No. 618,308. Patented Jan. 24, 1899.

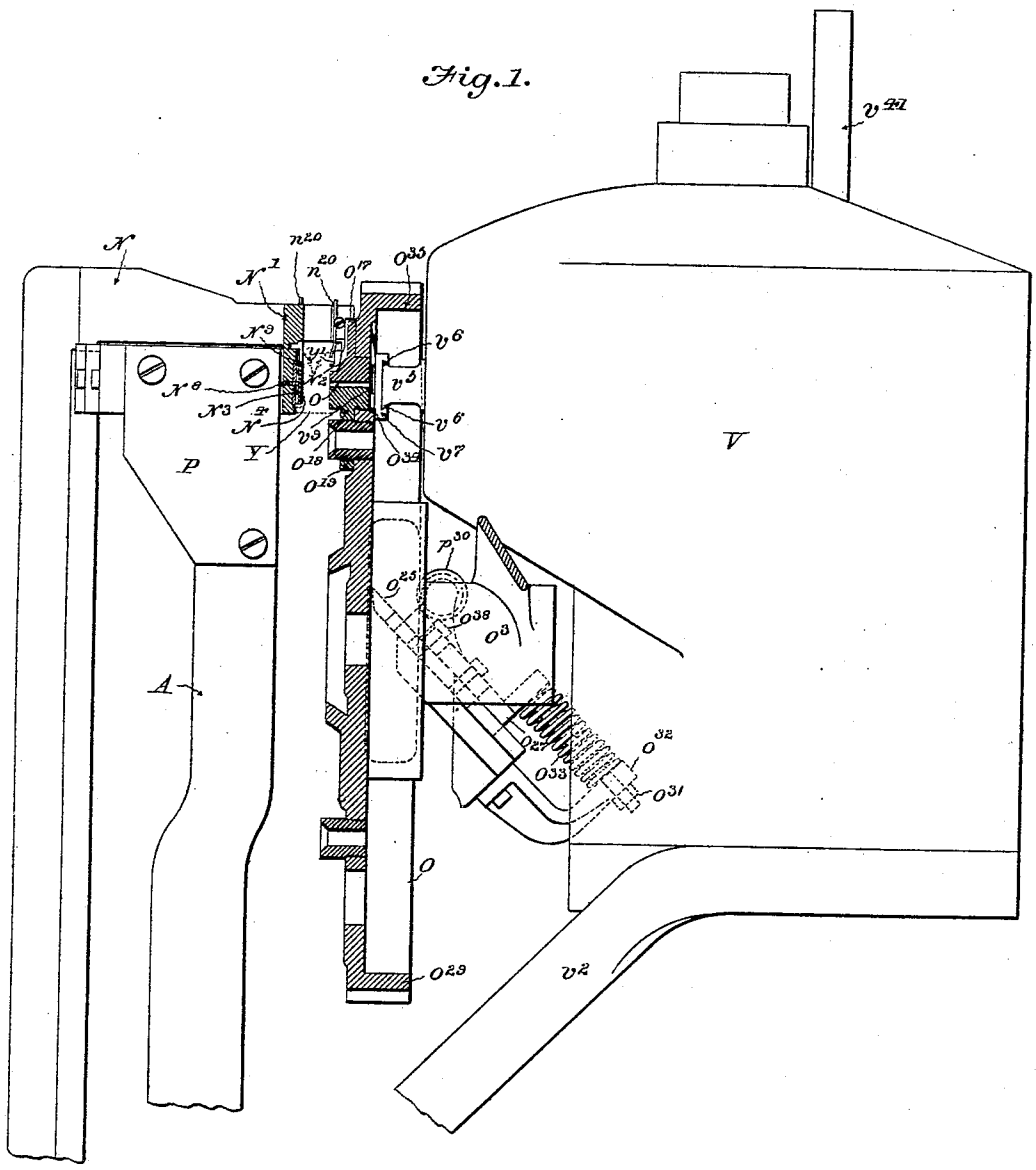
F. J. WICH.

MECHANISM FOR CASTING CURVED LINOTYPES.

(Application filed Dec. 31, 1897.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



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No. 618,308. Patented Jan. 24, 1899.

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MECHANISM FOR CASTING CURVED LINOTYPES.

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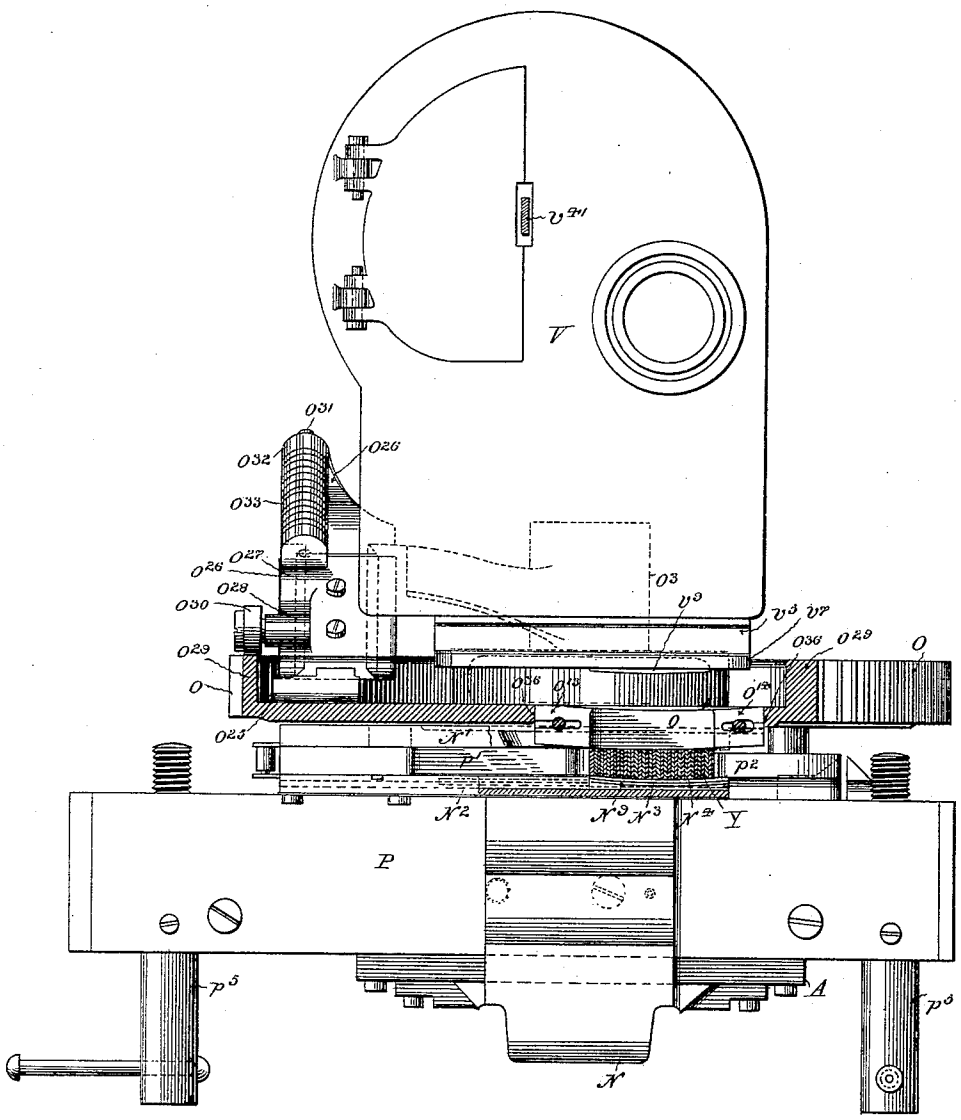
(No Model.) 4 Sheets—Sheet 2.

Fig. 2.



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MECHANISM FOR CASTING CURVED LINOTYPES.

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(No Model.) 4 Sheets—Sheet 3.

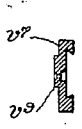

Fig. 5.

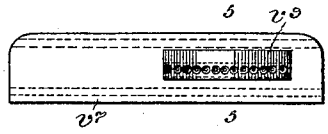

Fig. 3.

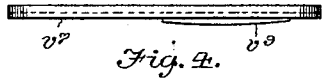

Fig. 4.

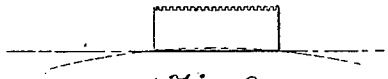

Fig. 6.

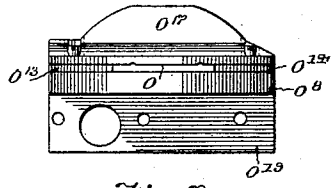

Fig. 7.

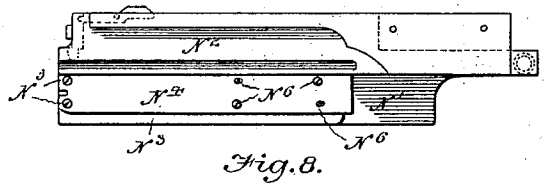

Fig. 8.

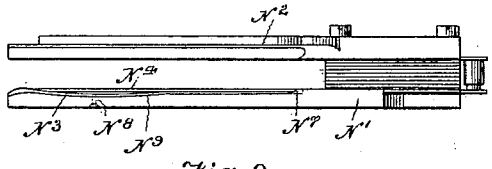

Fig. 9.

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MECHANISM FOR CASTING CURVED LINOTYPES.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 12.

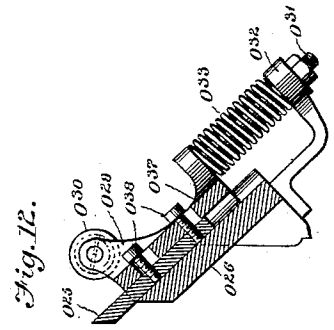


Fig. 13.

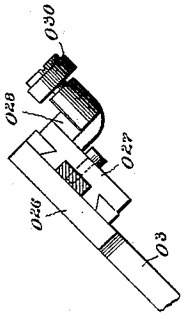


Fig. 11.

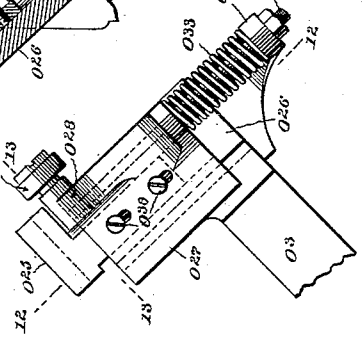
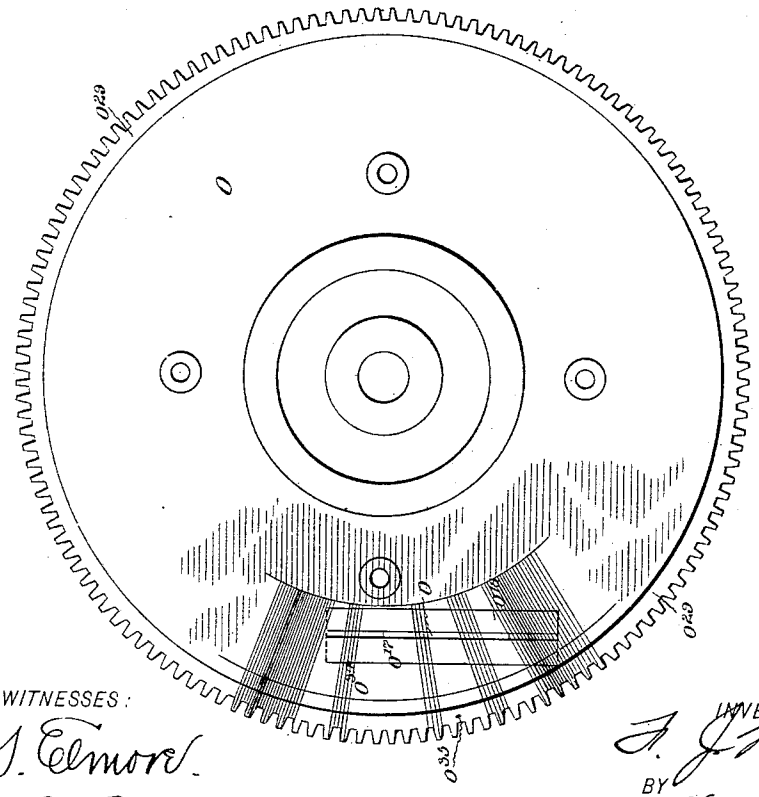


Fig. 10.



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UNITED STATES PATENT OFFICE.

FERDINAND JOHN WICH, OF MANCHESTER, ENGLAND, ASSIGNOR TO THE MERGENTHALER LINOTYPE COMPANY, OF NEW YORK, N. Y.

MECHANISM FOR CASTING CURVED LINOTYPES.

SPECIFICATION forming part of Letters Patent No. 618,308, dated January 24, 1899.

Application filed December 31, 1897. Serial No. 665,104. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND JOHN WICH, a subject of the Queen of the United Kingdom of Great Britain and Ireland, residing at Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Mechanism for Casting Curved Linotypes, (for which I have obtained the following patent in Great Britain and Ireland: No. 13,591, dated June 19, 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 improvements in mechanism for casting curved linotypes. A linotype is a movable printing-bar of a determined length, according to the width of the column or page in the printing of which it is to be used, having the type to print one line on its edge duly spaced and justified and at the same time incorporate with the body. Linotypes are practically known in this country only as the product of the Mergenthaler linotype-machine. This will be found fully described in the specification of Letters Patent of Great Britain No. 14,582 of 1890 and in United States Letters Patent dated September 16, 1890, Nos. 436,531 and 436,532. The present invention is applicable to all linotype-machines in which the selected matrices and space-bars composed into a line are held in front of a mold having a metal-injecting pump on the other side. It has, however, been conceived and developed with special reference to the Mergenthaler linotype-machine above mentioned, and for that reason, as well as because that machine is the only one in practical use in this country, its application thereto has been selected for illustration and detailed description. In the said machine when the composed line of matrices and space-bars is in the casting position it is supported between a pair of bars, one along the front and the other along the rear face of it. These hold it between a fixed abutment on the front face of it and the mold cavity in a part known as a "mold-wheel" on the rear side of it. The ends of the said line are held between the two jaws of a vise, which cramp it lengthwise. Behind the mold-wheel there is a metal-pot, the delivery-mouth of which fits up to the rear face of the mold and a metal-injecting pump. Hitherto the Mergenthaler linotype-machine has been made and sold in Great Britain with straight supporting-bars, straight mold, delivery-pot mouth, and straight composed line, a combination which yields straight linotypes. It is obvious that straight linotypes cannot be held to the surface of a printing-machine cylinder unless they stand thereon parallel with the axis of the cylinder. If they are required to stand transversely thereon — that is, with their lengths at right angles with the said axis— they must be curved to corresponding radii along both their feet and their printing edges. The front and rear faces of the mold, as well as the delivery-mouth of the metal-pot and the mechanism for trimming the foot of the linotype, must be modified accordingly.

The present invention consists, therefore, in the combination, with the supporting-bars, the mold, and the mouth of the delivery-pot, of improved means by which curved operative faces of the linotypes of the desired radii are substituted for the hitherto straight ones, respectively. It further includes means by which the said curved operative faces may be replaced by straight ones, respectively. In other words, my invention relates to mechanism by which linotypes may be cast with straight or with curved printing-surfaces, as demanded.

Referring to the accompanying drawings, which are to be taken as a part of this specification and read therewith, Figure 1 is a side elevation, partly in section, of the vise-frame, transporter, mold-wheel, and metal-pot looking at the machine from the right-hand side. Fig. 2 is a plan, partly in section, corresponding with Fig. 1, excepting as to the position of the metal-pot. Fig. 3 is a front elevation of the improved mouthpiece of the metal-pot. Fig. 4 is a plan corresponding with Fig. 3. Fig. 5 is a section taken along the line 5 5 of Fig. 3. Fig. 6 is an elevation of a curved printing-bar. Fig. 7 is a front elevation of a curved mold-block. Fig. 8 is a rear eleva-

tion of the improved top of the elevator. Fig. 9 is an inverted plan corresponding with Fig. 8. Fig. 10 is a rear elevation of the improved mold-wheel and one mold-block. Fig. 11 is a plan of the improved trimming-knife for the foot of a printing-bar looking at it in the direction of the arrow in Fig. 12. Fig. 12 is a section taken along the line 12 12 of Fig. 11. Fig. 13 is a section taken along the line 13 13 of Fig. 11 looking at it in the direction of the arrow.

The above-mentioned composed line of matrices and space-bars is represented in Figs. 1 and 2 by matrices Y. y' y' are the shoulders or lugs by which they hang from the two bars N′ N². These latter are horizontal, parallel with each other, and stand wide enough apart to receive the composed line between them. They themselves are fixed rigidly in relation to each other and to a vertical carrier-frame N, adapted to slide with a reciprocating vertical motion in suitable guides in the front of the main frame A of the machine. These three parts, bars N′ N² and frame N, which form a means for carrying the composed matrix-line and supporting it in front of the mold, are referred to in the specification of the Letters Patent above mentioned as the "yoke N." In the United States this yoke is commercially, and among machine users, known as the "first elevator" of the Mergenthaler machine. Throughout this specification the term "transporter" is substituted for "yoke." Each bar N′ N² is provided with an automatic latch n^{20}, adapted to rise as the composed line is delivered into the transporter and to close behind it after it has been so delivered. The front plate N′ is continued downward below the bottom edge of the rear plate N² for a distance equal to nearly the entire depth of a matrix Y.

Hitherto the rear face of the front plate N′ has been, like the opposite or front face of its fellow plate N², rigid. The present invention requires that it be capable of being changed at will to a surface that is curved in the direction of the length of the composed line to a radius corresponding to that of the cylinder of the printing-machine above mentioned, and, further, that the said curved surface be capable of being replaced at will by another of a different radius or by a straight one, each of such surfaces being perfectly rigid in its respective working position. This requisition of the capacity for a double replacement extends also to the mold and the delivery-mouth of the melting-pot. The above-described capacity for change of curvature is imparted to the said rear face by means of the combination in and with it of an arcual cavity and an adjustable elastic plate.

N³ is the arcual cavity. It stands in the bar N′ behind the composed line, extending along the bar for the maximum length of the line, and is, as shown in Fig. 1, preferably not wider than the distance between the top and bottom shoulders or lugs y' y'. The radius of this cavity is that of the smallest cylinder for which the machine is likely to be required to furnish linotypes.

N⁴ is the elastic plate. The strains which it will be called on to resist and the degree of elasticity which it must possess point to spring-steel of reliable quality as the proper material for it. There is a suitable recess N⁷ in the rear face of the bar N′ of the same size as or not less than the plate N⁴, and in which the latter fits flush with the said face of the bar N′. One end of the plate N⁴ is made fast to one end of the bar N′, leaving the adjacent portion of it to bridge the cavity N³ and the remainder to rest upon the bar N′ on the other side of the said cavity.

The figures show the end next to the mouth of the transporter as the fixed end, the free end extending for a suitable distance along and within the rear face of the bar N′.

N⁵ are the screws by which the above-mentioned fixed end of the plate N⁴ is held to the bar N′. The remainder of the device by which the plate N⁴ is held to the bar N′ is of a yielding character, adapted to allow of a slight motion of the respective portion of the plate in the direction of its length, such as screws N⁶, passed into the said bar on the opposite side of the arcual cavity N³ at suitable distances apart through elongated holes in the plate N⁴, as shown in Fig. 8, from which some of the screw-heads have been omitted. There is preferably a fixed lining N⁹ of both the cavity N³ and the recess N⁷. The maximum curvature of which the plate N⁴ is capable is of course one corresponding with the radius of the cavity N³. There is provided in the fixed plate N′, behind the cavity and preferably behind the center or maximum of it, an adjustable device adapted to limit the distance to which the plate N⁴ can be forced back into the cavity N³ by pressure exerted on the rear face of the said plate N⁴. A line of backing-up screws adjustable from the front face of the bar N′, or even a single screw N⁸, may be used for this purpose.

P is the fixed abutment standing immediately in front of the bar N′. It is held to the machine-frame by vise-screws p^5 p^5.

p' p^2 are the two vise-jaws. (Shown as in position for cramping the composed line between them.)

V is the metal-pot, and O the mold-wheel. The pot V is supported on upright lugs v^2, pivoted by their bottom ends (not shown) to the main frame of the machine, so as to provide for its motion to and from the casting position. In Fig. 1 it is in the casting position. In Fig. 2 it is waiting to be swung into it. The metal-injecting pump is inclosed within the casing of the metal-pot; but its presence is indicated by a portion of its piston-rod v^{41}.

According to the present invention the straight delivery-mouth in the intermediate piece v^5 is retained, the combination (necessary in view of such retention) with it of a removable curved one being provided for as follows:

Along each edge of the intermediate piece v^5 there is a vertical ridge v^6, which does not project to the front beyond the plane thereof, in order that the latter may retain its capacity for fitting metal-tight up to a straight mold.

v^7 is a slider undercut along both the bottom edges v^8 v^8 of its rear face, whereby it can be held metal-tight to the piece v^5 by sliding the said edges over the respective ridges v^6.

v^9 is a convexity on the front face of the slider v^7, the said convexity being parallel with the concavity of the rear face of the plate N^4. The arc of the convexity v^9 is not adjustable in respect of the radius of it, as is that of the plate N^4. For that reason a separate slider v^7 must be provided for each different concavity which will be given to the said plate N^4. The mold-wheel O is in all respects save the one described farther on with reference to the trimming mechanism, including its capacity for rotation within an arm o^3, as heretofore.

o is the mold-cavity in the mold-block. This latter is detachable from the mold-wheel O. It consists of a top piece or cap-plate o^{17}, a bottom piece o^{18}, and two distance-pieces or liners o^{13} o^{14}, the four being held fast together by a screw at each end, so as to frame the cavity o between them. The mold-block fits in a cavity o^{36} in the mold-wheel O in order that the delivery-mouth of the metal-pot V may reach it. It is held to the mold-wheel by screws passed through a flange o^{19}. According to the present invention the front and the rear faces of the mold-block are curved to be respectively parallel with the convexity v^9. As neither of the said faces of the mold-block are adjustable, being in that respect like the convexity v^9, a separate mold-block must be provided for each different concavity which will be given to the plate N^4.

The knife o^{25} is adapted to slide to and from the wheel O on a bracket o^{26}, springing from the arm o^3. o^{27} is a knife-block adapted to slide in a double V-groove upon the said bracket in a direction parallel with the axis of the wheel O. o^{28} is a finger projecting from the said block o^{27} and so situated as to be always in contact with the rear edge o^{29} of the rim of the mold-wheel O through an anti-friction-roller o^{30}.

o^{31} is a tail fast to and projecting from the opposite end of the block o^{27}, through a guide o^{32}, springing from the bracket o^{26}.

o^{33} is a spiral spring surrounding the tail o^{31} and compressed between the guide o^{32} and the knife-block o^{27}. The outer end of the said tail is fitted with a screw-threaded nut to regulate the degree of compression in the spring o^{33}.

o^{34} is a concavity in the rear face of the mold-wheel O surrounding the rear face of the mold-block on all sides. It is of a proper radius to provide for the knife next described gaining access to the rear face of the mold-block and parting company with it easily and without jerking. o^{35} is a similar concavity in the edge o^{29}.

o^{37} is the improved trimming-knife. Its cutting edge is long enough to insure contact between some of it and every part of the foot of the linotype. It is adjustably held to the knife-block o^{27} by set-screws o^{38}, passed down through slots o^{39} in the said block.

The wheel O, it will be observed, is simply a carrier for the mold, and the roller o^{30} a stop or bearing which rides against the mold-carrier to control the motion of the knife to and from the mold.

I believe the present to be the first instance in which a yielding knife in a linotype-machine has been controlled by a stop or bearing in order to relieve its cutting edge from the wear which would result from its constant and forcible contact with the mold or mold-carrier.

The action of the invention is as follows: The screws N^8 are set to support the plates N^4 of the matrix support or transporter parallel with the contour of the printing edge of the curved linotype to be cast, and the corresponding improved mold-block and delivery-mouth are fixed in their respective positions. The mold-wheel O and the metal-pot V are moved up into the casting position before the composed line is cramped between the vise-jaws p' p^2. The front face of the mold-block, therefore, easily forces the said line backward more or less throughout its length until it has assumed the curve of the plate N^4. If the latter is straight, the composed line remains straight. During the rotary motion of the mold-wheel O subsequent to the cast the resilience of the spring o^{33}, keeping the roller o^{30} in close contact with the rear edge o^{29} of the wheel-rim, forces it down into the concavity o^{35}, at the same time taking the cutting edge of the knife o^{37} down into the concavity of o^{34} and up to the rear face of the mold-block, with which it is held in contact throughout its length by the pressure of the said spring o^{33}. The said rear face of the mold-block therefore serves as a guide for the cut along the foot of the linotype which is consequently made parallel with the plate N^4.

I believe myself to be the first to provide in a linotype-machine means whereby the composed line of matrices may be supported at will in a straight or in a curved line, as demanded, and the first to construct a linotype-machine wherein linotypes may be produced with straight or with curved printing-surfaces, as demanded; and it is to be understood that the details of construction may be modified at the pleasure of the mechanic or to meet special conditions, provided there is no essential departure from the mode of operation herein described.

I claim—

1. In a linotype-machine, a flexible support for the composed line of matrices.

2. In a linotype-machine, a flexible support for the composed line of matrices, in combination with means for effecting a change in its longitudinal form.

3. In a linotype-machine, the pot provided with a removable mouthpiece, and the opposing matrix-support, having a variable surface to support the composed line, whereby the use of molds of different forms is permitted.

4. In a linotype-machine, the transporter or matrix-support, having an arcual cavity, in combination with the adjustable elastic plate, bridging said cavity.

5. In a linotype-machine, the transporter or matrix-support, having the arcual cavity, in combination with an adjustable elastic plate, bridging said cavity, and adjustable means supporting said plate at the rear.

6. In a linotype-machine, the transporter or matrix-support, having the arcual cavity, the adjustable elastic plate, bridging said cavity, and the metal-pot provided with an adjustable convex delivery-mouth, in combination with an intermediate mold.

7. In a linotype-machine, a mold, curved at the rear side, in combination with a yielding spring-supported knife, to trim the base of the slug in the mold, a stop or bearing on said knife, and a surface against which said stop acts to control the motion of the knife.

8. In a linotype-machine, a combination of a mold, a mold wheel or carrier, a spring-impelled knife to trim the base of the slug in the mold, and a bearing-surface on the mold-carrier, acting to control the advance of the knife.

In witness whereof I have hereunto affixed my signature, in presence of two witnesses, this 10th day of May, 1897.

FERDINAND JOHN WICH.

Witnesses:
FRANCIS D. JACKSON,
WILLIAM GLENN.