No. 685,980. Patented Nov. 5, 1901.

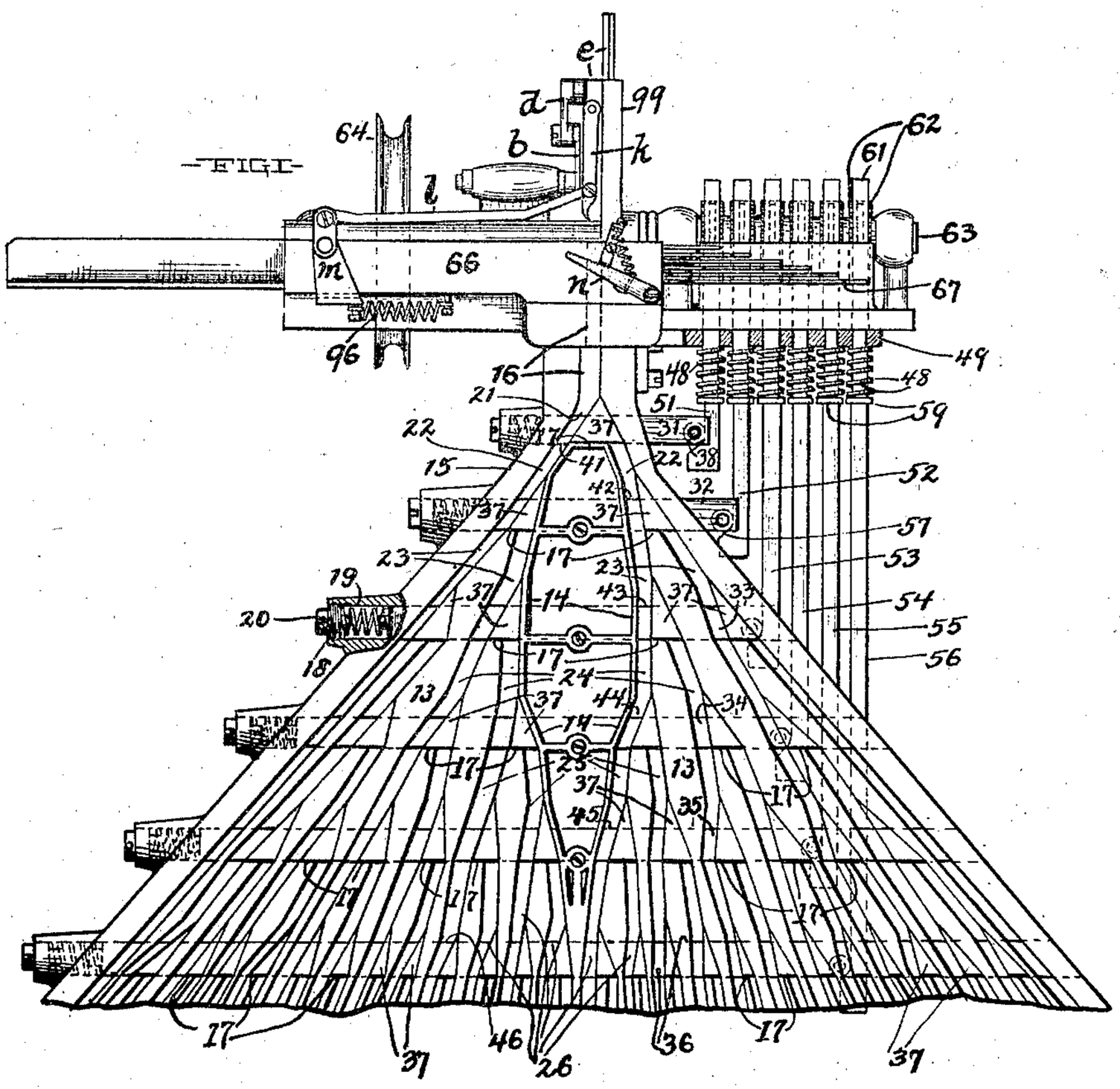
A. S. GILMAN.

LINOTYPING AND TYPE SETTING MACHINE.

(Application filed Sept. 12, 1900.)

(No Model.) 4 Sheets—Sheet 1.

FIG. 1.



WITNESSES:
Daniel E. Daly.
A. H. Parratt

INVENTOR
Arthur S. Gilman
BY
Lynch & Dorer
his ATTORNEYS

No. 685,980. Patented Nov. 5, 1901.

A. S. GILMAN.

LINOTYPING AND TYPE SETTING MACHINE.

(Application filed Sept. 12, 1900.)

(No Model.) 4 Sheets—Sheet 2.

FIG. II.

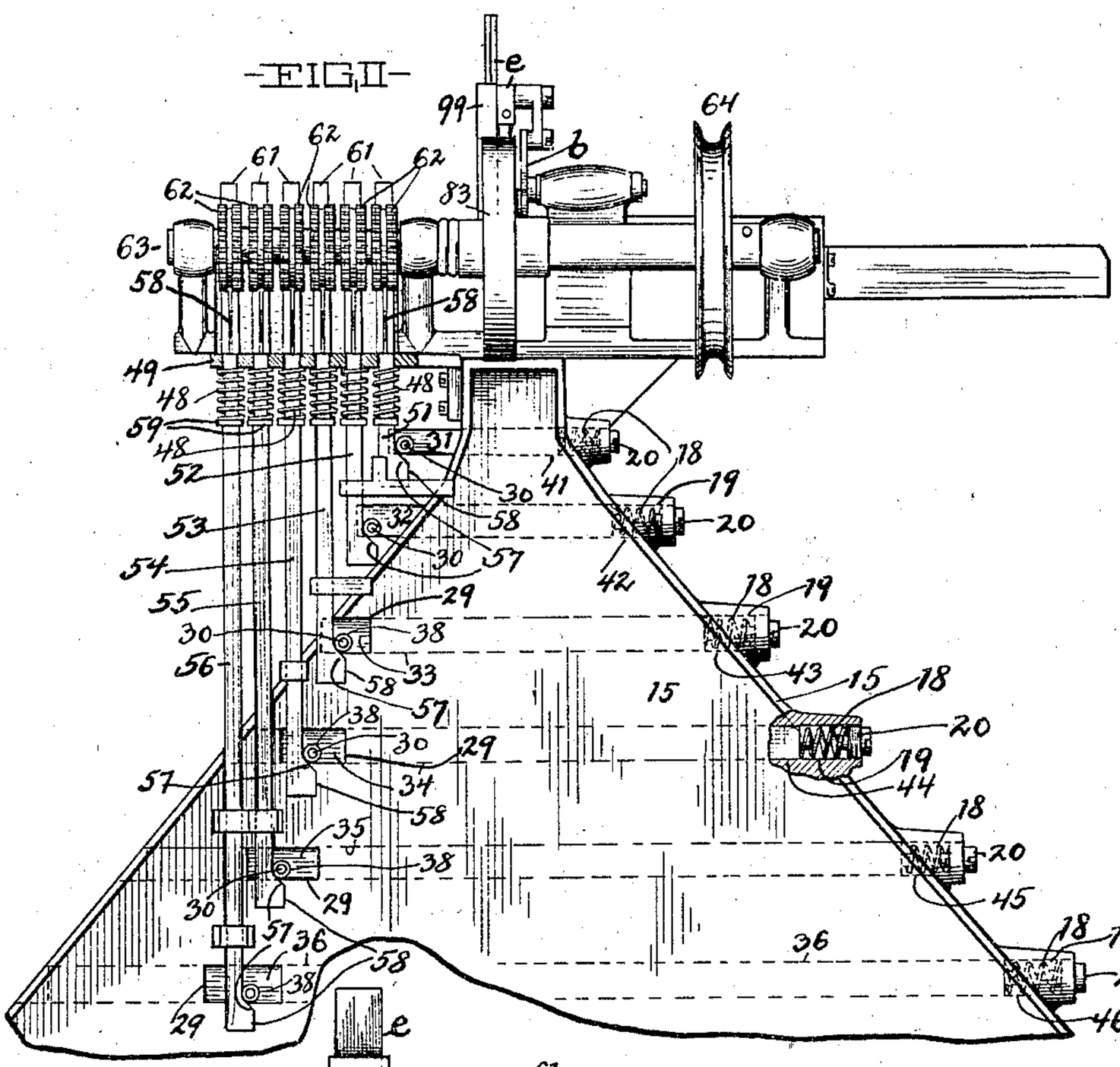
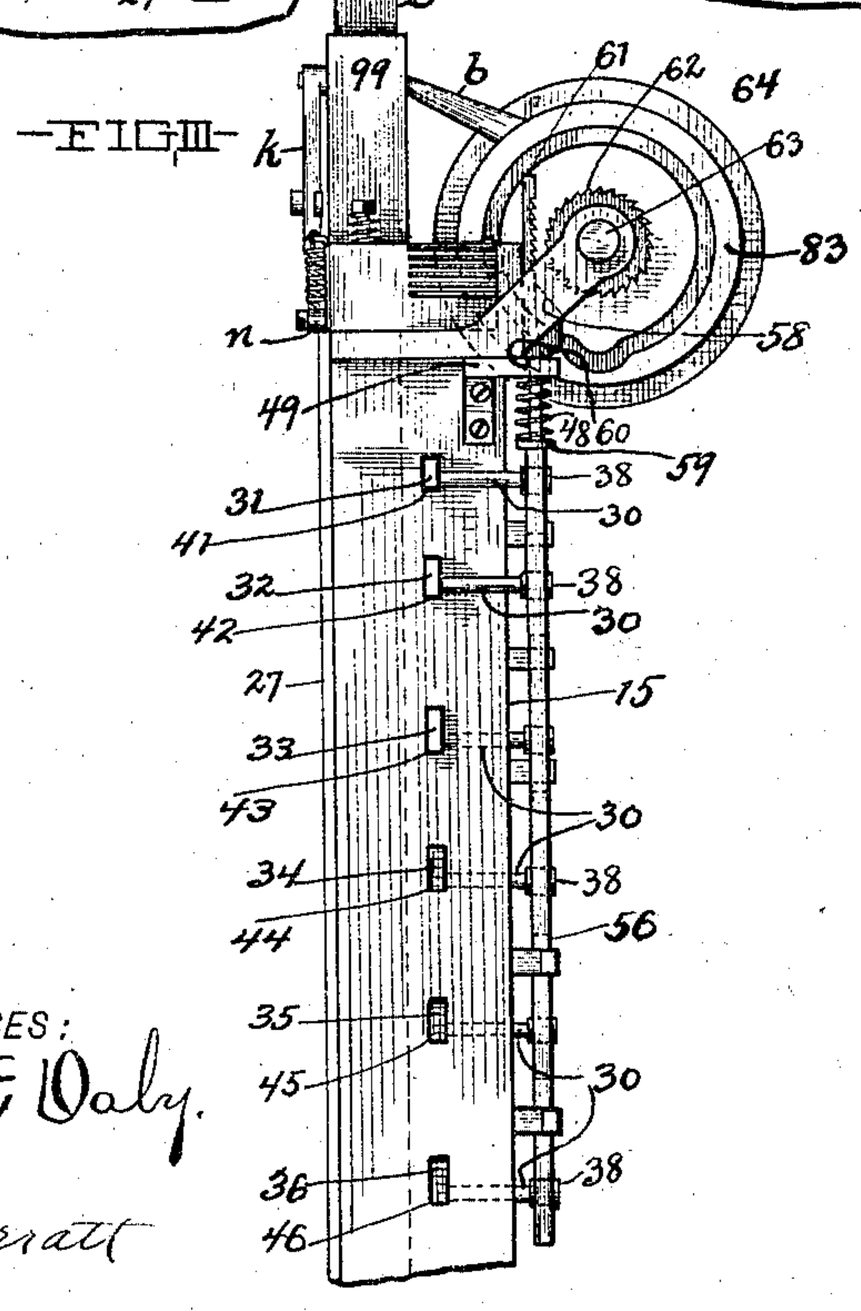


FIG. III.



WITNESSES:
Daniel E. Daly.
A. H. Parratt

INVENTOR
Arthur S. Gilman
BY
Lynch & Durer
his ATTORNEYS

No. 685,930. Patented Nov. 5, 1901.

A. S. GILMAN.

LINOTYPING AND TYPE SETTING MACHINE.

(Application filed Sept. 12, 1900.)

(No Model.) 4 Sheets—Sheet 3.

FIG. IV.

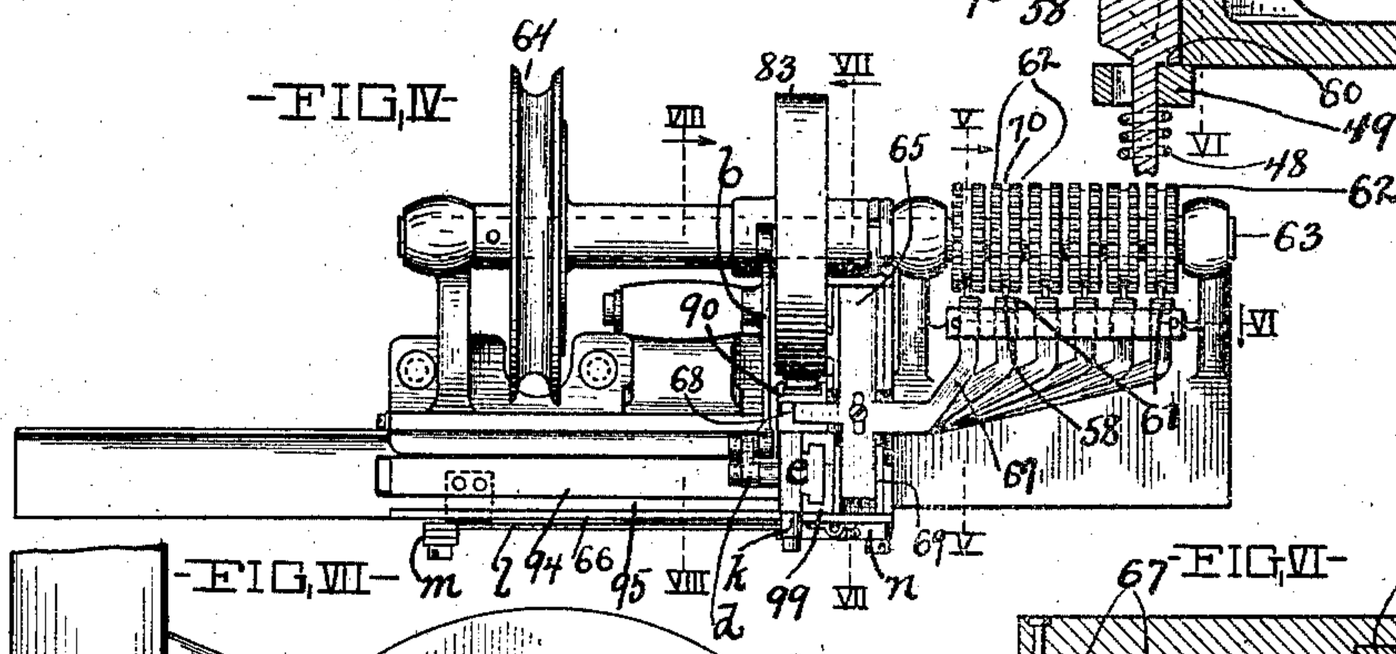


FIG. V.

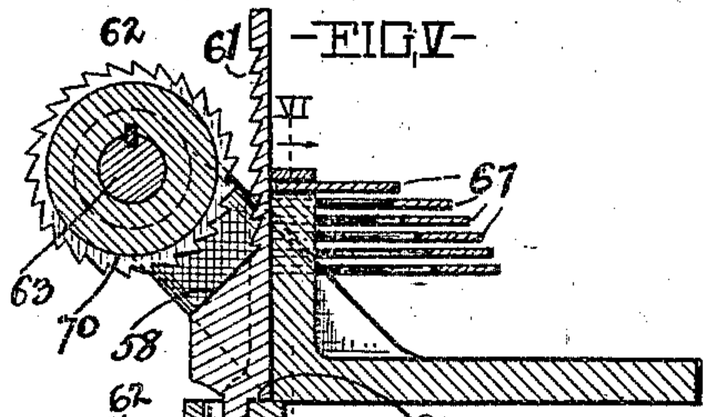


FIG. VI.

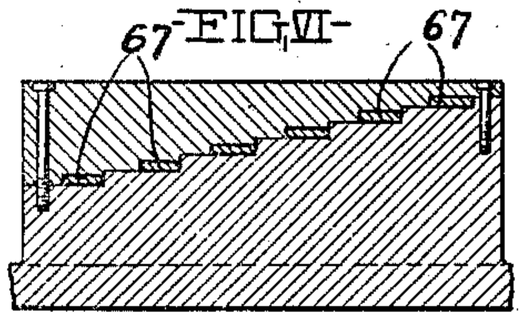


FIG. VII.

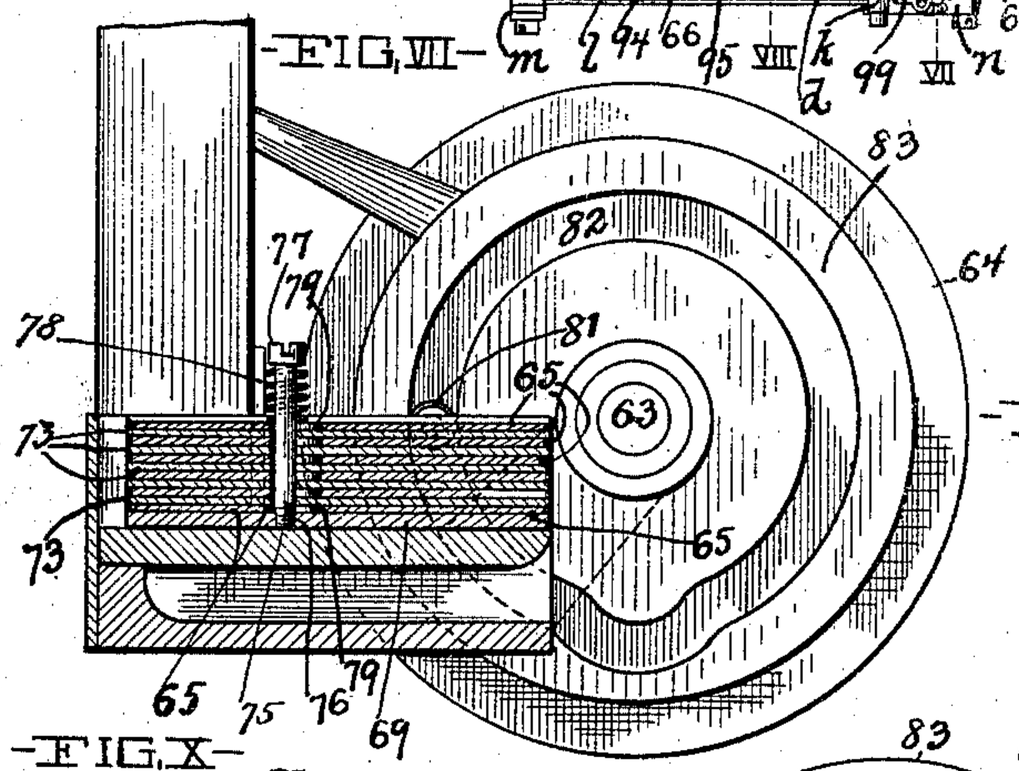


FIG. VIII.

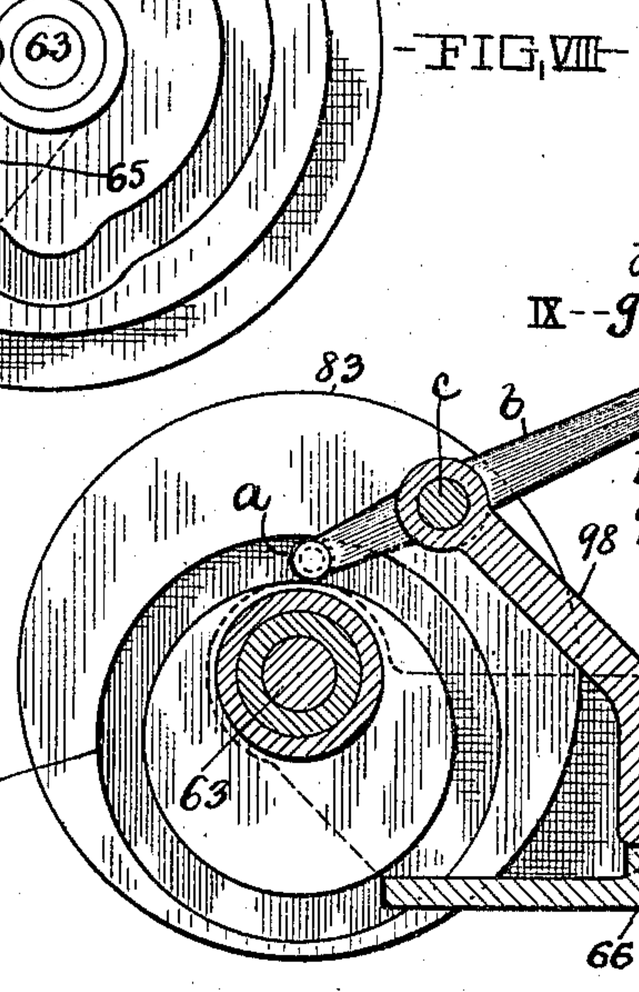


FIG. IX.

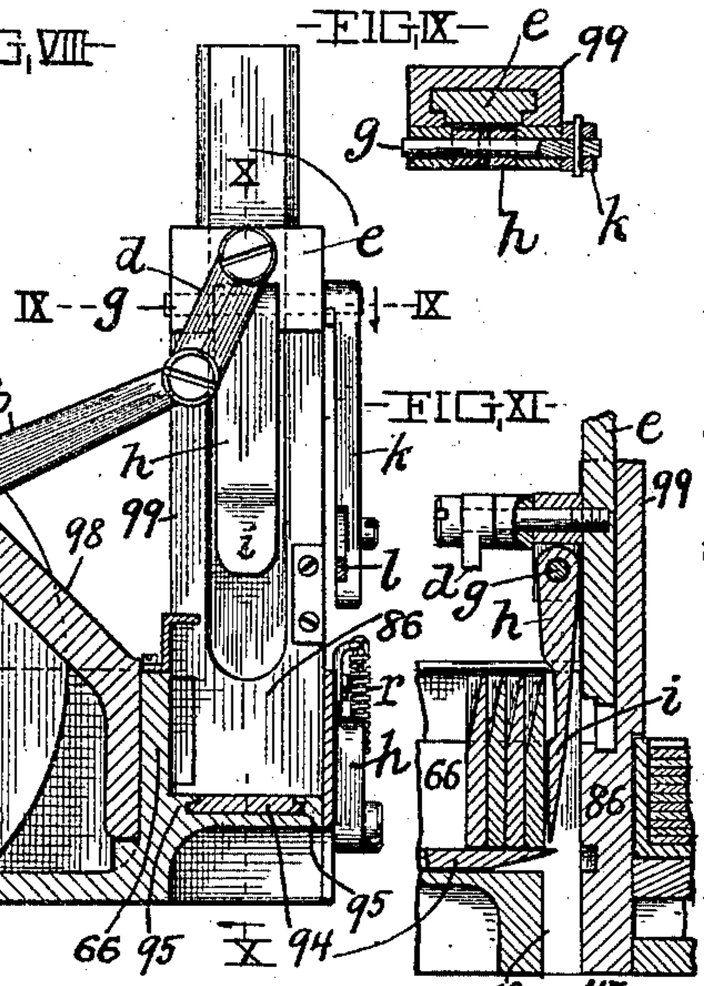


FIG. X.

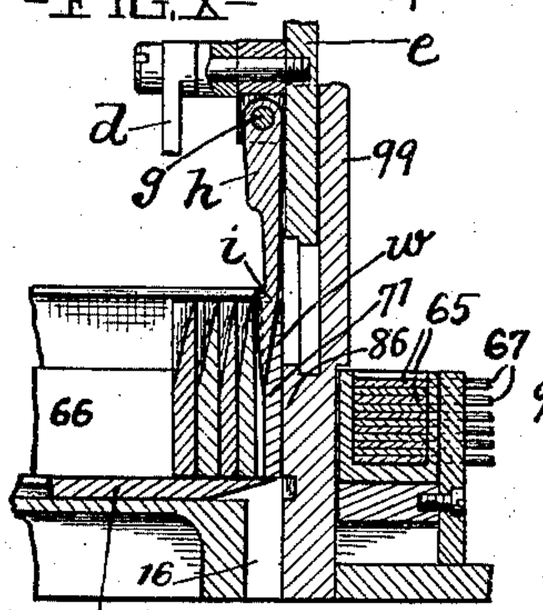


FIG. XI.

WITNESSES:

Daniel E. Daly.

A. H. Parratt

INVENTOR

Arthur S. Gilman

BY

Lynch & Dorer

his ATTORNEYS

No. 685,980. Patented Nov. 5, 1901.

A. S. GILMAN.

LINOTYPING AND TYPE SETTING MACHINE.

(Application filed Sept. 12, 1900.)

(No Model.) 4 Sheets—Sheet 4.

FIG XII

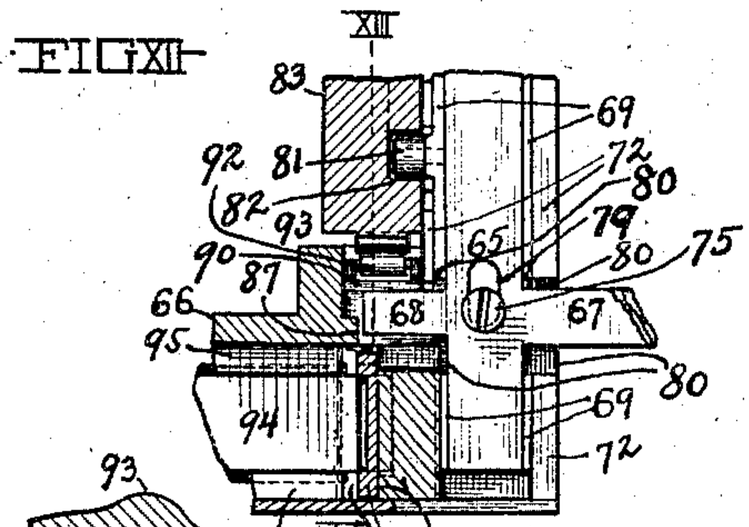


FIG XIII

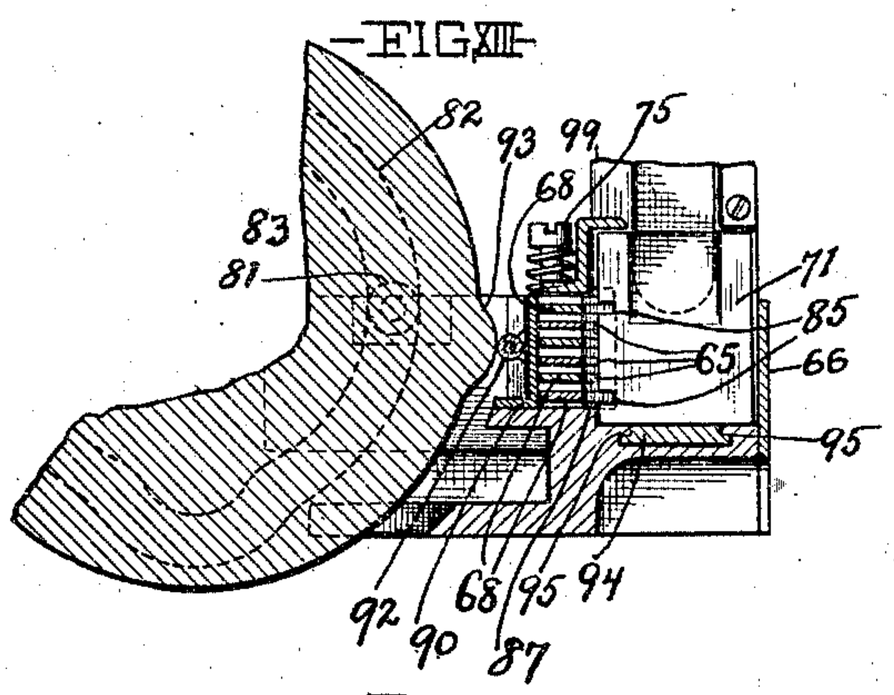


FIG XIV

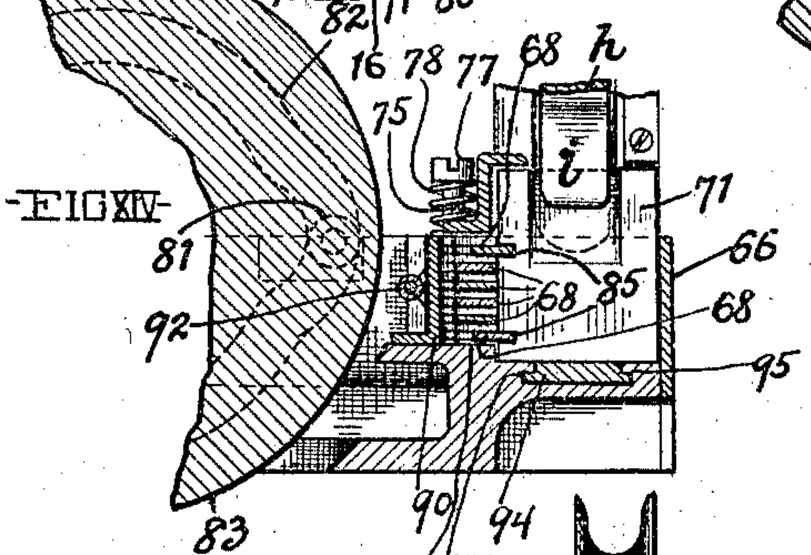


FIG XV

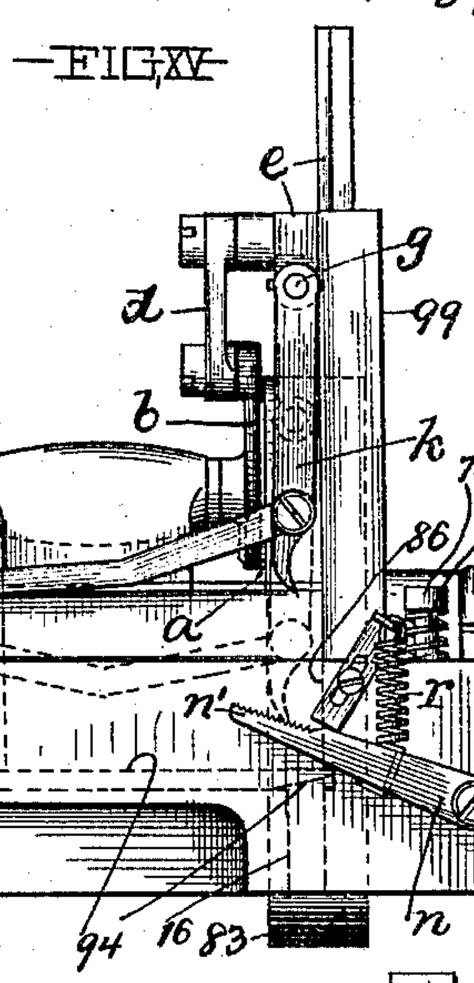


FIG XVI

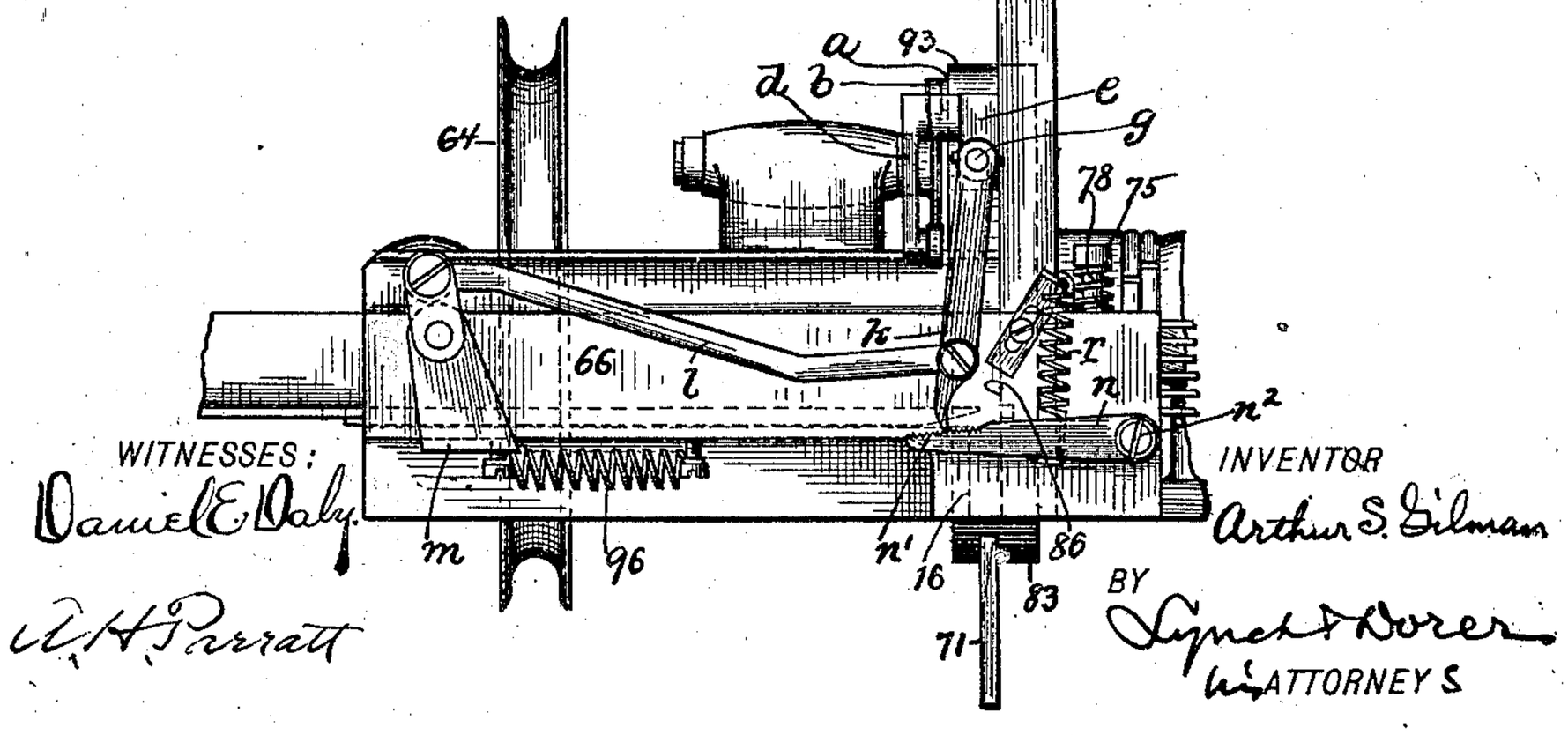
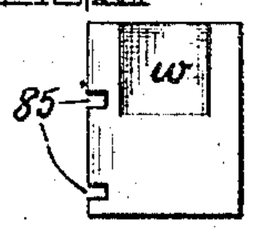


FIG XVII



WITNESSES:
Daniel E. Daly.
W. H. Parratt

INVENTOR
Arthur S. Gilman
BY
Lynch & Dorer
ATTORNEYS

UNITED STATES PATENT OFFICE.

ARTHUR S. GILMAN, OF CLEVELAND, OHIO.

LINOTYPING AND TYPE-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,980, dated November 5, 1901.

Application filed September 12, 1900. Serial No. 29,738. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR S. GILMAN, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Linotype and Type-Setting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in linotype and type-setting machines, and more especially to improved mechanism for operating a distributer or assorter designed for distributing or assorting matrices, type, &c., which mechanism is operated by the matrices or type requiring to be assorted.

The primary object is to provide mechanism of the character indicated that is simple in construction, durable, and reliable and rapid in its operation.

Another object of the invention is to provide a matrix or type suitable for the operation of the said mechanism without detrimentally affecting the durability of the type or matrix.

With these objects in view and to the end of realizing other advantages hereinafter appearing the invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a front side elevation, partly in section, of a distributer or assorter for distributing or assorting matrices, type, &c., in and for linotype and type-setting machines and shows a portion of the mechanism for operating the said distributer or assorter. Fig. II is a rear side elevation, partly in section, of the machine. Fig. III is a left-hand side elevation relative to Fig. II. Fig. IV is a top plan. Fig. V is a transverse vertical section on line V V, Fig. IV, looking in the direction of the arrow. Fig. VI is a transverse vertical section on line VI VI, Fig. V, looking in the direction of the arrow. Fig. VII is a transverse vertical section on line VII VII, Fig. IV, looking in the direction of the arrow. Fig. VIII is a transverse section on line VIII VIII, Fig. IV, looking in the direction of the arrow. Fig. IX is a top plan, mostly in section, on line IX IX, Fig. VIII, showing the slide *e*, the slideway for the said slide, and the shaft *g*. Figs. X and XI are front side elevations in section of portions of the machine, showing the discharging end of the feed-trough 66, the receiving end of the mouth or inlet 16 of the system of distributing or assorting channels, the gate for controlling communication between the trough and the said mouth or inlet, and means that coöperate with the matrix or type that is in position to be discharged from the trough in the operation of the said gate. Fig. XII is a top plan, partly in section, showing the discharging end of the feed-trough 66, the reciprocating carriage 69, the pile of slides 65 within the said carriage, the means for operating the carriage, and the means for returning a slide or slides that have been displaced by a type or matrix into their normal position. Fig. XIII is an elevation, mostly in vertical section, on line XIII XIII, Fig. XII, looking in the direction of the arrow. Fig. XIV is an elevation, mostly in section, corresponding with Fig. XIII, except that in Fig. XIV some of the movable parts are shown in a different position. Figs. XV and XVI are front side elevations of the feed-trough and mechanism instrumental in the operation of the gate that controls communication between the discharging end of the trough and the mouth or inlet of the system of distributing or assorting channels. Fig. XVII is a side elevation of a type or matrix.

A distributer or assorter provided with my improved mechanism is shown in Figs. I, II, and III and comprises an upright back 15, composed of a metal plate. The back 15 is triangular and has conveying channels or passage-ways formed upon its forward side. The distributer or assorter has its upper end provided with a mouth or inlet 16, at which the matrices, type, &c., that are to be distributed or assorted and conveyed to magazines (not shown) formed below the distributer or assorter are introduced. The mouth or inlet 16 is formed at the upper end of and communicates with the upper end of the uppermost channel 21 of the distributer or assorter. The back 15 is provided with horizontally-arranged sliding bars 31, 32, 33, 34, 35, and 36, that engage different correspondingly-arranged slideways 41, 42, 43, 44, 45,

and 46, respectively, formed in the back 15 at suitable intervals vertically. Each of the said bars upon its forward side is provided with one or more gate-forming lugs 37, and each gate of each gate-bar projects forwardly into the downwardly-enlarged lower portion of, and has a path or range of movement laterally within, a conveying channel or passage-way that is formed in any approved manner upon the forward side of the back 15, as already indicated, and has its lower end connected with the ends of two similarly-shaped and downwardly-diverging channels or passage-ways, whereof the greater number have their lower portions enlarged downwardly and engaged by gates formed upon another gate-bar, and so on down to the lowermost gate-bar—that is, each gate-bar extends across the rear side of one or more channels, and each gate is arranged to operate between the opposing and downwardly-diverging side walls of the lower enlarged portion of the respective channel and preferably rests or has bearing upon a shoulder or seat 17, formed centrally of the lower end of the channel and between the two channels that lead and diverge downwardly from the said end. One of the downwardly-converging side walls of each gate-engaged channel forms a stop for limiting the reciprocation of the gate, and consequently the gate-bar that bears the said gate in the one direction, and the opposite side wall forms a stop for limiting the reciprocation of the gate-bar in the opposite direction. Each gate in one of its positions interrupts communication between the gate's path and one of the passage-ways that lead and diverge downwardly from opposite ends, respectively, of the said path at opposite sides, respectively, of the gate's seat, and the gate in its other position interrupts communication between the said path and the other of the said passage-ways. Each gate is triangular and has its stop-engaging sides converging upwardly to a point that is flush with and engages the one or the other stop-forming walls according as the gate is actuated into the one or the other of its two positions, so as to avoid any obstruction or impediment in the passage of a matrix or type into and through the open or free portion of the gate-containing channel into that one of the two downwardly-diverging channels that is in open relation with the said open portion of the gate-containing channel. Hence each one of the opposite upwardly-converging sides of each gate is preferably parallel with the opposing wall of the two downwardly-diverging walls that bound the ends of the gate's path.

In Fig. I of the drawings, 22 and 22 designate the two gate containing or conveying channels that lead and diverge downwardly from the uppermost channel 21, 23 the two channels that lead and diverge downwardly from each channel 22, and so on down to the channels 26 or farther, as the case may be.

A coil-spring 18, confined at and engaging the left-hand end of each gate-bar, acts to retain the said bar in its right-hand position. Each spring 18 is preferably arranged within a hole 19, formed in a member of the stationary framework of the machine, which hole is closed at its outer end by a removable screw-threaded plug 20, that forms an abutment for the outer end of the spring and engages the correspondingly-threaded surrounding wall of the said hole. By removing this plug access is had to the spring.

It will be observed that in the case illustrated a matrix or type that is to be conveyed to the channel 26, that adjoins the left-hand side of the central partition 14, would require the actuation of gate-bars 32, 33, 34, and 35, and a type or matrix that is to be conveyed to the channel 26, that adjoins the right-hand side of the said partition, would require the actuation of gate-bar 31 only.

The operation of the gate-bars will be readily understood without further description or illustration.

The central partition 14 is made hollow for lightness and economy.

The forward side of the distributing or assorting channels are closed, preferably, by a glass plate. (Not shown in Fig. I, but shown, marked 27, in Fig. III.)

The distributer or assorter hereinbefore described, so far as the conveying channels or passage-ways and the sliding gates are concerned, forms no part of the present invention and is substantially the same as disclosed and claimed in United States Letters Patent No. 633,190, granted to me September 19, 1899.

The springs 18, as already indicated, act to retain the aforesaid gates in one of their extreme positions. Each of the gate-bars 31, 32, 33, 34, 35, and 36 is provided with a rearwardly-projecting arm 30, that extends rearwardly of the back 15, that is slotted, as at 29, to accommodate the location and operation of those arms 30 that extend through the back. (See Fig. II.) Vertically-reciprocating bars 51, 52, 53, 54, 55, and 56, that are operated by matrix-actuated or type-actuated mechanism, as will hereinafter appear, are capable of actuating the aforesaid gate-bars into the other of their extreme positions. Each of the bars 51, 52, 53, 54, 55, and 56 is provided at its lower end and inner side with an inclined or downwardly and inwardly sloping shoulder 57, and the arrangement of parts is such that normally the arm 30 of the gate-bar 31 extends over the upper end of the incline 57 upon bar 51. The arms 30 of the gate-bars 32, 33, 34, 35, and 36 extend over the upper end of the incline 57 upon the bars 52, 53, 54, 55, and 56, respectively, and each incline-bearing bar upon being actuated upwardly will, by means of its incline 57, actuate the contiguous or adjacent gate-bar from the latter's normal position into its opposite position against the action of that

spring 18 that acts to retain the said gate-bar in its normal position. Obviously, therefore, a matrix or type that is to be conveyed to the channel 26, adjoining the left-hand side of the central partition 14, and that would require the actuation of the gate-bars 32, 33, 34, and 35 would necessarily require the actuation of the bars 52, 53, 54, and 55, and the matrix or type requiring conveyance to the said channel and the mechanism arranged to be actuated by the said matrix or type when the type or matrix is in position to enter the inlet 16 of the system of distributing or assorting channels have the relative construction and arrangement required to result in the operation of the aforesaid gate-bars immediately preparatory to the discharge of the said matrix or type into the said inlet. A type or matrix that is to be conveyed to the channel 26, that adjoins the right-hand side of the said partitions, would require the actuation of gate-bar 31 only, and consequently the relative construction and arrangement of the matrix or type requiring conveying to the said channel and the other mechanism instrumental in the said actuation of the bar 31 are such as will result in the required actuation of the bar 31 immediately preparatory to the discharge of the type or matrix into the inlet 16. In fact, the relative construction and arrangement of each matrix or type requiring conveyance to a certain channel and the other mechanism instrumental in the actuation of the gate-bar or gate-bars requiring operation in the conveyance of the said type or matrix to the said channel are such as to result in the required operation of the said bar or bars immediately preparatory to the discharge of the matrix or type into the inlet 16.

As already indicated, each incline-bearing bar during its upward movement actuates the engaging gate-bar against the action of the spring that acts to retain the said gate-bar in its normal position. To cause the said gate-bar to be retained in its shifted position long enough to accommodate the passage of the matrix or type through the distributer or assorter or until the type or matrix has passed the gates that will have been shifted preparatory to the entrance of the said matrix or type into the inlet 16, the said incline-bearing bar at the lower end of its incline 57 is provided with a perpendicularly-arranged shoulder or surface 58, extending vertically downwardly from the lower end of the incline, which shoulder is long enough to retain the gate-bar in its shifted position the length of time required. It will be observed, therefore, that a gate-bar that is to be operated by the engaging incline-bearing bar is first actuated by the incline 57 of the said bar and then retained in its shifted position the required length of time by the perpendicular shoulder or surface 58, formed upon the last-mentioned bar below the incline. The arms 30 of each gate-bar to reduce the friction between it and the engaging incline-bearing bar during the operation of the said bars is provided with an antifriction-roller 38, arranged to be engaged by the incline-bearing bar. Each incline-bearing bar has lateral bearing in the stationary framework of the machine. Means acting to retain each incline-bearing bar in its lower or normal position is provided and consists, preferably, of a spiral spring 48, that is coiled and confined upon the said bar between an external annular shoulder 59, formed upon the bar a suitable distance above the bar's incline, and a horizontally-arranged member 49 (see Fig. V) of the stationary framework of the machine. Each incline-bearing bar is provided with an external shoulder 60, (see Fig. V,) that rests upon the member 49 of the stationary framework in the lower and normal position of the said bar. Each incline-bearing bar has its upper portion formed into a rack 61, that is formed upon the rear side of the bar and is adapted to engage a pinion 62, operatively mounted upon a horizontally-arranged shaft 63, that is supported in any approved manner from the stationary framework of the machine and rearward of the inlet 16 of the distributer or assorter and is provided with a driving-pulley 64. Each rack 61 is normally out of mesh with but in close proximity to the coöperating pinion, as shown in Figs. III and V; but the rack-bar's upper portion is sufficiently thin to render the said bar somewhat flexible and capable of slightly bending in the direction of the pinion as required to establish operative connection between the pinion and the rack.

The mechanism illustrated for establishing operative connection between a rack-bar and the coöperating pinion (see Figs. IV, V, VI, and XII) comprises a horizontally-arranged sliding plate 65, located forward of the shaft 63 between the shaft and the feed-trough 66, that is adapted to communicate with the inlet 16 of the distributer or assorter. The said plate 65 is capable of being reciprocated toward and from the said shaft and provided with an arm 67, arranged to engage the back of the rack of the said rack-bar and move the latter upon being actuated in the direction of the aforesaid shaft into operative engagement with the opposing pinion. The said plate 65 has another arm 68, (see also Figs. XIII and XIV,) that has the arrangement required to cause it to extend over the inlet 16 into the path of the type or matrix that is within the trough 66 in position to be distributed or assorted when the said plate 65 is in its forwardly extreme position, wherein the plate's rack-engageable arm is inoperative. There are therefore as many plates 65 as there are rack-bars, and these plates are arranged in a vertical row within a forwardly and rearwardly reciprocating carriage 69, (see Figs. VII and XII,) that has its sides slotted or cut away to accommodate the location of the arms 67 and 68 of the said plates.

As already indicated, the passage-way formed within the trough 66 constitutes the path along which the type or matrices requiring distribution or assortment are moved to the inlet 16, and 71 (see Figs. X, XIII, and XIV) designates a matrix or type that is next to be conveyed to the mouth or inlet 16.

The forwardly and rearwardly extending slideway 72 for the carriage 69 is formed upon the stationary framework of the machine. The trough 66 and the shaft 63 are parallel, and the path of the carriage 69 is arranged at right angles to and between the said shaft and the said trough. The side walls of the carriage 69 constitute the slideways for the sliding plates 65.

Adjacent plates 65 are separated by a relatively stationary plate 73, (see Fig. VII,) that is interposed between the said plates 65. A vertically-arranged bolt or screw 75 extends through the plates 65 and 73 and engages a correspondingly-threaded hole 76, formed in the bottom of the carriage 69. The plates 73 are provided, therefore, with registering holes that are engaged by a bolt or screw that secures the said plates to the carriage and renders the said plates movable with the carriage only. The screw 75 extends a suitable distance above the pile of alternately-arranged sliding plates and relatively stationary plates and has a head 77 at its upper end. A spiral spring 78 is mounted or confined upon the said screw between the latter's head and the top of the aforesaid pile of plates. The spring 78 is under sufficient tension to prevent looseness between the plates of the said pile of plates. The screw 75 extends easily through holes 79, formed in the sliding plates 65; but the said holes 79 are elongated longitudinally of the plates to render the latter shiftable endwise independently of the carriage containing them. The slideways for the carriage 69 are cut away, as at 80, (see Fig. XII,) to accommodate the location and operation of the arms of the plates 65. The carriage 69 is provided with a roller 81, that engages a cam-forming groove 82, formed in the cam-wheel 83, that is operatively mounted upon the shaft 63. The arrangement of parts and the trend of the groove 82 are such that the carriage 69 and its contents are reciprocated between and at right angles to the shaft and the feed passage-way formed in the trough 66; but normally the slide-forming plates 65 when they are arranged in line are not moved during the reciprocation of the carriage into operative engagement with the aforesaid rack-bars; also, when the carriage 69 is in its extreme forward position the arms 68 of the slides 65 project into the discharging end of the trough 66. Obviously, therefore, when a matrix or type is in position within the discharging end of the trough 66 and is constructed or shaped as required to render it capable of limiting the forward movement of the arm 68 of one or more of the slides 65 the slide or slides 65 that are thus obstructed by the type or matrix are displaced rearwardly out of line with the remaining slide-forming plates, and during the next rearward movement of the carriage 69 each displaced slide will be arranged as required to cause its other arm 67 to engage the back of the opposing rack and push the latter into operative engagement with the opposing pinion, whereupon the rack is elevated as required to effect the operation of the gate-bar arranged to be operated by the upright bar upon which the said rack is formed.

The construction or shape of each type or matrix to render the latter capable of actuating the rack-shifting slide or slides that must be operated by the said matrix or type immediately preparatory to the latter's descent into inlet 16 comprises as many recesses 85, (see Figs. XIII, XIV, and XVII,) formed in one of the side edges of the matrix or type, as there are rack-shifting slides that do not require operation by the said type or matrix preparatory to the latter's descent into the inlet 16, and hence the recesses formed in the said side edge of the matrix or type shall have such arrangement relative to the rack-shifting slide or slides that must not be actuated by the said type or matrix as will accommodate the entrance of the arms 68 of the said last-mentioned slides into the said recesses and avoid engagement of the said arms during the reciprocation of the slide-containing carriage 69 by the said type or matrix. The rack-shifting slide or slides that require to be operated by the matrix or type are when they are reciprocated forwardly, so as to cause their arms 68 to move in the direction of the path of the matrix or type, estopped, as already indicated, from moving into the said trough by the unrecessed portion of the recessed edge of the type or matrix, whose recesses permit the non-arrested slides to move forwardly without interruption, so that only the arrested rack-shifting slide or slides shall be rendered operative, as required, preparatory to the next rearward stroke of the slide-containing carriage. It follows then that normally the rack-shifting slides are arranged in line, and when in line and not acted upon by any type or matrix are reciprocated without effecting the operation of any pinion-engageable rack or racks.

The type or matrices that are to be distributed or assorted are fed with their recessed edges facing rearwardly longitudinally of the trough 66 in the direction of the mouth or inlet 16 of the system of distributing or assorting channels, and the end wall 86 at the discharging extremity of the trough is arranged as required to form a stop for the foremost matrix or type when the latter has come over the said inlet 16, and in the said position of the type or matrix the recesses in the rear edge thereof shall register with the slot 87 (see Fig. XII) formed in the rear side wall of the trough, and the distance that the said slot 87 extends leftward from within the end wall 86 of the trough 66 is not greater than

the thickness of the thinnest type or matrix, so that the arms 68 of the rack-shifting slides 65, that are arranged as required to render them capable of entering the said slot, shall not be operated upon by more than one matrix or type at a time. As soon as the matrix or type has operated upon the rack-shifting slide or slides requiring operation preparatory to the entry of the type or matrix into the inlet 16 of the system of distributing or assorting channels the matrix or type is discharged from the trough 66 into the said inlet and immediately after the shifted rack-bar or rack-bars have been held in their shifted position by the displaced rack-shifting slide or slides, the length of time required to permit the said type or matrix to pass through the channel or channels controlled by a gate or gates operated by the said rack-bar or rack-bars the disengagement of the said rack-bar or rack-bars from the engaging pinion or pinions is effected. The means for thus disengaging a pinion-engaging rack-bar from the coöperating pinion consists, preferably, of an incline 58, (see Figs. II and V,) formed upon the said rack-bar below the rack and having the trend and arrangement required to render it capable of engaging the central annular smooth peripheral surface 70 of the pinion upon the upward movement of the rack and disengage the rack from the pinion, and thereby shift the rack-engaging slide into the latter's normal position within the slide-containing carriage, and the arrangement of the parts is such that the rack and the engaging slide shall be returned to their normal position immediately after but not before the type or matrix that was instrumental in the operation of the said rack has passed the gate that was operated by the said rack. To positively insure the return of the shifted rack-shifting slide or slides into their normal position within the slide-containing carriage preparatory to the operation of any rack-shifting slide or slides by the next succeeding type or matrix, I provide a slide 90, (see Figs. XII, XIII, and XIV,) arranged rearwardly of the arms 68 of all of the rack-shifting slides forward of the cam-wheel 83 and engaging a forwardly and rearwardly extending slideway that is formed at the rear side of the trough 66. The said slide 90 does not interfere with the reciprocation of the carriage 69 and the latter's contents nor with the operation of any rack-shifting slide or slides by a type or matrix, but moves with the arms 68 of the said slides during their rearward movement. The slide 90 is provided upon its rear side with an antifriction-roller 92, that is arranged to be engaged by a cam 93, formed upon the periphery of the cam-wheel, and the arrangement of parts is such that after the required operation of any rack-shifting slide or slides and before any rack-shifting slide or slides shall have entered the trough 66 during the next succeeding forward movement of the carriage 69 the said cam 93 shall have engaged the roller 92 and actuated the slide 90, as required to cause the slides 65 to be realined—that is, to return all of the displaced rack-shifting slides into their normal position within the carriage 69.

The bottom of the trough 66 comprises a slide 94, that extends longitudinally of the trough and the correspondingly-arranged slideway 95 for the slide 94. The slideway-forming portion of the said bottom does not extend over the inlet 16 of the system of distributing or assorting channels, but the slide 94 in its normal position is slid endwise far enough in the direction of the discharging end of the trough to cause the said slide to obstruct communication between the trough and the said inlet. The discharging end of the trough 66 is arranged directly over the inlet 16. Mechanism for actuating the slide 94 outwardly in the direction of the receiving end of the trough, and thereby establish such communication between the trough's discharging end and the aforesaid inlet 16 as will permit only the foremost matrix or type that is in position within the discharging end of the trough and over the inlet 16 to drop by gravity into the said inlet, is provided. A suitably-applied spring 96 (see Figs. XV and XVI) acts to retain the slide 94 in its trough-outlet-closing position. The mechanism preferably employed for operating the bottom-forming slide 94 comprises the following: The cam-wheel 83 is provided at its left-hand side with a cam-forming groove 97, (see Fig. VIII,) that is engaged by a roller *a*, borne by the rear end of a forwardly and rearwardly extending vertically-tilting lever *b*, that is fulcrumed at or near its central portion, as at *c*, to a member 98 of the stationary framework of the machine, and has its forward end operatively connected by means of an upright link *d* with a vertically-reciprocating slide *e*, that engages a correspondingly-arranged slideway formed at the discharging end of the trough 66 upon an upright or standard 99, rigid with the stationary framework of the machine. The slide *e* is provided upon its left-hand side with a short forwardly and rearwardly extending oscillating shaft *g*, that has a depending arm *h*, (see Figs. VII and X,) normally contiguous to the slideway-forming side of the standard or upright 99, so that the shaft *g* can only oscillate in the direction required to move the arm *h* away from the said side of the said upright or standard. The shaft *g*, at the forward side of the slide *e*, is provided with a depending pawl *k*, (see Figs. VIII, XV, and XVI,) that at or near its lower end is operatively connected by means of a link *l* with an upright arm *m*, with which the trough's bottom-forming slide is provided. The link *l* extends from the pawl in the direction of the receiving end of the trough 66 and has its outer end engaging the arm *m*, that extends from the under side of the said slide forwardly to the forward side of the trough, and thence upwardly across the for-

ward side of the trough to the aforesaid link. The spring 96 is a coil-spring and extends longitudinally of the under side of the slide 94 and has one end thereof attached to the stationary framework of the machine at any suitable point between the slide's arm *m* and the trough's discharging end and has its other end attached to the said arm. The arrangement of parts is such that when the trough-bottom-forming slide is in its trough-closing position the pawl *k* (see Fig. XV) is disengaged from and a suitable distance above the upwardly-facing notched surface *n'* of a vertically-tilting arm *n*, that is pivoted horizontally at one end, as at n^2, to the stationary framework of the machine at the right-hand side of and a suitable distance from the shaft-carrying slide *e*. The notched arm *n* is arranged diagonally of the forward side of the trough 66 and in its normal position inclines upwardly and in the direction of the free end of the trough. The connection of the link *l* to the pawl in the elevated and normal position of the pawl is above the connection of the said link to the arm *m*, and consequently the bottom-forming slide will partially open the outlet of the trough during the descent of the pawl-bearing slide *e*. The opening of the said outlet is completed after the engagement of the pawl with the notched arm *n*. Upon the said engagement of the arm *n* by the pawl *k* during the descent of the slide *e* the arm *n* is tilted downwardly, and the downwardly-tilting arm *n* as it approaches a horizontal position will tilt the pawl, and consequently actuate the trough-bottom-forming slide in the direction of the receiving end of the trough and result in establishing such communication between the trough and the inlet 16 of the system of distributing or assorting channels as will permit the gravitating into the said inlet of the foremost type or matrix within the discharging end of the trough. The notched arm *n* when actuated by the pawl *k* moves against the action of a suitably-applied spring *r*, that acts to retain the said arm in its normal position. The spring *r* is a coil-spring that is attached at one end to the notched arm at any suitable point between the free end and the axis of the arm and has its opposite end attached to the stationary framework of the machine.

The type or matrices will necessarily vary in thickness. To suit the thickness of the matrix or type that is next to be conveyed from the feed-trough to the system of distributing or assorting channels and at the same time to hold back the remaining type or matrices within the trough, the depending arm *h* of the shaft *g* has its lower end wedge-shaped, as at *i*, and adapted to coöperate (see Fig. X) with a wedge *w*, formed upon the matrix or type that is next to be discharged from the feed-trough into the inlet of the system of distributing or assorting channels. The wedge upon the type or matrix is formed by beveling the upper portion of the type or matrix, and the arrangement of the parts is such that the lower wedge-shaped end of the aforesaid shaft-arm during the descent of the shaft-bearing slide *e* will come into engagement with the beveled side of the type or matrix between the said matrix or type and the next succeeding type or matrix and hold back or detain the last-mentioned matrix or type not only until the type or matrix that is in position to be discharged from the trough has dropped into the inlet of the system of distributing or assorting channels, but until the rack-shifting slide or slides that were not operated by the last-mentioned matrix or type have been withdrawn from the trough. The thickness of the matrix or type that operates the shaft-arm *h* regulates the extent to which the trough-bottom-forming slide is shifted in establishing such communication between the trough and the inlet of the distributing or assorting channels as is required to permit the said type or matrix only to drop from the trough. Of course the arrangement of parts is such also that the shaft-arm *h* shall have passed during the descent of the slide *e* between the matrix or type that is in position to be discharged from the trough and the next succeeding type or matrix before the pawl *k* has operatively engaged the notched arm *n*.

What I claim is—

1. The combination, with the distributer or assorter comprising upright channels and a mouth or inlet connected with the said channels, a feed passage-way leading to the said mouth or inlet, and reciprocating gate-carrying bars having their gates arranged to operate within different channels, respectively, of mechanism for operating the bars, means for rendering the said mechanism operative and comprising devices adapted to enter the aforesaid passage-way, means for actuating the said devices into the said passage-way, and the type or matrix adapted, when fed into position within the discharging end of the feed passage-way, to obstruct the movement of said devices into the feed passage-way, and the arrangement of parts being such that the said devices, when obstructed, as aforesaid, by the matrix or type, shall be actuated into relatively operative position.

2. The combination, with endwise-shiftable gate-carrying bars instrumental in the distribution or assortment of type or matrices, and means acting to retain the gate-bars in one of their two extreme positions, of upright bars provided with inclines arranged to engage and actuate the gate-bars into the other extreme position upon actuating the upright bars in one direction and provided with means for holding the gate-bars in their last-mentioned position until the upright bars are again rendered inoperative, means acting to retain the upright bars in their normal and inoperative position, mechanism for actuat-

ing the said upright bars in the direction required to effect the operation of the aforesaid gate-bars, and means for controlling the operativeness of the said bar-actuating mechanism, and means for rendering inoperative the means instrumental in rendering the aforesaid bar-actuating mechanism operative.

3. The combination, with endwise-shiftable gate-carrying bars instrumental in the distribution or assortment of type or matrices, and means acting to retain the gate-bars in one of their extreme positions, upright bars having inclines arranged to engage and actuate the gate-bars into their other extreme position upon shifting the upright bars upwardly and provided with perpendicular surfaces extending downwardly from the lower end of the inclines, means acting to retain the upright bars in their normal position, mechanism for operating the said upright bars, and normally inoperative, and means for rendering the bar-actuated mechanism operative.

4. The combination, with endwise-shiftable gate-carrying bars instrumental in the distribution or assortment of type or matrices, and means acting to retain the gate-bars in one of their extreme positions, of rack-bars instrumental in operating the gate-bars and normally inoperative; suitably-operated pinions arranged to be engaged by the racks; means acting to retain the rack-bars in their normal position, means for shifting the rack-bars laterally into engagement with the pinions, and means for disengaging the rack-bars from the pinions.

5. The combination, with endwise-shiftable gate-carrying bars instrumental in the distribution or assortment of type or matrices, of a suitably-operated pinion, another bar for operating the aforesaid gate-bars and provided with a rack adapted to engage but normally out of engagement with the pinion, means for shifting the rack-bar into operative engagement with the pinion, and means for disengaging the pinion from the rack and formed upon the rack-bar.

6. The combination, with endwise-shiftable gate-carrying bars instrumental in the distribution or assortment of type or matrices, of a suitably-operated pinion, another bar for operating the aforesaid gate-bar and provided with a rack adapted to engage but normally out of engagement with the pinion, a smooth annular surface formed upon the pinion, an incline-forming shoulder formed upon the rack-bar and arranged as required to render it capable of engaging the aforesaid annular surface of the pinion next after the required operation of the rack and pinion and separate the rack from the pinion.

7. The combination, with endwise-shiftable gate-carrying bars instrumental in the distribution or assortment of type or matrices, of a suitably-operated pinion, a bar having a rack arranged to engage but normally disengaging the pinion, which rack-bar is instrumental in operating the aforesaid gate-bar and has its rack-forming portion somewhat flexible laterally, means for bending the rack-forming portion of the rack-bar into operative engagement with the pinion, and means for disengaging the rack from the pinion.

8. The combination, with the distributer or assorter comprising a system of upright channels, a mouth or inlet connected with the said channels, reciprocating gate-carrying bars having their gates arranged to operate within different channels, respectively, and a feed passage-way leading to the aforesaid mouth or inlet, of a suitably-operated pinion, a rack-bar instrumental in the operation of the aforesaid gate-bar and adapted to engage but normally out of engagement with the pinion, a shiftable device arranged to render it capable of moving the rack-bar into operative engagement with the pinion but normally inoperative relative to the rack-bar, and means for actuating the said rack-operating shiftable device in opposite directions and into the aforesaid feed passage-way in actuating it in the one direction, which rack-operating device is shiftable independently of the said means for actuating it and normally operates idly, and the arrangement of parts being such that the said rack-operating device, when its movement in the direction of the feed passage-way is arrested by a matrix or type within the said passage-way, is displaced independently of the means employed in actuating it and rendered operative relative to the rack-bar, and means for returning the rack-shiftable device into its normal position after the required operation of the rack.

9. The combination, with the distributer or assorter comprising a system of upright channels, a mouth or inlet connected with the said channels, reciprocating gate-carrying bars having their gates arranged to operate within different channels, respectively, and a feed passage-way leading to the aforesaid mouth or inlet, of a reciprocating carriage, slides carried by and movable longitudinally of the path of the carriage independently of the carriage and arranged to enter the aforesaid feed passage-way upon the actuation of the carriage into one of its extreme positions so that a matrix or type within the discharging end of the said passage-way shall be engaged by such slide or slides as are obstructed by the type or matrix during the said actuation of the carriage and thereby displace the arrested slide or slides out of line with the remaining slides, normally inoperative mechanism for operating the aforesaid gate-bars and rendered operative by the aforesaid displaced slides during the reciprocation of the carriage away from the type or matrix, means for operating the carriage, and means for returning the displaced slides into their normal position upon the operation of the gate-bar-operating mechanism.

10. The combination, with the gate-bars of

the distributer or assorter, and mechanism for each of the said bars for operating the respective bar, of a reciprocating carriage, means for operating the carriage, a series of slides within and movable with the carriage and having, respectively, a movement, independently of the carriage and arranged to operate the different bar-operating mechanisms, respectively, when displaced or moved in the direction and to the extent required independently of the carriage.

11. The combination, with the different gate-bar-operating mechanisms, and the trough or passage-way along which the type or matrices, requiring distribution or assortment, are fed, of reciprocating devices movable independently and arranged to operate the different bar-operating mechanisms, respectively, and adapted normally to move into the discharging end of the aforesaid passage-way, means for simultaneously reciprocating the said devices, and the matrix or type within the discharging end of the said passage-way, which type or matrix is provided with recesses to accommodate the location and operation of some of the aforesaid reciprocating devices, and has unrecessed portions thereof adapted to obstruct the remaining reciprocating devices and thereby render the latter operative.

12. The combination, with the gate-bar-operating mechanism of a distributer or assorter of the character indicated, and the trough or passage-way along which the type or matrices, requiring distribution or assortment, are fed, of a reciprocating carriage arranged adjacent to the discharging end of the trough, means for operating the carriage, a slide carried by the carriage but movable longitudinally and independently of the carriage, which slide has a member or portion thereof arranged to enter the discharging end of the aforesaid passage-way during the reciprocation of the carriage, and has another member or portion normally inoperative relative to the aforesaid gate-bar-operating mechanism but rendered operative upon having its first-mentioned member or portion obstructed in its movement in the direction of the aforesaid passage-way by a type or matrix within the discharging end of the said passage-way, and means for returning the said slide into its normal position after having been rendered operative by a matrix or type.

13. The combination, with the gate-bar-operating mechanism of a distributer or assorter of the character indicated, and a trough or passage-way along which the type or matrices are fed, of a suitably-operated reciprocating carriage arranged adjacent to the discharging end of the trough, a slide borne by the carriage and movable longitudinally and independently of the carriage, which slide, at one of its side edges, has an arm arranged to enter the discharging end of the aforesaid passage-way during the reciprocation of the carriage, and, at its opposite side edge, has an arm that is normally inoperative relative to the aforesaid gate-bar-operating mechanism but rendered operative upon having the first-mentioned slide-arm obstructed in its movement in the direction of the interior of the aforesaid passage-way by a type or matrix within the discharging end of the said passage-way, and means for returning the said slide into its normal position after having been rendered operative by a matrix or type.

14. The combination, with the gate-bar-operating mechanism of a distributer or assorter of the character indicated, and a trough having an outlet at one end thereof, of a suitably-operated reciprocating carriage arranged adjacent and at right angles, or approximately at right angles, to the discharging end of the trough, a slide carried by the carriage and movable longitudinally and independently of the trough, which slide has an arm arranged to enter the discharging end of the aforesaid trough during the reciprocation of the carriage, and is provided with another arm that is normally inoperative relative to the aforesaid gate-bar-operating mechanism but rendered operative upon having its first-mentioned arm obstructed in its movement by a type or matrix within the discharging end of the trough, and a suitably-operated device arranged to engage the slide's first-mentioned arm, after the slide has been rendered operative by a matrix or type, and actuate the slide into its normal position.

15. The combination, with the mouth or inlet of a distributer or assorter and the feed-trough arranged to discharge into the said inlet, of the matrix or type in position to be next discharged from the trough and having a wedge-shaped portion, a suitably-operated device arranged to enter between the wedge-shaped portion and the next succeeding matrix or type, and thereby separate the said type or matrices, a gate arranged to control communication between the trough's discharging end and the aforesaid inlet, and such an operative connection between the said gate and the aforesaid type-separating or matrix-separating device that, when the said separating device is actuated by the wedge-shaped portion of the first-mentioned matrix or type, the gate shall be actuated in the direction required to establish communication between the trough and the aforesaid mouth or inlet.

16. The combination, with the mouth or inlet of the distributer or assorter and the feed-trough arranged to discharge into the said inlet, of the matrix or type in position to be next discharged from the trough and having a wedge-shaped portion, a suitably-operated oscillating arm arranged as required to render it capable of entering between the wedge-shaped portion of the said type or matrix and the next succeeding matrix or type, a gate arranged to control communication between the trough's discharging end and the aforesaid inlet, a stop for limiting the oscillation of the aforesaid arm in the direction of the trough's discharging end, and such an operative con-

nection between the said arm and the aforesaid gate that, when the arm is actuated by the wedge-shaped portion of the first-mentioned matrix, the gate shall be actuated in the direction required to establish communication between the trough and the aforesaid mouth or inlet.

17. The combination, with the mouth or inlet of the distributer or assorter, and the feed-trough arranged to discharge into the said inlet, of the matrix or type in position to be next discharged from the trough, a suitably-operated endwise-movable oscillating arm having its free end wedge-shaped and arranged as required to render it capable of entering between the said type or matrix and the next succeeding matrix or type, a gate arranged to control communication between the trough's discharging end and the aforesaid inlet, a stop for limiting the oscillation of the aforesaid arm in the direction of the trough's discharging end, and such an operative connection between the said arm and the aforesaid gate that, when the arm is actuated by the first-mentioned matrix, the gate shall be actuated in the direction required to establish communication between the trough and the aforesaid mouth or inlet.

18. The combination, with the mouth or inlet of the distributer or assorter, and the feed-trough arranged to discharge into the said inlet, and a gate for controlling communication, at the bottom of the trough, between the discharging end of the trough and the aforesaid inlet, means acting to retain the gate closed, and mechanism for opening the aforesaid gate and comprising a suitably-operated vertically-reciprocating slide arranged above the trough, the slideway for the slide, an oscillating shaft supported from the slide and arranged horizontally and transversely of the slide and provided with a depending arm arranged to enter between the matrix or type, that is in position to be discharged from the trough, and the next succeeding type or matrix, a pawl depending from and fixed to the said shaft, the vertically-tilting notched arm having its notched surface arranged to be engaged by the pawl, means acting to retain the notched arm in its normal position, and the operative connection between the pawl and the aforesaid gate, all arranged and operating substantially as shown, for the purpose specified.

19. The combination of a matrix-feed channel, matrices provided with marginal recesses and having a path of movement in said channel, a series of yielding bars, means for reciprocating said bars longitudinally so as to cause their path to periodically intersect that of the recessed margins of said matrices, whereby one or more bars, according to the character and location of said recesses, may be displaced.

20. The combination of a matrix-feed channel, matrices provided with marginal recesses and having a path of movement in said channel, a series of yielding bars, means for reciprocating said bars longitudinally so as to cause their path to periodically intersect that of the recessed margins of the end matrix, whereby one or more bars may, according to the character and location of said recesses, be displaced, and means for ejecting such matrix during the time of non-intersection of said bars with said margin.

Signed by me at Cleveland, Ohio, this 16th day of December, 1899.

ARTHUR S. GILMAN.

Witnesses:
C. H. DORER,
A. H. PARRATT.