

No. 661,852.

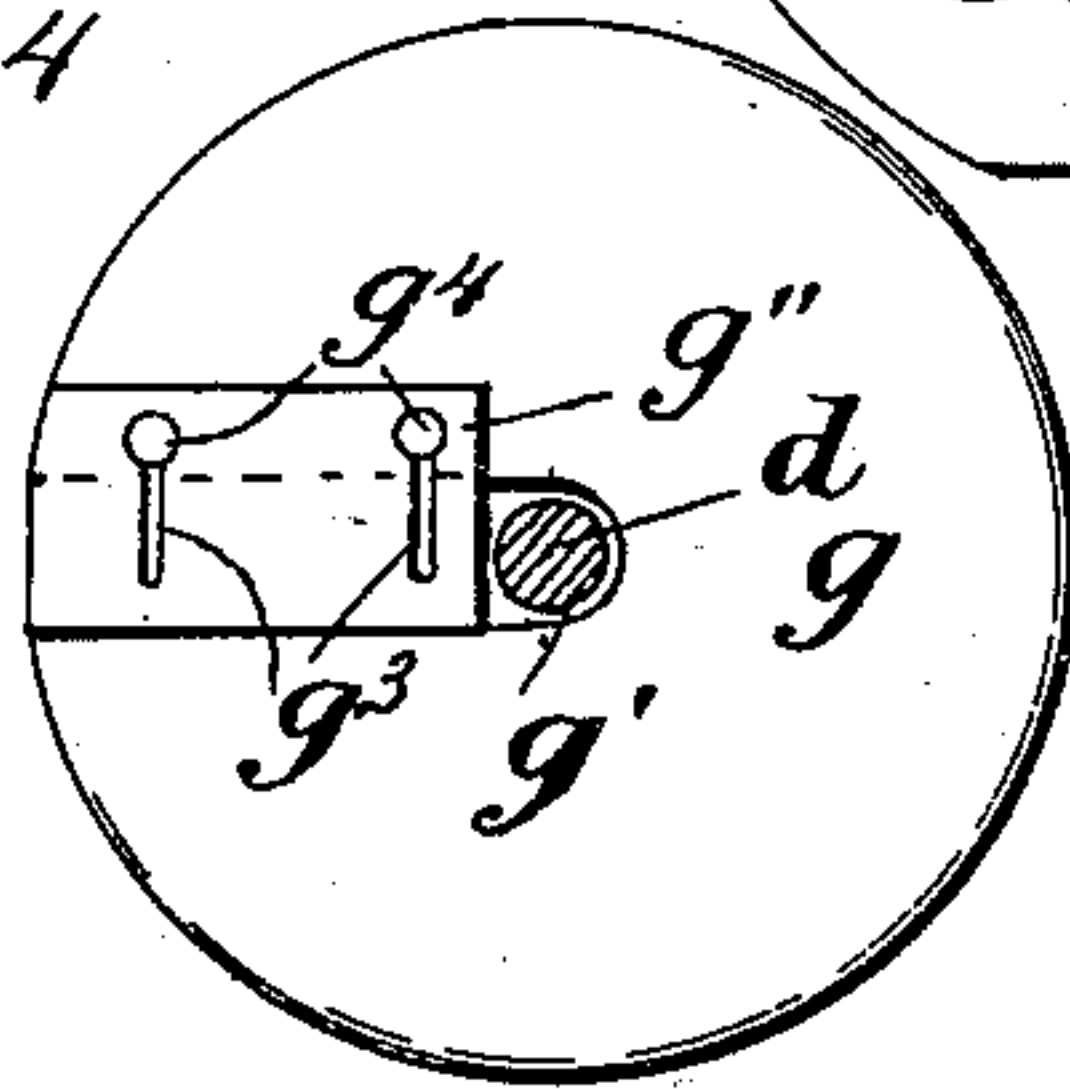
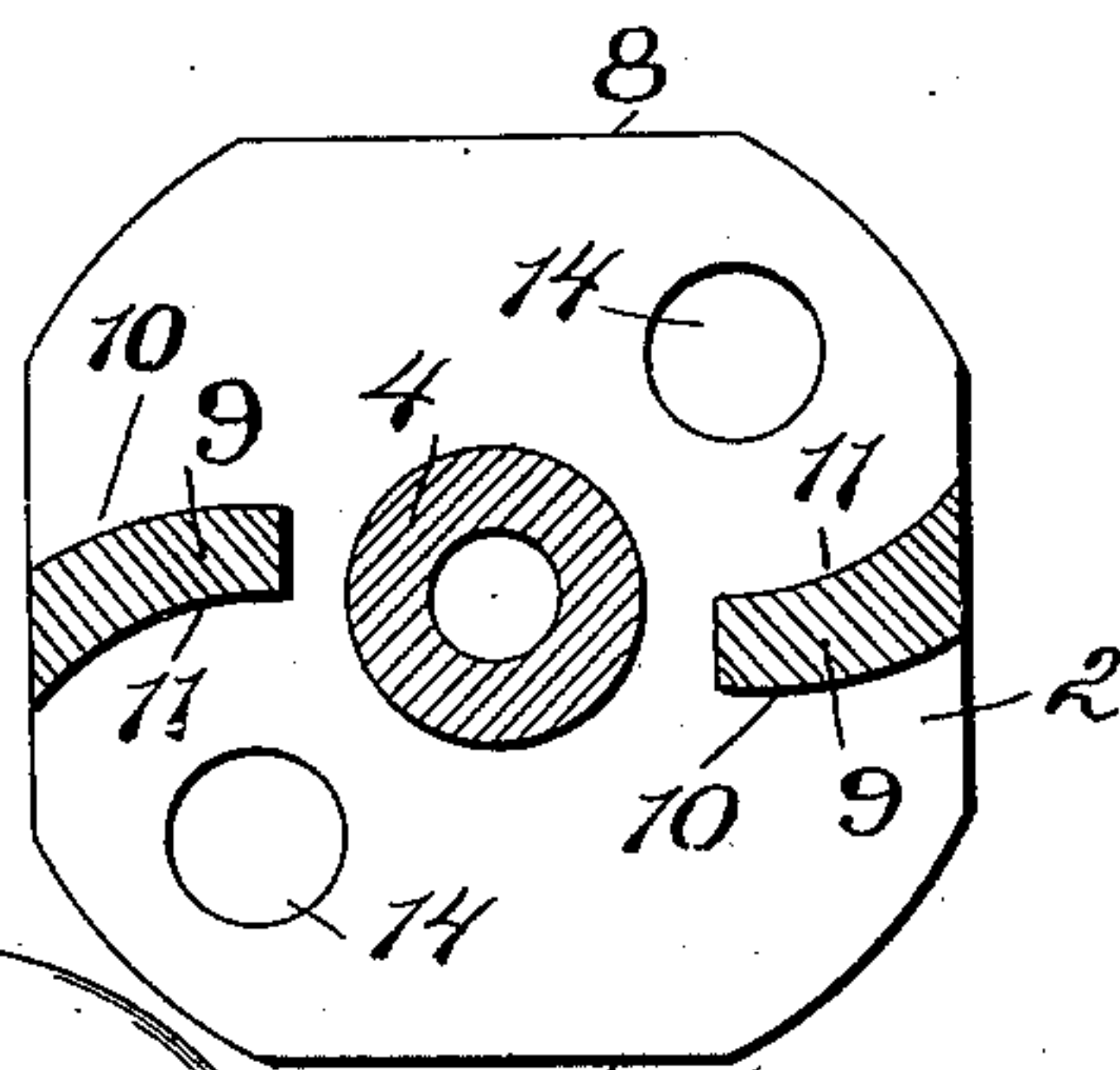
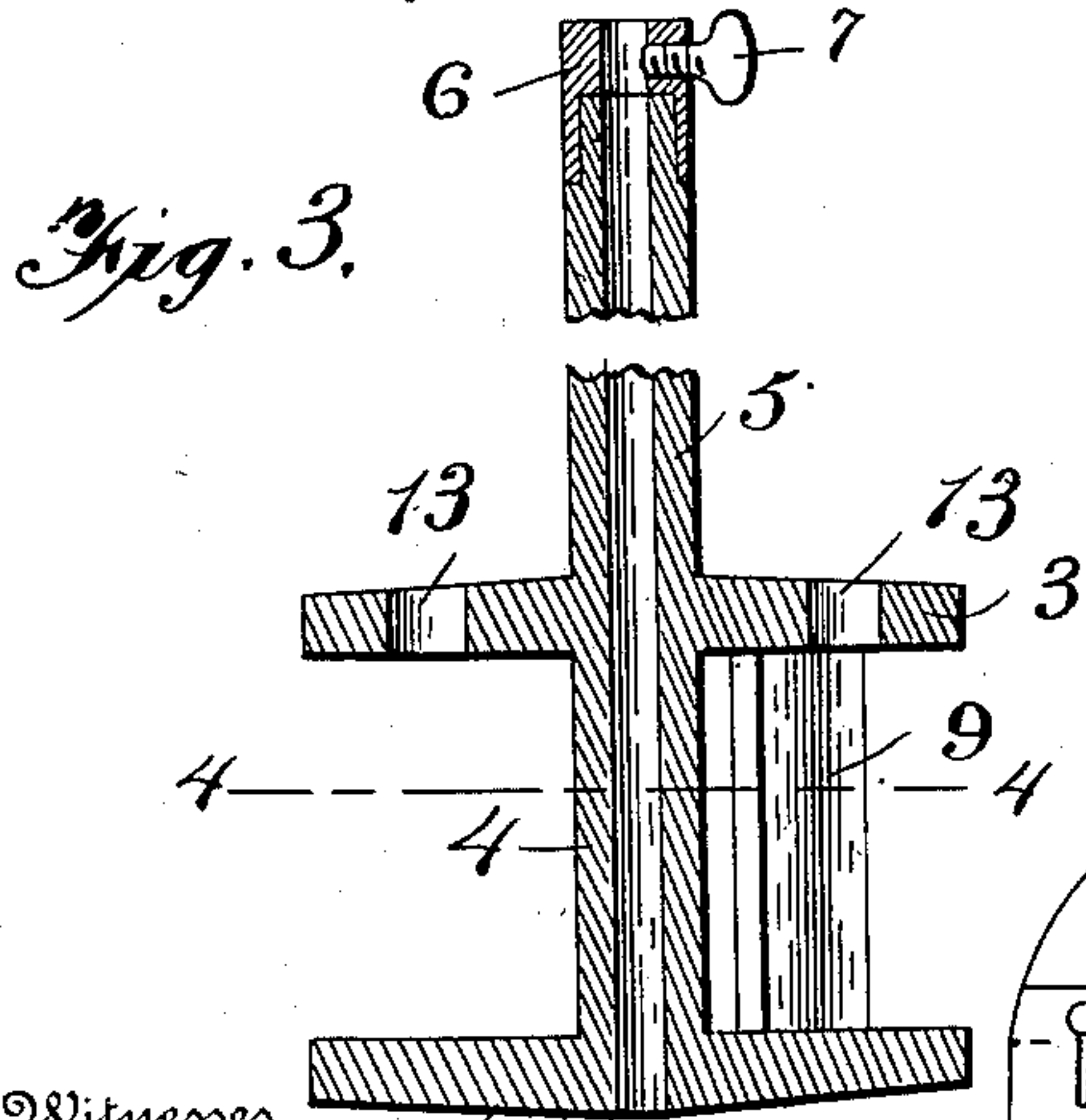
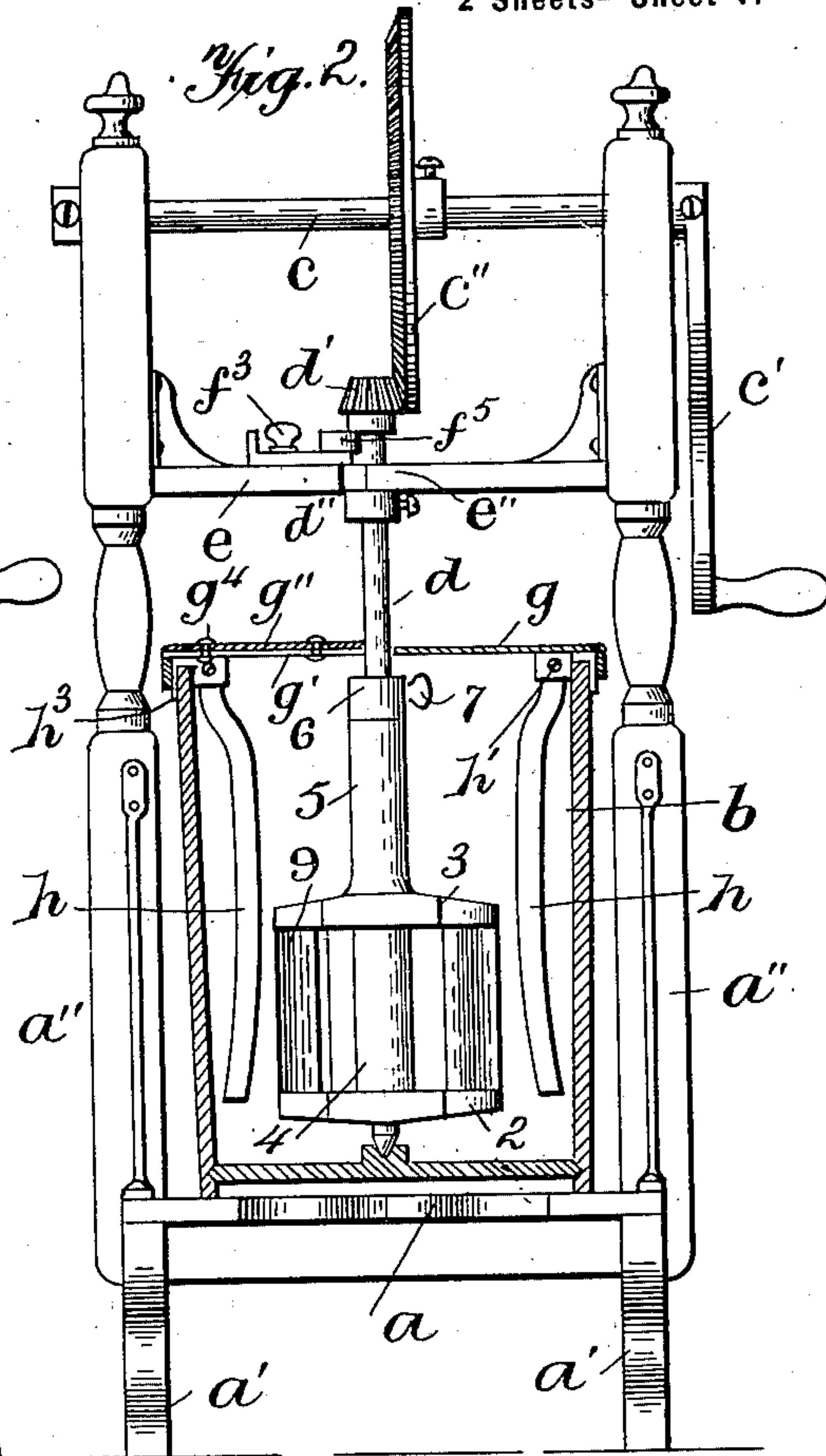
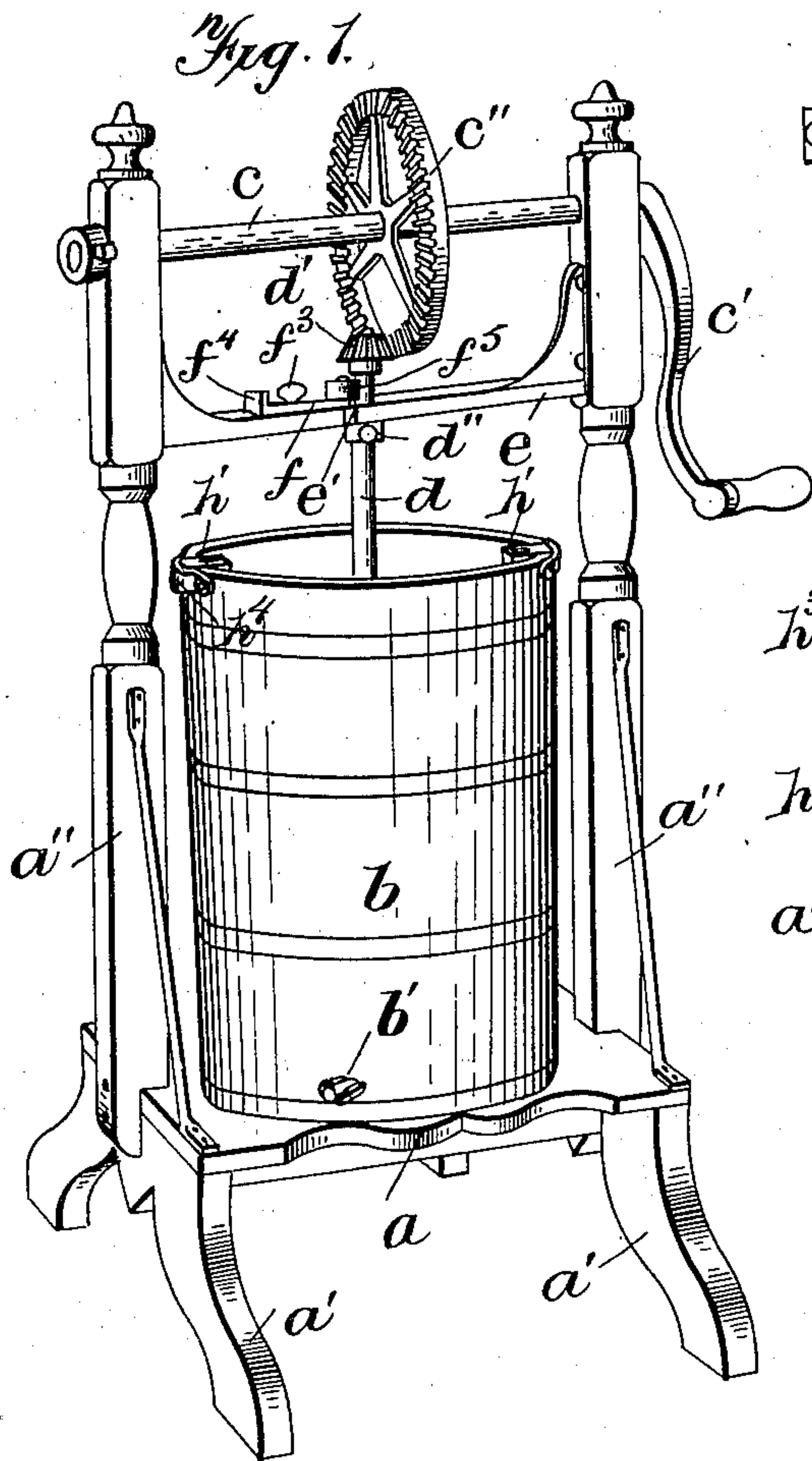
Patented Nov. 13, 1900.

J. N. CUMMINGS.
CHURN.

(Application filed Mar. 20, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
Geo. E. Peck
Emily R. Peck

Inventor
John H. Cummings
per
Hubert E. Peck
Attorney

J. N. CUMMINGS.

CHURN.

(Application filed Mar. 20, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 5.

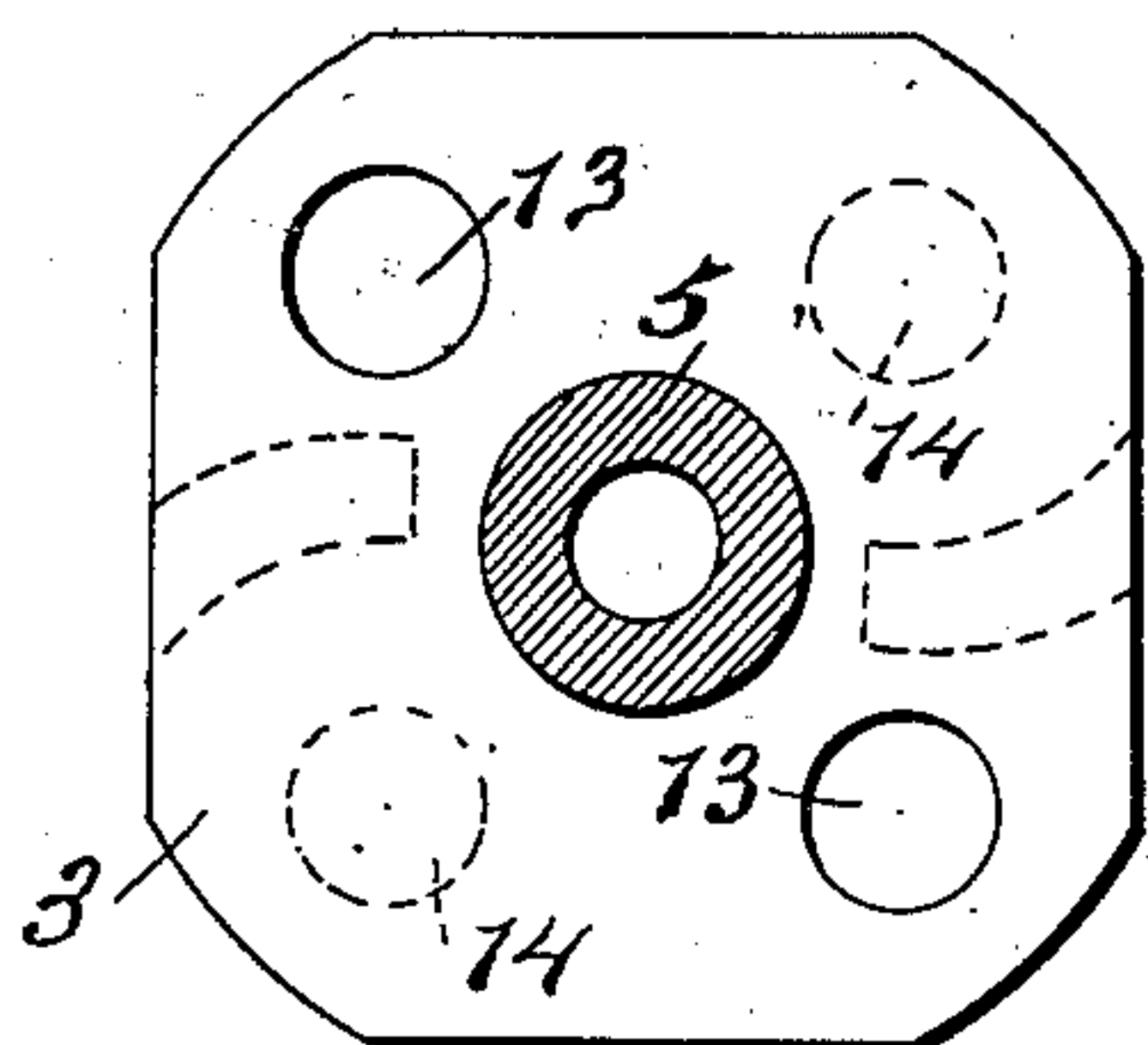


Fig. 6.

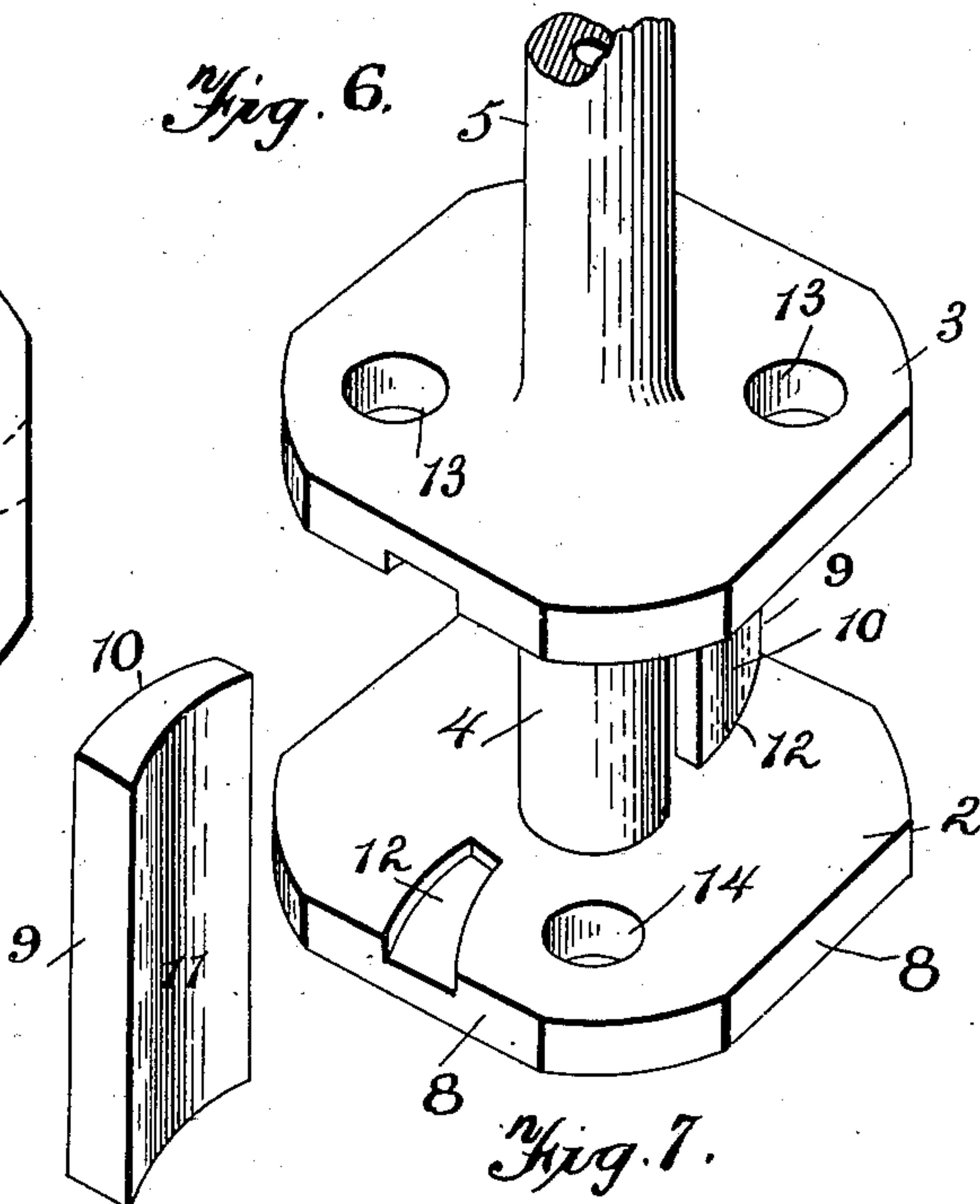


Fig. 9.

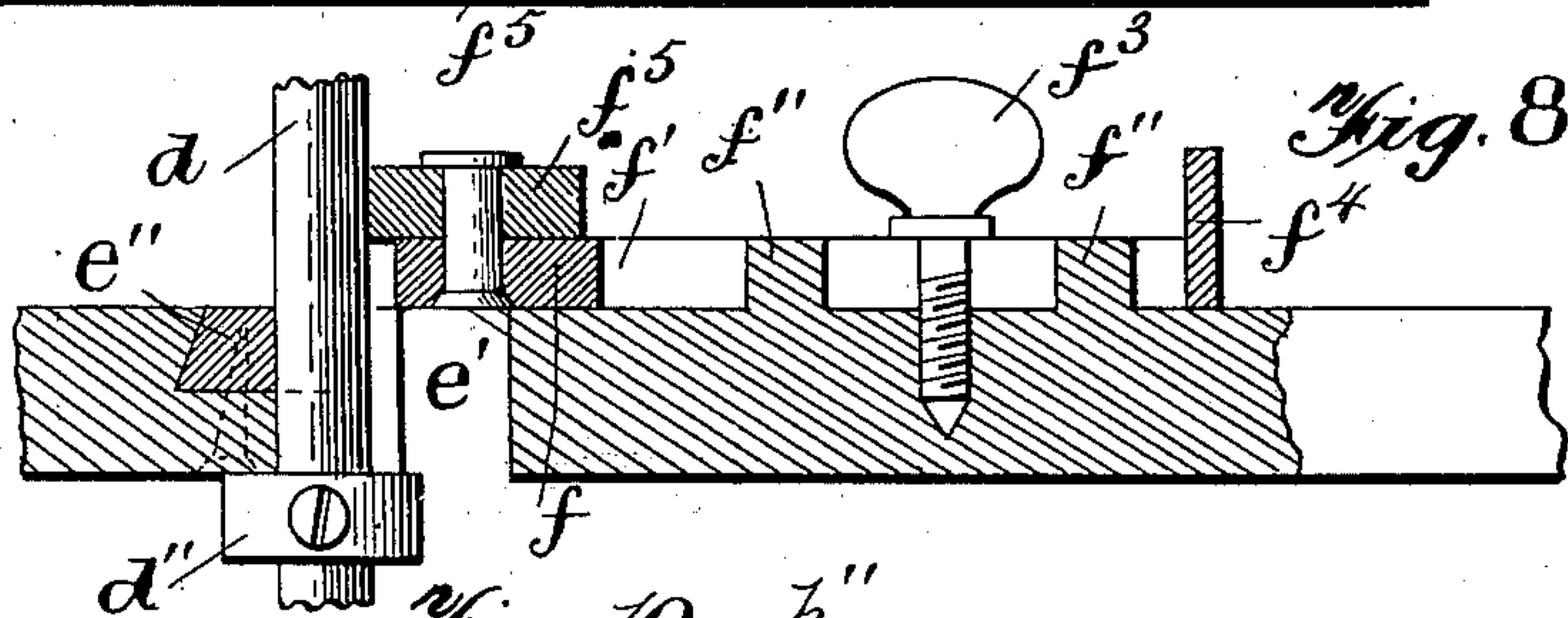
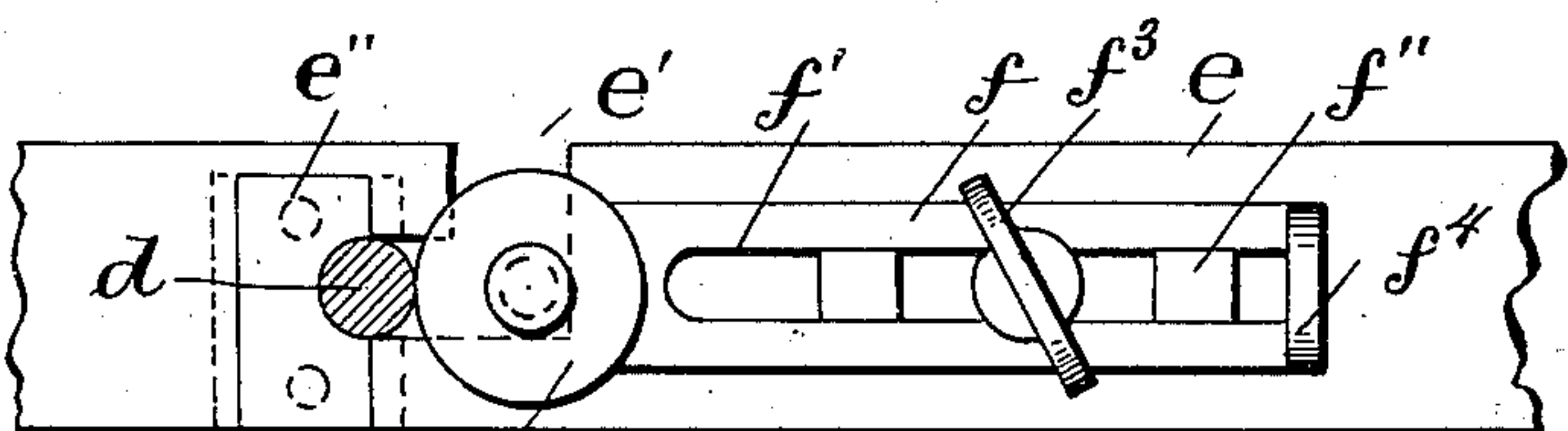
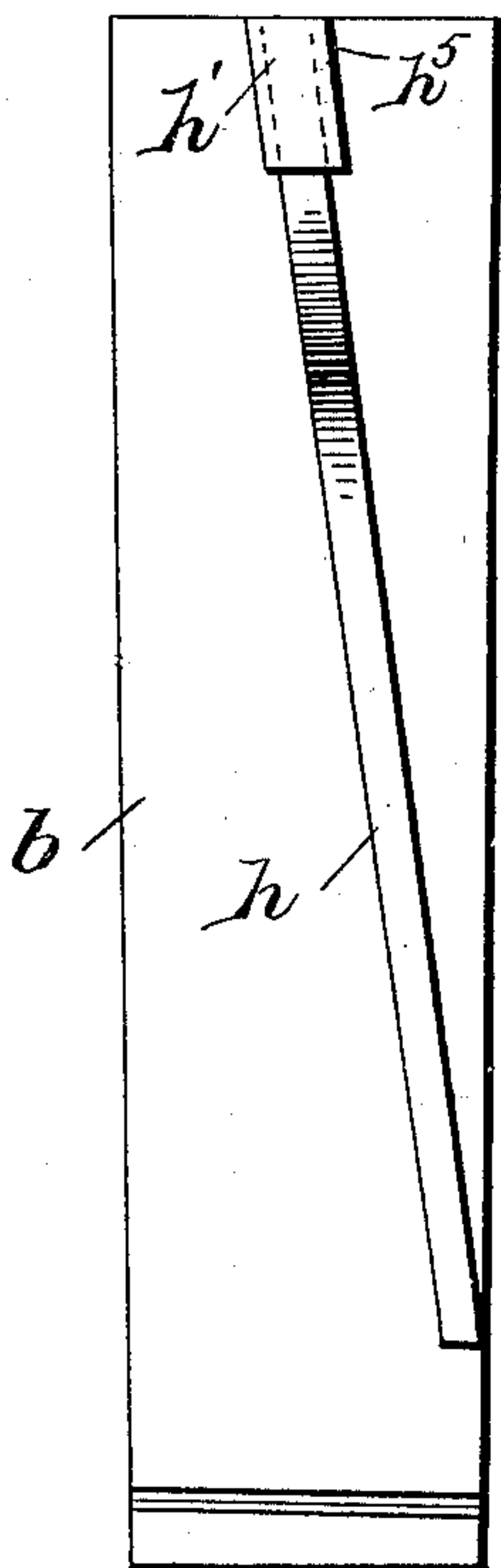
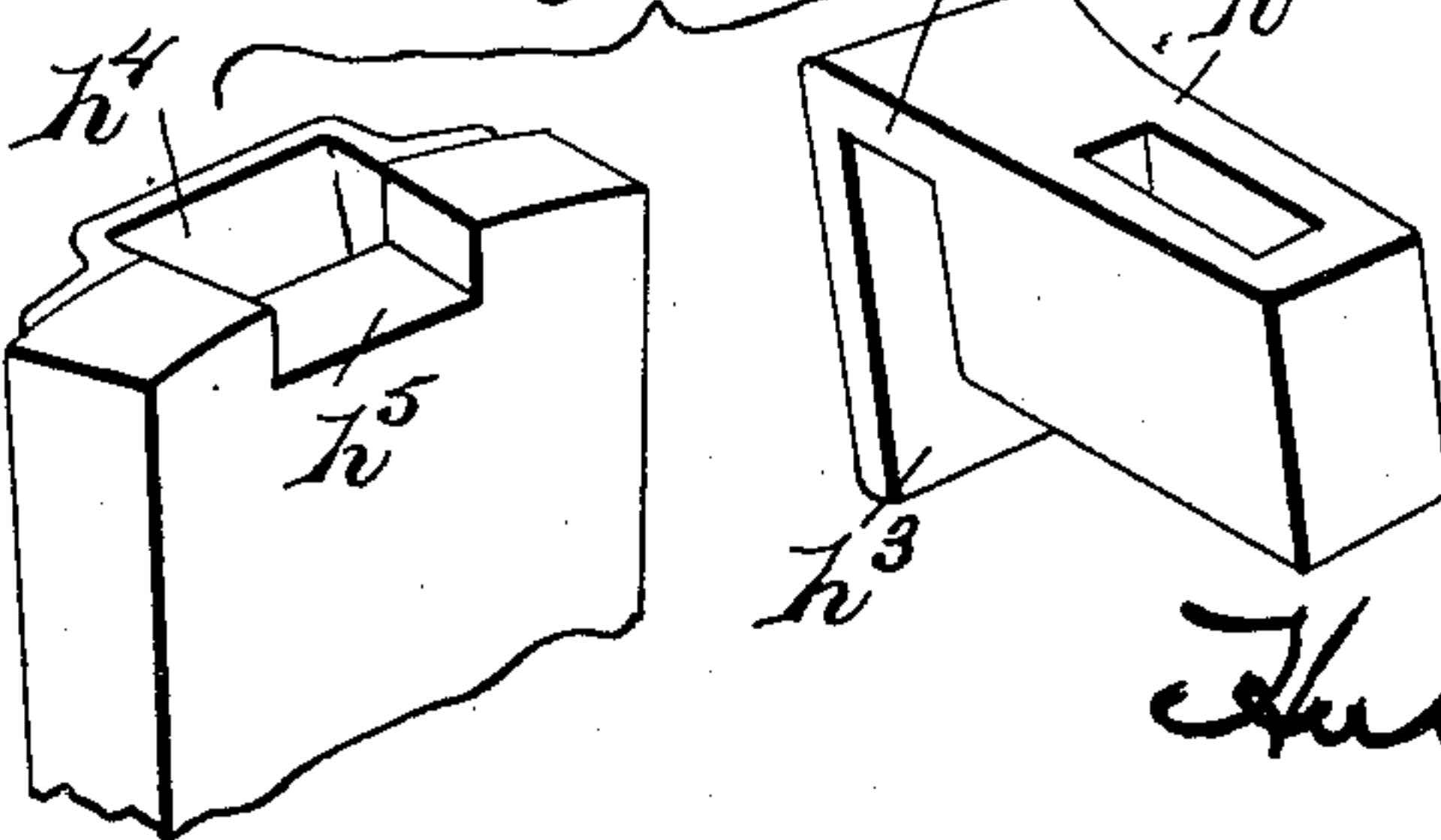


Fig. 10.



Witnesses

Geo. C. Frick.
Emily R. Peck

Inventor
John N. Cummings.

per

Hubert E. Peck
Attorney

UNITED STATES PATENT OFFICE.

JOHN NELSON CUMMINGS, OF THAMESVILLE, CANADA.

CHURN.

SPECIFICATION forming part of Letters Patent No. 661,852, dated November 13, 1900.

Application filed March 20, 1900. Serial No. 9,429. (No model.)

To all whom it may concern:

Be it known that I, JOHN NELSON CUMMINGS, a citizen of the United States, residing at Thamesville, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Churns; 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.

This invention relates to certain improvements in churns; and the objects and nature of the invention will be apparent to those skilled in the art from the following description of the accompanying drawings, which disclose for the purposes of explanation one construction as an example from among others within the spirit and scope of my invention.

The invention consists in certain novel features in construction and combinations and in arrangements of parts and details, as more fully and particularly described and pointed out hereinafter.

Referring to the accompanying drawings, Figure 1 is a perspective of my churn, showing the supporting-stand for the tub and the dasher-shaft and operating mechanism, also showing the improved device for removably locking or confining the shaft in the cross-bar of the supporting framework or stand. Fig. 2 is a side elevation showing the tub partially broken away, showing the dasher and its shaft and the breakers within the tub. Fig. 3 is a central vertical section through the dasher. Fig. 4 is a cross-section through the dasher on the line 4 4, Fig. 3. Fig. 5 is a top plan view of the dasher, dotted lines showing the location of the fans and the holes behind the same in the bottom disk of the dasher, the dasher-hub being shown in cross-section. Fig. 6 is a detail perspective view of part of the dasher, showing one of the removable fans separated from the dasher. Fig. 7 is a detail top plan of part of the cross-bar of the frame or stand, showing the dasher-shaft in section. Fig. 8 is a detail sectional elevation of the top cross-bar of the frame, showing part of the dasher-shaft locked therein. Fig. 9 is a detail elevation of a breaker and part

of the tub looking at the inner face of the stave of the tub to which the breaker is attached. Fig. 10 is a detail perspective view of the hooked bracket of a breaker and the upper end of a stave of the tub formed to receive said bracket, the bracket being shown separated from the stave. Fig. 11 is a reduced top plan of the tub-cover, showing the dasher-shaft in section and the slot in the cover closed by the sliding plate.

In the drawings I show a simple yet strong and durable stand or frame adapted to receive the tub and support the dasher-operating mechanism, and while this form of stand or frame possesses various features of advantage, yet I do not intend to limit my invention to employment therewith nor, in fact, to any supporting frame or stand. The frame shown consists of a horizontal floor or platform *a*, on which the tub *b* removably rests. This platform is upheld by end legs or supports *a'*, from which the parallel side posts *a''* extend vertically to the desired vertical distance above the tub. *c* is a horizontal drive-shaft mounted in suitable bearings or journal-boxes at the upper ends of said two posts or uprights *a''*, and this shaft can be rotated by any suitable driving means or power, although in the drawings I show the same provided with an end hand-crank *c'*. The shaft is provided with suitable means for rotating the dasher at a high rate of speed. For this purpose I show in the drawings a large toothed gear-wheel or bevel-gear *c''*, rigid on the central portion of said shaft and meshing with a small pinion *d'*, rigid on the upper end of the single vertical dasher-shaft *d* and located beside the lowest portion of said gear *c''*. The lower end of the dasher-shaft is removably stepped or mounted in a wooden socket or depression at the center of the tub-bottom.

e is a horizontal cross-bar between and at its ends rigidly secured to said two posts or uprights. This cross-bar is located a short distance below the gear on the drive-shaft. It is usually formed by an integral casting. This cross-bar braces and ties the upper ends of said posts together; but its main function is to support and hold the dasher-shaft in its

proper vertical position during operation. At its central portion this cross-bar is formed with the right-angle slot e' —that is, the slot has the longitudinal portion, one end of which is extended transversely through a longitudinal side edge of the cross-bar. This slot extends vertically completely through the cross-bar, and its width is just sufficient to loosely receive the dasher-shaft. A wooden journal or bearing box e'' is fitted in the inner end of the slot to receive the dasher-shaft. It is obvious that the dasher-shaft can be removed from the tub by moving the same longitudinally in the cross-bar and then laterally therefrom through the transverse portion of said angle or bayonet slot.

d'' is a collar or sleeve on the dasher-shaft and arranged at the under face of the cross-bar to prevent the dasher-shaft jumping from its lower bearing. This collar is clamped to the shaft to permit vertical adjustment.

Suitable mechanism is provided to hold the dasher-shaft with its pinion in mesh with the large driving-gear and at the same time removably lock or hold the dasher-shaft in the said cross-bar. As a convenient means for this purpose I show a sliding block, plate, or bolt f , arranged and movable longitudinally on the top face of the cross-bar and formed with a longitudinal slot f' , into which the stop-lugs f'' , rigid with the cross-bar, project and which limit the longitudinal movement of said bolt. I preferably employ two separated lugs, so as to guide the bolt in its reciprocation and confine the same in the proper position.

f^3 is a clamping thumb-screw by which the bolt is locked and clamped in the desired adjustment. This screw is shown passing through the slot of the bolt and into the cross-bar at a point between the two guiding and stop lugs. The outer end of the plate or bolt is formed with the rigid upwardly-projecting lug or handle f^4 , by which the plate can be easily reciprocated when the clamping-screw is loosened. The inner end of the plate carries a horizontally-rotating wheel or roller f^5 , mounted and turning on a vertical pivot rigid with and projecting above said plate. The roller is located on the top face of the plate and is of such diameter as to project beyond the end of the plate. The plate or bolt is so arranged that when moved to its limit of outward movement the angle-slot in the cross-bar will be entirely uncovered and the dasher-shaft can be inserted therein or removed therefrom, as the case may be. When the dasher-shaft has been placed in the cross-bar slot, said bolt or plate is moved inwardly until its said roller bears against the shaft and presses its pinion against the large gear-wheel. The clamping-screw is then tightened and the dasher-shaft is held at the inner end of said slot with its pinion in mesh with the large gear. The roller travels against the shaft just under the hub of the pinion, and as the

roller is rotated by frictional contact with the shaft friction is reduced to a minimum, and yet the angle-slot can be uncovered and removal of the shaft permitted by merely moving the said plate or bolt outwardly on the cross-bar.

g is the removable cover for the tub. I prefer to employ a cover, although its use is not absolutely necessary, as my dasher is so peculiarly constructed and arranged that all splashing of the cream by the dasher during the churning operation is avoided. The cover shown is preferably formed of sheet metal to properly fit on the top of and close the tub and permit passage of the dasher-shaft. The cover is provided with the radial slot g' to receive the dasher-shaft as the cover is removed or replaced on the tub when the shaft is in place. g'' is a sliding plate resting on the cover and arranged to slide over and cover said slot when the cover is in place with the shaft located at the inner end of the slot. When it is desired to remove the cover, the slide is moved back to expose the slot. The slide is shown provided with the parallel slots g^3 , having closed ends and arranged transversely of the slide, and suitable stops g^4 , rigid with the cover, project through said slots and guide and limit the movement of the slide and hold the same down on the cover. By means of this slide and the slot covered by the same the condition of the cream being churned can be watched without removing the cover by merely pushing back the slide, so that the cream can be observed through the slot.

In connection with my rotary dasher, which causes a rapid rotary motion as well as other movements within the body of cream in the tub, I prefer to employ certain improved breakers, usually two in number, (although my invention is not so limited,) arranged diametrically opposite each other within the tub. Each breaker consists of a long blade h , preferably formed of wood and depending within the tub and hung from the top edge thereof. Each breaker has its lower end arranged a suitable distance above the bottom of the tub, so that there will be a clear space—say of about two inches—between the lower ends of the breakers and the floor of the tub. This is a feature of considerable importance, as stagnation of the cream at the bottom of the tub is thereby avoided. There is usually in churns of this character stagnation of the cream below the dasher caused by the breakers extending to and resting on the floor of the tub. I avoid this serious objection and keep the entire body of cream in rapid rotation by, among other arrangements, providing this clear space just above the floor of the tub for the free and unobstructed rotation of the cream. Also each thin flat preferably imperforate breaker-blade h is curved inwardly at its ends toward the inner face of the tub. In other words, the breaker-blades

are somewhat bow-shaped, so that their centers bulge toward the dasher and leave a narrow unobstructed space between the side of the tub and their inner edges. The breakers
 5 are so hung and mounted as to be inclined at a suitable angle from the perpendicular and usually so as to incline downwardly and inwardly. The upper end of each blade is fitted and secured in a vertical socket in the inner
 10 end of a metal block or hanger h' , which is formed with the outwardly-projecting shank h'' , provided at its outer end with the depending lip h^3 , the block constituting a socket with an outwardly-projecting hook. The
 15 hook is of a size and capacity to catch or fit over the top edge of the tub, and thus hold the blade firmly in the desired position.

During the operation of the churn the pressure of the cream against the breakers tends
 20 to move the same around with the cream, causing the fastening devices usually employed to slide or slip around the top edge of the tub. To avoid this difficulty and to arrange the upper ends of the breakers and
 25 their hangers approximately flush with or below the top edge of the tub, so as not to interfere with the cover, I form the tub-staves which receive the breakers with depressed seats or notches h^3 in their upper edges, into
 30 which the portions h' of the hooks or hangers rest and by which the breakers are held against movement with the cream and by which the breakers are held properly positioned and yet freely removable. However,
 35 I do not wish to so limit my invention, although I consider such a feature a valuable improvement. If desired, the breakers can be held properly positioned without the depressed seats h^3 by metal loops h^4 , secured at
 40 the outer face of the tub and receiving the hooks, as shown. I usually employ such loops with the depressed seats, as shown in the drawings. The hangers for the breakers are preferably formed on an angle substantially
 45 as shown to hold the breakers at the desired angle to the perpendicular, as hereinbefore described.

I prefer to form my dasher, excepting the fans, from a single block of wood, and I there-
 50 by attain certain material advantages. The dasher is turned out in one piece with the bottom disk 2, the corresponding parallel upper disk 3, and the connecting cylindrical hub 4, which has the long upward extension
 55 5 above the top disk. The said hub is centrally perforated for the passage of the dasher-shaft, the perforation or bore of the hub 4 5 being of such diameter as to permit longitudinal adjustment or movement of the dasher
 60 on said shaft to regulate the vertical position thereof according to the quantity of the cream within the tub and also to permit ready removal of the dasher from the shaft. The hub 4 5 is of sufficient length to preferably extend
 65 above the cream in the tub and afford a handle or handhold, whereby the dasher can be

moved vertically on the dasher-shaft. I usually rigidly secure a metal ring or sleeve 6 on the upper end of said hub above the cream, and provide this ring with means for clamp-
 70 ing the dasher in the desired vertical position on the shaft. In the drawings I show a set-screw 7, adjustable radially through a hole tapped in said ring, to grip or release the shaft.

The top and bottom faces of the dasher are
 75 preferably plain and somewhat rounded, and the inner faces of the disks are preferably flat and constructed to prevent clogging of the cream therein. The wide edges of the disks are formed with the several correspond-
 80 ing flat faces 8—that is, each flat face 8 of a disk has its counterpart in the opposite disk—and said faces 8 of each pair are preferably located in the same vertical plane. I prefer
 85 that said flat faces of each disk should be arranged in planes at right angles to each other—that is, each disk is formed with four flat faces—although my invention is not so limited. The edge of each disk between said flat
 90 faces is rounded, or, in other words, the corners are rounded off, preferably forming arcs having the axis of the dasher as a center. 9
 9 are the fans or deflectors arranged within the dasher between said disks, and I show two fans arranged diametrically opposite
 95 each other. Each fan is arranged between the portions of the disks provided with said flat faces 8 8, and the outer vertical edge of the fan extends between said flat faces
 100 and is about flush therewith, and the fan extends inwardly of the space between the disks on a curved line and, its inner vertical edge is located a distance from the hub, whereby a
 105 clear unobstructed space is left around the hub within the circle including the inner vertical edges of said fans. Each fan is formed of a block of wood having the wide outer flat edge and the outwardly and rearwardly curved convex front face 10 and the rear con-
 110 caved face 11, curving inwardly from the inner vertical edge to the outer vertical edge of the fan. The inner faces of the disks are formed with shallow ways or grooves 12 12 to receive said fans, which can gradually taper
 115 inwardly in width about as shown, so as to wedge and lock in said grooves against accidental displacement after each fan has been forced into its proper position. I prefer to have the fans removable, so that they can
 120 slide into and out of said grooves on the application of the proper force, whereby either or both fans can be removed and certain advantages are attained, as hereinafter set forth.

13 13 are vertical holes or cream-ducts ex-
 125 tending completely through the top disk just in advance of the convex front faces of the fans, respectively, and 14 14 are corresponding ducts extending completely through the bottom disk immediately in rear of the con-
 130 cave rear faces of the fans, respectively. These ducts are preferably circular.

As the dasher rotates at a high rate of speed, the front convex faces of the fans deflect the cream outwardly from the dasher and create a suction therein which draws the cream down through the top ducts 13 13. The rear concave faces of the fans also tend to draw the cream from the interior of the dasher and throw it outwardly and create a suction which draws the cream from the bottom of the tub beneath the dasher upwardly through the ducts 14 14. Hence as the dasher revolves the cream is drawn in from both ends of the dasher and thrown out with great force from the center thereof and the entire body of cream is kept in rotation within the tub with the dasher and is thrown against the breakers. Material advantages are attained by employing the flat faces at the edges of the dasher-disks, as the butter is thereby formed in balls which form on these faces and are carried rapidly around with the dasher, thereby effectually forcing out and separating the buttermilk. This is not possible where the disks, are formed circular, as disks of such shape will not gather the butter, but will break the globules and produce a greasy substance. By providing the ducts in the upper and lower disks adjacent to said flat-edge faces and rounded edges of the disks the greatest agitation of the cream is produced and certain material advantages and new results are attained. I also attain advantages by so constructing my dasher as to maintain the greatest possible degree of agitation throughout the entire body of cream and avoiding clogging or stagnation thereof within the dasher, which is the case where the cream is formed radially into a dasher having numerous internal obstructions, passages, and deflectors.

When the cream is thick, one of the fans can be removed to avoid clogging, and if the cream is very thick, as is often the case, both of the fans can be removed and the dasher will quickly and satisfactorily perform its work and produce the butter by reason of the vertical ducts and the peculiar edge formation of the disks.

As the dasher is made from one piece of wood without obstructions, the milk and butter do not adhere to it and the only cleansing necessary is scalding with hot water.

It is evident that various changes might be made in the forms, constructions, and arrangements of the parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the particular constructions shown and described, but consider myself entitled to all such modifications as fall within the spirit and scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a churn, in combination, a tub, a rotary dasher-shaft, and the rotary dasher re-

movably located on the shaft and consisting of the hub, the lower horizontal disk rigid with the lower end of the hub, the upper horizontal disk rigid with the hub and a distance above the lower disk, said disks having the corresponding flat-edge butter-collecting faces and the intervening rounded portions, substantially as described, the vertical fan between and perpendicular to the flat inner faces of the disks with a space between its vertical inner edge and the hub, said fan having its vertical front face transversely convexed to throw the cream from the dasher and its vertical rear face transversely concaved to draw the cream from the dasher and throw it outwardly, substantially as described.

2. In a churn, the combination, of a tub, a dasher-shaft, means for rotating the same, and the integral wooden dasher consisting of the elongated hub receiving said shaft and having securing means and the two parallel separated horizontal disks on the hub having the flat-edge faces, operating on the cream as described, and the intervening rounded portions of said edges, said disks having vertical openings therethrough, the opening in one disk being out of line with the opening in the other disk, substantially as described.

3. In a churn, in combination, a tub, a rotary dasher-shaft, the dasher removably located on said shaft and consisting of the cylindrical hub through which the shaft passes and extended upwardly to form a handle and provided with clamping means at its upper end, the two parallel separated horizontal disks turned out with said hub from a single block, said disks having the flat-edge faces with intervening rounded portions, for the purpose described, vertical openings through said disks between said flat-edge faces and said hub, the horizontal inner faces of said disks having ways extending inwardly from said flat-edge faces, and a vertical removable inclined fan having its top and bottom edges fitted in said ways, a space being left between the vertical inner edge of the fan and said hub, and the vertical outer edge of said fan being about flush with corresponding flat-edge faces of said disks, a vertical opening of one disk being in front of said fan and an opening of the other disk behind said fan, for the purpose described.

4. In a churn, the combination of a stand, a churn-tub, a rigid horizontal cross-bar above the tub, a rotary drive-shaft mounted in the stand above the cross-bar and provided with a gear, said cross-bar having angular slot *e'*, opening through a side edge thereof and extending longitudinally of the bar with a bearing at its inner end, a removable rotary dasher-shaft passing through said slot, a pinion rigid on the upper end of the dasher-shaft above said bar and meshing with said gear, a stop on said dasher-shaft below said bar, a slide longitudinally arranged on said bar, a roller

mounted on a vertical axis at the inner end
of the slide and projecting beyond the inner
end of the slide into engagement with the
dasher-shaft immediately below the pinion
5 and holding said shaft to said bearing at the
inner end of said slot and said pinion to said
gear, whereby when the slide is drawn back
from the slot the shaft can be removed later-
ally through the slot and from said bar, guides

and a clamping means for said slide, substan- 10
tially as described.

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

JOHN NELSON CUMMINGS.

Witnesses:

J. D. BUTLER,
W. C. ARMSTRONG.