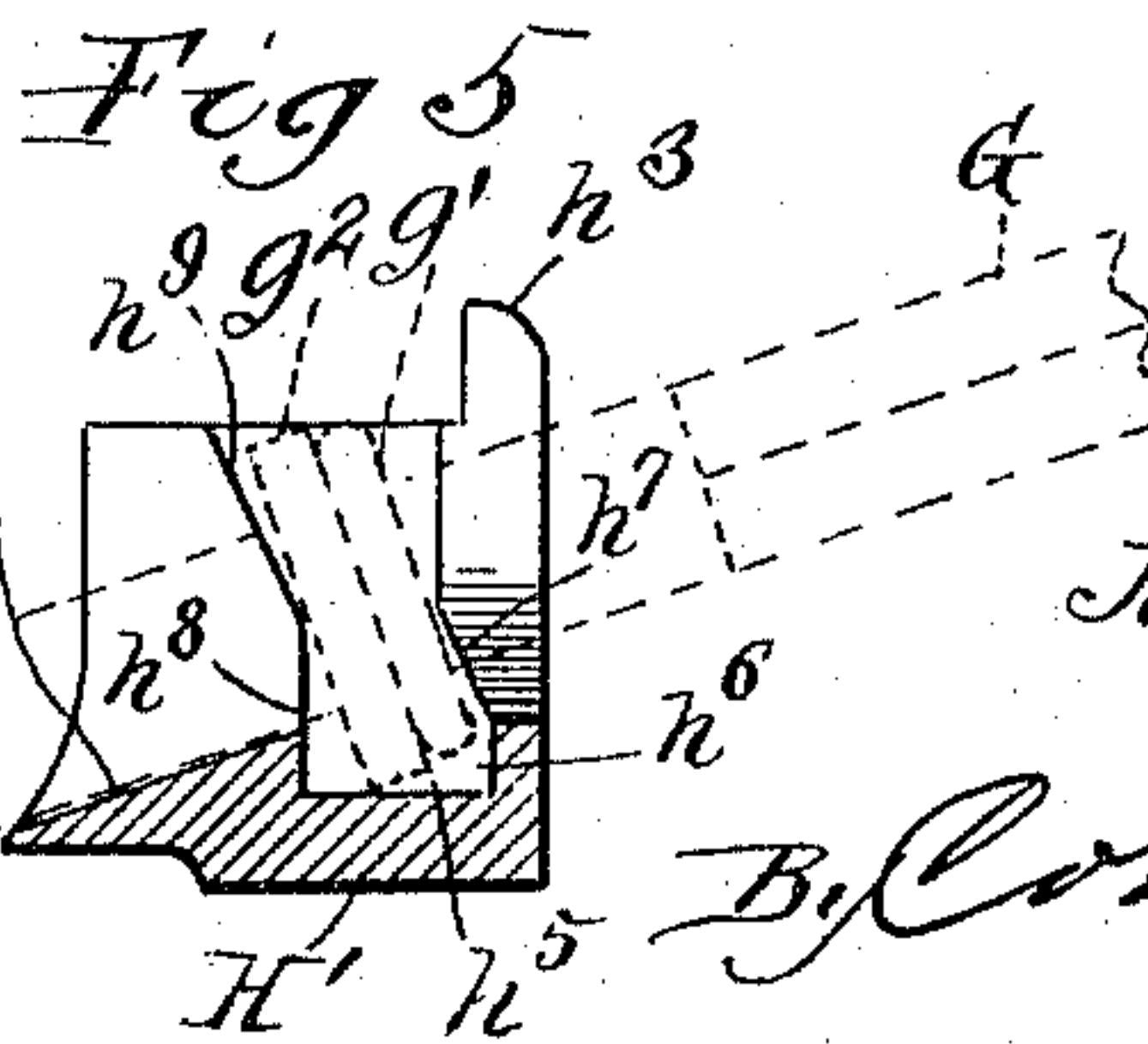
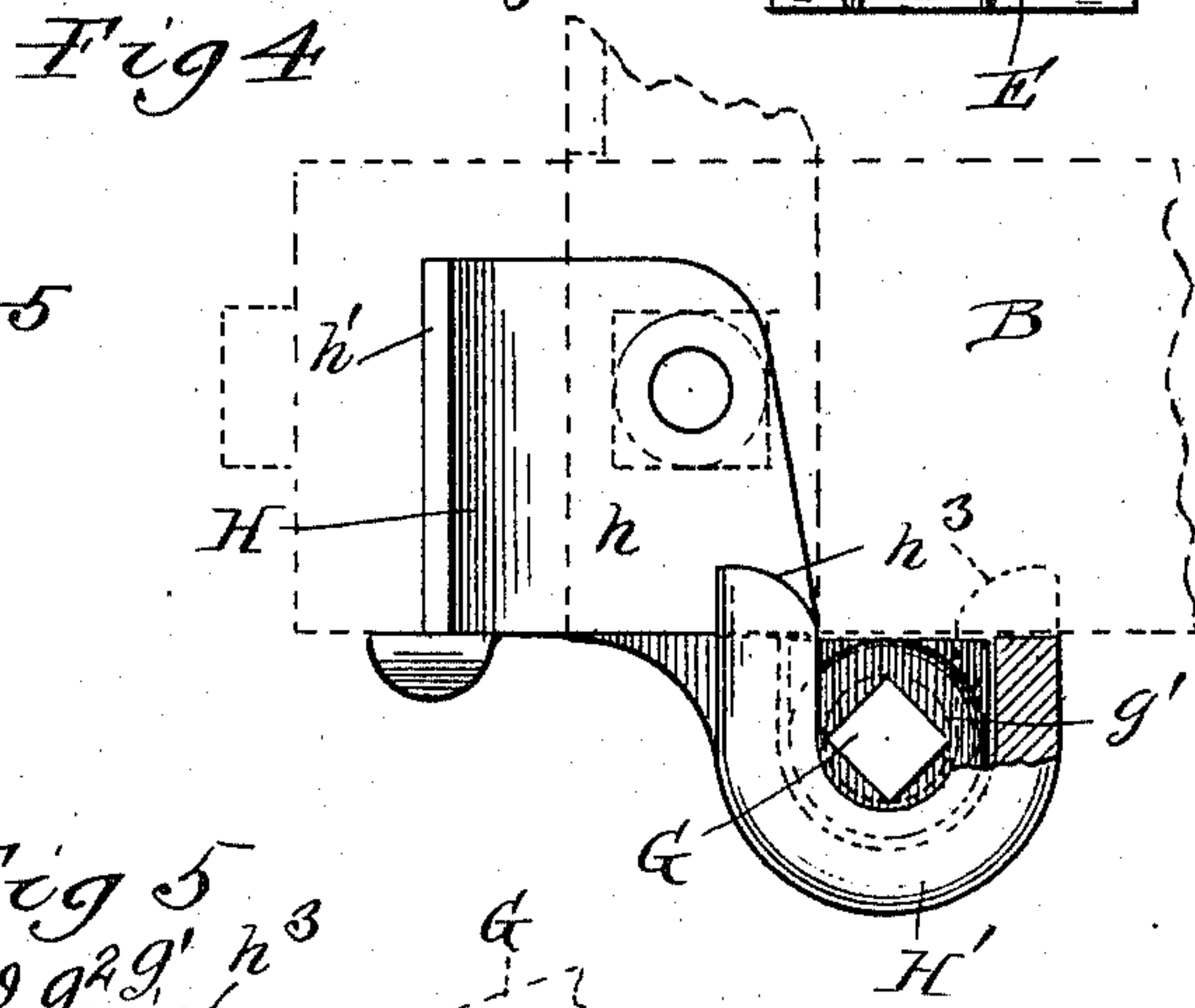
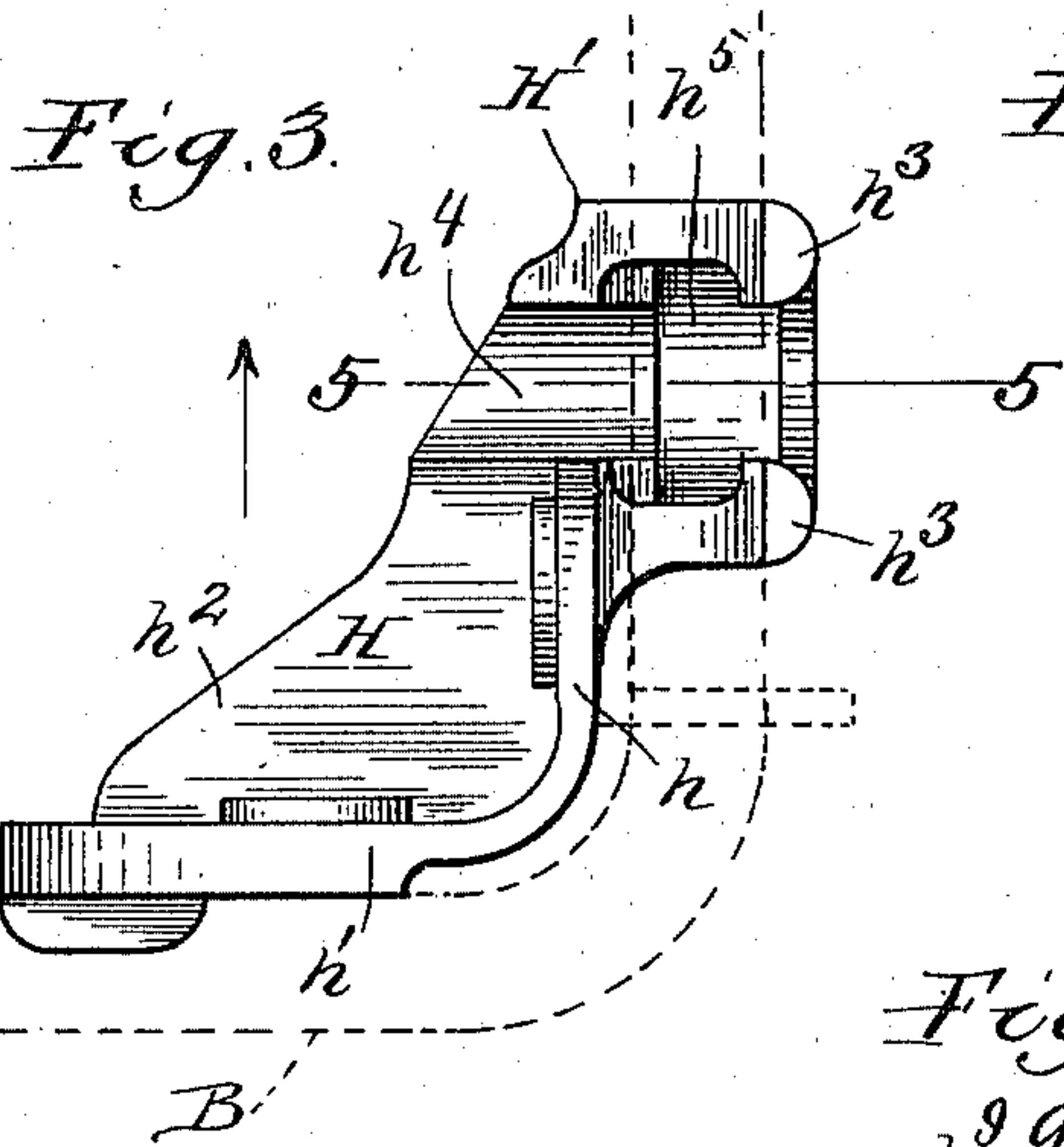
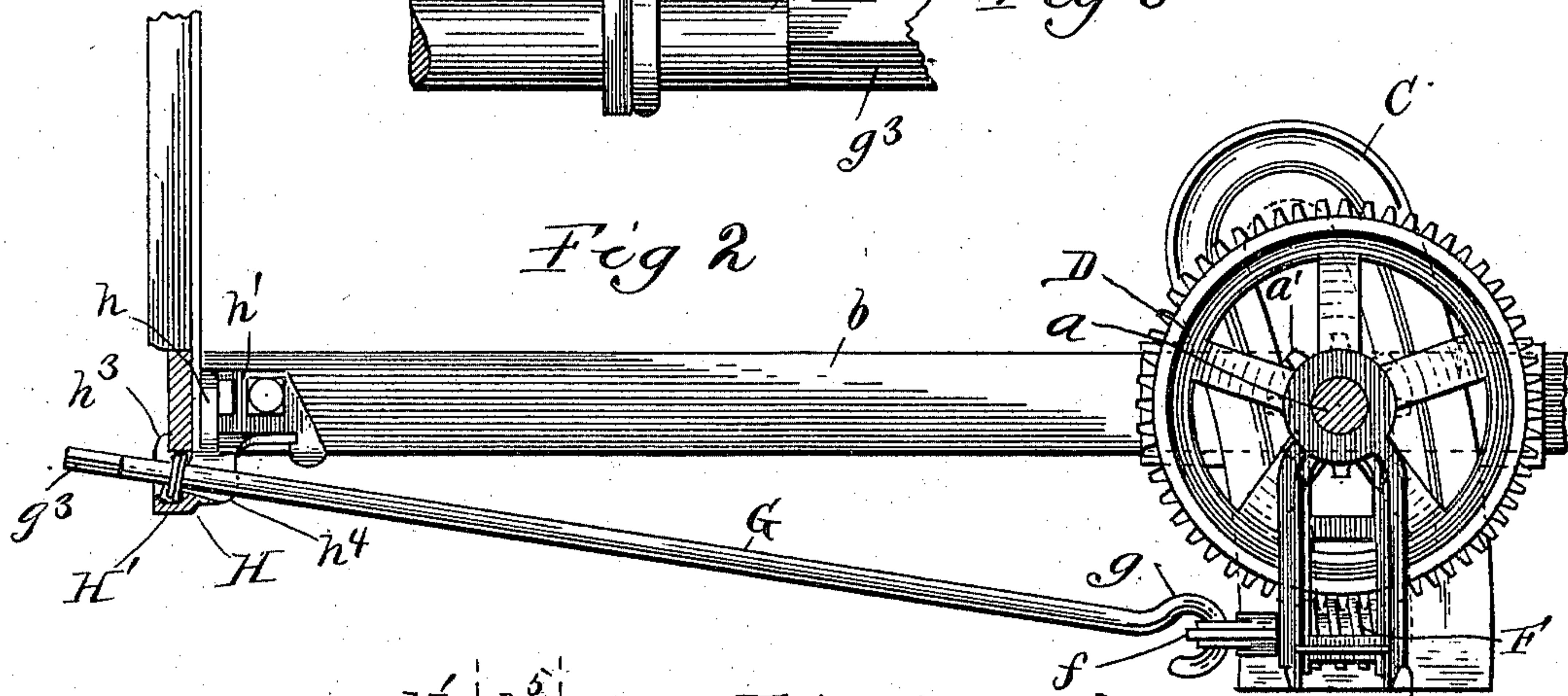
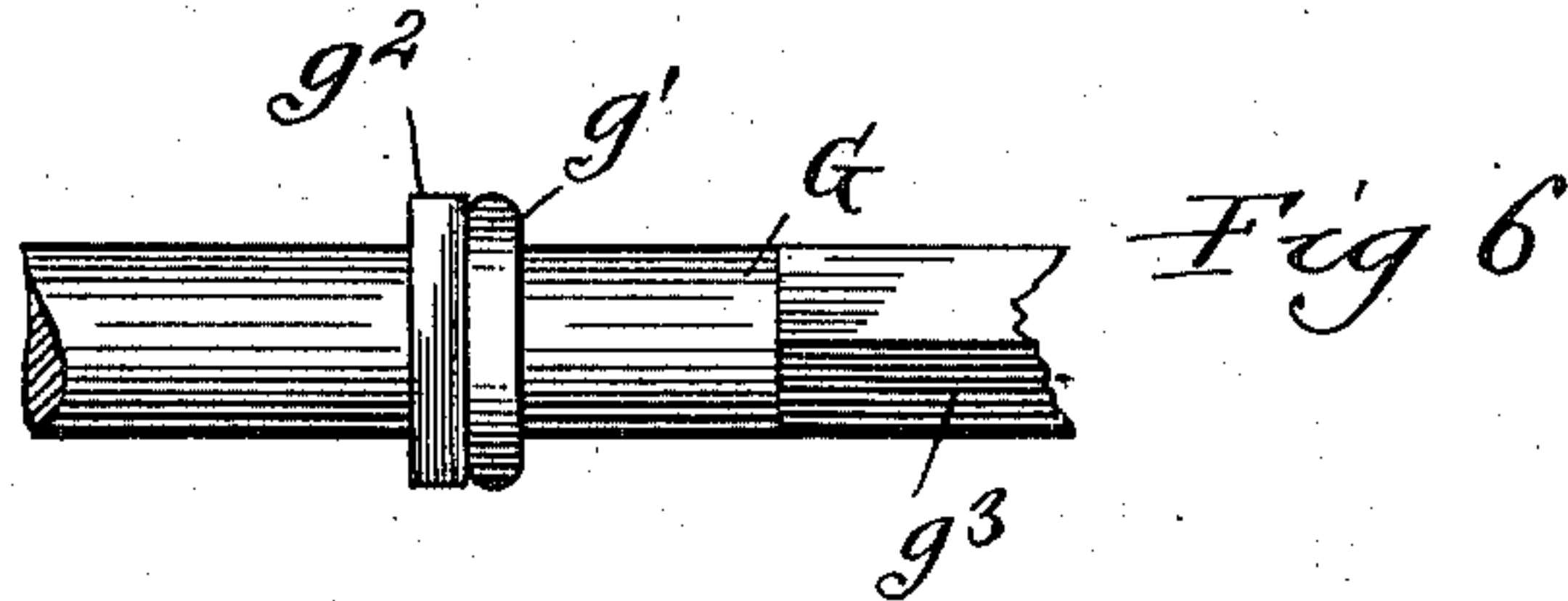
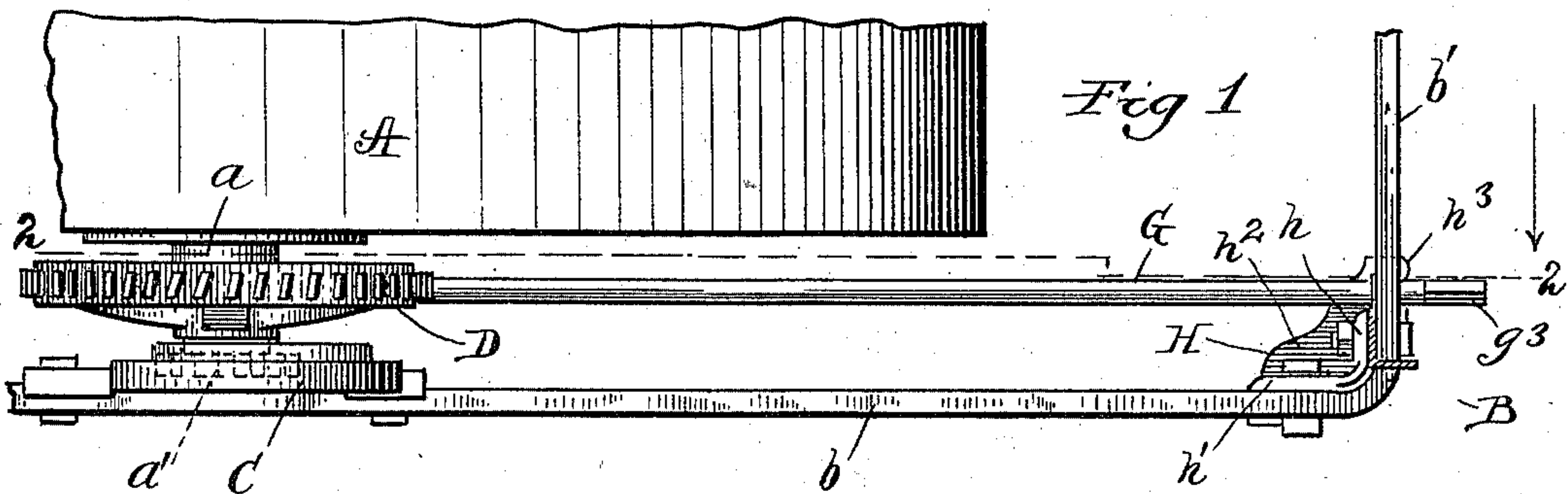


(No Model.)

J. MACPHAIL.  
HARVESTER.

No. 581,916.

Patented May 4, 1897.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## HARVESTER.

SPECIFICATION forming part of Letters Patent No. 581,916, dated May 4, 1897.

Application filed July 1, 1895. Serial No. 554,520. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES MACPHAIL, a citizen of the United States, residing at Blue Island, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Harvesters, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan view of a portion of a grain-harvesting machine embodying my invention; Fig. 2, a cross-section of the same, looking on the line 2 2 of Fig. 1 and in the direction of the arrow; Fig. 3, a detail plan of the bracket in which one end of the worm-shaft is mounted, a portion of the beam to which it is attached being shown in dotted lines; Fig. 4, a front end elevation of the same with the worm-shaft mounted in position and a portion of the main frame, to which it is attached, shown in dotted lines; Fig. 5, a detail section taken on the line 5 5 of Fig. 3 and looking in the direction of the arrow, and Fig. 6 a detail side elevation of the front or journal end of the worm-shaft. In the drawings Figs. 1 and 2 are upon one scale. The remaining views, Figs. 3 to 6, inclusive, are upon another and enlarged scale.

The invention relates to mechanism or devices for raising and lowering the main frame of a grain-harvester with reference to the axle of the main or ground wheel.

The present improvement relates to a structure in general features substantially the same as shown and described in my pending application, Serial No. 510,045, filed May 4, 1894; and it consists in special devices or means for mounting the free end of the worm-shaft in a suitable journal-bearing.

The construction and operation of so much of a grain-harvester as is necessary to an understanding of this invention will now be given, and the specific improvement which is believed to be new, and which it is desired to secure by Letters Patent, will then be designated in a claim.

In the drawings, A represents the main or ground wheel, *a* its axle, and B a portion of the main frame, *b* being the end bar or beam on the stubble side of the machine and *b'* the continuation thereof, bent inward at right

angles in front of the wheel. One of the usual sector-plates C is shown attached to the end bar and provided with the ordinary curved slot, and a toothed pinion *a'* on the axle engages with pins or teeth in the curved slot, which are not shown in the drawings, but are a well-known and generally-used feature in this class of machines. A worm gear-wheel D is also fixed on the main-wheel axle, and a hanger E is freely journaled on the axle, from which it depends by the side of the gear-wheel D. This hanger may be forked, and at its lower end the said forks may be turned upward underneath the worm gear-wheel. In the working arrangement a short worm F is journaled in this bent lower end of the hanger and engages with the worm gear-wheel on the axle. The rear end of this worm is provided with a loop or ring *f*, which provides the device for connecting to the worm the shaft by which it is turned whenever desired. All of these parts thus far mentioned are practically identical, as shown in the drawings, with the like devices described and shown in my said prior application, Serial No. 510,045, and therefore are not specifically described, and are here disclaimed, except in connection with a shaft of special construction and mounting for turning the worm and which will now be described. This shaft G is provided at one end with an open hook *g*, which is adapted to engage with the loop on the worm the same as in my said earlier application, but its outer or rear end is differently constructed and differently mounted. A bracket H of special construction is secured to the rear outer corner of the main frame. This bracket is of metal, and its main body is shaped substantially like angle-iron, being composed of two sides or webs *h h'*, which are connected at their lower edges by an angular-shaped flange *h<sup>2</sup>*. This bracket is secured to the outer rear corner of the main or wheel frame, being arranged inside thereof, as shown in Fig. 3. The side *h* of this bracket is secured to the rear cross-bar *b'* of the wheel-frame. At the extremity of the web *h* there depends a large lug or arm H', which extends backward or rearward from the face of this web, passing under the end cross-bar of the main frame, fitting up close to the under side



of said bar, and provided at its outer extremity with lugs  $h^3$ , adapted to extend up a little way on the outside of the cross-bar, thereby holding this bracket firmly in place on the latter, which is seated between the said web and the lugs thereon. This extension lug or arm  $H'$  is journaled or, in other words, is bent at its lower portion in hook shape to form a bearing  $h^4$  for the shaft  $G$ , by means of which the worm is turned. A wide groove  $h^5$  is cut transversely of this bearing and in the surface thereof, running entirely around the latter. At the lower or bottom portion of this groove the front or outer edge or face is set farther outward than the upper portion, as seen at  $h^6$  in Fig. 5, and is inclined backward from this bottom edge of the groove to the normal perpendicular portion thereof, this incline being indicated by  $h^7$  in the same Fig. 5. The lower portion  $h^8$  of the rear or inner face of the said groove is straight and parallel with the upper portion of the front section just described above, and extends upward in this line to points in about the same plane as the lower ends of the former. Thence these faces are inclined inward or backward, as indicated by  $h^9$  in said Fig. 5, where it will be seen that this incline is about parallel with the lower front incline at the opposite edge of the groove. The bottom of this bracket in rear of the said groove is inclined downward as it extends backward, thereby forming a rear or inner bearing-surface  $h^{10}$  for the worm-shaft, inclined downward toward the support for the worm.

The worm-shaft  $G$  is provided near its outer end with a collar  $g'$ , which is fixed thereon and adapted to enter the groove in the bracket-lug  $H'$ , though it is not thick enough to fill this groove. In addition to this fixed collar there may be placed also on the shaft a washer  $g^2$  inside of the collar and adapted to the groove like the latter, the two together substantially filling the narrowest space between the two faces of the groove, as seen in Fig. 5. The lug  $H'$  of the bracket provides a bearing for the worm-shaft, and, when properly mounted, obviously the collar on the shaft will come directly underneath the end bar of the main frame, so that the bearing-opening and groove therein must be deep enough to provide for the free movement of the collar. The collar and washer serve to hold the shaft in proper relation to the worm with which it is connected, and the several inclines in the lug-bearing in which the shaft is mounted provide for the raising and lowering of the inner end thereof as the main frame is raised or lowered by the turning of the worm. This is clearly obvious from the relation of the parts indicated in Figs. 2 and 5. The outer extremity of the worm-shaft is preferably provided with an angular section  $g^3$  for the ready

application of a hand-crank, whereby the shaft may be turned to adjust the main frame vertically.

It may be desirable to provide for the ready detachment of the worm-shaft from the machine or attachment thereto in working position without removing any other part. If so, the collar may be secured to the shaft by a threaded connection. The washer is of course loose on the shaft, and therefore these two pieces may be placed in position in the lug when the bracket to which the latter belongs is secured to the frame. The shaft may then be detached by unhooking from the worm and turning in the proper direction to be withdrawn from the collar. To effect this result, however, the collar must in some way be temporarily held in position while the shaft is turned either by a steady strong pull on the shaft or a little wedge which may be inserted in the tapering space between the collar and the lower edge of the main frame-bearing, which space is clearly shown in Fig. 4 of the drawings. Of course there will be no difficulty with the washer, as the shaft will slip right through it. In remounting the worm-shaft in working position like action is required, though the direction of the movement is reversed. Unless some provision of this nature is made obviously the worm-shaft cannot be wholly detached from the machine without removing the bracket  $H$  or loosening it so that the bearing-lug will drop far enough below the rear cross-bar to permit the collar and washer to pass out.

In some mechanical details there may be changes without dispensing with the main features of the invention, and the applications of such modifications are contemplated in the use of the invention under different circumstances on different machines.

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

In a harvester, having a main frame vertically adjustable on the main axle, gearing,  $D$  and  $F$ , for adjusting the main frame on the axle, a shaft,  $G$ , hooked or hinged at one end to one member of said gearing and at its other end provided with a collar,  $g'$ , and a bracket,  $H$ , secured to the rear of the main frame and having a lug or arm,  $H'$ , to make a bearing for the said shaft, provided with a transverse groove,  $h'$  and inclines,  $h^7$ ,  $h^9$ , and  $h^{10}$ , whereby the collared end of the said gear-driving shaft may be mounted in said bearing and its vibration or vertical movement at the other end accommodated when in action to raise or lower the main frame, substantially as described.

JAMES MACPHAIL.

Witnesses:

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I. A. HELMICH.