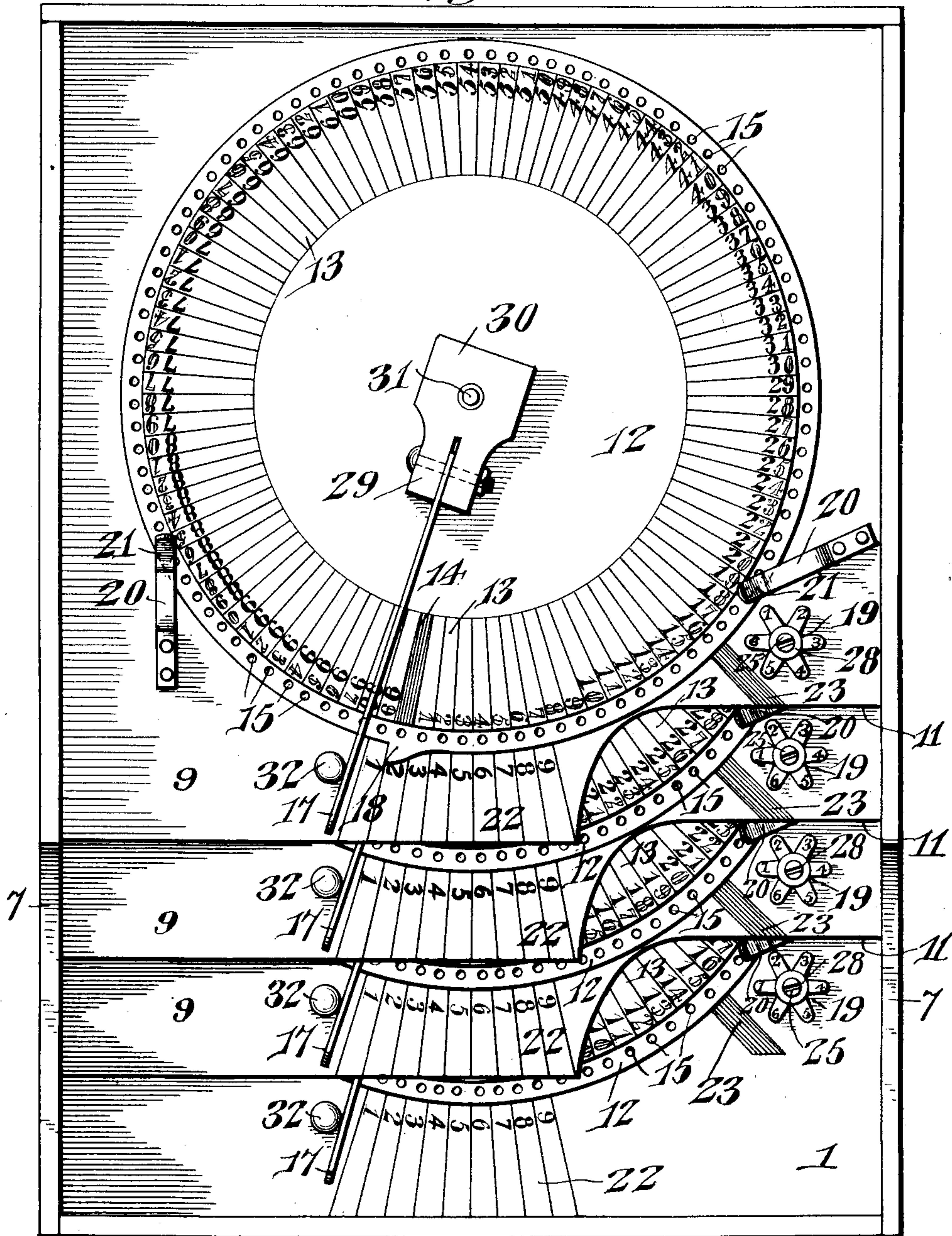


Fig. 1.



Witnesses

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997,065.

C. L. KELLEY.  
 ADDING MACHINE.  
 APPLICATION FILED APR. 21, 1910.

Patented July 4, 1911.

3 SHEETS—SHEET 2.

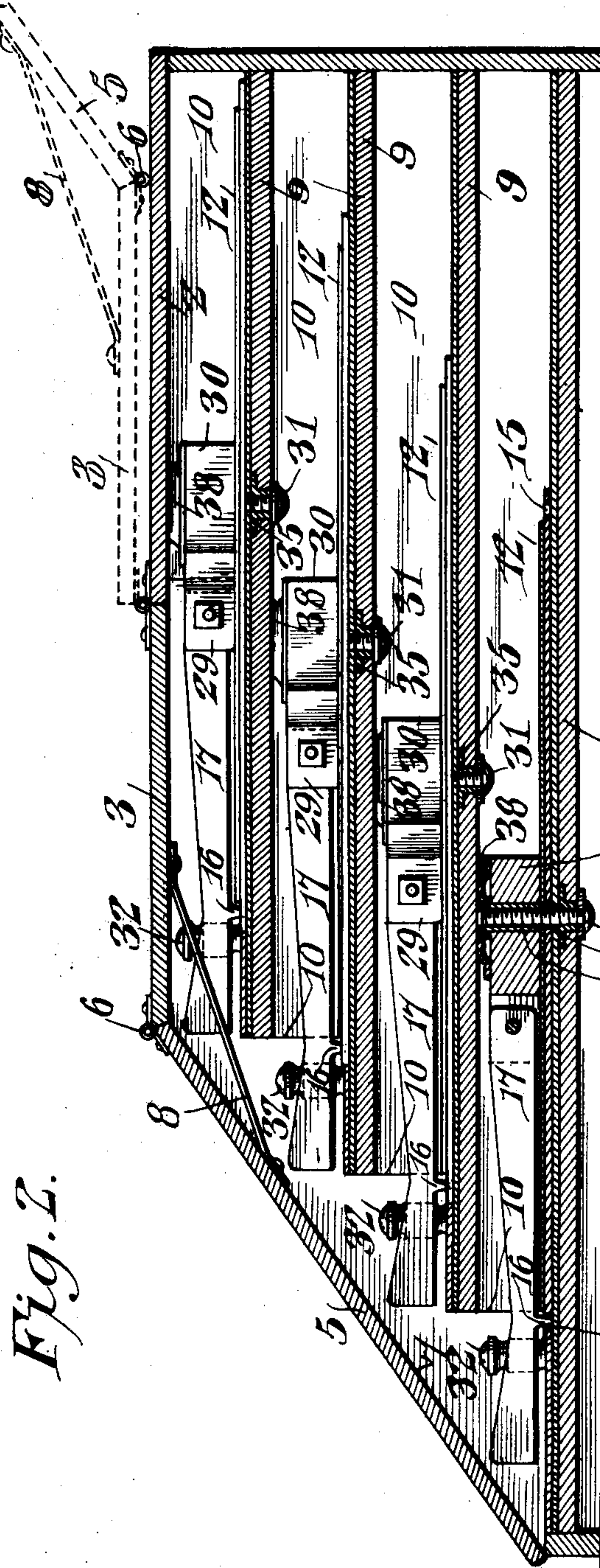


Fig. 2.

Fig. 8.



Fig. 7.

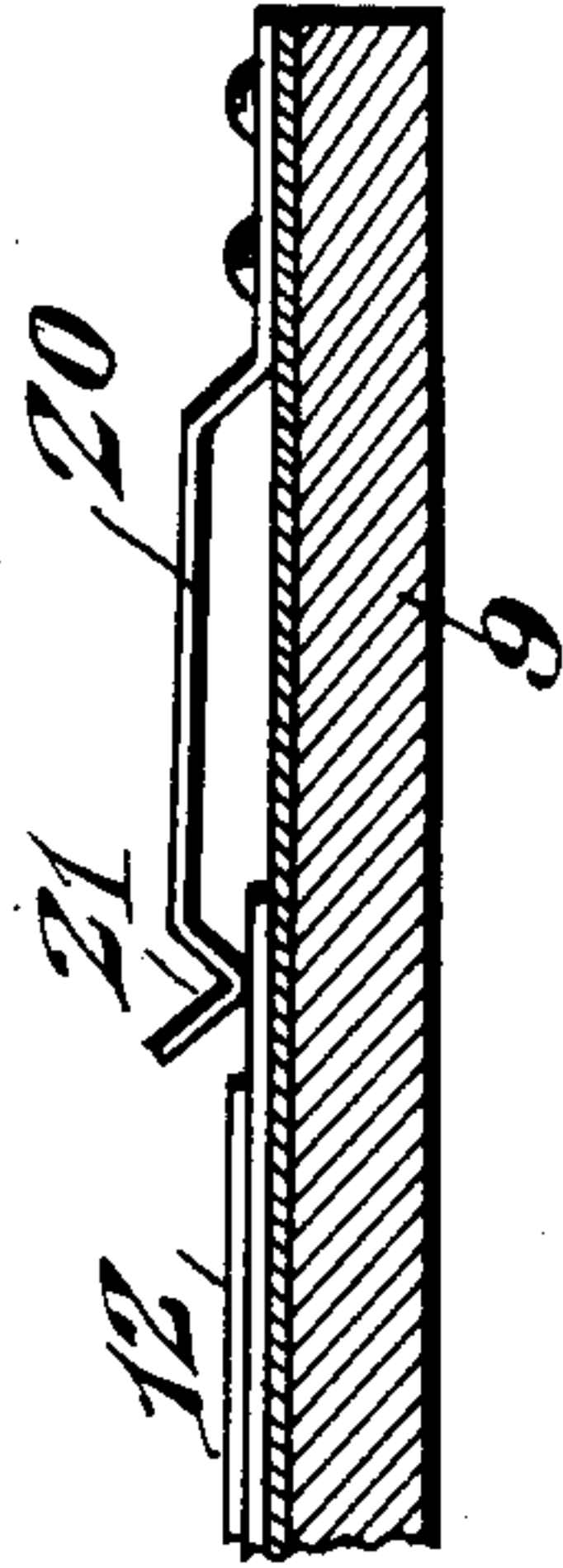
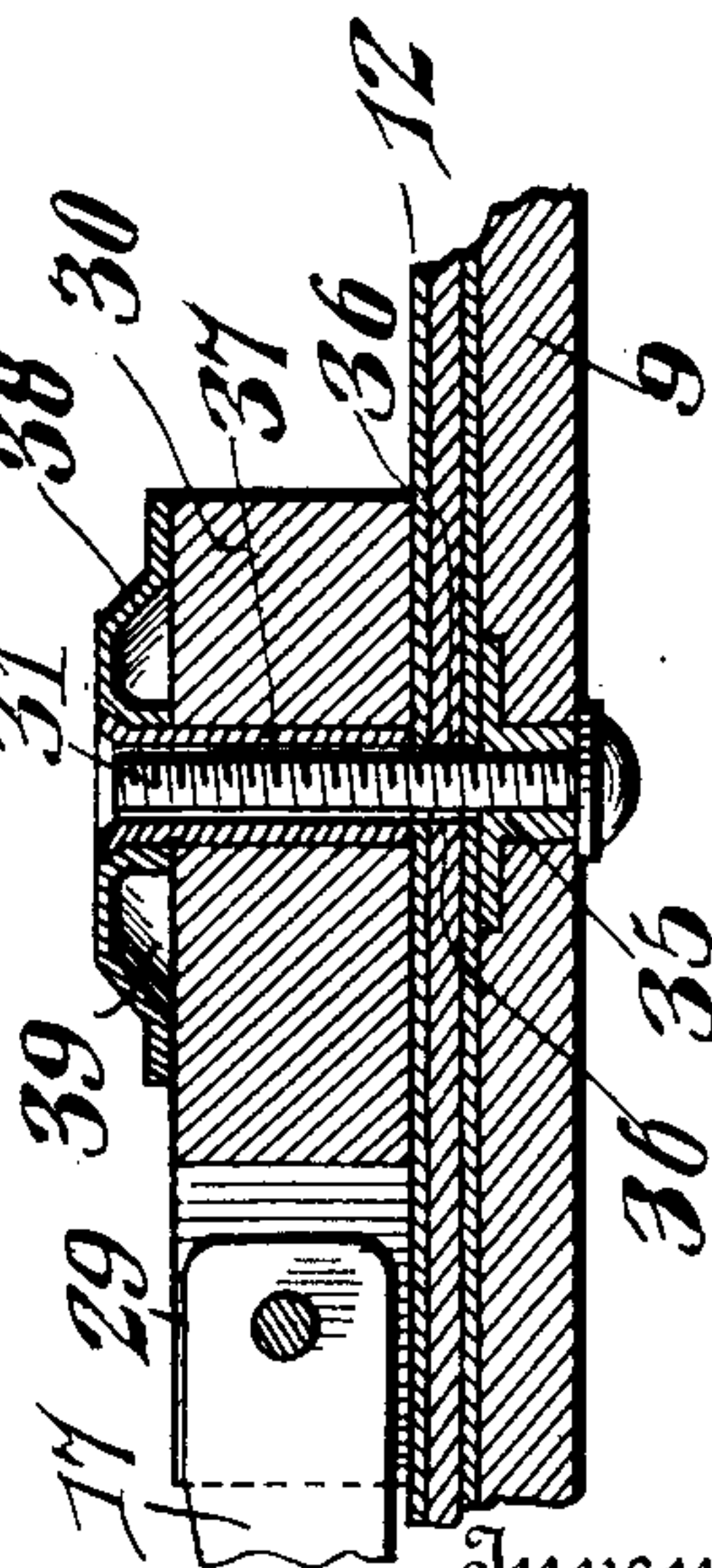


Fig. 4.



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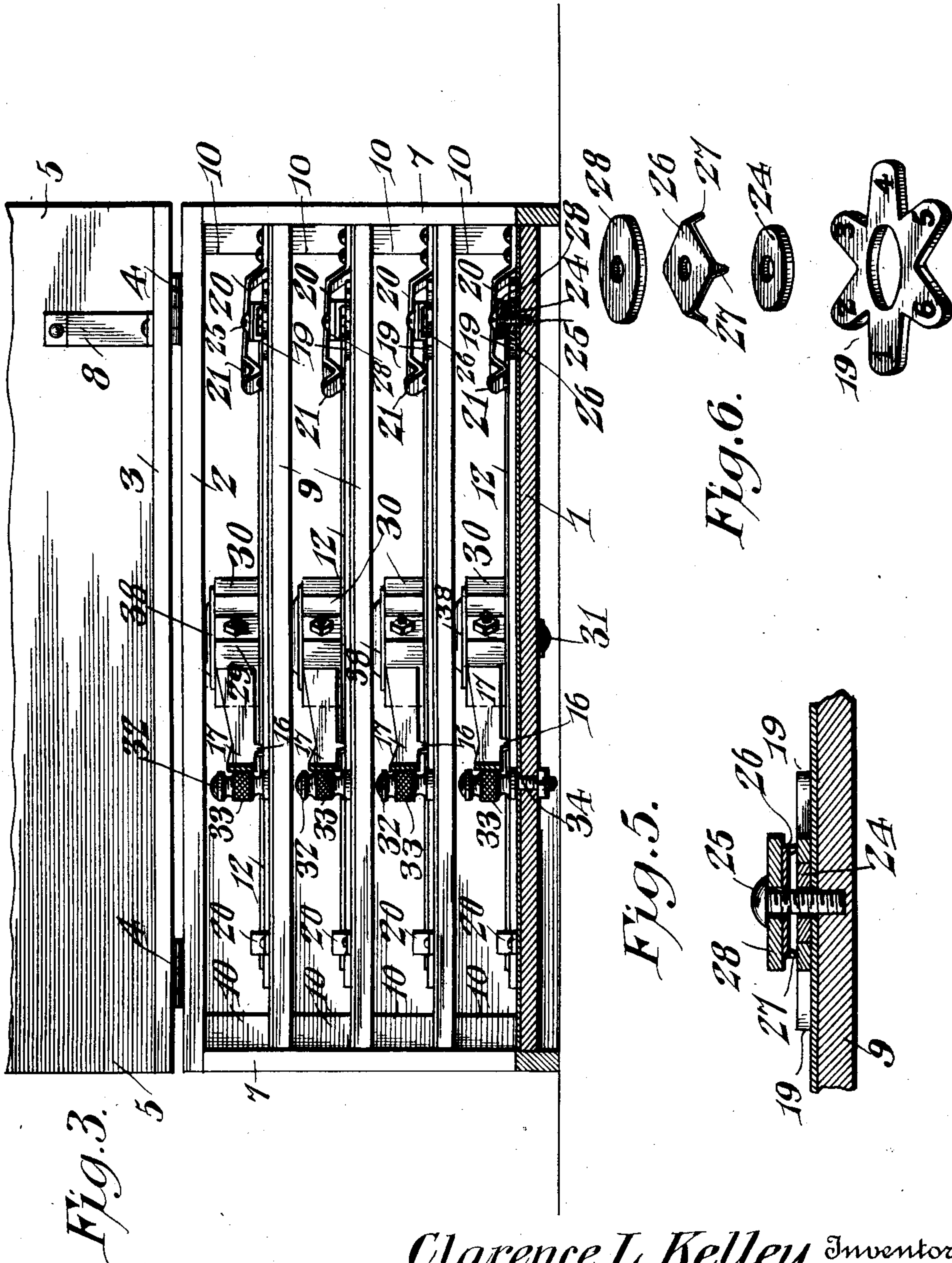


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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

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## ADDING-MACHINE.

997,065.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed April 21, 1910. Serial No. 556,767.

*To all whom it may concern:*

Be it known that I, CLARENCE L. KELLEY, a citizen of the United States, residing at St. Paris, in the county of Champaign and State of Ohio, have invented a new and useful Adding-Machine, of which the following is a specification.

This invention relates to adding machines, and has for its object the provision of a simple mechanism whereby columns of figures may be rapidly added so that the sum of the figures may be quickly and accurately obtained, and which may be operated by any person without liability to an error.

One object of my invention is to provide a device for the stated purpose which will occupy but small space and will be so constructed that broken or worn out parts may be quickly repaired or renewed without necessitating the provision of an entirely new machine.

A further object of the invention is to provide a device which will be of substantial and durable character and which will respond readily to the actuating impulses exerted by the operator in adding figures.

All these objects, and such other objects as will hereinafter incidentally appear, are attained in the use of the device illustrated in the accompanying drawings, and the invention consists in certain novel features of the same which will be hereinafter first fully described and then more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a plan view of my improved adding machine, the top or cover being removed. Fig. 2 is a central longitudinal section of the machine, the cover being shown closed in full lines and raised in dotted lines. Fig. 3 is an end elevation partly in section of a machine constructed in accordance with my invention. Fig. 4 is an enlarged detail section of the pivotal support for one of the operating levers. Fig. 5 is an enlarged detail section through the axis of one of the star wheels. Fig. 6 is a detail view in perspective showing the parts of the star wheel separated and in their proper relative positions. Fig. 7 is a detail view of one of the spring fingers by which the counting disks are held in position upon the base plates or shelves. Fig. 8 is a detail perspective view of one of the operating levers.

Referring to the drawings, there is shown

a box or casing 1 with a top comprising a fixed section 2 and a section 3 connected to the section 2 by hinges 4, so that it may be turned back upon the section 2, as indicated in dotted lines, Fig. 2. The section 3 has an extension 5 connected thereto by hinges 6 designed to rest upon beveled edges 7 of the side walls of the casing at what may be termed the front of the casing. The section 5 is connected to the section 3 by a bar or bracket 8, so that when the cover of the box, comprising the members 3 and 5, is folded back upon the member 2 the member 5 is held in an inclined position convenient for the support of papers upon which may be written the columns of figures, the sum of which it is desired to ascertain.

Within the box or casing 1 are a series of superposed supports or shelves 9 in spaced relation one to the other with what may be termed the front edges progressively stepped back from the front of the casing, so that these edges are presented in spread-count order, each shelf overlying the major portion of the shelf under it and presenting to view only a comparatively small portion of the front edge of the shelf. These several shelves are supported upon cleats 10 fast to the side walls of the casing 1. When the shelves are introduced into the casing they are moved upon the cleats 10 until they engage the back wall of the casing and as each shelf is shorter than the next shelf thereunder, the exposed front edges are displayed in spread-count order as stated. The front edge of each shelf is cut away for a distance back from the front edge of the shelf, as indicated at 11. The bottom of the casing has the same relation to the shelf immediately above it as the shelves have one to the other and for the purposes of the present invention the bottom of the casing may be treated as a shelf.

The bottom of the casing and each shelf in order thereover has pivotally mounted thereon a counting disk 12 centesimally divided into equal spaces 13 about its periphery, these spaces extending for a suitable distance radially toward the center. In the divisions 13 are produced numerals running consecutively from one to ninety-nine, while the division which would count one hundred is utilized as the zero space and is accentuated by having produced therein a color contrasting with that of the disk, this zero space being indicated at 14.



For purposes of differentiation all the digit numbers of the disk counting units may be of one shade or color and all those of a higher order, the numbers representing  
 5 tens, are of another shade or color. Preferably the digits counting units are inscribed in red and those counting tens are inscribed in black, and these contrasts are indicated in the drawing, Fig. 1, by light and heavy  
 10 numerals, respectively.

In each disk adjacent its edge and corresponding with the several divisions indicated on the disk are perforations 15 arranged in a circular series, these perforations being engageable by a point or spur  
 15 16 on one edge of an operating lever 17, there being such a lever for each disk. There is also formed on each disk a tooth 18 in radial line with the zero space 14 and  
 20 this tooth is designed to actuate a star wheel 19 mounted on the respective shelf 9 or upon the bottom of the casing, in accordance with the particular disk 12 under consideration, the arrangement being such that at each  
 25 complete rotation of the disk 12 the star wheel will be moved one step.

The counting disks 12 are each engaged at their peripheral portion by leaf springs 20 secured upon the support of the disk,  
 30 and each leaf spring has a substantially V-shaped lip 21 at its free end bearing upon the surface of the disk remote from the supporting shelf. These springs 20 act in the nature of elastic friction brakes, which,  
 35 however, will not interfere in any manner with the movement of the counting disks under the influence of the operating levers, but will exert sufficiently frictional pressure upon the disks to prevent the latter slipping  
 40 from the position to which they may have been brought in the operation of the device. In the particular instance shown two such elastic position retaining members 20 are provided for each disk, and these members  
 45 are sufficiently spaced apart for effective operation.

On the bottom of the casing and on each shelf at the displayed front portion thereof and to one side of the cut away portion of  
 50 each shelf there is produced a series of divisions 22 radial to the axis of rotation of the respective disk and in extent sufficient to contain the digits 1 to 9 in regular order. There is further produced upon the bottom  
 55 of the casing and upon each shelf in order so as to be visible through the cut away portion of the shelf immediately thereover an index 23 designed to mark the starting or zero point of the respective counting disk.  
 60 The star wheel 19 and index markings 20 may be adjacent, so that the tooth 18 may cause the actuation of a star wheel at the same time it is brought to the zero position, considering the respective counting disk as  
 65 being turned progressively in the proper di-

rection, such direction of movement being clockwise as viewed in Fig. 1. While the index marking 23 may be of any suitable character, it may be conveniently made in the form of a wide dash or line in a con-  
 70 trasting color with the surface of the shelf and of a width corresponding to the width of the zero space 14 and disposed radially to the respective disk 12.

The cut away portion 11 of each shelf ex-  
 75 poses only a very limited portion of the underlying disk 12, so that the eye of the operator is not confused by the display of a large circular series of visible numbers but will quickly seek the index 23 for each disk  
 80 12 and by arranging the shelves and disks in spread-count order the eye readily travels from one index marking 23 to the next without liability of confusion.

The star wheel 19 may, of course, have  
 85 any desired number of points and the points have displayed upon them visible numbers arranged in consecutive order. The star wheel is shown as a plate with equi-distantly  
 90 disposed radial arms and a central opening filled in by a washer or bearing plate 24 through which is passed a securing screw 25, also carrying a presser plate 26 having at the corners teeth or points 27 caused to  
 95 bear against the surface of the star wheel by a washer 28 between said pressed plate and the head of the screw. By this means the star wheel may be rotated about the screw  
 25 as an axis, but because of the frictional engagement of the parts the star wheel will  
 100 maintain any position to which it may be turned.

Each operating lever 17 is pivoted at one end between arms 29 extending from a block  
 105 30 mounted to turn upon a pivot 31 constituting the pivot of the counting disk, and movement of the lever 17 and the block 30 with it about the pin 31 is limited in one direction by a stop 32 related to the divi-  
 110 sions 22 and located on a respective shelf 9 or the bottom when at the initial end of the series of divisions 22. While the stop 32 is shown in the form of a milled head 33 mounted upon a threaded shank or bolt 34  
 115 secured to the support for the stop, such construction is not mandatory.

The pivot 31 is shown as a screw of suitable length extending through a bushing  
 120 35 fast in the support, whether such support be the bottom of the casing or one of the shelves 9, and the pivot screw which is threaded for passage through the bushing 35 extends freely through a central opening 36 in the respective disk 12 and through  
 125 a sleeve 37 traversing the respective block 30, while upon that face of the block remote from the disk 12 there is lodged a disk 38 which may be dished, as indicated at 39, to impart to the disk a greater effective thick-  
 130 ness than that of the metal of the disk and



the corresponding end of the sleeve 37 may be flared in the disk 38 to secure the same to the block 30. The disk 38 engages the under surface of a shelf 9 or the top 2, as the case may be, whereby the block 30 while permitted to turn upon the screw or pivot pin 31 is both spaced a short distance from the respective shelf 9, or the top 2, and is held with sufficient frictional force to prevent it moving except when purposely moved by a manipulation of its actuating lever 17.

While the pivot pin or screw 31 is shown as threaded throughout its length, this has no function other than that the pin is threaded for passage through the bushing 35, but screws like the showing of the pin 31 are commercial articles which may be more cheaply purchased on the market than would be the cost of pins partially threaded and partially plain were to be specially made.

By arranging the several disks and their supports in spread-count order, a sufficient portion of each disk is displayed for the purpose of indicating totals, while the rest of the disk is hidden from view to avoid confusion as might occur were all the numerals of the disk visible at one time, and, furthermore, all the disks may be exact duplicates and may be all formed by a single die and all the imprints necessary be made from a single type form, thus very materially cheapening the cost of production and facilitating repairs, if necessary, all the movable parts in any one compartment being duplicates of like parts in all the other compartments, while the utility of such an instrument for the addition of many numerals extending into the higher orders is brought about by the stepped or spread-count arrangement of the disks and their supports.

The superposed arrangement of the identical counting disks presents a very compact and readily manipulated adding machine capable of utilizing a large number of counting disks to represent respectively higher orders of numbers within a very limited area and with a minimum portion of the numbered surface of each disk visible, whereby liability of confusion is practically eliminated.

The manner of using my improved apparatus will be most readily comprehended by the statement of an example. Suppose it be desired to add the numbers 200, 2496, 3420, 9000, 600, 999. Beginning with the bottom number, the counting disks all having been brought to such position that their zero spaces will register with the index 23 on their respective supports, the operating lever of the lowest disk, which will count the units, is moved over the guide or index spaces 22 until it rests over the figure 9 in

said guide spaces. It is then lowered so that the spur 16 will engage the opening immediately thereunder in the edge of the counting disk and the lever is then swung to the left until it strikes the stop 32. The lever on the next upper shelf is then, likewise, manipulated as well as the third lever counting from the bottom. The lowest number, 999, will have then been registered by the counting disks, and the third lever corresponding to hundreds will then be moved to the space marked 6 in the guide spaces 22 and then marked against the stop 32. This movement will cause the division space marked 15 on the hundreds disk to be brought into registry with the index 23 on its support. In the same manner, the thousands disk is moved nine spaces and the other numbers in the stated example are added in the same manner. As a result of these several manipulations, the uppermost disk will have its space marked 14 brought into registry with the index 23, while the next lower disk will have its division marked 25 in that position, and likewise, there will appear 20 on the disk next to the bottom, and 15 on the lowest disk. To complete the operation, it is now necessary to carry the 1 of the 15, marked by the lowest disk, to the second disk by manipulating the operating lever in the described manner, thus making the second disk register 21. The 2 of this disk is in the same manner transferred to the third disk, making it 27, while the 2 of the third disk is carried to the top disk, making it mark 16. The result, 16,715, is then read by noting both digits appearing opposite the index 23 on the top disk and reading only those appearing in red on the lower disks.

From the foregoing description, it will be seen that I have provided an exceedingly simple machine by which long columns of figures may be rapidly and accurately added, whereby the footing of accounts may be rapidly accomplished. Every time a counting disk completes a revolution, the spur or tooth 18 on the edge of the same will be brought against one tooth of the star wheel 19 adjacent thereto and will actuate the said star wheel so as to bring a higher numbered tooth or point of the same adjacent the index 23, as will be understood. It will be readily noted that the several parts of my device are inclosed so that they will be protected against injury and are arranged in stepped relation so that only so much of the mechanism will be exposed as is necessary to perform the operations for which the machine is designed.

The advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which



I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when  
 5 desired as are within the scope of the claims appended hereto.

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

10 1. An adding machine comprising a plurality of shelves or supports arranged in stepped relation and having their front edges partly cut away, a counting disk upon  
 15 each of the said supports, a reading index on the upper surface of each support below the cut-away portion of the superposed support, an operating index arranged on the upper surface of each support at the front edge thereof, an operating lever movable  
 20 over the said operating index to engage the counting disk at various points of the same, and a stop arranged at one side of said operating index to limit the movement of the lever.

25 2. The combination of a support, a counting disk pivotally mounted thereon, a block loosely mounted on the pivot of the counting disk above the disk, and a lever pivotally secured to the said block and movable there-  
 30 with over the disk and adapted to engage the disk to impart movement thereto.

35 3. In an adding machine, a series of superposed counting disks, each with a consecutive series of numbers thereon adjacent the margin of the disk, the series of disks being in spread-count order to expose the  
 40 reading portions of said disks to view while hiding the remainder of the disks, means individual to each disk for the independent actuation thereof, and members fixed with  
 45 relation to the disks and each having displayed thereon a single series of digits in proper order, and means for indicating the reading points of the disks.

50 4. The combination of a support, a threaded stem secured therein, a counting disk loosely fitting over the said stem, a block arranged over the counting disk, a sleeve fitted in the said block to encircle the threaded stem and out of contact therewith,  
 55 and a dished washer on the upper side of the block fitting against the said sleeve and held to the block thereby.

60 5. The combination of a support, a pivot therein, a bearing plate around the said pivot, a hollow wheel resting on the support around the said bearing plate, a spring  
 65 presser plate bearing upon the upper side of the counting wheel and fitted on the pivot, and a washer upon the pivot resting on the upper side of the said presser plate.

6. In an adding machine, a series of counting members in superposed spread-count  
 65 order, actuating means for each counting member individual thereto and independent

of the other counting members, and supports for the counting members individual thereto and also in spread-count order, each support having means for indicating the  
 70 reading point of the counting member and of an area to cover the next counting member except for a limited area to expose the reading point thereof.

7. In an adding machine, a series of counting members in superposed spread-  
 75 count order, actuating means for each counting member individual thereto and independent of the other counting members, and supports for the counting members individual thereto and also in spread-count  
 80 order, each support having means for indicating the reading point of the counting member and of an area to cover the next counting member except for a limited area to expose the reading point thereof, and  
 85 each support being provided with indications comprising a series of digits in regular order representing units in coactive relation to the manipulating means for the counting means carried by said support.

90 8. In an adding machine, a suitable casing, a series of readily removable supports therein arranged when in operative position in spread-count order, a counting device on  
 95 each support and individual thereto, and a manipulating means for each counting device individual to said counting device, each support being provided with means for indicating the reading point of its counting  
 100 device and shaped to expose a limited area of the next adjacent counting device in order away from the observer and the indicating means for the reading point thereof.

105 9. In an adding machine, a suitable casing, a series of readily removable supports therein arranged when in operative position in spread-count order, a counting device on  
 110 each support and individual thereto, and a manipulating means for each counting device individual to said counting device, each support being provided with means for indicating the reading point of its counting  
 115 device and shaped to expose a limited area of the next adjacent counting device in order away from the observer and the indicating means for the reading point thereof, each support also carrying a counting means of  
 120 superior order responsive to each complete actuation of the first named counting device carried by the same support.

125 10. In an adding machine, a suitable casing, a series of readily removable supports therein arranged when in operative position in spread-count order, a counting device on  
 130 each support and individual thereto, and a manipulating means for each counting device individual to said counting device, each support being provided with means for indicating the reading point of its counting



device and shaped to expose a limited area of the next adjacent counting device in order away from the observer and the indicating means for the reading point thereon, each supporting device being also provided with means in coactive relation to the manipulating means for the counting device carried thereby to determine the extent of movement of the manipulating means and with another counting device of superior order responsive to each complete actuation of the first named counting device carried by the said support.

11. In an adding machine, a series of identical counting devices in spread-count

order, manipulating means individual to the counting devices whereby each may be actuated independently of the next, and means for exposing circumscribed reading portions of the counting devices and hiding from view the remainder of each of said counting devices. 20

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

CLARENCE L. KELLEY.

Witnesses:

M. H. GUTHRIDGE,

W. W. WIAINT.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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