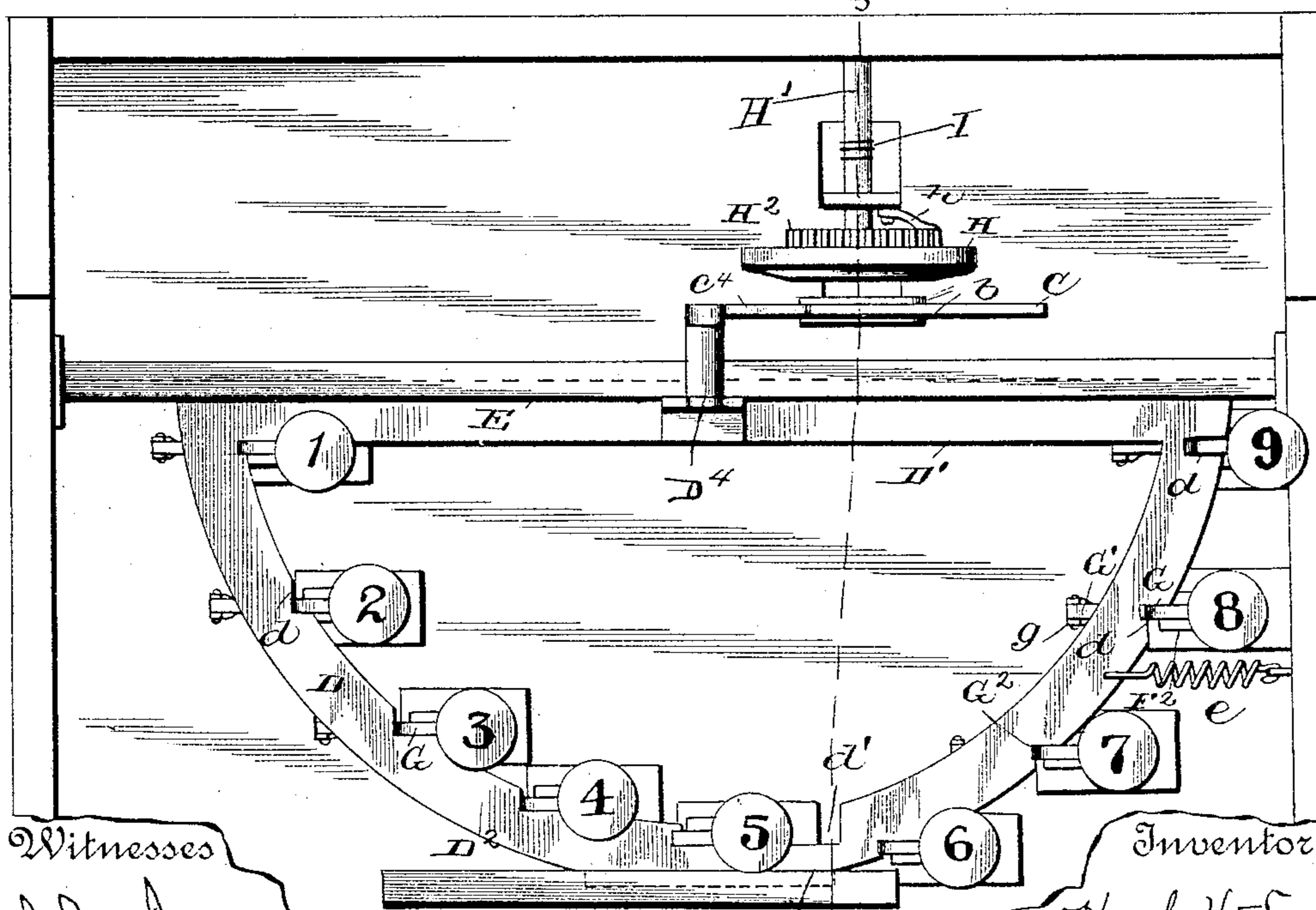
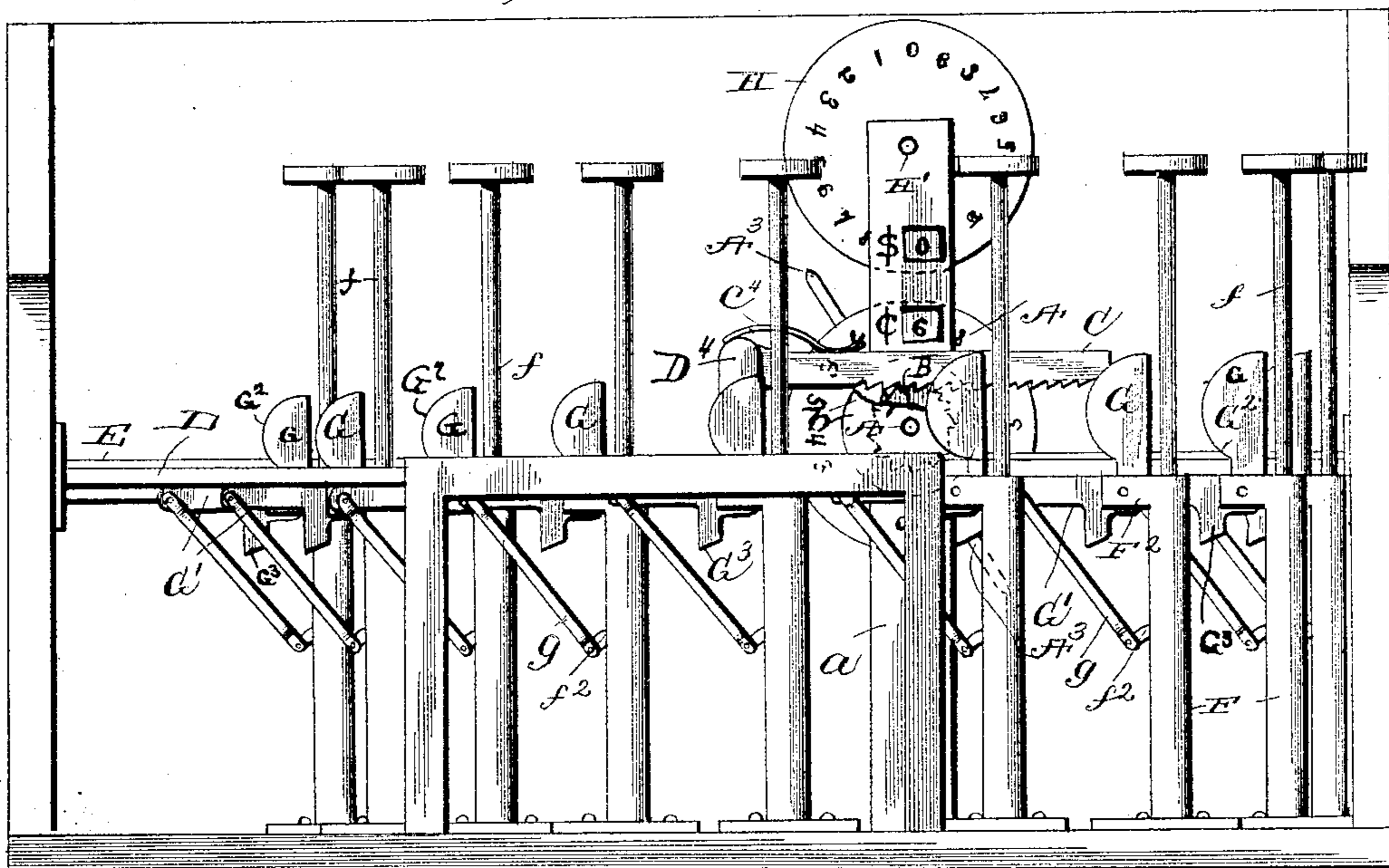


2 Sheets—Sheet 1.

No. 473,833.

Patented Apr. 26, 1892.

Fig. 1.



Witnesses

John Inurie
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Fig. 2.

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Attorney

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T. H. Alexander

Inventor

Hugh V. Dunn

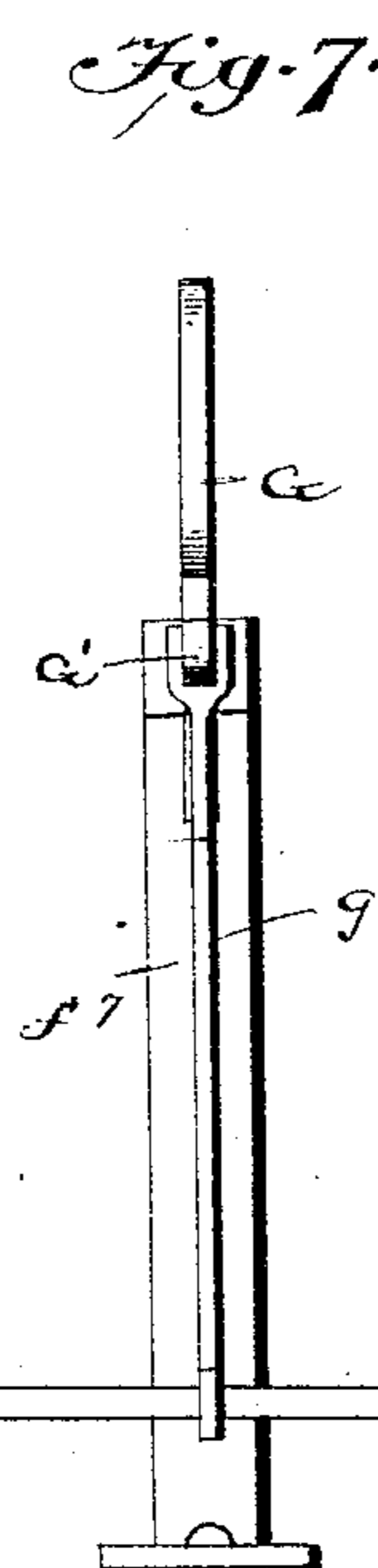
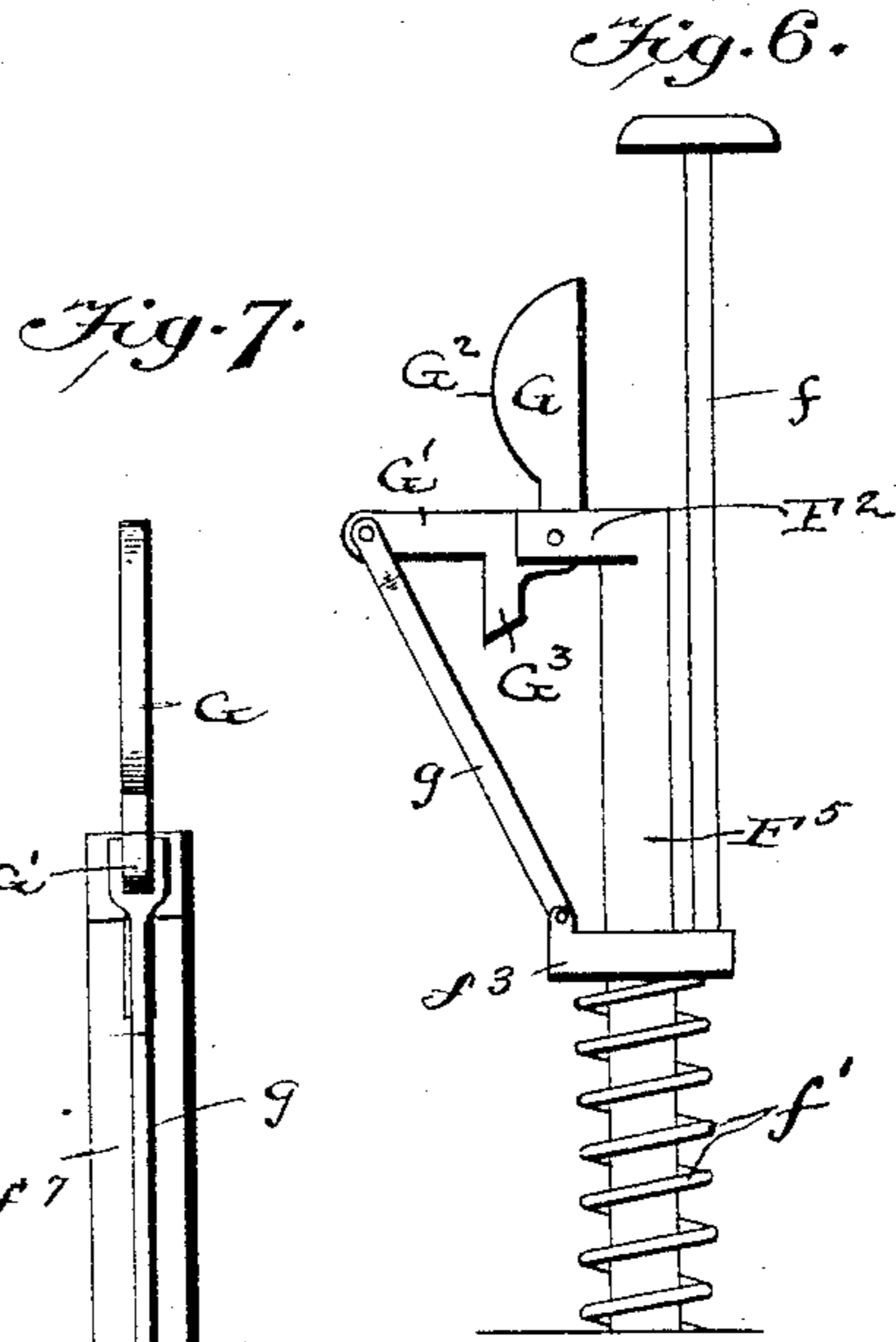
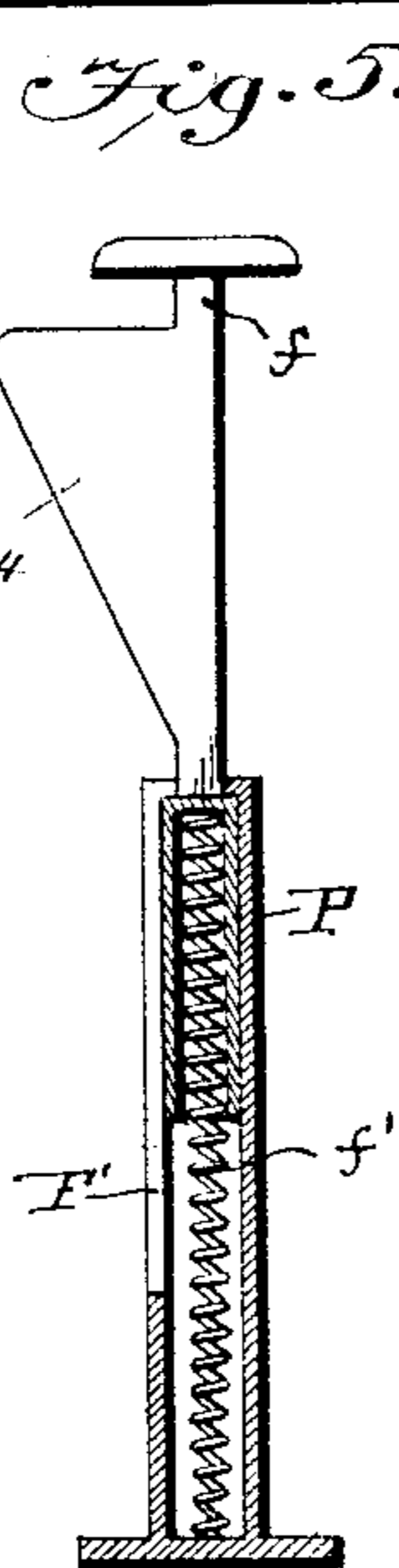
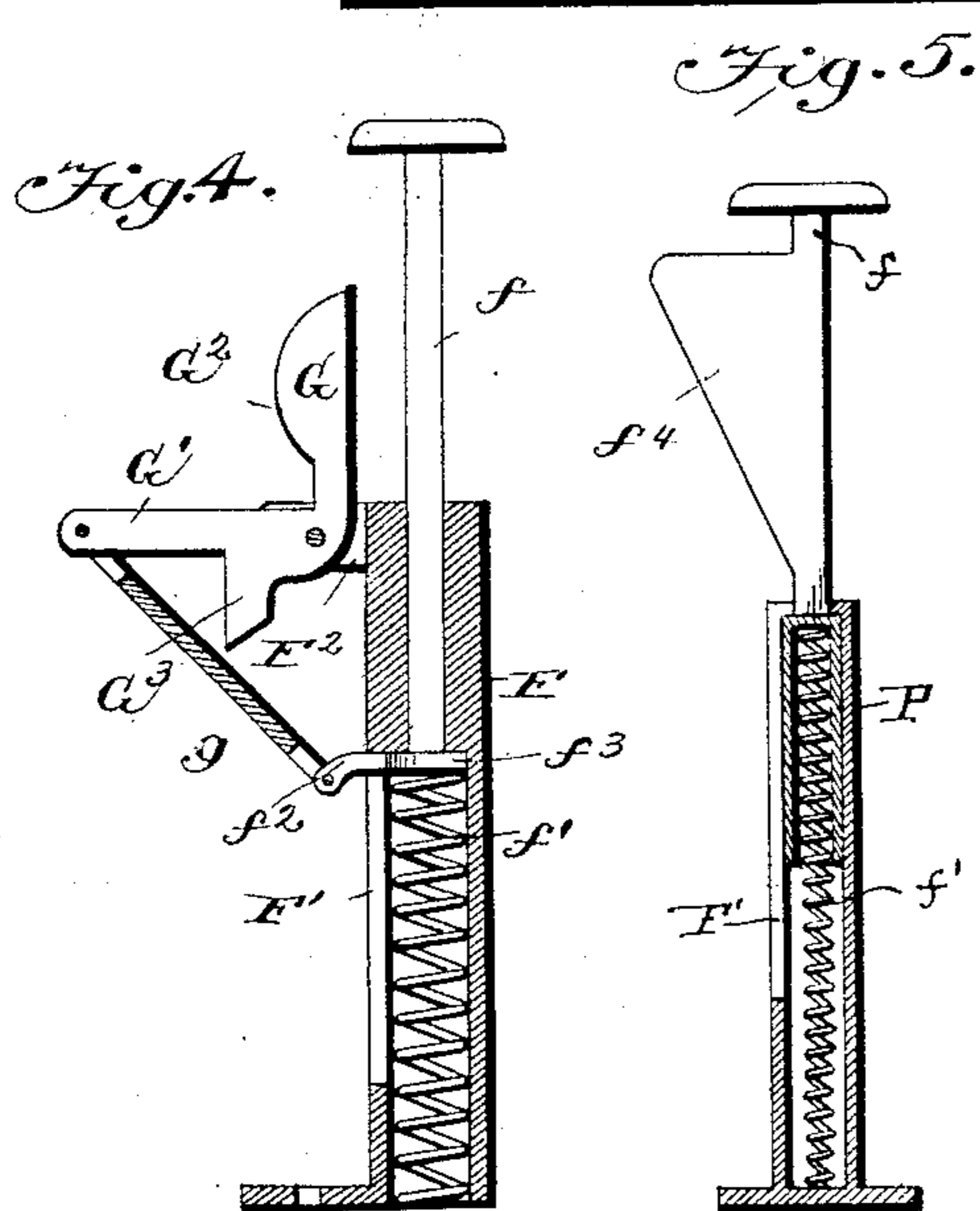
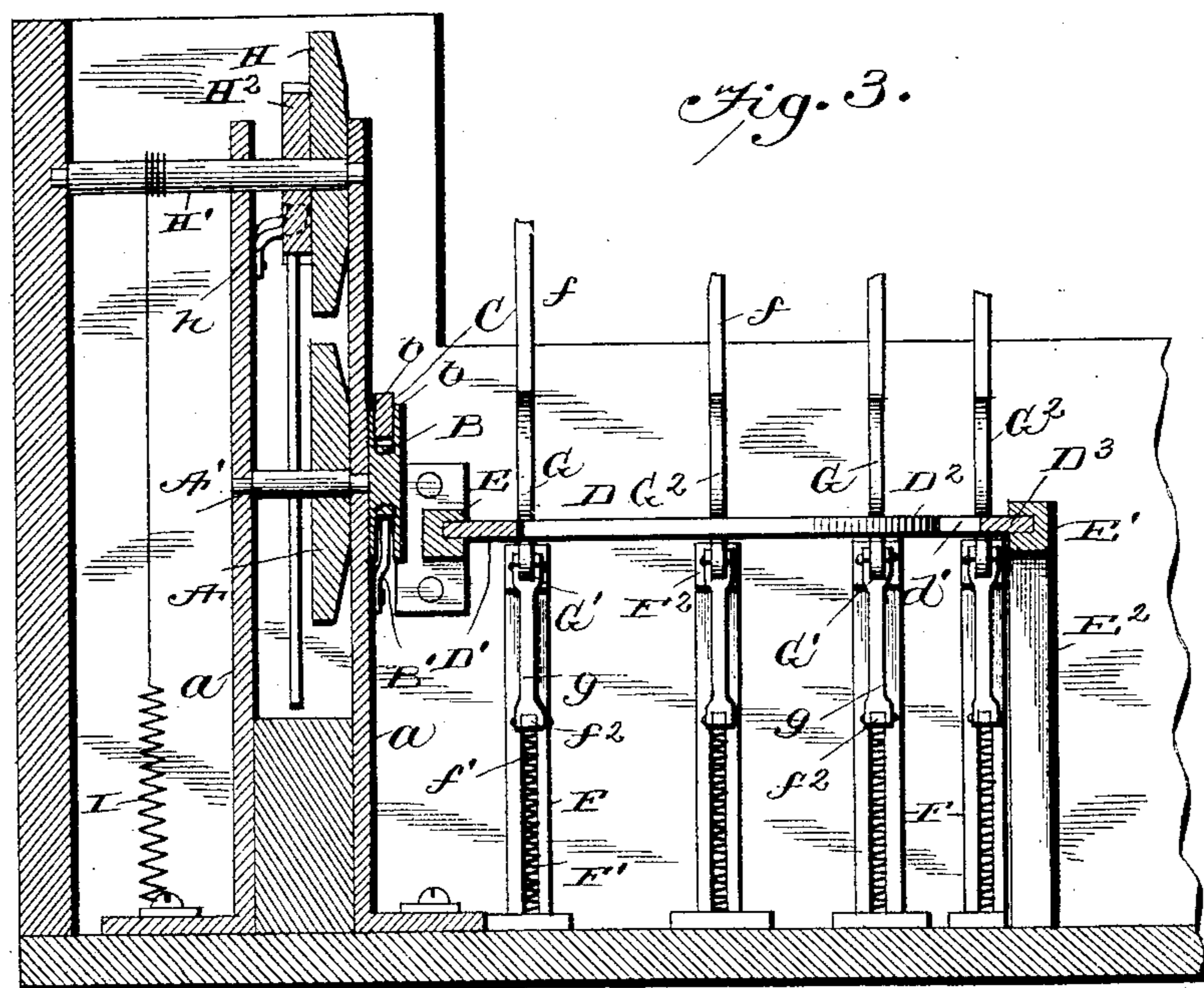
(No Model.)

2 Sheets—Sheet 2.

H. V. DUNN.
CALCULATOR.

No. 473,833.

Patented Apr. 26, 1892.



Witnesses

John Irvine
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By his Attorney

Inventor
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UNITED STATES PATENT OFFICE.

HUGH V. DUNN, OF HUNTINGTON, WEST VIRGINIA.

CALCULATOR.

SPECIFICATION forming part of Letters Patent No. 473,833, dated April 26, 1892.

Application filed December 11, 1891. Serial No. 414,678. (No model.)

To all whom it may concern:

Be it known that I, HUGH V. DUNN, of Huntington, in the county of Cabell and State of West Virginia, have invented certain new and useful Improvements in Calculators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

Figure 1 is a front elevation of my improved calculating-machine, the cover being removed. Fig. 2 is a plan view of the same with cover removed. Fig. 3 is a central vertical section through the same on line 3 3, Fig. 2. Fig. 4 is an enlarged vertical section through one of the frame-shifter supports and key connections. Figs. 5, 6, and 7 are detail views illustrating modifications of the frame-shifting devices.

My invention is an improvement in calculating or registering machines wherein a train of registering-dials are operated by and from depressible keys; and the objects are to improve the mechanism for accurately shifting the dials, the key-mountings, and the dial-mountings.

To these ends the invention consists in the novel construction of the dial-shifting frame and the devices for shifting said frame by and from the depressible keys, and in certain other novel details of construction and combination of parts, as will be clearly understood from the following description and concisely stated in the claims.

Referring to the drawings by letters, A designates the "units-dial," which is fixed on a revoluble shaft A', horizontally journaled in uprights a a, rising from the base of the machine, or otherwise properly supported. The face of dial A is divided near its perimeter into equal spaces, preferably twenty in number or a multiple of ten, and these spaces are respectively numbered "0 1 2 3 4 5 6 7 8 9," as indicated in the drawings. Upon the front end of shaft A' is fixed a ratchet-wheel B, the teeth of which equal in number the divisions on the face of dial A. This ratchet-wheel, as shown, has peripheral flanges b at each side of its teeth to guide a ratchet-toothed rack-bar C, which is reciprocated longitudinally at right angles to the shaft A by a laterally-

moving frame D. The frame D, as shown in Fig. 2, is semicircular in contour, having a rear diametrical or straight bar D' and a front semicircular portion D², connected to the ends of the bar D' and preferably formed integrally therewith. The rear edge of bar D is supported on and guided by a grooved bar E, which is fixedly supported in the casing in any proper manner, lying at right angles to the shaft A'. At the center and outer edge of the portion D² is formed a short horizontal grooved bar E', supported by uprights E² or otherwise fixed in the casing. The frame D can thus reciprocate transversely of the casing in a horizontal plane. The end of rack-bar C is pivotally connected to the upper end of an arm D⁴, rising from rear bar D' of the frame, and when the frame is reciprocated in one direction the teeth of the ratchet-bar engage ratchet-wheel B and rotate the shaft A' and dial A; but when the frame moves back the rack-bar rides over the ratchet, the latter being kept from revolving backward by means of a spring-dog B'. Bar C is kept in contact with the ratchet by a presser-spring c⁴. Frame D is held and returned to normal position by suitable springs e, attached to the frame and side of casing.

F F designate a series of tubes arranged in a semicircle beneath the frame D. In the drawings but nine tubes are shown in Figs. 1 and 2, four of which stand just below the outer right-hand edge of portion D² of frame D, one at the center but inner edge of said frame and the other four below the inner left-hand edge of the frame. These tubes are secured to the base of the casing, and each has a vertical slot F' in its left side, extending slightly more than half-way up it, and at the top each has a pair of horizontal laterally-projecting ears F² at its left-hand side, which partly underlie the edges of portion D' of the frame.

f f are key-stems extending through suitable openings in the cover of the casing into the tubes F, respectively, being upheld, as shown, by springs f', concealed in the tubes. The stems have proper heads on their upper ends bearing numbers "1" to "9," consecutively, from left to right.

G G designate the frame-shifters, each being roughly L-shaped in contour and respect-

ively pivoted at their angles between the ears F^2 of the tubes F . Each shifter G has a horizontal leftwardly-extending arm G' and an upstanding cam-arm G^2 . The arms G' of the
 5 shifters are about equal in length and are respectively pivotally connected by links g with the tangs f^2 of followers or collars f^3 , attached to the lower ends of the key-stems in the tubes, the tangs projecting through the slots
 10 F' . The cam-arms G^2 of the shifters are rounded or cam-faced on their edges adjoining the frame D , and normally rest in bearing-notches d , formed in the edges of the portion D^2 thereof, four of said notches being in
 15 the outer or right-hand edge and five in the inner or left-hand edge of portion D^2 , as shown in Fig. 2. The cam-arms are also of varying lengths, the extreme left cam-arm being the shortest and the successive arms being gradually elongated, so that the extreme cam-arm
 20 G^2 at the right will shift frame D nine times as far as the extreme left cam-arm, or as many times farther as there are immediate key-stems or cam-arms. It will be noticed that
 25 when a key-stem is depressed the shifter G to which it is connected, as described, will be rocked or turned, so as to throw its cam-arm G^2 against the edge of the frame D , and thereby force the latter to move to the left. The movement of each shifter is so regulated, however,
 30 that its cam-arm will not pass below the frame and will only move the frame the exact distance desired. This can be accomplished by limiting the downward movement of the key-stem or of the shifter.

In the drawings each shifter has a stop G^3 depending from its arm G' near the pivot, which stop strikes against the tube F and limits the movement of the cam-arm, and consequently of the frame. The inner edge of
 40 portion D^2 is cut away, as at d' , so that the central shifter-arm G^2 will not hinder the lateral movements of the frame when either of the other shifters is operated.

From the foregoing description it will be seen that each key, when depressed, will cause the shifting of the frame a certain predetermined distance, and the ratchet-teeth of the bar C and the wheel B are so calculated with
 50 relation to the movement of the frame that the first or left-hand key will move the rack-bar one notch, imparting a one-twentieth revolution to dial A , and the extreme or right-hand key (where but nine keys are used) will move
 55 the rack-bar nine notches, imparting a nine-twentieth revolution to said dial, the frame being thrown back to normal position by the springs, as described.

Any suitable number of registering-wheels
 60 may be arranged and operated from dial A that may be desired.

In the drawings I have shown a tens-dial H fixed on the shaft H' , journaled above shaft A' and dial A and having a ratchet-wheel H^2
 65 attached to it, the teeth of which are successively engaged by pins $A^3 A^3$, projecting from dial A at diametrically-opposite points. The

face of dial A is divided into a number of divisions corresponding to the number of teeth on the ratchet H' , each division being marked
 70 with a multiple of ten. Preferably dial A has twenty divisions numbered from "0" to "9" and repeated from "0" to "9," and each time-dial A is revolved once dial H is partially revolved, so as to shift it two divisions. The
 75 ratchet H^2 is engaged by a spring-dog h , by which rebound or back action of the dial is ordinarily prevented.

I designates a coil-spring, one end of which is attached by a flexible connection to shaft
 80 H' in rear of the dial H and which is wound up as the dial revolves. In order to bring the dial H to "naught" position, the dog h is disengaged from the ratchet-wheel H^2 . The spring I then instantly unwinds and brings
 85 the dial back to normal position. A weight and cord might be substituted for the spring, if desired.

It is obvious that the dials might be of any size and the number of divisions on their faces
 90 varied; also, that one or more dials might be added, to be driven from dial H , if desired. In fact, various modifications might be made in the arrangement and number of registering-wheels and in the devices for transmitting
 95 motion from the reciprocating frame to the dials without departing from the essential features of the invention.

Instead of employing shifters G cam-blocks f^4 might be attached to the key-stems above
 100 tubes F , which, when depressed, would engage the bearing-notches d of frame D and shift the same, as indicated in Fig. 5.

Instead of tubes F rods F^5 might be substituted, collars f^3 being guided on these rods
 105 and the key-stems attached to the collars, as indicated in Fig. 6. The stops G^3 of the shifters in this construction strike rods F^5 , and their movement is arrested thereby.

If it should be desired to have the key-stems below and in front of frame D , instead
 110 of above it, horizontal key-levers f^6 might be used, the same being pivoted at their inner ends and projecting forward below the frame D and beside the uprights f^7 , upon which the
 115 shifters G are mounted, substantially as described, the arms G' of the shifters being connected by links to the respective key-levers, as indicated in Fig. 7.

As shown, the ratchet-bar C is above the
 120 ratchet-wheel B and is loosely pivoted to the frame. It might, however, be arranged below the frame and fixed thereto if the ratchet-wheel was dogged on shaft A' , as will be obvious to a mechanic without illustration.
 125

The mechanism described may be employed in calculators or adding-machines, registers, &c.

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

1. The combination of the movable frame with a series of pivoted frame-shifters G G , adapted to engage the edges of and move the

frame, and a series of vertically-movable key-stems, and connections between the stems and frame-shifters, substantially as specified.

2. The combination of the movable frame 5 formed with a curved front portion having a series of bearing-notches in its outer edge at one side and in its inner edge at the other side with a series of movable cams respectively engaging said bearing-notches and key- 10 stems for operating said cams, substantially as described.

3. The combination of a movable frame and pivoted cam frame-shifters G, having stops G³, and means for arresting the movement of 15 said stops with the support for said shifters, and keys and connections for operating said shifters, all substantially as specified.

4. The combination of the rotatable shaft, an indicating-dial thereon, a movable frame, 20 mechanism for imparting rotary movement to the shaft from said frame, and a series of pivoted frame-shifters G G, and the key-stems and connections between the same and said shifters, constructed and arranged to operate 25 substantially as described.

5. The combination of the movable frame, the pivoted rocking frame-shifters G, the spring-controlled key-stems, and the links pivotally connecting said stems and shifters, 30 substantially as specified.

6. The combination, with the frame D, constructed substantially as described, of the frame-shifters G G, having stops G³, and the key-stems and connections for operating said 35 shifters, substantially as described.

7. The combination of the dial, its shaft and ratchet-wheel, the movable frame D, the rack-bar C, connected to said frame and engaging said ratchet-wheel, the frame-shifting 40 cams, and the key-stems for operating the same, substantially as specified.

8. The combination of the dial, its shaft and ratchet-wheel, the horizontally-movable frame, the ratchet-bar pivotally connected to 45 said frame and engaging said ratchet-wheel, the series of pivoted rocking frame-shifters engaging the edges of said frame, the key-stems

and the link connections between said stems and frame-shifters, and springs for returning the frame to normal position, substantially as 50 and for the purpose described.

9. The combination of the movable frame with the slotted tubes arranged below the same, the springs therein, the key-stems playing in said tubes, and the cams operated by 55 said stems, adapted to shift the frame, substantially as specified.

10. The combination of the movable frame with the slotted tubes below the same, the frame-shifters pivoted to the upper ends of 60 said tubes, the key-stems playing in said tubes, and the link connections between the lower ends of said stems and the frame-shifters, as and for the purpose described.

11. The combination of the registering- 65 dials, the movable frame D, the ratchet-bar C, the series of tubes F, the pivoted frame-shifters G, and the key-stems for operating said shifters, substantially as specified.

12. The combination of the horizontal frame 70 D, the grooved guides therefor, the series of frame-shifters G, pivoted below said frame, the key-stems, and the link connections for operating the frame-shifters from the stems, substantially as set forth. 75

13. The combination of the registering- dials, the horizontally-movable plate D, constructed substantially as described, the ratchet-bar pivoted to the frame and engaging a ratchet-wheel on the first dial-shaft and 80 the spring for controlling said frame, the series of frame-shifter supports below the frame, the key-stems guided by said supports, the frame-shifting cams, and the connections between said cams and key-stems, substantially 85 as specified.

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

HUGH V. DUNN.

Witnesses:

S. BRASHEARS,

JAS. R. MANSFIELD.