

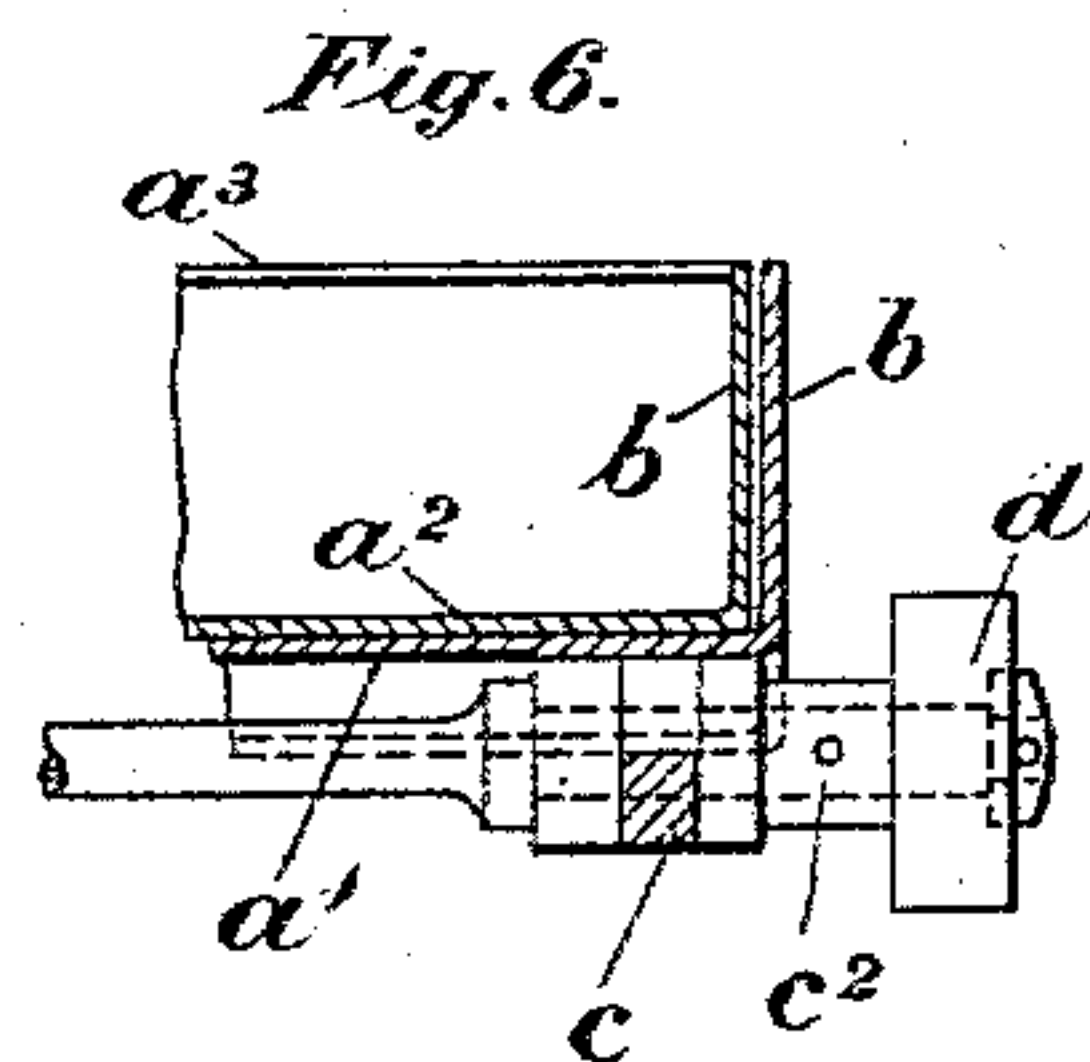
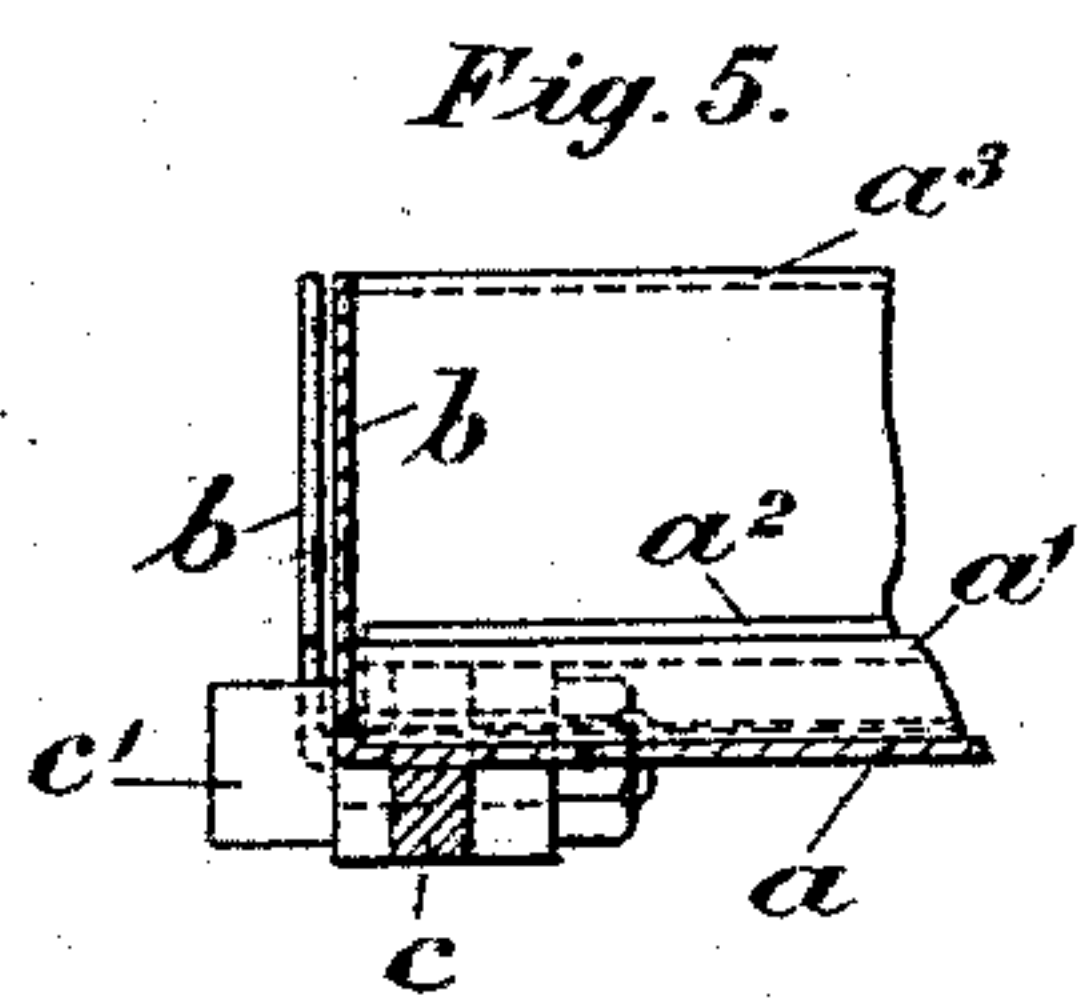
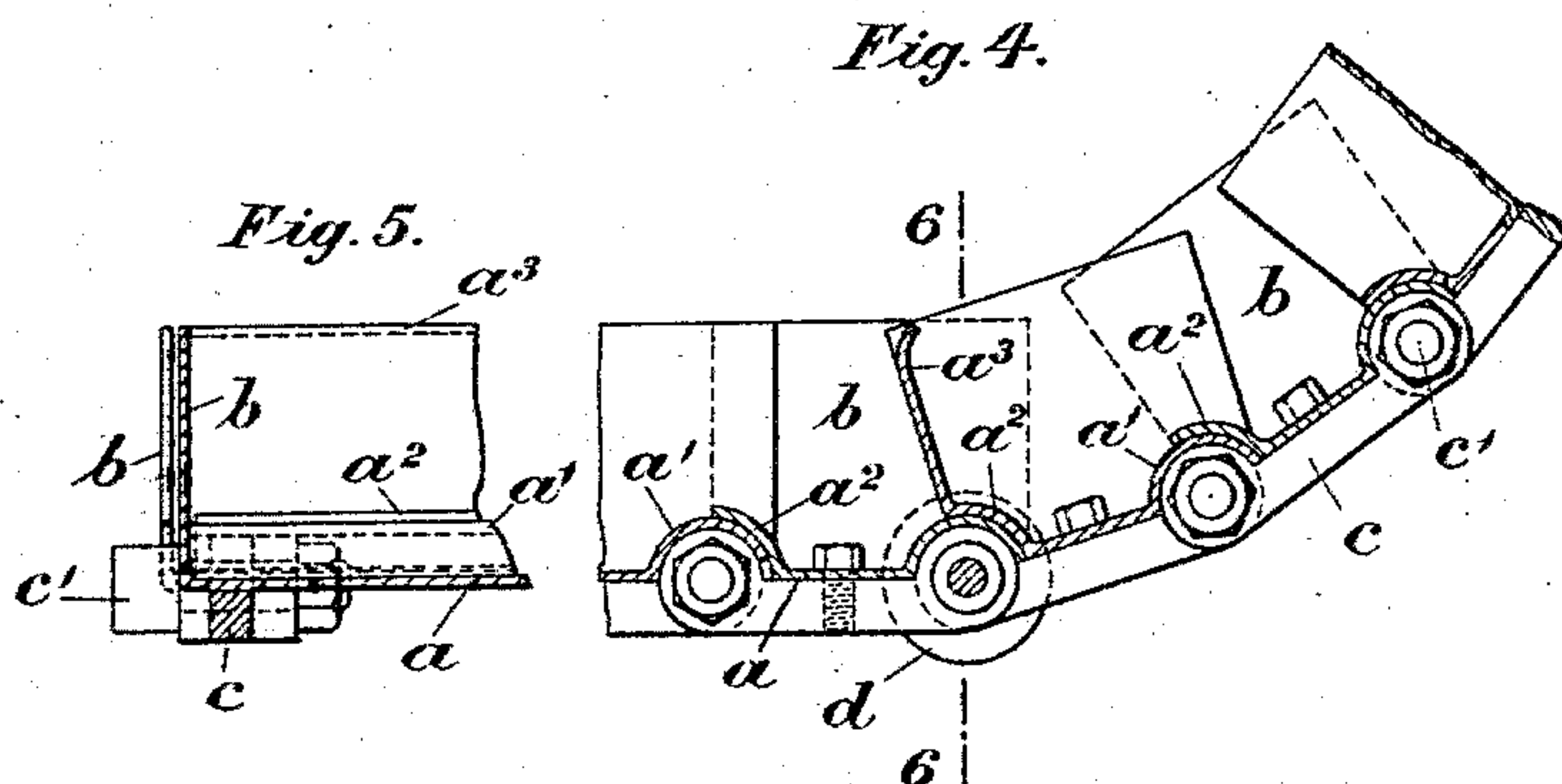
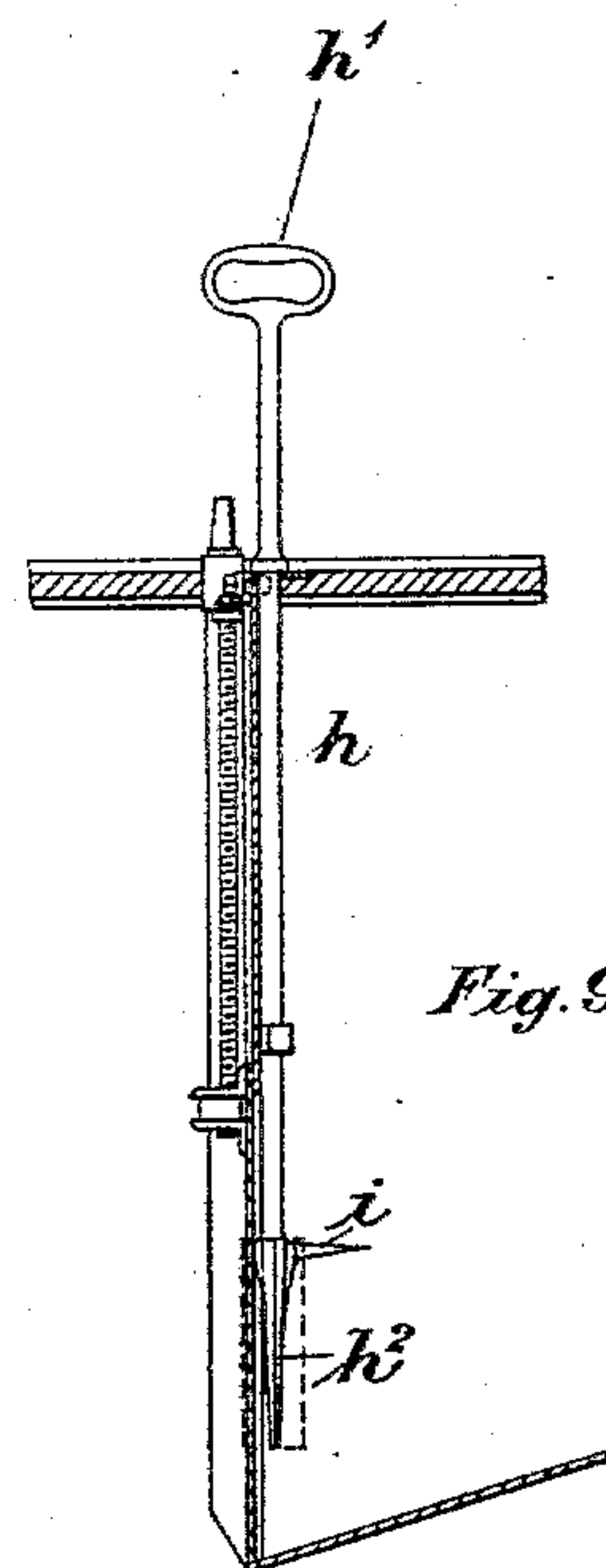
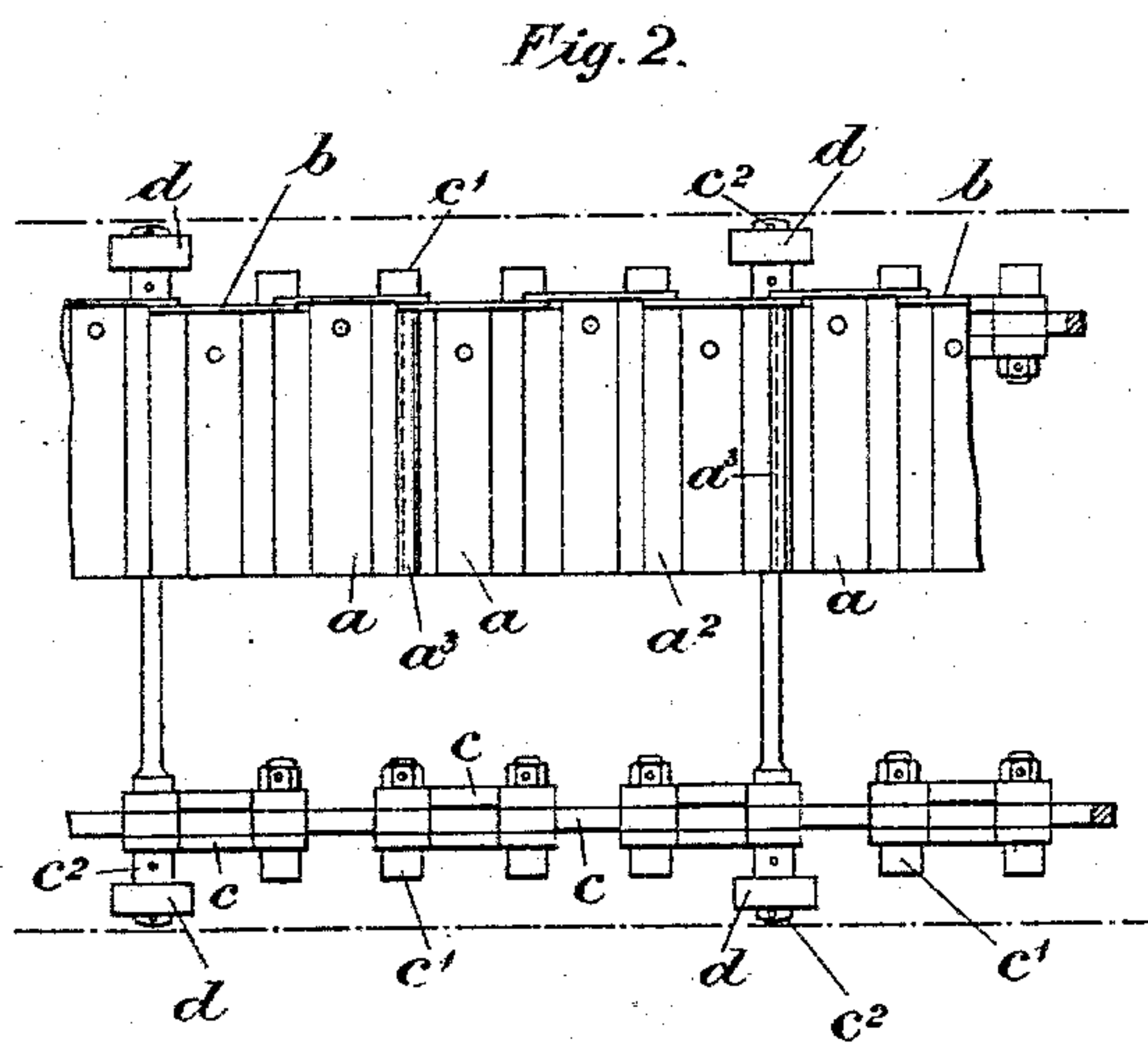
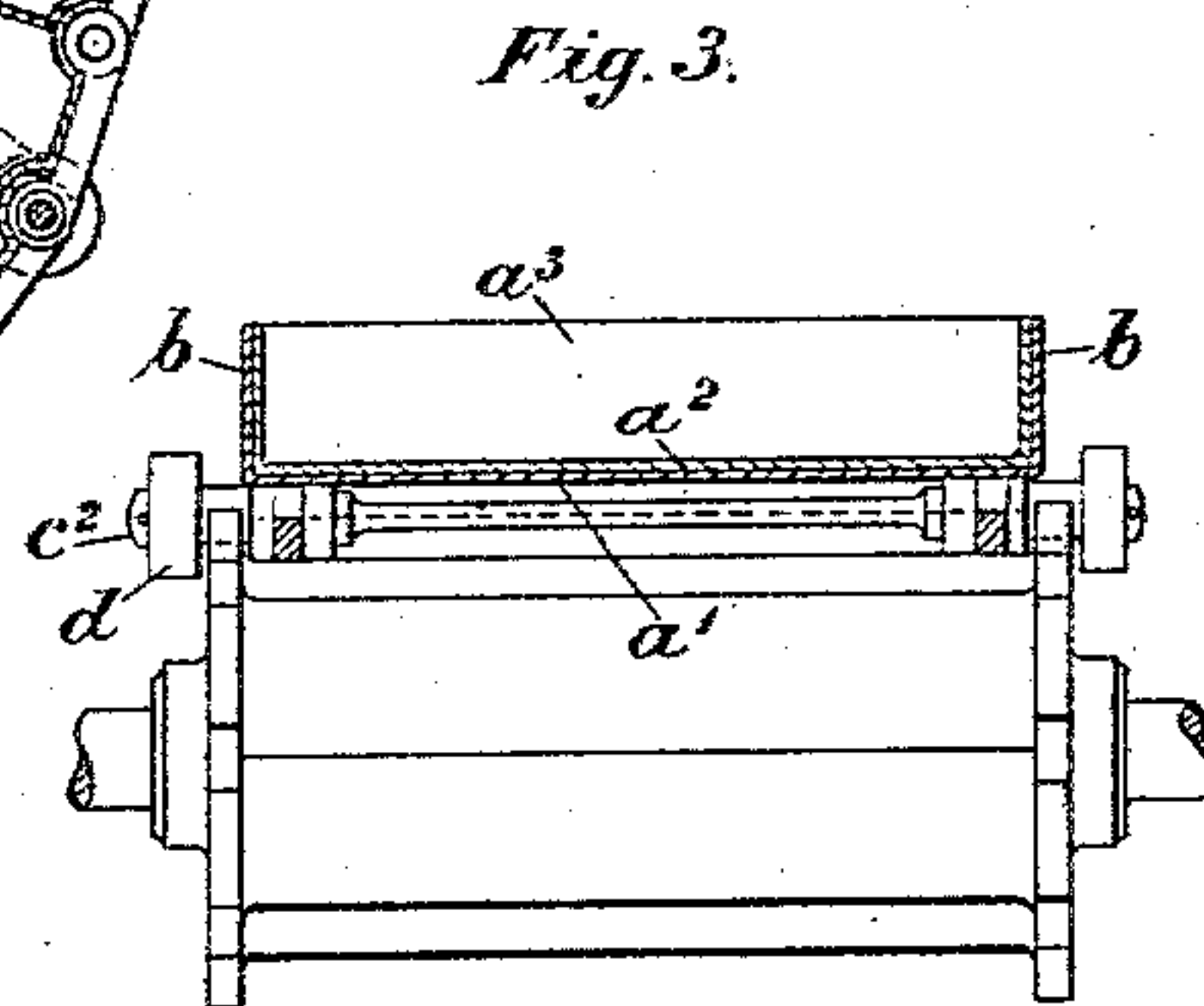
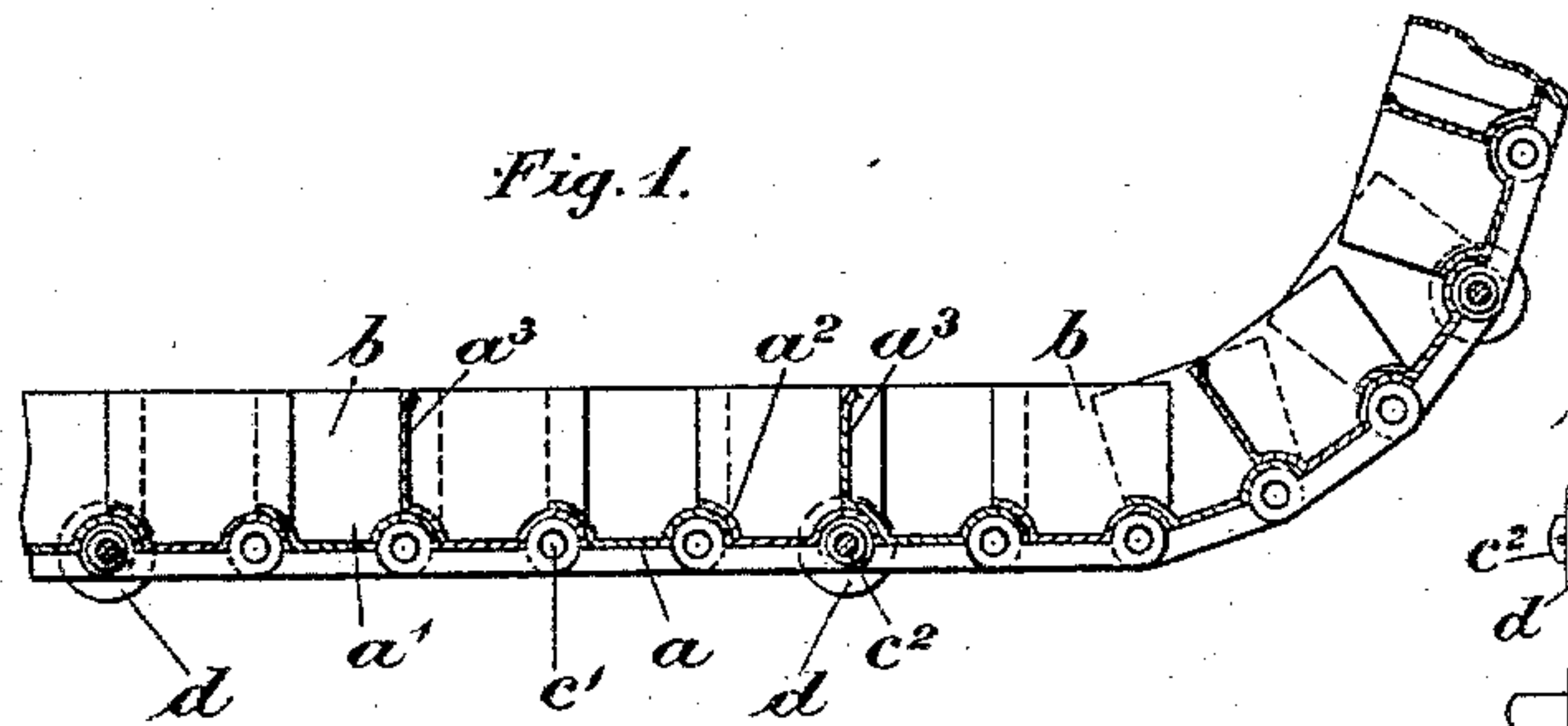
(No Model.)

2 Sheets—Sheet 1.

M. J. PAUL.
MEANS FOR DISCHARGING COAL.

No. 551,509.

Patented Dec. 17, 1895.



Witnesses
W. F. Cain.
Thos. P. Blann

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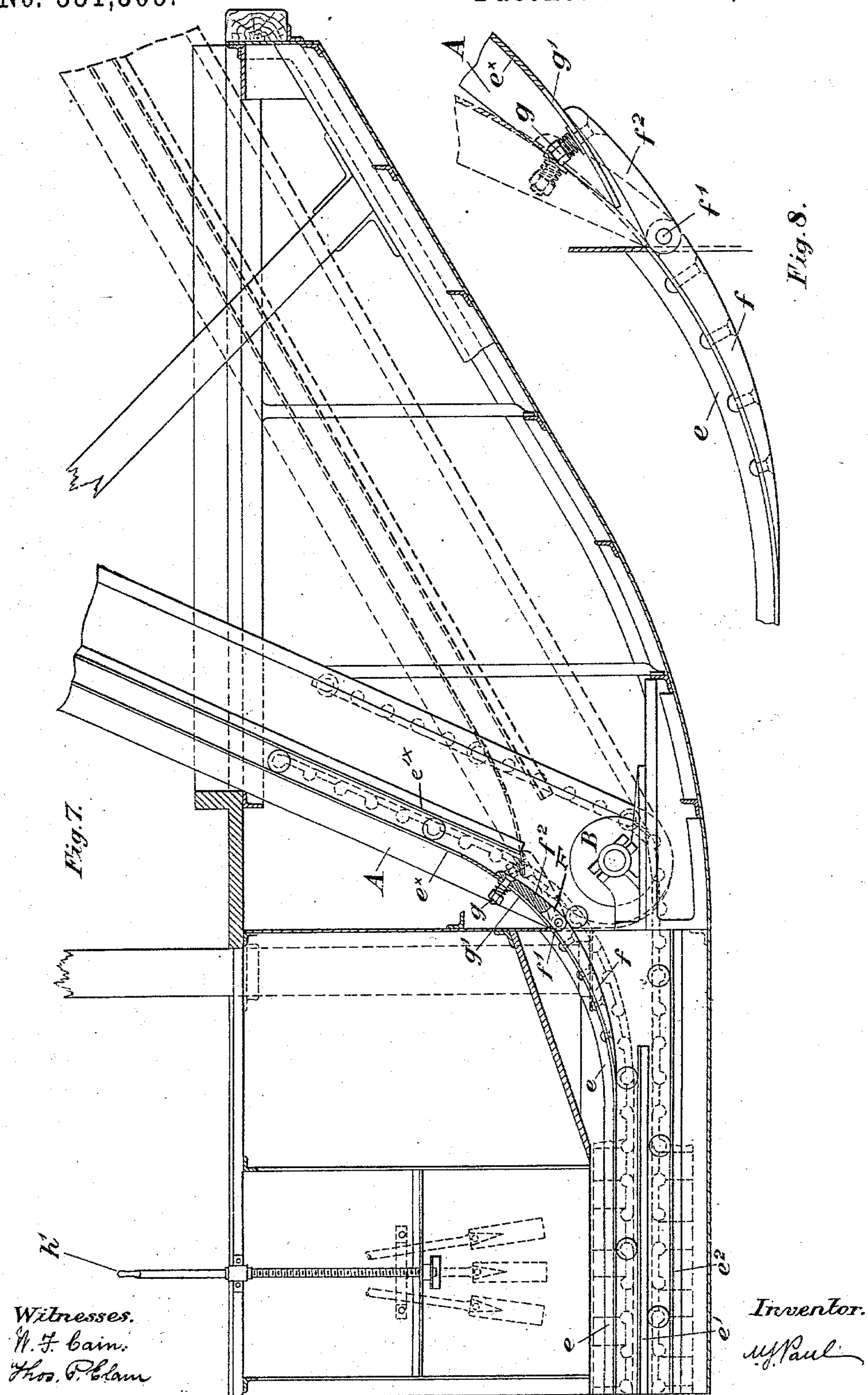
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

MICHEL JOHN PAUL, OF LONDON, ENGLAND.

MEANS FOR DISCHARGING COAL.

SPECIFICATION forming part of Letters Patent No. 551,509, dated December 17, 1895.

Application filed January 29, 1895. Serial No. 536,526. (No model.) Patented in England January 13, 1894, No. 837.

To all whom it may concern:

Be it known that I, MICHEL JOHN PAUL, a subject of the Queen of Great Britain and Ireland, residing at 4 Bedford Place, Russell Square, London, in the county of Middlesex, England, have invented certain new and useful improvements in or applicable to means for discharging coal and similar cargo from lighters or ships to ships or wharves, (in respect whereof I have obtained Letters Patent in Great Britain bearing date January 13, 1894, No. 837,) of which the following is a specification.

This invention relates to means of the general character of those described in the specification to my Letters Patent No. 475,888, dated May 31, 1892, for discharging coal and similar cargo from lighters to ships or wharves. In that specification is described a lighter furnished with an endless traveling bed extending along the floor of the lighter and passing over a pivoted derrick-arm and provided on either side with coal-bunkers whence the traveling bed is fed. There is also described a special mode of constructing the traveling bed, the chain being composed of plates of peculiar shape adapted to prevent the coal or other cargo slipping off the chain while ascending the inclined derrick-arm. The plates composing the chain are placed close together, and, although this chain is capable of performing its functions satisfactorily, the weight is found to be somewhat excessive, and there are, moreover, between the plates interstices through which fine coal and dust may escape.

One of the objects of the present invention is to provide a flexible traveling bed which is not only light, but reduces the escape of the fine or dust coal to a minimum.

Another object is to provide a hinged connecting slipper-piece to connect the guide-rails on the hinged derrick-arm with the corresponding guide-rails on the lighter; and still another object is to provide a simple means for both encouraging and checking the flow of coal from the bunkers.

The drawings illustrate an embodiment of the invention.

Figure 1 of the said drawings is a longitudinal section, and Fig. 2 a plan illustrating the

improved construction of the traveling bed. Fig. 3 is a transverse section showing the driving-drum in engagement with the axles of the traveling bed. Figs. 4, 5, and 6 are fragmentary views drawn to a larger scale, Fig. 4 being a longitudinal section showing the bed at the commencement of its ascent of the derrick-arm, Fig. 5 a view looking at the left-hand side of Fig. 4, and Fig. 6 a section taken on the line 6 6 in Fig. 4. Fig. 7 is a longitudinal vertical section of the delivery end (or bow) of a lighter fitted with my improvements. Fig. 8 is a detached view of the slipper-piece which bridges the gap between the fixed and movable guide-rails on the lighter and derrick-arm. Fig. 9 shows, in side elevation, the means I employ both for encouraging and for checking the flow of the coal from the bunkers.

In constructing a traveling bed according to my invention I employ a series of trough-shaped pieces of metal a the full width of the traveling bed, the transverse or front and rear edges a' a^2 of each piece of metal a being formed as sections of hollow cylinders. The sides of each piece a are furnished with plates b projecting to a suitable height and forming a wall or siding along each side of the traveling bed. These pieces of metal a are linked together on either side of the traveling bed. The links c are preferably arranged singly and in pairs alternately to form a Vaucauson chain, and are connected by joint-pins c' c^2 , the axes of which are coincident with the axes of the sections of the hollow cylinders forming the transverse edges a' a^2 of the trough-shaped pieces of metal a . The links c have enlarged circular ends, the enlargements being on the upper side of the links and above the general level of the same, and being embraced by the inner cylindrical parts a' , embracing said circular enlargements. Certain of the joint-pins c^3 extend from side to side of the traveling bed to form axles, and carry rollers d , which run on the rails e e' e^2 , Fig. 7. The leading edge a' of each trough-shaped piece a is a section of a cylinder of smaller diameter than the trailing edge a^2 , the difference in the diameter of the two cylinders being equal to twice the thickness of the metal of which the pieces are

made—in other words, the smaller cylinders a' fit exactly in the larger ones a^2 . Some of the troughs are furnished with backs a^3 , which may correspond in height with the side plates b . In each trough-shaped piece the edge curved to the smaller radius lies concentrically within the edge curved to the larger radius of the adjoining trough-shaped piece, the one part overlapping the other sufficiently far to allow the chain to flex or bend to the maximum extent without leaving a crack or interval between the edges. A chain constructed in this manner is practically dust-tight.

It will be noted, particularly by inspection of Figs. 1 and 4, that the sections a are made relatively very short, the links c being, of course, correspondingly short, and that there are four joints and joint-pins between each two adjacent axles carrying the wheels d . This construction imparts great flexibility to the traveling bed and enables it to adapt itself to tracks at all times.

As the traveling bed must flex upward in passing onto the inclined derrick-arm, the curved overlapping edges a' a^2 being then on the convex side of the bed, the upper lip or edge a^2 must be short enough to permit the maximum upward flexure. The trough-like pieces a will be rigidly secured in some known way to the links c .

At the foot of the derrick-arm A, near where it is pivoted to the lighter at B, the upper side of the traveling bed leaves the horizontal guide or track rails e e' , and passes to the corresponding guide or track rails e^x $e^{x'}$ on the upper face of the derrick-arm. These rails are so spaced as to permit the rollers or wheels d to pass between them freely.

As the derrick-arm A may stand at almost any angle with the horizontal, within practicable limits, it is necessary to provide means for maintaining connection between the upper guide-rails e on the lighter and the corresponding upper guide-rails e^x on the derrick-arm. This object I attain by means of a slipper-piece F, Figs. 7 and 8, which is of a curved form and bridges the space between the rails e and e^x . The forward end of the rail e is curved upward, as seen in Fig. 8, and the main fixed portion f of the slipper-piece is secured to the under side of said rail e , preferably by rivets, as shown in Fig. 8. The lower convex edge of the part f forms the track for the wheels d until they reach the point f' , where the movable part f^2 of the slipper-piece is hinged to the part f . The wheels d pass on and upward over the convex lower face of the part f^2 till they are led onto the flanged rail e^x on the derrick-arm. This rail e^x is curved at its lower extremity and slotted at g' to receive a bolt g , fixed in the forward portion f^2 of the slipper-piece and provided with a cushion-spring which holds the portion f^2 up to the slotted rail e^x with a yielding pressure. In Fig. 7 the full lines show the parts described

in one position and the dotted lines show them in another position.

It is not really of much importance whether the slipper-piece F is fixed to the guard-rail e and coupled loosely to the rail e^x , or vice versa; but being hinged to one part and coupled with a loose or slotted connection to the other part enables the traveling bed to pass smoothly from the horizontal to the upwardly-inclined track.

For the purpose both of loosening the coal when inclined to jam in the bunker and of checking its escape therefrom when too free a flow takes place, I arrange in a position adapted to control the exit from the bunker an agitator, Figs. 7 and 9, which consists of a pivoted bar h furnished with a handle h' at its upper extremity and a flattened spade-like portion h^2 at its lower end. A spike or projection i is provided as a further means for assisting in loosening the coal. I do not, however, restrict myself to this spike, for so long as the bar is adapted for being vibrated, rotated, and reciprocated it will be found capable of performing the double function described.

Having thus described my invention, I claim—

1. The combination with a track having non-movable guide-rails e , a derrick-arm, hinged at its lower end and carrying a track having guide-rails e^x , adapted to be set at an incline with respect to the non-movable track, the said track on the derrick-arm, and an endless, flexible traveling bed mounted on said tracks, of self-adjusting means for connecting the rails e and e^x , comprising a slipper-piece hinged to one of said rails and having a sliding bearing on the other rail, substantially as set forth.

2. In an apparatus for the purpose set forth, the combination with the fixed guide-rail e , the hinged derrick-arm, and the guide-rail e^x on said derrick-arm, of the slipper-piece F, comprising two parts hinged together at f' , the part f having a convex under surface and fixed to one of the guide-rails, and the part f^2 having a convex under surface and a slotted, sliding connection with the other rail, substantially as set forth.

3. In an apparatus for the purpose set forth, the combination with the fixed guide-rail e , the hinged derrick-arm and the guide-rail e^x , on said derrick-arm, of the slipper-piece F, having a part f , with a convex under surface, secured to the forward end of the rail e , and a part f^2 , having a convex under surface and hinged to the forward end of the part f , a bolt g , fixed in the part f^2 of the slipper-piece and engaging a slot g' in the rail e^x , and a cushion spring on said bolt, substantially as set forth.

MICHEL JOHN PAUL.

Witnesses:

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THOS. P. ELAM.