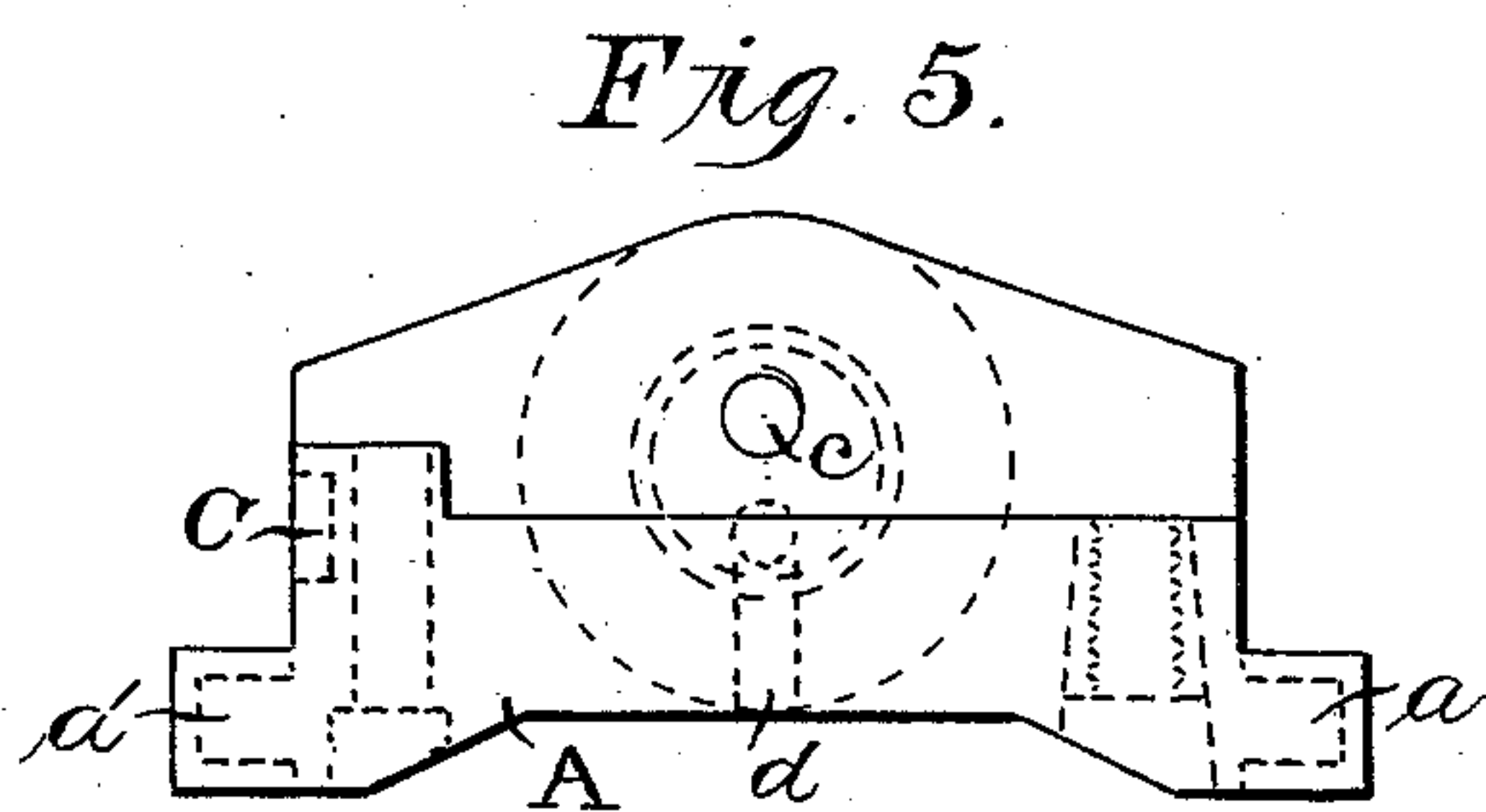
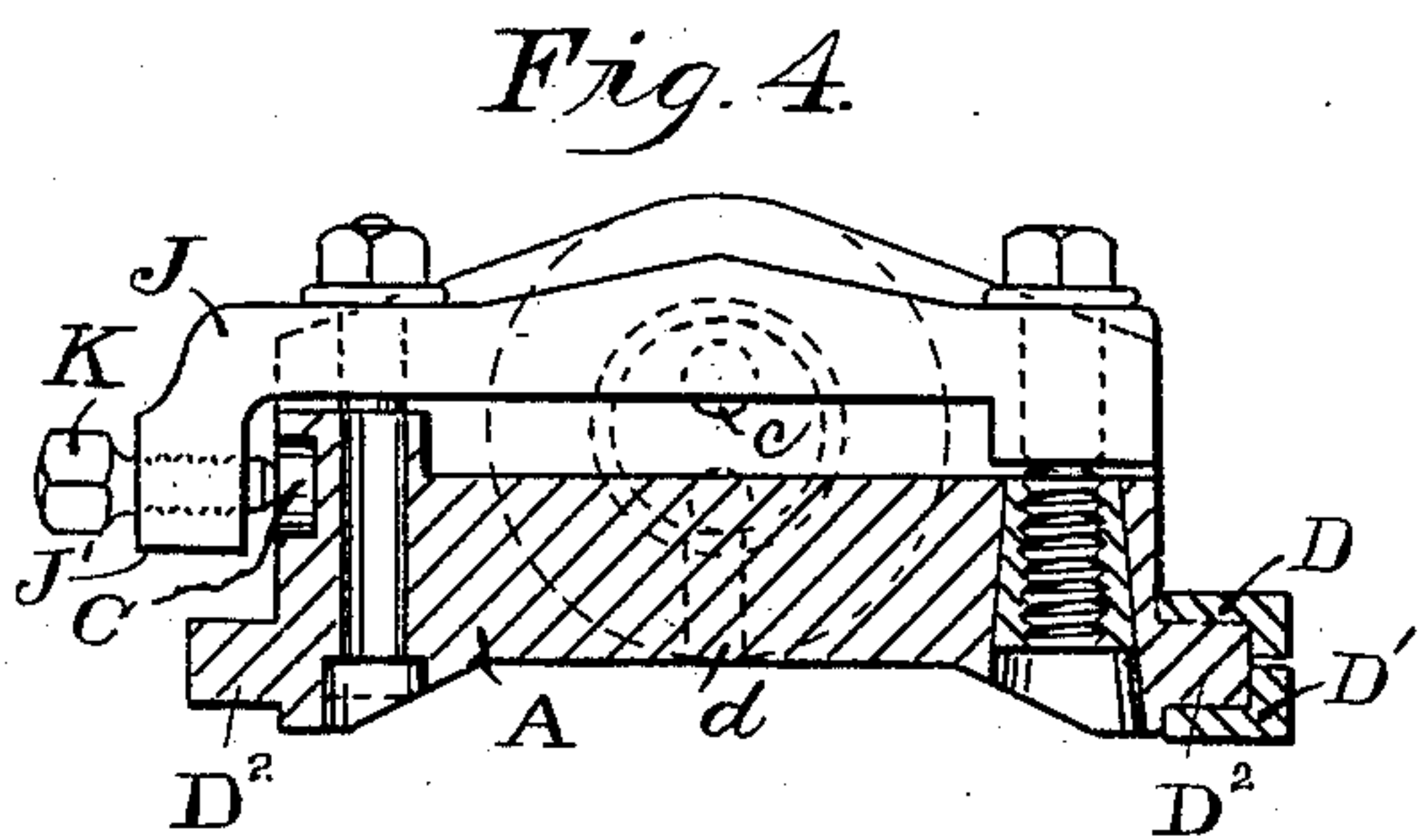
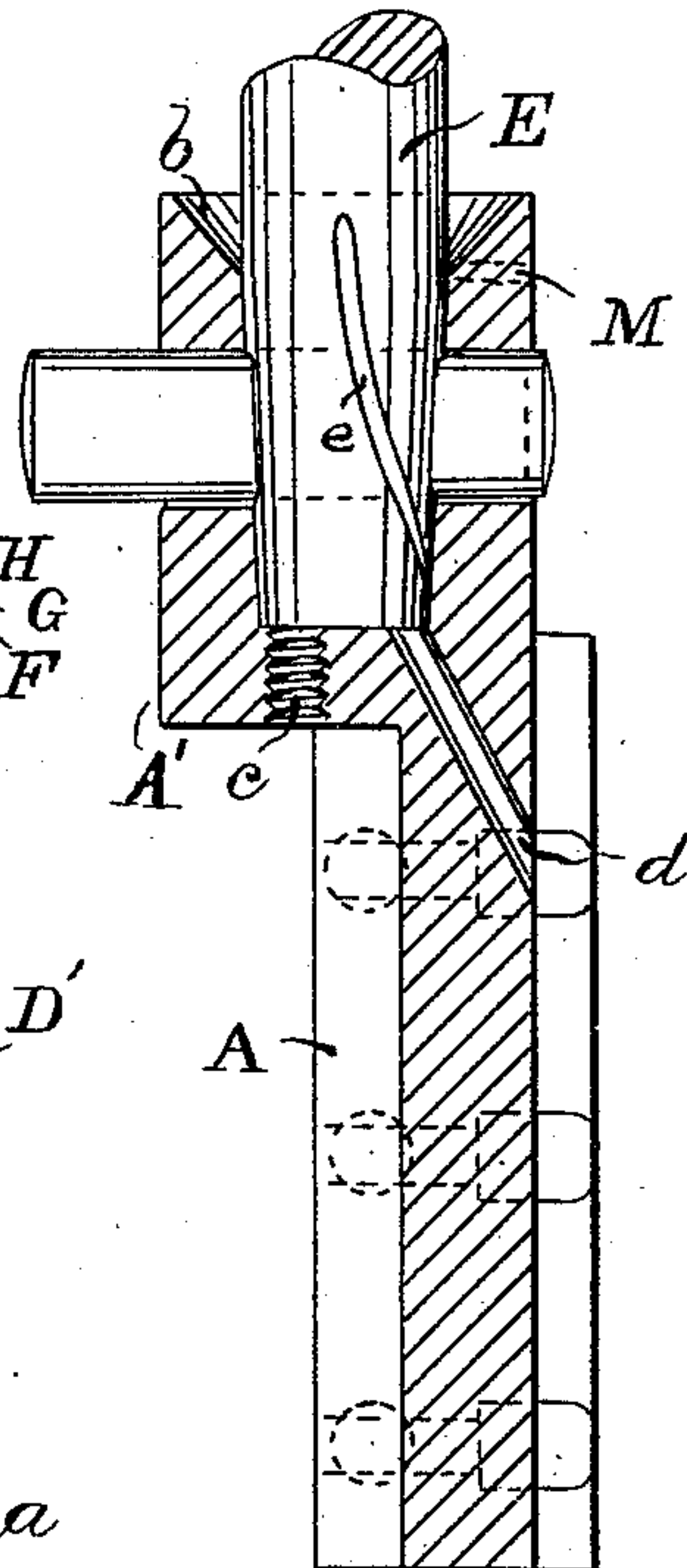
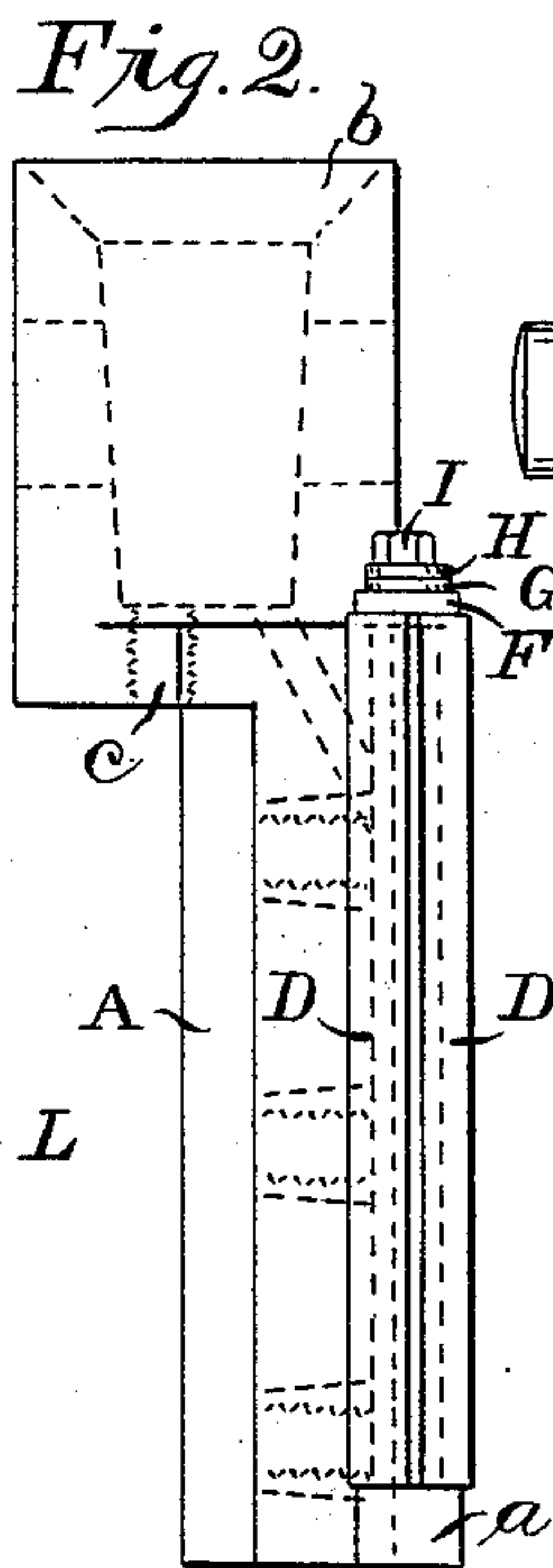
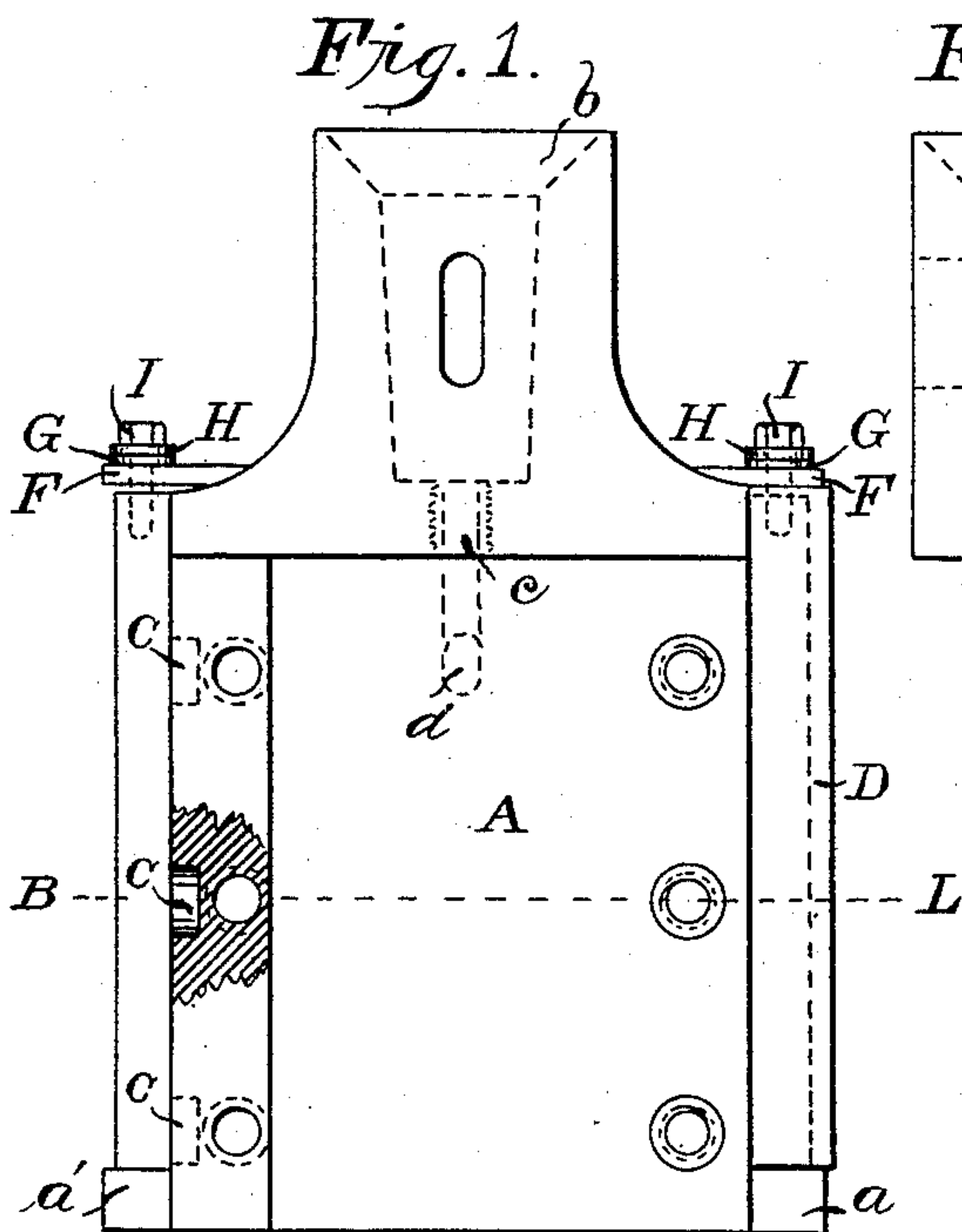
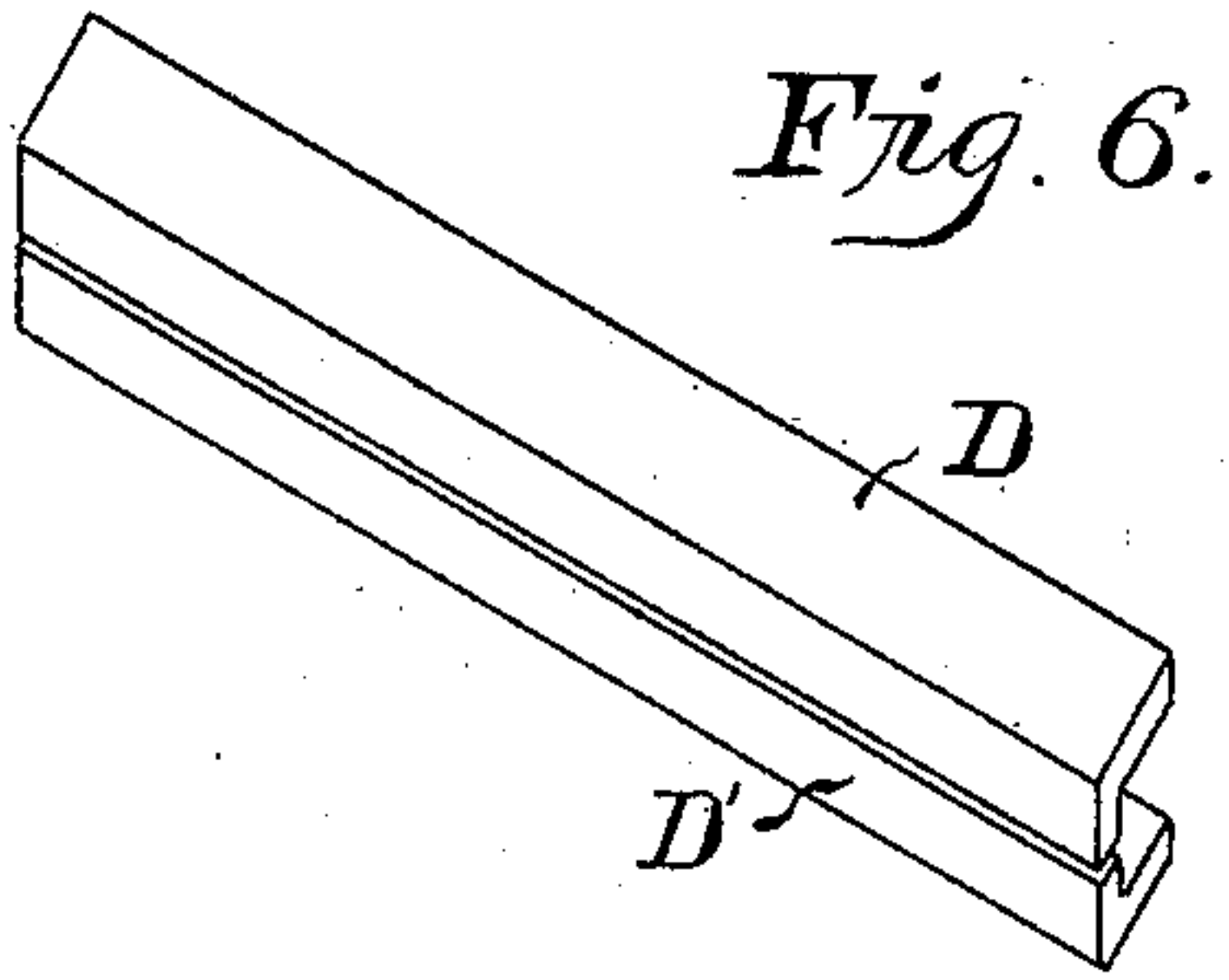


(No Model.)

A. BALL.
GANG DRILL CHANNELING MACHINE.

No. 452,354.

Patented May 19, 1891.



WITNESSES:
Arch. M. Catlin
E. R. Corner

INVENTOR:
Albert Ball
by
Benj. R. Catlin ATTORNEY

UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO THE
SULLIVAN MACHINE COMPANY, OF SAME PLACE.

GANG-DRILL CHANNELING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 452,354, dated May 19, 1891.

Application filed June 23, 1890. Serial No. 356,477. (No model.)

To all whom it may concern:

Be it known that I, ALBERT BALL, a resident of Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Gang-Drill Channeling-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

The invention is an improvement upon a drill-holder suitable for a gang-drill channeling-machine for which patent was granted December 13, 1887, to Albert Ball, and numbered 374,818, and its objects are to perfect the details of construction in machines of such character; and it consists in the matters hereinafter set forth, and particularly pointed out.

In the accompanying drawings, Figure 1 is a front elevation of a cross-head. Fig. 2 is an edge view of the same. Fig. 3 is a vertical central section from front to rear. Fig. 4 is a horizontal section on line B L of Fig. 1. Fig. 5 is a bottom view, and Fig. 6 is a perspective of a detail.

The reference-letter A denotes the head-piece of a drill-holder, and E a piston-rod keyed thereto.

b indicates a recess formed in the head about the piston-rod, where it enters the drill-holder, to receive oil or water that works down on the rod from the cylinder. A groove (indicated by e) is formed in the rod and made to connect with a channel d in the head, whereby liquid matter which enters the receptacle b is conveyed to the back of the cross-head. A channel such as indicated by dotted lines at M might be made to subserve the same purpose. It is of course immaterial whether channel e is formed in the rod or in the head, and more than one may be used, if desired. It is also immaterial whether the piston-rod itself be keyed directly to the drill-holder (or cross-head) or whether a connecting-rod be used.

It is necessary to set the cross-head very firmly upon the piston-rod or connecting-piece, and ordinarily hammering is required to remove it after the removal of the locking device. To avoid such objectionable ham-

mering, a passage c is provided in the head at the bottom of the rod, which when screw-threaded, as shown, will permit the use of a screw to force the rod from its seat. A jack might be employed for this purpose, in which case the passage would not require to be threaded.

Heretofore a piston-rod has been loosened by forcing a pin against its foot by means of a gib and wedge applied through a transverse opening. It is characteristic of my device that the opening in the bottom of the piston-socket is located in an offset A' of the head and is directly accessible, and that a releasing device can be applied in direct line with the rod and without the intervention of a wedge or other like means.

J indicates one of the clamps adapted to be held by means of screw-bolts against the drills in the head. K is a set-screw, and C a piece of steel made specially hard and secured in the iron or steel head A. The object of this hard piece of metal is to obviate the wearing or tearing effect of the screw upon the comparatively soft metal of the head. The particular form of the disk or piece is not material. A single strip might be substituted for the three disks shown, and other metals or alloys of peculiar hardness could be used instead of hard steel.

The drills make about three hundred blows against the solid rock per minute and are not held with sufficient security by ordinary bolt-fastenings. I provide the clamp with an offset J', and arrange a set-screw therein transverse to the usual bolt. These bolts require to be screwed up hourly, and the very best steel will be worn away under the repeated operations. I am aware that hard-metal pieces have been used in soft-metal fastenings to resist the wear of screws in mill-spindles, and such device is not broadly of my invention. Ordinary hard metal such as heretofore used in connection with the brass bearings of mill-spindles will not answer the purpose of my improvement, as such bearing-plates would not be harder than are my drill-holders in which specially-hardened plates are secured. Further, my construction is such that the screw-heads are exposed and directly accessible, which is a feature of importance

in a structure which requires very frequent tightening of the screws.

The guides of the head are denoted by D^2 , D^2 , and $D D'$ indicate gibs to protect the same.

5 They are made angular or L-shaped, as shown, and are applied to the exterior corners of the guides with their lower ends resting upon shoulders or flanges $a a'$, respectively.

F denotes a bearing-plate resting upon their
10 upper ends.

$G G$ are elastic washers or packings, and $H H$ are metal washers, and $I I$ cap-screws for forcing these parts together to hold them firmly in position. The elastic washer, which
15 may be made of leather or like material, prevents the breaking off of the caps or heads of the screws. A spring may be substituted for the leather washer or packing with an equivalent effect. In use these gibs will become
20 "upset" and shortened, and the screws provide means for remedying this by suitably screwing the parts together when required, thus obviating lost motion of the gibs.

It will be understood that the above-described devices can be employed in machines
25 widely differing in other respects; and I do not wish to be understood as limiting the improvements to any particular form of gang-drill.

30 I am aware that a split ring has been applied to a piston to arrest or scrape off water passing down through a stuffing-box, said ring having a downwardly-inclined surface to conduct the water into a receptacle provided
35 with a discharge-pipe. I am also aware that a cylinder, nut, and screw-threaded stud have been interposed between the end of a piston-rod and a wrist-pin of a cross-head, the device being made removable, and that removable keys or wedges have also been used to
40 provide for detaching piston-rods and cross-heads; and, further, I am aware that gibs have been clamped to cross-heads by screws, and I do not broadly claim devices for effecting
45 these various objects.

My improvement for removing water requires no new parts, but simply a recess in the top of the head adjacent to the rod, and a channel formed either in the rod or in its
50 seat, leading away from the drills. My improvement for detaching the piston-rod and drill-head is simple, and requires no complicated supplementary parts. My device for holding and supporting gibs dispenses with
55 transverse screws and slots and recess to give

access to said screws, and it supports them at their ends only.

Having now described my invention, what I desire to secure by Letters Patent is—

1. In a drilling-machine, a drill-holder head
60 combined with a piston-rod and provided with a recess in the top of said head and immediately adjacent to the rod to receive liquids that run down on the rod, and a passage leading from said recess and extending between
65 the rod and head and out through the rear of the latter to convey them to the rear of the drill-head, substantially as set forth.

2. In a drilling-machine, a drill-holder head combined with a piston-rod, said head having
70 a socket to receive the rod, a movable device for holding the rod in said socket, and an opening extending through its wall to the foot of the rod, said socket being located in a lateral extension or offset of the head, whereby
75 a simple straight device can be forced directly against the foot of the rod by power applied immediately against its end, substantially as set forth.

3. In a drilling-machine, a drill-holder head
80 provided with guides having shoulders at their bottom to support gibs, and devices for forcing the gibs down lengthwise upon the shoulders, substantially as set forth.

4. In a drilling-machine, a drill-holder head
85 having guides provided with shoulders, angular or L-shaped gibs adapted to embrace the angles of the guides, and screws to force the gibs down upon the flanges, substantially
90 as set forth.

5. In a drilling-machine, a drill-holder head having guides provided with shoulders, angular or L-shaped gibs adapted to embrace
95 the angles of the guides, a bearing-plate, and screws to force the gibs down upon the flanges, substantially as set forth.

6. In a drilling-machine, a drill-holder head having guides provided with shoulders, angular or L-shaped gibs adapted to embrace
100 the angles of the guides, a bearing-plate, an elastic washer or spring, a metal washer, and screws to force the gibs down upon the flanges, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing
105 witnesses.

ALBERT BALL.

Witnesses:

FRANK A. BALL,
C. B. RICE.