J. C. LOTTERHAND.

SIGNAL PRINTING MEANS FOR CALCULATING MACHINES.

APPLICATION FILED MAY 1, 1914.

1,167,000.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

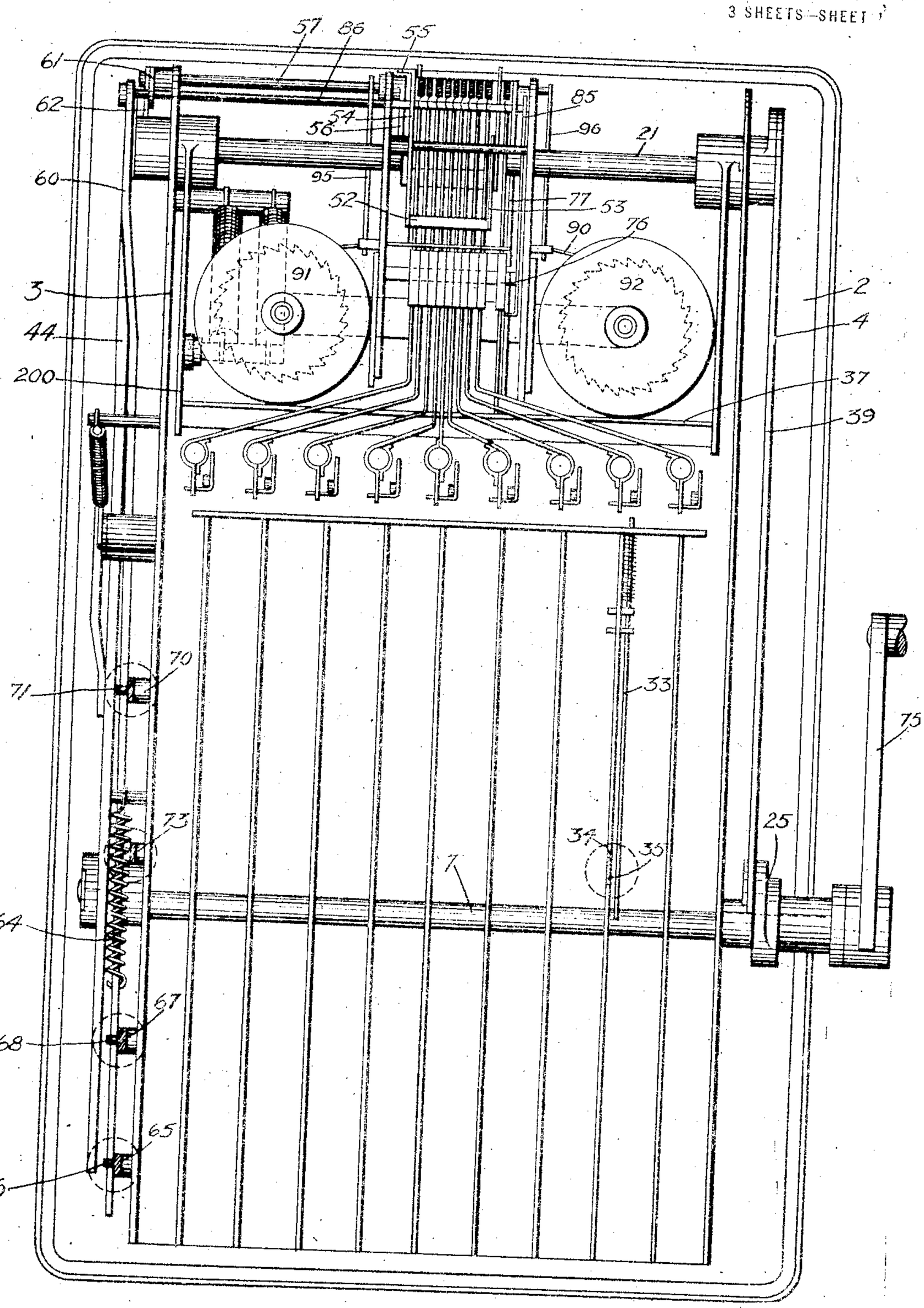


Fig. 1

Witnesses:
Eric B. Kramer.
Morris Kramer.

Inventor
J. C. Lotterhand.
By his Attorney
William A. Reid.

J. C. LOTTERHAND.

SIGNAL PRINTING MEANS FOR CALCULATING MACHINES.

APPLICATION FILED MAY 1, 1914.

1,167,000.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 2.

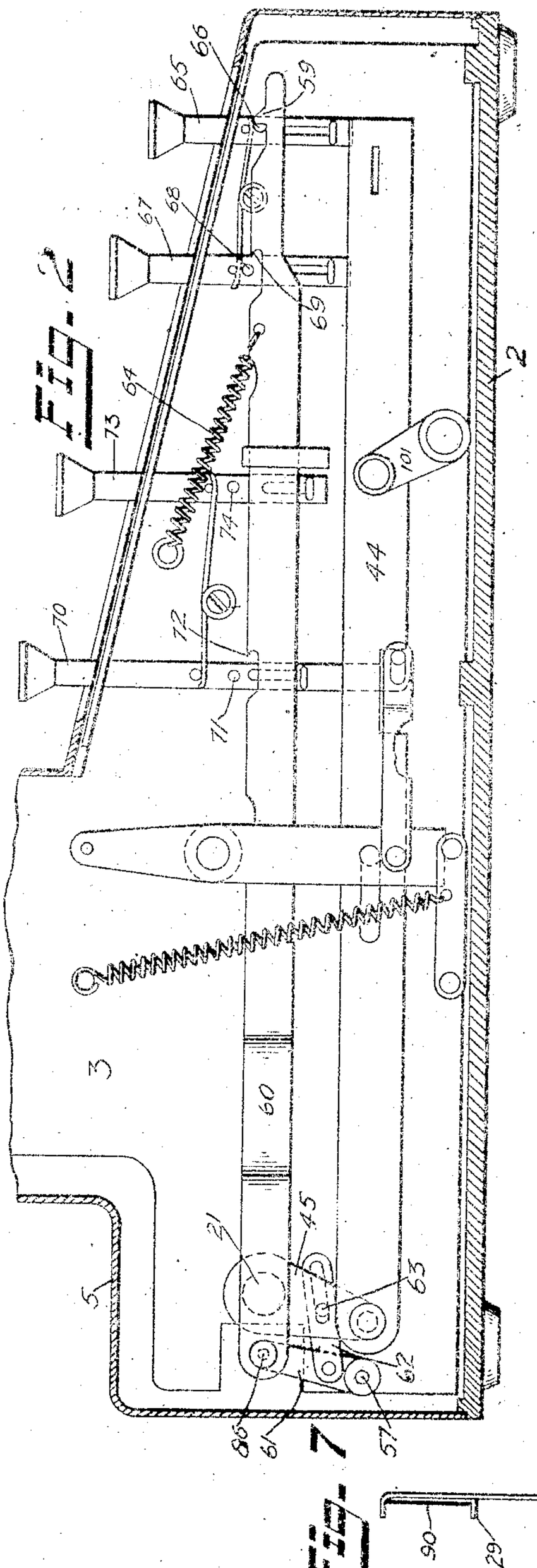


FIG. 2

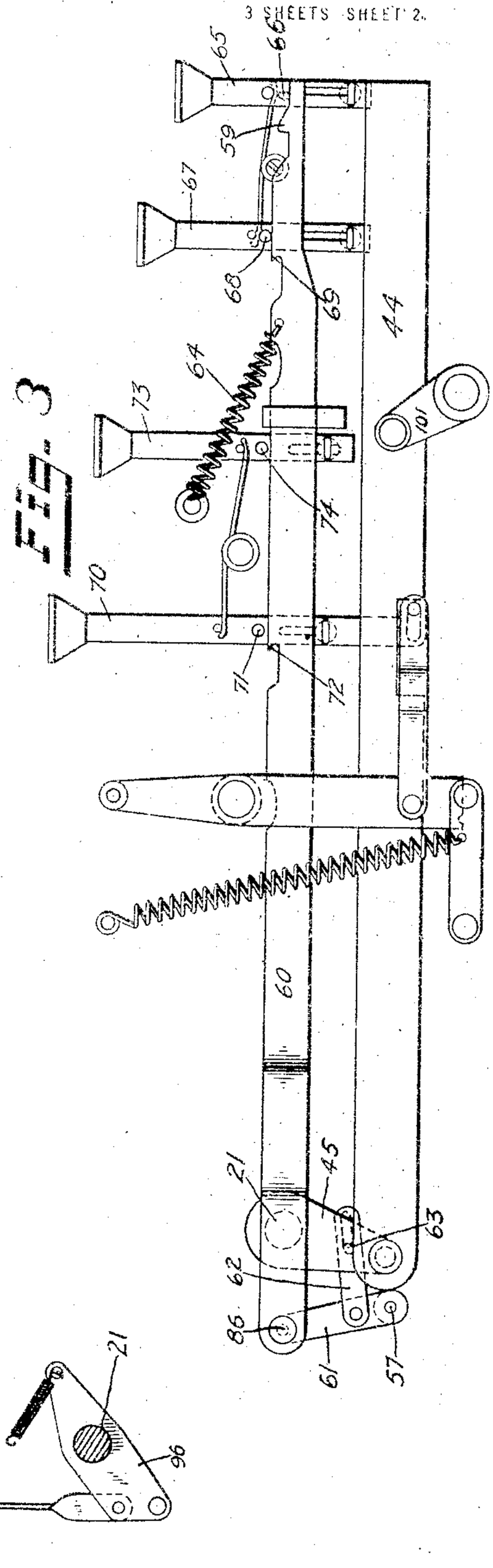


FIG. 3

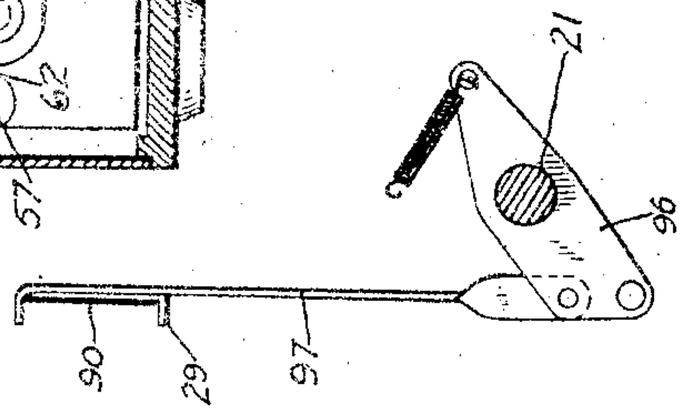


FIG. 4

Witnesses
Ewin B. Kramer.
Morris Pearlman.

Inventor
J. C. Lotterhand.
By his Attorney
William A. Reid.

J. C. LOTTERHAND.

SIGNAL PRINTING MEANS FOR CALCULATING MACHINES.

APPLICATION FILED MAY 1, 1914.

1,167,000.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 3.

Fig. 8

Fig. 4

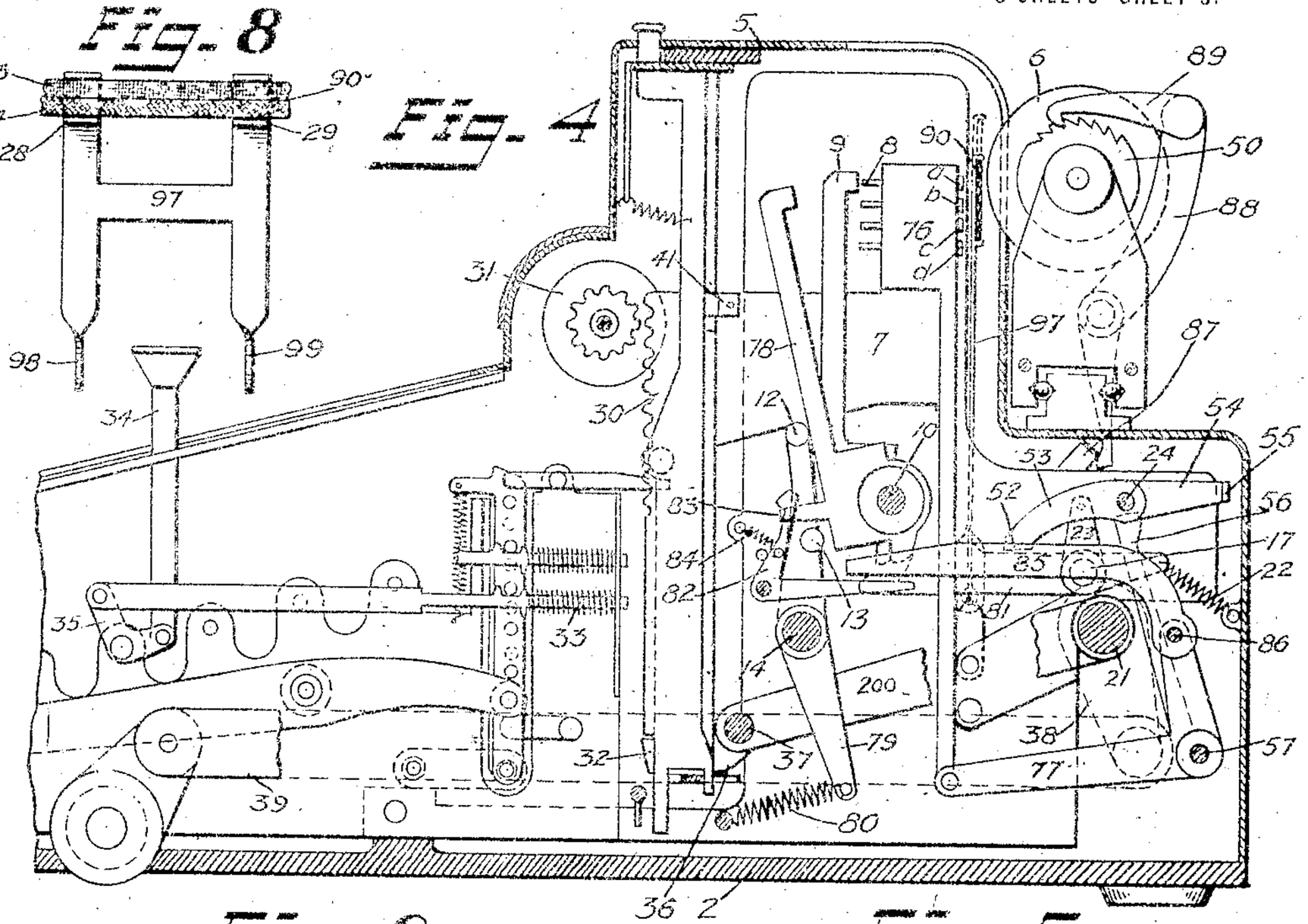


Fig. 6

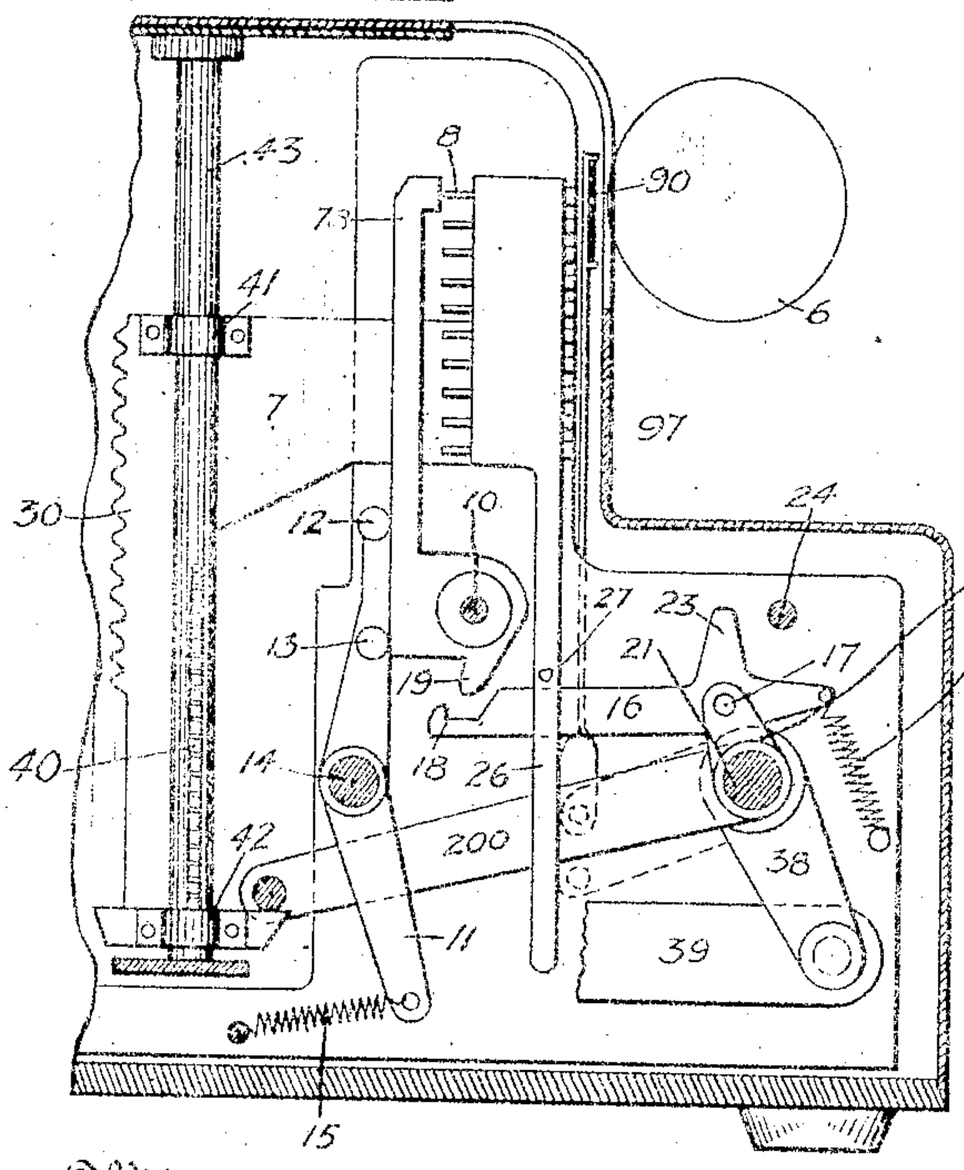
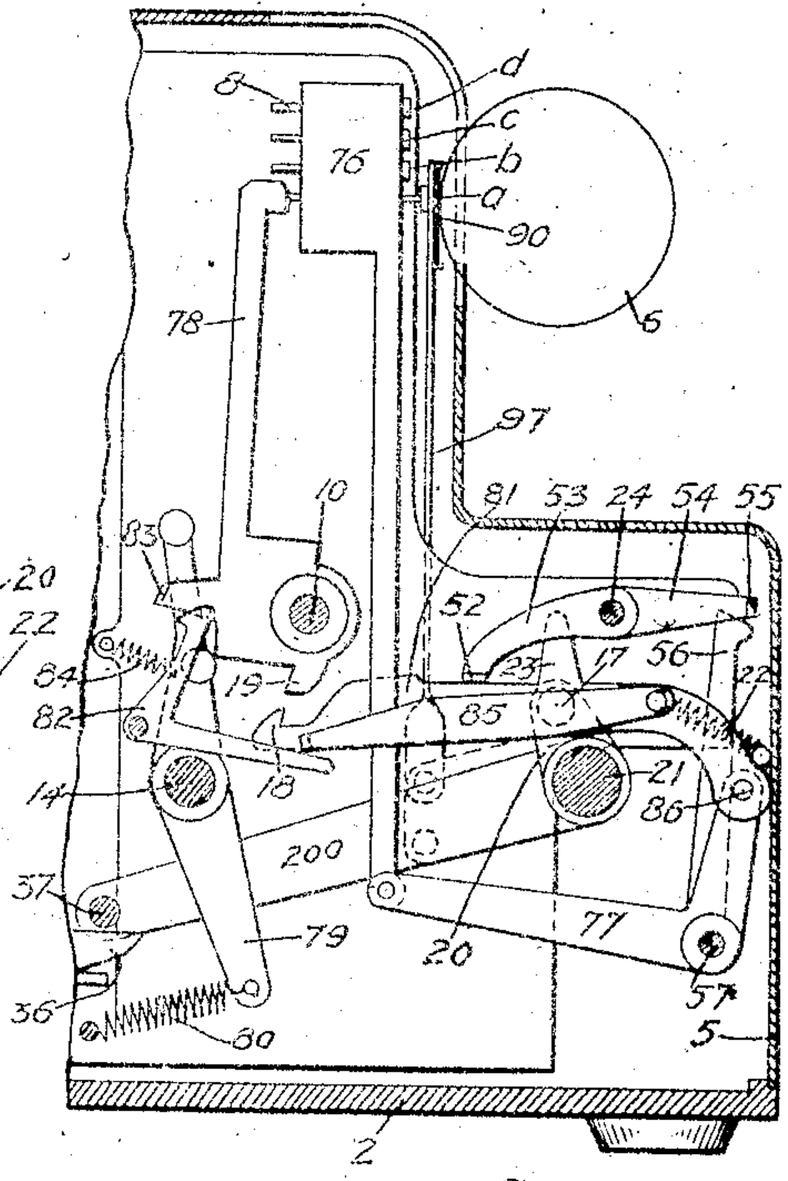


Fig. 5



Witnesses:
Eric B. Kramer
Louis Sommer.

Inventor
J. C. Lotterhand.
By his Attorney
William A. Reid.

UNITED STATES PATENT OFFICE.

JASON C. LOTTERHAND, OF NEW YORK, N. Y., ASSIGNOR TO ADDOMETER CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

SIGNAL-PRINTING MEANS FOR CALCULATING-MACHINES.

1,167,000. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed May 1, 1914. Serial No. 835,630.

To all whom it may concern:

Be it known that I, JASON C. LOTTERHAND, citizen of the United States, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Signal-Printing Means for Calculating-Machines, of which the following is a specification.

This invention has for its object to provide means in a calculating machine, for causing the signals or special designating characters, such as a total, or a sub-total, or a non-add, or a non-print, to be printed in a color different from the number or matter to which it relates, and adjacent which it is placed. Heretofore, in machines of this character, sometimes the items are printed in one color, and the total, or the sub-total is printed in a different color; and in such case a special signal to indicate the total or sub-total, is printed in the same color in which the total or sub-total is printed, and which is therefore, different from the color in which the items are printed.

In the present invention, both the items, and the special matter or results, such as the total or sub-total, are all printed in one color; while the signals or designating characters are printed in a color different from that of both the items, and the total or the sub-total.

This invention is especially designed for use in connection with the means for printing the signal characters immediately upon actuation of the special key, and previous to any operation of the handle or the operating member of the machine; which means forms the subject matter of United States Patent No. 1,092,497 granted to me April 7th, 1914.

In the accompanying drawings, representing one embodiment of my invention, Figure 1 is a plan view of a portion of an adding machine with my invention applied thereto; Fig. 2 is a side elevation showing the signal keys and connected parts; Fig. 3 is a view of parts shown in Fig. 2, in other positions; Fig. 4 is an elevation showing the signal printing devices; Fig. 5 is a fragmentary view showing the printing devices in other positions. Fig. 6 shows the main printing means; and Figs. 7 and 8 show the ribbon controlling means.

The machine is shown as comprising a suitable base 2 with upright side plates 3 and 4 on each side, and also a suitable casing 5. At the rear is shown a platen 6 and in front of the same are arranged a series of rack and type plates 7, carrying a set of type plungers 8; see Figs. 4–7. The rack and type plates are shiftable to bring any one of its type in position to print on the platen, and in front of each rack and type plate is arranged a hammer 9 that will strike the positioned type of its corresponding rack and type plate to effect the impression on the platen. By this means a row of figures will be printed in a horizontal line on a record sheet on the platen in the usual manner, and it is desirable to print the special character or signal adjacent this numeral, preferably at one side, such as the right hand side, as is done in the construction set forth herein.

The hammers 9 are shown as all mounted to turn on a cross shaft 10; see Figs. 4 and 5, suitably supported at each end, and each hammer is provided with an energizer lever 11 having contacts 12 and 13 for engagement with the rear edge of the corresponding hammer, these levers swinging on a stationary shaft 14, and retracted by a spring 15 at the lower end of the lever to swing the lever and to cause the hammer to strike, when the hammer has been retracted.

Coöperating with each hammer is a trigger 16, mounted on a suitable shaft 17 to swing thereon to cause a hook 18 on each trigger to engage a tip 19 connected with each hammer 9. The shaft 17 for the triggers, is mounted on a pair of swinging levers 20 fast on an operating shaft 21, by which the levers are swung to shift the position of the shaft 17 and thereby bodily move the triggers back and forth. A spring 22 connects each trigger with a suitable fixed plate to swing the triggers and bring the hook to engage the tip 19. But when the levers 20 move the shaft 17 rearward carrying the triggers back, an arm 23 on each trigger engages a stop bar 24 that will swing the triggers against the force of their springs and trip the hook from the tip. When the triggers moved the hammers away they swung forward and placed their energizer levers under tension, and when the triggers are thus tripped, the hammer will be released to strike.

Each rack and type plate 7 is provided with an extension 26 carrying a stop 27 nor-

mally engaging the top edge of the trigger 16 to hold the trigger down with its hook below the tip of the coöperating hammer so that when the rack and type plate is in this position, the rearward movement of the trigger by the swinging of the lever will not affect the hammer. But as soon as the rack and type plate rises the hammer will rise and cause the hook to engage the tip.

The rack and type plate is provided with a rack 30 on its front portion to engage numeral wheels 31. At the foot of the rack and type plate is a stop 32 arranged to engage stop bars 33, as indicated in Fig. 7, the stop bars being connected with key stems 34 by means of a bent lever 35. At the rear of the rack and type plate at its foot is another lug 36 arranged to engage a universal bar 37 mounted on the side arms 200.

When the shaft 21 is swung by means of an arm 38 connected with a side bar 39, the universal bar will permit the rack and type bars to be elevated by springs 40. Each rack and type bar has suitable guides 41 and 42 sliding on posts 43, in which is placed the spring 40 that will elevate the rack and type plate when free to move upward. When the universal bar travels upward the rack and type plate will be thus drawn upward until its foot 32 engages a stop bar that may have been set by a key, when the rack and type plate is arrested with a type in the printing position opposite the hammer that corresponds with the key depressed. The side bar 39 is shown connected with a crank 25 fast on a crank shaft 1 operated by a handle 75. This shaft 1 extends across the machine and carries on the opposite side a crank 101, see Fig. 2, that operates a side bar 44 similar to the side bar 39. A crank 45 connects shaft 21 with the side bar 44.

Means are also provided for preventing operation of the printing hammers, when the rack and type plates are elevated to actuate the adding mechanism, which is known as the non-print operation. In Fig. 4 is shown a bar 52 carried by a pair of suitably pivoted levers 53, that lie on top of the triggers 16. This bar is normally free so that the triggers will not be thus interfered with in their upward movement. But an arm 54 connected with one of these triggers, extends to the rear and is provided with an ear 55 arranged to be engaged by a stop arm 56 mounted on a rock shaft 57 suitably supported at the rear of the machine and extending beyond the left side plate 3. In the position shown in Fig. 5 the stop 56 will hold the bar 52 engaging the triggers and prevent their rising when the rack and type plates move upward, and therefore the triggers will not swing and trip any of the hammers.

As shown in Fig. 2, on the left side of the machine, is arranged a bar 60 pivoted at its rear to a crank 61 fast on the said shaft 57. A slotted link 62 connects the crank 61 with the crank 45 by a pin 63 thereon. This bar 60 is pulled rearwardly by a coil spring 64 that will serve to rock the shaft 57. The link 62 serves to swing the crank 61 to return the bar 60 on the forward movement of the side bar 44 by the operating handle in the normal operation of the machine. Total key 65 is shown that is vertically slidable and carries a lug 66 arranged to engage the bar 60 when the key is depressed. The bar has an inclined lug or cam 59 arranged to engage the lug 66 to hold the bar 60 in normal forward position with the spring 64 under tension.

A sub-total key 67 is provided having a pin 68 arranged to engage the bar 60 and depress it, whereby the bar will have the lug 59 disengage the pin 66, thereby permitting the spring 64 to draw the bar rearward; the latter movement is limited by a stop 69 on the bar. A third key 70 which may be the non-add key, is vertically slidable to have its stop 71 engage the bar 60 to swing it and release it from the stop 66; and the rearward movement is limited by a suitable stop 72. Thus the stops of the keys 67 and 70 are relatively positioned whereby the latter will permit a greater rearward movement of the bar 60; it being understood that the depression of the key 65 will not permit any rearward movement of the bar. A fourth key 73 is shown that may be the non-print key, having a stop 74 arranged to strike the bar and swing it down to disengage the stop 66. But no limit abutment is provided for the stop 74, whereby the bar 60 can be moved rearward its full distance. It will be understood that these four keys will each swing the bar downward, and that three of them will permit rearward movement of the bar for different distances, respectively, while the fourth key will not permit rearward movement. When the bar has been shifted rearwardly, the next operation of the operating member and crank 45 will cause the link 62 to swing the bar 60 forward again, causing the cam stop 59 to reëngage the stop 66 to lock the bar in its normal forward position. It will be understood that the operation of any one of these keys will shift the bar 60 rearward to rock the shaft a different distance. When the non-print key is depressed the shaft will be rocked its maximum distance, and this will be effective to move the stop arm 56 rearward a maximum distance to lock the arm 54 and lock the triggers out of position for engagement with the hammers.

At the right side of the described rack and type plates is a printing plate 76 carrying four type, *a*, *b*, *c*, and *d*, see Fig. 4, that can be brought opposite the printing position on the platen. This carrier 76 is piv-

oted to an arm 77 fast on the shaft 57, and these parts are so positioned that in the four positions of this shaft 57 produced by the depression of any one of the said four keys one of these type is brought to the printing position. When the total key is depressed, the bar 60 is not shifted, and the shaft remains stationary, the type *d* will be opposite the printing position, which is the total character printing type. A hammer 78 is suitably pivoted to strike these type as positioned and is provided with an energizer 79 controlled by a spring 80 similar to those described. A special trigger 81 is provided to cock the hammer 78, being constructed similar to the triggers described, and mounted on the same shaft 17, whereby this hammer is cocked when other hammers are swung back. When the hammer 78 has been cocked, it is held by a latch 82 that engages an ear 83 on the rear of the hammer to hold it in its cocked position, the latch being swung forward by a spring 84. In the normal operation of the machine by which the hammers are cocked and then released, this hammer 78 will be cocked to engage the latch 82, that will hold it in the cocked position and it will not be tripped at this time. To trip this latch, an arm 85 is provided fast on a cross shaft 86 that is secured to the bar 60 at its pivotal connection with the crank 61. When one of these four keys is depressed, for instance the sub-total key, the bar 60 cannot move rearward, and at the final part of the downward swing of the bar 60, the shaft 86 will swing sufficiently to cause the arm 85 to trip the latch and permit the cocked hammer 78 to strike the type in the carrier 76; the type for this total being normally positioned. But when any of the other keys is depressed, as the key 70, its pin 71 will strike the bar 60 and swing it downward, but the initial movement will not be sufficient to trip the cocked hammer. The bar moving downward will be soon disengaged from the pin 66 and the bar will be instantly drawn rearward by the tension spring 64. This rearward movement of the bar 60 will rock the shaft 57 and shift the carrier 76 to bring the non-add character to printing position. It will be understood that this rearward movement of the bar is effected instantaneously before the key 70 has been depressed its full distance, and at the final downward movement of the key the bar will be sufficiently swung to rock the shaft 86 and swing the arm 85, tripping the latch to release the cocked hammer and the non-add character will print. The same applies to the other two keys 67 and 73, in which case the carrier will be first shifted to bring the proper character to printing position and thereupon the cocked hammer will be tripped. It will be understood that this operation of printing the character is performed instantaneously upon the depression of any of these keys, and is absolutely independent of the movement of the operating handle and connected parts of the machine. But the operating handle serves to restore the side bar 60 to the former position, and further to re-cock the hammer 78, to be ready for the next operation of any of these four keys.

At the printing location on the platen 6, and between it and the type 8, is a ribbon 90 that travels between spools 91 and 92 being wound alternately on these spools by any suitable automatic mechanism, well known in this art, and not shown. Means are provided for supporting this ribbon 90, that comprises two portions 93 and 94 of different colors, such as red and black, whereby the ribbon is normally retained with one color, such as the red part 93, at the printing location and when the main operating member of the machine is actuated the ribbon is automatically shifted to bring the black portion 94 into the printing position, moving the red portion beyond the place of printing. As shown this shifting means is directly connected with the universal bar 37 to be moved in unison therewith. As this bar is swung from the shaft 21, I secure to the latter shaft two arms 95 and 96. To these arms is pivoted a frame 97, at its extensions 98 and 99. This frame 97 carries channeled extensions 98 and 99 that serve as guides for the ribbon 90. From this arrangement it will be understood that in the normal position of the universal bar 37, the ribbon will be supported with the red portion at the printing place, between the signal type and the platen. Whenever any one of the four signal keys is depressed, and the signal printed by the means I have set forth, since the universal bar and its shaft have not moved from normal position, the signal will be printed in red. But when any other matter is printed, such as items set up by the keys, or any special matter such as a total or sub-total, the main operating member must be actuated, and the universal bar must be shifted before such printing is effected. This will result in the ribbon being shifted to bring the black portion to the printing location, displacing the red portion. Therefore, any matter that is printed other than the signals, is done in the color of the ribbon, at the shifting of the ribbon from normal position, while the signals are printed in the other color of the ribbon that is retained in the normal position.

The platen is swung at each printing operation by any suitable means that will not move the platen until after the printing is done. By the means herein shown the printing is done at the final part of the upward movement of the universal bar 37. The shaft 21 carries an arm 87, that engages a lever 88,

which carries a pawl 89. On the platen is secured a ratchet wheel 50 that is engaged by the pawl 89; and on the return stroke of the bar 37, the pawl will swing the platen. Since the signals are printed previous to the operation of the machine to print the other matter this printing must be done before the platen is moved so that the signal will appear opposite the number.

Having thus described my invention what I claim is:—

1. In a calculator having the usual accumulating and printing means, a main operating device for said means arranged to set up selected items upon the normal operation of such device, and special keys adapted to cause special operations of the accumulating or printing means, or of both on operation of the main operating device, the combination of signal printing means connected with the special keys and organized and constructed to be operated to print a signal at once upon the depression of the special key and previous to the operation of the said main operating device that effects the special operation of the machine according to the special key depressed, a two-color ribbon device, and means for automatically controlling the ribbon device to cause the said signal characters to be printed in one color and to cause the ribbon to move to have the said adjacent special matter printed in another color by said printing means.

2. In a calculator having the usual accumulating and printing means, a main operating device for said means arranged to set up selected items upon the normal operation of such device, and special keys adapted to cause special operations of the accumulating or printing means, or of both on operation of the main operating device, the combination of signal printing means connected with the special keys and organized and constructed to be operated to print a signal at once upon the depression of the special key and previous to the operation of the said main operating device that effects the special operation of the machine according to the special key depressed, a two-color ribbon device, and means for automatically controlling the ribbon device to normally hold the ribbon in a position to cause the signal characters to be printed in one color and to cause the ribbon to move automatically upon movement of said main actuating member whereby to have the adjacent special matter printed in another color by said printing means.

JASON C. LOTTERHAND.

Witnesses:
WILLIAM H. REID,
CAROL M. ROMAN.