

No. 614,562.

Patented Nov. 22, 1898.

W. H. LOCK & J. PLACE.
MOLDING MECHANISM FOR LINOTYPE MACHINES.

(Application filed Dec. 31, 1897.)

(No Model.)

3 Sheets—Sheet 1.

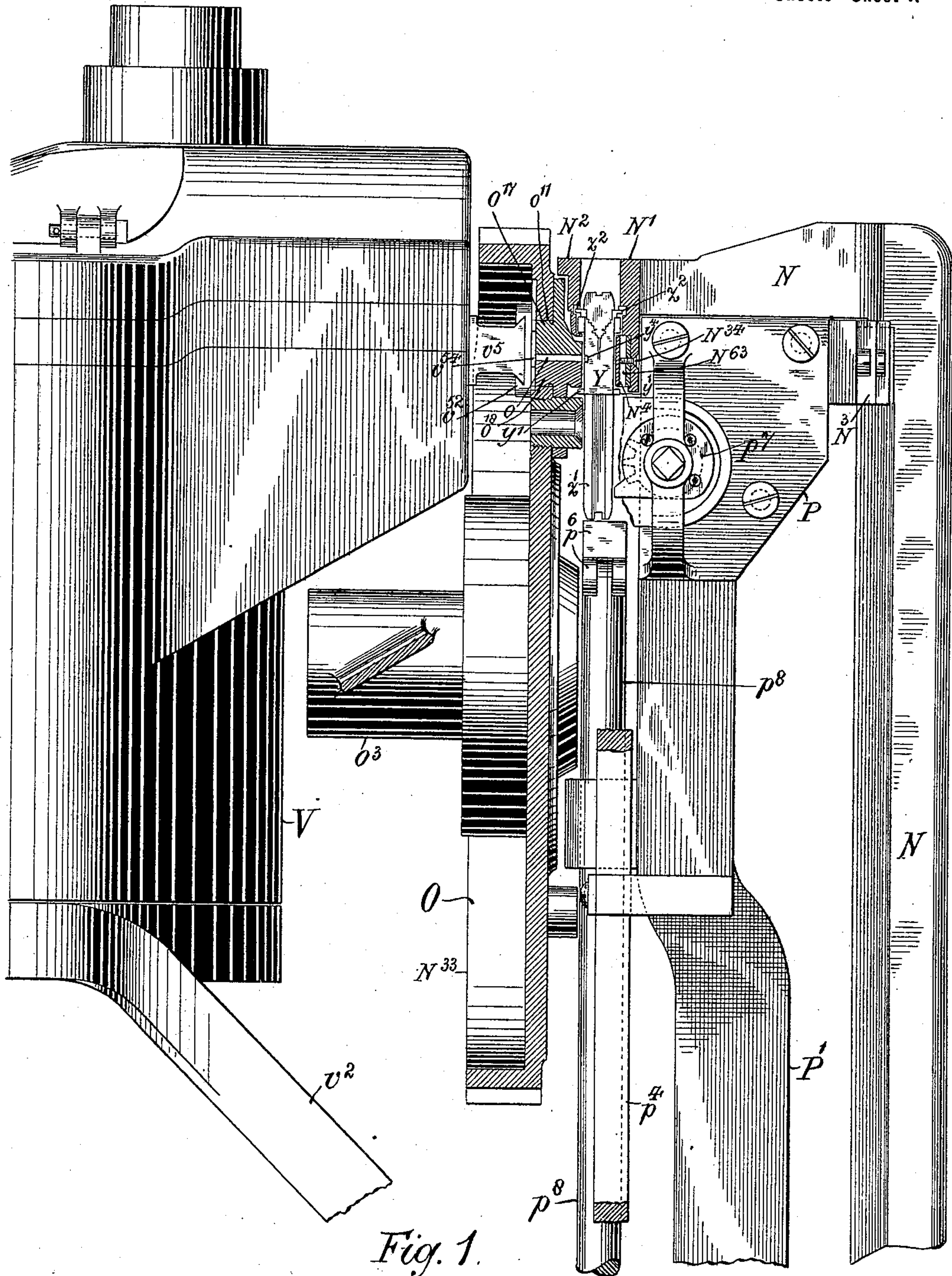


Fig. 1.

WITNESSES.

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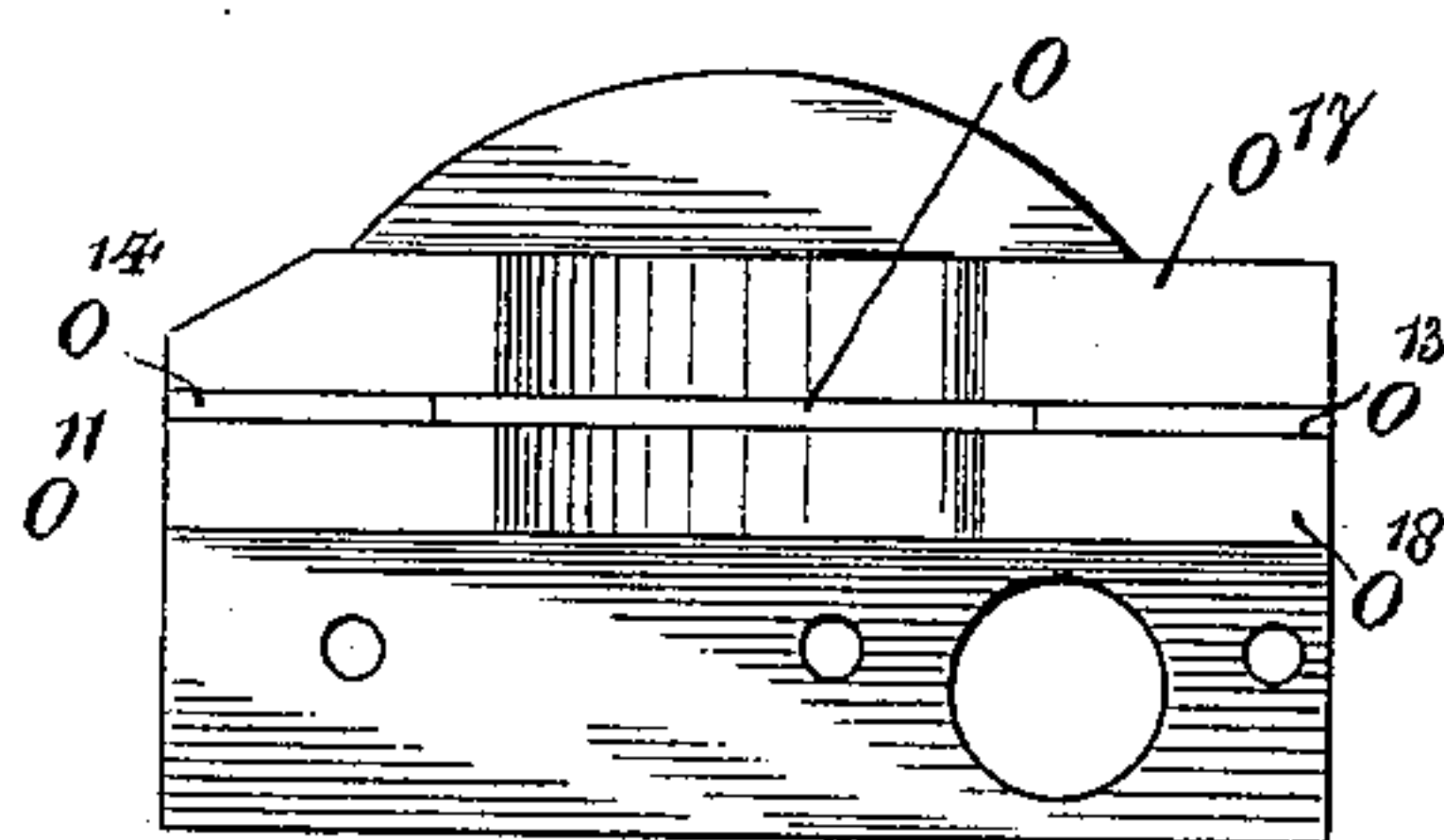


Fig. 2.

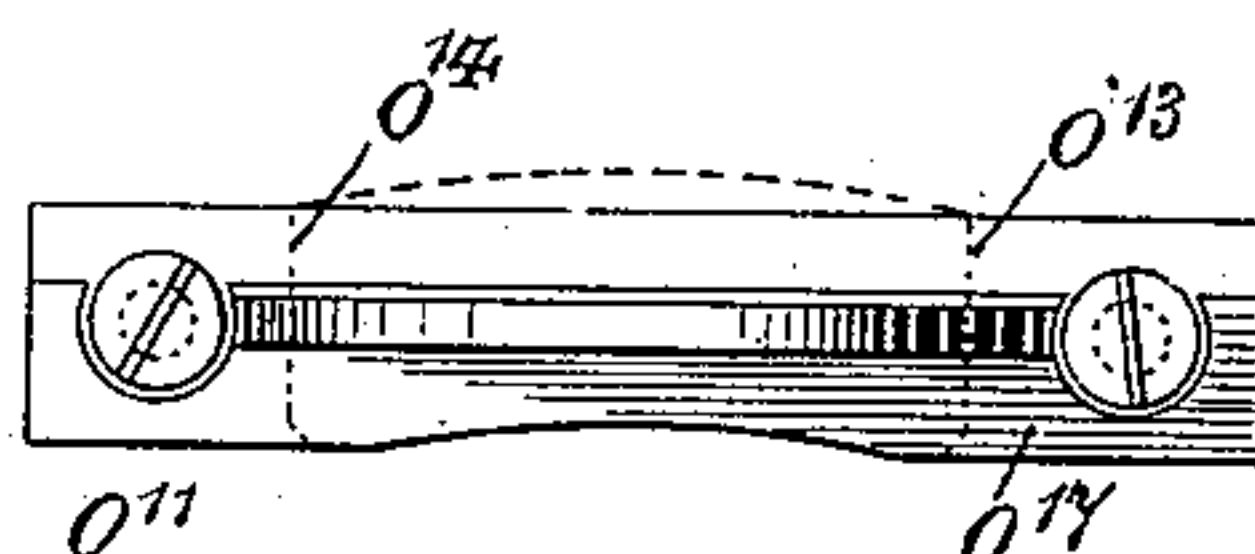


Fig. 3.

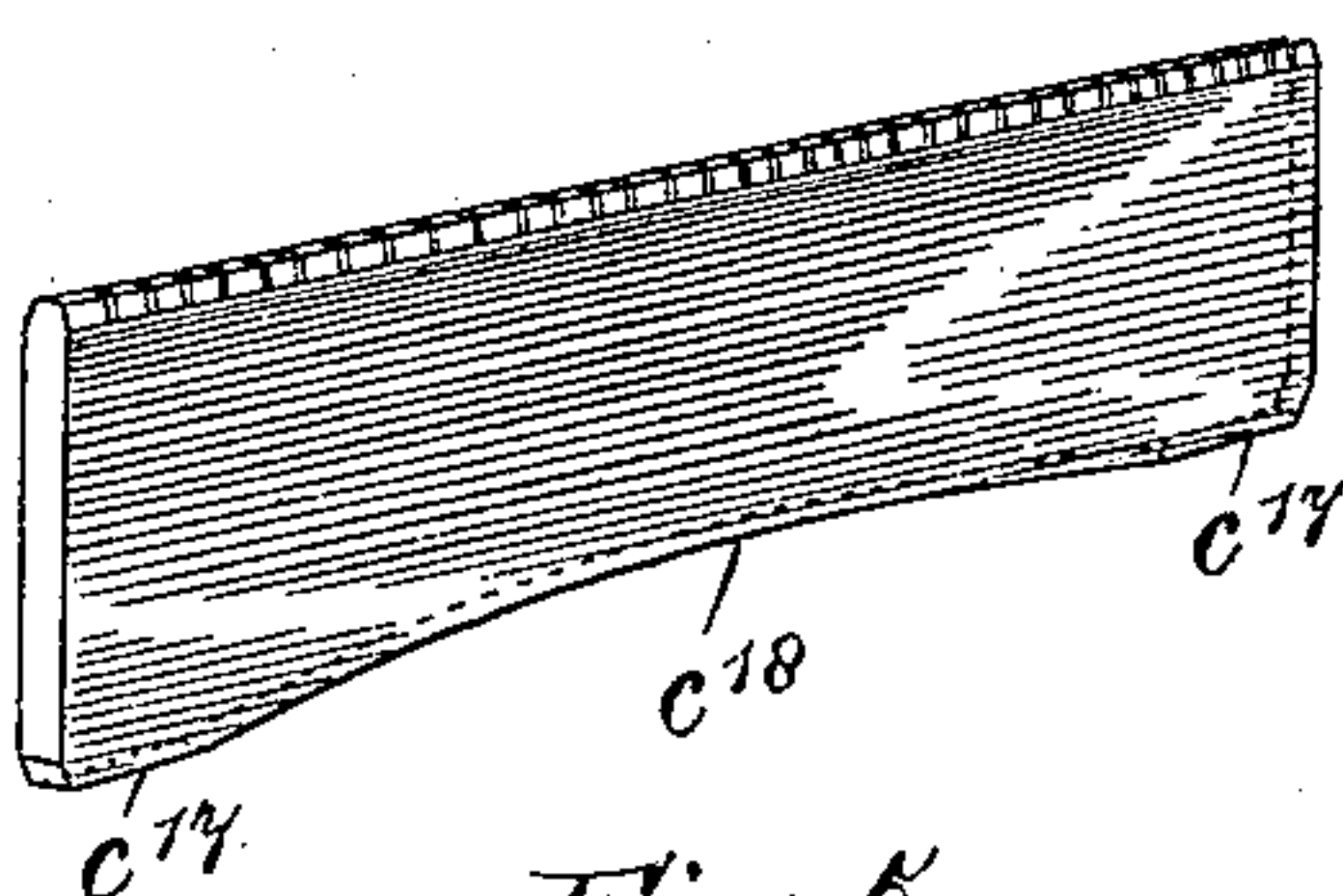


Fig. 5.

WITNESSES

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3 Sheets—Sheet 3.

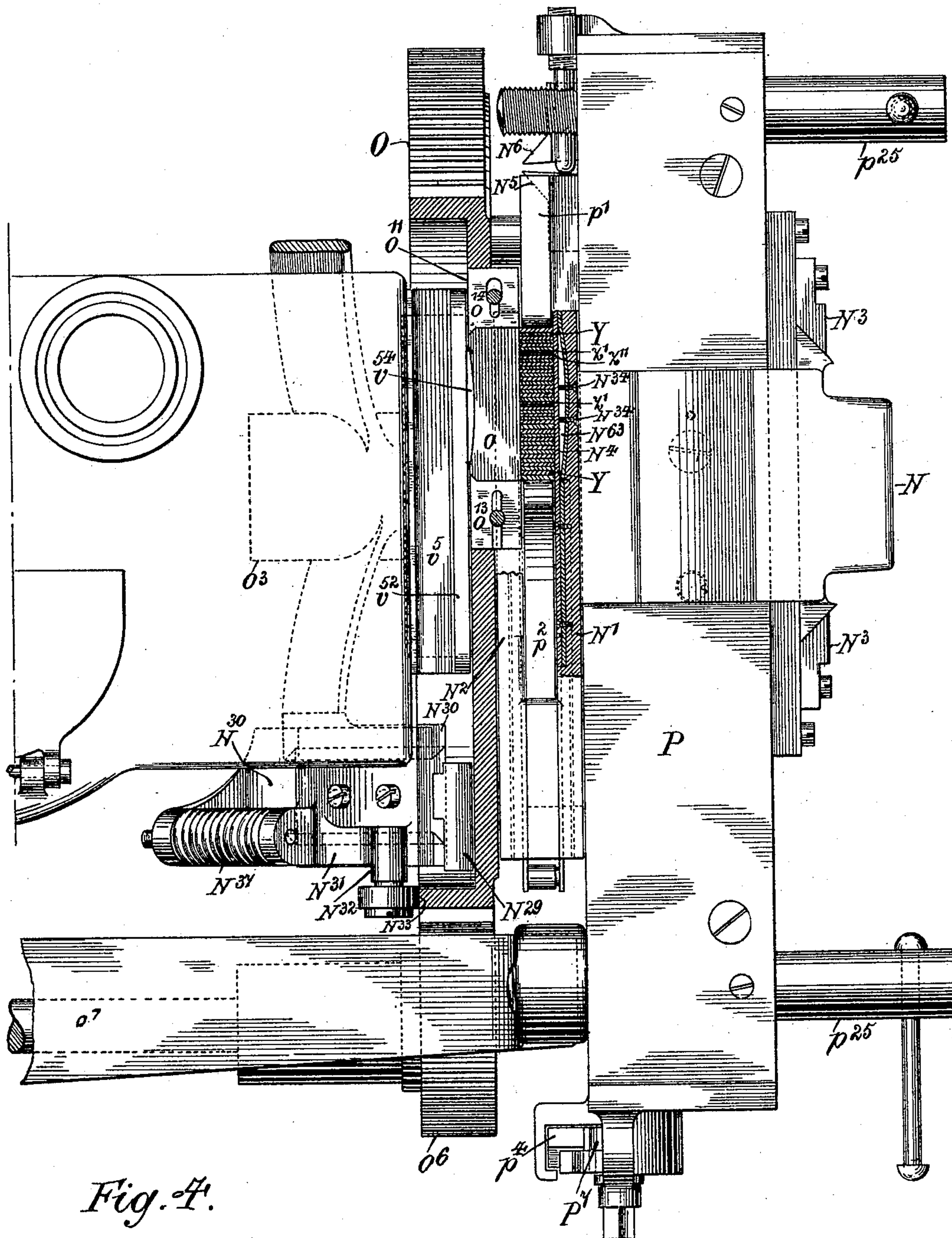


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM H. LOCK, OF LONDON, AND JOHN PLACE, OF MANCHESTER, ENGLAND, ASSIGNORS TO THE MERGENTHALER LINOTYPE COMPANY, OF NEW YORK, N. Y.

MOLDING MECHANISM FOR LINOTYPE-MACHINES.

SPECIFICATION forming part of Letters Patent No. 614,562, dated November 22, 1898.

Application filed December 31, 1897. Serial No. 665,079. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM HENRY LOCK, of London, and JOHN PLACE, of Manchester, in the county of Lancaster, England, subjects
5 of the Queen of the United Kingdom of Great Britain and Ireland, have invented certain new and useful Improvements in and Connected with the Molding Mechanism of Linotype-Machines, (for which we have obtained
10 a patent in Great Britain and Ireland, No. 506, dated January 7, 1897;) and we do hereby declare that the following is a full, clear, and exact description of the invention, reference
15 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 ap-
pertains to make and use the same.

The present invention relates to improve-
20 ments in and connected with the molding mechanism of linotype-machines.

The aim of the invention is to adapt the machine at will for the production of linotypes which are flat on the base or linotypes
25 which are concave on the base for a portion of their length, so that they may be seated directly on the cylinder of a press or printing-machine.

A linotype-machine is a combined compos-
30 ing and casting machine. The units upon which it operates are (ignoring spaces for the moment) type-matrices in some cases and type-dies in others. In either class of cases the thing which it casts—its product, in fact—
35 is a printing-bar having along one edge of it and incorporated with it a line of printing-type duly spaced and justified into words.

The said invention is applicable to all linotype-machines in which the composed line of
40 matrices and spaces (or their equivalent) is held up to a mold having a metal-injecting pump on the other side of it. The accompanying figures illustrate the application of it to the well-known Mergenthaler linotype-
45 machine, partly because it has been conceived and developed with special reference to that machine and partly because the latter is the only linotype-machine in operation in this country.

50 The Mergenthaler linotype-machine is

fully described in the specification of United States Letters Patent Nos. 436,531 and 436,532, to which the reader is referred for further particulars of its mechanism outside the scope of the present invention. The units on which
55 it operates are matrices and spaces. The former are practically rectangular plates of hard brass of uniform shape and size, excepting that they differ in thickness, according to the width of the respective character. The "spaces," or
60 "space-bars," as they are commonly called, are double wedges, each bar having one wedge much longer than the other. Matrices and space-bars are of the same width, the result
65 being that a composed line of them has a rear and front face parallel with each other and both unbroken save for the presence of the row of formative cavities in the rear face. It is in this row of formative cavities that the
70 printing-types of the linotype are formed. The composed line of matrices and space-bars finds itself at a certain point in the cycle of the operations of the machine within the grasp of an organ known as a "shifter,"
75 which latter holds it by nipping its two ends together. These ends are parallel with each other and at right angles with the rear and front faces. The shifter transfers the line into an organ known as a "transporter" or
80 "first elevator." The transporter consists of a pair of parallel bars, between which the line is received. Its function is to carry it down into the casting position, to hold it there during the act of justification and the process
85 of casting, and to then carry it away to the distributor. During the time that the line is in the casting position each end of it is within a short distance of a fixed abutment, while the line is behind an abutment covering the front face of it. The distance between the
90 two fixed abutments or jaws is equal to the length of the line to be printed and settles the length of the linotype.

The mold for the body of the linotype is a cavity in a so-called "mold-wheel," through
95 which it extends from front to rear, standing therein parallel with the diameter of the wheel. This wheel stands in a vertical plane, and the front face of the metal immediately surrounding the said cavity—being, in fact,
100

the front face of the so-called "mold-block"—is shaped to fit metal-tight against the rear face of the line of matrices, its cavity registering with the above-mentioned row of formative cavities when the said wheel is moved up from the rear. When the wheel has been brought up from the rear to the line, the several members of the latter are held by the engagement of certain projecting shoulders on them under corresponding fixed shoulders. This is the casting position. The metal pot and pump are next brought up to the rear face of the mold-wheel and hot metal is injected into the mold. The latter actually consists of the mold-cavity in the mold-wheel and the row of formative cavities then in conjunction with it. The front face of the metal-pot and the rear face of the mold-block are both parallel with the row of formative cavities, so that the resultant linotype is a straight one.

When a demand arose for curved linotypes adapted to stand upon a printing-machine cylinder with their lengths at right angles to the axis thereof, it was proposed to meet that demand by modifying the machine in the way described in the specification of British Letters Patent No. 13,591 of 1896. According to that the rear face of the front bar of the transporter, frequently known as the "first elevator," has an arcual cavity formed in it and lengthwise of it. The radius of this cavity is that of the smallest cylinder on which linotypes are likely to be used. Across this cavity there stretches an elastic plate which, resting upon the straight portions of the plate, bridges the cavity and presents, until it is bent, the usual straight face to the composed line. The elastic plate is held to the front plate by screws or any other suitable device. A portion of this device is of a yielding character—for instance, fixed screws standing in slots in the elastic plate—so as to allow of a slight motion on the part of the plate. There is provided in the fixed plate in front of the cavity and preferably immediately opposite its center an adjustable device adapted to limit the distance to which the elastic plate can be forced into the cavity by pressure from the rear exerted upon its rear face. A line of backing-up screws is used for the purpose. Both front and rear faces of the mold-block, in which the mold cavity is formed, are bent to the required arc, thereby making it concave along its rear face and convex along its front face. This block is preferably detachable, so as to be substituted by another of a different radius or by a straight one. The lips of the mouth of the delivery-spout of the metal-pot are also curved to the required arc.

The adjustable device above mentioned is set to limit the motion of the elastic plate, according to the desired shape of the linotype, and a mold-block and pot-mouth of the desired shape to correspond with the device so adjusted are mounted upon the mold-wheel and metal-pot, respectively. The

mold-wheel is then moved to the front as far as it will go. The composed line and the elastic plate in front of it yield to the push of the front face of the mold-block until they are stopped by the backing-up screws. The two faces of the composed line then stand parallel with the two faces of the mold-block. The convex mouth of the metal-pot is then moved up to the rear face of the mold-block and the mold for a curved linotype is complete and ready to receive the hot metal.

The necessary modification in the mounting of the knife for trimming the concave foot of the curved linotype is as follows: The knife is adapted to slide to and from the said foot. In the Mergenthaler linotype-machine the mold-block is carried by a vertical wheel revolving about a horizontal axis. A spring behind the knife keeps its cutting edge up to the rear face of the wheel—that is to say, in the plane of the trimmed foot. As the concave face of the mold-block comes around the spring makes the cutting edge follow it, whereby the foot is trimmed truly to the required arc. The knife is provided with a suitable surface outside its cutting edge proper to engage with the rear face of the mold-block.

The molding mechanism for curved linotypes described above is characterized by a serious obstacle to a quick conversion from one for curved linotypes to one for straight ones, and vice versa. This obstacle is due to the position and temperature of the metal-pot. It has already been explained that the front of the mouth of the delivery-spout of the pot is curved to match the block. It is of course practicable to make this part of the pot removable and to fit it with a straight part, but the pot itself is so crowded in by adjacent and intervening organs of the machine and it is, besides, so hot that making any alteration in it is a particularly nasty and correspondingly tedious job.

The object of the present invention is to provide for a quick conversion of the molding mechanism of any given machine set for curved linotypes to one for straight linotypes, and vice versa, by mere substitution of mold-block and readjustment of the elastic plate.

According to the present invention the convexity of the metal-pot mouth is retained in a form that makes interference with it unnecessary. A mold-block concaved behind to receive the convex mouth of the metal-pot and straight in front is substituted for the concavo-convex mold-block above described.

Referring to the accompanying figures, which are to be taken as part of this specification and read therewith, Figure 1 is a transverse vertical section from the left hand of the machine of the mechanism concerned. Fig. 2 is a rear elevation, and Fig. 3 a plan, of the improved mold-block. Fig. 4 is a sectional plan of the mechanism concerned, omitting the cap-plate of the mold-block and the rear horizontal bar of the transporter.

Fig. 5 is a perspective view of a linotype having a combined concave and flat foot.

A is a part of the machine-frame; Y Y, the matrices; $y' y'$, their projecting shoulders; y^4 5 y^4 , the formative cavities; $z' z'$, the longer and $z^{11} z^{11}$ the shorter wedges of the space-bars; $z^2 z^2$, their suspending-shoulders; N, the transporter; N' N', the pair of parallel bars between which the composed line of matrices 10 and space-bars is transferred from the shifter, (not shown); N³ N³, the guides on the abutment P, between which the transporter moves vertically; N⁶³, an arcual cavity in the rear face of the front bar N'; N⁴, an elastic plate 15 held to the bar N' and stretching across the cavity N⁶³; N³⁴ N³⁴, backing-up screws; $p' p^2$, the abutments, being a pair of vise-jaws between which the composed line stands; P, the abutment then covering the front face of the 20 line; p' , the vise-frame which carries the three abutments; $p^{25} p^{25}$, the screws by which the vise-frame is held fast to the machine-frame A; p^4 , a rack-bar, and P⁷ a pinion engaging therewith to control the vise-jaw p^2 ; $p^6 p^6$, 25 the justifying-plates, the lower one pushing the upper one against the longer wedges z' under the action of two lifting-rods p^8 , (only one shown); o, the mold-cavity; o¹¹, the mold-block; o¹³ o¹⁴, the end-liners, and o¹⁷ o¹⁸, the 30 cap and bottom plates thereof; O, the mold-wheel, to which the mold-block is made fast; o³, the bearing in which the horizontal journal of the mold-wheel is carried and can turn; o⁶, its driving-pin; o⁷, the shaft of the latter; N⁵ N⁶, the knives for trimming the sides 35 of the linotype; N²⁹, the knife for trimming the linotype-foot; N³⁰, the bracket which carries the said knife; N³¹, its sliding block; N³², a finger projecting from the latter and always in contact with the rear edge N³³ of the rim 40 of the mold-wheel O; N³⁷, a spring holding the finger N³² and the knife N²⁹ up to their work; V, the pot which supplies the molten type-metal to the mold-cavity o; v^{52} , a perforated plate or mouthpiece driven tightly over the mouth or throat v^5 of the metal-pot, and v^{54} a convex protuberance on the mouth- 45 piece v^{52} , in which the actual delivery-mouth is formed, and v^2 one of the legs upon which the pot is supported and swung up to and 50 away from the mold-block o¹¹. All the foregoing parts are as heretofore, with the exception of the convexity v^{54} . Heretofore the chord of this was identical with the length 55 of the linotype, so that the base of the latter was concave throughout its length. The present invention requires that it should not be identical, but shorter than the linotype, so that the latter will have on its base flat por- 60 tions at the ends.

The concavity in the rear face of the mold-block o¹¹ and the convexity v^{54} on the mouth of the pot have a common radius, which is that of the cylinder of the printing-machine 65 supplied by the linotype-machine, to which the present invention is applied. That rela-

tionship provides for curved linotypes being made when they are required.

The production of straight linotypes in the same linotype-machine without changing the 70 sliding piece v^{52} and by substitution of mold-block and readjustment of the device in front of the composed line is provided for as follows: The plate N⁴ is set straight and backed up in that position. The concavo-convex 75 mold-block used for making curved linotypes is taken off the mold-wheel O and one made according to the present invention is substituted for it; or instead of such taking off and substitution the mold-wheel may be fitted 80 with two mold-blocks, one made according to the present invention and the other concavo-convex. The fitting a mold-block with two mold-blocks does not form, *per se*, any part 85 of the present invention. It is described in detail in the specification of British Letters Patent No. 2,549 of 1895.

The mold-block o¹¹ has, according to the present invention, when straight linotypes are demanded from the machine, a straight 90 front face and a concave rear face, as distinguished from the parallel straight front and rear faces of a mold-block for straight linotypes on the one hand and from the parallel arcual front and rear faces of the curved 95 linotype mold-block described in the specification of British Letters Patent No. 13,591 of 1896 on the other. Further, the chord of the concavity in its rear face is less than that of its full length. The chords of the 100 convexity v^{54} and of the concavity in the rear face of the mold-block o¹¹ are of the same length; but that length is less than the length of the mold-cavity o by twice the length of a practicable straight foot c^{17} at each end of 105 the linotype. It is these two straight feet that are relied on to make the linotype produced by the present invention capable of standing upon a flat platen or lengthwise on a cylinder, and for that reason one is placed 110 at each end of the linotype, as shown in Fig. 5. For the same reason the concavity in the rear face of the mold-block is midway of the two liners o¹³ o¹⁴, and the convexity v^{54} occupies a corresponding position upon the slid- 115 ing piece v^{52} .

Fig. 4 shows the invention as applied to a machine for casting straight linotypes. The front face of the mold-block o¹¹ is straight and the plate N⁴ is set parallel with it. The 120 convexity v^{54} and the concavity in the rear face of the mold-block are both of the same radius as the cylinder of the printing-machine supplied by the linotype-machine. The linotypes cast in the mold-block illustrated are 125 as shown by Fig. 5, having a straight printing edge along the top and a straight foot c^{17} at each end. These feet together suffice to support the printing edge when the linotype is used on a platen-machine. When curved 130 linotypes are wanted from the same machine, the mold-block illustrated is replaced by one

having a concave rear face adapted to receive the metal-pot mouth metal-tight against it, as indicated in full lines in Fig. 3, and a convex front face, as indicated by dotted lines in the same figure, this mold being essentially the same as that shown in Patent No. 13,591 of 1896, already referred to, except that the concavity in the rear face is of a length less than the length of the slot or mold proper.

The backing-up screws N^{31} are also set so as to allow of the elastic plate N^4 retreating before the convex front face of the mold-block into the cavity N^{63} . A curved linotype produced under this invention will have the two flat feet c^{17} , but it will bed to the cylinder of the printing-machine by virtue of the intermediate concave foot c^{18} , and the bedding of that intermediate foot c^{18} will suffice. The two flat feet c^{17} may simply stand idly off the cylinder, neither bedding to anything nor interfering with the proper bedding of the linotype to the said cylinder, or the surface of the machine-cylinder may be fitted with special devices to engage the ends of the improved linotype and hold them steady.

In order that linotypes in accordance with our invention may be applied directly to the printing-cylinder, it is of course necessary that the concavity in the base of the linotype shall be very slight and that the radius of the curve shall be very great in proportion to the length of the linotype. We are aware of the linotype illustrated in Letters Patent to John R. Rogers, No. 437,139, having a flat base with a small semicircular depression at the center. This depression, of great depth and sharp curvature, results from the employment of a melting-pot having a central delivery-spout. The depression has no mechanical function. It is not intended to and will not permit the application of the linotype to a printing-cylinder. The Rogers linotype is therefore to be clearly distinguished from the linotype produced in our machine, having a shallow concavity extending from near one end nearly to the other and of very slight depth in relation to its length.

We claim—

1. The combination with the apparatus of a linotype-machine which holds the composed line in the casting position, of a convex metal-pot mouthpiece the chord of its arc shorter than the mold-cavity, and a detachable mold-block having its rear face correspondingly concave for less than the length of its cavity, said mold being covered or closed at the rear by the pot, substantially as described and shown.

2. The combination with the apparatus of a linotype-machine which holds the composed line in the casting position, of a convex metal-pot mouthpiece, the chord of its arc shorter than the mold-cavity; a detachable mold-block having its rear face correspondingly concave for less than the length of its cavity, and its front face straight; and an adjustable device on the opposite or front side of the composed line, capable of being set rigidly either straight, or parallel with the concave portion of the rear face of the mold-block along the entire length of the composed line.

3. In a linotype-machine, the combination of a matrix-support, adjustable at will to a curved or a straight form, an opposing pot, having a convex portion less in length than the mold, and an intermediate mold, having its rear face adapted to fit the pot-mouth, whereby the machine is adapted by the interchange of molds to cast linotypes having straight or curved surfaces for use on flat or circular presses, as may be demanded.

In witness whereof I, WILLIAM HENRY LOCK, have hereunto affixed my signature, in presence of two witnesses, this 11th day of October, 1897.

WILLIAM H. LOCK.

Witnesses:

G. F. WARREN,

CHAS. S. WOODROFFE.

In witness whereof I, JOHN PLACE, have hereunto affixed my signature, in presence of two witnesses, this 18th day of October, 1897.

JOHN PLACE.

Witnesses:

FRANCIS S. JACKSON,

I. A. STREET.