

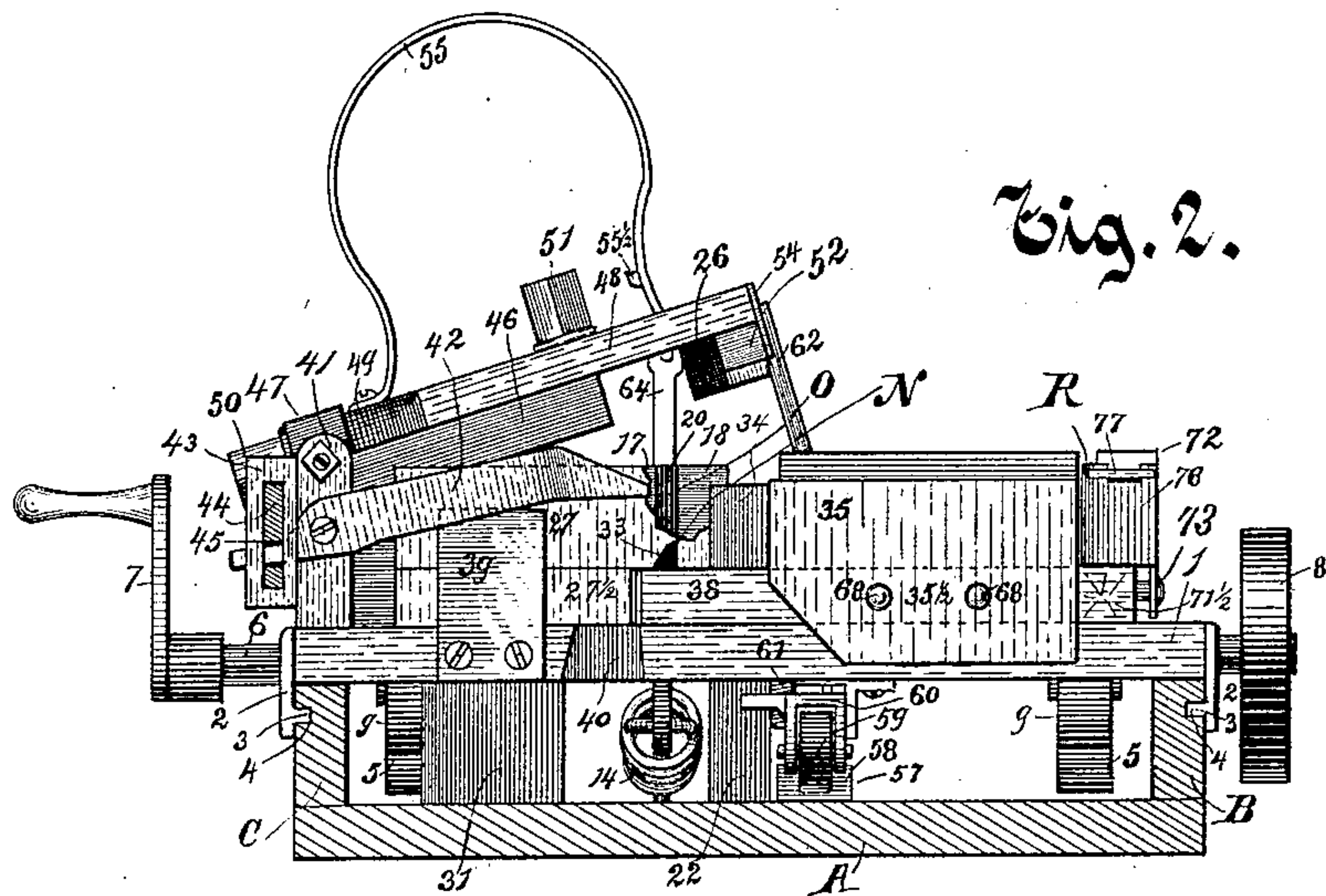
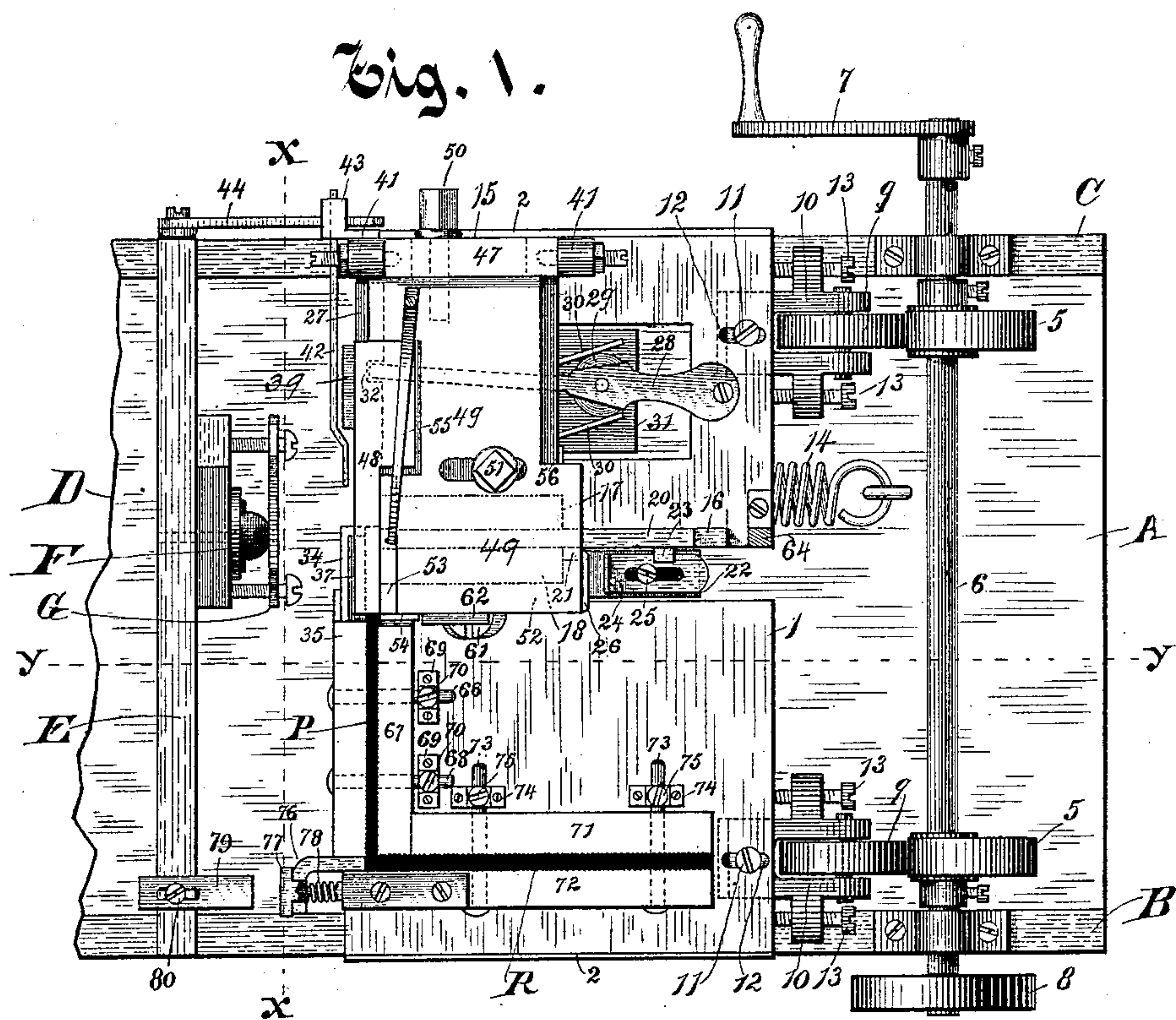
(No Model.)

3 Sheets—Sheet 1.

F. KEEHN.
TYPE FOUNDRY MACHINE.

No. 390,680.

Patented Oct. 9, 1888.



Witnesses.
C. H. Keene,
Anna Faust.

Inventor.
Francis Keehn.
By *Ernst Benedict.*
Attorneys.

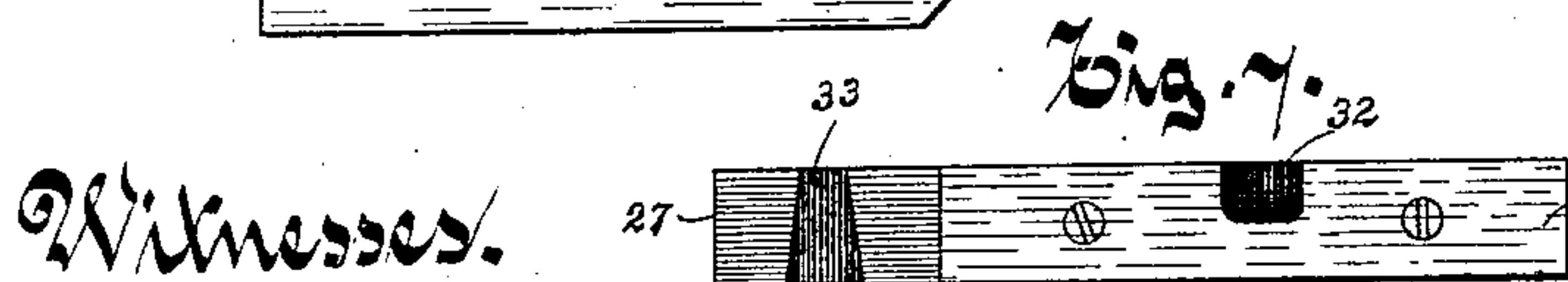
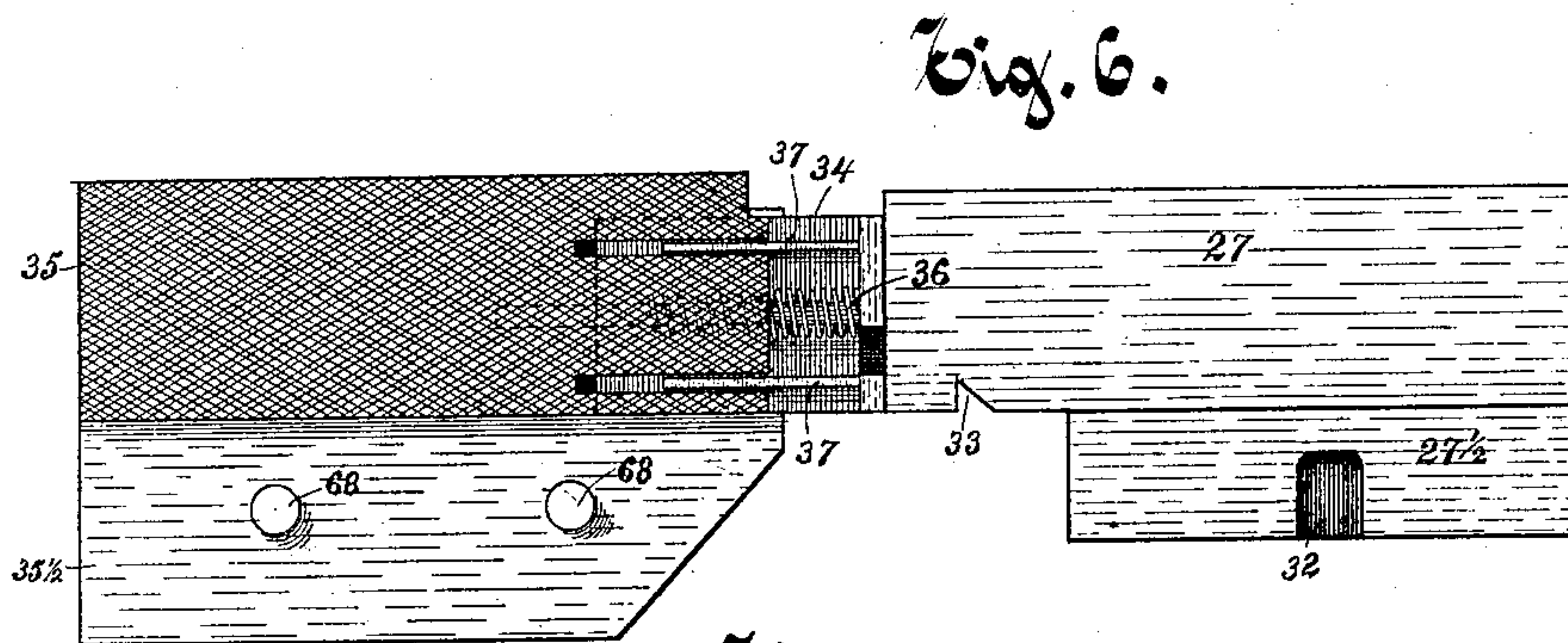
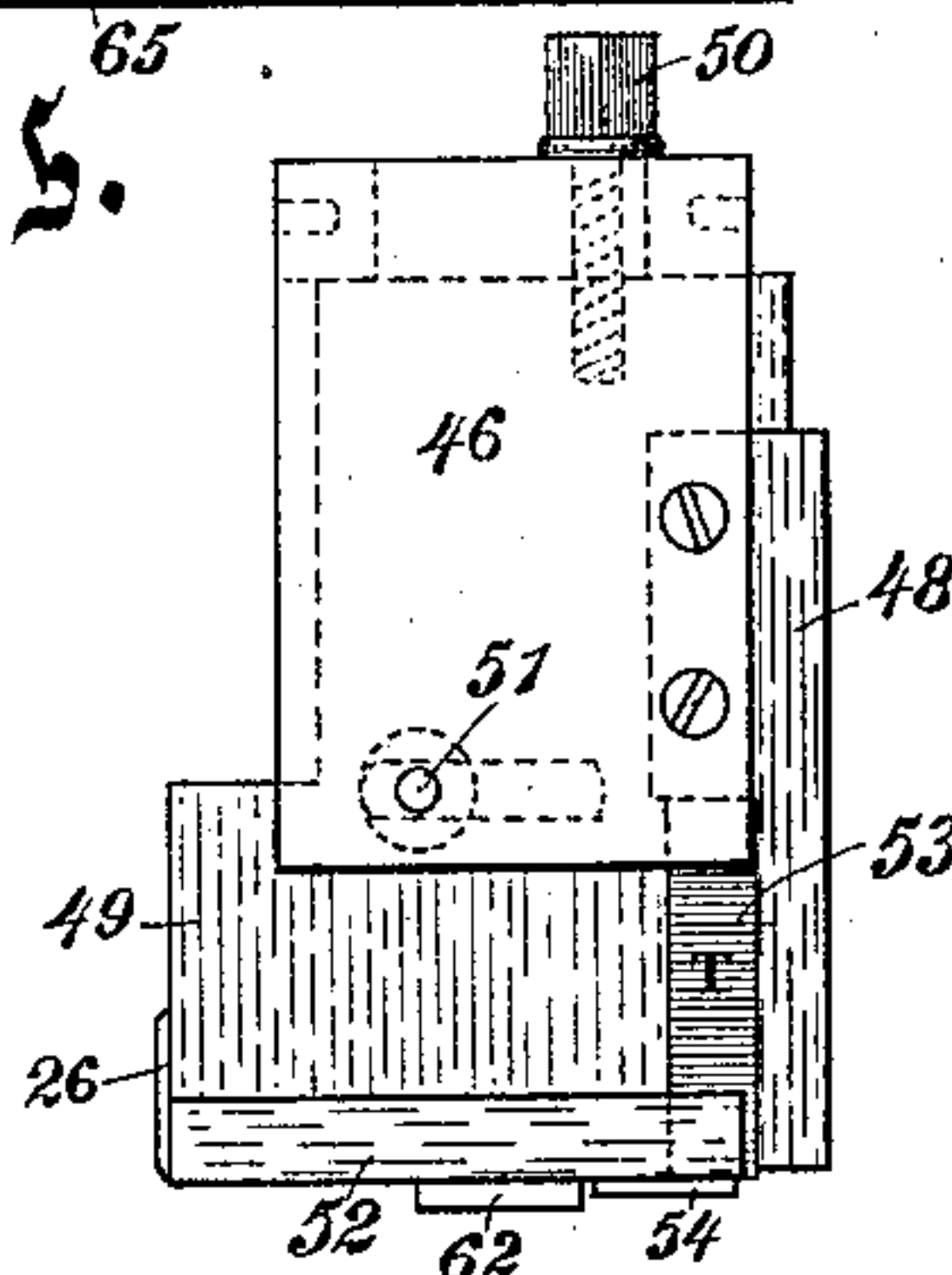
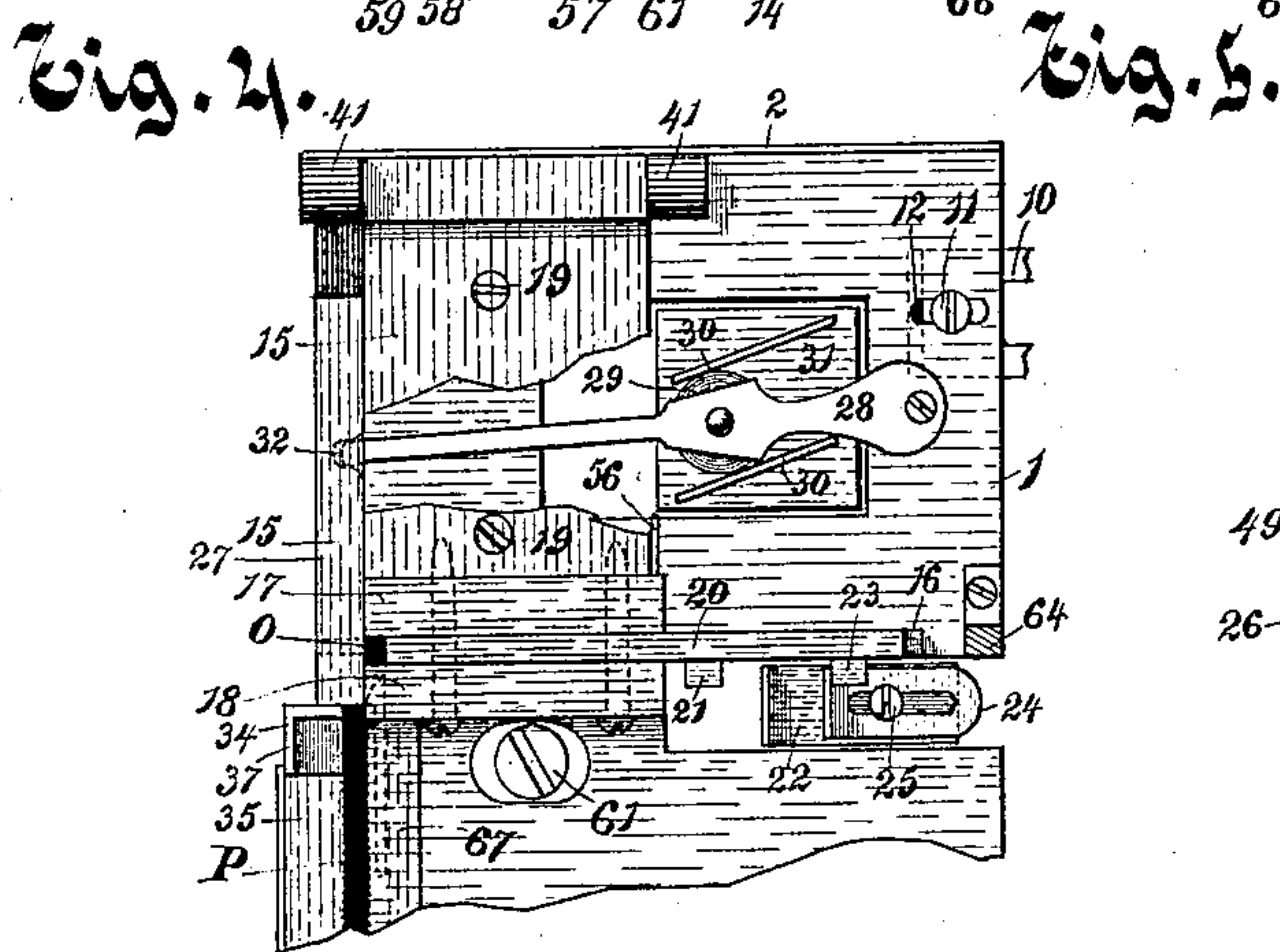
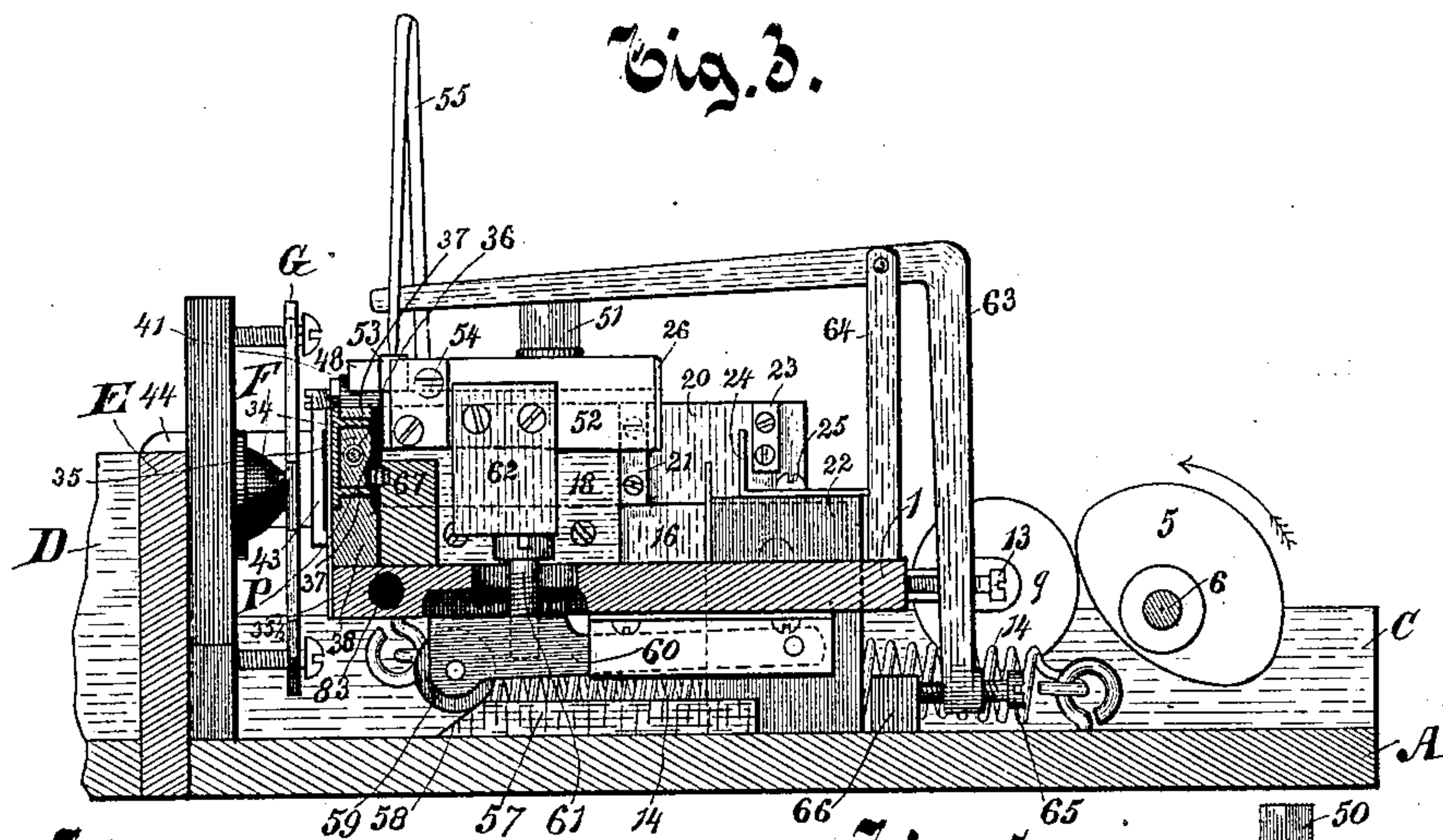
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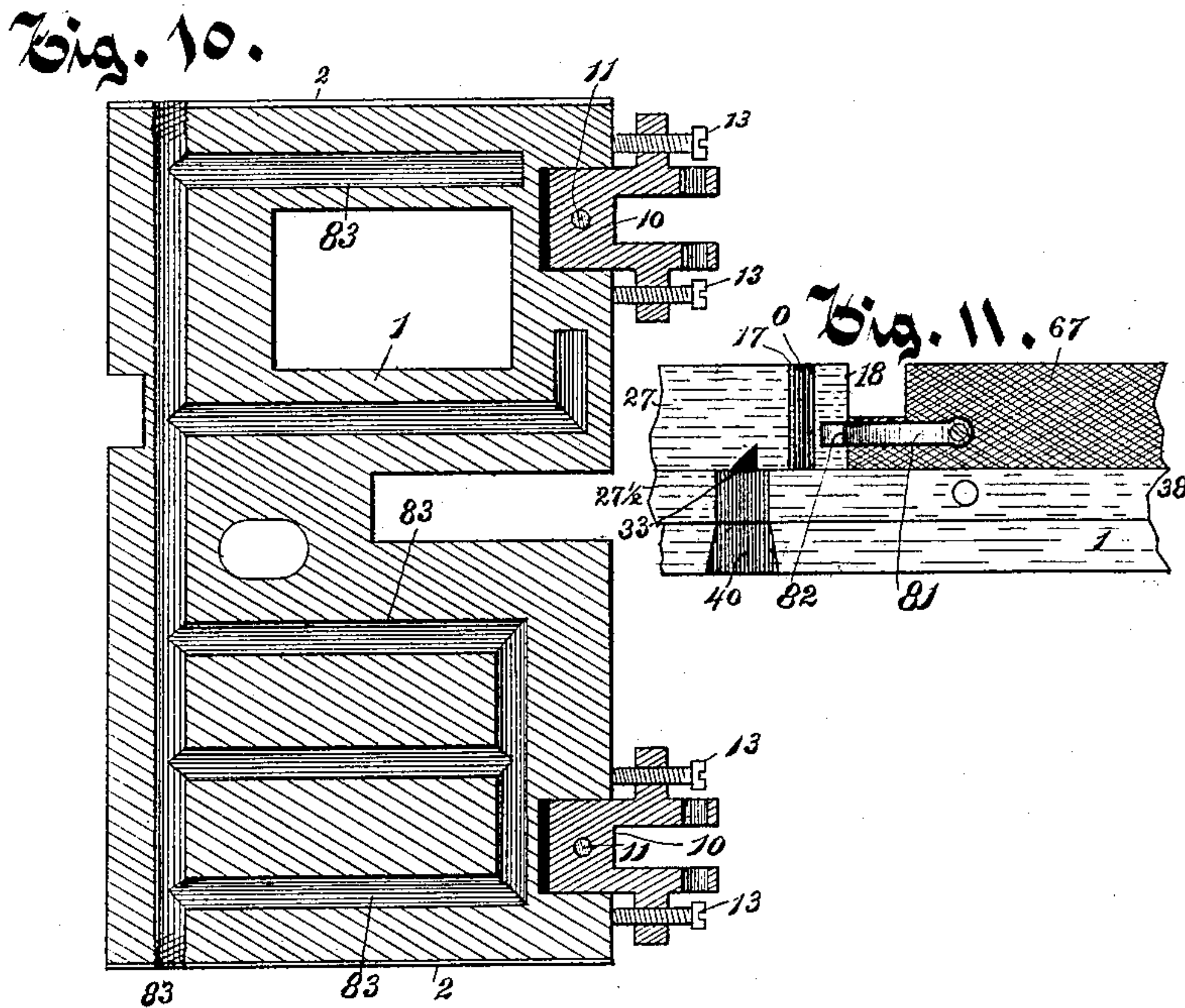
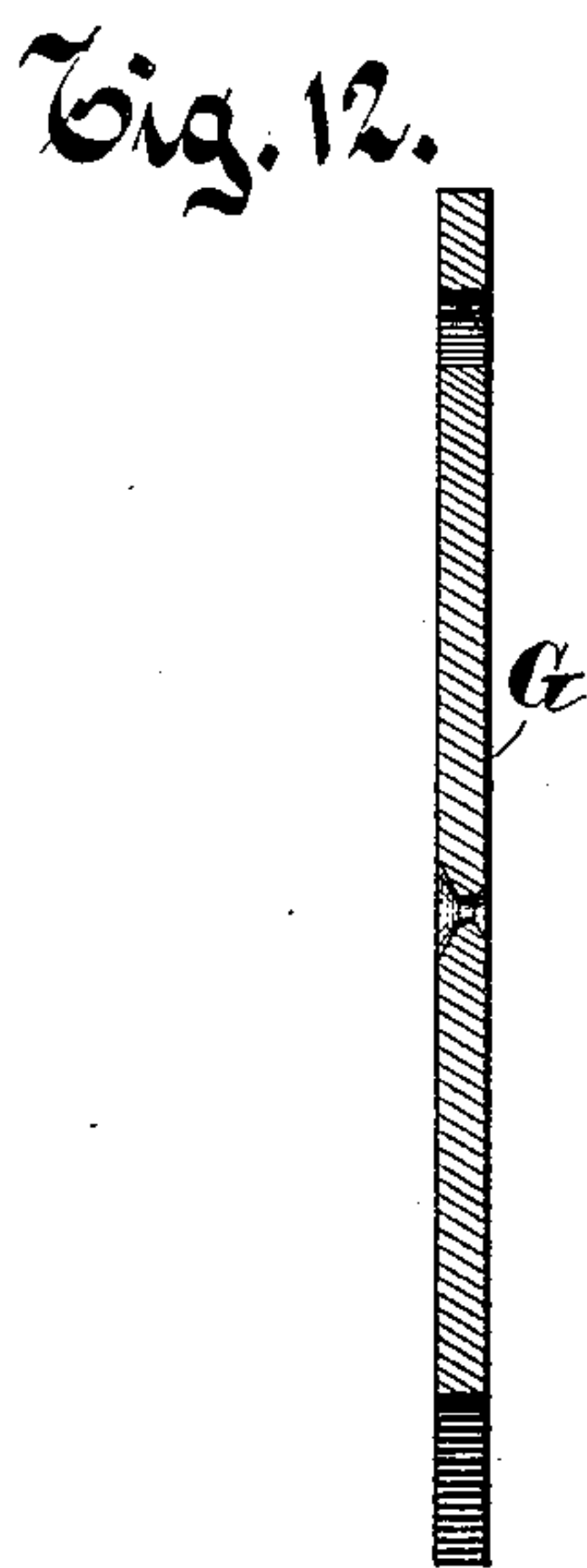
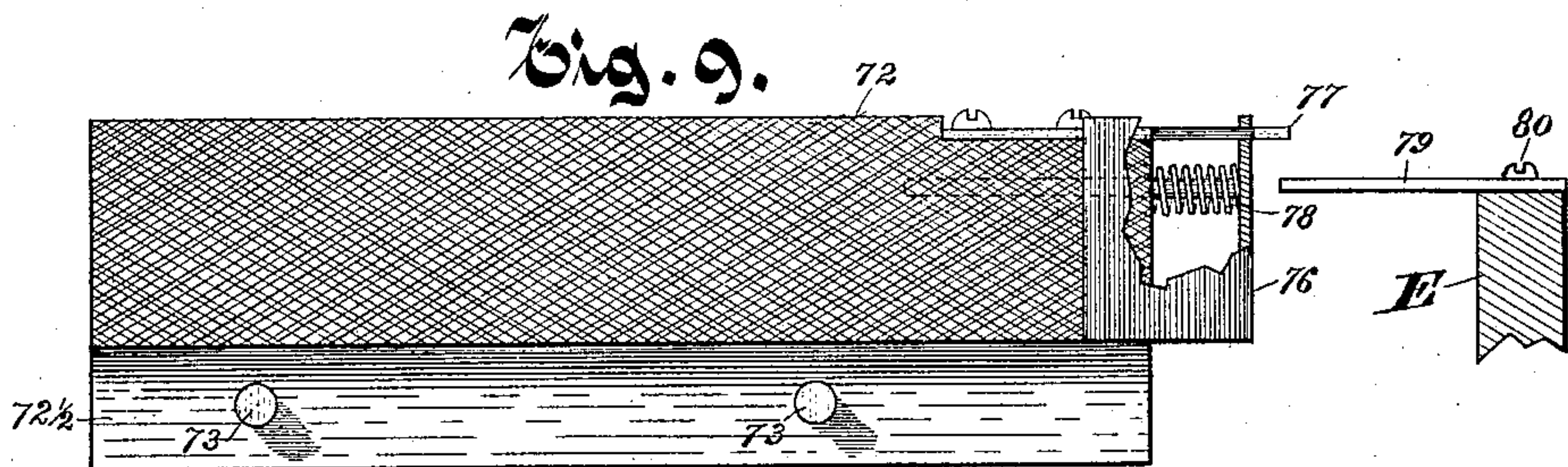
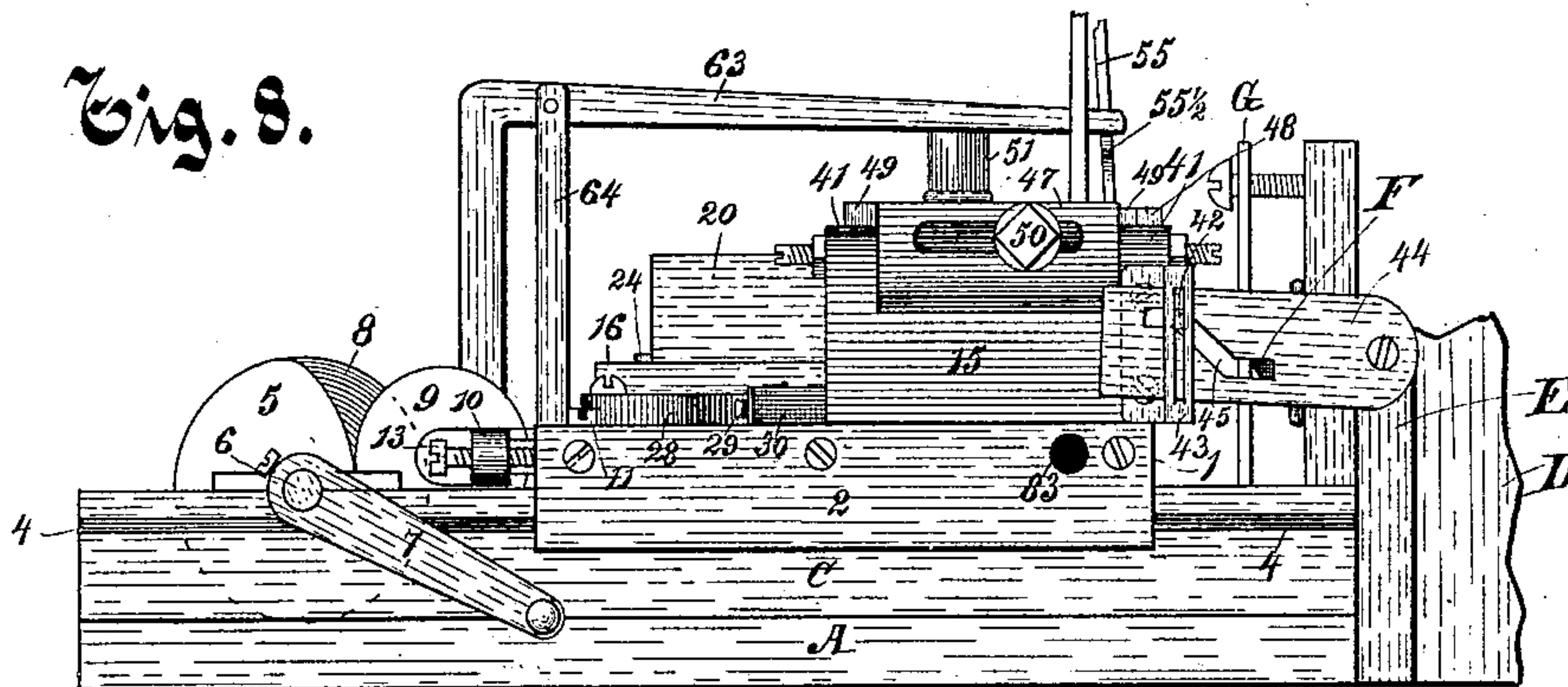
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3 Sheets—Sheet 3.

F. KEEHN.
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A. H. Keeney.
Anna Faust.

Inventor.

Francis Keehn
By Ernst Benedict.
Attorneys.

UNITED STATES PATENT OFFICE.

FRANCIS KEEHN, OF MILWAUKEE, WISCONSIN.

TYPE-FOUNDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 390,680, dated October 9, 1888.

Application filed November 10, 1887. Serial No. 254,762. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS KEEHN, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Type-Founding Machines; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

My newly-invented device (the novel features of which are hereinafter specifically claimed) embodies mechanism whereby type can be more readily and more perfectly molded and more completely finished than is known to have been done by any machine heretofore, the parts of which mechanism are more advantageously located, supported, and held, are more readily adjustable, more easily and harmoniously manipulated, and are less liable to displacement and to wear than are corresponding parts or the parts intended for similar work in other machines.

In the drawings, Figure 1 is a plan of my type-founding machine. Fig. 2 is an end view of my machine as seen from the left on line X X of Fig. 1, a part being broken away to show an interior portion more fully. Fig. 3 is a vertical section and view on line Y Y of Fig. 1. Fig. 4 is a plan of the device for cutting off the sprue and forcing the newly-formed type forward from the mold-chamber and adjacent parts. Fig. 5 is a plan of the under side of the register of the mold. Fig. 6 is an elevation of the inner sides of the movable front plate of the mold and of the other side of the front of the carriage. Fig. 7 is a bottom or edge view of the movable plate shown in Fig. 6. Fig. 8 is an elevation of that side of the machine at the top in Fig. 1. Fig. 9 is an elevation (a part in section and parts being broken away) of the inside of that side of the machine at the bottom in Fig. 1. Fig. 10 is a horizontal central section of the bed or carriage upon which the mold is supported. Fig. 11 is a detail in elevation of parts seen in and existing in connection with parts shown centrally in Fig. 2. Fig. 12 is a central longitudinal cross section of the condenser.

The same letters and figures refer to like parts in all the views.

The solid frame, consisting of the bed-piece A and upwardly-extending longitudinal sides B and C, is rigidly connected to or integral with the reservoir for holding the molten type-metal, and with which reservoir is the pump for forcing the molten metal into the mold, which reservoir and pump are not shown in the drawings, but are understood to be located on that side of the machine broken away at D. A cross-bar, E, is secured to the frame, and the hollow nipple F is affixed thereto, through which nipple the fluid metal is forced into the mold. A metal plate, G, known as the "condenser," is secured movably to the bar E about and partly in front of the nipple F. There is an orifice through the condenser G continuous with the orifice in the nipple, through which the molten metal is forced into the mold. The orifice through this plate is funnel-shaped outwardly, so that when the flow of metal there-through ceases and the metal sets there is a little knob of metal formed on the end of the sprue in this funnel-shaped part of the orifice.

The bed 1 of the carriage rides upon the top of the sides B and C and is secured thereto and guided in its reciprocating movement forward and back by the end pieces or guides, 2 2, secured thereto, one at each side, which guides are provided with the inwardly-projecting ribs or flanges 3 3, which enter and move in the horizontal grooves or channels 4 4 in the outer surfaces of the sides B and C. At the rear of the carriage are two cams, 5 5, rigid on a shaft, 6, which shaft is supported in bearings in the sides B and C of the frame, and is rotated by hand by means of the crank 7 on shaft 6, or by means of power applied by a belt running on the band-wheel 8, rigid on shaft 6. The cams 5 5 bear against the rear of the carriage and are adapted to force it forward.

To overcome friction and facilitate the manipulation of the carriage, two anti-friction wheels, 9 9, are secured to the rear edge of the bed of the carriage, against which wheels the cams 5 5 bear and rotate. The anti-friction wheels 9 9 have their journal-bearings in brackets 10 10, adjustably secured to the bed 1 by means of the set-screws 11 11, passing through slots 12 12 in the bed of the carriage and turning into the brackets 10 10, whereby a slight amount of adjustment forward or backward is

provided for, which may be required in case of wear of the mechanism. The movement of the brackets 10 10 nearer to or farther from the bed of the carriage can be conveniently accomplished and regulated by means of two set-screws, 13 13, in each bracket, turning through ears thereof against the edge of the bed of the carriage.

A coiled-wire spring, 14, is secured at its rear end to the bed of the frame A, and at its front end is attached to the under side of the bed of the carriage 1, and is adapted to draw and hold the carriage yieldingly to the rear. A base-block, 15, is secured removably to the upper surface of the carriage by means of the screws 19 19, Fig. 4, turning through it into the bed of the carriage. Two upright blocks, 17 and 18, having an adjustment strip, 16, between them, are secured to the base-block 15 by means of screws turning through them and through the adjustment strip 16 into the base 15. The adjustment-strip 16 is as thick as the width of the type to be cast, so that the upright blocks 17 and 18 are separated from each other as far as the width of the body of the type to be cast, and these upright blocks form the sides of the mold for the type, and the adjustment-strip forms the bottom of the mold for the bottom end of the type. The blocks 17 and 18 extend upwardly above the adjustment-strip 16 a distance equal to the length of the body of the type to be cast, thereby forming a groove or channel between them above the adjustment-strip 16, in which a sliding body, 20, is fitted and adapted to reciprocate endwise. The sliding body 20 is provided with a lug, 21, which lug is adapted to impinge against the front surface of the standard 22, which standard is affixed to the bed of the frame A, whereby the movement rearwardly of the body 20 with reference to the frame A is limited and controlled, and the movement and relation of the carriage to the body 20 are such that when the body 20 is held against further rearward movement by the standard 22 the carriage is yet permitted to move rearward until when at the rearmost extent of its travel the front edge of the body 20 is in a plane with the front ends or surface of the blocks 17 and 18 and of the base-block 15. Another lug, 23, on the body 20 is adapted to impinge on its front surface against a movable stop, 24, whereby the forward movement of the body 20 with the carriage is arrested.

The stop 24 is secured and made adjustable on the standard 22 by means of a set-screw, 25, turning through a slot in the stop 24 into the standard 22. By this means the stop 24 can be adjusted to control to its proper extent the movement of the body 20 rearwardly with reference to the carriage. A stop, 26, is secured to the adjustable plate of the register, and is adapted to impinge against the rear side of the lug 21 and prevent too great a rearward movement of the body 20. This stop 26, being secured to the adjustable plate 49 of the register, is so located that by the adjustment of the

plate for the reception of the matrix (of any particular size) it is in the proper position to stop the movement rearwardly of the body 20 at the correct place to secure the proper thickness of the body of the type.

A metal plate, 27, constructed of hardened steel, and for convenience of construction preferably made in two parts, 27 and 27 $\frac{1}{2}$, is located and adapted to reciprocate endwise in front of the base-block 15 and partially in front of the blocks 17 and 18 and the adjustment-strip 16 and body 20. This metal plate 27 is reciprocated endwise as the carriage reciprocates forward and back by means of a lever, 28, pivoted at its inner end on the bed of the carriage, which lever is provided with a horizontally-rotating anti-friction wheel, 29, traveling between and bearing against diagonal ways 30, located on a post, 31, projecting upward rigidly from the frame A, the outer end of which lever rests in a recess, 32, provided therefor in the inner side of the plate 27 $\frac{1}{2}$. The plate 27 is provided with a recess or notch, 33, which is somewhat smaller at its inner end than at its outer end, the rear side of which recess is beveled downwardly. This recess is so located in the plate 27 that it comes exactly in front of the aperture in the nipple F at the moment when the molten metal is to be discharged into the chamber of the mold, and the molten metal is discharged through this recess into the mold. In the process of casting a type, as soon as the metal is discharged into the chamber of the mold through this recess 33, and the chamber is completely filled with metal, the carriage is started rearwardly, and at the same moment the plate 27 is forced laterally toward the side, whereby the jet or sprue of metal formed in the recess 33 is cut off clean from the side of the type, and is also at the same moment broken away from the nipple F.

The plate 27 is supported and rides at its rear end on the bed of the carriage and at its front end on a flange, 38, secured to or made integral with the bed of the carriage, and is held in place in front of the base-block 15 by a guard, 39, secured to the front edge of the bed of the carriage. The flange 38 extends at its inner end a little past the adjustment-strip 16, and when the recess 33 is in front of the body 20 this flange 38 forms the bottom of the aperture N, of which the walls of the recess 33 are the sides, through which the molten metal is forced into the mold. There is an aperture, 40, downwardly through the bed of the carriage at a point above which the recess 33 is located when the plate 27 is back against the side of the carriage, through which aperture 40 the sprue is discharged.

Opposite the front end of the metal plate 27 is a reciprocating head-piece, 34, which is supported and reciprocates forward and back in ways in the end of the body of the file 35, the file being secured rigidly in a vertical position laterally on the carriage. This head-piece 34 is held yieldingly up to the end of the

plate 27 by means of the coiled-wire spring 36, inserted around a stem on the head-piece, between the front of the head-piece and the end of the file 35. The head-piece 34 is provided with two guards, 37 37, the inner edges of which are in the plane with the inner surface of the file 35, and are adapted to hold the newly-formed type in position after it is forced from the mold-chamber, as hereinafter described.

At one end, at the side of the carriage, the base-block 15 is provided with flanges 41 41, which project laterally beyond the sides of the base-block 15, and also project upwardly above the surface of the main body of the block 15, as shown in Figs. 1, 2, 4, and 8. To the front edge of one of these flanges 41 a finger, 42, is pivoted, the longer or inner end of which is adapted to oscillate vertically in front of the recess 33. The outer end of the finger 42 oscillates vertically in a guide, 43, secured to the outside of the flange 41. A guide-plate, 44, is pivoted at its outer end to the cross-bar E and extends inwardly through a slot in the guide 43, in which it moves horizontally as the carriage reciprocates forward and back. This guide 44 is provided with a diagonal slot, 45, in which the outer end of the finger-lever 42 is inserted and travels and by which the lever is forced up and down as the carriage reciprocates. This finger-lever 42 is intended and adapted to strike the jet or sprue and knock it out of the recess 33 if it should fail to fall therefrom by gravity, and for this purpose its location and adjustment are such that the inner end of the finger comes down, passing close in front of the recess 33, just after the sprue has been cut from the type by the rearward motion of the plate 27.

The register of the mold is hinged to the base-block 15 by pins through the flanges 41 into the body 46 of the register. The body of the register 46 is provided at its rear end with an upwardly-extending flange, 47, and a bearing, 48, rigidly secured to the top surface thereof near one side, which bearing, when the register is in position on the block 15, projects out laterally over the plate 27 and forwardly in front of but above the upright blocks 17 and 18. An adjustable plate, 49, forming a part of the register, is secured movably to the body 46 by means of the set-screw 50, passing through a slot in the flange 47 and turning into the plate 49, and the set-screw 51, turning through a slot in the plate 49 into the body of the register 46, whereby the plate 49 is adjustable toward or from the bearing 48. The body 46 is adapted, when the register closes down upon the block 15, to fall and fit just within the block 17, and the bar or flange 52, secured to the front end of the adjustable plate 49, is adapted to fall and fit over and just on the outside of the block 18.

The matrix 53, by which is meant the little bar in which the mold of the face of the type is formed *in intaglio*, is intended and adapted to rest at one end on the body of the register

46 and at the other end to rest on the flange 52 and to lie between the side of the projecting end of the bearing 48 and the side of the adjustable plate 49, the location and arrangement of which parts are clearly shown in Fig. 5. A stop, 54, secured to the outer corner of the adjustable plate 49 and projecting in front of the end of the recess for the matrix, prevents the matrix from moving endwise outwardly. A U-shaped spring, 55, is secured at one end, near the rear of the register, to the upper surface of the plate 49, which spring at its front end is provided with a point adapted to enter an indent in the top of the matrix and hold the matrix firmly in position downwardly and up to the stool. A small guard-stop, 56, is secured to the inner edge of the base-block 15 to guide and stay the register in position when closing and closed down upon the base-block 15. For the purpose of raising the matrix off the newly-formed type, I swing the register upward slightly, and as the matrix is located at a considerable distance from the axis of the register the motion raises the matrix nearly perpendicularly off the face of the type, whereby by reason of such nearly-perpendicular movement the breaking or bending of hair-lines in the face of the type is obviated, which injury frequently occurs in other forms of machine where the matrix is raised at a sharp angle.

To accomplish the raising of the matrix and register from the type and its subsequent lowering to position again, I provide a rail or way, 57, secured longitudinally to the upper surface of the bed of the frame A and terminating at its front end in an abrupt incline, 58. A wheel, 59, supported and rotating in one end of the swinging arm 60, the other end of which arm is pivoted to the under side of the bed of the carriage, travels on this way 57 and incline 58 as the carriage reciprocates forward and back. An adjustable post, 61, turns by a screw-thread into the top of the arm 60 near its front end, and the upper end of this post 61 impinges against an arm, 62, secured rigidly to the front end of the plate 49. The location and adjustment of these parts are such that at the instant the carriage starts rearwardly from its extreme front position the wheel 59 commences to travel up the incline 58, thereby raising the register and its supported matrix. To force the register down into its proper position when the carriage comes to the front again should it fail to properly fall by gravity, I provide a bent lever-arm, 63, pivoted near its angle in the top of a standard, 64, which standard is supported on the bed of the carriage. The lower rear end of this lever-arm 63 is provided with a set-screw, 65, turning through it toward the front, the front end of which set screw 65 is adapted to impinge against a lug, 66, rigid on the bed of the frame A, whereby the front or forward arm of the lever 63 is thrown down upon a lug, 55½, on the spring 55, forcing the register down into position. The proper adjustment

of the lever-arm 63 with reference to the register can be secured by turning the set-screw 65.

On the other side of the carriage from the base-block 15, on the upper surface of the bed of the carriage, alongside of the flange 38 and rigidly secured thereto or to the carriage or integral therewith, is an upwardly-extending file, 67, the front surface of which is in a plane with the front surfaces of the base-block 15 and of the blocks 17 and 18. In front of this file 67 and of the flange 38 is located the file 35, which file 35 is supported in position and made adjustable with reference to its distance from the file 67 by means of two pins, 68 68, projecting rigidly inwardly from a guard, 35 $\frac{1}{2}$, rigid on the body of the file 35, through the flange 38 and file 67, and through brackets 69 69, rigid on the bed of the carriage. This file 35 is secured adjustably in its position by means of the set screws 70 70, turning through the brackets 69 69 against the pins 68 68. The inner and opposing abrading surfaces of the files 67 and 35 are intended for taking the burr or any little projections from the sides of the type as the type are forced forward between them after leaving the chamber of the mold. The channel or groove P between the file 67 and file 35 is just equal to the correct thickness of the type being made. Along the side of the carriage, near its edge and rigidly affixed thereto, is an upwardly-projecting file, 71, which file is located alongside of and may be secured to the flange 71 $\frac{1}{2}$, which flange is secured to or is integral with the bed of the carriage, the top of which flange 71 $\frac{1}{2}$ is in a horizontal plane with the top of the flange 38, whereby a level floor is formed for the intersecting and continuous channels P and R, in which the type travels from the time of its leaving the mold-chamber until it is discharged from the machine. The flange 71 $\frac{1}{2}$ is a continuation at right angles therewith of the flange 38 and is constructed similarly thereto. In front of, parallel with, and opposite to the file 71 above the flange 71 $\frac{1}{2}$ is a movable file, 72, which is secured adjustably to the file 71 by means of the pins 73 73, projecting rigidly inwardly from the guard 72 $\frac{1}{2}$, rigid with the file 72, through the flange 71 $\frac{1}{2}$ and file 71, and through the brackets 74 74, which brackets are secured rigidly to the bed of the carriage. This file 72 is adjusted with reference to its distance from the file 71 by means of the set-screws 75 75, turning through the brackets 74 74 against the pins 73 73. This movable file 72 extends forward beyond the front end of the file 71 to and partly alongside of the end of the movable file 35, whereby a continuous channel is formed from between the files 67 and 35 to and between the files 71 and 72. The inner abrading-surfaces of the files 71 and 72 are also adapted for cutting off any burr or little projections from the edges of the type as the types are forced forward between them.

A plunger, 76, is secured to the front end of the file 72, which is adapted to move forward and back, being supported and guided

by the guide-bracket 77, secured rigidly to the file 72. This plunger is forced outwardly as far as permitted by the guide-bracket 77 by the coiled spring 78, inserted around a pin between an outer flange of the plunger 76 and the end of the file 72. An arm, 79, secured adjustably to the cross-bar E by means of a set-screw, 80, turning through a slot in the arm into the cross-bar E, is adapted to impinge against the plunger 76 as the carriage comes forward toward the cross bar E and force the plunger rearwardly, the face of which plunger comes in contact with the type and forces it forward in the channel R between the files 71 and 72.

A small flat spring, 81, provided with a beveled free end and a catch, 82, near its free end, is secured in a recess therefor in the side of the file 67 and end of block 18, which spring is so located and arranged as to permit the type to be forced past the beveled free end and by its catch to hold the type from any backward movement.

As machines for type founding are liable to become heated from the molten metal when type are being cast, I provide a series of passages or ducts, 83 83, through the bed of the carriage so constructed that water may be introduced from one side and be discharged from the other side in a continuous stream, whereby the machine will be kept cool and may so be kept in constant use.

In operating this machine by rotating the shaft 6, the cams 5, bearing against the carriage, force it forward until its front surface (the plate 27) comes in contact with the condenser G on and about the nipple F, forming tight joints between them and establishing a continuous passage from the nipple through the condenser and through the aperture N into the mold-chamber O, and at the moment of contact of the plate 27 with the condenser G the molten fluid is injected from the reservoir into the mold-chamber. Immediately thereupon, by the further rotation of the cams 5 5, their support against the carriage being withdrawn, the carriage is moved rearwardly again by the action of the spring 14. When the carriage is forced forward, as just described, the plate 27 is forced forward endwise in front of the mold-chamber O by the action of the lever 28, and as the carriage is withdrawn rearwardly by the spring 14 the lever 28 forces the plate 27 backward, whereby the sprue is cut from the type and the recess 33 in plate 27 is brought to the rear of the end of the flange 38 and over the aperture 40 in the bed of the carriage, as shown in Fig. 11, whereby the sprue is free to fall by gravity out of the machine, it having been broken away from the nipple at the moment the carriage commenced to move rearwardly, and as the carriage moves rearwardly the lever-finger 42 is thrown down in front of the recess 33 and strikes the projecting end of the sprue, (if the sprue has not already fallen away by gravity,) knocking it out of the recess 33; also, as the carriage moves forward, as before described, the

rear end of the arm 63 strikes the lug 66, throwing the forward end of the lever down on the lug 55 $\frac{1}{2}$ and forcing the register and matrix down firmly in position on the mold, and as the carriage starts rearwardly again the wheel 59 travels up the incline 58, raising the register and matrix (the pressure downwardly of the lever 63 being simultaneously released) from the mold and just above the face of the newly-formed type. The incline 58 is quite abrupt, so that the matrix is raised quickly on very slight movement of the carriage rearwardly; also, as the carriage is forced forwardly the sliding body 20 is caught by the adjustable stop 24 and held until, as the carriage moves forward away from it, the stop 26 is brought back against the lug 21, thereby opening the mold-chamber O at the end of the body 20. The mold-chamber is always of a proper width for forming the body of the intended type, as the sliding body 20 is caught and held by the stop 26, which is always in the proper relative position, being secured to the adjustable plate 49 of the register, which is necessarily adjusted to the matrix being used. As the carriage moves rearwardly, the lug 21 impinges against the front of the standard 22, forcing the sliding body 20 forward (as the carriage moves rearwardly) through the mold-chamber O and pushing the newly-formed type therefrom against the guards 37 37 of the head-piece 34. Then as the carriage moves forward again the plate 27 is thrown forward against the type and carries it along into the channel P and away from in front of the chamber O.

It will be understood that as new type are formed and pushed into the channel P each succeeding type is thereafter intermittently pushed forward by the plate 27, forcing its predecessor forward through the channel P into the channel R, wherein the type are also forced forward intermittently at each reciprocation of the carriage by the plunger 76. By the passage of the type through the two channels P and R, the walls of which are roughened like files, the burr and any other roughnesses are removed from the body of the type. A matrix, 53, is of course required for each particular letter, and the body of this matrix is made of the proper width laterally to adapt it to the desired thickness of the body of the type to be cast, and such matrix is secured and held in the register between the bearing 48 and the plate 49, the plate 49 being always adjusted against and with reference to the matrix being used.

Type of different sizes, as pica and brevier, can be founded in this machine by the use of a proper mold therefor, it being only necessary to remove the block 15 and the parts attached thereto from the carriage by means of the screws 19 19 and to substitute therefor another block containing a mold-chamber of the proper size.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a type-founding machine having a mold-chamber, two stationary blocks, 17 and 18, forming two sides of the chamber, a stationary strip, 16, forming the bottom of the mold-chamber, a sliding block, 20, serving alternately as a side of the mold-chamber and as a plunger to force the type from the mold, and a reciprocating plate, 27, provided with a jet-receiving recess, 33, such plate serving alternately as one side of the mold-chamber and as a plunger to force the type away from before the mold chamber, substantially as described.

2. In a type-founding machine, a sliding body, 20, fitted and adapted to reciprocate endwise between two blocks, 17 and 18, forming sides of the mold-chamber, and two lugs, 21 and 23, on said body, all located and supported on a movable carriage, in combination with a standard, 22, affixed to the carriage-supporting frame, and an adjustable stop, 24, on the standard 22, against which standard and stop said lugs are adapted to impinge, all substantially as described.

3. In a type-founding machine, a movable plate, 27, located and supported and adapted to reciprocate in front of the blocks 17 and 18, forming sides of the mold-chamber, and a lever, 28, pivoted on the bed of the carriage, which lever centrally is guided by and travels between diagonal ways, said lever being adapted to reciprocate the slide 27, all supported on the traveling carriage, in combination with a post, 31, rigid on the carriage-supporting frame, and diagonal ways 30 on said post, substantially as described.

4. In a type-founding machine, a movable slide, 27, supported and caused to reciprocate in front of and against the blocks 17 and 18, forming the sides of the mold-chamber, and in said slide a recess, 33, having a downwardly-beveled rear side and a front cutting-edge, substantially as described.

5. In a type-founding machine, a lever-finger, 42, pivoted on a block affixed to the carriage, one end of which lever-finger oscillates in front of and near to the recess 33 in the plate 27, through which the molten metal is injected into the mold-chamber, in combination with a guide-plate, 44, secured to a cross-bar of the frame of the machine, said guide-plate being provided with a diagonal slot, 45, in which the outer end of the lever-finger 42 is received and guided, substantially as described.

6. In a type-founding machine, a matrix-holding register hinged to a permanent part of the carriage and comprising a body part, 46, a thereto-affixed bearing, 48, a movable plate, 49, adjustably secured to the body part 46, and a therein-formed recess for the reception of the matrix 53, substantially as described.

7. In a type-founding machine, the combination of a therein-pivoted register-body, 46, a thereto-affixed bearing, 48, an adjustable plate, 49, a thereto-attached spring, 55, and a therein-held matrix, 53, substantially as described.

8. In a type-founding machine, a register-body, 46, a thereto-adjustably-secured plate, 49, and a stop, 26, affixed to the outer corner of the plate 49, in combination with a sliding body, 20, and a lug, 21, thereon, substantially as described.
9. In a type-founding machine, a standard, 22, affixed to the frame A, and an adjustable stop, 24, thereon, in combination with a sliding body, 20, supported on the carriage and provided with lugs 21 and 23, substantially as described.
10. In a type-founding machine, a swinging register carrying the matrix of the mold and supported on a reciprocating carriage, in combination with a lever, 63, pivoted on the carriage, and a lug, 66, on the frame, against which one arm of the lever impinges, forcing down the matrix, substantially as described.
11. In a type-founding machine, a bar, 57, fixed to the upper surface of the frame and provided with an abruptly-inclined front end, 58, and a thereon-traveling wheel, 59, supported and rotating in an arm, 60, pivoted to the mold-supporting carriage, in combination with a post, 61, in the arm 60 and a swinging register provided with an arm, 62, adapted to impinge against the post 61, substantially as described.
12. In a type-founding machine, a traveling carriage and a thereto-pivoted swinging lever, 42, in combination with an arm, 44, pivoted to the frame and extending through and traveling in a slotted guide on the carriage, which arm 44 is provided with a diagonal slot, in which one arm of the lever 42 is received and travels, substantially as described.
13. In a type-founding machine, two upright blocks, 17 and 18, a sliding body, 20, and a movable plate, 27, forming the sides of the

mold-chamber, in combination with two files, 67 and 35, at a distance apart, the file 35 including as a part thereof the reciprocating head-piece 34 and its guards 37 37, which files, so located and constructed, with the end of block 18, form a continuous groove from the mold-chamber, intermittently open by the withdrawal rearwardly of plate 27 for the automatic travel of the type, substantially as described.

14. The blocks 17 and 18, sliding body 20, and reciprocating plate 27, forming the side of a mold-chamber, and the opposing files 35 and 67 and 71 and 72, all located and supported on the reciprocating bed 1 of a type-founding machine, in combination with means for actuating plate 27, operated by the reciprocating bed, and with plunger 76, whereby the type are forced out of the mold and through the groove between the files, substantially as described.

15. In a type founding machine, a movable carriage having two files, 71 and 72, and flange 71½, in combination with a plunger, 76, supported by guide-bracket 77, secured to file 72, and actuated by spring 78, and the arm 79, secured to the frame of the machine, substantially as described.

16. The combination of the block 18, the file 67, and flange 38 with the file 35, secured at a distance from and opposite to the file 67, the thereto-attached reciprocating head-piece 34, provided with guards 37 37, and the reciprocating plate 27, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS KEEHN.

Witnesses:

C. T. BENEDICT,
C. H. KEENEY.