No. 859,647. PATENTED JULY 9, 1907.

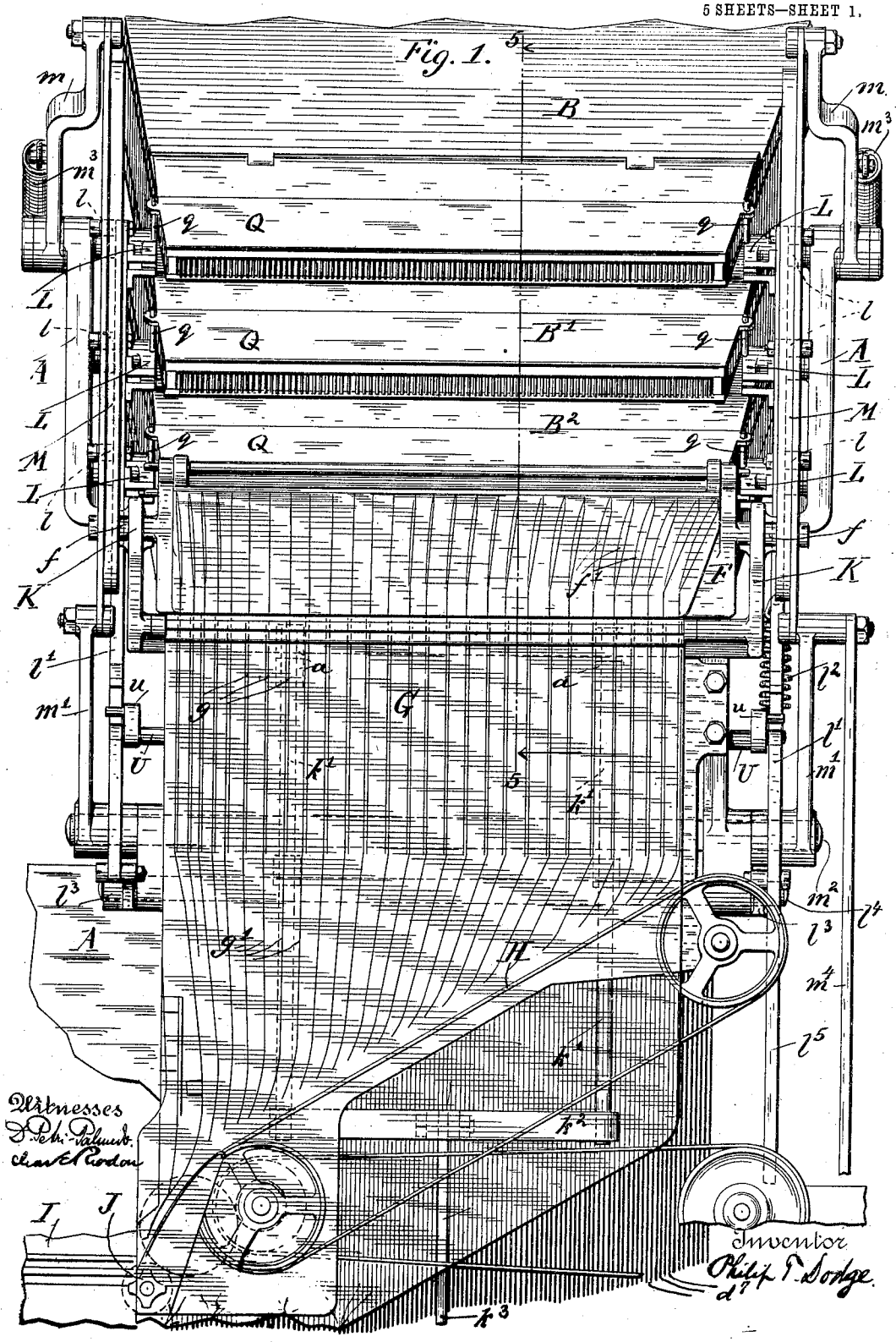
P. T. DODGE.

LINOTYPE MACHINE.

APPLICATION FILED NOV. 13, 1906.

5 SHEETS—SHEET 1.

Fig. 1.



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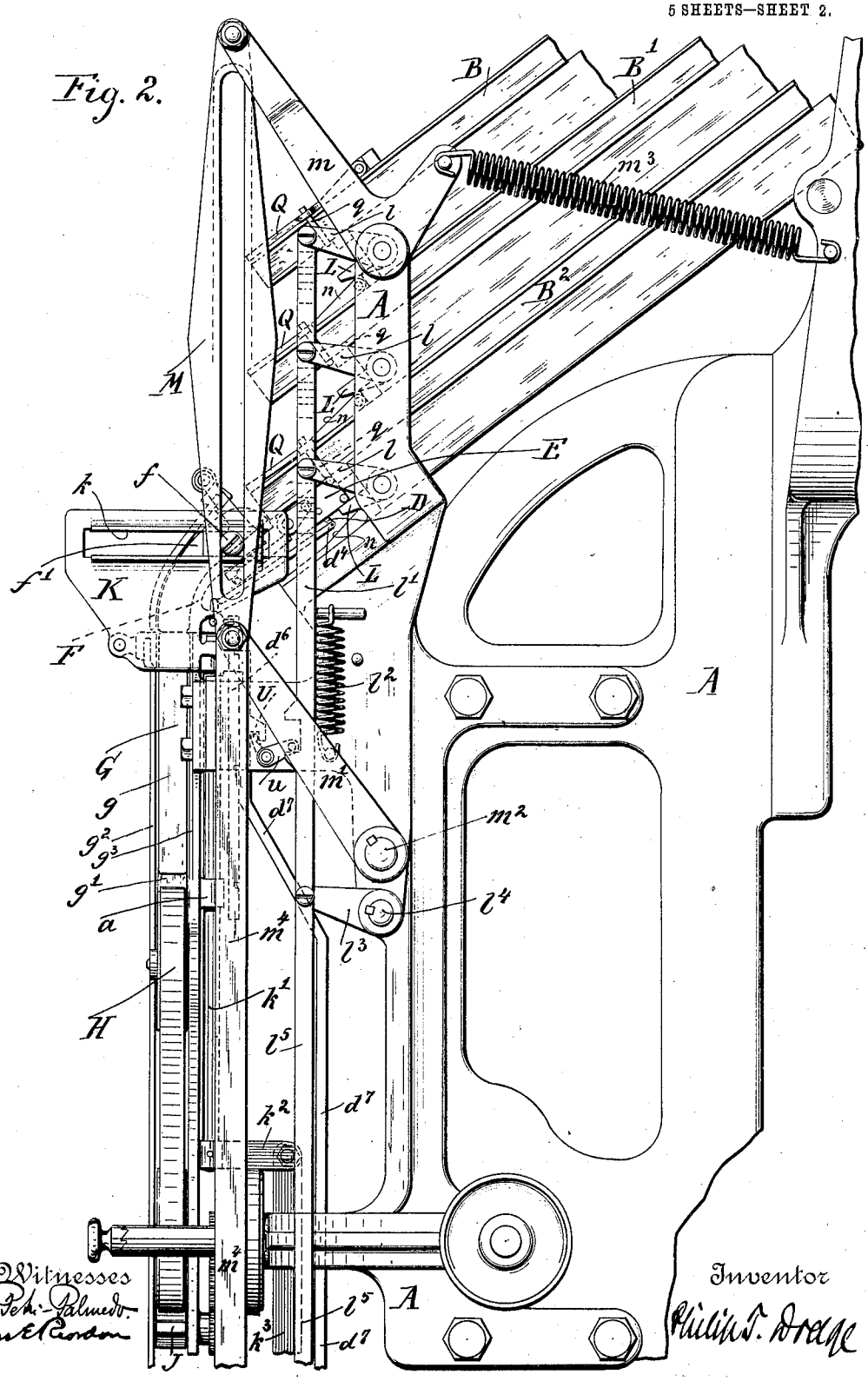
5 SHEETS—SHEET 2.

Fig. 2.



Witnesses

Inventor

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5 SHEETS—SHEET 3.

Fig. 2a.

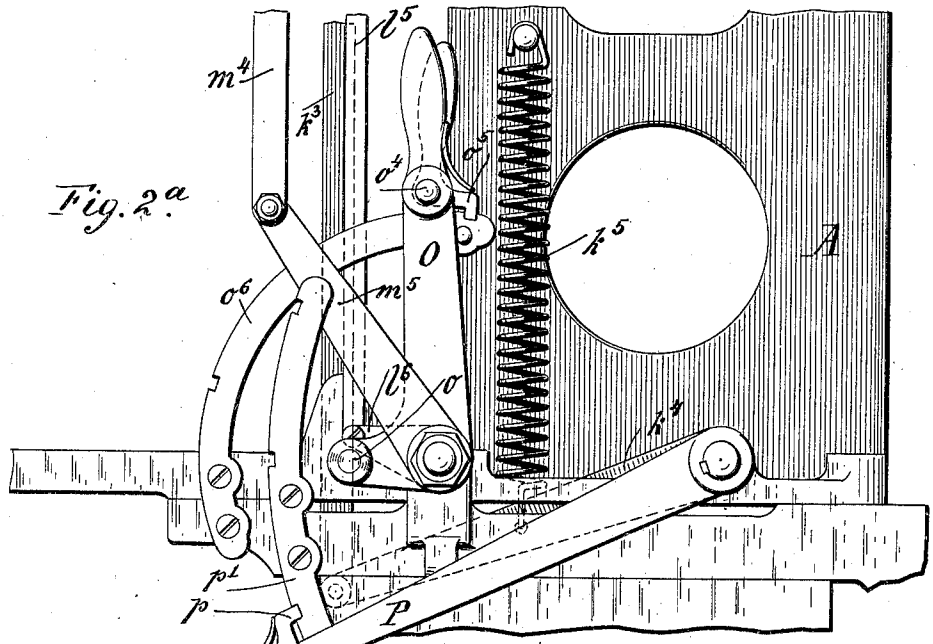


Fig. 3a.

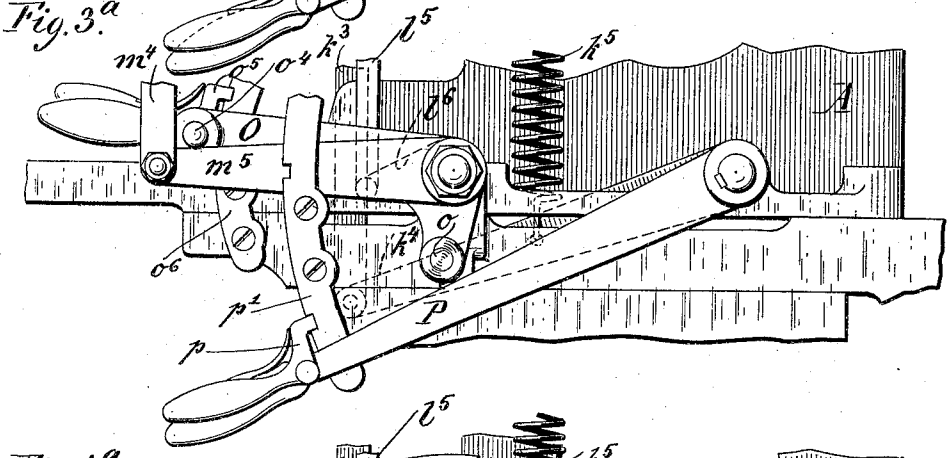
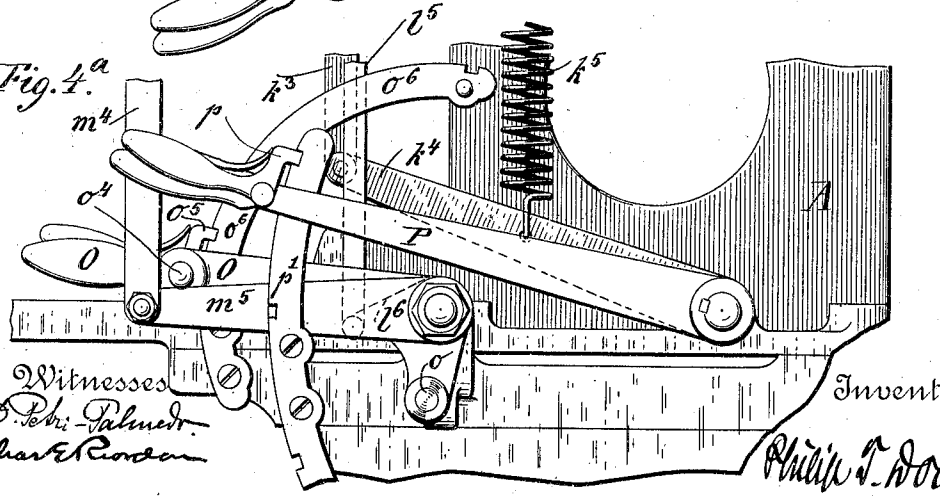


Fig. 4a.



Witnesses
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Chas. E. Riordan

Inventor
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5 SHEETS—SHEET 4.

Fig. 3.

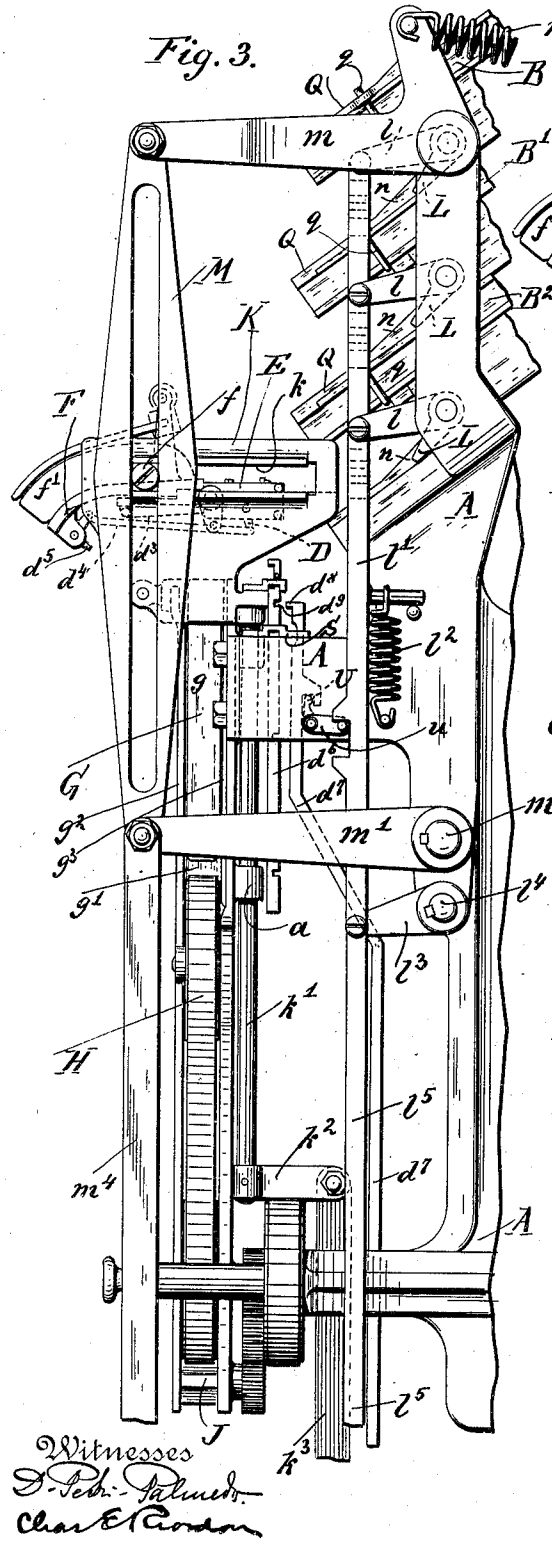
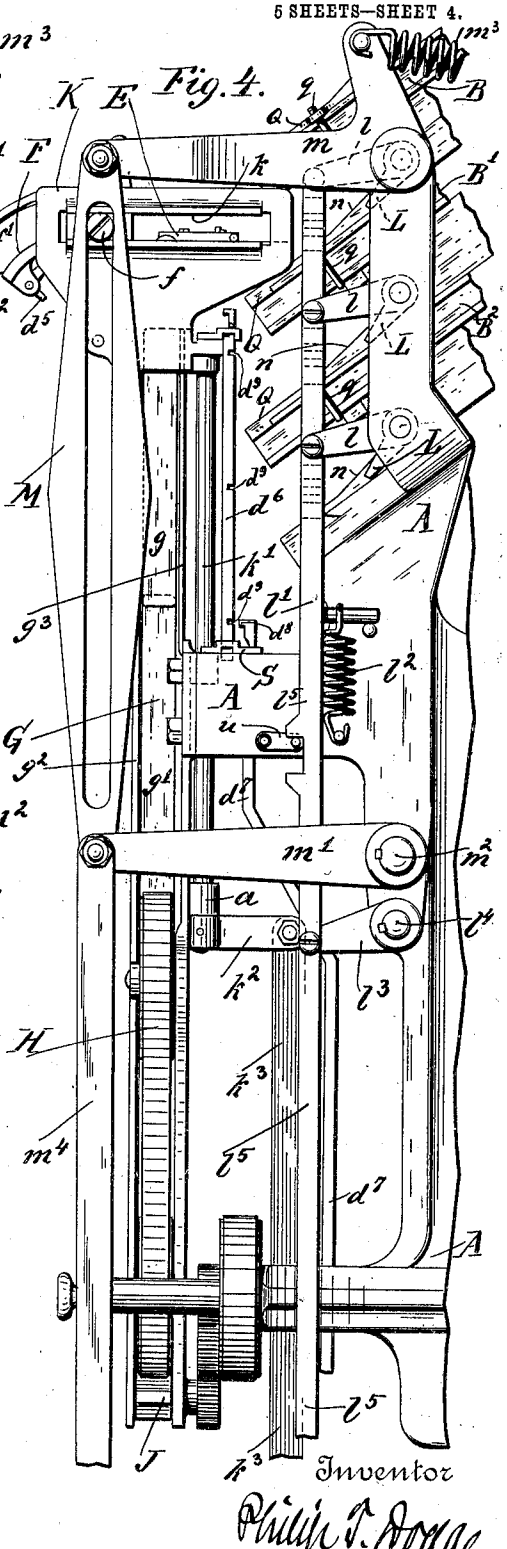


Fig. 4.



Witnesses

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Chas. E. Gordon

Inventor

Philip T. Dodge

No. 859,647. PATENTED JULY 9, 1907.

P. T. DODGE.

LINOTYPE MACHINE.

APPLICATION FILED NOV. 13, 1906.

5 SHEETS—SHEET 5.

Fig. 5.

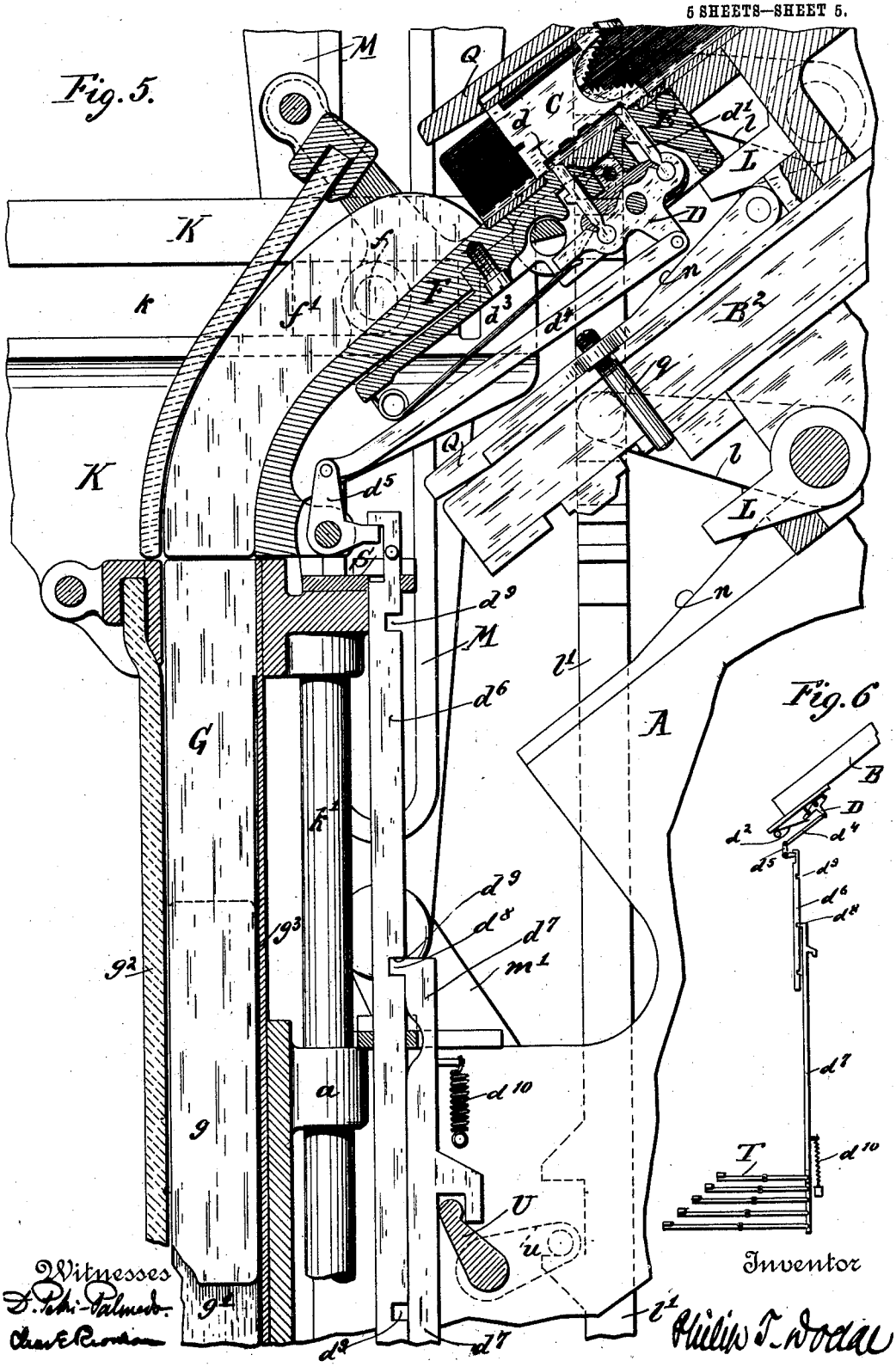

Fig. 6

UNITED STATES PATENT OFFICE.

PHILIP T. DODGE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO MERGENTHALER LINOTYPE COMPANY, A CORPORATION OF NEW YORK.

LINOTYPE-MACHINE.

No. 859,647. Specification of Letters Patent. Patented July 9, 1907.

Application filed November 13, 1906. Serial No. 343,213.

To all whom it may concern:

Be it known that I, PHILIP T. DODGE, of the city of Washington, District of Columbia, have invented a new and useful Improvement in Linotype-Machines, of which the following is a specification.

My invention has reference to linotype machines wherein circulating matrices, representing type characters, are stored in magazines, selected and assembled temporarily in line, and presented to a mold in which a printing slug or linotype is cast against them, the matrices being thereafter returned, through distributing mechanism, to the top of the magazine.

The invention relates more particularly to that form of machine in which a series of stationary superposed magazines, each containing a font or set of matrices, is arranged to deliver the matrices to a common raceway at the front.

In machines heretofore designed, each magazine was provided with a series of escapements, one for each channel, to control the delivery of matrices therefrom. These escapement mechanisms were complicated and expensive.

It is the aim of my invention to enable a single series of escapements to deliver matrices from any one of the magazines at will.

To this end, the invention consists broadly in the combination of a series of normally fixed magazines with a single series of escapements, so arranged as to be relatively movable, in order that the escapements may be brought in operative relation to any one of the magazines.

The advantages of my invention reside mainly in the fact that I am enabled to deliver matrices from a series of magazines by means of a single escapement mechanism, and the further fact that I am enabled to make use of a series of stationary magazines, which in turn permit the use of a stationary distributing mechanism in operative relation to all the magazines at one time, as shown for example in Letters Patent of the United States Nos. 640,033 and 799,943, or the application of John R. Rogers, Serial No. 301,665, filed February 17, 1906.

My organization is the first, I believe, in which a single series of escapements can be employed in connection with a series of magazines to any one or all of which matrices may be in course of distribution at any moment. This permits a continuous distribution of matrices to any one or all of the magazines, so that the operator may use matrices at will from any magazine without being compelled to await the distribution of those previously delivered from other magazines. In other words, the operator is permitted to deliver matrices at any instant from any one of the magazines regardless of the character or font of matrices contained in previous lines.

In the preferred form, shown in the accompanying drawings, the inclined magazines are fixed rigidly on the main frame, and the escapement mechanism is movable vertically in such manner that it may be set in operative relation under any one of the magazines at will, the arrangement being such that connection with the keyboard can be maintained under the various adjustments.

In the drawings, Figure 1 is a front elevation of a machine having my improvement embodied therein. Fig. 2 is a side elevation of the same, looking from the left. Figs. 2^a, 3^a, and 4^a are detail views of the operating levers. Figs. 3 and 4 are side views showing the escapement mechanism in different positions in the course of adjustment. Fig. 5 is a vertical section on an enlarged scale, through the front of the machine, on line 5—5 of Fig. 1, with the escapements in operative relation to an upper magazine. Fig. 6 is a diagram illustrating the finger-key connections for operating the escapements.

Referring to the drawings, A represents the main frame, which may be of any suitable construction. B, B′, &c., represent inclined magazines, of which there may be any desired number, fixed in position one above another on top of the main frame.

Each magazine consists, as usual, of two parallel plates grooved or channeled longitudinally in their inner faces to receive and guide the matrices C, as usual. There is only one magazine in action at a time. The delivery of the selected matrices from this magazine, one at a time, is effected by a series of ordinary escapement levers D, one for each channel in the magazine. These levers are centrally pivoted and are provided at opposite ends with pawls d, d', which are projected upward alternately through the under side of the magazine to control the escapement of the matrices.

The series of escapements are supported in a bar or frame E, known as the escapement-bar. When released, the matrices pass downward from the end of the magazine over a throat-plate F and between vertical partition-plates f' thereon. Continuing their downward course, they pass through the vertically channeled face-plate or raceway G, by which they are delivered to the inclined belt H, which in turn delivers them, as shown in Fig. 1, into the assembler I in front of the star-wheel J, by which they are assembled in a compact line.

So far as described, the escapement, throat-plate, &c., are of the ordinary construction and operate in the ordinary manner.

Instead of providing a series of escapements for each

magazine, I connect the escapement-bar E firmly to the throat-plate F, and mount them both in such manner as to admit of their being shifted at will and placed in operative relation to any one of the magazines.

The supporting and adjusting devices may be widely varied. In the form shown in the drawing, the throat-plate, which gives support to the escapement-bar, is provided at opposite ends with trunnions f mounted in horizontal slots k in a vertically movable yoke K, carried on the upper ends of vertical rods k', mounted to slide upward and downward through guides a on the main frame.

When the escapements are in operative position under either magazine, they are held up firmly in place by vertically swinging arms L, which act beneath the rear corners of the escapement-bar E on opposite sides of the machine, as shown in the several figures. When the arms L are turned downward, they permit the escapement-bar to turn around the trunnions f as pivots and fall away from the magazine, after which the escapement and the throat may be moved forward entirely clear of the magazine, as shown in Fig. 3, the trunnions f sliding forward along the slots k. After the throat and escapements have been thus retracted, they may be raised or lowered until they are opposite another magazine which is to be brought into use, after which the throat and escapement-bar are moved backward, the escapement-bar turned up to its place and confined by arms L,—there being a pair of these arms for each magazine.

For the purpose of governing the forward and backward movements of the throat and escapements to and from the magazines, I provide on opposite sides of the machine, vertically slotted yokes M, which receive the trunnions f before referred to. These vertical yokes are jointed at their upper and lower ends to arms m, m', which are in turn pivoted at their rear ends to the frame, so that as they are swung upward and downward, they will carry the yokes M forward and backward, causing the yokes in turn to impart a like movement to the throat and escapement mechanism.

The lower arms m' are mounted on opposite ends of a rock-shaft m^2 extending through the main frame from side to side, this arrangement maintaining parallelism of the yokes M and causing them to move in unison.

The upper yoke-supporting arms m are made of angular form and connected by springs m^3 with the main frame, these springs tending to carry the yokes M upward and rearward so as to aid in holding the escapements and the throat in their operative positions, as shown in Fig. 2. As the escapement-bar is moved downward and forward away from the magazine, the rear corners of the escapement-bar E, or studs thereon, ride over arms L and upon inclined surfaces n, which aid in guiding the bar, and prevent it from turning over to an objectionable position during its movement.

The series of arms L which hold the escapement devices upward in their operative positions, are each provided with a secondary arm l, which arms are connected in series to a vertical controlling-bar l', urged constantly downward by a spring l^2, and lifted by means of a hand-lever, as hereinafter described, so that the arms L may be operated in unison and caused to act on the escapement-bar in any of its several positions. These controlling-bars are in turn connected at their lower ends to crank-arms l^3 on opposite ends of a rock-shaft l^4 extending through the main frame from side to side. One of these cranks l^3 is connected by a descending bar l^5 to an arm l^6 mounted loosely on the pivot of a hand-lever O mounted on the main frame and carrying a stud o. When the lever is in its normal and upright position, the stud o, acting beneath the arm l^6, causes the latter to lift the bar l^5, thereby turning the arms l upward so that they will hold the escapement bar firmly against that magazine to which it is for the time being applied.

The yokes M, which control the forward and backward movement of the escapement and throat, are connected by a descending bar m^4 to an arm m^5, which is also mounted loosely on the axis of the lever O. This lever is provided with a second stud o^4 in such position that when the lever is turned forward and downward, as shown in Figs. 3^a and 4^a, it will depress the arm m^5, causing it to draw down the bar m^4, and thereby pull the yokes M downward and forward so that the throat and escapement are caused to slide forward in the yokes K. The lever O is provided with a latch o^5 engaging a notched plate o^6, by which it will be secured in the different positions.

It will be understood that when the lever O is drawn forward, its first effect is to release the escapement and permit it to fall away from the magazine, after which its second effect is to move the yokes M forward so that the escapements will be drawn clear of the magazines preparatory to their vertical adjustment. After this action, the lever P is operated to raise or lower the escapement, and while the lever is locked in position and the escapement supported at the proper level, the lever O is turned upward causing the escapement to be moved backward and upward beneath the magazine, and thereafter causing the escapement to be locked in place by the underlying arms L.

From the foregoing it will be seen that the manipulation of the two levers will transfer the escapement mechanism and the throat from one magazine to another.

Referring now to the means for imparting motion to the horizontal and vertical yokes, and to the arms L, attention is directed particularly to Figs. 2, 2^a, &c., and Figs. 3 and 4.

The horizontal yokes K have their supporting rods k' connected to a cross-bar k^2, carried at its middle by a vertical bar k^3, jointed at its lower end to an arm k^4, fixed on a common pivot with a hand-lever P.

A spring k^5 is attached to the main frame and connected to the arm k^4, as shown, so that it tends to counterbalance and lift the yoke K, the escapement and the throat-plate carried thereby. By moving the lever P upward and downward, the yoke K and the escapement may be set at any required height. This lever is provided with a latch p, arranged to engage a notched locking-bar p', whereby it may be held in any required position.

When the escapement is disconnected from the magazine, the contained matrices would escape were not provision made to the contrary.

Various mechanisms adapted to secure the matrices in the non-operative magazines are well known in the art, but I recommend the arrangement shown, consisting of a plate Q overlying each magazine and hinged at the rear edge so that it may rise and fall, its forward end being adapted to pass down past the top plate of the magazine far enough to engage over the ends of the foremost matrices and prevent their escape. In order to automatically lift these matrix-retaining plates Q out of action, they are provided, as shown in Fig. 5, with depending arms q in position to be acted upon and lifted by the escapement-bar when it is raised to its operative position under the magazine. When the escapement-bar is released and permitted to fall, the plates Q are permitted to descend and engage the matrices.

As the throat F is raised and lowered with the escapement, it follows that the upper end of the channeled face plate or raceway G must be adjusted accordingly, and I therefore construct this face plate in sectional or telescopic form so that its upper and lower end may be raised and lowered in relation to the lower and stationary portion.

As shown in the drawings, the vertical partitions consist of upper portions g and lower portions g'. The upper portions g together with the front and back plates g^2 and g^3, are secured to the yoke K and move upward and downward therewith so as to maintain their operative relations to the throat F. The lower sections g', which overlap and form continuations of the upper sections, are fixed to the main frame and remain stationary.

Each escapement lever D is acted upon by a spring d^3, tending to raise the lower pawl and to depress the upper one. The escapements are held normally in the position shown in Fig. 5 against the stress of the spring d^3 by a link d^4 connected to an angular lever d^5 pivoted to the throat F. This lever d^5 has its horizontal arm urged constantly downward by a vertical reed or slide d^6 detachably engaged with a second slide or reed d^7 urged constantly downward by a spring d^{10} of sufficient strength to overcome the spring d^3. The reed d^7 will be connected with an ordinary finger-key T, as shown in Fig. 6, or with a finger-key mechanism such as is used with the corresponding reeds in linotype machines, so that when the key is actuated, the reed d^7 being raised, will in turn raise the upper section d^6 and permit the spring d^3 to reverse the position of the escapement. As soon as the key action ceases, the parts will assume the position shown in Fig. 5.

Inasmuch as the finger-keys are fixed in position in the main frame while the escapement mechanism is raised and lowered, so as to change the distance between them, it is necessary that the connecting reeds shall be variable in length. It is for this reason that each reed is divided into the two sections d^6 and d^7. The lower section d^7 is provided at the upper end with a lip d^8 adapted to enter, one at a time, corresponding notches d^9 formed in the upper section d^6. The lip will be engaged in one or the other of the notches according to the height at which the escapement is fixed, or in other words, according to the magazine to which the escapement is applied.

The two sections d^6 and d^7, connected as described, constitute in effect a continuous reed of variable length. It is obvious that the two sections may be connected in any suitable manner which will admit of their being separated and reconnected in different relations. It is also obvious that any suitable means may be employed for guiding and holding the sections. In the construction shown in Fig. 5, a plate S fixed in the main frame serves to guide the lower ends of the sections d^6 and also the upper ends of sections d^7. The plate is slotted to permit the lower sections d^7 to be retracted and disengaged from the upper sections. This separation of the lower sections from the upper, and the reconnection of the parts, is effected by a rocker-plate U mounted in a horizontal pivot in the main frame and engaging at its upper edge beneath ears on the sections d^7. At one end, this rocker-plate U is provided with a crank-arm u, engaging in a notch in the vertical bars l', heretofore referred to as controlling the devices which lock the escapement to the magazine. When these bars are in their normal and operative position, they hold the rocker-plate U in the position shown in Fig. 5, so as to maintain the engagement between the two sections of the reed, and when the bars l' are depressed to release the escapement, they rock the plate U backward and disconnect the sections of the reed, thus permitting the upper sections d^6 to be moved upward and downward with the escapement, the throat-plate, and the raceway G.

The operation of the mechanism is as follows:—Assuming the escapement-bar to be in operative relation to one of the magazines; as shown in Fig. 2 and in Fig. 5, the operator manipulates in proper sequence the finger-keys T representing the various characters required, thereby causing the reeds d^6, d^7 to rise against the resistance of the spring d^{10}, thus releasing the levers d^5 and the escapements D so that the latter may be reversed by the action of the springs d^3. The action of the escapement permits the matrix to descend from the position shown in Fig. 5 until arrested by the lower escapement pawl d. When each finger-key is released, each escapement D assumes its original position, retracting the pawl d and permittting the matrix to escape and pass downward through the throat F and raceway G to the assembling mechanism, the next matrix in the magazine taking the place of the one discharged. The delivery of matrices is continued until all the characters and spaces required in one line are assembled. This operation will be continued until a change in the face or style of the type is required. In order to bring into action a different font of matrices in another magazine, the operator first moves the lever O downward and forward, thereby releasing the arm l^6 and bar l^5 so that the escapement-supporting arms L may swing down. This action releases the escapement bar and permits it to fall away from the magazine. At the same time, the bars l^5 are caused to operate the rocker-bar U, which disconnects the lower sections d^7 of the escapement-actuating reeds from the upper sections d^6. The bar l^5 at the same time turns the rock-shaft V in the escapement-bar to lock the escapements to prevent the pawls from reversing their positions during the transfer of the bar from one magazine to another. The continued movement of the lever O causes its stud o^4 to depress the arm m^5 which, through the intermediate connections, pulls down the yokes M. These yokes in descending, move forward and, acting

on the trunnions f, carry the escapement-bar and throat forward clear of the magazines, as shown in Fig. 3. The lever P is next operated and, through the arm k^4 and bar k^3, it raises or lowers the yoke K, as required, until the escapement-bar and throat are presented opposite the magazine which is to be brought into use. The lever P is now locked in position to maintain the height of the parts. The vertical movement of the yokes K is accompanied by a corresponding vertical movement of the upper section of the raceway G and the upper sections d^6 of the escapement-actuating reeds. The lever O is then turned upward; the first effect being to move the yokes M upward and rearward so as to carry the escapement-bar beneath the magazine, after which the arms L are turned upward to force the escapement-bar into intimate contact with the magazine and hold it in operative relation thereto.

While I prefer to employ an escapement mechanism of the form herein shown, or the same general form, it is to be understood that this mechanism in itself is not an essential feature of my invention, and that I may substitute escapement devices of any other suitable form, such devices being already known in the art in several forms.

It will also be understood by the skilled mechanic that the devices for sustaining the escapement mechanism in operative position, and for sustaining it while it is being shifted, may be widely modified without departing from the scope of my invention.

By the expression "escapement mechanism movable at will" and similar expressions employed herein, I refer to escapement mechanisms which are movable bodily so that the one set or series of escapements may be located to control the delivery of matrices from one magazine or another, as required.

Having described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a linotype machine, plural fixed magazines in combination with an escapement mechanism movable bodily at will into operative connection with one magazine or another.

2. In a linotype machine, plural fixed magazines and a single escapement mechanism, in combination with means for moving the latter at will from one magazine to another.

3. In combination with plural magazines, an escapement mechanism, means for shifting the latter from one magazine to another, and means for locking said mechanism in operative relation to the selected magazine.

4. In a linotype machine, and in combination, two or more fixed magazines, an escapement mechanism and a matrix-guiding throat connected as one, and movable from one magazine to another at will.

5. In a linotype machine, plural superposed magazines, an escapement mechanism and a matrix-guiding throat movable from one magazine to another at will, and a vertically extensible raceway to conduct the matrices to the assembling mechanism, said elements combined for joint operation, substantially as described.

6. In combination, plural fixed magazines lying one above another, a vertically movable escapement mechanism applicable to either magazine at will, and vertically movable means for guiding the matrices from that magazine which is in action to the assembling mechanism.

7. A series of fixed parallel magazines, and an escapement mechanism operative through the side of any magazine in advance of its delivery end, in combination with means for moving said mechanism from one magazine to another at will, and means for confining the mechanism in operative position.

8. A series of inclined superposed magazines, an escapement mechanism operative in connection with any magazine, means for moving said escapement mechanism horizontally, means for moving the same vertically, and means for locking the same fast to one magazine or another at will.

9. A series of fixed superposed magazines, an escapement mechanism operative in connection with any magazine, pivotal supports for said mechanism, and means for supporting the pivots and permitting the same to be moved horizontally and vertically; whereby the presentation of the escapement to one magazine or another at will is permitted.

10. In combination, a fixed magazine adapted to permit the entrance of escapements through its side, and a movable bar carrying a series of escapements, horizontal trunnions around which said bar may be rocked to move the escapements to and from their operative position, and movable supports for the trunnions.

11. In a linotype machine, fixed superposed magazines, an escapement mechanism vertically movable from one magazine to another, a stationary finger-key mechanism, and extensible connections between the finger-keys and the escapement mechanism; whereby the keys are permitted to operate the escapement mechanism in its various positions.

12. In combination, a stationary magazine, an escapement mechanism applicable to and removable from the magazine at will, and movable supports adapted to sustain the escapement mechanism both in its operative and its inoperative positions.

13. In combination, a stationary magazine, an escapement mechanism separable at will therefrom, movable supporting mechanism connected to the escapement mechanism by trunnions, and independent means for locking the escapement to the magazine when in operative position; whereby the movement of the escapement mechanism to and from the magazine, and a rocking movement incident to said movement, are permitted.

14. In combination, a stationary magazine, complete escapement mechanism detachably applied thereto, means for sustaining the escapement mechanism and transporting the same to and from the magazine, and means for locking the escapement mechanism firmly against the magazine in operative position.

15. In combination with a stationary magazine, an escapement mechanism having a swinging and sliding movement in relation to the magazine, and devices for controlling the movement of said mechanism.

16. In a linotype machine, and in combination with a stationary magazine, an escapement mechanism and a matrix-guiding throat rigidly united, and movable supports permitting said members to be moved to and from the magazine.

17. In a linotype machine, a stationary magazine, an escapement mechanism removable therefrom at will, and means for retaining the matrices within the magazine, said means arranged to be thrown out of action by the escapement mechanism as the latter assumes its operative position.

18. In combination with a magazine, a movable matrix-retaining plate Q, and a removable escapement mechanism arranged to throw the plate out of action; whereby the matrices are automatically secured when the escapement is removed and automatically released when the escapement is applied.

19. In combination with a linotype magazine, a removable matrix-retaining plate Q applied at its upper side, and arms extending downward from said plate and adapted to be operated by means below the magazine.

20. In combination with the fixed magazine, the cooperating escapement mechanism removable bodily at will from the magazine, and the rocking-arm L for holding the escapement mechanism in operative relation to the magazine.

21. In a linotype machine, and in combination with a fixed magazine, an escapement mechanism and matrix-guiding throat removable from the magazine, the escapement-actuating springs d^3, the links d^4 and levers d^5 connected with the removable members, substantially as shown.

22. In a linotype machine, a series of superposed stationary magazines, an assembling belt H to receive matrices therefrom, and an intermediate raceway G, comprising a lower and stationary section with a series of vertical channels therein, and an upper vertically movable section with corresponding channels therein, and means for guiding and moving said upper section.

23. In a linotype machine, the fixed vertical partitions g' in combination with the partitions g, the plates g^2 and g^3 all mounted for vertical adjustment.

24. In combination with plural fixed magazines, an escapement mechanism and vertically and horizontally movable yokes supporting said mechanism and serving to transfer the same from one magazine to another, and means for confining the escapement in the selected position.

25. In a linotype machine, and in combination with plural magazines, an escapement mechanism movable vertically from one magazine to another, a stationary keyboard and connecting mechanism between the escapement and keyboard, said mechanism including longitudinally adjustable reeds.

26. In a linotype machine, and in combination with a fixed magazine, removable escapement mechanism, vertically extensible reeds for operating the escapement mechanism, and devices connected with each other for releasing the magazine and disconnecting the reeds.

27. In combination with plural stationary magazines, removable escapement mechanism, and connected devices for moving the escapement first horizontally and then vertically.

28. In combination with a stationary magazine, co-operating escapement mechanism, supporting devices adapted to lower the escapement mechanism away from the magazine, and supports to sustain the escapement mechanism while moving horizontally from under the magazine.

29. In combination with the movable escapement mechanism, the yokes K and M, the hand-lever, and connections whereby the hand-lever moves said yokes alternately.

In testimony whereof I hereunto set my hand this twelfth day of November, 1906, in the presence of two attesting witnesses.

PHILIP T. DODGE.

Witnesses:
F. M. EGGLESTON,
WALTER MOBLARD.