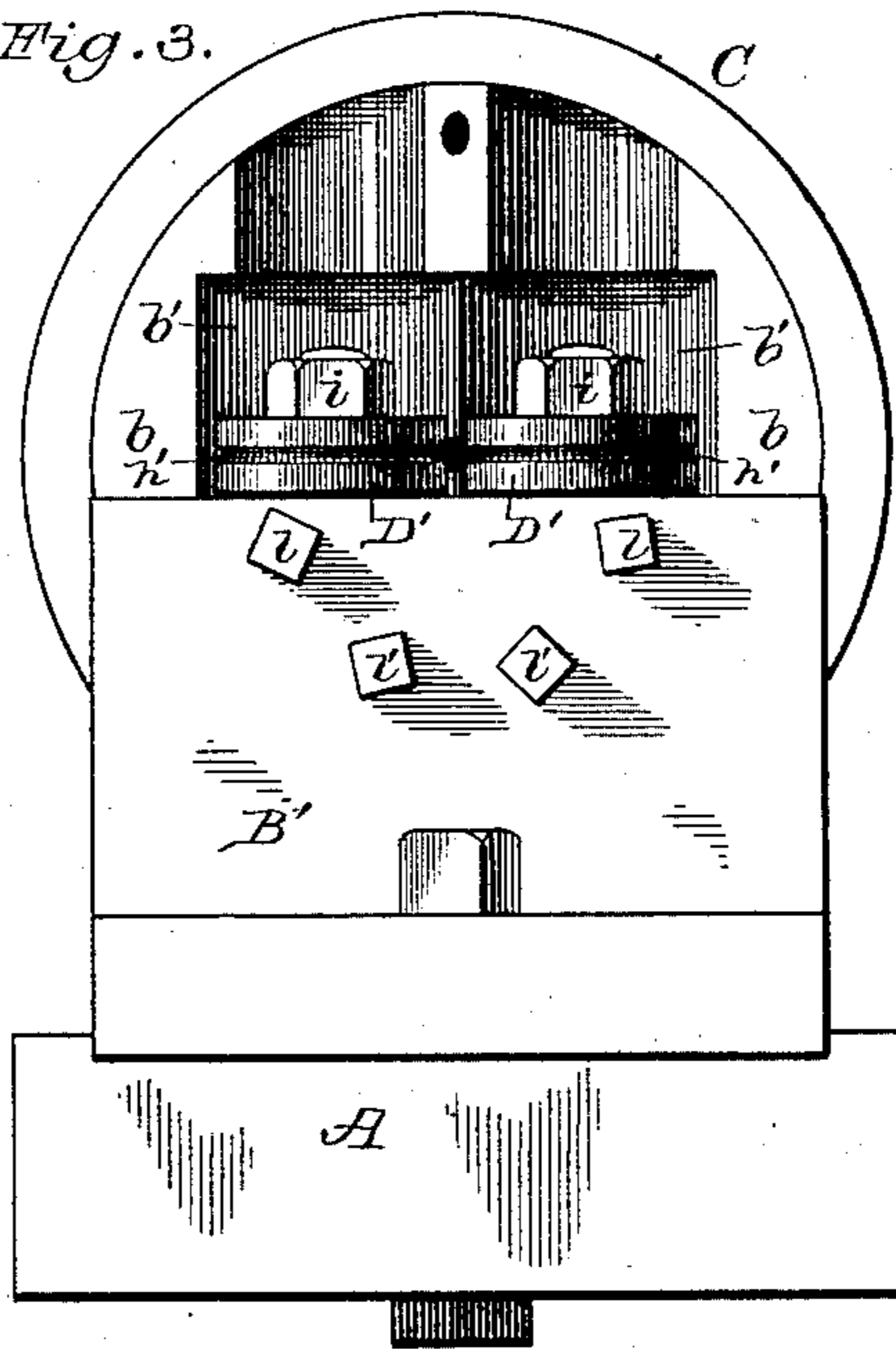


Fig. 3.



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Fig. 4.

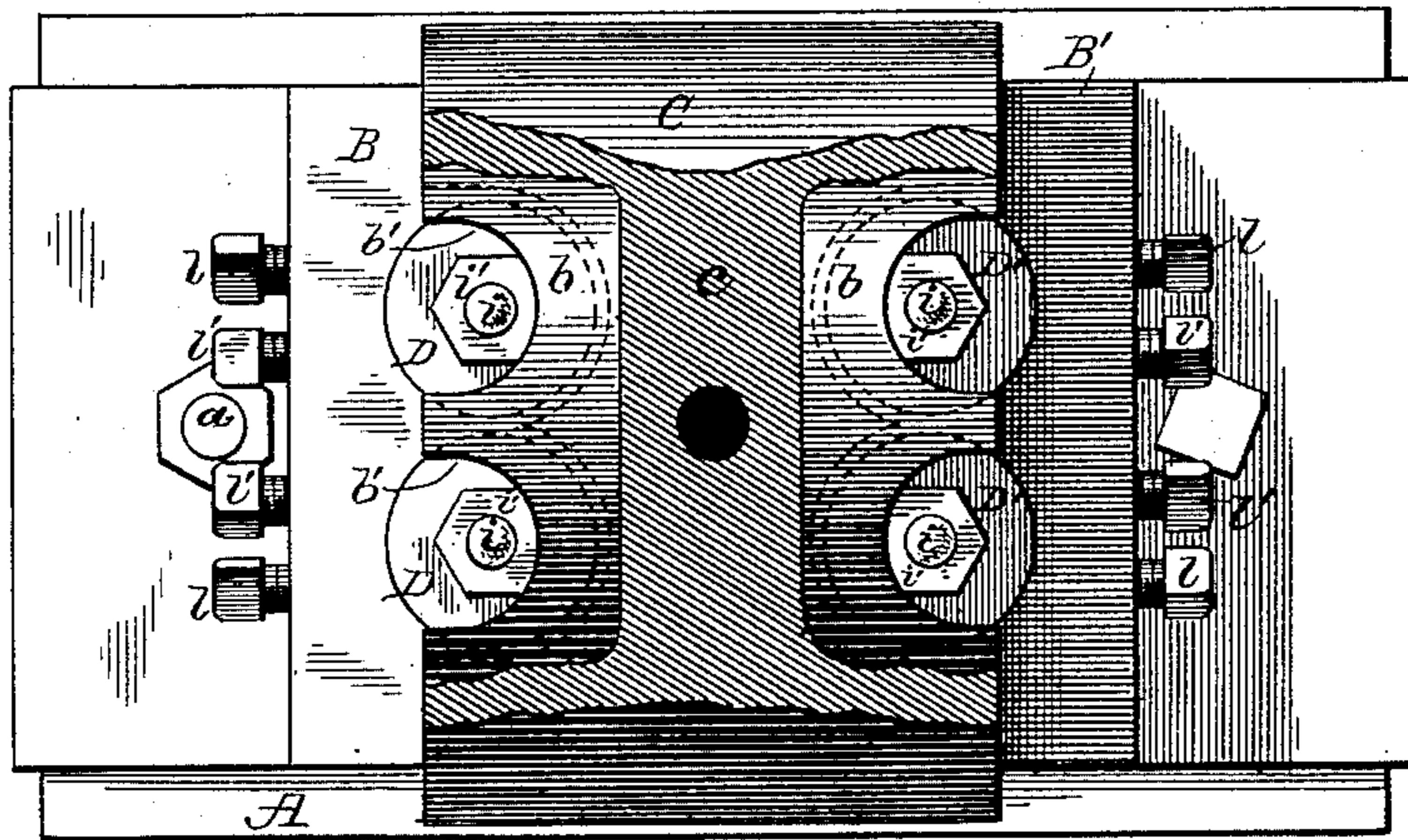
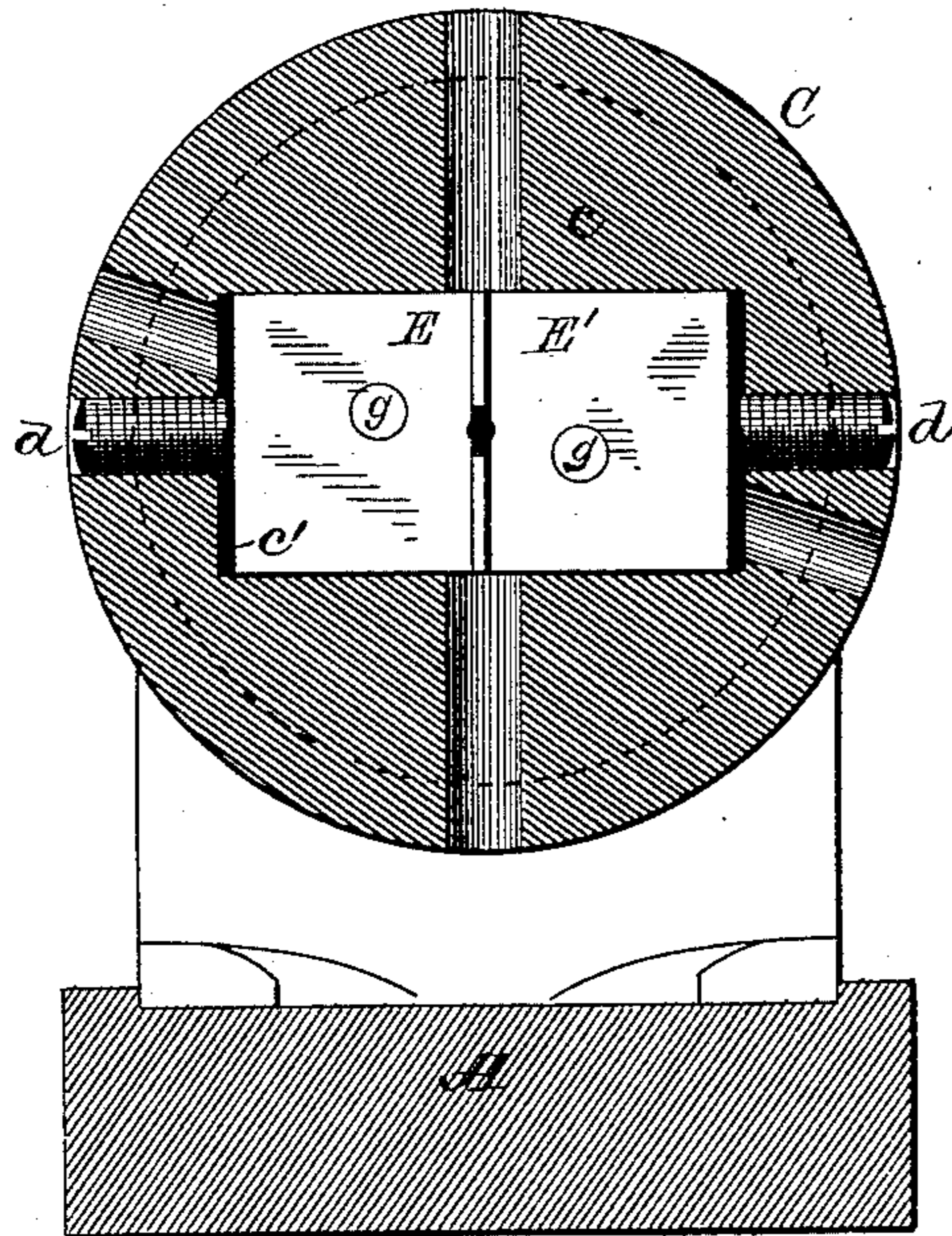


Fig. 5.



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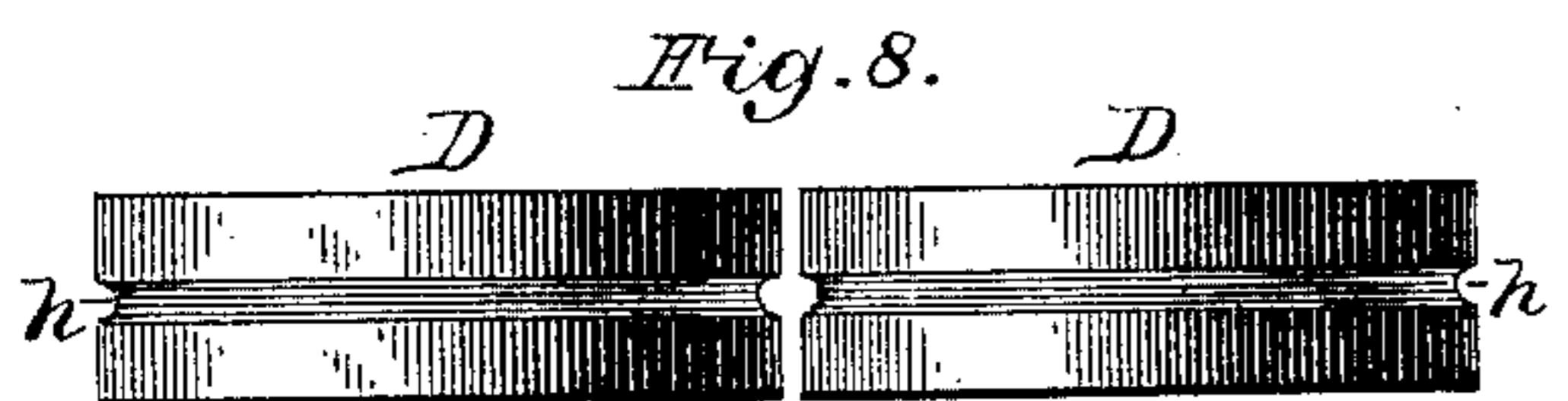
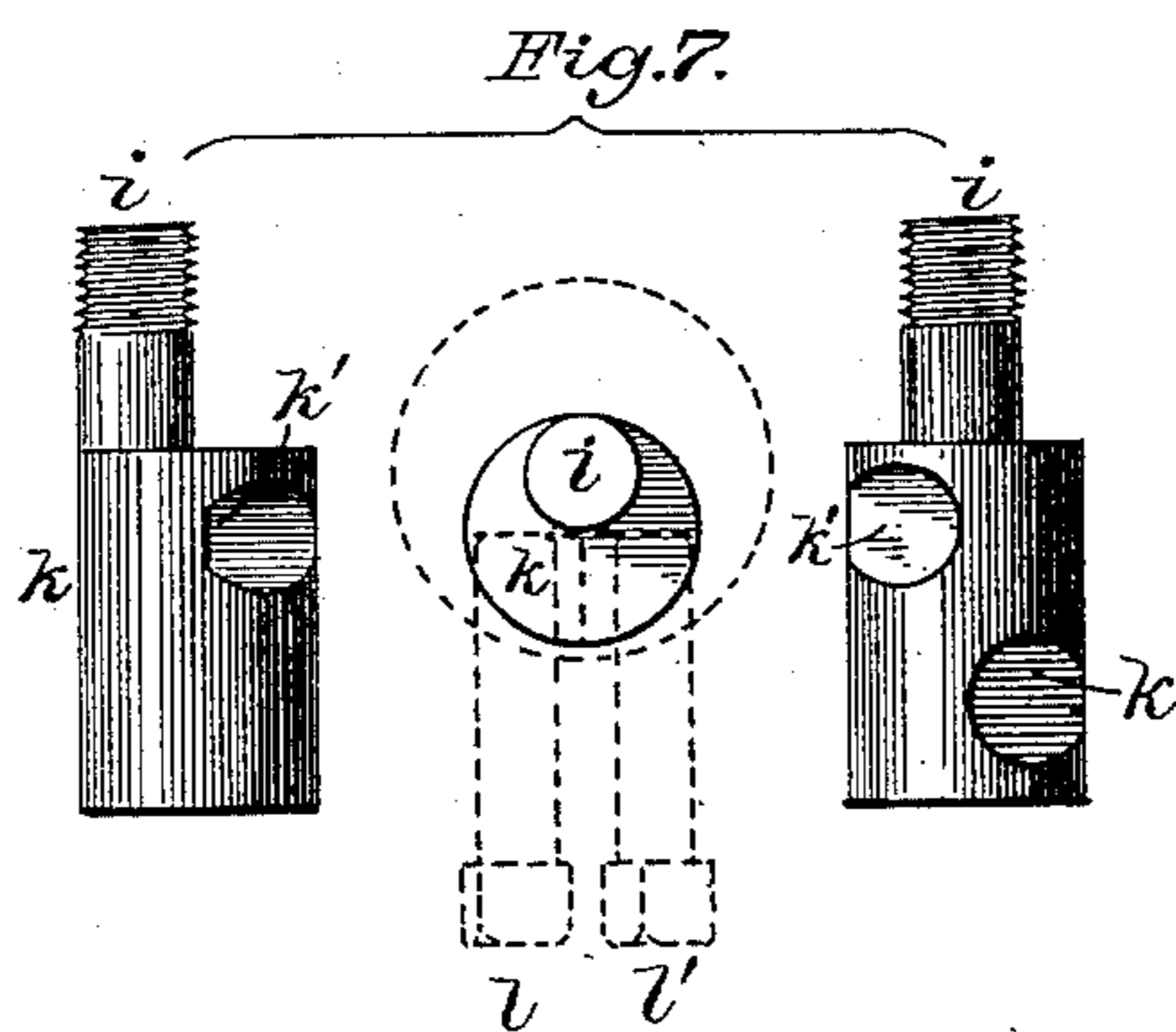
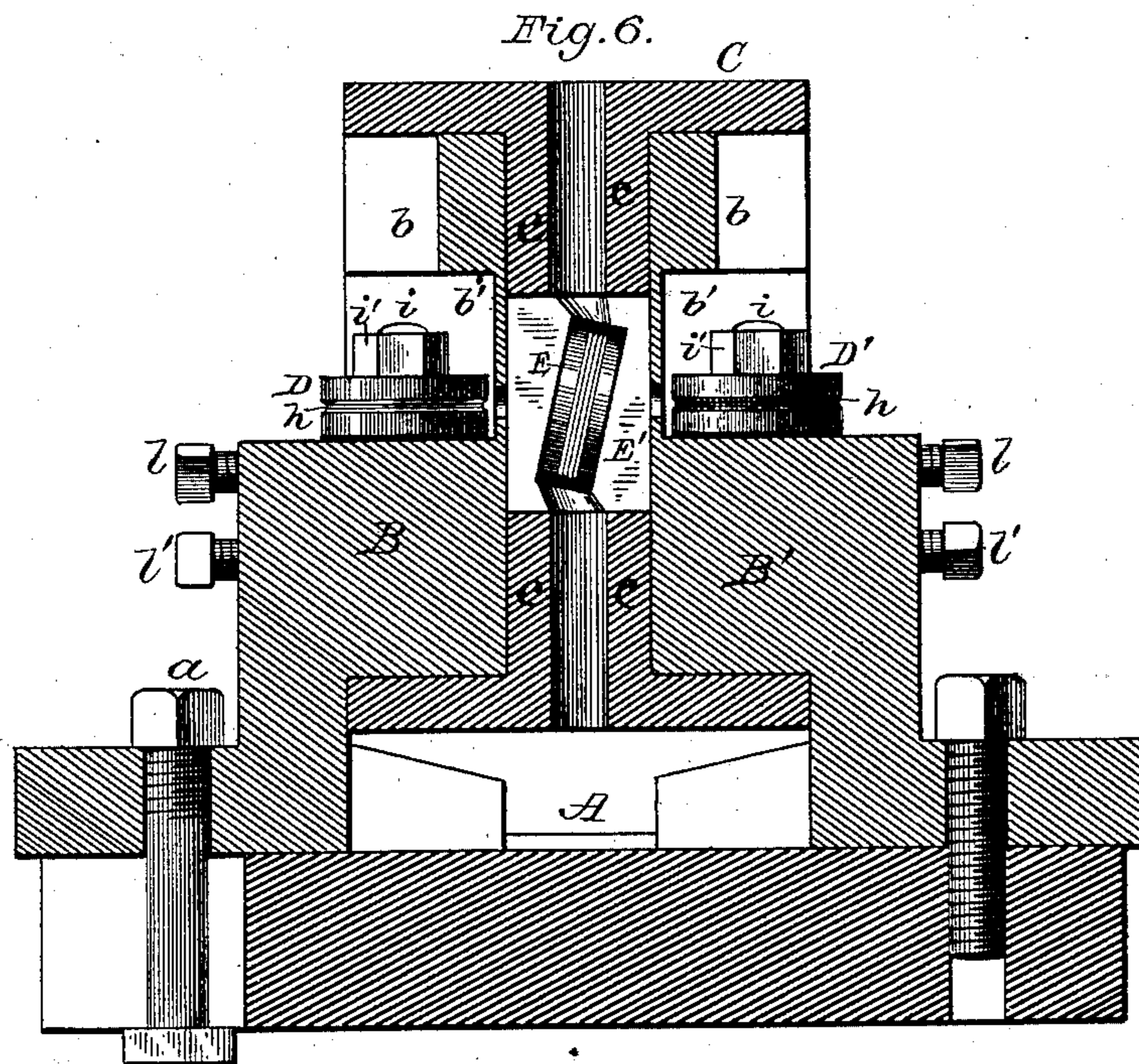
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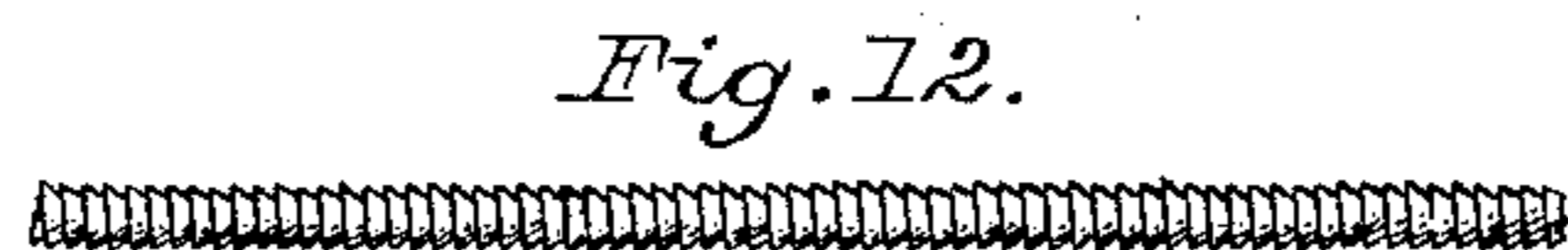
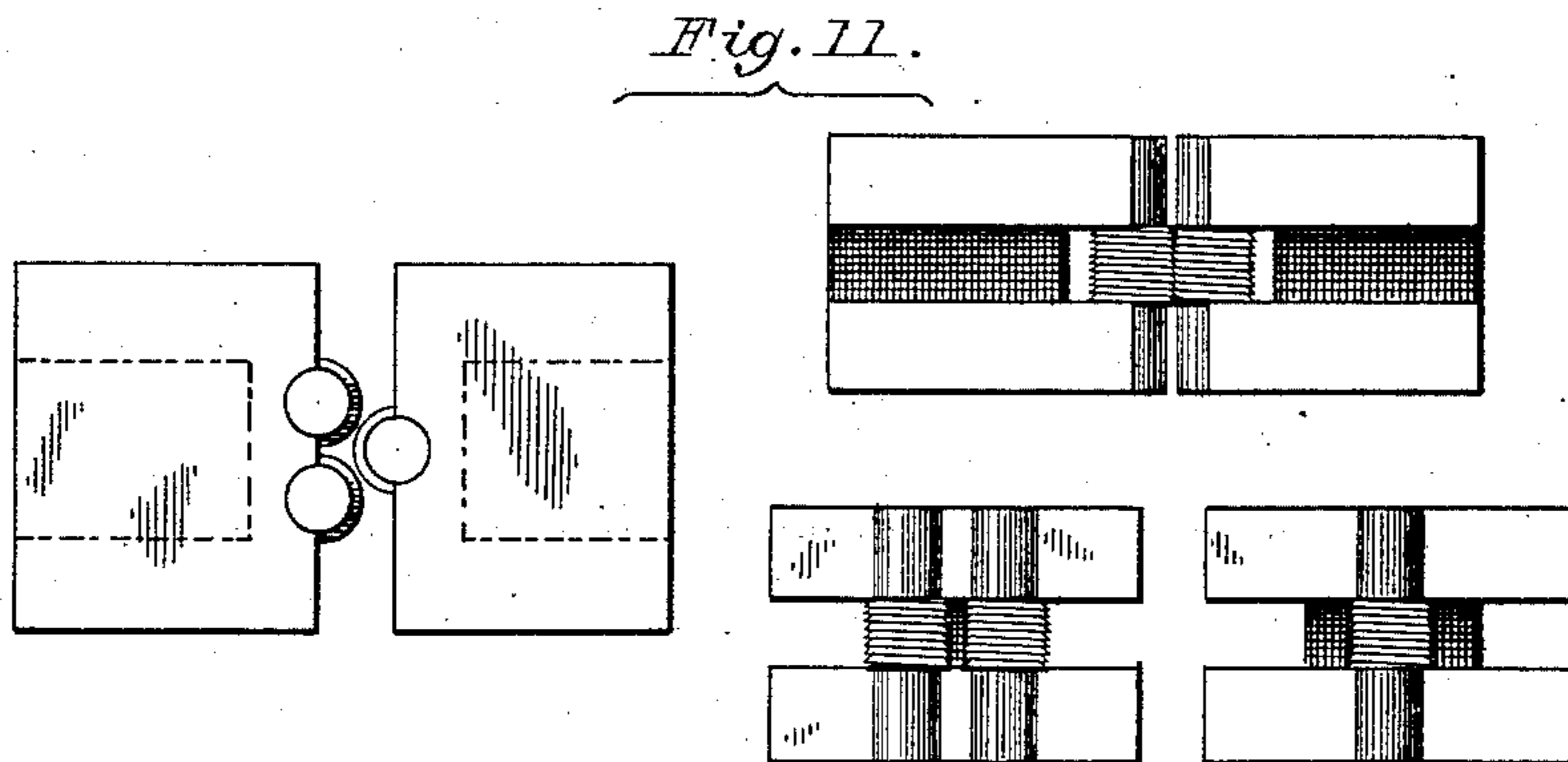
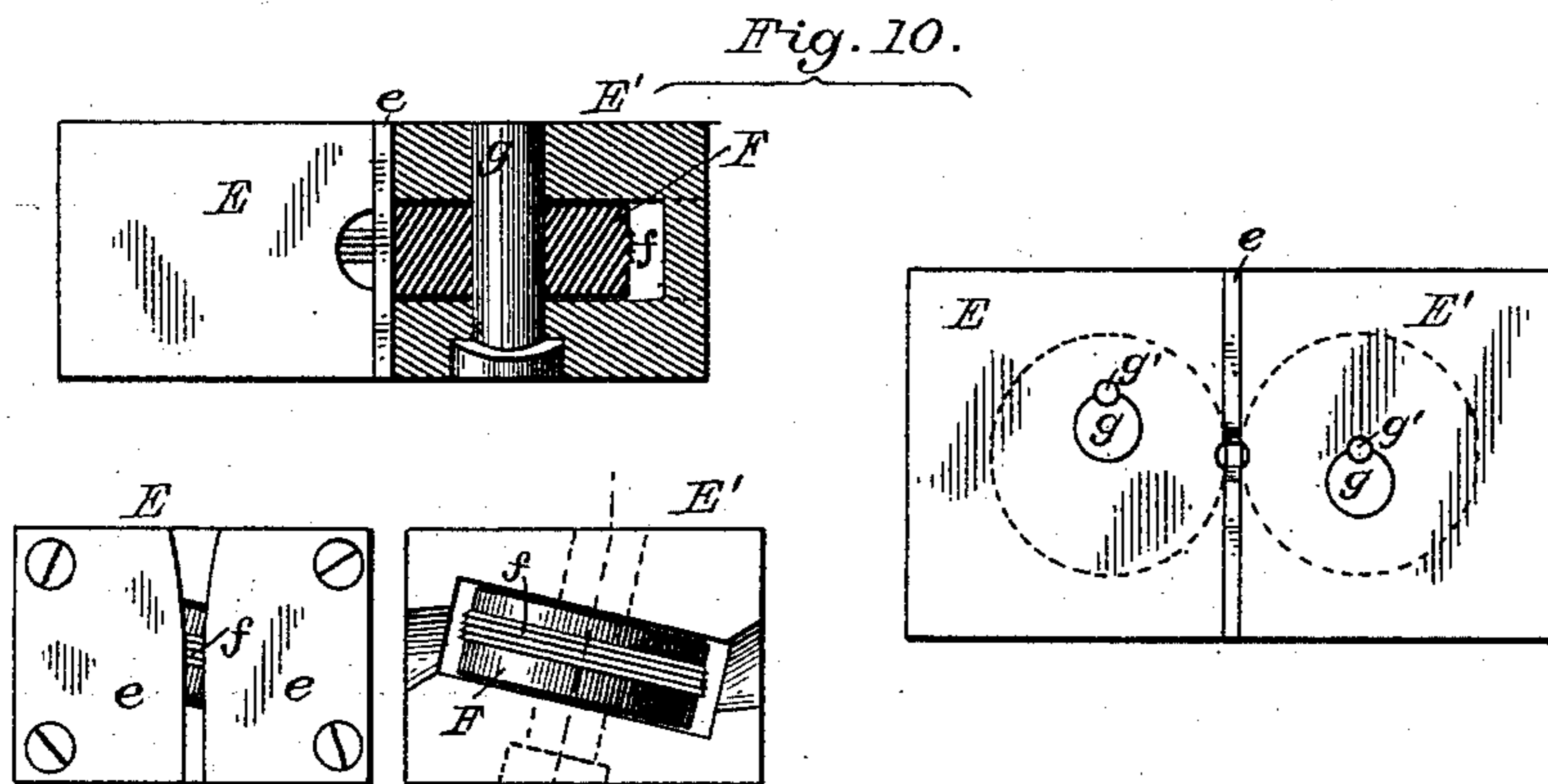
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UNITED STATES PATENT OFFICE.

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MACHINE FOR SPIRALLY SCORING WIRE.

SPECIFICATION forming part of Letters Patent No. 315,144, dated April 7, 1885.

Application filed September 3, 1884. (No model.)

To all whom it may concern:

Be it known that I, HORACE K. JONES, of the city and county of Hartford, in the State of Connecticut, have invented a certain new and
5 useful Machine for Spirally Scoring Wire; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part thereof, is a clear,
10 true, and complete description of the several features of my invention.

The prime object of my invention is to economically produce spirally-scored wire for use in the manufacture of wire nails having spirally-barbed shanks.

15 A machine embodying the several features of my invention in their best form spirally scores the wire by a mere displacement of surface metal as distinguished from a removal thereof as in the ordinary process of screw-
20 cutting, although certain portions of my invention can be employed in connection with thread-cutting dies. It is, however, obviously desirable that the spiral barbs of a wire nail should be as strong as is consistent with their
25 dimensions, and that the shanks should be as stiff as is practicable, and these conditions are fully provided for by me, because in forming the spiral barb no metal is removed. The metal forming the spiral barb is well condensed, and
30 the body of the wire is also condensed and materially hardened, because the barb is developed by heavy rolling pressure applied peripherally to the wire as it passes through the machine.

35 I employ in my machine a revolving head, which is chambered cylindrically and also radially near its center to afford a radial slot or slots, each for the reception of one or more die-blocks, in which rotary roller-dies have firm
40 bearings, and each of said blocks is controlled by an adjusting-screw, which is accessible through the periphery of the revolving head, so that the several roller-dies may be so advanced or retired as to afford a spiral pass between their coincident working-faces of such
45 size as is best suited to the diameter of wire to be spirally scored. The rotative strains upon the wire incident to the heavy pressure and the rotation of said roller-dies is so great
50 that it is necessary not only to prevent the

wire from rotating, but also to so confine it on each side of and in close proximity to said roller-dies that the intervening length of wire will be too short to admit of its being twisted by the action of the dies, it being obvious that
55 by twisting the wire its value for nail-making would be materially impaired. The action of said roller-dies is such as to cause the wire to travel longitudinally through the pass, and therefore no special feeding mechanism is re-
60 quired, it being only necessary to provide means for guiding said wire to the pass and for progressively clamping it as it enters, and, as a rule, in a similar manner clamping it as it leaves the pass. For those purposes I em-
65 ploy two pairs of rotary clamps mounted on axes at right angles to the axis of the head and as far within on each side as may be practicable. These rotary clamps are disk-shaped and peripherally grooved, the grooves of one
70 pair being smooth and those of the other pair being scored crosswise to properly engage with the finished wire without impairing its spiral scores. These rotary clamps are
75 mounted in a novel manner upon rotative eccentric studs, which are rendered adjustable by means of lateral screws parallel with the axis of the revolving head, the whole being so arranged that although said rotary clamps are
80 practically within the revolving head they can be readily adjusted even while said head is in motion.

In order that the machine can be smoothly operated at high speed and with little noise, I have so constructed the revolving head that a
85 driving-belt can be directly applied thereto, as distinguished from driving it by means of toothed gearing or pinions. I have also so organized the bearings or hubs on which said head revolves that one or both of them can be
90 readily removed for affording convenient access to the interior of the head and to the roller-dies therein.

The character of the roller-dies may be widely varied without departure from certain
95 portions of my invention.

For obtaining the best results, having reference to speed in service, durability, and uniformity in the spirally-scored wire, I employ but two roller-dies, each having one or
100

more annular (not spiral) scoring-ribs, and each being mounted diagonally in a die-block fitted to slide in the radial slot or chamber within the revolving head, and between the coincident faces of the two die-blocks I employ a guide, which prevents the wire from being deflected from a right line by the action of the roller-dies. Spirally-ribbed roller-dies may also be employed, and I have used three of such in one group with good results; but their axes are parallel with the axis of the revolving head and not diagonal, as with the annularly-ribbed roller-dies before referred to. In their best form the scoring-ribs on these dies in cross section are vertical or straight on one side and angular on the other, thus producing a spiral barb in its best possible form for enabling a driven nail to resist withdrawal.

I am aware that various organizations have heretofore been devised for operating upon wire in a more or less analogous manner, and it is to be understood that after a full description of my machine the features deemed novel will be specified in the several clauses of claim hereunto annexed.

Referring to the drawings, Figure 1 is a side elevation of one of my machines. Figs. 2 and 3 illustrate the same, respectively, in front and rear end views. Fig. 4 is a top or plan view of the same with the revolving head partially broken away. Fig. 5 is a central lateral section of the machine. Fig. 6 is a central longitudinal section. Fig. 7 in several views illustrates one of the eccentric clamp-disk studs detached, showing the abutting-seats with which the inner ends of adjusting-screws tangentially engage for rotating said studs and thereby varying the clamping capacity of the grooved disks. Figs. 8 and 9 are enlarged views of the two pairs of rotary clamps. Fig. 10 in several views illustrates a pair of annular-ribbed roller-dies and their blocks. Fig. 11 in several views illustrates a group of three spirally-ribbed roller-dies and their blocks. Fig. 12 illustrates a piece of wire as spirally barbed in my machine.

The base-plate or bed A of the machine should be of considerable weight, and be provided with means whereby it can be firmly mounted upon a bench or other suitable foundation. I prefer that the top of said bed be longitudinally channeled, as shown, for the reception of the two standards B B', so fitted to said channel that their proper alignment with each other is readily obtained. The standard B' may be permanently secured to the bed-plate; but the standard B should be longitudinally movable thereon, and rendered capable of ready attachment and displacement by means of one or more clamp-screws, *a*. Each standard on its inner side has a hub, *b*, the two hubs serving as a stationary journal for the revolving die-head C, and at the center of each hub there are coincident holes, through which the wire to be worked

upon travels at the exact center of said revolving head. Each standard on its outer side is inwardly recessed, as at *b'*, to enable the location of the pairs of rotary clamps or clamp-disks D D' as near to the center of the revolving head as may be practicable. The revolving head C may be provided with external gear-teeth for meshing with a driving-gear; but in its best form it is turned off externally, after the manner of a belt-pulley, as shown, so as to be directly driven by a belt from a convenient counter-shaft, thus insuring a smooth easy movement at great speed and without noise.

It will be seen that the revolving head is internally chambered annularly, to afford a bearing at each end to fit the journal-hubs *b*, and that it has a central web, *c*, which is radially slotted or rectangularly chambered, as at *c'*, for the reception of the roller-die blocks E E', each having a radial adjusting-screw, *d*, which is tapped into the revolving head and is externally accessible by way of peripheral openings therein, as clearly shown. The die-blocks E E' and their roller-dies in their best form are specially illustrated in the several views of Fig. 10. They are substantial counterparts, with the exception that the die-block E has a pair of guide-plates, *e*, on its front face. These guide-plates serve to prevent deflection of the wire from a right line during its passage through the head, because at their coincident edges said plates afford a rigid guiding-channel for the wire while being peripherally acted upon by the roller-dies.

For performing the function of these plates, and as a substitute therefor, guide-tubes of proper sizes may be employed, when they are arranged to project inwardly from the center of each hub, and are firmly mounted therein, it being seen that said guide-plates practically afford between their edges and the two faces of the blocks a wire-receiving space nearly rectangular in cross-section, it being larger on one side of the dies than on the other, as shown, to provide for the increase in the diameter of the wire incident to the die-rolling operation. It will be seen that with the roller dies and blocks shown in Fig. 11 the guide-plates *e* cannot well be employed, but that guide-tubes, as described, may be readily relied upon. The roller-dies F, one in each block, are absolute counterparts in form and dimensions. As here shown, in Fig. 10, each has four ribs, *f*; but a lesser or greater number may be employed. These ribs *f* may be V-shaped in cross-section; but for obtaining the best results they are, as here shown, constructed with straight sides and an inclined top for producing a true barbed score. These roller-die ribs are annular—that is, not spiral; but they are caused to operate spirally upon the wire, because said dies are rotatively set angularly in their blocks on diagonal studs *g*, which are prevented from rotation by keys *g'*. It will be seen that when the roller-die blocks are within the head they can be advanced by their

adjusting-screws *d*, so as to properly operate on wire of various sizes and with more or less pressure. Variations in the arrangement of these roller-dies in their blocks can be made without departure from my invention. As shown, the four scoring-ribs *f* are arranged to develop but one spiral score on a piece of wire; but by variation in their inclination they can be made to cut two or more spiral scores, if desired, and said ribs can themselves be spiralled and then be relied upon for making one or more spirals on the wire.

Referring now to the rotary clamps or clamp-disks *D* and *D'* it will be seen that the clamp at the front of the machine is composed of two disks *D*, which are exact counterparts and are peripherally grooved, as at *h*, so as to enable them to firmly grasp a wire and to prevent it from rotation, while permitting it to freely pass into the machine. The grooves *h* are smooth and should approximate in dimensions to each particular size of wire. Said disks freely revolve on their studs *i* and can readily be removed and replaced by detaching the nuts *i'* on said studs and without disturbing the revolving head. The clamp at the rear of the machine is also composed of two disks *D'*, like those already described, except that their grooves *h'* are so scored crosswise and angularly that they can firmly engage with a spirally-scored wire without injuring it. I have made these disks of comparatively soft metal—Babbitt metal, for instance; but they may be made of iron or steel.

While I deem it essential in some cases to employ these rear clamp-disks, and advisable in all cases, I have found that in some instances they can be dispensed with—as, for instance, when working on lightly-scored large wire. The distance between the die-rolls and the point at which the clamp *D* bites the wire is so small that the short intervening length of wire is not liable to injury by the twisting effect of the dies.

For adjusting the clamp-disks with reference to each other, and to the line of the central pass in the revolving head, adjusting-screws are necessary; but it will be seen that their location within the head and the limited space therein precludes the use of screws located in a line corresponding with the line of movement required by the disks. I have therefore mounted said disks on complex eccentric studs, the stud *i* being eccentrically located on the end of a larger stud, *k*, (or the two may be integral,) as seen in Fig. 7. Each of these large studs is rotatively housed in vertical tubular bearings in the standard, and each on its front side has two screw-seats, *k'* *k'*, and said seats being on opposite sides of the vertical axis of said stud it will be seen that the adjusting-screws *l* and *l'* will have at their inner ends a tangential bearing in their respective seats, thus enabling said screws *l* of either pair of clamps to force the disks toward each other and the adjusting-screws *l'* to separate them, it being understood that

said screws are, as shown, tapped into holes in the outer face of each standard, thus rendering them conveniently accessible while the revolving head is in motion.

The wire shown in Fig. 12 has the spiral barb well known and long employed in what are known as "drive-screws," and in a general way both forms of roller-dies shown in Figs. 10 and 11 produce similar results, although the large annularly-ribbed dies of Fig. 10 can be operated with greater rapidity and uniformity, and, as a rule, produce a more thoroughly condensed and stronger spiral barb.

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

1. The combination, substantially as hereinbefore described, of the revolving head and the radially-adjustable die-blocks within said head and provided with bearings for roller-dies.

2. The combination, substantially as hereinbefore described, of the revolving head, the die-blocks radially adjustable in said head, and the roller-dies angularly mounted in said blocks.

3. The combination, substantially as hereinbefore described, of the revolving head, radially-adjustable blocks in said head, and roller-dies mounted in said blocks provided with one or more annular scoring-ribs.

4. The combination, substantially as hereinbefore described, of the revolving head, the scoring-dies and their radially-adjusting blocks within said head, and a clamp for preventing the rotation of wire while free to move through the head.

5. The combination, substantially as hereinbefore described, of the revolving head containing scoring-dies, the rotary clamp disks mounted on eccentric studs, and the adjusting-screws for rotating said studs and thereby adjusting the clamp-disks with reference to each other and to the axial center of the revolving head.

6. The combination, substantially as hereinbefore described, of the revolving head, the scoring-dies, and the blocks within said head, and a guide for maintaining wire in a right line while passing through said head.

7. The combination, substantially as hereinbefore described, of the revolving head, the die-blocks, the two roller-dies angularly mounted in said blocks and within said head, and the guide plates secured to one of the die-blocks.

8. The combination, substantially as hereinbefore described, of the two revolving roller-dies, their blocks adjustable with reference to each other, and the guide-plates.

9. The combination of the bed-plate, the revolving head, and the two standards, each provided with an inwardly-projecting journal-hub for said head, substantially as described.

HORACE K. JONES.

Witnesses:

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W. C. RUSSELL.