No. 778,313. PATENTED DEC. 27, 1904.

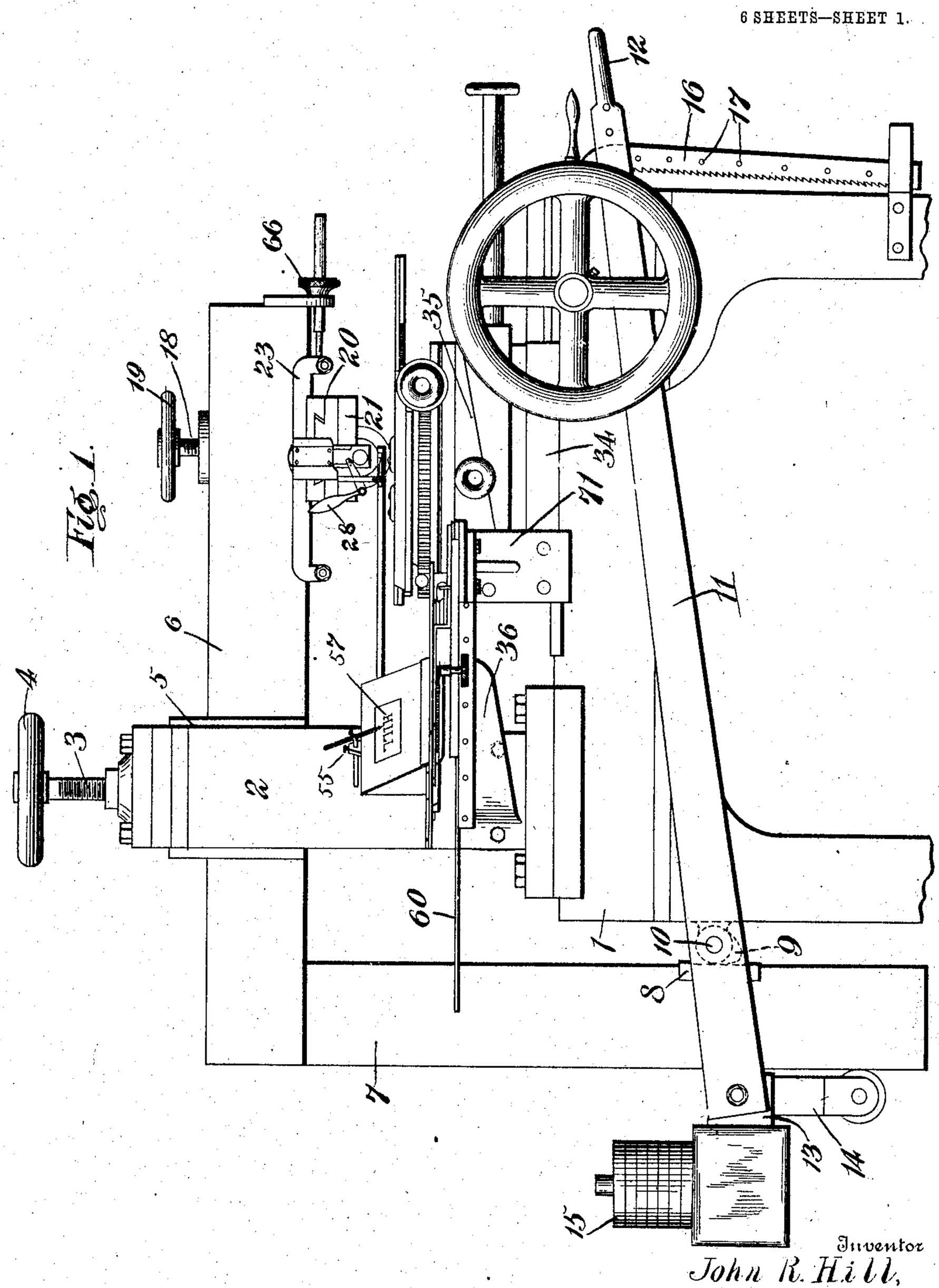
J. R. HILL.

METHOD OF PRODUCING PRINTING PLATES OR SURFACES.

APPLICATION FILED APR. 23, 1904.

6 SHEETS—SHEET 1.

Fig. 1.



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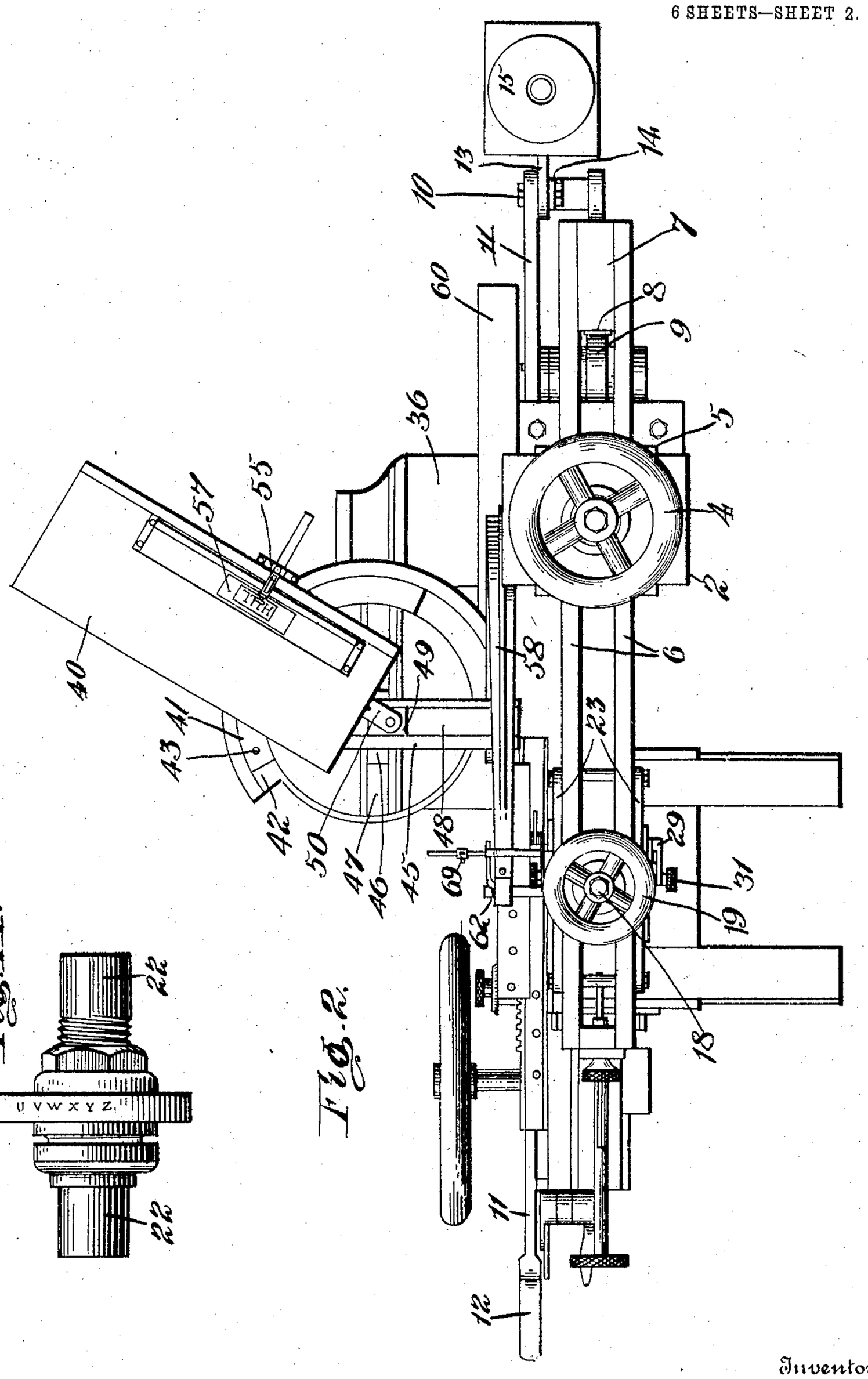

Fig. 2.

Fig. 14.

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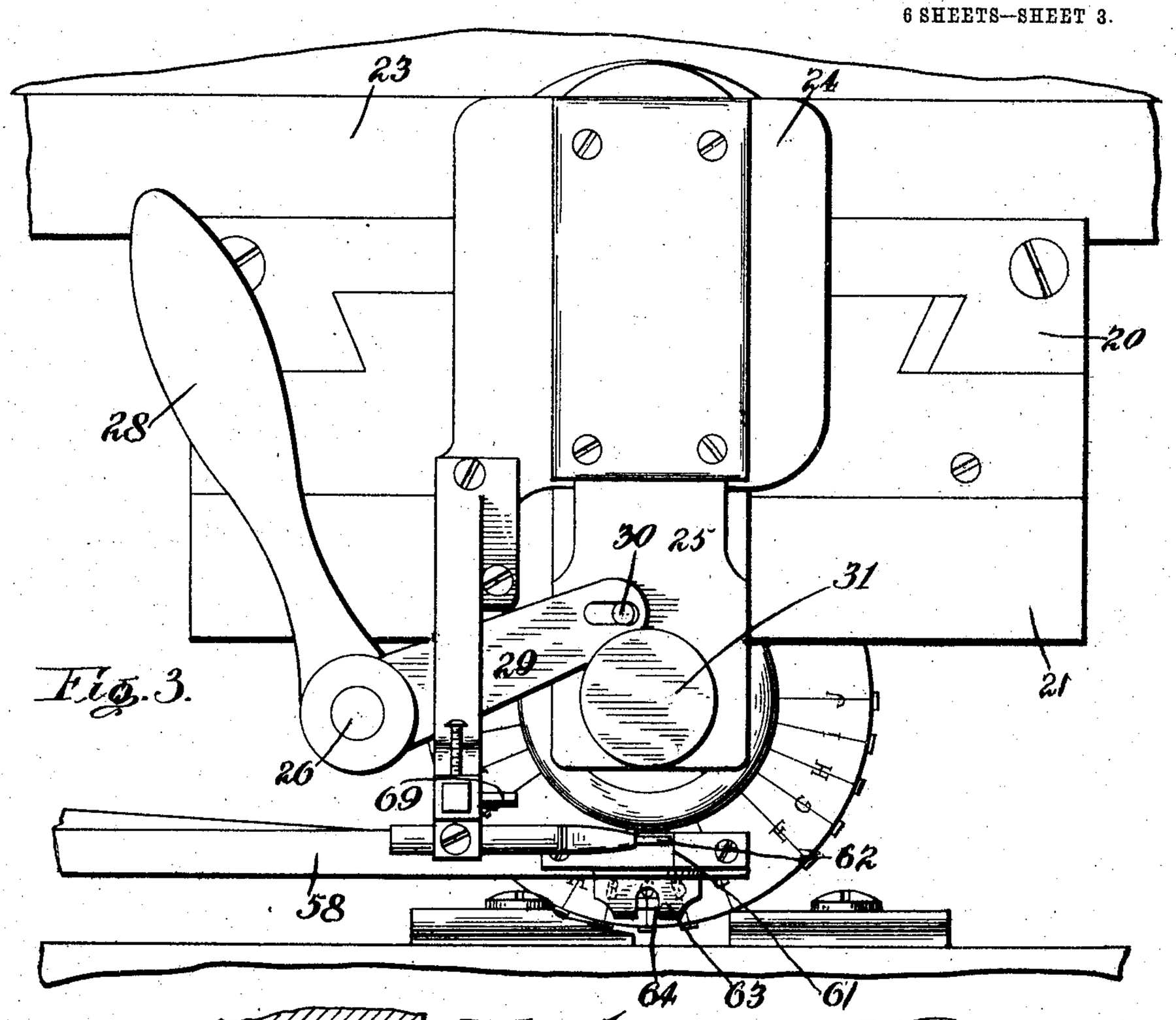

Fig. 3.

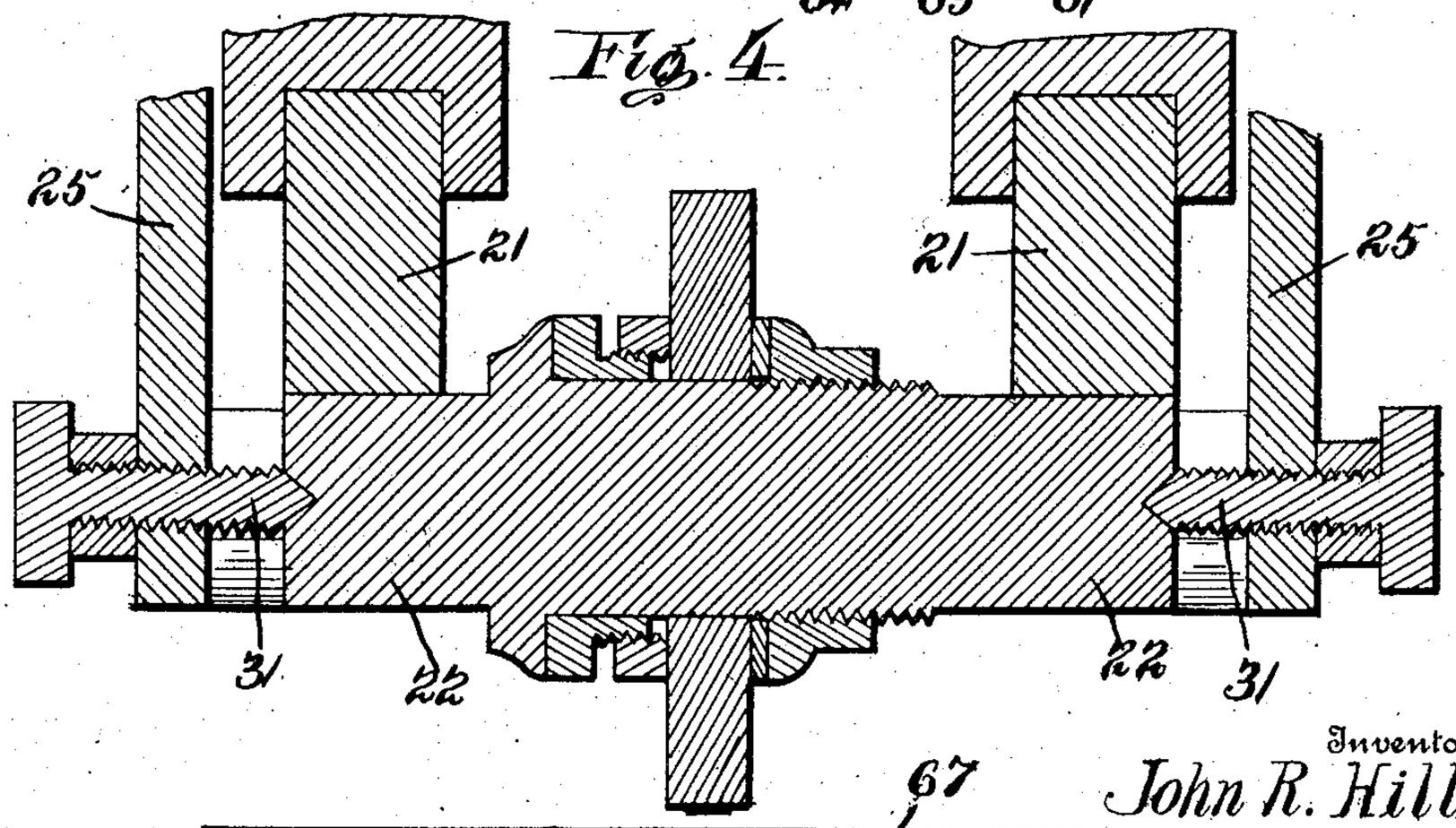

Fig. 4.

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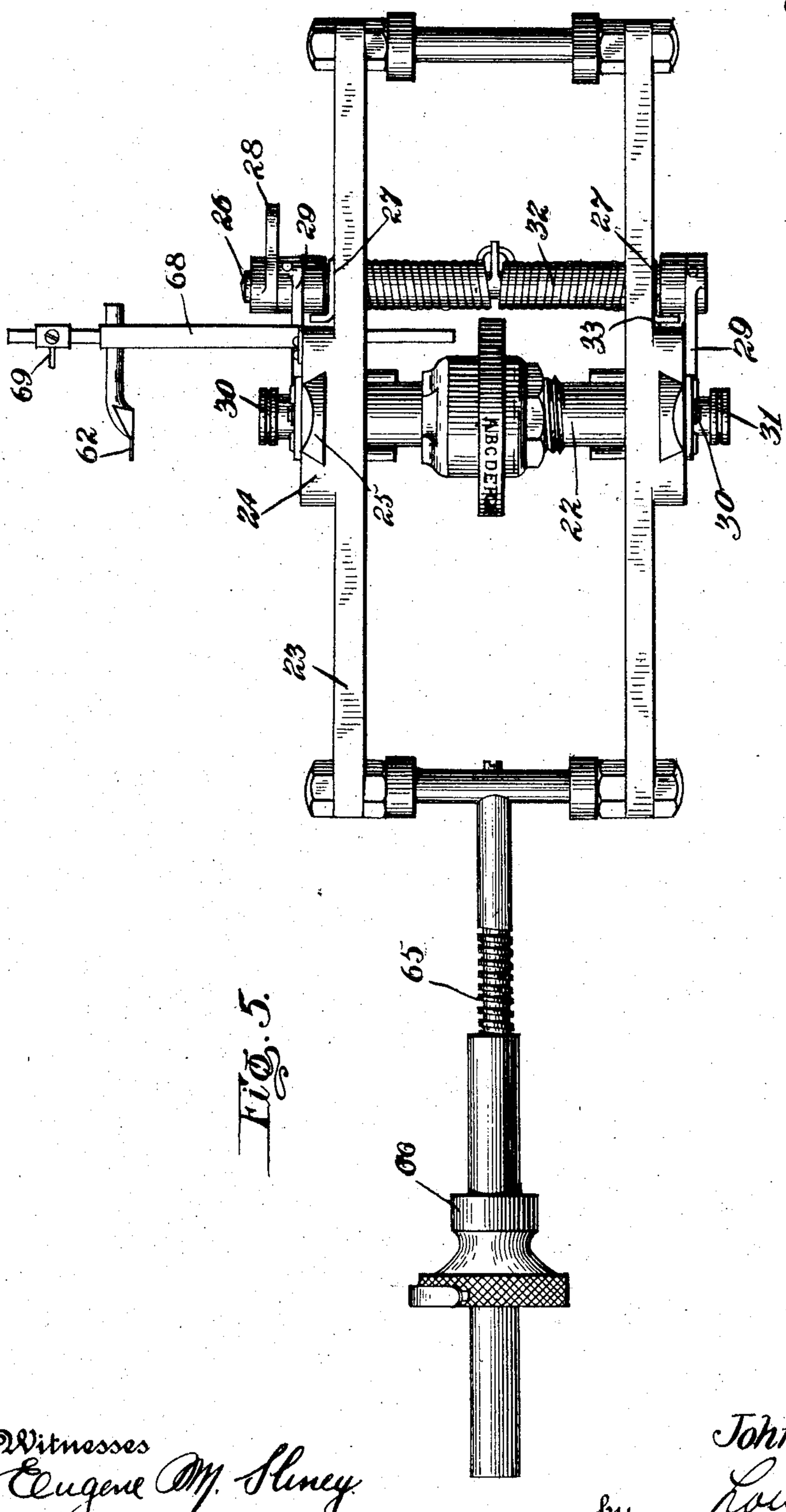

Fig. 5.

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6 SHEETS—SHEET 6.

Fig. 6.

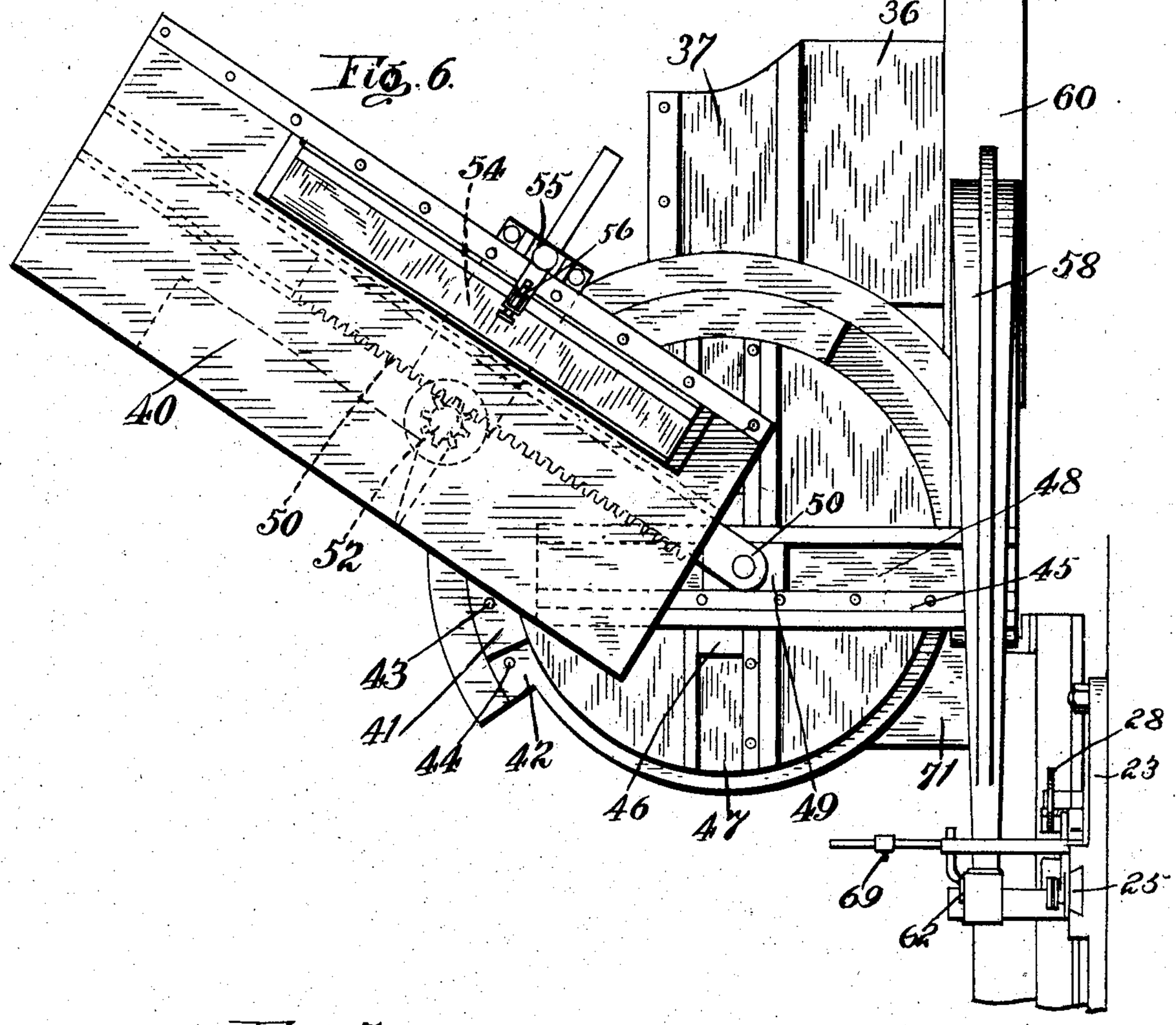
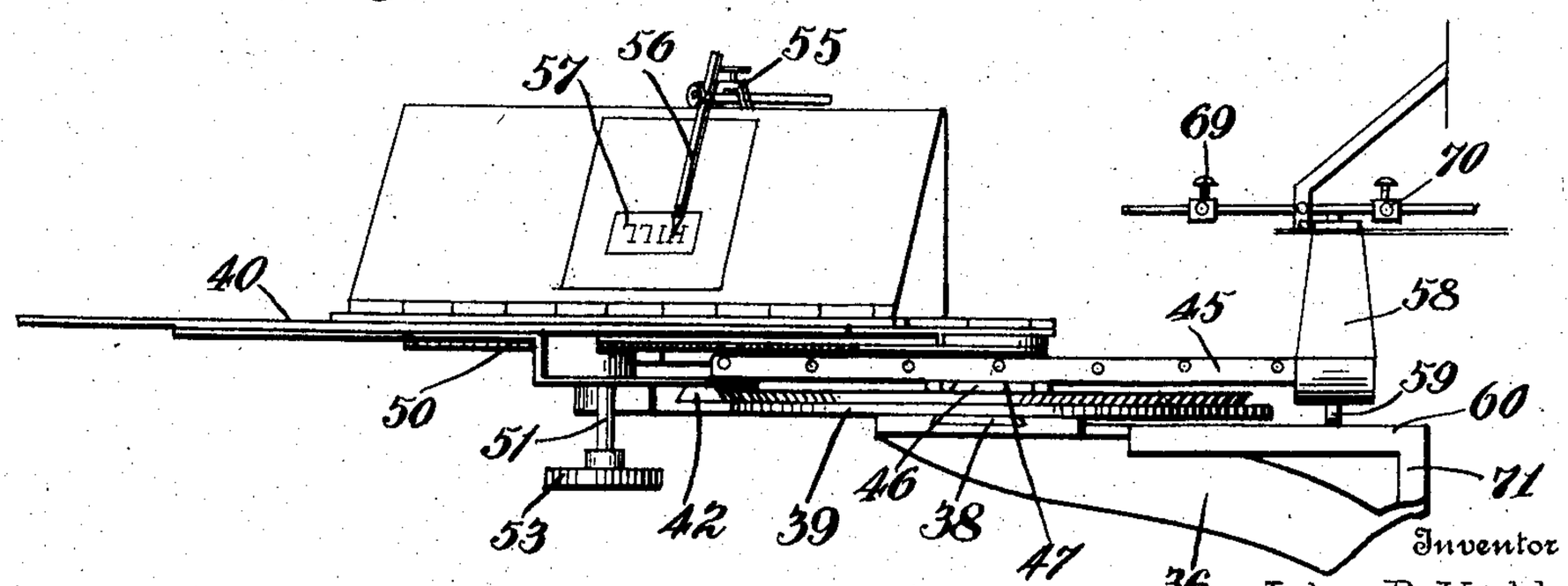


Fig. 7.



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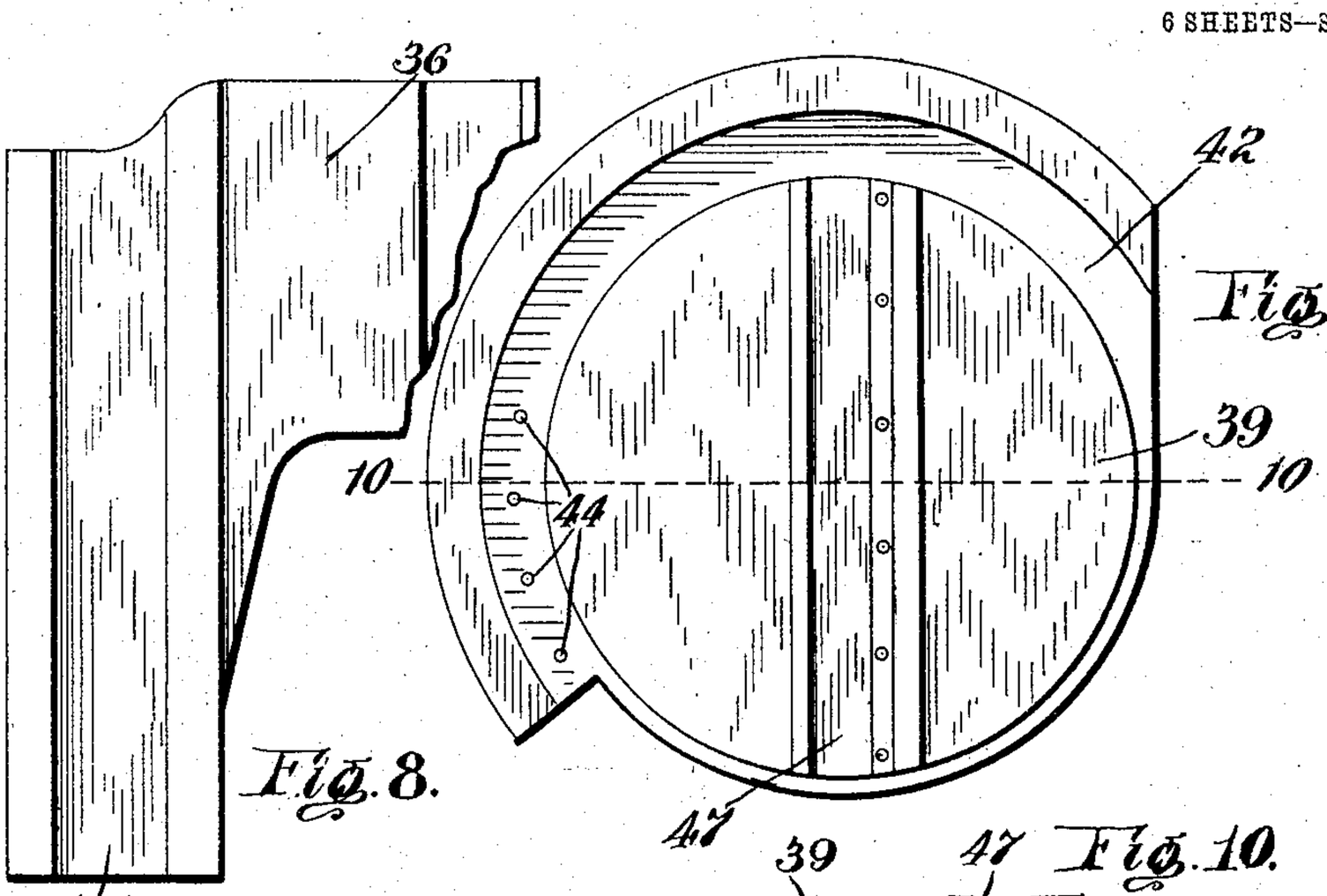


Fig. 8.

Fig. 9.

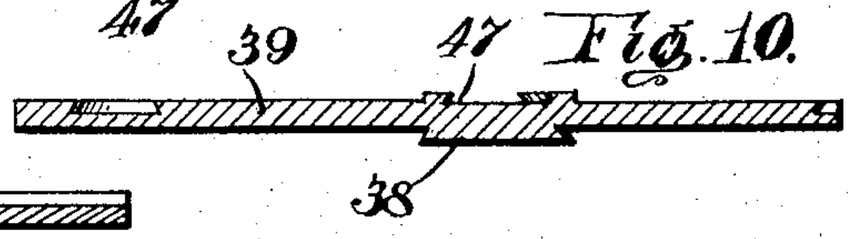


Fig. 10.

Fig. 11.

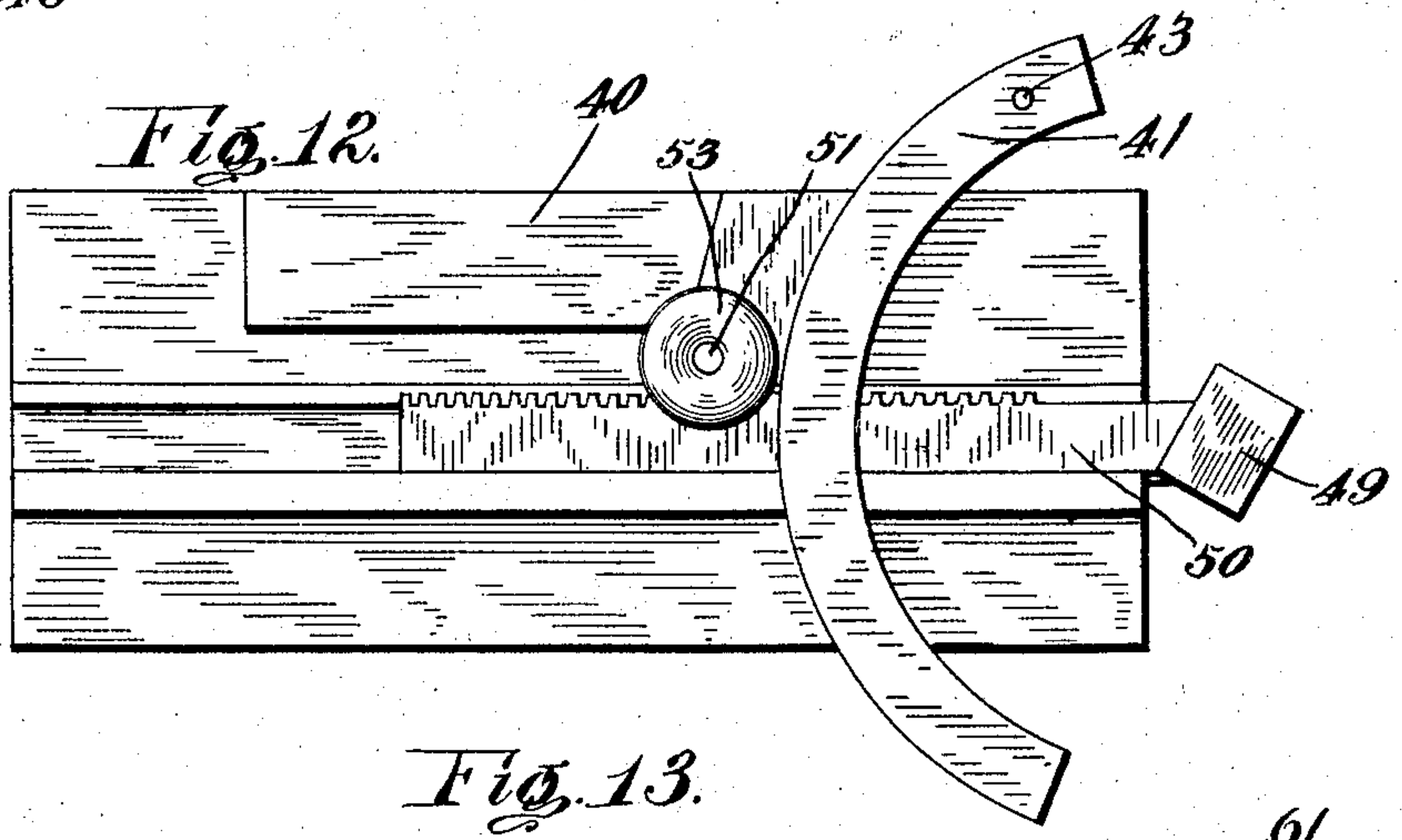
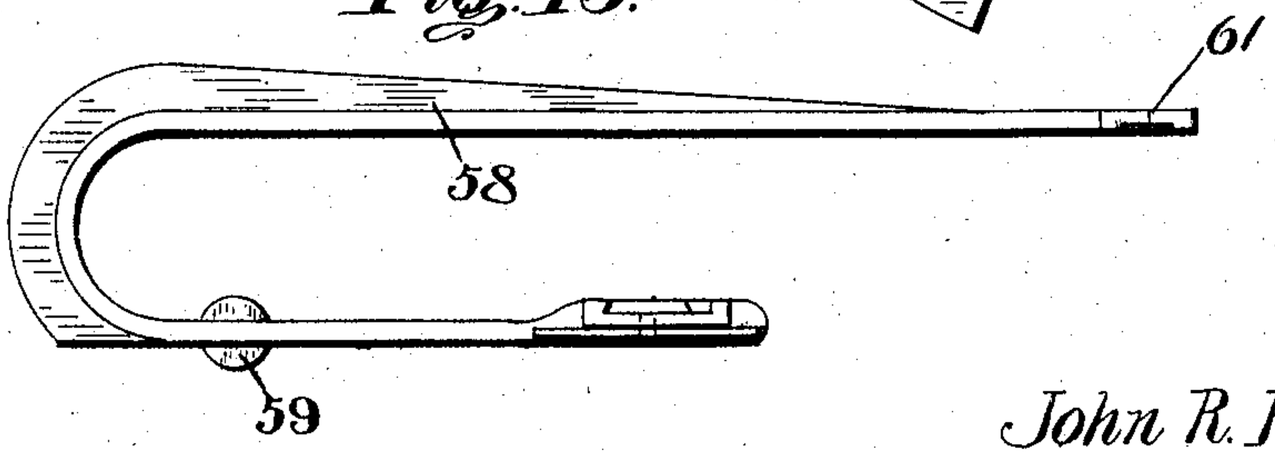


Fig. 12.

Fig. 13.



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No. 778,313. Patented December 27, 1904.

UNITED STATES PATENT OFFICE.

JOHN R. HILL, OF WASHINGTON, DISTRICT OF COLUMBIA

METHOD OF PRODUCING PRINTING PLATES OR SURFACES.

SPECIFICATION forming part of Letters Patent No. 778,313, dated December 27, 1904.

Application filed April 23, 1904. Serial No. 204,649.

To all whom it may concern:

Be it known that I, JOHN R. HILL, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Methods of Producing Printing Plates or Surfaces, of which the following is a specification.

My invention relates to an improved method of producing printing-plates by the transfer process; and it consists in the steps and combinations herein described and claimed.

The objects of my invention are to provide an improved method of providing metallic blanks with letters, characters, or designs by the transfer process for producing printing-plates such as are employed in printing bank-notes, &c., in an expedient and convenient manner, whereby the amount of labor now required in the production of such plates is greatly reduced and the capacity of an operator correspondingly increased.

A further object of my invention is to provide an improved method for producing printing-plates which will obviate the necessity of engraving an initial plate and preparing a separate transfer-roll for each different combination or arrangement of letters or other characters.

A further object of my invention is to provide an improved method of producing printing-plates by the transfer process whereby all combinations and arrangements of characters can be accurately transferred to printing-plates with any desired relative arrangement of spacing by the employment of a limited number of suitable primary surfaces, such as transfer-rolls, thus obviating the necessity of producing and maintaining in stock a separate transfer-roll for each different group or arrangement of characters.

I have herein described my invention as applied to forming names and titles upon bank-note plates; but it is obviously adapted for use in numerous other connections and manners.

In the accompanying drawings, forming a part of this application, and illustrating one means for carrying out my invention, Figure 1 is a side elevation of a transfer-press equipped with devices for enabling the operation of my invention to be conveniently carried out. Fig. 2 is a plan view of the construction illustrated in Fig. 1. Fig. 3 is a detail side elevation, on a larger scale, showing a transfer-roll or primary surface positioned in the press, together with its coöperating parts. Fig. 4 is an axial sectional view through the transfer-roll and its supporting means. Fig. 5 is a detail plan view showing the transfer-roll carried by a sliding saddle, which is employed for positioning the roll in the transfer-press. Fig. 6 is a detail plan view, on a larger scale, illustrating the adjustable proportional spacing means shown in Figs. 1 and 2. Fig. 7 is a front elevation of the construction shown in Fig. 6. Fig. 8 is a detail plan view of the supporting-bracket for the adjustable proportional spacing mechanism. Fig. 9 is a detail plan view of a disk-carrying member of the adjustable proportional spacing mechanism, which is slidably mounted on the supporting-bracket shown in Fig. 8. Fig. 10 is a section on the line 10 10 of Fig. 9. Fig. 11 is a longitudinal section of a slide member, which is slidably supported in a groove on the upper surface of the disk-carrying member. Fig. 12 is a top plan view of the pattern-carrying angularly-adjustable member of the proportional spacing mechanism, showing a rack slidably mounted thereon and pivotally supporting a slide-block, which latter is adapted to slidably engage a dovetail groove on the top surface of the slide member. Fig. 13 is a detail side elevation of the pointer-arm of the adjustable spacing mechanism, which is rigidly secured to the slide member, as clearly shown in Figs. 6 and 7. Fig. 14 is a detail elevation showing a transfer-roll, which is employed as the primary surface in the herein-described operation of my invention.

Referring to the drawings, 1 indicates a transfer-press frame provided with stanchions 2, through the top of which is threaded an adjusting-screw 3, carrying a hand-wheel 4. The lower end of the adjusting-screw 3 is swiveled in a trunnion-block 5, mounted for vertical movement on said stanchions. A beam 6, journaled on the trunnions of said block 5, is shown provided with a downwardly-extended portion 7, which carries a contact-plate 8 in position to be engaged by a

cam 9, secured on the shaft 10. An operating-lever 11 is secured to the shaft 10 and provided with a handle 12 in convenient position for actuation by the operator. A bell-crank lever 13 14, pivotally supported at the rear of the lever 11, has its arm 13 suitably weighted at 15 to press its arm 14 against the downward extension 7 with sufficient force to maintain the contact-plate 8 in engagement with the cam 9. A rack 16 is freely suspended at its upper end on the forward part of the press-frame in position to engage a pawl or lug on the lever 11 and acts as a gravity-latch to lock said lever in its depressed position. The rack 16 is shown provided with a series of apertures 17, adapted to receive a pin or stop for limiting the downward swing of the lever 11, and thereby insure a uniform impression of the several characters.

It will be clear from the above description that when the lever 11 is depressed by the operator the cam 9 will engage the extended portion 7 of the beam 6 and swing said beam sufficiently on the trunnion-block 5 to bring the transfer-roll into operative engagement with the printing-plate being operated upon.

A clamping-screw 18, having a hand-wheel 19, provides means for clamping the bearer-head 20 in any desired position along the beam 6. Any suitable bearers 21 are adjustably carried by the bearer-head in position to engage the arbors 22 of the transfer-roll in the usual manner. A saddle 23 is slidably supported on the bearer-head 20 and carries guideways 24 for the transfer-roll supports 25. A feed-screw 65 and nut 66 are shown for actuating the saddle on the bearer-head. A spindle 26 is rotatably supported in bearings 27, carried by the saddle, and is provided with a handle 28 and with two slotted crank-arms 29, engaging pins 30 in the respective supports 25. The supports are provided with suitable means, such as the pointed screws 31, for normally maintaining the arbor of the transfer-rolls against the lower surfaces of the bearers 21 and a spring 32, engaging a lug 33 on the spindle 26, and the bearings of said spindle tends to raise the slides 25 up to their uppermost position and to hold the transfer-roll arbor properly against the bearers.

Reference-numerals 34 and 35 indicate the usual bed and work chuck employed on transfer-presses, together with means for actuating the bed and adjusting the chuck, and these need not be further described herein.

Fig. 14 illustrates a transfer-roll having the entire alphabet in relief on its periphery, which may constitute the primary surface in the operation of my invention in forming names and titles on bank-note plates. This roll is shown provided with guide-letters and radial lines on one of its sides, which register with the corresponding letters on its periphery, as shown specifically in Fig. 3.

A bracket 36 is shown rigidly secured to one of the stanchions 2 and provided on its upper face with an undercut channel 37, constructed to receive a dovetail projection 38 on the lower surface of a disk-carrying member 39 for slidably supporting the latter on said bracket. An angle-bracket 71, carried by the press-bed 34, is rigidly secured to the disk-carrying member 39 for reciprocating said member on its supporting-bracket 36 upon actuation of the press-bed. A pattern-carrying member 40 has secured thereto an annular guide 41, constructed to fit in an annular undercut channel 42 in the disk-carrying member, the guide 41 being provided with an aperture 43 for receiving a locking-pin which can be brought into register with any of a series of apertures 44 in the disk-carrying member to permit any desired angular adjustment of the pattern-carrying member relatively to the disk-carrying member. A slide member 45 is provided with a dovetail projection 46, constructed to slidably engage a similar channel 47 in the top surface of the disk-carrying member and with an undercut groove 48 in its upper surface adapted to receive a slide-block 49, which latter is pivotally supported on a rack 50, slidably supported on the pattern-carrying member. A spindle 51 carries a pinion 52, in mesh with the rack 50, and is provided with a hand-wheel 53. A plate 54 is secured to the rack 50 and carries a standard 55 for supporting an index 56 in position, to be shifted along a pattern 57 by the movement of the rack 50.

The pointer-arm 58 is adjustably secured to the inner end of the slide member 45 and is preferably provided with a supporting-roller 59 in position to travel on a track 60 during the movement of the pointer-arm and slide member. The free end of the pointer-arm is provided with an index-mark 61, adapted to be brought into registry with a pointer 62, which is adjustably supported on the roll-carrying saddle 23. A rod 68 is shown secured to the support of the pointer 62 and carrying adjustable holders 69 and 70, adapted to carry magnifying-glasses in position for accurately reading the registry of the pointer 62 and index-mark 64, with their corresponding lines. A pointer 63, carried by the pointer-arm 58, is provided with an index-mark 64 in such position that any desired radial guide-line on the side of the transfer-roll can be brought into registry therewith by properly rotating said roll in its supporting-slide.

In the carrying out of my invention by the herein-described means the printing-plate for receiving the name or title is secured in the press-chuck in any usual manner and a stock-transfer roll carrying the proper characters for the desired style and design of name or title is positioned in the supports 25. A pattern comprising the desired characters in their required arrangement is then prepared of any convenient size and secured in any suitable

manner upon the pattern-carrying member 40 of the adjustable proportional spacing mechanism and the pattern-carrying member properly adjusted in the annular slot 42 to produce in the subsequent operation the desired relative proportion between the spacing of the characters on the printing-plate and such spacing in the pattern. The index 56 is then adjusted to the first character of the pattern, guiding-dots being preferably provided on the pattern (see especially Figs. 1 and 7) to permit accurate adjustment of the index 56 to each of the several characters. The nut 66 is then actuated to shift the saddle 23 sufficiently to bring the pointer 62 into registry with the index-mark 61 on the pointer-arm 58, and the chuck 35 is then operated to bring the desired point in the printing-plate in position to receive the impression of the first character in the name or title.

As an alternative operation for the steps above described subsequent to placing the printing-plate and transfer-roll in the press such printing plate and roll can be brought into proper relation to insure the impression of the first character of the name or title at the desired point on said plate by actuating the bed 34 or chuck 35 to suitably adjust the plate or by adjusting the roll-carrying saddle 23 by the nut 66, after which the pointer 62 and index-line 61 can be brought into register by shifting the pointer-arm 58 through the medium of the rack and pinion 50 and 52. A pattern comprising the desired characters in their required arrangement is then secured to the pattern-carrying member in proper position to bring the first character of the name or title in registry with the index 56.

After the above-described portion of my improved process has been carried out by either of the specified alternative series of steps the transfer-roll is rotated in its supports sufficiently to establish register between the index-mark 64 and the guide-line on the side of the roll corresponding to the first character of the desired name or title. The operator then depresses the lever 11 sufficiently to produce the required pressure of the periphery of the transfer-roll on the printing-plate 67, and the first character of the name or title is then rolled into the printing-plate 67 by reciprocating said plate under the transfer-roll in the usual manner, after which the operator raises the lever 11 to elevate the transfer-roll out of engagement with the printing-plate 67. The operator then actuates the hand-wheel 53 to shift the rack 50 sufficiently to bring the index 56 into registry with the second character of the pattern. Such shifting of the rack 50 will act through the block 49 to shift the slide member 45 and its attached pointer-arm 58 through a distance determined by the angular position in which the pattern-carrying member has been adjusted. This movement of the pointer-arm 58 will shift the index-mark 61 from registry with the pointer 62 the exact distance desired on the printing-plate 67 for the spacing between the first and second characters of the name or title, and the operator then shifts the bed 34 and its attached parts sufficiently to move the pointer-arm 58 until its index-mark 61 again registers with the pointer 62. It is obvious that instead of shifting the pointer-arm 58 the saddle 23 could be shifted to move the pointer 62 into registry with the index-mark 61. The transfer-roll is then rotated in its supports sufficiently to establish register between the index-mark 64 and the guide-line on the side of the roll corresponding to the second character of the desired name or title. The operator then depresses the lever 11 sufficiently to produce the required pressure of the periphery of the transfer-roll on the printing-plate 67, and the second character of the name or title is then rolled into the printing-plate 67 by reciprocating said plate under the transfer-roll in the usual manner, after which the operator raises the lever 11 to elevate the transfer-roll out of engagement with the printing-plate 67. The hand-wheel 53 is then actuated to shift the index 56 into registry with the third character of the name or title and the above-described steps of my process repeated until the desired name or title has been produced in the printing-plate 67, which constitutes a secondary surface adapted to receive the desired name or title and to be subsequently employed for printing in the manner usual with such plates either with or without previous hardening.

It will be obvious that instead of preparing a pattern of the desired characters in their required arrangement such pattern could comprise guide marks or indices suitably spaced apart to correspond with the relative arrangement of the characters constituting the name or title. It will further be clear that the transfer-roll constituting the primary surface could be provided with various partial or complete designs in relief on its periphery instead of with letters or other characters.

I am aware that printing-surfaces, such as bank-note plates, have been produced by means of rolls having the alphabet or other desired characters in relief on their peripheries by tediously laying off on the plate the desired positions for the several characters and then depending upon the sight and touch of the operator for successively bringing the several characters on the roll into more or less accurate relation to the positions previously laid off on the plate; but such method has proven impracticable for producing accurate positioning and spacing and differs widely in both its operation and results from my invention. I am also aware that printing-surfaces have been formed by means of rolls carrying a double or so-called "compound" alphabet with the letters arranged in couplets in relief

upon their peripheries and in the employment of which the first letter of one of said couplets was inserted in a matrix previously formed in the printing-plate for positioning the second letter of said couplet relative to said plate. This method embodies all the defects of the above-described method and, further, produces an irregular printing-surface and necessitates the employment of a single constant spacing between the several letters impressed on the printing-plate.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described method of producing printing-plates by means of a primary surface provided with various characters or designs and guide-marks, which consists in preparing a pattern of convenient size indicating the desired arrangement and relative positions of characters or designs, adjusting an index of a proportional spacing means to the first character position or design position indicated on such pattern, establishing registration of a pointer and one of the guide-marks carried by the primary surface with index-marks on said spacing means, so positioning a printing-plate relative to the primary surface that the character or design of the latter corresponding to the first guide-mark will be positioned for impression at the desired point in said plate, impressing such first character or design into the printing-plate, adjusting the index of the proportional spacing means to the second character position or design position indicated on such pattern, establishing registration of the pointer and the proper second guide-mark carried by the primary surface with the index-marks on the spacing means, and impressing the second character or design corresponding to such second guide-mark into the printing-plate, substantially as described.

2. The herein-described method of producing printing-plates by means of a primary surface provided with various characters or designs and guide-marks, which consists in preparing a pattern of convenient size indicating the desired arrangement and relative positions of characters or designs, adjusting an index of a proportional spacing means to the first character position or design position indicated on such pattern, establishing registration of a pointer and one of the guide-marks carried by the primary surface with index-marks on said spacing means, so positioning a printing-plate relative to the primary surface that the character or design of the latter corresponding to the first guide-mark will be positioned for impression at the desired point in said plate, impressing such first character or design into the printing-plate, adjusting the index of the proportional spacing means to the second character position or design position indicated on the pattern, establishing registration of the pointer and the proper second guide-mark carried by the primary surface with the index-marks on the spacing means, impressing the second character or design corresponding to such second guide-mark into the printing-plate, and repeating the steps specified in forming the second character or design until the several characters or designs of the pattern have been suitably impressed in the plate, substantially as described.

3. The herein-described method of producing printing-plates by means of a primary surface provided with various characters or designs and guide-marks, which consists in preparing a pattern of convenient size indicating the desired arrangement and relative positions of characters or designs, establishing registration between the index of a proportional spacing means and the first character position or design position indicated on such pattern, establishing registration of a pointer and one of the guide-marks carried by the primary surface with index-marks on said spacing means, so positioning a printing-plate relative to the primary surface that the character or design of the latter corresponding to the such first guide-mark will be positioned for impression at the desired point in said plate, impressing such first character or design into the printing-plate, adjusting the index of the proportional spacing means to the second character position or design position on the pattern, establishing registration of the pointer and the proper second guide-mark carried by the primary surface with the index-marks on the spacing means, and impressing the second character or design corresponding to such second guide-mark into the printing-plate, substantially as described.

4. The herein-described method of producing printing-plates by means of a primary surface provided with various characters or designs and guide-marks, which consists in preparing a pattern of convenient size indicating the desired arrangement and relative positions of characters or designs, establishing registration between the index of a proportional spacing means and the first character position or design position indicated on such pattern, establishing registration of a pointer and one of the guide-marks carried by the primary surface with index-marks on said spacing means, so positioning a printing-plate relative to the primary surface that the character or design of the latter corresponding to the first guide-mark will be positioned for impression at the desired point in said plate, impressing such first character or design into the printing-plate, adjusting the index of the proportional spacing means to the second character position or design position indicated on the pattern, establishing registration of the pointer and the proper second guide-mark carried by the primary surface with the index-marks on the spacing means, impressing the second character or design corresponding to such

second guide-mark into the printing-plate, and repeating the steps specified in forming the second character or design until the several characters or designs of the pattern have been suitably impressed in the plate, substantially as described.

5. The herein-described method of producing printing-plates by means of a primary surface provided with various characters or designs and guide-marks, which consists in preparing a pattern of convenient size indicating the desired arrangement and relative positions of characters or designs, adjusting a proportional spacing means to the proportion required between the lengths of such pattern and of the printing-surface to be produced thereof, establishing registration between the index of a proportional spacing means and the first character position or design position indicated on such pattern, establishing registration of a pointer and one of the guide-marks carried by the primary surface with index-marks on said spacing means, so positioning a printing-plate relative to the primary surface that the character or design of the latter corresponding to the such first guide-mark will be positioned for impression at the desired point in said plate, impressing such first character or design into the printing-plate, adjusting the index of the proportional spacing means to the second character position or design position on the pattern, establishing registration of the pointer and the proper second guide-marks carried by the primary surface with the index-marks on the spacing means, and impressing the second character or design corresponding to such second guide-mark into the printing-plate, substantially as described.

6. The herein-described method of producing printing-plates by means of a primary surface provided with various characters or designs and guide-marks, which consists in preparing a pattern of convenient size indicating the desired arrangement and relative positions of characters or designs, adjusting a proportional spacing means to the proportion required between the lengths of such pattern and of the printing-surface to be produced thereof, establishing registration between the index of a proportional spacing means and the first character position or design position indicated on such pattern, establishing registration of a the primary surface with index-marks on said pointer and one of the guide-marks carried by the spacing means, so positioning a printing-plate relative to the primary surface that the character or design of the latter corresponding to the first guide-mark will be positioned for impression at the desired point in said plate, impressing such first character or design into the printing-plate, adjusting the index of the proportional spacing means to the second character position or design position indicated on the pattern, establishing registration of the pointer and the proper second guide-mark carried by the primary surface with the index-marks on the spacing means, impressing the second character or design corresponding to such second guide-mark into the printing-plate, and repeating the steps specified in forming the second character or design until the several characters or designs have been suitably impressed in the plate, substantially as described.

7. The herein-described method of producing printing-plates by means of a transfer-roll provided with various characters or designs on its periphery and with corresponding guide-marks, which consists in preparing a pattern of convenient size indicating the desired arrangement and relative positions of characters or designs, establishing registration between the index of a proportional spacing means and the first character position or design position indicated on such pattern, establishing registration of a pointer and one of the guide-marks carried by the transfer-roll with index-marks on said spacing means, so positioning a printing-plate relative to the transferroll that the character or design of the latter corresponding to the first guide-mark will be positioned for impression at the desired point in said plate, impressing such first character or design into the printing-plate, adjusting the index of the proportional spacing means to the second character position or design position on the pattern, establishing registration of the pointer and the proper second guide-mark carried by the transfer-roll with the index-marks on the spacing means, and impressing the second character or design corresponding to such second guide-mark into the printing-plate, substantially as described.

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

JOHN R. HILL.

Witnesses:
FRANK D. RICE,
W. W. CURRY.