

(No Model.)

3 Sheets—Sheet 1.

A. M. BRAINARD.  
BOLT AND NUT.

No. 404,953.

Patented June 11, 1889.

Fig. 1.

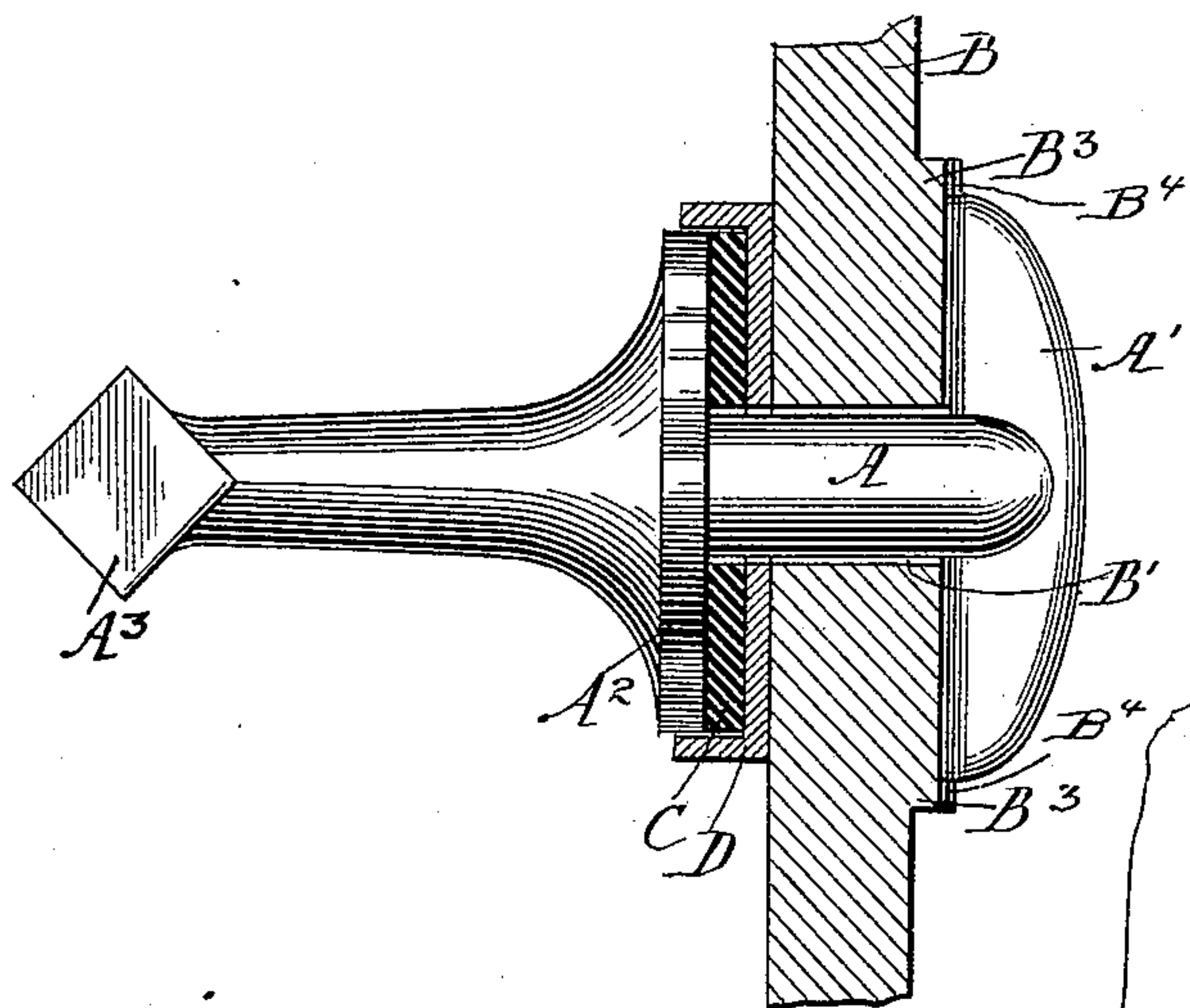


Fig. 4.

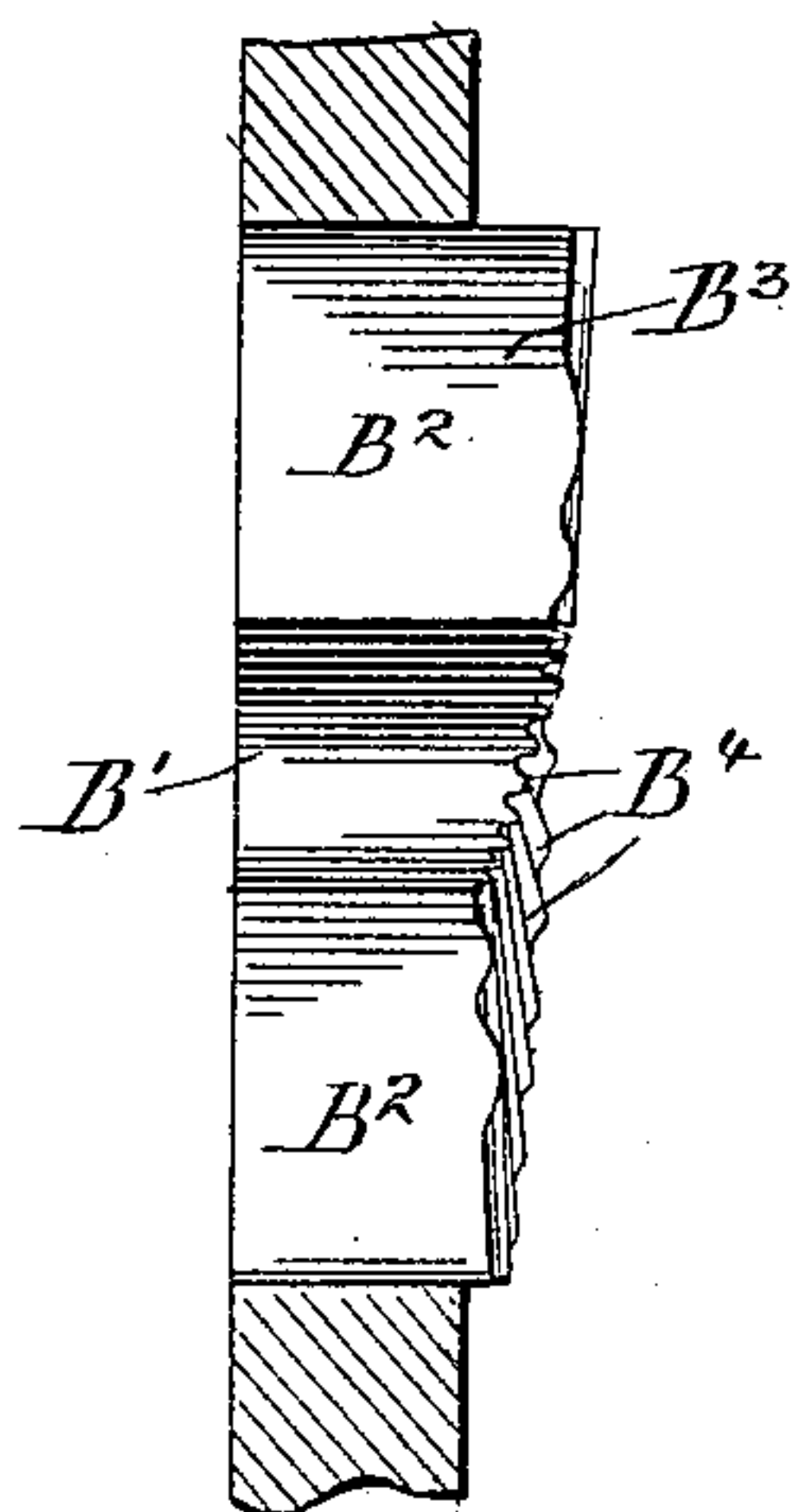


Fig. 2.

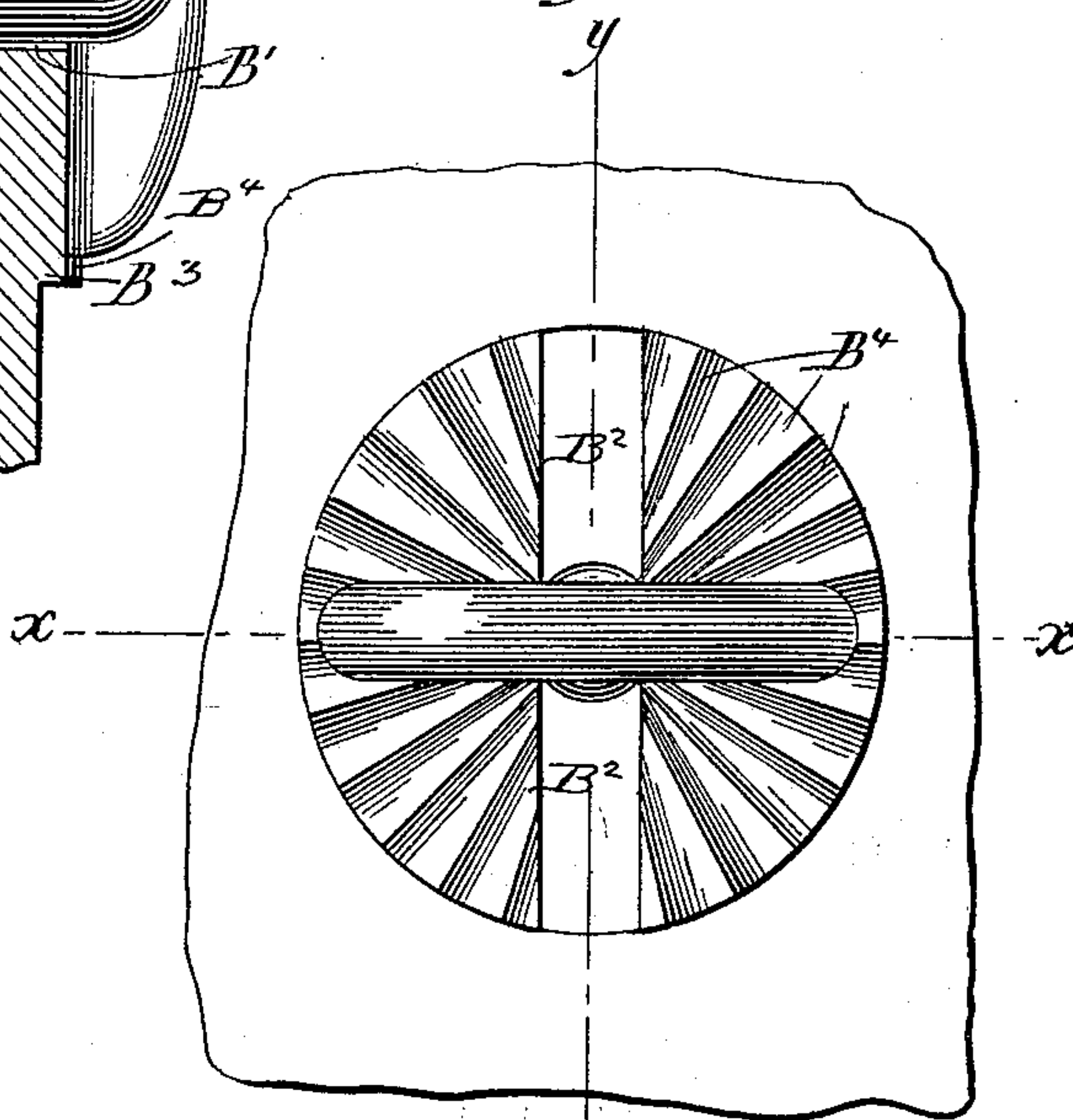


Fig. 5.

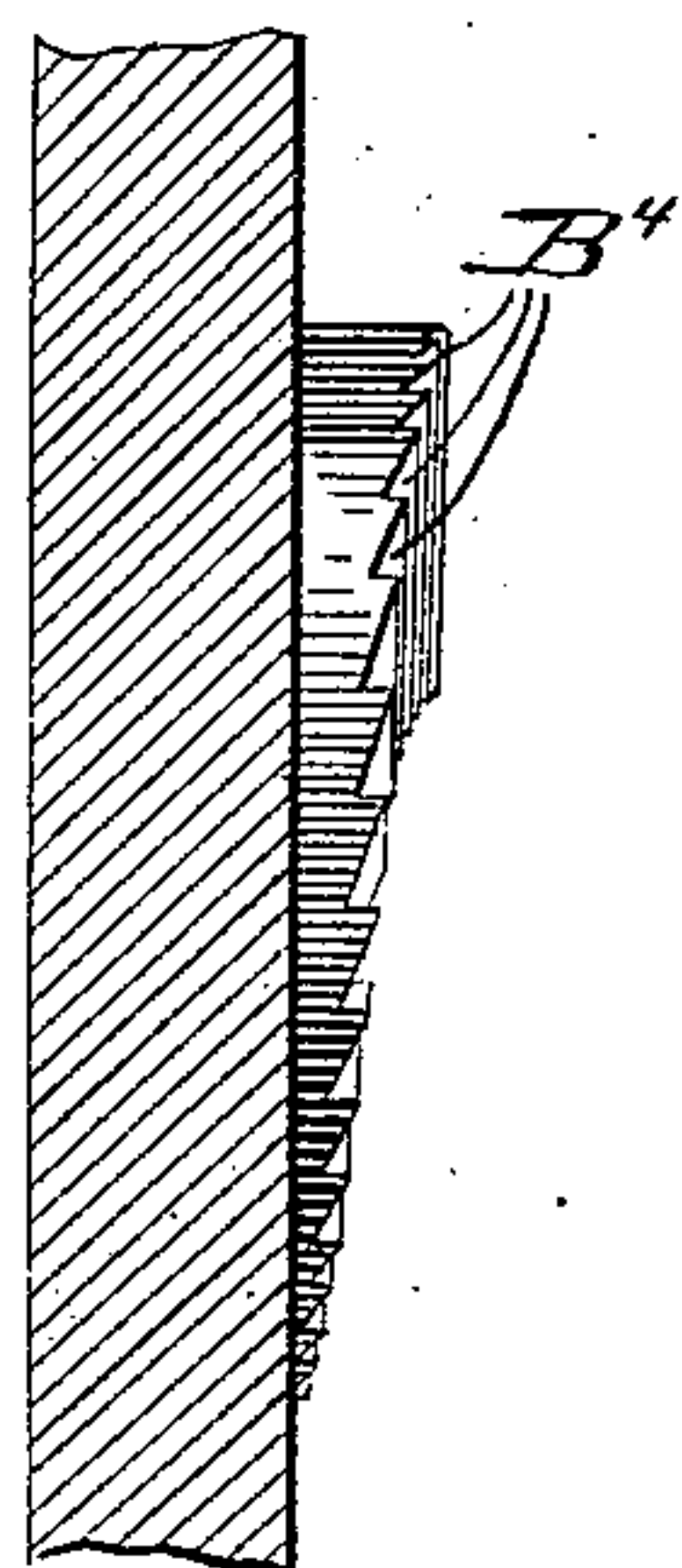
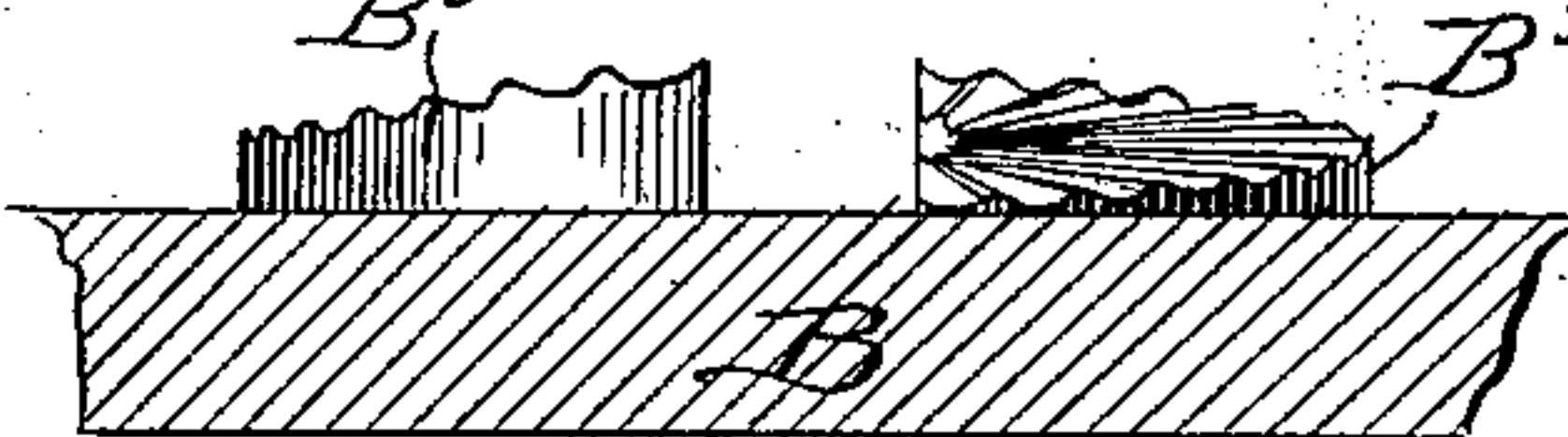


Fig. 3.



Witnesses:

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A. M. Hutchinson.

Inventor:

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Fig. 7.

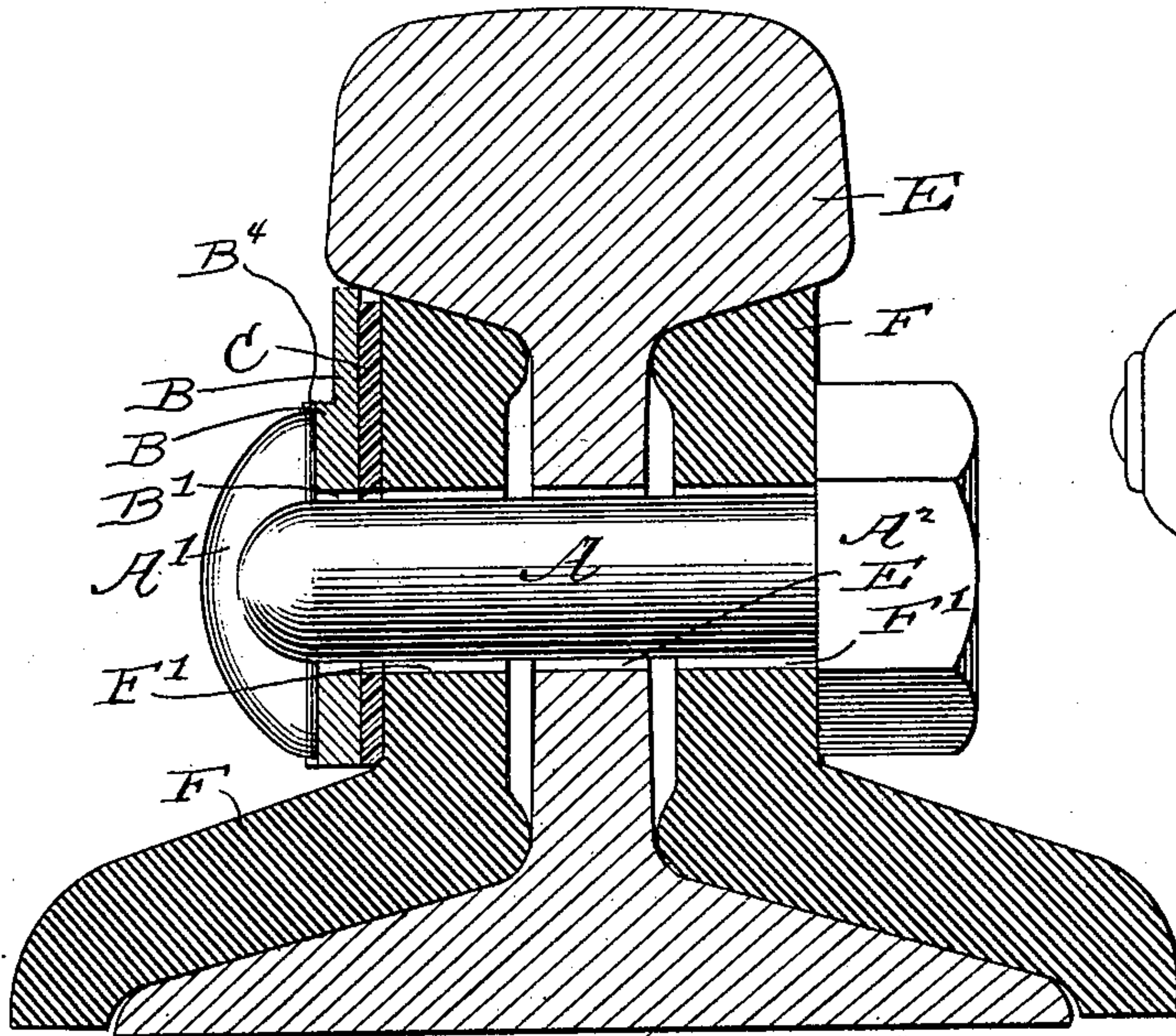


Fig. 6.

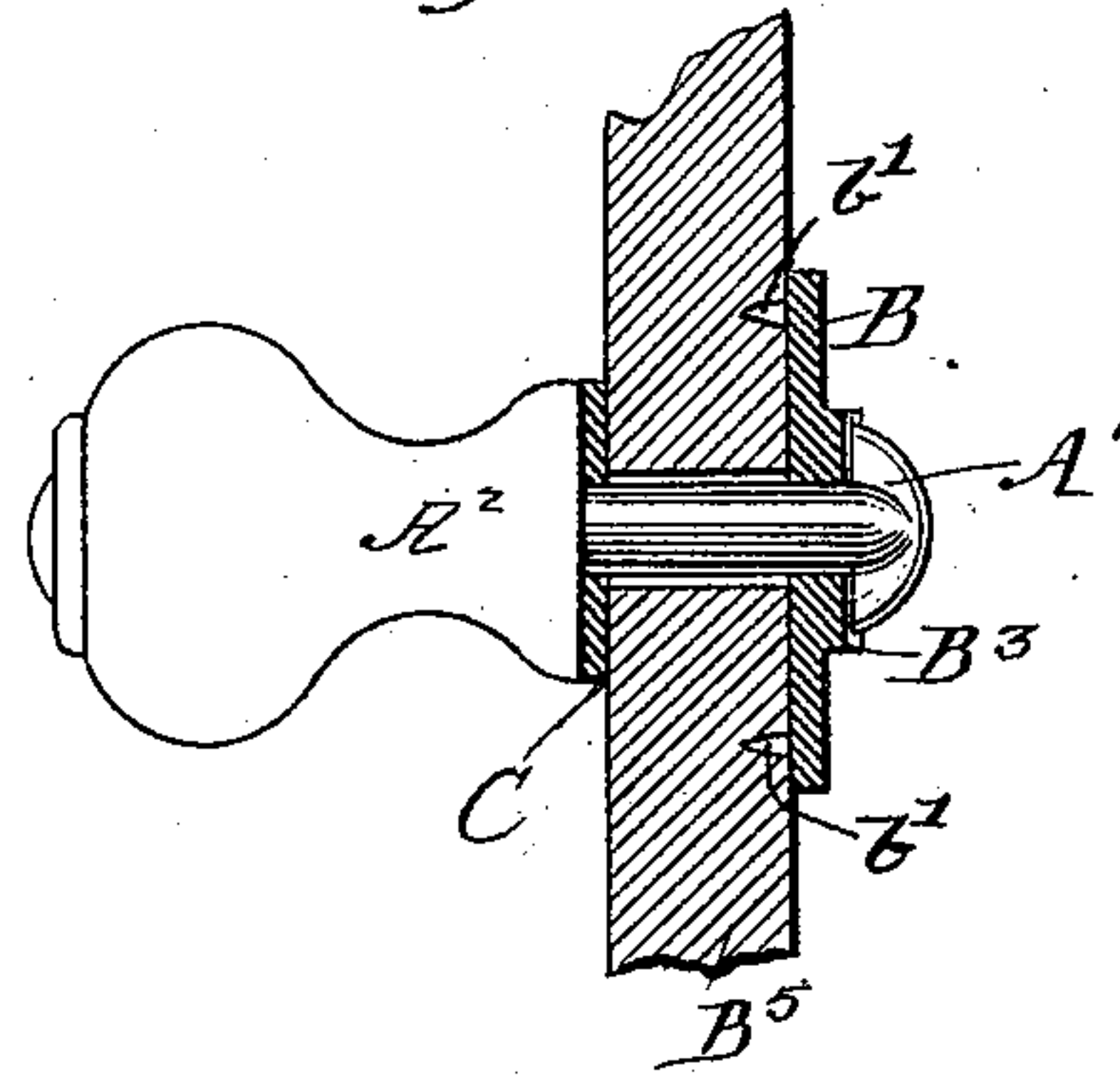


Fig. 8.

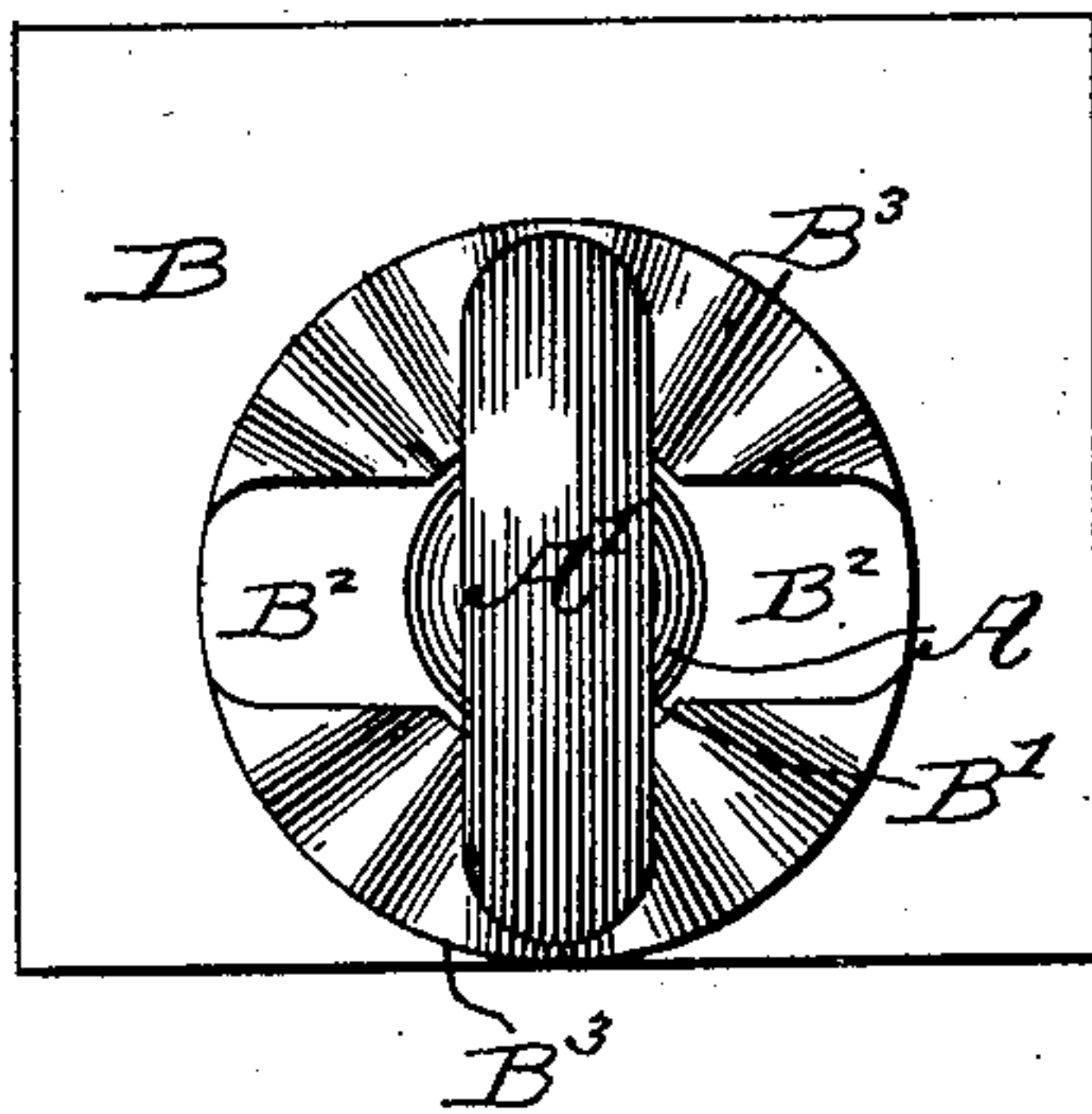


Fig. 9.

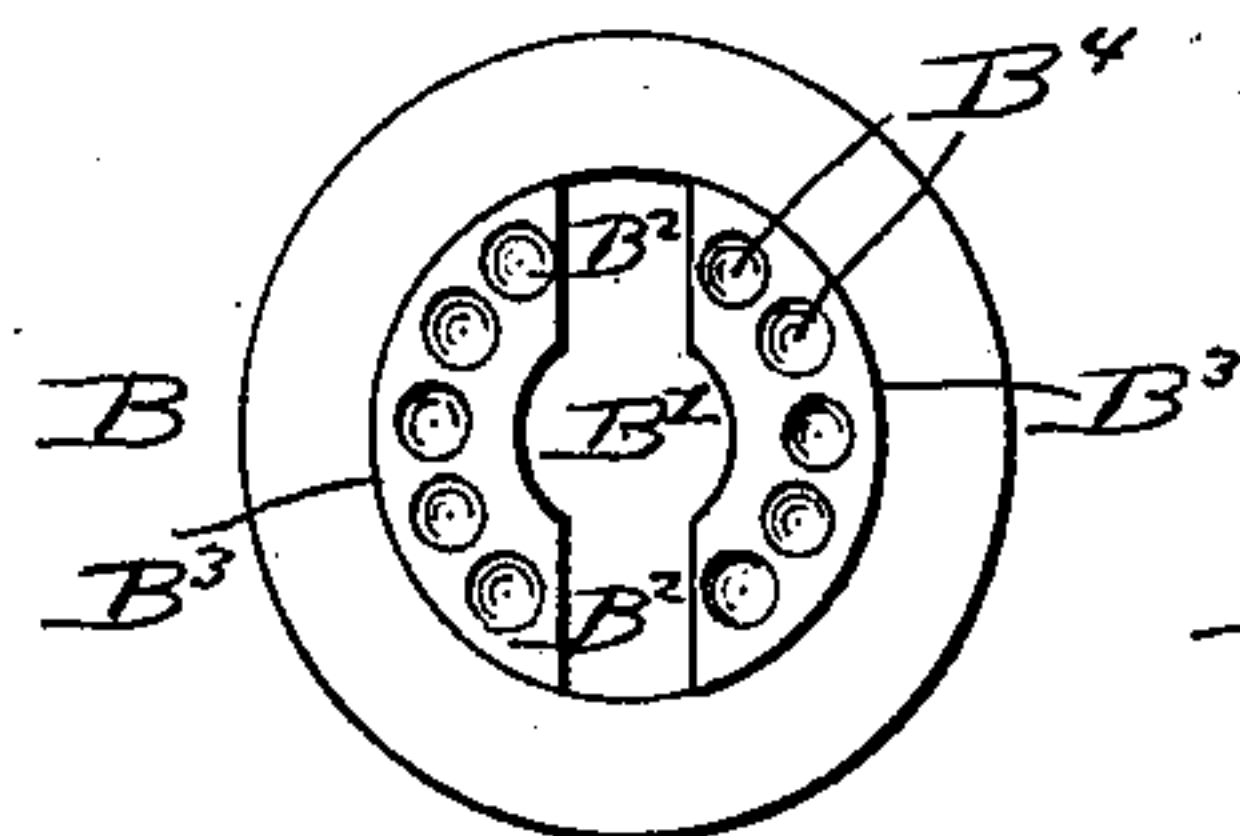


Fig. 10.

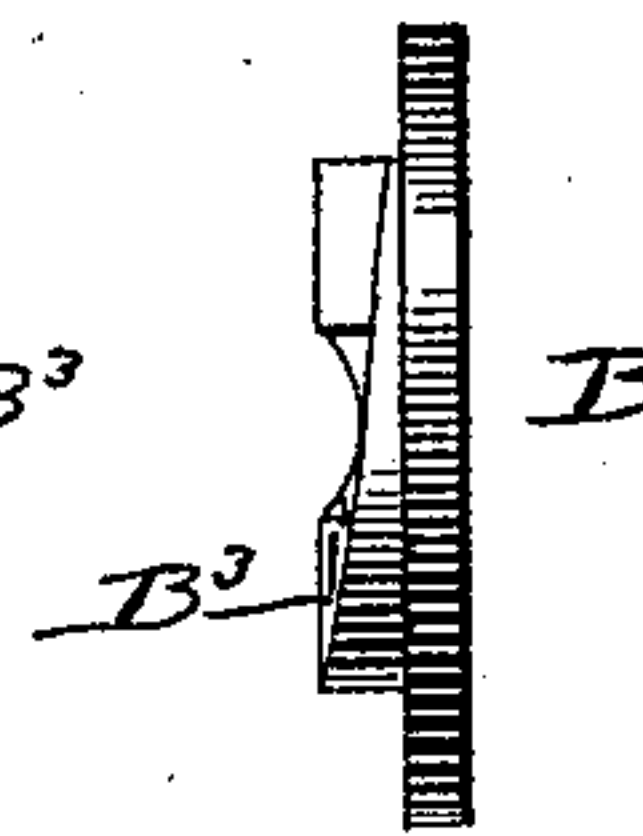


Fig. 11.

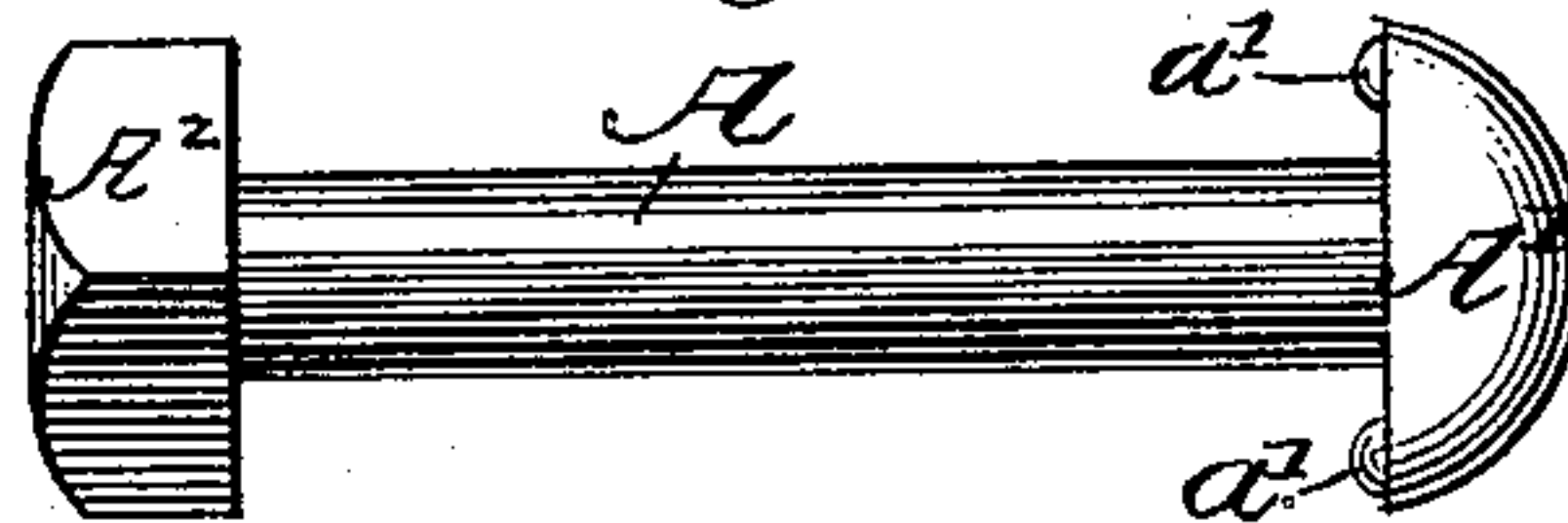
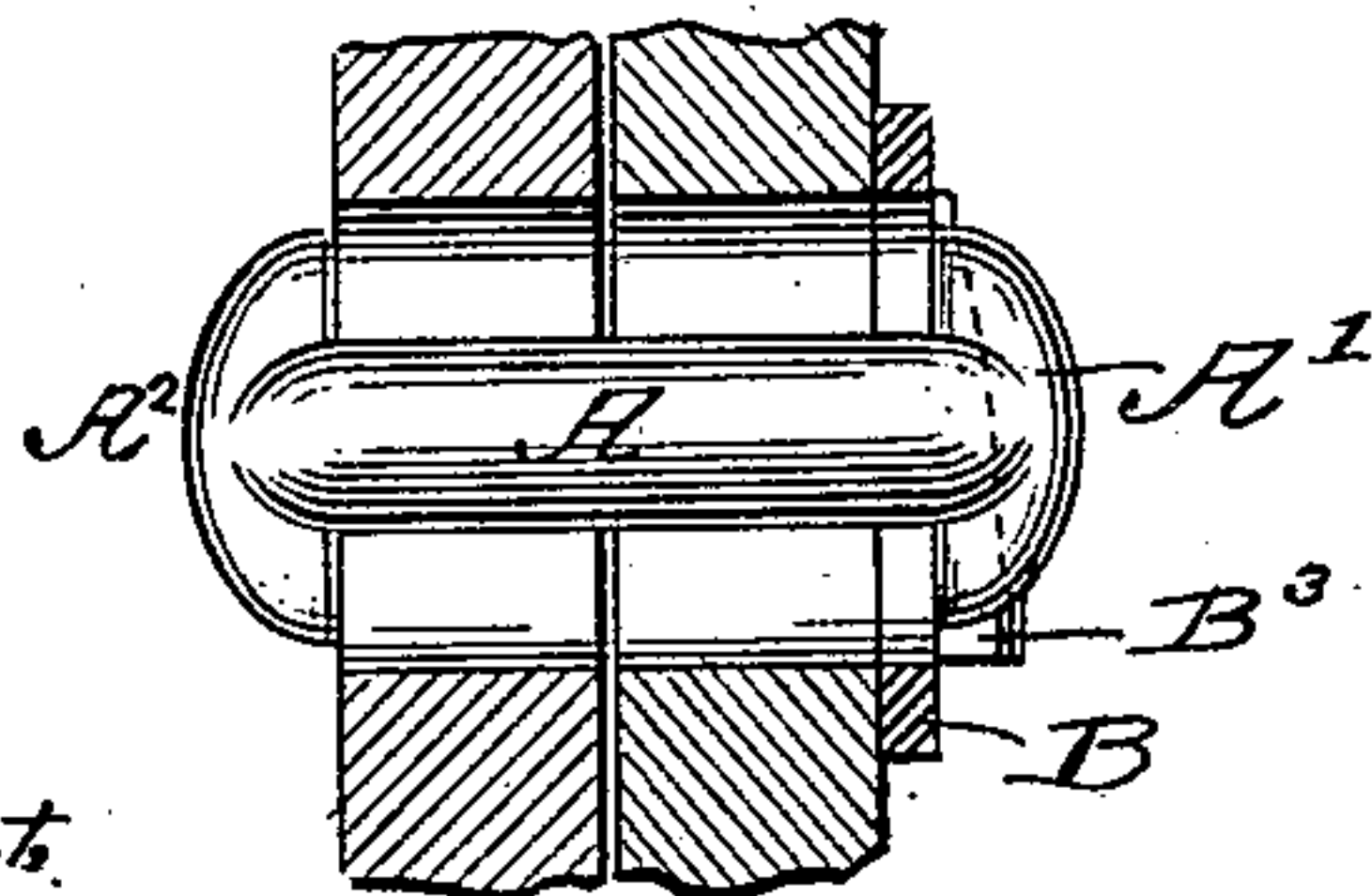


Fig. 12.



Witnesses:

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Inventor:

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By Cyrus H. K. Jr.  
Atty.



(No Model.)

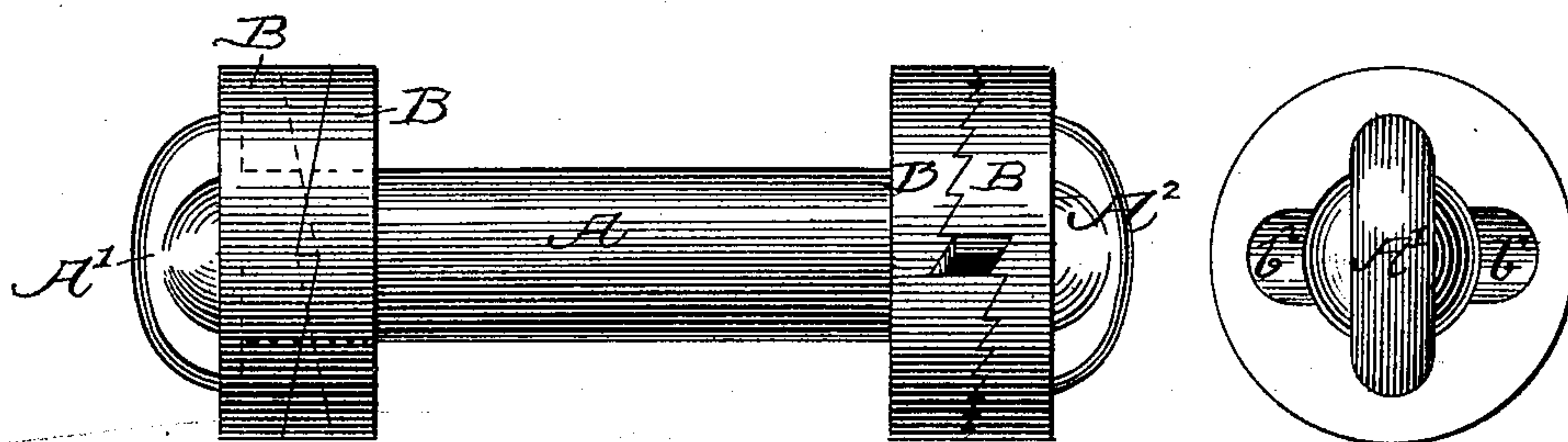
3 Sheets—Sheet 3.

A. M. BRAINARD.  
BOLT AND NUT.

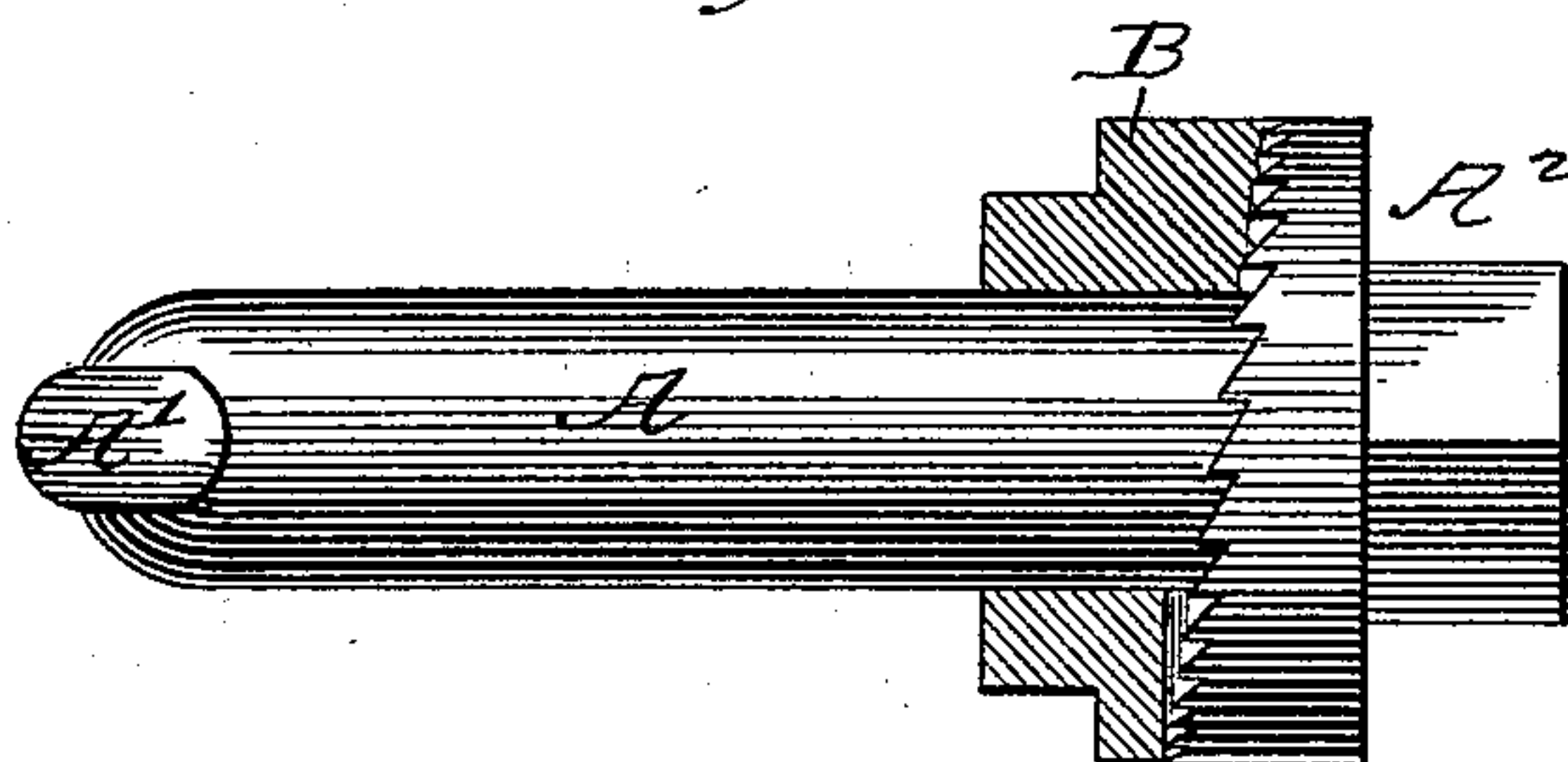
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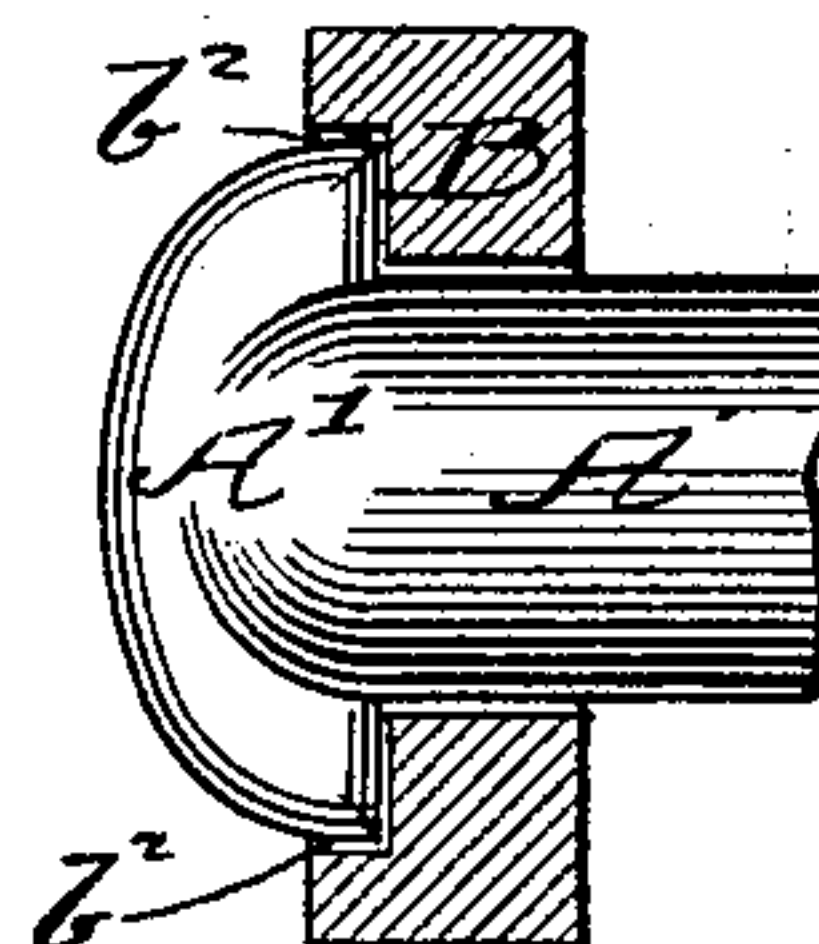
*Fig. 13.*



*Fig. 14.*



*Fig. 15.*



*Witnesses:*

*Charles H. Roberts*

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*Inventor:*

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# UNITED STATES PATENT OFFICE.

ADELBERT M. BRAINARD, OF CHICAGO, ILLINOIS.

## BOLT AND NUT.

SPECIFICATION forming part of Letters Patent No. 404,953, dated June 11, 1889.

Application filed August 30, 1888. Serial No. 284,184. (No model.)

*To all whom it may concern:*

Be it known that I, ADELBERT M. BRAINARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bolts and Fastening-Plates Therefor; 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to bolts and to plates for fastening said bolts without the aid of threads. The fastening is effected by means of cams extending around the bolt on the outer face of the fastening-plate beneath a T-head formed on the end of the bolt which usually receives the thread. Among the advantages belonging to this bolt and plate may be mentioned the cheapness of manufacture and their stability and rigidity after they have been put into place. It is well known that in many situations the threaded nut placed upon a bolt becomes loosened. For example, thermal expansion and contraction and continuous vibrations loosen the nuts. This is well known to those familiar with railroad and bridge service.

In the accompanying drawings, Figure 1 is a section in line  $x\ x$  of Fig. 2, showing the door of a stove-oven having a handle secured thereto by means of my improved bolt. Fig. 2 is an elevation of a portion of the inner face of said door. Fig. 3 is a view looking edgewise at a portion of said door. Fig. 4 is a section in line  $y\ y$  of Fig. 2. Fig. 5 shows a plate having serrated cams. Fig. 6 is a transverse section of the front wall of a wooden drawer, having a handle applied thereto by means of my improved bolt and plate. Fig. 7 is a transverse section of a railroad-rail joint, showing the rail and fish-plate bound together by means of my improved bolt and plate. Fig. 8 is an elevation showing the end of the bolt and the plate seen in Fig. 7. Figs. 9, 10, and 11 show a modified bolt and plate therefor. Fig. 12 shows a bolt having a T-head at each end. Fig. 13 shows a bolt hav-

ing double plates. Figs. 14 and 15 show another form of bolt.

Referring to Fig. 1, A is the shaft of the bolt. A' is a T-head extending across the end of said shaft. A<sup>2</sup> is a shoulder extending around said shaft and corresponding to the head of an ordinary bolt, and for convenience in description I shall herein regard it as the head of the bolt. Said head is prolonged outwardly, and terminates in a transverse bar A<sup>3</sup>, which serves as a handle. B is a portion of the stove-door, and is in this case to be regarded as the plate. This is pierced by a hole B', which latter has on opposite sides the slots B<sup>2</sup>. Said hole is but a little larger than the diameter of the shaft A of the bolt, and said slots are just large enough to allow the ends of the T-head A' to pass through them. Beginning at the diagonally-opposite sides of said slots B<sup>2</sup> the surface of the stove-door B is gradually raised around the hole B' to the opposite slot. By this means two cams B<sup>3</sup> are formed around said hole and beneath said T-head A'. The sloping faces of said cams are preferably provided with depressions or notches B<sup>4</sup>, extending toward the hole B'. Said depressions are substantially equal in depth, and are therefore farther from the surface of the door as the highest part of the cam is approached. The faces of the T-head, coming into contact with the cams B<sup>3</sup>, are rounded and narrowed or otherwise shaped in order that they may fit into and rest firmly in the depressions or notches B<sup>4</sup>. Between the outer face of the door and the head A<sup>2</sup> there is preferably interposed an elastic washer C. In a stove this washer should be made of asbestos or some other material which is not destroyed by the heat of the stove. When this bolt and handle are to be secured to the door, the washer C is drawn over the bolt against the head A<sup>2</sup>. The end of the bolt bearing the T-head A' is then extended through the hole B' until the T-head emerges at the other side of the door and the head A<sup>2</sup> rests against the washer C. On now slightly turning the bolt the ends of the T-head will rest over the lowest portion of the cams B<sup>3</sup>, and on turning the bolt farther the ends of the T-head will be drawn into the depressions B<sup>4</sup>, and the head A<sup>2</sup> will be drawn closely against the elastic washer C. As the bolt is turned farther, the ends of



the T-head will slip from one depression to the next higher until the bolt is drawn so tightly that it cannot be moved farther. As the ends of the T-head rest in the depressions  $B^4$ , the bolt cannot turn backwardly unless it is turned forcibly. Should the bolt tend to become loose through change of temperature, the elasticity of the washer C will hold the ends of the T-head in the notches  $B^4$ , and while the bolt is being secured the elasticity of said washer admits of sufficient axial movement to allow said T-head to slip from notch to notch. A second washer D, made of metal and having an outwardly-directed rim at its circumference, may be inserted between the stove-door and the washer C, said rim being set out far enough from the center to surround and hide the elastic washer C and extend over a portion of the head  $A^2$ .

In Fig. 5 the cam is represented as having its face serrated, the teeth pointing forward. This allows the ends of the T-head  $A'$  to slip forward from one depression  $B^4$  to the next, but does not allow them to return. This form may be used when it is not desired to remove the bolt after it has been set into place.

In Fig. 6 the bolt is similar to that shown in Fig. 1. C is a similar packing, and B is a plate bearing similar cams  $B^3$ . The plate rests against the inner face of the wooden front  $B^5$  of a drawer. The face of the plate B, resting against the front  $B^5$ , is provided with points or extensions  $B'$ . These sink into the wood and hold the plate against turning.

In Fig. 7 the bolt is like the one shown in the preceding figure, excepting that the head is polygonal and adapted to be grasped by a wrench. E is a railroad-rail. F F are the ordinary fish-plates used to make a joint at the meeting ends of the rails. The bolt extends transversely and horizontally through the rail and fish-plates as do the bolts now in use in railway-service. The holes  $E'$  and  $F'$  through said rail and plates are now usually made oblong or extra large; hence the T-head of my improved bolt will pass through them.

A plate B, similar to the one shown in Fig. 6, excepting that the points  $b'$  should be made strong and spaced to extend into the ends of the oblong holes in the fish-plates, is placed between the T-head and the adjacent fish-plate. The points  $b'$  may be dispensed with and the plate extended upwardly or downwardly sufficiently to rest against the head of the rail above or the fish-plate below and thus held against turning. This form is shown in the drawings. A yielding washer C is preferably inserted between the plate B and the adjacent fish-plate, or between the head of the bolt and the other fish-plate. Turning the bolt by means of a wrench will rigidly secure it, as explained of the stove-handle. In Fig. 8 the end of the T-head and the plate are shown in elevation.

Figs. 9 and 10 illustrate a plate having cams provided with circular depressions  $B^4$  in lieu

of transverse depressions  $B^4$ , and the inner face of each end of the T-head  $A'$  is provided with a half-spherical elevation  $a'$ , which falls into the depressions  $B^4$  as the bolt is turned.

In Fig. 12 the bolt is shown as having a T-head at each end. This is designed to be used when the bolt and the plate must be applied from the same side of a wall. This is done by placing the plate over the hole through which the bolt is to extend, and then pushing one end of the bolt through the plate and wall and turning it by applying a wrench to the T-head resting over the plate. The T-head  $A^2$  may be a key extending through a transverse slot in the bolt instead of being formed integral with the bolt. A single plate may be used at each end of the bolt, and at either or both ends of the bolt two or more plates may be placed face to face, as shown in Fig. 13. In this case the outer plate is provided on its flat face with radial depressions  $b^2$  between the slots  $B^2$ . The cam-faces of the plates are placed into contact, and the T-head  $A'$  is allowed to rest in the depressions  $b^2$ . Thus the T-head engages the outer plate and turns it when the bolt is turned. When two plates are thus used, the bolt is tightened twice as fast as when one is used.

Fig. 14 shows at the T-head a plate like the one described in the preceding paragraph as having the depressions  $b^2$ , excepting that it is without cams. The inner face of the opposite head of the bolt is provided with one or more cams like those already described. Surrounding the shaft of the bolt and resting in contact by its cam face with the cams on the inner face of said bolt-head is a plate like those previously shown. This may have inwardly-directed points or extensions to set into the hole through which the bolt extends, or the plate may be otherwise shaped to prevent its rotations. On turning the bolt the camless plate at the T-head will turn also, while at the other end the bolt-head will turn on the adjacent plate and be crowded outwardly on the same. The camless plate at the T-head may be omitted when the hole through which the bolt extends is so small as to allow the T-head to be engaged by the walls at the side of the hole.

It will be readily understood from the foregoing description that my improved bolt and plate may be applied to numerous and varied uses, and that they may be varied in size, form, and arrangement of parts without departing from my invention, and that they may be secured by applying the wrench to either or both ends of the bolt.

Many things to which the bolt and plate are to be applied are in themselves elastic. These will not require the elastic washer C to be interposed between the plate and the opposite head of the bolt.

In another application for Letters Patent, executed by me of even date herewith, I have described and claimed the railroad-rail joint herein described. In this application no claim



is made for such a joint—that is to say, a joint composed of the meeting ends of the rails, the fish-plates, and my improved bolts, plates, and washers.

5 I claim as my invention—

1. A plate having a hole to admit the shaft of a bolt, and having on one or both faces of the plate one or more cams at the side of said hole, substantially as shown and described.
- 10 2. A plate having a hole to admit the shaft of a bolt, and having one or more cams at the side of said hole, said cams having depressions in their faces, substantially as shown and described.
- 15 3. A plate having a hole to admit the shaft of a bolt, and a slot or slots to admit the T-head of a bolt, and having on one or both faces one or more cams at the side of said hole, substantially as shown and described.
- 20 4. The combination, with a bolt having a shaft and a head at each end of such shaft, of one or more plates to surround said shaft, each plate being provided with one or more cams adapted to rest in contact with and en-
- 25 gage one of said heads of the bolt, substantially as shown and described.
5. The combination, with a bolt having a shaft and a head at each end of such shaft, of one or more plates to surround said shaft,
- 30 each plate being provided with one or more cams having depressions on their faces, said cams adapted to rest in contact with and engage one of said heads of the bolt, substantially as shown and described.
- 35 6. The combination, with a bolt having a shaft and a head at each end of such shaft, of one or more plates to surround said shaft, each plate being provided with one or more cams adapted to rest in contact with and en-
- 40 gage one of said heads of the bolt, and a yielding washer suitably located on said shaft to regulate the longitudinal movement of the bolt, substantially as shown and described.
7. The combination, with a bolt having a
- 45 shaft and a head at each end of such shaft, of one or more plates surrounding said shaft, each plate being provided with one or more cams having depressions in their faces, said cams adapted to rest in contact with and en-
- 50 gage one of said heads of the bolt, and a yielding washer suitably located on said shaft to regulate the longitudinal movement of the bolt, substantially as shown and described.
- 55 8. The combination, with a bolt having a shaft and a head at each end of said shaft, of a plate surrounding said shaft and pro-

vided with one or more cams having depres-  
sions on their inner faces, said cams adapted  
to rest in contact with and engage one of said 60  
heads, a yielding washer surrounding said  
shaft and interposed between said plate and  
the head of the bolt farthest from said plate,  
and a second washer provided with a rim  
surrounding said yielding washer and a por- 65  
tion of the adjacent head of the bolt, sub-  
stantially as shown and described.

9. The combination, with a bolt having a  
shaft and a head at each end of said shaft,  
of a plate surrounding said shaft and pro- 70  
vided with one or more cams having depres-  
sions in their faces, said cams being adapted  
to engage one of said heads of the bolt, and  
a washer of asbestos surrounding said shaft  
and interposed between said plate and the 75  
head of the bolt farthest from said plate, sub-  
stantially as shown and described.

10. The combination, with a bolt having a  
shaft and a head at each end of such shaft,  
of a plate surrounding said shaft and pro- 80  
vided with one or more cams having depres-  
sions on their faces, said cams being adapted  
to engage one of the heads of the bolt, a  
washer of asbestos surrounding said shaft and  
interposed between said plate and the head 85  
of the bolt farthest from said plate, and a sec-  
ond washer having a rim to surround said  
washer of asbestos and a portion of the ad-  
jacent head of the bolt, substantially as  
shown and described. 90

11. The combination, with a bolt having a  
shaft and a head at each end of said shaft,  
of two plates surrounding said shaft and hav-  
ing their meeting faces provided with cams,  
and one of the plates having on its outer 95  
face the depressions  $b^2$ , or their equivalent,  
to engage the adjacent head of the bolt, sub-  
stantially as shown and described.

12. The combination, with a bolt having a  
shaft and a head at each end, the inner face 100  
of one of said heads being provided with one  
or more cams, of a plate surrounding said  
shaft, and having on one of its faces one or  
more cams adapted to rest in contact with  
the cam or cams on the inner face of the 105  
head of said bolt, substantially as shown and  
described.

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

ADELBERT M. BRAINARD.

Witnesses:

L. VERNON FERRIS,  
CYRUS KEHR.