
A.M. Stephenson and His Adder (1873)

Bob Otnes

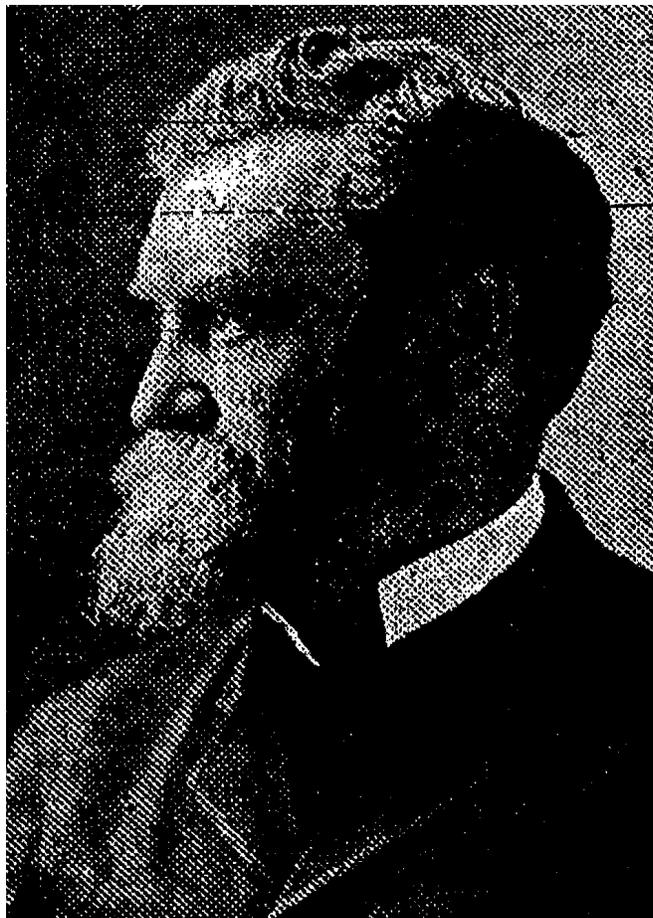


Figure 1. Archibald M. Stephenson

Introduction

Archibald M. Stephenson (1844 – 1913) appears to have had a case of wanderlust. He took many long trips across the United States during his lifetime. He financed these excursions with the sales of his invention, the Stephenson Adder. It is a metal device, somewhat smaller than a playing card, and quite thin. It was employed as a column adder.

His adder was one of many that began to appear after the Civil War. It is a modest device, both in size, capacity, and presumably price. However, at a time when few were numerate, it would be a useful and reliable aid to addition.

Biographical Information

A rough chronology of Stephenson's life based on [1], [2], [3] and his patent [4] is as follows:

June 2, 1844 Born near a creek called Brown's Wonder near Lebanon, Indiana.

1860 The family moves to Tolono, Illinois.

ca. 1863 Stephenson starts employment with the Illinois Central Railroad as an agent, apparently at Peotone, Illinois. Later, he becomes a bill clerk.

1865+ Leaves the Illinois Central and becomes a traveling salesman, "making a complete tour of the United States, visiting every state and territory."

? Becomes the general agent for the Rockford, Rock Island & St. Louis Railroad at Beardston, Illinois.

? Two years as a traveling salesman.

? The Rockford, Rock Island & St. Louis Railroad is purchased by the Chicago, Burlington & Quincy. Stephenson becomes their agent at Beardston again, where he remains until 1879.

March 25, 1873 Stephenson receives patent 137,107 for "Adding-Machines." At this time his address is Manteno, Illinois.

1879 Stephenson moves to Wilmington, Illinois and engages in the newspaper business. This work extends to Braidwood and Braceville, Illinois.

1892 Went out of the newspaper business. Made another trip covering every state and territory.

1895–96 Arrives in Joliet. Listed as a printer in the *Joliet City Directory*.

1896–1897 Joliet: Listed as a solicitor.

1899–1900 Joliet: Listed as a traveling agent.

1906–1907 Joliet: Dual listings for residence and his printing company.

September 13, 1913 Dies at 67 of a stroke in Utica, New York, while on one of his selling trips as the "representative of an adding machine company" [1].

His obituaries note that he had a wife and two daughters (a son died early), belonged to the Masonic Lodge, and was known as "the old warhorse of the Republican Party." None of his biographical material gives the date and location of his marriage.

Alas, the above bare facts raise more questions than they answer. Did he do all of his wandering because he loved it, or because he failed in business? One can imagine him traveling from town to town, boarding house to hotel, with a single suitcase containing a change of clothes and his calculators. He must have spent time in the West

when it was pretty rough country. He must have been an interesting character.

Finally, the original information from which the above was taken has the air of having been written or influenced by Stephenson himself, which might well cast a bit of doubt on its total correctness.

The Patent

The interesting thing about the machine shown in the Stephenson patent (as opposed to the machine that was produced) is that it is a rather poor device, and quite possibly would not work as an adder if built as shown.

The problem is that it is a *register*. That is to say, you can actually only input information from the rightmost

dial, such as with an automobile odometer. Inputting a number from one of the three leftmost dials would work correctly for some positions of the dials, but on occasion, input would interfere with the carry mechanism from a dial to the right of it. The dials alternate in turning in different directions, tending to be confusing. And there are no detents shown, which could make the action erratic. More on this later.

Whether Stephenson actually had made any adders of the original design is not known. What he did do was modify it heavily, reducing it to two dials, and adding a single detent. Only nine examples were available for examination at the time of writing. They fall into two distinct types.

A. M. STEPHENSON.

Adding-Machines.

No. 137,107.

Patented March 25, 1873.

Fig. 1.

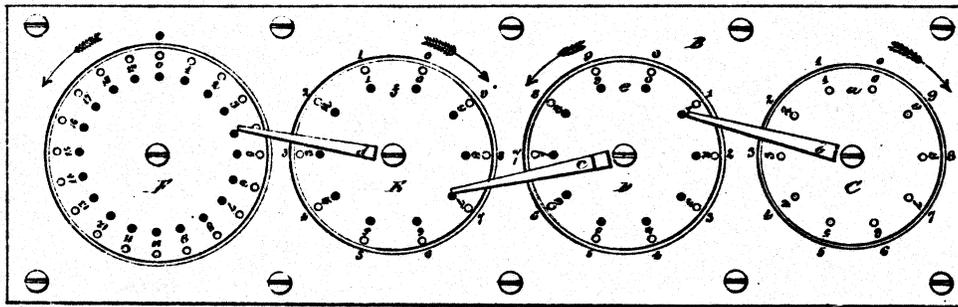


Fig. 2.



Figure 2. Illustrations from the Stephenson patent.

The Type I Stephenson Adder

As noted, Stephenson solved his problem by deleting the left two of the four dials in the original design. The rightmost dial has the digits zero through nine, while the second dial has digits zero through nineteen. Thus, the range of the machine is zero through 199. Input is done using only the right dial. The utility of this will be discussed below.

The type I Stephenson has the following characteristics:

- The front of the adder is plain. There are six raised rivets, and the two dials.
- The back is raised to accommodate the mechanism. There are two additional rivets, plus the exterior portion of a spring. See lower left of the photograph.
- The back has stamped lettering, effectively five lines of information.

The example shown below is typical: most of the Type I adders tend to be quite worn.

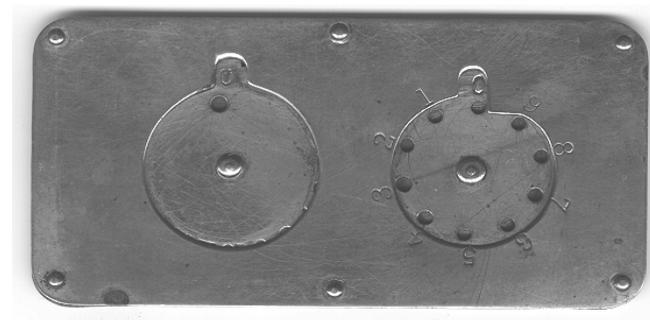


Figure 3. Front of the Type I Stephenson Adder.



Figure 4. Back of the Type I Stephenson Adder.

The lettering, without the curving shown in the top and bottom lines, reads:

A.M. STEPHENSON
MANUF'R
WILLMINGTON
ILL'S.
PAT. MAR. 25 '73.

Willmington, Illinois, is one of three known locations for this type. The other two are Beardstown, Illinois and Oil City, Pennsylvania. The latter has the March 25, 1873 patent date, but has the name C.B. Simmons rather than that of Stephenson; otherwise, it is identical. It is assumed that Mr. Simmons was an agent.

It is highly unlikely that Stephenson actually manufactured the adder himself. While his biographical information is scanty, nothing in what little there is indicates a background in metal work. It is far more likely that they were made for him by a stamping company, very possibly

in nearby Chicago or some other major city.

The Type II Stephenson Adder

The Type II Stephenson adder has the following characteristics:

- The front of the device now has a raised pattern.
- The finish is either brass or what is probably a nickel plate over brass.
- The back has only three lines of lettering; the patent date is omitted; only Joliet is mentioned on the examples.
- In addition to the six rivets at the edges and the two rivets for the dials, there are now two protrusions for the detent mechanism. See below.

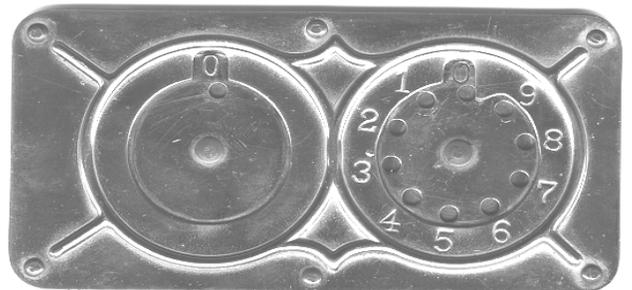


Figure 5. Front of the Type II Stephenson Adder.



Figure 6. Back of the Type II Stephenson Adder.

What is noticeable now on the back is the absence of the patent date. As patents run for 17 years, it was probably dropped after it expired in 1890 or thereafter.

X-rays of the Two Types of Adders

Figure 7. X-Ray of the type I Stephenson Adder.

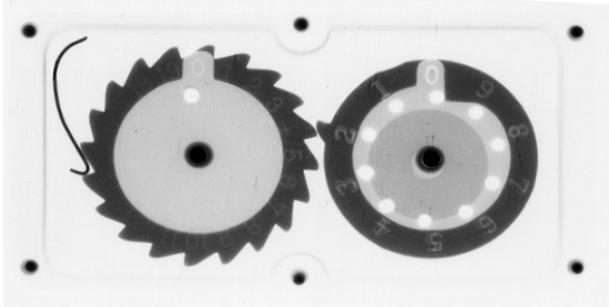
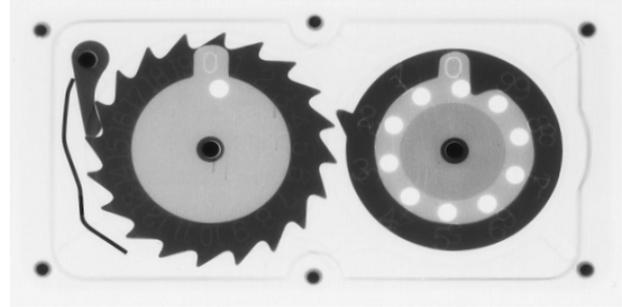


Figure 8. X-Ray of the type II Stephenson Adder.



The above pictures are positive prints of two x-rays taken of the Stephenson adders shown previously. Internally, as can be seen, they are almost identical. The only difference is in the detents. The word *detent* comes from the same root as the word *detention*, that is to say, it is something that stops. In the usage here, the detent stops the leftmost wheel from turning further than one position when the tooth from the rightmost wheel engages it. Furthermore, it prevents the leftmost wheel from being turned in

reverse.

The action of the detent in the Type II adder would appear to be more positive in its action than the earlier model, no doubt the reason for its introduction.

The action of the adder is simple: when the rightmost wheel completes or exceeds the sum of ten, the single tooth urges the tens wheel forward one position. This is a very simple carrying mechanism.

Do not attempt to run the Machine TOO FAST at first; go slow until you get used to it!

Directions For Using The Stephenson Adding Machine.

Set both wheels so that a cipher will appear in the open space at the top of each wheel; turn the right hand wheel for each figure in the column. If the figure is a 9 put the pencil in the hole opposite the figure 9 and turn the wheel to the top. If the next figure is a 7 then turn the 7 to the top, continuing to turn each figure to the top until you reach the bottom of the column, and whatever figures appear in the open space at the top will be the answer.

To carry, you first throw the 0 to the top of each wheel, being particular about this; then throw up what you have to carry. If you have 9 to carry set left wheel at 0 and right wheel at 9. If 6 to carry set left wheel at 0 and right wheel at 6, and so on. If you have two figures to carry you will throw up the figures on both wheels; if it is 15 you throw up 1 on the left wheel and 5 on right wheel, and so on. It will take a little practice for you to become familiar with the carrying process.

The Bicycle and The Adder.

You will see an expert roll his wheel out in the street, give it a push, jump on and away he speeds so easily that you imagine that any one could do that; but upon attempting it you will find that it will take some practice before you become an expert on the bicycle. Just so with the Adding Machine. You see the agent using the machine and think it easy enough, and any person could do it as well, but upon trial you will find you are mistaken, and that it will take considerable practice before you can handle it as easy as the agent did. But don't get discouraged, a little practice and patience and you will be well pleased with the machine. This little machine is having the largest sale of any novelty ever placed on the market. Agents are making big money, and if you want a good paying agency, address the patentee,

**A. M. STEPHENSON,
222 Iowa Avenue, JOLIET, ILL.**

— Are you going on a visit? If so, you can make your expenses — and good wages besides — by selling Adding Machines on your trip. Write for terms to agents.

Practice with the Machine, first on short columns of figures, until you get familiar with the setting and carrying process.

Figure 8a. Instructions for the Stephenson Adder.

The Stephenson as a Column Adder

First of all, note that the 222 Iowa address shown on the instruction sheet is that listed for Stephenson (at least) for the years 1895–1901 [5]. Also note the last two sentences: in common with notices on the adders (see the reverse of the Type II adder), Stephenson was always looking for agents. The above instruction sheet is the only piece of ephemera that I have found that mentions the device. It came with the Type II adder shown. It is possible that the adder was sold mainly through agents rather than through magazines or in stores.

It is clear from the instructions that this device was meant to be a *column adder*. This is a natural approach to mechanical arithmetic: students are taught to add one column at a time, digit by digit. After the sum for the first column on the right is completed, one writes the least significant digit in the column sum below the column, and then the most significant digit or digits of the summation is written at the top of the column or columns to the left. After the first column is finished, one goes on to the next column to the left, and so on. This is what people learned and what they were used to. The Stephenson was sold as an aid to this process.

The user cannot reliably input into the leftmost dial of the Stephenson: the sole input are the digits 0 through 9 on the rightmost dial. In use, you would probably put the adder on the paper with the columns of numbers at the top row, and go down the first column, entering one digit at a time. When the column is completed, you would write the digit at the bottom of the column, the carry at the top of the next column, clear the machine and start over.

Is it useful? Here are some arguments in its favor:

- It does addition in a natural manner. That is, in the way people are taught in school.
- It is very portable and probably could be stowed in a vest pocket. The examples weigh less than a pocket watch (2 oz. or so), and would be convenient to carry. The Webb and the Groesbeck adders, for example, weigh considerably more and are correspondingly less portable.
- It could be put directly below a row of figures on a paper, and thus would help keep track of position in the computation.
- It was relatively cheap compared to the Webb, let alone the Groesbeck. The \$6 price for a basic Webb adder would have been one or two weeks' wages for many people at the time.
- There is no easy way to clean the Stephenson Adder when dirt gets inside. On the other hand, there is

only one dial to turn when carries occur, and the small capacity of the device permits a more rugged carry mechanism than the Webb or the Groesbeck. With only a single dial to act on, and the lever arm obtained with a turn of 36° per digit, carrying is not a problem.

Conclusions and Acknowledgements

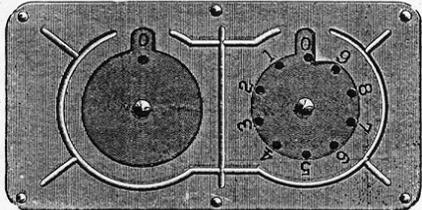
The adder was patented in 1873 and perhaps was actively being sold (by others; see below) as late as 1929, a period of 56 years. It would have to be called successful, if only in providing a source of income and amusement for Mr. Stephenson.

I should like to acknowledge assistance given by Robert DeCesaris, Conrad Schure, and Roger Gambrel of the Joliet Public Library. Special thanks are made to Darryl Rehr for permission to reprint the two advertisements below from *ETCetra*, No. 44, Sept. 1988.

**THE STEPHENSON
ADDING MACHINE,**

*Not a Toy but a Practical Machine
for Adding Figures. * * * * **

*It is the Greatest Invention of the age in the mathematical line,
adding figures, proving your trial balance, and carry-
ing on a conversation at the same time.*



The exact size of the Adding Machine is shown in the above cut; it being made small and convenient for carrying in the vest pocket, where it is always ready for use. It is beautifully and substantially gotten up, handsomely nickel plated and will last a life-time. Full and plain directions for operation are sent with each machine.

Editorially, the American Bank Report says: "A practical machine for adding figures. It is beautifully made, and adds any column with marvelous rapidity and accuracy. One should be in every bank and counting room. It will pay for itself in one day."

This machine is an article for practical use in which the longest column of figures is quickly added without requiring the least mental work, and with the certainty of getting the correct result at the first computation. Read the testimonials on opposite side of this sheet.

It is the fastest selling article on the market, and live, wide-awake agents should write for terms at once. Sample Machine prepaid to any address on receipt of **\$1.50**.

DO NOT WAIT, BUT WRITE FOR AGENTS TERMS TODAY.

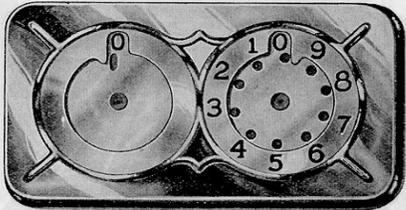
ADDRESS ALL ORDERS TO

**A. M. STEPHENSON,
JOLIET, ILL.**

Figure 9. An advertisement for the Stephenson Adder.

The Mindling Version

**The Vest Pocket
ADDING MACHINE**



The Vest Pocket Adding Machine illustrated above is made expressly for those who want a reliable pocket calculator that will add any column of figures that can be found, with the least effort, and in the shortest length of time. It is inexpensive, easy to operate, durable and accurate. Just the thing for traveling auditors, bank examiners, commercial men and contractors.

Easy to Operate . . . Lasts a Lifetime

GUARANTEE

Every Vest Pocket Adding Machine is guaranteed to be absolutely accurate and to work perfectly at all times. Any machine found defective in any respect within two years of date of purchase will be replaced free of charge.

This machine requires little more space in your pocket than a calling card. No other adding machine made is so compact and convenient to use. High grade material and workmanship puts it in a class by itself, for it never gets out of order and will be just as serviceable fifty years from now as it is today.

WRITE FOR COMPLETE DETAILS
G. N. MINDLING
Manufacturer of
THE VEST POCKET ADDING MACHINE
1418 N. St. Clair Street,
PITTSBURGH, PA.

Adds Long Columns with Ease, Speed and Accuracy

had been on the market for over 50 years.

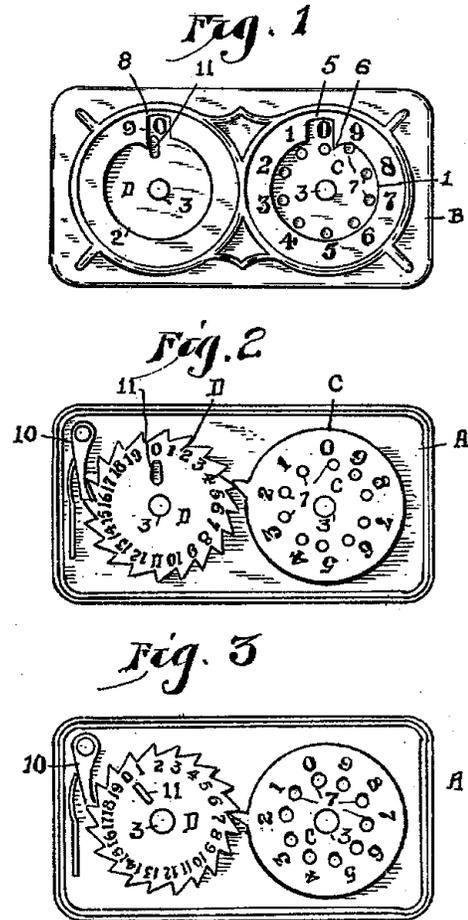


Figure 11. Taken from the Mindling Patent.

Figure 10. An advertisement for the Mindling version.

In 1998 Rehr [6] published an advertisement from 1929 showing a device called the “Vest Pocket Adding Machine” produced by G.N. Mindling of Pittsburgh, PA. See Figure 10.

One of these has turned up on the marketplace bearing a patent date. Following this up, it was found that Mindling received U.S. Patent number 1,585,675, granted on May 25, 1926. See Figure 11.

The illustration of the interior of the Mindling adder in the patent looks rather different from that of the interior shown in the Stephenson patent. However, when you compare the interior of the Mindling with x-rays of the Stephenson, the mechanisms are effectively identical! Mindling managed to receive a patent for a design that

References

1. Stevens, W.W., *Past and Present of Will County, Illinois*, S.J. Clark Publishing Co., 1907.
2. Anonymous, *Joliet Evening Herald*, September 12, 1913.
3. Anonymous, *Joliet News*, September 13, 1913.
4. Stephenson, A.M., U.S. Patent 137,107, March 25, 1873.
5. *Joliet City Directory*, years of 1895–96, 1896–1897, and 1899–1900.
6. Rehr, Darryl, “Before and After”, *ETCetra*, No. 44, September 1988.



Left, Stephenson; Right, Mindling. Yes, there are some slight differences.