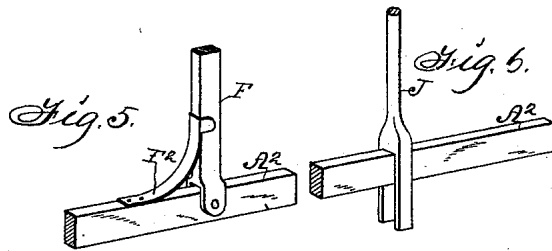
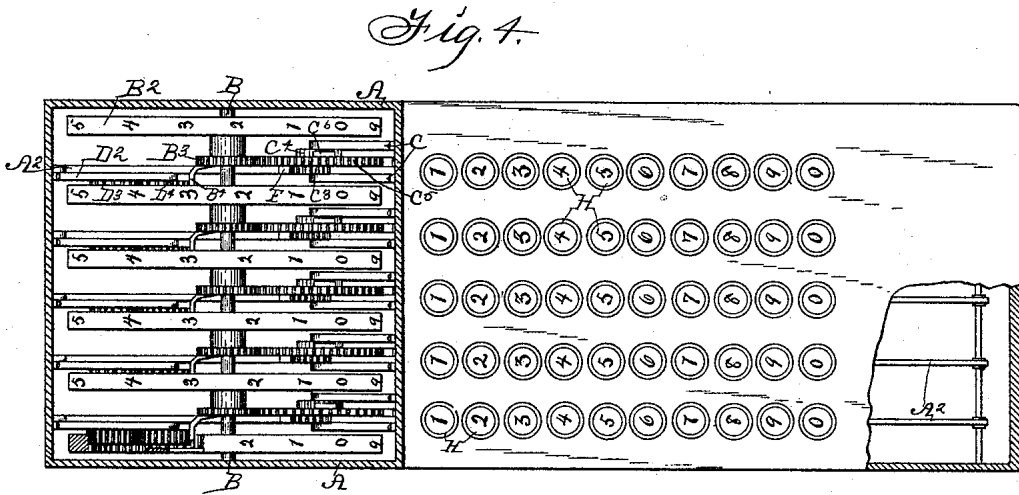
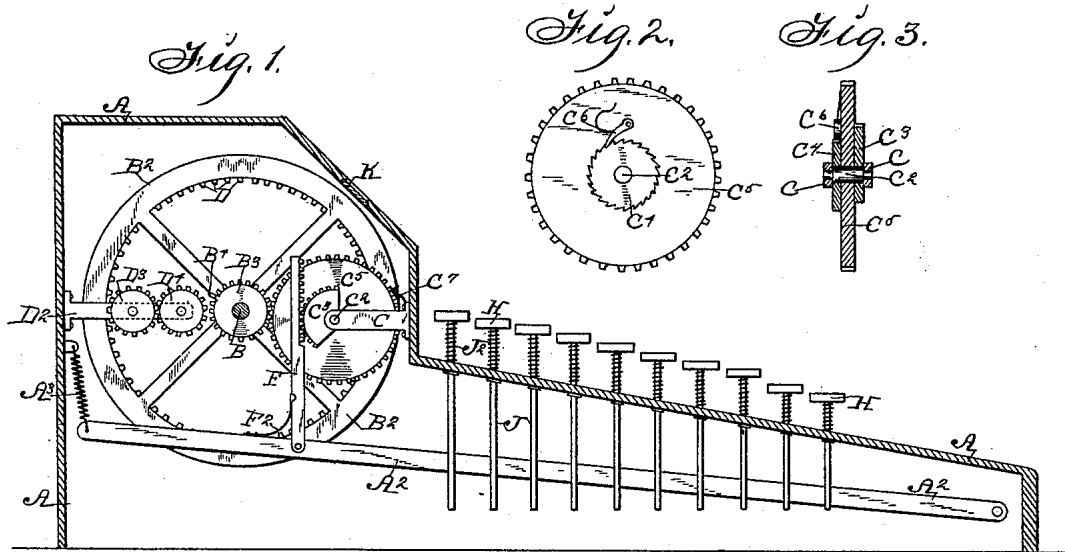


(No Model.)

T. A. TRENT, Jr.  
ADDING MACHINE.

No. 508,450.

Patented Nov. 14, 1893.



Witnesses:  
J. Ralph Orwig.  
A. S. Boyd

Inventor: Thomas A. Trent, Jr.  
By Thomas G. Orwig, Attorney.

# UNITED STATES PATENT OFFICE.

THOMAS A. TRENT, JR., OF DES MOINES, IOWA.

## ADDING-MACHINE.

**SPECIFICATION** forming part of Letters Patent No. 508,450, dated November 14, 1893.

Application filed November 28, 1892. Serial No. 453,429. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS A. TRENT, Jr., a citizen of the United States of America, residing at Des Moines, in the county of Polk and State of Iowa, have invented an Improved Adding-Machine, of which the following is a specification.

My object is to provide a cheap, simple and durable adding machine which shall be capable of easy and accurate operation and which shall occupy a minimum of space; and my invention consists in the construction, arrangement and combination of the various mechanical elements constituting the device as herein-after set forth, pointed out in my claims and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal sectional view of complete machine. Fig. 2 is an enlarged detail side view of a part of the operative mechanism. Fig. 3 is a transverse sectional view of the same. Fig. 4 is a top or plan view of the complete machine with parts of the casing removed to show the operative mechanism. Fig. 5 is an enlarged detail perspective view of one of the operating levers and a portion of one of the racks pivotally connected therewith and a spring to engage the rack and Fig. 6 is an enlarged detail view of one of the operative levers and the lower end of one of the keys connected therewith.

Referring to the accompanying drawings A designates the inclosing casing of the operative mechanism.

A<sup>2</sup> designates levers pivoted in the forward portion of the casing and extending rearwardly longitudinally thereof. Connected with their rear end portions are the coil springs A<sup>3</sup> to normally hold them to the upward limit of their stroke. Extended horizontally through the rear portion of the casing is an axle B and loosely mounted upon that axle are a plurality of registering disks B<sup>2</sup> having broad edges upon which at regular distances apart are placed numerals ranging from 0 to 9, and attached to the hub of each of these disks is a pinion B<sup>3</sup> which has a tooth B<sup>4</sup> projecting outwardly from its side for purposes hereinafter set forth.

C designates brackets secured to the casings A and adapted to support an axle C<sup>2</sup> in proximity to the pinions B<sup>3</sup>. There is one of these

axles C<sup>2</sup> to each of the registering disks, and two brackets are required for each axle as clearly shown in the drawings. Fixed to these axles are the segmental pinions C<sup>3</sup> and the ratchet wheel C<sup>4</sup>, and loosely mounted on the same axle between the segmental pinion C<sup>3</sup> and the ratchet wheel is a pinion C<sup>5</sup> which has a spring actuated pawl C<sup>6</sup> attached thereto and normally in engagement with the ratchet wheel C<sup>4</sup>. This pinion C<sup>5</sup> is in engagement with the pinion B<sup>3</sup> so that when the segmental pinion C<sup>3</sup> is moved the motion will be transmitted to the pinion C<sup>5</sup> through the instrumentality of the pawl and ratchet when rotated in the proper direction and this will advance the registering disk by reason of the pinion C<sup>5</sup> being in engagement with the pinion B<sup>3</sup>.

C<sup>7</sup> is a spring pawl normally in engagement with the pinion C<sup>5</sup> to prevent its accidental rotation.

The inner portion of each of the registering disks (with the exception of the first one on the right hand side) is provided with teeth D on the inner portion of its rim. D<sup>2</sup> designates brackets secured to the casing A, and D<sup>3</sup> and D<sup>4</sup> are two pinions journaled to each bracket and in mesh with each other. The one D<sup>3</sup> is normally in mesh with the teeth on the registering wheels B<sup>2</sup> and the other one D<sup>4</sup> is in position to be engaged by the tooth B<sup>4</sup> each time the pinion B<sup>3</sup> is rotated one complete revolution. These parts are so arranged relative to each other that each time the pinion B<sup>3</sup> makes a complete revolution the tooth B<sup>4</sup> by engaging the train of gear wheels will move the next registering wheel to the left of the pinion B<sup>3</sup> just one-tenth of a revolution.

Motion is imparted to this mechanism as follows:

F designates racks one of which is pivotally connected with each of the levers A<sup>2</sup> and normally held in engagement with the segmental pinions C<sup>3</sup> by means of the springs F<sup>2</sup> which are fixed to the levers A<sup>2</sup> and their free ends impinge the racks. It will now be obvious that the distance the registering disks will be rotated is regulated by the length of stroke imparted to the rack F.

H designates rows of keys in the casing or frame arranged longitudinally above each of the levers A<sup>2</sup> and having ten keys to each

row with digits marked upon each key ranging from 1 at the top of the row to 0 at the lower end thereof.

J designates the key stems extending downwardly through the casing and bifurcated at their lower ends to be placed astride the levers A<sup>2</sup>.

J<sup>3</sup> are coil springs encircling the stems J and impinging the casing and the keys to normally hold them elevated. These keys are so arranged that each will have a sufficient amount of vertical movement, and by reason of the differences in distance from the pivotal point of the lever a depression of the keys nearest to the pivotal point of the lever and bearing numerals of greater value will move the free end of the lever a greater distance than a depression of the keys farther from the pivotal point bearing the numerals of smaller denomination. The relative distances which these various keys will move the lever A<sup>2</sup> is graduated as follows. A depression of the first key at the head of the column will move the lever a sufficient distance to rotate the registering wheel the distance between two of the numerals marked thereon. A depression of the key number 0 will move the registering disk one complete revolution.

K designates an elongated opening formed in the casing immediately above the registering disks and of such a width as to reveal but one of the digits upon each disk.

In the machine shown there are five rows of keys the first from the right representing units, the second tens, the third hundreds, and so on, so that numbers in the tens of thousands may be registered. It will be readily seen that the numbers of rows may be increased or diminished without departing from the spirit of my invention.

The practical operation of the machine is as follows:—Assuming that a column of figures were to be added, the keys are depressed which correspond with the various digits of said number each digit in the column which corresponds with its denomination, and each time that numbers in any column whose sum total amounts to ten or more are depressed the next registering disk to the left is moved the distance between two of the numbers on the periphery of the disk by means of the tooth B<sup>4</sup> engaging the train of gear wheels in mesh with the teeth on the inner portion of the rim of the registering disk. For example assuming that the numbers 175 and 684 are to be added—the following keys are depressed in the order stated: key No. 1 in the third or hundreds column; key No. 7 in the second column or tens, and key No. 5 in the first or units column. This will rotate the third disk sufficiently to bring the 1 on the periphery thereof into coincidence with the opening H in the casing. The second disk will show 7, and the first 5. The key No. 6 in the third or hundreds column is then de-

pressed which it will be obvious will bring the numeral 7 on the third disk into coincidence with the opening H. Key No. 8 in the second column is then depressed and the second disk is rotated sufficiently to perform one complete revolution and cause the tooth B<sup>4</sup> connected with the second disk to engage the third disk and cause it to rotate one-tenth of a revolution and bring the numeral 8 of said third disk to appear at the opening H, and the numeral 5 on the second or tens disk to appear at said opening, and a depression of key No. 4 in the first or units column will cause the numeral 9 to appear at the opening H.

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

1. In an adding machine, the combination of the following elements, to wit: a plurality of disks loosely mounted upon a suitable axle and having numerals marked upon their outer peripheries at regular distances, and teeth formed on their inner peripheries, a pinion B<sup>3</sup> connected with the hub of each disk and a tooth B<sup>4</sup> projecting from each of said pinions, two pinions D<sup>3</sup> and D<sup>4</sup> to each disk mounted in a suitable support in mesh with each other and the outer one in mesh with the internal peripheral teeth of the said disk and the inner one in the path of the tooth B<sup>4</sup> of the next pinion B<sup>3</sup> to the right, arranged and combined substantially as and for the purposes stated.

2. In an adding machine the combination of the following elements, to wit: a suitable casing, an axle extended transversely therethrough, a plurality of disks loosely mounted thereupon and numbers upon the peripheries of the disks, a pinion B<sup>3</sup> having a tooth B<sup>4</sup> connected with each of the said disks as set forth, axles mounted in suitable supports in alignment with each of the pinions B<sup>3</sup>, a pinion loosely mounted on each of said axles in mesh with the pinions B<sup>3</sup>, a ratchet wheel fixed to each axle at the side of said pinions, a spring actuated pawl attached to the pinion to engage the ratchet wheel, a segmental pinion attached to each axle, a rack in mesh with each pinion, a lever pivotally connected with each rack, a spring to hold the rack in close engagement with the pinion, a rod running through the casing to which the said levers are pivoted, and a spring to normally hold the levers elevated, spring actuated keys to operate the levers, and the pinions D<sup>3</sup> and D<sup>4</sup> mounted on suitable supports and in mesh with each other and one of them in mesh with the teeth on the interior of the rims of the registering disks and the other in position to be engaged by the tooth B<sup>4</sup>, all arranged and combined substantially in the manner set forth for the purposes stated.

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Witnesses:

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