(No Model.) 3 Sheets—Sheet 1.

R. BAUMANN.

ADDING MACHINE.

No. 522,098. Patented June 26, 1894.

Fig. 2.

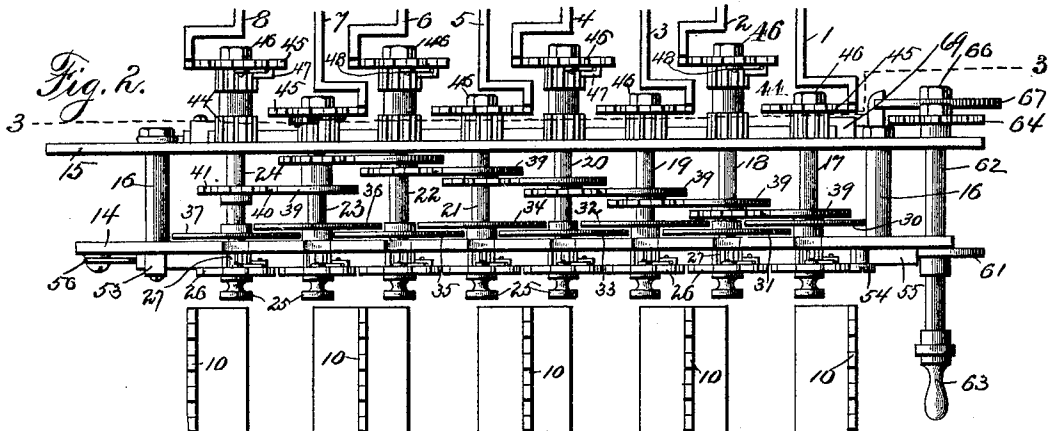
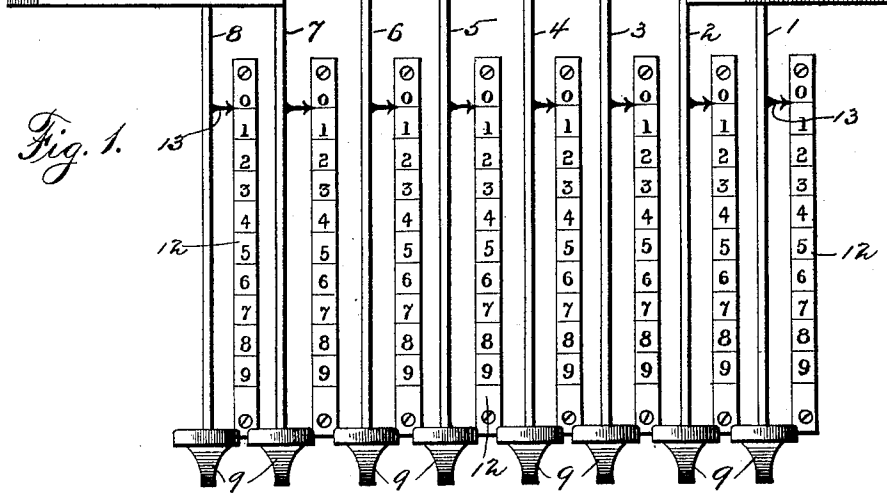


Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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ADDING MACHINE.

No. 522,098. Patented June 26, 1894.

Fig. 3.

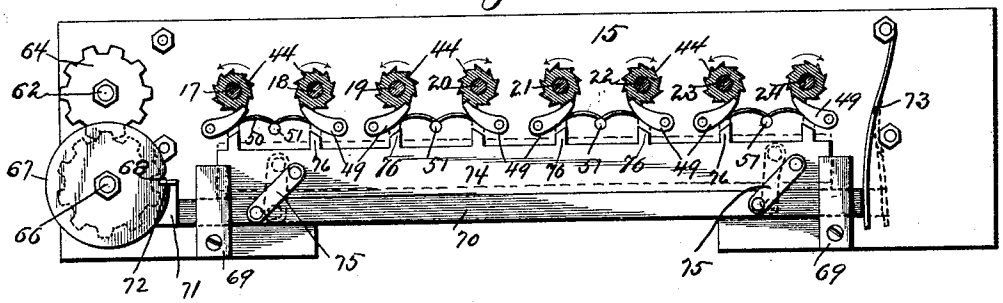


Fig. 4.

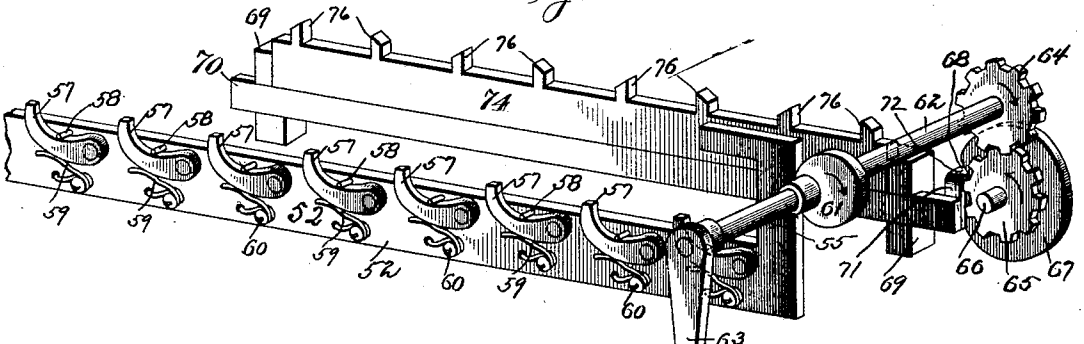
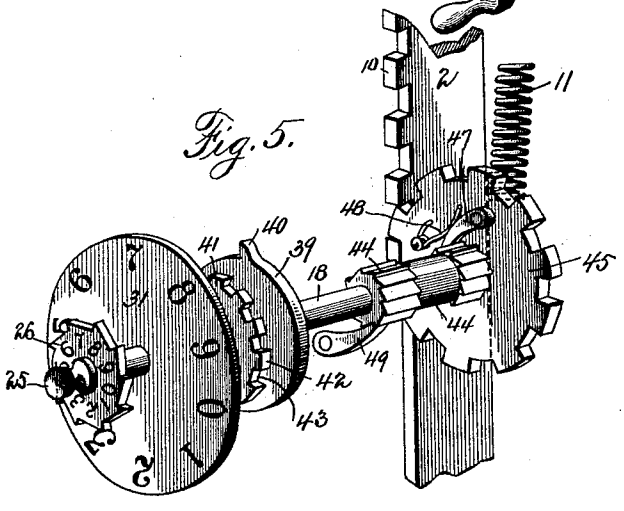


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

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ADDING MACHINE.

No. 522,098. Patented June 26, 1894.

Fig. 7.

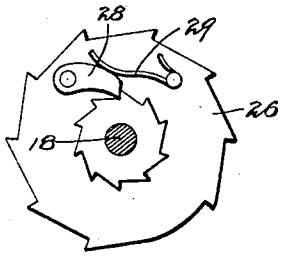
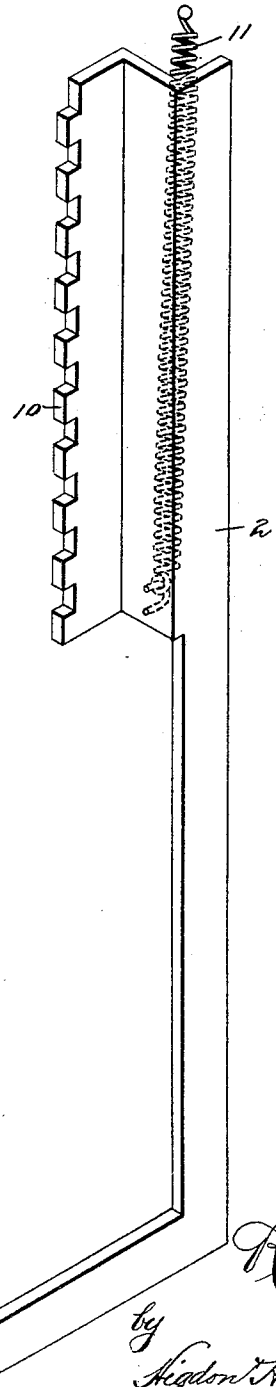


Fig. 6.



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UNITED STATES PATENT OFFICE.

ROBERT BAUMANN, OF ST. LOUIS, MISSOURI.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 522,098, dated June 26, 1894.

Application filed September 4, 1893. Serial No. 484,746. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BAUMANN, of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Adding-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improvement in adding machines of a class wherein a series of numbered disks are mounted each on a separate spindle, whereby one rotation of the units disk imparts one-tenth of a rotation to the disk of next higher denomination, and wherein the marks upon the disks are visible through sight openings, or slots, and are read consecutively, and my invention consists in the novel construction, combination, and arrangement of parts hereinafter specified and designated in the claims.

The object of my invention is to provide an improved machine of this class, which shall be very complete and compact in arrangement, and which shall produce improved results as compared with the results of machines of the same class heretofore constructed.

A further object of my invention is to provide a machine of this class with one series of disks mounted upon separate spindles for use as a total adding mechanism, and an additional series of disks mounted upon the same spindles, and arranged to be simultaneously and automatically set and reset to zero without disturbing the relative positions of the total adding disks, whereby the reading of the said additional disks may be taken from time to time, and the reading of the total adding mechanism at a time later on.

In the drawings, Figure 1 is a front elevation of the operative mechanism of my improved machine, with the common supporting frame and devices removed. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is a sectional rear elevation of the parts shown in Fig. 2, the section being taken on the line 3—3 of Fig. 2. Fig. 4 is a detailed view in perspective of the resetting mechanism for the additional adding disks, and of the lock mechanism for the total adding disks detached. Fig. 5 is a detailed view in perspective and enlarged with parts broken away, showing the mountings and connections of one of the disk spindles. Fig. 6 is a detailed view in perspective, showing one of the rack-bars detached. Fig. 7 is a detailed rear sectional elevation of a spindle used in carrying out the invention, and illustrating the parts mounted thereon.

1, 2, 3, 4, 5, 6, 7, 8 indicate a series of rack-bars or keys, preferably made of sheet metal, and arranged to be mounted in any common form of guides so as to slide vertically, and so that their edges will be presented toward the front of the machine, as shown in Fig. 1. I do not show the guiding devices for these keys, nor do I show the main casing or frame of the machine, as these parts may be readily constructed by any skilled mechanic, and as I do not consider that they form any portion of my invention. I have therefore limited my illustrations to the essential parts of my improved machine.

The lower end of each of the rack-bars is provided with a finger button 9, so that by pressing downward upon the latter, any one of said rack-bars will be moved in a vertical line downward a corresponding distance. The portion of said rack-bars adjacent to their upper ends are bent laterally, and then forward to avoid crowding, as these parts must necessarily be placed comparatively close together, and by thus bending the same, I find I can economize in space. The upper portion of the rack-bars are provided on their front edges with a series of teeth 10, which project therefrom in vertical alignment.

Adjacent to each rack 10 of the rack-bar is a suitable spring 11, the lower end of which is properly connected to its rack-bar, and the upper end of which is secured to some fixed portion of the machine frame, so that said spring normally holds the rack-bar, to which it is connected at the limit of its upward movement. The series of rack-bars are arranged parallel.

Located vertically at one side of, and parallel to each rack-bar, is a plate 12 provided on its front face with graduation marks, preferably from 0 to 9 consecutively, beginning at a point adjacent to the upper end of said plate. In this manner a series of these plates are located as described. They may be secured in position by means of common screws

or the like, engaging the plate, and being driven into its own fixed portion of the machine.

Pointers 13 are fixed one to each rack-bar so as to project laterally therefrom and normally register with the zero mark of the graduated plates 12.

14 and 15 indicate respectively the front and rear frame plates of the adding mechanism. These plates are securely spaced, and are held a distance apart by means of transverse bars or bolts 16.

I will now proceed to describe the adding or registering mechanism. 17, 18, 19, 20, 21, 22, 23, 24, indicate a series of separate parallel spindles located each in a horizontal plane to rotate in bearings formed in the front and rear plates 14 and 15 respectively. The front ends of said spindles project a distance in front of the front plate 14, and the rear ends of said spindles project a distance in the rear of the rear plate 15. Each spindle has fixed upon its projecting front end a separate knob 25, which projects a distance in front of said front plate 14, and is acessible to the operator for a purpose hereinafter mentioned. Mounted loosely to turn upon the projecting front portion of each spindle of the series is a ratchet wheel 26, having peripheral teeth, and having indicating characters upon its front face, preferably arranged thereon radially in the form of numerals from 0 to 9 consecutively, forming what I term additional adding disks. Fixed upon the projecting portion of each spindle of said series, at a point next adjacent the front face of the front plate 14, and next adjacent the ratchet wheel 26 on the same spindle, is a smaller ratchet wheel 27. The ratchet wheels 26 are thus located each between the smaller ratchet wheel 27 and a knob 25, and each of these parts are rotatable with the spindle which carries them. The ratchet wheel 26 is constructed in a peculiar manner; that is it has nine teeth, which are in a uniform pitch, and spaced a regular distance apart with a tooth located adjacent to each of the indicating marks upon the said wheel, except that the tooth adjacent the numeral 5 thereon is omitted, leaving a space between the adjacent teeth at such point that is double the dimensions of the space between any other two adjacent teeth of said wheel for a purpose hereinafter mentioned. The ratchet wheel 27 preferably has ten teeth spaced at regular intervals apart. The ratchet wheels 26 are rotatable upon the spindles 17, 18, 19, 20, 21, 22, 23, 24, in one direction only, the rotation thereof in the opposite direction being prevented by means of a pawl 28, pivotally secured to the rear face of each ratchet wheel 26 to engage with the teeth of the ratchet wheel 27, and prevent said reverse movement of said ratchet wheel 26 upon its spindle. This pawl is continually pressed into contact with the ratchet wheel 27 by means of a suitable spring 29, having one of its ends fixed to said ratchet wheel 26 adjacent to said pawl, so that its free end normally engages said pawl, and forces the same into engagement with the teeth of ratchet wheel 27. Each of the spindles 17, 18, 19, 20, 21, 22, 23, 24, has fixed upon it in the rear of the front plate 14 a total adding disk, having upon its front face characters identical with those upon the front face of the ratchet wheels 26. The total adding disk and the ratchet wheel 26 of each separate spindle have their characters normally located in radial alignment; that is, the 0 on said total adding disk is in radial alignment with the 0 on the ratchet wheel 26 of the same spindle, so that as said spindle and said parts rotate, the indicating characters of the said disk and said ratchet wheel move in unison. The total adding disks I will describe by the numerals 30, 31, 32, 33, 34, 35, 36, 37. The characters near the upper edge of the total adding disks are adapted to be brought into horizontal alignment in the rear of a series of sight openings 38, formed in the front plate 14, or it may be a single long slot or sight opening formed in said plate, so that a horizontal line of numerals will be exposed through said sight opening or openings during operation of the machine. Simultaneous with the exposure of a horizontal line of numerals upon the series of total adding disks, another horizontal line of numerals is exposed by the ratchet wheels 26. The spindles 17, 18, 19, 20, 21, 22, 23, 24, are provided with transmitting devices for moving forward the next adjacent spindle, carrying a total adding disk and ratchet wheel 27 of next higher denomination one step for each rotation of the next lower spindle of the series. I have here shown these transmitting devices in the form of disks having a single peripheral projection engaging toothed wheels. The spindle 17, which I will designate as the units spindle, has fixed upon it in the rear of its adding disk 30, a circular disk 39 having a single peripheral tooth, or projection 40, and each of the remaining spindles of the series is provided with a similar disk 39, having a single peripheral projection 40, and also each additional spindle of the series has fixed upon it a separate toothed wheel 41 having a determinate number, preferably ten peripheral teeth or projections 42, and ten peripheral spaces or depressions 43. (See Fig. 5.) These toothed wheels and the disks 41 are fixed upon their respective spindles to rotate therewith, and so that when the first or units spindle 17 is rotated once forward, the peripheral projection 40 of its disk 39 will engage the teeth 42 of the toothed wheel 41 carried by the next adjacent spindle, and move said spindle and the parts carried by it one step forward, and so on throughout the series of spindles. It will be noted that the spindle 17 is to be rotated in a certain direction, which is indicated by the arrow in Fig. 3. It will also be noted that the next adjacent spindle is to be rotated in a reverse direction,

also as indicated by the arrow in Fig. 3, and so on throughout the series of spindles. It will be further noted that the relative position and construction of the peripheral projection 40 on the disks 39, and the teeth 42 of the wheels 41 are such that any one of the series of spindles above the units spindle may be rotated separately and independently in a forward direction without disturbing the position of, and without affecting the spindles and adding disks of lesser denomination below, which is a very desirable point of advantage in mechanism of this class. This is accomplished by reason of the fact that the peripheral projection 40 of the disks 39 normally rests out of the path of the next adjacent toothed wheel 41, so that said projection engages only the teeth, and depression of the adjacent toothed wheel of the next higher denomination. This latter construction, as well as the herein described arrangement of series of parallel separate spindles, each carrying the adding disk, I do not claim herein, as such forms the subject matter of a separate application filed by me of even date herewith, Serial No. 484,745. The series of spindles 17, 18, 19, 20, 21, 22, 23, 24, are of alternate short and long lengths to permit such disposition of the upper ends of the rack-bars 1, 2, 3, as will occupy the smallest space, as shown in Fig. 2, whereby the parts now to be described may overlap each other for such purposes. Fixed upon the projecting rear portion of each spindle of the series 17, 18, 19, 20, 21, 22, 23, 24, at a point next adjacent the rear face of the rear plate 15, is a ratchet wheel 44. This wheel may be of the form shown in Fig. 5 of considerable length, so as to extend a considerable distance upon the spindle upon which it is fixed, and have a smooth peripheral portion located intermediate of its ends but all made in one piece, or it may be of the continuous toothed form shown at the right hand of Fig. 2 so as to have a length which is considerably less than the form shown in Fig. 5, and the result will be the same in both cases. The only reason the said ratchet wheel 44 is made long upon one spindle and short upon the next adjacent spindles on either side of it is to economize in space, and permit overlapping of the toothed wheels presently described. The ratchet wheels 44 rotate with the spindles on which they are fixed. Loosely mounted to rotate upon the rear projecting portions of each of the spindles 17, 18, 19, 20, 21, 22, 23, 24, is a toothed wheel 45. The wheels 45 are located upon said spindles directly in the rear of the ratchet wheels 44, and are held loosely thereon by means of common nuts 46, threaded upon the projecting rear ends of said spindles. Pivotally mounted, one upon each of the toothed wheels 45, are pawls or dogs 47, arranged so that their free ends normally engage the teeth of the adjacent ratchet wheel 44. Common springs 48 are fixed upon the front face of said toothed wheels 45, so that one of their ends is free, and these springs engage said pawls 47, and normally urge and hold them in contact with the teeth of the adjacent ratchet wheel 44, the arrangement being such that said toothed wheels 45 are free to rotate in one direction upon said spindles, and are prevented from rotating thereon in an opposite direction by engagement of said pawls with said ratchet wheels 44. The teeth 10 of the rack-bars 1, 2, 3, 4, 5, 6, 7, 8, engage each the teeth of one of the loose toothed wheels 45 on the series of spindles, so that as said rack-bars are moved up and down, the toothed wheels geared with them will be correspondingly moved forward or backward on their respective spindles. (See Figs. 5 and 6.) The spindles 17, 18, 19, &c., are prevented from rotating, except in the direction indicated by the arrows in Fig. 3, by means of a series of pawls 49, which are pivotally mounted upon the rear face of the rear plate 15, one closely adjacent each of the ratchet wheels 44, and these pawls are held in engagement with said ratchet wheels 44 by means of common wire springs 50, which are fixed at 51 to said rear plate, so that their free ends expand in engagement with said pawls, and accomplish the purpose just mentioned. The pawls 49 also act as frictional brakes to yieldingly retain the spindles each in the position in which they are placed.

I will now describe the construction of the locking mechanism for the total adding disks, also the construction of the resetting mechanism for the additional series of adding disks. I desire in this description to use the words "additional adding-disks" interchangeably with the words and numerals "ratchet-wheels 26," for the reason that said ratchet-wheels are really additional adding-disks, although they possess the form and function of ratchet-wheels, they possess the additional form and function of adding-disks. As previously stated, the additional disks 26 are constructed in a peculiar manner, which is different from that of the other ratchet wheels herein described, in that all of the other ratchet wheels have ten teeth, while the additional-disks 26 have but nine teeth for a purpose hereinafter stated. Diametrically opposite the zero mark on each of the disks 26 is the mark "5," and there is at such point a tooth omitted leaving a larger space between the adjacent teeth than the space between the teeth at a different point in the periphery of said disks. When the disks 26 are set to zero, the point at which a tooth is omitted is located in a vertical line and directly beneath the zero mark on each of said disks. 52 indicates a horizontal locking bar mounted upon the front face of the front plate 14 to reciprocate a limited distance. This lock-bar is mounted in any common guides which will hold it in position. I here show it mounted in a bearing formed in a bracket 53 adjacent one of its ends, said bracket being secured to said front plate by means of common screws

or other fastenings. Its opposite end is supported in position by working loosely beneath the heads of common screws 54, which overlap said plate. Said screws are threaded into common holes formed in said front-plate. (See Fig. 1.) One end of the bar 52 (shown at the right hand of Fig. 1) is provided with a vertical extension 55, which extends at a right angle to the body of said bar. This bar 52 is normally retained at the limit of its movement in one direction by means of a common spring such as 56, preferably made of wire and having one of its ends fixed to said front plate at a point adjacent the end of said bar which is opposite the end which has the vertical extension 55, and the other end of said spring is free and is arranged to bear upon the adjacent end of said bar, for the purpose just mentioned. Pivotally mounted upon the front face of the bar 52 and spaced at regular intervals apart, are a series of spring pressed pawls 57. One end of each of these pawls 57 is free and the free ends of all of them project in the same direction and are adapted to contact with the teeth of said disks when the bar 52 is reciprocated. There is one pawl 57 for each disk 26. Stop pins or lugs 58 project from the front surface of the bar 52 and limit the upward movement of said pawls. Common springs 59 have one of their ends secured to the front surface of the bar 52 by means of a screw 60 or other common fastening, their opposite ends free and arranged to engage and normally urge upward said pawls 57 and retain the same at the limit of their upward movement. (See Figs. 1 and 4.) The reciprocating-bar 52 is moved in one direction by means of a cam or eccentric 61 fixed upon the shaft 62, which latter is mounted in suitable bearings in the front plate 14 and the rear plate 15 of the frame so as to extend from one of said plates to the other. The eccentric 61 is fixed upon said shaft at a point just in front of the front plate 14 so as to rotate with its periphery in contact with the outer edge of the vertical extension 55 of said reciprocating-bar. The front end of said shaft projects a distance forward of said front plate and has fixed upon it a common hand crank 63 or other common means by which said shaft may be rotated in its bearings in the direction indicated by the arrow in Fig. 4. From the above it will be observed that the bar 52 will have a reciprocating motion imparted to it when said shaft 62 is rotated. The rear end of the shaft 62 projects a distance beyond the rear face of the rear plate 15, and has fixed upon it a gear wheel 64, which meshes with another gear-wheel 65 of the same diameter located in a vertical plane directly beneath it. The gear wheel 65 is mounted to rotate loosely upon a pin or stud 66 which projects from the rear face of the rear plate. A circular disk 67 having a single notch or depression 68 in its periphery, is also mounted to rotate loosely on said pin or stud 66 in unison with said gear-wheel 65. However, the use of the gear-wheels 64 and 65 is not absolutely essential, and I do not desire to limit myself to their employment, for it is obvious that the only function which they perform is to impart movement to the circular disk 67, which might in some cases be fixed directly upon the projecting rear end of said shaft 62, and the operation in each case would be substantially identical. The only reason I make use of said gear-wheels is so that I may locate said shaft 62 in one horizontal plane and locate said circular disk 67 in a lower plane. Mounted in suitable bearings, formed in brackets, or bearing blocks 69, upon the rear face of the rear plate 15, is a reciprocating horizontal bar 70. One end of this bar 70 is located closely adjacent the circular disk 67, and projects into the space between said disk and said rear plate 15. Fixed upon said horizontal bar 70 adjacent said end is a vertical bracket or arm 71, carrying a horizontal projection 72, which latter is adapted to engage in the depression 68 of said circular disk, to move said horizontal bar in one direction. The bar 70 is normally urged toward said circular disk, and the horizontal projection 72 is normally retained in contact with the periphery of said disk by means of a common spring 73, one end of which is fixed to said rear plate at a point adjacent the end of said horizontal bar, which is located a greater distance from said circular disk, and the opposite end of which is free and projects into contact with the end of said bar. Any other common form of spring may be used for this purpose. This spring normally retains said bar at the limit of its movement in one direction. 74 indicates another horizontal bar, which is also mounted in suitable bearings in the brackets or bearing blocks 69, directly above the bar 70, and parallel therewith. But the bar 74 is fixed against longitudinal movement by contact of its ends with portions of said brackets, or bearing blocks 69, as shown in Figs. 3 and 4, so that said bar 74 is capable of only a vertical movement bodily, and parallel with the bar 70. 75 indicates parallel inclined links, the upper ends of which are pivotally connected to the vertical movable bar 74, and the lower ends of which are pivotally connected to the horizontal reciprocating bar 70, so that when the said last mentioned bar is moved toward the right hand in Fig. 3, said bar 74 will be thrown a corresponding distance upward, and when said lower bar 70 returns to its normal position, said upper bar 74 will be thrown downward a corresponding distance. The movement of these parts is indicated by dotted lines in Fig. 3. 76 indicates a series of projections carried by the upper edge of the vertical moving bar 74. I provide as many of these projections 76 as there are pawls 49, and locate said projections so that one is directly beneath each of said pawls, and is adapted to contact therewith when said bar is moved upward and become disengaged therefrom when said bar is thrown

downward, for a purpose hereinafter mentioned.

The operation is as follows: The operator, prior to use of the machine, should set the total adding disks 30, 31, 32, 33, 34, 35, 36, 37, to zero by grasping the projecting knobs 25 upon the front ends of the parallel spindles 17, 18, 19, 20, 21, 22, 23, 24, which may be done very readily by turning each spindle in the direction indicated by the arrow above it in Fig. 3. The pawls 49 yieldingly retain said spindles each in the position in which it is placed. The additional disks 26 should also be set to zero, which may be quickly accomplished by simply rotating the shaft 62 in the direction indicated by the arrow in Fig. 4, by means of the hand-crank 63, and the cam or eccentric 61 will thus be made to engage the vertical extension 55 of the reciprocating horizontal bar 52 at each rotation of said shaft, and slide said bar toward the left hand in Figs. 1, 2, and 4, compressing the spring 56, as indicated by dotted lines in Fig. 1. The bar 52, each time it is reciprocated, carries the pawls 57 with it, and the free ends of said pawls engage the teeth of the additional disks 26, and move each of said disks one step forward at each reciprocation of said bar, and as the reciprocations are continued (as many times as the numeral of greatest value, exhibited on any disk 26, may indicate, and this can never exceed nine,) each of said adding disks 26 will be moved step by step until said pawls 57 reach the point in the periphery of said disk at which a tooth is omitted when further movement of said disks, by engagement of said pawls will cease, and each of said disks will come to rest with its zero mark diametrically opposite the point at which said tooth is omitted, and the zero marks of all the said disks will then be in horizontal alignment in the plane above the spindles 17, 18, 19, 20, 21, 22, 23, 24. Any additional reciprocations of said bar will not move the disks 26 any farther by reason of the omitted tooth; and so, if any disk or number of disks were at zero, when the resetting operation began, no motion would be imparted to these disks. This resetting movement of the additional disks 26 has no effect upon the position of the total adding disks 30, 31, 32, 33, 34, 35, 36, 37, for the reason before stated, that said additional disks are loosely mounted upon their spindles, and may be moved in one direction without moving said spindles, their pawls 28 sliding over the teeth of the ratchet wheels 27 without moving said spindles. Meanwhile each of said spindles is securely locked against possible movement in the following manner: As the shaft 62, which carries the hand-crank 63 is rotated, and the movement is imparted to the gear-wheels 64 and 65, and to the circular disk 67, and at each rotation of said disk, the inclined side of the notch or depression 68 therein engages the horizontal projection 72 of the bracket or arm 71, carried by the reciprocating bar 70 on the rear plate 15 of the frame, and forces said horizontal projection and said reciprocating bar toward the right hand in Fig. 3, in opposition to the power exerted by the spring 73. This latter movement of said bar 70 causes the lower ends of the links 75 to be carried with said bar to a point more nearly beneath the point at which the upper ends of said links are connected to the vertical movable bar 74, which causes said last named bar to be thrown upward to the position indicated by the dotted lines in Fig. 3, which throws the projections 76, carried by said bar 74, each into contact with the under side of one of the pawls 49, and said pawls are thereby forced more securely into contact with the ratchet wheels 44, and are held in said position until said circular disk 67 makes a complete rotation; or in other words, as long as the horizontal projection 72 rests in contact with the periphery of said disk, and until the notch or depression 68 is again positioned for engagement by said horizontal projection, when the action of the spring 73 will return the reciprocating bar 70 to its normal position, and said horizontal projection 72 will again be forced into engagement with said notch or depression 68, and return the vertical moving bar and its projections 76 also to their normal position, which is that in which they are shown in Fig. 3. It will be observed that when the projections 76 are in forcible engagement with the pawls 49, the ratchet wheels 44, and the spindles which carry them, will be locked securely against rotation, so that the additional adding disks 26 may, as previously stated, be reset without disturbing the position of the total adding disks of the machine. Any one of the finger buttons 9 may be pulled downward by the operator to add or register any amount, and the downward movement of each finger button causes a corresponding downward movement of its rack-bar, and a corresponding rotation of the toothed wheel 45, which is connected to said rack-bar, and this toothed wheel 45, imparts movement in the same direction to the ratchet wheel by reason of its pawl 47 engaging said ratchet wheel, and as said ratchet wheel is fixed upon one of the spindles of the series, said spindle is rotated a corresponding distance in the same direction, and carries with it its total adding disk, and its additional disk, and the result is visible to the operator, and so on throughout the series of keys and connections. If the operator desires to move any one of the series of spindles 17, 18, 19, 20, 21, 22, 23, 24, and the adding disks carried thereby, forward through one step, he pulls down the appropriate finger button 9, and its rack-bar, so that the pointer 13 of said rack-bar is moved downward from (0) zero to the numeral one (1) upon the graduated vertical plate 12, which is fixed parallel and adjacent said rack-bar, and so on, according to the number of spaces he desires to impart to said indicating disks.

When said disks are set at zero, it is necessary that the same be moved forward over ten separate spaces to move the next adjacent disk of higher denomination one step forward, and so on throughout the series. After the rack-bars 1, 2, 3, 4, 5, 6, 7, 8, have been moved downward, they are returned to normal position by the action of their springs 11. The normal position of these rack-bars is that in which they are shown in Fig. 1.

What I claim is—

1. An improved adding mechanism, having one series of adding disks upon a series of separate spindles, for use as total adding disks, an additional series of adding disks mounted upon the same spindles, and means which simultaneously return one series of said disks step by step to zero, substantially as herein specified.

2. An adding mechanism constructed with one series of disks mounted each disk upon a separate spindle for use as total adding disks, and an additional series of adding disks, mounted one upon each of the same spindles which carry the first mentioned disks, and means arranged to simultaneously set to zero all of said additional series of disks without disturbing the relative positions of the total adding disks, substantially as herein specified.

3. The combination of a series of separate parallel spindles, a series of adding disks, mounted one upon each of said spindles, an additional series of adding disks, mounted one upon each of the same spindles, so that there are two adding disks mounted upon each spindle, mechanical means applied to each spindle, which imparts to the spindle carrying adding disks of next higher denomination above it a movement one step forward upon one complete rotation of the next adjacent spindle of next lower denomination, a series of finger-buttons, one finger button for each spindle, and mechanical means applied to said finger buttons and said spindles to connect the same for operation, substantially as herein specified.

4. The combination with the front and rear plates of an adding mechanism spaced apart, of a series of separate parallel spindles located each in a horizontal plane to rotate in bearings formed in said front and rear plates, the front ends of said spindles projecting a distance in front of said front plate, and the rear ends of said spindles projecting a distance in the rear of said rear plate, re-setting knobs located one upon each projecting front end of said spindles, a toothed wheel on each rear projecting end of said spindles, separate adding disks having characters upon their faces and mounted two upon each of said spindles, the disks upon said spindles forming two separate series, one of said series being fixed upon the spindles and the other series loose thereon, means for holding each disk of one of said series against movement on their spindles in one direction, means for rotating forward said spindles and the disks carried thereby, and means which simultaneously set all of one series of said disks to zero without disturbing the position of the other series of disks and without rotating said spindles, substantially as herein specified.

5. The combination, in an adding machine, of a rotatable spindle, an adding disk fixed upon said spindle, an additional adding disk loosely mounted on the same spindle, both disks being rotatable with said spindle in one direction, one of said disks having separate peripheral teeth spaced a regular distance apart except that one tooth is omitted, leaving a space between said adjacent teeth, and a reciprocating device which engages said teeth and simultaneously rotates said toothed disks step by step until the point is reached in the periphery of all of said disks at which said tooth is omitted, substantially as herein specified.

6. The combination of a series of separate spindles, two separate series of adding disks having characters on their faces, and mounted upon said spindles, finger buttons for moving said spindles, means constructed to automatically and simultaneously set all of one series of said disks to zero independent of the other series, and means for holding the other series of disks against movement during the resetting of the other series of disks, substantially as herein specified.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT BAUMANN.

Witnesses:
W. J. SANKEY,
JNO. C. HIGDON.