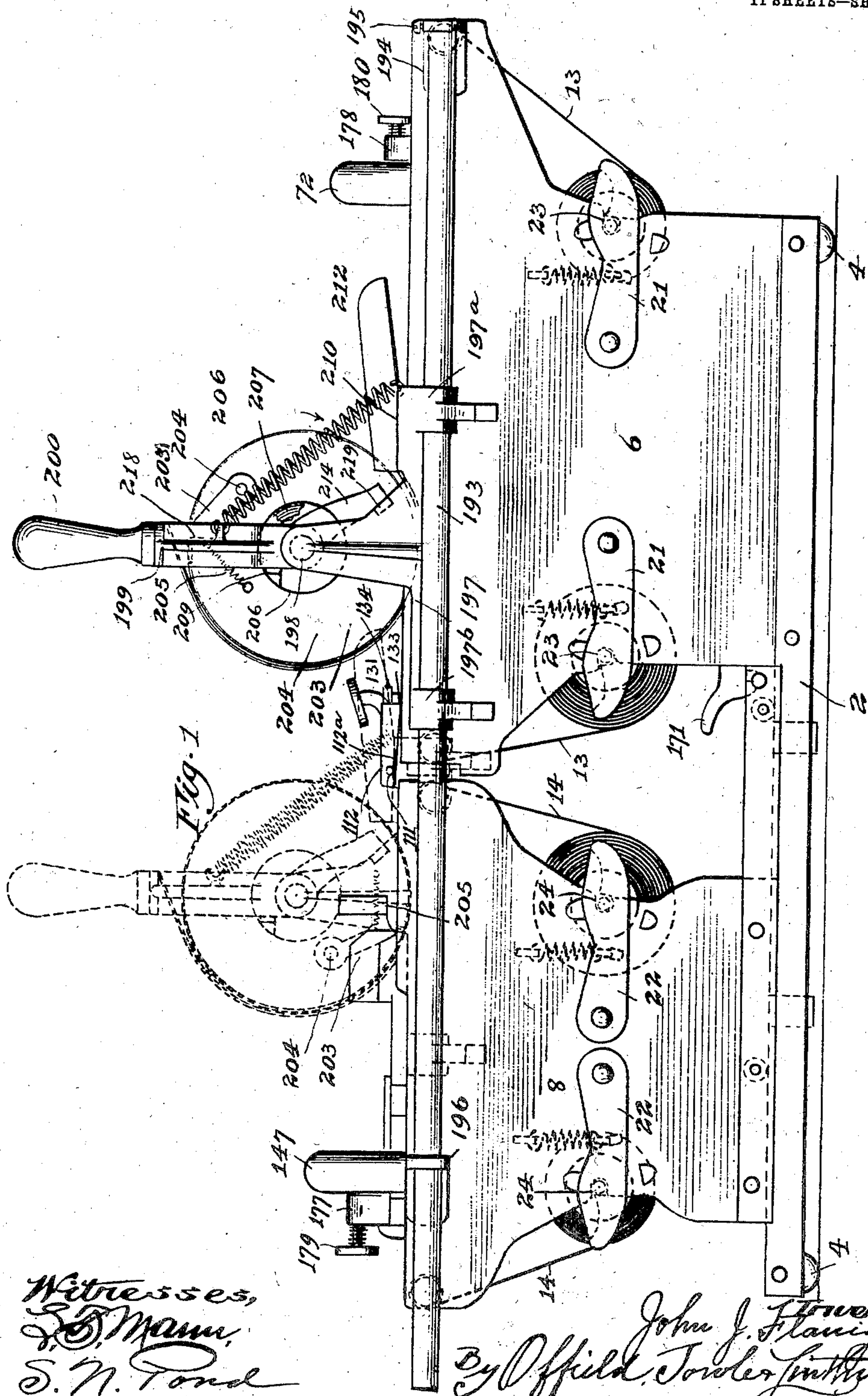


965,887.

J. J. FLANIGAN.
MULTIPLE COPYING MACHINE.
APPLICATION FILED DEC. 5, 1908.

Patented Aug. 2, 1910.
11 SHEETS—SHEET 1.



Witnesses,
S. M. Mann,
S. N. Pond

Inventor,
John J. Flanigan
By Office J. Fowler & Co. Attys.

965,887.

J. J. FLANIGAN.
MULTIPLE COPYING MACHINE.
APPLICATION FILED DEC. 5, 1908.

Patented Aug. 2, 1910.

11 SHEETS—SHEET 2.

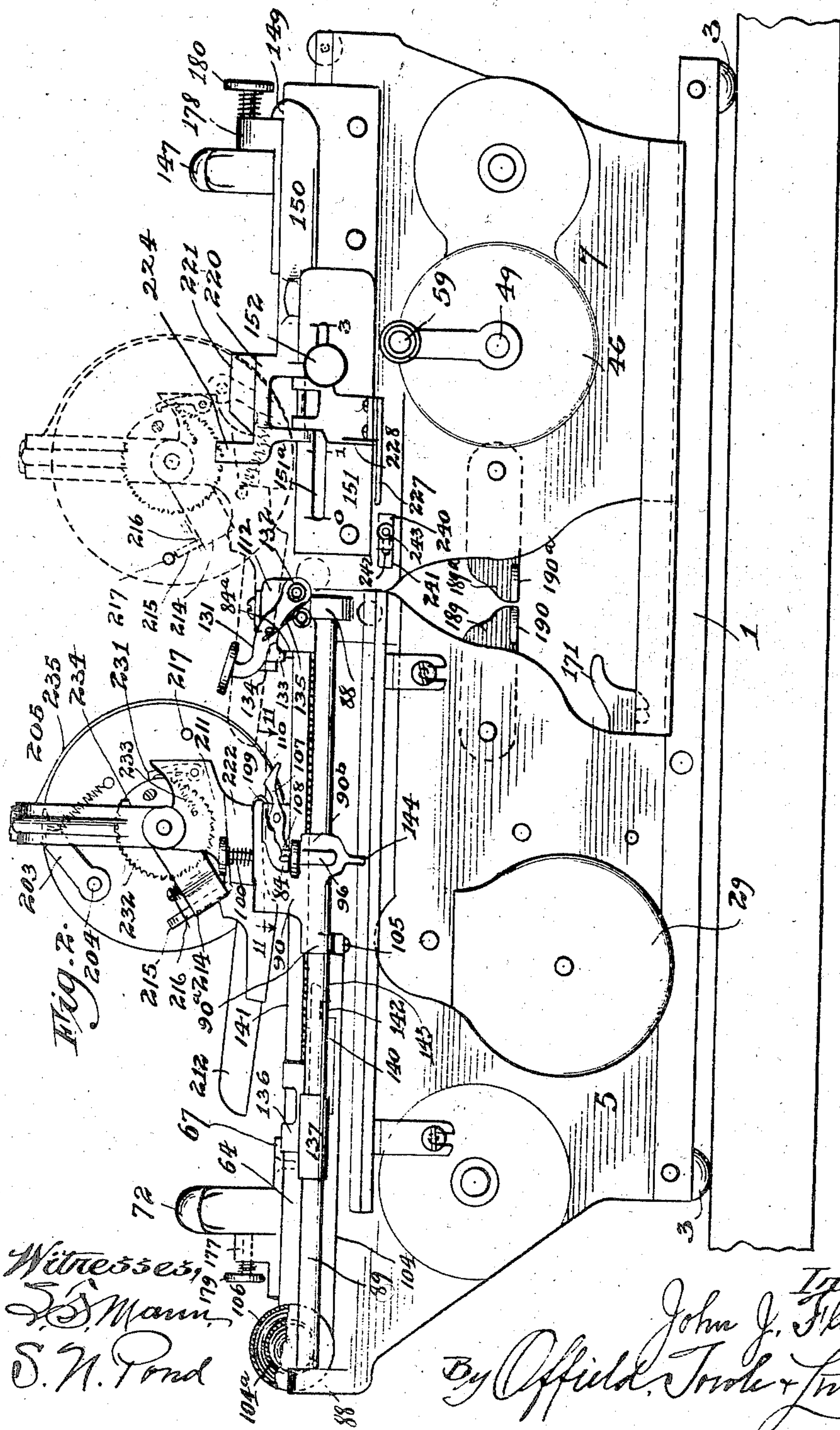


Fig. 2.

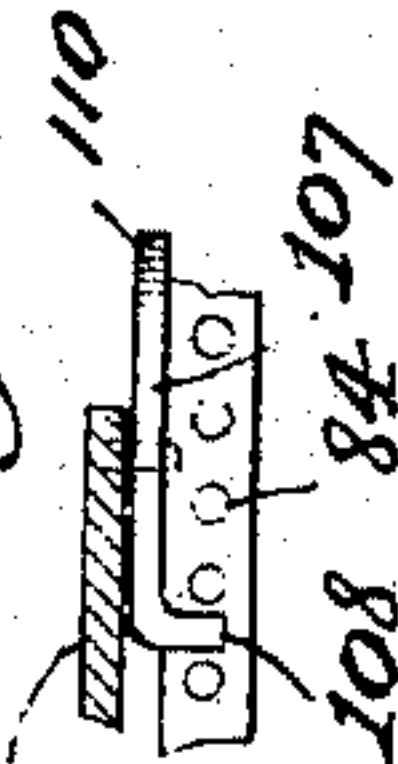


Fig. 11.

Witnesses,
S. J. Mann
S. N. Pond

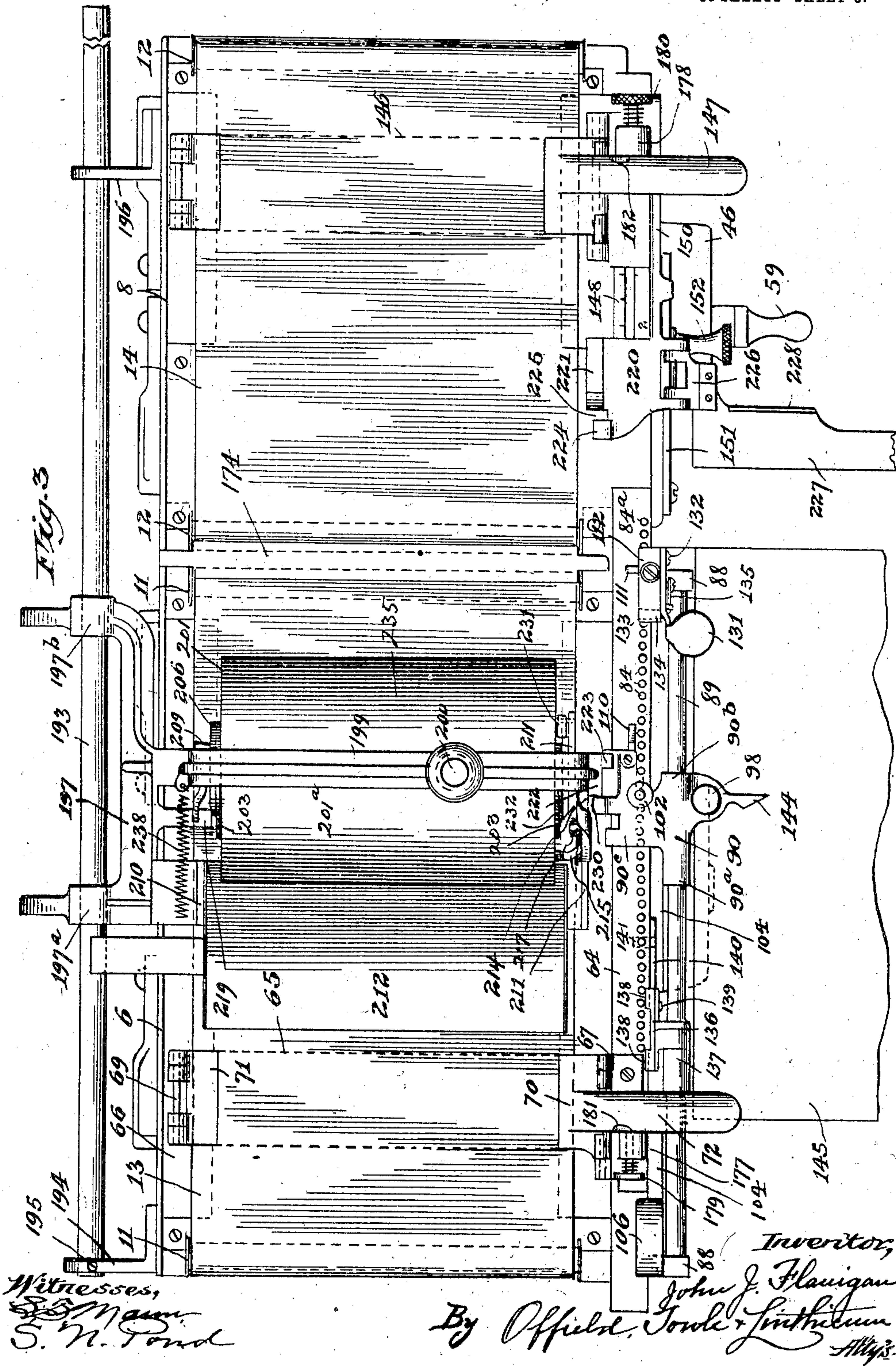
Inventor,
John J. Flanigan
By *Offield, Torle & Lintner*
Attys.

J. J. FLANIGAN.
 MULTIPLE COPYING MACHINE.
 APPLICATION FILED DEC. 5, 1908.

965,887.

Patented Aug. 2, 1910.

11 SHEETS—SHEET 3.



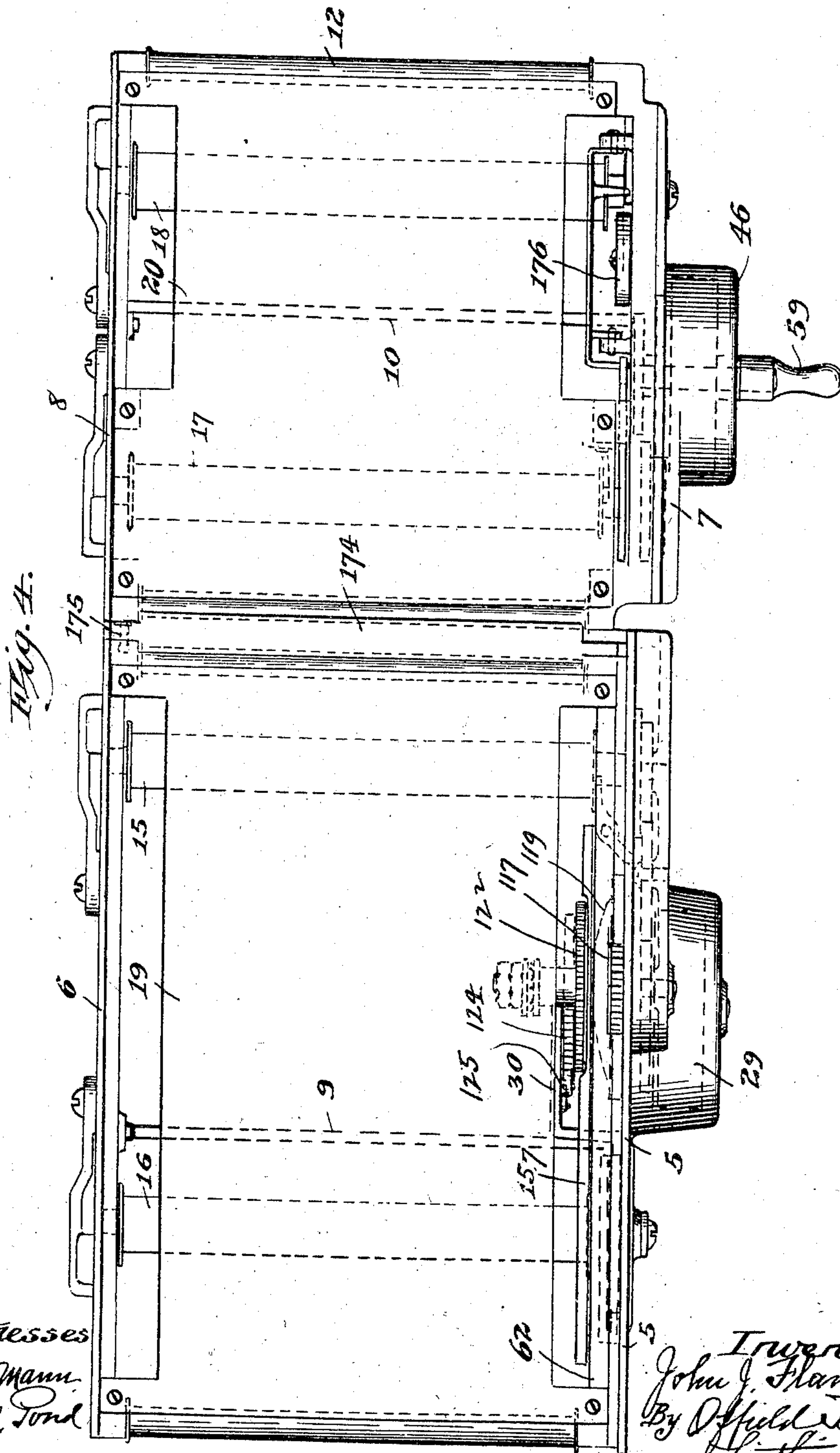
Witnesses,
 S. M. Ford
 S. N. Ford

Inventor,
 John J. Flanigan
 By Offield, Towle & Lathrop
 Attys.

965,887.

J. J. FLANIGAN.
MULTIPLE COPYING MACHINE.
APPLICATION FILED DEC. 5, 1908.

Patented Aug. 2, 1910.
11 SHEETS—SHEET 4.



Witnesses
F. J. Mann.
S. N. Pond

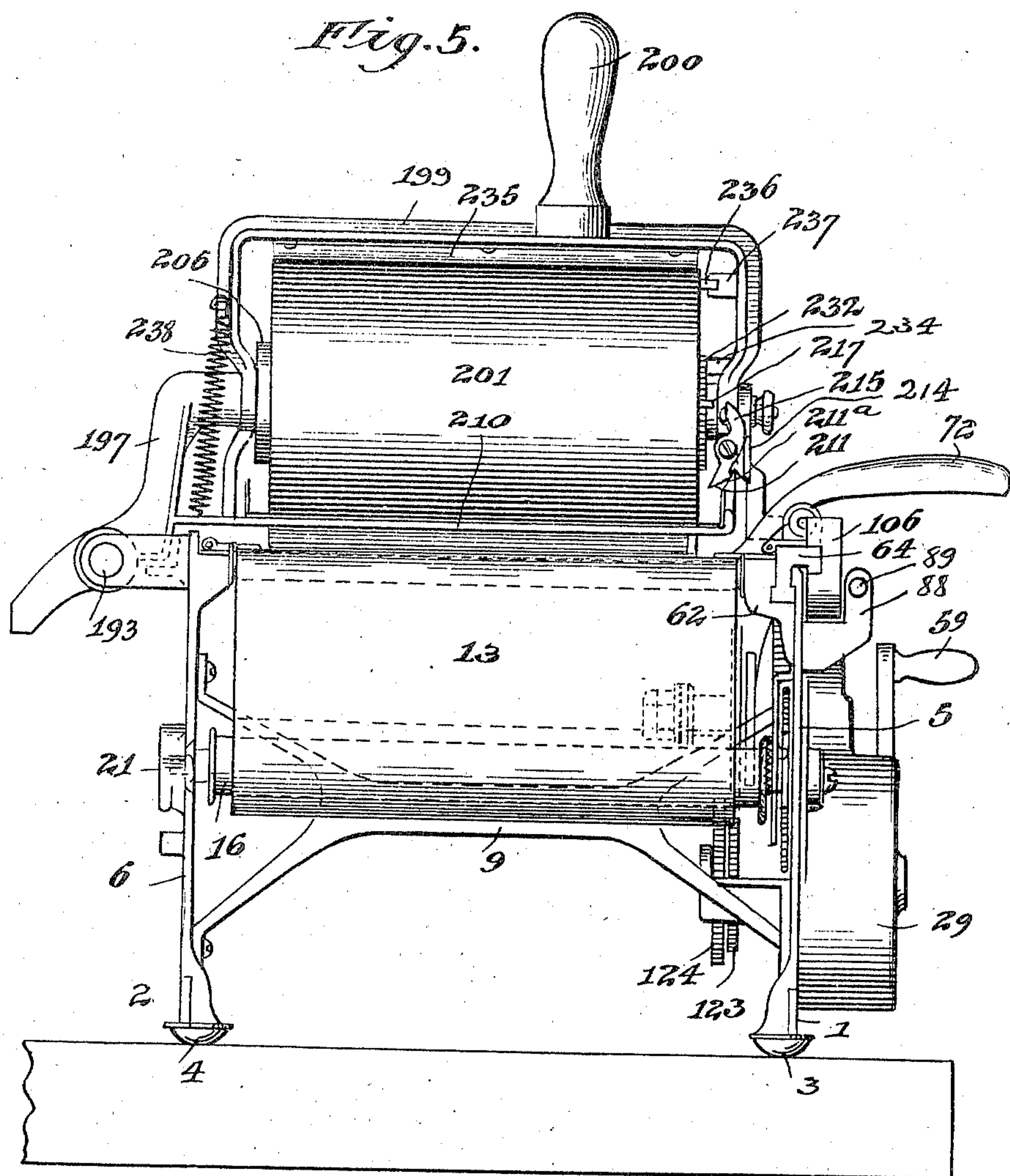
Inventor,
John J. Flanagan
By Osfield Towle
& Lindemann
Attys

965,887.

J. J. FLANIGAN.
MULTIPLE COPYING MACHINE.
APPLICATION FILED DEC. 5, 1908.

Patented Aug. 2, 1910.

11 SHEETS—SHEET 5.



Witnesses,
S. D. Mann,
S. H. Pond

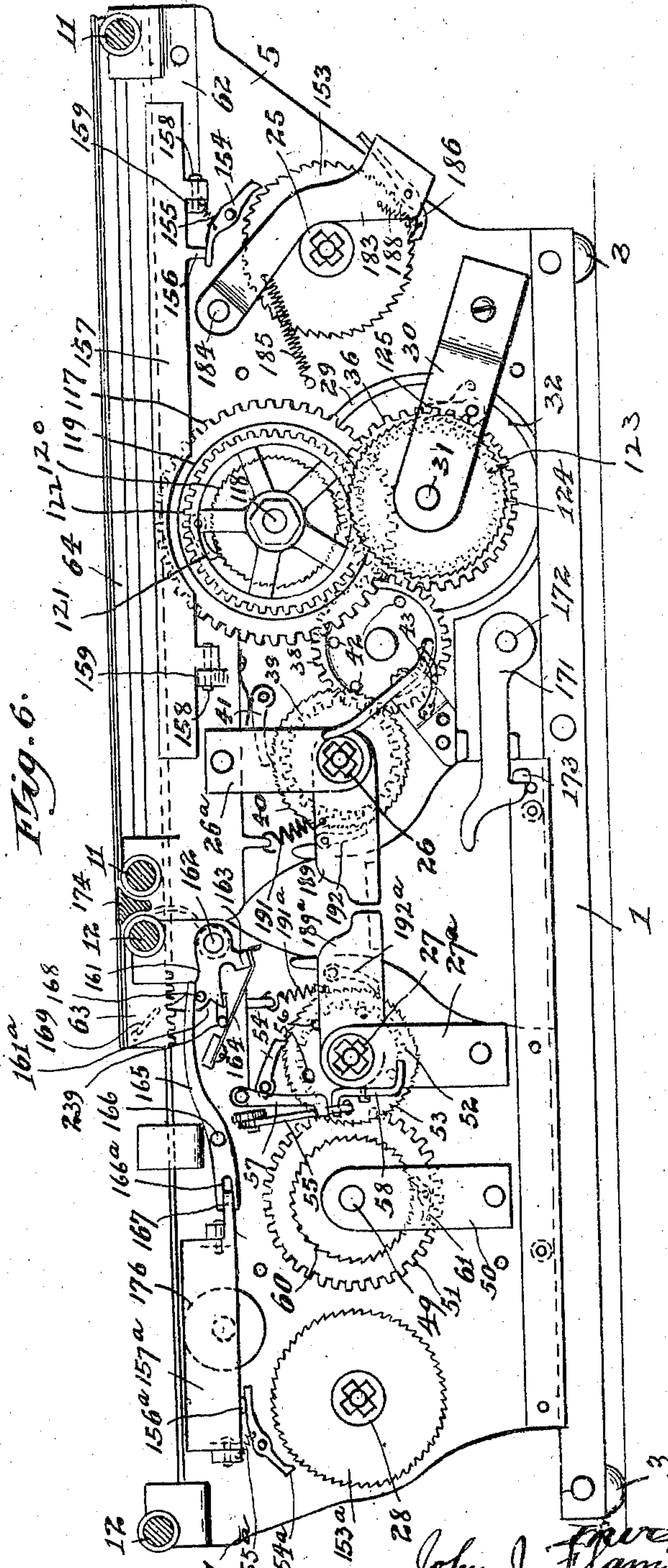
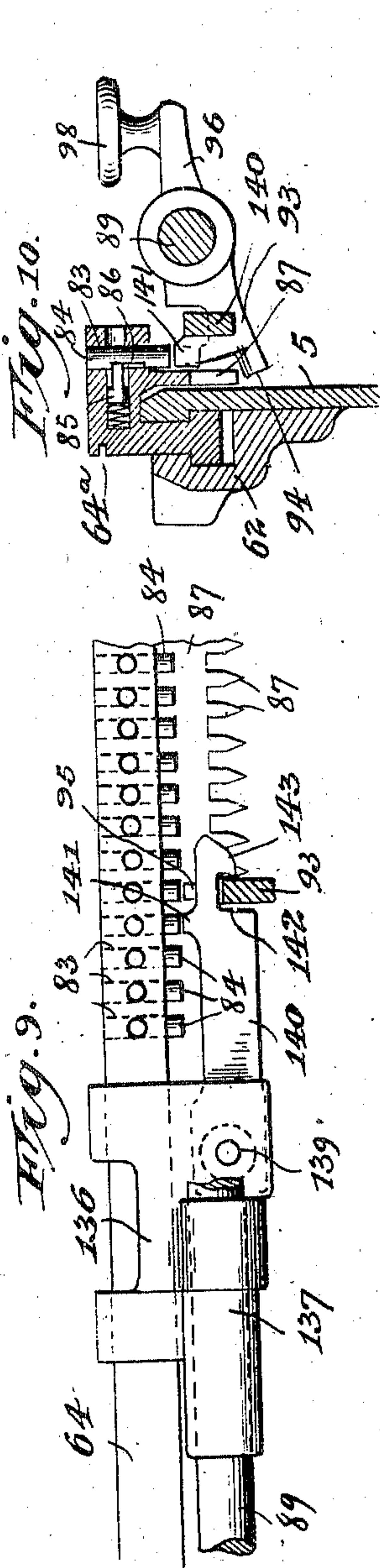
Inventor,
John J. Flanigan
By *Offield, Fowler & Lathrop*
Attys.

965,887.

J. J. FLANIGAN.
MULTIPLE COPYING MACHINE.
APPLICATION FILED DEC. 5, 1908.

Patented Aug. 2, 1910.

11 SHEETS—SHEET 6.



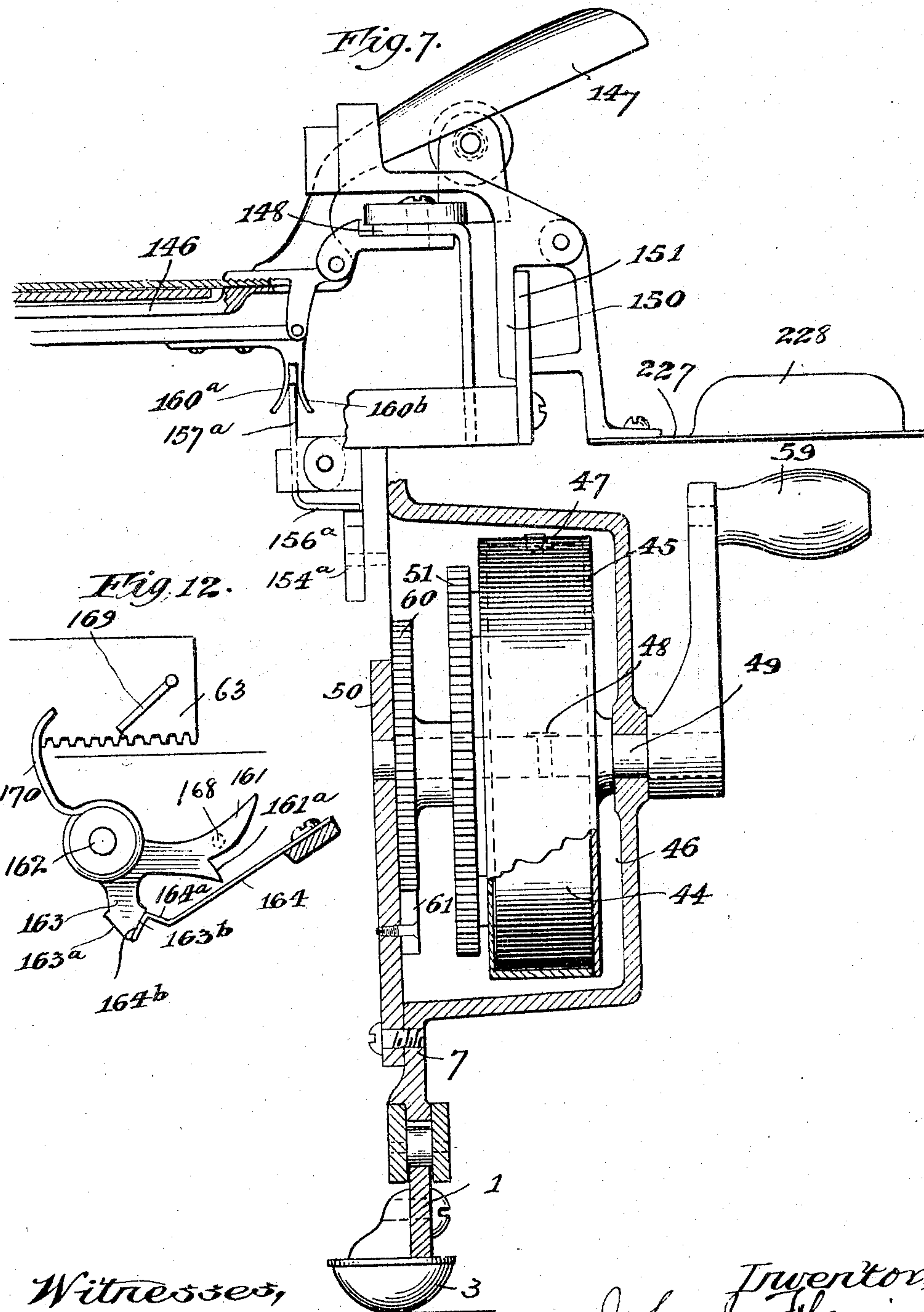
Witnesses,
S. J. Mann
S. N. Pond

John J. Flanigan
By Offield, Towle & Smith
Attys.

965,887.

J. J. FLANIGAN.
MULTIPLE COPYING MACHINE.
APPLICATION FILED DEC. 5, 1908.

Patented Aug. 2, 1910.
11 SHEETS—SHEET 7.



Witnesses,
J. S. Mann,
S. H. Pond

Inventor,
John J. Flanigan
By Alfred Fowler Litchman
Attys.

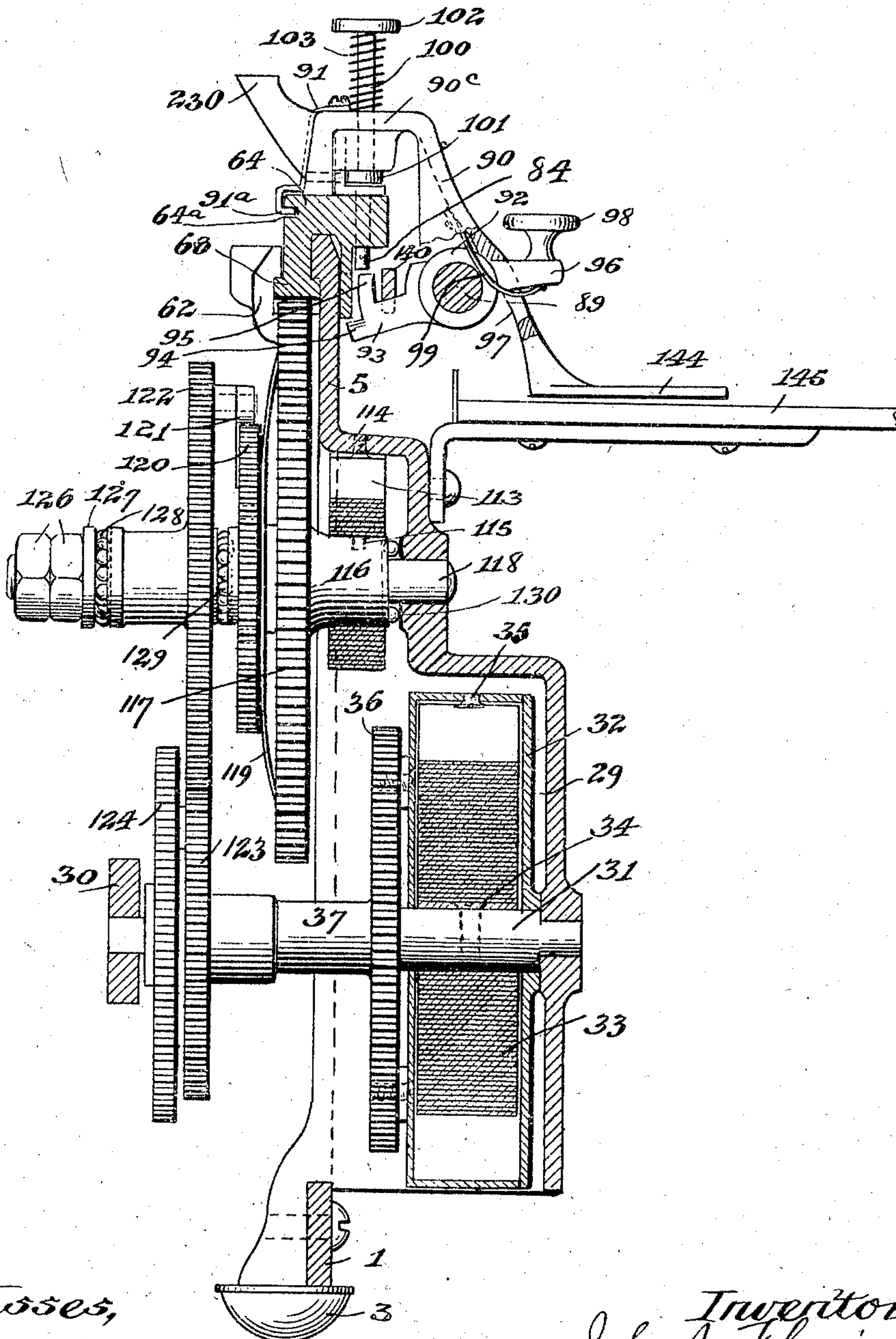
J. J. FLANIGAN.
 MULTIPLE COPYING MACHINE.
 APPLICATION FILED DEC. 5, 1908.

965,887.

Patented Aug. 2, 1910.

11 SHEETS—SHEET 8.

Fig. 8.



Witnesses,
 J. D. Mann
 S. N. Ford

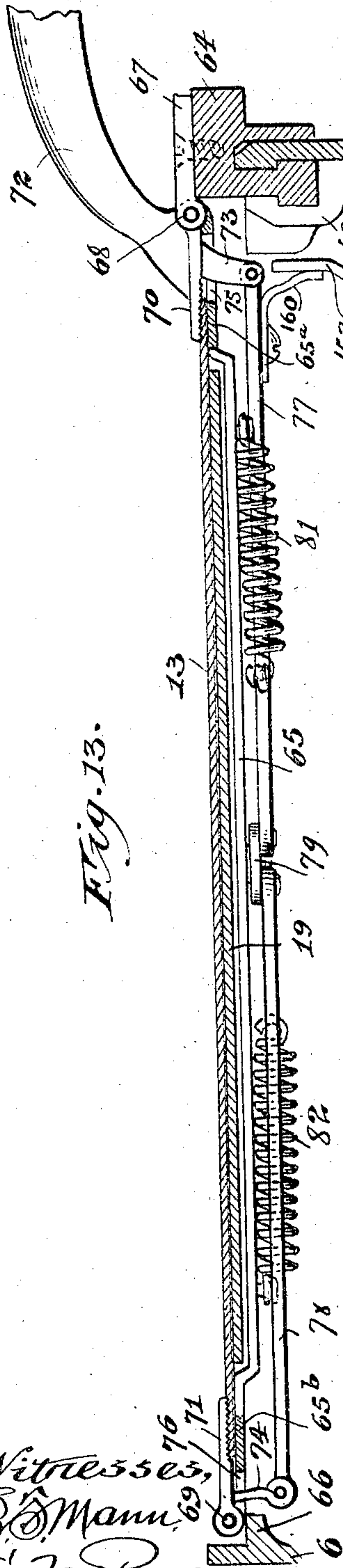
Inventor,
 John J. Flanigan
 By *Offield Fowler Lusk*

Patented Aug. 2, 1910.

11 SHEETS—SHEET 9.

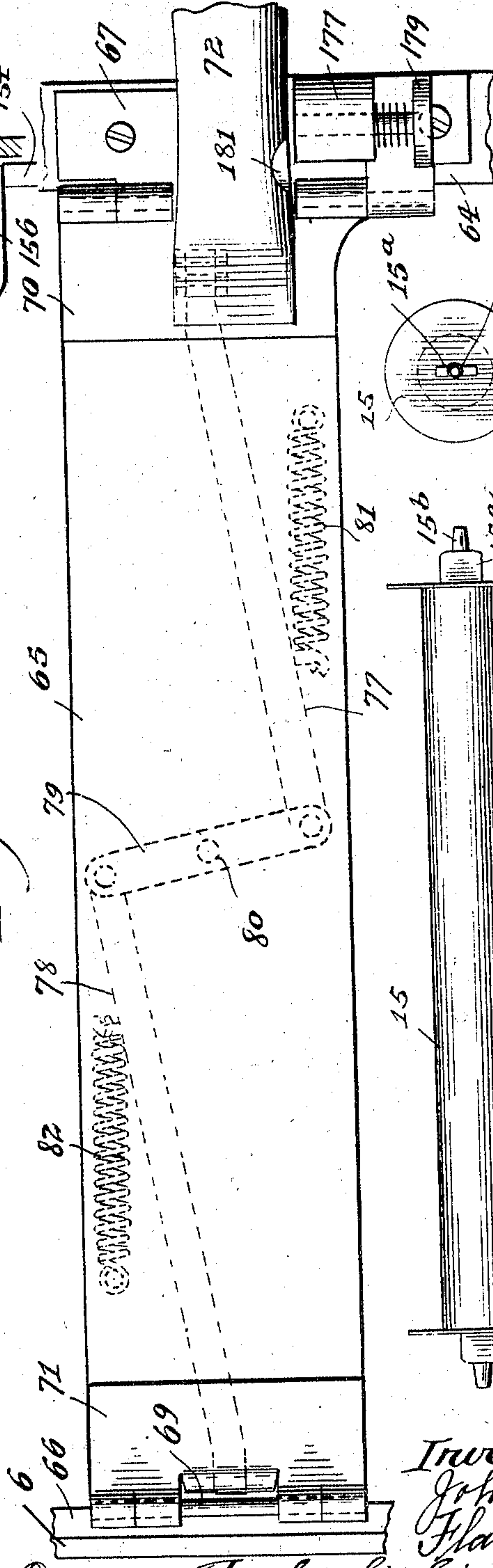
965,887.

Fig. 13.



Witnesses,
 S. Mann
 S. N. Pond

Fig. 14.



By Offield Towler Linthicum
 Attys.

Fig. 17.

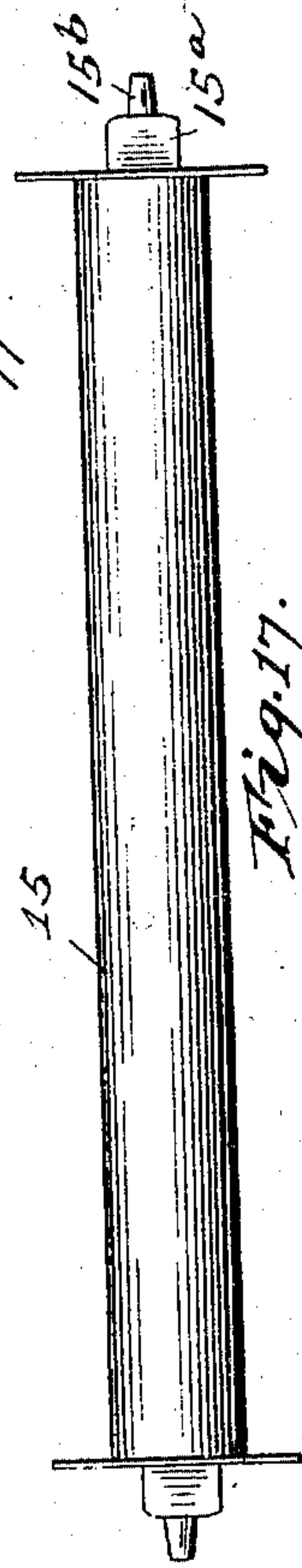
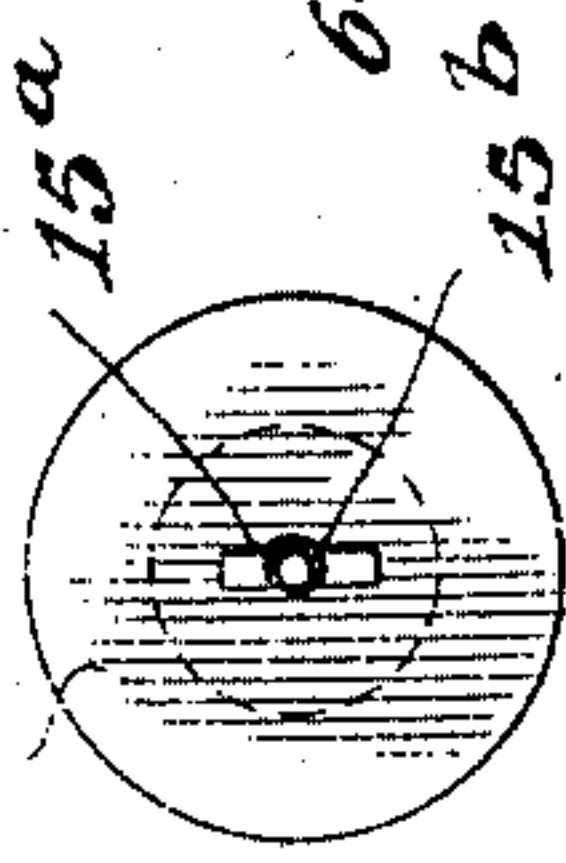


Fig. 18.



J. J. FLANIGAN.
 MULTIPLE COPYING MACHINE.
 APPLICATION FILED DEC. 5, 1908.

965,887.

Patented Aug. 2, 1910.

11 SHEETS—SHEET 10.

Fig. 15.

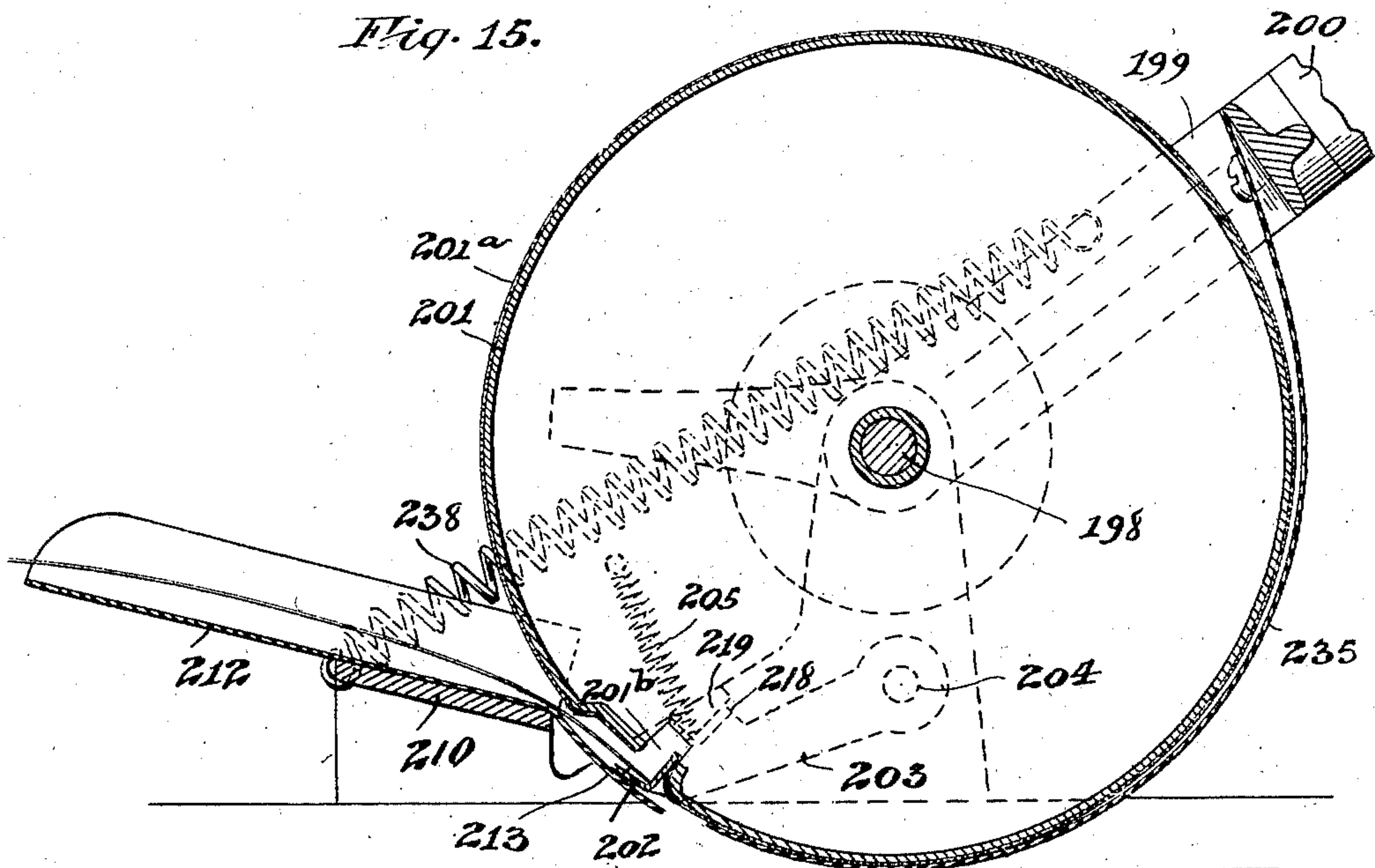
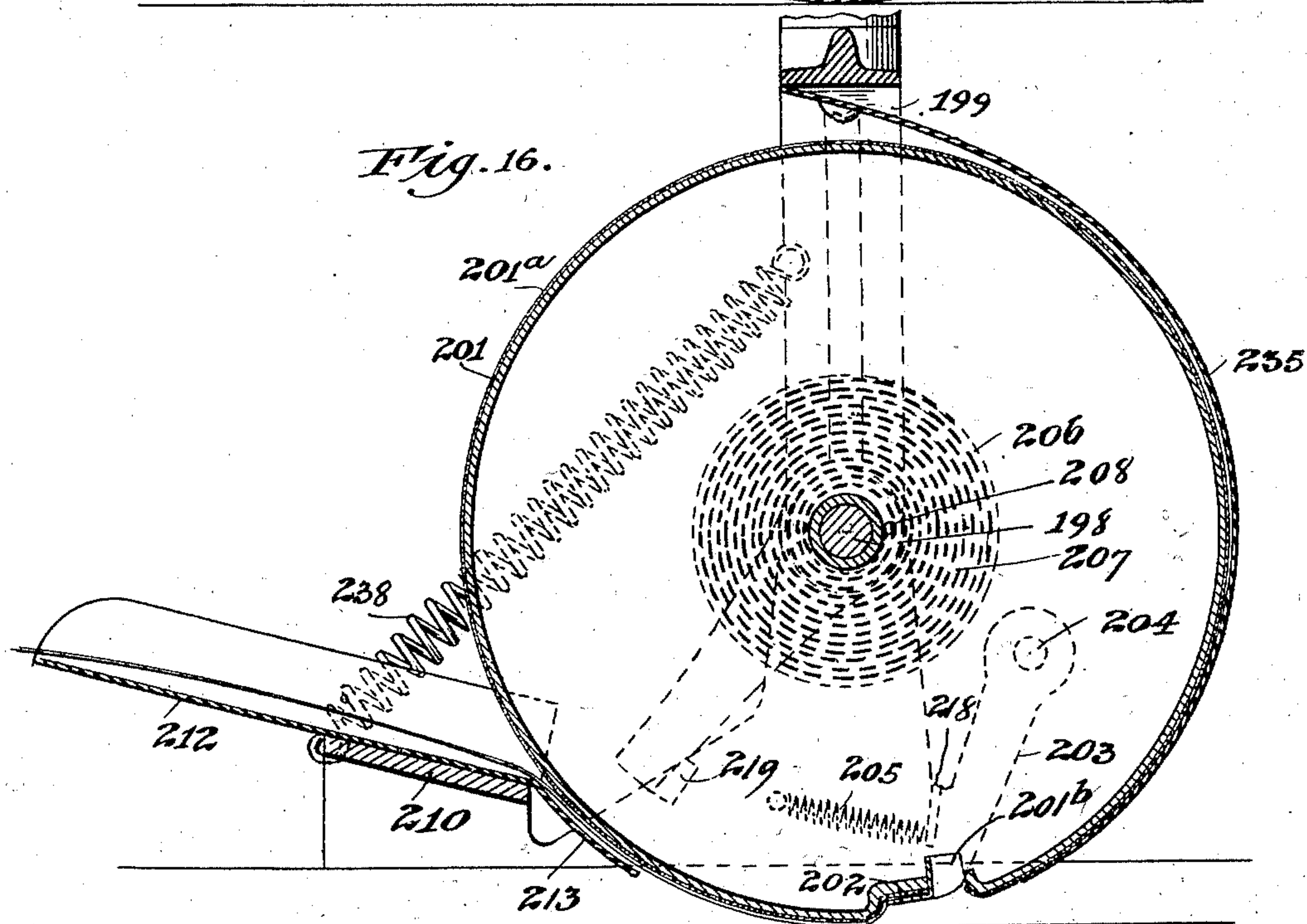


Fig. 16.



Witnesses,
 S. Mann
 S. N. Ford

By *John J. Flanigan* Inventor,
 Offield, Towle & Hutchinson
 Attys.

J. J. FLANIGAN.
MULTIPLE COPYING MACHINE.
APPLICATION FILED DEC. 5, 1902.

965,887.

Patented Aug. 2, 1910.

11 SHEETS—SHEET 11.

Fig. 19.

SMITH & JONES				Name <u>H.L. Roberts</u> P.O. _____ R.F.D. _____ County _____ State _____			
DIV.	Cat No	Q	U				
K	824	1		childs Coat 5yrs	365		
	298	1		Pr shoes 6yrs	65		
	1201	1		Pr shoes SZ 09	85		
	25	1		Pr Leggings 6Ys	35		
	26	1		Pr Leggings 10Ys	35		
Y	888	1		Box Angora wool	100		
	450	1		Yd Ribbon Cord	14		
	209	2		Yds Flannel Red 30	60		
S	10	1		Pkg Safety Pins	08		
	30	1		Comb	10		
	450	1		Tape measure	17		
T	39	2		Pr Drawers	75	150	
	80	2		Vests SZ 30	75	150	
	62	1		Undervest SZ 30		35	
	75	2		Pr L Stockings	25	50	
	145	2		Ladies Vests	12	24	
W	903	1		Boys Cap SZ 6		25	
	887	1		Pr Knee Pants		45	

Fig. 20.

SMITH & JONES				Name <u>H.L. Roberts</u> P.O. _____ R.F.D. _____ County _____ State _____			
DIV.	Cat No	Q	U				
S	10	1		Pkg Safety Pins	08		
	30	1		Comb	10		
	450	1		Tape measure	17		

Witnesses,
S. J. Mann
S. N. Pond

Inventor,
John J. Flanigan
By Offield Torde & Luthman
Attys.

UNITED STATES PATENT OFFICE.

JOHN J. FLANIGAN, OF CHICAGO, ILLINOIS.

MULTIPLE COPYING-MACHINE.

965,887.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed December 5, 1908. Serial No. 466,152.

To all whom it may concern:

Be it known that I, JOHN J. FLANIGAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Multiple Copying-Machines, of which the following is a specification.

This invention relates to improvements in multiple copying machines, or hectographs, as they are sometimes called, and has for its principal object to provide a machine capable of effecting what I term "sectional copying" under a single common head or caption. In other words, the object sought is to produce a copying machine onto which a transfer may be made of the written or printed matter contained on one master sheet or document, which latter contains certain data at the top commonly known as the heading or caption, and which data is common to and required in connection with portions of sections of other matter on the same sheet, so as to produce therewith a complete record.

One of the leading uses for which my invention is designed is in connection with the clerical work of mail order and other large commercial houses. By the usual methods of commercial houses departmental orders are made for that portion of the goods contained in any order which must be furnished from each department; and it is therefore necessary to repeat the caption data or information on each several departmental order. These departmental orders are made from the original customer's order, and after the goods have been packed and shipped the departmental orders are returned to the billing department and invoices of the whole shipment made from the several departmental orders. On this invoice, of course, the heading or caption appears but once, and the items furnished by each department, together with expenses, etc., are taken from the completed departmental orders. The machine of the present invention is designed to receive an impression of the caption and several groups of departmental orders that may be compiled in an invoice at the first writing, and then produce departmental copies of the caption and of that group or section of the items which is to be furnished by each of the respective departments. The machine is also designed

to furnish as many copies as may be required of any and all portions or combinations of portions of the original document or master sheet for the numerous purposes to which such copies may be utilized to advantage.

The machine of my invention, while chiefly designed for the purpose above outlined, is capable of use generally wherever sectional copying under a single or common head or caption may be required as, for instance, in transferring day-book or journal entries to ledger accounts.

In its general features the machine comprises two longitudinally alined frame-sections, preferably made separable for convenience in applying and removing the duplicating bands, one of said sections carrying the duplicating band to receive the caption and the other carrying the duplicating band to receive the items or groups of items. Each section of the machine has mounted thereon a band-gripping device slidable in the direction of travel of the bands and clamping the opposite edges of the latter. The gripper that engages the caption band coöperates with a stop device on the frame which determines and limits the extent of travel of the said band according to the length of the individual caption to be impressed thereon. The gripper engaging the other duplicating band is rigid with a longitudinally slidable spring-actuated bar that carries a series of stop-pins coöperating with a fixed stop on the frame, and also with an indicator device which determines from the master sheet the several stop-pins that are to be used in the step-by-step advance of the duplicating band according to the length of the several items or groups of items on the master sheet, and also throws said pins into and out of operative position for coöperation with a fixed stop on the frame. The receiving rolls of the duplicating bands are preferably both under spring tension tending to wind them up, and suitable detent devices thrown into action upon the release of the clamps arrest the winding of the bands when the clamps are released and slipped back for a fresh hold on the bands.

In the accompanying drawings and the following detailed description thereof I have sought to disclose one practical mechanical form in which the principle of the invention may be embodied; but it will be understood that in many of the details of

construction the machine illustrated might be modified without involving any departure from its principle of operation or any variation from the substantial features of the invention.

Referring, then, to the drawings, Figure 1 is an elevational view of the machine from one side thereof. Fig. 2 is a similar elevational view from the opposite side thereof. Fig. 3 is a top plan view of the machine. Fig. 4 is a top plan view of the machine, omitting the duplicating bands and other details of the mechanism for the sake of clearness. Fig. 5 is an elevational view of one end of the machine. Fig. 6 is a longitudinal section, showing in elevation the inner side of one of the main side-frame members of the machine and the mechanism carried thereby. Fig. 7 is a fragmentary cross-sectional view, on an enlarged scale, through that section of the machine adapted to receive and transmit the impression of the heading or caption. Fig. 8 is a cross-sectional view similar to Fig. 7 through that section of the machine adapted to receive and transmit the impressions of the items or groups of items under the heading or caption. Fig. 9 is an enlarged broken detail, partly in section, of the automatic selective stop mechanism controlling the movement of the item-duplicating band. Fig. 10 is a cross-sectional detail through the last-mentioned mechanism. Fig. 11 is a detail horizontal section on the line 11-11 of Fig. 2, looking downwardly. Fig. 12 is a detail elevation of an interlocking device controlling the relative movements of the band-gripping devices. Figs. 13 and 14 are, respectively, a longitudinal section and top plan of one of the gripping devices of the duplicating bands. Figs. 15 and 16 are cross-sectional views of the platen cylinder and the mechanism carried thereby for clamping and releasing the sheet on or from which a copy is to be made. Fig. 17 is a side elevation of one of the spools of the duplicating band. Fig. 18 is an end elevation of the spool shown in Fig. 17. Fig. 19 is a plan view of a master-sheet, from which sectional copies are designed to be made by the machine, each having the same heading or caption. Fig. 20 is a similar view of one of such sectional copies.

Referring to the drawings for a detail description of the mechanism, 1 and 2 designate a pair of parallel horizontal bars supported at their ends on feet 3 and 4, respectively, and constituting the main rests or supports for the machine frame and parts carried thereby. To the bars 1 and 2 are rigidly secured at one end of the latter the main upright side-frame members 5 and 6 of that section of the machine designed to carry what I shall hereinafter term the "item" duplicating band; while the other

portions of the bars 1 and 2 constitute a track or slideway for the side-frame members 7 and 8 of the other section carrying what I shall hereinafter term the "caption" duplicating band. The side-frame members 5 and 6 are rigidly connected and spaced by a transverse brace 9 (Figs. 4 and 5), and a similar transverse brace 10 connects and spaces the side-frame members 7 and 8 of the other frame section. The side-frame members of the two sections are further connected and spaced at their inner and outer ends by rods 11 and 12 (Fig. 6) which are rotatably mounted in said frame-members and serve as guide rollers for the duplicating bands 13 and 14 (Fig. 3). The item-duplicating band 13 is wound on receiving and delivering spools 15 and 16, respectively (Fig. 4), and the caption-duplicating band 14 is similarly wound on receiving and delivery spools 17 and 18, respectively, the intermediate or flat working sections of the two bands being supported on horizontal beds 19 and 20 suitably secured to and between the side-frame members. The several spools 15, 16, 17 and 18 are all alike, and one of said spools is illustrated in detail in Figs. 17 and 18, from which it will be seen that the heads of the spools have formed thereon or otherwise rigid therewith a longitudinally projecting squared portion 15^a, and projecting longitudinally of the latter a cylindrical bearing spindle 15^b that is coaxial with the body of the spool, the two ends of the spool being duplicates. The several spools are removably journaled at one end by their spindles 15^b in pivoted spring-actuated arms 21 and 22 (Fig. 1) mounted on the outer sides of the side-frame members 6 and 8, respectively, each of said arms having formed therein a half-journal cooperating with semi-circular notches 23 and 24 formed in the edges of the side-frames, which permit the insertion and removal of the spindles of the spools when the arms 21 and 22 are depressed, and confine them when in place. At their opposite ends the squared portions 15^a of the spools are received in the correspondingly shaped sockets of chucks 25, 26, 27 and 28 carried by rotary parts journaled in the side-frames 5 and 7, more particularly hereinafter described, and through which the rotating movements of the spools are effected or controlled. This duplicate construction of the several spools renders them bodily interchangeable relatively to their bearings; while the duplicate squared and rounded construction at the ends of each spool renders the latter interchangeable end for end, so that either end may engage the journal bearing and the other the chuck. This is important, since, when either duplicating band has been wholly wound up on the receiving spool, the two spools of that band may be withdrawn

and reversed as to their respective bearings, the delivery spool then becoming the receiving spool, and vice versa.

The receiving spool 15 of the item-duplicating band is normally maintained under winding tension by the following mechanism. Referring more particularly to Figs. 6 and 8, 29 designates a lateral pocket formed in the side-frame member 5, in the outer wall of which and in a bracket 30 secured to and extending inwardly of said wall is journaled a shaft 31. Loosely mounted on shaft 31 within the pocket 29 is a circular spring case 32 containing a helical spring 33, the inner end of which is secured at 34 to the shaft 31, while its outer end is secured at 35 to the rim of the case 32. Secured to one face of the case 32 is a spur gear 36, the hub 37 of which is loose on the shaft 31. Gear 36 meshes with and drives an idler gear 38 journaled in the side-frame member 5, and said gear 38 in turn meshes with and drives a gear 39 that is rigid with the spool chuck 26, this latter being journaled in a depending hanger 26^a secured to the side-frame member 5, and further being provided with a ratchet disk 40 engaged by a spring-pressed dog 41 which prevents back turning of the chuck and spool. The idler gear 38 is provided with a series of holes 42 adapted to be engaged by a pivoted spring-pressed locking dog 43, the tail of which lies adjacent to and slightly inwardly of the chuck 26, so that, when the spool is inserted in the chuck the dog 43 is retracted and the spring power is transmitted to the chuck, while, when the spool is withdrawn the dog 43 instantly snaps into one of the holes 42 and thus locks the spring against unwinding.

The receiving spool 17 of the caption duplicating band is normally maintained under winding tension through the chuck 27 by means of a helical spring 44 (Fig. 7), which latter is contained in a circular case 45 located within a lateral pocket 46 in the side-frame member 7. The outer end of said spring is secured at 47 to the rim of the case 45 and its inner end is secured at 48 to a shaft 49 journaled at one end in the wall of the pocket 46 and at its opposite end in an upstanding bracket 50 secured to the side-frame member 7. The spring case 45 is loose on the shaft 49, and secured to one face thereof and also loose on the shaft 49 is a spur gear 51 which meshes with and drives a spur gear 52 (Fig. 6) rigid with the chuck 27, which latter is rotatably mounted in an upstanding bracket 27^a secured to the side-frame member 7, and is also provided with a ratchet disk 53 engaged by a spring-pressed dog 54 for preventing back turning of the chuck. The chuck 27 is automatically locked against turning under the impulse of the spring 44 when the spool is not in place by means of a pivoted dog 55, the inwardly

bent nose of which is adapted to engage one of a series of holes 56 formed in the ratchet disk 53, the dog 55 being normally pressed into such engagement by a leaf spring 57. The dog is automatically retracted upon the insertion of the spindle of the spool in the chuck 27 by means of a bent lever 58 pivoted between its ends to the bracket 27^a, its upper end underlying the dog 55 and its opposite end extending into the vicinity of and slightly in front of the chuck 27 so that, upon the insertion of the spindle in the chuck, the head of the spool strikes said lever and retracts the dog 55, thus leaving the spring 44 free to exert its winding tension upon the chuck 27. The spring 44 is wound up from time to time by a handle 59 fast on the shaft 48; while back turning of the shaft 49 under the expansive effect of the spring is checked by a ratchet disk 60 fast on shaft 49 and engaged by a spring-pressed dog 61.

The tensioning spring 33 of the receiving spool 15 of the item-duplicating band is wound up by the manual retraction of the gripper and automatic travel-limiting devices of the item-duplicating band when said gripper is moved backwardly relatively to the band for a new engagement with the latter. These last-mentioned features will next be described, and the friction drive therefrom to the shaft 31 on which the spring 33 is wound will then be set forth.

Referring more particularly to Figs. 4, 5, 6 and 8, 62 designates a guide-strip secured to the inner face of the side-frame member 5 along its upper edge, between which strip and the opposed inner wall of the frame-member 5 is formed an undercut guide channel for the depending integral rack-bar 63 of the gripper-carrying bar 64, this latter resting slidably upon the upper edge of the side-frame member 5 and adapted, in its forward movement, to override the upper edge of the longitudinally aligned side-frame member 7 of the other section of the machine, as shown in Fig. 6. The bar 64 performs several functions, chief of which are to carry the gripper or clamping device of the item-duplicating band and to furnish a support or carrier for a row of stop pins to assist in the measurement of the successive movements of the item-duplicating band and in the automatic arrest of the latter at the termination of each movement.

Referring first to the gripper, the construction and operation of which is most clearly shown in Figs. 3, 13 and 14, 65 designates a metal strip extending between the opposite side-frame members, the main intermediate portion of said strip lying beneath the bed 19, and the upwardly offset end portions 65^a and 65^b (Fig. 13) lying substantially flush with and opposite the longitudinal edges of the bed 19. The end 65^b slidably rests upon an inwardly ex-

tending ledge or shoulder 66 of the side-frame member 6, while the opposite end 65^a has integral therewith or secured thereto an extension 67 overlying and rigidly secured to the top of the bar 64. The upwardly offset end portions 65^a and 65^b of the strip 65 constitute stationary clamp-members for engaging the longitudinal edges of the item-duplicating band 13, as shown in Fig. 12, and pivoted to the ends of the stationary clamp-members 65^a and 65^b on hinge pintles 68 and 69 are movable clamp-jaws 70 and 71, respectively. Rigid with the clamp-jaw 70 is an operating handle 72. The two movable jaws are connected so as to be opened in unison by the depression of the handle 72 through the agency of depending lugs 73 and 74 on the under sides of the clamp-jaws 70 and 71 and projecting through slots 75 and 76 in the stationary clamp-jaws, and links 77 and 78 pivoted to said lugs 73 and 74 and to the opposite ends of an intermediate lever 79, which latter is centrally pivoted at 80 to the under side of the strip 65. Tension springs 81 and 82 connected to the links 77 and 78, respectively, and at their other ends anchored to the under side of the strip 65 normally operate in opposition to the depression of the handle 72 and maintain the movable jaws 70 and 71 closed on the edges of the band. The outer edge of the bar 64 is, throughout the greater portion of its length, provided with a series of closely disposed vertical holes 83 extending therethrough, best shown in the detail views Figs. 9 and 10, in each of which holes is slidably mounted a pin 84 of a length somewhat exceeding the length of the hole, and each of said pins is given a limited vertical sliding capacity so as to project either above or below the bar 64 by means of a spring-pressed key 85 slidably mounted in a horizontal socket in the bar 64 and engaging a groove 86 in the pin 84. The key 85 serves to both limit the extent of movement of the pin 84 and to hold it frictionally in position when raised. Depending from the bar 64 just inwardly of the row of holes 83 and just outside the upper edge of the frame-member 5 is a comb-shaped member 87, the teeth of which constitute guides for a pin-raising device next to be described.

Mounted in brackets 88 (Figs. 2 and 3) on the side-frame member 5 alongside the bar 64 is a rod 89 that constitutes a support for a carrier 90 that is slidably mounted thereon. This carrier, as best shown in Figs. 2, 3 and 8, is a substantially hollow casting having sliding bearings at 90^a and 90^b on the rod 89, and an upper portion 90^c overlying the bar 64, the inner depending side of which rests slidably upon said bar and has secured thereto a bent sheet metal strip 91 (Fig. 8) having an inwardly bent

end 91^a engaging a horizontal guide-groove 64^a in the inner side of the bar 64, whereby the carrier 90 is maintained in sliding engagement with the bar 64 and prevented from rocking on the rod 89. Within the depending portion of the carrier 90 and confined between the bearings 90^a and 90^b is a hub 92 rigid with which is an inwardly projecting arm 93 having a tapered tip 94 and an upwardly extending finger 95. Rigid with the hub 92 on the outer side thereof is an arm 96 that projects through a slot 97 in the depending portion of the carrier 90 and carries a button 98, by the depression of which the finger 95 is moved upwardly so as to raise one of the stops-pins 84 from its normal position in which it projects below the bar 64 to its raised or stop position in which it projects thereabove. The finger 95 is guided into engagement with the lower end of the pin by the engagement of the tip 94 between two adjacent teeth of the guide 87. A leaf spring 99 is secured to the carrier casting and at its free end underlying the arm 96 returns the latter to raised position when free, thus normally maintaining the finger 95 out of engagement with the pins 84. The carrier 90 is also equipped with means for manually returning the raised pins to lowered position and with means for arresting the backward travel of the carrier under the influence of a spring-retracted device hereinafter described. The pin-depressing device consists simply of a bolt 100 slidably mounted in the upper portion 90^c of the carrier, said bolt having on its lower end a head 101 of sufficient diameter to engage two adjacent pins and on its upper end a button 102 for depressing the bolt, the latter being normally maintained in elevated position by a spring 103 between the top of the carrier and the lower side of the button 102. The carrier 90 and, of course, the pin-raising mechanism which is housed therein, is normally urged in a backward direction relatively to the bar 64 by means of a tape 104 (Fig. 2) that is attached at 105 to the rear end of the carrier 90 and at its other end is wound around a spring-actuated drum 104^a (Fig. 2) in a circular casing 106 secured to the bar 64 at or near its rear end. The carrier 90 is restrained against this backward pull by means of a pivoted stop pawl 107 that is mounted in the carrier 90 and has a transversely bent end 108 that abuts against any one of the series of pins 84 that may have been raised to stop position as clearly shown in Figs. 2 and 11; the pawl being normally urged to "stop" position by a spring 109. The pawl 107 has at its forward end an inclined face 110 that, each time the carrier 90 reaches the forward limit of its travel, engages a fixed horizontal pin 111 (Fig. 3) that projects inwardly from the upper end

of a bracket 112 secured to the side-frame member 5, whereby the carrier 90 is released from engagement with the foremost of the series of raised stop-pins and is automatically drawn back by the tape 104 until the pawl 107 engages the next of the series of raised stop-pins and arrests the carrier thereat.

The bar 64 is normally urged forwardly or in the direction of the caption end of the machine by a helical spring 113 (Fig. 8) secured at one end to the side-frame 5, as shown at 114, and at its other end at 115 to the hub 116 of a spur gear 117 mounted preferably by anti-friction balls as shown, on a shaft 118 secured in the frame members 5, said gear 117 directly engaging the rack 63 of the bar 64. The spring 113 is re-tensioned by the manual retraction of the bar 64 by the operator when retracting the band clamp for a fresh grip upon the band. In this connection I will describe the means whereby the same manual retraction of the bar 64 maintains the spring 33 of the receiving spool of the band under tension. Still referring to Fig. 8, on the shaft 118 is a friction disk 119 engaging one face of the spur gear 117, fast with which friction disk is a ratchet disk 120 engaged by a pawl 121 mounted on the adjacent face of a spur gear 122, this latter also being rotatably mounted on the shaft 118. The gear 122 meshes with and drives a gear 123 fast on the shaft 31, and a ratchet disk 124 engaged by a pawl 125 (Fig. 6) prevents unwinding of the spring through back turning of the shaft 31. From this it is evident that the rotation of the spur gear 117 under the return travel of the rack 63 through the connections described winds up the spring 33 to the extent permitted by the friction disk 119, which latter is capable of adjustment by means of nuts 126 and washer 127 on the inner end of shaft 118. To prevent undue friction, anti-friction balls are employed between the hubs of the several rotary members on shaft 118 and the frame 5 and washer 127, as shown at 128, 129 and 130.

The bar 64, when retracted to its extreme limit, is automatically arrested in that position by means of the engagement of the foremost of the row of pins carried by the bar 64. Said pin, designated by 84^a is, unlike the others, normally spring-pressed to the upwardly projected position, and the under side of the upper end of the bracket 112, which projects inwardly over the upper side of the bar 64 is beveled or inclined on its under surface, as shown at 112^a in Fig. 1, so that said pin 84^a is depressed by sliding contact with the inclined under side of said bracket and, when it has passed the latter, springs up into stop engagement with the inner end of said overhanging portion of the bracket. Said pin is depressed so as to

release the bar 64 when the item apron is to be advanced, by manual depression of a lever 131 (Figs. 1, 2 and 3) that is pivoted at 132 to the outer face of the bracket 112 and has an inwardly and transversely extending finger 133 overlying the row of pins in the bar 64, the lever 131 and finger 133 being normally raised against a stop projection 134 carried by the bracket 112 by a spring 135 (Fig. 2). When the bar 64 is fully retracted, the depression of the lever 131 forces downwardly the foremost spring-actuated stop-pin 84^a, allowing the bar 64 and the gripper carried thereby to move forwardly, thus advancing the item-duplicating band relatively to the receiving spool until the next of the series of raised pins in the bar 64 engages the overhanging end of the bracket 112 constituting a fixed stop.

In order to prevent further step-by-step advance travel of the item-duplicating band after the band has advanced to a point where the impression of the last item or group of items has passed down out of the printing field, and the machine is ready to be re-primed for a new impression from another master-sheet, I provide a device which interlocks with the depending lower ends of the pins 84 and, through the carrier 90, finds an abutment against the fixed bracket 112. This device is designed to be set in interlocked relation to that one of the row of pins which lies opposite the point on the item-duplicating band just below the last item or group of items thereon, and, as herein shown, consists of the following parts. 136 designates a slide that, by a hub or sleeve 137, is slidably mounted on the guide-rod 89 and operates over the outer vertical face of the bar 64, having inwardly projecting guide flanges 138 maintaining its engagement therewith. To this slide is pivoted at 139 by a friction joint a longitudinally extending latch-member 140. This latch-member has an inwardly extending lateral finger 141 lying directly below the pins 84, and it also has formed in its lower edge a notch 142, its forward end being rounded or curved from the forward edge of said notch up to the tip of the latch, as shown at 143 in Fig. 2. The carrier 90 has a laterally projecting index pointer 144, best shown in the detail view Fig. 8, that overlies a table 145 detachably mounted on the side-frame member 5 of the machine, on which table the master-sheet to be copied is laid. When the carrier 90 is retracted and positioned with the index pointer 144 just below the last item or group of items on the master-sheet, the arm 93 of the pin-elevating device slides under the cam-shaped end of the latch 140 and interhooks with the notch 142 thereof. The subsequent depression of the arm 96, not only raises one of the pins 84 by means of the finger 95, but

also raises the latch 140, causing the finger 141 thereof to raise the next pin 84 in rear of that raised by the finger 95, so that said finger 141 interhooks, as it were, with the next depending pin 84 in rear thereof so that, with the latch 140 in the said position, the bar 64 cannot advance farther without carrying the latch 140 and its supporting slide 136 with it. If, in priming the machine, the slide 136 is at the extreme rear or left hand end of the machine, the carrier 90 is moved backwardly until the arm 93 interhooks with the notch 142 of the latch, whereupon both may be drawn forwardly until the pointer indicates the position at which the first of the row of stop-pins is to be set up. This raising of the latch 140 into interengaging relation with the pins of the bar 64 allows the arm 93 to drop out of engagement therewith when the pressure on the arm 96 is released, and consequently the carrier 90 advances alone to the several other positions at which its pointer 144 lies opposite the spaces between successive items or groups of items on the master-sheet.

Passing now to a consideration of the means for controlling the caption-duplicating band 14, 146 designates as an entirety a gripper which is a duplicate of the gripper already described for controlling the item-duplicating band and has a similar laterally projecting handle 147 by which it is opened for the purpose of a fresh adjustment upon the band. The handle end of this gripper, however, slidably engages a horizontally slotted guide 148 that may be suitably graduated in inches or other measurements, as indicated in Fig. 3, its extent of bodily travel being determined by the inner end of the slot of the guide 148 and a stop shoulder 149 (Fig. 2) formed on the end of an adjustable gage-bar 150, which latter is slidably confined between the vertically depending portion of the slotted guide 148 which secures the latter to the frame-member 7 and a horizontally slotted scale-bar 151 also secured to the side-frame member 7. The inner end or shank of the bar 150 carries a screw-threaded clamp 152 the stem or shank of which slidably engages the slot 151^a of the scale-bar 151, the latter being graduated, as indicated, corresponding to the graduations of the slotted guide 148. By setting the clamp 152 at any one of the graduated positions indicated on the scale 151, the stop 149 is so positioned as to permit a to-and-fro movement of the band gripper 146 to an extent corresponding to the indicated adjustment on the scale 151. This graduated adjustment is preferably provided, so as to insure an advance travel of the caption duplicating band to an extent corresponding with varying heights of captions to be transferred thereto. For instance, if a caption of one inch height or

depth is to be transferred to the band, the gripper will be set for a one-inch travel so that, when the band is advanced to carry the impression of the one-inch caption out of the printing field, the advance movement will be limited to an extent just sufficient to so carry the one-inch caption out of the printing field and no more, thus utilizing the entire band for printing purposes and avoiding waste of space between successive captions.

Inasmuch as the receiving spools of both bands are normally under winding tension at all times when said spools are in operative position in the machine, it is necessary, when the band-gripping devices are released in order to be retracted to a fresh hold upon the band, to provide means for preventing the winding up of the bands during those times when the latter are not restrained against the pull of the winding spools by the grippers. The means for thus controlling the receiving spool of the item-duplicating band consists of the following. Referring to Figs. 4, 6 and 13, 153 designates a ratchet disk fast with the chuck 25 of the delivery spool of the item-duplicating band, and 154 designates a pivoted detent cooperating therewith. This detent is impelled into engaging relation to the ratchet disk by a spring 155, but is normally prevented from such engagement by a depending outwardly turned finger 156 overlying the tail of the detent carried by a bar 157 that is supported by laterally offset pivots 158 carried by inwardly projecting brackets 159 on the frame-member 5, so that said bar normally tends to tip or rock on its pivots in a direction to raise the finger 156 out of engagement with the detent pawl 154. When the clamps of the gripper are closed on the belt, as shown in Fig. 13, this bar 157 is maintained in an upright position, in which the finger 156 retracts the pawl 154 from its ratchet by means of a depending finger 160 secured to the under side of the link 77 of the gripper and slidably engaging the inner face of the bar 157. The instant the clamps of the gripper are opened the finger 160 is retracted, allowing the bar 157 to rock on its pivots and the finger 156 to rise out of engagement with the pawl 154, whereupon the latter instantly snaps into engagement with the ratchet disk 153 and thus prevents the receiving spool from drawing the band off the delivery spool. A duplicate of this mechanism is employed for the control of the delivery spool of the caption-duplicating band at the opposite end of the machine, the parts of said mechanism being identified by the same numerals with an alphabetical exponent.

It is desirable, in order to prevent mistakes in using the machine, and in order to insure the "clearing" of the caption-dupli-

cating band, as well as of the item-duplicating band, when the machine is re-primed for a new master-sheet, to so interlock the gripping devices of the two bands that the gripping device of the item-duplicating band cannot ordinarily be re-set to a fresh position on the band without having first manipulated the gripping device of the caption-duplicating band. In the present machine I have provided a mechanism of this character, which will now be described.

Referring principally to Figs. 6 and 12, 161 designates a pawl pivotally mounted at 162 on the inner wall of the frame-member 7, said pawl having an upwardly extending nose engaging the teeth of the rack-bar 63 in a manner to permit forward movement of the rack-bar but locking the same against return movement until the pawl has been thrown out of action. This pawl is provided with a depending toe 163 which, as best shown in the detail view Fig. 12, has two differently inclined faces 163^a and 163^b. A leaf-spring 164 has an angularly bent free end presenting two oppositely inclined faces 164^a and 164^b, the former of which engages the face 163^a of the toe of the pawl when the latter is engaged with the rack-bar and holds it in such engagement, while the face 164^b engages the face 163^b of the pawl when the latter is out of engagement with the rack-bar and holds it disengaged from the latter. The pawl 161 is in engagement with the rack-bar during the forward travel of the latter; and, consequently, before the rack-bar, and the gripper of the item-duplicating band attached thereto, can be returned to initial position, it is necessary to disengage the pawl from the rack-bar. This is done through mechanism connected to and operated by the gripper of the caption-duplicating band.

Referring to Fig. 6, 165 designates a lever pivoted at 166 to the side-frame member 7, one end of said lever being forked as shown at 166^a, and engaging an outwardly turned finger 167 carried by the strip 157^a which, as above described, is under the control of the gripper of the caption-duplicating band and controls the pawl 154^a of the delivery spool of the latter. The opposite end of the lever 165 overlies a lateral pin 168 on the pawl 161. When the rack-bar has reached the limit of its advance or forward travel and it is necessary to return the same and the gripper of the item-duplicating band to initial position for a new hold on the latter, the depression of the handle of the caption-duplicating band permits the pivoted strip 157^a to rock, thus, through the rise of the finger 167, rocking the lever 165 and, through the pin 168, depressing the pawl 161 out of engagement with the rack-bar. This causes the free end of the spring 164 to snap into engagement with the other face 163^b of the

toe of the pawl, as shown in Fig. 12, thus holding the latter disengaged and permitting the free return of the rack-bar. This release of the pawl from the rack-bar takes place while the operator is manipulating the gripper of the caption-duplicating band to set it to a fresh position on the latter, so that the manipulation of the caption-duplicating band to insure a fresh surface of the latter for the next impression is insured before the item-duplicating band can be primed to receive the next impression. The pawl 161 is automatically thrown back into rack-engaging position upon the complete return or retraction of the rack-bar by means of the engagement of a finger 169 mounted on the forward end of the rack-bar inwardly of the inner side of the latter with the free end of a spring 170 secured to the hub of the pawl, the free end of said spring projecting into the path of said finger and, when struck by the latter, throwing the toe of the pawl back from the position shown in Fig. 12 to the position shown in Fig. 6 in which the pawl engages the rack-bar for the next operation. To insure the rocking of the pivoted strip 157^a in a direction to raise the fingers 156^a and 167, the gripper 146 of the caption-duplicating band may be provided with a depending finger 160^b on the opposite side of the strip 157^a from the finger 160^a, the finger 160^b insuring the downward rocking movement of said strip, while the finger 160^a effects the return of said strip to upright position (Fig. 7).

It may sometimes happen that the number of items or groups of items to be printed under a single caption may be greater than can be accommodated by a single working surface of the item-duplicating band, so that it may be necessary to manipulate the item-duplicating band several times in succession to obtain the requisite printing space for all the items under a single caption. In order, therefore, to be able to so manipulate the item-duplicating band without having to manipulate the gripper of the caption-duplicating band preliminary to each retraction of the gripper of the item-duplicating band, I provide a manually operable device for temporarily locking the pawl 161 out of engagement with the rack-bar, irrespective of the travel of the latter; this device comprising a pin 239 (Fig. 6) carried by a slide 240 (Fig. 2), the latter being mounted in a slideway 241 formed in or on the side-frame member 7, said pin extending through a horizontal slot 242 in said side-frame member and adapted, by a knob 243, to be moved into and out of engagement with a notch 161^a formed in the lower edge of the pawl 161, the relation of the pin to said notch being such that, when the pin is moved toward the pawl, it engages the lower inclined edge of the notch, throwing the

pawl down out of engagement with the rack and holding it so disengaged until manually released by the retraction of the pin 239.

The two longitudinal sections of the machine frame are secured together by a latch 171 (Fig. 6) pivoted at 172 to the side-frame member 5 and engaging a lug 173 on the bottom rail or shoe of the side-frame member 7.

In order to form a practically continuous bed for the two sections of the machine, I interpose between the individual beds of the sections a transversely extending bridge-bar 174 (Figs. 4 and 6) which is pivoted at 175 to the inner end of one side of the section carrying the item-duplicating band, permitting it to be swung upwardly, out of the way when the machine sections are to be separated.

An idler roll 176 (Fig. 6) journaled on the inner wall of the side-frame member 7 constitutes an antifriction support for the advancing end of the rack-bar as the machine is operated.

In lugs 177 and 178 (Figs. 1 and 3) formed on extensions of the stationary hinge-members of the grippers are slidably mounted spring-retracted locking bolts 179 and 180, respectively, the inner ends of which, when pressed inwardly, engage notches 181 and 182 formed in the gripper handles 72 and 147, whereby the clamps or jaws of the grippers may be locked open when desired.

The successive advance movements of the item-duplicating band, which result from both the spring tension on the receiving spool and the spring actuation of the gripper-carrying rack-bar, and the sudden arrest of the latter at the end of each successive movement by the stop devices described, produces a somewhat sudden or jerky movement of the band which tends to unwind from the delivery spool more of the band than is wound up on the receiving spool, thus producing slack in the band near the former. To neutralize this effect and maintain the printing surface of the band taut, I preferably employ the device shown in Fig. 6 consisting of an arm 183 pivoted at 184 to the inner wall of the side-frame member 5 and lying adjacent to the inner face of the ratchet-disk 153, said arm being normally impelled to swing in a downward direction by a spring 185. The free end of this arm carries a dog 186, the nose of which is kept in engagement with the toothed periphery of the ratchet-disk by a spring 188. The ratchet-disk 153, it will be remembered, is rigid with the chuck 25 of the delivery spool, and when the latter turns in a direction to unwind the band the arm 83 is raised; and as soon as the unwinding movement of the spool ceases, the return downward movement of the arm 183 under the impulse both of gravity and the spring 185, imparts a short

winding up movement to the delivery spool which takes out any slack that may have occurred in the band itself. I also preferably apply to the chucks of the receiving spools of both bands a somewhat similar device which, however, is manually operated, when necessary, to render the bands perfectly taut and smooth out any wrinkles that may occur therein.

Referring to Figs. 2 and 6, 189 and 189^a indicate arms freely pivoted on the spindles of the chucks 26 and 27, respectively, the free adjacent ends of said arms having finger-pieces 190 and 190^a projecting laterally between the adjacent ends of the side-frame members 5 and 7. Said arms are normally upheld by springs 191 and 191^a and carry spring-pressed pawls 192 and 192^a engaging the ratchet-disks 40 and 53, respectively. In case the spring drive imparted to the chucks 26 and 27 of the winding spools is insufficient to render smooth and taut the printing surfaces of the bands, this can be effected manually by depression of either or both of the arms 189 189^a by the finger-pieces 190 and 190^a.

I will next describe the platen and its operating and adjunctive devices whereby pressure is imparted to the master and copy sheets when the same are laid on the printing surfaces of the duplicating bands. This device, generally described, comprises a hollow cylinder rotatably mounted in a suitable frame, which latter is slidably and pivotally mounted at one end on a supporting rod secured to one side of the machine opposite and parallel with one edge of the printing bed. Associated with the cylinder is a clamp with means for opening the same to receive the upper edge of the sheet and for closing the clamp on the sheet when the cylinder is set in initial position to roll over the printing surface of the duplicating bands. As the cylinder is thus advanced, a spring between the cylinder and its frame is tensioned so that, when the cylinder is raised from the duplicating band, it automatically rotates in the opposite direction, unwinding and delivering the sheet. Also associated with the cylinder are suitable guides for facilitating the entrance and delivery of the sheet and the smooth and accurate winding of the sheet on the cylinder. For a detail description of this mechanism, reference may be had to Figs. 1, 2, 3, 5, 15 and 16 of the drawings.

Referring first to Figs. 1 and 3, 193 designates a rod that is secured in an angle-bracket 194 attached to the upper rear corner of the side-frame member 6 as by a set-screw 195. This rod passes through and slidably engages a similar angle-bracket 196 attached to or near the forward upper corner of the side-frame member 8. Slidably mounted on the rod 193 by separated bear-

ings 197^a and 197^b in a carriage 197. Secured in a socketed bearing in the upper end of the carriage 197 is a horizontal spindle 198 which extends across and above the bed of the machine. On this spindle is loosely mounted a bail 199, the intermediate horizontal portion of which is provided with a handle 200 whereby the bail may be rocked on said spindle. Loosely mounted on the spindle between the vertical arms of the bail is a hollow sheet metal cylinder 201, the cylindrical surface of which is, in practice, preferably covered with a canvas or other surfacing material 201^a. Said cylinder at one point in its circumference is provided with a longitudinal depression 201^b, shown in Figs. 15 and 16, in which lies a clamp-bar 202, said clamp-bar having at its ends arms 203 pivoted at 204 to the end walls of the cylinder and normally impelled to clamp-closing position by springs 205. Loosely mounted on the spindle 198 between one end of the cylinder and the adjacent arm of the bail, is a spring case 206 containing a helical spring 207, one end of which is attached to said spring case, while the other end is secured to a pin 208 projecting eccentrically from the end wall of the cylinder. A laterally projecting lug 209 on the outer wall of the spring case abuts against the adjacent arm of the bail, the latter thus constituting a stop for one end of the spring, and the latter is so wound that, as the cylinder is rolled from the caption-recording end of the machine toward and over the item-recording end, the spring is wound up, so that, when the cylinder is raised angularly on the pivotal bearings 197^a and 197^b of its carriage, and the bail is swung to one side to release a detent device, hereinafter described, the spring unrolls the sheet from the cylinder.

Rigid with the carriage 197 is a horizontal bar 210 extending across and above the bed of the machine and parallel with and in front of the cylinder relatively to its direction of working travel, which bar has at its opposite end a rearwardly and upwardly bent arm 211 (Fig. 2), the upper portion of which constitutes a bearing for that end of the spindle of the cylinder. This bar and its inwardly extending arm constitute supports for several accessory devices, the bar 210 itself supporting a guide-chute 212 which directs the entrance and discharge of the paper. The chute 212 has, as best shown in Figs. 15 and 16, a downwardly turned lip 213 that projects below the lower edge of the bar 210 and guides the edge of the paper sheet directly into the clamp 202 (See Fig. 15).

In order to open the clamp 202 to receive the upper margin of the sheet, one arm of the bail is provided with a laterally extending arm 214, to the end of which is pivoted

a pawl 215, the nose of which is normally pressed toward the end of the cylinder by a spring 216, in which position it abuts against a pin 217 on the latter so that, when the bail is swung to the right as shown in Fig. 15, the cylinder is partially rotated in the same direction until outwardly projecting lugs 218 on the clamp-supporting arms 203 abut against inwardly extending stops 219 on the carriage 197 and arm 211 at the opposite end of the cylinder. The slight continued rotation of the cylinder permitted by the extensible character of the springs 205 separates the clamp-bar from its seat in the surface of the cylinder, as shown in Fig. 15, readily permitting the insertion of the edge of the sheet. The return swing of the bail to vertical position permits the automatic closing of the clamp by the springs 205. When the handle is in the vertical position, as in operating the cylinder over the bed of the machine, the pawl 215 is kept out of engagement with the pin 217 by the engagement of the tail of the pawl with an inclined surface 211^a on the arm 211, as clearly shown in Fig. 5.

For correctly positioning the platen cylinder at the start, I provide in connection with the graduated scale 151 a guide for the free end of the cylinder-supporting frame (constituted by the carriage 197, bar 210 and arm 211), said guide, as best shown in Figs. 2 and 3, consisting of an inwardly extending plate 220 that is integral or rigid with the gage-bar 150 and is supported on the upper edge of the scale 151. The plate 220 has on its inner edge an upstanding rest 221 adapted to support a laterally offset depending arm 222 (Fig. 3) on the arm 211; and said depending arm 222 carries a laterally offset lug 223 that, as the cylinder is moved off the rest 221, engages an upright post 224 integral with the plate 220 and drops through a vertical notch 225, out of engagement with the guide 220. Pivoted to the outer edge of the guide-plate 220 by a depending hinge bracket 226 is a horizontally extending gage-arm 227 having an upturned flange 228 in transverse alinement with one edge of the notch 225 which marks the tangent line of the platen cylinder in the initial position of the latter. The gage-arm 227 coöperates with the detachable table 145 on which the master-sheet is laid preliminary to its application to the duplicating bands, as hereinafter described. The platen cylinder having thus been correctly positioned on the caption-duplicating band, by pushing on the bail handle the cylinder is rolled over the printing bed toward the opposite end of the machine, the bail being prevented from swinging in the direction of movement by the contact of the arm 214 with the underlying portion of the cylinder frame, until the depending arm 222 strikes

an inwardly extending stop-lug 230 (Fig. 8) carried by the carrier 90, the position of the latter on the bar 64, accordingly, determining the extent of travel of the platen cylinder, and consequently the amount of copy taken off the item-duplicating band by the sheet carried by the platen. As the cylinder rolls in the forward movement of the platen, the spring 207 is wound up, and it is restrained from unwinding the cylinder, until released, by a pawl 231 pivoted in an extension of the arm 211 and cooperating with a ratchet-disk 232 fast on the cylinder head, said pawl being urged into engagement with the ratchet by a spring 233.

When the cylinder has been swung up on its supporting rod 193 out of engagement with the duplicating band, the bail is given a rearward swing, whereupon a cam-lug 234 thereon strikes the nose of the pawl 231, forcing it out of engagement with the ratchet 232, whereupon the cylinder is free to rotate backwardly and thereby unwind and discharge the printed sheet. The ratchet disk 232 has a smooth portion in its periphery, as shown, over which the nose of the pawl rides idly, when the bail is being operated to open the clamp in priming the platen cylinder. To insure the accurate winding and unwinding of the paper on the platen cylinder, the bail is provided with a substantially semi-circular sheath or guard 235 that overlies the rear half of the cylinder. When the bail is swung rearwardly at the conclusion of the printing operation so as to release the spring and cause the cylinder to unwind and deliver the printed copy, the angular swing of the bail which effects the release of the pawl 231 from the ratchet 232 is of such extent as to carry the lower edge of the guard 235 into overlapping relation to the lip 213 of the discharge chute 212, which facilitates and insures the correct discharge of short sheets, cards, or the like which, in the printing travel of the cylinder, may have been carried past the tangent point of the cylinder on the band. A pin 236 (Fig. 5) projecting from one end of the cylinder and engaging a cooperating stop lug 237 projecting inwardly from the adjacent arm of the bail, effects the proper positioning of the cylinder for the start when the bail is returned to vertical position after having been swung backwardly to permit the discharge of a printed sheet. A tensile spring 238 between the platen frame and one arm of the bail normally maintains the bail in vertical position.

In describing the operation of the machine we will assume that it is to be used to produce sectional order sheets for the several departments of a mail order house or department store. Assuming that an order for a miscellaneous lot of goods comes in, the order is first written out on a master-sheet

such as is shown at A in Fig. 19. This master-sheet contains at its upper end a caption A' on which is printed in copying ink the name and address of the person or firm from whom the order is received and, usually, the name of the house by which the order is received, together with any other suitable or appropriate data. Beneath the caption, on the suitably ruled and lined main body portion of the sheet designated by A² is printed in copying ink the several items of the order, together with the quantities and prices, which items are, as shown, arranged in groups under the several sales departments or divisions of the house, as, in the illustration given, under divisions K, Y, S, T and W. In the case of a mail order house, there will also preferably be printed opposite each item the catalogue number thereof. The gage-arm 227 is then set on the scale 151 opposite the position indicating the height of the caption, and secured in such position by the clamping nut 152. The platen cylinder having been moved to the initial or starting position above the caption end of the machine with the offset depending arm 222 of the platen frame supported on the rest 221, in which position the cylinder is held out of engagement with the band, the master-sheet is introduced into the grip of the clamp of the platen cylinder, and the latter is then rolled over the duplicating bands, transferring the impression of the caption to the inner portion of the caption-duplicating band, and the impression of the grouped items to the inner portion of the item-duplicating band, the raising of the platen cylinder and rearward swing of the handle unwinding and delivering the sheet from the cylinder in the manner already described. The master-sheet is then laid, face up, on the table 145, with its upper edge abutting against the stop-flange 228 of the gage-arm 227, in which position the several printed lines of both the caption and item-duplicating portion of the sheet lie in transverse alinement with the impressions thereof previously transmitted to the two duplicating bands. The carrier 90, with its pin-setter 93 interhooked with the latch-member 140, in the manner shown in Figs. 9 and 10, is then moved along its supporting bar 89 until the pointer 144 overlies a position on the lower end of the sheet just beneath the lowermost group of items indicated as pertaining to division W. The button 98 is then depressed, which raises the pin-setter 93 and also the free end of the latch-bar 140, thereby, through the pin-engaging fingers 95 and 141, raising two adjacent stop-pins 84, the arm 93 being guided in such movement by engagement of its beveled tip 94 with the teeth 87 of the comb-like guide lying below the stop-pins.

Upon the release of the button 98, the

spring 99 raises the latter and lowers the pin-setter out of engagement with the depending ends of the pins; but the latch-bar 140 remains in raised position with its finger 141 between the lower ends of the pins on either side of the two pins that have been raised; so that said latch-bar and its sliding carrier are thus interlocked with the bar 64 and constitute a stop to prevent any further rearward movement of the carrier 90, in the later operation of the machine, until released. The carrier 90, thus freed from engagement with the latch 140, is next moved successively to positions where its pointer overlies the spaces between the remaining groups of items on the master-sheet, the pin-setter being actuated to raise one of the pins at each of said positions. After the pin-setter has raised the last of the series of raised stop-pins (which will lie opposite the spaces between the first and second groups of items on the master-sheet), the carrier is automatically retained in said position against backward pull of its retracting tape 104 by the engagement of the bent end 108 of the pawl 107 with said pin, in the manner clearly indicated in Figs. 2 and 11.

The machine has now been primed for the striking off of sectional orders for the several divisions or departments. For this, a blank sectional order sheet, such as shown at B in Fig. 20, having a suitably ruled caption portion B' identical in size with the caption portion A', of the master-sheet, and an item portion B² ruled similarly to, but shorter than the item portion A² of the master-sheet, is inserted in the platen cylinder and the latter then rolled over the caption-duplicating band and the inner portion of the item-duplicating band containing the impression of the first group of items for division K. The travel of the platen cylinder is automatically arrested as soon as the platen has advanced far enough to effect the printing of the uppermost group of items on the sectional order sheet by the engagement of the foremost edge of the depending arm 222 of the platen frame with the stop-lug 230 of the carrier 90, in the manner shown in the plan view, Fig. 3. The platen is then raised, the handle thrown back to release the clamp, the printed sheet withdrawn, and the platen cylinder retracted to initial raised position to receive the next sectional order sheet. This having been done, the operator depresses the lever 131, which causes the finger 133 to depress the foremost stop-pin 84^a which, it will be recalled, is normally maintained in elevated position. This permits the rack-bar carrying the series of stop-pins, with the band-gripper, to move forward under the combined influence of the winding spring of the receiving spool and the actuating spring of the rack-bar; and the carrier

90, being in engagement with the foremost of the several manually raised stop-pins is, of course, also carried forwardly until the beveled nose 110 of its pawl 107 engages beneath the pin 111, which rocks said pawl, releasing its tail 108 from engagement with the raised pin 84, which latter pin then engages the foremost edge of the upper end of bracket 112, thereby arresting further travel of the rack-bar and band, and simultaneously carrier 90, being released from the foremost pin, is drawn back by its tape 104 until the tail of its pawl strikes the next of the series of raised stop-pins, by which it is arrested. Another sectional sheet B is then applied to the platen, and the latter is manipulated as before, thus printing the order for division Y. The same operations are repeated until all of the separate orders for the several divisions or departments indicated on the master-sheet have been printed, it being understood that, of course, any desired or required number of copies of the complete master-sheet may be struck off, as also any desired or required number of copies of each sectional sheet.

As the carrier moves back into engagement with the first of the series of raised stop-pins which was originally opposite the space below the lowermost group of items on the master-sheet, its rear bearing 90^a comes in contact with the bearing 137 of the carrier or support of latch 140, so that, after the item-duplicating band has been permitted to advance to a position in which the impression of the last group of items has been carried below the printing plane, the engagement of the pawl 107 with pin 111 does not permit any further retraction of the carrier 90 by depression of the lever 131 or otherwise, and further forward movement of the item-duplicating band until the machine has been again primed is prevented by reason of the abutment of the forward bearing 90^b of the carrier 90 with the bracket 88 supporting the inner end of the rod 89.

In order to re-prime the machine for further use with another master order sheet, it is necessary, before the gripper of the item-duplicating band can be set back to a new engagement with the band, to first advance the previously used portion of the caption-duplicating band, which is done by depressing the clamp-handle 147, moving the gripper outwardly to the extent permitted by the stop 149, as shown in Fig. 2 (which corresponds in extent to the height of the caption of the sheet previously used), and then permitting the winding spring of the receiving spool to wind up the band to an extent which carries below the printing surface exactly the previously used portion of the caption-duplicating band, and no more. This manipulation of the clamp of the caption-duplicating band retracts the pawl 161

out of engagement with the rack-bar, throwing it to the position shown in Fig. 12, so that the rack-bar can then be retracted with the backward movement of the gripper of the item-duplicating band to fresh position, the finger 169 at the completion of said backward movement striking the spring 170 and thus re-setting the pawl 161 to rack-engaging position.

When either or both of the duplicating bands have been completely wound up on their receiving spools, by throwing up the bridge-bar 174, and throwing back the hook 171, the two sections of the machine may be separated, the spools taken out and simply reversed, by reason of the described adaptation of the duplicate ends of each spool to both the journal and chuck bearings thereof, the receiving spool then becoming the delivery spool, and vice versa, and this may be repeated until the duplicating bands are worn out or unfit for further use.

I claim:

1. In a multiple copying machine, the combination with a supporting frame, of a pair of duplicating bands mounted thereon, the working surfaces whereof are in longitudinal alinement, independently operable pairs of spools on which the idle portions of said bands are wound, means for tensioning said bands, and a platen operable over the working surfaces of both bands, substantially as described.

2. In a multiple copying machine, the combination with a supporting frame, of a pair of duplicating bands mounted thereon, the working surfaces whereof are in longitudinal alinement, independently operable pairs of spools on which the idle portions of said bands are wound, means for tensioning said bands, a platen cylinder, and means for guiding the latter in a rolling movement over the working surfaces of both bands, substantially as described.

3. In a multiple copying machine, the combination with a supporting frame made in two separable sections, of a pair of duplicating bands mounted on said sections, respectively, with their working surfaces in longitudinal alinement, receiving and delivery spools mounted in each of said frame sections whereon the idle portions of the bands are wound, means for tensioning the bands, and a platen operable over the working surfaces of both bands, substantially as described.

4. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a winding spring for said receiving spool, and means for automatically arresting the advance movement of said dupli-

cating band at any of the series of predetermined positions, substantially as described.

5. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a winding spring for said receiving spool, means for automatically arresting the advance movement of said duplicating band at any of a series of predetermined positions, and manually operable means for successively releasing said band-arresting means, substantially as described.

6. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a continuously acting winding spring for said receiving spool, means for effecting successive advance movements of portions of the working surface of the band off said bed, and means for arresting the travel of the band at the end of each successive movement, substantially as described.

7. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a spring exerting a winding tension on said receiving spool, means for effecting successive advance movement of portions of the working surface of the band off said bed, means for determining the extent of each such advance movement, and means for automatically arresting the travel of the band at the end of each successive movement, substantially as described.

8. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a spring exerting a winding tension on said receiving spool, a gripper adapted to clamp said band, a bar slidably mounted on said frame parallel with the band and carrying said gripper, spring means normally urging said bar in the direction of travel of the band, a series of stop devices carried by said bar, means for setting any of said stop devices into operative position, a fixed stop cooperating successively with said operatively positioned stop devices whereby to arrest the successive advance movements of said bar, and means for moving said stop devices successively into inoperative position whereby to permit suc-

cessive advance movements of said bar, substantially as described.

9. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a spring exerting a winding tension on said receiving spool, a gripper adapted to clamp said band, a bar slidably mounted on said frame parallel with the band and carrying said gripper, spring means normally urging said bar in the direction of travel of the band, a series of stop devices carried by said bar, means for setting any of said stop devices into operative position, a fixed stop cooperating successively with said operatively positioned stop devices whereby to arrest the successive advance movements of said bar, means for moving said stop devices successively into inoperative position whereby to permit successive advance movements of said bar, and means for locking said bar against further advance movement when the last of said operatively positioned stop devices has engaged said fixed stop, substantially as described.

10. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a spring exerting a winding tension on said receiving spool, a gripper adapted to clamp said band, a bar slidably mounted on said frame parallel with the band and carrying said gripper, spring means normally urging said bar in the direction of travel of the band, a row of stop-pins mounted in said bar, the foremost whereof is normally maintained in operative position, manually operable means for setting any of the other of said stop-pins into operative position, a fixed stop cooperating successively with said operatively positioned stop-pins, and manually operable means for moving said stop-pins successively into inoperative position whereby to permit successive advance movements of said bar, substantially as described.

11. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivering spools mounted in said frame whereon the idle portions of said band are wound, a spring exerting a winding tension on said receiving spool, a gripper adapted to clamp said band, a bar slidably mounted on said frame parallel with the band and carrying said gripper, spring means normally urging said bar in the direction of travel of the band, a row of stop-pins mounted in said bar, the foremost whereof

is normally maintained in operative position, a carrier mounted to travel over said bar and carrying a pointer and, in alignment with the latter, a device for setting any of the other of said stop-pins into operative position, a fixed stop cooperating successively with said operatively positioned stop-pins, and manually operable means for moving said stop-pins successively into inoperative position whereby to permit successive advance movements of said bar, substantially as described.

12. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a spring exerting a winding tension on said receiving spool, a gripper adapted to clamp said band, a bar slidably mounted on said frame parallel with the band and carrying said gripper, spring means normally urging said bar in the direction of travel of the band, a row of stop-pins mounted in said bar, the foremost whereof is normally maintained in operative position, a carrier mounted to travel over said bar, spring means tending to retract said carrier, an outwardly projecting pointer on said carrier, a pin-setter in alignment with said pointer and movable with said carrier, a pawl on said carrier automatically engaging said stop-pins when moved to operative position by said pin-setter, a fixed stop cooperating successively with said operatively positioned stop-pins, manually operable means for moving said stop-pins successively into inoperative position, whereby to permit successive advance movements of said bar, and means for automatically disengaging said pawl from said pins to permit retraction of said carrier at the termination of each forward movement of said bar, substantially as described.

13. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound, a spring exerting a winding tension on said receiving spool, a gripper adapted to clamp said band, a bar slidably mounted on said frame parallel with the band and carrying said gripper, spring means normally urging said bar in the direction of travel of the band, a row of stop-pins mounted in said bar, the foremost whereof is normally maintained in operative position, a carrier mounted to travel over said bar, spring means tending to retract said carrier, an outwardly projecting pointer on said carrier, a pin-setter in alignment with said pointer and movable with

said carrier, a pawl on said carrier automatically engaging said stop-pins when moved to operative position by said pin-setter, a fixed stop cooperating successively
 5 with said operatively positioned stop-pins, manually operable means for moving said stop-pins successively into inoperative position, whereby to permit successive advance
 10 movements of said bar, means for automatically disengaging said pawl from said pins to permit retraction of said carrier at the termination of each forward movement
 15 of said bar, and another manually operable device mounted on said carrier for returning said stop-pins to inoperative position, substantially as described.

14. In a multiple copying machine, the combination with a frame carrying a bed, of
 20 a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame whereon the idle portions of said band are wound,
 25 a spring exerting a winding tension on said receiving spool, a gripper adapted to clamp said band, a bar slidably mounted on said frame parallel with the band and carrying
 30 said gripper, spring means normally urging said bar in the direction of travel of the band, a row of stop-pins mounted in said bar, the foremost whereof is normally main-
 35 tained in operative position, a manually operable pin-setter for moving any of the other of said stop-pins into operative position, a guide for directing said pin-setter
 40 into engagement with said stop-pins, a fixed stop cooperating successively with said operatively positioned stop-pins, and manually operable means for moving said stop-pins
 45 successively into inoperative position whereby to permit successive advance movements of said bar, substantially as described.

15. In a multiple copying machine, the combination with a frame carrying a bed, of
 45 a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted on said frame whereon the idle portions of said band are wound,
 50 a continuously acting winding spring for said receiving spool, a slidable gripper adapted to clamp said band, means for releasing said gripper from clamping engage-
 55 ment with said band and moving it to a new position of engagement therewith, and means controlled by said gripper-releasing means
 60 for arresting the unwinding movement of said delivery spool, substantially as described.

16. In a multiple copying machine, the combination with a frame carrying a bed, of
 60 a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted on said frame whereon the idle portions of said band are wound,
 65 a continuously acting winding spring for said receiving spool, a slidable gripper

adapted to clamp said band, a handle whereby said gripper is released from clamping
 engagement with said band and moved to a new position of engagement therewith, a
 70 ratchet-disk rigid with said delivery spool, a detent cooperating with said ratchet-disk, and means controlled by said handle where-
 75 by the engagement of said detent with said ratchet-disk is effected simultaneously with the actuation of said handle to release said gripper, substantially as described.

17. In a multiple copying machine, the combination with a frame carrying a bed, of
 a duplicating band having its working sur-
 80 face supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, a chuck engaging the spindle of said receiving spool, a continu-
 85 ously acting winding spring for said chuck, and a detent for said chuck released by the spool when inserted in the chuck, substantially as described.

18. In a multiple copying machine, the combination with a frame carrying a bed, of
 90 a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, means for effecting an
 95 intermittent winding of said band on said receiving spool, and means for taking up slack in the band between said receiving and delivery spools, substantially as described.

19. In a multiple copying machine, the combination with a frame carrying a bed, of
 100 a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, means for effecting an
 105 intermittent winding of said band on said receiving spool, and means applied to the delivery spool for automatically taking up slack in the band between said receiving and delivery spools, substantially as described.

20. In a multiple copying machine, the combination with a frame carrying a bed, of
 110 a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, means for effecting an
 115 intermittent winding of said band on said receiving spool, means applied to the delivery spool for automatically taking up slack in the band resulting from excess
 120 movement of said delivery spool, and manually operable means applied to the receiving spool for smoothing and tightening the band on said bed, substantially as described.

21. In a multiple copying machine, the combination with a frame carrying a bed, of
 125 a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, a gripper slidably
 130 mounted on said frame and engaging said band, a spring and connections therefrom to

said gripper for actuating the latter over said frame in the direction of the receiving spool, manually operable means for releasing and returning said gripper to starting position and, through said connections, re-tensioning said spring, a winding spring for said receiving spool, and tensioning means for said last-named spring actuated by said gripper-actuating connections on the return movement of said gripper, substantially as described.

22. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, a gripper slidably mounted on said frame and engaging said band, a spring and connections therefrom to said gripper for actuating the latter over said frame in the direction of the receiving spool, means for automatically arresting the advance travel of said gripper at each of a series of predetermined positions, manually operable means for releasing and returning said gripper to starting position and, through said connections, re-tensioning said spring, a winding spring for said receiving spool, and tensioning means for said last-named spring actuated by said gripper-actuating connections on the return movement of said gripper, substantially as described.

23. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, and a gripper slidably mounted on said frame and provided with clamps adapted to engage the opposite edges of said band, substantially as described.

24. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, a gripper slidably mounted on said frame and provided with clamps adapted to engage the opposite edges of said band, a handle on said gripper, and means actuated by said handle for opening said clamps, substantially as described.

25. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, a gripper slidably mounted on said frame beneath said bed and provided with clamps adapted to engage the opposite edges of said band, spring-actuated connections between said clamps normally maintaining the latter closed on the band, a handle on said gripper, and means actuated by said handle for simultaneously

opening said clamps, substantially as described.

26. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, a gripper slidably mounted on said frame and engaging the margins of said band, an operating handle on said gripper, a gage mounted on said frame, and stop devices limiting the travel of said gripper to the amount indicated by said gage, substantially as described.

27. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools whereon the idle portions of said band are wound, a gripper slidably mounted on said frame and engaging the margins of said band, an operating handle on said gripper, and means determining the extent of travel of said gripper, the same comprising a fixed scale on said frame, a slidable gage-member on said scale, means for securing the latter at any fixed position on said scale, and a stop carried by said slidable gage-member adapted to engage said gripper at one extreme of its travel, substantially as described.

28. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band supported on said bed, a platen frame slidably mounted at one end adjacent to one edge of said duplicating band and overlying the latter, a platen cylinder rotatably mounted in said platen frame, and a platen-positioning device adjustably mounted adjacent to the opposite edge of said duplicating band and cooperating with said platen frame at its other end to determine the starting position of said platen cylinder relatively to the duplicating band, substantially as described.

29. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band supported on said bed, a platen frame hinged at one end to swing in a vertical plane and slidably mounted at said hinged end adjacent to one edge of said duplicating band and overlying the latter, a platen cylinder rotatably mounted in said platen frame, and a platen-positioning device adjustably mounted adjacent to the opposite edge of said duplicating band and cooperating with said platen frame to determine the starting position of said platen cylinder relatively to the duplicating band, substantially as described.

30. In a multiple copying machine, the combination with a frame carrying a bed, of a duplicating band having its working surface supported on said bed, receiving and delivery spools mounted in said frame where-

on the idle portions of said band are wound, a winding spring for said receiving spool, means for effecting successive advance movements of predetermined sections of said band over said bed, a platen movable over said band, a stop device for limiting the extent of travel of said platen, and means for automatically shifting said stop device successively to positions opposite the divisions between said predetermined sections of said band as the latter is advanced, substantially as described.

31. In a multiple copying machine, the combination with a supporting frame, of a pair of duplicating bands mounted thereon with their working surfaces in longitudinal alinement, band-controlling grippers slidably mounted on said frame and respectively engaging the margins of said bands, handles for said grippers through which the latter are released and retracted for fresh holds on said bands, means automatically locking one of said grippers against retraction, and means actuated by the handle of the other gripper for releasing said locking means, substantially as described.

32. In a multiple copying machine, the combination with a supporting frame, of a pair of duplicating bands mounted thereon with their working surfaces in longitudinal alinement, band-controlling grippers slidably mounted on said frame and respectively engaging the margins of said bands, handles for said grippers through which the latter are released and retracted for fresh holds on said bands, means automatically locking one of said grippers against retraction, means actuated by the handle of the other gripper for releasing said locking means, and means for automatically restoring said locking means to operative position upon the complete retraction of said first-named gripper, substantially as described.

33. In a multiple copying machine, the combination with a supporting frame, of a pair of duplicating bands mounted thereon with their working surfaces in longitudinal alinement, band-controlling grippers slidably mounted on said frame and respectively engaging the margins of said bands, handles for said grippers through which the latter are released and retracted for fresh holds on said bands, a slidable rack-bar rigid with one of said grippers, a spring-pressed pawl normally engaging said rack-bar in a manner to prevent its retraction, and means actuated by the handle of the other gripper for throwing said pawl out of engagement with said rack-bar, substantially as described.

34. In a multiple copying machine, the combination with a supporting frame, of a pair of duplicating bands mounted thereon with their working surfaces in longitudinal alinement, band-controlling grippers slid-

ably mounted on said frame and respectively engaging the margins of said bands, handles for said grippers through which the latter are released and retracted for fresh holds on said bands, a slidable rack-bar rigid with one of said grippers, a spring-pressed pawl normally engaging said rack-bar in a manner to prevent its retraction, means actuated by the handle of the other gripper for throwing said pawl out of engagement with said rack-bar, and means for restoring said pawl to operative engagement with said rack-bar upon the complete retraction of the latter, substantially as described.

35. In a multiple copying machine, the combination with a supporting frame and a duplicating band mounted thereon, of a platen frame slidably mounted on said supporting frame above said duplicating band, a cylinder rotatably mounted in said platen frame, an operating handle for said cylinder, means for effecting the rolling of a copy sheet around said cylinder when the latter is in rolling engagement with said duplicating band, and spring means operating to rotate said cylinder in a backward direction when the latter is raised out of engagement with said duplicating band, whereby to discharge the printed copy sheet, substantially as described.

36. In a multiple copying machine, the combination with a supporting frame and a duplicating band mounted thereon, of a platen frame slidably mounted on said supporting frame above said duplicating band, a cylinder rotatably mounted in said platen frame, an operating handle for said cylinder, a spring-actuated clamp extending longitudinally of the surface of said cylinder, means for opening said clamp to admit the margin of a copy sheet thereto, spring means normally tending to rotate said cylinder in a backward direction to discharge the printed sheet, a ratchet fast with said cylinder, a pawl normally engaging the same to prevent backward rotation of said cylinder, and means for disengaging said pawl from said ratchet after the completion of the printing operation, substantially as described.

37. In a multiple copying machine, the combination with a supporting frame and a duplicating band mounted thereon, of a platen frame slidably mounted on said supporting frame above said duplicating band, a cylinder rotatably mounted in said platen frame, an operating handle including a bail pivotally mounted in said platen frame coincident with the axis of said cylinder and straddling the latter lengthwise, a spring-actuated clamp extending longitudinally of the surface of said cylinder, a tangential guide-chute mounted on said platen frame, and a curved guide secured to said bail and

partially surrounding the surface of said cylinder, substantially as described.

38. In a multiple copying machine, the combination with a frame formed in two separable sections disposed end to end, of duplicating bands mounted on and longitudinally of said frame-sections with their working surfaces in a common plane, and a bridge-bar lying between the inner adjacent ends of said duplicating bands with its upper surface substantially in the plane of the latter, substantially as described.

39. In a multiple copying machine, the combination with a frame formed in two separable sections disposed end to end, of duplicating bands mounted on and longitudinally of said frame-sections with their working surfaces in a common plane, and a bridge-bar pivoted at one end to the inner end of one of said frame-sections and adapted to bridge over the space between the inner adjacent ends of said duplicating bands, substantially as described.

40. In a multiple copying machine, the combination with a frame formed in two separable sections disposed end to end, of track rails rigid with one of said sections whereon said other frame-section is slidably mounted, duplicating bands mounted on and longitudinally of said frame-sections with their working surfaces in a common plane, and means for separably connecting the ad-

jacent ends of said frames, substantially as described.

41. In a multiple copying machine, the combination with a frame formed in two separable sections disposed end to end, of duplicating bands mounted on and longitudinally of said frame-sections with their working surfaces in a common plane, a platen-supporting rod disposed longitudinally of and alongside said frame-sections, said rod being secured to one of said frame-sections and slidable relatively to the other, a platen-frame slidably and pivotally mounted on said rod, and a platen-cylinder rotatably mounted in said platen-frame above said duplicating bands, substantially as described.

42. In a multiple copying machine, the combination with a machine frame having on one side thereof a journal bearing and on the opposite side a chuck, of a duplicating band, and a spool on which said duplicating band is wound, said spool having at each end a squared chuck-engaging member and a cylindrical bearing member, whereby said spool is interchangeable end for end between said chuck and journal bearing, substantially as described.

JOHN J. FLANIGAN.

Witnesses:

SAMUEL N. POND,
FREDERICK C. GOODWIN.