No. 619,241. Patented Feb. 7, 1899.

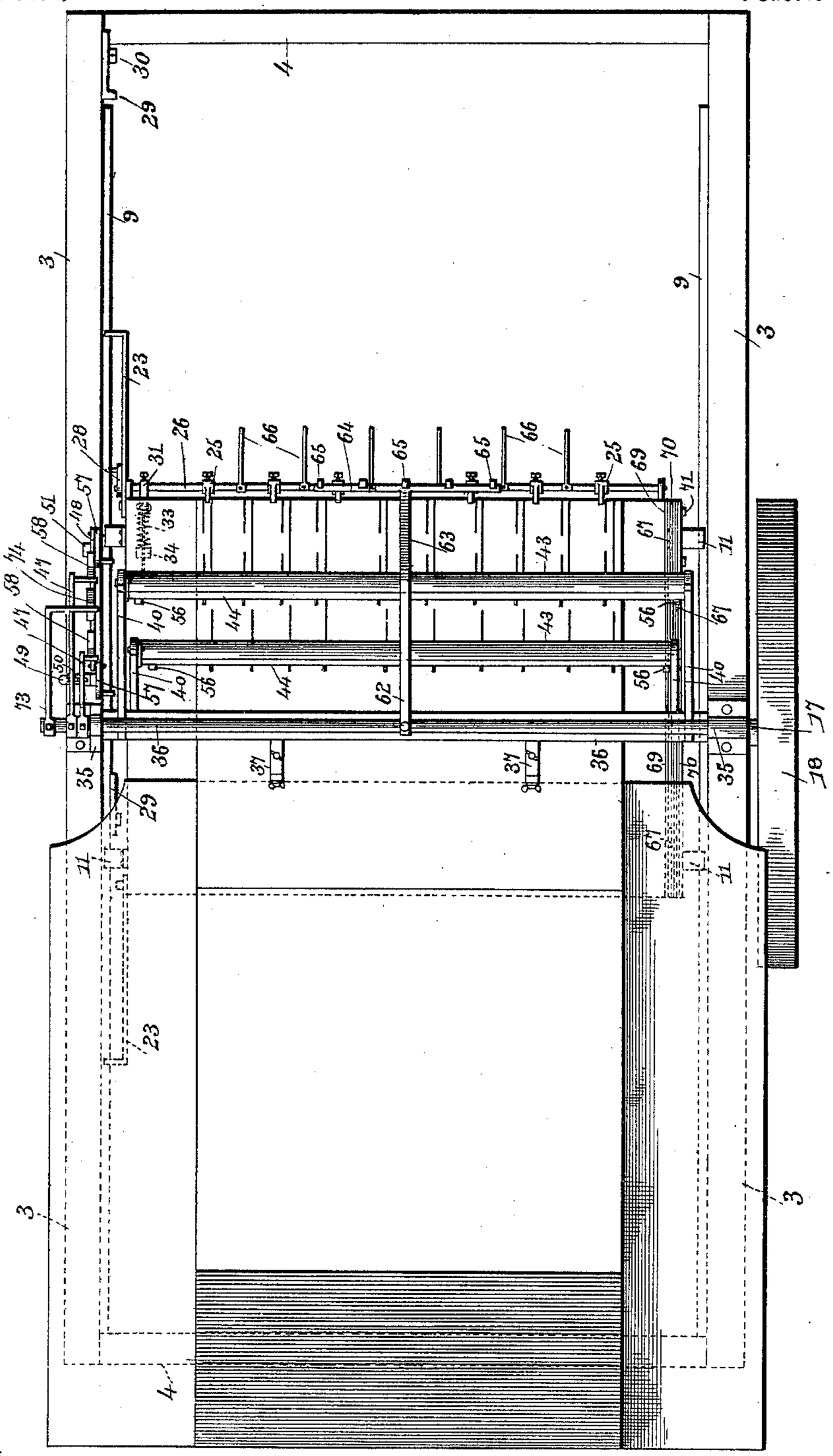
F. H. VAN LOOZEN.

RULING MACHINE.

(Application filed Apr. 17, 1895. Renewed July 19, 1898.)

(No Model.) 4 Sheets—Sheet 1.

FIG. 1.



Witnesses
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(No Model.) 4 Sheets—Sheet 2.

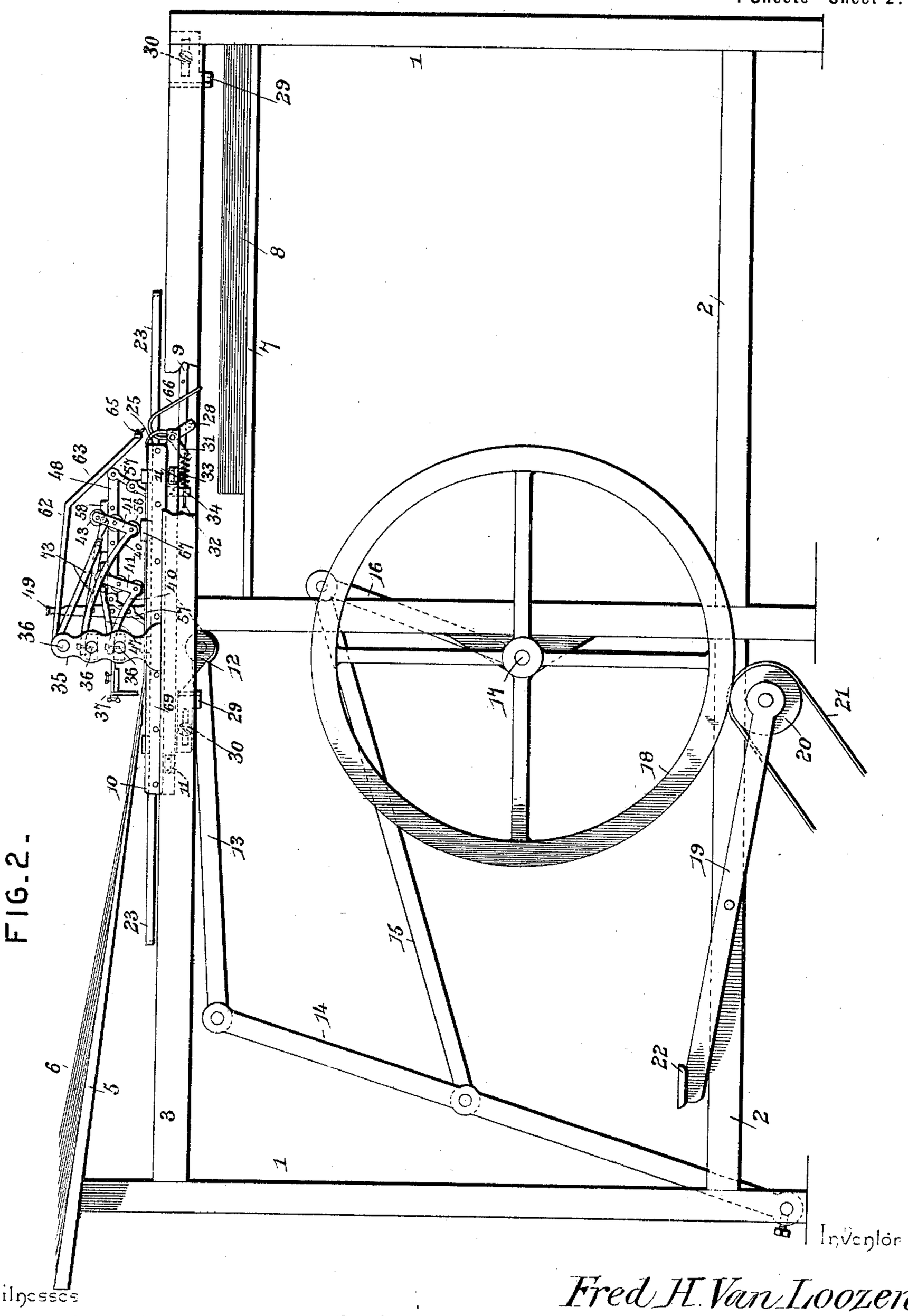

FIG. 2.

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(No Model.) 4 Sheets—Sheet 3.

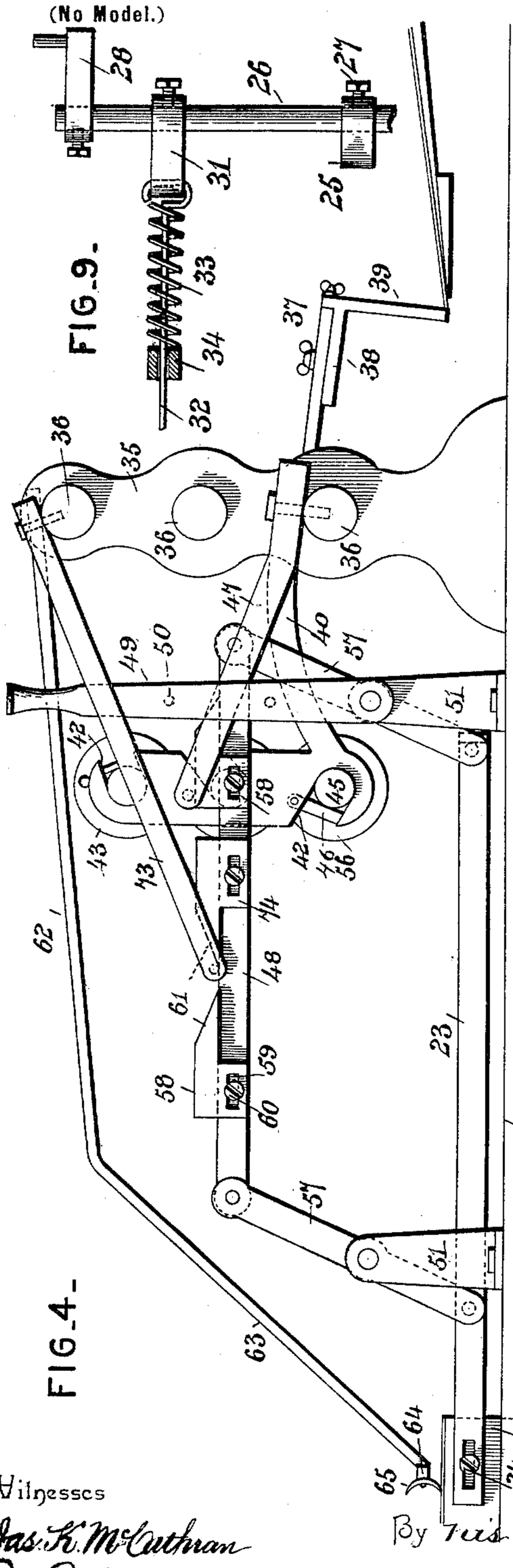

FIG. 4.

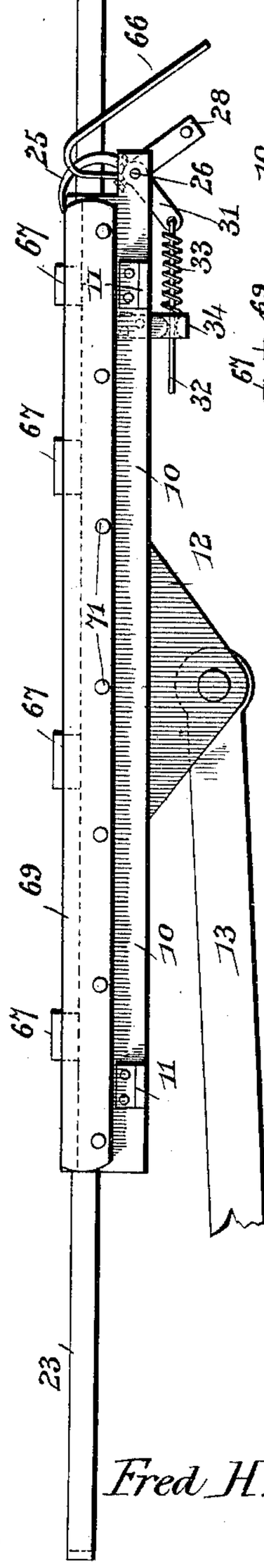

FIG. 3.

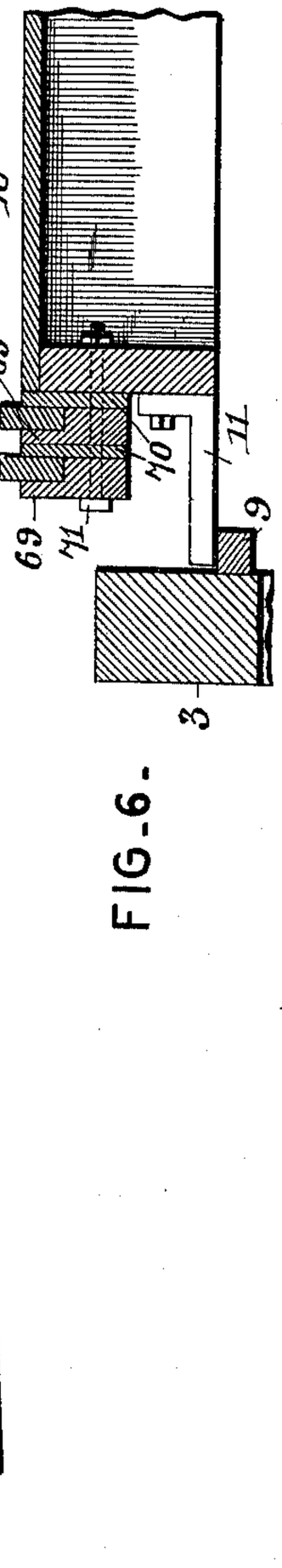

FIG. 6.

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(Application filed Apr. 17, 1895. Renewed July 19, 1898.)

(No Model.) 4 Sheets—Sheet 4.

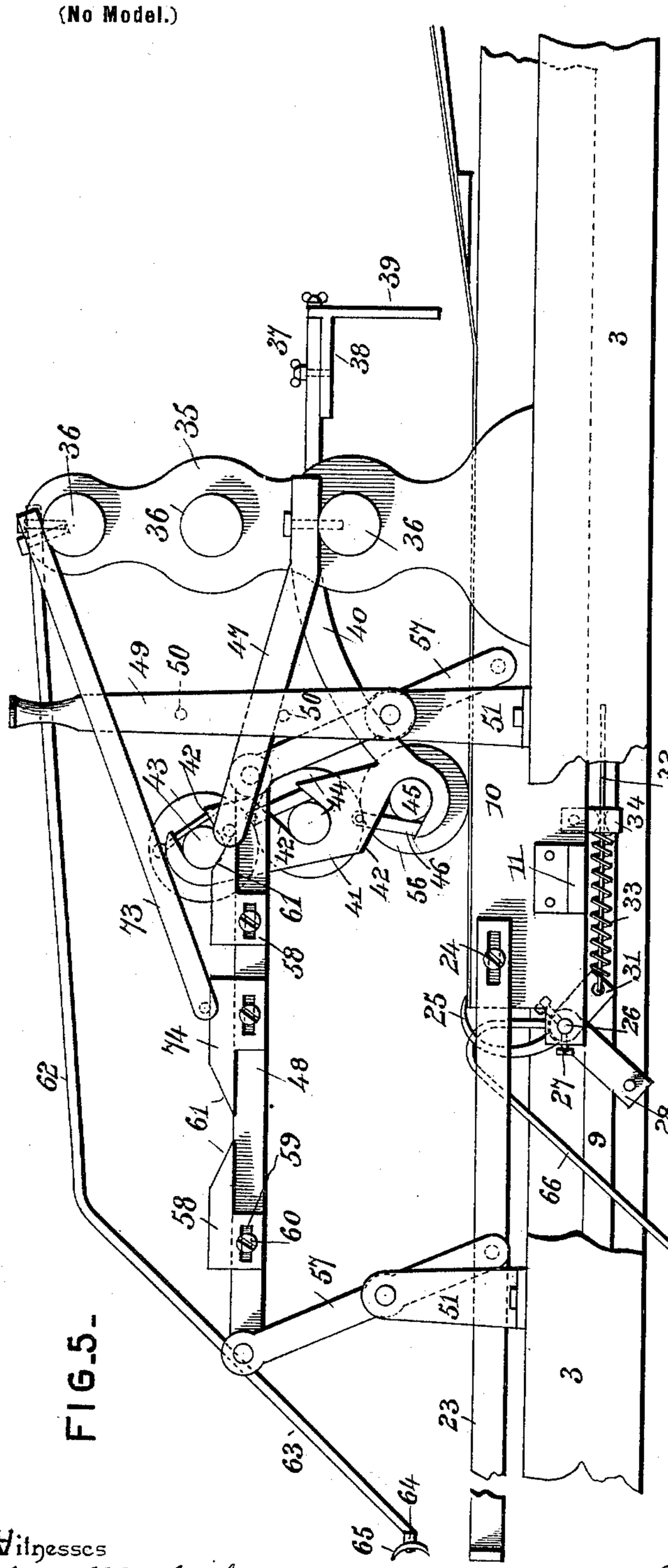

FIG. 5.

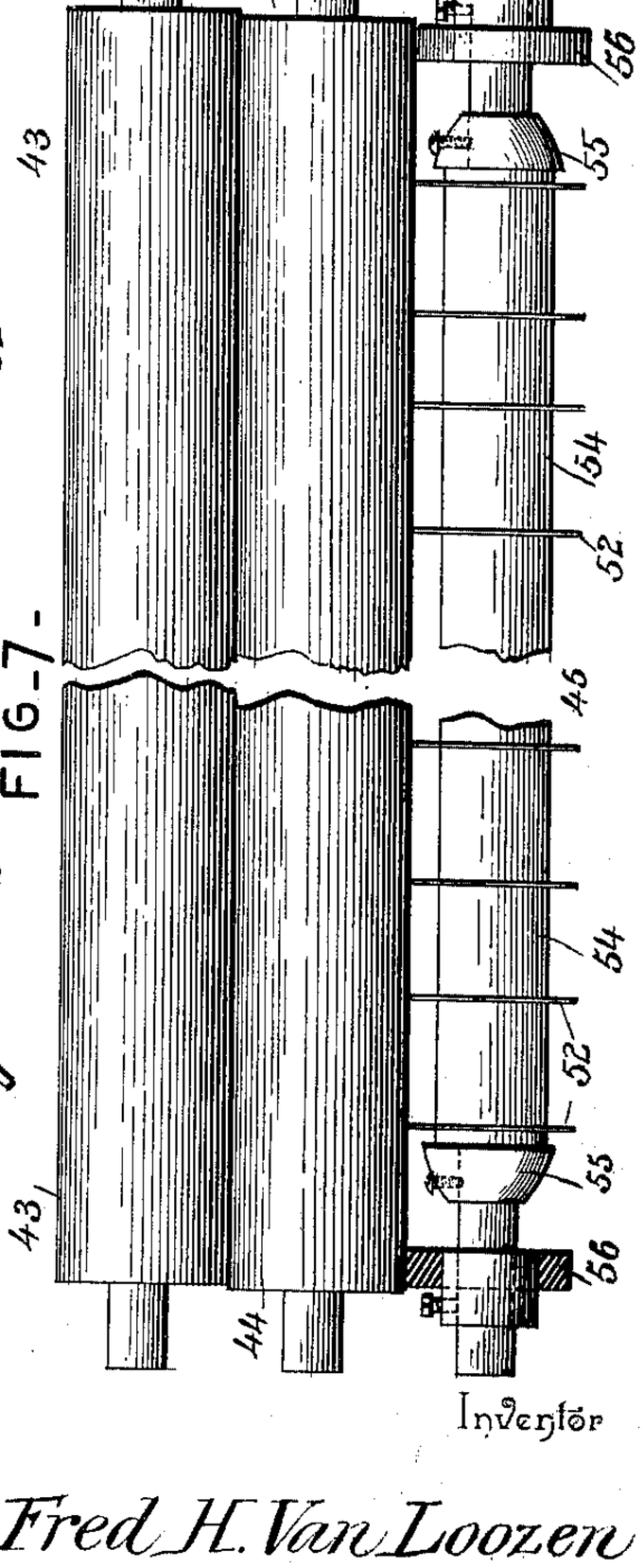

FIG. 7.

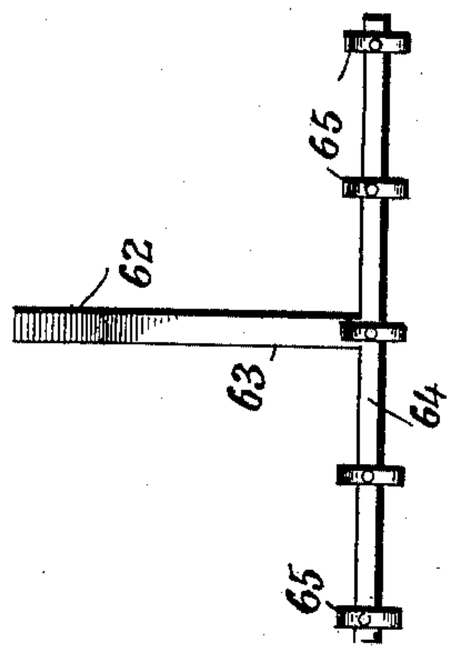

FIG. 8.

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UNITED STATES PATENT OFFICE.

FRED HENRY VAN LOOZEN, OF CLEVELAND, OHIO.

RULING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 619,241, dated February 7, 1899.

Application filed April 17, 1895. Renewed July 19, 1898. Serial No. 686,375. (No model.)

To all whom it may concern:

Be it known that I, FRED HENRY VAN LOOZEN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Ruling-Machine, of which the following is a specification.

This invention relates to certain new and useful improvements in paper-ruling machines, and aims to provide a simple and automatic mechanism for interrupting the ruling at required points, so that a sheet of paper may be ruled with continuous lines or broken and interrupted lines, as required, and which will automatically grip and release the sheet to be ruled at the proper time, all as will appear more fully hereinafter.

Other objects and advantages will be apparent from the subjoined description, taken in connection with the accompanying drawings, in which—

Figure 1 is a top plan view of a paper-ruling machine constructed in accordance with and embodying the vital principles of the invention. Fig. 2 is a side elevation of the same, parts being broken away. Fig. 3 is a side elevation of the movable bed which carries the sheet to be ruled to the ruling mechanism. Fig. 4 is a side elevation of the ruling mechanism, showing the relative disposition of the parts when the paper-guides are down, the ruling devices out of operative relation, and the paper-detent in position to remove the paper from the bed as the latter makes its return travel, one set of ruling devices being omitted for the sake of simplicity of illustration. Fig. 5 is a view similar to Fig. 4, showing the relative arrangement of the parts when the paper-guides are up, the ruling devices lowered, and the paper-detent above the plane of the bed. Fig. 6 is a detail view in section of two tracks, showing the relative disposition of the bed and the adjacent longitudinal beam of the frame. Fig. 7 is a front elevation of the ruling and ink-distributing provisions, having an intermediate portion broken away. Fig. 8 is a front elevation of the paper-detent. Fig. 9 is a detail view of the paper-gripping mechanism.

The framework for supporting the operating parts of the machine may be of any suitable construction best adapted for the purpose, and, as shown, comprises corner-posts 1, lower longitudinal beams 2, upper longitudinal beams 3, and suitable cross-beams 4 for bracingly connecting the longitudinal beams, whereby a substantial structure is attained for sustaining the operating parts of the machine. At the front end of the framework is placed a table 5, upon which the pile of paper 6 to be ruled is placed, said table inclining inwardly and downwardly to facilitate the feed of the paper to the ruling mechanism. At the opposite or rear end of the framework is placed a support or shelf 7 at a lower level than the top of the said framework to receive the paper 8 after it has been ruled. Tracks or rails 9 are placed on the inner side of the longitudinal beams 3 to support the movable bed 10 in its reciprocatory movements, said bed having lateral extensions 11, by means of which it is supported and held in proper position upon the tracks 9. The bed 10 is provided with a pendent projection 12, which has connection by means of a link 13 with a bar 14, that is pivoted at its lower end to the front portion of the framework, and is connected midway of its ends by means of a pitman 15 with a crank 16, movable with a shaft 17, upon which is mounted a balance-wheel 18, which receives its motion from a suitable source of power to reciprocate the bed when the machine is in use for ruling paper. A lever 19, pivoted between its ends to a longitudinal beam 2, has a friction-pulley 20 at one end, which is driven by means of a belt 21 from a suitable source of power and is adapted to be brought in engagement with the balance-wheel 18 to rotate the latter when the machine is in gear, said lever 19 having a foot-rest 22 at its front end for the foot to obtain a purchase upon to operate the lever to bring the pulley 20 in contact with the wheel 18.

The bed 10 will be suitably covered by tympan or other material common in the art of printing for covering platens, and has stops 23 at its opposite ends for engagement with the paper-ruling mechanism to throw the latter in and out of working position, as will appear more fully hereinafter. These stops 23 have adjustable connection with the ends of

the bed and are slotted at their inner ends to receive binding-screws 24, by means of which they are held in the located position. That end of the machine receiving the paper to be ruled will be designated as the "front" end and the end at which the ruled paper is delived and placed upon the support 7 as the "rear" end, and the corresponding ends of the bed will be similarly designated, the end of the bed facing the rear end of the machine being designated hereinafter as the "rear" end of the bed.

The paper-gripping mechanism is located and attached to the rear end of the bed and comprises gripping-fingers 25, provided in suitable number and mounted upon a transverse shaft 26 and secured in the required position by convenient fastening means, such as the binding-screws 27. An arm 28 is secured upon one end of the transverse shaft 26 and is adapted to be struck by stops 29, properly disposed and having adjustable connection with a longitudinal beam 3 of the framework. These stops 29 are slotted and secured in the located position by means of binding-screws 30 in the ordinary manner. A second arm 31 is secured to the shaft 26, and has a rod 32, upon which a coil-spring 33 is mounted, attached thereto, said rod operating at its free end through a suitable guide 34, between which and the arm 31 the said spring 33 is confined. The arms 28 and 31 are approximately right-angularly disposed, and the arm 28 swings from one side of a perpendicular line to the other, according as the gripping-fingers 25 are opened and closed, and the arm 31 swings correspondingly above and below a line passing horizontally through the axis of the shaft 26. Hence it will be seen that by this disposition of the parts the spring 33 serves the dual purpose of holding the gripping-fingers open and closed.

Standards 35 are mounted upon the longitudinal beams 3 and have corresponding openings at different relative levels to form bearings for the ends of a series of transverse shafts 36, which support the paper-guides, the ruling mechanism, and the paper-detent. The paper-guide is composed of a series of arms 37, which are attached at their inner ends to the lowermost shaft 36, and bracket extensions 38, adjustably connected with the outer portions of the said arms 37, the vertical members 39 of the bracket extensions extending across the path of the paper to limit the forward movement of the sheet when the latter is fed to be caught by the gripping mechanism of the movable bed 10. The ruling mechanism is mounted in a frame comprising side pieces 40, which are attached at their inner ends to the lowest shaft 36 and which have upwardly-extending portions 41, having notches 42 in their edges to receive the journals of a series of rollers 43, 44, and 45, said rollers being held within the notches by latches 46, which extend across the open sides of the said notches, as will be readily comprehended. The side pieces 40 extend in a diametrically opposite direction to the arms 37. Hence when the paper-guide is lowered the ruling mechanism is elevated, and vice versa. An arm 47 is secured to the lowermost shaft 36 and projects therefrom in an opposite direction to the arms 37 and is constructed to be engaged at its free end with a horizontally-movable bar 48, by means of which the free end of the arm 47 can be lifted and the ruling mechanism raised from engagement with the paper being ruled. A pin or laterally-extending portion at the outer end of the arm 47 projects across the path of the bar 48 and is engaged by the inner block 58, so as to attain the desired result and movement of the arm 47. A handle-bar 49, having an inwardly-extending pin 50 projecting across the path of the arm 47, is pivoted at its lower end to a bracket 51, secured to the frame, and this handle-bar is adapted to be turned so as to raise the arm 47 at will and lift the paper-ruling mechanism from engagement with the bed or the paper thereon. By this means the paper-ruling mechanism is at all times under the control of the attendant, and can be thrown out of operative relation when required for any desired purpose. Hence should a sheet of paper become out of register or become disarranged upon the bed, the ruling mechanism can be lifted, thereby preventing spoiling of the sheet.

The rollers 43 and 44 supply ink to the circular markers 52 in the ordinary manner commonly practiced in the art of printing. The marking-roller 45 comprises a series of circular markers 52, strung upon a shaft 53 and spaced apart by interposed washers or collars 54, mounted upon the shaft 53, the circular markers and washers being held in a fixed relation by end collars 55, secured upon the end portions of the shaft 53 by binding-screws or other appropriate fastening means. Rollers or broad-faced disks 56 are secured upon the end portions of the shaft 53 and are of a size to correspond to the diameter of the circular markers 52 and engage with the roller 44 and prevent the circular markers 52 from cutting into and otherwise injuring the inking-roller 44, and these disks 56 are adapted to engage with and travel upon the edge portions of the bed 10, so as to impart a rotary movement to the shaft 53 and the circular markers carried thereby. The spacing washers or collars 54 vary in length, so as to regulate the distance between the circular markers corresponding to the distance apart at which it is required to rule the lines, and these parts 54 and the circular markers are adapted to be removed from the shaft 53 and differently related to correspond to the nature of the required ruling. If required, the ink-distributing rollers can be adjusted longitudinally and supplied with different-colored inks in bands, so that a variegated ruling may

be obtained, if desired. The rollers or disks 56 will in practice have rubber-faced tread-surfaces to prevent injurious contact with the ink-distributing roller 44 and with the bed 10, and another advantage is the frictional engagement between the said rollers and the bed, whereby a positive movement of the marking-roller is obtained in the operation of the machine.

The bar 48 has pivotal connection at its ends with arms 57, which are pivoted midway of their ends to similar brackets 51, mounted upon the framework of the machine, and said bar will have blocks 58 adjustably and removably attached thereto to assist in conjunction with the vertical movement of the said bar 48 to lift the ruling mechanism from engagement with the paper being ruled when the bed is reaching the limit of its movement in each direction. These blocks 58 have slotted portions 59, through which binding-screws 60 pass to attach the blocks to the bar 48 in the desired position. One end of each block 58 is beveled, as shown at 61, to facilitate the riding of the engaging portion of the respective arm thereon to the top of the block. The lower ends of the arms 57 are adapted to be engaged by the stops 23, and when said lower ends are moved toward the rear the bar 48 will be elevated and lift the ruling mechanism from engagement with the bed, and when moved in an opposite direction or toward the front of the machine the bar 48 and the ruling mechanism will be lowered and the paper-detent correspondingly elevated.

The paper-detent consists of a bar 62, secured at its inner end to the topmost shaft 36 and having its outer portion 63 bent downwardly and forwardly and provided with a cross-head 64, having prongs 65 at intervals in its length to engage with the paper after the latter has been ruled to remove it from the bed as the latter returns to a normal position at the front end of the machine to receive another sheet to be ruled. When the ruling mechanism is performing work and the bed is advancing to the rear end of the machine, the paper-detent is held out of service, and when the bed reaches the limit of its movement at the rear end of the machine and is about to return to a normal position the stop 23 at the front end of the bed engages with the front arm 57, reverses its position, elevates the bar 48, lifts the ruling mechanism, and lowers the paper-detent, the prongs 65 of which engage with the ruled sheet and remove it from the bed as the latter returns to the front end of the machine. At or about the time the stop 23 strikes the arm 57 the arm 28 engages with the stop 29, and the paper-gripping mechanism is released, thereby freeing the ruled sheet, which is removed from the bed in the manner described. The ruled sheet as it is disengaged from the bed drops upon the support 7 and forms the pile 8. In order to prevent the ends of the gripping-fingers 25 from engaging or otherwise interfering with the free removal of the sheet from the bed, it has been found expedient to provide a series of curved guards 66, over which the sheet glides in its displacement from the bed 10. These curved guards 66 may be wire, light bars, or strips of metal, which are secured to the rear end of the bed 10 and curve rearwardly and downwardly therefrom.

When it is required to interrupt the ruling, so as to produce broken lines, strips or projections 67 are provided and located in the path of the rollers 56, which latter when riding over the projections 67 will lift the ruling mechanism from engagement with the sheet being ruled. It will be understood that the length of the projections 67 will correspond with the space or interruption in the lines of ruling and that they will be supplied in sufficient number to correspond with the required number of spaces or interruptions in the lines to be ruled. It is not absolutely necessary to provide projections for each roller, as one set may be made to answer the desired purpose. In order to provide for the adjustment, interchangeability, and the removal of the projections 67, a track 68 has been devised and is secured to the edge portion of the bed, being disposed so that the roller 56 adjacent thereto will travel upon the said track, which latter consists of two parts 69 and 70, which are adapted to be secured together by bolts 71, between which the projections or strips 67 are clamped, one of the parts, as 70, having a ledge 72, upon which the strips 67 are supported. This part of the invention will be readily understood when it is remembered that the plane of the track 68 corresponds with the level of the bed 10 and that the strips 67 project a short distance above the plane of the surface of the said bed. Hence when the roller 56 is traveling on the track between the strips 67 the ruling mechanism will be lowered and performing work; but when the roller 56 engages with and travels upon the strips 67 the ruling mechanism will be elevated and held out of engagement with the sheet, and consequently the ruling will be interrupted.

It must be understood that the ruling mechanism can be provided and used singly or increased by providing duplicate sets of ruling mechanism substantially as herein described, and when increasing the number beyond one the arms of the side pieces 40 must be extended, so that the different sets will occupy positions relatively in advance of one another to admit of the marking-rollers making engagement with the sheet to be ruled. It will also be understood that the bar 48 must be lengthened and that a block 58 must be had for each ruling device to engage with its respective elevating-arm 47 to lift the ruling mechanism at the proper time. Obviously the rollers of the respective ruling devices must be of different lengths to admit of one ruling device operating independently of the other, and the tracks 68 must be provided in suffi-

cient number and disposed so as to engage with the roller 56 of each ruling device, whereby each is automatically operated independently of the other, as will be readily understood. The shaft 36, supporting the primary ruling mechanism, is the only one of the series provided with and carrying the paper-guide, and the topmost shaft carries the paper-detent solely, and between these two shafts are disposed the shafts, one or more, carrying the extra or duplicate ruling devices. When more than one ruling device is provided, the circular markers of each will be differently related, so that the markers of one ruling device will not track in the path of the circular markers of the other ruling device, and by having the circular markers so disposed the lines may be ruled as close together as required and one set of lines can be interrupted at points different from the interruptions in any other set, thereby providing for a variety of ruling to meet all requirements where it is desired to have broken lines of the same or different colors.

The operation of the machine is as follows: The paper to be ruled is placed in a pile upon the table 5 and is fed one sheet at a time forward, and is brought in register by the paper-guide by having its front edge engage with the vertical extensions 39. The bed 10, moving toward the front end of the machine with the gripping-fingers 25 open, causes the arm 28 to engage with the stop 29 and close the gripping-fingers upon the projecting edge of the sheet and grip the same when the said bed is reaching the limit of its return movement. At the same instant the rear stop 23 will strike the rear arm 57 and move the bar 48, so as to lower the ruling mechanism and elevate the paper-guide, and the bed moving toward the rear end of the machine carries the sheet beneath the ruling mechanism, the ruling being effected in the manner previously described, and as the bed reaches the limit of its rearward movement the arm 28 is engaged by the rear stop 29 and the gripping-arms 25 are opened and release the sheet, and at the same time the front stop 23, engaging with the front arm 57, moves the bar 58, so as to lift the ruling mechanism from engagement with the paper and lower the paper-detent, which engaging with the ruled sheet removes it from the bed as the latter returns to a normal position, substantially in the manner hereinbefore set forth. The paper-detent is controlled in its movements by a block 74, similar in construction to the blocks 58 and attached in a like manner, but in an inverse position, to the bar 48, said block 74 being disposed to engage with an arm 73, made fast at its upper end to the shaft 36, carrying the paper-detent.

In order to adapt the invention to various styles of machines according to the nature of the work to be performed, it must be distinctly understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. In a paper-ruling machine, the combination with a ruling mechanism capable of vertical movement, and a bed to carry the paper to be ruled adapted to reciprocate beneath the ruling mechanism, of a longitudinal bar extending across the path of a portion of the frame of the ruling mechanism, pivoted arms normally inclining to the vertical and supporting the said longitudinal bar, and a stop carried by the reciprocating bed to engage with one of said pivoted arms to effect a vertical movement of the said ruling mechanism, substantially as described.

2. In a ruling-machine, the combination of a ruling mechanism adapted to move vertically, a longitudinal bar extending across the path of a portion of the frame of the ruling mechanism, upright arms pivoted intermediate of their ends and carrying the longitudinal bar, a reciprocating bed for supporting the paper to be ruled provided with stops to alternately engage with the said pivoted arms to actuate the longitudinal bar and effect a vertical movement of the ruling mechanism positively in each direction, a paper-gripping mechanism placed at the front end of the reciprocating bed, and stops disposed to engage with and automatically open and close the paper-gripping mechanism, substantially as set forth.

3. In a ruling-machine, the combination with a ruling mechanism and a relatively movable bed, of a track comprising two parts, one of said parts having a supporting-ledge, strips, or projections, spaced at intervals apart and secured between the parts of the track and sustained upon the said supporting-ledge, and constructed to engage with the ruling mechanism and automatically throw the same out of engagement with the sheet, whereby broken or interrupted lines are ruled, and fastenings for clamping the strips between the parts of the track and securing the latter to the bed, substantially in the manner set forth.

4. In a ruling-machine, the combination with a ruling mechanism and a traveling bed provided with stops, of a bar supported upon pivoted arms, which latter project across the path of the stops carried by the said bed and are actuated thereby to raise and lower the said bar, and the latter being constructed to engage with and raise and lower the ruling mechanism, substantially in the manner set forth.

5. In a ruling-machine, in combination, a ruling mechanism, a reciprocating bed provided with stops, upright arms pivoted between their ends and having their lower portions extended within the path of the stops provided on the bed, a bar having pivotal connection with the said pivoted arms, and

blocks detachably connected with the said bar and having a beveled portion to engage with a projecting portion of the ruling mechanism to throw the latter in and out of operative relation, substantially as described for the purpose set forth.

6. In a ruling-machine, the combination of a ruling mechanism and a paper-guide extending in opposite directions and pivotally supported, and related so that when the paper-guide is lowered the ruling mechanism is elevated, and vice versa, and a reciprocating bed provided with stops adapted to engage with and throw the ruling mechanism in and out of working position, substantially as set forth.

7. In a ruling-machine, the combination of a ruling mechanism, a paper-guide, a reciprocating bed provided with stops to throw the ruling mechanism and paper-guide in and out of working position, and a paper-detent to engage with the ruled sheet and remove the latter from the bed when the same is returning to a normal position, substantially as described.

8. In a ruling-machine, the combination with a ruling mechanism, and a reciprocating bed, of a paper-detent comprising a pivotally-supported arm having a cross-head at one end formed at intervals in its length with prongs, and mechanism for vibrating the arm to lower the cross-head to permit its prongs to engage with the ruled sheet and remove the latter from the bed when the same is returning to a normal position, substantially as described.

9. In a ruling-machine, the combination with a pivoted frame comprising side pieces having upright extensions provided with a series of upwardly-inclined notches in their edges and a series of coöperating rollers journaled in the said notches, the lowest roller of the series having a number of circular markers which are strung upon a shaft and properly spaced apart, and rollers 56, of substantially the same diameter as the circular markers, mounted upon the same shaft with the said markers, of a reciprocating bed to support the sheet to be ruled, and projections at intervals in the length of the bed to act in conjunction with the said rollers 56 substantially as described for the purpose set forth.

10. In a ruling-machine, the combination with a ruling mechanism and a paper-detent, of a reciprocating bed provided at its rear end with paper-gripping devices, and curved guards attached to the rear end of the said bed to prevent interference of the gripping devices with the sheet when the latter is leaving the bed through the instrumentality of the paper-detent, substantially as set forth.

11. A ruling-machine comprising a frame, a series of transverse shafts disposed in vertical relation and mounted in bearings provided in standards rising vertically from the frame of the machine, a ruling mechanism attached to the lowest shaft, a paper-guide secured to the same shaft with the ruling mechanism and extending in an opposite direction thereto, a bar pivotally attached to upright arms and provided with removable blocks, one of which engages with an arm having connection with the lowest transverse shaft, a paper-detent secured to the top transverse shaft, an arm having connection with said top shaft and adapted to engage with one of the blocks on the aforesaid bar, a reciprocating bed provided with a paper-gripping mechanism and having stops to engage with the said upright arms to actuate the paper-detent, the ruling mechanism, and the paper-guide, and projections on the said bed to engage with the ruling mechanism and produce broken or interrupted lines, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRED HENRY VAN LOOZEN.

Witnesses:
L. A. WILSON,
A. A. ODELL.