No. 686,029. Patented Nov. 5, 1901.

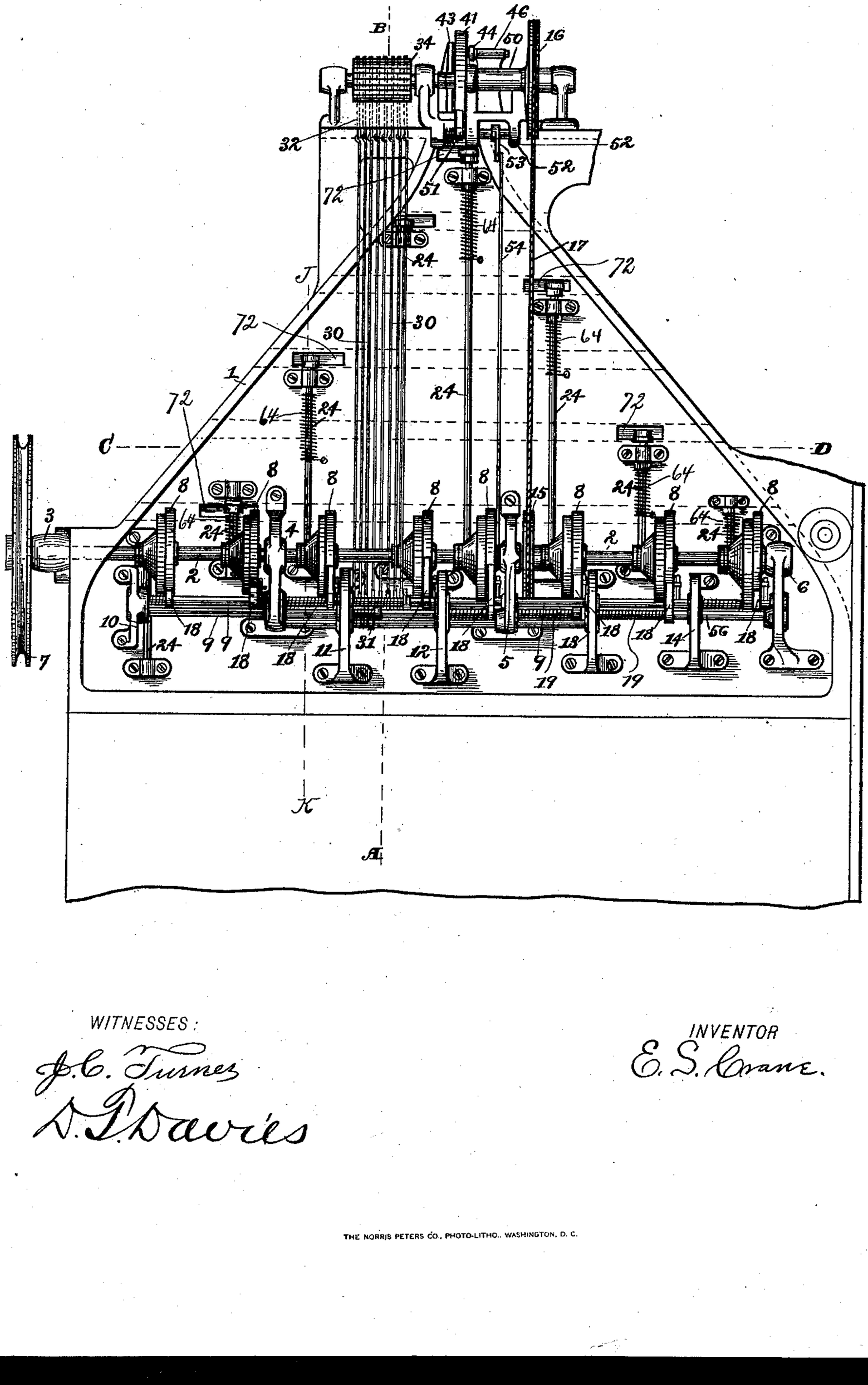
E. S. CRANE.

MATRIX DISTRIBUTING MACHINE.

(Application filed Apr. 18, 1898.)

(No Model.) 8 Sheets—Sheet 1.

FIG. 1.



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8 Sheets—Sheet 2.

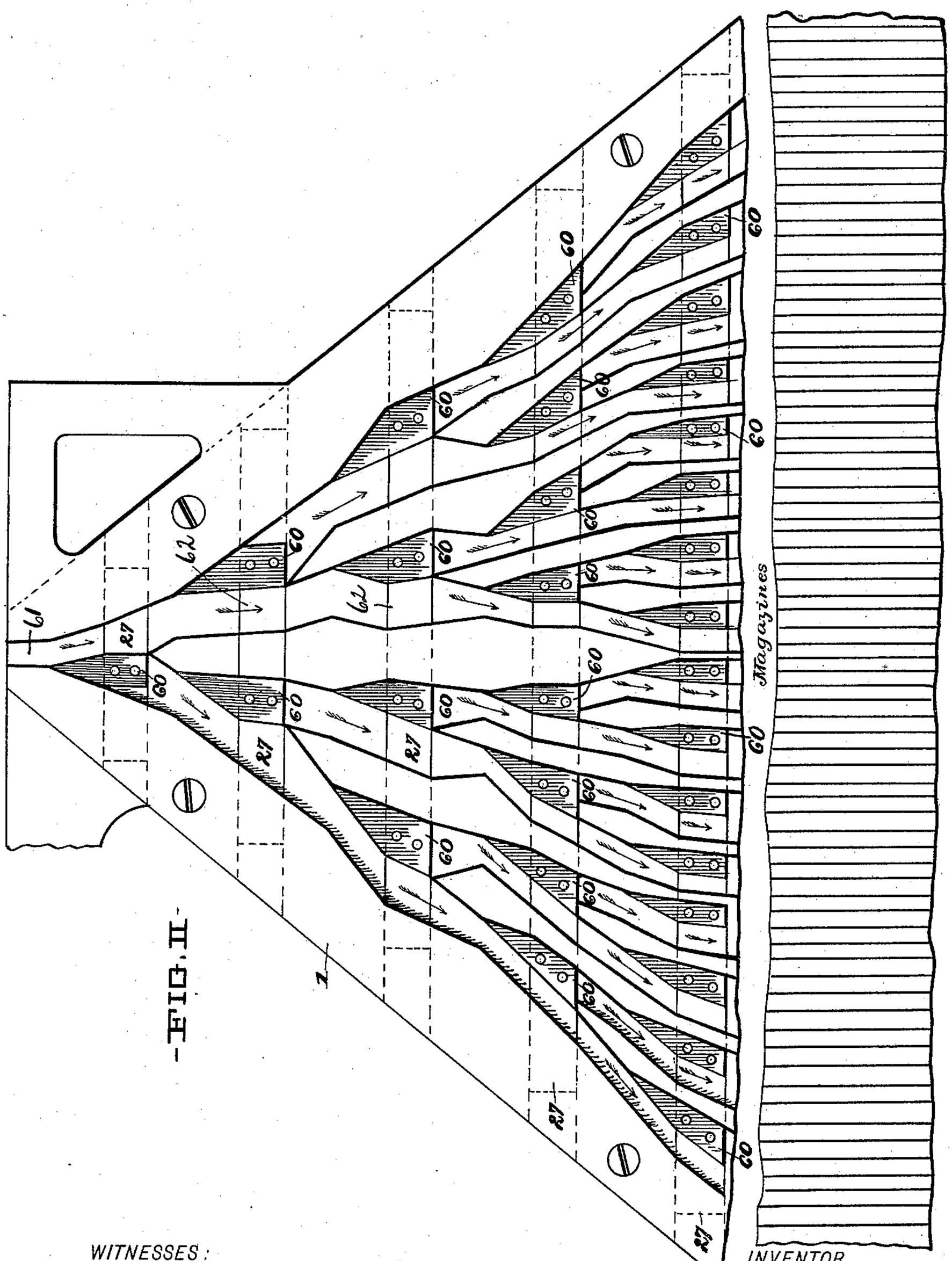

FIG. II.

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(No Model.) 8 Sheets—Sheet 3.

FIG. III.

FIG. XIII.

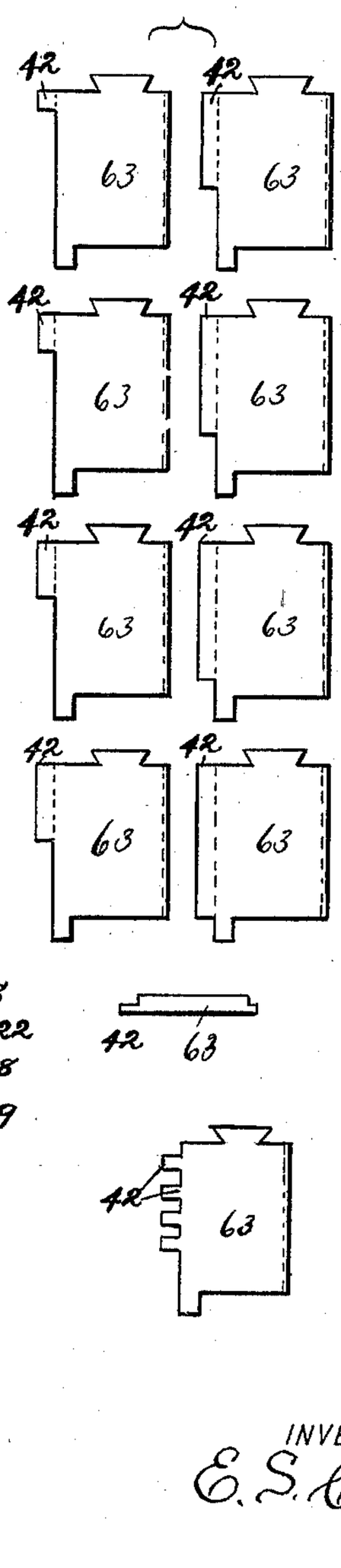
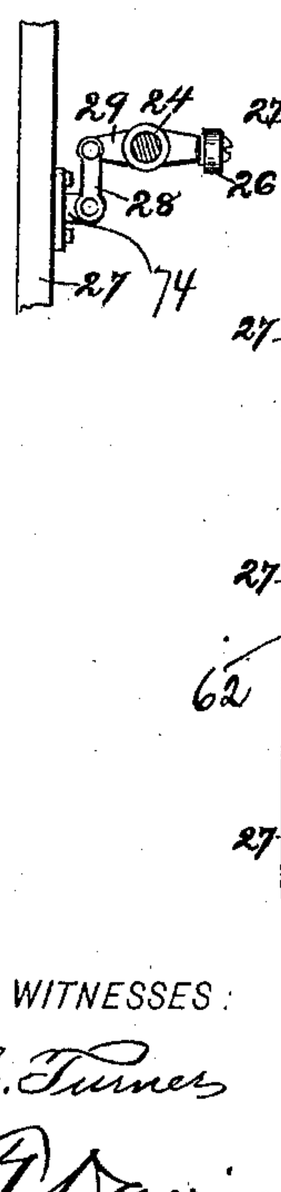


FIG. XV.



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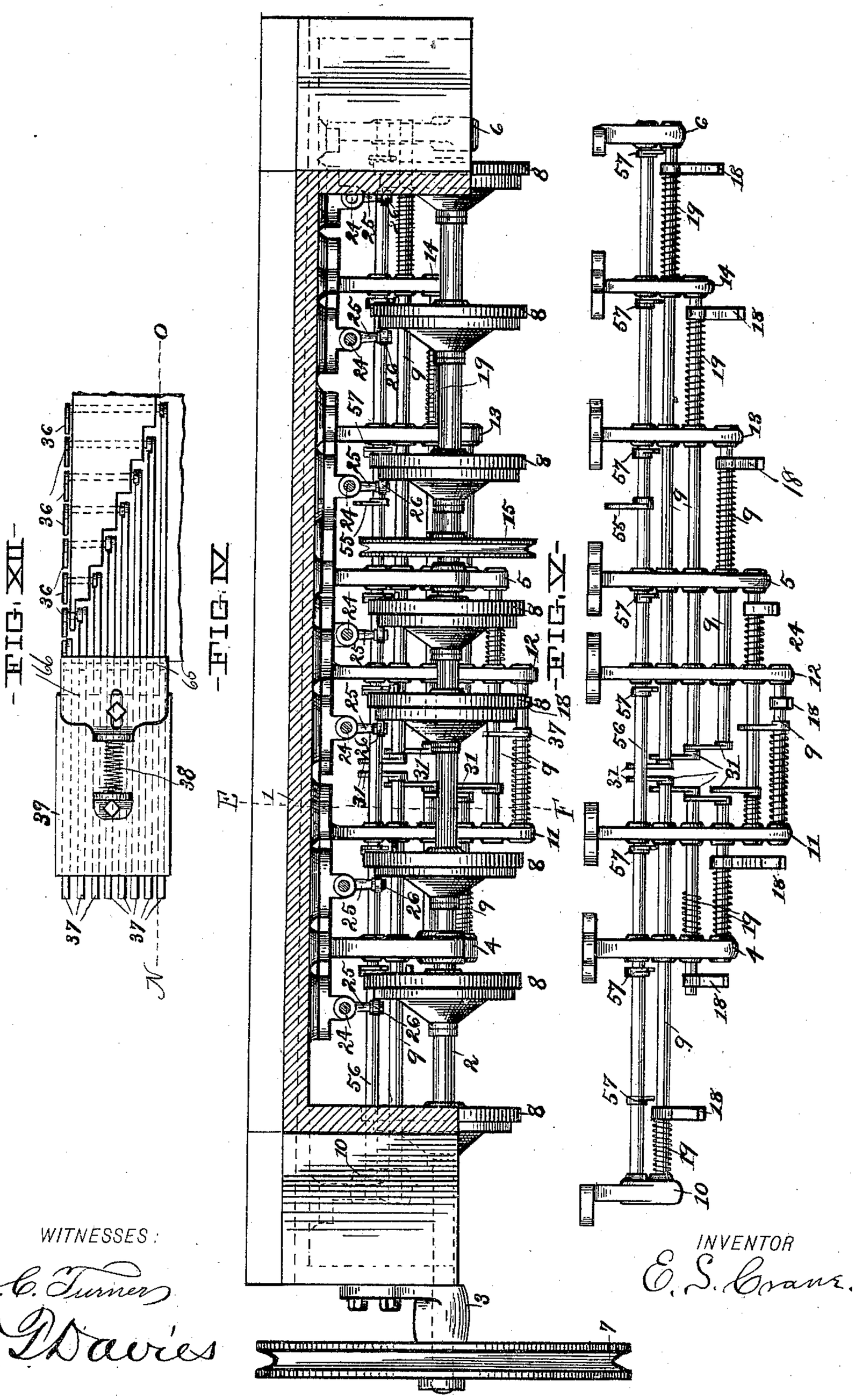
(No Model.) 8 Sheets—Sheet 4.



No. 686,029 Patented Nov. 5, 1901.

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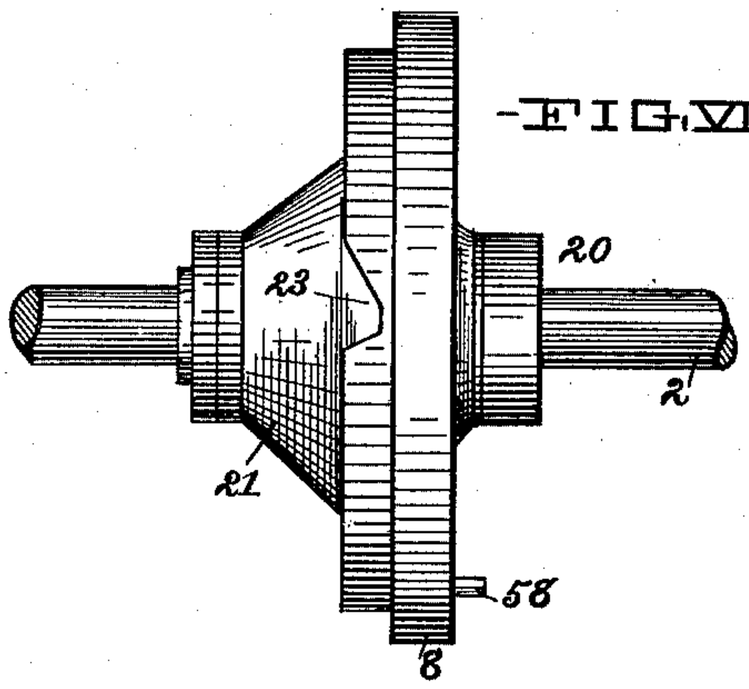
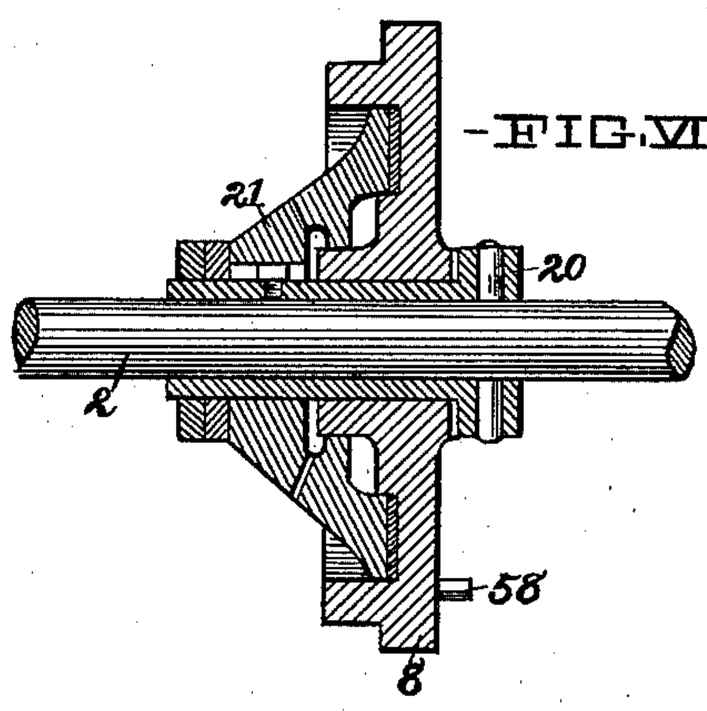
(No Model.) 8 Sheets—Sheet 5.

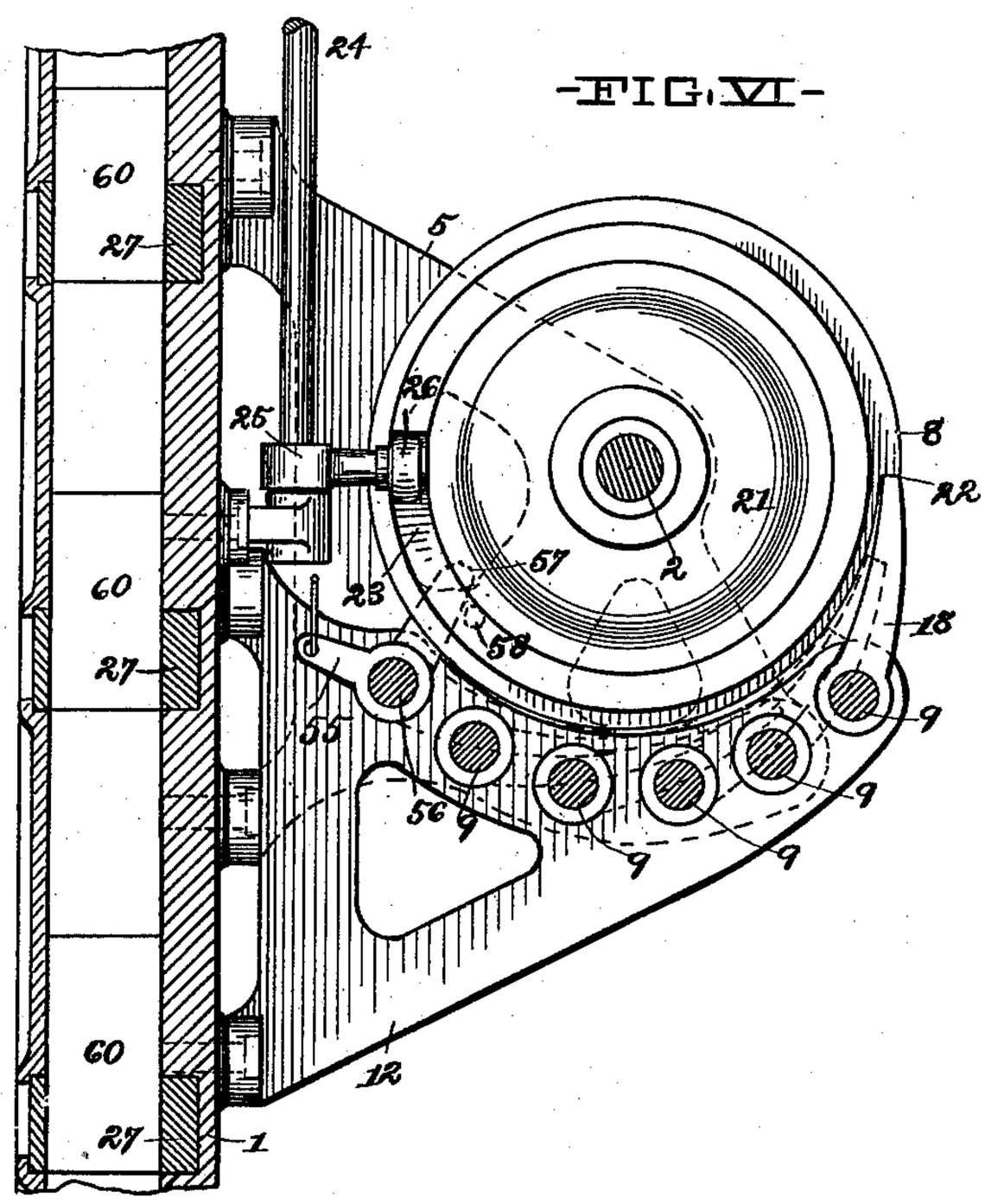
-FIG. VII-



-FIG. VIII-



-FIG. VI-



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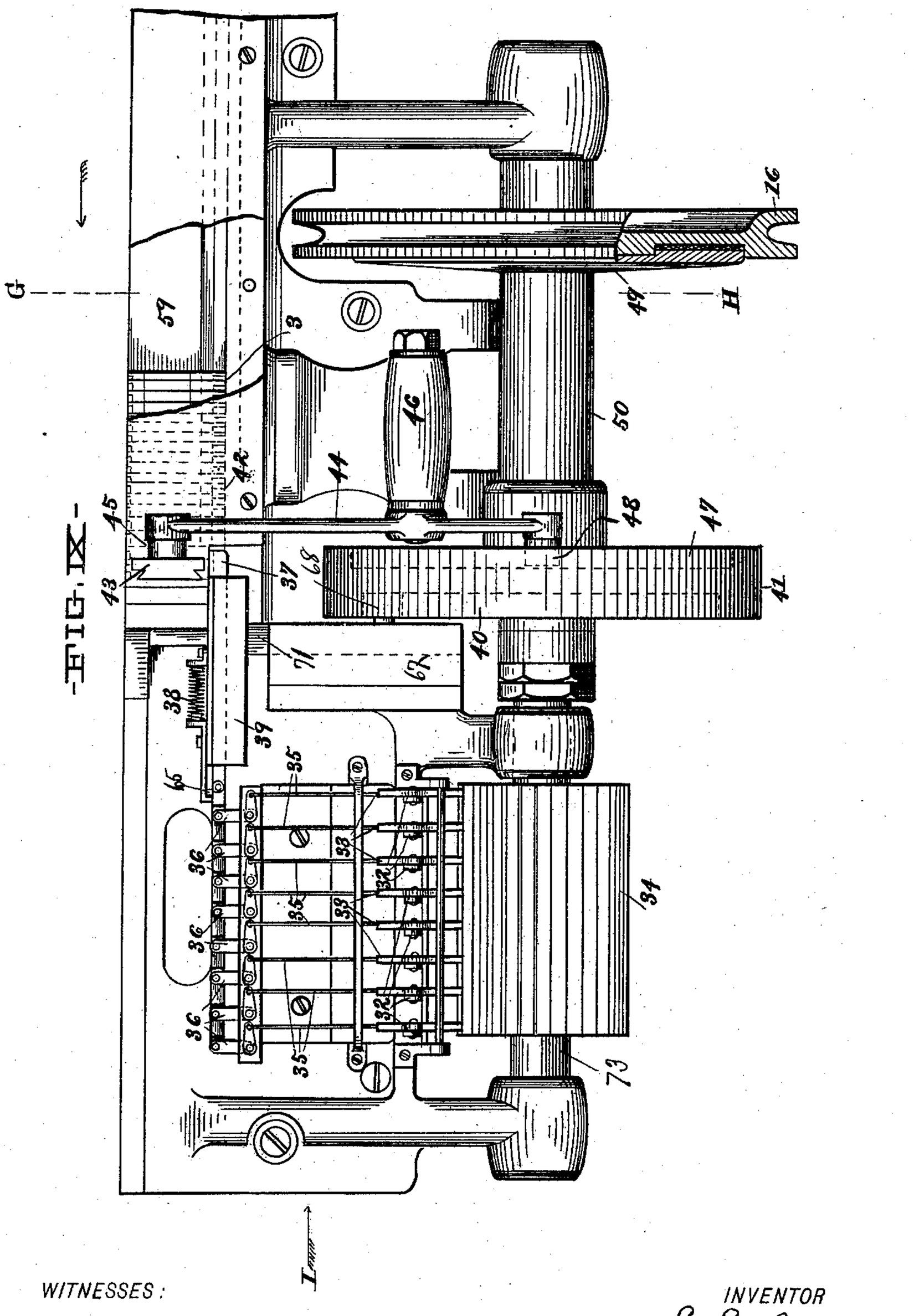
(No Model.) 8 Sheets—Sheet 6.

FIG. IX.



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(No Model.) 8 Sheets—Sheet 7.

FIG. X

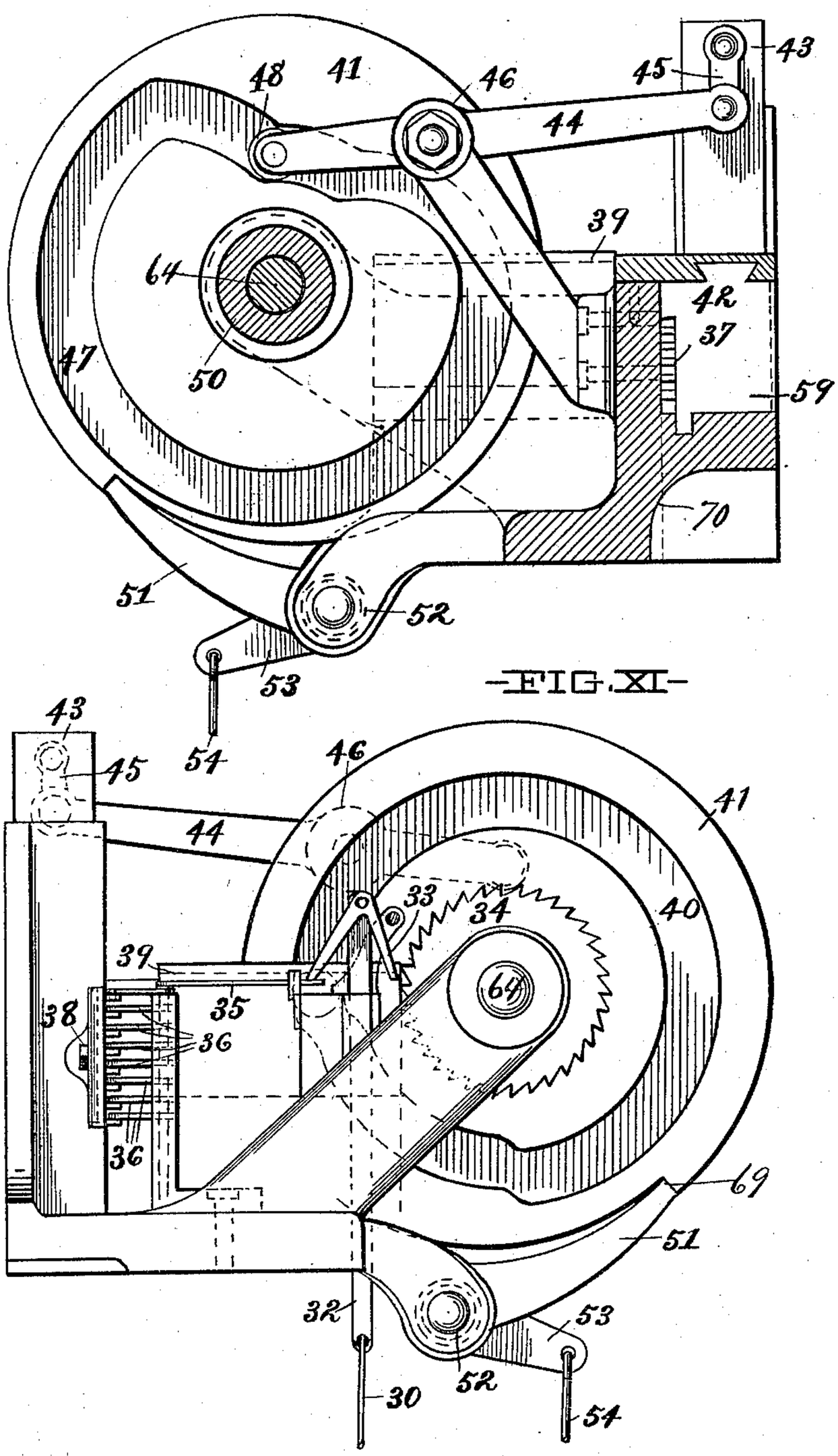

FIG. XI

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(Application filed Apr. 18, 1898.)

(No Model.) 8 Sheets—Sheet 8.

FIG. XV

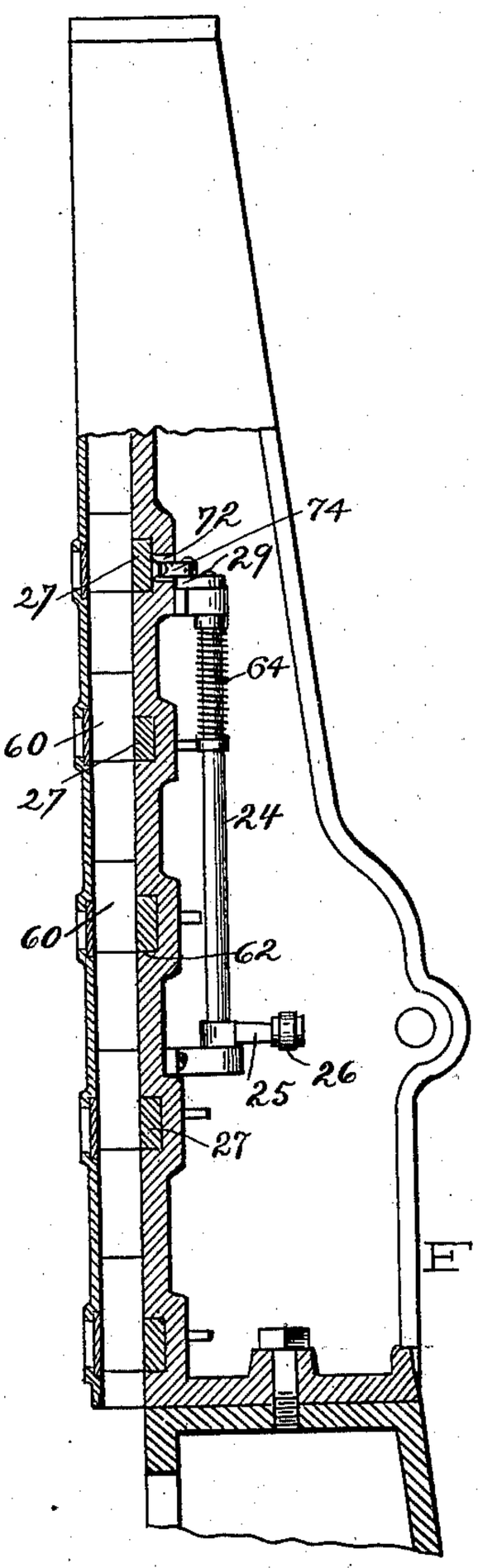


FIG. XVI

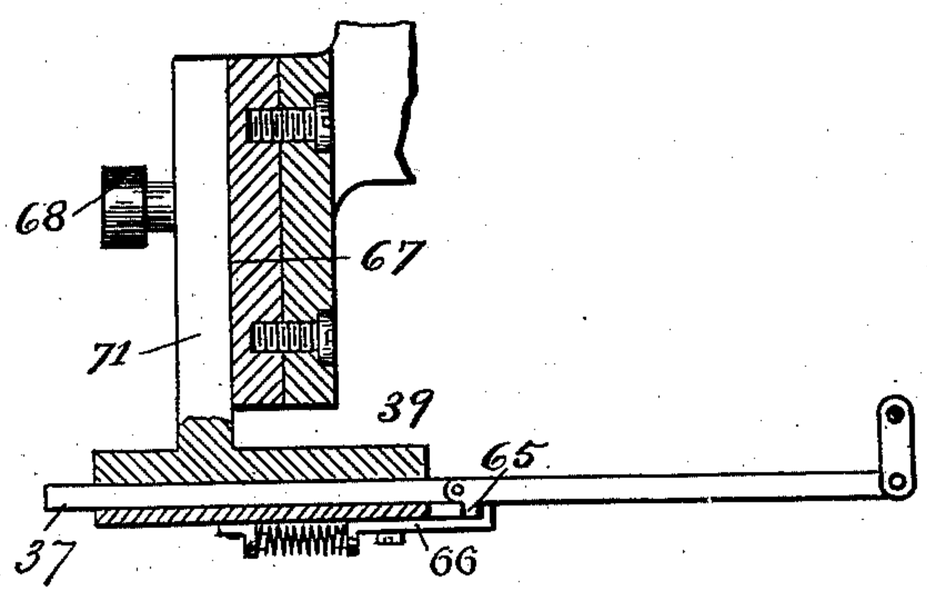


FIG. XVII

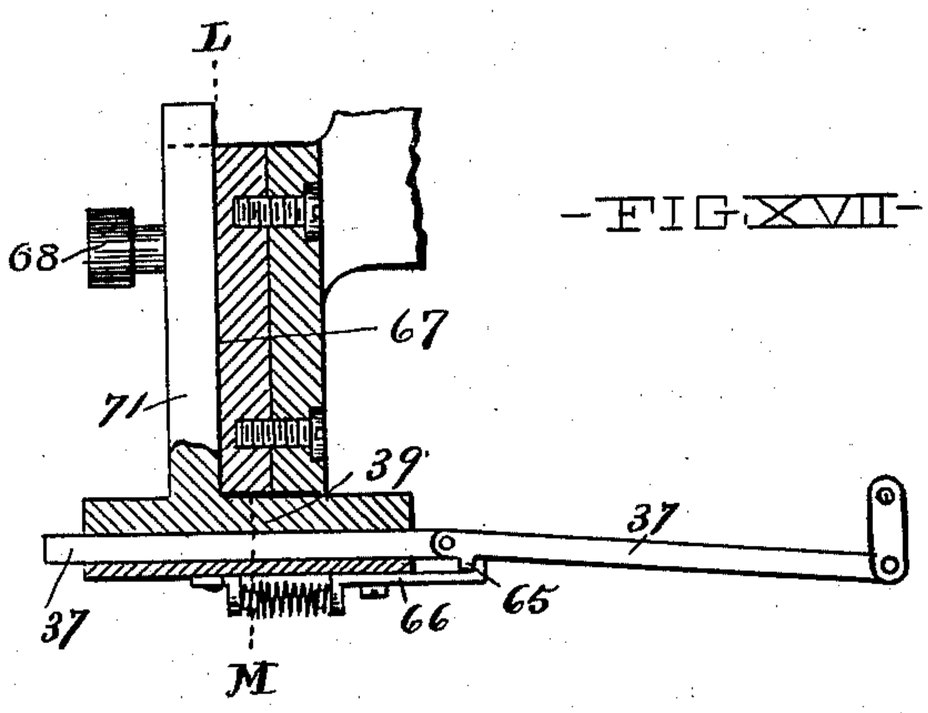
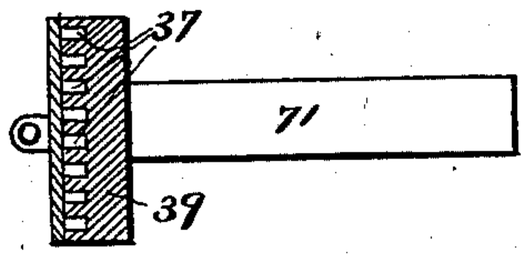


FIG. XVIII



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A. Emerkel

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UNITED STATES PATENT OFFICE.

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MATRIX-DISTRIBUTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 686,029, dated November 5, 1901.

Application filed April 18, 1898. Serial No. 677,939. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. CRANE, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Matrix-Distributing Machines, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

My invention relates to the class of machines in which type-matrices or type are selected and released by finger-keys and assembled in a line, from which a type-bar is made, and the matrices are automatically distributed to their respective magazines. This invention relates particularly to that branch of the machine known as the distributing mechanism. The present invention is intended to produce a simple, durable, and efficient mechanism by which these matrices are distributed; and it consists in means hereinafter fully described.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure I represents a rear elevation of my invention. Fig. II represents a front elevation of same broken away. Fig. III represents a vertical transverse cross-section of same, taken upon line A B, Fig. I. Fig. IV represents a horizontal section taken upon line C D, Fig. I. Fig. V represents a plan view of a portion of the device with parts removed to more clearly illustrate the mechanism employed. Fig. VI represents an enlarged transverse vertical cross-section of a portion of the device and taken upon the plane indicated by line E F, Fig. IV. Fig. VII represents a detail elevational view of one of the friction-clutches employed. Fig. VIII represents a longitudinal axial cross-section of said clutch, showing the shaft upon which it is mounted in elevation. Fig. IX represents an enlarged plan view, partially in section and broken away, of the top portion or feed mechanism of the machine. Fig. X represents an enlarged detail cross-section of said top portion, taken upon the plane indicated by line G H, Fig. IX, looking in the direction indicated by the arrow at the right of said figure. Fig. XI represents an enlarged end elevation of said top portion of the machine looking in the direction and from the point indicated by the arrow I, Fig. IX. Fig. XII represents an enlarged detail front elevation of a portion of said top portion. Fig. XIII represents a group of matrices of different forms, such as are employed in connection with my invention, one of the views in said figure representing a plan view of a matrix, the others representing side elevations thereof. Fig. XIV represents a detail view of a portion of the mechanism. Fig. XV represents a partial vertical cross-section of the distributing-frame, taken upon the plane indicated by line J K, Fig. I. Fig. XVI represents a detail cross-section taken upon the plane indicated by line N O, Fig. XII. Fig. XVII represents a cross-section on said plane N O, showing the mechanism in a second position; and Fig. XVIII represents a detail cross-section taken upon the planes indicated by line L M, Fig. XVII.

Upon the back of an upright frame 1, Figs. III and IV, and journaled in bearings supported by brackets 3, 4, 5, and 6 is a shaft 2, which may be driven by means of a pulley 7, suitably secured thereto. Upon said shaft are mounted and secured at intervals a series of friction-clutches, each consisting of a member 21, Fig. VII, rotatively secured to a sleeve 20, rotatively secured to shaft 2, and a second member 8, contiguous to said member 21, loosely mounted upon said sleeve and having lateral frictional contact with said member 21, as shown in Fig. VIII. Below said series of clutches and arranged parallel with each other and with shaft 2 is a series of oscillatory bars 9, supported in bearings formed in brackets 4, 5, and 6 and in brackets 10, 11, 12, 13, and 14, as shown in Figs. III, IV, and V. The number of said bars corresponds with the number of friction-clutches, and each such bar is provided with a pawl 18, which is normally held in engagement with a notch or shoulder 22, Fig. VI, formed in each of the clutch mem-

bers 8, such engagement being effected by means of a torsional spring suitably secured to each oscillating bar, as shown in Fig. V.

The front portion of the frame is provided at its top with a channel 61, whose upper or receiving end is in communication with means for feeding matrices, such means being hereinafter fully described. The delivery or lower end of said channel is divided into two branches, each branch subdivided into two branches, each such subdivision being again divided, such division being continued and resulting in as many channels as there are characters required and in a series of groups of branches of various degrees of subdivision, the order of such degrees increasing from the main channel toward the opposite side of the frame. A series of channels is thus formed, all radiating from said single channel 61, each radiating channel constituting a branch of a channel intermediate of it and the receiving end of the single channel or the feeding means. The lower or delivery ends of the lowermost channels are each connected with a suitable magazine for storing the matrices.

In the delivery end of each intermediate channel is located a gate 60, Fig. II, having lateral faces converging in the direction of said channel 61, such sides being parallel with the channel-walls respectively adjacent thereto, and the width of each gate is such as to permit of its transverse reciprocation in its respective channel, whereby it may be caused to recede from one of said adjacent channel-walls and contact the other, thereby opening one branch of the channel in which it is located and closing the other. The lateral gate-faces being parallel with the channel-walls, as before mentioned, the extremities of said faces contact the channel-walls, thus permitting one entire lateral surface of the gate to form a part of such channel-wall. The amount of transverse movement is made equal to one-half the width, measured in the direction of travel, of a part of the intermediate channel in which the gate is located and which is contacted at each lateral wall by such gate, so that when the gate is in either of the two positions acute angles, and hence shoulders offering obstruction to the passage of the matrices, are entirely avoided. The delivery end of channels which constitute branches of channels resulting from the same number of subdivisions are preferably arranged in parallel transverse rows, whereby the gates may also be arranged in such rows, as shown in Fig. II. Each such row of gates is secured to a reciprocable bar 27, supported in grooves 62 in the frame, each gate of a row being riveted on the same bar, whence it is seen that gates controlling channels of like order of subdivision are mounted upon the same bar.

Upon the back of each bar 27 is secured a post 74, Fig. XIV, to which is attached a link 28, connected with an arm 29, secured to an upright oscillatory rod 24, said posts passing through slots 72 in the back of the frame, Figs. I and XV. The lower end of each such rod 24 is provided with an arm 25, provided at its extremity with a roller-bearing 26. Said bearing is held in contact with the outer lateral face of the member 8 of one of the friction-clutches, and the bar 27, connected therewith, is held normally in its left-hand position, as viewed when looking toward the front of the frame, by means of a spring 64, suitably located. The number of such friction-clutches is equal to the number of bars 27, so that each such bar is connected with such lateral face of one clutch. Said faces are each provided with a cam-notch 23, Figs. VI and VII, which receives the roller-bearing at the end of said arm 25, the position of said arm at such time being its normal position and the corresponding bar 27 being hence in its left-hand position. The cam-notches 23 and notches 22 are located with reference to each other so that they are simultaneously engaged by said roller-bearings 26 and the pawls 18, respectively, as shown in Fig. VI. The main portion of each outer lateral face of said cam members 8 lies in the same plane perpendicular to the clutch-axis of rotation, as shown in Fig. VII.

The inner end of each of the oscillating bars 9 is provided with an arm 31, suitably secured thereto, to which are respectively secured one of a series of upwardly-extending rods 30, Figs. I and III. To the upper end of each such rod 30 is secured the lower end of a vertically-reciprocable rod 32, Fig. XI. At the upper end of each such rod 32 is hung a pawl 33, having a forwardly and rearwardly extending arm, the latter extending into the vicinity of a ratchet-wheel 34, secured to a shaft 73, driven by a pulley 16, Fig. IX, the weight of the two arms being such as to cause the said rearwardly-extending arm to project into the path of and be engaged by the said ratchet-wheel when the pawl is permitted to hang loosely upon its pivot. Such engagement is, however, prevented by horizontally-located releasing-bars 35, which respectively engage the forwardly-extending arms and lift the pawl, so that said rearwardly-extending arms may escape the ratchet-teeth, as shown in Fig. XI. The opposite end of each releasing-bar is connected with one arm of a bell-crank 36, the other arms of such cranks being connected, respectively, to each of a series of yielding bars 37, Figs. XI and XII, mounted in a frame 39. Each of said bars 37 is formed with a lug 65, which is engaged by a spring-actuated plate 66, slidably mounted upon the front face of said frame, the spring's extremities being secured, respectively, to said frame and plate, whereby the bars 37 are normally caused to assume a position such that their free ends are caused to project from the end of the frame, the releasing-bars being during such position of bars 37 in a position in which they are capable of engaging the forwardly-extending arms of the pawls 33—that is, the position illustrated in Fig. XI. Each such bar 37 is formed of two links, as shown

in Fig. XV, pinned at their contiguous extremities, whereby each bar may be caused to bend or break in a direction transverse to its movement as effected by the spring-plate 66. The said free ends of the releasing-bars normally project into the end of a matrix-channel 59, Fig. IX, into and toward said end of which matrices 63 are fed by suitable means. (Not shown.) Part of the matrices are provided upon one side with integral projecting portions 42, Fig. XIII, such portions being of varying lengths and location upon matrices of different character and of the same length on matrices of the same character. As many different lengths of such projections are provided as there are projecting bars. Others of the matrices are provided with a series of projections of varying lengths, location, and forming varying combinations, part of such projections forming lateral marginal openings in the transverse matrix-faces, as shown, such combinations being the same in matrices of like character and varying in matrices of different character. The widths of the feed-channel and location of the projecting releasing-bar ends are such as to permit the projections 42 on the matrices to engage the said bar ends as they are fed toward and against the end of the said channel—that is, lines passing through said projecting portions and parallel with the direction of feed at the channel end pass through the ends of said bars at the points of projection of the latter into said channel.

The frame 39 is mounted upon the end of a bar 71, Figs. XVII and XVIII, projecting transversely therefrom, and mounted in a slide-bearing 67, Figs. IX and XVI. Said bar is provided with a laterally-projecting pin secured thereto and having mounted on its outer end a roller-bearing 68, which engages a cam-slot 40, formed in one lateral face of a cam-disk 41, Figs. XI and XVI. Said disk is secured to or formed integral with a sleeve 50, upon one end of which is secured or mounted one member 49 of a friction-clutch, the other member of which is pulley 16, which drives the shaft 64 and the ratchet-wheel 34, Fig. IX. The opposite face of said cam-disk is formed with a cam-slot 47, in which travels a roller-bearing 48, attached to the end of a lever 44, whose opposite end is secured to a plunger 43, operating in a slideway penetrating the end of the feed-channel 59 and transversely with respect to the direction of feed of the matrices. A slot 70 is formed in the frame and in the path of operation of the said plunger and in communication with the end of the feed-channel, the opposite end of said slot being in direct communication with the upper single channel 61 of the distributing-frame 1, and hence with the matrix-storage magazines. Said lever 44 is suitably fulcrumed in a bearing 46 upon a bracket secured to the machine-frame. The periphery of cam-disk 41 is provided with a notch 69, Figs. X and XI, which is normally engaged by a pawl 51, which prevents during such engagement the rotation of said disk. Such engagement is effected by a spring suitably connected with the pawl or its operating means. Said pawl is mounted upon a rod 52, to which is secured an arm 53, to the outer extremity of which is secured the end of a rod 54. The lower end of said rod is secured to the outer end of an arm 55, secured to an oscillatory rod 56, mounted parallel with the bars 9, Figs. III, IV, and V. Said rod 56 is provided with a series of dogs 57, Fig. V, each of which is located so as to be capable of being engaged by a pin 58, secured to the outer lateral face of each clutch member 8, as shown in Figs. VII and VIII.

The machine is operated and operates as follows: The matrices are fed into the feed-channel 59 by suitable mechanism (not shown) with the projections 42 in alinement with the projecting bars 37, as before stated. The inner end matrix on reaching the extremity of the channel engages one or more of the said bars through the medium of said projections 42. The number or combination of bars so engaged depends upon the particular form of said projection, the varying forms described making it possible for one or more successively-located bars to be engaged or any combination of bars to be engaged. Such combinations may involve the engagement of alternate bars or bars separated by one or more bars, such intermediate bars passing between the projections on the matrices formed with the combinations of such projections, and hence escaping engagement.

From the above-described construction of the device it is seen that there are a series of mechanisms consisting of means for actuating channel-controlling means and comprising a connected structure each operative independently of every other, such structure consisting of the following elements: A reciprocable bar 37, a bell-crank 36, a releasing-bar 35, a pawl 33, the ratchet-wheel 34, (common to the entire series,) a vertically-reciprocable rod 32, a connecting-rod 30, an arm 31, secured to one of the oscillatory bars 9, a pawl 18, secured to said bar, a clutch member 21, capable of operating a second member 8, an oscillatory rod 24, having an arm 25 operated by said clutch member 8, and a transversely-reciprocable bar 27, said bar having, as before described, a series of gates 60 secured thereto for controlling a series of channels in the distributing-frame and actuated by said rod 24. Each one of this series is similarly constructed, and hence a description of the operation of but one series is necessary in order to understand the operation of each. As the said end matrix is still farther fed into and toward the end of the feed-channel one or more of said reciprocable bars 37 yield in the direction of feed of the matrices by contact with the adjacent transverse surface of the end matrix, thereby permitting an unengaged bar or bars to pass through the

plane of such face where the number of bars engaged is less than the whole. The matrix engaging the bar is now ejected from the channel into the distributing-frame. In order to accomplish such operation, it is necessary to disengage such matrix from the yielding bar or bars, which prevent the movement thereof in any but one lateral direction when such matrix is provided with a projection located above any such bar and also for reasons which will presently appear. Such operation and its accomplishment will hereinafter be fully described. As each such bar is so moved it moves a bell-crank 36, so as to withdraw a releasing-rod from under one of the pawls 33. On being so released the pawl falls into a position such that its rearwardly-extending arm is projected into the path of the teeth of the rotating ratchet-wheel and is engaged thereby. Such engagement results in the upward movement of a rod 32, and consequently, through the medium of rod 30 and an arm 31, in the disengagement of one of the pawls 9 from a friction member 8. This member has a continuously-revolving member 21, contiguous to and frictionally engaging its inner lateral surface. Such frictional engagement is, however, inoperative during the engagement of pawl 9 with the member 8; but on the disengagement of such pawl the driving member 21 immediately becomes operative and begins to rotate said member 8. Such rotation immediately results in one oscillatory stroke of a rod 24 through the operation of the outer lateral cam-face of said member 8 upon the arm 25 through the roller-bearing 26. Such oscillatory stroke effects the movement of one of the bars 27 to its opposite extreme position from its normal position, in which it is held by the spring 64, secured to the corresponding rod 24. A series of channels hitherto closed are thereby opened and a series of open channels thereby closed. It is hence seen that any desired storage magazine may be connected by a continuous unbroken channel with the channel 61 by operating, as above described, the proper combination of bars 37. Immediately after the above-described action has taken place the plunger 43 descends and ejects the end matrix from the channel 59 in a direction transverse with respect to the direction of feed and into the channel 61, from whence it descends into its proper magazine. Such ejection is effected as follows: At the proper point in the rotation of clutch member 8 the pin 58 strikes one of the dogs 57, secured to rod 56, oscillating the latter and the shaft 52 in the upper part of the machine. The oscillation of said shaft 52 releases the pawl 51 from engagement with the cam-disk 40, rendering the driving-pulley operative and effecting one revolution of the said disk, the pawl being only momentarily released, immediately contacting and pressing against the disk periphery, whereby on completion of one revolution the notch 69 is reëngaged and further revolution stopped. During such revolution the frame 39 is moved transversely with respect to the feed-channel 59, Fig. XVII, by means of cam-slot 40 and roller 68, thereby withdrawing the ends of rods 37 from any existing vertical engagement with a matrix formed with combinations of projections and leaving the said matrix free to be moved downwardly and to be ejected from said channel. Immediately upon the withdrawal of said frame the plunger 43 is caused to descend, by the action of cam-slot 47, upon the roller-bearing secured to lever 44, thereby ejecting the end matrix. Such withdrawal is permitted by the linked construction of the rod 37, as is readily seen from the foregoing description. The plunger and frame are thereupon returned to their normal positions. Such transverse movement of frame 39 has, however, freed the ends of all engaged bars 37, so that the latter are restored to their normal positions by means of the spring-actuated plate 66. Such restoration restores the releasing-bars to a position such that their ends may again engage the forwardly-extending arm of each of the pawls 33 which have been lifted. The lifted pawls resume their lowered positions upon the completion of a revolution of their respective friction member 8, when pawls 9 reëngage the notches 22 in said members. The mechanism is, however, so timed that such reëngagement does not take place until all of the releasing-bars have been restored to their normal positions, so that on descending each pawl engages the end of such a bar, and is thus swung clear of the revolving teeth on ratchet-wheel 34, thus escaping engagement therewith.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means covered by any one of the following claims be employed.

I therefore particularly point out and distinctly claim as my invention—

1. In a matrix-distributing machine, a distributing-frame having an inlet, a series of outlets, and a system of channels increasing in number from said inlet in the direction of the outlets so as to form branches of various orders of subdivisions and groups of branches of like order of subdivision, a gate located at each junction of branches adapted to open one and close another thereof, and mechanical means for simultaneously so actuating gates controlling branches of like degree of division, substantially as set forth.

2. In a matrix-distributing machine, the combination with upright conveying-channels, of a suitably-operated reciprocating bar, and a plurality of gates operatively connected with the bar and arranged within and movable transversely of the different channels respectively, substantially as set forth.

3. In a matrix-distributing machine, the combination with upright channels, of a suit-

ably-operated reciprocating bar, and a plurality of gates operatively connected with the bar and arranged to obstruct one or the other side of the different channels respectively, according as the bar is moved into the one or the other of its two positions, and means acting to retain the bar in one of the said positions.

4. In a matrix-distributing machine, the combination with upright channels and an upright back or support having horizontally-arranged slideways formed at suitable intervals vertically; of reciprocating slides engaging the slideways, and a plurality of gates operatively connected with each slide and engaging and movable transversely of different channels respectively, substantially as and for the purpose specified.

5. In a matrix-distributing machine, the combination of an upright back or support provided with parallel slideways arranged at suitable intervals; suitably-operated endwise-shiftable bars or slides engaging the different slideways respectively; channels extending transversely and at one side of the aforesaid slideways, and a plurality of gates carried by the aforesaid slides and arranged within and movable transversely of different channels, respectively.

6. In a matrix-distributing machine, the combination with a plurality of upright channels; of a suitably-operated and suitably-supported sliding bar at the rear of the channels, which bar is provided, upon its forward side, with gates projecting into the different channels respectively, and having the configuration and arrangement required to render them capable of obstructing the one side or the other side of the respective channel according as the bar is shifted into the one or the other of its extreme positions.

7. In a matrix-distributing machine, the combination with a distributing-frame having an inlet, a series of outlets and a system of channels establishing communication between said inlet and outlet and increasing in number in the direction of the outlets so as to form branches of various orders of subdivisions and groups of branches of like order of subdivision, of exclusively mechanical means for controlling the openings of branches of like degree of subdivision so as to open or close such branches to communication simultaneously, substantially as set forth.

8. The combination, with a system of upright conveying-channels, of a distributer or assorter of the character indicated, and a suitably-operated reciprocating bar having a plurality of gates arranged within and movable transversely of the different channels, respectively, and means acting to retain the said bar in one of its extreme positions, of mechanism for shifting the said bar into its other extreme position, and having the construction required to cause it be operated by a matrix or type when the latter is in position to be delivered to the aforesaid system of channels.

9. The combination, with the distributer, or assorter comprising upright channels, a reciprocating bar, and a plurality of gates operatively connected with the bar and arranged to obstruct one or the other side of the different channels, respectively, according as the bar is moved into the one or the other of its two positions, of means acting to retain the bar in one of its said positions, and exclusively mechanical means adapted to be rendered operative by a type or matrix and arranged to actuate the aforesaid bar into its other position.

10. The combination, with the distributer or assorter having a system of upright channels and a mouth or inlet connected with the said channels, and reciprocating gate-carrying bars having each a plurality of gates, the gates being arranged to operate within different channels, respectively, and means acting to retain the bars in one of their extreme positions, of mechanism for actuating the bars into their other extreme position, exclusively mechanical means adapted, when rendered operative, to operate the aforesaid bar-actuating mechanism and adapted to be operated by a type or matrix preparatory to the latter's delivery to the aforesaid mouth or inlet.

11. The combination, with the distributer or assorter comprising upright channels and a mouth or inlet connected with the said channels, reciprocating gate-carrying bars having each a plurality of gates, the gates being arranged to operate within different channels, respectively, and a feed passage-way leading to the aforesaid mouth or inlet, of exclusively mechanical means for operating the aforesaid bars and arranged to be rendered operative by contact with an edge of a type or matrix when the latter is in position within the discharging end of the aforesaid feed passage-way, and means for effecting an operative engagement or connection between the said bar-actuating means and the edge of the said matrix or type.

12. The combination, with the distributer or assorter comprising upright channels and a mouth or inlet connected with the said channels, reciprocating gate-carrying bars having each a plurality of gates, the gates being arranged to operate within different channels, respectively, and a feed passage-way leading to the aforesaid mouth or inlet, of mechanism for operating the bars, devices for rendering the said mechanism operative and rendered operative by a type or matrix that has been fed into position within the discharging end of the aforesaid passage-way by contact with a side edge of the matrix or type, and means for effecting an operative engagement between the matrix or type and the mechanism-operating means adapted to be engaged, as aforesaid, by the type or matrix.

13. The combination, with the distributer or assorter comprising a system of upright channels, a mouth or inlet connected with the

said channels, and reciprocating gate-carrying bars having each a plurality of gates, the gates being arranged to operate within different channels, respectively, and a feed passage-way leading to the aforesaid mouth or inlet, and means acting to retain the gate-bars in one of their extreme positions, of upright bars provided with means for actuating the gate-bars into their other extreme position, and normally inoperative means acting to retain the upright bars in their normal and inoperative position, and mechanical means for rendering the upright bars operative and arranged to be rendered operative by a type or matrix that has been fed into position within the discharging end of the aforesaid passage-way.

14. The combination, with the distributer or assorter comprising a system of upright channels, a mouth or inlet connected with the said channels, and reciprocating gate-carrying bars having each a plurality of gates, the gates being arranged to operate within different channels, respectively, and a feed passage-way leading to the aforesaid mouth or inlet, and means acting to retain the aforesaid bars in one of their two extreme positions, of upright bars instrumental in shifting the gate-bars into their other extreme position, springs acting to retain the upright bars in their normal and inoperative position, mechanism for operating the said upright bars against the action of the said springs, and means for rendering the said bar-operated mechanism operative and adapted to be operated by a type or matrix fed into position within the discharging end of the aforesaid passage-way.

15. The combination, in a distributer or assorter of the character indicated, with a plurality of gates instrumental, respectively, in guiding or controlling the passage of a type or matrix through the distributer or assorter, a bar connecting the said gates together, the mouth or inlet of the distributer, and a feed passage-way leading to the said mouth or inlet, of exclusively mechanical means for operating the aforesaid bar and arranged to be rendered operative by contact with a type or matrix when the latter is in position within the discharging end of the aforesaid feed passage-way, and means for effecting an operative engagement or connection between the said bar-actuating means and the aforesaid matrix or type.

16. In a matrix-distributing machine, the combination of matrix-feeding means; a frame provided with a series of channels radiating from a single channel, each such radiating channel constituting a branch of a channel intermediate of it and said feeding means; a series of gates, one of such gates located in each such intermediate channel and each gate provided with lateral faces converging toward said single channel; and means for actuating each gate to cause either of said faces to contact the adjacent wall of its respective intermediate channel, and thereby cause the opposite face to recede from its adjacent channel-wall and form part of the surface of the latter, substantially as set forth.

17. In a matrix-distributing machine, the combination of a frame provided with a series of channels radiating from a single matrix-channel, each such radiating channel constituting a branch of a channel intermediate of it and the receiving end of said single channel, and having a series of gates reciprocable transversely, one such gate located at the delivery end of each such intermediate channel and provided with sides parallel with the adjacent sides of the intermediate channel in which it is located, substantially as set forth.

18. In a matrix-distributing machine a series of channels communicating with a series of magazines, in combination with a series of rows of gates controlling said channels, each row being mounted upon a transversely-reciprocable bar, substantially as set forth.

19. In a matrix-distributing machine, the combination of a frame provided with a series of channels radiating from a single matrix-channel, each such radiating channel constituting a branch of a channel intermediate of it and the receiving end of said single channel, and having a series of gates reciprocable transversely, one such gate located at the delivery end of each such intermediate channel, each gate provided with lateral surfaces converging in the direction of said single channel and each parallel with the adjacent surface of the said intermediate channel, substantially as set forth.

20. In a matrix-distributing machine, the combination of a frame provided with a series of channels radiating from a single matrix-channel, each such radiating channel constituting a branch of a channel intermediate of it and the receiving end of said single channel, and having a series of gates movable transversely, one such gate located at the delivery end of each such intermediate channel, each gate provided with lateral surfaces converging in the direction of said single channel, the lateral extremities of such surfaces adapted to contact the lateral surface of the intermediate-channel surface adjacent to such gate-surface, substantially as set forth.

21. In a matrix-distributing machine, the combination of a frame provided with a series of channels radiating from a single channel each such radiating channel constituting a branch of a channel intermediate of it and the receiving end of said single channel, a series of transversely-reciprocable bars, a series of gates, one such gate located at the delivery end of each intermediate channel and adapted to close one branch of such channel, and permit its companion branch to be open, said series of gates secured to said bars, and means for reciprocating said bars, substantially as set forth.

22. In a matrix-distributing machine, the combination of a series of matrix-magazines,

a frame provided with a series of channels communicating with said magazines, means for feeding matrices into said channels, means for controlling said channels to form a passage from said feeding means to a magazine, a series of mechanisms operative independently of each other, for actuating said channel-controlling means, means for operating said actuating mechanisms, means for rendering said operating means inoperative, releasing mechanisms connected with each of said actuating means whereby each of the operating means may be rendered operative independently of the others, substantially as set forth.

23. In a matrix-distributing machine, the combination of a matrix-feed magazine, a series of means for controlling passages to matrix-storage magazines, a series of mechanisms operative independently of each other for actuating said controlling means, each such mechanism provided with locking means for rendering it inoperative, a series of mechanisms normally inoperative for releasing each such actuating mechanism, and a series of independently-operative bars projecting into said feed-magazine for rendering said releasing mechanism operative, substantially as set forth.

24. The combination with the system of upright conveying-channels of a distributer or assorter of the character indicated, and a series or plurality of gates arranged within and movable transversely of the different channels, respectively, a bar or member connecting the said gates together, means acting to retain the said series or plurality of gates in one extreme position, and mechanism for shifting the said series or plurality of gates into the other extreme position and having the construction required to cause it to be operated by a matrix or type when the latter is in position to be delivered to the aforesaid system of channels, substantially as set forth.

25. In a matrix-distributing machine, the combination of a matrix-feed magazine, a series of yielding bars projecting into said magazine, a ratchet-wheel, means for rotating the latter, a series of reciprocable rods, each such rod provided with means for engaging said wheel, means adapted to release said engaging means to engage said wheel, each yielding bar having engagement with said releasing means, substantially as set forth.

26. In a matrix-distributing machine, the combination of a matrix-feed magazine, a series of yielding bars projecting into said magazine, a ratchet-wheel, means for rotating the latter, a series of reciprocable rods each provided with a pawl for engaging said ratchet-wheel, a series of reciprocable releasing-rods connected with said yielding bars and adapted to hold said pawls out of engagement with said ratchet-wheel, substantially as set forth.

27. In a matrix-distributing machine, the combination of a rotating member, a series of reciprocable rods provided with means for disconnectibly engaging said member, a second rotating member, a series of disks adapted to be rotated by said second rotating member, means for locking each disk against such rotation and connected with one of said rods whereby the reciprocation of each of the latter unlocks a disk and permits of its rotation by said second rotating member, substantially as set forth.

28. In a matrix-distributing machine, the combination of a rotating member, a series of reciprocable rods provided with means for disconnectibly engaging said member, a rotating shaft having secured to it a series of friction-disks, a second series of friction-disks, each one of the members of which engages a disk in the first-named series, a series of locking-pawls engaging said second-named series of disks to prevent their rotation, each such pawl connected with one of said reciprocable rods, whereby the reciprocation of each of the latter unlocks a disk and permits of its rotation.

29. In a matrix-distributing machine, the combination of a matrix-feed channel, an ejector for ejecting matrices from said magazine, a yielding bar projecting into said magazine, a rotating member, a reciprocable rod provided with means for engaging said rotating member, said yielding bar adapted to effect such engagement, a second rotating member having a friction-disk secured thereto, a second friction-disk loosely mounted on said second rotating member and engaging said first-named disk by frictional contact, means for locking said second disk against rotation and connected with said reciprocable rod, means for operating said ejector, said means controlled by said second-named disk, substantially as set forth.

30. In a matrix-distributing machine, the combination of a matrix-feed channel, a series of yielding bars normally projecting into and means for withdrawing said bars from said channel transversely of the direction of feed of the matrices into same, substantially as set forth.

31. The combination of a matrix-feed channel, a series of yielding bars normally projecting into said channel, means for feeding matrices along the channel toward said bars, and a series of matrices provided with marginal projecting portions adapted to engage either a single bar or combinations thereof, substantially as set forth.

32. The combination of a matrix-feed channel, a column of matrices, a series of yielding bars normally projecting into the end of said channel, and means for feeding said column toward said bars, the matrix-column being composed of matrices having lateral projecting portions of varying lengths and of varying location, part of such portions being continuous and part intermittent in construction, lines parallel with the direction of feed and passing through said portions passing through the end of either a single bar or com-

bination of bars, whereby each matrix may be caused to engage either such one bar or such combination to cause it or them to yield and means for ejecting such matrix from said channel in a direction transverse with respect to the direction of feed, substantially as set forth.

33. The combination of a matrix-feed channel, a column of matrices, a series of yielding bars projecting into said channel and movable transversely of the direction of feed, means for feeding said matrices along said channel and toward said bars, each matrix having a portion of its face adapted to either engage one bar or a combination of bars and permit the bars so unengaged to pass through the plane of such face, and means for disengaging such matrix from such disengaged bars, whereby it may be ejected from said channel, substantially as set forth.

34. The combination of a matrix-feed channel, a column of matrices, means for feeding the latter along said channel, a series of bars projecting into said channel adapted to yield in the direction of feed and mounted in a frame movable in a direction transverse to said direction of feed, matrices included in said column each provided with a projecting portion forming marginal recesses opening in the direction of movement of said frame, said projecting portions adapted to engage by contact a bar or a combination of bars comprising less than the whole number of bars, whereby the remaining bar or bars so unengaged are caused to engage said matrix in a manner such as to prevent transverse movement in a second direction transverse to the direction of feed, and means for actuating said frame in its transverse movement, substantially as set forth.

Signed by me this 15th day of April, 1898.

EDWARD S. CRANE.

Attest:
D. T. DAVIES,
J. C. MCLELAND.