No. 646,227. Patented Mar. 27, 1900.

E. G. LEONARD.

LINOTYPING MACHINE.

(Application filed Dec. 31, 1897.)

(No Model.) 2 Sheets—Sheet 1.

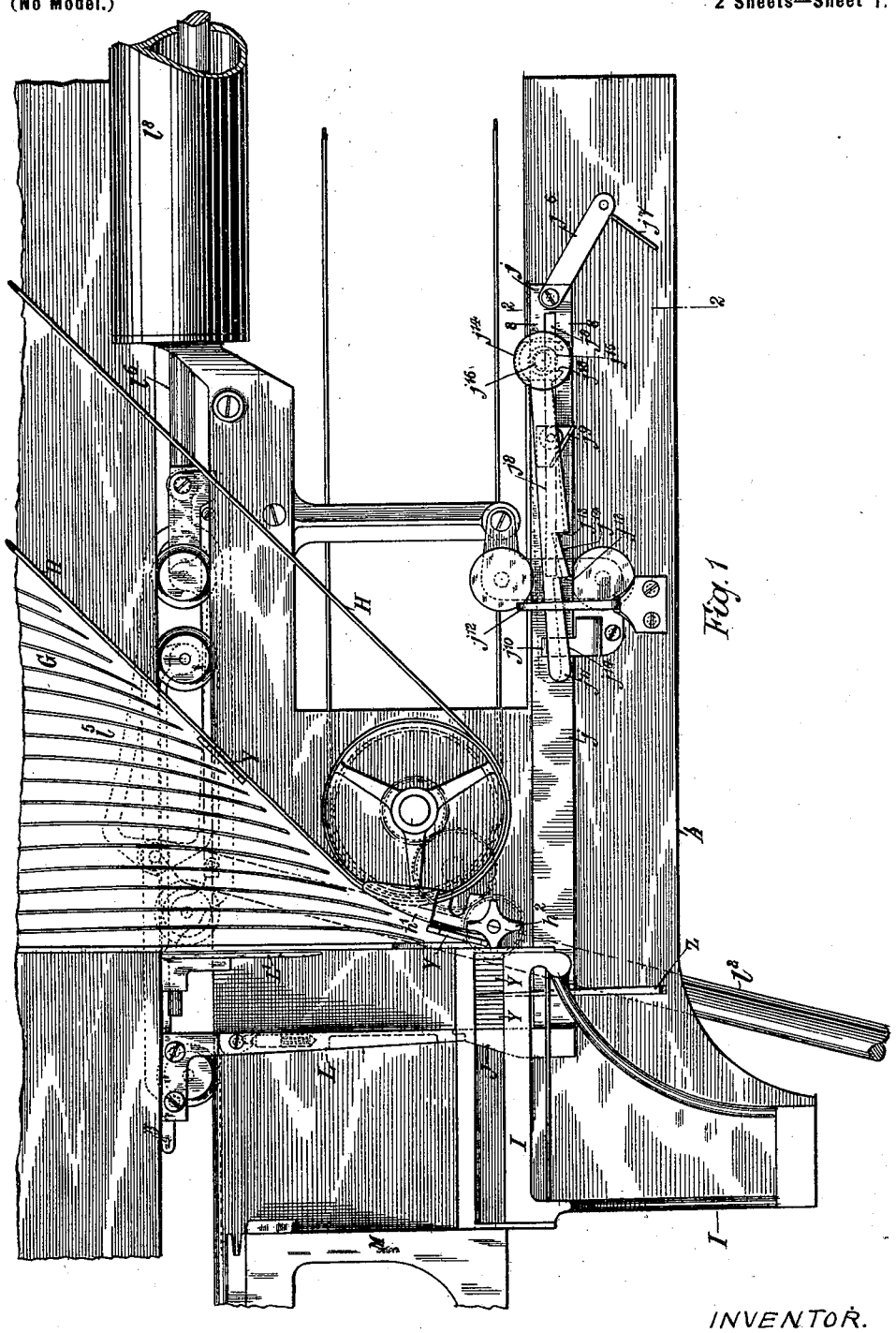

Fig. 1

WITNESSES.
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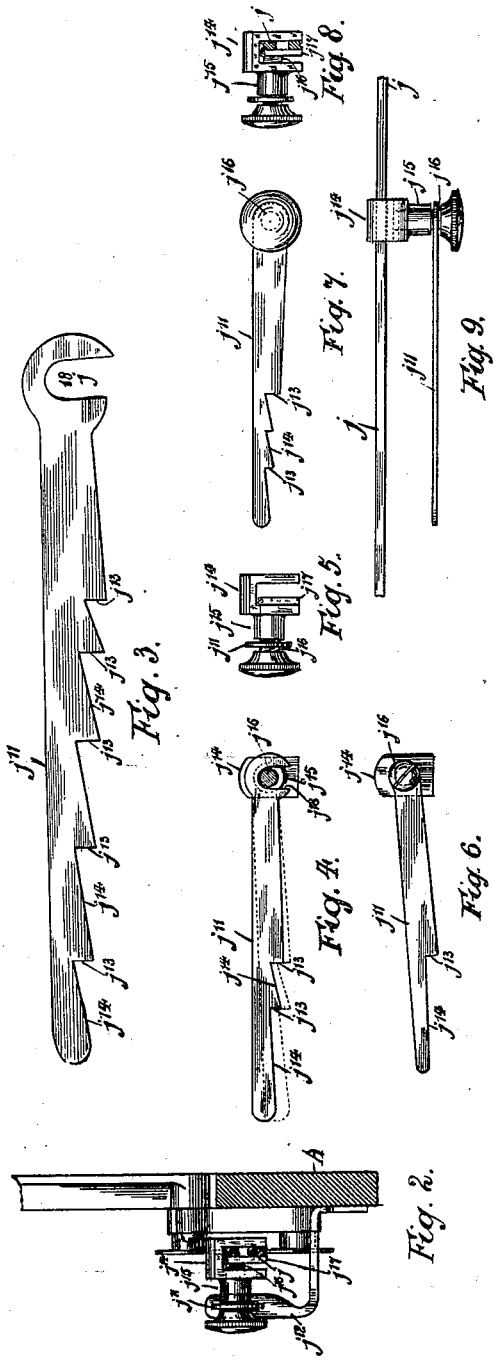

Fig. 3.

Fig. 8.

Fig. 7.

Fig. 9.

Fig. 5.

Fig. 4.

Fig. 6.

Fig. 2.

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UNITED STATES PATENT OFFICE.

EDWARD GEORGE LEONARD, OF SHEFFIELD, ENGLAND, ASSIGNOR TO THE MERGENTHALER LINOTYPE COMPANY, OF NEW YORK, N. Y.

LINOTYPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 646,227, dated March 27, 1900.

Application filed December 31, 1897. Serial No. 665,023. (No model.)

To all whom it may concern:

Be it known that I, EDWARD GEORGE LEONARD, a subject of the Queen of the United Kingdom of Great Britain and Ireland, residing at Fox street, Sheffield, in the county of York, England, have invented certain new and useful Improvements in and Relating to Linotype-Machines, (for which I have obtained the following patent: Great Britain and Ireland, No. 19,118, dated August 29, 1896;) and I do hereby declare that the following is a full, clear, and exact description of the invention, reference being made to the accompanying drawings, which are to be taken as part of this specification and read therewith, and one which will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to assembling mechanisms of linotype, type-setting, and other composing machines used in the production of printing-surfaces.

A linotype-machine presents a bank of finger-levers to its operator and also other similar levers and analogous parts grouped within his reach and which he may be called upon to operate, the objects of such grouping being (*a*) the prevention of his having to leave his seat to get at them and (*b*) the keeping of them within his view. The depression of each finger-lever, acting through suitable mechanism, effects the release of the corresponding character in the form of either a type-matrix or of a type-die from the magazine which contains the whole font of characters. As the characters, together with the necessary spaces, are released from their respective places in the magazine they are assembled in a convenient place preparatory to the next step in the production of the linotype. So long as the copy consists of lines of regular length or of lines no more irregular than are the first lines of paragraphs or quoted lines of verse the operator finds his work of composition straight forward from start to finish; but it is not always that the work is straight forward. It is no unusual thing, especially in connection with sporting news, for the operator to be called upon to compose from such copy as the following seven lines, which have been reproduced from a newspaper report of a certain cycling event:

1	L. and J. Franks	Dover Road C. C.	Tandem	135	660
2	G. W. Bishop	St. Andrew's C. C	Single	134	1,174
3	E. and H. Sames	Unattached	Tandem	128	0
4	W. Fagg	Norwood C. C	Single	127	220
5	H. Lock	Putney A. C	do	126	295
6	W. H. Fenwick and A. Payne.	Ranelagh C. C	Tandem	123	730

Each of the first six lines is broken up into six portions or measures. The first portion consists of the position-number at the head of the line, together with the immediately-following leader; the second portion, of the name of the competitor who occupied that position; the third, the name of his club, and so on.

Neatness of work demands that the initials of all the portions relating to the same part of the report shall register columnwise with each other. Now the operator by his composition of the first line has in respect of the distances between the six portions thereof fixed the point in the case of each of five of the lines at which the said portions in it shall respectively begin. He must therefore either treat each portion as a single piece or in some way or other attain the capacity for the above-described columnar registering being attained as he composes each of the following lines. By "piece" is meant as much of a whole line as can be composed straight ahead without finding oneself balked.

The object of the present invention, stated broadly, is to provide the operator with a combined indicator and stop adapted to be actuated by the machine itself and which shall automatically indicate to him where throughout the composition of each following line occur the points in the copy at which the finger-keys corresponding with the initial characters of the portions must respectively be depressed and which shall, further, be capable of stopping the composition at any of the said points. With such automatic indicator and stop each line is composed as a single-piece one, thereby obviating all such contingent alterations of mold, ejector-blade, or other part of the machine as might have

become necessary if the operator had been compelled to treat each portion as a single piece.

The invention has been developed with special reference to and for use upon the Mergenthaler linotype-machine, and partly because of that and partly because that machine is the only linotype-machine in practical use in this country the application of the said invention to it has been selected for illustration and detailed specification.

Referring to the accompanying drawings, Figure 1 is a part front elevation of the Mergenthaler linotype-machine. Fig. 2 is a transverse section taken along the line 2 2 of Fig. 1. Fig. 3 is a front elevation of a four-portion detachable automatic indicator on an enlarged scale. Fig. 4 is a front elevation of a three-portion detachable automatic indicator, including part of the clamping device. Fig. 5 is a side elevation of Fig. 4, including the head of the clamping-screw. Fig. 6 is a front elevation of a two-portion non-detachable automatic indicator and its clamping device. Fig. 7 is a front elevation of a four-portion non-detachable automatic indicator. Fig. 8 is a transverse section taken along the line 8 8 of Fig. 1. Fig. 9 is a plan of an automatic indicator, its clamping device, and a portion of a moving part which carries it.

The Mergenthaler linotype-machine above mentioned and hereinafter described in part is described in detail in the specification of Letters Patent No. 436,532, of 1890. To facilitate reference thereto, those parts of the machine which occur in the accompanying Fig. 1 are marked with the same reference-letters as are used in the said specification.

The Mergenthaler linotype-machine as manufactured and used at the present time uses type-matrices, (as distinct from type-dies,) assembles them in line together with a complement of space-bars during the process of composition, transfers the composed line to the casting mechanism, and then casts and delivers a linotype. These matrices Y are separable metal plates and are not mechanically connected with each other or with any part of the machine. The font of them is stored in a magazine carried by the top of the main frame A of the machine and from which they can descend by gravity. This they do, one by one, as soon as their respective detents are moved away by the depression of the respective finger-keys, falling through a series of channels G. The mouths of these channels are alined obliquely across the front of the machine just behind the bank of finger-keys above mentioned, and therefore in front of the operator. The lowest of the channel-mouths is nearest to the place where the matrices Y and space-bars Z are assembled into a line and the highest farthest from it. Beneath the oblique row of channel-mouths there is a constantly-running belt H, upon which the matrices Y drop and lie. They are carried along by it and delivered, feet first, down a decline h' in the direction of the mouth of the assembling-block L. This latter consists, as far as the act of assembling the matrices and space-bars is concerned, of a pair of horizontal bars adapted to receive between them the said matrices and space-bars if the latter are presented vertically and side on. The necessary change of position from oblique to vertical is effected by a star-wheel h^2, mounted upon a horizontal axis standing transversely of the oblique path of the matrices Y, the said wheel revolving in the vertical plane. The axis of this wheel h^2 is below the said path and occupies such a position that at one moment a portion of its periphery is practically part of the path and at the next moment that portion is turned up into the vertical position and toward the mouth of the said assembling-block L. In the interim a matrix Y has come down upon the wheel periphery, and the above-described change of position suffices to upend that matrix and to deliver it, vertical as to position, but horizontal as to direction of motion, into the assembling-block. The first matrix to enter meets a block J, which has received the name of "yielding resistant" for a reason which will forthwith appear. The block in question is capable of a horizontal motion between the bars of the said assembling-block L. It is held flush with the mouth of the latter by the pull of a spring or weight; but the strength of such pull is adjusted to be less than that of the push of the line of matrices and space-bars which is gradually increasing in the said assembling-block under the action of the star-wheel h^2. The consequence is that although the said block J does in a sense resist the entrance of each matrix into the assembling-block it yields before the increasing length of line. This yielding resistant J is carried by a horizontal bar j, which slides in suitable guides fast on the front of the machine and in front of the operator.

Fig. 1 includes several parts of the machine which are not concerned in the present invention, such as the shifter-arms L L', the independent slides by which they are guided in the main frame A, the horizontal guide M, through which the shifter-arms move with the composed line between them on its way to the casting mechanism, the lever l^2, by which the said shifter-arms L L' are moved to the left, the link l^5, by which the said lever l^2 is connected to the slide of the arm L', the piston-rod l^6 and the cylinder l^8 of a pneumatic device for controlling the speed at which the said shifter-arms are moved to the left, a link j^6, connecting the right end of the bar j to the pulling-spring j^7, already referred to, a horizontal slot j^8 in the said bar, an indicator j^9, adjustable upon the said bar for the length of the line to be composed, and its stop j^{10}, fast upon the main frame A. All the foregoing parts are as heretofore.

j^{11} is my new indicator, and j^{12} the automatic stop for it. The former is a bar adapted to

be loosely held to the bar j, and the stop is a bar projecting outward from the main frame A, to which it is made fast and over which last-mentioned bar the indicator must move step by step with the bar j as the latter is pulled by the growth of the composed line in the assembling-block I and in the same direction, too. The indicator j^{11} is provided with a series of shoulders j^{13}, the number of shoulders in a series being one less than the number of portions or columns in the copy.

The action of the invention is as follows: Referring to the sample of copy quoted above, let it be supposed that the operator has just completed the composition of the last line of the preceding portion of his copy. Before beginning to compose the first of the seven lines in question he counts up the number of portions in his copy and finds it six. He then selects an indicator j^{11} having five shoulders—that is, one less than the number of portions. Such an indicator is illustrated in Fig. 3. The right end of it is held to the bar j by a clamp, described in detail farther on; but this holding must be of such a kind that the indicator can rise and fall upon it as upon an axis. For the reason that the bar j moves from right to left when it is going through its working stroke, it is the right end of the indicator j^{11} that is clamped to the said bar j and to the right end of the latter as well, the indicator standing parallel with the said bar j and its free end pointing to the left. The said free end of the indicator j^{11} is then placed upon the stop j^{12} and the operator begins to compose the first portion—viz., "1." The first shoulder j^{13} comes up to the stop j^{12} as soon as the space which represents the white between the first and the second portions is in the assembling-block. If the operator now proceeds with the composition of the second portion, the first matrix in it would be jammed between the star-wheel h^2 and the said space; but as the indicator j^{11} is immediately before his eyes he sees the engagement of the stop j^{12} and the first shoulder j^{13}, whereupon he lifts the nose of the indicator and begins the composition of the second portion—viz., "L. and J. Franks." The entrance of the first or "L" matrix into the assembling-block moves the indicator j^{11} accordingly, whereupon the operator removes his finger and the next of the incline j^{14}—*i. e.*, the one which extends from the first to the second shoulder j^{13}—drops upon the stop j^{12}. The remaining portions of the line are treated in the same way.

The utility of the invention makes itself more apparent in the lines succeeding the first one, for the reason that the occurrence of the before-mentioned points in the copy at which the second and following portions in each respectively begin is given automatically and always with the same exactitude as in the case of the first line. Thus the action of the indicator j^{11} is always in full view of the operator, and even if he neglected its indication the automatic stop would prevent him from bungling the piece in hand. In dealing with the seventh line he will compose quad for the first portion and one at the head of the second portion.

With reference to the stop j^{12} it must be remarked that the operative part of it is only as much as is necessary for the shoulders j^{13} to engage with. It is preferred that it should be a loop, as illustrated, because a loop embraces the indicator j^{11} and prevents it from wandering from its path. The bottom of the said loop is then the stop proper, and the loop has incorporated with it a bracket by which and holding-screws the combination is conveniently held to the main frame A.

With reference to the shoulders j^{13} and the stop j^{12} it must be pointed out that the presence of the former on the bottom edge of the indicator and the position of the stop j^{12} under the said indicator is obviously the most convenient one, because engagement between them is maintained by gravity.

The preferred clamp consists of a saddle-piece j^{14}, adapted to straddle the bar j, having a socket j^{15} projecting horizontally from the front of it and screw-threaded internally to receive a screw j^{16}, the nose of which carries a pivoted flange j^{17}. The latter and the screw are held together in such a way that the screw j^{16} turns in the said flange j^{17} without turning it. The indicator j^{11} is held to the screw in any convenient way. When a machine is equipped with a series of these indicators, it is obviously preferable that they should all be detachable and interchangeable with only one clamp to the series. For that reason the right end of each indicator is enlarged and has a vertical notch j^{18} in its bottom edge, whereby it is adapted to straddle the screw j^{16}, as indicated in Fig. 2, the length of the screw being adjusted so that it shall stop short of pinching the indicator j^{11} between its head and the socket j^{15} when the bar j is clamped. An indicator may be non-detachable from its clamp, as indicated in Figs. 6 and 7. The head of the screw j^{16} may be shaped as most convenient.

The motion of the bar j is a horizontal one and in front of the operator. For that reason it is as convenient as might be that the indicator j^{11} should be clamped to it. At the same time the invention does not limit me in respect of the particular moving part of the machine from which is taken the power necessary to move the indicator j^{11} in sight of the operator. Neither does it limit me to the direction of the indicator's motion, for if the indicator is moved vertically spring-pressure would suffice to keep its operative edge engaged with the stop j^{12} properly positioned for its purpose and would thereby provide for the discharge of all the functions described above.

I claim—

1. In a composing-machine and in combination with a resistant movable under the influence of the line being composed, a stop

arranged to arrest said resistant before the composition of the line is completed.

2. In a composing mechanism, a resistant, movable under the influence of the line being composed, in combination with a stop to arrest the resistant when the line has reached the predetermined length, and a second stop arranged to arrest the resistant before the composition of the line is completed.

3. The combination in a composing-machine of the bar, moved step by step by the increasing length of the line being composed, a stepped indicator connected to said bar, and a stop with which the steps of said indicator engage.

4. The combination in a composing-machine of an indicator, provided with steps or shoulders, adapted to be moved step by step with the increasing length of the line being composed, and a stop with which the successive steps of said indicator engage.

5. The combination in a linotype-machine of the assembler bar or slide j, a stepped or shouldered indicator j^{11}, and a stop j^{12}.

6. In a linotype-machine, the combination with the assembler-slide of means for arresting the same at predetermined points in its advance, prior to the completion of the line of composition.

In witness whereof I have hereunto affixed my signature, in presence of two witnesses, this 28th day of May, 1897.

EDWARD GEORGE LEONARD.

Witnesses:

ALBERT HOPKIN,

CHARLES CLEMENT FARNSWORTH HALLAM.