

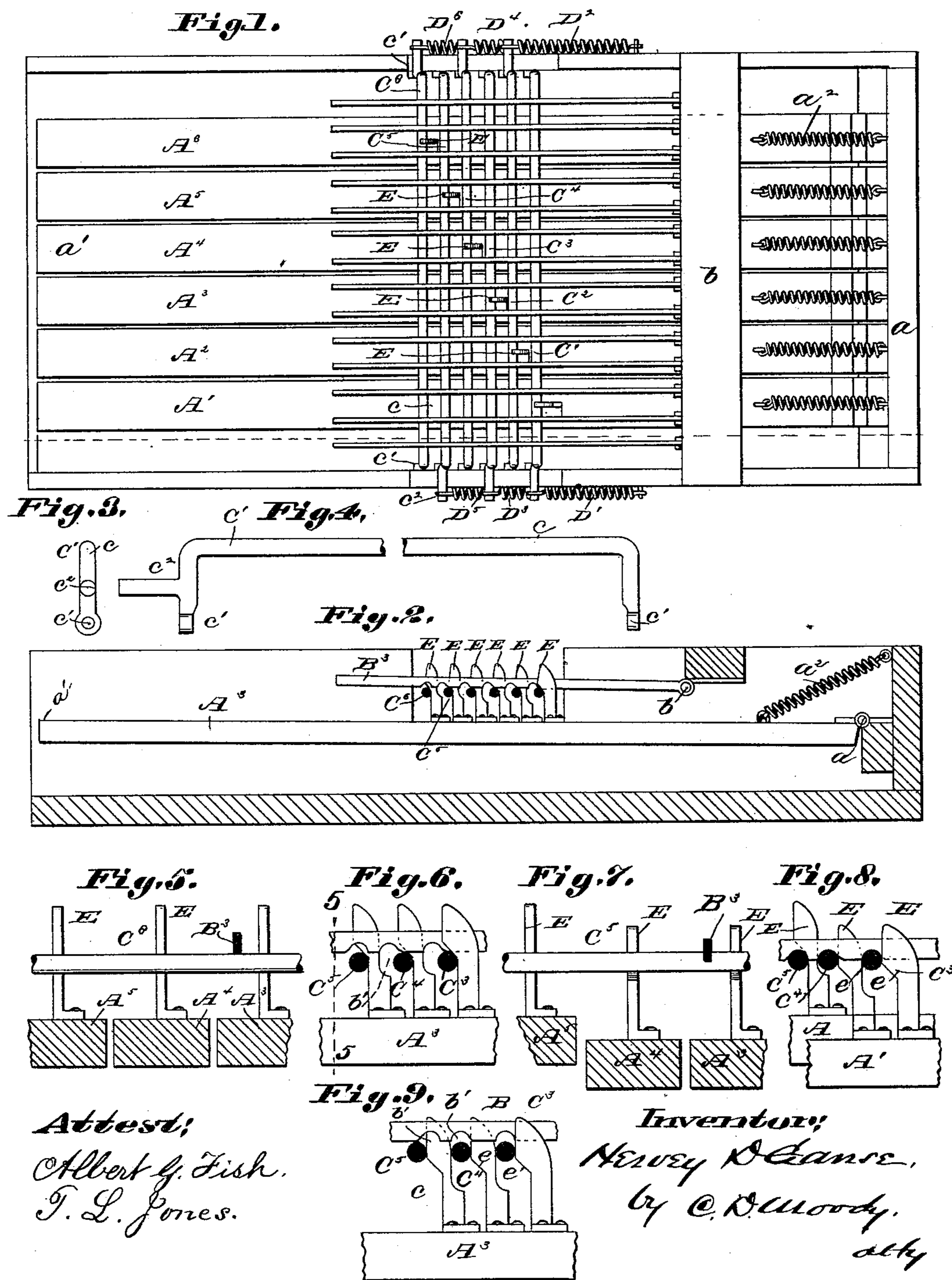
(No Model.)

H. D. GANSE.

DEVICE FOR OPERATING A SET OF LEVERS.

No. 386,776.

Patented July 24, 1888.



# UNITED STATES PATENT OFFICE.

HERVEY D. GANSE, OF CHICAGO, ILLINOIS.

## DEVICE FOR OPERATING A SET OF LEVERS.

SPECIFICATION forming part of Letters Patent No. 386,776, dated July 24, 1888.

Application filed June 24, 1884. Renewed April 20, 1887. Serial No. 235,537. (No model.)

*To all whom it may concern:*

Be it known that I, HERVEY D. GANSE, of Chicago, Cook county, Illinois, have made a new and useful Improvement in Devices for  
5 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 plan of the improvement; Fig.  
10 2, a vertical longitudinal section thereof; Fig. 3, an end elevation of one of the tumbler-supports; Fig. 4, a side elevation of one of the tumbler-supports; Fig. 5, a vertical cross-section on the line 5 5 of Fig. 6, showing three  
15 of the keys and parts immediately therewith connected; Fig. 6, a side elevation of the parts shown in Fig. 5; Fig. 7, a view similar to that of Fig. 5, but showing two of the keys depressed; Fig. 8, a side elevation of the parts  
20 shown in Fig. 7, and Fig. 9 another side elevation, but showing all three keys depressed and the tumbler upheld.

The same letters of reference denote the same parts.

25 The present invention is the peculiar mode hereinafter described and claimed of moving any one, as desired, of a set of levers by means of one or more of another set of levers, the operating-levers being less in number than those  
30 operated upon.

$A' A^2 A^3 A^4 A^5 A^6$  represent the set of operating-levers. Six of these levers are shown; but saving as they are less in number than the levers moved I do not wish to be confined  
35 to any particular number. Each of these levers  $A'$ , &c., can be similarly and independently vibrated upon a fulcrum,  $a$ , the pressure of the operator's finger causing the forward end,  $a'$ , of the lever to be depressed, and a spring,  $a^2$ ,  
40 or other equivalent means operating to restore the lever to its original position when the pressure is removed.

$B' B^2$ , &c., represent a set of tumblers. These tumblers in number correspond to the set of  
45 levers operated upon, and, if desired, they may be considered the set of levers operated upon, or they may be considered an intermediate set of levers whose movements, respectively, can be communicated to the set of levers  
50 it is desired to operate upon. These tumblers can be similarly and independently vibrated upon a fulcrum,  $b$ .

$C' C^2 C^3 C^4 C^5 C^6$  represent a series of what may be termed "tumbler-supports." They correspond in number with the keys  $A' A^2$ , 55 &c., and they, respectively, belong to the keys  $A' A^2$ , &c.—that is, to each key belongs a corresponding tumbler-support, and when a key is vibrated upon its fulcrum the tumbler-support belonging to that key is moved, and, as 60 follows, the tumbler-supports, as shown in Figs. 1, 2, are arranged transversely in the device above the keys  $A' A^2$ , &c., and beneath the tumblers  $B' B^2$ , &c.

The tumbler-supports at their upper edge, 65  $c$ , are straight. They are adapted to tilt forward and backward in the direction of the longitudinal axis of the device, and to this end they are, at  $c' c'$ , journaled in suitable bearings at the sides, respectively, of the key-board. 70 The tumbler supports are tilted in one direction (forward, as shown in the drawings) by means of the keys, and are withdrawn into an upright position by means of the springs  $D' D^2$ , &c. 75

The movements of the keys are communicated to the tumbler-supports, preferably as follows: Each key is provided with an arm,  $E$ , having an inclined portion,  $e$ , which is adapted to bear against the tumbler-support, and substantially as shown in the various views of the drawings. On depressing a key the arm belonging to that key is drawn downward with the key and the inclined portion  $e$  of the arm is forced against the tumbler-support, which 85 in consequence is tilted on its bearings toward the forward end of the key-board. The two positions of the arms with reference to the tumbler-supports are shown—for instance, in Figs. 6 and 7, respectively. On releasing the 90 key the spring  $D'$ , &c., belonging to that tumbler-support operates to restore the tumbler-support to its upright position. The springs  $D'$ , &c., are connected with the tumbler-supports, respectively, by attaching the forward 95 end of the spring to some part, say, the projection  $c^2$  of the tumbler-support.

The present improvement is a substitute for a portion of the construction shown in a pending application of mine for a device for oper- 100 ating a set of levers. In the construction referred to a series of slides with notches irregularly distributed upon them is employed in combination with a series of tumbler-rods.

The tumbler-rods have straight continuous edges, and any tumbler-rod is adapted to drop into the slides whenever the slides are so moved endwise as to present a continuous notch across the entire series of slides beneath that tumbler-rod. Now, in place of using such notched slides and tumbler-rods having a smooth continuous edge and causing the slides to be moved endwise to effect a dropping of a tumbler-rod, the present tumbler-supports have a continuous edge, and that edge of the tumblers which bears upon the tumbler supports has a series of notches, and the movement of a tumbler-rod is effected by so tilting the tumbler-supports as to bring them, respectively, beneath the several notches in that tumbler-rod. The distribution of the notches  $b'$  upon the edges of the several tumblers is such that no two tumblers shall in that regard be alike, while every several tumbler shall admit of the entrance into all of the notches upon that one tumbler of all the tumbler-supports, when, by the proper combination of keys, those tumbler-supports are brought into their proper respective distances from each other. This is illustrated with the three tumbler-supports  $C^1 C^2 C^3$ , Figs. 6, 8, 9. In Fig. 6 the tumbler-support  $C^1$  is beneath the notch  $b'$  in the tumbler  $B'$ , but the tumbler-supports  $C^2 C^3$  are not beneath any notches in that tumbler. The tumbler therefore remains upheld; but by operating the tumbler-supports  $C^2 C^3$  so as to bring them beneath the notches  $b' b'$ , respectively, the tumbler drops, as shown in Figs. 7, 8. In case all three,  $C^1 C^2 C^3$ , of the tumbler-supports are moved the tumbler still remains upheld, as in Fig. 9, for although the tumbler-supports  $C^2 C^3$  are moved into position for the tumbler to drop, the tumbler-support  $C^1$  is moved out of line with its notch  $b'$  in the tumbler, and the tumbler therefore remains upheld by the tumbler-support  $C^1$ —that is, each tumbler has as many notches  $b'$  as there are tumbler-supports—and the several notches in the various tumblers throughout the series of tumblers are so relatively distributed that but one tumbler at a time is allowed to drop, and whenever the tumbler-supports are so relatively adjusted as to admit of the falling of any tumbler that combination of the keys which is employed in producing such relative adjustment of the tumbler-supports operates to prevent any other tumbler from falling. The distribution of notches upon the tumblers is so made that the same combinations of keys are available as are described in my several applications for Letters Patent filed, respectively, July 17, 1882; July 18, 1883; August 6, 1883; December 10, 1883. Since these combinations are there set forth no further reference to them is here made, it being understood that when the combination requires the movement of a key the notch corresponding to that key stands in advance of the tumbler-support, and when the combination requires that a key be not moved

the notch corresponding to that key stands directly over the tumbler support. (See Figs. 2 and 6.)

It will be observed that the tumbler and its support are interacting—that is, the tumbler drops by reason of its gravity and by reason of the relative shape of the notch in the tumbler and that portion of the tumbler-support which enters the notch, substantially as shown in Fig. 6—for instance, the returning of the tumbler-support into its upright position operates to lift the tumbler so as to disengage the tumbler-support from the notch. I do not in all cases wish to be confined to this mode of disengaging and lifting the tumblers. They may be lifted by auxiliary means, (not here shown,) which auxiliary means may in turn be operated by the keys in their movement; nor do I wish to be limited to a tumbler which in its movement is adapted to turn upon a pivot, as here shown; nor do I wish to be limited to a tilting tumbler support; for in place of such a tumbler and such a tumbler-support the tumbler may be adapted to be raised and lowered in a directly vertical direction, and the tumbler-support may be adapted to be moved bodily sidewise, so as to come into and out of line with its notch in the tumblers above. I prefer, however, the construction shown.

I am aware that heretofore in a mechanism for perforating paper for telegraphic purposes there has been described a series of punch-selecting bars which are pivoted at one end and whose edges are notched, the notches being differently distributed upon the several bars and with a view to selection among the bars by means of edges, which at the will of the operator will or will not enter the notches. The mechanism referred to, however, differs essentially from the present improvement, in this: it makes simultaneous selection of several bars, whereas in the present instance but one tumbler is selected at one time, and by no manipulation can more than one tumbler be selected at one time. This difference in turn hinges on another difference equally radical. The mechanism referred to selects not by inserting the selecting-edge into the notch of the punch-selecting bar but by bringing up that edge against the solid metal of the bar. When the edge meets nothing but a notch, it makes no selection, for selection is made by lifting the bar, and when the lifting-lever meets a notch it simply enters it and does nothing. It further follows that when any single lever meeting a solid part of the bar lifts that bar the other levers, if they be lifted, do not even enter the notches of that bar, for the one lifting-lever carries up bar, notches, and all. In the present construction, on the other hand, the selection is effected by the entrance of the edges into the notches, and therefore by the entrance of all the edges into their respective notches. In the one mechanism the touching of a single selecting-edge to the unnotched

part of the bar effects the selection of that  
bar. In the other (the present) mechanism  
such a contact of the selecting-edge with an  
unnotched part of the tumbler prevents se-  
5 lection.

I claim—

In a selecting device, the combination of the  
keys, the tumblers, and the tumbler-supports,  
said tumblers having notches distributed

therein, as described, so that there is in each 10  
tumbler a notch corresponding to every tum-  
bler-support, and said tumbler-supports being  
movable to enable them to enter said notches,  
substantially as described.

HERVEY D. GANSE.

Witnesses:

CHAS. D. MOODY,  
CHARLES PICKLES.