No. 623,014. Patented Apr. 11, 1899.

A. W. HANIGAN & G. H. YARDLEY.

SPACE BAR FOR LINE CASTING MACHINES.

(Application filed Mar. 3, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 8.

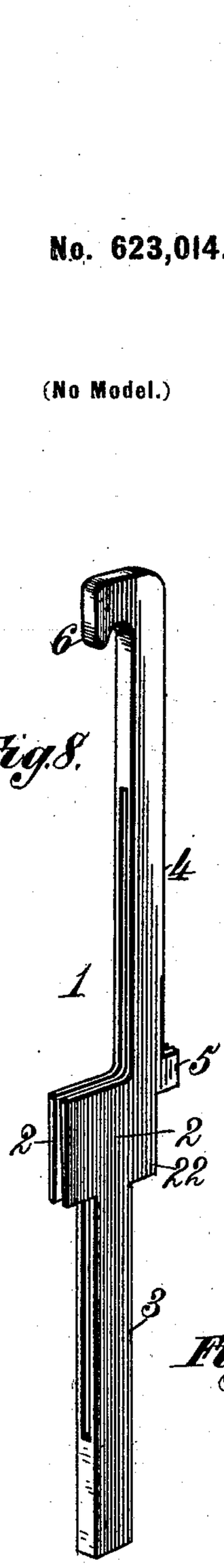

Fig. 7.

Fig. 6.

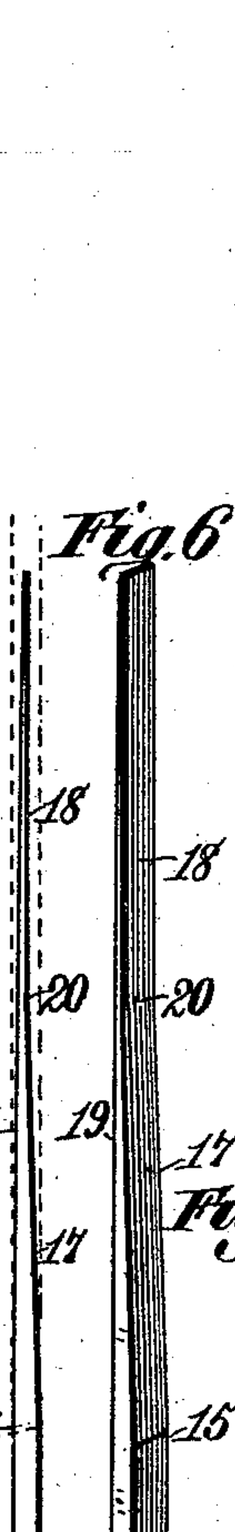

Fig. 5.

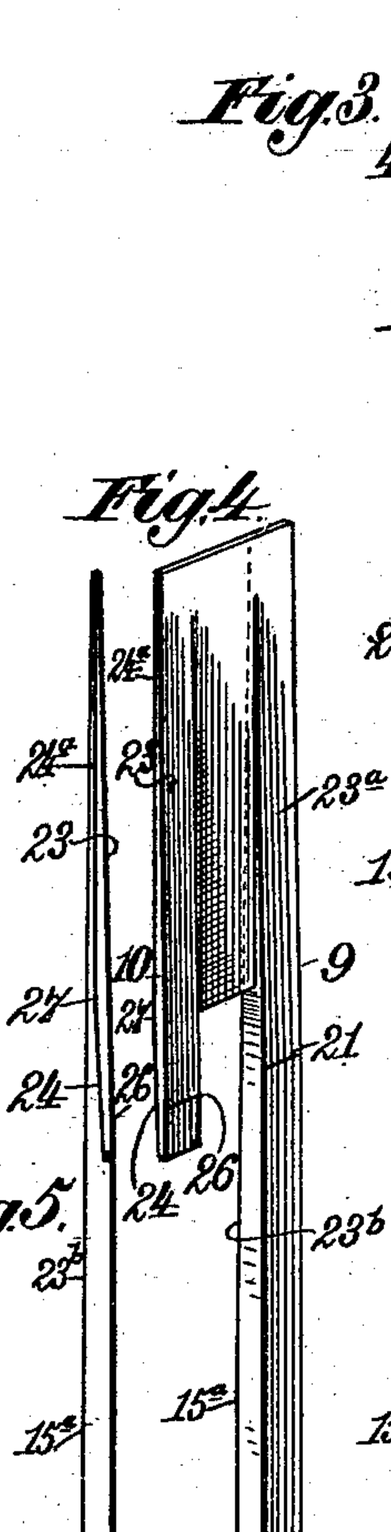

Fig. 4.

Fig. 3.

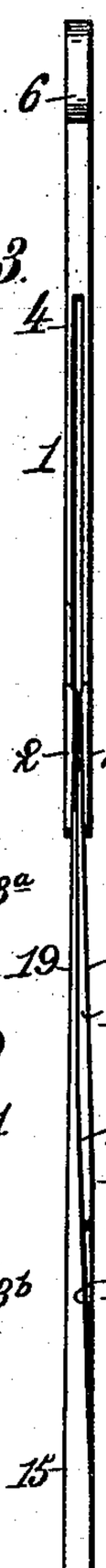

Fig. 1.

Fig. 2.

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Fig. 9.

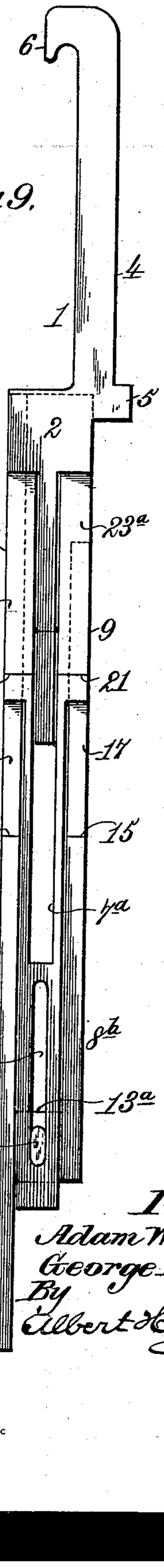


Fig. 11.

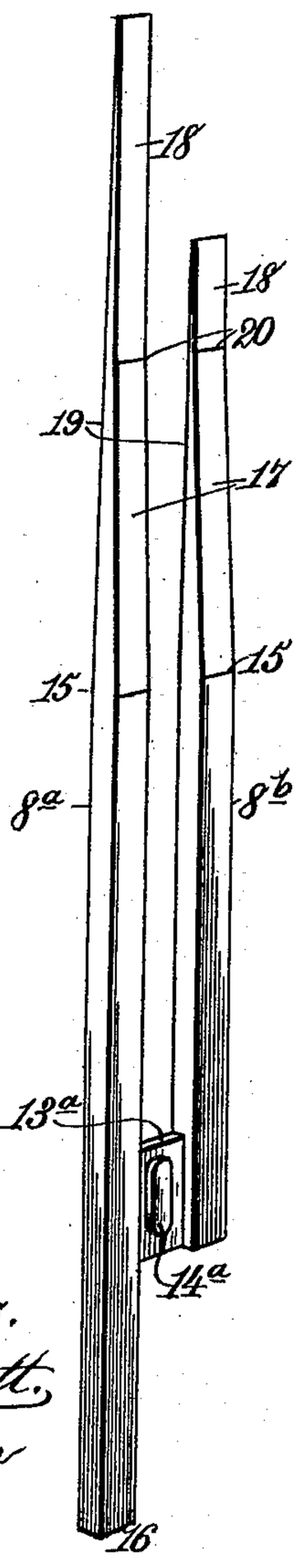
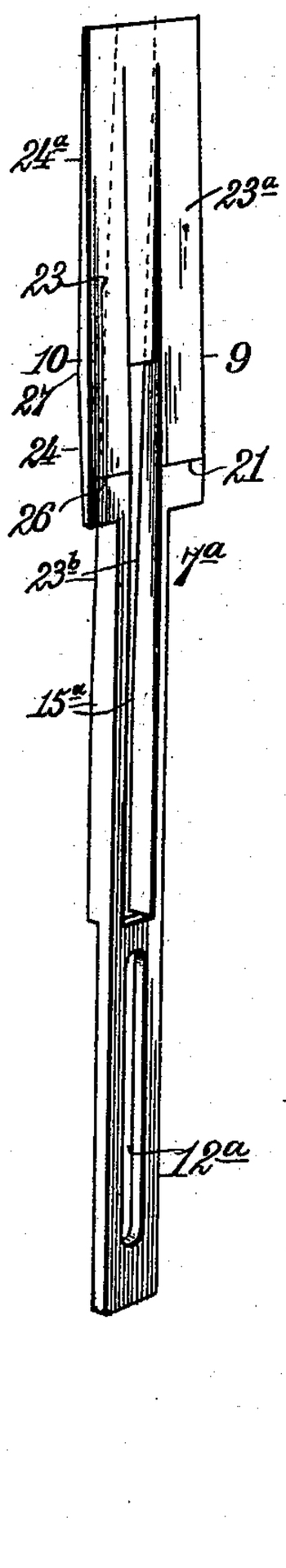


Fig. 10.



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UNITED STATES PATENT OFFICE.

ADAM WINFIELD HANIGAN, OF BALTIMORE, MARYLAND, AND GEORGE HENRY YARDLEY, OF MONTREAL, CANADA.

SPACE-BAR FOR LINE-CASTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 623,014, dated April 11, 1899.

Application filed March 3, 1898. Serial No. 672,449. (No model.)

To all whom it may concern:

Be it known that we, ADAM WINFIELD HANIGAN, a citizen of the United States, and a resident of Baltimore, Maryland, and GEORGE HENRY YARDLEY, a subject of the Queen of Great Britain, and a resident of Montreal, Province of Quebec, Canada, machinists, have invented certain new and useful Improvements in Space-Bars for Line-Casting Machines, of which the following is a full, clear, and exact specification.

This invention relates to line-justifying spacers for that class of line-casting machines wherein type matrices or dies representing the required characters are stored in their appropriate channels of a type-magazine, from which the matrices or dies are released in the order of their selection through the medium of the finger-keys of a keyboard or otherwise and swiftly pass to a line assembling or composing box or chamber, where the line is justified by spacers and then utilized for the production of type-high printing-bars either by casting direct from the type characters, if they are intaglios, or by causing the line of relief type characters, if they are in relief, to impress matrix material and form a matrix-line from or by which the printing-bar is cast. In this class of type-composing and line-casting machines the lines of assembled type characters require to be justified to avoid greater or less variations in their length, and thereby produce type-high printing-bars, which can be employed to print a column or page that will present the desired perfect appearance. In some instances the composed lines are comparatively short and the maximum expansion of ordinary expansible space-bars is insufficient to expand the line the full length of the assembling or composing box or chamber, which is essential in order to obtain "tight" lines of uniform length.

The chief object of our present invention is to provide new and improved expansible space-bars possessing such characteristic features of construction and operation that they can be expanded to the extent required for correctly justifying the composed lines of matrices or type characters to obtain justified lines all exact in length without regard to the precise number of type characters in the line.

The invention also has for its object to improve that type of expansible space-bar wherein a tapering or wedge-shaped expander-section is movable longitudinally between opposing resilient cheek-pieces and to render the space-bar more efficient in use, enable it to be expanded to a greater extent than usual, obtain the initial expansion through the medium of a primary expander and subsequent maximum expansion by the conjoint action of the primary and an auxiliary expander device in such perfect manner that all the lines of assembled matrices or relief type characters will be expanded with precision the required extent to make tight lines exact in length under all circumstances or conditions.

To accomplish these objects, our invention involves the features of construction, the combination or arrangement of parts, and the principles of operation hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a perspective view of our improved spacer. Fig. 2 is a longitudinal central sectional view of the same, showing both expander-sections in their lowest position. Fig. 3 is an edge view showing both expander-sections in their lowest position. Fig. 4 is a detail perspective view of the main or primary expander-section. Fig. 5 is an edge view of the same. Fig. 6 is a detail perspective view of the auxiliary expander-section. Fig. 7 is an edge view of the same. Fig. 8 is a detail perspective view of the main stationary section of the spacer. Fig. 9 is a side elevation showing a modified construction of the spacer. Fig. 10 is a detail perspective view of the main or primary expander-section of the modified construction, and Fig. 11 is a detail perspective view of the auxiliary expander-section of the modified construction.

In the several figures the parts are magnified to more clearly show the tapering portions.

In type-setting and line-casting machines the composed lines of type employed for producing the cast type-bars are seldom coequal in length, and since exactness in the length of the lines is essential to obtain the high perfection desired in the printing art the lines should be justified by spacers or space-bars

operated to expand the line the necessary predetermined length after the line has been composed.

In that class of space-bars having opposing resilient cheek-pieces expanded by an interposed tapering or wedge-shaped section the maximum expansion of the space-bar is somewhat limited, due to the necessity of preserving parallelism of the cheek-pieces at the point where the type characters of the printing-bar are cast.

Our invention produces space-bars which can be contracted to the required extent or thinness and expanded to any necessary thickness, according to the conditions required under variations in the length of the composed lines, and at all times make these lines tight in the assembling or composing chamber and of exact length.

In order to enable those skilled in the art to make and use our invention, we will now describe the same in detail, referring to the accompanying drawings, wherein it will be observed that the upper or main body-section 1 of the spacer is in many respects the same as the Scudder space-bar employed in the monoline composing-machine and described and shown in Letters Patent No. 494,899, issued April 4, 1893. This space-bar section 1 is held stationary during the justification of the line, and it is constructed with two parallel resilient cheek-pieces 2, from which a shank portion 3 extends downward and an upper end portion 4 extends upward, and is provided with a projecting supporting-lug 5, which when the space-bar is introduced into the line being composed engages a part of the machine in such manner that the upper or main body-section 1 is held against rising when the spacer is expanded, as will hereinafter appear. The outer surfaces of the resilient cheek-pieces are exactly parallel, while their inner surfaces are tapering and so constructed that they diminish in thickness from their upper to their lower edges. The top extremity of the upwardly-extending end portion 4 is provided with a hook 6, designed to engage a device by which the space-bar may be carried to and placed in the space box or chamber of the magazine, the same as in the monoline; but it should be understood that as regards the construction of that part of the space-bar which enables it to be carried back to the space box or chamber from which it was discharged we do not limit ourselves to the employment of the hook, as the upper end of the space-bar may be otherwise constructed to suit the particular machine in which it is used.

The opposing resilient cheek-pieces of the space-bar are expanded to any degree from the minimum to the maximum through the medium of a main or primary expander-section 7 and an auxiliary expander-section 8, which lies at one side of the upper end portion of the primary expander-section 7 and extends down longitudinally along the edges thereof and of the main or body section 1, as clearly shown in Fig. 1. The primary expander-section is constructed with marginal longitudinal ribs 9 and 10, the latter being cut off, so that an open space is formed between its lower end and the offsetting lower end portion of the section 7, which contains a longitudinal slot 12. This construction, as shown in Figs. 1 to 8, enables the auxiliary expander-section 8 to lie beside the longitudinally-ribbed portion 10 and to rest against the longitudinal edges of the main section 1 below the cheek-pieces and against the longitudinal edge of the lower end portion of the primary expander-section. The auxiliary expander-section is provided with a projecting flange or plate 13, having an offsetting elongated lug or pin 14, constructed with parallel vertical edges and extending into the slot 12 for the purpose of retaining the auxiliary section in correct position and guiding it in its longitudinal movements. The lug or pin should so engage the edges of the slot as to effectually prevent lateral separation of the parts at all points. The sides of the lower end portion of the auxiliary expander-section from about the point 15 to the lower extremity 16 are exactly or substantially parallel, while its upper end portion is constructed with two distinct tapering parts, one at one side, as at 17, and the other at the opposite side, as at 19. The taper 17 is the most abrupt taper and commences at or about the point 15, as best seen in Figs. 5 and 7, and terminates at or about the point 20. The less abrupt taper 19 commences at the point 15 and terminates at the upper extremity of the section. The upper end of the taper 17 vanishes into a portion 18, which instead of being tapering is parallel with the sides of the lower thickened end portion of the auxiliary expander-section.

The longitudinal rib or member 9 is provided with a taper 23^a at one side, running from the point 21 to the upper extremity of the rib, and with a taper 23^b at the opposite side of considerably greater length, running from about the point 15^a to the upper extremity of the rib. The rib 10 is provided at one side with a taper 23, running from the point 26 to the upper extremity of the rib, and at the opposite side with a taper 24, running from the point 27 to the lower extremity of the rib. The side 24^a of the rib 10 opposite the taper 23 is not tapering, but is parallel with and fits the non-tapering side 18 of the expander-section 8. In this manner the expander-section 7 is supplied with triple tapers or three distinct tapers—to wit, the taper 23 23^a of exactly the same or similar in length, the comparatively long taper 23^b, and the comparatively short taper 24. The tapers 23 23^a, being at one and the same side of section 7 and of the same length, are referred to as in fact constituting one taper; but the tapers 23^b and 24, being greatly different in length, are regarded as two distinct tapers. The tapers 23 23^a accurately fit the inner ta-

pering surface of one of the cheek-pieces 2, at the front and rear edge portions thereof, the rear edge portion being indicated by numerals 22. The short taper 24 accurately fits the taper 17 of the auxiliary expander-section 8, and the comparatively long taper 19 of the auxiliary expander-section fits the tapering inner surface of the front edge portion of the cheek-piece which is opposite the cheek-piece against which the tapering surface 23 23^a of the expander-section 7 bears. The parallel non-tapering surfaces 18 and 24^a also accurately fit each other. The comparatively long taper 23^b bears against the inner tapering portion of one of the cheek-pieces, as will be obvious. This peculiar construction of tapers enables us to make them far less abrupt than where a single expander-section is employed, and at the same time a wider expansion of the cheek-pieces is rendered possible.

In Fig. 1 the space-bar is represented partially expanded—that is to say, the main or primary expander-section 7 has been thrust upward and the auxiliary expander-section is about to be raised farther.

In Fig. 2 both expander-sections are in their lowest position; but only plate 13 and guide lug or pin 14 of the auxiliary expander-section 8 are actually shown, in that the line of section is centrally through the lug or pin, and the auxiliary section 8 does not therefore appear.

In Fig. 3 the expander-sections are both in their lowest position and the view is looking at what may be termed the "front edge" of the auxiliary expander-section.

In the modification illustrated in Figs. 9, 10, and 11 the auxiliary expander-section is duplicated as regards its longitudinal taper member in such manner that the taper portions can move between the resilient cheek-pieces at the front and rear edge portions thereof—that is to say, the auxiliary expander-section comprises two longitudinal parallel members 8^a and 8^b, the former being longer than the latter, so that when the auxiliary expander-section is lowered to the limit of its downward motion by the depressor of the monoline or otherwise, according to the machine in which the space-bar is employed, the upper extremity of the longest member will lie between the cheek-pieces, the shortest member will lie some distance below the cheek-pieces, as shown in Fig. 9, and the cheek-pieces will bear against the primary expander-section and the member 8^a of the auxiliary expander-section.

The lower end portion of the primary expander-section 7^a in the modified construction is made comparatively narrow and of such form that it will lie between the adjacent parallel inner edges of the longitudinal members 8^a and 8^b of the auxiliary expander-section. The two members 8^a and 8^b are united through the medium of the flange or plate 13^a, which carries the elongated lug 14^a, designed to move in the longitudinal slot 12^a of the expander-section 7^a.

In Figs. 9, 10, and 11 the several tapers are indicated by reference-numerals the same as those used in Figs. 1 to 8 to indicate the tapers, and therefore further explanation in this respect is deemed unnecessary. The tapers of the member 8^b are the same as those of the member 8^a; but the member 8^b is shortened to pass between the parts of the body or main portion 4 and enable the auxiliary section to be raised to its full extent.

We have for convenience of description termed the duplex-tapered expander-section 8 or 8^a an "auxiliary" expander and the triple-tapered expander-section 7 or 7^a a "main" or "primary" expander; but the gist of the invention resides in the provision of two independently-movable expander-sections arranged between the resilient cheek-pieces of a spacer-body for obtaining the initial and final expansions at different times, as hereinbefore set forth.

The construction of the parts composing the improved spacer is such as to secure the necessary minimum contraction and a greater expansion of the resilient cheek-pieces than heretofore without the employment of objectionable abrupt tapers, as would be essential in a single wedge designed to secure the same degree of wide expansion.

The expander-sections, as here shown, are specially designed to be operated by a suitable justifier-shoe in the monoline composing-machine, which shoe is given two distinct movements, the first securing the initial expansion of the resilient cheek-pieces and the second effecting such further expansion as may be required.

In the normal position of the several parts of the space-bar when they are assembled in the line being composed the lateral lug or pin 14 or 14^a of the auxiliary expander-section lies at the lower end of the slot 12 or 12^a.

In our improved spacer the main or primary expander-section is first acted upon and raised until it comes to a stop. In this movement of the main or primary expander-section the auxiliary expander-section is also raised; but after the main or primary section comes to a stop and the initial expansion of the spacer is effected the auxiliary expander-section is or can be raised independent of the main or primary expander-section to effect the maximum expansion of the spacer or such further expansion as may be necessary to make the lines tight and of uniform length.

In our spacer, starting with the necessary minimum contraction of the cheek-pieces, a comparatively wide expansion of these cheek-pieces can be effected without the presence of abrupt tapers, such as would be essential if a single wedge designed to secure the same degree of expansion were employed. Further, the cheek-pieces are expanded from the minimum to the maximum without throwing them out of parallelism, which is important, in that these cheek-pieces should constantly lie exactly parallel in the justification of the line

and at the point where the type characters are cast.

Where the lines of assembled matrices or dies are comparatively short, the necessary expansion of the line to the full length of the assembling or composing box or chamber cannot be effected by the employment of a single wedge or expander-section without making the latter of considerable thickness and with such abrupt tapers as to be in a measure objectionable. In our improved spacer the first up motion of the expander-sections expands the cheek-pieces to approximately the thickness of the thickest part of the metal of the sections 1 and 7, while the subsequent up motion of the auxiliary expander-section obtains an expansion of the cheek-pieces considerably greater than the thickest parts of the metal of the said sections 1 and 7, and thus a wide expansion is obtained while preserving the parallelism of the resilient cheek-pieces.

Having thus described our invention, what we claim is—

1. An expansible spacer, consisting of a body or main section having resilient cheek-pieces having tapering inner surfaces, and two independent expander-sections having contiguous tapering end portions and interposed between said cheek-pieces, one tapered expander-section serving to secure the maximum expansion of the cheek-pieces after the initial expansion thereof is effected, substantially as described.

2. An expansible spacer, consisting of resilient cheek-pieces, an expander-section having triple tapering surfaces, two at one side and the third at the opposite side, and an auxiliary expander-section having duplex opposing tapering surfaces, substantially as described.

3. An expansible spacer, consisting of resilient cheek-pieces, an expander-section having triple opposing tapering surfaces, two of different length, and an auxiliary expander-section having duplex tapering surfaces running different distances at opposite sides thereof, substantially as described.

4. An expansible spacer, consisting of resilient cheek-pieces, and two independently-movable expander-sections having tapering surfaces arranged side by side, one section being of a greater length than the other, substantially as described.

5. In a spacer for a line-casting machine, the combination with cheek-pieces having tapered inner surfaces and parallel outer surfaces, and a primary expander-section between the cheek-pieces, of an auxiliary expander-section having tapered portions arranged at one side of the primary expander-section and between the latter and one of the cheek-pieces, said auxiliary expander-section being of greater length than the primary expander-section, substantially as described.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

ADAM WINFIELD HANIGAN.
GEORGE HENRY YARDLEY.

Witnesses:
E. S. BELASCO,
H. BRODIE.