No. 863,754. PATENTED AUG. 20, 1907.

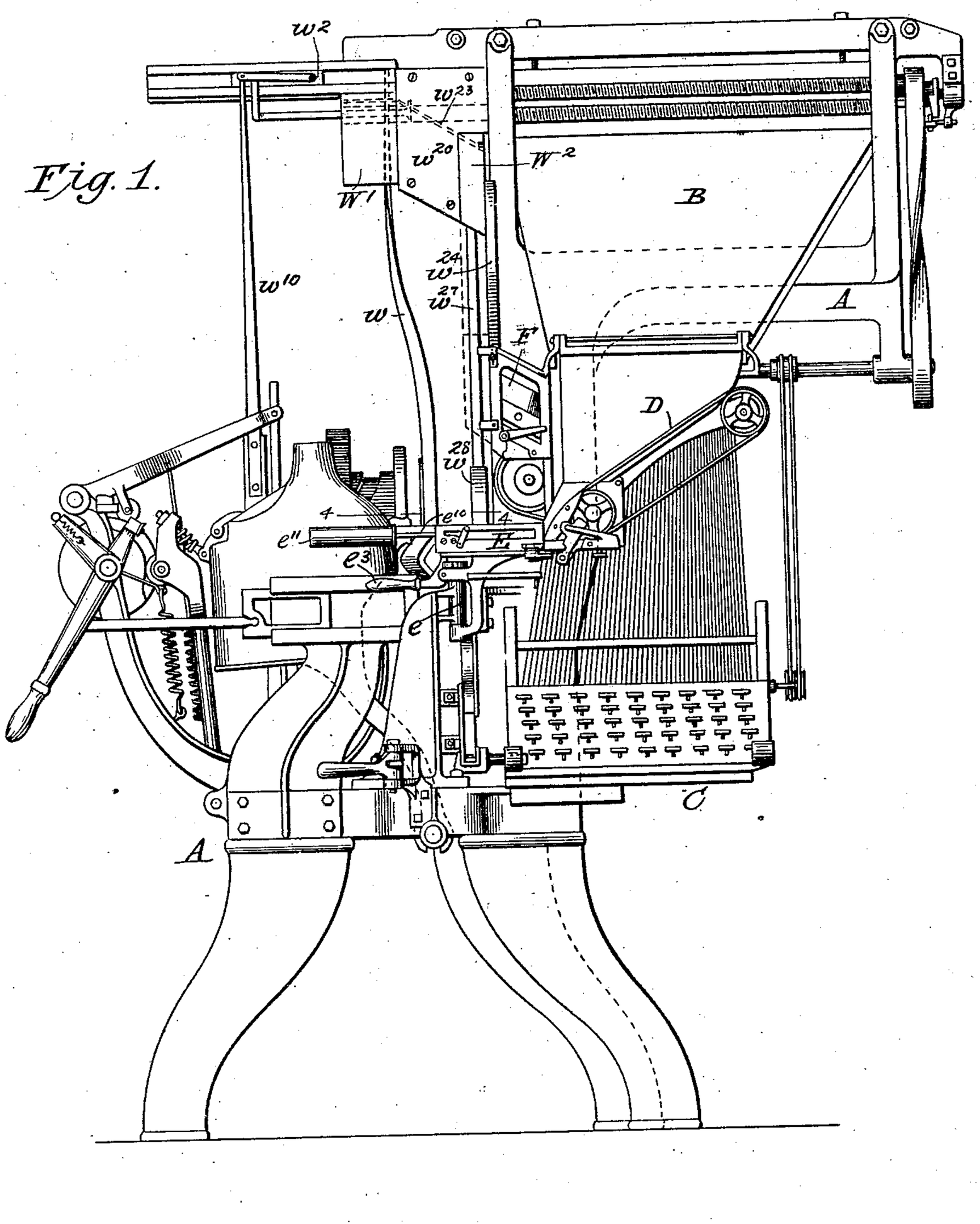
D. A. POE.

LINOTYPE MACHINE.

APPLICATION FILED FEB. 4, 1905.

6 SHEETS—SHEET 1.

Fig. 1.



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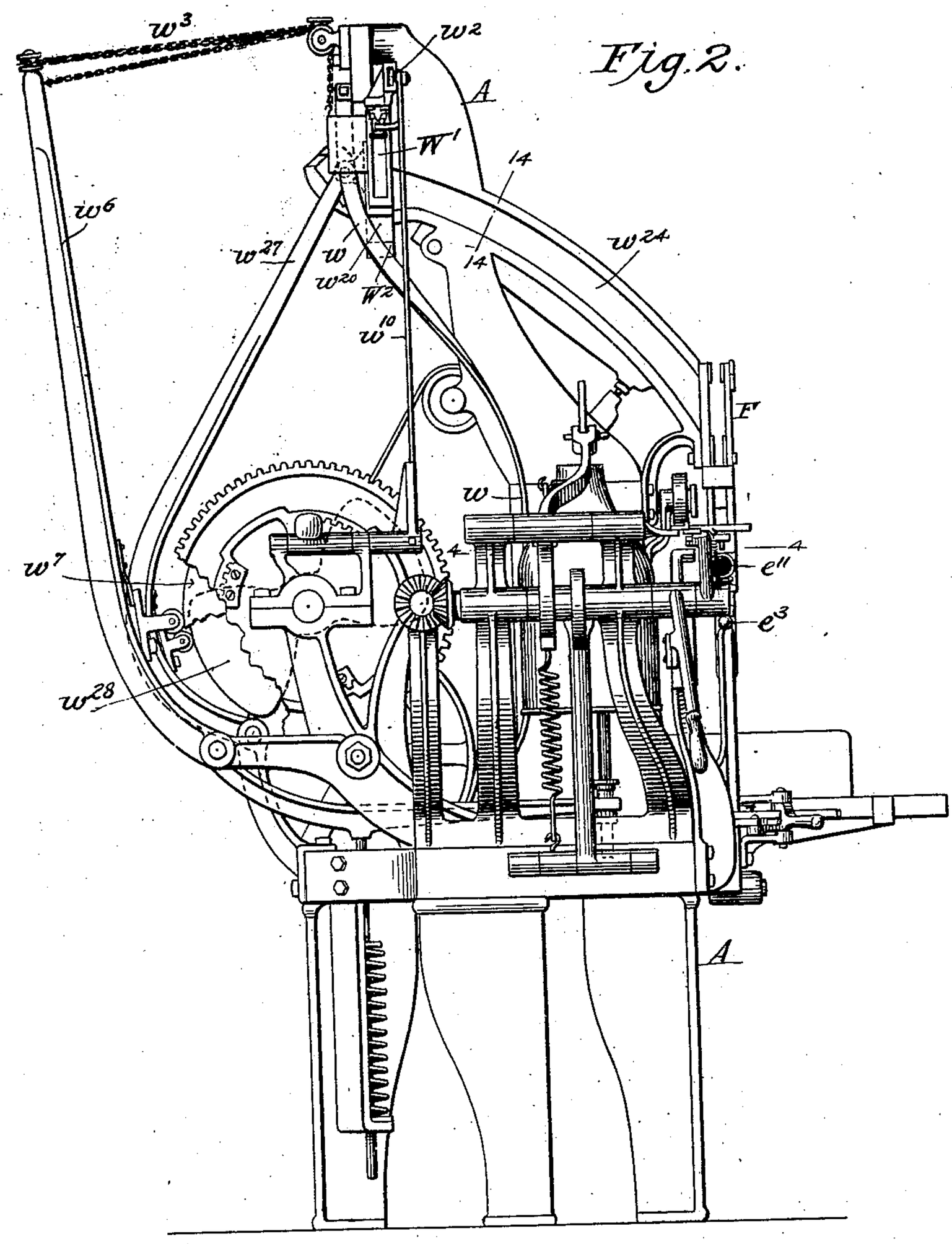
6 SHEETS—SHEET 2.

Fig. 2.



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6 SHEETS—SHEET 3.

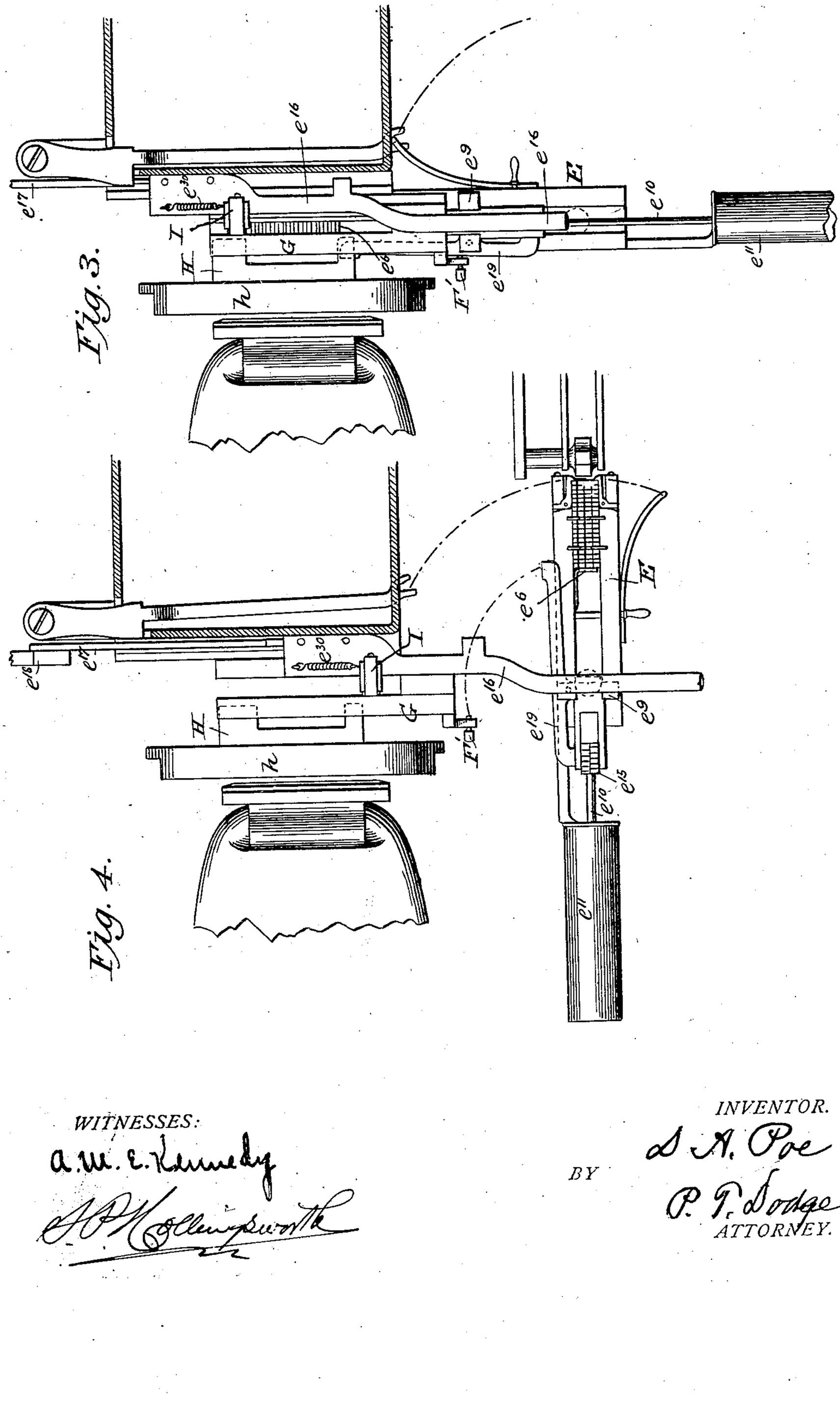

Fig. 3.

Fig. 4.

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6 SHEETS—SHEET 4.

Fig. 5.

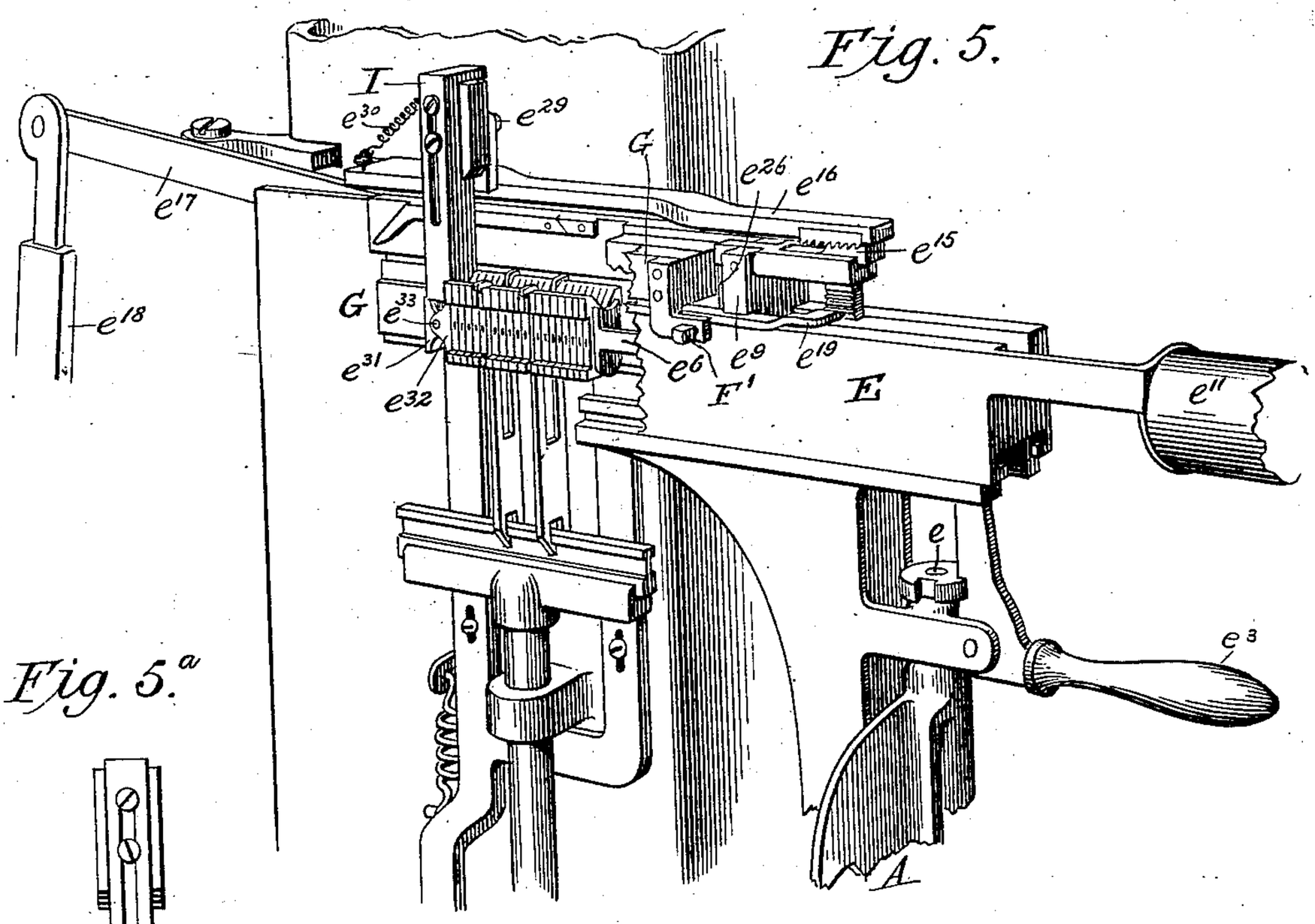


Fig. 5.a

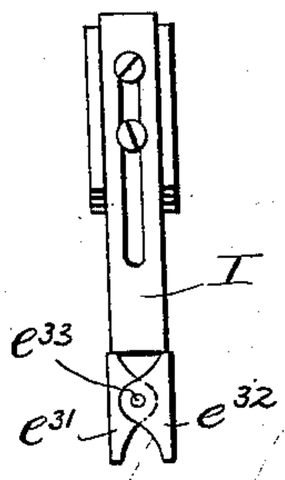


Fig. 6.

ON LINE 6—6.

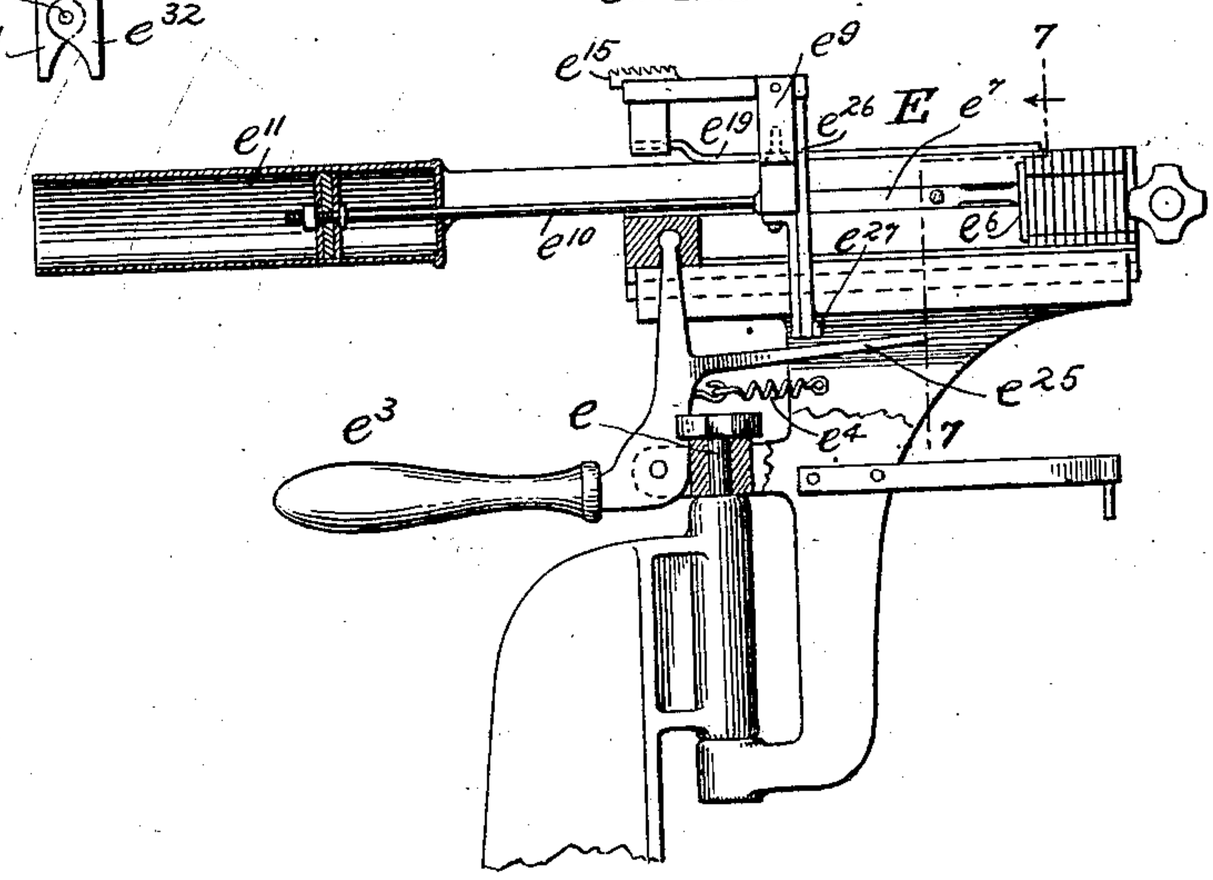
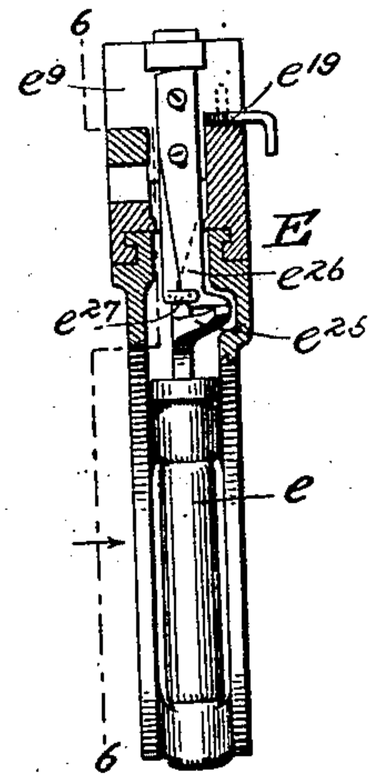


Fig. 7.

ON LINE 7—7.



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6 SHEETS—SHEET 5.

Fig. 8.

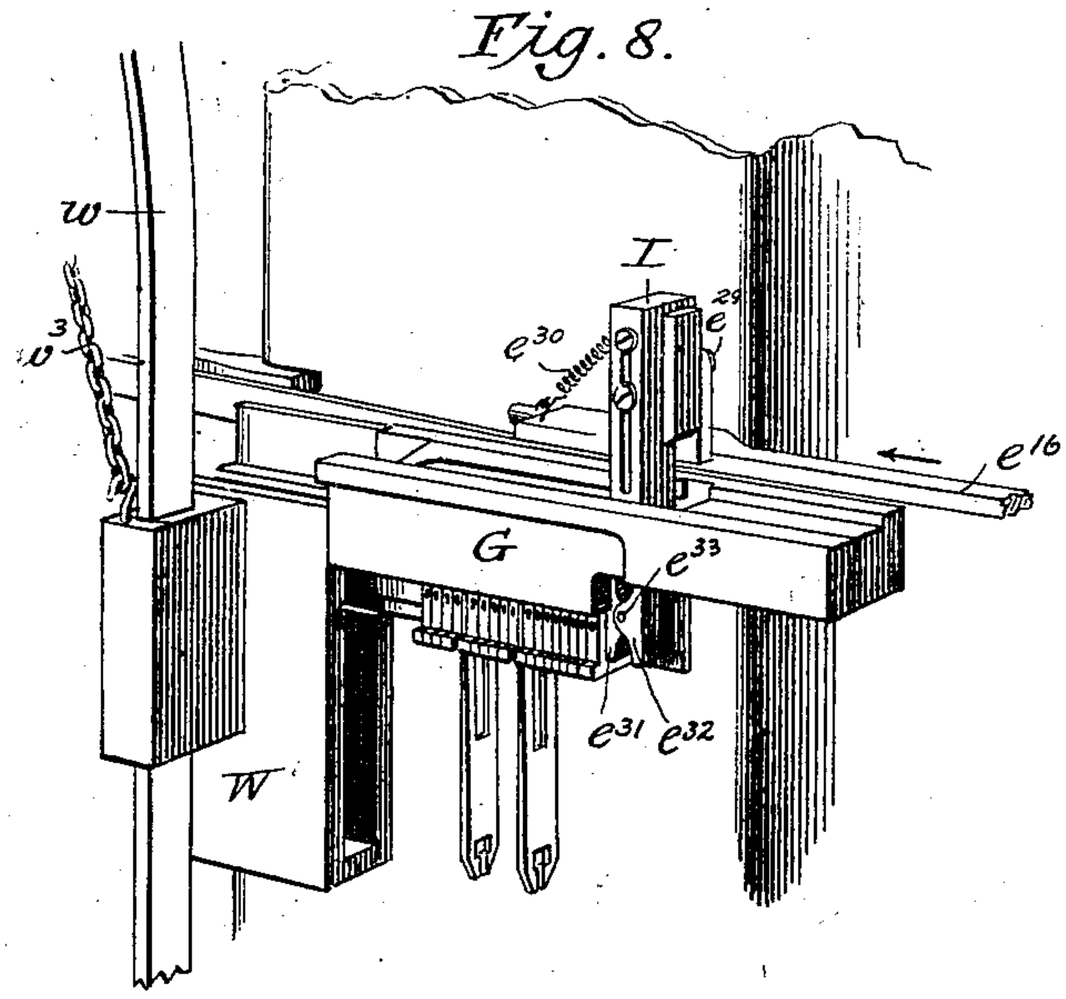
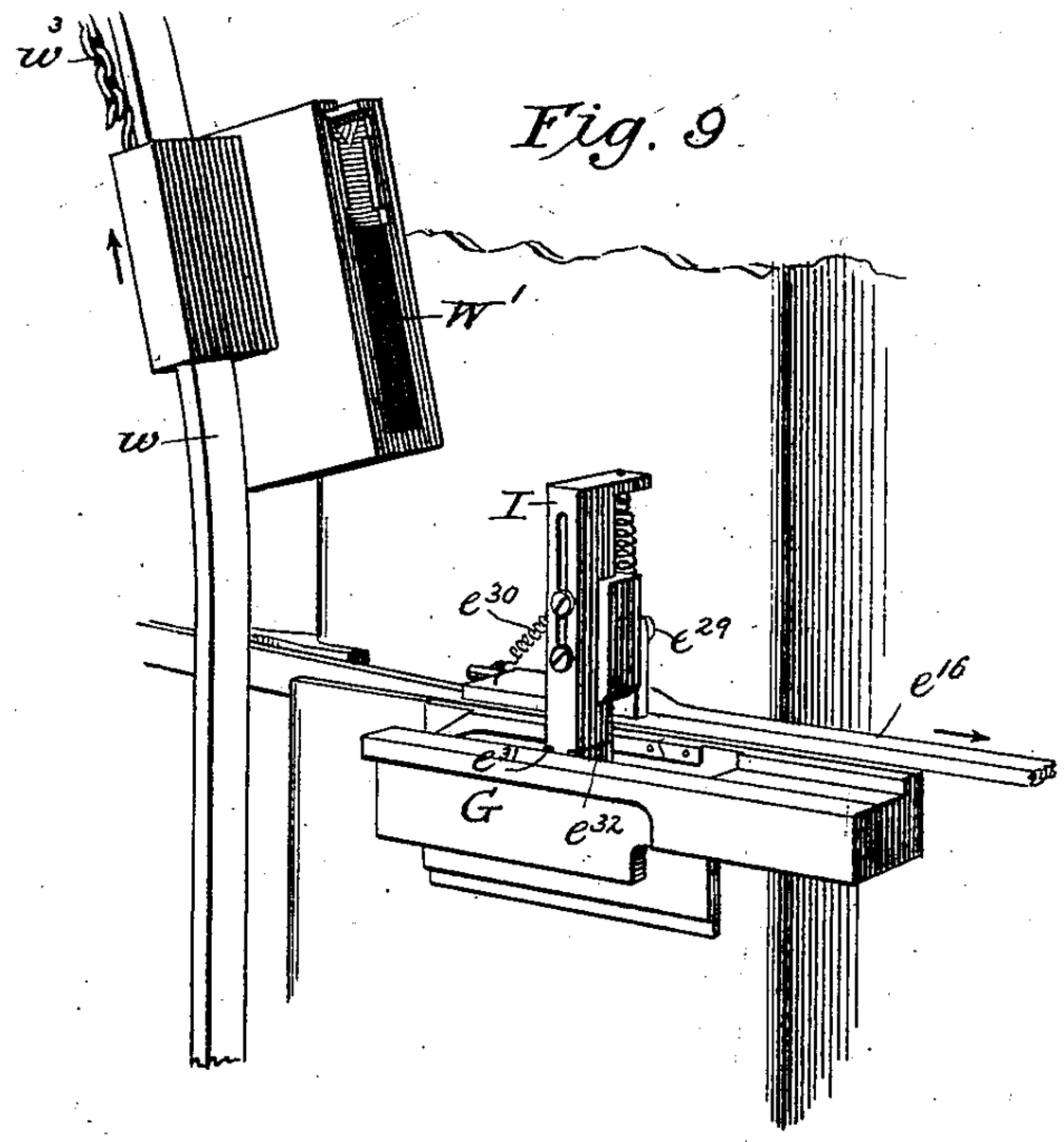


Fig. 9.



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6 SHEETS—SHEET 6.

Fig. 11.
ON LINE 11–11

Fig. 10.

Fig. 12.
ON LINE 12-12

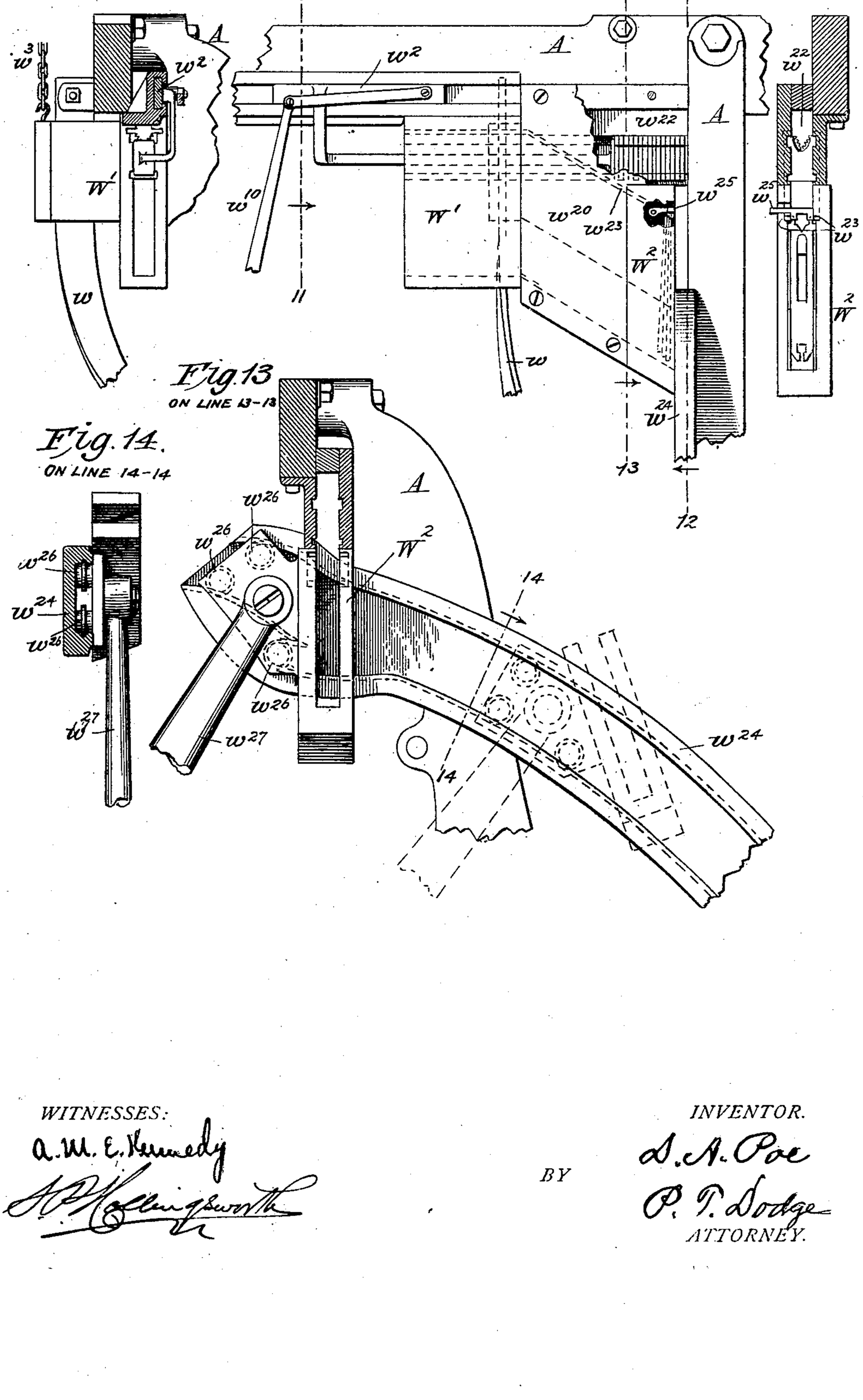

Fig. 13
ON LINE 13–13

Fig. 14.
ON LINE 14–14

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UNITED STATES PATENT OFFICE.

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LINOTYPE-MACHINE.

No. 863,754. Specification of Letters Patent. Patented Aug. 20, 1907.

Application filed February 4, 1905. Serial No. 244,196.

To all whom it may concern:

Be it known that I, DAVID A. POE, of Montreal, Province of Quebec, and Dominion of Canada, have invented a new and useful Improvement in Linotype-Machines, of which the following is a specification.

This invention relates to machines for producing linotypes or printing bars, each bearing on the edge, in relief, properly spaced and justified, the characters necessary to print a line of predetermined length.

It has reference more particularly to machines of the general organization represented in Letters Patent of the United States No. 734,746, and is intended to improve and render more certain the action of said machine, and overcome various defects in the mechanisms for transferring the composed line of matrices and spacers and for effecting the distribution of the lines, hereinafter specifically referred to.

Referring to the drawings:—Figure 1 is a front elevation of a machine having my improvements incorporated therein. Fig. 2 is an elevation of the same, looking from the right side. Fig. 3 is a plan view, looking downward from the line 4—4, Figs. 1 and 2, illustrating the assembling, line transferring and casting devices, after the line has been transferred to a position in front of the mold. Fig. 4 is a like view, showing the position of the parts during the composition of the line. Fig. 5 is a perspective view, showing the composed line in the casting position, together with the assembler and principal parts for transferring and sustaining the same. Fig. 5^a is a view of the finger and attendant parts, for resisting the advance of incoming matrix lines, and for delivering the lines after use to the distributing devices. Fig. 6 is a vertical section, on the line 6—6 Fig. 7 through the assembler and adjacent parts, in the assembling position. Fig. 7 is a transverse view, on the line 7—7, of the preceding figure. Fig. 8 is a perspective view, looking toward the rear, showing a line in the course of transference from the casting position, together with the principal parts for moving it. Fig. 9 is a perspective view of the same parts, at a later stage of action, with the composed line lifted above the casting level toward the distributing mechanism. Fig. 10 is a front elevation of the parts for delivering the composed line to the distributing devices at the top of the machine. Figs. 11 and 12 are vertical cross sections on the lines 11—11 and 12—12, respectively, of Fig. 10. Fig. 13 is a cross section on the line 13—13, Figs. 1 and 10. Fig. 14 is a view on the correspondingly numbered line of Figs. 2 and 13.

Referring to the drawings, A represents the main frame; B, the inclined magazine containing the matrices; and C, the keyboard, having its finger keys connected by intermediate devices with escapements for releasing the matrices in the selected order, one at a time, from the magazine.

D is the inclined carrier belt, on which the matrices falling from the magazine, are delivered, and by which they are directed successively, on end, into a channel in the upper end of the assembler, E, into which they are crowded laterally by the usual star-wheel at the right, as shown in Figs. 1, 4 and 6. The assembler, E, is mounted to turn on the vertical axis, e, in the main frame, and is provided with a lever or handle, e^3, by which it may be turned, after the composition of the line is completed, horizontally through an arc of 90°, its receiving end swinging rearward until the assembler stands at right angles to its original position and with its open end at the rear, as shown in Figs. 3 and 5.

G is a horizontal line support or receiver, consisting of two parallel arms rigidly connected at their forward ends and having their rear ends, which are of greater depth, grooved on their inner faces, and adapted to receive the line of matrices and spacers between them and to give support thereto by resting under their upper ears or shoulders, as shown in Figs. 5 and 8.

H is a mold, carried by a vertical vibratory arm h, having at its ends ears between which the matrices are presented and by which the final length of the line is determined.

I is a depending finger, standing normally in front of the line, as the latter is pushed endwise from the assembler E to the support or receiver, G, and acting thereafter behind the line to carry the same out of the support G, into the carrier for transferring the line to the distributing devices as hereinafter explained.

During the composition and elongation of the line, its advance is resisted by the slide, e^6, which is also utilized at a later stage, as shown in Fig. 5, to push the line out of the assembler, E, into the support, G, above referred to. The resisting and delivering finger, e^6, is mounted on the forward end of a slide, e^7, and is actuated by mechanism hereinafter described. The upper part of the assembler E, in which the line is supported, is mounted to slide longitudinally on the lower portion, so that its ends may engage the frame when in the receiving position, and engage the support G, when in the delivering position. Its movement is controlled by the lever e^3, which is pivoted to the lower part of the assembler, jointed to the upper part, and acted upon by a spring, e^4, as shown in Fig. 6.

To the line resisting and delivering device e^6, is connected a horizontal slide, e^9, mounted on the assembler E, and connected through a rod, e^{10}, with a piston in a dash pot e^{11}, to control the speed at which the device e^6 advances when delivering the line from the assembler. The slide, e^9, is provided with a vertically movable toothed dog, e^{15}, designed to engage, when the assembler is in the discharging position, with corresponding teeth on the lower side of the actuating and transferring bar, e^{16}, which is mounted to slide forward

and backward in guides on the frame, under the influence of an actuating link, e^{17}, connected to the upper end of a vibrating lever e^{18}, moved in a forward direction by a cam and retracted by a spring, as heretofore. Until the assembler E, has been turned from the receiving to the delivering position, the dog e^{15} is held down below its engaging position by a catch e^{19}, which, in the original machine required to be released by a finger lever e^{20}, shown in the patent above referred to.

The foregoing parts, with the exceptions noted, and the details of finger I, are constructed and arranged to operate in essentially the same manner as the parts bearing like letters in Patent No. 734,746.

In the original machine of Patent No. 734,746, it is necessary, after the line has been assembled and the assembler turned through the quarter revolution into line with the channel or receiver G, for the operator to move the thumb lever e^{20}, of the patent, to detach the dog e^{19} from pawl e^{15}, in order to permit the dog to rise and interlock with the teeth of the reciprocating actuating bar, e^{16}. Unless the operator moves lever e^{20} before releasing his hold on lever e^{3}, thereby permitting the spring, e^{4}, to move the upper sliding portion of the assembler rearward, the engagement of the dog will not take place at the proper distance from the stop which controls the movement of bar e^{16}, and therefore, the matrix line will not be pushed backward into exactly the right position in the sustaining and alining channel G. Unless the lines are placed in exactly the proper position opposite the mold, the horns or projections on the latter will pi the line of matrices, or break or bend the matrices.

One of the present improvements is designed to overcome the necessity for the manual control of the connecting dog e^{15} and the evils which resulted from the failure to actuate it at the proper time.

To this end I provide means whereby the dog is caused to engage with the actuating bar e^{16}, when the assembler is brought into line with the line support or receiver, G. The details may be variously constructed and arranged.

In the drawing, as a means of holding the dog, e^{15}, downward out of engagement, I provide in place of the latch e^{19} and lever e^{20} of the patent, a horizontal latch e^{19} connected by a vertical pivot to the upper sliding portion of the assembler, E, as shown in Figs. 3 and 4, with one end arranged in position to engage teeth on the side of the dog e^{15}, as shown in Fig. 5, and with the opposite end in position to encounter the adjustable stop, F^1, by which the rotation of the assembler E, is limited, as shown in Figs. 3 and 4. When, therefore, the assembler is turned to its delivering position, the dog e^{15} is automatically actuated at the proper time and permitted to engage the teeth of the actuating bar e^{16}, by which the parts are moved rearward to deliver the line from the assembler to the receiver G.

The essence of the invention in this respect lies in the employment of an automatic device for establishing the proper connection to effect the delivery of the line through the influence of the turning assembler or parts connected therewith.

In the original machine of Patent No. 734,746, after the casting operation and after the matrix line has been pushed out of the line support G, it was necessary to actuate the special finger lever, e^{23}, of the patent, in order to disengage the dog e^{15} from the teeth of the actuating bar e^{16}. This mechanism is uncertain in action, demands careful attention on the part of the operator and prevents the assembler from being constructed, as in other machines, to open at the front, in order to permit the introduction of pi matrices, or other corrections in the line.

My second improvement relates to this part of the machine and provides for unlocking the dog e^{15} from the bar e^{16}, by the act of sliding the upper part of the assembler forward, out of engagement with the support G. This permits the parts to be disengaged and the assembler to be turned freely forward, at will, and also permits the use of an assembler having a hinged front or gate to permit access to the line of matrices.

I now provide the lever e^{3}, by which the assembler is turned and its upper part moved endwise, as shown in Fig. 6, with a rear arm or extension e^{25}, acting beneath an upright dog, e^{26}, the upper end of which acts, in turn, beneath the forward end of the latch or dog e^{15}. When at the completion of the assemblage of a line, the handle e^{3} is operated to slide the upper part of the assembler, preparatory to swinging the line rearward, the pawl e^{26} is out of the path of the arm e^{25}, as shown in Fig. 6; but when the line of matrices and spacers has been carried into the receiver G, the sliding movement of the parts will carry the pawl e^{26} into position over the arm e^{25}, so that when the lever e^{3} is again actuated to unlock the sliding part of the assembler from the receiver G, preparatory to turning the assembler forward, the arm e^{25} causes the dog e^{26} to raise the rear end of the dog e^{15}, thereby throwing its forward toothed end downward out of engagement with the bar e^{16}.

When, therefore, the operator, in order to return the assembling channel to its ordinary position, depresses the lever e^{3}, the line delivering devices automatically disengage from the actuating devices. As the carriage or sliding top of the assembler is drawn forward, the dog e^{19}, being carried away from the actuating stop F', is permitted to automatically engage the dog e^{15} and lock the same down. There is a spring behind the latch e^{19}, so that it is, except when engaged by the stop F', always in position to engage with the teeth in the side of the dog e^{15}. After the pawl e^{26} has performed its duty in disengaging the dog e^{15} from the actuating bar, it is necessary that the pawl e^{26} shall cease its action on the dog. This is provided for by giving the pawl an oblique movement. It is connected at the lower end, as shown in Fig. 7, by link e^{27}, with the sliding line delivering devices, so that, as it is carried upward by the arm e^{25}, it is also caused to move sidewise until it finally passes beyond the arm and out of its control, so that it may fall and cease its action on the dog e^{15}.

From the foregoing it will be understood that the levers e^{20} and e^{23} of the patent are dispensed with, and the dangers resulting from failure to actuate them at the proper time, is entirely eliminated, the movement of the lever e^{3} serving in my improved machine to accomplish in a more certain manner all the results which were accomplished by the three levers in the original machine.

After the line was cast in the machine of Patent No. 734,746, the line of matrices and spacers was pushed by a vertical finger, I, carried by slide e^{16}, out of the support G, into the carriers for delivering them to the distributing mechanism.

In practice it is found that the room available for the operation of the original finger, is so limited that it could not be made of sufficient strength to fulfil its purpose.

In the present improved machine, the finger I, is mounted to slide vertically in guides on the slide e^{16}, as before, so that it may be lifted to return over the top of the incoming line of matrices. The guide for this finger instead of being made rigid on the slide e^{16}, is mounted on the horizontal pivot e^{29}, and held normally in operative position against a stop shoulder, by a spring e^{30}. If, for any reason, the lower end of the finger meets a serious obstruction, the guide will turn around the pivot e^{29}, and let the lower end of the finger override the line. This spring also permits the finger to adapt itself to the function of leading the incoming line of matrices into the machine. The hinged joint permits the finger to yield before the incoming line so that it is adapted to adjust itself to lines varying in length, the lines being thus held compactly together between the finger at the rear and the pusher or resistant e^{6} at the front. In order that the finger may bear squarely against the vertical end of the matrix line, it is provided at the lower end, at opposite sides, with rocking plates e^{31} and e^{32}, carried by a horizontal pivot e^{33}. A spring designated e^{8}, in the machine of Patent No. 734,746, was interposed between the pusher or follower, e^{6}, and the actuating slide, e^{9}. The presence of this spring led to an uncertainty in the action and positions of the parts and caused various troubles.

In my improved machine, I connect the member e^{6}, rigidly with the sliding member e^{9}, so that the distance between them is invariable, and so that the pusher plate will be advanced always to a definite and predetermined position, in order that the matrix line may be left in position to enter between the jaws of the mold.

In the original machine of the patent, the composed line of matrices and spacers was delivered after the casting action, horizontally rearward from the support G, into two independent elevators, V and W, one overlying the other, and serving to lift the spacers and matrices, respectively. It was necessary that these elevators should receive, in addition to the rising movement, independent rotary movement, and in practice it was found that they were objectionable. To overcome this defect and secure the result by rotary motion alone, I make use of a single elevator adapted to carry the entire line of matrices and spacers to the upper part of the machine, where the spacers are successively separated and permitted to descend into a vertically movable carrier, by which they are lowered, in groups, to their magazine, while the matrices are advanced horizontally into the usual distributing mechanism.

The improved construction is shown in Figs. 1, 2, 8, 9 10, &c., in which W^1 represents the line elevator, in the form of a box, open on both sides, with shoulders on its upper part to sustain the matrices and spacers, and mounted to slide upward and downward on a twisted guide, w, similar to that used in the original machine. The box is raised and lowered by a chain, w^3, passing around guide pulleys and connected to an actuating lever w^6, which is, in turn, controlled by a cam, w^7, as in the original machine.

Preparatory to the transfer of the line from the support G, the elevator box W^1, is lowered, as shown in Fig. 8, to the rear end of the line support G, in position to receive both the matrices and the spacers, as they are delivered horizontally from the latter, by the finger I. After the transfer of the line is effected, the box W^1 rises, as shown in Fig. 9, and continues its upward motion until it reaches the top of the machine where it alines with the side of a stationary box, w^{20}, fixed to the distributing mechanism. This box, w^{20}, has vertical side walls between which the line enters, and it contains in the top, as shown in Figs. 10 and 12, a horizontal bar, w^{22}, toothed horizontally to engage and sustain the matrices, as the line is carried forward by the usual pusher slide, w^2, actuated, as in the machine of the patent, by the lever w^{10}. The side walls of the box, w^{20}, contain downwardly inclined grooves, w^{23}, in their inner faces, to receive the ears of the spacers, which project laterally beyond the matrices, as usual. As the line advances, the ears of the spacers are caused to ride downward in the grooves, w^{23}, whereby the spacers are carried downward and separated from the matrices. The grooves are continued through the box w^{20}, and deliver the ears of the spacers into corresponding grooves in the walls of a receiver or carrier box, W^2, mounted to travel upward and downward on a fixed guide, w^{24}, so that the box may assume alternately the receiving position shown in Figs. 10 to 13, and a delivering position adjacent to the spacer magazine, F, as shown in dotted lines in Fig. 1.

The carrier, W^2, is provided on top with pawls, w^{25}, to retain the spacers therein until the box assumes the delivering position, by which time these pawls will be raised out of engagement with the spacers by contact with the top of the magazine, F. When, therefore, the carrier assumes the delivering position, the spacers slide therefrom, by gravity, into the magazine F. The guide, w^{24}, is curved longitudinally, and is grooved in its side face to receive the three rollers or studs, w^{26}, Figs. 13 and 14. At the upper end the groove is given a peculiar form, as shown in Fig. 13, having a shoulder at the bottom to arrest the lower roller and thereby compel the carrier to assume a proper vertical position. The carrier, W^2, receives motion from a lever, w^{27}, pivoted at its lower end to the main frame, and controlled by a cam, w^{28}, as shown in Figs. 1 and 2, the cam being mounted on the main shaft of the machine, so that the carrier W^2, like the carrier W^1, is raised and lowered during each cycle of operations of the machine; in other words, once for each slug cast.

I believe it to be broadly new to elevate a composed line of matrices and spacers, and thereafter separate the spacers and transfer them to a carrier, by which they are in turn transferred to their magazine or holder.

I also believe it to be new to employ a single turning movement for restoring the matrices and spacebands to the positions they were in in the magazine and before they were rotated in the assembler.

It is manifest that the details of construction may be variously modified.

Having described my invention, what I claim is:—

1. A support for a composed line of matrices and spacers, mounted to turn about a vertical axis, in combination with a support to receive the line from the first named support, mechanism for transferring the line from the first support to the second, and means controlled by the turning motion of the first support, to set the transferring devices in action.

2. In a linotype machine, the assembler E, adapted to support the composed line of matrices and spacers, and mounted to turn through an arc of ninety degrees, in combination with the support, G, adapted to receive the line from the assembler, line delivering devices mounted in the assembler, an actuating device therefor, and means automatically controlled by the turning movement of the assembler, to effect a connection between the line delivering devices and the actuating device.

3. In a linotype machine, the combination of the turning assembler, E, a reciprocating device therein to eject the line of matrices and spacers, a support G, to receive the line therefrom, a mechanically reciprocated arm e^{16}, a dog e^{15} connected with the ejector to engage said arm, a spring to cause the engagement, and a detent e^{19}, controlled by the movement of the assembler, to release the dog and permit its engagement.

4. In a linotype machine, the assembler having the sliding upper portion to sustain the line, the sliding line ejector therein, provided with dog e^{15}, an actuating bar e^{16}, a lever e^{19} to control the dog, and a fixed device, F', to effect the disengagement of said lever and release the dog.

5. In a linotype machine, the turning assembler having a longitudinally movable top portion adapted to sustain the line, a sliding device therein to eject the line, the mechanically actuated operating bar e^{16}, devices for connecting said bar with the line ejecting device, and a handle, e^3, and coöperating devices, whereby it is adapted to serve the double purpose of controlling the assembler and of disengaging the ejector from its actuating mechanism.

6. In a linotype machine, the pivoted assembler with its sliding upper portion and the controlling handle e^3, in combination with the sliding devices therein to eject the line, an actuating device for the ejector, means for connecting the ejector with the actuating device, and means controlled by the handle of the assembler to disengage the ejector.

7. In combination with the turning assembler, a sliding ejector therein to deliver the line, a power actuated arm to move the ejector, and connecting devices between said parts, arranged to be thrown into action by the turning motion of the assembler, and to be automatically thrown out of action as the ejector returns to its normal position.

8. In a linotype machine, in combination with a support for the composed line of matrices and spacers, a line resisting and line delivering finger, I, mounted to slide horizontally and vertically and also mounted to turn about a horizontal axis, in combination with a spring tending to keep it in operative position.

9. In a linotype machine, a horizontally movable line delivering finger, I, mounted on an arm on a horizontal axis, and provided at the lower end with a rocking face, whereby the face is permitted to retain its vertical position, notwithstanding the inclination of the finger.

10. In a linotype machine, the combination of a horizontal slide, a vertical finger connected therewith through a horizontal pivot, a spring tending to maintain the vertical position of the finger, and means whereby the finger is caused to act first as a yielding resistant at the forward end of the matrix line and thereafter as a pusher in rear of the line, to advance the latter.

11. In a linotype machine, a reciprocating member e^{16}, a vertical finger, I, a guide in which said finger slides vertically, said guide connected to the reciprocating member by a horizontal axis, a spring tending to maintain the finger in its upright position, and means for determining the vertical movement of the finger, that it may pass over and fall behind the successive lines.

12. In a linotype machine and in combination with means for delivering the composed line of matrices and spacers thereto, an elevator W^1, a grooved box w^{20} to receive the line and separate the matrices from the spacers, and a spacer carrier W^2, to deliver the spacers to their magazine.

13. In a linotype machine, an elevator for the composed line of matrices and spacers, means for separating the matrices and spacers, and means for delivering the latter in groups to their magazine.

14. In a linotype machine, a spacer magazine near the assembling level, a matrix distributing mechanism at a higher level, means for delivering the composed lines of matrices and spacers to the upper level and there separating the matrices from the spacers, and a carrier for delivering the separated spacers in groups to their magazine.

15. In a linotype machine, the combination of an elevator for the composed lines of matrices and spacers, a distributing mechanism for the matrices, intermediate means for separating the spacers from the elevated line of matrices, a carrier to which the spacers are delivered, and means for reciprocating said carrier between its receiving position and a delivering position, and a magazine to which the spacers are delivered.

16. In a linotype machine, a magazine for the matrices, a distributer overlying the same, means for presenting the composed lines of matrices and spacers adjacent to the distributer, and means for separating the spacers from the matrices and carrying them downward in groups.

17. In a linotype machine, a carrier arranged to travel to and fro, in combination with a grooved guide, w^{24}, having its end formed to compel a vertical position of the carrier, substantially as described.

18. In a linotype machine, a carrier having three studs or rollers thereon, in combination with a grooved guide, w^{24}, having its upper end enlarged and shouldered, as described, to determine the final position of the carrier.

19. In a linotype machine, the combination of an assembling mechanism, a distributing mechanism parallel therewith, a casting mechanism at right angles thereto, means for turning a line of assembled matrices and space bands in one direction for presentation to the casting mechanism, and means for turning the line of matrices and space bands by one operation in the reverse direction, for presentation to the distributing mechanism.

20. In a linotype machine, the combination with an assembler and means to discharge the assembled line from the assembler, of means to turn the assembler, the means for discharging the line being under the control of the means for turning the assembler.

21. In a linotype machine, the combination with an assembler and means to discharge the assembled line from the assembler, of a single lever for turning the assembler and for controlling the discharge of the line therefrom.

22. In a linotype machine, the combination with an assembler and means to discharge the assembled line from the assembler including an actuating bar, of a single lever for turning the assembler and for operatively connecting the actuating bar with the rest of the line discharging means.

23. In a linotype machine, the combination with an assembler and means to discharge the assembled line therefrom, of a single lever adapted to lock the assembler in either of its positions, to turn the assembler and to control the discharge of the line therefrom.

24. In a linotype machine, the combination with an assembler and means to discharge the assembled line from the assembler including an actuating bar, of a single lever for turning the assembler and for operatively connecting with and disconnecting the actuating bar from the rest of the line discharging means.

25. In a linotype machine, the combination with an assembler and means to discharge the assembled line from the assembler including an actuating bar, of a single lever for turning the assembler, said lever being adapted to lock the assembler in either of its positions, and to connect with and disconnect the actuating bar from the rest of the line discharging means.

26. In a linotype machine, the combination of an assembler having sliding parts, a lever to turn the assembler,

an actuating bar, said sliding parts including a spring pawl adapted to engage the actuating bar, and means to disengage the pawl from the actuating bar under the control of the lever.

27. In a linotype machine, the combination of an assembler having sliding parts, a lever to turn the assembler from its receiving to its discharging position and vice versa, an actuating bar, said sliding parts including a spring pawl and a latch normally holding the pawl away from the actuating bar, means to release the pawl from the latch so that it may engage the bar, and means to disengage the pawl from the bar again, both of which means are operated through the lever.

In testimony whereof I hereunto set my hand this ... tieth day of January, 1905, in the presence of two attesting witnesses.

DAVID A. POE.

Witnesses:
ROBERT MEREDITH,
W. WINLITE.