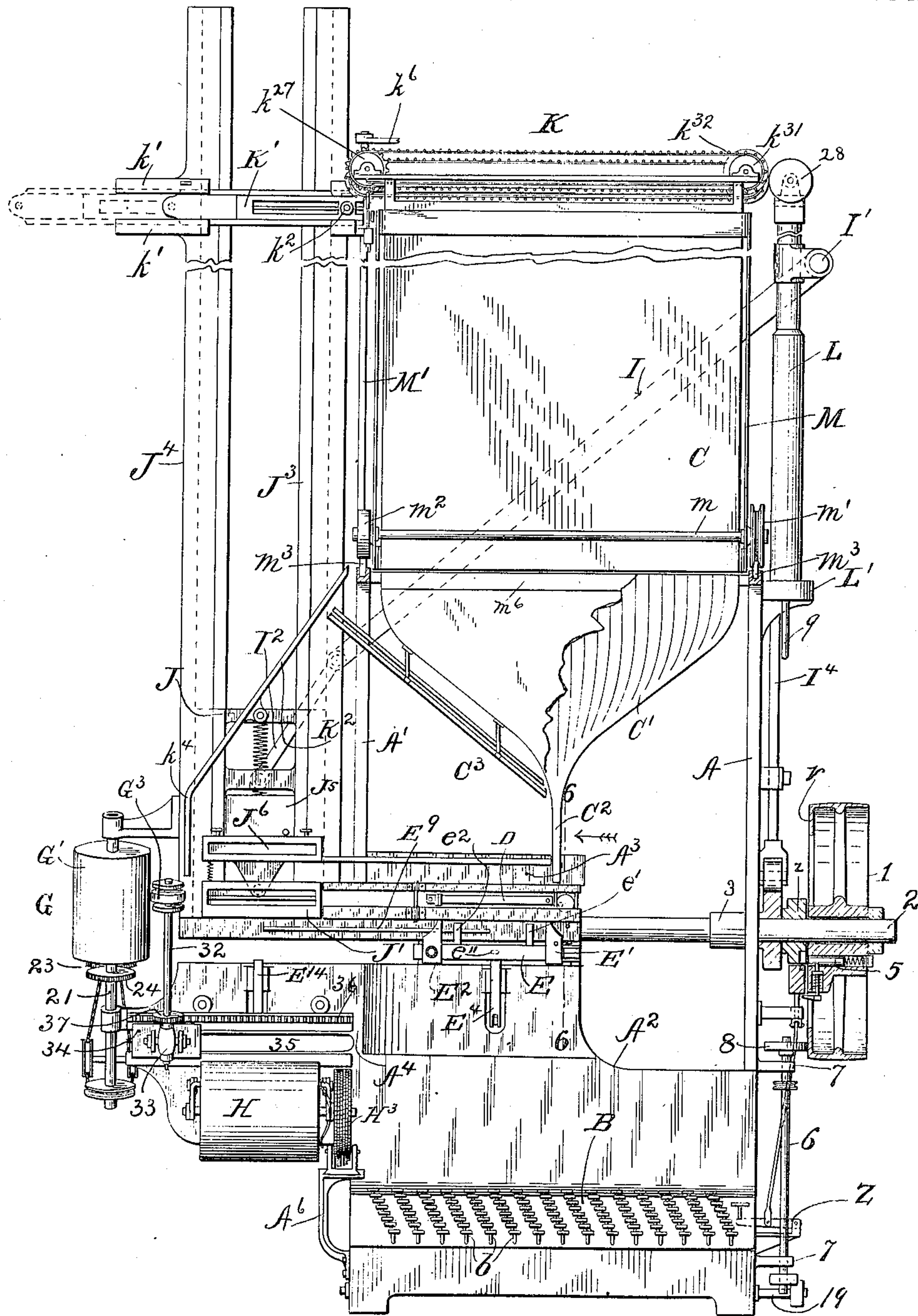


TYPE SETTING AND PRINTING MACHINE.

921,946.

11 SHEETS—SHEET 1.



Charles B. Mann Jr.  
John B. Birch

*Fig. 1.*

Frank H. Brown  
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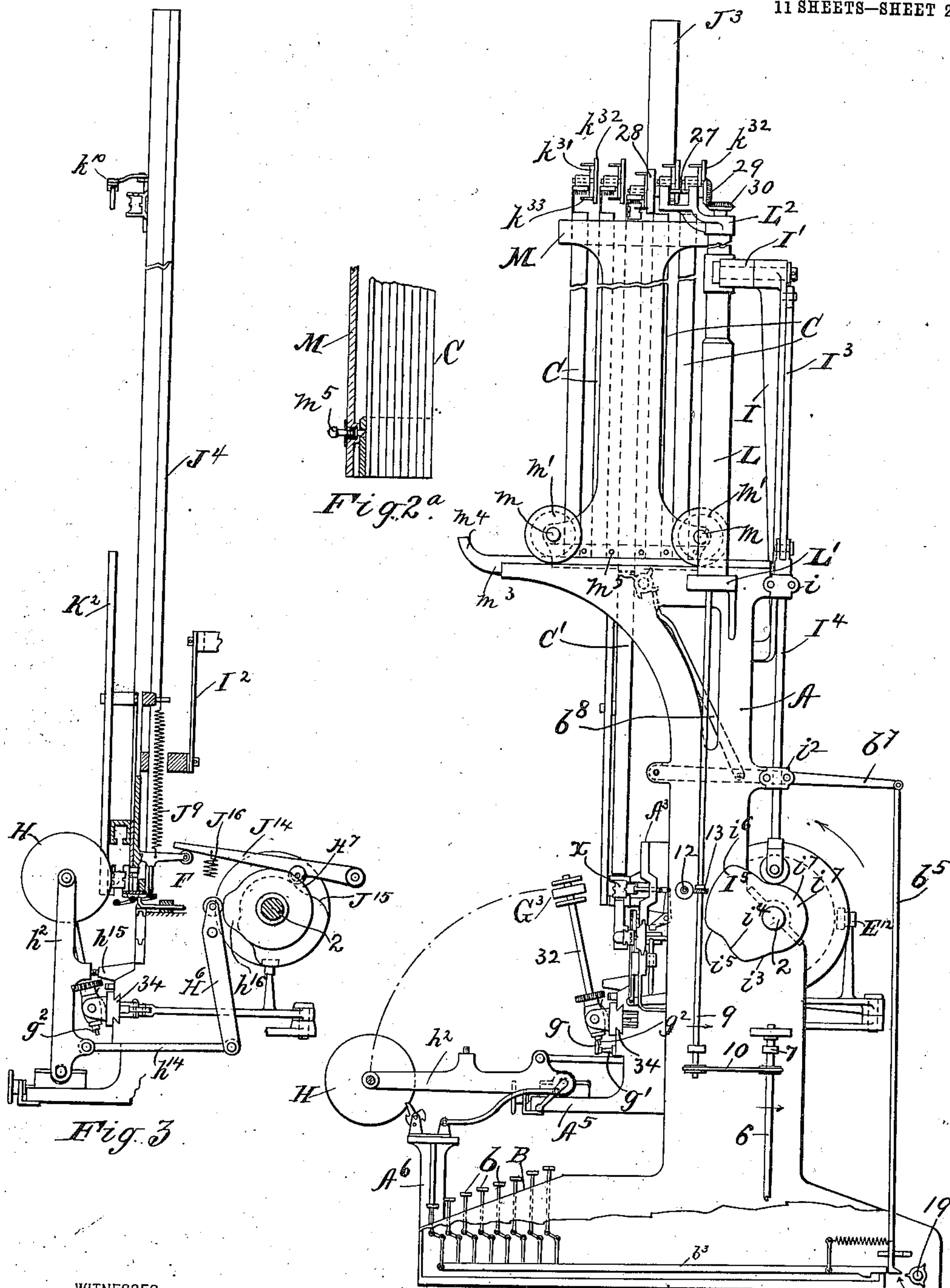
F. H. BROWN, J. E. HANRAHAN & J. L. SELLAR.  
TYPE SETTING AND PRINTING MACHINE.

APPLICATION FILED SEPT. 30, 1899. RENEWED APR. 13, 1904.

921,946.

Patented May 18, 1909.

11 SHEETS—SHEET 2.



WITNESSES:

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John B. Smith

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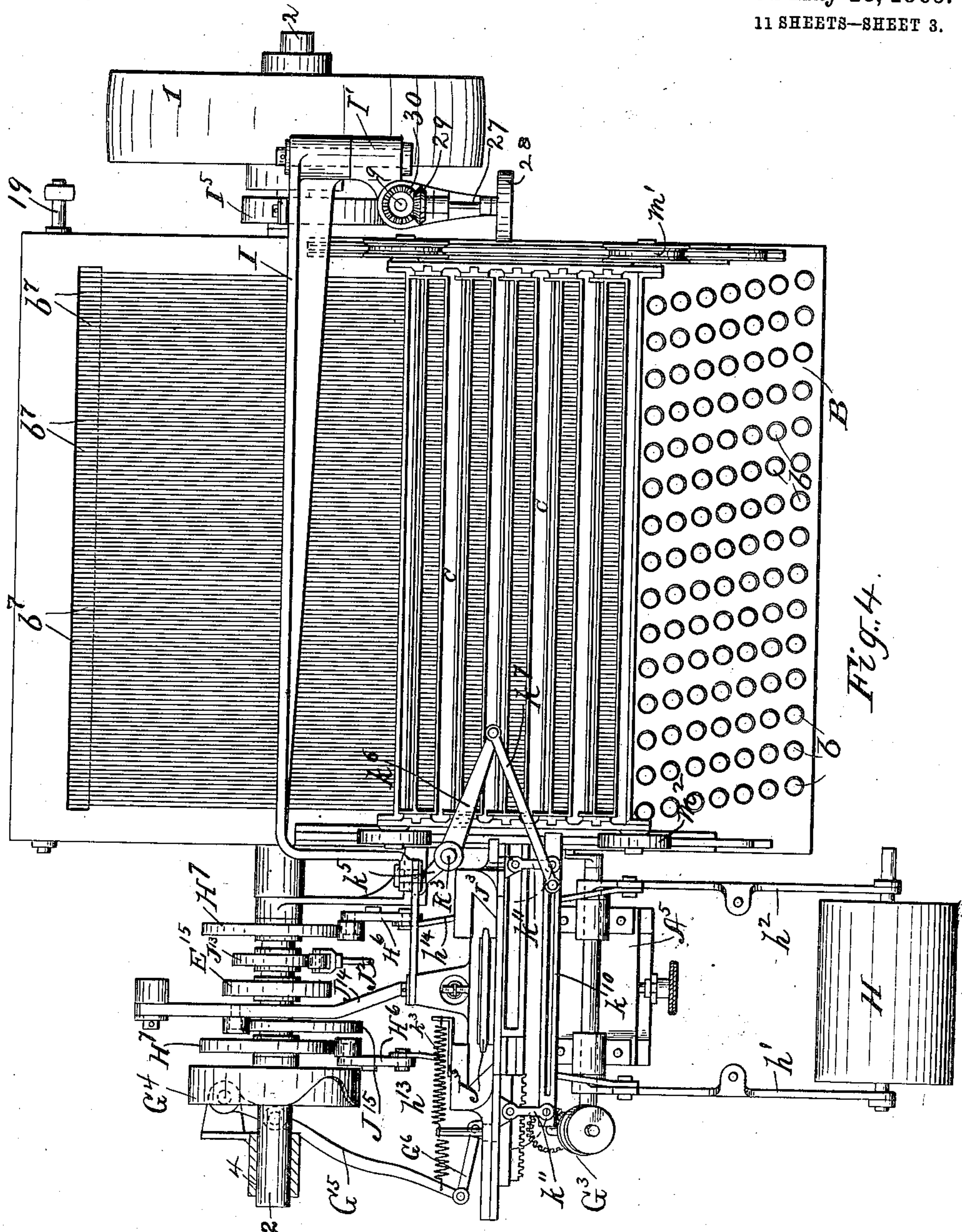
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11 SHEETS—SHEET 3.



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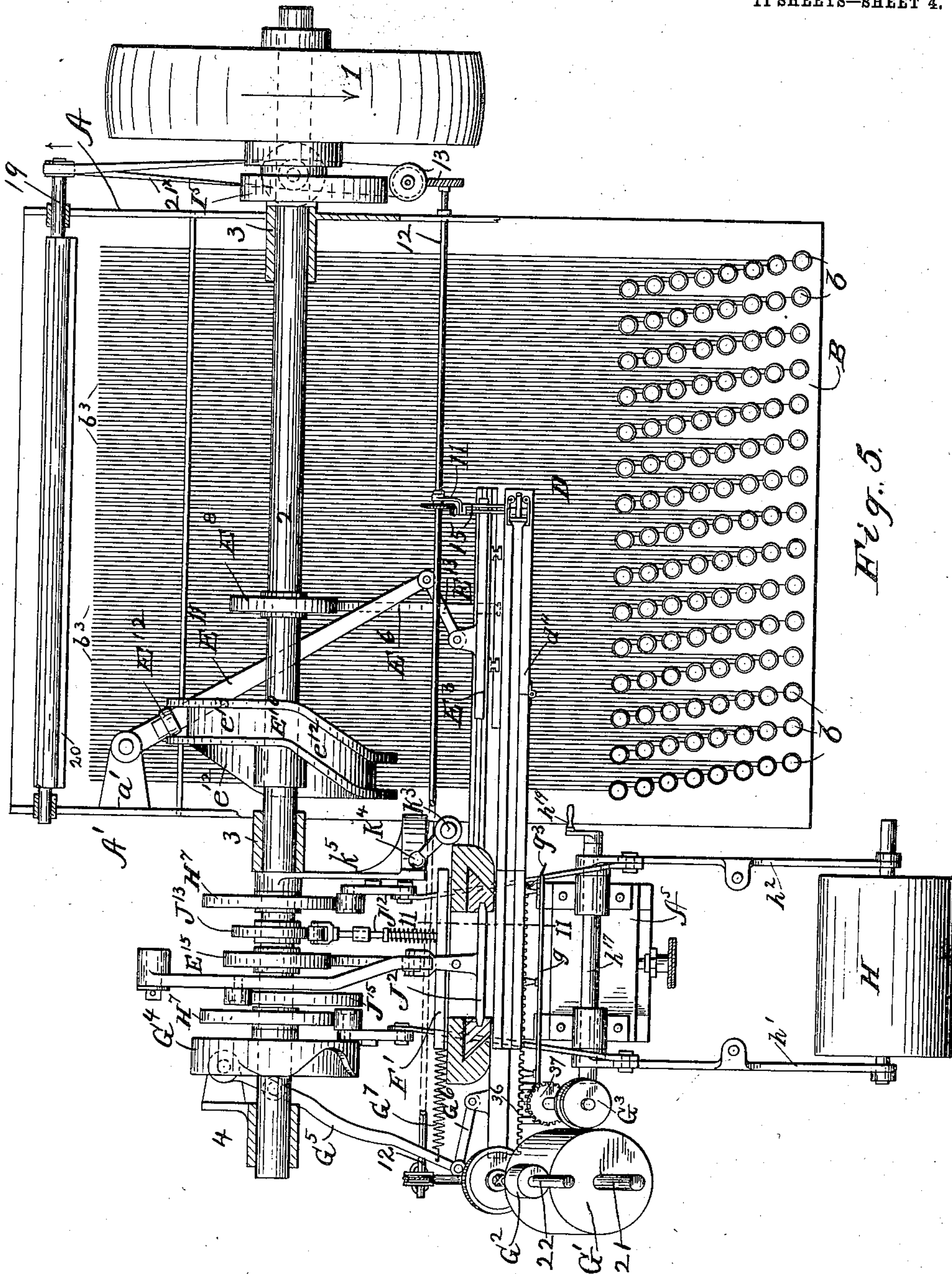
F. H. BROWN, J. E. HANRAHAN & J. L. SELLAR.  
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921,946.

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11 SHEETS—SHEET 4.



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TYPE SETTING AND PRINTING MACHINE.

921,946.

11 SHEETS—SHEET 5.



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APPLICATION FILED SEPT. 30, 1899. RENEWED APR. 13, 1904.

Patented May 18, 1909.

11 SHEETS—SHEET 6.



*Fig. 8.*

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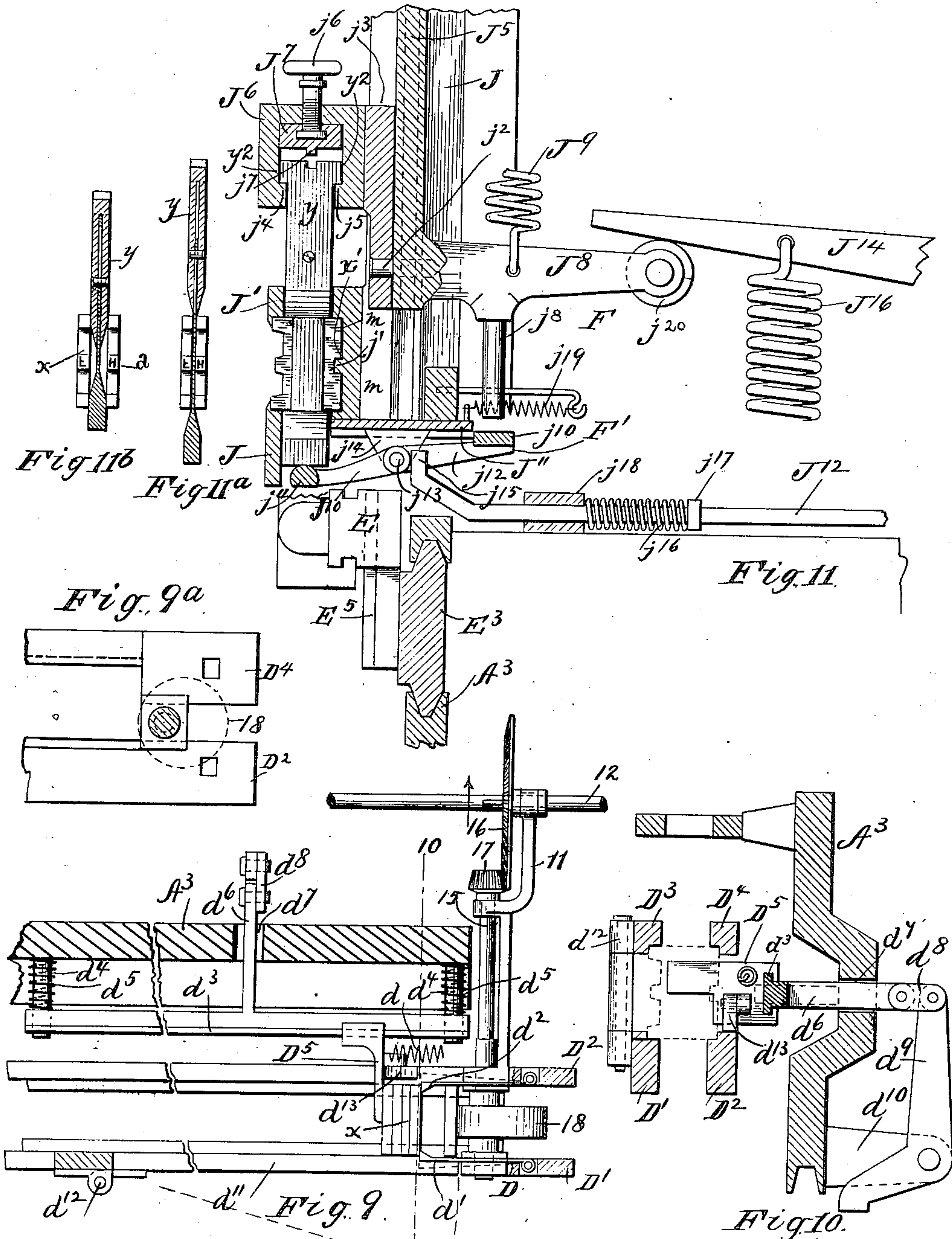
F. H. BROWN, J. E. HANRAHAN & J. L. SELLAR.  
TYPE SETTING AND PRINTING MACHINE.

APPLICATION FILED SEPT. 30, 1899. RENEWED APR. 13, 1904.

921,946.

Patented May 18, 1909.

11 SHEETS—SHEET 7.



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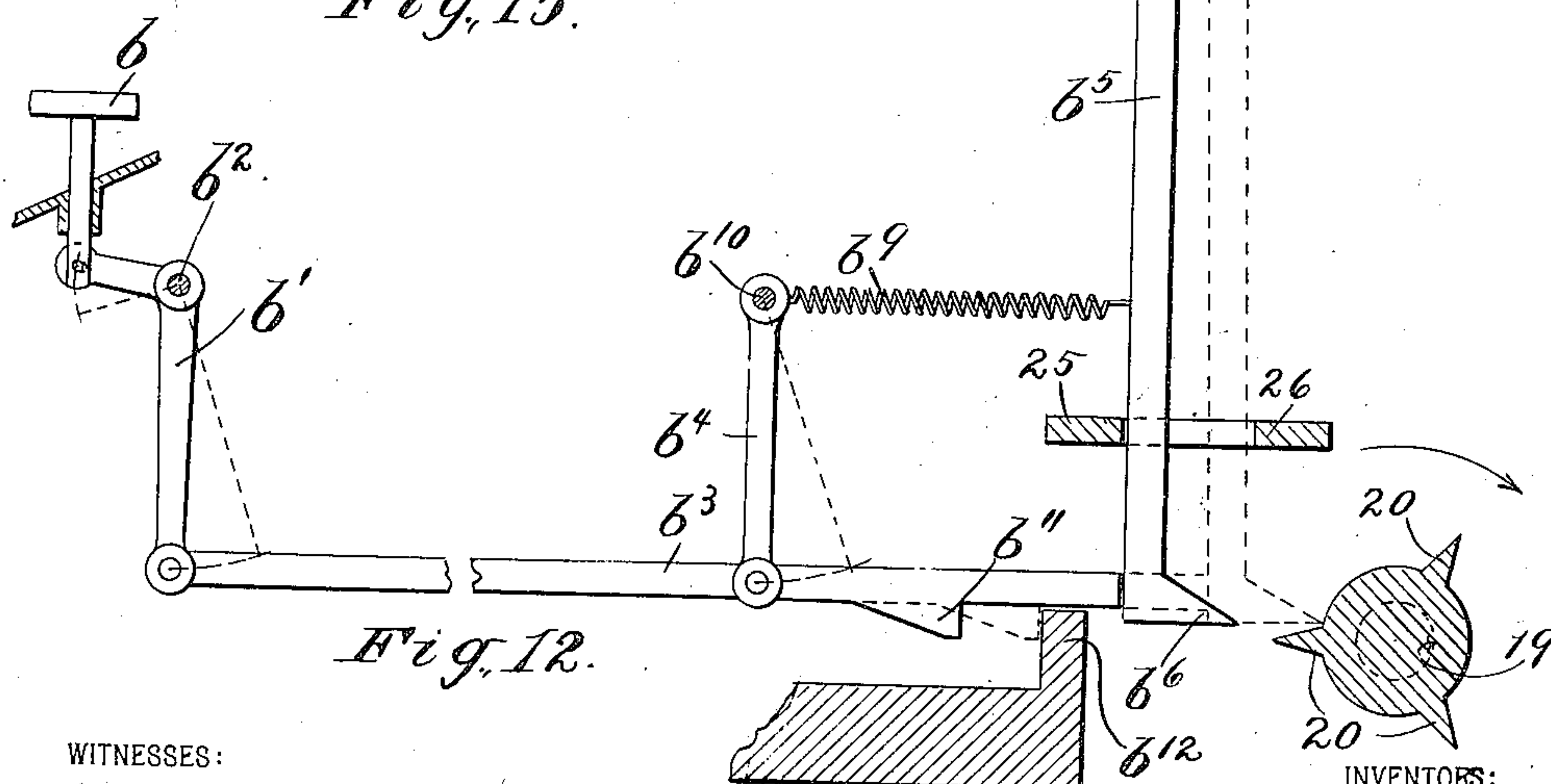
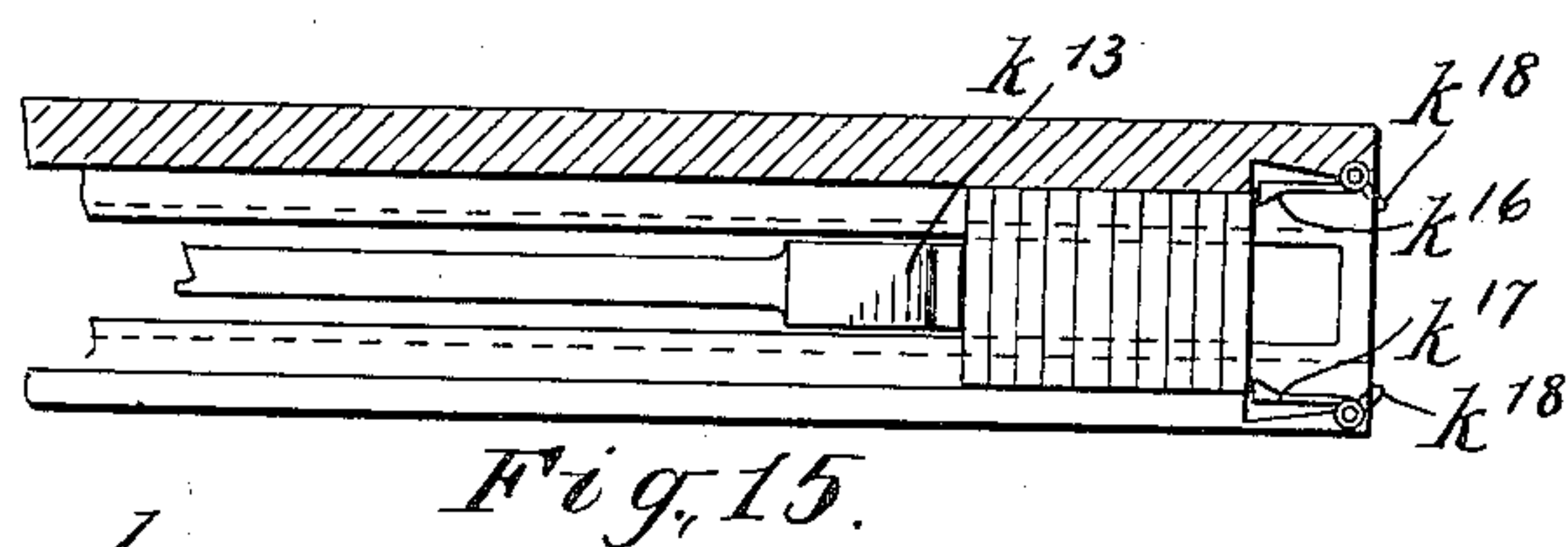
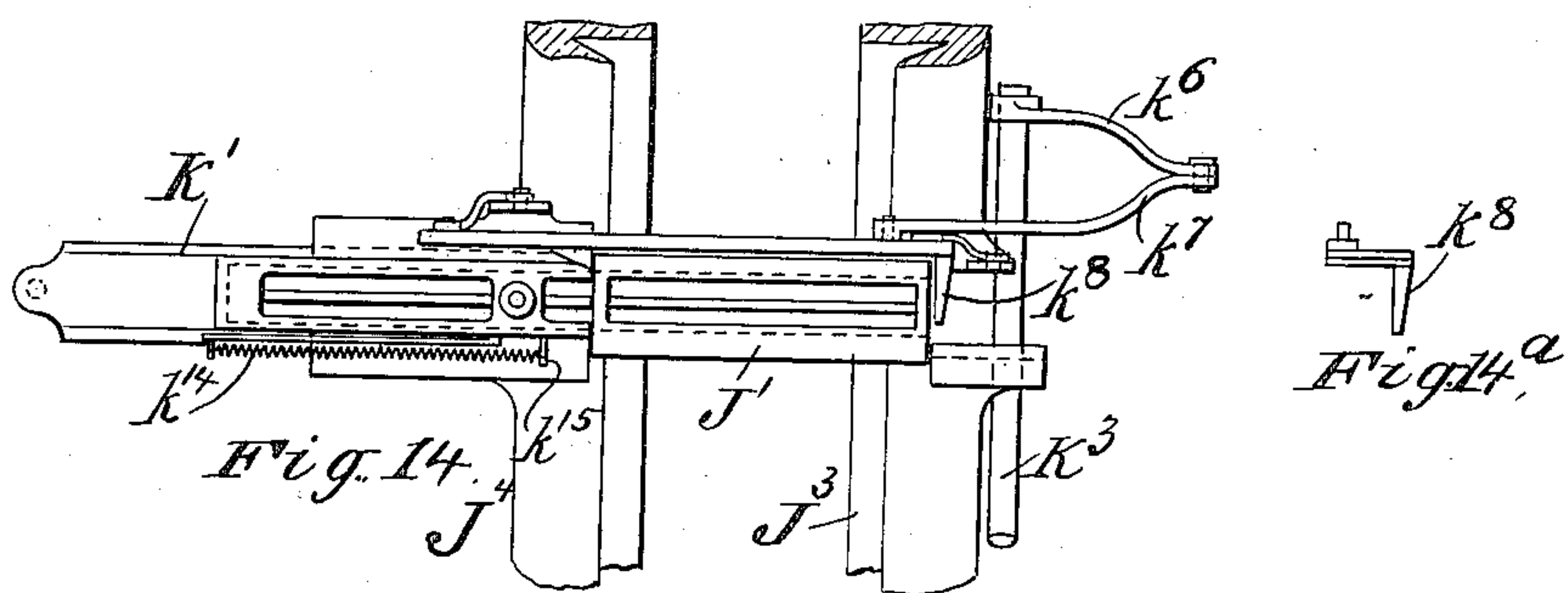
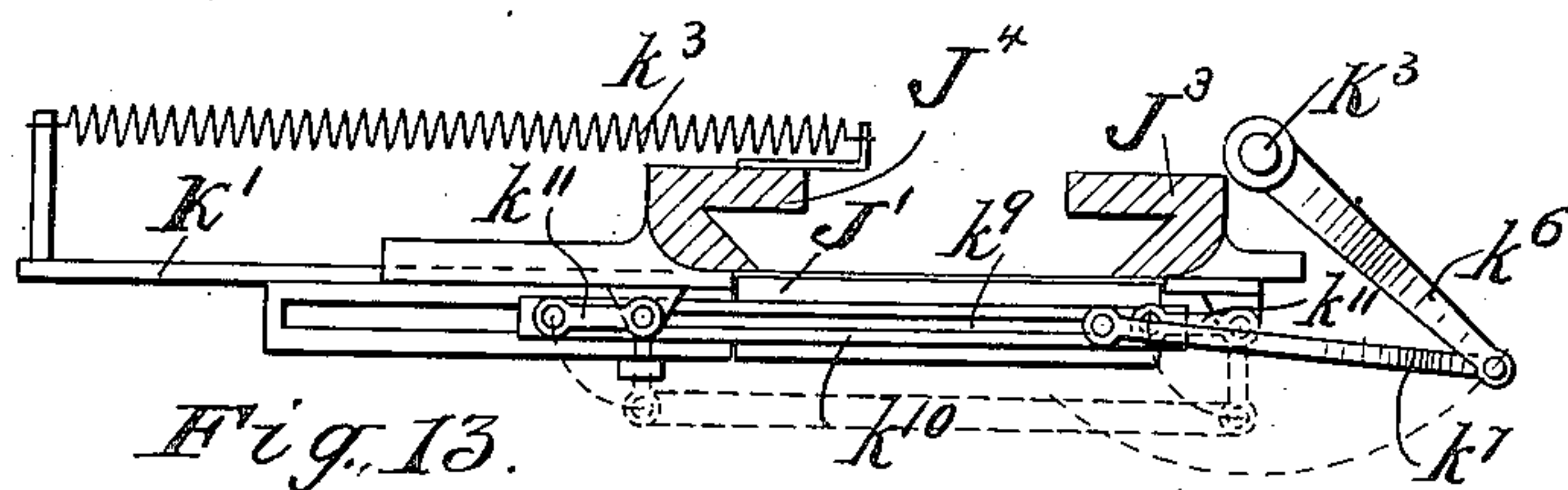
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APPLICATION FILED SEPT. 30, 1899. RENEWED APR. 13, 1904.

921,946.

Patented May 18, 1909.

11 SHEETS—SHEET 8.



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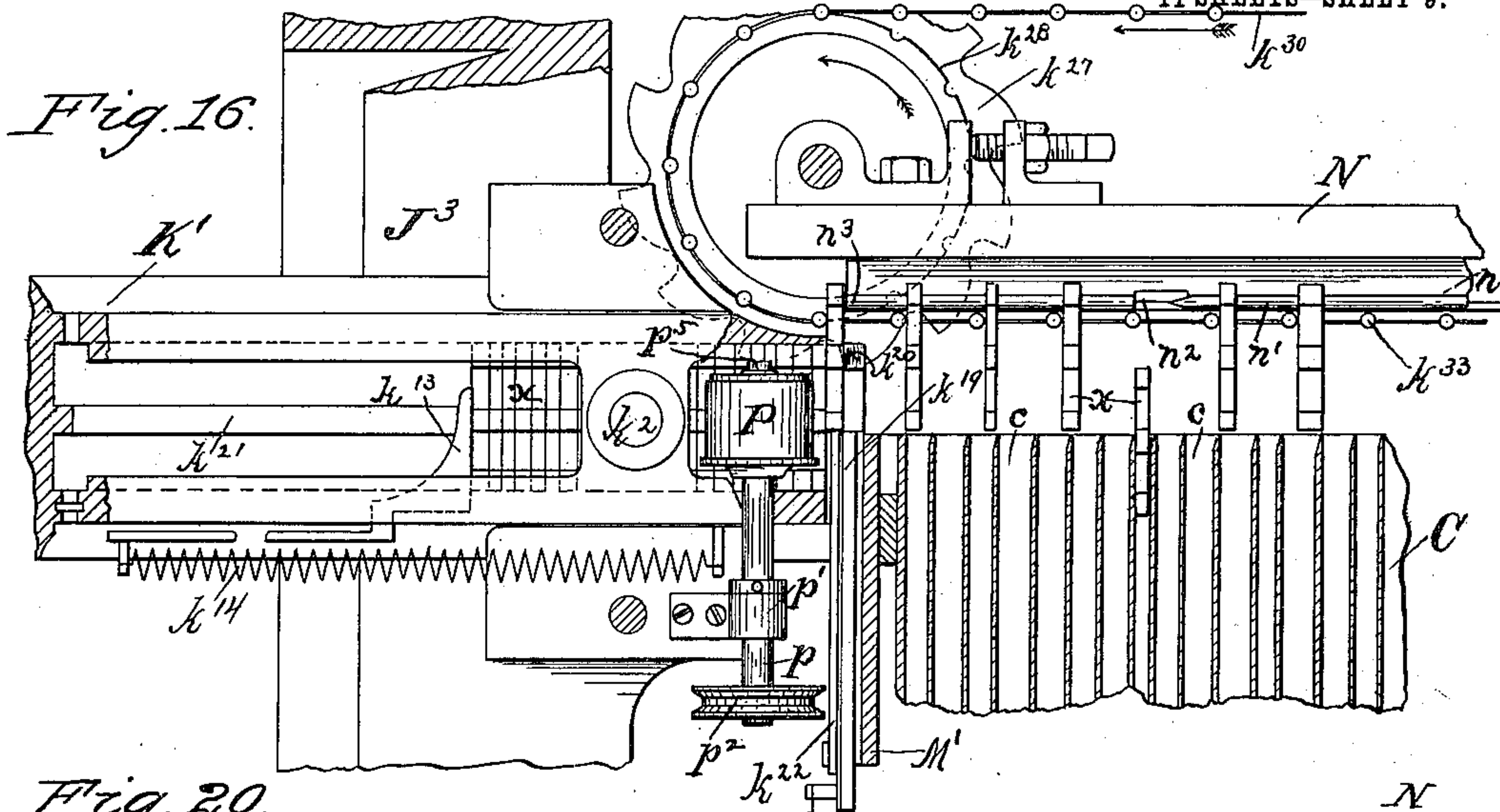
TYPE SETTING AND PRINTING MACHINE.

APPLICATION FILED SEPT. 30, 1899. RENEWED APR. 13, 1904.

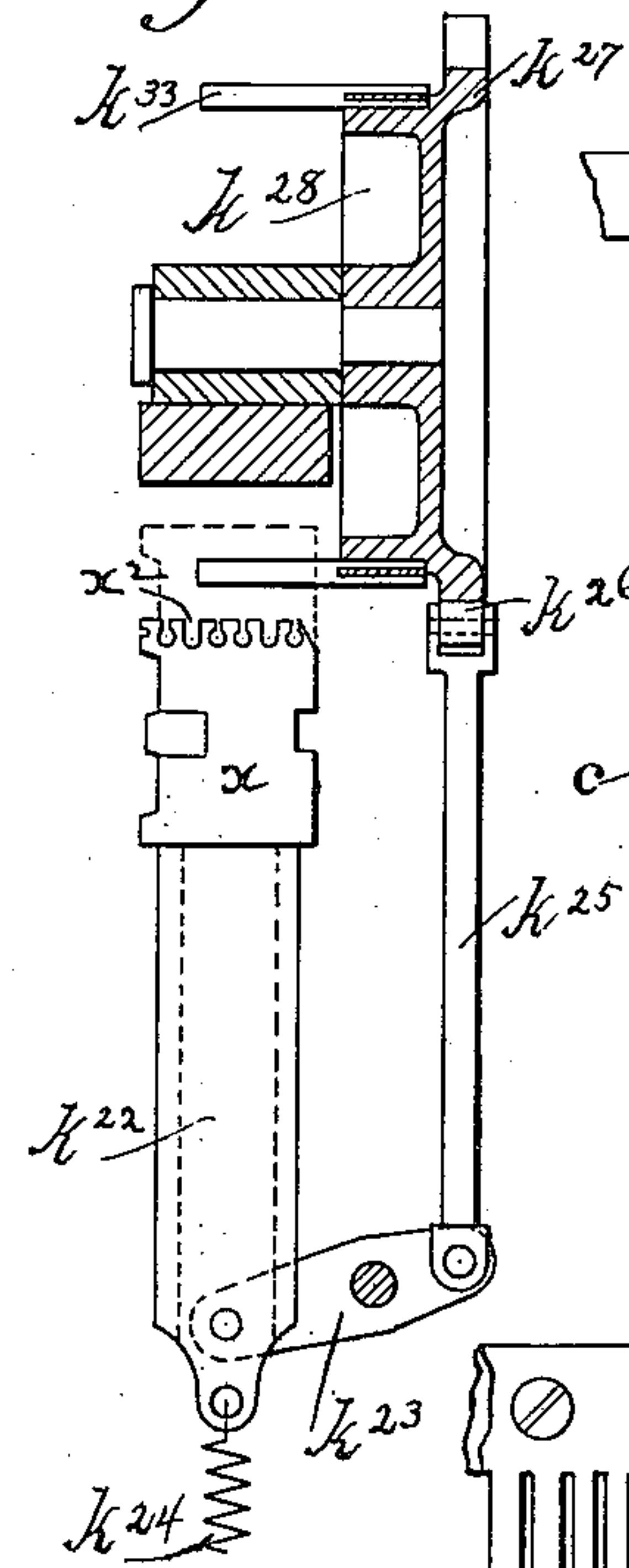
921,946.

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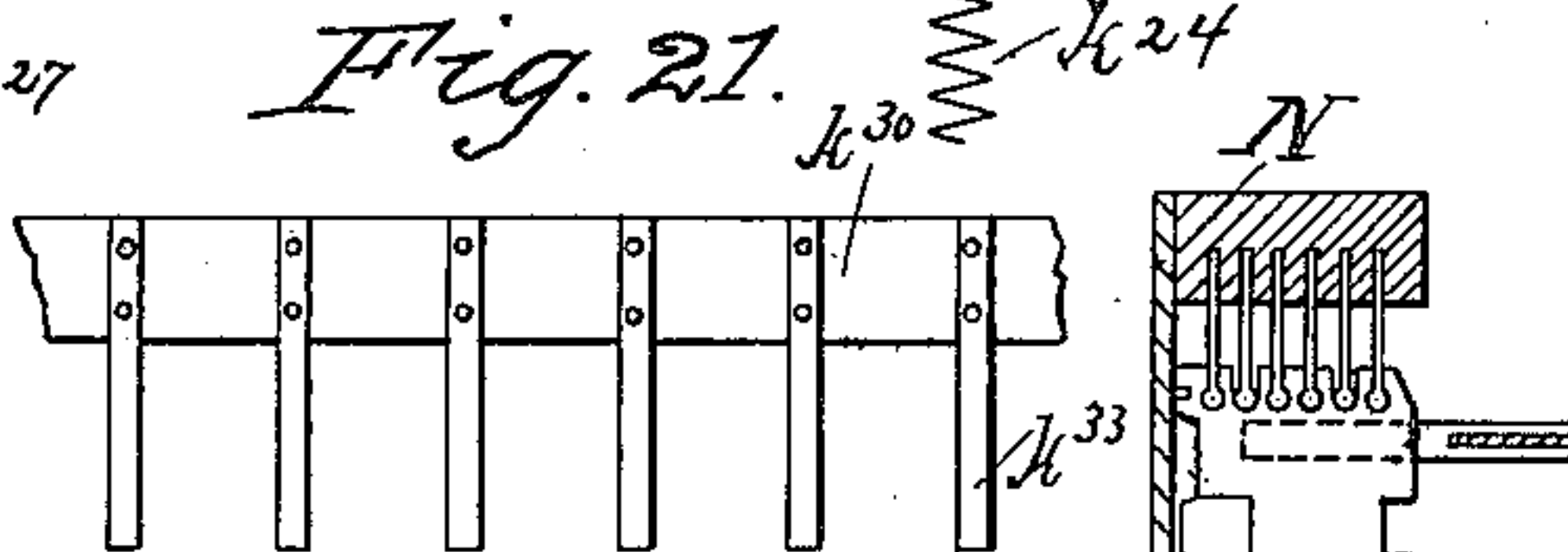
11 SHEETS—SHEET 9.



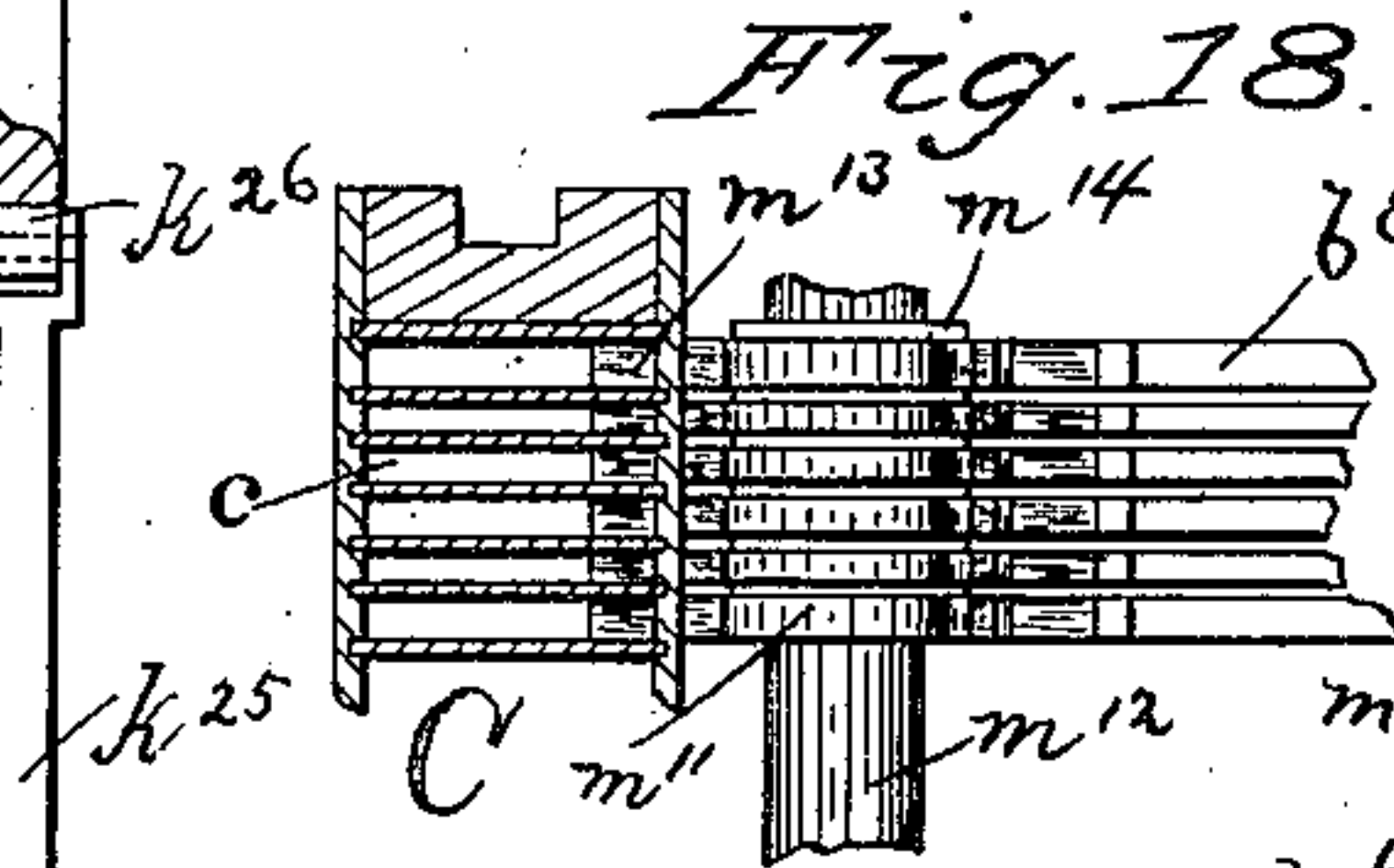
*Fig. 20.*



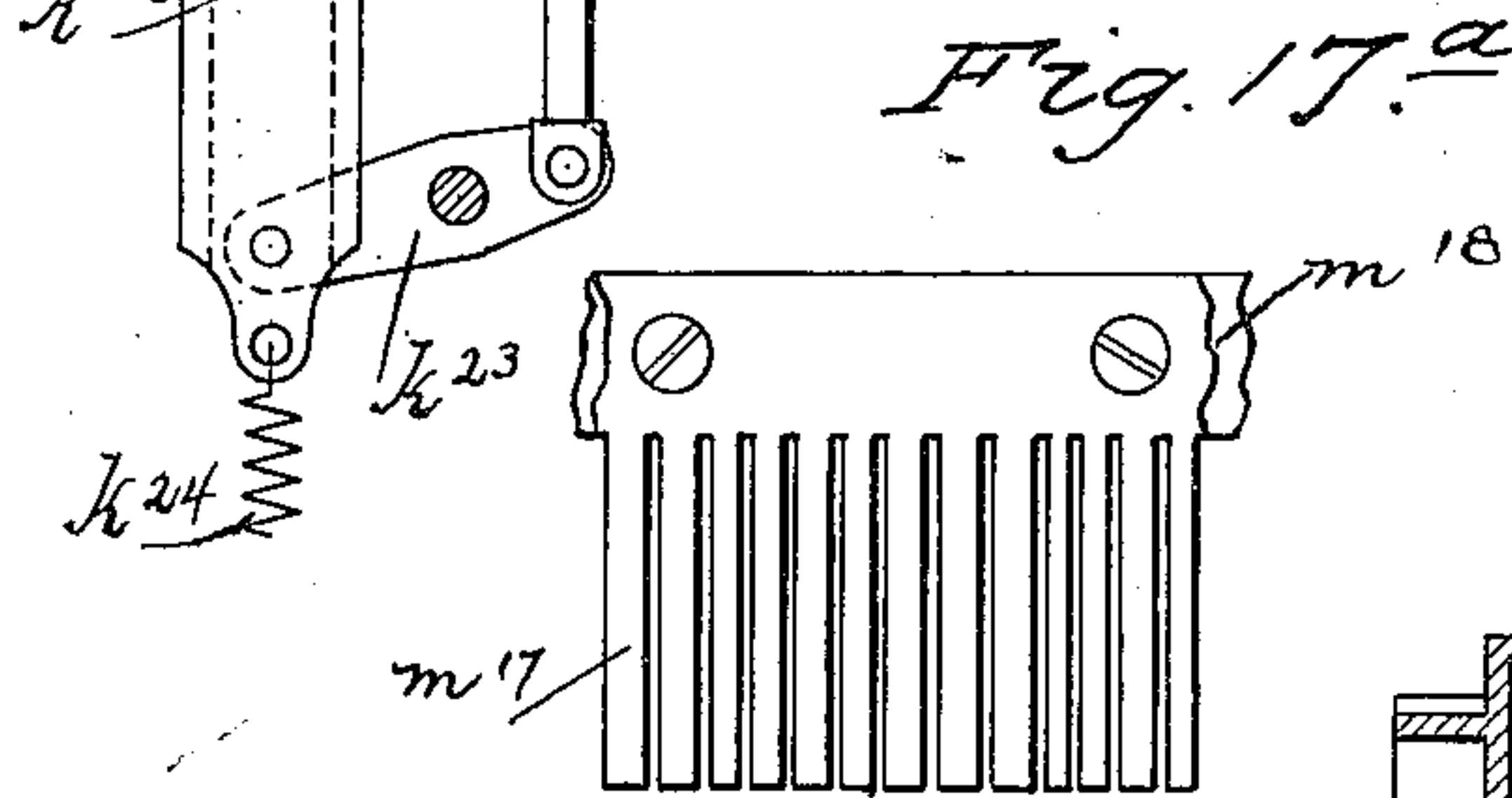
*Fig. 21.*



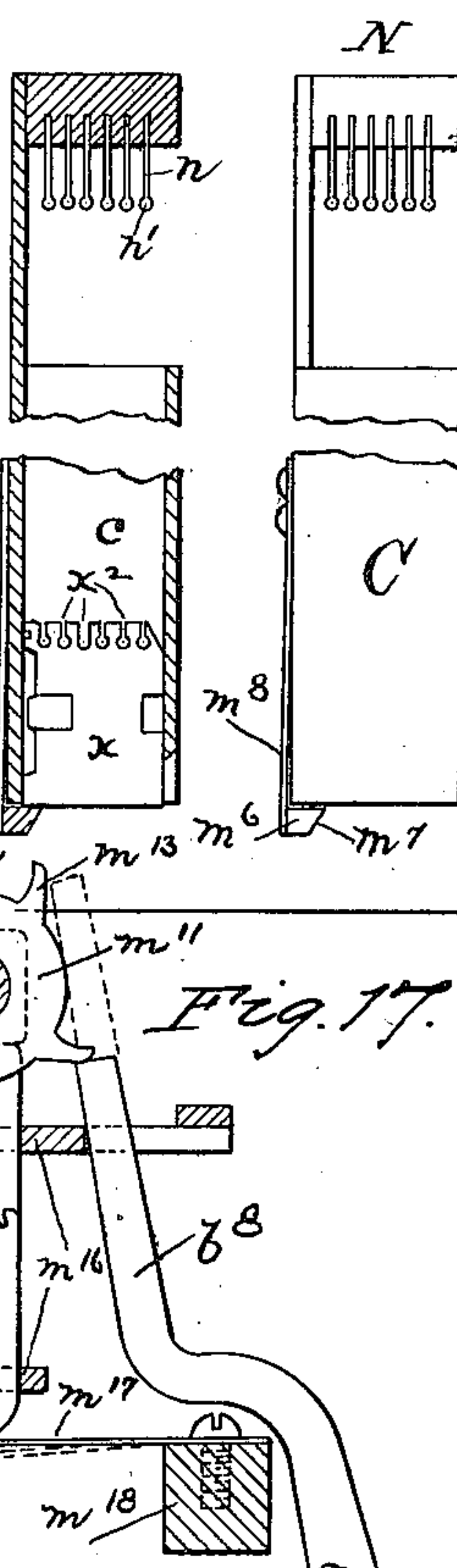
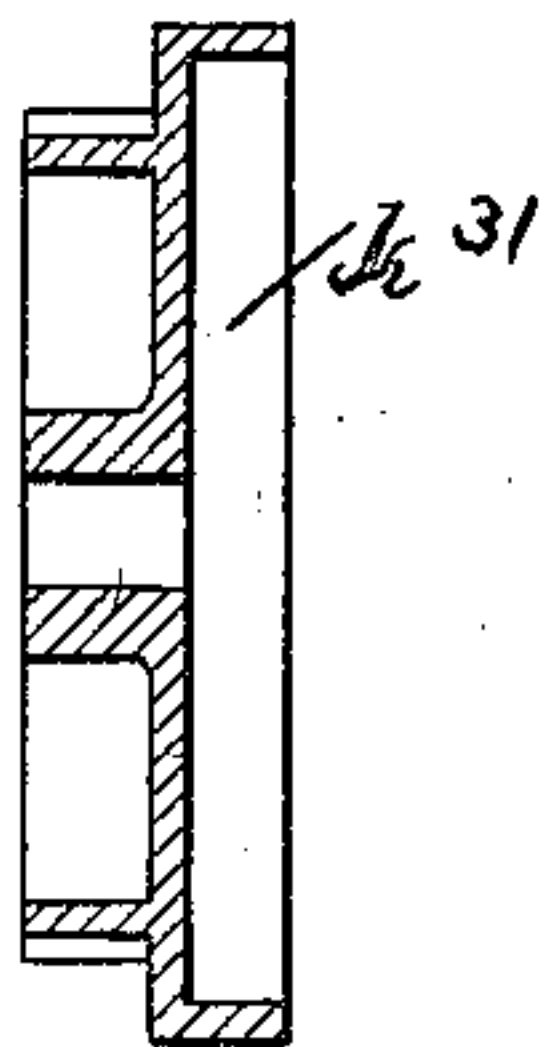
*Fig. 18.*



*Fig. 17.*



*Fig. 19.*



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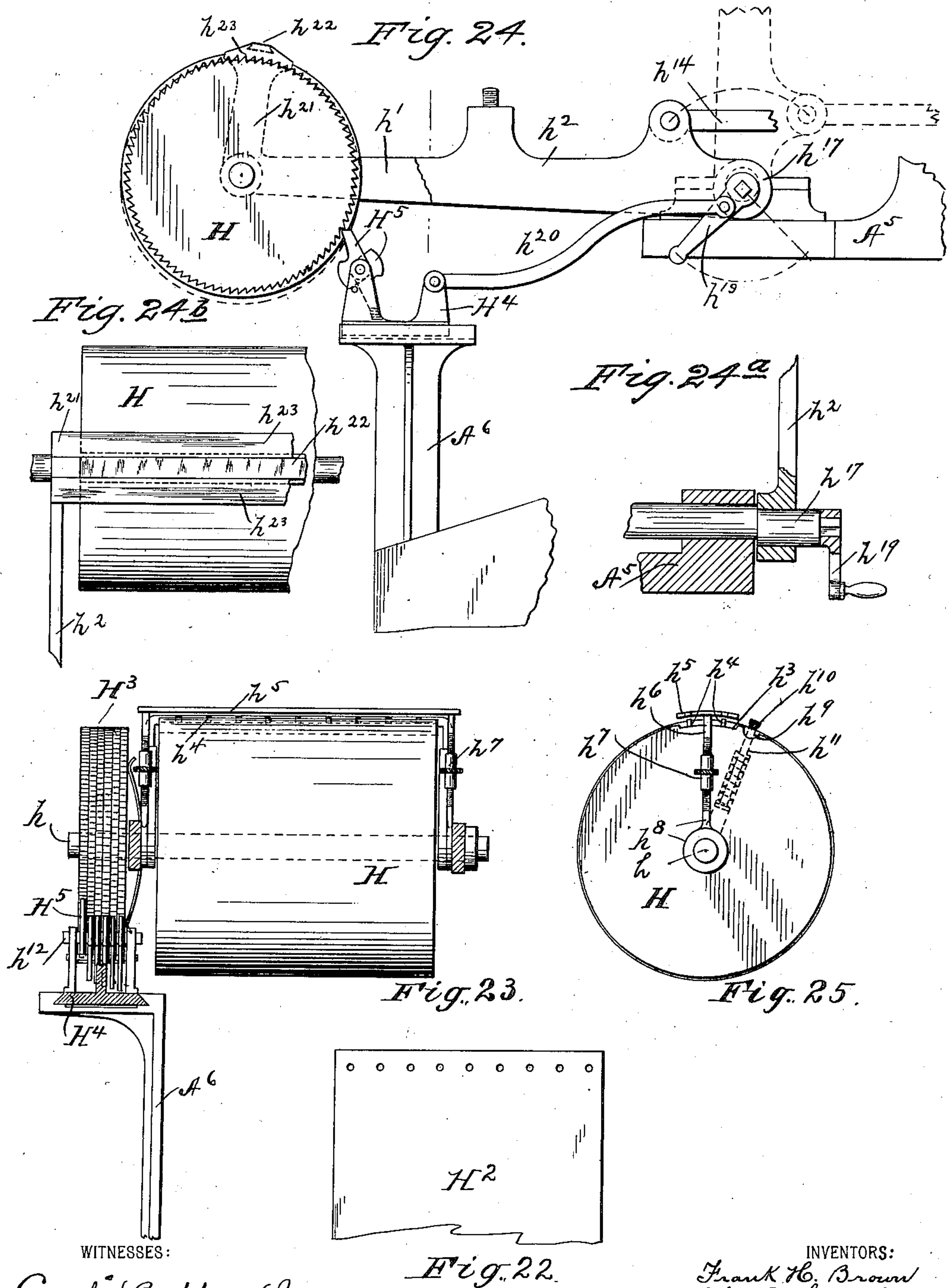
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921,946.

Patented May 18, 1909.

11 SHEETS—SHEET 10.



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Fig. 22.

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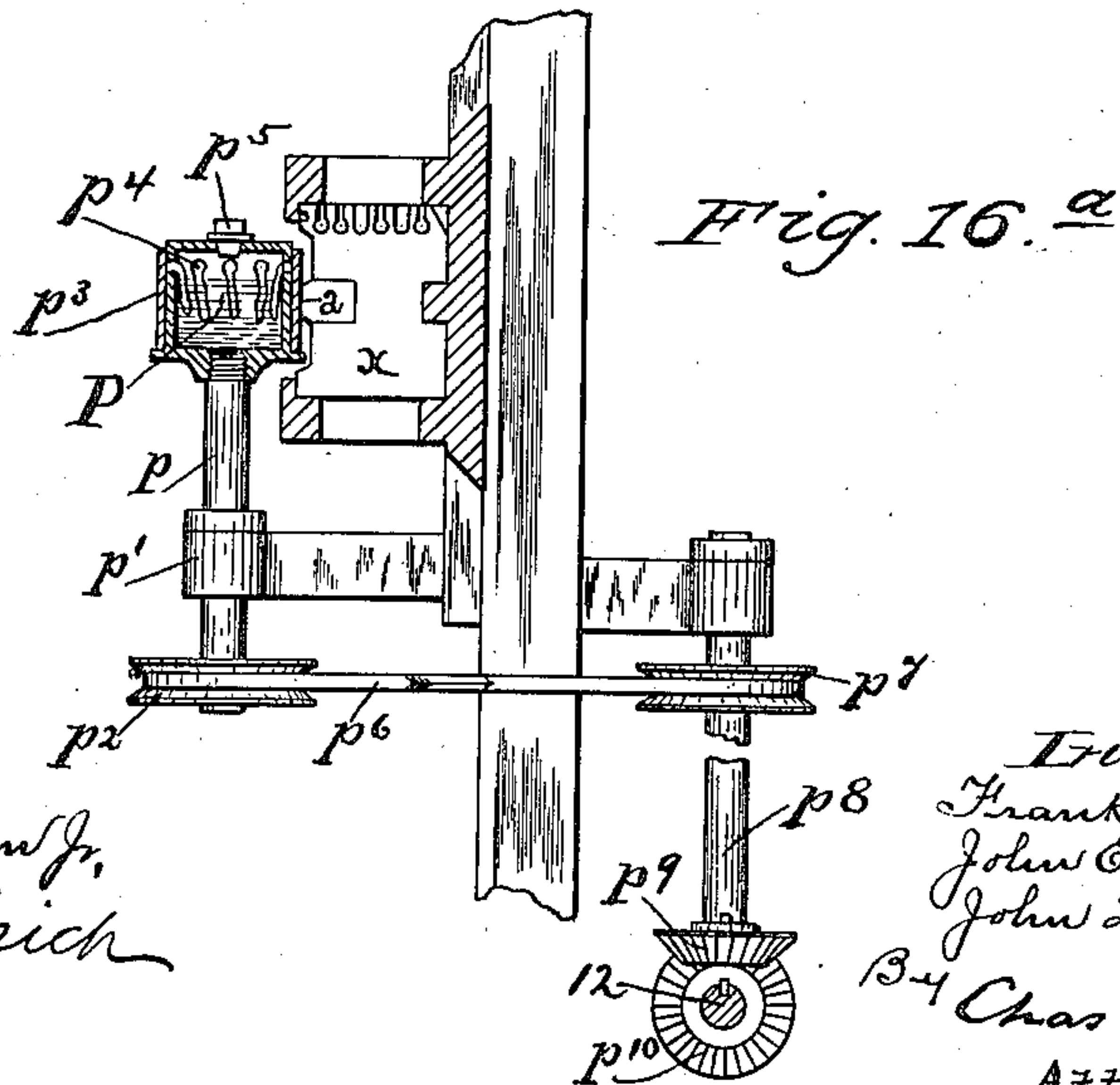
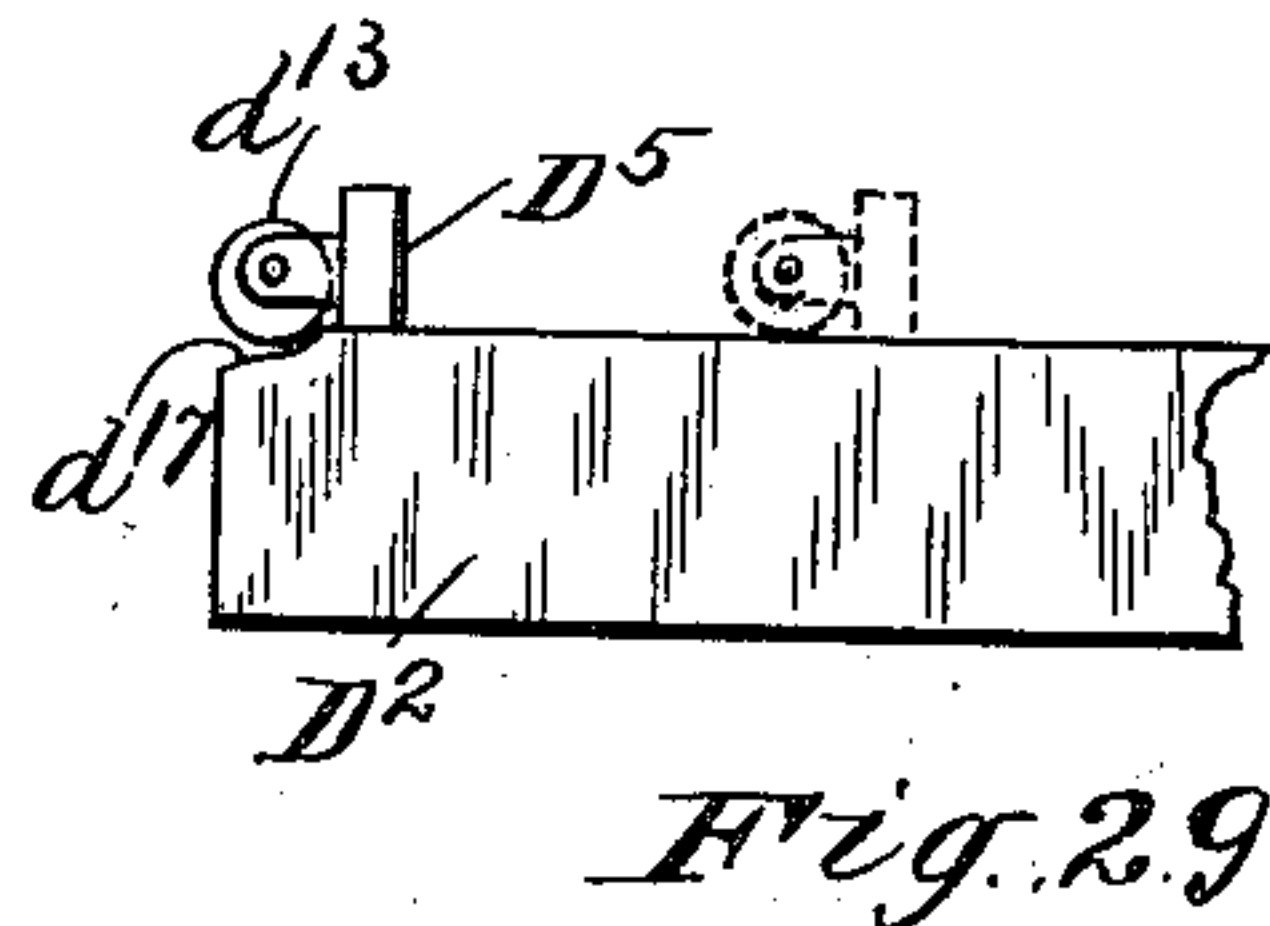
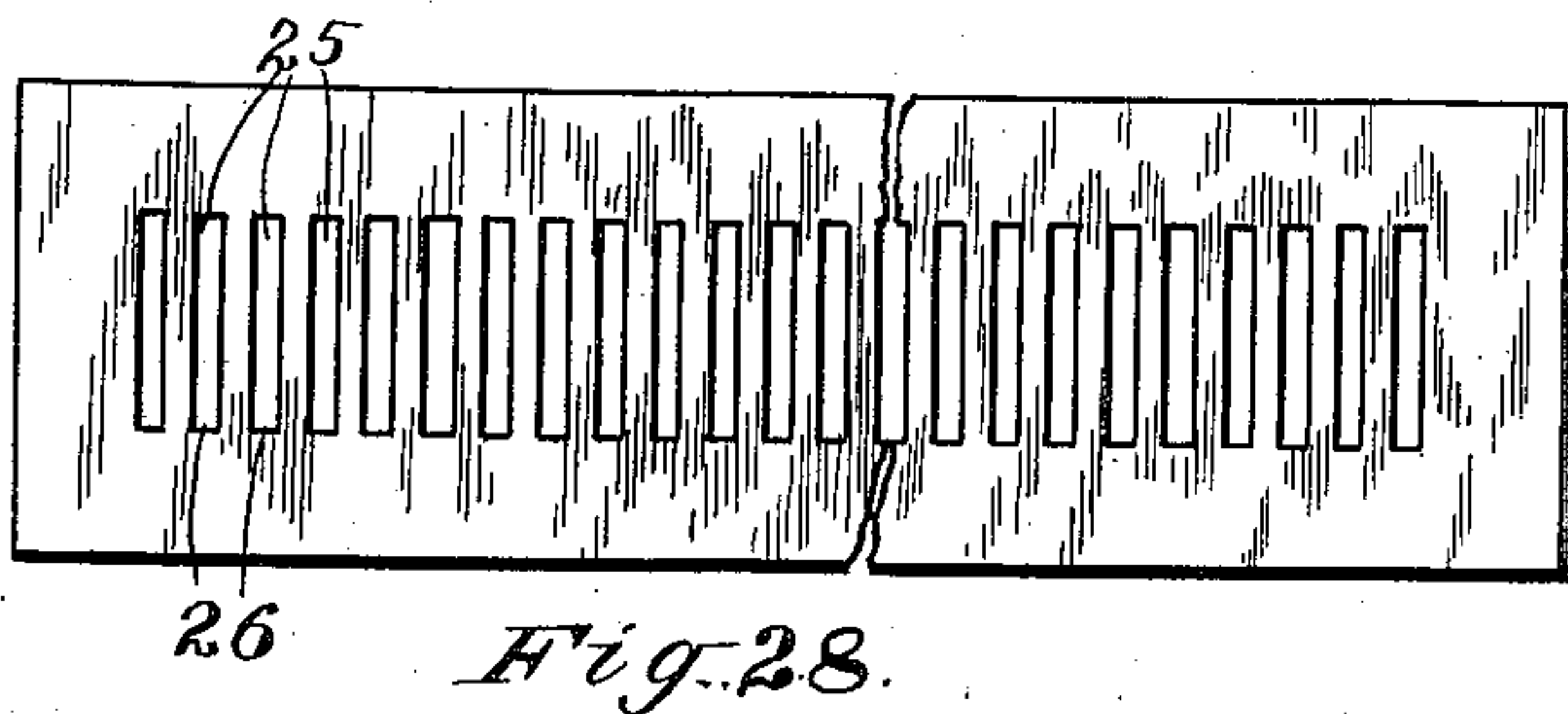
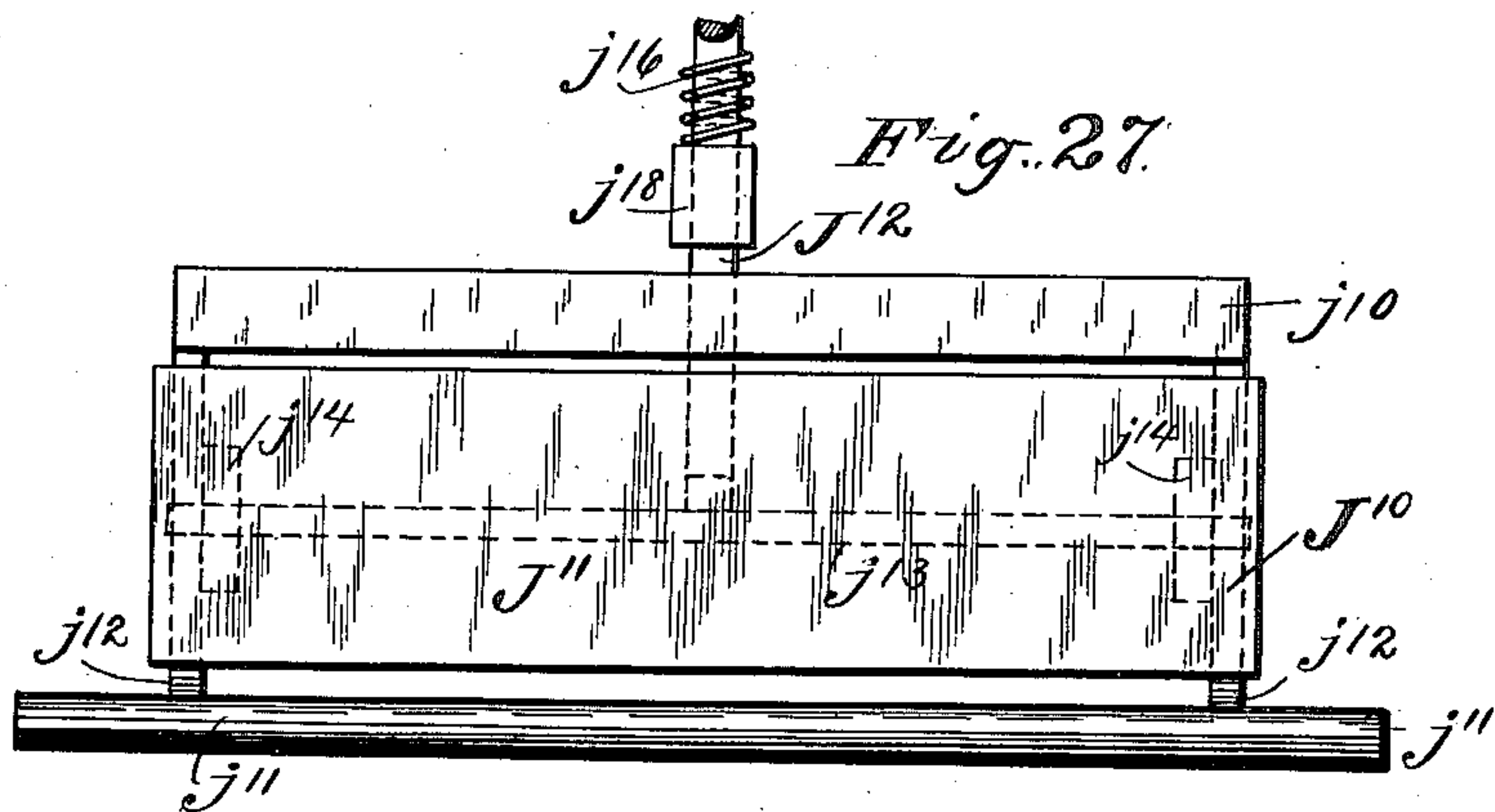
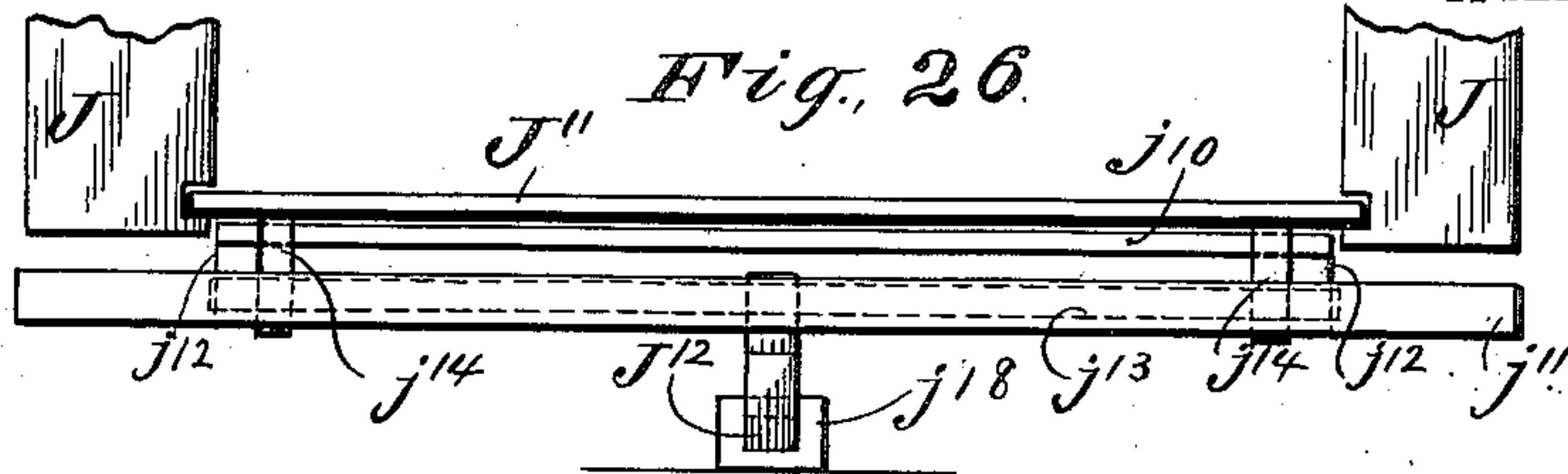
TYPE SETTING AND PRINTING MACHINE.

APPLICATION FILED SEPT. 30, 1899. RENEWED APR. 13, 1904.

921,946.

Patented May 18, 1909.

11 SHEETS—SHEET 11.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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ASSIGNORS, BY MESNE ASSIGNMENTS, TO AMERICAN PLANOGRAPH COMPANY, OF NEW  
YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

## TYPE-SETTING AND PRINTING MACHINE.

No. 921,946.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed September 30, 1899, Serial No. 732,196. Renewed April 13, 1904. Serial No. 203,038.

*To all whom it may concern:*

Be it known that we, FRANK H. BROWN, JOHN E. HANRAHAN, and JOHN LINDSAY SELLAR, citizens of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Type-Setting and Printing Machines, of which the following is a specification.

10 Our invention relates to a machine for composing type-characters into lines and taking an impression from the composed lines.

In the art as heretofore practiced type-setting machines using ordinary foundry type have been arranged in magazines or holders 15 having separate compartments for each letter and other character employed in printing, and the assembling or composing of such type into a line effected from a key board after which the operation of "justifying" or 20 properly spacing the words to fill the line to its desired length has been performed by hand; the printed impression then has been taken upon a press entirely separate from the assembling or composing machine, and 25 finally the types distributed or restored to their proper compartments in the magazines or holders by being manually placed in distributing mechanism provided for that purpose. This class of type-setting machines 30 while used to some extent has not met the requirements of the printing craft, for obvious practical reasons. In another proposed method a number of movable bars are shown 35 arranged side by side, each bar having type faces of all the letters of the alphabet and other characters employed in printing formed in cameo on one edge, and means provided whereby said bars are adjusted longitudinally with relation to each other so that a 40 selected character of one bar will be in alignment with selected characters upon the other bars, these selected characters thereby forming a composed line of type-faces after which such composed line was to have been inked and a printed impression taken therefrom upon a strip of paper; but this method was found impracticable because a second line 50 first been readjusted to their normal position. Another method employs a composing and type-casting machine wherein individual type characters in the form of matrices or type-molds representing each letter and

other character used in printing, are placed 55 in a magazine or holder having separate compartments for each of the different letters or characters, and controlled from a suitable key board. In the operation of this machine after a line of matrices or molds has been assembled or composed, the line is automatically "justified", and presented against an open side of a heated mold to which the line of matrices serves as a closure, and molten 60 metal is then supplied to form a casting from the said composed line of matrices; the product of this machine is a bar of metal having upon one edge in cameo all the characters formed by the said line of matrices; this cast bar is technically known as a type-bar or 65 "linotype". After the type-bar has been cast, the assembled matrices are automatically distributed by the machine to their respective compartments in the magazine. While the several steps in this method of 70 casting type-faces in a line are automatically performed, the product of the machine is not an ink-impressed line or lines upon a suitable surface such as we provide for, but is a cast-metal type-bar or "linotype" which must be 75 removed from the machine and in conjunction with other type-bars from the composed type-matter which may be stereotyped and finally inked and printed by entirely separate machinery; furthermore, in actual commercial use of the linotype, the printed results or topographical appearance is often 80 lacking in that clean-cut distinctness of outline and general artistic finish that is obtainable ordinarily from good foundry type. Again this method is objectionable in the comparative difficulty attending the correction of errors in the type-bars, an error of a single letter necessitating the recomposition and recasting of an entire line. And finally, 85 another objection to the linotype casting method is that it introduces into the operation an expensive and undesirable step, that of hot metal casting.

Objects of this invention are to provide a 100 machine which will compose and automatically justify a line of types and take an inked impression therefrom on a suitable impression receiving surface; to provide such a machine which will impress the assembled, 105 justified and inked lines successively, a line at a time, on the impression receiving surface in column or page alinement; to provide for



a uniform impression of successive lines; to provide a machine which shall automatically assemble individual types into line, justify the line, ink the line, take an inked impression therefrom and return the types of the line to their respective compartments to be again assembled; to provide a machine which will give a product from which excellent printing plates may be made without the use of molten metal, stereotyping, electrotyping or make ready.

A further object of this invention is to produce a typesetting, justifying, inking, printing, and distributing machine which may employ type that are not removed from the machine during any of these operations, the type securing a high class of artistic finish or appearance in the printed product.

A still further object of the invention is to produce a typesetting, justifying, inking, printing, and distributing machine which shall be capable of automatically performing either one or all of the several operations of justifying, inking, printing, and distributing lines of type simultaneously with the setting or composing of another line of type, thereby greatly increasing the speed with which the machine may be operated.

Another object of the invention is to produce a composing machine having only a single key-board, which will compose lines of type-characters which have faces of various sizes in order that the operator may compose from one key-board an entire newspaper article, which shall include a wide range of display headlines, a credit line of special type-face, both leaded and solid body-matter, small cap or bold-face sub-heads, "inserts" of other sizes of type-faces, and tabulated forms.

These and other objects of invention will in part be obvious and will in part be set forth hereinafter.

The inventive consists in certain novel combinations of parts, and novel constructions and arrangements of parts hereinafter described and pointed out in the claims.

The inventive idea here involved may find expression in various mechanical forms, and we have, for the purpose of illustrating the invention, shown one of such forms in the accompanying drawings; but it is to be distinctly understood that said drawings are intended for the purpose of illustration only and not as defining the limits or scope of the invention.

In said drawings:—Figure 1 is a front elevation of our machine; Fig. 2 is an end elevation of Fig. 1, parts being omitted; Fig. 2<sup>a</sup> is a detail view of a catch device to retain a magazine at the elevated position. Fig. 3 is a detailed side elevation, parts being in section, of the platen, the elevator and connected parts; Fig. 4 is a top plan view of the machine, the distributing mechanism being

removed; Fig. 5 is a horizontal section of the uprights supporting the magazines; the driving mechanism and other parts; Fig. 6 is a vertical section on an enlarged scale on the line 6—6 Fig. 1 looking to the left; Fig. 7 is a detail of one of the shifting jaws; Fig. 8 is a broken front elevation showing portions of the elevator and magazine together with the justifying space holder; and means for returning the spaces thereto from the elevator; Fig. 8<sup>a</sup> is a detail of the justifying space box in position to transfer the spaces to the holder; Fig. 8<sup>b</sup> is a detail of the space delivering devices; Fig. 9 is a horizontal sectional plan on the line 9—9 Fig. 6; Fig. 9<sup>a</sup> is a detail of the assembling race-way; Fig. 10 is a vertical section on line 10—10 Fig. 9; Fig. 11 is a broken vertical section on the line 11—11 Fig. 5, showing the justifying mechanism; Figs. 11<sup>a</sup> and 11<sup>b</sup> are details showing the action of the justifying wedges; Fig. 12 is a detail view showing part of the connections between the key-board and the type-delivery devices; Figs. 13 and 14 are plan and front elevation views respectively showing the means for transferring the type from the chase box to the distributing car; Figs. 14<sup>a</sup> and 15 are details thereof; Fig. 16 is a broken vertical detail of the distributing devices; and the type-cleanser. Fig. 16<sup>a</sup> is a detail view of the type-cleaner. Fig. 17 is a vertical section showing the relation of several magazines, the chute and release. Fig. 17<sup>a</sup> is a plan view of the spring fingers. Fig. 18 is a plan view of the releases and section of a magazine. Fig. 19 is a section of the wheel, *k*<sup>31</sup>, driving the distributing belt. Fig. 20 is a vertical section of wheel, belt and type-lift. Fig. 21 is a top view of part of distributing belt. Fig. 22 is a detail of a strip of paper employed on the platen. Fig. 23 is an elevation of the platen with its ratchets and pawls. Fig. 24 is an end elevation of platen and connected parts. Fig. 24<sup>a</sup> is a detail of eccentric fulcrums. Fig. 24<sup>b</sup> is a top view showing preferred style of platen. Fig. 25 is an end view of platen and paper fastener. Figs. 26 and 27 are elevation and plan views respectively of a part of the justifying devices; Fig. 28 shows a plan view of the combined guide and stop plate for the type delivery bars; and Fig. 29 is a rear vertical detail of the assembling slide in the race-way.

We shall for the sake of clearness, first give a general description of our improved composing machine, after which we shall give a detailed description of the several sets of coöperating mechanism which make up the machine as a whole, together with a statement explaining the manner in which the several sets of mechanism are combined.

For printing we prefer to employ a foundry-cast type-face of the best quality of type metal, mounted in or upon the edge of a



suitably shaped block of harder material, such as brass, but it is to be understood that certain parts of the invention are not limited to the employment of type-mounts.

5 The justifying space which we prefer to employ and which is shown herein, consists of two oppositely-disposed wedges with their thin edges confronting each other and loosely connected by a thin blade so that the  
10 two wedges may be adjusted toward or away from each other. The result of this construction is that the wedges, while at all times united together, may nevertheless be made to approach each other so as to open  
15 or expand the line of type within which they are located, the degree of such expansion depending on the extent to which the wedges enter the line. While we deem such justifying spaces as very efficient, it is to be  
20 understood that our invention so far as the machine is concerned, contemplates the employment of any suitable justifying device.

Referring to the several figures of the drawings, A, A<sup>1</sup>, are upright side plates suitably connected together, and, with their  
25 cross connections, constitute the frame of the machine, the whole of which is mounted on any suitable base, not shown. Situated between the lower portions of the upright  
30 plates, A, A<sup>1</sup>, is the key-board, B, while the magazine, C, is carried upon brackets extending forward from the upper ends of the plates.

C<sup>1</sup> is a system of converging chutes or  
35 channels leading from the mouths of the several compartments in the magazine to the single delivery chute, C<sup>2</sup>, terminating immediately over the type receiving race-way, D.

40 E is the type-line transfer mechanism consisting of a pair of jaws, E<sup>1</sup>, E<sup>2</sup>, operated by suitable cam devices to rise and grasp the composed type-line and transfer the same from the assembling position into the position where it is first justified by the justifying  
45 mechanism, F, then inked by the inking devices, G, after which the impression mechanism, H, comprising a platen carrying a suitable surface of paper or other material,  
50 is presented thereto and the ink impression obtained upon said surface.

J, is the elevator mechanism whereby the type-line and justifying spaces are elevated after the impression has been taken, in order  
55 that the justifying spaces may be returned to their holder, C<sup>3</sup>, and the type distributed through the medium of the type distributing mechanism, K, located at the top or open end of the magazine, C.

60 1 is a continuously-driven pulley loosely mounted on the shaft 2, which turns in bearings 3 in the side frame plates, A, A<sup>1</sup>, of the machine, and bearing 4 on the base thereof, (see Fig. 5). The pulley, 1, is to have a suitable  
65 clutch mechanism whereby it may be

made fast or loose on the shaft, 2; any well-known clutch-mechanism may be employed, the only requirement is that it be operative through the medium of a key adjacent the key-board. It is therefore not deemed  
70 necessary to describe the clutch mechanism with minuteness, but it is sufficient to say that a collar, z, is rigidly secured on the shaft, 2, and has a recess on its face; a spring-bolt, 5, is carried in the hub of the pulley, 1,  
75 and said bolt is held retracted when the pulley is running loosely. When however it is desired to make the pulley fast on the shaft, 2, the key-lever, Z, is depressed by the operator which causes the bolt, 5, to shoot  
80 and engage the recess on the collar, z, the bolt being automatically disconnected from the collar as the shaft, 2, completes one revolution.

6 is a small vertical shaft having bearings  
85 in suitable ears 7, 7, attached to the upright plate, A, said shaft having upon its upper end a friction wheel 8 in constant operative relation with a flange, v, formed on the inner side of the main driving pulley 1. 9 is a  
90 second vertical shaft also mounted in suitable bearings on the upright plate, A, and 10 is a driving belt connecting the shafts 6 and 9.

Mounted transversely in the machine, in  
95 bearings in the upright plate, A, and in a suitable bracket, 11, rigidly secured to a permanent part of the machine, (see Fig. 9), is a shaft 12 which is connected to the shaft 9 by suitable worm gearing 13, (see Figs. 2 and  
100 5). Positioned at right angles to the shaft 12 and having bearing in the bracket, 11, and also in the rails, D<sup>1</sup>, D<sup>2</sup>, is a shaft 15 connected by suitable beveled gears 16 and 17 to the transverse shaft 12. The shaft 15 has  
105 mounted thereon and revolving therewith between the rails, D<sup>1</sup>, D<sup>2</sup>, of the assembling race-way the cam wheel 18, said shaft 15 having bearings in said rails D<sup>1</sup>, D<sup>2</sup>, at a point immediately to the right of the delivery  
110 chute, C<sup>2</sup>.

Mounted in bearings in the upright plates, A, A<sup>1</sup>, at the extreme rear of the machine, is a shaft 19 (see Figs. 1, 2, 4, 5 and 12) having longitudinal ribs or ridges 20, projecting  
115 radially from its surface and along the greater portion of the length of the shaft, said ribs being equally spaced and giving the shaft in transverse section the outline of a star wheel. This shaft receives continuous motion from  
120 the shaft 6 by means of the belt 21<sup>x</sup>.

The transverse shaft 12 extends entirely across the machine and to the rear of the elevator mechanism, J, and is connected by suitable driving connections, as a belt 14,  
125 with the shaft 21 of the ink cylinder, G<sup>1</sup>, which shaft is in turn geared to the shaft 22 of the reciprocating ink brayer, G<sup>2</sup>, through the medium of the gears 23 and 24 (see Figs. 1 and 5).



The shaft 9 extends upward through a protecting tube, L, (see Fig. 2) which is mounted on a bracket, L<sup>1</sup>, on the side plate, A, said tube carrying upon its upper end an outwardly-extending bracket arm supporting bearings for a short shaft 27, having upon one end thereof a friction wheel 28, and on the other end a beveled gear 29, gearing with a like gear 30, upon the upper end of shaft 9. The shaft 27 together with its friction wheel 28 is utilized to operate the type distributing mechanism in a manner which will be hereinafter more fully described.

From the foregoing description it will be understood that the transverse shaft 12, the shaft 15 operating the eccentric or cam 18, the shaft 19 with its longitudinal ribs 20, and the shafts 21 and 22 of the inking devices, as well as the shaft 27 with its friction wheel 28, are all in continuous operation.

Having thus described the means for operating the continuously-moving portions of the machine, we will now describe in the order of their employment or operation the various mechanisms which, combined, compose the entire machine, explaining in connection with each mechanism the manner in which it is connected to and operated by the power driving mechanism.

*The type magazine and justifying space holder.*—A plurality of magazines may be and preferably is employed in our machine, in order that the operator may have at his disposal a number of fonts of type, with bodies of various sizes, for example, body types, italics, and display type. These several magazines in the present instance six, but more may be used, are preferably mounted on a suitable car movable on a track, to the end that any one of the several magazines may be brought at the will of the operator, into position to deliver the type therefrom into the upper end of the chute, C<sup>1</sup>. Referring to Figs. 1, 2 and 8, the magazine-car comprises upright plates, M, M<sup>1</sup> suitably connected together at the top and bottom by cross-bars and mounted upon axles, m, extending at each end out through the plates, M, M<sup>1</sup>, and having upon the projecting ends wheels, m<sup>1</sup>, m<sup>2</sup>, the wheels at one side being grooved, the wheels of the car resting upon rails, m<sup>3</sup>, supported by brackets formed upon the top of the side plates, A, A<sup>1</sup>. These rails are provided at their forward ends with upwardly turned portions, m<sup>4</sup>, which act as a stop to prevent the magazine car from moving forward off of the rails. Mounted in this magazine car are a plurality of upright magazines, C, having formed therein a number of compartments, c, (see Fig. 8), the number of these compartments corresponding to the number of type characters employed in the particular font for which the magazine is designed. The magazine car is adjustable upon the track backward and forward so as

to bring the lower opening or mouth of any one of the several magazines, C, over the upper end of the chute, C<sup>1</sup>. Each of the magazines, C, is vertically adjustable in the magazine car, all of the magazines being normally retained in the highest position by a suitable catch or other retaining device, as, m<sup>5</sup>, (see Figs. 2 and 2<sup>a</sup>). The operator having selected the magazine which he wishes to bring into operation, adjusts the car backward or forward until the desired magazine is directly over the mouth of the chute, C<sup>1</sup>, when the catch, m<sup>5</sup>, is released and the selected magazine permitted to descend into close and operative relation with the mouth of the magazine chute, C<sup>1</sup>. The compartments, c, in all of the magazines are open both at the top and at the bottom, the type being retained in said compartments superimposed one upon the other. Means are provided whereby the column of type contained in each compartment is prevented from escaping at the lower end or mouth of the compartments, except when the magazine is lowered into operative relation with the chute, C<sup>1</sup>, and then only in response to a pressure by the operator upon a key of the keyboard corresponding to the particular compartment. Such means may consist either of independent retaining devices for each compartment of each magazine, or they may consist of a single retainer for each magazine which normally operates in connection with all of the compartments of any single magazine to prevent the escape of the types therefrom when the magazine is out of operative relation with the chute, C<sup>1</sup>,—that is raised,—but which single retainer is withdrawn when the magazine is lowered into operative position, all the types being then retained and delivered one at a time by suitable releasing mechanism provided for that purpose.

The type-retaining device for each magazine consists of a horizontal bar, m<sup>6</sup>, see Fig. 17 having one edge, m<sup>7</sup>, beveled and extending entirely across below the lower ends of all the compartments of the magazine and on which the lowermost type-mount, x, in each compartment normally rests; this type-retaining bar, m<sup>6</sup>, hangs pendent by several thin plate springs, m<sup>8</sup>, which are attached to the side of the magazine near its bottom—said springs tending to keep the bar under the lower ends of the compartments. The chute, C<sup>1</sup>, has at the upper end of its front wall a plate, m<sup>9</sup>, with a beveled edge, m<sup>10</sup>. When either one of the several magazines, C, is lowered into operative connection with the chute, the beveled face of its retaining bar will contact with the beveled edge, m<sup>10</sup>, on the chute and thereby the springs, m<sup>8</sup>, will yield and the retaining bar, m<sup>6</sup>, automatically forced from its normal position, no longer retaining the type mounts in the compartments, the type-mounts being then retained



in this particular magazine by the type-releasing device, which will now be described.

The type releases are attached to the chute,  $C^1$ , and coöperate with one magazine only at a time—that particular magazine that is adjusted into operative relation with the chute. Referring more particularly to Fig. 17,  $m^{11}$ , is a rotary release mounted upon and turning independently of a shaft,  $m^{12}$ , extending crosswise of the chute. There are as many rotary release devices as compartments in the magazine. In the present instance the rotary release,  $m^{11}$ , has four hooked prongs,  $m^{13}$ , one of which is normally projecting through a slot in the upper end of the chute, in position to sustain the lowermost type-mount,  $x$ , in the compartment,  $c$ , of the magazine immediately above it, and all other type-mounts in that compartment. At one of its sides the rotary-release has a square hub,  $m^{14}$ . A vertical bolt,  $m^{15}$ , is below the rotary release, and is movable up and down in suitable guides,  $m^{16}$ , the upper end of the bolt being in contact with one of the sides of the square hub, and the lower end of the bolt resting upon a spring-finger,  $m^{17}$ ; the spring fingers are preferably made in the form of a comb, shown in Fig. 17<sup>a</sup>, which is attached to a horizontal bar,  $m^{18}$ , that holds it in position under the several bolts. An upright rod,  $b^8$ , which has up-and-down movement imparted to it by mechanism presently to be described, has its upper end normally under one of the prongs,  $m^{13}$ , on the rotary release device; when this rod moves upward it causes the releaser,  $m^{11}$ , to make a quarter turn which has the effect to release the lowermost type-mount,  $x$ , in the compartment, and at the same time to project the next prong,  $m^{13}$ , into the chute under the next type-mount and prevent any more type-mounts from being released; the prong that is in the chute and under the magazine-compartment always serves to sustain all the type-mounts that are in that compartment.

It is to be understood that the face,  $a$ , of the type from which the impression is made is secured on an edge of the type-mount that is recessed, so that as the type-mount slides down through the compartment in the magazine the face of the type will not be in contact with any part of the compartment and therefore the type-face will not be worn or injured.

From an inspection of Fig. 8 it will be understood that the number of guiding channels,  $c^1$ , in the chute,  $C^1$ , is much less than the number of type-mount compartments in the magazine,  $C$ . The lower end of each channel,  $c^1$ , terminates a short distance above the funnel-shaped side walls of the chute,  $C^1$ , and preferably the walls of the channels,  $c^1$ , slightly converge toward the central line of the chute, to the end that the type-mounts, as they leave said channels, may be partially

turned in the direction of the chute delivery,  $C^2$ .

Any preferred form of holder may be employed for the justifying spaces. We have shown in Figs. 1, 8 and 8<sup>b</sup> hereof, a holder,  $C^3$ , which consists of two downwardly inclined rails,  $c^3$  properly spaced apart so as to permit the body of the justifying wedges to pass down between them, but so that the outwardly projecting ears,  $y^2$ , upon the upper ends of the justifying wedges may engage thereon. The two rails,  $c^3$ , are inclined at a sharp angle and are suspended under the left hand side of the chute,  $C^1$ , with their lower ends in close proximity to the chute-delivery,  $C^2$ , their upper ends extending to the edge of the elevator track or way,  $J^3$ . Above and on a line midway between the two rails,  $c^3$ , is placed a guide-rail,  $c^4$ , so positioned that when the justifying spaces,  $y$ , are placed upon the rails or ways,  $c^3$ , the notch,  $y^1$ , formed in the top of the upper justifying wedge, will engage the said guide rail,  $c^4$ , as will be readily understood from an inspection of Fig. 8<sup>b</sup>. A series or number of justifying spaces,  $y$ , are designed to hang pendent upon such rails or ways and are prevented from escaping at the bottom of the rails by the upwardly-turned lips,  $c^5$ , (see Fig. 8),—the guide-rail,  $c^4$ , terminating just before it reaches the lower end of the rails,  $c^3$ , so that the lowermost justifying space in the holder is free from the said guide rail.

Referring now to Fig. 8<sup>b</sup>,  $b^{13}$ , is a lever similar to one of the levers,  $b^7$ , attached to one of the push rods,  $b^5$ , of the assembling mechanism, to be hereinafter described. Said lever,  $b^{13}$ , is connected to a lever,  $c^6$ , one arm of which is in position to raise the lowermost justifying space upon the depression of the end of the lever,  $b^{13}$ , connected therewith. The lowermost justifying space having been lifted through the action of the levers,  $b^{13}$ ,  $c^6$ , above the upwardly projecting lips,  $c^5$ , is, by the weight of the inclined column of justifying spaces behind it, pushed off of the rails and falls into proper position in the type-assembling race-way, being guided in its fall by suitable guide walls having top flaring sides,  $c^8$ , (see Figs. 8 and 8<sup>b</sup>). The upper ears,  $y^2$ , of the justifying spaces lodge on the two horizontal bars,  $D^6$ , and the said spaces hang pendent and advance along said bars into the justifying box.

*Assembling mechanism.*—The assembling mechanism comprises a suitable horizontal receiving channel or race-way,  $D$ , suitable devices for releasing the type-mounts from the magazine and delivering them to the race-way, and means for advancing the type-mounts in the race-way step-by-step, as the same are delivered. The delivery of the type-mount from the magazine and of the spaces from their holder is effected by the operator manually depressing the keys,  $b$ ,



upon the key-board, B. Each key of the key-board preferably has a character indicating the particular compartment of the magazine to which it relates, in the usual manner which will be well understood. The several keys of the key-board have each a separate line of connections composed of a set of levers, and push bars, through the combined action of which the release device,  $m^{11}$ , at the top of the chute,  $C^1$ , is controlled. These may all be substantially identical and a description of the operation of a single key and its connections with the release device will suffice for all.

We prefer to employ power mechanism to operate the type release devices, and to control the same from the key-board, and have shown such devices in the accompanying drawings, but such need not necessarily be employed, as the release devices, if found desirable, may be operated directly from the key-board, without the interposition of such power mechanism.

Referring more particularly now to Figs. 2 and 12, the key,  $b$ , is connected to one arm of a bell-crank lever,  $b^1$ , which is pivoted on a rod,  $b^2$ , extending transversely across the machine immediately under the key-board. The bell-crank lever is pivotally connected at its lower end to a push-bar,  $b^3$ , suspended by means of a link,  $b^4$ , hanging from a rod,  $b^{10}$ , so that the push-bar may swing toward the vertical rod,  $b^5$ , which has on the lower end thereof a toe,  $b^6$ , projecting toward, but normally out of the path of the ridges or ribs 20 on shaft 19, continuously revolved by power. The upper end of the rod,  $b^5$ , is connected to the lever,  $b^7$ , which is connected to a push rod,  $b^8$ , whose upper end acts on the rotary release,  $m^{11}$ , as already described. A spring,  $b^9$ , acts on the rod,  $b^5$ , to keep the toe,  $b^6$ , of the rod out of engagement with the revolving shaft, 19,—the influence of the spring being limited by a stop 25 suitably supported on the frame of the machine. On the under side the push bar,  $b^3$ , has a downwardly-projecting shoulder,  $b^{11}$ , and,  $b^{12}$ , is a rigid upwardly-projecting flange, lying in the path of movement of said shoulder,  $b^{11}$ , and operating as a stop to limit the backward movement of the bar,  $b^3$ , when the key is depressed; the flange,  $b^{12}$ , extending entirely across the machine and operating as a stop for all of the push bars,  $b^3$ .

The operation of the delivery mechanism is as follows:—A key,  $b$ , being depressed causes the bell-crank,  $b^1$ , to force the pusher bar,  $b^3$ , against the vertical rod,  $b^5$ , until its toe,  $b^6$ , is in the path of the ridges 20 on the continuously-revolving shaft 19, this movement of the toe,  $b^6$ , being limited by the stop 26 in the path of the bar,  $b^5$ , as is clearly shown by the dotted lines in Fig. 12. The toe,  $b^6$ , having engaged one of the ribs 20, the rod,  $b^5$ , is elevated until the lower end of its

heel is raised above the upper line of the push-bar,  $b^3$ , and disengages therefrom and from the rib 20 by the spring,  $b^9$ , and leaving the toe-piece resting on top of the push-bar. The upward movement of the rod,  $b^5$ , caused by the action of the revolving shaft, 19, produces an upward push upon the rod,  $b^8$ , which operates the rotary release,  $m^{11}$ , to liberate one type-mount from the particular compartment of the magazine to which the key depressed by the operator corresponds. It will be observed that if the operator should hold the key,  $b$ , depressed for any considerable period of time that there will nevertheless be but one type character delivered from the corresponding compartment of the magazine, as in such case the rod,  $b^5$ , cannot drop into the proper operative position in the path of the pusher-bar,  $b^3$ , until the operator withdraws pressure from the key,  $b$ , thus permitting the bar,  $b^3$ , to swing back to its normal position toward the key board, thereby withdrawing the end of the pusher-bar from under the heel of the rod,  $b^5$ , and permitting the latter to again drop into its normal position. The stop shoulder,  $b^{11}$ , and flange,  $b^{12}$ , are so positioned with relation to each other that the pusher-bar,  $b^3$ , will be stopped before it shall have forced the toe,  $b^6$ , far enough to injuriously contact with the shaft, 19. When a type-mount is permitted by the releaser,  $m^{11}$ , to pass from the magazine it enters one of the guide-channels,  $c^1$ , in the chute,  $C^1$ , and from thence is conducted into the chute delivery,  $C^2$ , from whence it is delivered to a race-way in which a line of type is set up and along which the line is then shifted to the justifying and printing positions. This type receiving race-way in its preferred form of construction is illustrated in Figs. 1, 8, 9, 10, and consists essentially of four horizontal rails suitably arranged to receive and retain the type-mounts,  $x$ , and conduct the same from the point where they are delivered to the chase-box,  $J^1$ , where the line is justified and the ink impression taken therefrom. Referring to Figs. 9 and 10,  $D^1$ ,  $D^2$ , are the bottom rails having upwardly projecting ribs or flanges extending along the outer edges thereof, the distance between the flange on the rail,  $D^1$ , and the flange on the rail,  $D^2$ , being approximately that of the type-mount upon which the type proper is mounted.  $D^3$ ,  $D^4$ , are the upper rails of the race-way and are located immediately above the lower rails,  $D^1$ ,  $D^2$ , at a distance substantially equal to the height of the type-mounts and each has a downwardly projecting flange on the under side thereof corresponding to the upwardly projecting flanges on the lower rails. It will be readily understood from inspection of Fig. 10 that the four rails,  $D^1$ ,  $D^2$ ,  $D^3$ , and,  $D^4$ , form a channel or race-way along which the type-mounts may be advanced until the com-



plete line has been assembled. Immediately under the lower end of the chute delivery,  $C^2$ , the upper rails,  $D^3$ ,  $D^4$ , of the race-way are slightly cut away so as to permit the type-mounts to enter between said rails and rest with the lower end of the mounts upon the lower rails,  $D^1$ ,  $D^2$ , and between the upwardly projecting flanges thereof. Upon either side of the cam wheel 18, which revolves in a vertical plane between the rails of the race-way, are two spring clips,  $d^1$ ,  $d^2$ , the said clips lying for a greater portion of their length within the walls of the rails, but whose forward ends are formed with shoulders projecting into the channel of the race-way, said shoulders being beveled rearwardly and outwardly.

$D^5$ , is a slide moving on the rail or way,  $d^3$ , situated immediately to the rear of the race-way,  $D$ , the slide,  $D^5$ , having an arm projecting forward between the upper and lower rails,  $D^2$ ,  $D^4$ , into the path of the type-mounts advancing through the race-way, and forms a yielding resistance to said type-mounts—a spring,  $d$ , being attached to the slide at one end and to a fixed part of the machine at the other end, so that the slide advances to the left against the tension of the spring,  $d$ , as each succeeding type-mount enters the race-way. The slide-way,  $d^3$ , supporting the resisting slide,  $D^5$ , is mounted to reciprocate in a substantially horizontal plane on pins,  $d^4$ , projecting forward from the face of the vertical frame plate,  $A^3$ , springs,  $d^5$ , being preferably interposed between the slide-way  $d^3$ , and the frame plate,  $A^3$ . An arm,  $d^6$ , projects rearward from the slide rail,  $d^3$ , through a slot,  $d^7$ , formed in the frame plate  $A^3$ , and is connected by a link,  $d^8$ , to a bell crank lever,  $d^9$ , pivoted in ears,  $d^{10}$ , projecting from the rear face of the frame plate,  $A^3$ . A gate,  $d^{11}$ , is formed on the forward side of the race-way whereby a portion of the front rail,  $D^3$ , and the projecting flange portion of the rail,  $D^1$ , may be swung out on the hinge,  $d^{12}$ , as will be understood from inspection of Fig. 9. The cut-away portion of the upper rails,  $D^3$ ,  $D^4$ , being immediately under the chute delivery,  $C^2$ , the type descending through said chute passes in between the rails,  $D^3$ ,  $D^4$ , and rests upon the track-way of the bottom rails,  $D^1$ ,  $D^2$ , at a point between the spring clips  $d^1$ ,  $d^2$ , and immediately in front of the cam wheel 18, (see Fig. 9). The revolution of this cam wheel forces the type-mounts to the left as shown in this figure, until it engages the beveled shoulders of the spring clips,  $d^1$ ,  $d^2$ , thereby expanding the clips and permitting the type-mounts to pass beyond the ends thereof, after which the spring clips again project within the race-way and operate as stops to prevent the return of the type-mounts against the cam wheel 18. This advance movement of the type-mounts in the

race-way brings them in contact with the resisting slide,  $D^5$ , and advances it also to the left against the tension of its spring,  $d$ . Each succeeding type-mount is delivered in front of the cam wheel 18, and advanced thereby which opens the spring clips, and in turn advances the preceding type-mounts along the slide-way, in a manner which will be readily understood. Should the operator discover upon inspection that any errors have occurred in composing the line, he can open the gate,  $d^{11}$ , without disturbing the line of type-mounts and correct the error. In order to prevent the resisting slide,  $D^5$ , from automatically closing up the line under the influence of its spring,  $d$ , while such correction is being made, a movable stop is provided which retains the resisting slide in any position to which it may have been advanced in composing the line. Any suitable stop may be employed for this purpose, and we have shown the same in the form of a cam,  $d^{13}$ , pivoted to that side of the resisting slide next to the cam wheel 18, and bearing normally upon the top of the lower rail,  $D^2$ , in such manner that while it permits free movement of the resisting slide to the left it wholly prevents any movement thereof to the right, as will be readily understood. The line having been composed, is next acted upon by shifting mechanism which shifts the line along the race-way,  $D$ , to the left and into the chase-box,  $J^1$ , of the justifying and elevator mechanism.

*Shifting mechanism.*—The shifting mechanism, which is best shown in Figs. 1, 5 and 6, comprises a pair of jaws,  $E^1$ ,  $E^2$ , each mounted for longitudinal movement upon the horizontal bar,  $E$ , which bar is vertically adjustable upon suitable slide ways,  $e^1$ ,  $e^2$ , attached to a carrier block,  $E^3$ , sliding horizontally in a suitably grooved slot in the frame plate  $A^3$ , as shown in Fig. 6. The jaw  $E^1$ , is mounted to move longitudinally upon the bar,  $E$ , a spring,  $e^3$ , being provided in the end of bar,  $E$ , and acting against the face of the jaw,  $E^1$ , and tending to force it toward the longitudinal center of the bar,  $E$ . A catch,  $e^4$ , is pivoted to the jaw,  $E^1$ , and has a nose,  $e^5$ , engaging in a notch,  $e^6$ , in the upper edge of the horizontal bar,  $E$ , so that when the jaw,  $E^1$ , is pushed against the tension of the spring,  $e^3$ , it abuts the shoulder,  $e^7$ , on said bar,  $E$ , and the nose,  $e^5$ , of the catch enters the notch,  $e^6$ , and retains the jaw in position against the tension of the spring. A pin or lug,  $e^8$ , projects downward from the lower face of the rail,  $D^2$ , immediately over the tail of the catch,  $e^4$ , all of which will be readily understood from an inspection of Figs. 6 and 7. The jaw,  $E^2$ , is also mounted to slide longitudinally upon the horizontal bar,  $E$ , and is provided with a set screw for rigidly securing it in any position to which it may be adjusted, such adjustment de-



termining the length of the line that may be grasped between the jaws.  $E^4$ , is a vertically sliding jaw-lift mounted to slide in a suitable way,  $E^5$ , attached to the front of the frame plate  $A^3$ , the jaw-lift being under the longitudinal center of the jaw bar,  $E$ . The jaw-lift is pivotally attached at its lower end to a lever,  $E^6$ , pivoted in a suitable support,  $E^7$ , the rearward end of the said lever being provided with a friction roller,  $e^9$ , bearing upon the face of the cam  $E^8$ , on the shaft 2, (see Figs. 5 and 6). The cam,  $E^8$ , advancing in the direction of the arrow depresses the end of the lever,  $E^6$ , having the friction roller,  $e^9$ , thereon and holds the same depressed during the passage of the dwell,  $e^{10}$ , on the cam, after which the lever  $E^6$ , returns to its normal position. The depression of the rear end of the lever,  $E^6$ , raises the front end thereby elevating the jaw-lift,  $E^4$ , which moves upon the slide-way,  $E^5$ , and the jaw-lift,  $E^4$ , impinging upon the under side of the jaw-bar,  $E$ , moves the same upward upon the slides,  $e^1$ ,  $e^2$ , until the upper ends of the jaws,  $E^1$ ,  $E^2$ , project upward between the lower rails,  $D^1$ ,  $D^2$ , of the race-way, the jaw,  $E^1$ , passing to the right and the jaw,  $E^2$ , to the left of the assembled line of types, the longitudinal adjustment of the jaws being such as to enable them to pass freely up at opposite ends of the line without too close contact therewith. As said jaws nearly reach the upward limit of their movement the tail,  $e^4$ , of the catch on the jaw,  $E^1$ , strikes against the downwardly projecting lug,  $e^8$ , on the rail,  $D^2$ , and trips the catch, thereby permitting the spring,  $e^3$ , to force the jaw,  $E^1$ , snugly into contact with the end of the line of types, whereby the line is clamped securely between the two jaws. The frame plate,  $A^3$ , has projecting forward therefrom a horizontal rail,  $E^9$ , and the horizontal jaw bar,  $E$ , has projecting rearward from its center a lug,  $e^{11}$ , and when the jaw bar,  $E$ , is elevated the said lug,  $e^{11}$ , is raised just past the right hand end of the rail,  $E^9$ , with the lower surface of the said lug just above the upper face of the rail. While the jaw bar,  $E$ , with its lug is in this position, the carrier block,  $E^3$ , begins its shifting movement to the left, being actuated by means which will hereinafter be described, so that the lug,  $e^{11}$ , engages the upper surface of the rail,  $E^9$ , thereby holding the jaw bar with its jaws in an elevated position. After the dwell,  $e^{10}$ , on the cam,  $E^8$ , has passed the anti-friction roller,  $e^9$ , on the lever,  $E^6$ , the jaw-lift,  $E^4$ , descends.

Referring now to Fig. 5,  $E^{10}$ , is a cam wheel mounted on the shaft, 2, having two substantially similar, but reversely inclined cam faces,  $e^{12}$ , and two dwell surfaces,  $e^{13}$ .  $E^{11}$ , is a lever pivoted in ears,  $a^1$ , projecting from the inner face of the side frame plate;  $A^1$ , said lever being connected by a link,  $E^{13}$ ,

to the rear of the carrier block,  $E^3$ , as is clearly shown in Fig. 6. A roller,  $E^{12}$ , attached to the lever,  $E^{11}$ , near the fulcrum enters between the flanges of the cam,  $E^{10}$ , as shown in Fig. 5, and when the main shaft 2 is revolved the first action of one of the cam faces,  $e^{12}$ , is to shift the lever from the position shown in Fig. 5 to the left, carrying with it the sliding carrier block,  $E^3$ , and the jaw-bar and jaws attached thereto. The dwell,  $e^{10}$ , upon the cam,  $E^8$ , maintains the jaw-lift,  $E^4$ , in its elevated position until the initial movement of the lever,  $E^{11}$ , to the left has brought the lug,  $e^{11}$ , on the jaw bar,  $E$ , over the rail,  $E^9$ , the jaw-lift then descending and the bar,  $E$ , being supported upon and traveling along the rail,  $E^9$ . As the lever,  $E^6$ , is in the act of elevating the first jaw lift,  $E^4$ , it contacts with a vertical thrust bar,  $d^{14}$ , movable in an eye,  $d^{15}$ , projecting from the rear face of the frame plate,  $A^3$ , (see Fig. 6). This thrust bar has its upper end immediately under the lower end of the bell crank lever,  $d^9$ , pivoted in ears,  $d^{10}$ , and projecting from the rear of the frame plate,  $A^3$ , said bell crank lever having its upper arm connected by the link,  $d^8$ , to the arm,  $d^6$ , projecting through an opening,  $d^7$ , in the frame plate,  $A^3$ , and attached to the slide rail,  $d^3$ , of the assembling race-way, as hereinbefore described. On its upward movement the thrust bar impinges upon the short arm of the bell crank lever,  $d^9$ , and withdraws the slide,  $d^3$ , to the rearward against the tension of the springs,  $d^5$ , on the pins,  $d^4$ , thereby withdrawing the resisting slide,  $D^5$ , from the end of the line of type and the cam,  $d^{13}$ , off of the rail,  $D^2$ , whereupon the spring,  $d$ , immediately returns the resisting slide,  $D^5$ , to its initial position near the shouldered ends of the spring clips,  $d^1$ ,  $d^2$ , the cam  $d^{13}$ , entering the recess,  $d^{17}$ , formed in the rear of the rail,  $D^2$ , and riding up out of the recess as the resisting slide,  $D^5$ , is again advanced, (see Fig. 29). The slide,  $D^5$ , is thus withdrawn from the end of the line of types just after the jaws,  $E^1$ ,  $E^2$ , have risen into position to grasp the line, and just prior to the initial movement of said jaws to the left, so that the line of type is held in compact position between spring clips,  $d^1$ ,  $d^2$ , at one end and the resisting slide,  $D^5$ , at the other end until the same is grasped firmly by the two jaws. It will thus be seen that the line is at all times firmly clamped and held in compact condition. As the line of type-mounts and justifying spaces is shifted by the shifting devices, it is moved to the left out of the race-way,  $D$ , the type-mounts entering a chase-box  $J^1$ , which box constitutes in effect a continuation of the race-way, with this exception, that the back of the chase box is composed of a single piece and has projecting from the inner face thereof a horizontal rib,  $j^1$ , (see Fig. 11) which rib enters the aligned



notches,  $x^1$ , in the rear edges of the type-mounts. As the type-mounts enter the chase box,  $J^1$ , the upper ends of the upper wedges of the justifying spaces,  $y$ , enter into a depressible justifying box,  $J^6$ . The line having been shifted to the chase box is in position to be acted upon by the justifying mechanism which will now be described.

*Justifying mechanism.*—As the type-mounts were delivered from the chute delivery,  $C^2$ , the justifying spaces,  $y$ , were delivered at the proper places in the line of mounts for such spaces, and were transferred with the line of mounts along the race-way and into the chase-box,  $J^1$ , the lower wedges of the justifying spaces depending through the open slot in the bottom of the chase-box, and the longer, upper wedges of the justifying spaces projecting upward through the open top of the chase-box with the upper end or ears,  $y^2$ , entered into the justifying box,  $J^6$ , as will be readily understood by inspecting Fig. 11.

$J$ , is an elevator car in vertical grooved elevator ways,  $J^3, J^4$ , the chase-box,  $J^1$ , being supported upon and projecting forwardly from the bottom of the elevator car. Mounted to slide vertically in the elevator car,  $J$ , is a slide plate,  $J^5$ , having pivotally connected to its forward face by means of the pivot,  $j^2$ , a plate,  $j^3$ , supporting on its forward face a justifying box,  $J^6$ . This justifying box is open on its under side and has flanges,  $j^4, j^5$ , projecting inwardly from the side walls of the box, said flanges constituting ways or rails upon which the projecting ears,  $y^2$ , of the upper justifying wedges travel, and by which the said spaces are supported. Within the upper portion of the justifying box is a vertically movable bar,  $J^7$ , supported by adjusting screws  $j^6$ , and having a downwardly projecting rib,  $j^7$ , corresponding in cross section to the notch,  $y^1$ , formed in the top of the upper justifying wedges. Projecting rearward from the slide plate,  $J^5$ , and rigidly connected thereto, is an arm,  $J^8$ , having upon the rear portion thereof an anti-friction roller,  $j^{20}$ , and also having on the under side thereof a downwardly projecting pin,  $j^8$ . A spring,  $J^9$ , is attached to the slide plate,  $J^5$ , or as here shown to the rearwardly projecting arm,  $J^8$ , and is also attached at its upper end to the cross bar,  $j^9$ , of the elevator car,  $J$ , the tension of the spring,  $J^9$ , being such as to normally hold the slide-plate,  $J^5$ , in the upper end of the elevator car.

Referring to Figs. 11 and 27,  $J^{10}$ , is a rocking frame having side bars,  $j^{10}$ , and  $j^{11}$ , suitably connected by end pieces,  $j^{12}$ , said frame being mounted to tilt upon a longitudinal shaft,  $j^{13}$ , having bearings in the ears,  $j^{14}$ , depending from the lower side of the plate,  $J^{11}$ . This plate,  $J^{11}$ , is mounted to slide backward and forward in the bottom of the elevator

car,  $J$ , and carries the rocking frame,  $J^{10}$ , shown in Fig. 26.  $J^{12}$ , is a rod having its upwardly turned end,  $j^{15}$ , resting against the shaft,  $j^{13}$ , of the rocking frame,  $J^{10}$ , the rear end of said rod,  $J^{12}$ , being held in operative contact with a cam,  $J^{13}$ , by a spiral spring,  $j^{16}$ , surrounding the shaft between a collar,  $j^{17}$ , thereon and a sleeve,  $j^{18}$ , attached to the frame of the machine. The operation of the cam is such as to give the rod,  $J^{12}$ , a forward thrust immediately after the line of type-mounts has entered the chase-box,  $J^1$ , whereby the upwardly turned arm,  $j^{15}$ , thereof acting against the rod,  $j^{13}$ , slides the plate,  $J^{11}$ , and with it the frame, forward until the bar,  $j^{10}$ , rests under the pin,  $j^8$ , and the rod or bar,  $j^{11}$ , rests immediately under the bottom of the lower justifying wedges in the chase-box,  $J^1$ ,—the sliding action of the plate,  $J^{11}$ , taking place against the tension of the spring,  $j^{19}$ , connected at one end to the plate and at the other to the elevator car. When the rocking frame,  $J^{10}$ , is thus pushed forward by the rod,  $J^{12}$ , the lower end of the pin,  $j^8$ , is a slight distance above the plate,  $j^{10}$ , and the adjustable bar,  $J^7$ , in the justifying box, is a substantially equal distance above the upper wedges of the justifying spaces in said box.  $J^{14}$ , is a lever pivoted to the frame of the machine (see Figs. 3 and 11) with its forward end resting upon the anti-friction roller,  $j^{20}$ , on the rear end of the arm,  $J^8$ , of the slide,  $J^5$ , except when said lever is elevated through the action of a cam,  $J^{15}$ , acting against the tension of a spring,  $J^{16}$ , which spring is strong enough to overcome the tension of the spring,  $J^9$ , which tends to hold the slide,  $J^5$ , in the upper part of the elevator car,  $J$ . As shown in Fig. 3 the cam,  $J^{15}$ , is free from contact with the anti-friction roller on the lever,  $J^{14}$ , and this lever is therefore free to be depressed by the action of the spring,  $J^{16}$ , thereby carrying with it the slide,  $J^5$ , and causing the bar,  $J^7$ , in the justifying box to bear upon the upper justifying wedges. Simultaneously with the downward movement of the justifying box, the pin,  $j^8$ , impinges upon the bar,  $j^{10}$ , tilting the frame,  $J^{10}$ , upon its pivoted shaft and causing the bar,  $j^{11}$ , to press upward against the lower wedges of the justifying wedges. The upper and lower wedge members of the justifying spaces are therefore simultaneously pressed toward each other, causing them to advance into the line of type-mounts and spread the same as far as the adjustment of the jaws,  $E^1, E^2$ , will permit. The extreme movement of the upper and lower justifying wedges, from the position which they normally assume when they are originally placed in the line of type-mounts to the position when the wedges are forced between the type-mounts to the fullest extent possible, is illustrated in Figs. 11<sup>a</sup> and 11<sup>b</sup>. Should the line, however, be so nearly filled as to be properly justified without the complete entrance of the wedges



between the type-mounts in the manner shown in Fig. 11<sup>b</sup>, the wedges may enter between the said type-mounts to such an extent only as is necessary to properly expand the line within the limits defined by the jaws, E<sup>1</sup>, E<sup>2</sup>, the yielding tension of the spring, J<sup>10</sup>, being such as to render this action possible. During this justifying action the jaw, E<sup>1</sup>, is forced back by the justifying wedges against the spring, e<sup>3</sup>, until the jaw abuts the shoulder, e<sup>7</sup>, and the latch nose, e<sup>5</sup>, catches in the notch, e<sup>6</sup>, in the jaw-bar, E. This action of the justifying mechanism, viz., the downward movement of the justifying box, J<sup>6</sup>, and the upward movement of the bar, j<sup>11</sup>, is timed to occur during the first portion of the dwell in the cam, E<sup>10</sup>, after the line has been shifted from the race-way, D, into the chase-box, J<sup>1</sup>, and when the justifying wedges have been inserted within the line to the extreme extent permitted by the jaws, E<sup>1</sup>, E<sup>2</sup>, the justification of the line is complete, and the same is ready for the action of the inking devices.

*Printing mechanism.*—The printing mechanism is automatic in its operation and consists of means for inking the type after the line has been justified as just described, and of other means for presenting a proper surface, such as paper, to the face of the inked type for taking the ink impression; and first we will describe the inking devices.

Referring more particularly to Figs. 1 and 5 in which the inking device is indicated by, G, G<sup>1</sup>, is an ink cylinder on a continuously-rotating shaft 21, which is driven by a belt connecting it to the transverse shaft 12, as heretofore explained. The surface of the ink cylinder G<sup>1</sup>, has ink applied thereto in any suitable manner and the same is evenly distributed over the surface of the cylinder by the operation of the reciprocating ink brayer, G<sup>2</sup>, the same being given reciprocating movement relative to the ink cylinder by any suitable means. As one means for accomplishing this reciprocating movement we have shown the brayer, mounted on a shaft 22 geared to the shaft 21, the said shaft having right and left intersecting screw threads cut thereon, whereby the continuous operation of the shaft 21 causes the brayer, G<sup>2</sup>, to move up and down upon the shaft, and distribute the ink upon the ink cylinder. G<sup>3</sup>, is an inking roller normally resting in contact with the surface of the ink cylinder, G<sup>1</sup>, as shown in Figs. 1 and 5. This roller may be made of any suitable material such as is ordinarily employed for applying ink to the surface of type, and is mounted, on a shaft 32, which shaft is in turn mounted at its lower end in the hub 33, having trunnions resting in suitable bearings on the carrier block 34 moving in the slotted way 35, formed in the frame plate of the machine. Immediately above the slot 35 a rack 36 is attached to the front frame plate, A<sup>4</sup>, said

rack extending from the right-hand end of the slot 35 entirely across to the left-hand edge of the machine. On the shaft 32 of the ink roller is a pinion 37 positioned on the shaft so as to engage the rack 36 when the shaft is rocked on its trunnions, so as to bring the two into juxtaposition. Normally the shaft 32 is tilted forward on its trunnions so as to disengage the pinion 37 from the rack 36, this tilting action being due to a light spring shown in Fig. 2. Immediately below the slot 35 in the frame plate, A<sup>4</sup>, is formed an upwardly-projecting horizontal rail, g, supported on brackets, g<sup>1</sup>, extending out from the frame plate. The shaft 32 projects downward through the hub 33, or the latter may have a downwardly-projecting lug, g<sup>2</sup>, integral therewith, in position to engage the rail, g.

Referring now to Figs. 4 and 5, G<sup>4</sup>, is a cam for controlling the movements of the inking roller and for this purpose is engaged by one arm of the lever, G<sup>5</sup>, pivoted to the frame of the machine and having its other end connected by the link, G<sup>6</sup>, with the carrier block 34 upon which the trunnions are mounted. The action of the cam on the lever, G<sup>5</sup>, together with the spring, G<sup>7</sup>, acting in opposition thereto, causes the slide or carrier block 34 to reciprocate backward and forward within the limits of the slot 35. Referring now to Fig. 2, the shaft 32 being tilted by its spring in such position as to throw the lug, g<sup>2</sup>, on the rear or inner side of the rail, g, when the lever, G<sup>5</sup>, moves the carrier block 34 from the position shown in Fig. 1 to the extreme right of the slot 35, the inking roller is held out of contact with the face of the type on the mounts, x, until the block has reached the extreme right-hand limit of its movement, at which time the lug, g<sup>2</sup>, contacts with a suitable tilting device, as for example, a spring cam surface, g<sup>3</sup>, whereby the lever 32 is tilted until the roller, G<sup>3</sup>, is brought in contact with the face of the type in the chase-box, J<sup>1</sup>, and the lug, g<sup>2</sup>, is thrown to the forward or outer side of the rail, g; this tilting of the shaft 32 brings the gear 37 into coöperative relation with the rack 36, and as the carrier block 34 is returned on its movement to the left through the action of the cam lever, G<sup>5</sup>, the shaft 32 is revolved through the action of the rack and pinion, and the surface of the line of type evenly inked. Just as the carrier block 34 reaches the limit of its movement to the left, lug, g<sup>2</sup>, passes off of the end of the rail, g, and the spring immediately tilts the inking roller shaft 32 forward, thereby disconnecting the rack and pinion and leaving the inking roller in frictional contact with the inking cylinder, G<sup>1</sup>.

Referring to Figs. 1, 2, 3, 4, 5, 23, 24 and 25, H, is a cylindric platen mounted on a shaft, h, having bearings in the outer end of



two levers,  $h^1$ ,  $h^2$ , fulcrumed on the bracket,  $A^5$ , extending outward from the frame of the machine immediately under the foot of the elevator. This platen,  $H$ , has formed in one portion of its circumference a depression,  $h^3$ , extending from one end of the cylinder to the other, and having two rows of short pins,  $h^4$ , projecting radially along either side of the depression, the ends of the pins being substantially even with the round surface of the platen. A curved plate,  $h^5$ , is provided to fit in this depression and has two lines of perforations therein to fit over the pins,  $h^4$ ; the plate,  $h^5$ , has at its opposite ends, which project somewhat beyond the end of the platen, a screw-threaded arm,  $h^6$ , which is connected by a screw-threaded sleeve or nut,  $h^7$ , to a rod,  $h^8$ , hung upon the shaft,  $h$ , of the platen. Adjoining the said depression in the platen is a second depression,  $h^9$ , also extending from end to end substantially parallel with the first depression,  $h^3$ , said depression having a rod,  $h^{10}$ , normally held therein by spring-pressed arms,  $h^{11}$ , as will be understood by inspection of Fig. 25.

$H^2$ , Fig. 22, is a strip of paper having suitable perforations at both ends, said perforations being spaced to correspond to the spacings of the pins,  $h^4$ , in the depression,  $h^3$ , in the platen. This strip of paper is to be of suitable length to exactly extend around the cylindric platen, and in applying the said strip to the platen, one end of the paper is slipped over one of the rows of pins,  $h^4$ , the strip is then passed around the cylinder under the bar,  $h^{10}$ , and over the other row of pins,  $h^4$ , and the plate,  $h^5$ , firmly pressed down thereon by the action of the screw-threaded sleeves,  $h^7$ . The bar,  $h^{10}$ , then being brought over the depression,  $h^9$ , is drawn by its springs into the depression, thereby forcing the paper into said depression and taking out any slack on the same, thus insuring the presentation of a perfectly smooth strip of paper to the type.

We have thus far described the cylinder,  $H$ , as the platen to press the paper against the line of type to take therefrom an inked impression. The cylinder used as a platen will produce good results, but we prefer the form of platen illustrated in Figs. 24 and 24<sup>b</sup>. Here the cylinder,  $H$ , serves as the means for carrying the paper and the paper might be secured and tightened by the same means shown in Fig. 25, but in these figures a separate platen,  $h^{21}$ , is attached in fixed position to the two levers,  $h^1$ ,  $h^2$ , and extends longitudinally along the face of the cylinder,  $H$ , so that the said cylinder may revolve step by step independently of the separate platen. This narrow straight platen,  $h^{21}$ , has a yielding central face,  $h^{22}$ , that is flat, and it is this face which we prefer to use to press the paper to the face of the inked line of type. Each longitudinal edge,  $h^{23}$ , of this platen is beveled

and the paper attached to the cylinder,  $H$ , passes over the flat central face,  $h^{22}$ , and also over the two beveled edges,  $h^{23}$ . It will now be seen that the narrow platen,  $h^{21}$ , stands off or projects away from the circumference of the cylinder and is better adapted to press against the type faces,  $a$ , which are recessed in the edge of the type-mounts. Mounted on one of the projecting ends of the shaft,  $h$ , is a series of ratchet wheels,  $H^3$ , rigidly secured to the shaft,  $h$ , each of said ratchet wheels having ratchet teeth of a uniform size cut thereon, but the several wheels having teeth of different sizes, no two being alike in size, to the end that the platen may be given a greater or less turning movement by the action of any one of a number of suitable pawls engaging the same. Mounted on a bracket arm,  $A^6$ , projecting upward from the left hand edge of the base of the machine, is a slide,  $H^4$ , (see Fig. 23) carrying a series of pawls,  $H^5$ , in number corresponding to the number of ratchet-wheels,  $H^3$ , said pawls being mounted to turn upon a common axis,  $h^{12}$ . The several pawls are provided with a weighted end and are so arranged that any one of them may be turned up with its nose in position to engage its corresponding ratchet wheel, and held in such position by its weighted end; only one of said pawls being designed to be elevated in operative position at a given time, the others being turned back or thrown out of operative position, as shown in Fig. 24.

Referring now to Figs. 3, 4 and 5,  $h^{13}$ , and,  $h^{14}$ , are links connecting the platen levers,  $h^1$ ,  $h^2$ , to cam-operated levers,  $H^6$ , whose movements are controlled by cams  $H^7$ , mounted upon the main shaft 2 of the machine. By reference to Fig. 3 it will be seen that the action of the cams,  $H^7$ , tilts the levers,  $H^6$ , so as to lift the platen levers,  $h^1$ ,  $h^2$ , until the platen with the paper is brought against the face of the type in the chase-box,  $J^1$ , to take an inked impression, a stop,  $h^{15}$ , being provided to exactly regulate the pressure. The dwell,  $h^{16}$ , on the cam,  $H^7$ , determines the length of time during which the platen shall be presented to the face of the type, after which the cam permits the platen to fall into the position shown in Fig. 2. In thus falling into the lower position one of the ratchets,  $H^3$ , on the shaft,  $h$ , of the platen is engaged by one of the pawls and the cylindric platen revolved a step, the length of which is determined by the size of the teeth on the particular ratchet wheel engaged by the pawl. The extent of this step or part revolution will determine the space between the line just printed on the paper and the next succeeding line. Should the operator desire to increase or diminish this space he may do so by throwing the pawl last in operation down, and turning up into operative position the pawl corresponding to the



ratchet wheel which will give the spacing desired.

It sometimes happens that it is desirable not to print a line, even after the type has been shifted to the chase-box,  $J^1$ , and justified, as, for example, when an error in composing has been discovered after the clutch 5 has been thrown in, and we provide means for throwing the platen off in such cases, so that it may not take an impression. For 10 this purpose the fulcrum of the levers,  $h^1, h^2$ , is adjustable toward and from the frame of the machine. One means of securing this adjustment is shown in the drawings and particularly in Figs. 24 and 24<sup>a</sup>, wherein the 15 fulcrum of the levers,  $h^1, h^2$ , is shown mounted on the ends of an eccentric shaft,  $h^{17}$ , which has a crank arm,  $h^{19}$ , attached at one end thereto, whereby it may be given a 20 quarter revolution by the operator. This crank arm is connected by a link,  $h^{20}$ , with the slide,  $H^4$ , upon which all the pawls,  $H^5$ , are carried, so that in turning the crank arm,  $h^{19}$ , the slide, and with it the pawls, are 25 switched out of operative relation with the descending ratchets of the platen. By swinging the crank arm,  $h^{19}$ , to the right hand in Fig. 24 a quarter turn is given the eccentric shaft,  $h^{17}$ , and thereby the fulcrum 30 of the two platen levers,  $h^1, h^2$ , is moved nearer toward the frame plate,  $A^4$ ; as the links,  $h^{13}, h^{14}$ , which throw the platen levers have a definite extent of movement at all times, it is obvious that this change of posi- 35 tion of the fulcrum will effect a corresponding change in the movement of the platen and that the latter will not contact with the face of the line of type, and an inked impression will not be taken. The operator holds 40 the crank arm,  $h^{19}$ , to the right-hand position as in Fig. 24, until the platen descends, thus holding the pawls out of operative relation with the ratchets and thereby avoiding a 45 turn of the platen and consequent double-spacing of the next line printed. When the jaw-bar,  $E$ , with its attached jaws is shifted to its extreme position to the left, so as to move a line of type from the race-way,  $D$ , into the chase-box,  $J^1$ , the lug,  $e^{11}$ , upon 50 the jaw-bar,  $E$ , moves past the extreme left end of the rail,  $E^9$ , so that the jaw-bar is no longer supported by means of the lug resting upon said rail, and in order to retain the jaws in their elevated position grasping the 55 opposite ends of the line of type during the justifying and printing operations, a second jaw-lift,  $E^{14}$ , (see Fig. 1) is employed which automatically rises under the jaw-bar,  $E$ , and supports the same as the lug,  $e^{11}$ , slips 60 off the rail,  $E^9$ ,—this jaw lift,  $E^{14}$ , being operated through the medium of a suitable cam,  $E^{15}$ , (see Figs. 4 and 5), provided on the shaft 2, for this purpose. Inasmuch as the construction and operation of this jaw-lift 65 are identical with that of the first jaw lift,

$E^4$ , we have not deemed it essential to describe or illustrate the same in detail. An inked line having been printed on the paper on the platen the second jaw lift,  $E^{14}$ , is automatically lowered, permitting the jaw bar, 70  $E$ , with the jaws,  $E^1, E^2$ , to move down upon the guide rails,  $e^1, e^2$ , thus leaving the line of type in the chase-box without any substantial restraint at the ends of the line, the types 75 being prevented from falling within the chase-box by reason of the horizontal rib,  $f^1$ , therein which enters the notch,  $x^1$ , in the types. The ends of the line having been freed from restraint the cam,  $J^{15}$ , acts upon the lever,  $J^{14}$ , to lift the same against the 80 tension of its spring,  $J^{16}$ , thus relieving the pressure upon the arm,  $J^8$ , of the slide plate,  $J^5$ , carrying the justifying space box,  $J^6$ , and the spring,  $J^1$ , then lifts the justifying box,  $J^6$ , relatively to the chase box,  $J^1$ . The re- 85 sult of this relative movement is that the justifying wedges are withdrawn from the line of type mounts, the same being spread in the chase-box,  $J^1$ , sufficient to permit the lower justifying wedges to pass there- 90 through. At the instant when the justifying spaces have been thus withdrawn from the chase-box,  $J^1$ , the elevator car begins to move up the elevator guides,  $J^3, J^4$ .

*Elevator mechanism.*—Referring now to 95 Figs. 1, 2 and 4,  $I$ , is a lever pivoted in a bracket,  $I^1$ , attached to the tube which surrounds the upper portion of the shaft 9. This lever extends diagonally downward 100 across the back of the machine and is connected by a suitable link,  $I^2$ , to the rear of the elevator car,  $J$ . Connected to the lever,  $I$ , near its fulcrum is a link  $I^3$ , to which is pivotally connected a rod,  $I^4$ , having vertical 105 movement through suitable sockets,  $i, i^2$ , attached to the frame plate,  $A$ , and having on the lower end thereof a friction roller in operative engagement with a cam,  $I^5$ , on the shaft 2. By inspecting the cam,  $I^5$ , as 110 the same is shown in Fig. 2, it will be observed that there is a rise,  $i^3$ , then a dwell,  $i^4$ , a second rise,  $i^5$ , and another dwell,  $i^6$ , after which comes its normal outline,  $i^7$ . When the shaft 2 is thrown into operation 115 through the action of the clutch mechanism 5, shown in Fig. 1, the first portion of the revolution of the shaft will cause the normal dwell portion,  $i^7$ , of the cam,  $I^5$ , to travel under the roller of the lower end of the rod,  $I^4$ , without imparting any upward motion 120 to said rod, after which the rise,  $i^3$ , will give the rod a lift or upward thrust until the roller on the rod comes in contact with the dwell,  $i^4$ , when the upward motion of the rod will cease for a short interval of time, 125 after which the further upward thrust of the rod will be occasioned by the rise,  $i^5$ , in the cam and the rod will then be held in this, its highest position, during the passage of the dwell,  $i^6$ , under the roller, after which the 130



rod will descend to its lowermost position, and the shaft 2, having completed its revolution and been automatically disconnected from the driving pulley, 1, will cease to revolve. The first upward movement of the rod  $I^4$ , causes a like upward movement of the lever,  $I$ , carrying with it the elevator car,  $J$ . As the car moves upward the justifying space box is struck on the rear of its right-hand end by a projecting spring 39 which engages the cam-face 40 on the box and the justifying box is therefore tilted on its pivot,  $j^2$ , against the tension of its spring 41. Just as the box has reached the inclination shown in Fig. 8 the dwell,  $i^4$ , on the cam,  $I^5$ , is brought into action, and the justifying space box,  $J^6$ , is momentarily held with its right-hand and lower end registering with the upper end of the inclined tracks or rails  $c^3$ , constituting the justifying space holder. During the pause occasioned by the dwell,  $i^4$ , on the cam,  $I^5$ , the justifying spaces will all slide by gravity out of the justifying space box,  $J^6$ , on to the justifying space holder. Immediately after this action is completed the continued upward movement of the elevator car,  $J$ , is occasioned by the action of the rise,  $i^5$ , on the cam,  $I^5$ , the space box,  $J^6$ , being tilted upon its pivot far enough to permit it to pass the spring 39, after which the spring 41 restores the space box to its horizontal position, a pin 42 being provided as a stop to insure its assuming such horizontal position. The rise,  $i^5$ , on the cam,  $I^5$ , operating through the bar,  $I^4$ , and the lever,  $I$ , then raises the elevator,  $J$  to the top of the elevator guide ways,  $J^3$ ,  $J^4$ . The chase-box,  $J^1$  containing the line of type-mounts is thus brought into alinement with the distributing car,  $K^1$ , and means are provided for transferring the type from the chase-box,  $J^1$ , to the distributing car, from which the type-mounts are then distributed to the magazines.  $C$ .

*Distributing mechanism.*—Referring to Fig. 1,  $K^1$ , is a distributing car arranged to horizontally reciprocate in a suitable way,  $k^1$ , across the front of the elevator guide ways at the top of the magazines.  $K^2$ , is a bar rigidly attached to the elevator car,  $J$ , and lying in a diagonal position across the face of the elevator car, and  $k^2$ , is an anti-friction roller mounted on a pin projecting from the front of the right-hand end of the distributing car,  $K^1$ . As the elevator car rises the inclined bar,  $K^2$ , acts upon the roller,  $k^2$ , as a cam face, thus forcing the distributing car,  $K^1$ , to move to the left against the tension of its spring,  $k^3$ , (see Fig. 13). After reaching its position to the extreme left as shown in dotted lines in Fig. 1 and in full lines in Fig. 14, the distributing car is retained in said position by the vertical portion,  $k^4$ , of the cam bar,  $K^2$ , the vertical portion of said bar terminating but a short distance above the

chase box,  $J^1$ . The parts are so proportioned that at the instant when the elevator car has reached its highest point, the chase box,  $J^1$ , and the distributing car  $K^1$ , are in exact alinement, and means are provided for transferring the entire line of type-mounts from the chase box into the distributing car during the pause of the elevator car in its topmost position, caused by the dwell,  $i^6$ , of the cam,  $I^5$ . The particular means employed for effecting the transfer of the type-mounts from the chase-box,  $J^1$ , to the distributing car,  $K^1$ , is illustrated in Figs. 13, 14 and 14<sup>a</sup>.  $K^3$ , is a shaft hung in suitable bearings, as for example, on the side of the elevator way,  $J^3$ , and provided on its lower end with a crank arm,  $k^5$ , as shown in Fig. 5. On the upper end of this shaft,  $K^3$ , is a crank arm,  $k^6$ , pivotally connected to a link,  $k^7$ , which carries on its other end a pivoted tongue,  $k^8$ , projecting through a slot  $k^9$ , in the bar,  $k^{10}$ , hung by links,  $k^{11}$ , the other ends of which are pivotally connected to suitable supports connected to the elevator tracks immediately above the distributing car,  $K^1$ . The tongue,  $k^8$ , fits snugly within the slot,  $k^9$ , and is capable of a sliding movement therein but with some considerable friction. The slotted bar,  $k^{10}$ , may be swung on the links,  $k^{11}$ , in a horizontal plane in such manner as to bring the bar down quite close to the face of the elevator ways as shown in full lines in Fig. 13, or the bar may be turned on the links so as to be held horizontally out from the surface of the elevator-ways, the links then being in position shown by dotted lines in said Fig. 13, and in full lines in Fig. 4.

Normally the shaft  $K^3$ , is held in the position indicated in Fig. 4 by any suitable spring (not shown) whereby the slotted bar,  $k^{10}$ , is held far enough out from the elevator guide way to permit the elevator car with its supported justifying box to pass thereunder. The elevator having reached the position where the chase box,  $J^1$ , registers with the distributing car,  $K^1$ , as shown in Fig. 14, the cam quadrant,  $K^4$ , mounted on the shaft 2 operates through the arm,  $k^5$ , to give the shaft,  $K^3$ , a quarter revolution, thereby imparting a like revolution to the crank-arm,  $k^6$ , as indicated by dotted lines in Fig. 13. The first result of this movement is to swing the slotted bar,  $k^{10}$ , from the position shown in Fig. 4 to that shown in Figs. 13 and 14, thereby bringing the tongue,  $k^8$ , immediately opposite the right-hand end of the chase box,  $J^1$ ; the continued revolution of the crank arm,  $k^6$ , results in the movement of the tongue through the chase box, the tongue being guided in said movement by the slot,  $k^9$ , in the slotted bar,  $k^{10}$ . The result of this movement of the tongue,  $k^8$ , through the chase box,  $J^1$ , is the transfer of the type mounts into the distributing car,  $K^1$ , the said type mounts being forced into said car



against a pusher block,  $k^{13}$ , (see Fig. 15), which is attached at one end to a spring,  $k^{14}$ , the other end of which is attached to a pin,  $k^{15}$ , on the distributing car. The line of type  
 5 mounts having been transferred into the distributing car, the spring,  $k^{14}$ , is prevented from forcing the same out again by the action of spring clips,  $k^{16}$ ,  $k^{17}$ , which automatically retreat into suitable cut-away spaces  
 10 formed in the sides of the distributing car to permit the type to enter said car, but which spring forward and prevent the return movement of the type, as clearly shown in Fig. 15. The quarter revolution of the shaft,  $K^3$ , having  
 15 been completed, the arm,  $k^5$ , becomes free from the cam quadrant,  $K^4$ , and said shaft acting under the influence of its spring is returned to its normal position, withdrawing the tongue,  $k^8$ , from the chase box,  $J^1$ ,  
 20 and swinging the slotted bar,  $k^{10}$ , on the links,  $k^{11}$ , out from the elevator guide way. At this instant the rod,  $I^4$ , passes off of the dwell,  $i^6$ , of the cam,  $I^5$ , the result being that the elevator car is permitted to descend to  
 25 the bottom of the elevator guide way, the distributing car,  $K^1$ , moving under the influence of its spring  $k^3$ , across the elevator guide way with the anti-friction roller  $k^2$ , in contact with the cam face of the bar,  $K^2$ , until  
 30 the distributing car is returned to the position shown in Figs. 1 and 16. During the descending movement of the elevator car the spring 39 yields to permit the chase box and justifying box to readily pass by without any  
 35 interference therefrom. As the distributing car,  $K^1$ , reaches the position shown in Figs. 1 and 16 the projecting lugs,  $k^{18}$ , on the spring clips,  $k^{16}$ , and  $k^{17}$ , cause said clips to turn or retreat within the cut-away portions in the  
 40 walls of the car, whereupon the spring,  $k^{14}$ , acting through the pusher bar,  $k^{13}$ , advances the type mounts until the extreme right-hand type in the car is arrested by contact with a stop plate,  $k^{19}$ , and a lug,  $k^{20}$ , (see Fig.  
 45 16). The distributing car has projecting from the back or rear wall thereof a rib,  $k^{21}$  which enters the notch,  $x^1$ , in the rear of the type mount, thus holding them in proper vertical position and alinement. When the car  
 50 is arrested in its extreme right-hand position it comes in contact at the bottom with the stop plate,  $k^{19}$ , a narrow space being cut away at the end of the distributing car. Interposed between the car and the stop plate,  
 55  $k^{19}$ , is a thin blade,  $k^{22}$ , shown in Figs. 16 and 20. This blade is mounted upon one end of a lever,  $k^{23}$ , and a spring,  $k^{24}$ , is employed to normally keep the blade depressed; the other end of the lever,  $k^{23}$ , is connected to a  
 60 thrust bar,  $k^{25}$ , moving upward in suitable vertical bearings and having on its upper end an anti-friction roller,  $k^{26}$ , projecting into the path of the tooth-wheel,  $k^{27}$ , which wheel has a pulley-face,  $k^{28}$ , provided with notches,  $k^{29}$ .  
 65 Passing over the pulley-face is an endless

belt  $k^{30}$ , having pins,  $k^{33}$ , attached and projecting from one edge of the belt, and so arranged that the part of the pins attached to the belt will engage the notches,  $k^{29}$ , on the pulley-face. The said belt engages a similar  
 70 pulley-face on wheel,  $k^{31}$ , mounted on the opposite side of the magazine, said wheel having integrally formed therewith a friction face,  $k^{32}$ , which, when the magazine upon  
 75 which it is mounted is lowered into operative position with respect to the chute, is in frictional contact with the friction disk 28 on the continuously-revolving shaft 27 (see Figs. 2 and 4).

Referring to Fig. 2, it will be seen that  
 80 separate distributing mechanism is provided for each magazine; that is, each magazine has a separate driving belt,  $k^{30}$ , two wheels,  $k^{27}$ , and  $k^{31}$ , and a set of distributing ways. Immediately over the mouths of all the compartments of each magazine, C, and extending  
 85 from one side to the other thereof, is the distributing bar or plate, N, from which depends a series of thin rails,  $n$ , (see Figs. 16 and 17) having beads,  $n^1$ , on their lower  
 90 edges, the number of said thin rails corresponding to the number of notches or spaces,  $x^2$ , cut in the upper end of the type-mounts. These notches or spaces in the type-mounts may be variously formed, but we have shown  
 95 them in the form of circular holes bored through the type-mount along a line slightly below from the upper end thereof, each of said holes having a slot narrower than the  
 100 diameter of the hole connecting the same with the top edge of the type-body. Some of the holes, however, instead of a narrow slot are opened to the top of the type-mount by a slot whose width is equal to the diameter of the holes. All of the type-mounts  
 105 representing any given letter or character used in printing have the same number of broad and narrow slots arranged in identically the same order, a different combination of broad and narrow slots being employed  
 110 for each different letter or character used. With these slots we have arranged one hundred and twenty combinations,—being one to correspond with each key of the key-board. Immediately over the particular compartment,  
 115  $c$ , of either of the magazines, C, in which any particular type-mount belongs, the beads,  $n^1$ , corresponding to the narrow slots in that particular type-mount are broken away as clearly shown at,  $n^2$ , in Fig.  
 120 16. Inasmuch as the broad slots in the top of each type-mount do not engage any beads, the type-mounts while being distributed are supported solely through the medium of the narrowly-slotted openings,  $x^2$ , which engage  
 125 the beads,  $n^1$ , and when a type-mount reaches the point in its travel along the thin rails,  $n$ , where the beads are cut away, such type-mount will drop vertically into the mouth of the particular compartment,  $c$ , to which it  
 130



belongs. In order that the type-mounts may be fed from the distributing car,  $K^1$ , and placed upon and advanced along the beaded rails,  $n, n^1$ , the toothed wheel,  $k^{19}$ , is caused to have each tooth contact with the friction roller,  $k^{26}$ , thereby producing an upward thrust upon the thin blade,  $k^{22}$ , whereby the type-mount,  $x$ , resting immediately over said thin blade is elevated into the position shown in full lines in Fig. 16 and in dotted lines in Fig. 20, which position brings the type-mounts above the stop-plate,  $k^{19}$ , and the notch,  $x^1$ , on the back of the type-mount immediately opposite the stop,  $k^{20}$ , and the top slots  $x^2$ , on the type-mount immediately opposite the pointed ends,  $n^3$ , of the beaded rails,  $n, n^1$ , in which position the upper end of the type-mount is in the path of the pins,  $k^{33}$ , on the pulley belt,  $k^{30}$ . There is nothing now to prevent the pin moving the type-mount to the right, as the notch in the back of the type-mount will permit the latter to pass the stop,  $k^{20}$ . In this position the spring,  $k^{14}$ , acting through the pusher bar,  $k^{13}$ , thrusts the entire line of type to the right at the same time that the pin,  $k^{33}$ , engages the elevated type-mount,  $x$ . The result of this combined action is to force the type-mount upon the beaded rails,  $n, n^1$ , along which it is advanced by the pins on the belt. As the toothed wheel,  $k^{27}$ , revolves, each tooth, acting in conjunction with the spring  $k^{24}$ , of the blade,  $k^{22}$ , alternately elevates and depresses the blade, and as the same is lowered it permits the line of type-mounts to advance to the right so as to bring one type at a time over the blade, when the action of the next tooth on the wheel,  $k^{27}$ , again lifts the blade, raising the type immediately thereon in the position to, in its turn, be started along the distributing ways.

We provide a device to cleanse the type-faces,  $a$ , and remove the ink therefrom after the inked impression has been taken and previous to the distribution of the type to the magazines. Preferably this type-cleansing device should act on the types while they are still in the assembled line. The type-cleaner is shown in Figs. 16 and 16<sup>a</sup>. It consists in the present instance of a small hollow cylinder,  $P$ , mounted on the end of a shaft,  $p$ , revolvable in a bearing,  $p^1$ , and having a pulley,  $p^2$ . The height of the hollow cylinder,  $P$ , is less than the measurement of the recess on the front edge of the type-mounts as seen in Fig. 16<sup>a</sup>, so that said cylinder may project into said recess and, while revolving, lightly contact with the type-faces,  $a$ , in said recess. The cylinder has an outside sleeve or jacket of felt or suitable soft woven material,  $p^3$ , and the walls of the cylinder near the top have several small holes through each of which a short wick or strand,  $p^4$ , passes to the interior of the cylinder and hangs pend-

ent therein. These small wicks or strands connect with the outside felt jacket,  $p^3$ . The top of the cylinder has an opening through which benzine or other suitable fluid can be filled into the cylinder; a plug,  $p^5$ , closes the top opening. It will now be understood that the fluid in the cylinder passes up the small strands,  $p^4$ , by capillary attraction and out through the holes to the felt jacket,  $p^3$ , which is thereby kept moist with such fluid. The cylinder carrying the moistened jacket revolves in contact with the type-faces and cleans the type. The line of types in the distributing car is forced toward the right-hand and the side of the cleansing cylinder,  $P$ , in contact with the type revolves, as indicated by the arrow, in the opposite direction, and the type-faces are thereby cleansed of ink. Movement is imparted to the cleansing cylinder,  $P$ , by a cord,  $p^6$ , connecting the pulley,  $p^2$ , with a pulley,  $p^7$ , on a vertical shaft,  $p^8$ , which extends down to the transverse shaft, 12, and a bevel wheel,  $p^9$ , on the vertical shaft gears with a bevel wheel,  $p^{10}$ , on the transverse shaft.

It will be observed that after the operator has set a line of type and has thrown the clutch 5 so as to bring the same into operative connection with the driving pulley 1, the operations by which the jaw mechanism rises, grasps the type, and shifts it into the chase box; by which the justifying mechanism properly justifies, and the printing mechanism inks and takes the impression therefrom; by which the justifying spaces are withdrawn and returned to their proper holder, and the chase box elevated, the type transferred to the distributing car and thence to the distributing rails or ways, and finally to the magazine, are all automatically performed without any necessary attention upon the part of the operator, all of the above specified movements being accomplished during a single revolution of the shaft 2, except the transfer of the types from the distributing car and their distribution into the magazine. It will be apparent therefore that, after the operator has composed a line of types and has touched the means for operating the clutch 5, he may begin immediately to assemble a second line, and the second line having been assembled and in its turn shifted to the inking and printing position, the operator may immediately proceed to assemble a third line without waiting for the distribution of the types composing the first line. All of the operations of shifting, justifying, inking, taking the inked impression and elevating a line of type to the distributor are accomplished by one revolution of the shaft 2, which, when the revolution has been completed, is automatically disconnected from the driving pulley, 1, the said parts operated



by the shaft then remaining stationary until the operator again connects the pulley to the shaft by means of the clutch-mechanism 5.

We believe ourselves to be the first to provide an organized machine wherein individual foundry type contained in one or more magazines are circulated; that is, moved in succession to assembling, justifying and printing positions; automatically taking an inked impression from a line of such type; and then distributing the types into their proper magazines, and we therefore desire to claim the same broadly.

We believe ourselves to be the first to provide a type-setting and printing machine with a single key-board wherein are employed individual foundry types which have bodies of various sizes, such as are used for advertising and displaying,—the machine being capable of assembling and printing one line at a time, an entire newspaper article including a wide range of display head-lines, leaded and solid body types, and inserts of other sizes of body type, and we therefore desire to claim the same broadly.

While the various parts of this invention are all shown in a machine wherein mechanism for applying ink to type, and mechanism for taking an inked impression are elements, it is to be understood that certain mechanical parts and combinations of parts constituting part of this invention, as set forth in various claims hereto appended, are equally applicable to other typograph or composing machines which do not include mechanism for inking or printing, and such claims therefore are not to be restricted to a machine employing means for inking or for taking inked impressions.

While we have described the machine specifically and with minuteness it is to be understood that this has been done merely for the sake of clearness, as the principles of the invention are not limited to the specific form, or the particular mechanical construction or arrangement of parts shown.

Having thus described our invention what we claim is:

1. In a type-setting and printing machine the combination of a magazine having a plurality of compartments for different type characters; individual types; means for assembling the said types and spacing devices therefor; means to justify the assembled line of types; devices to apply ink to the assembled types; means for taking an ink impression from the justified line of types; means for separating the spaces from the types; mechanism for elevating the justifying spaces to their holder and also the types to the distributing mechanism; and distributing mechanism to return the types to their respective compartments in the magazine.

2. In a type-setting and printing machine

the combination of individual types, a magazine having compartments for the different types, a key-board operating manually for assembling a line of said types in any desired order, justifying mechanism, mechanism for obtaining an inked impression from said line of types, shifting devices operating to remove the line of types from the point of assembly to the printing mechanism, and distributing devices for returning the individual types to the magazine.

3. In a type-setting and printing machine, the combination of a type magazine; a key-board manually operated to assemble the types into a line; power-operated inking and printing mechanisms to take an inked impression from the types; a race-way along which the line of assembled types is shifted from the point of assembly to the said inking and printing mechanisms and distributing mechanism to return the types to the magazine.

4. In a typesetting and printing machine the combination of individual type; a magazine having compartments each of which contains a supply of only one type character of said individual type; a key-board manually operated to detach said individual type from their respective compartments and assemble them into a line; means to justify the assembled line of type; power-operated inking and printing mechanism which takes an inked impression from each line of assembled type; and means to return said detached type and distribute the same to the compartments in the magazine.

5. A type-setting and printing machine having in combination independent type; a magazine having compartments for the storage of the type; means by which the type may be detached from the compartments and circulated; mechanism operated by a key-board for assembling detached type into a line and to start them in circulation; means for applying ink to the type; and means for taking an inked impression from said assembled line of detached type.

6. In a composing machine the combination of a single type-chute; a car movable over the upper end of said chute; a plural number of type magazines all supported by said car and each magazine vertically adjustable independent of the others and registerable with said chute; and distributing mechanism to return the types to their respective magazines.

7. In a composing machine, the combination of a single type-chute; a plural number of magazines each magazine vertically adjustable independent of the others and all movable into and out of operative relation with said single chute and each magazine provided with a type-character retaining device which is automatically cut-out of its normal action with respect to any magazine



that is in register with the said chute; and a single series of type-character releasing devices independent of the plural magazines and which control the release of type-characters from any magazine that is in register or operative relation with the chute.

8. In a composing machine, the combination of a single type-chute; and a plural number of magazines all horizontally adjustable over the upper end of said chute and each magazine vertically adjustable, independent of all the other magazines into and out of operative relation with said single chute.

9. In a type-setting machine, the combination of a single chute; a plural number of magazines all horizontally adjustable into and out of operative relation with said single chute; and a plural number of separate distributing devices one being attached above each magazine.

10. In a type-setting machine, the combination of a single type-chute; a car movable over the upper end of said chute; a plural number of magazines all supported by said car and either magazine registrable with said chute; and a plural number of separate distributing devices—one attached above each magazine.

11. In a type-setting machine, the combination of a single type-chute; a plural number of magazines each adjustable into and out of operative relation with said single chute; a single series of type-releasing devices which controls the release of types from that magazine only that is in register with the chute; and a plural number of separate distributing devices one attached above each magazine.

12. In a type-setting machine, the combination of a single type-chute; a plural number of magazines all horizontally adjustable into and out of operative relation with said single chute and each magazine vertically adjustable independent of the others; a single series of type-releasing devices which controls the release of types from that magazine only that is in register with the chute; distributing mechanism to return the types to their respective magazines and a single key-board co-acting with the said single series of type-releasing devices.

13. In a type-setting machine, the combination of a single type-chute; a car movable horizontally over the upper end of the single chute; a plural number of magazines all vertically adjustable on said car and normally retained in their highest position out of operative relation with said single chute; a single series of type-releasing devices which control the release of types from that magazine only that is in register with the chute; and distributing mechanism to return the types to their respective magazines.

14. In a type-setting and printing machine, the combination of a single type-chute; a plural number of magazines each

one of which may have compartments for type whose bodies are of size different from those in either of the other magazines and all of the magazines adjustable into and out of operative relation with said single chute; type-releasing devices; a single key-board co-acting with said type-releasing devices to assemble a line of type from either one or more of said magazines; and mechanism for obtaining an inked impression from said assembled line of type, whereby the operator may compose from one key-board lines of type which have bodies of various sizes such as display type and print same upon any suitable surface.

15. In a type-setting and printing machine, the combination of a single type-chute; a plural number of magazines either one of which is adjustable into and out of operative relation with said single chute; type-releasing devices; a single key-board co-acting with said type-releasing devices to assemble a line of type from either one or more of the magazines; mechanism for obtaining an inked impression from said assembled line of type; and distributing mechanism to return the types to their respective magazines.

16. In a type-setting and printing machine the combination of a race-way for receiving the type; a slide normally projecting into the path of the type in said race-way; a spring connected to said slide; means for advancing the type step by step as the same are delivered one at a time to the race-way; line-shifting devices for moving a completed line of type along the raceway; means for withdrawing said slide from the path of the type prior to the initial shifting action of said devices, and mechanism for obtaining an inked impression from said line of type.

17. In a type-character composing machine, the combination of an assembling race-way having an open bottom; a pair of jaws below the race-way and vertically movable through said open bottom into and out of said raceway; and means for reciprocating said jaws along the race-way.

18. In a composing machine, the combination of an assembling race-way; a vertically-movable jaw-bar under said race-way; two jaws longitudinally adjustable on said bar; and means for reciprocating said jaw-bar and jaws along the race-way.

19. In a composing machine the combination of an assembling race-way; a vertically-movable jaw-bar under said race-way; longitudinally adjustable jaws thereon; a vertically movable jaw-lift; a track or rail parallel with the race-way and supporting said jaw bar when the latter is in its elevated position; means to lower the said bar and jaws at the end of the track or rail; and means for reciprocating said jaw bar.



20. In a composing machine the combination of a race-way; a vertically-movable jaw-bar; a pair of jaws thereon one of which is adjustable toward the other by the tension of a spring; a catch retaining the jaw in its retracted position; and means for tripping said catch as both jaws move vertically into the race-way to grasp the assembled line of type.
21. In a composing machine the combination of the assembling race-way; a vertically-movable jaw-bar; a pair of jaws thereon; a horizontally reciprocating carrier supporting said bar and jaws; a suitable cam; and a cam-lever in operative engagement with said cam and with said reciprocating carrier.
22. In a composing machine the combination of an assembling race-way; a chase box in alinement therewith; four-motioned type-character shifting jaws which enter the chase-box; and means to justify the assembled line of type-characters while the latter are in the jaws and the jaws are in the chase-box.
23. In a composing machine, the combination of the assembling race-way; a chase-box alined therewith and forming a continuation thereof; two type-character grasping jaws movable into said race-way, movable along the race-way into the chase-box, movable therefrom and finally movable back to their normal position, and means imparting said movements to the said two jaws.
24. In a composing machine the combination of the assembling race-way and the chase-box alined therewith, the reciprocating carrier, the jaw-bar and type-character grasping jaws vertically adjustable on said carrier, the jaw-lift whereby the said jaws are elevated into the race-way, means whereby the jaws are supported in their elevated position in the chase-box, means for permitting the jaws to descend, and means for reciprocating the carrier, whereby the said type-grasping jaws are given the four motions of ascending into the race-way, advancing therealong to the chase box, descending therefrom and returning under the race-way to their normal position.
25. In a type-setting machine, the combination of a chase-box with a line of type therein; four-motioned jaws grasping the opposite ends of the said line of type; spaces in the line—each space having two oppositely-disposed justifying wedges connected thereto; and means for advancing both of said oppositely-disposed wedges into the line.
26. In a type-setting machine the combination of a chase-box with a line of type therein; means supporting the opposite ends of said line of type; vertical spaces in the line having two oppositely-disposed justifying wedges connected thereto; a justifying box having engagement with the upper wedges of said spaces; a movable bar under the lower wedges of said spaces; and means simultaneously advancing the justifying box and said bar.
27. In a composing machine the combination of a chase-box with a line of type-characters therein; movable jaws supporting said line of type-characters at opposite ends, one of said jaws being adjusted toward the other by spring-tension; a catch acting to hold the spring-pressed jaw at a predetermined retracted position; spaces in the line having two oppositely-disposed wedges attached thereto, and means for advancing both of said oppositely-disposed wedges into the line.
28. In a composing machine the combination of a chase-box with a line of type characters therein; spaces in the line having two oppositely-disposed justifying wedges connected thereto; a justifying box supporting the said spaces by their upper wedges, and adjustable toward and from the chase-box; and means for moving the justifying box independently of the chase-box, thereby withdrawing the said spaces and wedges and leaving the line of type characters in the chase-box.
29. In a composing machine the combination of an elevator car; a chase-box mounted thereon; a justifying box also mounted on the elevator car and movable toward and from the chase-box independently thereof, and means imparting said movements thereto.
30. In a composing machine the combination of an elevator car; a chase-box secured to the car; a justifying box mounted to slide on the elevator car above the said chase box; a spring tending to hold the justifying box at the top of the said car, and means overcoming the tension of said spring when the car is in its lowered position.
31. In a composing machine the combination of the chase-box, the justifying box, means holding said boxes in proper relative positions to receive the type characters and the justifying wedges, means for advancing the justifying-box toward the chase box, and means for withdrawing the justifying box from said chase-box.
32. In a type-setting and printing machine the combination of a chase-box; a race-way along which the line of assembled type is shifted into the chase-box; an ink supply device; an oscillating, revolving ink-roller reciprocating along the chase-box; and means for oscillating, revolving and reciprocating the said ink-roller.
33. In a type-setting and printing machine the combination of a chase-box with a line of type therein; an ink-roller mounted to reciprocate in front of said chase-box; means holding the ink-roller in contact with the line



of type as it moves in one direction, and out of contact therewith as it moves in the reverse direction.

34. In a type-setting and printing machine the combination of the chase-box with a line of type therein; a vibratory cylindric platen; means for vibrating the platen; and devices for partly rotating the cylindric platen step by step at each vibration thereof.

35. In a type-setting and printing machine the combination of a vibrating platen; a race-way along which a line of assembled type is shifted to the printing position in front of the platen; means for inking the line of type; and means for vibrating the platen to and from the said type-line.

36. In a type-setting and printing machine, the combination of a key-board manually operated to assemble independent types into a line; a device to apply ink to said assembled line of types; a race-way along which the line of types is shifted from the point of assembly to the said inking device; and a vibratory cylindric platen which takes an inked impression from said line of types.

37. In a type-setting and printing machine the combination of the revoluble platen mounted on a shaft; movable bearings for said shaft and carrying the shaft and platen; a ratchet wheel on said shaft; a pawl stationed in the path of movement of said ratchet wheel, and means for moving said bearings without moving the pawl.

38. In a type-setting and printing machine the combination of independent type; key-board mechanism which composes said types into lines of predetermined length; means to justify the composed lines; means for applying ink to said lines; and a platen carrying paper and movable to said composed lines of type to take an inked impression therefrom.

39. In a type-setting and printing machine the combination of an intermittent revoluble platen; means for securing paper or other material thereto; means for moving the platen to and from the type; and a throw-off device to prevent the platen from making impressions.

40. In a type-setting and printing machine the combination of type-assembling mechanism; a platen; vibrating levers supporting the platen; and an eccentric fulcrum for said levers.

41. In a type-setting and printing machine the combination of a revoluble cylindrical platen; vibrating levers supporting the same, and an eccentric fulcrum for said levers.

42. The combination of a revoluble cylindric platen; a ratchet wheel revoluble therewith; levers supporting the platen and ratchet wheel and having an eccentric fulcrum; a slide supporting a pawl in the vibratory path of the ratchet wheel, and operative means connected to both the slide and the

eccentric fulcrum, whereby when the eccentric fulcrum is turned the pawl simultaneously will be thrown out of the path of the ratchet wheel.

43. In a type-setting and printing machine the combination of a revoluble cylindrical platen; means for securing a sheet of paper or other material wound around the platen; vibratory levers supporting the platen; and a throw-off device to prevent the platen from taking impressions when it vibrates.

44. In a composing machine the combination of a race-way along which a line of assembled type is shifted; an elevator car to raise the type from the race-way; a chase-box and justifying box supported by the said car; a justifying-space holder, and a type-distributing mechanism.

45. In a composing machine the combination of an elevator car; a justifying box supported by the car; an inclined justifying-space holder, and means alining the justifying box with said holder.

46. In a composing machine the combination of an elevator car; a chase-box thereon; type-distributing mechanism; a distributing car reciprocating crosswise of the path of the elevator car; and devices for transferring the type from the chase-box to the said distributing car.

47. In a composing machine the combination of the elevator ways; a distributing car normally lying across said ways; an elevator car movable up and down on said ways and supporting a chase-box; and means on the elevator car withdrawing said distributing car as the elevator car is raised.

48. In a composing machine the combination of the elevator car; a chase-box on said car; a distributing car reciprocating crosswise of the path of the elevator car; and a cam on the elevator car engaging the distributing car and shifting it as the former is moving to its topmost position.

49. In a type-setting and printing machine the combination of upright guide-ways; an elevator car movable up and down on said ways; a chase-box on said car for carrying type; a magazine for the storage of type; mechanism for obtaining an inked impression from the type while in the chase-box; type-distributing mechanism, and means transferring the type from the chase-box to said distributing mechanism.

50. In a type-setting machine the combination of a distributing car for holding a line of type; a plural number of magazines each provided with its own distributing devices; and means whereby the distributing devices of either of the said magazines may be adjusted into operative relation with the said distributing car.

51. In a type-setting machine the combination of the chase-box; a reciprocating distributing car; a magazine for the storage of



type; type-distributing ways; means for transferring a line of type bodily from the chase-box to the said car; and devices for transferring one type at a time from the said  
5 car to said distributing ways.

52. In a type-setting and printing machine, the combination of a continuously-moving power-device for actuating the magazine type-releasers; manually operated type-  
10 assembling devices; continuously-moving type-distributing devices, and intermittently operating, justifying, inking and printing mechanisms.

53. The combination of a movable distributing car for holding a line of type; a thrust plate reciprocating across the mouth of the said car; type distributing ways in proximity to the thrust plate; a distributing belt traveling parallel with said distributing  
20 ways, and a wheel simultaneously operating the said belt and thrust plate.

54. In a type-setting and printing machine, the combination of individual type; a magazine for the storage of the type; means  
25 for assembling a line of said types; mechanism for obtaining an inked impression from said line of types; and a device for cleaning the line of types.

55. In a type-setting and printing machine, the combination of individual type; a magazine for the storage of the type; a keyboard by which type in the magazine are assembled into a line, a mechanism for distributing the type into the said magazine;  
30 mechanism for obtaining an inked impression from said line of types; and a device for cleaning the line of types—said cleaner acting on the type in its transit from the printer to the distributor.

56. In a type-setting and printing machine, the combination of a single type-delivering chute; a plural number of type-magazines all adjustable into and out of operative relation with said single chute; one keyboard coöperating so as to assemble a line of  
45 type from either of said magazines; mechanism for obtaining an inked impression from said assembled line of types; and means to shift the line of type from the point of assembly to the printing mechanism.  
50

57. The combination of a movable chase-box adapted to contain one line of type at a time; printing mechanism for obtaining an inked impression from a line of type in said  
55 chase-box; distributing mechanism; and means for raising the chase-box and transferring the said line from the printing mechanism to the distributing mechanism.

58. A typographic machine including in  
60 combination means for composing a line of types; means for justifying the line of types; means for inking the line of types; means for holding an impression receiving material; and means for bringing the impression re-

ceiving material and the line of types into  
impression contact. 65

59. A typographic machine including in combination means for composing a line of types; means for justifying the line of types; means for inking the line of types; means for  
70 holding an impression receiving material; means for bringing the impression receiving material and the line of types into impression contact; and means for distributing the types. 75

60. A typographic machine including in combination means for composing a line of types; means for justifying the line of types; means for inking the line of types; means for holding an impression receiving material; means for bringing the impression receiving material and the line of types into impression  
80 contact; and means for cleaning the line of types.

61. A typographic machine including in  
85 combination means for composing a line of types; means for justifying the line of types; means for inking the line of types; means for holding an impression receiving material; means for bringing the impression receiving  
90 material and the line of types into impression contact; means for cleaning the line of types; and means for distributing the line of types.

62. A typographic machine including in combination with type holding means; keyboard controlled mechanism for selecting  
95 types from said holding means for composing lines of types; means for justifying a composed line of types; means for inking the line of types; means for holding an impression receiving material; and means for bringing the  
100 line of types and the impression receiving material into impression contact.

63. A typographic machine including in combination means for composing a line of  
105 types and for inserting interverbal spacing devices therein; means for regulating the interverbal spacing devices so as to justify the line; means for inking the line of types; means for holding an impression receiving  
110 material; and means for bringing the line of types and the impression receiving material into impression contact.

64. A typographic machine including in combination means for composing a line of  
115 types; means for justifying the line of types; means for clamping the line of types; means for inking the line of types; means for holding an impression receiving material; and means for bringing the impression receiving material and the line of types into impression contact. 120

65. A typographic machine including in combination means for composing a line of types; means for justifying the line of types; means for alining the line of types; means for inking the line of types; means for holding an impression receiving material; and means for



bringing the impression receiving material and the line of types into impression contact.

66. A typographic machine including in combination means for composing a line of types, means for automatically justifying the line of types, means for inking the line of types, means for holding an impression-receiving material, and means for bringing the impression-receiving material and the line of types into impression contact.

67. A typographic machine including in combination a magazine for holding types, keyboard-controlled mechanism for selecting types from the said magazine for composing lines of types, means for justifying a composed line of types, means for inking the line of types, means for holding an impression-receiving material, and means for bringing the line of types and the impression-receiving material into impression contact.

68. A typographic machine including in combination a magazine for holding types, keyboard-controlled mechanism for selecting types from the said magazine for composing lines of types, means for automatically justifying a composed line of types, means for inking the line of types, means for holding an impression-receiving material, and means for bringing the line of types and the impression-receiving material into impression contact.

69. A typographic machine including in combination a magazine having compartments for holding various types, keyboard-controlled mechanism for selecting types from the said magazine for composing lines of types, means for justifying a composed line of types, means for inking the line of types, means for holding an impression-receiving material, means for bringing the line of types and the impression-receiving material into impression contact, and means for automatically distributing the types to the proper compartments of the magazine.

70. A typographic machine including in combination a magazine having compartments for holding various types, keyboard-controlled mechanism for selecting types from the said magazine for composing lines of types, means for justifying a composed line of types, means for inking the line of types, means for holding an impression-receiving material, means for bringing the line of types and the impression-receiving material into impression contact, means for cleaning the types, and means for automatically distributing the types to the proper compartments of the magazine.

71. A typographic machine including in combination a magazine for holding types, keyboard-controlled mechanism for selecting types from the said magazine for composing lines of types, means for justifying a composed line of types, means for clamping the

line of types, means for inking the line of types, means for holding an impression-receiving material, and means for bringing the impression-receiving material and the line of types into impression contact.

72. A typographic machine including in combination a magazine for holding types, keyboard-controlled mechanism for selecting types from the said magazine for composing lines of types, means for justifying a composed line of types, means for alining the line of types, means for inking the line of types, means for holding an impression-receiving material, and means for bringing the line of types and the impression-receiving material into impression contact.

73. A typographic machine including in combination a magazine for holding types, keyboard-controlled mechanism for selecting types from the said magazine for composing lines of type, means for justifying a composed line of types, means for alining the line of types, means for inking the line of types, means for holding an impression-receiving material, and means for bringing the line of types and the impression-receiving material into impression contact.

74. A typographic machine including in combination means for composing a line of types, means for justifying the line of types, means for inking the line of types, means for holding an impression-receiving material, means for bringing the impression-receiving material and the line of types into impression contact, and means for regulating the force of the impression.

75. In a machine of the character described the combination of means to select relief type bodies and assemble the same to form a line of composition, means to justify said line, means for inking said line, means for receiving and holding an impression-receiving material, means for taking an impression of the inked line of type bodies, means for cleaning said type bodies and means for re-distributing said type bodies.

76. A typographic machine including in combination with type holding means, keyboard-controlled mechanism for selecting types from said holding means for composing lines of types, means for justifying a composed line of types, means for inking the line of types, means for holding an impression receiving material, and means for bringing the line of types and the impression-receiving material into impression contact.

77. A typographic machine including in combination a magazine for holding separate, independent types, keyboard-controlled mechanism for selecting such types from the said magazine for composing lines of types, means for justifying a composed line of types, means for inking the line of types, means for holding an impression-receiving



material, and means for bringing the line of types and impression-receiving material into impression contact.

78. A typographic machine including in combination a magazine for holding separate, independent types, keyboard-controlled mechanism for selecting such types from the said magazine for composing lines of types, means for automatically justifying a composed line of types, means for inking the line of types, means for holding an impression-receiving material, and means for bringing the line of types and the impression-receiving material into impression contact.

79. A typographic machine including in combination a magazine having compartments for holding separate, independent types, keyboard-controlled mechanism for selecting such types from the said magazine for composing lines of types, means for automatically justifying a composed line of types, means for inking the line of types, means for holding an impression-receiving material, means for bringing the line of types and the impression-receiving material into impression contact, and means for automatically distributing the said types to the proper compartments of the magazine.

80. A typographic machine including in combination a magazine having compartments for holding separate, independent types, keyboard-controlled mechanism for selecting such types from the said magazine for composing lines of types, means for justifying a composed line of types, means for inking the line of types, means for holding an impression-receiving material, means for bringing the line of types and the impression-receiving material into impression contact,

means for cleaning the types, and means for automatically distributing the types to the proper compartments of the magazine.

81. A typographic machine including in combination a magazine having compartments for holding separate, independent types, keyboard-controlled mechanism for selecting such types from the said magazine for composing lines of types, an assembling block for receiving the said line of types, clamping devices for holding the said line of types, means for conveying the said line of types from the assembling block to the clamping devices, means for automatically justifying the line of types, means for inking the line of types, means for holding an impression-receiving material, means for bringing the line of types and the impression-receiving material into impression contact, and means for automatically distributing the types to the proper compartments of the magazine.

82. A typographic machine including in combination means for composing a line of types, means for justifying the line of types, means for inking the line of types, means for holding an impression-receiving material, means for bringing the impression-receiving material and the line of types into impression contact, and means for causing a yielding action during the impression.

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

FRANK H. BROWN.  
JOHN E. HANRAHAN.  
JOHN L. SELLAR.

Witnesses:

CHARLES B. MANN, Jr.,  
GEO. KOETHER.