O. V. SIGURDSSON.

TYPE CASTING AND COMPOSING MACHINE.

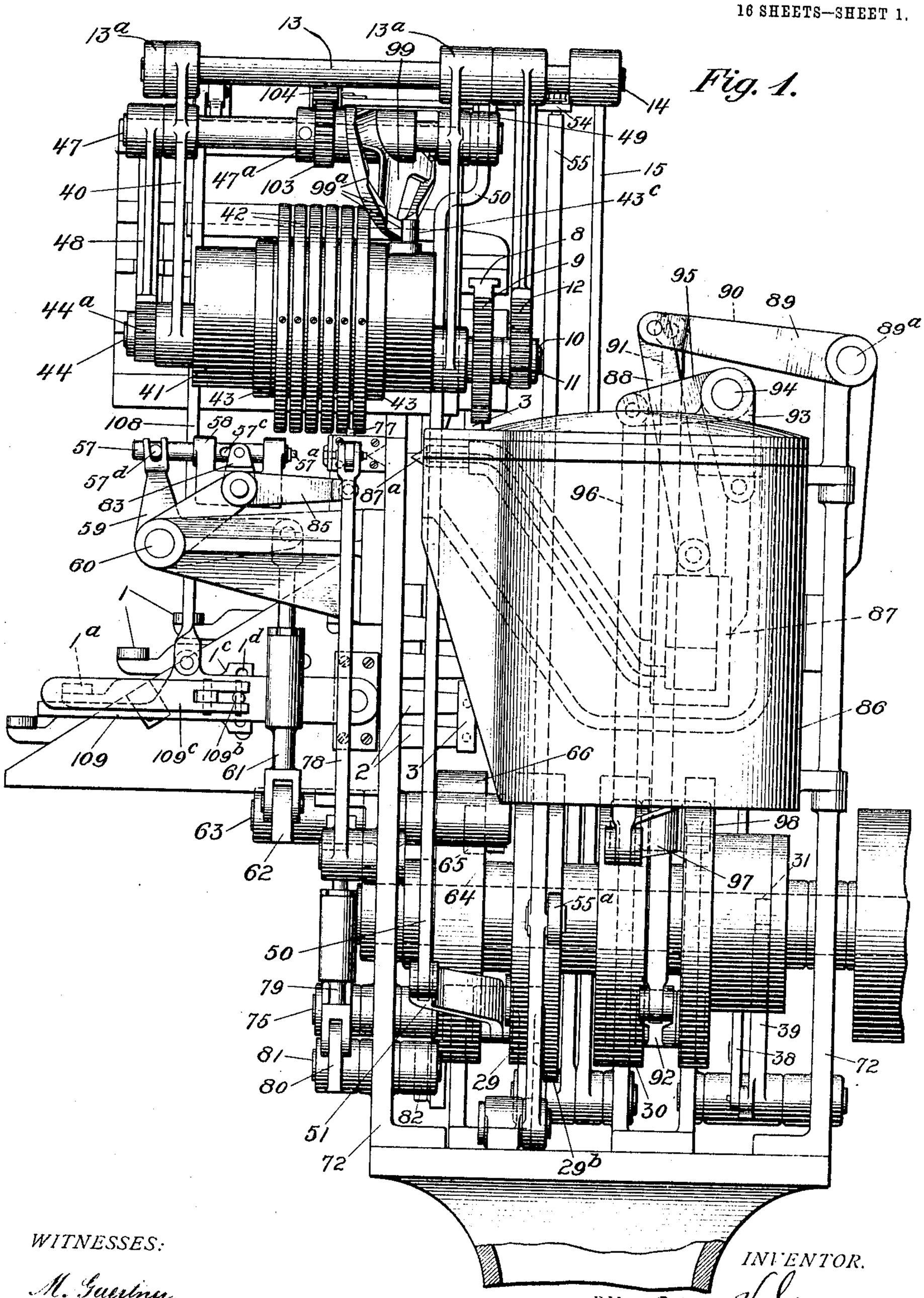
APPLICATION FILED MAY 3, 1909.

944,108.

Patented Dec. 21, 1909.

16 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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16 SHEETS—SHEET 2.

Fig. 2.

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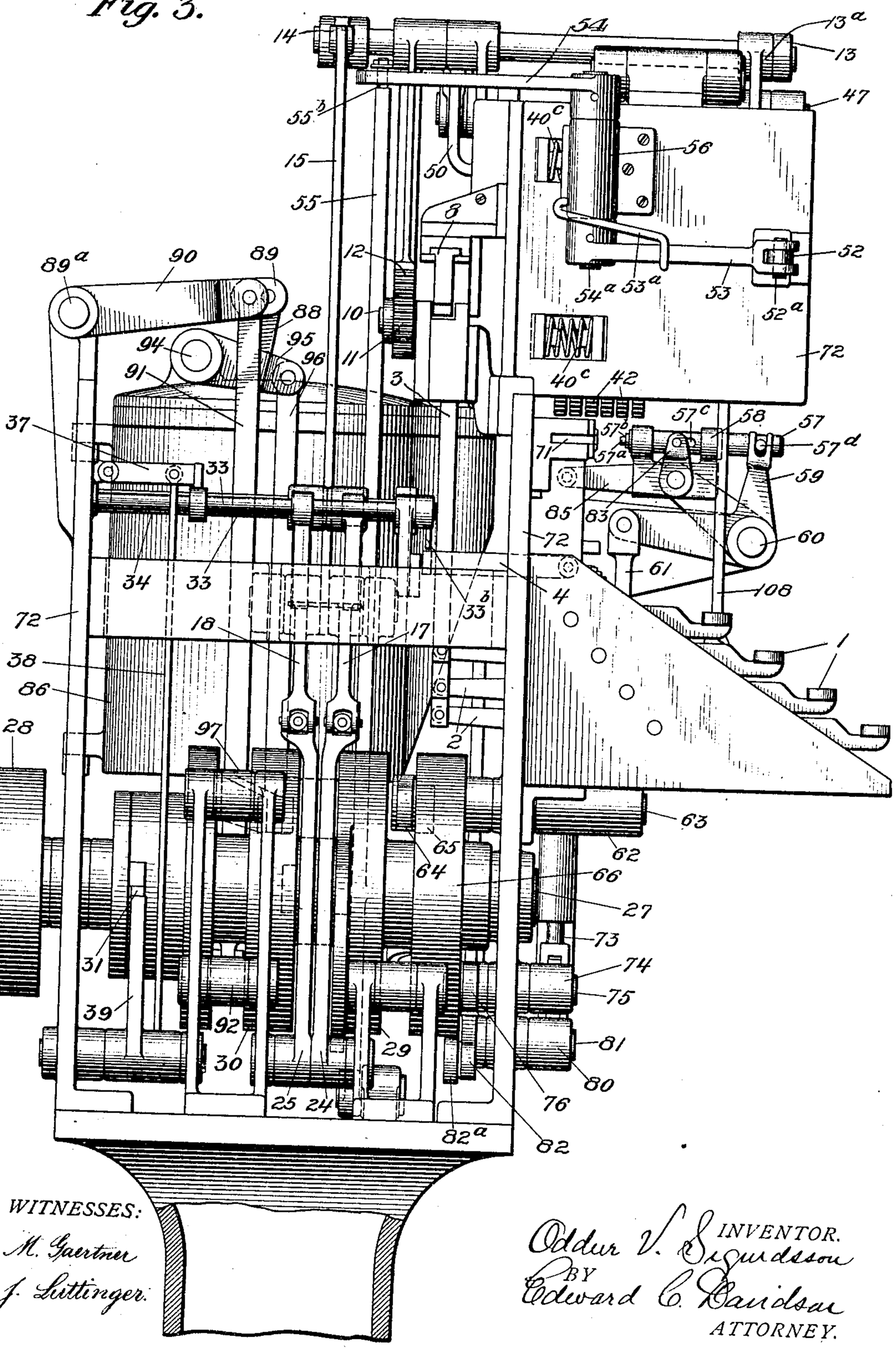
16 SHEETS—SHEET 3.

Fig. 3.



WITNESSES:

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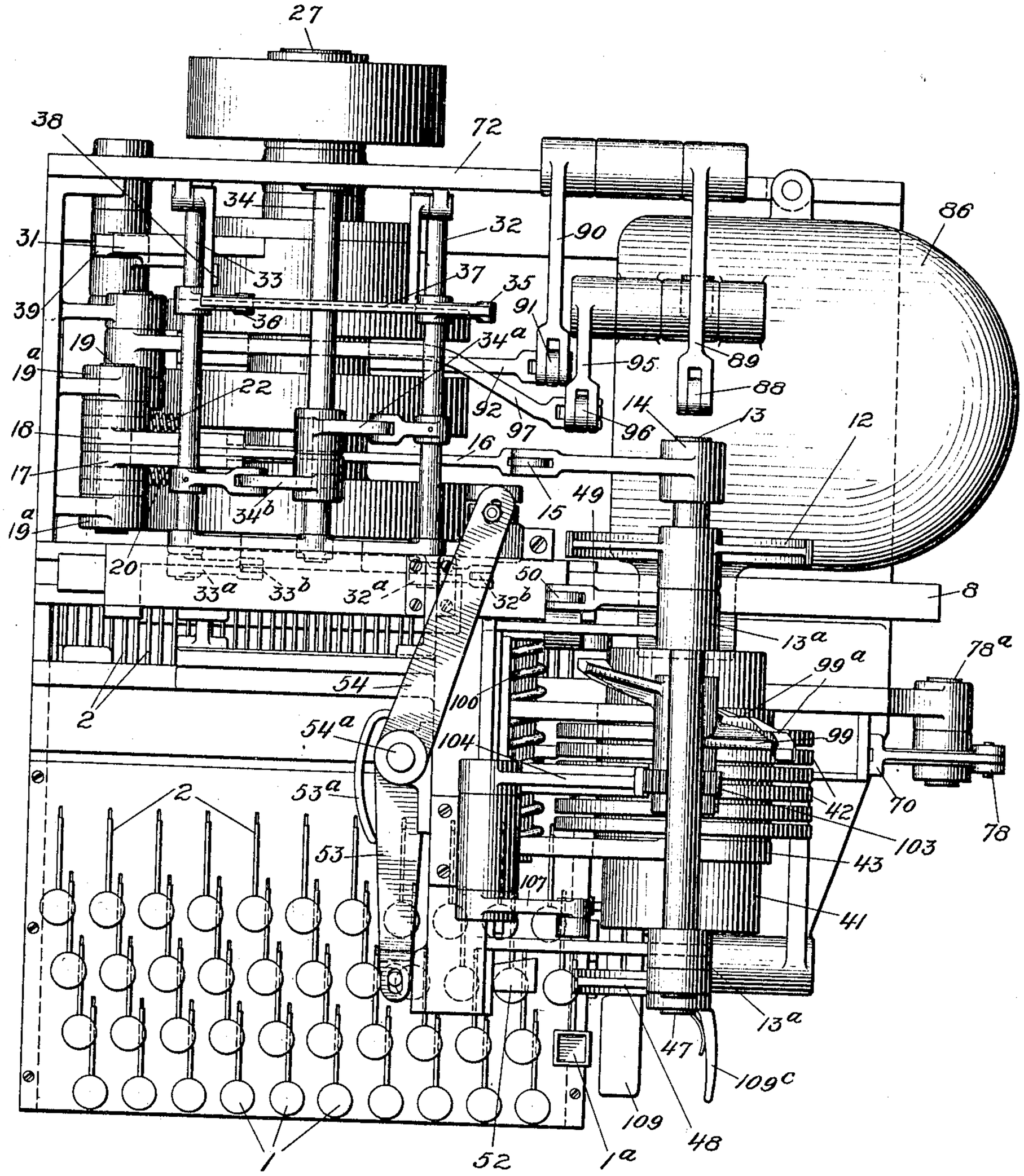
16 SHEETS—SHEET 4.

Fig. 4.



WITNESSES:

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16 SHEETS—SHEET 5.

Fig. 5.

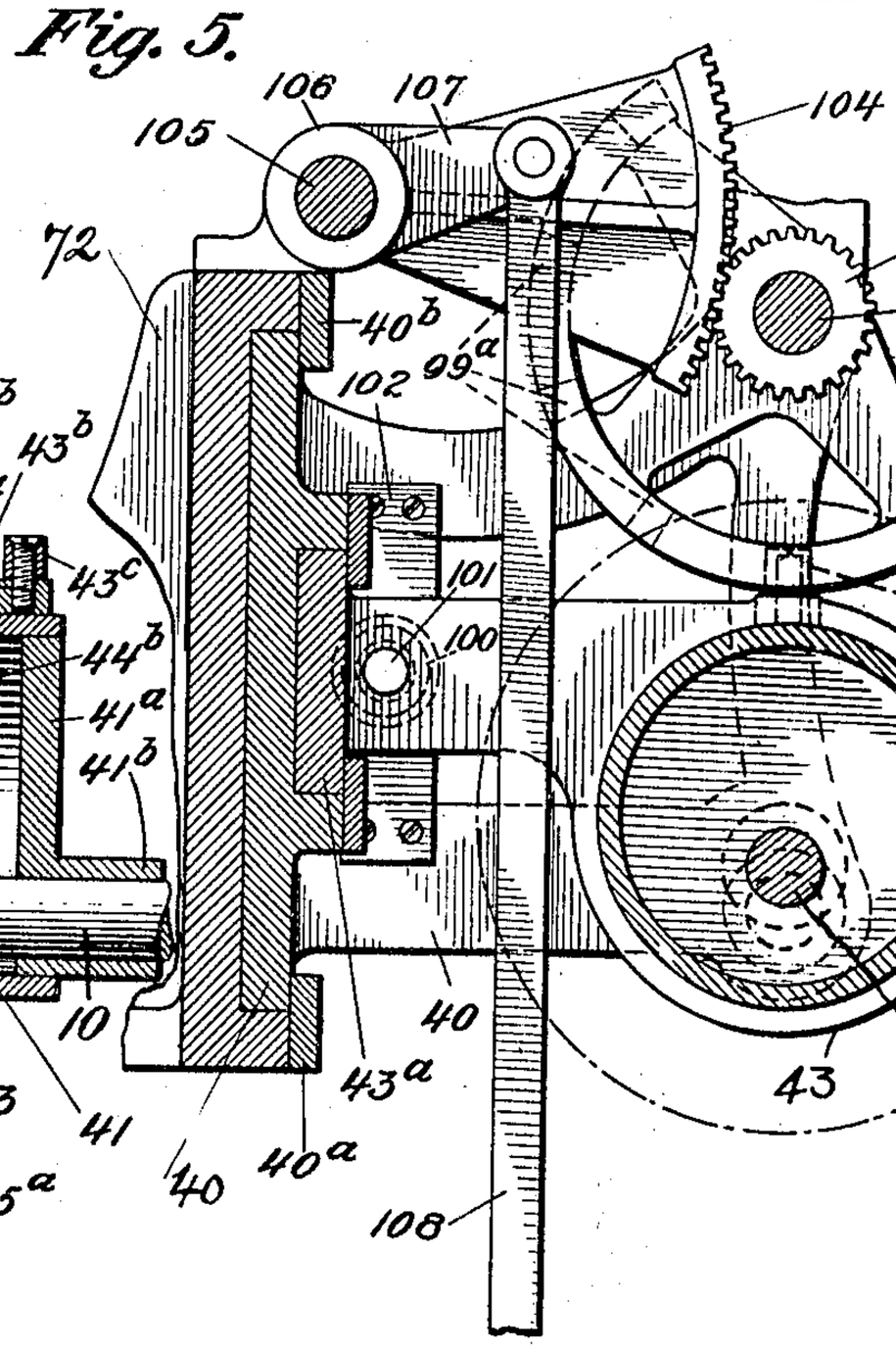


Fig. 7.

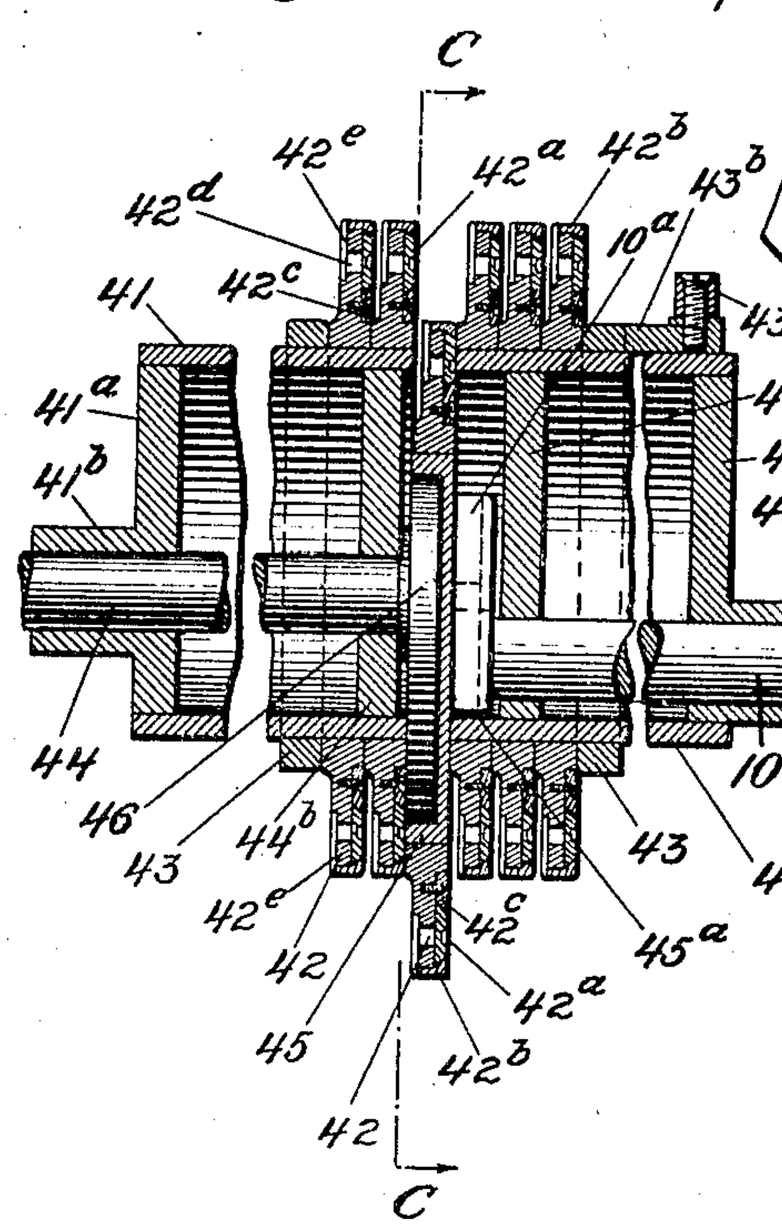


Fig. 6.

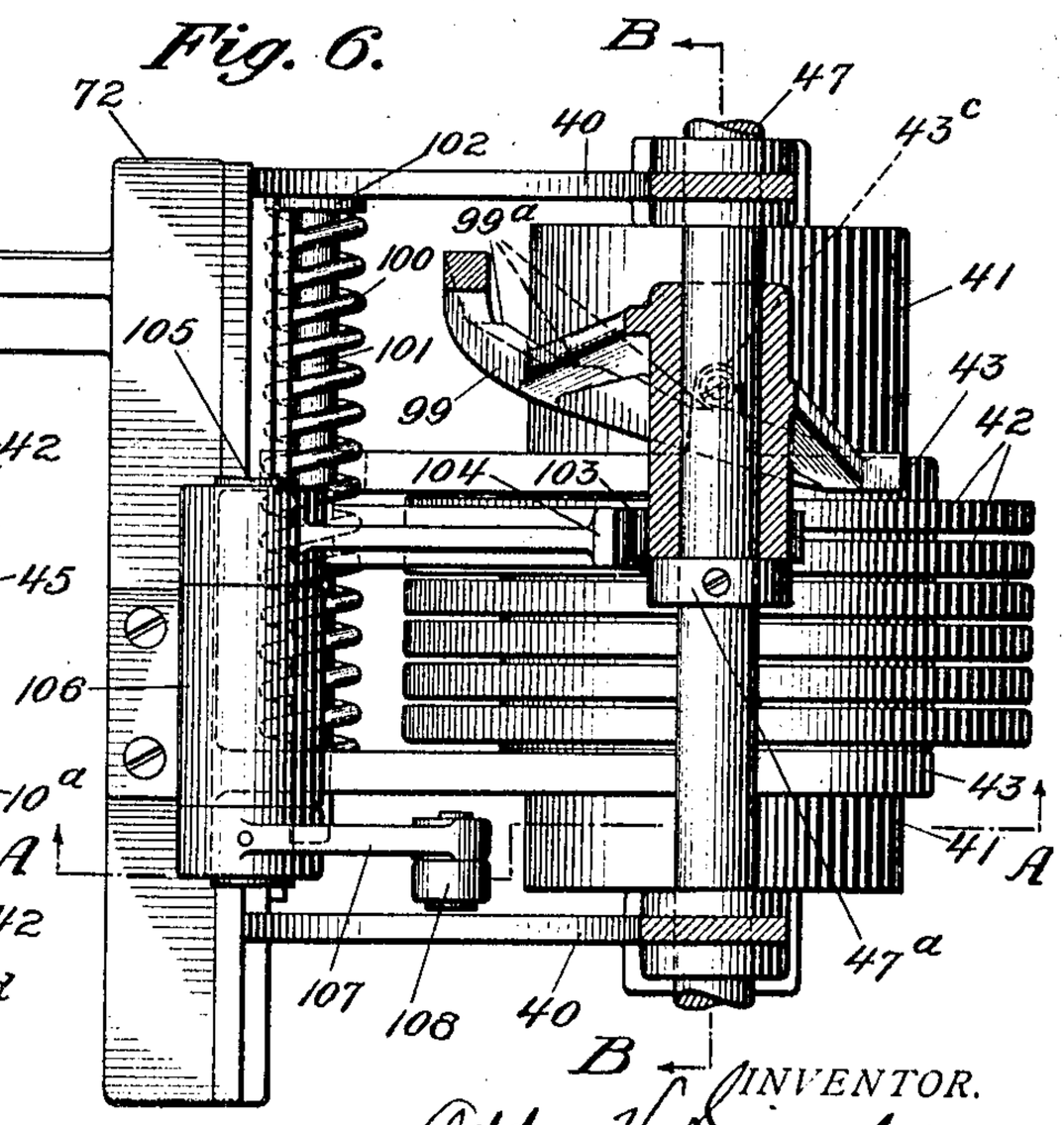
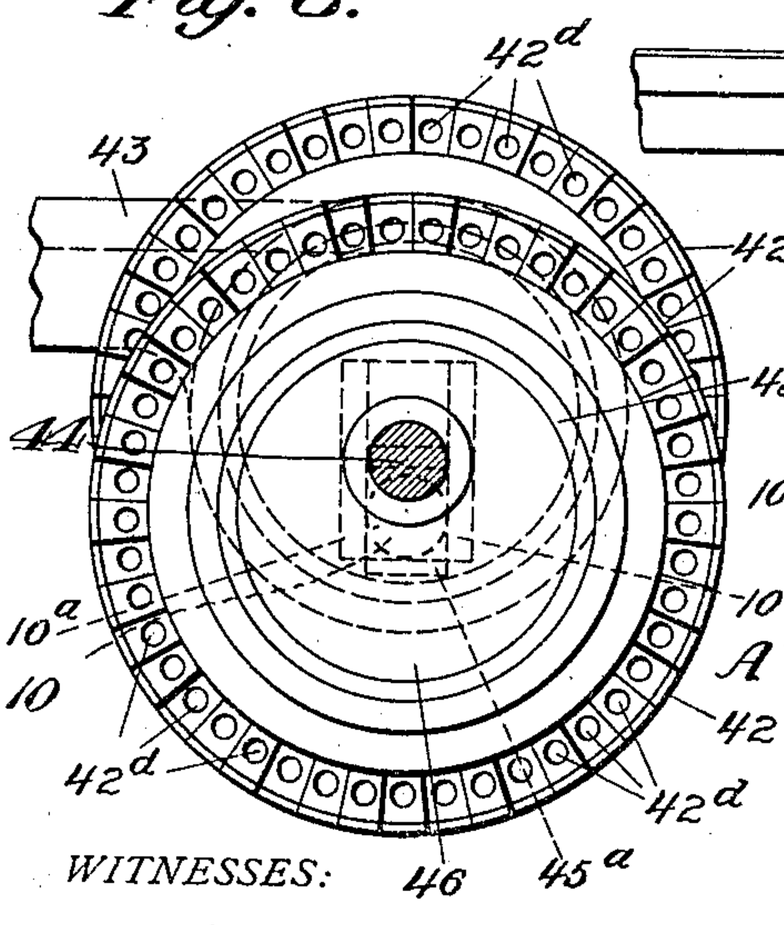


Fig. 8.



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16 SHEETS—SHEET 6.

Fig. 11.

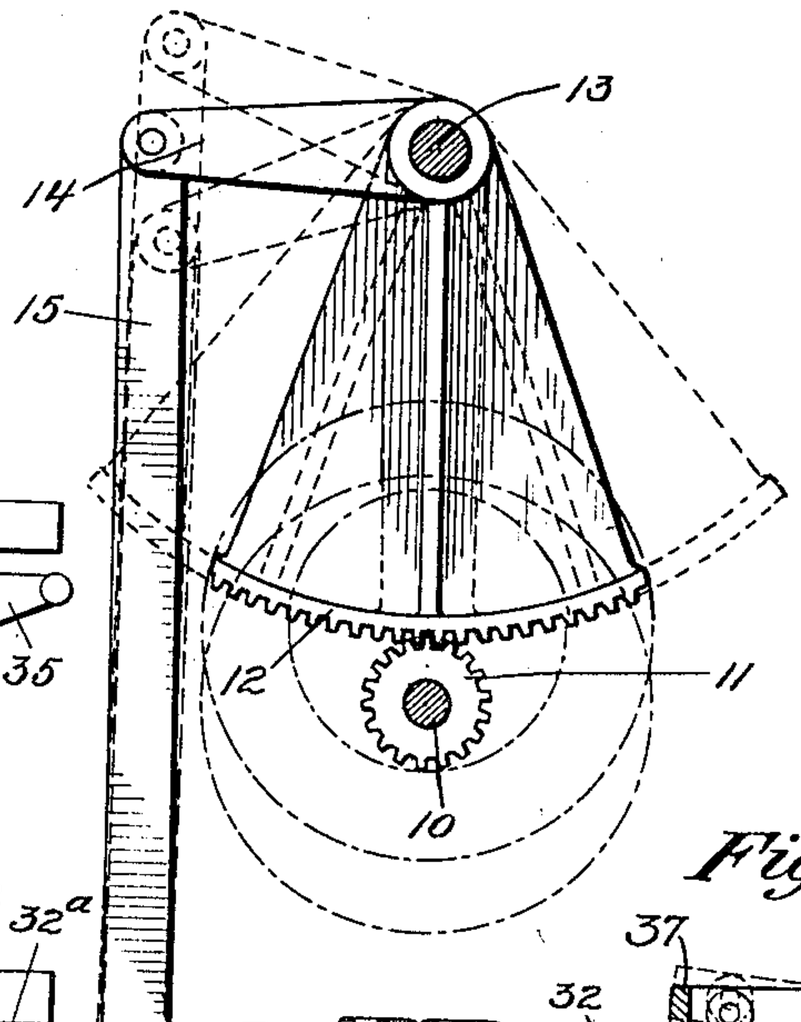


Fig. 9.

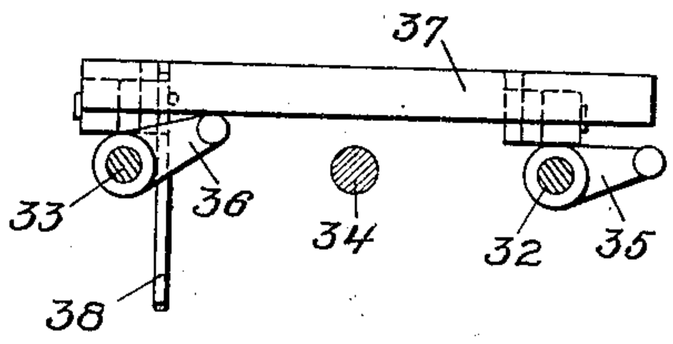
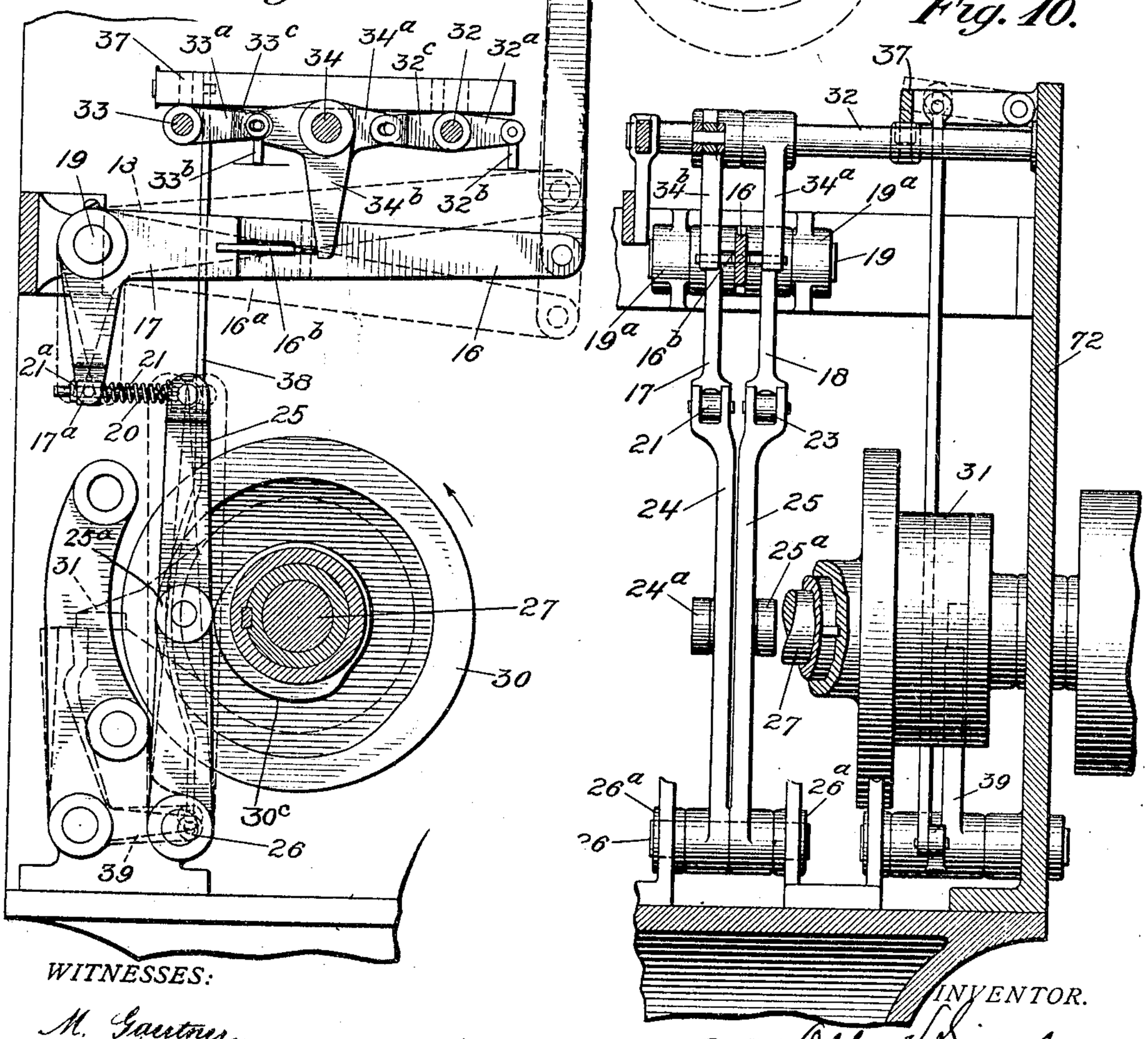


Fig. 10.



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16 SHEETS—SHEET 7.

Fig. 14.

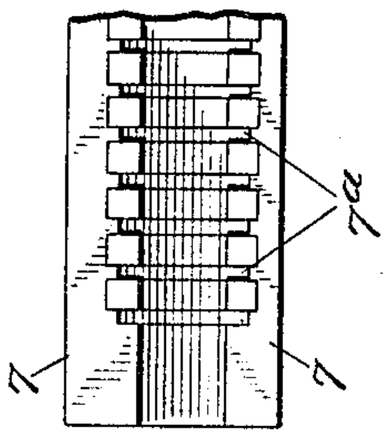
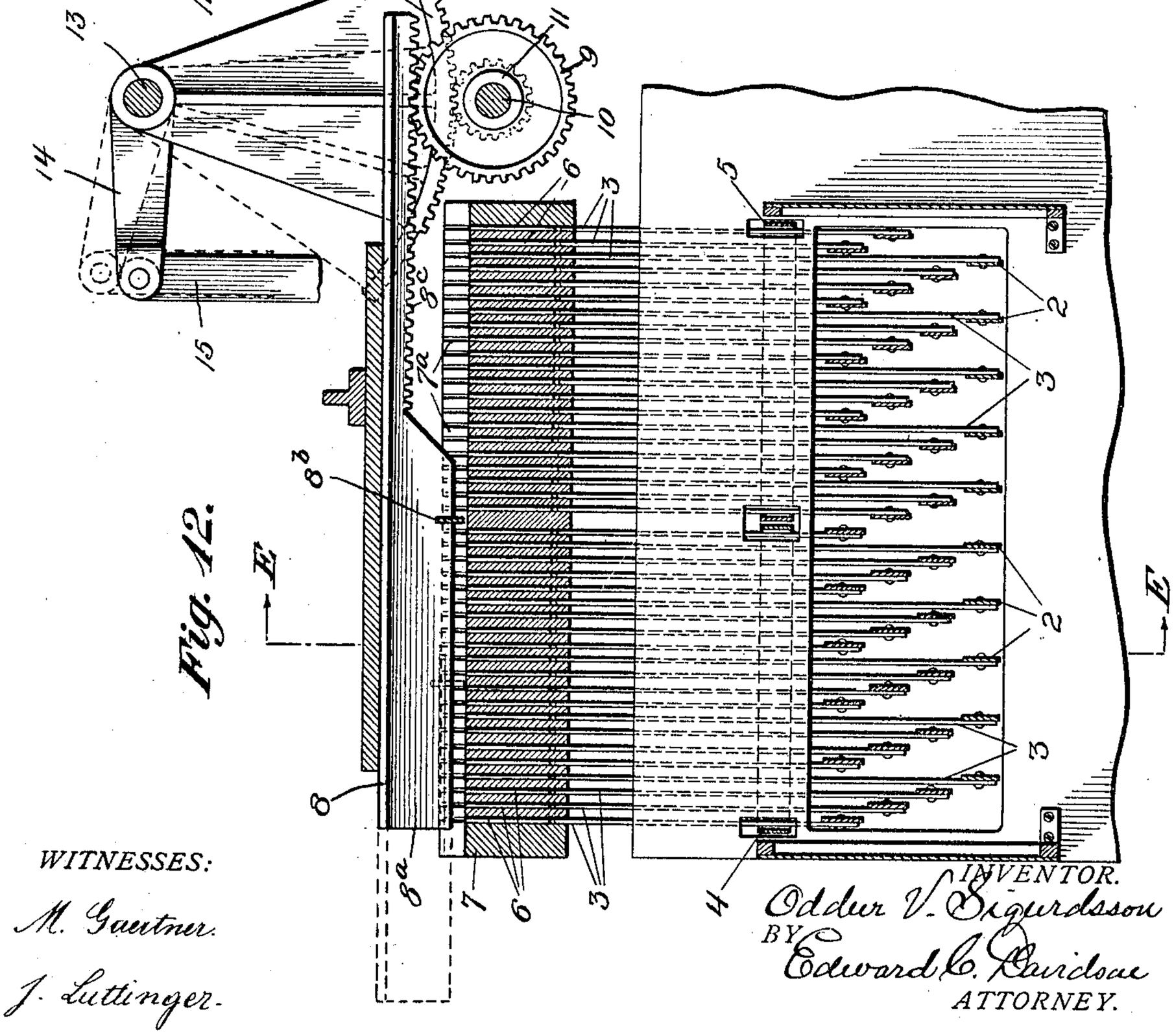


Fig. 13.

Fig. 12.



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16 SHEETS—SHEET 8.

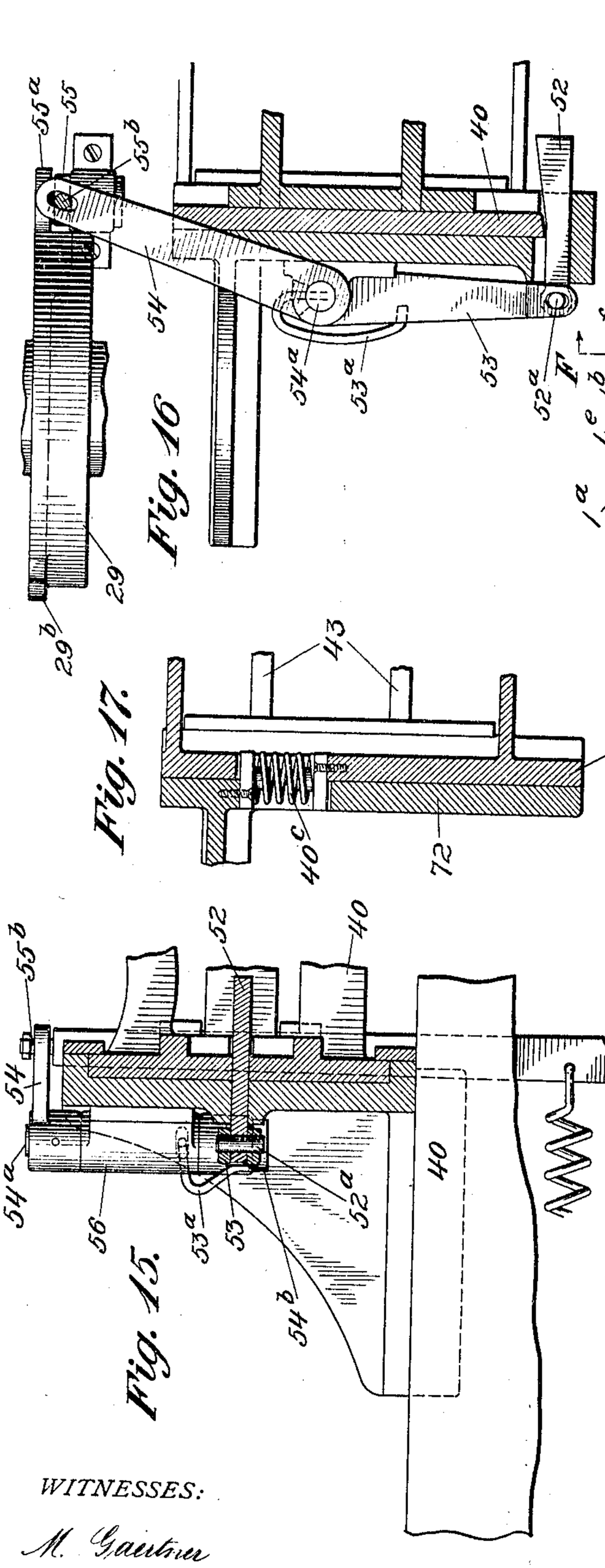

Fig. 16

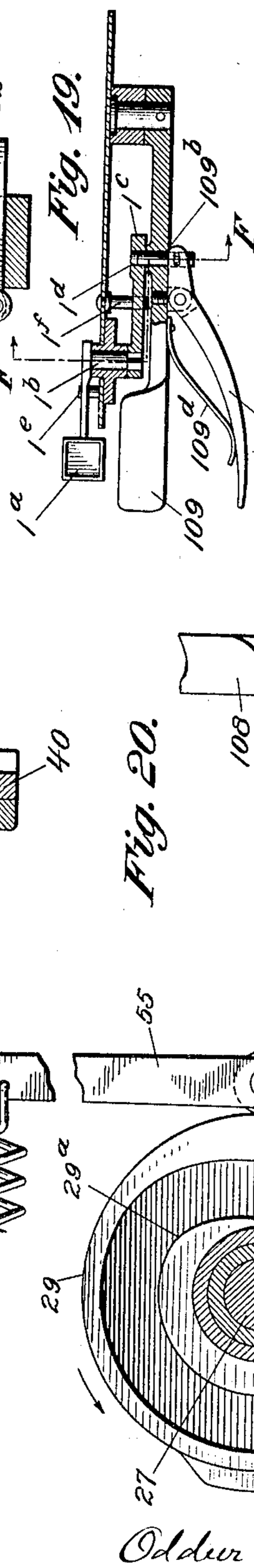

Fig. 19.

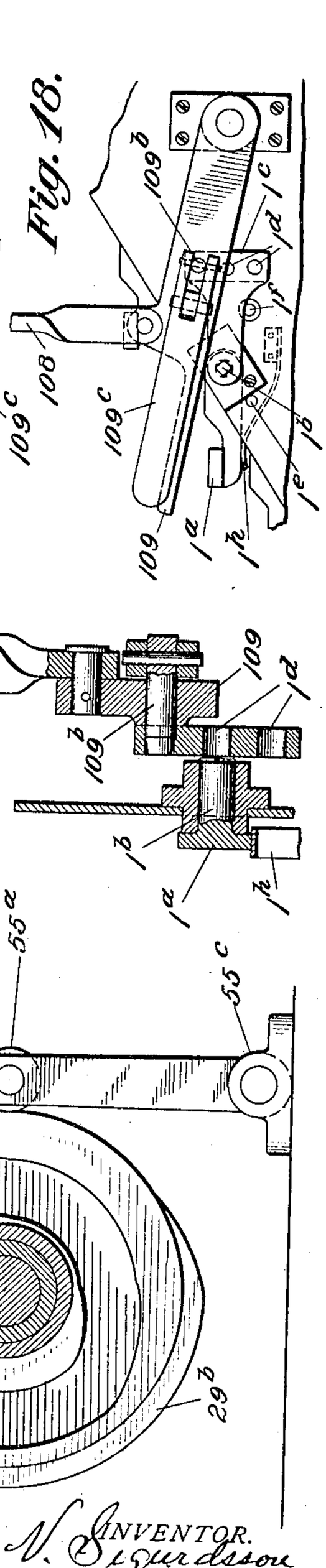

Fig. 18.

Fig. 17.

Fig. 20.

Fig. 15.

WITNESSES:

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16 SHEETS—SHEET 9.

Fig. 21.

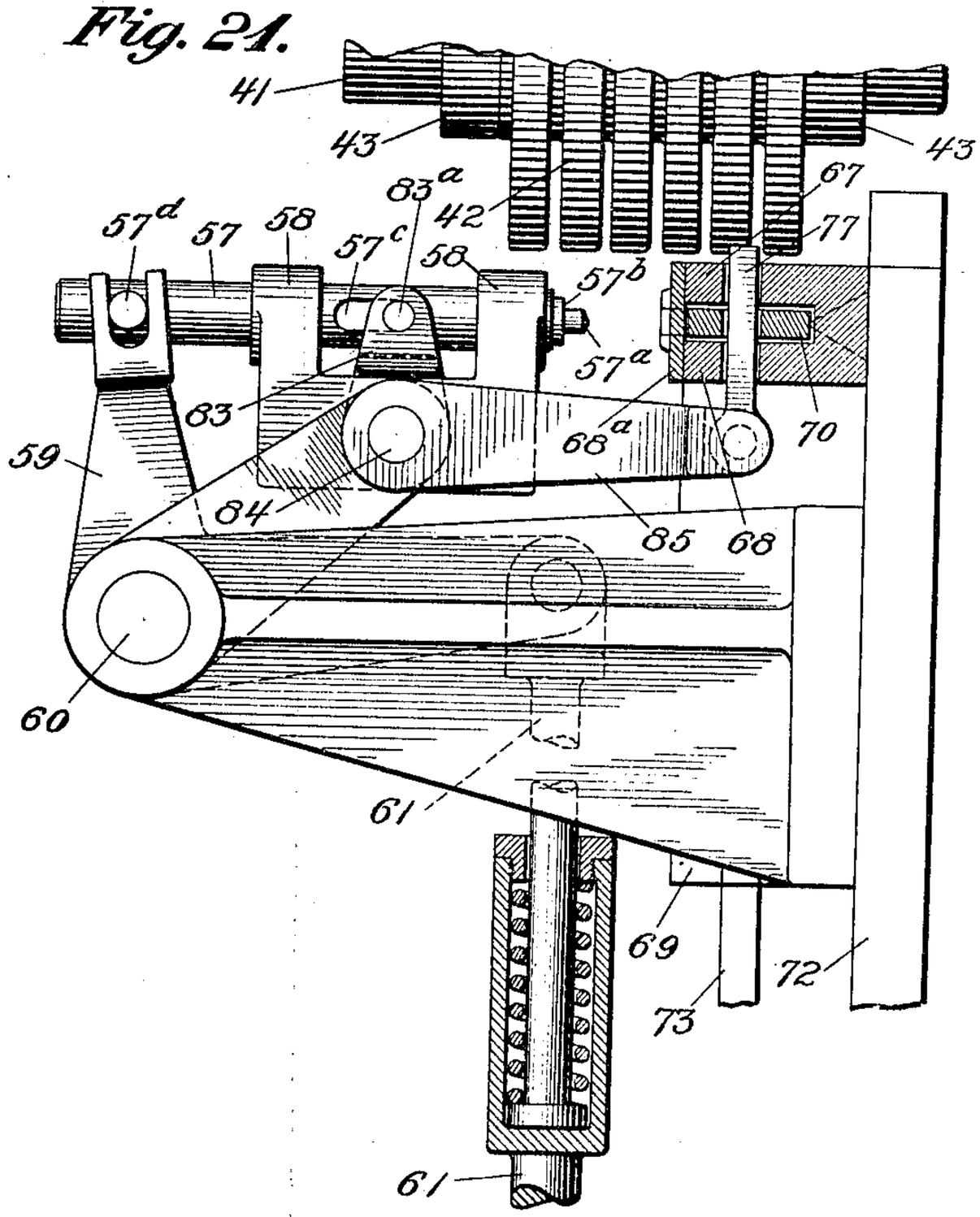
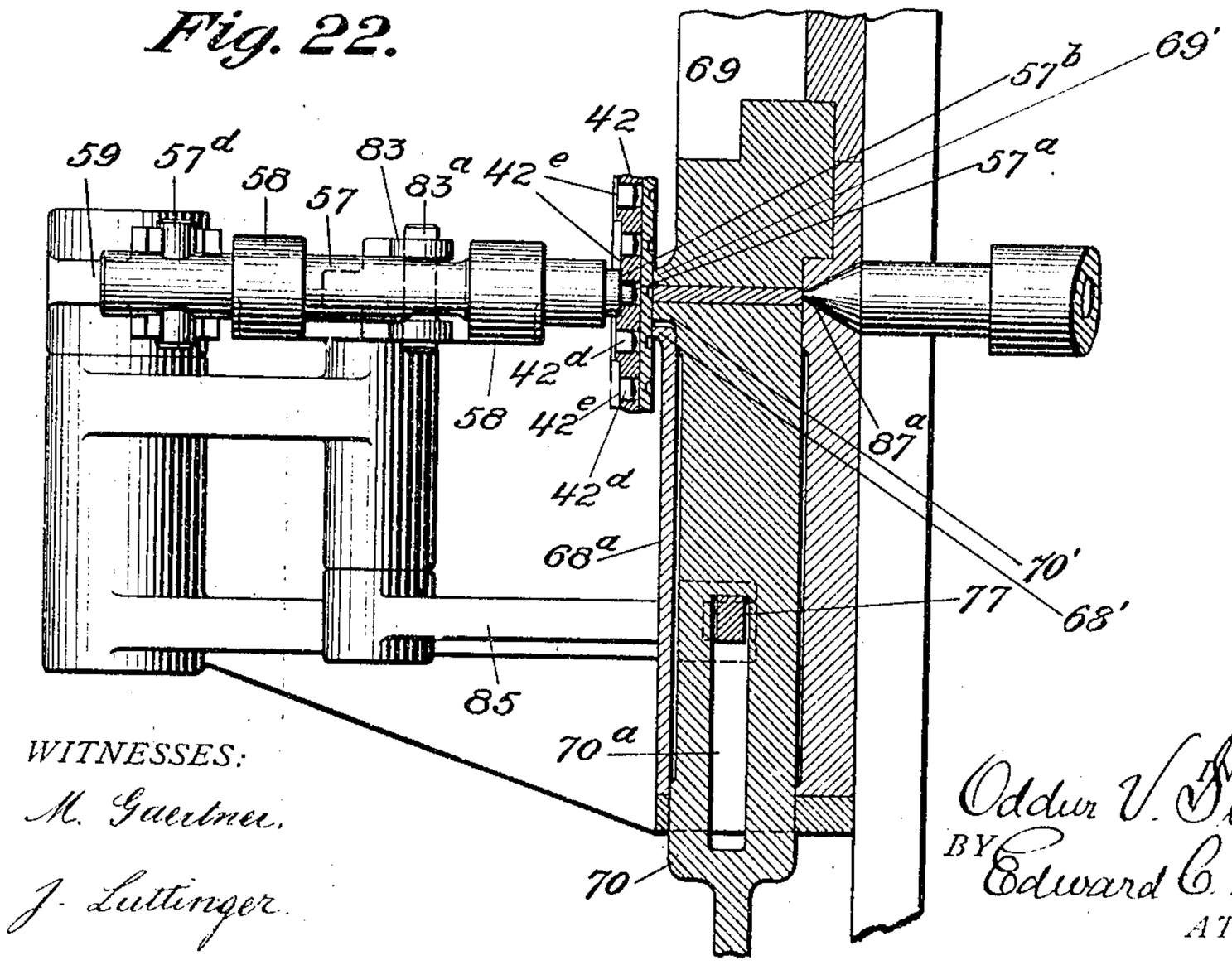


Fig. 22.



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16 SHEETS—SHEET 10.

Fig. 23.

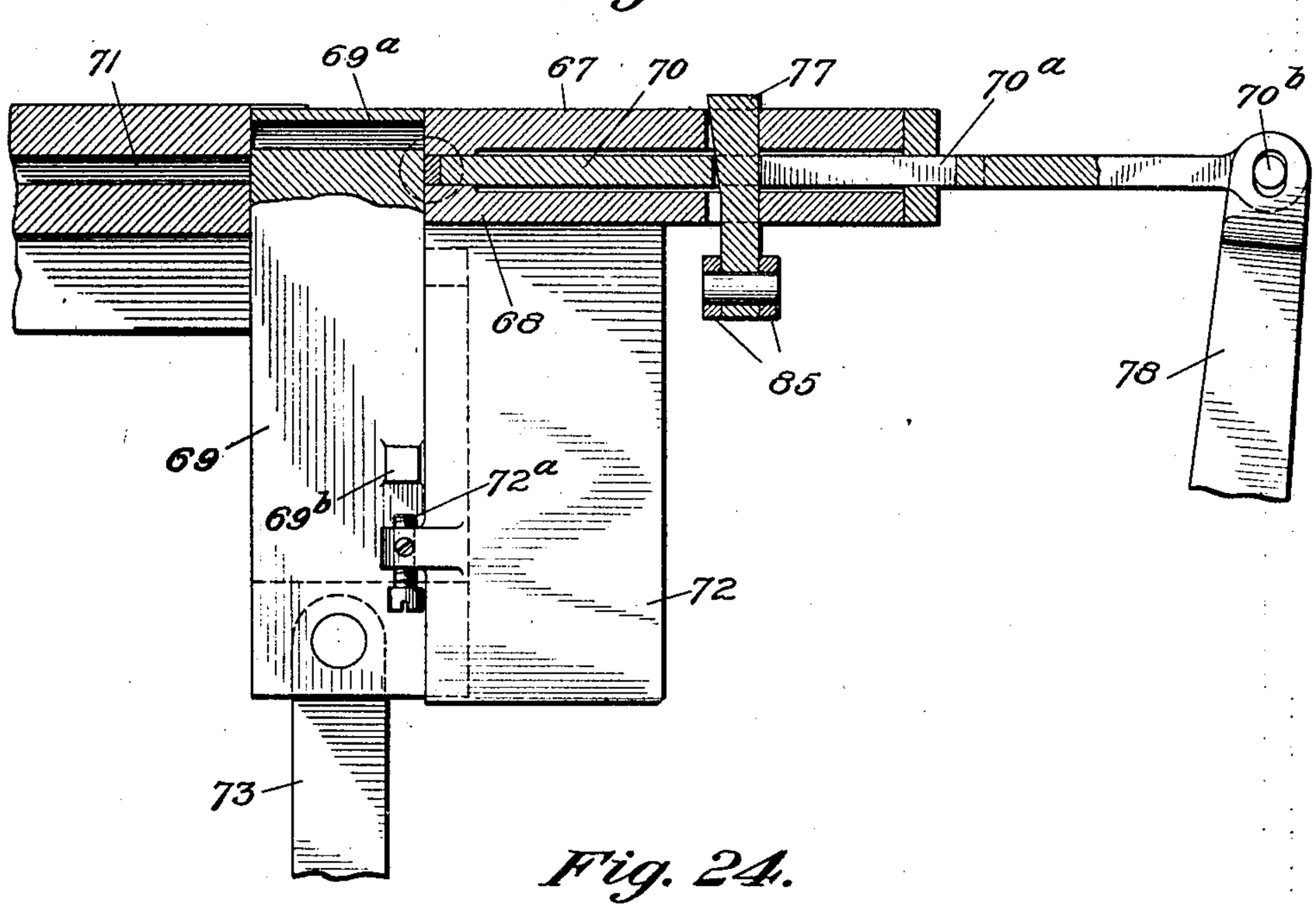
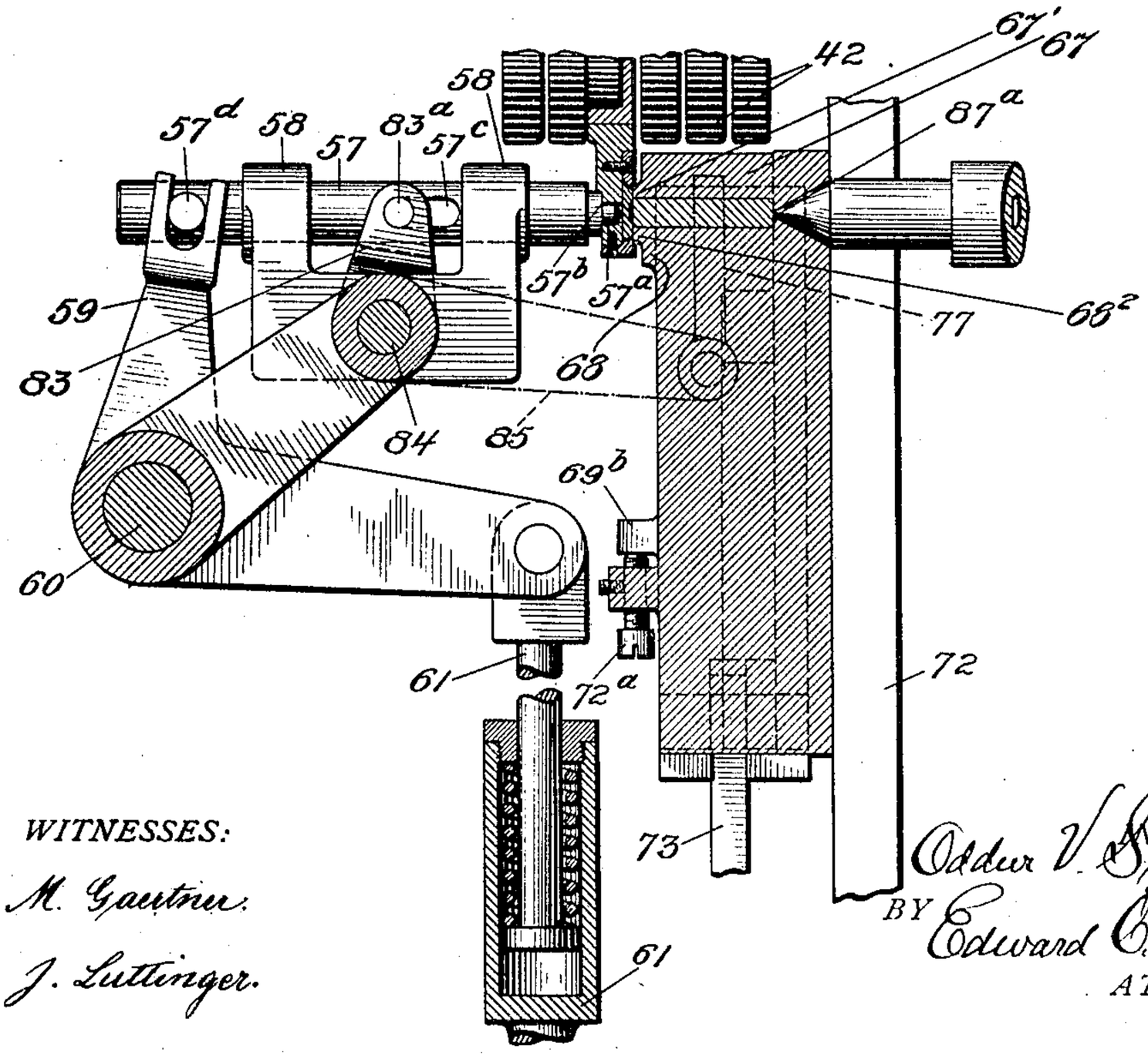


Fig. 24.



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16 SHEETS—SHEET 11.

Fig. 27.

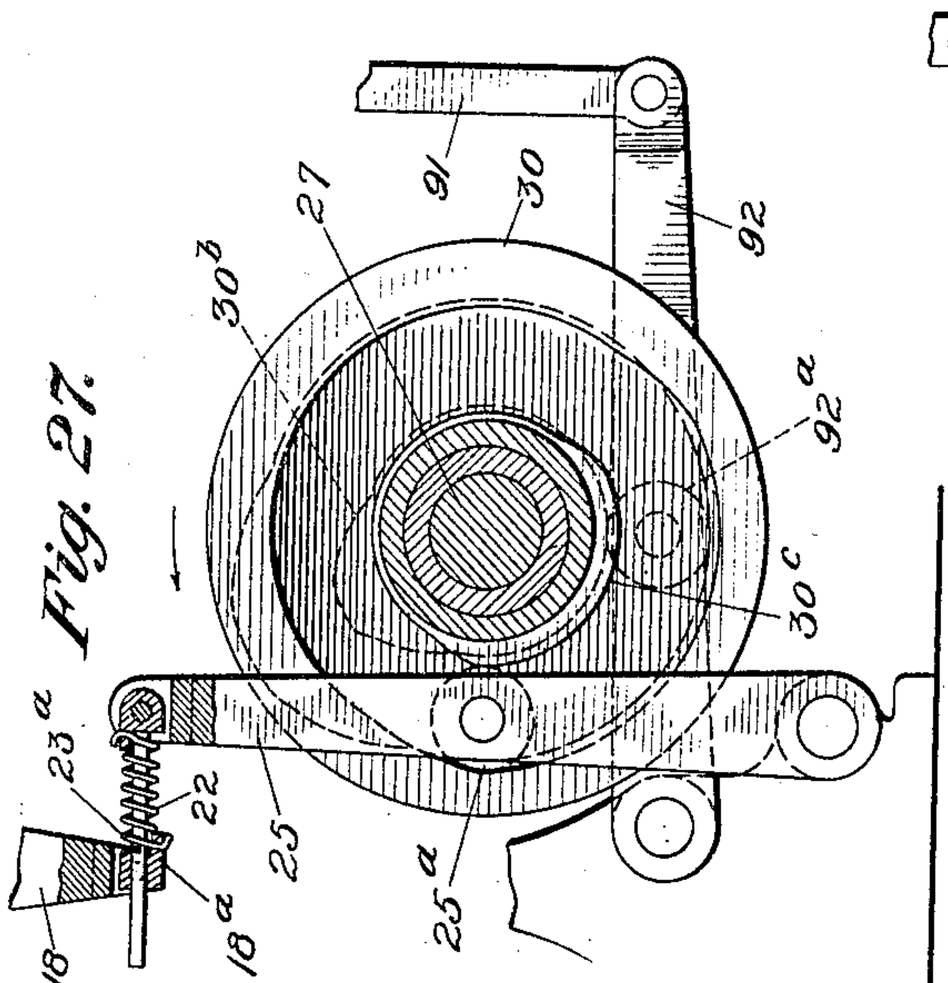


Fig. 28.

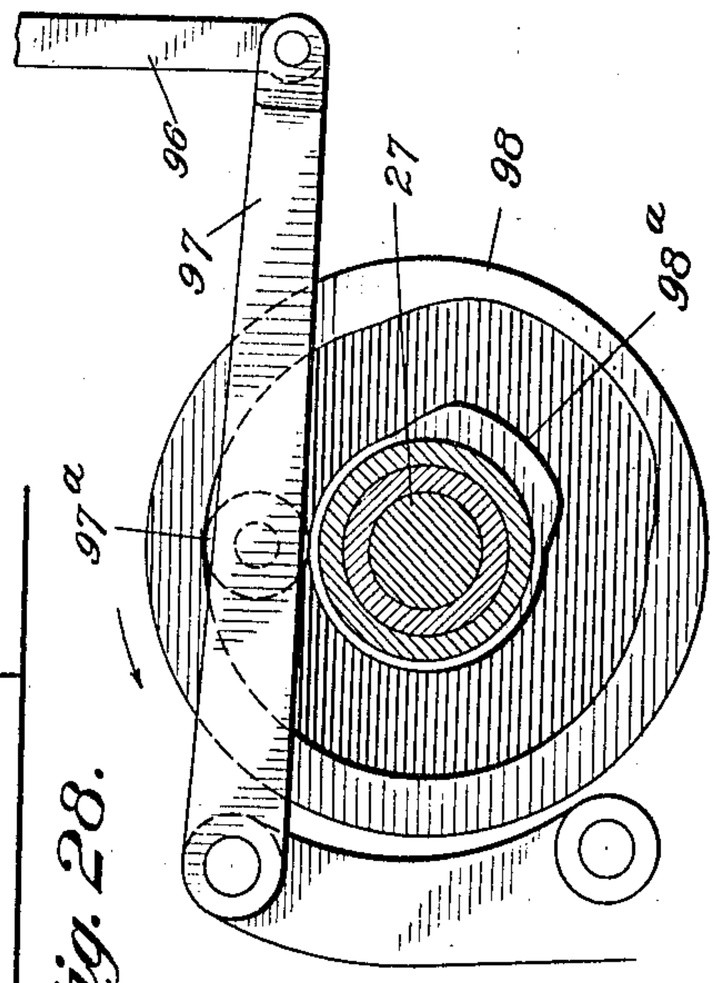
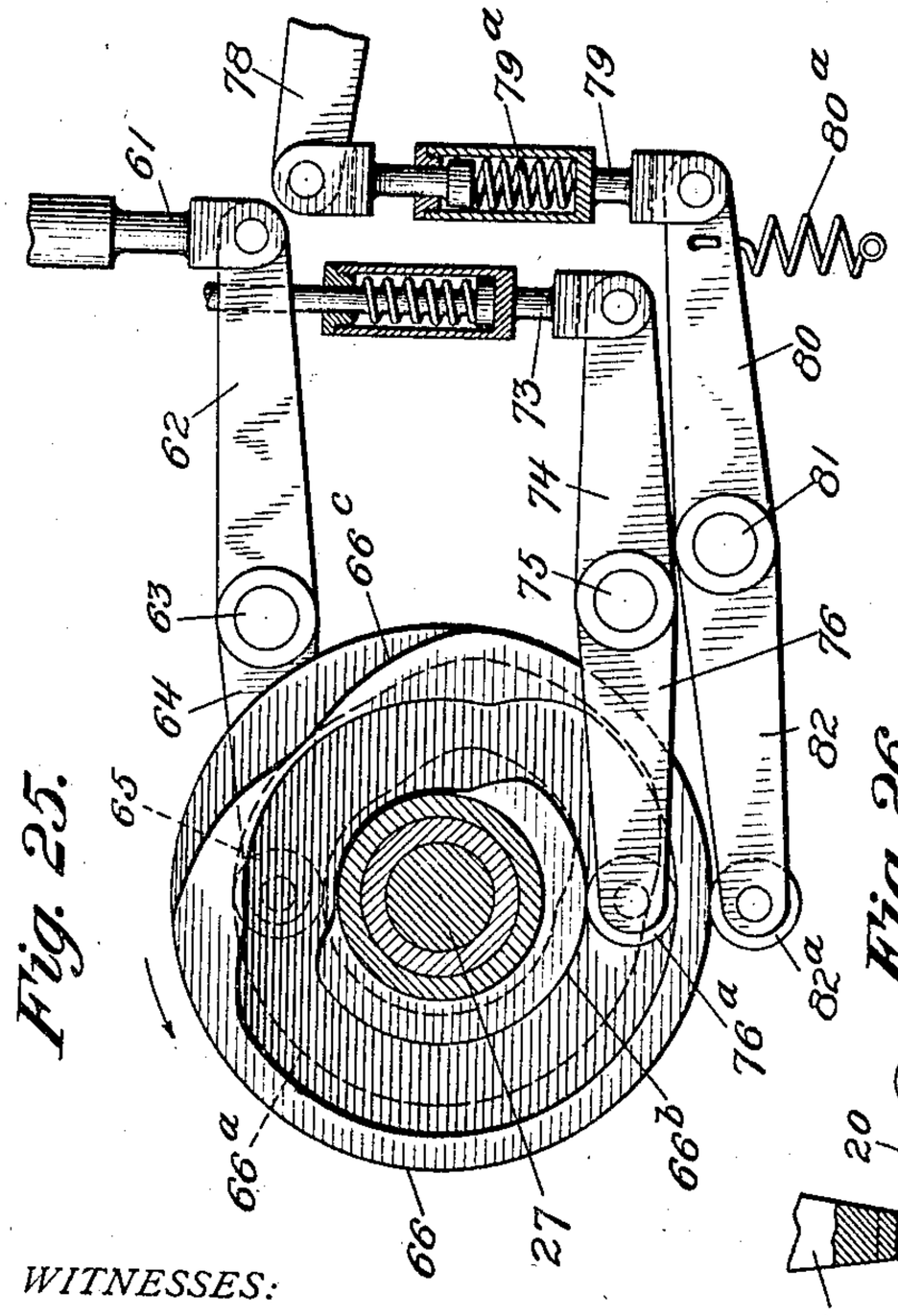


Fig. 25.



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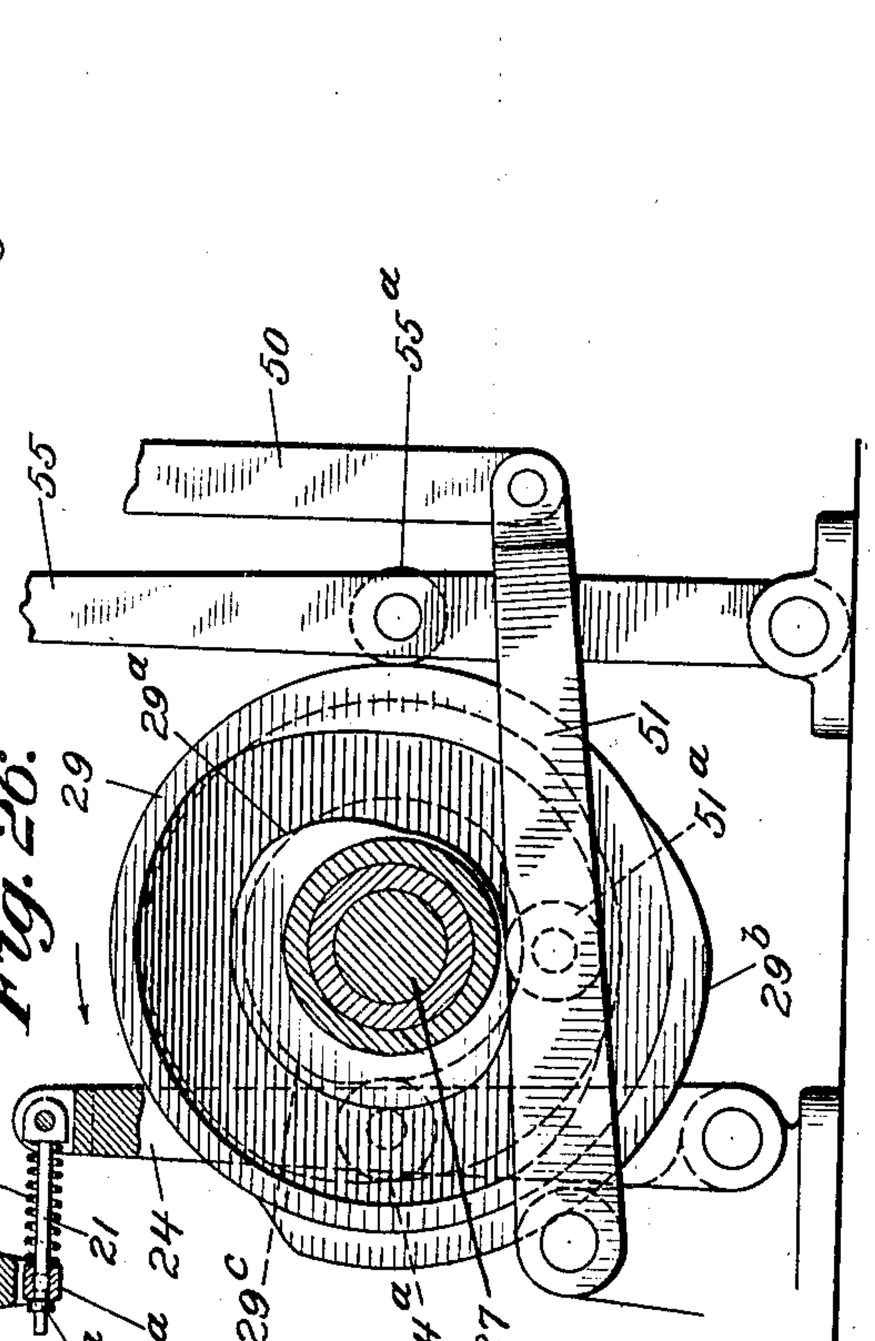

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16 SHEETS—SHEET 12.

Fig. 29.

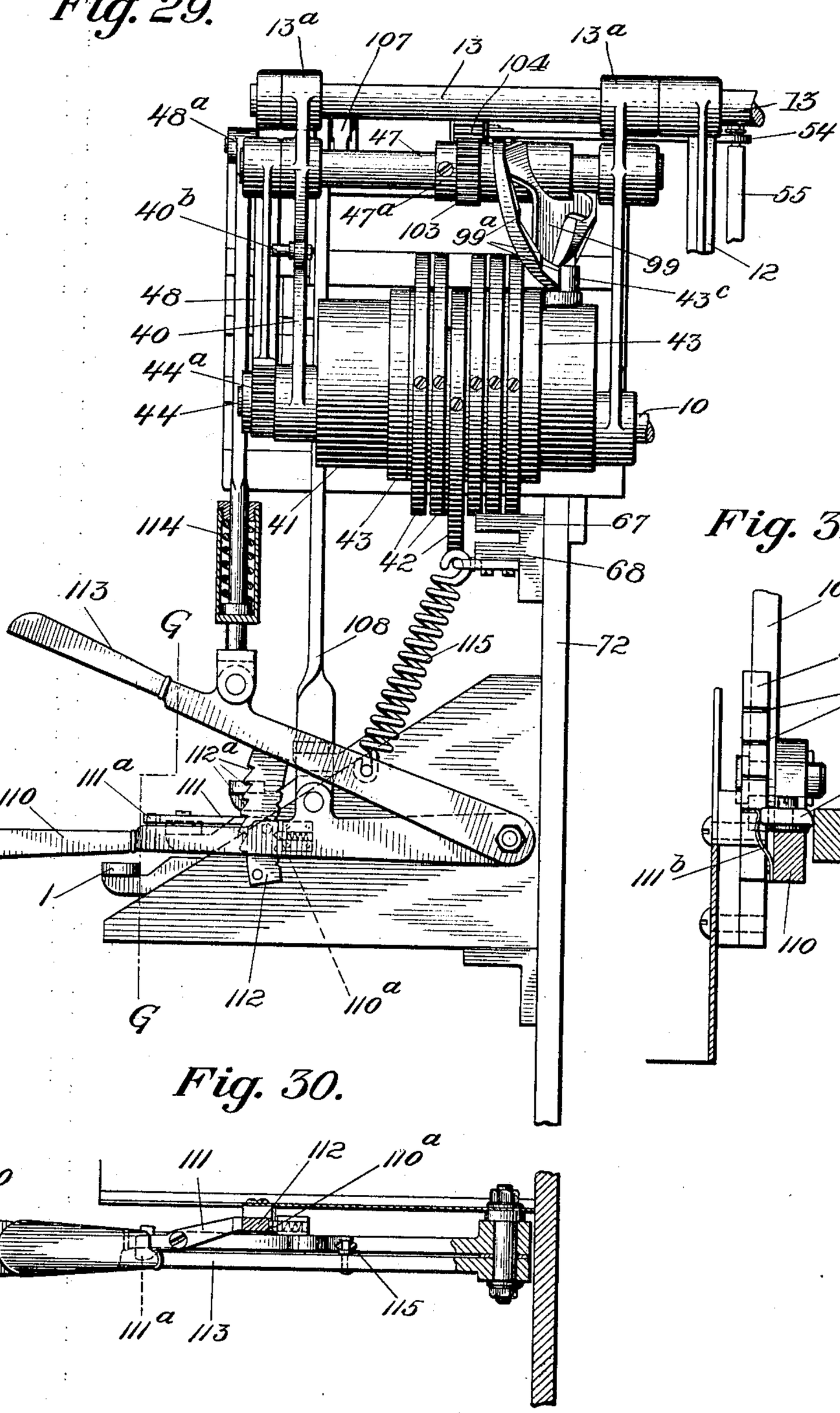

Fig. 30.

Fig. 31.

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TYPE CASTING AND COMPOSING MACHINE.

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16 SHEETS—SHEET 13.

Fig. 32.

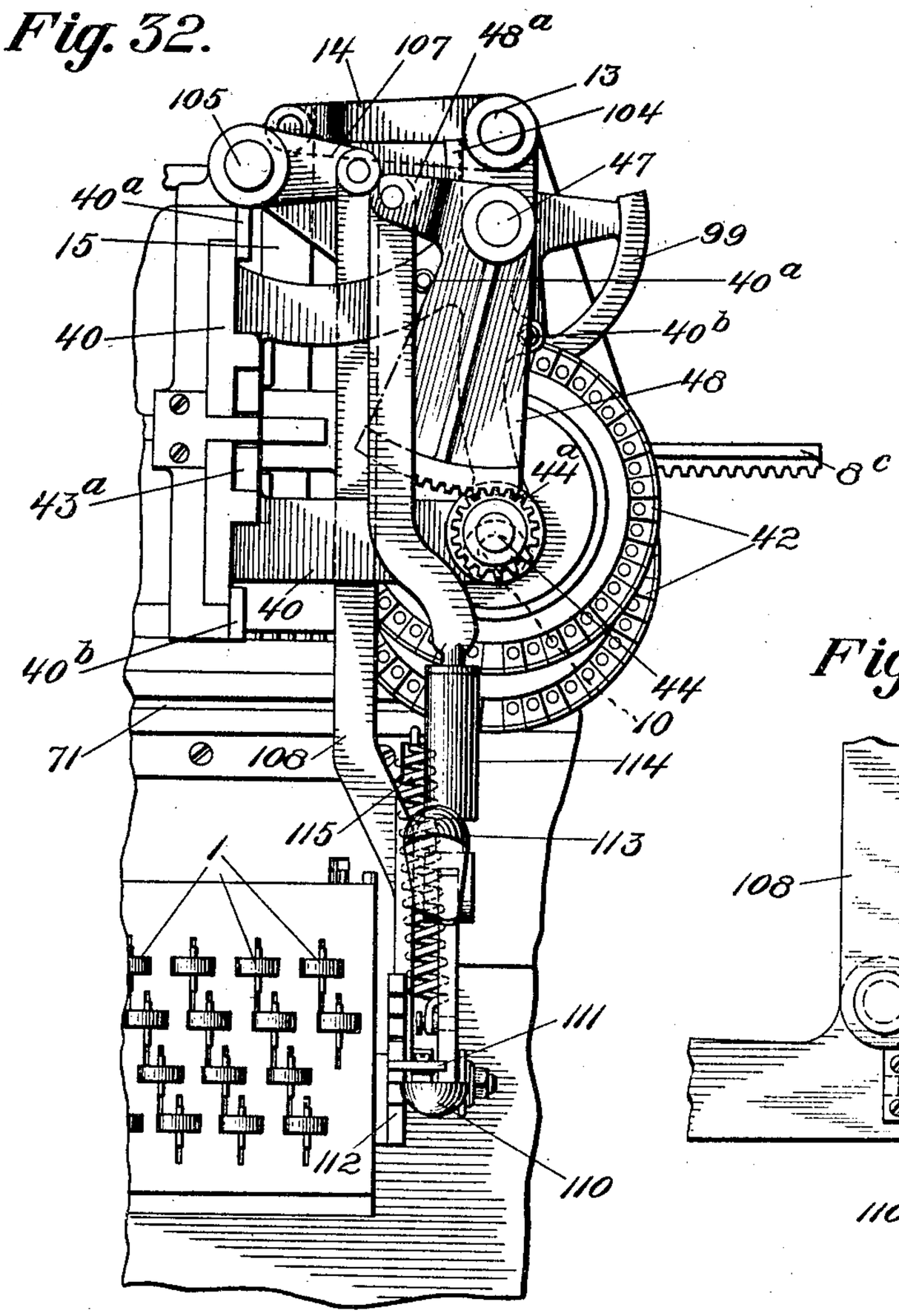


Fig. 33.

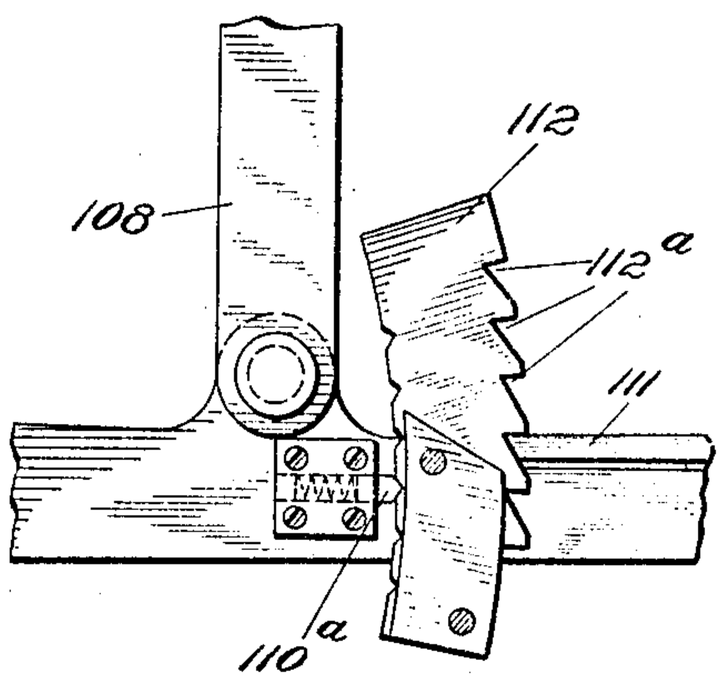
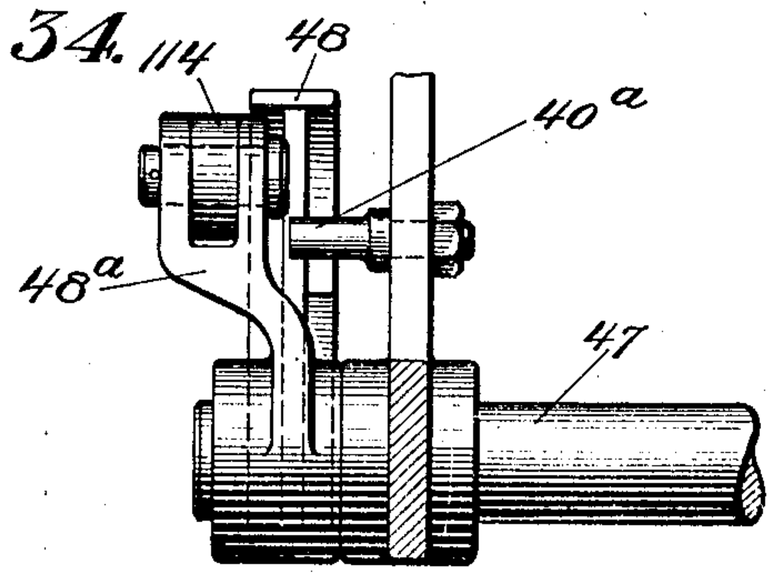


Fig. 34.



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16 SHEETS—SHEET 14.

Fig. 35.

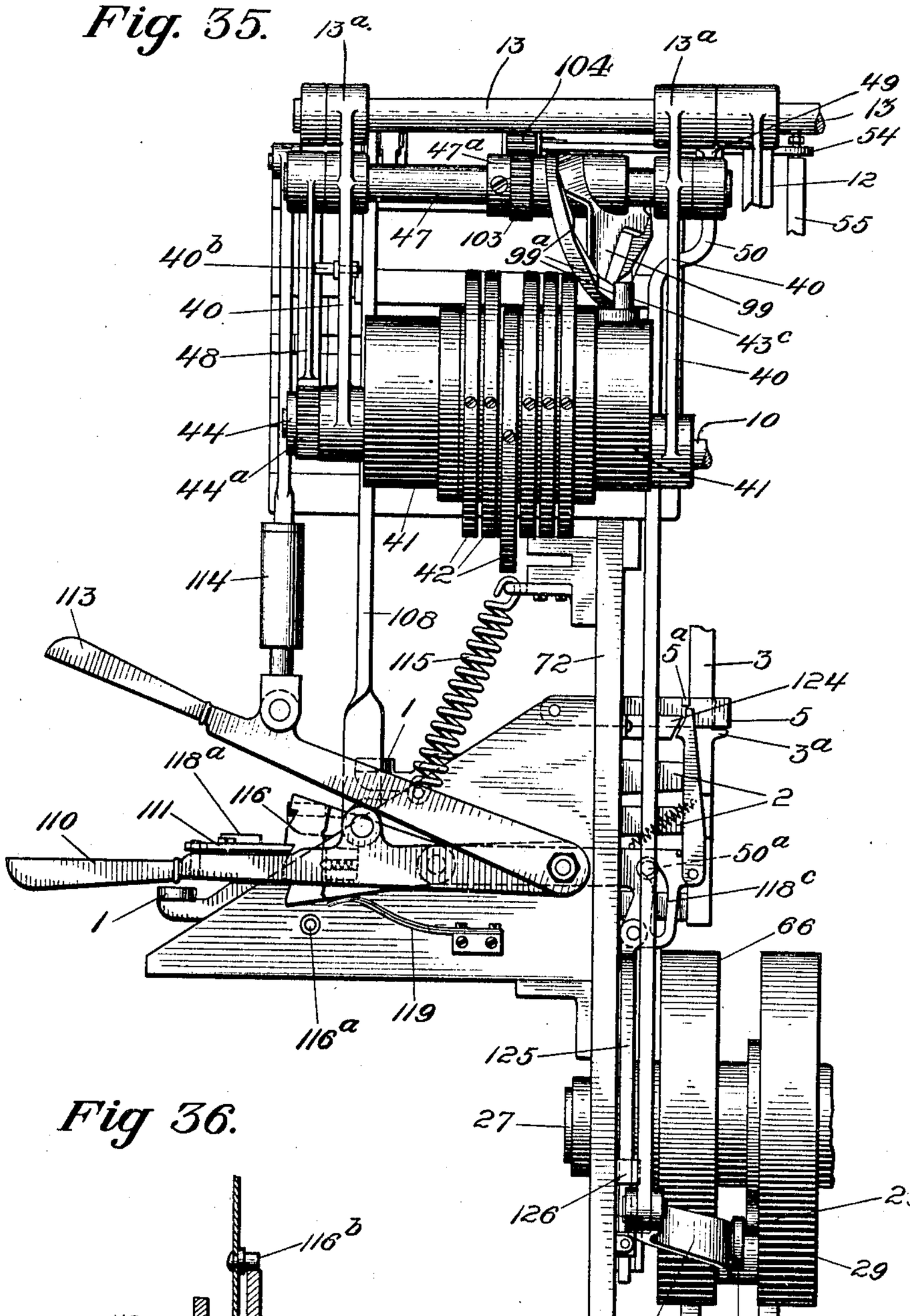

Fig 36.

Witnesses:

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TYPE CASTING AND COMPOSING MACHINE.

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16 SHEETS—SHEET 15.

Fig. 37.

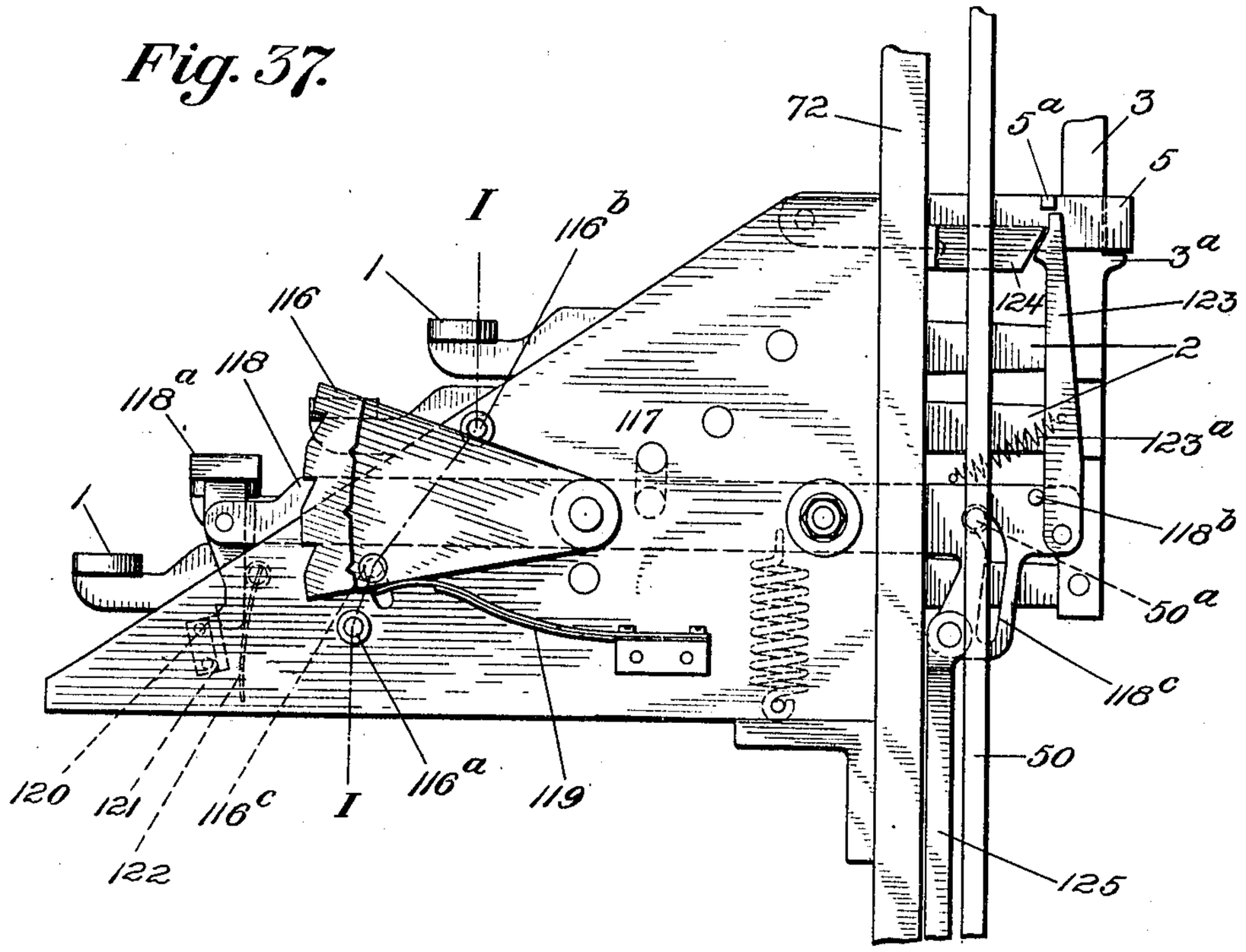
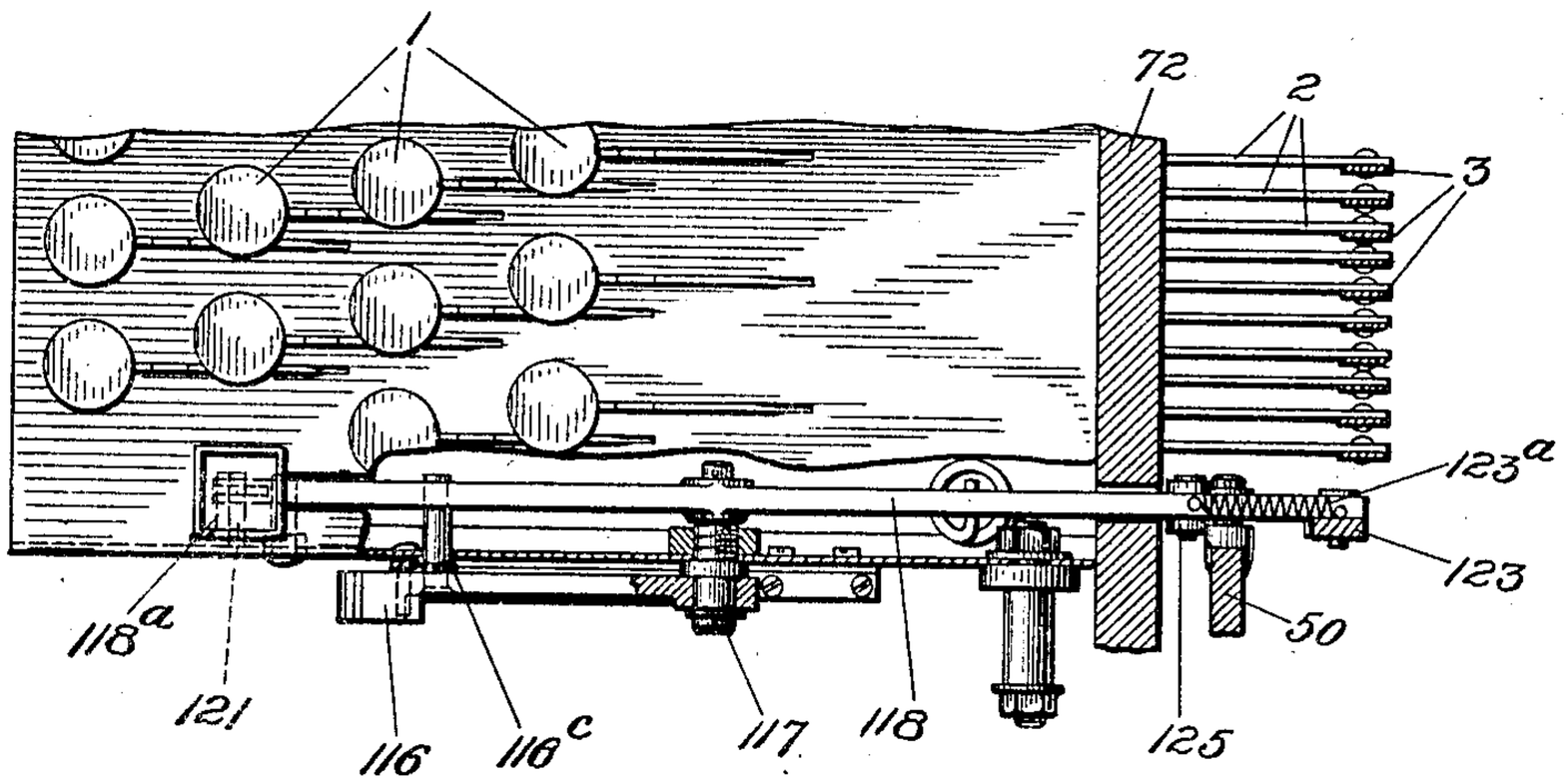


Fig. 38.



Witnesses:

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16 SHEETS—SHEET 16.

Fig. 39.

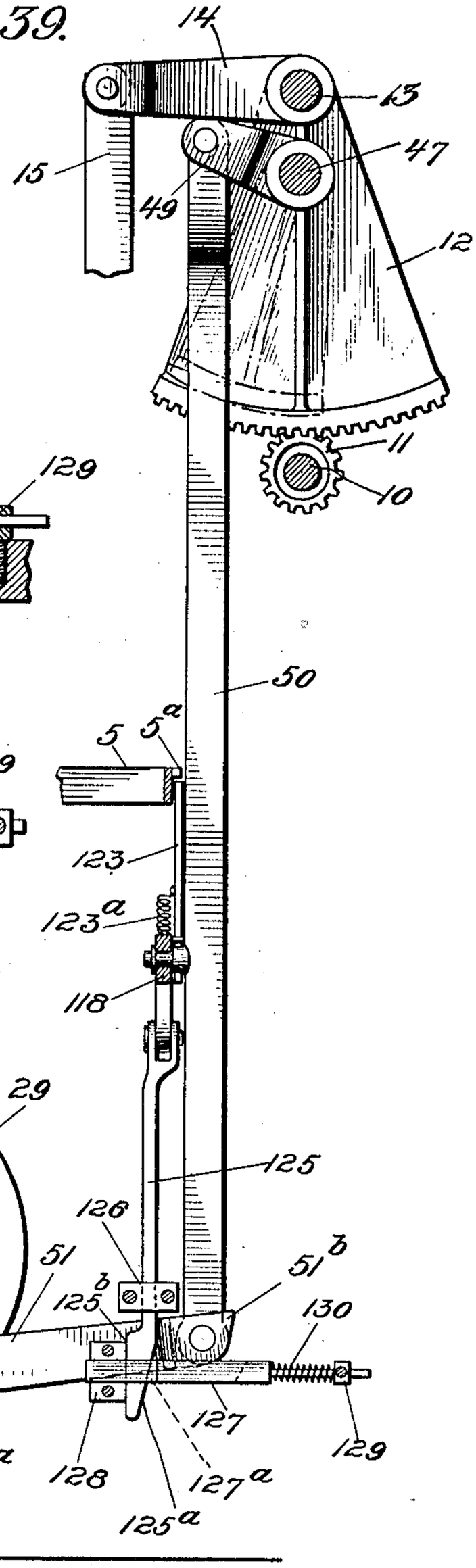


Fig. 40.

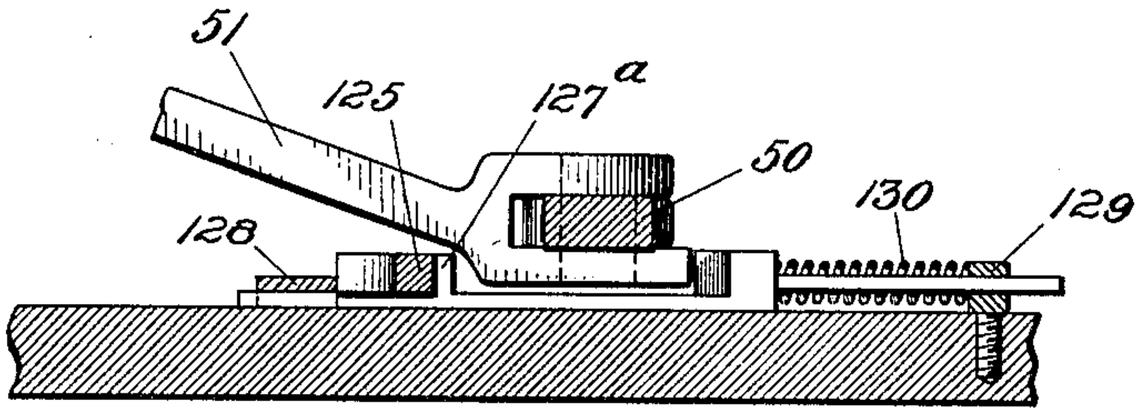
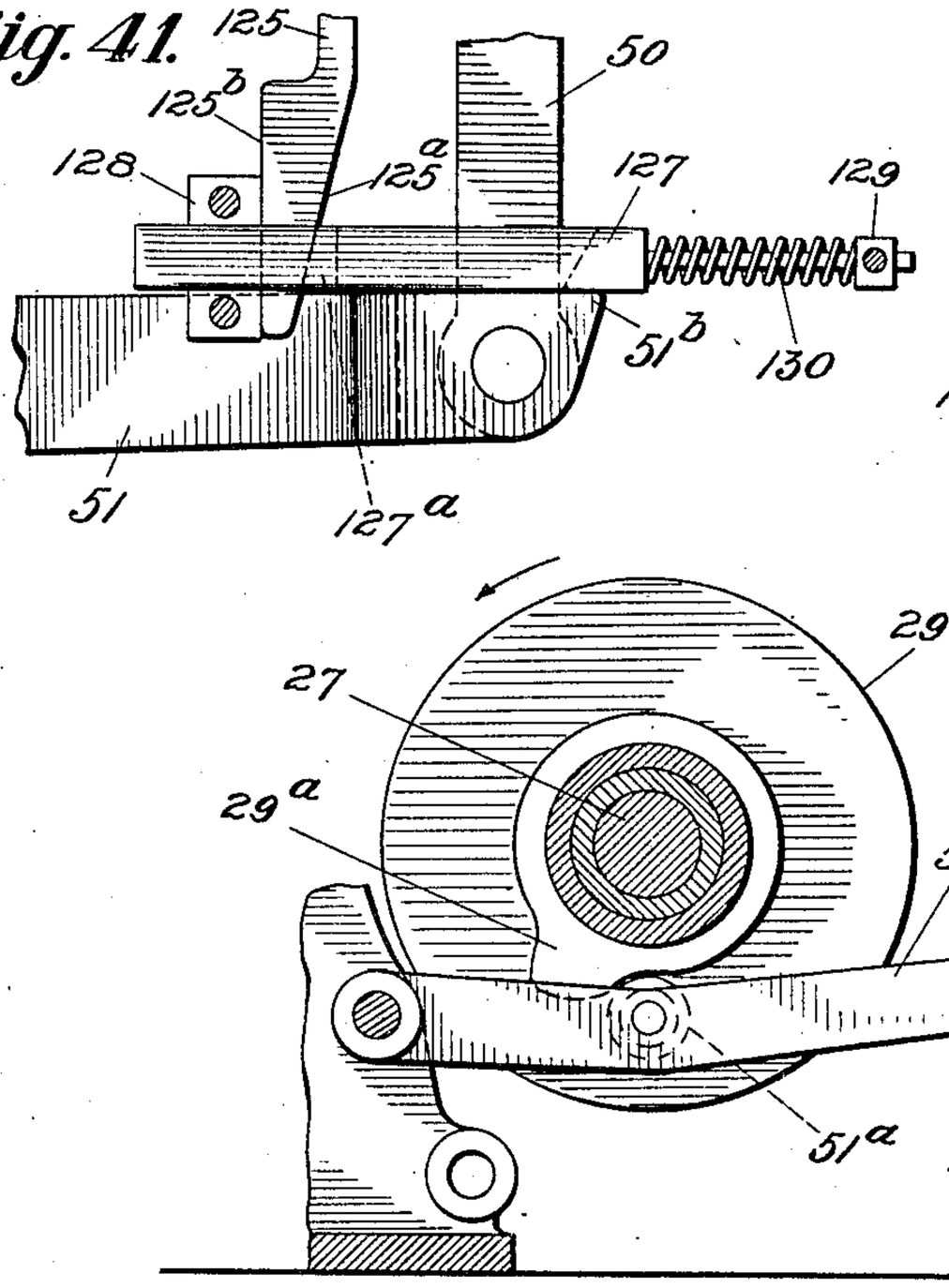


Fig. 41.



Witnesses:

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J. Luttinger.

Inventor

Oddur V. Sigurdsson

By his Attorney

Edward C. Davidson

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 AND COMPOSING MACHINE.

944,108. Specification of Letters Patent. **Patented Dec. 21, 1909.**

Application filed May 3, 1909. Serial No. 493,497.

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 Improvements in Type Casting and Composing Machines, of which the following is a specification.

This invention relates to a machine in which single type are cast and assembled into lines upon the manipulation of character keys in a key board.

It comprises a new organization wherein the casting and assembling into lines is done in the same plane; also an organization wherein the matrices are formed in disks mounted to receive a motion of rotation and translation transversely to the axis of rotation and also translation in a plane at right angles to the plane of rotation. The matrices of a font may be distributed on two disks and the required disk brought into molding position by rotation and translation. A plurality of type font disks may be employed and the different sets brought into operative position by the operator.

The accompanying drawings disclose a machine embodying this invention in what is deemed to be a practical and efficient form. Skilled mechanicians may, however, vary the organization without departing from the spirit of the invention.

Figure 1 is a right hand side elevation; Fig. 2, a front elevation; Fig. 3, a left hand side elevation; Fig. 4, a plan view; Fig. 5, a cross section on enlarged scale on line A A of Fig. 6, showing mechanism for moving the matrix disks; Fig. 6, a plan view of the same mechanism; Fig. 7, a longitudinal section, on line B B of Fig. 6, of the matrix disk barrel showing mechanism for rotating and translating matrix disks in the same plane; Fig. 8, a cross section through the matrix barrel on line C C Fig. 7; Fig. 9, a detail side elevation partly in section showing means for determining right or left hand rotation of matrix disks; Fig. 10, a detail rear elevation of same; Fig. 11, a detail front elevation of cam starting mechanism; Fig. 12, a section of the key board on line D D of Fig. 13, showing the matrix selector bar and stop pawls; Fig. 13, a cross section of the key board and matrix selector bar on line E E Fig. 12; Fig. 14, a detail plan view on enlarged scale of matrix selector bar stop pawl frame; Fig. 15, a detail side elevation partly in section of the matrix barrel sliding frame with shifting mechanism; Fig. 16, a plan view of Fig. 15, partly in section; Fig. 17, a longitudinal section of part of the matrix barrel sliding frame; Fig. 18, a detail enlarged side elevation showing shift key and type font shift lever; Fig. 19, a plan view partly in section of Fig. 18; Fig. 20, an enlarged sectional view of Fig. 19 on line F F; Fig. 21, a side elevation partly in section on enlarged scale, showing matrix disk locking device and mold adjusting mechanism; Fig. 22, a plan view of Fig. 21 with the mold in section showing a cast type in it; Fig. 23, a longitudinal section on an enlarged scale showing mechanism for adjusting the width of the mold for the thickness runningwise of type to be cast; Fig. 24, an elevation on an enlarged scale showing a matrix disk locked in molding position with the type mold in section showing a type character cast; Figs. 25, 26, 27 and 28 are detail views of cams for operating the various mechanisms; Fig. 29, is a partial right hand elevation of the machine showing means by which the operator may retain the active matrix disk in its lower position; Fig. 30, a plan view of the lever system shown in Fig. 29; Fig. 31, an enlarged sectional view of such levers on line G G of Fig. 29; Fig. 32, a partial front elevation of the mechanism for operating the matrix disks; Fig. 33, an enlarged detail view of segment locking device; Fig. 34, an enlarged detail view showing the matrix disk throwing device connection and stop pin; Fig. 35, a partial right hand elevation of the machine showing means for automatically retaining the active matrix disk in its lower position; Fig. 36, a detail section on line I I Fig. 37; Fig. 37, an enlarged elevation of the right hand end of the key board housing with some parts removed; Fig. 38 is a part plan and part sectional view of Fig. 37; Fig. 39 is a part elevation, showing actuating cam with connections to matrix disk throwing segment; Fig. 40, a plan view on an enlarged scale of the locking device shown in Fig. 39; and Fig. 41, an elevation of Fig. 40.

To attain increased speed in the operation of the machine, the key board is so divided that one-half of the keys to the right are arranged to throw the selector bar to the right, and the other half of the keys throw

the bar to the left. The lower case letters are carried on one disk and the caps on another, while the numerals and other characters may be distributed on both disks. Each disk may carry forty-two characters, and means is provided for bringing either disk into molding position. There are therefore two disks in a set and there may be a plurality of sets.

Pivotally mounted in a housing carried by the frame of the machine are key levers 2 carrying at their outer ends character finger pieces 1 and pivotally connected at their inner ends to vertical push rods 3. Push rods 3 carry projecting lugs 3[a] adapted to form a support for and to lift yokes 4 and 5 controlled respectively by the keys of left hand half of the key board and the right hand half of the key board. Yokes 4 and 5 are pivotally mounted at their outer ends in the key board housing.

The vertical push rods 3 are provided at their upper ends with recesses 3[b] adapted to engage corresponding recesses in the lower ends of stop pawls 6, guided in vertical slots 7[a] in the plates 7 supported by suitable brackets on the frame 72 of the machine.

Mounted above the stop pawls 6, in suitable sliding ways, is the transversely disposed matrix selector bar 8, having a downwardly projecting rib 8[a] with a projecting lug 8[b]. One end of the matrix selector bar 8 is extended, and has on its under surface a rack 8[c] that engages a spur gear 9 on shaft 10. On the outer end of shaft 10, beyond gear 9, is a pinion 11 meshing with a segment gear 12, carried by shaft 13, mounted in bearings 13[a] on a sliding frame 40. Shaft 13 carries at one extremity a lever arm 14 connected at its outer end by link 15 to lever arm 16, Figs. 3, 4, 9 and 10 to which reference is now made. Lever arm 16 is loosely mounted on shaft 19 fixedly carried by the frame, and is provided with a slot 16[a] in which is pivotally mounted a T-shaped dog 16[b]. On shaft 19 at either side of lever arm 16 are loosely mounted bell crank lever arms 17 and 18, the ends of their horizontally extending arms being provided with slots or recesses adapted to be engaged by the long end of the T-shaped dog 16[b]. The downwardly projecting arms of the bell crank levers 17 and 18 are forked and carry pivotally mounted blocks 17[a] and 18[a].

The forked end of bell crank lever 17 is flexibly connected to lever arm 24 by a rod 21 having one end pivotally attached to the yoke end of lever arm 24 and the other end slidably mounted in a hole in block 17[a] of bell crank arm 17. On the outer end of rod 21 is a fixed collar 21[a] designed to abut against 17[a] and hold bell crank arm 17 in its neutral position when cam 30 is at rest. Interposed between block 17[a] of bell crank arm 17 and lever arm 24 on rod 21 is a compression spring 20 which tends at all times to preserve a fixed distance between the connected end of bell crank arm 17 and lever arm 24. Bell crank lever arm 18 and lever arm 25 are connected in a similar manner to arms 17 and 24, except that a tension spring 22 connects the two arms tending to draw them together, and the pin 23[a] is interposed between them to limit the minimum distance between their connected ends, Figs. 26 and 27. Lever arms 24 and 25 carry rollers 24[a] and 25[a] actuated by bridal cams 29[c] and 30[c] respectively. Cams 29 and 30 are loosely mounted on the continuously running driving shaft 27 through the clutch member 31. Normally the bell cranks 17 and 18 and lever arm 16 stand in the horizontal position shown by full lines in Figs. 9 and 10, the slots in the ends of the bell cranks registering with the slot 16[a] and T-shaped dog 16[b] of lever arm 16, either of said bell crank arms then being in position for engagement with T-shaped dog 16[b] as the latter is thrown to the right or left of its mid position.

The device above described is similar in all respects to that disclosed in my application, Serial No. 460,397 filed October 31, 1908, although a modified mechanism is required for its operation from the key board as hereinafter described.

The movement of the matrix selector bar 8 to the left, as viewed from the front of the machine, is governed by the left hand half of the key levers, and its movement to the right by the right hand half of the key levers of the key board. Mounted above the yokes 4 and 5, Figs. 3, 4, 9, 10, 11 and 12, are two shafts 32 and 33 extending to the rear frame 72 of the machine and supported in suitable bearings. Their forward or key board ends carry short lever arms 32[a] and 33[a] to the outer ends of which are pivotally connected the downwardly projecting fingers 32[b] and 33[b], the lower ends of which in the normal rest position are but slightly above the cross arms of yokes 5 and 4 respectively, and the fingers may be engaged and lifted by the yokes when the latter are lifted. Interposed between and parallel to shafts 32 and 33 is a third shaft 34 carrying bell crank arms 34[a] and 34[b] the downwardly projecting arms of which straddle the lever arm 16 and are respectively adapted to engage the short arms of the swinging T-shaped dog 16[b] and throw it to the left or right of its mid position. The horizontally extending arms of bell crank levers 34[a] and 34[b] carry pins engaged by slots in the forked ends of lever arms 32[c] and 33[c] mounted on shafts 32 and 33.

Shafts 32 and 33 carry lever arms 35 and 36 that engage with the cross arm of yoke 37 pivotally mounted in the rear of frame 72 of the machine. Pinned to one arm of yoke 37 is a downwardly extending link 38 whose lower end is pivotally connected to the hori-

zontal arm of a bell crank lever 39, the upper end of the vertically extending arm of which acts as a stop for clutch member 31.

The cam 30^c shown in elevation in Fig. 9 is that which operates lever arm 25 through roller 25^a. The cam that operates lever arm 24 through its roller 24^a is not shown in Fig. 9, but is indicated by dotted lines in Fig. 26 as cam slot 29^c.

It will be obvious from the construction set forth that by the manipulation of any key of the key board, for example one in the left hand half, the vertical push rod 3 to which it is connected will raise through its lug 3^a the yoke 4 and also its corresponding stop pawl 6 into the path of matrix selector bar 8. Yoke 4 in rising lifts the finger 33^b imparting a motion of rotation to shaft 33; the outer end of lever arm 33^c lifts the horizontal end of bell crank lever 34^b throwing its downwardly projecting arm to the left and forcing the T-shaped dog 16^b into the slot of the horizontally projecting arm of bell crank lever 18, thus locking lever arm 16 to bell crank lever arm 18 as a unit (Figs. 9 and 10).

In the rocking of shaft 33 lever arm 36 raises yoke 37 and by it, through link 38 the horizontal arm of bell crank lever 39 is lifted, disengaging the vertical arm of said lever from clutch member 31, allowing the clutch to engage shaft 27 and start all the cams in rotation.

Cam 30 in its rotation draws lever arm 25 toward shaft 27 and through its flexing connection 22 (Fig. 27) carries with it the lower arm of bell crank lever 18, raising the horizontal arm of said lever and with it lever arm 16 and link 15 to the upper dotted position shown in Fig. 9, thereby raising lever arm 14 which moves shaft 13 and segment gear 12, clockwise, producing an anticlockwise rotation of shaft 10 through pinion 11. Shaft 10 through gear 9 and rack 8^c moves the matrix selector bar 8 to the left until the lug 8^b comes in contact with stop pawl 6 which has been thrown up by depression of the key lever. The matrix selector bar 8 is shown in its moved position by dotted lines in Fig. 12.

The throw of cam slot 30^c of cam 30 acting upon lever arm 25 is sufficient to move the matrix selector bar 8 to contact with the extreme left hand stop pawl 6 when said pawl is thrown up by its actuating key lever. When the matrix selector bar 8 is stopped by any pawl 6 between its middle or normal position of rest and its maximum throw to either the left or right, the excess of movement imparted to lever arms 24 and 25 is compensated for in the flexing spring connections between lever arms 24 and bell crank lever 17 and lever arm 25 and bell crank lever 18 as shown in detail Figs. 26 and 27.

By manipulation of any key lever of the right hand half of key board, rotation of shaft 10 will be reversed and matrix selector bar 8 will move to the right until stopped by the pawl 6 thrown up by the key lever depressed.

Above and to the right of the key board and fixedly carried by a slidably mounted frame 40 is the matrix barrel 41 (Figs. 4, 5, 6, 7 and 8), having mounted upon it matrix disks 42. This barrel comprises two cylindrical portions 41, 41, with an opening between their adjacent ends, and two heads 41^a, 41^a having extended cylindrical ends 41^b that serve as fixed supports for the barrel in the sliding frame 40.

The matrix disks 42 are closely fitted to the barrel 41 and are mounted to slide along it being guided by splines, not shown, to preserve their alinement and prevent rotation on the barrel. In the machine illustrated there are three sets of type font matrix disks there being two in each set. Any number of type font sets, within reasonable limits, may be employed.

Two yoke rings 43 slidably encircle the matrix barrel 41, one at either end of the series of matrix disks 42, and have arms extending back to the base 43^a slidably mounted in the matrix barrel frame 40 (Fig. 5). The rings 43 bear a fixed relation to each other and preserve contact at all times between the matrix disks 42. One of the rings 43 has an arm 43^b extending along the upper surface of matrix barrel 41 and carrying in its outer end a roller 43^c.

Concentrically mounted in the side faces of the matrix disks, adjacent their peripheries are the character matrices 42^a held in place by clamping rings 42^b and 42^c. The matrix plates 42^a may be individually set in the disks or may be made up in sections. In the disks 42 back of each matrix plate is a hole 42^d to receive an alining and locking device.

Shaft 10 that carries spur gear 9 and pinion 11 extends through the cylindrical portion 41^b of matrix barrel head 41^a and has formed at its inner end the guides 10^a inclosing on three sides the back 45^a of disk 45. The disk 45 is counterbored on its face opposite back 45^a to receive an eccentric 46 fast on the inner end of shaft 44 that extends through the cylindrical portion 41^b of the left hand matrix barrel head 41^a and carries on its outer end a pinion 44^a, Figs. 1 and 2. The cylindrical portions 41^b of the barrel heads form the outer bearings for shafts 10 and 44 while the plates 44^b fixed within the respective sections of the matrix barrel 41 form their inner bearings. The outside diameter of disk 45 is the same as that of matrix barrel 41. When in its normal position disk 45 completes the broken matrix barrel 41, forming one continuous

matrix disk barrel along the axis of which the matrix disks 42 are free to move.

Disk 45 carries a spline which when in its normal position registers with the splines of matrix barrel 41, forming a continuous guide for the matrix disks 42 in their movement along the barrel and acting as a key to produce rotation of the matrix disk that is in operation. The opening between the two portions of matrix barrel 41 is as great as the thickness of one matrix disk 42.

When one of the matrix disks 42 is moved to the opening in the matrix barrel 41 and engaged by disk 45, a motion of rotation may be imparted to it by shaft 10 through guides 10^a and block 45^a. In like manner by rotation of shaft 44 a movement of translation will be imparted to the matrix disk, by the eccentric disk 46. The movements of rotation and translation of the matrix disk 42 may take place simultaneously.

In Figs. 7 and 8 one of the matrix disks is shown moved to its lower position to bring a matrix character in line with the mold face.

Parallel with the axis of the matrix barrel 41 and vertically above it is shaft 47 supported in bearings on frame 40. This shaft carries at its outer end a segment gear 48 meshing with pinion 44^a on shaft 44 (Figs. 1, 2 and 7), and at its inner end a lever arm 49 connected by link 50 to lever arm 51 (Figs. 1, 2, 3, 4 and 26). The lever arm 51 is pivotally mounted to a bracket of the machine frame 72 and carries a roller 51^a actuated by cam slot 29^a, whose throw is just sufficient to produce a half revolution of shaft 44 through the connections above described and such one half revolution of said shaft throws the matrix disk in operation to its lower position (Figs. 7 and 8).

By manipulation of any key in the board, shaft 10 is given either a right or left hand movement by matrix selector bar 8 until arrested by the particular pawl 6 thrown up by a depressed key lever. Rotation of shaft 10 revolves the active matrix disk to bring the selected matrix to the molding point when the disk is in its lower-most position.

Means for moving the operative matrix disk to the mold face and locking it in mold position, may be as follows: Matrix barrel frame 40 supporting the actuating mechanism for the matrix disks 42 is slidably mounted in a recess in main frame 72 of the machine, being retained in the recess by jibs 40^a and 40^b Figs. 2 and 5. The frame 40 is held in normal or central position by the action of compression springs 40^c (Figs. 3 and 17) interposed between said frame and the machine frame 72. Pivotally mounted on pin 55^c, Fig. 15, is the lever arm 55 carrying roller 55^a acted upon by cam face 29^b of cam 29. The upper end of lever 55 is provided with a pin 55^b bearing in the slotted end of lever arm 54 pinned to the upper end of shaft 54^a carried in bearing 56. Loosely mounted on the lower end of shaft 54^a and supported by a fixed collar 54^b is the lever arm 53 having its outer end forked and slotted to receive the pin 52^a of wedge 52. Between the shaft 54^a and lever arm 53 is formed a flexing connection by means of spring 53^a for the purpose hereinafter described. Wedge 52 passes through the housing of the matrix barrel sliding frame 40 and has its beveled edge in contact with the end of said frame which is cut to conform to the angle of said wedge, Figs. 15 and 16. Upon rotation of cam 29, cam surface 29^b acting on roller 55^a throws outwardly lever arm 55 and through lever arm 54 shaft 54^a spring 53^a and lever arm 53, draws wedge 52 to the left forcing matrix barrel sliding frame 40 in the direction of the type mold and bringing the operative matrix disk in contact with the mold face.

In the above movement of the matrix disk the flexing connection between lever arm 53 and shaft 54^a serves to cushion the operative matrix disk against the mold face. In Figs. 22 and 24, the operative matrix disk 42 is shown locked in contact with the mold face by pin 57^a of plunger 57 entering hole 52^d in the disk. Plunger 57 is mounted in the bearings 58 and receives its motion through the forked bell crank lever 59 acting on pin 57^d. Bell crank lever 59 is pivotally mounted on shaft 60 and has its horizontal arm connected by a flexing link 61 (Figs. 21, 24 and 25) to lever arm 62, mounted on a shaft 63 extending through frame 72 and carrying at its inner end a lever arm 64 having a roller 65 actuated by cam slot 66^a of cam 66.

The upper and lower portions of the type mold are formed by fixed plates 67, 68, that limit the width of the type, the sliding mold face 69 forms one end and the adjustable plunger 70, which by its position determines the thickness running-wise of the type to be cast, forms the other end of the mold.

A cover plate 68^a forms one side of the guide way in which the part 70 slides (Fig. 22). The face of the mold is formed by outwardly projecting surfaces 68′, 67′, 68^2, 69′ and 70′ of the parts 68^a, 67, 68, 69 and 70 respectively (Figs. 22, 23 and 24). The construction of the mold is clearly shown by Figs. 21, 22, 23 and 24. Sliding mold face 69, near its upper end is provided with a type channel 69^a, through which the type after having been cast are moved to the line channel 71. Sliding mold face 69 is mounted in guiding grooves formed in the frame 72 of the machine and is provided with a stop lug 69^b designed to engage a limit screw 72^a on the frame. When the stop lug 69^b is in contact with the screw, the type channel 69^a of sliding mold face will register with the type mold and line channel 71 forming a continuous passage for the type from the

mold to the line channel. The lower end of the sliding mold face 69 is pivotally connected by flexing link 73 to lever arm 74 and through shaft 75 to lever arm 76. Lever arm 76 carries at its outer end roller 76[a] actuated by cam slot 66[b] of cam 66.

The adjustable mold plunger 70 and the fixed plates 67, 68 of the mold are slotted to admit of the passage of the adjusting wedge 77. The adjustable plunger 70 serves both to determine the width of the mold and to eject the cast type into line channel 71. The slotted portion 70[a] of plunger 70 straddles adjusting wedge 77 and is of sufficient length to admit of forcing the type from the mold to the line channel 71, without interference with wedge 77. On the outer end of plunger 70 is a pin 70[b] engaged by slots in the forked end of a bell crank lever 78, pivoted at 78[a] to the frame 72, its horizontally projecting arm being connected by flexing link 79 to lever arm 80. Lever arm 80 is pinned to shaft 81 whose inner end carries lever arm 82 having mounted at its outer end a roller 82[a] held in contact with its actuating cam face 66[c] of cam 66 by a tension spring (Figs. 2 and 25).

Forward movement of plunger 70 to determine the size of the mold cavity is imparted by the wedge 77 and is compensated for by the spring 79[a] of flexing link 79. To limit the thickness of the mold to the type to be cast the following mechanism may be provided. Matrix locking plunger 57 (Figs. 21, 22 and 24) is provided at its inner end with the shoulder 57[b] adapted to seat on the counterbored recesses in disks 42 which are of varying depths relatively to the required thickness of the particular type to be cast. Plunger 57 between its bearings 58 has a slot 57[c] through which passes pin 83[a] carried by forked lever 83, mounted on shaft 84 that carries lever arm 85 the outer end of which is pivotally connected to the lower end of adjusting wedge 77. In the forward or locking movement of plunger 57 the outer end of slot 57[c] engages pin 83[a] of lever arm 83, and moves the latter forward until the shoulder 57[b] of plunger 57 seats in the recess 42[c] in the matrix disk 42. By the forward movement of lever arm 83 the outer end of the lever arm 85 is deflected drawing downward wedge 77 which forces forward plunger 70 to adjust the type mold. All parts are then in the mold position and ready for casting.

A suitable hot metal pot 86 is provided with a pump 87 the plunger of which is actuated by link 88 lever arm 89 shaft 89[a] lever arm 90, link 91, lever arm 92 carrying roller 92[a] bearing in cam slot 30[b] of cam 30. The pump 87 has an extended spout with a conical end 87[a] that is moved forward to the sprue hole of the mold when pump 87 is rocked about its swinging support. The pump 87 is thrown forward by lever arm 93, shaft 94, lever arm 95, link 96 and lever 97 carrying roller 97[a] bearing in cam slot 98[a] of cam 98. All parts being in casting position the pump nozzle 87[a] is moved forward to the mold sprue hole, and the pump plunger descends injecting molten metal into the mold.

Immediately after the casting operation, locking plunger 57 recedes, unlocking the matrix disk 42 which then moves back from the mold face and returns to normal position on the matrix barrel. Sliding mold face 69 is drawn downward until checked by stop 69[b] and 72[a] bringing the type channel 69[a] in alinement with the mold and line channel 71; adjustable plunger 70 moves forward ejecting the cast type from the mold and through the channel 69[a] into the line channel 71; plunger 70 immediately returns to normal position and sliding mold face 69 ascends closing the mold (Fig. 23).

All cam slots being accurately timed the above motions of the operating parts take place in their proper sequence. By giving the matrix selector bar 8 a movement, right or left, from normal or central position there is a marked saving of time in the operation of the machine.

In the above description of the operation of the machine, casting of type from one of the lower case matrix disks only, has been considered.

The following mechanism may be provided for shifting from lower case to caps. Loosely mounted on shaft 47 above the matrix barrel 41 is a cam segment 99 (Figs. 1, 2, 4 and 5) having formed on one of its faces, adjacent to roller 43[c] a plurality of steps 99[a] corresponding in number to the matrix disks carried by the machine. By clockwise rotation of cam segment 99 (Figs. 1 and 2) one step, the matrix disks 42 move to the left a distance equal to the thickness of one of said disks, bringing a new disk over the opening between the two halves of the matrix barrel 41 and into operative relation to the shifting disk 45. By counter clockwise rotation of cam segment 99 one step, the matrix disks are moved to the right a distance equal to the thickness of one of said matrix disks. In casting from one type font shift is made from one to the other of the two adjacent matrix disks constituting said type font. The slidably mounted block 43[a] carrying yoke rings 43 is normally pressed to the left as viewed in Fig. 1, by the action of compression spring 100 (Figs. 6 and 7) that bears at one end on plate 102 carried by sliding matrix barrel frame 40, and passes through an opening in the right hand arm of ring yoke 43 and bears at its other end on the left hand arm of ring yoke 43. Fastened in plate 102 is a pin 101 that extends through spring 100 and through the

left hand arm of ring yoke 43, the pin serving as a guide for and preventing buckling of the spring. By the cam pressure action of spring 100 roller 43^c is maintained at all times in contact with the face of segment cam 99. Formed at one end of the hub of segment cam 99, is a pinion-gear 103 meshing with segment gear 104 carried by shaft 105, mounted in bearing on the frame 72 and having at its other end a lever arm 107 connected by link 108 to shift lever 109. Shaft 47 carries a fixed collar 47^a with which pinion 103 is always held in contact. Enlarged detailed views of the key board shift mechanism are shown by Figs. 18, 19 and 20. Shift key 1^a is integral with the short shaft 1^b carried by a suitable bearing in the key board housing and having on the outer end the lever arm 1^c whose free end is enlarged and provided with a plurality of holes 1^d to receive a latch pin 109^b on shift lever 109. The holes 1^d corresponding in number to the type fonts carried by the matrix barrel 41. Downward movement of the outer end of shift key lever 1^a is limited by the stop pin 1^e and the lever is normally held up against the pin by a leaf spring 1^h. Shift lever arm 109 is pivotally mounted on the key board housing and is provided with a latch arm 109^c that actuates latch pin 109^b. The long end of latch arm 109^c is normally pressed outward from shift lever arm 109 by spring 109^d. Shift key 1^a controls the shifting of but one set of type font disks, from lower case to caps and reverse, and in its lower case or normal position stands as shown in Fig. 18. The drawing shows the middle set of type font matrix disks as the active pair or set, while in the enlarged detail Figs. 18, 19 and 20, the key board shift levers are shown in position for the operation of the right hand set of type font matrix disks as seen in Fig. 1.

The shift from lower to upper case of any type font is accomplished by the manipulation of shift key 1^a which, acting through latch pin 109^b engaged with the upper hole 1^d of lever arm 1^c, moves upwardly the shift lever arm 109, and through link 108, lever arm 107, shaft 105, segment gear 104 and pinion 103, rotates the segment cam 99 clockwise one step, allowing roller 43^c of yoke ring 43 to follow the face of said cam bringing the upper case matrix disk into position to be operated by the matrix disk shifting mechanism. The downward movement of the shift key 1^a to the stop pin 1^e is just sufficient to produce the shift of the operative matrix disk from lower to upper case.

To throw into operative position a different set of type font matrix disks, latch pin 109^b is withdrawn from its engaging hole 1^d of lever arm 1^c and the shift lever arm 109 moved downward from position shown in Fig. 18, until the latch pin engages with either of the other holes 1^d of lever arm 1^c. The movement of shift lever 109 to bring latch pin 109^b to the next succeeding hole 1^a of lever arm 1^c being just sufficient to rotate segment cam 99 two steps of the cam face, and to bring a new set of type font matrix disks into operative position.

It will be apparent that further time could be economized in the operation of the machine by maintaining the active or operating matrix disk in its lower or casting position when a plurality of characters are to be cast from a single disk, and simply rotating said disk to bring the desired matrix characters to the mold position. Two modifications for accomplishing this result are disclosed. The first is illustrated by Figs. 29 to 34 inclusive, which show a device for manually maintaining the operative matrix disk in its lower position. The second modification is illustrated in Figs. 35 to 41 which show means for automatically securing the same result.

In the first modification (Figs. 29 to 34) lever arm 110 is connected by link 108 to lever 107 that actuates cam 99 to bring the different sets of type font matrix disks into operative position. While any particular matrix disk is operative, lever 110 is locked by means of an off-set latch 111, mounted on the lever and engaging one of the notches 112^a of segment 112 which is fastened to the key board housing. Lever arm 113 is connected by flexing link 114 to arm 48^a of segment gear 48 and controls the throwing of the active matrix disk to its lower position. The lever arm 113 is normally held in its upper position (Fig. 29) by a tension spring 115 that corresponds to the lower or casting position of the active matrix disk. Two stop pins 40^a and 40^b are provided in the sliding frame 40, and limit the movement of segment gear 48 to register the active matrix disk in its lower and upper positions respectively. Lever arm 110 is provided with a spring pressed latch 110^a engaging notches on the inner edge of segment 112. These notches correspond in number to the matrix disks carried by the machine and the snapping of the latch as lever 110 is moved up or down serves as an indicator to count the number of matrix disks moved.

From the previous descriptions of the machine it will be apparent that if any matrix may remain in its lower or casting position, it may still be acted upon by the selecting mechanism to rotate it and bring any desired matrix character to molding position. In the present modification the matrix disk throwing mechanism is controlled by hand levers 113 and 110, and when they are once set for any particular matrix disk, any number of characters may be cast from that disk, all other parts of the machine be

ing operated automatically from the key board.

In order to shift from one matrix disk to the other, lever 113 is moved downwardly, against the action of spring 115, until stopped by pin 48[b] at which point the matrix disk that has been active will have returned to its normal position on the matrix barrel 41. Further downward movement of said lever will be compensated for by the flexing link 114.

Lever 113 in its downward movement engages the rounded nose 111[a] of latch 111 camming it inwardly and disengaging it from the notched segment 112, thereby unlocking lever 110. The action of lever 113 on nose 111[a] of latch 111 is shown in Fig. 31. Latch 111 is normally pressed into engagement with the segment 112 by spring 111[b]. When the two levers 110 and 113 are held together in the hand, they may be moved up and down together, the movement of the lever 110 bringing any desired matrix disk into position to be thrown down by the last portion of the upward movement of lever 113 beyond the locking range of segment 112.

In the second modification comprising an automatic device for maintaining the active matrix disk in its lower or casting position, the notched segment 116 (Figs. 37 and 38) is loosely mounted on a short shaft 117 fixedly mounted on outside of the key board housing, the inner end of said shaft having loosely mounted on it the shift key lever 118. Segment 116 carries a pin 116[c] that extends through a slot in the key board housing and is designed to be acted upon by the shift lever 118. Stop pins 116[a] and 116[b] are provided to limit the lower and upper movement of segment 116, and a leaf spring 119 normally holds the segment against the upper stop pin 116[b]. Shift key 118[a] is pivotally mounted in the end of lever 118 and has a downwardly projecting lock 120, which, in the lowest position of lever 118, engages latch 121, because of pressure of spring 122. Shift lever 118 extends backwardly through the frame 72 of the machine and carries at its inner end the upwardly extending pawl 123 that is normally held inward against stop pin 118[b] by spring 123[a].

The upper end of pawl 123, in its upward movement, engages lug 5[a] of yoke 5 and is cammed from engagement with said lug by the cam piece 124 (Fig. 37). In the inner end of lever 118 is a cam slot 118[c] that engages pin 50[a] carried by link 50. This link 50, as already described connects lever arm 49 of shaft 47 and roller lever arm 51. The latter is loosely mounted on its pivot point and is capable of having imparted to it a lateral movement to throw its roller 51[a] into engagement with cam 29[a]. Suspended from the enlarged inner end of shift lever 118 is a camming rod 125 guided in block 126 and engaging at its lower end a spring pressed latch block 127. At the lower end of rod 125 are two faces 125[a] and 125[b]. Face 125[b] bears against the guide block 128 and face 125[a] engages a beveled projection 127[a] on latch block 127, slidably mounted in guides 128 and 129 carried on frame 72 of the machine, and normally pressed against rod 125 by spring 130. Latch block 127 is designed to engage the end 51[b] of lever 51 (Fig. 41) to hold the lever in its lower position and the roller 51[a] out of engagement with cam 29[a] when a plurality of characters is to be cast from any of the cap matrix disks. Hand levers 113 and 110 are provided, as before stated, (as in the first modification) for changing from one set of type font disks to the other; the segment 116 however has but three notches or latch points, that correspond to the number of sets of type font disks carried by the machine.

In Fig. 35 the machine is shown as having the lower case matrix disk, of the middle type font set, in casting position and the machine may be operated automatically from the key board to cast any number of type from this disk.

When it is necessary to cast caps or other characters carried by the second matrix disk of the active type font set, shift key 118[a] is depressed, pawl 123 is raised, engages lug 5[a] of yoke 5, lifts the yoke and starts cam shaft 127 as previously explained. Further upward movement of the pawl 123 causes it to pass out of engagement with lug 5[a] because of contact with the cam piece 124, and the yoke 5 is allowed to return to normal position to be engaged by any of the lugs 3[a] actuated from the key board.

By the upward movement of the inner end of lever 118 cam rod 125 is raised, its lower end disengages latch 127 allowing it to move inward to lock lever 51 when the latter is thrown down by cam 29[a]. At the same time lever 50 is thrown inward by cam slot 118[c] acting on pin 50[a] and roller 51[a] is brought into the path of cam 29[a], which by its action on the roller depresses lever 51 that through link 50, lever 49, shaft 47 and segment gear 48 rotates shaft 44 and raises the active matrix disk to its normal position on the matrix barrel.

The actions above described will have taken place during that portion of the downward movement of lever 118 before said lever engages pin 116[c] of segment 116 and permit the return of the active matrix disk to the matrix barrel before the cap matrix disk may be brought into operative position on the barrel.

As shift lever 118 engages pin 116[c] of segment 116 the latter is deflected until stopped by pin 116[a]. This movement is sufficient to

throw a new matrix disk into operative position on the matrix barrel 41, by means of hand lever 110 locked to segment 116 by latch 111ª and link 108 that actuates the means for rotating cam 99.

When shift key 118ª is fully depressed the latch at its lower end 120 engages block 121 to hold the lever in its lower position, so that successive characters may be automatically cast from the cap matrix disk by manipulation of the keys of the board.

When it is required to bring into use an entirely different set of type font disks, hand lever 113 is deflected (as in the manually operated device of the first described modification), disengaging latch 111 from segment 116 and moving lever 110 to engage the desired notch in segment 116.

I claim:

1. In a type casting machine, a matrix disk carrying a set of character matrices in its side adjacent its periphery, means for rotating the disk to bring a selected matrix to desired position, a type casting mold, and means for bodily moving the disk in the plane of its rotation to bring the selected matrix in line with the type casting mold.

2. In a type casting machine, a plurality of matrix disks each carrying a set of character matrices in its side adjacent its periphery, means for moving any of the disks axially into a given plane, means for rotating the disk so located to bring a selected matrix thereon into desired position, a type casting mold, and means for bodily moving the disk in the plane of its rotation to bring the selected matrix in line with the type casting mold.

3. In a type casting machine, a matrix disk carrying a set of character matrices in its side adjacent its periphery, means for half-way rotating the disk in opposite directions to bring the matrices as selected in the two halves of the disk in one position, a type casting mold, and means for bodily moving the disk in the plane of its rotation to bring the selected matrix in line with the type casting mold.

4. In a type casting machine, a pair of matrix disks carrying a font of type distributed between them, means for axially moving either of the disks into a given plane, means for similarly imparting rotation to the disks, as to the upper and lower case type characters, so located in the given plane, a type casting mold, and means for bodily moving the set disk in the plane of its rotation to bring the selected character matrix in line with the type casting mold.

5. In a type casting machine, a plurality of pairs of matrix disks, each pair carrying a font of type, the lower case on one and the upper case on the other, means for axially moving any pair of disks and means for setting the disks of each pair in a given plane, a type casting mold, means for rotating the disk so located to bring the matrices as selected in one position, and means for moving the operative disk in the given plane to bring the selected matrix in line with the type casting mold.

6. In a type casting machine, a plurality of pairs of matrix disks, each pair carrying a font of type, the lower case on one and the upper case on the other, means for axially moving any pair of disks and means for setting the disks of each pair in a given plane, a type casting mold, means for rotating the disk so located in opposite directions to bring the matrices as selected on the two halves of the disk in one position, and means for moving the operative disk in the given plane to bring the selected matrix in line with the type casting mold.

7. In a type casting machine, a matrix disk carrying a set of character matrices in its side adjacent its periphery, means for rotating the disk to bring the matrices as selected in one position, a type casting mold, means for bodily moving the disk in the plane of its rotation to bring the selected matrix in line with the type casting mold, and means for axially moving the disk in its translated position to bring the set matrix firmly against the end of the type mold.

8. In a type casting machine, a pair of matrix disks carrying a font of type distributed between them, means for axially moving either of the disks into a given plane, means for similarly imparting rotation to the disks, as to the upper and lower case type characters, so located in the given plane, a type casting mold, means for bodily moving the set disk in the plane of its rotation to bring the selected character matrix in line with the type casting mold, and means for axially moving the disk in its translated position to bring the set matrix firmly against the end of the type mold.

9. In a type casting machine, a disk having on one of its sides near its periphery a set of character matrices and in its other side corresponding locking holes, means for rotating the disk and means for moving it in the plane of its rotation to bring the matrices as selected in one position, a type casting mold with its open end in line with the matrix in set position, means for axially moving the disk to set the matrix against the open end of the mold, and a locking bolt adapted to seat in the locking holes.

10. In a type casting machine, a matrix disk carrying a set of character matrices, a key board with the key characters corresponding to the matrix characters, a continuously rotating drive shaft, means set in action by a manipulated key of the key board for rotating the disk to bring the matrices as selected in one position, a type casting mold, and means also set in action

by said manipulated key for bodily moving the disk in the plane of its rotation and simultaneously with its rotation to bring the said matrix in line with the mold.

11. In a type casting machine, a pair of matrix disks carrying a font distributed between them, a key board with the key characters corresponding to the matrix characters, a continuously rotating drive shaft, means set in action by a manipulated key of the key board for axially moving either of the disks into a given plane, and means also set in action by the manipulated key for similarly imparting rotation to the disks, as to the upper and lower case type characters, so located in the given plane, a type casting mold, and means for bodily moving the set disk in the plane of its rotation to bring the selected character matrix in line with the type casting mold.

12. In a type casting machine, a matrix disk carrying a set of character matrices in its side adjacent its periphery, a key board with the key characters corresponding to the matrix characters, a character selector controlled by any manipulated key of the key board, means for operating the character selector, and connecting means between the character selector and the disk, whereby the matrix character of the disk corresponding to the character of the key manipulated is set in operative position.

13. In a type casting machine, a matrix disk carrying a set of character matrices in its side adjacent its periphery, a key board with the key characters corresponding to the matrix characters, a character selector controlled by any manipulated key of the key board, means for operating the character selector, connecting means between the character selector and the disk, whereby the matrix character of the disk corresponding to the character of the key manipulated is set in operative position, a type casting mold, and means for moving the disk in the plane of its rotation to bring the selected character matrix in line with the type casting mold.

14. In a type casting machine, a matrix disk carrying a set of character matrices, a key board with the key characters corresponding to the matrix characters, a character selector controlled by any manipulated key, means for moving the selector to the right and left of its central normal position, said means being controlled by the keys of the key board, those at the right half of the key board causing the selector to move in one direction and those at the left half of the key board causing the selector to move in the other direction, and connection between the selector and matrix disk, whereby the disk is rotated in opposite directions by the right and left hand movement of the selector.

15. In a type casting machine, a plurality of pairs of matrix disks, each pair carrying a font of type matrices, the lower case on one and the upper case on the other, a key board with the key characters corresponding to the matrix characters, a continuously rotating drive shaft, means set in action by any manipulated key and operated by the drive shaft for axially moving any pair of disks, means for setting the disks of each pair so moved in a given plane, means also set in action by the manipulated key for rotating the set disk to bring the matrices as selected in one position, a type casting mold, and means for moving the operative disk in the plane in which it is rotated to bring the selected matrix in line with the type casting mold.

16. In a type casting machine, a matrix disk carrying a set of character matrices, means for rotating the disk to bring the matrices as selected in one position, a type casting mold, means for bodily moving the disk in the plane of its rotation to bring the selected matrix in line with the type casting mold, and means for making inoperative the means for bodily moving the matrix disk.

17. In a type casting machine, a plurality of matrix disks each carrying a set of character matrices, means for moving any of the disks axially into a given plane, means for rotating the disk so located to bring the matrices as selected in one position, a type casting mold, means for bodily moving the disk in the plane of its rotation to bring the selected matrix in line with the type casting mold, and means for making inoperative the means for bodily moving the matrix disks.

18. In a typecasting machine, a matrix disk having a set of character matrices, a support on which the disk may be rotated to bring a selected matrix to desired position, a type mold and means for adjusting such support to effect bodily movement of the disk in the plane of its rotation to bring a selected matrix in line with the type mold.

19. In a typecasting machine, a plurality of matrix disks each having character matrices, a support upon which the disks are movable axially such a support comprising a part movable at right angles to the axis of the disks, means for rotating a disk upon said part of the support to bring a selected matrix to desired position, a type mold and means for moving said part of the support to bodily move the disk in the plane of its rotation to bring the selected matrix in line with the type mold.

20. In a type casting machine, a plurality of matrix disks each having character matrices, a cylindrical support having a part eccentrically rotatable upon which support the disks are axially adjustable to bring a desired one upon the eccentric rotatable portion thereof, means for rotating the disk upon said part to bring a selected matrix to

desired position, a type mold and means for rotating said eccentrically rotatable part to move the disk bodily in the plane of its rotation to bring the selected matrix in line with the type mold.

21. In a type casting machine, a matrix disk having character matrices, an eccentrically rotatable support therefor upon which the disk is rotatable to bring a selected matrix to desired position, a type mold, and means for rotating said support to move the disk bodily in the plane of its rotation to bring the selected matrix in line with the type mold.

22. In a typecasting machine, a matrix disk having a set of character matrices on its side adjacent its periphery, a support on which the disk may be rotated to bring a selected matrix to desired position, a type mold and means for adjusting such support to effect bodily movement of the disk in the plane of its rotation to bring a selected matrix in line with the type mold.

23. In a typecasting machine, a plurality of matrix disks each having character matrices on its side adjacent its periphery, a support upon which the disks are movable axially such a support comprising a part movable at right angles to the axis of the disks, means for rotating a disk upon said part of the support to bring a selected matrix to desired position, a type mold and means for moving said part of the support to bodily move the disk in the plane of its rotation to bring the selected matrix in line with the type mold.

24. In a typecasting machine, a plurality of matrix disks each having character matrices on its side adjacent its periphery, a cylindrical support having a part eccentrically rotatable upon which support the disks are axially adjustable to bring a desired one upon the eccentric rotatable portion thereof, means for rotating the disk upon said part to bring a selected matrix to desired position, a type mold and means for rotating said eccentrically rotatable part to move the disk bodily in the plane of its rotation to bring the selected matrix in line with the type mold.

25. In a type casting machine, a matrix disk having character matrices on its side adjacent its periphery, an eccentrically rotatable support therefor upon which the disk is rotatable to bring a selected matrix to desired position, a type mold, and means for rotating said support to move the disk bodily in the plane of its rotation to bring the selected matrix in line with the type mold.

26. In a typecasting machine, a matrix disk having a set of character matrices, a support on which the disk may be rotated in either direction from normal position to bring a selected matrix to desired position, a type mold and means for adjusting such support to effect bodily movement of the disk in the plane of its rotation to bring a selected matrix in line with the type mold.

27. In a typecasting machine, a plurality of matrix disks each having character matrices, a support upon which the disks are movable axially such a support comprising a part movable at right angles to the axis of the disks, means for rotating a disk upon said part of the support in either direction from normal position to bring a selected matrix to desired position, a type mold and means for moving said part of the support to bodily move the disk in the plane of its rotation to bring the selected matrix in line with the type mold.

28. In a type casting machine, a plurality of matrix disks each having character matrices, a cylindrical support having a part eccentrically rotatable upon which support the disks are axially adjustable to bring a desired one upon the eccentric rotatable portion thereof, means for rotating the disk upon said part in either direction from normal position to bring a selected matrix to desired position, a type mold and means for rotating said eccentrically rotatable part to move the disk bodily in the plane of its rotation to bring the selected matrix in line with the type mold.

29. In a typecasting machine, a matrix disk having character matrices, an eccentrically rotatable support therefor upon which the disk is rotatable in either direction from normal position to bring a selected matrix to desired position, a type mold, and means for rotating said support to move the disk bodily in the plane of its rotation to bring the selected matrix in line with the type mold.

30. In a typecasting machine, a matrix disk having character matrices, means for rotating the disk to bring a selected matrix to desired position, a type mold, means for bodily moving the disk in the plane of its rotation to bring it into operative relation to the mold and the selected matrix in line with the mold and means for rotating the disk while in operative relation to the mold to successively select and cast type from two or more matrices of the disk prior to the return thereof to normal position.

31. In a typecasting machine, a plurality of matrix disks each having character matrices, means for moving any of the disks axially into a given plane, means for rotating the disk so moved to bring a selected matrix to desired position, a type mold, means for bodily moving the disk in the plane of its rotation to bring the disk into operative relation to the mold and the selected matrix in line with the type mold, and means for rotating the disk while in operative relation to the mold to successively

select and cast type from two or more matrices of the disk prior to the return thereof to normal position.

32. In a typecasting machine, a type mold, a plurality of independently rotatable disks each having character matrices, means for axially moving the disks collectively in either direction from normal position to bring a selected disk into desired position relatively to the mold and means for rotating such selected disk in either direction from a normal position to bring a selected matrix thereon to a desired position relatively to the mold, combined with an operating key board the character keys of which have characters corresponding with those of the matrix disks.

33. In a typecasting machine, a plurality of independently rotatable disks each having character matrices, means for axially moving the disks collectively in either direction from normal position to bring a selected disk into desired position, means for rotating such selected disk in either direction from a normal position to bring a selected matrix thereon to a desired position and means for moving the selected disk bodily in the plane of its rotation.

34. In a typecasting machine, a plurality of independently rotatable disks each having character matrices in its side adjacent the periphery, means for axially moving the disks collectively in either direction from normal position to bring a selected disk into desired position and means for rotating such selected disk in either direction from a normal position to bring a selected matrix thereon to a desired position.

35. In a typecasting machine, a plurality of independently rotatable disks each having character matrices in its side adjacent the periphery, means for axially moving the disks collectively in either direction from normal position to bring a selected disk into desired position, means for rotating such selected disk in either direction from a normal position to bring a selected matrix thereon to a desired position and means for moving the selected disk bodily in the plane of its rotation.

36. In a typecasting machine, a disk having matrices, a support upon which it is permanently mounted and upon which it is rotatable to bring a selected matrix to desired position and means for moving the disk bodily transversely to its axis to bring the selected matrix to a molding point.

37. In a typecasting machine, a plurality of independently rotatable disks each having matrices, means for bringing a selected disk into a given plane, means for rotating said disk to bring a selected matrix thereon to desired position, and means for partially displacing said disk from its mate or mates to bring the selected matrix to a molding point.

38. In a type casting machine a normally stationary intermittently rotatable matrix disk having character matrices rigidly fixed in its side and adapted to coöperate with a type mold.

39. In a type casting machine a rotatable matrix disk having character matrices rigidly fixed in its side combined with means for rotating it in either direction from normal position to bring a selected matrix to desired position and a coöperating stationary type mold.

40. In a type casting machine a rotatable matrix disk having character matrices in its sides, a type mold, means for moving the disk transversely to its axis to bring it into operative relation to the mold and means for rotating the disk to bring a selected matrix thereon to desired position.

41. In a type casting machine a rotatable matrix disk having character matrices in its side, a type mold, means for moving the disk transversely to its axis to bring it into operative relation to the mold and means for rotating the disk in either direction from normal position to bring a selected matrix thereon to desired position.

42. In a type casting machine a plurality of rotatable matrix disks each having character matrices in its side, means for moving the disks axially to bring a selected one into a given plane, a type mold, means for moving the selected disk transversely to its axis to bring it into operative relation to the mold and means for rotating the selected disk to bring a selected matrix thereon to desired position.

43. In a type casting machine a plurality of rotatable matrix disks each having character matrices in its side, means for moving the disks axially to bring a selected one into a given plane, a type mold, means for moving the selected disk transversely to its axis to bring it into operative relation to the mold and means for rotating the selected disk in either direction from normal position to bring a selected matrix thereon to desired position.

44. In a type casting machine, a normally stationary intermittently rotatable matrix disk having in its side rigidly fixed character matrices arranged in series concentrically to its axis and adapted to coöperate with a stationary mold.

45. In a type casting machine, a normally stationary intermittently rotatable matrix disk having in its side character matrices arranged in series concentrically to its axis combined with a type mold and means for closing a selected matrix in the side of the disk against the face of the mold.

46. In a type casting machine, a rotatable

matrix disk having character matrices in its side combined with means for rotating the disk through a plurality of distances in either direction from normal position to bring a selected matrix thereon to desired position.

47. In a type casting machine, a pair of matrix disks having a font of type matrices distributed between them, means for axially moving either disk into a given plane, a type mold, means for moving that one of the disks in said plane transversely to its axis to bring it into operative relation to the mold, and means for rotating said disk to bring a selected matrix thereon to desired position.

48. In a type casting machine, a pair of matrix disks having a font of type matrices distributed between them and one of said disks being normally in a given plane, means for moving the disks axially to transfer the other of said disks to said plane, a type mold, means for moving that one of the disks in said plane transversely to its axis to bring it into operative relation to the mold and means for rotating said disk to bring a selected matrix thereon to desired position.

49. In a type casting machine, a pair of matrix disks having a font of type matrices distributed between them, means for axially moving either disk into a given plane, a type mold, means for moving that one of the disks in said plane transversely to its axis to bring it into operative relation to the mold, and means for rotating said disk in either direction from normal position to bring a selected matrix thereon to desired position.

50. In a type casting machine, a disk having on one of its sides near its periphery a set of character matrices and in its other side corresponding locking holes, means for rotating the disk and means for moving it transversely to its axis to bring the matrices as selected in one position, a type casting mold with its open end in line with the matrix in set position, means for axially moving the disk to set the matrix against the open end of the mold, and a locking bolt adapted to seat in the locking holes.

51. In a type casting machine, a matrix disk having a set of character matrices, a support on which the disk is permanently mounted to be rotated to bring a selected matrix to desired position, a type mold and means for adjusting such support to effect bodily movement of the disk transversely to its axis to bring a selected matrix in line with the type mold.

52. In a type casting machine, a plurality of matrix disks each having character matrices, a support upon which the disks are movable axially such a support comprising a part movable at right angles to the axis of the disks, means for rotating a disk upon said part of the support to bring a selected matrix to desired position, a type mold and means for moving said part of the support to bodily move the disk transversely to its axis to bring the selected matrix in line with the type mold.

53. In a type casting machine, a plurality of matrix disks each having character matrices, a cylindrical support having a part eccentrically rotatable upon which support the disks are axially adjustable to bring a desired one upon the eccentric rotatable portion thereof, means for rotating the disk upon said part to bring a selected matrix to desired position, a type mold and means for rotating said eccentrically rotatable part to move the disk bodily to bring the selected matrix in line with the type mold.

54. In a type casting machine, a matrix disk having a set of character matrices on its side adjacent its periphery, a support on which the disk may be rotated to bring a selected matrix to desired position, a type mold and means for adjusting such support to effect bodily movement of the disk transversely to its axis to bring a selected matrix in line with the type mold.

55. A type mold, a plurality of disks carrying matrices and adjustable axially and each independently movable transversely to its axis to displace it and bring it into operative relation to the mold, a key board having keys corresponding to the matrices on the disks, means whereby one of said disks may be normally maintained in operative relation to the mold, means whereby on manipulation of the keys corresponding with matrices on the disks that is in operative relation to the mold said disk is rotated to bring the selected matrices successively opposite the mold, and means for retiring said disk and bringing another disk into operative relation to the mold.

56. A type mold, a plurality of disks carrying matrices in their sides and adjustable axially and each independently movable transversely to its axis to displace it and bring it in operative relation to the mold, a key board having keys corresponding to the matrices on the disks, means whereby one of said disks may be normally maintained in operative relation to the mold, means whereby on manipulation of keys corresponding with matrices on the disk that is in operative relation to the mold said disk is rotated to bring the selected matrices successively opposite the mold, and means for retiring said disk and bringing another disk into operative relation to the mold.

57. A type mold, a plurality of disks carrying matrices and adjustable axially and each independently movable transversely to its axis to displace it and bring it into operative relation to the mold, a key board hav-

ing keys corresponding to the matrices on the disks, means whereby one of said disks may be normally maintained in operative relation to the mold, means whereby on manipulation of keys corresponding with matrices on the disk that is in operative relation to the mold said disk is rotated in either direction from its normal position of rest to bring the selected matrices successively opposite the mold, and means for retiring said disk and bringing another disk into operative relation to the mold.

In testimony whereof, I have hereunto subscribed my name.

ÓDDUR V. SIGURDSSON.

Witnesses:

M. W. CLEPHANE,

EDWARD C. DAVIDSON.