

H. J. SUTHERLAND.  
MITER CUTTING MACHINE FOR METALLIC BINDING FOR PATTERNS, &c.  
APPLICATION FILED DEC. 16, 1908.

934,027.

Patented Sept. 14, 1909.

4 SHEETS—SHEET 1.

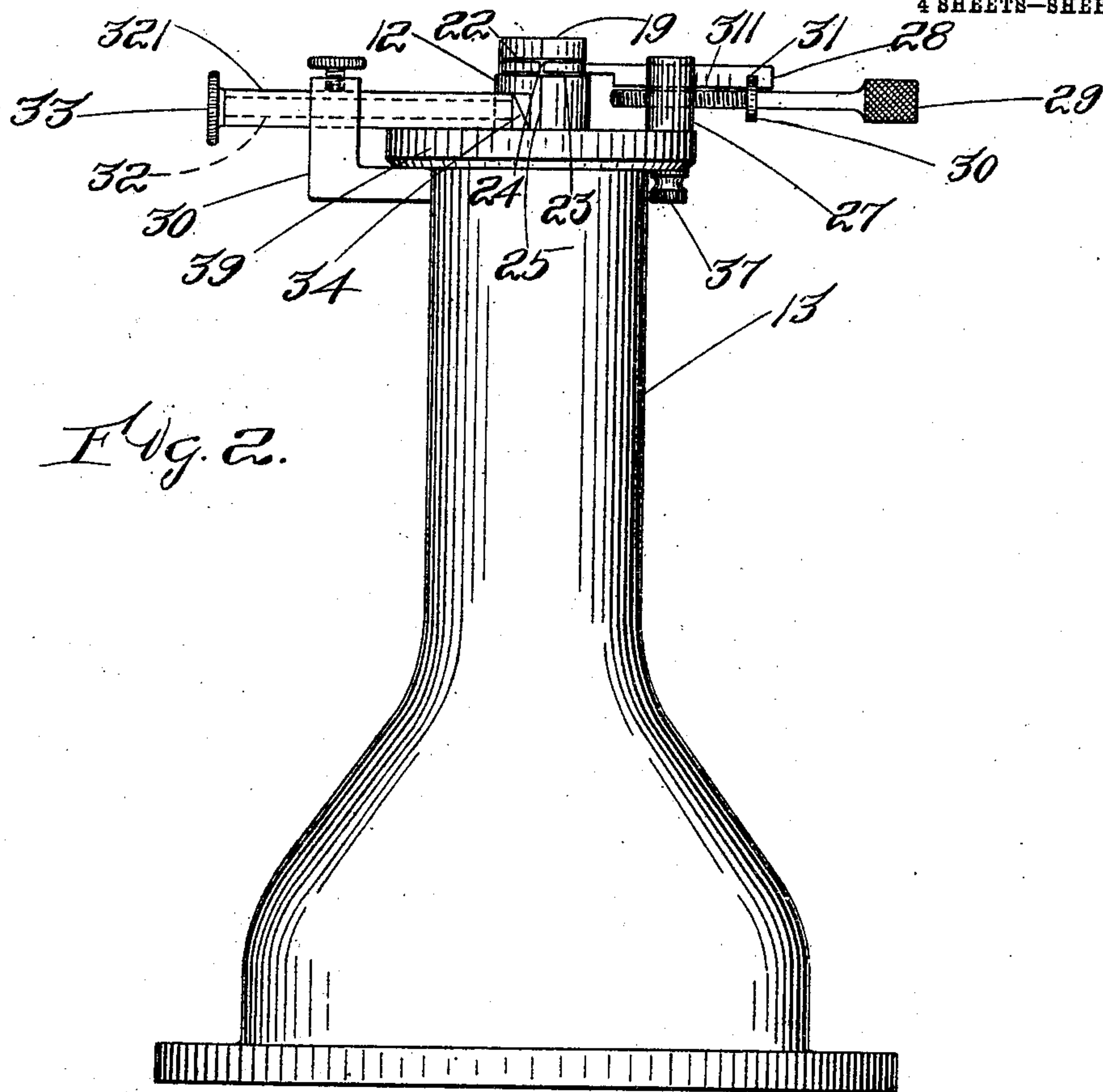


Fig. 2.

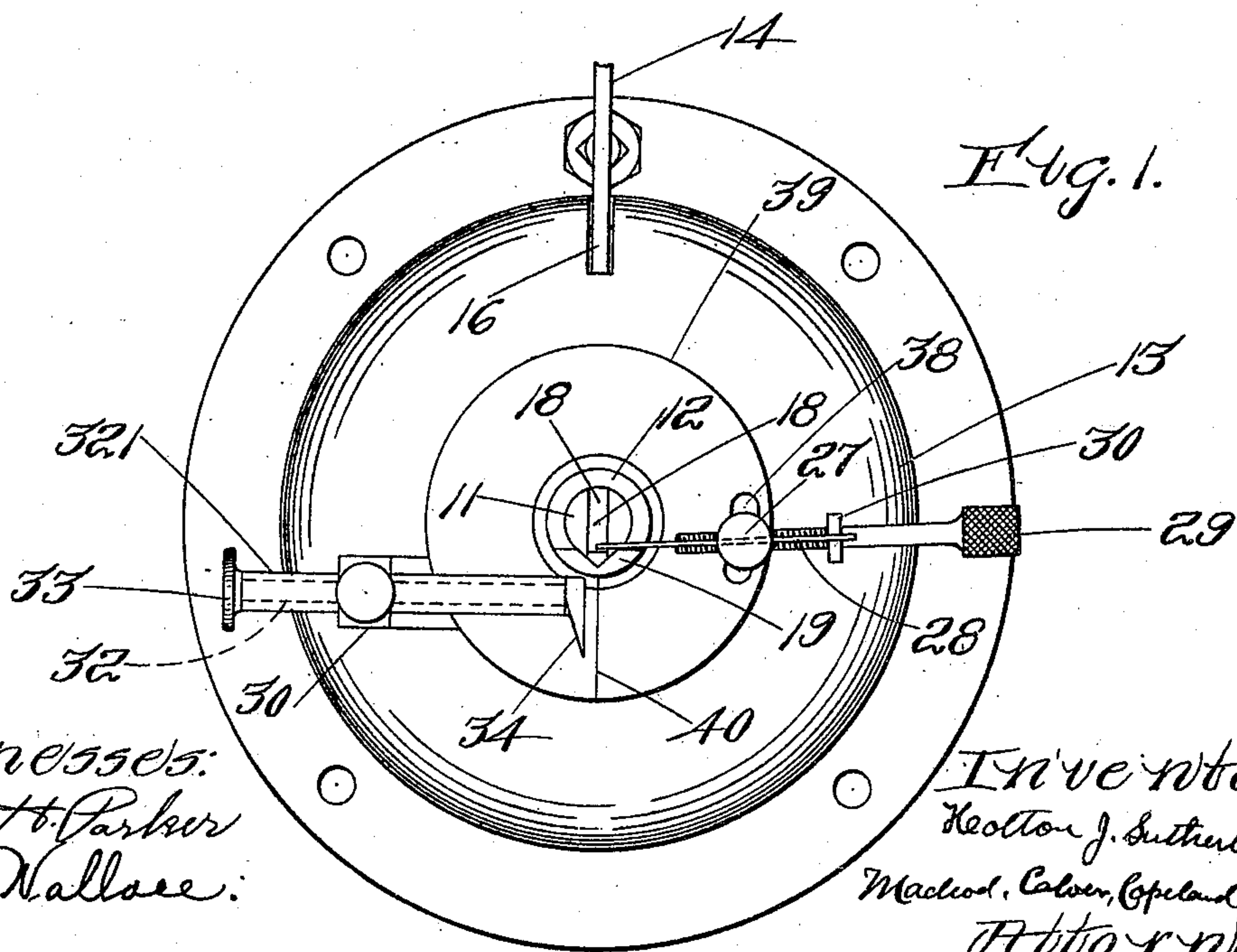


Fig. 1.

Witnesses:  
John H. Parker  
R. Wallace.

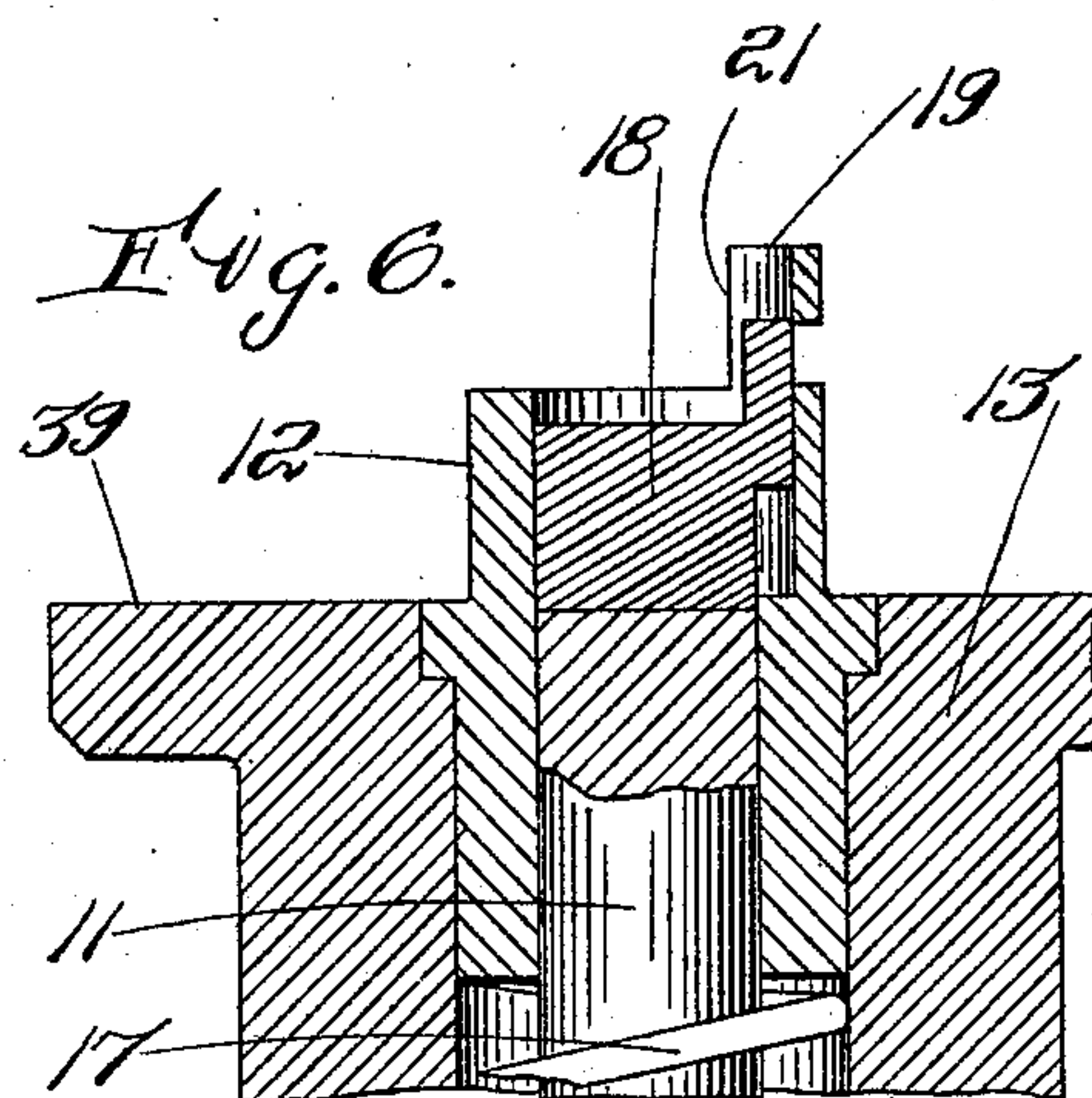
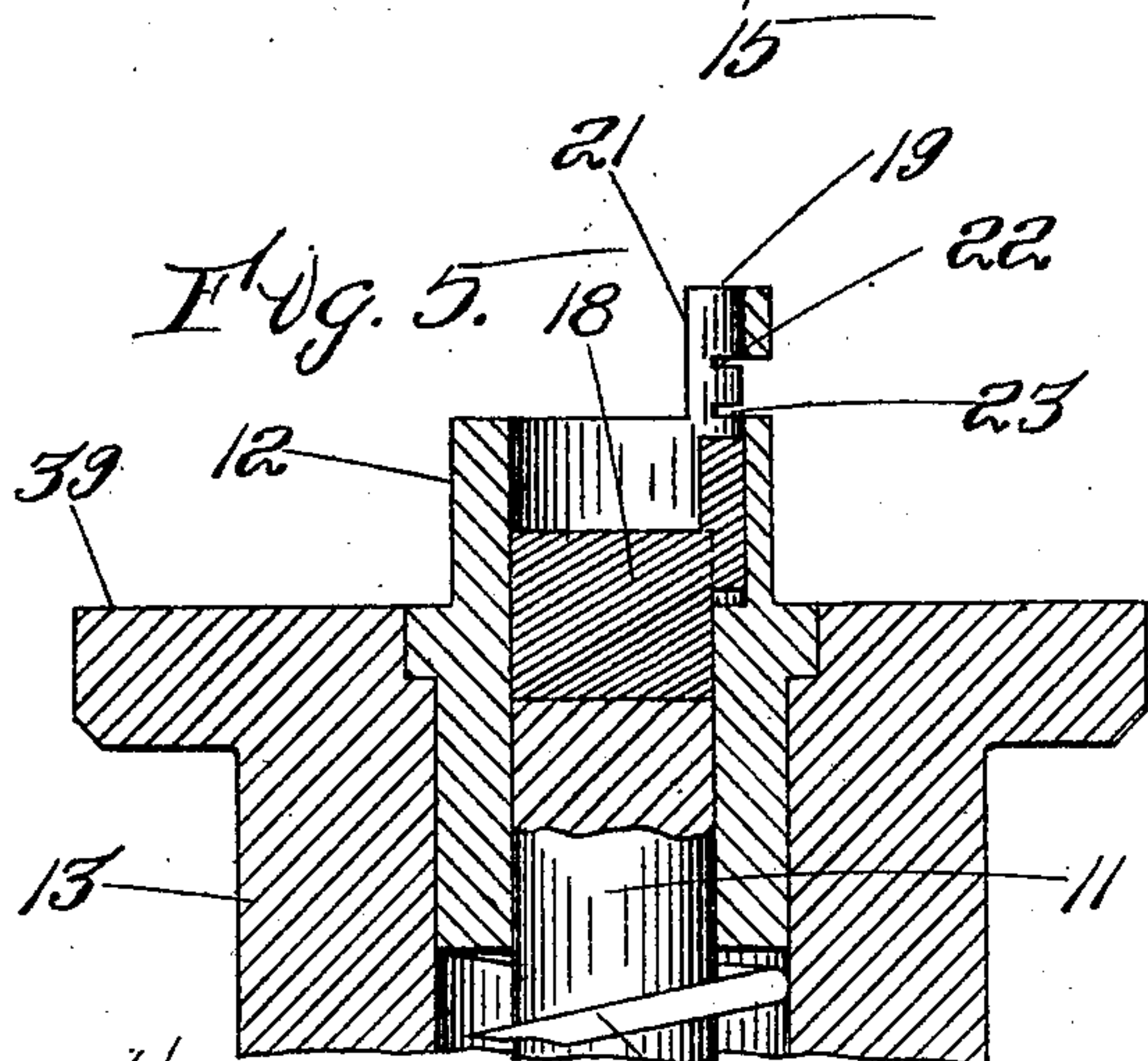
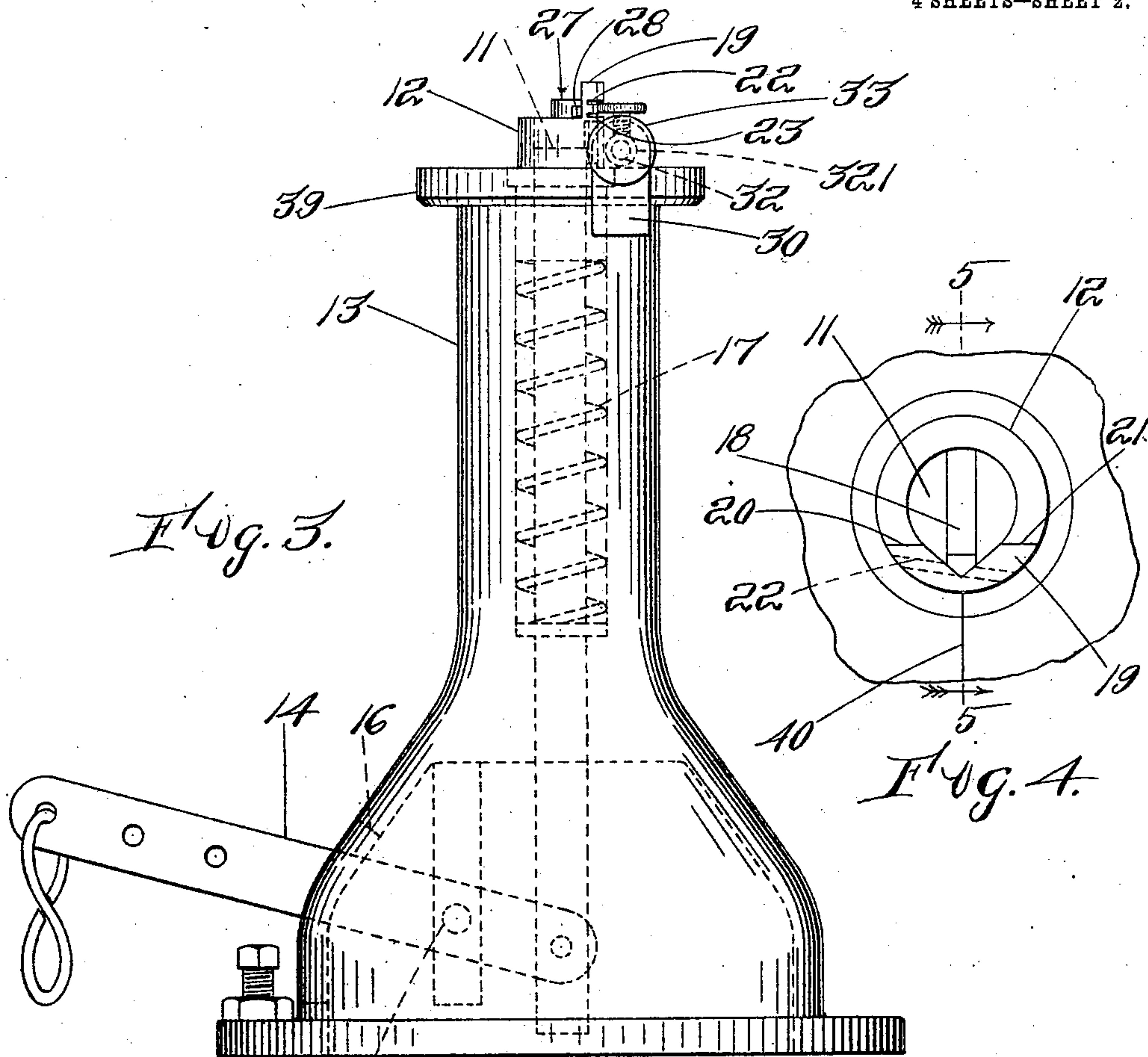
Inventor:  
Hector J. Sutherland  
Macdonald, Calver, Copeland & Co.  
Attorneys.

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John H. Parker  
R. Wallace.

Inventor:  
Heston J. Sutherland  
by Macleod, Calver, Copeland & Sibley  
Attorneys.

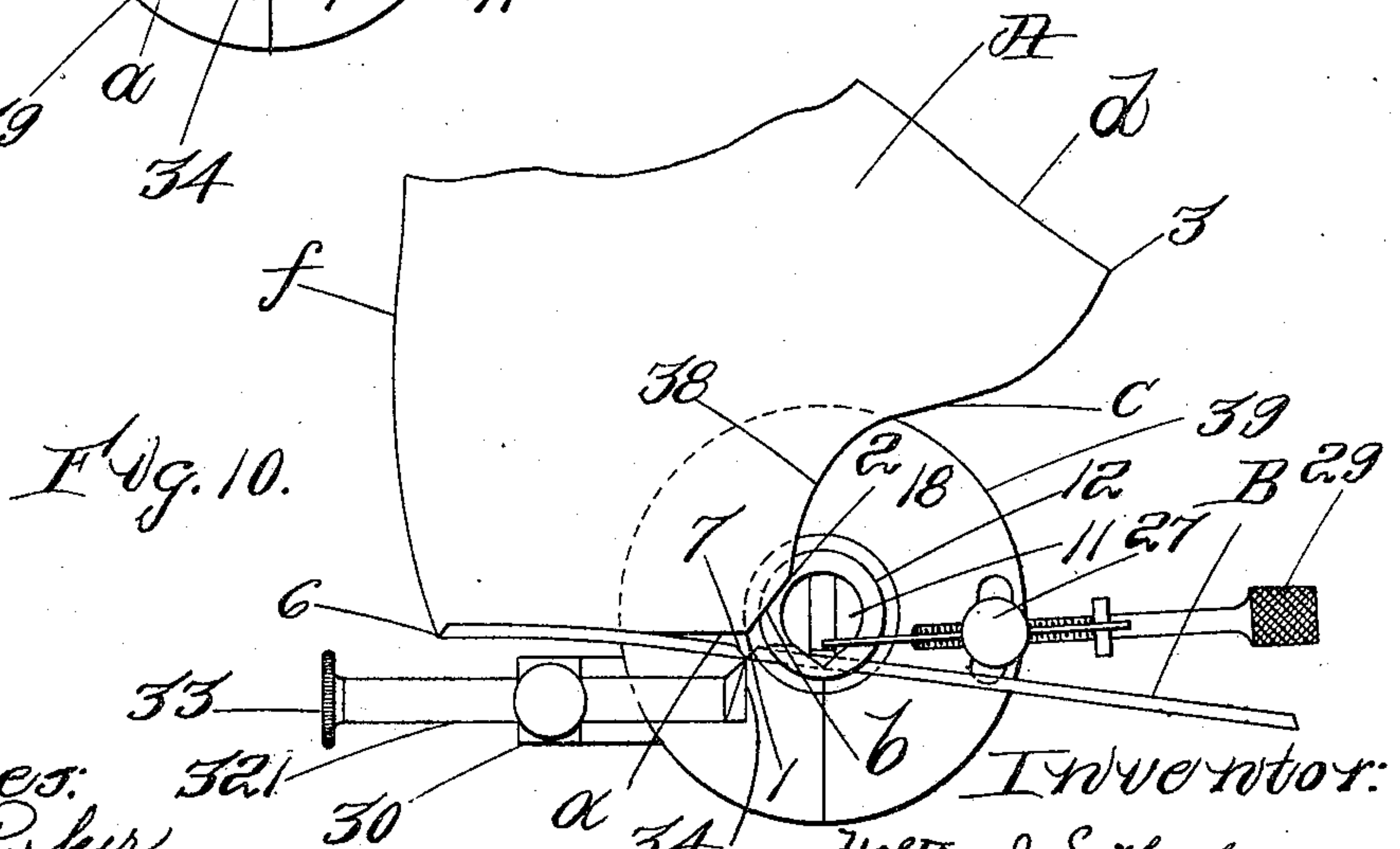
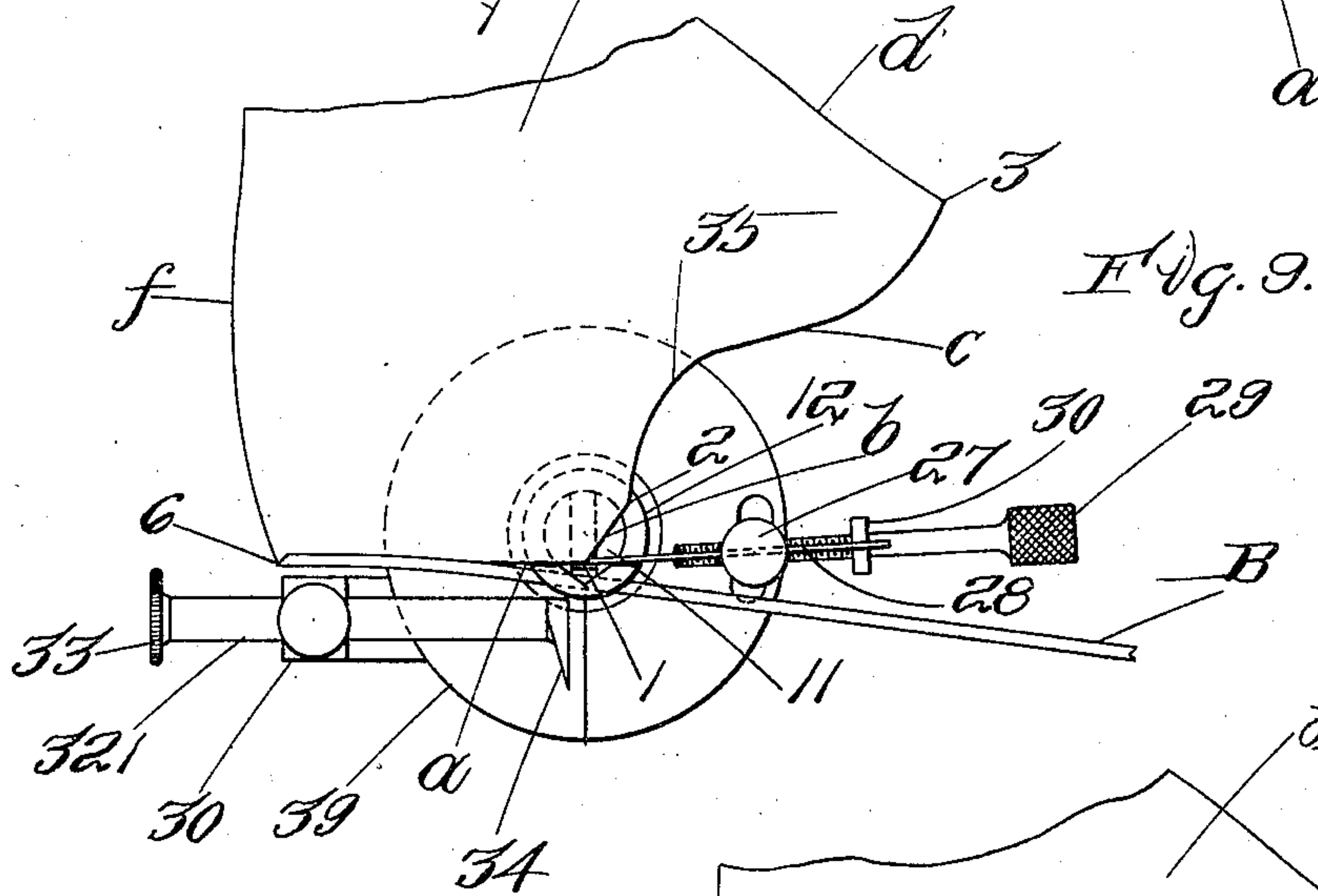
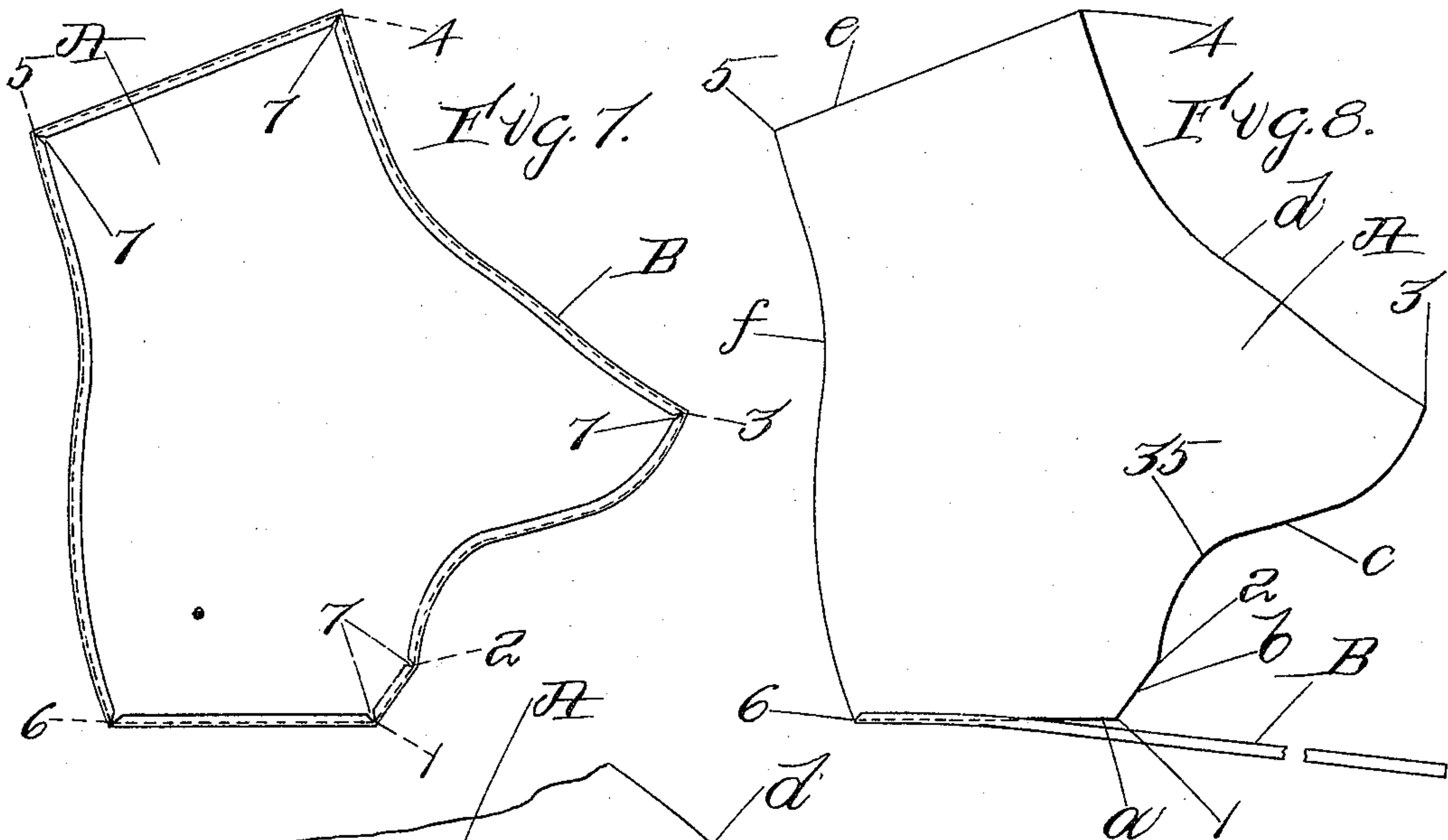


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4 SHEETS—SHEET 3.



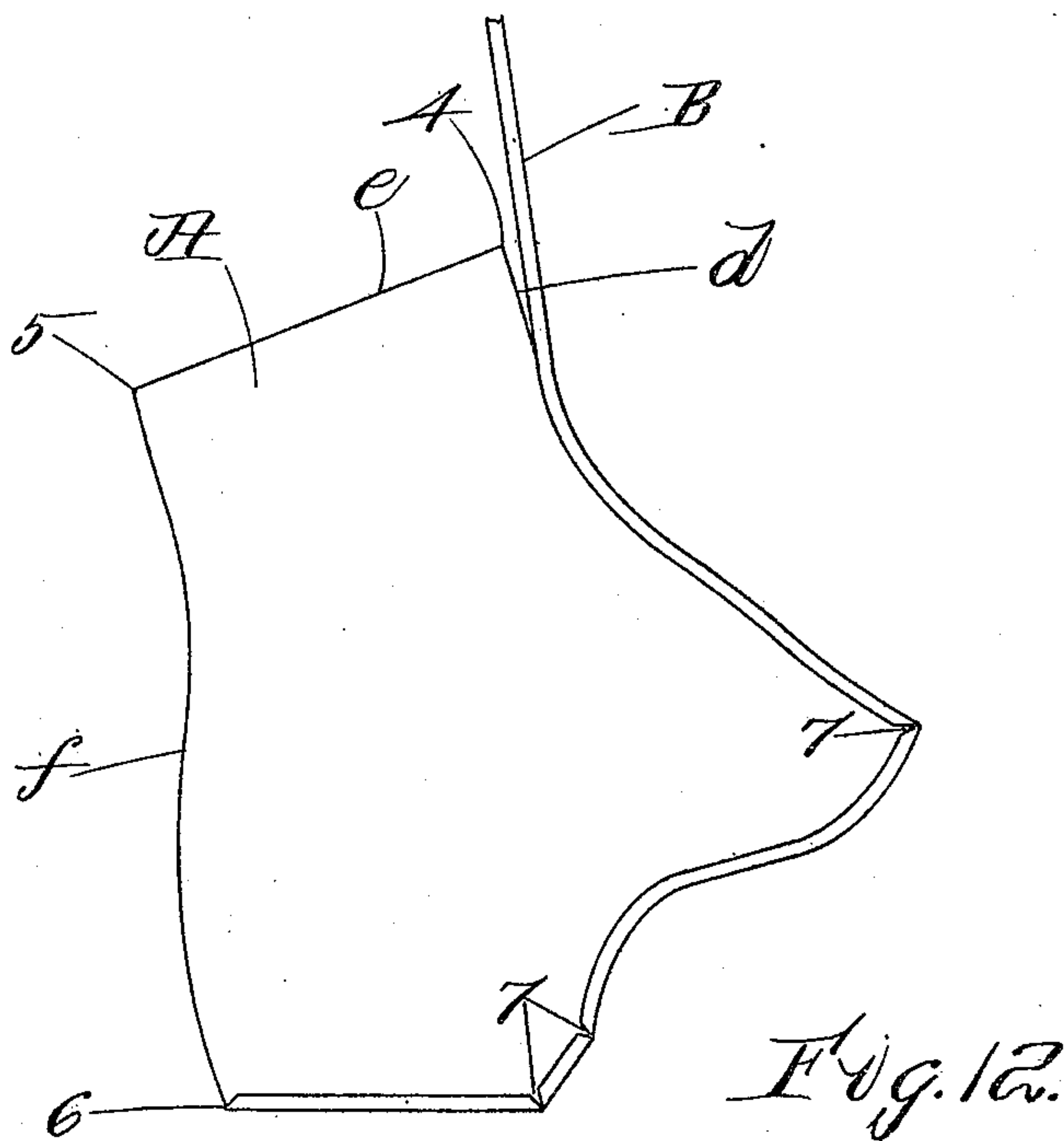
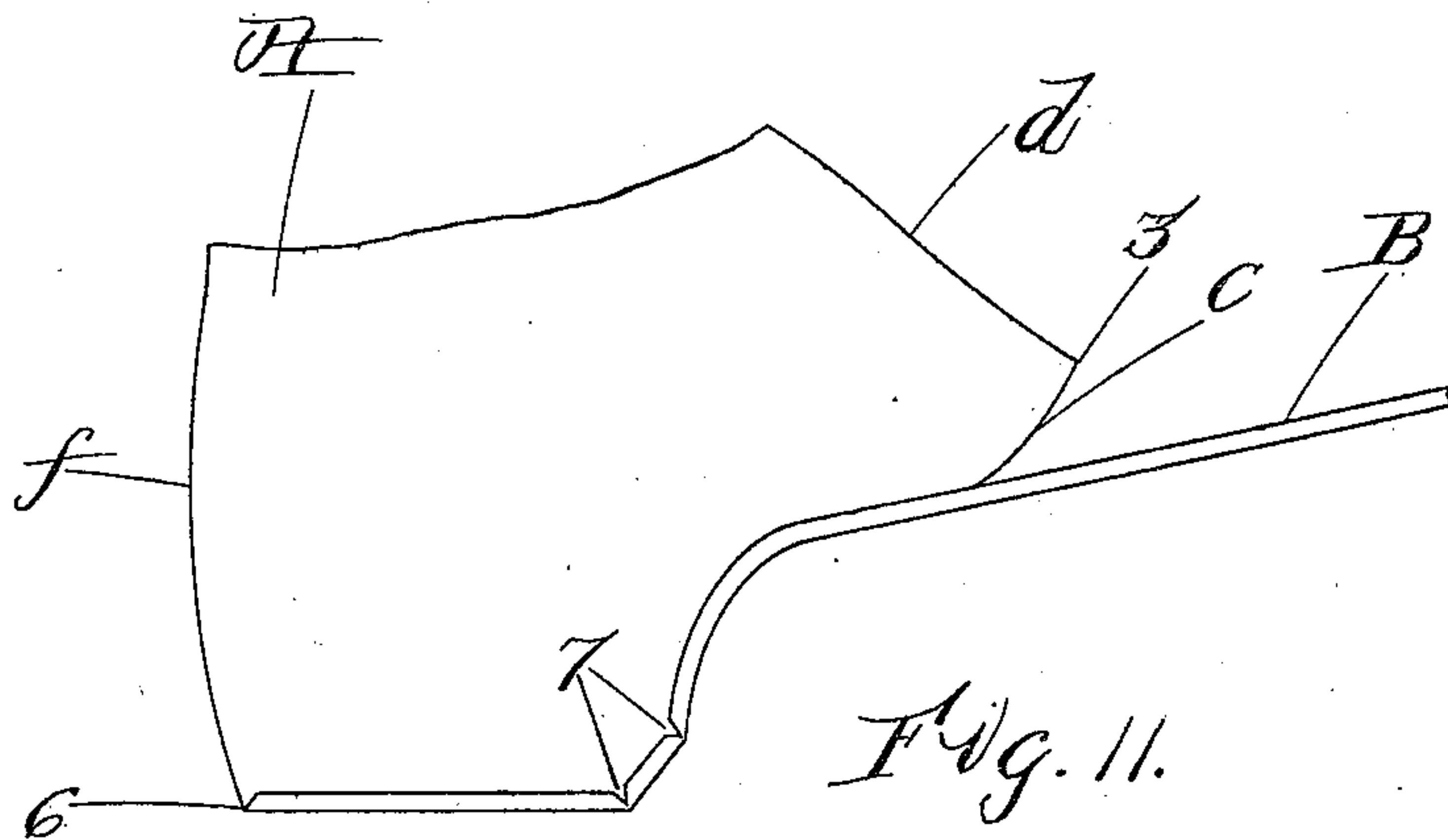
Witnesses:  
John H. Parker  
R. Wallace.

Inventor:  
Holton J. Sutherland  
by Macdonald, Calver, Copeland & Sibley  
Attorneys

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Witnesses:  
 John H. Parker  
 R. Wallace.

Inventor:  
 H. J. Sutherland  
 by Macdonald, Leavelle, Leopold and Pike  
 Attorneys.



# UNITED STATES PATENT OFFICE.

HOLTON J. SUTHERLAND, OF SWAMPSCOTT, MASSACHUSETTS.

MITER-CUTTING MACHINE FOR METALLIC BINDING FOR PATTERNS, &c.

934,027.

Specification of Letters Patent. Patented Sept. 14, 1909.

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*To all whom it may concern:*

Be it known that I, HOLTON J. SUTHERLAND, citizen of the United States, residing at Swampscott, county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Miter-Cutting Machines for Metallic Binding for Patterns and the Like, of which the following is a specification, reference being had therein to the accompanying drawings.

In the manufacture of boots and shoes and certain kinds of garments and various other articles it is customary to use a pattern shaped to the blank which is to be cut from a sheet of material out of which the article is to be made and to lay the sheet of material upon a cutting board, placing the pattern upon the sheet, and then cutting around the pattern with a knife by hand to cut the blank from the sheet. Patterns for this purpose are frequently made of thick paper or paper board, such as junk board or other similar material and in order to protect the edge of the pattern from undue wear or from being cut with the knife, it is common to bind the edge of the pattern with a metallic binding. The binding usually employed for this purpose comes in long pieces or strips somewhat flexible and formed U-shaped in cross-section, the width of the groove formed by the legs of the U-shaped strip being just sufficient to easily fit the thickness of the pattern to be bound, and when the binding is run onto the pattern it is necessary to pass it through some sort of a squeezing device to pinch the binding onto the pattern so as to hold it securely. It is desirable to have the binding as a continuous strip running entirely around the pattern, rather than to have the binding put on in sections. In order to enable the continuous binding strip to be bent around corners of the pattern in applying it, and to prevent buckling of the side flanges or legs of the binding at such corners, it is desirable to cut miters or V-shaped sections out of the legs or flanges of the binding strip at the points where it is to be bent. It is important that these miters should be cut at exactly the right point in order to give a proper fit, that is the center of the miter or the apex of the V-shaped notch should come directly at the corner of the pattern. Heretofore it has been customary to first apply the binding strip to one edge of the pattern and pinch

it on for a portion of its length to hold it in place, then to measure and mark with some instrument on the binding strip exactly where the miter is to be cut, in alignment with a line drawn from the corner of the pattern at right angles with the edge last bound, then to bend or spring away from the pattern a portion of the strip near where the miter is to be cut, then apply it to the mitering machine and cut the miter, then to bend the strip around the corner, and in the same way to measure each one of the sides and mark the strip before mitering it. This same process has to be gone through with for every succeeding pattern even if of the same size and shape, so that if twenty-five or fifty patterns of exactly the same size and shape are to be bound, the same measuring and marking process has to be gone through with for each one of them.

The main object of my invention is to provide a mitering machine having attached thereto a guide whereby the exact point at which the miter is to be cut may be determined with accuracy for each pattern without the necessity of marking the pattern and also to make the guide adjustable so that it may be adjusted for adapting it to patterns of varying contour.

Another feature of the invention relates to the miter cutting mechanism.

The invention will be understood from the following description taken in connection with the accompanying drawings, and the novel features are pointed out and clearly defined in the claims at the close of the specification.

In the drawings:—Figure 1 is a plan of a machine embodying the invention. Fig. 2 is a front elevation of the machine. Fig. 3 is a left hand side elevation. Fig. 4 is an enlarged view of the cutter mechanism. Fig. 5 is a section on line 5—5 of Fig. 4 showing the cutter in its lowermost position. Fig. 6 is a section on line 5—5 of Fig. 4 showing the cutter in its elevated position. Fig. 7 is a plan of a bound pattern. Fig. 8 is a plan of a pattern showing the binding strip started on one edge thereof, before being mitered for the first corner. Fig. 9 is a plan showing the pattern in the same partially bound condition as in Fig. 8, set in the machine ready for mitering the first corners. Fig. 10 is a plan showing the method of mitering for the second corner, which is for



a short side. Fig. 11 is a plan of the pattern showing the binding clenched on two sides and partially run onto the third side. Fig. 12 is a plan of the pattern showing the strip clenched onto three sides and partially run onto a fourth side.

Referring to the drawings:—A represents a pattern of the blank which is to be cut out and B represents the metallic binding strip. For illustration, the blank A which is shown is a pattern of a shoe quarter and is of somewhat irregular shape having the sides *a*, *b*, *c*, *d*, *e*, and *f*, and corners respectively 1, 2, 3, 4, 5 and 6. The binding strip B is preferably started for convenience at one corner, as for instance on the edge *a* at the corner 6, and run on for a portion of the side *a*, as shown in Fig. 8. The strip is run from the edge *a* around the corner 1, onto the edge *b*. In order to enable the strip to turn the corner the legs or side flanges of the strip should have formed in them the miters or V-shaped notches 7 which should be located exactly at the proper place so that the bend will be made exactly at the corner 1. In carrying out my invention after the strip is started on the edge *a* as already described it will be pinched onto the edge *a* of the pattern for a portion of the distance toward the corner 1, being left some distance back from the corner unpinched so that the strip may be sprung away from the pattern at the corner and placed in the miter machine to enable the miter to be cut without cutting the pattern. In order to be sure of having the miter cut in the strip at the proper point before turning the corner 1 it is necessary to have some way of marking or indicating where it is to be cut. This point should be the apex or center of the notch and should be directly against the edge of the corner 1. It will be observed that when the binding strip is set down upon the edge, the downwardly extending legs or the side flanges of the strip will cover up the corner and lie down for a short distance onto the face of the pattern. Owing to this fact it will be seen that if the second edge to be covered, as *b*, makes an obtuse or acute angle with the edge *a*, if the strip is set down close to the edge *a* for its full distance to the corner 1, it will be impossible to tell exactly where the corner is, unless some previous mark is made upon the pattern at right angles with the edge *a* from the corner. Therefore it has heretofore been customary before closing down the strip upon the edge *a* to mark a line upon the side of the pattern running from the corner 1 upon the face of the pattern and at right angles with the edge *a* and then when the binding strip is brought down close upon the edge *a* to make a mark on the binding strip against the line to indicate where the miter should be cut.

The machine embodying my invention is

so constructed and provided with a guide that the guide may be set so that any number of patterns of the same form may have the strip mitered for the corner without previously making any mark upon the strip or on the pattern.

A mitering machine embodying my invention will now be described.

A vertically movable plunger 11 is slidable in the vertical cylinder 12 which is fixedly mounted in the standard 13. Any mechanism which may be actuated at the will of the operator may be employed to operate the plunger. The mechanism shown for elevating the plunger consists of a lever 14 fulcrumed intermediate its ends at 15, one end of which engages with the slotted lower end of the plunger within the hollow base of the standard 13, the other end of the lever projecting out through the slot 16 in the side of the base and may be operated in any suitable manner, preferably by the foot of the operator by means of a treadle. The plunger is retracted, after the foot is released from the treadle, by a spring 17 which holds it in its normal position. Projecting from the upper end of the plunger 11 is a miter cutter 18 shaped in cross section to the form of the notch to be cut. The cylinder 12 within which the plunger 11 reciprocates projects somewhat above the upper end of the standard 13, and projecting still farther upward is a segmental extension 19 of the cylinder 12 having the edges 20, 21. Formed in the outer periphery of the segmental extension 19 of the cylinder 12 are two horizontal grooves 22, 23, one above the other spaced apart equal to the cross sectional distance between the two flanges of the binding strip so that the binding strip may be engaged with the grooves. A portion of the outer face of the extension 19 between the two grooves 22, 23, is also cut away and a narrow slit 24 is made through the segmental extension 19 to enable the cutting edge of the miter cutter 18 to project into said slit and engage the flanges of the strip when the plunger is moved upward. A vertical line 25 on the upper portion of the periphery of the extension 19 indicates the center of the slit 24 or where the center of the cutter will come up.

In order to cut the miter in the binding strip, as for instance after the strip has been started on the edge *a*, and pinched down for a portion of its distance to prevent its slipping off, the strip is entered into the grooves 22, 23 and shoved forward until the corner 1 of the pattern strikes the guide as will be hereinafter explained, the strip being sprung away from the edge *a* sufficiently so that the edge *a* will slide along against the inner edges 20, 21 of the extension 19. The foot lever is then operated to move the plunger upward and cut the notches in the two



flanges of the strip. An adjustable guide is provided to indicate exactly how far forward the pattern and strip are to be moved to cut the miter in order that the pattern  
 5 may be moved directly into position without the necessity of marking the pattern or strip. Any suitable guide may be provided but the one which I have shown and which I prefer is as follows: Mounted on the upper end of  
 10 the standard 13 at the opposite side from that from which the binding strip is entered is a block 27 having adjustably mounted thereon a guide plate 28 which projects horizontally above the upper end of the cylinder 12  
 15 in a direction to meet the advancing corner of the pattern. This guide 28 is longitudinally adjustable in the block 27 by means of an adjusting screw 29 having a flange 30 which engages with a slot 31 in the guide  
 20 28. By turning the adjusting screw 29 the guide may be moved forward or backward. In order to enable the guide to be adjusted to the proper position for any particular angle I provide the machine with a scale  
 25 having divisions 311 marked thereon. The scale divisions may be marked directly on the guide 28.

Where the edge to be bound is very short, as for instance, the edge *b*, I provide special  
 30 supplementary guide mechanism.

In running the strip on short sides such for instance as the side *b* the side is so short that if the strip be pinched onto the side *a* for its entire length and the corner 1 is  
 35 turned and the strip then partially pinched on the side *b* before the miter for the corner 2 is cut there is not sufficient length for the strip to be engaged in the grooves 22, 23 and for the corner 2 to be brought up against  
 40 the guide 28 in the manner previously described for cutting the miter for corner 1. I therefore provide means whereby the strip may be suitably guided to cut the miter for the corner 2 after the miter for corner 1 is  
 45 cut before the strip is bent around the corner 1. The guide mechanism which I employ is as follows: Mounted in a bearing 30 on the upper part of the standard is a sleeve 321 through which loosely passes a shaft 32 hav-  
 50 ing at its rear end a handle or knob 33 and having at its forward end a finger or knife 34 turned up at a right angle with the shaft, this finger being formed with a thin or knife edge. The loose fit of the shaft within the  
 55 sleeve enables the shaft to be rotated within the sleeve without longitudinal movement with relation to the sleeve, one end of the sleeve butting against the handle or shoulder on one end of the shaft and the other end of  
 60 the sleeve butting against the finger 34. The sleeve fits loosely within the bearing 30 so that the sleeve and shaft together may move longitudinally within the bearing. The shaft 32 and its holding sleeve are adjusted  
 65 to such position that the distance from the

edge of the finger 34 to a point opposite the center of the slit 24 will be equal to the length of the short side *b* between corners 1 and 2.

In order to indicate where the miter is to  
 70 be cut for turning the corner at the end of a short side, as for instance the corner 2 at the end of the side *b* as above mentioned, after the miter for the corner 1 is cut and before  
 75 bending the strip to turn the corner 1 the pattern and attached strip are moved back and adjusted so as to bring the finger 34 into alinement with or opposite the apex of the notch which has already been cut for the  
 80 corner 1 and the plunger is then operated to cut another notch in the strip while in this position. This last notch will be cut at exactly the point where the distance between its center and the center of the notch for the  
 85 corner 1 will be equal to the length of the side *b* so that now the strip can be bent around the corner 1 and then bent around the corner 2, both miters being cut in the right position for this purpose. The strip  
 90 can be pinched onto the side *b* and bent around corner 2 and run partially around the side *c*, being bent to fit into the concave curve 35. The strip is left free to spring  
 95 back from the edge for a short distance and should then be mitered to turn the corner 3 as previously described for corner 1. The  
 100 mitering and bending on of the strip will then be carried on successively for the other sides and corners by using the guide in the manner previously described. The most  
 105 convenient method is to bind one side at a time for all of the patterns of the same form which are then in the pile ready for binding, and then to start again with the first pattern and bind its second side and run through all  
 110 of the patterns for the second side before binding the third side, this being especially convenient if the guide is to be re-adjusted for the second corner so as to save adjusting it but once for the whole set. If, however,  
 115 there are several corners in series having the same angle of turn on a short side as above described all of such sides may be bound on each pattern before taking up the next pattern. A line 40 is preferably marked on the  
 120 upper end of the standard whereby the finger 34 may be adjusted at any subsequent time to the proper position to indicate where the miter shall be cut in another set of patterns of the same length of side.

Not only is it desirable to have the guide  
 28 adjustable longitudinally in the block 27 but it is desirable to have the guide adjust-  
 125 able laterally. If the guide is mounted in a block 27 this lateral adjustment may be obtained by making the block 27 adjustable laterally. One way of accomplishing this is to mount the block upon a screw 37 which  
 130 extends up through an elongated slot 38 in a flange 39 on the upper end of the standard



13. The screw 37 screws into the block 27 and may be set up to clamp the block in this adjusted position.

What I claim is:

5 1. In combination with a machine for mitering a binding strip for turning the binding strip around a corner on the partially bound article, a guide for positioning a corner of the partially bound article with  
10 relation to the cutter whereby an unbound portion of the binding strip is also positioned in relation to the cutter.

2. In combination, a machine for mitering a continuous binding strip for turning the  
15 binding strip around a corner of a partially bound article, an adjustable guide for positioning a corner of the partially bound article whereby an unbound portion of the binding strip is positioned in relation to the  
20 cutter.

3. In combination with a machine for mitering binding strips for turning the binding strip around corners of an article to which the strip is partially attached, an ad-  
25 justable guide for positioning the unattached portion of the binding strip in relation to the cutter, and a scale whereby the position to which the guide should be adjusted for any particular corner may be indicated.

30 4. In combination with a machine for mitering binding strips for turning corners, a guide whereby the article with the strip partially bound thereon may be positioned and thereby fix the position of the strip with  
35 relation to the cutter, and a secondary guide to be used in combination with said first guide for positioning the strip for mitering a second corner at the end of a short side.

40 5. In a machine for mitering binding strips to facilitate bending the strip around corners, a plunger carrying at its end a miter cutter, means for vertically reciprocating said plunger and cutter, a guide whereby the article with the strip partially bound there-  
45 on is positioned and thereby the binding strip is positioned with relation to the cutter.

6. In a machine for mitering binding strips to facilitate bending the strip around corners, a miter cutter, means for vertically  
50 reciprocating said cutter, a guide whereby the article with the strip partially bound thereon and having a projecting free portion is positioned and thereby the projecting free portion of the binding strip is posi-  
55 tioned with relation to the cutter.

7. In a machine for mitering binding strips to facilitate bending the strip around corners, a plunger carrying at its upper end a miter cutter, means for reciprocating said  
60 plunger and cutter, an adjustable guide which forms an abutment for a corner of the article with the strip partially bound thereon and having a projecting free portion whereby the free portion of the strip is posi-  
65 tioned to be engaged by the cutter at the

point where it is to be bent to turn said corner.

8. In a machine for mitering binding strips to facilitate bending the strip around corners of a pattern to which the strip is  
70 partially attached, said strip having a projecting free portion, a plunger carrying at its end a miter cutter, means for reciprocating said plunger and cutter, a slotted guide and support for the free portion of the bind-  
75 ing strip, said guide having a slot within which the cutter reciprocates, a guide which forms an abutment for the pattern whereby the pattern is positioned and thereby the binding strip is positioned to be engaged by  
80 the cutter at the point where it is to be bent to turn a particular corner.

9. In a machine for mitering binding strips to facilitate bending the strip around corners of a pattern to which the strip is al-  
85 ready partially attached, a plunger carrying at its upper end a miter cutter, means for reciprocating said plunger and cutter, an adjustable guide which forms an abutment for the corner of the pattern whereby a project-  
90 ing free portion of the strip is positioned to be engaged by the cutter at the point where it is to be bent to turn said corner and a scale which indicates the position to which the guide should be adjusted.  
95

10. In combination with a machine for mitering a binding strip for bending the binding strip around a corner of an article upon which the strip is already partially  
100 bound, said strip being partially secured to the edge of the article before reaching the corner, a guide for positioning the corner of the article around which the strip is to be bent with relation to the cutter whereby the unbound portion of the binding strip is po-  
105 sitioned with relation to the cutter to insure that the cutter will miter the strip at the proper point for turning the corner.

11. In a machine for mitering binding strips to facilitate bending the strip around  
110 corners, a vertically reciprocable miter cutter, means for reciprocating said cutter, a slotted guide and support for the free portion of the binding strip, said guide having a slot within which the cutter reciprocates,  
115 a guide against which the article to be bound may be made to abut whereby the article may be positioned and thereby the binding strip may be positioned to be engaged by the cutter at the point where it is to be bent to  
120 turn a particular corner, a scale which indicates the position to which the guide should be adjusted, a secondary guide to be used in combination with said first guide for posi-  
125 tioning the strip for mitering a second corner at the end of a short side.

12. In a machine for mitering binding strips to facilitate bending the strip around corners, a vertically reciprocable miter cut-  
130 ter, means for reciprocating said cutter, a



slotted support for the free portion of the binding strip, a guide against which the article to be bound may be made to abut whereby the article may be positioned and  
5 thereby the binding strip may be positioned to be engaged by the cutter at the point where it is to be bent to turn a particular corner, a rotary adjustable guide having a finger which may be set to indicate the distance between a miter already cut and the  
10 miter to be next cut whereby after one miter is cut the strip may be positioned for the next miter.

13. In a machine for mitering binding  
15 strips to facilitate bending the strip around corners, a vertically reciprocable miter cutter, means for reciprocating said cutter, a slotted support for the free portion of the binding strip, a guide against which the  
20 article to be bound may be made to abut whereby the article may be positioned and thereby the binding strip may be positioned to be engaged by the cutter at the point it is to be bent to turn a particular corner, a  
25 rotary adjustable guide having a finger which may be set to indicate the distance be-

tween a miter already cut, and the miter to be next cut whereby after one miter is cut the strip may be positioned for the next miter, and scales to indicate the position to  
30 which said guides should be adjusted.

14. In a machine for mitering binding strips for turning corners, a vertically reciprocable plunger carrying at its upper end a miter cutter, means for vertically reciprocating said plunger and cutter, and a holder  
35 for the binding strip adapted to hold the strip in position for the strip to be engaged by the cutter on its up stroke.

15. In a machine for mitering binding  
40 strips for turning corners, a vertically reciprocable miter cutter, means for vertically reciprocating said cutter, and a holder for the binding strip adapted to hold the strip in position for the strip to be engaged by the  
45 cutter on its up stroke.

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

HOLTON J. SUTHERLAND.

Witnesses:

WILLIAM A. COPELAND,  
ALICE H. MORRISON.