

Nov. 25, 1924.

1,516,929

E. L. RELLER

MONEY SCHEDULING MACHINE

Filed Jan. 24, 1916

13 Sheets-Sheet 1

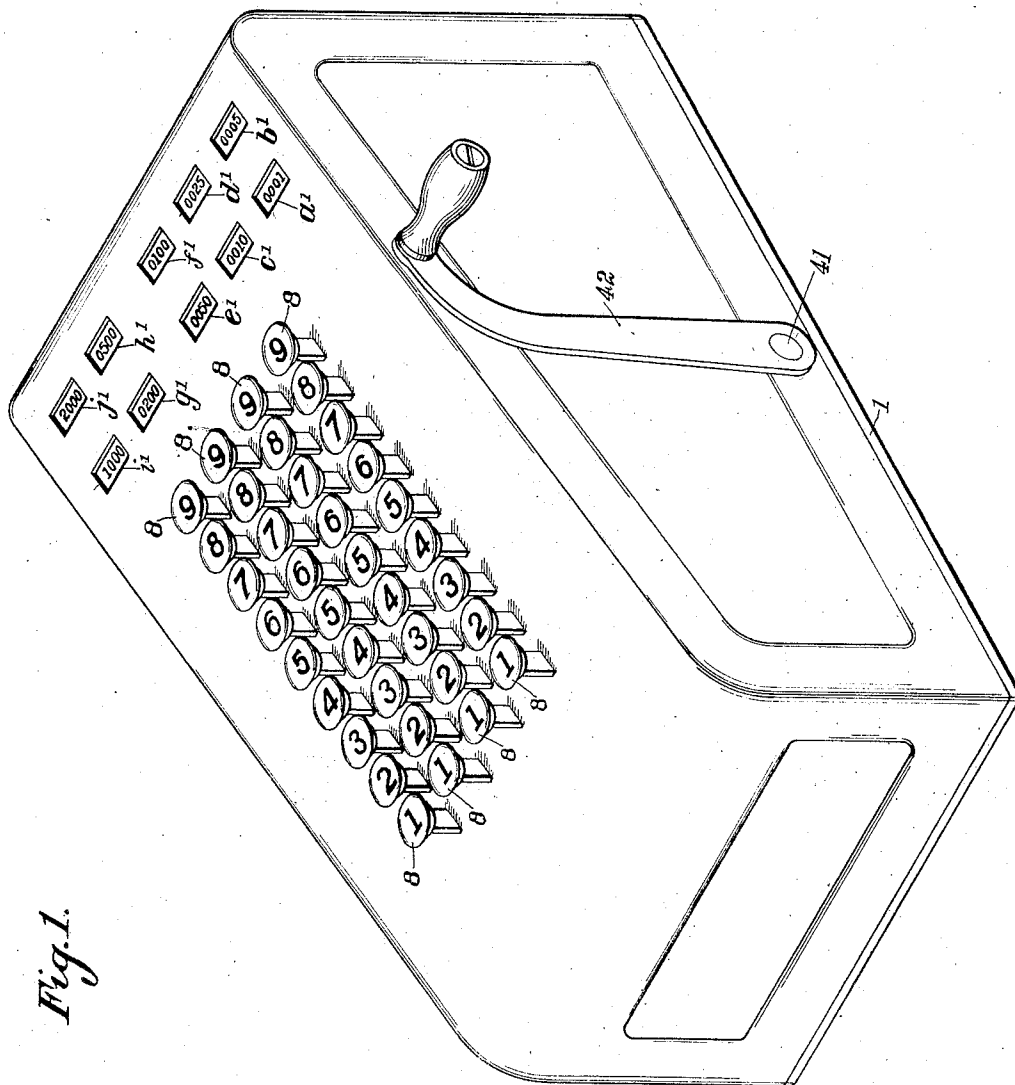


Fig. 1.

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13 Sheets-Sheet 2

Fig. 2.

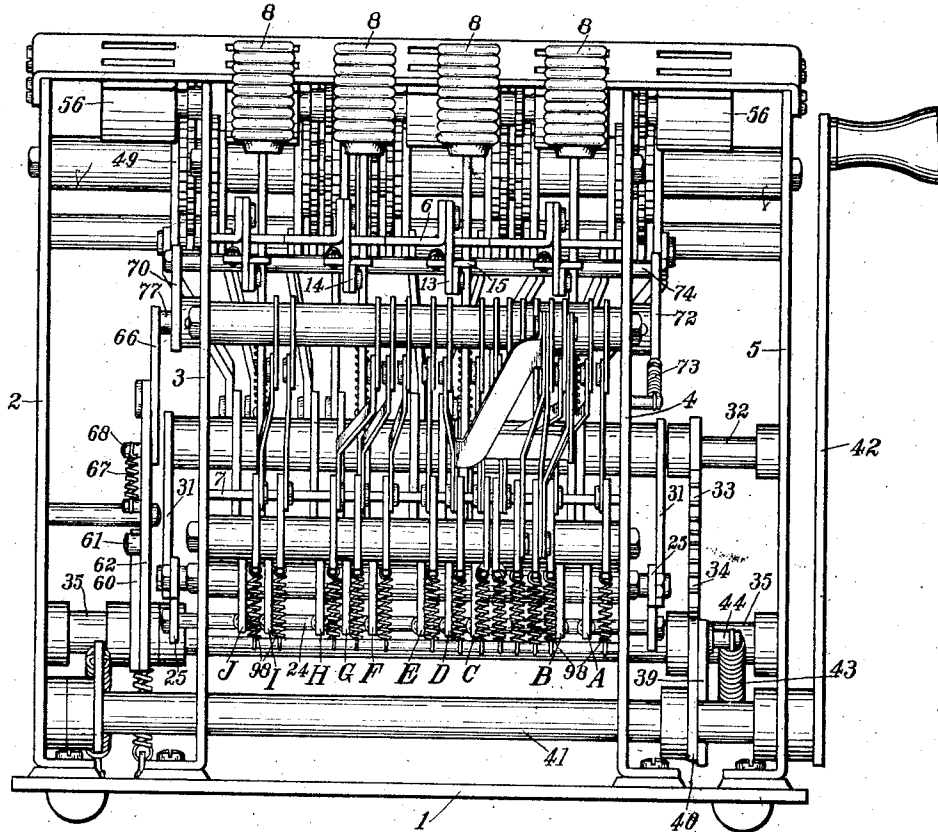
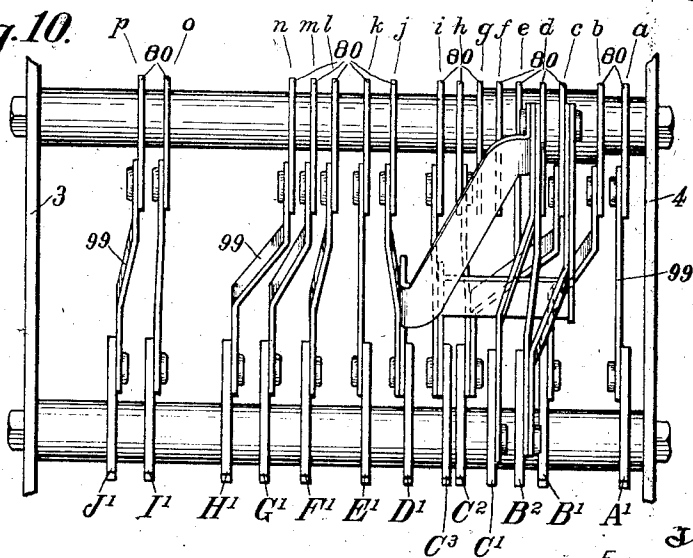


Fig. 10.



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Fig. 3.

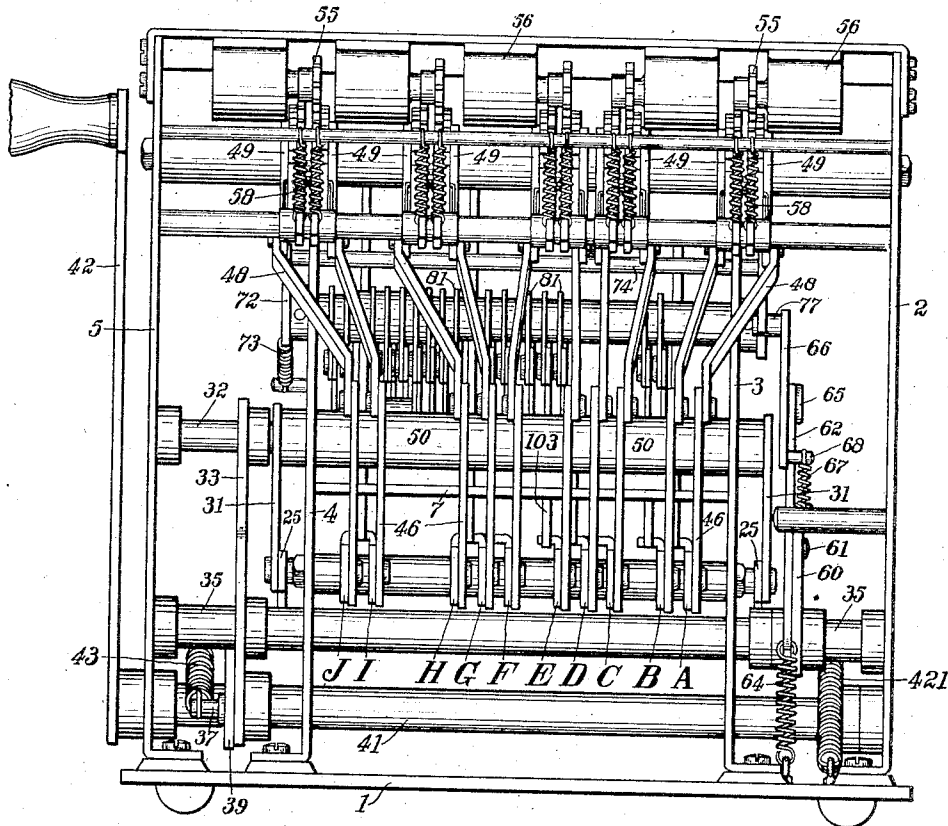


Fig. 11.

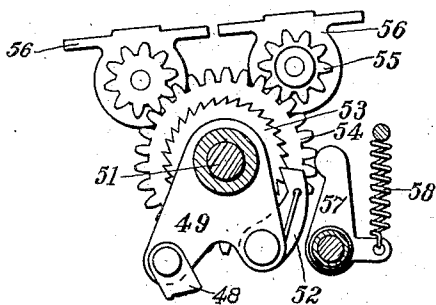
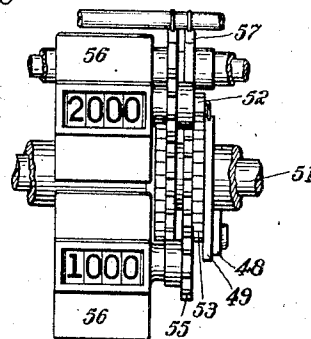


Fig. 12.



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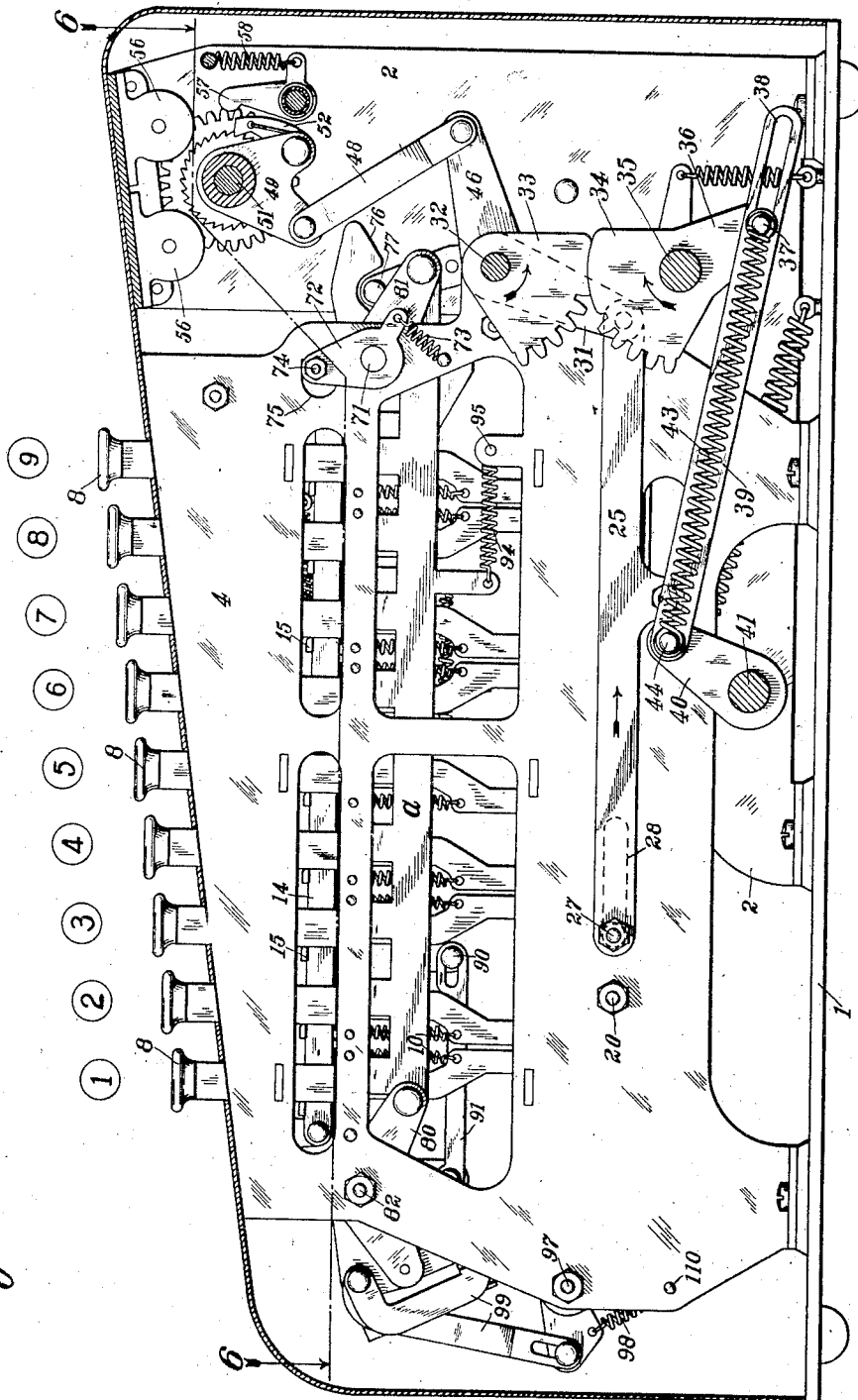
1,516,929

MONEY SCHEDULING MACHINE

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Fig. 4.



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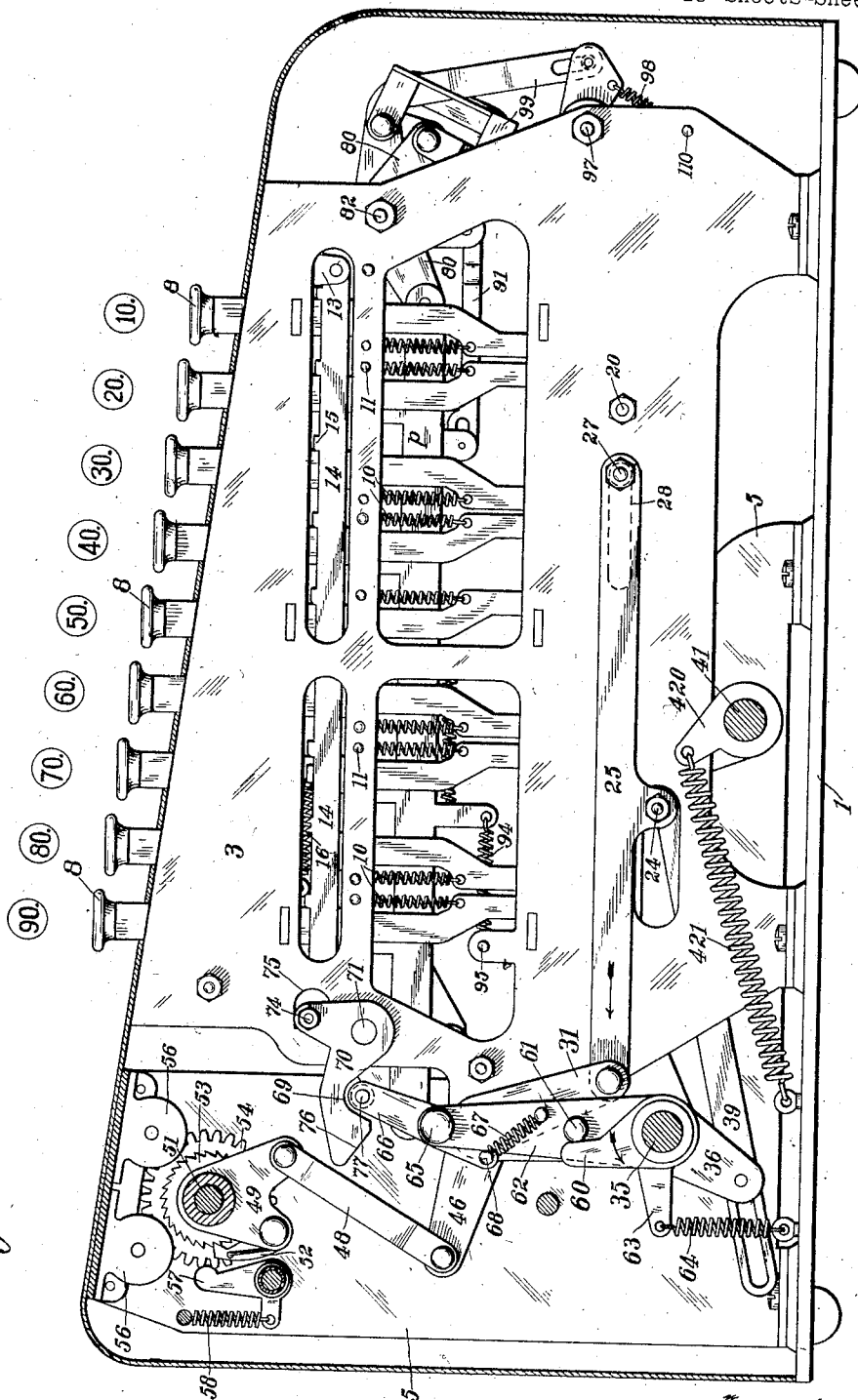
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MONEY SCHEDULING MACHINE

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Fig. 5.



Inventor:
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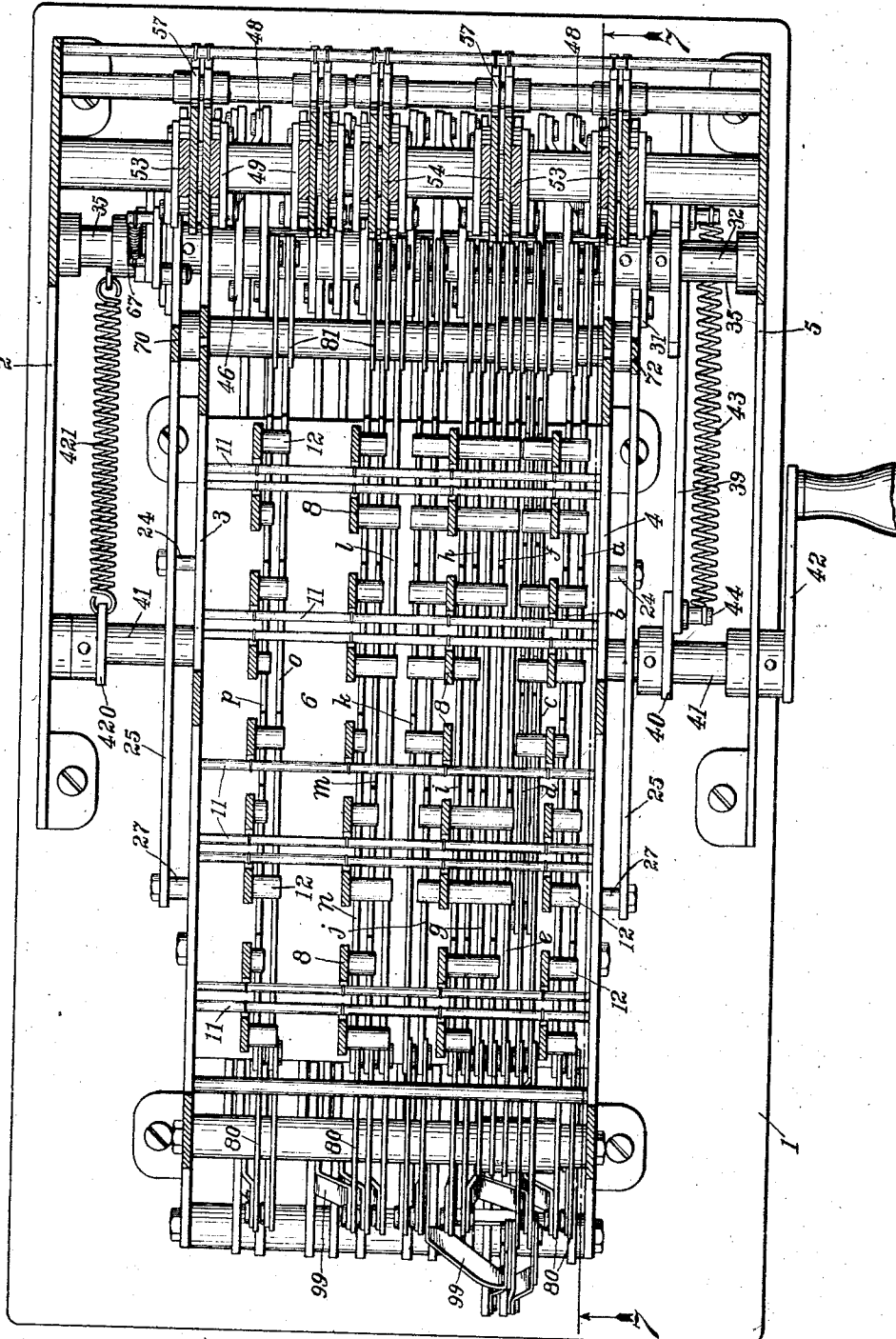
1,516,929

MONEY SCHEDULING MACHINE

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Fig. 6.



Inventor:
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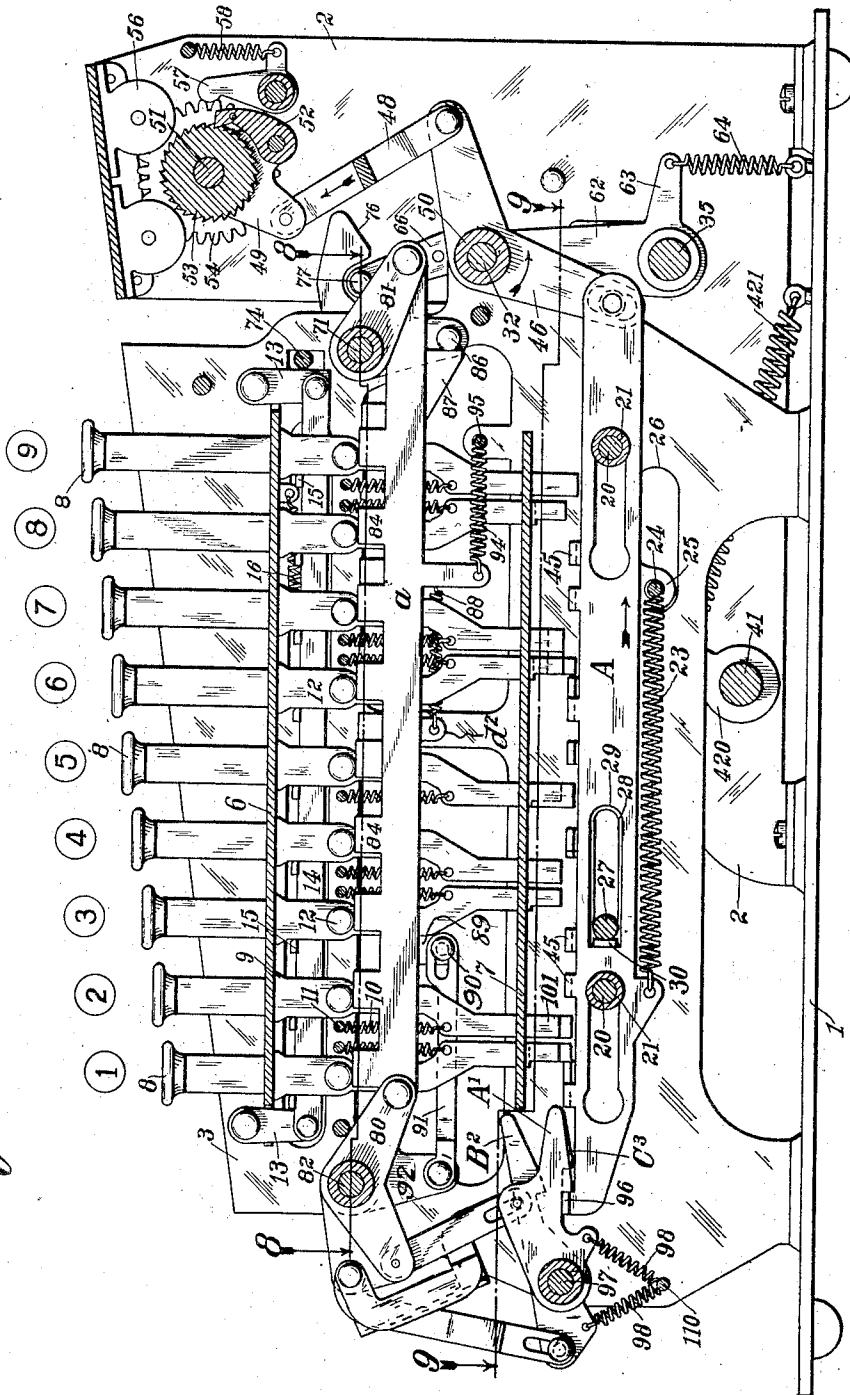
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MONEY SCHEDULING MACHINE

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Fig. 7.



Inventor:
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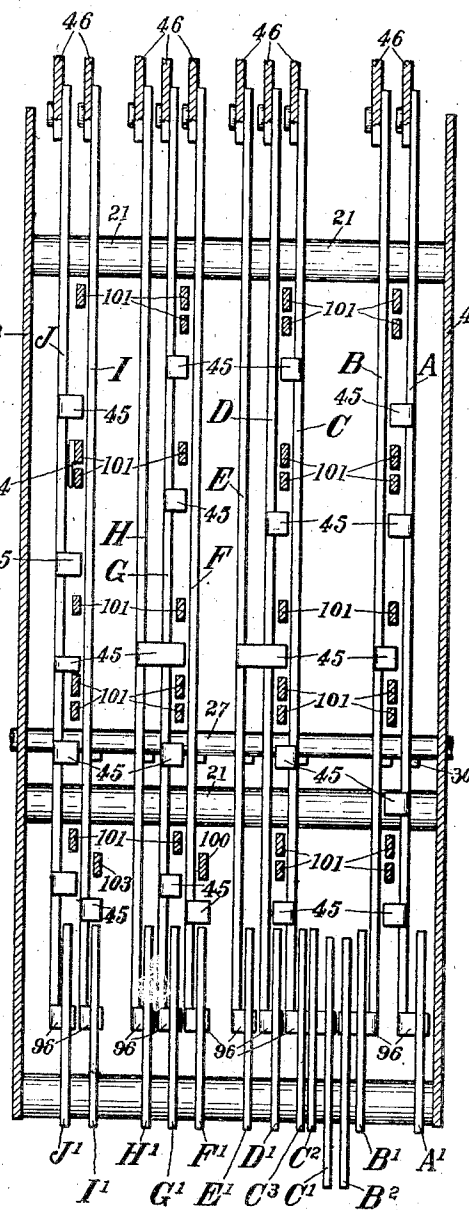
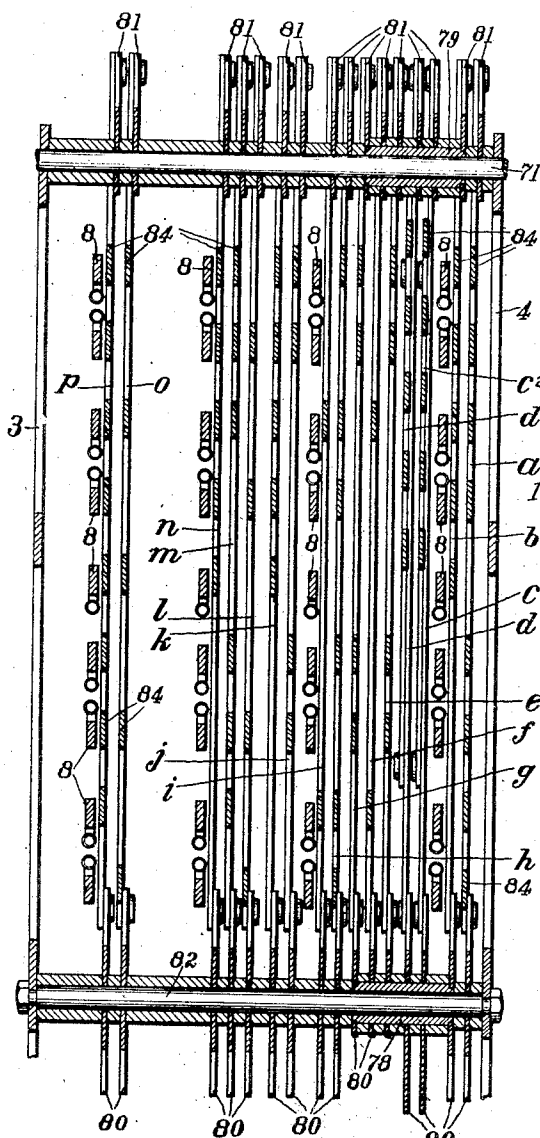
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MONEY SCHEDULING MACHINE

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Fig. 8.

Fig. 9.



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MONEY SCHEDULING MACHINE

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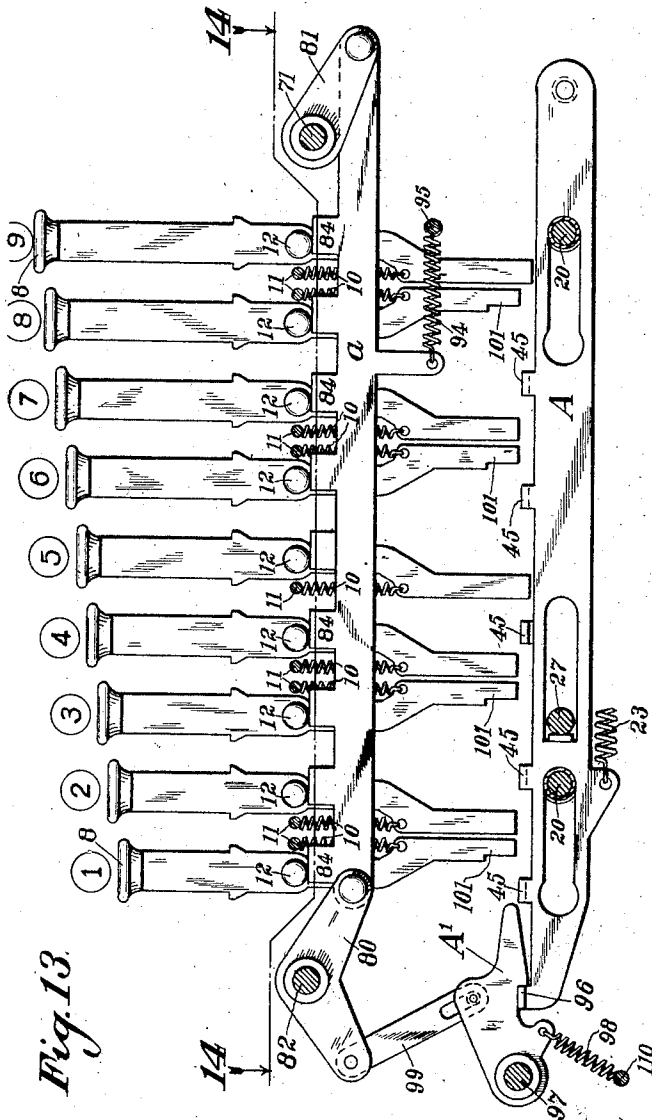
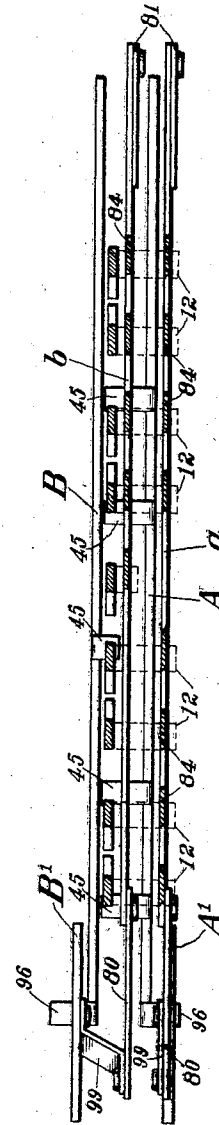


Fig. 13.

Fig. 14.



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Nov. 25, 1924.

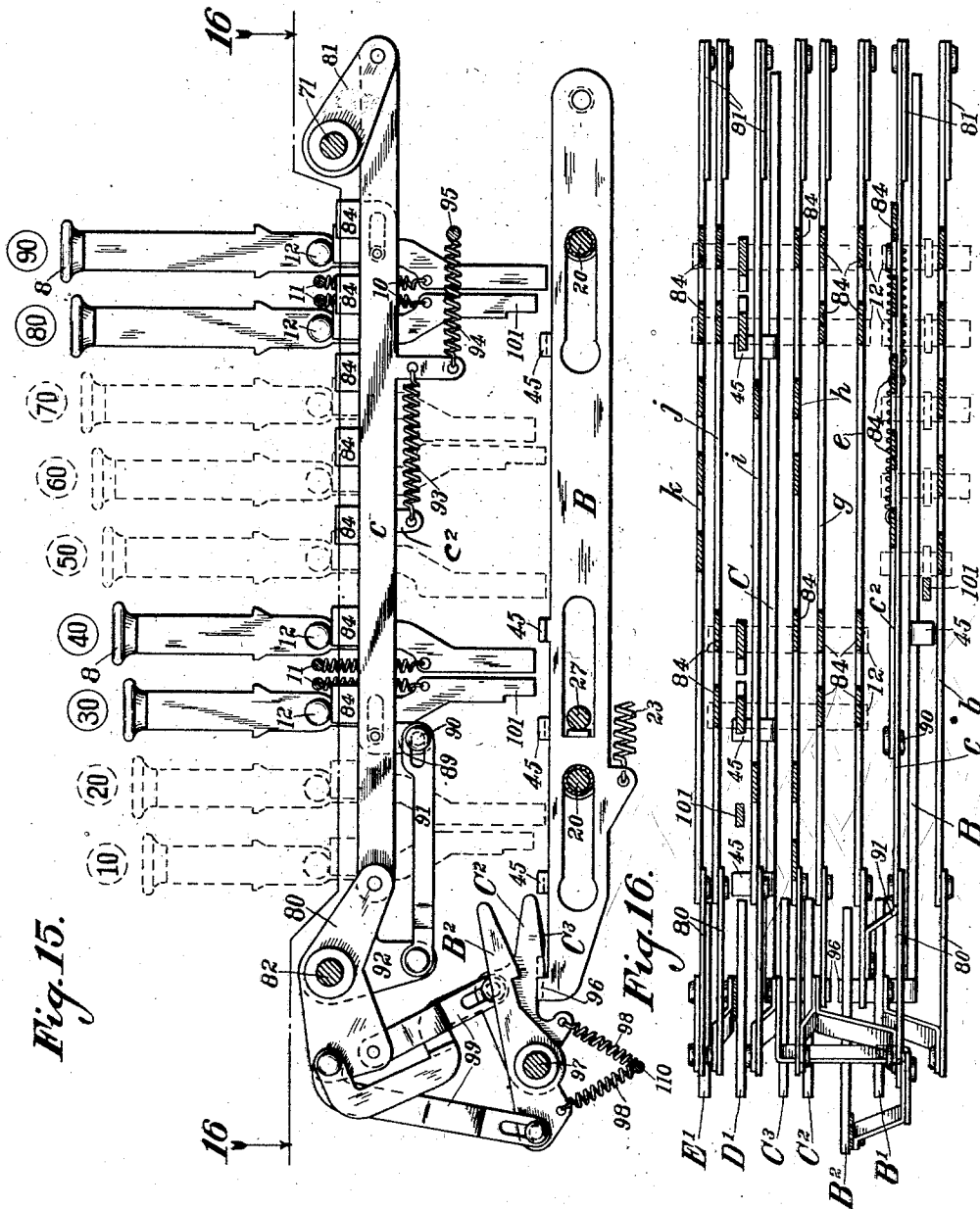
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MONEY SCHEDULING MACHINE

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13 Sheets-Sheet 10



Inventor:
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MONEY SCHEDULING MACHINE

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13 Sheets-Sheet 11

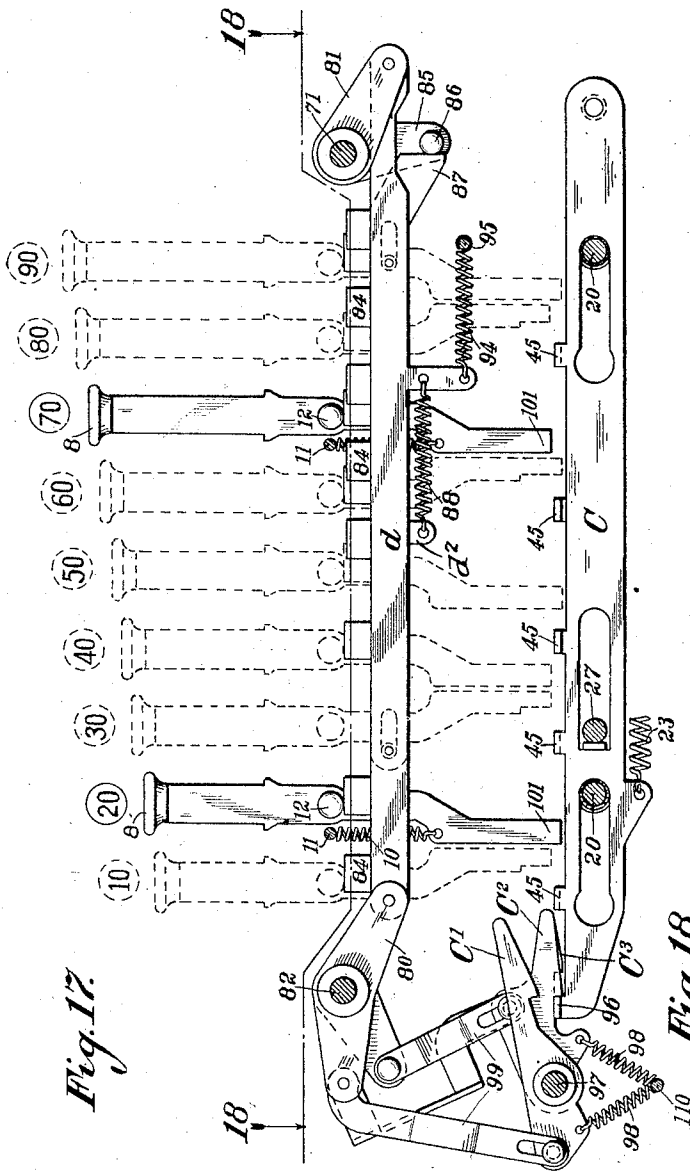


Fig. 17.

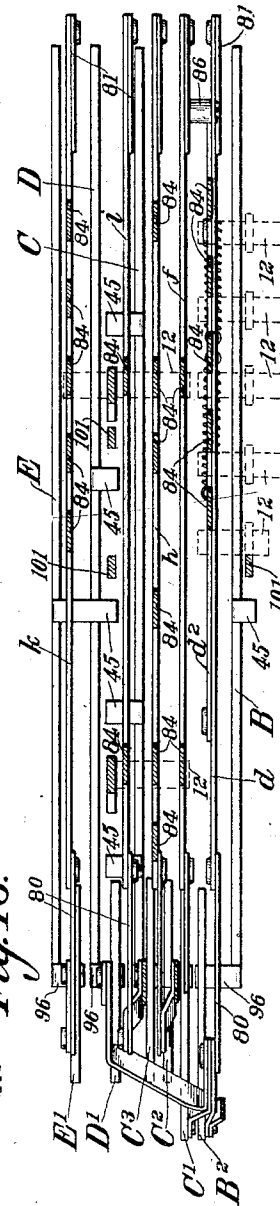


Fig. 18.

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Nov. 25, 1924.

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MONEY SCHEDULING MACHINE

Filed Jan. 24, 1916

13 Sheets-Sheet 12

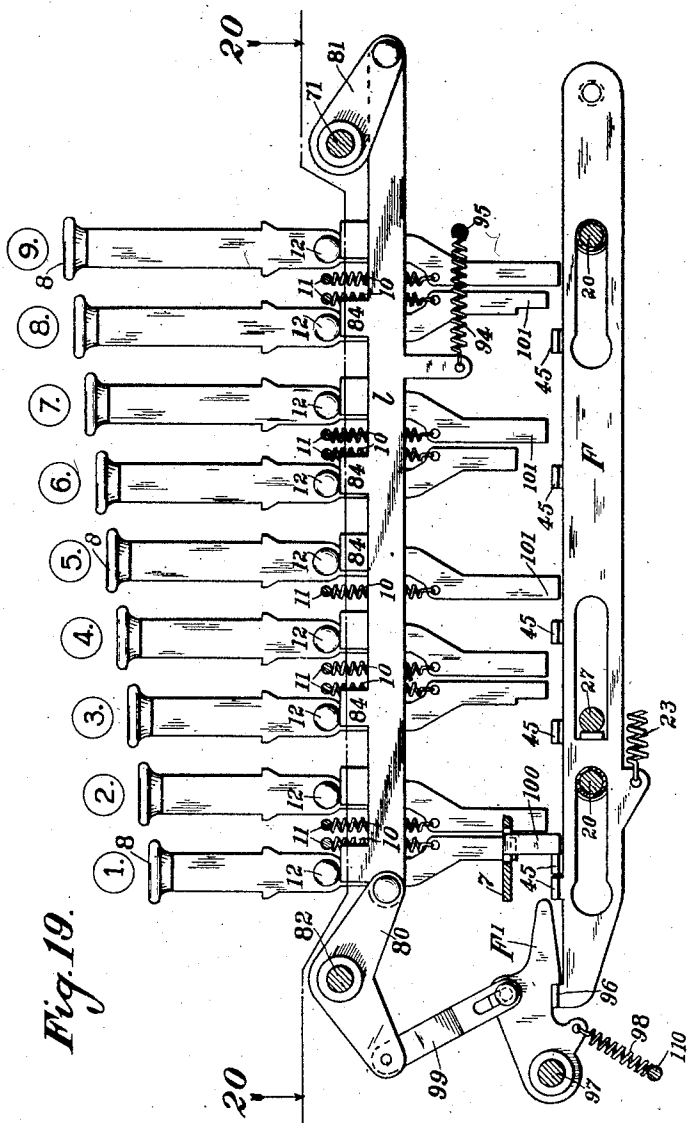
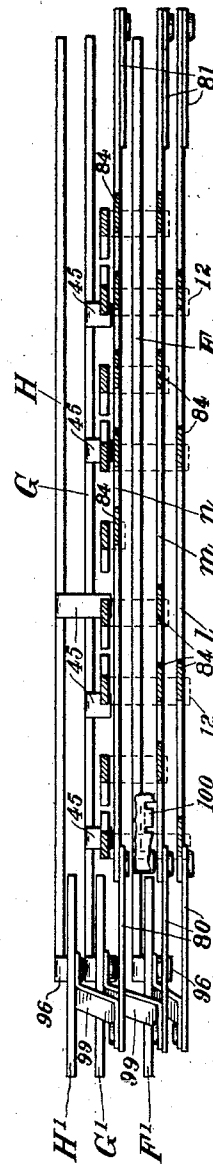


Fig. 20.



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UNITED STATES PATENT OFFICE.

EDWIN L. RELLER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO LIBERTY SYSTEMS CORPORATION, OF WILMINGTON, DELAWARE.

MONEY-SCHEDULING MACHINE.

Application filed January 24, 1916. Serial No. 74,023.

To all whom it may concern:

Be it known that I, EDWIN L. RELLER, a citizen of the United States, and residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Money-Scheduling Machines, of which the following is a specification.

This invention relates to machines for scheduling the denominations required to make up a given item, such as the scheduling of the required coins of different denominations to make up a given sum.

In an automatic scheduling machine, the machine should be so constructed that by setting up on the key board an item or number, the mechanism will automatically divide that number into its denominations which are the least in number for the item or number set up on the key board, and, therefore, into the largest possible denominations of that item or number. In such a machine, it is important that the denominator elements, whether registers or coin founts, should not require duplication, at the same time, maintaining the key board simple and of large capacity. Accordingly in the ideal scheduling machine, there should be a decimal key board, together with only one denominator element for each denomination; and the mechanism controlled by the keys and controlling the operation of the denominator elements, should be such that when any number is set up on the key board, the mechanism should operate to automatically divide that number into the least number of denominations and of the greatest denominations.

In the decimal key board type of machine, the keys are arranged decimally and usually in columns of nine or ten keys, the columns representing units, tens, hundreds, etc. This is the ideal type of machine in that a small key board has a very large capacity. Difficulty is, however, experienced in this type of machine on account of the peculiarities encountered in the denominations of existing systems of coinage, and we will take as an example the United States system, although the same peculiarities are common to other systems.

The multiples of a dollar are integers with reference to the number and are represented by the dollar, tens of dollars, etc.,

on a decimal key board. No multiple of a dollar, (except where two dollars and a half gold pieces are used, which is very rare) is anything but a simple integer multiple of the units and tens. Accordingly, the units column of keys can have a set of connections to its denominator elements and the same is true of the tens, hundreds, etc.

When, however, we come to the denominations of a dollar, the conditions are different; while these denominations are mostly integer multiples of units and tens of cents, such for instance, as 1¢ and 5¢ which are integer multiples of units and 10¢, and 50¢ which are integer multiples of dimes; in the case of a quarter, which is a fractional multiple of a dime, being represented, therefore, by a compound number, one component is in the tens column and the other in the units column, so that this quarter is made up of both orders.

This quarter denomination occurs in all numbers from 25¢ to 49¢ and 75¢ to 99¢; and it must be obtained by the combined operation of a component or key in each order, that is, by tens and units keys. A practical operative scheduling machine, employing a decimal key board and scheduling a number into denominations which are the least for that number, must, therefore, be so constructed, and the keys must have such connections, that the 2, 3, 4, 7, 8 and 9 keys in the tens columns will cooperate with the units keys, so as to select a quarter denominator element whenever required. Furthermore, in order to schedule into the least number of denominations, the connections must be such that by the combined operation of units and tens keys, a dime or two dimes must be obtained with a quarter, for instance, one dime with 35¢ to 44¢ and 85¢ to 94¢ and the two dimes with 45¢ to 49¢ and 95¢ to 99¢.

One of the objects of this invention, therefore, is to provide a scheduling machine, which has a simple decimal key board, which will positively schedule any number into its denominations which are the least for the number set up on the key board and one of which denominations is the greatest possible denominations for that number.

Another object is to provide a scheduling machine having a decimal key board,

in which the denominator elements do not exceed in number the denominations chosen, so that there is no duplication.

Another object is to provide a scheduling machine in which the keys or selective manipulative elements are arranged for combined operation to represent a compound item, and in which analysis mechanism is adapted, upon the combined operation of selected manipulative elements, to automatically and positively select those select or denominator elements, which represent the denominations of the item represented by the operated keys.

Another object is to provide a scheduling machine in which the units and tens keys are adapted for combined operation to divide the number set up thereby and automatically and positively select those select denominator elements, which represent the least number of denominations of the greatest denominations of that number.

Another object is to provide a scheduling machine employing a decimal key board, in which a compound denomination, such as a quarter, will be selected whenever the number set up on the key board requires a quarter as one of the denominations.

In machines of this type some of the select or denominator elements, such as the dime and penny elements, must be arranged for both single and double step movements, and the penny element must in addition have triple and quadruple movements: this is for the reason that in scheduling there may be required either one or two dimes and one, two, three or four pennies. It is, however, important that a machine of this type be so constructed that when a single step movement is desired, for instance, in the case of a dime, there will not be accidentally obtained a double step movement, or in the case of a penny, a triple or quadruple movement.

Another object of this invention, therefore, is to provide a machine in which the operation of the select or denominator elements is positively limited and controlled in accordance with the selections made; and more particularly whereby when a certain step movement is desired, that no excess movement will be imparted to any select or denominator element.

In machines of this type as heretofore constructed, the selective manipulative elements or keys have been arranged to control or actuate either slides or ejectors, which eject coins of the denominations required to make up a given sum, or they have actuated corresponding denomination counters.

As it is necessary that the selective elements select the select elements connected with the counters or ejectors, as the case may be, and as the denominations of the coins to make up given items vary considerably with these items, it is often necessary to "switch"

in order to select the proper select elements. If, now, the mechanism is not positive in its operation, the result is liable to be inaccurate. Moreover, it is essential that the select elements be actuated by means extraneous of the selective elements, as otherwise too much effort by the operator is required.

Another object of this invention, therefore, is to provide a machine of the type referred to which will be positive in its operation, in which the elements will always be moved to a predetermined position, and in which the operating means is extraneous of the selective elements.

Another object is to provide a machine of this type in which the selective elements operate to release the select elements, and in which the released elements are positively actuated and positively arrested in predetermined positions.

Another object is to provide a machine of this type in which the parts corresponding to a series are utilized for operation in another series, thereby reducing the parts required.

Another object is to provide a machine of this type which is simple in construction and operation, economical to manufacture, and durable.

Further objects will appear from the detail description taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of a machine embodying this invention;

Figure 2 is a front elevation with the case removed;

Figure 3 is a rear elevation;

Figure 4 is a side elevation of the right side of the machine;

Figure 5 is a side elevation of the left side of the machine;

Figure 6 is a section on the line 6—6, Figure 4;

Figure 7 is a section on the line 7—7, Figure 6;

Figure 8 is a section on the line, 8—8, Figure 7;

Figure 9 is a section on the line 9—9, Figure 7;

Figure 10 is an enlarged detail of Figure 2;

Figure 11 is a detail side elevation of one of the counters;

Figure 12 is a detail plan of Figure 11;

Figure 13 is a detail side elevation, showing the operation of the first and second denominations;

Figure 14 is a section on the line 14—14, Figure 13;

Figure 15 is a side elevation showing the operation of the third denomination;

Figure 16 is a section on the line 16—16, Figure 15;

Figure 17 is a side elevation showing the operation of the fourth and fifth denominations;

Figure 18 is a section on the line 18—18, Figure 17;

Figure 19 is a side elevation showing the operations of the sixth, seventh and eighth denominations;

Figure 20 is a section on the line 20—20, Figure 19;

Figure 21 is a side elevation showing the operations of the ninth and tenth denominations; and,

Figure 22 is a section on the line 22—22, Figure 21.

Referring to the accompanying drawings, and more particularly, to Figures 1 to 12 inclusive, 1 designates a base which supports side frames 2, 3, 4 and 5. Connecting the inside side frames 3 and 4 are a pair of plates 6 and 7.

The plates 6 and 7 are slotted to receive the shanks of a series of selective manipulative elements or keys 8. The key shanks are shouldered, as shown at 9, and each key is raised by means of a spring 10, connected, at one end, to the key, and, at the other end, to a cross bar 11 connecting the frames 3 and 4, so as to normally operate to hold the shoulders 9 against the top plate 6. Each key is provided with a cross pin 12 for a purpose hereinafter to be described. Mounted on ears struck up from the plate 6 are pairs of arms 13, each pair of which are connected, at their lower ends, to and support a link 14 having laterally bent lugs 15 adapted to engage the shanks of the keys. Springs 16, connected to the top plate 6 and the link respectively, normally operate to move the links 14 to the right. Figure 7, so as to yieldingly hold the lugs 15 thereon in engagement with the shanks on the keys. The lower faces of the shoulders 9 are beveled, so that when any key is depressed, the bevel will cooperate with the lugs 15 to move the link to the left, Figure 7, and the lug will then snap over the shoulder to lock the key in depressed position. There are a series of arms 13 and links 14, one for each longitudinal row of keys.

Mounted on cross bars 20, connecting the plates 3 and 4, and separated by suitable spacers 21, are a series of select elements or register bars A, B, C, D, E, F, G, H, I and J. Each register bar is connected to one end of a spring 23, the other end of which is connected to a cross pin 24 mounted on a pair of links 25. The plates 3 and 4 are slotted, as shown at 26, to permit the cross bar to work therethrough in connection with the links 25, which are positioned on the outer sides of the plates. The forward ends of the links 25 are mounted on the ends of a cross bar 27 working in slots 28 in the plates 3 and 4, and passing loosely through slots 29 in the register bars A—J. These register bars have laterally turned lugs 30,

so as to provide for large bearing faces against the cross bar 27. The springs 23 operate to hold the lugs 30 in engagement with the cross bar 27.

Each of the links 25 is connected, at its rear end, to an arm 31 fixed to a shaft 32 mounted in the plates 3, 4 and 5, and this shaft has fixed thereto a mutilated gear segment 33 meshing with a mutilated gear segment 34 fixed to a shaft 35. The gear segment 34 is provided with an arm 36 having a pin 37 working in a slot 38 in a link 39, and connected to an arm 40 fixed to a shaft 41 mounted in the plates 2 and 5, and having a crank 42. The shaft 41 has, at the other end, an arm 420 connected by a spring 421 with the base 1. A spring 43 connects the pivot pin 44 with the pin 37.

Each one of the register bars A—J has a series of laterally turned lugs or stops 45, and each is connected to a bell crank lever 46, loosely mounted on a shaft 32, and connected by a link 48 with the pawl carrier 49 of a register mechanism. The bell crank levers are held in spaced relation by spacers 50.

The registers, which are shown in detail in Figures 11 and 12, are arranged in pairs, but each is independently operated by its particular register bar. Each pawl carrier 49 is loosely mounted on a cross shaft 51, and carries a pawl 52 engaging a ratchet 53 connected with a gear 54 which meshes with a pinion 55 of a register 56. Each gear 54 is engaged by a stop pawl 57 and held in engagement therewith by a spring 58.

The shaft 35 has fixed thereto an arm or finger 60 engaged by a pin 61 on a bell crank lever 62 loosely mounted on the shaft 35, and having an extension 63 connected by a spring 64 to the base 1. The bell crank lever has pivoted at 65 a finger 66, the lower end of which is connected by a spring 67 to the bell crank lever, which spring operates to hold the pin 68 on the finger in engagement with the edge of the bell crank lever. The upper end of the finger carries a pin 77 which is adapted to engage a recess 69 in an arm 70 fixed to the end of the shaft 71 in the frames 3 and 4. The other end of the shaft 71 has also fixed thereto an arm 72 connected by a spring 73 to the plate 4. The arms 70 and 72 carry a cross bar 74, which projects through recesses 75 in the plates 3 and 4, and is adapted to engage the arms 13 heretofore referred to. The free end of the arm 70 has a bevel face 76.

Forward movement of the crank 42 against the tension of the spring 421 will operate, through the arm 40 and the spring 43, to move the gear segment 34 in the direction of the arrow, Figure 4. This movement of the gear segment 34 will move the gear segment 33 on the shaft 32 in the direction of the arrow, and will, through the arms 31,

move the links 25 rearwardly, or in the direction of the arrow. In view of the yielding connection between the cross bar 24 on the links 25 with the register bars A—J, through the springs 23, this movement of the links 25 will carry with it such register bars as are free to move or unlocked, as hereinafter explained, so as to carry them forwardly. Such register bars will, through their bell cranks 46 and links 48, move the pawl carriers 49 with their pawls 52 back on their ratchets 53. When the crank 42 has been moved rearwardly to its limit, and is then released, the spring 421 will carry the crank and its shaft, together with the connected links 25, back, and the cross bar 27 will restore the displaced register bars A—J back to original position. This will, through the connections heretofore referred to, move the pawl carriers and their pawls so as to operate and set the registers.

During the forward movement of the crank and its connected parts, the finger 60 will move with the shaft 35 in the direction of the arrow, Figure 5, and this will cause the spring 64 to move the bell crank lever 62 in the same direction, but the spring 73 has sufficient strength so that the finger 66 will be swung on its pivot 65, so as to cause the pin 77 to snap over the hooked end of the arm 70, the spring 67 yielding during this movement. On the return movement of the parts, however, the finger 66 will be fixed to the lever 62 on account of the engagement of the pin 66 with the lever, and the pin 77 will, therefore, upon engaging the incline or bevel 76, swing the arm 70 and the rock shaft 71, thereby moving the cross bar 74 to the left, Figure 7, so as to, by engagement with the arms 13, shift the links 14 and release the keys. Upon the completion of the movement, the pin 77 on finger 66 will again snap into the recess 69, with the parts in original position.

A series of intermediate elements or release bars *a, b, c, d, g, h, i, j, k, l, m, n, o* and *p*, and a pair of shift bars *e* and *f*, are arranged along the machine between the plates 3 and 4. Each of these bars is suspended from a pair of arms 80 and 81 loose on shafts 82 and 71 respectively which shafts are mounted in the plates 3 and 4. Each of the bars, with the exception of *c* and *d*, is provided with upwardly extending lugs 84 arranged in the path of the cross pins 12 on the key shanks. Each of the bars *a—p* is connected by a spring 94 with a cross bar 95 connecting the plates 3 and 4, so as to normally operate to move the bars to the right, Figure 15.

Referring to Figures 15 to 18 inclusive, the bars *c* and *d* have slidably mounted thereon bars *c*² and *d*² respectively, these bars *c*² and *d*² being arranged for sliding

movement by headed rivets on the bars *c* and *d* engaging slots in the bars *c*² and *d*² respectively. The arm 81, carrying the bar *f*, has a part 85 provided with a pin 86 engaging a lug 87 on the bar *d*², and the latter is connected by a spring 88 to the bar *d*, so as to normally tend to move the bar *d*² to the right, Figure 17, on bar *d*. The bar *c*² has a downwardly projecting lug 89 having a pin 90 engaging a slot in a link 91 connected to an extension 92 on the arm 80 carrying the bar *e*, and a spring 93 connects the bar *c*² with the bar *c*, so as to normally tend to move the bar *c*² to the right, Figure 15, on bar *c*.

Referring to Figure 8, the shafts 82 and 71 have mounted loosely thereon hubs or sleeves 78 and 79 respectively. To the right ends of these hubs are fixed the arms 80 and 81 respectively, carrying the bar *b*, and to the left ends of these hubs are fixed the arms carrying the bar *g*. The bars *b* and *g* will, therefore, move in unison. The arms carrying the bars *c, d, e* and *f* are loosely mounted on the hubs, and, like the arms carrying the remaining release bars, are separated by spacers.

The forward ends of the register bars A—J have laterally projecting lugs 96, which are engaged respectively by pawls A', B', B², C', C², C³, D', E', F', G', H', I' and J'. These pawls are mounted upon a shaft 97 in the side plates 3 and 4, and each pawl is actuated by a spring 98, connected, at one end, to the pawl, and, at the other end, to a cross bar 110 between the plates 3 and 4. The pawls are connected with the arms 80 by suitable links 99, as shown more particularly in Figure 10, and as hereinafter more particularly described. The key shanks are provided with extensions 101 forming stops adapted to arrest the register bars A—J, but, in case of the bars F and I, the same are arrested by the stops 100 and 103 on the plate 7.

From the above it will be noted that the depression of any particular selective manipulative elements or key causes one of the intermediate elements or release bars *a—p* to be depressed, and this raises or drops an appropriate pawl or pawls to release or lock an appropriate select element or register bar or bars A—J, and the released register bar is then shifted, as pointed out heretofore. When the register bar or bars are returned, the lugs thereon will again snap under the pawls, and will be retained in retracted position.

In accordance with this invention, the operation is such that, for a given item, the registers will automatically register the coins of the largest possible denomination which, when added together, will give that item. Below is given a table containing

the different items and the coins of largest denomination required to fill that item.

Items.	Coins of largest denomination.
5	
1¢ to 4¢	Pennies.
5¢ to 9¢	Nickel and pennies.
10¢ to 14¢	Dime and pennies.
15¢ to 19¢	Dime, nickel, and pennies.
20¢ to 24¢	Two dimes, and pennies.
25¢ to 29¢	Quarter and pennies.
30¢ to 34¢	Quarter, nickel, and pennies.
35¢ to 39¢	Quarter, dime, and pennies.
40¢ to 44¢	Quarter, dime, nickel, and pennies.
45¢ to 49¢	Quarter, two dimes, and pennies.
50¢ to 54¢	Half and pennies.
55¢ to 59¢	Half, nickel, and pennies.
60¢ to 64¢	Half, dime, and pennies.
65¢ to 69¢	Half, dime, nickel, and pennies.
70¢ to 74¢	Half, two dimes, and pennies.
75¢ to 79¢	Half, quarter, and pennies.
80¢ to 84¢	Half, quarter, nickel, and pennies.
85¢ to 89¢	Half, quarter, dime, and pennies.
90¢ to 94¢	Half, quarter, dime, nickel, and pennies.
95¢ to 99¢	Half, quarter, two dimes, and pennies.
\$1	Dollar.
\$2	Two dollar bill.
\$3	Two dollar bill and dollar.
\$4	Two two dollar bills.
20	
\$5	Five dollar bill.
\$6	Five dollar bill and dollar.
\$7	Five dollar bill and two dollar bill.
\$8	Five dollar bill, two dollar bill and dollar.
\$9	Five dollar bill and two two dollar bills.
\$10	Ten dollar bill.
\$20	Twenty dollar bill.

The operations of the mechanisms to schedule the coins for the different items are as follows:

1¢ to 4¢.

Referring to Figures 13 and 14, the depression of any one of the first four keys 8 will cause the depression of the release bar *a* to raise the pawl *A'*, thereby releasing the penny register bar *A*. Actuation of the crank 42 will shift the released register bar *A* until the lug 45 thereon is arrested, by the shank stop 101 of the actuated key, in a position corresponding to the item set by the key. Upon return of the crank, the penny register *a'* will be actuated to register the number of pennies corresponding to the actuated key. It will be noted, in this connection, that the first lug 45 (from the left) will be arrested by the shanks of the first two keys, while the second lug will be arrested by the shanks of the third and fourth keys, corresponding to one, two, three and four spaces respectively of the register bar.

5¢ to 9¢.

Referring to Figures 13 and 14, it will be noted that the release bar *a* has no lug 84 under the "5" key, while the release bar *b* only has lugs under the keys "5," "6," "7," "8," and "9." Moreover, the pins 12 on the last four keys bridge the lugs on both bars *a* and *b*. Depression of key "5" will depress release bar *b* and raise pawl *B'* to release register bar *B*. The latter is, upon actuation of the crank, arrested by engagement of the stop thereon with the shank "5," and, upon return of the crank, the nickel register *b'* will be actuated. Upon

actuation of the higher keys "6" etc., both release bars *a* and *b* will be depressed to release both register bars *A* and *B*, the former being stopped after passing through one space, while the latter will be arrested by engagement of the second and third lugs 45 thereon with the shanks of the last four keys upon movement of the register bar through one, two, three and four spaces respectively. Thus, when the "7" key is depressed, the nickel register *b'* will register one, while the penny register *a'* will register two. It will be noted that the "5" key has its shank elongated so as to always arrest the bar *B* upon its release, even though the key "5" is not depressed. This obviates duplication of lugs on this bar.

10¢ to 24¢.

Referring to Figures 17 and 18, upon depression of the "10" key in the second bank, the release bar *h* will be depressed. This operates to raise the pawl *C²* from the lug 96 of the dime register bar *C*. Now it will be noted that the shoulder on the pawl *C²* is spaced rearwardly of the shoulder on the pawl *C¹* one space. Upon operation of the crank, therefore, the register bar *C* will be arrested by the pawl *C²* after it has moved one space, thereby causing, upon return of the crank, the dime register *c'* to be actuated to register one dime. Depression of any key in the penny bank will cause the penny and nickel registers to be registered as before.

Upon depression of the "20" key, the pin 12 thereon, which extends across the bar *h* as well as the bar *i*, the latter having, in this case, a lug 84 in the path of the pin, depresses both bars so as to lift both pawls *C²* and *C³*, and entirely release the dime bar *C*. Upon actuation of the crank, the dime bar *C* will now be arrested by the engagement of the lug 45 thereon with the shank of the "20" key, after the register bar has moved through two spaces, so that, upon return of the crank, the dime register will register two dimes. The operation of the penny bank of keys from "1" to "4" inclusive, will, of course, be the same as before.

25¢ to 29¢.

Referring again to Figures 17 and 18, it will be noted that the pin 12 on the "20" key also crosses the lug 84 on the shift bar *j*, which, upon being depressed, swings the extension 85 on its arm 81 to the left, Figure 17, thereby moving the slide *d²* to the left. This slide has a series of lugs 84, which, while normally out of register with the cross pins on the "5," "6," "7," "8" and "9" keys in the penny bank, are, upon depression of the "20" key, through the connections described, shifted underneath the latter keys. Upon the depression of the "20" key and the

subsequent depression of one of the penny keys "5," "6," "7," "8" and "9," the latter will depress the bar *d*. The "20" key will have raised the pawls C² and C³, and one of the keys in the penny bank will have raised the pawl B' as before, but the depression of the bar *d* will, through its link connections 99, operate to drop pawls B² and C' over the lugs 96 on the nickel and dime register bars B and C, and concurrently raise the pawl D' on the quarter register bar D. The result is, therefore, that the nickel and dime bars are locked, while the quarter bar (and the penny bar in case a key higher than "5" is depressed) is released, so that, upon actuation of the crank, the quarter bar will be moved through one space, the lug 45 thereon being stopped in any suitable manner, as by the shank on the "60" key. Upon return of the crank, the quarter register (and the penny register in case the item is over 25¢) is actuated to register one quarter. The parts are, of course, restored to original position as before.

30¢ to 34¢.

Referring to Figures 15 and 16, it will be noted that the cross pin on the "30" key bridges a lug 84 on a bar *j*, and also a similar lug on the bar *g*, so as to depress both of these bars. The depression of the bar *j* will, through the connecting link 99, raise the pawl D' from the quarter register bar (both links having pin and slot connections with the pawl). Concurrently, depression of the bar *g* will, through its arms 81 and 80 connected by hubs 78 and 79 to the corresponding arms 80 and 81 of the bar *b*, raise the pawl B' from the nickel register bar. This will release both the quarter and the nickel register bars, so that, upon operation of the crank, the quarter and nickel registers will be operated to register a quarter and a nickel. Of course, the depression of the penny keys "1" to "4" in connection with the "30" key will release the penny register bar in connection with the quarter and nickel register bars.

35¢ to 39¢.

Referring again to Figures 15 and 16, it will be noted that the cross pin 12 on the "30" key also bridges the lug 84 on the shift bar *e*. This shift bar, as heretofore described, operates, upon depression, to shift the bar *e*² on the bar *e* so as to position the lugs 84 thereon under the cross pins on the "5" to "9" penny keys, so that, upon depression of one of the latter keys, the bar *e* will be depressed. Depression of the bar *e* will operate to lower the pawl B² to lock the nickel bar and raise both pawls C², C³ from the dime register bar. The result is, therefore, that the depression of the "30" key and one of the keys "5" to "9" will cause the re-

lease of the quarter bar, the release of the dime bar, and also the release of the penny bar in case a penny key higher than "5" is depressed. The second lug 45 on the dime bar will be arrested by the shank of the depressed "30" key, so that the latter will be moved through one space upon actuation of the crank. The registers will, therefore, be actuated to register one quarter, one dime, and the number of pennies over five.

40¢ to 44¢.

Referring again to Figures 15 and 16, it will be noted that the "40" key, in addition to bridging the lugs on the bars *e*, *g* and *j*, also bridges a lug on the bar *h*. Depression of this key alone, or on connection with one of the penny keys "1" to "4," will operate to release the quarter register bar as before, raise the pawl C² from the dime bar to allow it to move forward one space until arrested by the pawl C³, and, through the bar *g*, the hubs 78 and 79 and the bar *b*, raise the pawl B' from the nickel bar. The result is, therefore, that the quarter, dime and nickel register bars will be released, so that the corresponding registers will, upon movement of the crank, be actuated to register a quarter, a dime and a nickel. The penny register will, of course, be operated as before.

45¢ to 49¢.

The operation is the same as described in the preceding paragraph, except that shift bar *e* is, in this case, operated as for 35¢ to 39¢, and except that the 10¢ register bar is, in this case, arrested by the "40" key, after moving two spaces, thereby registering two dimes.

50¢ to 54¢.

The depression of the "50" key operates to depress the bar *k*, so as to raise the pawl E' and release the half dollar register bar E, which is actuated, upon operation of the crank, to move the half dollar register one space, the register bar being arrested by the shank of the "50" key.

55¢ to 59¢.

The operation is the same as in the preceding paragraph, except that the nickel and penny bars now come into play in the same manner as before.

60¢ to 64¢.

Upon reference to Figures 6 and 8, it will be noted that the cross pin of the "60" key bridges a lug on the 50¢ release bar *k* as well as the lug on the 10¢ release bar *h*. Operation of the key will, therefore, release both the 50¢ and the 10¢ register bars.

65¢ to 69¢.

The operation is the same in this case as

in the preceding paragraph, the nickel and penny bar coming in this case into play, so as to register a half, a dime, a nickel, and pennies.

70¢ to 74¢.

Referring to Figures 6 and 8, it will be noted that the "70" key has a cross pin which not alone bridges a lug on the half dollar release bar *k*; but also lugs on the dime release bars *h* and *i*. The depression of the "70" key, either alone or in connection with keys "1" to "4" in the penny bank, will, therefore, operate to release the half register bar *E* and dime register bar *C*, which latter will, upon actuation of the crank, be arrested by the shank of the "70" key after the bar has moved two spaces, so as to register one half, and two dimes, and, of course, the proper number of pennies.

75¢ to 79¢.

Referring again to Figures 6 and 8, it will be noted that the cross pin on the "70" bar also bridges a lug on the shift bar *j*. Depression of the "70" key in connection with one of the penny keys "5" to "9" will, therefore, operate as in the 25¢ to 29¢, to lock the nickel and dime register bars and release the quarter bar, so as to register a half, a quarter, and the requisite number of pennies.

80¢ to 84¢.

Referring to Figures 6 and 8, it will be noted that the cross pin on the "80" key bridges lugs on the half and quarter release bars *j* and *k*, and also a lug on the auxiliary nickel release bar *g*. Depression of the "80" key in connection with one of the penny keys "1" to "4" will, therefore, operate to release the half, quarter and nickel register bars, in connection with the penny bar, so as to register a half, a quarter, a nickel and the proper number of pennies.

85¢ to 89¢.

Upon referring to Figures 6 and 8, it will be noted that the cross pin on the "80" key also bridges the shift bar *e*. The depression of the "80" key in connection with one of the penny keys "5" to "9" will, therefore, operate as in 35¢ to 39¢, so as to only release the half, quarter and dime register bars (and the penny bar), the dime register bar being arrested by the shank of the "80" key after it has moved one space, so that the machine will register a half, a quarter, a dime, and the appropriate number of pennies.

90¢ to 94¢.

Referring again to Figures 6 and 8, it will be noted that the "90" key has a cross pin engaging the half, quarter, dime and nickel auxiliary release bars *k*, *j*, *h* and *g*

respectively. The depression of the "90" key, alone or in connection with the penny keys "1" to "4", will, therefore, operate to release the half, quarter, dime and nickel register bars, as well as the penny register bar, so as to actuate the corresponding registers.

95¢ to 99¢.

Referring to Figures 6 and 8, the cross pin on the "90" key, as well as the cross pin on the "80" key, cooperates with a lug on the shift bar *e*, so as to release the dime register bar, which is arrested by the "90" key shank after it has moved two spaces to register two dimes. Depression of the "90" key in connection with one of the penny keys "5" to "9" will, therefore, operate to release the half, quarter, dime and penny register bars, whereby, upon operation of the crank the corresponding registers are actuated.

\$1.00 to \$9.99.

Depression of the \$1.00 key in the third bank (Figures 19 and 20) causes the cross pin thereon to depress the release bar *l*, thereby raising the pawl *F'* to release the dollar register bar *F*, which is now arrested by the stop 100 on the frame, so as to register \$1.00. Depression of the \$2.00 key causes a depression of the release bar *m*, and this, actuating the pawl *G'*, will release the \$2.00 register bar *G*, which is arrested by the shank of the \$2.00 key one space, to register one two dollar bill. It will be noted that the \$3.00 key bridges both the release bars *l* and *m*, so that both register bars *F* and *G* will be released and both arrested after moving one space, so as to register a \$1.00 and a \$2.00. The \$4.00 key, on the other hand, bridges only the release bar *m*, but the \$2.00 register bar *G* will now be arrested by the shank thereon after it has moved two spaces. The \$5.00 key depresses the release bar *n*, which will raise the pawl *H'*, so as to release the \$5.00 register bar *H*, which will always be arrested by the shank of the \$5.00 key. Similarly, the proper combinations can be obtained for items higher than \$5.00, which will be combinations of \$5.00, with \$1.00, \$2.00, and \$1.00 and \$2.00. It will be noted, in this connection, that the shank of the \$5.00 key is normally positioned so as to always arrest the \$5.00 register bar after it has moved through one space.

\$10.00 to \$99.99.

Referring to Figures 21 and 22, depression of the \$10.00 key will depress the release bar *o*, so as to raise the pawl *I'*, thereby releasing the \$10.00 register bar *I*, which, upon actuation of the crank, is arrested by the lug 103 on the plate 7, so that the reg-

ister bar will be moved through one space to register \$10.00 on the \$10.00 register *z'*. Depression of the \$20.00 key will, on the other hand, depress the release bar *p*, thereby raising the pawl *J'* and releasing the \$20.00 register bar, which, upon the operation of the crank, is arrested by the shank of the \$20.00 key after moving through one space to register \$20.00 on the \$20.00 register *j'*. Similarly, the \$40, \$60, and \$80 keys will release and arrest the \$20.00 register bar after the latter has moved through two, three and four spaces respectively. The cross pins 12 on the \$30, \$50, \$70 and \$90 keys bridge lugs on both the release bars *o* and *p*, to release both register bars I and J, the register bar I being arrested in each instance by the fixed stop 103, while the register bar J is arrested by the shanks of the \$30, \$50, \$70 and \$90 keys respectively, and after having shifted through one, two, three and four spaces respectively. In order, however, to obtain such a movement with the \$70 key, the end of the latter is extended forwardly, as shown at 104, so as to be flush with the forward edge of the \$60 key.

It will, therefore, be seen that the invention accomplishes its objects. The key board is of the simple decimal type, in which in this particular instance, the keys are arranged in columns of nine keys each. It will, however, be noted that in accordance with this invention, it is not necessary to provide zero keys, but the depression of any key in any column will set up on the key board the units or tens represented by that key, and the scheduling is obtained without depression of a zero or extra key.

The denominator elements, which, in this case, are in the form of counters, correspond in number to the denominations of the system employed, so that there is no duplication of those elements. This is due to the fact that the mechanism enables the machine to always divide the item or number set up on the key board into the least number of denominations required to make up that item.

Whenever a number is set up on the key board and whenever that number requires a denomination which is a compound number made up of units and tens, the units and tens components in the units and tens column cooperate and by their combined operation and action, select that denominator element, together with such other denominator elements, as are required to make up that item. In this machine, therefore, the columns do not work independently so that each column will schedule into its individual denominations required to make up first, the number represented by the tens component and second, the number represented by the units component but the action is a combined ac-

tion and the scheduling is of the compound number, due to the combined action of the mechanism connecting the columns of keys with the denominator elements.

In accordance with this invention, a series of selective manipulative elements, such as keys, are arranged for combined operation to represent compound items; or more specifically a series of numbers are arranged in different orders, such as units and tens, so that units and tens keys are arranged for combined operation to set up on the key board a number which is a compound number, in that it is made up of a units component and a tens component. A series of select elements, comprising in this particular embodiment, the bars A, B, C, etc. are connected with denominator elements, such as the counters, *a'*, *b'*, *c'*, etc., so as to represent denominations of the compound items or numbers set up on the key board. The analysis mechanism controlled by the keys and controlling the operation of the select elements, comprises a series of intermediate elements, *a*, *b*, *c*, etc. so as to selectively but positively control the operation of the select elements, whereby upon combined operation of selected keys, the mechanism operates to automatically and positively select those select elements, or more specifically stated, to permit operation of only those select elements which represent the denominations of the item or number set up by the operated keys; the selection is such that the selected select elements represent the denominations which are the least in number for the item set up by the operated keys; furthermore, the combined operation of the keys causes the selection of a select element which represents the greatest denomination of the number represented by the operated keys.

The analysis mechanism is so constructed and connected that by the combined operation of units and tens keys, representing a given compound number, there is automatically selected that select element which represents a denomination, such as a quarter, which is greater than the tens component of that number and, therefore, greater than the major or tens order of that item; the mechanism is, moreover, so constructed as to select either solely, such a quarter select element, or the same in combination with another select element or select elements required to make up the number set up on the key board. It will, therefore be noted that the denomination select element thus selected is greater than the least of the compound numbers which can be set up by the units and tens keys in combination.

As heretofore described in the scheduling of certain numbers, such as 35 and 85, it is necessary to selectively select or choose two select elements, namely a quarter and a dime by the combined operation of tens and units

keys; the same combined selective action is necessary for the scheduling of numbers, such as 45 and 95, requiring, two dimes.

In certain cases, however, where only a dime or two times is required, such, for instance, as in scheduling 10 and 20, the selection is obtained wholly by the tens key, and the same is true where a nickel is required by the operation of a units key. In accordance with this invention, therefore, the mechanism is constructed so that upon operation of a key of one order, such as either the units or tens, it will automatically select one of these select elements corresponding to that order, such as a dime for the tens column and a nickel for the units column, and it will be noted that the dime denomination has a value which is not greater than the least of the compound number which can be set up on the key board by the combined operation of tens and units keys; however, upon combined operation of the keys of the different orders, the mechanism operates to automatically select another select element, such as a quarter, which represents a denomination whose value is greater than the lowest of those compound numbers. It will, moreover, be noted that a quarter is obtained by the scheduling of a number and by the combined operation of tens and units keys, when the operated keys represents a compound number equal to or greater than such denomination, namely a quarter. In accordance with this invention, therefore, the operation of a key of either order will automatically select a corresponding select element, while the combined operation of keys of different orders will automatically select a corresponding select element. More specifically in the embodiment of this invention as heretofore described, the operation of a key of either order operates to automatically select a select element corresponding to that order, while upon the combined operation of keys of different orders, the mechanism operates to automatically select a select element corresponding to both orders and prevents the operation of the select elements corresponding to either order, except when required, for instance, for the scheduling of 35, 45, 85 and 95, as heretofore described; in such a case, the selection is of a select element representing a denomination corresponding to a compound number represented by the operated keys of different orders, and one or more select elements corresponding to one or both of the orders. Accordingly, a quarter is scheduled when the number represented by the keys equals or exceeds the value of that denomination, namely 25, and a quarter and a dime and a quarter and two dimes are obtained when the number exceeds the sum of the denominations, namely 34 or 45.

As heretofore described, the intermediate elements *a, b, c*, etc., correspond to the select elements *A, B, C*, etc., and the connections from the keys to the intermediate elements, and from the intermediate elements to the select elements are such, that upon operation of a selected key, shifting of the select elements representing the denomination of the number set up by the operated key is permitted; thereafter, the select elements are shifted to an extent corresponding to the required units of each denomination; thus, the dime select element is shifted one or two spaces and the penny select element is shifted one, two, three or four spaces, the select elements being arrested after movement through the distances required. In case of keys containing the higher denomination, such as the 5, 6, 7, 8, and 9 units keys, these keys operate both the intermediate elements or shift bars controlling the penny and nickel select bars.

In the case requiring for a dime and a double dime, two latches are provided as heretofore described, and these latches are adapted to latch the select element in different positions; the raising of a latch operated by a key of a lower number permitting movement of the select element or bar to permit the same to shift until arrested by a latch connected to be operated by a key of a higher number. One latch, therefore, has connections from keys requiring unit denominations, while the other latch has connections from keys requiring multiple denominations; in the latter case, the connections from keys requiring multiple denominations are to both latches.

It will be noted that in accordance with this invention the register bars or operable means are normally all locked, that the analysis mechanism controlled by the keys unlocks certain required bars and that these unlocked bars are then moved upon operation of the handle to required positions and are positively arrested at the required positions, whether they be in the first position when one dime or one penny is required, in the second position when two dimes or two pennies are required, or in the third or fourth positions when three or four pennies are required. It is to be noted, however, that when the analysis mechanism is set to arrest the dime bar in the first position, this dime bar cannot under any conditions move beyond that position. The same is true of the penny bar. Accordingly in accordance with this invention there is not only operable means, namely the register bars, actually controlled for any monetary value to cause minimum scheduling, but there is also provided means for positively limiting the extent of operation of the operable means.

When the quarter alone is required, this quarter bar is released while all of the other

bars are positively locked; when, however, there is required in addition to the quarter another denomination, for instance the dime, then the dime bar is released; however, this
5 dime bar is then also positively controlled so that its movement is positively limited in accordance with the selection made. Where, for instance only a unit shifting of the dime bar is required, then such unit shifting is
10 positively limited. This is due to the fact that in the machine embodying this invention the bars are locked by latches which are selectively released and these bars are arrested in their predetermined selected positions and they cannot move beyond those
15 positions. Accordingly the mechanism is not only arranged to analyze any and, therefore, all possible monetary values, but it is insured that the result of the analysis will be positively set up and registered.

It will be noted that the same elements utilized when scheduling an item from 1¢ to 49¢ are used when scheduling an item
25 from 50¢ to 99¢ with the additional use of the 50¢ denominator or selected bar. This reduces the number of parts to a minimum and simplifies the construction as well as the operation of the entire machine.

The select elements or denominator bars
30 are actuated positively by the crank, while the selective manipulative elements or keys operate through the release or intermediate controlling elements or bars to lock and release the denominator bars. Moreover, these
35 denominator bars are arrested, and, therefore, positively positioned in selected positions by the key shanks themselves. All of the register or denominator bars which are not released are positively locked by the
40 latches or pawls, and, therefore, positively retained against movement. This results in a machine which is positive and accurate in its operation. There can, therefore, be no overthrow of any of the parts, since the control of each part is positive and certain.

The registers are actuated on the return of the crank, the pawls thereon being set on the forward movement of the crank. This insures positioning of all parts prior to the
50 actuation of the register, thereby insuring accurate operation.

It is obvious that various changes may be made in the details of construction without departing from the spirit of this invention, and it is, therefore, to be understood that
55 this invention is not to be limited to the specific construction shown and described.

Having thus described the invention, what is claimed is:

60 1. In a machine of the class described, a series of selective manipulative elements arranged for combined operation to represent compound items, a series of select elements adapted to represent denominations of those
65 items, analysis mechanism adapted, upon

the combined operation of selected manipulative elements, to automatically select those select elements which represent the denominations of the item represented by the operated manipulative elements, and means for
70 positively limiting the operation of all of said select elements in accordance with such selection.

2. In a machine of the class described, a series of selective manipulative elements arranged for combined operation to represent
75 compound items, a series of select elements adapted to represent denominations of those items, analysis mechanism adapted, upon the combined operation of selected manipulative elements, to automatically select those
80 select elements which represent the denominations of and are the least in number for the item represented by the operated manipulative elements, and means for
85 positively limiting the operation of all of said select elements in accordance with such selection.

3. In a machine of the class described, a series of selective manipulative elements arranged in a series of rows of different
90 orders so that elements of different orders are adapted for combined operation to represent compound items, a series of select elements adapted to represent denominations of those
95 items, analysis mechanism adapted, upon the combined operation of selected manipulative elements of different orders, to automatically select those select elements which represent the denominations of the item represented by the operated manipulative elements.
100

4. In a machine of the class described, a series of selective manipulative elements arranged in units and tens so that tens and
105 units are adapted for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, analysis mechanism adapted, upon the combined operation
110 of unit and ten manipulative elements, to automatically select those select elements which represent the denominations of the number represented by the operated manipulative elements, and means for positively
115 limiting the operation of all of said select elements in accordance with such selection.

5. In a machine of the class described, a series of selective manipulative elements arranged in units and tens so that tens and
120 units are adapted for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, analysis mechanism adapted, upon the combined operation
125 of unit and ten manipulative elements, to automatically select those select elements which represent the denominations of the number represented by the operated manipulative elements and one of which select
130

elements represents a denomination which is greater than the tens component of that number, and means for positively limiting the operation of the other select element.

6. In a machine of the class described, a series of selective manipulative elements arranged in units and tens so that tens and units are adapted for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers; analysis mechanism adapted, upon the combined operation of unit and ten manipulative elements representing a given number, to automatically divide that number and automatically select those select elements which represent the denominations of that number and one of which select elements represents a denomination which is greater than the tens component of that number, and means for positively limiting the operation of the other select element.

7. In a machine of the class described, a series of selective manipulative elements arranged in a series of rows of different orders so that elements of different orders are adapted for combined operation to represent compound items, a series of select elements adapted to represent denominations of those items, analysis mechanism adapted, upon the combined operation of selected manipulative elements of different orders, to automatically select those select elements which represent the denominations of the item represented by the operated manipulative elements and one of which select elements represents a denomination which is greater than the major order of that item, and means for positively limiting the operation of the other select element.

8. In a machine of the class described, a series of keys arranged for combined operation to set up compound items, a series of select elements adapted to represent denominations of those items, a series of intermediate elements arranged for operation by said keys, and mechanism for causing said intermediate elements to selectively control the operation of said select elements, adapted, upon combined operation of selected keys, to automatically select and positively limit the extent of movement of each of those select elements which represent the denominations of the item set up by the operated keys.

9. In a machine of the class described, a series of keys adapted for combined operation in different orders to set up compound numbers, a series of select elements adapted to represent denominations of those numbers, a series of intermediate elements arranged for operation by said keys, and mechanism for causing said intermediate elements to selectively control the operation of said select elements, adapted, upon combined

operation of selected keys of different orders, to automatically select and positively limit the extent of movement of each of those select element which represent the denominations of the number set up by the operated keys.

10. In a machine of the class described, a series of keys adapted for combined operation as units and tens to set up compound numbers, a series of select elements adapted to represent denominations of those numbers, a series of intermediate elements arranged for operation by said keys, and mechanism for causing said intermediate elements to selectively control the operation of said select elements, adapted, upon combined operation of selected unit and ten keys, to automatically select and positively limit the extent of movement of each of those select elements which represent the denominations of the number set up by the operated keys.

11. In a machine of the class described, a series of keys arranged for operation to set up numbers, a series of select elements adapted to represent denominations of those numbers, a series of intermediate elements corresponding to said select elements and arranged for operation by said keys, connections between corresponding intermediate and select elements, adapted, upon operation, of a selected key, to automatically select and permit shifting of only those select elements representing the denominations of the number set up by the operated key, and means for shifting those select elements to extents corresponding only to the required units of each denomination.

12. In a machine of the class described, a series of keys arranged for operation to set up numbers, a series of select elements adapted to represent denominations of those numbers, a series of intermediate elements corresponding to said select elements and arranged for operation by said keys, connections between corresponding intermediate and select elements, adapted, upon operation of a selected key, to automatically select and permit shifting of only those select elements representing the denominations of the number set up by the operated key, and means controlled by the operated key for shifting those select elements to extents corresponding only to the required units of each denomination.

13. In a machine of the class described, a series of keys arranged for operation to set up numbers, a series of select bars adapted to represent denominations of those numbers, a series of shift bars corresponding to said select bars and arranged for operation by said keys, latches for said select bars and connected to corresponding shift bars, adapted, upon operation of a selected key, to automatically release those select bars representing the denominations of the num-

ber set up by the operated key, and means for shifting the released select bars to extents corresponding to the required units of each denomination.

14. In a machine of the class described, a series of keys arranged for operation to set up numbers, a series of select bars adapted to represent denominations of those numbers, a series of shift bars corresponding to said select bars and arranged for operation by said keys, latches for said select bars and connected to corresponding shift bars, adapted, upon operation of a selected key, to automatically release those select bars representing the denominations of the number set up by the operated key, and means controlled by the operated key for shifting the released select bars to extents corresponding to the required units of each denomination.

15. In a machine of the class described, a series of keys arranged for operation to set up numbers, a series of select bars adapted to represent denominations of those numbers, a series of shift bars corresponding to said select bars and arranged for operation by said keys, latches for said select bars and connected to corresponding shift bars, adapted, upon operation of a selected key, to automatically release those select bars representing the denominations of the number set up by the operated key, means for shifting the released select bars, and means for arresting said released select bars in positions corresponding to the required units of each denomination.

16. In a machine of the class described, a series of keys arranged for operation to set up numbers, a series of select bars adapted to represent denominations of those numbers, a series of shift bars corresponding to said select bars and arranged for operation by said keys, latches for said select bars and connected to corresponding shift bars, adapted, upon operation of a selected key, to automatically release those select bars representing the denominations of the number set up by the operated key, means for shifting the released select bars, and means connected with the operated key for arresting said released select bars in positions corresponding to the required units of each denomination.

17. In a machine of the class described, a series of keys arranged in a row for operation to set up numbers, a select bar arranged along said keys and adapted to represent a denomination of those numbers, a shift bar arranged along and for operation by said keys, and a latch for said select bar and connected to said shift bar, adapted, upon operation of a selected key, to release said select bar and arrest the same by the operated key.

18. In a machine of the class described,

a series of keys arranged in a row for operation to set up numbers, a select bar arranged along said keys and adapted to represent a denomination of those numbers, a shift bar arranged along and for operation by said keys, a latch for said select bar and connected to said shift bar, adapted, upon operation of a selected key, to release said select bar, and means connected with said keys for arresting said select bar in positions corresponding to the required units of the denominations corresponding to the operated key.

19. In a machine of the class described, a series of keys arranged in a row for operation to set up numbers, a pair of select bars arranged along said keys and adapted to represent denominations of those numbers, a pair of shift bars corresponding to said select bars and arranged along and for operation by said keys, latches for said select bars and connected to the respective shift bars, adapted, upon operation of a selected key, to release those select bars representing the denominations of the number of the operated key, and means for shifting the released select bars to positions corresponding to the required units of each denomination.

20. In a machine of the class described, a series of keys arranged in a row for operation to set up numbers, a pair of select bars arranged along said keys and adapted to represent denominations of those numbers, a pair of shift bars corresponding to said select bars and arranged along and for operation by said keys, latches for said select bars and connected to the respective shift bars, adapted, upon operation of a selected key, to release those select bars representing the denominations of the number of the operated key, and means for arresting the released select bars by engagement with said keys.

21. In a machine of the class described, a series of keys arranged in a row for operation to set up numbers, a pair of select bars arranged along said keys and adapted to represent denominations of those numbers, a pair of shift bars corresponding to said select bars and arranged along and for operation by said keys, latches for said select bars and connected to the respective shift bars, adapted, upon operation of a selected key, to release those select bars representing the denominations of the number of the operated key, and means operated by engagement with the operated key for arresting one of said released select bars in positions corresponding to the required units of its denomination.

22. In a machine of the class described, a series of keys arranged in a row for operation to set up numbers, a pair of select bars arranged along said keys and adapted to

represent denominations of those numbers, a pair of shift bars corresponding to said select bars and arranged along and for operation by said keys, the keys containing the higher denominations operating both of said shift bars, latches for said select keys and connected to the respective shift bars, adapted, upon operation of a selected key, to release those select bars representing the denominations of the number of the operated key, and means for shifting the released select bars to positions corresponding to the required units of each denomination.

to represent a denomination of those numbers, and a pair of latches for said select element and connected for operation by keys of different numbers, adapted upon actuation of one latch by its connected key to cause the other latch to arrest said select element in shifted position corresponding to the required unit of the denomination represented by the operated key.

28. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, and a pair of latches for said select element and connected for operation by keys of different numbers, adapted upon actuation of one latch by its connected key to cause the other latch to arrest said select element in shifted position corresponding to the required unit of the denomination represented by the operated key, and adapted upon actuation of the last latch by its connected key to permit further shift of said select element corresponding to the required unit of the denomination represented by the operated key.

29. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, and a pair of latches for said select element and connected for operation by keys of different numbers, adapted upon operation of a key of a lower number to actuate its connected latch and permit said select bar to shift until arrested by the latch connected to a key of a higher number.

30. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, and a pair of latches for said select element and connected for operation by keys of different numbers, adapted upon operation of a key of a higher number to actuate both latches.

31. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, a pair of latches for said select element, connections from keys requiring unit denominations to one of said latches, and connections from keys requiring multiple denominations to both of said latches.

32. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, a pair of latches for said select element, connections from keys requiring unit denominations to one of said latches, and connections from keys requiring multiple denominations to both of said latches, adapted upon actuation of one latch to cause the other latch to

23. In a machine of the class described, a series of keys arranged in a row for operation to set up numbers, a pair of select bars arranged along said keys and adapted to represent denominations of those numbers, a pair of shift bars corresponding to said select bars and arranged along and for operation by said keys, the keys containing the lower denomination operating the shift bar of lower denomination and the keys containing the higher denomination operating both of said shift bars, latches for said select bars and connected to the respective shift bars, adapted, upon operation of a selected key, to release those select bars representing the denominations of the number of the operated key, and means for shifting the released select bars to positions corresponding to the required units of each denomination.

24. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, and a pair of latches for said select element and connected for operation by the respective keys, said latches being adapted to latch said select element in different positions.

25. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, and a pair of latches for said select element and connected for operation by the respective keys, adapted upon actuation of one latch to cause the other latch to arrest said select element in shifted position.

26. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, and a pair of latches for said select element and connected for operation by the respective keys, adapted upon actuation of one latch to cause the other latch to arrest said select element in shifted position, and adapted upon actuation of said last latch to permit further shift of said select element.

27. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted

arrest said select element in shifted position.

33. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, a pair of latches for said select element, a pair of shifting elements connected with said latches, one of said shifting elements being operable by keys requiring unit denominations and the other shifting element being operable by keys requiring multiple denominations.

34. In a machine of the class described, a series of keys arranged for operation to set up numbers, a select element adapted to represent a denomination of those numbers, and a pair of intermediate elements connected to permit respectively unit and multiple shifting of said select element, connected respectively for operation by keys requiring respectively unit and multiple denominations and adapted to positively limit the unit shifting of said select elements.

35. In a machine of the class described, a series of selective manipulative elements arranged in different orders for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a select element corresponding to each order and a select element corresponding to both orders, analysis mechanism adapted, upon combined operation of selected manipulative elements, to automatically select those select elements representing the denominations of the number represented by the operated manipulative elements, and means for positively limiting the operation of all of said select elements in accordance with such selection.

36. In a machine of the class described, a series of selective manipulative elements arranged in different orders for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a select element corresponding to each order and a select element corresponding to both orders, analysis mechanism adapted, upon combined operation of selected manipulative elements, to automatically select said select elements corresponding to both orders and selectively one of said select elements corresponding to one order, and means for positively limiting the operation of said last element.

37. In a machine of the class described, a series of selective manipulative elements arranged in different orders for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a select element corresponding to each order and a select element corresponding to both orders, analysis mechanism adapted, upon

combined operation of selected manipulative elements, to automatically select said select element corresponding to both orders and said select elements each of which corresponds to one order, and means for positively limiting the operation of said last elements.

38. In a machine of the class described, a series of selective manipulative elements arranged in different orders for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a select element corresponding to each order and a select element corresponding to both orders, mechanism adapted, upon combined operation of selected manipulative elements, to automatically select said select element corresponding to both orders, and mechanism adapted to selectively and positively prevent operation of one of said select elements corresponding to one order.

39. In a machine of the class described, a series of selective manipulative elements arranged in different orders for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a select element corresponding to each order and a select element corresponding to both orders, mechanism adapted, upon combined operation of selected manipulative elements, to automatically select said select element corresponding to both orders, and mechanism adapted to positively prevent operation of said select elements each of which corresponds to one order.

40. In a machine of the class described, a series of selective manipulative elements arranged in different orders for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a select element corresponding to each order and a select element corresponding to both orders, analysis mechanism adapted, upon combined operation of selected manipulative elements, to automatically select said select element corresponding to both orders and selectively one of said select elements corresponding to one order when the number represented by the operated manipulating elements equals or exceeds the sum of the denominations of the selected elements, and means for positively limiting the operation of the select elements corresponding to one order.

41. In a machine of the class described, a series of selective manipulative elements arranged in different orders for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a select element corresponding to each order and a select element corresponding to both

orders, analysis mechanism adapted, upon combined operation of selected manipulative elements, to automatically select said select element corresponding to both orders and
 5 said select elements each of which corresponds to one order, when the number represented by the operated manipulative elements equals or exceeds the sum of the denomination of the selected elements, and means for
 10 positively limiting the operation of each of the select elements corresponding to one order.

42. In a machine of the class described, a series of keys arranged in units and tens so that tens and units are adapted for combined
 15 operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a units element, a tens element, and a quarter
 20 element, analysis mechanism adapted upon combined operation of tens and units keys, to automatically select said quarter element, and means adapted to lock said units and tens elements against movement.

43. In a machine of the class described, a
 25 series of keys arranged in units and tens so that tens and units are adapted for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a
 30 units element, a tens element and a quarter element, mechanism adapted, upon operation of either tens or units keys, to automatically select corresponding tens or units elements, analysis mechanism adapted upon combined
 35 operation of tens and units keys, to automatically select said quarter element, and mechanism adapted to positively limit the operation of said tens and units elements.

44. In a machine of the class described, a
 40 series of keys arranged in units and tens so that tens and units are adapted for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a units element, a tens element and a
 45 quarter element, and mechanism adapted, upon combined operation of tens and units keys, to automatically select said quarter element and selectively and positively prevent
 50 operation of either of said tens and units elements.

45. In a machine of the class described, a series of keys arranged in units and tens so that tens and units are adapted for combined
 55 operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a units element, a tens element and a quarter element, and mechanism adapted,
 60 upon combined operation of tens and units keys, to automatically select said quarter element and positively prevent operation of both of said tens and units elements.

46. In a machine of the class described,
 65 a series of keys arranged in units and tens

so that tens and units are adapted for combined operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a units element, a tens element, a quarter element and a half element,
 70 and mechanism adapted, upon combined operation of tens and units keys, to automatically select said quarter element and selectively one or more of said half, tens
 75 or units elements when the number set up by the operated keys equals or exceeds the sum of the denominations of said selected elements, and mechanism for positively preventing operation of the elements not selected.
 80

47. In a machine of the class described, a series of keys arranged in units and tens so that tens and units are adapted for combined
 85 operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a units element, a tens element, a quarter element and a half element, and a shifting member connected to
 90 each element and adapted for actuation by said keys, the tens keys representing numbers less than the denomination of said half element having connections to said members corresponding to the keys representing
 95 numbers greater than that denomination.

48. In a machine of the class described, a series of keys arranged in units and tens so that tens and units are adapted for combined
 100 operation to represent compound numbers, a series of select elements adapted to represent denominations of those numbers, including a units element, a tens element, a quarter element and a half element, and mechanism adapted, upon operation of
 105 said keys, to automatically select those elements which represent the denominations of the number represented by the operated keys, the connections from the keys representing numbers less than the half denomination corresponding progressively to the keys representing numbers higher than that denomination.
 110

49. In a machine of the class described,
 115 a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denominations of selected items, means for shifting said bars, means for normally locking
 120 said bars, means operated by said keys for selectively operating said locking means to selectively release for operation those bars which correspond to the denominations of the item as given by the selected keys and
 125 denomination accumulators connected for operation by said bars.

50. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a
 130

- series of select bars corresponding to denominations of selected items, shifting means having a constant connection with said bars, mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys and denomination accumulators connected for operation by said bars.
51. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denomination of selected items, shifting means having a yielding connection with said bars, mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys and denomination accumulators connected for operation by said bars.
52. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denominations of selected items, shifting means having a yielding connection with said bars, means for normally locking said bars, means operated by said keys for selectively operating said locking means to selectively release for operation those bars which correspond to the denominations of the item as given by the selected keys and denomination accumulators connected for operation by said bars.
53. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denominations of selected items, shifting means having an unbroken connection with said bars, mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys and denomination accumulators connected for operation by said bars.
54. In a machine of the class described, a series of selective manipulative elements adapted and arranged for operation to represent items, a series of select elements adapted to represent denominations of those items, operating means adapted to set said select elements upon its forward movement and operate the set elements upon its return movement, and analysis mechanism adapted, upon operation of selected manipulative elements, for selectively controlling the operation of those select elements which represent the denominations of the item represented by the operated manipulative elements.
55. In a machine of the class described, a series of selective manipulative elements adapted and arranged for operation to represent items, a series of select elements adapted to represent denominations of selected items, and mechanism operated by said selective manipulative elements for selectively controlling the operation of said select elements, the same principal connections and operations being utilized with a given item as with that item plus a predetermined item.
56. In a machine of the class described, a series of selective manipulative elements adapted and arranged for operation to represent items, a series of select elements adapted to represent denominations of selected items, and mechanism operated by said selective manipulative elements for selectively controlling the operation of certain of said select elements below a predetermined item, and auxiliary mechanism operated by said selective manipulative elements for selectively controlling the operation of another of said select elements above said predetermined item.
57. In a machine of the class described, a series of selective manipulative elements adapted and arranged for operation to represent items, a series of select elements adapted to represent denominations of selected items, mechanism operated by said selective manipulative elements below a predetermined item for selectively controlling the operation of those select elements which represent the denominations of the selected item, and auxiliary mechanism cooperating with said first mechanism and operated by said selective manipulative elements above said predetermined item for selectively controlling the operation of those select elements which represent the denominations of said last selected item.
58. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denominations of selected items, mechanism connecting keys below a predetermined item with certain of said bars to selectively control the operation of those bars which correspond to the denominations of the selected item, and auxiliary mechanism connecting keys above said predetermined item with another of said bars to selectively control the operation of those bars which correspond to the denominations of a selected item above the predetermined item.
59. In a machine of the class described, a series of selective manipulative elements adapted and arranged for operation to represent items, a series of select elements adapted to represent denominations of selected items, means for operating said selected elements, and mechanism operated by said selective manipulative elements for selectively permitting and positively limiting the extent of operation of those select ele-

ments which represent the denominations of the selected item, said mechanism being constructed and arranged that upon operation of a selective manipulative element the
 5 item of which contains several denominations, the select elements representing the denomination of a lower order will remain inoperative while the selected element representing the denomination of a higher order
 10 will be operated.

60. In a machine of the class described, a series of selective manipulative elements adapted and arranged for operation to represent items, a series of select elements
 15 adapted to represent denominations of selected items, means for locking said select elements, and mechanism operated by said selective manipulative elements for selectively releasing those select elements which
 20 represent the denominations of the selected item, the select element representing a denomination of a lower order in the selected item being locked and the select element representing a denomination of a higher
 25 order being released.

61. In a machine of the class described, a series of selective keys adapted and arranged
 30 for operation to represent items, a series of select bars corresponding to denominations of selected items, and mechanism operated by combined operation of a plurality of said keys for selectively releasing those selected
 35 bars which represent denominations of the selected item, adapted to selectively lock a bar of a lower order and release a bar of a higher order.

62. In a machine of the class described, a series of selective keys adapted and arranged
 40 for operation to represent items, a series of select bars corresponding to denominations of selected items, and mechanism operated by combined operation of a plurality of said keys for selectively releasing those selected
 45 bars which represent denominations of the selected item, adapted to selectively lock all of said bars except such as correspond to the denominations of the items as given by the selected key or keys.

63. In a machine of the class described, a series of selective keys adapted and arranged
 50 for operation to represent items, a series of select bars corresponding to denominations of selected items, and mechanism operated by combined operation of a plurality of said
 55 keys for selectively permitting and positively limiting the extent of operation of those bars which correspond to the denominations of the item as given by the selected keys, a plurality of keys controlling the operation of
 60 a bar.

64. In a machine of the class described, a series of selective keys adapted and arranged
 for operation to represent items, a series of select bars corresponding to denominations

of selected items, latches for said bars, and
 65 mechanism operated by combined operation of a plurality of said keys for selectively controlling said latches adapted to selectively release those selected bars which represent
 70 denominations of the selected item.

65. In a machine of the class described, a series of selective keys adapted and arranged
 75 for operation to represent items, a series of select bars corresponding to denominations of selected items, latches for said bars, certain of said bars having a series of latches, and mechanism operated by combined operation, said keys for selectively controlling said
 80 latches, adapted to selectively release those selected bars which represent denominations of the selected item.

66. In a machine of the class described, a series of selective keys adapted and arranged
 85 for operation to represent items, a series of select bars corresponding to denominations of selected items, and controlling elements for said bars, said elements being selectively operated by combined operation, said keys to permit and limit the extent of operation of
 90 those bars which correspond to the denominations of the selected item.

67. In a machine of the class described, a series of selective keys adapted and arranged
 95 for operation to represent items, a series of select bars corresponding to denominations of selected items, controlling elements for said bars, adapted to selectively release those selected bars which represent denominations
 100 of the selected item, the bars corresponding to denominations of a lower order having a plurality of said elements operated by different keys.

68. In a machine of the class described, a series of selective keys adapted and arranged
 105 for operation to represent items, a series of select bars corresponding to denominations of selected items, and mechanism operated by combined operation, said keys for selectively controlling the operation of said bars, adapted to selectively release those selected
 110 bars which represent denominations of the selected item, said mechanism comprising a controlling element adapted for operation by a series of said keys.

69. In a machine of the class described, a series of selective keys adapted and arranged
 115 for operation to represent items, a series of select bars corresponding to denominations of selected items, and mechanism operated by said keys for selectively permitting the
 120 operation of those bars which correspond to the denominations of the item as given by the selected keys, including a series of controlling elements, each operable by a series of said keys, adapted to control the operation
 125 of said bars.

70. In a machine of the class described, a series of selective keys adapted and arranged

for operation to represent items, a series of select bars corresponding to denominations of selected items, and mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys, including a series of controlling bars, each operable by a series of said keys, adapted to control the operation of said bars.

71. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denominations of selected items, and mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys, including a controlling bar operable by a series of said keys and adapted to control the operation of one of said selected bars.

72. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denominations of selected items, and mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys, including a controlling bar operable by a series of said keys and adapted to control the operation of a series of said selected bars.

73. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denominations of selected items, mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys, including a controlling bar operable by a series of said keys and controlling the operation of one of said selected bars, and means for positioning said selected bar.

74. In a machine of the class described, a series of selective keys adapted and arranged for operation to represent items, a series of select bars corresponding to denominations of selected items, mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys, including a controlling bar operable by a series of said keys and controlling the operation of one of said selected bars, and means connected with said keys for positioning said selected bar.

75. In a machine of the class described, a series of denominator bars, a series of

controlling bars connected to control the operation of said denominator bars, a series of item keys, and mechanism operated by said keys and said controlling bars for selectively permitting and positively limiting the extent of operation of each of those denominator bars which correspond to the denominations as given by the selected keys, certain keys of said series operating one of said controlling bars and other keys of said series operating the other of said controlling bars.

76. In a machine of the class described, a series of denominator bars, a series of controlling bars connected to control the operation of said denominator bars, a series of keys, and mechanism operated by said keys and said controlling bars for selectively permitting and positively limiting the extent of operation of each of those denominator bars which correspond to the denominations as given by the selected keys, certain keys of said series operating one of said controlling bars and other keys of said series operating both of said controlling bars.

77. In a machine of the class described, a series of denominator bars, a series of controlling bars connected to control and positively limit the extent of operation of said denominator bars, and a series of item keys arranged in different orders, the keys operating said controlling bars in accordance with the denominations corresponding to the item represented by the selected key.

78. In a machine of the class described, a series of denominator bars, a series of item keys, mechanism operated by combined operation of a plurality of said keys for selectively controlling and positively limiting the extent of operation of those bars which correspond to the denominations of the items as given by the selected keys, said mechanism including means for shifting the operating connection to a bar of a higher denomination when the item corresponding to the selected keys contains that denomination.

79. In a machine of the class described, a series of denominator bars, a series of item keys, mechanism operated by combined operation of a plurality of said keys for selectively controlling and positively limiting the extent of the operation of those bars which correspond to the denominations of the items as given by the selected keys, said mechanism including means for shifting the operating connection from a bar of a lower denomination to a bar of a higher denomination when the item corresponding to the selected keys contains that denomination.

80. In a machine of the class described, a series of denominator bars, a series of item keys, latches for said bars, mechanism operated by combined operation of plurality

of said keys for selectively controlling said latches adapted to selectively release those selected bars which represent denominations of the selected item, and adapted to latch the bars of a lower denomination and release the bars of a higher denomination when the item corresponding to the selected keys contains that denomination.

81. In a machine of the class described, a series of denominator bars, a series of item keys, latches for said bars, mechanism operated by combined operation of a plurality of said keys for selectively controlling said latches, adapted to selectively release those selected bars which represent denominations of the selected item including means shifted by a selected key corresponding to an item approaching a given denomination adapted to latch the bars of a lower denomination and release the bar of the given denomination when the item corresponding to the selected keys contains that denomination.

82. In a machine of the class described, a series of denominator bars, a series of item keys, latches for said bars, mechanism operated by combined operation of a plurality of said keys for selectively controlling said latches, adapted to selectively release those selected bars which represent denominations of the selected item including means shifted by a selected key corresponding to an item approaching a given denomination and operated by another selected key adapted to latch the bars of a lower denomination and release the bar of the given denomination when the item corresponding to the selected keys contains that denomination.

83. In a machine of the class described, a denominator bar, a series of keys, mechanism operated by said keys for selectively permitting the operation of those bars which correspond to the denominations of the item as given by the selected keys, including means operated by a key whose item approaches the denomination of said bar for indirectly controlling and positively limiting the extent of movement of said bar, and means operated by a key whose item exceeds the denomination of said bar for directly controlling and positively limiting the extent of movement of said bar.

84. In a device of the character described, a key-board formed of banks of manipulatable keys corresponding to solely single unit numbers, a plurality of operable means corresponding to denominations of monetary values, means controlling said operable means for analyzing any monetary value represented by the manipulated keys into the minimum number of denominations of equivalent total monetary value and means for positively limiting the extent of operation of said operable means.

85. In a device of the character described, a keyboard formed of banks of manipulatable

keys corresponding to solely single unit numbers, a plurality of operable means corresponding to denominations of monetary values, indicators controlled by said operable means, means controlling said operable means for analyzing any monetary value represented by the manipulated keys into the minimum number of denominations of equivalent total monetary value and means for positively limiting the extent of operation of said operable means.

86. In a denominator indicating machine, the combination of a plurality of indicators representing denominations of monetary values, each indicator bearing a series of integers arranged in unit sequence, a keyboard comprising keys corresponding to dollar and cent values, operable means controlled by said keys and controlling said indicators for analyzing all monetary values including forty-five to forty-nine cent values represented by the manipulated keys into the minimum number of denominations of equivalent total monetary value, means controlling each of said indicators respectively for adding the particular number of such denominations upon successive operation of the keys and means for positively limiting the extent of operation of said operable means.

87. In a device of the character described, the combination of a key board comprising keys corresponding to solely single integer values, differential selective mechanism controlled by said keys and constructed to analyze any certain monetary value including the values of forty-five to forty-nine cents represented by the manipulated keys into the minimum denominations of equivalent total monetary value, members corresponding to the respective denominations of monetary value controlled by said selective mechanism, and devices corresponding respectively to denominations of monetary value, and directly connected with said members.

88. In a device of the character described, a series of denomination registers, a keyboard and analyses mechanism controlled by said key-board and controlling said registers for analyzing any certain value represented by the manipulated keys into the minimum number of the monetary denominations of equivalent total value, said analysis mechanism comprising latches, operating rods retained by said levers and respectively controlling said registers and means for engaging and disengaging said latches with and from said operating rods.

89. In a device of the character described, a series of devices corresponding to denominations of monetary values, a key board comprising keys corresponding to solely single unit values, analysis mechanism controlled by said keys for analyzing any certain value

including the respective values of thirty-five to forty-nine cents represented by the manipulated keys into the minimum number of the denominations of equivalent total value, and means controlled by said analysis mechanism and controlling said denomination devices adapted to positively control the extent of operation of said devices for each of said values.

In testimony whereof I affix my signature 10
this 31 day of December, 1915.

EDWIN L. RELIER.