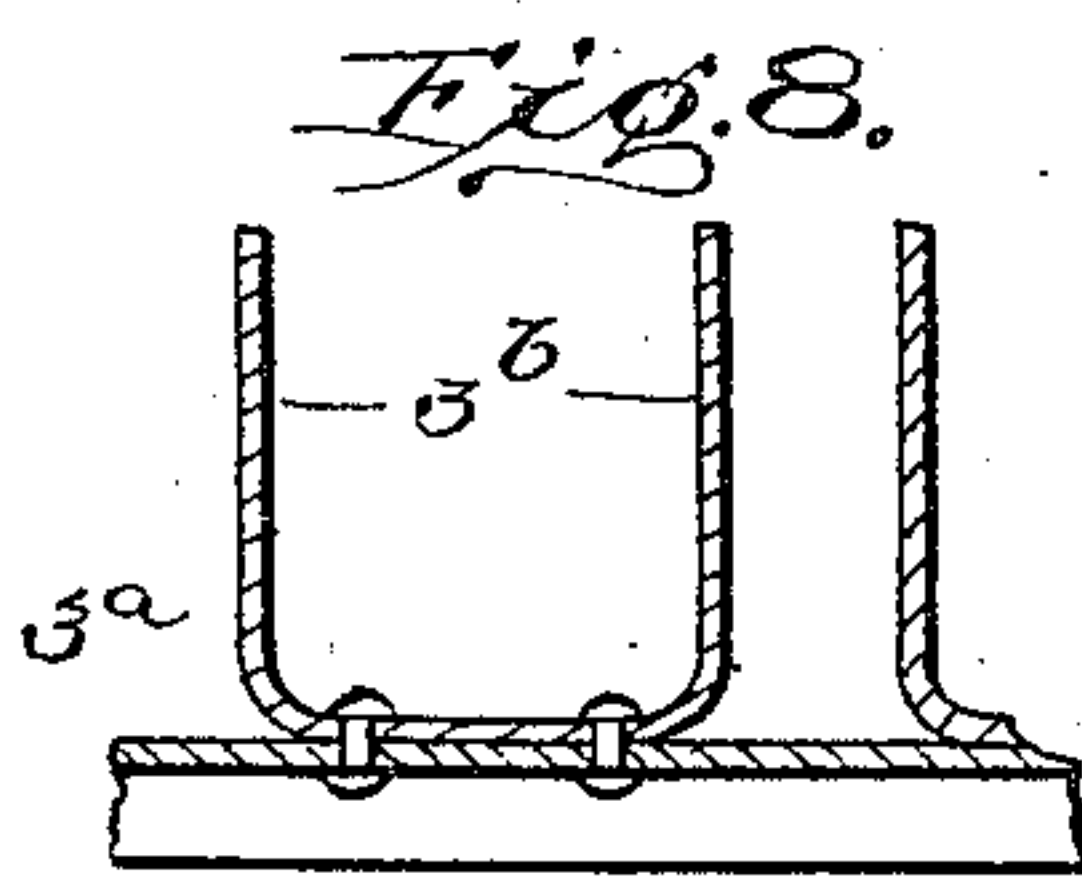
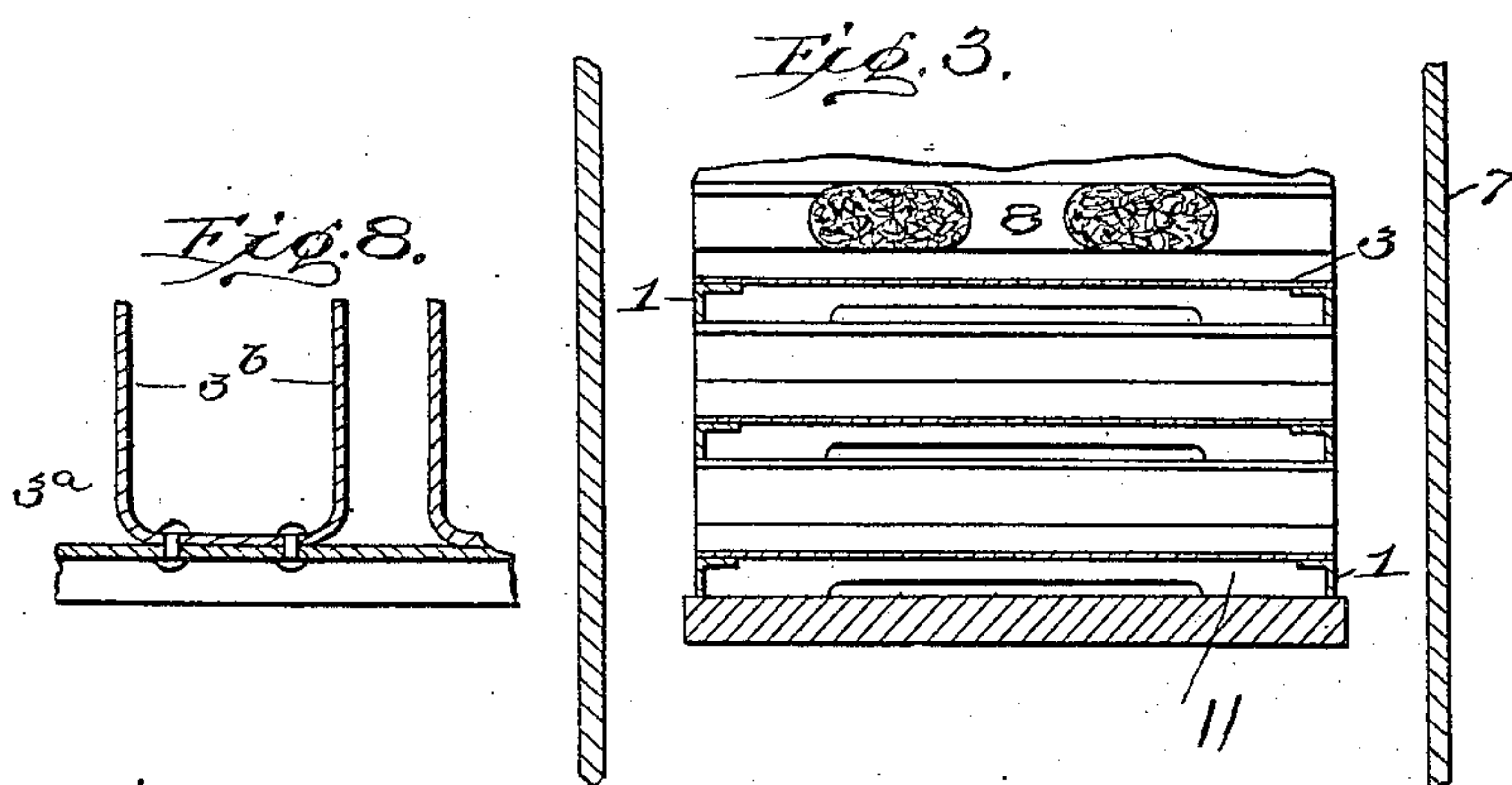
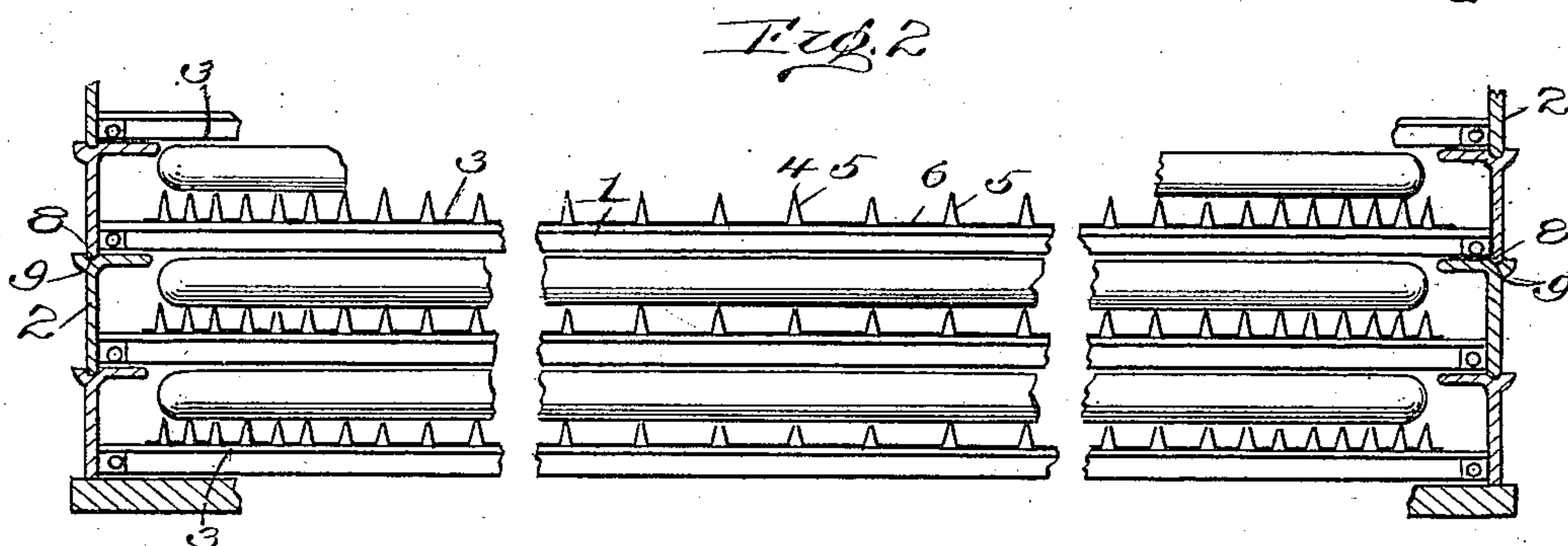
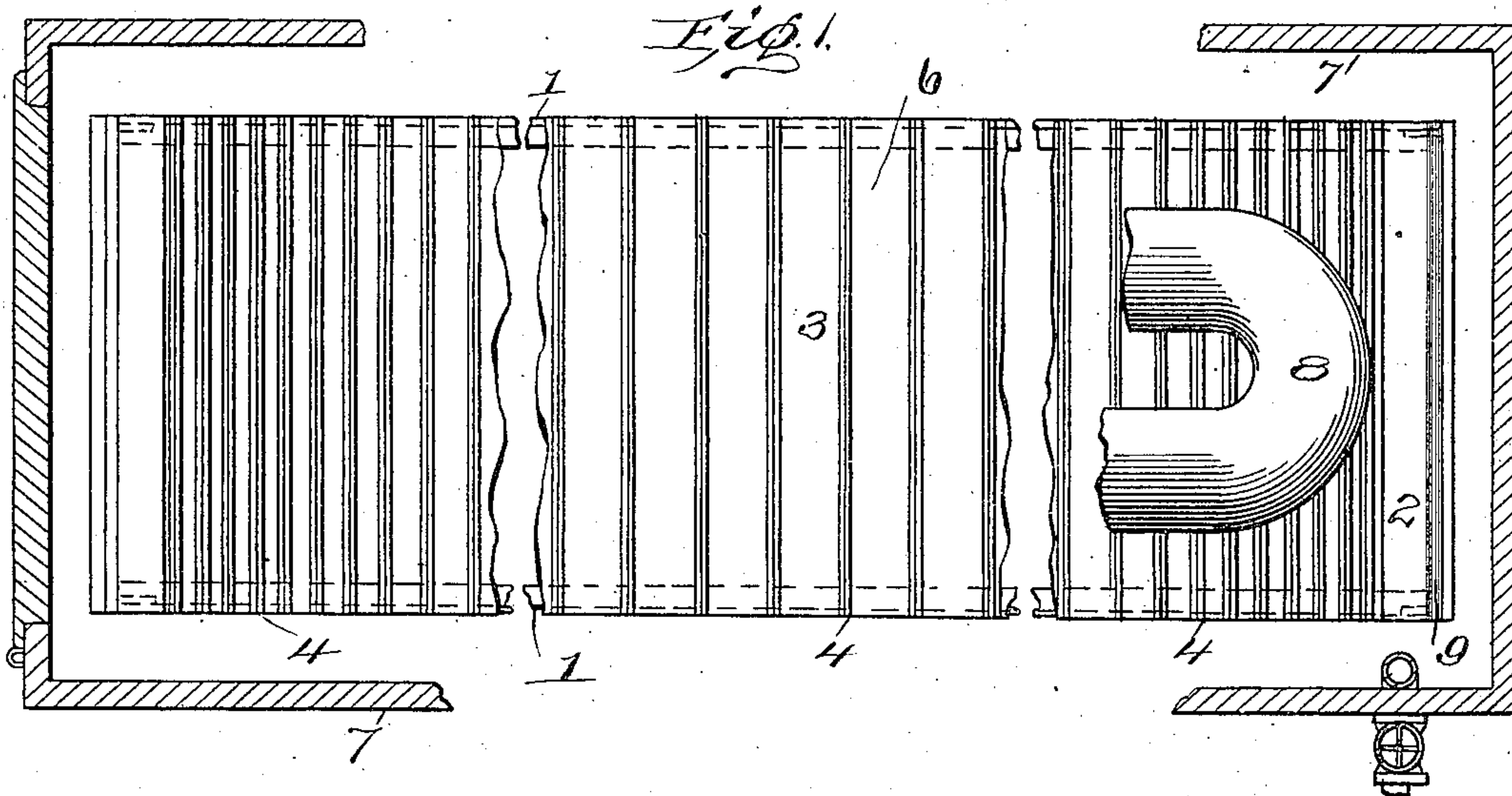


No. 843,510.

PATENTED FEB. 5, 1907.

W. G. WILLIAMS.  
STEAMING APPARATUS.  
APPLICATION FILED JUNE 13, 1905.

2 SHEETS—SHEET 1.



Witnesses  
*J. M. Fowler Jr.*  
*Edwin C. Crooman.*

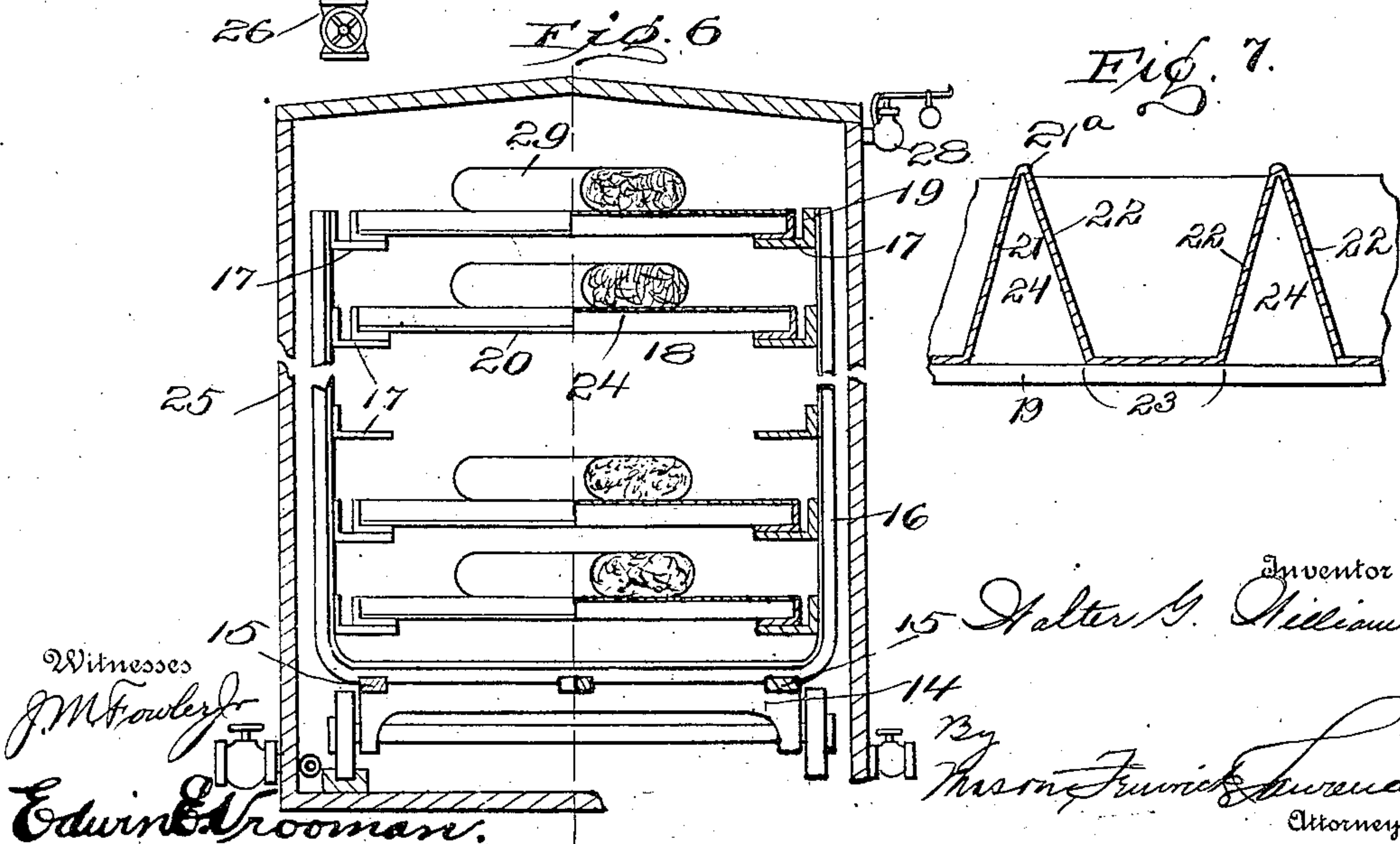
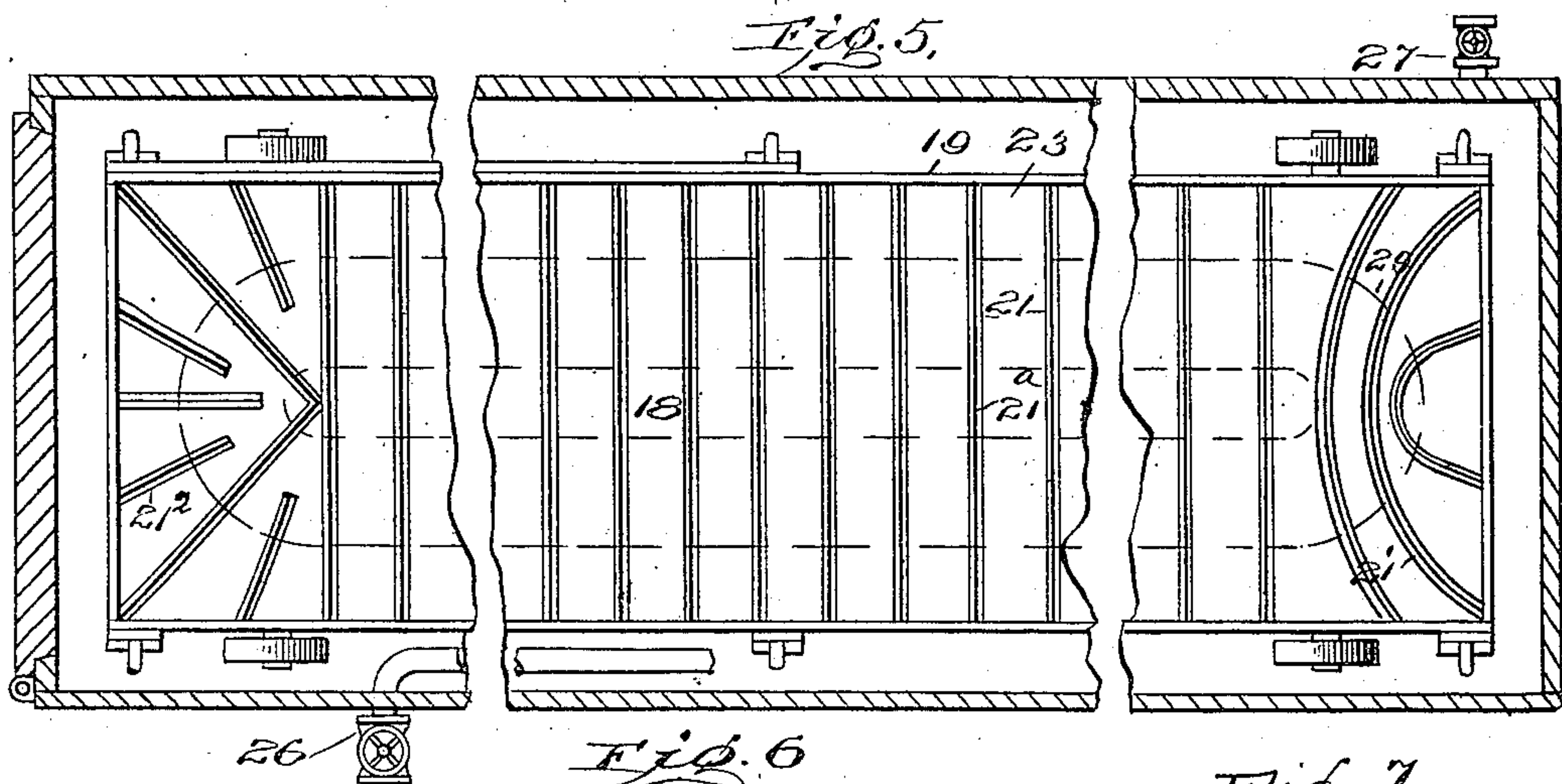
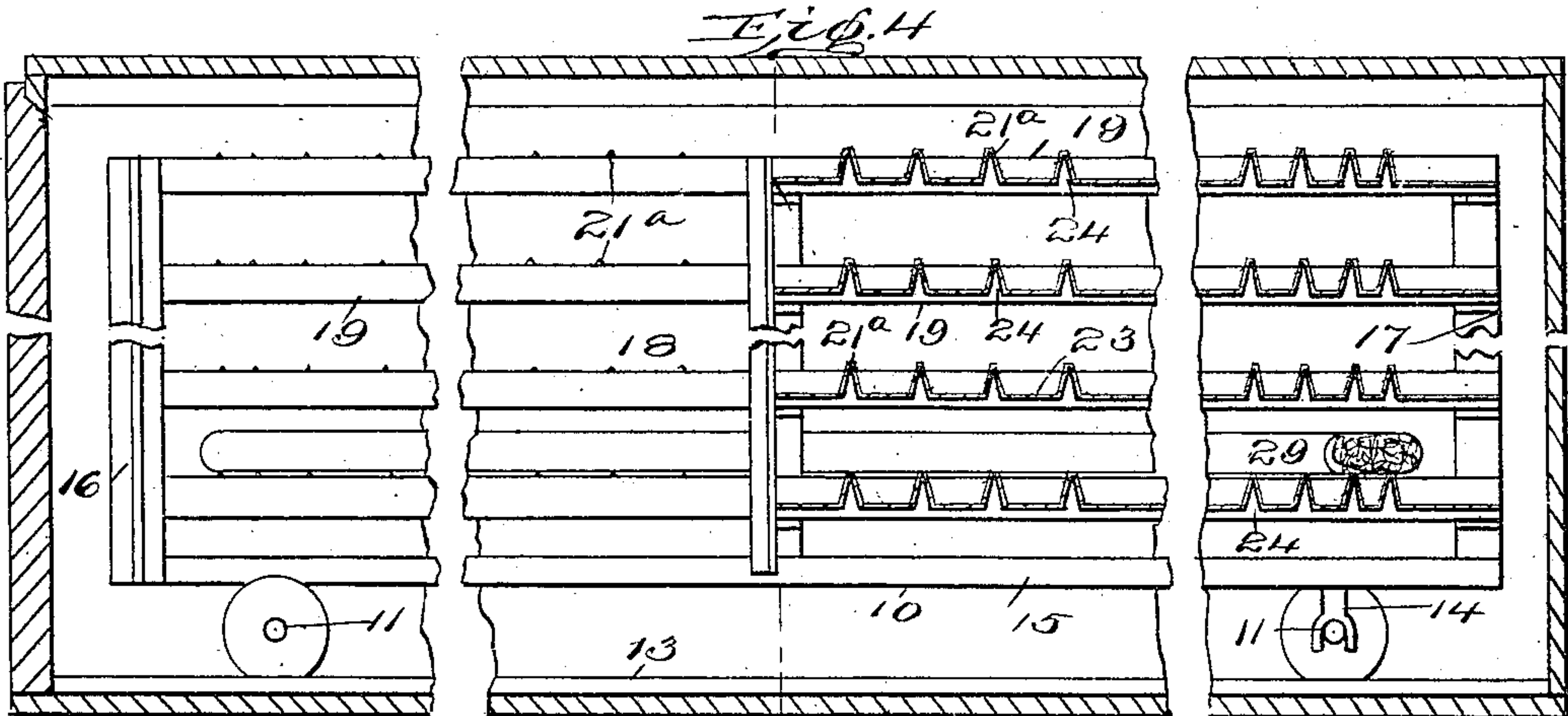
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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ELEVEN-TWENTIETHS TO CHARLES J. McLAIN, OF NEW YORK, N. Y.

## STEAMING APPARATUS.

No. 843,510.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed June 13, 1905. Serial No. 265,101.

*To all whom it may concern:*

Be it known that I, WALTER G. WILLIAMS, a subject of the King of Great Britain, residing at Thompsonville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Steaming Apparatus; 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 appertains to make and use the same.

This invention relates to certain new and useful improvements in apparatus for subjecting fabrics of various kinds to a steaming process, and more particularly to means for supporting said fabrics while they are undergoing such a process.

My improvements are applicable to the steaming of printed yarns as are used in the manufacture of tapestry carpets after said yarns have been printed in the usual manner, and I will therefore hereinafter refer more particularly to the steaming of such yarns, without, however, limiting the use of my appliances to such purpose.

Yarns which are to be printed are generally wound around a drum in a thin continuous and uniform layer, preferably of the thickness of one thread, and liquid coloring-matter, thickened by the addition of flour, paste, or similar substances, is then applied thereto by color-wheels in streaks running parallel with the axis of the drum, so as to give to the particular thread which is being printed the different colors and shades which the respective pattern of carpet to be produced calls for, the thread after being wound showing the same succession of shades and colors in every length equal to the circumference of the drum. Either during such printing operation or immediately thereafter and while the yarn is still on the drum the color is further forced into it by means of scrapers, either operated automatically or by the hands of the operators. These manipulations serve to distribute the color in an approximately uniform manner over and through the yarn; but it requires the mechanical action of steam upon the yarn and the colors to thoroughly fix said colors, so that they shall not be liable to be washed out during the subsequent scouring of the yarn. For that purpose I put the hanks of yarn as

are still in a moist condition upon the horizontal frames of peculiar construction, suitably placed one above the other, and while inclosing the frames in a suitable chamber or housing I conduct into said housing and maintain therein for about half an hour steam under about five-pounds pressure, afterward scouring the yarns, drying it, straightening it out, and putting it in a setting-frame, so as to place the various threads which are to be woven into the carpet into their proper relative positions, after which the weaving itself takes place. To obtain proper results, it is of the utmost importance that the yarns while so undergoing a steaming process be heated uniformly throughout, so that its texture and its length be not affected by the steaming process or by contact with the frame supporting it, that the running of different colors into each other be guarded against, and that any water produced by the condensation of the steam be carried off promptly and without being permitted to come in further contact with the yarn.

One of the numerous objects of my invention is to provide a peculiarly-constructed frame for supporting the yarn which will readily meet these requirements and in addition shall be of simple construction, durable, and compact, so as to permit of utilizing the space in the steaming-room for the steaming of the greatest possible quantity of yarn at a time.

Another object of the invention is the construction of a frame which will permit steam to pass entirely around the yarn which is supported thereon when said frame is positioned within a suitable housing—as, for instance, a steaming-box.

With these and other objects in view the invention consists of certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the claims hereto appended.

In the drawings, Figure 1 is a plan view of a steaming-frame constructed in accordance with the present invention. Fig. 2 is a longitudinal vertical section of a plurality of steaming-frames in their proper relative positions. Fig. 3 is a transverse sectional view taken on line 3 3, Fig. 2. Fig. 4 is a longitudinal vertical section of the steaming-cham-



ber, showing on the left-hand side half of the carriage of my improved steaming-frames in side view and on the right-hand side the other half of said carriage in longitudinal section. Fig. 5 is a longitudinal sectional view of a steaming-chamber or housing and a top plan view of a carriage with steaming-frames placed thereon as depicted in Fig. 4. Fig. 6 is a transverse sectional view of the steaming-chamber, the left-hand portion showing an end view and the right-hand side a vertical section of the carriage. Fig. 7 is an enlarged fragmentary longitudinal sectional view of the steaming-frame depicted in Figs. 4 to 6. Fig. 8 is an enlarged fragmentary longitudinal sectional view of another embodiment of the present invention.

Referring to the drawings by numerals, 1 designates longitudinal girders, which are preferably arranged parallel and made of angle-iron, and 2 2 two end connections between said longitudinal girders 1. A corrugated or fluted member or plate is carried by the girders 1. The corrugated or fluted member or plate 3, which is supported by means of the girders 1, is preferably constructed of sheet metal, such as aluminium. Aluminium is preferably used for the reason that it resists the action of the acids that are contained in the color of the substances generally employed in dyeing yarns. The member or plate 3 is corrugated or fluted, so as to have the upper edges 4 of said corrugations, upon which the hanks of yarn are intended to rest, terminate in narrow ridges which run substantially at right angles to said girders 1, the walls of the corrugations being preferably made to slope downward abruptly, so as to readily and promptly carry downward from the yarn in condensed steam or other liquid to deposit the same upon the portions 6 of the member or plate 3 between said corrugations.

7 is a steaming-box or housing in which the steaming-frames are inserted, said box being constructed in the usual manner, so as to admit steam at the bottom and discharge it at the top, its walls coming within a few inches of the edges of the frame. A hank of yarn resting upon such a frame is indicated by 8, and as ridges 4 in the present instance extend above the longitudinal parallel girders 1, upon which they are supported, such ridges 4, however, at the same time being placed beneath the lower edges of the longitudinal girders of the steaming-frame directly above the same, it will be seen that there are longitudinal spaces left between the girders of adjoining steaming-frames at the same elevation with the hank of yarn, so as to permit free and uninterrupted circulation of steam to and through such yarn and laterally along the sloping sides of the corrugations, as well as along the upper and lower surface. The ridges 4 are placed closer to-

gether near the ends of the steaming-frame. The horizontal corrugated member or plate 3 has its ridges 4 formed closer together near the ends, so as to provide adequate supports there for the curved portions of the hank, it being advisable to lay the hank upon the frame in the form shown in Fig. 1, so as to avoid parts of the hanks which are colored differently touching each other. The end connections 2 are preferably made of greater depth than the longitudinal girders, so as to permit of supporting the successive steaming-frames one upon the other, suitable feet 8 being provided on the under side of the various cross connections 2, fitting into corresponding sockets 9 on the upper surfaces of the cross connections on the steaming-frame directly underneath. The girders are secured to the cross connections 2 near their base. The bottom of the end or cross connections 2 of an upper frame rests on the grooved top of the end connections of the next frame underneath.

Referring to the embodiment depicted in Figs. 4 to 6, 10 is a carriage comprising axles 11, wheels 12, journaled upon said axles 11 and traveling on rails 13. Yokes 14 are supported on said axles, and longitudinal stringers 15 are secured to said yokes. Frames 16 are positioned upon the stringers 15, each of said frames 16 being formed, preferably, of T-iron and are substantially U-shaped. At regular intervals shelves 17 are secured to the frame, their length being equal to the width of said frame. The shelves 17 are preferably made of angle-iron.

In the embodiment shown in Figs. 4 to 6 I employ steaming-frames 18, which are of the same general structure as the frames shown in the embodiment depicted in Figs. 1 to 3. Each of the steaming-frames 18 comprises parallel longitudinal girders 19, which, as is the case with the girders depicted in the embodiment in Figs. 1 to 3, are preferably formed of angle-irons. Owing to the angle-iron structure of the girders, they are adapted to come to rest upon the horizontal flanges of the shelves 17. The corrugated member or plate 20 is supported by parallel girders 19. The corrugated member or plate 20 and the parallel girders 19 constitute a drip-pan. In this instance a corrugated member or plate 20 is preferably formed of the same material as member or plate 3 for similar reasons.

The upper edges 21<sup>a</sup> of the corrugations 21, upon which the hanks of yarn are to be placed, terminate in narrow ridges, the upper walls 22 of the raised or corrugated portions being preferably made to slope downward for the same reason, as hereinbefore specified, for similarly constructing the corrugated portions of the member or plate 3. Any condensed steam or other liquid will be deposited upon the portions 23 of the drip-pan be-



tween its corrugations. The lower surfaces of the extreme upper portions of said ridges preferably come even with the upper surfaces of girders 19, while the portions 23 of the frame constituting the pan engage the horizontal flanges of the girders 19, so as to have the vertical flanges of said girders form walls closing laterally the ends of hoods 24, formed beneath the walls 22.

25 is a steam box or chamber into which carriage 10 is run after the yarn has been put on the steaming-frame and the latter has been placed upon shelves 17.

26 is a pipe with a suitable valve for admitting steam to the bottom of the steaming box or chamber.

27 is an outlet-pipe, and 28 a safety-valve.

The carriage is positioned so as to permit of free flow of steam upward around the various frames and the latter being placed at sufficient distances to provide horizontal spaces between the girders and the drip-pan of the steaming-frames, through which the steam may circulate into the hanks of yarn 29 and from which it may enter upward into hoods 24. The position of one of the hanks upon one of my steam-frames is indicated in dotted lines, Fig. 5.

While the corrugations 21, along the central portions of steaming-frames 18 are shown to be placed parallel with each other and at right angles to the parallel longitudinal girders 19, I prefer to place the corrugations or ridges near the ends of said frames in positions deflected with reference to the positions of aforesaid ridges, so as to provide adequate supports there for the curved portions of the hanks, it being necessary to curve their ends, so as to keep different portions of the hanks which may be colored from contact with each other, and a suitable arrangement in that respect is shown on the right-hand side of Fig. 5, in which the corrugations 21' are shown to be made curving, with their concaved sides facing the nearest end of the steaming-board. The ridges formed by corrugating the member or plate 20 may be straight, but deflected with reference to said central ridges, as shown at 21<sup>2</sup> in the left-hand portion of Fig. 5. I prefer to place shelves 17 upon the frame of the carriage, so that all steaming-frames may be withdrawn from the steam-chamber simultaneously and that thus all the hanks may be exposed to the steam for the same period; but frames 16 might instead be made stationary within chamber 25 in case provision be made to readily empty said chamber of steam, and in that case wheel-supports for carriage 10 might be dispensed with. The advantage of my improved construction above described are manifold, particularly as compared with the appliances for steaming printed yarns heretofore in general use. Thus by making the corrugated-metal mem-

ber or plate 20, which supports the yarn, form a hood or hoods open only at the bottom I secure there the continuous presence of a body of steam, which will heat the upper surface of said hood sufficiently to thoroughly heat the yarn placed above it and readily evaporate any liquid that may become lodged upon such surfaces.

By supporting my improved steaming-frames within the steaming-boxes independent of each other I am enabled in case only a limited number of frames should be required to be used to provide extra large steam-spaces between the frames and very free circulation of the steam along and around the hanks of yarn both from the spaces along the sides and the ends of the steaming-frames. The upper edges of the vertical flanges of girders may be lower than the upper edges of the ridges 21<sup>a</sup>, so as to permit of free passage of steam underneath the hanks of yarn throughout the full width of the steaming-frames and to prevent contact of the yarn with said edges when placing it upon the frames or withdrawing it therefrom and consequent soiling of the yarn.

It will be seen from the foregoing description that the steaming-frames of both embodiments comprises a pair of parallel longitudinal girders and a corrugated or fluted member carried thereby. By employing as the supporting means for the corrugated member angle-iron girders advantages are obtained, among which may be mentioned the fact that the horizontal extending portion of the girder constitutes a bracket for supporting the corrugated member and, as is the case with the embodiment depicted in Figs. 4 to 7, the vertical portion of the girders constitute the end structure of the hoods 24. It is also to be noted that by reason of the peculiar structure of the steaming-frames, both sides of which are readily accessible to the steam, I prevent the dripping of liquid from one hank upon the one underneath it, and I particularly secure thorough heating of said corrugated member or plate, and consequently rapid evaporation of any liquid that may be temporarily deposited thereon, I having found in practice that such corrugated members or plate when taken out of the steam-chest are substantially dry and that owing to the slight contact between the yarn and the ridges on the plate there is virtually no color deposited on said plates, so that they do not even have to be cleaned before being used again. It frequently happens that while the yarn is resting on a steaming-frame the action of the steaming-frame will tend to spread the hank outward toward the longitudinal edges of the same, and as these edges are apt to become soiled when the hanks are being placed upon the frame much yarn is spoiled in that manner where the longitudinal girders extend to the same



elevation as the supports of the hank or above the same. I avoid this difficulty by preferably carrying the edges 13, Fig. 1, or 21<sup>a</sup>, Fig. 4, above longitudinal girders 11.

5 In employing corrugated or fluted sheet metal in the construction of the steaming-frames for supporting the yarn I provide a cheap construction, light in weight and capable of being readily shaped and assembled, and in making the corrugated sheet constituting the member or plate act as a support for the yarn and also as a drip-pan for catching the drippings I obtain a very compact structure, whereby I am enabled to place a larger number of steaming-frames in a steam-box or housing of a given size than has been positioned heretofore, thus as far as space as well as the quantity of steam used for steaming a hank of yarn is concerned and in making the steam-frames rest one above the other, as shown, I do away with the separate frames for supporting the steam-frames upon the carriages, as illustrated in Figs. 4 to 6.

It will be noted that in the two embodiments the same general features are found—to wit, the angular parallel girders carrying a corrugated member constituting the drip-pan corrugations or ridges of said member, being spaced apart differently at each end than in the central portion thereof. Many other features are common to the structure of the steaming-frames in both embodiments. It will be unnecessary in view of the foregoing description to specifically designate these like features. By reason of the positioning of the ridges at each end of the steaming-frame at an angle to the central ridges, as depicted in Fig. 5, the drip-pan is provided with drains at each end thereof—that is to say, any liquid running off of the hank at the ends of the steaming-frame may be discharged at the ends of the drip-pan.

While I have referred to the member or plate in both of the embodiments hereinbefore specifically described as being provided preferably with corrugations, I do not limit the drip-pan to a corrugated structure, as other means for producing ridges thereon may be employed—as, for instance, in Fig. 8, in which the parallel girders for supporting the plate or member 3<sup>a</sup>, which carries the substantially U-shaped transverse members 3<sup>b</sup>, constituting ridges for supporting the hank. It is essential that the hank-engaging portion of the ridges in all of the embodiments be not very wide, for the reason that it is desirable that the oxygen in the steam be permitted to penetrate to all of the threads of the hank for preventing the same from decaying.

What I claim is—

1. A steaming-frame, comprising horizontal girders, and rigid cross-supports carried thereby, said cross-supports being placed

closer together near the ends of the frame than along the central portion.

2. The combination of a multiplicity of steaming-frames, one resting above the other, each frame comprising a corrugated member of sheet metal, and means for supporting said member extending crosswise with reference to the corrugations, spaces being left between said supporting means at substantially the same elevation in the upper surfaces of the corrugation and between the corrugated member and said supporting means, for the purpose of permitting full flow of steam along the upper and lower surfaces of the corrugated member.

3. A steaming-frame, comprising a member provided with a series of ridges extending upward therefrom, said member constituting a drip-pan, the under side of said member forming hoods open only at the bottom.

4. An apparatus for steaming yarn, comprising a member provided with a series of ridges extending upward therefrom, said member forming hoods open only at the bottom, a housing around said steaming-frame, and means for introducing steam into said housing and into said hoods and above the same.

5. In an apparatus for steaming yarns, the combination of a steaming-frame, comprising a member provided with a series of ridges extending upward therefrom, said member constituting a drip-pan, the under side of said member forming hoods open only at the bottom, a housing around said steaming-frame, means for introducing steam into said housing and into said hoods and for circulating said steam above and below the same.

6. In an apparatus for steaming yarns, the combination of a steaming-frame, comprising a corrugated member, the cross-sections of the corrugated portions of said member being constructed as hoods closed laterally by walls placed crosswise with reference thereto, a housing around said steaming-frame, means for conducting steam into said housing and into said hoods and into the space adjoining the upper surfaces of said corrugated portions.

7. In an apparatus for steaming yarns, the combination of a steaming-frame, comprising horizontal girders, a member provided with raised portions, carried by said girders, said member constituting a drip-pan, the raised portions substantially V-shaped in cross-section and said portions placed crosswise with reference to said girders, said girders serving to close said raised portions laterally, a housing around said steaming-frame, and means for introducing steam into said housing and into the hoods formed by said raised portions and for passing steam into the space above and adjoining said raised portions.

8. A steaming-frame, comprising girders,



a member provided with a transverse raised  
portion open at both ends carried by said  
girders, said girders serving to close the ends  
of said raised portion for forming a hood open  
5 only at its bottom.

9. A steaming-frame comprising separate  
girders, a corrugated or fluted member car-  
ried by said girders, and said girders closing

the ends of the corrugations of said member  
for forming hoods.

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

WALTER G. WILLIAMS.

Witnesses:

WM. J. MULLIGAN,  
THOMAS SCHOFIELD.