

(No Model.)

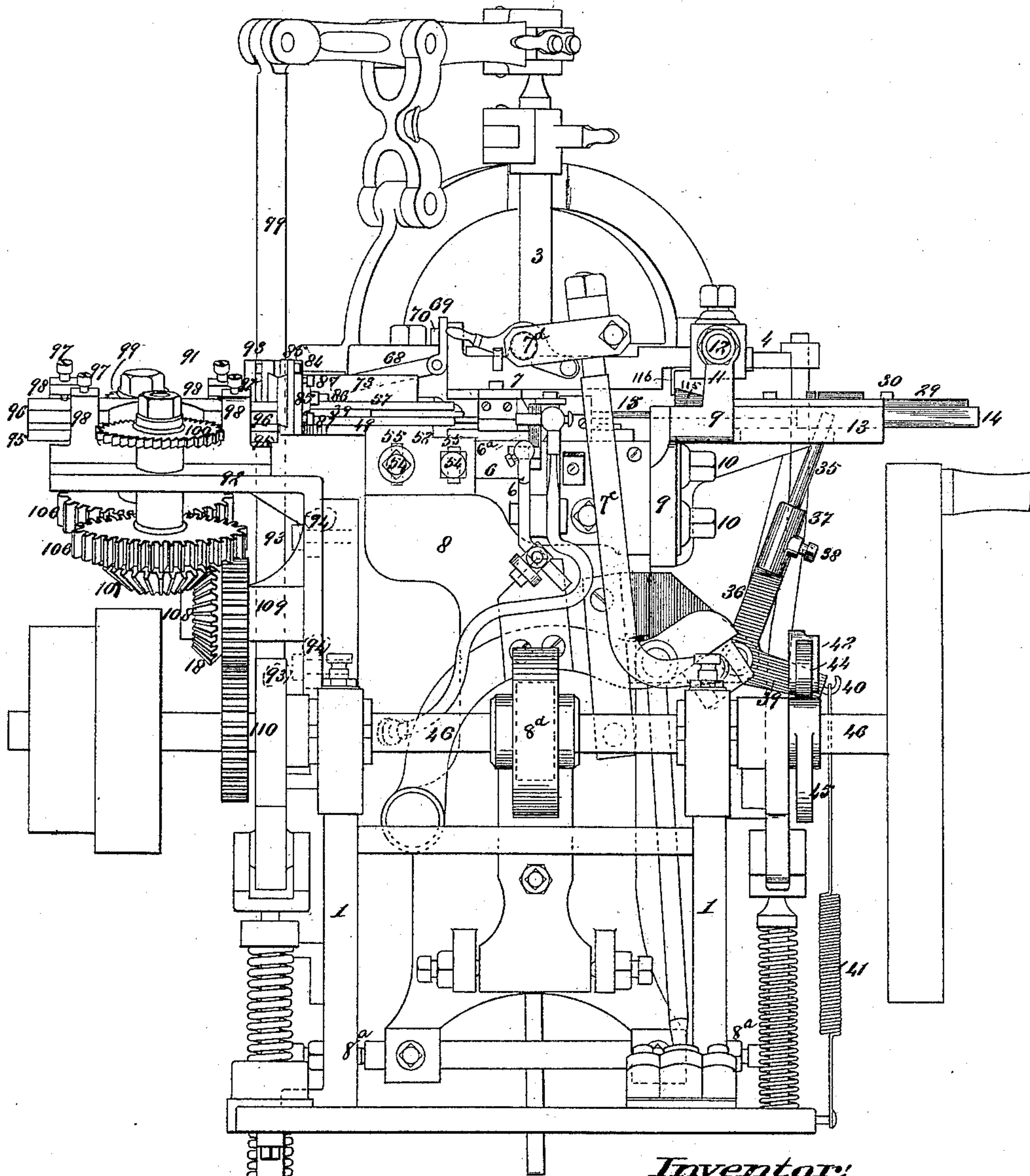
4 Sheets—Sheet 1.

J. G. PAVYER.
MACHINE FOR MAKING TYPE.

No. 413,087.

Patented Oct. 15, 1889.

Fig. I.



Attest,
C. Arthur.
H. S. Knight.

Inventor,

James G. Pavyer.

By Knight Bros.

Attys.

(No Model.)

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Fig. II.

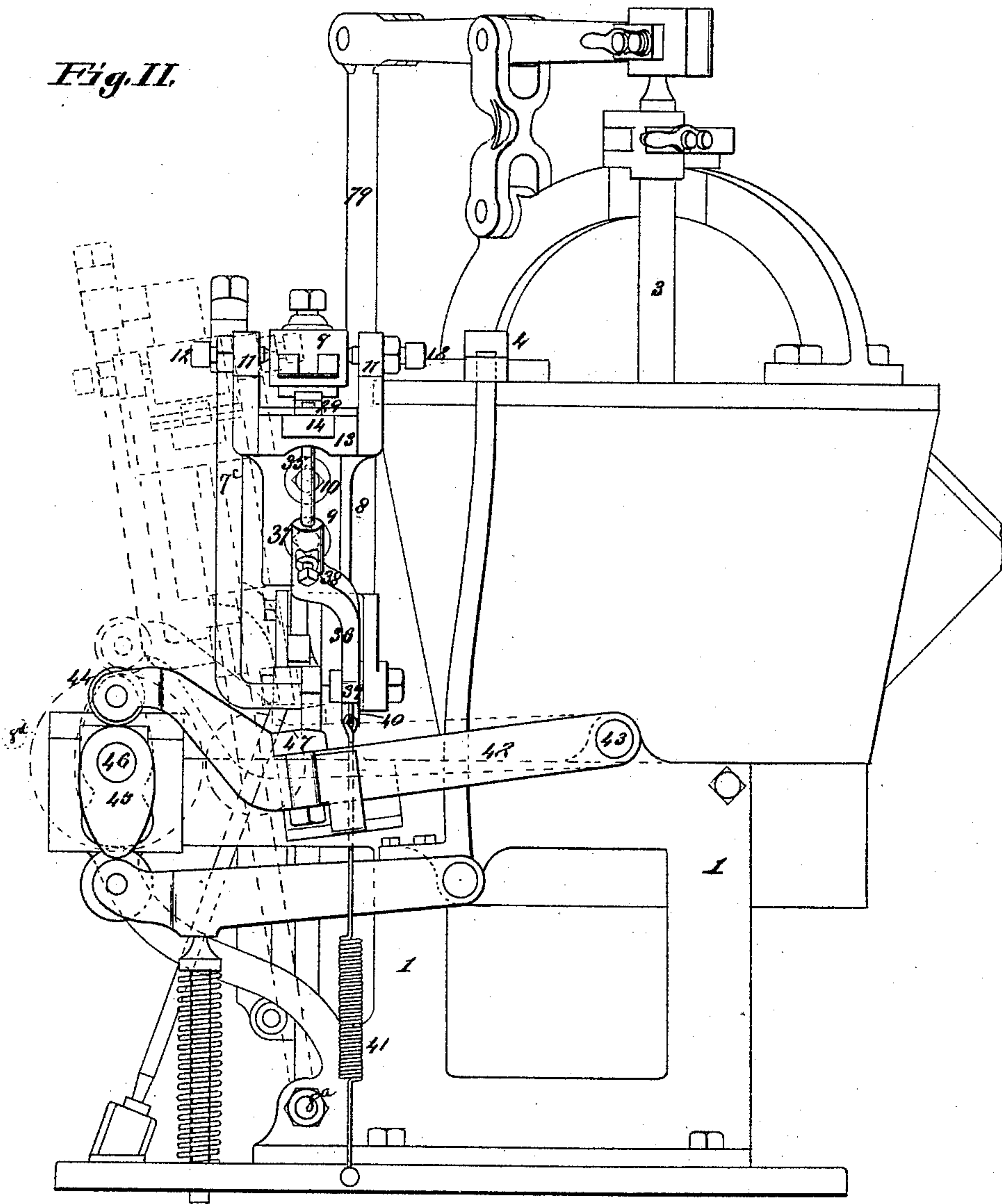


Fig. III.

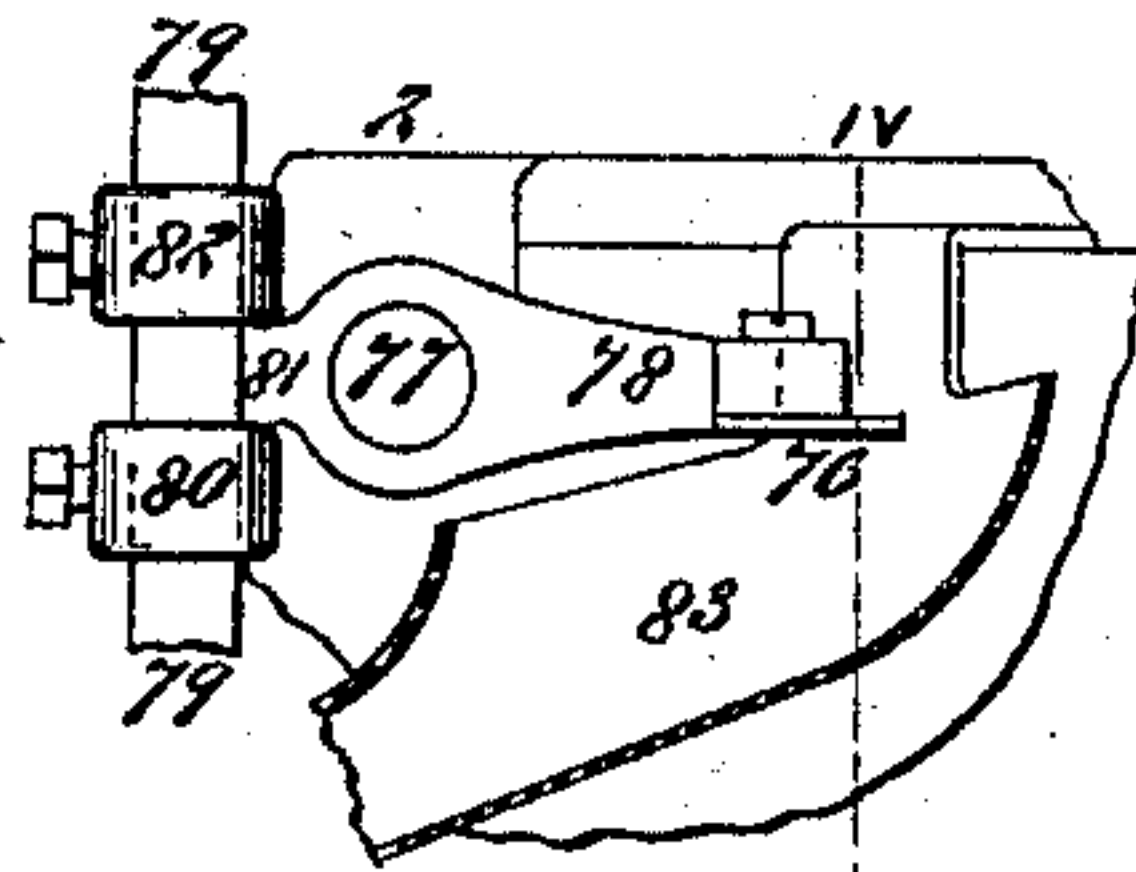
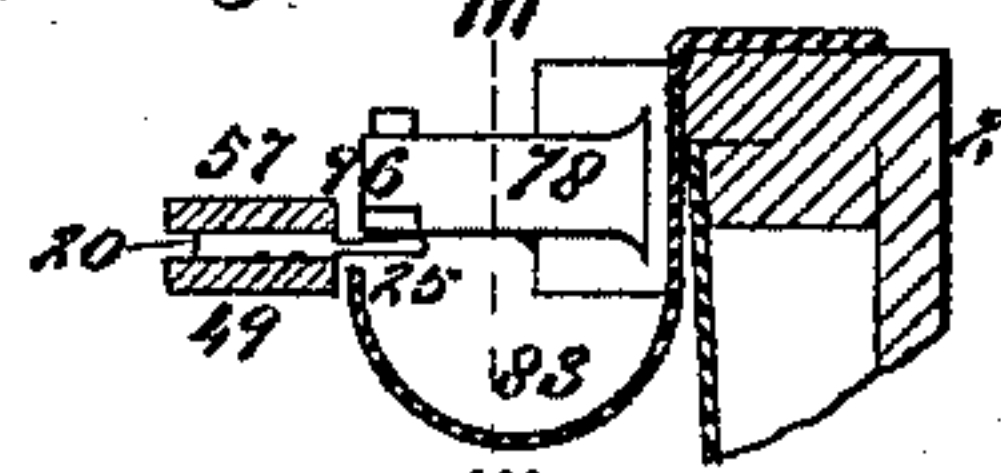


Fig. IV.



Inventor,

Attest,
E. Arthur
H. S. Knight

James G. Pavyer.

By Knight & Bro.
Atty.

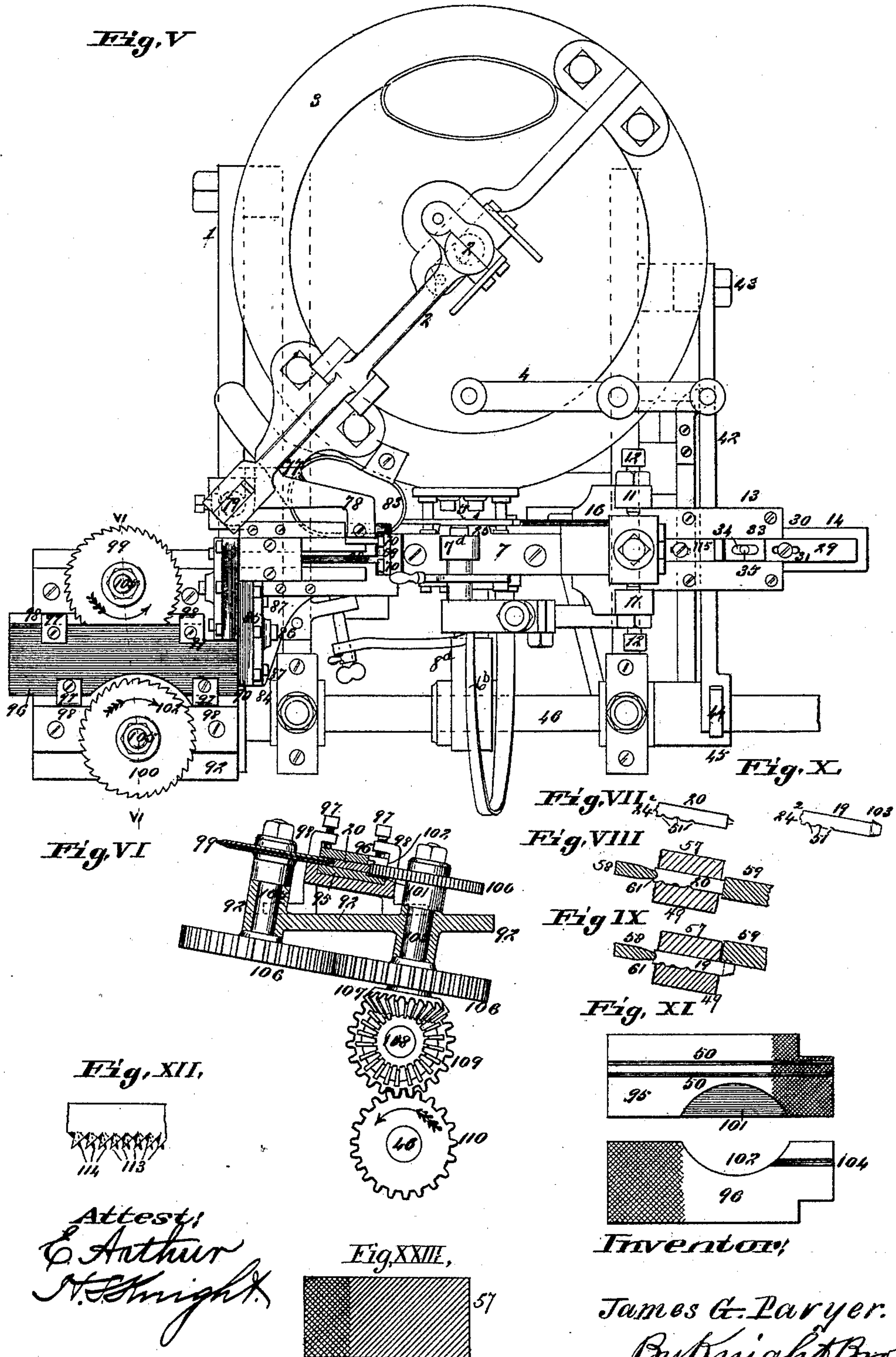
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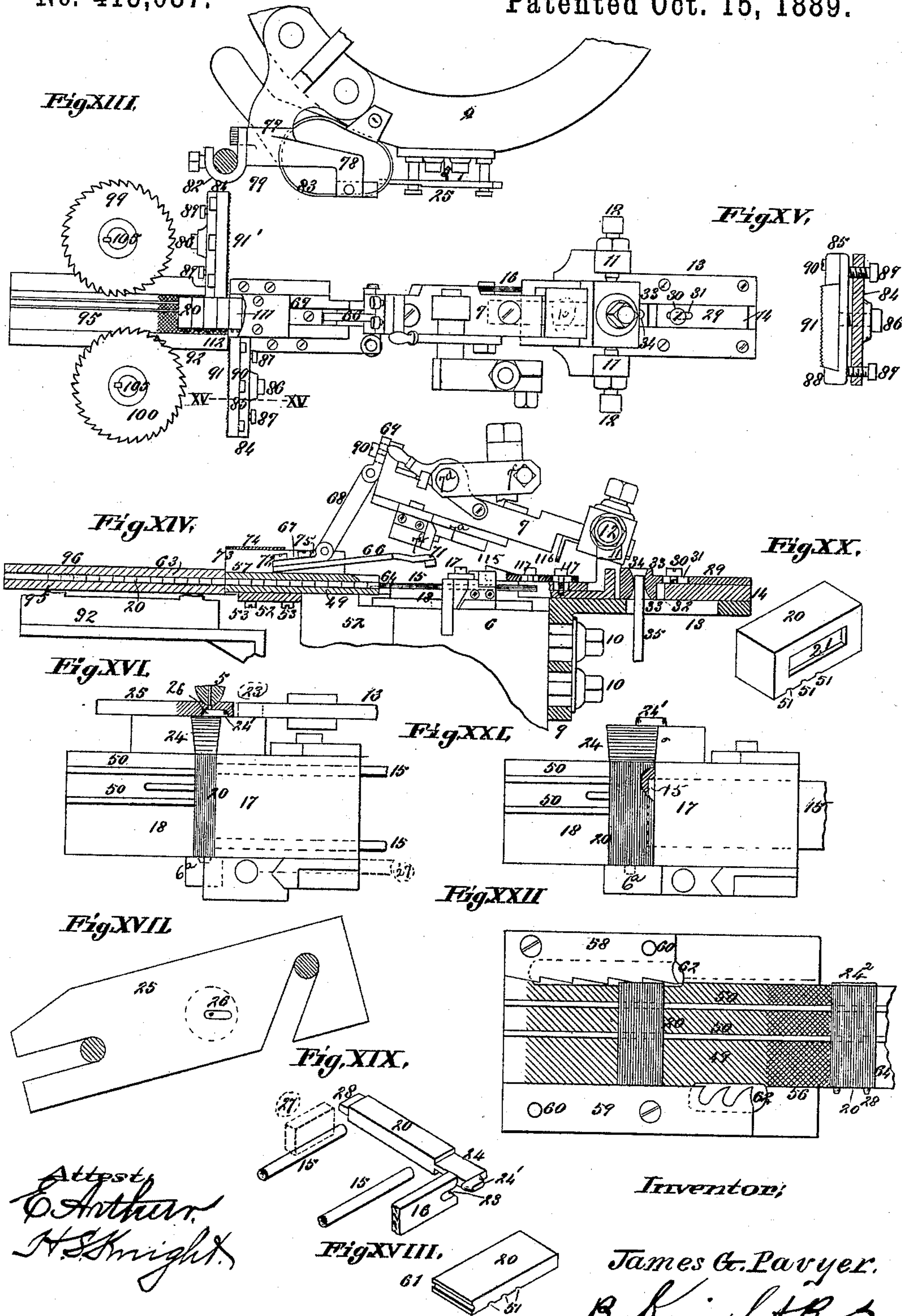
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Attest
C. Arthur
H. Knight.

Inventor;

James G. Pavyer.
By Knight Bros.
Attys.

UNITED STATES PATENT OFFICE.

JAMES G. PAVYER, OF ST. LOUIS, MISSOURI.

MACHINE FOR MAKING TYPE.

SPECIFICATION forming part of Letters Patent No. 413,087, dated October 15, 1889.

Application filed March 14, 1889. Serial No. 303,301. (No model.)

To all whom it may concern:

Be it known that I, JAMES G. PAVYER, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Machines for Making Type, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 This is a machine for casting and finishing type and quads ready for use.

The novelties cannot be briefly stated. They will be defined in the claims.

Figure I is a front elevation of the machine 15 in position for casting the type. Fig. II is a side elevation of the machine with the tilting frame and appendages, indicated in full lines in casting position and in broken lines in the finishing position. Fig. III is a detail 20 vertical section showing the breaker in front elevation. Fig. IV is a vertical section at IV IV, Fig. III. Fig. V is a plan with parts in the position shown in Fig. I. Fig. VI is a transverse vertical section at VI VI, Fig. V. 25 Fig. VII is an edge view of an unfinished quad. Fig. VIII is a detail vertical section showing a quad passing between revolving cutters whose position and form are indicated by part sections. Fig. IX is a detail vertical 30 section showing type passing by revolving cutters. Fig. X is an edge view of an unfinished type. Fig. XI is a view of the working-faces of the dressing-plates. Fig. XII is an enlarged detail edge view of a dressing-plate, 35 illustrating the manner of cutting the teeth thereon. Fig. XIII is a detail top view of the machine in discharging position with parts removed and parts broken away, the view agreeing with the broken lines in Fig. II. 40 Fig. XIV is a detail side view of the machine in finishing position, with parts removed and parts broken away. Fig. XV is a transverse vertical section at XV XV, Fig. XIII. Fig. XVI is an enlarged detail view of the bottom 45 half of the mold, showing the nipple and the nipple-plate in horizontal section. Fig. XVII is an enlarged vertical longitudinal section at XVII XVII, Fig. XIII. Fig. XVIII is an enlarged perspective view of a finished quad. 50 Fig. XIX is an enlarged perspective view of an unfinished type. Fig. XX is a perspective view of large recessed quad. Fig. XXI

is a top view of lower part of the type-mold, showing manner of casting recessed quad. Fig. XXII shows fixed cutters in place of ro- 55 tary cutters for dressing the ends of a quad or lower end of a type. Fig. XXIII is a face view of the top plate 57.

No novelty is claimed in the main frame 1, the melting-pot 2, the jet-pump 3, the choker 60 4, the jet-nipple 5, nor in the mold-blocks 6 and 7 or the vibrating plates 8 carrying them, although novel attachments are made to the mold-blocks and vibrating plate. Nor is any novelty claimed in the actuating devices of 65 the vibrating plate or movable mold-block, or of the matrix, the jet-pump, or the choker. The lower half-mold is composed of a bottom plate 18 and side 17, while the upper or movable half-mold has a top plate 7^a and an end 70 plate 7^b, which form, respectively, the bottom, sides, and top of the mold when closed together, as seen in Fig. I. The matrix forms one end of the mold, while at the other end is the opening for the jet or sprue 24. The up- 75 per mold-block is thrown up and down by an arm 7^c, whose lower end is hinged to a fixed point, and whose upper end is hinged to the upper mold 7, at 7^d. The lifting of the upper mold-block is caused by the swinging forward 80 of the vibrating plate 8, or vice versa. The device is an old one. The vibrating plate 8 is pushed inward by the cam 8^a on the main shaft 46, and it is thrown outward by means of a spring. (Not seen.) This, like the means of 85 lifting and forcing down the upper mold-box, is an old device. The matrix 6^a is forced into the casting position (as seen in Figs. I, V, XVI, and XXI) by a spring 6^b, and its upper end is thrown directly outward from the 90 mold to draw it from the letter upon the newly-cast type by the upper end of a lever 6^c, which is pressed upon the lower end of the matrix by the outer movement of the vibrating plate 8, the matrix tilting on a rib 95 (upon the vibrating plate) between its upper end and the lever-bearing. This is an old device. The pivots 8^a, on which the vibrating plate 8 oscillates, are shown in Figs. I and II. In Fig. XIII the side 17 of the lower mold 100 would not show, and the pusher is shown in flat form in dotted lines, as seen in Fig. XXI.

9 is a bracket attached to the vibrating plate 8 by screws 10, and carrying the arms

11, in which the center screws 12 have bearing. The center screws form the pivots on which the upper mold-block 7 vibrates, this mold-block being actuated by the usual means. The bracket has a horizontal extension 13, forming the guide to a slide 14, to which are attached the pushers 15 and 16. The pushers 15 may properly be round steel wires. They pass through the side 17 of the lower type-mold 18, and as the slide moves forward push the type or quad from the mold. Pushers of the described form are shown in Figs. XVI and XIX. In Fig. XXI a single pusher of a flat form is shown passing through the side 17 of the mold. This form is used when casting types 19 or quads 20 with a recess 21 in the side, in such case the end of the pusher 15 being allowed to project into the mold, as seen. Where the process is the same for types or quads, the word "type" will generally be used in the description. Where the round pushers 15 are used, they do not ordinarily project into the type-space of the mold, so that they take no hold of the types. Some provision is therefore made to prevent the types from rolling as they are pushed from the mold. This device is shown the most clearly in Figs. XVI, XVII, and XIX, and will now be described. The pusher rod or bar 16 is attached to the slide 14 and works clear of the mold upon its inner side. The pusher-bar 16 is slotted at 23 to engage a projection 24' upon the end of the jet 24. This projection 24' has heretofore been made round, being formed in a round recess in the nipple-plate 25. The recess 26 in this case is elongated to make a projection of the required form to engage in the slot 23 and prevent the rolling of the types. (See Figs. XVII.)

At 27, Fig. XVII, is shown in broken lines the front end of a pusher which is secured to the slide 14, and which passes between the front of the mold and the matrix when the latter is moved away from the mold. This pusher in a type would engage against the letter 28, and in a quad would engage a projection 28 in place of the letter. This pusher 27 is not essential, but may be used with large types. The slide 14 has a longitudinally-adjustable piece 29 secured to the slide by a screw 30, which passes through a slot 31 in the piece 29 and screws into the slide. The slide has an aperture 32, partly filled by the head 33 of the piece 29. The head 33 has a hole 34, enlarged longitudinally at top and bottom, into which extends the rod 35, which forms part of the upright arm of a bell-crank lever 36. The rod 35 fits in a socket 37, and is held in position by a set-screw 38, so as to be vertically adjustable. The horizontal arm 39 of the bell-crank lever carries a hook or eye 40, with which engages the upper end of a spring 41, whose office is to draw down the horizontal arm 39, and thus draw back the slide 14 into the position seen in Figs. I, II, V, XIII, and XIV.

42 is a lever fulcrumed to the main frame at 43 and carrying an anti-friction roller 44, which bears upon a cam 45 upon the main shaft 46. The lever 42 has a block 47 secured to the lever by a vertically-adjusting screw 48. The construction is such that when the mold is in its forward position the block 47 is beneath the horizontal arm 39 of the bell-crank lever, and as the cam 45 lifts the lever 42 the horizontal arm 39 is lifted by the lever 42 and the slide 14 is pushed forward, the pushers 15 and 16 carrying the type from the mold along the top of the plate 49, which is in line with the bottom of the mold, so that the type slides without impediment from the mold onto the plate 49. The top of the lower mold 18 has ribs 50, which form the grooves 51 in the types, and two of these ribs are carried along the top of the plate 49 and form guides for the types, preventing their end-wise movement. The plate 49 is secured by a vertically-adjustable bracket 52 to the lower mold-block 6 and the vibrating plate 8, the bracket being attached to the plate 49 by screws 53 and to the mold-block 6 by screws 54, which pass through vertical slots 55 in the bracket and screw into the said mold-block and vibrating plate. (See Figs. I and XIV.) The plate 49 has intersecting file-teeth cut upon its upper face, as seen at 56, Fig. XXII, to dress off the under side of the types as they are pushed over it. The upper sides of the types are dressed off by similar file-teeth upon a plate 57 above and parallel to the plate 49. These plates are held the required distance asunder by distance-blocks, or by cutters 58 59, which are inserted between them. The top plate 57 is secured to the bottom plate 49 by screws passing through holes 60 in the cutters. In dressing quads both of the cutters 58 and 59 are used, the cutter 58 having convex-edged teeth and forming the bottom groove 61 in the lower end of the quad, while the teeth of the cutter 59 are flat edged and finish off the top of the quad flat. In dressing types the cutter 59 is removed and a distance-block put in its place to give space for the passage of the letter. One of the finished types or quads will form a suitable distance-piece. One set of file-teeth is discontinued for a greater part of the surface of the plates 49 and 57, and the inclination of the continued file-teeth is preferably such as to tend to force the foot of the type against the grooving-cutter 58; but the guide-ribs 50 are chiefly depended on to guide the types in their passage between the plates.

At 62 are shown orifices through which the shavings escape from the cutters. The types (or quads) are forced between the plates 49 57 by the pushers, each type being forced into the plate of the one last cut, and thus the whole line 63 of types moved forward the width of one type at each movement. The pushers carry the types from the mold when the vibrating plate 8 is in its forward position, as seen in broken lines in Fig. II, and

as seen in Figs. XIII and XIV. Each type is left by the pushers in the position seen at 64, Figs. XIV and XXII.

66 is a retaining-dog, which prevents any retrograde movement of the types in the absence of the pushers, and has on top a bracket 67, to which is hinged the lower end of a link 68. The upper end of the link is hinged to an adjustable bracket 69, connected to the free end of the mold-block 7 by screws 70, which pass through upright slots in the bracket. The bracket is made adjustable, so as to give means for the adjustment of the position of the dog, so that the tooth 71 shall come in contact with the rear side of the type at 64 as the upper mold-block 7 closes down to the casting position, as seen in Fig. I. The front end 72 of the dog works between guides 73 and through a passage beneath a plate 74. As the upper mold-block is thrown up to allow the discharge of the type, the toothed end of the dog is thrown up, as seen in Fig. XIV, and the type passes beneath it. In order to insure this position of the dog, the link has a projection 75, which rests against the top of the dog and holds the front end 72 down.

While the type (or quad) is in the position shown at 64 the vibrating plate 8 is carried inward to the casting position and carries the jet 24 of the type last cast beneath the breaker 78, which is pivoted at 77, and as the connecting-rod 79 of the jet-pump is raised a tappet 80 upon the rod strikes the under side of the end 81 of the breaker-arm, and the other end, carrying the breaker-blade 76, descends rapidly and snaps off the jet 24 close to the base of the type, generally leaving a little projection 24², (see Fig. XXII,) which is removed by the cutter 58 in forming the groove 61. A tappet 82 on the rod 79 serves, by impingement against the end 81, to lift the active end of the breaker on the descent of the rod. The jet falls into a chute 83 and is carried off. (See Figs. III, IV, V, and XIII.)

I will now describe the devices for dressing the vertical sides of the types (or quads.)

84 is a bracket-arm secured to or forming part of the bracket 52 and extending outward at right angles to the face of the mold-block 6.

85 is a block secured to the bracket by a screw 86 at the middle. Four screws 87 work in the bracket, and their points bear against the block 85 near the corners, and furnish means of adjusting the plate upon the bracket. The plate has a fixed cleat 88 and a cleat 89, held to it by screws 90.

91 is a file whose edges are engaged by the cleats 88 and 89, and whose face is in the same plane as the ends of the plates 49 and 57.

92 is a bracket attached to the main frame by screws 93, which pass through vertical slots 94 in the bracket and screw into the main frame. This means of attachment allows of the vertical adjustment of the bracket. The bracket 92 has upon it a bracket-arm 84', similar in all respects to the bracket-arm

84, and carrying a file 91', similar to the file 91. The faces of the files 91 and 91' are in parallel planes in very close proximity, so that the faces of the files just clear each other in passing. The file 91' is attached to the arm 84' in precisely the same way as the file 91 is attached to the arm 84, and detailed description need not be repeated, the same reference-numbers being used in both cases.

95 is a file-plate attached to the bracket 92, and whose upper surface is exactly in the same plane as the upper surface of the plate 49 when the mold is in its forward position, as seen in broken lines in Fig. II, and as seen in Figs. XIII and XIV, so that the types pass freely from between the file-plates 49 and 57 into a like space between the file-plate 95 and file-plate 96 above it and parallel with it.

The plates 95 and 96 have file-surfaces on the sides presented to the types to dress the types as they are pushed forward between them by means of the pushers 15 and 16. Distance pieces or blocks are inserted between the edges of the file-plates outside the line of types to keep them the required distance asunder. Types or quads may appropriately be used for the distance-pieces. The file-plates are held in position by screws 97, which work in the cleat-lugs 98 upon the bracket, the ends of the screws bearing on the top plate 96. (See Figs. I, V, and VI.)

In order to dress the ends of the types or quads or complete such dressing, I provide two rotary cutters or milling-wheels 99 and 100, which play between the file-plates. The rotary cutter 99 has round-edged teeth, so as to make or finish the groove 61 in the base of the type or quad. The cutter 100 has straight-edged teeth, and is used in the same plane as the other cutter when dressing quads, in which it dresses off the upper end of the quad flat. The thickness of the cutter 100 is usually such that it extends past the planes of the working-faces of the file-plates, both above and below. To give place for this cutter, the lower file-plate 95 has a recess 101 extending a part of its thickness, and the upper file-plate 96 has a recess 102 extending through its whole thickness, so as to allow the under side of the cutter to be set in the same plane as the lower side of the plate 96, as is required in finishing some kinds of types, where the bevel 103 at the base of the letter extends past the plane of that side of the type and has to be dressed down to this plane. (See Fig. IX.) The file-plate 96 has a groove 104, to allow the passage of this bevel projection. The cutters are on spindles 105, having at their lower ends matching spur-wheels 106, engaging together. One of these spindles carries a bevel-wheel 107, that engages a similar wheel on a horizontal shaft 108, upon which is a spur-wheel 109, engaging a spur-wheel 110 upon the main shaft 46. (See Figs. I, V, VI, and XIII.)

In the line of type extending along the file-plates 49 and 95 the line of meeting between

two of the types 111 and 112 is always between the planes of the working-faces of the files 91 and 91', the adjacent ends of the plates 49 and 95 being in the planes of the working-faces of the files. This, it will be seen, allows the free oscillation of the plate 8, carrying the molds. The meeting edges of the types 111 and 112 will be dressed by the files 91 and 91', respectively, in both the inward and outward movement of the plate 8. To enable the files 91 and 91' to work effectually in both directions, the teeth 113 and 114 are cut so as to face in opposite directions, as shown in Fig. XII. A second advantage is gained by this opposite inclination of the teeth—namely, that while one set is cutting the passage of the type over the other set will clear the filings from them. The slide 14 is drawn backward by the spring 41, through the medium of the bell-crank lever 36, which does not give what is called a "positive motion."

I provide a device, which will now be described, to insure the slide reaching its backward position. This consists of a block 115 upon the slide and a push-piece 116 upon the upper mold-block 7. The construction is such that as the mold-block is moving downward the push-piece 116 comes in contact with the block 115, if the slide has not reached its rear position, and carries it fully back to such position. One or both of the parts 115 and 116 should be made adjustable. In this case the block is made adjustable by attaching it to the slide by screws 117, which pass through longitudinal slots in the block 115.

I claim as my invention—

1. The combination of a pusher 15, working through one side of the mold, and a pusher 16, engaging the projection 24', substantially as set forth.

2. The nipple-plate 25, having a recess, and the pusher 16, having a slot 23, adapted to engage an elongated projection 24' upon the type, for the purpose set forth.

3. The combination, with the vibrating plate 8, of the adjustable bracket 9, giving bearing to a slide 14, carrying the pusher 15, substantially as set forth.

4. The combination, with the slide 14, carrying the pusher 15, of the adjustable piece 29, having a hole 34 for the engagement of the actuating-lever 36, substantially as set forth.

5. The combination of slide 14 and lever 36, having bearing on the vibrating plate 8, lever 42, fulcrumed to the fixed frame, and cam 45 upon the main shaft 46, substantially as set forth.

6. The combination of slide 14 and lever 36, having bearing on the vibrating plate 8, lever 42, fulcrumed to the fixed frame and having an adjustable block 47, and the cam 45 upon the main shaft 46, substantially as and for the purpose set forth.

7. The combination of slide 14, lever 36, lever 42, cam 45, and spring 41, all adapted to operate substantially as set forth.

8. The combination of the slide 14, having a projection 115, and the vibrating mold-block 7, having a push-piece 116, substantially as and for the purpose set forth.

9. The combination of the pump-rod 79, having tappets, and the jet-breaker 78, constructed and operating substantially as set forth.

10. The combination, with the vibrating upper mold-block 7, of the dog 66, connected to the mold-block by link 68, and adapted to operate substantially as set forth.

11. A dressing-plate, as 49, having inclined file-teeth adapted to press the base of the type against the cutter 58, substantially as set forth.

12. The combination of dressing-plates 49 and 57, carried by the vibrating plate 8, and dressing-plates 95 and 96, carried on a stationary bracket 92, substantially as and for the purpose set forth.

13. The combination of the transverse dressing-plates 91 and 91', carried, respectively, by the vibrating plate 8 and the stationary bracket 92, and adapted to operate substantially as set forth.

14. A type-dressing file, as 91, having teeth 113 and 114, presenting in opposite directions, substantially as and for the purpose set forth.

15. The combination, with the vibrating plate 8, of the two adjustable brackets 9 and 52, carrying, respectively, the slide 14, carrying a pusher, and dressing-plates 49 and 57, substantially as set forth.

16. The transverse oppositely-reciprocating dressing-files 91 and 91', and suitable supporting-brackets, said files being adjustably supported on the brackets by holding-block 85 and screws 86 and 87, substantially as set forth.

17. The vibratory breaker 78, in combination with the dressing-plates 49 and 57, the latter serving to hold the type firmly while the jet is broken off.

JAMES G. PAVYER.

In presence of—

SAML. KNIGHT,
BENJN. A. KNIGHT.