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No. 896,710.

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COMPUTER.

PATENTED AUG. 25, 1908.

APPLICATION FILED OCT. 24, 1907.

5 SHEETS—SHEET 2.

Fig. 9.

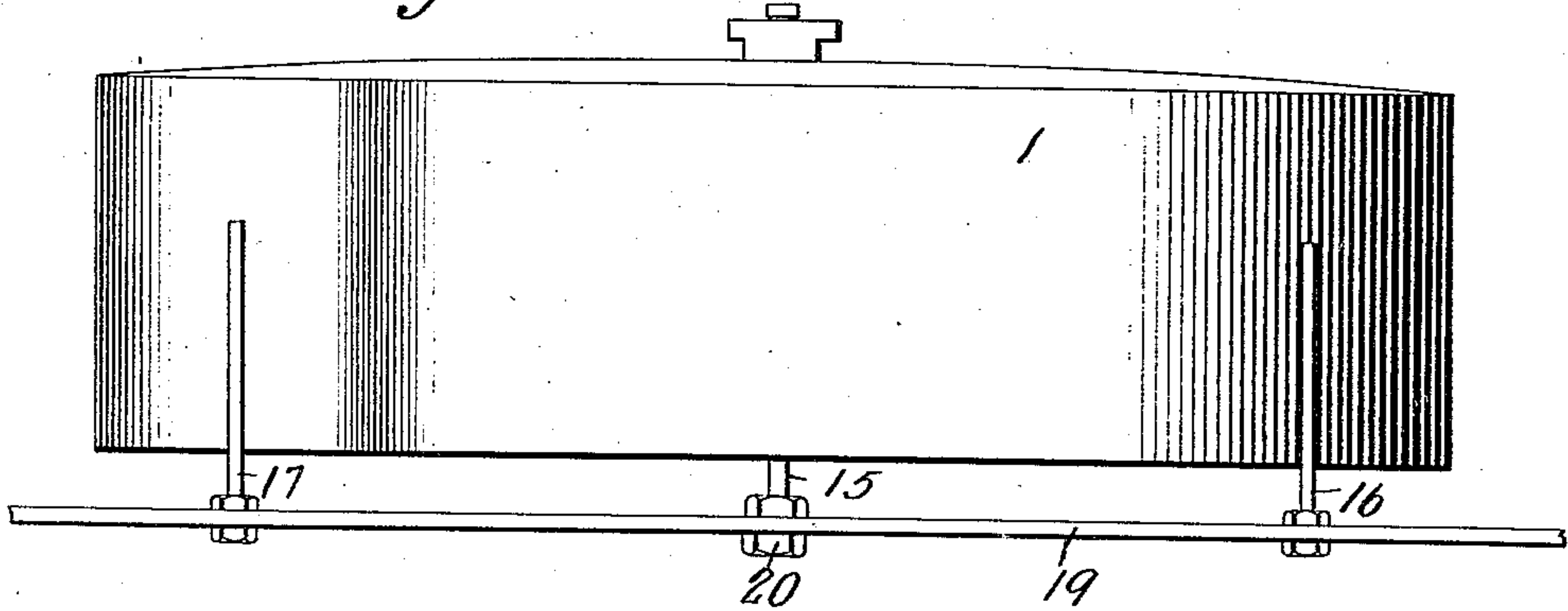


Fig. 10.

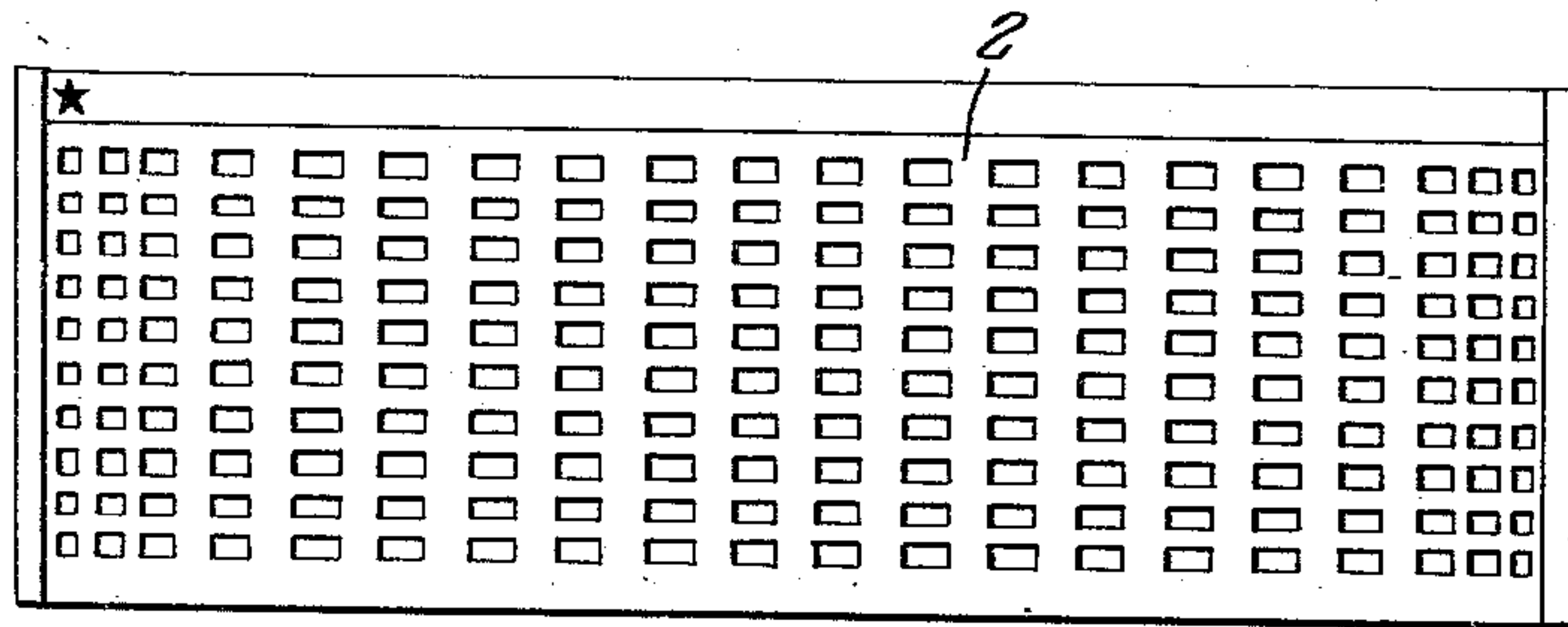


Fig. 2.

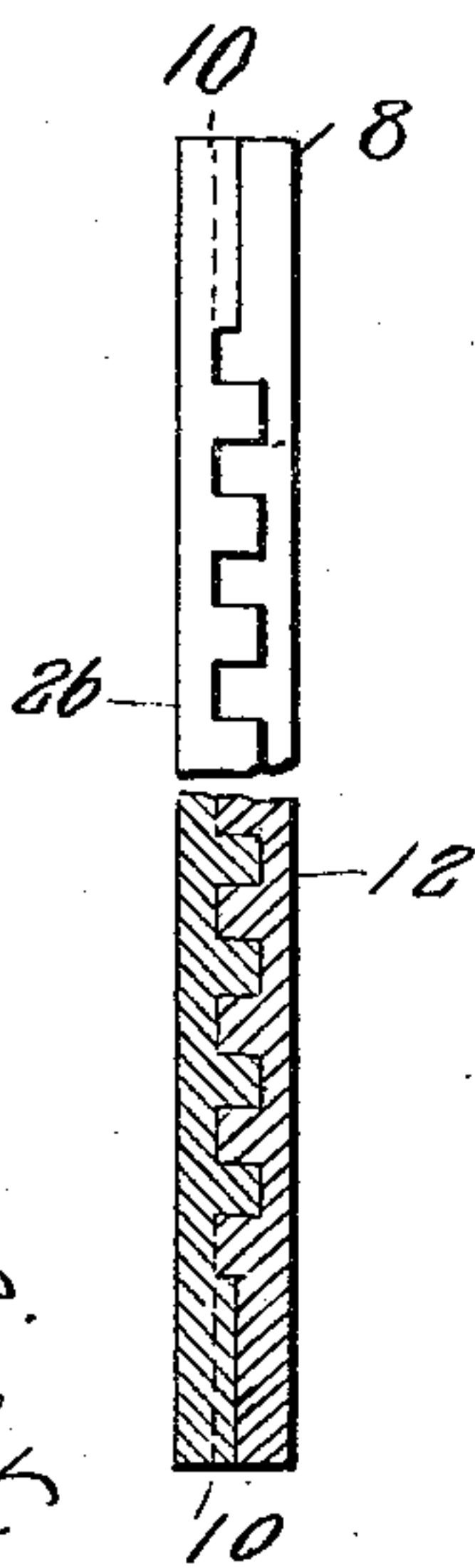
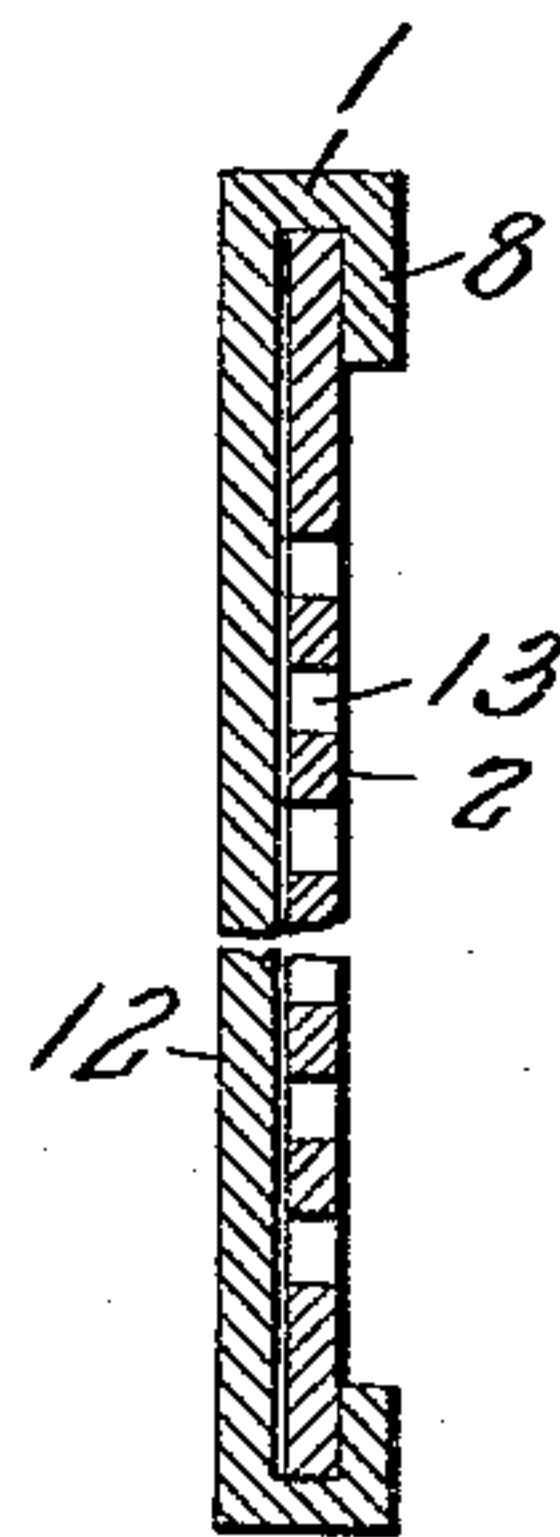


Fig. 8.



Fig. 4.



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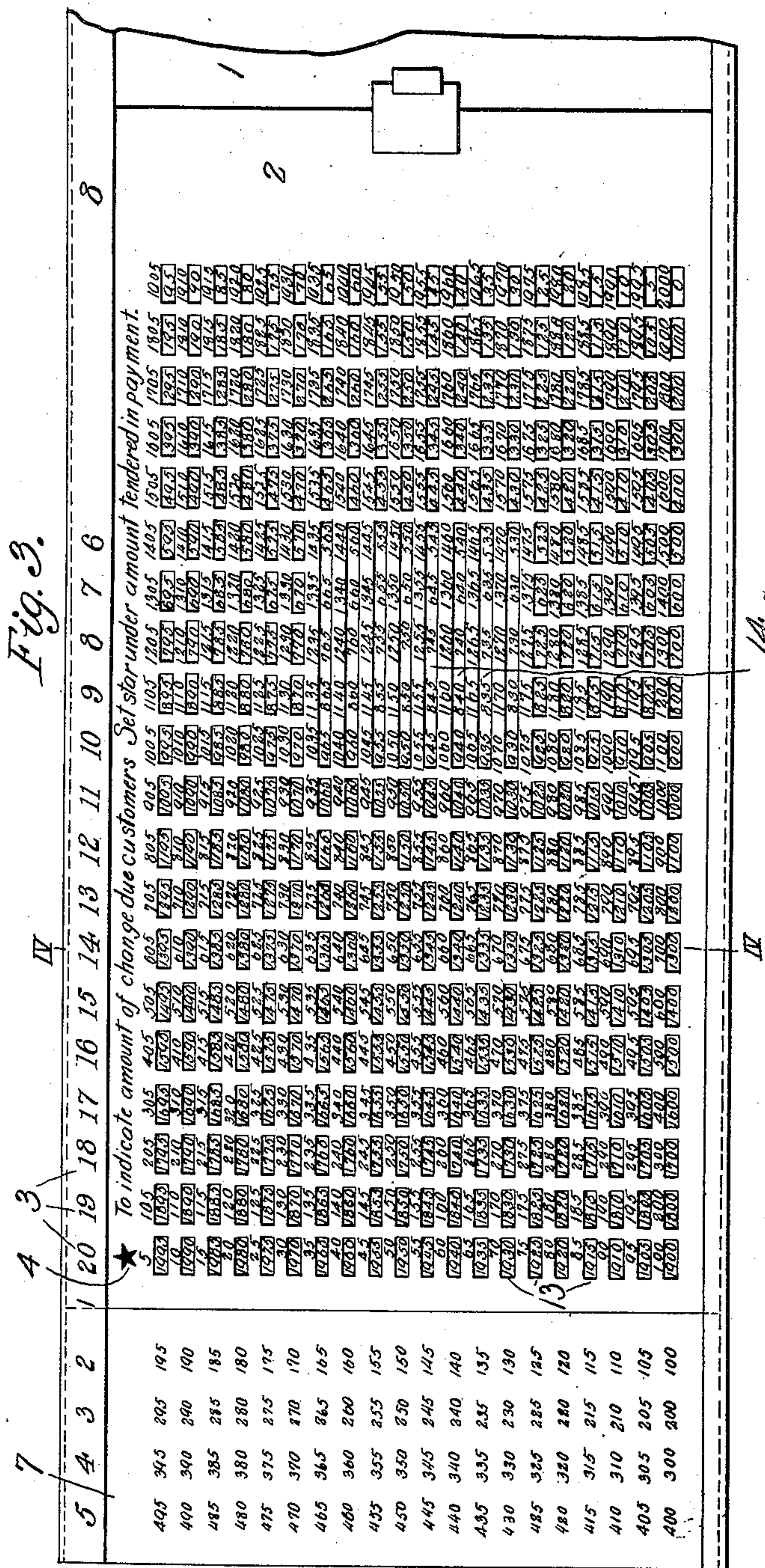
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5 SHEETS—SHEET 3.



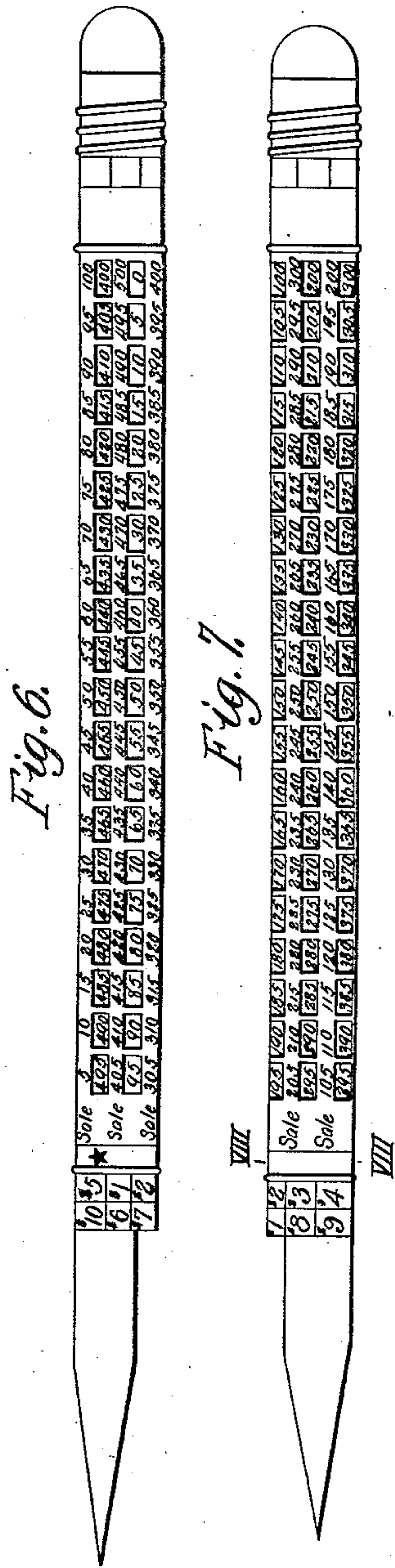
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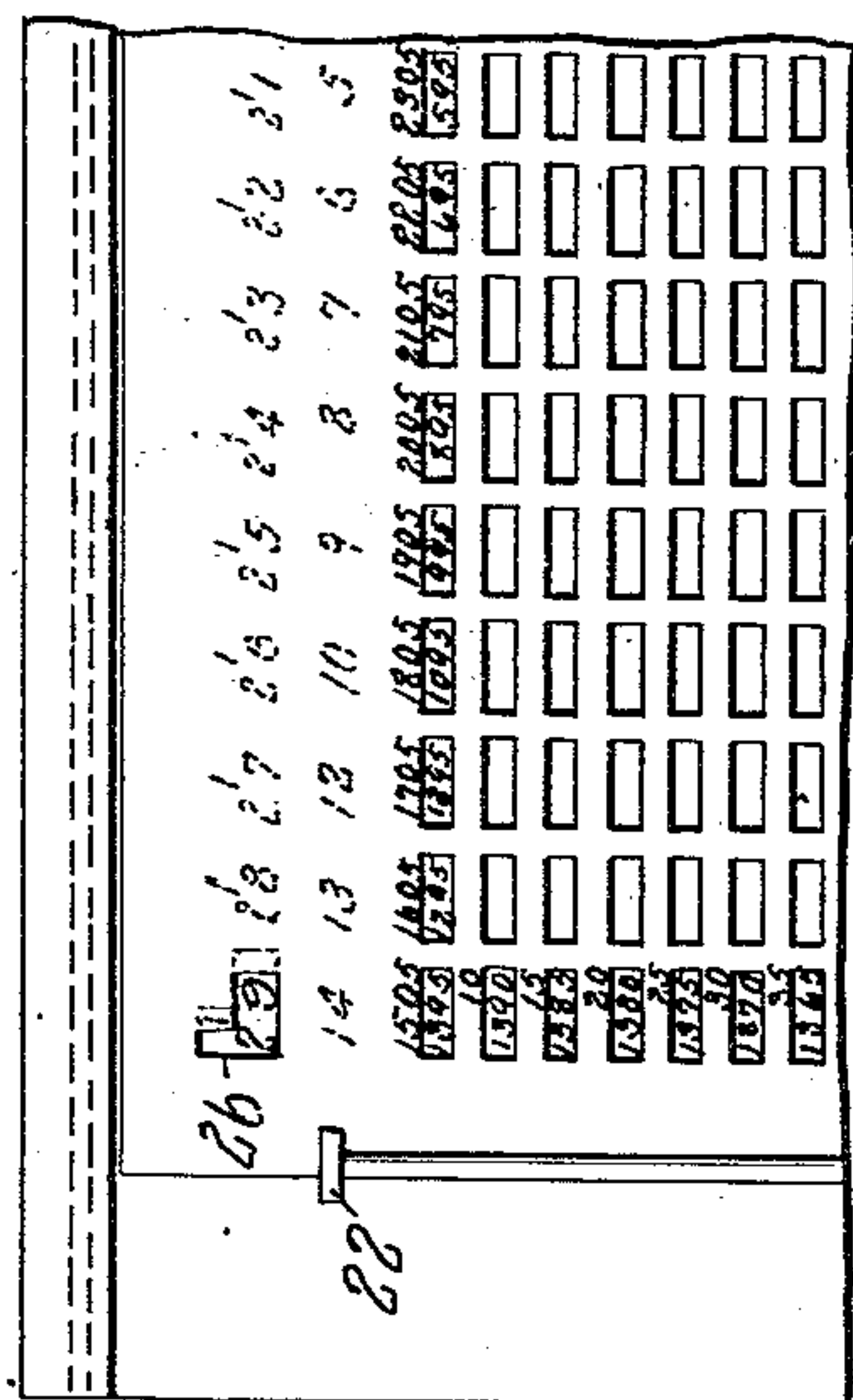


Fig. 11.

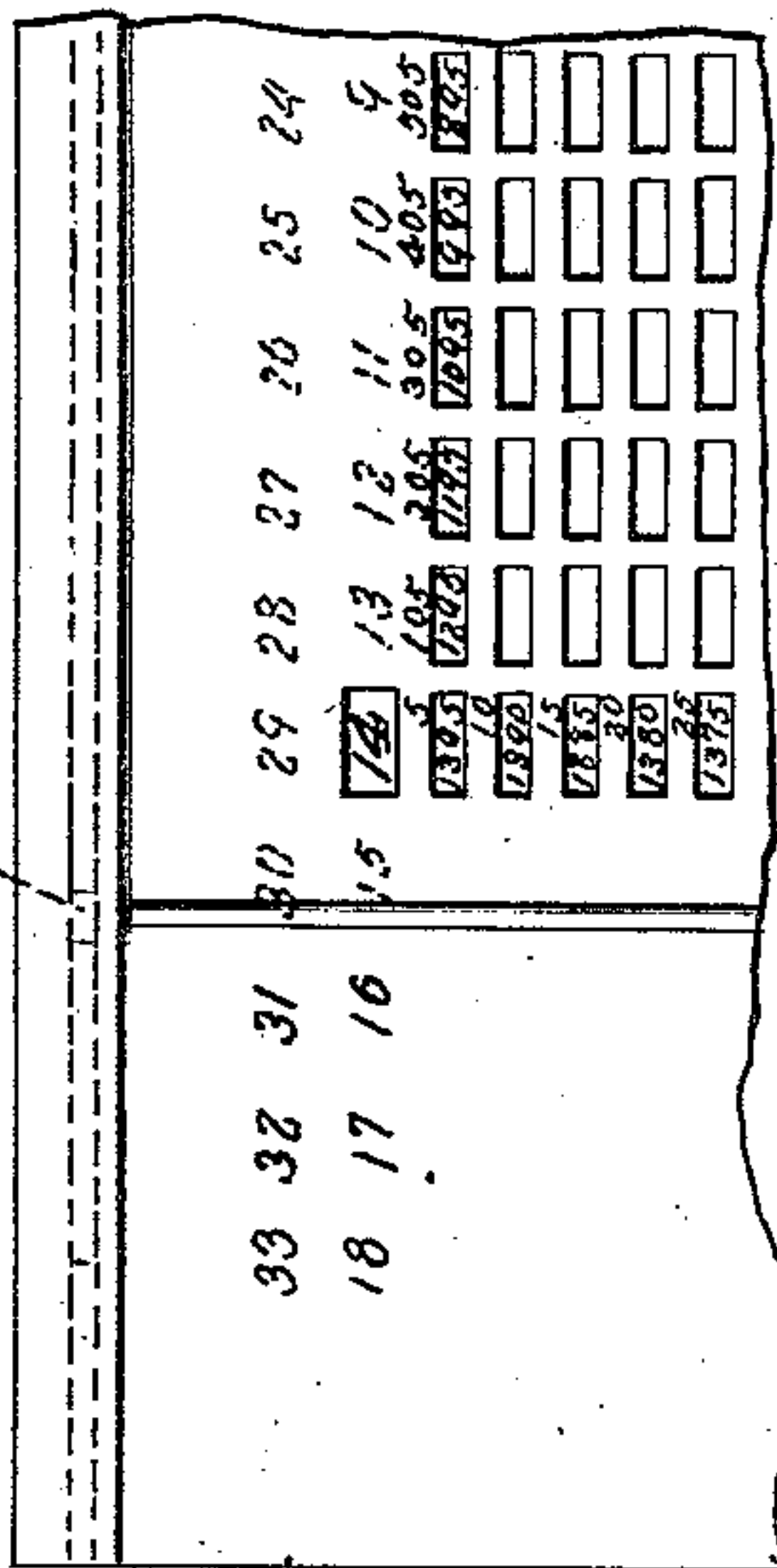


Fig. 12.

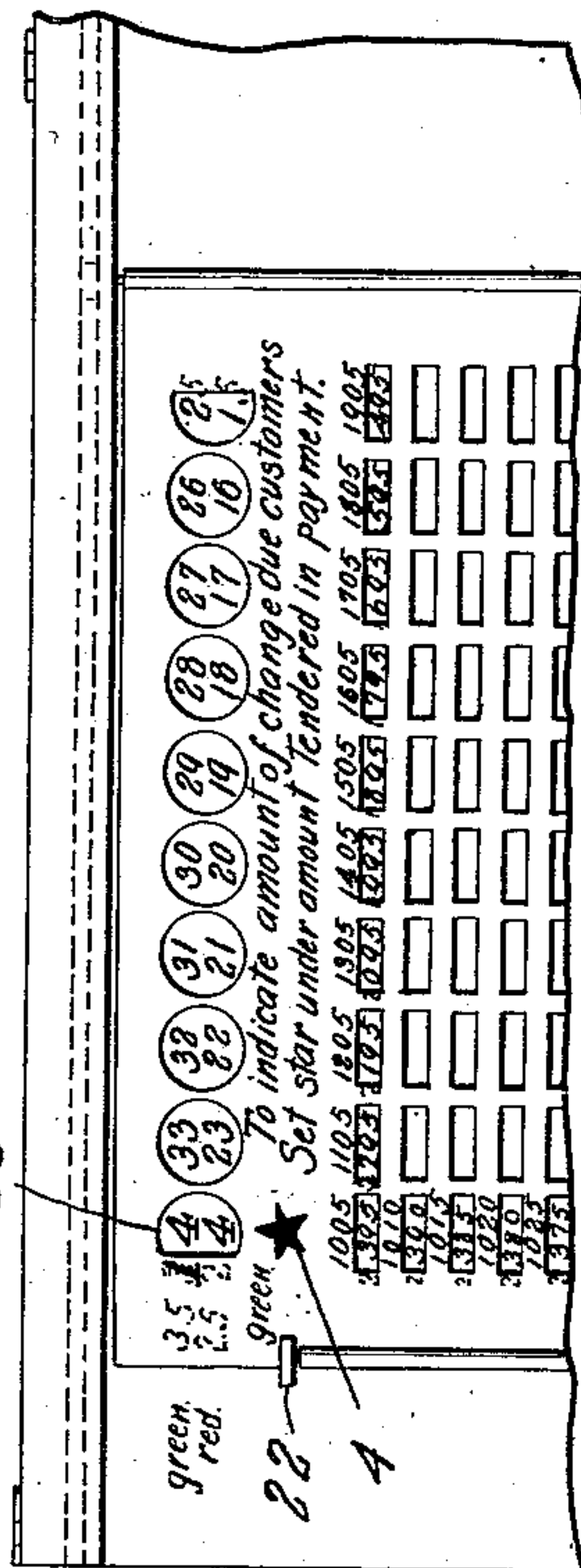


Fig. 13.

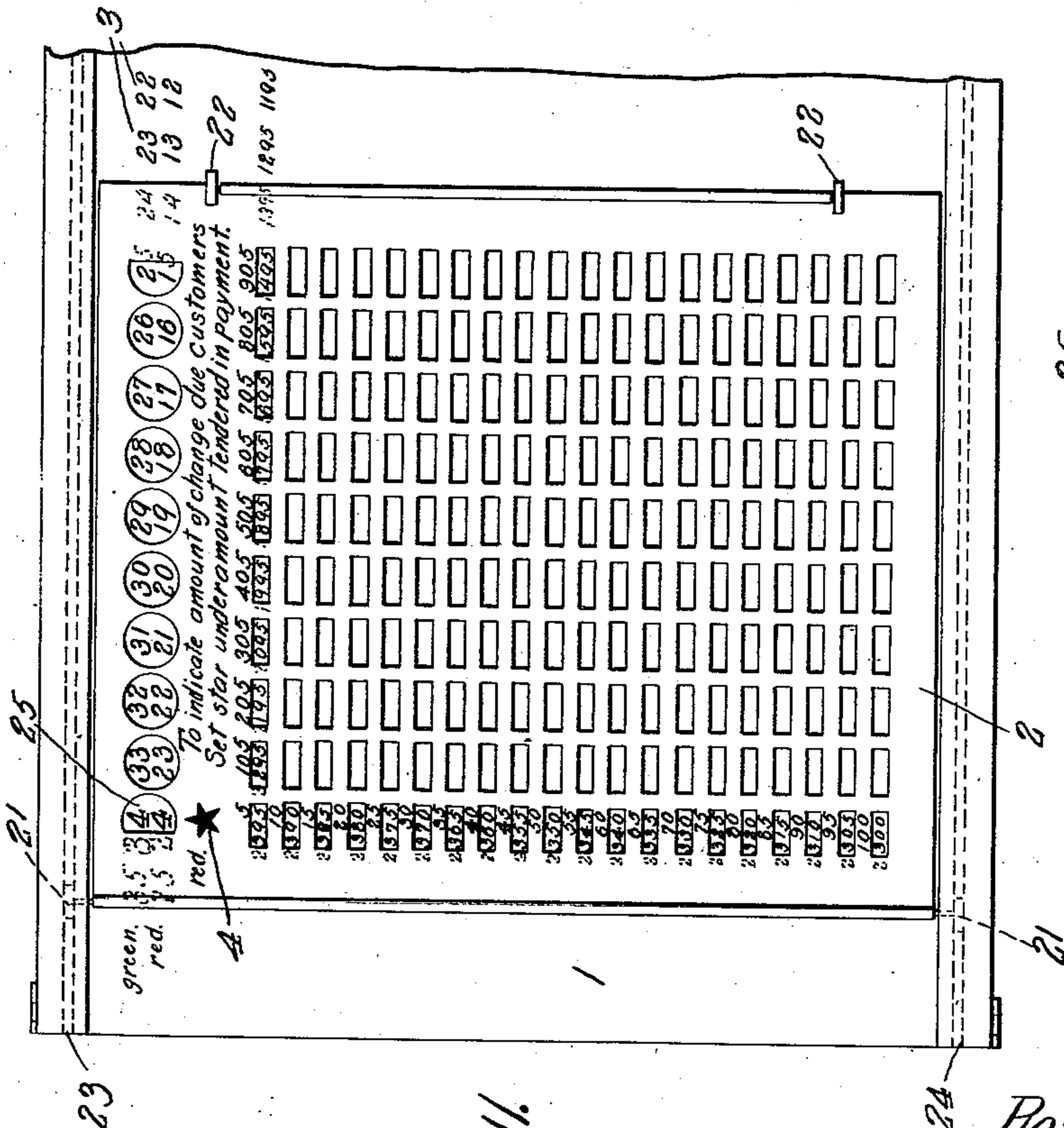


Fig. 14.

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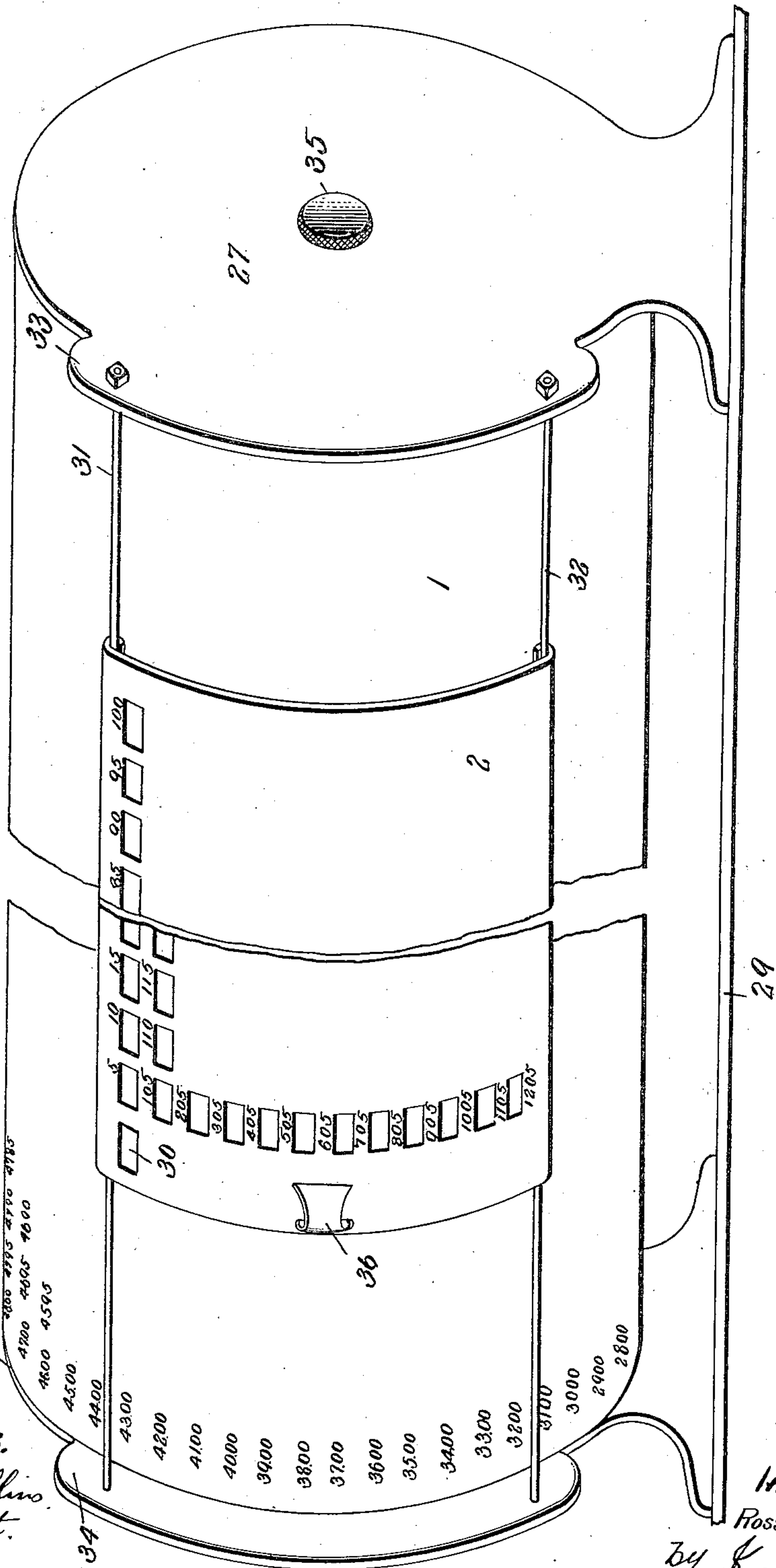
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5 SHEETS—SHEET 5.

Fig. 15.

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# UNITED STATES PATENT OFFICE.

ROSS D. BURHANS, OF KEOKUK, IOWA.

## COMPUTER.

No. 896,710.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed October 24, 1907. Serial No. 398,957.

*To all whom it may concern:*

Be it known that I, ROSS D. BURHANS, residing at Keokuk, county of Lee, and State of Iowa, have invented certain new and useful Improvements in Computers, of which the following is a specification.

This invention relates more particularly to money change computers and has for its object the instantaneous recording of the amount of change due to a purchaser, but as will be readily appreciated, it is applicable to any system of computation in which the principles met with, are similar to those involved in money transactions.

The object of this invention is accomplished by means of the construction and combination of parts hereinafter described and shown in the accompanying drawings, in which,

Figure 1 is a plan view of the preferred form of my invention; Fig. 2 is a section on the line II—II, Fig. 1; Fig. 3 is a plan view of a second embodiment of my invention; Fig. 4 is a section on the line IV—IV, Fig. 3; Fig. 5 is a view in elevation of another embodiment of my invention; Figs. 6 and 7 show two views of still another embodiment; Fig. 8 is a section on the line VIII—VIII, Fig. 7; Fig. 9 shows another embodiment of my invention with the sight-board member removed; Fig. 10 is a view in elevation of the sight-board member for the embodiment shown in Fig. 9; Fig. 11 is a plan view of another embodiment of my invention in which the sight-board member is reversible; Fig. 12 is a plan view of the embodiment shown in Fig. 11 in which the sight-board member is shown inverted; Fig. 13 is a fragmental view showing a modification of the embodiment shown in Fig. 11; Fig. 14 is another fragmental view in which is shown the same modification with the sight-board member inverted; and Fig. 15 is a view in perspective of one form of my invention as embodied in a horizontal cylinder or drum.

Referring now to the drawings, like numerals refer to similar parts wherever used.

The computer broadly speaking consists of two relatively movable members upon each of which is provided a system of figures arranged thereon in columns, the said columns comprising a plurality of arithmetic series in direct and inverse progressions.

Upon one of the relatively movable members 1, is arranged a column of index figures

3, each of which in the embodiments herein disclosed, is designed to represent any whole number of dollars which may be presented by a purchaser in payment of value received. Upon the other of said movable members 2, is provided in one form or another, an index 4 which is adapted to be brought into reading relation with any one of the index figures 3 on member 1 where it is desired to read off in the manner hereinafter referred to, the amount of change due to a customer.

In order to insure a more perfect understanding of my device, reference should be had to the specific structures shown in the drawings. A base-member 1 has a solid back-portion 12 and is provided with a series of tongues 5 and grooves 6 alternated throughout the greater portion of the breadth of the said base-member. On the upper or outer surfaces of the ridges thus formed are a plurality of columns of figures 7 (seen best at the right of Fig. 1). These figures are so arranged as to form series of figures in inverse arithmetic progression along the ridges from left to right and also across the ridges from top to bottom of the view shown in Fig. 1. At the top of the base-member is a broad index-bearing face or slab 8 on which is arranged the index-figures 3 already referred to. The plane of this face or slab is somewhat below the plane of the top of the ridges 5 as shown in Fig. 2. The reason for depressing this surface below the tops of the ridges will be understood from the structure of the sight-board member 2 which comprises in a single piece a series of slats 9 and side-slabs 10 with their upper faces in the same plane and a reinforcing cleat 26 on either end of said sight-board member which serve to secure in rigid relation, the aforesaid slats and slabs. Upon an inspection of Fig. 2 it will be seen that the tops of the ridges 5, slats 9 and slabs 10 form a continuous surface so as to bring the members of the base-member on the same level with the numbers of the sliding sight-board member which greatly facilitates the reading of said numbers. Provided in the upper slab 10 are a series of circular openings 11 through which the numerals on the index slab are visible as the upper member slides over the lower member. Over the circular openings furthest to the left, is placed a star which serves as an index.

In the use of this form of my invention to ascertain the correct amount of change due a



customer, the sight-board member is moved until the star comes directly over the number on the index-slab representing the amount offered in payment by the customer. Searching there for a number on some one of the slats 9 which represents the amount of the purchase, the correct amount of the change due will be found immediately thereunder on one of the ridges 5 immediately adjoining.

As an example we might consider the position shown in Fig. 1 when if the amount of purchase was 85 cents and a \$20.00 bill offered by the purchaser, the star is set over the 20 on the index slab and by following down the column immediately under the 20 until the 85 is reached, we ascertain from the number next below on the ridge 5 that \$19.15 change is due the customer and in the same manner we may obtain the required result for any amounts within the range of the computer.

Referring now to Figs. 3 and 4, the same general arrangement of the numerals on the relatively movable members is evident but in this embodiment the numbers on the base-member corresponding to those carried by the ridges 5 of Fig. 1, are arranged all in the plane of the solid back-portion 12 while the sight-board consists of a flat sliding board 2 provided with a series of rectangular perforations or sight-openings 13 or as a modification thereof, I may provide a series of slots 14 of sufficient length to enable the operator to see a plurality of the numbers of the base-member through a single slot. In this embodiment the index slab 8 forms a retaining guide rail for the sight-board. A star in the upper left hand corner of the sight-board adapts it for the same manipulation as pointed out in reference to Fig. 1.

The embodiment shown in Fig. 5 is an adaptation to a lead pencil which is of great convenience in any locality where low denominations of currency are the general rule.

Figs. 6, 7 and 8 show similar embodiments to that of Fig. 5 but with the numbers arranged longitudinally of the pencil-holder.

In the embodiment shown in Figs. 9 and 10 a drum 1 is mounted to rotate upon the upright post 15 which is in turn rigidly supported in the bed plate 19 by means of the check nuts 20. Upon either side of the center in front are two vertical rods 16 and 17 which are likewise secured to the base plate 19 by check nuts and so positioned as to be adapted to receive the curved sight-board 2 shown in Fig. 10. As the operation of this embodiment is exactly similar to that of the other embodiments, no further description is necessary.

Referring now to Figs. 11, 12, 13 and 14, an example is given of a sight-board member mounted upon rollers and adapted to be swung about one edge thereof in such manner that both sides of the board may be utilized for the table of figures, thus making a great

reduction in the size of the said sight-board member. In this embodiment, I preferably employ a piece of sheet metal 2 provided on one edge with rollers 21, about whose axis the sight-board is adapted to swing for reversing the same. For retaining the sight-board member on the base-member T-shaped grooves 23 and 24 are provided in either side of the base-member. In these the rollers 21 can run freely while at the same time restraining the sight-board against an outward movement from the base-member. Upon the right edge of the sight-board are mounted two additional rollers 22 which serve to keep the sight-board from dragging. In considering the operation of this embodiment, it will be noticed in Figs. 11 and 12 that two sets of index figures have been made use of on the index slab, one of these sets being in green and the other in red while upon one face of the sight-board member is placed a red star and upon its reverse face a green star. When it becomes necessary to use the red star side of the sight-board the column of red index-figures are employed therewith and when the green star side is made use of the green figures are of course to be utilized. Referring now to the perforations in the upper edge of the sight-board, it will be noticed that the outside or index perforations 25 have been shown flattened on one side and that a numeral 1 has been placed a little to the left of the flattened edge. The purpose of this is to enable a very handy modification in the use of the device. For example when the sight-board is set as shown in Fig. 11, let it be required to find the change due out of \$4.00 on an expenditure, of \$.05. To secure this result the sight-board has been moved as shown in the drawing until the digit 2 of 24 has been covered, thus leaving the 4 when upon examining the reading of the figures showing through the sight-opening immediately below the 5, it will be found that the amount is \$3.95. For ascertaining the change due from \$14.00 on a purchase of \$5.00 a small 1 is placed upon the sight-board a little to the left of the index perforation 25. This digit serves at once as the first digit of 14 and reminds the operator that a 1 must be placed before the change number shown in the table on the base member. When it comes to ascertaining the change from \$24.00, the sight-board is of course moved far enough to the left to show the 24 through the index-perforation when it will be found that \$23.95 is the amount of change registered below. In the same manner the sight-board may be reversed and used for expenditures ranging from \$10.00 to \$20.00 as is apparent from an examination of Fig. 12.

Shown in Figs. 13 and 14 is a modification of the embodiment illustrated in Figs. 11 and 12 in which on one side of the sight-board the added digit 1 is placed above and intermedi-



ate to the digits of the regular index numbers while upon the other side thereof the arrangement is similar to those shown in the former embodiments. To facilitate this last arrangement, the two lines of index-numbers are separated somewhat and separate openings provided therefor in the sight-board. To adapt the sight-board to work in with the upper line of these figures, an L-shaped index perforation 26 is provided by means of which the first digit may be changed by a slight shifting of the sight-board when the amount of change registered will of course be found to correspond. By an examination of Fig. 14, it will be observed that on a purchase of \$15.05 the change may be computed mechanically from \$19.00 or \$29.00; \$18.00 or \$28.00 etc., by a slight movement of the sight-board.

In the embodiments shown in Fig. 15, a base or plate 29 is provided upon which and near the ends thereof, are rigidly mounted the end brackets or members 27 and 28. Supported within said end brackets, and rotatable about a horizontal axis, is a drum 1 corresponding in its usage to the base-members in the other embodiments already described. In front of the same and of a similar construction to the sight-board members used in the other embodiments, a shield or convexed sight-board member 2 is mounted slidably upon the wires 31 and 32. Being tightly stretched between the ears or projections 33 and 34 of the end brackets 27 and 28, the aforesaid wires serve a double purpose by acting as ties for the end members and guides for the sight-board member. Projecting out from each end bracket and rigid with the drum 1, is a knurled thumb grip whereby the drum may be rotated into any desired position relative to the sight-board member 2. By reference now to the numbers carried by these relatively movable members, it will be seen that a different arrangement has been adopted. Thus upon the rotary drum, the last column on the left is provided with whole numbers entirely around the drum (approximately one half of the same being visible) while in each of the columns to the right thereof, will be found similar series of numerals, each of which is .05 less than the numeral immediately to its left. Upon the sliding sight-board member on the other hand it will be seen that the vertical columns contain series diminishing in steps of \$1.00 from top to bottom while from left to right along the horizontal columns, an increase of \$.05 occurs from number to number from one side to the other. As in the sight-board members shown in the other embodiments, the sight-board 2 shown in Fig. 15, is provided in its upper left hand corner with an index opening 30. A thumb or finger hold 36 carried by the sight-board member, enables the operator to set the sight opening 30

into operative relation with any vertical column of figures on the drum there beneath when by turning the knob 35, any desired number in said vertical column may be brought into registry with the index opening 30 to represent the amount tendered in payment of any purchase or bill. Glancing along the sight-board 2, the operator next selects the number thereon to represent the amount of the purchase when within the sight opening immediately below that number is found the amount due as change to the purchaser.

It will of course be evident that in the drum embodiment of my invention, the limiting amounts which can be embodied thereon, are dependent only upon the size of the drum and the size of the numerals placed thereon. It will further be evident that the sight-board number 2 may be extended to entirely encircle the drum without departing from the spirit of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. A computer comprising two relatively movable members, one of which carries an arithmetical series of index-figures and a plurality of columns of figures adjacent thereto, each column forming an arithmetic series and the members leading each column forming an arithmetic series; and the other member carrying an index for coöperation with the index-figures of the first named member and also carrying a plurality of columns in arithmetical progression adapted to be brought into coöperative relation with all the series on the other of said members.

2. A computer having relatively movable members, one of which is provided with a plurality of slots extending throughout the length of said member, a plurality of numerals arranged on the bars formed between said slots; and the other member comprising a plurality of raised ridges upon which are arranged a plurality of numerals, and a slab provided with index-figures the raised ridges of one member being adapted to move in the slots of the other member in such manner as to bring all the numerals into a substantially continuous surface.

3. A computer having a base-member comprising a solid back portion, index-slabs raised above the solid back and extending longitudinally thereof, figures on the upper surfaces of said index-slabs, a plurality of ridges intermediate to the index-slabs and having their upper faces in a plane above that of said index-slabs, on these ridges; and a sight board movable on the base-member and comprising a plurality of bars adapted to slide in the groove formed in the base member by the longitudinal ridges, the several slots and ridges being proportioned in such manner as to bring the upper surfaces



of the ridges and bars approximately into the same plane, and a slab provided with sight-openings through which the figures on said index-slabs may be read.

5 4. In a computer, a member comprising a plurality of ridges having numeral bearing faces in the same surface and another ridge provided with an index-bearing face which is depressed relatively to the numeral faces of the ridges; and a sight-board member comprising a plurality of bars adapted to slide in the grooves between said ridges, and a slab provided with sight-openings and having its upper surface in the same plane as the numeral faces of the ridges.

10 5. A computer comprising two relatively movable members one of which is provided with a column of figures in increasing arithmetic progression in one direction, a second column of figures arranged in increasing arithmetic progression in a direction at right angles to that of the first, and an index thereon for adapting it to cooperate with the other member; and the other member provided with columns in inverse arithmetical progression at right angles to each other, the figures on said members being so chosen as to make the sum of each even pair in a vertical column, equal to the index-figure at the top of the column.

20 6. In a computer, a pair of relatively movable members, one of which is provided with a plurality of ridges having numeral-bearing surfaces and an index-bearing slab; and the other of which is formed of numeral-bearing bars movable between the ridges, and a perforated slab through which the readings on the index-bearing slab can be read.

30 7. In a computer, a pair of relatively movable members, one of which is provided with ridges having numeral bearing surfaces and a slab having an index-bearing surface; and the other of which is formed of numeral-bearing bars movable between the ridges, and a perforated sight-slab through which the index-surface can be read, and further provided with a sighting-attachment by means of which the bar-formed member may be set with reference to the ridged member.

40 8. In a computer, two relatively movable members, each provided with figures arranged in columns in two directions, the columns on one member being formed in direct arithmetic progression and those on the other being formed in inverse arithmetic progression so that the sum of each even pair of figures from the top to the bottom of any column is equal to the sum of any other even pair in the same column; an index-figure at the top of each column which is equal to the sum of each even pair of figures in that column, said index figure being carried on only one of the members; and an index carried by the other member.

50 9. In a computer, a base-member comprising

ing a plurality of ridges having numeral-bearing faces forming parts of the same surface in space and another ridge provided with an index-bearing face; and a sight-board member comprising a plurality of bars adapted to slide in the grooves between said ridges, and a perforated index-sight-board for setting the sight-board member relatively to the base-member.

70 10. In a computer, a base-member comprising a plurality of ridges with numeral bearing faces, another ridge provided with an index-bearing face; and a sight-board member comprising a plurality of bars adapted to slide in the grooves between said ridges to bring the numerals carried by the sight-board member into varying relations with the numerals carried by the ridges of the base-member, a perforated sight-slab integral with the sight-board member and an index-carried by the sight-board member whereby the two members may be set in any desired relation.

80 11. In a computer, two relatively movable members, each having tables of figures arranged in columns parallelly and perpendicularly, all of the columns on one member being formed in direct arithmetical progression and all those on the other member being formed in inverse arithmetical progression; a column of index-figures carried by one of the members and an index carried by the other member whereby the figures of one member may be thrown into cooperative relation with the figures of the other member, the sum of each even pair of figures from top to bottom of any column, being equal to the index-figure at the top of that column.

90 12. In a computer, two relatively movable members, each having tables of figures arranged in columns in two directions, all the columns on one member being formed in direct arithmetical progression and all those on the other member being formed in inverse arithmetical progression; a column of index-figures carried by one of the members and an index sight-board carried by the other member and comprising a slab provided with perforations.

100 13. In a computer, two relatively movable members, each having tables of figures arranged in columns and having their series in direct and inverse arithmetical progression, one of said members being provided with a plurality of sight openings arranged intermediate to the columns of that member and through which the figures on the other member may be read, a column of index-figures carried by one of the members and a sight index carried by the other member whereby the figures on both members may be brought into cooperative relation with each other by means of the said sight openings.

110 14. In a computer, two relatively movable members, having figures arranged in col- 130



umns; one of said members being provided with a sight-opening adjacent to a column of figures on that member through which the figures on the other side may be read, a column of index-figures carried by one of the members and a sight-index carried by the other member whereby the figures on the two members may be brought into coöpera-

tive relation with each other by means of the said sight-opening.

The foregoing specification signed at Keokuk Iowa this thirty first day of May, 1907.

ROSS D. BURHANS.

In presence of—

GEORGE C. KEPPEL,  
N. J. MONTAGUE.