

(No Model.)

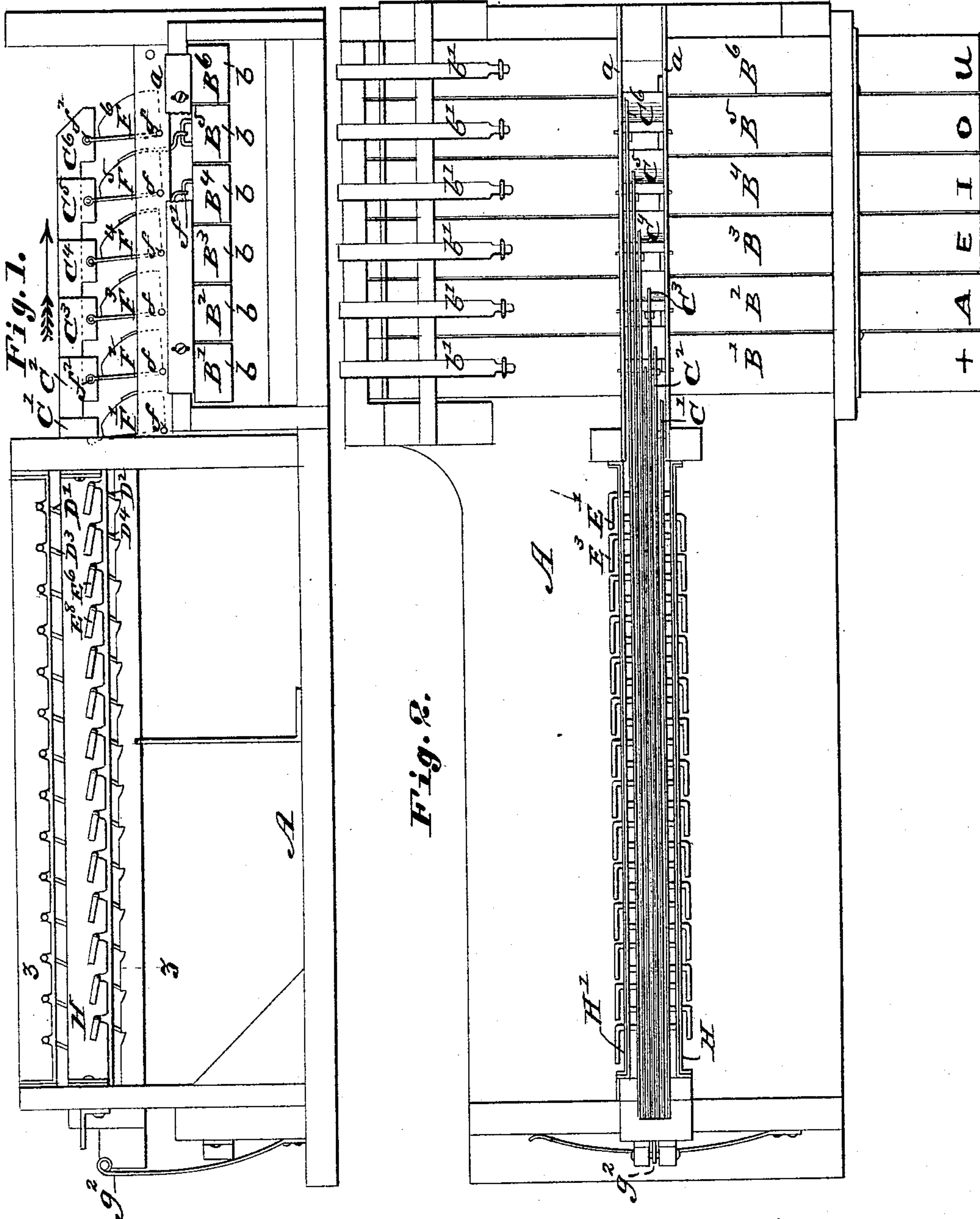
3 Sheets—Sheet 1.

H. D. GANSE.

DEVICE FOR OPERATING A SET OF LEVERS.

No. 390,769.

Patented Oct. 9, 1888.



Attest:
Charles Pickles.
S. C. Logan.

Inventor:
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(No Model.)

3 Sheets—Sheet 2.

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Fig. 4.

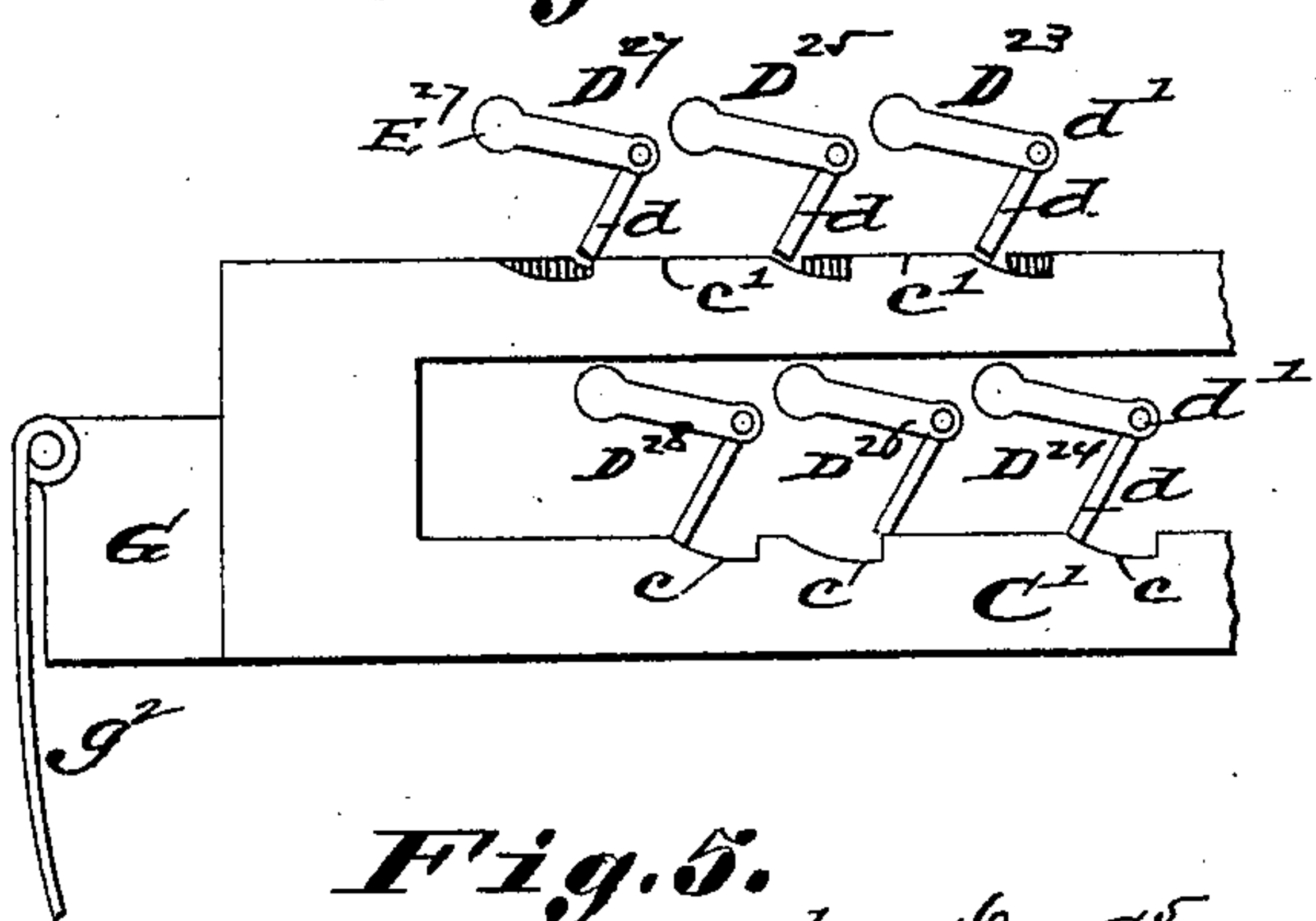


Fig. 3.

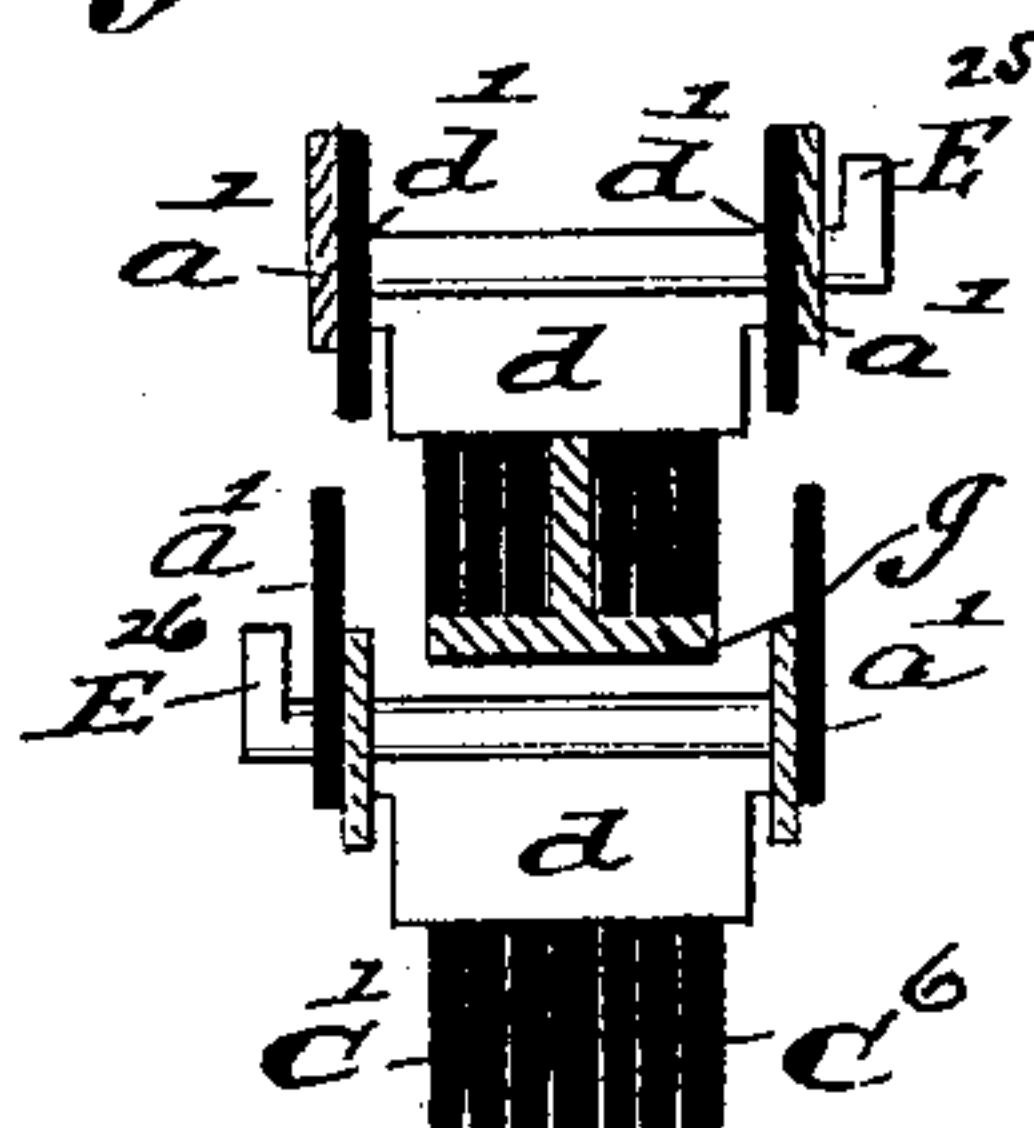


Fig. 10.

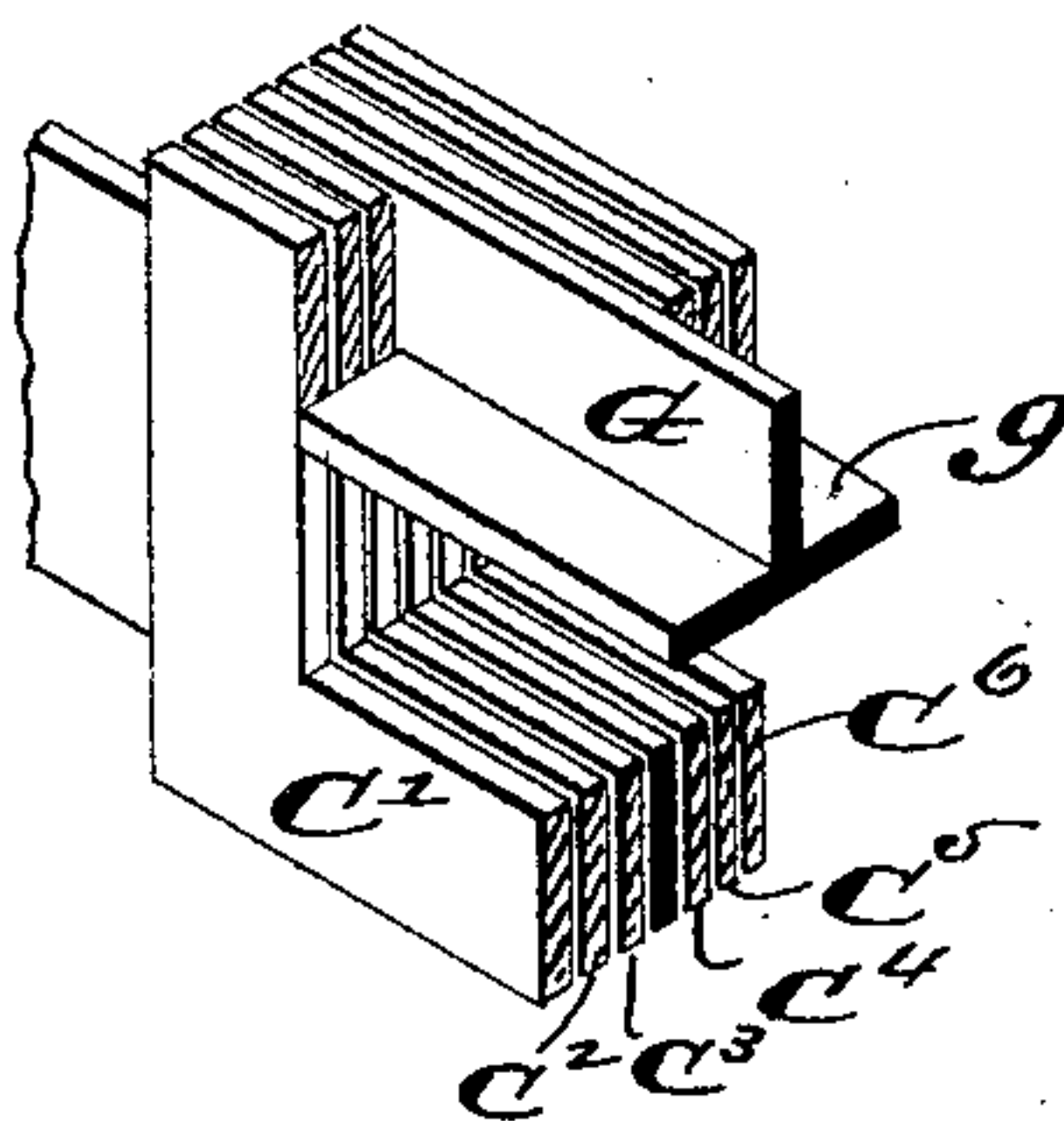


Fig. 5.

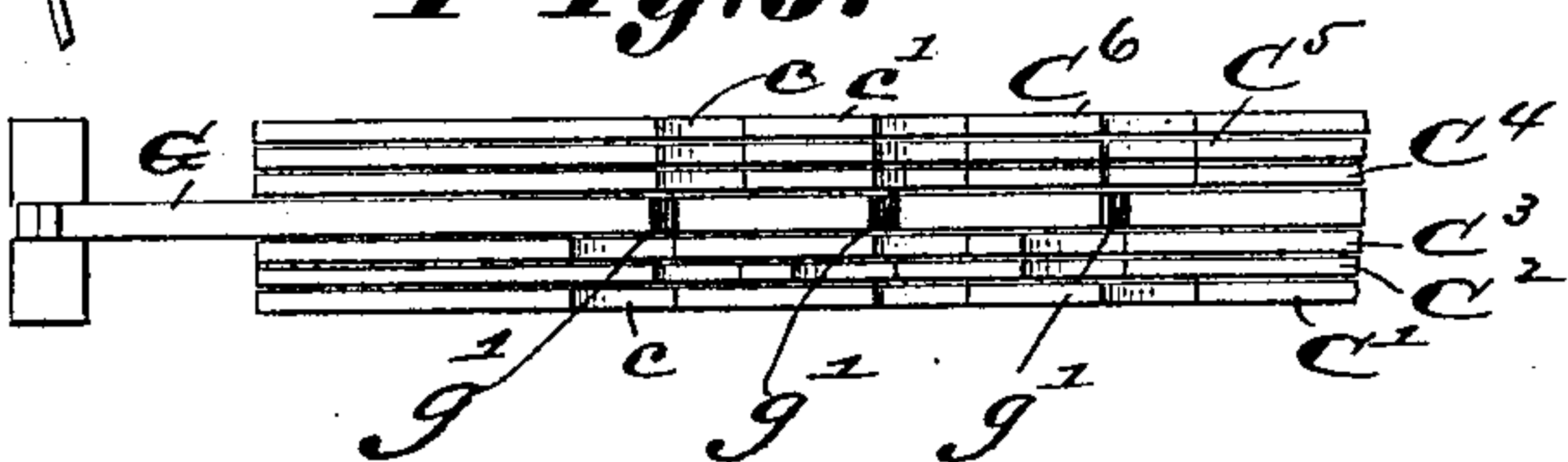


Fig. 6.

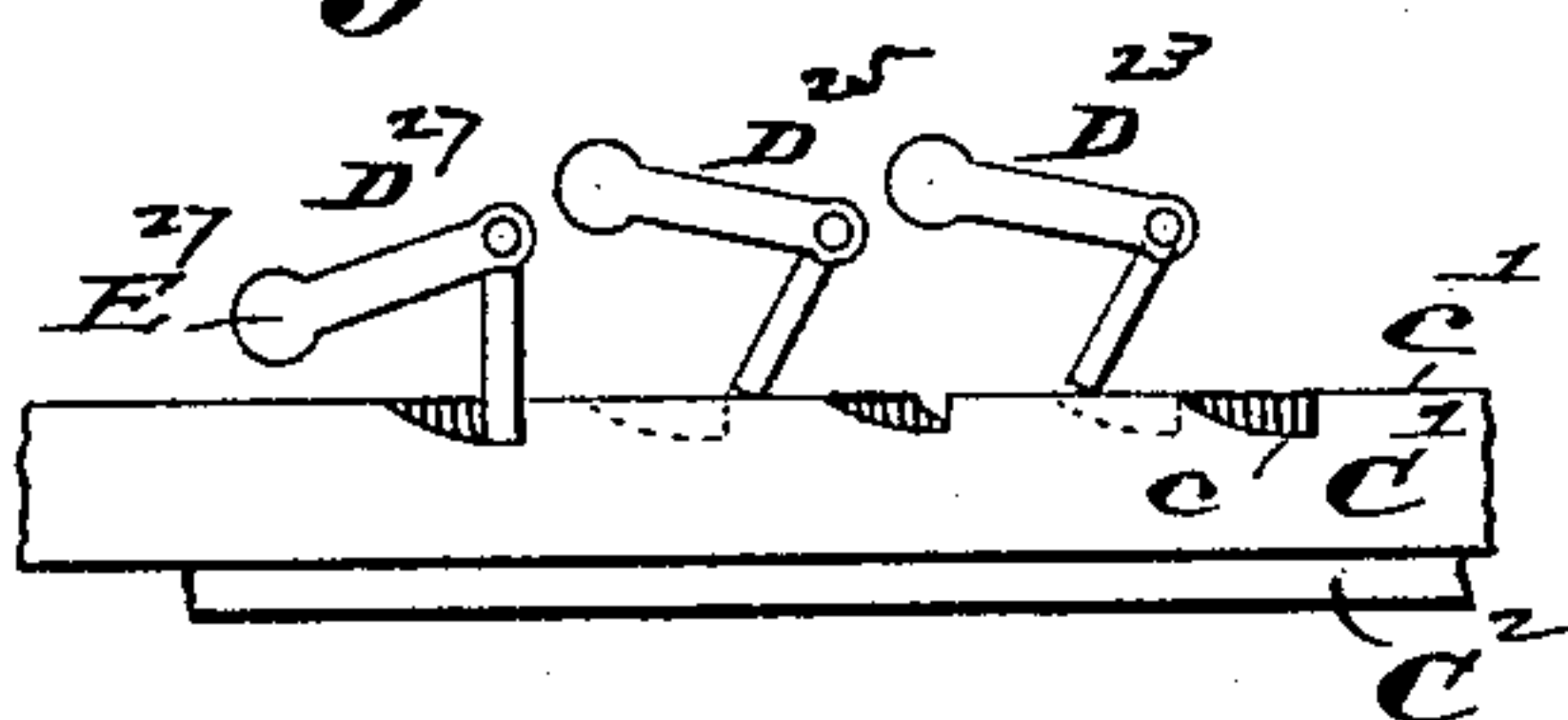


Fig. 8.

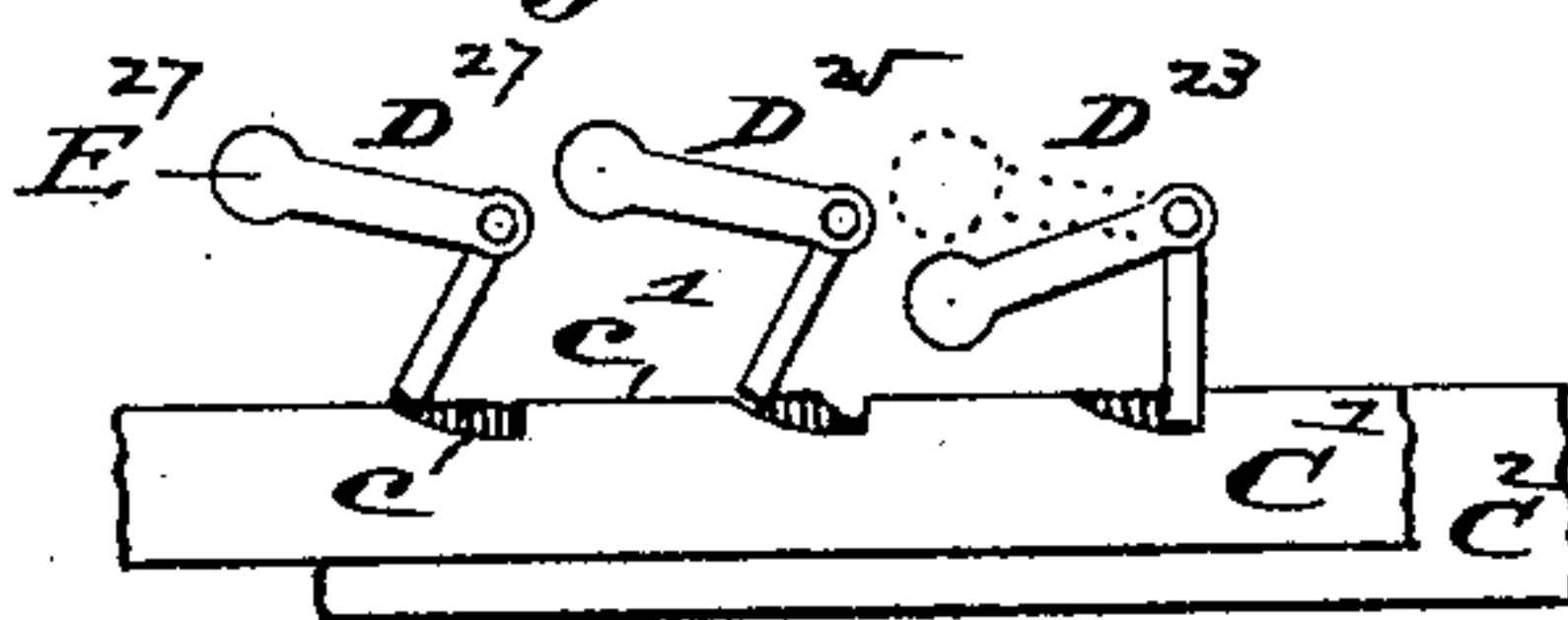
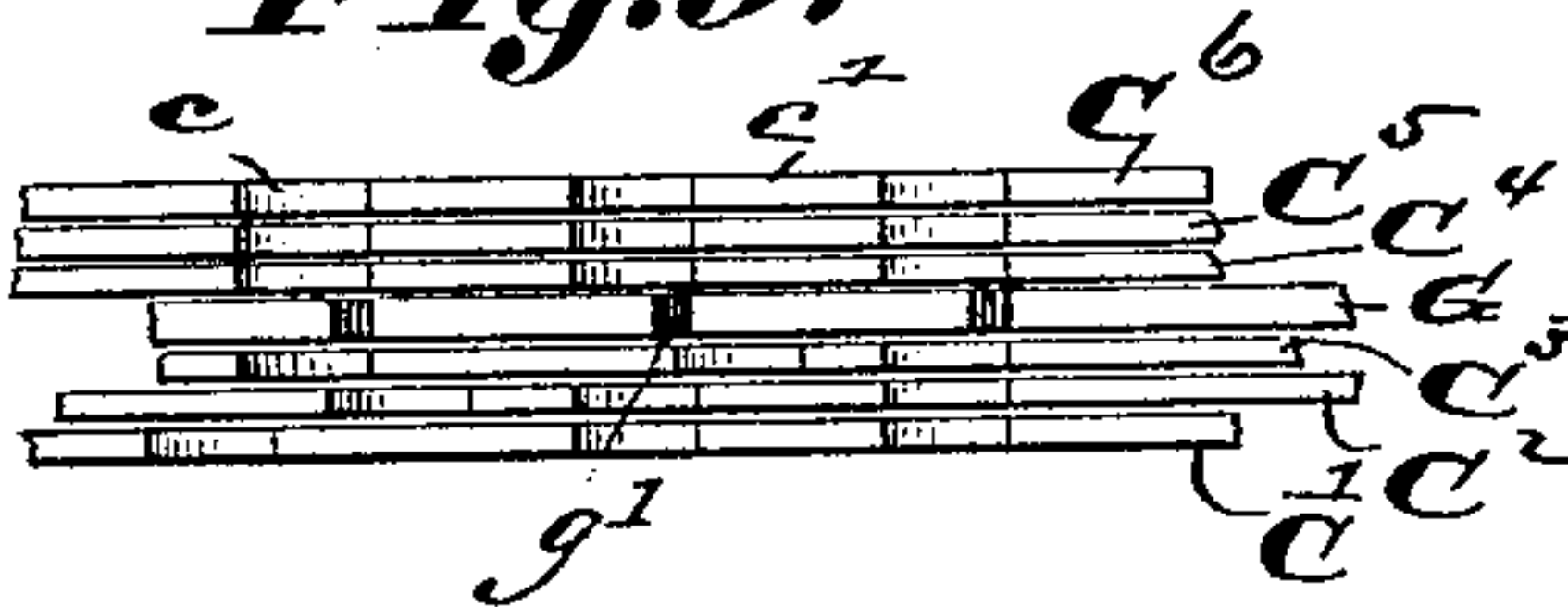


Fig. 7.



Fig. 9.



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Fig. 11.

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D O I E A +

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UNITED STATES PATENT OFFICE.

HERVEY D. GANSE, OF ST. LOUIS, MISSOURI.

DEVICE FOR OPERATING A SET OF LEVERS.

SPECIFICATION forming part of Letters Patent No. 390,769, dated October 9, 1888.

Application filed August 6, 1883. Serial No. 102,960. (No model.)

To all whom it may concern:

Be it known that I, HERVEY D. GANSE, of St. Louis, Missouri, have made a new and useful Improvement in Devices for Operating a Set of Levers, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a side elevation of the device; Fig. 2, a plan; Fig. 3, a cross-section, upon an enlarged scale, at the line 3 3 of Fig. 1; Fig. 4, a side elevation, upon an enlarged scale, showing the rear end of the slides; Fig. 5, a top view of the rear end of the slides; Figs. 6, 7, 8, 9, views illustrating the movements of the slides and tumblers, Figs. 6 and 8 being side views and Figs. 7 and 9 being top views; Fig. 10, a detail, being a sectional view in perspective, showing the rear ends of the slides; and Fig. 11, a diagram used to illustrate the relative movements of the slides.

The same letters of reference denote the same parts.

This invention consists, mainly, of a set of operating-levers, a set of movable slides, and a set of tumblers. The slides in number correspond to the operating-levers, and the movements of the slides are responsive to the movements, respectively, of the operating-levers. The tumblers in number correspond to the levers operated upon, and the movements of the levers operated upon are dependent upon the movements of the tumblers respectively corresponding to the levers.

In the drawings, A represents the base of the device.

B' B² B³ B⁴ B⁵ B⁶ represent the operating-levers.

C' C² C³ C⁴ C⁵ C⁶ represent the slides.

D' D², &c., represent the tumblers.

E' E², &c., represent the levers operated upon.

The operating-levers B', &c., can be considered and hereinafter will be styled "keys," the operator's hand being placed on the forward ends, *b b*, of the keys, as on the keyboard of a piano, causing the ends *b b* to be depressed, as desired, and, through the mechanism hereinafter described, producing the desired movements of the levers E', &c. The keys B', &c., turn upon a suitable fulcrum.

Springs *b'*, &c., act to recover the keys when the ends *b* are released by the operator. The keys B', &c., are connected with the slides C', &c., respectively by means of the levers F' F², &c. These last-named levers are of the bell-crank order, are pivoted at *f* in the fixed bars *a a*, have a sliding connection, *f'*, with the keys B', &c., and at *f²* have a pivoted connection with the slides C', &c. The depression of any one of the keys B', &c., therefore causes its corresponding slide C', &c., to move endwise in a direction at right angles to the longitudinal axis of the key. The slides in the edge opposite to the tumbler-rods are notched, as seen more distinctly in Figs. 4, 5, 6, 7, 8, and 9. The object of these notches is as follows: For each of the levers to be moved there is a corresponding tumbler, and the desired movements of the levers E', &c., are effected by previously moving the tumblers. The movements of the tumblers are accomplished by means of the notches referred to, the notches providing spaces into which the tumblers can drop. It is only necessary therefore to control the dropping of the tumblers, so that they shall be dropped in the proper order, as desired. This is determined by the location of the notches in the slides.

The distribution of the notches along the several slides is made upon the following principle: In order to allow any tumbler to fall six notches, (there being six slides in the present case,) one in each slide must be in line beneath the tumbler. As many keys as are depressed to allow that tumbler to fall so many notches must, before the depression of the keys, have stood, not beneath the tumbler, but a little to the left thereof, ready to be brought to their places beneath the tumbler, when the keys shall be depressed and the slides moved by them to the right; but as many keys as are not depressed for the production of the movements of the tumbler-rods so many notches are already standing under the tumbler waiting to have those others just named brought into line with them. For example, the letter A (the present invention being here illustrated as an attachment to the type-writer) is commanded in this device by the depression of the single key marked A in Fig. 2 of the drawings. Accordingly, be-

neath the A-tumbler (meaning the tumbler which is connected with and effects the movement of that one of the levers E', &c., marking the letter A in the type-writer) all the five slides that respond to the other keys, B² B³ B⁴ B⁵ B⁶, must have their notches standing ready, while the notch of the slide of that one A-key stands out of line to the left.

Fig. 11 of the drawings is a diagram employed to illustrate the relative movements of the slides. It may be considered as representing the slides in plan view, the place of each tumbler being indicated by a cross-line, and the slides are shown as they stand when no key is depressed. In the diagram the fifth line of notches, counting from the left, belongs to the letter A, as above described. Next, on the right, come the notches of the numeral 3, whose lever comes in that order in the Remington type-writer, to which this form of device is adapted. The numeral 3 is commanded in my system, to be hereinafter described, by the three keys on the left of the key-board. Accordingly the three slides which respond to those keys are seen to have notches to the left of the line of the tumbler. Next come the notches of the letter Z, which letter is commanded by the two keys marked in Fig. 2 I and U. The notches of the corresponding slides, accordingly, are seen to stand to the left of the Z-tumbler. The remainder of Fig. 11 shows in the different combinations the two classes of notches that have now been described—namely, those which stand in the line of the tumbler ready to receive it, and those which must be moved up into line by the depression of the keys B' B², &c. The endwise movement of the slides is in the present case but a small fraction of an inch. That, therefore, is the distance to the left which the out-of-line notches must stand in order that the depression of the proper keys may bring them into line.

It will be seen that since each notch, which so long as its key is untouched stands in line under a given tumbler, itself moves to the right when its key is touched, that movement breaks up the line of notches for that tumbler and prevents it from dropping. For example, the letter B in this device is commanded by the key marked A, in combination with the next key to the right of it. An examination of the A-row of notches in the diagram will show that, although the combination of keys used in producing B will bring the one A-notch up into place for producing A, that combination will at the same time draw the notch on the next slide to the right and out of place, so that while the B-tumbler can fall the A-tumbler cannot. In this way throughout the system the combination that produces any one line of notches under its proper tumbler breaks up every other.

The system of combinations used in this device is found very convenient; but I do not limit myself to it. It is shown in full in the diagram. Its main features are as follows:

The key marked B', Fig. 2, is not used at all for the production of letters, but comes into notice for producing punctuation marks and numerals. The remaining five keys produce the letters, as follows: The keys marked A E I O U produce, each by itself, the vowels for which they are marked—that is, the key marked A produces A, the key marked E produces E, and so on. For the production of the consonants, keys are combined according to the following plan: any vowel-key that is simultaneously depressed with the key next to the right of it will produce the consonant which in the alphabet stands next after that vowel, the A-key with the next producing the letter B, the E-key with the next producing F, the I-key with the next producing J, and so on. In making the addition to the U-key, since there is none beyond it, the five lettered keys are used in a circle—that is, the operator adds to the U-key the A-key, going round from the top of the key-board to the bottom. Thus the U-key, with the A-key, produces V. By extension of this system any vowel-key, in combination with the two keys next above it, produces the second letter after that vowel. So A, with two additional keys, produces C; E, with two additional keys, G, and so on. A, with three additional keys, produces H, and so on. The tumblers may be variously shaped; but for the present purpose that form shown is desirable, the tumbler being in the form of a leaf, *d*, which is journaled at *d'* *d''* in the fixed bars *a'* *a''* in the frame of the machine. The leaves *b* *b*, therefore, in their movements swing to and fro, as indicated by the broken lines in Fig. 8. The levers E', &c., to be moved are connected with the tumblers D', &c., the levers E', &c., being in the present case virtually extensions of the journals of the tumblers.

G represents a slide adapted to be moved endwise in the machine. It is arranged alongside, and, if desired, between the slides E', &c., substantially as shown. The slide G is provided with a flange, *g*. This flange, as shown in Figs. 3 and 10, constitutes a shoulder against which the slides E', &c., in their forward movements press. The depression, therefore, of any one of the keys B', &c., operates not only to move its corresponding slides C', &c., but also to move the slide G in the same direction. The slide G, as shown in Figs. 5, 7, and 9, is notched at *g'* *g''*, &c. These notches *g'*, &c., are so distributed in the edge of the slide G as to be beneath the tumblers D', &c., when the latter are allowed to drop, by bringing the notches in the slides C', &c., into coincidence, as heretofore described. The tumbler, therefore, drops not only into the notch in the slides C', &c., but also into the coincident notch in the slide G. The function of the slides C', &c., is to provide a space into which the tumbler can drop. The function of the slide G is to positively move the tumbler after it has dropped into one of the notches *g'*—that is to say, by continuing to depress the key B', &c., after the tumbler has dropped into the notch,

the slide G is forced farther along in the same direction, which movement of the slide G in turn causes the tumbler to be rotated in its bearings, and in such movement to cause the
 5 corresponding lever E' to be moved. As soon as the operator releases the keys B', &c., which have been depressed, the springs b', &c., operate through the keys B', &c., and the bell-crank levers F', &c., to move the slides C', &c.,
 10 endwise backward into their original positions. A spring, g', Figs. 1, 2, and 4, operates to withdraw the slide G into its original position. The return movements of the slides C', &c., operate to lift the tumblers D', &c., into their
 15 original positions—that is, the lower edges of the leaves b are lifted out of the notches c in the slides C', &c., and rest upon the space c' of the slides between the notches c, as shown in Figs. 4, 6, and 8. On depressing the keys B',
 20 &c., again for the purpose of operating the tumblers and levers E', &c., the slides C', &c., and G are moved forward again, and so on with every depression of the keys B', &c.

I do not wish to be confined to the special
 25 form of notch c shown; but whatever form is employed the notch and tumbler should be so made and so relatively shaped and combined as to enable the tumbler to enter the notch as a slide moves in one direction, and
 30 cause it to be expelled from the notch by the action of the slide as the slide is moved in the opposite direction.

The movements of the lever E', &c., can be communicated to mechanisms of various descriptions, for I do not desire to be confined
 35 in using the present device to any one form of mechanism. The device, however, is especially adapted to a type writer, as by means of it the many levers of a type-writer mechanism can be operated with comparatively few
 40 keys. The plates H H' serve to confine the tumblers in their bearings and prevent them from being accidentally misplaced.

I claim—

45 1. The combination of the notched slides and the tumblers, said tumblers constructed and arranged substantially as described, so that they enter the notches when the slides are

moved in one direction, and said slides when moved in the opposite direction act to restore
 50 the tumblers to their original positions.

2. In combination, the apertured and movable slides C', &c., having notches arranged as described, so that each change of position
 55 of the slides shall present a different notched opening across the entire series of slides, substantially as described.

3. The apertured and movable slides C' C', &c., having notches arranged as described, in combination with each other and with means,
 60 substantially as described, for returning each of said slides to its original position when released, substantially as described.

4. The apertured slides C' C', &c., having notches arranged as shown, in combination
 65 with each other, and with means, as described, for returning them to a uniform position when released, and with means, as described, for conveniently actuating them, substantially as described.
 70

5. The combination of the slides C', &c., the tumblers D', &c., and the slide G, substantially as described.

6. The combination of the keys B', &c., bell-crank levers F', &c., notched slides C',
 75 &c., tumblers D', &c., the levers E', &c., and the notched slide G, substantially as described.

7. The combination of the keys B', &c., the bell-crank levers F', &c., springs b', &c., the notched slides C', &c., the tumblers D', &c.,
 80 the notched slide G, and the spring g', substantially as described.

8. The combination of the keys B' B', &c., the notched slides C' C', &c., and the means, substantially as described, for connecting the
 85 keys with the slides, and the tumblers D' D', &c., the movements of the notched slides answering the movements of the keys, for the purpose described.

9. The combination of the slides C' C', &c.,
 90 and G, the tumblers D' D', &c., and the levers E' E', &c., substantially as described.

HERVEY D. GANSE.

Witnesses:

C. D. MOODY,
 S. E. LOGAN.