

(No Model.)

3 Sheets—Sheet 1.

S. TAYLOR.
METAL COVERED ROOF.

No. 459,980.

Patented Sept. 22, 1891.

Fig. 1.

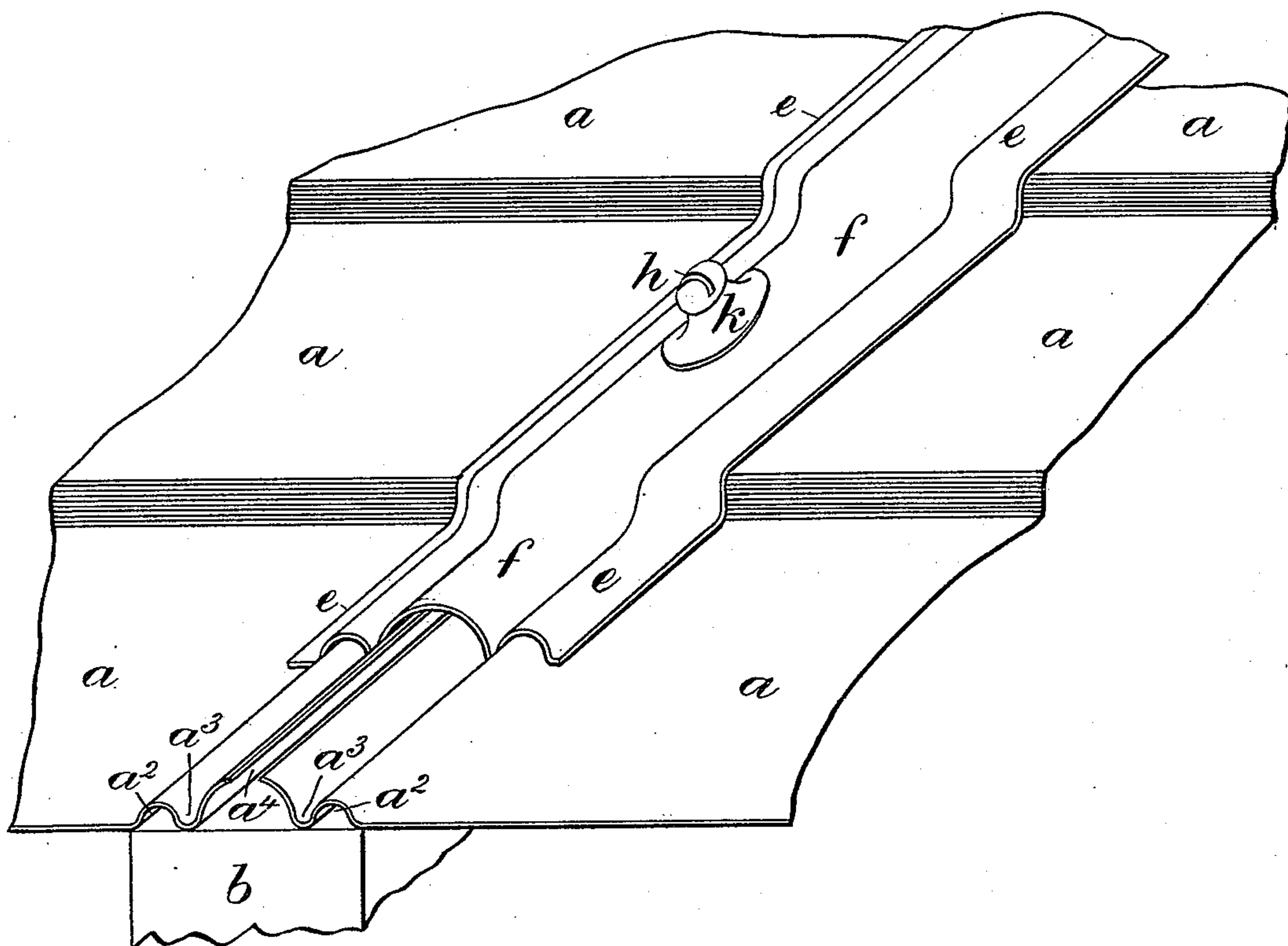
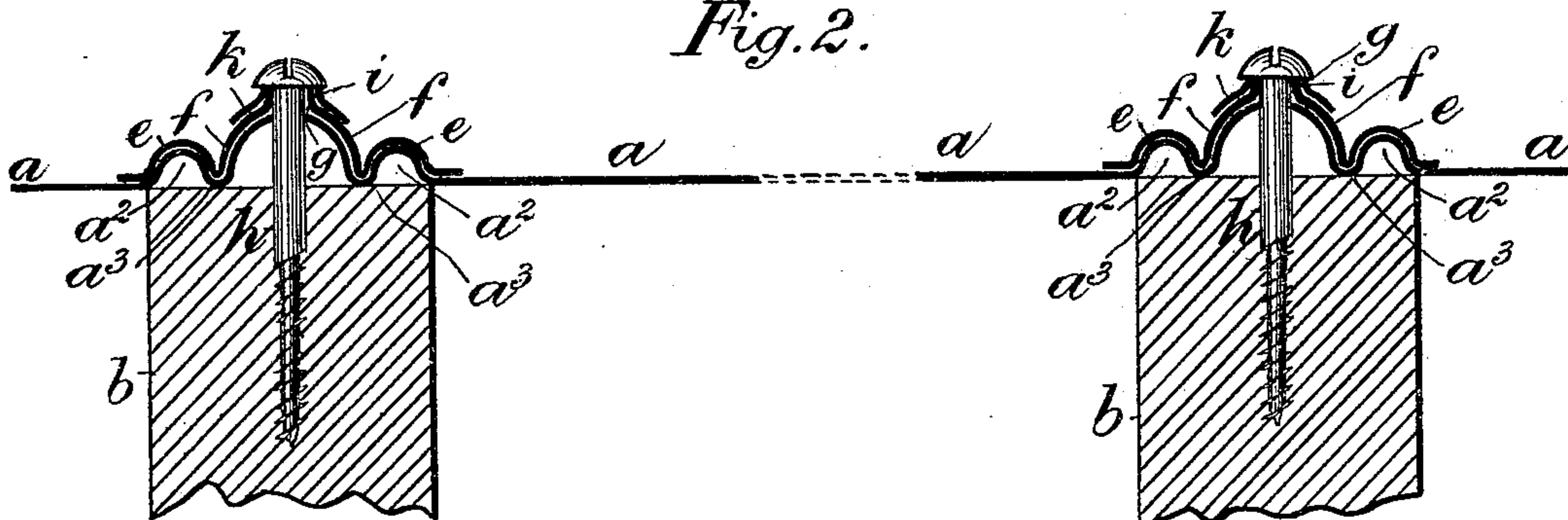


Fig. 2.



Witnesses;—

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Inventor;—

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(No Model.)

3 Sheets—Sheet 2.

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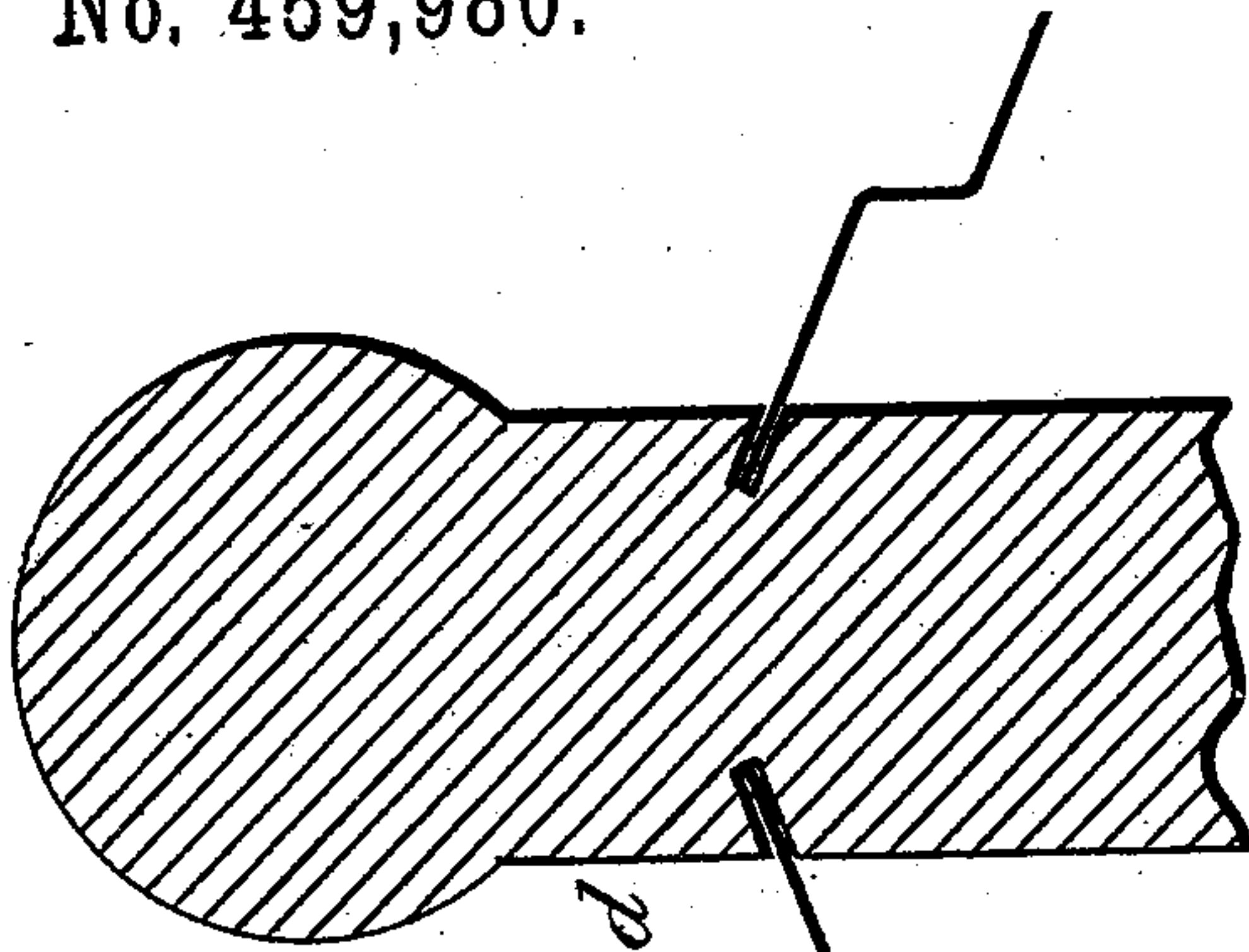


Fig. 3.

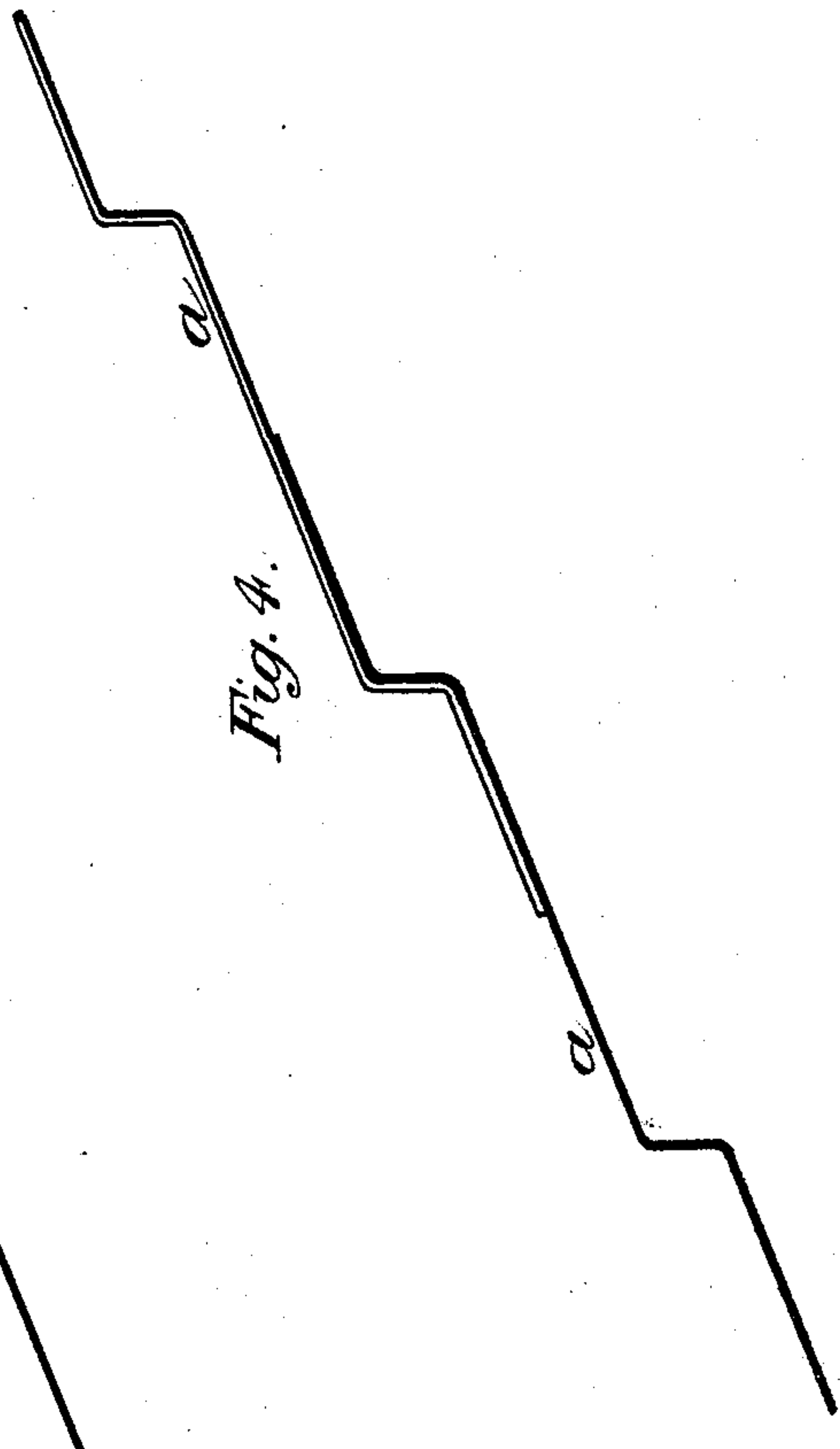
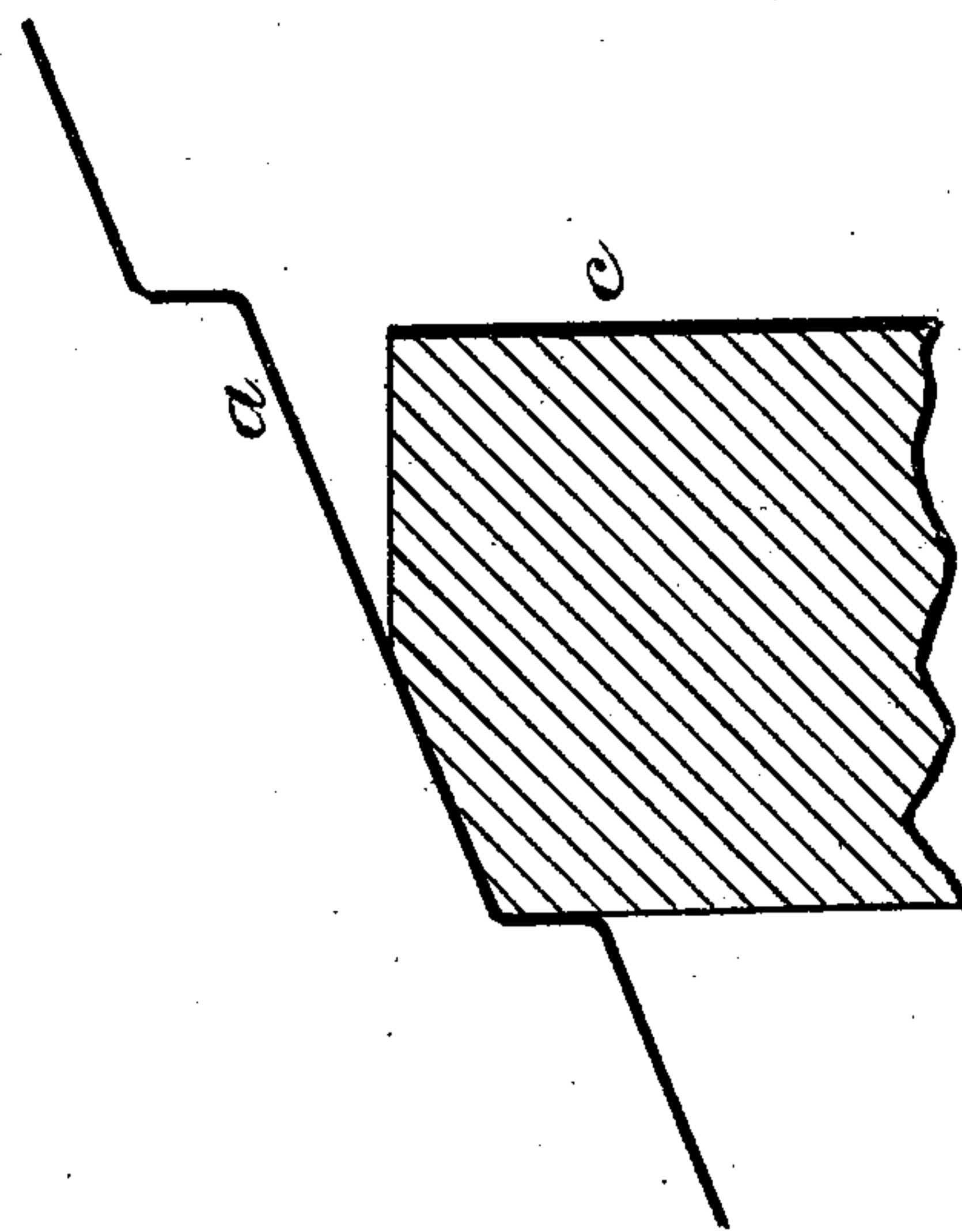


Fig. 4.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 5.

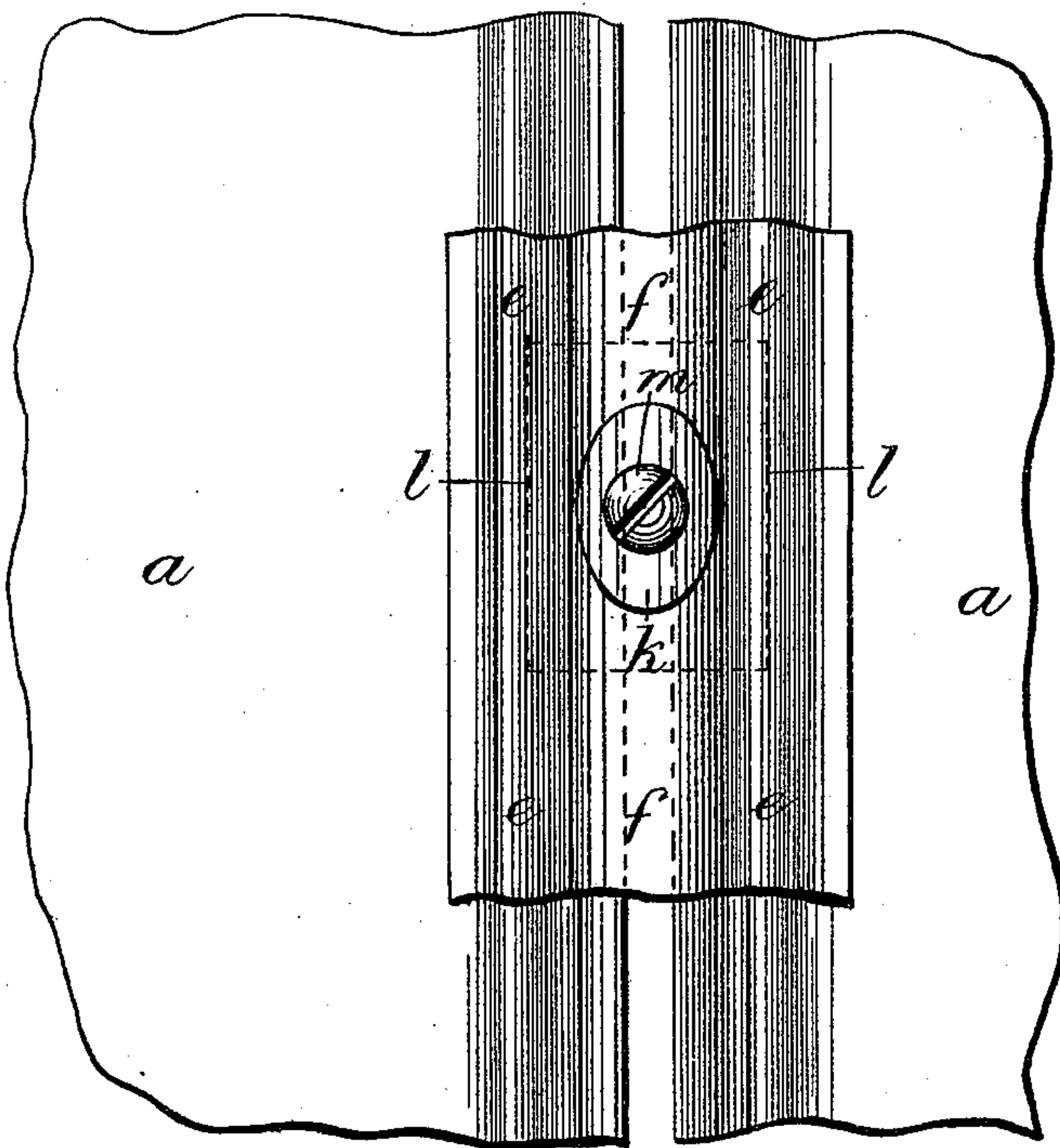


Fig. 7.

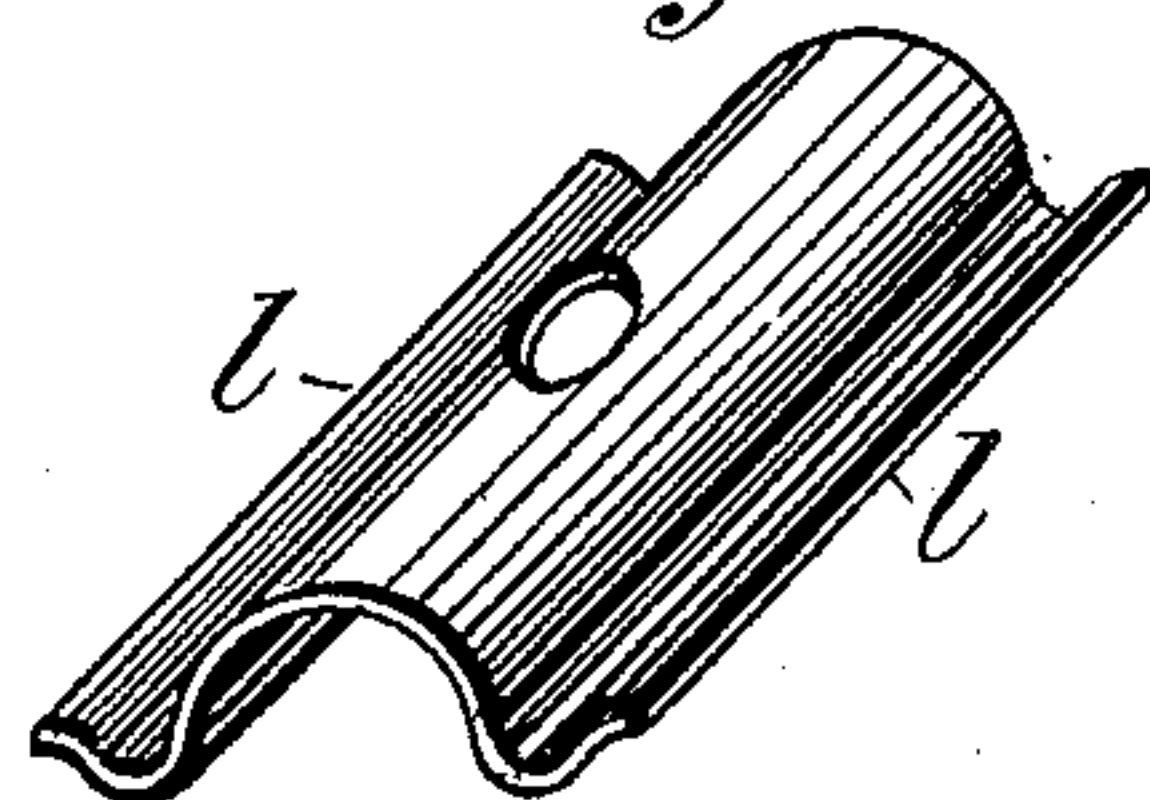
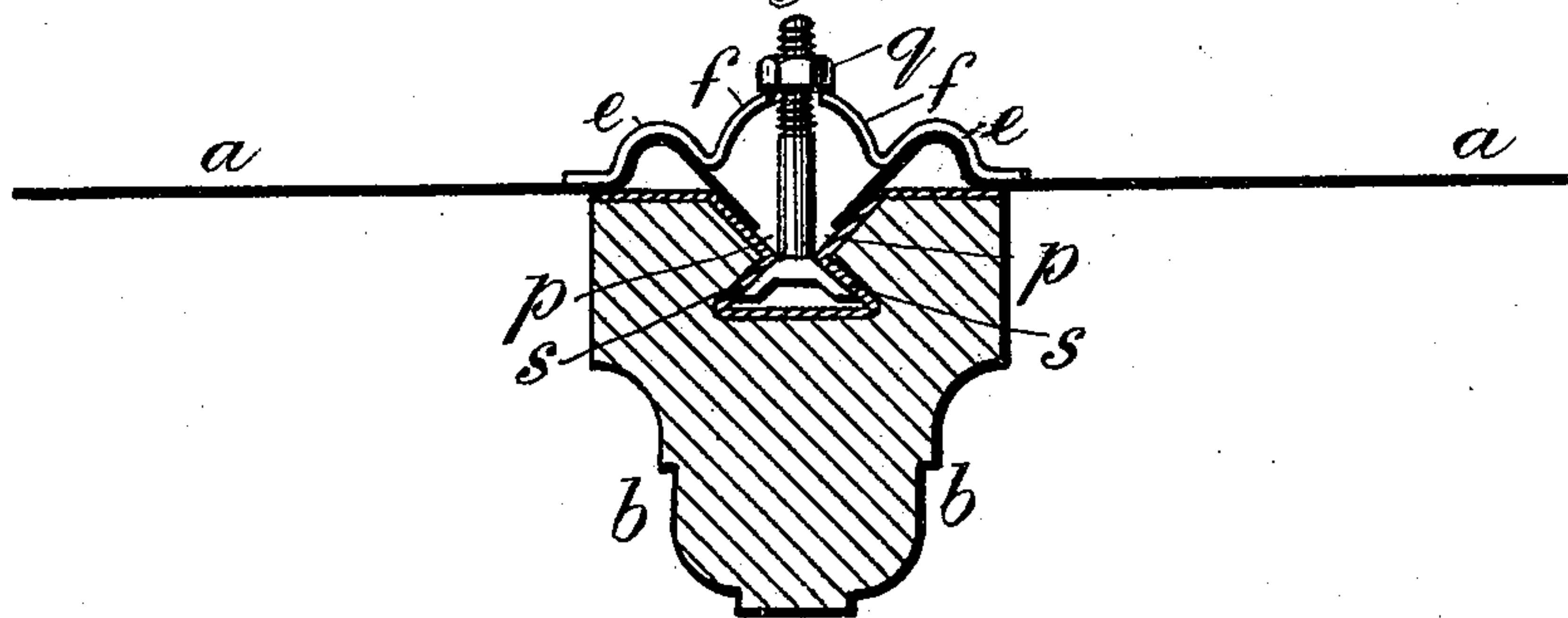


Fig. 6.



Fig. 8.



Witnesses;—

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Inventor;—

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UNITED STATES PATENT OFFICE.

SAMUEL TAYLOR, OF BIRMINGHAM, ENGLAND.

METAL-COVERED ROOF.

SPECIFICATION forming part of Letters Patent No. 459,980, dated September 22, 1891.

Application filed May 6, 1891. Serial No. 391,833. (No model.) Patented in England March 31, 1887, No. 4,818.

To all whom it may concern:

Be it known that I, SAMUEL TAYLOR, of Birmingham, England, a subject of the Queen of Great Britain, have invented certain new and useful Improvements in Metal-Covered Roofs, (for which Letters Patent of Great Britain were granted to me dated March 31, 1887, No. 4,818;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention consists, principally, of the improvements hereinafter described in constructing the sheets constituting the metal covering of the roof and fixing the said sheets to the supporting wooden or metallic rafters of the roof or to the wooden rafters and boarding of the roof.

By my improvements the roofing-sheets are very easily fixed, no skilled labor being required, the roofing-sheets are without holes or piercings, the joints are protected against the entrance of water, provision is made for the ready expansion and contraction of the sheets by changes of temperature, and the sheets can be packed for storage or transit with the same facility as ordinary corrugated sheets.

My invention is specially applicable to the metal coverings of roofs made of sheets of zinc and galvanized iron, but is also applicable to coverings made of other metals and alloys.

In constructing a metal-covered roof according to my invention I use, by preference, stepped roofing-sheets, the steps of the sheets being arranged equidistantly and parallel with the ridge and eaves of the roof, and I so construct the longitudinal edges of the stepped sheets, or those edges which are supported on the rafters, that the said edges assist in fixing the sheets in their places on the rafters, and also prevent, or prevent to a large extent, water passing over the said edges to the rafters. For these purposes I make along each bearing-edge of the roofing-sheet a convex beading or raised part, and between the said beading and the extreme edge of the sheet I make a gutter, the said gutter being formed by bending upward the extreme edge of the metal sheet at an obtuse angle. A

combined beading and gutter of the kind described is made at each bearing-edge of the roofing-sheets. The beading described acts as a barrier to the passage of water to the extreme edge of the sheet, and the raised edge or gutter acts as a conduit for conveying away water which may have passed over the beading. The beaded and guttered edges of the adjacent sheets to be supported on and fixed to the rafters are not in contact, but are arranged at a short distance apart on the rafter, and I fix the opposed edges of the separated sheets to the rafter by means of a cap or fixing-strip having steps in it corresponding with those in the roofing-sheets, the edges of the said cap having such a figure that they can engage or interlock with those of the roofing-sheets. The fixing-cap between its locking or engaging edges is arched for giving it rigidity, and in the middle of the arched part of the fixing-cap holes are made for the fixing-screws or screw-bolts to pass through. Around the holes in the fixing-cap the metal is raised or an embossment made to prevent water from the roof passing to the said holes.

In making flat metal-covered roofs and other covered roofs I use in conjunction with the roofing sheets and caps described zinc or metal lined grooved wooden rafters, and I fix the caps to the edges of the roofing-sheets in the manner hereinafter described.

I will now proceed to describe with reference to the accompanying drawings the manner in which my invention is to be performed.

Figure 1 represents in perspective a portion of a roof provided with stepped roofing-sheets and fixing appliances constructed according to my invention. Fig. 2 represents in cross-section the same in conjunction with two rafters. Fig. 3 represents a longitudinal section of the stepped roofing-sheets, and Fig. 4 the longitudinal lap for joining the ends of two stepped roofing-sheets. Fig. 5 represents in plan, Fig. 6 in cross-section, and Fig. 7 a part of the same, the arrangement of my invention when the roof is made without vertical bearers, and the roofing-sheets are fixed to purlins, as hereinafter explained. Fig. 8 represents in cross-section my arrangement applied to a metal-lined grooved wooden (or metal) rafter.

The same letters of reference indicate the same parts in the several figures of the drawings.

a a are the stepped metal roofing-sheets.

5 *b b* are the wooden rafters.

c, Fig. 3, is the eaves-plate, and *d* the ridge of the roof.

Upon the rafters *b b* the longitudinal edges of the stepped roofing-sheets *a a* are supported in the manner best seen in Figs. 1 and 10 2, where it will be seen that the opposed edges of the roofing-sheets are not in contact, but are arranged at a short distance apart. Each bearing-edge of the roofing-sheet is made with 15 a convex beading or raised part *a*², and between the said beading and the extreme edge of the sheet is a gutter *a*³, the said gutter being made by bending upward the extreme edge of the metal sheet at an obtuse angle 20 and curving the same, as seen in Fig. 2. The said beading *a*² acts as a barrier to the passage of water to the extreme edge of the sheet, and the raised edge and gutter at *a*³ acts as a conduit for conveying away water 25 which may have passed over the beading *a*². *e f e* is the fixing-cap or fixing-strip, by which the edges of the roofing-sheets are fixed to the rafters, the said cap or fixing-strip extending from the ridge of the roof to the eaves- 30 plate, so as to cover the bearing edges of the roofing-sheets from end to end and the space between the said bearing-edges of the sheets. The continuous fixing cap or strip *e f e* is stepped and has a corresponding figure to the 35 adjacent edges of the two roofing-sheets *a a* to be fixed on the rafter—that is, the middle of the said cap is arched at *f* to fit over the curved raised and gutter parts at *a*³ *a*³ of the roofing-sheets—and the edges of the cap are 40 provided with beadings *e e* for engaging or interlocking with those marked *a*² *a*² on the edges of the roofing-sheets. (See Fig. 2.) In the middle of the arched part *f* of the fixing-cap *e f e* elongated or elliptical holes at *g* are 45 made at the required distances apart for the fixing-screws *h* to pass through, the said screws being screwed into the wooden rafters *b b*. When metal rafters are used, screw- 50 bolts are passed through the rafters and fixed by screw-nuts.

i is the raised part or embossment around the hole *g* in the fixing-cap to prevent water from the roof passing through the said hole, and under the head of the screw a curved 55 washer *k* is used for the same purpose.

It will be seen that no holes are made in the roofing-sheets *a a*, the screws or screw- 60 bolts used to secure the caps passing between the separated edges of the sheets at *a*⁴, as best seen in Fig. 1. The supporting-edges of the adjacent roofing-sheets *a a* having been arranged at the proper distance apart on the rafter *b*, the fixing-cap *e f e* is engaged or interlocked with the edges of the sheets and the 65 said cap fixed in its place by passing screws *h* (or screw-bolts) through the said cap and screwing them into the rafter or rafter and

boardings, the curved washers *k* being interposed between the heads of the screws and the fixing-cap. The bearing-edges of the roof- 70 ing-sheets are thus secured very firmly on the rafter, the fixed roofing-sheets being capable of expanding and contracting and having the provisions hereinbefore pointed out for protecting the joints from water and for convey- 75 ing away water. No bending or doubling of the roofing-sheets *a a* at the eaves, ridge, hip, or at other impediments in the roof is required, as the sheets are made to pass into grooves in the roof-framing, as illustrated in 80 Fig. 3.

The manner in which the ends of two roofing-sheets are engaged together to form the longitudinal lap is illustrated in Fig. 4, where 85 it will be seen that the junctions of the ends of the sheets fit closely together, no screws or bolts for securing them together being necessary. Plain or unstepped roofing-sheets and caps may be used with the improvements hereinbefore described, and illustrated in the 90 accompanying drawings.

When no boarding is used in framing the roof, vertical bearers are required at distances apart corresponding to the width of the sheets used, as before described; but my improve- 95 ments may also be applied to roofings constructed without the said vertical bearers and may be fixed to the purlins only. In this case the roofing-sheets and the roofing-cap are bolted together between the purlins by the 100 arrangement represented in Figs. 5, 6, and 7—that is, I use a strong washer *l*, (shown separately in Fig. 7,) having nearly the same figure as the fixing-cap, and I fix the said washer *l* on the under side of the adjacent edges of 105 the roofing-sheets *a a* by means of the screw-bolt and screw-nut at *m*, a curved washer *k* being interposed between the head of the screw-bolt and the fixing-cap. The continuous fixing-cap *e f e*, washer *l*, and the adjacent edges of the roofing-sheets *a a* are thus 110 secured together between the purlins.

In applying my improvements to grooved rafters, either made of wood or metal, I arrange the parts in the manner represented in 115 Fig. 8. In this case the extreme edges of the roofing-sheets, instead of being turned up and curved, are turned down, so as to fit against the lined groove *p* in the rafter *b*, and the arch-shaped and beaded fixing-cap *e f e*, after 120 it has been interlocked with the adjacent edges of the roofing-sheets *a a*, is fixed in its place by the screw-bolts *q*, the cross-pieces or feet of which are drawn against the inclined or undercut shoulders *S S* in the grooved 125 rafter, as will be understood by an examination of Fig. 8.

My improvements may be applied to curved roofs as well as to flat roofs, the roofing-sheets having the required form given to them by 130 hand when fixing them, and the fixing-caps may be made of wood or other non-metallic material instead of metal.

Having now particularly described and as-

certained the nature of my invention and the manner in which the same is to be performed, I declare that I claim as my invention—

1. The combination, with roofing-sheets *a*,
5 having their longitudinal edges separated from each other and formed in proximity thereto with raised beads *a*², the fixing-cap having the arched center *f* and raised beads *e* formed in proximity to the edges and engaging the raised beads of the roofing-sheets,
10 and fixing-screws passing between the edges of the roofing-sheets and engaged with the arched center of the fixing-cap, substantially as described.

2. The combination of roofing-sheets formed with steps and having their longitudinal edges separated from each other and formed in proximity thereto with raised beads *a*², the fixing-cap having the arched center *f* and
15 raised beads *e* formed in proximity to the edges and engaging the raised beads of the roofing-sheets, and the fixing-screws passing between the edges of the roofing-sheets and engaged with the arched center of the fixing-
20 cap, substantially as described.

3. The combination of the rafters *b*, the

roofing-sheets *a*, having their longitudinal edges separated from each other and formed in proximity thereto with raised beads *a*², the fixing-cap having the arched center *f* and
30 raised beads *e* formed in proximity to the edges and engaging the raised beads of the roofing-sheets, and the fixing-screws engaged with the rafters, passing between the edges of the roofing-sheets, and engaged with the
35 arched center of the fixing-cap, substantially as described.

4. The combination of the roofing-sheets having their longitudinal edges curved upwardly, separated from each other, and formed
40 in proximity thereto with the raised beads *a*² and gutters *a*³, the fixing-cap having the arched center *f* and shaped to enter the gutters and extend over the beads of the roofing-sheets, and fixing-screws passing between the
45 edges of the roofing-sheets and engaged with the arched center of the fixing-cap, substantially as described.

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Witnesses:

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WILLIAM TONKS.