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**AUTOMATIC COMPOSING MACHINE**

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**41 Claims. (Cl. 197—20)**

Our present invention relates to an automatic composing plant for printed texts.

The printing of texts involves a number of preparatory steps requiring to a large extent the services of a human operator. These steps usually include the transcription of an author's manuscript in typewritten form, for the purpose of producing a working copy for the compositor on which the latter, in addition to correcting typographic and grammatical errors, will enter a number of annotations for the printer such as the following:

- (a) Indication of format and margins;
- (b) Determination of justification;
- (c) Determination of fonts or type faces for various passages of the text;
- (d) Modification, if any, of paragraphs appearing on the typewritten copy;
- (e) Indication of spaces to be left for cuts, tables and the like to appear in the body of the text;
- (f) Arrangement of footnotes.

The so annotated copy is then handed to a printer who proceeds to set the type (automatically or by hand) or in some other manner, e. g. by a photographic process, prepares a matrix from which the text can be reproduced the desired number of times. The important steps in this operation may include the breakup of the lines and the justification of the margin in addition to the operations indicated by the compositor's annotations, at least some of these steps having hitherto required the intervention of the human mind.

One of the objects of the present invention is to provide means for automatically carrying out the two steps just referred to.

A more general object of this invention is to provide means for automatically performing a number of composing operations hitherto carried out manually and mentally.

A related object of our invention is to reduce the cost of reproduction of printed texts and to eliminate sources of human error by providing a substantially fully automatic composing plant.

Another object of the instant invention is to provide means for automatically preparing a matrix for reproduction purposes from a record adapted to be produced in simple manner from any legible manuscript.

It should be understood that the matrix herein referred to need not be in type but may take the form of an intermediate record (e. g. a perforated tape or a photographic film) adapted to control a type-setting machine in some manner known per se.

For the sake of convenience, any recorded item adapted to be read or scanned by automatic means (e. g. mechanically, electrically or optically) will be referred to as a "coded entry"; any recorded item adapted to be read directly, including arbitrary or special (e. g. stenographic) symbols, will be termed a "clear entry." Indications not germane to the text to be printed, such as the afore-

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mentioned compositor's annotations, will be referred to as "service informations."

An automatic composing plant according to the invention is primarily useful in a system in which the following operational steps, partly manual and partly automatic, are to be carried out:

(A) Registration of coded entries of text and service informations correlated with one another; this stage of operations may comprise one or more recording phases and may result in a single record containing both kinds of entry or in a separate record for each kind;

(B) Progressive conversion of these coded entries into electrical signals, again (according to the number of records) in a single operational phase or in two overlapping or alternating phases;

(C) Translation of the above signals into a pattern of variables (e. g. electrical potentials) defining the complete typographic makeup of a text to be produced by a manually or automatically operated type-setting machine;

(D) Retranslation of the aforementioned variables into coded entries for the control of an automatic or semi-automatic type-setting machine or into clear entries for the control of a machine operated by hand.

It will be understood that stage (A), above, may involve the recording of additional coded entries representing a proofreader's corrections as well as the necessary service informations relating thereto; these additional entries will then be converted in stage (B) into sets of electrical signals serving to cancel and to modify certain of the variables produced in stage (C). It will further be possible to produce a record of clear entries, for monitoring purposes, simultaneously with the preparation of the coded entries in stage (A) and also, if desired, to obtain parallel clear and coded records at the output of stage (D).

Thus, a system according to our invention comprises means for carrying out the registration, conversion, translation and retranslation set forth under (A), (B), (C) and (D) above, at least the means for effecting the three last-mentioned operations being substantially fully automatic.

Generally, the registration of coded entries in stage (A) will involve a human factor, especially with regard to service information and corrections of text. A feature of our invention resides in the adaptation of conventional keyboard machines (e. g. typewriters or teleprinters) for the recording of such entries in a most convenient and expeditious manner. A machine so modified comprises additional keys for the service entries, preferably together with means for (automatically or manually) consecutively numbering each line for purposes of correlating the original record with a second record bearing the necessary corrections. Evidently, such a machine could produce the original text and service entries on a single record or on two separate records; the former is preferable since it dispenses with the need for special means to correlate the two kinds of entries. The operator may use such machine in the same manner as a conventional typewriter, except that any carriage return either within a line or to a preceding line must be avoided and no corrections must be made in the principal text. The necessity for numbering each line may, however, be obviated in cases where, following the typing of each line together with the accompanying service informations, such line is immediately proofread and a cancellation signal is registered upon the discovery of any typing error, the line immediately succeeding them taking the place of the one so canceled.

Usually, then, and especially where a clearly legible manuscript is available on which the necessary annotations have already been entered by hand, it will be most