

910,473.

Patented Jan. 19, 1909.

3 SHEETS—SHEET 1.

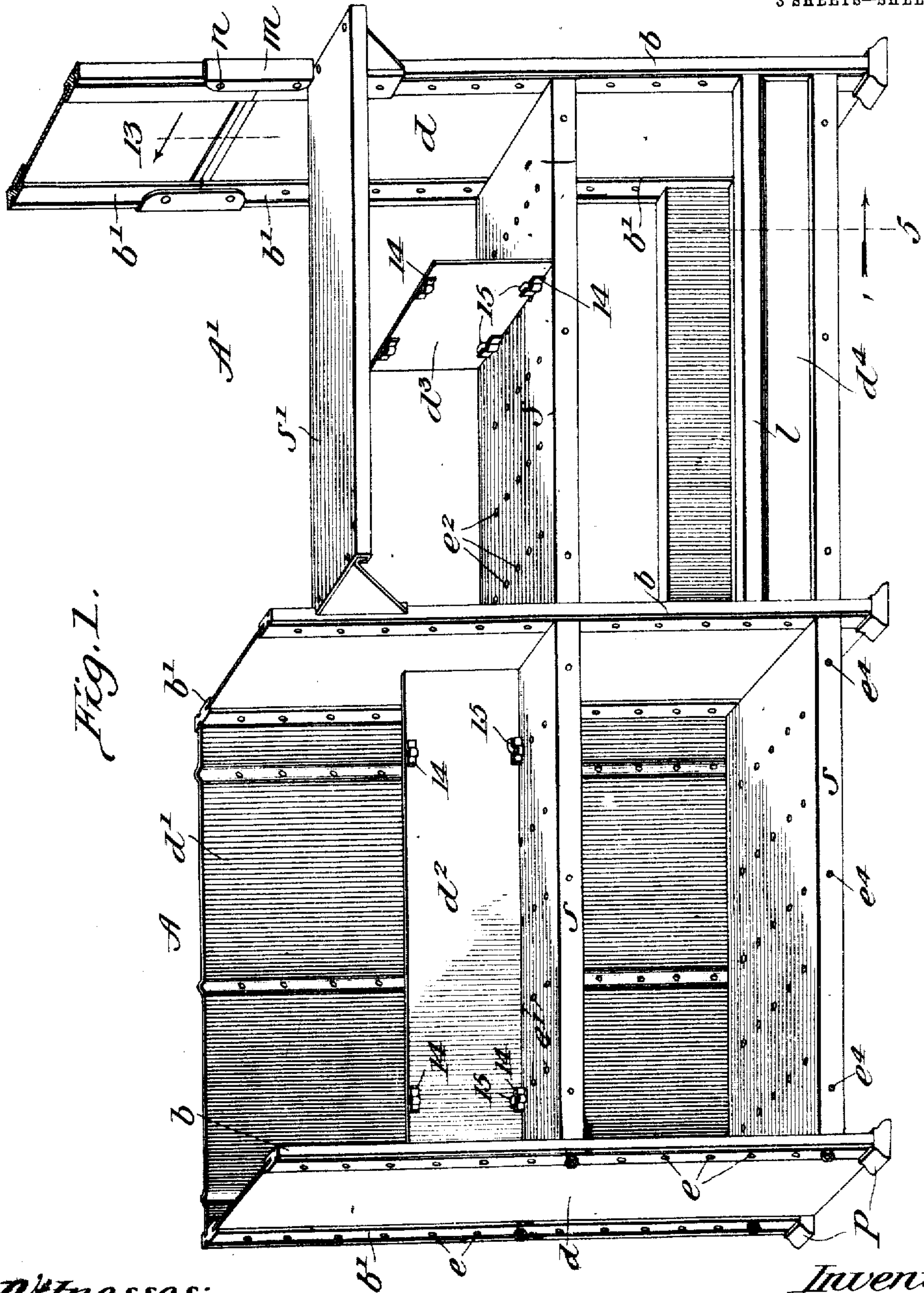


Fig. 1.

Witnesses:
J. R. Lewis.
A. W. Dean

Inventor,
James E. Bales
By Robert Catherwood
His attorney

J. E. BALES.
SHELVING.

APPLICATION FILED MAY 23, 1908.

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3 SHEETS—SHEET 2.

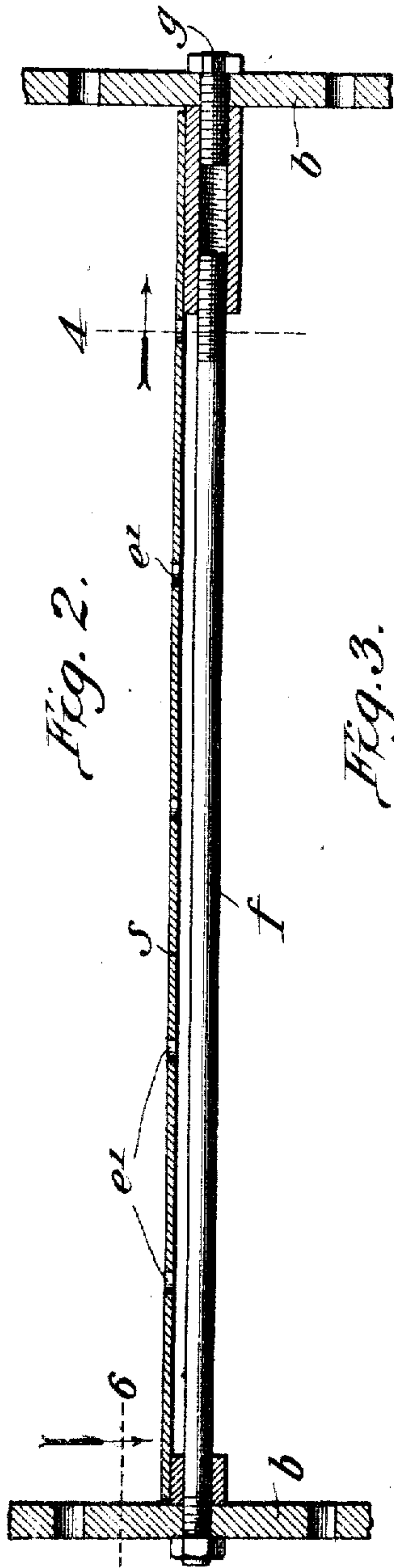


Fig. 2.

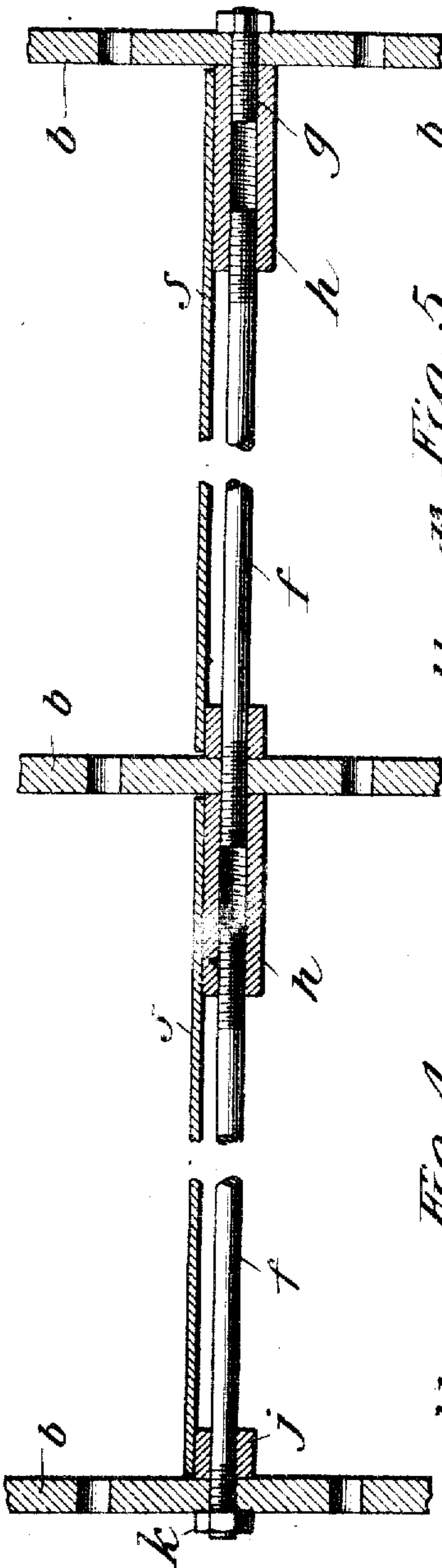


Fig. 3.

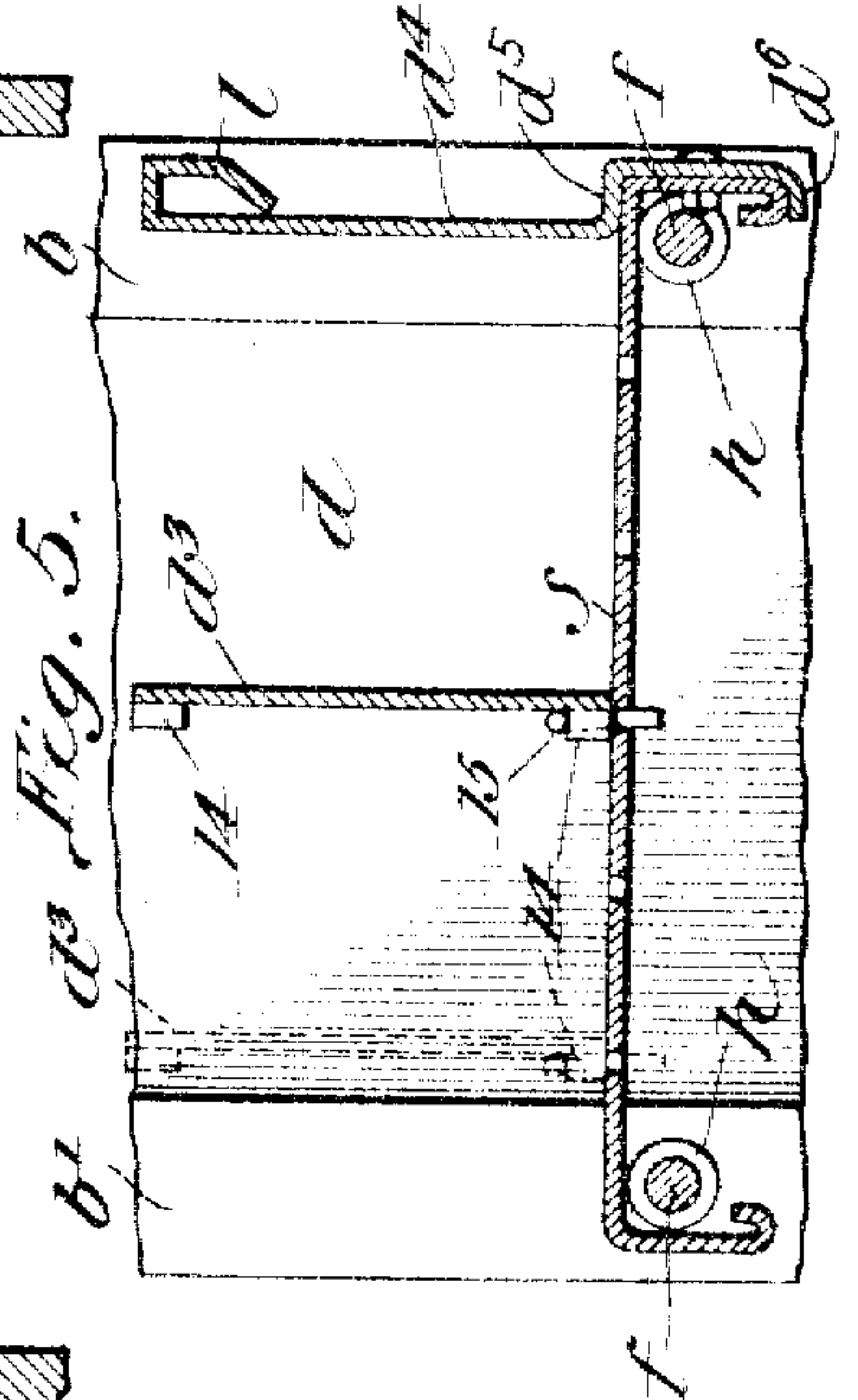


Fig. 4.

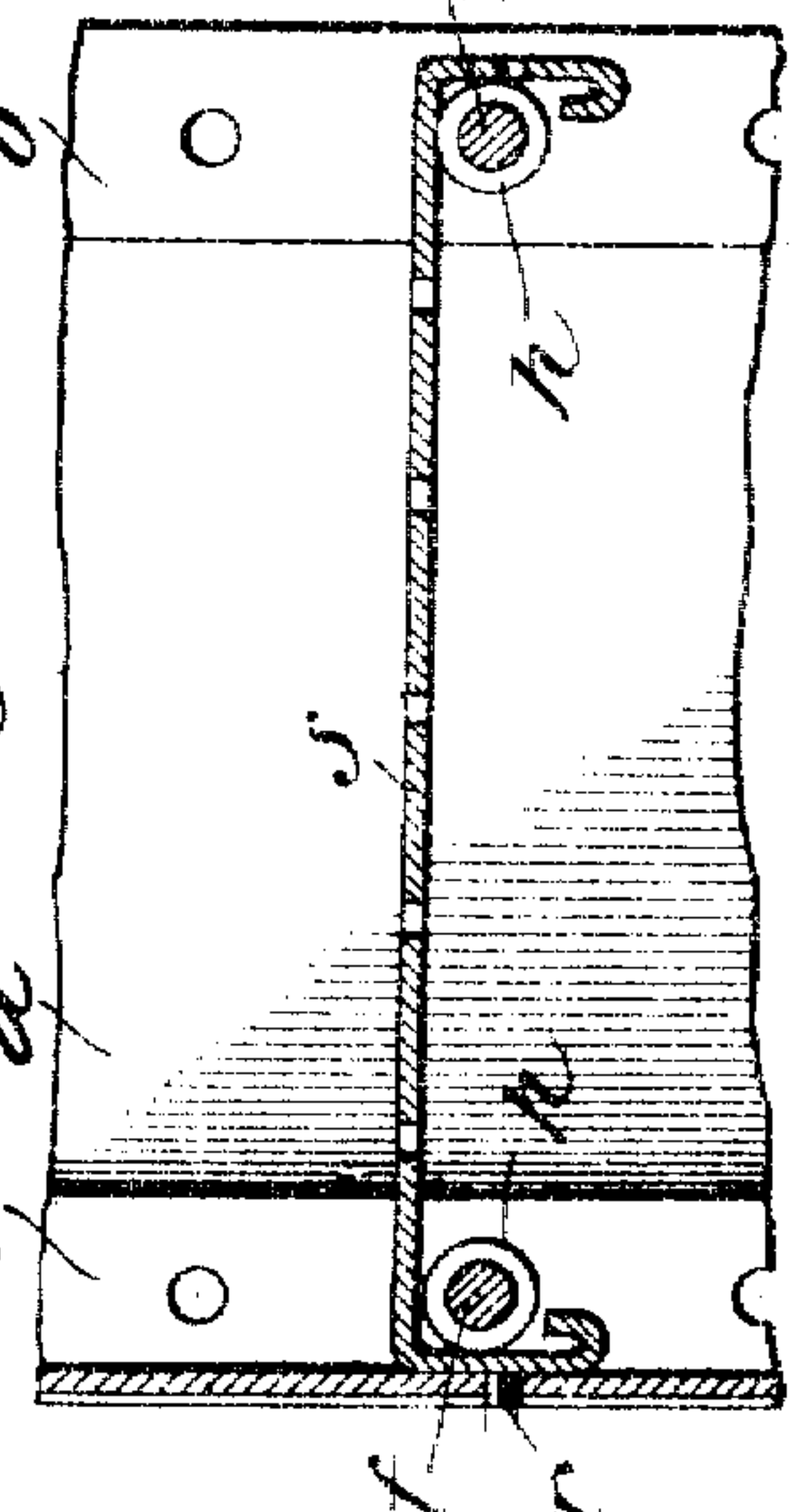


Fig. 5.

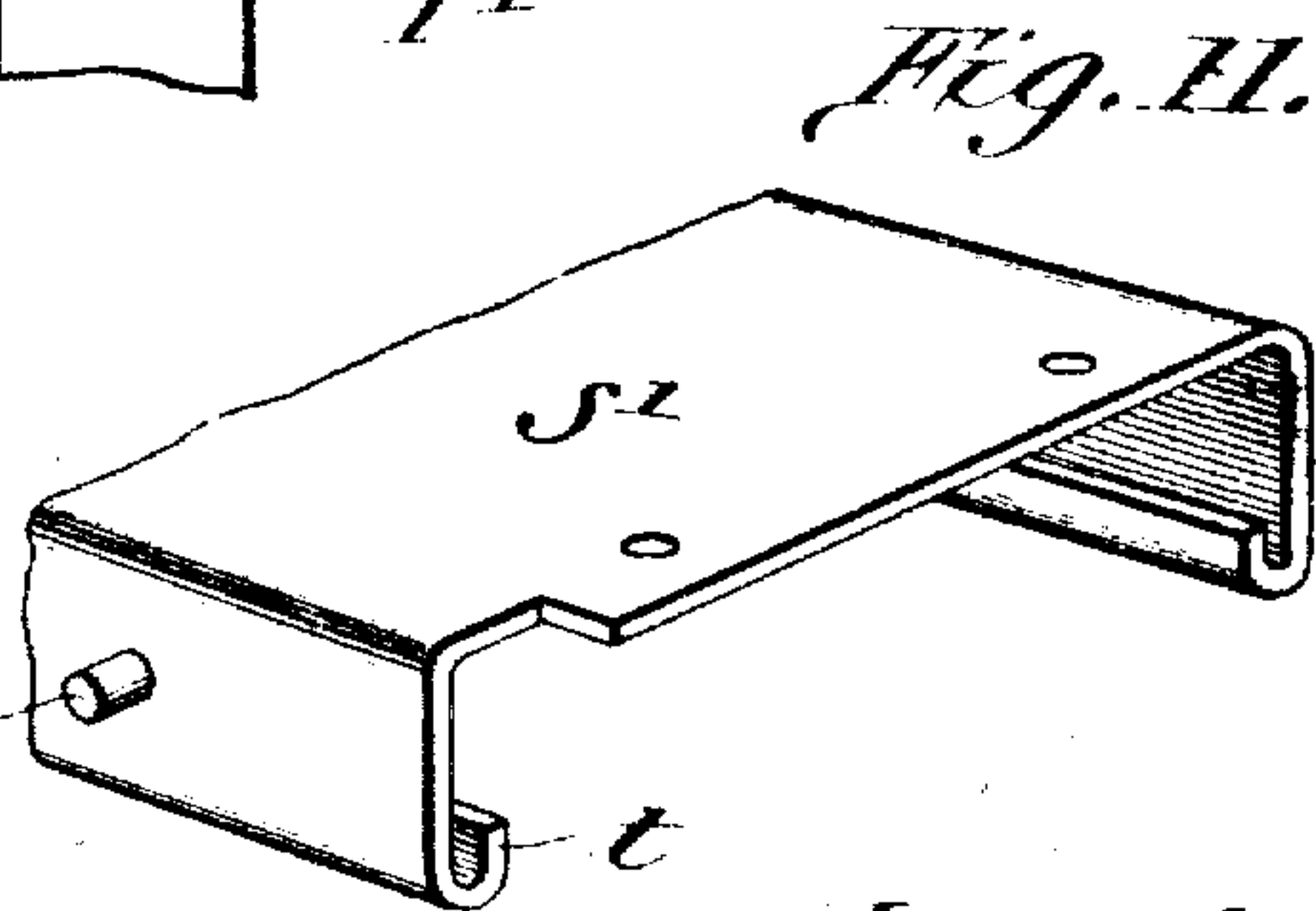
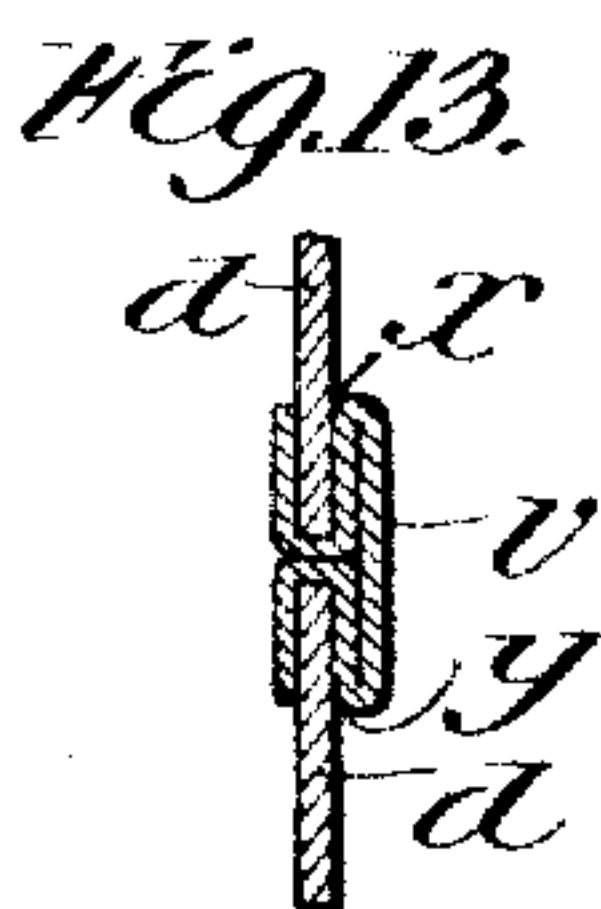
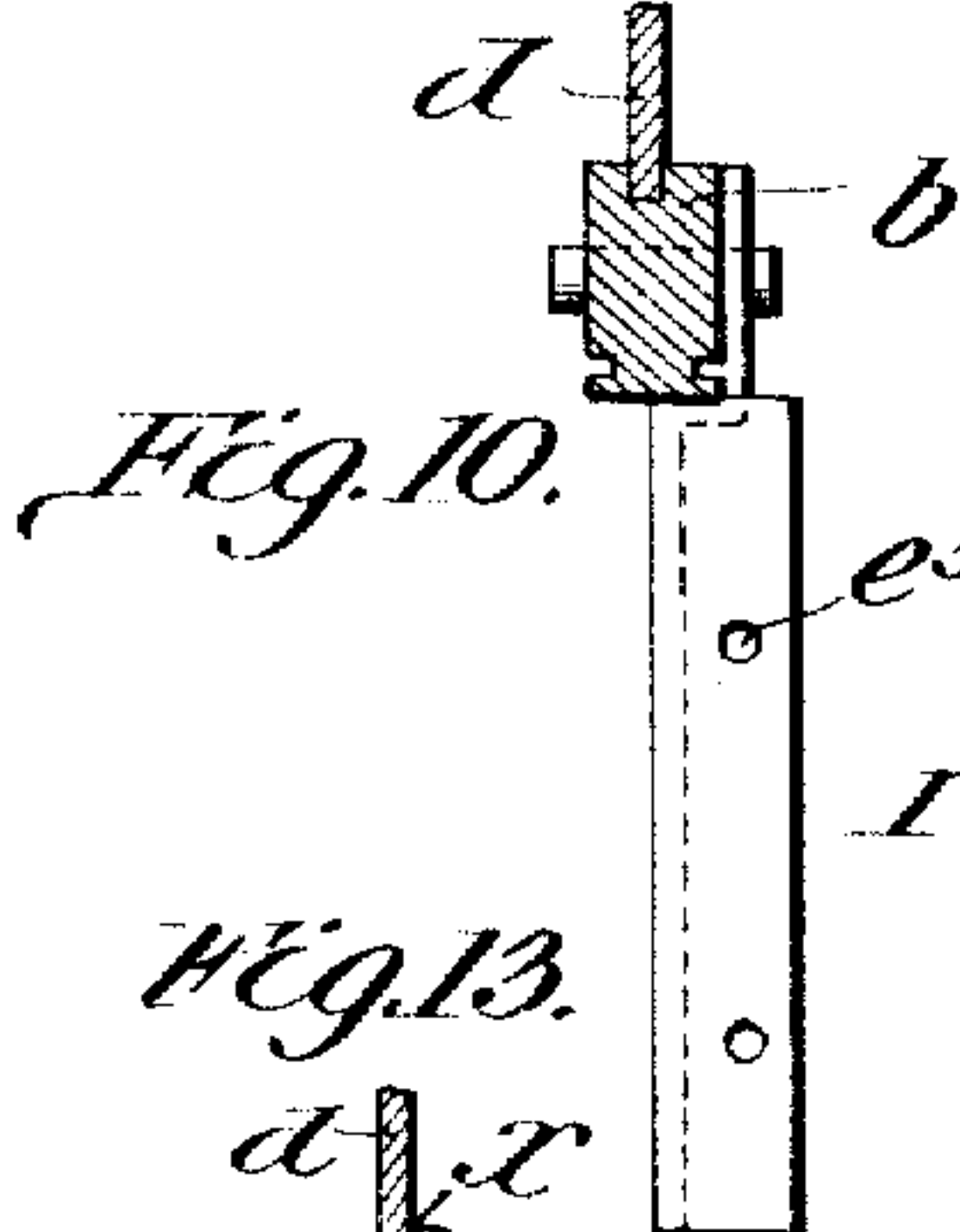
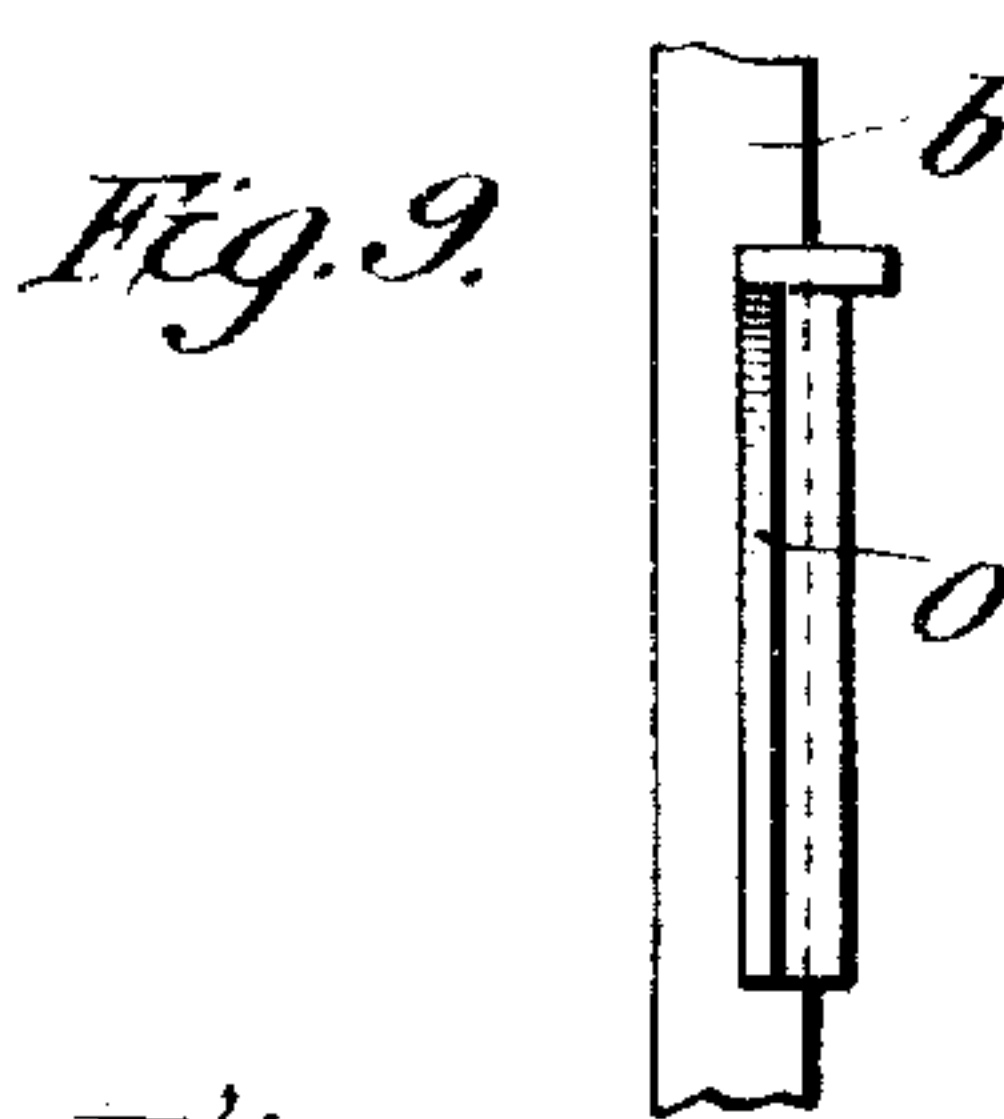
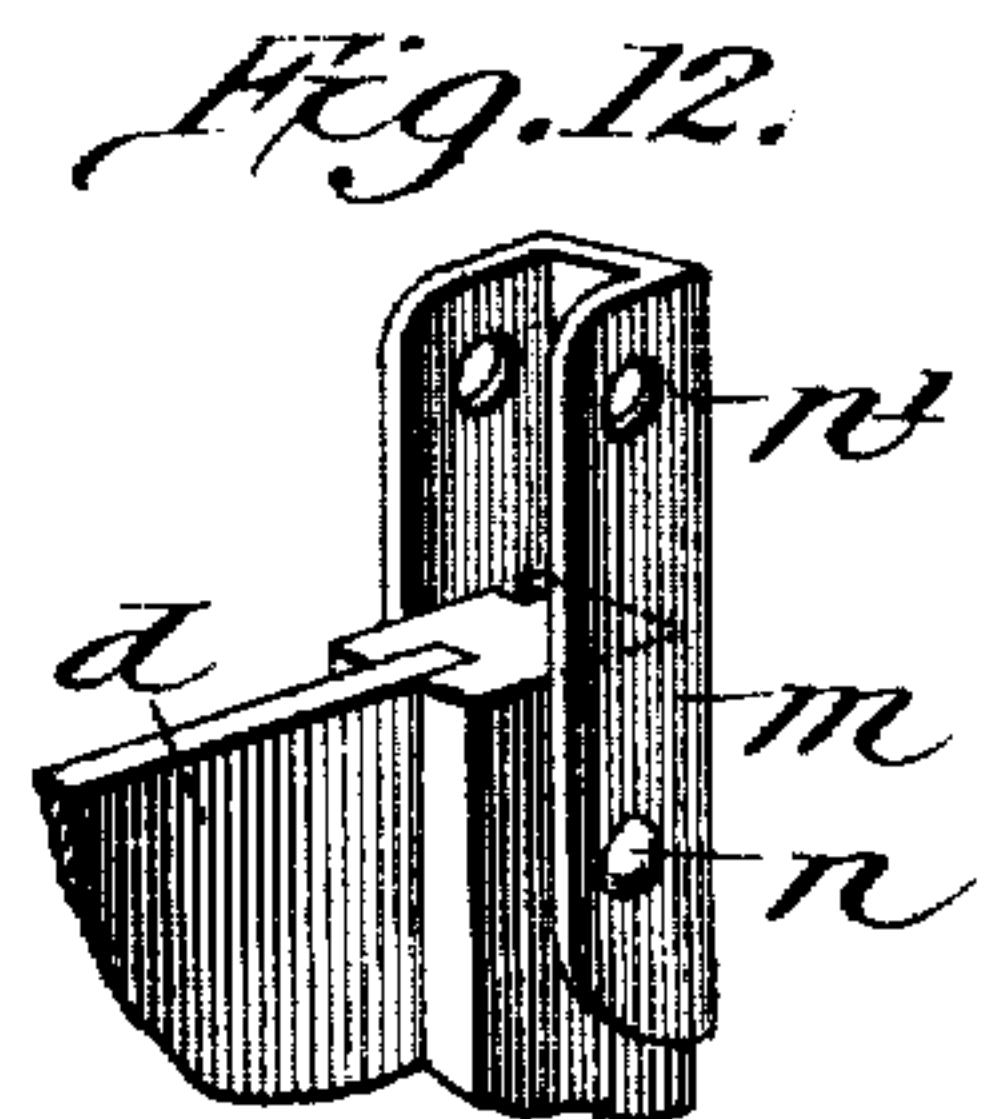
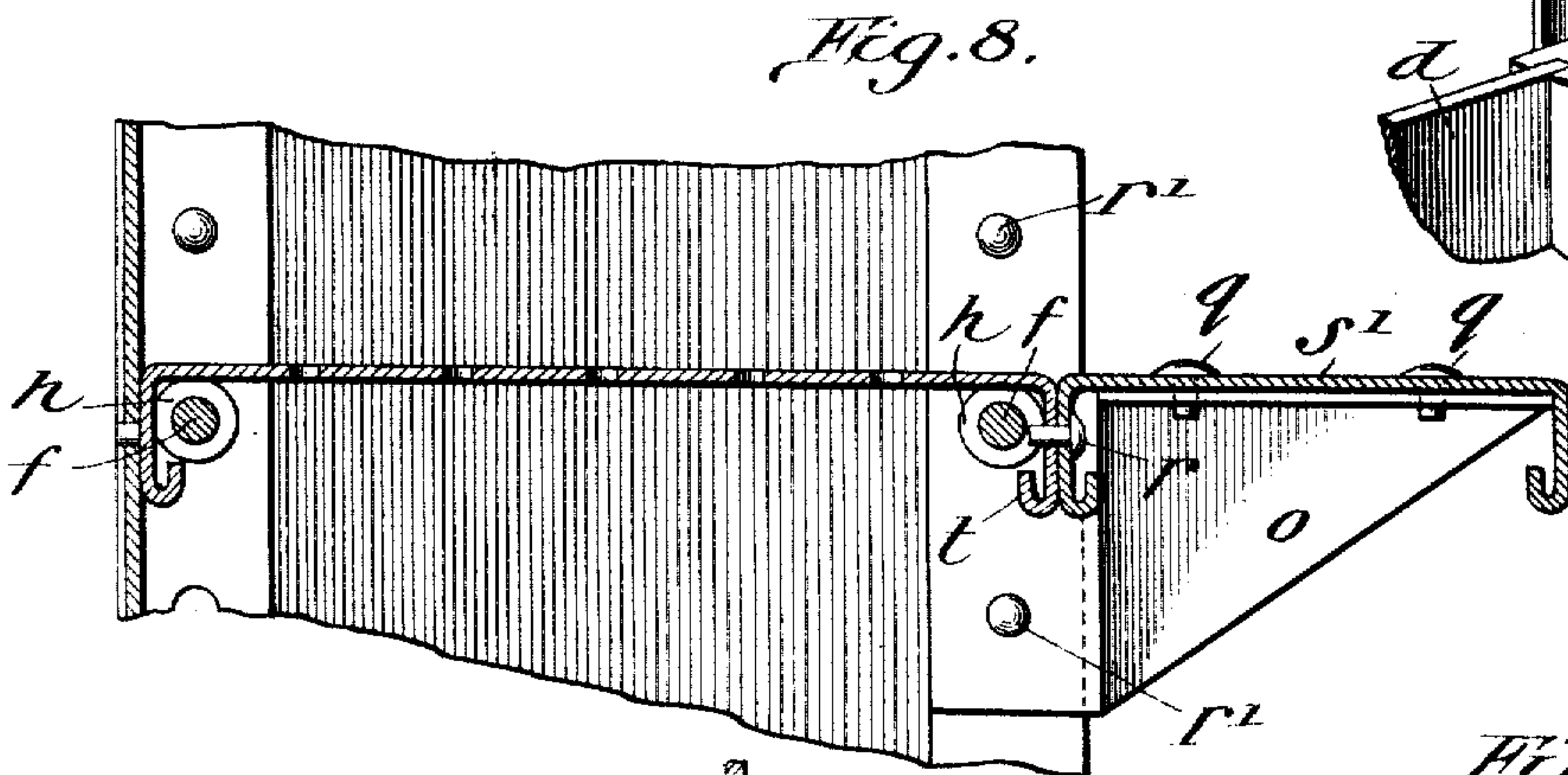
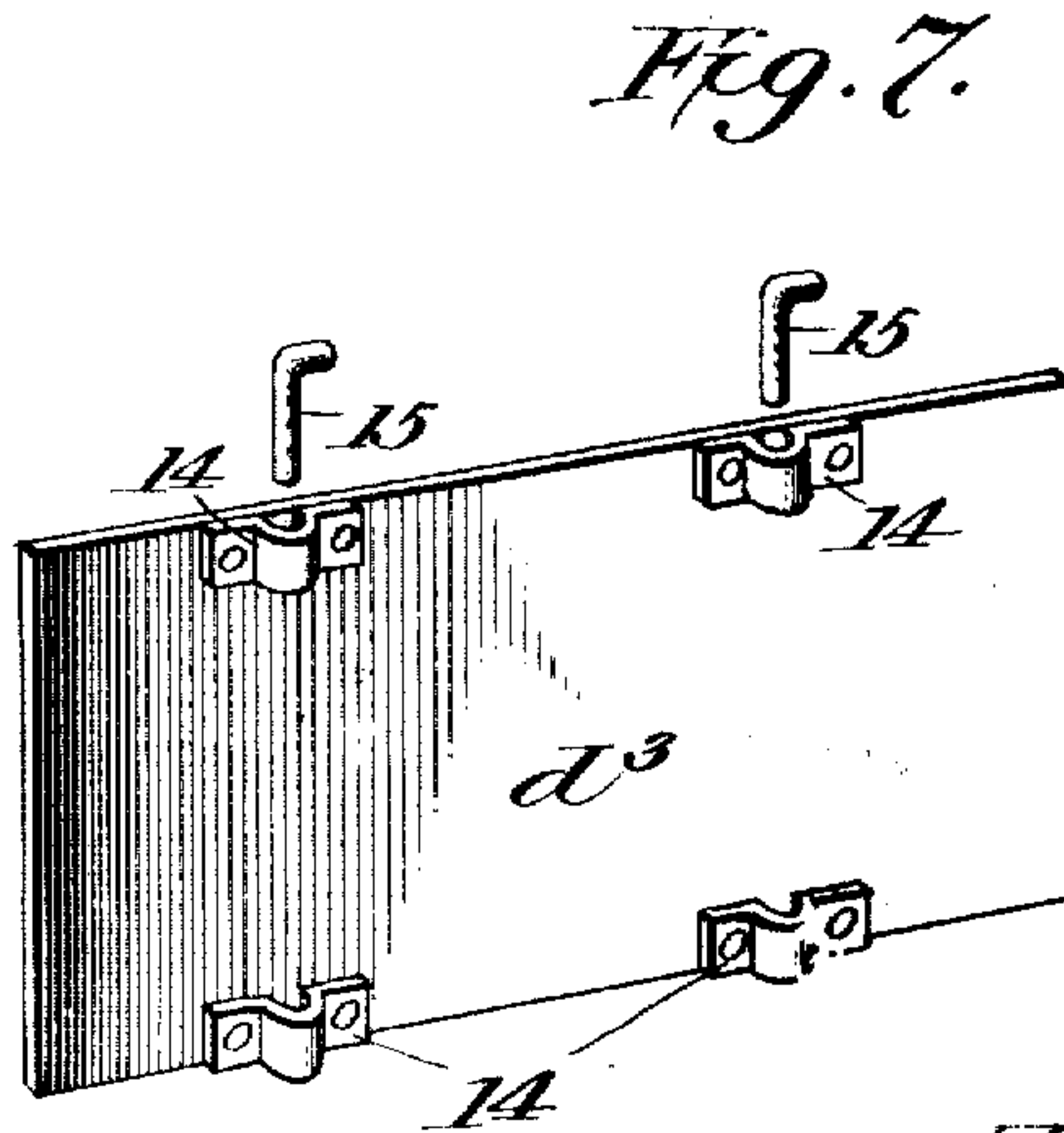
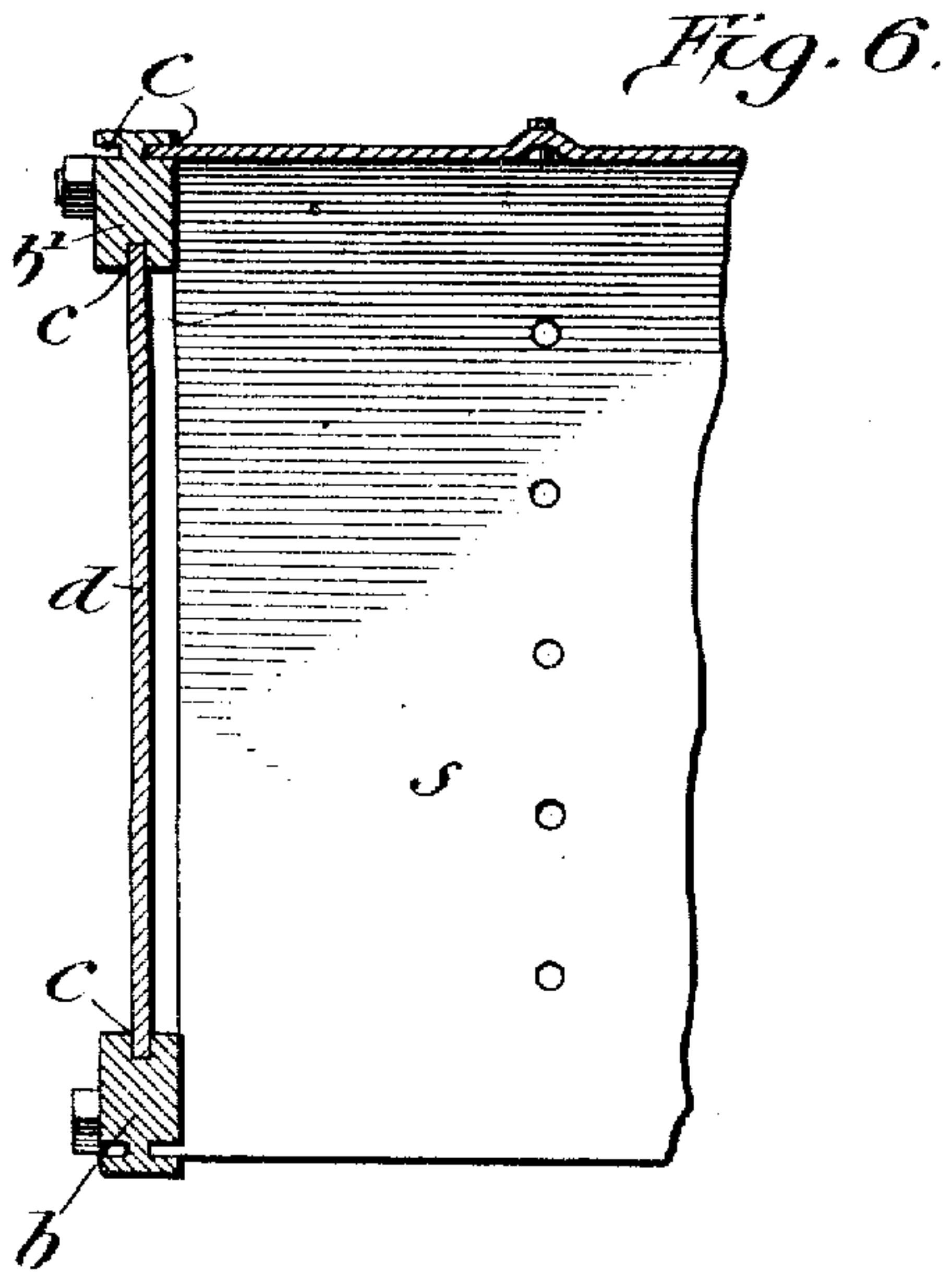
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W. Lewis
H. W. Dean

Inventor,
James E. Bales
By Robert Catherwood
His attorney.

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3 SHEETS—SHEET 3.



Witnesses:
D. L. Lewis
H. W. Dean

Inventor,
James E. Bales
By Robert Catherswood
His attorney

UNITED STATES PATENT OFFICE.

JAMES E. BALES, OF AURORA, ILLINOIS, ASSIGNOR TO LYON METALLIC MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHELVING.

No. 910,473.

Specification of Letters Patent.

Patented Jan. 19, 1909.

Application filed May 23, 1908. Serial No. 484,634.

To all whom it may concern:

Be it known that I, JAMES E. BALES, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Shelving, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to shelving. Its object is to provide a durable, economical device of this character, readily assembled or taken apart, capable of being built up in sections, as single shelves, with or without back, or as double shelving with capacity for indefinite extension or addition of sections upwards and lengthwise for attachment of parts to vary the depth and height of individual shelf spaces for subdivision thereof.

The invention also provides means for extending a shelf to project forward of its side supports for closing the entire structure of any desired portion thereof to form closed or partially closed bins, each bin being adjustable as desired to vary its width, height, and length within the shelf.

Another very important object of the invention is to provide shelving which may be assembled in small spaces, such as vaults, closets or small store rooms; and also to provide shelving which may be added to, section by section, as the storage requirements grow, each section to be complete and tight as the enlargement or lengthening of the shelving progresses, the whole comprising a unitary structure whether the shelving consists of a single section or many sections, end to end. These last two objects will be readily understood by those familiar with the practical work of assembling shelving of this character.

In the ordinary shelving where a single tight rod extends through two or more sections, the space necessary for assembling must be about twice as long as the length of the rod, otherwise the rod can not be slipped into place when withdrawn. This is of vital consideration in vaults, for example, where the space for assembling is necessarily restricted. As a result of my invention my shelving may be readily assembled in vaults, practically no longer than the aggregate length of the shelving which it is to contain, in other words, shelving may be installed to occupy practically the entire length of wall space. Furthermore the construction is a

"universal" one, in the sense that the shelving may be added to indefinitely by merely providing additional members identical in all respects with the ones already erected. And the structure will be unitary at all stages of its erection, section by section, and will be perfectly tight and self-supporting during the addition of the supplemental sections.

In the accompanying drawings I have shown shelving embodying my invention in its preferred form.

Figure 1 is a view in perspective of two assembled sections illustrating my preferred method and means of subdividing, extending, or closing shelving space to adapt the shelving to varied requirements and conditions. Fig. 2 is a sectional view through one of the shelves, and two of its oppositely disposed uprights or corner bars, showing a tight rod, coupling sleeve, shelf leveler and means for detachably securing these parts to the corner bars in position beneath the shelf. Fig. 3 is a sectional view taken through two aligned shelves in different sections and their oppositely disposed corner bars, showing two tight rods, couplings, shelf levelers, and end attachments to the corner bars in removable position beneath the shelves. In the position shown in Figs. 2 and 3 the shelving is not quite tightened up as it would be when in actual use for it is contemplated that the structure will be so tightened as to hold the uprights closely against the ends of the shelves to thereby combine the structure into a unitary whole. Fig. 4 is a cross sectional view on line 4 of Fig. 2. Fig. 5 is a cross sectional view on line 5 of Fig. 1, illustrating a method of attaching and detaching one of the front plates to form a bin or chest in a shelf-space. Fig. 6 is a horizontal sectional view on line 6 of Fig. 2, showing means for removably securing end and back plates between the corner bars. Fig. 7 is a view in perspective of a division plate for subdividing shelf space and means for attaching it removably in position. Fig. 8 is a view similar to Fig. 4, showing the construction of the extension shelves and their supporting brackets. Fig. 9 is a front elevation of one of the uprights or corner bars and the extension shelf supporting bracket. Fig. 10 is a view of an extension shelf supporting bracket and means for removably attaching it to a corner bar. Fig. 11 is a de-

tail perspective of one end of the extension shelf. Fig. 12 is a detail perspective of a connecting plate for extending the shelving vertically. Fig. 13 is a sectional view of the end piece union.

As shown in the drawings, the shelving is built up in one or more sections A A' supported at the corners by pairs of rigid uprights or vertical corner bars *b b'*, preferably provided with removable pedestals or feet *p*. Additional sections may be added above and at either end, as desired, each pair of uprights being constructed, as hereinafter more fully described, to support an end of two longitudinally adjacent sections. Each upright is provided on three edges with grooves *c* extending longitudinally of it, the grooves in each of the rear uprights, or bars *b'* registering with the grooves in longitudinally adjacent uprights or bars *b'* and also with the grooves in the front uprights or bar *b* on the same end of the section. Similarly, the grooves in each of the uprights or bars *b* register with the grooves in the longitudinally adjacent bars *b* and with the groove in the bar *b'* on the same end of the section.

In order to close the ends of the sections between uprights on the same end of a section, I provide end pieces or sectional division plates *d*, each adapted to slip into the grooves *c c* between uprights on the same end of a section, whence it may be readily removed, and, similarly, when it is desired to close either the sides or backs or fronts of sections, I provide the back or side closure pieces *d'*, which may be removably secured to adjacent uprights on opposite ends of a section by slipping into the registering grooves *c* therein.

In order to support the shelving, I provide an adjustment of the shelves to a variety of positions in the section and to adjustably lock the sections together, I provide in each of the uprights *b b'* series of registering openings *e*, the openings in the rear bars *b'* being in registration one with another, and the openings in the front bars having similar inter-registration, the number of openings in the series regulating the variety of shelf adjustments. These openings are adapted to receive the shelf supporting tie-rods *f* and the cap screws *g*. I prefer to construct the tie-rods *f* to extend longitudinally of the sections, threading the ends, and to insert one end in one of the openings *e* while the other is inserted in an interiorly threaded coupling or adjusting sleeve *h*. The other end of the coupling or sleeve *h* is adapted to receive either the threaded end of the adjacent tie-rod *f* or the threaded end of the cap screw *g*, these ends being of the same size with threads and of similar pitch. It will be seen that the use of the threaded couplings or adjustment sleeves and the

threaded cap screws to connect adjacent uprights provides means for drawing the uprights *b b'* together and strengthening and uniting the sections to form a practically unitary and integral structure. Said tie rods support the shelves *s*, and this preferred form of the structure one end of each shelf rests upon the outer surface of the coupling *h*. To level or guide the shelf a collar *j* is fitted loosely over each tie rod, its upper surface being in alignment with the top surface of the coupling *h* on the opposite end of the rod.

As a result of the construction thus far described, two of the advantageous characteristics of my invention will be apparent by considering the manner in which the shelving is assembled. Having reference to Fig. 3 of the drawings, the shelving will, under ordinary circumstances be constructed as follows: First the upright *b* at the right end of the structure will be placed approximately in the position it is finally to occupy. The couplings *h* will then be secured at the proper elevations therein by means of the cap screws *g*. The screws will be tightened so that the couplings will be held firmly and permanently in place. The upright may then be placed against the wall and will not have to be subsequently disturbed. Shelves *s* will then be placed with their right ends resting upon the couplings *h* and immediately thereafter the next upright *b* will be placed close against the opposite ends of the shelves and the tie rods *f* will be slipped through the corresponding aperture and be screwed into the open end of the coupling *h*, care being first taken to have the leveler *j* slipped over said rod so as to support the end of the shelf adjacent to the last mentioned upright. If but a single section of shelving is required the structure will be finished off by screwing a nut *k* on the projecting end of each of the tie rods on the outside or left side of said second upright, said nuts being screwed up tight so as to draw the two partitions to a firm bearing against the ends of the shelves. It is this drawing of the parts tightly together which causes the structure to become a strong and firm whole, and prevents the component members thereof from "working" or "racking" relatively to each other. Under ordinary circumstances, however, the shelving will consist of more than one section, so the nuts *k* will be omitted from the ends of the first set of rods *f*, and in their place will be substituted the next set of coupling members *h*, which in Fig. 3 lie to the left of the second or middle upright. It is obvious that these second couplings are equally efficacious in holding the structure tightly together, as a result of which it will be seen that the first section remains complete and tight, while the second and subsequent sections are being added. The process of erec-

tion or assembling for the second, third, and subsequent sections will follow in a similar manner to the one described in the assembling of the first section. The shelving may be finished at any upright by merely employing a nut k instead of a coupling h . In fact if a short coupling is used, there is no special reason why it cannot be used to finish off the end section instead of a nut, for under such circumstances an additional section may be supplied without the removal or substitution of a single piece of the structure. Thus it will be seen that the shelving is complete at the completion of the erection of each section and yet is ready for the addition of another section which will in turn become an integral portion of the entire structure. In this connection another attribute becomes apparent for it will be seen that the rods are no longer than the shelves and moreover do not have to be passed through the last upright after the latter is in position. This makes it possible to assemble the shelving in a space practically no longer than the space which the shelving is to occupy, which, as above pointed out, is of great importance under conditions frequently found in practice where space is limited.

Where it is desired to bring one or more of the shelves out of alinement with its fellows, its supporting rods, front and rear, may be removed and secured by nuts k and cap screws g and other nuts k and cap screws g used to secure the rods of adjacent sections. The nuts or cap screws may be conveniently used at the ends of sections containing alined shelves.

When it is desired to divide the shelf space longitudinally, so as to give double shelving, the backs d' are removed and the removable separate shelf-backs d^2 inserted. These shelf-backs I prefer to secure to the shelves, located one above the other, by means of eye clips 14, secured at the top and bottom of the backs d^2 , and adapted to receive pins 15, which are dropped into them and which project into openings e' in the shelves s . They are constructed preferably in sets of different sizes to fit the various sizes of shelf space. When a back d^2 is thus secured intermediate of the edges of the shelves between vertically adjacent shelves, it makes the structure a double shelving, affording access to both sides, a construction especially suited to cases set up in the middle of a room. When it is desired to subdivide one or more shelf spaces transversely, divisions or plates d^3 may be inserted, the fastening means being similar to that described for securing d^2 . Plates d^3 are preferably constructed of different sizes, to fit the different sizes of shelf space. Any desired number of openings e' and e^2 may be cut in the shelves for securing the plates d^2 and d^3 in different positions to separately and independently subdivide one

or more shelf spaces, as desired, both longitudinally and transversely.

Where it is desired to close one or both sides (front or rear) of shelf space I provide the plates d^4 , adapted to be secured by screws or other suitable means in the openings e^4 in the edges of the shelves s and by tie-rods f , couplings h inserted in the hollow bead l and secured to uprights b b' by cap screws g or nuts k . It will be seen by referring to Fig. 5 that the plates d^4 are so constructed as to have two horizontal flanges d^5 , d^6 , the flange d^5 resting upon and engaging the upper surface of the shelf and the flange d^6 engaging the lower edge of the shelf. The result is that the plate d^4 reinforces and stiffens the shelves, for it is obvious that with such construction the shelf can not be flexed without also flexing the plate d^4 . Said plates d^4 "fit over", as it were, the edges of the shelves and therefore act as stiffening members in addition to the flanges at the front and rear edges of the shelves themselves. To build up the sections vertically, clips or U-plates m (Fig. 12) may be removably secured on the tops of the uprights b b' by screws n , or other suitable means, and additional uprights similar to b b' placed end to end on the top of the first mentioned uprights b b' and embraced by the U-plates m to which they are secured by screws n' , or other suitable means. The end pieces are interlocked by horizontal bars v provided with the longitudinal grooves x on the top and similar grooves y on the bottom; they extend between uprights b and b' on the same end of each section. Each of these bars is interposed between vertically adjacent end piece d d' and the bottom of the upper and the top of the lower end piece slipped into the grooves x and y , respectively, to interlock the two.

To extend a shelf to project forward of its side supports, I provide the extension shelves s' secured at the ends to the brackets o by means of rivets or other suitable fastenings q , and by the projections r , which register with, and are adapted to be inserted in the openings e^4 . The brackets o are secured to the uprights b and b' in the openings by means of screws or other suitable fastenings r' .

I prefer to construct my shelving of metal, and for greater strength to turn down and bend back the edges of the shelves s s' , as shown in Figs. 8 and 11, to provide a fold or bend t . The shelving may be built up as single shelving, with or without the removable backs d , or it may be built up as double shelving by removing the backs d' and inserting, between each vertically adjacent shelf, the backs d^2 . It may be extended longitudinally by adding new sections and securing them by means of the tie-rods f and coupling sleeves h , with cap screws and rod nuts on the ends, and it may be

extended vertically by securing to the top of each of the uprights *b b'* the U-plates or clips *m* and fastening the bottoms of other similar uprights end to end thereon. The shelves may be adjusted to vary the height of individual shelf spaces by separately removing the front and rear rods *f* supporting a given shelf and inserting them at the desired position in any of the oppositely disposed registering holes *e*, slipping on the collars *j*, attaching the sleeves *h* and the nuts *k* and cap screws *g* at the ends of the tie-rods, as above described. The depth of individual shelf spaces may be varied by moving the backs *d'* from one to another of the openings *e'* and inserting the pins 15 in clips 14 to secure said backs. The shelf space may be subdivided transversely, as desired, by inserting the side pieces *d''* in any desired series of openings *e''*. The shelves may be extended to project beyond their side supports by fastening the extension shelves *s'* upon the brackets *o* and securing the latter with the pins *r* and pins *q* in the openings *e'* and *e''*. Any shelf space may be closed to form a bin or chest by securing the plates *d'* in the openings *e'* and inserting the rod connections *f*, *h*, *j* with *g* or *k* at the ends inserted in the openings *e*. It will be understood that many modifications both in construction and arrangement of my shelving will suggest themselves to those skilled in the art, and I do not wish to be understood as limiting myself to the means shown and described, but—

What I claim is:

1. In shelving, front and rear uprights, corresponding openings arranged thereon, tie-rods, those on the same side of said shelving being similarly threaded at the ends, interiorly threaded cylindrical couplings located between adjacent uprights and adapted to unite the adjacent ends of the rods within the same section and the adjacent ends of the rods within the adjacent section projecting through one of said openings, and means for interlocking the tie-rods and end uprights to form a unitary structure.

2. In shelving, front and rear uprights, other front and rear uprights arranged above said first mentioned uprights and adapted to extend said structure vertically, grooves on the adjacent edges of uprights on the same end of said shelving, upper and lower end pieces adapted to fit therein to close the opening between uprights on the same end of said shelving, horizontal bars interposed between adjacent upper and lower end pieces having upper and lower grooves therein, the former adapted to embrace the bottoms of said top end pieces and the latter to embrace the tops of said lower end pieces, for the purposes described.

3. In shelving, uprights forming supports for sections or series of shelves arranged one

above another, corresponding aligned openings in each upright, tie-rods, one end of each being adapted to be slipped through one of said openings, extending endwise of said sections and united to adjacent uprights on the same side of said sections, means for interlocking said tie-rods and the end uprights, cylindrical couplings interiorly threaded to engage threads on the ends of said tie-rods, the tie-rods in each section being slipped through one of said openings and locked within the adjacent section to the coupling therein, whereby successive series of shelves may be built up in sections longitudinally and locked to form a unitary case or structure.

4. In shelving comprising sections formed by uprights arranged in pairs at the ends of each section, removable end pieces, shelves and removable backs for each separate shelf space, means for adjustably interlocking said sections and supporting said shelves at different heights, and means for adjusting said removable backs to different positions to vary the depth of each shelf space independently, whereby said shelving may be built up in sections, united as a unitary structure, as double or single shelving with shelf space of uniform or different depth and height, substantially as described,

5. In shelving adapted to be built up in sections, uprights arranged in pairs to form the corners of sections, shelves adapted to fit one above another between pairs of uprights, means for supporting said shelves at different heights and for interlocking longitudinally adjacent uprights in a connected series, means for securing the tops of uprights on lower sections to the bottoms of uprights on the sections above, backs for each of said sections, means for removably securing them thereto, longitudinally divisional backs for spaces between vertically adjacent shelves, means for securing them thereto and means for interlocking registering divisional backs in vertically adjacent shelf spaces, whereby the shelf space may be varied in height, depth and width.

6. In shelving adapted to be built up in sections, uprights grooved longitudinally on the front and sides arranged to form the corner supports of the sections, end and side pieces adapted to fit in said grooves between adjacent sections, to form the walls thereof, shelves adapted to fit therein, means for supporting said shelves at different heights and for interlocking longitudinally adjacent sections, cross division plates, means for securing them to said shelves at different points thereon to subdivide the space between vertically adjacent shelves.

7. In shelving adapted to be built up in sections, shelves arranged in tiers, removable uprights adapted to support said shelves, removable extension shelf-brackets, means

for securing them to said uprights and extension shelves supported by said brackets whereby the shelf surface of one or more of said shelves may be laterally extended, for the purposes described.

8. In shelving adapted to be built up in sections, uprights, means for removably securing them end to end to form the corners of vertically adjacent sections, end pieces, means for removably securing them, each between uprights on the same end of each section, and horizontal bars provided with longitudinal top and bottom grooves, said bars being interposed between vertically adjacent end pieces and embracing the tops and bottoms thereof in said grooves, whereby said end pieces are removably interlocked, for the purposes described.

9. In shelving, an upright, a coupling, means for holding said coupling tight against the inside of said upright, a shelf above said coupling adapted to abut the upright on the same side as the coupling, a second upright parallel to the first and located on the same side thereof as the shelf, a tie rod engaging said coupling, and means engaging said tie rod for forcing said second uprights against the remaining end of the shelf.

10. In shelving, an upright, a coupling, means for holding said coupling member tight against the inside of said upright, a shelf above said coupling adapted to abut the upright on the same side as the coupling, a second upright parallel to the first and located on the same side thereof as the shelf, a tie rod engaging said coupling and an interiorly threaded member on the outside of said second upright screwing upon said tie rod for holding said upright tight against the end of said shelf.

11. In shelving, an upright, an interiorly threaded cylindrical coupling, screw means for holding said coupling tight against the inside of said upright, a shelf above said coupling adapted to abut the upright on the same side as the coupling, a second upright parallel to the first and located on the same side thereof as the shelf, a tie rod engaging said coupling, and means screwing on said tie rod for forcing said second upright against the remaining end of the shelf.

12. In sectional shelving, having one shelf length to a section, the combination of an upright, a coupling, means for rigidly holding said coupling in contact with the inside of said upright, a second upright at the opposite end of the section, a shelf extending between said uprights, a tie rod adapted to make screw connection with said coupling, and a second coupling adapted to force said second upright against the end of the shelf to hold the latter firmly between said uprights whereby one section of shelving is held tight while the next section is being erected, said second coupling being adapted

to make screw connection with the rod of the next succeeding section in a manner similar to the first.

13. In sectional shelving, the combination of an upright, a coupling, means for rigidly holding said coupling in contact with the inside of said upright, a second upright at the opposite end of the section having an aperture therein, a shelf extending between said uprights, a tie rod adapted to slip through the aperture in said second upright and make screw connection with said coupling, and a second coupling making screw connection with said tie rod and adapted to force said second upright against the shelf to hold the latter between the end and second uprights, whereby the first section of the shelving is held tight while the second section is being erected, said second coupling being adapted to make screw connection with a tie rod of the next succeeding section of shelving in a manner similar to the first.

14. In shelving, the combination of two uprights, a shelf located between them and extending from one to the other, a coupling located between said partitions and means including a tie rod one end of which engages the coupling and the other end penetrates one of the partitions for drawing said partitions toward said coupling to bear against the ends of the shelf, said coupling being adapted to screw against one of said uprights whereby said coupling may be rigidly held during erection.

15. In shelving, the combination of two uprights, a shelf located between them and extending from one to the other, a coupling located between said partitions and means including a tie rod one end of which engages the coupling and the other end penetrates one of the partitions for drawing said partitions toward said coupling to bear against the ends of the shelves, said coupling lying wholly between the partitions, said coupling being adapted to screw against one of said uprights whereby said coupling may be rigidly held during erection.

16. In shelving, the combination of two uprights, a shelf located between them and extending from one to the other, a coupling located between said partitions and means including a tie rod, one end of which engages the coupling and the other end penetrates one of the partitions for drawing said partitions toward said coupling consisting of an interiorly threaded sleeve into which said tie rod screws, said coupling being adapted to screw against one of said uprights whereby said coupling may be rigidly held during erection.

17. In shelving, the combination of two uprights, a shelf located between them extending from one to the other, a tie rod threaded at both ends and at one end extending through one of said partitions, a nut

screwing onto said rod outside of said partition for drawing the partition tight against the ends of the shelf, a threaded coupling screwing onto the opposite end of the rod between the partitions, the outer end of the coupling abutting the remaining partition and means for tightly holding the last mentioned partition against the remaining end of the shelf.

10 18. In shelving, the combination with the shelves and uprights for supporting the same, of plates adapted to form a front or rear wall, said plates having flanges for engaging both the upper and lower edge of a shelf for
15 stiffening the same.

19. In shelving, the combination of up-

right supporting members, shelves extending between them and supported thereby, said shelves consisting of sheet metal and having along the edge a flange arranged substantially vertically, and a metallic plate adapted to stand substantially upright at the edge of the shelf, said plate having a flange adapted to engage both the upper and lower edge of the flange on the shelf for increasing the security of position of said plate. 20 25

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JAMES E. BALES.

Witnesses:

ROBERT CATHERWOOD,
D. L. LEWIS.