

M. MAYER.
CALCULATING MACHINE.

No. 417,261.

Patented Dec. 17, 1889.

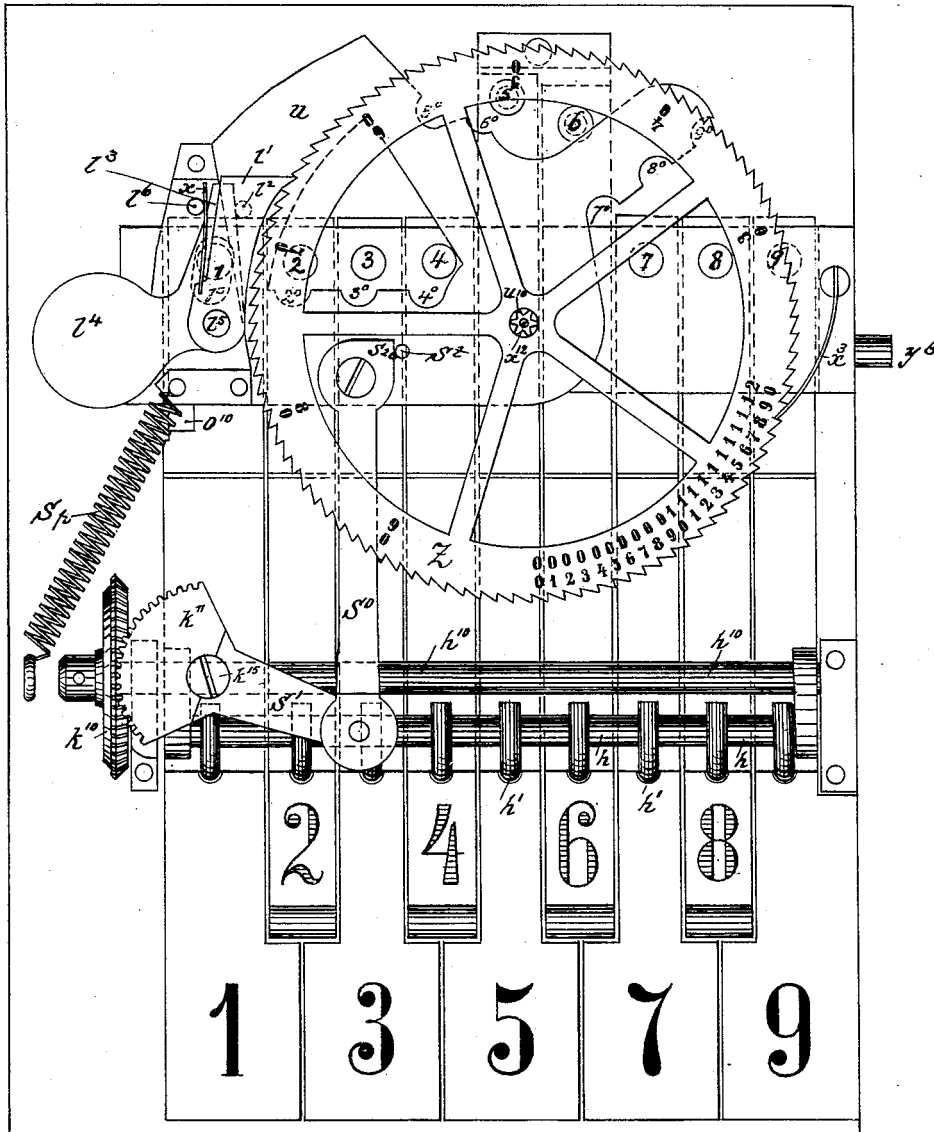


Fig. I.

Witnesses
A. Houghman,
Wm. Wagner.

Inventor
Max Mayer
Per Rueder & Pieske
attorneys.

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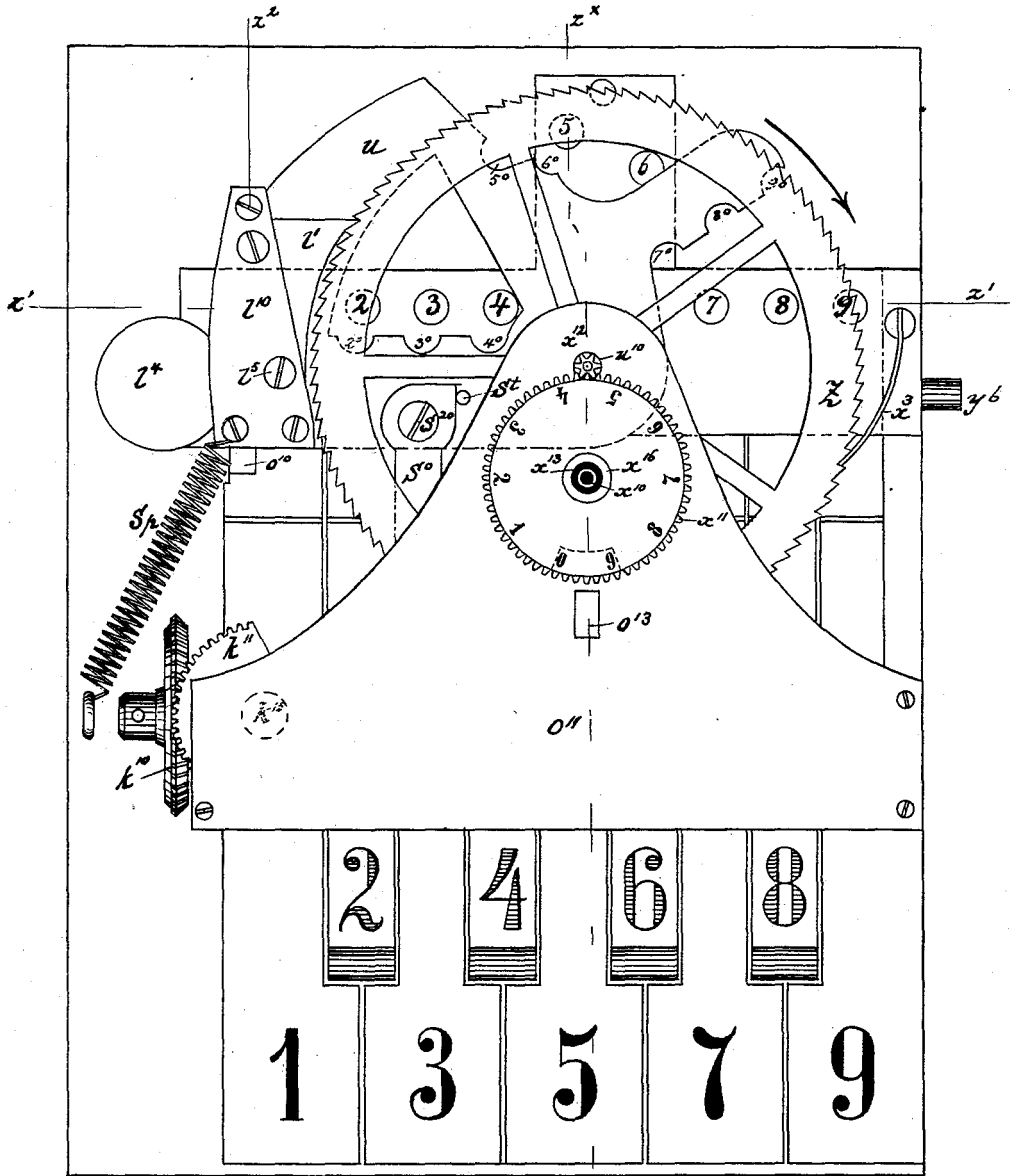


Fig. II.

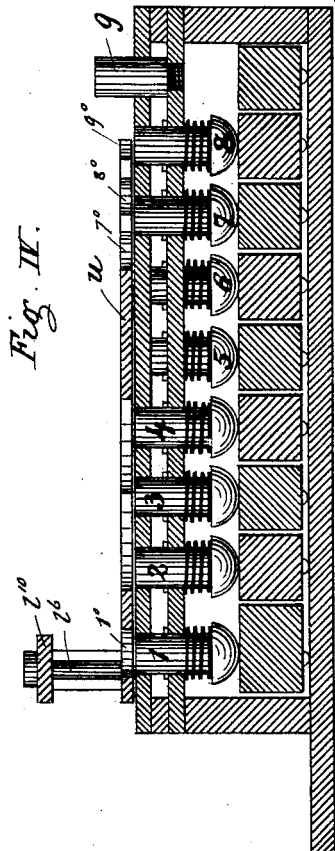
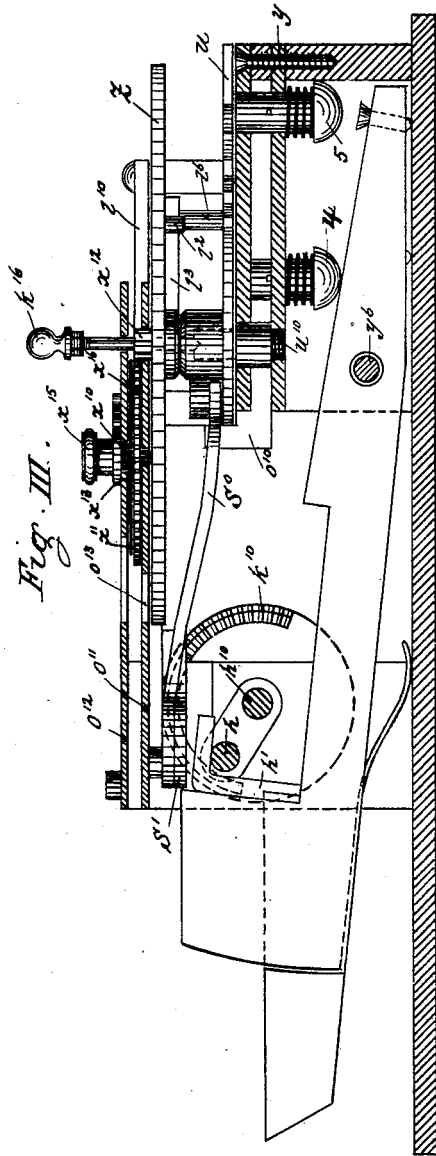
Witnesses.
A. Sponglmann.
Wm. Wagner

Inventor:
Max Mayer
per Rooden & Bickel
Attorneys.

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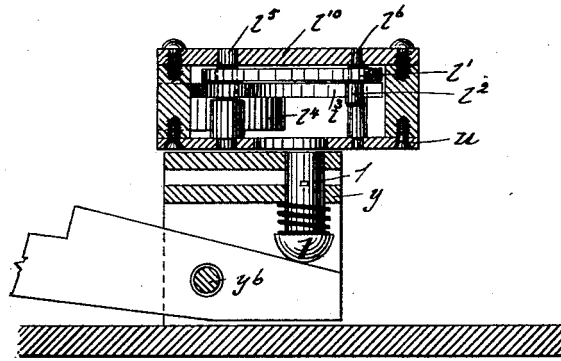


Fig. V.

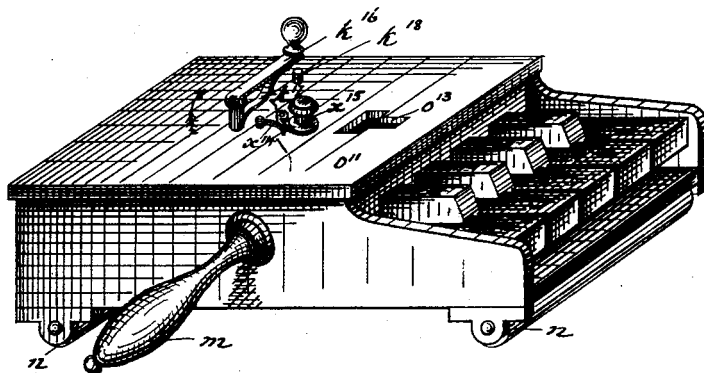


Fig. VI.

Witnesses.
Honglmans.
Wm. Wagner.

Inventor.
Max Mayer
Per Rooder & Reisman
Attorney.

UNITED STATES PATENT OFFICE.

MAX MAYER, OF MUNICH, BAVARIA, GERMANY.

CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 417,261, dated December 17, 1889.

Application filed September 27, 1888. Serial No. 286,513. (No model.) Patented in England January 14, 1888, No. 629; in France February 15, 1888, No. 162,118; in Austria-Hungary May 11, 1888, No. 4,530 and No. 16,295, and in Germany August 16, 1888, No. 44,398.

To all whom it may concern:

Be it known that I, MAX MAYER, a citizen of Germany, residing at Munich, in the Kingdom of Bavaria, Germany, have invented a new and Improved Calculating-Machine, (for which I have obtained a patent in Great Britain, No. 629, bearing date January 14, 1888; in Germany, No. 44,398, bearing date August 16, 1888; in France, No. 162,118, bearing date February 15, 1888, and in Austria-Hungary, Nos. 4,530 and 16,295, bearing date May 11, 1888,) of which the following is a specification.

In the accompanying drawings, Figure I is a top view of the machine with the casing and the top plates o^{11} and o^{12} removed. Fig. II is a similar top view having only the top plate o^{12} removed. Fig. III is a vertical section on line $z^x z^x$, Fig. II. Fig. IV is a vertical cross-section at line $z' z'$, Fig. II. Fig. V is a vertical section at the end at line z^2 , Fig. II. Fig. VI is a perspective view of the outside of the machine.

To sum up large columns of figures, an apparatus showing numbers of eight to ten digits is not essential, but for ordinary use an apparatus suffices which is only arranged for a three-digit number. When using such an apparatus, the units, tens, hundreds, &c., are added separately, the last figure of the resulting number is noted down, and the other carried numbers of the same, after the apparatus has been adjusted to zero, are counted into the next row of figures. By restricting the apparatus to a three-figure number other simplifications are rendered possible.

Over the common shaft y^b of the keys a horizontal metal plate y is arranged, in which the steel points 1 2 3, &c., are guided. The steel points are raised direct by the key ends. The bow u and the figure-wheel to be moved by the same are arranged in a horizontal position. The bow oscillates about the shaft u^{10} , secured in the metal plate y , and is so shaped and recessed as to always abut against the corresponding steel pivot on the stroke of a key. The arrangement of steel pivots and the corresponding shape of the bow may be varied at pleasure. In the shape adopted in the drawings the bow u abuts with the recess

1° against the steel pivot 1, (see Fig. I,) with the recess 2° against the pivot 2, and the recesses 3° 4° 5° 6° 7° 8° corresponding with the pivots 3 4 5 6 7 8, Figs. I and II. The limit for the number 9 is determined by the stationary pin 9. On the bow u is arranged the pawl l' , turning on shaft l^b , and catching into the figure-wheel z , and below said pawl, Figs. I and V, the weighted pawl l^t oscillates about the same vertical shaft l^b .

The stopping of the figure-wheel set in motion by the key is effected as follows by aid of the momentum of the bow proper: In the pawl l' is secured a steel pin l^2 , which is in contact with a projection l^3 of the weighted pawl l^t . This weighted pawl is so constructed that its center of gravity lies a few millimeters behind the extension of the connecting-line between the shaft of the figure-wheel z and of the weighted pawl. When moving, the pawl-weight, therefore, always tends to occupy a position exactly radial to the center of the figure-wheel, but at the moment when the movement of the bow is impeded by the steel pivots from continuing its course in a tangential direction. Thus the point of the pawl l' presses so firmly into the teeth of the figure-wheel that the latter is arrested. The pawl l' and the weighted pawl l^t are secured at a corresponding height by a sleeve provided at the weighted pawl and embracing the shaft, Fig. V. The pin l^b prevents the weighted pawl weight from staying behind owing to inertia, and leaves to the pawl l' only so much play as to allow it to pass along over the teeth of the wheel on the return movement of the bow. Above the pawl is situated the cover-plate l^{10} , rigidly connected with the bow u . The pawl is continually pressed into the teeth of the wheel by the spring x bearing against pin l^6 . The bow u receives its horizontal movement from the keys, each of which by a pressure by means of the hooks h' on the rod h sets in motion the shaft h^{10} and the vertical beveled wheel h^{10} , and by the latter the horizontal sector-gear h^{11} , oscillating about the shaft h^{12} , secured in a projection of a vertical wall, and by means of the arm or crank S' , secured thereto, the motion is transmitted by the lever S^0 to the bow u .

The figure-wheel z , rigidly connected with its shaft, is arranged either on a pin, as shown in the drawings, Fig. III, revolvably and moves concentrically with the bow u . The stop-spring x^9 secures the wheel z when at rest, and prevents the same from being taken along on the rearward movement of the bow. This return movement of the bow is effected by the spiral spring S^p as soon as the key struck is freed again. To cause the bow to retain its proper position at the projection o^{10} without rebounding and thrusting the figure-wheel forward for one or more teeth, the pin S^t is provided on the bow u , which on the receding of the latter meets the projection S^{20} of the lever S^o , and by abutting against the same neutralizes the oscillating power of the bow immediately before the abutment of the same against the projection o^{10} .

The figure-wheel is provided with a hundred teeth to indicate the two last figures of the sum. Corresponding to the teeth and within the same are engraved or stamped on a thin sheet-metal ring the figures 0 to 99. To allow these figures to be made larger and more distinct, preferably the tens and units are arranged not side by side, but the tens over the units; therefore the figures $\frac{7}{9}$ read as the numbers 79.

Over the figure-wheel z lies fastened on the side a plate o^{11} of thin sheet-steel, having a slot o^{13} or slots at the places where the numbers on the wheel are to be read. Between this and a second exactly similarly-shaped plate o^{12} is situated a tooth-wheel x^{11} , revolvable about a shaft x^{10} , which wheel is moved forward by the pinion x^{12} , situated upon the shaft w^{10} of the figure-wheel, at each revolution of the latter for a tenth of the periphery. This smaller wheel serves to indicate the hundreds without requiring a further transferring device.

To allow, with this apparatus, the adjustment to zero to be effected in a simple manner, the figures are arranged on a thin sheet-metal disk x^{16} , which bears on the wheel x^{11} and partakes of the motion of the wheel, by means of a friction-connection, by a tube x^{15} , rigidly connected thereto, placed over its shaft and adjusting itself to the same. Said tube is provided with a button x^{15} , for the purpose of adjustment to zero, by means of which button the figure-disk x^{16} of the wheel x^{11} can be revolved independently of the latter. The reading-opening for the hundreds is so much widened that when a number just

appears on the left side the preceding one is still visible. The number standing on the right is available until the two last figures of the tens and units appear or have just passed by.

For instance:

9	8	but	9	8
0			9	

1 reads 901

8 reads 808

The apparatus is closed with a cover, from which project the shafts of the figure-wheel and of the tooth-wheel.

For the purpose of adjusting the apparatus to zero, the shaft of the figure-wheel is provided with a crank k^{16} , Fig. VI, secured thereto by means of a hinge and pressed upward by means of a spring k^{17} , to allow the crank to pass unimpededly along over the pin k^{18} during the addition. Subsequently the zero adjustment is effected by pressing down the crank and turning it in the direction indicated by an arrow until it abuts against the pin k^{18} .

To adjust the tooth-wheel x^{11} to zero, a small button or knob x^{15} , having a recess, is provided above the cover on the tube x^{13} . On this knob slides a spring x^{14} , which does not impede the ordinary revolution. On turning, however, the tube with its button, the recess stops on the spring at the figure 0.

The apparatus is placed upon rollers n and provided with a handle m , as shown in Fig. VI.

When the apparatus is to be moved from place to place, it is grasped by the handle and propelled in either direction upon the rollers.

What I claim is—

1. In a calculating-machine for three-figured sums, the horizontal bow u , having nine recesses, by means of which the bow is adapted to be arrested by pins raised direct by the keys and the bevel-wheels $k^{10} k^{11}$, in combination with spring S^p and lever S^o , having the projection o^{10} , projection S^{20} , and pin S^t , substantially as and for the purpose set forth and described.

2. The combination of a set of keys with a set of pins, an oscillating recessed bow engaged by the pins, a figure-wheel moving concentrically with the bow, and a pawl on the bow that engages the figure-wheel, substantially as specified.

MAX MAYER.

Witnesses:

G. DEDRENY,

A. M. CICKMAN.