O. V. SIGURDSSON.

TYPE CASTING MACHINE.

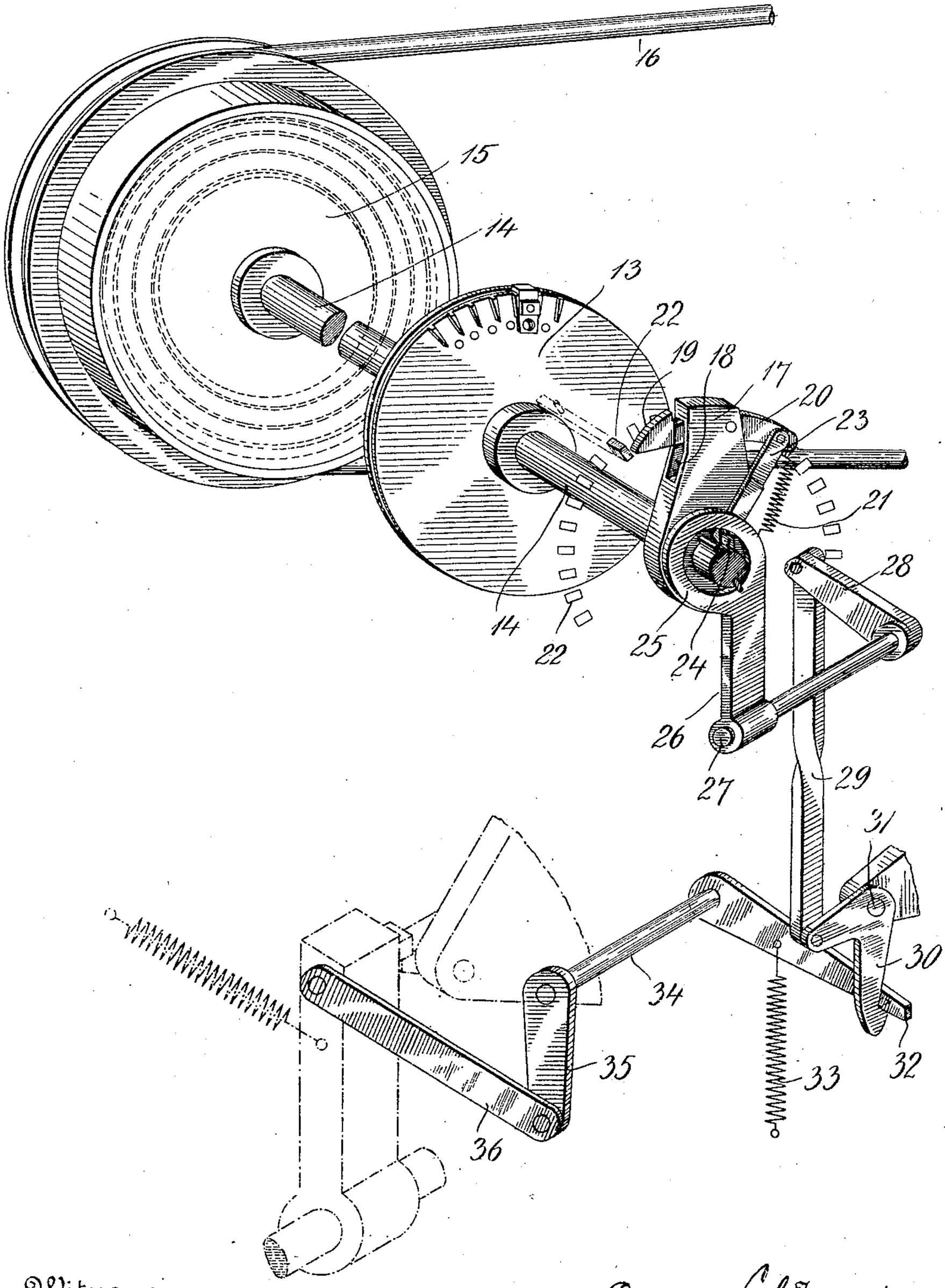
APPLICATION FILED NOV. 17, 1909.

960,047.

Patented May 31, 1910.

6 SHEETS—SHEET 1.

Fig. 1.



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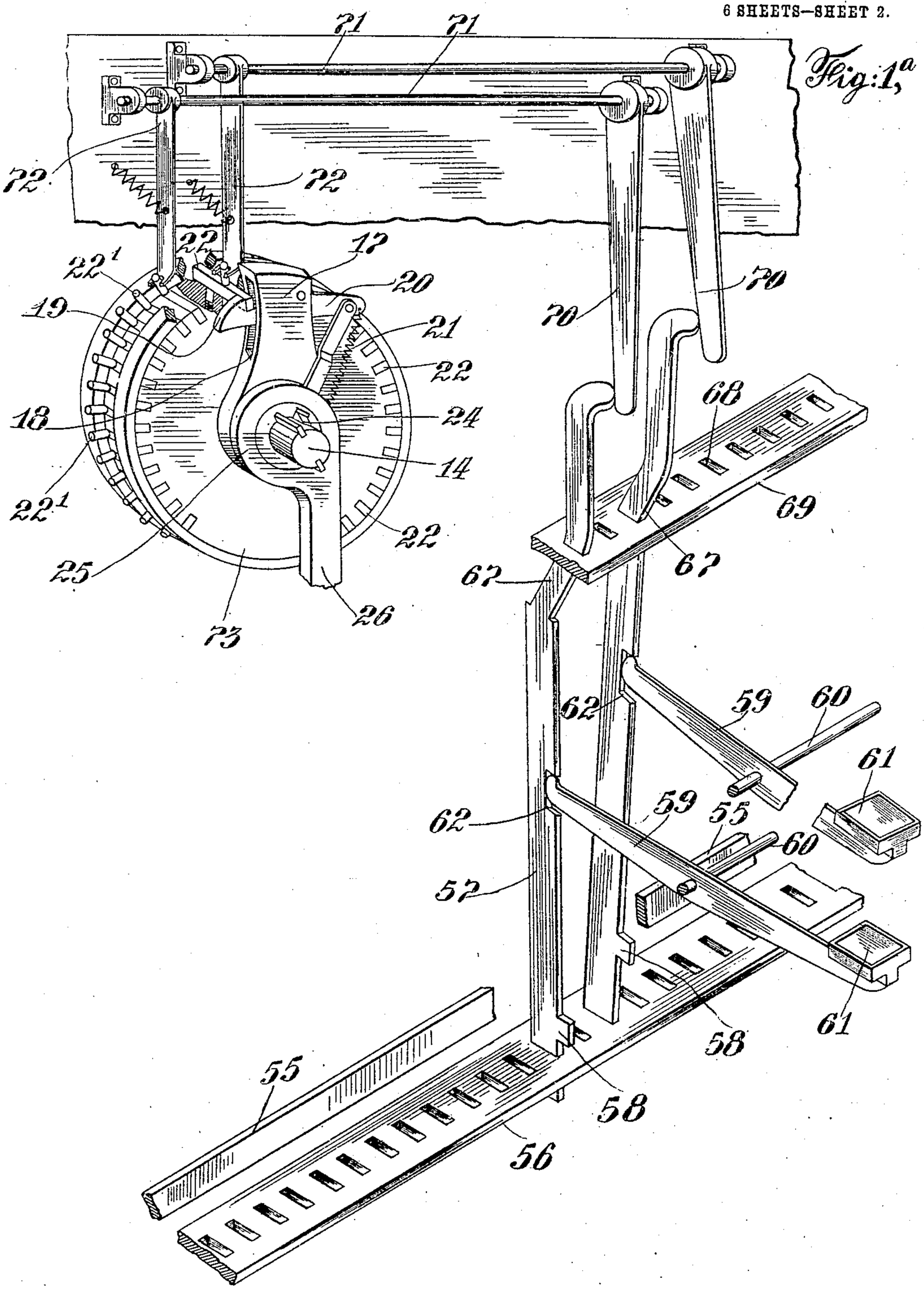
6 SHEETS—SHEET 2.

Fig: 1,a



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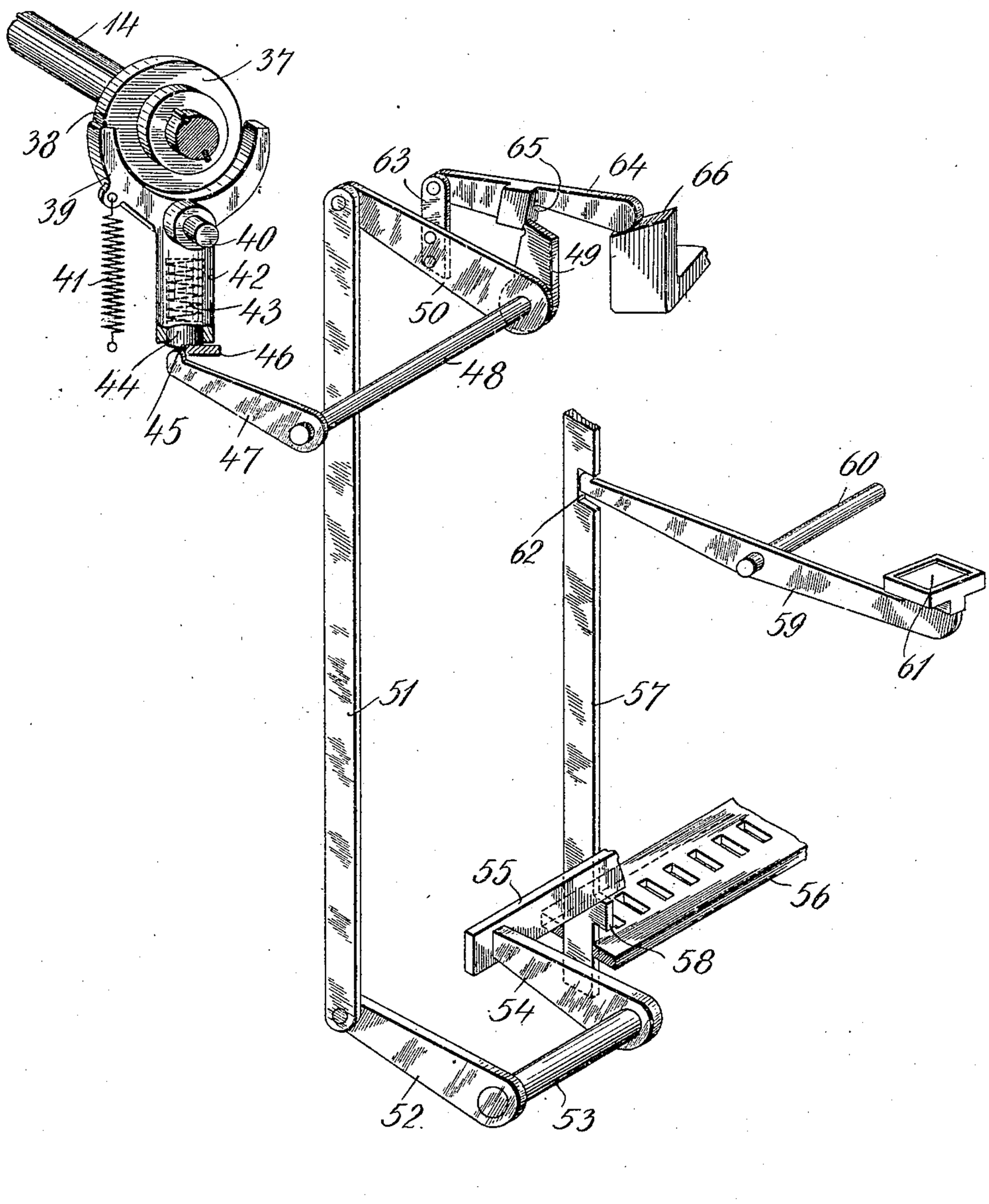
6 SHEETS—SHEET 3.

Fig. 2,



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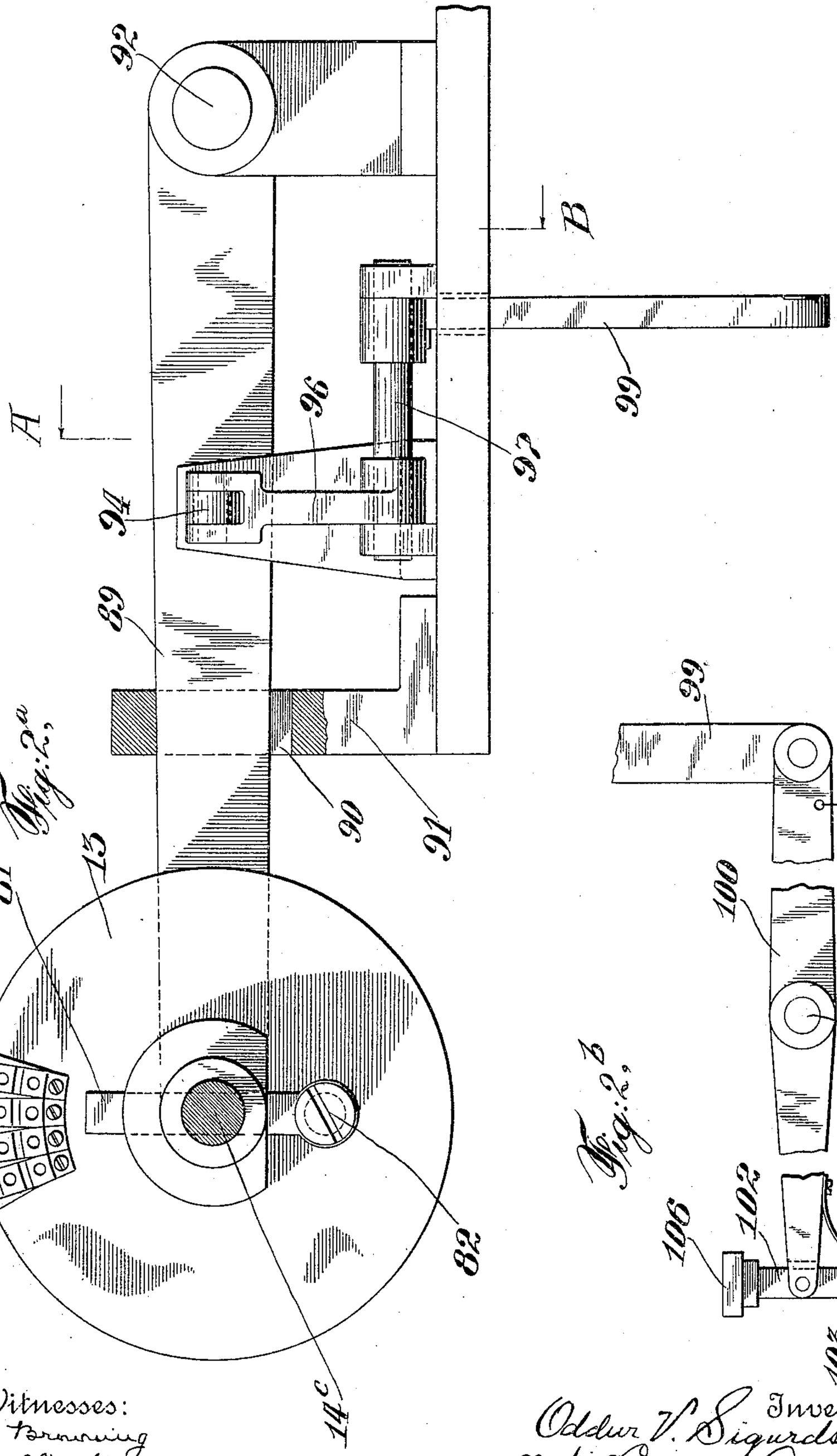
6 SHEETS—SHEET 4.



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6 SHEETS—SHEET 5.

Fig: 2d,

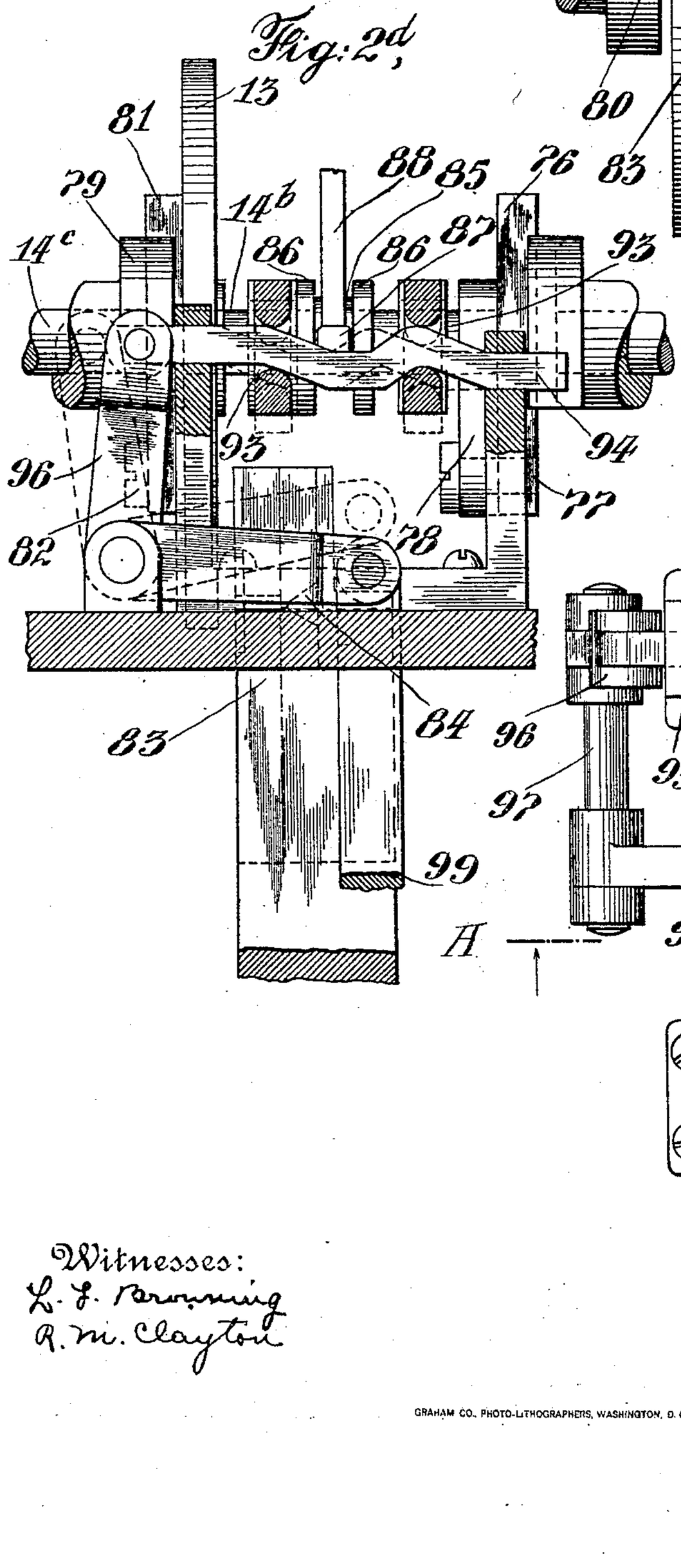
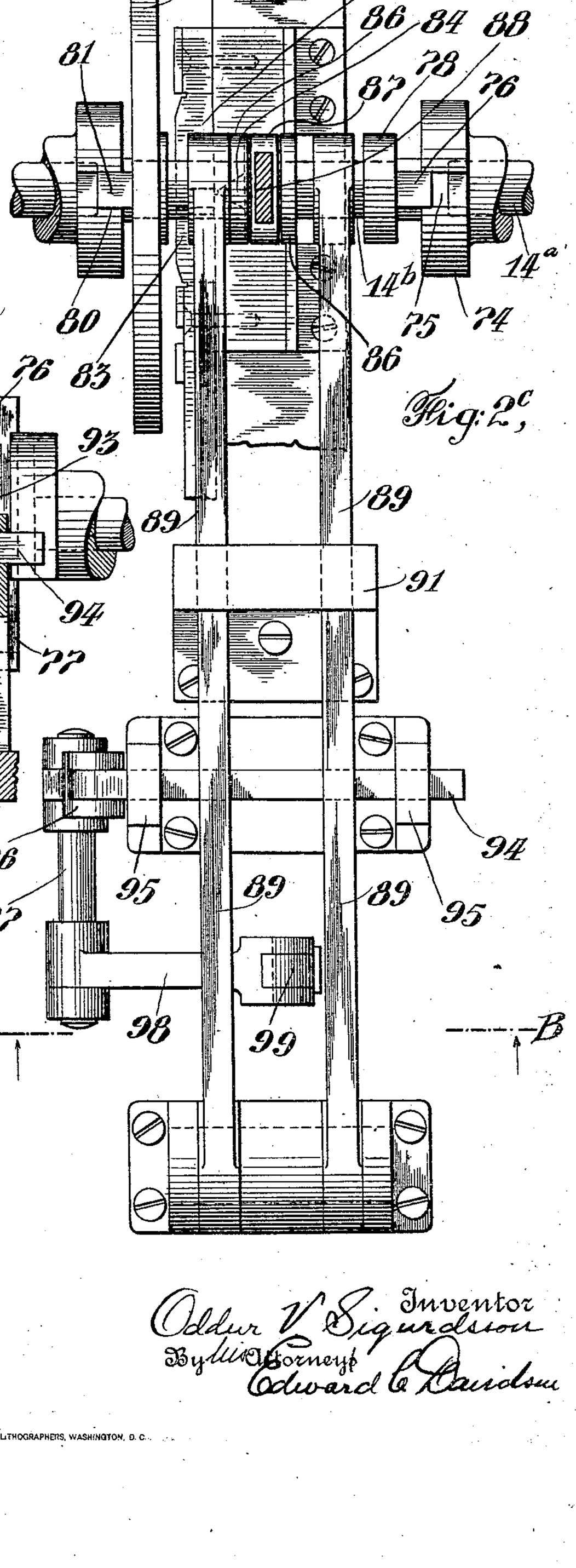


Fig: 2c,



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6 SHEETS—SHEET 6.

Fig: 3,

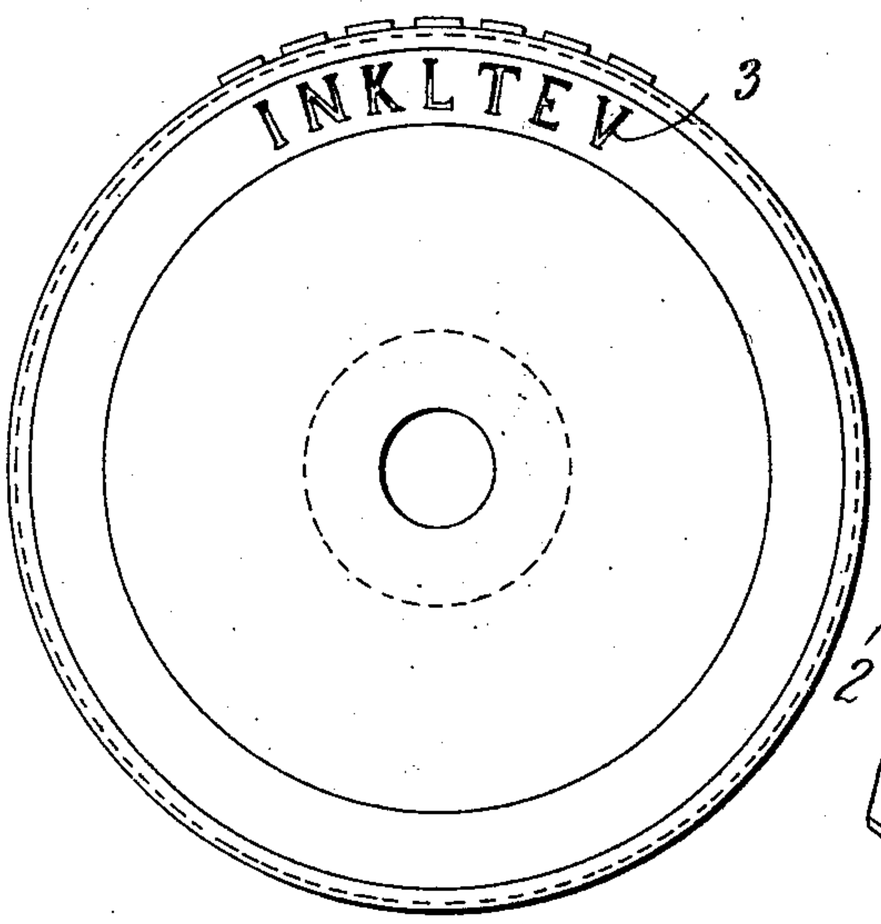

Fig: 4,

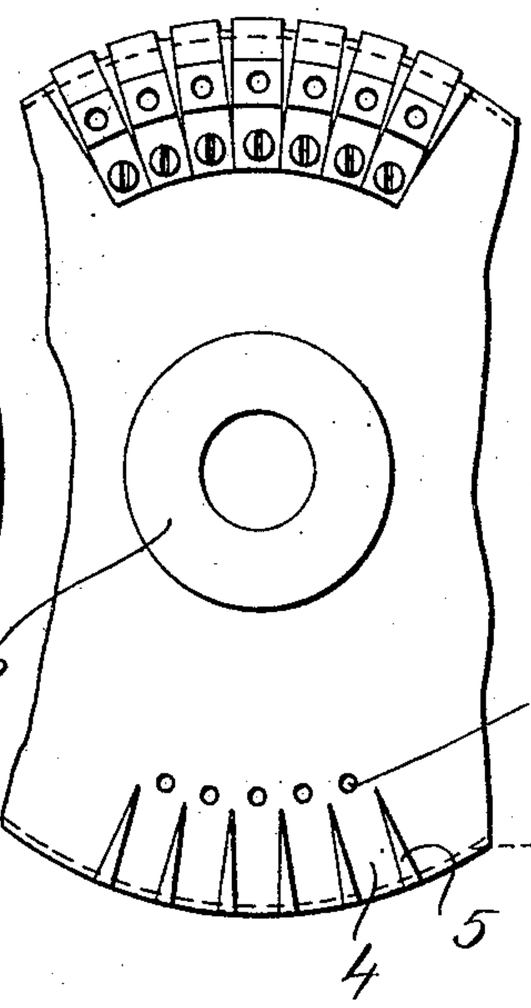

Fig: 5,

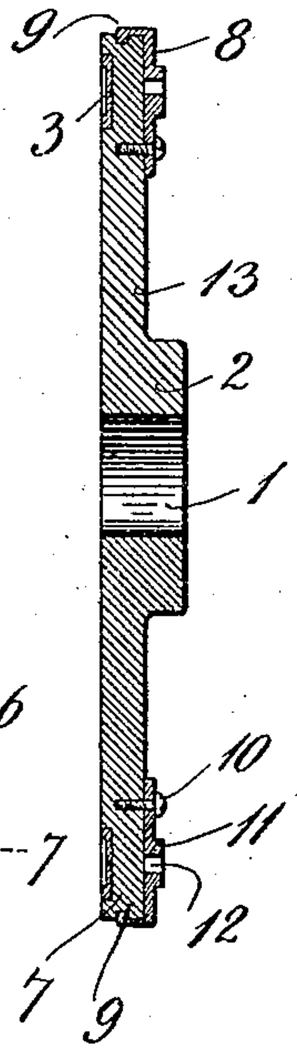

Fig: 6,

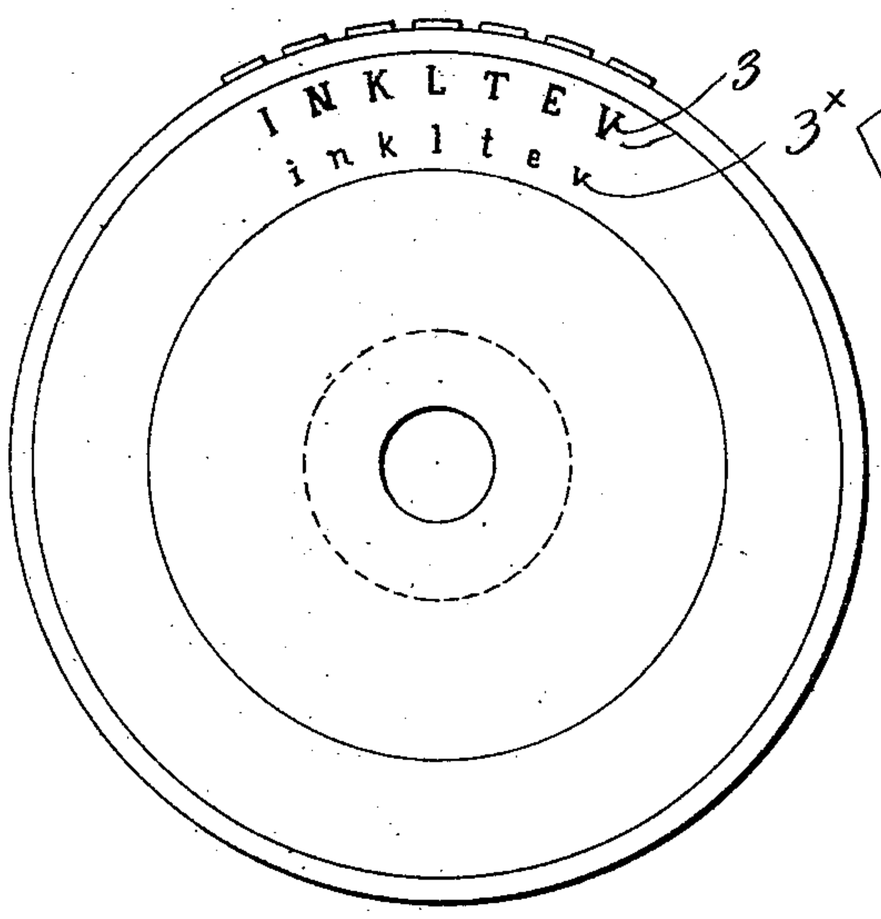

Fig: 7,

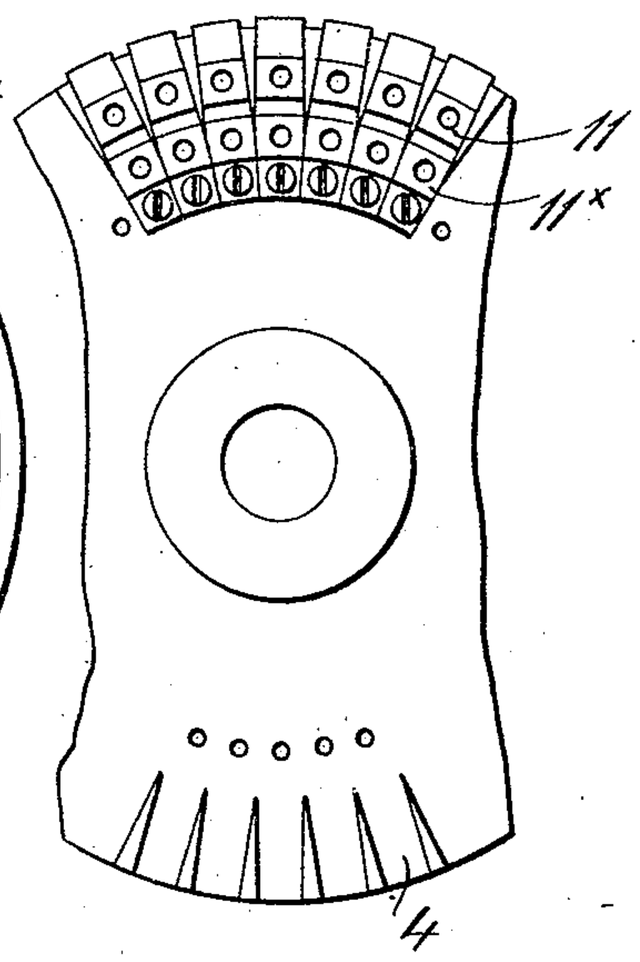

Fig: 8,

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UNITED STATES PATENT OFFICE.

ODDUR V. SIGURDSSON, OF NEW YORK, N. Y., ASSIGNOR TO ODDUR MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

TYPE-CASTING MACHINE.

960,047. Specification of Letters Patent. **Patented May 31, 1910.**

Application filed November 17, 1909. Serial No. 528,477.

To all whom it may concern:

Be it known that I, ODDUR V. SIGURDSSON, a subject of the King of Denmark, residing in the borough of Brooklyn, city and State of New York, have invented certain new and useful Improvements in Type-Casting Machines, of which the following is a specification.

In a machine constructed in accordance with this invention the molding devices are controlled by means brought into action by a part moving with the matrix disk and becoming effective to trip or start the molding devices only when the selected matrix has certainly reached its operative molding position.

A further feature of the invention is that the power by which the machine is operated maintains under constant tension spring devices, as a spring drum, the reaction of which, when the apparatus is tripped or started into motion on the depression of keys in the key-board, serves to rotate the matrix-disk to bring the matrix corresponding with a depressed key to molding position.

A further feature of the invention, not dependent upon those above mentioned and capable of use in machines of any appropriate construction adapted to its use, is that the matrices are arranged in plural series in or on the side of the matrix disk, the different series being of different radius. By this arrangement the entire font may be disposed in two concentric series in the side of the disk. Preferably the lower case characters would be in the series of greatest radius,—*i. e.*, that closest to the circumference of the disk; and the upper case characters in the series of lesser radius. When lower case type are cast, the disk is merely suitably revolved to bring the selected matrices into operative relation to the mold which ordinarily and preferably would be stationary; and when upper case characters are cast, a translation of the disk in a plane at right angles to its axis is effected to bring the upper case series of matrices into operative relation to the mold.

The invention further comprises certain improvements, hereinafter described, in the matrix disk itself.

The various movements of the apparatus, their initiation, termination and control from the key-board, will be obvious to those skilled in such matters; and in many respects the complete machine may be the same in detail of mechanical parts as that disclosed in my Letters Patent for improvements in typecasting and composing machines dated Dec. 21, 1909, and numbered 944,108. For this reason it has not been thought necessary to illustrate in detail all the parts of the typecasting machine.

The accompanying drawings show certain organizations serving for the operation or control of the type- matrix disk and mold from the key-board of the machine; and practical experience has shown that these constructions are suitable and well adapted to their intended purposes but they may be varied by those skilled in the art without departing from the principles of this invention.

Figure 1 is a perspective view showing a matrix disk, its driving spring drum, matrix-selecting devices and means whereby the positioning of the selected matrix is caused to initiate the operation of the molding devices. Fig. 1^{a} is a similar view showing the stop devices indicated in Fig. 1 and a way of controlling them from the key-board. Fig. 2 is a similar view showing means by which, when a key in the board is depressed, the matrix disk is released or tripped and may, therefore, be rotated to the desired extent to bring the corresponding matrix to the molding point. Fig. 2^{a} is a detail elevation showing a means of moving the matrix disk at right angles to its axis. Fig. 2^{b} is a detail elevation of part of Fig. 2^{a}. Fig. 2^{c} is a plan view of Fig. 2^{a}. Fig. 2^{d} is a section on line A, B, of Figs. 2^{a} and 2^{c}. Fig. 3 is an elevation of the matrix face of a matrix disk. Fig. 4 is a partial elevation of the opposite or rear face thereof. Fig. 5 is a central cross-section. Figs. 6, 7 and 8, respectively, are views corresponding respectively to Figs. 3, 4 and 5 but showing a disk having plural and concentric series of matrices.

The matrix disk will first be described by referring to Figs. 3, 4 and 5:—It has a central bearing aperture 1, preferably sur-

rounded by a thickened or hub portion 2. There is set into its matrix face, or front face as it will be called, a series of matrices 3 arranged concentric to the axis of the disk. It has not been thought necessary to show in the drawing the entire series. It is, of course, immaterial so far as this invention is concerned, how the matrices are formed or let into the surface of the disk. On the opposite or back face of the disk opposite the matrices respectively, the disk is milled to produce radial grooves 4 formed by ribs 5; and, opposite the end of each such groove, is a tapped recess 6. In the peripheral face of the disk is an annular groove 7. Opposite each matrix and fitted in the radial groove 4 is a hard metal piece 8 having a flange with a lip 9 that fits in the annular groove 7 and an aperture through which a screw 10 passes into the threaded recess 6. The piece 8, immediately back of or opposite the matrix, is formed with a raised face 11 in which is an aperture 12. The aperture 12 is for the reception of a locking-pin; and the raised face 11 forms a bearing for the shoulder on the pin that determines the width of the mold to correspond with the particular matrix. The elevations of the several surfaces 11 correspond with the widths of the type to be cast. This means of locking the disk with the selected matrix at the molding point, of pressing the matrix against the face of the mold and of determining the adjustment of the mold with respect to the width of the character to be cast may all be precisely the same as disclosed in my Letters Patent numbered 944,108 before mentioned. This construction of matrix disk permits of the ready removal and accurate replacement of the parts 8, in the event of their becoming worn, injured or distorted.

Figs. 6, 7 and 8, show a matrix disk in all respects the same as that already described except that there are two concentric series of matrices, 3, $3^{\times}$, and there are therefore on the rear face of the matrix disk two corresponding concentric series of raised surfaces, 11, $11^{\times}$, each having its recesses 12 for the locking-pin.

If the normal position of the matrix disk is such that the matrices of the outer series 3 are in proper relation to the mold, then it is necessary either that the mold be moved radially with reference to the disk to bring it into proper relation with the inner series $3^{\times}$ of the matrices, or, that the disk be moved in a plane at right angles to its axis. Either mode of operation may be adopted but the latter is preferred because of its greater simplicity. For convenience of description the matrix disk will be designated as 13.

Referring now to Fig. 1, matrix disk 13 is fast on a shaft 14 adapted to be rotated by an ordinary spring drum 15 maintained constantly wound by a cord belt 16 driven by the constantly acting motive power by which the operations of the machine are carried out under control of the key-board. On shaft 14 is secured a radial arm or block 17 having in it a slot 18 transverse to the axis 14. In this slot is pivoted a latch 19 having a tail piece 20 to which is applied a coiled reaction spring 21 the end of which is secured to the hub or bearing portion of the block 17. In order that the matrix corresponding with the depressed key in the key-board shall be arrested at the proper point with respect to the mold, there is provided a circular series of movable stops 22 shown in detail in Fig. 1^{a} and hereinafter described. These stops may be mounted to slide endwise in a fixed cylinder or drum concentric to the shaft 14. There is one such series of stops for both series of matrices; that is to say, if the disk be such as shown in Fig. 1, there will be a stop for each matrix; if the disk be such as shown in Fig. 6 there will be a stop for each matrix of the outer series; and, since the matrices of the two series are arranged in radial lines, one series of stops will serve for both series of matrices. Operative connections, such as bell-crank levers, links, rods and slides, extend from the respective stops or slides 22 to the key-board and are there controlled so that on the depression of a key its corresponding stop 22 will be moved into the path of block 18 fast on the matrix disk shaft, and therefore the matrix disk will be arrested by abutment of block 18 against stop 22 at the proper point to position the selected matrix at, or opposite, the molding point. In Fig. 1 neither the entire series of stops 22 nor the entire series of matrices is shown. When the molding operation is completed, the stop is withdrawn by the controlling cam or other power-actuated device and all the parts return to normal position as hereinafter described. As block 18 approaches stop 22, the curved face of latch 19 rides under the stop and the leading end of the latch is forced down, thereby causing its rear end or tail 20 to draw up a link 23 that carries upon its end a cam face 24 which, as the link moves upwardly, cams outwardly a ring 25 encircling shaft 14 and having an extension 26 fast on a rock-shaft 27 that also carries a radial arm 28 to which is pinned a link 29 extending downward to a bell-crank latch 30 pivoted at 31 upon a fixed part of the machine. This latch 30 normally holds up a lever-arm 32 to which is applied a coiled spring 33 whose reaction tends to draw down the arm. The arm 32 is fast on a rock-shaft 34 having secured to it a radial arm 35 to which is pinned a link 36 that acts to trip or set into operation the

molding devices. The molding devices may be operated and controlled as in my Letters Patent No. 944,108 above mentioned, or in any appropriate or suitable manner. The parts are so related that the movement of latch 19 effects the tripping and starting of the molding devices at, or a moment before, the selected matrix is in position but casting can never occur until the matrix has reached the molding position because the parts are so timed that the tripping or starting of the molding devices by arm 36 cannot occur before the selected matrix is closed against the mold.

Fig. 2 shows a manner in which the matrix disk may be tripped or released on depression of a finger-piece or key in the key-board. The matrix disk shaft 14, or rather that part of it appearing in Fig. 2, is a prolongation beyond the ring 25 shown in Fig. 1. Keyed on this shaft is a snail or eccentric piece 37 having a shoulder 38 normally engaged by a two-armed stop-pawl 39 embracing the snail piece and pivoted at 40; coiled spring 41 has one end applied to that arm of the pawl that engages the shoulder 38, and the other end is attached to a fixed point on the frame. Below the pivot 40, the pawl has a circular hub or arm 42 that is bored out and has seated in it a coiled spring 43 that tends to force outwardly a circular block 44 fitting in the hub. This block has formed on its end face a shoulder 45 that is normally engaged by a fixed piece or plate 46. Bearing upon the face of the block 44 is an arm 47 fast on a rock-shaft 48 having fast on it another radial arm 49. Loosely turning on the rock-shaft is a link 50 to the end of which is pinned a pendent link 51 pivoted at its lower end to an arm 52 fast on a short rock-shaft 53 having also fast upon it an arm 54 to the end of which is secured a cross-bar 55. 56 is a plate forming part of the key-board structure and having in it a series of slots. In these slots are fitted, to slide vertically, plates 57 each having a shoulder 58 underlying the cross-bar 55. The key-levers (one only being shown) may be mounted to rock about the axis 60 intermediate its ends. Its front end is equipped with the usual finger-piece 61 and its rear end engages a notch 62 in upright plate 57 of which latter there is one for each key-lever. When the finger-piece 61 is depressed plate 57 is drawn upwardly raising cross-bar 55 and causing link 51 to move upwardly thereby raising lever-arm 50. Secured to lever-arm 50 is a vertical post 63 in the end of which is pivoted a latch 64 having a block or shoulder 65 that engages the end of the radial plate or arm 49 on rock-shaft 48. The free end of latch 64 rides upon the fixed upwardly inclined cam face 66. When, therefore, link 51 is forced upwardly, the shoulder or block 65 on latch 64 forces arm 49 rearwardly and elevates arm 47 which pushes upwardly, against the tension of spring 43, the latch plug or block 44 so as to disengage it from the fixed stop-plate 46 at which time the reaction of spring 41 will throw stop-pawl 39 out of engagement with the shoulder of snail 37, thereby releasing the matrix disk shaft and permitting its rotation by the spring drum. The shoulder 38 of the snail will, as the shaft rotates, cam outwardly the other arm of the stop-pawl and restore the parts to normal position so that when one revolution of the shaft has been completed the shaft will be arrested, and all the parts will again have assumed the position indicated in Fig. 2.

Fig. 1[a] shows a means of operating the stops 22. It should be understood, however, that any suitable means may be used, that illustrated being merely one of many ways that may readily be devised by skilled mechanicians. The upper portions of plates 57 are angularly disposed in the planes of their flat sides as at 67 and work in slots 68 in a fixed cross-plate 69. When the plates are elevated by depression of their corresponding key levers 59, their extreme upper ends cam out radial arms 70 each of which is fast on a rock shaft 71 that carries another arm 72 forked at its end to embrace a pin 22′ on its corresponding sliding stop 22. When, therefore, a key lever is depressed, the matrix disk 13 is set in motion and the corresponding stop 22 advanced into the path of latch 19 and block 17. The stops, of which there should be one for each key lever, are arranged in a circle but do not occupy the entire circle since there should be a space as indicated at 73 where there are no stops and opposite which the block 17 stands when the parts are in normal position of rest.

To effect translation of the disk at right angles to its axis when a matrix disk with plural series of matrices is used, the general construction disclosed in my said Letters Patent numbered 944,108 may be adopted.

This construction is shown in Figs. 2[a] to 2[d]. One section 14[a] of shaft 14 has fast on its end (Figs. 2[c] and 2[d]) a circular head 74 with a deep diametric slot 75 in which works a square bar 76 having its lower end pivoted at 77 in a plate 78 secured to one end of the intermediate shaft 14[b] to the other end of which is keyed the matrix disk 13. The other section 14[c] of shaft 14 has on its end contiguous to the matrix disk a head 79 having in it a deep radial slot 80 in which works a square bar 81 pivoted at 82 to the side of the matrix disk on an axis in line with the axis of pivot 77. Hence the intermediate section 14[b] of the shaft is rotated coincidently with rotation of shaft 14 by the

spring drum 15, or other motive power, and yet shaft section 14[b] may be moved (as hereinafter described) transversely to its axis to bring a selected matrix on disk 13 properly opposite the orifice or mouth of a type mold 83. The conical socket 84 of the mold for the reception of the nipple through which molten metal is injected into the mold cavity is indicated by dotted lines in Figs. 2[c] and 2[d]. A matrix on the side of the disk 13 having been selected when the disk is in either normal or translated position, the shaft section 14[b] is moved endwise to the right (as viewed in Figs. 2[c] and 2[d]) to close the matrix against the mouth of the mold. The drawing shows, fast on shaft section 14[b], a hub or sleeve 85 having at its ends flanges 86 between which is disposed a shaft shifting yoke 87, the lever arm 88 of which may, at the proper time, be operated upon by any appropriate means, as a cam, to shift the shaft section and close the matrix against the mold. The drawing shows the shaft section 14[b] as turning in bearings in the ends of a pair of parallel arms 89, 89, passing through slots 90 in a fixed frame piece 91 and pivoted upon a common axis 92 at their other ends. Intermediate the axis 92 and frame piece 91, the arms have coincident transverse apertures 93 in which a cam bar 94 works. This cam bar is guided in apertures in fixed frame plates 95 and has jointed to one end an arm 96 fast on a rock shaft 97 having another arm 98 disposed at about right angles to arm 96, the construction being, in effect, a bell-crank lever. To arm 98 is jointed a link 99 pivoted at its lower end (Figs. 2[a] and 2[b]) to the rear end of a shift key lever 100, pivoted intermediate its ends at 101, having pivoted to its front end a finger piece push pin 102 notched at 103 to engage a locking piece 104 and into engagement with which a spring 105 normally tends to urge it. When the finger piece 106 is depressed the cam bar 94 is moved endwise to effect translation of the matrix disk into the position in which type may be cast from the inner series of matrices located in its side. The latch 103, 104, will retain the parts in such position as long as desired and may be released by lateral pressure on the finger-piece. Suitable reaction springs will of course be used wherever needed. One such spring 107 is shown applied to the shift key lever and it alone may be of adequate strength to return the cam bar and associated parts to normal position when pressure on the finger-piece ceases or its latch is released.

I claim:

1. A rotatable disk having in its side a plurality of series of matrices, combined with a type casting mold, means for changing the relation of said parts radially of the disk to bring either series into operative relation to the mold and means for selecting a matrix in either series for casting a type.

2. A rotatable disk having in its side a plurality of concentric series of matrices, combined with a stationary type casting mold, means for translating the disk in a plane at right angles to its axis to bring either of the series into operative relation to the mold and means for selecting a matrix in either series for casting.

3. A rotatable disk having in its side a plurality of concentric series of matrices, combined with a stationary type casting mold, means for translating the disk in a plane at right angles to its axis to bring either of the series into operative relation to the mold, means for selecting a matrix in either series for casting, and means for closing the face of the matrix against the mouth of the mold.

4. A flat disk mounted to turn only in a plane at right angles to its axis and having in its side a plurality of concentric series of matrices, the matrices of the different series being arranged in the same radial lines combined with a single circular series of movable stops adapted to arrest the disk with a matrix of either series in operative relation to a molding point.

5. A rotatable disk mounted to turn only in a plane at right angles to its axis and having in its side a plurality of connectric series of matrices, means for rotating the disk in a plane at right angles to its axis to bring any one of the matrices in one series to a molding point and means for moving the disk at right angles to its axis to bring another series of matrices into operative relation to the molding point.

6. The combination with a disk having matrices, of a spring adapted to rotate the disk, means for maintaining the spring constantly under tension, means for releasing the disk on depression of keys in the key board to permit it to be rotated by the spring and a series of stop devices acting to arrest the matrix with the selected matrix in operative position with respect to a molding point.

7. A type casting machine, comprising a rotatable disk carrying matrices, stop devices for arresting the disk with the selected matrix in operative position with respect to a molding point and means actuated by such stop devices and acting to put into operation the casting devices when the selected matrix has been positioned.

8. A disk having in one of its sides a series of matrices, in its opposite side a series of corresponding seats, detachable metal pieces secured in said seats and each having a recess for the reception of a lock-

ing pin and a raised surface adapted to adjust the mold with respect to its corresponding matrix.

9. A disk having in one of its sides a series of matrices, in its opposite side a corresponding series of seats and in its periphery an annular groove and detachable metal pieces fitting in said seats and having lips engaging the annular groove, recesses to receive a locking pin and raised surface to control the adjustment of a mold.

In testimony whereof, I have hereunto subscribed my name.

ODDUR V. SIGURDSSON.

Witnesses:
EDWARD C. DAVIDSON,
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