

No. 753,528.

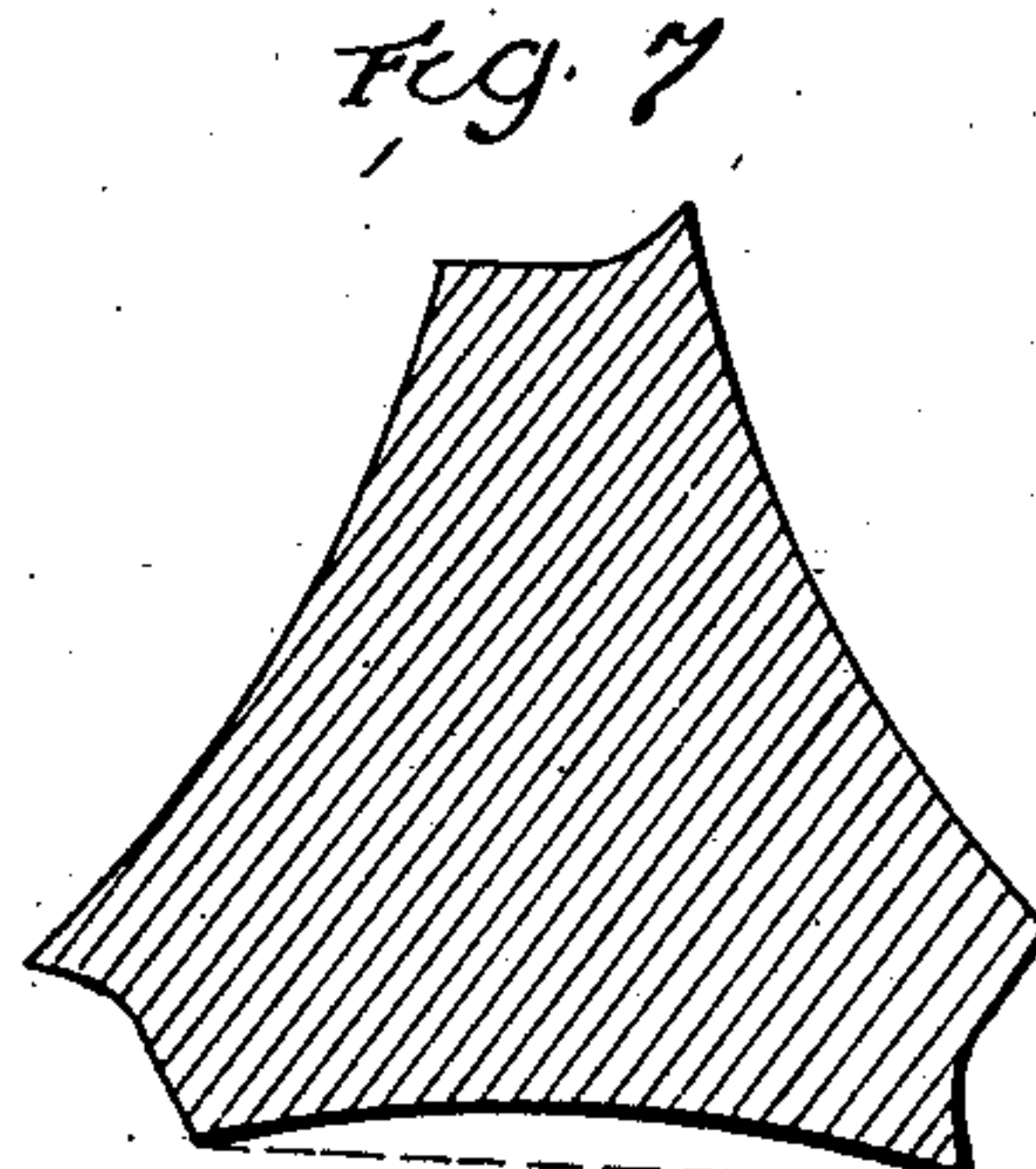
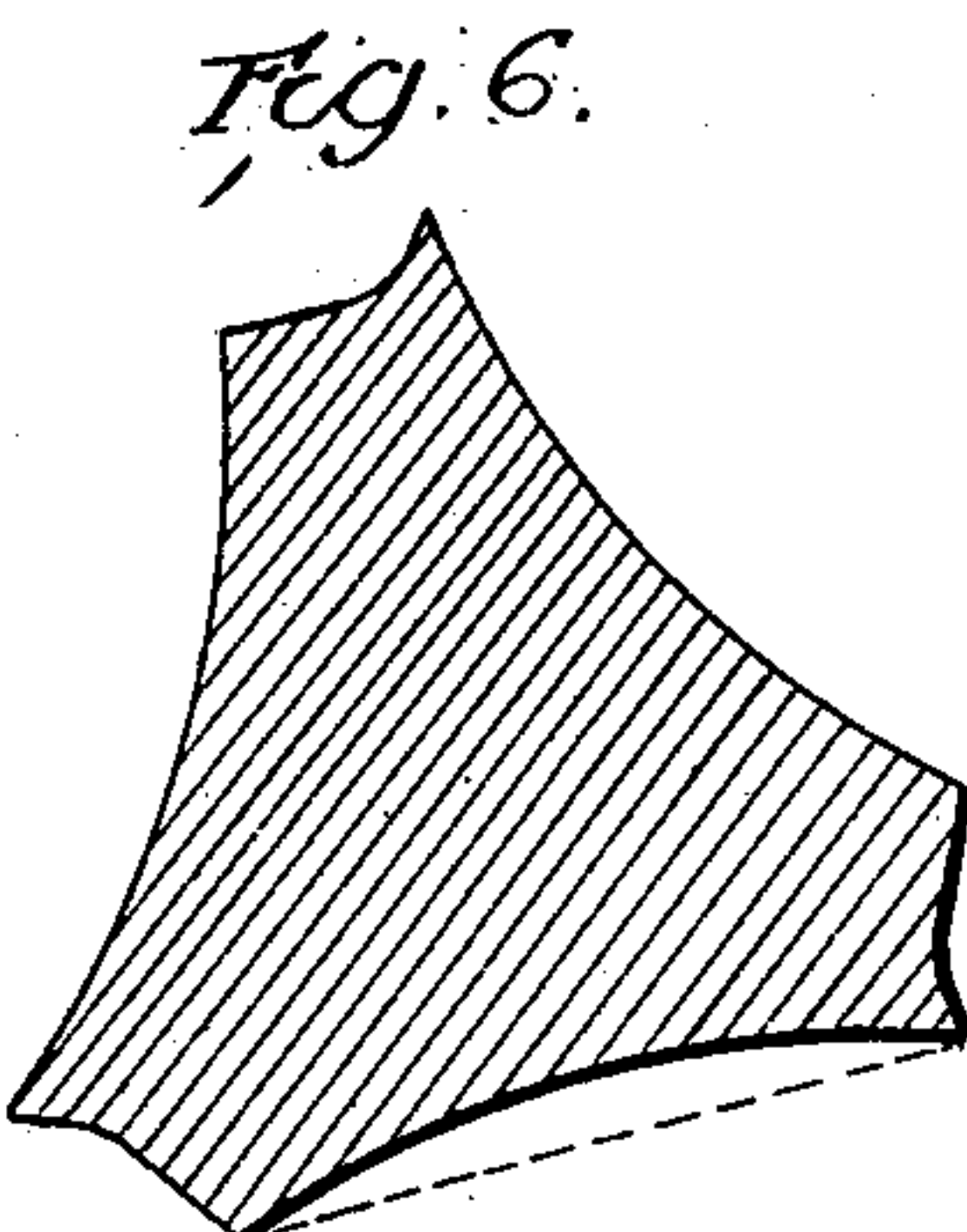
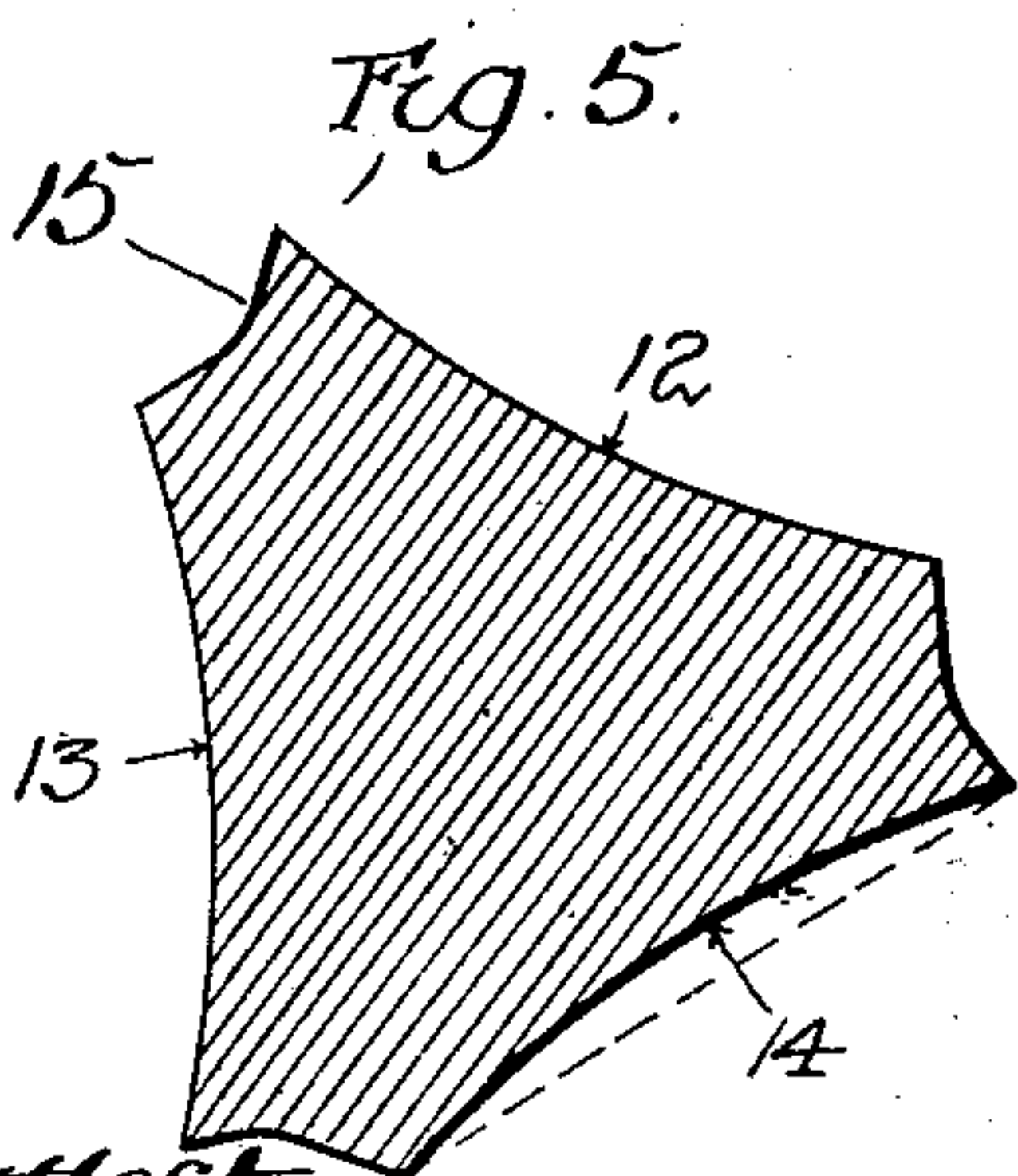
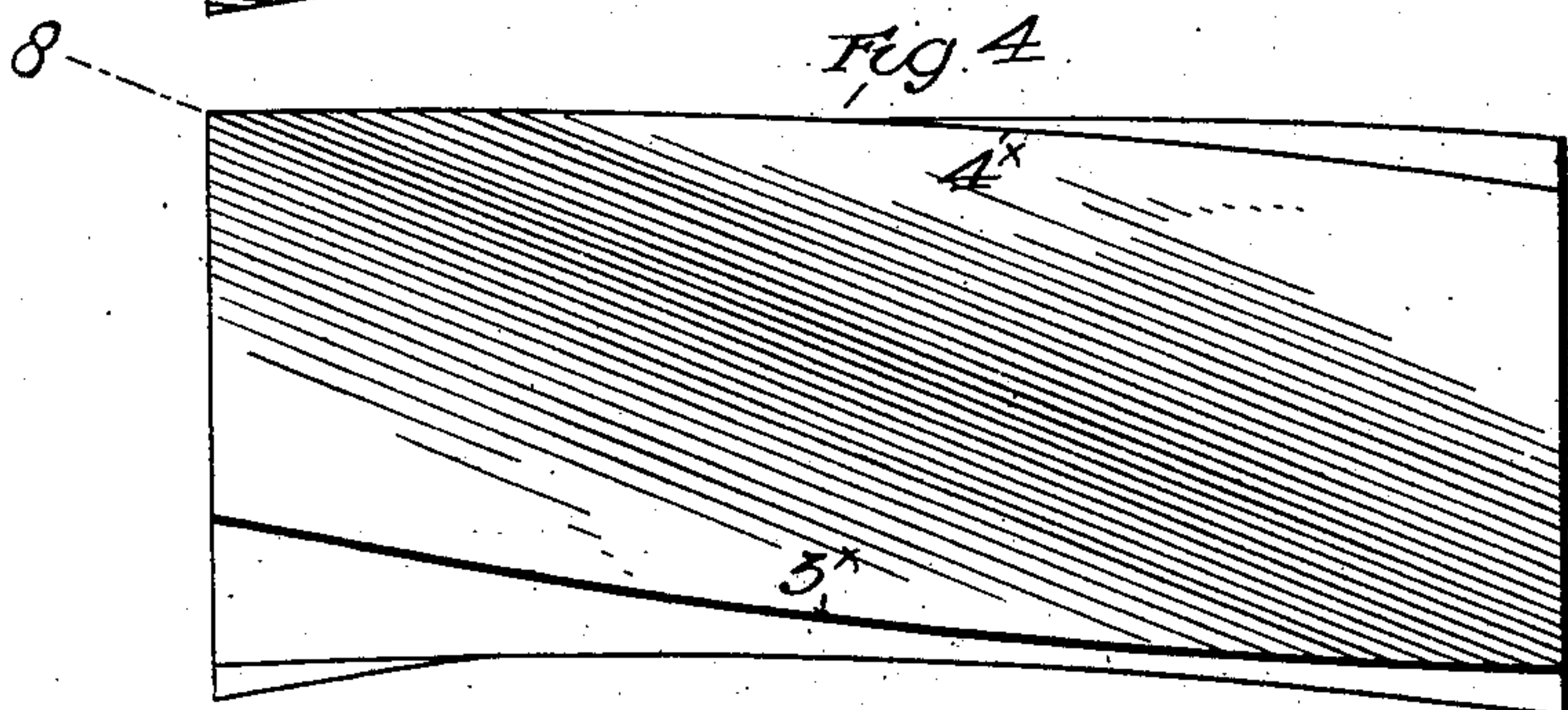
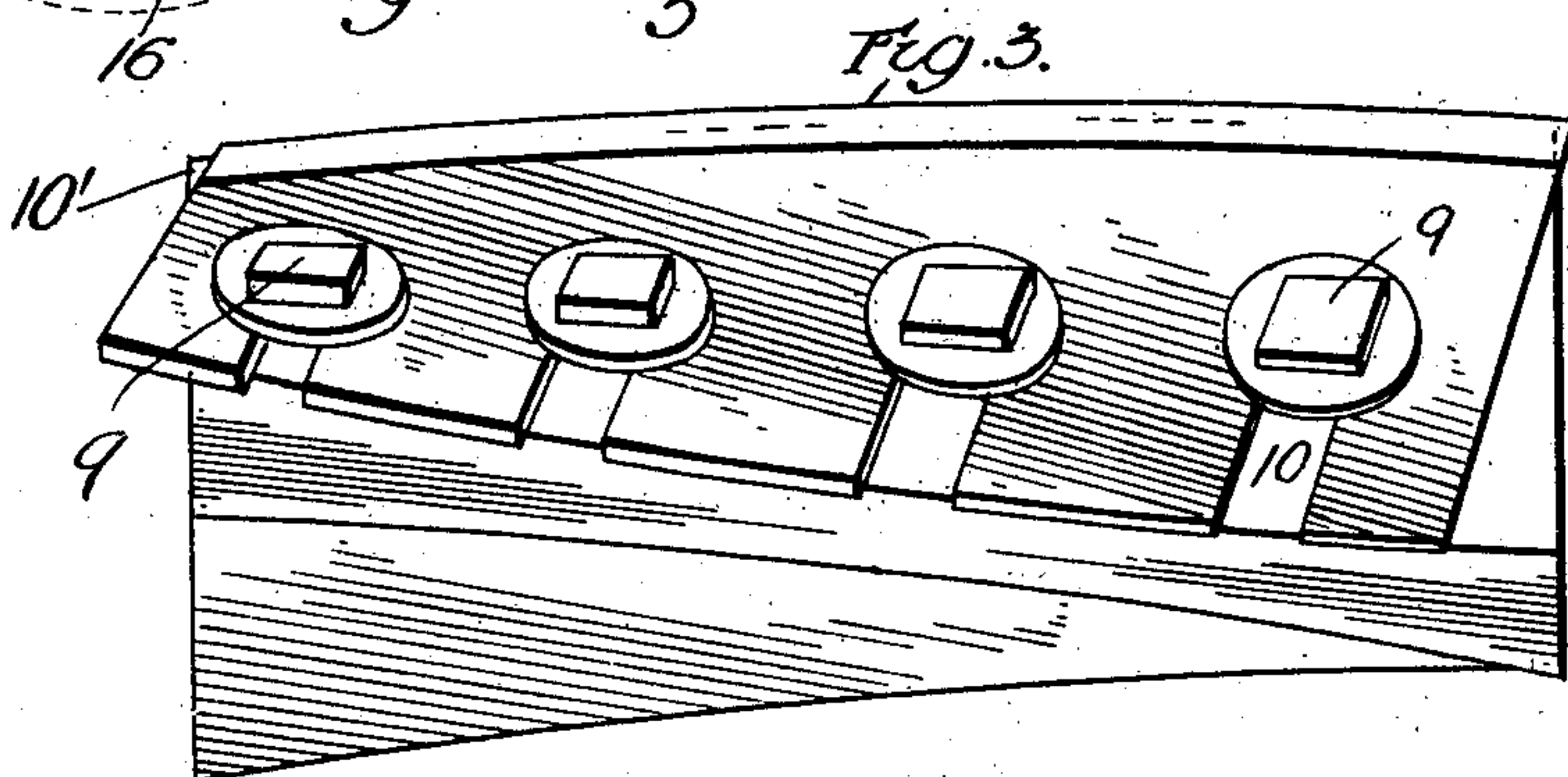
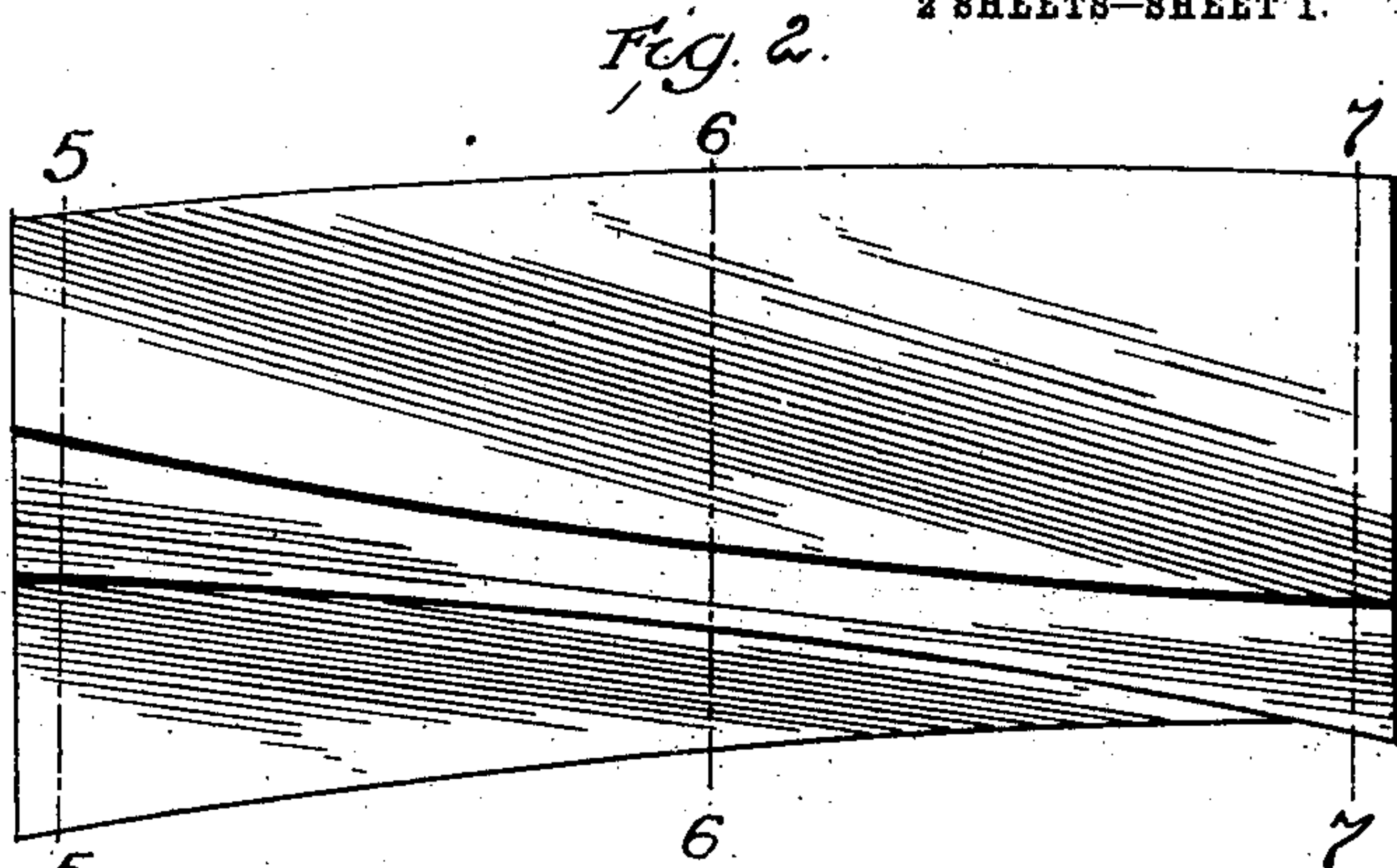
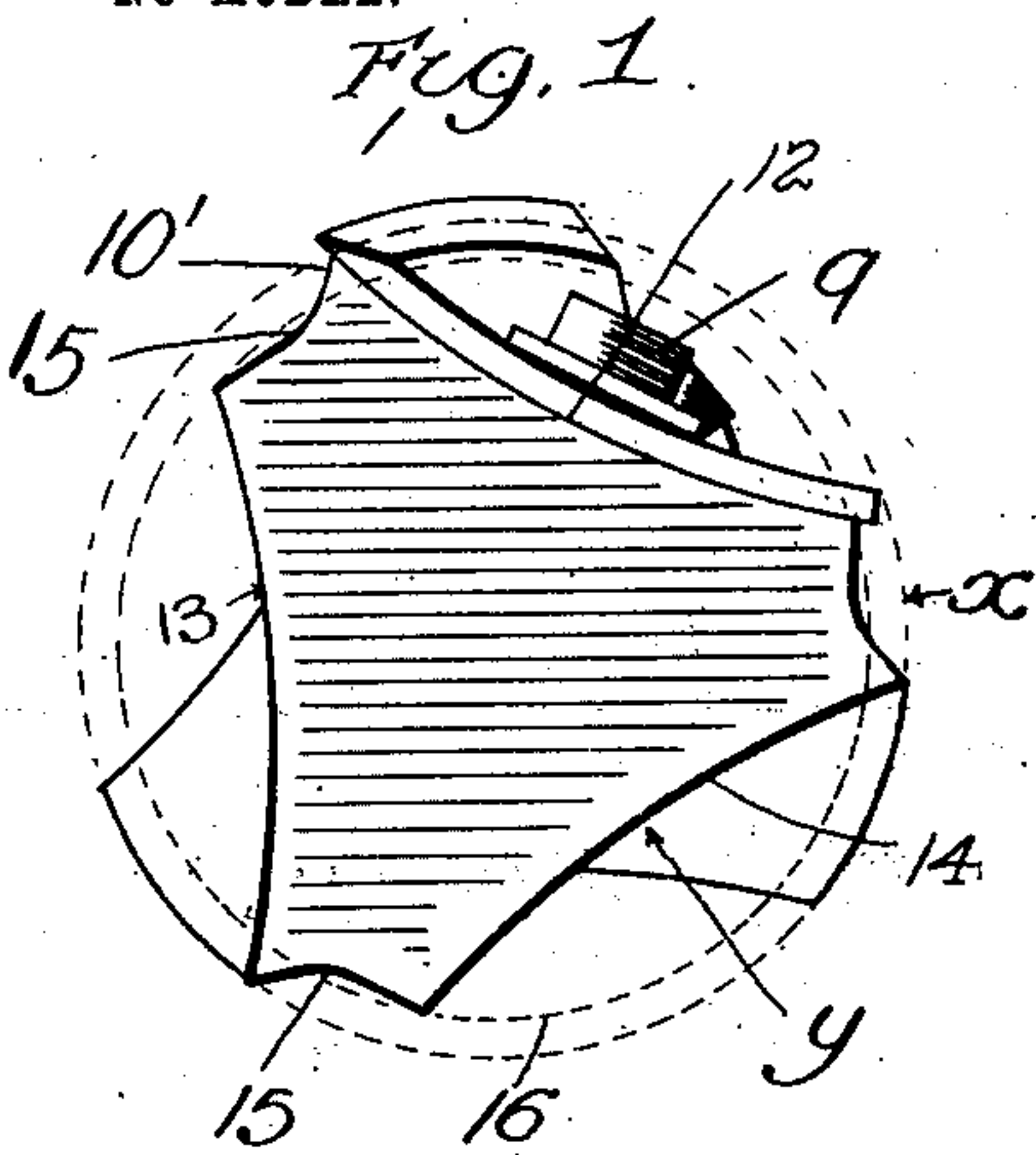
PATENTED MAR. 1, 1904.

F. STUTZMAN.  
CUTTER HEAD.

APPLICATION FILED OCT. 30, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



attest.  
Commissioner.  
Edward Sarton

Inventor.  
Frank Stutzman.  
By *Wm. Spear Company*  
Attys.

No. 753,528.

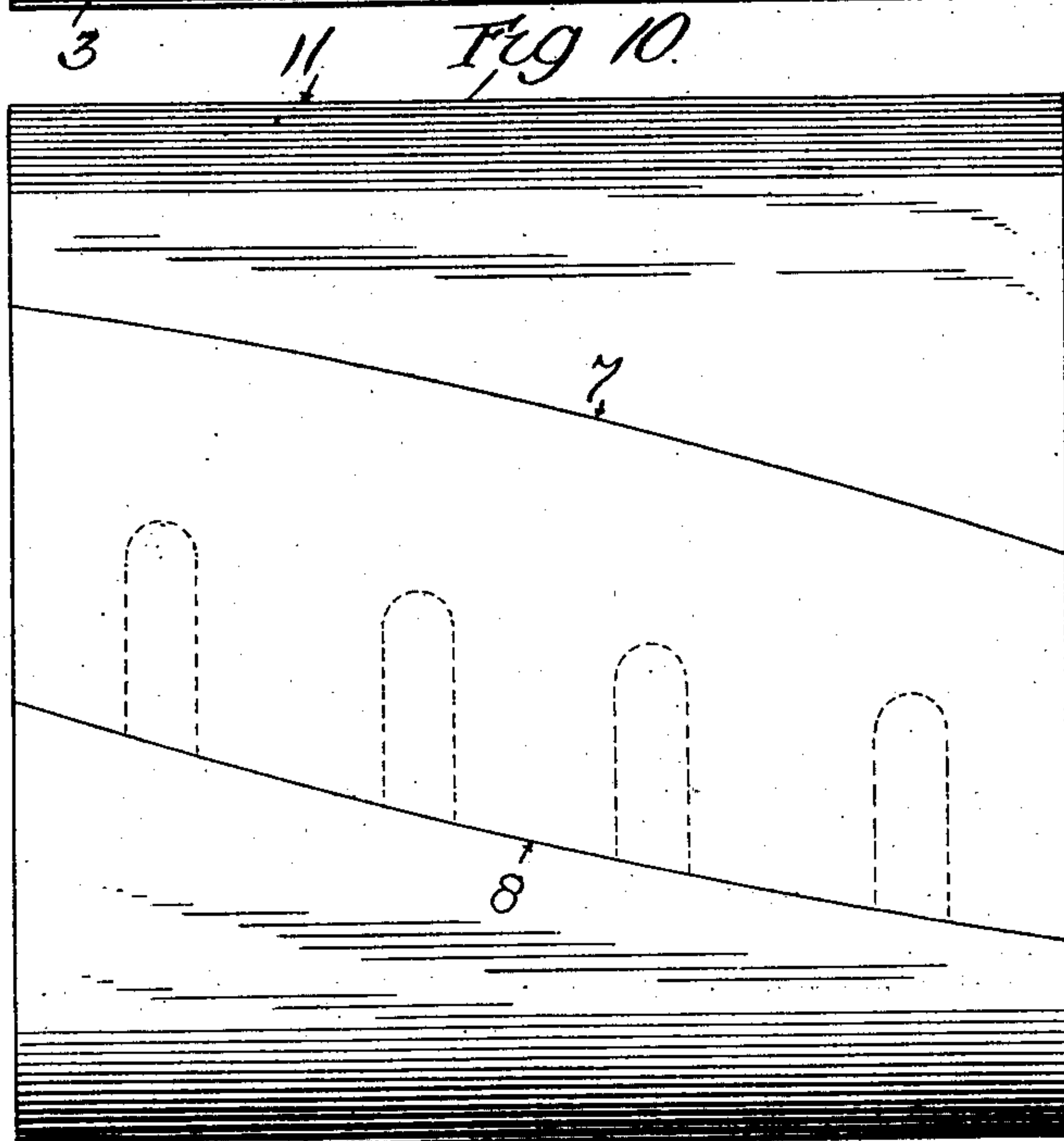
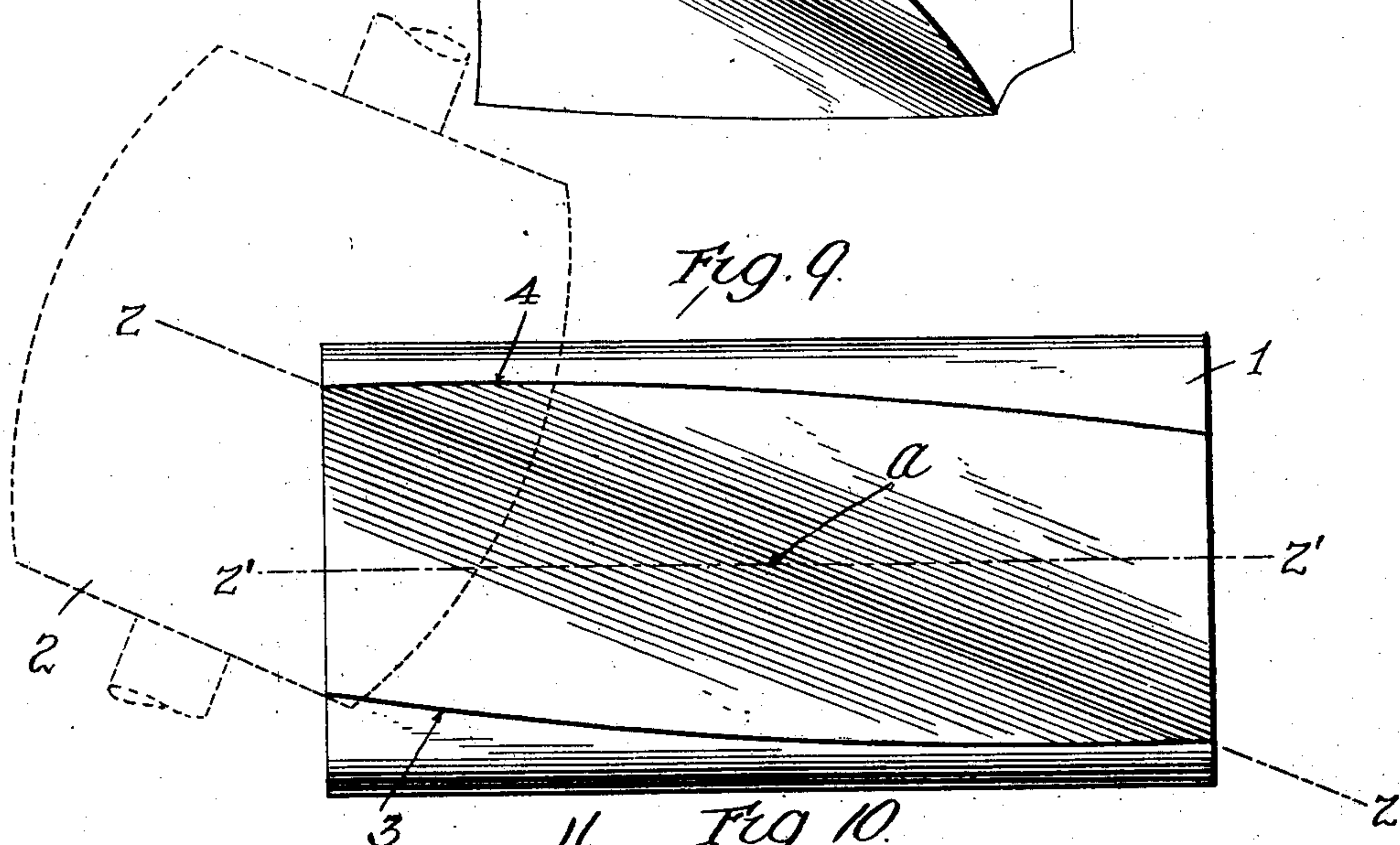
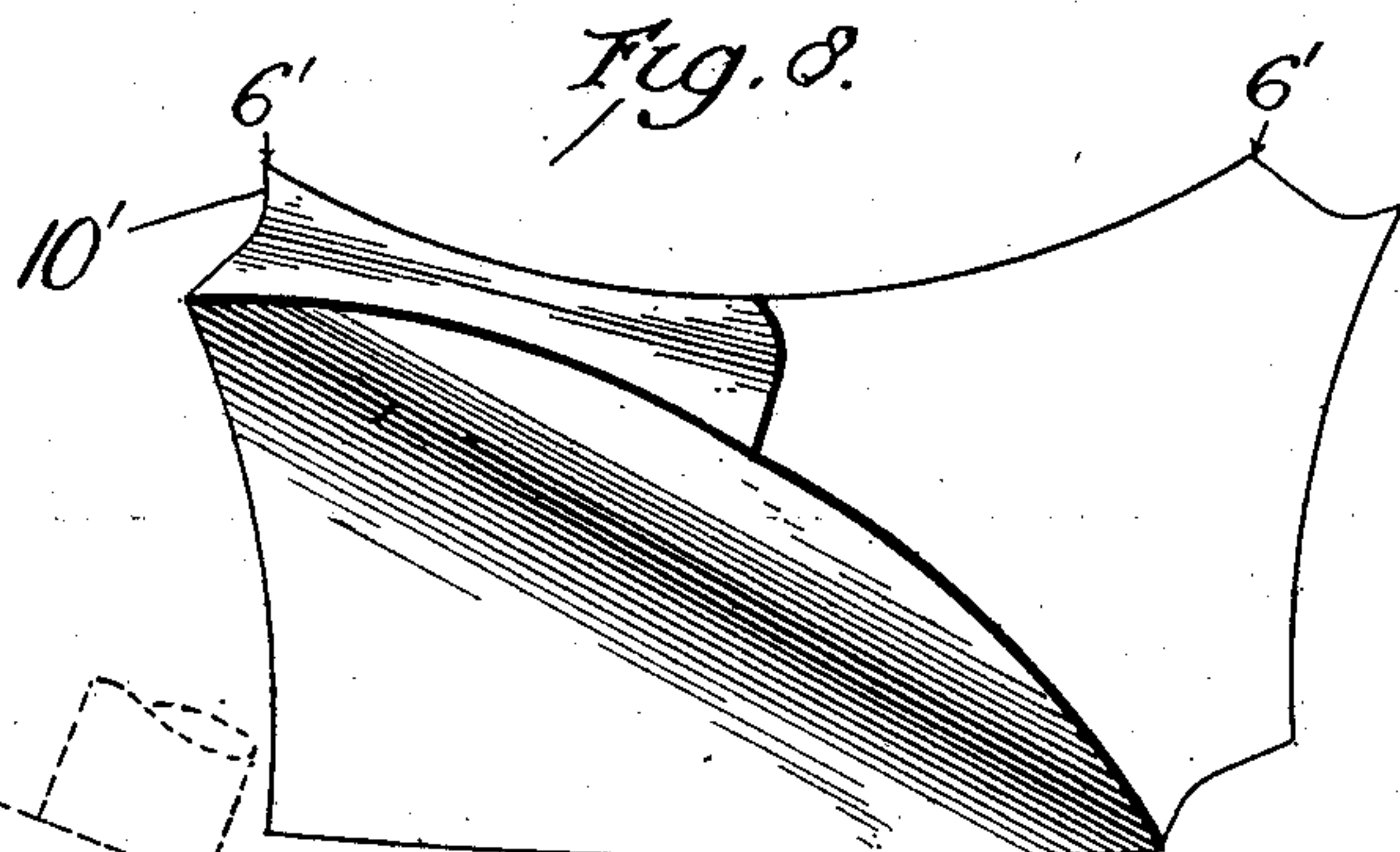
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NO MODEL.

2 SHEETS—SHEET 2.



attest:  
C. Middleton  
Edward Sartor

INVENTOR:  
Frank Stutzman  
His Agent Company

Atty's



# UNITED STATES PATENT OFFICE.

FRANK STUTZMAN, OF WILLIAMSPORT, PENNSYLVANIA.

## CUTTER-HEAD.

SPECIFICATION forming part of Letters Patent No. 753,528, dated March 1, 1904.

Application filed October 30, 1903. Serial No. 179,228. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK STUTZMAN, a citizen of the United States, residing at Williamsport, Lycoming county, State of Pennsylvania, have invented certain new and useful Improvements in Cutter-Heads, of which the following is a specification.

My invention relates to cutter-heads, and is designed particularly for the purpose of securing a draw cut and at the same time to provide a construction whereby the knife-blade may be adjusted to maintain its parallelism with the cutter-head and to maintain also a constant or uniform relation thereto.

My invention comprises a cutter-head having a plurality of seats disposed about the same for the cutting-blades or knives, said seats being in the form of shallow grooves with curved bottoms and extending diagonally or at an incline longitudinally of the axis of the cutter-head, but not in a spiral direction in relation to the said head.

In carrying out my invention both the curve of the knife and the transverse curve of the knife-seat are formed on a true circle, and the knife-blade will fit the curved seat closely throughout its extent and in all positions to which it may be adjusted.

In the accompanying drawings, Figure 1 is an end view of the cutter-head. Fig. 2 is a side view looking from the point  $x$  at the right of Fig. 1. Fig. 3 is a view similar to Fig. 2 with one of the knife-blades in place. Fig. 4 is a plan view looking from the point  $y$ , Fig. 1, toward the axis of the cutter-head. Figs. 5, 6, and 7 show cross-sectional views taken on lines 5 5, 6 6, and 7 7, showing so much of the cutter-head as will illustrate the relation of different parts of the same knife-seat to the cutter-head, it being understood that these views are taken with the cutter-head remaining in one position. Fig. 8 is a view looking from one end of the cutter-head in the direction of the dotted line 8 8 of Fig. 4. Fig. 9 is a view illustrating how my cutter-head is formed from a cylindrical piece of material. Fig. 10 is a diagram to illustrate how the knife-blade may be formed from a cylindrical

shell so as to fit the curved seat of my cutter-head.

It is thought that the construction of my cutter-head will be best understood by referring to the way in which it may be manufactured, and in this connection reference is had to Fig. 9, which shows a cylindrical piece or head 1 with a milling-tool (indicated at 2) arranged to cut a shallow groove or seat therein, (indicated by the lines 3 and 4, which represent the opposite margins of the said shallow groove or seat.) In forming this shallow groove or seat the milling-tool is caused to traverse the block of material along the line  $z z$ , which, as indicated, is at an angle to the axial line  $z' z'$  of the cylindrical piece of material from which the head is to be formed. It will be noticed particularly that the inclined line  $z z$  crosses the line  $z' z'$ , representing the axial plane of the cutter-head at the point  $a$ , which is centrally of the length of the cylinder, so that the two angles on opposite sides of this central point  $a$  formed by the points  $z a z'$  are equal. The line  $z z$  represents a line extending along the periphery of an imaginary cylinder and parallel to the axis thereof, which cylinder would be formed were the curved surface of the groove extending transversely to this line continued into the form of a cylinder. The line  $z z$ , crossing, as it does, the axial plane at the point  $a$ , lies in front of the axial plane at one end an equal distance to that at which it lies in rear of said axial plane at its other end.

We will suppose that the cylindrical piece is held with its axis horizontal and the cutting action of the milling-tool takes place always in the same horizontal plane, so that the line  $z z$ , representing the bottom of the channel straight from end to end, is a horizontal one and parallel to the horizontal axial plane of the cylindrical piece from which the cutter-head is to be made. From this it will be seen that my channel is of such form as would be made by taking a cylindrical piece of material and presenting this to a milling-tool, so that said milling-tool would traverse said piece of material on a diagonal line or a



line inclined to the vertical axial plane of the cylindrical piece, the said cylindrical piece being supposed to be maintained with its axis horizontally and the milling-tool also moving  
5 in a horizontal plane. By reason of this a cutter-head is produced having seats inclined laterally to the axial planes of the cutter-head, the said seats, however, not being of spiral form.

10 My invention is clearly distinguished from cutter-heads having knife-seats arranged spirally thereabout, for it will be seen that a spirally-extending seat cannot be formed by a milling-tool passing over the surface of a cyl-  
15 inder in a horizontal plane while the said cylinder is maintained constantly with its axis horizontally.

The effect of the above operation is to form a channel with its longitudinal edges curved  
20 from end to end of the cutter-head, such edges being indicated at 3<sup>x</sup> 4<sup>x</sup> in Fig. 4. Figs. 5, 6, and 7 indicate sectional views of the channel or seat looking from the left of Fig. 4, and it will be seen that the channel is of different  
25 depths, that at the point where the section-line 6 6 extends being of greater depth than the portions at the ends of the seat or channel, this being due to the fact that the milling-tool cuts deeper at the crest of the cylinder than  
30 it does at the opposite ends thereof, where the side begins to slope away, and this difference in depth results from the fact that the milling-tool does not follow a spiral path around the cylindrical block, but cuts in the same hori-  
35 zontal plane along the surface of the cylinder while said cylinder is held with its axis horizontally.

Fig. 8 illustrates the fact that the channel or seat is formed on a true circle in a direc-  
40 tion at right angles to the line  $z z$  extending diagonally of the said channel or groove from corner to corner.

In order to provide a knife for the cutting-head as above described, it is necessary to  
45 provide a blade which will represent a part of a cylinder the periphery of which is of the same curvature as that represented by the segment of the circle 6' 6', Fig. 8, and as illustrating how such a knife may be formed  
50 reference is had to Fig. 10, which indicates a cylindrical shell, the radius of which is the same as that upon which the curve 6' 6' in Fig. 8 is formed, but instead of cutting out the knife with its longitudinal edges 7 and 8  
55 extending parallel with the axis of the cylinder the said blade is cut out from the cylindrical shell at an incline, so that its edges 7 and 8 will be inclined to the axial plane and will curve in a direction around the circum-  
60 ference of the cylinder. A knife of this formation when fitted to the channel or seat of the cutter-head will lie closely thereon from end to end, and it may be held by bolts 9

passing through slots 10 in the knife-blade and into the cutter-head. This knife-blade 65 will have its edge slightly curved from end to end, and it will produce a draw cut on the material being operated upon. The slots in the cutter-blade are arranged parallel with each other, and the said blade may be adjusted 70 back and forth while maintaining its edge parallel with the edge of the chip-breaker 10'.

By reference to Fig. 10 the diameter of the piece of cylindrical material from which the cutter-head is formed is indicated at 11 11. 75

In the present instance the cutter-head is adapted to receive three cutter-knives—one upon each of the shallow seats or grooves 12, 13, and 14. The edges of these grooves are at a slight distance apart, and in order to 80 form the chip-breaker 10' the material of the cutter-head is cut away at 15 between the edges of the seats or channels, so that this cut-away portion lies some distance within the original circumference of the cylindrical 85 piece, (indicated by the dotted line 16.) It will be noticed that the medial line of each knife-seat extends at an angle to the radial plane of the cutter-head at that point.

I claim as my invention— 90

1. A cutter-head comprising a groove or shallow channel extending longitudinally and at an inclination to an axial plane of the cutter-head, said channel or groove having its bottom curved transversely and having its 95 edges curving longitudinally and a cutting-knife held by the said seat or channel, substantially as described.

2. A cutter-head having a seat or channel extending longitudinally thereof whose curved 100 surface represents the curved periphery of a cylinder whose axis is arranged at an inclination to that of the axis of the cutter-head, substantially as described.

3. A cutter-head comprising a piece having 105 shallow channels or grooves extending longitudinally thereof, said grooves being formed on a true circle transversely and having their bottom portions straight from end to end and extending at an angle to an axial plane of the 110 cutter-head, and knives with edges curved longitudinally arranged adjustably on the seats, substantially as described.

4. In combination with a cutter-head having non-spiral seats concaved transversely and extending longitudinally of the cutter-head at an angle to an axial plane, said cutter-head having chip-breakers between the said seats. 115

5. In combination with a cutter-head having non-spiral seats extending longitudinally of 120 the said head and curved transversely and knives forming the section of a cylinder whose radius is the same as the transverse curve of the groove or channel and whose cutting edge is curved longitudinally and results from the in- 125 clination of the said edge in relation to the



axial plane of the imaginary cylinder and part of which the knife-blade represents.

5 6. A cutter-head having non-spiral seats extending from end to end at an inclination to the radial or axial planes which pass through the central points of said seats, said seats being curved transversely on a true circle, knives fitted to said seats and having cutting edges curved from end to end and means for ad-  
10 justably holding the knives to the said seats

and to maintain the parallel relation of the cutting edge to the chip-breaker in all positions, said cutting edge having a draw cut on the material, substantially as described.

In testimony whereof I affix my signature in 15 presence of two witnesses.

FRANK STUTZMAN.

Witnesses:

A. R. JACKSON,  
H. S. CAHERT.