(No Model.) 4 Sheets—Sheet 1.

# L. S. BURRIDGE & N. R. MARSHMAN.

## ADDING AND RECORDING MACHINE.

No. 553,331. Patented Jan. 21, 1896.

Fig. 1.

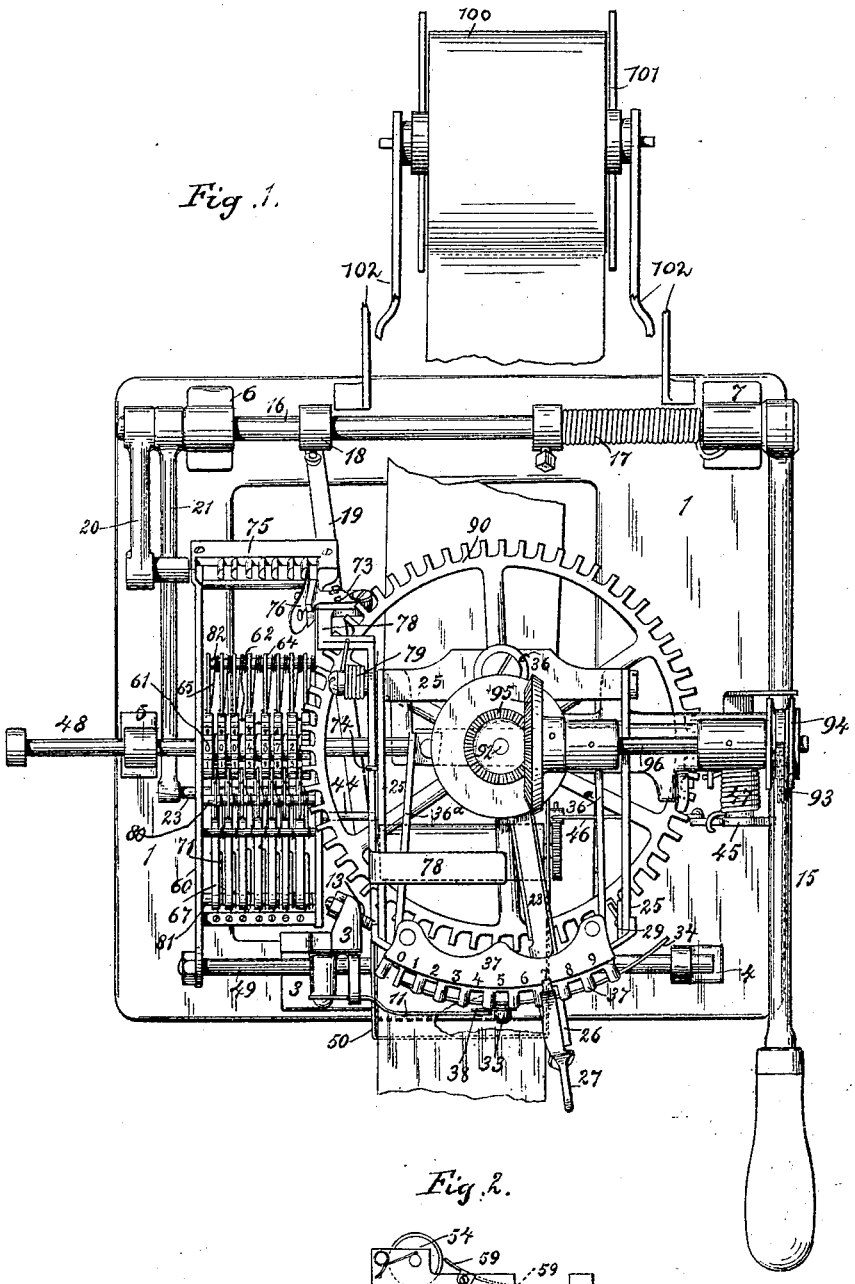
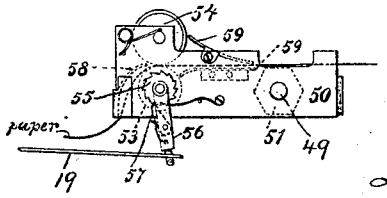



Fig. 2.

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(No Model.) 4 Sheets—Sheet 2.

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Fig 5

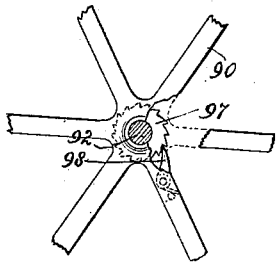



Fig. 4.

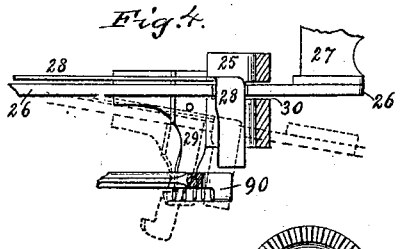
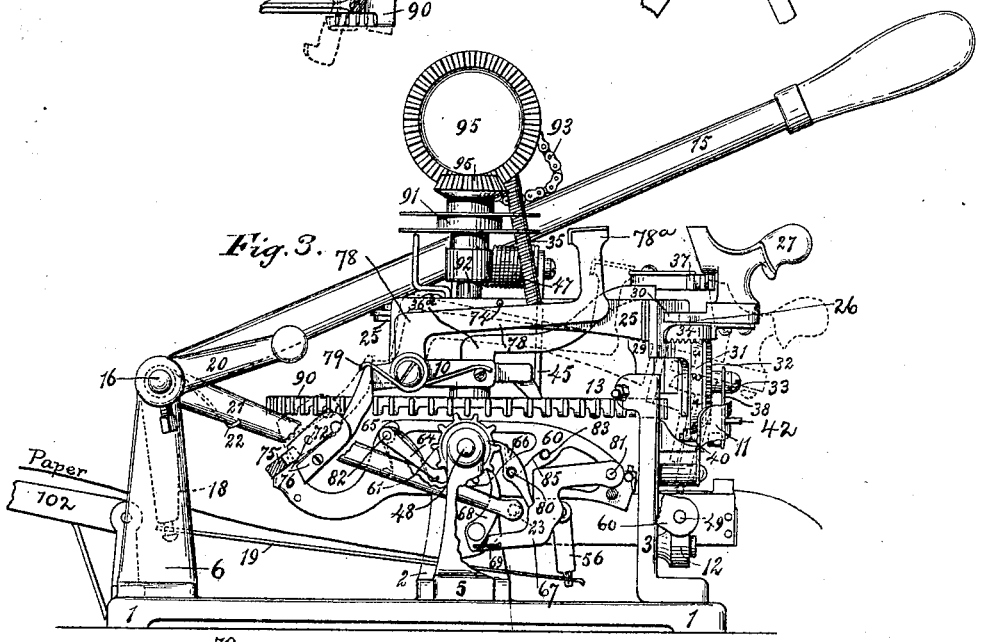



Fig. 3.



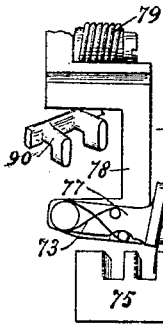




Fig. 6.

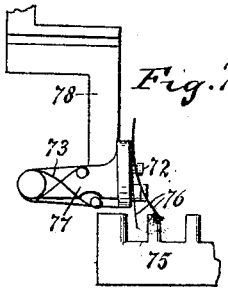



Fig. 7.

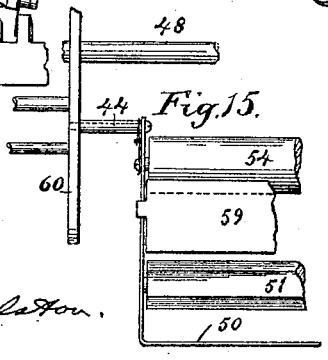



Fig. 15.

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## ADDING AND RECORDING MACHINE.

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Fig. 9.

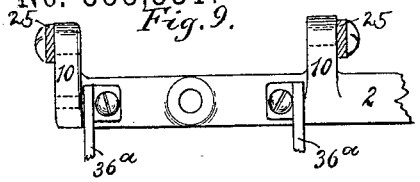



Fig. 8.

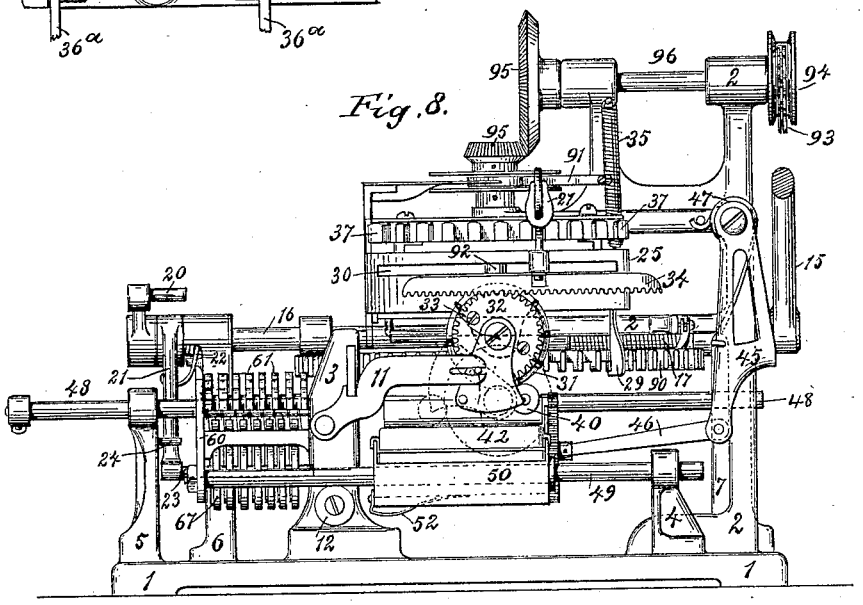



Fig. 11.

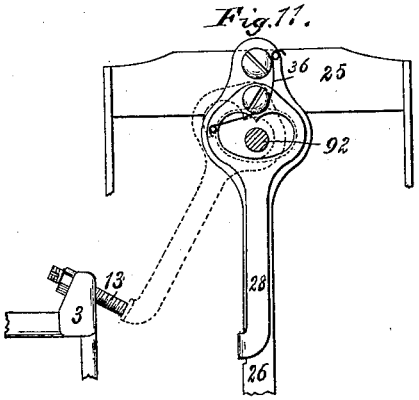



Fig. 10.

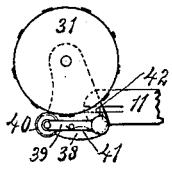



Fig. 13.

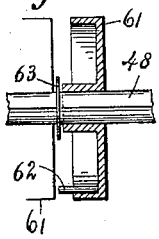
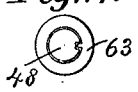



Fig. 14.

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## ADDING AND RECORDING MACHINE.

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Fig. 16.

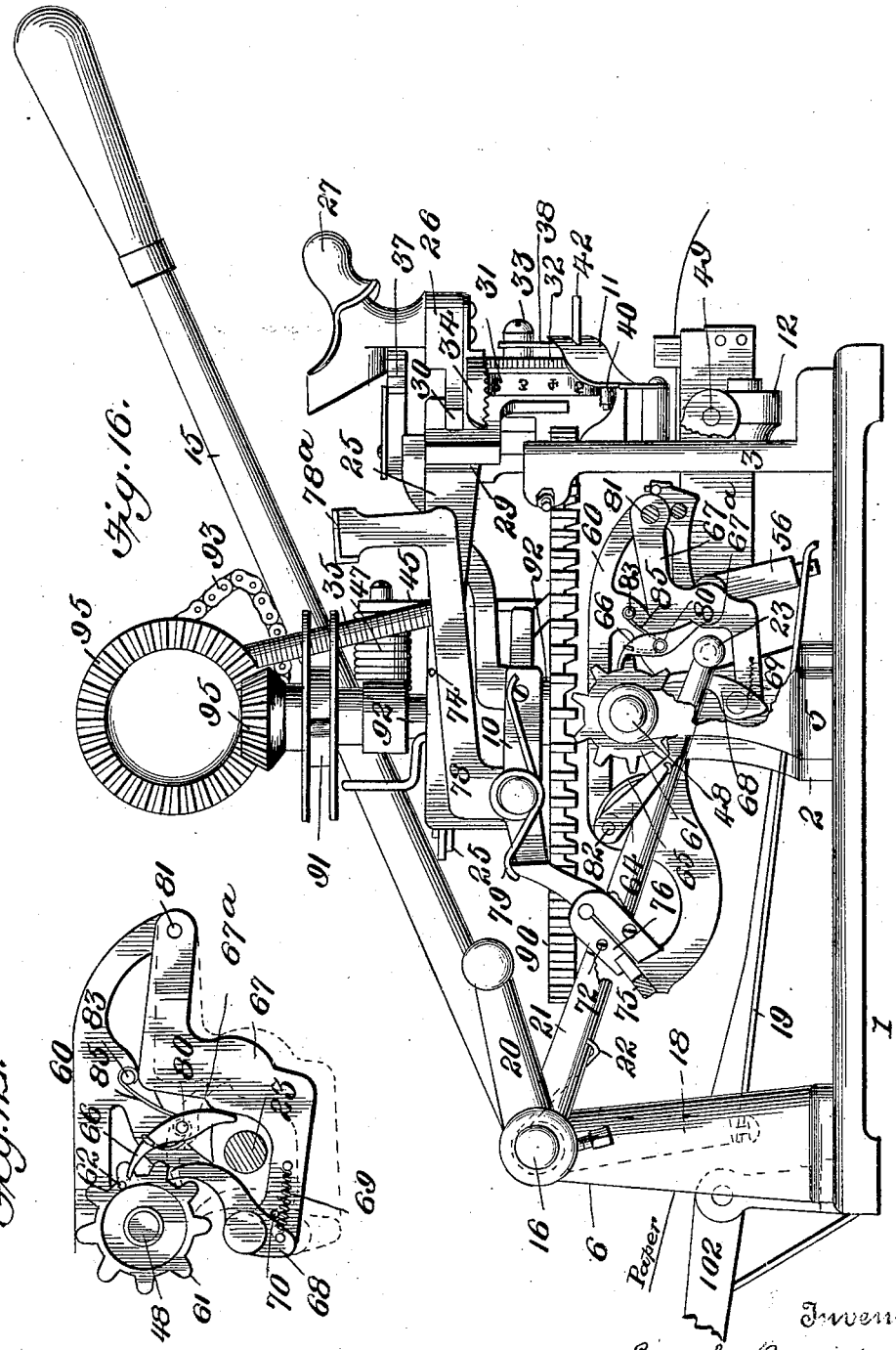

Fig. 12.



Witnesses
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Attorney

# UNITED STATES PATENT OFFICE.

LEE S. BURRIDGE AND NEWMAN R. MARSHMAN, OF NEW YORK, N. Y.

## ADDING AND RECORDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,331, dated January 21, 1896.

Application filed December 20, 1894. Serial No. 532,482. (No model.)

*To all whom it may concern:*

Be it known that we, LEE S. BURRIDGE and NEWMAN R. MARSHMAN, citizens of the United States, residing at New York city, in the county and State of New York, have invented a certain new and useful Adding and Writing Machine, of which the following is a specification.

The object of our invention is to provide a machine that will print and add figures by the operation of a stylus as exemplified in Letters Patent on type-writers granted to us on April 7, 1885, Nos. 314,996 and 315,386, this invention being the outgrowth of that, and an adaptation of it modified to serve the purpose for which it is intended.

Referring to the drawings, Figure 1 is a plan view. Fig. 2 is a detail side view of the paper-carriage as seen when looking at the left-hand side of the machine. Fig. 3 is a side elevation as seen when looking at the left-hand side of the machine. Fig. 4 is a detail view of the escapement controlling the adding mechanism. Fig. 5 is a detail plan view of the ratchet and pawl engaging the main wheel. Figs. 6 and 7 are detail views of the escapement controlling the carriage. Fig. 8 is a front elevation. Fig. 9 is a detail plan view of a portion of the standard 2. Fig. 10 is a detail view of the inking device and type-wheel, looking from the rear. Fig. 11 is a detail plan view of escapement, partially shown in Fig. 4. Fig. 12 is a detail view, on a much larger scale, of an adding-wheel and tens-carrying mechanism. Figs. 13 and 14 are views of an adding-wheel and its arbor, &c. Fig. 15 is a detail plan view showing the connection between the adding and the paper-carriage frames. Fig. 16 is a side elevation, similar to Fig. 3, but on a larger scale.

1 is the base on which is rigidly secured the standard 2 and posts 3, 4, 5, 6, and 7. On the projections 10 of the standard 2, Figs. 1, 3, and 9, is fulcrumed the frame 25 by shoulder-screws. Across the rear part where this frame is fulcrumed is fastened a cross-piece which serves to strengthen the frame, and in the center of this cross-piece is fulcrumed the stylus-arm 26, which projects through the slot 30, Fig. 8, in the front of the frame 25, and at the outer extremity of arm 26 is secured the stylus 27.

The type-wheel 31 and gear-wheel 32 (see Fig. 16) are secured together and rotated on the screw 33, which enters a projecting lip of the frame 25. (Shown in dotted lines in Fig. 8.) Below the stylus 27 on the arm 26 is secured the rack 34, which meshes in the gear-wheel 32. The frame 25 is held upwardly by the spring 35. Two arms 36ª are secured to the standard 2, and rigidly support the letter-plate 37, Figs. 1, 8, and 9, which has ten downward tapering slots or sockets, and opposite each a number, beginning with 0 on the left.

By moving the stylus to the numeral desired the type-wheel will be rotated, bringing the desired numeral on the type-wheel opposite the impression-point, and by depressing the stylus it will enter a slot and be locked from any side motion, thereby also locking the type-wheel.

The type are inked by the felt roller 40, which is saturated with ink and rotates on a wire which is riveted to the small arm 39, which is fulcrumed to the arm 38, and the spring 41 causes the roller 40 to bear against the type, Fig. 10.

The arm 38, which carries the above-mentioned arm 39 and roller 40, rotates on the screw 33, which is also the fulcrum of the type-wheel 31, and the pin 42, which is riveted to arm 38, projects through a slotted guide-piece 11, which is rigidly secured to the post 3.

The normal position of the ink-roller 40 is on the part of the type-wheel 31 over the platen 51, but as the frame 25 is depressed (by depressing the stylus) the roller rides away, owing to the pin 42 projecting into the slotted guide-piece 11, and allows the type to strike the platen 51, Fig. 8, and upon the downward and upward motion will ink the type opposite to the impression-point.

The carriage consists of the frame 50 for carrying the paper and the frame 60 containing the adding wheels and mechanisms. (See Figs. 8 and 15.) These two frames are joined together by a shoulder-screw 44, Fig. 15, and are supported in the front by being fast to the rod 49, which is longitudinally movable through the opening in the post 4 on the right and bears on the wheel 12 (see Fig. 8) fulcrumed on the post 3, and at the back the frame 60 is fast to the rod 48, which is longi-

tudinally movable through an opening in the standard 2 on the right and through an opening in the post 5 on the left, Figs. 1 and 15. The two frames 50 and 60 and rods 48 and 49 will therefore travel as one carriage. This carriage is propelled toward the right by the spring 47, (seen best in Fig. 8,) which is coiled on the fulcrum of and bears against the cam-shaped lever 45, to the free end of which is pinned a pitman 46, which in turn is pinned at its other extremity to the frame 50 of the carriage, Fig. 8. Said carriage is returned to the left by the lever 15, as hereinafter described.

The escapement, which is for the purpose of allowing the carriage to go to the right a tooth at a time, consists of the rack 75, (see Figs. 6 and 7,) which is secured to the rear of the frame 60, (see Fig. 1,) and the split spring-dogs 76, (although made of one piece they act as two,) which are secured to the flat face of the arm 77, which is pivoted to the lever 78, which in turn is fulcrumed on the screw which supports the left-hand side of the frame 25. (See Fig. 1.)

The dogs 76 are made of one piece of spring metal split in the middle part way, and one half is screwed rigidly to the flat face of arm 77, while the other half has an outward spring the space of a tooth in the rack 75, and which can be regulated by a screw 72.

The lever 78 has a finger key or plate $78^a$ at its front extremity above the letter-plate to be used for spacing when no printing or adding is required, and it is also depressed at every depression of the frame 25 by the pin 74, which projects from said frame 25 above said lever 78. The spring 79 bears the lever up. The dog 76 has an outward spring, so that when the lever 78 is depressed the free half will spring out, and when returned to normal this free half will enter the next opening in the rack and be pushed against the flat face of the arm 77, (by a tooth of the rack,) as the spring 47 which propels the carriage is stronger than the spring of the dog.

When the carriage has gone the required distance to the right and is returned to the left or first position (which operation will be explained farther on) the dog 76 will ride over the teeth in the rack—that is to say, the arm 77 will have an up-and-down motion from the fulcrum, and the spring 73 tends to bear this arm down, and consequently the dog into engagement with the rack, Figs. 6 and 7.

The platen 51, which is on the rod 49, is hexagonal in form, as seen in Figs. 2 and 15, and is kept in position by the spring 52 bearing on one of its sides or faces, Fig. 8. The rubber rollers 53 and 54 are in rolling contact with each other and serve to feed the paper forward, when rotated, in a manner well understood. They are rotated by means of the ratchet-wheel 55 and arm 56, which has a pawl 57 engaging in the ratchet-wheel. This arm 56 is operated by the connecting rod or link 19, to which it is loosely connected, as will be explained farther on.

The paper is passed between the shield 58 and roller 53, and by turning the rollers it will be guided between them and between the shields 59, which serve to keep the paper secure on the platen, Fig. 2. The paper may be in short lengths; but to avoid the constant entering and for other reasons we have shown a roll of paper 100 on a spool 101, the ends of which are supported in slots in the extremity of two arms 102 which are secured to the base. The roll of paper is stationary; but there is sufficient distance between the roll and frame for the paper to bend as the carriage travels back and forth.

The adding mechanism consists of the adding-wheels 61, which are cut with ten teeth and rotate on the rod 48, which has a keyway cut into it, Figs. 13 and 14, and between each two wheels 61 is placed a thin washer 63, which has a tongue fitting in the keyway in the rod 48, to prevent all the adding-wheels 61 from rotating together, and thereby avoid any frictional action of one wheel on another.

64 are anchoring-pawls which serve to bring and retain their respective wheels 61 in a set position. They are cut at their extremities on two angles which set in the teeth or between two teeth of the wheels 61, as shown in Figs. 3 and 16. The rod 82 serves as a bearing for said pawls, and the springs 65 tend to keep them in engagement with said wheels 61. The triggers 66, arms 67, and pawls 68 are the tens-carrying-over mechanism. On the left side of each wheel 61 (except the last on the left) is a pin 62. (Shown clearly in Fig. 13.) The triggers 66 have the rod 80 for a bearing. The arms 67 have the rod 81 for fulcrum, and at the outer extremity of each arm a pawl 68 is fulcrumed and a spring 69 tends to bear the pawl against the pin 70, Fig. 12. The springs 71 (see Fig. 1) bear the arms 67 up and the lower part of each trigger 66 rests against a jog or step $67^a$ cut in the arm 67 and retains its respective arm down, as shown in Figs. 3, 12 and 16.

The anchoring-pawls 64, triggers 66, and arms 67 all have tubes fastened to them to increase the length of bearing on their supporting-rods and keep them in proper positions. The springs 85 bear against the triggers 66.

The upper part of the triggers 66 is between the adding-wheels 61 in line with the pins 62, so that when a wheel is rotated the pin 62 pushes out the trigger 66, causing the lower part of it to disengage itself from the arm 67, allowing said arm to spring up by the action of the spring 71, and the pawl 68, which is in line with an adding-wheel, will cause that particular wheel to rotate one tooth, as shown in full lines in Fig. 12. The arresting-point of the arm 67 is the rod 83, Figs. 3, 12, and 16.

It will be seen that there are eight adding-

wheels and anchoring-pawls, but only seven triggers 66 and arms 67. The pin 62 of the first adding-wheel to the right acts on the first trigger and that acts upon the first arm, the pawl of which when let off acts upon the second adding-wheel, and so on, so that the first adding-wheel to the right has no arm in line with it, and the last adding-wheel to the left has no pin and obviously no trigger to act on.

The reading-line of the adding-wheels is the upper central line (see Fig. 1) and the pins 62 are set in a position to act on the triggers 66 as the wheels are rotated from 9 to 0.

The adding-wheels 61 are rotated (except for carrying the tens) by the large gear-wheel 90, which is made as light as possible and whose teeth project below the surface of the wheel sufficiently to mesh with the teeth of whichever of the adding-wheels it is operating. For instance, if such a number as "321" is to be printed and added, the stylus is first operated to print the numeral "1," and as the large gear-wheel 90 is at this moment in mesh with the units-adding wheel said units-adding wheel is moved to add one. Now, as the paper-carriage and the frame carrying the adding-wheels all move as one carriage, the adding-wheels are moved toward the right the same distance (one notch of the rack 75) as the paper-carriage moves. This movement to the right, of course, brings the next adding-wheel (the tens-wheel) into mesh with the gear-wheel 90, so that when the "2" of the number "321" is printed the second or tens-adding wheel is rotated (to add the 2) instead of the units-wheel. Of course it is easily seen that as the paper-carriage and the adding-wheels move to the right the proper adding-wheel will be brought into mesh with the operating-wheel 90—that is, when the numeral "2" is printed the adding-wheels again move to the right, thus bringing the hundreds-adding wheel into mesh with the operating gear-wheel 90, so that when the "3" of the number "321" is printed the "3" will be added on the hundreds-adding wheel, and so on if a larger number is printed and added. This wheel 90 is loosely journaled on the arbor 92 and has a pawl 98 mounted thereon, (see Fig. 5,) which engages with a ratchet-wheel 97, which is fixed to said arbor 92 and therefore rotates with the arbor as the latter is rotated by the flat coiled spring 91. (See Figs. 3 and 8.) Of course when the arbor 92 and its ratchet-wheel 97 are rotated by said spring, the wheel 90 is caused to rotate also, through the medium of the pawl 98, as will be readily understood. When the arbor is rotated in the opposite direction, the pawl 98 simply slips over the teeth of ratchet-wheel 97 in the usual manner. This wheel 90 is arrested by an L-shaped piece 29, which is rigidly secured to the right of frame 25 and the projecting L of which is between the teeth of the wheel 90, as shown in Figs. 1, 4, and 8. When the frame 25 is depressed, the wheel 90 is freed from the piece 29 and is free to rotate under the influence of the spring 91.

On the arm 26 is fulcrumed the arm 28, which has a finger projecting downward in line with the teeth in the wheel 90, and the spring 36 bears this arm 28 against or parallel with the arm 26. Now when the frame 25 is depressed the finger of the arm 28 will enter between two teeth in the wheel 90, and as soon as the projecting L of piece 29 has passed below the teeth the wheel 90 will be impelled by the spring 91, carrying the arm 28 with it, the spring on the arm 28 being much lighter than the spring 91, until the arm 28 comes in contact with the set-crew 13 on the post 3, where it will be arrested. (See Fig. 11.) When the frame 25 is allowed to return to normal, the wheel 90 will have no motion, as the projecting L of piece 29 will enter between two teeth before the finger of arm 28 is above the teeth of the wheel. When, however, it is above said teeth, it (arm 28) will be impelled toward the arm 26 by the spring 36. These two arms 26 and 28 each have an opening cut in them (see Fig. 11) to allow movement without contact with the arbor 92.

It must be understood that the teeth of the letter-plate 37 that form the slots or sockets before referred to, except the first on the left, are cut on the same gage as the teeth in the wheel 90, so that when the stylus 27 enters a slot in the letter-plate the finger of arm 28 will enter between two teeth in the wheel.

The different slots in the letter-plate cause the finger of arm 28 to enter the teeth in the wheel the required distance from the set-screw 13. Thus when the stylus enters the first cut on the right-hand end, which is the "9," the wheel will rotate nine teeth before the arm 28 comes in contact with the set-screw 13. When a "0" is to be printed the wheel 90 does not rotate at all, as the arm 28, instead of going centrally between two teeth, will be close to the one on the right-hand side and up against the set-screw 13, thereby preventing the wheel 90 from rotating. It will be noticed that the first slot in the letter-plate on the left-hand end is not equidistant with the others for that purpose.

The operating-arm 15 is secured on the shaft 16, which is supported by the posts 6 and 7. When this arm is drawn down by the handle it causes the flat coiled spring 91 to be wound up, whatever amount it may have run out, through the agency of a chain 93, which connects the operating-arm 15 to a drum 94 on the arbor 96, thus causing the latter to rotate, consequently rotating the miter-wheels 95 as the drum and the miter-wheels are fast to their respective arbors 96 and 92. The drawing down of the arm 15 also causes the carriage to be returned to the left-hand side of the machine, as said arm 15 bears against a cam-shaped lever 45, which is connected to the carriage by the pitman 46, hereinbefore mentioned. (See Fig. 8.) It will also cause

the paper to be advanced for a new line through the agency of the arm 18, which is secured to the shaft 16 and is connected with the operating-arm 56 by the connecting-link 19. (See Figs. 2 and 16.) It will also cause the arms 67 to be reset or such of the arms as have been let off by means of the arm 20 (which is pinned on the shaft 16) bearing against the arm 21, which is loose on the same shaft and which has an inwardly-projecting arm or finger 23, which lies over all the arms 67. (See Figs. 1, 3, 12, and 16.)

A spring 22 bears the arm 21 up against the pin 24 on the post 5 to keep the arm or finger 23 normally above the arms. (See Fig. 8.) The arm 15 is normally held upright by means of a spring 17 on the shaft 16. (See Fig. 1.)

The operation consists in moving the stylus opposite to the desired numeral on the letter-plate and depressing it, which will cause that numeral to be printed on the platen 51, and the wheel 90 (and whatever wheel 61 it is in mesh with) to rotate that particular number of teeth. When the hand and stylus return, the carriage will take one step to the right, owing to the movement of the spring-dogs 76 with rack 75, and the next depression of stylus will cause a numeral of a higher numerical order to be printed and added.

When the desired number has been printed the arm 15 is drawn down, which will cause the carriage to be returned to the starting-point, the spring 91 to be rewound, the paper to be advanced to a new line, and the arms 67 to be reset, if let off during the rotation of the adding-wheels 61.

What we claim as new, and desire to secure by Letters Patent, is—

1. In an adding and printing machine, an adding mechanism having adding wheels constructed and arranged to add from 0 to 9 in each column, a gear-wheel arranged to actuate said wheels and adapted to successively engage with each of said wheels, a printing mechanism, a stylus movable horizontally and vertically, and intermediate mechanism constructed and arranged to operate the printing wheel and cause the gear-wheel to engage with and operate its proper adding wheel, when the stylus is operated, substantially as described.

2. In an adding and writing machine, the combination of adding wheels and a spring actuated wheel adapted to rotate the adding wheels, with a letter plate spaced evenly with the spring-actuated wheel for the purpose of letting off the spring actuated wheel the desired number of gear teeth, substantially as described.

3. In an adding and writing machine, the combination of adding wheels and a power wheel adapted to rotate the adding wheels, with an arm having a stylus at its free end, and a second arm fulcrumed on it adapted to enter the gear-teeth of the power wheel and act as an escapement, as set forth.

4. In an adding machine, the combination of a series of adding wheels, a power wheel constructed and arranged to successively engage with said adding wheels, thereby successively operating the same, an escapement having a part normally holding said power wheel in an inoperative position, and also having a part arranged to be moved by said power wheel when the latter moves, and a stop acting as an arrest for said second part, thus controlling the movement of said power wheel, whereby when a number is added the escapement permits the power wheel to move, thus actuating the proper one of the series of adding wheels until the said mentioned second part is arrested by the stop, substantially as described.

5. The combination in a carry mechanism, of adding wheels, a spring-actuated arm carrying means thereon for actuating one of said wheels when actuated by its spring, and a trigger constructed to hold said arm in a position of rest, whereby the arm is moved to operate an adding wheel, when released by the trigger, substantially as described.

6. The combination in a carry mechanism, of adding wheels 61 having pins 62 thereon, with a spring actuated arm 67 having a pawl 68 thereon constructed and arranged to operate one of the adding wheels when the arm 67 is actuated by its spring, and triggers 66 arranged to hold the arm in an inoperative position, substantially as described.

7. In an adding and writing machine where the adding mechanism and paper mechanism travel as one carriage, the combination of such carriage, with a cam-shaped arm constructed to return the carriage to its starting point by the action of a handle and bearing against the cam, as shown and described.

8. In an adding and writing machine, the combination of a stylus and a letter plate having slots cut into it for the reception of said stylus, with a gear-wheel whose teeth are cut equidistant with the slots in the letter-plate, substantially as described.

9. In an adding and writing machine, in which the paper frame and adding mechanism frame move step by step as one carriage, and in which the adding wheels are rotated by a spring-actuated wheel, and in which the carrying mechanism requires to be reset when let off; the combination of such carriage, spring-actuated wheel, and carrying-mechanism, with a handle-arm constructed through intermediate mechanism to return the carriage to its starting point, wind up the spring actuating the wheel, reset the carrying-mechanism, and feed the paper all by one uniform depression, substantially as described.

10. The combination in a carry mechanism, of adding wheels having pins thereon, of a spring-actuated arm having a pawl mounted thereon, constructed and arranged to operate one of said adding wheels when the arm is actuated by its spring, and a trigger constructed to hold the arm from being actuated

and lying in the path of the pin on the adding wheel, whereby when the pin operates the trigger the arm is released and is actuated by its spring to cause its pawl to operate an adding wheel, substantially as described.

11. In an adding and writing machine, adding mechanism, a spring-actuated wheel actuating the wheels of said adding mechanism, a traveling carriage for supporting and feeding the paper, in combination with a lever, and intermediate mechanism constructed and arranged to return said carriage to its starting point, to feed the paper through said carriage, and to wind up the spring actuating said wheel, upon the single operation of said lever, substantially as described.

12. In an adding and writing machine, adding mechanism, means for operating the adding wheels thereof, tens carrying mechanism for said adding wheels, and a carriage for supporting and feeding the paper, in combination with a lever, and intermediate mechanism constructed and arranged to return the carriage to its starting point, feed the paper through said carriage, and reset said tens carrying mechanism, upon the operation of said lever, substantially as described.

13. In an adding machine, the combination with a series of adding wheels, of a toothed power wheel arranged to successively engage with and thereby successively operate said adding wheels, means as the "projecting L" arranged to normally hold said power wheel inactive, a spring-actuated pivoted arm co-acting with said holding means, and arranged to be engaged with and moved by said power wheel when the latter is released by said holding means, and a stop acting as an arrest for said pivoted arm, and thereby acting as a stop for the power wheel, whereby when a number is added, the holding means permits the power wheel to move, thus operating the proper one of the series of adding wheels until the pivoted arm is arrested by said stop, substantially as described.

14. In an adding and writing machine, the combination of adding wheels, a power-wheel arranged to actuate the same, printing mechanism, a stylus constructed and arranged to control said printing mechanism, an escapement co-acting with said stylus and having one part as the "projecting L" normally holding the power-wheel and a second part arranged to be moved by said power-wheel when the latter is released by said projecting L, the movement of said second part being controlled by the said stylus, and a stop acting as an arrest for said second part, substantially as and for the purpose specified.

15. In an adding machine, the combination of a series of adding wheels, a toothed power-wheel arranged to operate the same, means as the "projecting L" arranged to hold said power-wheel, a spring-actuated pivoted arm co-acting with said holding means constructed and arranged to engage with the teeth of said power-wheel when the latter is released from the holding means, a letter-plate, a stylus co-acting with said letter-plate and controlling said holding means and pivoted arm, and a stop for limiting the movement of said pivoted arm, substantially as described.

16. In an adding and writing machine, the combination of a power-wheel, a movable frame having a rack thereon and carrying a series of adding wheels adapted to engage with the teeth of the power-wheel, a pivoted frame carrying a spring dog arranged to engage with said rack and to allow said movable frame to move step by step when said pivoted frame is operated to move said dog, and means for shifting said movable frame and its adding wheels when released by said dog, substantially as described.

17. In an adding and writing machine, the combination of a spring-actuated power-wheel, a movable spring-actuated frame having a rack thereon and carrying a series of adding wheels adapted to successively engage with the teeth of said power-wheel, a pivoted frame carrying a spring dog arranged to engage with said rack and to allow said movable frame to move step by step as released by said dog, a letter-plate, and a stylus co-acting therewith and connected with said pivoted frame, whereby said frame is moved to operate its dog and allow the movable frame to be shifted by its spring, when said stylus is moved, substantially as described.

18. In an adding and writing machine, the combination of a spring-actuated power-wheel, a spring-actuated movable frame having a rack thereon and carrying a series of adding wheels adapted to successively engage with the teeth of said power-wheel, a pivoted frame carrying a spring-dog arranged to engage with said rack and to allow said movable frame to move step by step as released by said dog, a letter-plate, a stylus co-acting therewith and connected with said pivoted frame, a printing mechanism under the control of said stylus, and a paper carriage, whereby the movements of the stylus cause the printing mechanism to print the paper on the carriage and the dog to operate, thus allowing the spring-actuated carriage to move, substantially as described.

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