

No. 750,514.

PATENTED JAN. 26, 1904.

G. H. WINSLOW & C. W. DENNETT.

WARP PRINTING MACHINE.

APPLICATION FILED MAR. 4, 1902.

NO MODEL.

4 SHEETS—SHEET 1.

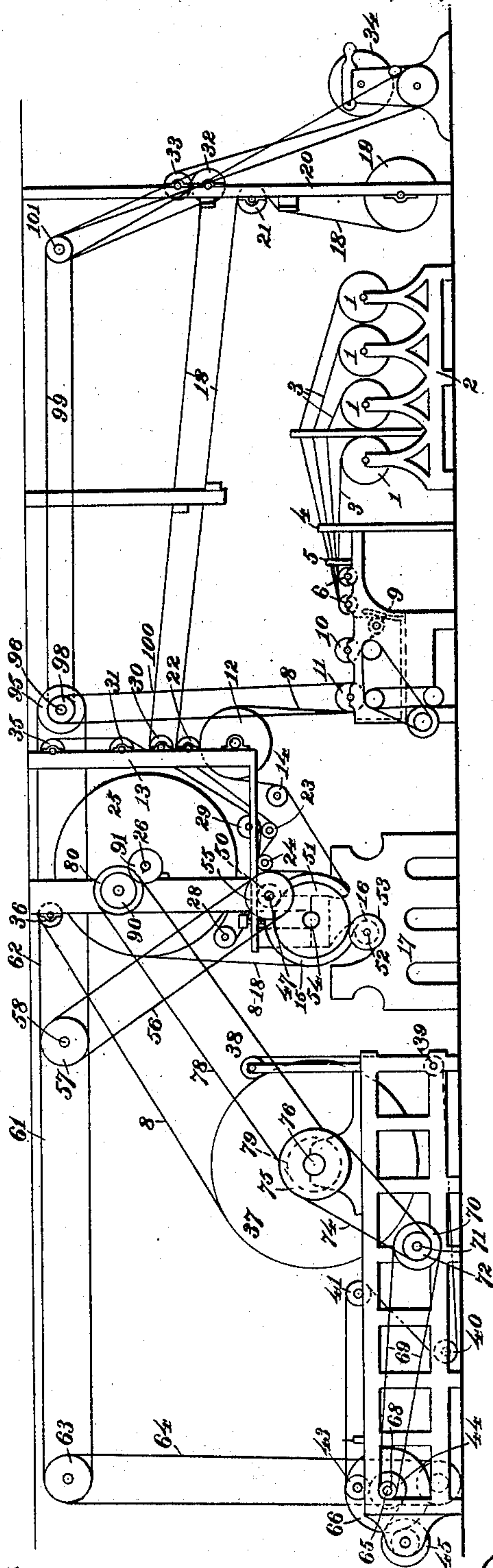


Fig. 1.

Witnesses

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Karl Daniel.

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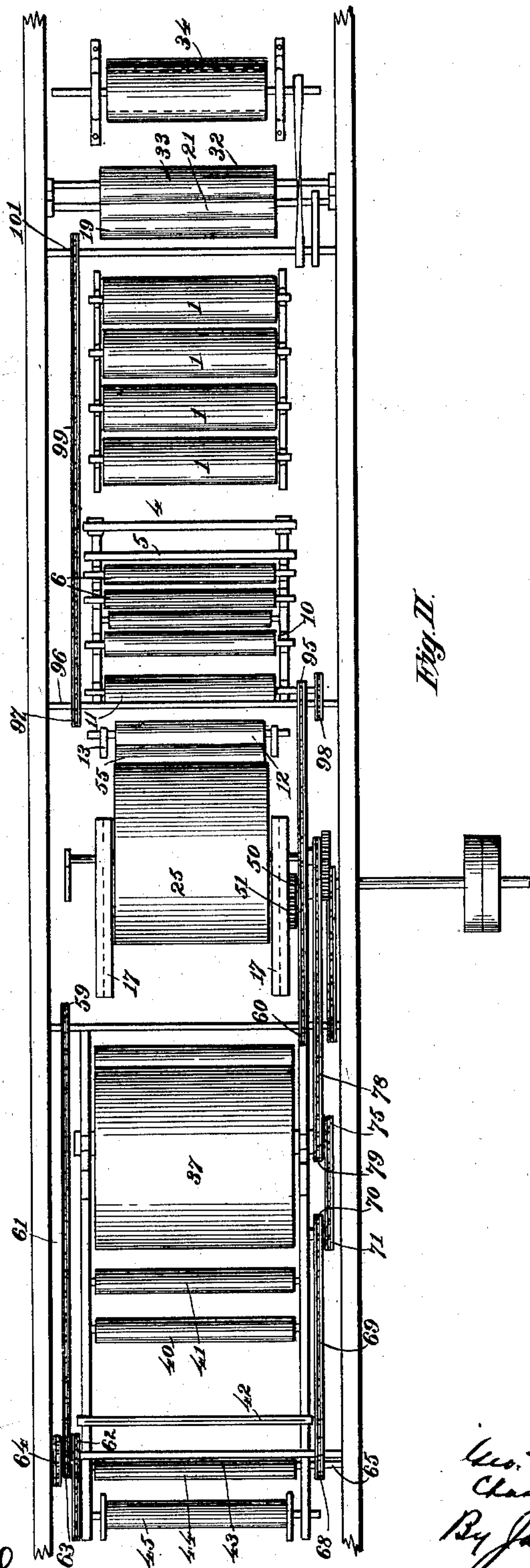


Fig. II.

Witnesses

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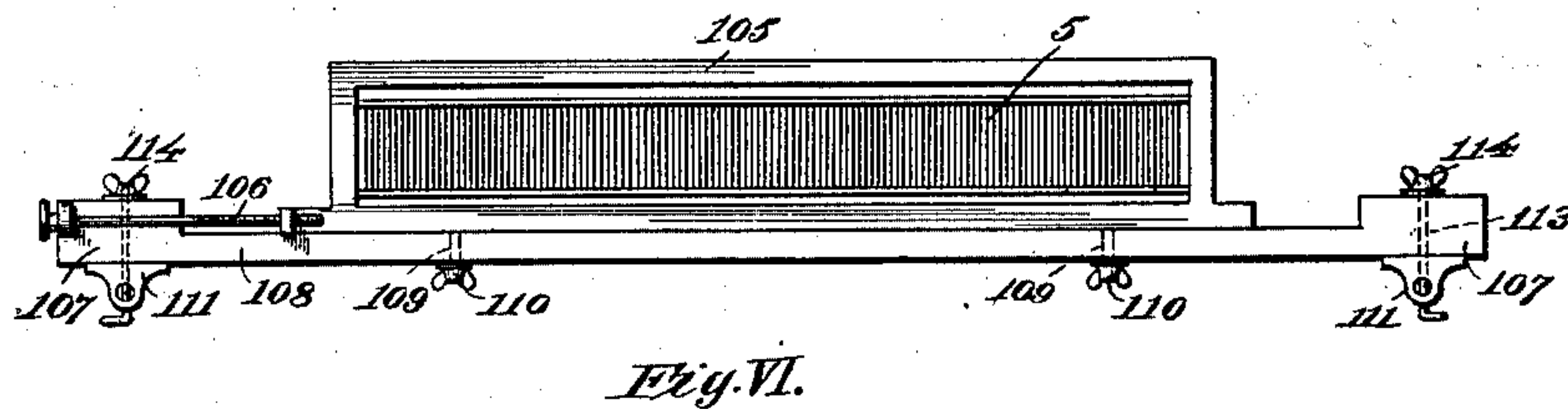
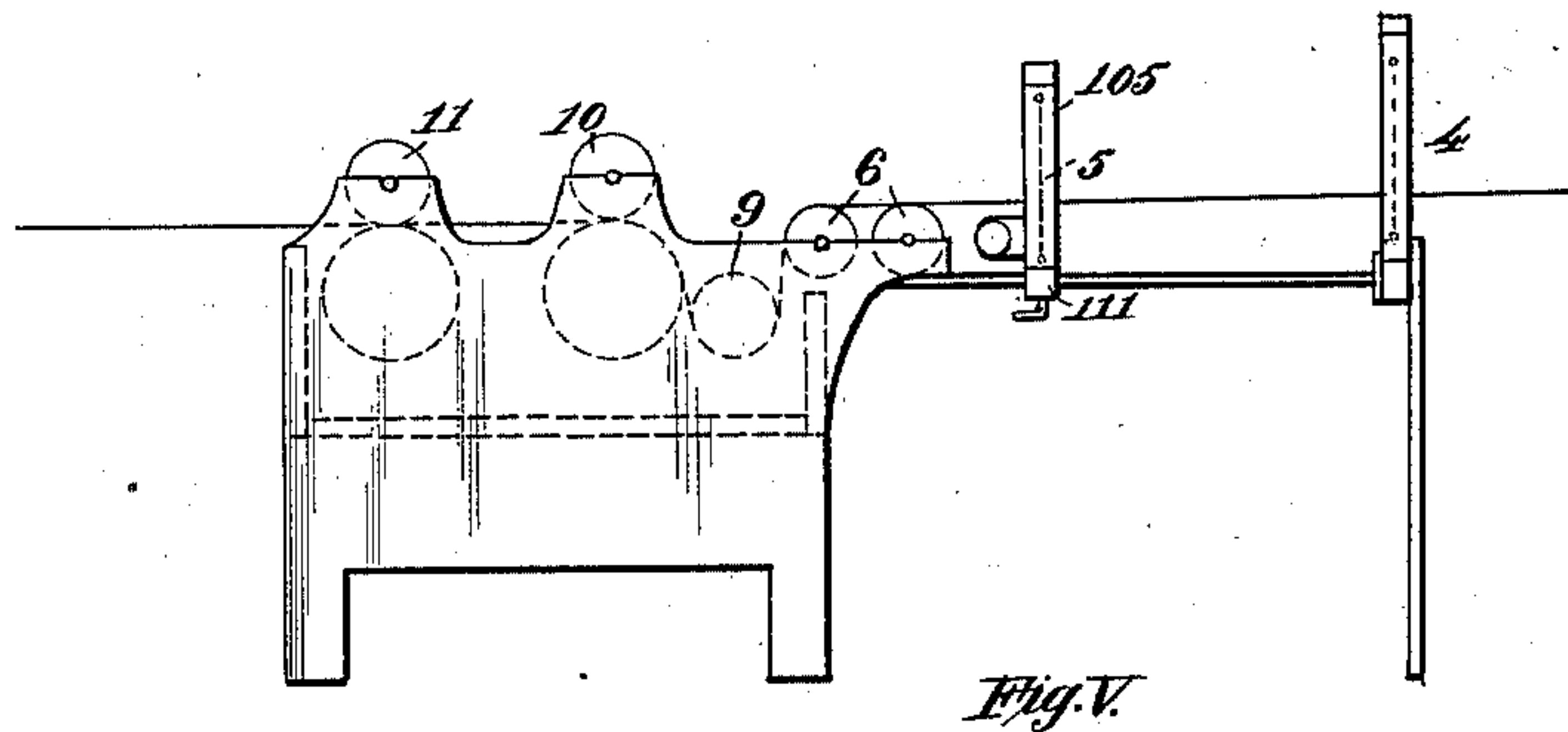
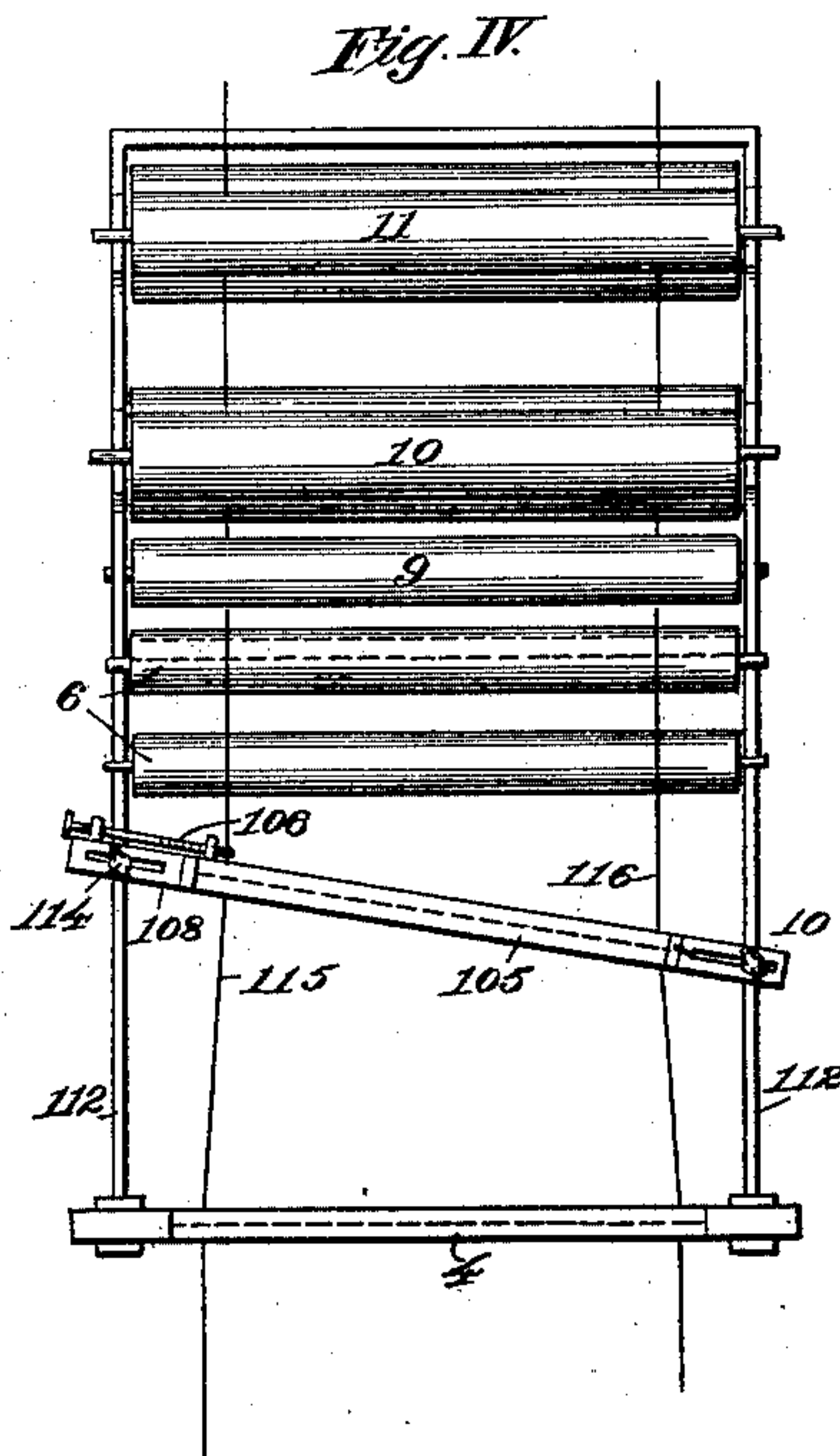
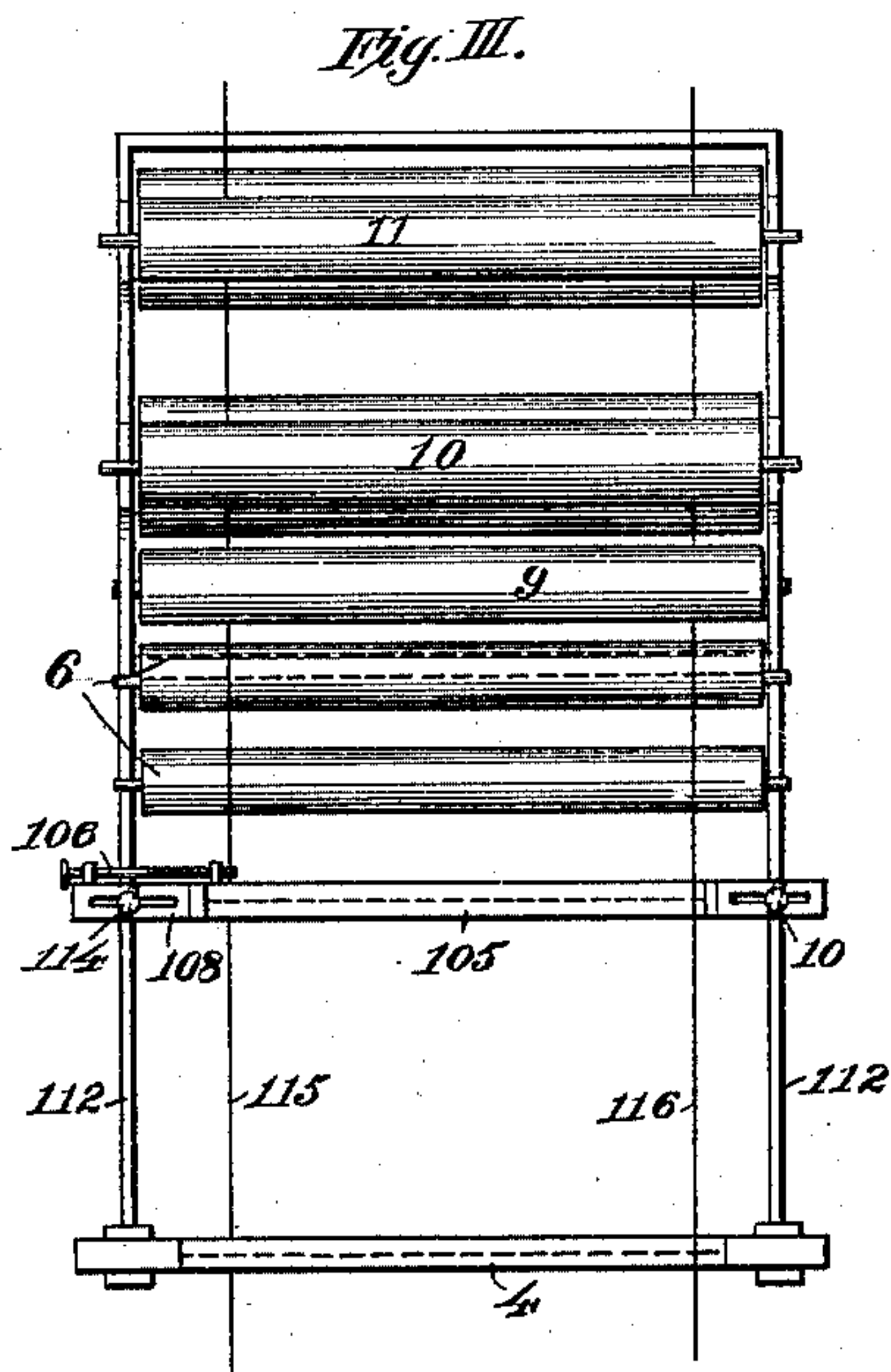
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APPLICATION FILED MAR. 4, 1902.

NO MODEL.

4 SHEETS—SHEET 3.



Witnesses

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4 SHEETS—SHEET 4.

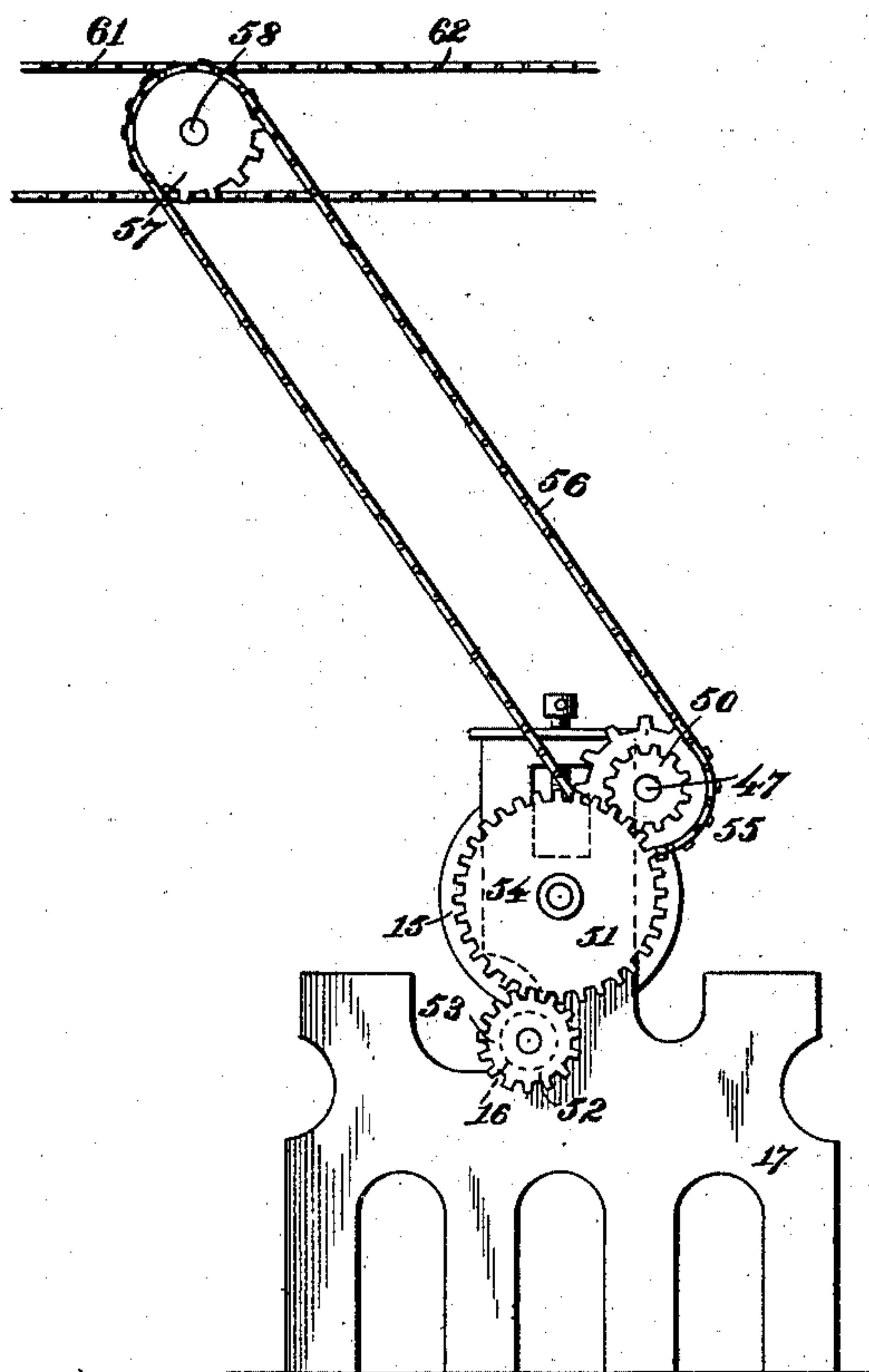


Fig. VII.

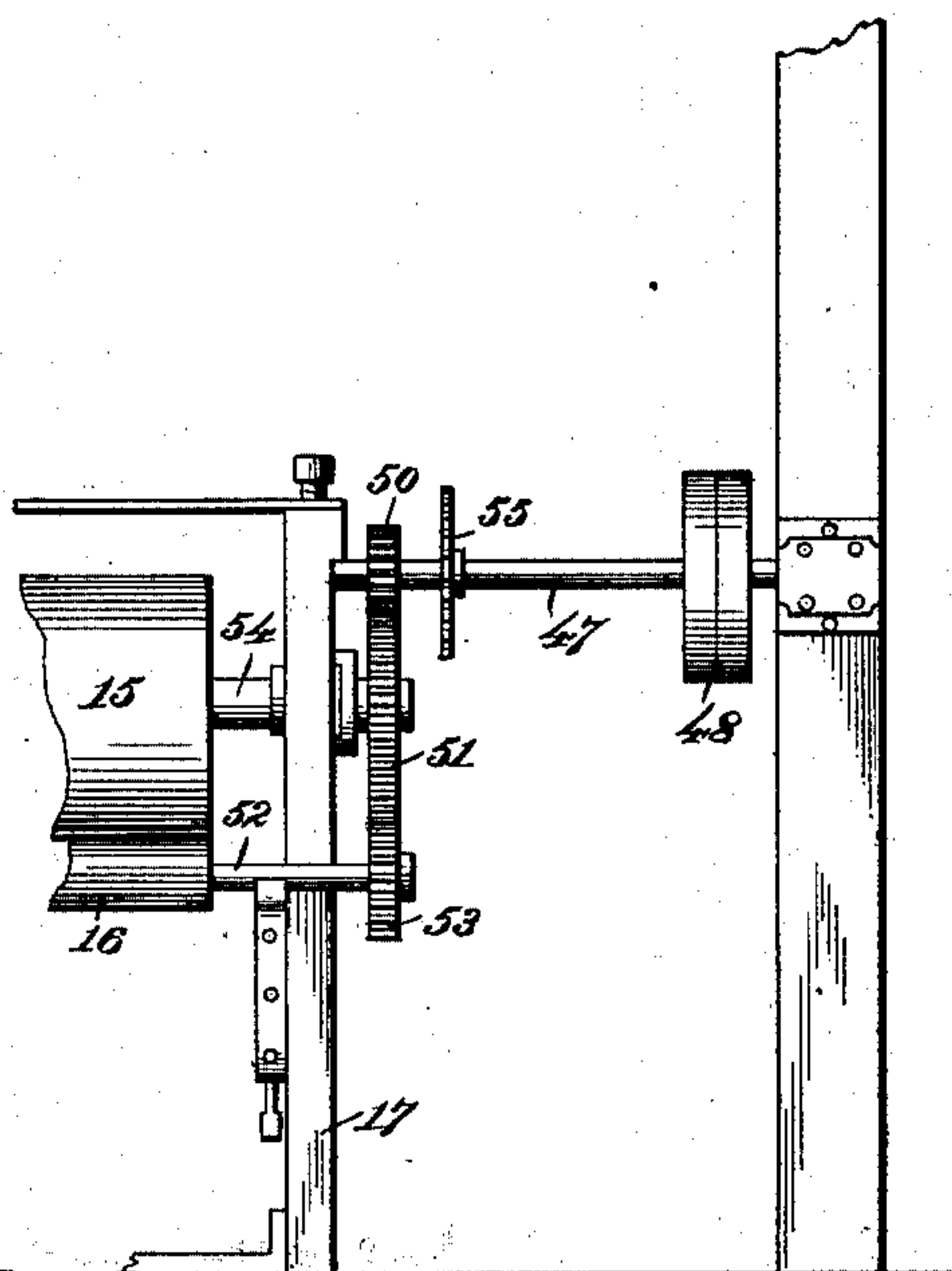


Fig. VIII.

Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE H. WINSLOW AND CHARLES W. DENNETT, OF NORTH ADAMS,
MASSACHUSETTS.

WARP-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 750,514, dated January 26, 1904.

Application filed March 4, 1902. Serial No. 96,642. (No model.)

To all whom it may concern:

Be it known that we, GEORGE H. WINSLOW and CHARLES W. DENNETT, of North Adams, in the county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Warp-Printing Machines, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of our invention is to produce an improved machine for printing color designs upon warps preparatory to weaving the threads of such warps into figured fabrics in which the figure referred to is in whole or in part derived from the printing of the warp.

The machine shown and described in this application is one adapted to carry out the process described in our concurrent application, Serial No. 96,641, filed the 4th day of March, 1902, to which application reference is herein made for complete description of the process and mode of operation of the machine.

In the accompanying drawings, Figure I is a side elevation of complete apparatus for carrying out our process, the illustration being mainly diagrammatic in character. Fig. II is a similar top plan view of the subject-matter of Fig. I. Fig. III is a top plan view illustrating the condensing-reed and showing the same at right angles to its frame. Fig. IV is a view similar to Fig. III, illustrating the reed set obliquely to its frame for the purpose of condensing a warp. Fig. V is a side elevation of the subject-matter of Fig. III. Fig. VI is a side elevation of the reed and its supporting members detached from their frame. Fig. VII is an enlarged view of a portion of the subject-matter of Fig. I, illustrating details of the printing-roller-driving mechanism. Fig. VIII is a view of a portion of the subject-matter of Fig. VII, taken at right angles thereto.

Referring to the numerals on the drawings, 1 indicates each of an ordinary series of beams, of which four are illustrated and which are revolubly mounted, as in a suitable frame 2. Upon the beams 1 are wound warp-threads 3, from which they are led, as through an ordinary base-reed 4 and through a condensing-

reed 5 over rollers 6 of a sizing-machine 7 of any ordinary or suitable description. Such mechanism being clearly understood in the art, it is sufficient here to specify that the warp 8, which receives form in passing through the reed 5, is carried into the sizing-vat by passing under a depressed roller 9, whence passing through two pairs of suitably-driven rollers 10 and 11 it has a portion of the sizing liquid squeezed out of it. From the second pair of rollers 11 the warp 8 is conducted over a moisture-regulating drum 12, which is revolubly mounted in suitable bearings in a pendent frame 13. The drum or cylinder 12 is heated, as by the internal application of steam. Means for regulating the heat as well as the size of the drum and the extent of the area of contact between it and the warp 8 afford means of nicely regulating the degree of moisture in the warp 8.

14 indicates a guide-roller, by means of which the warp is properly bent over the drum 12 and directed at a proper angle over a presser-roller 15, which is adjustably suspended from the frame 13. The roller 15 is adapted to bear against a printing-roller 16, suitably mounted in a frame 17, which carries the ordinary color-boxes, feed-rollers, and other appurtenances with which printing mechanism of this character is usually provided. The printing-roller is mechanically driven in a way which will be hereinafter specified; but the presser-roller 15 derives its motion from peripheral contact with the printing-roller 16. The warp 8 in passing between the rollers 15 and 16 receives the imprint of the design from the printing-roller. It is unnecessary to further specify the details of the printing mechanism, since it may be of any suitable construction well known in the art. In passing between the rollers 15 and 16 the warp is provided with a backing-cloth, which should move at an equal rate of speed with the warp in order to prevent disturbance of the threads thereof until after the print is dry, and we therefore provide in our apparatus mechanism for accomplishing that result. The backing-cloth 18 is carried in a roll 19, journaled as between upright frame-pieces 20.

21 indicates a guide-roller, over which the backing-cloth 18 is directed to a second guide-roller 22. Additional guide-rollers 23 and 24 serve to present the backing-cloth 18 at a proper angle to the roller 15, in passing over which the warp is laid upon the backing-cloth. In passing between the rollers 15 and 16 the backing-cloth 18, with the warp 8 upon it, (indicated by the numerals 8 18,) passes to a large drying-cylinder 25, journaled, as indicated at 26, in the frame 13.

28 indicates a guide-roller, which is preferably located for economy of dimensions near the cylinder 25 at such a point as will compel contact between the warp 8 and cloth 18 throughout the greater portion of the periphery of the cylinder 25. From the roller 28 the warp and cloth pass over a guide-roller 29 and thence to rollers 30 and 31, respectively. The peripheries of the rollers 30 and 31 are properly substantially tangential to a common plane, so that the warp 8 and cloth 18 proceed together to the roller 30, where they separate, the cloth 18 going over a pair of tension-rollers 32 and 33 to a take-up roll 34. The rollers 32 and 33 and the roll 34 are driven at a proper rate of speed to keep the cloth 18 taut and moving at a rate uniform with that at which the warp 8 moves.

In the apparatus illustrated it is important to provide means that will insure sufficient dryness in the warp 8 when it leaves the backing-cloth 18, which will prevent unequal stretching or shrinkage of the warp-thread or running of the color of the print. For that reason the dimensions and heating capacity of the cylinder 25 and the extent of contact between the periphery of that cylinder and the warp and backing-cloth must be carefully considered and calculated to the character of the work required of the apparatus. Such details of the construction and manipulation must necessarily be left to the judgment of the constructor and operator and can only be pointed out generally, as hereinbefore set forth, in a general description of the character of this specification.

After leaving the roller 31 the warp 8, passing over guide-rollers 35 and 36, which enable it to clear the roller 25, is brought into contact with a final drying-cylinder 37, from which, as by guide-rollers 38, 39, 40, and 41, it is conducted, after passing through a comb 42, over guide-rollers 43 and 44 to a loom-beam, upon which it is finally wound, ready for the loom.

It should be observed that the same care to preserve uniformity of movement of the warp is essential after it leaves the backing-cloth as at any former stage of the process and that accurate timing of the movements of the driving or drying operations of the apparatus must be preserved up to and including the driving of the beam 45, upon which the warp is finally wound.

The driving mechanism of our apparatus has been heretofore alluded to in general terms, and we will now proceed to describe the same more in detail. Referring, accordingly, to Fig. VIII, in view of Figs. I, II, and VII, as showing a practicable and preferred form of driving mechanism, 47 indicates the main driving-shaft of the apparatus, to which power may be applied as required, as through a split pulley 48. It is of course assumed that where "shafts" or "wheels" are mentioned they are suitably mounted in the usual manner upon some part of the frame of the apparatus or other supports available in the building where the apparatus is erected; but detailed description of journal-bearings and similar implied members will be omitted except where it appears to be especially required. The shaft 47 carries a fixed pinion 50, which meshes with a stud-supported gear 51, that communicates motion to the shaft 52 of the printing-roller 16, as through a pinion 53, fixed to the shaft 52. The roller 15, suspended by its axle 54, derives motion, as has been specified, through peripheral pressure against the roller 16, actual contact between the rollers 15 and 16 being prevented by the intervention of the warp and backing-cloth. Between the pinion 50 and the pulley 48 there is fixed to the shaft a sprocket-wheel 55, which, as by a sprocket-chain 56, communicates motion to a sprocket-wheel 57 upon a transverse shaft 58, which in turn, as by sprocket-wheels 59 and 60, communicates motion to sprocket-chains 61 and 62. The former drives a sprocket-wheel 63, (see Figs. I and II,) which is geared, as by a sprocket-chain 64 and suitable intermeshing wheels, to the shaft 65 of a feed-roller 66. 68 indicates a pinion upon the shaft 65, which, as by a chain 69, drives a wheel 70 upon a shaft 71, a pinion 72 on which communicates motion through a chain 74 to a sprocket 75 upon the shaft 76 of the drying-roller 37. A chain 78 communicates motion from a wheel 79 upon the shaft 76 to a wheel 80, that drives a gear 90, meshing with a gear 91 upon the shaft 26 of the drying-cylinder 25. The sprocket-chain 62, meshing with a wheel 95 upon the shaft 96, communicates motion through a pair of sprocket-wheels 97 and 98 to chains 99 and 100, respectively. The chain 100 is operatively connected with the driving mechanism of the sizing-machine 7, as diagrammatically indicated. The chain 99 drives a shaft 101, which in turn, through suitable belt-and-pulley connections, drives the rollers 32 and 33 and the take-up roll 34 at the required uniform rate of speed.

The driving mechanism of the apparatus, as above described, has each of its several parts so timed as to communicate with every rotating member adapted to impart motion to the warp and backing-cloth when they are united and when they are separated from each other at a uniform rate of speed, so that there

is nowhere exerted upon either the warp or the backing-cloth either an acceleration, weight, or drag which tends in the least to disturb the relations of the threads in the warp or of the figures in the design after they are printed upon the warp.

The details of the condensing-reed 5 and its means of operation for effecting the condensing function are illustrated in detail in Figs. III to VI, inclusive, of the drawings. Referring thereto, the reed 5 is mounted in a frame 105, longitudinally movable, as by means of an endless screw 106, mounted in the head 107 of a supporting-bar 108. The frame 105 is secured, as by terminally-threaded studs 109, which, working in longitudinal slots provided for them, respectively, in the bar 108, are provided underneath the bar, respectively, with wing-nuts 110, by which when the position of the frame 105 is adjusted with respect to the bar through manipulation of the screw 106 the frame may be securely fixed in place. The bar 108 is provided near its opposite extremities with swivel-eyelets 111, through which pass the respective side bars 112 of a supporting-frame. The side bars 112 being parallel and the eyelets 111 being free to turn, it is obvious that the reed in its frame 105 may be, within certain limits, brought to any required angle, as will appear upon comparison of Figs. III and IV. Each of the eyelets is secured to the supporting-bar 108, as by a stud-bolt 113, which carries upon its threaded extremity a wing-nut 114. By this means whenever the position of the reed is fixed it may be secured in that position by turning the nut 114 and drawing the eyelets 111 fixedly against the bottom of the bar 108. The operation of the reed 5 as a condenser is accomplished by setting it in a position oblique to the side bars 112. When the reed is at right angles to the side bars, the extreme lateral threads 115 and 116 of a warp are at their extreme limit of separation. If the reed be moved to an oblique position, the threads 115 and 116 will be drawn somewhat closer together, and the spaces between all of the intermediate threads will be correspondingly and distributively lessened. It is obvious, therefore, that within the limits of adjustment of the reed the width of a warp passing through its dents may be varied at will and without interrupting the operation of the apparatus. By this means the number of warp-threads presented to a given surface of the printing-roll may be readily varied for the purpose specified.

The operation of the apparatus as a whole having been described in the specification of its functions and mechanical structure and the operation of the condensing-reed having been pointed out more in detail, further description of the operation to one skilled in the art appears to be unnecessary.

In the foregoing specification and accompanying drawings we have shown and described preferred mechanism for accomplishing a given result; but we desire to have it understood that we do not limit ourselves to the precise details of construction of our apparatus, but, as suggested by the diagrammatical character of the illustration of the machine as a whole, reserve the right to modify and vary the same in all respects, so far as may be done without departing from the scope of the principle of our invention.

What we claim is—

1. In a warp-printing machine the combination with means for imparting to the warp a regulated degree of moisture, printing mechanism, a warp-receiving beam, and a drying-cylinder between said beam and printing mechanism, of means for compelling contact between said cylinder and the warp and its backing-cloth throughout the greater portion of the periphery of said cylinder, and synchronously-operative driving mechanism.

2. In a warp-printing machine the combination with suitable driving mechanism and printing mechanism, of an obliquely-movable reed adapted to regulate the spaces between the warp-threads passing through its dents with reference to the printing mechanism.

3. In a warp-printing machine, the combination with a reed, of means for adjusting it obliquely to the warp-threads passing through its dents.

4. The combination with a pair of parallel bars constituting a reed-supporting frame, of a reed carried thereby, and means for adjusting the position of the reed obliquely to the bars, at will.

5. The combination with a pair of parallel bars constituting a supporting-frame, of a reed-supporting bar obliquely adjustable thereon, and a reed-frame transversely adjustable upon the supporting-bar.

In testimony of all which we have hereunto subscribed our names.

GEORGE H. WINSLOW.
CHARLES W. DENNETT.

Witnesses:

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JAMES RUSSETT.