(No Model.) 3 Sheets—Sheet 1.

J. C. STINSON.

ADDING MACHINE.

No. 405,924. Patented June 25, 1889.

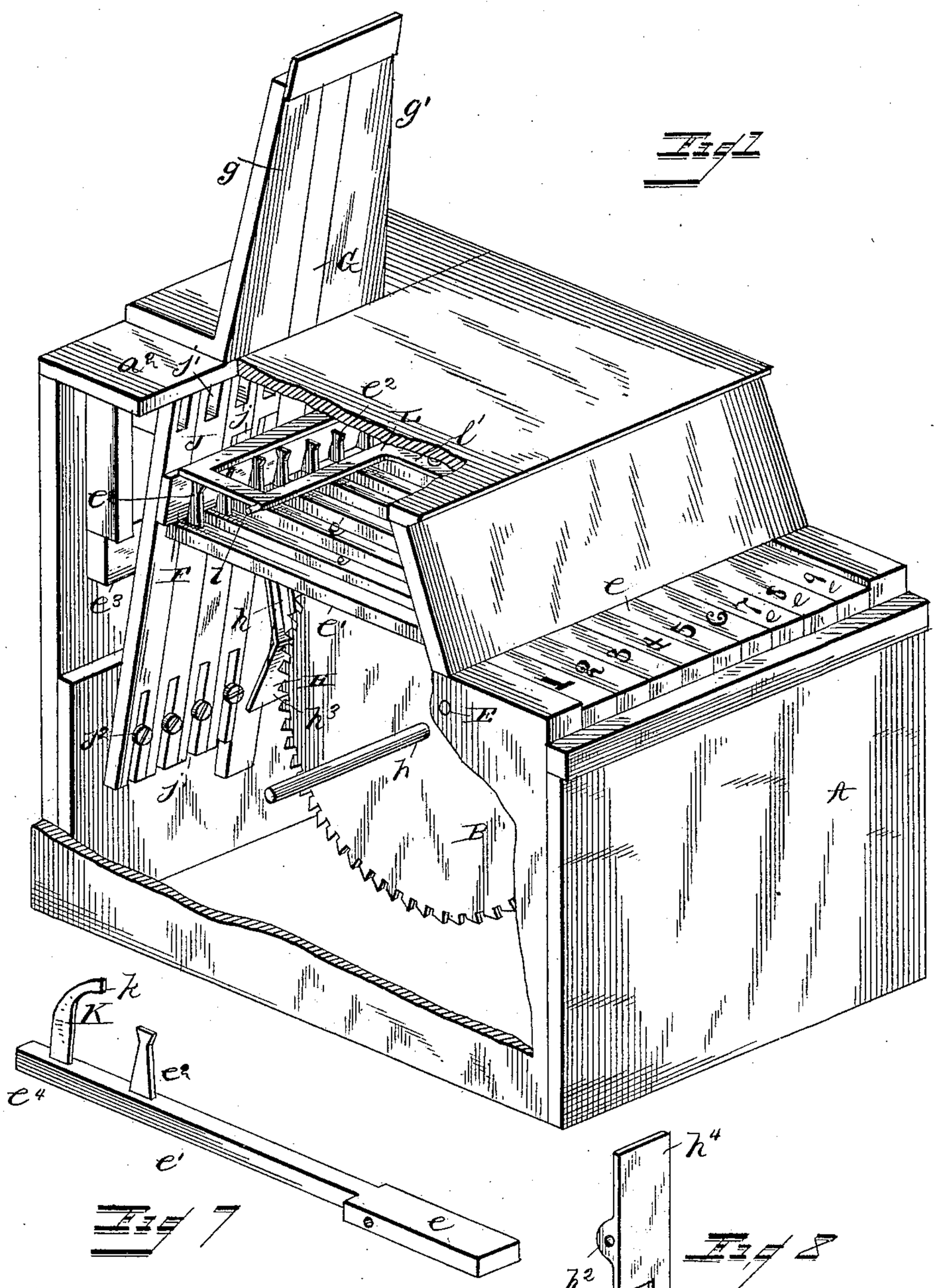

Fig 1

Fig 7

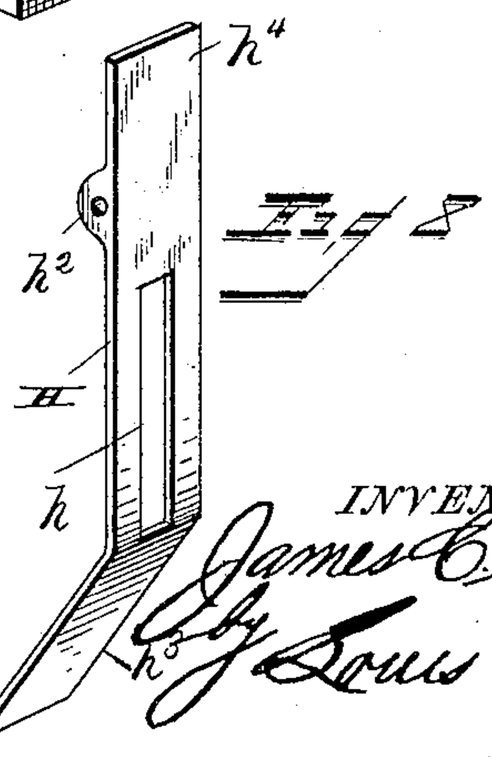

Fig 8

WITNESSES
F. L. Durand.
R. W. Elliott.

INVENTOR
James C. Stinson,
by Louis Bagger & Co.
Attorneys

(No Model.)

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Fig. 2.

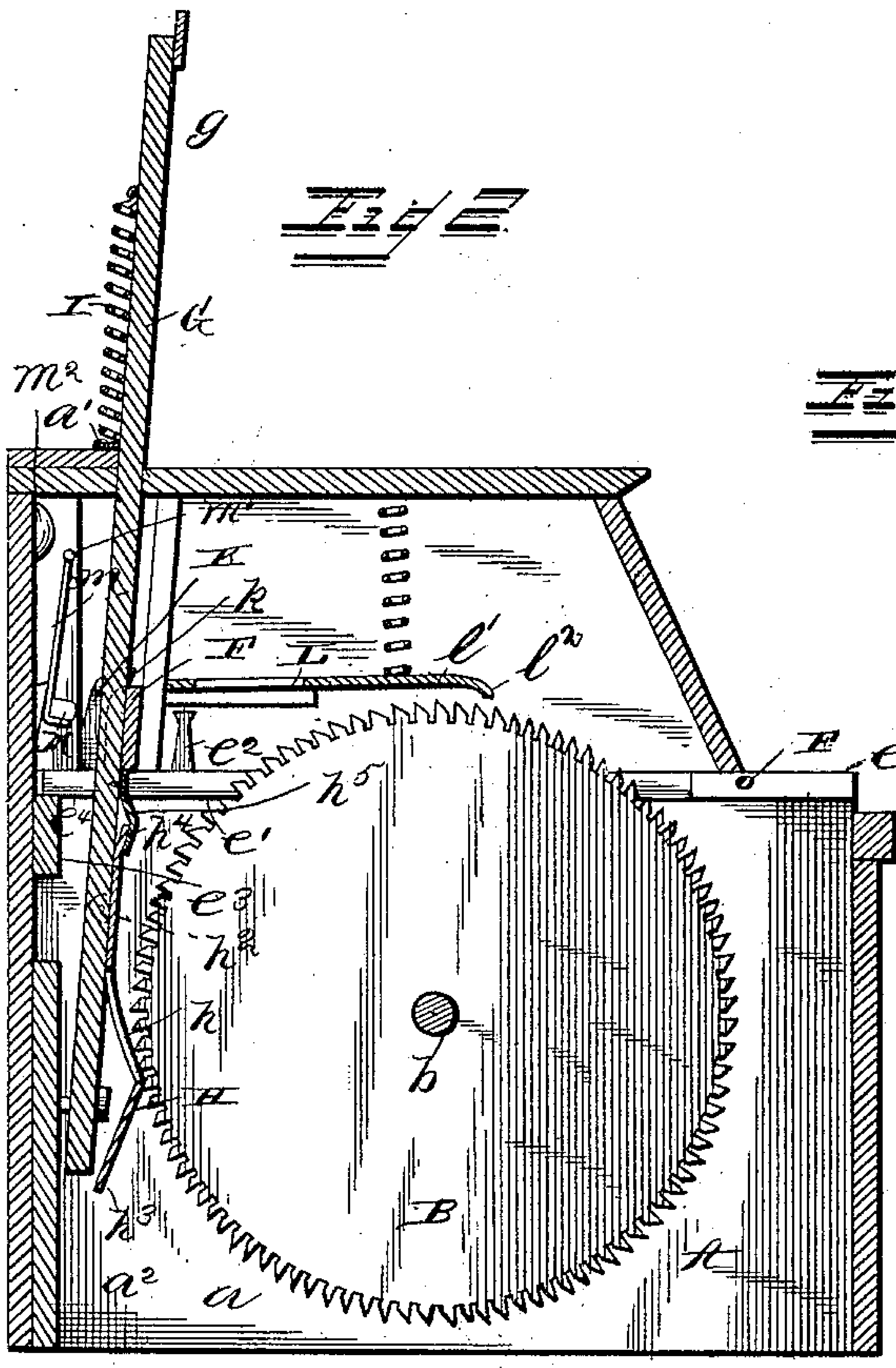


Fig. 3.

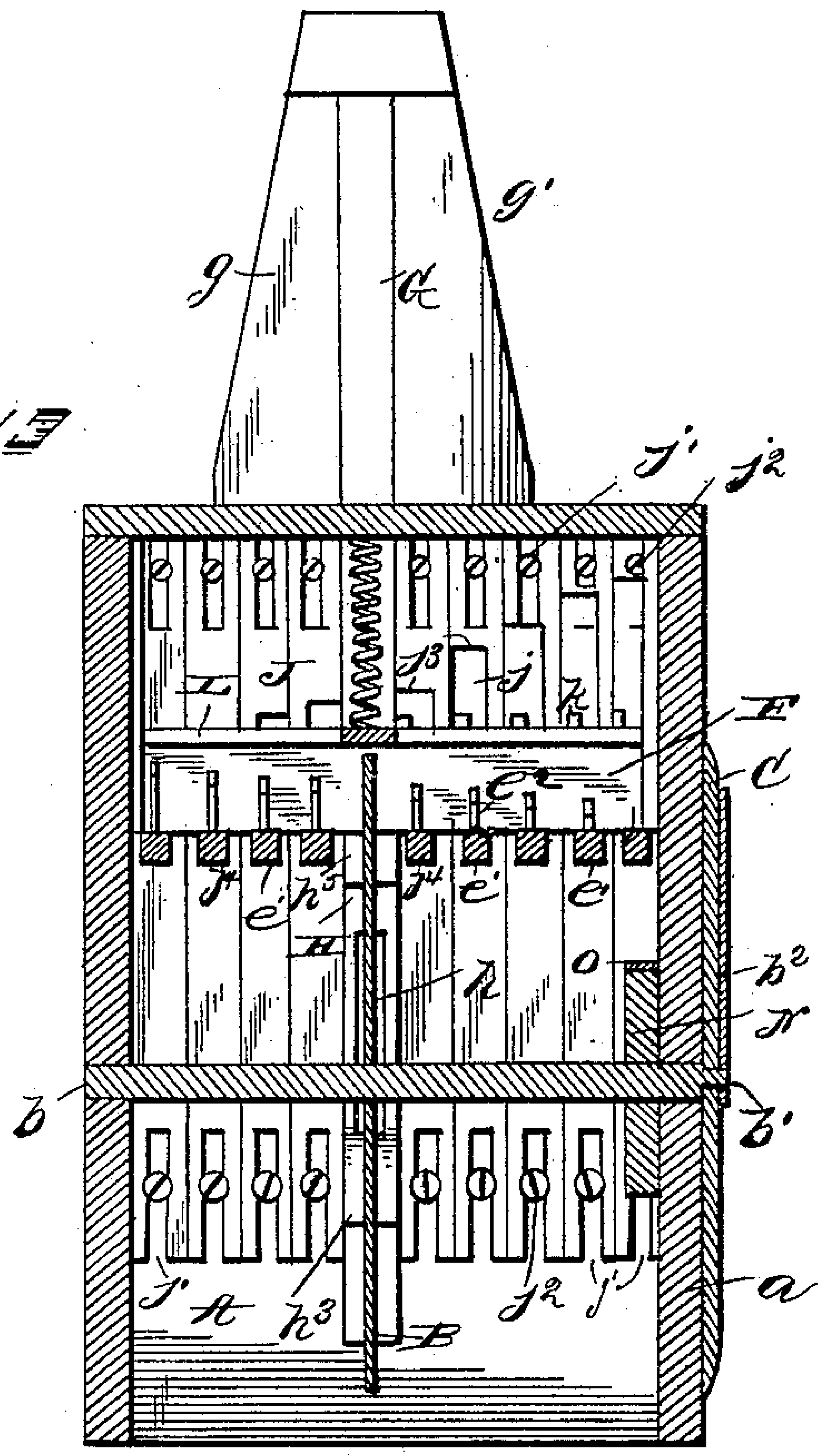


Fig. 4.

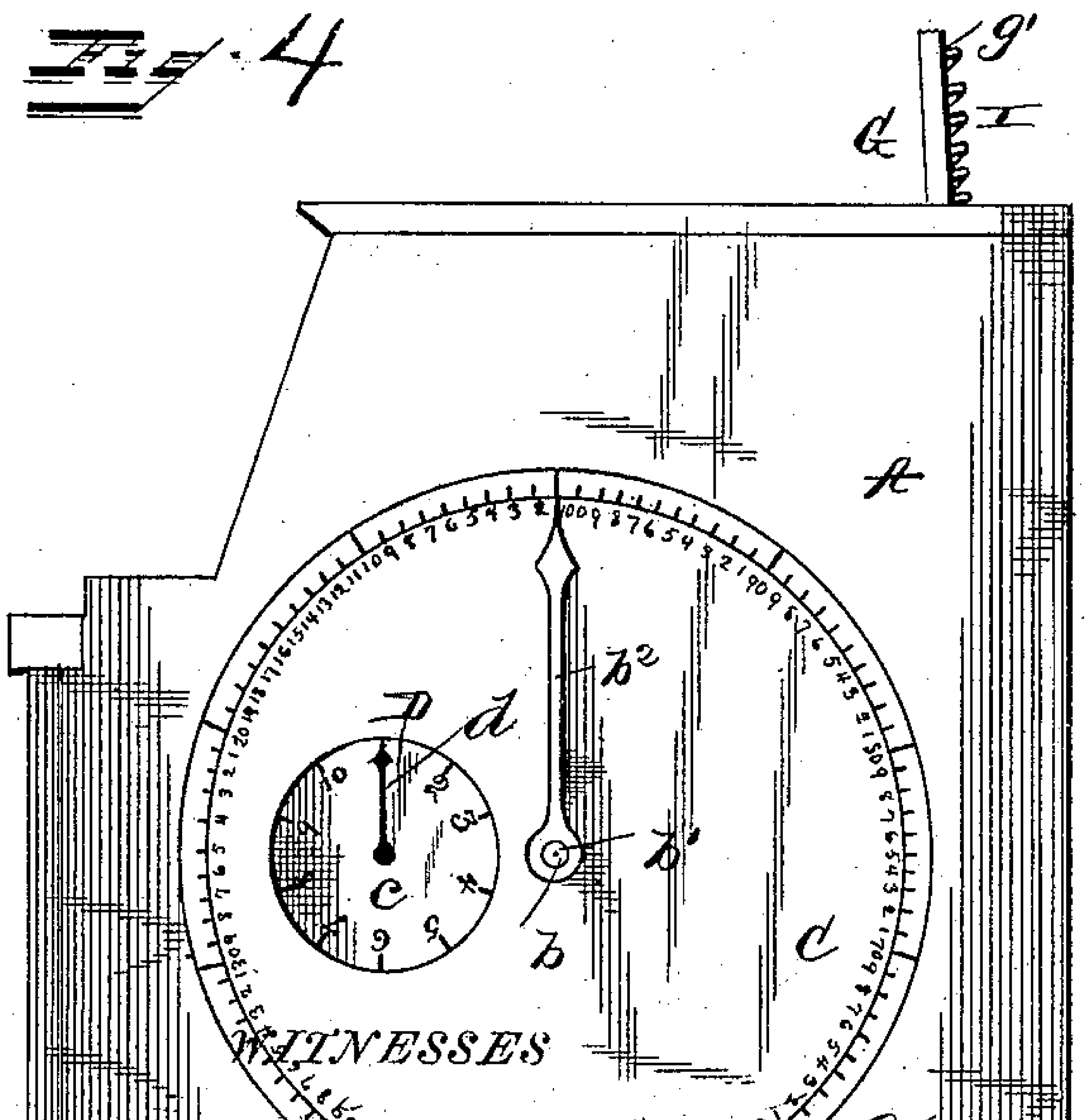
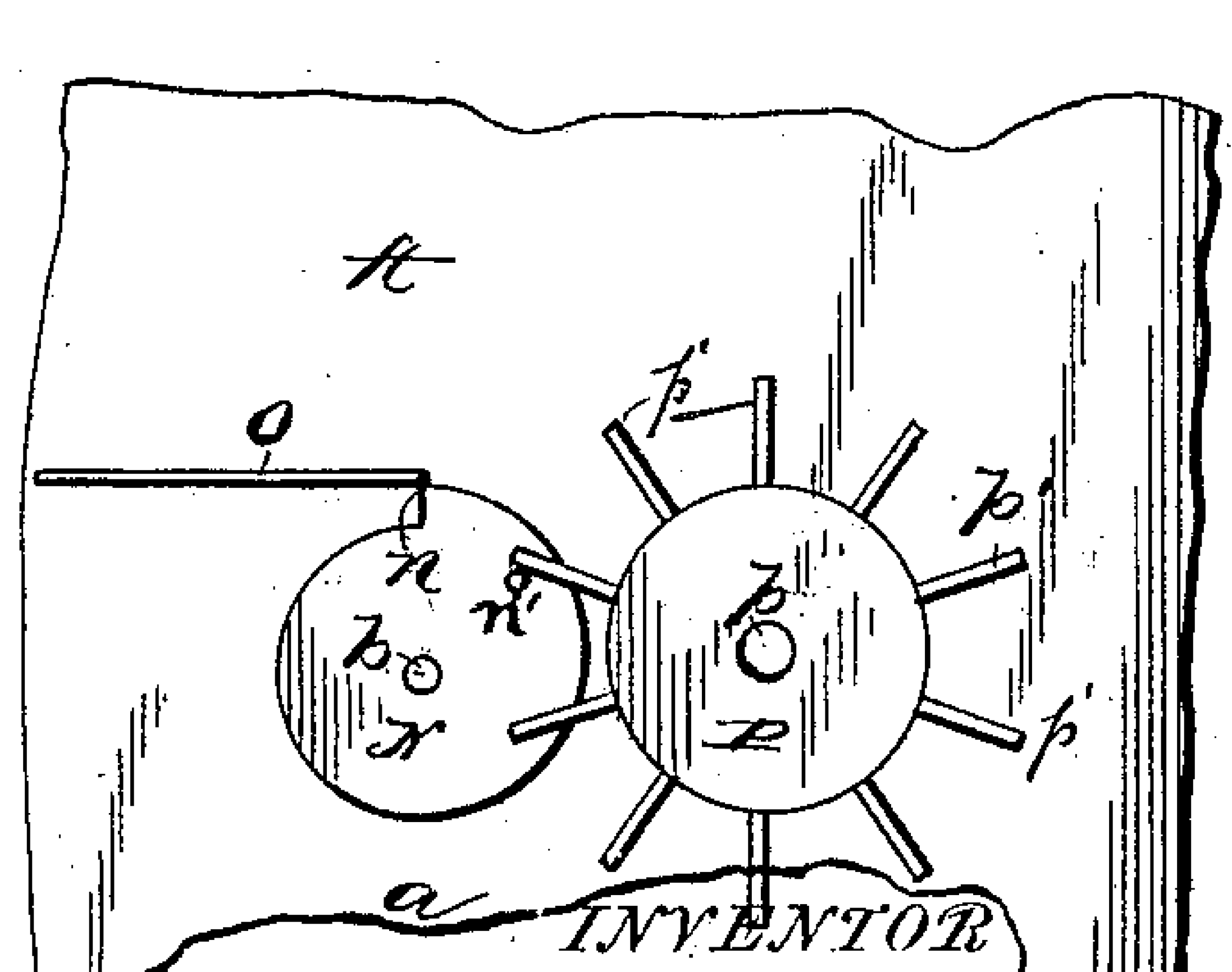


Fig. 5.



WITNESSES

R. W. Elliott,
F. L. Ourand.

INVENTOR

James C. Stinson
by Louis Bagger & Co.
Attorneys.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 3.

J. C. STINSON.

ADDING MACHINE.

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Fig 6

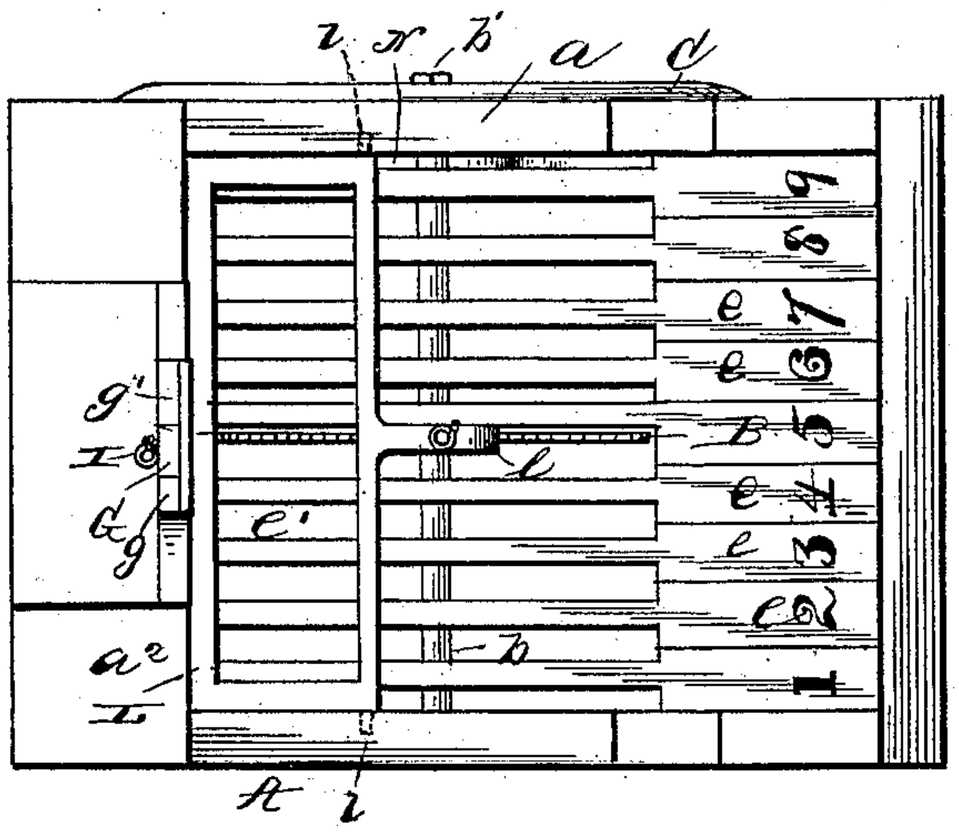
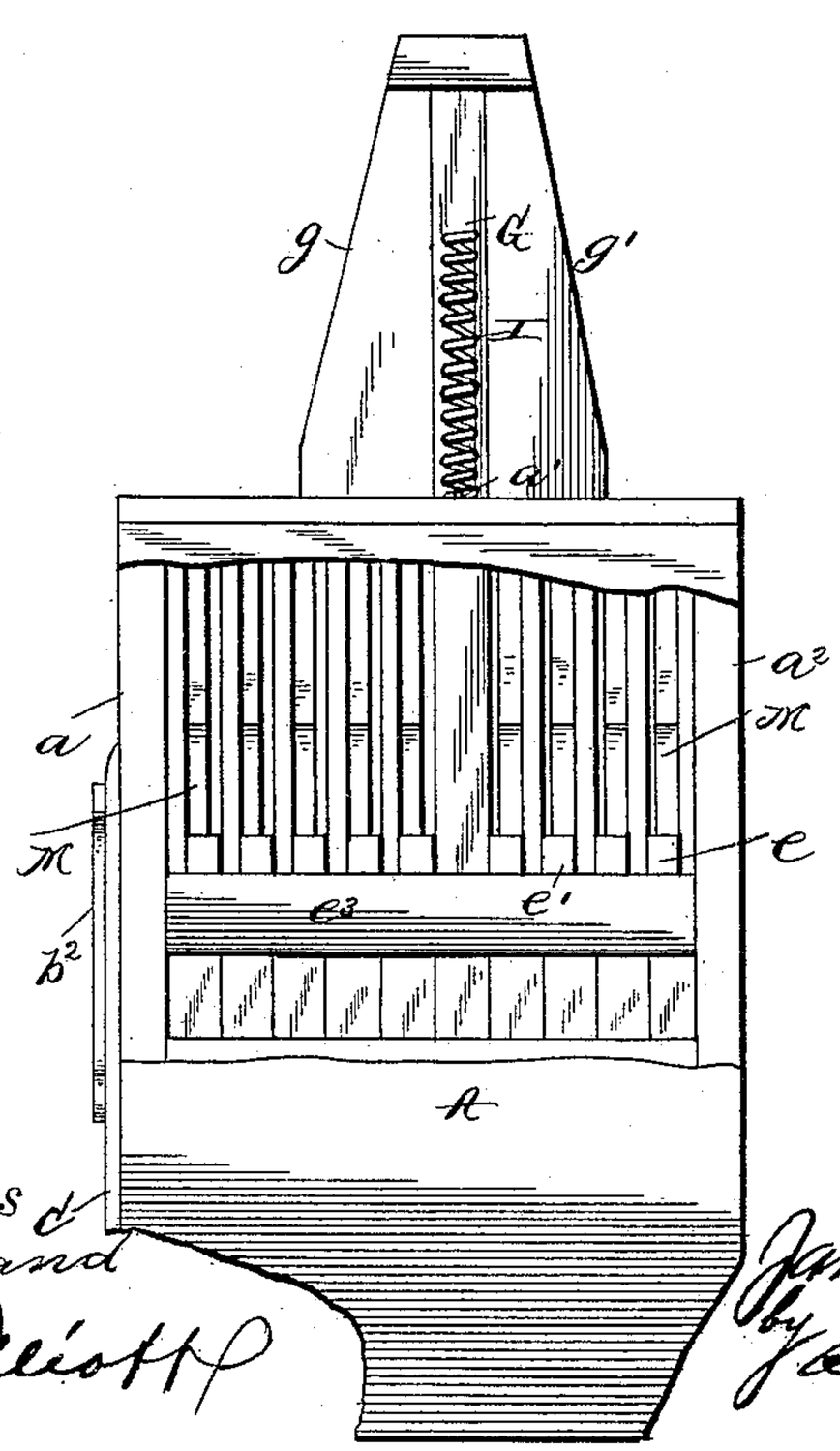


Fig 9



WITNESSES
F. L. Durand
R. W. Elliott

INVENTOR
James C. Stinson,
by Louis Bagger & Co
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES C. STINSON, OF PARIS, TEXAS, ASSIGNOR OF ONE-THIRD TO JOSEPH K. BYWATERS, OF SAME PLACE.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 405,924, dated June 25, 1889.

Application filed July 10, 1888. Serial No. 279,591. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. STINSON, a citizen of the United States, and a resident of Paris, in the county of Lamar and State of Texas, have invented certain new and useful Improvements in Adding-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to adding-machines.

The object is to produce an adding-machine which, while being constructed of but comparatively few parts, will be so adjusted and arranged as to allow an operator to make rapid and correct calculations; furthermore, to produce an adding-machine in which the operator will be enabled to detect immediately any mistake which he may have made, and, finally, to produce a simple, efficient, and effective adding-machine.

With these objects in view the invention consists in the novel construction and combination of parts of an adding-machine, as will be hereinafter fully described in the specification, illustrated in the drawings, and pointed out in the claims.

In the accompanying drawings, forming part of this specification, and in which the same letters of reference indicate the same or corresponding parts, I have illustrated one form of device embodying the essential features of my invention, although the same may be carried into effect in other ways without in the least departing from the spirit thereof, and in these drawings Figure 1 is a perspective view, with one side cut away, showing the internal construction of the device. Fig. 2 is a longitudinal sectional view showing the keys and the stops for regulating the movement of the hand or pointer, and mechanism for producing a certain sound when the keys are struck, so as to enable an operator to be able to determine by sound as well as by sight whether he has struck the correct key. Fig. 3 is a transverse sectional view showing more clearly the stops and the spring for engaging the ratchet-wheel that operates the hand or pointer. Fig. 4 is a side elevation showing the dials for registering the result of any calculation. Fig. 5 is a side elevation of a portion of one side of the casing, taken from the side opposite that shown in Fig. 4, showing the mechanism for operating the hundreds-dial, and also the friction device for preventing the ratchet-wheel from reversing when the keys are resuming their normal position. Fig. 6 is a top plan view with the casing removed, showing the mechanism for preventing the spring engaging a greater number of teeth on the ratchet-wheel than is desired. Fig. 7 is a detail view of one of the keys, showing a stop at one end to prevent the hand or pointer being carried too far when the key is struck suddenly by the operator. Fig. 8 is a detail view of the spring for engaging the teeth on the ratchet-wheel, and Fig. 9 is an end view showing more particularly the guide connecting with the universal bar for causing it to operate in a certain and positive manner.

Referring to the drawings, A designates the casing of the machine, which may be made in any shape and of any material desired. Within this casing, and mounted upon a suitable shaft *b*, having bearings formed in the side of the casing, is a ratchet-wheel B, the end *b'* of the shaft extending through the side *a* of the casing, and having secured at its end a hand or pointer b^2, which, when operated, revolves over a dial C, on which figures are placed consecutively from 1 to 100. The inner portion of this dial is cut away, as shown at *c*, so as to allow the operator to be able to see the smaller dial D, which registers the hundreds, this smaller dial also having a pointer *d* revolving over it.

Directly above the ratchet-wheel B, and mounted upon a common bearing E, are a number of keys *e*, upon which are placed raised numbers, ranging from 1 to 9, the object in having them raised being to enable an operator to distinguish by his sense of touch whether the proper key has been struck. The shanks or stems *e'* of the keys extend back and rest upon a cross-piece e^3, secured to the rear portion of the frame and beneath the universal bar F, secured to an upright G, the said universal bar operating the ratchet-

wheel to cause the hands on the dials to move. The mode of operating this portion of the mechanism is as follows:

At a point below the universal bar, and secured to the upright G, is a flat spring H, the lower portion of which is cut out to form a longitudinal slot *h*, in which a portion of the periphery of the ratchet-wheel moves. This spring is constructed with two ears h^2, by which it is secured to the upright, and the lower portion is bent out, as shown at h^3, at a point where the slot terminates, so as to form a face for engaging the teeth on the ratchet-wheel. The upper end of this spring forms a shoulder h^4, against which rests a spring h^5, secured to the upright and bearing upon the said shoulder, thereby causing it to engage the teeth on the ratchet-wheel. The upper end of this upright extends up, as shown, and works between the guides formed by the two upright pieces *g g'*. At a point near the top of the upright G is secured a coiled spring I, rigidly attached at its lower end to the top of the casing A, as shown at *a'*. Now it will be seen that when one of the keys *e* is pressed down the end of the shank *e'* bears against the universal bar F and raises it, and with it the spring H, the distance that the wheel is turned being equivalent to the number on the key; or, in other words, if the key is numbered 4, the distance that the wheel will revolve will be equivalent to the distance between four of the teeth. As soon as the key is released, the spring I draws the universal bar F back into position, and with it the key. It will be observed that these guides *g'* tilt inward. The object for constructing them in this manner is that when the keys are raised the under surface of the universal bar F will be prevented from slipping, and thus generating a certain amount of friction, which would be the case should the upright work vertically. If desired, this guide may move in the arc of a circle, so that the end of the shank, instead of slipping when the universal bar reaches a certain point, will be allowed to rock thereon, and thus prevent undue friction.

It is desirous to so arrange the keys that the length of their stroke will be just sufficient to cause the hand or pointer to revolve just the number of figures that the key is marked. In order to accomplish this, the following mechanism is employed:

To the rear portion a^2 of the casing are secured a number of stops J, in the sides, preferably, of which are cut recesses *j* of unequal length, the slot which the shank of the key numbered 1 engages being shortest, and the one that the shank of the key numbered 9 engages being the longest. At the upper and lower ends of these stops are cut longitudinal slots *j'*, through which pass screws j^2, for holding the said stops in proper position within the casing. Thus when the key is pressed down the distance between the upper and lower faces j^3 j^4 on the recesses will be equivalent to the distance between the number of teeth on the wheel corresponding to the key that is pressed down. Now in adjusting this device should it be found that when the key is struck it will carry the hand or pointer either too far past the given figure or not quite to it, the stroke of the key may be adjusted to a nicety by simply loosening the screws j^2 and moving the stops either up or down.

It has been found in practice that should the operator strike the key a sharp blow the universal bar will be thrown up too far to allow the hand to register accurately, and in order to obviate this difficulty an arm K, provided with a hook *k*, is secured to each of the keys, and is inclined slightly forward, so that when the keys are raised they will move in the arc of a circle. Now it will readily be seen that when the key is pressed and has reached the end of its upward stroke the hook K will engage the upper edge of the universal bar F, and thus prevent it from going farther than is necessary to move the ratchet-wheel the number of teeth desired; but while this means is adopted to prevent the universal bar from going too far, it will be necessary to adopt a certain and effective device for preventing the ratchet-wheel from turning too far independent of the universal bar—as, for instance, if the shaft on the ratchet-wheel worked loosely within the bearings and the key were to be struck a quick and hard blow, while the universal bar would be stopped and prevented going too far, still the ratchet-wheel from the velocity imparted to it might pass the given limit. In order to correct this and effectively guard against such an accident, a stopping device is secured within the casing and above the keys, and is so arranged that when the key has reached the limit of its upper stroke a pawl will engage the teeth on the ratchet-wheel and at the same instant that the spring H ceases to operate. In order to accomplish this result, I pivot a lever L within the casing, the trunnions *l* of which rest in suitable bearings in the casing. (See Fig. 6.) This lever may be made in any shape; but that shown in the drawings is preferred on account of its lightness and simplicity of manufacture—that is, made in the form of an oblong frame having on one side an arm *l'*, provided at its end with a pawl l^2, designed to engage the teeth on the ratchet-wheel. To each of the keys *e* is secured an upright e^2, designed to strike against the rear portion of the lever L when the key is pressed down, and thus force the pawl l^2 down into the teeth on the ratchet-wheel. These arms e^2 vary in length and are the reverse of the recesses *j*—that is, the arm *i* on the key marked 1 being the longest and the one on the key marked 9 being the shortest, for the reason that the first-named key only has to travel one-ninth the distance of the last-named key in performing its function. Consequently if the arm were not longer the ratchet-wheel

might escape past the point at which it is desired to be stopped before the pawl l^2 would strike the teeth.

I spoke in the first part of this specification of certain mechanism which can be operated by means of the keys to cause a particular sound to be made, whereby the operator could, after a little practice, operate the device as well in the dark as in the light by training his ears to distinguish between the given sounds.

In carrying this part of the invention into effect I pivot a block M within the casing and just within reach of the end e^4 of the keys e. To the upper side of this block are secured a series of metallic springs m, (only one being shown,) each having secured at its upper end a hammer m', and at a point in close proximity to these springs are secured a series of bells m^2, (only one being shown,) which will produce a series of different tones as the different keys are struck. Now it will be seen that should these different tones be the same as a scale—that is, one being C, two D, three E, and so on—and if the operator should strike the key 1 he will be enabled to know immediately by the sound the number of the key he has struck.

N designates a cam secured to the shaft b within the casing, upon the periphery of which bears a spring O, designed to prevent the ratchet-wheel from turning too rapidly. This cam serves to operate the hundreds hand or pointer d on the hundreds-dial D. The manner in which this latter is accomplished is as follows:

P designates a spur-wheel, which is mounted within the casing upon a shaft p and provided with ten arms or teeth p', designed to be engaged by a pin n' on the cam N. On the outer end of the shaft p is secured the smaller pointer d, before referred to, which revolves over the dial D. It will be seen at a glance that as the cam is revolved by the ratchet-wheel B and reaches the point n the pin n' engages with one of the teeth or arms p' and turns the hand on the hundreds-dial one point, and as this is accomplished the spring O slips from the point n and strikes on the cam, thus serving to give notice to the operator that one hundred has been counted on the machine.

It will thus be seen that although this device is exceedingly simple of construction it will be found highly efficient, durable, and accurate in use, and may be constructed at a figure far below any adding-machine at present on the market; also, by the arrangement of its different parts it will be impossible for it to get out of order, for the reason that no intricate or delicate mechanism is employed in its construction.

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

1. In an adding-machine, the combination of a series of keys pivoted upon a common bearing, a number of stops, and means for separately adjusting each stop to regulate the stroke of the keys, an upright, and guides secured to the casing, in which the said upright moves, a universal bar secured to the upright and resting upon the shanks of the keys, a ratchet-wheel, and a spring-pawl secured to the upright and engaging the teeth on the ratchet-wheel to operate the same, substantially as described.

2. In an adding-machine, the combination of the casing, guides secured thereto, an upright working in the guides, a universal bar secured to the upright, a number of keys pivoted within the casing, upon the shanks of which the universal bar rests, a ratchet-wheel, and a spring-pawl secured to the upright, the lower end of which spring-pawl is provided with a longitudinal slot through which a portion of the periphery of the ratchet-wheel moves, substantially as and for the purpose specified.

3. In an adding-machine, the combination of the casing, guides secured thereto, an upright working in the guides, a universal bar secured to the upright, a number of keys pivoted within the casing, upon the shanks of which the universal bar rests, a ratchet-wheel, and a spring-pawl secured to the upright, the lower end of which spring is provided with a longitudinal slot through which a portion of the periphery of the ratchet-wheel moves, and a spring secured to the upright and the casing to cause the universal-bar to resume its normal position after being operated by the keys, substantially as and for the purpose specified.

4. In an adding-machine, the combination of the casing, a series of keys pivoted upon a common bearing within the same, an upright and guides secured to the casing, in which the upright moves, a universal bar secured to the upright and resting upon the shanks of the keys, and arms secured to the said shanks, the upper ends of which arms are provided with hooks to engage the universal bar, substantially as and for the purpose specified.

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

JAMES C. STINSON.

Witnesses:
BENNETT S. JONES,
ROBERT M. ELLIOTT.