

Origin and Development of the Linotype Machine

PART II.—BY HENRY LEWIS BULLEN



MERGENTHALER realized the impracticability of his perfected band machine earlier than his friendly and liberal backers, Clephane and Hine. The machine was much too expensive to build and the inventor could not get satisfactory alignment of his matrices. They were amazed at the confession of failure after so much splurge; but, courageous as ever, they resolved to defer manufacture and resume experiment. The new idea was the single-matrix machine—a reversion to the ancient method of the typesetters—harking back to first principles and practices, as also in the case of the casting apparatus and mold! But now more money was needed. Already the leading newspaper publishers were interested in the impracticable band machine. Under the advice of Stillson Hutchins (Washington Post), six other publishers, Whitelaw Reid (New York Tribune), W. N. Haldeman (Louisville Courier-Journal), Victor Lawson and Melville E. Stone (Chicago Daily News), Henry Smith (Chicago Inter Ocean), and W. H. Rand (Rand, McNally & Co., Chicago), formed a syndicate and set out to acquire all the available stock, at prices averaging about \$10 above par. The syndicate, however, was able to acquire only seven thousand out of forty thousand shares. But, as has been said, money was needed for further experiment. A pool was formed of all earlier interests and the new publishers' syndicate. For the control of the pool the syndicate paid, it is said, the sum of \$300,000. This arrangement was consummated early in 1885. Melville E. Stone succeeded Hine as president and general manager. His first act was to attempt the removal of the factory from Baltimore to Chicago, but Mergenthaler, who held a prominent position in the German social and associational circles of Baltimore, would not be moved. Stone was soon succeeded by Whitelaw Reid as president and general manager. Reid represented D. O. Mills, his father-in-law, a California millionaire, who invested largely in the Mergenthaler Printing Company.

In the summer of 1885 the first single-matrix machine was finished. It was a crude affair, but in it were the first of the invaluable single matrices now so familiar to every printer. Mergenthaler attacked the problem of assembling these matrices with little inventive genius. The 1885 machine is known as the first "blower" machine. The matrices were held in perpendicular channels, and, dropping straight down onto a wire rod in the horizontal assembling channel, were brought to the justifying point by means of blasts of air provided by a blower—a most unmechanical makeshift, which did not work satisfactorily. However, the directors of the company, nearly all of them newspaper proprietors hungering for economy in their composing rooms, thought the 1885 "blower" model was good enough. They ordered one hundred made, but Mergenthaler had the order reduced to one dozen. In July, 1886, the first of this dozen, much improved over the 1885 model, the first linotype machine ever put to practical use in a printing plant, was installed in a special room in the office of the New York Tribune. The 1886 model, shown in Fig. 5, was found to be practicable, it justified the expectations regarding its economy, but many difficulties presented themselves, which Mergenthaler was eager to overcome before beginning quantity production. He was ordered to cease experimenting and to make two hundred machines. Thirty of these were built by Mergenthaler, and one hundred and sixty in a new factory in Brooklyn. Deliveries did not begin until the summer of 1887. In February, 1888, about sixty machines were in use in the composing rooms of members of the syndicate. All were of

the 1886 model, but none of them were sufficiently satisfactory. The directors were not only impatient with the delays in manufacturing, but skeptical of ultimate success. While the second hundred machines were in progress, with forty of the first hundred unfinished, the directors ordered work suspended on a third lot of one hundred. As a consequence of various disagreements Mergenthaler severed his connection with the company in April, 1888, leaving with it an unsatisfactory machine, which he had been prohibited from improving. A factory was established in Brooklyn, and there the first two hundred machines were completed; nevertheless at the close of 1888 the prospects for the success of the Mergenthaler Printing Company were far from being favorable.

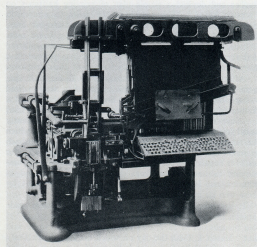


FIG. 5.—The Mergenthaler Linotype Machine of 1886, the second of the "blower" machines, so-called because the individual matrices were blown to the assembling point by a strong blast of air. The first "blower" machine was made in 1885. It was the first in which separate matrices for each character were used. In this picture the air pump is not shown. The matrix channels were perpendicular and in dropping into them the matrices were quickly damaged. Although very faulty, between 1886 and 1890 two hundred of these machines were made and distributed among the composing machines of the members of the syndicate of publishers, except sixty that were sold to a British syndicate. They cast excellent slugs. The "blower" machines were quickly scrapped when Mergenthaler's machine of the present model appeared in 1890.

Mergenthaler did not lose interest in his invention. He established a small work shop with money partially procured by selling his stock in the company that bore his name. Towards the end of 1888 he had completed drawings for an improved machine, virtually the machine of today, known as the 1890 model. He applied to James O. Clephane for financial assistance in building his improved machine. The Washington stockholders were now in opposition to the somewhat discouraged stockholders dominated by Mills. They provided Mergenthaler with funds to build his new machine. They were successful in regaining control of the Mergenthaler Printing Company, and L. G. Hine succeeded Reid as president and general manager. Reid in his last report confessed that the 1886 machine had developed so many defects that it seemed inadvisable to continue the manufacture. The Washington invincibles, led by Clephane and Hine, as usual, were in favor of persevering. When Hine became president, in January, 1889, there was not a single order on hand. The first two

hundred machines are said to have cost \$380,000 and were sold for \$160,000. In addition to the unsatisfactoriness of the 1886 machine, the directors were now confronted with a difficulty which in their own words was "seemingly insurmountable." Here was a machine; but no adequate means of supplying it with matrices had been devised. The rapid production of matrices required the rapid production of steel punches. The typesetter may use a steel punch only once;

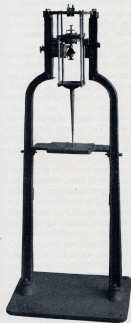


FIG. 6.—The Benton punch-cutting machine, on which the first steel punch was cut for the Mergenthaler Linotype machine. The second machine built by Benton. The Mergenthaler Printing Company bought No. 3 in 1889 and several others shortly after. Without this invention Mergenthaler's invention was impracticable. This machine is in the Typographic Library and Museum of the American Type Foundry Company, in Jersey City.

he seldom would use it half a dozen times. But each linotype matrix requires the use of a punch, and punches are fragile things. A steel punch may break the first time it is used. Where steel punches are used thousands of times a day the percentage of breakages is serious. Steel punches also wear out and must be replaced immediately they show signs of wear. Steel punches cut by hand are very expensive. It is said that the hand-cut steel punches of the Mergenthaler Printing Company cost \$5 each. This cost, however, was a small matter compared with the slowness of production when cut by hand. In 1890 the linotype company had six or seven punch cutters in its employ, and these could do no more than keep up the supply of matrices for about two hundred machines. Not in all the world could enough steel punch cutters be found to furnish an adequate supply of matrices, without which the machines were as useless and unsalable as a gun where powder is unobtainable. Further, steel punch cutting is a most difficult art, few men having the temperament to succeed

in it, while the process of instruction was slow and tedious. Another obstacle was found in the fact that the most expert punch cutters could not exactly duplicate any letter they might have cut. If the punch of a certain letter broke, the letter that replaced it was more or less a "wrong font." It was probably a realization of this "seemingly insurmountable obstacle" that induced the Mills interests to give way to the Clephane-Hine interests in the management. The Mills interests were seemingly saying good-by to their investment. Now there was a man in Milwaukee who had been confronted with a similar problem, though on a smaller scale. He needed punch cutters and could not get them. Without them a valuable typesetting patent—self-spacing types—would run its course with limited profits for lack of punches and matrices. He solved his difficulties by inventing a marvelous machine for cutting punches, completing it in 1884. He knew nothing of the machine or the troubles of the Mergenthaler Printing Company and that company knew naught about him or his machine, of which he had only two and needed no more. By the merest chance the existence of the punch-cutting machine of Linn Boyd Benton came to the knowledge of Philip T. Dodge, then patent attorney for the

Mergenthaler company. Dodge immediately went to Milwaukee and convinced himself of the extraordinary exactness and rapidity of the work done on Benton's machine. He brought back to New York a sample steel punch; an agreement was reached with Benton, whose invention breathed the breath of life into a business that had found itself restrained and restricted from selling its machines in sufficient numbers to make their manufacture profitable. Thus Benton saved the linotype machine, with an invention much more marvelous than the linotype machine. Fig. 6 is a picture of the second punch-cutting machine made by Benton. It was on this machine that the sample steel punch was cut for Dodge. The first Benton punch-cutting machine acquired by the Mergenthaler Printing Company was shipped from Milwaukee on February 13, 1889. In the next annual report of the Mergenthaler Printing Company appears the statement "that by the acquisition of the Benton punch-cutting machine a seemingly insurmountable obstacle to our success has been overcome." Benton did for Mergenthaler's linotype machine what Edison did for the Bell telephone—made it commercially practicable!

In the meantime, backed by Clephane and Hine, Mergenthaler was plodding along in the task of improving the machine. He produced another model, the fourth of his independent matrix machines, in 1889. It had improvements, but was not well designed and was scrapped. However, in February, 1890, a model that was virtually the linotype machine of today was completed. Mergenthaler had achieved his invention. Two hundred of the new machines were ordered, one hundred to be made in the Brooklyn factory and one hundred under contract in Mergenthaler's own factory in Baltimore, for Mergenthaler had not been reinstated in the employment of the Mergenthaler Printing Company.

With all serious mechanical difficulties overcome it became apparent that more capital was needed. Early in 1891 the Mergenthaler Printing Company (the Mills interest) and the original National Typographic Company (the Clephane-Hine interests) were consolidated in a new corporation, the present Mergenthaler Linotype Company, with a capital stock of \$5,000,000, of which each of the earlier companies received \$1,500,000, while \$2,000,000 was offered for sale. The Mills interest purchased a majority of the unallotted stock, and by doing so supplanted the Washington interest in the management. Hine ceased to be president in December, 1891, and was succeeded by Philip T. Dodge, under whose management the company achieved a success unprecedented in the history of inventions relating to printing. This success was shared in by those who had supported Clephane in his earlier efforts and in developing the various processes and machines which fell by the wayside. Mergenthaler received a royalty on every machine sold. All were happy, more or less, Mergenthaler much less than he deserved to be. The first dividend was paid in 1894. In some years the dividend has been as high as twenty per cent.

Under the administration of Hine, in 1890, the Rogers typograph appeared in the market, a sugstating machine which was offered for sale at a much lower price than the linotype machine. After litigation, which commenced in 1891 and ended in 1894, the Rogers machine was declared to be an infringement of the Mergenthaler patents. While this litigation was in progress, the Mergenthaler Linotype Company was sued by J. W. Schuckers for infringement of his double wedge patent of 1885. The Gally single wedge was practicable with Mergenthaler's band machines, but not with his independent matrix machines. In his dilemma Mergenthaler copied the principle of the Schuckers wedge, the wedge space now in use. While the Mergenthaler Linotype Company was suing the Rogers Typograph Company for infringements, it was defending itself against Schuckers. The Rogers Typograph Company was shrewd enough to buy Schuckers' patent and continued his suit. The courts sustained the Schuckers

