

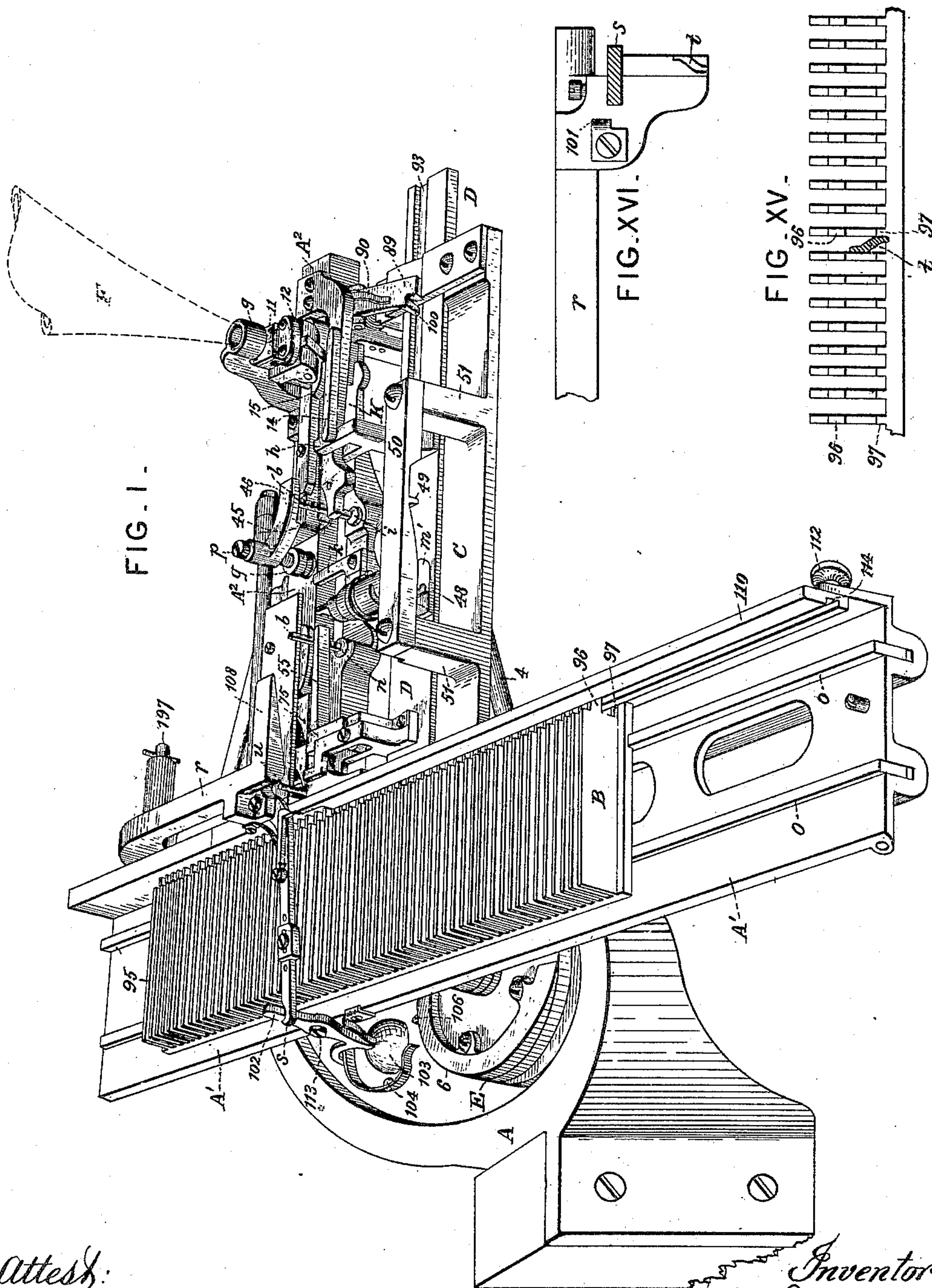
(No Model.)

6 Sheets—Sheet 1.

J. GUSTAFSON.
TYPE SETTING MACHINE.

No. 427,685.

Patented May 13, 1890.



Attest:
Geo. T. Smallwood,
Philip H. H. H.

Inventor
John Gustafson
by A. H. H.
his attorney

(No Model.)

6 Sheets—Sheet 2.

J. GUSTAFSON.
TYPE SETTING MACHINE.

No. 427,685.

Patented May 13, 1890.

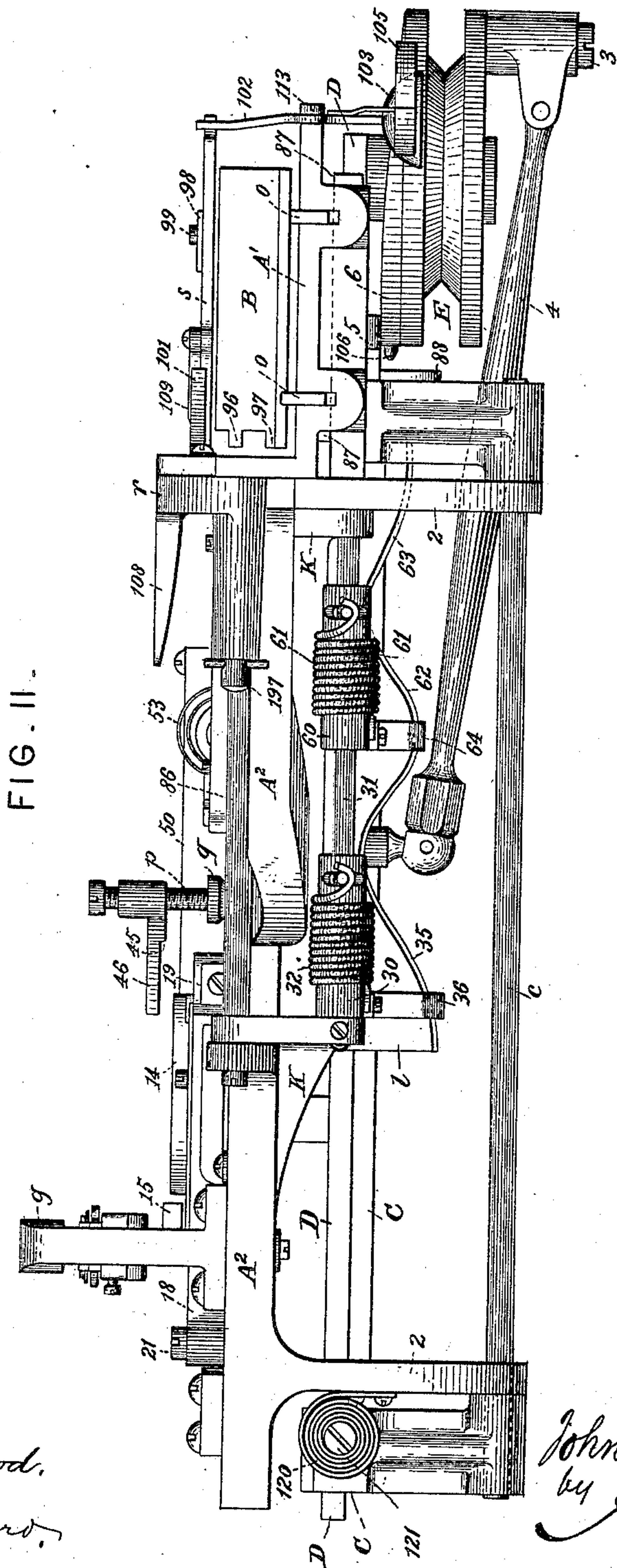


FIG. II.

Attest:
Geo. T. Smallwood,
Philip Mauro.

Inventor:
John Gustafson
by A. Pollok
his attorney

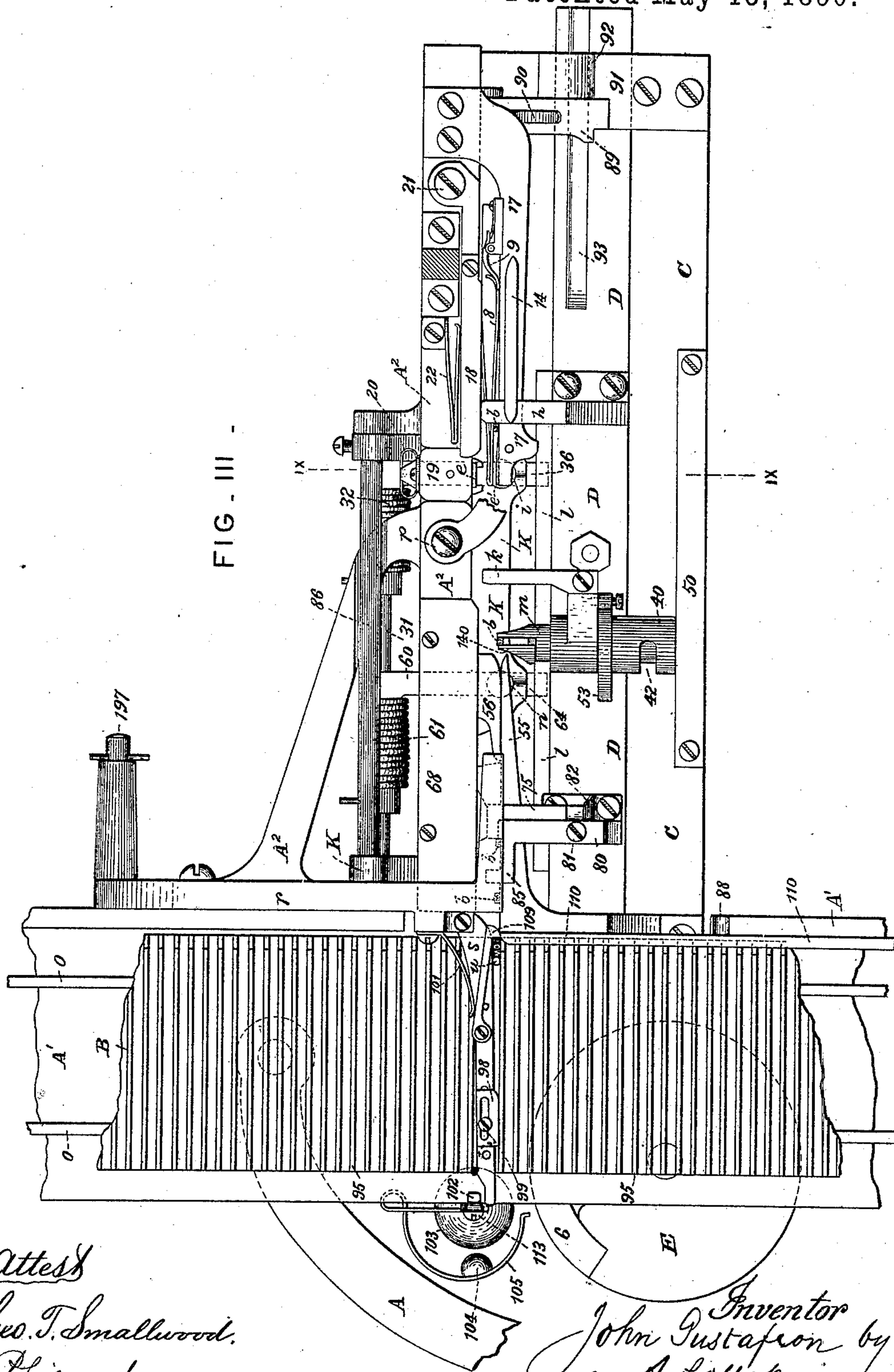
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6 Sheets—Sheet 3.

J. GUSTAFSON.
TYPE SETTING MACHINE.

No. 427,685.

Patented May 13, 1890.



Attest
Geo. T. Smallwood.
Philip Mauro.

Inventor
John Gustafson by
A. S. Folger
his attorney.

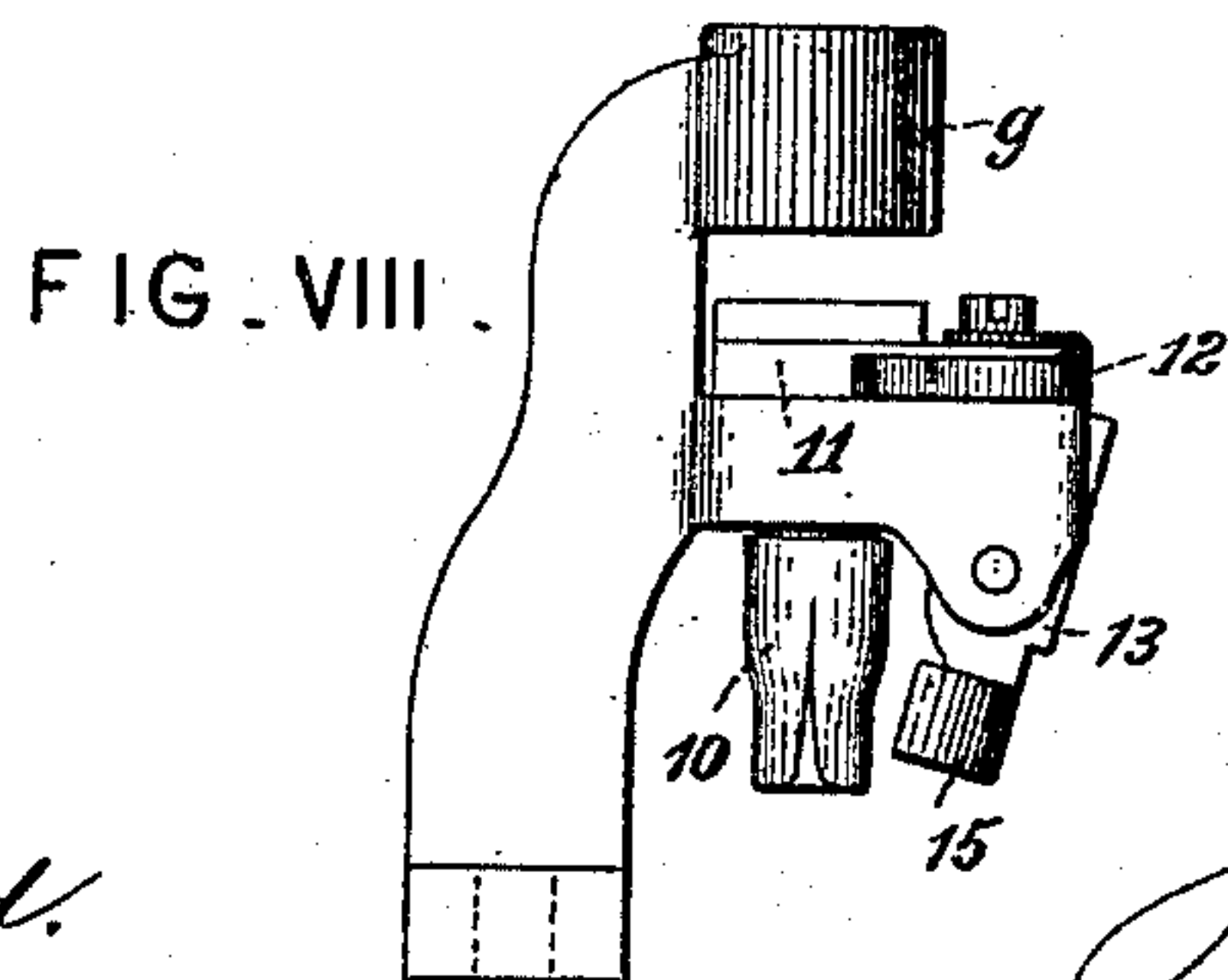
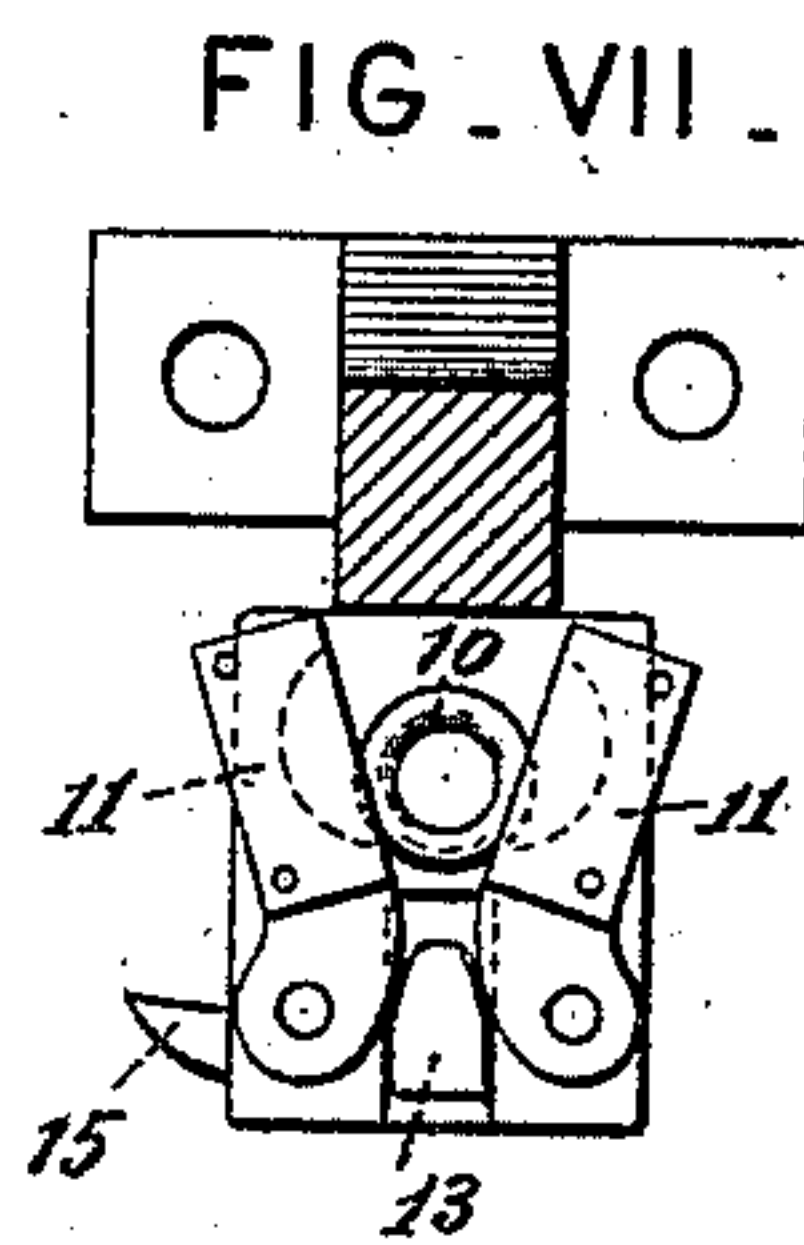
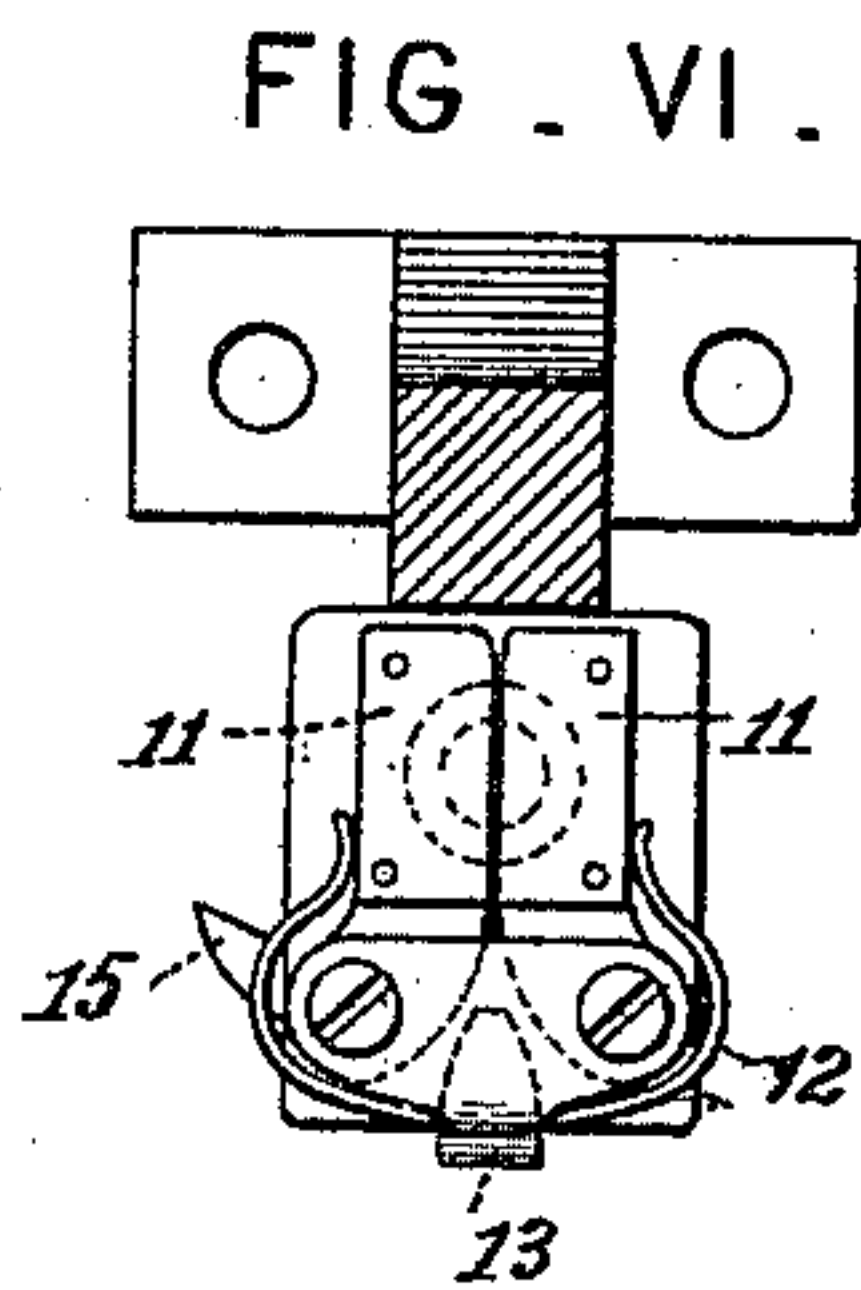
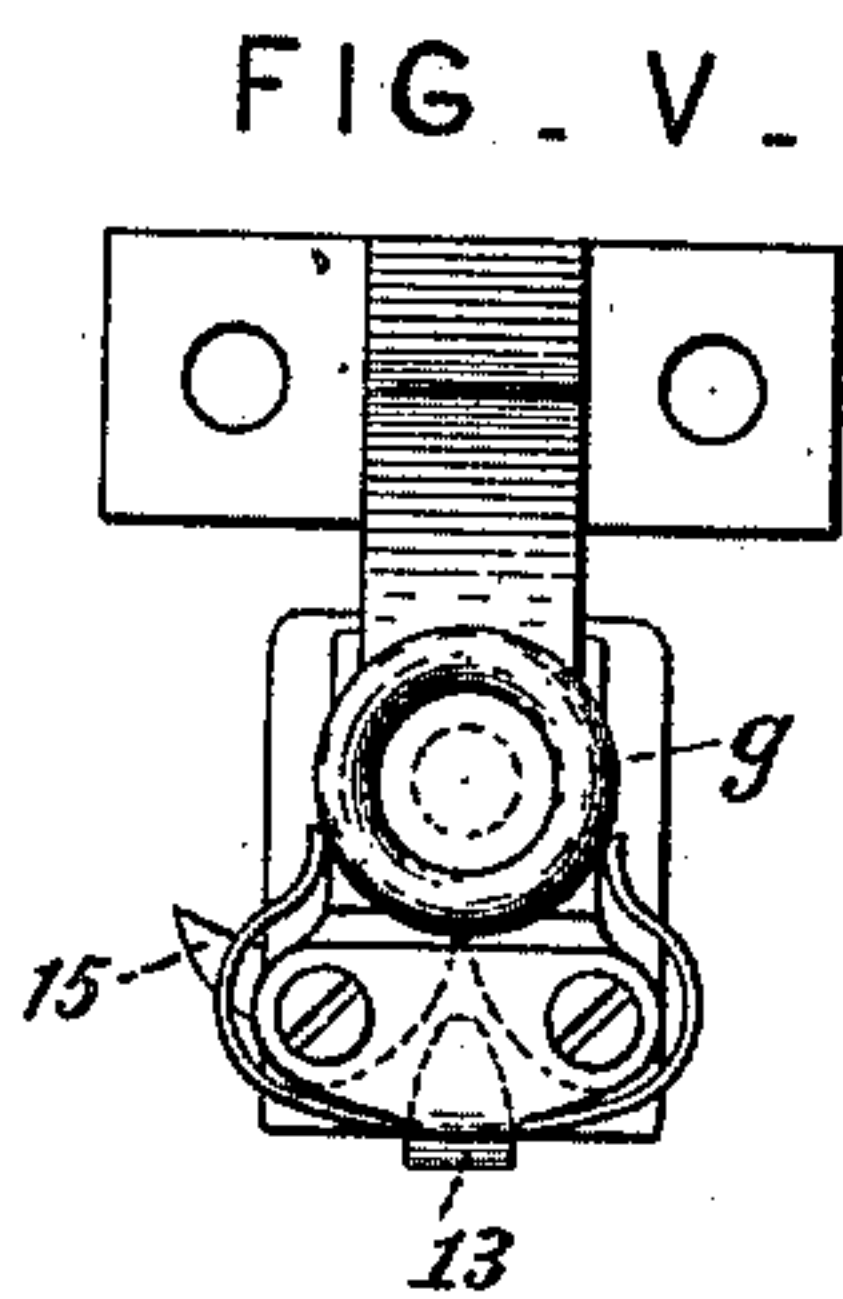
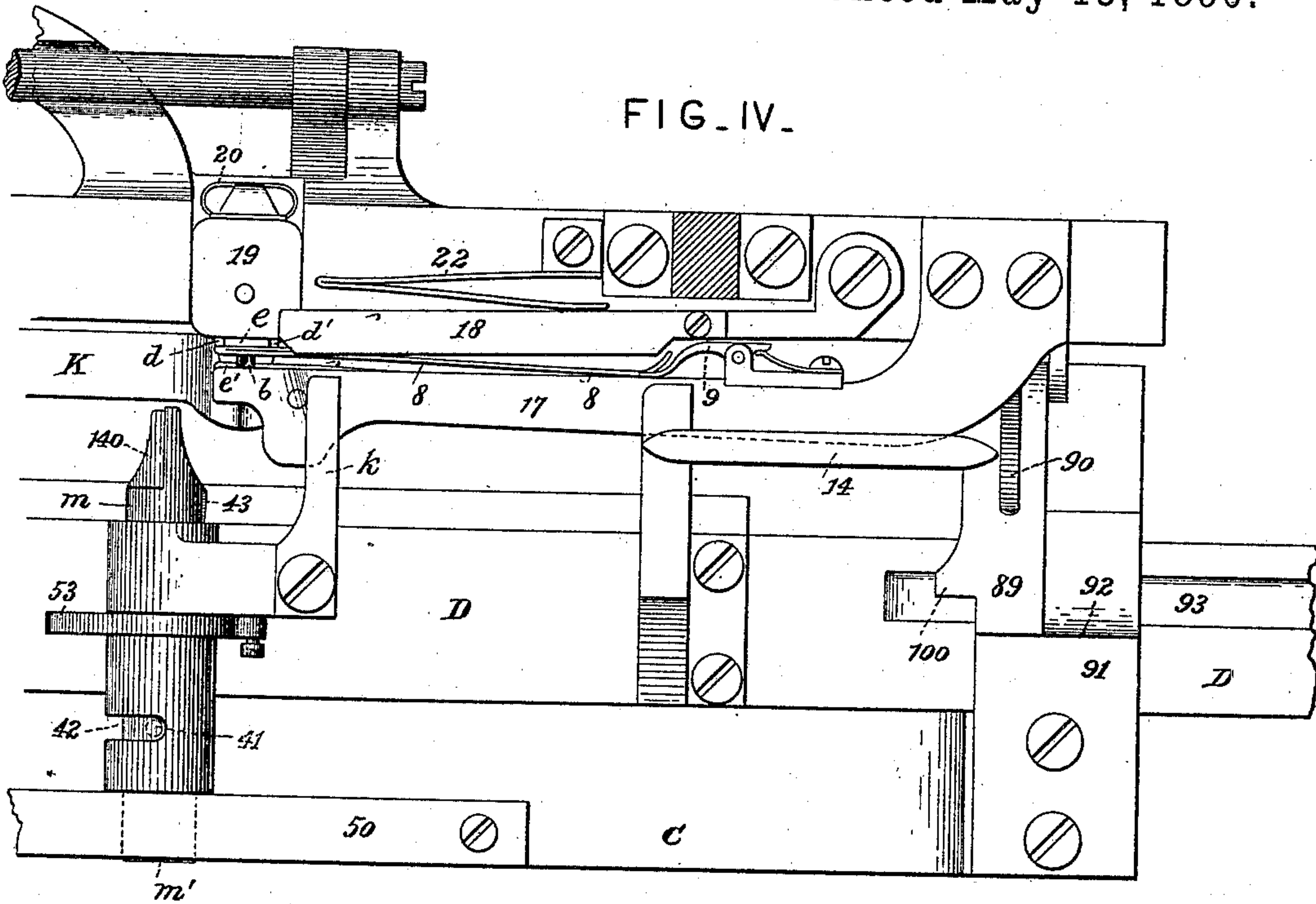
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6 Sheets—Sheet 4.

J. GUSTAFSON.
TYPE SETTING MACHINE.

No. 427,685.

Patented May 13, 1890.



Attest:
Geo. T. Smallwood.
Philip Hanna.

Inventor:
John Gustafson
by A. Hollok
his attorney.

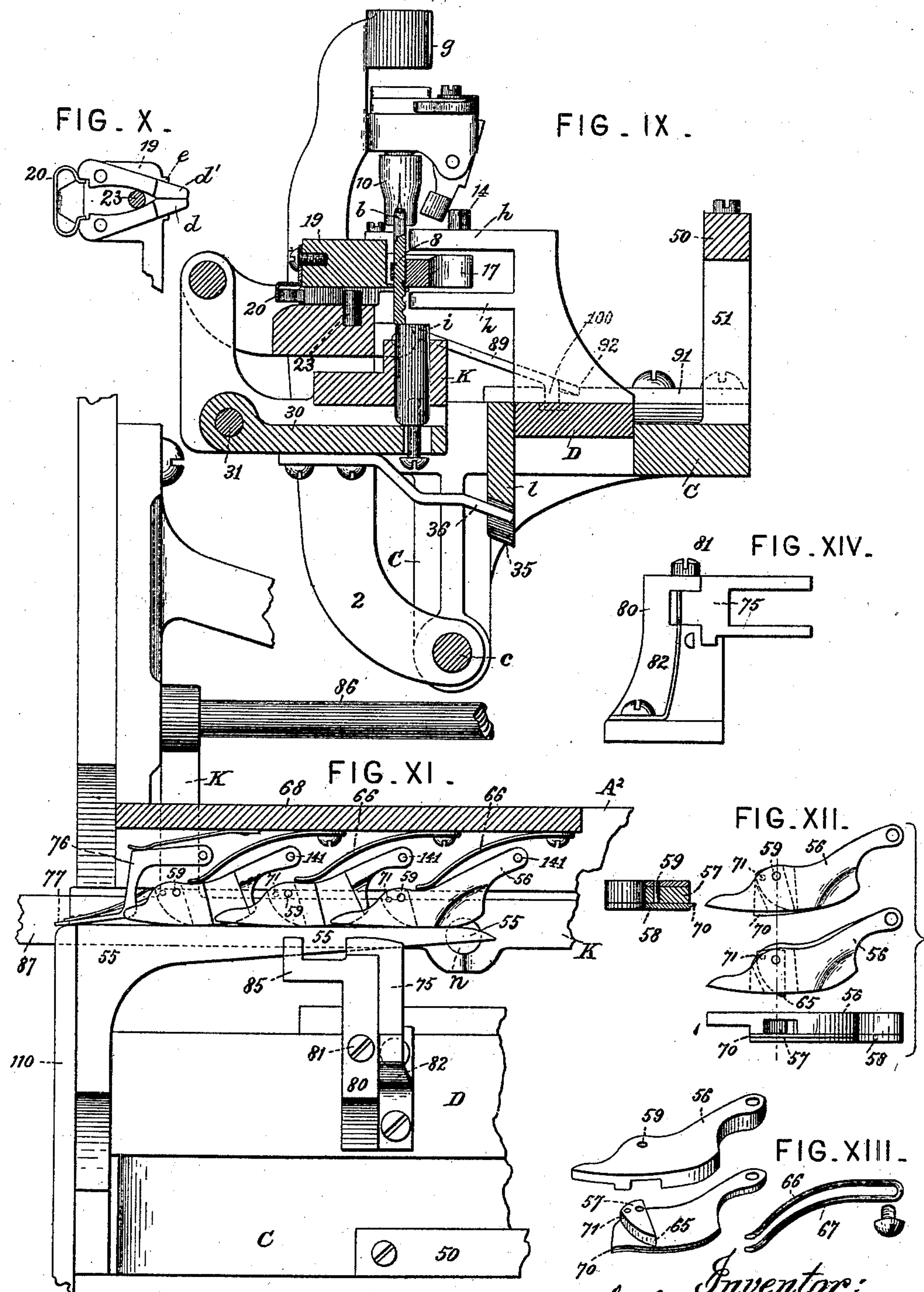
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J. GUSTAFSON.
TYPE SETTING MACHINE.

No. 427,685.

Patented May 13, 1890.



Attest { Geo. T. Smallwood.
Philip Bauer.

Inventor:
John Gustafson by
A. Pollak
his attorney.

(No Model.)

6 Sheets—Sheet 6.

J. GUSTAFSON.
TYPE SETTING MACHINE.

No. 427,685.

Patented May 13, 1890.

FIG. XVII.

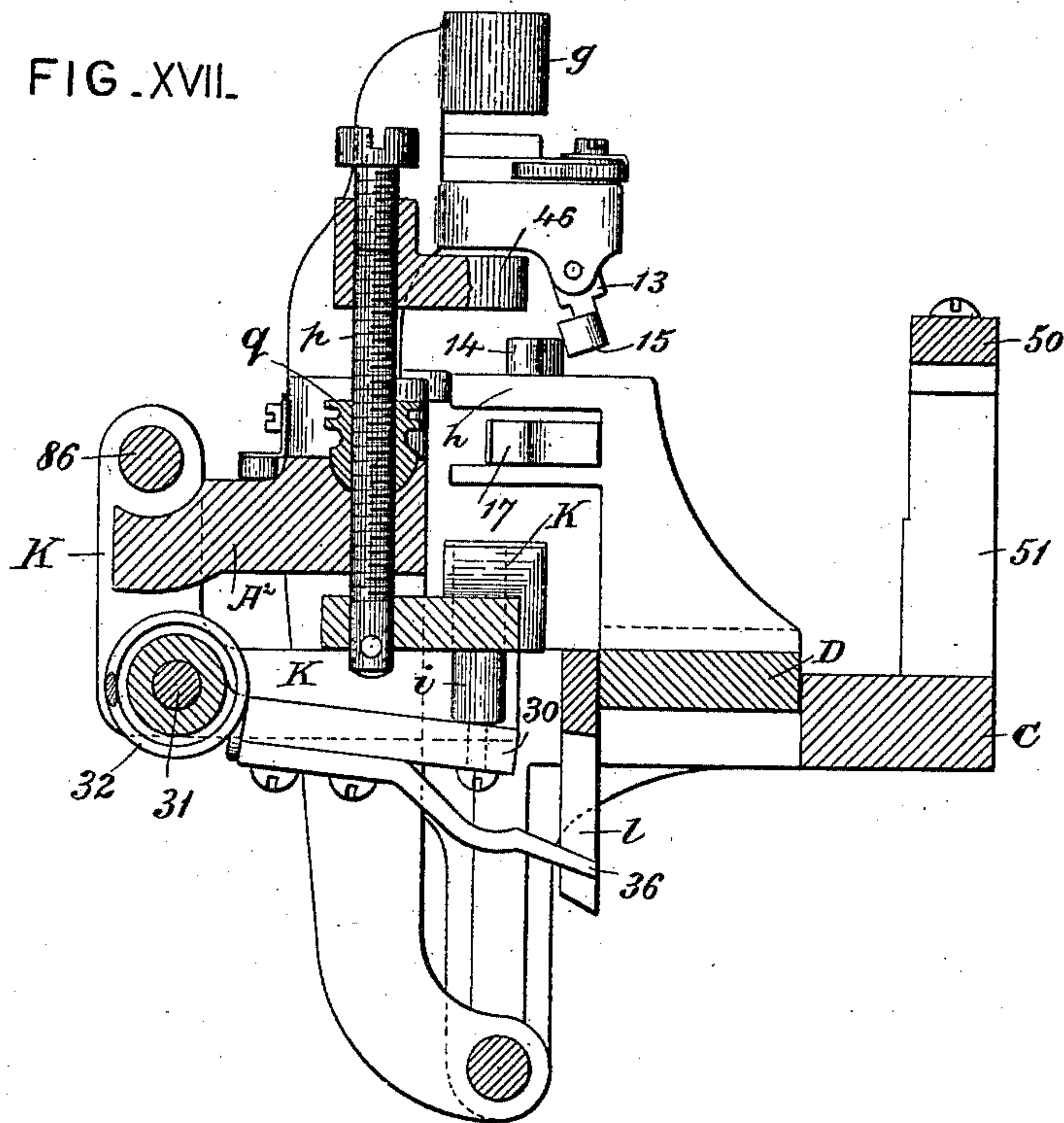


FIG. XVIII.

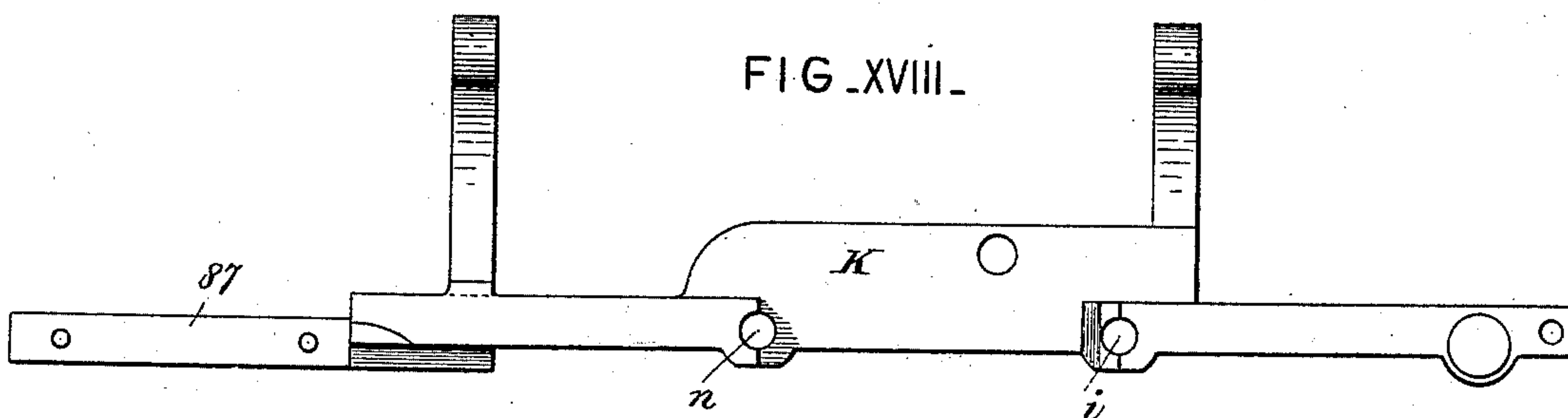
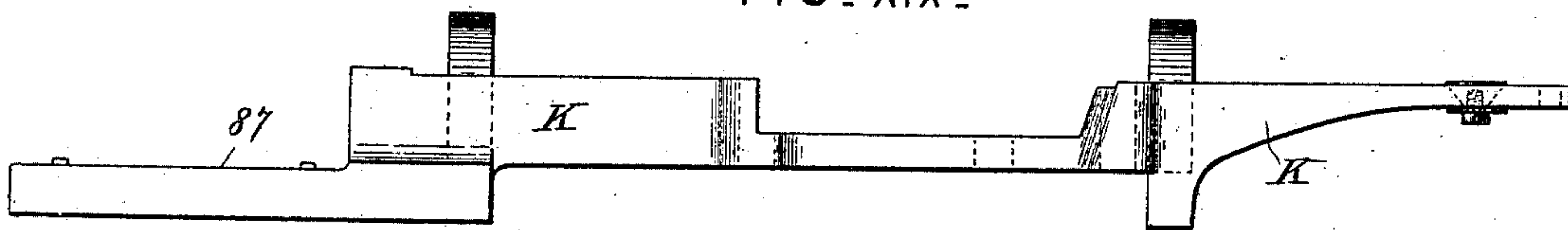


FIG. XIX.



Attest:
Geo. T. Smallwood,
Jas. K. McEachran

Inventor:
John Gustafson
by A. H. Olof
his attorney.

UNITED STATES PATENT OFFICE.

JOHN GUSTAFSON, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE LAGERMAN TYPOTHETER COMPANY, OF SAME PLACE.

TYPE-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 427,685, dated May 13, 1890.

Application filed February 27, 1889. Serial No. 301,327. (No model.)

To all whom it may concern:

Be it known that I, JOHN GUSTAFSON, of New York city, in the county and State of New York, have invented a new and useful
5 Improvement in Type - Setting Machines, which improvement is fully set forth in the following specification.

This invention has reference to type-setting machines, and more particularly relates to the
10 type-setting machine known as the "Lagerman Typotheter," which is described in United States Letters Patent No. 362,751, dated May 10, 1887. This invention may be regarded as an improvement upon the machine described
15 in that patent.

The present invention is designed to accomplish among other objects the following: to reduce the number of parts, and consequently the weight, cost of construction, and chance of
20 getting out of order; to enable the machine to set the type directly into the galley instead of in a channel leading thereto; to render the machine more certain in the operation of placing the type in the galley in the proper
25 position, and, generally, to increase the efficiency of the machine and its convenience to users. In the machine described in said patent devices were provided for turning the type in such position that one of its narrow-
30 est edges should be in contact with the fixed ledge or sill along which it is fed. This was a necessary preliminary to the operation of inverting or reversing the type in case it should enter the machine face downward, this
35 inversion or reversal constituting the next step or motion. These devices, however, do not operate with sufficient certainty upon small fonts of type, such as generally used in newspaper work, and in which there are a num-
40 ber of small type that are square, or approximately so, in cross-section. This difficulty is entirely obviated by the present invention, by means of which the type is inverted or reversed (if face downward) without regard to
45 the direction in which the nicked edge is turned. The first preliminary motion is therefore dispensed with and the proper final disposition of the type insured without regard to its size or shape, thus extending the field
50 of usefulness of the machine to include work

in which the finest type are employed. This result is accomplished by providing two pairs of feelers or catches, which, as the type is pushed up from beneath by a plunger, feel
along all its four sides, so that if the nicked
55 end be undermost (which means that the type is right side up) one or the other of these four feelers or catches engages one of the nicks and prevents the type being pushed up into
such position as to actuate the reversing mech-
60 anism. The reversing mechanism is in essential respects similar to that described in the aforesaid patent. It has, however, been somewhat simplified and improved, as hereinafter indicated. After being released by
65 the reversing mechanism, the type comes under the action of the tripping mechanism, whose function is to turn the type on its longitudinal axis until it is presented with its
nicked edge uppermost with respect to the
70 line—that is to say, away from the compositor. The improved tripping mechanism is materially different from that described in the aforesaid patent. It comprises three
trippers to provide for the possible contin-
75 uency of the type requiring three quarter-turns to bring it into proper position. The trippers are all alike, however, and it will be sufficient to state the principle of one. The action of tripping is performed by a
80 tooth, which can be moved into the path of the advancing type, and if so moved will engage its corner or edge and cause it to make a quarter-turn. As this principle is herein
carried out, the tooth is pivoted and is con-
85 nected with, so as to be actuated by, a ribbed piece or lever, which may be termed the "controller." The controller is pressed outward by a light spring, so that its rib is in the path
of the type. Said rib is adjusted to the height
90 of one of the nicks of the type, and as the latter advances, if it be already in such position that its nicked face is turned toward the controller, the nick will span said rib and the type
will pass without operating the tripper. If,
95 however, either of the three other or smooth faces of the type is turned toward this ribbed piece or controller, it will press the latter back against the pressure of its spring. The motion
of the controller is imparted to the
100

tripper, causing it to turn on its pivot, presenting its point in the path of the type and compelling the latter to make a quarter-turn. If this turn does not bring the nicked side up, the second tripper operates in the same way, and so of the third; otherwise the type passes on without turning by reason of its nick spanning the rib on the lever which controls the tripper. After passing the tripping mechanism the type is pushed directly into the galley, the machine being organized to effect that object, so that after completing the setting up of his matter the compositor will not have the last few lines thereof left in the receiving groove or channel of the machine, which would be objectionable, particularly in newspaper offices, where matter coming late is distributed in small "takes" among a large number of compositors. By means of this arrangement, moreover, the mechanism heretofore employed for breaking up the continuous row of type into lines of proper length is dispensed with.

The means for feeding the galley step by step as the lines are successively filled constitute another feature of the present invention. The galley moves by gravity, but is normally held by a movable stop or tooth carried by a pivoted arm and engaging a projection of the galley. A special type, or, more properly speaking, a pin of greater length than the ordinary type, is thrown into the hopper at the proper time to advance the galley, and it acts to lift the pivoted arm, release the galley, and permit it to move the space of one line. This escapement mechanism is so constructed as to preclude the possibility of the galley moving more than the required distance. A device—such as a bell—is provided to give the compositor an audible signal when the line is nearly full, giving him time to finish it with a word, or to divide the word properly, if necessary. This relieves the compositor of the necessity of keeping his eye fixed on an indicator, and enables him to concentrate his attention on the work of type-setting.

Different fonts of type are distinguished from each other by the arrangement or number of nicks. The machine must therefore be capable of adjustment to such different type, and it is very desirable that this adjustment should be of so simple a character that it can be quickly effected by the compositor himself. This is accomplished according to the present invention by mounting all the parts whose positions require to be changed on a movable bed, so that all these parts may be adjusted by a single screw. The plunger which brings the type to such position that one of its nicks is on a level with the rib of the tripper-controller is carried by this bed, so that to effect the desired adjustment it is only necessary to turn the adjusting-nut until one of the nicks of the type is on a level with this rib. All parts of the machine are then in position to set type similarly nicked.

The pushers or plungers for lifting the type are constructed to move in a right line, instead of in the arc of a circle, as heretofore. Consequently the type while acted upon by the feelers are pushed in a straight line coincident with the length of the type.

In the machine herein described the drive-wheel rotates continuously, instead of intermittently, as in the machine described in the aforesaid patent, and the electrical mechanism for starting the machine into operation is dispensed with.

The invention includes certain novel arrangements of the operating mechanism and certain special features of construction and combinations of parts, as hereinafter more fully set forth.

In the accompanying drawings, Figure I is a perspective view of a machine constructed in accordance with the present invention. Fig. II is a rear view thereof, partly in section. Fig. III is a plan view, part of the frame at the right of the machine and the hopper being removed. Fig. IV is a plan on a larger scale of that portion of the mechanism which acts on the type during its first movement. Figs. V, VI, VII, and VIII are details illustrating the trap. Fig. IX is a cross-section on line IX IX, Fig. III, in elevation, looking in the direction of the arrow. Fig. X is a detail of the under side of one set of feelers. Fig. XI is an enlarged plan of the tripper mechanism with top plate removed. Fig. XII represents a detail view of one set of tripper mechanism. Fig. XIII represents in perspective the different parts of the tripper mechanism. Fig. XIV is a side view of one of the type-feeding fingers. Fig. XV is a detail in sectional elevation, illustrating the galley-escapement; and Fig. XVI is a side view of the escapement-lever. Fig. XVII is a vertical section adjacent to the adjusting-screw, looking to the right, the swinging carrier being in its upper position and the slide at the left-hand end of its movement. Figs. XVIII and XIX are views in plan and elevation of the adjustable bed detached on a smaller scale than Fig. XVII.

The supporting and stationary frame is composed of castings A A' A². Casting A is, when in use, bolted to one of the uprights of the type-case. It is approximately semicircular in shape, and upon its two arms or horns rests the inclined casting A', by which the galley B is supported, and to which the casting A² is attached.

The swinging bed or carrier C is hinged on a rod c at the rear of the machine, Fig. II, supported by arms 2, depending from the frame. Bed C has a limited oscillating motion on rod c. This bed carries a slide D, which is adapted to move longitudinally in ways of said bed, and carries the type-feeding devices and other parts, as hereinafter set forth. Power is communicated to the moving parts from a wheel E, adapted to be driven by a belt or other means. On its under side is a

crank-pin 3, Fig. II, which drives slide D through a connecting-rod 4, which is connected with said slide by a ball-joint to enable said slide to follow freely the motions of the bed or carrier C. The left-hand end of the bed C has a projection 5, Fig. II, which at each revolution of wheel E is acted upon by a cam-piece 6 on the upper face of said wheel, whereby the bed C and all the parts carried thereby are raised. Cam 6 extends about half-way around the wheel E, so that during half the revolution of said wheel the bed is in its highest position. During this portion of the revolution the slide D is moving from right to left, so that said slide moves first to the right by the forward stroke of the connection-rod 4, then up with the bed C, then to the left by the back-stroke of said rod, and then down with the bed C. In Fig. I the bed C is down and the slide D moving to the right. In Fig. III the bed C is in its highest position, being raised by cam 6 and the slide D moving to the left.

The funnel or hopper F, in which the types are dropped by the compositor, is set in a fixed socket *g*, supported by the frame. Immediately under this socket is a small chute or tube 10. A trap is provided to control the admission of type, it being undesirable that the type should fall into chute 10 at the time the finger *h*, by which it is to be fed along, is under said tube. The trap consists of two pivoted sliding pieces or jaws 11, Figs. V to VIII, which are normally pressed together, as shown in Fig. VI, by spring 12. They are opened at the proper time by the lever 13, the upper wedge-shaped end of which enters between the jaws and spreads them apart at the proper time. (See Fig. VII.) This lever is actuated by a bar 14, carried by slide D, Figs. I, III, and IV. As the slide moves to the left, bed C being raised, the inclined surface of this bar passes behind and acts on a projection 15 of the lever 13, as shown in Fig. XVII, and forces it back, spreading the jaws and keeping them open until the bar 14 passes said projection. During the return motion of the bar 14 it passes in front of the projection 15, as shown in Fig. I, during which time the trap is closed and remains closed until after finger *h* passes the mouth of tube 10.

When a type falls through tube 10, it rests against the fixed ledge or sill 17 within the spring-gate 9, as in the patent above named. At the next return of finger *h* it is pushed to the left, being held against the sill 17 by a flat spring 8. Fig. III shows a type *b* as it is advanced by finger *h*. The first motion of slide D brings the type above the pusher *i*. Arriving at this point the bed C drops and the slide makes its return movement, as shown in Fig. IV. During this return movement the type is acted upon by mechanism which determines whether it is face up or not, and if not prepares to set the reversing mechanism into action. This mechanism consists of the pusher *i*, already re-

ferred to, and the feelers *d d' e e'*, which press against the four sides of the type as it is raised by the pusher, Figs. III, IV, and IX. 70

The feelers *d d'* are in the form of a pair of jaws having ribs of proper size to engage the nicks of the type, Fig. X. These jaws are carried by and pivoted in the head 19 of a swinging arm 18 and are pressed together by a spring 20. The swinging arm 18 is pivoted at 21 and is actuated by a spring 22. While slide D is making its movement to the left arm 18 is moved back and held back by the finger *k*. Before it is released by this finger it is caught by the finger *h*. As it moves back a pin 23, fixed to the frame, acts upon the jaws *d d'* and opens them. As soon as the type comes to rest arm 18 is released by finger *h* and is moved forward by its spring. At the same time the jaws *d d'* close upon the type *b*. Head 19 of arm 18 carries another rib or feeler *e*, while the fourth rib or feeler *e'* is carried by the sill or ledge 17. As soon as these feelers close in on all four sides of the type the pusher *i* begins to ascend, lifting the type. If the nicked end of the latter be down, the nick will be caught by one of these feelers, no matter which way the type may be turned, and the upward movement of the type arrested. The pusher *i* is carried by an arm 30 and works in a hole bored in the bed K, which will be hereinafter described, the pusher being connected with said arm by a flexible joint, Fig. IX, so that it moves in a right line. Arm 30 is pivoted on a rod 31 and is actuated by a spring 32, which imparts to the pusher its upward movement. Consequently the engagement of a nick in the type by one of the feelers can arrest the motion of the pusher, having only to resist the pressure of spring 32. The downward motion of the pusher is imparted by a cam-bar 1, which is bolted to the rear of slide D. As the slide D moves to the left, advancing the type, the cam-face 35 of bar 1 acts on a projection 36, attached to the pusher-arm 30, depressing the pusher. As soon as the type comes to rest at the end of its first movement, as above described, the pusher begins to rise by reason of the return of cam-bar 1. 100 105 110 115

If the feelers *d d' e e'* found no nick to engage, which would happen if the type *b* were wrong side up, the latter would be pushed up to the extreme limit of the motion of said pusher, as shown in Fig. I. The extent to which the type is raised determines whether during its next movement it will be reversed or not. This next movement is effected by the nippers or pinchers *m*. (See Figs. I, III, and IV.) These nippers or pinchers are substantially the same in construction and operation as shown in the aforesaid patent. They are pivoted in a sleeve 40, carried by slide D, and are capable of making a half-turn therein. A pin 41, working in a slot 42 in said sleeve, limits the revolving motion. One of the jaws 140 of the nippers is pivoted and actuated by a spring. It has a shoulder 43. 120 125 130

As the slide D reaches the end of its motion to the right and the bed C rises, this shoulder strikes the cam-shaped end of the fixed sill 17, and jaw 140 is consequently forced away from its fellow. The nippers can thus seize the type, which they do just as said type is released by the feelers, and as the slide makes its return motion the nippers *m* carry the type with them, as shown in Fig. III. If the type *b*, in consequence of being face downward, has been pushed up by pusher *i* to its highest position, its upper end will as the nippers advance strike the shoulder 45 of a bracket or overhanging arm 46, (see Fig. I,) thus slightly turning the nippers in sleeve 40. This turn is sufficient to cause a notch 48 in the end of the nipper-spindle *m'* to engage a tooth or dog 49 on the under side of the bar 50, supported by uprights 51 on bed C. (See Fig. I.) This engagement causes the nippers *m* to turn completely over, bringing type *b* right side up. If the type were already right side up, its upper end would not be high enough to strike the shoulder 45. Consequently it would be carried forward by the nippers without reversal. The turning of the nipper-spindle coils up spring 53, which during the next motion of slide D to the right returns the nippers to their normal position. The nippers therefore leave the type face up between the fixed ledge or sill 55 and the top piece 56 of the first tripping device and immediately over the pusher *n*, Fig. I.

The type are to be placed in the galley B with their nicked faces toward the top thereof, and the function of the tripper mechanism is to insure that the type shall be properly faced.

As soon as the type is released by the nippers the pusher *n* rises, lifting the type to the proper height for the action of the tripper mechanism. Pusher *n* works in a hole in bed K and is operated similarly to pusher *i*. It is carried by an arm 60, pivoted on rod 31 at the rear of the machine, and is actuated by a coiled spring 61. The pusher *n* is moved downward by the cam-faces 62 and 63 of the cam-bar 1, already referred to, said cams acting on a projection 64, attached to arm 60. Pusher *n* is connected with its carrying-arm 60 by a flexible joint, so that it moves in a straight line.

The tripper mechanism (see Figs. XI, XII, and XIII) consists of three pieces—namely, the top piece 56, the tripper 57, and the controller 58. The tripper as a whole is pivoted on pin 141 on casting A². The top piece 56 is pressed toward the fixed sill or ledge 55 by a light spring 66, holding the type as it moves forward with a yielding pressure. The tripper 57 is a small metal piece somewhat heart-shaped, and is pivoted to top piece 56 at 59, so that it can turn on its center 59 and throw its point 65 into or out of the path of the advancing type. The controller 58 is a flat plate, which is also pressed toward the ledge 55 by the pressure of a spring 67.

Springs 66 and 67 are attached to the plate 68, which is screwed down over the tripper mechanism. The controller 58 has on its outer edge a thin rib 70, which, as the controller is pressed out by the spring 67, projects slightly into the path of the advancing type. The pusher *n* is so adjusted with reference to this rib that it will raise the type to such position that one of its nicks (it is immaterial which one, if there be several) will be exactly on the level of this rib. The tripper 57 is connected with the controller 58 by a pin 71; but this pin is to one side of the pin 59, on which the tripper turns, so that whenever the controller is moved toward or away from the opposite ledge 55 the tripper is turned on its center 59, and its tooth or point 65 will be moved out of or into the path of the type.

Three sets of trippers are shown and are necessary to insure the proper setting of all the type; but as the other two sets are like the first it is not necessary to describe them.

The action of the tripper mechanism will now be readily understood. The type having been raised to the proper height by pusher *n* is next caught by finger 75 on slide D and advanced by this finger along the ledge or sill 55. If the nicked side be already turned toward the rib 70, which is the position the type is to take in the galley, the nick will span the rib, and the type will pass along without being affected by the tripper mechanism, since the point of the tripper 57 is held back out of the path of the type. If the type passes the first tripper without being turned, it will also pass the others, since the ribs 70 of all the controllers are on the same level. Consequently the type will come to rest for the third time between the ledge 55 and the spring-actuated holders 76 77, Fig. XI. If the type should be advanced by finger 75 with its nicked side first and one of its smooth sides toward the tripper mechanism, as soon as it comes to rib 70 of the first controller 58 this device is pushed back against the pressure of its spring, turning tripper 57 sufficiently to throw its point into the path of the type. This point catches the corner of the type, compelling it to make a quarter-turn in passing the obstruction. Finger 75 which carries the type is not rigid, but is pivoted in its support 80 by pin 81 and is held in its operative position by spring 82, Figs. XI and XIV. It can thus yield slightly as the type makes it turn. Said finger 75 is bifurcated, as shown in Fig. XIV, one member going above and the other below the fixed sill 55, so that it touches the type at two points, between which the tripper acts, thus keeping the type upright during this operation. If the type advances with its nicked side behind—i. e., to the right—it will require the action of all three trippers to turn it to its proper position. At the next return of the slide the finger 85 acts upon the type and moves it the distance necessary to place it in

the galley B. It thus requires four revolutions of wheel E, and consequently four reciprocations of slide D and four oscillations of bed C, to carry the type from the gate 9 to the galley B. At the first revolution it is advanced by the finger *h* as far as pusher *i*. At the second return of the slide it is seized and carried by nippers *m* as far as pusher *n*. At the third motion it is carried past the tripper mechanism by finger 75, and at the last is pushed into the galley by finger 85.

Different fonts of type are distinguished from each other by the different number or position of the nicks, and since the proper action of the machine depends upon the relation of the ribs on the controller to one of the nicks it is often necessary to adjust certain parts to enable the machine to operate on different type. It is very desirable that this adjustment should be effected quickly and should be such that the compositor himself can make it with certainty and without loss of time.

I will now describe the arrangements whereby all the parts whose positions require to be changed can be adjusted at one operation. The point to be observed is that the difference of level between the ribs of the tripper-controllers and the top of pusher *n* when in its highest position shall be equal to the distance between the bottom of the type and one of its nicks. According to the present invention the rod 31, upon which the pusher-arms 30 and 60 are pivoted, is carried by the bed K, which is hinged to the machine-frame on a rod 86. (See Figs. II, XVII, XVIII, and XIX.) This bed K has an arm 87, extending under the casting A', which is cut away at this point, so that the rails *o*, upon which the galley slides rest, directly upon this arm. Said arm is a continuation of that part of bed K in which the pushers *i* and *n* work. Bed K also has a screw *p*, which passes up through a hole in casting A' and upon which is a nut *q*. Figs. I, II, and XVII. To the upper end of this screw is fixed the bracket 46, whose shoulder 45 starts the rotation of pinchers *m*. Bed K can thus turn on rod 86 as a center, and its position is regulated by the nut *q*. If the bed be adjusted by means of this nut so that pusher *n* will lift the type to such a height that one of its nicks will register with the ribs of the controllers 58, the correct position of all the other parts will follow. The shoulder 45 will move with the bed K, so that its position relative to the pusher *i* will not be disturbed, and the rails *o* will also follow the motion of the bed, so that the bottom of the galley B will remain always on the same level with the top of the pusher *n*. Between the casting A' and the oscillating bed C is interposed a spring 88, (see Fig. III,) which acts as a buffer. For the same purpose spring 120 is placed at the rear of the machine, Fig. II, and is connected with bed C by a pin 127. To prevent vibration or jar of the bed C, a latch 89 is pivoted at the right of the frame and is pressed down

by a spring 90, Figs. III and IV. The plate 91, carried by the bed C, has a notch 92, into which the latch 89 falls when the bed drops to its lowest position, as in Figs. I and IV, and, engaging with said notch, checks the vibration of the bed. At this time the slide D is at the extreme left of its path, and the finger 100, carried by said latch, falls into the groove 93 of said slide. The bed is held by latch 89 until slide D approaches the right-hand end of its path, when the incline 94 at the end of groove 93 lifts finger 100, raising latch 89 and releasing the bed C before the cam 6 acts upon it.

The action of the galley will now be described with reference to Figs. I, II, III, XV, and XVI. The galley is preferably milled out of a solid piece of steel. It is mounted upon the inclined rails *o*, as already described, down which it can slide by gravity when permitted to do so. One side (the right in the drawings, Figs. I and III) of the galley is grooved from end to end, so that the projecting ends of the partitions 95 form two racks 96 and 97. An arm *r*, journaled on a pin 197, carries a detent or stop *t*, the lower tooth or pallet of which normally engages one of the teeth 97, holding the galley stationary, with one of its partitions 95 in line with the ledge or sill 55, along which the type is fed. The detent *t* is shaped as shown in Figs. XV and XVI, and its lower tooth or pallet is somewhat in the rear of the upper tooth or pallet—that is, nearer the upper end of the galley. Consequently if arm *r* be raised, the upper tooth will engage a tooth of the rack 96, the detent *t* being of greater length than the space between the two racks. When arm *r* again drops to its normal position, the lower tooth will drop into the next space above that which it formerly occupied, permitting the galley to drop the space of one line. Owing to the length of the detent *t*, it is impossible for the galley to move a greater distance than the space of a line. Pivoted to the arm *r* is a rod or bar *s*, upon which is an adjustable cam-piece 98, held by a clamp-screw 99. Bar *s* is pressed by a spring 101, so as to bear with yielding pressure upon the type *b* as they are formed in a line in the type-space. When the first of these type reaches cam 98, it pushes the bar *s* upward until its free end makes contact with a lever 102, pivoted at 113 to the casting A', and which carries at its lower end a bell 103. The clapper 104 of this bell is carried by a spring 105, and when lever 102 is tilted by bar *s* the end of spring 105 is thrown into the path of a lug 106 on the edge of wheel E, whereby the bell is sounded at each revolution of the wheel E, giving warning to the operator that he is nearing the end of a line. On hearing the bell sound the compositor finishes up his line, either by completing the word in hand, if possible, or by dividing it properly, and then throws in a pin *u*, longer than the type, which pin may be round or any other suitable shape, provided

that it be of the proper length to operate the escapement mechanism for feeding the galley R. This pin goes through the machine in the same manner as the type; but as it is fed along ledge 55 its upper end acts upon the inclined under surface of a projection 108 of arm *r* and raises said arm, disengaging the galley from the lower tooth of detent *t* and causing the upper tooth of the latter to engage a tooth of rack 96. A pin *u* is shown in Fig. I as having just passed projection 108. As soon as pin *u* passes this projection the arm *r* falls by gravity; but the lower tooth of detent *t* falls into the next space to that it formerly occupied, and the galley drops the space of a line, and pin *u* is pushed by finger 85 into the next type-space. As soon as the galley drops, bar *s*, being relieved of the pressure of the line of type that has just been completed is pushed down by its spring 101, lever 102 resumes its normal position, withdrawing the end of spring 105 from the path of lug 106, and the bell ceases sounding. The cam 98 on bar *s* is adjustable to different positions on said bar, according to the width of the column of matter that is being set up.

On the bar *s* is a pivoted catch 109, Fig. III, which is pushed back by the action of the type on its inclined face and drops as soon as the type passes its point, its shouldered end or hook catching the type and preventing its falling sidewise. When the line of type is finished and drops down with the galley, the end type of the line is held up by the side plate 110, which is screwed to the casting A' at 112 and has a longitudinal groove 114 for the admission of rack 96, Fig. I. When the galley is entirely filled, this plate 110 is unscrewed and removed with the galley, forming a support to prevent the type falling out.

The operation of the different parts of the apparatus has been described. The operation of the machine as a whole will therefore be comprehended without further explanation.

I would observe, in conclusion, that in the foregoing detailed description I have explained the best form contemplated of applying the principle of my invention. It will be understood, however, that I do not limit myself to the forms and arrangements of parts and details of construction hereinbefore described, since it is obvious that these could be modified or varied without departing from the spirit of my invention. It is obvious, furthermore, that parts of my invention could, if desired, be used without others.

Having thus explained my said invention and the best mode in which I have contemplated applying the principle thereof, what I claim, and desire to secure by Letters Patent, is—

1. In a type-setting machine, the combination, with the galley, of a reciprocating slide carrying a series of feeding devices or fingers for feeding the type by successive stages

through the machine, the last of said fingers being arranged to push the said type directly into said galley, substantially as described. 7c

2. In a type-setting machine having a hopper for receiving the type and a galley into which they are to be placed, the combination of a reciprocating slide extending from the mouth of said hopper to said galley and a series of feeding devices carried by said slide for acting on the type, one after another, and carrying it by successive stages through the machine, the last of said feeding devices being arranged to push the type directly into said galley, substantially as described. 80

3. In a type-setting machine, the combination of a reciprocating pusher for raising the type and spring-actuated feelers acting simultaneously on all four sides of said type while lifted by said pusher, substantially as described. 85

4. The combination of the feed-slide, a spring-actuated arm carrying ribbed jaws or feelers, a finger on said slide for pressing back said arm, and a spring for closing said jaws or feelers against said type when said arm is released by said finger, substantially as described. 90

5. The combination of the swinging spring-actuated arm carrying a pair of jaws or feelers for acting on opposite sides of the type, a second pair of feelers for acting simultaneously upon the other two sides of the type, and a reciprocating pusher for raising the type while embraced by said feelers, substantially as described. 100

6. The combination, with the pusher, the four feelers, and devices for opening and closing the same upon a type, of the reciprocating slide and a pair of nippers in a bearing of said slide for seizing the type after it has been raised by said pusher, substantially as described. 105

7. The combination, with the feelers acting simultaneously on all four sides of the type and the pusher, of the reversing-nippers and the overhanging shouldered arm or bracket, substantially as described. 110

8. The combination, with type-feeding devices and feelers for acting on the sides of the type, of a reciprocating pusher for raising the type, said pusher working in a straight line coincident with the length of the type, substantially as described. 115

9. The combination, with the feelers, of the reciprocating pusher working in the line of the type when held by said feelers, substantially as described. 120

10. In a type-setting machine, a pusher for adjusting the type, said pusher working in a straight hole or guideway, and being combined with devices for imparting thereto a reciprocating motion in a right line and with feelers for acting on the sides of the type while the latter is raised by said pusher, substantially as described. 125

11. The combination, with the feelers, of a pusher and a hinged carrying and actuating 130

arm therefor, said pusher being connected with said arm by a flexible joint, substantially as described.

12. The combination, with a reciprocating pusher, of an adjustable bed carrying the same, whereby the path of movement of said pusher may be varied, substantially as described.

13. The combination, with the type-feeding devices, of the shouldered bracket for starting the reversing mechanism, said bracket being mounted on an adjustable support, substantially as described.

14. The combination, with the machine-frame, of a bed adjustably connected therewith and supporting or carrying the pushers, and also carrying the overhanging shouldered bracket, so that these parts may be simultaneously adjusted, substantially as described.

15. The combination, with type-feeding mechanism, of a tripper movable into and out of the path of the type and a controller for regulating the position of said tripper as the type passes it, substantially as described.

16. The combination of the movable tripper, the controller connected therewith and having a rib projecting into the path of the type, and a spring holding said controller with yielding pressure, so that when said controller is forced back the tripper will be thrown out and engage the edge of the type, substantially as described.

17. The combination, with the movable tripper and the ribbed controller therefor, of a pusher for raising the type to such position that one of its nicks will register with the rib of said controller, substantially as described.

18. The combination of the pivoted tripper and the spring-actuated ribbed controller pivoted to said tripper at a point eccentric to the pivot of the latter, substantially as described.

19. In a type-setting machine, the combination, with a ledge or sill along which the type is to be fed and a type-feeding finger, of tripper mechanism comprising a spring-actuated piece for pressing against the type, a tripper pivoted thereto, and a controller pivoted eccentrically to said tripper and having a rib projecting slightly into the path of said type, substantially as and for the purpose set forth.

20. In a type-setting machine, the combination, with type-feeding devices, of three sets of tripping mechanism arranged in series for acting successively upon the type as advanced by the feeding devices, substantially as described.

21. The combination, with the type-feeding devices and a tripper or device for turning the type on its longitudinal axis, of a controlling rib or projection in the path of the type in line with one of the nicks thereof, so that when the type is fed forward with its nicked side toward the said rib or projection

it passes the latter without actuating the tripper, substantially as described.

22. The combination of the reciprocating pusher, a type-feeding finger or device for advancing a type after being raised by said pusher, and a series of tripping mechanism comprising each a movable tripper and a ribbed controller, substantially as described.

23. The combination, with the galley having two racks, of an escapement-lever carrying a detent or stop working between said racks and engaging the same alternately, substantially as described.

24. The combination, with the galley, of the escapement-lever and detent for controlling the motions thereof, said lever having an inclined projection overhanging the path of the type, whereby the said lever may be actuated by the passage of a type or pin of proper height, substantially as described.

25. In a type-setting machine, the combination, with the galley, of an alarm-signal—such as a bell—a bar overhanging said galley, and a cam on said bar acted upon by the line of type for putting the alarm-signal into operation, substantially as described.

26. The combination of the alarm-bell having a clapper movable into and out of the path of a lug on a moving part of the machine, an actuating-bar, and a cam on said bar arranged in the path of the type near the end of a line in said galley, substantially as described.

27. In a type-setting machine, the combination, with an alarm-signal, of an actuating-bar for bringing said signal into operation and a cam on said bar in the path of the type, said cam being adjustable on said bar, substantially as and for the purpose set forth.

28. In a type-setting machine, the combination, with the sliding galley, of the adjustable supporting-rails therefor, substantially as described.

29. The combination, with the sliding galley, of rails upon which said galley slides, a bed having an arm supporting said rails, and means for adjusting said bed to different heights, substantially as described.

30. The combination, with type-feeding devices and a galley for receiving the type, of a pusher for raising the type to the proper level to be fed into said galley and an adjustable bed carrying said pusher and also supporting the rails upon which said galley rests, whereby said galley and pusher may be adjusted simultaneously, substantially as described.

31. In a type-setting machine, the combination, with the frame, the galley, the feeding mechanism, and the reversing mechanism, of a bed adjustably connected with said frame and carrying the pushers, the shouldered bracket for starting the reversing mechanism, and the galley-rails, whereby all the parts may be simultaneously adjusted, substantially as described.

32. The combination, with the oscillating bed, of a spring-actuated latch for locking and preventing the vibration of said bed when in one position and an incline for withdrawing said latch at the proper time, substantially as described.

33. In a type-setting machine, the combination of the following elements: a reciprocating slide carrying a series of type-feeding fingers, a pusher arranged to act upon the type at the end of its first movement, ribbed feelers for pressing against all four sides of the type while lifted by said pusher, reversing mechanism also carried by said slide for acting upon the type during its second mo-

tion, another pusher for acting upon the type at the end of this motion and adjusting it for the action of the tripper mechanism, three trippers arranged in series for turning the type upon its longitudinal axis until properly placed, and a galley for receiving the type after passing the tripper mechanism, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN GUSTAFSON.

Witnesses:

JULIAN W. CHADWICK,
FRANK MCCLUSKY.