# N° 8723 A.D. 1897

*Date of Application, 6th Apr., 1897*

*Complete Specification Left, 1st Jan., 1898—Accepted, 6th Apr., 1898*

## PROVISIONAL SPECIFICATION.

### Improvements in and relating to Adding Machines.

I, SHOHÉ TANAKA, of 10, Tauenzienstrasse, Berlin, Germany, Doctor of Science, Student, do hereby declare the nature of this invention to be as follows:—

The object of the present invention is a stop mechanism for adding machines, preventing the toothed-wheel, called number wheel in these adding machines being worked by the spring or tappet which makes it move, from surpassing, by its acquired speed the exact point it should reach to mark a number required.

The apparatus is characterized by a moveable rod and a stoppage-click which is allowed to assume a rotation movement of a certain amplitude on this moveable rod; this stoppage-click functioning in such a manner that the pressure exercised upon a key of the adding apparatus, places the click into contact with the toothed-wheel or number wheel causing it to turn until the moveable rod runs against a vertically moving peg fastened to the extremity of the lever of the key operated upon, so that any subsequent rotation which might be occasioned by the speed obtained by the toothed wheel during its movement is absolutely avoided; a spring having during this time sent up the key on which a pressure was exercised. The stoppage-click being thus loosened from the teeth of the number wheel returns along with the moveable rod to its former position.

Dated this 5th day of April 1897.

L. DUVINAGE,
Agent for Applicant.

## COMPLETE SPECIFICATION.

### Improvements in and relating to Adding Machines.

I, SHOHÉ TANAKA, of 10, Tauenzienstrasse, Berlin, Germany, Doctor of Science do hereby declare the nature of my invention, and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

My invention has reference to adding-machines, and it consists of certain im-

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*Tanaka's Improvements in and relating to Adding Machines.*

provements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

In adding-machines heretofore generally known a toothed wheel, called number wheel is made to rotate through a certain particular number of angular divisions by depressing the corresponding button or key, which are provided for the numbers from 1 up to 9. In such a machine this rotation of the number-wheel takes place generally at once by depressing a key, and therefore when the keys are played very rapidly or with great force the number wheel, on account of the force acquired will move far beyond the expected amount.

My improvements embody certain features in the construction of an adding machine, through which the over-shifting above mentioned is totally done away with.

In the drawings Fig. 1 is a plan view of the new adding machine, of which the cover is partially removed to show the mechanism inside. Fig. 2 is a lateral elevation while the remaining figures show details of construction.

In Fig. 1 and 2, R is a ratchet wheel possessing in this case 100 equally distributed teeth on its circumference and rotating on the axle A in bearing B.

The keys are marked with figures from 1 to 9 and should be so arranged that on one of these keys being pressed down the rotation of the number-wheel for the corresponding number of teeth will be brought about. In order to recognize each time the position of the wheel, and consequently the required sum, a figure disc Z is screwed upon the wheel by means of screws $t$ and so arranged that the amount is visible through the opening K of the cover of the case. In the drawing the number 62 stands right under this opening. Further, the stop spring F is also screwed on the fixed pillar V, causing the wheel R to turn only in the direction of the hands of a watch and not backwards.

The pawl $k$ (Figs. 1 & 2) serves for causing the wheel to rotate and is carried in the way carefully described hereafter by two arms P and Q. In passing, it may be mentioned that the arm Q can revolve, independently, around the axis A of the number wheel, and leads with it the arm P, the pawl $k$ and the wheel R. The said rotary motion can be imparted to this arm by means of the pin $q$ fastened on it and protruding beyond the opposite side of the axle A.

The key levers $h^1$ $h^2$ $h^3$—$h^9$ formed into double levers revolve round the axis $u$ which is carried by three bearings S. U is a front-plate, with guiding slits for the separate keys which are thus confined to a limited range, that is to say, to the necessary extent of play up and down. The spring $f$ screwed on each key lifts them up. When the keys are pressed down, the screws $g^1$ $g^2$ $g^3$—$g^9$ press on a plate M marked in Fig. 1 by a dotted line (also in Fig. 2) which can swing round the axle line $a$—$b$ (Fig. 1) carried by two bearings T fixed under the ground-plate. By the spiral spring D fixed on a projection of the guide-plate U this swinging-plate M is always drawn upwards. From the edge of this plate M near the rotary axis A an arm G firmly fixed to M projects upwards, whose upper end terminates in a fork. Fig. 7 shows this fork seen along line $a$—$b$ in Fig. 1. In this fork as shown in Figs. 1 and 7 is located the above named pin $q$ of the arm Q. This arrangement for transmitting the movement is easily understood, it consists merely of two angles engaging each other (that is to say, the plate M with forked arm G, and slide arm Q provided with pin $q$ and pawl $k$) provided between the keys and the wheel. By virtue of the different play given to the levers through the relative position of the screws $g^1$ $g^2$ $g^3$—$g^9$ it is arranged that the proportionate rotation of the wheel is produced by the nearly equal play of the keys.

The prolonged arms of the key levers $h^1$ $h^2$ $h^3$—$h^9$ converge to an arc of stop pins $z^1$ $z^2$ $z^3$—$z^9$. The segment N supported by two pillars L L (Fig. 1 and in cross section Fig. 2) has nine vertical holes in which the stop pins $z^1$ $z^2$ $z^3$—$z^9$ are set moving up and down. The holes lie on a circumference described around the axis A and are placed at the distance from one another of one hundredth part of the circumference. Immediately over the said segment N moves back and for-

ward the pin *p*, terminating the arm P. *s* is a pin driven into the upper surface of the segment, and against which when undisturbed by the keys, the arm P is pressed with its pin *p* by the action of the spring D. This pin *s* determines the zero position.

We shall now give a detailed explanation of the character and use of the new catching mechanism. As already mentioned, the pawl *k* is carried by the superposed arms P and Q. The pawl *k* (it is to be remarked) which is angular in form, is pivotted on the arm P by screw *c* (Fig. 2) and an arm of it is bent upwards to catch in the teeth of the wheel R. The arm P again is pivotted on the fixed support B (Figs. 1 and 2); this arm P can also, with the arm Q, be made rotary round the main axis A of the wheel. From the arm P the pin *x* projects downwards. This is fixed in a guide-slit made in pawl *k*, so that the pawl can turn so far back and forward round its axis as to allow the upturned arm to catch and let go the teeth. There is another small hole on pawl *k* in which the pin *y* of the arm Q is set.

In the undisturbed state of the addition machine as shown in Fig. 1, the spiral spring D is seen first to act, so that the arm Q with the pin *y* tends to move the pawl in the direction of the hands of a watch. The pawl takes that position on which the pin *x* of the arm P (the latter bearing against the stop-pin *s*) is thrown on the right side of the notch. If a key is now pressed down, stretching the spring D, the pin *y* (Fig. 3), moving in the direction of the arrow point, forces the pawl to turn so that it comes to lie on the pin *x* with the left side of the notch. Then the pawl catches into the teeth of the wheel as shown in Fig. 3.

Let us assume that the key 9 is touched. This supposes in former addition machines an unfavorable condition. The arm Q now swings round the axis A bringing with it the pawl, the arm P and finally the wheel R. In the meantime, however, the rear end of the key-lever $h^9$ rises and pushes up the stop pin $z^9$ over the upper surface of the segment N so that the end *p* of the arm P is stopped by this stop-pin $z^9$, and naturally the wheel has turned as far as nine teeth. Fig. 4 shows the position of the catching mechanism in this state. As the pawl in this event has taken the position shown in Figs. 3 and 4, the key can go down no further. So long as the finger exercises a pressure on the key, the pawl remains between the teeth. It can thus be seen that the wheel, even if it may have received a great impetus in the direction indicated by the arrow in Fig. 4, must yet be brought completely to a stand-still by the pawl acting on the teeth.

On taking the finger from the key another condition occurs, shown in Fig. 5. Here the returning of the spring D only comes into consideration so that then the pawl is drawn by the pin *y* in the opposite direction so far that the pin *x* returns to rest on the right side of the notch. By this the wheel becomes again free and the whole catching mechanism, under the force of the spring D, must resume its original or rest position. The action of the pawl is manifestly the same if instead of key 9 any other key is used whereby naturally the catching mechanism is stopped at the proper position by the corresponding stop-pin *z*.

In order to bring the figure disc again to zero after adding up a number of figures on this machine, the projecting handle J (Figs. 2 and 6) is to be turned, pressing lightly at the same time against the metal ring plate until the handle pin *d* snaps in the hole *e* in the circular groove.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

A catching mechanism for addition machines characterised by a movable arm P and the pawl *k* pivotted in such a way that the pressure on a key brings the pawl against the wheel and the latter in consequence turns until the arm P strikes the pin Z of the corresponding key by which the impetus of the wheel is prevented from causing a movement exceeding the desired extent, while on releasing the

key the pawl *k* leaves the teeth and swings back with the arm into the original position, substantially as described and shown.

Dated this 29th day of December 1897.

L. DUVINAGE,
Patent Agent, 8, Rue des Princes, Brussels, Belgium.

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TANAKA'S Complete Specification.

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Fig. 1.

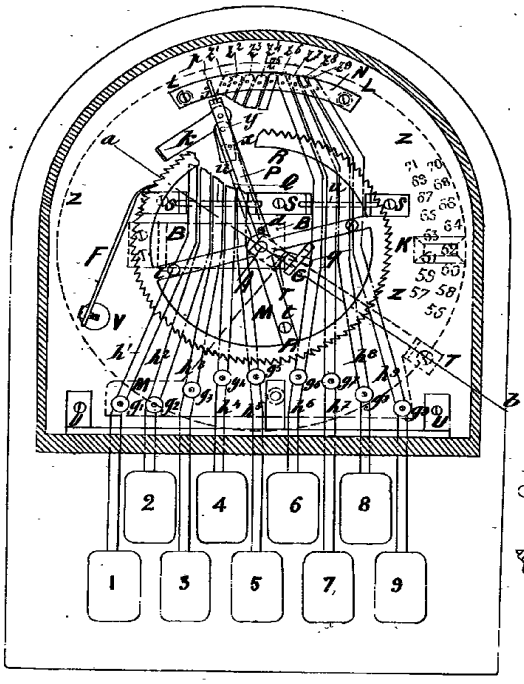



Fig. 3.

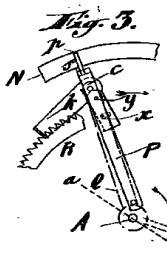


Fig. 4.

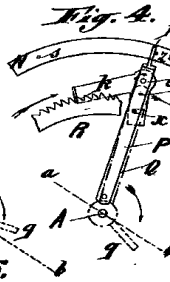


Fig. 5.

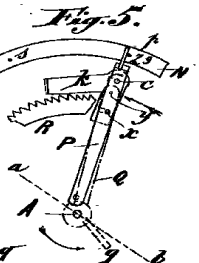


Fig. 6.

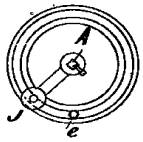


Fig. 7.

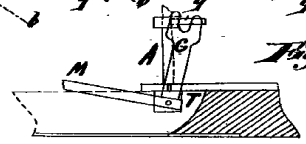
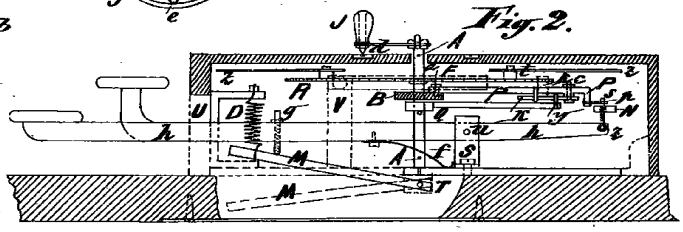


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]



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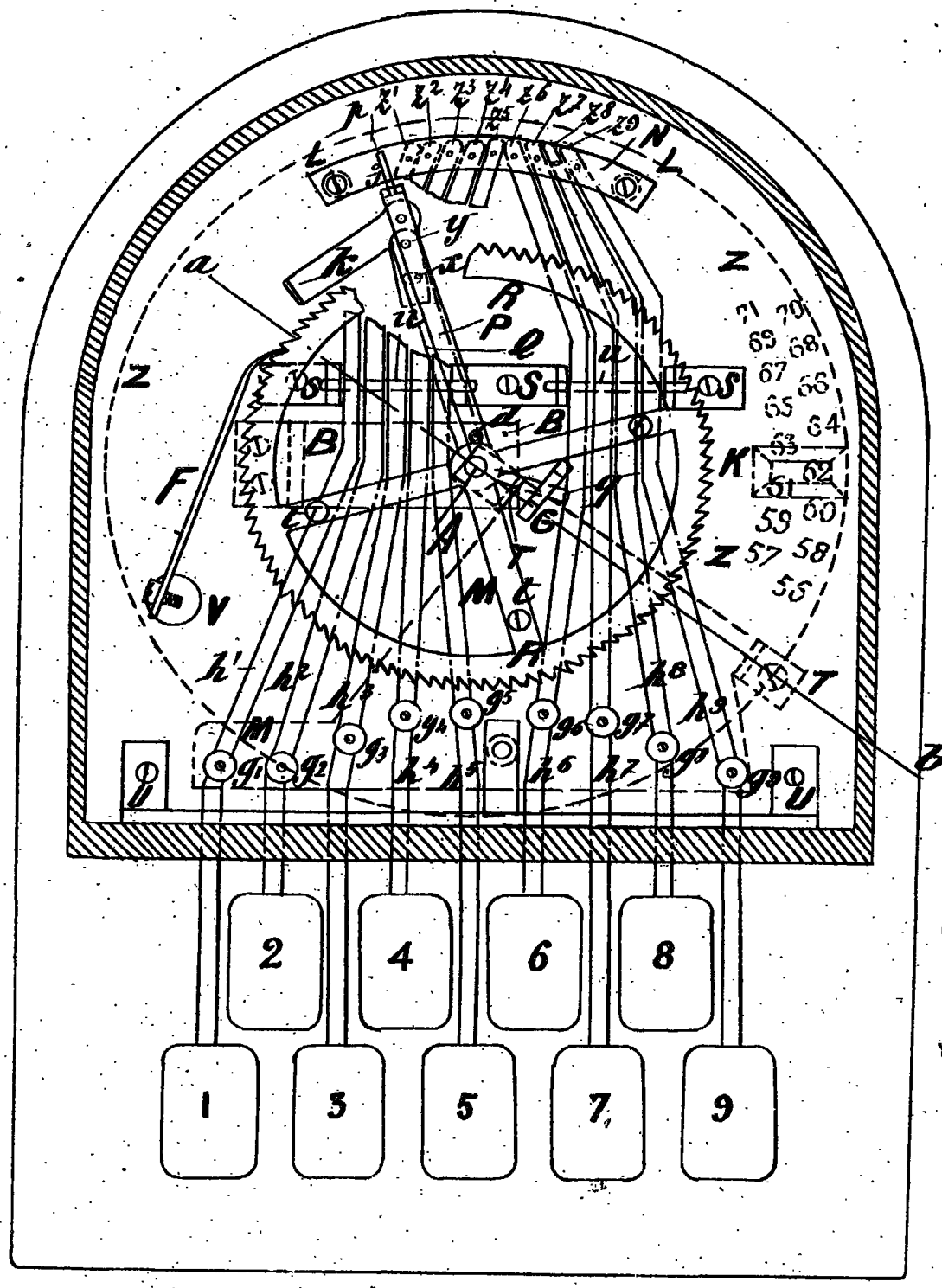
TANAKA'S Complete Specification.

*Fig. 1.*



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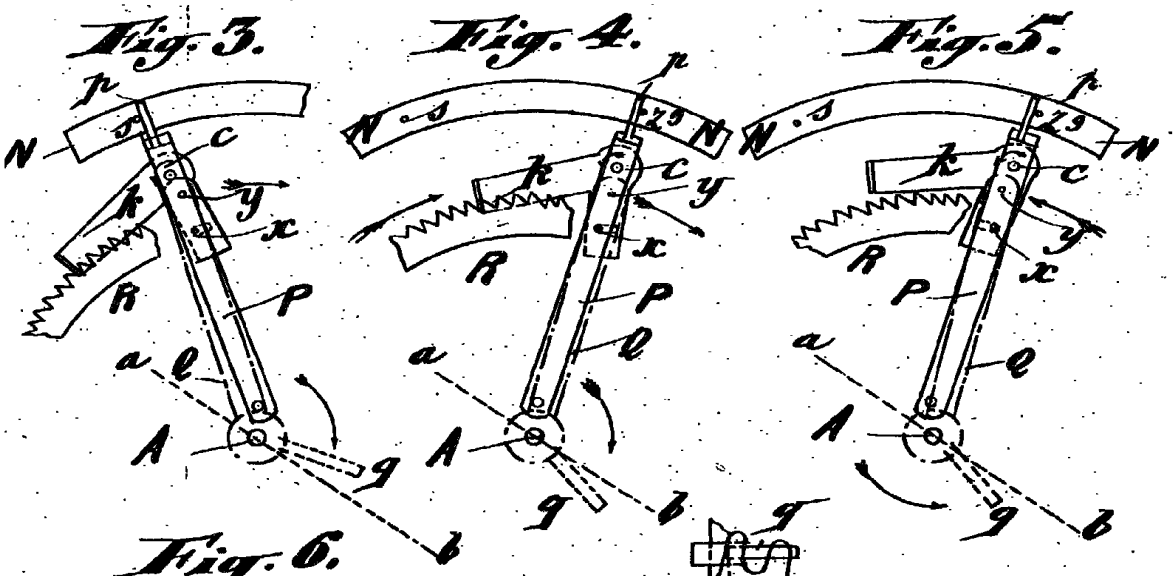


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