

No. 799,437.

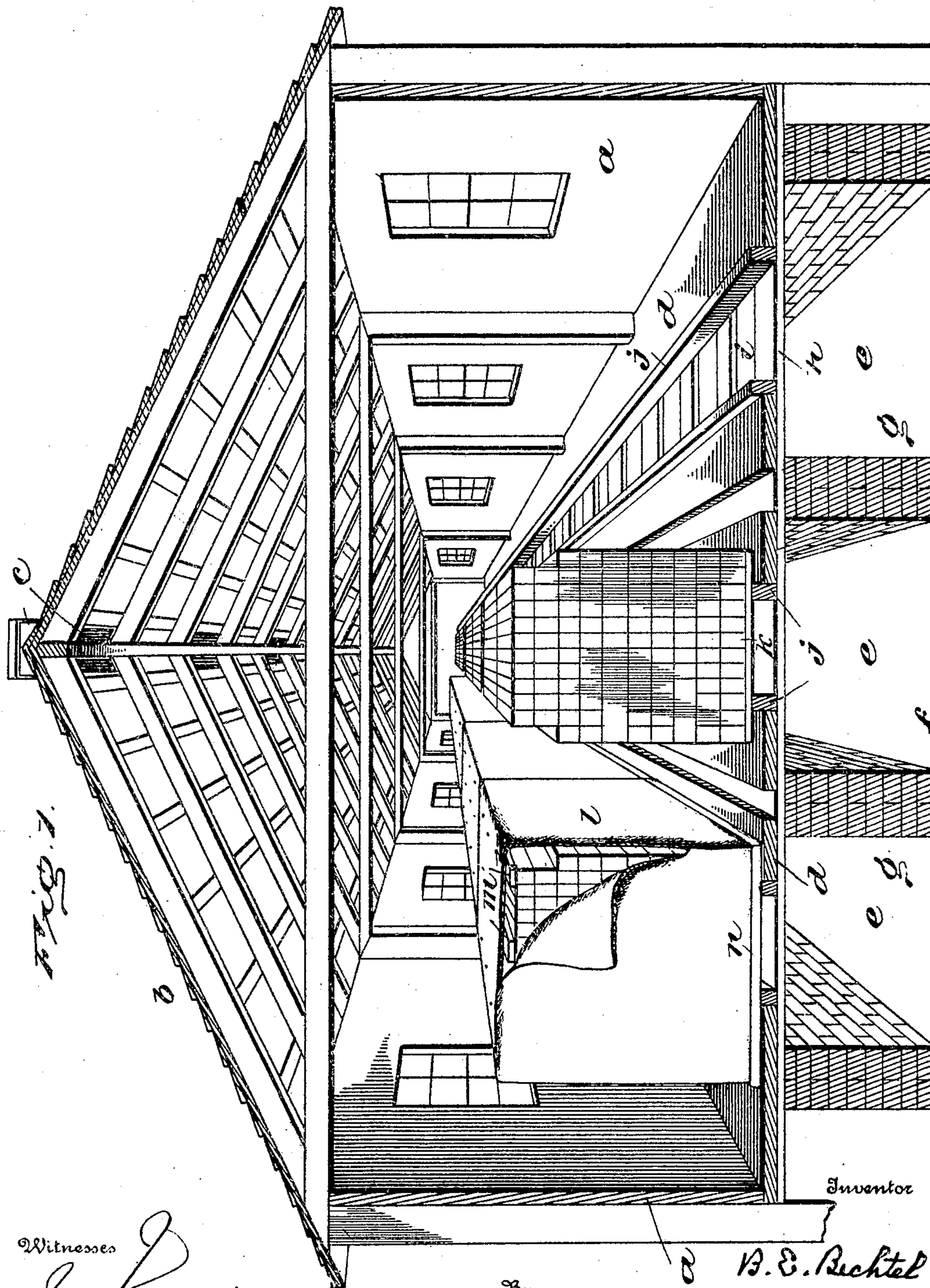
PATENTED SEPT. 12, 1905.

B. E. BECHTEL.

DRIER.

APPLICATION FILED FEB. 6, 1904.

3 SHEETS--SHEET 1.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 2.

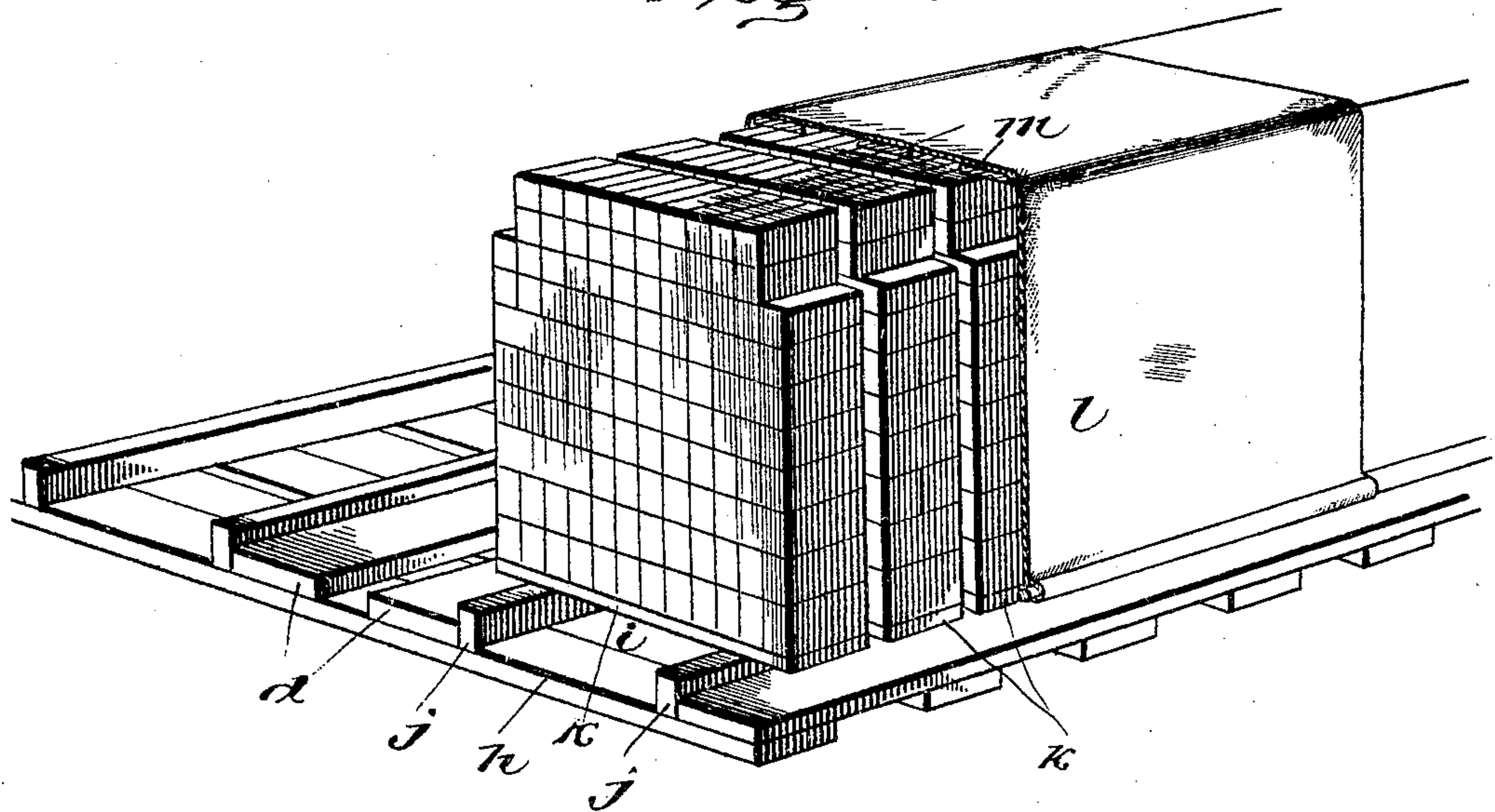
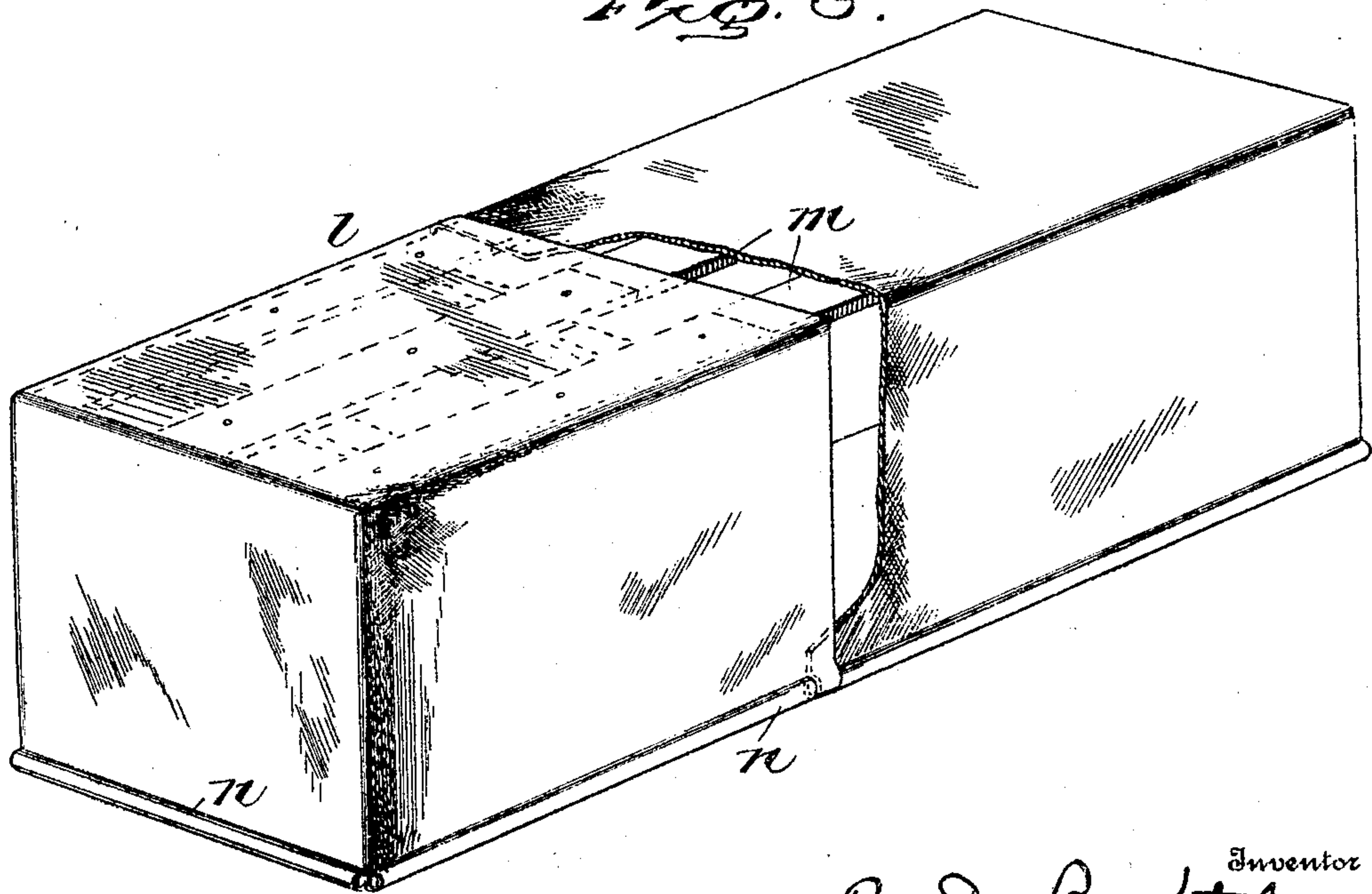


Fig. 3.



Witnesses

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Attorney



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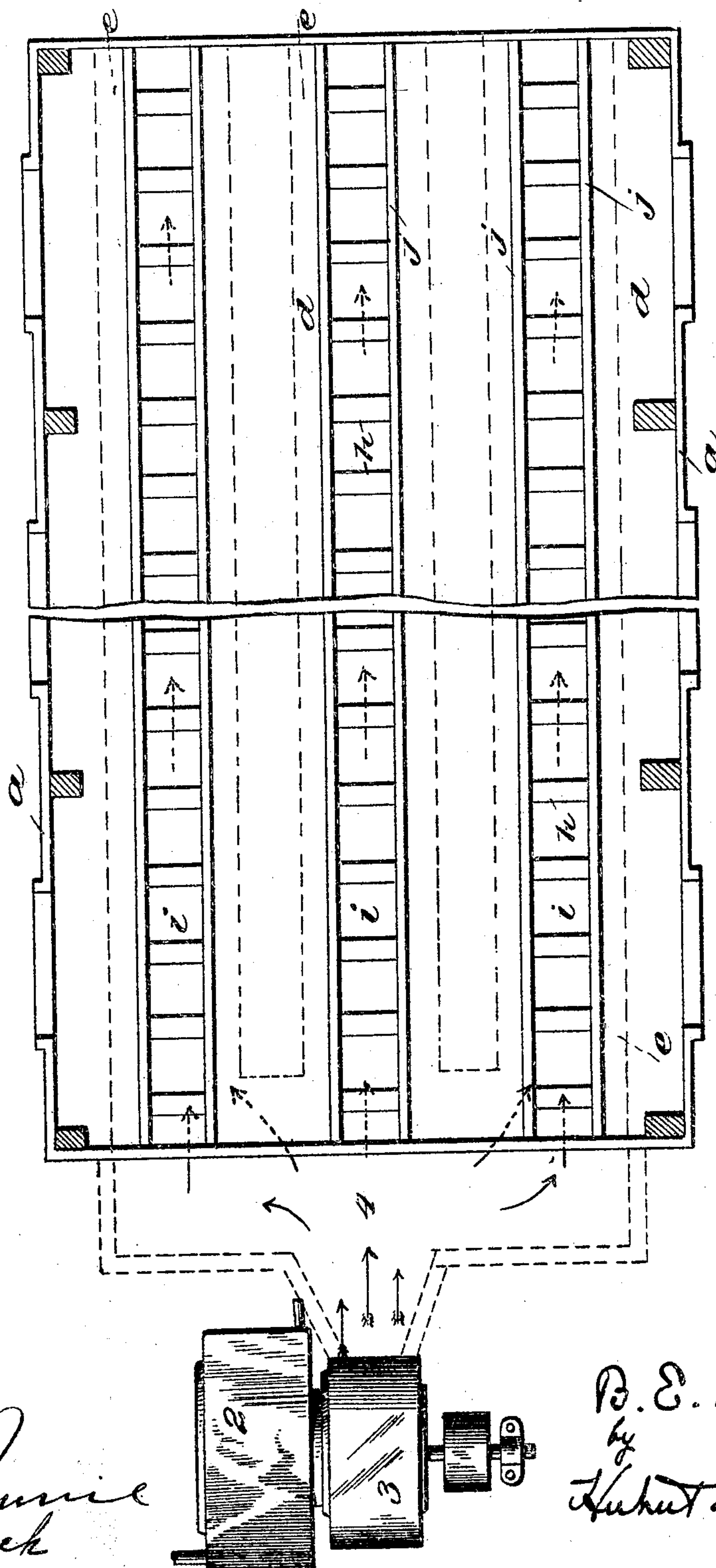
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3 SHEETS—SHEET 3.

Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

BYRON ERB BECHTEL, OF WATERLOO, CANADA.

## DRIER.

No. 799,437.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed February 6, 1904. Serial No. 192,273.

*To all whom it may concern:*

Be it known that I, BYRON ERB BECHTEL, a subject of the King of Great Britain, residing at Waterloo, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Driers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-  
10 pertains to make and use the same.

This invention relates to certain improvements in driers, and more particularly to brick and tile driers of the hot-air type.

An object of the invention is to provide  
15 certain improvements in driers whereby, if desired, the doors or windows of the drier-inclosure can be left open to enable the operators to work in the inclosure, bringing in green bricks and removing dried bricks, while  
20 at the same time other bricks are being dried in the inclosure, and the process of drying the same will not be interfered with by the open windows or doors, or, in other words, while one row of bricks is being dried another row  
25 of dried bricks can be removed and green bricks can be arranged in another row for drying.

Another object of the invention is to provide a drying building or inclosure having depressed hot-air flues longitudinally open at the top, with longitudinal elevated supports along opposite sides of each flue to receive the pallets carrying the green bricks, and whereby the hot air from the flue will pass  
35 up between the pallets and piles of bricks and permeate through the piles of bricks.

Another object of the invention is to provide means for drying green bricks wherein hot air passes up through the piles of green  
40 bricks and is retained within and caused to thoroughly permeate the piles of bricks by removable flexible or fabric coverings.

Another object of the invention is to provide certain improvements in means or arrangements in the process of drying bricks, tiles, and the like whereby material advantages are attained and the cost of production is reduced to a minimum.

The invention consists in certain novel arrangements or means employed in the process of drying bricks, tiles, and the like and in arrangements and constructions and in combinations of parts, as more fully and particularly specified and described hereinafter.

55 In the accompanying drawings, Figure 1 is a sectional perspective view of the interior of

a drying shed, inclosure, or building in accordance with my invention, showing one row of bricks arranged and covered for drying and another row of bricks which have been dried  
60 and are ready for removal, the bricks having been removed from the third flue, which is shown ready to receive the piles of green bricks for drying. Fig. 2 is a detail perspective  
65 view showing a portion of the inclosure and a portion of the row of piles of bricks over a flue, the fabric covering being broken away to show the means employed for securing and supporting the same. Fig. 3 is a detail  
70 perspective view showing two adjacent sections of the hood or flexible covering, portions being broken away. Fig. 4 is a partial plan or a view in the nature of a diagram, showing the drying-tunnel in sectional plan and by dotted lines indicating the blower or  
75 compressor pit communicating with the blast-flues of the tunnel, the blower or compressor and air-heater being shown in plan.

In the drawings, *a* represents the vertical walls, and *b* the roof, of a drying shed, inclosure, or building. The vertical walls are formed with windows and with end doors or openings, as shown. The roof is preferably provided with top openings or ventilating  
80 flues or stacks *c*. The shed or inclosure is oblong in shape or longitudinally elongated and is provided with the floor *d*. Beneath the horizontal plane of the floor I arrange one or more depressed hot-air flues *e*, extending throughout or approximately throughout  
85 the length of the shed or drying-kiln. In the present instance I show three parallel longitudinal similar flues *e*, each formed by the earth, concrete, or other floor *f* and the longitudinal vertical brick or other walls *g*,  
90 which also support the floor *d* and form the divisions between the flues. The floor *d* is formed by series of cross-beams or joists *h*, suitably spaced and extending transversely across the tops of the flues and resting on and  
100 supported by the vertical division-walls *g*. The planking of floor *d* is laid on said beams *h* so as to leave each flue longitudinally open at the top. In other words, each flue has the longitudinal top opening or slot *i* extending  
105 approximately throughout the length of the flue within the kiln or shed. The floor *d* along the opposite longitudinal edges of each opening *i* is provided with the raised supports *j*. In other words, a pair of parallel  
110 separated supports *j* is arranged along the top opening of each flue, and these supports are



elevated above the horizontal plane of the floor  $d$ . Each support  $j$  can be formed by a beam or series of beams resting on the joists  $h$  and set on edge or vertically, so that their upper edges are elevated and horizontal. The arrangement is such that the flooring  $d$  forms tracks outside of each pair of supports  $j$  for the wheels of brick-carrying trucks, which will straddle the supports  $j$  and the flue-opening.

Pallets  $k$  are employed, on which the green bricks are piled or stacked, so that each pallet carries a vertical stack or pile of bricks. Suitable brick-trucks convey the pallets of green brick into the kiln and along one of the flue-openings and deposit the same on the supports  $j$ . The flue-openings and supports  $j$  are so arranged that pallets of bricks can be moved from or placed along one flue-opening entirely independently of corresponding operations which may be simultaneously carried on along the other flue-openings, all without interfering with piles of brick undergoing the drying process along one of the flue-openings. It is obvious, however, that the raised supports  $j$  might be omitted and the pallets might be deposited directly on the floor at each side of the longitudinal flue-opening. The pallet extends transversely across the flue-opening, with the green bricks piled vertically thereon. The longitudinal opening of the flue is thus covered with the pallets and piles of green bricks to form a row extending practically throughout the entire length of the flue. The pallets are located usually a short distance apart—say about a half-inch apart—to leave narrow openings for the outflow of heated air from the flue.

In Fig. 4 I show any suitable air-blower, fan, or compressor 3, which is arranged to force air under pressure into the blower-pit 4, into which all of the blast-flues  $e$  open or with which they communicate, whereby air under pressure is forced through the flues. It is usually desirable to maintain a blast of heated air in the flues  $e$ , and hence I provide any suitable air-heater 2, through which the air-blower 3 draws its supply of air and which is then forced under pressure into pit 4 and therefrom into the flues  $e$ . Of course any other suitable arrangement can be provided for maintaining the air-blast in the flues. As it is usually desirable to produce an even blast throughout the length of each flue, I usually make the cross-sectional capacity of the flue approximately equal to the combined areas of the openings or spaces between the pallets, which can be placed about half an inch apart over the longitudinal flue-opening.

I provide means to cover or inclose each row of brick piles or stacks arranged along the flue-opening for the purpose of arresting or retaining the heated air within the stacks of green bricks, and thereby cause the air to thoroughly circulate between the bricks and

permeate throughout the stacks and effectively take up the moisture therefrom and properly and quickly dry the bricks independently of and without reference to the remaining flues in the kiln or the condition of the atmosphere within the shed or kiln and at the exterior of said means or cover. As a means which can be employed for this purpose I show a canvas covering. The hood or cover  $l$  for a row of stacks over a flue-opening is usually formed in sections, which overlap at their ends to form the complete hood, extending from one end of the row to the other and around the ends. Each section consists of a canvas cover or other suitable fabric which extends across the tops or upper ends of several stacks of bricks and hangs at the sides thereof to form curtains approximately reaching to the floor and hanging freely and a light framework  $m$ , resting longitudinally on the tops of the stacks of bricks and over which the canvas passes and to which it is secured. Each section of framework can consist of longitudinal strips or pieces suitably secured together by cross-pieces, and the framework in width is about equal to the width of a stack of bricks, so that the sides or curtains of canvas hang from the side edges of the framework to cover the sides of the rows of stacks. The lower free ends of the canvas curtains are usually stretched and held down to the floor by strips of wood  $n$  or other suitable material fastened to the canvas. A row of brick-stacks set up and covered as thus described causes the hot air from the flue to pass up between the pallets and brick-stacks. The upward blast of hot air is arrested by the cover and forced to circulate laterally between the bricks, and thereby take up the moisture. The moisture-laden air being under pressure is forced through the fabric cover, and thereby deposits a certain proportion of moisture in the fabric, which to a certain extent renders the fabric impervious to air, which forces the air to seek an escape or relief by passing down the inner sides of the canvas curtains to the floor and under the lower edges of the curtains. The air is hence maintained under a certain amount of pressure within the brick-stacks and under the covering. The moisture-laden air which escapes from the covering is discharged from the drying shed or kiln through the roof-ventilating flues or through the open doors or windows.

Attention is called to the fact that my loose fabric hood removably rests on and covers the top of the brick-stack and closes at least the upper portion of the stack against escape of the moisture-laden air, requiring said air to seek a lateral escape from the exterior of the lower portion of the stack and under the lower edges of the depending curtains of the hood. As the air is forced upwardly under pressure at the bottom of the stack the hood hence



maintains the air under a certain degree of pressure within the stack, so that the air finds relief or release by pressing out the lower ends of the depending curtains of the hood, and high efficiency in a drying system is attained through this method.

The advantage of the several-flue tunnel or kiln resides in the fact that under my invention while the green bricks along one flue are covered and being dried the dried bricks can be removed from another flue and green bricks can be piled along the third flue for drying. Under my invention these various operations can be carried on at the same time, because the doors and windows of the tunnel or kiln can be kept wide open, so that the operators can work in the kiln without inconvenience or injury to their health and yet without detriment to the drying operation and without in any way reducing the drying capacity of the kiln. In other words, I find where bricks are dried according to my invention it makes no difference, so far as the drying operation is concerned, whether the tunnel or kiln is closed or whether the windows and doors thereof are open. It is therefore possible to provide large doors, ventilators, and windows for thoroughly lighting and ventilating the tunnel or kiln. I also find from practical experience in the operation of my invention that the bricks can be most quickly and economically dried under the method herein described.

When a row of brick-stacks has been dried, the canvas covering can be easily removed therefrom and placed on an adjacent row of stacks of green bricks by merely lifting the depending canvas curtains and folding them over on the top portions of the cover-sections and then lifting the cover-sections from the dry bricks and placing them in proper position on the row of green-brick stacks and then dropping the curtains.

I do not as at present advised wish to limit all features of my invention to the construction or arrangement of drying kiln or tunnel or to the exact arrangement of the flues whether one or more flues be employed, and it is evident that various changes and modifications might be resorted to in the forms, constructions, and arrangements of the parts described without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the exact method and disclosure set up herein.

What I claim is—

1. In a drier, in combination, an air-flue having a top opening, means to support a row of brick-stacks along said opening, and a fabric hood or covering for said row of brick-stacks, said covering formed in sections, each section comprising a top framework, the fabric confined to said framework and having depending curtains.

2. In a brick-drier, in combination, a hot-air

flue into which hot air is forced under pressure and having a longitudinal top opening, a floor forming tracks and supports along said opening to support stacks of bricks approximately closing said top opening and forming passages for the upward flow of the air-blast through the stacks and from the flue, means for forcing an air-blast through said flue, and removable closing means extending over the tops of the stacks and confining the air therein under pressure and permitting lateral escape of the moisture-laden air at the lower portions of the stacks.

3. In a brick-drier, in combination, a longitudinal air-flue, a floor having an opening arranged longitudinally at the top of said flue and forming supports for stacks of bricks partially closing said openings and permitting upward passage of the heated air from the flue through the stacks, and a fabric hood extending over the stacks and partially confining the air therein under pressure and closing the top portions of the stacks against escape of air.

4. A brick-drier comprising an inclosure having ventilator-openings, several separate longitudinal hot-air flues, a floor over said flues and having longitudinal openings along the tops of said flues and separated by floor-space, said floor forming tracks and supports longitudinally along the opposite sides of each opening and adapted to support pallets of bricks arranged above said floor and transversely of said openings, and means to force air-blasts through said flues for the purposes substantially as described.

5. A drying-tunnel having a floor with parallel longitudinal brick-pallet supports, said floor forming wheel-tracks longitudinally along said supports, and an air-flue arranged longitudinally under said floor, said floor having an opening between said supports and into and longitudinally along the top of said flue, substantially as described.

6. A drying tunnel or inclosure having a longitudinal air-flue, and the floor over the same and having an opening into and longitudinally along the top of said flue, said floor having raised brick-pallet supports arranged longitudinally along the opposite sides of said opening and said floor forming wheel-tracks along said supports, substantially as described.

7. A drying-tunnel having a floor and several longitudinal air-flues below the floor, said floor having separated openings into and longitudinally along the tops of said flues respectively, said floor forming brick-pallet supports and wheel-tracks exteriorly of said flues and longitudinally along the opposite sides of said openings, respectively, each opening and its supports and tracks being independent of the adjoining openings, supports and tracks, fabric closing-hoods resting on and completely closing the top portions of the row of brick stacks along and partially closing the opening of a flue, whereby the drying process can be



conducted over one flue while bricks are being conveyed to and removed from other flues within the one tunnel.

8. In a brick-drier, in combination, a horizontally-disposed flue having a longitudinal outlet-opening, means for maintaining an air-blast in said flue, a series of vertical brick stacks closely distributed along said opening and partially closing the same and forming air-outlets into and approximately evenly distributed throughout the series of stacks, the capacity of said outlets being approximately equal to the capacity of said means, whereby an approximately even distribution of air is maintained throughout the flue and stacks, and covering means closing the top portions of the series of stacks and preventing direct upward flow of the air through the stacks and from the tops thereof, thereby maintaining the air-blast in said stacks under pressure, substantially as described.

9. In a brick-drier, in combination, a horizontal flue approximately throughout its length having a longitudinal top opening, means for maintaining an air-blast in said flue, a row of vertical brick stacks closely arranged throughout the length of said opening and partially closing the same and forming approximately uniform outlets from said opening to the various stacks, whereby an approximately even flow of air is maintained throughout the flue and to the stacks, and a flexible covering-hood on and closing the row of stacks against direct upward flow of air through and from the top portions of the stacks, thereby smothering the air-blast in the stacks to circulate in all portions thereof, substantially as described.

10. In a brick-drier, in combination, an inclosure, means for supporting a stack of bricks, a flue for discharging an air-blast upwardly into said stack, means for forcing air into said flue, and a loose partially-pervious-material hood extending over said stack and completely closing the top portion thereof to retard the upward passage of the air-blast through said stack, whereby the moisture-laden air renders said hood approximately impervious thereby forcing the air to escape under pressure laterally from the stack beneath the lower edges of said hood.

11. A brick-drier, comprising means to force an upward blast of air through a vertical brick stack, and a fabric closing-hood to confine the air in and prevent its upward passage from the top of the stack and having loose depending curtains at all sides of the stack and adapted to yield outwardly and force the lateral escape of the moisture-laden air from the lower portions of the stack.

12. Means to discharge an air-blast upwardly into a vertical brick stack, in combination with a removable closing-hood resting on the stack and completely closing the top por-

tion thereof and confining the air therein and having weighted inclosing depending curtains free to swing outwardly from the stack sides to permit escape of air, for the purposes substantially as described.

13. A brick-drier comprising means to force an upward flow of air into a vertical brick stack, and a removable normally partially-pervious flexible hood resting on and completely covering and closing the top portion of the stack and depending at the sides thereof, to permit effective escape of the air only beneath said depending portions of the hood.

14. In a brick-drier, in combination, an inclosure, means to support a vertical stack of bricks, means to maintain an upward blast of air into said stack, and a removable partially-pervious flexible fabric hood closed at the top and covering the top portion of said stack and having freely-hanging curtains around the stack, whereby the blast is smothered in the stack and forced to seek relief by bulging out said curtains to escape thereunder from the sides of the stack, thereby forcing the air to circulate throughout all portions of the stack, said fabric taking up moisture from the moisture-laden air, whereby the porosity of the fabric is reduced, substantially as described.

15. In a brick-drier, in combination, means to support a row of brick stacks, and a removable inclosing hood or cover arranged over and loosely depending at the sides of said stack to partially confine the air therein, said hood comprising a top longitudinal frame from which the hood depends, said frame adapted to rest longitudinally on the top of the stack, substantially as described.

16. A drier comprising an elongated air-flue having a longitudinal top opening, means to support a row of closely-arranged brick stacks over and partially closing said opening so that the air is directed up into said stacks, and a removable hood resting on said row and depending at the sides thereof and completely covering and closing the top portion of the row, whereby the air is confined in the row and forced to seek relief laterally approximately at the lower portions only thereof, beneath the hood.

17. A drier comprising means to support a vertical stack of bricks or other articles to be dried, and a removable fabric hood resting on and supported by and completely covering and closing the top portion of the stack and hanging loosely around and closing the sides thereof, the depending sides of the hood being free to yield outwardly at their free ends to permit relief of the air-pressure within the stack.

18. A drier comprising means to support a row of vertical stacks of bricks or other articles, and a removable inclosing hood or cover arranged over and depending at the sides of said row to partially confine the air therein,



said hood formed in sections adapted to overlap at their ends, each section having a longitudinal top frame.

19. A brick-drier comprising means to support a vertical stack of bricks, and a removable inclosing hood or cover adapted to extend over said stack and partially confine the air therein, said hood closed at the top and forming means forcing the escape of the moisture-laden air laterally from the lower portions of the sides of the stack, substantially as described.

20. A removable closing-hood adapted to extend over and depend around a row of bricks during drying thereof, said hood formed in sections, each section comprising a longitudinal top frame having depending flexible side curtains.

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

BYRON ERB BECHTEL.

Witnesses:

JAMES C. HAIGHT,  
C. E. WHYARD.