

(No Model.)

2 Sheets—Sheet 1.

W. J. ENSWORTH.
ADDING AND RECORDING APPARATUS.

No. 605,705.

Patented June 14, 1898.

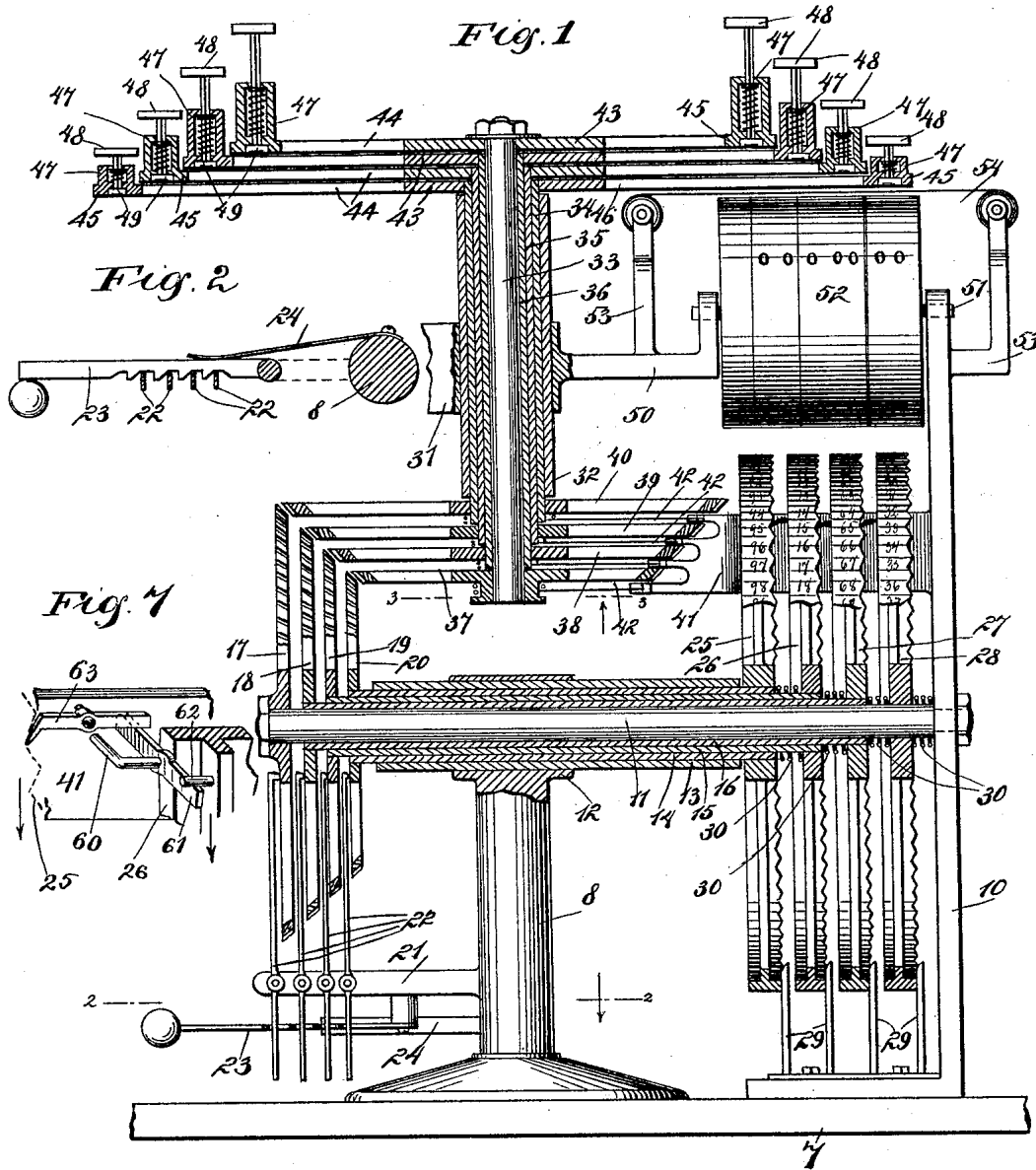


Fig. 3

WITNESSES:
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INVENTOR
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 BY *[Signature]*
 ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4

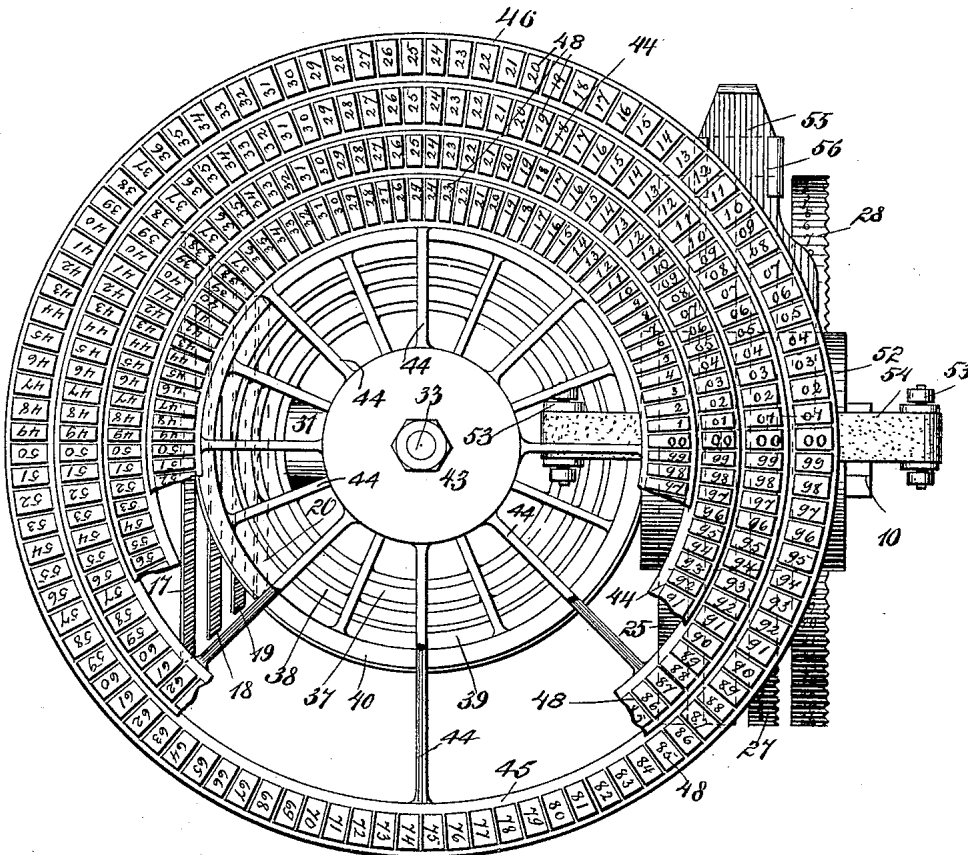
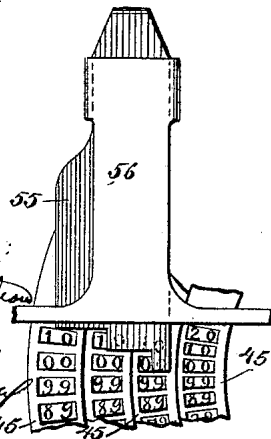
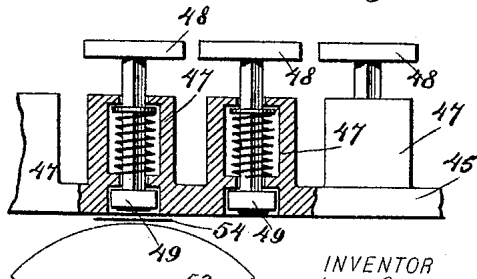


Fig. 5



WITNESSES:
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Fig. 6



INVENTOR
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UNITED STATES PATENT OFFICE.

WILLIAM J. ENSWORTH, OF ERIE, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE ERIE CASH REGISTER COMPANY, LIMITED, OF SAME PLACE.

ADDING AND RECORDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 605,705, dated June 14, 1898.

Application filed August 11, 1897. Serial No. 647,890. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. ENSWORTH, of Erie, in the county of Erie and State of Pennsylvania, have invented a new and Improved Adding and Recording Apparatus, of which the following is a full, clear, and exact description.

This invention is an apparatus for registering and recording figures; and it comprises printing devices for impressing the numbers individually and registering-wheels for casting up the individual figures in a total or aggregate sum.

This specification is the disclosure of one form of my invention, while the claims define the actual scope of the conception.

Figure 1 is a vertical section of the invention. Fig. 2 is a detail section on the line 2 2 of Fig. 1. Fig. 3 is a detail section on the line 3 3 of Fig. 1, looking in the direction of the arrow in said figure. Fig. 4 is a plan view of the invention. Fig. 5 is a fragmentary view illustrating the stop-plate. Fig. 6 is a fragmentary section showing in detail the keys for the printing device, and Fig. 7 is a fragmentary and enlarged perspective view showing the advancing-pawls for the re-

The frame of the machine rests on a base 7 and has a main column 8. A standard 10 is mounted rigidly on the base 7 and carries a horizontal shaft 11, that passes through a bearing 12 in the upper portion of the column 8.

Held rigidly by the bearing 12 is a horizontally-extending tube 13, which loosely incloses three hollow shafts 14, 15, and 16. The innermost shaft 16 turns loosely on the shaft 11, and all of the shafts 14, 15, and 16 are capable of revoluble movement independently of each other. The shafts gradually increase in length inward from the shaft 14, so that the ends of the hollow shafts are respectively extended one beyond the other. Attached to the left-hand end of the shaft 11 is a bevel-gear 17, attached to the corresponding end of the hollow shaft 14 is a bevel-gear 18, attached to the corresponding end of the shaft 15 is a bevel-gear 19, and attached to the corresponding end of the shaft 16 is a

bevel-gear 20. The bevel-gears gradually decrease in size inward from the gear 17. The gears 17, 18, 19, and 20 may move independently and horizontally with their respective shafts 14, 15, 16, and 11. Running out rigidly from the column 8 is an arm 21, carrying levers 22, which bear, respectively, against the gears 17, 18, 19, and 20 and by which the said gears, with their attached shafts, may be shifted horizontally. A ratchet-latch 23 is pivoted on the arm 21 and pressed by a spring 24. This latch holds the levers 22 in normal position. By moving the arm 23 against the spring 24 any desired one of the levers 22 may be operated to shift the gear with which it coacts.

The ends of the shafts 14, 15, 16, and 11 opposite the ends having the gears 17, 18, 19, and 20 are provided, respectively, with wheels 25, 26, 27, and 28, which have wide peripheries with numbers thereon, each set of numbers running from "0" to "99." One edge of each periphery of the wheels 25, 26, 27, and 28 is serrated, and these edges are respectively engaged by spring-fingers 29, standing on the base 7 and serving to hold the wheels 25, 26, 27, and 28 in the positions to which said wheels may be put. Movement imparted to the wheels 17, 18, 19, and 20 will turn the shafts whereon said wheels are carried, and the shafts in turn will impart movement to the wheels 25, 26, 27, and 28. These latter wheels are the registering-wheels, which show the total of the sums that are written. Fig. 7, which shows the advancing-pawls for transmitting movement from one registering-wheel to the other, illustrates between each pair of the registering-wheels a bent arm 60, held rigidly by the arm 41. Fulcrumed on the arm 60 is a lever 61, arranged to be engaged by a pin 62, fixed on the contiguous registering-wheel. For each arm 60 the arm 41 carries a pawl 63, which pawls are respectively engaged with the levers 61. The pawls 63 respectively engage the toothed edges of the wheels 25, 26, and 27. When a registering-wheel to the right of another registering-wheel turns a complete revolution, the pin 62 on said turning-registering-wheel will rock the lever 61, which throws the coacting pawl

63 and turns the contiguous registering-wheel one point or notch. By these means the register is effected by a principle similar to the well-known registering or adding devices.

5 The parts 60, 63, 61, and 62 are so arranged that the necessary sliding of the registering-wheels may be permitted without interference by said parts. The shafts 11, 16, 15, and 14 are pressed endwise in a leftward direction

10 with reference to Fig. 1 by means of expansive spiral springs 30, bearing against the right-hand ends of the shafts 14, 15, and 16 and against the hubs of the wheels 25, 26, 27, and 28.

15 An arm 31, supported horizontally, has a bearing 32, in which a solid shaft 33 and three hollow shafts 34, 35, and 36 are revolubly mounted. Fixed to the shaft 33, at the lower end thereof, is a bevel-gear 37, capable of

20 meshing with the gear 20. Fixed to the lower end of the shaft 36 is a bevel-gear 38, capable of meshing with the gear 19. Fixed to the lower end of the shaft 35 is a bevel-gear 39, capable of meshing with the gear 18, and fixed

25 to the lower end of the shaft 34 is a bevel-gear 40, capable of meshing with the gear 17. Rigidly secured to the standard 10 is a finger-plate 41, the fingers of which respectively carry hair-springs 42, attached to the shafts

30 36, 35, and 34 and to the hub of the wheel 37, such springs serving to hold the above-named parts in normal position.

The upper ends of the shafts 34, 35, 36, and 33 are arranged one above the other, the innermost shaft being the longest, and these

35 shafts are respectively provided with horizontal recording-wheels which are of different diameters and which are arranged one above the other, the uppermost wheel being

40 the smallest. Each recording-wheel has a box 47 secured to its upper side and at the periphery thereof. Sliding vertically within each box 47 is a spring-pressed key 48, on the lower end of which is a die 49. The dies 49 on each

45 wheel bear numbers ranging from "0" to "99." The upper face of each key is printed with a number corresponding to the number on the die of said key. These keys, with their dies, serve as recording devices, and each key

50 moves through or across the plane of the wheel or wheels, below and between the spokes thereof, to effect an impression, as hereinafter described. Each wheel is of different diameter to permit the keys of one wheel to be struck

55 without interfering with those of the other, the said wheels comprising each a hub 43 and a rim 45, connected by widely-separated and slender spokes 44, radiating from the hub, so that the keys will meet with no impediment

60 to their operation.

Carried in the upper end of the standard 10 and in an arm 50, carried by the arm 31, is a shaft 51, on which a roll 52 of paper is mounted, which roll may be handled in any desired

65 manner. Arms 53 are respectively carried by the standard 10 and by the arm 50, said arms 53 carrying rolls of the inked ribbon 54. The

ribbon 54 runs transversely across the roll 52 of paper and beneath the recording-wheels.

The numbers are recorded by pressing down 70 the keys 48, so that the dies 49 may be engaged with the inking-ribbon 54 to impress the number on the roll 52 of paper. As will be more fully explained hereinafter, it may in some cases be desirable to protect from 75 pressure certain elements of the numbers on certain keys. To attain this end, I provide a plate 55, sliding in a bracket 56, suitably supported on the frame of the machine, so that the plate will be located beneath the keys 80 48 of the recording-wheels. By moving this plate toward and from the ribbon 54 the plate may be made to cover certain figures of the numbers on the dies of the keys 48, so as to prevent the impression of said figures. Such 85 operation is illustrated in Fig. 5.

The outermost wheel of the recording-wheels has its keys made to represent cents, and the die of each key on this wheel may be provided with a decimal point to separate the 90 numbers struck by the keys of the said outermost wheel from the numbers that are struck by the remaining recording-wheels, such latter numbers indicating dollars. It will be understood that, if desired, the keys 95 may be made to indicate numbers simply, with those of the said outermost recording-wheel representing decimal fractions. On the two recording-wheels next to the outermost recording-wheel some of the keys and 100 their corresponding dies have numbers with zero-marks before them. These keys on each wheel except the outermost recording-wheel are the keys representing the numbers from "1" to "9." In some cases, however, it will 105 not be desirable to strike these zero-marks—for example, when the sum "202" is to be written. It therefore is the function of the plate 55 to cover the zero-marks on the dies, so as to prevent the impression of said zero- 110 marks on the roll 52; but should it be desired to write the number "20,202" the plate 55 is moved out, so as not to interfere with the impression of the "0" on the "2" key of the wheel which is in position to strike such figure. 115

Assuming now that it be desired to record and register a certain number, the recording-wheels are manually shifted so that the desired numbers will be arranged over the point at which the zero-marks of said wheels are 120 illustrated in Fig. 4. The appropriate keys should now be depressed, whereupon the roll 52 will be impressed with the numbers on the dies. As the recording-wheels are shifted movement will be transmitted to the gears 40, 125 39, 38, and 37 by means of the several shafts on which said gears are carried. Previous to this operation the levers 22 should have been moved so as to mesh the gears 17, 18, 19, and 20 with the gears 37, 38, 39, and 40. Con- 130 sequently as the latter gears are turned the gears 17, 18, 19, and 20 also will be turned and the wheels 25, 26, 27, and 28 will be moved so that the sum of the number recorded on

the roll 52 will be cast into the total shown by the registering-wheels 25, 26, 27, and 28, such total being read on said wheels with reference to any suitably-arranged indicator-point. When the operation has been performed, the arm 23 should be moved against the spring 24, so as to release the levers 22 and permit the return of said levers with their associated parts by the action of the expansive springs 30.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a series of shafts inclosed one within the other and independently revoluble, registering - wheels respectively carried on said shafts, a second series of shafts inclosed one within the other and independently revoluble, gearing connecting the shafts of each series in pairs, recording-wheels respectively mounted on the members of the second series of shafts, and keys carried by the recording-wheels.

2. The combination of a series of gears, a series of shafts inclosed one within the other and independently revoluble, a gear fixed to each member of the said series of shafts and respectively meshing with the first series of gears, a spring pressing each shaft endwise to hold the gears out of engagement with each other, and means for moving the shafts against said springs.

3. The combination of a column, a bearing carried thereby, a series of shafts mounted in the bearing and inclosed one within the other and being independently movable, a gear fixed to each shaft, a lever pressing each gear, a latch-plate holding the levers, and a spring pressing the shafts respectively against the levers.

4. The combination of a series of shafts inclosed one within the other, a gear fixed to each shaft, a fingered plate held adjacent to each finger of the plate, the hair-springs respectively being in connection with the shafts whereby to hold the same in a normal axial position.

5. The combination of a series of shafts inclosed one within the other, a series of recording-wheels respectively fixed to the shafts, each recording-wheel comprising a hub and a rim connected by spokes, and keys carried by the rims of the wheels, and recording devices carried by the recording-wheels, some of said recording devices being capable of moving across the plane of a portion of the wheels.

6. The combination of a series of wheels turning on a common center, the wheels being of different sizes and each wheel comprising a hub and a rim connected by spokes, and keys carried by the wheels, a portion of said keys being capable of moving through the plane of a portion of the wheels.

7. The combination of a series of recording-wheels having different diameters, re-

coding-keys carried by the wheels, and a plate movable in the vicinity of the keys so as to cover certain parts thereof.

8. The combination of a series of levers, spring-pressed parts respectively engaged thereby, a ratchet-latch coacting with the levers to hold the same, and a spring pressing the ratchet-latch.

9. The combination of a plurality of recording-wheels turning on a common center, boxes carried by each wheel, spring-pressed keys respectively movable in the boxes, and a die to which each key is attached.

10. The combination of a series of shafts revoluble on a common axis, a wheel turning with each shaft, recording devices mounted on each wheel, and springs in connection with the shafts whereby to return the wheels to a normal position.

11. The combination of a series of shafts inclosed one within the other and revoluble on a common axis, a series of wheels respectively fixed to the shafts, the wheels having varying diameters and having spokes, and recording devices carried by each wheel, the recording devices being movable transversely to the planes of the wheels, and some of the recording devices being capable of extending between the spokes of some of the wheels.

12. The combination of a series of wheels turning on a common axis and having spokes, the wheels also having varying diameters, and recording devices carried by the wheels and movable transversely to the planes thereof, some of the recording devices being capable of extending between the spokes of some of the wheels.

13. A recording-wheel having a rim, a box secured to the rim and extending transversely to the plane of the wheel, and a recording-key mounted in said box and movable through the same.

14. The combination of a series of shafts, a series of registering-wheels respectively carried on the shafts, a second series of shafts, recording-wheels respectively carried on said second series of shafts, and gearing connecting the two series of shafts in pairs so that the members of the several pairs of shafts with their corresponding recording and registering wheels will turn in unison.

15. The combination of a series of shafts inclosed one within the other, and revoluble on a common axis, registering-wheels respectively carried by the shafts, a second series of shafts inclosed one within the other and revoluble on a common axis, recording-wheels respectively carried by the second series of shafts, and gearing connecting the members of the two series of shafts in pairs.

16. The combination of a series of shafts revolubly mounted one within the other, a registering-wheel carried at one end of each shaft, the registering-wheels being located in close proximity with each other, a gear-wheel carried by each of said shafts, a second series of shafts, the members of which are revolu-

bly mounted one within the other, a gear fixed to each shaft of said second series and respectively meshed with the first-named gears, and recording-wheels respectively carried one by
5 each shaft of said second series.

17. The combination of a series of shafts revolubly mounted one within the other, a registering-wheel carried by each shaft of said series, expansive springs situated between
10 the registering-wheels and maintaining the relative positions thereof, a gear-wheel fixed to each shaft of said series, a second series of shafts revolubly mounted one within the

other, a gear fixed to each shaft of said second series and respectively capable of mesh- 15
ing with the first-named gears, means for independently sliding the shafts of said first-named series to engage the gears with each other, and recording-wheels respectively carried by the members of said second series of
20 wheels.

WILLIAM J. ENSWORTH.

Witnesses:

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F. F. CURTZ.