

(No Model.)

2 Sheets—Sheet 1.

A. E. SHATTUCK & C. THORN, Jr.

ADDING MACHINE.

No. 349,459.

Patented Sept. 21, 1886.

FIG. 1.

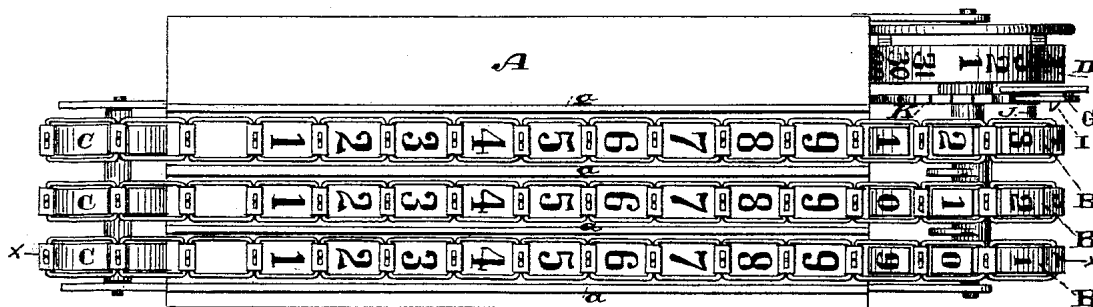


FIG. 2.

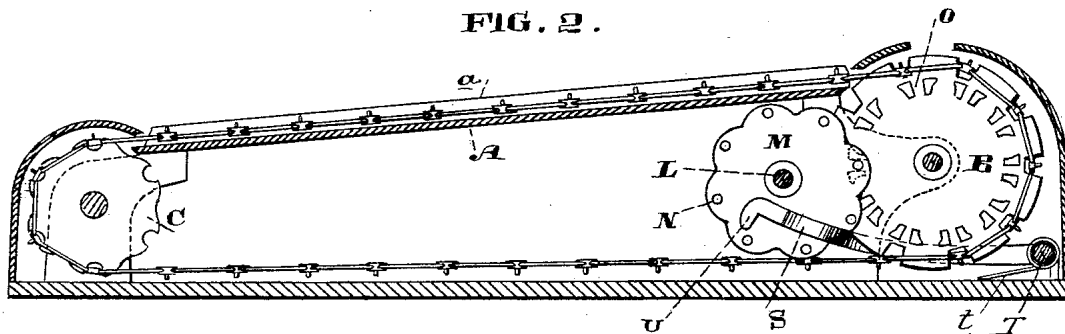


FIG. 4.

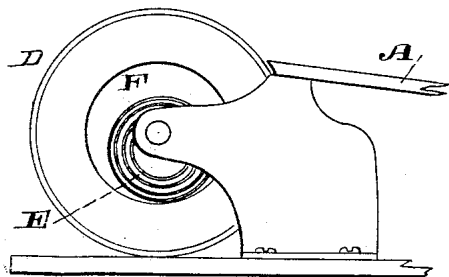
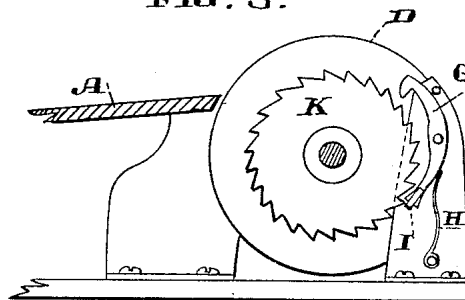


FIG. 3.



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FIG. 5.

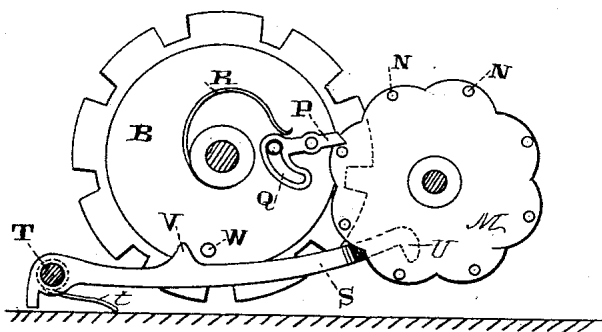


FIG. 6.

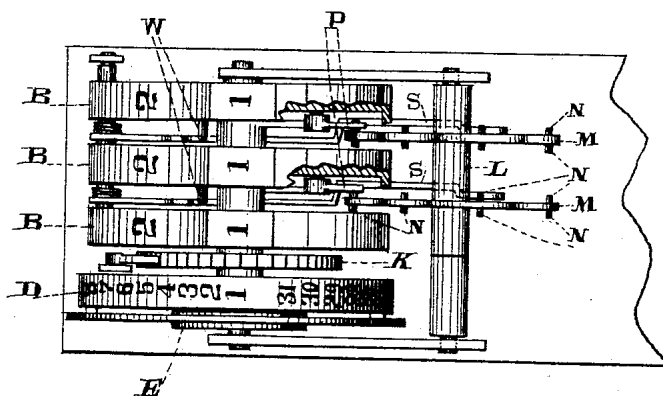
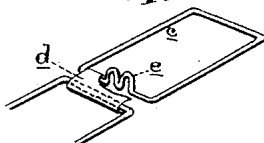


FIG. 7.



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UNITED STATES PATENT OFFICE.

ARTHUR E. SHATTUCK, OF SACRAMENTO, AND CHARLES THORN, JR., OF
SAN FRANCISCO, ASSIGNORS, BY MESNE ASSIGNMENTS, OF ONE-THIRD
TO GEORGE C. GAYLORD, OF NEVADA CITY, CALIFORNIA.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 349,459, dated September 21, 1886.

Application filed December 30, 1885. Serial No. 187,124. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR E. SHATTUCK, of Sacramento, Sacramento county, State of California, and CHARLES THORN, Jr., of the city and county of San Francisco, State of California, have invented an Improvement in Adding-Machines; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to a device or apparatus for mechanically adding columns of figures.

It consists of one or more open belts, slides, or chains passing over rollers having digits imprinted upon them, and tables with corresponding digits, and mechanism connected with the rollers, whereby those representing the next higher denominations are properly rotated and prevented from turning too far, and in connection with these, of an independent drum or roller having a series of figures only upon its periphery, whereby the higher amounts may be indicated without increasing the number of chain-wheels and connected mechanism.

In our Patent No. 268,135, dated November 28, 1882, we have shown a series of chain wheels or rollers, and chains passing over them, and a table correspondingly numbered with certain mechanism, whereby the rollers indicating the higher denominations are moved at the proper time.

Our present invention provides an improved mechanism for this purpose, and a means for indicating the higher numbers without increasing the number of chain wheels or rollers.

Referring to the accompanying drawings for a more complete explanation of our invention, Figure 1 is a plan or top view of our apparatus. Figure 2 is a longitudinal vertical section taken through X X, Fig. 1. Fig. 3 shows the pawl and ratchet of the independent tally-wheel. Fig. 4 shows the end of the wheel and the spring. Fig. 5 is a side elevation of the pawls and the stop-lever of the primary wheel. Fig. 6 is a plan of the same. Fig. 7 is a view of a link.

In the present construction we have shown a slightly-inclined table, A, supported upon

suitable standards at each end. To these standards are fixed shafts upon which rollers B and C are fitted to turn. The rollers C at the lower end of the table are idlers, to simply support and carry the open chain or belt which passes over them. The rollers or pulleys B at the upper end, which I term the "primary," pulleys are also formed so that the chain will pass around them, and they have figures from 0 to 9 imprinted or formed upon them. The chain is formed of open links *c*, united by clasps *d*. The lower end of each link is bent upward, as shown in Fig. 7, so as to form a convenient handle or projection, *e*, which may be taken hold of by the operator when he desires to draw the chain downward the lower end of the table in adding. The table is preferably formed with longitudinal channels extending from the upper roller B to the lower roller C, with ribs or projections *a* between the channels, which serve as guides for the chains as they pass over the table. These channels are also marked with digits, commencing with 9 at the upper end, and ending with 1 at the lower end, so that when a number is to be added, by simply taking hold of the link of the chain which covers that number and drawing it down to the lower end of the table the corresponding roller B at the upper end, around which the chain passes, will be rotated, so as to bring a figure uppermost, which will indicate the amount of the addition. One, two, or more of these chains or wheels may be employed, and in connection with them we use an independent drum or roller, D, having upon it any desired number of figures, from 1 upward, this roller being advanced one figure upon its periphery each time when the chain-wheel next adjacent to it has been rotated an entire revolution, so as to bring the zero uppermost. This independent roller thus acts as a tally-roller and reduces the number of chain-wheels which it is necessary to use in carrying out additions of large numbers.

The drum D has a coiled spring, E, fitted into a recess in the disk or head F at its outer end, one end of this spring being fixed to the framework, and the other end to the hub of the drum,

so that when the spring is coiled up its tension will be sufficient to rotate the drum forward when it is released. The drum is held so as to prevent it from rotating by an escapement-pawl, G, one end of which is held down by a spring, H. A lug or projection, I, upon one side of this escapement, is so formed that when the pin J upon the roller B, which is adjacent to this drum, comes in contact with the lug it raises that end of the escapement above the tooth of the escapement-wheel K, with which it is engaged, thus allowing the wheel to move forward, it being fixed to the hub of the drum D so that it turns with it. The opposite end of the escapement is pressed down so as to engage a tooth of the escapement-wheel K the instant after the first tooth is released, thus preventing the wheel from turning too far. When the pin J has passed the curved or inclined lug I, the spring H will force that end of the escapement down, so as to engage with the following tooth of the escapement-wheel, while the opposite end of the escapement being raised, the tooth which it had engaged will escape, the wheel or drum D thus moving forward by two short impulses the distance necessary to bring the next figure upon its rim uppermost. It will be manifest that this drum may be provided with as many figures upon its periphery as desired, it being only necessary to construct the escapement with the teeth of the escapement-wheel of sufficient fineness to correspond with the figures. The numeral-rollers B are mounted upon the shaft side by side, and are provided with a mechanism by which each subsequent roller is moved forward one figure when the preceding roller has completed an entire revolution, so as to bring the zero upon its periphery uppermost.

40 This mechanism is constructed as follows: Upon a shaft, L, which is supported in the frame-work or standard parallel with the shaft upon which the rollers B are mounted, are loosely mounted disks M. The shaft upon which the disks are mounted is sufficiently near to the periphery of the rollers B, so that the peripheries of the disks will overlap or extend in between the rollers. These disks have pins N fixed so as to project upon each side, as shown. Upon one side these pins pass into radial slots O, formed in the side of the roller which is to be advanced. Upon the opposite side they are engaged by a device fixed upon the side of the wheel or roller whose movement advances the succeeding one. This device consists of a pawl, P, the end of which projects sufficiently to engage one of the pins N, when it arrives opposite to it, and thus move it forward, carrying with it the succeeding roller. The pawl is so constructed that it disengages from the pin when the succeeding roller has been moved forward one figure.

The inner end of the pawl has a slotted arc, Q, formed with the fulcrum-pin of the pawl as a center, and a pin projecting from the side of the wheel passes through this arc, which

travels backward upon the pin as the pawl is moved. A spring, R, acts to return this pawl to its position after it has passed one of the pins. The construction is such that if it is desired to turn the roller B backward, for any purpose, it may be done, as the pawl will turn about its fulcrum, so as to allow it to pass the pin on the disk M without acting upon it.

In order to prevent the disk (and with it the succeeding roller B) from being advanced more than one figure by this mechanism, we employ a locking-lever, S, which has its fulcrum upon a shaft at T, and a coil-spring, t, which acts upon the lever so as to raise its free end. This inner or free end has a hook, U, which, when the lever is down, passes in front of one of the pins in the edge of the disk and locks the disk. When the lever is raised, this hook disengages from the pin and allows it to pass. A projection, V, is formed upon the upper side of this lever at such a point that it is engaged by a pin, W, upon the side of the roller B, and the lever is forced down in front of a pin at the instant when the disk and the succeeding roller are being advanced by a pawl, and the hook is thus forced down in front of a pin upon the disk, so as to stop it and prevent its moving any farther. The instant the pin W upon the roller passes the lug V upon the lever it allows the lever to rise and the hook rises out of the way of the pin, so that at the proper time the disk may make its next forward movement without impediment, the hook being brought down just in front of one of the pins at the instant of each forward movement, so as to act as a check, and it is raised as soon as the disk is stopped, so as to allow its next movement. For all ordinary work a single roller, with its table of numerals and traveling chain and the tally-roller, is sufficient, but in higher numbers two or three chain-rollers may be employed, if desired. By the use of the tally-roller it reduces the number of chain-rollers, and thus greatly reduces the friction incident upon the number of mechanisms which are to be moved by the first roller when the figures to be added contain from 4 to 9 or 10 places. The machine is much more compact and easily operated.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an adding-machine, the stationary table with figures upon its surface, the traveling chain and the numeral-rollers provided with radial slots, in combination with a disk having pins projecting upon each side of its rim, one end of said pins engaging the radial slots in one of the rollers, an adjacent and driving roller, and a pawl fulcrumed upon said roller and engaging the opposite projecting end of the pins, substantially as herein described.

2. A shaft, the numeral-rollers mounted upon said shaft, one of said rollers having a spring-pawl fulcrumed upon its side, and the

other having radial slots in the adjacent side, in combination with a second shaft, a disk journaled upon said shaft, so that its periphery enters the space between the two rollers, 5 said disk having pins projecting from its sides, whereby one end is engaged by the pawl upon the driving roller, while the other end engages the slot or lug upon the other roller, substantially as herein described.

10 3. A shaft, the numeral-rollers mounted upon said shaft, a second shaft, a disk provided with pins and mounted upon said second shaft, so that its periphery extends between the adjacent numeral-rollers, and a 15 mechanism whereby the second roller and disk are advanced by the movement of the primary roller, in combination with a lever having a hook or projection to engage the pins of the disk, and a pin upon the primary roller projecting so as to engage a lug upon the lever 20 and depress it at the instant when the disk and second roller are advanced, substantially as herein described.

4. In combination with the numeral-rollers 25 and intermediate disks provided with pins, as shown, the pawl fulcrumed to the driving-roller, so as to engage said pins upon the

disks, said pawl being provided with a slotted arc at its inner end, the guide-pin operating in said arc, and a returning-spring, substantially as herein described. 30

5. A shaft, one or more numeral-rollers loosely journaled upon said shaft, an independent tally-roller loosely journaled upon the same shaft, and having a coiled spring by 35 which it is advanced when released, in combination with an escapement-wheel, an escapement mounted upon the frame, so as to engage the teeth of said escapement-wheel, which turns with the tally-roller, and a pin 40 projecting from the numeral-rollers, so as to engage and operate the escapement and allow the tally-roller to advance at each revolution of the numeral-roller, substantially as herein described. 45

In witness whereof we have hereunto set our hands.

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CHARLES THORN, JR.

Witnesses:

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