

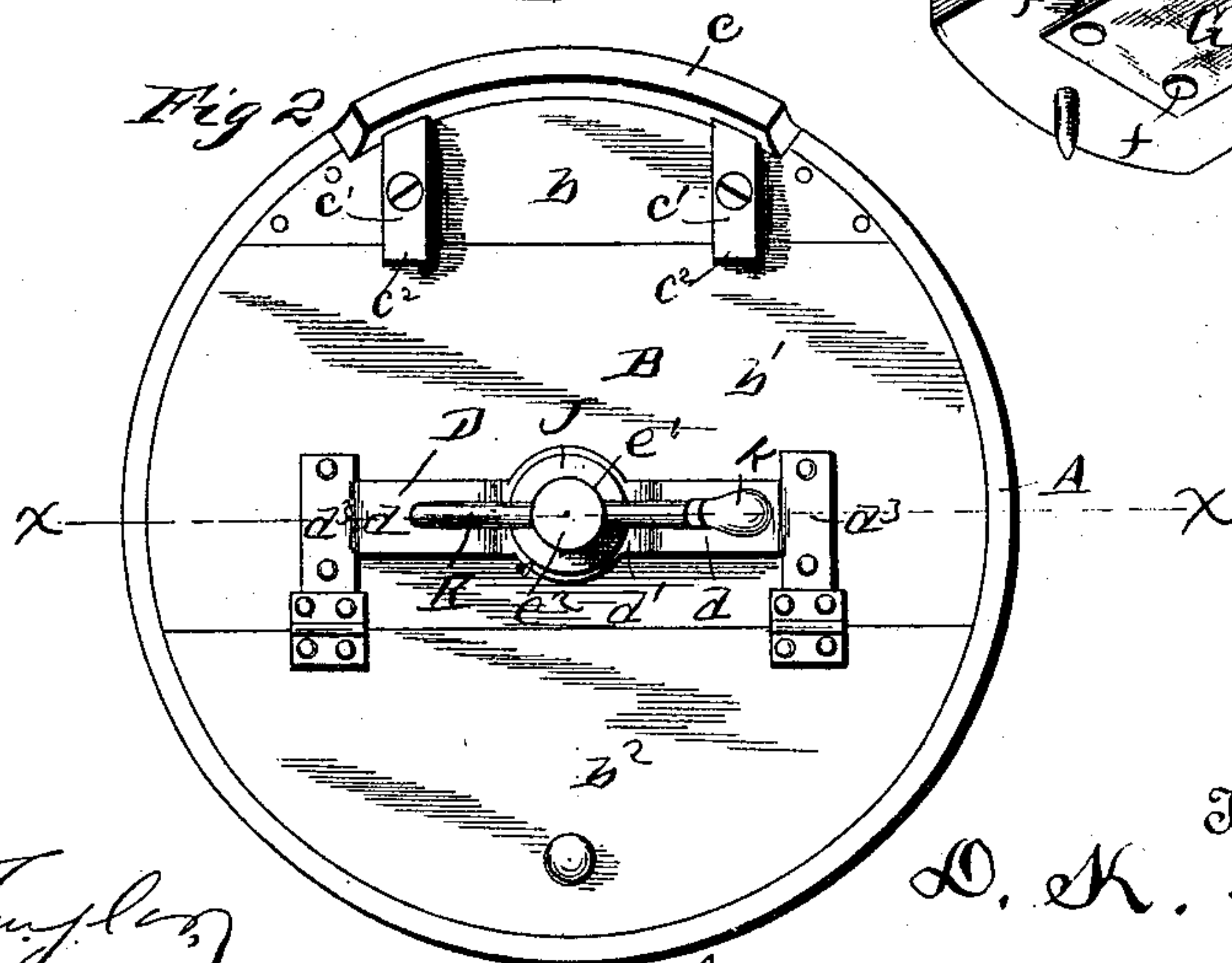
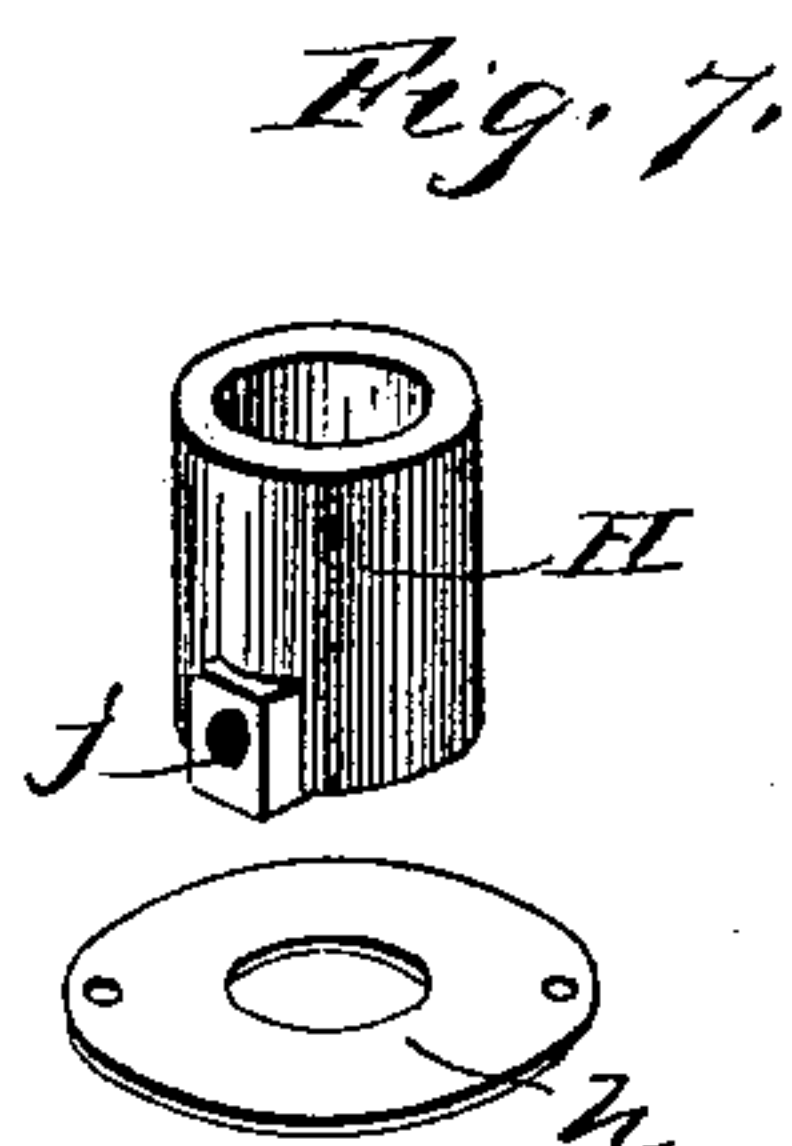
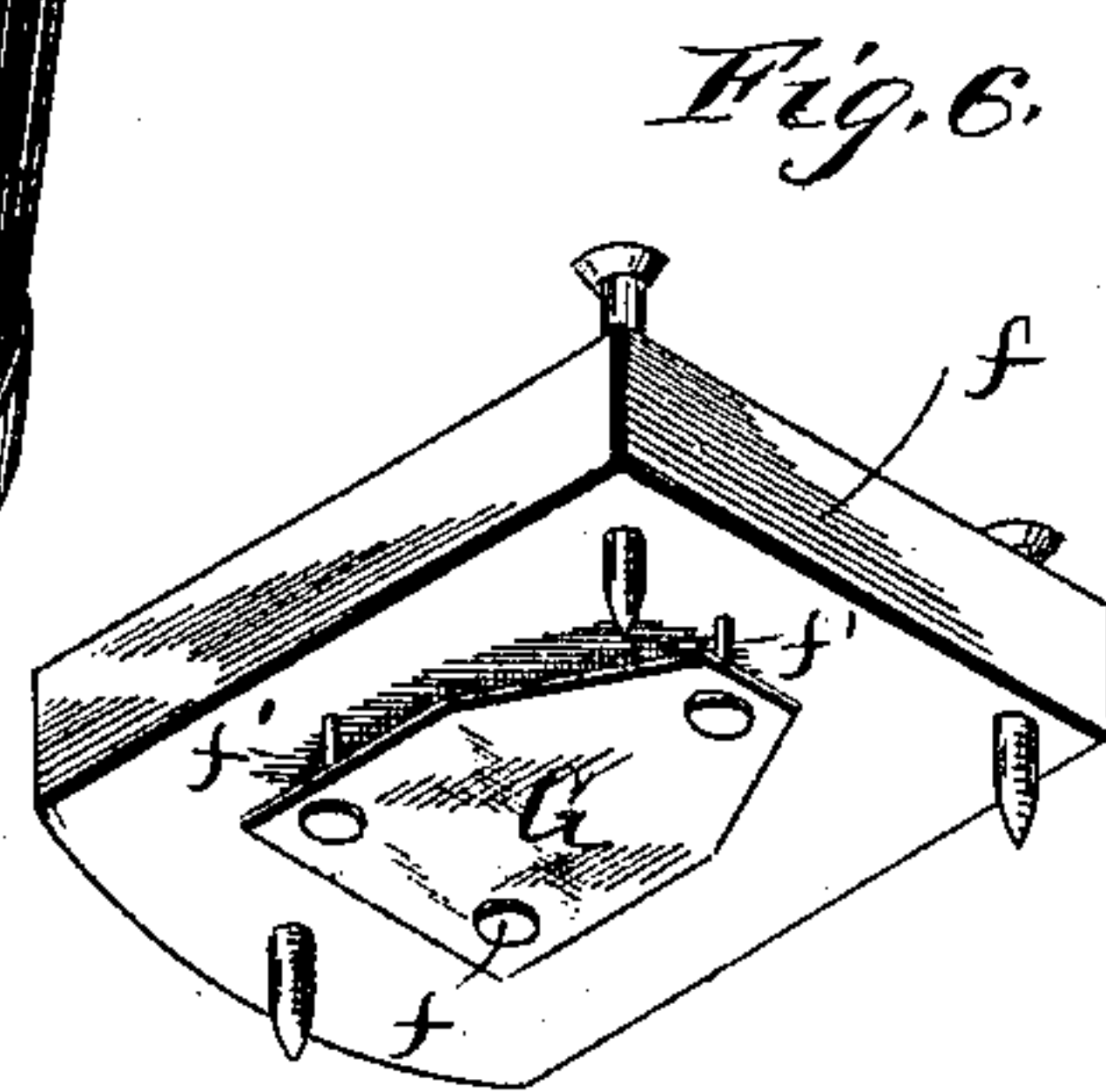
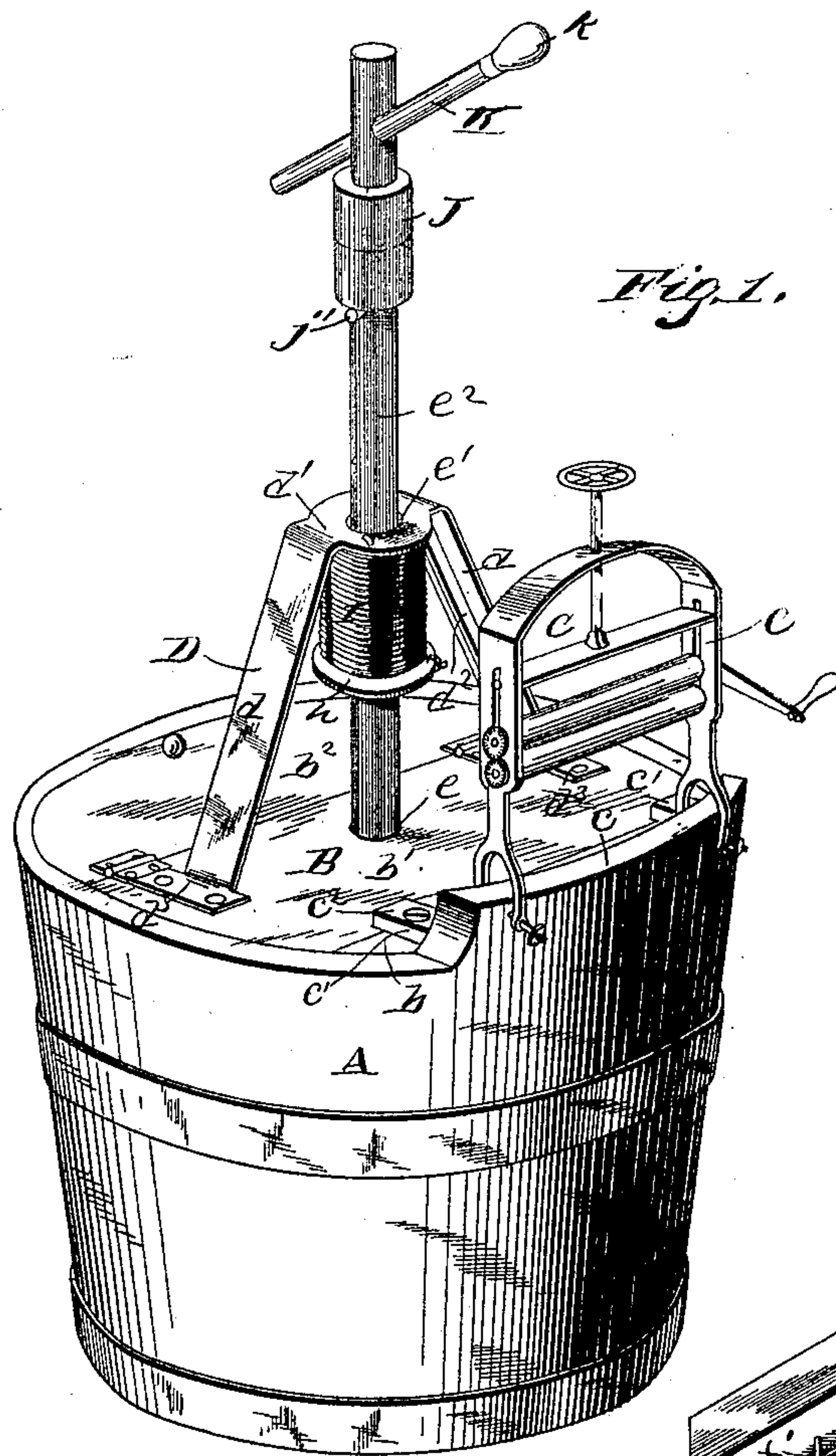
(No Model.)

2 Sheets—Sheet 1.

D. K. HICKOK.  
WASHING MACHINE.

No. 366,665.

Patented July 19, 1887.



Witnesses

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Inventor

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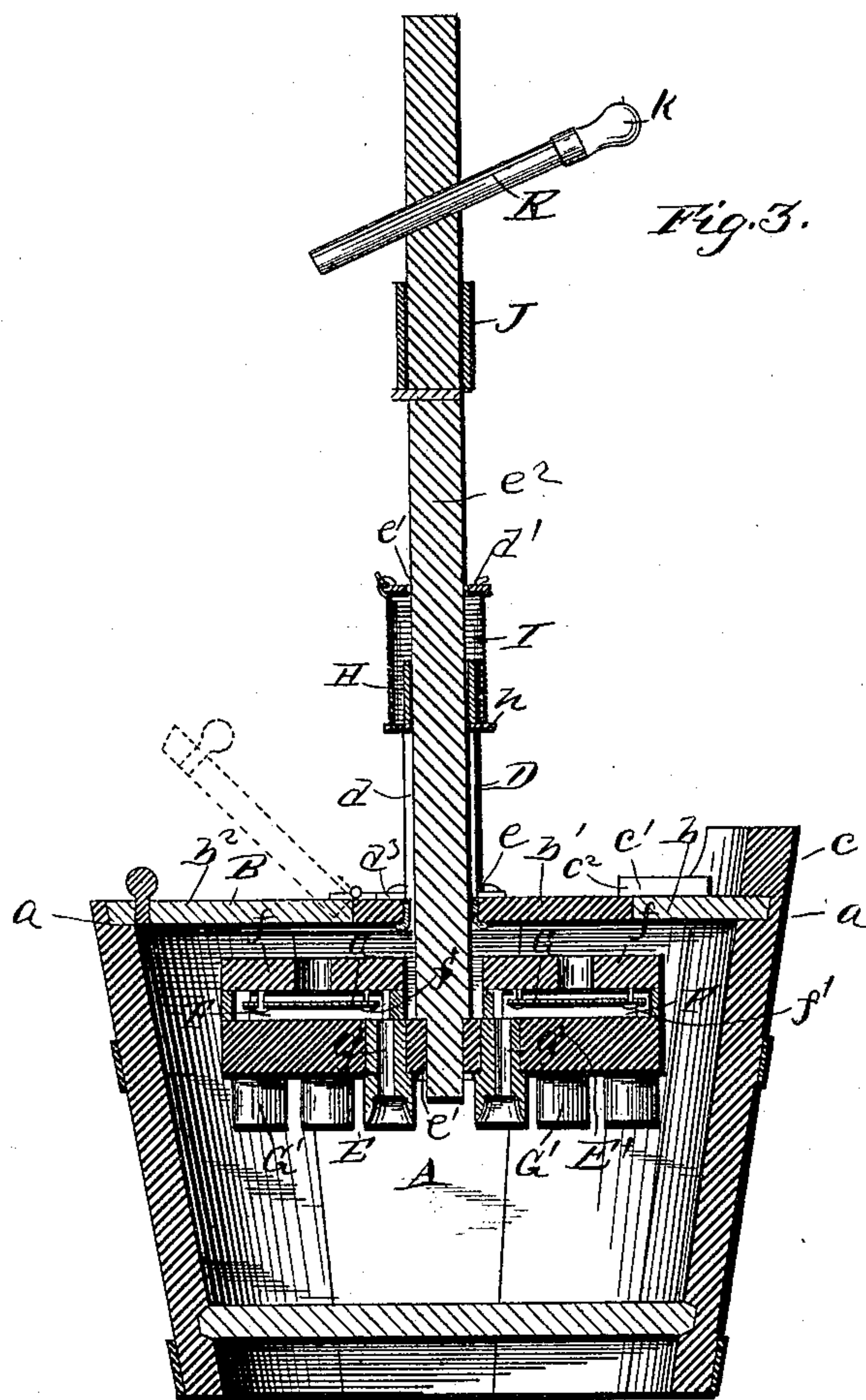
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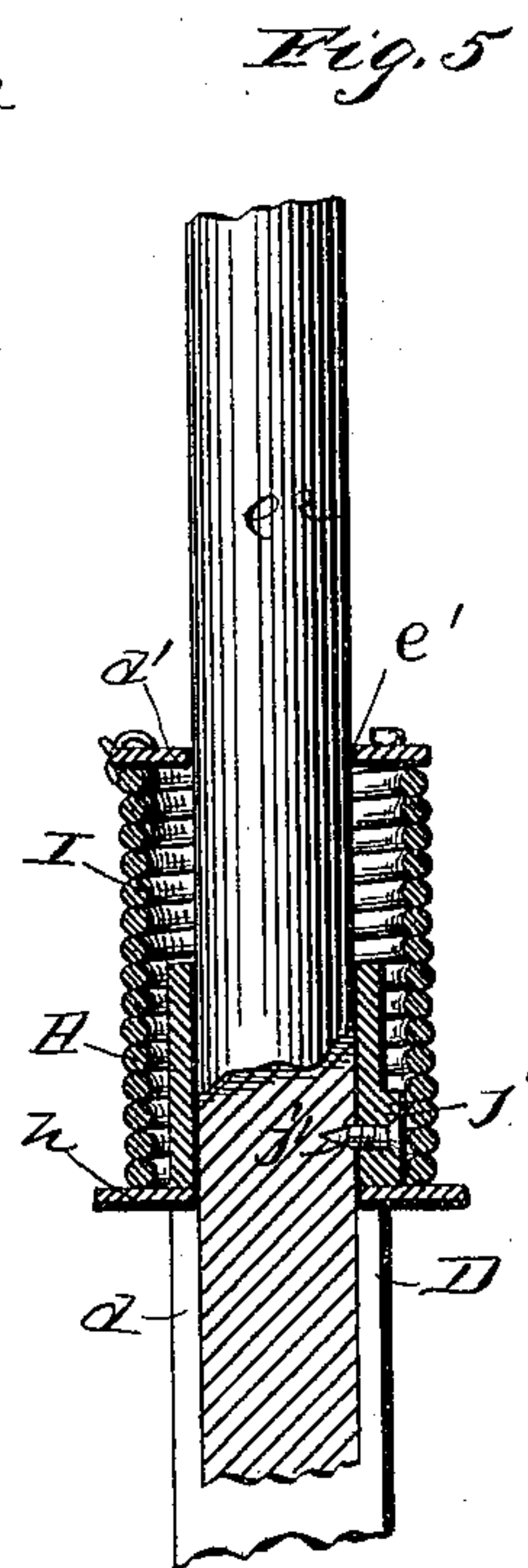
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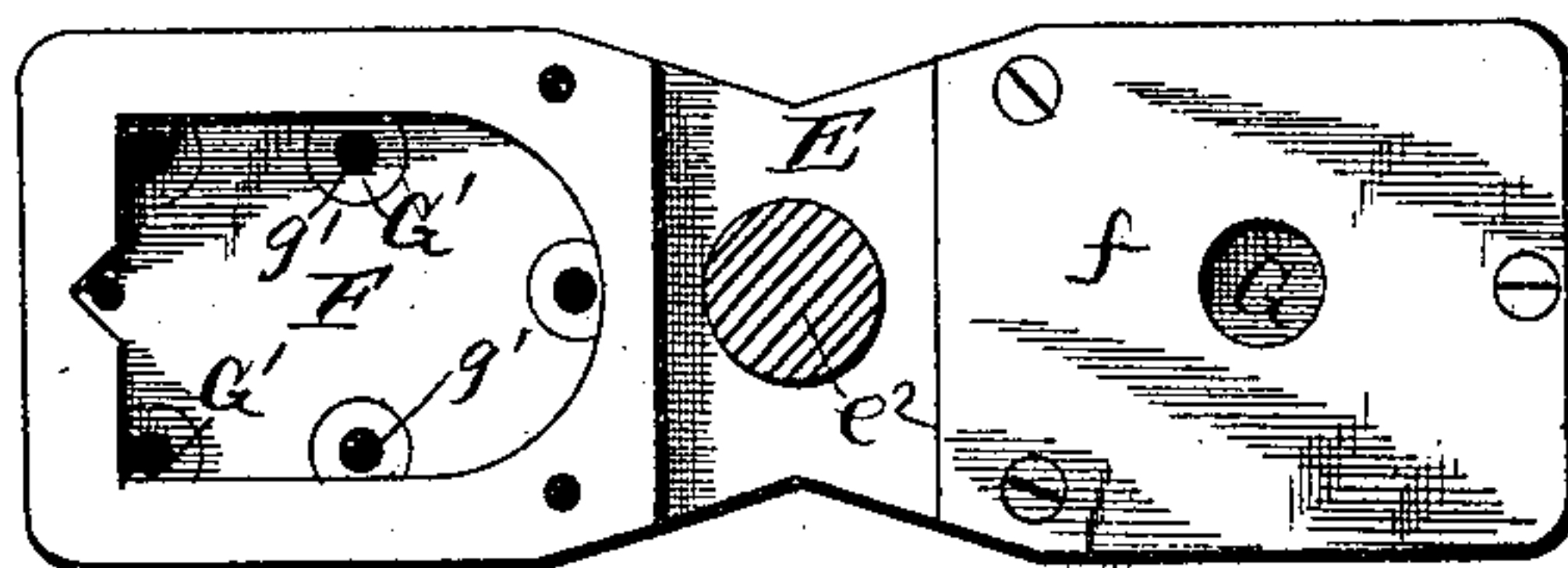


*Fig. 3.*



*Fig. 5*

Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

DEWEY K. HICKOK, OF MORRISVILLE, VERMONT.

## WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 366,665, dated July 19, 1887.

Application filed October 25, 1886. Serial No. 217,158. (No model.)

*To all whom it may concern:*

Be it known that I, DEWEY K. HICKOK, a citizen of the United States, residing at Morrisville, in the county of Lamoille and State of Vermont, have invented new and useful Improvements in Washing-Machines, of which the following is a specification.

My invention relates to improvements in washing-machines; and it consists of the peculiar combination and novel construction and arrangement of the various parts for service, substantially as hereinafter fully described, and particularly pointed out in the claims.

The object of my invention is to provide the vertically-reciprocating pounder of a washing-machine with improved means for assisting the up-and-down strokes thereof, and thereby very materially aid the operator and relieve him to a considerable degree of the tiresome labor of operating the machine.

A further object of my invention is to provide improved means which can be readily regulated or adjusted to vary the force exerted thereby upon the said reciprocating pounder, so that the machine can be adjusted to vary the power of the pounder proportionately to the quantity of fabrics in the receptacle to be operated upon.

A further object is to provide improved means for connecting a wringer with the receptacle which shall discharge the water wrung from the fabrics thereby into the receptacle, the said wringer-supporting devices forming an integral part of the receptacle and permitting the cover of the receptacle to be detached without removing or affecting the wringer; and, finally, the object of my invention is to provide an improved pounder with a head which has a series of air-cells which open into a common air-chamber, and a valve working in the said chamber and serving for all of the air-cells which open therein, thus dispensing with a separate valve for each cell, as will more fully hereinafter appear.

In the drawings hereto annexed, which form a part of this specification, and which illustrate a washing-machine embodying my improvements, Figure 1 is a perspective view. Fig. 2 is a top plan view thereof. Fig. 3 is a vertical central sectional view on the line  $x x$  of Fig. 2. Fig. 4 is a detached view of the head of the pounder, showing the operating-

rod thereof in section and with one of the covers of the air-chamber removed. Fig. 5 is a vertical longitudinal sectional view through a portion of the operating-rod of the plunger, and Figs. 6 and 7 are detached perspective views of parts of my improvements.

Referring to the drawings, in which like letters of reference denote corresponding parts in all the figures, A designates the tub or receptacle of my improved washing-machine, which is preferably made substantially cylindrical in form and with a closed bottom, as shown. The upper end of the tub or receptacle is left open and provided with an annular flange,  $a$ , and on this flange rests a cover, B, which fits within the upper edge of the receptacle and lies flush therewith.

The cover B is made of three or more sections,  $b$ ,  $b'$ , and  $b''$ ; and the section  $b$  thereof is rigidly and permanently secured to the receptacle or tub A. The section  $b$  of the cover is arranged at one side of the receptacle, and the outer edge of the cover is curved to conform to the shape of the receptacle, while the inner edge thereof is made straight, as shown. The upper ends of the staves that form the receptacle or tub are extended above the upper surface of the fixed section  $b$  of the cover, the staves at one side of the tub being extended only as at  $c$ , thereby forming a ridge or flange integral with the receptacle. The ends of this flange or ridge terminate at or near the ends of the fixed section of the cover, and it is arranged concentric with the outer curved edge of the section  $b$ . A wringer, C, of any approved or preferred pattern, is detachably connected to the extended ends of the staves or the flange by the usual clamps or other devices, as will readily be seen by reference to Fig. 1. The fixed section  $b$  of the cover is further provided with transverse battens  $c'$ , which are rigidly affixed thereto; and these battens are arranged parallel with each other and form an inclosed space with the ridge or ledge  $c$ , to prevent the escape of water which falls upon the section  $b$  from the wringer, the rear edge of the section  $b$  being left free, so that the water on the section can escape freely therefrom and fall into the receptacle or tub, as will be very readily understood. When it is desired to use the wringer, the sections  $b'$   $b''$  of the cover and the plunger are removed, so



that the fabrics can be readily removed from the tub and the water will fall back into the same, and the rear ends of the battens  $c'$  are extended beyond the straight-edge section  $b$  of the cover a sufficient distance to adapt the battens to fit or lie over the edge of the section  $b'$  contiguous to the straight edge of the fixed section  $b$  of the cover, so that the cover is fitted tightly in place, this extended end of the battens being lettered  $c^2$ . (See Figs. 1, 2, and 3.)

The sections  $b'$  and  $b^2$  of the cover are hinged together at their contiguous edges, as shown, and the central and side sections,  $b'$   $b^2$ , of the cover are thus connected together, so that they can be detached or removed from the receptacle simultaneously. When the cover is fitted in place, the central section,  $b'$ , thereof is held from displacement by the extended ends  $c^2$  of the battens  $c'$  bearing thereon, and the hinged section  $b^2$  of the cover can be raised or elevated, as shown by the dotted lines in Fig. 3, without removing the section  $b'$  or displacing the same, to permit the operator to inspect the contents of the receptacle or tub with ease and facility and while the operation of washing is being performed.

D designates a bracket or frame, which is arranged in a vertical position and is rigidly affixed to the central section,  $b'$ , of the cover. This frame comprises the diverging standards  $d$ , which are inclined with relation to each other, and the horizontal connecting-piece  $d'$ , at the upper terminal ends of the inclined standards, the whole being cast or otherwise formed in a single piece of metal. The inner opposing sides of the inclined standards are provided with integral strengthening-ribs  $d^2$ , which give the standards a T form in cross-section, and the lower ends of the standards have angular horizontal feet,  $d^3$ , through which are passed the screws or other devices to rigidly fasten the frame to the central section,  $b'$ , of the cover.

The central section of the cover is provided with an opening,  $e$ , and the horizontal connecting-piece  $d'$  of the frame has a similar opening,  $e'$ , which aligns with the opening  $e$  of the cover, and through these aligned openings pass a vertically-movable operating-rod,  $e^2$ , of a reciprocating plunger E, which operates in the tub or receptacle A to properly act upon the fabrics therein. This plunger E comprises a head,  $E'$ , which is arranged in a horizontal position, and the head has a central opening, through which is passed the lower end of the operating-rod  $e^2$ , which has a transverse opening in its lower end, through which a pin or key is passed to detachably connect the head and operating-rod of the plunger together. The head has two air-chambers, F, which are arranged on its upper side and on opposite sides of the operating-rod  $e^2$  thereof, and these chambers are provided with removable covers  $f$ , which are securely and firmly fastened thereto by screws or other suitable means. The cover is provided with a series of two or more vertical guide-pins,  $f'$ ,

on its under side, which depend therefrom into the air-chamber, and the lower ends of the depending guide-pins have enlarged heads, which serve to limit the downward movement of the valve G, which works on the said guide-pins. This valve is preferably flat, as shown in detail in Fig. 6 of the drawings, and it has openings through which are passed the guide-pins, so that the valve is capable of vertical movement freely on the guide-pins, and is prevented from displacement thereby and from downward movement by the heads of the said pins, as will be very readily understood.

G' designates a series of air cups or cells, which are arranged on the lower under sides of the head of the plunger, and are rigidly connected or fastened thereto, so that they will properly act upon the fabrics in the receptacle or tub. A series of these air cells or cups G' is provided for each of the air-chambers F, preferably five cells to a single chamber, although the number can be varied without departing from the principle of my invention. The lower under sides of the air cells or cups are left open, as is usual, to adapt them to properly act upon the fabrics, and at their upper ends they are provided with short tubular nozzles  $g'$ , which pass through suitable openings in the head and communicate with the air-chambers F therein, these nozzles being rigidly secured in the head by any preferable means to firmly connect the air-cells thereto. It will be seen that I provide a single air-chamber to a series of cells or cups which all open into the same chamber, and a single valve to the series of cups or cells, which is located and guided in the air-chamber; and to this feature I attach especial importance, as I thereby dispense with a single valve for each of the cells or cups, which it has been customary to provide in this class of machines.

A thimble or sleeve, H, is fitted on the operating-rod of the reciprocating plunger, and against the lower end of this sleeve bears a washer or plate,  $h$ , which projects at its edges beyond the periphery of the sleeve, and to this washer is secured the lower end of a coiled retracting-spring, I, which also encircles the operating-rod and the sleeve or thimble thereon. The upper end of the said coiled spring is secured or connected to the fixed vertical frame D of the machine, and the spring draws upon the washer, so that it is normally held in contact with the lower end of the sleeve or thimble H on the operating-rod of the plunger; and as the sleeve is rigidly fastened or connected to the operating-rod by the means which I will presently describe, the plunger is also elevated, so that it is in condition to be depressed by the pressure of the hand on the operating-rod. The sleeve or thimble is provided with an integral enlarged boss,  $j$ , on one side, through which is formed an opening, and in this opening works a binding-screw,  $i$ , which impinges upon the operating-rod and thereby holds or clamps the sleeve or thimble to the rod. The sleeve can be adjusted ver-



5 tically on the rod by merely releasing the binding-screw and then moving the sleeve in the required direction, after which the binding-screw is again tightened to hold the sleeve at its desired elevation. When the sleeve or  
10 thimble is lowered on the operating-rod, it depresses the washer which bears against the lower side or end thereof, and thereby distends the spring to increase the power or tension thereof; and when the sleeve is elevated on the  
15 rod the spring draws upon and elevates the washer, and the tension of the spring is thereby weakened or decreased, as will be very readily understood.

20 J designates a weight which is fitted on the upper end of the operating-rod of the plunger, in order to assist the downward movement or stroke of the same. A series of two or more of these weights of different heaviness are employed, as shown in Fig. 1 of the drawings, so that the pressure exerted by the weight on the plunger can be varied by the employment of one, two, or more, as is necessary.

25 The weights are made tubular in form, and they are fitted loosely on the upper end of the operating-rod, and the vertical displacement of the weights in a downward direction is prevented by means of a fixed stop-pin,  $j'$ , which is fastened in the operating-rod  $e^2$  at a suitable  
30 point, as shown.

The upper end of the operating-rod is provided with an inclined handle, K, which is passed therethrough and rigidly fixed or secured in place, and the upper end of the said  
35 handle is provided with a knob,  $k$ , which is to be grasped by the hand of the operator in order to rotate the operating-rod and plunger and thereby impart a horizontal rotary movement to the head in addition to its vertical  
40 pounding movement, in order to more thoroughly stir up the fabrics in the receptacle and present new surfaces for the action of the plunger. It will be seen that the spring is not fastened directly to the operating-rod of the  
45 plunger, but that the sleeve or thimble will rotate freely in the coiled spring when the rod is turned, and the rod itself will turn freely in the washer or ring to which the spring is connected.

50 The operating-rod can be rotated very freely without hindrance from the spring and the devices connecting the same to the rod, and the rod thus has a compound movement—a vertical reciprocating one, and a horizontal  
55 rotary movement—which can take place simultaneously or independently, as desired.

This being the construction of my improved washing-machine, the operation thereof is as follows: The sleeve or thimble is adjusted to  
60 the desired point on the operating-rod to attain the proper tension of the coiled spring, and the weight or weights J placed on the upper end of the operating-rod to assist the downward stroke of the plunger. The spring  
65 is of sufficient strength to elevate the plunger to the upper portion of the receptacle or tub and against the action of the weights J on the

operating-rod of the plunger. The fabrics are now placed in the receptacle, together with a suitable quantity of water, through the cover, 70 the section  $b^2$  of which is opened without disturbing the other parts of the apparatus, and the operating-rod is grasped and downward pressure applied thereto. The plunger is depressed against the action of the coiled spring, 75 so that the air cells or cups of the plunger are brought into contact with the fabrics in the receptacle, thereby forcing the water in the receptacle or tub up into the air-cells and close the valves in the air-chambers, which causes the air 80 that fills the cups and chambers to become compressed, during which process it is commingled or mixed with the water, which materially assists in cleansing the fabrics. The downward pressure of the hand on the operating-rod is released at the termination of the downward stroke of the plunger, and the spring 85 elevates or aids in elevating the plunger to the upper part of the receptacle, and thereby withdraws the cups or cells of the plunger from 90 the fabrics, and the downward pressure is again applied to the rod to depress the plunger again, thereby reciprocating the plunger vertically. The plunger can be rotated at the termination of or during the downstroke of the plunger, so 95 as to act on the fabrics and thereby stir them, so as to present new surfaces of the fabrics for the action of the plunger.

My improved washing-machine is very simple and durable in construction, easy and reliable in operation, and comparatively cheap of 100 manufacture.

I do not desire to confine myself to the exact details of construction or form and proportion of parts herein shown and described 105 as an embodiment of my invention, as I am aware that changes therein can be made without departing from the principle of my invention.

Having thus fully described my invention, 110 what I claim as new, and desire to secure by Letters Patent, is—

1. In a washing-machine, the combination of a receptacle, a fixed guide-frame, a plunger having an operating-rod passing through 115 the guide-frame, a sleeve fixed to the operating-rod, and a spring connected to the guide-frame and loosely connected with the sleeve through an intermediate device, substantially as described, for the purpose set forth. 120

2. In a washing-machine, the combination of a receptacle, a fixed guide-frame, a plunger operating in the receptacle, and having a rod passing freely through the guide-frame, so as to be capable of rotary motion therein 125 in addition to an endwise movement, a sleeve rigidly affixed to the rod, a spring encircling the sleeve and rod and connected to the frame, and a washer bearing against the sleeve and connected to the spring, substantially as described. 130

3. In a plunger for washing-machines, the combination of a head having the separate air-chambers, each provided with a remov-

able cover, the depending cups having the hollow nozzles fixed in the head and opening into the air-chambers, the headed guide-pins secured to the removable covers of the air-chambers, and the valves working over the guide-pins and limited in their downward movement by the heads, as and for the purpose described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

DEWEY K. HICKOK.

Witnesses:

M. P. CALLAN,  
WM. N. MOORE.