

T. B. CASWELL.

METHOD OF PERFORATING STRIPS FOR TYPE SETTING MACHINES.

No. 523,760.

Patented July 31, 1894.

| Character   | Size of Type Body. | Perforations for Character | Character | Size of Type Body. | Perforations for Character | Character | Size of Type Body. | Perforations for Character |
|-------------|--------------------|----------------------------|-----------|--------------------|----------------------------|-----------|--------------------|----------------------------|
| A           | 7/156              | 1-3-4                      | a         | 4/156              | 1-3-5                      | 1         | 4/156              | 1-5-6                      |
| B           | 7 "                | 2-4-5                      | b         | 5 "                | 2-4-6                      | 2         | 4 "                | 2-6-7                      |
| C           | 7 "                | 3-5-6                      | c         | 4 "                | 3-5-7                      | 3         | 4 "                | 3-7-8                      |
| D           | 8 "                | 4-6-7                      | d         | 5 "                | 4-6-8                      | 4         | 4 "                | 4-8-9                      |
| E           | 7 "                | 5-7-8                      | e         | 4 "                | 5-7-9                      | 5         | 4 "                | 5-9-10                     |
| F           | 7 "                | 6-8-9                      | f         | 3 "                | 6-8-10                     | 6         | 4 "                | 6-7-10                     |
| G           | 8 "                | 7-8-10                     | g         | 5 "                | 1-4-6                      | 7         | 4 "                | 1-5-9                      |
| H           | 8 "                | 1-2-4                      | h         | 5 "                | 2-5-7                      | 8         | 4 "                | 2-5-8                      |
| I           | 4 "                | 2-3-5                      | i         | 3 "                | 3-6-8                      | 9         | 4 "                | 3-4-9                      |
| J           | 6 "                | 3-4-6                      | j         | 3 "                | 4-7-9                      | 0         | 4 "                | 2-3-7                      |
| K           | 8 "                | 4-5-7                      | k         | 5 "                | 5-8-10                     | .         | 2 "                | 1-5-7                      |
| L           | 7 "                | 5-6-8                      | l         | 3 "                | 1-3-6                      | ,         | 2 "                | 1-5-8                      |
| M           | 8 "                | 6-7-9                      | m         | 8 "                | 2-4-7                      | :         | 3 "                | 1-4-10                     |
| N           | 7 "                | 7-8-10                     | n         | 5 "                | 3-5-8                      | ;         | 3 "                | 1-6-7                      |
| O           | 7 "                | 1-4-5                      | o         | 4 "                | 4-6-9                      | -         | 3 "                | 1-6-8                      |
| P           | 7 "                | 2-5-6                      | p         | 5 "                | 5-7-10                     | !         | 3 "                | 1-6-9                      |
| Q           | 7 "                | 3-6-7                      | q         | 5 "                | 1-3-7                      | ?         | 4 "                | 1-7-8                      |
| R           | 7 "                | 4-7-8                      | r         | 4 "                | 2-4-8                      | '         | 2 "                | 1-7-9                      |
| S           | 7 "                | 5-8-9                      | s         | 4 "                | 3-5-9                      | (         | 3 "                | 1-5-10                     |
| T           | 7 "                | 6-9-10                     | t         | 3 "                | 4-6-10                     | )         | 3 "                | 2-5-9                      |
| U           | 7 "                | 1-2-5                      | u         | 5 "                | 1-3-8                      | [         | 3 "                | 2-5-10                     |
| V           | 7 "                | 2-3-6                      | v         | 4 "                | 2-4-9                      | ]         | 3 "                | 2-3-8                      |
| W           | 9 "                | 3-4-7                      | w         | 7 "                | 3-5-10                     | Space     | 2 "                | 2-3-4                      |
| X           | 7 "                | 4-5-8                      | x         | 5 "                | 1-3-9                      | "         | 3 "                | 3-4-5                      |
| Y           | 7 "                | 5-6-9                      | y         | 5 "                | 2-4-10                     | "         | 4 "                | 4-5-6                      |
| Z           | 7 "                | 3-7-10                     | z         | 5 "                | 1-3-10                     | "         | 5 "                | 5-6-7                      |
|             |                    |                            |           |                    |                            | "         | 6 "                | 6-7-8                      |
| Remove Line |                    | 1-6-10                     | "         | 4 "                | 2-3-10                     | "         | 7 "                | 7-8-9                      |
| Insert Lead |                    | 2-3-9                      | "         | 4 "                | 3-4-8                      | "         | 8 "                | 8-9-10                     |

Fig. 1.

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By James Turner  
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Witnesses

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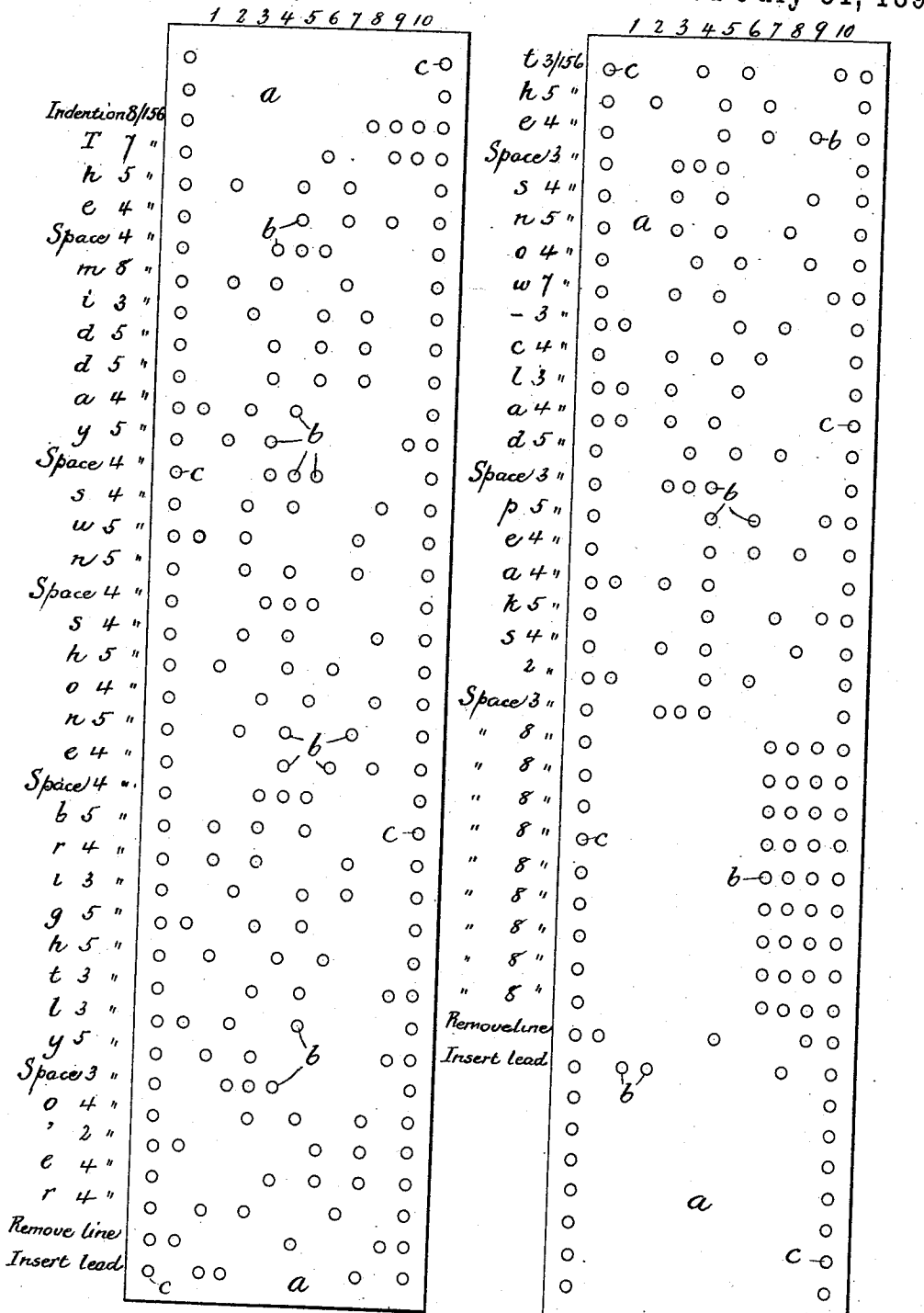


Fig. 2.

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# UNITED STATES PATENT OFFICE.

TRACY B. CASWELL, OF DENVER, COLORADO.

METHOD OF PERFORATING STRIPS FOR TYPE-SETTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 523,760, dated July 31, 1894.

Application filed April 21, 1893. Serial No. 471,351. (No model.)

*To all whom it may concern:*

Be it known that I, TRACY B. CASWELL, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Methods of Manufacturing Perforated or Punctured Strips for Type, Matrix, and Die Setting and Distributing; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a new and novel method of perforating or puncturing strips of paper, or other suitable material, to be employed for automatically operating type, matrix, and die setting and distributing machines, whereby new and useful results are obtained, as will appear from a reading of the following description, and the concluding claim.

My invention consists in perforating or puncturing a strip of paper, or other suitable material, in such manner as that when the strip shall be passed through a type, matrix, or die setting machine, of suitable construction, it will cause the type, matrices or dies thereof to be assembled into lines of equal lengths, suitable for printing, casting stereotypes, (by means of such assembled matrices,) or forming matrices for casting stereotypes, (by means of such assembled dies,) as the case may be; and when such strips are passed through distributing machines, of suitable construction, it will cause such type, matrices or dies to be distributed into their proper receptacles. My method of accomplishing this is as follows: I pass the strip of paper, or other suitable material, through a machine for making suitable perforations therein to operate, by suitable mechanism, the keys of type, matrix and die setting and distributing machines. Such perforations may be either in the manner of those herein- after at length set forth and described, or may be by means of single perforations differing in their positions across the strip for the different characters and "spaces" used in printing, or by other suitable arrangement of perforations. Such perforations, or combination of perforations, takes an equal portion of the strip lengthwise, and as the perforation, or

combination of perforations is made, the strip is advanced that distance. I form in the strip the perforations necessary to "set" all the words (and parts of words if the same be necessary), of a line, leaving blank intervals in the strip, between the words, for the perforations to "set" the "spaces." When the perforations for all the words that will make a line have been made, then, by suitable means, I go back and make such perforations in the blank intervals left between the words, as shall "set" in the line, when composed by the strip, "spaces" of a proper size to make the lines the required length. That is to say, the perforations for the "spaces" are not made consecutively with those for the words, but are left until all the words of a line are finished, and then made in the blank intervals reserved for them.

The type, matrices or dies to be "set" and distributed by the herein described perforated strip are to be runningwise of the line, a unit or multiple thereof, which unit I have represented in the drawings by one one-hundred-and-fifty-sixth of the length of the line to be "set," which line here is "brevier" type, thirteen "pica" ems in length (about two and one-sixth inches). This unit I have chosen only for the purpose of illustration, and the unit for "brevier" type, in actual practice, may be greater or less, if more suitable or desirable, and the unit may be the same size for the different sizes of type, or it may differ for different sizes.

The perforations for the words of a line having been made, leaving blank intervals for the "spaces," the total number of units represented by these perforations are to be subtracted from the whole number of units in the line, and the units remaining are divided equally (or as nearly so as possible) among those blank intervals left in the strip, and perforations made for "spaces" of those sizes in these intervals.

The particular method employed for perforations for the letters, points, characters and "spaces," and for other purposes connected with the "setting" and distributing of type, matrices and dies, herein represented, is as follows:

Each character, "space," &c., is represented by three perforations which are made trans-

versely to the length of the strip, different combinations of the perforations representing different characters, &c.; or in other words, suppose the width of the strip is sufficient to accommodate ten perforations side by side across it (which for explanatory purposes we will number from the left with the numbers "1" to "10"), and there being only three perforations to a character, "space," &c., the three perforations can be arranged in one hundred and twenty different relative positions. To further illustrate, "A" may have its perforations in the first, third and fourth positions; "B" in the second, fourth and fifth positions; to "insert lead" the second, third and ninth positions, and so on. But the number of perforations that the strip may accommodate crosswise thereof may be more or less than ten, this number only being chosen for the purpose of illustration.

The perforations representing a character in operation, are to permit a rod or bar, or the corresponding combination of certain rods or bars, to fall when the perforation or perforations come into position below and register with said rod or rods, bar or bars, and the latter in turn actuate the mechanism for setting or distributing (as the case may be) the type, matrix or die to which it belongs; or the perforation or perforations may cause a certain rod or rods, bar or bars, to drop and establish electrical circuits which will energize a magnet or magnets and actuate the type, matrix and die setting and distributing mechanism.

In the drawings Figure 1 is a diagram in which is given the characters and "spaces," &c., the combinations of perforations representing such characters, "spaces," &c., and the size of the bodies of the type, matrices, and dies, runningwise of the line, the latter being controlled by the fraction of the line which the type will occupy; as for instance, the unit being one one-hundred-and-fifty-sixth of the line, "a" would occupy four one-hundred-and-fifty-sixths; "A" seven one-hundred-and-fifty-sixths; "." two one-hundred-and-fifty-sixths, and so on. In the combinations of perforations "A" is represented by the combination whose perforations occupy the first, third and fourth positions, counting from the left; "B" by the second, fourth and fifth positions, and so on. But the number of units in the type bodies may differ from those given here, and the combinations of perforations may also differ, if such change is desirable, those here given being only for the purpose of illustration.

Fig. 2 represents a portion of a strip (a) of paper, or other suitable material, which has been perforated to represent different characters, &c., and these perforations are designated by b b.

The perforations represented are to set the plain leaded paragraph:

"The midday sun shone brightly o'er the snow-clad peaks,"  
the first strip being for the first line, and the

second a continuation of the first, and being for the second line.

In making the strip, the perforations for indenting the first line of the paragraph are made, then the perforations for the words "The midday sun shone brightly o'er" leaving a space between each word.

At the left of the drawings are the letters of the words and the fractional part of the line that each will occupy. The total amount of the type set so far will make one-hundred-and-thirty-seven one-hundred-and-fifty-sixths of the whole line, leaving nineteen one-hundred-and-fifty-sixths of the line to be filled by five spaces. This would require four one-hundred-and-fifty-sixths for four of the spaces, and three one-hundred-and-fifty-sixths for the fifth space. The perforations are then made in the five blank spaces, and perforations to remove the line, and insert a lead, and the next line is taken up. It is here evident before commencing that these words will not make a full line. Perforations are therefore made for the regular spaces three one-hundred-and-fifty-sixths of the whole line, and when the perforations for all the type are made there remains seventy-five one-hundred-and-fifty-sixths of the line to be filled. As eight one-hundred-and-fifty-sixths is the size of the largest blank, it is evident that it will take nine of these, and one of three one-hundred-and-fifty-sixths size. The perforations are then made for the three one-hundred-and-fifty-sixths, and then nine, for the eight one-hundred-and-fifty-sixths, and with the holes to remove the line, and to insert the lead it is completed.

I have also shown on Sheet 2 of the drawings a table of the letters, figures and other characters employed in printing with the size of the body of type, and the relative positions of the perforations representing them.

The strip may be fed, both through the machine for perforating it and the type, matrix or die setting or distributing machine, by a cylinder; and to give a positive action to the strips, the ends of the cylinders may be provided with a series of pins which extend outward from the surface to engage a series of perforations in each side of the strip. The latter perforations are shown at c c, but may be dispensed with and other means employed, the object being to obtain a positive feed of the strips.

In this description I have used the word "perforate" for the cutting out and removing of a portion of the material of the strip, as a conductor's punch would operate to perforate a ticket, and also for puncturing, or the breaking of the continuity of the material, leaving the broken portions adhering to the surrounding material, as a piece of paper would be punctured by forcing the point of a lead pencil through it. Wherever "space" is used I have meant type which are lower than those having characters on them, and which are to go between words, and fill out lines which may

end paragraphs; matrices which have no characters cut in them, and for the same purposes as above; and dies which are lower than those having characters on them, and for the same purposes as above.

5 What I claim as my invention, and desire to secure by Letters Patent, is—

10 The method herein described of perforating strips of paper or other suitable material to automatically operate type, matrix and die setting and distributing machines, said method consisting in passing said strips through suitable machines and consecutively forming therein perforations for the letters, 15 figures, points and other characters, leaving

blank intervals between the words, and when the perforations for the words necessary for a line are completed, forming in said blank intervals such perforation or combination of perforations as shall set spaces of a proper size to perfectly justify the line of type, said spaces in any one line being of as nearly equal sizes as possible. 20

In testimony whereof I affix my signature in presence of two witnesses.

TRACY B. CASWELL.

Witnesses:

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