

## Management and operation of the "IFACH" Adder

The first thing before starting a sum is to reset the machine to zero. This is achieved by inserting the tip of a stylus into the hole closest to the center of the upper wheel, pressing gently and rotating it with the stylus, counterclockwise. At the beginning of this movement you only have to turn the upper wheel, but there will come a time when the tip of the stylus is inserted into another hole in the lower wheel and, from here, it will drag the two wheels together, until the stylus hits a stop on the board, leaving the machine at zero.

If the operation has been done correctly, the arrows on the wheel will point to zero at their ends and the display will appear blank.

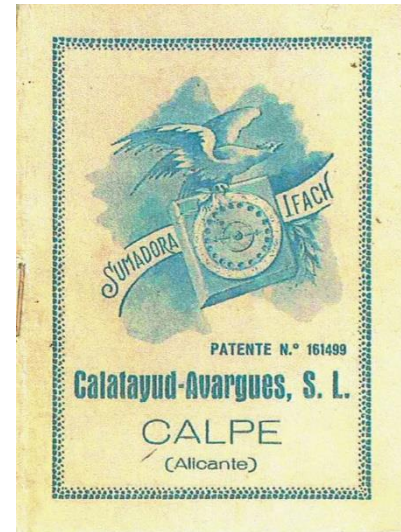
Already in this arrangement of the machine (all of this that we have described is automatic and is done instantly) the addends in the *column to the right of the sum* begin to be entered, inserting the stylus into the hole of the wheel corresponding to the black numbers of the circle, pressing and rotating it in the same direction as before until reaching the stop, which will now be when in line with the red zero<sup>1</sup>, taking out the stylus to enter all the addends in the column in the same way (we will not enter the zeros of the sum). Naturally, the stylus must press on the bottom board throughout the entire journey. In this way, it will drag the two wheels in the same direction, rotating one on the other in a small arc, which varies depending on the addend we enter, thus, for 9, the upper one slides over the lower one by a greater arc than for 8, 7, 6, 5, etc.

Once all the addends in the right column have been entered, we will proceed to read this partial sum.

To do this, we will observe what number an arrow indicates over the red numbers of the circle and this number will be written under the column as the first digit of the sum.

We will now enter the black number indicated by the other arrow, *as if it were an additional addend* (even if it is the zero at the top) and then we will read what we carry for the sum of the next column, in the display that the wheel presents. The machine is reset to zero as already explained, and the ones we carry are entered as follows:

Suppose we are to carry 23; We will enter the top zero twice (actually ten each time) and then three. If there were 15, we would enter zero once and then 5, etc. If it were a [single] digit number that we had, we would simply dial it.



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<sup>1</sup> It will be observed that the holes of the upper wheel coincide with those of the lower wheel at the lower zero, and that they gradually cease to coincide until the black zero, when they reach their maximum disagreement. When engaging them for large addends, the hole in the Lower wheel through which the tip of the stylus must pass is barely visible, but it will be enough to know that it is the immediate one in the direction that is dialed, the upper wheel should never be moved back to take the previous hole of the lower one. This observation refers to the high addends, mainly 8, 9 and the zero at the top, when it has to be entered, at the end of a partial sum, before reading the ones that are added, because as we have already said, the zeros as addends are not entered. In the other cases, the holes through which the stylus must pass are perfectly visible, one through the other.

Once we have entered the carry, we will proceed to enter the addends of the next column, in the same way already explained, repeating all the operations described, until we obtain all the figures of the sum.

In summary: The reading of the sum figures is always done on the red numbers, and before reading the carry, it is necessary to enter the black number that the arrow would have pointed to (even if it were the zero at the top).

Before adding the sum of each column, it is necessary to reset the machine and enter the carry we took from the previous column as explained.

As a final practical rule, we recommend that, when not using calculation by dictation (which is the fastest way to add), the adder be placed on top of the addition to be made, making it slide down to show the additions in groups of three, and raising it again at the end of each column to do the same with the next one.

Once a few additions have been practiced, all the movements become habitual and all mental effort disappears, making large sums with a security that is very difficult to achieve in other, much more expensive adding machine systems.

We cite the following example for greater understanding of everything that has been said.

Let the sum be, 379  
842  
670  
308  
749  
687  
774  
4409

We will set the adder to zero; we will place it on top of the sum so that only the 9, 2 and 8 are visible (the 0's are not entered) and we will enter them; we will lower the adder leaving 9, 7 and 4 visible and we will enter them. The arrow will indicate a 9 on the red numbers, which we will write as the first figure of the sum; By entering the number indicated by the arrow at its opposite end (1), a 3 will appear on the round display of the wheel. We reset the adder to 0 and enter the three that we carry. We now raise the adder, so that only the 7, 4 and 7 of the next column are visible and we enter them; then we show the 4, 8, 7 and enter them; The arrow will now point to a zero, we write down this zero as the second figure of the sum and we enter the zero at the top before reading the carry, which will be 4; We reset the adder back to zero, we enter the 4 we carry, and then, the 3, 8, and 6, the 3, 7, 6 and finally the 7.

The arrow will indicate a 4 (always in the red numbers) and entering the number that it points to at its opposite end (a 6), a 4 will appear on the display, which as there are no more columns of addends we will write in front of the 4 previously obtained, The number 4409 being therefore the sum we were looking for.