

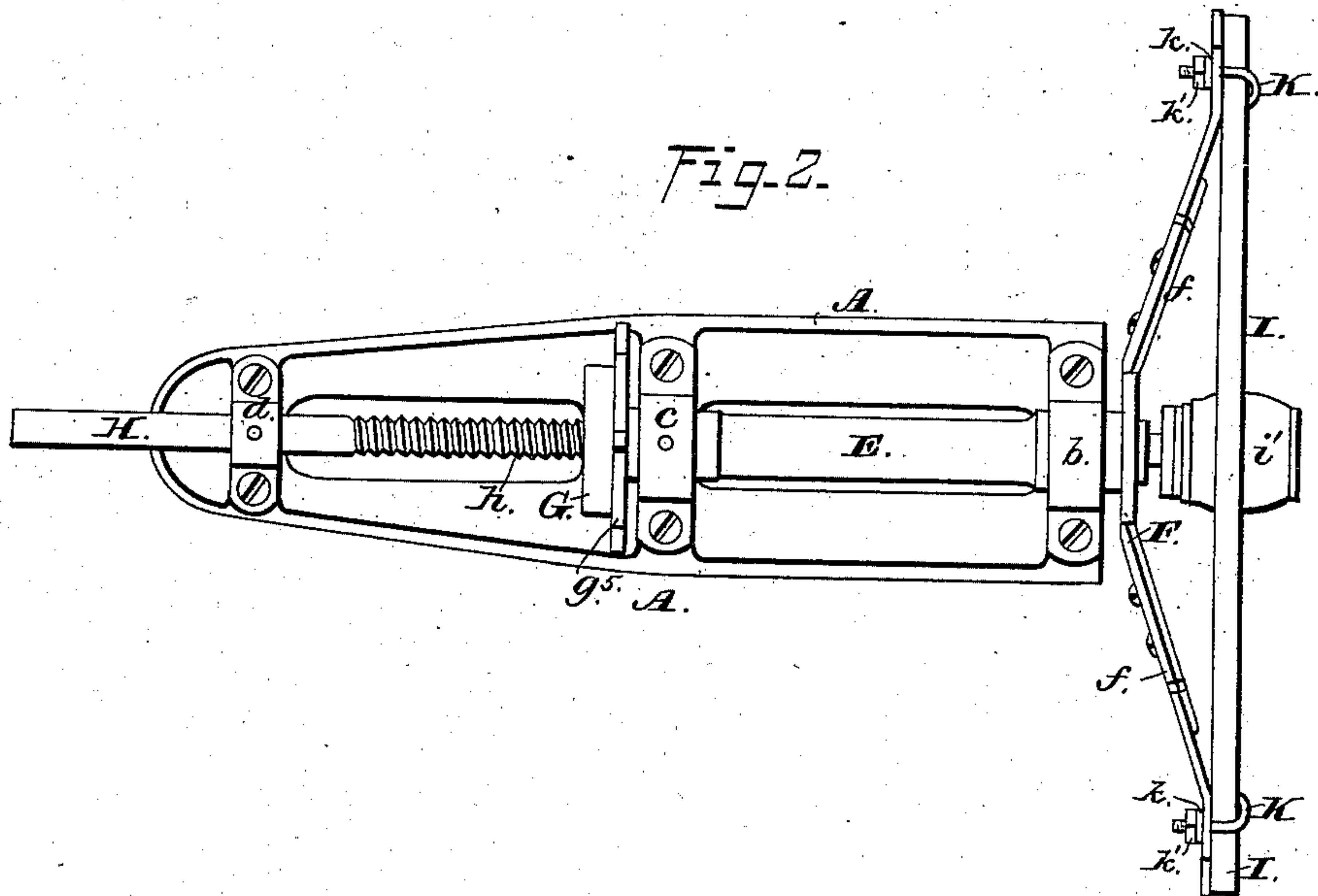
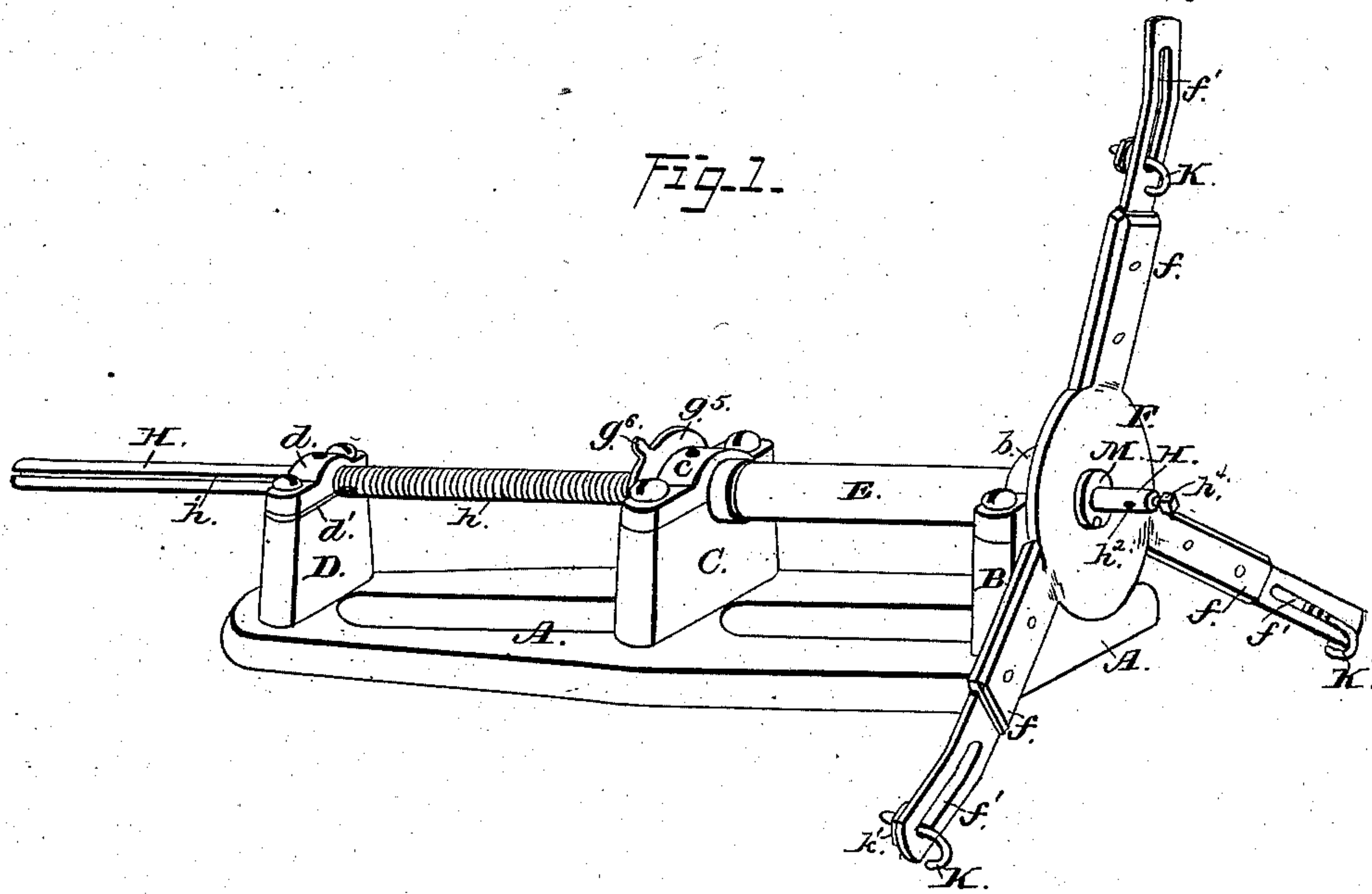
(Model.)

3 Sheets—Sheet 1.

A. O. WITHEY.  
Hub Boring Machine.

No. 239,907.

Patented April 5, 1881.



WITNESSES

Geo. E. Hutchinson.  
Henry L. Hazard.

INVENTOR

Arthur O. Withey, by  
Geo. S. Prindle, his Att'y

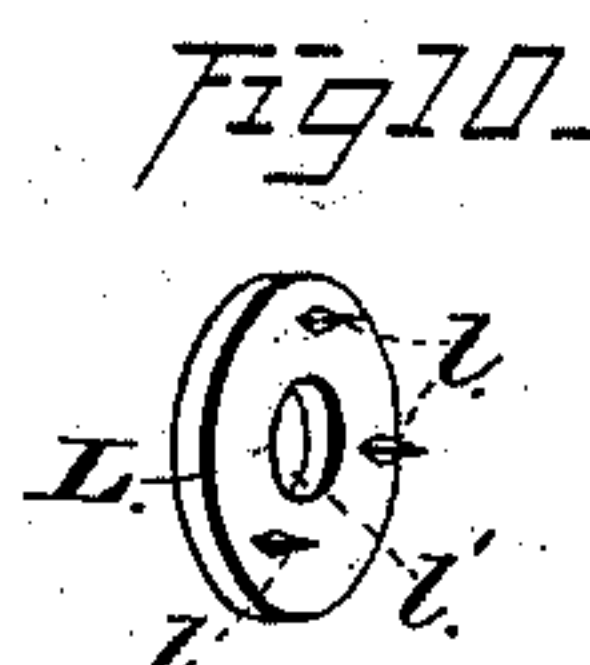
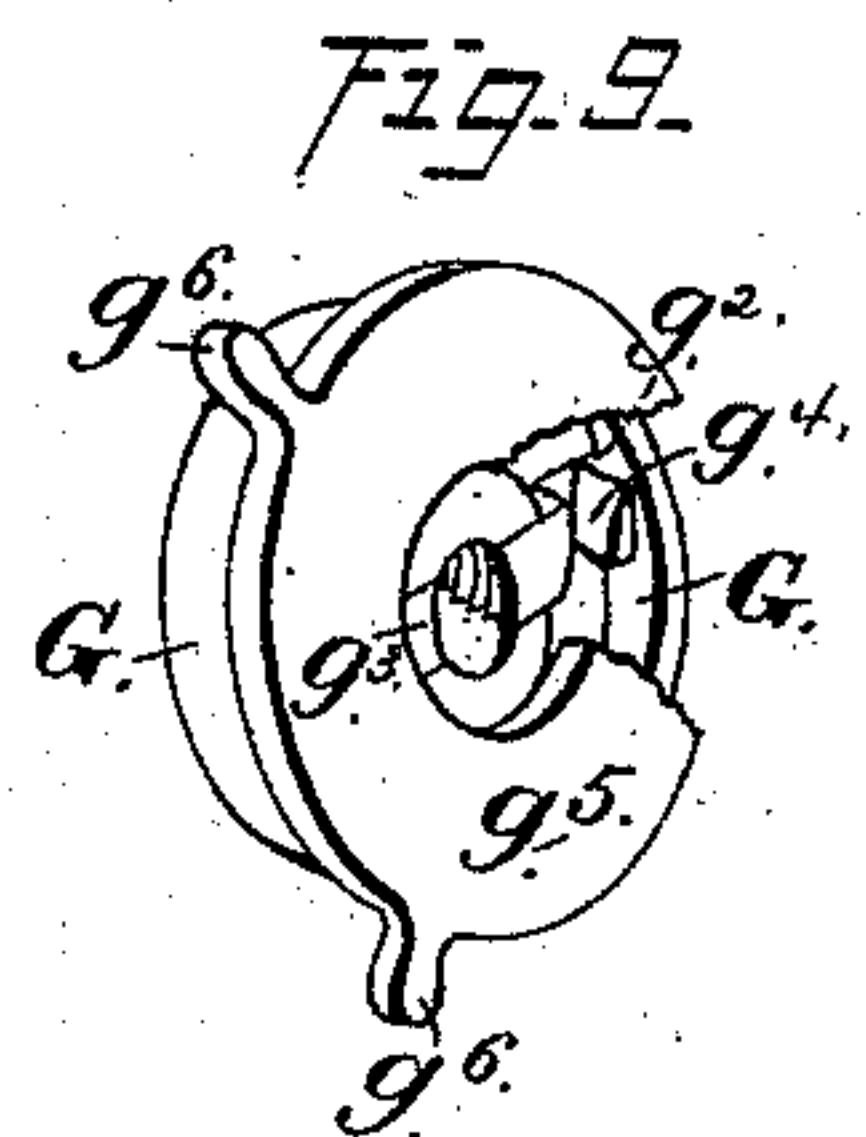
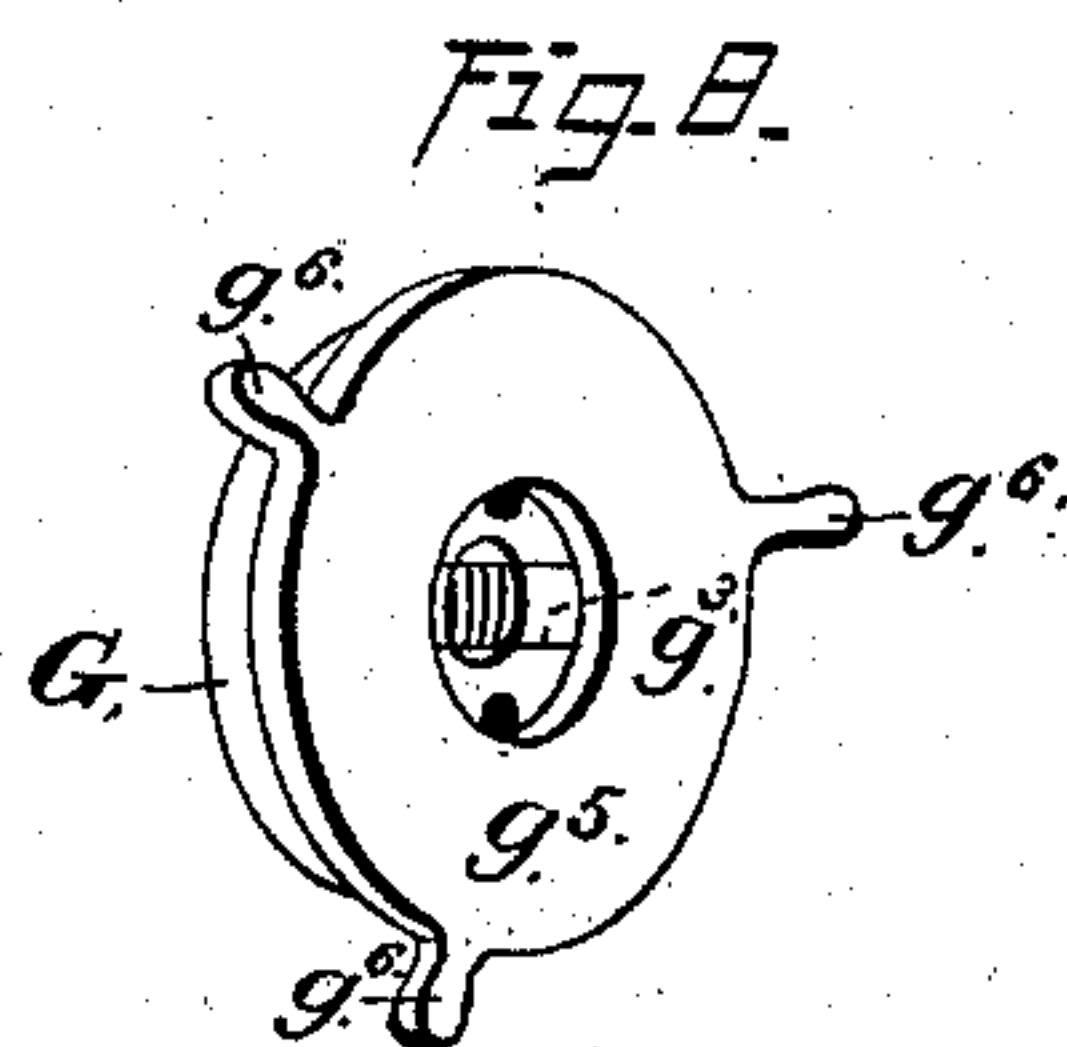
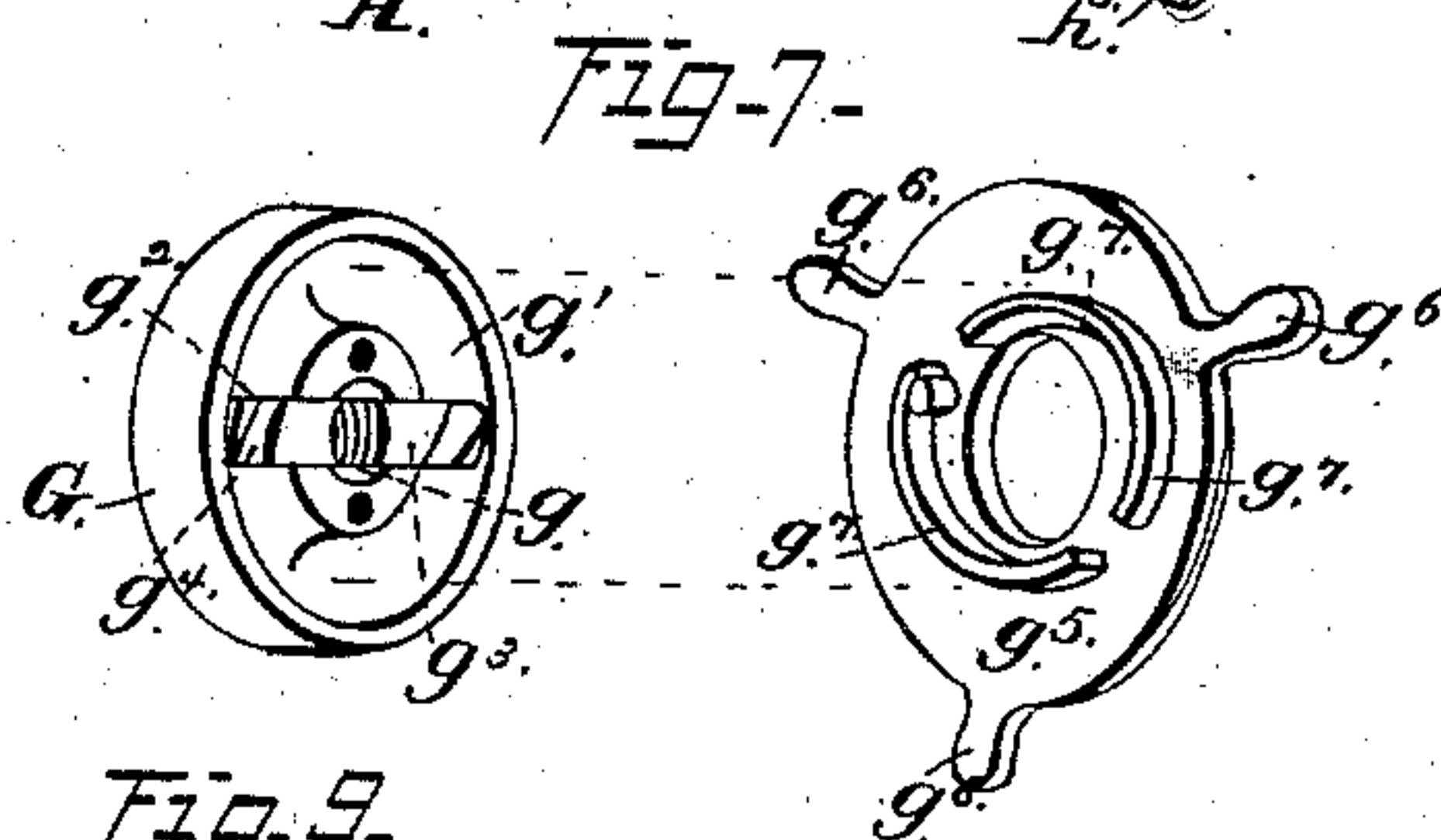
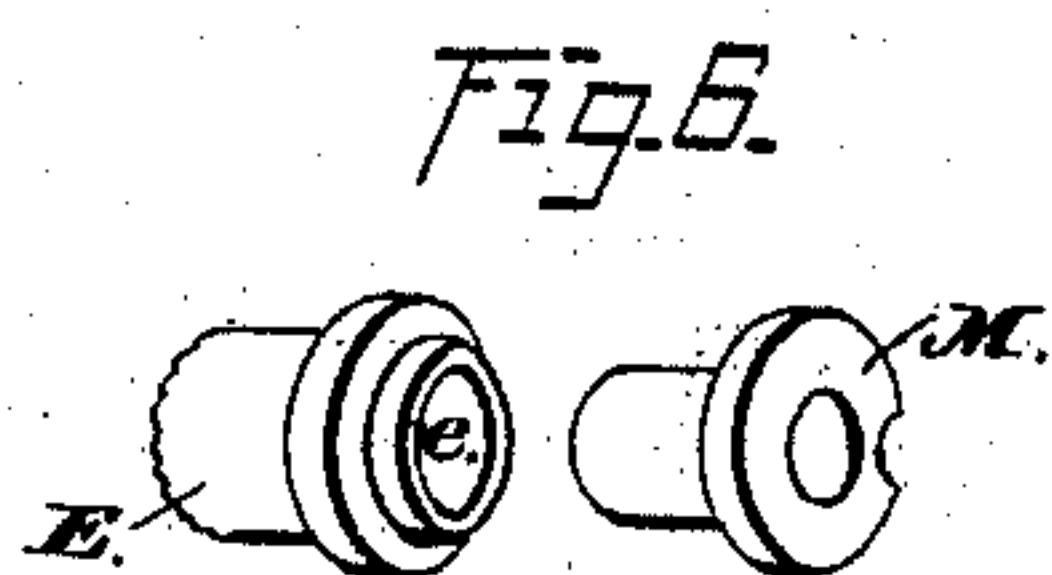
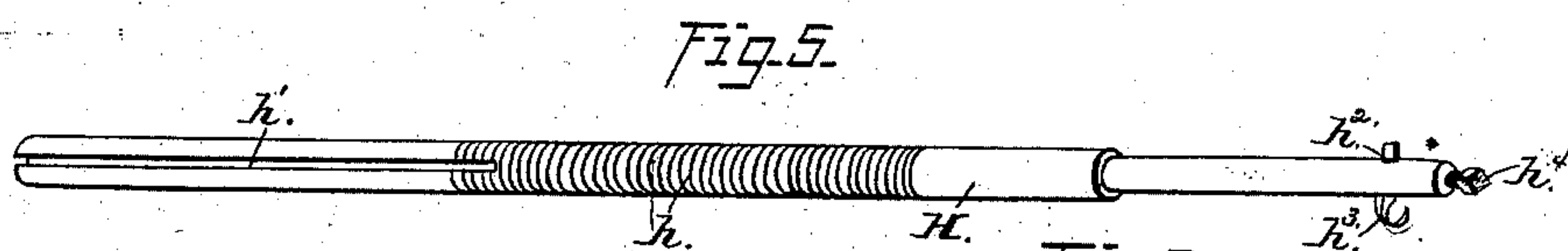
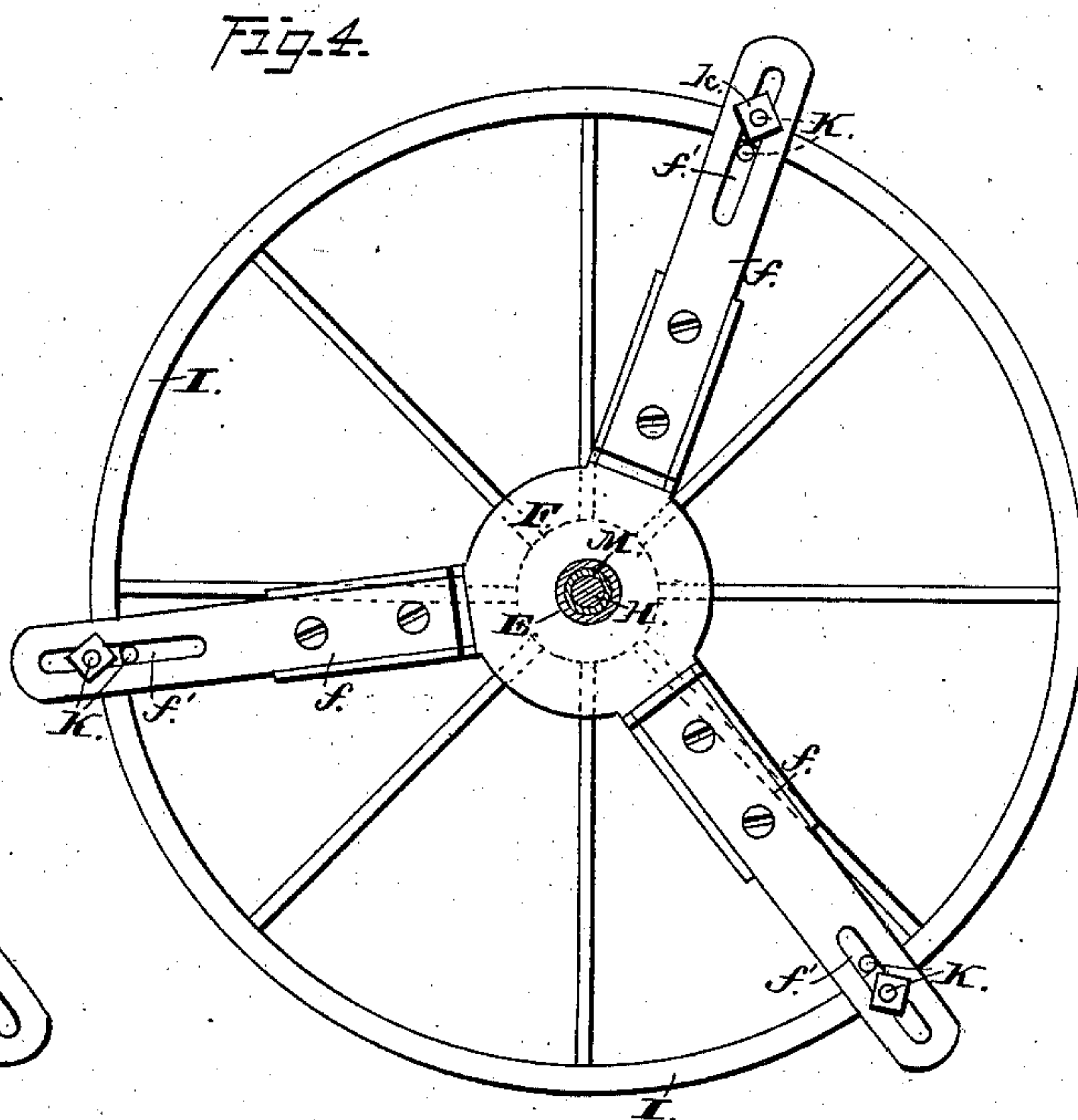
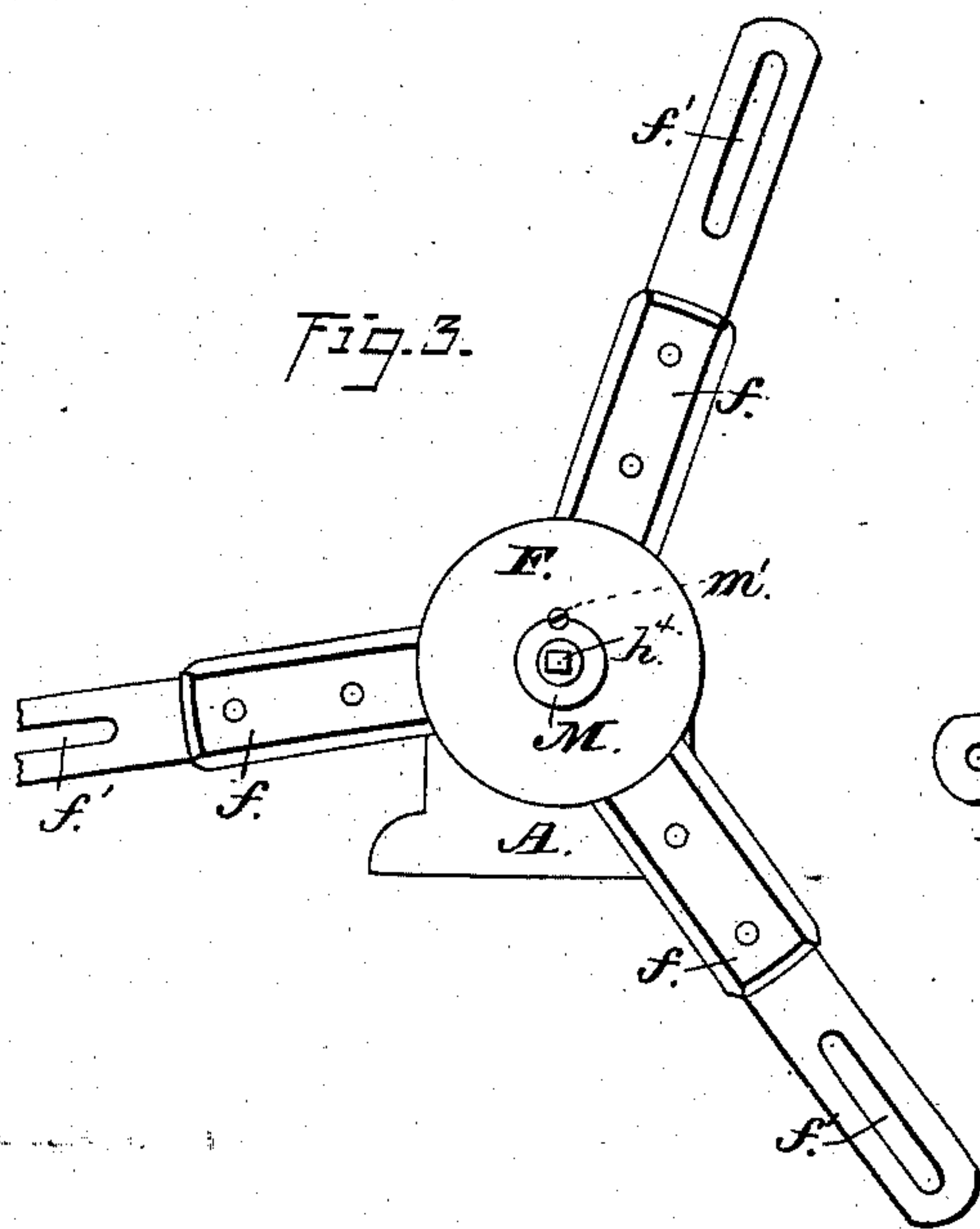
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WITNESSES=  
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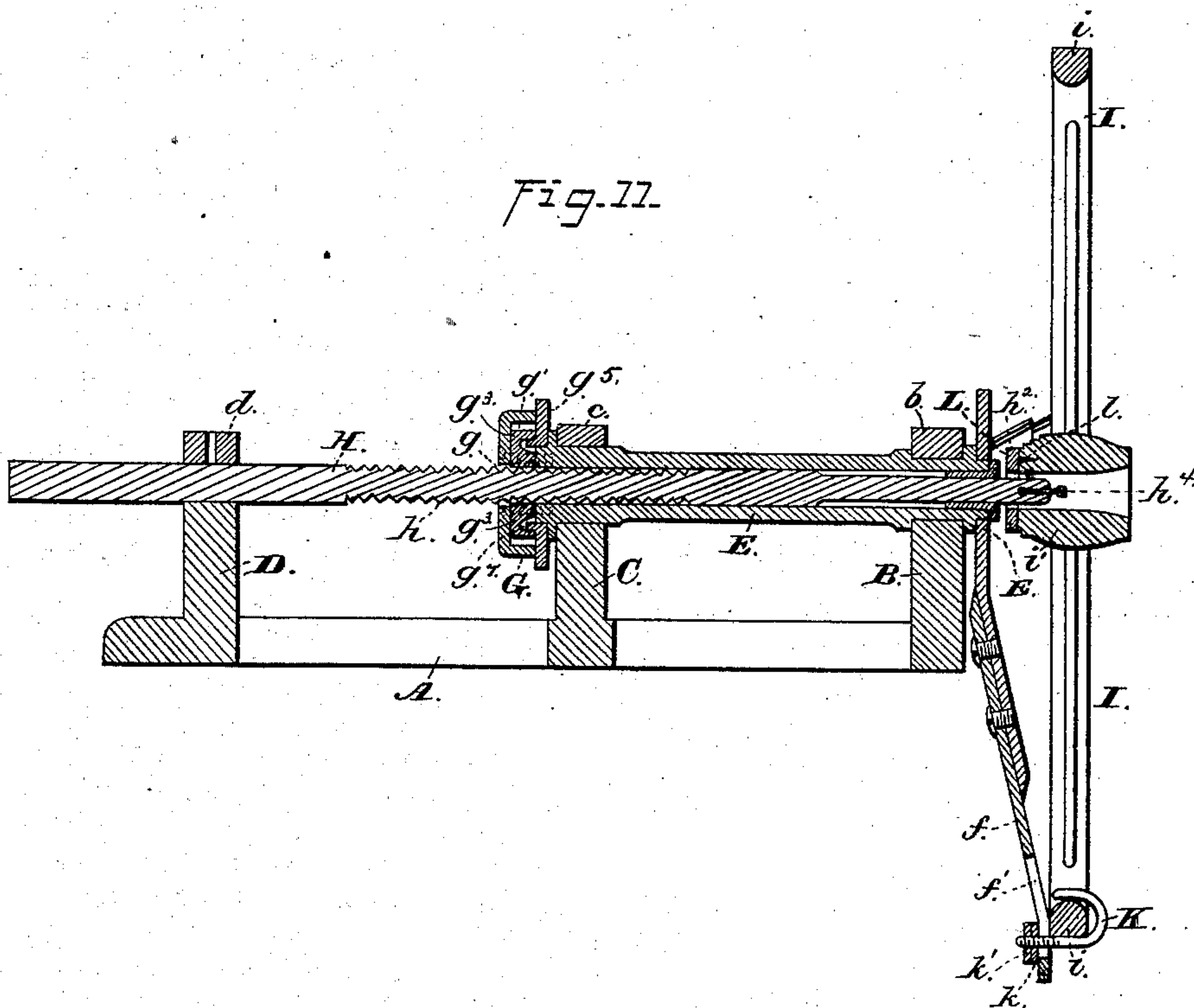
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Fig. 17.



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# UNITED STATES PATENT OFFICE.

ARTHUR O. WITHEY, OF SPRINGFIELD, ILLINOIS.

## HUB-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 239,907, dated April 5, 1881.

Application filed May 18, 1880. (Model.)

*To all whom it may concern:*

Be it known that I, ARTHUR O. WITHEY, of Springfield, in the county of Sangamon, and in the State of Illinois, have invented certain  
5 new and useful Improvements in Machinery for Boxing Wagon-Hubs; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part  
10 of this specification, in which—

Figure 1 is a perspective view of my device arranged for the reception of a wheel. Fig. 2 is a plan view of the upper side of the same, a wheel being in position for boring. Fig. 3 is  
15 an elevation of the front end of said device without a wheel. Fig. 4 is a like view of the rear side of the wheel-holder, a wheel being in position thereon. Fig. 5 is a perspective view of the boring-bar detached from the machine. Fig. 6 is a like view of the front end  
20 of the hollow mandrel and bushing separated from each other. Fig. 7 is a perspective view of the parts composing the expansible or chuck nut separated from each other. Fig. 8 is a like view of the casing and jaws as combined for use. Fig. 9 is a perspective view of  
25 said nut complete, a portion of the operating-plate being broken away to show the interior arrangement. Fig. 10 is a like view of the centering-collar; and Fig. 11 is a vertical longitudinal section of said machine upon a line passing through the axis of the boring-bar, a wheel being in position for the boring  
30 of its hub.

35 Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to enable wheel-hubs to be easily, quickly, and accurately "boxed."

40 It consists, principally, in the means employed for journaling the boring-bar and for adapting the machine to bars having different diameters of the boring end, substantially as and for the purpose hereinafter shown.

45 It consists, further, in the means employed for feeding the boring-bar forward or backward, substantially as and for the purpose hereinafter set forth.

50 In the annexed drawings, A represents the base-plate of my machine, from the upper

side of which, at points near each end and at its center, extend upward three journal-boxes, B, C, and D, that are each provided with a cap, *b*, *c*, or *d*, which is held in place by screws, in the usual manner.

55 Journalled within the journal-boxes B and C is a hollow shaft or mandrel, E, upon the front end of which is secured a spider, F, that has three arms, *f*, which extend radially outward and slightly forward from equidistant points, 60 and from their outer ends inward about one-third their length each arm is provided with a longitudinal slot, *f'*. Said arms *f* are preferably each made in two sections, and the same secured together by means of screws 65 passing through their overlapping ends; but, if desired, each arm may be made in one piece.

At the inner end of the mandrel E is an expansible nut composed in part of a circular casing, G, secured to or upon the end of said 70 mandrel, and provided with an axial opening, *g*, that corresponds to the opening in the mandrel E, a half-round annular groove, *g'*, in its front face, between its periphery and center, and a right-angled cross-recess, *g''*, that extends 75 radially outward in opposite directions from said center opening, *g*, and has parallel sides.

Within the recess *g'* are fitted two blocks, *g''*, which loosely fill the same transversely, 80 and have each slightly less length than the distance between one of the outer ends of said recess and the center opening, *g*, so that when moved to the outer limit of its motion the inner end of said blocks shall not project into 85 said opening. Each of said blocks or jaws is provided upon its inner end with a screw-thread which corresponds to the thread cut upon the bar H, so that if said jaws are moved inward they will engage with the said 90 threaded portion *h* and constitute a nut.

The radial movements of the jaws *g''* are effected by means of a plate, *g'''*, which is journalled upon the mandrel E immediately in front of the casing G, incloses the front side 95 of the latter, and is provided with radial projections *g''''*, by means of which said plate may be rotated. The casing G is secured to or upon the mandrel E by means of two screws, which pass through openings near the axial 100



center of said casing, (shown in Figs. 7 and 8,) and have their inner threaded ends contained within corresponding threaded openings in the end of said mandrel.

5 Upon the inner face of the plate  $g^5$ , at opposite sides of its center, and at such distance from the same as to be within the groove  $g'$  of the casing G, are two lugs,  $g^7$ , which are formed upon scroll-shaped lines, are disconnected at their ends, and have each the same  
10 relative distance from the center of said plate, which lugs fit into and engage with transverse grooves  $g^4$ , that are provided within the outer face at the outer ends of the jaws  $g^3$ .  
15 If, now, the plate  $g^5$  be turned in one direction, the jaws  $g^3$  will be moved simultaneously inward and caused to engage with the bar H, while by an opposite motion of said plate said jaws will be moved outward and  
20 released from engagement with said bar. A suitable stop is provided to arrest the rotary movements of said plate at the proper points.

The axial opening within the mandrel E and the opening within the rear journal-box, D, have  
25 the same diameters, and within the same is fitted the bar H, which has sufficient length to cause its ends to project outward beyond said box and beyond the front end of said mandrel, and has the central portion,  $h$ , of its periphery threaded to correspond to the thread  
30 within the expansible nut G. From said threaded portion  $h$  to the rear end of said bar H a groove or spline,  $h'$ , is cut longitudinally within the periphery of said bar, which spline  
35 is engaged by a feather,  $d$ , within said box D, by which arrangement said bar is prevented from rotating, while free to move longitudinally within its bearings. If, now, the mandrel E is rotated and the expansible nut G caused  
40 to engage with the threaded part  $h$  of the bar H, said bar will be drawn forward or pushed rearward in accordance with the direction in which said mandrel is rotated. The front end of the bar H is provided with a radial opening,  $h^2$ , that receives a cutter,  $h^3$ , which cutter  
45 is secured in place by means of a set-screw,  $h^4$ , that passes into the end of said bar at its axial center.

The spider F is intended for supporting a  
50 carriage-wheel, I, and the latter is secured to the outer face of the former by means of three hook-bolts, K, each of which bolts has its hook end engaged with the felly  $i$  of said wheel and its threaded portion passed through the slot  
55  $f'$  of each of the arms  $f$  of said spider, after which a suitable washer,  $k$ , is placed over said bolt, and a nut,  $k'$ , screwed upon the same and turned forward until said bolt has been sufficiently drawn rearward to clamp said felly  
60 firmly against the outer face of said arm.

In order to properly and easily center a wheel when attaching the same to or upon the spider F, an annular collar, L, having substantially the diameter of the exterior of the  
65 outer smallest end of the hub  $i'$ , and provided

upon one side with a number of pointed studs or pins,  $l$ , is placed centrally upon the end of said hub, with said pins downward, and the latter then driven into said hub by a few blows  
70 of a hammer upon the upper face of said collar. The opening  $l'$  at the center of the collar L corresponds in diameter to the outer end of the bar H, so that if the latter is caused to project sufficiently to enable said collar to engage with the same when the wheel I is placed  
75 against and secured to the arms  $f$  of the spider F, it will be seen that said wheel must be accurately centered. After the wheel I has been secured in place upon the spider F, the bar H is drawn rearward and the centering-collar removed with a chisel. The cutter  $h^3$  is now  
80 inserted in the boring-bar H and adjusted radially to cut the desired amount from the interior of the hub  $i'$ , after which the wheel I, together with the spider F, hollow mandrel  
85 E, and expansible nut G, is rotated, and said nut being caused to engage with the threaded portion of said bar, the latter will be moved forward and said cutter caused to travel  
90 through and enlarge the opening in said hub.

If, after the cutter  $h^3$  has passed through the hub  $i'$ , it is desired to still further enlarge the opening within the latter, said cutter can be reversed, and by turning the wheel I in a direction opposite to that before employed said  
95 cutter will travel backward and cut its way through.

For counterboring the hub the operation last described is performed, the form of the cutter and its radial adjustment being made to  
100 conform to the shape and dimensions of the counterbore.

In order that hubs having different interior dimensions may be bored upon the same machine, I employ boring-bars having their outer  
105 portions reduced in diameter to suit the dimensions of the opening to be cut; and as such reduction in diameter prevents such portion of said bar from filling the outer end of the hollow mandrel E, I provide for each bar so  
110 reduced in diameter a collar, M, which fits loosely thereon, and within the outer end of said mandrel I provide a recess,  $e$ , that corresponds to and receives said collar or bushing. A screw tapped into said mandrel in such  
115 position as to cause its head to engage with the outer end of said bushing securely fastens the latter in place.

Having thus fully set forth the nature and merits of my invention, what I claim as new  
120 is—

1. As a means for journaling the boring-bar H, and in combination therewith, the box D and hollow mandrel E, the latter provided at or within its front end with a detachable  
125 bushing, M, which corresponds interiorly to the dimensions of the outer portion of said bar, substantially as and for the purpose shown.

2. In combination with the journaled man- 130



drel E and boring-bar H, passing through the same, the expansible nut G, secured upon and revolving with the rear end of the former, and adapted to engage with or be released  
5 from the threaded periphery of the latter, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I

have hereunto set my hand this 29th day of April, 1880.

ARTHUR O. WITHEY.

Witnesses:

THOMAS A. WITHEY,  
W. H. WITHEY, Jr.