

No. 780,272.

PATENTED JAN. 17, 1905.

D. E. FELT.  
TABULATING MACHINE.  
APPLICATION FILED MAR. 30, 1901.

6 SHEETS—SHEET 1.

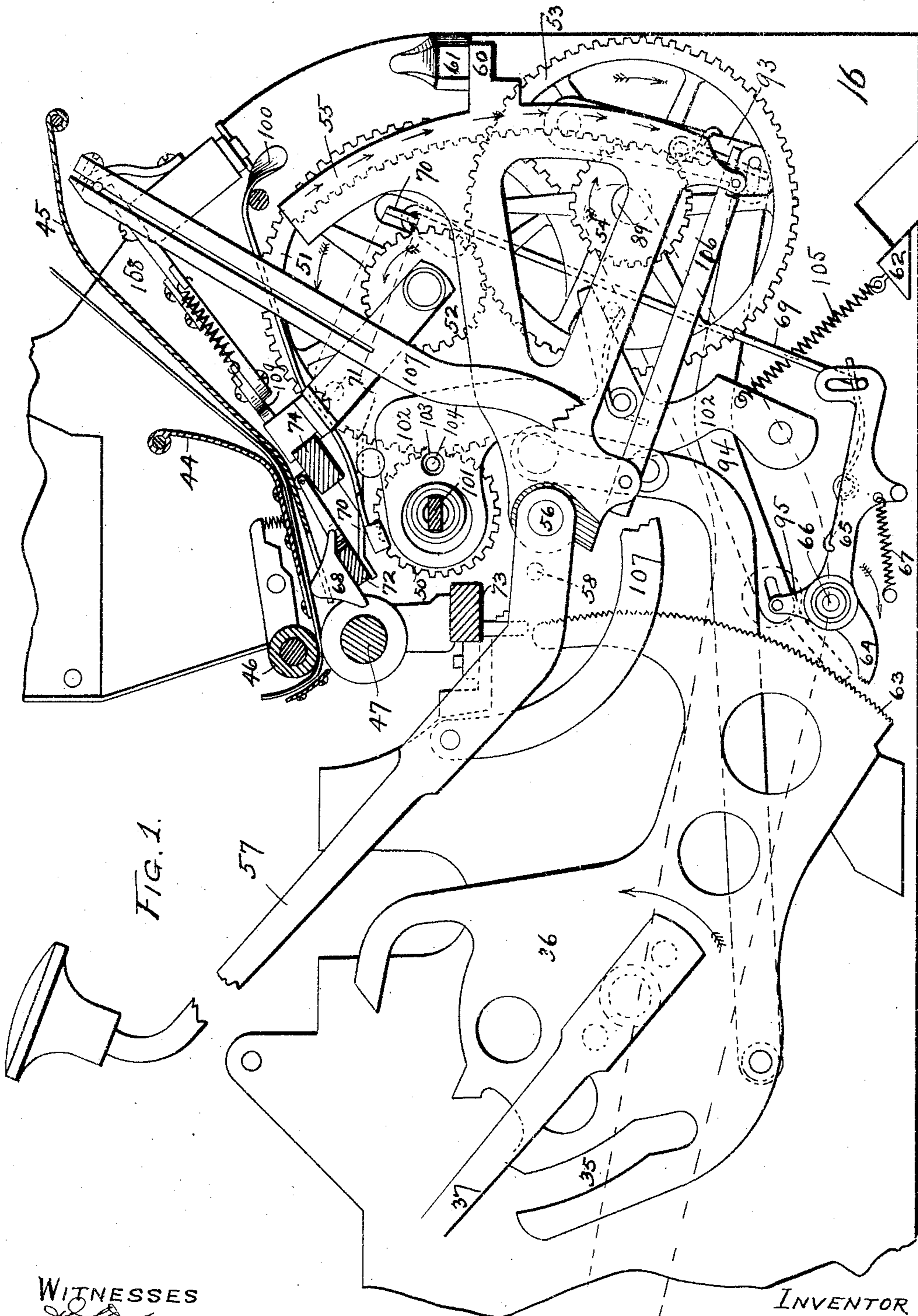


FIG. 1.

WITNESSES

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INVENTOR

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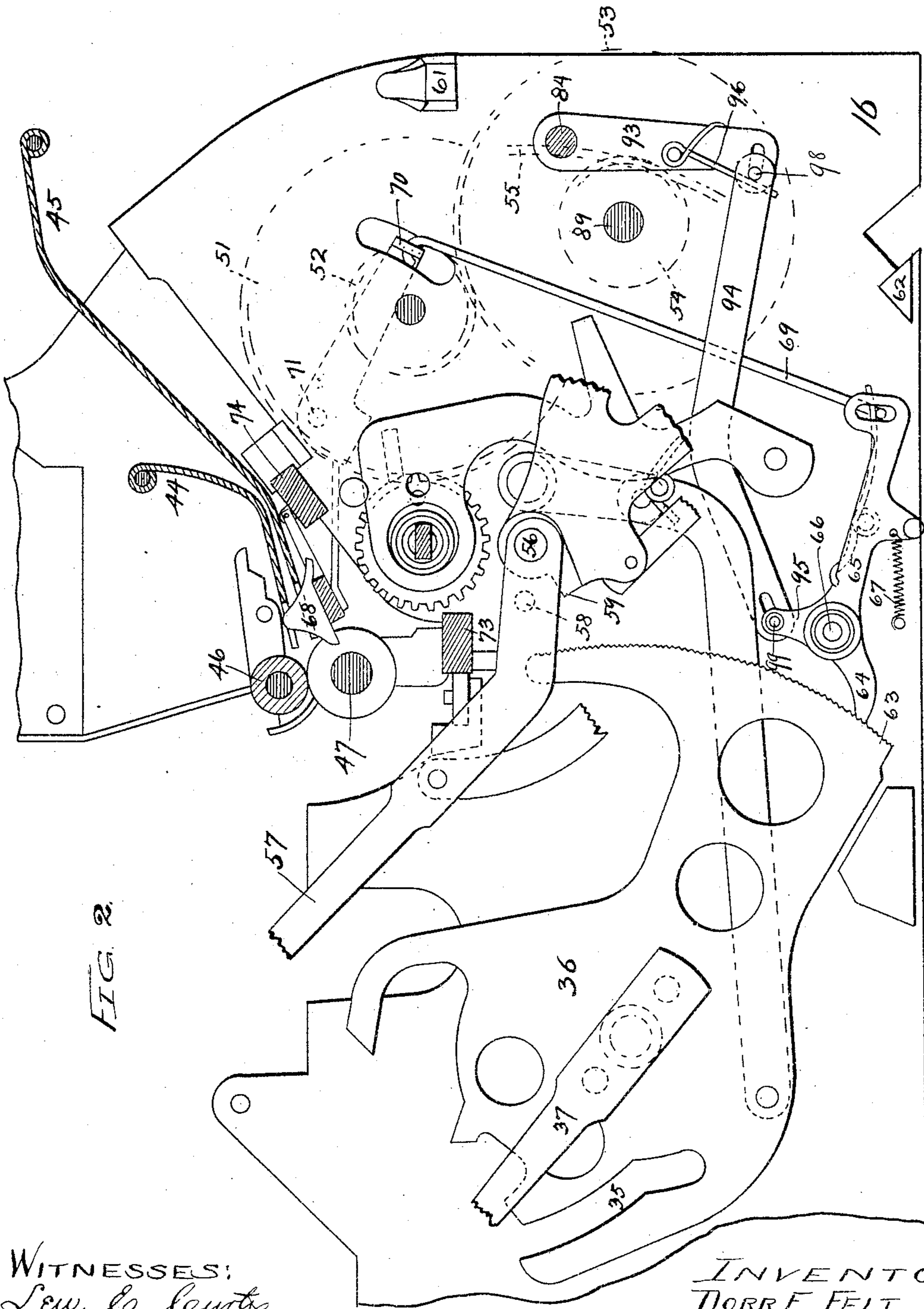


FIG. 2.

WITNESSES:  
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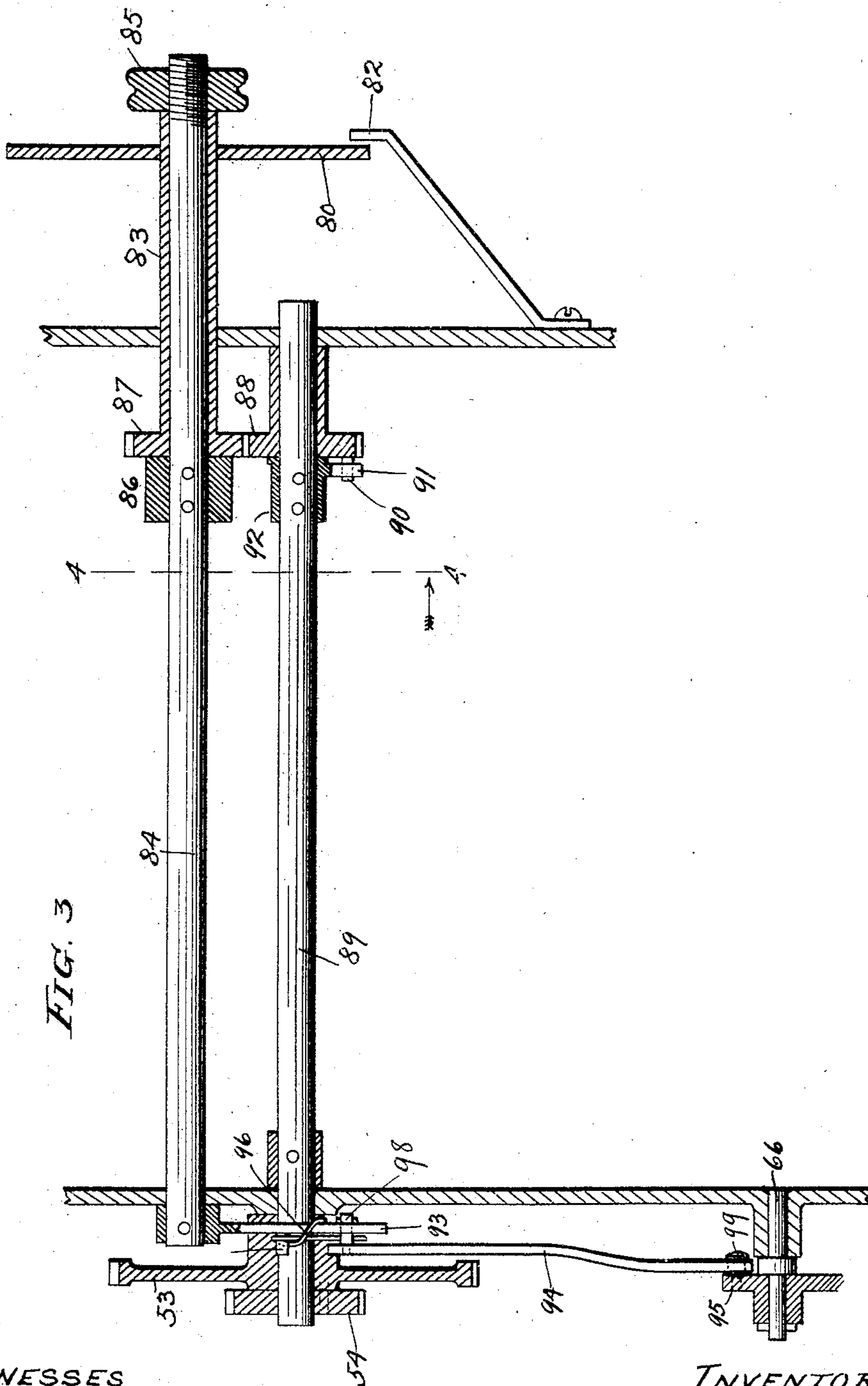
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6 SHEETS—SHEET 3.



WITNESSES

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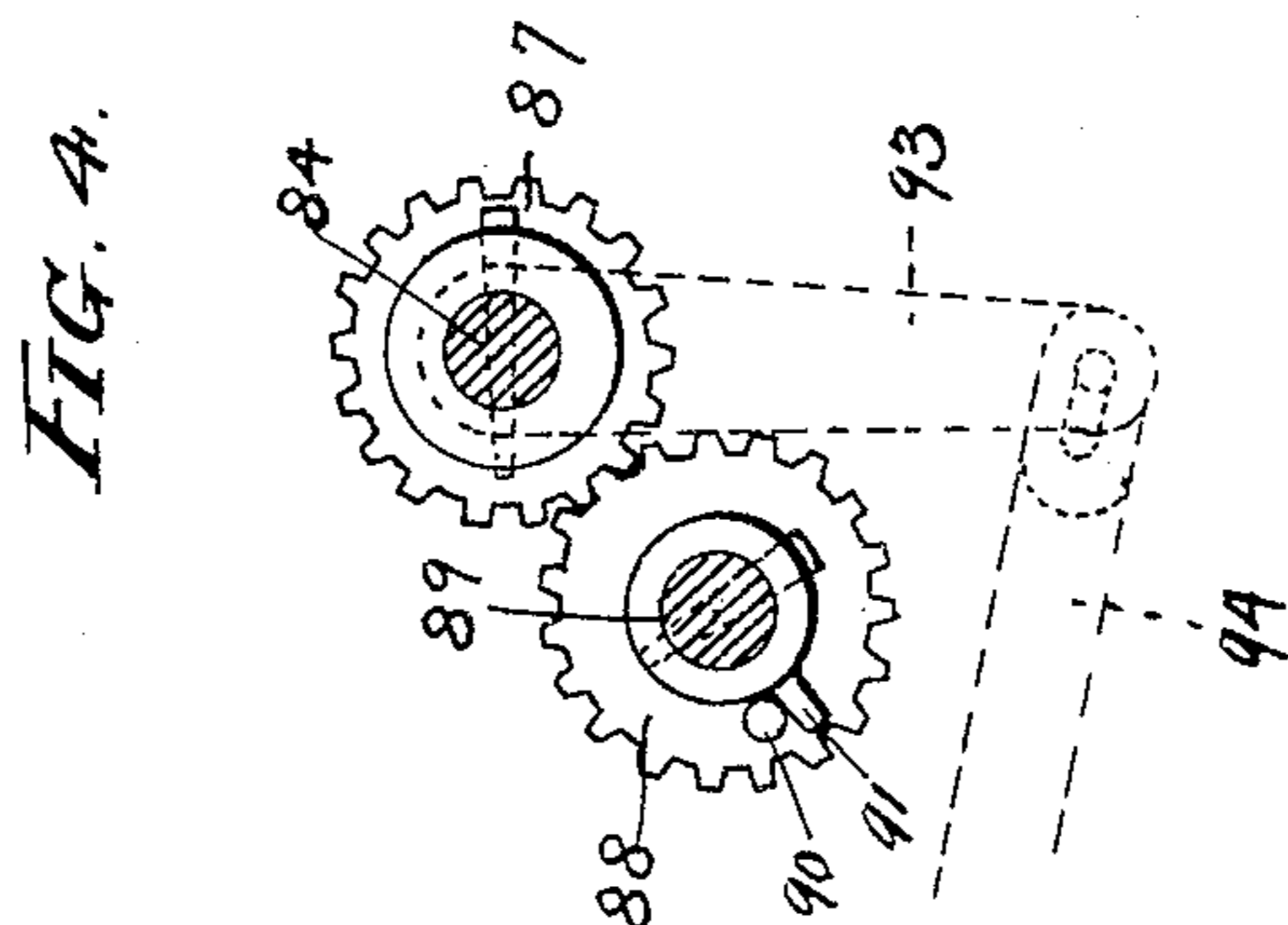
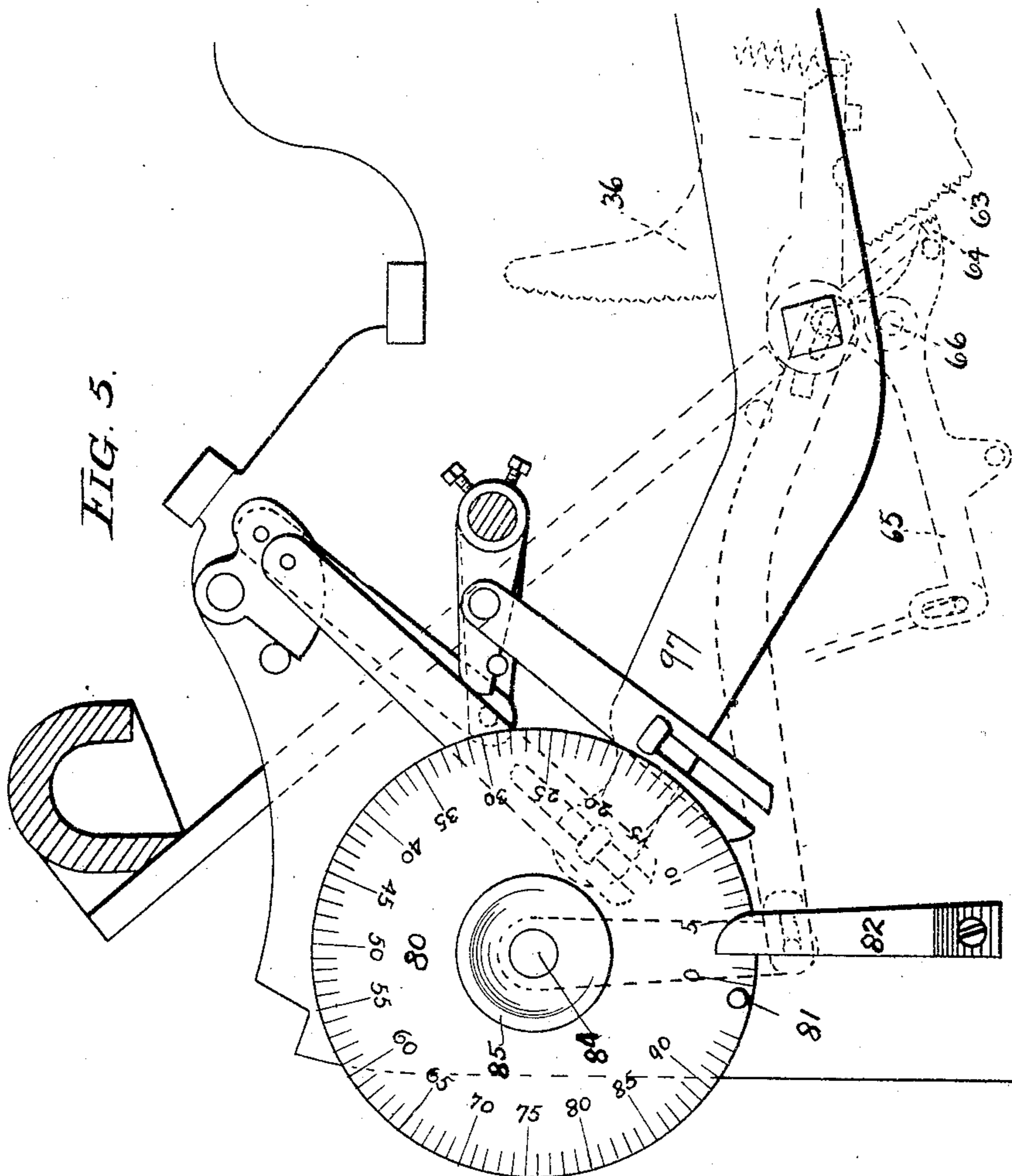
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6 SHEETS—SHEET 4.



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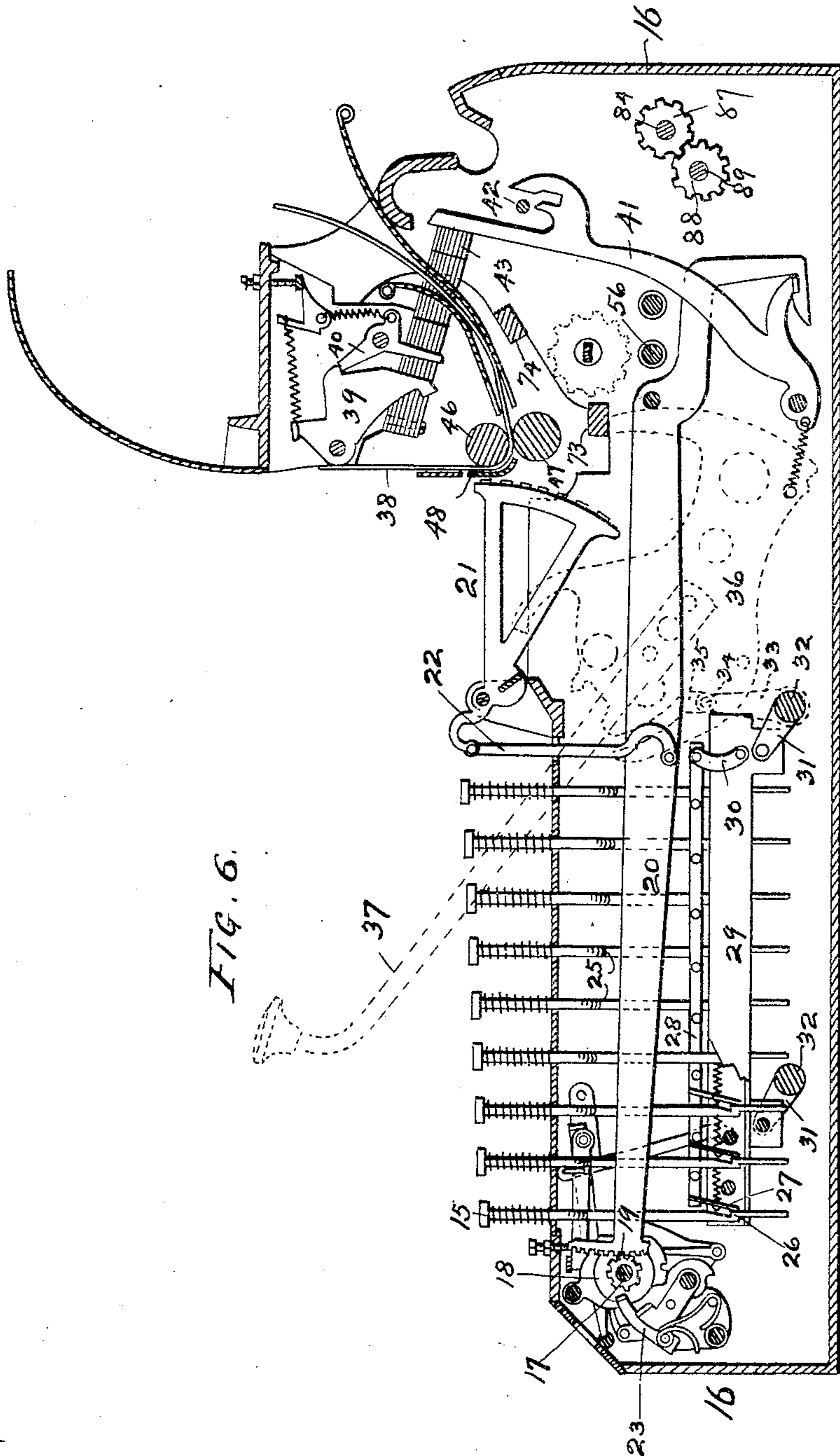
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6 SHEETS—SHEET 5.



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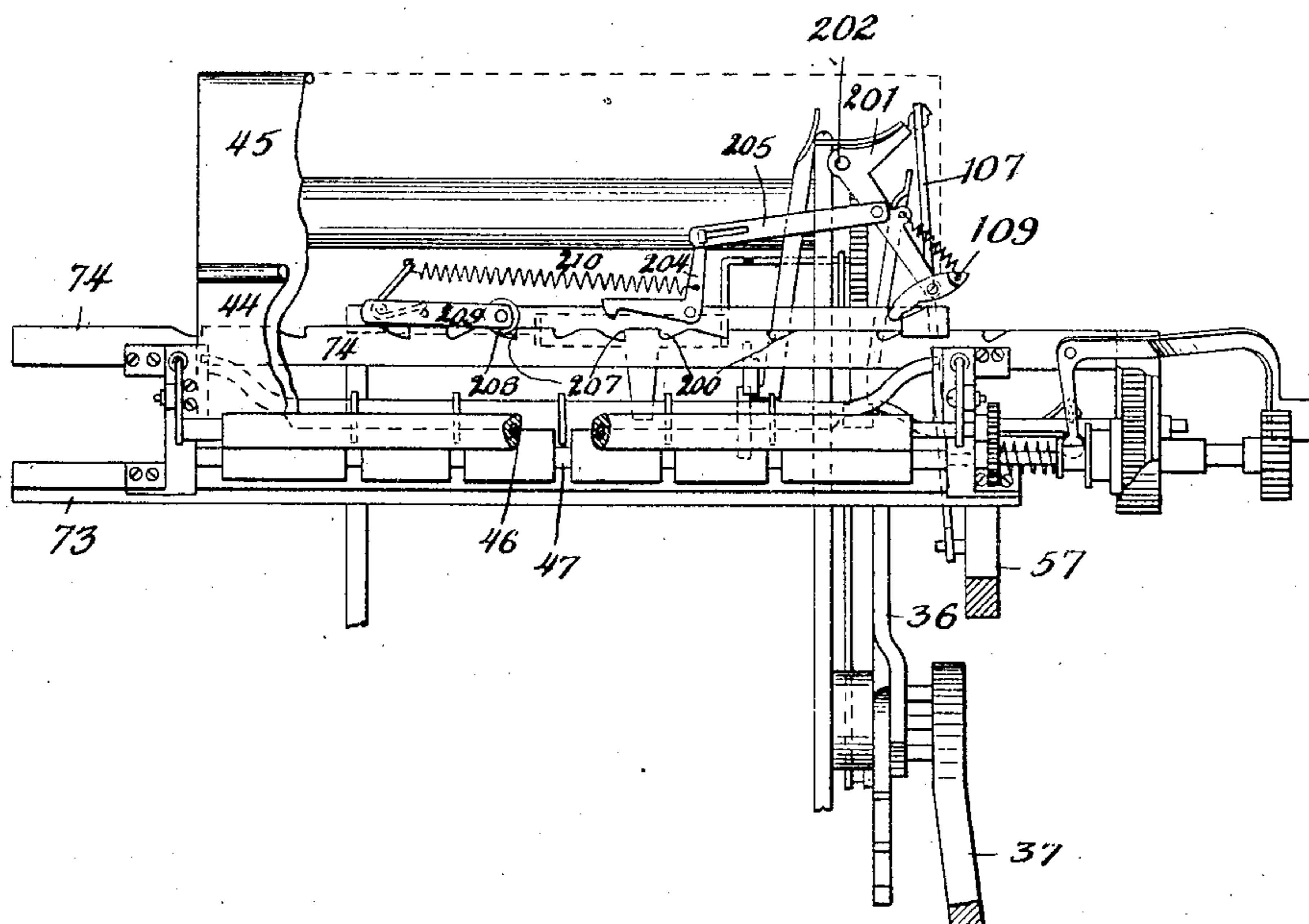
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6 SHEETS—SHEET 6.

Fig. 7



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# UNITED STATES PATENT OFFICE.

DORR E. FELT, OF CHICAGO, ILLINOIS, ASSIGNOR TO COMPTOGRAPH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## TABULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 780,272, dated January 17, 1905.

Application filed March 30, 1901. Serial No. 53,659.

*To all whom it may concern:*

Be it known that I, DORR E. FELT, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Tabulating-Machines, of which the following is a specification.

This invention relates to tabulating - machines.

In the use of these machines it is sometimes desirable to tabulate amounts upon a less number of lines, counting vertically, than the sheet is adapted to hold; and my object in the invention has been to provide the machine with means whereby the operator may be informed when he has tabulated any predetermined number of amounts. In other words, I have devised and applied to a tabulating-machine suitable mechanism adapted to be set in advance of the tabulating and which when any predetermined number of lines, either the entire number which the sheet will hold or any less number, have been tabulated the machine will automatically lock, so that no further amounts can be printed until the lock is released.

The invention is an improvement upon the machine shown in my application, Serial No. 36,951, filed November 19, 1900, and since patented in Patent No. 694,955, dated March 11, 1902, in which I show means for locking the machine when the bottom of the paper is reached, the locking mechanism being controlled by the paper itself; but in the present invention I do not rely upon the paper for this purpose, though the machine may embody both the mechanism of my said application and that of the present invention also.

The nature of the present improvements will be fully understood from the specification given below and is also fully illustrated in the accompanying drawings, in which—

Figures 1 and 2 are longitudinal vertical sections of a tabulating-machine embodying my invention, the first showing the parts in normal position; and the latter being partly broken away and showing the parts in their locked position. Fig. 3 is a detail cross-section. Fig. 4 is a section on the line 4 4 of

Fig. 3. Fig. 5 is a partial longitudinal vertical section, and Fig. 6 is a longitudinal vertical section showing more especially the printing mechanism of the machine. Fig. 7 is a partial horizontal section showing more especially the laterally-movable paper-carriage.

In said drawings, 15 represents the keys; 16, the surrounding frame; 17, the shaft on which the numeral-wheels 18 are supported; 19, the pinion actuating one of the numeral-wheels; 20, the segmental lever meshing with said pinion and also joined to the type-segment 21 by a link 22 in such manner as to position such segment when it (the lever) is depressed. The carrying-lever of the numeral-wheel next adjacent to the wheel shown appears at 23. The keys are each provided with an offset or bend 25 on its stem adapted to engage the lever 20, and the offsets are graduated in position, so that each key will be able to impart the proper amount of movement to the lever. The keys are made the medium of depressing the levers 20, and to this end each key-stem has a shoulder 26, adapted to be engaged by a spring-catch 27, carried by a frame 28, when the key is depressed or set by the finger of the operator. The frame 28 is united to an operating-frame 29 by links 30, and a bodily downward movement is imparted to frame 29 by cranks 31 on shafts 32, one of said shafts having a crank 33, the upper end of which carries a pin 34, working in a slot 35 in the main cam 36, operated by the printing and adding hand-lever 37. The downward movement of frames 28 and 29 caused when the hand-lever is operated carries any key which may have been set downward with the frames, and such key imparts a movement to its segment-lever proportioned to the power of the key, and the segment-lever in turn actuates its corresponding numeral-wheel to a proportionate extent and positions the type-segment to which it is attached with the figure corresponding to the key at the printing-center. It will be understood that there is a series of nine keys for each denomination embraced in the machine and that such keys are duplicates of the ones shown; also that there

is a separate numeral-wheel and segment-lever for each denomination, together with carrying devices for all the wheels except the lowest. The keys are released from the catches  
 5 by a horizontal movement of frame 28, imparted to it at the conclusion of the printing operation by means not shown, but which may be seen in my Patent No. 568,021, of September 22, 1896.

10 The paper (seen at 38) is impressed upon the type by spring-actuated hammers 39, of which there is one for each denomination and which are normally held out of action by detents 40, but are released from the detents by  
 15 the tailpieces 41, actuated in part by the segment-levers 20 and in part by a swinging cross-bar 42 and the hammer-releasing frames 43. The action of the parts 39 to 43 is fully set forth in my Patent No 644,287, of February  
 20 ary 27, 1900. The paper enters the machine between the guides 44 and 45, is fed by rolls 46 and 47, and is guided upward by guide 48.

The present machine also embodies mechanism for returning the paper to its starting  
 25 position after the completion of a vertical column and simultaneously shifting the paper laterally in column-spacing, and this returning and shifting mechanism may be patterned after the designs shown in either of my Pat-  
 30 ents No. 628,176 or No. 644,287. The mechanism now shown for this purpose is substantially like that of Patent No. 644,287 and consists of the pinion 50, which corresponds to the pinion C' of the patent and is actuated in  
 35 the line-spacing movements of the paper-rolls, the train of gears 51, 52, 53, and 54, the segment 55, actuated by gear 54 and supported on shaft 56, and the hand-lever 57, mounted on said shaft and having a stud 58 engaging the  
 40 shoulder 59 on the hub of segment 55. The segment also carries a projection 60, which encounters stationary stops at both limits of its path, the upper stop being shown at 61 and the lower one at 62.

45 The locking mechanism is preferably similar to that of my pending application, Serial No. 36,951, filed November 19, 1900, in which the edge 63 of cam 36 is serrated and is engaged by the serrated end 64 of a lever 65,  
 50 pivoted at 66 and having a spring 67 urging it into engagement with the cam. This spring is controlled by the means set forth in my said application and consisting of a series of feelers 68, arranged under the path of the paper  
 55 and pressed upward against the same by power from spring 67. The connections between the feelers and the spring consist of the lever 65, the connecting-wire 69, the lever 70, pivoted at 71 and acting upwardly on the bar 72,  
 60 supporting the series of feelers. The bar 72 is supported and moves with the laterally-movable paper-carriage, the longitudinal members whereof are shown at 73 and 74 (the full details of a desirable construction of  
 65 which carriage are fully set forth in my said

Patent No. 644,287) and which also support the paper rolls and guides, as will be understood. The feelers are prevented from moving upward by the paper; but as soon as the  
 bottom of the paper passes them they move  
 70 upward and allow the spring 67 to throw the lever 65 into engagement with the cam, thereby arresting both the adding and the printing mechanisms of the machine.

In order to insure the locking of the cam  
 75 36 by lever 65 when any predetermined number of lines have been printed, I employ the following mechanism: At 80 is a rotatable dial the face of which is divided by indicating-marks into spaces which ordinarily will  
 80 equal in number the number of lines which the paper is capable of receiving. The dial illustrated has ninety-four spaces, but may have any desired number, and it is provided with a stop-pin 81, adapted to encounter a  
 85 stationary pointer 82 and prevent it making a complete rotation. This dial is mounted on a sleeve 83, loosely encircling a shaft 84, but capable of being locked thereto by tightening the nut 85, so as to force the sleeve against a  
 90 collar 86, rigid on the shaft. The sleeve is also rigid and preferably integral with a pinion 87, meshing with a pinion 88 on the shaft 89, which is the shaft carrying the gears 53 and 54 of the paper-returning mechanism.  
 95 Pinion 88 is loose upon shaft 89, but is compelled to turn with the latter whenever the laterally-projecting pin 90, carried by the pinion, engages the arm 91, radiating from collar 92 on shaft 89. Shaft 89 is turned by gears  
 100 53 and 54, but communicates no motion to gear 87 or shaft 84 until the pin 90 and arm 91 engage. The sleeve 83 is normally locked to shaft 84, but is released whenever it is desired to change the relation between pin 90  
 105 and arm 91, so that their engagement may take place earlier or later. This adjustment is effected by turning the dial until the desired mark thereon is brought in front of the pointer, as seen at Fig. 5, where the  
 110 dial is set at the second mark, indicating that the engagement shall take place immediately after the second forward feeding movement of the paper. Obviously the dial might be set at 94 or any smaller number. When  
 115 the shaft 84 is thus actuated by the engagement of pin 90 and arm 91, it gives a swinging movement to an arm 93, rigidly attached to its farther end, and this arm is connected by a bar 94 to an upward projection 95 on  
 120 lever 65. The bar 94 is slotted at the end connected to projection 95, and the arm 93 is also slotted at the end joined to the bar, as shown, and at this latter junction a spring 96 is employed tending to force the bar in a di-  
 125 rection corresponding to that in which it is moved by arm 93. The actuation of shaft 84 through these devices moves lever 65 into locking position with the main cam, and thus arrests the printing and adding, both of which  
 130

are brought about by the movement of said cam, and as such actuation takes place whenever any predetermined number of lines has been printed it will be seen that I am able by  
 5 setting the dial at the desired number to bring about the absolute locking of the machine whenever that number of amounts has been tabulated and added in any column. The spring 96 renders the impact of the lever 65  
 10 with the main cam a yielding impact, thereby avoiding danger to those parts, without, however, impairing the locking-action. The dial is located at the side of the machine where the total-printing lever is usually located. This  
 15 lever is shown at 97 in Fig. 5, together with some of the parts actuated by it. The bar 94 is connected to the arm 93 by the pin 98, fast in the bar, and to arm 95 by pin 99, fast in the arm.

20 I have shown in the drawings a number of features which have no bearing upon the present invention, among which may be mentioned the interlocking lever 100, angular shaft 101, through which the feed-rolls are actuated by  
 25 means not shown, the movable plate 102, having an opening 103 for the pin 104, the spring 105, the cushioning contact 106, the bent link 107, connecting lever 57 to the pivoted lever 108, carrying the pusher 109 for shifting the  
 30 carriage in column-spacing. The construction and operation of all these parts is fully set forth in my said application Serial No. 36,951.

It will be understood that the shaft 84 will be rocked back after each actuation by the re-  
 35 turn of arm 93 and that shaft 89 is turned back with the backward rotation of gear 53, so that the locking-action will be released at each operation of the paper-returning mechanism.

The details of the laterally-movable carriage  
 40 will be found set forth fully in my said Patent No. 694,955, reference being made more especially to Fig. 2 of the patent. Referring to Fig. 7 of this application, 107 is the link receiving power from the reversing-lever 57.  
 45 This link is connected to an elbow-lever 201, pivoted at 202 and carrying at the end of its long arm a pusher 109, adapted to engage the notches 200 in the bar 74 of the carriage, and thereby to shift the carriage laterally a col-  
 50 umn-space at each actuation, said bar acting as a spacing device. To prevent overthrow, I may employ the elbow-shaped latch 204, which is joined to the elbow-lever 201 by a link 205 and enters notches 207, located be-  
 55 tween the notches 200. I may also employ a spring-pressed dolly-roll 208, entering the notches 207, to insure uniformity in the positioning of the carriage, the roll being carried on the end of the pivoted bar 209, which is  
 60 pressed downward at all times by the spring 210. Further details of the carriage will be found in said patent.

I claim—

1. The combination with the adding mech-  
 65 anism and the mechanism for printing the num-

bers added, of a paper-carriage capable of being moved laterally to position it for the printing of the numbers in columns, means for feeding the paper vertically in all the lateral po-  
 70 sitions of the carriage, and means acting in all the column positions of the carriage to lock said adding and printing mechanisms upon the completion of partial columns, substantially as specified.

2. The combination with the adding mech- 75  
 anism and the mechanism for printing the numbers added, of a paper-carriage capable of moving laterally, means for feeding the paper vertically at each impression without moving it  
 80 laterally, and means adapted to be set in advance and acting in all positions of the carriage to lock said printing and adding mechanisms upon the completion of partial columns, substantially as specified.

3. The combination with the adding mech- 85  
 anism and the mechanism for printing the numbers added, of a paper-carriage capable of moving laterally, means for feeding the paper vertically at each impression without moving it  
 90 laterally, a hand-lever for actuating the adding and printing mechanisms, and means acting upon the completion of partial columns and in all positions of the carriage to lock said lever, substantially as specified.

4. The combination with the adding mech- 95  
 anism, the printing mechanism and a hand-lever for operating said mechanisms, of means for locking said lever, mechanism controlling said locking means and causing the automatic  
 100 locking of the lever on the completion of any predetermined number of tabulations, and means for automatically releasing the locking-action, substantially as specified.

5. The combination in a tabulating-machine, with the printing hand-lever thereof, of means 105  
 for locking said lever, mechanism for feeding the paper vertically, mechanism for returning the paper, and mechanism connected to said returning mechanism and controlling the lock-  
 110 ing means.

6. The combination in a tabulating-machine, with the printing hand-lever thereof, of means 115  
 for locking said lever, mechanism for feeding the paper vertically, mechanism for returning the paper, and mechanism connected to said returning mechanism and controlling the lock-  
 ing means and also adapted to be set so it will act when any predetermined number of tabulations has been made.

7. The combination in a tabulating-machine, 120  
 of printing mechanism for printing the amounts tabulated, means for feeding the paper vertically after each impression, means for locking said printing mechanism, and mech-  
 125 anism controlling the locking means and acting whenever any predetermined number of tabulations has been made.

8. The combination in a tabulating-machine, of printing mechanism for printing the 130  
 amounts tabulated, means for feeding the pa-

per vertically after each tabulation, mechanism for returning the paper vertically, means for locking said printing mechanism, and mechanism controlling the locking means and acting whenever any predetermined number of tabulations has been made, the lock being released by the operating of the paper-returning mechanism.

9. The combination with the printing mechanism and the locking mechanism, of the paper-returning mechanism, and connections between said returning mechanism and said locking mechanism whereby the latter are thrown into action upon the completion of any predetermined number of tabulations.

10. The combination with the adding mechanism, the printing mechanism, and a paper-carriage having a lateral movement whereby it may be positioned for the printing in columns, of means for locking both said mechanisms on completion of the full columns, and means for causing action by said locking means on the completion of partial columns, substantially as specified.

11. The combination with the adding mechanism, the printing mechanism, and a paper-carriage having a lateral movement whereby it may be positioned for the printing in columns, and mechanism for feeding the paper vertically, of means for locking said mechanisms on the completion of full columns, and means for causing action by said locking means on the completion of partial columns, substantially as specified.

12. The combination with the adding mechanism, the printing mechanism and mechanism for feeding the paper vertically at each impression, of means for locking all said mechanisms, mechanism for returning the paper

and adjustable means adapted to be set in advance and to cause the locking means to act upon the completion of any predetermined number of impressions, substantially as specified.

13. The combination in a tabulating-machine of printing mechanism adapted to print two or more figures side by side at each impression, a paper-carriage, means for feeding the paper vertically at each impression, means for locking the machine when any predetermined number of tabulations has been made and means for releasing the locking means, substantially as specified.

14. The combination in a tabulating-machine of printing mechanism adapted to print two or more figures side by side at each impression, a paper-carriage, means for feeding the paper vertically at each impression, means for locking the machine when any predetermined number of tabulations has been made and means for releasing the locking means, said locking means being adapted to be set in advance, substantially as specified.

15. The combination in a tabulating-machine of printing mechanism adapted to print two or more figures side by side at each impression, a paper-carriage, means for automatically feeding the paper vertically a line-space at each impression, means for automatically locking the machine when any predetermined number of tabulations has been made and means for automatically releasing the locking means, substantially as specified.

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Witnesses:

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