F. G. JAHN.

PRINTING MECHANISM.

APPLICATION FILED FEB. 17, 1905. RENEWED JAN. 30, 1909.

929,951.

Patented Aug. 3, 1909.

6 SHEETS—SHEET 1.

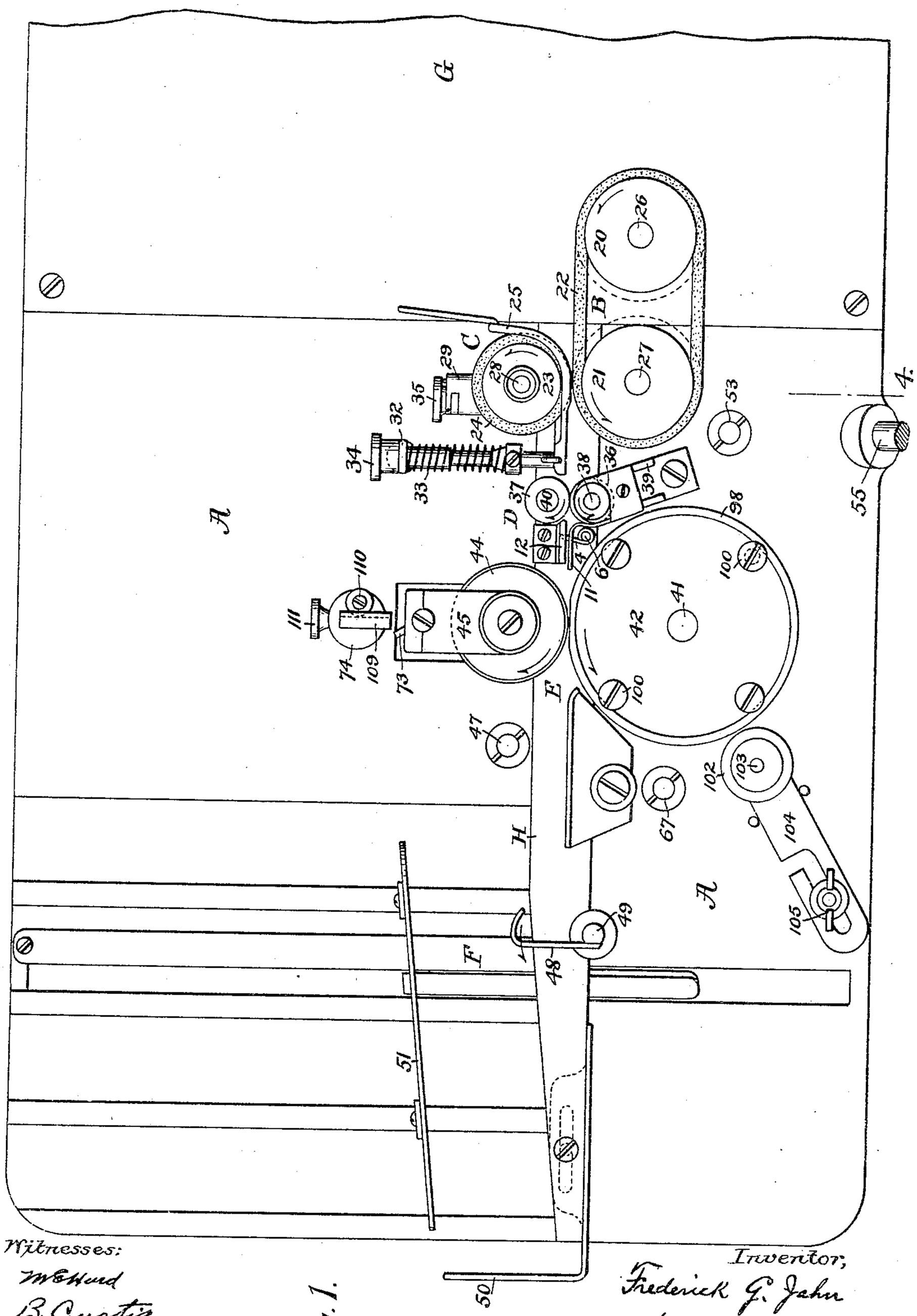

Fig. 1.

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6 SHEETS—SHEET 2.

Fig. 2.

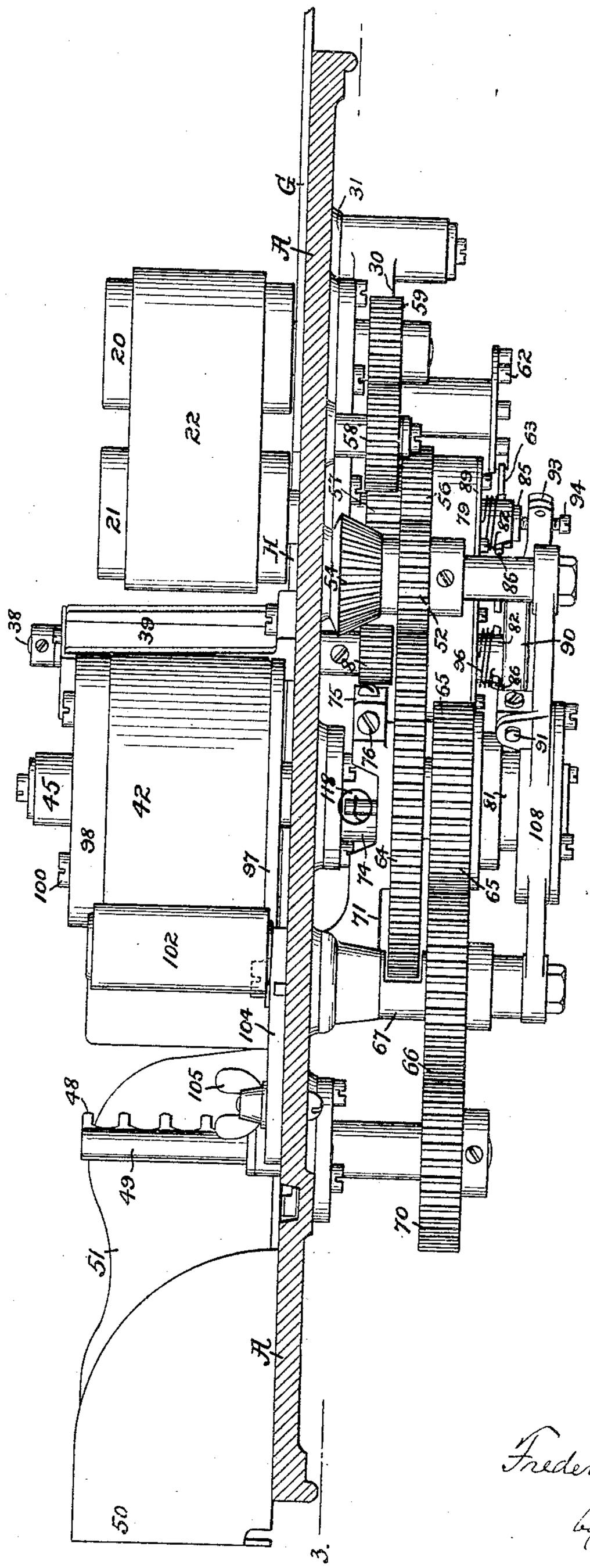

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Fig. 4.

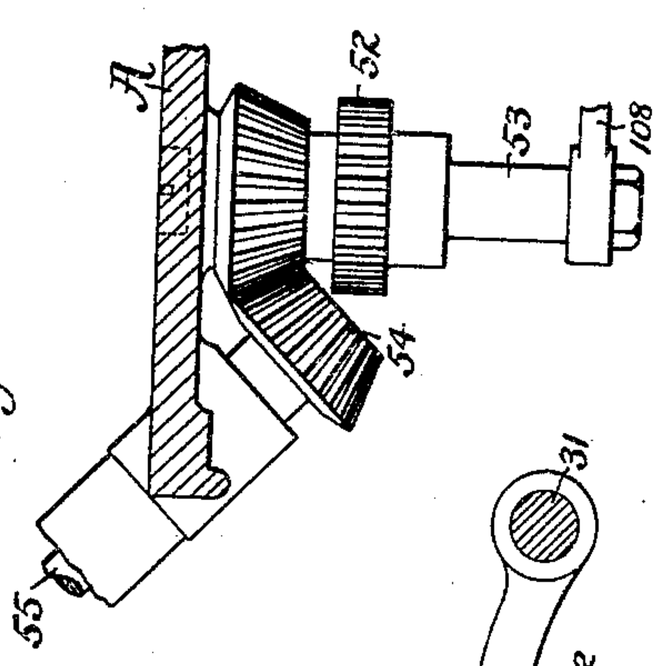


Fig. 5.

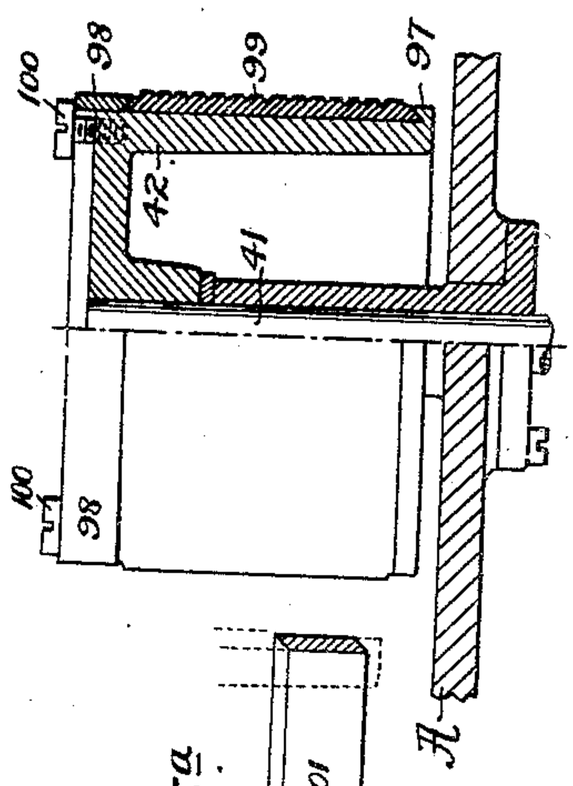


Fig. 5a.

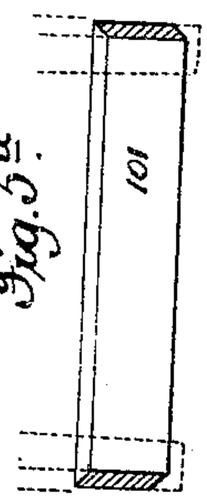
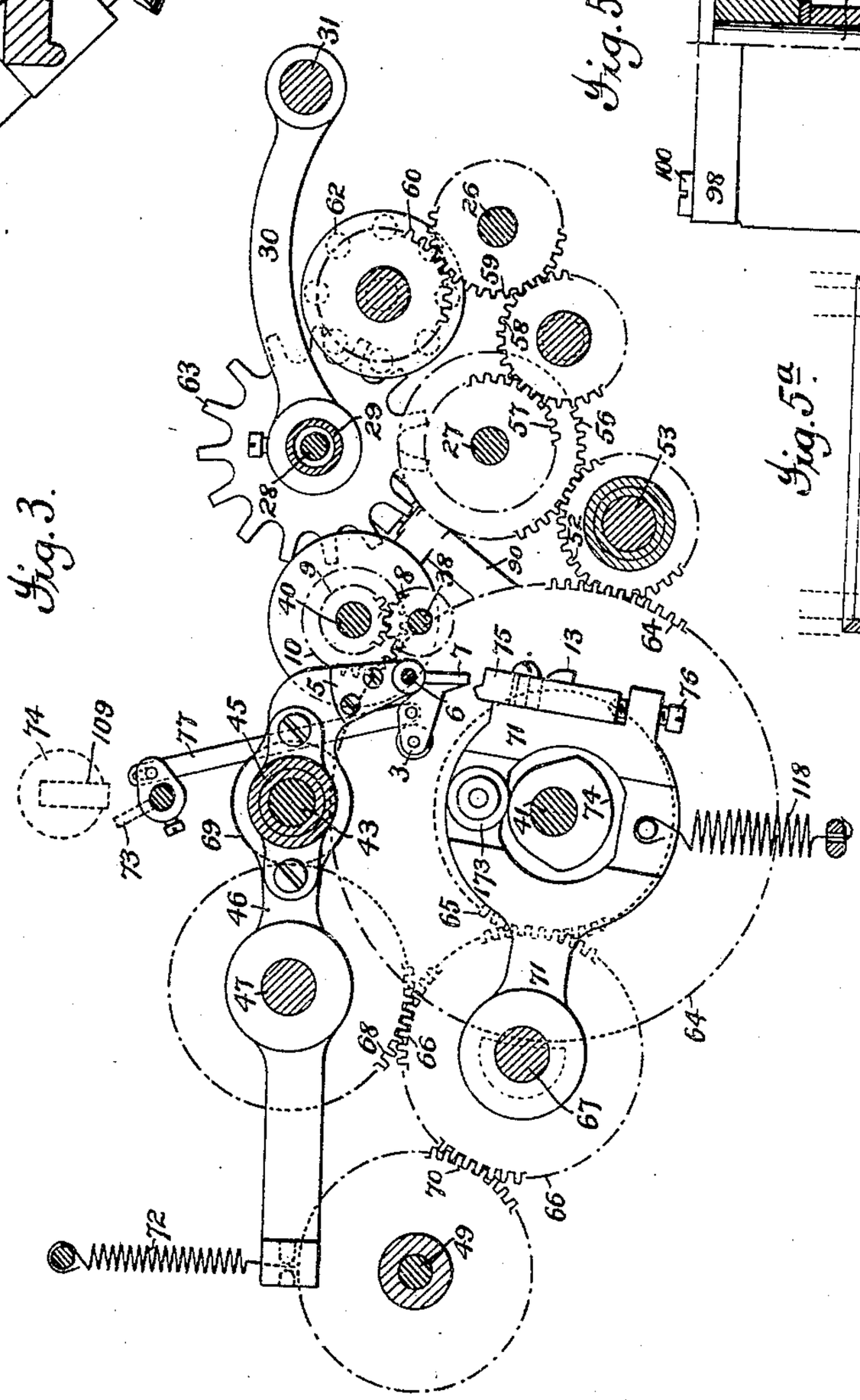


Fig. 3.



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6 SHEETS—SHEET 4.

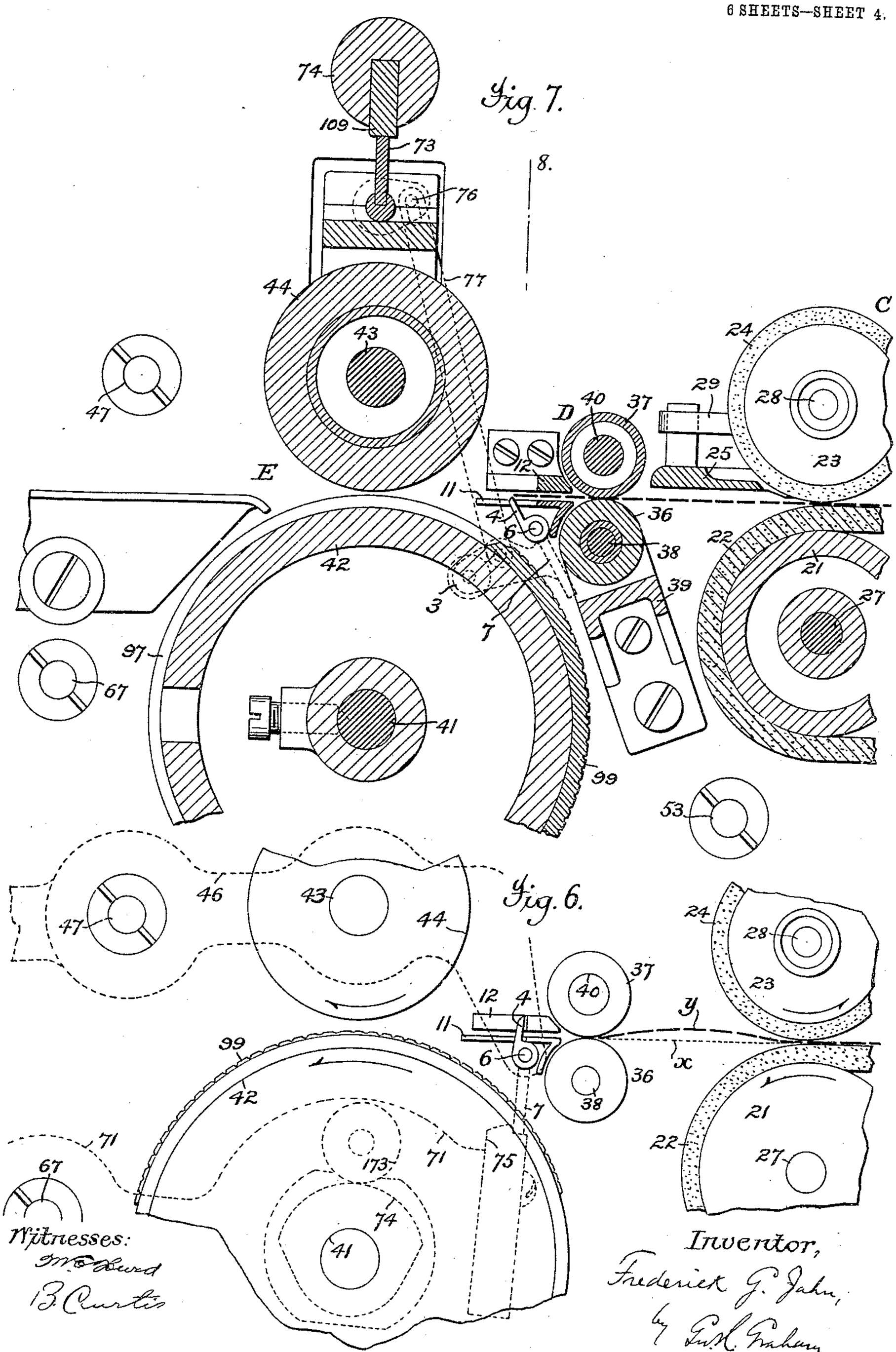

Fig. 7.

8.

Fig. 6.

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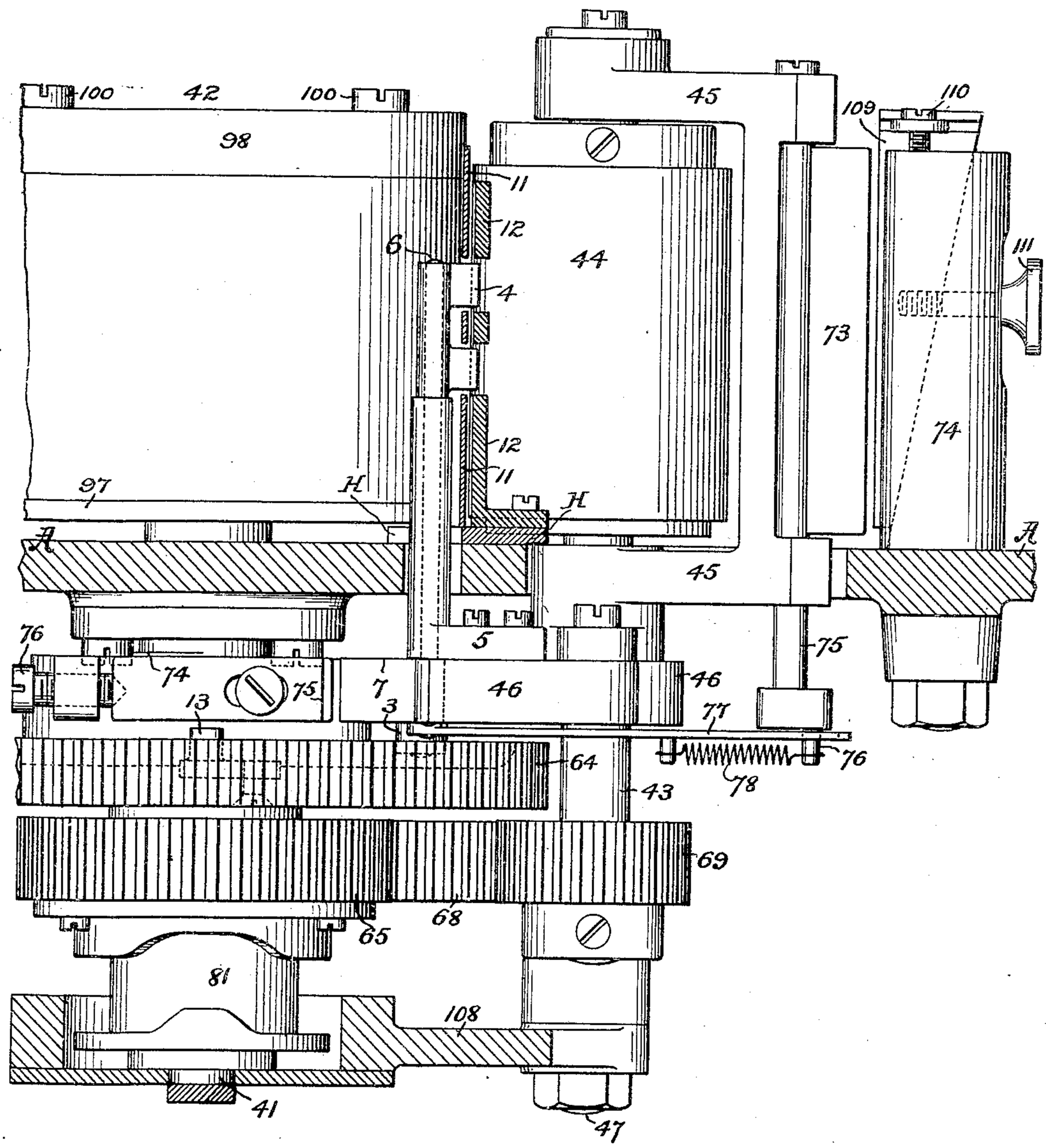
6 SHEETS—SHEET 5.

Fig. 8.



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6 SHEETS—SHEET 6.

Fig. 9.

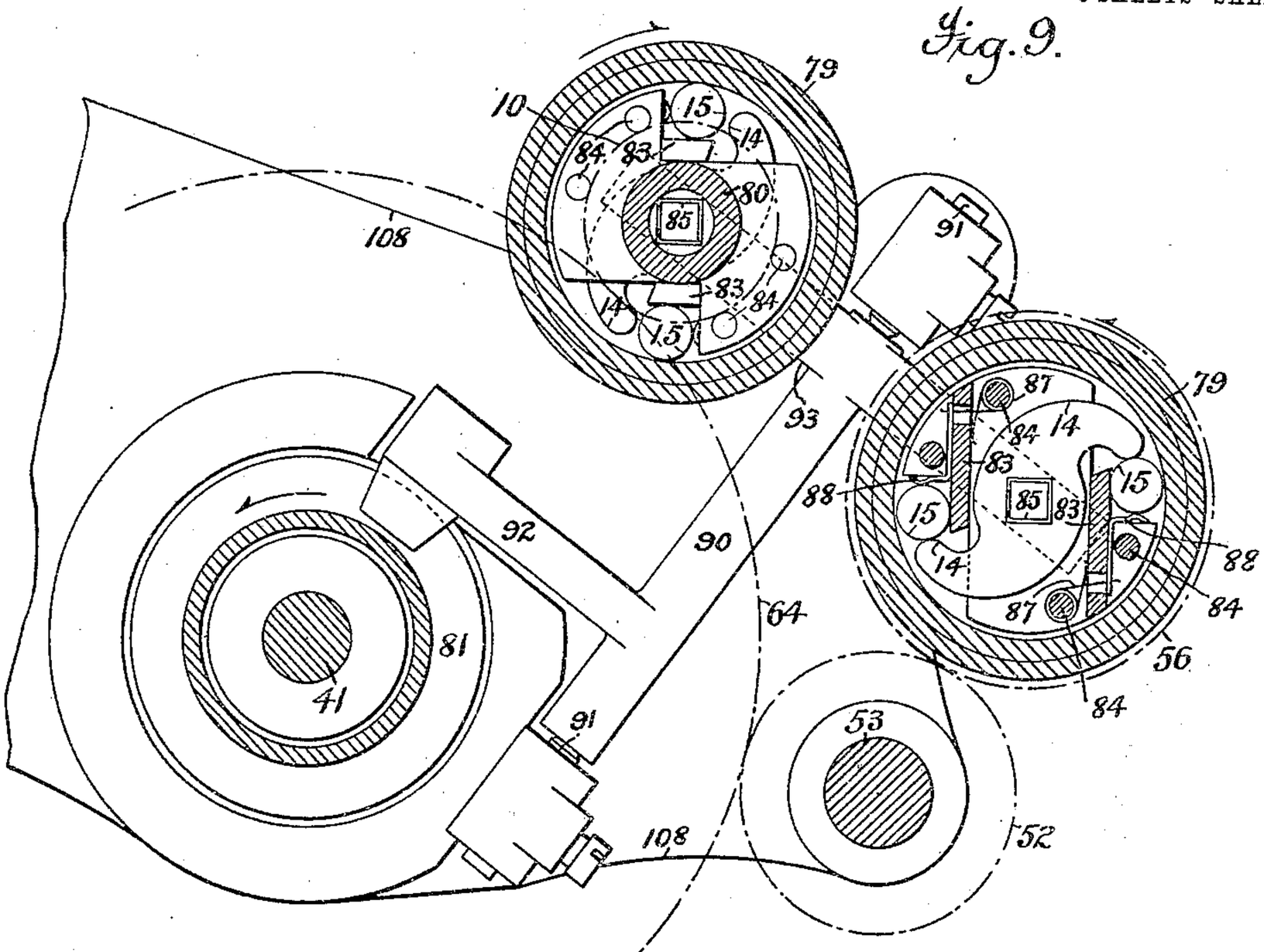
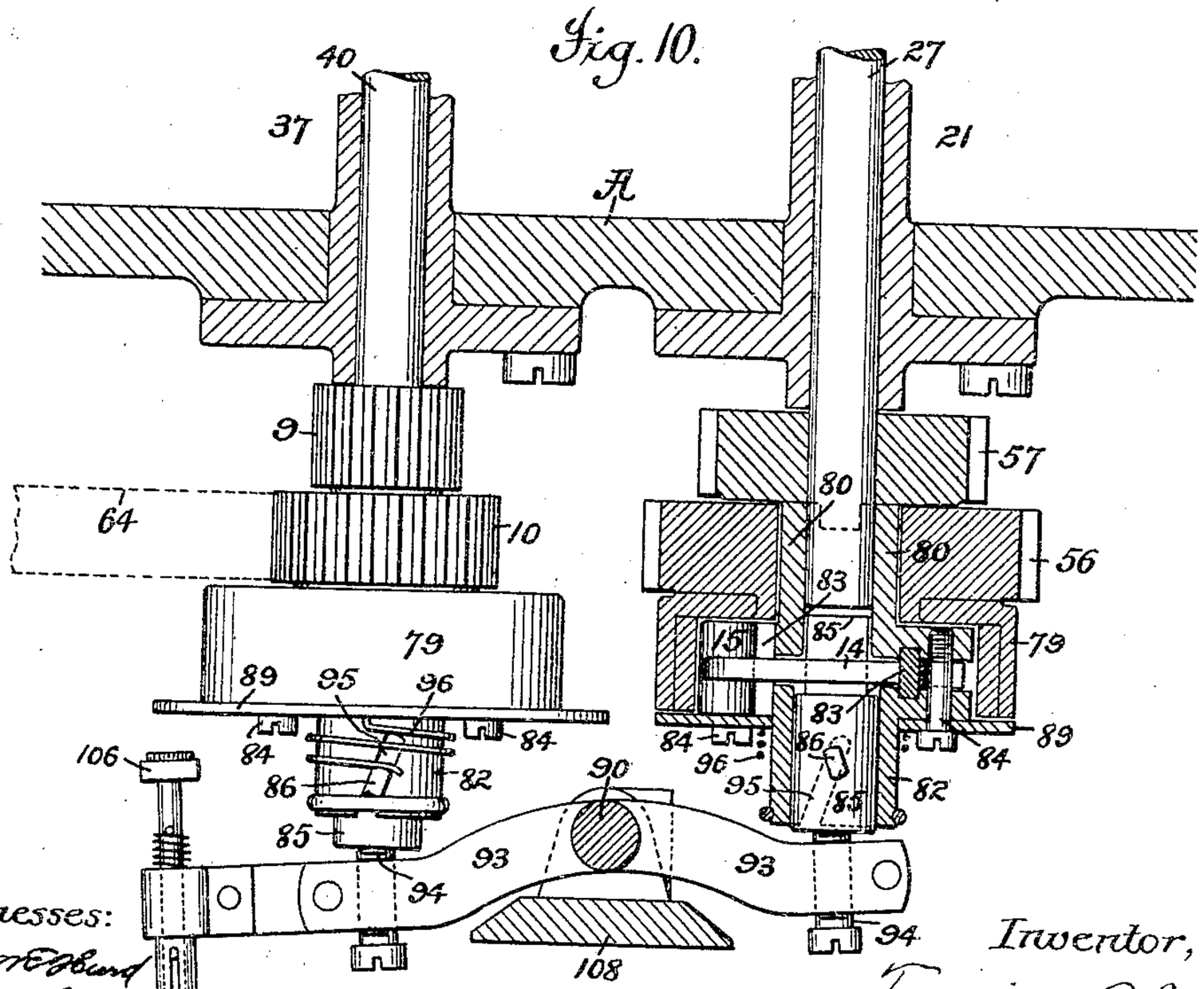


Fig. 10.



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UNITED STATES PATENT OFFICE.

FREDERICK G. JAHN, OF NEW YORK, N. Y., ASSIGNOR TO THE INTERNATIONAL POSTAL SUPPLY COMPANY OF NEW YORK, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

PRINTING MECHANISM.

No. 929,951. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed February 17, 1905, Serial No. 246,148. Renewed January 30, 1909. Serial No. 475,218.

To all whom it may concern:

Be it known that I, FREDERICK G. JAHN, a citizen of the United States, residing in the borough of Brooklyn, city and State of New York, have invented certain new and useful Improvements in Printing Mechanism, of which the following is a specification.

This invention relates generally to printing machines adapted for use for a variety of purposes and particularly for use where an impression either large or small is needed on material of varying conditions, dimensions and weight.

The improvements are embodied in a machine adapted to feed single sheets from a stack or pile of sheets and introduce individual sheets in proper time and register to the printing couple to receive the impression and thereafter to deliver and orderly stack the printed sheets, the operations being automatically accomplished either by hand power or other source of power and without the aid of skilled labor.

Considered *seriatim:* The feed mechanism is arranged to feed with equal facility and accuracy sheets of the largest dimensions of the printing capacity of the printing couple as well as the smallest that may be required to print. Opposed to the feed and coacting therewith is a separator for preventing the feed of two or more sheets at a time. Beyond the feed mechanism and separator are a pair of timing rolls between which the sheet fed by the feed mechanism passes to the printing couple which may consist of a printing cylinder or other device adapted to carry on its surface and be adjusted to any desired point thereon either type or stereotype of any form including rubber and celluloid or other material and an opposed impression roller or other device covered with a more or less yielding material such as rubber in contradistinction to a hard or metallic surface. And beyond the printing couple the printed sheets are received by a stacking or delivering mechanism by which they are orderly stacked for removal from the machine. In the preferred embodiment of the invention the printing couple rotates continuously and the feed mechanism and timing rolls act intermittently their movement being such that the leading edge of individual sheets are carried to the bite of the timing rolls and arrive at said bite at the time said rolls are at rest, the carrying movement of the feed being theoretically slightly more than is needed to present the leading edge at the bite of the timing rolls, the latter rolls then rotate in time with the printing cylinders to carry or feed the partially advanced or fed sheet to the printing couple and thereby insure the leading edge of the sheet always arriving at a predetermined point on the circumference of the printing cylinder and thus permit its printing surface to be located thereon to impress the sheet at any desired part thereof.

Mechanism coacting with the printing couple or with one of its members is provided so that when no sheet is present or is being fed into printing position the printing cylinder and impression roller will be out of contact or so far separated one from the other that no impression of the type or other matter on the printing cylinder will be imparted to the surface of the impression roller to thereafter form an offset on the back of the succeeding sheet or sheets being printed or impressed. This mechanism governing the impression coaction of the printing couple is controlled by a finger extending into the path of movement of the sheets to the printing position and is preferably located just beyond the timing rolls and between them and the printing couple. When a sheet is being advanced or being timely fed toward the printing couple the leading edge thereof will cause the finger to be rocked or moved to one side and thereby allow the printing couple to assume a coactive printing relation in time to properly act on the sheet that has brought about that relation. Mechanism is also provided so that when the printing couple assumes its coactive printing relation the impression roller is rigidly supported in alinement with the printing surface so that uniformity of impression and needed pressure are attained.

The printing surface of the printing cylinder is inked by any suitable inking device.

As a better understanding of the improvements will be had from a detailed description thereof, such description will now be given, reference being made to the accompanying drawings; in which:

Figure 1, is a plan view of the machine, a portion of its table plate being broken away, the operating hand wheel being removed and its spindle shown in section. Fig. 2, is a side elevation, the edge of the machine table being in section to better expose parts in contact with its under surface. Fig. 3, is a hori-

zontal section taken just below the machine table exposing the greater portion of the underlying mechanism in plan. Fig. 4, is a cross section on the line 4 of Fig. 1, showing the driving spindle and its immediate connections. Fig. 5, is a partial elevation and vertical section of the printing cylinder and its support. Fig. 5ª is a sectional elevation of one of the annular spacing rims. Fig. 6, is a plan view, enlarged, of a portion of the feed, timing and printing instrumentalities; and Fig. 7, is a horizontal section of the same. Fig. 8, is an enlarged cross section taken substantially on the line 8, Fig. 7. Fig. 9, is an enlarged horizontal section of the intermittent drive for the feed and timing mechanism; and Fig. 10, is a sectional elevation of the same.

The improvements are shown as embodied in a machine in which the axes of the operative parts are vertically arranged with respect to the machine table or base A but such arrangement while preferred in some instances is not deemed essential. The operative parts are supported above and below said table, those arranged above the table surface being the active elements of the machine in producing the printed product while those supported below the table being the gearing and other mechanism by which the timely coactive and automatic movements of the active elements are brought about.

The instrumentalities consist in the main of a sheet or other feeding mechanism B, with a separator C, a timing mechanism D, a printing mechanism or couple E and a stacker or delivery mechanism F. The machine table A is continued outwardly by a partially overlying table plate G whose top surface is continued through the machine by a narrow plate H secured to the top of the table and forming a level sheet track for the lower edges of the sheets moving from the feed mechanism to the stacker.

The feed mechanism B as here shown consists of a pair of rolls 20, 21 around which is stretched an endless carrying band 22 of rubber, or each roll may carry a rubber ring as indicated by dotted lines in Fig. 1, forming a feeding or carrying surface for individual sheets of a stack or pile of sheets which stand vertically on their lower edges on the table plate G resting or bearing with the aid of the fingers of the operator toward the carrying band or rings. Directly opposed to the roll 21 is the separator C which consists of a roll 23 carrying a rubber ring 24 and with this separator roll is combined a separator guide plate 25 with an opening for the protrusion of the roll and curved at one end to form a wedge shaped entrance for the sheets toward the bite of the opposed rolls 21 and 23 so that the pile or stack of sheets will lay with their leading edges forming a wedge the narrow portion being directed toward the said bite. The other portion of the guide is straight and extends for a short distance along and at one side of the path of movement of the sheets to the timing mechanism.

The spindles 26, 27 of the feed rolls 20, 21 rotate in fixed bearings carried by the machine table while the separator roll and guide are adapted to yield with respect to the feed roll 21 and to be adjusted with respect to and independently of each other and with respect to said roll 21. For this purpose the spindle 28 of the separator roll is borne by a bearing 29 extending upwardly from one end of a horizontal rock arm 30 pivoted at its opposite end to a stud 31 depending from the machine table, see Figs. 2 and 3. The separator guard 25 is also carried by the bearing 29 and has at its inner end a rod pivoted thereto and extending to the eye of a post 32 rising from the machine table and having an adjusting thumb nut 34 for moving the guide and roll 23 against the pressure of a coiled spring 33 bodily from and toward the face of the feed roll 21 and another thumb nut 35 for adjusting the guide with respect to the roll 23, each adjustment being made to attain the effective operation of the rollers in feeding and separating single sheets from the pile or stack of sheets and to compensate for the wear of the rubber ring 24 and feed band 22.

The timing mechanism consists of a pair of rolls 36, 37 arranged a short distance beyond the feed and separator rolls on opposite sides of the path of movement of the sheets to the printing couple. The spindle 38 of the roll 36 is mounted in bearings in a bracket 39 secured to the top of the machine table so as to render the roll adjustable toward and from its companion roll 37, and the spindle 40 of the roll 37 is supported by a fixed bearing secured to the machine table.

The spindle 41 of the printing cylinder 42 of the printing couple is mounted in fixed bearings in the machine table, while the spindle 43 of the impression roller 44 is mounted in bearings provided by a U-shaped frame 45 secured to a printing pressure arm 46 arranged immediately below the machine table to swing within narrow limits on a stud 47 fixed to and depending from said table.

The rotating blade 48 of the stacker is carried by a spindle 49 supported in fixed bearings secured to the machine table and in the orderly stacking of the printed product coacts with an adjustable end stop 50 and a slidable back plate 51 that retreats as the printed product accumulates and is pressed backward by the action of the rotating blade to make room in the stacker for incoming sheets.

The mechanism receives motion from the rotation of a driving gear 52 that is mounted on a stud 53 secured to the machine table

which gear is secured to the sleeve of one of a pair of bevel wheels 54, the other being secured to the end of an inclined driving spindle 55 mounted in a bearing carried by said table, see Figs. 1 and 4; the spindle being rotated by a hand or other wheel secured to its upper end. The driving gear 52 meshes with and drives a gear 56 mounted concentric with the feed roll spindle 27 which through suitable clutch or stop and start mechanism to be hereinafter described causes timely rotations of a gear 57 mounted on said spindle 27. The gear 57 through an intermediate 58 on a stud depending from the machine table communicates the intermittent motion of the spindle 27 to a gear 59 on the other feed roll spindle 26. The gear 59 in turn communicates similar motion to an intermediate gear 60 on a stud 61 depending from the machine table, while the downwardly extending sleeve of said intermediate 60 carries at its lower end a pinion 62 that engages and moves a toothed wheel 63 fast to the lower end of the separator roll spindle 28 and imparts similar intermittent movement to the separator roll 23, but in a direction opposed to that of the feed. The teeth of the pinion 62 are formed by studs riveted to a flat plate while the engaging teeth of the gear 63 cut into a flat plate are sufficiently deep to permit a swinging movement of said gear toward and from said pinion without disengagement of the teeth. The aforesaid driving gear 52 also meshes with a larger wheel 64 fast to the printing cylinder spindle 41 which in turn meshes with and continuously rotates a gear 10 mounted concentric with the timing roll spindle 40 and through suitable clutch or intermittently operative mechanism to be hereinafter described timely rotates said spindle and its roll 37. Said spindle 40 also carries a gear 9 which meshes with a gear 8 fast to the spindle 38 of the companion timing roll 36 whereby the two rolls rotate in unison. The printing cylinder spindle 41 has fast to it another and smaller gear wheel 65 which through an intermediate 66 on a stud 67, and another intermediate 68 on the printing pressure arm pivot stud 47 drives a gear 69 fast to the spindle 43 of the impression roller 44, whereby the rotations of the impression roller and printing cylinder are in unison and at the same surface speed. The intermediate 66 also meshes with and rotates a gear 70 fast to the spindle 49 of the stacker blade 48, for rotating the latter.

The means whereby the presence or absence of an incoming sheet may determine the coactive impression relation between the printing cylinder and the impression roller are interposed in the present embodiment of this part of the invention, but not necessarily so, between the spindle 41 and the supports for the impression roller 44. One of the purposes of the arrangement of gearing intermediate the cylinder spindle 41 and the roller spindle 43 is to allow a certain latitude of movement of the latter roller toward and from the printing cylinder, and means are provided for automatically moving and holding the surface of the impression roller away or out of contact with the printing surface on the cylinder 42 which means are rendered ineffective or quiescent by the fact that a sheet has arrived or is advanced at the proper time to receive the impression. Generally speaking these means consist of a movable wing or strut as 7, one portion extending into the path of the advanced sheet as its leading edge emerges from between the timing rolls on its way to the printing couples, and the other portion being adapted to be interposed between say, the printing pressure arm 46 and a cam operated lever 71 and removed from said position according as the presence or absence of a sheet to be printed may determine. As organized in the present machine in the absence of a sheet to be printed or on its arrival too late to make proper register with the printing surface the wing or strut will become the active instrumentality whereby during the continued rotations of the printing cylinder, the cam lever will positively move and hold the impression roller away and out of surface contact with the printing surface. If, however, the timely arrival of the sheet into printing register does or is to occur the wing or strut will become moved out of its normal operative position whereby the cam lever which continues to operate irrespective of the position of the strut will make a movement without affecting the printing couple so that the impression roller will stand or be held in impression contact with the printing cylinder and the sheet will be impressed upon. The impression roller is held to impression duty by a spring 72 connected to a prolongation of the printing pressure arm 46 and it and its frame and arm are bodily rocked away from the impression position by the cam lever 71 against the force of said spring; and the end of said prolongation of the arm 46 may rest and move against the underside of the machine table to prevent the sagging of said arm under the weight of the impression roller and its frame.

The wing or strut 7 is fixed to the lower end of a pin 6 adapted to rock in bearings provided by a bracket 5 secured to the printing pressure arm 46; the upper end of said rock pin carries a finger 4 extending across the path of movement of the sheets and across the space between a pair of fixed guides 11, 12 arranged on opposite sides of said path. The active position of the wing or strut, while the cam lever is acting to hold the impression roller out of impression position, is indicated by the dotted lines in Fig. 6, while its ineffective or inactive position

due to the timely arrival of a sheet to be impressed is indicated by the dotted lines in Fig. 7, and its effective or acting position while the cam lever is inactive is indicated in Fig. 3.

The cam lever 71 rocks on the stud 67, is shaped to straddle the printing cylinder spindle 41 and carries a roll 173 that bears against a suitable shaped cam 74 fast to said spindle 41. The cam roll is held against said cam by a suitable spring 118. The cam 74 is so shaped that it will permit the impression roller under the force of the spring 72 to idly move into its impression position once during each rotation of the printing cylinder at which time the lever is removed from contact with the strut 7 so that the sheet which may be then present will meet with very slight resistance in moving the strut to one side so that the succeeding movement of the lever will become an idle one and the impression roller will remain in its impression position. The movement of the roller into impression position is coincident with the meeting of a flat on the printing cylinder therewith so that the brace hereinafter described may be moved into active position without frictional contact with its coacting abutment.

For the purpose of adjustment and to provide a hardened surface the contact point of the cam lever 71 with the strut 7, is formed by a removably adjustable nose piece 75 held in place by a screw and adjusted laterally with respect to the lever by an end screw 76.

To restore the wing or strut 7 to its effective or acting position after its movement to the inactive position the gear 64 carries a contact or cam 13 that moves against a roll carried by an arm 3, extending from the side of the strut. When the strut has been moved to its inactive position its arm 3 is projected across the path of movement of said contact 13 so that at the proper time the latter will act to restore the wing or strut to its active position and at the same time return the finger 4 across the path of movement of the sheets.

To insure uniformity of impression the present embodiment employs a movable brace or blade 73 arranged to be interposed between the bearings of the impression roller 44 or its carrying frame and an unyielding abutment 74. Means are provided by which each time the printing couple is to coact to produce an impression the brace or blade will be moved or interposed between the impression roller frame 45 and the abutment 74 so that said roller 44 will be held equally rigidly to duty, thus supporting the roller in even surface alinement with the printing surface, the strain of impression being received and borne by the fixed abutment. The blade 73 projects radially from a rod 75 pivotally carried in bearings in the roller frame 45, and thus moves bodily with the impression roller when it is moved into and out of the impression position and at the same time from and toward the abutment.

The brace or blade 73 is conveniently and timely moved into and out of active position with respect to the abutment 74 by a connection with the movable wing or strut 7. For this purpose the blade rod 75 carries at its lower end a crank pin 76 that is connected by a link 77 with the arm 3 of the strut 7. One end of the link is slotted to provide limited lost motion between said strut and the blade. A spring 78 yieldingly connects the link with the crank pin, (Fig. 8), which serves to allow an earlier movement of the strut while the impression roller 44 is in its out of impression position, preventing the immediate interposition of the brace behind the fixed abutment, but as soon as the spring 72 has acted to move the impression roller into impression position the yielding connection with the brace or blade 73 serves to move the latter directly between the fixed abutment and the roller frame 45 as in Fig. 7, so that during the making of the impression the impression roller is held firmly and evenly to duty and a clear uniform impression obtained. By reason of the connections between the strut 7 and the brace 73 when the strut is returned to its normal active position the blade is simultaneously returned to its inactive position, Figs. 1 and 3, which allows the cam lever 71 through the interposition of the strut to move the impression roller and frame to their non-printing position as in Fig. 6. The contact face of the abutment 74 with the brace 73 is rendered adjustable by a wedge shaped plate 109 lying in a recess in the abutment and resting against its inclined wall as in Fig. 8. The needed limited adjustment of the plate is had by a head screw 110, and after adjustment is fixed in place by a clamp thumb screw 111.

The operative connections whereby the feed and timing rolls coöperate to present the sheets in proper register with the printing surface of the printing couple, consist of an intermittent drive mechanism for said rolls and is best seen in Figs. 9 and 10. It should be premised that the intermittent drive mechanism is such that the feed mechanism moves a single sheet from the pile or stack and presents its leading edge into the bite of the timing rolls as indicated by the straight dotted lines *x*, Fig. 6. The feed movement, however, is slightly in excess of that theoretically needed to carry the leading edge of the sheet into said bite in order to insure a slightly delayed sheet arriving in time. At the time the leading edge of the sheet enters the bite of the timing rolls as shown in said Fig. 6, said rolls are at rest and form a stop for the forward edge of said sheet, followed by the rotation of the timing rolls so as to carry

the sheet forward to the printing couple. The excess of movement of a normally fed sheet results in a slipping of the feed or in bending it somewhat out of the straight to one side or the other as indicated by the curved dotted line *y*, Fig. 6. The start of rotation of the timing rolls is so timed with relation to the rotations of the printing cylinder that the sheets will be taken and fed thereto and always meet the surface of said cylinder at the prearranged point. The intermittent drive mechanism for the feed roller and for the timing rolls is substantially alike, their direction of movement being reversed, and consists in each case of a constantly rotating clutch shell 79 and an intermittently rotated hub 80 with diametrically situated clutch rolls 15 interposed between the two, and means such as a rock arm 14 for moving said rolls out of clutching position whenever the feed roll and timing rolls are to rest. The unclutching of the clutch rolls is automatically controlled by a cam 81 rotating in unison with the printing cylinder to control the feed and time of movement of each sheet in harmony with the prearranged location on the surface of said cylinder. In the case of the feed roll 21, see Figs. 9 and 10, the clutch shell 79 forms a part of or is secured to the gear 56, while its coöperating hub 80 is connected to the feed roll spindle 27 and gear 57 and in the case of the timing roll the clutch shell is secured to the gear 10 and the hub to the timing roll spindle 40 and gear 9. For convenience in manufacture and assembling the hub 80 is made in two parts, the lower part 82 separated from the upper part by distance pieces 83 and held together by screws 84. The distance pieces also provide diametrically opposed and tangentially arranged hardened bearing faces against which the rolls 15 bear and the space between the two parts of the hub is occupied by the disengaging rock arm 14, its ends arranged to meet the forward walls of the rolls 15, with its polygonal opening slidingly mounted on or engaged by the similarly shaped end of a plunger 85 that is movable both vertically and rotatively with respect to the hub 80. The lower end of the plunger has an oppositely projecting cross pin 86 which takes into inclined slots 95 in the hub so that when the plunger is moved vertically it will also rotate slightly or twist and thereby rock its disengaging arm 14 into or out of contact with the clutch rolls 15. Each of the clutch rolls is insured moving into clutching position by a spring 87 acting on a slidable bearer 88 for contact with the roll and yields rearwardly with the roll when the disengaging arm acts to move said clutch rolls out of clutching position. The clutch rolls rest loosely in place on a bottom plate 89 that is held to the hub by the screws 84 before described. After the clutch has operated to rotate either the feed rolls or the timing rolls and is unclutched, the rolls are free to rotate independently of the clutch under the pull of the sheet should it be longer than the feed travel of said rolls. This free rotation of the timing rolls, may, however be prevented by a brake or stop to be hereinafter described.

As the feed and timing rolls in the present embodiment of the invention rotate in succession and preferably never together it results that when the timing rolls are clutched and being rotated the feed roll is unclutched and at rest as indicated by the position of the respective clutch rolls 15 in Fig. 9; and when the feed roll is clutched and rotating the timing rolls are unclutched and at rest. It follows that the single properly shaped cam 81, see Fig. 8, may operate to cause the simultaneous clutching and unclutching of the respective rolls. For this purpose there is provided a cam lever 90 mounted to rock on center pins 91 carried by bearings projecting from the spider plate 108. This lever has an arm 92 carrying a cam roll engaging the cam 81 and a pair of oppositely extending arms 93 having at their ends adjustable contacts formed by set screws 94 for contact with the lower ends of the key or plungers 85. The upward vertical movement of each plunger is had by a like movement of its end of the lever 90 against the force of a coiled spring 96 which returns the plunger to its down position following a like movement of its end of said lever. To avoid rotation of the timing rolls due to their momentum after the clutch has been disengaged, it is preferable to employ a stop therefor, which as seen in Fig. 10, may be a frictionally acting brake therefor provided by a yieldingly mounted pad 106 carried by one of the arms 93 and arranged to act simultaneously with the disengagement of the clutch rolls 15 against the extended surface of one of the bottom plates 89.

The printing cylinder 42 is preferably provided with means for removably securing the printing surface, such as a stereotype plate or the like in any desired position thereon circumferentially and laterally. Thus the cylinder is provided with a pair of rims arranged to engage the opposite edges of the printing surface arranged to be adjusted laterally on the cylinder, one toward or away from the other for removal of the printing surface or to accommodate them to the width thereof. In the present instance the cylinder is formed at one end with a rim 97, which may be a fixed one, and at the other end with a laterally adjustable clamping rim 98. The opposed faces of the rims have an annular undercut as seen in Fig. 5, to receive, for example, the inclined edges of a stereotype printing surface 99 between them

to clamp and confine the same to the cylinder. The adjustable rim is held in place, clamping the edge of the printing surface by a plurality of screws 100 taking into the cylinder end with their heads bearing against the exterior edge of said rim. By loosening the adjustable rim the printing surface may be turned circumferentially around on the printing cylinder to occupy any position required. Smaller width printing surfaces may be used and secured in place by employing one or more removable filling spacing rims 101, shaped as seen in Fig. 5ª, of appropriate width to fit onto the cylinder and widen out the otherwise narrow printing surface on either or both of its edges, so that the function of the exterior rims 97, 98 may be retained. Other forms of clamping devices may be used.

The printing surface 99 may be inked in any suitable manner and by any desired means, that shown consisting of an inked felt or other ink applying roll 102, Figs. 1 and 2, adapted to rotate in contact with said surface on a stud pin 103 carried by a removable bar 104 adjustably secured to the top of the machine table A by a clamping thumb nut 105.

From the foregoing description the operation of the machine will have been fully understood. It may be added, however, that the sheets of material to be marked or printed are arranged in greater or lesser quantity vertically on their longitudinal edges on the table plate G, against the feed belt 22 with their forward ends directed toward the curved guard 25. Upon power being applied to the machine the feed belt will move the sheet immediately in contact therewith forward past the reversely rotating separator roller 23, which is acting to hold all the other sheets from moving forward, so as to bring the forward end of said sheet into the bite of the then stationary timing rolls 36, 37, whereupon its forward movement momentarily ceases. The timing rolls then rotate to move the sheet forward, its leading end striking and rocking the movable wing 7 thereby causing the impression roller 44 to occupy its active relation with the printing cylinder 42, so that when the advancing sheet passes therebetween it will receive the desired impression from printing form supported by said cylinder. The printed sheet then passes onward into the stacker F, its rearward portion being struck by the rotating blade 48 and thereby moved laterally out of the path of movement of the succeeding sheet.

While the word "sheet" is employed herein to designate the article or piece handled by the machine it is obvious that its use is not necessarily limited thereto.

No claim is made to the particular clutch mechanism shown and described herein as the same forms the subject-matter of a co-pending application filed by me February 17th, 1905, Serial No. 246,149. Neither is claim made to the specific form of separator mechanism, the drive therefor and certain parts of the handwheel drive herein shown and described as the same forms the subject-matter of and the co-pending application filed by me February 24th, 1905, Serial No. 247,198.

What is claimed is:

1. The combination of a sheet feed mechanism a reversely rotated separator roll, forwardly rotating timing rolls having definite periods of rest and adapted at such periods to act as a stop for the head of the sheet presented by the feed mechanism, a sheet controlled printing couple, and a stacker for the printed product.

2. The combination of a sheet feed mechanism, a reversely rotated separator roll, forwardly rotating timing rolls having definite periods of rest and adapted at such periods to act as a stop for the head of a sheet, and a sheet controlled printing couple.

3. The combination of the sheet feed mechanism, the printing couple, an intermittently operative clutch embracing a continuously rotating member for the feed mechanism, and a cam carried by one of the printing members for controlling the action of said clutch device.

4. The combination of the timing rolls, the printing couple, an intermittently operative clutch device for the timing rolls and a cam operating in unison with one of the printing members for controlling the action of said clutch, as described.

5. The combination of the sheet feed mechanism the timing rolls, a clutch device for said feed mechanism and rolls, a cam for causing the intermittent action of the clutch and a printing couple, as described.

6. The combination of intermittently acting sheet feed mechanism, intermittently rotating timing rolls, a cam for controlling said intermittent motion and a printing couple, as described.

7. The combination of the sheet feed mechanism, the timing rolls, clutches therefor interposed between them and a driving part, a cam for controlling the action of said clutches and a printing couple, as described.

8. The combination of the printing couple, a sheet feed mechanism, a constantly rotating driver therefor, an interposed clutch device embracing a continuously rotating member for the feed mechanism and a rotating cam for controlling the action of the clutch, as described.

9. The combination of the printing couple, a sheet feed mechanism, an intermittently acting drive device embracing a continu-

ously rotating member for said feed mechanism and a rotating cam for controlling the action of said drive device, as described.

10. The combination of the printing couple, a feed roller for presenting sheets to said couple, a constantly rotated gear on the feed roller spindle a clutch interposed between said gear and spindle and a rotating cam controlling the action of the clutch, as described.

11. The combination of the printing couple, a feed roller and timing rolls coacting to present sheets to said couple, a constantly rotating gear on the feed roller spindle and on one of the timing roll spindles, clutches interposed between said gears and spindles and a cam for controlling the action of the clutches, as described.

12. The combination of a printing couple a feed roll for feeding material to said couple, a constantly rotating part mounted concentric with the axis of said roll, clutch rolls interposed between said part and said roll and a cam and connections for controlling the position of said clutch rolls, as described.

13. The combination of a printing couple a feed roll for feeding material to said couple, a constantly rotating shell mounted concentric with the axis of said feed roll, a hub carried by the feed roll within said shell, clutch rolls interposed between the shell and hub and a disengaging arm for said clutch rolls, as described.

14. The combination of a printing couple a feed roll for feeding material to said couple, a driving shell therefor mounted concentric with the axis of said roll a hub connected to said feed roll, clutch rolls interposed between the shell and the hub, a disengaging arm for said clutch rolls carried by said hub and means independent of the roll for controlling the action of said arm, as described.

15. The combination of a printing couple a feed roll for feeding material to said couple, a driving shell therefor, a hub connected to the feed roll and having tangential bearing faces, clutch rolls interposed between the shell and the hub bearing faces, a rock arm for moving the clutch rolls out of operative position and a cam and connection with the rock arm for controlling its movement, as described.

16. The combination of a printing couple a feed roll for feeding material to said couple, a driving shell therefor, a hub connected to said feed roll and having tangential bearing faces, clutch rolls interposed between said shell and the hub bearing faces, a disengaging rock arm for said clutch roll and carried by the hub, a plunger for rocking said arm and a cam and lever for moving said plunger, as described.

17. The combination of a printing couple one member of which is movable toward and from the other, means for moving said movable member and a movable strut pivotally connected to the movable member and interposed between said means and the movable member when no sheet is present, as described.

18. The combination of a printing couple, a lever for separating the members thereof, a movable strut interposed between the lever and one of said members when no sheet is present and said strut pivotally connected to said latter member and having a portion in the path of movement of the sheets passing to the printing couple.

19. The combination of a printing couple, a movable frame carrying one member of said couple, a rock lever and a movable strut pivotally connected to the frame for interposition between the frame and lever for communicating the movement of the lever to the frame when no sheet is present, as described.

20. The combination of a printing couple, a movable frame carrying one member of said couple, a lever, and a strut pivoted to the movable frame to impart a movement of the lever to the frame in the absence of a sheet and to interrupt such movement when a sheet is present.

21. The combination of a printing couple, a movable frame carrying one member of said couple, a displaceable strut pivoted to the frame and a lever for contact with said strut when no sheet is present, as described.

22. The combination of a sheet feed mechanism, a printing couple, a rock frame carrying one member of said couple, a rock lever for moving said frame and a strut carried by the rock-frame adapted to be moved from interposition between the lever and frame by the sheet advanced by the feed mechanism, as described.

23. The combination of a printing couple, a movable frame carrying one member thereof, a cam for moving said frame in one direction and a rockable strut carried by said frame for interposition between the cam and frame when no sheet is present, as described.

24. The combination of a printing couple, a movable frame carrying one member thereof, a vibrating lever, a sheet operated strut supported by said frame for interposition between the lever and frame when not so operated and a sheet feed mechanism, as described.

25. The combination of a printing couple, a movable frame carrying one member thereof, an operating lever, a strut supported by said frame for interposition between the lever and frame when no sheet is present and a restorer for moving the strut into interposition, as described.

26. The combination of a printing couple, a movable frame carrying one member there-

of, an operating lever, a strut supported by said frame for interposition between the lever and frame when no sheet is present, a rotating contact for positively restoring the strut into position, as described.

27. The combination of a printing couple, one member of which is movable toward and from the other, a cam for moving said member, a displaceable strut for communicating the action of the cam to said movable member, an abutment and a brace for interposition between the movable member and the abutment during the making of an impression, as described.

28. The combination of a printing couple one member whereof is movable toward and from the other, a cam for moving said member, a sheet operated strut for communicating the action of the cam to said movable member, an abutment and a brace movable with the strut for interposition between the movable member and the abutment during the making of an impression, as described.

29. The combination of a printing couple, a rigid abutment for taking the thrust during the impression and a displaceable brace for interposition between the rear of the longitudinal axis of one of the members of the printing couple and said abutment, as described.

30. The combination of a separable printing couple and means operable by the presence of a sheet to be printed for bracing one of the members thereof in rear of its longitudinal axis during the taking of an impression, as described.

31. The combination of a printing couple, a movable frame carrying one of the members thereof, and sheet operated means for bracing said frame in rear of the longitudinal axis of said member during the taking of an impression, as described.

32. The combination of a printing couple, a movable frame carrying one of the members thereof, a cam and connections for moving said frame out of impression position and a brace for holding the frame against movement during the impression, as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 14th day of February 1905.

FREDERICK G. JAHN.

Witnesses:

GEO. H. GRAHAM,

A. T. DOLPHIN.