

(No Model.)

E. H. WHITNEY.  
CAPSTAN.

No. 415,081.

Patented Nov. 12, 1889.

Fig. 1.

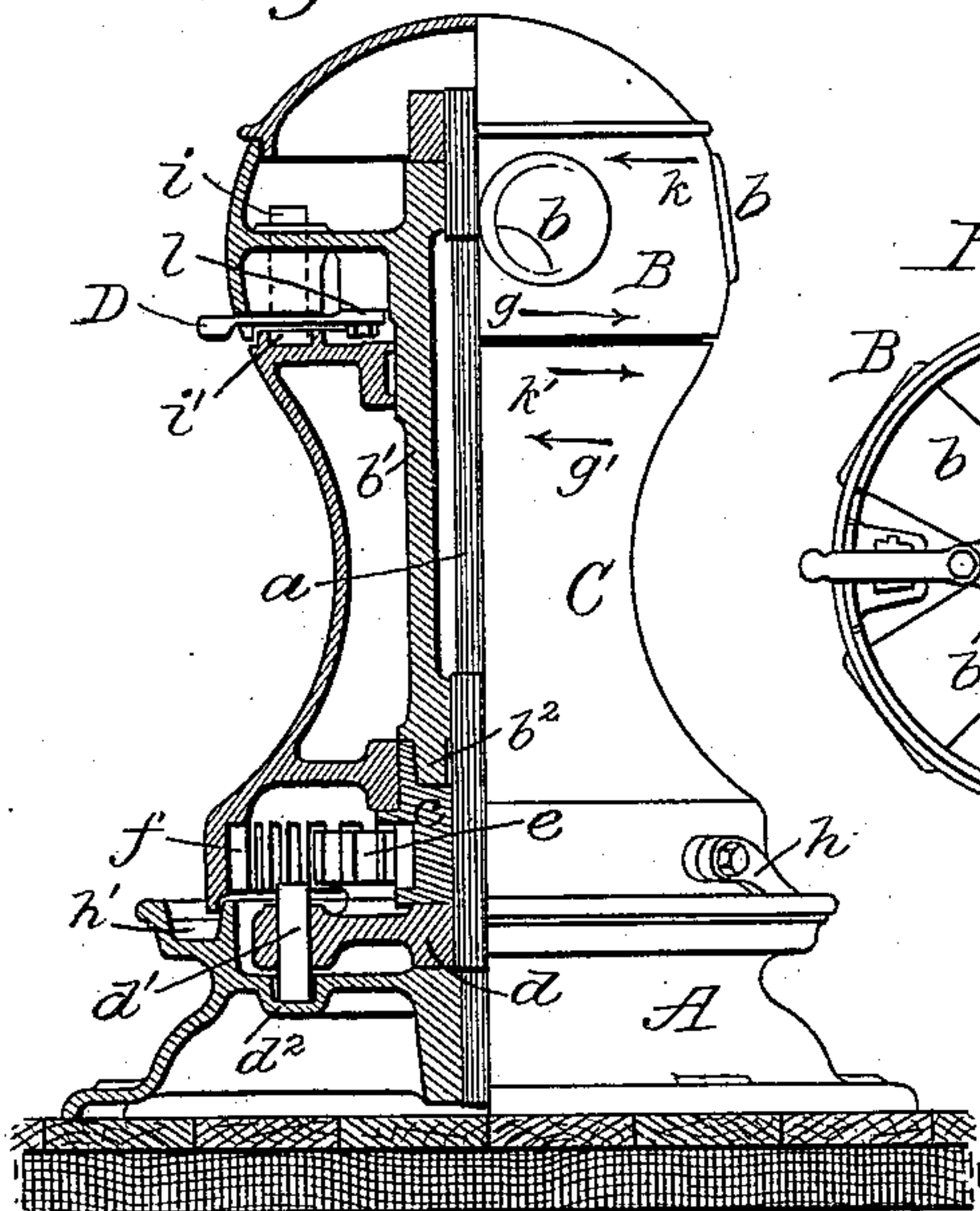


Fig. 2.

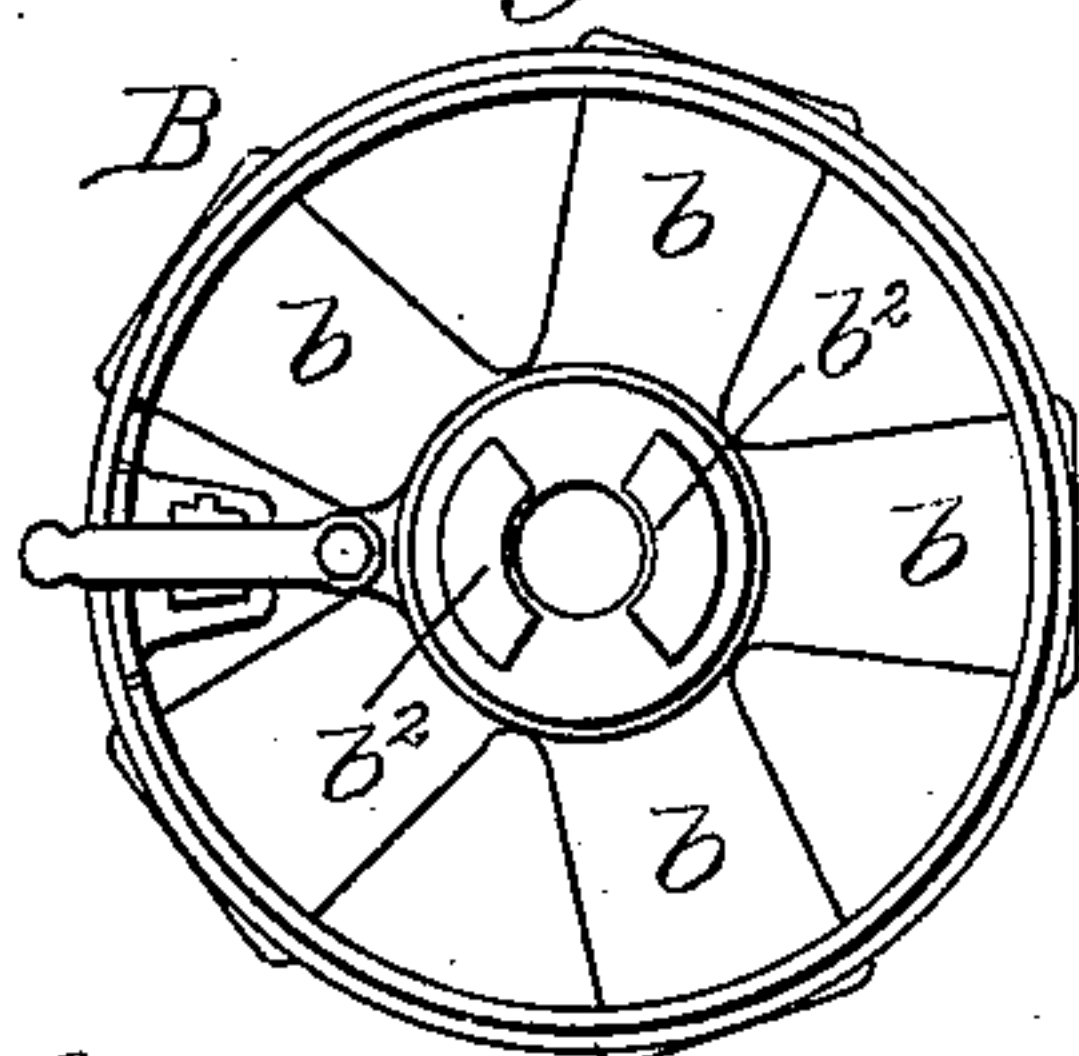


Fig. 3.

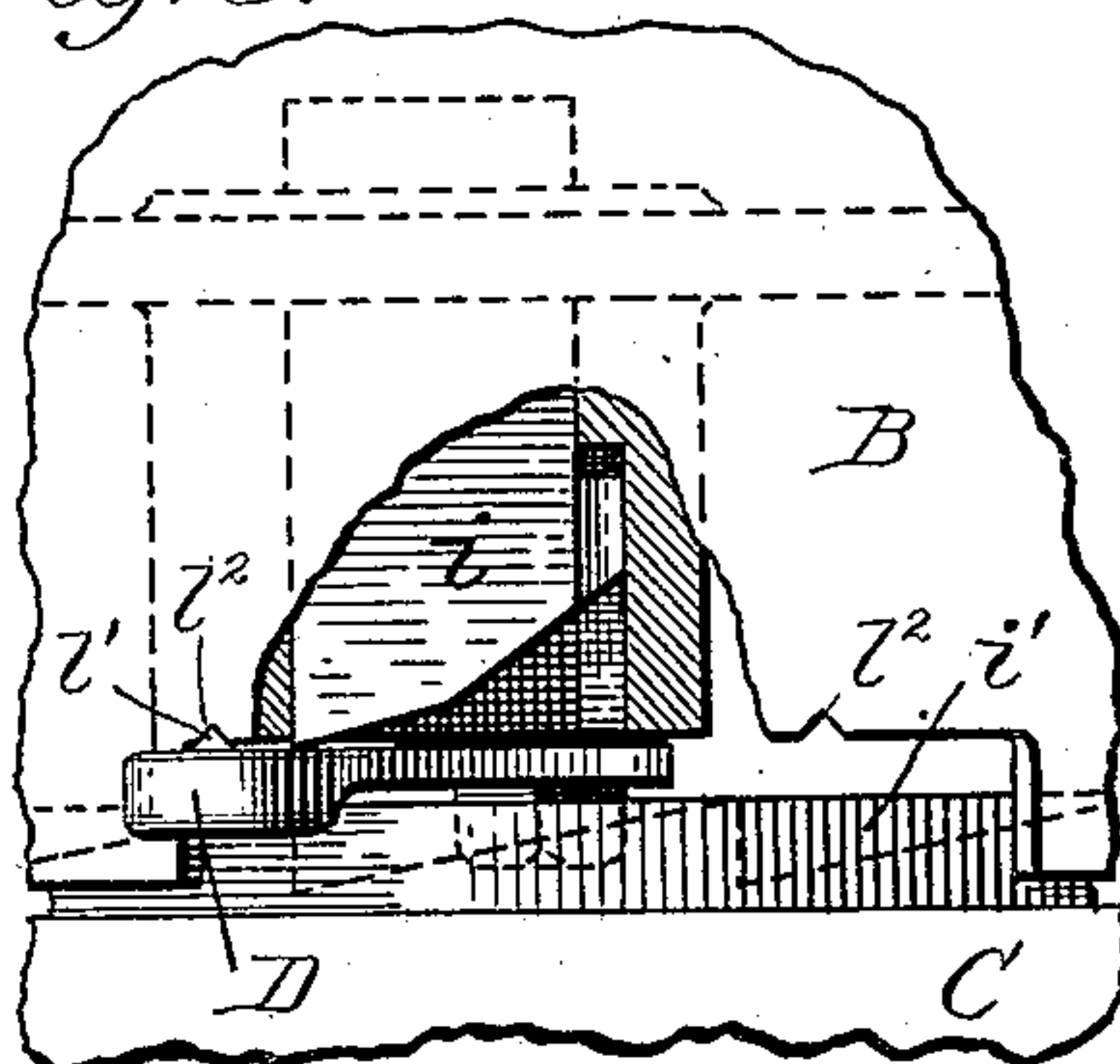


Fig. 4.

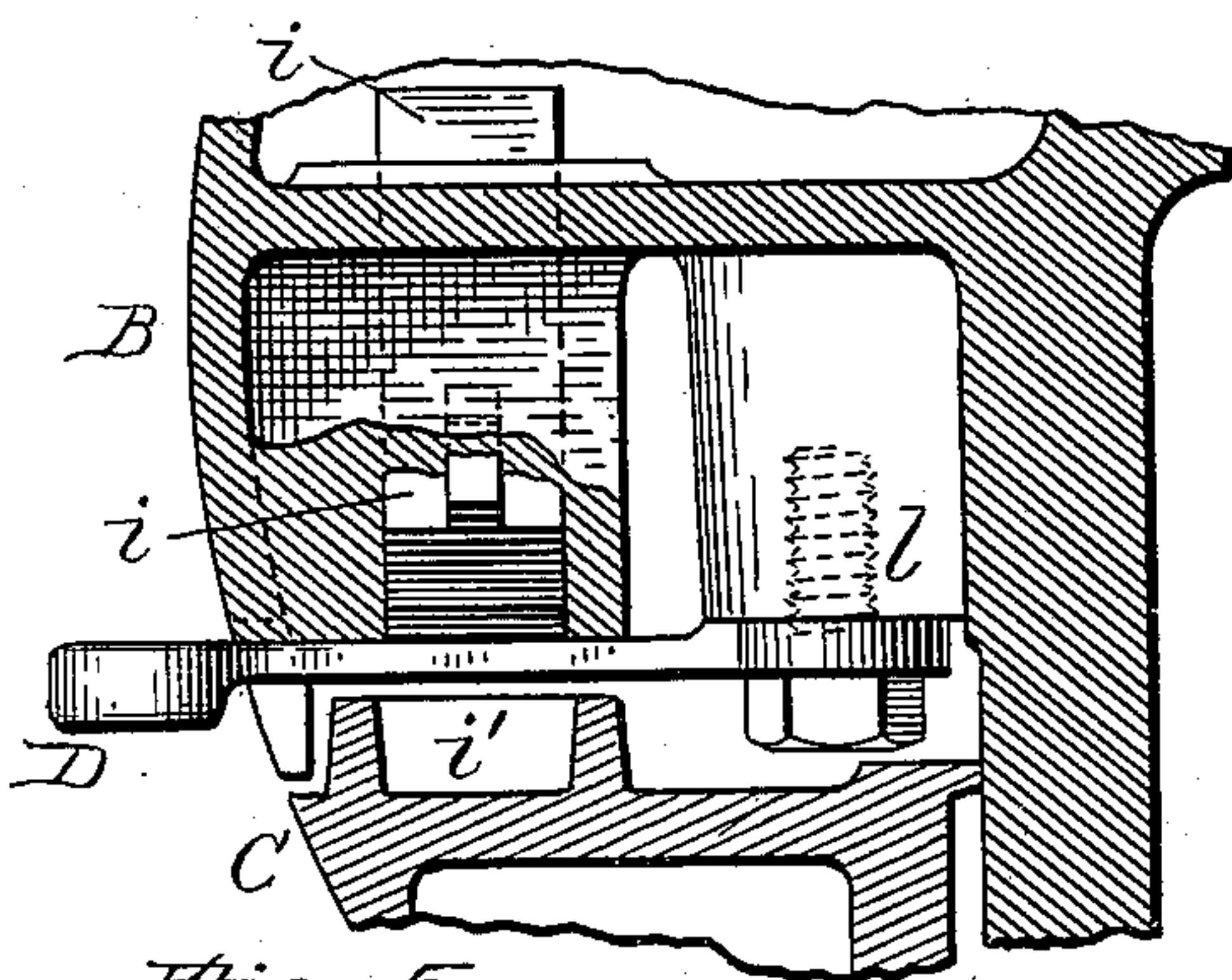
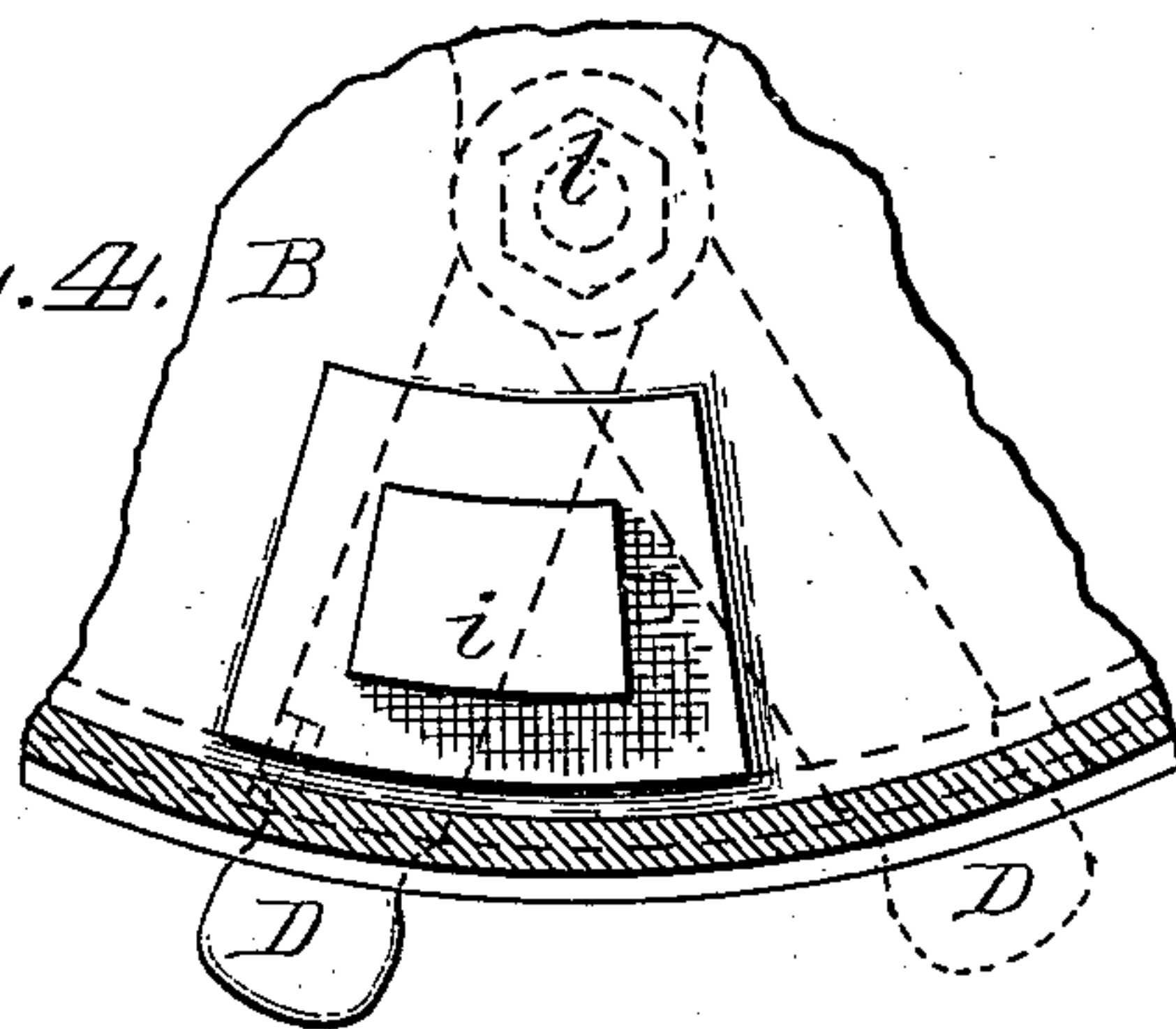


Fig. 5.

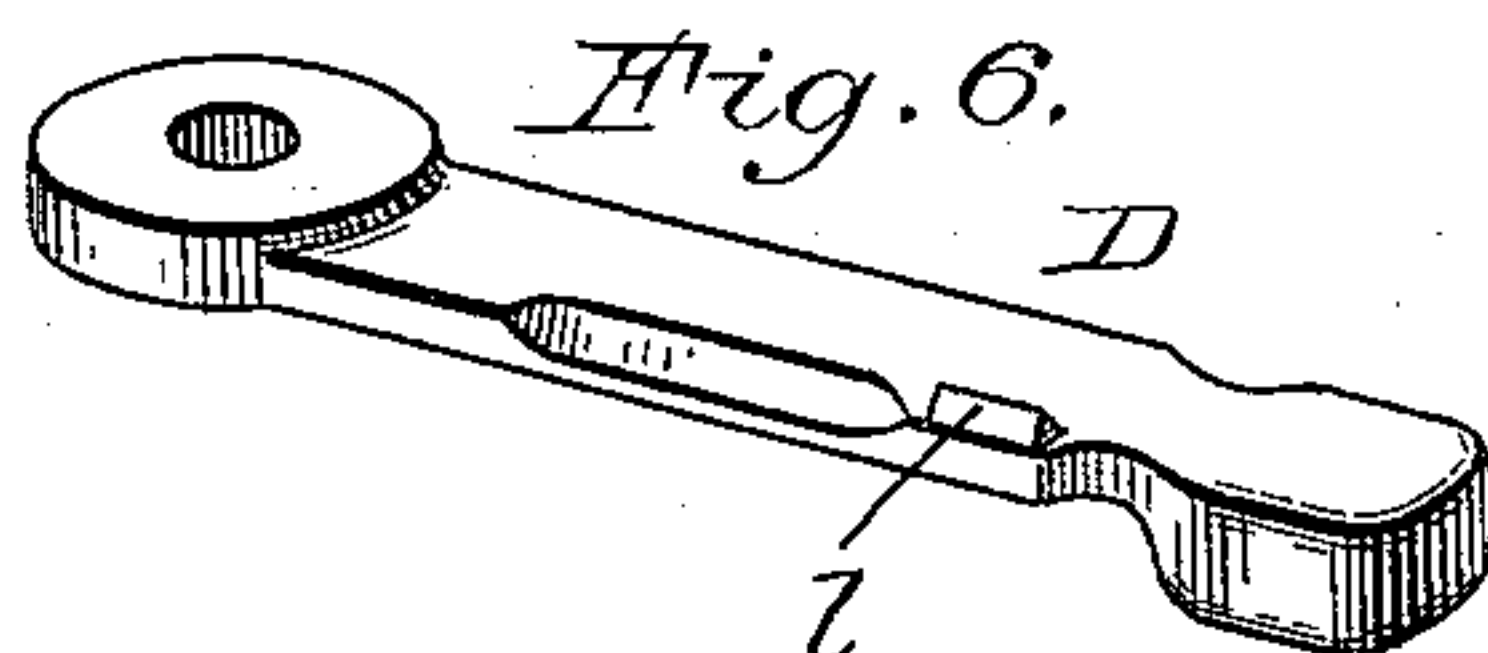


Fig. 6.

Fig. 7.

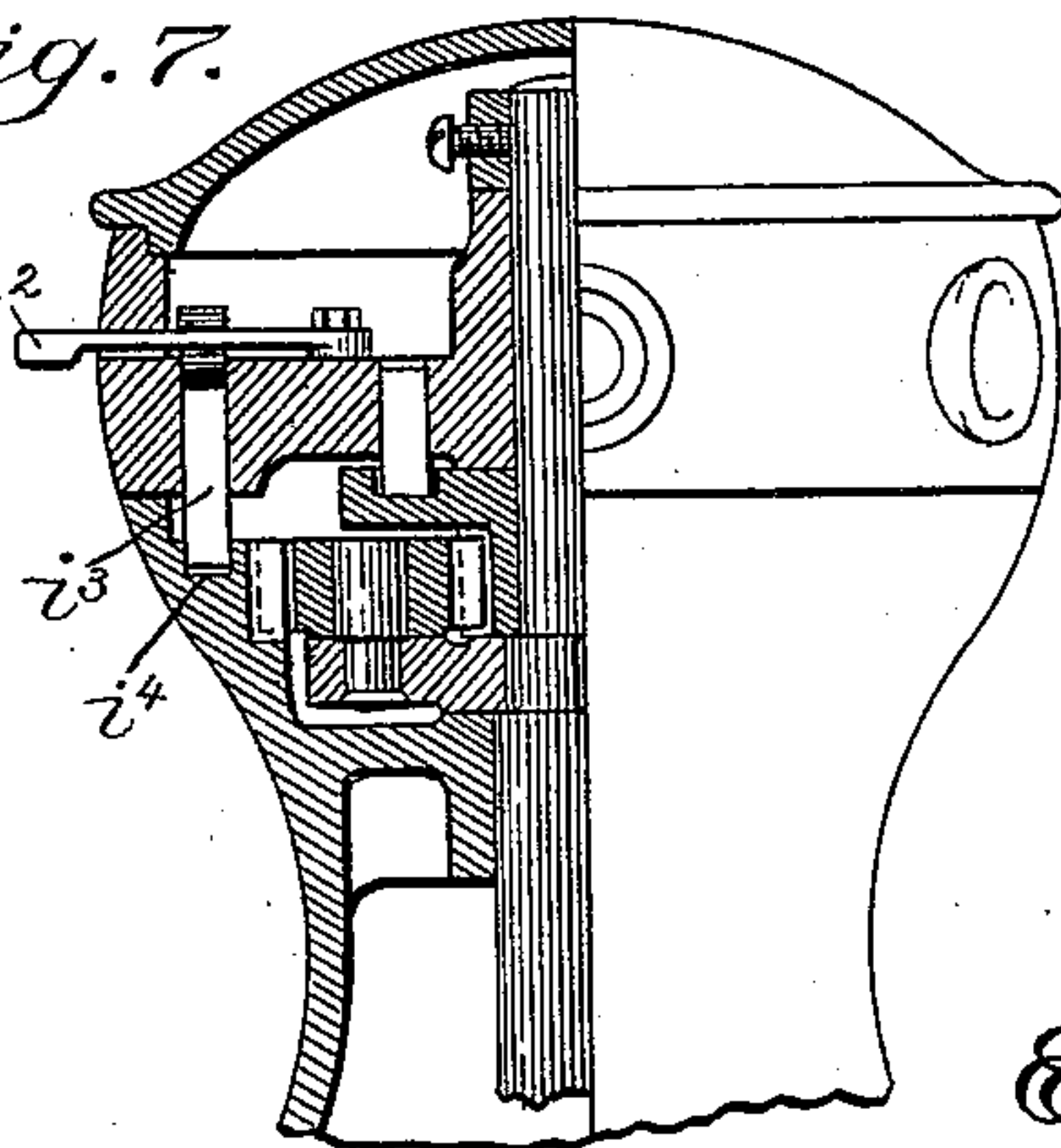
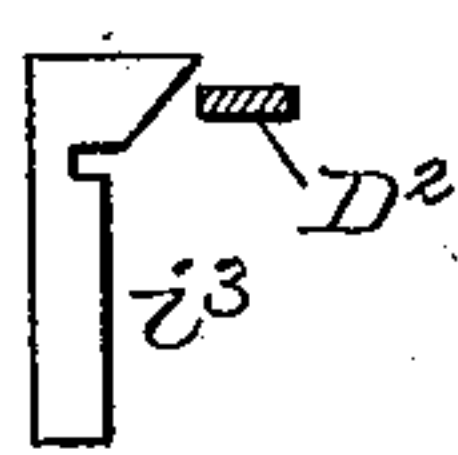


Fig. 8.



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# UNITED STATES PATENT OFFICE.

EDWIN H. WHITNEY, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE  
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## CAPSTAN.

SPECIFICATION forming part of Letters Patent No. 415,081, dated November 12, 1889.

Application filed August 7, 1889. Serial No. 320,038. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN H. WHITNEY, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Capstans; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My said improvements relate to such capstans as embody a fixed central spindle, a capstan-head, and a barrel, (each independently rotatable around said spindle,) internal gearing indirectly connecting said head and barrel, whereby the latter may be driven in one direction when the head is rotated at greater speed in the opposite direction, a ratchet, and a vertically-sliding pawl for directly connecting the head and the barrel, so that both may be rotated in one direction and at the same speed, said internal gearing then being inoperative. Capstans of this particular class were disclosed in Letters Patent No. 147,557, February 17, 1874, Reissue No. 8,511, December 3, 1878, and more particularly in Patent No. 351,241, October 19, 1886.

It is well known that in the use of ships' capstans the hawser or line in service when under surging strain is liable to get fouled on the capstan-barrel incident to its accidental overriding adjacent coils, and that it then becomes necessary at times in the use of such capstans to cut the line for effecting a clearance, especially when slackening at the opposite end of the line is impracticable.

The prime object of my invention is to obviate all necessity for cutting a line thus fouled, and in accomplishing that end I have also increased the general efficiency of said capstans, as when heavy lowering service is to be performed.

For relieving a line fouled as described a prompt slackening or uncoiling thereof is essential, and although this is practicable with some forms of capstans none of the particu-

lar type referred to have been heretofore so organized that the ratchet and sliding pawl by which the capstan head and barrel are directly coupled could be disconnected or rendered inoperative, and I have now for the first time in this variety of capstans provided for promptly disengaging said head-pawl from the ratchet for permitting the capstan-barrel to promptly revolve backwardly under the strain of the hawser, the barrel meantime being under complete control by way of the internal gearing, the capstan-head, and its bars.

After describing my invention as illustrated in the accompanying drawings, the features deemed novel will be duly specified in the several clauses of claim hereunto annexed.

Figure 1 illustrates in half-section and half side view a capstan embodying my invention in what I deem its best form. Fig. 2 is an inverted plan of the capstan-head and its sleeve or hollow shaft. Figs. 3, 4, and 5 are enlarged views illustrating the ratchet, the pawl and its controlling device, and adjacent portions of the capstan-head and the barrel. Fig. 6 illustrates the said pawl-controlling device detached. Figs. 7 and 8 illustrate my improvements as applied to a capstan otherwise organized and geared, as shown in one of the Letters Patent before referred to, No. 351,241.

Referring to Fig. 1, it is to be understood that the base A and the stationary central spindle *a* are as heretofore. The capstan-head B has the usual bar-sockets *b* and a pendent sleeve or hollow shaft *b'*, the whole rotatable on the spindle. The foot of said sleeve is provided with tenons at *b*<sup>2</sup>, which occupy mortises in a pinion or gear *c*, also rotative on said spindle. Below the pinion *c* there is a rotative disk *d*, having one or more vertically-sliding pawls *d'*, which engage with an annular ratchet *d*<sup>2</sup> in the base A. On this disk there are idle-gears *e*, which mesh with the gear *c*, and also mesh with an internal gear *f*, integral with or secured to the lower end of the capstan-barrel C, this being rotatable on upper and lower bearings provided therefor on the sleeve *b'* and a hub of the gear *c*. These parts thus described are



so organized that when the capstan-head is rotated, as indicated by the arrow  $g$  thereon, the barrel  $C$  will be driven in the opposite direction, as indicated by the arrow  $g'$ , and at lesser speed, the disk  $d$  in the base then being held against rotation by its pawl and ratchet  $d' d^2$ , the apparatus thus operating as a power-capstan. The barrel  $C$  at its base is provided with the usual strain-distributing pawls  $h$  for engaging with teeth in an annular ratchet at  $h'$  on top of the base  $A$ .

Inside of the head  $B$  there are one or more vertically-sliding pawls  $i$ , having beveled lower ends, which engage at their front faces with the vertical faces of the teeth of an annular horizontal ratchet  $i'$  in the top of the barrel  $C$ , so that when the head is rotated in the direction of the arrow  $k$  thereon the barrel  $C$  will be rotated at the same speed and in the same direction as before, as indicated by the arrow  $g'$ , the apparatus then operating as a simple capstan, the disk  $d$  then rotating with the barrel and the head, the pawl  $d'$  on the disk  $d$  and pawl  $h$  on the barrel then freely riding the inclines of their respective ratchets, and thus operating substantially as heretofore.

It will be seen that even if the pawls  $h$  on the barrel were thrown backward and released from their ratchet, the barrel could not rotate backwardly, because of the abutment of the face of the next engaging teeth of the ratchet  $i'$  against the face of the pawl  $i$  in the capstan-head, coupled with a corresponding but opposing abutment of the face of the pawl  $d'$  against the next engaging tooth of the ratchet  $d^2$  at the base of the capstan, it being obvious that said disk will be blocked by its pawl whether the gear  $c$  be rotated to drive the barrel or the barrel, as now provided for by me, rotated backwardly as if to drive the gear  $c$ , which is non-rotative except with the sleeve and the head, and, as the latter, as stated, is blocked by the pawl  $i$ , the barrel is absolutely locked against backward rotation, the pawls  $h$ , when used at all, serving merely to better distribute the working strains to which the capstan is subjected in service.

I have now provided for the prompt rearward rotation of the barrel as when induced by the strain of a hawser coiled thereon.

It will be observed that the ratchet  $i'$  of the capstan shown in Fig. 1 is located in the plane of the junction of the head and barrel, and that adjacent interior space is afforded for the introduction of a pawl-controller  $D$  in the form of a lever, internally pivoted at  $l$  to the head  $B$ , so as to swing horizontally, so that its outer end projects beyond the outer surface of the rim of the head to serve as a handle. As shown in Fig. 6, this lever has one edge beveled for properly engaging with the beveled lower end of the pawl  $i$  when the lever is swung in that direction, thus readily lifting the pawl and supporting it in its elevated and inoperative position. In its best form the pawl-controlling lever is sufficiently

flexible and resilient to enable it to operate with a spring action, so that it may be firmly secured in either of its two positions by means of the lug  $l'$ , which occupies V-shaped notches  $l^2$  in the overlying portion of the head. In the event of a line on the barrel becoming fouled, a sufficient strain is applied to the head for releasing the pawl from contact with an engaging tooth of the ratchet, the pawls  $h$  thrown backward, and the pawl  $i$  is then lifted and held by the lever, whereupon the strain on the line will rotate the barrel backwardly, as indicated by the arrow  $k'$ , while under full control of the then reversely-driven head, said head then rotating with its capstan-bars, as indicated by arrow  $k$ , until sufficient slack is afforded to enable a rearrangement of the line on the barrel, and then strain on the line can be at once applied and the regular working of the capstan resumed without readjusting the head-pawl or any requirement for any immediate readjustment of any other portion of the capstan.

With some of these capstans the vertically-sliding pawl projects too far below the junction of the head and barrel to enable the use of a horizontally-swinging lever arranged to engage with the lower end of the pawl—as, for instance, as shown in Figs. 7 and 8, wherein the upper portion of the capstan of the hereinbefore-mentioned Letters Patent No. 351,241, October 19, 1886, is shown with my improvement applied thereto. In this instance the vertically-sliding pawl  $i^3$  and the ratchet  $i^4$  are as shown in said patent; but the socket for this pawl in such prior capstans was closed at its upper end, and the internal gearing is so located as to afford no space for a lever-lifter operating below the pawl, as before described. For rendering the pawl  $i^3$  accessible for my purposes the pawl-socket is converted into an open-topped slot, and the pawl-controller  $D^2$  is located in the upper portion of the head, where there is ample space to receive it. This pawl-controller  $D^2$  is substantially the same as before described; but it is pivoted to the interior surface of the head, so as to properly engage with the pawl  $i^3$ , which, as clearly indicated in Fig. 8, is recessed and beveled at one side near its upper end, so that the controller or lifter engages therewith substantially as with the lower end of the pawl previously described. It will be seen that by providing for the control of these head-pawls in accordance with my invention these forms of capstans are made susceptible of a novel mode of operation, whereby valuable results can and do accrue from their use not only with respect to substantial economy in lines and hawsers liable to involve the safety of ships, but also in connection with prompt and safe lowering of heavy loads after they have been hoisted by the capstan.

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

1. The combination, in a capstan, of a sta-



tionary central spindle, an indirectly-gear-  
head and barrel rotatable around said spin-  
dle in opposite directions and at different  
speeds, a ratchet and a vertically-sliding pawl  
5 at the junction of the head and barrel di-  
rectly coupling them together for rotation in  
the same direction and at the same speed,  
said pawl being beveled at its lower end to  
permit it to ride freely over the ratchet when  
10 the head is rotated in the opposite direction,  
and a laterally-vibrating lever for lifting and  
supporting said pawl and rendering it wholly  
inoperative, substantially as described.

2. The combination, in a capstan, of a  
15 ratchet on top of the barrel, a vertically-slid-

ing pawl carried over said ratchet by the head  
of the capstan and beveled at its lower end,  
and a laterally-movable spring-acting lever  
pivoted at its inner end to said head, radially  
projecting therefrom for lifting said pawl 20  
from the ratchet, and having a retaining-lug  
for maintaining said lever securely in position  
while supporting the pawl in its inoperative  
position, substantially as described.

In testimony whereof I affix my signature in 25  
presence of two witnesses.

EDWIN H. WHITNEY.

Witnesses:

GEORGE L. GRAHAM,  
HARRISON S. BUFFUM.