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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

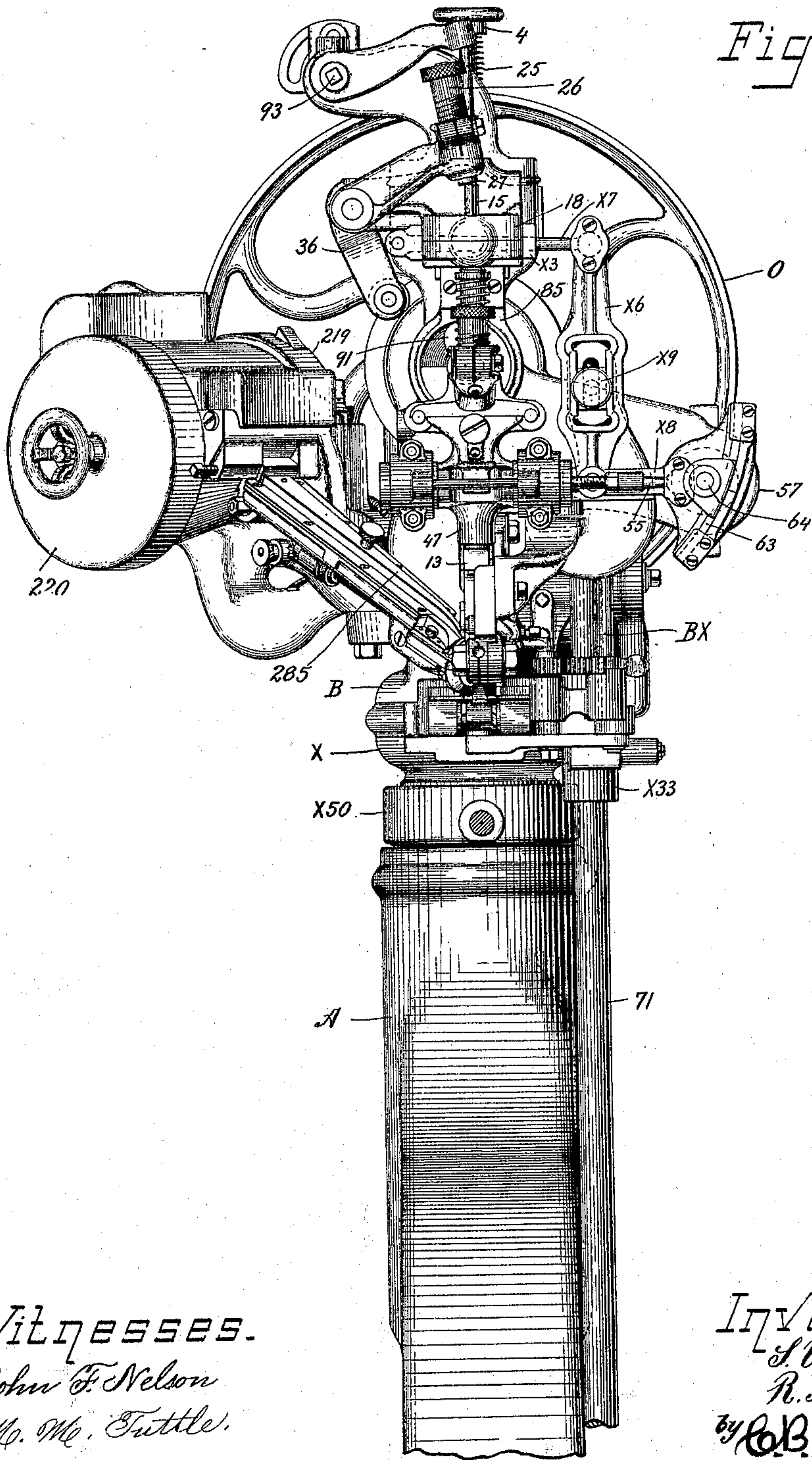


Fig. 1.

Witnesses.
John F. Nelson
Mc. Mc. Tuttle.

Inventors.
S. W. Ladd
R. F. McFeely
by C. B. Tuttle Atty

(No Model.)

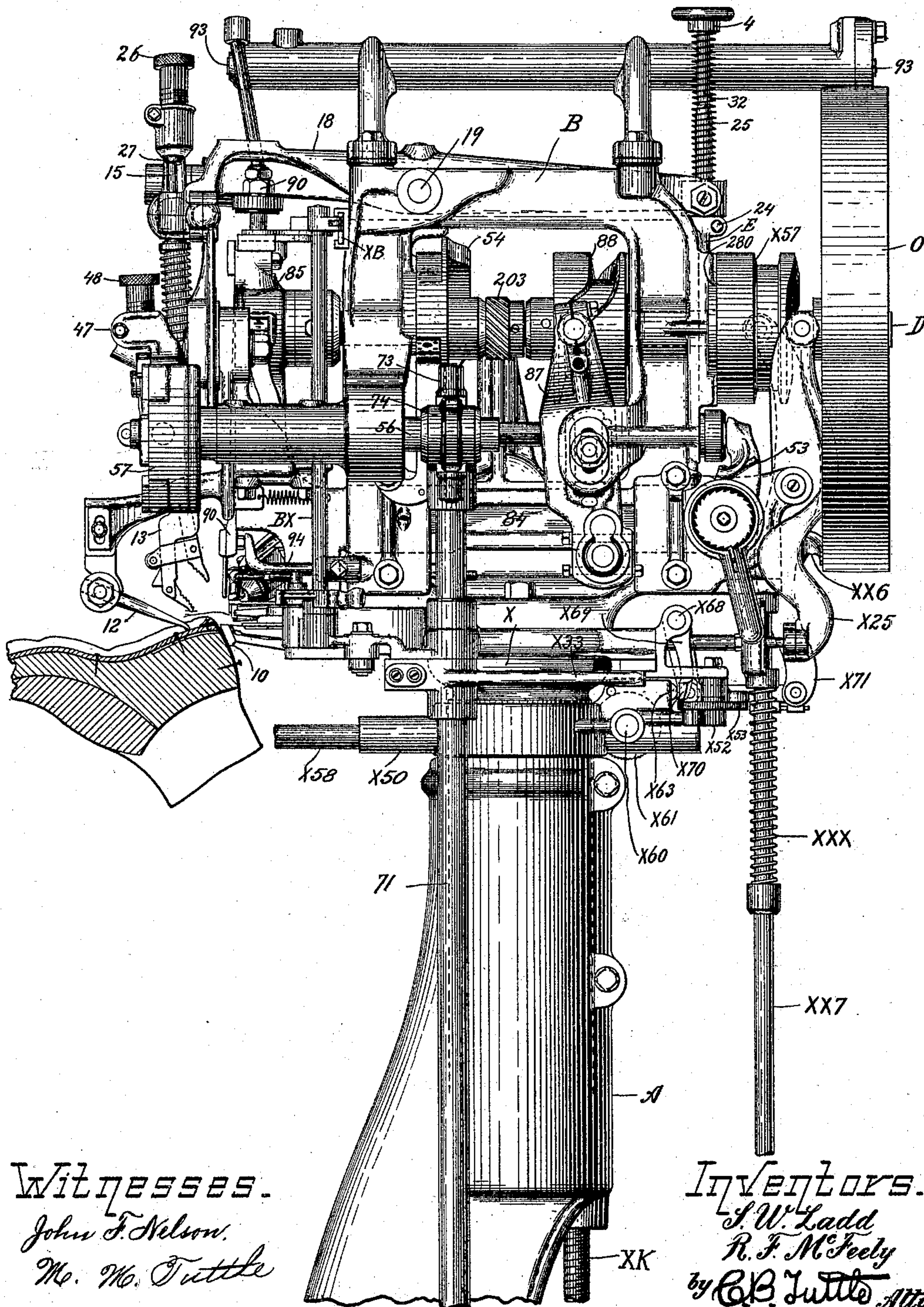
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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 2.



Witnesses.

John F. Nelson.

Mc. Mc. Tuttle

Inventors.

S. W. Ladd

R. F. McFeely

by C. B. Tuttle Atty.

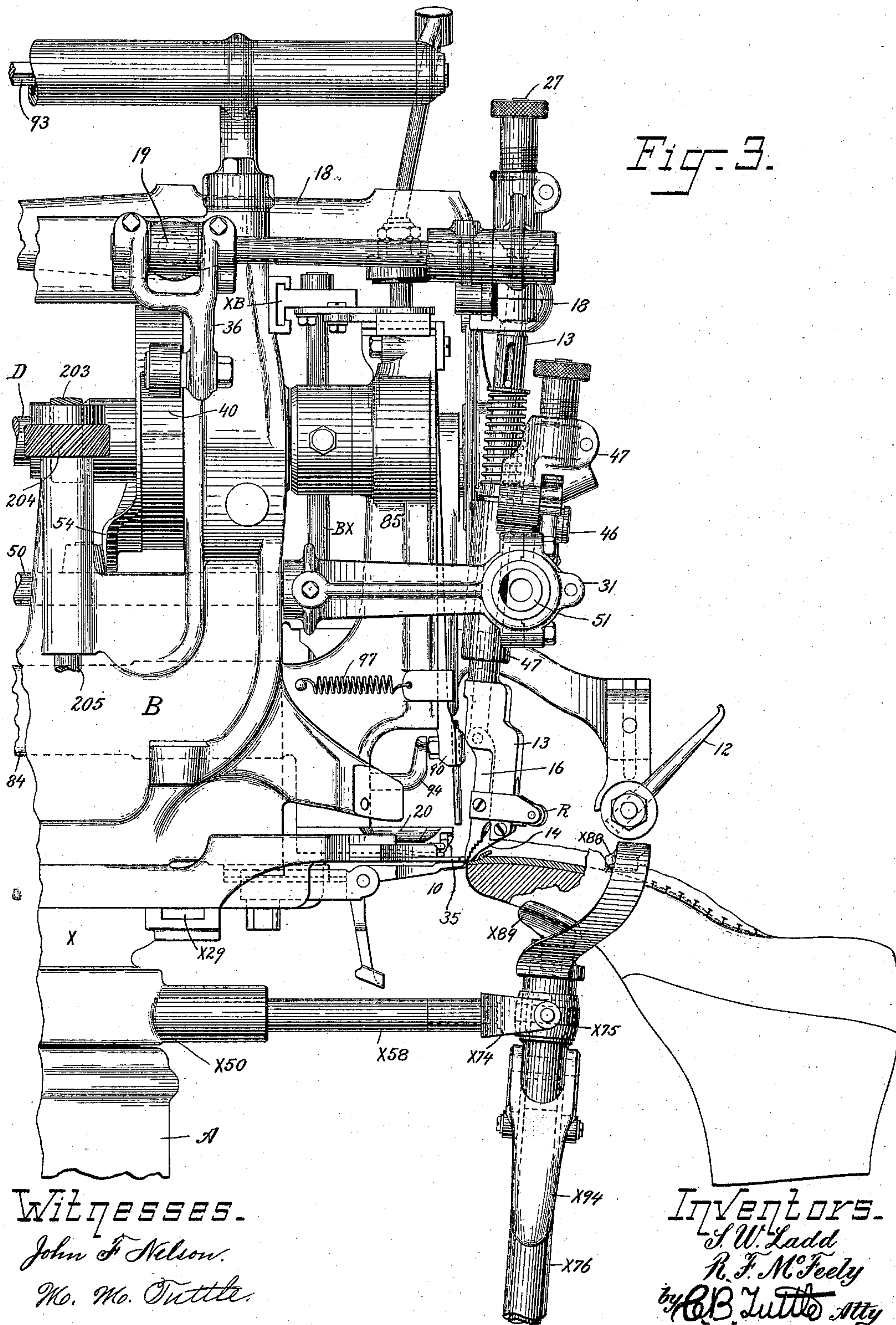
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No. 584,744.

Patented June 15, 1897.



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No. 584,744.

Patented June 15, 1897.

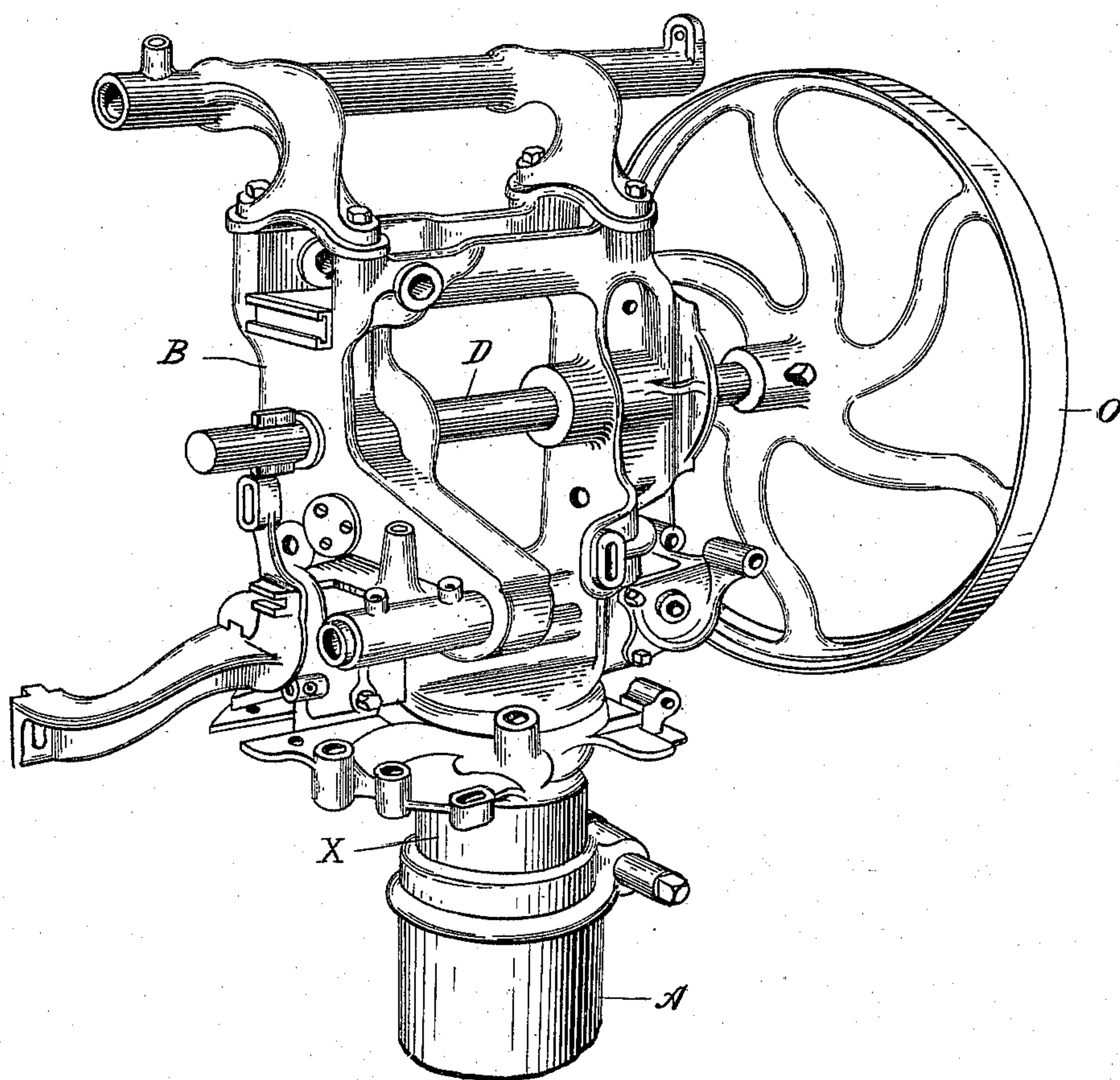


Fig. 4.

WITNESSES.

John F. Nelson
Wm. W. Tuttle.

INVENTORS.

S. W. Ladd
R. F. McFeely
by C. B. Tuttle
Atty.

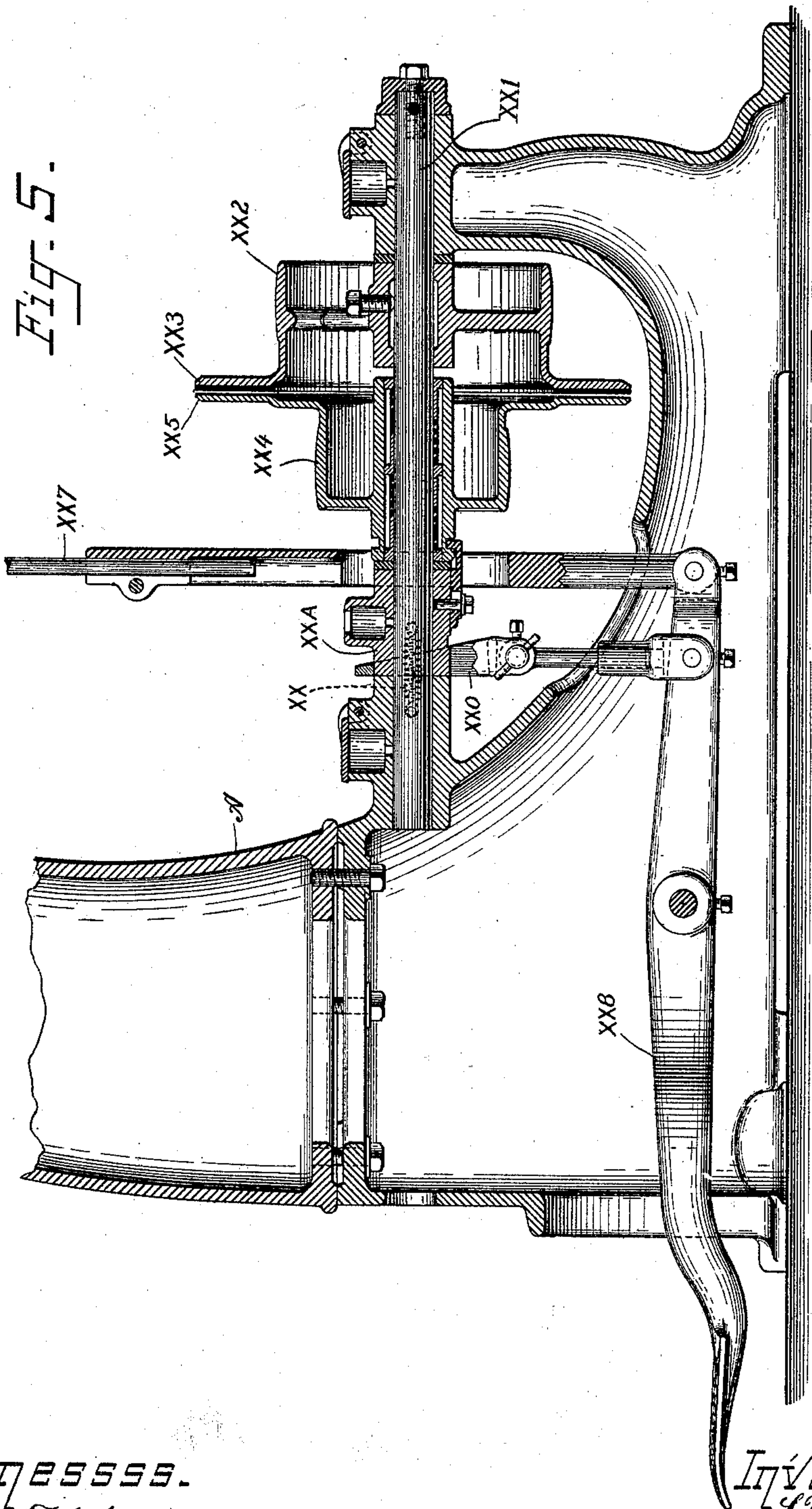
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LASTING MACHINE..

No. 584,744.

Patented June 15, 1897.



Witnesses.
John F. Nelson.
Wm. W. Tuttle.

Inventors.
S. W. Ladd
R. F. McFeely
by R. B. Tuttle Atty.

(No Model.)

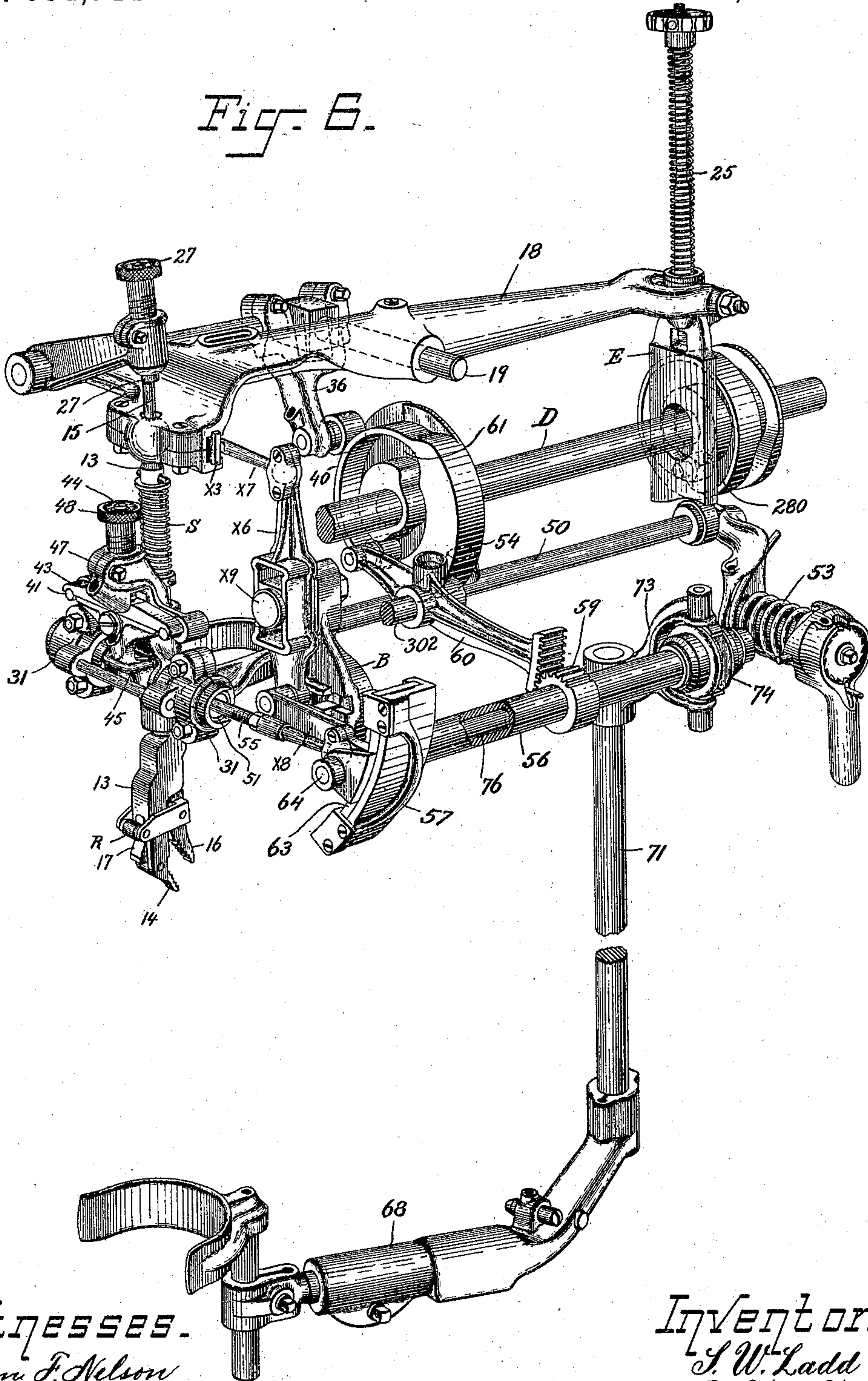
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LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 6.



Witnesses.
John F. Nelson
Mo. Mo. Tuttle

Inventors.
S. W. Ladd
R. F. McFeely
By C. B. Tuttle

(No Model.)

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Patented June 15, 1897.

Fig. 7.

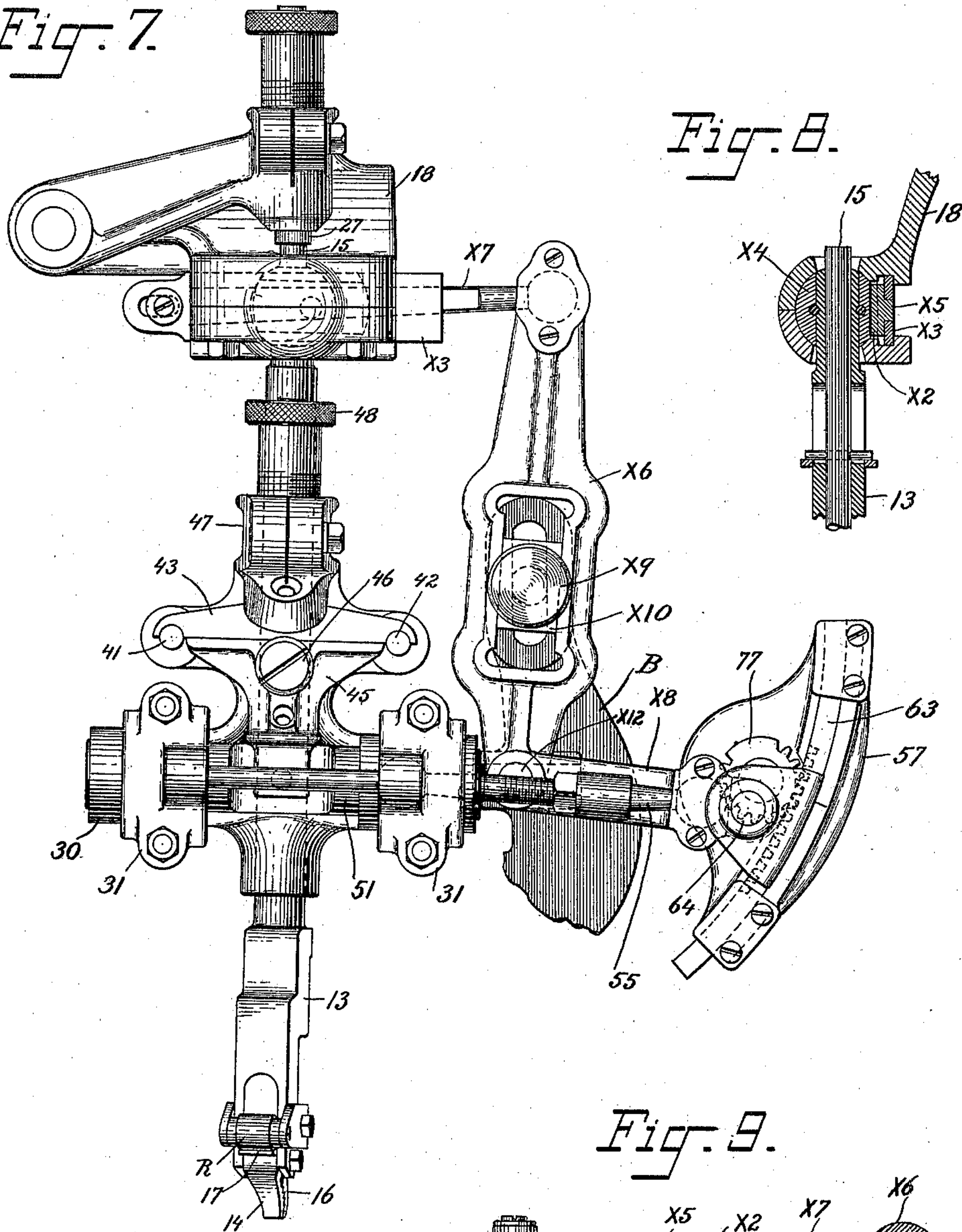


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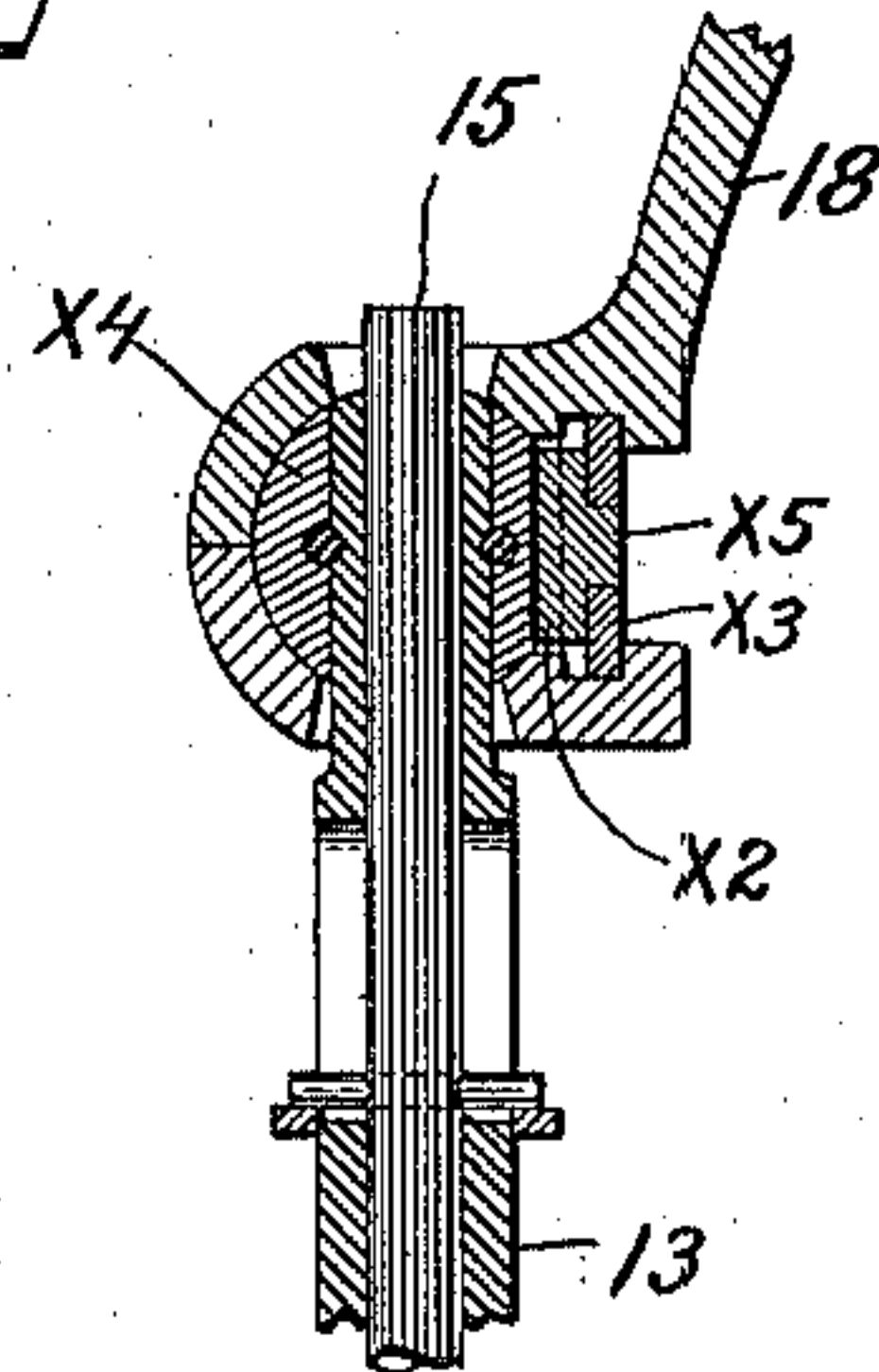
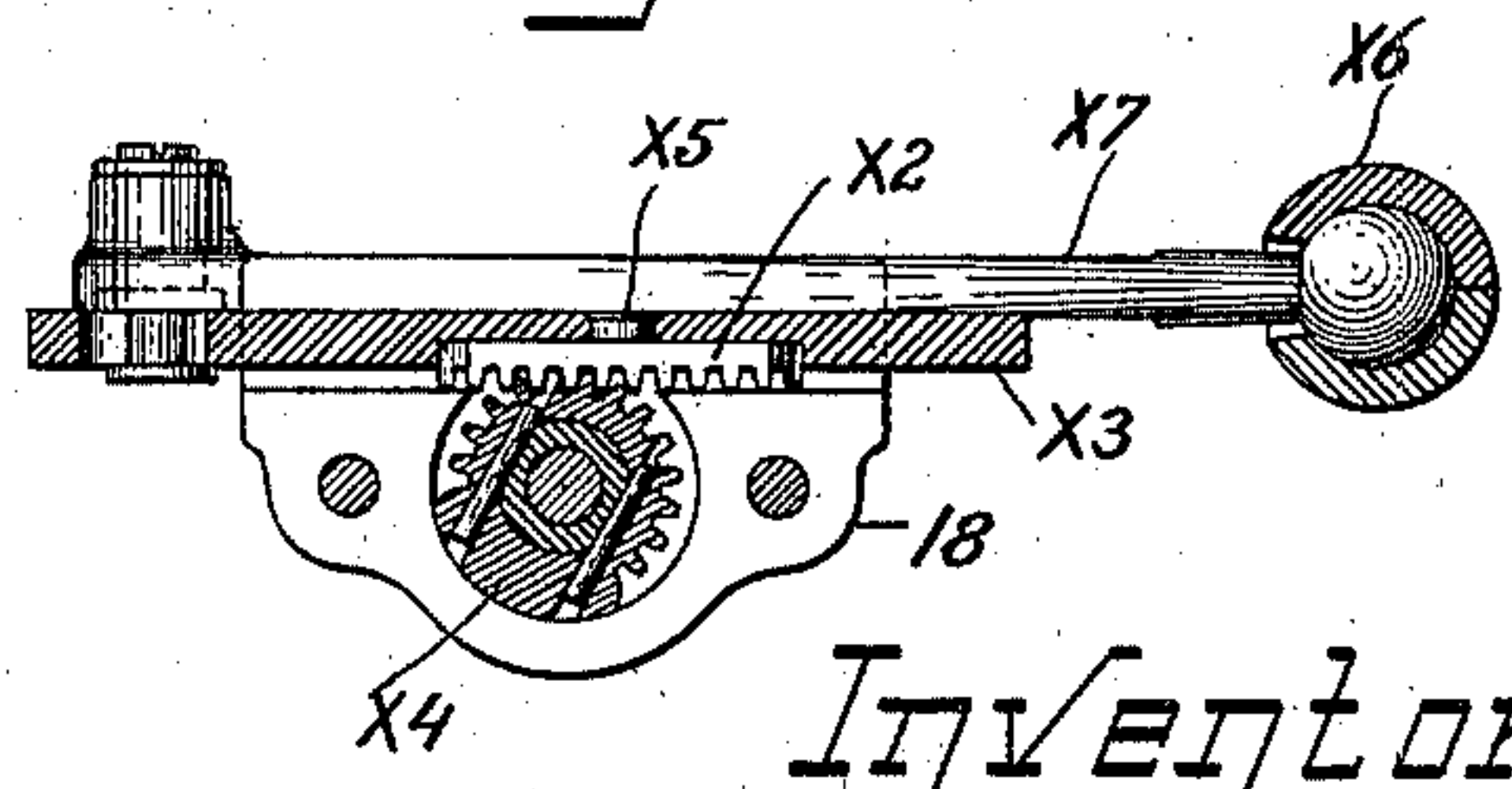


Fig. 9.



Witnesses.

John F. Nelson.

Wm. W. Tuttle.

Inventors.

S. W. Ladd

R. F. McFeely

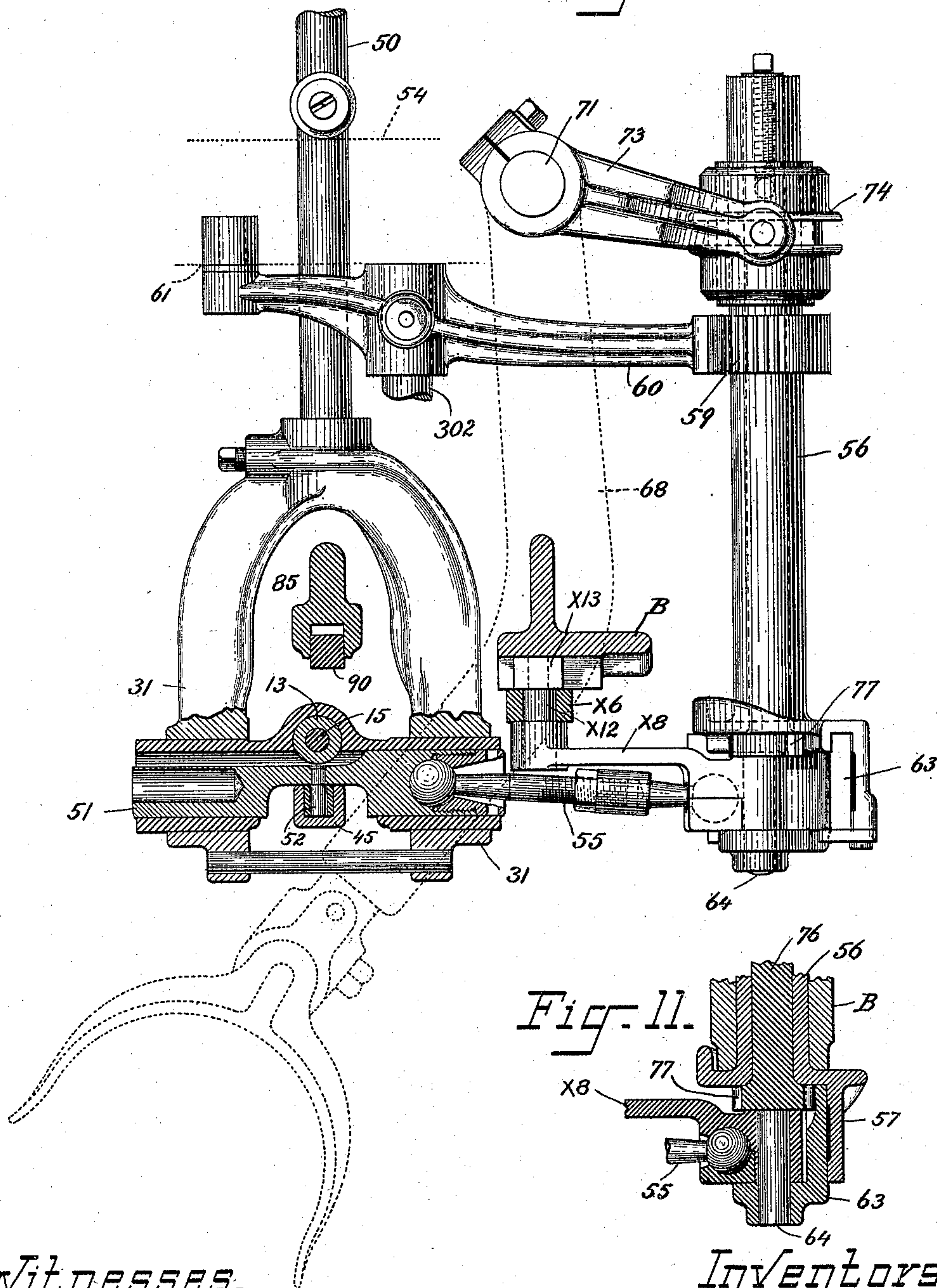
by R. B. Tuttle, Atty.

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No. 584,744.

Patented June 15, 1897.

Fig-10.



Witnesses:
John F. Nelson.
Wm. Mc. Tuttle.

Inventors.
S. W. Ladd
R. F. McFeely
by R. B. Little Atty.

(No Model.)

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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

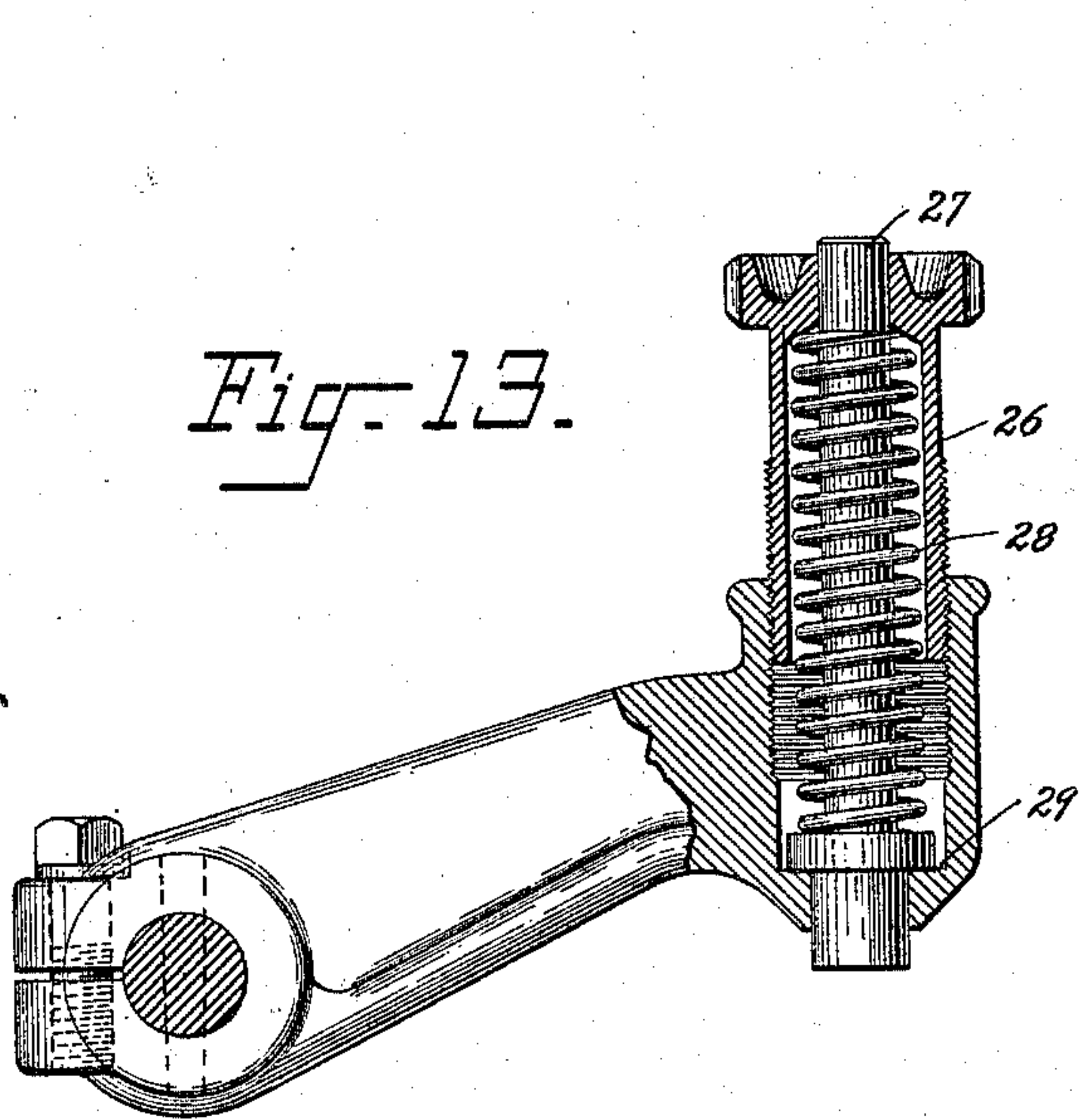


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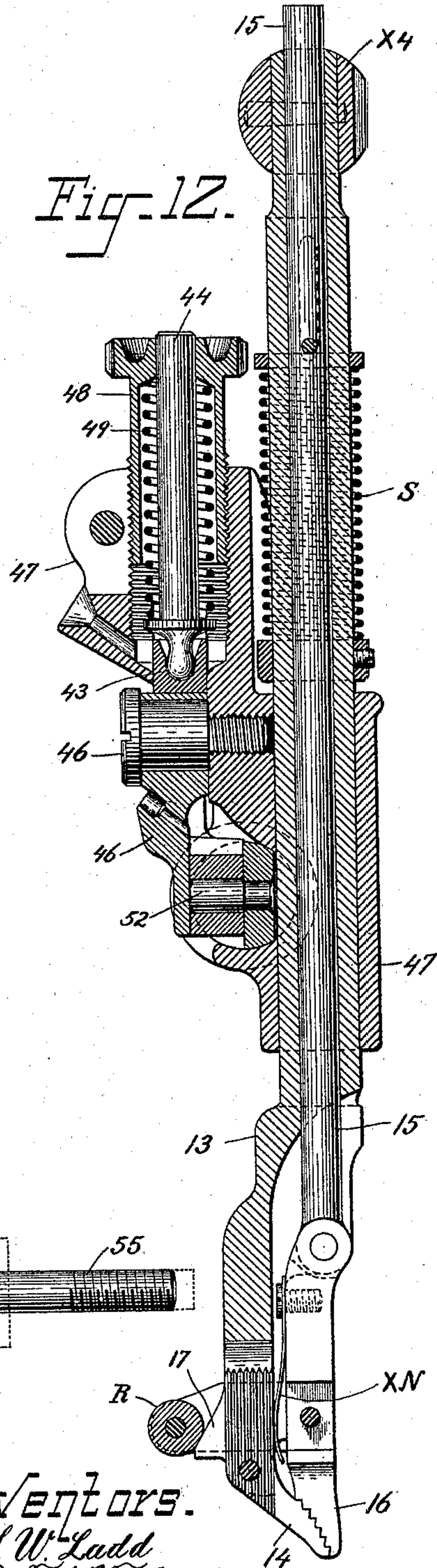


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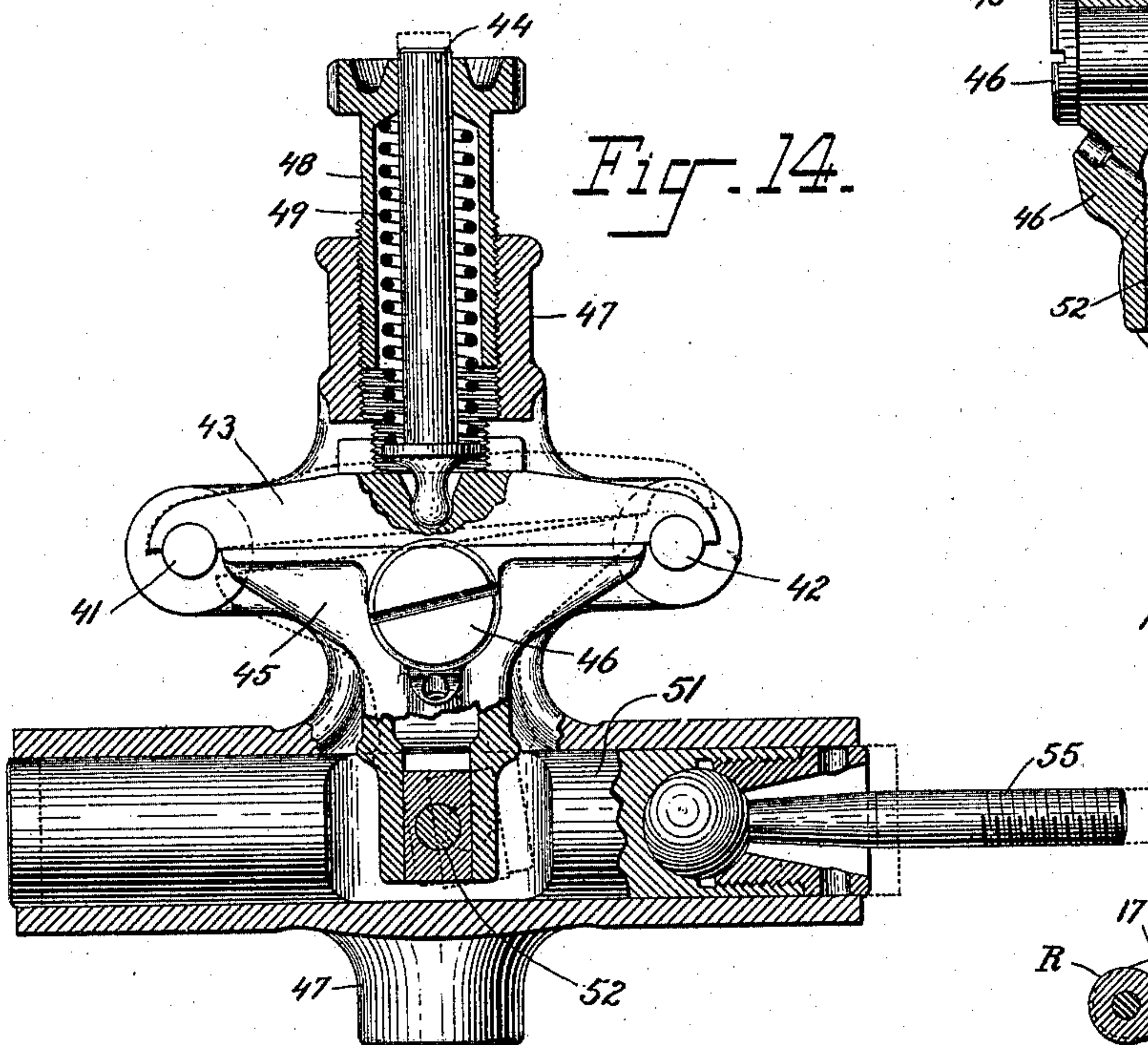


Fig. 14.

Witnesses.

John F. Nelson
Wm. Mc. Tuttle

Inventors.

S. W. Ladd
R. F. McFeely
by C. B. Tuttle Atty.

(No Model.)

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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 16.

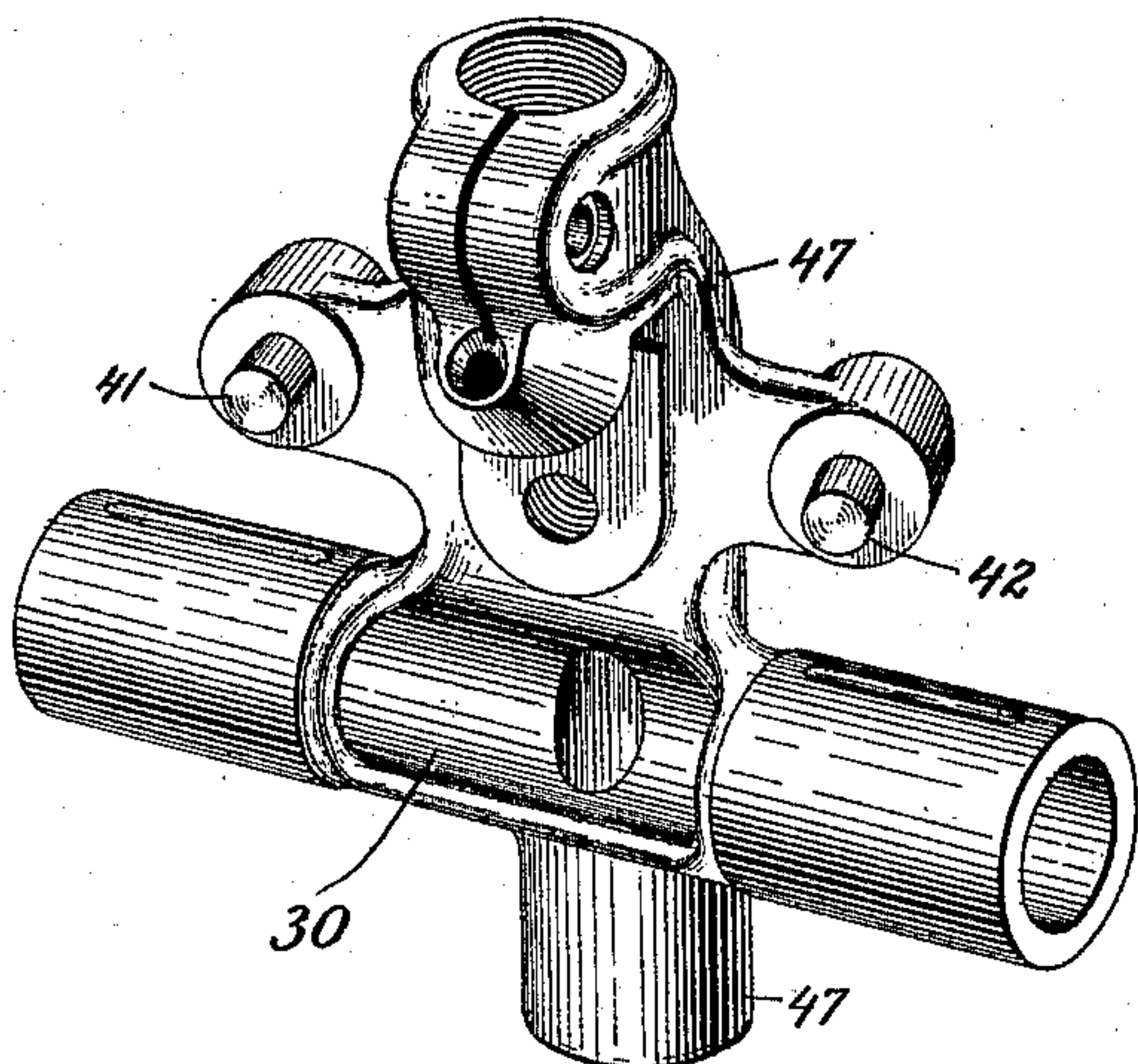
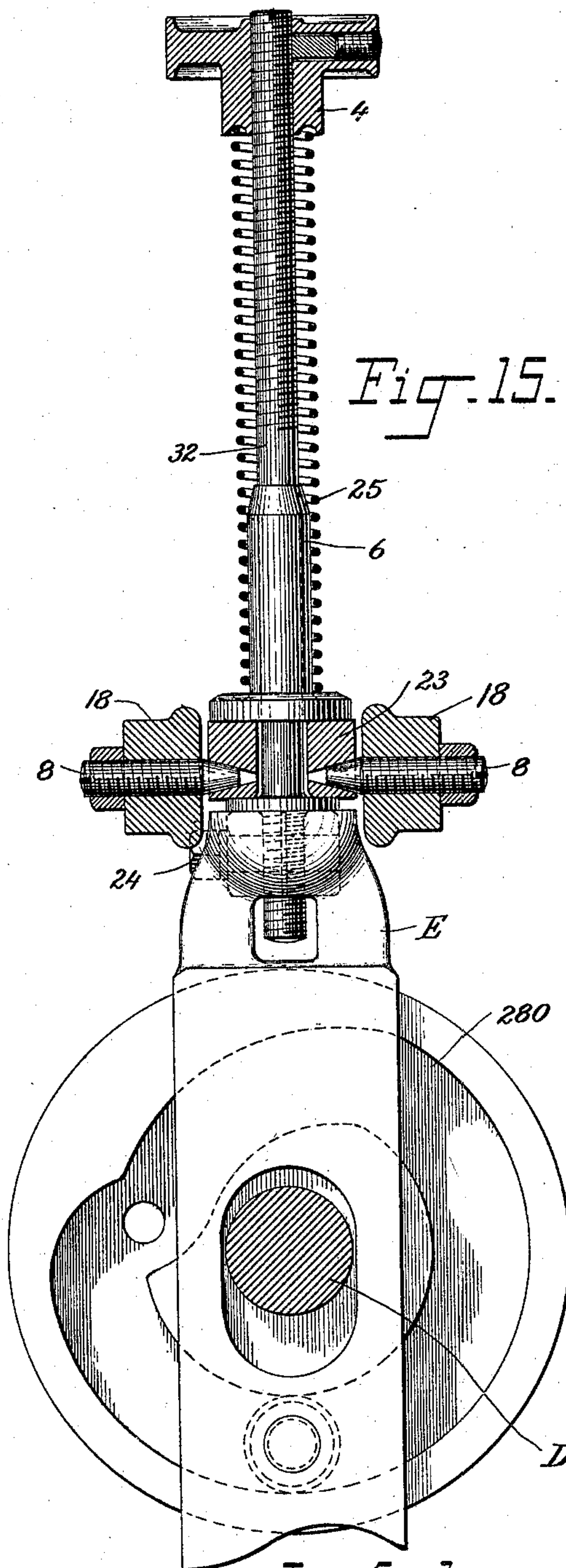


Fig. 15.



Witnesses.

John F. Nelson
Maudie Tuttle.

Inventors.

S. W. Ladd
R. F. McFeely
by E. B. Tuttle Atty.

(No Model.)

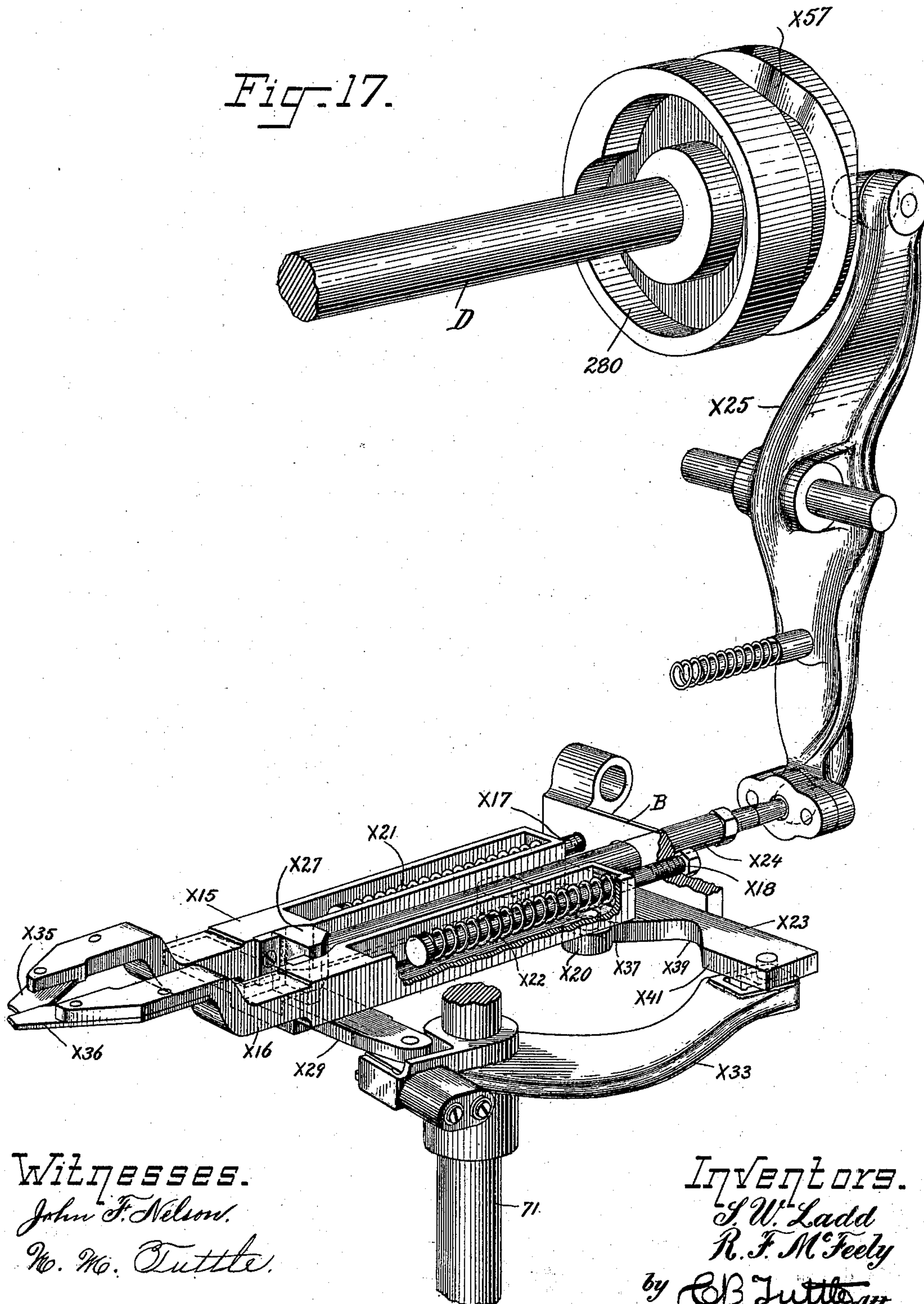
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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 17.



Witnesses.

John F. Nelson.

Wm. M. Tuttle.

Inventors.

S. W. Ladd

R. F. McFeely

by C. B. Tuttle Atty.

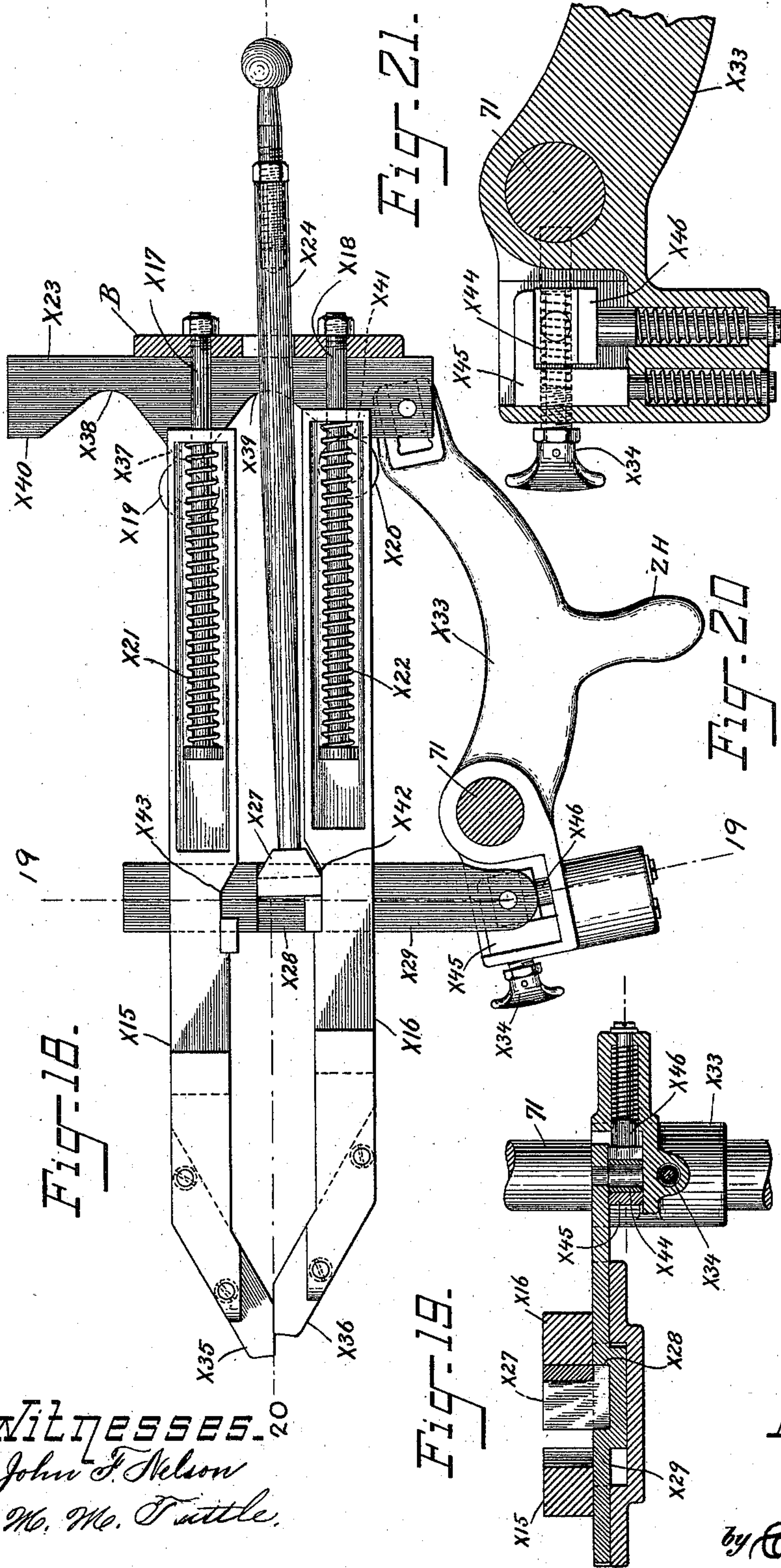
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LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.



WITNESSES.
John F. Nelson
W. W. Tuttle.

INVENTORS.
S. W. Ladd
R. F. McFeely
by C. B. Tuttle Atty.

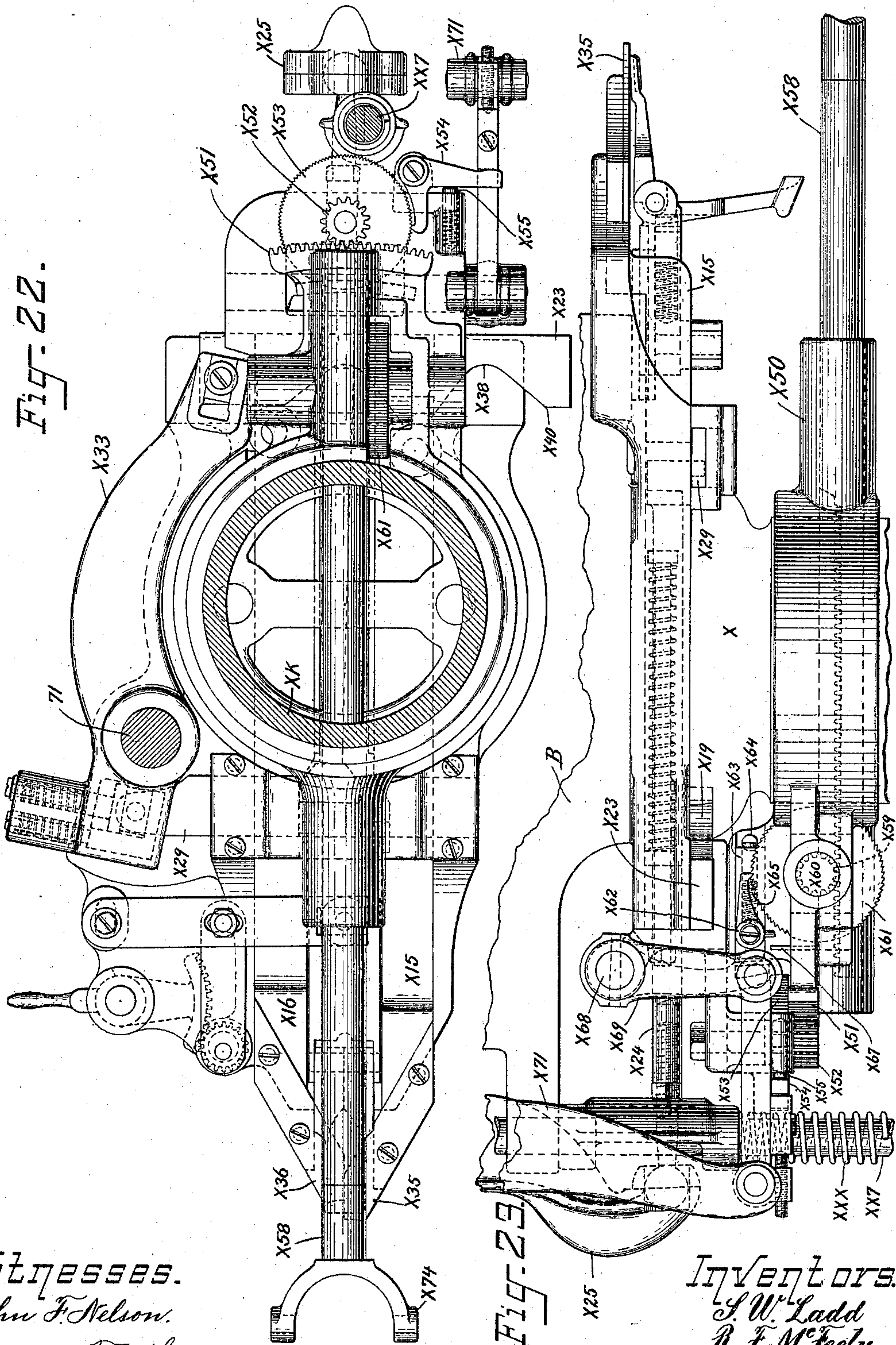
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LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.



Witnesses.
John F. Nelson.
Mo. McTuttle.

Inventors.
S. W. Ladd
R. F. McFeely
by C. B. Tuttle Atty.

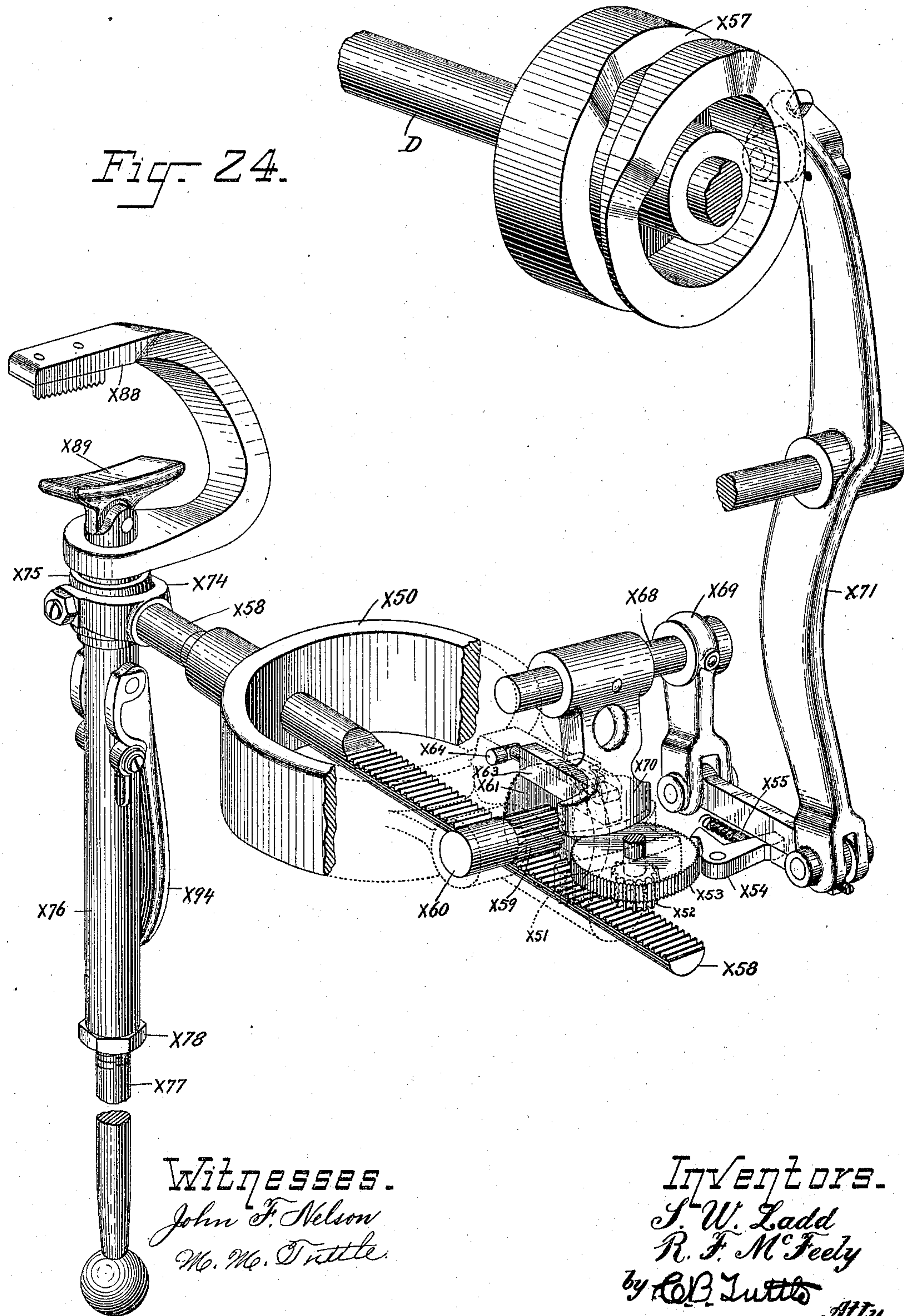
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Patented June 15, 1897.



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LASTING MACHINE.

No. 584,744.

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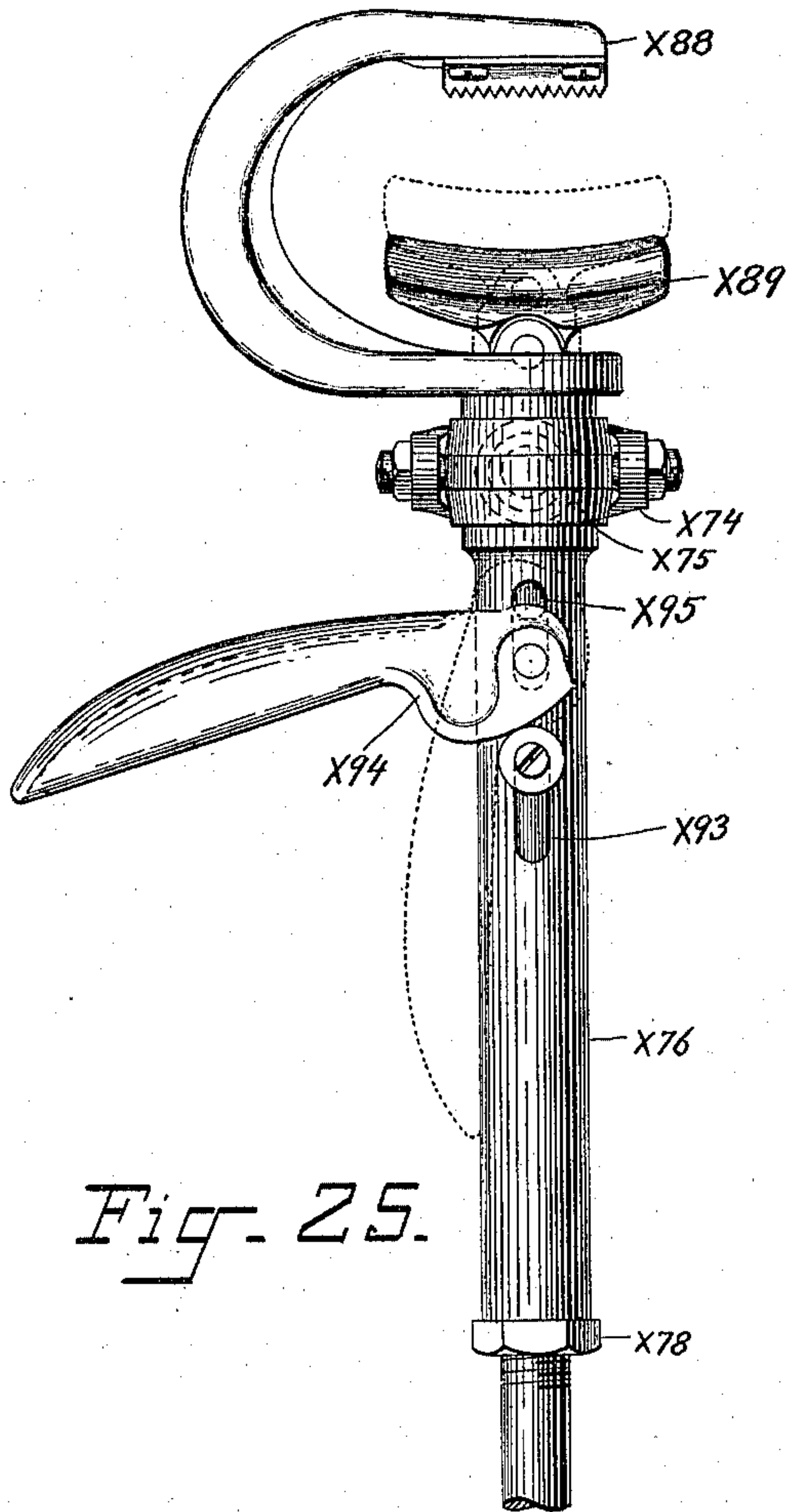


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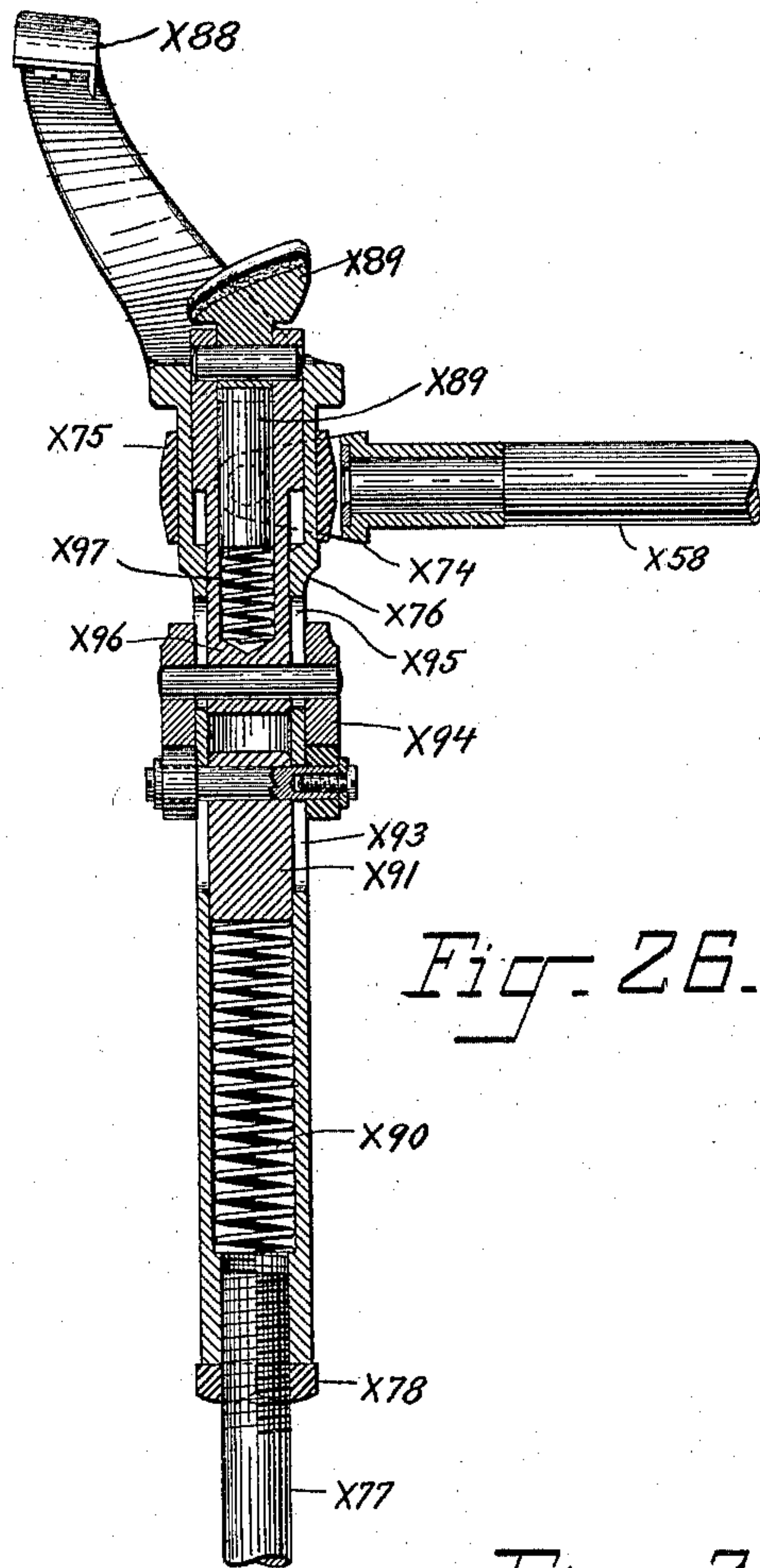


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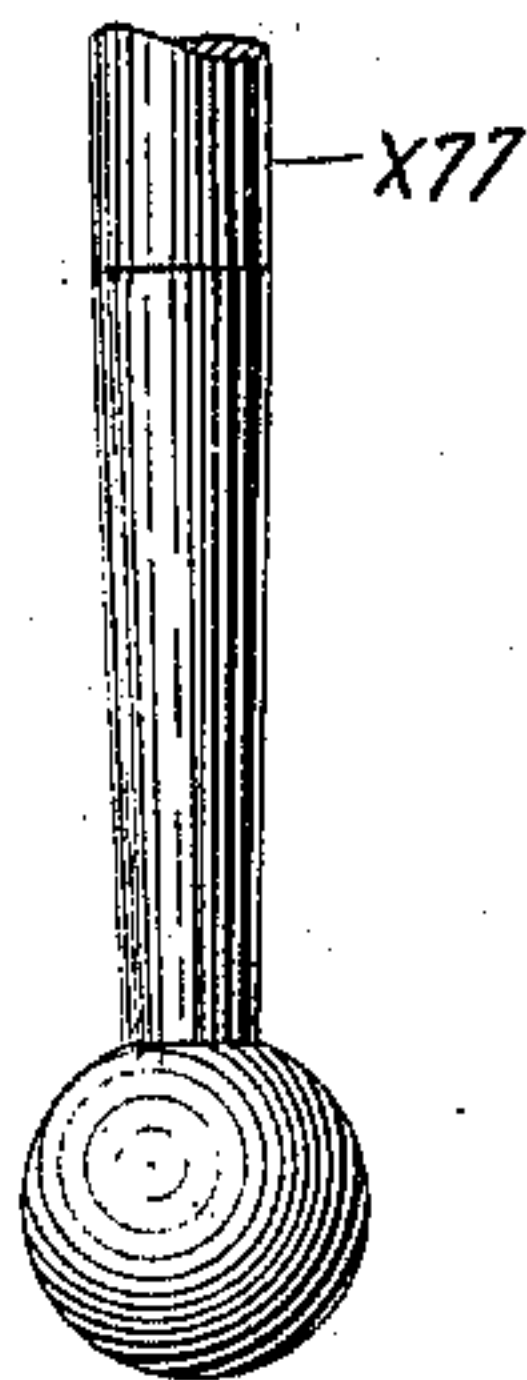


Fig. 27.

Witnesses.
John F. Nelson
Wm. W. Tuttle.

Inventors.
S. W. Ladd
R. F. McFeely
by C. B. Tuttle
Atty.

(No Model.)

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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 28.

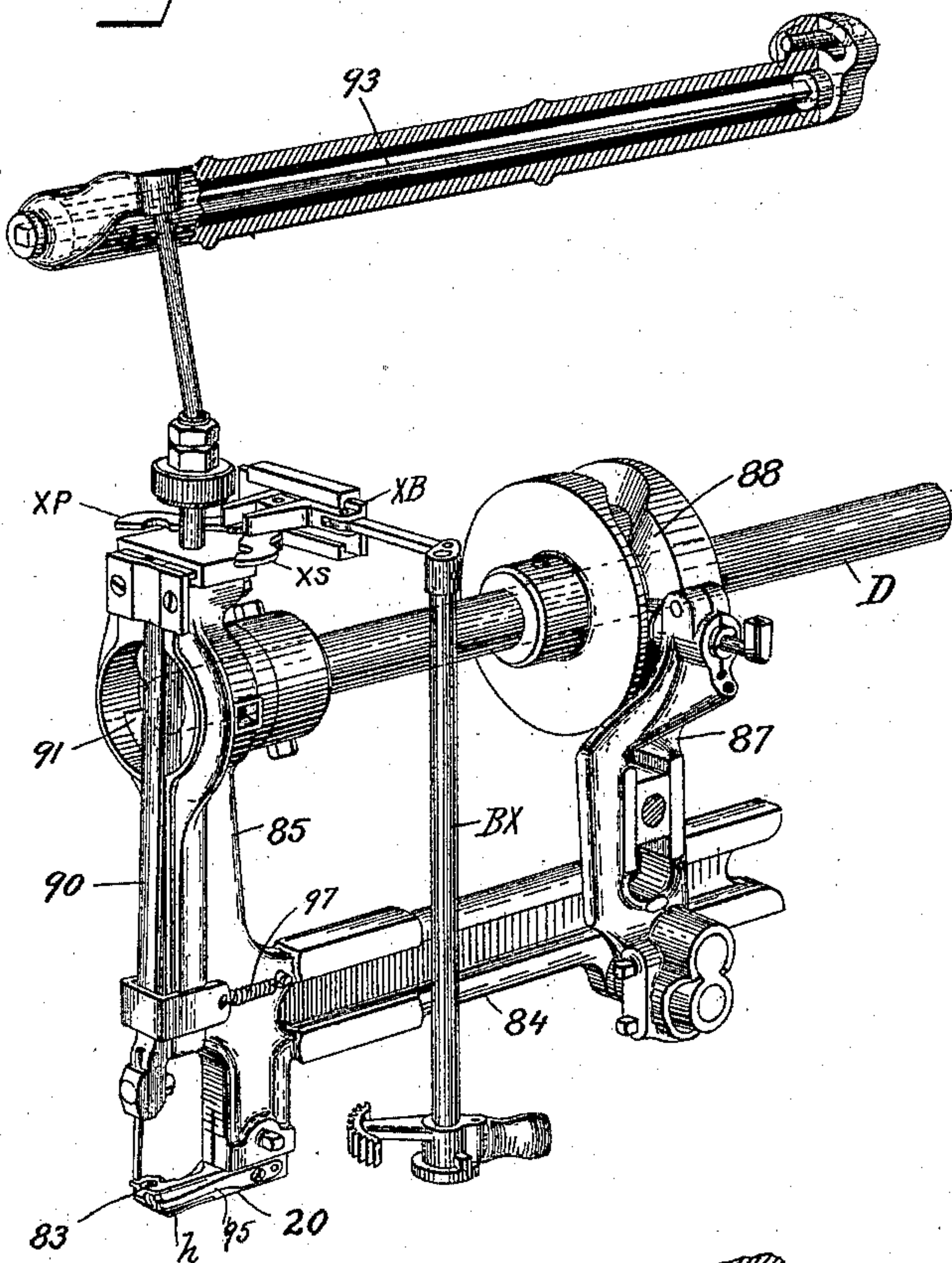
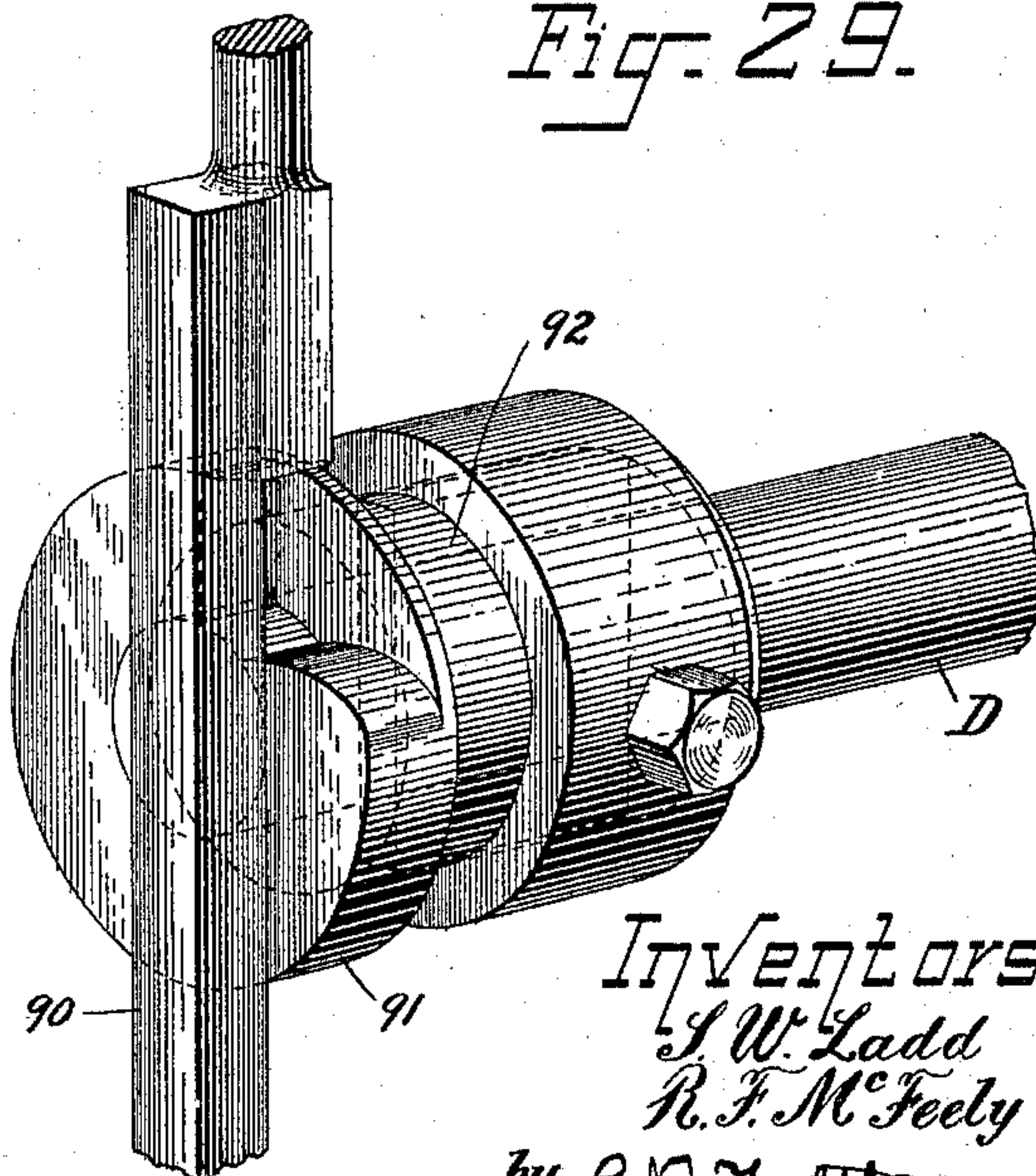


Fig. 29.



Witnesses.

John F. Nelson
Wm. Mc. Tuttle.

Inventors.

S. W. Ladd
R. F. McFeely
by C. B. Tuttle Atty.

(No Model.)

28 Sheets—Sheet 17.

S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

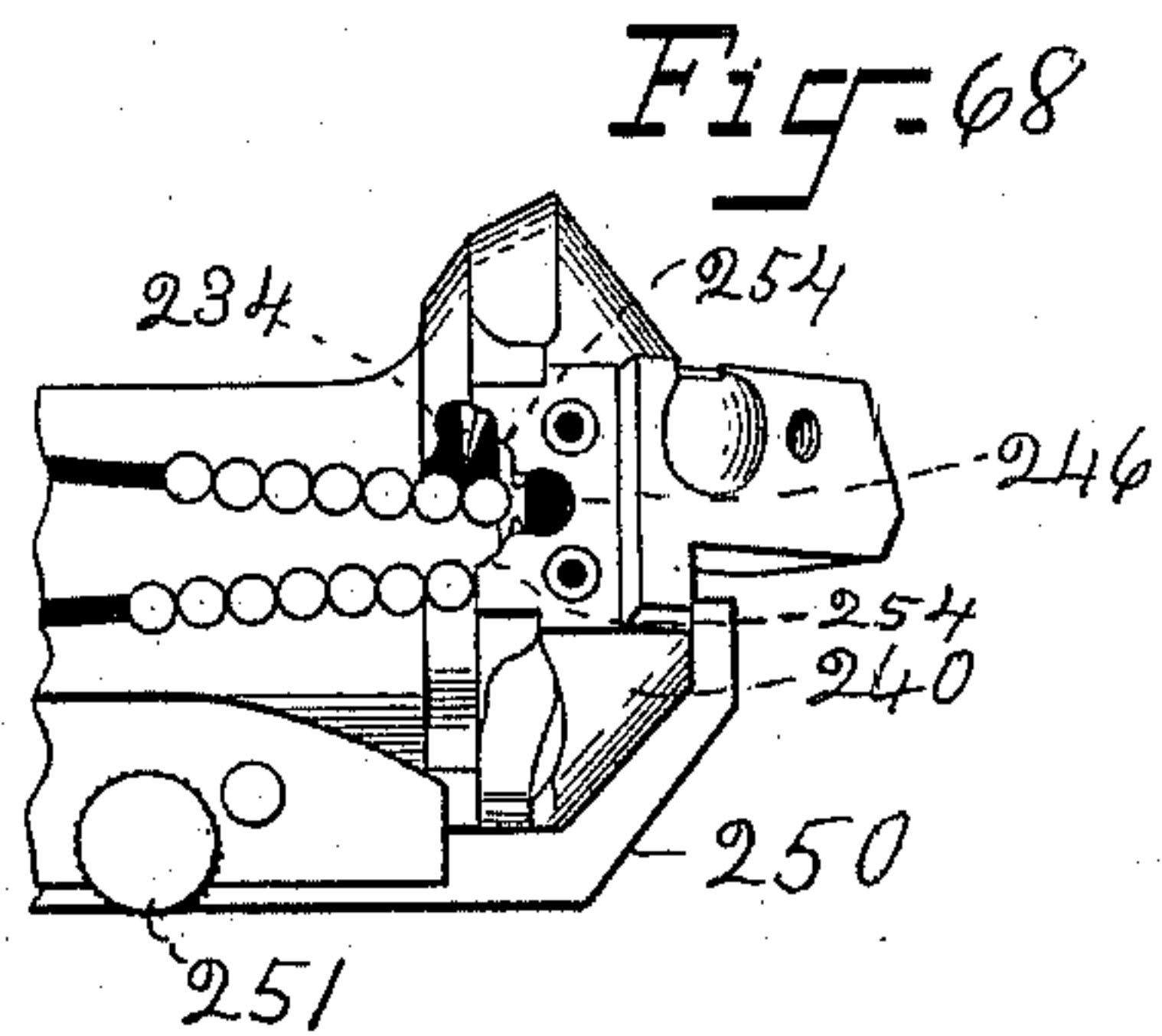
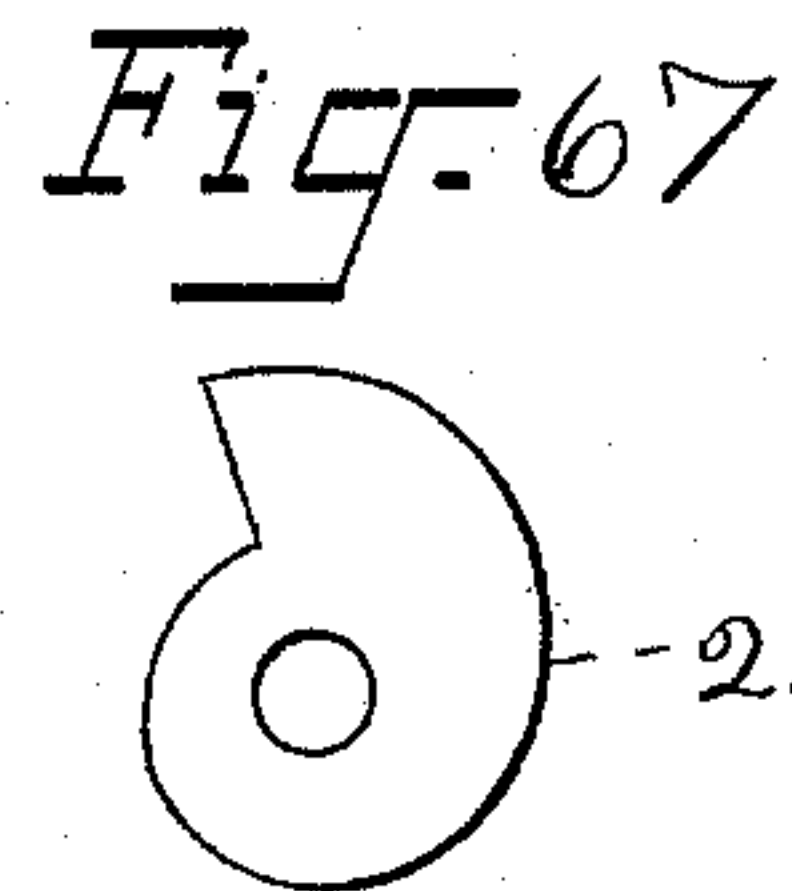
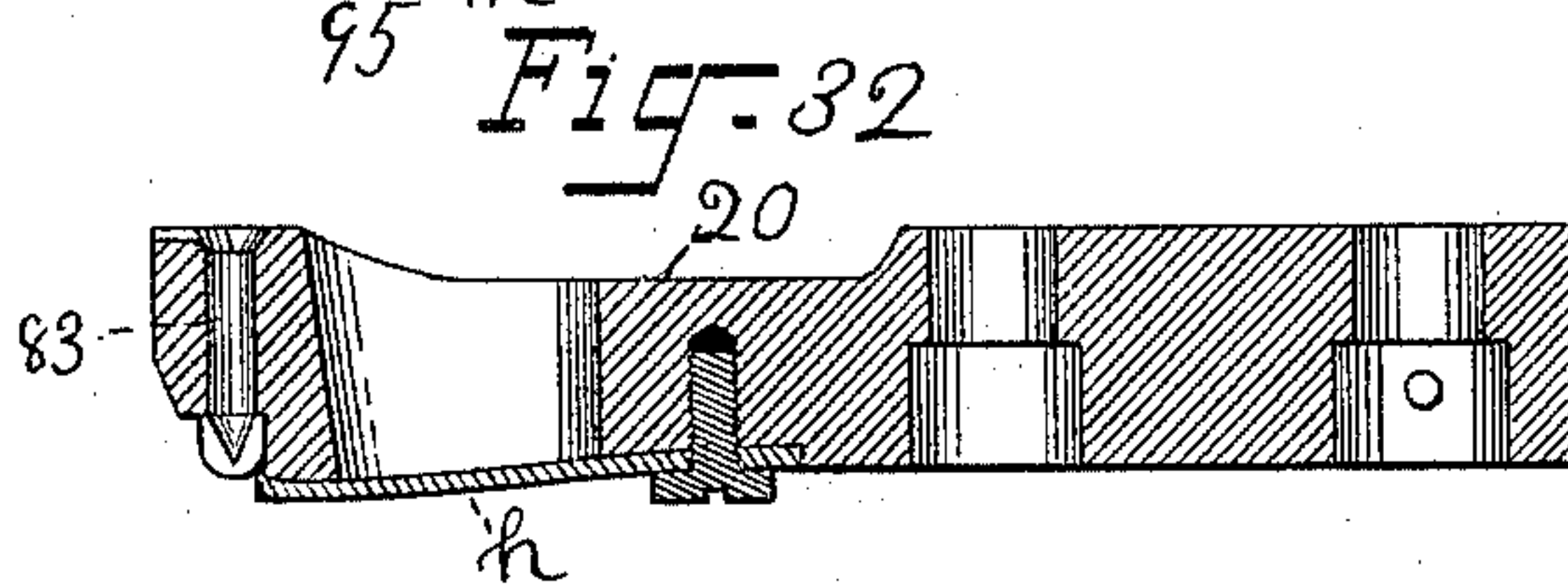
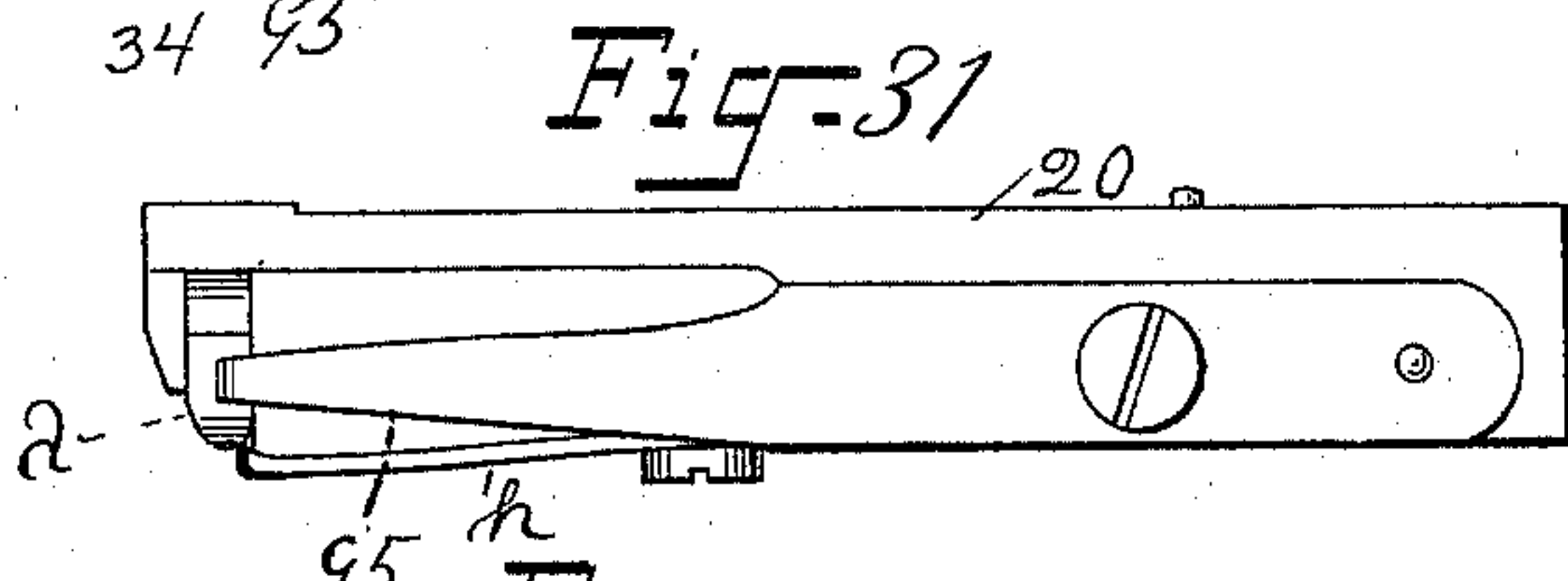
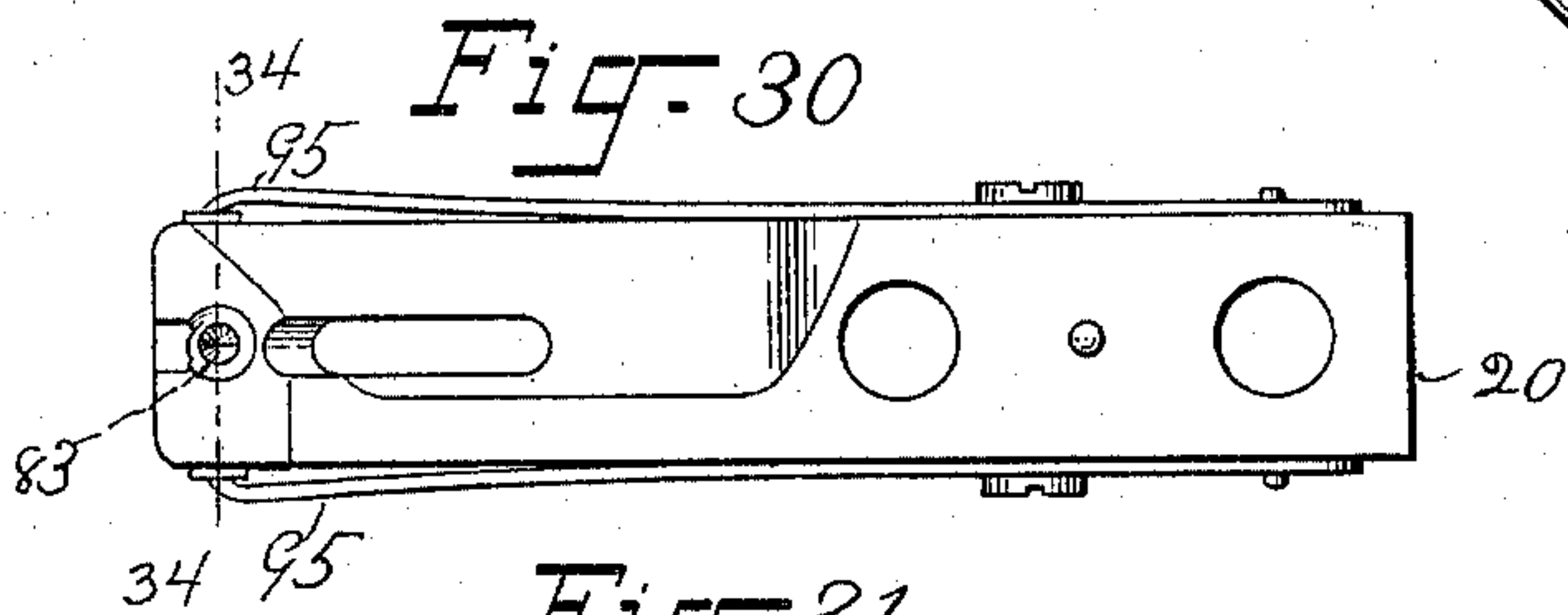
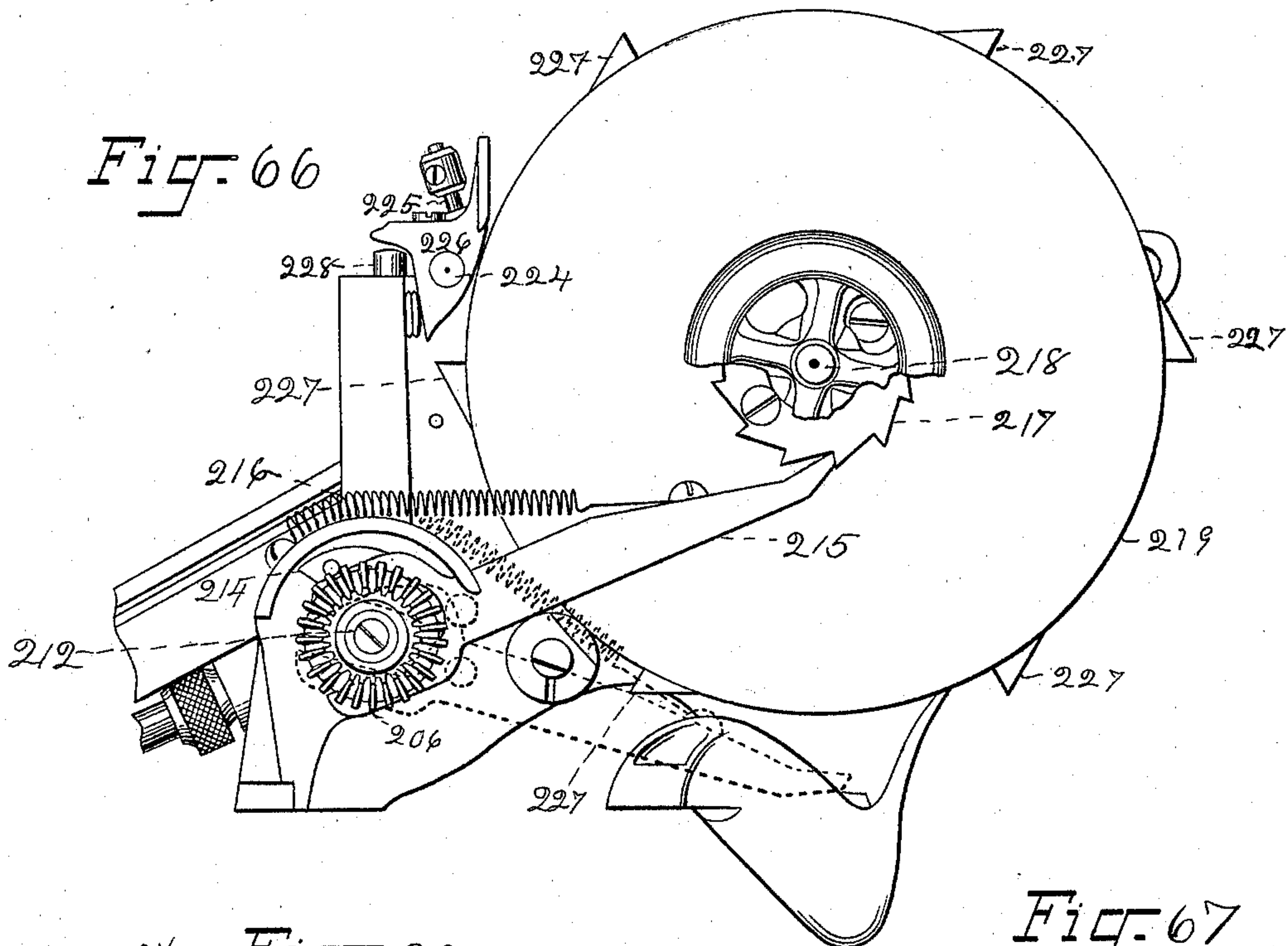


Fig. 33

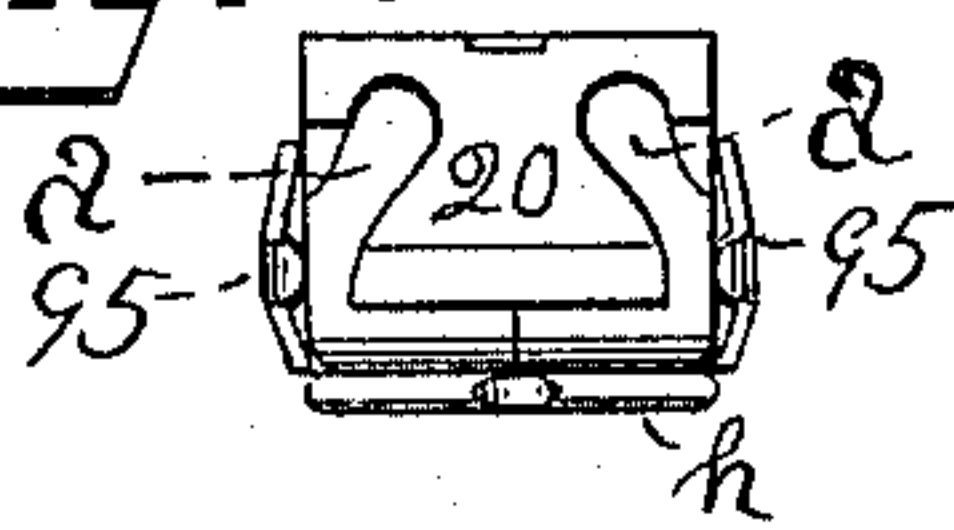
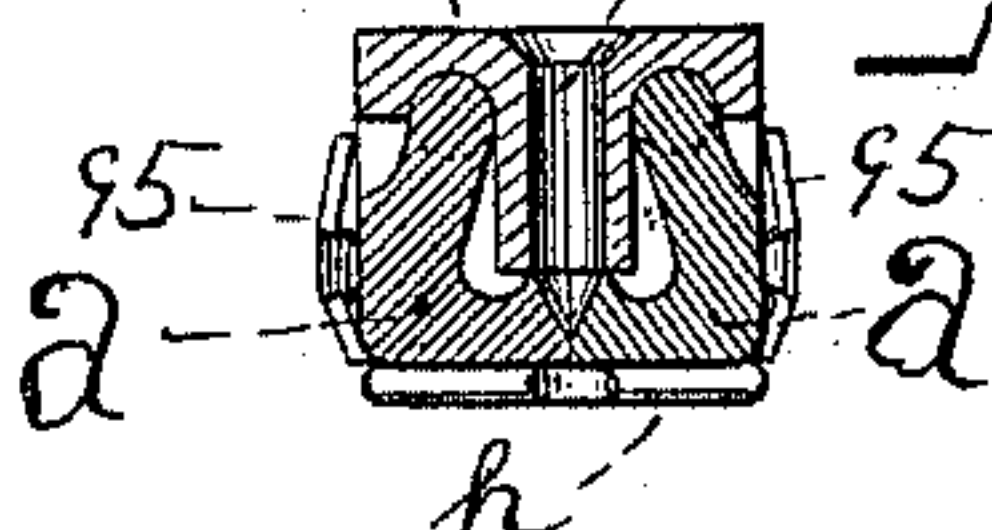


Fig. 34



Witnesses.
John F. Nelson
Mc. Mc. Tuttle.

Inventors.
S. W. Ladd
R. F. McFeely
by C. B. Tuttle Atty

(No Model.)

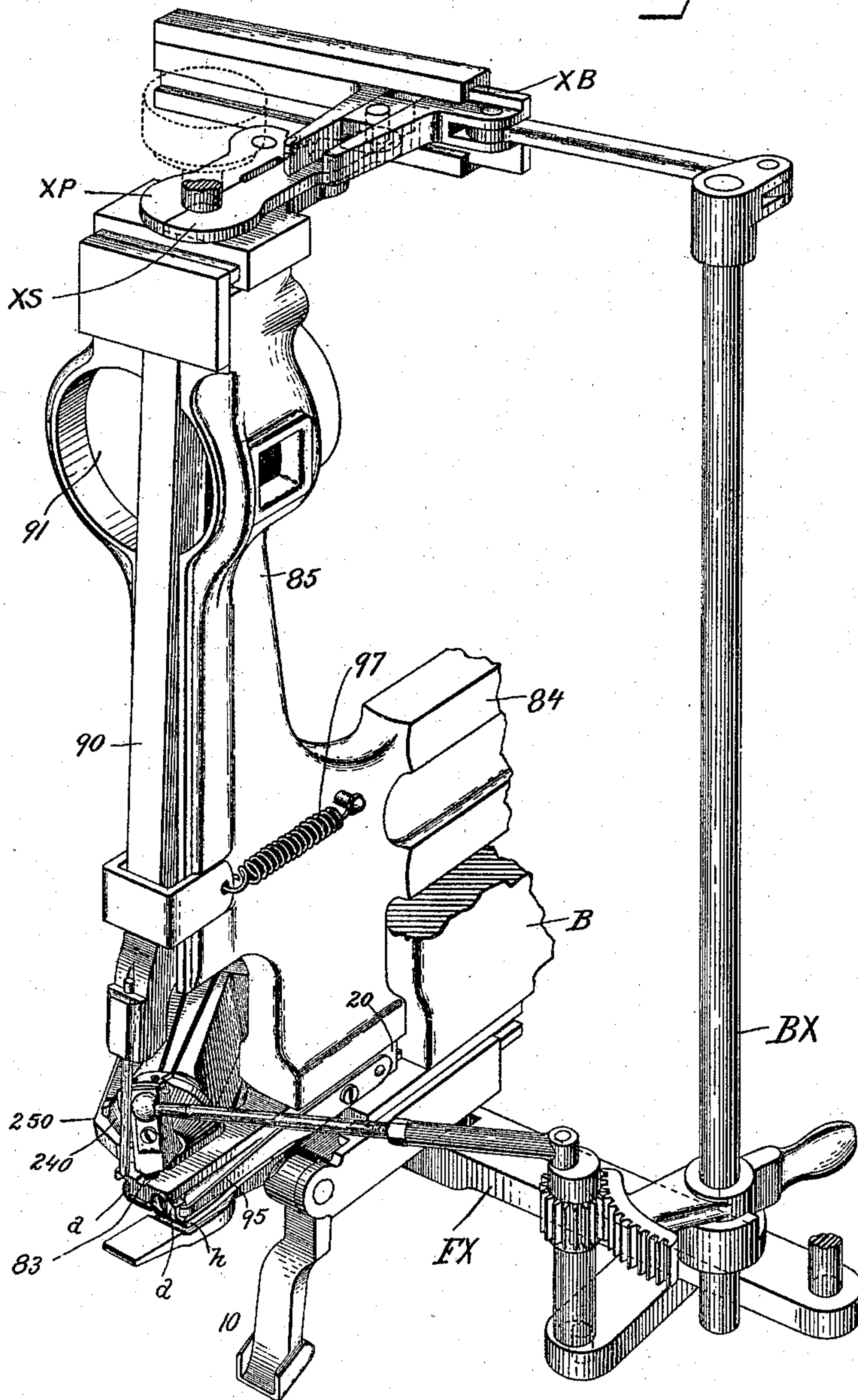
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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 35.



Witnesses.
John F. Nelson.
W. M. Tuttle.

Inventors
J. W. Ladd
R. F. McFeely
by R. B. Ladd Atty.

(No Model.)

28 Sheets—Sheet 19.

S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 36.

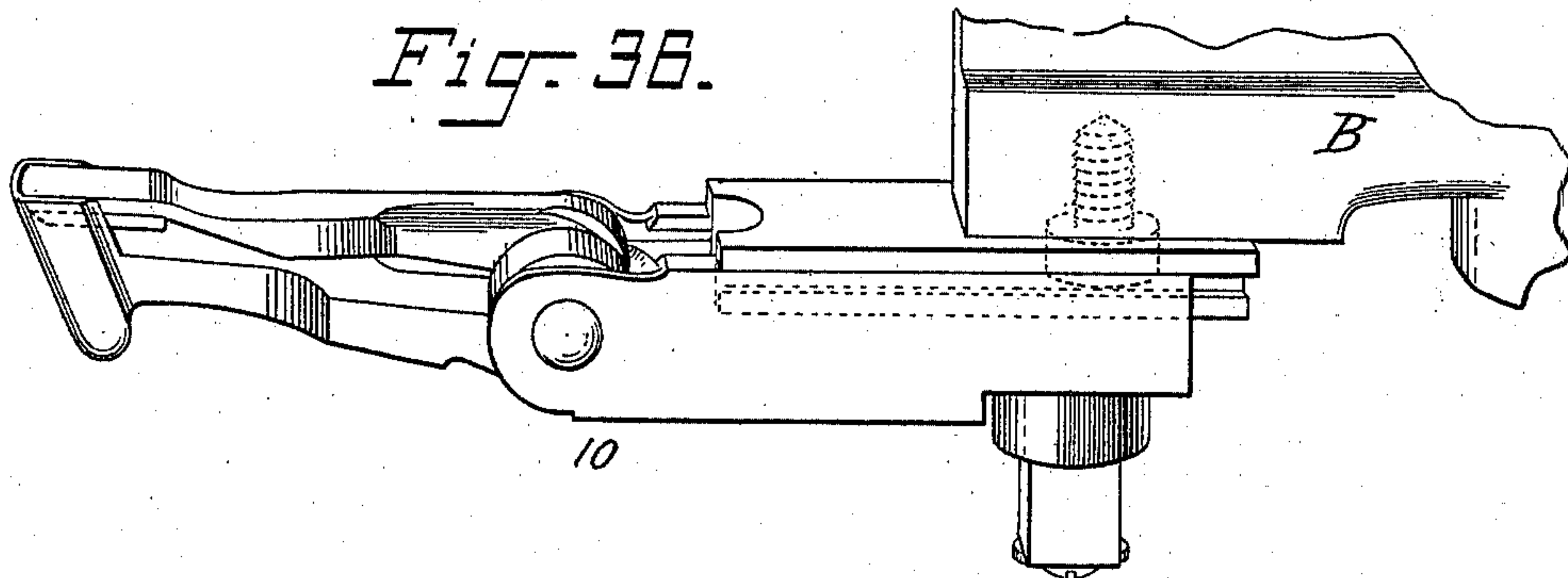


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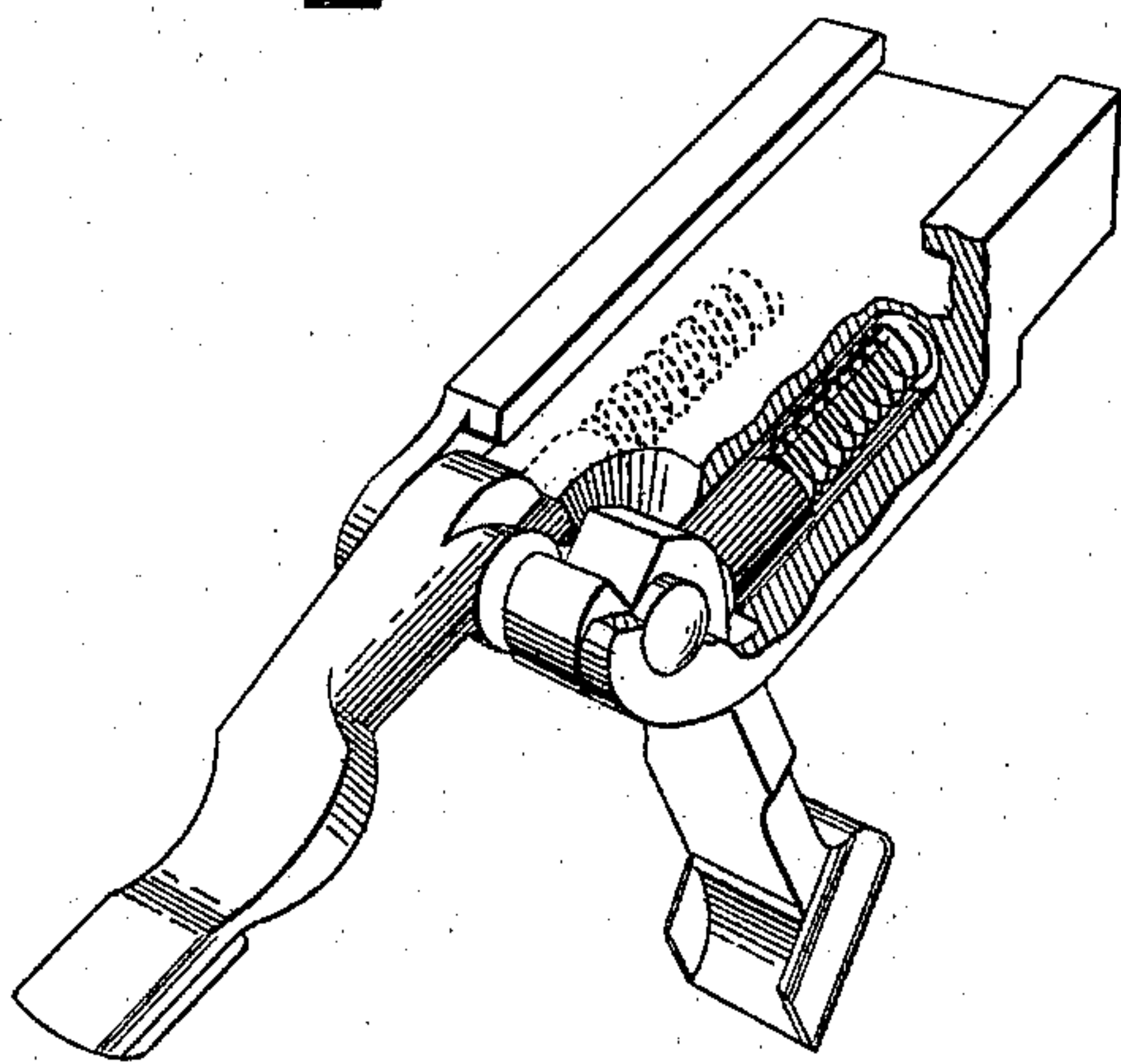


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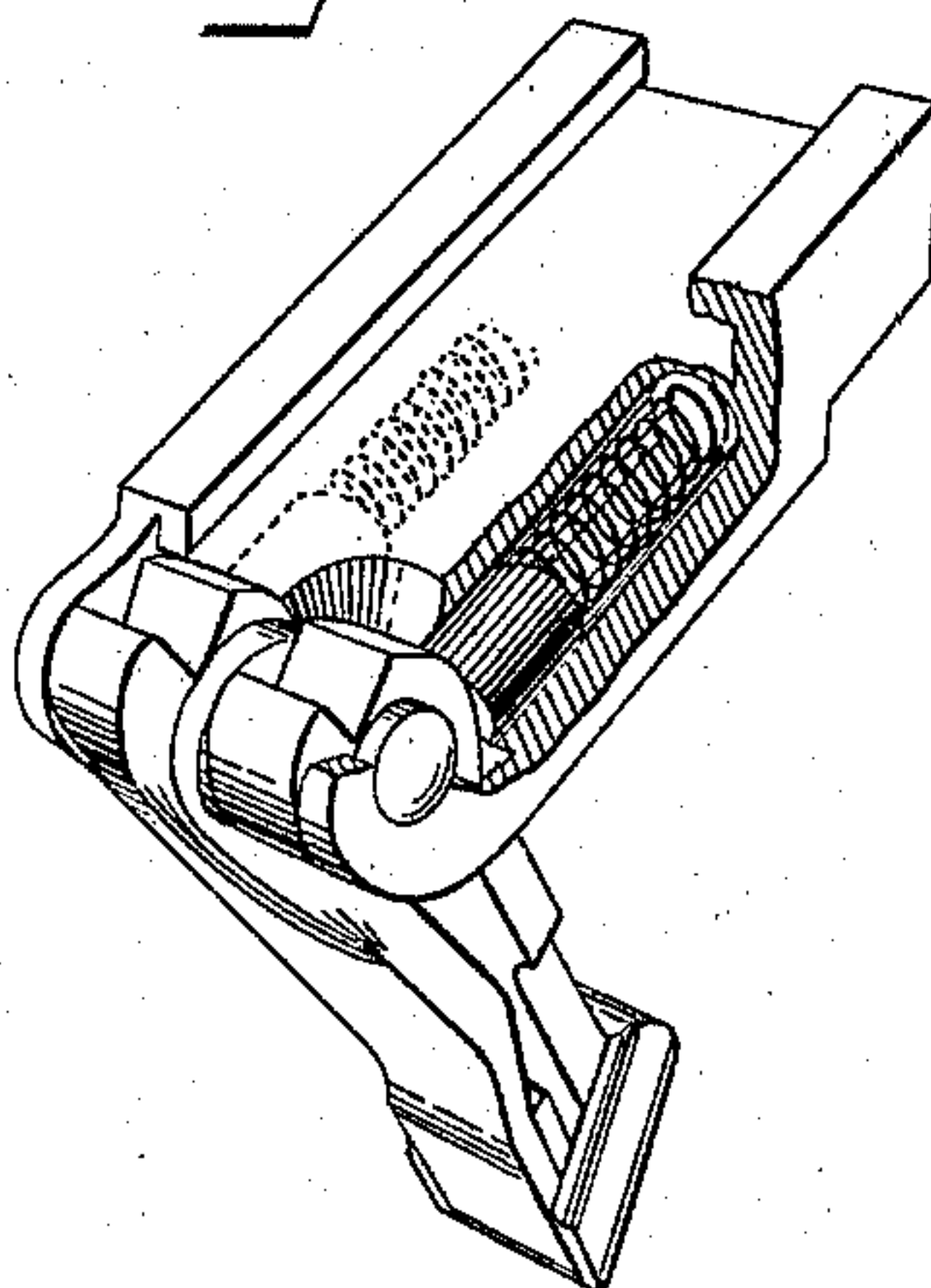


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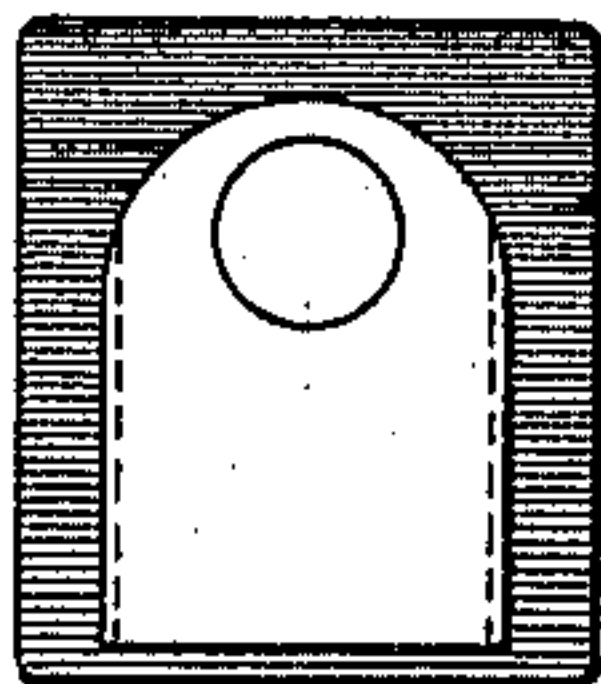
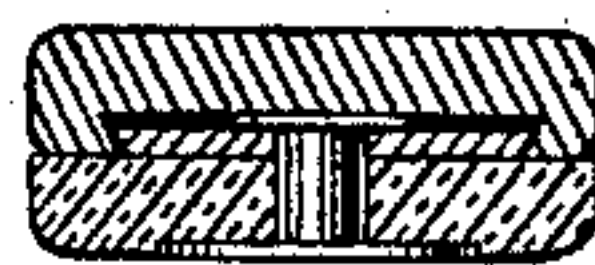


Fig. 40.



Witnesses.

John F. Nelson
Keranda M. Tuttle

Inventors.

S. W. Ladd
R. F. McFeely
by E. B. Tuttle Atty.

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28 Sheets—Sheet 20.

S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 41.

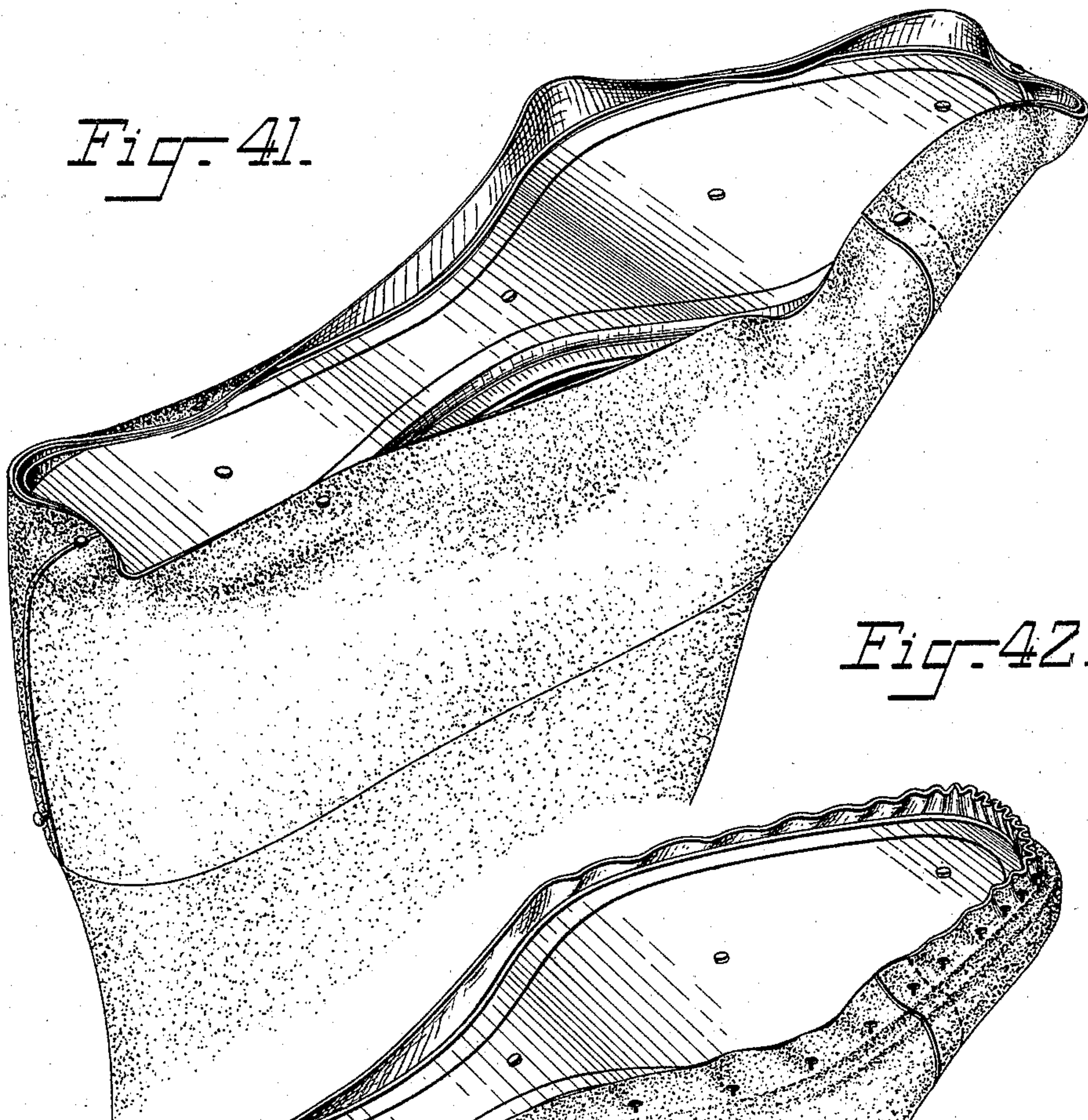
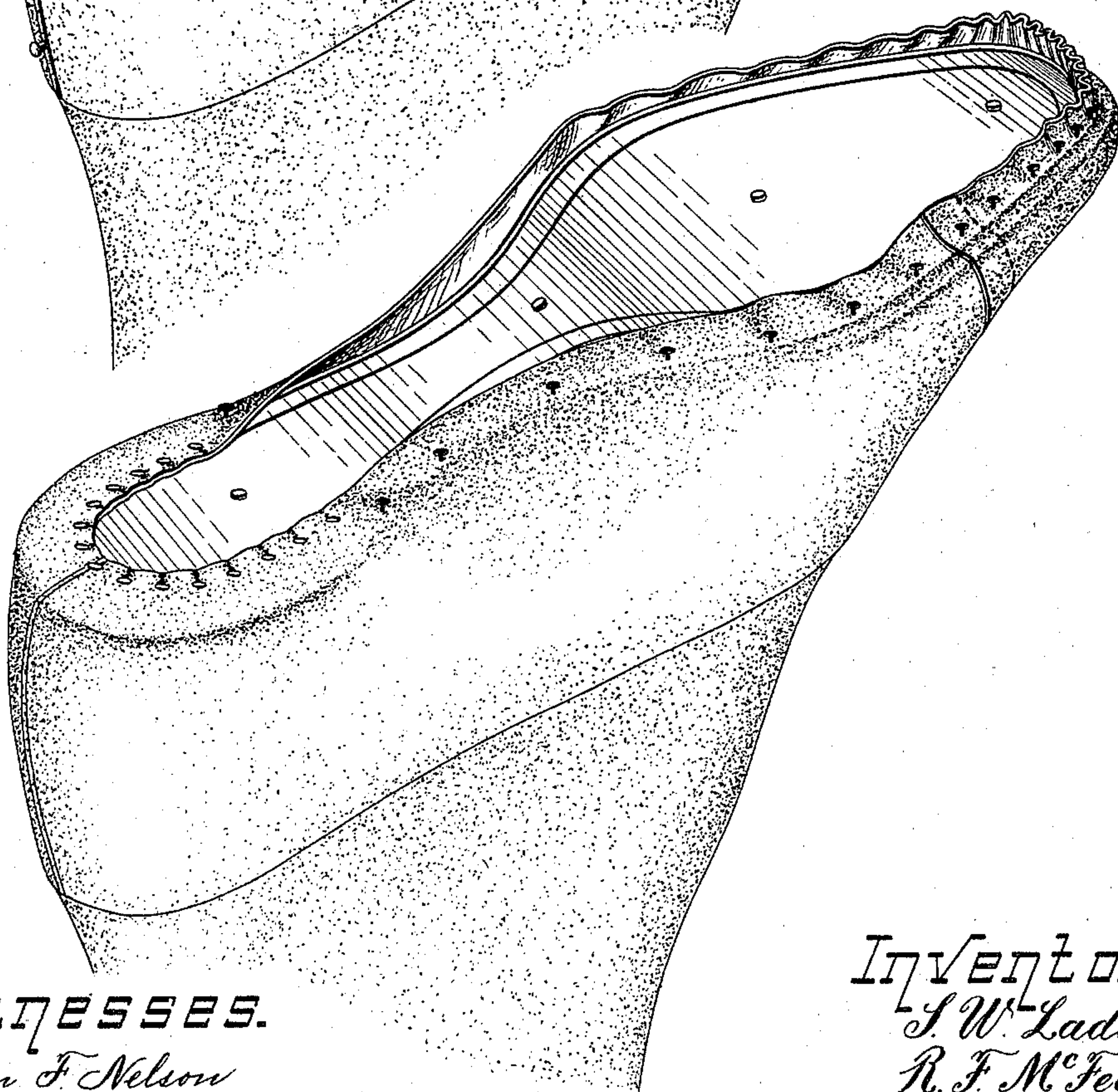


Fig. 42.



WITNESSES.

John F. Nelson
W. W. Tuttle

INVENTORS.

S. W. Ladd
R. F. McFeely
by E. B. Ladd

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28 Sheets—Sheet 21.

S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 43.

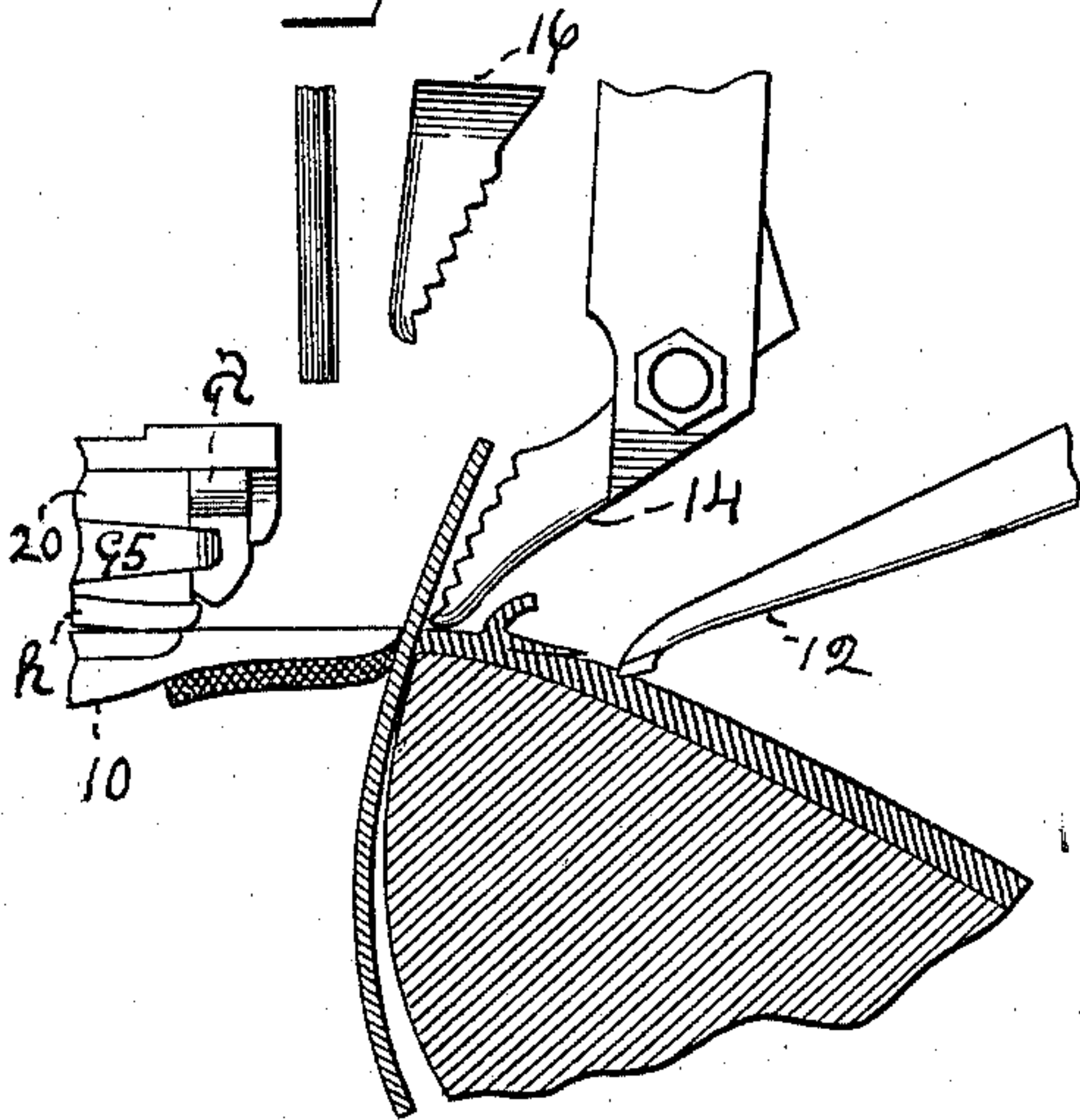


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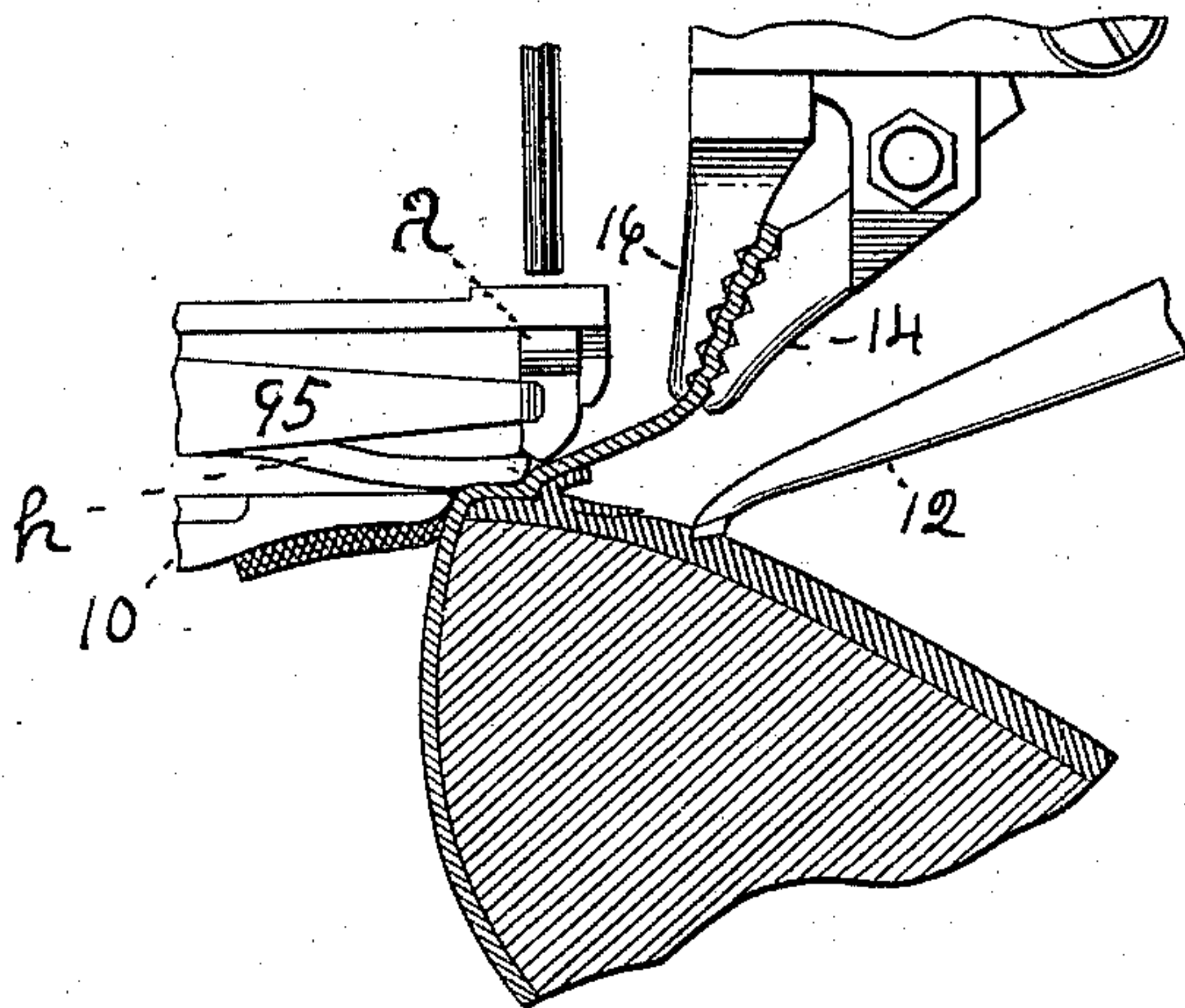
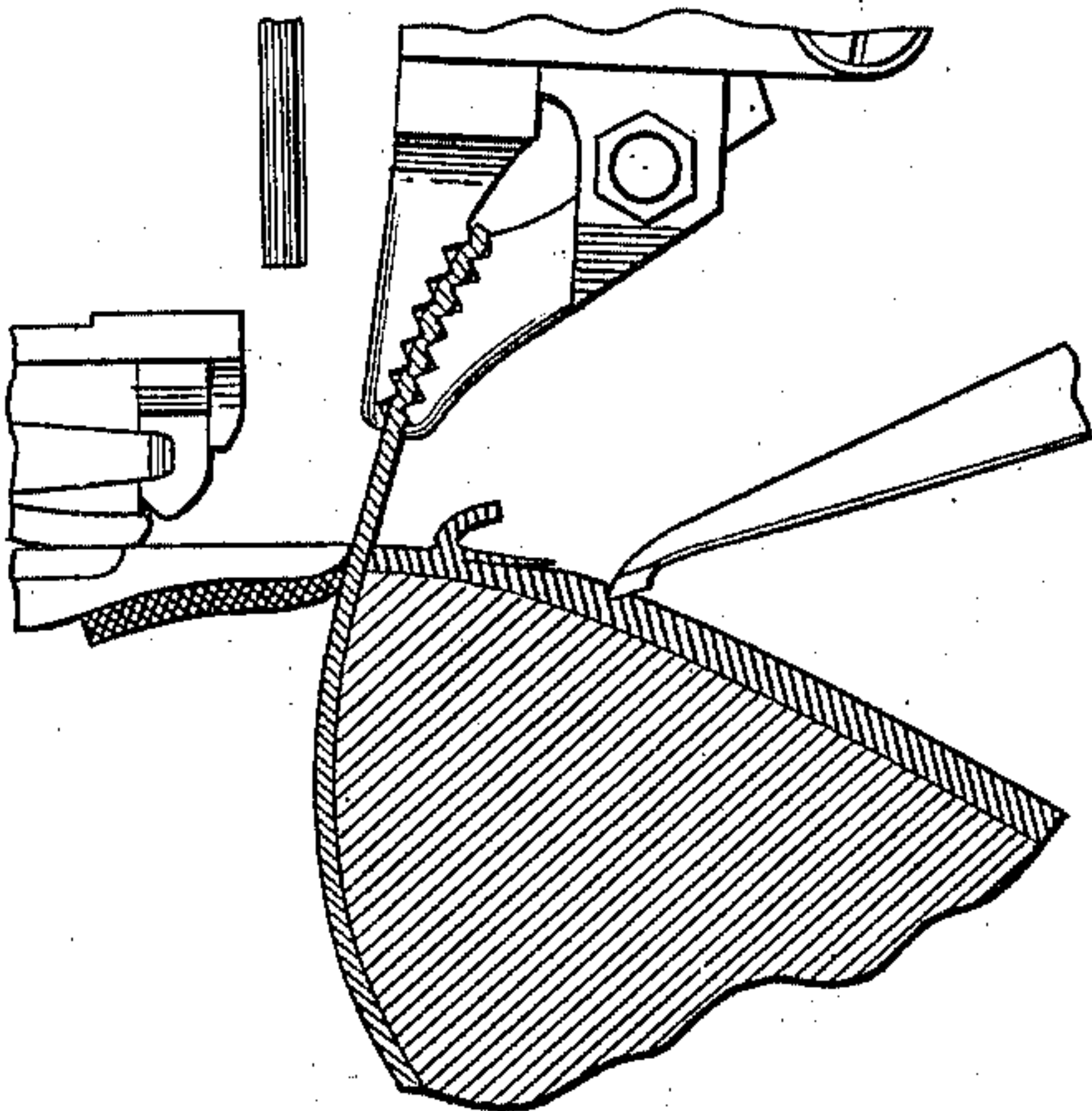
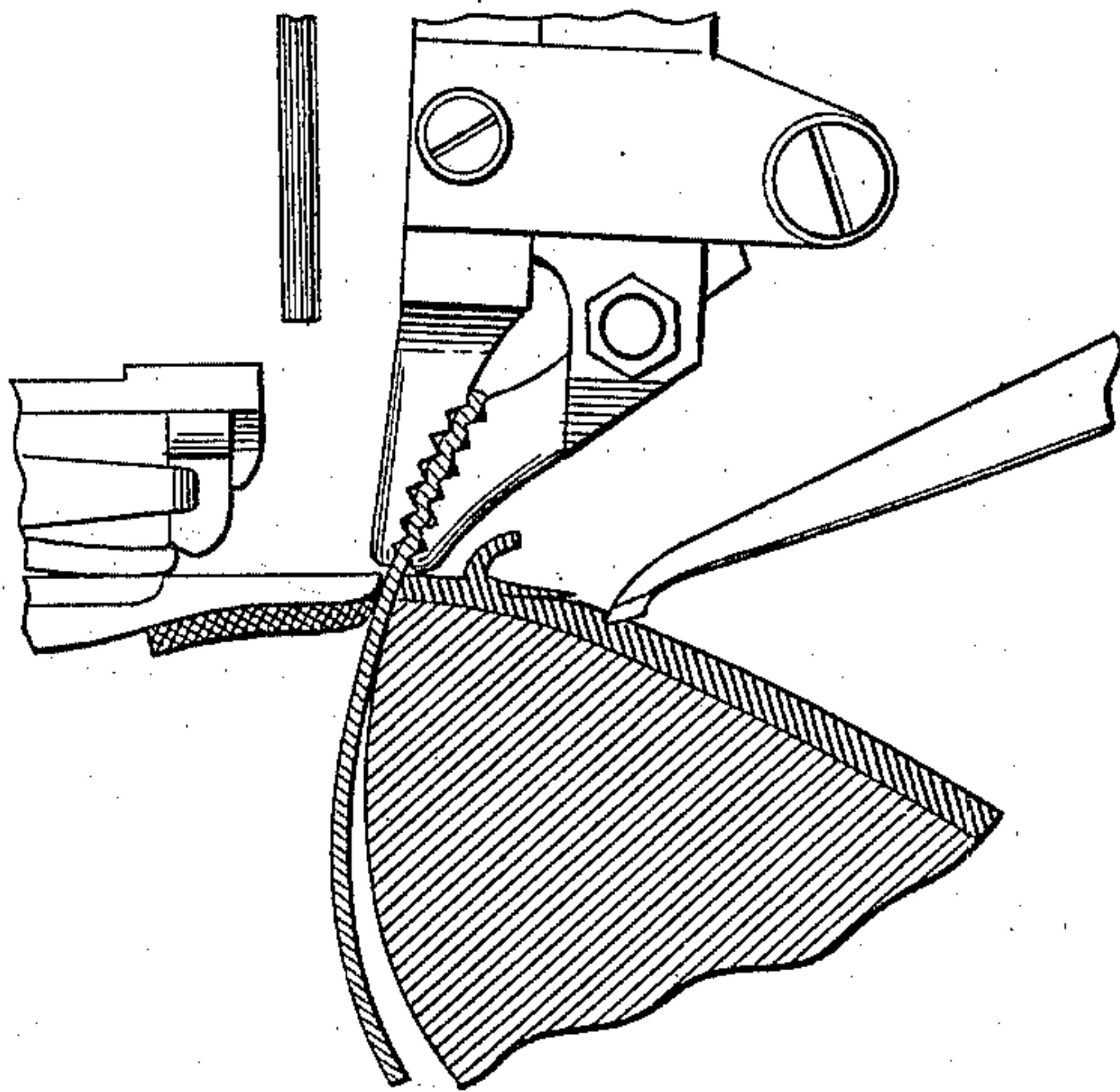


Fig. 45.

Fig. 46.

Witnesses.

John F. Nelson

Wm. W. Tuttle

Inventors.

S. W. Ladd

R. F. McFeely

by C. B. Tuttle
Atty.

(No Model.)

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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 47.

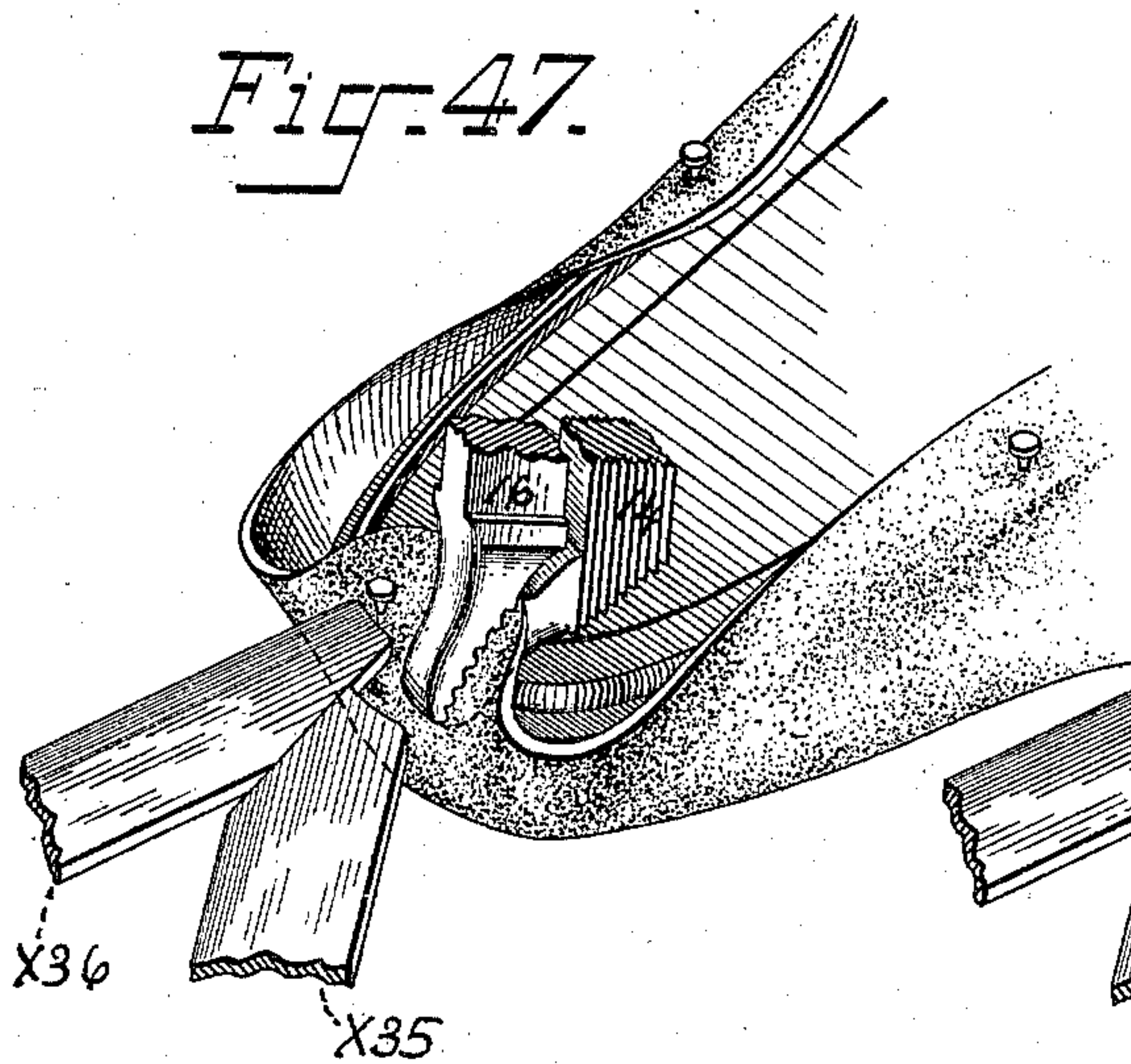


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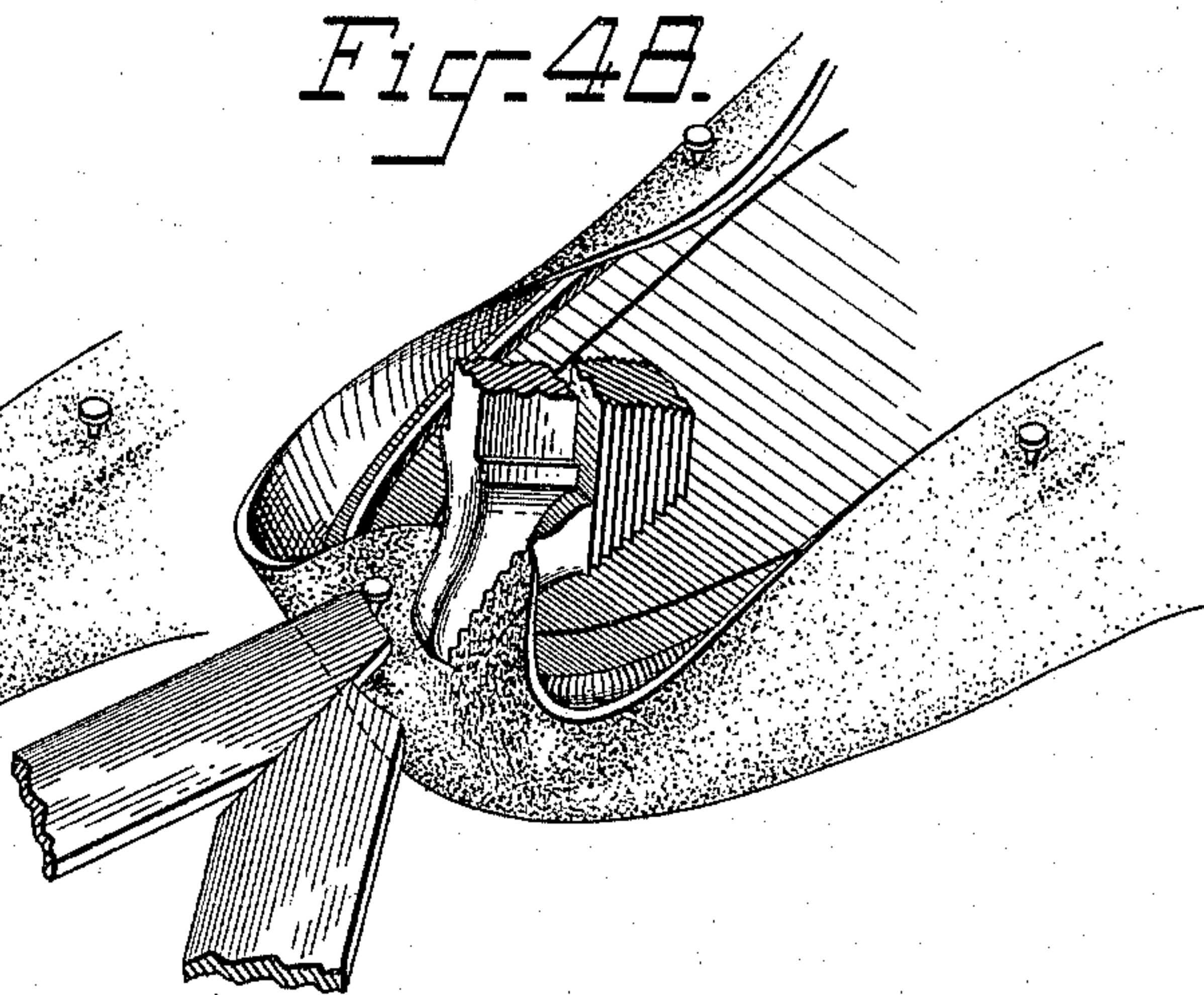


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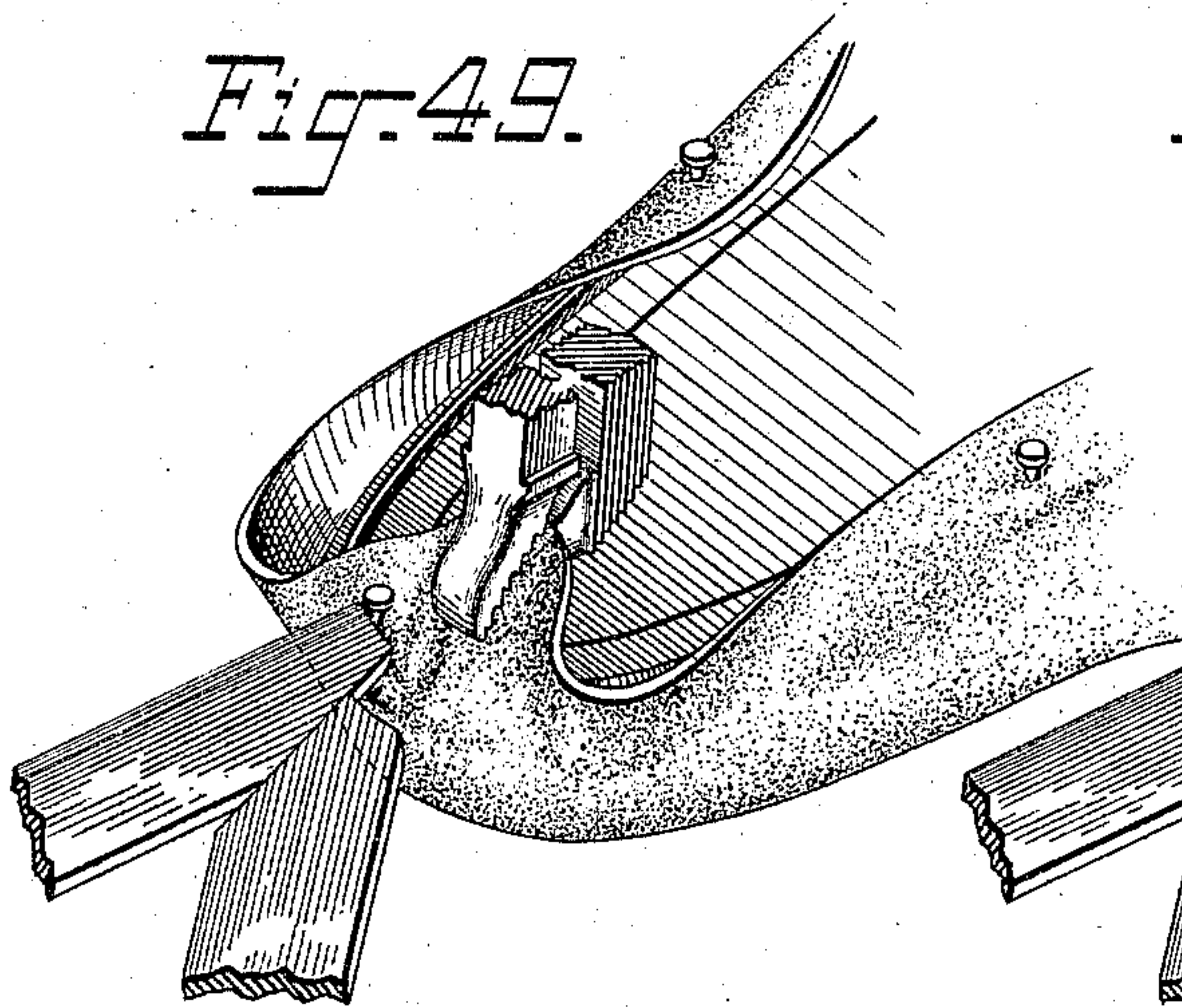


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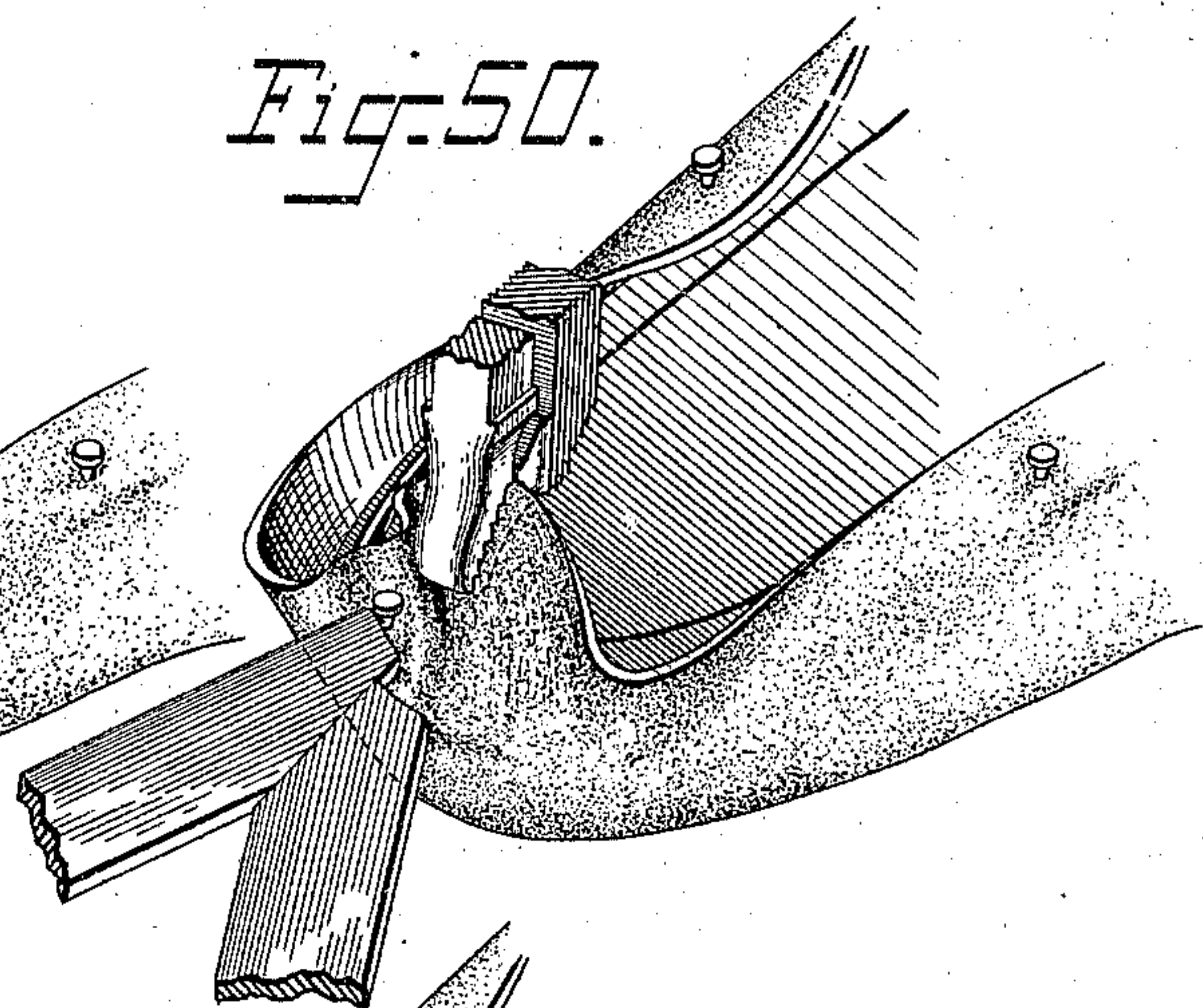
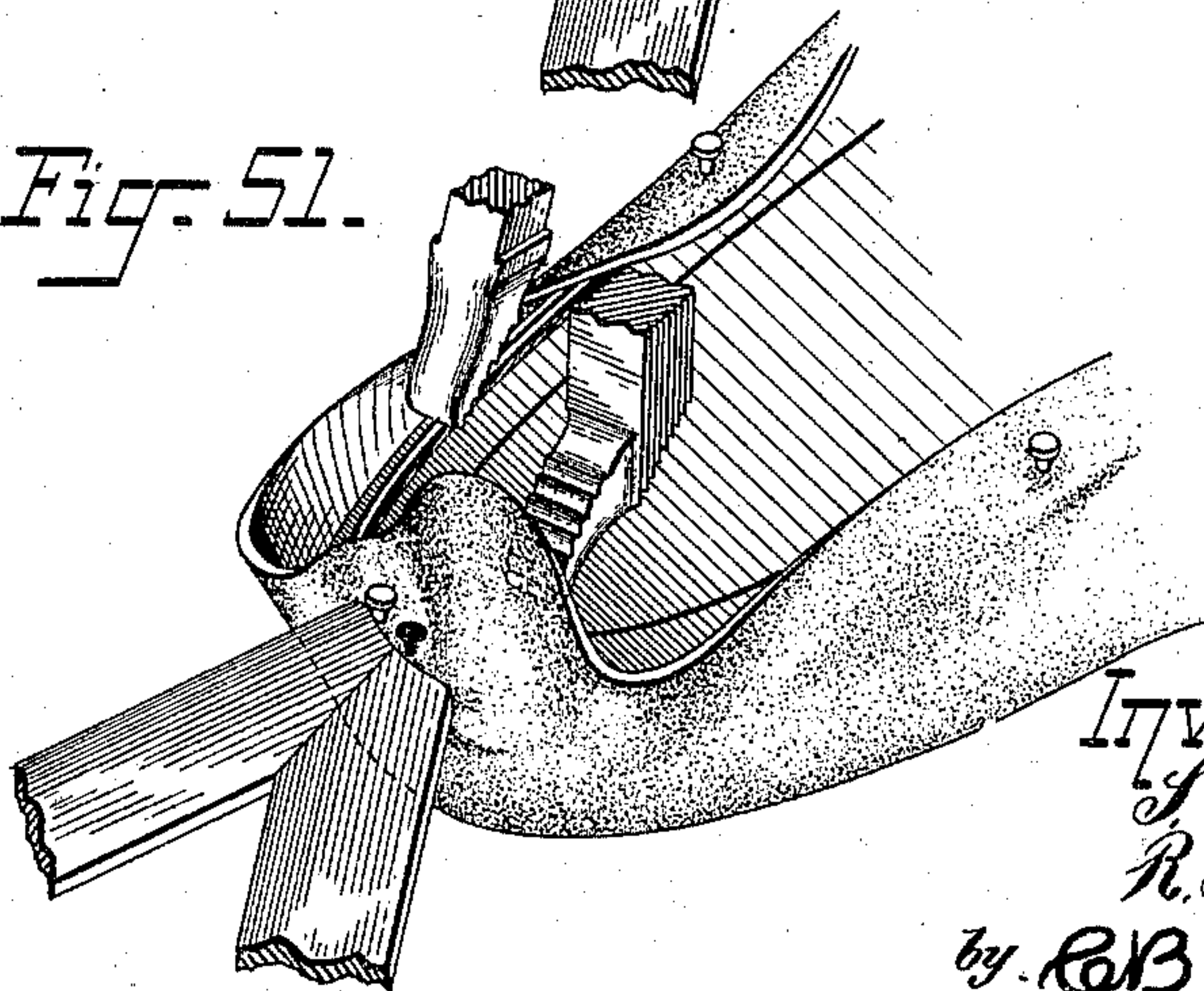


Fig. 51.



Witnesses.

John F. Nelson.
Wm. Mc. Tuttle.

Inventors.

S. W. Ladd
R. F. McFeely
by R. B. Tuttle

(No Model.)

28 Sheets—Sheet 23.

S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 53.

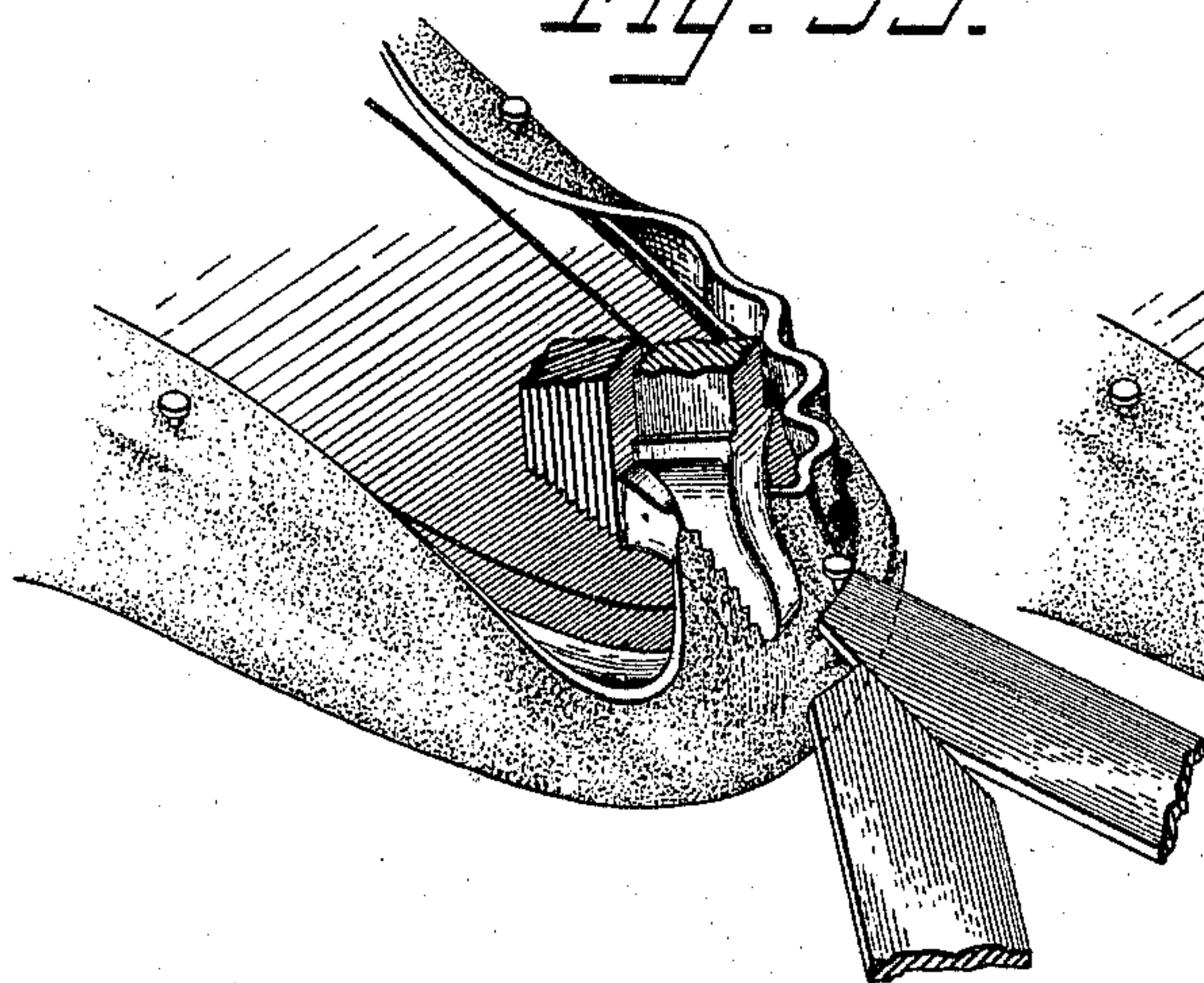


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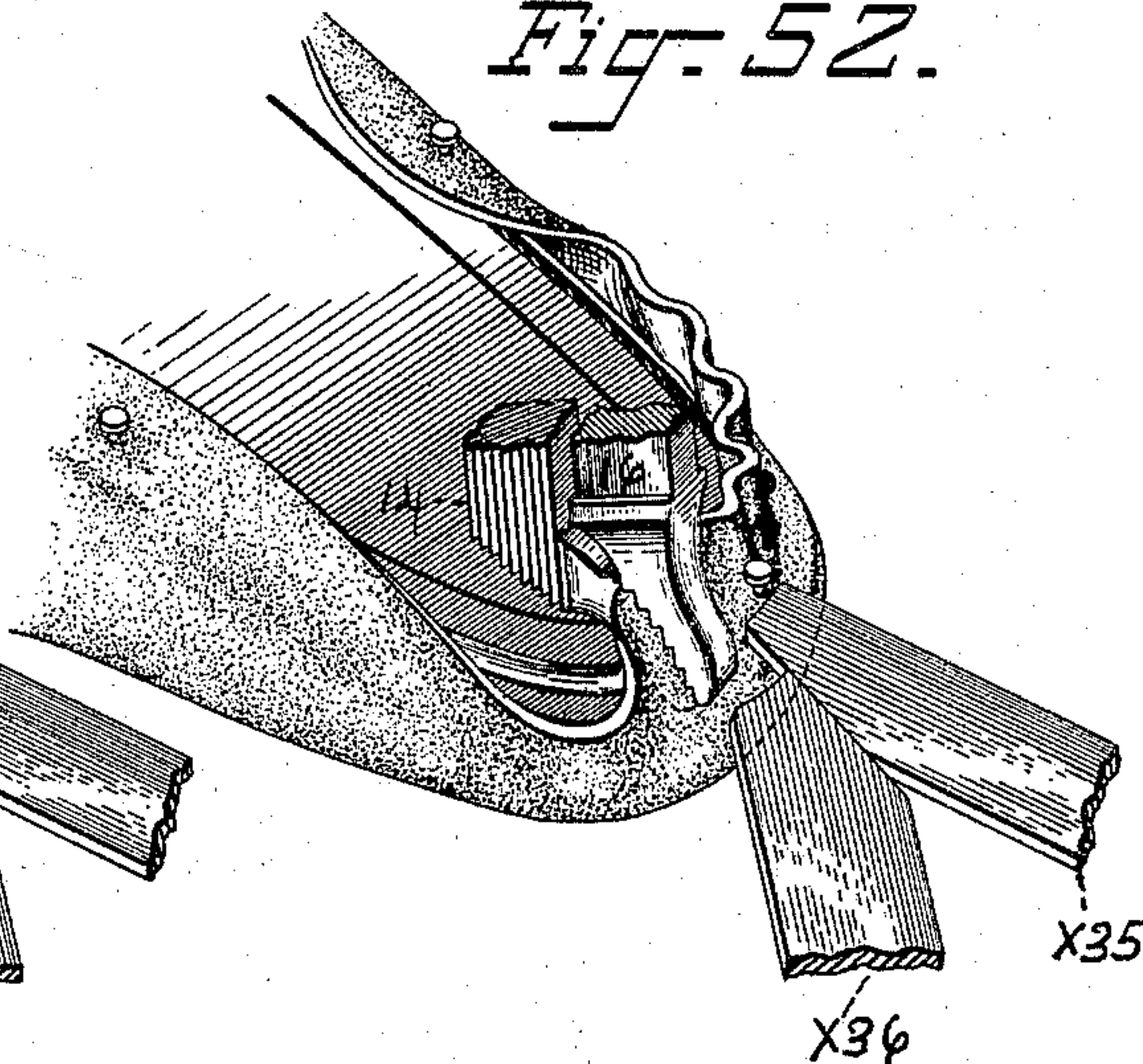


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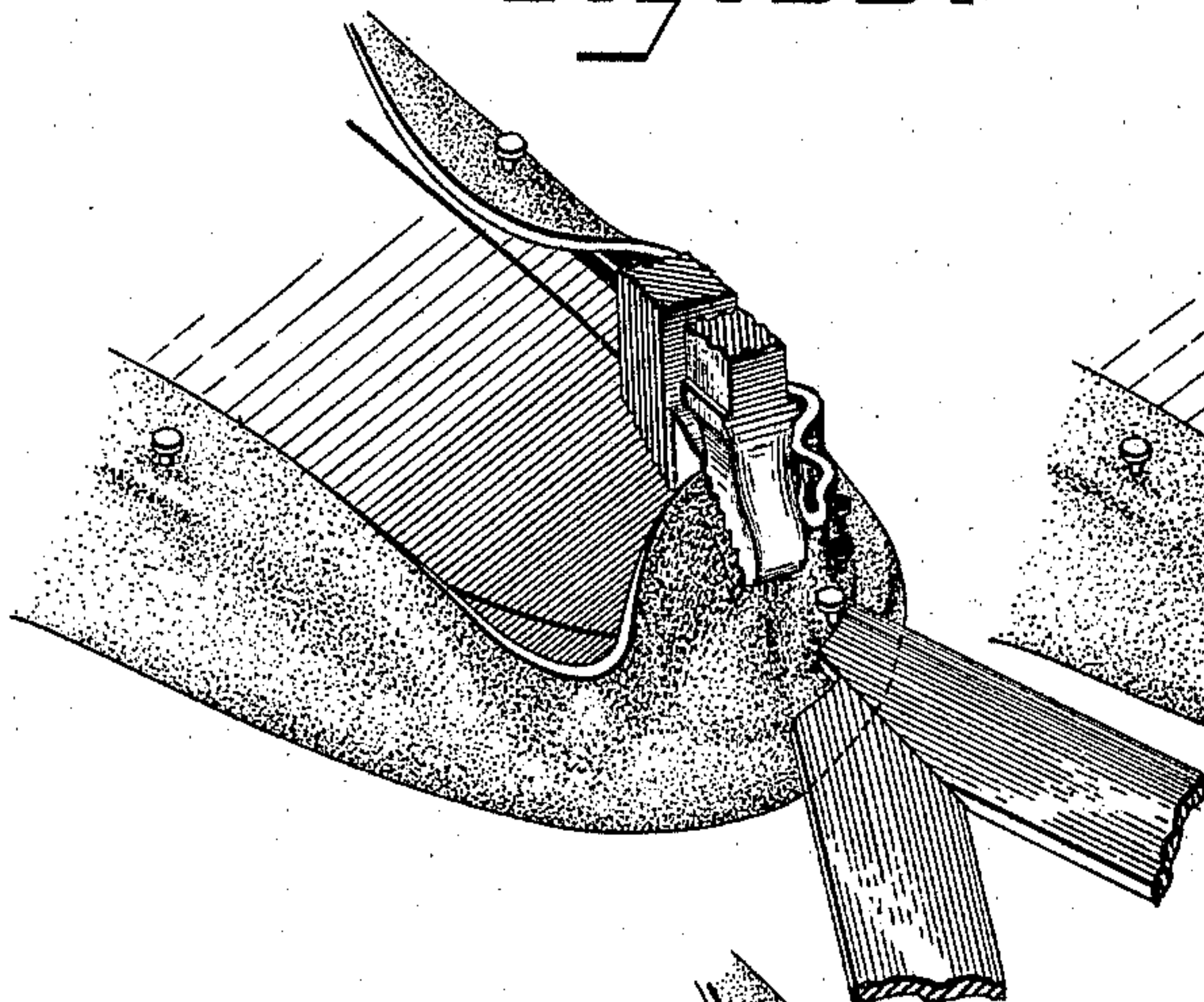


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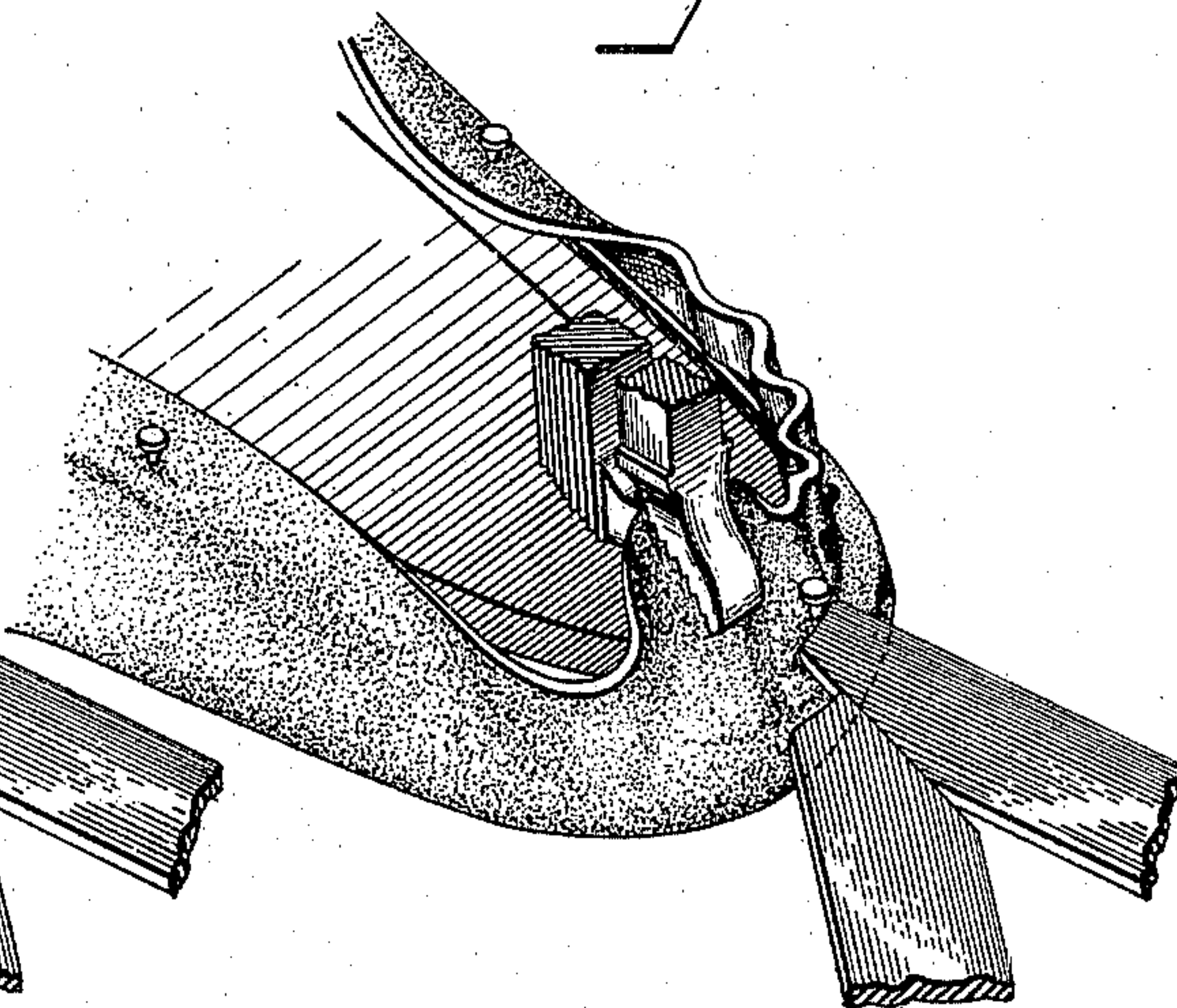
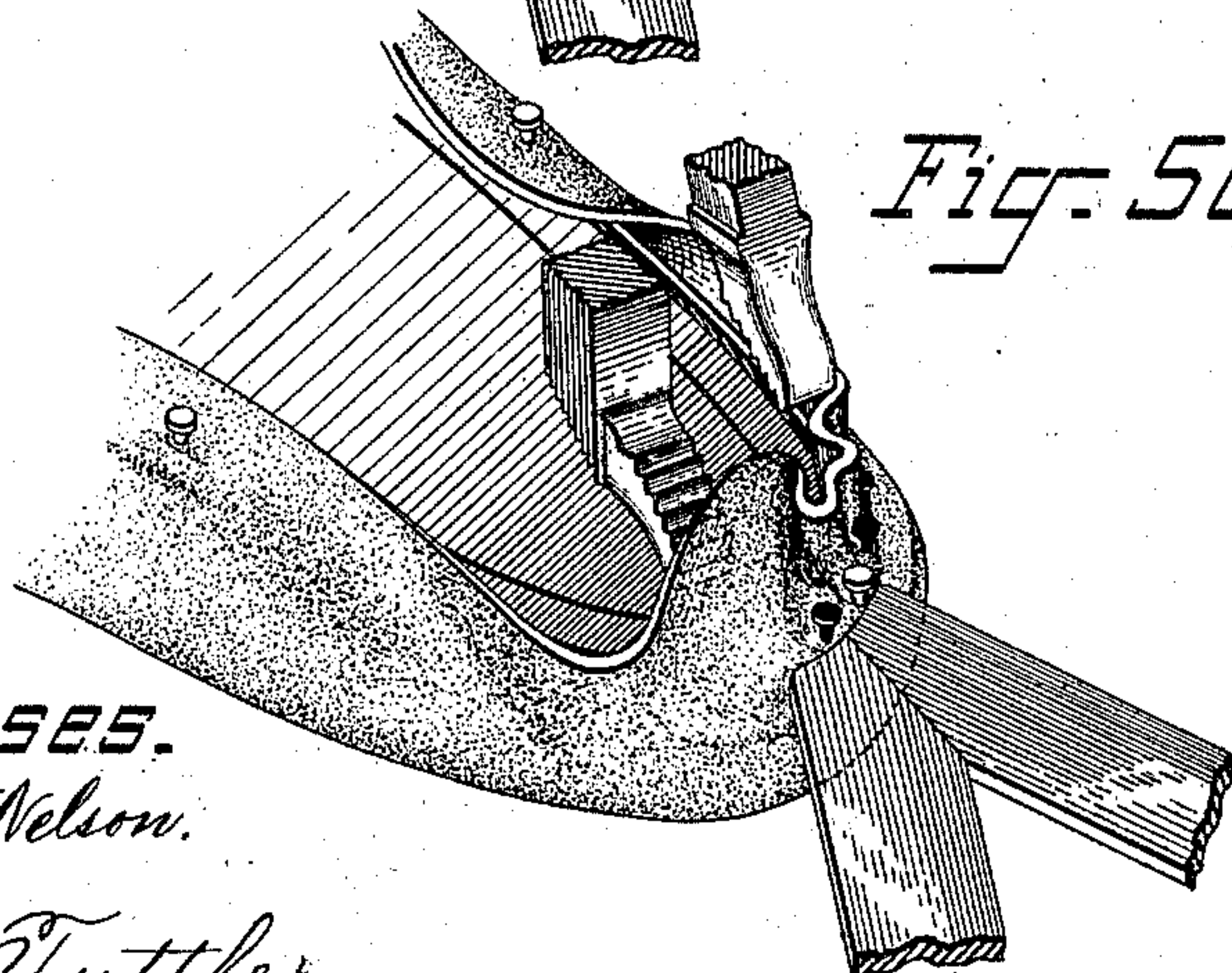


Fig. 56.



Witnesses.

John F. Nelson.

Wm. W. Tuttle.

Inventors.

S. W. Ladd

R. F. McFeely

by C. B. Tuttle

(No Model.)

28 Sheets—Sheet 24.

S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.

Fig. 57.

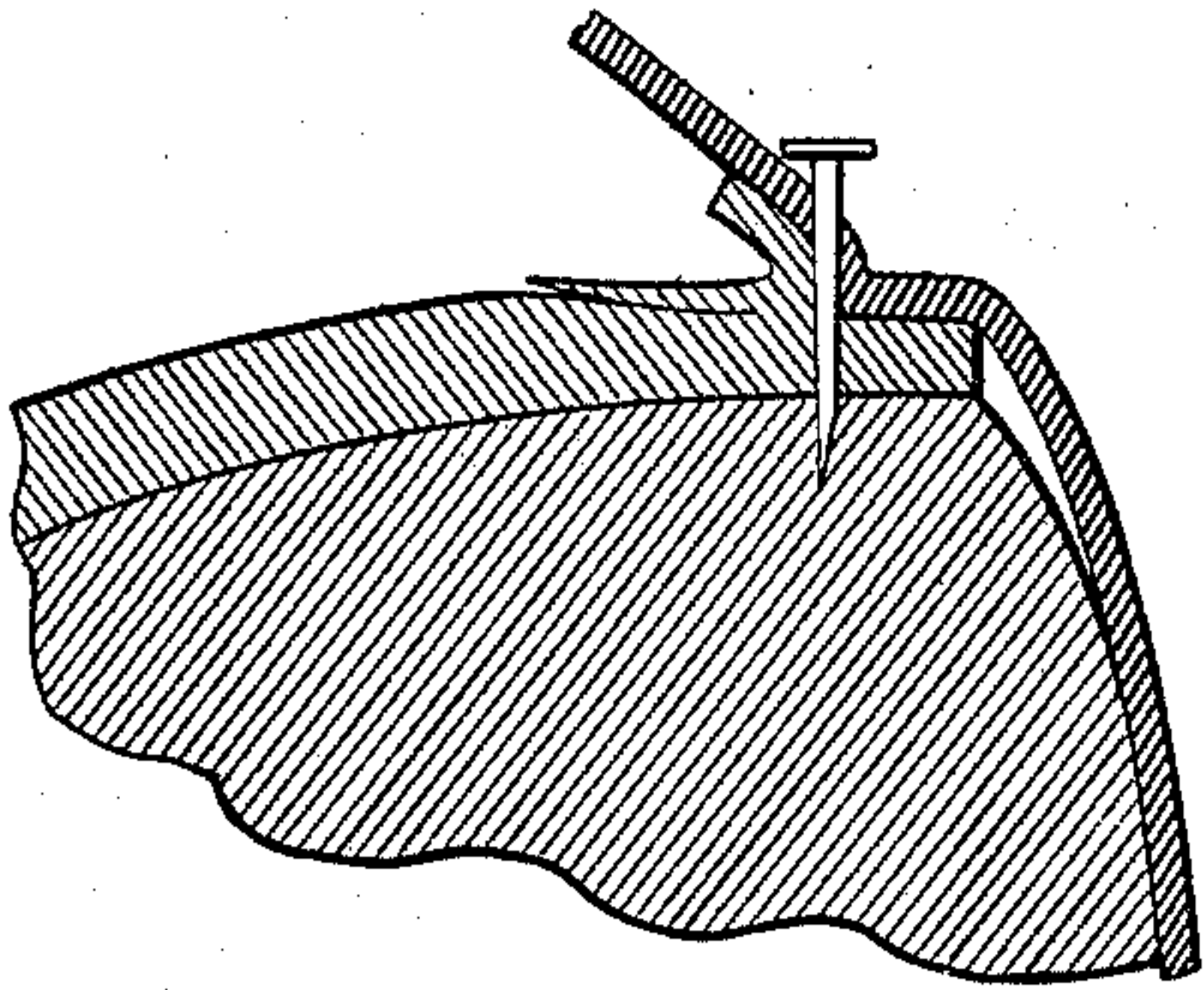
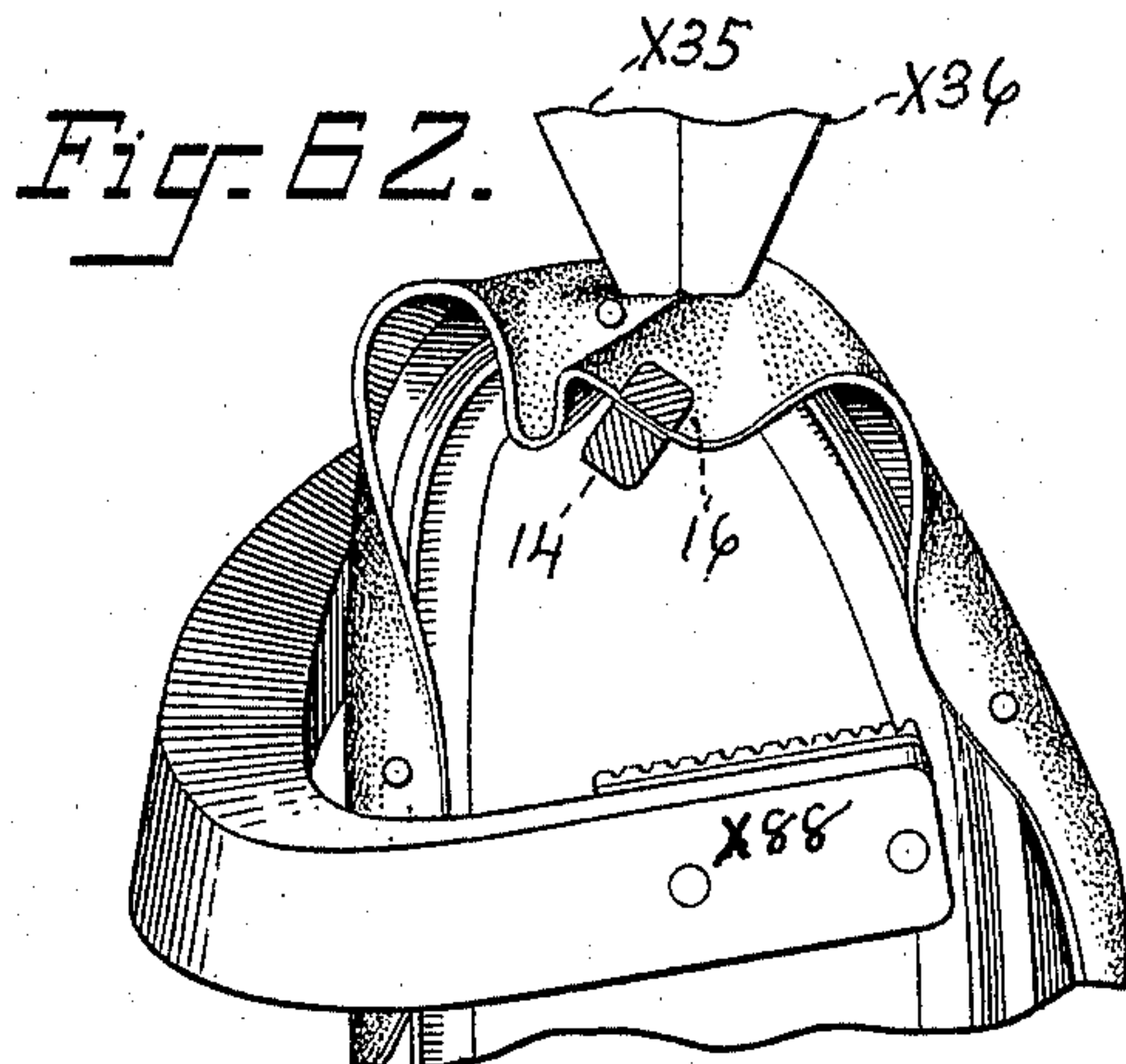
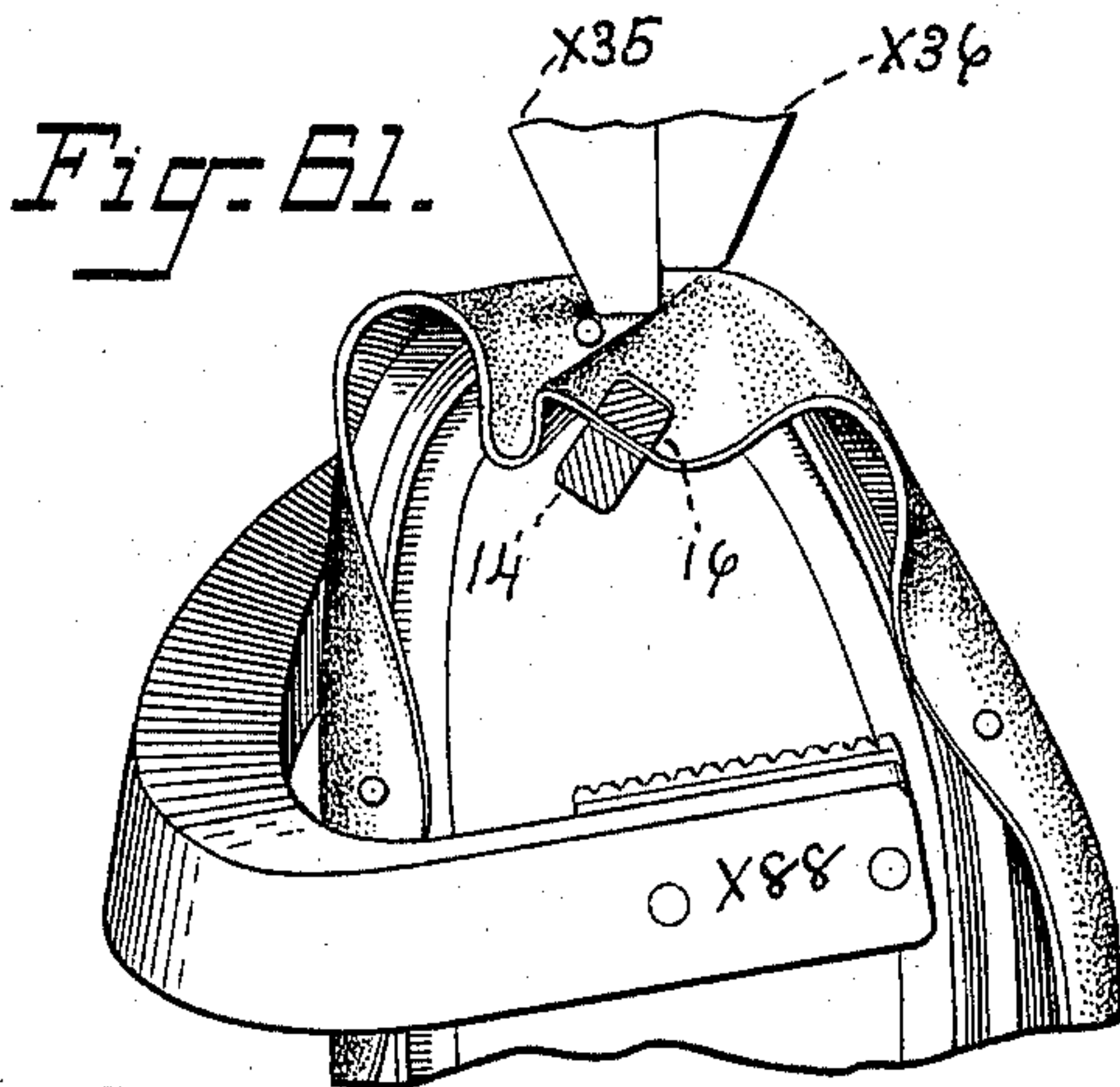
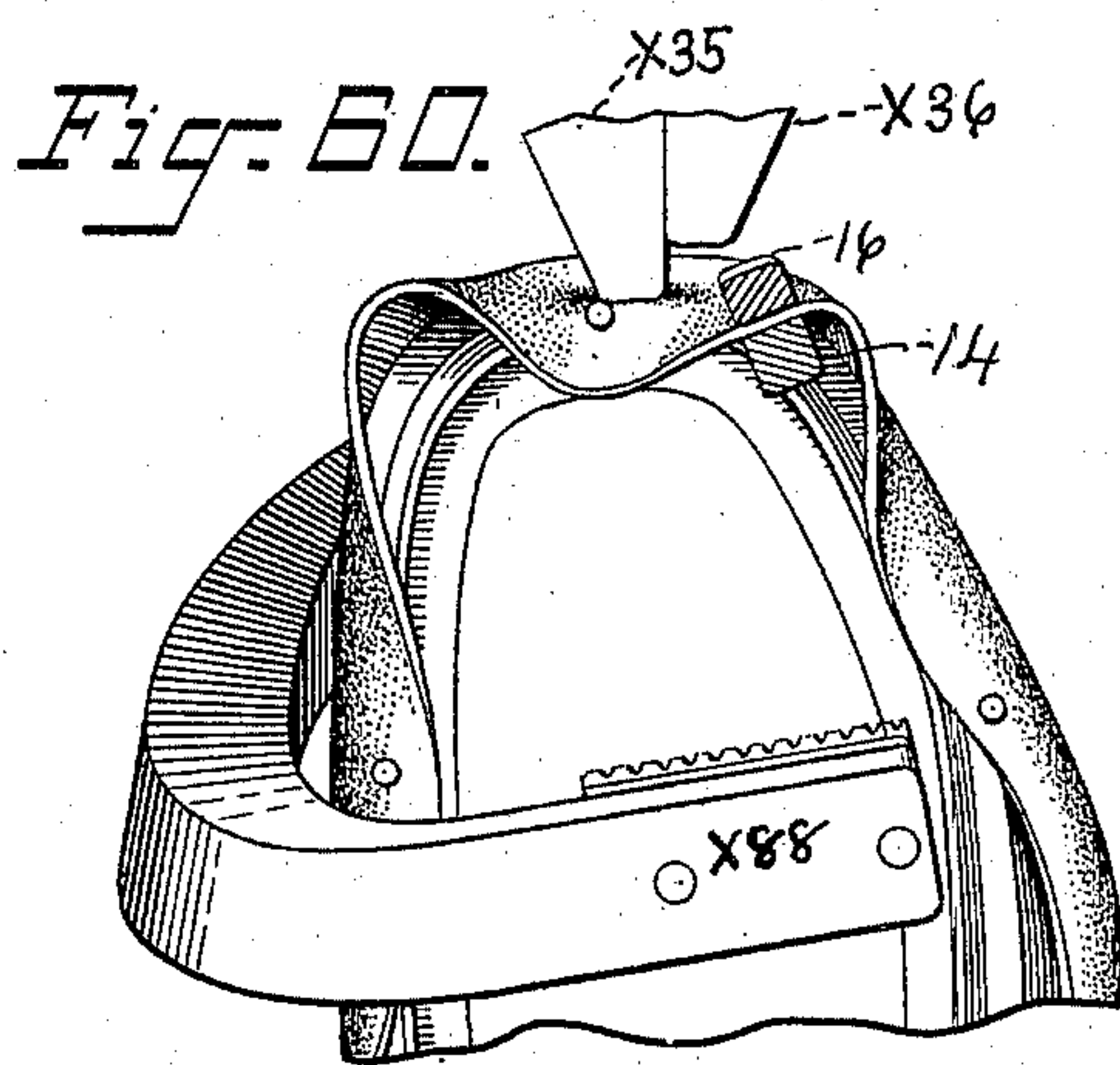
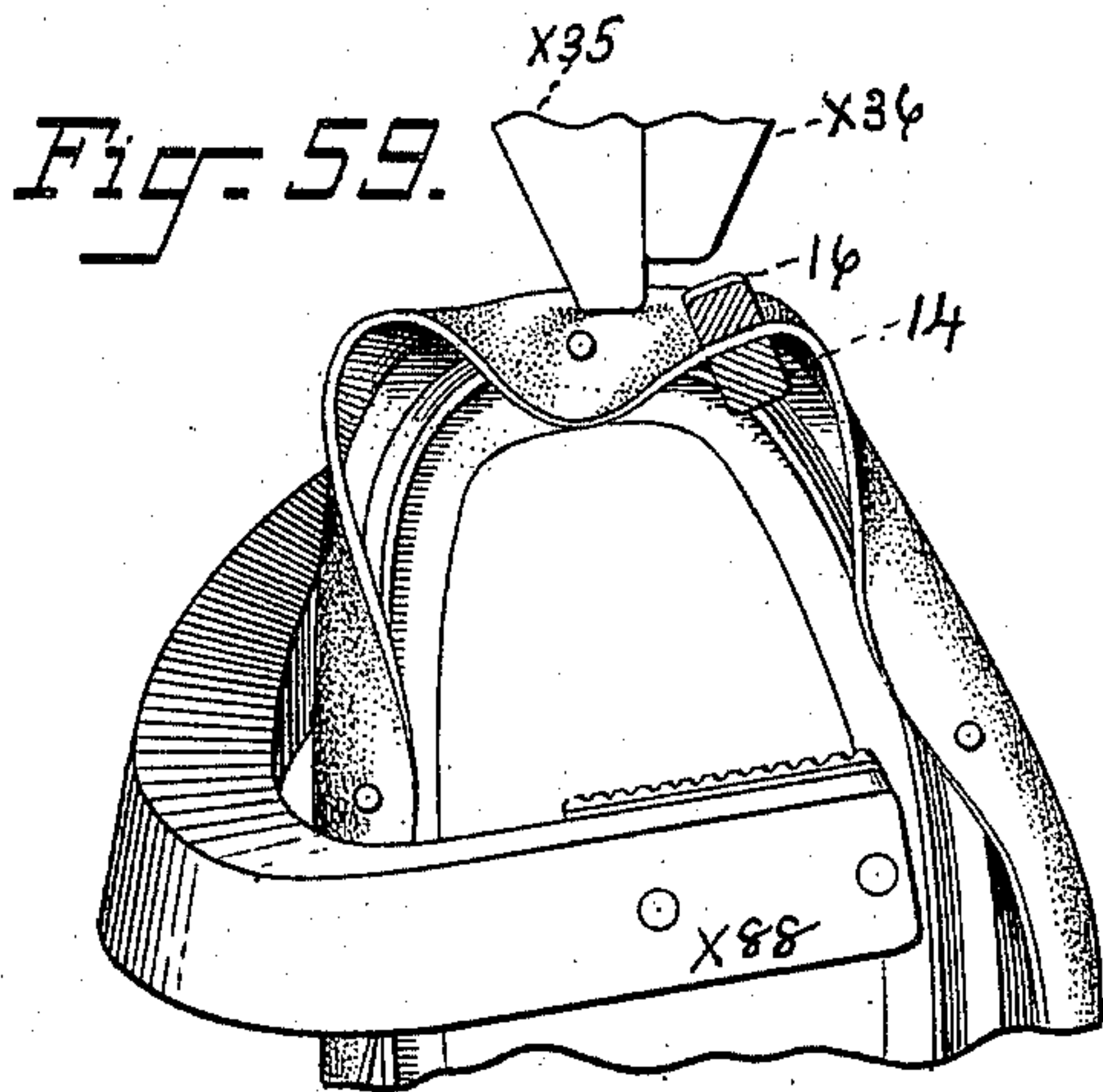
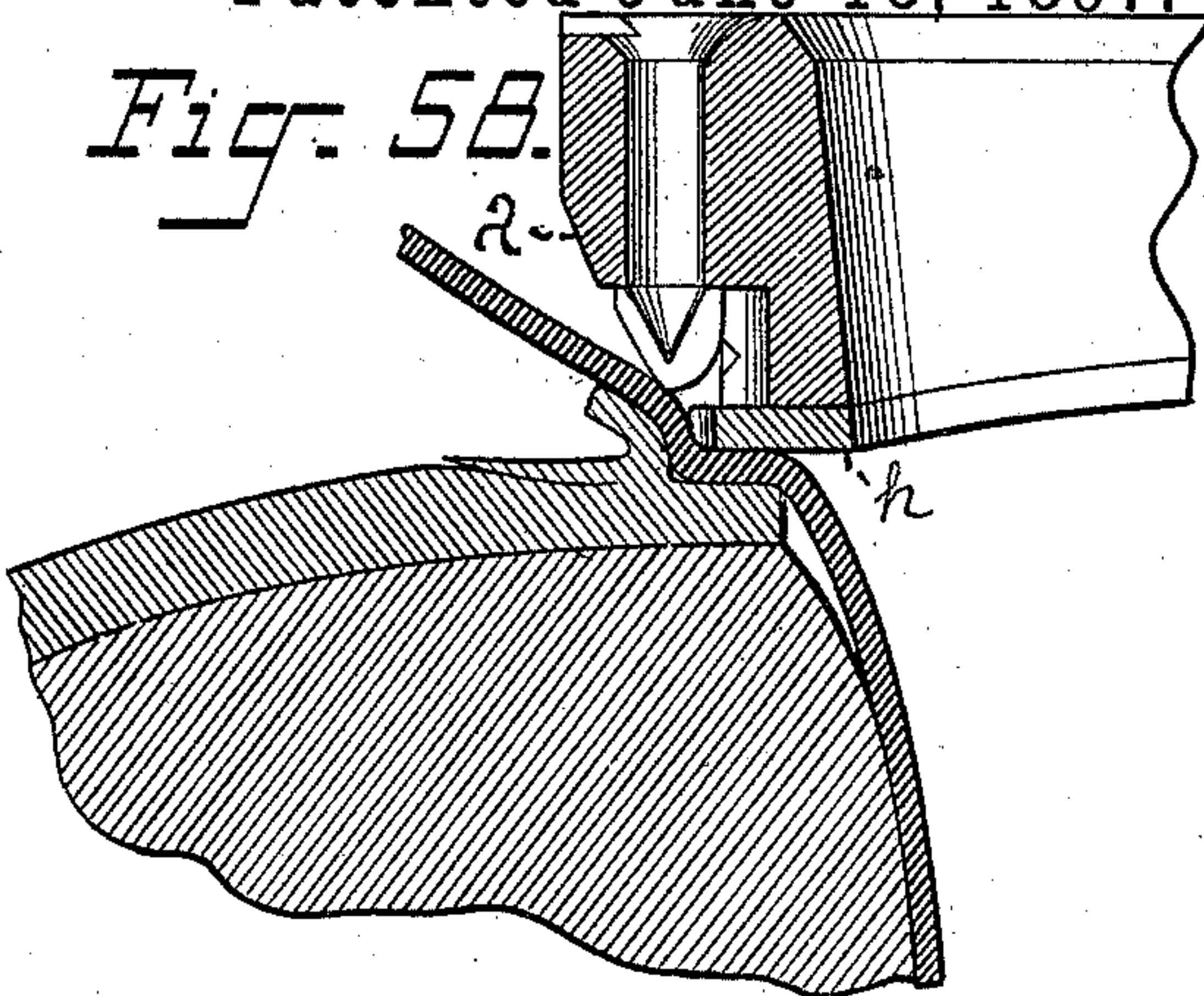


Fig. 58.



Witnesses.
John F. Nelson.
Mc. Mc. Tuttle.

Inventors.
S. W. Ladd
R. F. McFeely
by A. B. Tuttle, Atty.

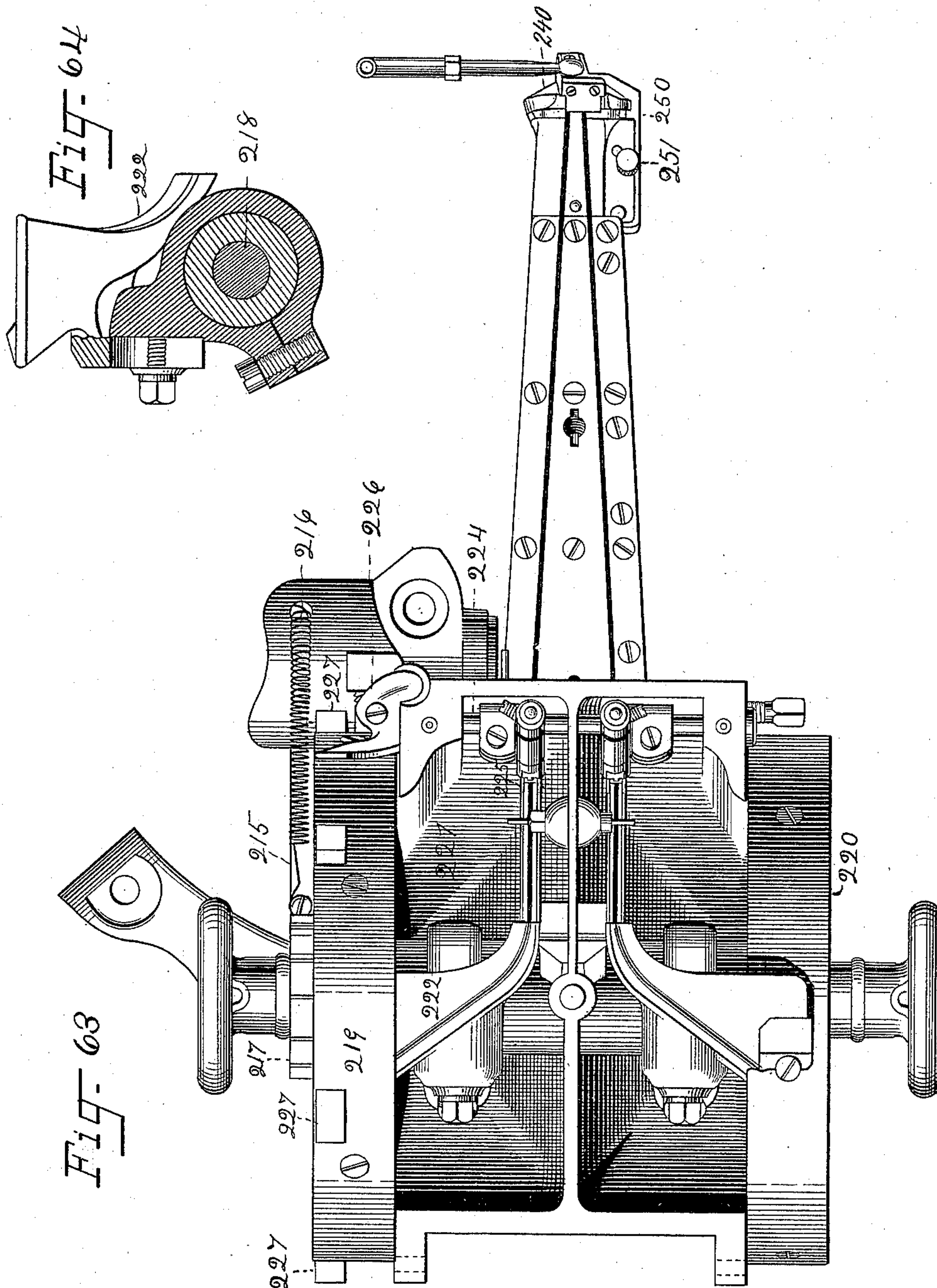
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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.



Witnesses.
John F. Nelson
Mo. Mc. Tuttle.

Inventors.
S. W. Ladd
R. F. McFeely
by C. B. Tuttle
Atty.

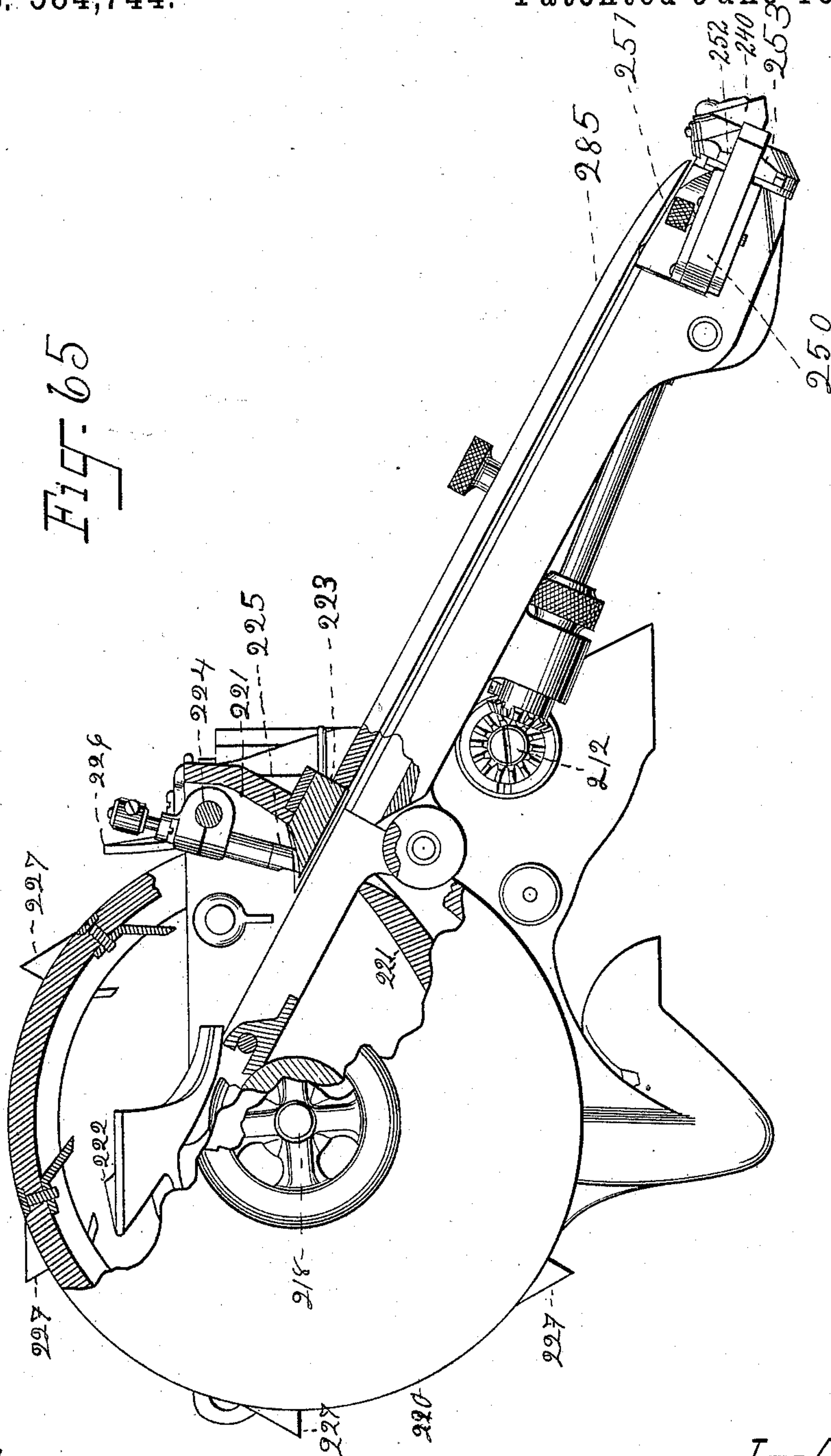
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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.



Witnesses.

John F. Nelson.
Wm. W. Fattle.

Inventors.

S. W. Ladd
R. F. McFeely
by B. B. Tuttle
Atty

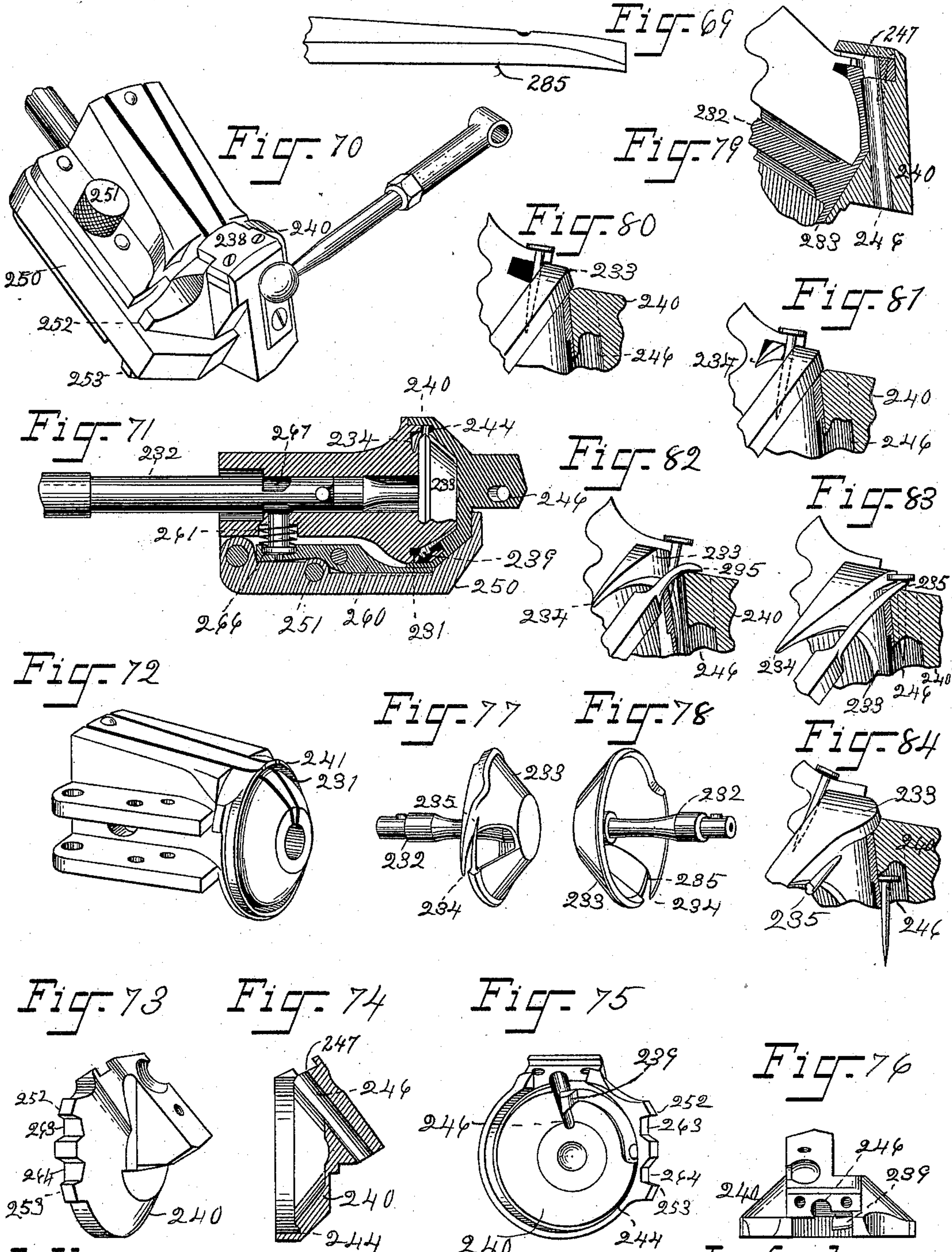
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S. W. LADD & R. F. McFEELY.
LASTING MACHINE.

No. 584,744.

Patented June 15, 1897.



Witnesses.

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(No Model.)

28 Sheets—Sheet 28.

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Fig. 85.

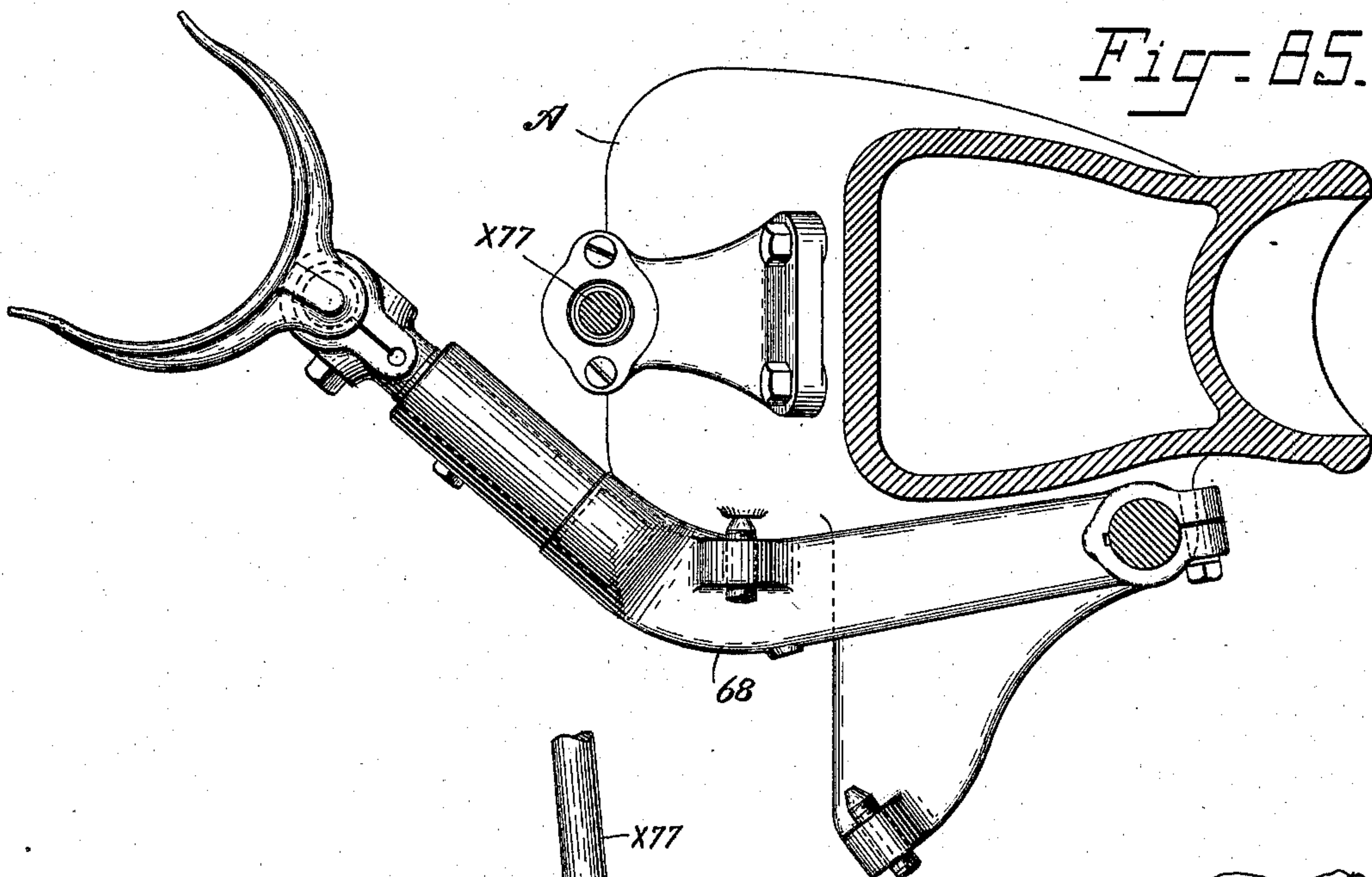
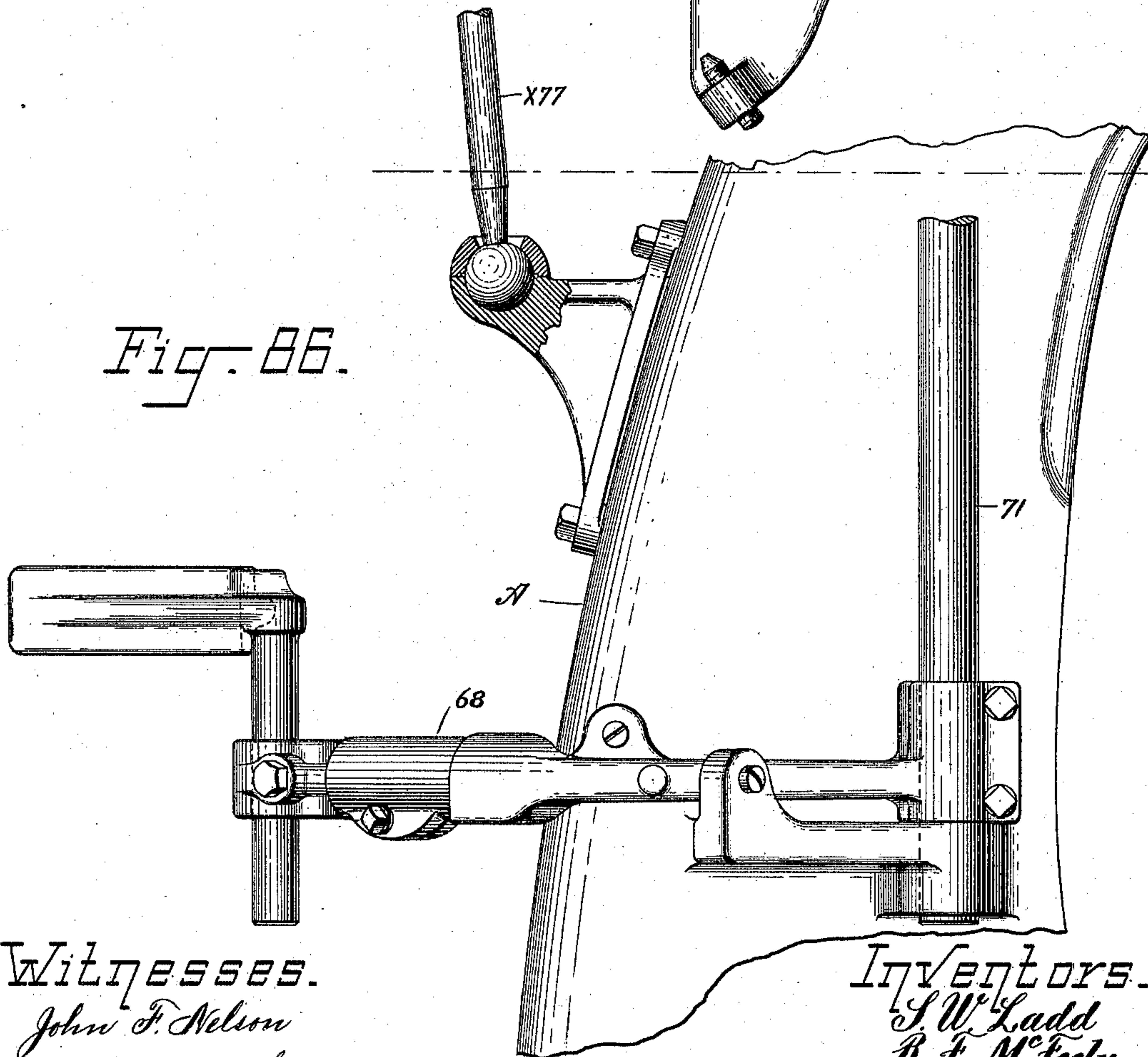


Fig. 86.



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UNITED STATES PATENT OFFICE.

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LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 584,744, dated June 15, 1897.

Application filed June 27, 1896. Serial No. 597,124. (No model.)

To all whom it may concern:

Be it known that we, SHERMAN W. LADD and RONALD F. McFEELY, of Beverly, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Lasting-Machines, of which the following, read in connection with the accompanying drawings, is a full and complete specification.

10 In the accompanying drawings, Figure 1 is an elevation of the front of the machine. Fig. 2 is an elevation of one side, and Fig. 3 is an elevation of a section of the opposite side thereof. Fig. 4 is a perspective showing the machine frame or head relieved of the operative mechanism. Fig. 5 is an elevation of a section, showing the treadle-power-transmitting connections. Fig. 6 is a perspective showing the pincers and their actuating connections assembled without the supporting-frame. Fig. 7 is a front elevation of the pincers and connections. Figs. 8 and 9 represent details connected with Fig. 7. Fig. 10 is a plan of mechanism connected with the pincers. Fig. 11 shows a detail connected with Fig. 10. Fig. 12 is an elevation in section, showing the pincers and connections. Figs. 13, 14, and 15 are elevations in section, showing mechanisms connecting with the pincers. Fig. 16 shows the pincers-carrier in perspective. Fig. 17 is a perspective showing work-pressers and operative connections assembled without supporting-frame connections. Fig. 18 is a plan of the pressers and shifting connections. Figs. 19 and 20 are elevations, partly in section, on lines 19 20, respectively, of Fig. 18. Fig. 21 is a detail connected with Fig. 18. Fig. 22 is a plan of the pressers and supporting-frame therefor, and shows also the jack and supporting and locking mechanisms. Fig. 23 is a side elevation of Fig. 22. Fig. 24 shows in perspective the jack and its supporting connections and the locking mechanism therefor assembled without the frame. Fig. 25 is an elevation of the jack detached. Figs. 26 and 27 show details connected with Fig. 25. Fig. 28 shows in perspective the tack-carrier and driving mechanisms and connection assembled without the frame. Fig. 29 shows a detail of Fig. 28.

Fig. 30 is a plan of the tack-carrier block. Fig. 31 is a side elevation. Fig. 32 is a longitudinal section, and Fig. 33 is an end elevation thereof. Fig. 34 is an elevation of a section thereof on line 34 of Fig. 30. Fig. 35 shows in perspective certain parts of the driver mechanism, also parts of the tack-distributing mechanism, the edge-rest, and connections wherethrough the associate members are adjustably moved all at one time. Figs. 36, 37, 38, 39, and 40 represent the edge-rest and connecting details. Fig. 41 shows the last and materials placed thereupon ready for the machine-lasting operation. Fig. 42 shows it after the lasting operation has been completed. Figs. 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, and 62 are sectional details showing different steps in the lasting operations, to be referred to hereinafter. Fig. 63 is a plan of the tack holding and feeding mechanisms. Fig. 64 is a detail connected with Fig. 63. Fig. 65 is a side elevation, partly in section, of mechanism shown in Fig. 63. Fig. 66 is an elevation of a section showing side opposite to Fig. 65. Fig. 67 is a detail connected with Fig. 66. Figs. 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, and 84 show details connected with the tack feeding and distributing mechanisms. Figs. 85 and 86 are details connected with the column.

Reference is made to the claims hereinafter written for a statement of the novel features of this invention.

As shown, this invention comprises a framework B, which is hereinafter spoken of as the "head." It is employed, mainly, for supporting the operating mechanism, and to that end it is made of an irregular contour and is mounted at the top end of the supporting-column A. Preferably the head is supported to permit of adjustment to different altitudes for the better accommodation of different workmen. In this connection a plunger is positioned in the column A with its top end above the column and its bottom end against the screw XK. The head is secured upon the plunger, and the screw XK, having suitable engagement with the column, may be turned in opposite directions for carrying the

plunger, and consequently the head and operative parts supported thereby, up or down for attainment of the altitude desired. A cut is made through the wall of the column A, whereby is formed a slot running longitudinally thereof, and the column is also provided with clamping-screws, by which it may be clamped about the plunger for maintaining the adjustment.

10 Journaled in the head is a shaft D. This is the main driving-shaft of the machine, and on it are set the cams and gears, &c., which give proper motion to the principal operative mechanisms.

15 Shaft XX' in the base of column A carries the fixed pulley XX², having friction-disk XX³, and the loose pulley XX⁴, having friction-disk XX⁵, adapted for movement on the shaft by action of spring XX and wedge XX⁰, which latter engages a sleeve XXA, in bearing with disk-hub XX⁵.

20 On shaft D is the pulley O for rotating the shaft D by belt-power from pulley XX⁴, and connecting therewith is a brake-shoe XX⁶, supported adjustably for vertical movement in the rod XX⁷. It carries the spring XXX and is connected with the treadle-lever XX⁸, which carries the wedge XX⁰, all this to the end that the workman may start and stop the machine at will by suitably operating the foot-treadle XX⁸.

On the head B is a rest 12, having its lower end face in the proper altitude for giving support to the last-bottom, and in nearly the same plane therewith is a rest 10, having its end face in position for giving support to the side of the last along the edge of the shoe inner sole. The edge-rest 10, Fig. 3, has support in the head B by a sliding connection to permit movement thereof toward and from the rest 12 and is shown as composed of two parts, one having a thin end face and the other having a broad end face. Both parts are adapted to permit being swung downwardly when not required for use. The bottom part or member has its bearing-face projected upwardly, so that when positioned for use it stands before the top member, and thereby is presented one continuous bearing-face for the shoe. Connecting with the rest 10 is the lever-arm FX, having connection with the handle-rod BX, Fig. 35, wherethrough the workman by suitably turning the rod may advance and withdraw the rest 10.

55 It may be stated here that the materials to be operated upon are prepared for the lasting operation by putting them onto a last with the inner sole upon the bottom thereof, all in the usual way. The upper is drawn over at the heel, toe, and preferably at the sides also and secured to the inner sole by a tack or other fastening device in each of said places. As such it is spoken of hereinafter as the "last" or "shoe." It is presented to the machine bottom upwardly against the rest 12 and with the edge thereof against the edge-rest 10 and is then in position for the pincers

to come forward and grasp the edge of the upper.

As shown, the pincers comprise two jaws. 70 The one, 14, is fixed and the other one, 16, is movable. Bar 13 carries the jaw 14. It is tubular, and in the center thereof, arranged to permit longitudinal movement, is the bar 15, to which is pivotally connected the jaw 16, Fig. 12. Bar 13 has the cam 17, and extending from the jaw 16 is a strap carrying the roll R, engageable with the cam 17. The spring XN tends to move jaw 16 outwardly, and it is against this spring that the jaw is 80 carried inwardly toward the jaw 14 by action of said cam 17 and connections.

It will be observed that a movement of the bar 15 in one direction operates to open and a movement thereof in the opposite direction 85 operates to close the pincers-jaws. In this connection a cam 40 on shaft D is set for contact with the bottom end of lever 36, Fig. 6.

A plunger 27, supported in the opposite end of lever 36, rests upon the top end of pincers-bar 15, and a movement of cam 40 against one end of lever 36 causes downward movement by the other end thereof, whereby the plunger 27 and consequently the pincers-bar 15 are moved downwardly for closing together 95 the pincers-jaws.

In the bar 15 are pins, which, projecting outwardly through slots in the bar 13, engage one end of a coil-spring seated against a fixed collar on bar member 15. Downward movement of bar 13 for closing together the pincers-jaws operates a contraction of spring S, and it is the expansive force of this spring S which lifts the bar 13 against the plunger 27 and operates, when permitted by cam 40, the 105 movement of bar 13 necessary for opening the pincers-jaws.

Lever 36 has its driver end chambered for receiving the plunger 27 and is provided with an internal (Fig. 13) shoulder 29. The plunger 27 is placed in said chamber with its bottom end projecting therefrom to engage the bar member 13 and its top end projecting therefrom through a screw-threaded nut 26. It has an enlargement formed thereupon and 115 by the spring 28 is normally forced to bear with said enlargement against the shoulder 29, all this to the end that the gripping force shall be applied from cam 40, through spring 28, yieldingly. Tension of spring 28 may be 120 varied adjustably by suitable operation of the nut 26.

125 Journaled in the head B is a rock-shaft 19, on which is mounted the lever 18. Lever 18 has one end in connection with bar 13 of the pincers, whereby to support and effect a lifting and lowering of the pincers mechanism as a whole, all this by suitably tilting the lever 18, Fig. 6.

In the topmost end of the bar E, Fig. 15, 130 and secured thereto adjustably by a screw-threaded clamping-screw 24, is the rod 32, having its top end screw-threaded for engaging and giving support adjustably to the corre-

spondingly screw-threaded nut 4. Interposed between the nut 4 and a flanged sleeve 6 on the rod 32 is a coiled spring 25. The sleeve 6 is arranged to permit free movement endwise on the rod 32, and, as shown, the spring 25 is exerted in forcing the head end of sleeve 6 to bear yieldingly upon the collar 23. Said collar 23 is adapted for free passage there-through of the rod 32. It is supported in the forked rear end of lever 18 by pins 8, on which it permits rocking movement, and it has its bottom face in touch with a fixed collar on the rod 32.

In the bottom end of bar E and projecting therefrom into a groove suitably formed therefor in the cam 280 is a pin wherethrough by each revolution of the cam 280 motion is transmitted for upwardly and downwardly moving the bar E. Cam 280 is set to revolve with the shaft D.

Movement of the bar E downwardly, operating through spring 25 and connections against lever 18, operates an upward movement of the pincers-supporting end thereof, whereby the pincers are lifted for straining the upper vertically. This by suitable formation of the cam 280 is made to take place while the pincers-jaws are holding the upper tightly gripped. The upper is thereby strained and stretched by power applied yieldingly thereto through the spring 25. By the nut 4 tension of spring 25 may be shifted, and the applied force may be thereby regulated for differently straining the different kinds of upper materials without tearing or unduly straining the same.

The groove in cam 280 is so formed that after the pincers have been lifted a further rotation of cam 280 operates an upward movement of bar E, reverses the movement of lever 18, whereby the pincers end thereof and consequently the pincers members supported thereon are lowered to the position required for placing the upper over the inner sole. By this means through the bar E and collar 23 to the lever 18 the force is applied in a positive manner. It is caused to take place after the pincers have been moved over the last, and is continued until the pincers have released the upper and been carried to the position for again seizing the upper, all this by mechanism to be further described hereinafter. By suitably turning the clamp-screw 24 rod 32 may be adjusted and supported with its collar at different altitudes, and thereby the lowering of the pincers may be adjustably varied.

The pincers-bar 13 has on its top end a ball which is entered in a socket formed therefor in the lever 18, all this to the end that the pincers mechanism when supported thereby as a whole shall permit movement, as required, for turning and moving the jaw members thereof forwardly and backwardly and from side to side. In this connection a carrier 30 is employed. This carrier, Fig. 16, comprises tubular, vertical, and horizontal parts, as

shown. In the vertical part thereof the pincers-bar 13 is arranged to slide, and in the head B is a longitudinally-movable rock-shaft 50, having on its front end a yoke with prongs 31 31, wherein is placed the horizontal part of carrier 30, Fig. 10. Shaft 50 has a pin and cam-roll set for engagement with the cam 54 on shaft D, whereby motion is imparted there-through for moving the shaft 50, and consequently swinging the pincers horizontally backward. This movement, combining with the lowering movement imparted to the pincers by lever 18, places the pincers in position for seizing the upper. This backward movement of shaft 50 is made to take place against the tension of a coil-spring 53, by which, as the cam permits it, the shaft and consequently the pincers are moved horizontally forward. This latter movement is allowed to take place after the pincers have gripped the upper and lifted it, and this, it will be understood, is the movement applied yieldingly to the pincers for carrying the upper over the inner sole. Connected with a spring 53 and its supporting-bar is a ratchet-and-pawl device whereby the tension of the spring may be varied, Fig. 6.

Shaft 50, it will be understood, also permits rocking movement, whereby the carrier 30 is adapted for the movement required thereof in swinging the pincers laterally. The pincers require said movement laterally from one side thereof to the other at times for suitably drawing and manipulating the upper at the toe of the last and at other places occasionally. In this connection the boss 47, Fig. 14, is employed, which to that end is integrant with or firmly secured to the carrier 30, Figs. 12 and 14. It being suitably chambered it has screw-threaded engagement with and supports in its top end the tubular nut 48. Projecting upwardly through said nut is a spindle-rod 44, having its body portion within the nut and boss and having its bottom end stepped loosely into a socket suitably formed therefor in the middle part of a bar-lever 43. Interposed between the nut 48 and the collar on the spindle 44 is the coiled spring 49. The tension of spring 49 is exerted downwardly through spindle 44 against the lever 43, whereby to hold the lever pressed yieldingly down upon the pins 41 42, which pins being fixed in the boss 47 support the lever with its bottom face in a substantially horizontal plane. Below the lever 43 and in alinement with the spindle 44 is a stud 46, having its support in the boss 47.

Supported to permit rocking movement on the stud 46 is the triangular lever-block 45, having engagement by its bottom end with a pin 52 in the slide 51 and having its top end face in touch with the bottom face of lever 43, wherethrough it is positioned by the action of spring 49 so as normally to hold the pin 52 in alinement with the pincers-bar 13, and this, it will be understood, is the position thereof normally and from which as a starting-point they are moved in carrying the pin-

cers laterally from side to side by endwise movement of the slide 51.

A movement of the slide 51 longitudinally in one direction, whereby the pin 52 is moved to one side out of alinement with pincers-bar 13, operates a rocking movement of lever 45, whereby one end of lever 43 is lifted from its supporting-pin against the normal tension of spring 49, and thereupon the moving force acting through said spring and the bearing end of lever 43 yieldingly compels a movement of the carrier 30, and consequently moves the pincers-jaws laterally for manipulating the upper to one side of the line of their vertical action. The slide 51 being similarly moved in the opposite direction effects a counter-movement of the lever 45, whereby the other end of lever 43 is lifted, and thereupon the moving force, applied in similar manner through spring 49 and the bearing end of lever 43, compels an obverse movement of carrier 30, and consequently moves the pincers-jaws laterally for carrying the upper to the other side of the said line of vertical action. By this means all movements of the pincers laterally are enforced yieldingly through the action of spring 49. The employment of a single spring insures that a uniform development of tensional strain will result from like movements of the slide 51 to either direction.

For the most complete and effectual manipulation of the upper the pincers require to be turned also at times. The mechanism for this purpose, as shown in Figs. 6, 7, 8, and 9, includes bar X^2 , which has on its face a rack or toothed formation whereby it engages a gear formation suitably made therefor in the pincers-supporting ball X^4 . It is located in a chamber suitably formed therefor in the slide X^3 and has its supporting-stud X^5 journaled in the slide X^3 . Thereby it is adapted for the oscillating movements required of it in conforming to the movements of ball X^4 consequent from swinging the pincers laterally. The slide X^3 is supported in the pincer-lifting lever 18 and permits movements longitudinally in either direction. By a movement of the slide in one direction the pincer-bar 13 and consequently the pincers-jaws are turned one way. By a movement of the slide in the opposite direction bar 13 and consequently the pincers-jaws are turned the other way.

The movements required of slide X^3 are imparted thereto from a rocking driver 57 through connections which include the lever X^6 , the rods X^7 X^8 , and a slide 63 in the driver. A stud X^9 , adjustably fixed in the head B, has mounted thereon a rotatable block X^{10} . Said block is made to enter an opening or slot suitably formed therefor in the lever X^6 . By this arrangement the lever permits movement longitudinally on said block, while it is supported laterally thereby and adapted to turn therewith on stud X^9 as its fulcrum. Lever X^6 has its top end pivotally connected with

one end of the rod X^7 , the opposite end whereof has a similar connection with the slide X^3 . Said lever X^6 has its bottom end journaled on a stud X^{12} , Fig. 10, whereby said power-transmitting connections X^6 X^7 X^8 are upheld. In this connection a slide X^{13} , adapted for movement horizontally in a chamber suitably formed therefor in the head B, is made to support the stud X^{12} , and thereby it is adapted for the movements required of it in conforming to the movements of lever X^6 . The rod X^8 , having one end also engaged with the stud X^{12} , has its opposite end connected with a pin 64 in the slide 63. Slide 63 is supported for movement in a groove suitably formed therefor in the driver 57 and is movable therein across the line of the axis of rotation of the driver to either side thereof.

Rocking movements are imparted to the driver 57 by a mechanism described hereinafter and whereby the driver is rocked once in each direction during every complete revolution of the main shaft D. As shown in the present instance, a rod 55 has one end in ball-and-socket joint connection with the driver end of the rod X^8 and has its opposite end in a similar connection with the slide 51. By this connection a movement of driver 57, operating a movement of slide X^3 , and consequently turning the pincers, shall effect a simultaneous movement of the slide 51 for moving the pincers laterally—all this to the end that movement of the pincers laterally to either side shall be accompanied by a gradual turning thereof, whereby is effected a compound action of the pincer for twisting, as well as for drawing, the upper laterally, and by suitably adjusting the stud X^9 the turning movements of the pincers may be increased and decreased independently with relation to the amount of lateral movement.

It is important to arrange the pincers-turning mechanism so that as the pincers arrive to the position for gripping the upper the gripping-plane of the pincers-jaws shall stand in relation to the last the same approximately as the plane of the upper material to be gripped thereby will normally occupy. To this end the pincers-turning mechanism is out of operation while parts of the upper are lasted, during which the pincers are moved forwardly and backwardly in alinement with the central longitudinal plane of the machine, the gripping-plane of the pincers-jaws being then at right angles to the said line of forward and backward movement and parallel with the central cross-sectional plane of the machine, Figs. 2, 43, 44, 45, and 46; but for the toe of the shoe, and other parts thereof occasionally, where the upper stands out from or angular to the last, the pincers-turning mechanism is put into operation and is adjusted for turning the pincers in suitable time relation, so that as the pincers arrive to the gripping position they will have been turned outwardly or angular to the last and with the gripping-plane of the pincers-jaws at an angle

to the central cross-sectional plane of the machine. The gripping operation will then take place according to the normal position of the upper and without materially changing the position thereof relatively to the last. (See Figs. 59 and 60.) Thereafter the pincers are moved for carrying the upper over the last and bending and placing it upon the inner sole, Figs. 61 and 62. It is not turning the pincers merely, but turning them to the required angle for gripping the upper according to the normal or outstanding line thereof, that gives the complete action desired for lasting the upper without liability of causing a wrinkle or semipucker thereof at the edge of the inner sole, and to further make complete this operation the mechanism for moving the pincers laterally is preferably made to operate in time for placing the pincers bodily at one side of the central longitudinal plane of the machine, Figs. 59 and 60, preparatory for the gripping operation.

Obviously a movement of the slide 63, whereby the pin 64 is carried to one side of the axis of rotation of the driver, will cause it to act as a crank-pin, compelling the pincers to turn and simultaneously move laterally in one direction. A movement of slide 63 in the opposite direction, whereby the pin 64 is carried out of alinement with said axis of rotation to the other side thereof, will in a similar manner compel the pincers to turn and simultaneously move laterally in the said opposite direction. A movement of slide 63, whereby pin 64 is positioned in alinement with the axis of rotation of the driver, will cause the pin 64 to be simply turned by rocking movements of the driver, whereupon no movement will be imparted thereby, and the pincers will consequently be at rest.

Driver 57 has fixed support on the end of a tubular shaft 56. Said shaft is supported in the head B and permits the rocking movements required thereof for rocking the driver 57. To this end it has a segmented gear 59 in mesh with the gear formation on one end of a lever 60, Fig. 10. A pin 302 on the head B supports the lever 60, and in the other end thereof is a pin and roll thereon supported for travel in the groove 61 of a cam on shaft D, wherethrough motion is imparted for tilting the lever and thereby partially rotating the shaft 56 once in each direction by every complete revolution of the main shaft D.

Supported rotatively in brackets on the column A is a vertical shaft 71, on the bottom end whereof is fixed the horizontal arm 68. Said arm carries on its free end a forked head supported thereby at about the altitude of a workman's knee while standing at the machine. Supported by a fixed connection on the shaft 71 and projecting horizontally therefrom is also an arm 73, having on its outer end a fork with pins extending therefrom into a groove suitably formed therefor in the collar 74, whereby it is engaged with the collar for movement thereof endwise. Said

collar 74 is supported to permit endwise movement on shaft 56 and has a groove-and-splined connection therewith, wherethrough it is made to participate in the rocking movements thereof.

Supported to permit rotative movement in the shaft 56 is a shaft 76, having on one end a gear 77 in mesh with a gear formation on the slide 63, whereby rotation of the shaft produces movement of the slide longitudinally. Fixed in the shaft 76 and projecting therefrom laterally through an opening in the shaft 56 is a pin having its outer end projected into a groove formed spirally in the collar 74, wherethrough a movement of the collar 74 in one direction endwise is made to turn the shaft 76 in one direction and a counter endwise movement of the collar 74 is made to turn the shaft 76 in the opposite direction.

It will now be observed that the driver 57 is given a continuous rocking motion, but that it imparts no movement to the pincers mechanism while the slide 63 is in position with its pin 64 in alinement with the axis of rotation thereof. This, it will be understood, is the position thereof while the arm 68 rests in a point about midway of its line of horizontal movement. Such is, for convenience, hereinafter sometimes called the "central" or "normal" position thereof, and during maintenance of this position the turning and lateral movements of the pincers are suspended. It is this position from which as a starting-point the arm 68 is moved horizontally to one side of its normal line to place slide 63 with its pin 64 on one side of the axis of rotation of driver 57, whereupon are put into action the parts for causing lateral movements and turning of the pincers in one direction. A movement of the arm 68 in like manner to the opposite side of said normal position operates a counter-movement of slide 63, whereby the said operative parts are put into action for causing lateral movement and turning of the pincers in the opposite direction. Said lateral movements of the arm 68 are allowed by the workman at will.

On shaft 71, Figs. 18, 19, and 20, is mounted the lever X^{33} , adapted by the adjustable pin X^{34} to be secured thereto for movement with the shaft. Having connection with the lever X^{33} at one end thereof is a slide X^{29} , having its support in head B and permitting movement endwise in both directions. In slide X^{29} is formed a recess X^{28} for receiving the forwardly and backwardly moving driver X^{27} . Driver X^{27} has connection with the end of a two-part adjustable rod X^{24} , the opposite end whereof is in ball-and-socket engagement with the lever X^{25} , wherethrough motion is imparted from a suitably-formed cam on the shaft D for moving the driver X^{27} forwardly and backwardly once in each direction by every complete revolution of the main shaft D.

Driver X^{27} is in sliding touch with the inner wall-surface of recess X^{28} . It is supported thereby and has engagement with the

side walls thereof whereby to be carried laterally by endwise movement of slide X^{29} in either direction for engagement with the bars X^{15} X^{16} , respectively. The bars X^{15} X^{16} carry each on their foremost ends a plate called "pressers" or "work - pressers" X^{35} X^{36} . Suitably entered in the rear end of said bars respectively are rods X^{17} X^{18} , on which the bars are supported for sliding movements forwardly and backwardly. Said bars carry each a fixed pin on which are mounted the rolls X^{19} X^{20} . Springs X^{21} X^{22} , arranged one in each of said bars and suitably tensioned therefor by engagement with said bars and rods, respectively, operate for drawing the bars yieldingly backward and normally hold the bars with their rolls X^{19} X^{20} respectively against the cam-faced slide X^{23} . Slide X^{23} has support rearwardly against the frame B and has connection with the end of lever X^{33} , wherethrough motion is imparted for moving the slide endwise in both directions. Slide X^{23} has a cam-face fashioned with an apex X^{37} in the central part thereof. This is the foremost extension and operates to support in different time relations the bars X^{15} X^{16} respectively at their foremost positions of rest. It has on one side of the apex a recess X^{38} , and on the other side thereof it has a similar recess X^{39} , and thereby it supports the bars simultaneously in their rearmost position of rest. Besides the apex and recesses named it has projections X^{40} X^{41} of a character less extended than the apex, said projections terminating forwardly in a plane about midway between the plane of the apex and a plane including the bottom of said recesses.

It will now be understood that a movement of lever X^{33} , whereby the cam-slide X^{23} is moved endwise sufficiently in one direction, causes an advance of the bar X^{15} to a position against the apex X^{37} , where it is adapted for the function of a work-presser, referred to hereinafter. By the same movement of cam-slide X^{23} the bar X^{16} is advanced to a position against the projection X^{41} , whereat it is engaged by the driver X^{27} , said driver having for that purpose been simultaneously carried to one side by the slide X^{29} , responding to the lever X^{33} , and thereby socketed in the recess X^{42} of said bar, Fig. 18. The bar and consequently its presser-plate will then be moved forwardly by each succeeding forward movement of the driver X^{27} and will be returned therewith by action of the spring X^{22} . An obverse movement of the lever X^{33} , whereby the slide X^{23} is moved sufficiently endwise in the other direction, operates a shifting of the bars X^{15} X^{16} , wherethrough the bar X^{16} is positioned against the apex for use as the presser and the bar X^{15} gets position against the projection X^{40} and then has engagement with the driver X^{27} to be moved by it and the spring X^{21} forwardly and backwardly, the driver having by a counter-movement of slide X^{29} again responding to the lever X^{33} been si-

multaneously carried sufficiently in the opposite direction and socketed in recess X^{43} of lever X^{15} , Fig. 17.

A movement of the lever X^{33} , whereby the slide X^{23} is positioned midway between the extremes of its lateral movements, operates to position the bars X^{15} X^{16} , respectively, in the recesses X^{38} X^{39} of the slide, where they stand out of all work relations and are at rest. By this last-named movement of lever X^{33} driver X^{27} is disengaged from the bars X^{15} X^{16} and is located therebetween, where its reciprocations may be continued while the bars stand still.

As shown, lever X^{33} has a position on shaft 71, whereby it will occupy said intermediate position when the shaft 71 is set with the arm 68 in its central position, in order that the movements of said arm 68 for starting, shifting, and stopping the pincer, lateral, and turning movements shall operate for starting, shifting, and stopping the operations of the bars and consequently the pressers X^{35} X^{36} . By an obvious movement of the stud X^{34} , however, the lever X^{33} may be moved by handle XH or be loosened, and the operation of the bars and consequently the pressers can be thereby differently timed or discontinued altogether, if desired.

It is now to be observed that while the driver X^{27} is running between the bars X^{15} X^{16} and in advance of the recesses X^{42} X^{43} there will exist no opportunity for carriage of the driver laterally.

To allow for movement of the shaft-arm 68 taking place at such times, the slide X^{29} has its connection with lever X^{33} made by interposing its attached swivel-block X^{44} between the head ends of spring-actuated plungers X^{45} X^{46} , which are suitably located in the lever X^{33} . By this arrangement any movement of the lever X^{33} against resistance by the driver X^{27} is allowed by one or the other of said plungers moving against its said actuating-spring, which, being contracted, operates, when position of the driver next permits it, for placing the driver into the bar-recess.

On the plunger EX, between the column A and machine-head B, and suitably arranged for movement rotatively thereon, is the yoke X^{50} , having at its rear end the segmental gear X^{51} in mesh with the gear X^{52} , Figs. 2, 22, and 24. X^{52} is supported for rotation on a stud-shaft in the head B, whereon is supported in like manner the ratchet-gear X^{53} , having fixed connection with the gear X^{52} , whereby to move therewith as one. Suitably fulcrumed on a stud in the head B is a crank-lever X^{54} , having as one arm thereof a pawl, Fig. 22, to engage the gear X^{53} and having engagement with a spring-actuated plunger X^{55} , whereby said arm is normally held out of engagement with the gear. Said lever has connection by its other arm with the lever X^{71} , wherethrough motion is imparted from a cam X^{57} on the main shaft D, formed suitably for moving the lever X^{54} into engage-

ment with the gear X^{53} and by holding it, and consequently the gear X^{52} , to thereby lock the yoke X^{50} against movement during a portion of each complete rotation of the main shaft D.

Supported in the yoke X^{50} for movement therewith and permitting endwise movement independently thereof is the bar X^{58} , having in one side thereof a rack-gear in mesh with the gear X^{59} . Gear X^{59} is on a shaft X^{60} in the frame B, whereon is also the ratchet-gear X^{61} , having fixed connection for movement as one with the gear X^{59} , whereby it will be understood that to prevent such rotation will operate to lock and hold the bar X^{58} against movement endwise. In this connection is employed the crank-lever X^{62} , Fig. 23, having for one arm a pawl to engage the gear X^{61} . It is fulcrumed on a pin in the slide X^{63} and is thereby supported for movement with the slide. Slide X^{63} has support and permits movement endwise on a stud X^{64} in the yoke X^{50} and is forced rearwardly by a spring X^{65} , whereby lever X^{62} is engaged by its power-arm with an adjustably-fixed plate X^{67} to have its power-arm thereby lifted above the gear X^{61} .

Supported in the head B is a lever X^{69} , supporting on one end a plate X^{70} , curved in similarity with the line described by the end of slide X^{63} when moved by swinging with the yoke X^{50} . Lever X^{69} has its power-receiving arm connected with lever X^{71} , where-through motion is imparted from cam X^{57} on the shaft D for causing the plate X^{70} to push forwardly the slide X^{63} once during every complete revolution of the shaft D. Lever X^{62} is released, its pawl end dropped into the gear X^{61} , and the bar X^{58} is thereby locked against endwise movement forwardly, all this while the slide X^{63} is moved a part of its allowed forward movement, and any forward movement of the slide taking place thereafter will cause rotation of the gear X^{59} and thereby mechanically draw backward the bar X^{58} . By this operation the shoes supported at the foremost end of bar X^{58} will be carried forcibly against the work-presser supported thereagainst. The extent of such movement will be varied adjustably by differently adjusting the plate X^{67} . The cam X^{57} has formation suitable for causing the desired movement forwardly of slide X^{63} and for holding it during the required locking of the bar X^{58} , and then to automatically release it, as hereinafter described.

For support and movement the yoke X^{74} is swiveled on the foremost end of the bar X^{58} , and collar X^{75} , for support and movement, is pivotally arranged in yoke X^{74} , Fig. 22. The sleeve X^{76} passes loosely through collar X^{75} and has support and provision for adjustment below by its bottom end on the rod X^{77} and adjustable nut X^{78} , and the rod X^{77} has ball-and-socket connection by its bottom end in a bracket on the column A, whereby to support and permit the rod and sleeve being

moved about universally, Figs. 3, 24, 25, and 26.

Sleeve X^{76} carries a spring X^{90} , which, by the top end thereof, supports a slide X^{91} . From slide X^{91} a pin X^{92} projects laterally through slot-opening X^{93} in the sleeve for engagement with the cam-face of the cam-lever X^{94} , which lever embraces the sleeve and is fulcrumed on a pin which, extending through slotted opening X^{95} in the sleeve, has support in the bottom end of a slide X^{96} . Slide X^{96} permits movement endwise in the sleeve and carries a spring X^{97} , against which is seated the plunger X^{98} , whereon is supported by pivotal connection therewith a rest X^{99} , which constitutes the bottom member of a two-part clamp for clamping the shoe. Said rest is formed suitably for resting the shoe fore part and is preferably cushioned for pressure against the shoe-upper without liability of injury thereto. It is moved upwardly with the plunger X^{98} by force applied yieldingly thereto from the cam-lever X^{94} through the springs X^{97} X^{90} , which latter spring also acts for taking up the superfluous movement of the cam-lever X^{94} .

Sleeve X^{76} carries a head (shown as integrant with the sleeve) which includes the top rest or clamp member. For this purpose the head shown has therein a bend running laterally off the sleeve, thence rearwardly upward, and thence laterally again to the vertical plane of its starting, or thereabout, whereby is provided a recess with the terminal arm X^{88} above and over the same for support to the shoe pressed upwardly thereagainst by the bottom clamp member X^{89} , which for this purpose is moved by cam-lever X^{94} .

It will be understood that after the pincers have gripped the leather and carried it over upon the last the tack-carrier and driving mechanism is moved forward into position for driving the tack and again is moved backward to allow the next operation of the pincers. To this end, Fig. 28, is employed a carriage composed of horizontal arm 84 and a vertical arm 85. The arm 84 is arranged to permit sliding movement in a groove formed therefor in the head B. Connected therewith is a lever 87, which engages a cam 88 on the main shaft, whereby the carriage is moved forward and backward over the last during each revolution of the cam.

The tack-inserting bar 90 is arranged to permit vertical movement in a groove formed therefor in the vertical arm 85. The bar is lifted by a cam 91. Said cam is mounted on the end of a sleeve 92. This sleeve is arranged on the main shaft D and is grooved and splined thereto, so as to revolve therewith for lifting the bar 90 and permit sliding movement on the shaft to accommodate the forward and backward movement of the carriage. The bar 90 is lifted against a spring-rod 93, which being twisted by the lifting operation operates to depress the bar whenever

the cam permits it, and this, it will be understood, is the power which drives home the tack. The tacks are received from the distributing mechanism, hereinafter explained, by a polished steel chute having a raceway, along which they are conducted to the separating and delivering mechanism, also described hereinafter, whereby tacks are dropped one at a time into a tack-holder, Fig. 30, to be thereby supported and carried forward to the driving-point. To this end the said holder 20 is secured to the bottom of the carriage-arm 85 and is moved backward and forward therewith. Said holder, by the rearward movement of the carriage, is brought into position with its tack-receiving tube directly under and in line with passage 246, where-through the tack is dropped into the chamber 83 of the tack-holder while the pincers are gripping and drawing the leather over the last. The carriage is then moved forward, carrying holder 20 and the hammer-bar 90 into position for driving the tack. During this forward movement the tack remains lodged in the holder. Said holder has two parts *a a*, Figs. 33 and 34, pivotally arranged. The parts are held together by springs 95 95, and the hammer-bar in descending passes into the tube 83, thereby spreading the parts against the action of the springs 95 95 and releasing the tack at the moment of driving.

The hammer-bar is hinged, so that the bottom may be swung forward and permit the holder 20 to pass under the tube 82. A rod 94 arrests the rearward movement of this lower end of the hammer-bar, thereby causing it to swing forward and allow the tack-channel block to have place over the tack-holder 20. During the forward movement of the carriage the hammer-bar is forced back to its normal condition by spring 97. By thus arranging the hammer-bar and swinging it backward and forward, as described, the work of lifting the hammer-bar high enough to clear the end of the raceway-block is avoided, and thereby the time required to lift the hammer-bar is shortened.

At the head end of driver-bar 90 are plates XS XP, which, being supported pivotally, admit of being introduced beneath the driver-head for stopping the downward movement thereof before the bottom end of the driver reaches the end of the driver-path. All this to the end that tacks may be driven thereby from the holder 20 and have a portion of their length left standing above the surface penetrated thereby. The plate XS has a segmented gear formation in mesh with a similar formation on the plate XP and has its rear end in swivel connection with the slide XB, whereby the plate may be opened from under and closed beneath the driver by suitably moving the slide XB. This, it will be understood, may be done by the operator at will, and in the present machine slide XB has connection with the rod BX to the end that a movement

of the rod for shifting the position of edge-rest 10 horizontally shall operate a movement of the slide XB and consequently open or close the plates XP XS.

The work-presser *h*, as shown, consists of a smoothly-polished steel plate or bar having its end face at right angles nearly to the bottom face thereof, whereby is formed an angle or corner at the work-bearing end thereof for bending the upper materials adjacent to the channel-lip. In the present machine said presser has connection with the tack-holder 20 to be moved thereby and is positioned therebelow with its work-bearing end rearwardly of the end thereof, whereby said holder 20 is adapted for bending the upper material upon the inner sole in advance of the presser. During the forward movement of the holder 20 presser *h* bears upon the upper material and wipes over the edge thereof, drawing and retaining it in position for driving of the tack.

The tack-distributing mechanism comprises a rotatable shaft 212, Fig. 66. In the machine represented, Fig. 3, motion is applied from shaft D through gears 203 204, rod 205, and a gear (not shown) on the end of rod 205 in mesh with gear 206, Fig. 66. Shaft 212 carries a cam 214. (Shown detached in Fig. 67.) The pawl 215 embraces at one end the cam 214 and rests forwardly on the ratchet-wheel 217. The pawl is pressed forwardly by cam 214 against the tension of a spring 216, whereby the pawl is moved quickly backward when the cam permits it. The resultant operation is to rotate the shaft 218 intermittently.

On shaft 218 is the disk 219, having one side in touch with and open to the basin 221. Tacks in the disk are lifted by rotation thereof and let fall into the pan 222 to slide therefrom into the raceway below. Tacks which do not enter the raceway pass downwardly into the basin 221 and along the inclined face thereof to the disk and are again lifted as before. The pan 222 is supported to permit adjustment toward and from the raceway by mechanism.

On the raceway is a bridge 223, whereby tacks not properly suspended in the raceway are stopped. In a rock-shaft 224 is set the tripper 225, adapted for movement and having its bottom end, which is preferably grooved, in touch with the raceway. The shaft 224 receives motion from the disk through studs 227, cam-lever 226, and spring-actuated stud 228, whereby the tripper is moved at intervals along the raceway, to thereby adjust and settle tacks into the raceway. The tripper is rested at intervals on the bridge, whereby to give way for passage of tacks thereunder. After passing the bridge tacks gravitate downwardly along the raceway to the separator mechanism at the terminal end thereof. Shaft 218 carries also a disk 220, wherewith is connected a basin, pan, raceway, and tripper connections, all in duplicate of those described as connected with disk 219, and all

this to the end that tacks of one size may be employed in one of said mechanisms, while tacks of another size are employed in the other.

Fig. 72 shows in perspective the end section of the raceway part or frame. It has an annular groove 231 in the end face thereof and has projecting therefrom the annular tongue 241. On said tongue, to permit movement rotatively, is set the block 240. Block 240 and its constructive features are shown fully in Figs. 73, 74, 75, and 76. It has an annular recess 244, which, cooperating with the annular groove 231 of the raceway part, affords a path in which are located to travel the prongs 234 235 of the tack-separating device. Said device is shown in Figs. 77 and 78, and comprises also a spindle 232 and disk 233, where through is an opening or passage, and has cam-faces or beveled formation bordering the edge of said passage. Its disk portion is concaved to fit the end of the raceway part, and it has support by its spindle 232 in the raceway part. It is moved rotatively by motion from shaft 212 through intermediate rod-and-gear connections. (Shown in Fig. 65.) Block 240 is shaped to have its inner wall in sliding touch with the outer wall of the separator-disk. It has a passage 246, at the top end whereof it also has an opening 247 laterally for communication with the raceway-channel.

In operation of the machine block 240 is positioned with its opening 247 in alinement with the raceway from which tacks are to be discharged. To that end said tacks, having gravitated down the raceway, stand with the foremost one in bearing touch with the separator-disk, so that the prong 234, as it comes round, passes behind said tack, Fig. 68. The separator, continuing its rotative movement, operates to carry the tack forwardly through its passage-opening and into the passage 246. The tack is dropped from the end of prong 235 and gravitates downwardly therefrom into the tack-holder 20, located therebelow. Said holder is made to pass from alinement with the passage 246 to the driving-point, with mechanism for driving the tack, as before described. Figs. 80, 81, 82, 83, and 84 show different stages in the operation of separating and discharging the tack and are made on an enlarged scale. Fig. 80 shows the tack with its body in position against the edge of separator-disk. Fig. 81 shows the tack as it is first engaged by the separator-prong. The next stage is shown in Fig. 82. In Fig. 83 the separator has moved to a point where the tack is about to drop from prong 235. Fig. 84 shows the tack discharged in transit through the passage 246 and another tack in position against the separator for engagement by the prong thereof. Supported in the block 240 is a spring-actuated stop 239. It bears normally against the outer face of the separator-disk, and when the separator moves to a point where the opening therethrough allows it this stop moves in-

wardly against the end of the raceway part, Fig. 71. It then operates to stop the body and point end of the passing tack from being carried too far laterally during its transit to the passage 246. The separator, continuing, lifts the stop to its normal position again after the tack has been delivered.

On the block 240 is a plate 238, having a channel corresponding to the channel 247. The lateral walls thereof are projected forwardly of the separator-path and are cut away to form the cam-faces 254, which, as the block 240 is turned rotatively, engage with the head of a tack standing against the separator and cooperate with the raceway-walls in pushing such tacks backwardly out of the separator-path. It will be understood that the block 240 may be turned from alinement with one into alinement with another of the raceway-channels, according to the size of the tack desired for use. In the machine represented herewith the block 240 has connection, by suitable devices, (shown in Fig. 35,) with the shifter-rod BX, to the end that by a movement of said shifter-rod the block 240 is turned for changing the tack-delivery simultaneously with the changing of the tack-driving and shoe-edge-rest mechanisms. The passage 246 has its terminal end in the axis of rotation of the block 240, to remain always in alinement with the receiving-tube of the tack-holder 20.

Pivotaly connected with the raceway part is a swinging lever 250, held in place adjustably by the pin 251. In working position this lever has its end in touch with the end face of block 240 and operates to hold the block against detachment from the raceway part. The body portion of said lever rests in the notch at the side of block 240. Movement of the block in one direction is stopped by the lever contacting with the side 252. Movement of the block in the opposite direction is stopped by the side 253 of the notch engaging with the opposite side of the lever 250, the block being thus stopped in position of alinement with the different raceways. Removal of the pin 251 allows the lever to swing backwardly for detachment of the part 240 from the raceway part.

Pivotaly connected with the raceway part is a lever 260, Fig. 71. In the present instance this lever is shown as in a recess covered by the lever 250. A spring 261 under one end of said lever operates to press the other end thereof in yielding contact with the edge of block 240. Said block 240 is provided with notches 263 264. The relation of these notches to the lever and block 240 is such that the end of said lever is located in one of said notches at the time of the block 240 being in operative relation with the raceway, so that to move the block 240 from operative relation with the raceway the end of lever 260 must be lifted against tension of the spring 261 out of its engaging notch, to which end the said walls of the notches are

beveled to cooperate with the beveled face of the lever for automatically lifting the lever as the block 240 turns. This mechanism, it will be understood, performs the function of a yielding stop for stopping the movement of block 240 in alinement with different raceways, and in case more than two raceways are to be employed this yielding stop would be more desirable than lever 250. Said lever 260 and connections operate, further, to automatically lock the block 240 against movement while a tack is passing through. To this end a pin 266, Fig. 71, is positioned beneath the end of lever 260 in alinement with groove 267, which partly surrounds the shaft 232, the arrangement being such that as the lever 260 lifts from the notches 263 264 pin 266 is thereby projected into groove 267. The full or grooved portion of shaft 232 is presented to the pin during passage of a tack through the block 240, and movement of the block is thereby prevented from taking place at such time.

Over the raceway is a cover 285, Fig. 69, the terminal end whereof is projected to cover the passage 246, and thereby a tack in passage to the point of discharge is prohibited from lifting out of place. This mechanism, in part, is the subject of a pending application for patent, Serial No. 546,155, and is not, therefore, claimed herein, broadly.

The shoe, having been duly prepared for the lasting process, is supported, bottom upwardly, against the rest 12 and laterally against the rest 10. It is then in position for the pincers to grasp the edge of the upper, Fig. 2.

The pincers, with jaws opened, approach the leather by moving backwardly under influence from cam 54, while gradually descending by influence from the cam 280. This brings the pincers into the grasping position with the fixed bottom jaw 14 against the inner face of the shoe-upper, Fig. 43. Thereupon the movable top jaw 16, by passing downwardly, under influence from cam 40, and forwardly, under influence from cam 17, effects the closing together of the jaws for gripping the upper therebetween.

The pincers, under further influence from cam 280, then lift in a nearly vertical line to stretch the leather, Fig. 45, and then move forwardly over the last by influence from spring 53, while gradually descending, under further influence from cam 280, and all the time hold firmly to the leather and finally bring it down upon the inner sole tightly stretched, Fig. 46. The work-presser *h*, moving forward with the tack-carrier and tack-driving appliances, under influence from cam 88, comes then to bear upon the upper, and, advancing, wipes, presses, and finally holds it over the last, whereupon cam 40 ceases to operate and the jaw 16 lifts by influence from spring S. The pincers, having thus released the upper, yield forwardly to spring 53, whereupon the presser and tacker appli-

ance, continuing, advance to place and the tack is driven, by action from spring 93, for securing the section of upper thus lasted to the inner sole, after which the tacking appliances and consequently the work-presser withdraw under further influence from cam 88, and the pincers will begin again the movements of descending backwardly to position for seizing the upper, as before. Such are the movements required of the pincers for lasting sides and other parts of shoes, but for lasting toes and other parts thereof occasionally it is desirable for the pincers to turn and move laterally. To this end the workman, desiring it, may shift the arm 68 from its central or normal position of rest to one side thereof, and thereafter the pincers, while moving to seize the leather, will turn and swing laterally to one side of the line of vertical movement thereof, under influence from the driver 57, Fig. 6, and will approach the upper with their gripping-plane angular to the last and conforming approximately with the plane of the section of upper standing ready for the gripping operation, Fig. 47.

After gripping the upper the pincers return, gradually turning and swinging, to the opposite side of their said line of vertical action. All this while the lifting and downwardly-forward or overlaying movements of the presser are taking place, and thereby a resultant forceful movement, is caused, which stretches the grasped section of upper, Fig. 48, turns it into alinement with the last, Fig. 49, and places it over the inner sole with the surplus plaited or fulled to one side, Fig. 50, where it receives the work-presser and tack-driving appliances, advancing as before, Fig. 51. For like movement of the pincers in the opposite directions the workman has only to shift the arm 68 in like manner to a position of rest on the other side of its said normal or central position, and thereupon like movements follow, as in Figs. 52, 53, 54, 55, and 56, for lasting the upper at the other side of the toe and places requiring such movements.

A single pair of pincers are employed, which in the lasting operation as a whole are applied to the different parts of the upper at different times while the shoe is moved and shifted about by the workman as required.

In the work of lasting welted or "Goodyear" shoes, so called, and especially as it is performed in lasting certain grades and kinds of such work, will now be described the operative movements of other members and features of this invention. In welted shoes the lasted upper material from the heel portion of the shoe forward lies over the inner sole in an irregular or broken line conformably with the irregular surface-line of the inner sole, as seen in cross-section, Fig. 57. From the marginal edge of the inner sole to the channel-lip it lies in one plane. At the lip it turns sharply upward in a nearly vertical line to the top thereof, and therefrom it lies over the lip in a plane somewhat above the

first-named plane and is secured there by a temporary fastening device, as shown, by a half-driven tack.

The presser while advancing over the shoe has its bottom face in bearing touch therewith to smooth and hold the upper down upon the inner sole. Its vertical end, advancing, bends and presses firmly against the portion of upper turned upwardly thereby against the welt of the inner sole, while the projecting end of the tack-carrying holder 20 rides over the welt and places the marginal edge of the upper in position thereabove for receiving the fastening-tacks, Fig. 58.

To relieve the workman and prevent exhaustion consequent from holding the shoe with sufficient force against the advancing presser, as also for securing the limit of such holding pressure which is required in places and while lasting certain kinds of material, the shoe is supported mechanically by the clamping members X^{88} X^{89} of the jack mechanism. The clamping is done by lifting the cam-lever X^{94} , suitably placing the shoe between the clamp members, and then depressing the lever. Supported there it permits movement universally forward, backward, laterally, and rotatively. It has the proper altitude for and may be positioned by the workman against the rest 10, in like manner as when held in hand. These supporting connections, and consequently the shoe, are locked automatically and are held against movement by the locking mechanisms described during a part of each revolution of the shaft D, which takes place in order to advance the presser and drive the tack, and are thereafter automatically released, when they may be shifted and the shoe thereby presented for the next succeeding operation of the machine.

Manipulations of the upper are performed at the toe and at other parts of the shoe occasionally by the presser members X^{35} X^{36} . Said members stand normally out of use, being then at rest in the most rearward of positions allowed thereto. They are positioned for work and started into operative use by movement of the lever X^{33} , which is performed by the workman at will, and in the arrangement shown it is done by movement of the arm 68 for starting, shifting, and stopping the lateral and turning movement of the pincers. A movement of the arm 68 in one direction advances their supporting-bars, and consequently the pressers X^{35} X^{36} , one to position for engagement with the driver X^{27} , Fig. 18, and the other to a position for work-rest, Figs. 17, 18, and 59.

The shoe, though it may be supported by hand, is at times supported by the clamps X^{88} X^{89} and jack connections. The shoe, supported thus, is positioned by the workman to the resting member of the pressers X^{35} X^{36} and is arranged thereto with the end face of said presser set firmly against the leather up-

turned before the channel-lip, its bottom face bearing downwardly on the material beneath it, Fig. 59. The machine moves then to the point where locking of the yoke X^{50} takes place, and further moving it operates a turn of the gear X^6 , which draws backwardly the bar X^{58} an amount suitable for causing the work-presser to set farther and completely into the angle of the inner sole and channel-lip thereof, whereby to bend and hold the upper firmly pressed against the channel-lip, Fig. 60. The machine, still moving, operates to hold the bar X^{58} , while the operative presser member is advanced for smoothing and placing the adjacent section of the upper, Figs. 61 and 62. The tack is inserted, the operative presser withdraws, and the locking connections automatically suspend their holding operations, whereupon the jack is freed and the shoe may be shifted about and again presented to the machine by the workman at will.

It will be observed the edge-rest 10 comprises an upper and lower member having each a work-bearing end face adapted for use separately. The upper member is intended for use in places along the shank and fore part of the shoe, where a short bearing-surface is required. The lower member is designed for use at the heel of the shoe, where a long bearing-surface is required. Said lower member has its work-bearing face projected to overlap the end of the upper member and thereby gives one continuous bearing-face terminating close up to the plane of the work-presser. It permits being swung downwardly, whereby is exposed the end of the top member when the same is required for use.

The tack-holder 20, it will be understood, in the backward movement is set beneath the raceway-block 240 in position for the tack discharged through passage 246 to be deposited therein.

In passing from the fore part to the heel of the shoe the workman turns the rod BX, whereby is effected simultaneously the movement of edge-rest 10 horizontally, also the movement of block 240 rotatively and the movement of plates XP XS in relation to the driver-bar; all this for purposes before described.

We claim—

1. A lasting-machine having pincers for holding the upper, and means for pulling the upper held thereby, combined with means for moving the pincers forwardly over the last and laterally and turning the pincers, the pincers holding the upper continuously during said movements, substantially as described.

2. A lasting-machine, having pincers for holding the upper and means for pulling the upper held thereby, combined with means for moving the pincers forwardly over the last and laterally and turning the pincers all at

one time, the pincers holding the upper continuously during said movements, substantially as described.

3. A lasting-machine, having pincers for holding the upper and means for pulling the upper held thereby, combined with means for moving the pincers forwardly over the last and laterally and turning the pincers, the pincers holding the upper continuously during said movements, said forward and lateral movements being imparted to the pincers through the medium of springs or similarly-yielding connections, whereby the pincers conform to shifting strains of the upper material, substantially as described.

4. A lasting-machine, having pincers adapted for holding the upper, and means for pulling the section of upper held thereby, combined with means for moving the pincers laterally, and turning the pincers, and means whereby the pincers' lateral and turning movements may be suspended during continued operations of the machine, substantially as described.

5. A lasting-machine, having pincers adapted for holding the upper, and means for pulling the section of upper held thereby, combined with means for moving the pincers laterally, and turning the pincers, and means under control of the operator for starting and suspending the turning and lateral movements of the pincers at will, substantially as described.

6. A lasting-machine, having pincers adapted for holding the upper, and means for pulling the section of upper held thereby, combined with mechanism for turning and moving the pincers laterally, and a part adapted for movement to vary the amount of turning and lateral movement of the pincers, substantially as described.

7. A lasting-machine, having pincers adapted for holding the upper, and means for pulling the section of upper held thereby, combined with mechanism for turning and moving the pincers laterally, and a part adapted for movement to start and stop and vary the pincers' turning and lateral movements, and a shifting connection to be operated by the workman, for moving said movable parts, substantially as described.

8. A lasting-machine, having pincers adapted for holding the upper, and means for pulling the section of upper held thereby, combined with mechanism for turning and moving the pincers laterally, said mechanism including an actuator which runs continuously during operation of the machine, and a part adapted for movement to start and stop the lateral and turning movements of the pincers independently thereof, substantially as described.

9. A lasting-machine, having pincers for gripping the upper, means for pulling the upper held thereby, and means for turning and moving the pincers laterally in opposite directions, combined with shifter connec-

tions for causing the pincers' turning and lateral movement to take place in one or other of said directions as desired during the lasting process, substantially as described.

10. The pincers, of a lasting-machine, supported by a ball at the top end thereof and permitting movement forward, backward and laterally over the last, and mechanism connected with said ball for turning the pincers, substantially as described.

11. In a lasting-machine adapted to work on different portions of the upper successively in repeated operations of the machine, a plurality of work-pressers arranged in different vertical planes relatively to the last-bottom, combined with actuating mechanism for repeatedly moving a work-presser during a number of repeated operations of the machine, substantially as described.

12. In a lasting-machine adapted to work on different portions of the upper successively in repeated operations of the machine, a plurality of work-pressers, combined with actuating mechanism for repeatedly moving a work-presser during a number of repeated operations of the machine, and means under control of the operator for starting and suspending the said operative movement of the work-presser at will, substantially as described.

13. A lasting-machine having in combination, a plurality of work-pressers, a shaft from which motion is imparted to the pressers through a movable driver, and connections for moving the driver in order to start or suspend the movement of a presser substantially as described.

14. A lasting-machine, having in combination, a movable work-presser, actuating connections for moving the work-presser to press the shoe-upper, arranged to repeat the movements of the work-presser automatically during continued operations of the machine, and means to suspend the operations of the work-presser independently of the continued operations of the machine, substantially as described.

15. A lasting-machine, having in combination, a movable work-presser, actuating connections for moving the work-presser against the shoe-upper, arranged for repeating the movements of the presser automatically during continued operations of the machine, and means controllable by the workman to start or suspend the operations of the work-presser independently of the continued operations of the machine, substantially as described.

16. A machine of the character indicated, having a plurality of separately-movable work-pressers, and supporting connections permitting movement to place a presser in position desired for bearing upon the overturned upper, combined with means whereby the presser may be placed in or removed from said position when required during the lasting process, substantially as described.

17. A lasting-machine, of the character in-

licated, having a plurality of separately-movable work-pressers, and supporting connections permitting movement for placing the pressers in position to bear upon the overturned upper, combined with means under control of the operator wherethrough the pressers are separately placeable in said position and removable therefrom at will, substantially as described.

18. A lasting-machine, having a plurality of separately-movable work-pressers, supporting connections permitting movement to place the pressers in position for bearing upon the overturned upper, mechanism wherethrough the pressers are placeable in and removable from said bearing position, an actuating mechanism wherethrough the pressers are moved in working the upper over the last, combined with means wherethrough operation of the mechanism to place one of the pressers in the bearing position puts in operation the mechanism to actuate another of the pressers movably over the upper, substantially as described.

19. A lasting-machine, having a plurality of separately-movable work-pressers, supporting connections permitting movement to place the pressers in position for bearing upon the overturned upper, mechanism wherethrough the pressers are placeable in and removable from said bearing position, according to the will of the workman, an actuating mechanism wherethrough the pressers are moved in working the upper over the last, combined with means wherethrough operation of the mechanism to place one of the pressers in the bearing position puts in operation the mechanism to actuate another of the pressers movably over the upper, substantially as described.

20. A lasting-machine, having upper-stretching devices adapted for stretching a part or section of the upper at one operation, actuating mechanism to operate said devices in stretching the upper over the last and repeating the operations thereof at intervals, for stretching the different parts of the upper at different times, a movable work-presser and means for moving the same over the upper and repeating the movements thereof at intervals conformably with the operations of the upper-stretching devices and means to suspend operations of the presser independently during repeated operations of the stretching devices, substantially as described.

21. A lasting-machine, having upper-stretching devices adapted for stretching a part or section of the upper at one operation, actuating mechanism to operate said devices in stretching the upper over the last and repeating the operations thereof at intervals for stretching the different parts of the upper at different times, combined with a movable work-presser and means for moving the presser over the upper, having provision to repeat the operations of the presser conform-

ably with the repeated operations of the stretching devices, means to suspend operations of the presser during repeated operations of the stretching devices, and means controllable by the workman for starting and suspending the operations of the presser at will, substantially as described.

22. A lasting-machine, having upper-stretching devices adapted for stretching a part or section only of the upper at one operation, mechanism for moving the upper-stretching devices in stretching the upper over the last, including provision to repeat the operations thereof at intervals for stretching the different parts of the upper at different times and also to differently move said devices, at times, for working the upper laterally, a movable presser and actuating connections for moving the presser over the upper and connections wherethrough the operations of the presser are automatically limited to taking place in conjunction with the said movements of the upper-stretching devices for working the upper laterally, substantially as described.

23. A lasting-machine, having upper-working devices and actuating connections for moving said devices in working the upper over the last and differently moving said devices at times in order to plait or crimp the upper laterally, a work-presser adapted for movement and actuating mechanism to move the presser over the upper, and connections wherethrough the operations of the presser are automatically limited to taking place in conjunction with the movements of the upper-stretching devices for plaiting or crimping the upper laterally and means controllable by the workman to start or suspend the plaiting and crimping operations of the upper-stretching devices at will, substantially as described.

24. A lasting-machine, having upper-stretching devices and actuating mechanisms for moving said devices in straining the upper over the last and differently moving said devices at times for working the upper laterally, a work-presser adapted for movement over the upper along the line of strain thereon by the upper-stretching devices, actuating mechanism for moving the presser and connections wherethrough the operations of the presser are automatically limited to taking place in conjunction with the movements of the upper-stretching devices for working the upper laterally, and means controllable by the workman to suspend operations of the presser during one or more repeated operations of the upper-stretching devices for working the upper laterally, substantially as described.

25. A lasting-machine, having pincers adapted for holding the upper, means for pulling the section of upper held thereby, a presser and means to support it against the overturned upper, adjacent to the line of the pincers' pull thereon, a second presser and means

to actuate it movably over the upper along the said line of pincers' pull, substantially as described.

26. A lasting-machine, having pincers adapted for holding the upper, means for pulling the section of upper held thereby, a presser and holding connections to support it against the overturned upper, adjacent to the line of the pincers' pull thereon, a second presser and means to actuate it movably over the upper along the said line of pincers' pull, and means to turn and move the pincers laterally, substantially as described.

27. A lasting-machine, having upper-working devices and actuating mechanisms therefor adapted for holding the upper and stretching the section of upper held thereby, a presser and means to support it against the overturned upper and means to change the relative positions of said devices and presser laterally, and a second presser and means to actuate it movably over the upper, and all cooperative, whereby the upper is strained over the last and plaited or fulled, substantially as described.

28. A lasting-machine, having upper-stretching devices and actuating mechanisms for moving said devices in working the upper over the last and differently moving said devices at times in working the upper laterally, combined with a plurality of separately-movable work-pressers, and means to actuate the pressers movably over the upper and connections wherethrough an operative movement by one of the pressers is made to take place in conjunction with the operation of said stretching devices for working the upper laterally in one direction, and an operative movement by another of said pressers is made to take place in conjunction with a movement of the stretching devices for working the upper laterally in the other direction, substantially as described.

29. In a lasting-machine adapted to work by repeating the operations of the machine on different parts of the upper at different times, a work-presser adapted for pressing upon the overturned upper and mechanism for holding the shoe mechanically pressed against said presser, combined with a second presser and means to actuate the second presser over the upper, repeatedly during repeated operations of the machine, substantially as described.

30. In a lasting-machine adapted to work by repeating the operations of the machine on different parts of the upper at different times, a work-presser adapted for pressing upon the overturned upper, a jack for holding the shoe, means to change the relative position of the jack and presser whereby the presser is mechanically pressed against the upper, a second presser and means to actuate the second presser over the upper repeatedly during repeated operations of the machine, substantially as described.

31. A lasting-machine, having upper-work-

ing devices adapted for holding the upper and means for pulling the section of upper held thereby, a presser adapted for support against the upper adjacent to the line of pull thereon, a jack for holding the shoe, means to change the relative position of the jack and presser whereby the presser is mechanically pressed against the upper, a second presser adapted for movement over the upper along the said line of pull thereon and means to support and move the pressers respectively, substantially as described.

32. A lasting-machine, having upper-working devices adapted for holding the upper and means for pulling the section of upper held thereby, a presser and means to support it against the upper adjacent to the line of pull thereon, a jack for holding the shoe and permitting movement by the workman, a locking mechanism engageable with the jack for holding it locked at times against movement by the workman, a second presser adapted for movement and means to actuate it movably over the upper, substantially as described.

33. In a lasting-machine, the combination of mechanism adapted for feeding and separately delivering different sized tacks and permitting movement whereby it is shifted from delivering one sized tacks to delivering another sized tacks, a tack-driving mechanism adapted for driving the tacker to different planes whereby the driven tacks are left with their head ends at different altitudes relatively to the plane or surface penetrated by the body parts thereof, said mechanism permitting movement to change its operation from driving the tacks to one of said planes or altitudes to the operation for driving tacks to another of said planes or altitudes, mechanism including a rest against which the shoe is positioned for receiving the tack, adapted for resting the shoe in different positions laterally with relation to the point of driving the tack, whereby the driven tacks are located at different distances from the edge of the shoe-sole and permitting movement to change the rest from a point for supporting the shoe in one of said positions to the point for supporting it in another of said positions and means wherethrough a movement of the parts effecting the change in one of said mechanisms is made to cause the movement of parts whereby the change is effected in the other of said mechanisms respectively, substantially as described.

34. The combination in a lasting-machine, of mechanism adapted for feeding and separately delivering different sized tacks, and permitting movement whereby it is shifted from delivering one sized tacks to delivering another sized tacks, driving mechanism adapted for driving the tacker to different planes whereby the driven tacks are left with their head ends at different altitudes relatively to the plane or surface penetrated by the body parts thereof, said mechanism per-

mitting movement to change its operation from driving the tacks to one of said planes or altitudes to the operation for driving tacks to another of said planes or altitudes, mechanism including a rest against which the shoe is positioned for receiving the tack, adapted for resting the shoe in different positions laterally with relation to the point of driving the tack, whereby the driven tacks are located at different distances from the edge of the shoe-sole and permitting movement to change the rest from a point for supporting the shoe in one of said positions to the point for supporting it in another of said positions, and means wherethrough a movement of the parts effecting the change in one of said mechanisms is made to cause the movement of parts whereby the change is effected in the other of said mechanisms respectively, and means controllable by the workman at will whereby to effect the said change of parts as desired in the lasting operation, substantially as described.

35. A lasting-machine, having upper-stretching devices, and actuating mechanism for moving said devices in working the upper over the last, and differently moving said devices, in working the upper laterally, at times, combined with a pair of movable work-pressers, means to actuate the pressers movably over the upper, including provision to cause operative movement by one of the pressers, in conjunction with the movement by said stretching device to work the upper laterally in one direction, and cause operative movement by the other presser, in conjunction with the movement of said stretching devices to work the upper laterally in the other direction, and means wherethrough a presser is located in a position adapted for bearing against the upper conjunctively with the operative movement by a presser over the upper, substantially as described.

36. A lasting-machine of the character indicated, having devices for holding the upper, and devices for stretching the upper held thereby, combined with means for turning and shifting the positions of said devices relatively to the last, whereby the upper is twisted with relation to the edge of the last and carried forwardly and laterally over the same, and strained continuously during said operations, substantially as described.

37. A machine of the character indicated, having a work-presser for pressing the upper over the inner sole, a part provided with a work-bearing face arranged below the plane of said presser for bearing against the side or edge part of the shoe, and a second part provided with a longer bearing-face, adapted for overlapping the bearing-face of said first part, means to support said second part in position with its bearing-face extended over the bearing-face of said first part to the plane of the work-presser, and means permitting movement of said second part whereby to expose

said first part for use separately, substantially as described.

38. The combination of the tack-raceway, the tack-separator, and the spring-actuated stop 239 supported to bear inwardly on the separator, substantially as described.

39. In a lasting-machine of the character indicated, mechanism adapted for feeding and delivering different sized tacks, mechanism for driving the tacks to different planes or altitudes relatively to the surface penetrated by the body parts thereof, and mechanism for resting the shoe in position to receive the tacks, combined with means for changing the relative positions of the resting and delivering mechanisms, and means for relatively shifting the delivering and driving mechanisms, the combination operating to locate different sized tacks at different distances from the edge of the shoe-sole and drive these to different altitudes, substantially as described.

40. In combination bars, X^{15} , X^{16} , adapted for endwise movement, the pressers, X^{35} , X^{36} , supported by the bars, the slide, X^{23} , having connection with the bars for endwise movement thereof in one direction, and spring devices for moving the bars in the opposite direction, substantially as described.

41. A machine of the character indicated, having a plurality of work-pressers supported for movement from a position for bearing upon the upper to a retracted position away from the upper, and means for repeatedly moving a presser, combined with a part to be operated for movement of a presser to a retracted position and automatically suspending the operations of a moving presser, substantially as described.

42. A lasting-machine adapted for working upon different parts of the upper successively in repeated operations of the machine, having a work-presser adapted for bearing upon the upper, and a second presser combined with means for repeatedly moving said second presser over the upper at one side of the first-named presser during a number of repeated operations of the machine, substantially as described.

43. A lasting-machine of the character indicated, having a plurality of work-pressers, supported for movement from a position against the upper material to a retracted position away from the upper material, during a number of repeated operations of the machine, combined with means to advance and withdraw the pressers collectively as desired, substantially as described.

44. In a lasting-machine, the combination of mechanism adapted for feeding and separately delivering different sized tacks and permitting movement whereby it is shifted from delivering one sized tacks to delivering another sized tacks, a tack-driving mechanism adapted for driving the tacks to different planes whereby the driven tacks are left with

their head ends at different altitudes relatively to the plane or surface penetrated by the body parts thereof, said mechanism permitting movement to change its operation
 5 from driving the tacks to one of said planes or altitudes to the operation for driving tacks to another of said planes or altitudes, and a connection between the feeding and delivering mechanism and the driving mechanism
 10 by means of which the shifting of one effects a corresponding shifting of the other, substantially as described.

45. A lasting-machine of the character indicated, having a work-presser supported for
 15 movement from a position against the upper material to a retracted position away from the upper material, combined with means for shifting the presser from one to the other of said positions, and means to actuate the
 20 presser movably over the upper, substantially as described.

46. A lasting-machine of the character indicated, having upper-lasting appliances for lasting the upper over the last, combined with
 25 an auxiliary presser mechanism arranged for use in fulling or crimping the upper, substantially as described.

47. A lasting-machine of the character indicated, having upper-lasting appliances for
 30 lasting the upper over the last, combined with an auxiliary presser mechanism for use in fulling or crimping the upper, and means for putting the said auxiliary mechanism into and out of operation, as desired, during the
 35 lasting process, substantially as described.

48. A lasting-machine of the character indicated, having upper-lasting appliances for lasting the upper over the last, and a work-presser mechanism comprising a plurality of
 40 presser members, combined with means for moving a presser in coöperative relation with another presser, the combination operating for crimping or fulling the upper, substantially as described.

45 49. A lasting-machine of the character indicated, having pincers for gripping the upper, and means for pulling the upper held thereby, combined with means for turning and moving the pincers laterally in oppo-

site directions, the combination operating to
 50 turn and move the pincers laterally in one direction while holding a section or part of the upper, and turn and move the pincers laterally in the opposite direction while holding another section or part of the upper, different parts of the upper being moved and
 55 turned in different directions during the lasting process, substantially as described.

50. A lasting-machine of the character indicated, having pincers for gripping the upper, combined with means for pulling the upper held thereby, and means for moving the pincers over the last and turning the pincers to grip the upper at an angle to the central cross-sectional plane of the machine, substantially as described. 60

51. A lasting-machine of the character indicated, having pincers for gripping the upper and means for pulling the section of upper held thereby, combined with mechanism
 70 for changing the relative positions of the pincers and last, the combination operating to arrange the pincers for gripping the upper, with the gripping-plane of the pincers' jaws angular to the central cross-sectional plane
 75 of the machine, and thereafter gripping and turning the gripped upper over the last, substantially as described.

52. A lasting-machine of the character indicated, having pincers for gripping the upper and means for pulling the section of upper held thereby, combined with mechanism
 80 for changing the relative positions of the pincers and last, the combination operating to arrange the pincers for gripping the upper at one side of the central longitudinal plane of the machine, with the gripping-plane of the pincers' jaws angular to the central cross-sectional plane of the machine, and thereafter
 85 gripping and turning the gripped upper over the last, substantially as described. 90

Signed at Lynn, Massachusetts, this 23d day of June, A. D. 1896.

SHERMAN W. LADD.

RONALD F. McFEELY.

Witnesses:

C. B. TUTTLE,

A. M. TUTTLE.