No. 744,087. PATENTED NOV. 17, 1903.

O. MERGENTHALER & E. LAWRENZ.

LINOTYPE MACHINE.

APPLICATION FILED SEPT. 23, 1899. RENEWED APR. 6, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

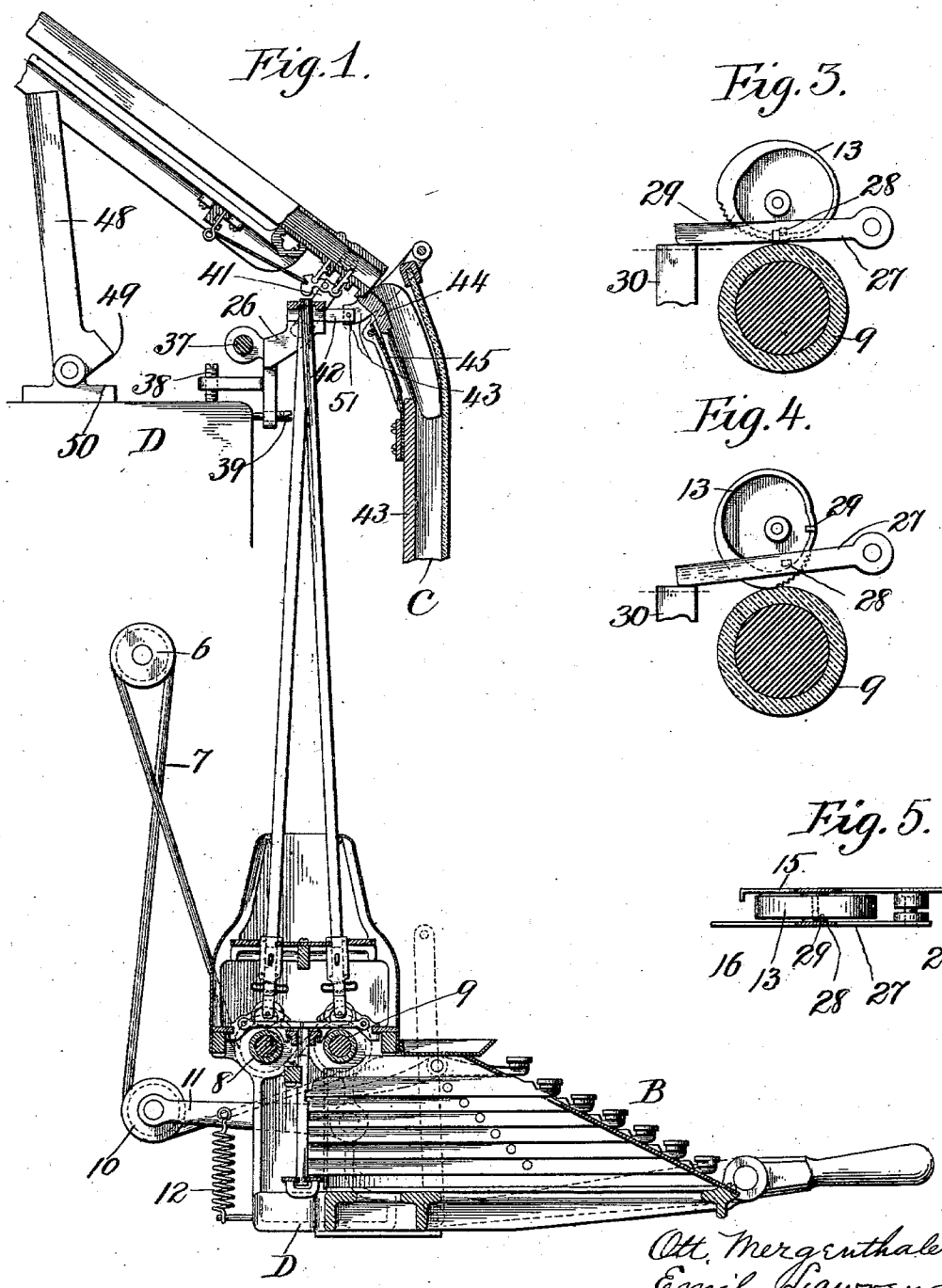



Fig. 3.




Fig. 4.




Fig. 5.




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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

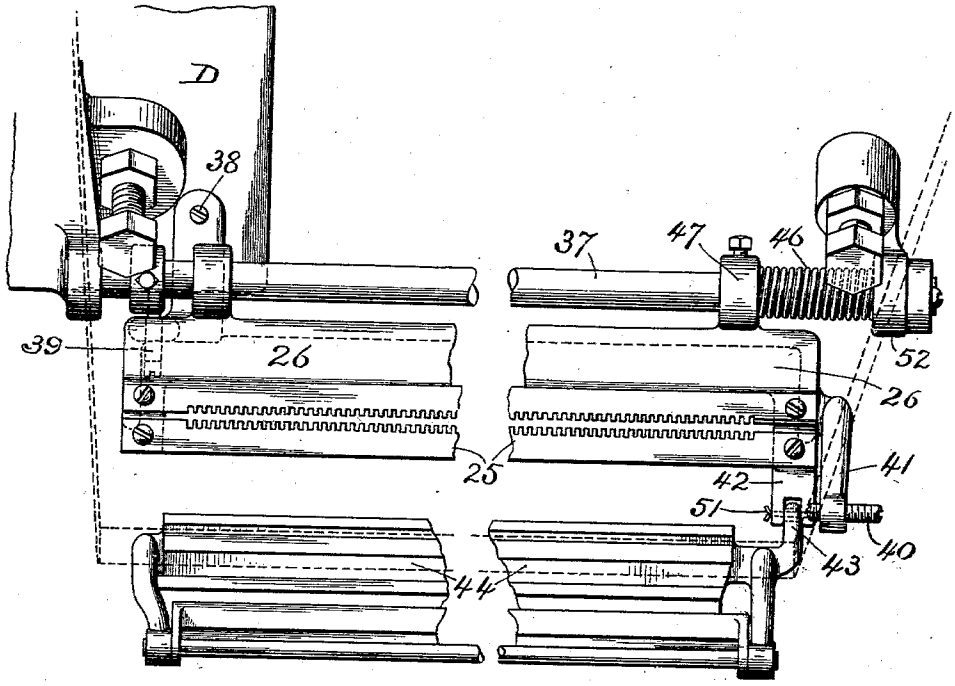
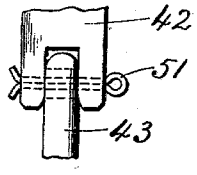



Fig. 9.




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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 6.

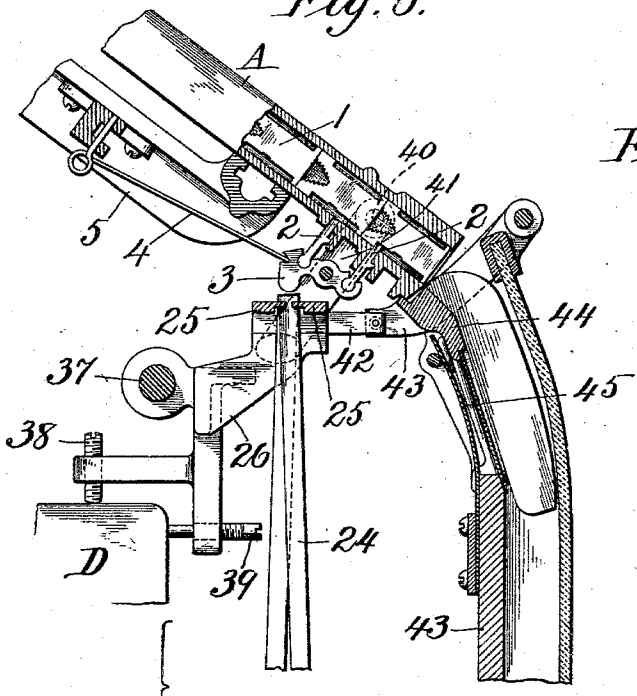
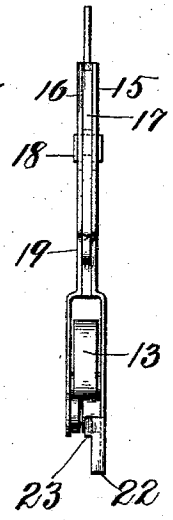



Fig. 7.



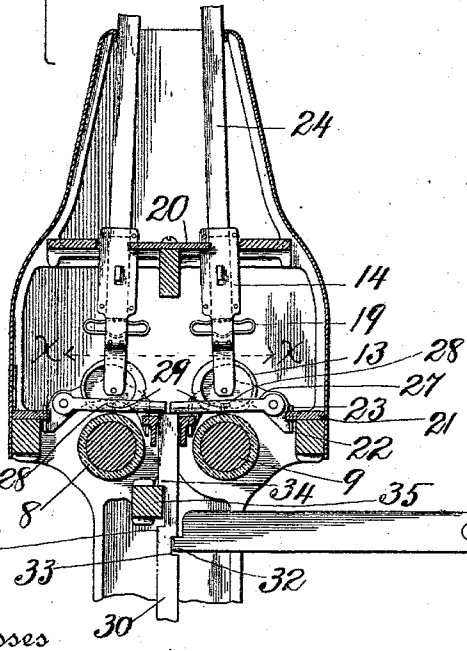
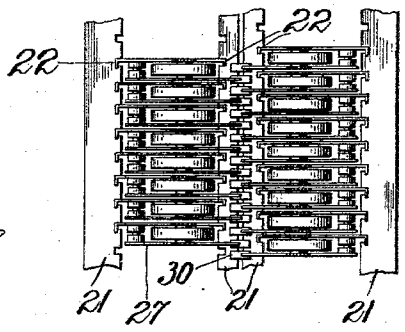




Fig. 8.




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No. 744,087. Patented November 17, 1903.

# UNITED STATES PATENT OFFICE.

OTTMAR MERGENTHALER AND EMIL LAWRENZ, OF BALTIMORE, MARYLAND, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE OTT. MERGENTHALER COMPANY, OF BALTIMORE, MARYLAND, A CORPORATION OF DELAWARE, AND THE MERGENTHALER LINOTYPE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## LINOTYPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 744,087, dated November 17, 1903.

Application filed September 23, 1899. Renewed April 6, 1903. Serial No. 151,414. (No model.)

*To all whom it may concern:*

Be it known that we, OTTMAR MERGENTHALER and EMIL LAWRENZ, citizens of the United States, residing at the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Linotype-Machines, of which the following is a specification.

The objects of our invention are to simplify and lessen the cost of manufacture of various parts of the composing mechanism of linotype-machines, to provide an easy key action and a quick and positive operation of the matrix-escapements, to provide for the ready disconnection of the magazine from the escapement-operating mechanism to permit of cleaning or changing the magazine, to provide a ready and positive relative adjustment of the keyboard-rods and escapement mechanism, to provide a simple means of sustaining the forward end of the magazine for purposes of cleaning, and to produce a sufficient and uniform tension at all times on the keyboard driving-belt.

Our invention will be described in detail in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section through the keyboard and escapement mechanism of a linotype-machine, showing so much thereof as is necessary for the illustration of the present invention. Fig. 2 is a plan view of a portion of the mechanism at the magazine-outlet. Fig. 3 is a side elevation of one of the cams in normal or inoperative position. Fig. 4 is a similar view showing the cam in operation. Fig. 5 is a plan view of the cam and its stop-pawl. Fig. 6 is an enlargement of part of Fig. 1. Fig. 7 is an edge view of one of the cam-carriers and its cam. Fig. 8 is a partial plan view looking down from the line $x$ $x$ of Fig. 6, and Fig. 9 is a detail.

Referring to Figs. 1 and 6, A indicates the magazine; B, the keyboard; C, the assembler-channels, and D D parts of the fixed frame. The matrices 1 are sustained in the magazine by means of pawls 2 2 of the escapement, the said pawls being connected to a verge or lever 3. The lower pawl is normally thrust into the magazine to detain the lowest matrix, and the upper pawl is normally withdrawn from the magazine by means of a spring 4, connected to a fixed support 5, upon which the magazine rests. It will be understood that the magazine contains a series of channels, and there is an escapement device, such as described, for each channel. Power is supplied to operate the escapements by means of a drive-pulley 6 and belt 7, which passes around pulleys on the ends of roller-shafts 8 and 9, as shown in dotted lines in Fig. 1. The belt 7 also passes around a pulley 10, carried by pivoted arm 11, which arm is normally drawn down by spring 12. The spring is properly proportioned to supply sufficient tension to the belt and to continuously take up any slight lengthening of the belt due to the stretching of the material. The delay heretofore caused by shortening the belt to take up wear is thus avoided.

Above the rollers 8 and 9 are two series of cams 13, each cam being supported in a vertically-sliding cam-carrier 14. Each cam-carrier consists of two side plates 15 and 16, suitably spaced apart. Between these plates is a short slide 17, held in place with freedom for vertical movement by means of a U-shaped key 18, Figs. 6 and 7. The slide 17 rests upon a spring 19, which spring is supported in the cam-carrier. The upper ends of the carriers slide in a suitable guide or comb 20, which is removable to permit of the easy removal of the carriers. The lower end of each side plate 15 has two branches which slide vertically in grooves in guide-combs 21. These branches have right-angled portions 22, which slide in the grooves, and one of these right-angled portions on each carrier is provided with a shoulder 23 to limit the downward movement of the carrier and support it when it is inactive, Figs. 6 and 7. The lower ends of the escapement-bars 24 rest within the carriers and upon the sliding rods 17. The upper ends are guided in combs 25 upon

an adjustable frame 26, and they stand beneath the rear ends of the escapement-levers. Each cam-carrier is provided with a pivoted stop-arm 27, which has a projection or shoulder 28, adapted to intercept a projection 29 on its respective cam to stop the revolution of the latter. Beneath the free end of each stop-lever is a key-bar 30, adapted to be vertically reciprocated by one of the key-levers 31 of the keyboard. As shown, the key-lever has a projection 32, which engages a notch 33 in its key-bar. Each of the key-bars is provided with a shoulder 34, by means of which the bar is supported on the fixed rod 35. A second shoulder 36 prevents the key-bar from being raised abnormally. It will be understood that for each key-lever there is one key-bar, one cam-carrier, one escapement-bar, and one escapement. The arrangement of the several parts will be evident from inspection of Figs. 6 and 8.

The operation of the devices above described is as follows: Upon pressing the key-lever the key-bar is raised and the free end of the stop-lever, which normally rests upon the key-bar, is raised sufficiently to carry the shoulder 28 above the projection 29 on the cam. The cam or eccentric is unequally weighted, and as soon as released it begins to revolve, and immediately it engages the roller 9 and is rapidly rotated. To facilitate this engagement, the roller is preferably covered with soft material, such as rubber, and the cam is provided with a roughened or serrated surface. The rotation of the cam raises the cam-carrier, to which it is attached, a slight distance and then permits it to fall again. At the end of a single rotation the cam is again detained by the stop 28, the stop-lever having been lowered in the meantime. The upward movement of the cam-carrier is communicated to the slide 17 through the spring 19 and then to the escapement-bar 24, which rests on slide 17. The spring takes up the shock of sudden starting and stopping and also provides relief in case the escapement-pawls should stick or refuse to operate for any reason. It will thus be seen that each time a key-lever is operated the pawls of the corresponding escapement are quickly reciprocated by power and returned to their normal position, a matrix bearing the desired character being thereby delivered to the assembling mechanism.

The frame 26, in which the upper ends of the escapement-bars are guided, is adjustable longitudinally upon a rod 37 and adjustable laterally about said rod by means of set-screws 38 39, which pass through lugs in the frame and bear upon a part of the main frame D. The longitudinal adjustment of frame 26 is effected by means of a screw 40, carried by an arm 41 on said frame and bearing upon the magazine A. The frame 26 carries arms 42, which are loosely pivoted to rearward projections 43 of the "front" 44, the parts 43 having large openings, through which pivot-pins 51 extend. (See Fig. 9.) The upper end of said front is normally pressed forward by means of spring 45. The coiled spring 46 has one end abutting against the eye 47 on frame 26 and its other end bearing on a fixed part 52. The front 44 has a longitudinal sliding movement on the assembler-entrance, in consequence of which the said front and the escapement-bar frame 26 are urged to the left by spring 46, and the parts are held stationary in the desired position by the adjusting of screw 40.

As a convenient means of sustaining the magazine when it is raised to be cleaned a lever 48 is provided. The lower end of the lever is pivoted to the main frame D, and the upper end is adapted to swing forward to support the lower end of the magazine. The lever is preferably provided with a stop 49, which comes in contact with an abutment 50 to limit its forward movement.

In the foregoing specification we have described the best embodiment of our invention at present known to us. It will be evident, however, that various changes in details of construction and arrangement may be made without departing from the spirit of the invention, and therefore we do not limit ourselves to the present structure illustrated and described.

What we claim, and desire to secure by Letters Patent, is—

1. In a linotype-machine, the combination with a roller and means for rotating the same, of a sliding cam-carrier frame adjacent to the roller, a cam carried by said carrier and having a tendency to engage with the roller, a stop normally holding said cam out of engagement, means operated by a key-lever for temporarily withdrawing the stop, and a connection between the cam-carrier and the magazine-escapement.

2. In a linotype-machine, the combination with a roller and means for rotating the same, of a sliding cam-carrier, a cam carried by said carrier in proximity to the roller and having a tendency to engage therewith, a stop-lever having a shoulder normally engaging a projection on said cam, a key-lever, and a key-bar between said key-lever and said stop-lever.

3. In a linotype-machine, the combination with a rotating roller, of a sliding cam-carrier, a cam mounted on said carrier in proximity to the roller, means for engaging the cam with the roller temporarily, an escapement-operating bar operated by the cam-carrier, and a spring interposed between said bar and carrier.

4. In a linotype-machine, the combination with a rotating roller, of a sliding cam-carrier, a cam pivotally mounted on said carrier adjacent to the roller, a spring supported on the carrier, a slide within the carrier-frame supported on said spring, and an escapement-operating bar supported on said slide.

5. In a linotype-machine, the combination

of the escapement-bars, a sliding frame for guiding said bars, a front 44 interlocking with said frame, the spring for urging said frame and front in one direction, and the adjusting-screw mounted in a connection of said parts and bearing upon the magazine to effect the accurate adjustment of the escapement-bars to their respective escapements.

6. In a linotype-machine, the combination of a sliding guide-frame for the escapement-bars, a magazine having a series of escapements, the arm on said frame having an adjusting-screw bearing upon the magazine, a connection between said frame and the front 44, and the spring arranged to hold said adjusting-screw in contact with the magazine.

7. In a linotype-machine, the combination with the removable magazine, of the hinged support for the lower end of said magazine adapted to sustain it when raised from its normal position.

In testimony whereof we affix our signatures in presence of two witnesses.

OTT. MERGENTHALER.
EMIL LAWRENZ.

Witnesses:
MURRAY HANSON,
WILLIAM H. BERRY.