

No. 772,581.

PATENTED OCT. 18, 1904.

R. RAWSON & E. LODGE.
APPARATUS FOR DYEING COPS, &c.

APPLICATION FILED APR. 26, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

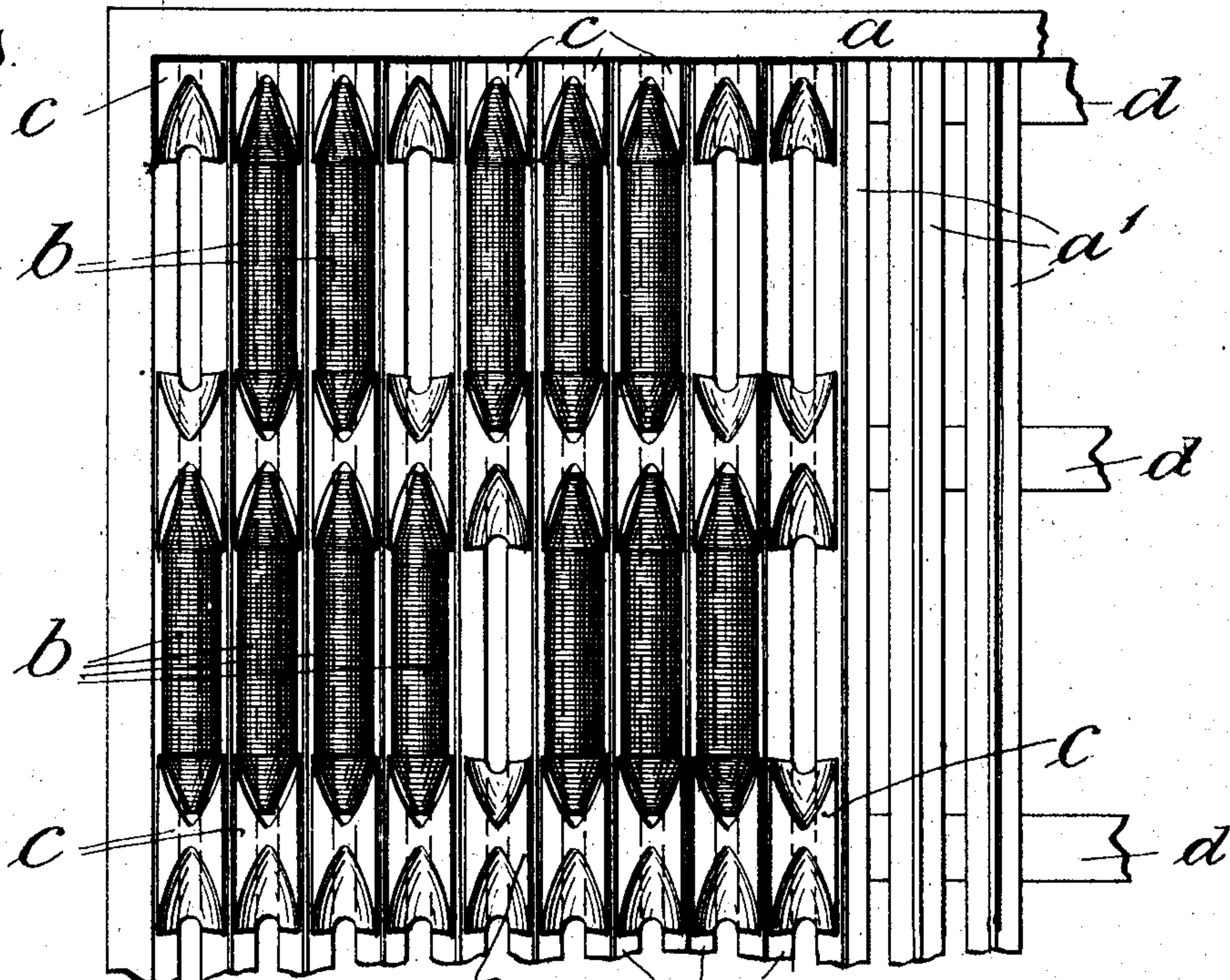


Fig. 2.

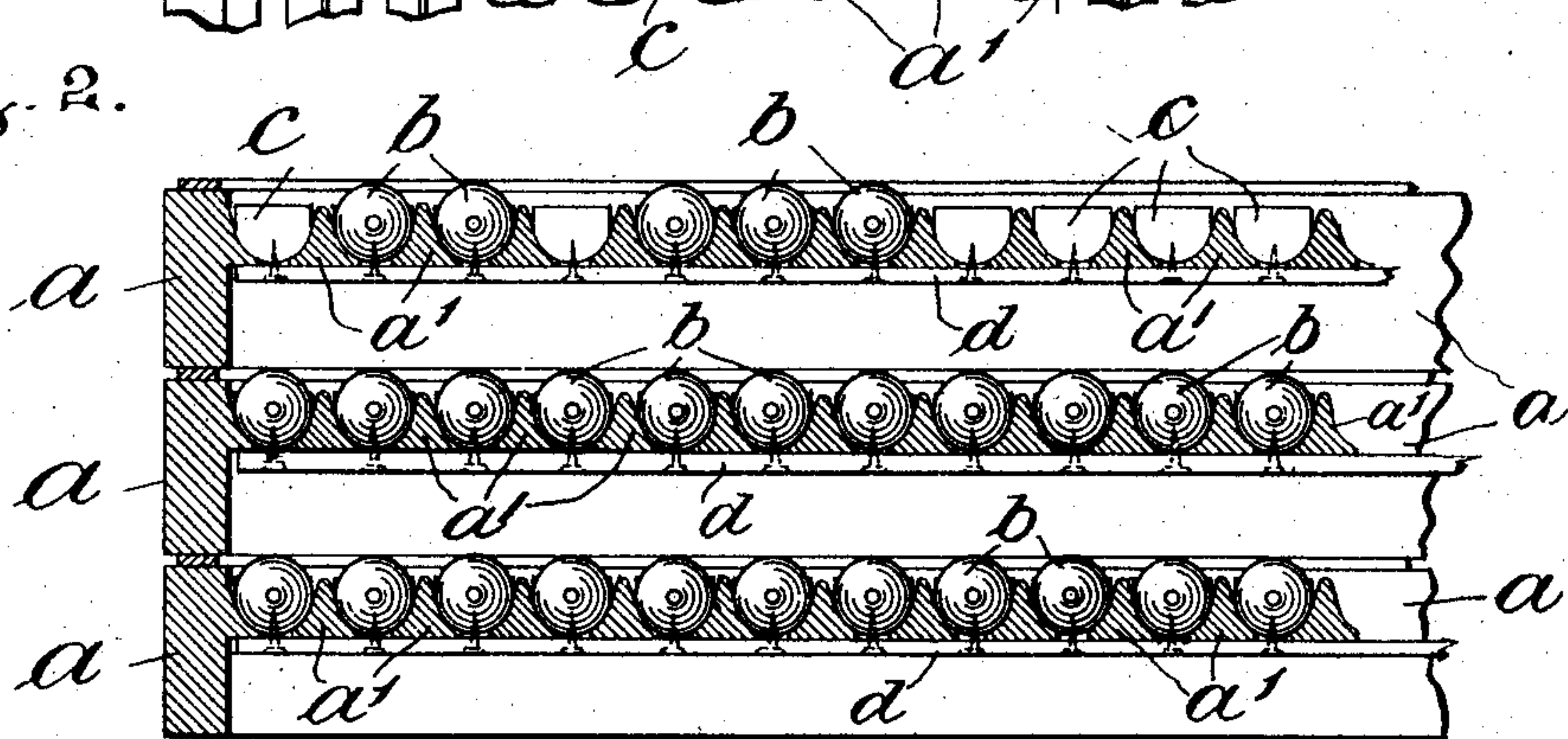
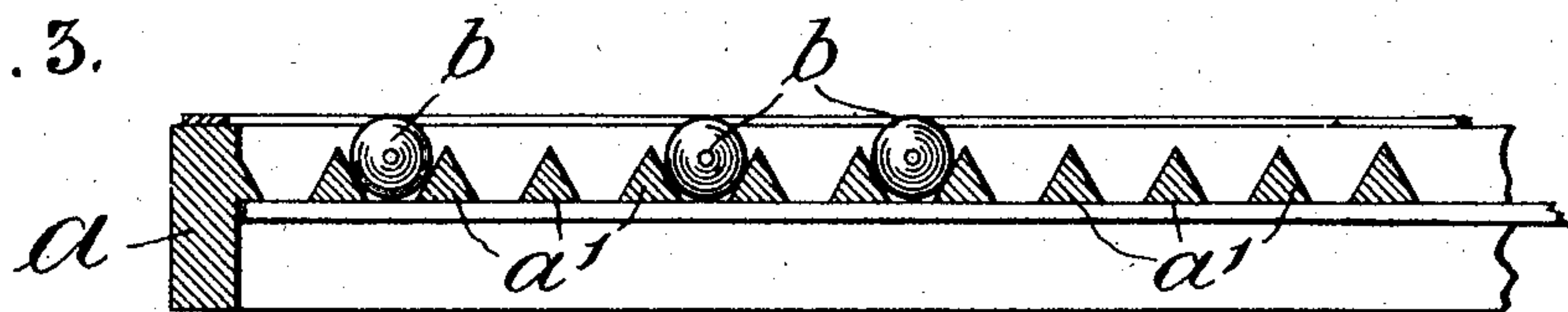


Fig. 3.



Witnesses.

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3 SHEETS—SHEET 2.

Fig. 4.

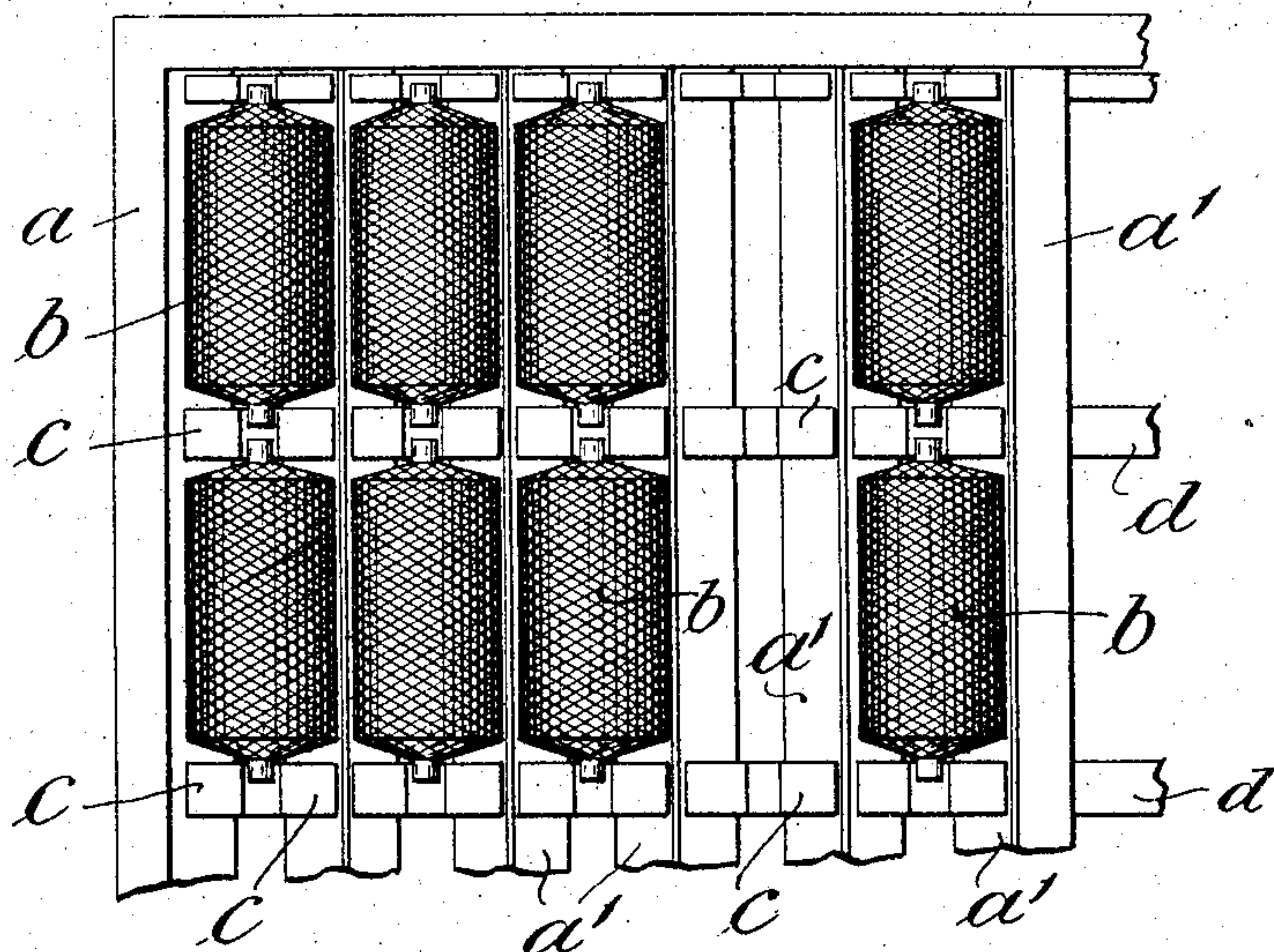


Fig. 5.

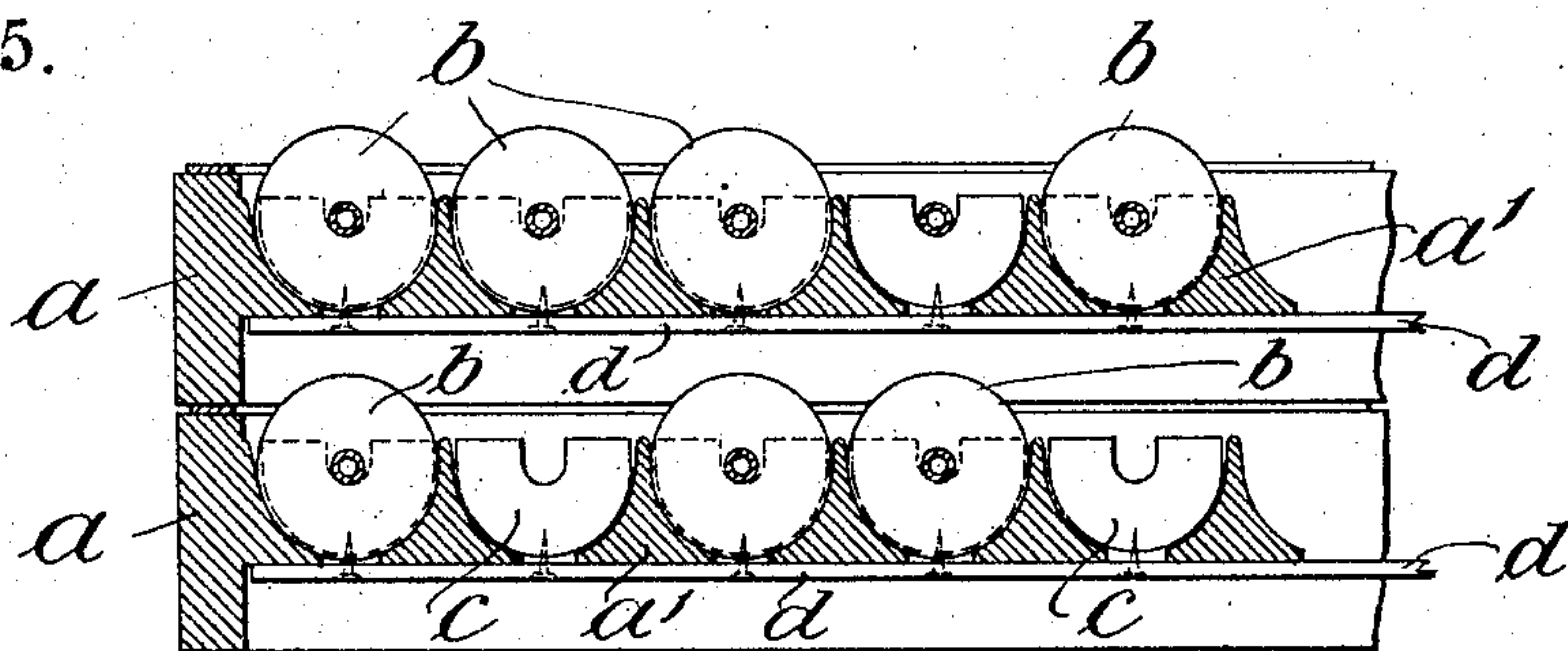


Fig. 6.

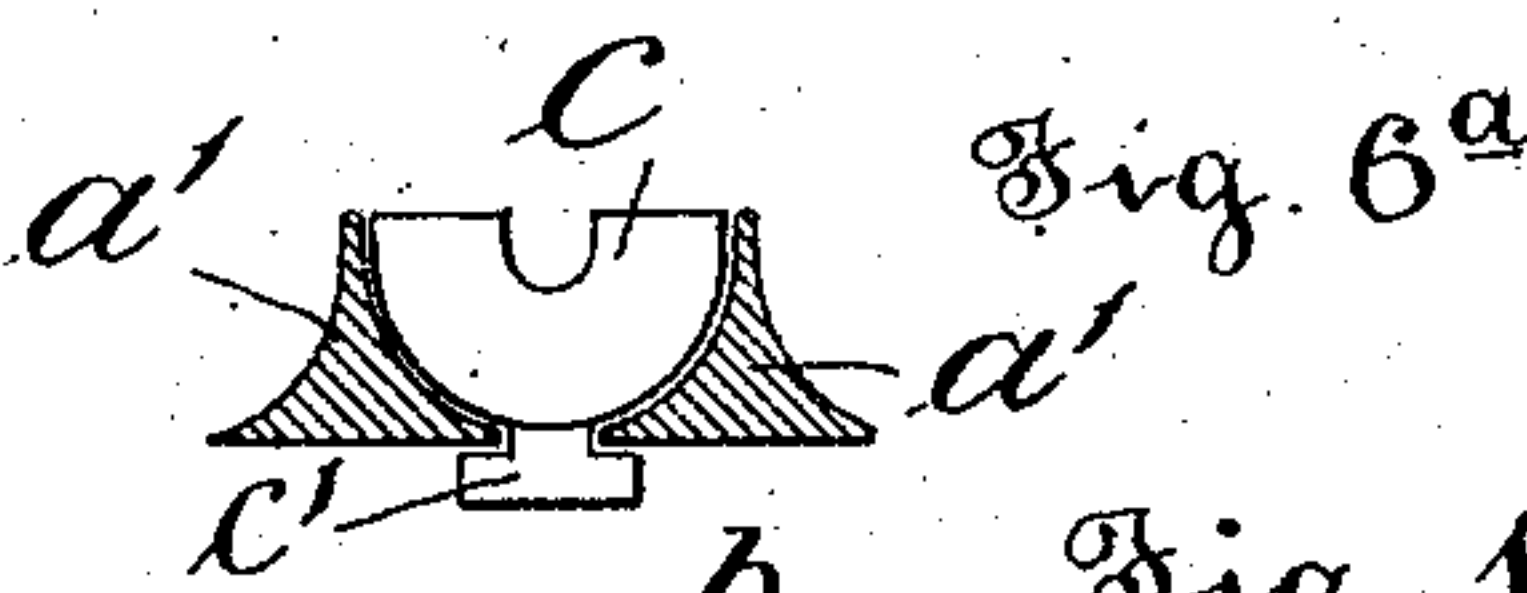
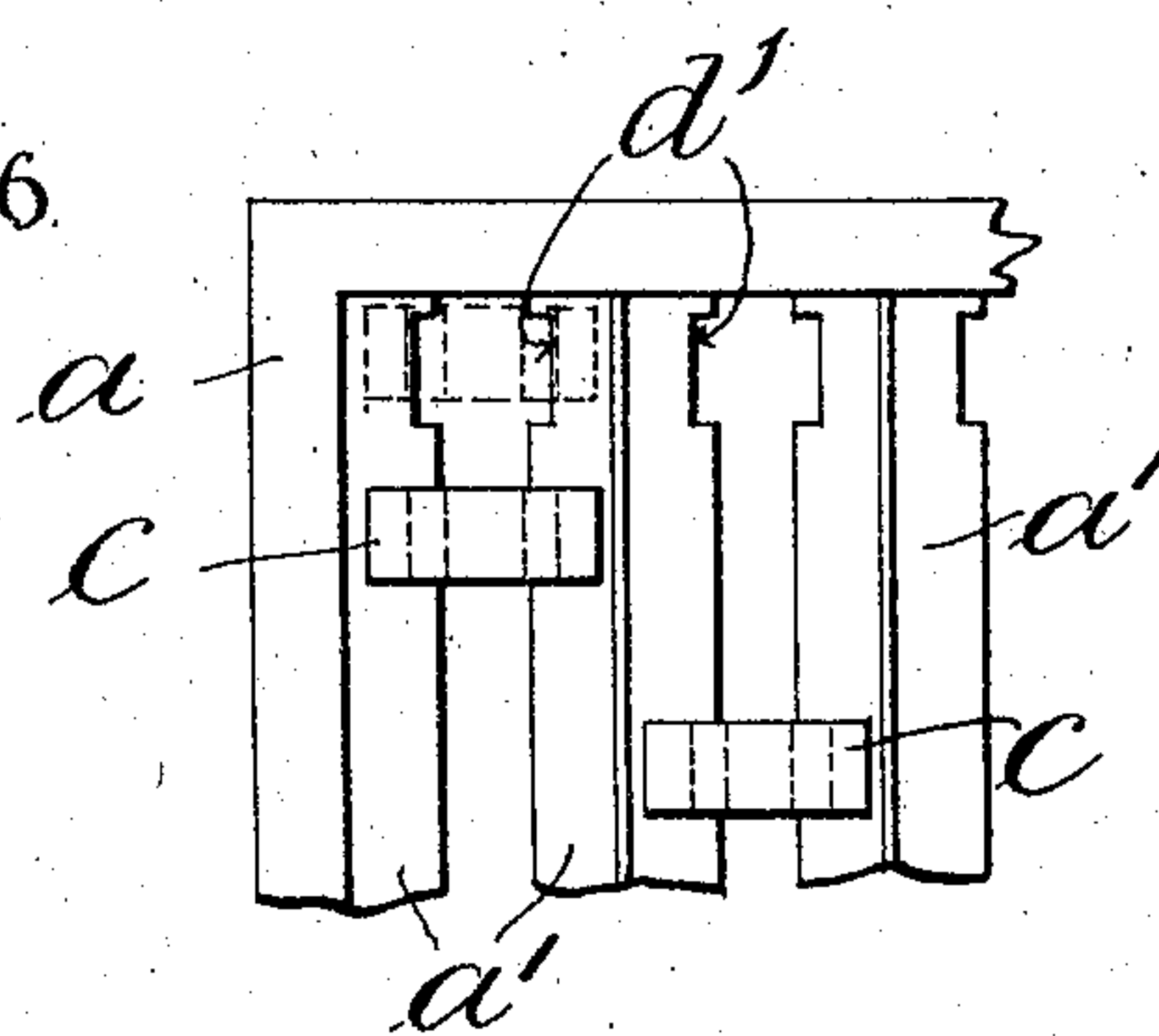
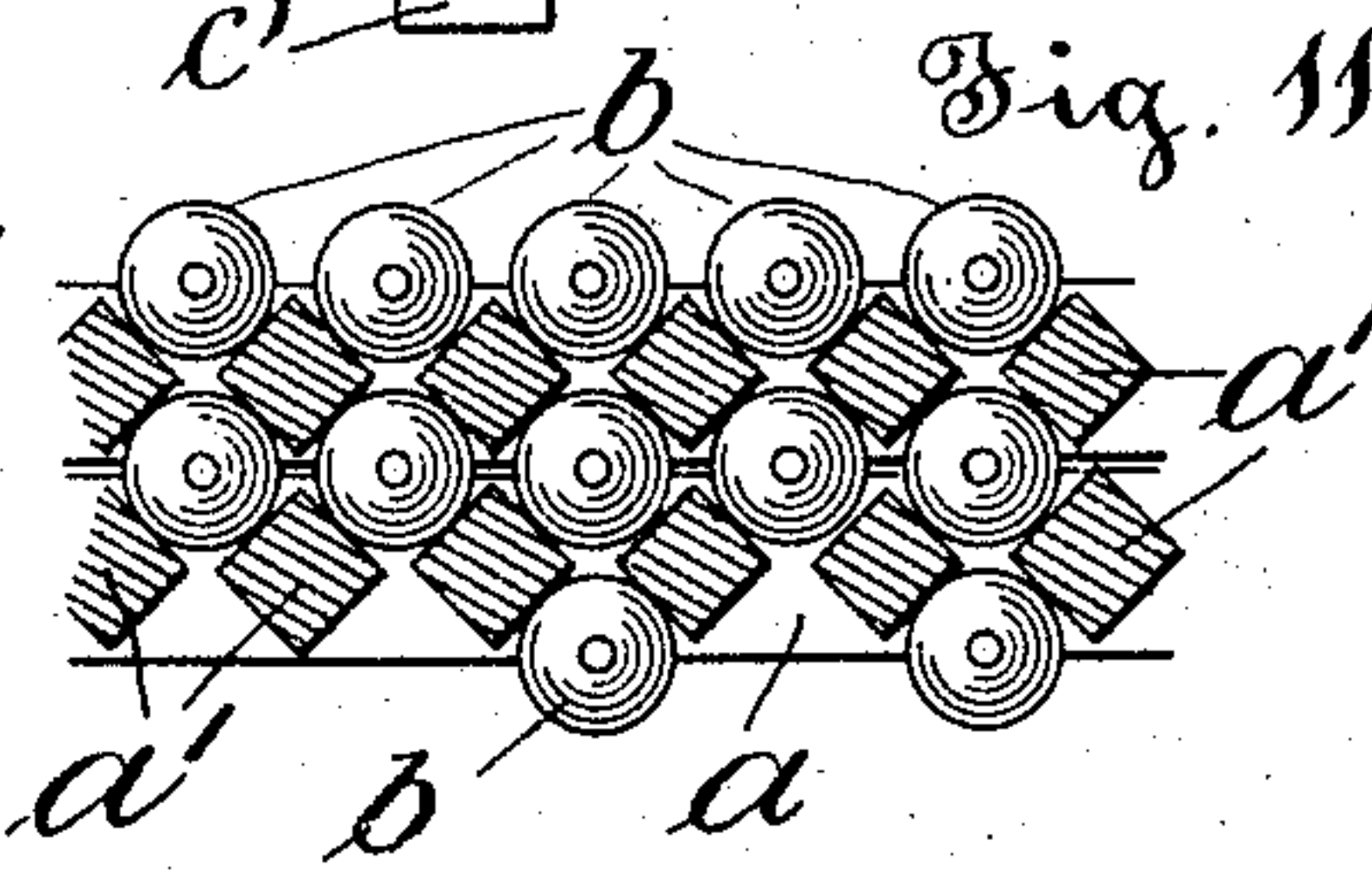


Fig. 6a

Fig. 11.



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3 SHEETS—SHEET 3.

Fig. 7.

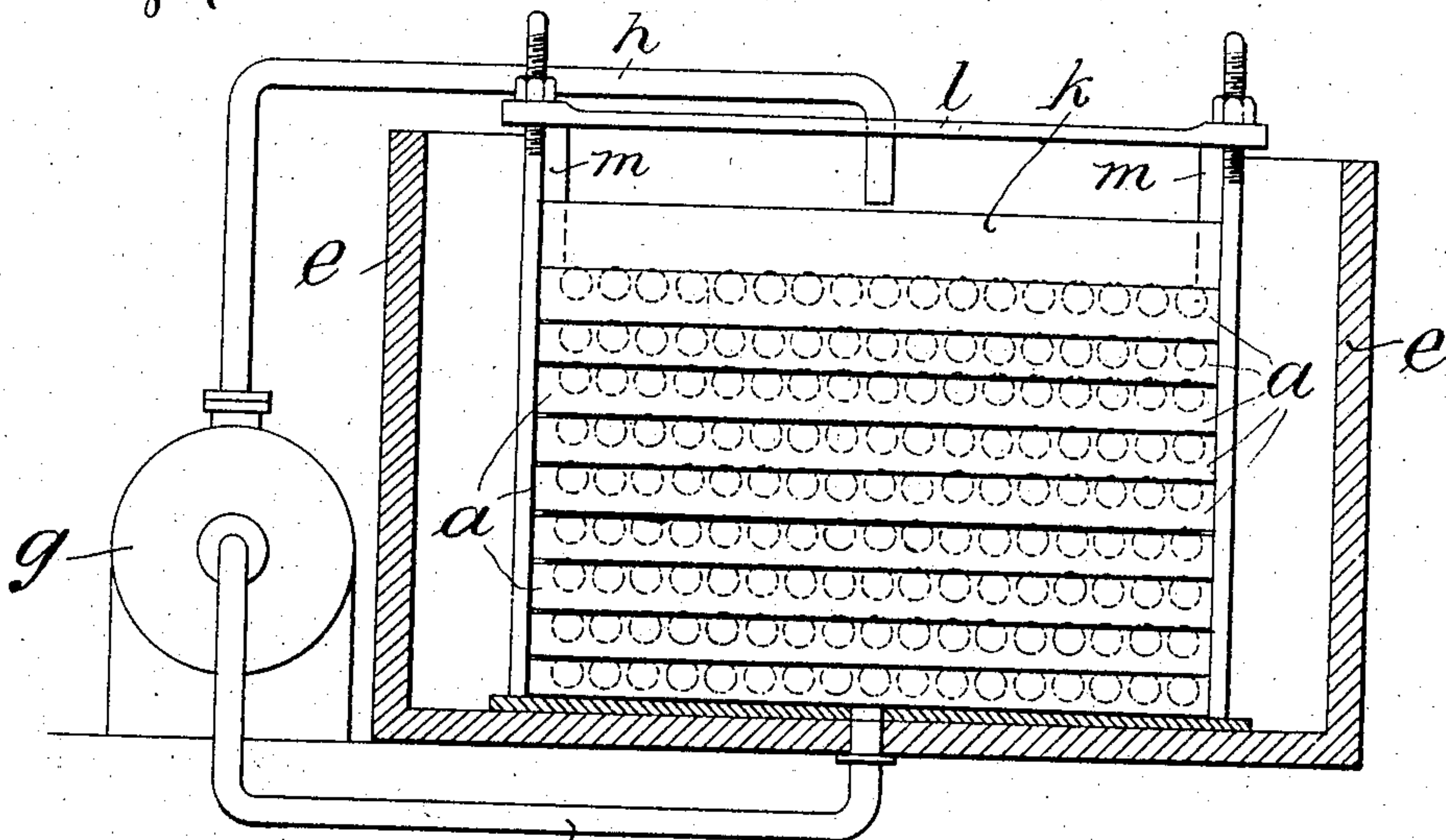


Fig. 8.

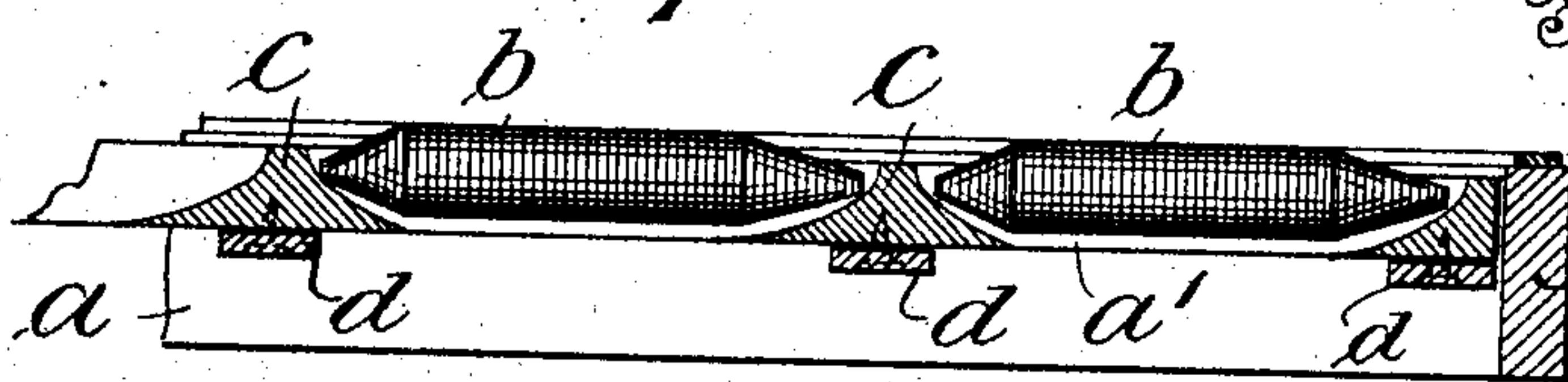


Fig. 9.

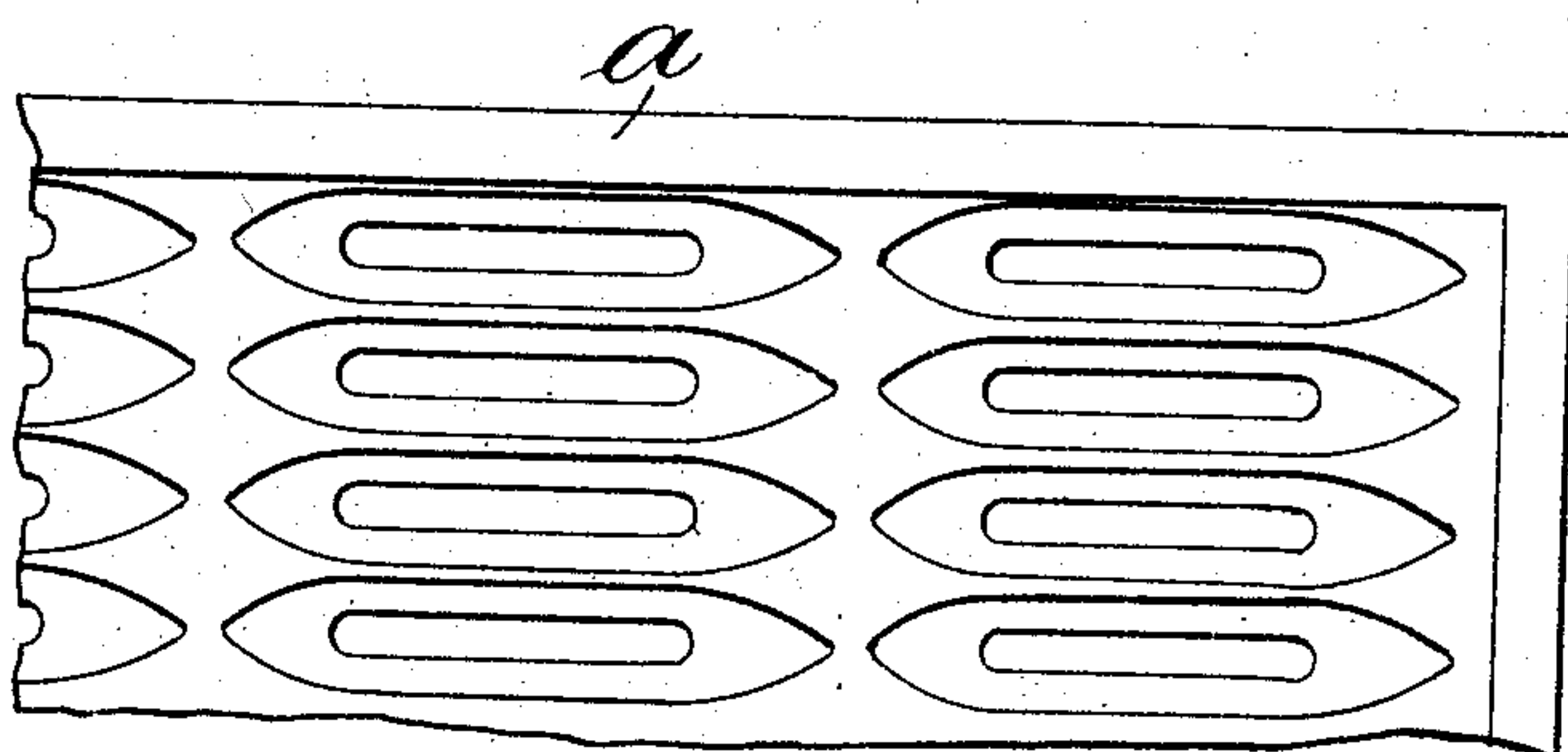
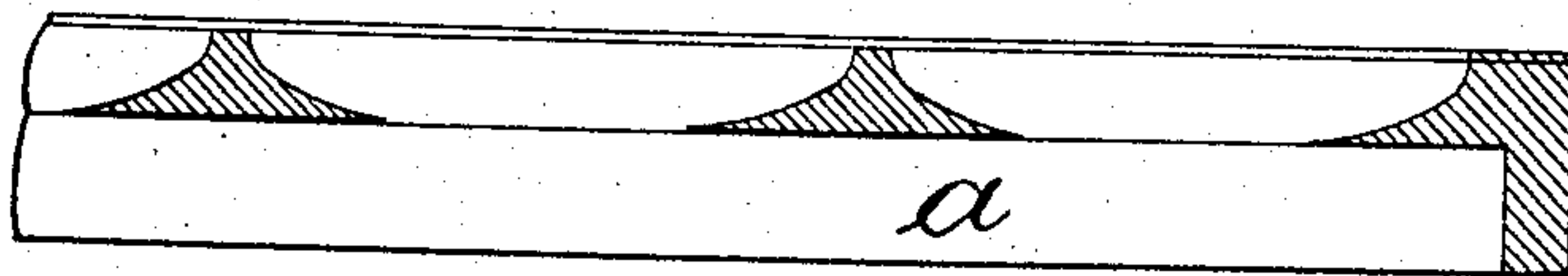


Fig. 10.



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UNITED STATES PATENT OFFICE.

ROMULUS RAWSON AND EDWARD LODGE, OF HUDDERSFIELD, ENGLAND.

APPARATUS FOR DYEING COPS, &c.

SPECIFICATION forming part of Letters Patent No. 772,581, dated October 18, 1904.

Application filed April 26, 1904. Serial No. 204,962. (No model.)

To all whom it may concern:

Be it known that we, ROMULUS RAWSON and EDWARD LODGE, subjects of King Edward VII of Great Britain, residing at Huddersfield, in the county of York, England, have invented certain new and useful Improvements in Dyeing or Treating with Liquids Yarn in the Cop or Cheese, of which the following is a specification.

This invention has reference to the dyeing, scouring, bleaching, or similar treatment with liquids of textile fibers made up in the form of cops or cheeses.

The object of this invention is to dye, scour, or bleach yarn in the cop or cheese instead of in the hank and to subject the whole yarn mass from center to circumference of the cop or cheese to the action of the liquor, whereby the process of reeling the yarn for dyeing purposes is obviated.

Our invention consists of the various novel features which will be hereinafter described, and pointed out in the following claims.

In the accompanying drawings, Figure 1 is plan view of a portion of a cop-holding frame embodying our improvements. Fig. 2 is a transverse section showing a set of frames built up one above the other, a portion only of said frames being shown. Fig. 3 is a transverse section of the cop-frame shown in Figs. 1 and 2, showing a slight structural modification. Fig. 4 is a plan view of a portion of our improved frame for holding cheeses. Fig. 5 is a transverse section taken on line 1 2 of Fig. 4. Figs. 6 and 6^a are plan and cross-section, respectively, of a fragment of frame, showing a modification hereinafter referred to. Fig. 7 is an elevation showing a series of frames built up in a tank or vessel with pump and connections for continuously circulating the liquor through the frames. Fig. 8 is a longitudinal section of one end of a cop-frame such as illustrated at Fig. 1. Figs. 9 and 10 are plan view and longitudinal section, respectively, showing a cop-frame cast or made in one piece. Fig. 11 is a cross-section illustrating a modified construction of the frames.

Referring to the drawings, and first to Figs. 1 to 5, letter *a* represents a frame of square, rectangular, or other suitable shape. Integral with said frame or secured thereto are a series of parallel bars or rods *a'*, spaced at equal distances apart to leave open spaces between each bar, the sides of the bars being preferably curved to the segment of a circle to form semicircular pockets of substantially the diameter and shape of a cop, as shown at Figs. 1 and 2, or of a cheese, as shown at Figs. 4 and 5, or said bars may be made triangular in cross-section, as shown at Fig. 3, the object being, whatever shape of recess may be formed by the section of bars employed, to admit of cops or cheeses *b* fitting closely in the said recesses to prevent any clear passage being left between the cops or cheeses and the bars for liquid to get through. Fitting in the spaces between each bar in the frame, at suitable distances apart longitudinally of said bars, are a series of loose blocks *c*, those for the cop-frame shaped or dished out at one end to receive the nose of a cop and at the opposite end to receive the base of a cop, so that the bases of the cops in, say, the first row of cops fit in the correspondingly-shaped ends of the blocks between same and the second row, while the noses of the latter row of cops fit in the opposite ends of said blocks. The blocks for the cheese-frames are provided with open bearings to receive the tubes on which the cheeses are built. The blocks in each series or row are secured by screws or like means to a loose plate or cross-bar *d* on the under side of the frame, so that the whole of the blocks in each row can be bodily moved or adjusted longitudinally of the bars *a'* to accommodate cops or cheese of different lengths. In lieu of the blocks in each row being secured to a cross-bar, as described, they may each be provided with a T-base or foot *e'*, adapted to be passed through an enlarged opening *d'* at one end of each recess and slid longitudinally of the bars to any position, as illustrated at Figs. 6 and 6^a, each individual block thus being adjustable separately. The frames *a* are made of

suitable depth, so that when placed one upon the other, as illustrated at Figs. 2 and 5, the cops or cheeses in one frame will be clear of the frame placed above it. Around the upper edges or faces of each frame is secured any

5 suitable packing or jointing strip to make an air and liquid tight joint between the frames when built up one on the top of the other.

A single frame filled with cops or cheeses 10 may be dealt with at one time, or in dyeing, bleaching, or scouring large quantities of yarn a series of frames would most commonly be employed and be built up in a vat or vessel *e*, as shown at Fig. 7, or on a flat bed, as 15 the frames themselves form a vessel, the said bed or bottom of the vat or vessel having one end of a pipe *f* connected thereto which communicates at its opposite end with a pump *g*, to which is connected one end of a second 20 pipe *h*, whose opposite open end terminates over the frame or pile of frames. In using a single frame or a series of frames the sides of the frame or of the top frame may be extended to form a well of suitable depth above 25 the cops or cheeses to hold the "top water" or said well may be conveniently formed by a plain frame placed on the cop or cheese filled frame or upper frame of the series, as indicated at *k* in Fig. 7, the said frame and 30 the cop or cheese filled frame or frames being secured or held firmly down upon the bed or bottom of the vessel and upon each other by screws or bolts or by end plates or wedges *m*, wedged tightly between a cross head or bar 35 *l*, secured by uprights to the flat bed or bottom of the vessel and the upper edges of the top frame, as shown at Fig. 7. The vessel or the well above the built-up series of frames is first charged with a supply of dye liquor 40 (or scouring or bleaching or other liquid as the case may be) and the pump then set in motion. The action of the pump draws the liquid down through the frame or frames to the outlet-pipe *f*; but as the openings in the 45 frame or frames are closed up by the cops or cheeses it necessarily follows that to reach said outlet the liquor or liquid must pass through the bodies of the cops or cheeses, which are thus thoroughly saturated with the 50 liquor from core to circumference and yarn dyed throughout. The liquor or liquid drawn through the frames by the pump *g* is forced through pipe *h*, which delivers it to the top of the frames again and maintains a continuous 55 circulation which can be kept up as long as desired to get the best results, and when discontinued the said pipe *h*, which may conveniently be a flexible pipe, is arranged to deliver the dye or other liquid into a storage 60 vessel ready for reuse at the next operation. The heating of the liquors or liquids may be effected by coils, jacketed frames, or direct

steam in any of the well-known ways. If the frames are jacketed or made hollow, the parallel bars *a'* may also be made hollow to admit 65 of steam or hot or cold air being circulated therethrough for heating or drying or cooling purposes, and in some cases the hollow bars could be perforated at the sides and cold or hot air or steam blown through the perfora- 70 tions direct upon the cops or cheeses laid between the bars.

In dealing largely with cops of a given length and size the frame could be cast or made with a series of recesses of the same 75 size and shape as the cops, as at Figs. 9 and 10, so that the said caps would just fit into same. A similar frame might also be employed for cheeses.

In Fig. 11 we show a slight modification in 80 the construction of our improved frame in which the upper and under sides are made to receive cops or cheeses, the object of such construction being that when two or more frames are built up one above the other the 85 cops in the recesses on the upper sides of the lower frames will enter and fit in the recesses on the under sides of the upper frames, and thus be held firmly on each side. In using frames of this or similar construction the liquor 90 or liquid could first be drawn down through the frames, and after circulating in that direction for some time could subsequently be forced in the reverse direction or upward through the frames.

Having fully described our invention, what we claim, and desire to secure by Letters Patent, is— 95

1. An apparatus for dyeing, scouring, bleaching, or treating with liquids, yarn in 100 the form of cops, cheeses, or the like, comprising a frame or frames having a series of parallel bars of suitable size spaced apart to form recesses between each bar, to receive the cops, which fit closely therein, adjustable 105 blocks to hold and support the ends of the adjacent rows of the cops and fill in the spaces between said cops, and a pump for causing the liquor or liquid to circulate through the frame, substantially as shown and described. 110

2. In an apparatus for dyeing, scouring, bleaching, or treating with liquids, yarn in the form of cops, cheeses, or the like, the combination with a frame or frames having 115 recesses, opened at the top and bottom, to receive the cops, and separating adjustable blocks to support the ends of the cops, which fill up said recesses, of a pump for causing the liquid to circulate through the frame, and through the bodies of the cops, substantially 120 as shown and described.

3. An apparatus for dyeing, scouring, bleaching, or treating with liquids yarn in the form of cops, cheeses, or the like, com-

prising two or more frames, each frame hav-
ing a series of bars extending across the same,
said bars having curved longitudinal sides or
edges, forming semicircular grooves or re-
cesses of substantially the diameter of the cop,
5 said recesses opened at the top and bottom,
and adjustable separating-blocks to support
the ends of the cops, and means for making
liquid-tight joints between the frames, and a
10 pump adapted to cause the liquid to circulate

through the frames, substantially as shown
and described.

In testimony whereof we affix our signatures
in presence of two witnesses.

ROMULUS RAWSON.
EDWARD LODGE.

Witnesses:

THOMAS H. BARRON,
ERNEST HUSTURCK.