
The Lightning Calculator – Bonham, Hook and Pangborn

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Note: This article was adapted from a paper read before the International Slide Rule Meeting held in Munich on 15 September 2001.

Introduction

This article attempts to sort out the tangled web of information concerning the dial adders made by a number of different companies: the Bonham & Schram Company (B&S), the Calculator Company, The Pangborn Calculator, the Lightning Calculator Company, the Smallwood Calculator, and the Los Angeles reincarnation known as the Lightning Adding Machine Company. As will be seen, the Bonham & Schram, The Calculator Company, and the Pangborn Calculator machines, with minor variations, are essentially identical. The Lightning Calculator/Adding Machine, while different in many ways, is a direct descendant from them. The widely known book by Martin [5] discusses the Calculator Company, the Pangborn, and the Lightning Calculator, but does not mention the Bohnham & Schram machine.

What Martin has to say about the Calculator Company, the Pangborn Adding Machine Company, and the Lightning Calculator Company is technically correct—that their machines were manufactured in the same factory. However, the factory did not belong to any of them. Apparently, the factory was a metal stamping company in Grand Rapids (or nearby). It made the devices for all three companies on a job-shop basis. The three makers were different companies owned by different people. Also, Martin's omission of certain critical information, particularly the existence of B&S, has tended to cloud the joint history of the companies.

These adders were produced from around 1905 to about 1959. They were very successful in the marketplace. Perhaps millions of the Lightning Adders were made in Los Angles, and are to be found in almost every flea market in the United States. The "Calculator" types, while not as common as the various Lightnings, can hardly considered to be rare. At the time of writing, Pangborns and Smallwoods are scarce, and very few B&S examples are known to me.

Bohnam & Schram - Chicago

1871 W.R. Bonham born February 6.

1905 Bonham applies for two patents.

1907 Patent 845,747 granted March 5 (filed November 20, 1905).

1909 Patent 908,371 granted April 6 (filed April 6, 1905).

1917 Bonham is the Chicago manager of the Triumph Electric Co. of America.

Information about Walter Richard Bonham is scant, and such as it is has been taken from Marquis [3].

He filed two petitions for patents on his machine in 1905, the date given in Martin. However, the patents were not granted until 1907 and 1909. There is a 1906 address for the B&S company in Chicago. Bonham lived in Chicago.

The three examples of Bonham & Schram calculators that I have seen all have a plain brass finish. The Calculator, Pangborn and early Lightning machines all have black enamel finishes. Except for the finishes and the names stamped on them, the machines are identical, as will be seen in their pictures and their X-rays shown in Figure 3.

The Calculator Company – Grand Rapids and Hook



Figure 1. R. Wallace Hook ca 1940.

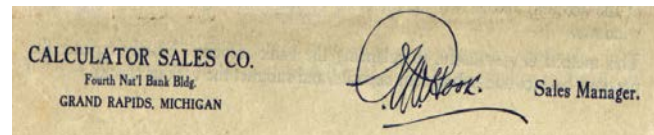


Figure 2. Hook's signature on a Calculator document.

R. Wallace Hook first appears in 1915 as the manager of the Calculator Company of Grand Rapids, Michigan. He would be associated with the Calculator Company and the Lightning Calculator Co., both of Grand Rapids, for over 25 years.



Figure 3.

- | | |
|------------------|--|
| Top: | The Bonham & Schram Improved Calculator. |
| Second from top: | X-Ray of the Bonham & Schram. |
| Third from top: | X-Ray of The Calculator. |
| Bottom: | The Calculator. |

1915 Calculator Sales Co., 217-218 Fourth Natl Bank Bldg., R. Wallace Hook, Agency Manager, Distributors of the Calculator Adding Machine

1916 Calculator Sales Co., 217-218 Fourth Natl Bank Bldg, R. Wallace Hook, Agency Manager, Distributors of the Calculator Adding Machine

1917 Calculator Corporation, 217-219 Fourth Natl Bank Bldg., R. Wallace Hook, President, P.O. Hamm, Sec-Treas. Distributors of the Calculator Adding Machine

1918 - 1919 Calculator Corp. Natl Bank, R.W. Hook.

1920 Same; moved to Wm Alden Smith Bldg.

1921 Became Lightning Calculator

The Calculator Company appears in the Grand Rapids directory for the first time in 1915, with R.W. Hook as the manager, not the owner. Hook was born in 1891, so he would have been about 24. That is, someone else apparently owned the company, but Hook operated it for some years. I do not know who the actual owner was. It could have been Bonham, Schram, Pangborn, or someone entirely different.

Grand Rapids – Pangborn

1921 Pangborn Adding Machine Co., 339 Commerce Av SW

1922 Pangborn Adding Machine Co., 339 Commerce Av SW (Frank C. Pangborn)

1923 Pangborn Adding Machine Co., 339 Commerce Av SW

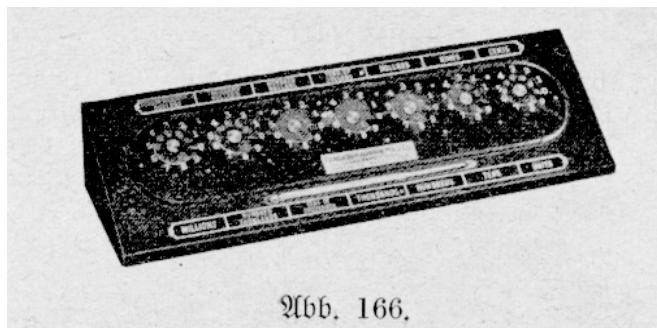


Figure 4a. The Pangborn machine from [4].



Figure 4b. The Pangborn decal.

The date March 5, 1907 shown on the decal in Figure 4b is assumed to be for the Bonham patent number 845,747. The patent file wrappers for this patent include

a copy of notice of proceedings filed on behalf of Frank C. Pangborn in the United States District Court, District of Michigan, on March 8, 1922 against R. Wallace Hook and The Calculator Corporation. The patents referred to in the action are the two granted to Bonham. I do not know the outcome of the proceedings.

Note that under the decal in Figure 4b, one can clearly read “THE CALCULATOR CORP.” This would lead one to believe that Pangborn had purchased The Calculator Corporation and changed the name to his own.

Hook may have owned The Calculator Corporation at the time of the sale, or he could have been mentioned in the suit because of his patent for the Lightning Calculator.

In the 1921 Grand Rapids City Directory, the Pangborn Adding Machine Co. and the Lightning Calculator are both mentioned, the latter for the first time. Also in 1921 Hook filed his first patent (it was not granted until 1926). My guess is that Hook, who had worked for the Calculator/Pangborn company, at this point split off and formed a new company with his new design in 1921.

The Pangborn company was mentioned in the 1923 directory, but not in the one for 1924. Pangborn could have failed in the face of competition from the superior Lightning, or he could have sold out to Hook. Generally, the Hook (Lightning) was a better machine, the sole better feature of the B&S/Pangborn being that it will both add and subtract (but not at the same time) while the Lightning will only add (ignoring the complementary method—the Lightning is not marked for it).

Martin [5] states that they were both made by the same company, and that is probably true in that both companies probably had them manufactured at the same stamping foundry, or that Hook bought out Pangborn.

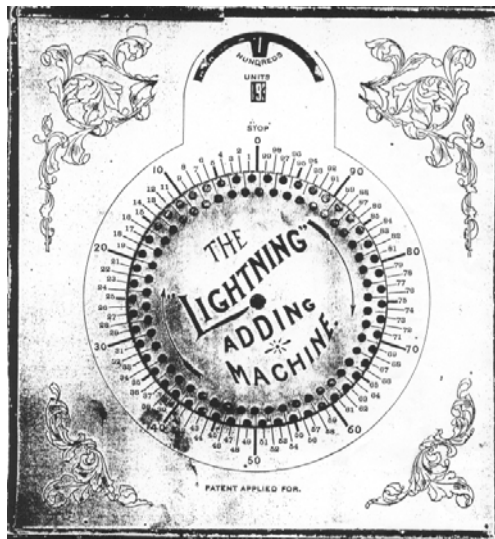


Figure 5. An earlier machine with the Lightning name.

Grand Rapids – The Lightning Calculator



Figure 6. The Grand Rapids Lightning Calculator of R.W. Hook.

- 1921** R.W. Hook files patent – this became the Lightning machine.
- 1921** Lightning Calculator Co., 5th floor Wm. Alden Smith Bldg., R.W. Hook, F.E. Hook, sec-treas., Russel Reeve, asst. manager. (F.E. Hook was R.W. Hook's father.)
- 1923** Lightning Calculator Co., 5th floor Wm. Alden Smith Bldg, R.W. Hook, President, L. L. Hook, secretary-treasurer.
- 1924** Lightning Calculator Co., 504, 30 Ionia Avenue SW.
- 1926** Hook granted patent 1,574,249 for the Lightning.
- 1926** Lightning Calculator Co., Houseman Bldg., R.W. Hook, President, F.E. Hook, general manager.
- 1927 -1929** Same.
- 1930** H.T. Landefeld, manager.
- 1931** F.E. Hook, Houseman Building.
- 1932 - 1939** Same.
- 1940** No manager named. Perhaps Hook sold out.
- 1941** Lightning Calculator Co., 363 Houseman, Morris Zuckerman, manager.
- 1942 - 1944** Lightning Calculator Co., 504, 41 Pearl NW R363, Morris Zuckerman, manger.
- 1948** R.W. Hook dies January 2.

I believe that during this whole period (1921 to 1940) only the black machine with wooden base was made and sold.

I stated above that the Lightning Calculator was the superior machine. This is because the Calculator is a quirky device in that locations for reading the result of the summation are not fixed. Rather, each dial has 10 holes; nine of them are identical. The tenth hole is elongated towards the pivot of the dial so that it exposes a digit otherwise hidden. As the dials are turned to input the addend, they sequentially expose the result digits 0,1, ... ,8,9. The problem is that the digits are not on the same line. Check Figure 3. The Calculator on the bottom shows the result 0003480; the result hole positions are different for each of the four right digits.

What Hook did was move the results from underneath the input dials over to new and separate windows. These windows reveal digits now printed on the gears used to transmit carries from one digit to the next. The mechanism of The Calculator and The Lightning are nearly the same: Hook only changed where the output is read.

That is not to say that the machines are identical. Far from it. The Lightning is larger and heavier. Also, it requires an additional carrying type wheel, not actually carrying, to act as the result wheel for the rightmost digit.

The construction of the two adders is different: The Calculator employs rivets to hold its top and bottom plates together, and cannot be readily taken apart. This is the reason that X-rays were used to show the insides of this type of machine.

The Lightning, on the other hand, has a top face completely free of rivets. Instead, the top plate is held onto the machine with metal tabs that wrap around the bottom plate. While I do not recommend removing the top from a Lightning, it can be done remembering that the tabs can easily break off after a series of cold bends.

Los Angeles – The Lightning Adder



Figure 7. Three versions of the Los Angeles Lightning Adder. Starting from the top, they are brown, green, and a blue-grey.

The Lightning surfaced again in Los Angeles in 1946. It is possible that the stamping processes were needed because of the war, and that no machines were made from 1942 to 1946.

The information that follows on the two Lightning Adding Machine organizations in Los Angeles was taken from Los Angeles City Directories.¹ I do not know why there were two separate locations. Perhaps one was for manufacturing and the other for sales.

1946-1947 Lightning Adding Machine Co., 543 S. Spring, Lightning Calculator Co., 325 W. 2nd.

1950-1953 Lightning Adding Machine Co., 1260 W. 2nd, Lightning Calculator Co., 543 S. Spring.

1955 Lightning Adding Mach Sales Co., 234 W. 37th Pl., Manufacturers and Distributors-Lightning Adding Machines.

1956-1959 Lightning Adding Machine Sales Co., 2306 W. Slauson., Manufacturers and Distributors-Lightning Adding Machines, Earl Coffin, President.

In Los Angeles, manufacture started with the original model, but switched from the wooden base to the Bakelite stand that was to become standard. Note in Figure 7 is that it is now the *Lightning Adding Machine* rather than the *Lightning Calculator*. Also, while the type font for *Lightning* in the earlier machine at the top is the same as the Grand Rapids machines, the font changed to a different style in later models.

The first changes were from the plain black to the variety of different colors. The top machine in Figure 7 shows a tan model. I know of red and dark red versions, and have even heard of plaid ones!

Next, it got a clearing mechanism (green model) and finally the subtraction feature (gray model). These improvements were not unique to the Lightning. The clearing mechanism is the same as that of the Thomas de Colmar Arithmometer, and the reversibility of the dials that permits subtraction appeared on many machines prior to the Lightning.

¹The information was actually supplied by the Pasadena City Library System as the copies in the Los Angeles Library System were damaged and unavailable.

The Los Angeles company may have made over two million adders. It is probably the most successful of all of the small adders. The final gray model works well, and is quite practical.

Smallwood – Oakland

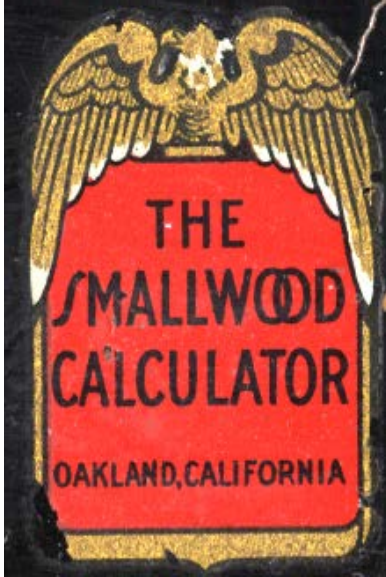


Figure 8. The Smallwood decal.

The Smallwood Calculator Company of Oakland, California produced a close copy of the original Lightning Calculator. The dimensions are about the same. There is a slight difference in weight between two examples that I compared: 12.50 oz. for the Lightning versus 13.05 oz. for the Smallwood. The principal difference is that the Lightning has the name and location of the company stamped

into the metal and filled in with paint at the right end of the machine, while the Smallwood has a decal in the same location.

The decal does not seem to be covering any stamping, as was the case with the Pangborn.

Investigation so far has produced no other information on the Smallwood.

Conclusions

This family of machines had a long and useful life. They are perhaps the ultimate democratization of the design of Blaise Pascal's 17th century design of an adding machine, permitting almost anyone of modest means to have a substantial and reliable aid.

For the collector there are many models to try to find. Some are very common, which makes them inexpensive. Others might take years to acquire. As for myself, I certainly am still looking.

References

1. Bonham, W.R., *Calculating Machine*, US patent No. 908,731, filed Apr. 6, 1905 and granted Mar. 5, 1907.
2. Bonham, W.R., *Calculating Machine*, US patent No. 845,747, filed Nov. 20, 1905 and granted Jan. 5, 1909. Two-fifths assigned to A.J. Schram of Lake Geneva, WI.
3. Marquis, A.N. ed., *The Book of Chicagoans*, Chicago, A.N. Marquis & Company, 1917.
4. Martin, E., *Die Rechenmaschinen und ihre Entwicklungsgeschichte*, Pappenheim, Verlag Johannes Meyer, 1925.
5. Martin, E., *The Calculating Machines*, the English translation by Peggy Aldrich Kidwell and Michael R. Williams, (Cambridge, MA and London) The MIT Press, and (Los Angeles, San Francisco) Tomash Publishers, 1992.



The Gaugers at work at the London docks. 1900? Supplied by Jim Bready