This invention relates to typographical machines generally, and is illustrated in connection with such machines in the linotype class. It is directed to means whereby typographical elements such as the expansible spacers (so-called spacebands) or matrix-spaces or character-matrices employed in such machines may be released from their magazine or place of storage without special movement of an operator’s hand to accomplish such release. The linotype keyboard is a “left-handed” keyboard in the sense that the most-frequently-used letters are represented on keys at the left-hand side of the keyboard, with the usual spacer key at the extreme left beyond the letter keys. The facility with which such a keyboard may be operated varies according to whether an operator is left-handed, ambidextrous, or right-handed; but, in all cases, the necessity of keeping the left hand in position to touch the spacer key at the completion of successive words has prevented the employment of the fingers of the left hand to best advantage in fingermg the letter keys. It has always been possible to provide a spacer key elsewhere than at the left-hand side of the keyboard, and many commercial machines are provided with an additional spacer key at the right-hand side of the keyboard and with a spacer bar extending across the keyboard for use when composing in all-capital letters which are represented on keys at the right-hand side of the board; nevertheless it is known that—for ordinary composition—operators naturally use the key at the left of the board; and since this natural tendency results from a conscious or unconscious desire to economize in movement of the hands and, especially, to touch the spacer key as soon as possible at completion of composition of a word, it is therefore apparent that a still more natural method would be that contemplated in this present invention which provides for releasing a spacer by merely exerting slight additional pressure on the letter keys at the completion or beginning of each successive word during the course of composition, and this regardless of which hand happens to be employed to release the terminal letter of a word, thus distributing the work of spacer release among all the digits of both hands. It is known, also, that operators who accustom themselves to a light, rhythmic touch of the keys accomplish production results with less effort than is required where a contra touch system is practiced; therefore, since this present invention compels a light touch except for letters which are terminals of words, the preferred touch system naturally results. Minor and contributing objects in view are: to provide for regulating the touch of the letter keys to accommodate the preferences of individual operators while learning the new system and thereafter; to provide for changing to and from the new or old systems at will; to retain the old system in connection with the new so that spacers may be released when no letters are required, as when making corrections or adjustments in the assembled line of typographical elements; to provide alternative constructions adapting the new system to a changeable and changing art; to provide a construction which may readily be applied to both new and outstanding commercial machines. The manner of attaining the objectives listed above is set forth in the annexed specification and illustrated in the accompanying drawings, in which:

Figure 1 represents a side elevation, with certain covering parts removed, of the right-hand side of a portion of a linotype machine having our improvement applied thereto in connection with a power-driven keyboard;

Fig. 2 shows in fragmentary elevation a modified form of the invention, suitable for application to a non-power-driven keyboard;

Fig. 3 is a fragmentary plan view taken on the line 3—3 of Fig. 2;

Fig. 4 is an enlargement of a detail as it appears in Fig. 7;

Fig. 5 shows an alternative method of applying our improvement to a machine similar to that represented in Fig. 1;

Fig. 6 is a fragmentary plan view taken on the line 6—6 of Fig. 5;

Fig. 7 is a plan view of a portion of Fig. 1 taken on the line 7—7 thereof;

Fig. 8 shows a detail as varied in construc-
tion to meet use requirements not met by its alternative construction as shown in Figs. 1 and 7.

In the drawings, well-known machine parts are generally indicated by numerals with or without exponents, while letters of the alphabet with or without exponents are generally employed to indicate parts which are new or modified to serve our purpose.

Referring first to Fig. 1: A normal touch of any keyboard key 1 will release a matrix 2 in usual manner by lifting the corresponding key-restoring weight 3, thus rocking the trigger 4, permitting the cam yoke 5 and cam 6 to drop until the cam is in engagement with the roller 7, whereupon the cam is rotated by the roller, causing the free end of the yoke 5 to rise and raise the matrix-releasing reed 8 which actuates the escapement 9 to release a matrix. This normal movement of a key 1 and its lever 10 carries a shoulde of the key weight 3 to a position in contact with a hinged cross-bar A which is an element of the present invention. Any movement of a key 1 beyond or in addition to that required to release a matrix will cause the cross-bar A to move accordingly and this movement of the cross-bar is employed to free a cam 6 of which in turn actuates the spacer-releasing reed 8 and the centrally-pivoted spacer-releasing lever 11, thus releasing a spacer S from the spacer box B. The cross-bar A is part of a hollow rectangle comprised also of the left-hand end portion A1, the right-hand end and arm A2 and a connecting rock-shaft A3. The shaft is supported in brackets B1, B2 secured to the usual keyboard posts 12 by means of the usual screws 13. Heretofore the spacer-releasing cam 6 has been stopped in rest position in the same manner as all other keyboard cams, against a fixed stopping pin 14. For present purposes, to control the spacer-releasing cam 6, we substitute for the usual stopping pin 14 a movable stopping finger D1 carried by a lever E1 centrally pivoted on a fulcrum-rod F and connected by means of a link G to the aforementioned arm A2 of the cross-bar A. Through the connections as described any movement of a key-weight 3 beyond that required to release a matrix, will be imparted to the cam-stopping finger D1, thus freeing the cam 6. The lever is such that only about one-third of the movement required of the finger D1 is needed at the keys 1 in order to free the cam 6. The cam need not differ from the usual form thereof which is grooved peripherally, has the cross-pin 6a for engaging the stopping pin, and is lightened on one side of its center so as to be comparatively heavier on the side which first engages the roller 7 when the cam is freed. Therefore, when the spacer-releasing cam 6 is freed as described it rotates by gravity to engagement with the roller 7 as shown in dotted lines preliminary to any movement of the cam-yoke, and thereafter the action does not differ from that of the other keyboard cams. The yoke 5a differs from the usual cam-yokes only in the respect that it carries a stud 5a which enters a recess E in the cam-freeing lever E1 and serves to keep the lever in proper position relative to the cam. This same stud also serves to insure the restoration of the lever E2 and connected parts to normal position following a spacer-releasing action of the parts. For this purpose the stud contacts with the vertical end wall of the slot B2 as the cam-yoke rises, thus returning the stopping finger D1 in time to stop the rotation of the cam and restoring the cross-bar A in the event that the parts have not dropped by gravity. This arrangement makes it possible to have the effective weight of the cross-bar A very light if so desired by an operator. The effective weight of the cross-bar is determined and regulated by means of an adjusting screw G3 which is recessed at its inner end to receive the end of a spring G2 interposed between the screw and the movable arm A2. Normal position of the cross-bar A is determined by a stop B2.

In order that operators of machines equipped with the improvement may at will release the spacers in manner heretofore usual, the usual spacer keys 15 (Fig. 7) are retained and when used the new parts above described do not function, the stopping finger D1 remaining stationary and the cam-yoke dropping in usual manner preliminary to rotation of the cam. In order that an operator who so desires may use the old method continuously and without the necessity of restricting himself to a light keyboard touch, we provide a lock G4 which when turned to the position shown in dotted lines prevents movement of the arm A2 and connected parts.

The spacers S may be released either at the beginning or ending of words, a matter which may be predetermined by the size of the spacer-releasing cam. For example, a large cam will retard the release, in which case additional pressure on a letter key would be applied at the finish of a word. Other determining factors are the time of travel of the matrices from their magazine to the well-known assembler 20 (which time varies as between different machines), and the kind of direct-release device employed in the spacer box B. The spacer-releasing device selected for illustration in Fig. 1 is that disclosed in Patent No. 1,651,215, reference characters similar to those in that patent being used to identify the parts; but the action differs from that of said patent in the respect that in the present case the front releasing pawl D is normally in its down position and a spacer S is released upon the return movement of the pawl, thus retarding the release. A fast release could be obtained either by com-
pounding the releasing leverage so as to cause the front pawl D to normally occupy an up position as in said patent, or by transposing the releasing pawls, that is to say, moving the present front pawl back on the member of which it is a part, and moving the present rear pawl forward to the position vacated by the present front pawl D.

For use with machines employed on special classes of composition the improvement may be applied to control the release of typographical elements other than and instead of the expansible spacers. For example, some linotype machines are equipped with type-writer-style of type-face, and in this class of composition best word-spacing is obtained if the matrix-spaces of fixed size are used instead of expansible spacers; but operators generally do not use the matrix-spaces between words since to do so would interfere with regular habits of operating by throwing the work of space-release all on the fingers of the right hand; they therefore prefer the alternative method of using expansible spacers and at the completion of a composed line calculating the extent to which the spacers will expand and finishing with matrix-spaces accordingly. It will be apparent that with the present improvement applied to control the release of the matrix-spaces of fixed size, composition of this class will become ordinary composition relative to the matter of word-spacing. For this purpose an arm H (Fig. 7) is mounted on the cross-bar A and its rock-shaft A₁ and may be moved from one to another position according to the location of the key-board cam which is selected to be controlled. The usual cam-stopping pin 14 associated with the selected cam-position is removed, the special cam-yoke having the stud 5₀ is substituted for the regular cam and yoke, and the lever E¹ and the link G are connected for control by the arm H in manner similar to that described for the control when it is from the permanent arm A². Since the trigger 4 is retained, the specially-controlled cam may also be actuated in the heretofore usual manner, at will, without removing the special parts of the special unit. If the selected cam-position is in the front row of cams, the releasing finger (D, Fig. 8) may be longer accordingly and extend between the contiguous escapement-actuating reeds 8 to a position for engagement with the cam cross-pin 6₂. The lever E¹ (Fig. 8) is pivoted on a suitable member E² secured in a selected position on the cam-yoke frame 16. The position occupied by the special unit in Figs. 7 and 8 is not intended to indicate the control of any particular matrix, and the action would be the same in any position. The fulcrum-rod F for the cam-release lever E¹, D₁ may extend entirely across the keyboard length and be supported at intervals in arms F¹ secured to the cam-yoke frame 16, so that the same rod may support the special unit in any selected position. The operating arm H is held in a selected position by means of a set-screw h. The same device may thus serve for releasing any special or regular matrix of frequent occurrence in special classes of composition but represented on the key-board in a position remote from the left-hand side thereof, or in any position in interference with regular operating habits and taxing an operator's memory of location. In Fig. 8, the restoring means consists of an arm 5₀ (corresponding in function to the stud 5₀ of Fig. 1) and a link 5₀ connected to the arm E².

By providing an additional special unit comprising the releasing lever E¹ (or E²) and the cam-yoke with the stud 5₀, a third use for the improvement is possible, namely to release both an expansible spacer and a matrix-space at the same time. This is sometimes desirable, as when composing in large type requiring wide spacing between words. When the device is so employed, it is immaterial whether the two spacer elements are released by exerting the additional pressure on a letter key 1 or on the regular expansible-spacer key 1₅ or on the matrix-space key, for in each case the bar A would move and the additional element or elements would be released. The special unit shown in dotted lines in Fig. 7 would appear in full lines if the two units were employed together, and would occupy the position necessary to release a thin matrix-space. This would not prevent the same matrix-space being released in regular manner, nor would it prevent the expansible spacer being released in regular manner.

An alternative method of applying our improvement for the release of expansible spacers is illustrated in Fig. 5: The cross-bar A₄ functions as hereinafore described, but carries a forward-extending arm I ending with an adjustable contact-screw J positioned beneath a stud 1₇₄ extending through a suitable clearance in the keyboard end plate 19 from the usual space-key lever 1₇. Upon actuation of the cross-bar A₄ resulting from a maximum movement of a letter-key 1 the screw J contacts with the stud 1₇₄, raising the space-key lever 1₇ and the usual space-key weight 3₄ and thus actuating the remaining usual train of connections to release a spacer.

For releasing both a matrix-space and an expansible spacer at the same time according to the procedure explained in the description of Fig. 1, the cross-bar A₄ and rock-shaft A₇ (Fig. 5) support an arm H₁ which may be set by means of a set-screw h₁ to a selected position as in the case of the member H in Fig. 1. The free end of this lever H₁ contacts an angular lever R one arm of which terminates beneath a shoulder of the key-restoring weight 3ₐ. When the cross-bar A₄ is moved...
due to added pressure on a key 1, the key-weight associated with the lever R will rise accordingly and the matrix-space or other character will be released. When only an expansible spacer is to be released, the upper lever H is adjusted to a non-engaging position relative to the angular lever R. In order that only a matrix-space may be released, if so desired, the front end of the aforementioned spacer-releasing lever I is hinged as at 1 so that it may be swung out of engaging relation to the stud 15a carried by the expansible-spacer key-lever 17. When both expansible spacers and matrix-spaces are to be released together, all parts remain in operative position. The small shaft T which supports the angular lever R is additionally supported at a selected position from a relatively larger shaft U by means of a link V. The shafts T, U are supported in the afore-described brackets B, B which are reversed as applied to Fig. 5 in order to locate the arm I outside the keyboard length. A latch Z pivoted on the keyboard screw 13 (corresponding in function to the lock G of Fig. 1) may be made to engage the arm I when spacers and matrices are to be released in regular manner only. The latch Z carries a stop 1 which determines normal position of the cross-bar A.

The description in the paragraph above applies also to the similar feature as applied to the modification shown in Fig. 2, similar reference characters with exponents or differing exponents being employed to designate corresponding parts. A bar W is added in Fig. 2 for supporting the angular lever R when not in use. The arm H is adjustable on the rock shaft A and an additional shaft A and held in a selected position by means of the screw A.

Fig. 2 illustrates a modification of our invention adaptable to matrix-releasing devices which do not require keyboard cams, the matrix-escapement 27 of Patent No. 1,679,318 being illustrated as an example. In this modification each key-restoring weight K supports a fulcrumed lever L the rear end of which remains in contact with the cross-bar A as an initial fulcrum point. When the weight K is raised incident to depression of a letter key 1 the front end of a corresponding fulcrumed lever L lifts a matrix-releasing reed 18 so that only one matrix will escape. The hinged cross-bar A is provided with a forwardly-extending arm A, which supports the spacer-releasing reed N. When the rear end of a fulcrumed lever L rises as described the cross-bar A and arm A are rocked accordingly and an expansible spacer is released, whereupon all the parts drop in unison to normal position. Rear ends of the fulcrumed levers L are spaced apart in notches O on the cross-bar A; their front ends are guided and spaced apart in a slotted plate P which in common with a plate Q for guiding and spacing the matrix-releasing reeds is integral with the rigid fulcrum-bar M. A plate X is keyed to the lever-spacing plate P and serves to support the fulcrumed levers L and also to guide and space apart the key-restoring weights K. Key-board frame ends Y support the several cross-bars M, A, T, U, W and 21, the lower cross member 21 being a well-known means for guiding and spacing apart the key-restoring weights at their lower ends. When only matrix-spaces or character-matrices are to be released the hinge-pin N supporting the expansible-spacer releasing reed may be removed and the expansible spacers may then be released in regular manner only. The fulcrumed lever L (partly omitted in Fig. 2) which controls release of the expansible spacers when released in regular manner (by use of the spacer key 15) has an extension L which acts directly on the spacer-releasing reed N when the spacers are to be released in regular manner, the reed N having a clearance slot N so that the arm A will not move idly in the event that the hinge-pin N has not been removed as and for the purpose above described. When the hinge-pin is removed an additional pin N serves to keep the reed N in position on the extension L.

A latch Z (corresponding in function to the lock G in Fig. 1) serves to lock the cross-bar A against movement when spacers and matrices are to be released in the heretofore usual manner. The arm H (described in the paragraph preceding) is adjustable on the rock shaft A and a paralleling shaft A serving that purpose only.

In Fig. 7 the cam-freeing lever E is shown in full lines in position to release expansible spacers, and in dotted lines is shown as adjusted to a position for releasing a matrix; in Fig. 6 the corresponding element (the lever R of Fig. 5) may be considered as beneath the operating arm H and therefore adjusted to a position for releasing a matrix only, provided the arm I is not locked, and a matrix in addition to a spacer provided the hinged end of arm I is in operative position; in Fig. 3 the corresponding element (the lever R of Fig. 2) is shown in full lines in non-operative position relative to its operating lever H, and in dotted lines in operative position.

Description of the operation and use of our invention has been carried along with a
description of the structures. In the three optional constructions the method of using the improvement is the same: an operator having determined by adjustment whether an expandable spacer, a matrix, or both expandable spacer and matrix are to be released, he exerts pressure on a letter key 1 (or spacer key 15, if preferred, when releasing a matrix and expandable spacer together) in addition to that required for releasing a single typographical element, the cross-bar \( A \), \( A' \) or \( A'' \) moves accordingly and the additional spacer or matrix is released, or both spacer and matrix may be released as explained.

It will be understood that the invention as hereinbefore disclosed may be changed within the spirit thereof in various particulars and we do not wish therefore to be limited to the specific constructions herein shown except as we shall be limited by the appended claims.

We claim:

1. In a typographical machine, in combination with keys for selectively controlling the release of character-matrices, means whereby a movement of a selected key in addition to the movement thereof requisite to release a matrix, will serve to release a spacer.

2. In a typographical machine, in combination, the keyboard keys, a restoring weight for each of said keys, a stop-bar embracing all of said weights and serving to determine a normal movement thereof sufficient to release a typographical element, and means whereby movement of said stop-bar resulting from an added movement of a selected one of said keys and its weight will cause an additional typographical element to be released.

3. A combination as set forth in claim 2 including also means for varying the resistance of the therein recited stop-bar relative to the added movement of a selected key, according to the preference of individual operators.

4. In a typographical machine, in combination, the keyboard keys, the matrix-releasing reeds, a spacer-releasing reed, individual intermediate devices through which movement is imparted to a selected one of said matrix-releasing reeds upon manual actuation of a corresponding key, a stop-bar common to all of said intermediate devices and permitting an initial movement of a selected key sufficient to actuate a corresponding intermediate device, and means whereby an added movement of the same key will move said stop-bar and thus impart movement to an intermediate device associated with said spacer-releasing reed and cause a spacer to be released.

5. A combination as set forth in claim 4, characterized by the fact that the recited spacer-releasing devices other than the recited stop-bar may be actuated in usual manner and independently of said stop-bar, and including means for locking said stop-bar against movement so that spacers may be released in usual manner, at the option of individual operators.

6. In a typographical machine, in combination with key-controllable members in series for releasing, selectively, typographical elements comprising matrices and expandable spacers, a movable bar embracing said series of key-controllable members and capable of being moved by excess movement key-imparted to a selected one thereof, means whereby such movement of said bar will impart movement to an additional key-controllable member and thus cause the release of an additional typographical element, and means for predetermining which additional typographical element will be released as a result of such movement of said bar.

7. A combination as specified in claim 6, characterized by the fact that the recited means for imparting movement from the recited bar to an additional key-controllable member may be provided in duplicate and serve to cause the release of two additional typographical elements.

8. A combination as specified in claim 6, characterized by the fact that the recited means for releasing an additional typographical element is of a character and structure which will not prevent the same predetermined additional typographical element from being released in usual manner, at will.

Signed at Pasadena, Los Angeles County, California, this 13th day of January, 1930.

OREN GORDON PICKETT.
GEORGE E. MARLATT.