

No. 705,341.

Patented July 22, 1902.

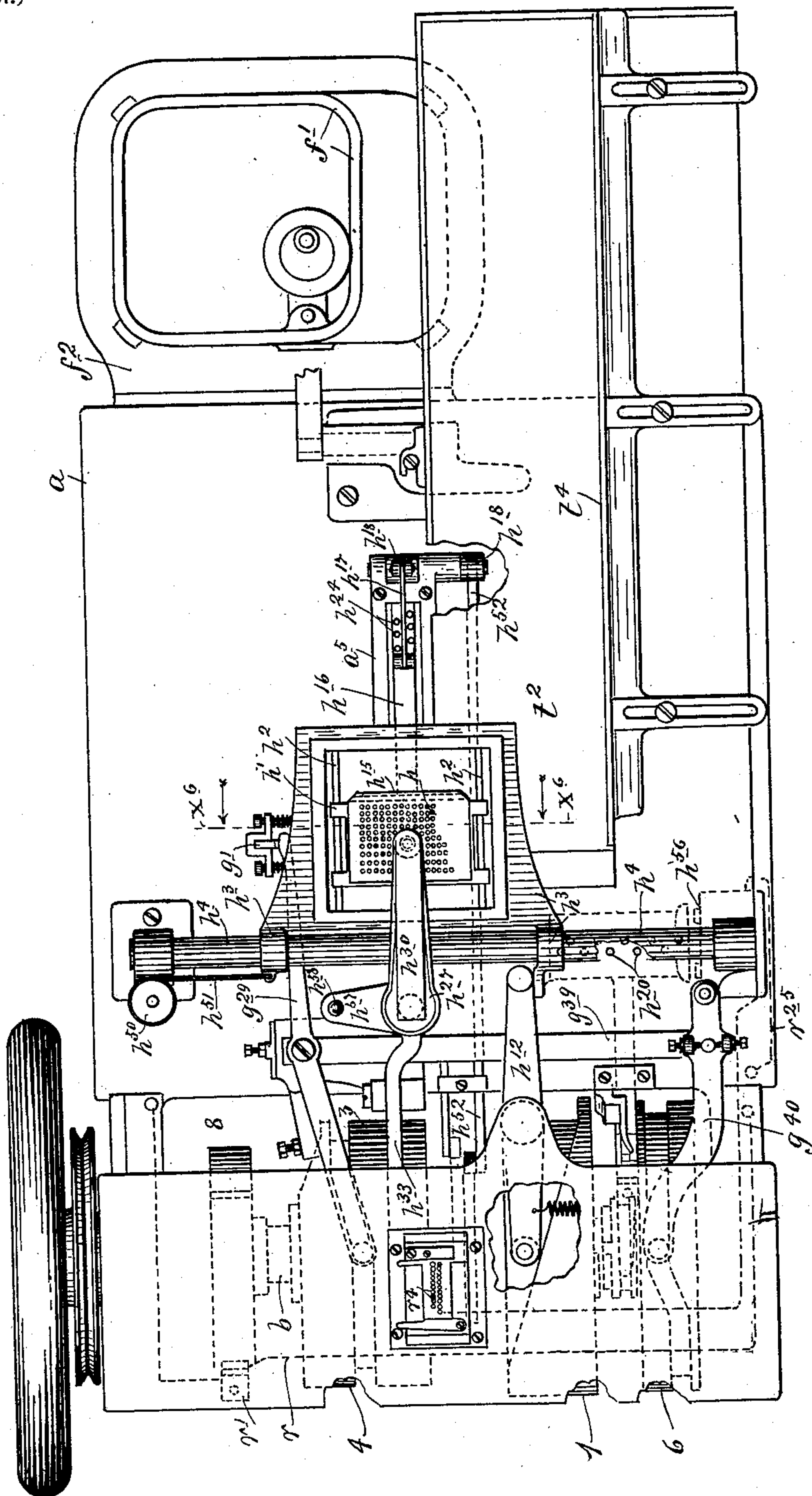
G. A. GOODSON.
TYPE CASTING AND SETTING MACHINE.

(Application filed Nov. 23, 1901.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



Witnesses
A. H. Opsahl.
H. D. Tilton.

Inventor
George A. Goodson.
by William M. Merchant
Attorneys

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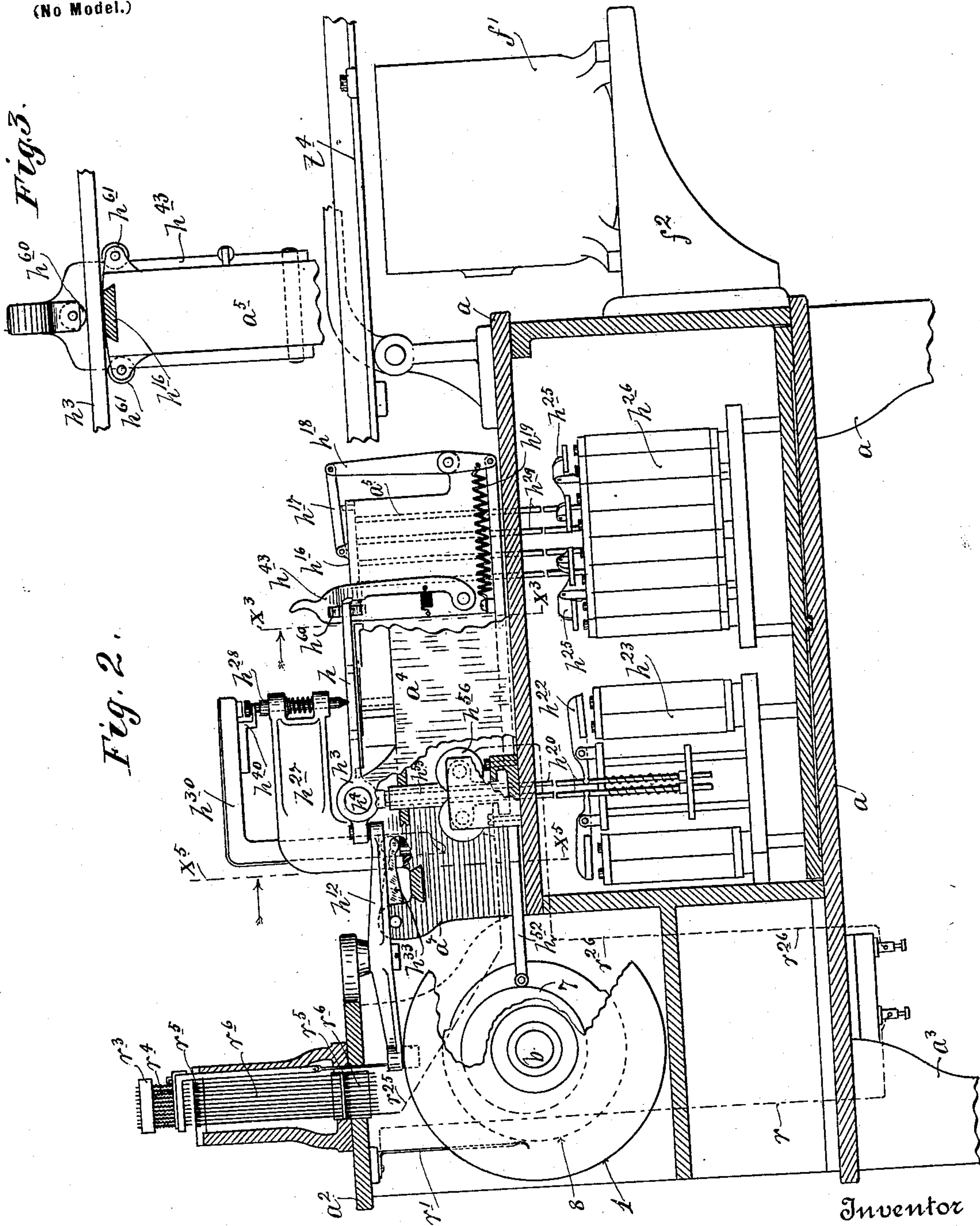
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5 Sheets—Sheet 2.

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Witnesses
A. H. Opsahl.
H. D. Kilgore.

Inventor
George A. Goodson.
by Williamson & Merchant
Attorneys

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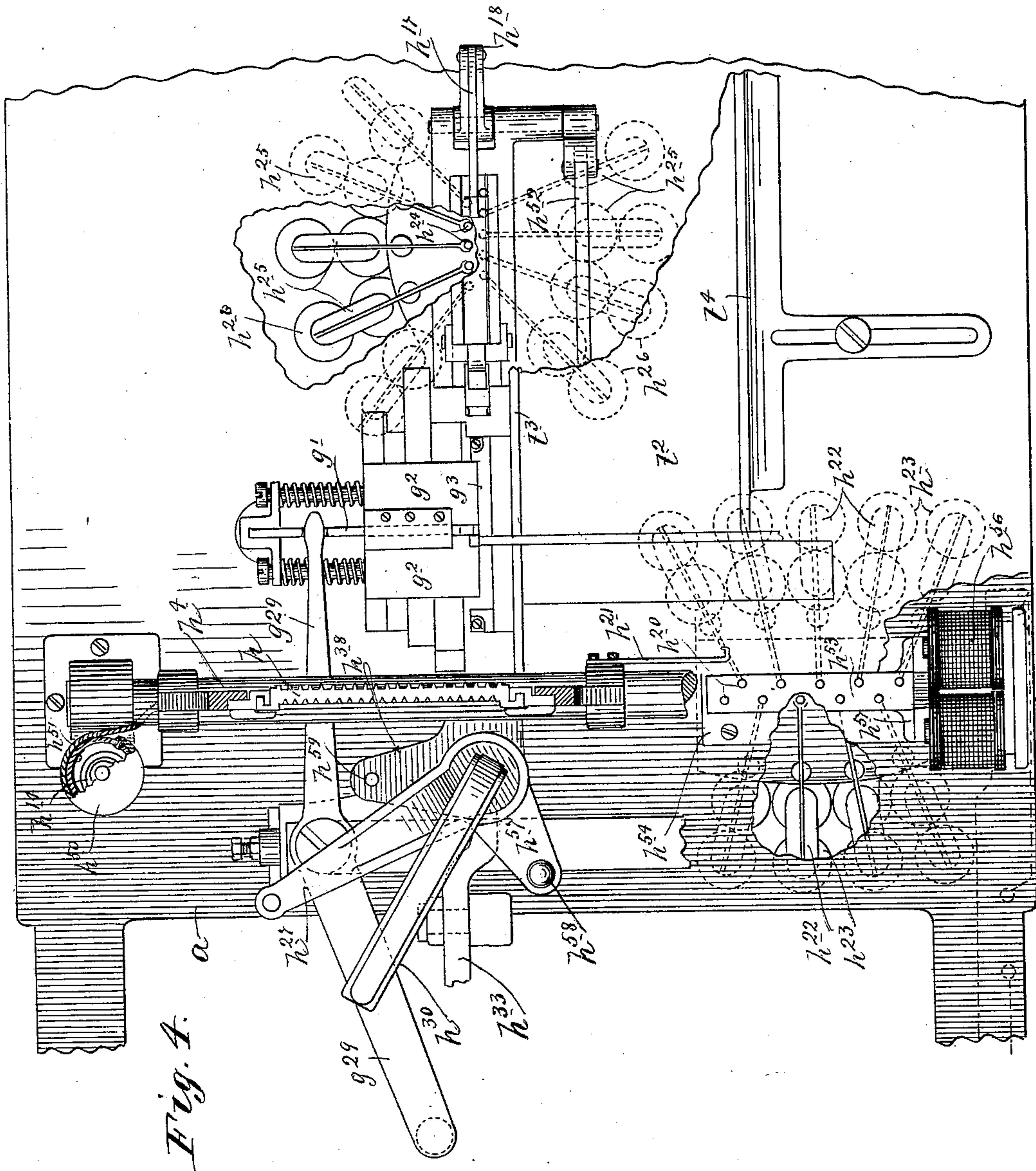


Fig. 4.

Witnesses
A. H. Opsahl.
H. D. Kilgus

Inventor
George A. Goodson
by Williamson & Merchant
Attorneys

G. A. GOODSON.

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5 Sheets—Sheet 4.

Fig. 5.

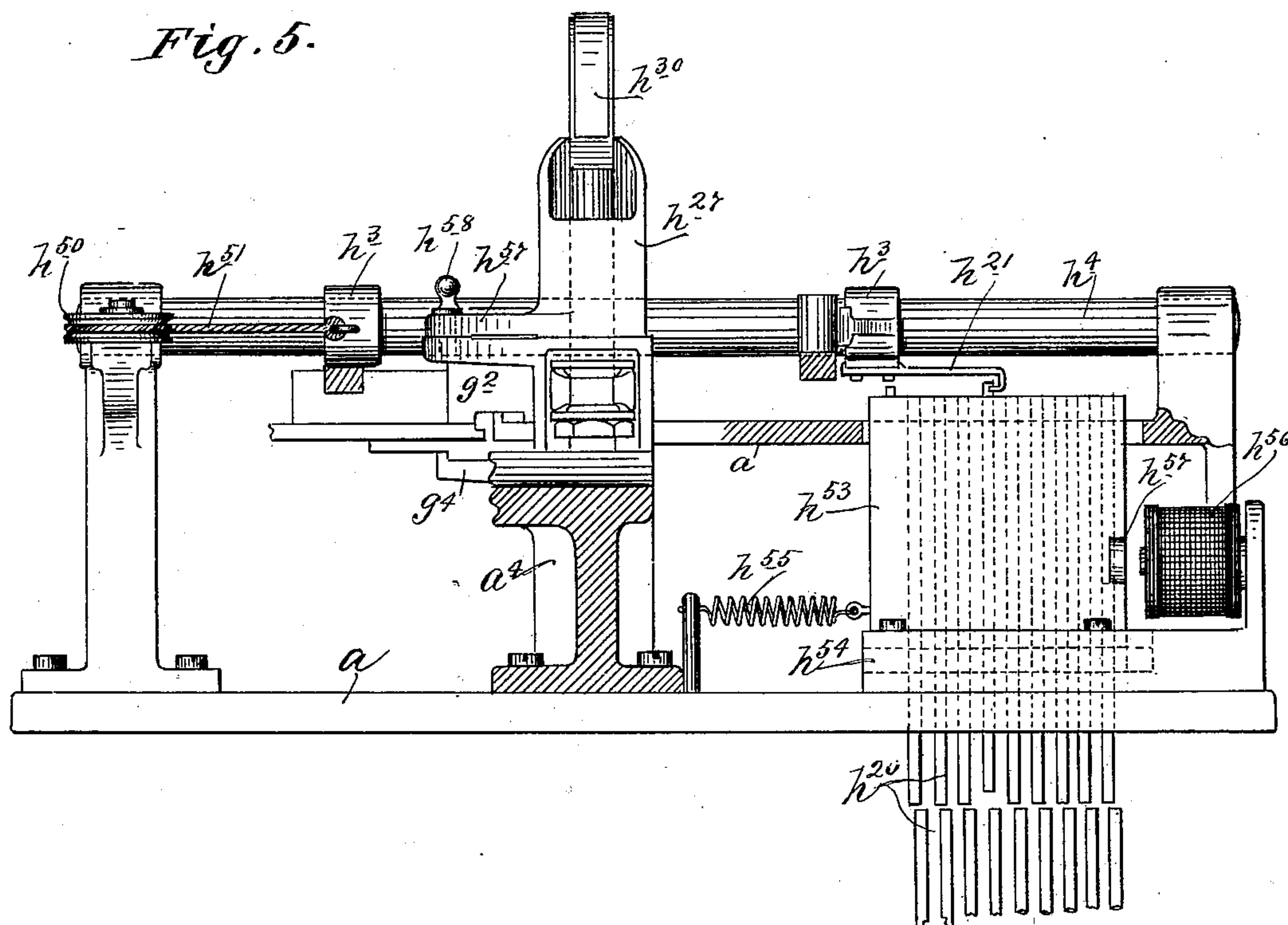
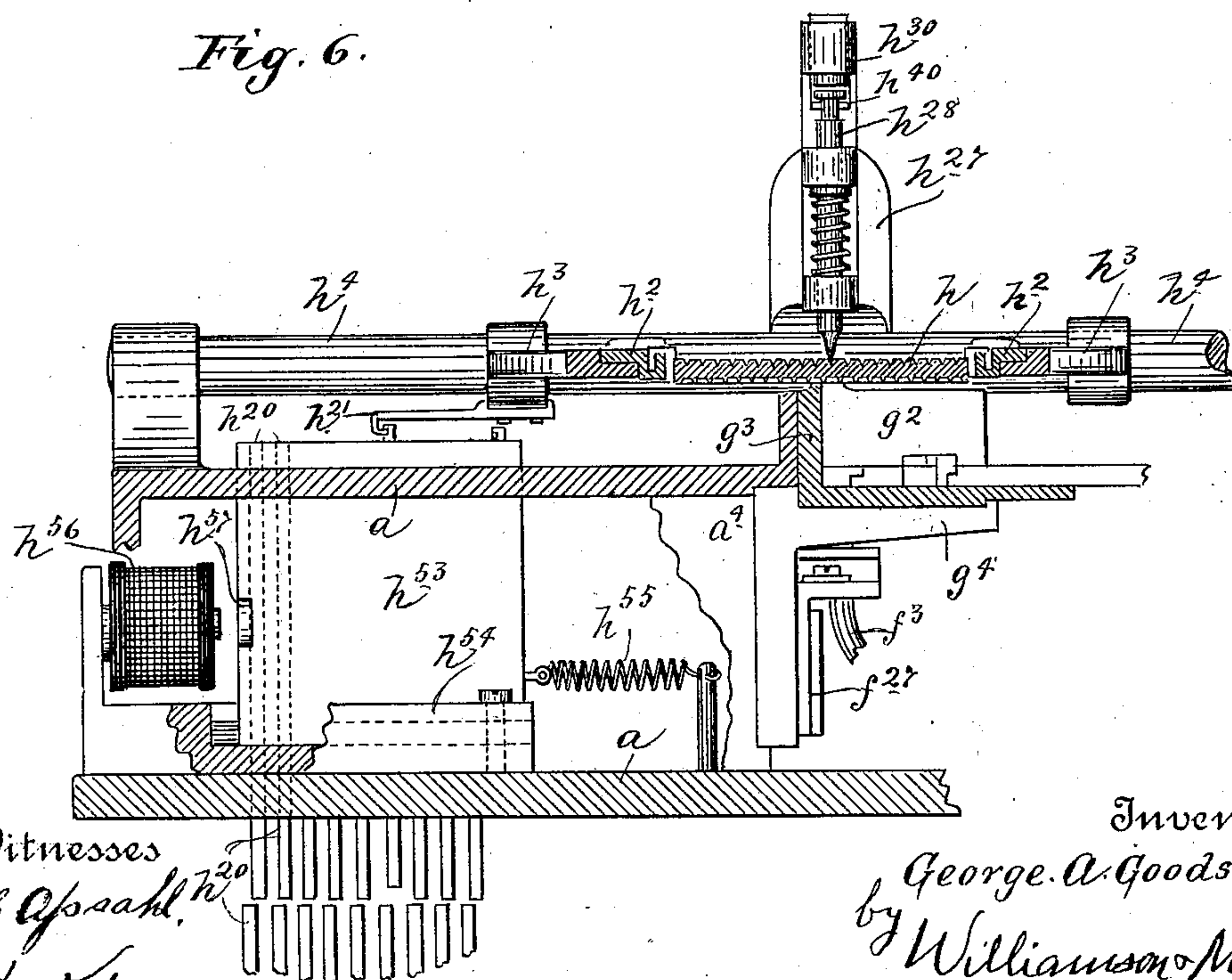


Fig. 6.



Witnesses
A. H. Opsahl
H. S. Hilgner

Inventor
George A. Goodson.
by Williamson & Merchant
Attorneys

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5 Sheets—Sheet 5.

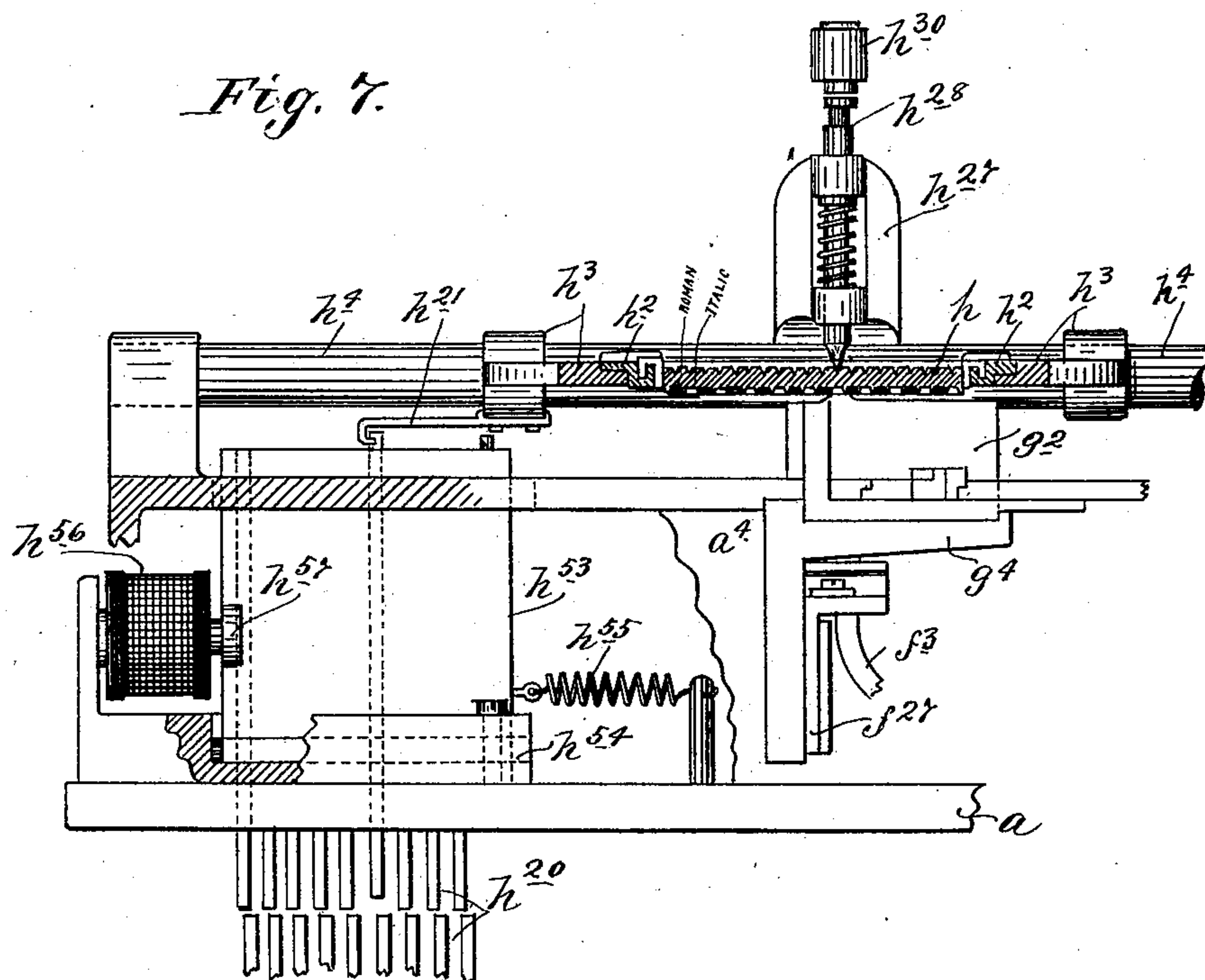


Fig. 8.

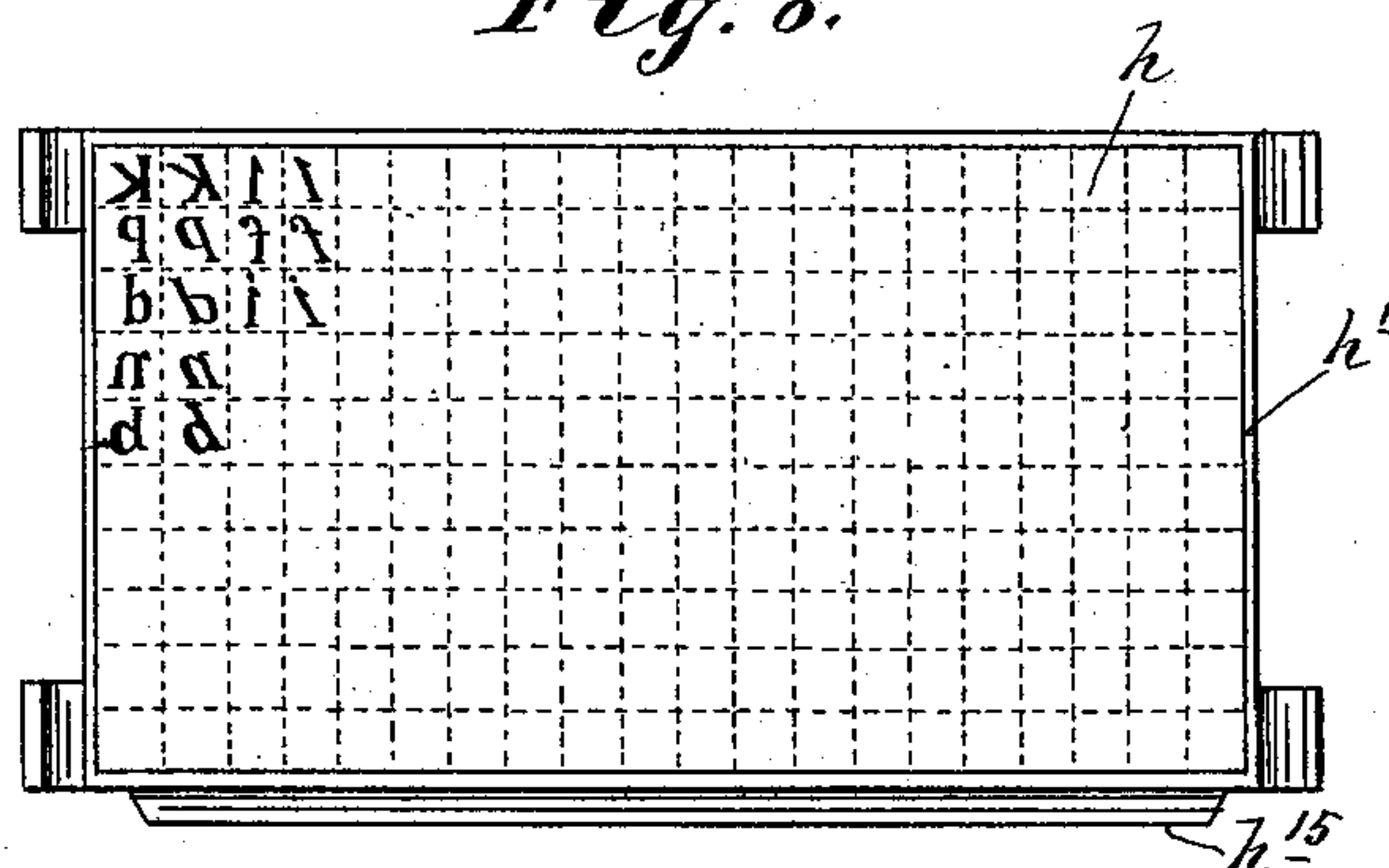
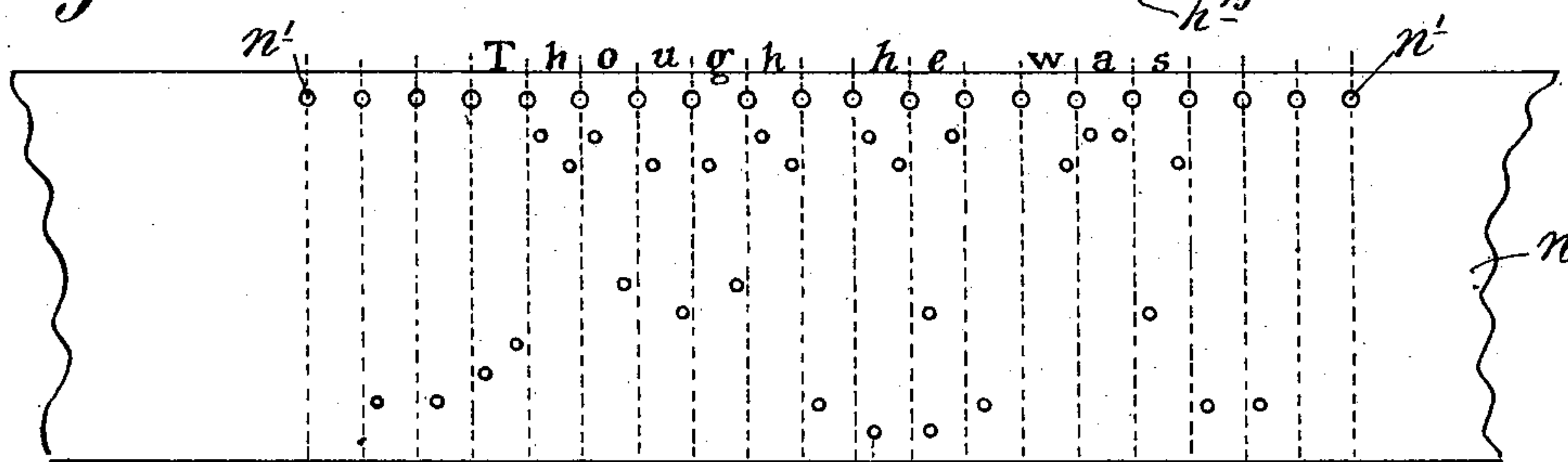


Fig. 9.



Witnesses
A. H. Opsahl.
H. D. Lilgner

Space.
Shiftaction, Italic
Shiftaction, Italic
Space.

Inventor
George A. Goodson
by Williamson & Merchant
Attorneys

UNITED STATES PATENT OFFICE.

GEORGE ARTHUR GOODSON, OF MINNEAPOLIS, MINNESOTA.

TYPE CASTING AND SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 705,341, dated July 22, 1902.

Application filed November 23, 1901. Serial No. 83,360. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ARTHUR GOODSON, a citizen of the Dominion of Canada, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Type Casting and Setting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to type casting and setting machines, and was especially designed to effect certain improvements in the Goodson system for casting and setting type, which system is disclosed most nearly in its commercial form in my prior United States patents, No. 606,007, of date June 21, 1898, and No. 609,098, of date August 16, 1898. Said Patent No. 606,007 discloses what I call my "composing-machine," under the action of which a pattern or dummy in the form of a punctured representative strip is produced which subsequently is made to control the type casting and setting machine disclosed in my said Patent No. 609,098. Otherwise stated, the Goodson type casting and setting machine is entirely automatic in its action, as it operates under the control of said pattern or representative strip. In said type casting and setting machine the matrices, which coöperate with the type-body mold and the other elements of the machine to cast and set individual type, are carried by a two-way movable matrix-carriage, and this carriage is variably intercepted by two coöperating banks or sets of stops for selecting and centering the selected die in casting position. Otherwise stated, the matrices are arranged in rows in two different directions and one set or bank of said stops serve to properly intercept the matrix-carriage in one direction of its movement for selecting the row in which the desired matrix is contained and the other set or bank of said stops serve to intercept the matrix-carriage in the other direction of its movement in the proper position to select and center the desired matrix of the row. Hence in my prior patents one set or bank of said stops, because of their said function, are called the "row-selecting" stops and the other set or bank thereof are

called the "individual" stops. In the Goodson machine the matrices are formed in the face of a solid block. Otherwise stated, I employ what I call an "integral-font matrix-block," produced by the process disclosed in my foundation United States Patent No. 530,481, of date December 4, 1894. The back of the block contains centering holes or surfaces for coöperation with a suitable centering-pin to finally and exactly center the selected matrix in casting position, and said centering-holes are uniformly spaced apart in two different directions. Otherwise stated, the matrix-block has uniform steps of movement in both of its two directions of travel. My matrix-block as disclosed in my prior patents was square in form or outline and provision was made for ten steps of movement in each of two different directions. That was sufficient to provide for upper and lower case letters, numbers, and punctuation-marks. In some points of view, however, it is desirable to provide for a greater number of type. Otherwise stated, more than one hundred matrices are needed on the matrix-block to give the machine an increased range of product. For example, it is desirable to have both Roman and Italic type. My present improvement has for its especial object to accomplish this result in the simplest possible way. To that end I increase the size of the matrix-block in one or both of its superficial dimensions, according to the increased number of matrices which may be desired, and then provide means for shifting one or both of the two banks or sets of intercepting-stops for selecting and centering the desired matrix. In the instance illustrated in the drawings, for example, it is assumed that the increase in the number of the matrices on the block is desired for the purposes of rendering available both Roman and Italic letters. Hence the matrix-block is increased in size in one direction only of its face—to wit, the row-selecting direction—in respect to its two-way movement, and the Roman and Italic letters occupy alternate rows. Provision is then made for shifting only the row-selecting bank or set of stops, no change being required in the bank or set of the individual stops. By shifting the bank or set of row-selecting stops from one to another of

two positions the same identical set of ten stops are rendered available to intercept the matrix-block in twenty different positions. Otherwise stated, the matrix-block may now have ten times twenty stopping positions instead of ten times ten, as in my prior patents. If the bank of individual stops had also been provided with similar means for shifting the same, the number of stopping positions would be twenty times twenty, or four hundred. From this it will be seen that by my present invention I multiply the stopping positions available from a single set or bank of stops without increasing the number of the stops themselves. The required shift of the bank of stops is effected under the control of the pattern or punctured strip. Otherwise stated, the strip which I employ on my improved machine contains not only the representations required for the normal selections of character-type, but when necessary for the given composition also contains the representation of a shift action for coöperation to secure a different selection of character-type. For example, if the normal representation be the Roman letters and the shift action be designed for coöperation to select Italic letters, then whenever an Italic letter is to be selected the strip will contain a shift-action hole which when the strip comes into action on the type casting and setting machine will coöperate to control the shift of the bank of stops, so as to make the same coöperate with the other set or bank of stops to position the matrix-block to center an Italic-letter matrix.

From the foregoing general statements it will be easy to follow the detailed description, which will now be given.

To best show my improvement in working position, it has been deemed desirable to illustrate a number of the parts of my machine as disclosed in my prior patents; but these old parts will not be detailed or noted only in so far as it is thought necessary to distinguish the improvements. The old parts illustrated where not otherwise noted may be assumed to be identical with the parts disclosed in my Patent No. 609,098, of date August 16, 1898, and when necessary to note the same in the description the same reference notations will be employed as in said prior patent.

The invention is illustrated in the accompanying drawings, wherein like notations refer to like parts throughout the several views.

In said drawings, Figure 1 is a plan view of the type casting and setting machine with my improvements embodied therein, some parts being broken away and many parts of the machine being removed. Fig. 2 is a view chiefly in vertical longitudinal section on an irregular line through Fig. 1 with some parts removed and others broken away and some parts shown in elevation. Fig. 3 is a detail in section on the line $x^3 x^3$ of Fig. 2. Fig. 4 is a view chiefly in plan of some of the same parts illustrated in Fig. 1, but with some of said parts in different positions, some parts

being shown in section, others being broken away, and still others being removed. Fig. 5 is a detail in vertical section on the line $x^5 x^5$ of Fig. 2 with some parts removed. Fig. 6 is a view in vertical section approximately on the line $x^6 x^6$ of Fig. 1, looking at the same parts as shown in Fig. 5, but from an opposite direction, with some portions removed and other parts broken away. Fig. 7 is a view similar to Fig. 6, but with the parts shown as they would appear when the row-selecting stops had been shifted into a different position from that shown in Figs. 5 and 6 as their normal positions. Fig. 8 is a view in underneath or bottom plan showing the face of the matrix-block and its smaller or transverse carriage detached, and Fig. 9 is a view in plan showing a portion of the pattern or punctured representative strip.

The matrix-block h has its matrices arranged in rows in two different directions, with the rows in one direction also arranged according to size of face—to wit, all the matrices of a given row being of the same number of units in running width of face, just as in my prior patents, but as compared with the matrix-block in my prior patents has twice the number of rows in the line of its row-selecting travel with Roman and Italic letter matrices disposed in alternate rows, as is clearly shown in Fig. 8. Said matrix-block h is removably fixed to its smaller or transverse carriage h' . This carriage h' is mounted on suitable guides h^2 , fixed to and forming parts of the main or large carriage h^3 for movement transversely of the line of travel of said main carriage h^3 . The main carriage h^3 is pivoted to a guide-rod h^4 , suitably secured to the main frame of the machine in proper position in respect to the top bed-plate a . The said main carriage h^3 is connected by a cord h^{51} or other suitable flexible connection with the sheave h^{50} , which is subject to a barrel-spring h^{14} for putting the main carriage h^3 under tension from said spring h^{14} to move lengthwise of the guide-rod h^4 in the direction of travel required for selecting the row of matrices. Said carriage h^3 is also subject to the inner end of a spring-held cam-lever h^{12} , pivoted to the shelf frame-plate a^2 and subject at its outer end to a properly-formed cam-surface on cam-wheel 1, carried by the main or constantly-running shaft b . Under the action of the cam-wheel 1 and the cam-lever h^{12} the main carriage h^3 is thrown to an initial position most remote from the barrel-spring h^{14} , thereby setting the spring under tension to move the said carriage in the opposite direction as rapidly as permitted by said cam and cam-lever until intercepted by the proper member of the row-selecting stops h^{20} .

The small or transverse carriage h' is provided with a downturned flange or lip h^{15} , which engages over a corresponding upturned flange of a bumper-slide h^{16} , mounted in frame-bracket a^5 for movement at right angles to

the line of travel of the main carriage h^3 . Said slide h^{16} is connected by a link h^{17} with the upper end of a pivoted lever h^{18} , which at its opposite end is subject to a spring h^{19} , secured to a fixed base of resistance and tending to throw the said bumper-slide h^{16} and smaller matrix-carriage h' outward as far as possible crosswise of the main carriage h^3 . The said pivoted lever h^{18} has attached to its lower end a cam-rod h^{52} , which extends toward the shaft b and is subject to a cam 7 on said shaft for moving the said lever h^{18} in the proper direction to throw the bumper-slide h^{16} and the smaller or transverse matrix-carriage h' inward to its limit or initial position on the main carriage h^3 , and thereby also setting the spring h^{19} under tension to move the said transverse carriage h' in the opposite direction as rapidly as permitted by the cam 7 and until the bumper-slide and said carriage h' are intercepted by the proper member of the individual stops h^{24} , which project into the path of said slide h^{16} when properly set under the control of said strip or pattern, as disclosed in my prior patent. The said individual stops h^{24} are subject to armature-levers h^{25} and magnets h^{26} , as in my prior patents. The row-selecting stops h^{20} are subject to armature-levers h^{22} and magnets h^{23} . Otherwise stated, the row-selecting stops h^{20} and the individual stops h^{24} are subject to armature levers and magnets under the control of the punctured representative strip through suitable electric connections, (not herein shown, but which would be in practice exactly the same as disclosed in my prior patent, No. 609,098.) As in my said prior patent, No. 609,098, the stops h^{20} and h^{24} are shown as formed in two sections, with the lower members thereof attached to the inner ends of the armature-levers and normally spring-held in their lowermost positions. In the present instance, however, the upper sections of the movable members of the row-selecting stops h^{20} have their guide-block h^{53} , mounted for sliding movement in a suitable guideway formed in a base-block h^{54} , fixed to the top bed-plate a of the main frame. Said stop guide-block h^{53} is subject to a spring h^{55} , tending to hold the same in its normal position, and is also subject to a magnet h^{56} , which when energized shifts the said block h^{53} to an opposite position and sets the spring h^{55} under tension to return said block h^{53} to its normal position when the shift-magnet h^{56} is deenergized. The movement of the guide-block h^{53} is parallel with the guide-rod h^4 or the line of travel of the main matrix-carriage h^3 . When the block h^{53} is in its normal position, or as shown in Figs. 5 and 6, the row-selecting stops h^{20} will be in proper position for the interception of the main carriage h^3 to select the normal rows of matrices—such, for example, as the Roman letters; but if the said guide-block h^{53} be drawn by said shift-magnet h^{56} to its opposite extreme position, as shown in Fig. 7, then the said row-selecting stops h^{20} will be

in position to intercept the main matrix-carriage h^3 in proper position to select other than the normal rows of type—as, for example, the rows containing Italic letters. Whether in one position or the other the guide-block h^{53} always maintains the sections of the row-selecting stops h^{20} carried thereby in such position relative to the lower sections thereof carried by the armature-levers h^{22} that the latter will operate the former. Otherwise stated, the upper sections of the row-selecting stops always cooperate with the lower sections thereof carried by the armature-levers h^{22} and subject to the magnets h^{23} . The guide-block h^{53} is shown as provided with a piece of soft iron h^{57} , set therein in proper position to serve as an armature for the shift-magnet h^{56} .

By reference to Fig. 9 it will be seen that the representative strip n is provided with marginal feed-holes n' , word-space holes, and character-selecting holes, as in my prior patents; but it may also be noticed that the compositions called for by the strip include two Italic letters—to wit, the letters of the word “he”—and that the feed-spaces on the strip for these two Italic letters contain two special holes marked “Shift-action.” In other words, if the Roman character be the normal character and the shift-action call for Italics and the normal selection requires two holes, as is the case in the instance illustrated, then the abnormal selection, as the Italics in the case illustrated, will employ three holes—to wit, the normal and the shift-action holes. When this strip n comes into action on the type casting and setting machine, it is fed under the bank of thrust-pins r^4 , exactly as in my prior patents. In the present instance, however, one of the thrust-pins r^4 is appropriated to the shift-action—to wit, the one shown most black in Fig. 2—and will cooperate through the shift-hole of the strip to establish the proper electric connections for energizing the shift-magnet h^{56} when the abnormal selection is to be made. As shown, current reaches the machine over the source-wire r , spring-contact r' , and one of the cams—to wit, the member 8 on the shaft b —during the proper portion of the revolution of the shaft, and thence reaches the mercury-cells r^3 and thrust-pins r^4 , as in my prior patents. The shift-action member of the thrust-pins r^4 cooperates with the proper member of the mercury-cups r^5 and conductor-sections r^6 , from which a special conductor r^{25} extends to the shift-magnet h^{56} , whence a return-conductor r^{26} leads back to source.

The electric connections for the magnets h^{23} of the row-selecting stops and the magnets h^{26} of the individual stops have not been shown, but are exactly the same as in my Patent No. 609,098, and hence it must be obvious that the shift-action hole on the strip for any given character will come into play coincidentally with the character-holes, and thereby energize or cause to be energized the

shift-action magnet h^{56} coincidently with and for the same length of time that the stop-magnets are energized. Hence the shift-action magnet will hold the stop guide-block h^{53} in its abnormal position long enough to permit the stops to make the abnormal selection.

The main or large matrix-block carriage h^3 is shown as provided with a hook-shaped catch h^{21} for engagement with the set member of the stops h^{20} , as in my prior patents. It is of course obvious that the particular member of the intercepting-stops which determine the extreme limit of the matrix-block's travel away from normal or initial position requires no armature or magnet, and hence is shown as a fixed stop. The fixed stop for the row-selecting bank must, however, of course be fixed to and movable with the guide-block h^{53} in its shifting movements.

Attention will now be directed to certain changes in construction or modifications of some of the parts shown as compared with my prior patents, especially Patent No. 609,098.

From an inspection of the drawings it will be seen that the main matrix-carriage h^3 , which travels parallel with the constantly-running shaft b , is without any housing and that it is mounted for pivotal movement toward the said shaft b . In my said prior patents the main matrix-carriage moved in the same direction within a housing which was pivoted to suitable bearings at one side of the machine for pivotal movement in a plane parallel with the main shaft b . This change has been made for simplification and better exposure of the type-body mold g' g^2 g^3 and the galley t^2 t^3 t^4 and certain other parts about the center of the machine. This modification called for certain further changes. The spring-seated centering-pin h^{28} instead of being mounted in a yoke fixed to the main matrix-carriage housing, as in my prior patent, is now mounted in the outer end of the horizontal arm of an angular holder h^{27} , the vertical arm or section of which sets in suitable fixed bearings h^{31} , fixed to the main frame, with freedom for pivotal movement, so as to permit the same to swing toward the shaft b , and thereby clear the main carriage h^3 and permit the latter to be turned upward and rearward from the position shown in Figs. 1, 2, 5, 6 into the position shown in Fig. 4. This holder h^{27} is provided with an arm h^{57} , having a locking thumb-bolt or pin h^{58} , which when the holder is in its normal position, as shown, for example, in Figs. 1 and 2, is made to engage with the hole or seat h^{59} in a fixed part of the framework of the machine, and thereby to lock the holder h^{27} in its normal position.

The vertically-movable plunger h^{30} retains the same shape as in my former patents; but its vertical arm now extends through or is seated in the vertical section of the holder h^{27} , with its axis coincident with the axis of the holder h^{27} , with freedom for pivotal motion with the said holder h^{27} or independently

thereof in the bearings afforded by said holder. The plunger h^{30} is subject to the cam-lever h^{33} for its up-and-down motions, exactly as in my prior patents. Otherwise than in the respect just hereinbefore noted the said plunger h^{30} is mounted and operates exactly as in my prior patent. The horizontal arm of the plunger h^{30} carries a sliding keeper h^{40} , bifurcated at its outer end and adapted to engage the upper end portion of the centering-pin h^{28} when the parts are in their normal or working position, as best shown in Fig. 2, thereby preventing any angular or pivotal motion of the plunger h^{30} in respect to the centering-pin h^{28} and its holder h^{27} . With this construction it is obvious that the plunger h^{30} and the pin-holder h^{27} may be swung into the positions shown in Fig. 4 whenever so desired for clearing the matrix-carriage and permitting the latter to be turned upward and backward, as shown in Fig. 4, for exposing the type-body mold, galley, and other parts at and about the center of the machine.

The mold-plunger g' is subject to a cam-lever g^{29} and the cam-wheel 4 exactly as in my prior patents for its normal actions in casting type, and the cam-lever g^{29} may have its fulcrum shifted through the connection g^{39} , cam-lever g^{40} , and the cooperating cam-channel in the normally idle cam-wheel 6, just as in my prior patent, No. 609,098, for imparting to the mold-plunger the extra-long stroke required for pushing the line of cast type entirely out from the type-body mold into a position in front of the mouth of the galley.

When the matrix-carriage is in its normal or working position, it is held down by a pivoted spring-latch h^{43} , as best shown in Figs. 2 and 3. This latch h^{43} is of proper form to straddle the pillow-block a^5 or casting in which are mounted the individual stops h^{24} with freedom for a limited pivotal motion which is sufficient to clear the matrix-carriage when the latch is thrown outward to its limit. The latch h^{43} carries a roller h^{60} , and to the pillow-block a^5 are secured a pair of rollers h^{61} , which cooperate with the roller h^{60} to afford antifriction-bearings for the main matrix-carriage h^3 in its traveling movement lengthwise of its guide-rod h^4 and crosswise of the pillow-block a^5 . The reverse lip or flange engagement between the small or transverse matrix-carriage h' and the bumper-slide h^{16} maintains the engagement of these parts, while permitting the free movement of the main matrix-carriage h^3 at right angles thereto.

The mold-plunger g' is variably intercepted for setting the same for any given type by a set of stops operated by armatures and magnets (not shown) under the control of the strip through electric connections, (not fully shown,) but all of which parts are the same as in my prior patents.

The molten metal is supplied from the melting-pot f' on the bracket f^2 , located remotely from the type-body mold, under the

action of a suitable pump in the melting-pot through a small pipe or tube f^3 , a portion of which appears in Figs. 6 and 7. This tube is connected into an electric circuit, (not shown,) and the nipple or delivery end of the same is mounted on a nipple-slide f^{27} , which in turn is mounted on a vertically-movable mold-support g^4 , all exactly as in my prior patents, and these parts are operated by exactly the same means and in exactly the same manner as in my prior patents. For the purposes of this case it has not been deemed necessary to show in detail the means for operating the mold or controlling the supply of the molten metal.

The matrix-block has been illustrated and described herein as provided with Roman and Italic letters in alternate rows, and the shift-action has been shown and described as applied to shift the row-selecting bank of stops in order to secure the selection of Roman or Italic letters, as may be required by the composition represented on the strip. It must be understood, however, that this is only one instance of the application or use of the invention and that in point of principle the said invention is capable of manifold other uses. Otherwise stated, the invention renders available a multiplied number of stopping positions from a single set or bank of stops, thereby enabling a much larger number of matrices or dies to be provided on the matrix-carriage, regardless of what these may be, and, nevertheless, to permit the same to be selected under the control of the strip without requiring any increase in the number of the stops themselves. Instead of being applied to only one of the two banks of stops the shift-action mechanism might be duplicated or otherwise readily modified for application to both of the two banks of stops under the control of the strip, thereby again doubling up or multiplying the number of stopping positions available to the matrix or die carriage. The matrix or die carriage is in point of function, of course, a die-selecting carriage, and whether the dies, whether male or female, be on the carriage or the carriage be simply a selecting device taking different positions in order to select the desired die my invention herein disclosed and claimed would apply equally well for multiplying the number of selections securable from any given number of stops.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. A representative pattern or dummy for controlling the actions of a type casting or setting machine, which pattern contains normal representations for the normal selections of character-type and, when necessary for the given composition, also contains the representation of a shift-action for cooperation to secure a different selection of character-type, substantially as described.

2. In a type casting or setting machine, the combination with a die-selecting carriage, of a bank or set of stops, for variably intercepting said carriage to make the desired selection, and a shift-action device operative to shift said bank of stops for multiplying the stopping positions available to said carriage from said bank of stops, substantially as described.

3. In an automatic type casting or setting machine, controlled by a pattern or dummy representing the desired composition, the combination with a die-selecting carriage, of a bank or set of stops under the control of said pattern, for variably intercepting said carriage to make the desired selection, and a shift-action device also controlled by said pattern and operative to shift said bank of stops for multiplying the stopping actions available to the carriage from said stops, substantially as described.

4. In a type casting or setting machine, the combination with a two-way movable die-carriage having the dies thereon arranged in rows in two directions, of two corresponding banks or sets of stops, for variably intercepting said carriage, one set of stops serving to select the row, and the other set thereof serving to select the individual die of the row, and shift-action mechanism operative to shift at least one of said banks of stops, for multiplying the stopping positions available to said carriage from said stops, substantially as described.

5. In an automatic type casting and setting machine controlled by a pattern or dummy representing the desired composition, the combination with a two-way movable matrix-carriage, having the matrices arranged thereon in rows in two directions, of two corresponding banks or sets of stops under the control of said pattern, for variably intercepting said carriage to select the desired matrix, and a shift-action device also controlled by said pattern and operative to shift at least one of said banks of stops, for multiplying the stopping positions available to said carriage from said stops, substantially as described.

6. The combination with a bank of magnets and armature-levers, of a bank of stops including movable members subject to said armature-levers, and a shift-action device operative to shift the position of said bank of stops relative to said armature-levers but maintaining the same subject thereto in both of the shift positions substantially as described.

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

GEORGE ARTHUR GOODSON.

Witnesses:

JAS. F. WILLIAMSON,
F. D. MERCHANT.