

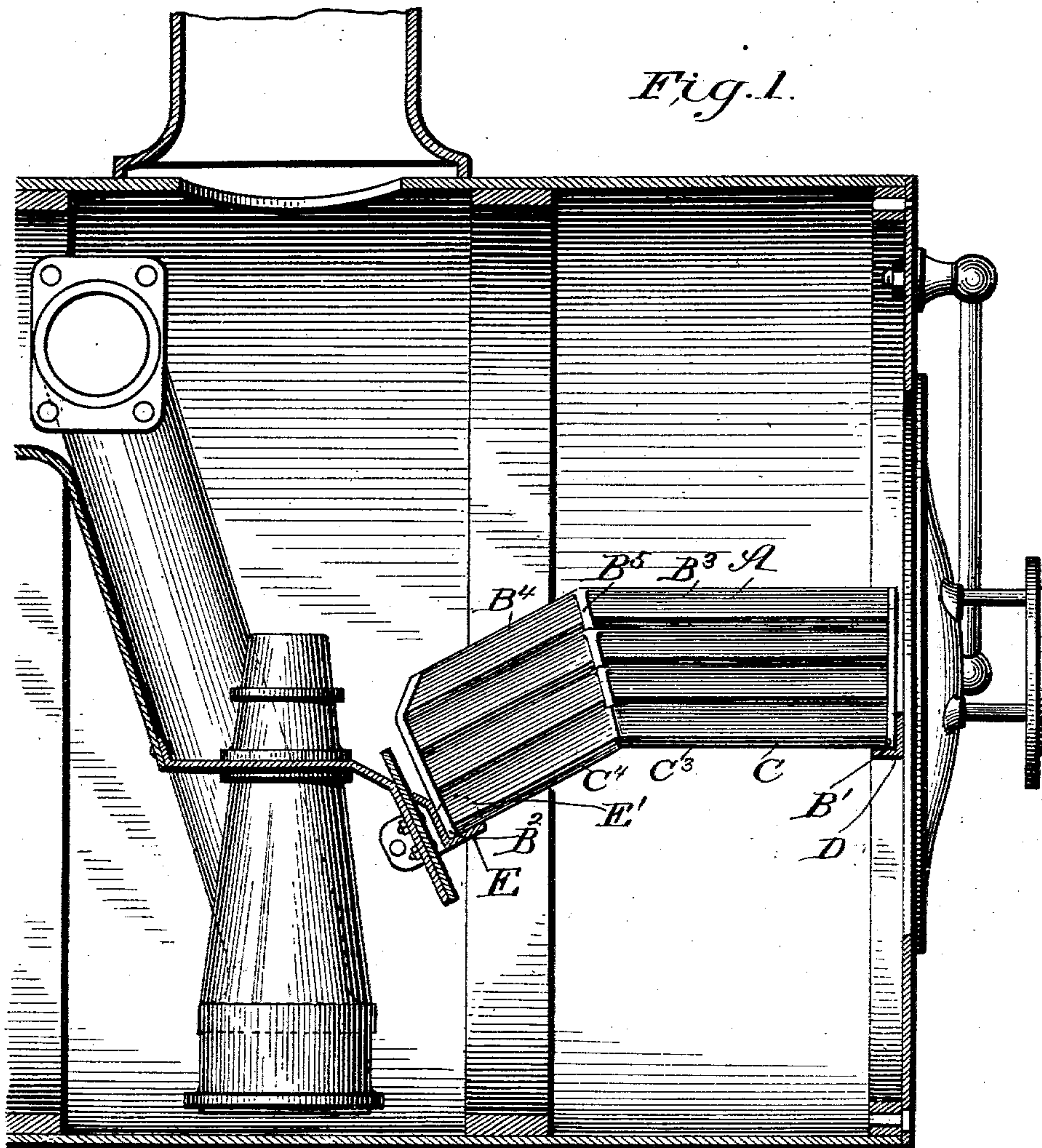
No. 740,227.

PATENTED SEPT. 29, 1903.

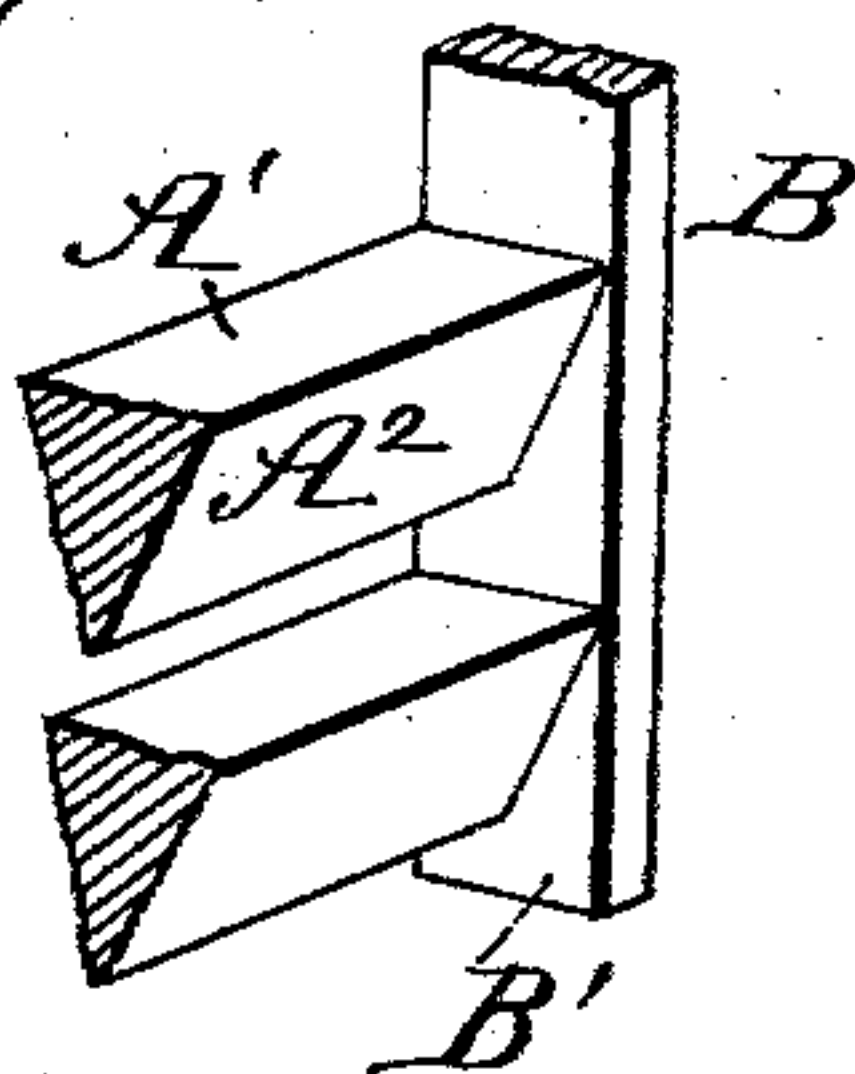
J. W. BRYANT.  
SPARK EXTINGUISHER.  
APPLICATION FILED FEB. 7, 1903.

NO MODEL.

3 SHEETS—SHEET 1



*Fig. 3.<sup>a</sup>*



WITNESSES:  
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*Perry B. Turpin*

INVENTOR  
*James W. Bryant.*  
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No. 740,227.

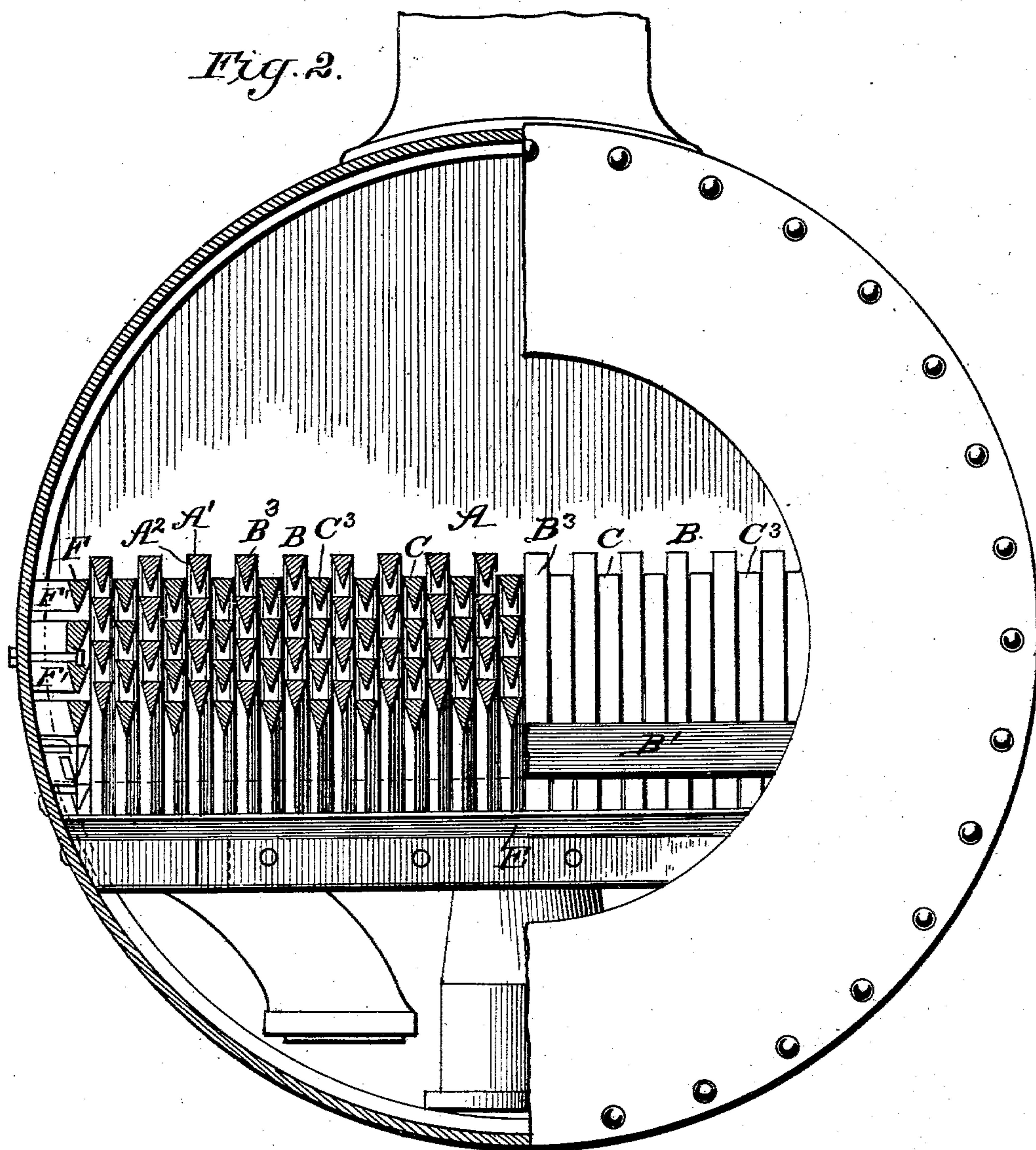
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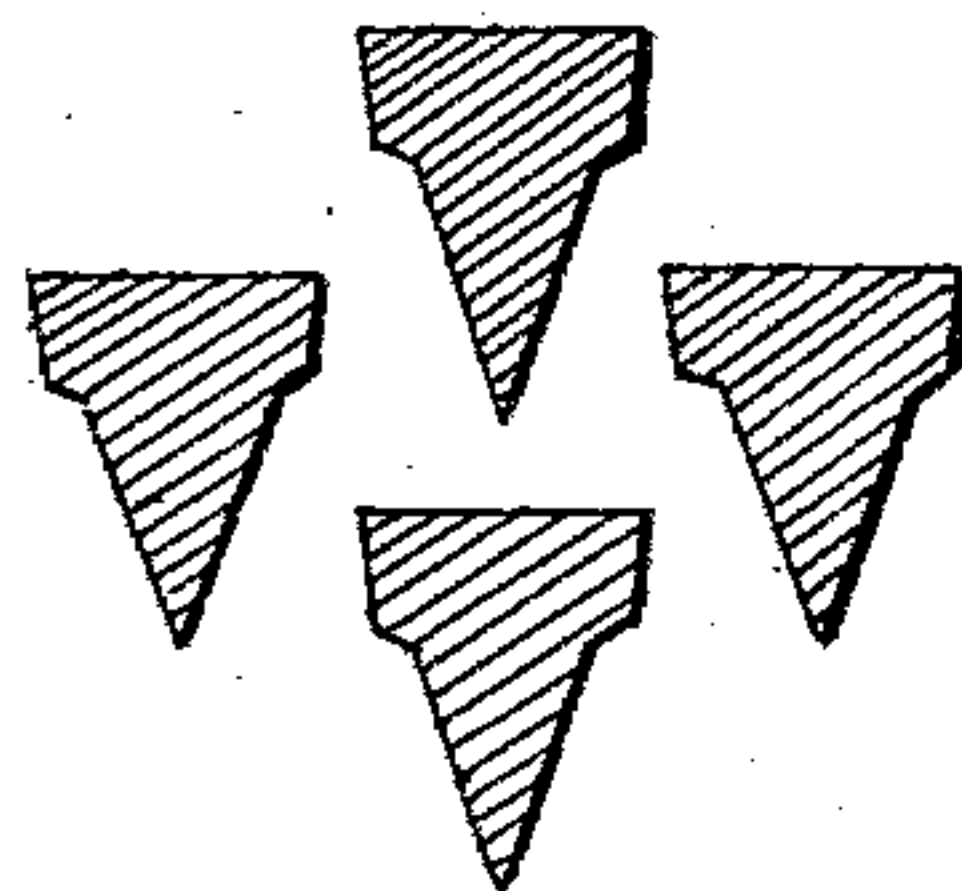
NO MODEL.

3 SHEETS—SHEET 2.

*Fig. 2.*



*Fig. 1.*



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3 SHEETS—SHEET 3.

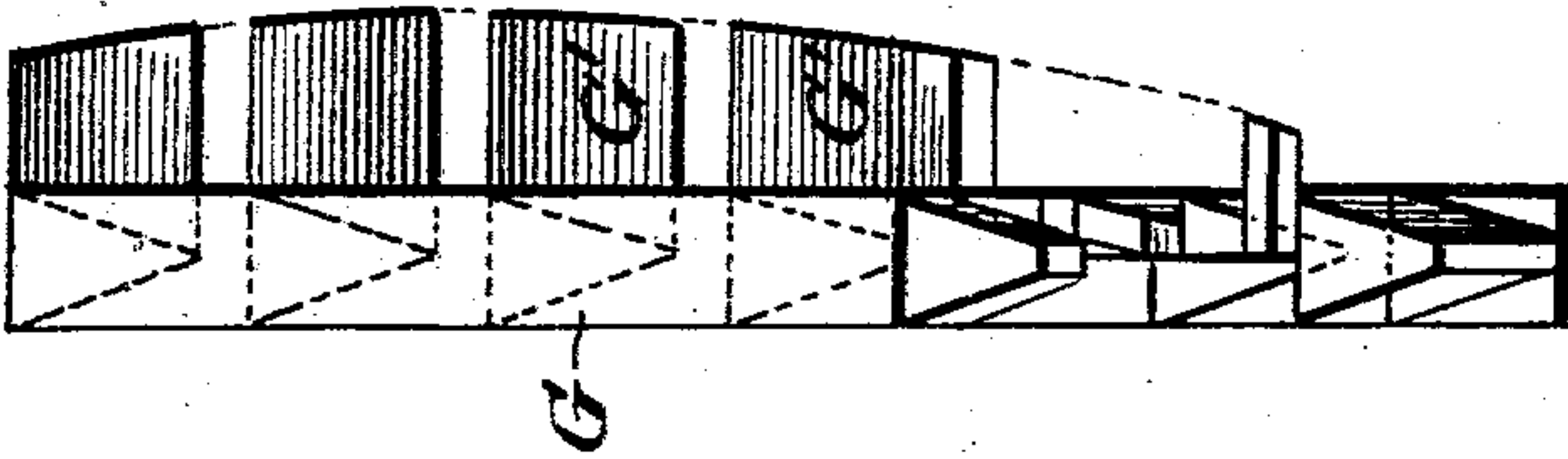


Fig. 5.

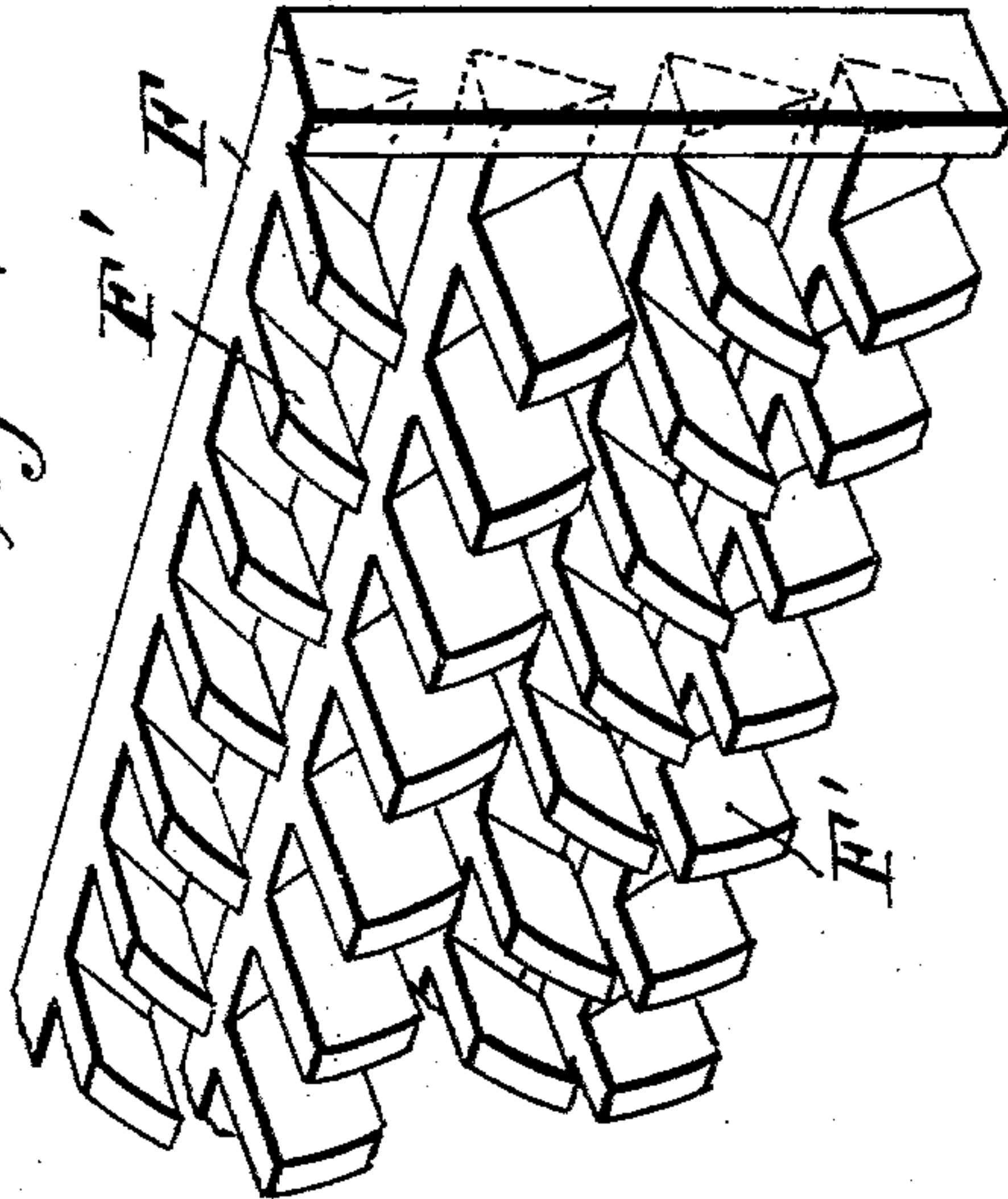


Fig. 4.

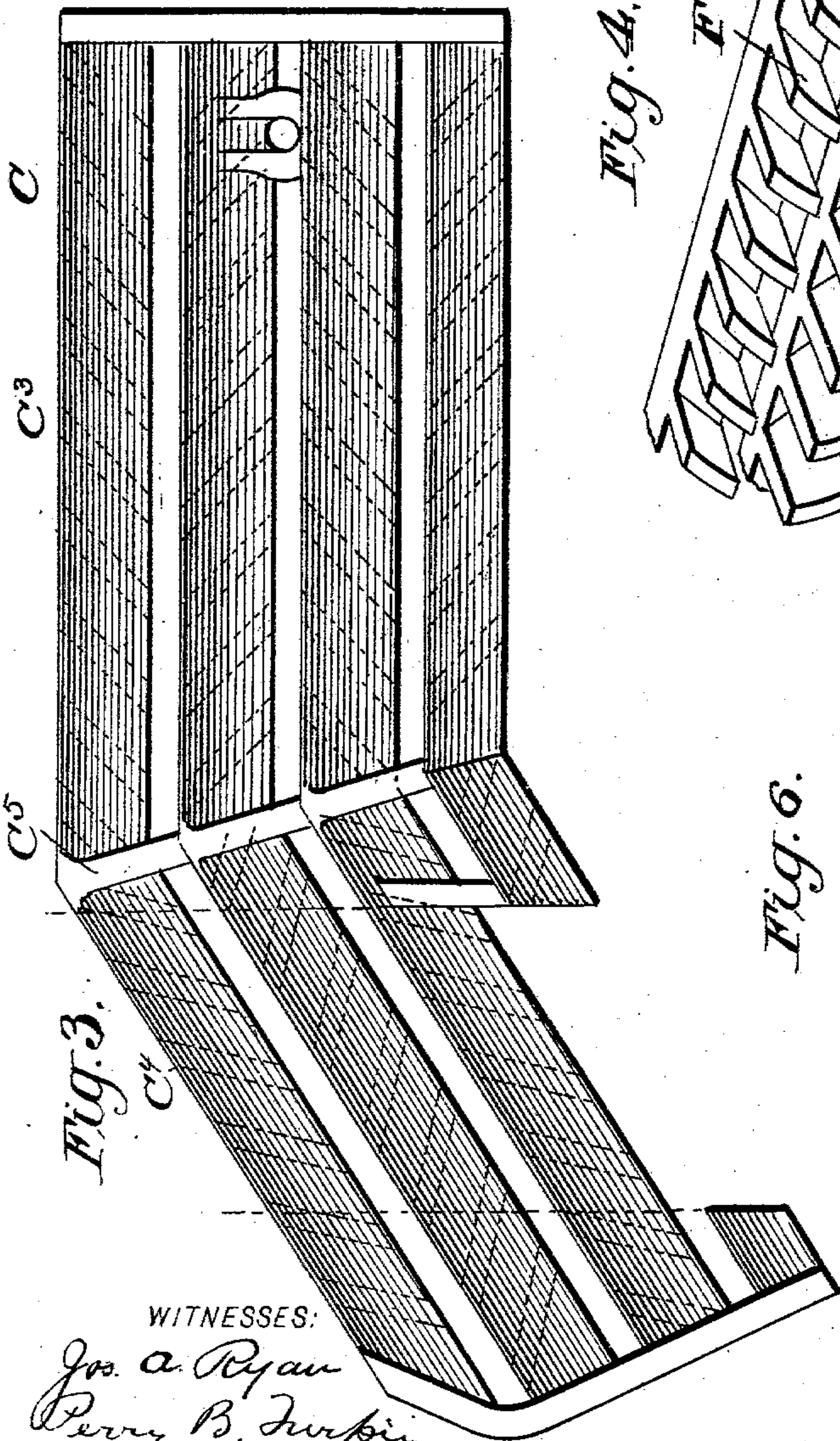


Fig. 3.

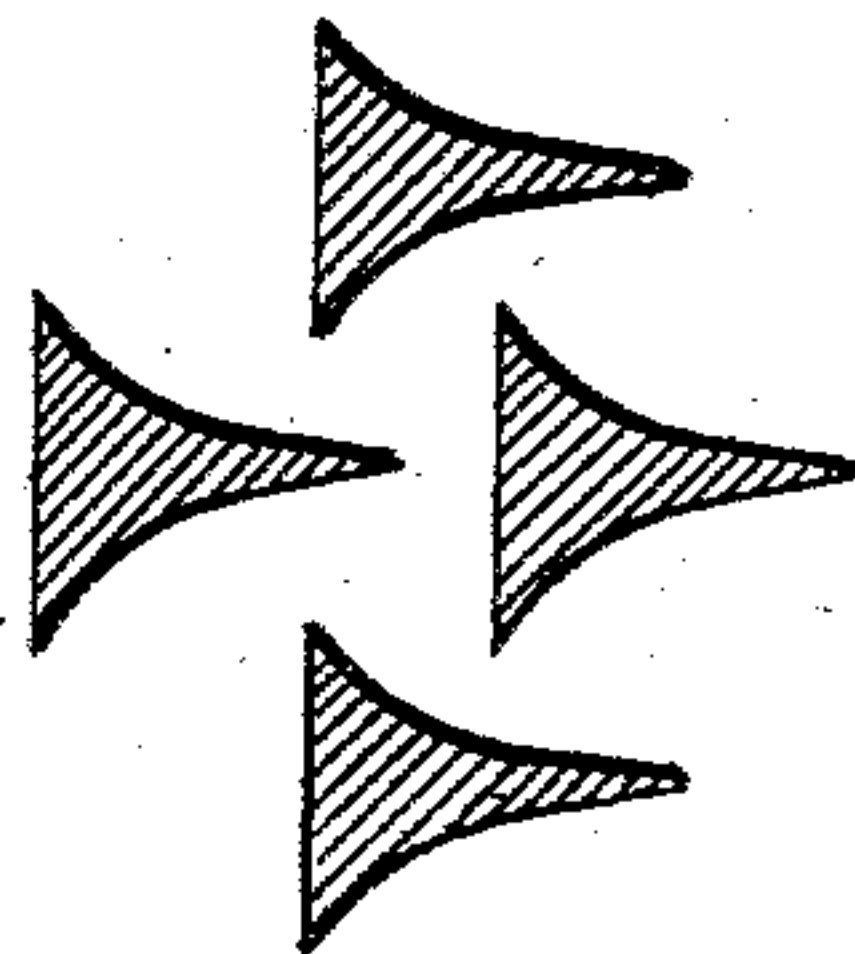


Fig. 6.

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## UNITED STATES PATENT OFFICE.

JAMES W. BRYANT, OF CREWE, VIRGINIA.

## SPARK-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 740,227, dated September 29, 1903.

Application filed February 7, 1903. Serial No. 142,324. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES W. BRYANT, a citizen of the United States, and a resident of Crewe, in the county of Nottoway and State of Virginia, have made certain new and useful Improvements in Spark-Extinguishers, of which the following is a specification.

My invention is an improvement in spark-extinguishers for use on locomotives, and has for an object to provide a simple novel construction by which to thoroughly extinguish and pulverize the sparks and cinders without impeding the discharge of same from the stack, whereby the engine will be prevented from throwing sparks or fire, the draft of the engine will be increased, and the engine will be enabled to clean its front of all cinders and sparks, so the front of the engine will be clear at all times, thus enabling a practically perfect draft; and the invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a vertical longitudinal section of the front of a locomotive provided with my improvements. Fig. 2 is a sectional front elevation of the locomotive. Fig. 3 is a side elevation of one of the intermediate grating-sections. Fig. 3<sup>a</sup> is a detail view of the front end of the other intermediate section. Fig. 4 is a detail perspective view of the front portion of one of the side grating-sections. Fig. 5 is a front elevation of the other side section. Fig. 6 illustrates a somewhat different form of grating-bar, and Fig. 7 illustrates a still different form of grating-bar.

In carrying out my invention I seek to provide between the diaphragm and the stack a grating crossing the passage for the products of combustion and operating upon the sparks or cinders in such manner as to thoroughly pulverize the same and extinguish any fire without preventing the passage of the sparks or cinders or of the pulverized resultant. In the construction shown I effect this by means of a series of staggered bars extending transversely the passage for the products of combustion and arranged in vertical and lateral series to provide throughout the space for the passage of the products a grating which will

operate upon the sparks and cinders, causing the same to take a zigzag course through the grating and will at the same time by the force of the draft cause the sparks or cinders to strike against the downwardly-facing surfaces of the adjacent bars in such manner as to be thoroughly pulverized or disintegrated in their course through the grating. As shown, the bars A taper downwardly, presenting at their lower edges a comparatively sharp edge and gradually widening toward their upper edges. This may be effected by forming the bars with flat faces A' and A<sup>2</sup>, the faces A<sup>2</sup> extending from the top faces A' on straight lines to the lower edge of the bar, as shown in Fig. 2. It may, however, be desirable in some instances to curve or concave the downwardly-facing surfaces of the bar, as shown in Fig. 6, and this may be desirable in order to bring the adjacent bars nearly together without decreasing the space between them for the passage of the sparks, and manifestly the bars may be otherwise shaped in cross-section without departing from some of the broad principles of my invention. I prefer, however, to make them downwardly tapering in cross-section, as shown, as thereby the surfaces are provided to be impinged by the sparks as they are forced upward by the draft through the grating, and the sharp edges do not unnecessarily limit the draft through the grating.

It will be noticed that the several bars are arranged in vertical series and that the bars of one upright or vertical series are staggered with respect to the bars of the adjacent upright series, so that I secure the baffling-passages for the sparks or cinders as they pass to the stack.

In constructing the grating I prefer to make it in a series of upright sections, each section carrying an upright series of grate-bars and the alternate sections being alike and being similar to the adjacent sections except that the sections B are slightly higher than the sections C, this being secured by providing the sections B with feet B' and B<sup>2</sup> at their front and rear ends to so elevate them as to secure the staggered relation between their bars A and the corresponding bars of the shorter sections C. Manifestly this staggered relation might be otherwise secured; but I



find the means shown to be simple and efficient for the purpose, and therefore prefer it. These upright sections B and C are mounted at their front and rear ends on supporting-rails D and E, consisting, preferably, of angle-irons suitably secured in front of the locomotive, the iron D being riveted to the front plate of the locomotive, while the iron E has at its ends flanges E' riveted to the sides of the locomotive-front, as shown. These sections B and C are held by gravity on their supporting-plates, and the sections are composed, as shown, of the front wings B<sup>3</sup> and C<sup>3</sup> and the rear wings B<sup>4</sup> and C<sup>4</sup>, the rear wings inclining downwardly, as shown, this construction being preferred, as it enables ready access to the portions of the locomotive, especially in the neighborhood of the exhaust-nozzles. It will also be noticed that the front rail for supporting the sections B and C is arranged at a point above the bottom of the said doorway about one-third of the diameter of the door-opening, thus permitting convenient access to the interior of the locomotive-front above and below the grating.

In forming the wings B<sup>3</sup> C<sup>3</sup> and B<sup>4</sup> C<sup>4</sup> a comparatively abrupt angle is formed, as shown, and to strengthen the upright sections and prevent breakage at the angle it is preferred to provide the sections at such point with the strengthening-ribs B<sup>5</sup> and C<sup>5</sup> at the opposite sides of the sections, as will be understood from the drawings. As the sections B and C are arranged upright within and across the cylindrical front of the locomotive, it will be noticed they will leave spaces at the opposite sides, resulting from the curvature of the cylindrical front. To occupy these spaces and to prevent cinders and sparks and the like from passing freely to the stack at the sides of the front, I provide the opposite side sections F and G, which, like the sections B and C, are provided with longitudinal bars tapering downwardly, as shown in the detail, Figs. 4 and 5. These longitudinal tapered bars of the sections F and G are provided on their outer sides with the outwardly-projecting lugs F' and G', whose outer edges conform to the inner curvature of the cylindrical front. These lugs F' and G' incline reversely on the adjacent longitudinal bars of the sections F and G, so that the sparks and cinders as they pass upward will be forced to traverse a zigzag course and will be extinguished and powdered or granulated as they pass upwardly to the opposite sides of the grating.

It will be understood from the foregoing description and the accompanying drawings that by my invention I provide a grating which crosses the passage for the products of combustion and operates to powder or granulate the cinders as they pass to the stack, thoroughly extinguishing all fire without stopping the cinders to clog the front of the

locomotive, so that I prevent the engine from throwing fire or sparks, and also by keeping the front of the locomotive clear of sparks or cinders enable a practically perfect draft of the locomotive at all times.

By constructing the grating in sections, as shown, I am able to cheaply produce an appliance and also to readily employ the invention in locomotives already in use. This sectional construction of the grating also enables me to readily replace sections which may become worn or broken at any time without necessitating the renewal of the entire grating.

In applying my invention to locomotives already in use it is only necessary to secure the rails D and E within the locomotive-front in suitable position—such, for instance, as shown—and insert the gratings through the door and support the same on the rails, as shown.

As shown, it is preferred to arrange the front rail to cross the doorway in such manner as to permit access above and below the grating-sections; but manifestly while I prefer to arrange the grating to cross the doorway I do not desire to be limited to such specific arrangement in the broad features of my invention.

In Fig. 7 I show another form of bar which will increase the baffling effect of the device and not decrease the draft. Manifestly this bar may be employed in some instances without departing from some of the broad principles of my invention.

It will be understood from the foregoing description that by my invention I do not arrest the passage of the sparks or cinders; but I permit a comparatively free passage thereof to the stack, meanwhile causing the sparks to successively strike the downwardly-tapering surfaces of the bars and be deflected successively from the several bars as the sparks pass through the grating.

In Fig. 7 I show a specific construction of the grate-bars in which the bars are provided at their upper edges with the laterally-projecting ribs or beads, and this may be preferred in same instances.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A spark-extinguisher for locomotives comprising a series of upright sections fitting side by side and provided each with longitudinal bars tapering downwardly toward their lower edges and arranged with the bars of one section staggered with respect to those of the adjacent sections, and upright side sections fitting alongside the outer upright sections and having longitudinal downwardly-tapering bars and provided with lugs projecting outwardly from the said bars and rounded on their outer edges to coincide with the rounded sides of the locomotive-front, said upright sections being formed of front or



main wings and rear wings deflected downwardly at an incline from the rear ends of the main wings, and bracing-ribs at the angle between the main and rear downwardly-inclined wings substantially as set forth.

2. A locomotive provided at its front across the passage for the products of combustion passing to the stack with a grating comprising a series of longitudinally-extending bars arranged in close proximity and tapering toward their lower edges and a series of bars above those of the tapered series and staggered with relation thereto and located in such proximity to the bars of the first series that the sparks, &c., striking the tapered lower edges of the first series will be deflected, as they pass upward, against the bars of the upper series substantially as set forth.

3. A locomotive provided at its front across the passage for the products of combustion passing to the stack, with a grating comprising a series of bars extending vertically and laterally and staggered relatively and tapered toward their lower edges, and the bars being located in such proximity that the upwardly-ascending sparks, cinders, &c., will strike the downwardly-tapering surfaces of the bars and be deflected thence against the bars laterally to and above said surfaces substantially as set forth.

4. A spark-extinguisher comprising bars arranged in vertical and lateral series with the bars of the vertical series staggered relatively to those of the adjacent vertical series and tapered toward their lower edges and the bars being located in such proximity that the upwardly-ascending sparks, cinders, &c., will strike the downwardly-tapering surfaces of the bars and be deflected thence against the bars laterally to and above said surfaces substantially as set forth.

5. A spark-extinguisher comprising a grating composed of bars arranged in vertical and lateral series and tapering toward their lower edges, the bars of the adjacent vertical series being staggered and the bars being located in such proximity that the upwardly-ascending sparks, cinders, &c., will strike the downwardly-tapering surfaces of the bars and be deflected thence against the bars laterally to and above said surfaces substantially as described.

6. A spark-extinguisher provided at its opposite sides with outwardly-extending lugs curved at their outer edges to coincide with the curvature of a locomotive-front and staggered whereby to produce a zigzag passage for the products passing through them substantially as described.

7. A spark-extinguisher having vertical and lateral series of bars forming a grating for the passage of the products of combustion and provided at its opposite sides with laterally-projecting lugs staggered relatively and conforming at their outer edges to the curvature of the locomotive-front substantially as described.

8. A spark-extinguisher comprising a grating adapted for the passage through it of the products of combustion and having a series of succeeding, staggered, reversely-inclined downwardly-facing surfaces whereby the sparks and cinders may be forced by the draft to strike successively against reversely-inclined surfaces and be deflected from one surface to the succeeding higher surface substantially as set forth.

9. A spark-extinguisher comprising a grating composed of a series of downwardly-tapering bars arranged in close proximity and bars above and in position to be impinged by the sparks deflected by the tapered surfaces of said bars substantially as described.

10. A spark-extinguisher comprising a grating having vertical and lateral series of bars arranged in close proximity and provided at its opposite sides with upright sections having downwardly-tapering bars and lugs extending laterally from said bars and inclined to the vertical and conforming at their outer edges to the curvature of the locomotive-front.

11. A locomotive provided at its front across the passage for the products of combustion passing to the stack with a grating comprising a series of bars extending vertically and laterally and staggered relatively, said bars being tapered toward their lower edges to afford surfaces for the sparks to strike and be deflected to the higher bars in their passage to the stack without arresting the sparks substantially as and for the purposes set forth.

12. A locomotive provided in its front with a grating composed of a series of bars arranged in close proximity and extending at its front edge across the doorway of the front about midway between the upper and lower edges thereof, whereby to permit access through said doorway above and below the grating substantially as described.

13. A locomotive having in its front a spark-extinguishing grate crossing at its end the doorway of the front about midway between the upper and lower edges of said doorway whereby to permit access through the doorway above and below the grating, the latter having its rear portion inclined downwardly substantially as set forth.

14. The combination with a locomotive-front of the front and rear rails secured therein, and the grating supported on said rails and having downwardly-tapering longitudinal bars arranged in vertical and lateral series and in close proximity whereby the sparks in passing upward will be deflected from the tapered surfaces of the bars against the tapered surfaces of the succeeding upper lateral bars substantially as set forth.

15. A spark-extinguisher consisting of a grating composed of the series of upright sections having longitudinal bars arranged in series one above the other, the upright sections being arranged side by side substantially as set forth.



16. The combination with the locomotive-front and the front and rear angle-arms therein for the grating, of the grating consisting of the series of upright sections provided each  
5 with a series of solid triangular bars arranged one above the other, the sections being arranged side by side and mounted on said angle-arms substantially as set forth.

17. In a spark-extinguisher a grating-section provided with a series of longitudinal bars arranged one above the other and tapering toward their lower edges substantially as set forth.

18. A spark-extinguisher consisting of a  
15 grating composed of a series of upright sections arranged side by side and having each longitudinal bars tapering toward their lower edges, and the side sections having longitudinal bars tapering toward their lower edges  
20 and provided with laterally-projecting lugs inclined to the vertical and conforming at their outer edges to the curvature of a locomotive-front substantially as described.

19. A spark-extinguisher for locomotives  
25 having longitudinal and lateral series of bars and spaced apart to afford a passage for the products of combustion and arranged in such proximity as to cause the sparks to strike and be deflected successively from the several  
30 bars against the succeeding upper lateral bars as they pass through the grating substantially as described.

20. The combination with a locomotive-front of the front rail secured within the front  
35 and crossing the doorway thereof, the rear rail arranged adjacent to the diaphragm-plate

and below the front rail, and the grating supported at its front end on the front rail and at its rear end on the rear rail and having a main or front section arranged approximately  
40 horizontal, and a rear section inclining downwardly to the rear rail substantially as set forth.

21. A locomotive provided with a spark-extinguisher composed of a series of bars which  
45 are triangular in cross-section and are provided at their upper edges with outwardly-projecting ribs or beads substantially as described.

22. A spark-extinguisher comprising a series of upright sections arranged side by side and in close proximity and provided each with a series of bars tapering toward their lower edges and arranged one above the other, the bars of each section alternating with those  
50 of the adjacent sections whereby there is provided staggered passages for the sparks in the passage thereof to the stack substantially as and for the purposes set forth.

23. The combination of the front, the stack,  
60 and the extinguisher arranged below the stack and comprising a series of upright sections arranged side by side and provided each with a series of bars arranged one above the other, and the side sections being provided  
65 with laterally-projecting portions conforming to the curvature of the front substantially as set forth.

JAMES W. BRYANT.

Witnesses:

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C. D. EPES.