

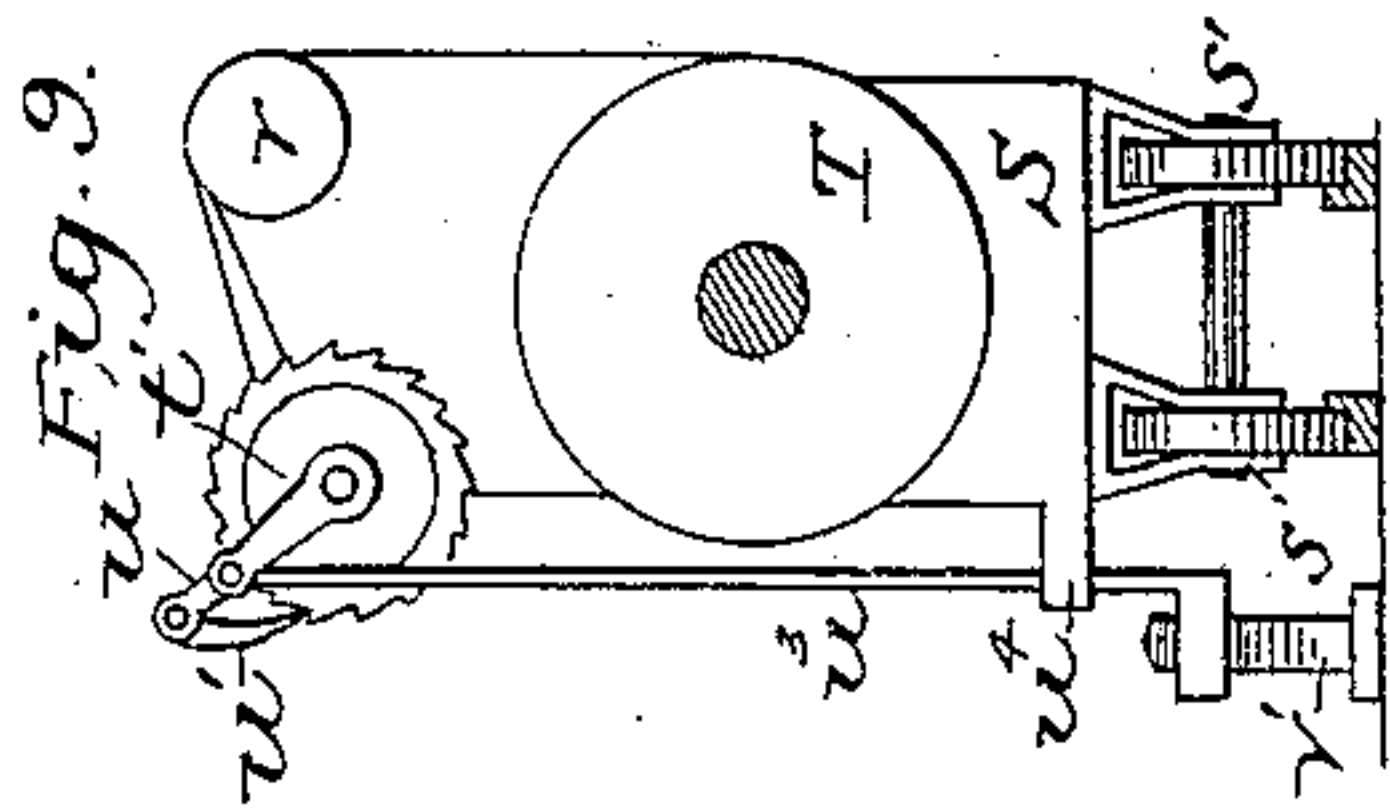
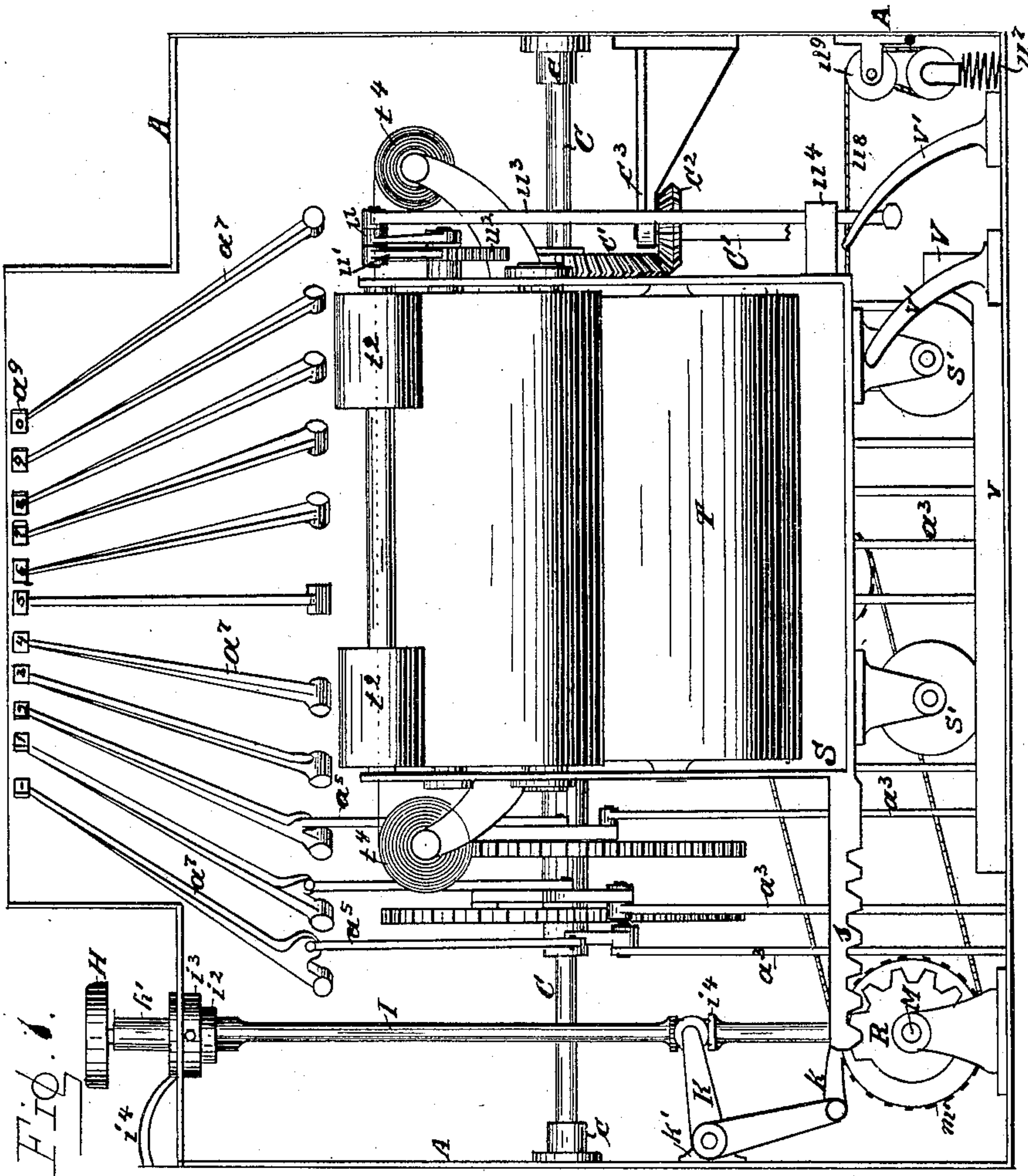
(No Model.)

4 Sheets—Sheet 1.

J. H. EICKERSHOFF.
AUTOMATIC PRINTING AND ADDING MACHINE.

No. 565,337.

Patented Aug. 4, 1896.



Witnesses
Ernest K. Hood
Harriet A. Hood

Inventor
John H. Eickershoff

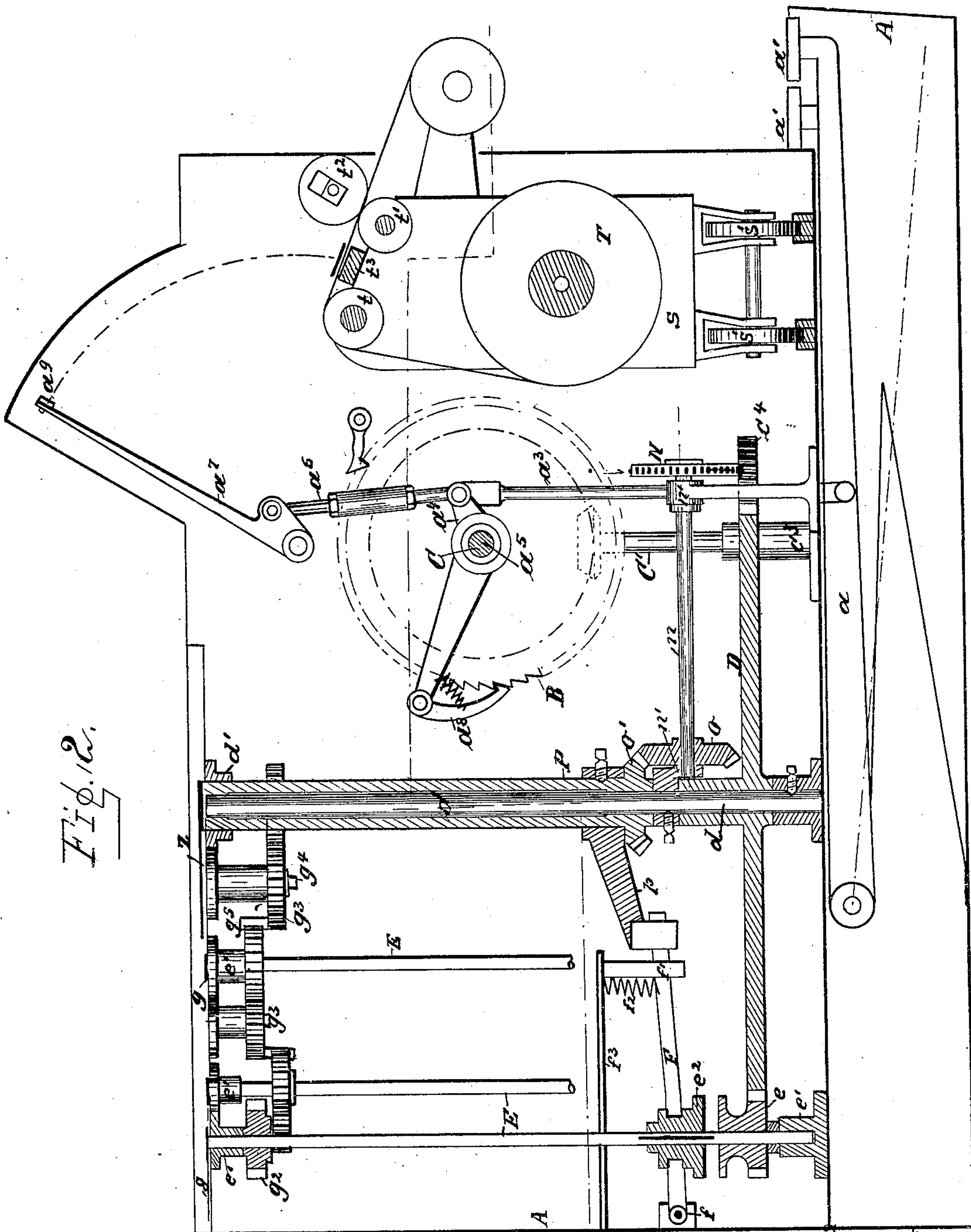
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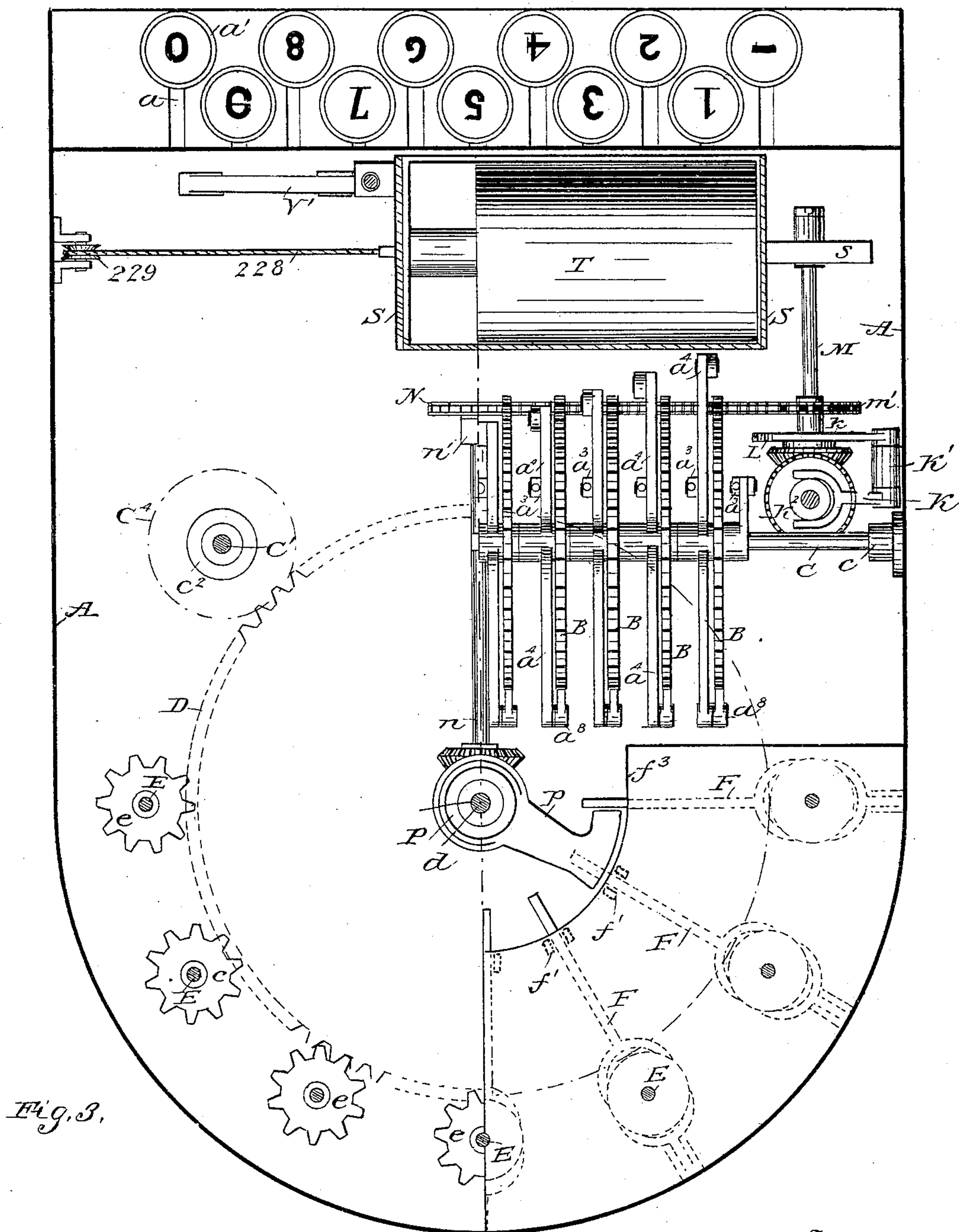


Fig. 3.

Witnesses

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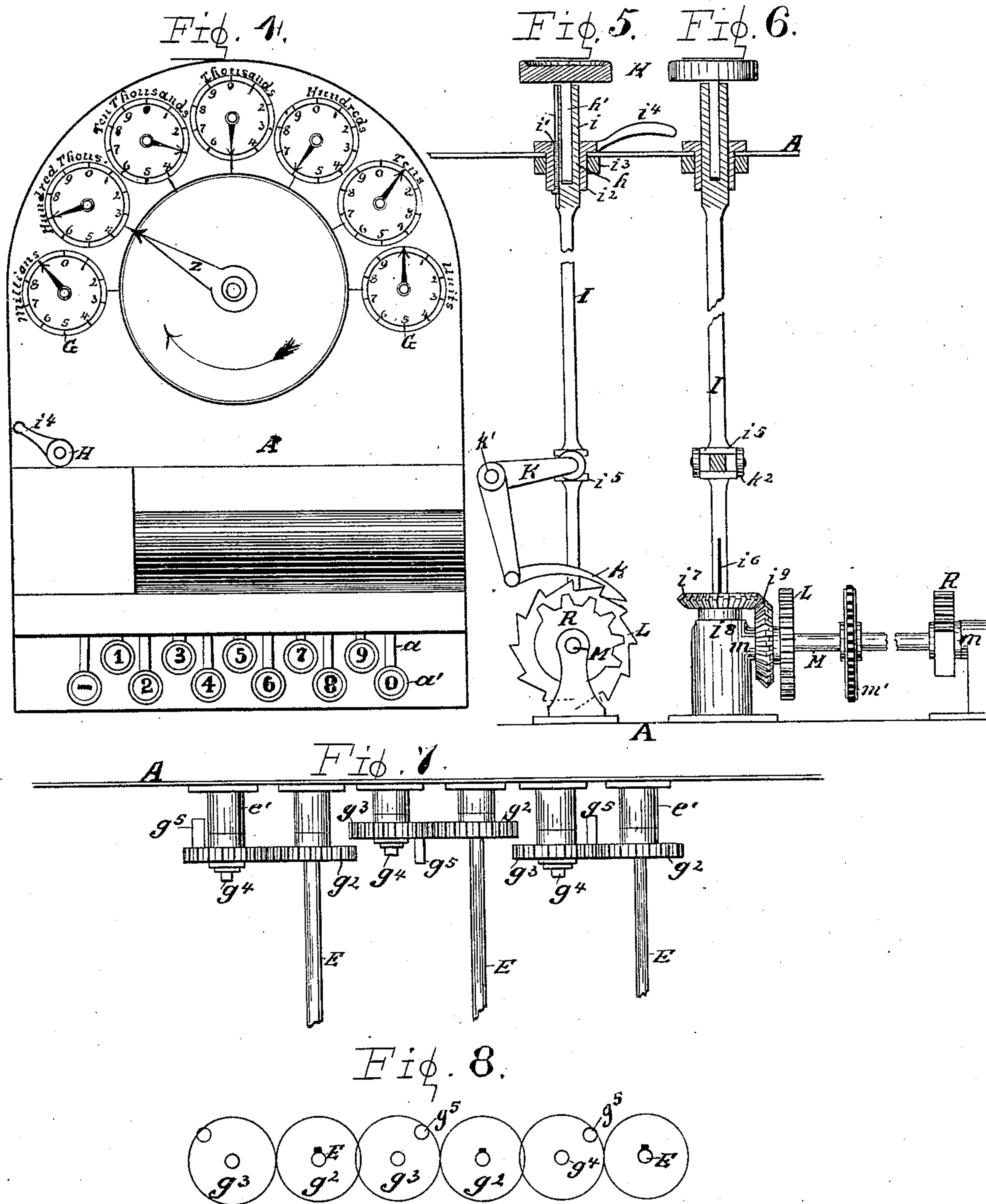
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AUTOMATIC PRINTING AND ADDING MACHINE.

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Witnesses

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Harriet H Hood

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John H. Eichershoff

UNITED STATES PATENT OFFICE.

JOHN HENRY EICKERSHOFF, OF CINCINNATI, OHIO.

AUTOMATIC PRINTING AND ADDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,337, dated August 4, 1896.

Application filed February 26, 1896. Serial No. 580,886. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY EICKERSHOFF, a citizen of the United States of America, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Printing and Automatic-Adding Machines, of which the following is a specification.

The object of my invention is to provide a writing and automatic-adding machine in which the numbers are written in regular order from left to right and the addition accomplished simultaneously with the printing, a machine in which numbers of different denomination may be readily written in columns and the result of any addition or partial addition indicated, and a machine in which adding is accurately and positively accomplished; and my invention consists in the combination and arrangements of parts hereinafter described and claimed.

Figure 1 is a front elevation of my device. Fig. 2 is a central vertical section; Fig. 3, a sectional plan of the device; Fig. 4, a top plan on a reduced scale; Fig. 5, a partial section of the position-key; Fig. 6, a side view of the same; Fig. 7, a detail elevation of the adding-wheels; Fig. 8, a plan of the same, and Fig. 9 an end elevation of the carriage.

Mounted in a casing A is a series of levers a , provided at their outer ends with finger-keys a' , preferably near the bottom of the casing. A series of levers a^4 are pivoted on a shaft at a^5 and each is connected with one of the levers a by a link a^3 . Links a^6 connect with a set of levers a^7 , carrying type a^9 , adapted to print upon a record-strip. The other end of levers a^4 are provided with pawls a^8 , adapted to operate ratchet-wheels B. The lengths of the arms of levers a^4 , carrying links a^3 , vary according to the numeral to be printed. The greater the numeral the shorter the lever. If, for instance, the key carrying figure "9" is pressed down, the catch corresponding therewith will rotate the ratchet-wheels B to the extent of nine teeth, or if the key carrying the figure "2" is pressed down the catch will rotate the ratchet-wheel to the extent of two teeth. The ratchet-wheels B are mounted on a shaft C, supported in and rotating in bearings c . Mounted upon the same shaft is a bevel-wheel c' , meshing with

and operating a bevel-wheel c^2 , adapted to actuate a shaft C', supported in bearings c^3 . On the lower end of shaft C' a spur-pinion c^4 is mounted and adapted to engage with and operate a central wheel D, rotating freely upon a stationary upright stud d .

Meshing with and arranged about the periphery of wheel D is a series of small wheels e , rotating freely on upright spindles E, supported in and adapted to rotate in bearings e' . It might be here mentioned that wheels e have ten teeth, and the gearing between wheels e and ratchets B is such that by rotation of the ratchet-wheels B, say, nine teeth the wheels e are also rotated nine teeth.

Mounted on spindles E, above the wheels e , are clutches e^2 , rotating with and adapted to slide on spindles E and engaging with wheels e . A set of shifting-levers F, adapted to engage with clutches e^2 , is pivoted to the casing at f and provided at their inner ends with guides f' , adapted to support them against lateral movement. Spiral springs f^2 , secured to the shifting-levers and to plate f^3 , mounted above the shifting-levers, are adapted to return the levers F and clutches e^2 to their normal position out of engagement with wheels e .

The extreme upper ends of spindles E are provided with arrows g , adapted to register with a series of indicating-dials. By moving keys a' the levers a and a^4 , the catches a^8 , and the ratchet-wheels B, together with shaft C, are actuated, and this movement is transmitted by bevel-wheels c' and c^2 to shaft C', thence by spur-pinion c^4 to the central wheel D, from whence the rotation is transmitted to the small wheels e , ordinarily rotating freely around the spindles E. By operating shifting-levers F wheels e transmit their rotation to spindles E and the arrows g .

A position-key, consisting, substantially, of a finger-key H, a spindle I, a bell-crank lever K, and a shaft M, is mounted in casing A, and is adapted to operate shifting-levers F through a train of connecting mechanism hereinafter described. Key H is provided with a pin h' , loosely fitted in a sleeve or socket i in the spindle I. The upper end of spindle I is provided with a key i' , engaging with a bushing i^2 , embracing the socketed portion of spindle I, and passes through the top plate of casing A. A collar i^3 embraces bushing i^2 below the

top plate of casing A and supports the bushing against sliding movement. A handle i^4 is carried by bushing i^2 , adapted to rotate the bushing and, through the bushing, the spindle I.

A bell-crank lever K, pivoted to the casing at k' , carries a fork k^2 , taking between a pair of collars i^5 on spindle I, and a pawl k for the operation of the ratchet-wheel L, secured to the shaft M, carried in bearings m . A sprocket-wheel m' is also secured to shaft M, and is adapted to operate, through a chain connection, a second sprocket-wheel N, secured to a shaft n and supported in bearings n' . A bevel-wheel O is secured to shaft n and is adapted to engage with and operate a bevel-wheel O', secured to a sleeve P, surrounding and rotating freely on an upright shaft d . Above the wheel O' is an arm p , secured to the sleeve P, adapted to rotate therewith and actuate the levers F. Surrounding the upper part of sleeve P is a bearing d' , depending from the top plate of casing A, adapted to support one end of sleeve P. The extreme upper end of the sleeve is provided with a pointer z .

The lower part of spindle I is provided with a key-seat i^6 , adapted to slide on a key carried by bevel-wheel i^7 , supported in a bearing i^8 . Meshing with bevel-wheel i^7 is a bevel-wheel i^9 , secured to shaft M next to ratchet-wheel L. By sliding spindle I the collar i^5 actuates the lever K, and pawl k operates the ratchet-wheel, thereby rotating shaft M. Sprocket-wheel m' being rotated, the movement is transmitted to shaft N through a chain connection, and bevel-wheels O and O' rotate sleeve P, arm p , and pointer z . As the bevel-wheel i^9 is secured to shaft M, and is rotating therewith, the spindle I, in a sliding movement, also gives to itself a rotary movement. By turning handle i^4 of the position-key a quick rotation of the parts operated from key II is possible.

I do not wish to confine myself to the specific form of position-key and mechanism connecting it with the shifting-levers shown, as any transforming mechanism may be used without departing from the spirit of my invention, so long as but one transformer is used adapted to place any indicator in driving connection with any key. By this arrangement the actuation of a single key effects, by suitable connecting mechanism, all of the required changes of position of the pointer z , the key and its connections constituting what will hereinafter be called a "transformer."

S is a carriage provided with wheels S', a rack s , paper-storing roll T, paper-supporting roll t , paper-feeding roller t' , and friction-rollers t^2 , pad t^3 , and a set of carbon-strip rollers t^4 . The feed-roller t' is provided with a lever u , having a catch u' and a ratchet-wheel u^2 . Pivoted to the end of the feed-lever u is a rod u^3 , guided at its lower end in a bracket u^4 . The lower end of rod u^3 is provided with a

projection engaging with curved guides v' when the carriage is actuated, thereby operating the feed-rolls. A gear-wheel R, partly blank, is secured to shaft M, adapted to cooperate with rack s and move the carriage.

By revolving the shaft M, as illustrated, wheel R is also rotated and the cogs of the wheel engage with rack s during the forward movement of the carriage and the printing of a line of figures. The rack is then released by the blank space of wheel R, and the carriage S is automatically returned by spring u^7 and is ready for another forward movement. Spring u^7 is secured to casing A and provided with a cord u^8 , connected to the carriage S, and a pair of sheave-wheels u^9 . A pair of stops V are secured to the rails v to limit the return movement of the carriage.

Near the upper part of the indicator-spindles E, below bearings e' , are secured gear-wheels g^2 , adapted to engage with and actuate intermediate wheels g^3 , rotating freely on pins g^4 . Each of the intermediate wheels g^3 is provided with a pin or tooth g^5 , extending from the face thereof and adapted to engage with and actuate a gear-wheel g^2 after a complete revolution of wheel g^3 and spindle E of the dial indicating the next higher denomination is moved to the extent of one tooth.

The top of the indicators G and the pointer z is covered with glass for protection. In the center of the glass covering the indicators are small holes to permit a key to enter keyholes in the arrows, which are adapted to return them to "0" upon the completion of the addition of a column of figures.

The operation is as follows: Before adding a column of figures return all the arrows of the indicators h to "0" by using a key for the pointers of the indicators. Suppose now that two lines of figures, say "4628489" and "5107121," should be written and added. First take handle i^4 of the position-key and turn so that the arrow z is directed toward the million-indicator G, as the highest figure of the first line to be added is "million." Corresponding and in same line with pointer z is arm p , operating the shifting-levers F with clutch e^2 for connecting the same with wheels e , in order to operate the spindles E and arrows g of million-indicator G. If, therefore, the pointer z is set to the million-indicator, it means that arm p has connected lever F and its clutch with the wheel e of the million-indicator. The carriage containing the paper and printing-pad for printing the figures is corresponding with pointer z and also ready for printing the first figure in the million-line. Now push key "4," and by this movement the figure "4" is printed on the record-strip, and the ratchet-wheels B are rotated four teeth, which movement is transmitted to the wheel e , so that the indicator of "million" shows the figure "4." Push now the position-key, which brings pointer z to the next indicator, "hundred thousand," by which movement the carriage is also moved and

ready for the next figure. The number wanted in "hundred thousand" is "6." Push figure "6" and this figure is printed on the paper next to "4," and the indicator "hundred thousand" shows "6." Now the position-key is pushed again and the pointer z moved to "ten thousand," and with it the carriage. The figure in this column is "2," which is recorded. Then continue with the other figures in the same way. When the last figure of that line is recorded, the indicators will read "4628489," which figures are also printed on the paper. As soon as the last figure in that line is printed, carriage S is released from the cogs of wheel R and is returned by spring u . By the return movement of the carriage, actuated by the spring, the feed-roller t is operated by the curved rods and by the other mechanism for the feed-roller, as before described. By this means the record-strip is brought in position for the next line of figures. Now it will be necessary to have the machine speedily placed in position for the next line to be added, and in order to do so the handle i^4 of the position-key is turned, which operates the arm p . The handle i^4 is turned until pointer z reaches the highest figure next to be added, which is in the present case again "million." When pointer z is fixed for that place, the number-key "5" is pushed, which figure is printed below the figure "4" of the first line. The million-indicator will now show "9," as the first figure was "4," and "5" is added. Now the position-key H has to be pushed for the next figure, after which the number-key "1" is pushed, indicating at "hundred thousand" "7," because the figure shown before on the indicator was "6," and "1" is added. The printing is going always the same as before. Push position-key again for "ten thousand," and then figure-key "0." This figure has no connection with any part of the indicators, and is only printed, and it is therefore not shown on the indicator. The next figure is "7" for column "thousand." The figure before recorded on that indicator was "8," and by adding the "7" the figure "15" is obtained, and by the adding-wheels the figure "1" is transmitted to the next higher indicator, in this case to the "ten-thousand" indicator, which transferring is done automatically as soon as the arrow of the "thousand" indicator passes between the figures "9" to "0." The operation is done by the gear-wheels g^2 and intermediate wheels g^3 and the pin or tooth g^5 , as described before. The next figure now to be added is "1" in the "hundred" indicator. The figure recorded here before was "4," and by adding "1" the figure "5" will be recorded. The next figure now will be "2," and as the indicator "ten" shows "8" it will be necessary to transfer the figure "1" to the "hundred" indicator, making it read "6," and the indicator "ten" shows "0." The last figure in the line to be added is "1," and as that

indicator shows "9" it will show after adding the "1" the figure "0," as figure "1" has to be transferred to the "ten" indicator, which was indicating "0," but after the adding will record "1." Reading now the indicators it will be found that they read as follows, commencing with the indicator on the left side, "9735610," which is the sum of the two lines of figures added. After the last figure is added the carriage automatically returns. The arrow z is now moved from the last indicator, so as to disengage arm p from levers F , so that the carriage S is free from the cogs of wheel R . Then the carriage is moved by hand to make a line of dashes below the figures to be added, thus leaving the indicators unchanged. The carriage is then moved by hand for printing the figures below the dashes as they appear on the indicators.

I claim as my invention—

1. The combination in an automatic-adding machine of a series of keys; a corresponding series of ratchets adapted to be driven thereby; a series of indicators driven by the ratchets, and a single transformer for connecting either of the indicators with either of the ratchets, substantially as and for the purpose set forth.

2. The combination in an automatic-adding machine of a series of keys, a corresponding series of ratchets adapted to be driven thereby; a series of indicators driven by the ratchets; a shaft carrying mechanism adapted to connect either of the indicators with either of the ratchets, a pointer on the shaft, adapted to show which indicator is in connection with the ratchets; a key for movement of the pointer; and mechanism connecting the key with the shaft, carrying the pointer, substantially as and for the purpose set forth.

3. The combination in an automatic-adding machine of a series of keys, a series of ratchets adapted to be driven thereby; a series of indicators driven by the ratchets; a shaft carrying mechanism adapted to connect either of the indicators with either of the ratchets, a pointer on the shaft, adapted to show which indicator is in connection with the ratchets; a key for movement of the arrow; a sliding shaft carrying the position-key, a ratchet carried by a shaft, at an angle thereto, a pawl operated by the sliding shaft, adapted to revolve the ratchet-shaft, and a connection between the ratchet-shaft and the pointer, substantially as and for the purpose set forth.

4. The combination in an automatic-adding machine of a series of keys, a series of indicators driven therefrom, mechanism adapted to place any indicator in driving connection with any key, a slidable part adapted to actuate the connecting mechanism step by step and a revoluble part adapted to actuate the connecting mechanism through any desired part of a revolution, substantially as and for the purpose set forth.

5. The combination in a writing and automatic machine of a series of keys; a corre-

sponding series of ratchets adapted to be driven thereby; a series of type-arms driven from the keys; a series of indicators driven by the ratchets; a record-strip, and a single transformer for connecting either of the indicators with either of the ratchets, substantially as and for the purpose set forth.

6. The combination in a writing and automatic-adding machine of a series of keys; a series of ratchets adapted to be driven thereby; a series of type-arms driven from the keys; a series of indicators driven by the ratchets, a carriage, a record-strip carried thereby, means for moving the carriage, and a single transformer for connecting either of the indicators with either of the ratchets, substantially as and for the purpose set forth.

7. The combination in a writing and automatic-adding machine; a series of keys; a corresponding series of ratchets adapted to be driven thereby; a series of type-arms driven by the keys; a series of indicators driven by the ratchets; a single transformer for connecting either of the indicators with either of the ratchets; a carriage a record-strip carried thereby, and means for moving the carriage and indicators concurrently, substantially as and for the purpose set forth.

8. The combination in a writing and automatic-adding machine; a series of keys; a corresponding series of ratchets adapted to be driven thereby; a series of type-arms driven by the keys; a series of indicators driven by the ratchets; a single transformer for connecting either of the indicators with either of the ratchets; a carriage, a record-strip carried thereby, means for feeding the record-strip, and means for moving the carriage and indicators concurrently, substantially as and for the purpose set forth.

9. The combination in a writing and automatic-adding machine, a series of keys; a corresponding series of ratchets driven thereby; a series of indicators driven from the ratchets; adding-gearing connected with the indicators and a single transformer for connecting either of the indicators with either of the ratchets, substantially as and for the purpose set forth.

10. The combination in a writing and automatic-adding machine, a series of keys; a series of type-arms, a connection between the keys and type-arms, a series of indicating-dials, a series of shafts carrying pointers adapted to register certain amounts on the dials, each shaft provided with clutch mechanism driving mechanism connected with the keys, a position-key adapted to actuate the clutches, and connect either of the indicators with the driving mechanism, and a pointer adapted to show which indicator-shaft is in connection with the driving mechanism, substantially as and for the purpose set forth.

11. The combination in a writing and automatic-adding machine, a series of keys, a series of type-arms, connection between keys and type-arms, a series of indicating-dials, a

series of shafts carrying pointers adapted to register certain amounts on the dials, each shaft provided with clutch mechanism, a series of ratchet-wheels mounted on a shaft and adapted to be driven by said keys, a connection between said shaft and one element of each of the clutches, a position-key adapted to actuate mechanism for throwing the other element of the clutches into engagement with its mate, thereby connecting the indicating-shaft with their driving mechanism, and a dial, substantially as and for the purpose set forth.

12. In an automatic adding and printing machine a position-key, consisting of a sliding shaft, a socket in the end thereof, carrying a loose finger-piece, a shaft at an angle to the sliding shaft, geared thereto, a ratchet-wheel secured to the shaft at an angle, to the sliding shaft, and a pawl engaging therewith adapted to be actuated by the sliding shaft, substantially as and for the purpose set forth.

13. The combination in a writing and automatic-adding machine, a series of keys, a series of type-arms, a connection between the keys and type-arms, a series of indicating-dials, a series of shafts carrying pointers adapted to register certain amounts on the dials, each shaft provided with clutch mechanism a series of ratchet-wheels mounted on a shaft and adapted to be driven by the keys, a connection between said last-named shaft and one element of each of the clutches, mechanism for throwing the other element of each clutch into engagement with its mate, thereby connecting the indicating-shaft with the driving mechanism, and a carriage adapted to be operated by said key, substantially as and for the purpose set forth.

14. In a writing and automatic-adding machine the combination of a shaft, a bevel-gear thereon, a shaft driven therefrom carrying a gear-wheel having teeth on a part of its periphery, a carriage provided with a rack engaging the gear, and means for moving the carriage independent of the gear, substantially as and for the purpose set forth.

15. In a writing and automatic-adding machine the combination of a shaft, a bevel-gear thereon, a shaft driven therefrom carrying a gear-wheel having teeth on a part of its periphery, a carriage provided with a rack engaging the gear, the means for moving the carriage independent of the gear, a record-strip carried by the carriage, and means for feeding the record-strip, substantially as and for the purpose set forth.

16. In an adding-machine the combination of a gear; a series of gears loosely mounted on spindles, meshing with the gear, pointers mounted on the spindles adapted to cooperate with a series of dials, a clutch splined to and sliding on the spindles, and levers adapted to slide the clutches and engage with the gears on the spindles, substantially as and for the purpose set forth.

17. In an adding-machine a key adapted to

show the position of certain driving mechanism, consisting of a spindle, I, a socket in the end thereof, a revolving attachment connected therewith, a gear splined to the spindle adapted to mesh with a gear carried by a shaft, M, a sprocket, *m'*, thereon, adapted to drive a shaft, *u*, carrying a gear, O, meshing with a gear, O', adapted to rotate an arm, *p*, and a series of clutches adapted to be operated thereby, substantially as and for the purpose set forth.

18. The combination in a writing and automatic-adding machine of a series of keys, a series of ratchets carried by a shaft, a series

of levers adapted to operate the ratchets, a connection between the keys and levers, a bevel-gear on the shaft adapted to operate a shaft carrying a spur-pinion adapted to mesh with a large gear, a series of gears loosely mounted on spindles, and meshing with the large gear, and means for connecting the gears and spindles, substantially as and for the purpose set forth.

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