C. P. WETMORE.

CIPHER CUT-OUT FOR ADDING MACHINES.

APPLICATION FILED APR. 24, 1907.

1,180,556.

Patented Apr. 25, 1916.

4 SHEETS—SHEET 1.

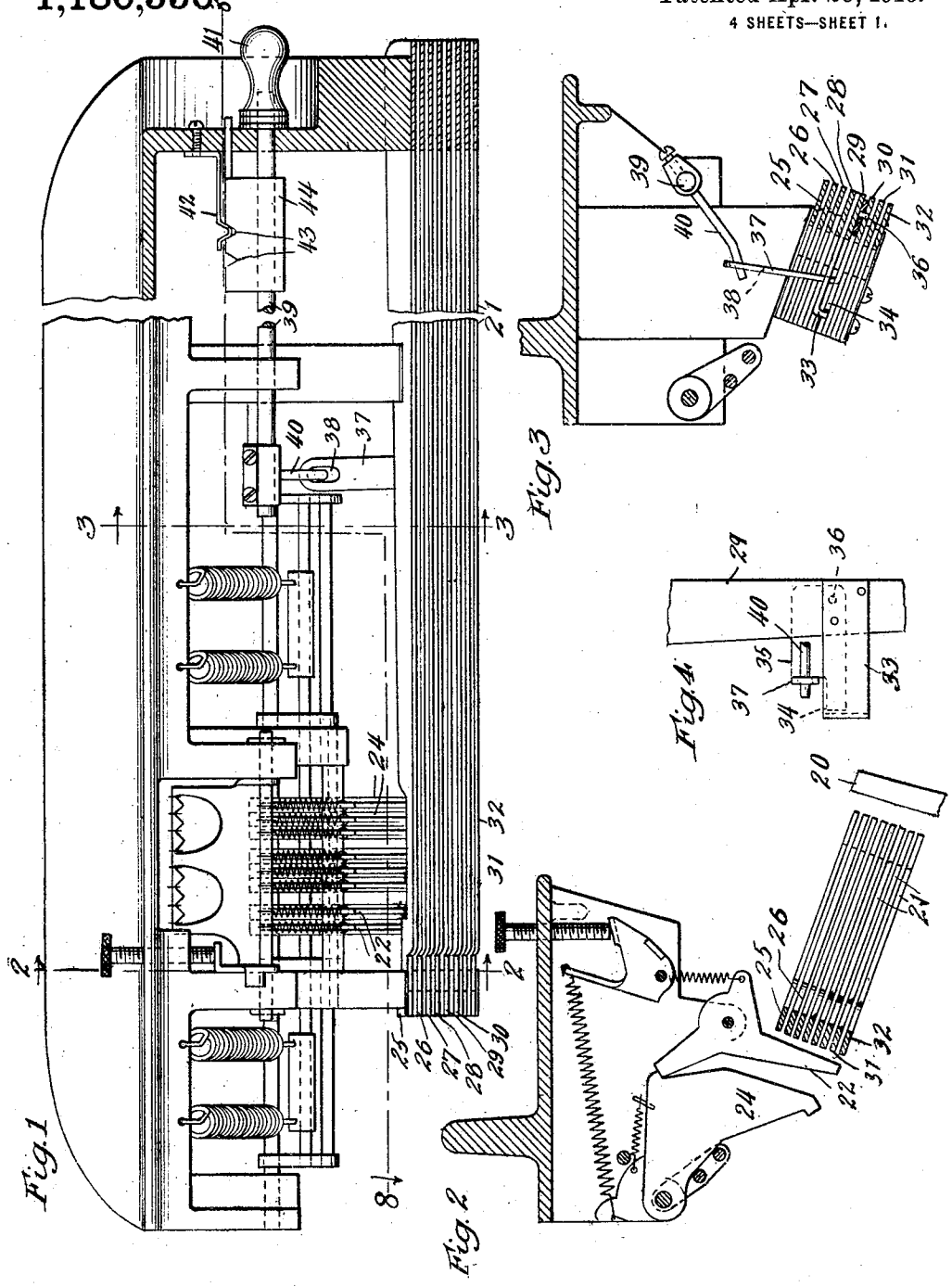


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Witnesses:

Wm. Geiger

H. W. Munday.

Inventor:

Charles P. Wetmore

By Munday, Evans, Adcock & Clarke.

Attorneys

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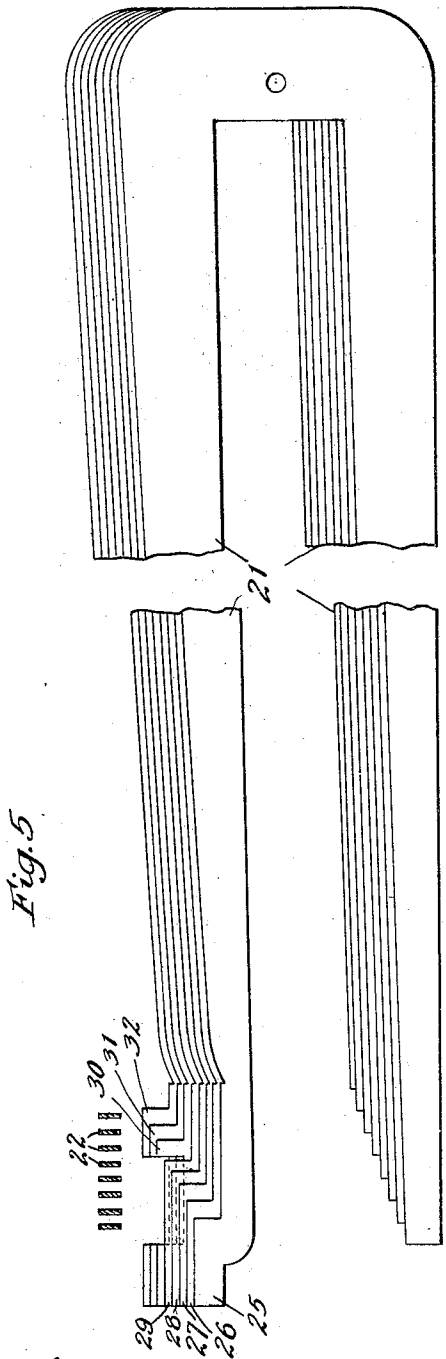


Fig. 5

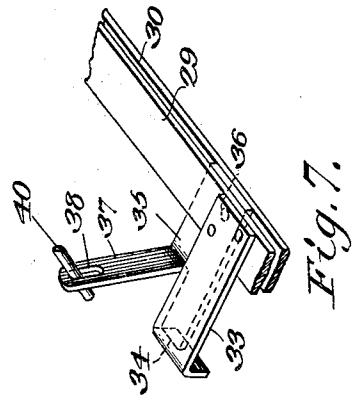


Fig. 7.

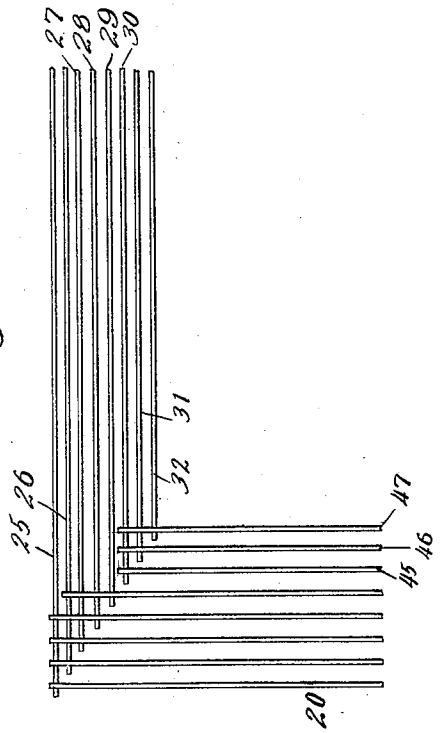


Fig. 6

Witnesses:

Wm. Geiger

H. W. Munday.

Inventor:

Charles P. Wetmore.

By Munday, Evarts, Adcock & Clarke.

Attorneys

C. P. WETMORE.

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4 SHEETS—SHEET 3.

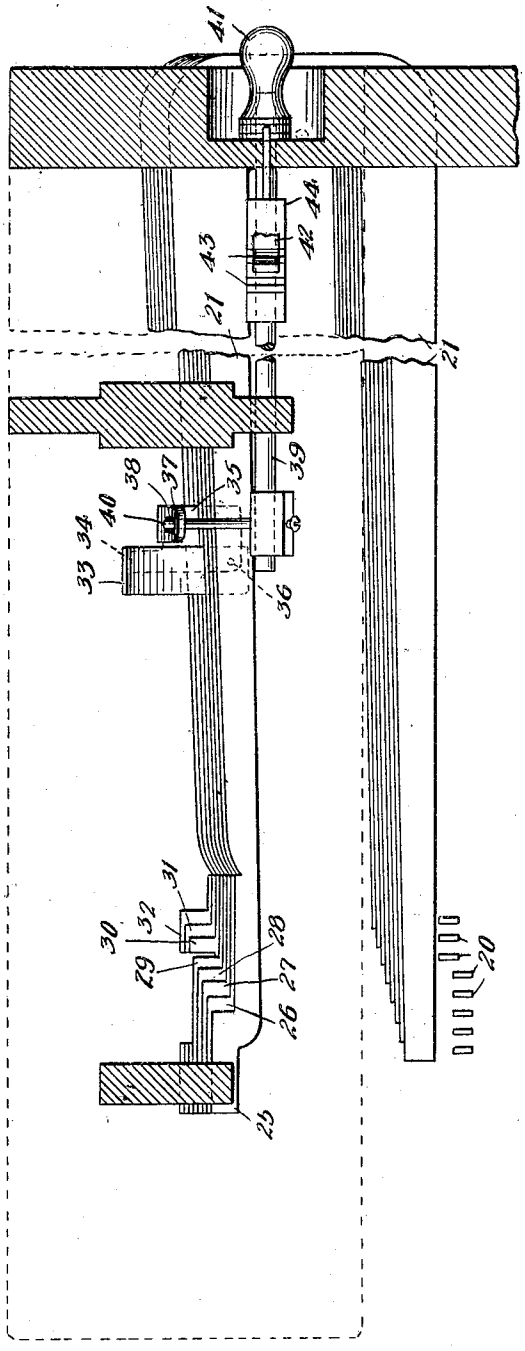


Fig. 8

Witnesses:

Wm. Geiger

H. W. Munday.

Inventor

Charles P. Wetmore

By Munday, Evarts, Adcock & Clarke,

Attorneys

C. P. WETMORE.

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4 SHEETS—SHEET 4.

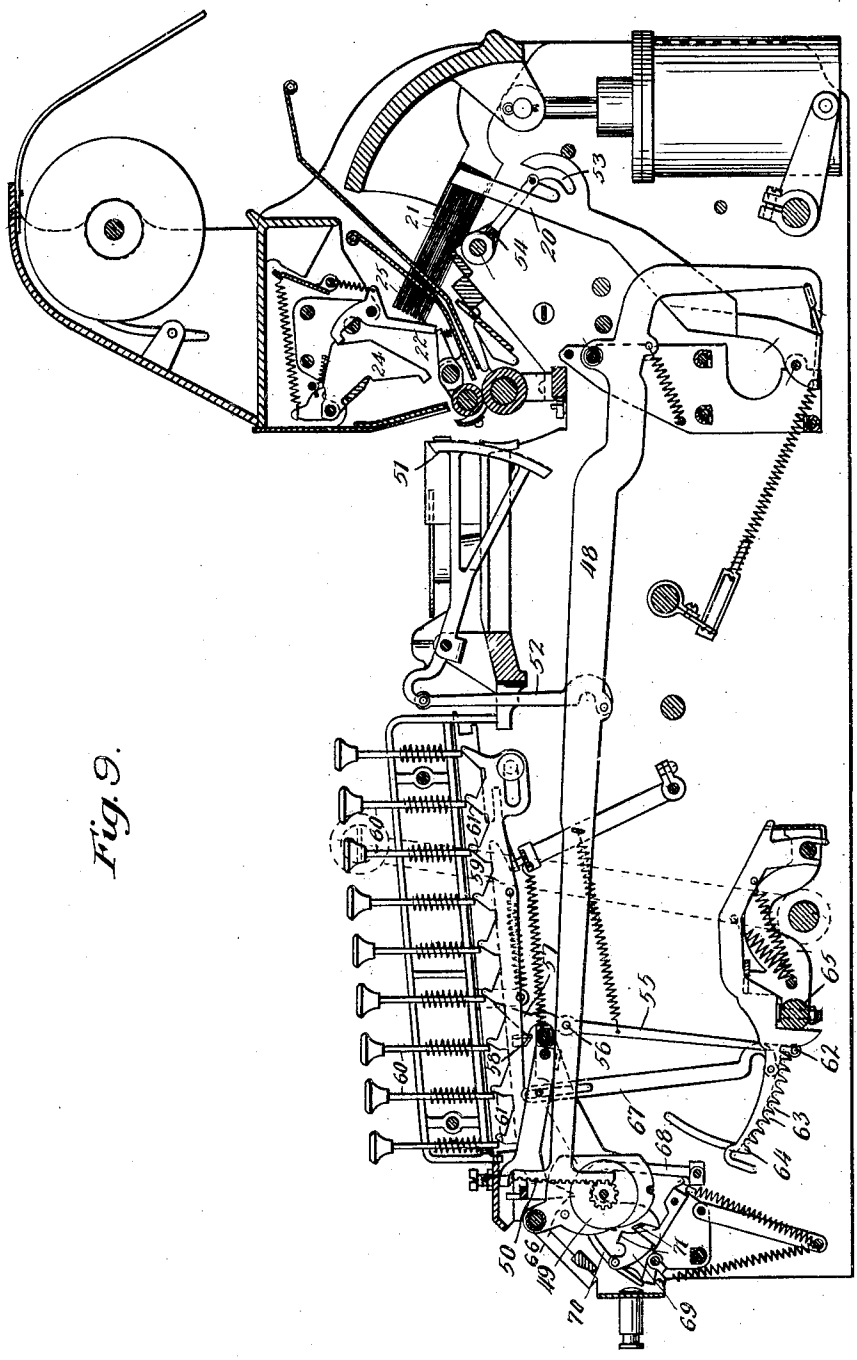


Fig. 9.

Witnesses:

Wm. Geiger

A. W. Munday

Inventor:

Charles P. Wetmore

By Munday, Evarts, Adcock & Clarke.

Attorneys

UNITED STATES PATENT OFFICE.

CHARLES P. WETMORE, OF CHICAGO, ILLINOIS, ASSIGNOR TO COMPTOGRAPH COMPANY, A CORPORATION OF ILLINOIS.

CIPHER CUT-OUT FOR ADDING-MACHINES.

1,180,556. Specification of Letters Patent. Patented Apr. 25, 1916.

Application filed April 24, 1907. Serial No. 369,972.

To all whom it may concern:

Be it known that I, CHARLES P. WETMORE, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Cipher Cut-Outs for Adding-Machines, of which the following is a specification.

My invention relates to printing adding machines, and the particular embodiment of it here shown is indicated as applied to the printing adding machine commonly known as the Comptograph, and generally shown in the various United States patents heretofore issued to Dorr E. Felt for printing adding machines and their mechanism, and more particularly shown in the patent to Felt and Wetmore, No. 853,543, issued May 14, 1907; and the object of my invention is to provide mechanism whereby the automatic filling in of the ciphers to the right of any digit printed may be optionally prevented to the right of an order, to the end that the operator may at will divide the listing into separate parallel columns that may be printed simultaneously without lateral shifting of the paper in the machine.

My invention has for further objects the effecting of such other improvements in structure and function as may be found to obtain in the devices hereinafter described or claimed.

In the accompanying drawings forming a part of this specification, Figure 1 is a rear elevation, partly in section, of the upper rear portion of the adding machine to show the mechanism more particularly involved in my invention; Fig. 2 is a sectional view on the line 2—2 of Fig. 1; Fig. 3 is a sectional view on the line 3—3 of Fig. 1; Fig. 4 is a fragmentary top plan view of the coupling device shown in Figs. 1 and 3; Fig. 5 is a partly diagrammatic perspective view of the gang of U-bars, to show more particularly their relation to the hammer pawls; Fig. 6 is a rear plan view of the tail-piece lever ends and the ends of the rear arms of the U-bars, to show their relative arrangement; Fig. 7 is a perspective view of the coupler cut-out mechanism operative between the fifth and sixth U-bars; Fig. 8 is a sectional view on the line 8—8 of Fig. 1, showing the gang of U-bars in the same somewhat diagrammatic perspective in which they appear in Fig. 5, and also indicating the tips of the sixth, seventh and eighth tail-piece levers 20 as partly set forward toward operative engagement with their U-bars; and Fig. 9 is a partial sectional view lengthwise through the machine, to show the general relations of the adding and printing mechanisms.

Like reference numerals indicate like parts in all of the figures.

For each of the nine or more orders in the machine, there is a type segment bearing the ten types "0", "1", "2", "3", "4", "5", "6", "7", "8", "9", and presenting the zero at the printing line when in normal position. When any one of the significant digits is to be printed by any type segment, such type segment is swung up to proper position to bring such digit type to the printing line. The same movement that operates to so position any type segment also operates to slightly set forward the corresponding tail-piece lever 20, so that in the subsequent completion of the printing action movement of the machine, such tail-piece lever will be engaged and moved farther forward by the movable member whose function it is to so engage and move the tail-piece levers that have been set as aforesaid, as set forth in lines 14 to 127 of page 5 of the patent to Felt No. 644,287 of February 27, 1900. Thus, in each complete operating action of the machine, only those tail-piece levers are thrown forward which correspond to type segments that have been positioned to print significant digits, the other tail-piece levers remaining stationary. When any tail-piece lever is thrown completely forward, it engages one or more of the U-bars 21, and any U-bar so engaged is thrown forward far enough to strike against and trip the one or more hammer-pawls 22 with which the other arm of such U-bar is adapted to engage. The patent to Felt No. 644,287, on page 5 of the specification, sets forth the general operation of these U-bars, which are called "releasing-frames" in said patent.

The tripping of any hammer-pawl 22 releases the corresponding spring-actuated type-hammer 24, and, of course, results in the making of a type-impression in the corresponding order. If a significant type has been set in position in such order, the type impression made will, of course, be a significant digit, but if the type segment in

such order has not been moved from normal position, the type impression made will be the zero normally presented at the printing line by each type segment.

To the end that the aforesaid actuation of any U-bar to cause the printing of a significant digit may at the same time trip all the hammers of lower order that are not simultaneously actuated by other U-bars,—so that a cipher may be printed in each lower order where no significant digit appears,—the ends of the forward arms of the U-bars are so notched that each U-bar, from that of the second order up, will engage not only the hammer-pawl of corresponding order, but also directly engage one or more hammer-pawls of next lower order or orders, with the exception to be later explained. Thus, the U-bar of lowest order is so notched that its projection 25 engages the extreme right-hand, or lowest order, hammer-pawl, and the U-bar of second order is so notched that its projection 26, engages the hammer-pawls of both the first and second order, and the third U-bar is so notched that its projection 27, engages the hammer-pawls of first, second and third order, and the fourth U-bar is so notched that its projection 28, engages the four right hand hammer-pawls, and the fifth U-bar is so notched that its projection 29, engages the hammer-pawls of the lowest five orders. And if this system of notching were continued throughout the entire series of U-bars, each one of the U-bars of still higher order would in like manner engage with all the hammer-pawls of all the lower orders; but at the U-bar of sixth order, the drawings show a break in this progressive system of notching, and it will be noted that the U-bar of sixth order is so notched that its projection 30, engages the hammer-pawl of the sixth order only, and then the progressive system of notching is continued through the still higher U-bars, the seventh U-bar being so notched that its projection 31, engages the sixth as well as the seventh hammer-pawl, and the eighth U-bar being so notched that its projection 32, engages the sixth, seventh and eighth hammer-pawls.

The hammer face of the eighth order is provided with a lateral extension (as indicated in Fig. 21 of the above mentioned Patent 853,543) that strikes any digit-type that happens to be set up to the printing line in the ninth order, but does not effect any printing unless a significant digit is so set up, inasmuch as no cipher is present on the ninth type segment, or ever required to be printed in the ninth or highest place.

The above described break between the fifth and sixth orders, in the progressive system of notching of the U-bars, obviously provides that the actuation of any U-bar below the sixth order will always trip not only the hammer-pawl of corresponding order but also all the hammer-pawls of the lower orders, and that each U-bar above the sixth order trips both its corresponding hammer-pawl and the hammer-pawls of lower order down to and including the sixth, but the actuation of the sixth or any higher U-bar would not cause the tripping of any hammers below the sixth order unless the sixth U-bar were in some manner coupled to and caused to actuate the U-bar of the fifth order. If such coupling is present and operative, it is obvious that the machine will be provided with a complete system of automatic cipher printing, so that the printing of a significant digit in any order will cause the filling in of ciphers in all lower orders in which significant digits are not simultaneously printed; but if such coupling, of the sixth to the fifth U-bar, is not effected, the automatic cipher printing will be interrupted and cut out below the sixth order and the printing of a significant digit in the sixth or any higher order will not cause the filling in of any ciphers below the sixth order. Such a coupling device, to couple the sixth U-bar to the fifth, is provided, and is made operable at the will of the operator. One of the arms of the fifth U-bar has riveted upon it a forwardly projecting hooked clip 33, and the downwardly bent free end of the said clip 33 is adapted to be engaged by the forwardly projecting tip 34 of the movable clip 35 pivoted at 36 on the U-bar of the sixth order. This movable clip 35 has a forwardly projecting arm 37 slotted at 38; and to swing this movable clip upon its pivot, so as to move it either into or out of engagement with the hooked clip 33, there is provided a sliding rod 39 having the downwardly projecting pin 40 engaged in the slot 38 of the clip-arm 37. The said sliding rod is moved back and forth by means of a thumb-knob 41, and is held in either of its two possible positions by means of a spring detent 42 acting in the notches 43 of the block 44 carried on said sliding rod. When the said sliding rod is pushed in, the pivoted clip is swung to the normal position shown in Figs. 1 and 4, in engagement with the hooked clip 33, so that when the sixth U-bar, carrying said pivoted clip, is moved, it will carry with it and move to like extent the fifth U-bar; and when the sliding rod is drawn out, by pulling the thumb-knob, the pivoted clip is moved out of engagement with the hooked clip, and the sixth U-bar becomes free to move without in any manner affecting the fifth U-bar. It is thus evident that when the coupling device is in action, any actuation of the sixth U-bar will cause a corresponding movement of the fifth, and so the printing of a significant digit in the sixth order would cause the automatic filling in of ciphers in all the lower orders;

but it remains to provide that the sixth U-bar, when thus coupled to the fifth, shall always be moved when any U-bar of still higher order, as the seventh or the eighth, is actuated, so that the same complete automatic cipher printing, in the five lowest orders, may take place when a digit is printed in the seventh or a higher order instead of the sixth. To effect this latter result, the ends of the other or rear arms of the U-bars and the tail-piece lever-ends engaging therewith are so arranged that the tail-piece lever of each order higher than the sixth shall overlap and engage with not only the U-bar end of its own order, but also the ends of all the U-bars of lower order down to and including the sixth. Thus, the tail-piece lever-end 45 engages with only the end of the sixth U-bar, but the tail-piece lever-end 46 of the seventh order overlaps the end of the U-bar of the sixth order as well as the U-bar of the seventh order, and the tail-piece lever-end 47 of the eighth order overlaps both the U-bar ends of the sixth and seventh orders as well as the eighth order,—so that the actuation of a tail-piece lever in any order above the sixth, will cause the actuation of the U-bar of the sixth order as well as the actuation of the U-bar of corresponding order, and the movement of the sixth U-bar will cause the movement of the fifth U-bar, as aforesaid, if the coupling device is in action. It may be noted that the tail-piece lever-ends of the first, second, third, fourth and fifth orders each overlap not only the U-bars of corresponding order, but also some or all of the U-bars of lower order, but this has to do primarily with other considerations not directly involved in the cipher cut-out function of the device herein described, such overlapping merely effecting some distribution, among a plurality of the U-bars, of the strain of tripping a plurality of the hammer pawls, inasmuch as without such overlapping a single one of the U-bars may sometimes have to take all of the strain of tripping a plurality of pawls.

The position at which the coupling device is shown as located in the drawings, between the sixth and fifth orders, would effect the necessary cipher cut-out to enable the operator to divide the listing into two separate columns, one comprising the first or right hand five places in the machine, and the other comprising the remaining or four left-hand places in the machine; but, of course, the coupler may be elsewhere positioned, and the U-bar notching and tail-piece lever arrangement correspondingly modified, to effect the division of the listing between any other two columns.

The sectional view Fig. 7 shows the general relations of the adding and printing mechanisms. Each of the series of main adding-levers 48 performs the three-fold function of rotating the corresponding adding wheel 49, by means of the segment gear 50, of setting in position the type segment 51, by means of the connection 52, and of setting forward the tail-piece levers 20 so that their curved slots 53 will be engaged by the comb-piece 54 when the latter is subsequently rocked downward. (The patent to Felt, No. 644,287, on page 5 of the specification sets forth the manner of operation of this comb-piece or "cross-bar"). The movement of the aforesaid main-lever 48 is effected through the main-lever connection 55 that is pivoted upon said main-lever at 56. This main-lever connection is provided at its upper end with a cam-arm 57, adapted to be in constant contact with and shifted by the cam-stud 58 on the sliding cam-bar 59, which latter is shifted to greater or less extent by the depression of one or another of the keys 60, each of said keys being arranged to impinge against and shift one of the series of cams 61 that project upward from and are integral with the aforesaid sliding cam-bar. The extent of the movement of the cam-bar is thus determined by the key that is depressed, and in turn determines the extent to which the cam-stud 58 shall swing back the cam-arm 57 of the pivoted main-lever connection 55; and the extent to which the said short or cam-arm of the connection is swung back determines the extent to which the long or lower arm of said pivoted connection shall be swung forward. The extreme free end of said long arm of said connection 55 carries the stud 62, and the extent to which said long arm is swung forward determines the engagement of said stud in one or another of the series of notches 63 in the forward end of the adding arm 64 when the latter is rocked downward in the subsequent actuation of the machine. And the particular notch in which the aforesaid stud happens to engage, of course, determines the extent to which the main-lever 48 will be pulled down by its connection 55, upon the aforesaid rocking of the adding-arm 64. The adding-arm is secured to the main rock-shaft piece 65 and the rocking of said rock-shaft piece, upon the pulling of the operating handle of the machine, effects the movement of the adding-wheels and the positioning of the type-segments to the extent predetermined by the depression of the corresponding keys.

66 is the numeral wheel stop that checks the forward movement of the numeral wheel effected by the segment gear 50, said stop being actuated through the connection rod 67 whose lower end is pivotally secured to the forward end of the adding-arm.

68 is the back stop to prevent backward rotation of the numeral wheel. And the carrying from one numeral wheel to that of

the next higher order is effected by the carrying-levers 69, with their carrying-pawls 70 and carrying-stops 71, operating in the well known manner of the identical devices shown in the hereinabove mentioned patent to Felt and Wetmore No. 853,543.

The numeral wheel mechanism is of course duplicated as many times as there are orders in the machine.

My invention is hereinbefore set forth as embodied in a particular form of construction, but I do not limit it thereto or to less than all the possible forms in which the said invention, as hereinafter claimed, may be embodied and distinguished from prior devices.

I claim:—

1. In a multiple order adding-machine, in combination, adding mechanism, printing-mechanism including the multiple spring-actuated type-hammers, automatic cipher-printing mechanism, a pivoted latch for coupling together and uncoupling the hammer-release mechanism in two adjacent orders, and an optionally operable member for actuating said latch, substantially as specified.

2. In a multiple order adding-machine, in combination, adding mechanism, printing-mechanism including the multiple spring-actuated type-hammers and the hammer-pawls and U-bars, said U-bars being adapted to release said pawls in series, and an optionally operable latch whereby U-bars controlling separate series of hammer-pawls may be either coupled to or freed from each other, substantially as specified.

CHARLES P. WETMORE.

Witnesses:
H. A. LEAM,
L. J. OTTEN.

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

Corrections in Letters Patent No. 1,180,556.

It is hereby certified that in Letters Patent No. 1,180,556, granted April 25, 1916, upon the application of Charles P. Wetmore, of Chicago, Illinois, for an improvement in "Cipher Cut-Outs for Adding-Machines," errors appear in the printed specification requiring correction as follows: Page 4, strike out lines 18–27, comprising claim 1; same page, line 28, for the numeral "2" read *1;* same page, after line 37, insert—

2. In a multiple-order adding-machine, in combination, adding mechanism, printing mechanism including the multiple spring-actuated type hammers and the hammer-pawls and pawl-releasing members, said pawl-releasing members being adapted to release said pawls in series, and an optionally operable latch whereby pawl-releasing members controlling separate series of hammer-pawls may be either coupled to or freed from each other, substantially as specified.

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of May, A. D., 1916.

[SEAL.]

J. T. NEWTON,
Acting Commissioner of Patents.