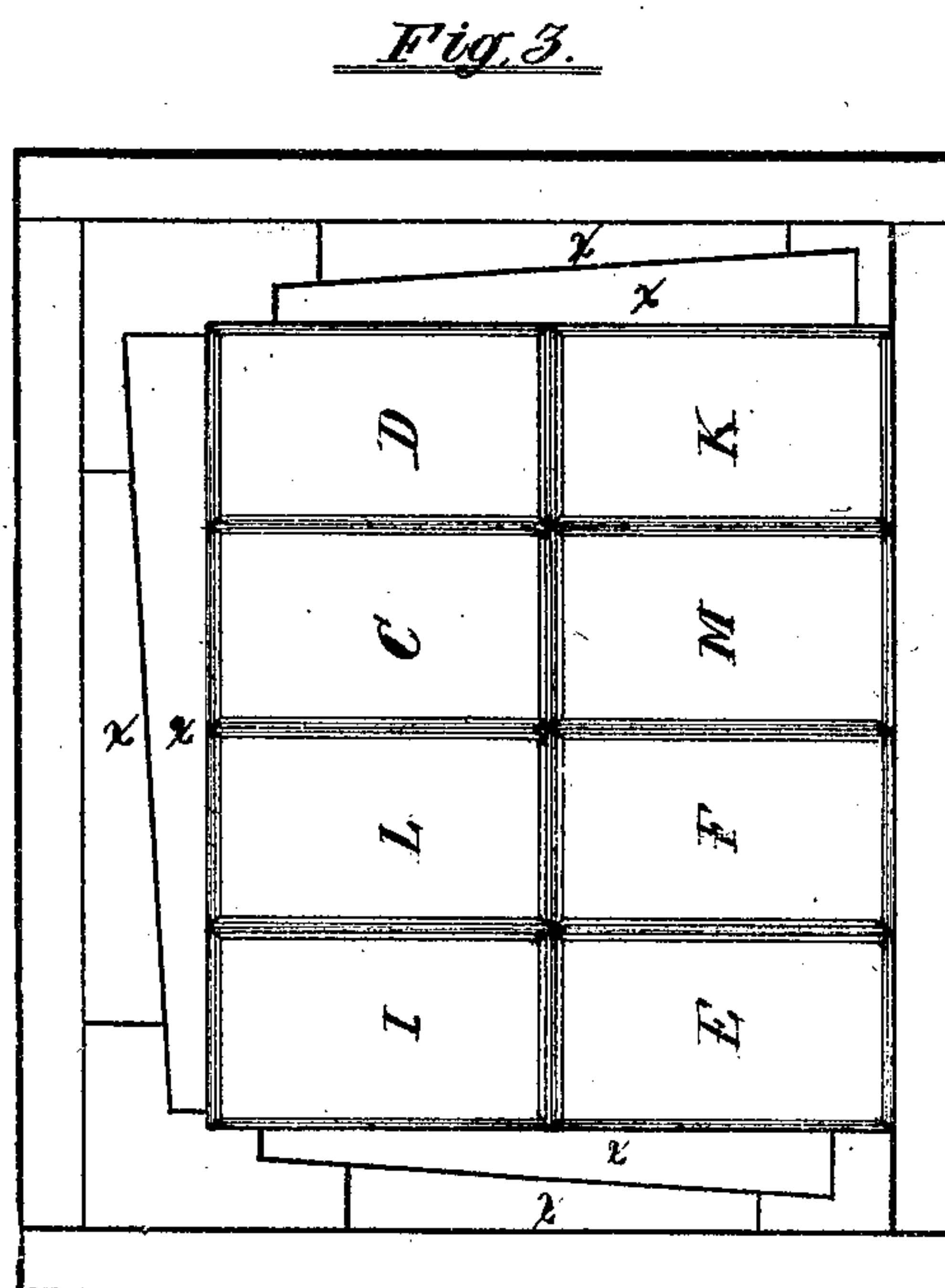
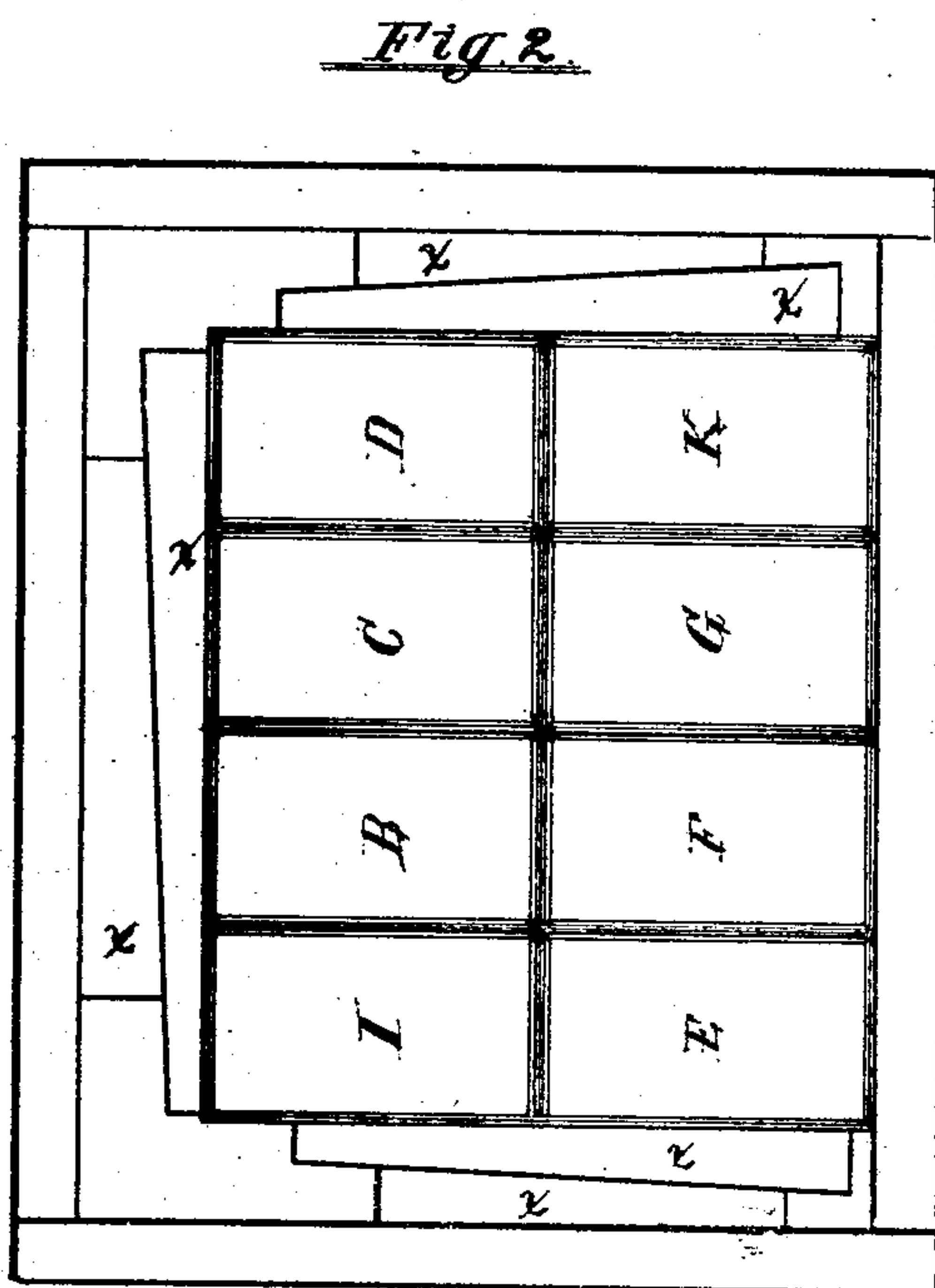
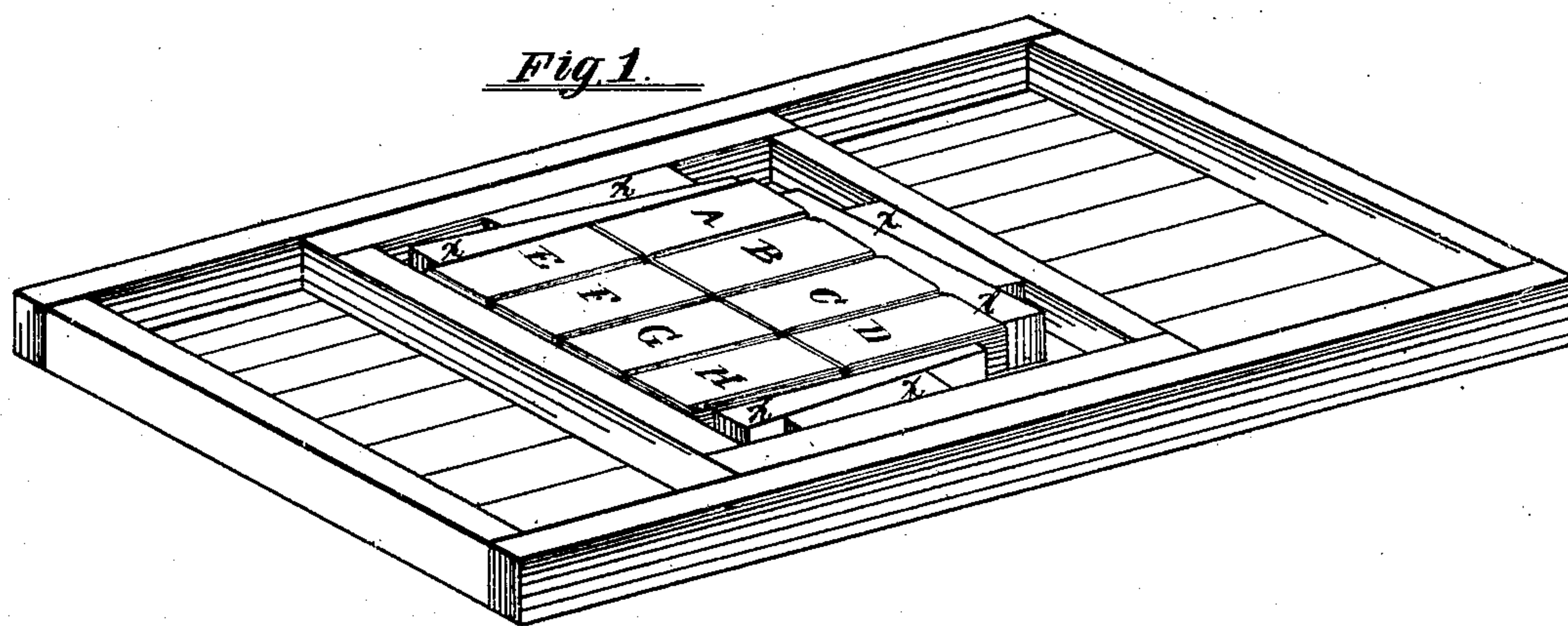


I. REYNOLDS.  
Lithographic Printing-Forms.

No. 144,796.

Patented Nov. 18, 1873.

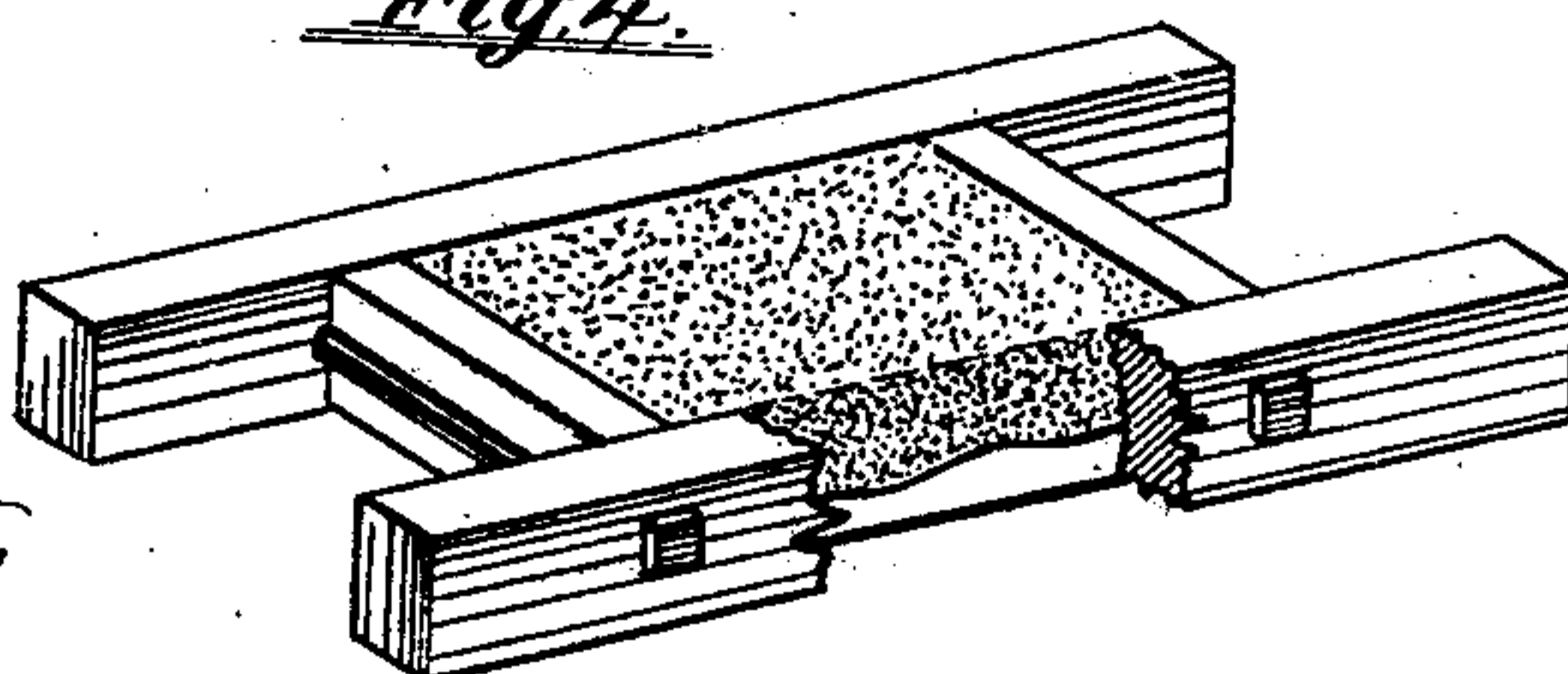


Witnesses,

*W. R. Adams.*

*John J. Halsted.*

Fig. 4.



Inventor,

*Ira Reynolds*



# UNITED STATES PATENT OFFICE.

IRA REYNOLDS, OF DAYTON, OHIO, ASSIGNOR TO REYNOLDS & REYNOLDS,  
OF SAME PLACE.

## IMPROVEMENT IN LITHOGRAPHIC PRINTING-FORMS.

Specification forming part of Letters Patent No. **144,796**, dated November 18, 1873; application filed  
March 21, 1873.

*To all whom it may concern:*

Be it known that I, IRA REYNOLDS, of Dayton, in the State of Ohio, have invented certain Improvements in the art of Printing from Lithographic Stones, of which the following is a specification:

It is the object of my invention very greatly to reduce labor and save time, and also so to reduce the cost of lithographic printing that, in an office where large amounts of work are done, a small job of five hundred sheets may be printed at as cheap a rate as ten or twenty times that number.

To practice my invention I employ a number of stones, made of equal thickness, and either all of the same length and breadth, or with one or more of the set, if desired, of double or quadruple (in area) of the others, in order that they may be assembled together within a "chase" or frame, and securely held there during the operation of taking the lithographic impressions therefrom. The means for holding them may be in any convenient way, or in the manner of holding type in place in their frames, wedges or quoins, *w*, being shown for this purpose in the drawing. This assemblage of stones, each being first prepared with impression which is to be transferred from it to the paper, is now ready for use, the whole form being composed of sections or blocks.

In the accompanying drawings, Figure 1 illustrates the bed of a press, having thereon a chase in which is a form made up of an assemblage of lithographic stones, each stone being designed and adapted for printing something—say a bill-head, letter-head, ornamental design, picture, &c.—entirely different from that on each or any of the other stones. Figs. 2 and 3 show, on an enlarged scale, the form in a chase removed from the bed of the press; and Fig. 4, a frame suitable for adding to the thickness of any stone, in order to bring all to the same height, thus avoiding any stone-cutting, sawing, or reducing for such purpose.

In my illustrations I have, for the sake of simplicity, shown only eight lithographic stones in a form, though more or less may be employed, dependent on the greater or less variety of work to be done, and the relatively

different number of impressions required from each stone.

Now, let us suppose the printer has an order from one person for one thousand bill-heads, which are to be struck off from the stone marked A, and from another person for two thousand pictures from stone marked B, for three thousand letter-heads for another customer from stone marked C, and for four thousand circulars for another customer from stone marked D, and also has other orders from other four parties for quantities severally of four, three, two, and one thousand impressions of other four bill-heads, &c., from stones marked E F G H, and also other orders named hereinafter. Now, it will be evident, that when the whole form has been put into the press, and one thousand impressions have been struck off, to fill the order for stone A, the act of printing these has, in the same time and with the same labor, and with no additional cost, except for ink, also printed one thousand of each of the other seven orders. The stones A and H, being now no longer required, are speedily unlocked from the form and removed, and other reserve stones, I K, from each of which three thousand impressions are required, are substituted for them, and the printing proceeded with. This I call the first change. The stones in the form will then be as designated in Fig. 2.

It will be observed that I prefer to substitute for the removed stones such others as need not be removed till the whole of the work for the highest required number of impressions shall be finished, the one thousand impressions for the removed stones and the three thousand for the inserted ones equaling together in number the four thousand required from stones D and E.

Next I proceed to strike off another thousand impressions from the form thus changed, and this will complete the two thousand required from each of the stones B and G, and also, at the same time, a thousand copies from every other stone. These stones B and G are then removed, and reserve stones L M (see Fig. 3) put in their places, and from each of which two thousand impressions are required. This I call the second change. The work pro-



ceeds, and another thousand impressions taken from each of the eight stones.

I now remove stones C and F, (the required three thousand impressions having been struck off from each,) and replace them with other reserve stones, not needing to be illustrated, but which may be called N and O, from each of which only one thousand impressions are required. This I call the third and last change; and it will be seen, also, that at this stage just one thousand impressions, and no more, are required from each of the other stones in the form.

When such thousand impressions are next given, the whole work is done, and with the expenditure of but little time, cost, or labor beyond what would have been necessary to print only the four thousand circulars from stone D; while the result shows the printing of fourteen different jobs from fourteen customers, amounting in all to thirty-two thousand impressions, and all with only three changes of the form.

For larger orders, say for fifty to one hundred thousand impressions, the stone for them would remain a long time in the chase, while changes would be made only for orders of lesser amount.

While I have illustrated with eight section stones or blocks in a form, and for six reserve stones, it will be readily seen that I am not limited to the number of stones in either case, as they may be varied to any number up to the capacity of the press, to suit circumstances, and the more or less extensive business carried on in different printing-offices.

Some of the stones may be in area double, or treble, or quadruple the size of the others, if desired; as, for instance, when the design, or imprint, or the sheet of paper to receive the imprint, needs to be larger.

By my invention, also, I can economize in the cost of the stone, as I can use those of lesser area, the locking them in forms dispensing with the need of their being individually so weighty; also, they need not be so thick, as I can increase the thickness of a slab or stone which is less than that of the stone of greatest thickness, and so equalize the thickness of all that their tops shall be in the same plane, by means of the frame shown in Fig. 4. To do this, I place the stone in the frame with its smooth face on a plane or bed, and then, with any suitable plaster or composition, fill up the unfilled part of the cavity of the frame, and leave it until it has hardened and clung to the stone, taking

care to previously oil the frame, that the plaster shall not adhere to it.

By this means all the stones are cheaply equalized in thickness, and no sawing, or stone-cutting, or grinding is necessary on the under face of the stone, thus saving much expense, as the plaster brings the whole to shape and surface.

In case the blocks should accidentally vary somewhat in size, it is unimportant, as the deficiencies of any could be made up or supplied by reglets or their equivalents.

My invention is applicable in all cases which would warrant or justify engraving, and it is designed for all kinds of work which can be done by lithography; and I also avoid by it the transferring or multiplying upon a single larger stone the same impression to be printed. Large stones are also very expensive, much more so than a number of smaller ones which would occupy the same area, and smaller ones are more cheaply cut and dressed, and more readily handled. Besides, a form when made of stones some or all of which have had their thickness artificially increased is much lighter and more easily handled than if made up of solid stones.

Lithographic stones are imported at considerable cost for freight or duties. When made lighter by my process, much expense is saved in these items.

To prepare stone for my improvement in lithography, I employ the usual means for facing the stones to a true surface; but for the shaping of the sides, I place them upon a horizontal bed, with the face or trued surface downward; I then make use of saws hung so as to give the desired width at one operation and the desired length at another operation, so as to leave their two sides and ends at right angles with the face of the stones. They are then ready for the thickening-frames above described; or the stones may be sawed at only one side and one end, and then placed in sizing-frames, with other saws to give the desired length and width.

I claim—

A lithographic printing-form consisting of a series of stones of equal proportionate or multiple size, equalized in thickness, and arranged substantially as described, so that any one or more of the stones may be removed at will, and others substituted therefor.

Witnesses: IRA REYNOLDS.

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JARVIS MOULDEN.