

G. WENKER.
BOOK SHELF.

No. 517,503.

Patented Apr. 3, 1894.

Fig. 1

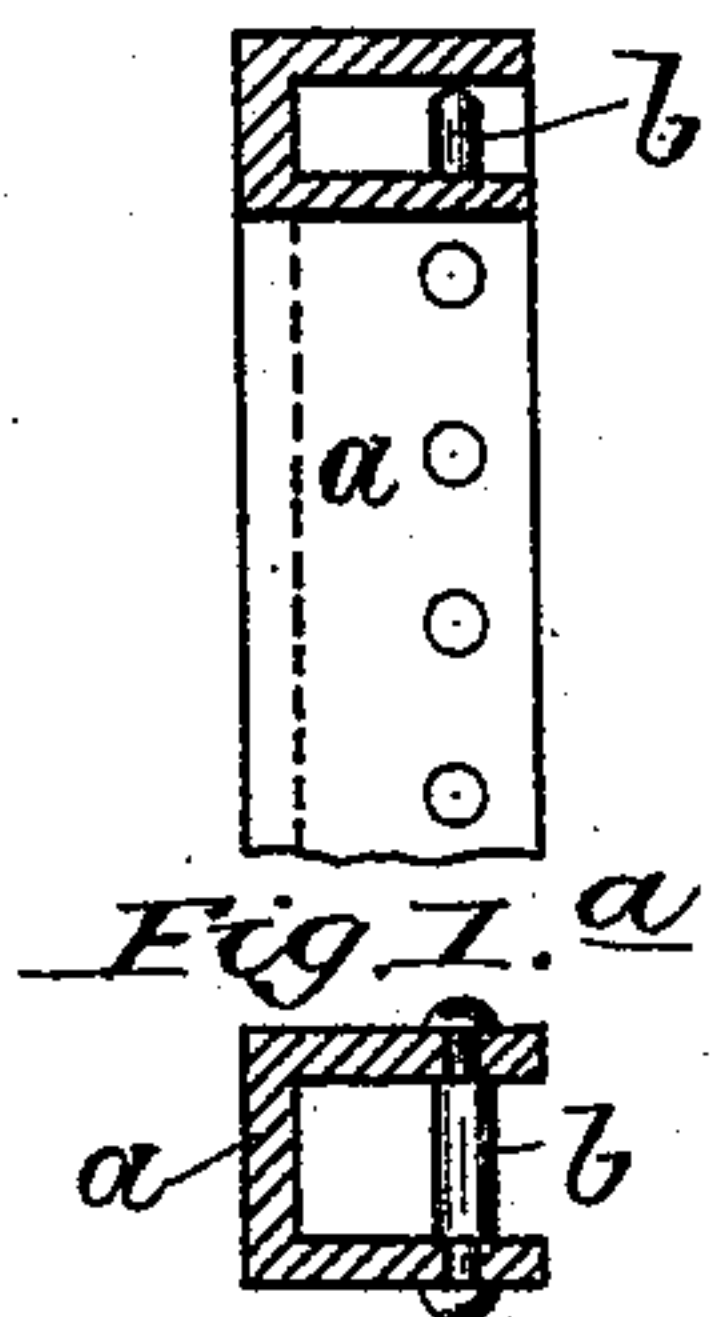


Fig. 2.

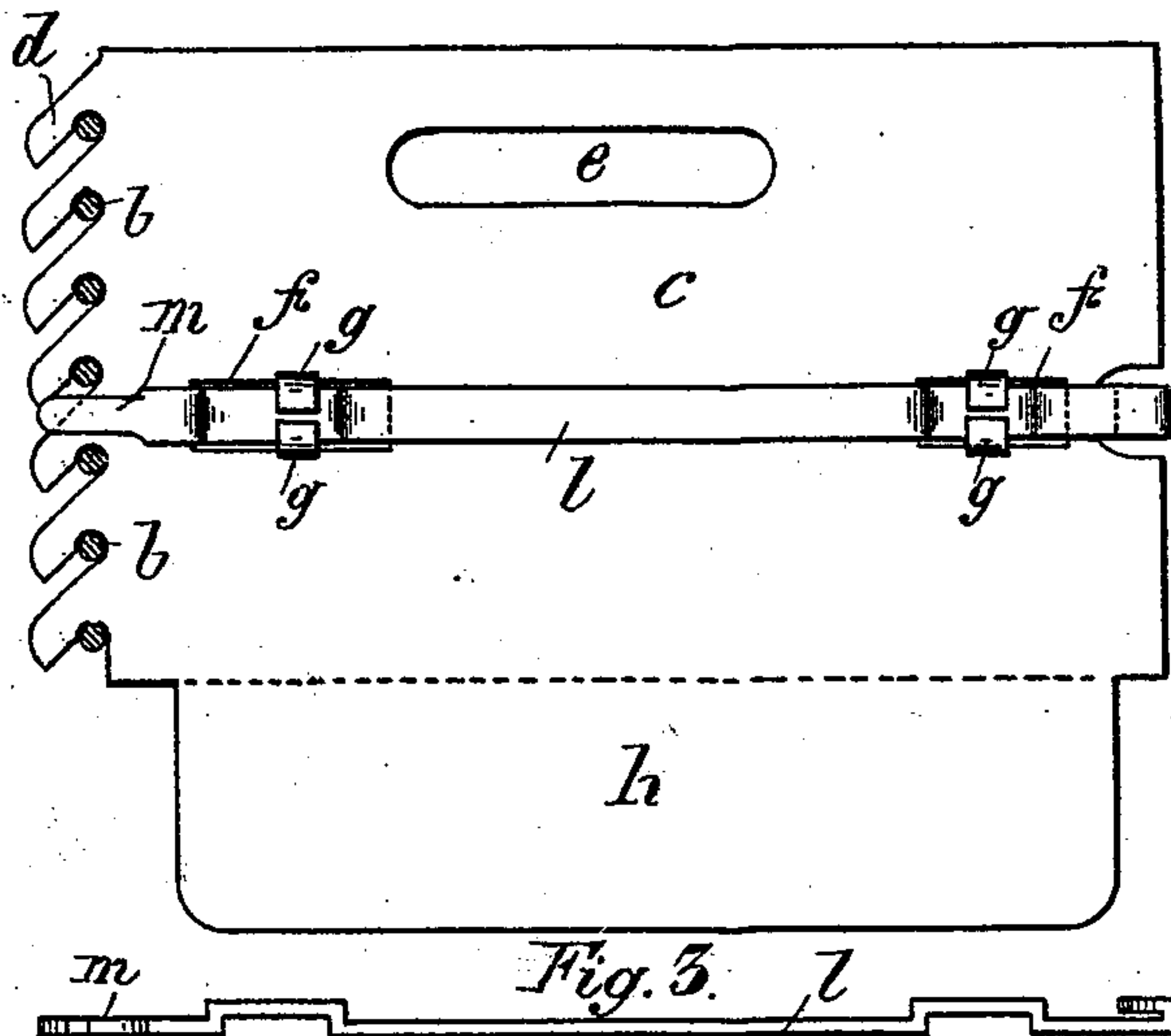


Fig. 3.



Fig. 4.

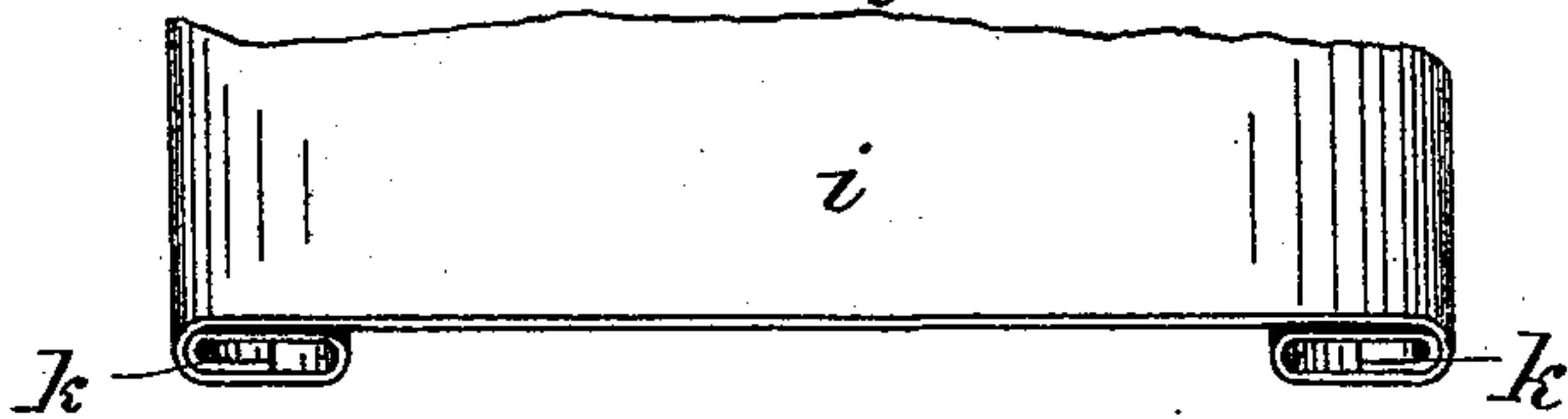


Fig. 5.

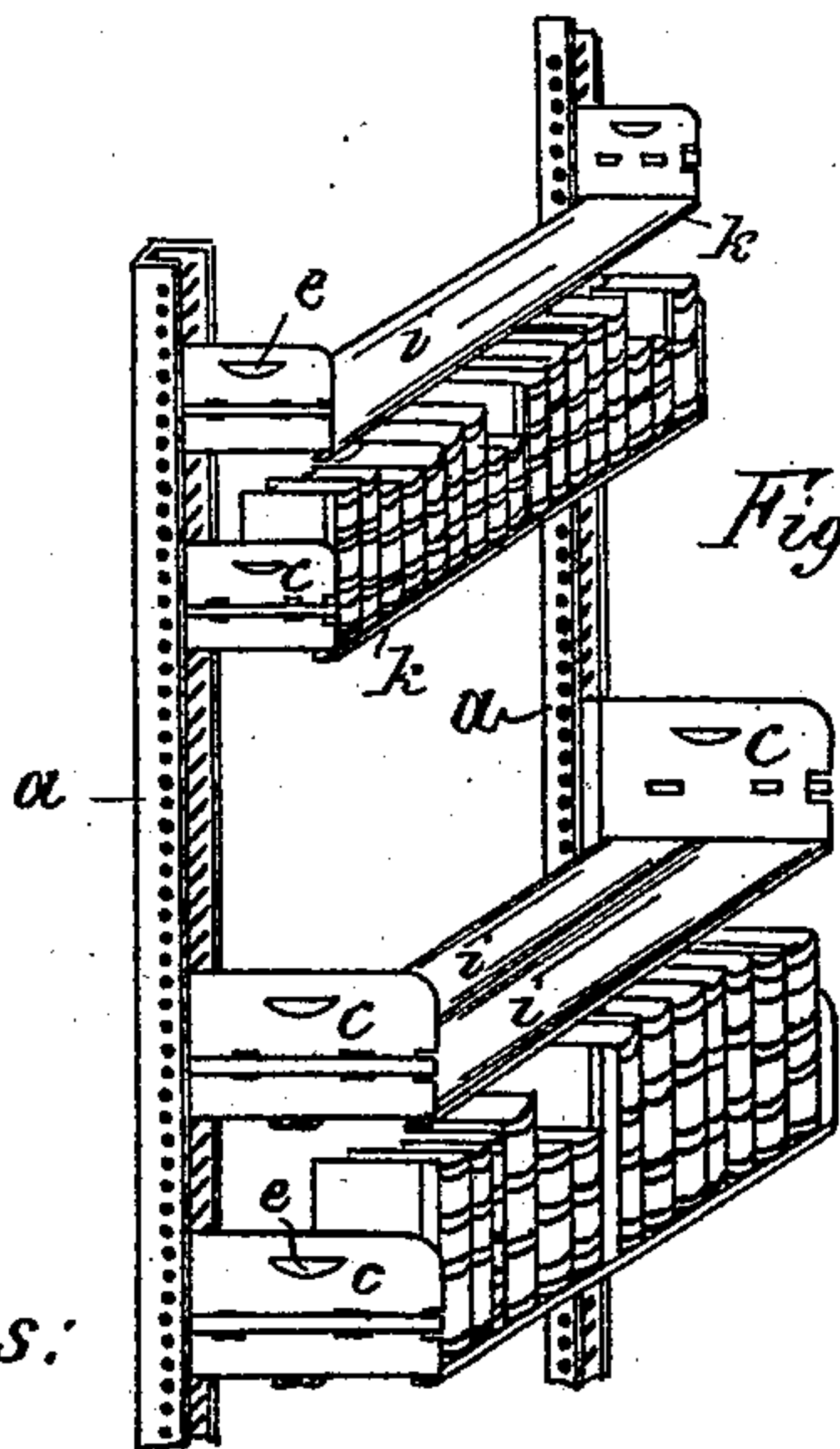
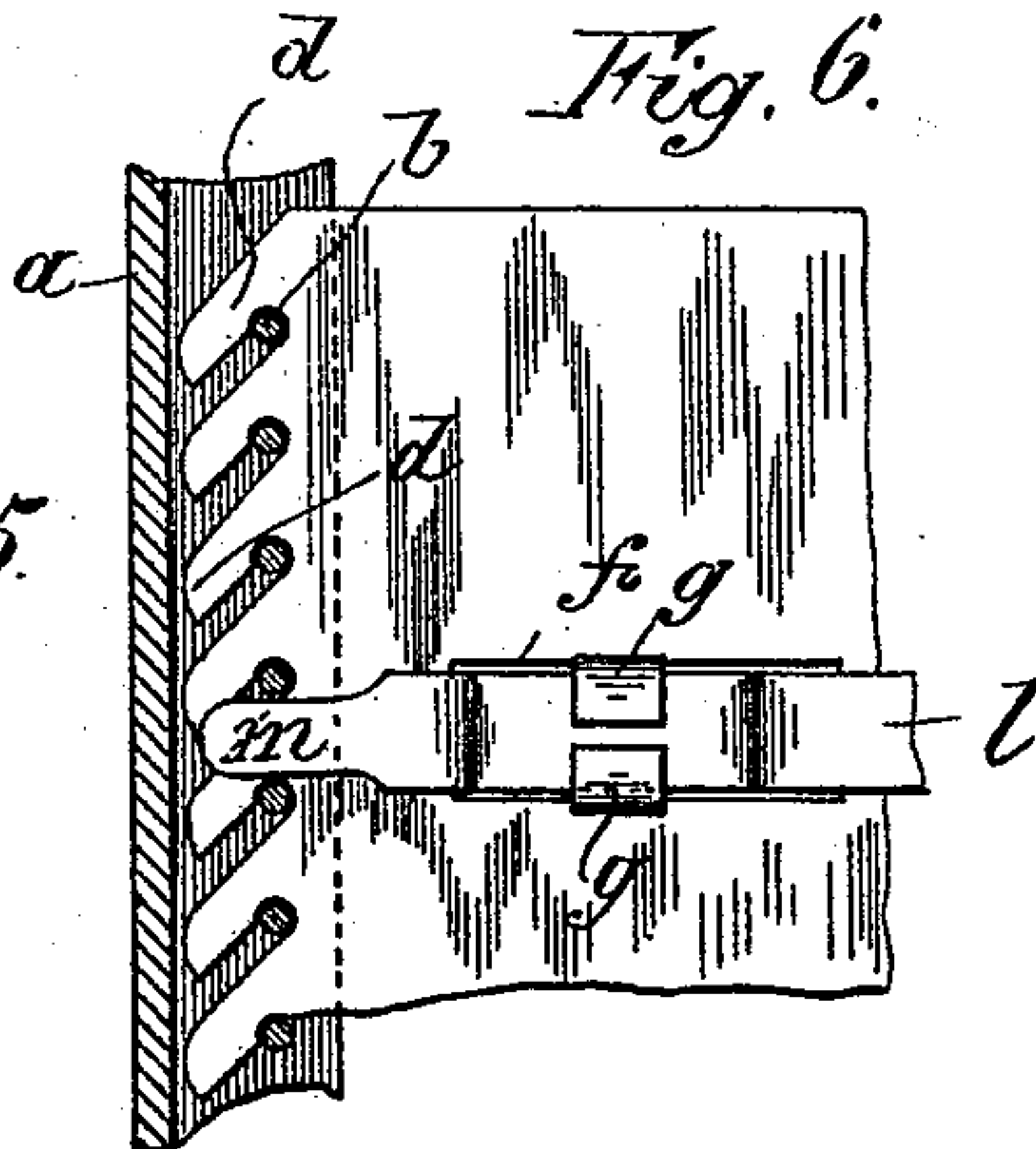


Fig. 6.



Witnesses:

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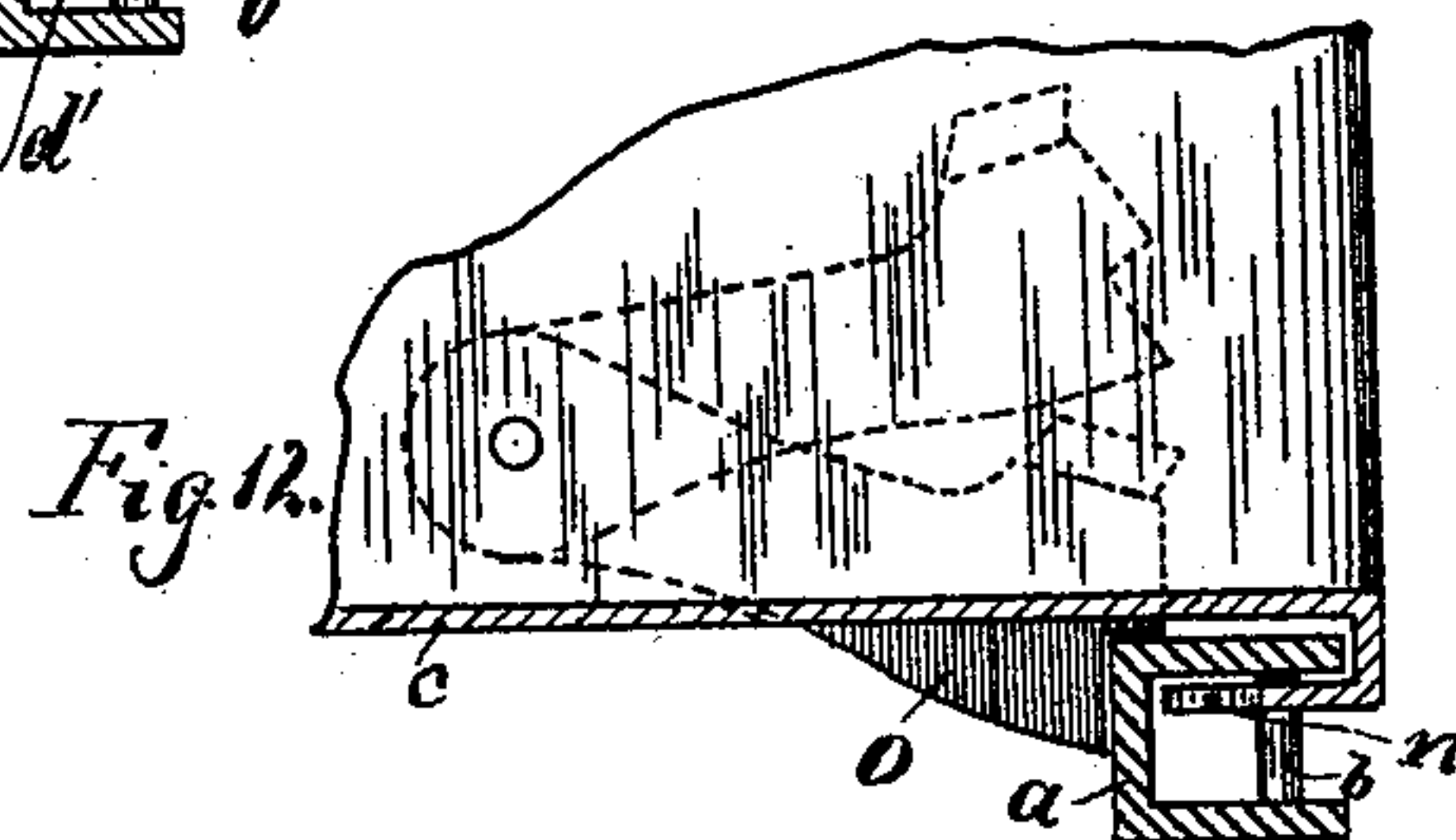
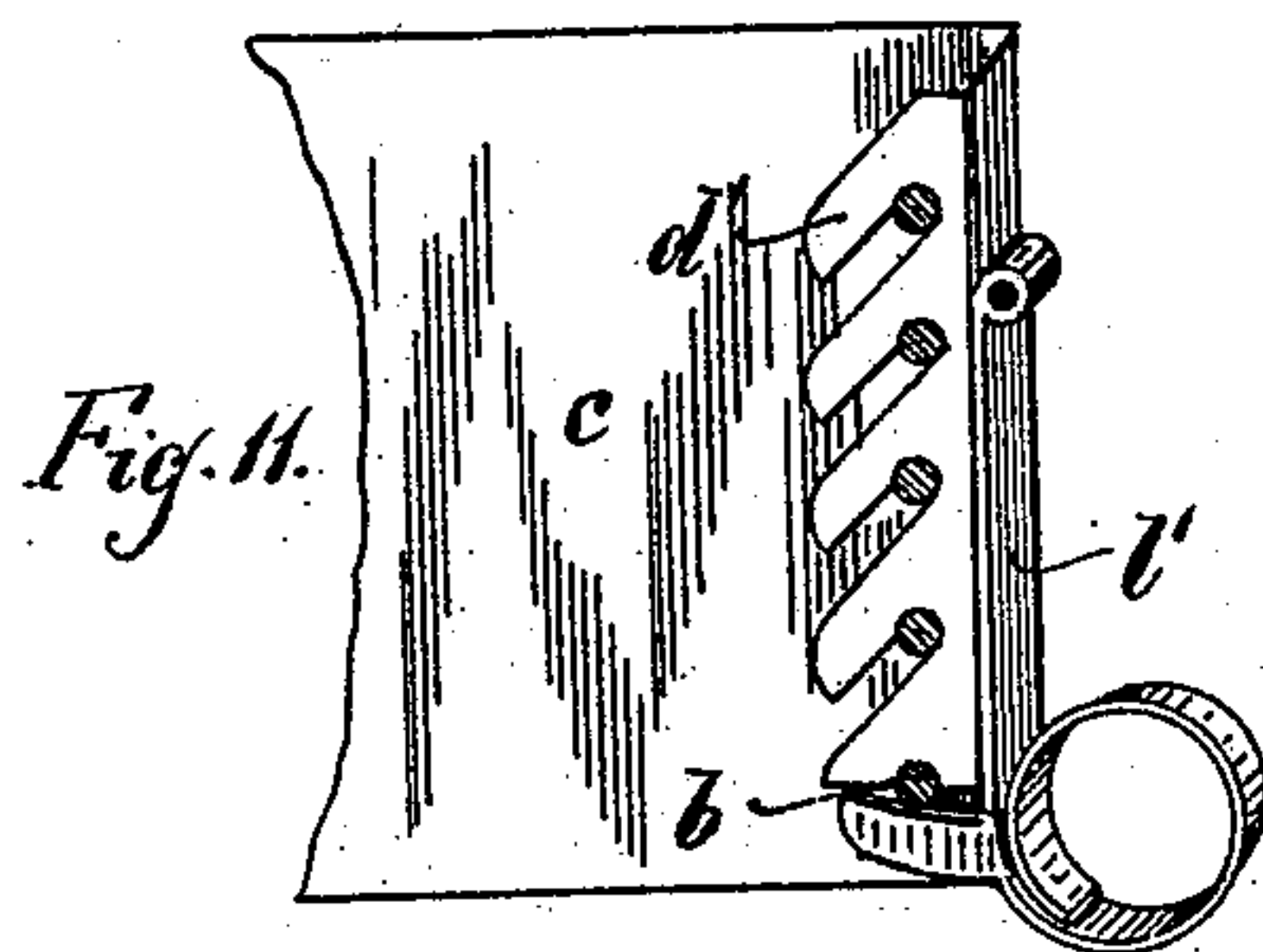
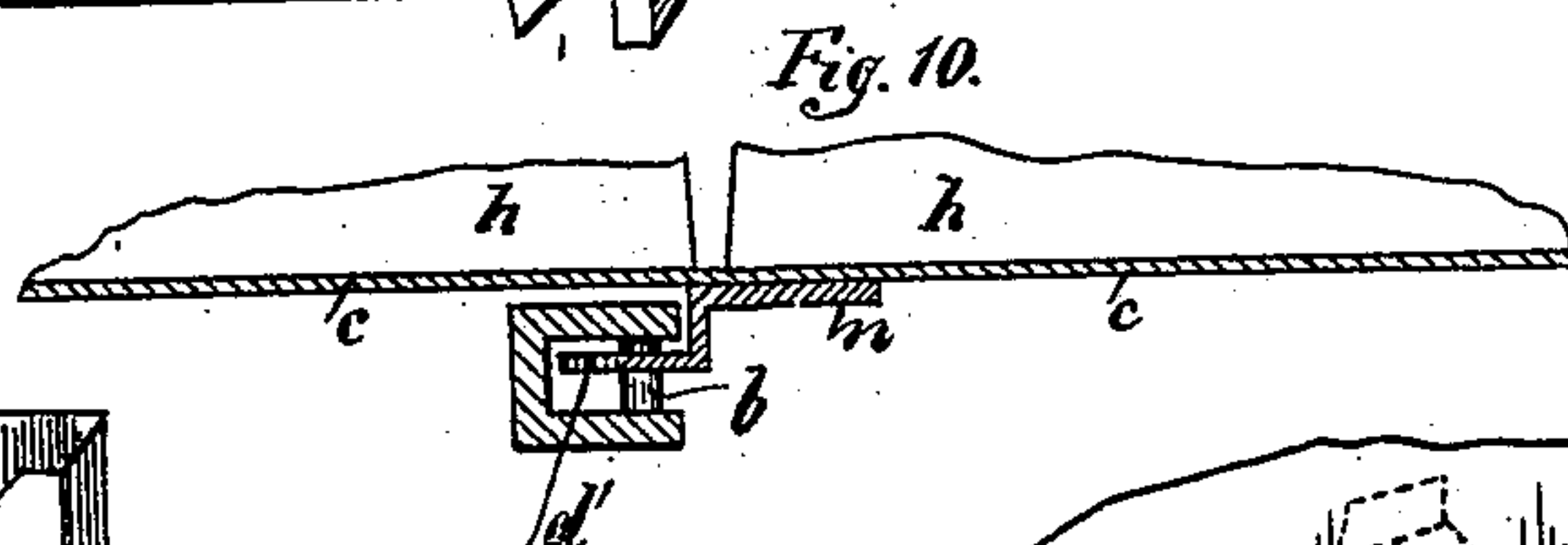
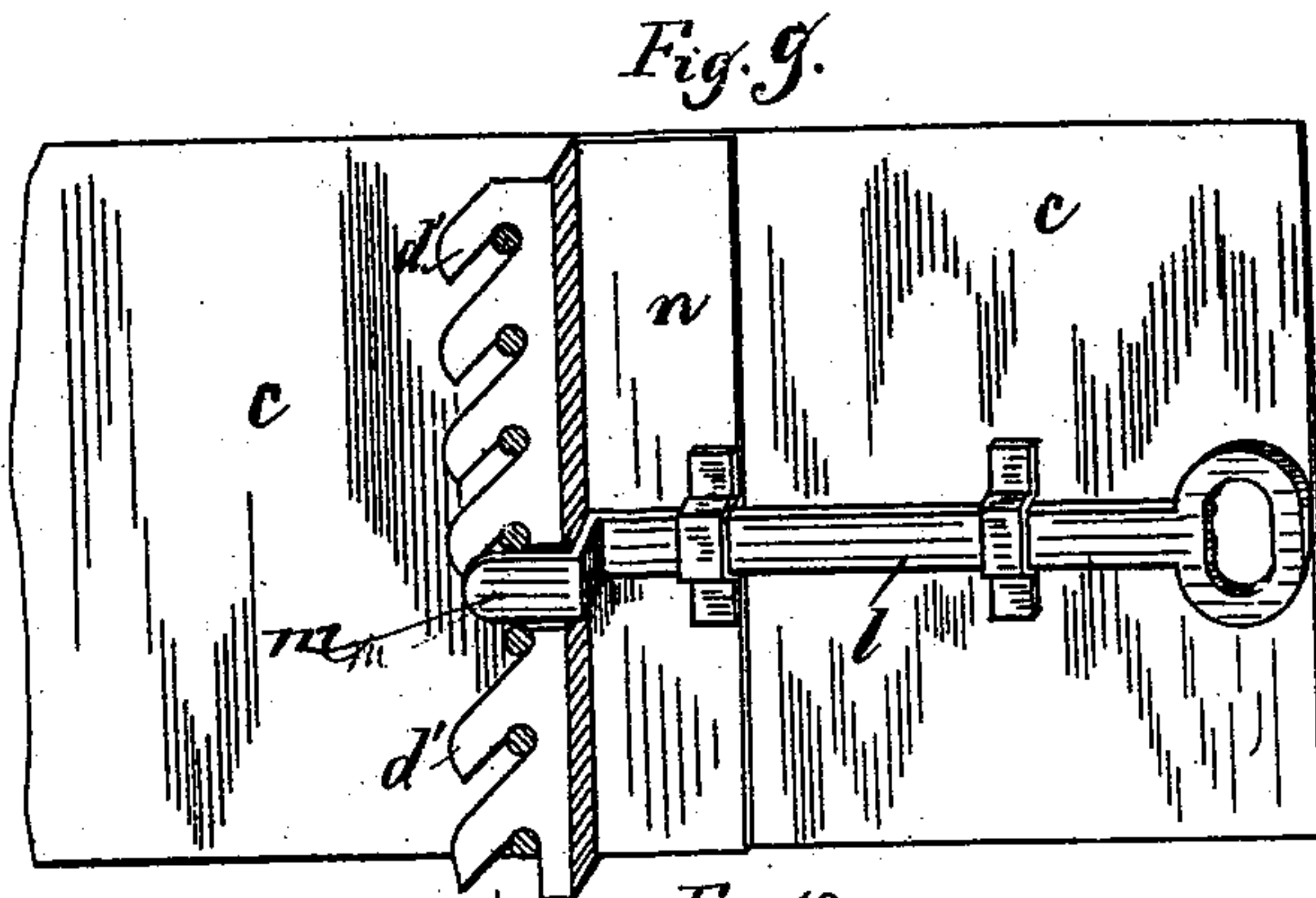
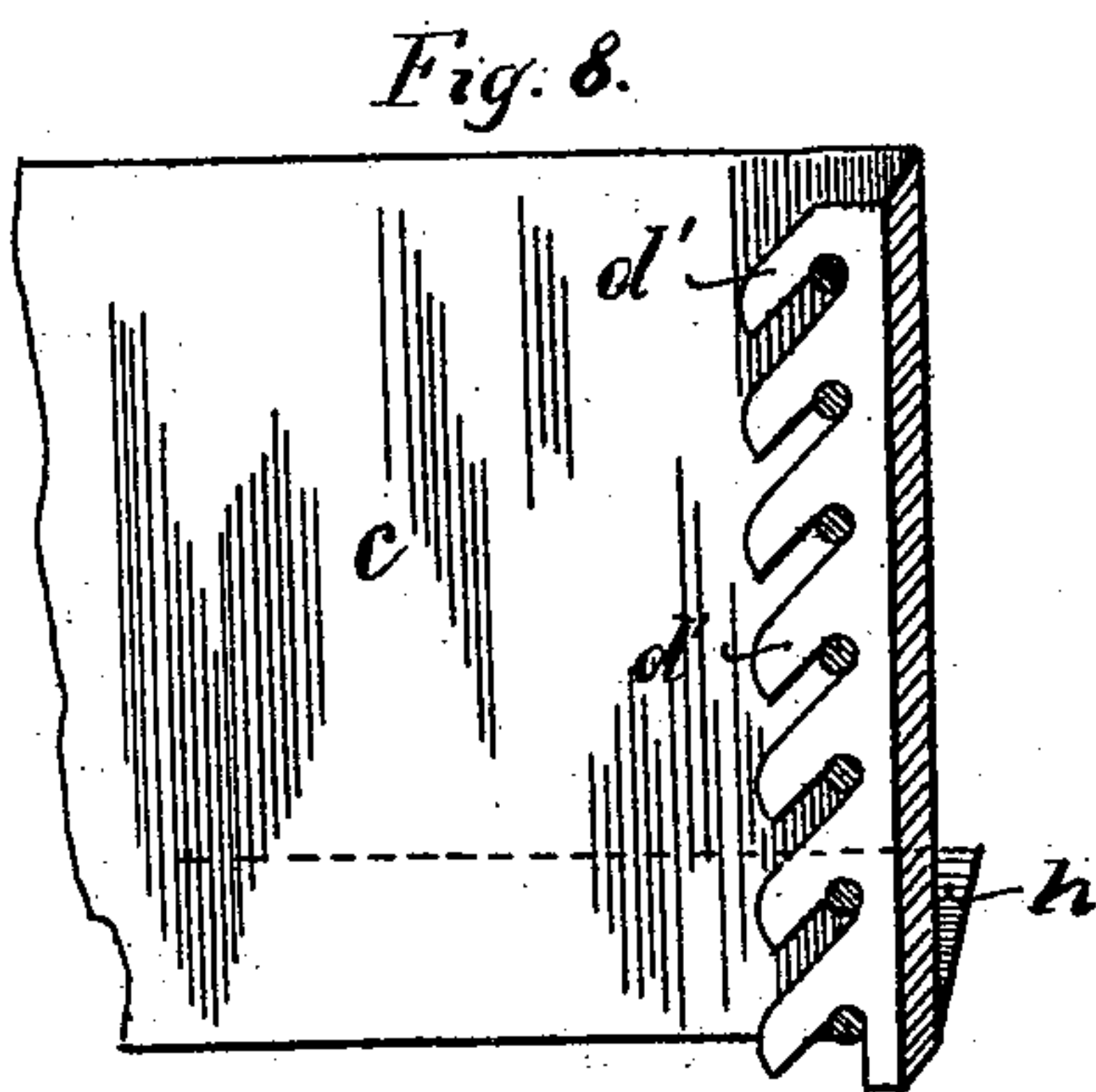
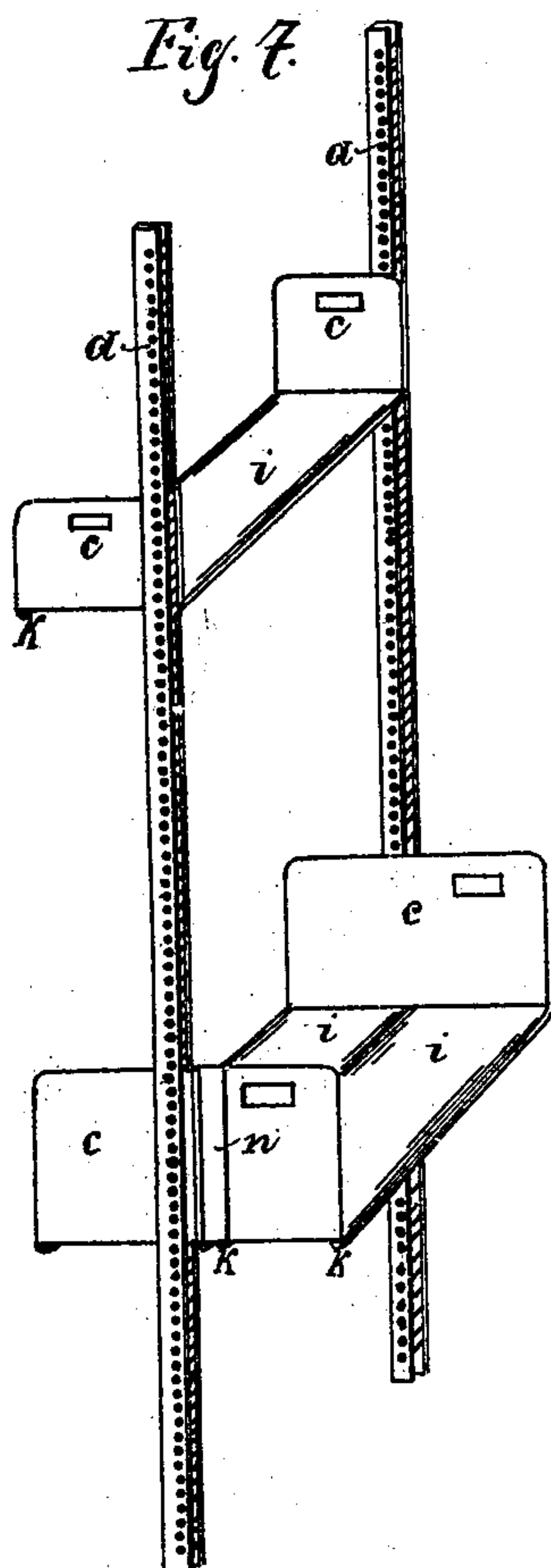
(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

GEORG WENKER, OF MARBURG, GERMANY.

BOOK-SHELF.

SPECIFICATION forming part of Letters Patent No. 517,503, dated April 3, 1894.

Application filed June 24, 1893. Serial No. 478,731. (No model.)

To all whom it may concern:

Be it known that I, GEORG WENKER, doctor of philosophy, a subject of the King of Prussia, residing at Marburg-on-the-Lahn, in the Kingdom of Prussia, Germany, have invented new and useful Improvements in Book-Shelves, of which the following is a specification.

I have provided a book-shelf with adjustable bearing plates which may be mounted quickly in proper supports and rapidly dismounted again.

The book-shelves constructed according to this invention are illustrated in the accompanying drawings.

Figure 1, is a sectional perspective of a portion of one of the step standards and Fig. 1^a is a cross section of the same; Fig. 2 a side elevation of the shelves with a safety bolt. Fig. 3 is a cross section of the safety bolt. Fig. 4 shows the bottom plate having the longitudinal edges rolled up. Fig. 5 represents the total arrangement of a book-shelf constructed according to this invention. Fig. 6 shows the safety device consisting of the bolt *l* applied to the bearing plates. Figs. 7 to 12 illustrate a modified construction of a book-shelf embodying this invention, the step-standards being attached not to the wall but placed in front of the proper frame. Fig. 7 shows the total arrangement of the modified book-shelf; Fig. 8 a side plate for books of smaller size, the teeth being applied to the front side. Fig. 9 represents the arrangement of a side plate for books of larger sizes. Fig. 10 is a horizontal section of the side plate shown in Fig. 9. Fig. 11 represents a particular shape of the safety bolt. Fig. 12 shows the construction of another safety device.

The arrangement of the book-shelf is essentially as follows: The step standards consist of the U-shaped bent sheet-iron *a* and the steps *b*. The latter are riveted into the side walls of the sheet iron *a* at equal distances from each other. These step-standards may be constructed of any desired capacity of bearing strength by strengthening the back, in the case of unilateral book shelves they are secured to the wall at suitable distances from each other, whereupon the proper bearing plates are hooked in between the steps. The bearing plates consist of the side plates,

bottom plates and safety bolts. The side plates *c* are provided on the rear side with a range of teeth which preferably are obtained by stamping. The several teeth *d* are directed downward, the distance of which from middle to middle is corresponding to the distance of the steps *b* of the standard *a*. It is advantageous to round out upward the inner angles of the clearings so that the steps may firmly catch. To carry easily the whole bearing plates the side plates are provided on their upper border with a cutting *e*. The lower border carries an adjoint piece *h* corresponding to the width of the bottom plate and bent inward at a right angle. The bottom plates *i* made also of thin sheet iron have their longitudinal edges bordered or rolled up, whereby they obtain a considerably higher capacity of bearing strength. These rolled borders *k* (Fig. 4) are obtained in such a manner, that the longer edge of sheet iron is first rolled so as to form a collar, which is then pressed into a flat shape. By rolling round one or more times, the capacity of bearing strength of the bottom plate may be regulated at will. By pressing the collar into a flat shape I attain in comparison with the great capacity of bearing-strength a very small loss of space in the perpendicular direction.

The borders *k* are of such a shape that the pieces *h* of the side plates *c* can be inserted between the border and the bottom plate, so that a complete firmly connected bearing plate is obtained which, together with the books arranged thereupon, can easily and readily be displaced or carried away. To prevent any motion of the teeth between the steps and consequently any sliding of the plates, the several side plates *c* are provided with recesses *f* having flaps *g* bent up (see Figs. 2 and 6); the bolt *l* shown in section in Fig. 3 and held by the flaps *g* is movable in the horizontal direction. If this bolt *l* is advanced its front correspondingly large tongue *m* engages between two steps of the standard and constitutes a very firm connection between the bearing plates and step-standards (see Fig. 6). If it be desired to avoid the circumstantial cuttings the bolt may be constructed as a band of sheet metal movable in two guides fixed by rivets (see Fig. 9), a small

space in the width of the book shelf is lost and the branches of the step-standards must be arranged correspondingly at a larger distance from each other.

5 In shelves for books of larger size the side and bottom plates must of course be correspondingly larger. In this case the correspondingly large side plate *e* has advantageously two rectangularly bent pieces *h*, over
10 which also two bottom plates *i* may be pushed. Owing to their four rolled longitudinal edges these bottom plates are of a correspondingly greater capacity of bearing strength so that a sagging of the plates will not take place.
15 This arrangement is applied to the two lower bearing plates of Fig. 5.

If several book-shelves are employed the one near the other, the step-standards on the inner sides are used each time simultaneously
20 for two shelves, so that for each contact face one step-standard becomes superfluous.

In freestanding bilateral shelves either double standards with steps are provided on each side or unilateral step-standards are connected two by two in a suitable manner. In
25 the first case the standard *a* would have an I-shaped cross-section, the inner beam of which must be of the required corresponding capacity of bearing strength.

30 The book-shelves constructed according to this invention offer in many respects very important advantages. First, owing to the simple manner of construction of the several parts the first costs are very low; second, by
35 the small thickness of the bottom- and side-plates much space is saved which is important for large libraries, sales-rooms and the like. As the side and bottom plates correspond to the size of the books, there is no
40 space lost in the width of the shelves; third, the several bearing plates are easily and rapidly adjustable in very low distances (distances of the steps) without taking away the books and in the case of removal, &c., they
45 may be carried easily together with the books; fourth, the total weight of the iron parts is lighter than that of the wooden parts of a wooden shelf having the same size.

The book-shelf with adjustable bearing
50 plates is disposed preferably in the following manner: In store rooms the step-standards are secured at top and bottom to iron cross bars connected with the supporting pillars of the magazine. In smaller libraries the step
55 standards are provided at their lower ends with a rectangularly projecting foot in order to prevent tilting. The several standards are held by means of suitable cross bars at the right distance from each other. In book
60 cases, &c., the step-standards are fastened to the back wall by means of screws.

If there is plenty of space the bottom plate may be substituted by a board fixed by means of screws to the side plates. This arrange-
65 ment may of course be used advantageously also for shop shelvings in store-rooms and the like.

It is advisable to protect, before using the shelves, all the iron-parts of the latter by painting or oxidizing against rust. 70

The construction shown in Figs. 7 to 10 is based on the same principles as the construction above described, with the exception however, that the toothed border is applied to the front edge of the plates for books of
75 smaller size and nearly in the center of the side plates for books of larger size, as illustrated in Fig. 7. In this case the step standards are arranged not behind but before the side plates or in the center of the latter re-
80 spectively. In side plates for books of smaller size the toothed border arranged on the front side (teeth *d'*) is bent twice outward at a right angle, so that it embraces the inner branch of the step-standard as shown in
85 Figs. 7 and 11. In side plates for books of larger size the toothed border *n* is riveted nearly at the center as illustrated in Fig. 9 in elevation and in Fig. 10 in cross section. This arrangement of the step-standards and
90 teeth offers the following essential advantages. The load of the books of smaller sizes is supported entirely, and that of books of larger sizes partially behind the teeth, it has therefore not the tendency to unhook the
95 teeth but forces them still more firmly into the steps. For this reason a special safety bolt is scarcely required. If notwithstanding such a bolt is to be used, I prefer the form of fastening *l'* shown in Fig. 11 as particularly
100 advantageous. Another also very simple safety device is shown in Fig. 12. Below the horizontal piece *h* of the side plate is arranged a pivoted support *o* catching with its nose behind the step-standard, which relieves
105 the strain very considerably. The removal of the several bearing plates for displacing them is much more easily effected, while the said plates are much more rapidly adjusted, as the step standards are nearer in front of
110 the person.

The above described arrangement can be applied without any difficulty to any wooden book-stand in fastening by means of screws the step standards to the front edges of the
115 side boards.

To obtain an adjustment for very small distances it is suitable to reduce the number of steps in the standards to the half or third in taking their distances two or three times as
120 large as the teeth. In this case the bolts catching into the steps (if they are used) must be provided with two or three teeth, so that at each position of the bearing plate, they seize a step. 125

I claim—

1. The combination of the U-formed step standards having horizontal steps at very small distances from each other with the bottom plates or shelves of extremely thin sheet
130 metal having the two longitudinal edges rolled up and pressed into a flat shape, side plates of sheet metal each having a rectangularly bent lower piece and a series of down-

wardly projecting teeth to engage adjustably the steps of the standards and a locking slide to prevent displacement of the teeth and steps, all substantially as described.

5 2. A book shelf consisting of the step standards, the side plates supported therefrom, bent pieces *h* forming continuations of the side plates and a bottom plate *i* having rolled edges removably supported by said pieces *h*,
10 substantially as described.

3. In combination with the standards having the steps *b*, the side plates having a series of downwardly projecting teeth, and a hori-

zontally movable slide arranged in line with the space between two steps whereby it is 15 adapted to close the entrance to one of the recesses between the teeth and thus retain the step within the recess, substantially as described.

In testimony whereof I have signed my 20 name to this specification in the presence of two subscribing witnesses.

GEORG WENKER.

Witnesses:

AUGUST WENKER,

JUL M. WALSTENREHEID.