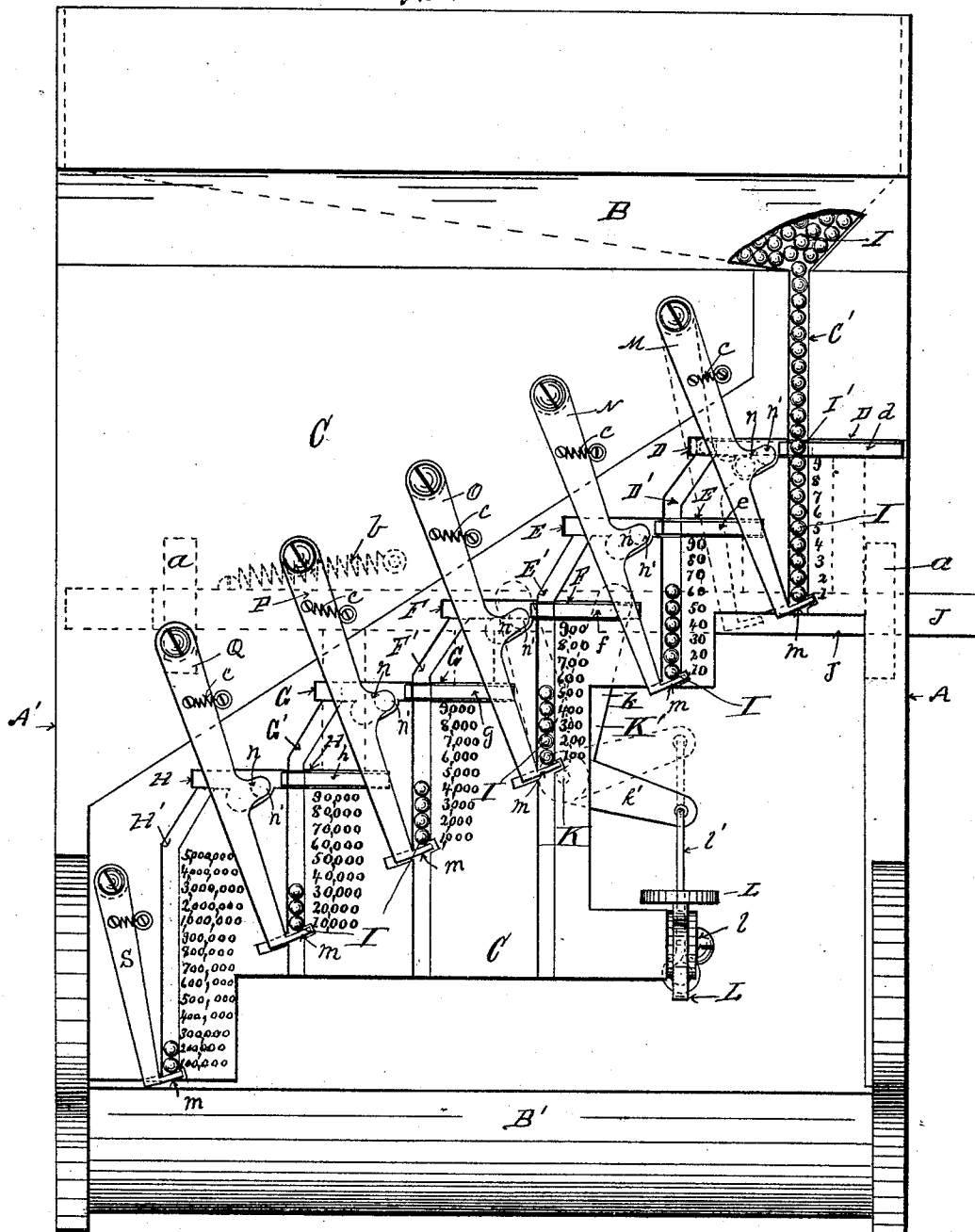


W. H. CLARK.
COUNTING MACHINE.

No. 516,984.

Patented Mar. 20, 1894.

Fig. 1.



Witnesses

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Att'y.

UNITED STATES PATENT OFFICE.

WILLIAM H. CLARK, OF ERIE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
BENJAMIN B. BROWN, OF SAME PLACE.

COUNTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 516,984, dated March 20, 1894.

Application filed March 6, 1893. Serial No. 464,815. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. CLARK, a citizen of the United States, residing at the city of Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Counting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention consists in the improvements in counting machines, hereinafter set forth and explained and illustrated in the accompanying drawings in which—

Figure 1. is a front view in elevation of my improved counting machine, the front transparent plate thereof being removed. Fig. 2. is an end view of the same in elevation, parts thereof being broken away. Fig. 3. is a rear view in elevation of a sliding bar and carriers secured thereto, forming part of my improved counting machine. Fig. 4. is a top or plan view of the same.

The invention, as shown in the drawings embodies a form of my invention in which but one key is used, but it will be readily seen that instead of using but one key, I can use any number of keys, each representing a different amount, with passages from the hopper inlets controlled by said keys, so as to utilize my invention in cash registers, adding machines, and other machines of like character, with equal facility.

In the type of my invention shown in the drawings, A, A' are the end frames of my machine, which are connected together by a hopper B at the top of the frame, and a receptacle B' at the bottom thereof. Between the end frames A A', I also secure a plate C, which is provided with horizontal slots D, E, F, G, and H. I also make in the face of the plate, vertical grooves C', D', E', F', G', and H', the width and depth of these grooves being a little more than the diameter of the balls I operating therein. The groove C' opens into the bottom of the hopper B and extends downward and crosses the slot D at right angles;

the groove D' extending from near the rear end of the slot D downward across the slot E; the groove E' extending from near the rear end of the slot E downward across the slot F; the groove F' extending from near the rear end of the slot F downward across the slot G; the groove G' extending from near the rear end of the slot G downward across the slot H, and the groove H' extending from near the rear end of the slot H downward; each of the said grooves C' D' E' F', and G' extending downward from the slots D, E, F, and G far enough to hold nine of the balls I below said slots; the slot H' however may extend downward any distance desired. Commencing at the lower end of the groove C' I place, numbers, commencing with 1 and ending with 9 opposite the space occupied therein by each ball up to the bottom of the slot D, and I likewise number the slot D' by tens, from ten to ninety; the slot E' from one hundred to nine hundred; the slot F' from one thousand to nine thousand; the slot G' from ten thousand to ninety thousand, and the slot H' from one hundred thousand upward as desired. Across the back of the plate C is mounted in guides *a a*, a horizontally sliding bar J, (a rear view in elevation of which is shown in Fig. 3, and a top or plan view in Fig. 4.) to which are secured blocks *d, e, f, g*, and *h*, which fit into the slots D, E, F, G, and H in the plate C and move horizontally therein. Near one end of each of the blocks *d, e, f, g*, and *h* are transverse grooves *d', e', f', g'*, and *h'*, which grooves, when the said blocks are in their normal positions, at the right hand ends of the slots in which they operate, (as shown in Fig. 1) form parts of the vertical grooves C', D', E', F', G', and H', so that the balls I placed therein will pass down through the same to the bottoms of said grooves. On the back of the plate C, I secure a stud K (see Fig. 2) upon which I pivot a bell crank lever K', the upwardly projecting arm *k* of which engages with a rearwardly projecting stud J' on the sliding bar J, and the horizontal arm *h'* of which is connected with a key lever L pivoted on a bearing *l* on the lower part of the plate C, by means of a link *l'*. By means of this key lever, the horizontally sliding bar J is moved toward the left hand side of the

machine, until the grooves d' , e' , f' , g' , and h' in the blocks d , e , f , g , and h are moved over the upper ends of the vertical grooves D' , E' , F' , G' , and H' as and for the purpose
 5 set forth. The bar J and the blocks d , e , f , g , and h thereon, being moved back to their normal positions at the right hand ends of the slots D , E , F , G , and H by the action of a retracting spring b operating thereon when
 10 pressure is removed from the key lever L . To the face of the plate C , I pivot downwardly projecting levers M , N , O , P , and Q , each of which is provided with a retracting spring c to retain it in its normal position. On the
 15 lower end of each of these levers is a shoe m operating in an inclined slot in the face plate C , so that when the levers M , N , O , P , and Q are in their normal positions, as shown in Fig. 1, the vertical grooves C' , D' , E' , F' , and G'
 20 are cut off by the shoes m , so that nine of the balls I will fill the space in each of said grooves from the shoes m therein up to the slots D , E , &c., the tenth ball in each groove resting in the transverse groove d' , e' , f' , g' , h' in the
 25 blocks d , e , f , g , h , hereinbefore described. The width and depth of vertical grooves C' , D' , E' , F' , G' , and H' are made a little more than the diameter of the balls I , and the transverse grooves d' , e' , &c., in the sliding blocks
 30 d , e , &c., are made only about one half the diameter of the ball in depth, the blocks d , e , f , g , h being set back from the face of the plate C , a distance equal to half the diameter of the balls I ; the balls I being retained in the grooves
 35 C' , D' , E' , F' , G' , H' by a plate of glass, mica, or other transparent material R over the face of the plate C , as shown in Fig. 2, so that the figures on the face of the plate C hereinbefore described, can be read through said plate.
 40 On the levers M , N , O , P , Q opposite the ends of the blocks d , e , f , g , h , I make lateral projections n provided with inwardly projecting bosses n' , which the blocks d , e , &c., pass under without engaging therewith; but in case
 45 balls are in the grooves d' , e' , &c., in said blocks, as illustrated at I' in the groove C' and d' in Fig. 1, then when the blocks e , f , g , h are moved to the left, by the operation of the key lever L , the ball I' in the slot d' of
 50 the block d engages the boss n' on the projections n and forces the lever M back, until the shoe m thereon releases and discharges the nine balls below the block d into the receptacle B' at the base of the machine, mean-
 55 while, the ball I' in its traverse passes over the boss n' and the lever M returns to its normal position; the block d continuing its lateral traverse, until the ball I' in the slot d' thereof is carried over and discharged into
 60 the vertical groove D' , when the pressure on the key lever L being relieved, the retracting spring b acting on the sliding bar J returns the block d to its normal position, again allowing the balls I to pass down and fill the groove
 65 C' when the operation above described can be repeated, until ten balls are delivered into the vertical groove D' when the tenth ball I'

in said grooves in like manner engages the boss n' on the projection n of the lever N and is in like manner carried and delivered into
 70 the groove E' and when ten balls are delivered into the groove E' , the tenth ball in said groove is in like manner carried and delivered into the groove F' , &c. It is seen that the levers M , N , O , P , and Q are only op-
 75 erated by the movement of the sliding bar J when there is a ball I' in the notches d' , e' , f' , g' or h' in the carriers d , e , f , g , or h corresponding to the lever moved, and this only occurs in each case when the vertical slots C'
 80 D' , E' , F' or G' corresponding thereto have nine balls therein, then in each case the tenth ball, when delivered into any one of the vertical slots C' , D' , &c., rests in the slots
 85 d' , e' , &c., of the carrier d , e , &c., as the case may be, and is by the next movement of the mechanism carried to the next groove to the left, thereby increasing its value ten times,
 90 and at the same time the lever corresponding to the vertical groove from which it is taken is raised and the remaining nine balls therein discharged from said groove; for example, suppose each ball while in the groove C' represented one cent, as soon as ten balls passed
 95 down therein, the next operation of the key lever would carry the tenth ball over into the groove D' where it would represent ten cents, at the same time discharge into the receptacle B' the remaining nine balls in said groove
 100 C' , and when ten balls were deposited in the groove D' , the next operation of the key lever would carry the tenth ball therefrom into the groove E' where it would represent one hundred cents, and at the same time, discharge
 105 into the receptacle B' the remaining nine balls in said groove D' . The operation of the mechanism being the same in the remaining grooves F' , G' , and H' , as heretofore described. So each time a ball is moved into a groove to
 110 the left, its value then is ten times what it was in the groove from which it was removed.

In operation, suppose there were an unknown number, say one hundred and fifty balls in the hopper, and it was desired to count them, the first operation of the key le-
 115 ver would deliver the tenth ball from the groove C' to the groove D' ; the tenth time the key lever was operated thereafter one ball would be carried from the groove D' into the groove E' , and five more operations of the
 120 key lever would deposit five balls in the groove D' leaving none in the groove C' , looking then at the figures at the sides of the grooves D' and E' it would be seen that there was one ball in the groove E' opposite the
 125 figure 100, and five balls in the groove D' the uppermost one of which would be opposite the figure 50, which would read one hundred and fifty; the correct count of all of the balls in the hopper. It will readily be seen that
 130 the whole number of balls passing from the hopper B can at any time be ascertained, as for example, the machine as shown in Fig. 1 now reads 234,569, and the result would be

the same if the balls represented cents and dollars, the two right hand grooves cents, and the remainder dollars, the correct result being in all cases given.

5 Having thus fully described my invention, so as to enable others to construct and operate the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

10 1. The combination in a counting machine, of a series of grooves for receiving balls, with mechanism for carrying a ball from one groove to another, and lever mechanism for discharging the balls in the grooves below
15 the ball carried to the next groove, substantially as and for the purpose set forth.

2. The combination in a counting machine, of a series of grooves for receiving balls, and mechanism moving transversely across said
20 grooves, adapted to carry a ball from one groove to another, with lever mechanism adapted to be operated by the ball so carried contacting therewith, while being moved from one groove to another, substantially as
25 and for the purpose set forth.

3. The combination in a counting machine, of a hopper for retaining a supply of balls a series of vertical grooves, one of which communicates with said hopper, with grooved
30 blocks sliding transversely across said vertical grooves, so as to carry a ball from one groove to another, key lever mechanism for operating said grooved blocks, and lever mechanism forming cut-offs in said vertical
35 grooves below the transversely sliding blocks adapted to be operated by the ball contacting therewith, while being carried by said grooved blocks from one vertical groove to another, substantially as and for the purpose set forth.

4. The combination in a counting machine, 40 of a series of vertical grooves as C', D', E', &c., and grooved blocks as d, e, f, &c., moving transversely across the grooves C', D', E', &c., with levers as M, N, O, &c., each having projections as n and bosses n' on said pro- 45 jections, adapted to be engaged by a ball as I' when it is carried from one groove to another, and shoes as m on the lower ends of said levers, adapted to operate as cut-offs in said vertical grooves, substantially as and 50 for the purpose set forth.

5. The combination in a counting machine, of a series of grooves for receiving balls, lever mechanism contacting with a ball in one groove and moving it to another groove, 55 and mechanism adapted to be operated by said ball during its traverse from one groove to another, so as to discharge the balls remaining in the groove from which said ball is moved; substantially as and for the pur- 60 pose set forth.

6. The combination in a counting machine, of a series of grooves for receiving balls, balls in said grooves corresponding in value with the grooves in which they are situated, mech- 65 anism for moving a ball from one groove to another of a different value and mechanism operated by the movement of such ball from one groove to another, to discharge the balls remaining in the groove from which such 70 ball was moved; substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. CLARK.

Witnesses:

C. B. HAYES,
A. L. JACKSON.