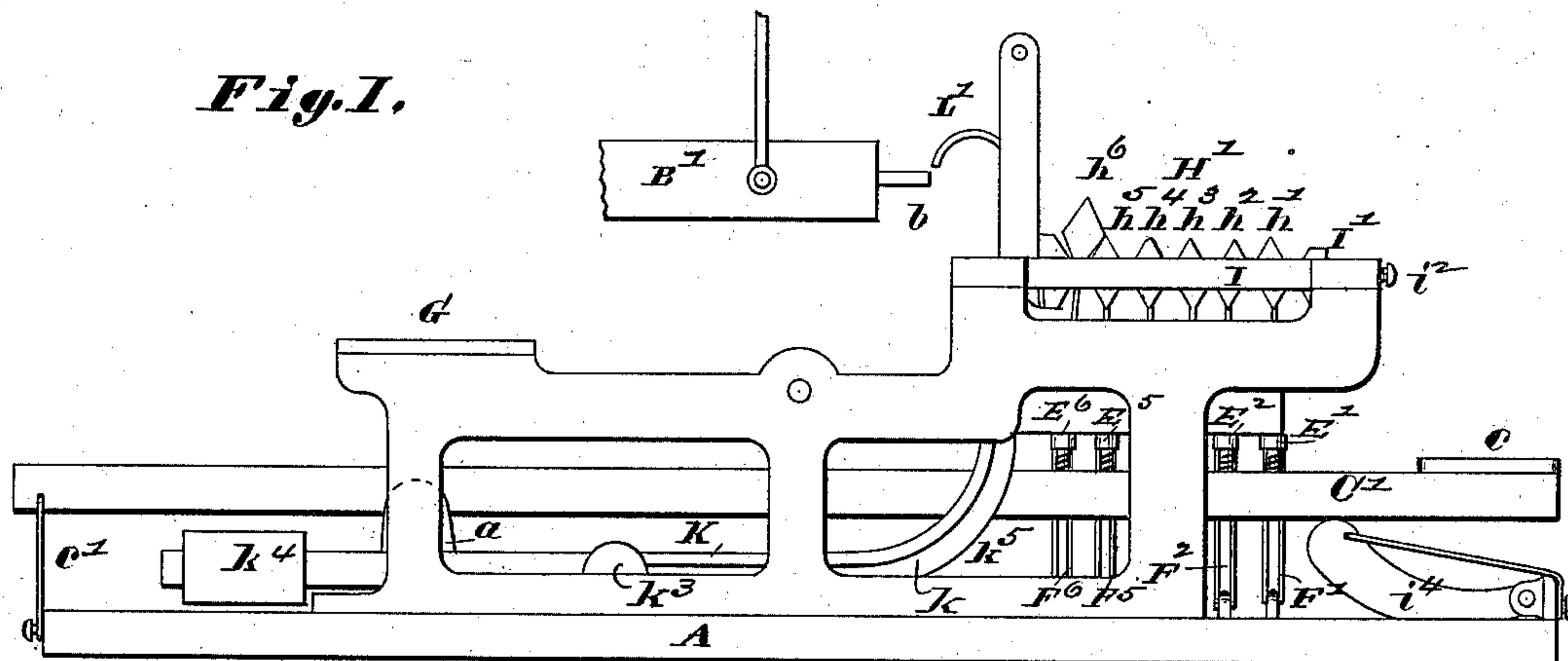


H. D. GANSE.

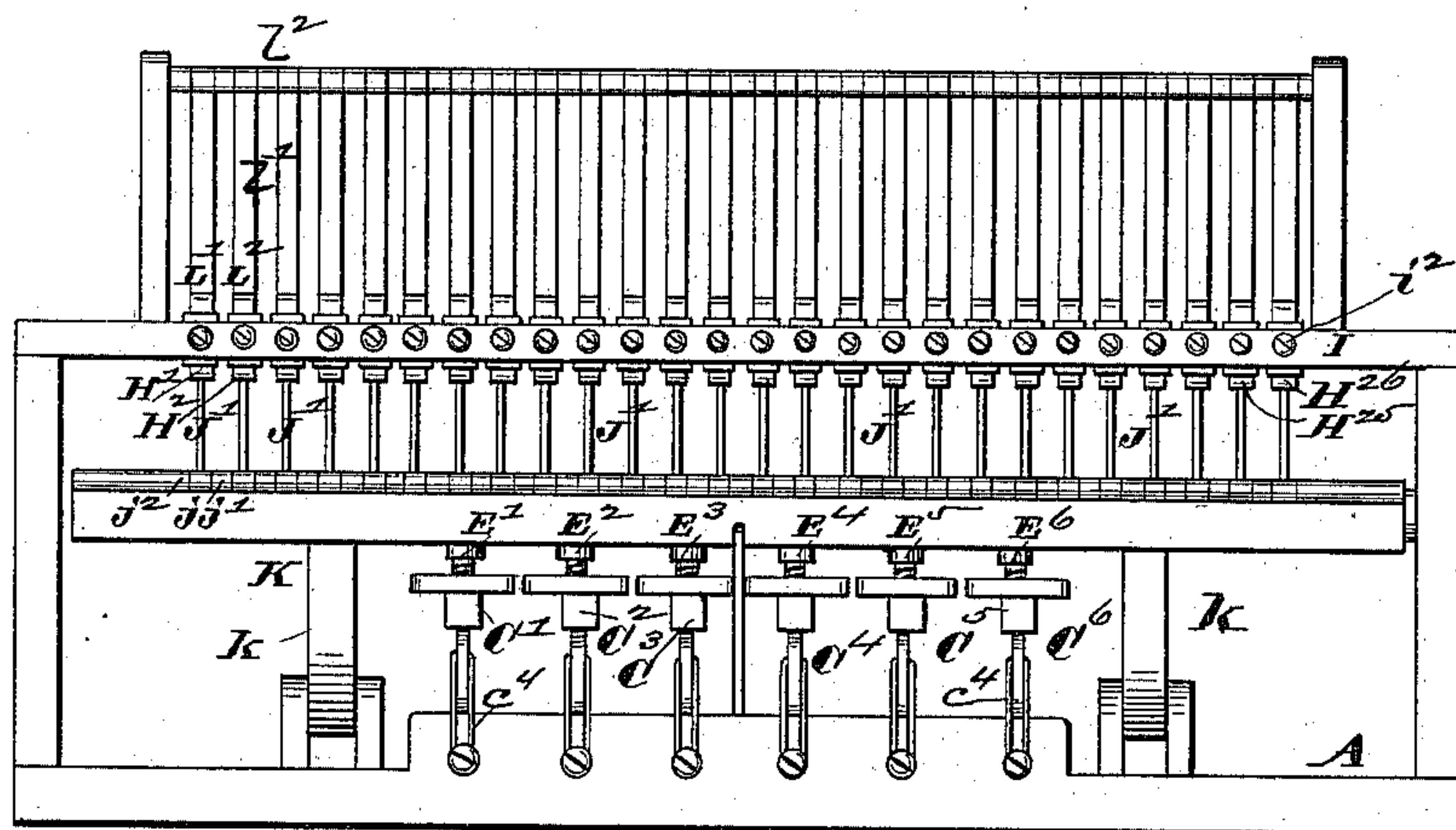
DEVICE FOR OPERATING A SET OF LEVERS.

No. 382,298.

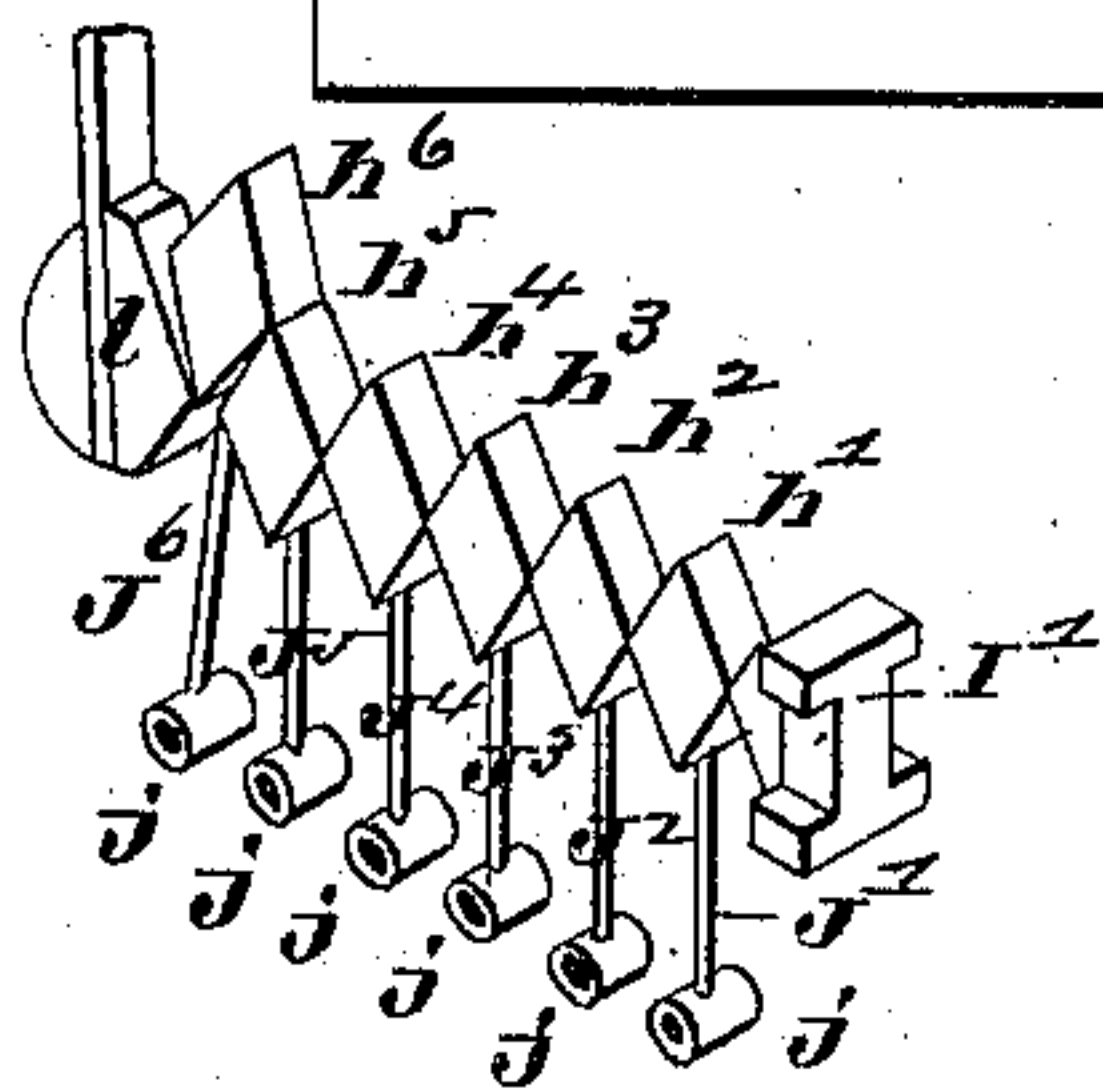
Patented May 8, 1888.



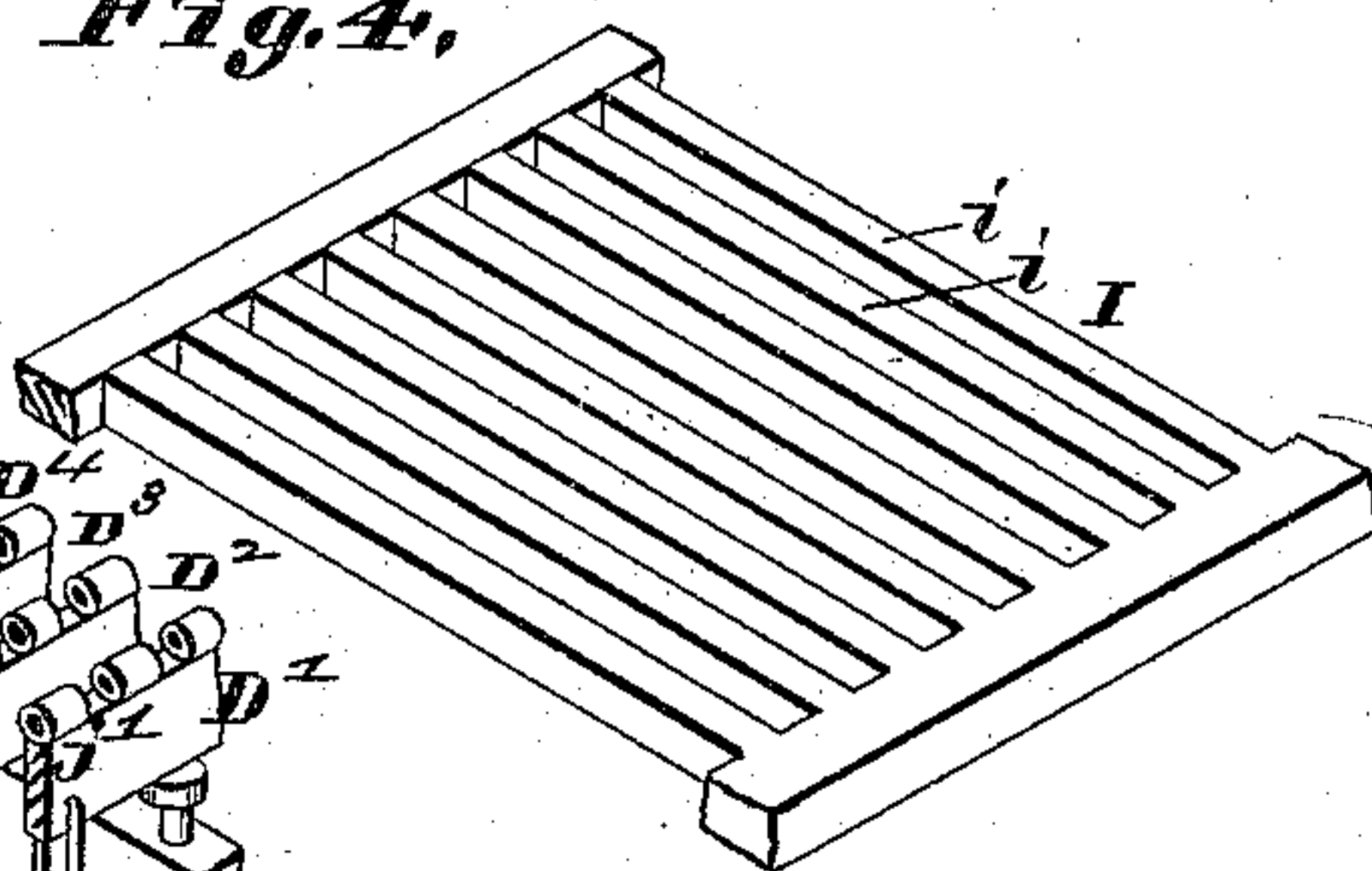
**Fig. 2.**



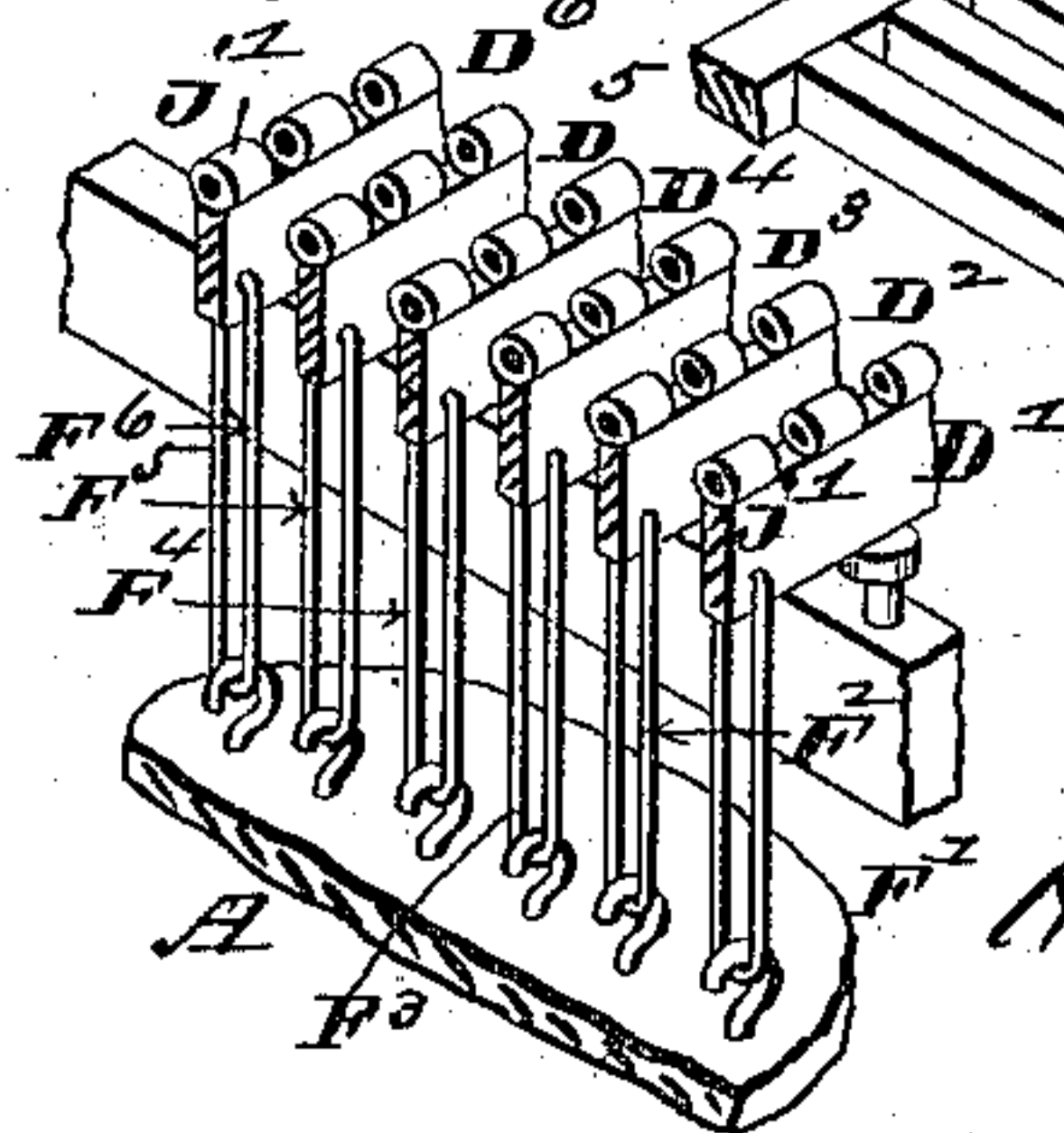
**Fig. 3.**



**Fig. 4.**



**Fig. 5.**



Attest:

Charles Pickle  
J. W. Hoke.

Inventor:

Hervey D. Ganse  
by C. P. Moody atty

(No Model.)

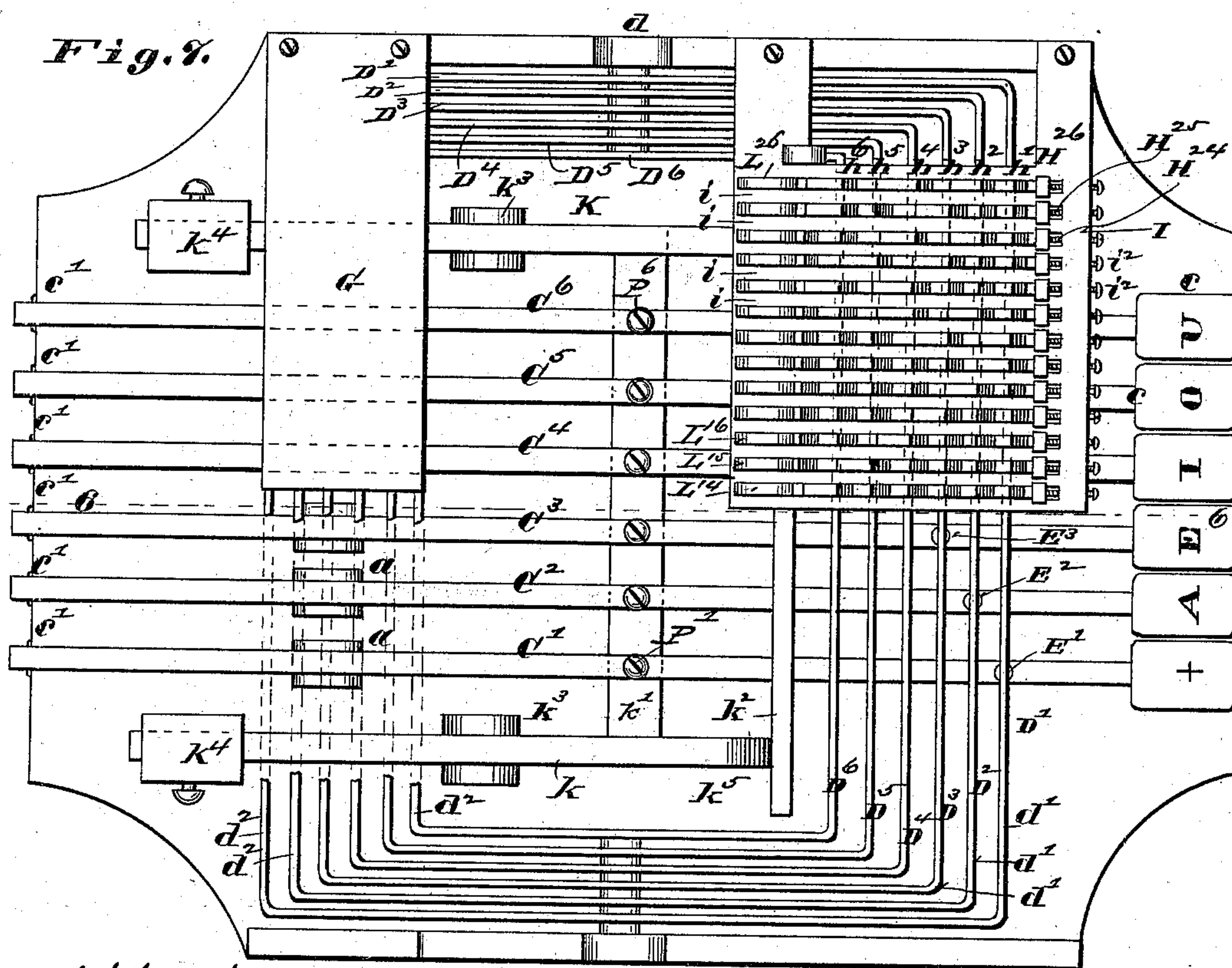
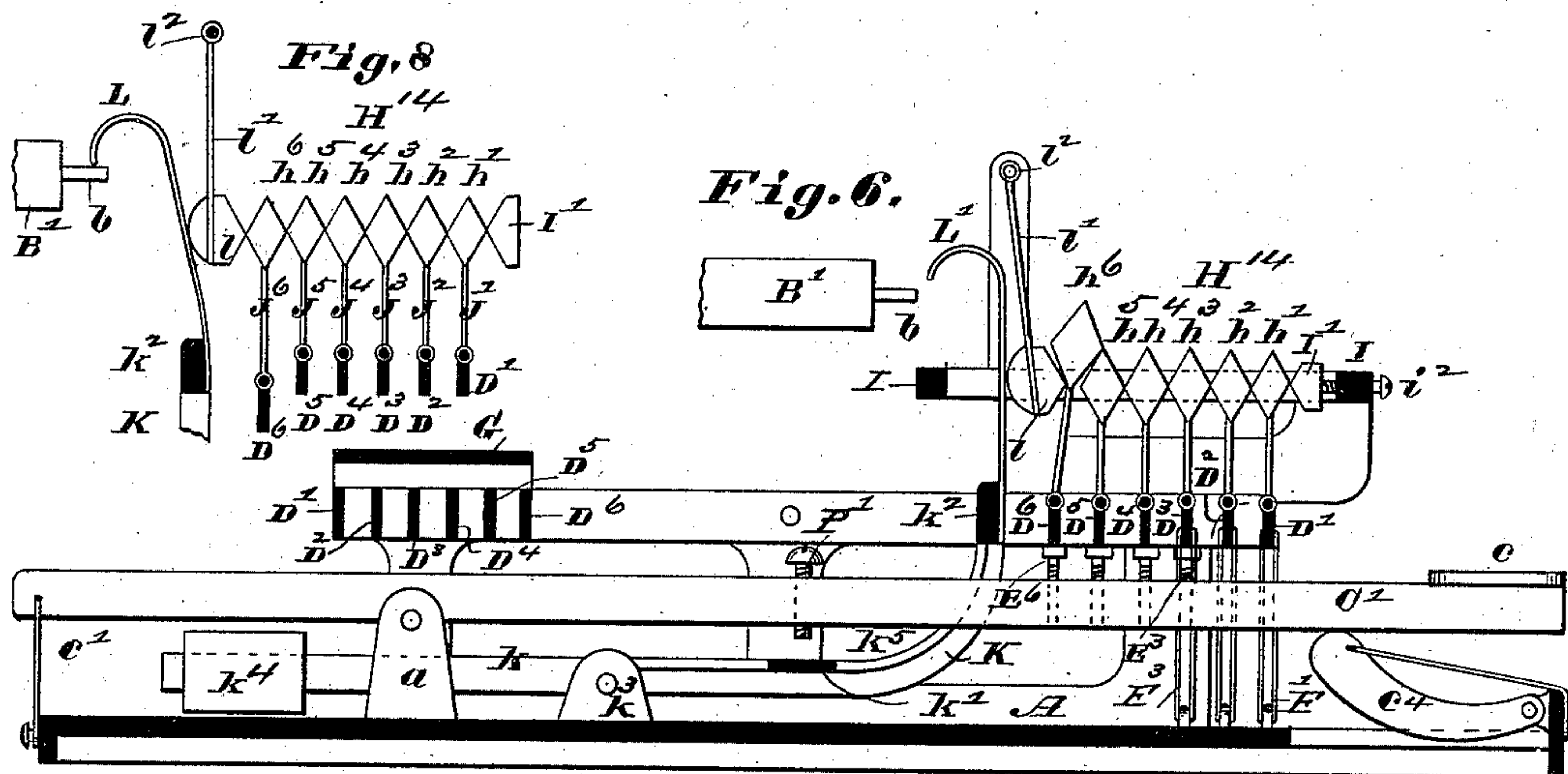
3 Sheets—Sheet 2.

H. D. GANSE.

# DEVICE FOR OPERATING A SET OF LEVERS.

No. 382,298.

Patented May 8, 1888.



*Attest:*

Charles Pickles.  
J. W. Fiske.

*Inventor:*

Hervey D. Gause,  
by C. D. Moody, atty



H. D. GANSE.

DEVICE FOR OPERATING A SET OF LEVERS.

No. 382,298.

Patented May 8, 1888.

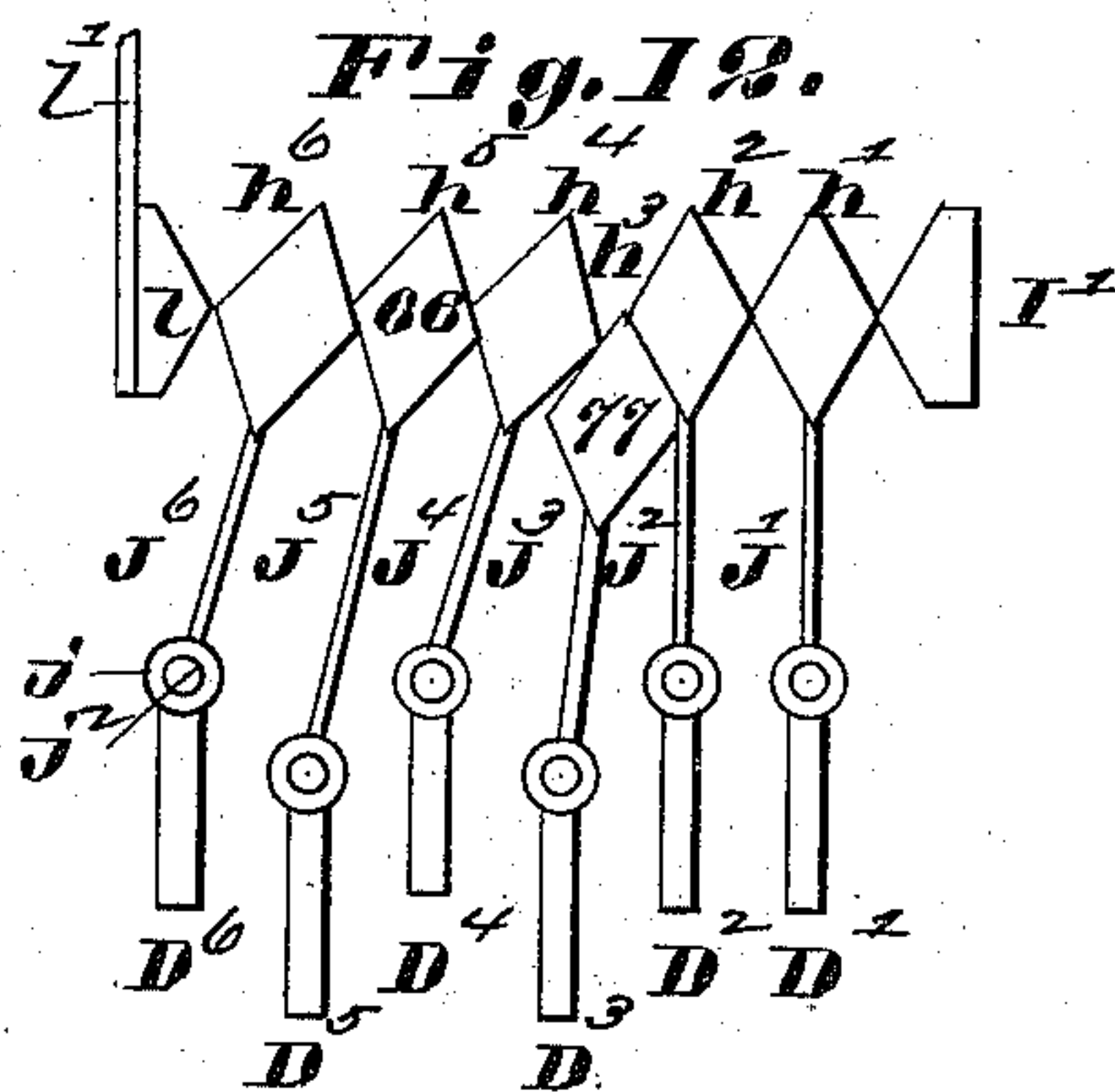
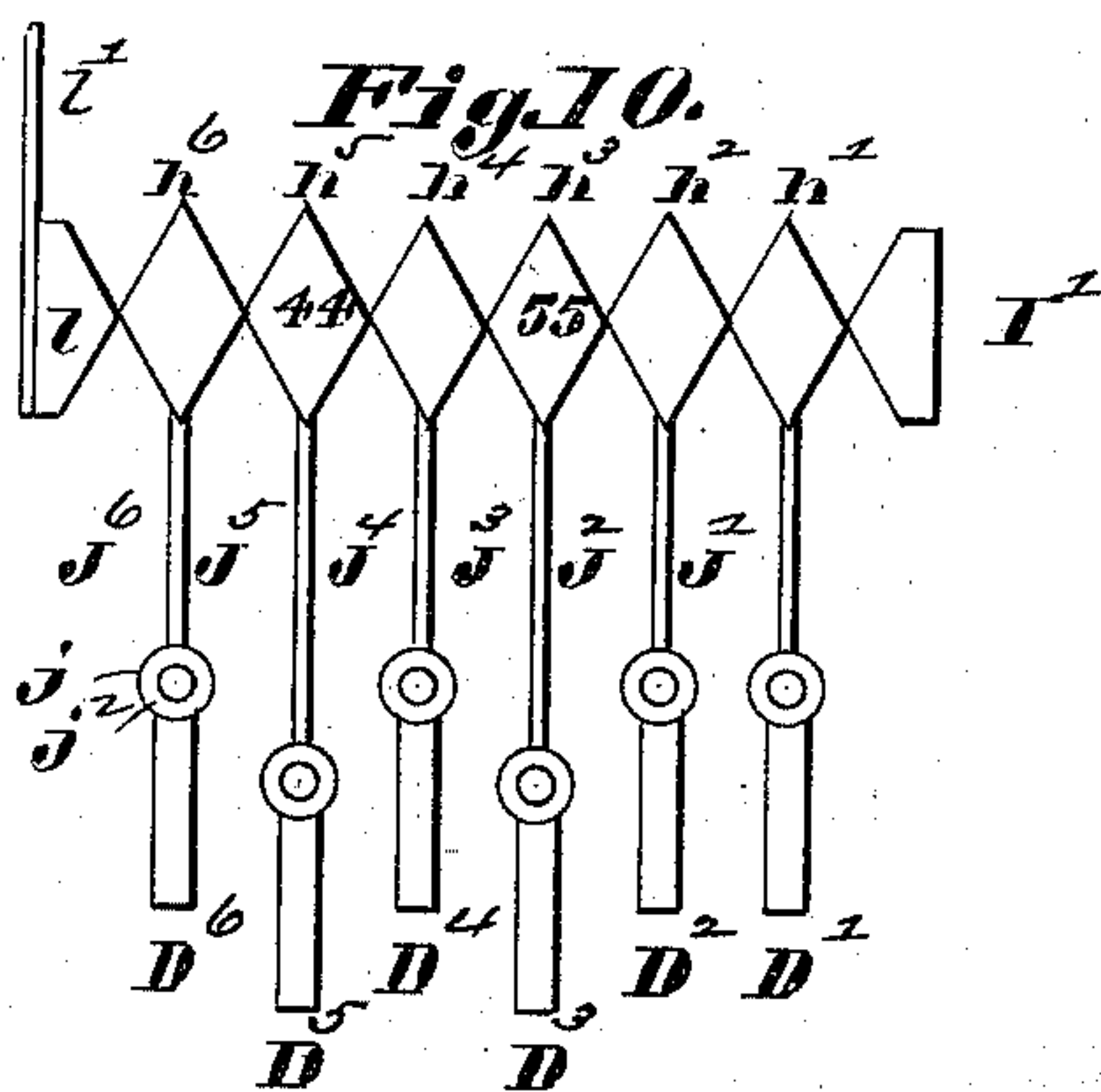
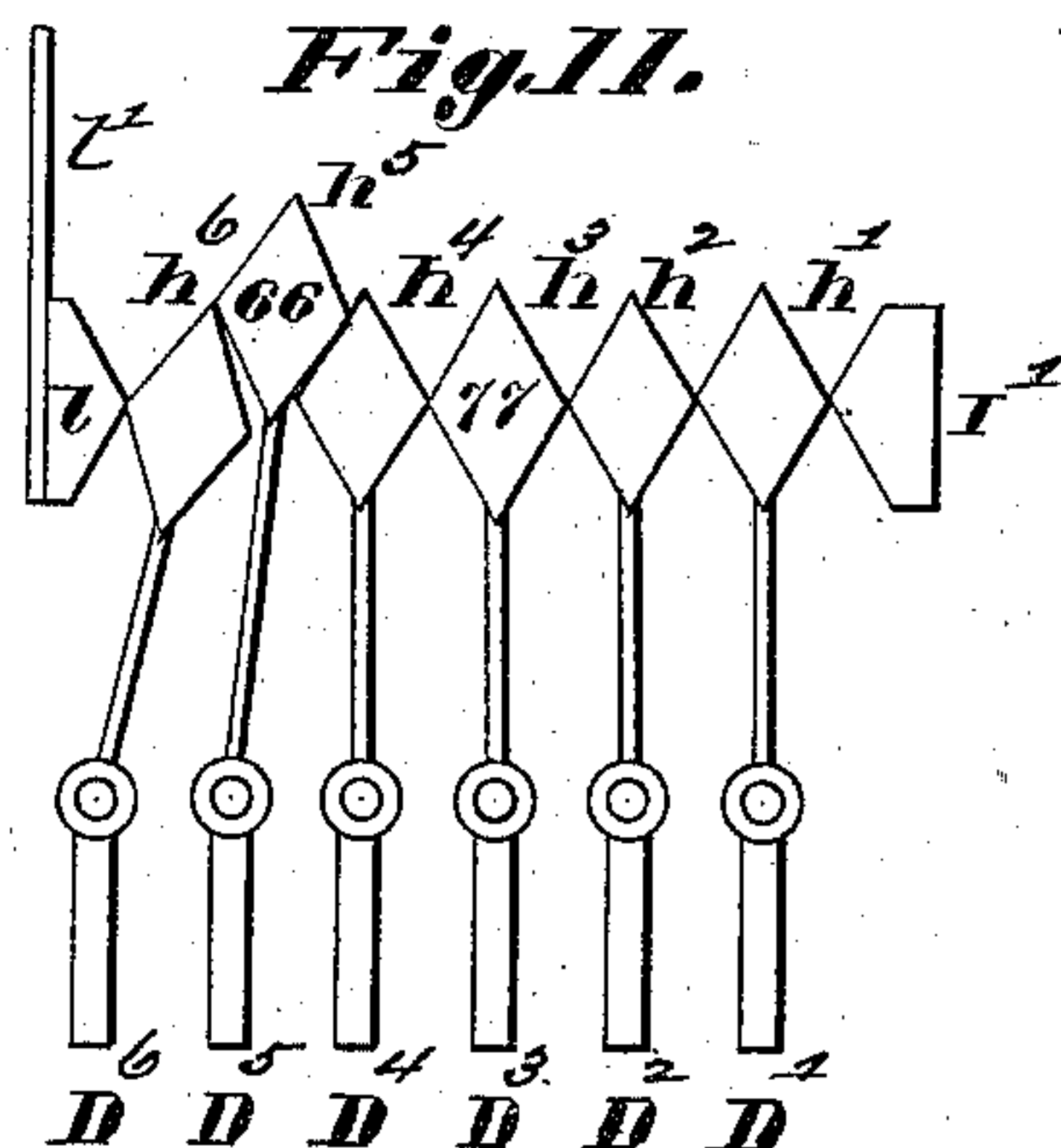
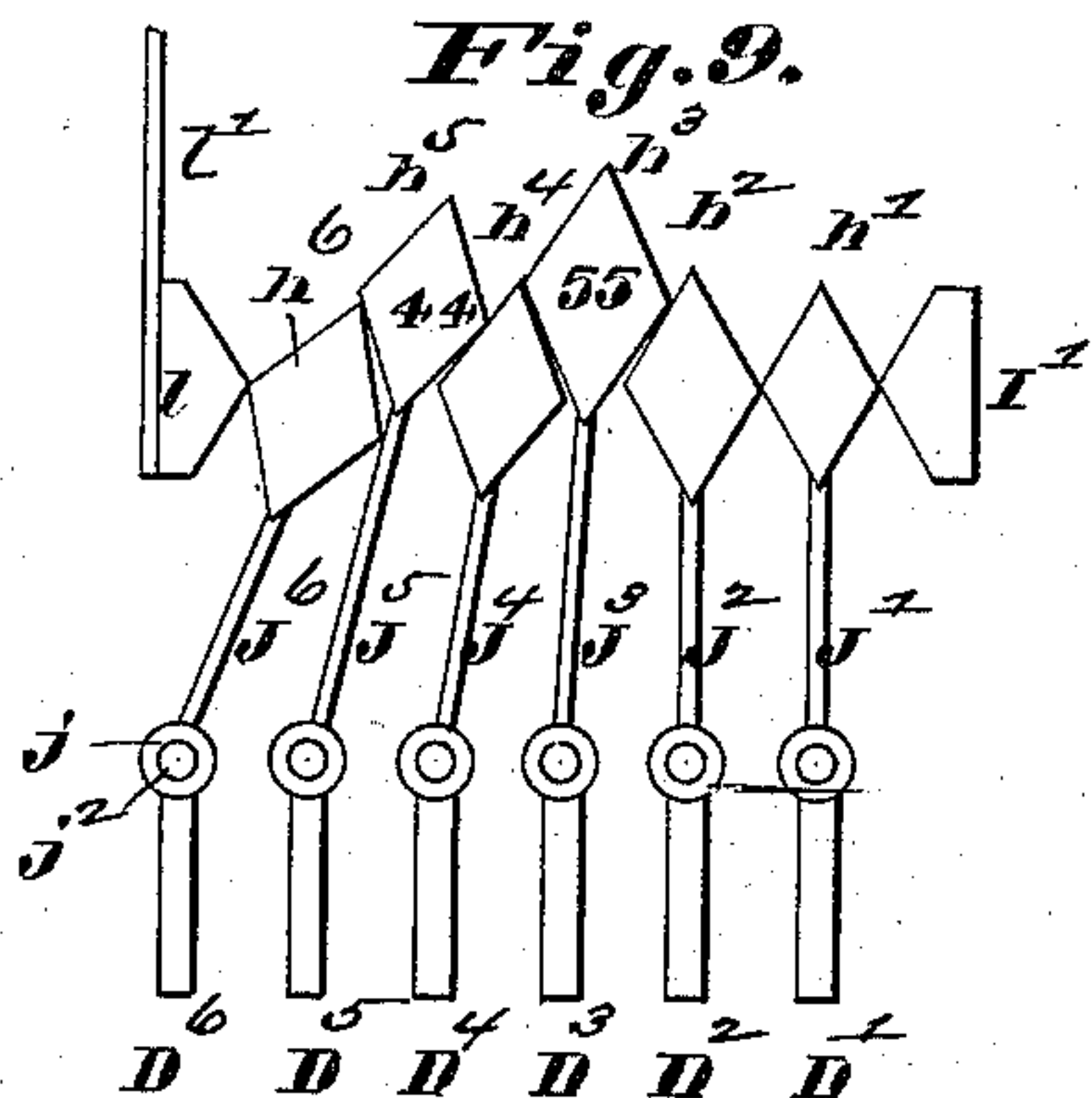
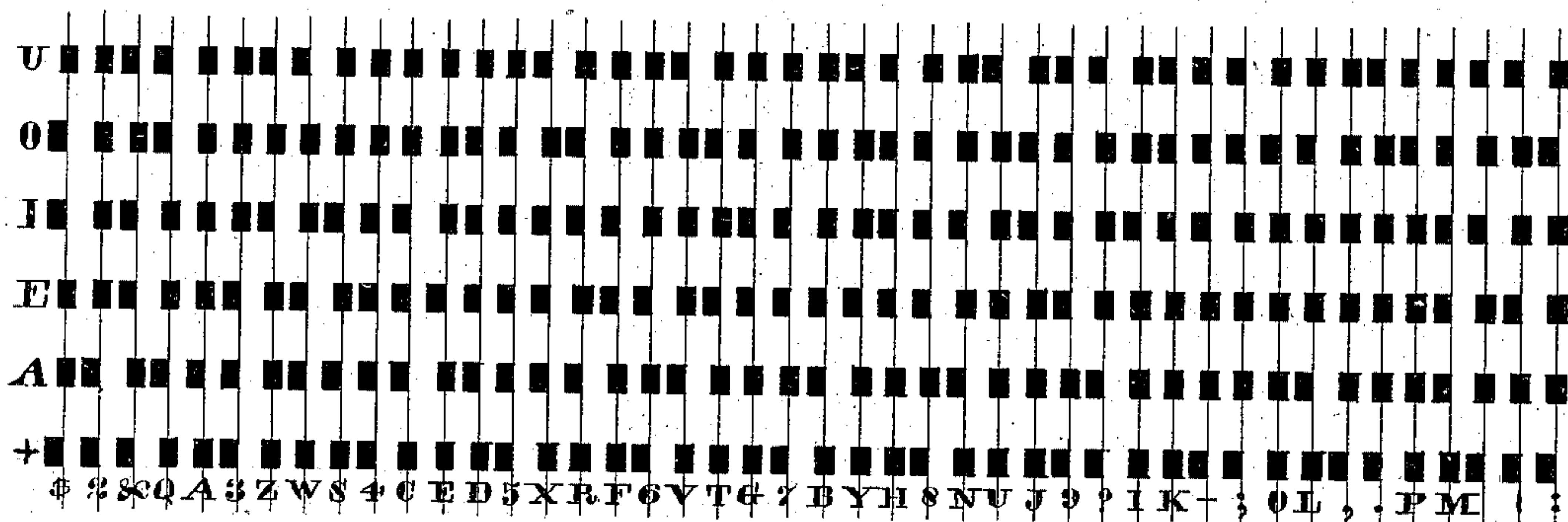


Fig. 13.



Attest:  
Charles Pickles.  
J. W. Hoke.

Inventor:  
Henry D. Ganss  
by C. D. Moody  
att.



# UNITED STATES PATENT OFFICE.

HERVEY D. GANSE, OF CHICAGO, ILLINOIS.

## DEVICE FOR OPERATING A SET OF LEVERS.

SPECIFICATION forming part of Letters Patent No. 382,298, dated May 8, 1888.

Application filed July 18, 1883. Renewed April 20, 1887. Serial No. 235,538. (No model.)

*To all whom it may concern:*

Be it known that I, HERVEY D. GANSE, of Chicago, in the county of Cook and State of Illinois, a citizen of the United States, have  
5 invented a new and useful Improvement in Mechanism for Operating by a few Levers a Set of Many Levers, such as have heretofore been actuated in machines by direct manipulation, of which the following is a full, clear,  
10 and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a side elevation of a machine embracing my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a perspective  
15 view of the files of wedges detached from the machine. Fig. 4 is a perspective view of the slotted guide-plate for the wedges. Fig. 5 is perspective view exhibiting a part of the  
20 mechanism detached. Fig. 6 is a vertical longitudinal section of the machine, taken at line 6 6 of Fig. 7. Fig. 7 is a plan of the machine, half of the wedges and their immediate connections being omitted. Fig. 8 is a side ele-  
25 vation showing the same file of wedges shown in Fig. 6, the wedges being in line. Figs. 9, 10, 11, and 12 are side elevations of files of wedges, illustrating the different positions they assume when in operation. Fig. 13 is a  
30 diagram illustrating the relative positions or movements of the wedges throughout the series of files of wedges, to be hereinafter referred to in the description of the operation of my invention.

35 The leading elements of this invention consist of a set of operating-levers serving as keys, a set of independently oscillating frames, a series of files of movable wedges, and an auxiliary rocking frame, so organized as to be  
40 applied to and operate a set of levers like those of a type-writer.

The principal object of my invention is to furnish a mechanism which, by the use of a few keys or actuating parts, will operate the  
45 numerous levers or keys of a type-writer or any analogous machine to which my mechanism may be readily applied, to simplify and facilitate the operation.

50 In the drawings, A denotes the base and frame of the machine. C' to C<sup>6</sup>, inclusive, denote the primary levers or keys for operating

the machine. These levers are hinged at a to uprights or brackets connected with the frame A, and are held in their normal positions by elastic connections c' at their rear ends, and by  
55 the curved spring-arms c<sup>4</sup> below their front ends.

The frames D' to D<sup>6</sup>, inclusive, to be presently described, are each held upon the adjustable stud of its respective key by its elastic  
60 connection F' to F<sup>6</sup>, inclusive, connecting the front sides of said frames with the base A of the machine. The six rectangular frames, D' to D<sup>6</sup>, inclusive, are graded in size and occupy the same plane, one within another, and  
65 are journaled upon the bearings d d. The fronts of these frames, when the machine is at rest, are held up by their respective set-screws (which serve as adjustable studs) above the  
70 common plane of the keys, and there is sufficient space between the keys and these frames to allow the fronts of the latter to descend, each with its respective key, when the key is depressed. The ascent of the fronts of the  
75 frames D' to D<sup>6</sup>, inclusive, may be arrested at their normal common plane by a stop-plate above them attached to the main frame A.

Next in order are the wedges h' to h<sup>6</sup>, inclusive, constituting what I denominate a "file of wedges," (marked H' in Fig. 1.) In the  
80 machine as shown in the present drawings there are twenty-six of these files of wedges, (represented in Fig. 2, marked, respectively, H' to H<sup>26</sup>, inclusive.) These diamond-shaped wedges are each made with a shank, J' to J<sup>6</sup>  
85 inclusive, throughout the twenty-six files. Each of the shanks is furnished with an eye, j, which connects with the eyes j' on its frame, and the joint is completed between the shanks and the frames by the insertion of a pivot-rod  
90 at j<sup>2</sup>, as shown in Figs. 9, 10, and 12. Each file of wedges, like that at H', Fig. 1, occupies one of the slots between bars i of the slotted guide-plate I, which is secured to the main frame A of the machine, as shown in Figs. 1 and 2,  
95 and the wedges are movable up and down and longitudinally therein. All the wedges h', being those of the front row of wedges of the series of files of wedges, are jointed, as above specified, to the top of the front part of the  
100 outermost frame, D', and all of the wedges h<sup>2</sup> of the series of files of wedges are likewise



jointed to the front part of frame  $D^2$ , and all of the wedges  $h^3$  of the series of files of wedges are jointed in like manner to frame  $D^3$ , and in like manner all of the wedges  $h^4$ ,  $h^5$ , and  $h^6$ , respectively, are jointed to their respective frames  $D^4$ ,  $D^5$ ,  $D^6$ , forming rows extending across the machine.

A plate, G, Fig. 1, is secured across the main frame over the rear sides,  $d^2$ , of the six frames, and serves as a stop to limit the ascent thereof, and it thus limits the descent of the wedges jointed to the front or forward sides of the frames.

K denotes the hinged rocking frame located within the main frame A, consisting of horizontal and upwardly-curved arms  $k$   $k$  and the cross-bars  $k'$   $k^2$ . It has its bearings at  $k^3$   $k^3$ , and is provided at its rear end with a counter-balance,  $k^4$ , which serves to uphold the front,  $k^5$ , of said frame whenever its front end is not borne down by one or more of the keys C' to C<sup>6</sup>, inclusive. The cross-bar  $k^2$  is provided with a row of spring-hooks, L' to L<sup>26</sup>, inclusive, which project upward through the ends of the slots of the guide-plate I. These hooks are secured at equal distances apart to the bar  $k^2$  of frame K, and correspond in number with the number of files of wedges H', &c.

Irregularly-shaped blocks  $l$ , of like thickness with the wedges, occupy each a place between the shank of the hook and the file of wedges in the respective slots of the guide-plate I. These slots between bars  $i$  of the guide-plate are longer than the greatest width of each entire file of wedges, together with that of the block  $l$  and the shank of the hook, in order to permit rearward movement of the latter, as hereinafter described. The blocks  $l$  have two plane edges, corresponding in form with the impinging edges of the wedges, and are suspended by pendants  $l'$ , hinged to the uprights  $l^2$ , to allow them freedom of motion in the slots. The rearmost edges of the blocks  $l$  are curved, and severally they act upon the shanks of the spring-hooks respectively whenever the wedges of their respective files are brought into horizontal line. It must be observed that these hooks and suspended blocks correspond in number with the files of wedges and occupy the slots of the guide-plate with them respectively.

Within the front end of each of the slots of the guide-plate I an adjustable abutment, I', is located, which may be adjusted by a set-screw,  $i^2$ , to determine the extent of rearward motion to be given to the spring-hooks through the action of the wedges.

The detached part B' in Fig. 1 represents a part of one of a series of primary levers or keys of a type-writer or any similar machine, which levers are ordinarily manipulated by the fingers of the operator. Such levers or keys may be provided with tenons  $b$ , and brought into the proper relation to my mechanism to be operated by the hooks L.

The set-screws P' to P<sup>6</sup>, inclusive, inserted

through the key C' to C<sup>6</sup>, inclusive, are to be so adjusted as to act respectively, during the final part of the descent of said keys, upon the cross-bar  $k'$  of rocking frame K, and depress said frame at the proper time.

It may now be remarked that while the drawings show but twenty-six files of wedges, the six frames with their keys are competent to make selections among sixty-three files of wedges, and the six keys may be so manipulated as to act through the mechanism upon sixty-three primary levers or keys of a machine to which my machine so organized may readily be applied.

Having described the component parts and the connection of the mechanism constituting my invention, I will now describe its operation, referring to the drawings, and to the diagram, Fig. 13, illustrating the same.

The keys C' to C<sup>6</sup>, inclusive, can be severally depressed, or two or more of them may be simultaneously depressed by the fingers of the operator. Each of the letters A E I O U can be produced by a type-writer to which my machine is applied, by the depression of a single key, marked, as in Fig. 7, with such letter. For instance, the letter A is produced in a type-writer to which my invention is applied, as above specified, by the depression of the single key marked A, in Fig. 7 of the drawings. It being impracticable to show in a drawing the relative heights or positions of all the wedges, the diagram, Fig. 13, is made to illustrate the relative arrangement of wedges throughout the series of files when the machine is at rest, and to aid the description of their operation. This diagram consists of squares and cross-lines—the squares are six in number, transversely of the diagram, corresponding to the six wedges in each file—and longitudinally of the diagram the squares are in long rows of forty-four, each corresponding in number to the number of files of wedges required to operate forty-four different levers of a type-writer. The several letters, numerals, and characters to be produced are marked at the bottom of the diagram, each under its own file of squares (wedges.) The six long rows of squares are respectively designated at their left ends by the mark + and letters A E I O U. Each row of squares so marked stands for the row of wedges which in the machine is depressed by the key bearing the same mark, so that in any given file of squares the square in the row with the +, or with A, or E, or I, or O, or U, respectively, at its left end indicates that wedge in the given file which is commanded by the key marked with the same sign or letter. The cross-lines represent the greatest width to which all the squares (wedges) of a file must be brought in order to exert a wedging action upon the hook. Those squares that are shown at the left of a cross-line represent those wedges of a file which (when the machine is at rest) are above the line or level at which the file of wedges exerts



its action upon the hook; and those squares directly upon the cross-lines represent those wedges of a file which are already at the line or level at which the file of wedges exerts its wedging action. The fifth row of squares, counting from the left of the diagram, will be seen to be that of letter A, and next, to the right of it, is the row (or file) of squares of numeral 3, and so on throughout the diagram each transverse row of squares is designated by the letter or character to print which said row of squares (wedges in the machine) must be brought into action, as above specified. Accordingly the squares in the three long rows marked at their left + A E, respectively, and which respond to the keys marked + A E, are seen to be at the left of the cross-line of the numeral 3; and so on throughout the series, one or more squares in each file or transverse row is at the left of the cross-line of its row or file.

It will be seen that each square, which, so long as its key is at rest, remains in line with a given cross-line, itself, moves to the right when its key is depressed and breaks up the row of squares of that cross-line. In other words, in the machine the wedge, which, so long as the frame beneath it is unmoved, remains in the line or at the level at which the file of wedges to which it belongs exerts its action upon the hook, is drawn below the line or level at which its file exerts its action, and that file of wedges is, in consequence, prevented from acting upon its hook. For example, the letter B is commanded (in the type-writer) by the key marked A and the key E next to the right of it, jointly; and an examination of the file of squares for producing A will show that although the combination or joint depression of keys for producing B will bring the single square for producing A into line it will at the same time draw the E square in the next longitudinal row out of line in the transverse row A, so that while the B file of squares acts the A file cannot. In this way throughout the system the combination or joint action of keys that brings one file of squares (wedges) into line with its cross-line (to act upon the hook) breaks up every other file.

Figs. 9 to 12 illustrate the working of the wedges. In Fig. 9 two wedges, (marked 44 and 55,) are shown elevated above the others. By depressing frames  $D^3$  and  $D^5$ , to which these wedges are respectively hinged, they are drawn down into line with the other wedges of their file and the file exerts its wedging action, as shown in Fig. 10. In Figs. 11 and 12 the action of another file of wedges, in connection with same two frames  $D^3$   $D^5$ , is illustrated. One of the wedges of this last-named file—namely, wedge 66—being the wedge in line transversely in the machine with the wedge 44 (and therefore hinged to the same frame  $D^3$ ) has a longer shank,  $J'$ , than the shank of wedge 77, a wedge (transversely of the machine) in

line with wedge 55. Therefore the depression of the frames  $D^3$   $D^5$  operates not only to draw the wedge 66 down into line, (which would if operated alone make its file act,) but also draws down wedge 77 out of line, as shown in Fig. 12, and prevents its file from acting on its hook.

It will be noticed that the shanks  $J^3$  and  $J^5$  of wedges 44 and 55, respectively, in Figs. 9 and 10, are also longer than the shanks connecting the other wedges in that file to their respective frames.

This rule above explained is followed throughout in the arrangement of wedges of the various files—the wedges which when brought down into line to exert a wedging action being provided with longer shanks than those of the other wedges. After a key has been depressed and released by the operator the spring  $c'$  and spring-arm  $c^4$  act to lift the key to its normal position in the plane of keys; but spring  $c'$  may be of sufficient power to dispense with arm-spring  $c^4$ ; also, when a key is released, its respective set-screw,  $P'P^2$ , &c., ascends with it and permits the front of rocking frame K to ascend coincident with the breaking up of the file of wedges, which the given key had just brought into operative action, the counter-balance  $K^4$  serving for the purpose, and the spring-hook of the file of wedges being released assumes its vertical position, acting upon the file to force it toward the abutment  $I'$ , ready for its next operation. The depression of a frame carries down all the wedges which are jointed to that frame, and on each frame there is one wedge, and only one, which, by being brought down, will of itself produce an operating file of wedges—that is, a file of wedges whose greatest widths are all at the same line or level. That, therefore, will be the only file whose wedging effect is produced by the depression of that one key. In Figs. 1, 3, and 6 all the wedges of the single file shown in those figures are seen to be standing at the same level, except the wedge  $h^6$ ; but in Fig. 8 this wedge  $h^6$  has been brought down into the same level with the rest—namely, by the depression of its key and frame. Thereupon the hanging block  $V$  is pressed against the spring-hook L, thrusting it over the tenon  $b$ . Then the farther depression of the key bears down the rocking frame K, which carries the hook L. Thus the type-writer key or lever  $B'$  is drawn down by the hook, and the letter which that lever  $B'$  produces is printed.

Two wedges of a file may have those longer shanks, so that the machine, when at rest, shows those two wedges standing above the rest of their file. In that case the two frames to which those wedges are jointed must be brought down by the depression of their keys, that the wedges may come into the operative line. (See Figs. 9 and 10.) The rule of operation then is this: In order to make any file of wedges operative, only those keys are to be depressed which lower those wedges of that



file which are standing above the others when the machine is at rest. Accordingly the study of diagram, Fig. 13, will enable any person to understand the operation of the machine.

5 Having fully described my invention, I claim—

1. The wedges  $h'$  to  $h^6$ , inclusive, in combination with abutment  $I'$ , block  $l$ , and hook  $L$  in guide-plate  $I$ , substantially as described.

10 2. A file of wedges,  $h'$  to  $h^6$ , inclusive, in combination with a set of frames,  $D'$  to  $D^6$ , inclusive, jointed together, substantially as and for the purpose specified.

3. The combination of a file of wedges,  $h'$  to  $h^6$ , inclusive, an abutment for the file to press against, and a movable block to be moved by the file when the wedges move into line, substantially as described.

4. The combination of a file of wedges,  $h'$  to  $h^6$ , inclusive, an abutment for the file to press against, a movable block, substantially as described, to be moved by the file when the wedges move into line, and means, substantially as described, for moving the wedges into and out of line.

5. The combination of a file of wedges,  $h'$  to  $h^6$ , inclusive, each of which is adapted to be moved into and out of line with the other wedges of the file, and means for moving the various wedges of the file into and out of line, for the purpose described.

6. The combination of a series of files of wedges marked  $h'$  to  $h^6$ , inclusive, abutments for the various files to bear against, and a series of movable blocks, substantially as described, to be moved respectively by the files as the wedges of the respective files come into line.

7. The combination of the series of files of

wedges  $h'$  to  $h^6$ , inclusive, the abutments  $I'$ , 40 the blocks  $l$ , shanks  $J'$  to  $J^6$ , inclusive, and the frames  $D'$  to  $D^6$ , inclusive, substantially as described.

8. The combination of keys  $C'$  to  $C^6$ , inclusive, frames  $D'$  to  $D^6$ , inclusive, shanks  $J'$  to  $J^6$ , 45 inclusive, and the series of files of wedges  $h'$  to  $h^6$ , inclusive, substantially as described.

9. The combination of keys  $C'$  to  $C^6$ , inclusive, the adjustable studs  $E'$  to  $E^6$ , inclusive, and the frames  $D'$  to  $D^6$ , inclusive, substantially 50 as described.

10. The combination, with the guide-plate  $I$  and the series of files  $H'$  to  $H^6$ , inclusive, of movable wedges, substantially as described.

11. The combination of the rocking frame 55  $K$ , and the hooks  $L'$   $L^2$ , &c., to operate the levers or keys of a machine, substantially as described.

12. The combination of the keys  $C'$  to  $C^6$ , inclusive, and frame  $K$ , provided with its spring- 60 hooks, substantially as described.

13. In combination with the series of files of wedges  $H'$  to  $H^6$ , inclusive, the adjustable abutments  $I'$  to  $I^6$ , as and for the purpose described.

14. The combination of the file of wedges  $h'$  to  $h^6$ , inclusive, the movable block  $l$ , and the hook  $L$ , to operate the levers or keys of a machine, substantially as described.

15. The combination of a file of wedges,  $H$ , 70 composed of wedges  $h'$  to  $h^6$ , inclusive, and frames  $D'$  to  $D^6$ , inclusive, connected with the wedges by shanks of different lengths, as and for the purpose described.

HERVEY D. GANSE.

Witnesses:

C. D. MOODY.

ALBERT G. FISH.