No. 815,518. PATENTED MAR. 20, 1906

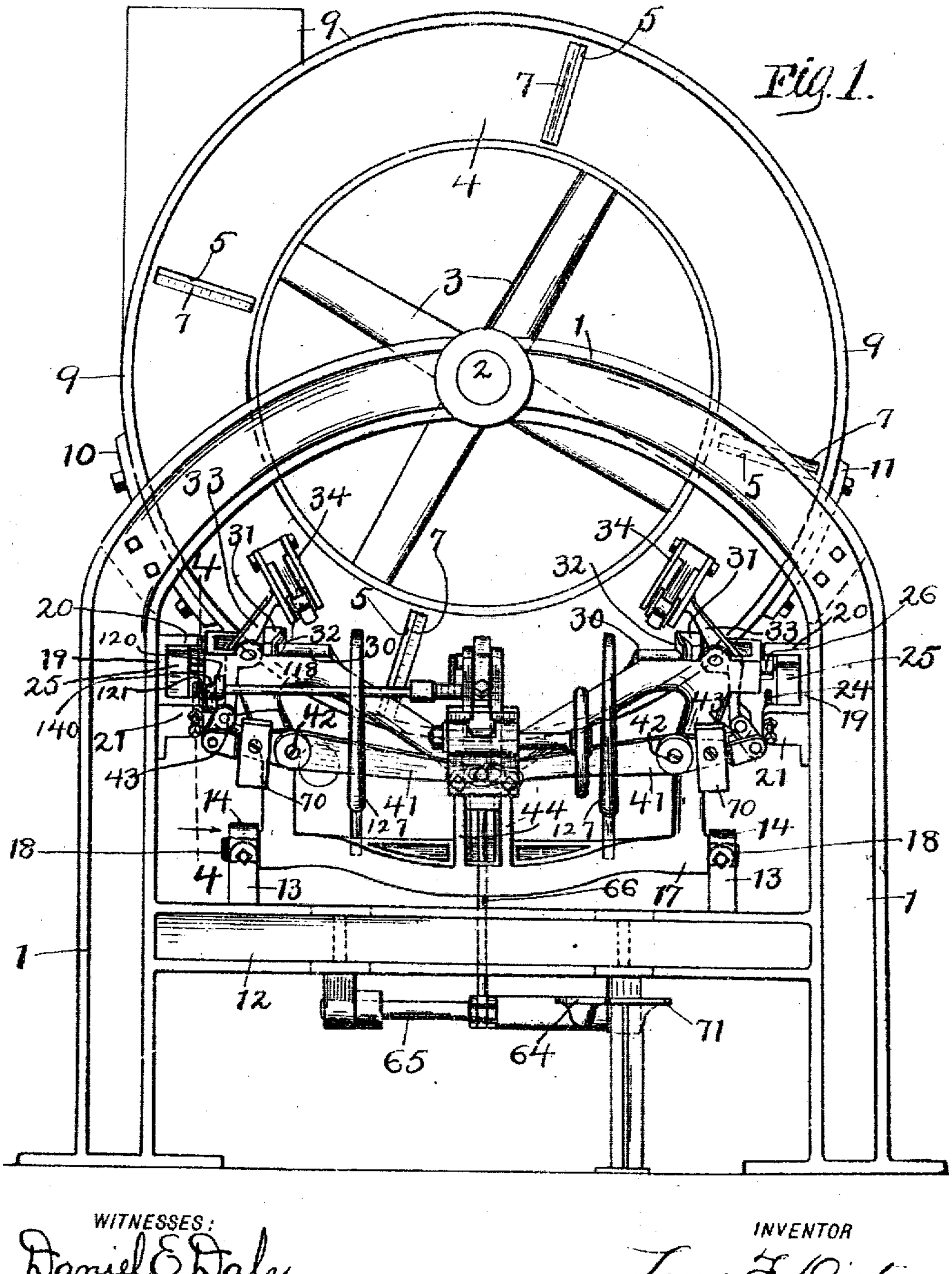
L. F. DIETER.

STAVE JOINTER.

APPLICATION FILED MAY 1, 1903.

9 SHEETS—SHEET 1.

Fig. 1.



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Louis F. Dieter

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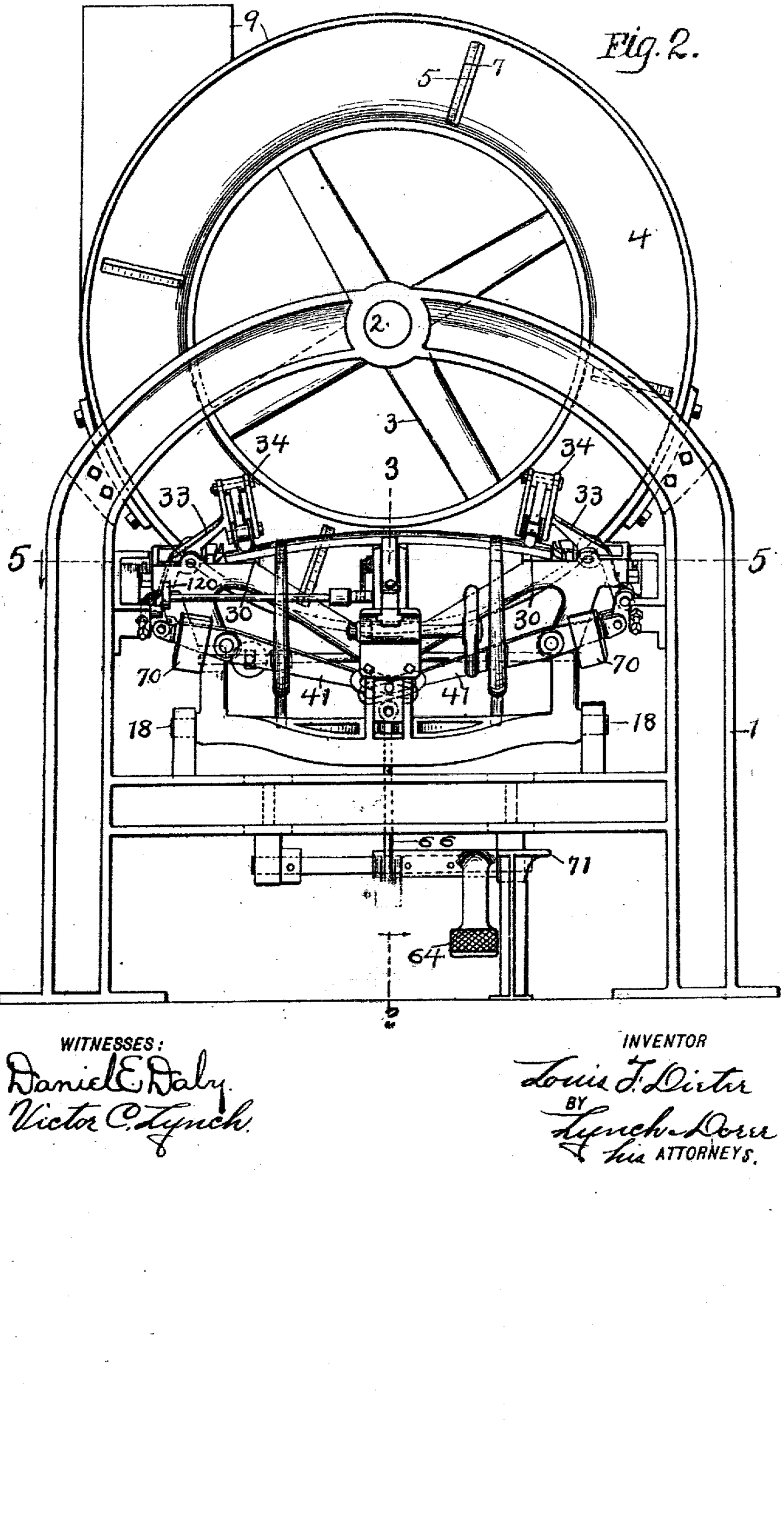
9 SHEETS—SHEET 2.

Fig. 2.



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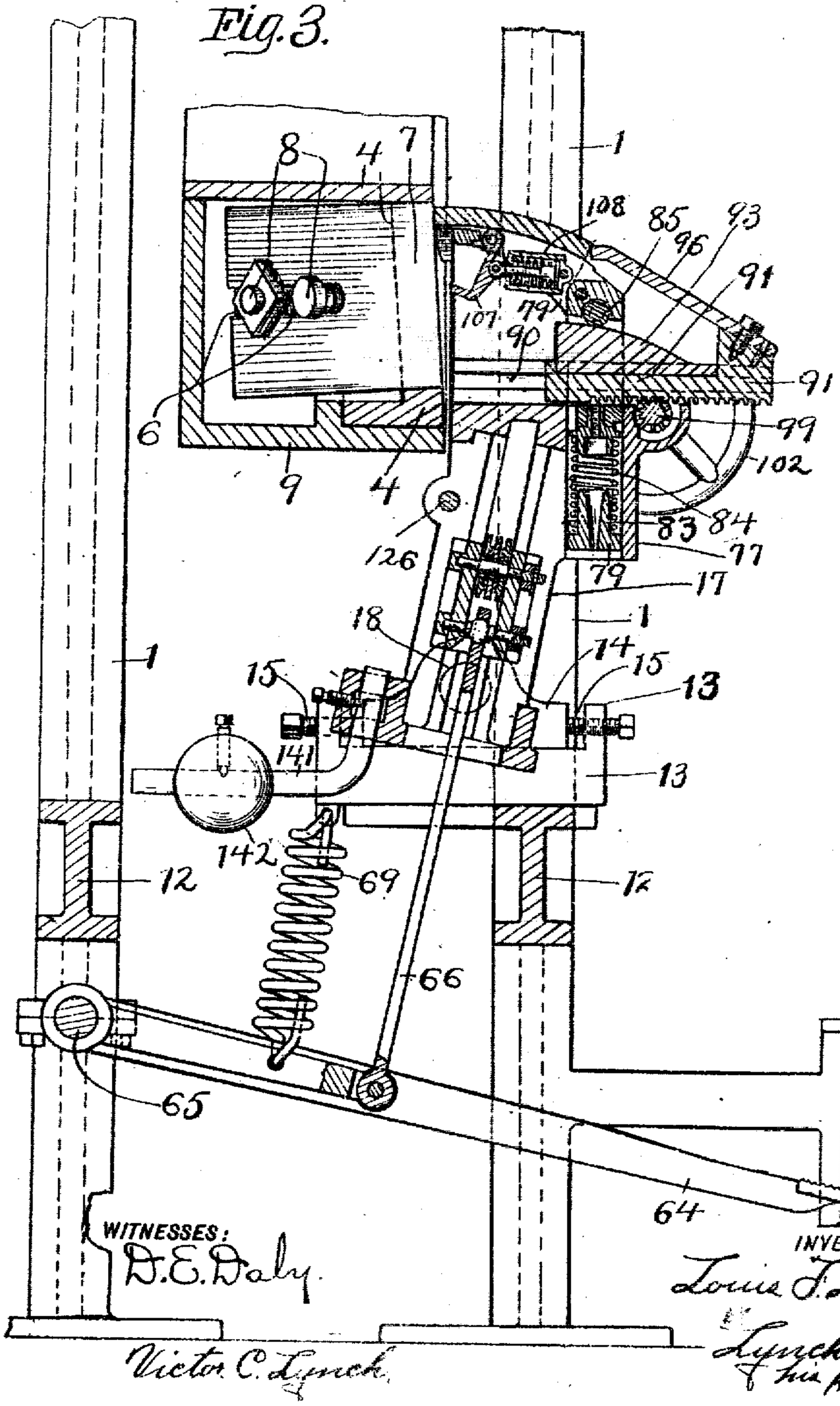
9 SHEETS—SHEET 3

Fig. 3.



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9 SHEETS—SHEET 4.

Fig. 4.

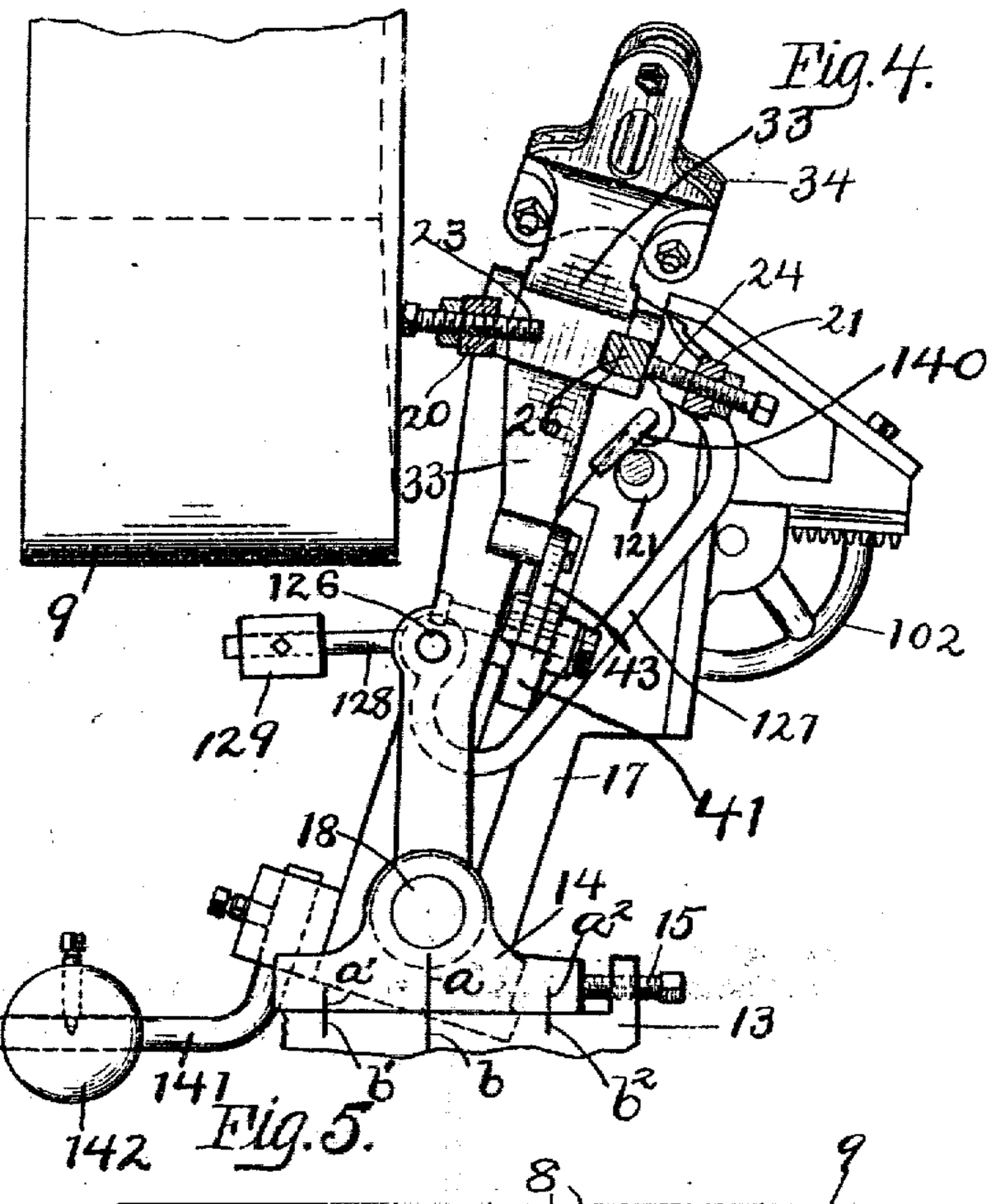
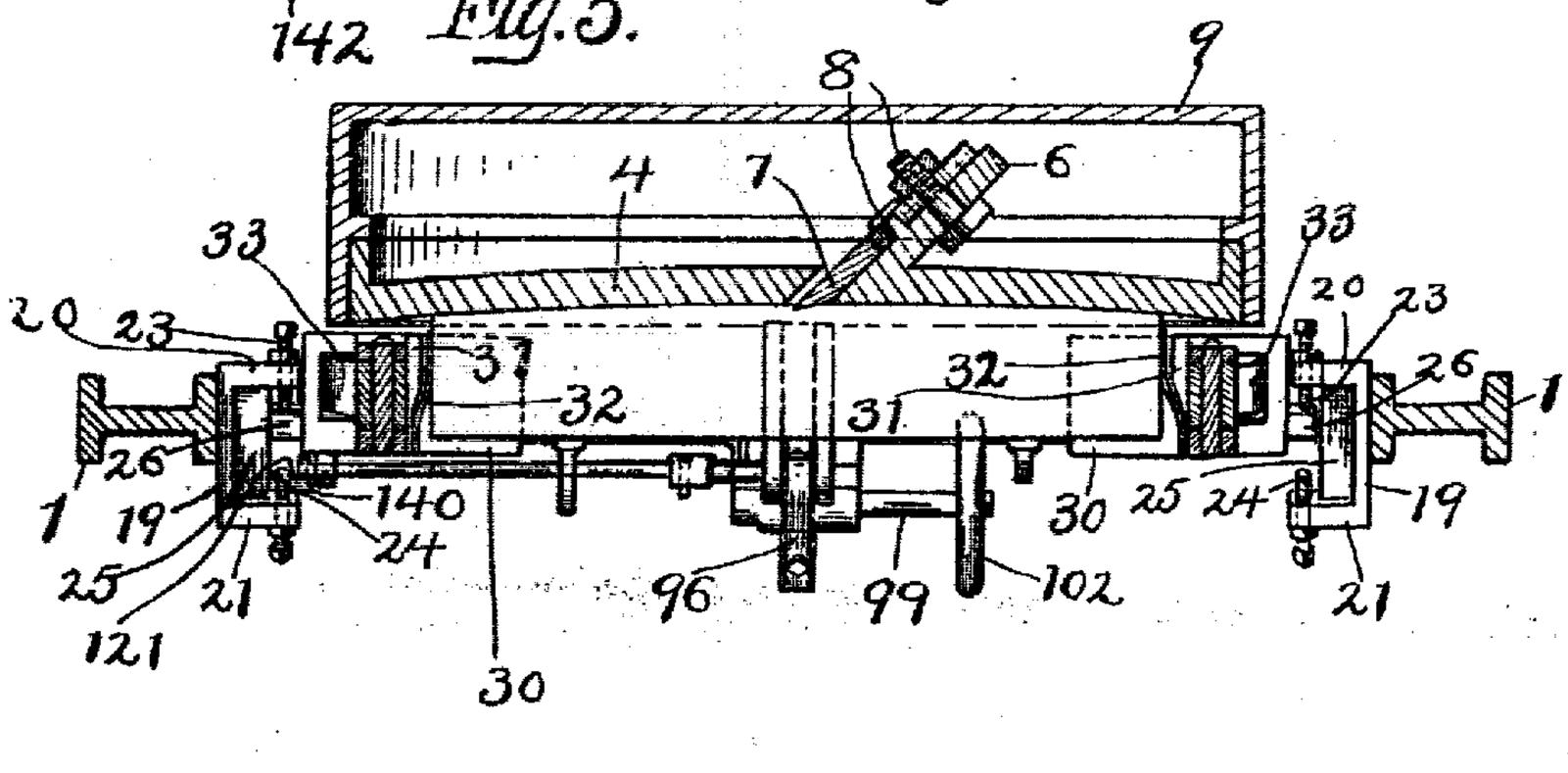


Fig. 5.



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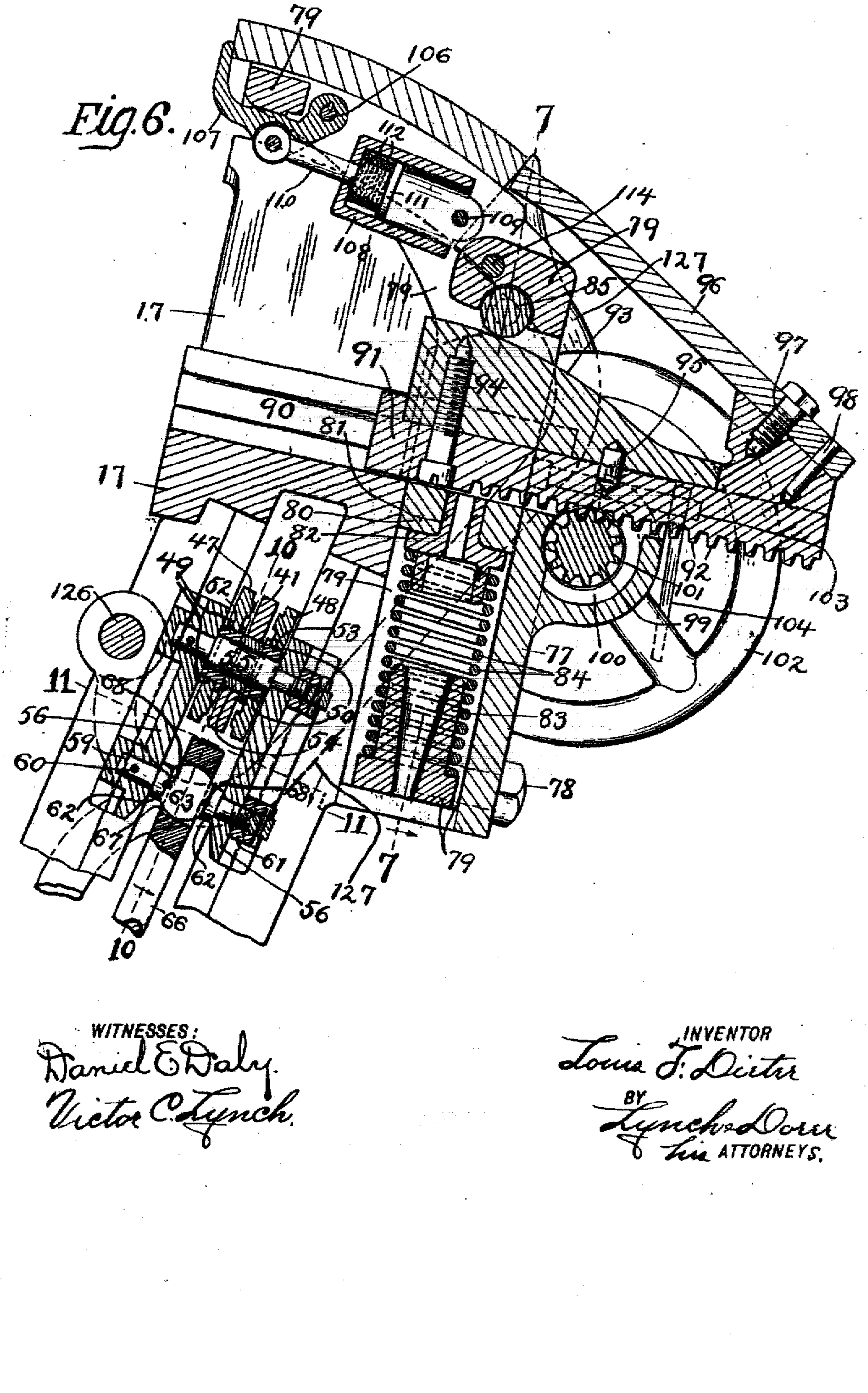
9 SHEETS—SHEET 5.

Fig. 6.



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9 SHEETS—SHEET 6

Fig. 7.

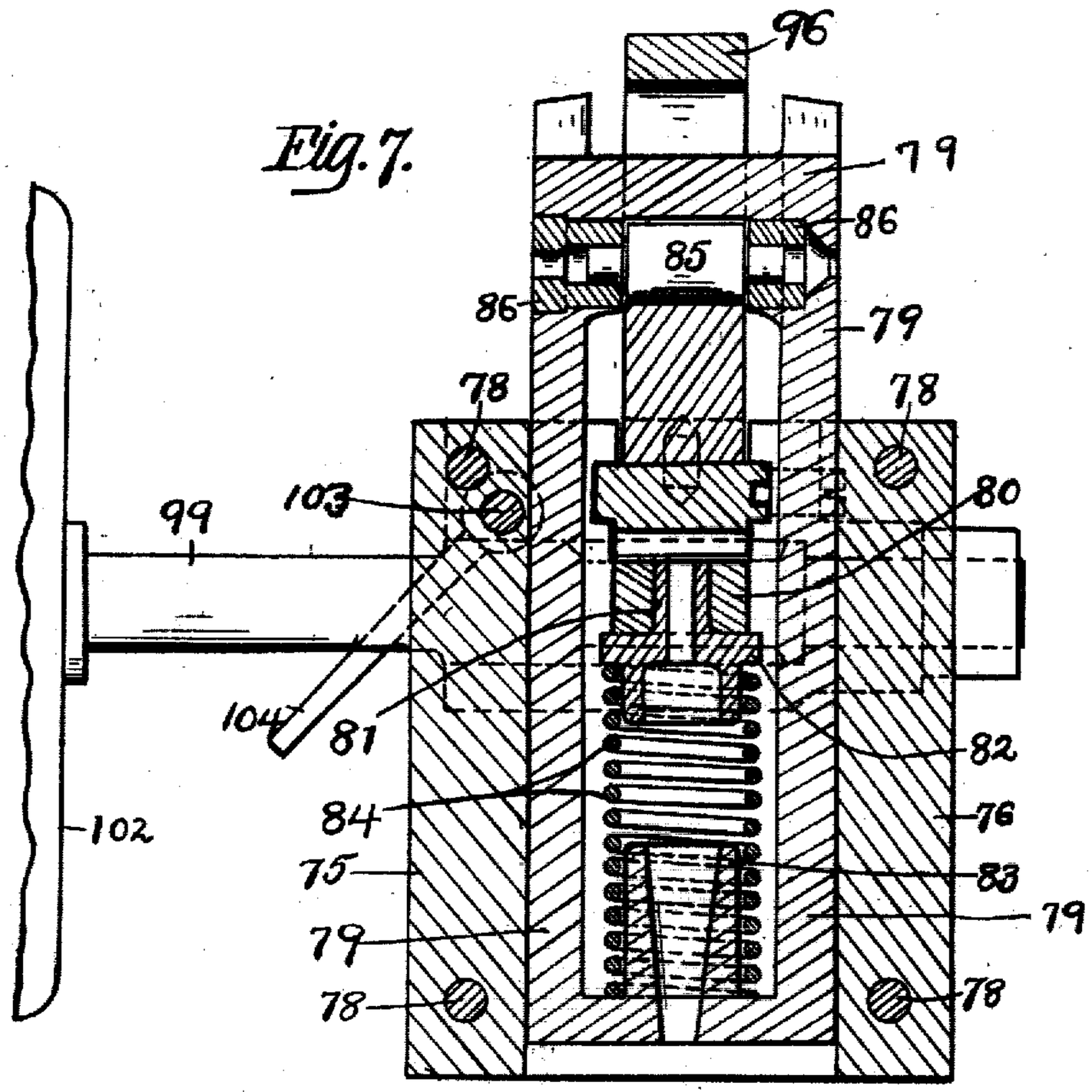
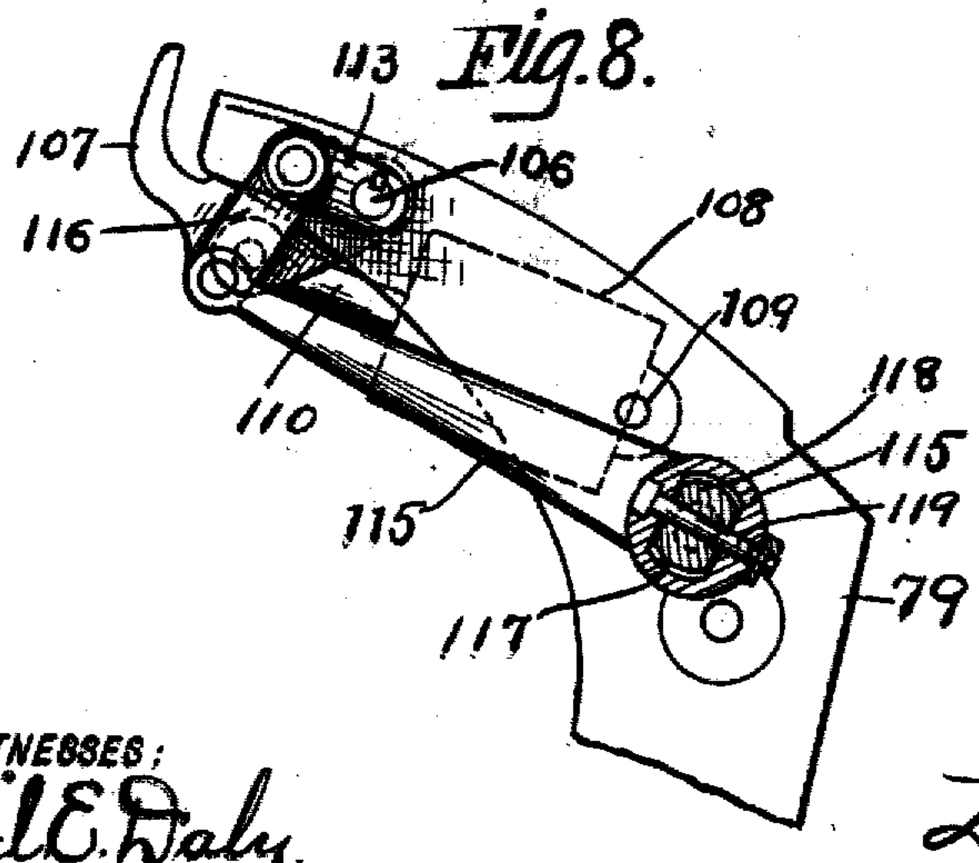


Fig. 8.



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9 SHEETS—SHEET 7

Fig. 9.

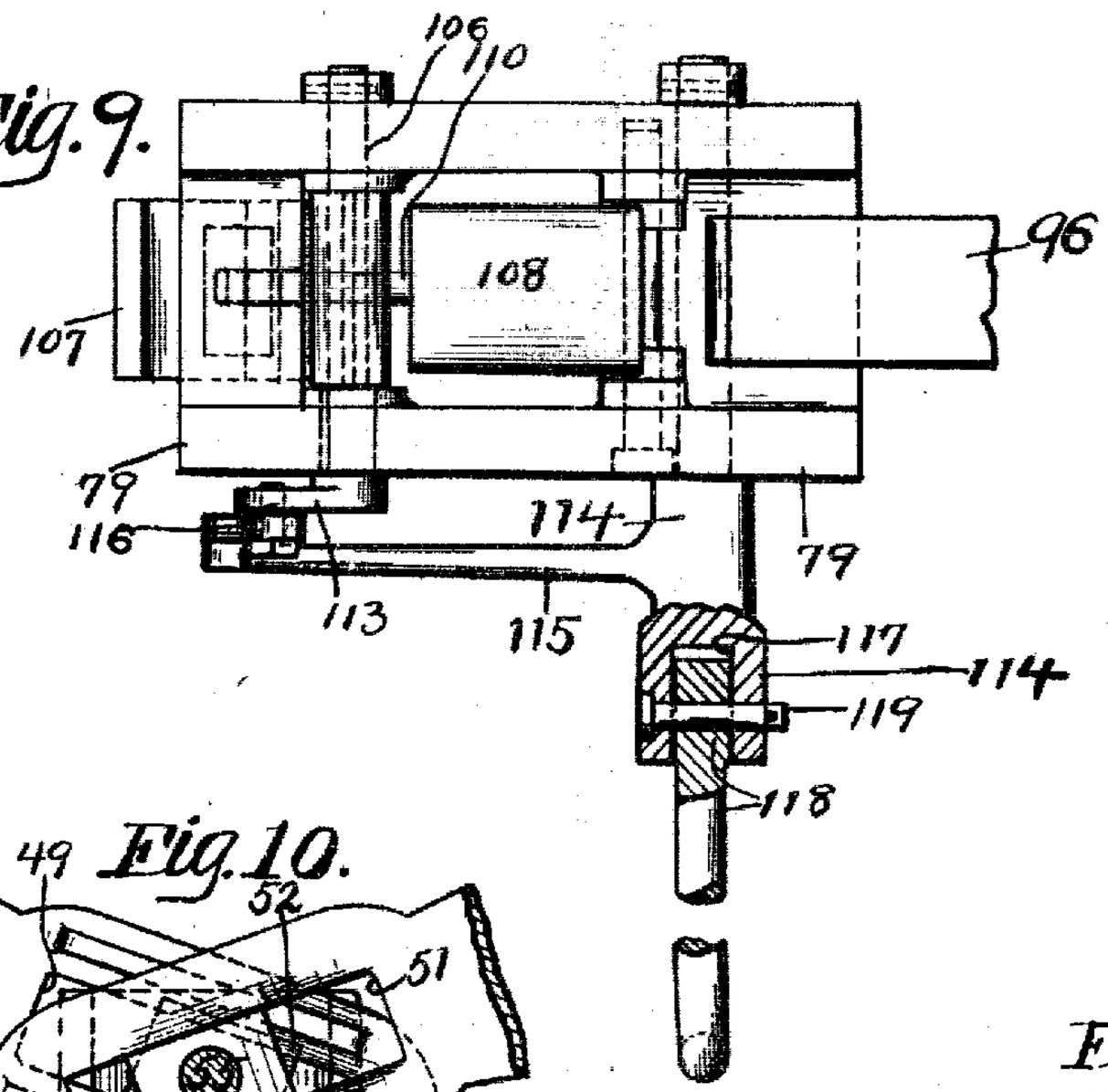


Fig. 10.

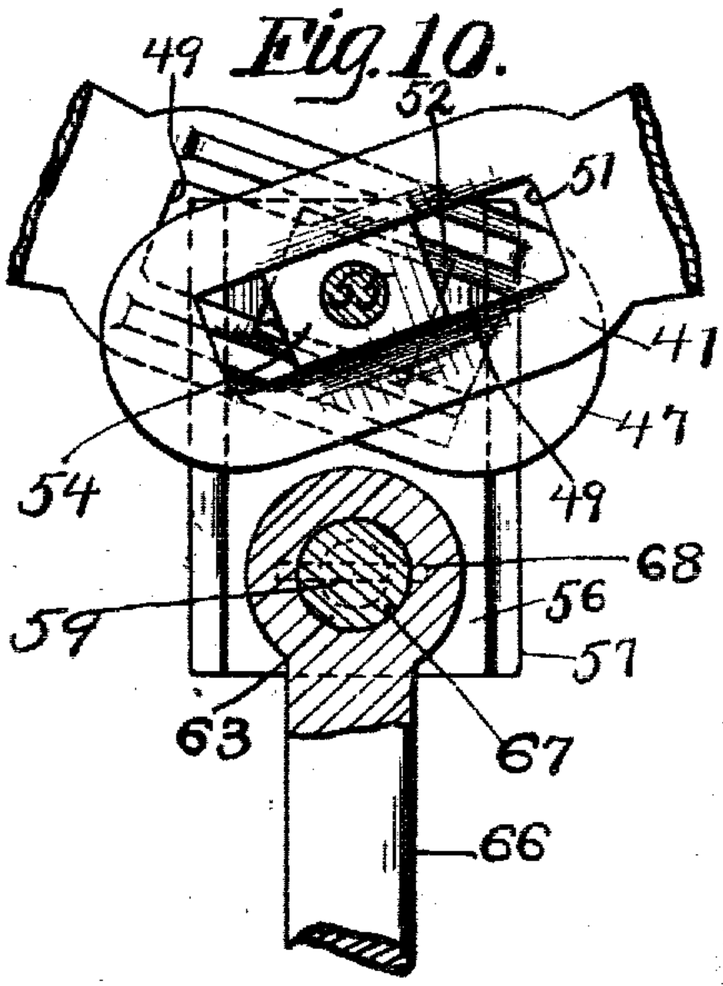
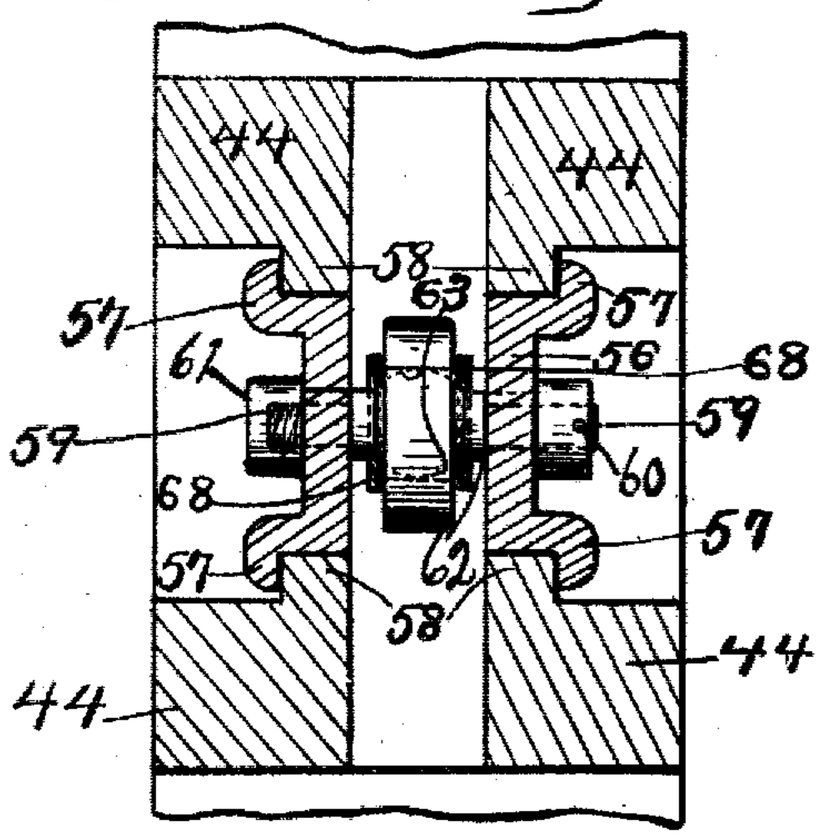


Fig. 11



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No. 815,618. PATENTED MAR. 20. 1906.

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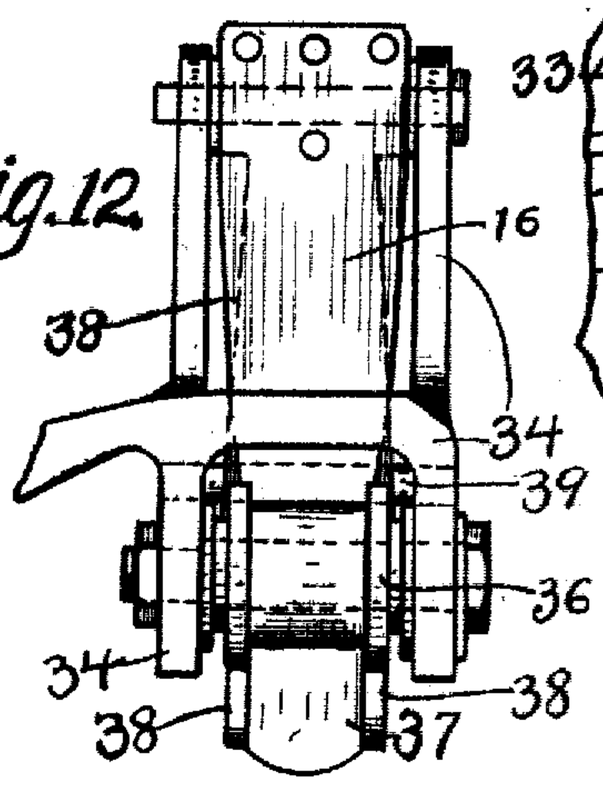
9 SHEETS—SHEET 8.

Fig. 12.



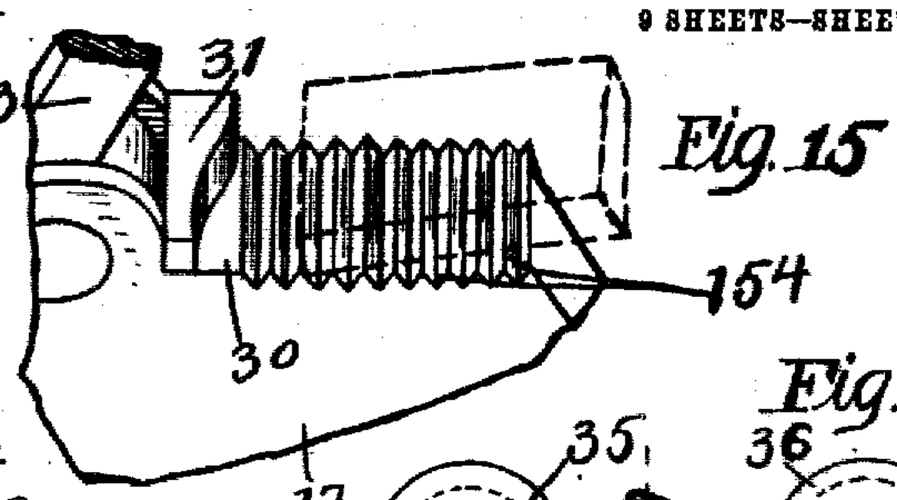


Fig. 15.

Fig. 16.

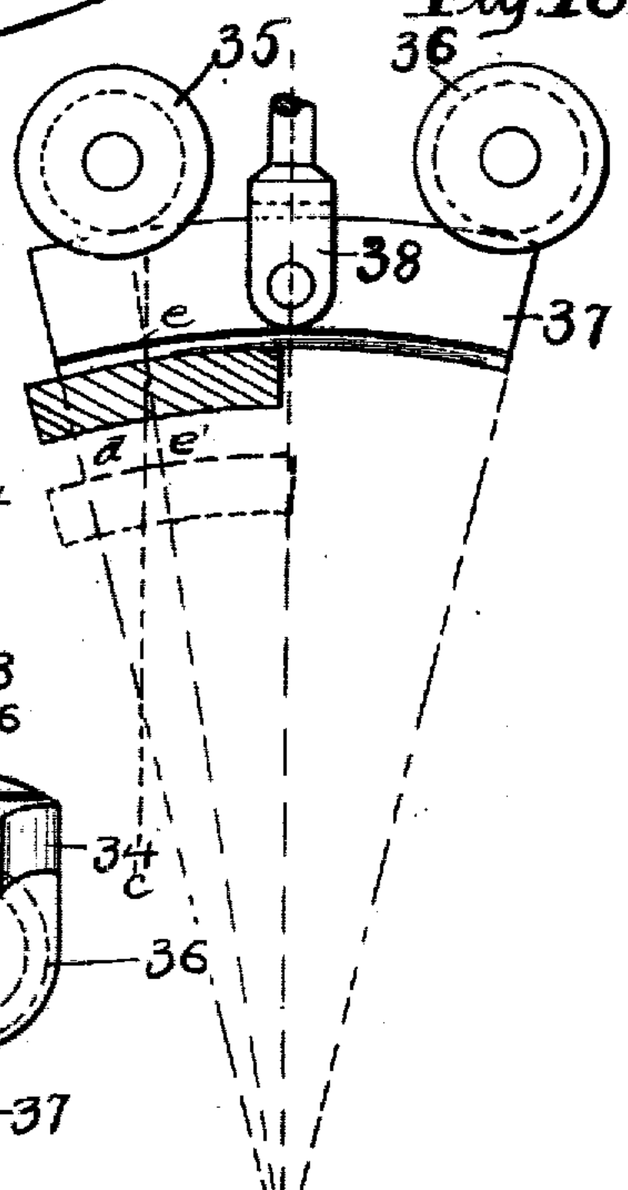


Fig. 13.

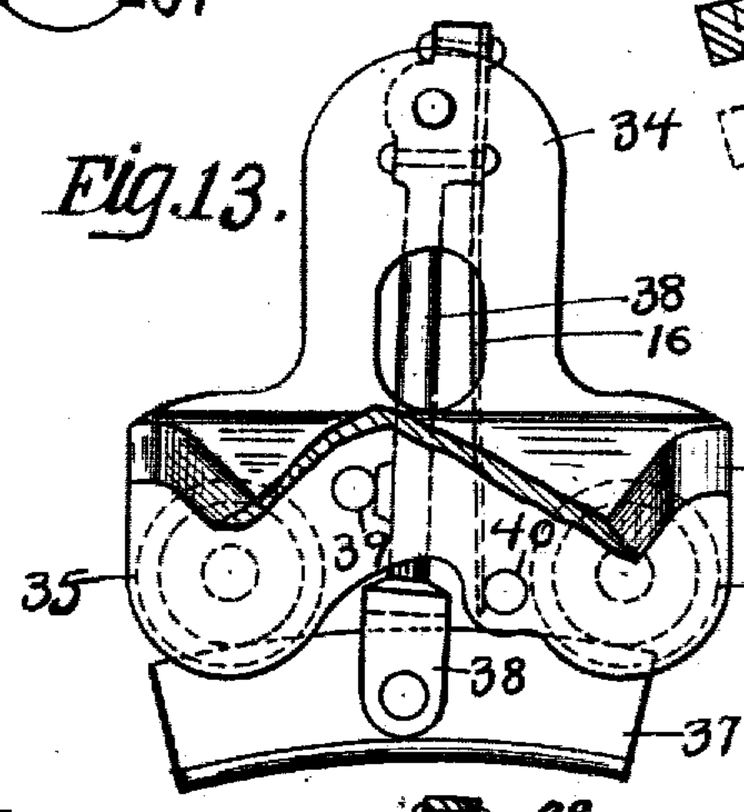


Fig. 17.

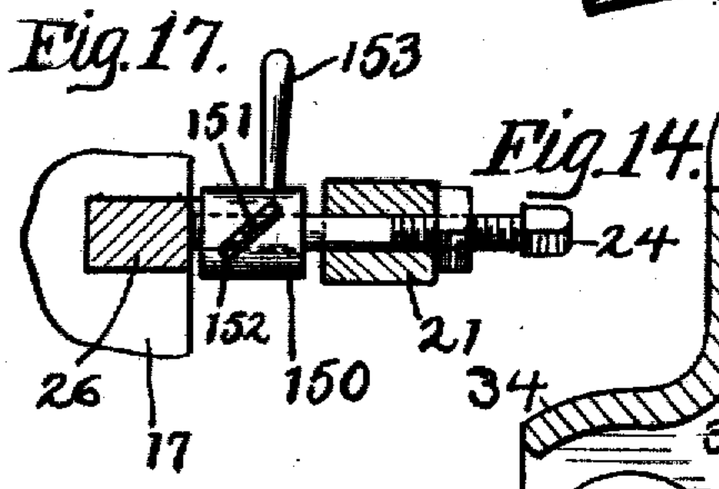


Fig. 14.

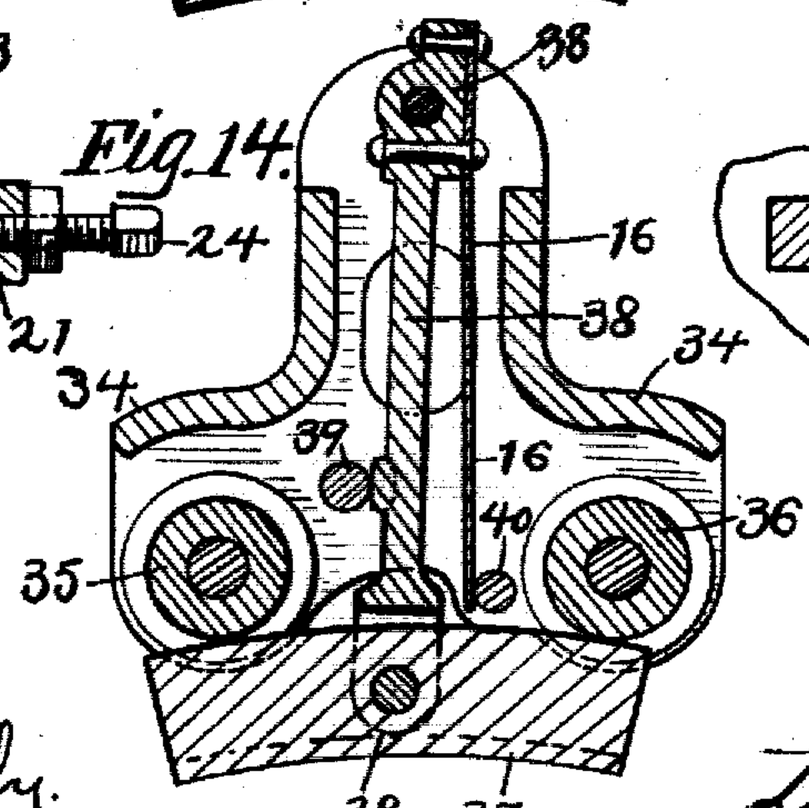
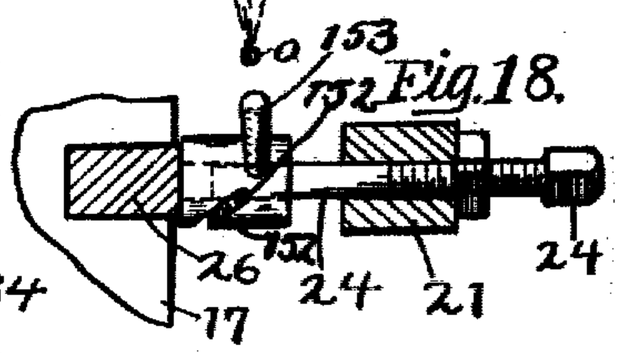


Fig. 18.



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L. F. DIETER.

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APPLICATION FILED MAY 1, 1903.

9 SHEETS—SHEET 9.

Fig. 19.

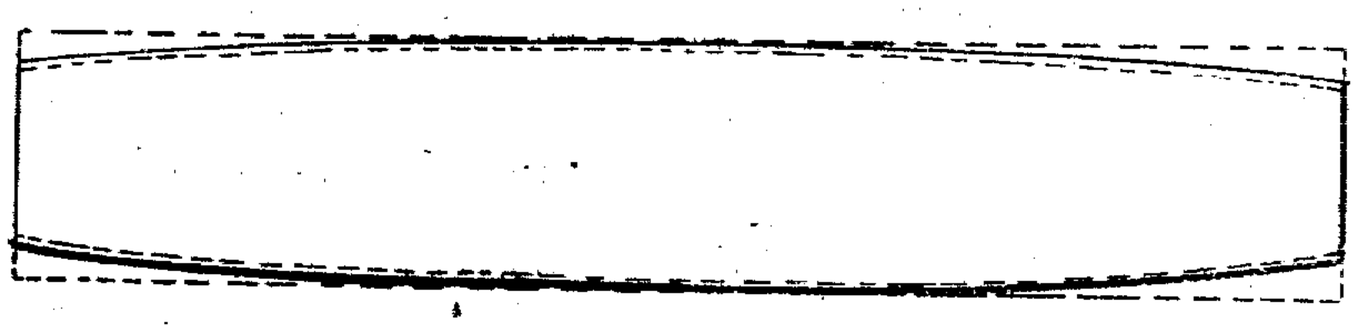


Fig. 20.

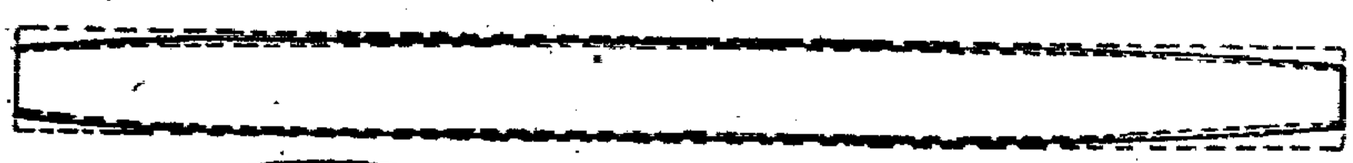


Fig. 21.

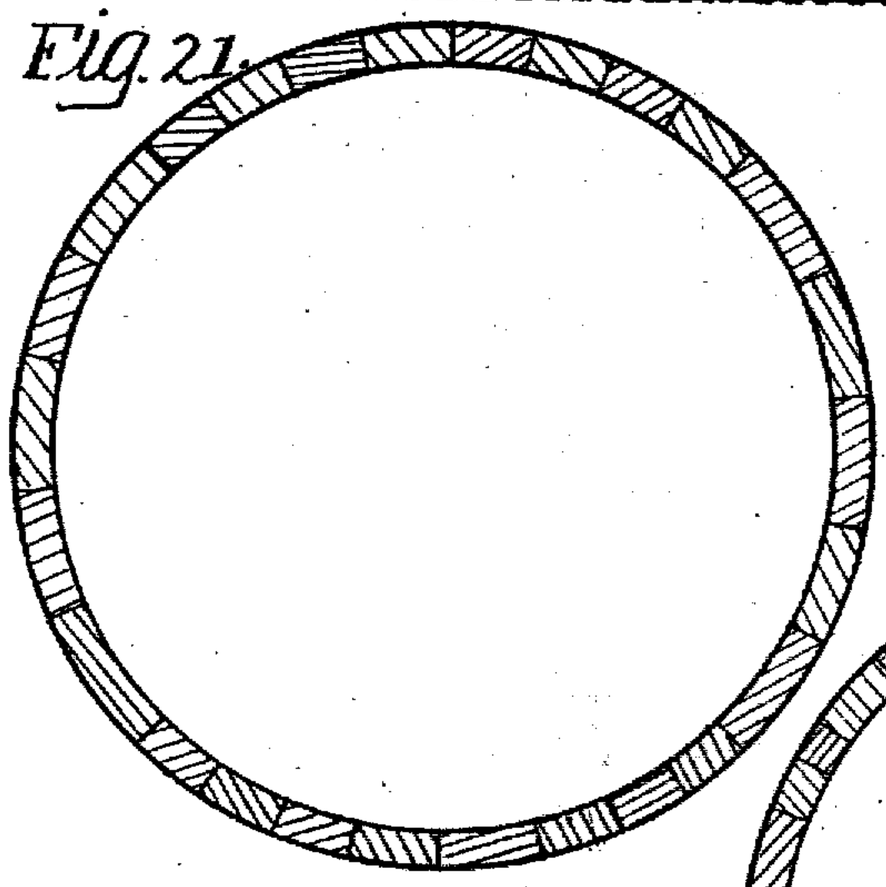
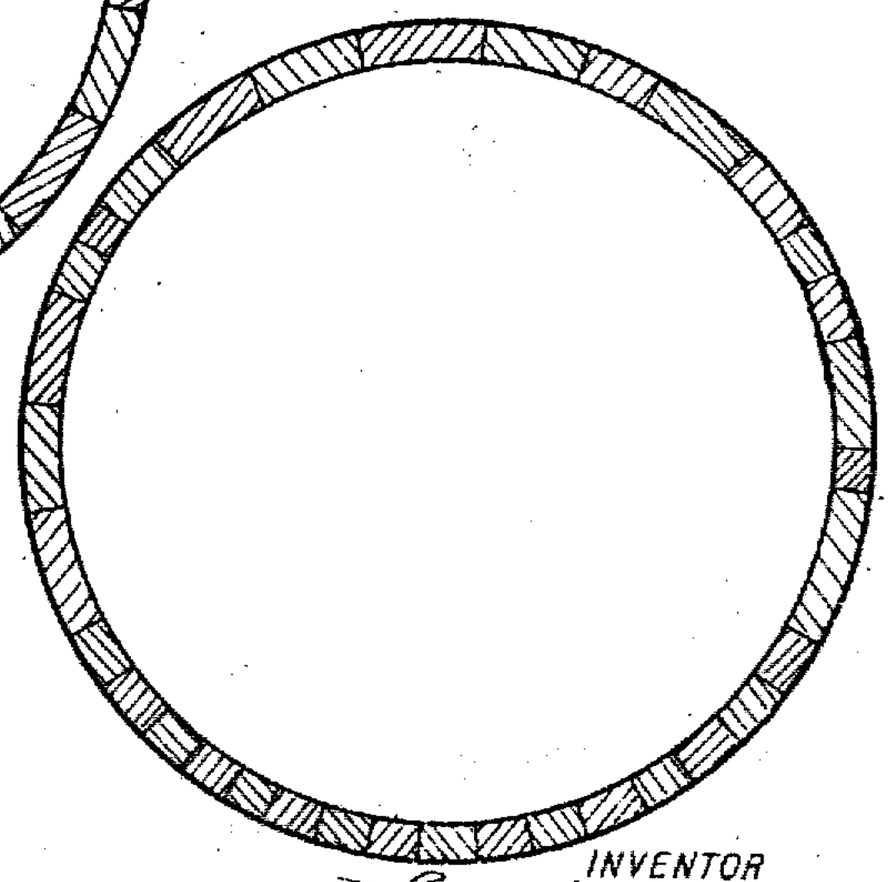


Fig. 22.



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UNITED STATES PATENT OFFICE.

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STAVE-JOINTER.

No. 815,518. Specification of Letters Patent. Patented March 20, 1906.

Application filed May 1, 1903. Serial No. 155,161.

To all whom it may concern:

Be it known that I, LOUIS F. DIETER, a citizen of the United States of America, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Stave-Jointers; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to improvements in stave-jointers.

The object of this invention is to provide a machine of this character which will cut the joints on each stave proportionately to the width of the stave, so that after the machine has been adjusted for jointing staves for a barrel of a determined bilge all staves which are fed into the machine will be cut by the machine in such a manner that any of them which together are sufficient to form a barrel may be assembled irrespective of the width of the individual staves and form perfect or liquid-tight joints.

My invention consists in the features of construction and combination of parts hereinafter described in the specification, pointed out in the claims, and illustrated in the drawings.

In the accompanying drawings, Figure 1 is a view in front elevation, showing the stave-carrying frame swung away from the cutter and in position to receive a stave. Fig. 2 is a view in front elevation, showing a stave upon the stave-carrying frame and in position to be operated upon by the cutter. Fig. 3 is a section on line 3 3, Fig. 2. Fig. 4 is a section on line 4 4, Fig. 1. Fig. 5 is a section on line 5 5, Fig. 2. Fig. 6 is an enlarged central sectional view of the upper part of the stave-carrying frame. Fig. 7 is a section on line 7 7, Fig. 6, looking in the direction of the arrow. Fig. 8 is a view in side elevation of the top part of the center rest, showing the stop for limiting the movement of the stave toward the cutter when the stave is being adjusted on the stave-carrying frame. Fig. 9 is a top plan of the top of the center rest, illustrating same device. Fig. 10 is a section on line 10 10, Fig. 6, looking in the direction of the arrow. Fig. 11 is a section on line 11 11, Fig. 6, looking in the direction of the arrow. Fig. 12 illustrates one of the clamping-jaws which holds the ends of the stave on the stave-carrying frame. Fig. 13 is a view of the same in side elevation. Fig. 14 is a section on the middle plane, Fig. 12. Fig. 15 is a fragmentary view of one of the end rests for the stave, showing the corrugations thereon. Fig. 16 is a diagrammatic view illustrating the movement of the end of the stave while being bent. Figs. 17 and 18 are enlarged detail views illustrating the stop for limiting the forward movement of the stave-carrying frame. Figs. 19 and 20 are diagrammatic views illustrating the comparative amounts which must be cut from a wide stave and from a narrow stave in forming joints thereon. Figs. 21 and 22 are diagrammatical illustrations showing how staves jointed by the machine herein described can be arranged in barrels irrespective of their width.

In the accompanying drawings, 1 represents the frame of the machine, in the upper part of which is journaled a shaft 2, on which is mounted a cutter-head of the usual type now in general use on stave-jointers. This cutter-head comprises a wheel 3, on the face of which, near its periphery, is formed a plate 4, the surface of which is inclined or beveled toward the center of the wheel. In the plate 4 are formed slots 5, and on the back of the plate in proximity to the slots 5 are formed supports or guideways 6, in each of which is adjustably mounted a chisel-edge plate or bit 7, which is arranged to project through the adjacent slot 5. These bits 7 are secured in their proper adjustment in the respective guideways 6 by means of bolts 8. A casing 9 is arranged around the cutter-head to catch the shavings from the stave, and this casing is rigidly secured to the frame by means of brackets 10 and 11, respectively.

A bar 12 extends across the front of the frame 1, and on this bar are arranged two boxes 13, in each of which is mounted a bearing-block 14. Screws 15 extend through the front and back end of the said boxes 13 and engage the respective bearing-blocks 14. By means of these screws 15 the said bearing-blocks can be adjusted in their respective boxes 13 and locked in any desired position. The stave-carrying frame 17, on which the stave is clamped and properly bent before being presented to the cutter, is journaled in

the bearing-block 14 by means of trunnions 18, which are preferably formed integral with the said frame 17, so that the said stave-carrying frame 17 can be rocked toward or away from the cutter.

It is to be understood that the adjustment of the bearing-block 14 in the boxes 13 will determine the bevel on the edges of the staves, and consequently the diameter of the barrel formed from the staves, and this adjustment is made when the machine is first assembled and tested in the shop, and therefore this adjustment will not be changed unless it is desired to make barrels of greater or less diameter than the ones produced by the machine as originally assembled. Now as this adjustment must be very exact it can be best accomplished by one especially skilled in this particular art, and therefore when the machine is set up and tested before it leaves the shop the bearing-blocks 14 are adjusted in the boxes 13 so that the machine will produce a barrel of a determined diameter, and then a mark or groove is formed in each of the bearing-blocks and a similar mark or groove *b* is formed in each of the boxes 13 in line with the respective grooves formed in the bearing-blocks, so that when the machine is reassembled in its permanent position the proper adjustment of the bearing-blocks in the boxes can be secured by causing the two grooves *a* and *b* in the respective bearing-blocks and in the respective boxes to register with each other. The machine can also be tested for forming joints on staves for barrels of various diameters, and similar grooves a' a^2 and b' b^2 can be formed in the respective bearing-blocks and in the respective boxes, thus forming a scale or index by means of which any mechanic can adjust the machine for producing staves suitable for forming barrels of any required diameter.

My adjustable stops for limiting the movement of the stave-carrying frame toward or away from the cutter and my device for supporting the stave-carrying frame against the endwise strain of the cutter are arranged as follows: On each side of the frame 1 is secured a plate 19, to which are secured plates 20 and 21, which extend at a right angle therefrom. In the respective plates 20 and 21 are arranged screws 23 and 24, respectively. A block 25 extends across the plate 19 between the plates 20 and 21. On the respective ends of the said stave-carrying frame 17 are formed lugs 26, which are so arranged that when the frame 17 is rocked back and forth the said lugs 26 will travel between the end plates 20 and 21 and across the face of the block 25. The adjustment of the screws 23 determines the limit of the travel of the frame 17 toward the cutter-head, and the adjustment of the screws 24 determines the limit of the backward movement thereof. The screws 23 by limiting the movement of the stave-carrying frame 17 toward the cutter prevent the stave from being uselessly cut away and also make it possible to produce a very smooth surface on the joint, for when the stave-carrying frame becomes stationary the knives will continue to pass over the jointed edge of the stave and plane it very smoothly. The blocks 25 serve as side bearings for the stave-carrying frame 17 and support it against the endwise strain caused by the operation of the cutter while cutting a joint on the stave. On one of the screws 24 (see Figs. 17 and 18) is arranged a sleeve 150, in which is formed a slot 151. A small stud 152 is secured on the screw 24 and extends into the slot 151. A handle 153 is secured to the sleeve 150. By turning the sleeve 150 on the screw 24 it can be caused to project beyond the end of said screw 24, and thus prevent the stave-carrying frame 17 from swinging back as far as it otherwise would. The especial object of this auxiliary stop will appear hereinafter.

On top of the stave-carrying frame 17, at each end thereof, is formed a seat 30, having a curved surface corresponding to the curvature of an arc of a circle having the same diameter as the barrel which will be formed from the said staves. These seats 30 serve as rests for the ends of the stave when clamped on the stave-carrying frame. Stops or guides 31 are formed on the respective seats 30, which prevent any longitudinal movement of the stave and also serve to bring the center of the stave exactly over the center rest, hereinafter described. The stops or guides 31 are preferably formed so that they flare outwardly in order that a stave may be readily inserted between them and are preferably of sufficient height so that the center rest will not project above them when raised to its highest position. As some staves vary slightly in length, flat springs 32 may be provided at the ends of the respective seats 30 and are preferably secured to and arranged parallel with the guides 31. These springs 32 have equal resiliency and sufficient movement to accommodate such accidental variation in length as may exist between staves designed to be assembled in the same-sized barrel, and they will therefore always engage the ends of the staves and center the staves, exactly over the center rest. A series of ribs or corrugations 154 may be formed on the respective seats 30, as shown in Fig. 15. The object of these ribs is to prevent short staves which do not come in contact with the ends of the seats, from being shifted by the operation of the cutter.

The devices for clamping the ends of the staves on the end seats are mounted and arranged as follows: At each end of the stave-carrying frame near the top is pivotally

mounted a bell-crank lever 33, to the upper end of which is secured a clamping-jaw for holding the end of the stave on the adjacent seat. Each clamping-jaw comprises two rollers 35 and 36, respectively. A curved plate 37, approximately equal in length to the width of the widest stave, is supported beneath the rollers 35 and 36, so that the rollers are in contact with the upper surface thereof, by means of a link 38, the upper end of which link 38 is pivotally secured in the frame 34. The curvature of the plates 37 corresponds to the curvature of the seats 30, so that they will press evenly on the ends of the staves and cause them to conform to the curvature of the seats 30. In the frame 34 at each side of the link 38 are formed stops 39 and 40, respectively. A flat spring 16 is secured to the side of the link 38 and is arranged to come into contact with the stop 40 and normally hold the link 38 against the stop 39. The object of this construction is to prevent what might be called "lateral" strain, which would be produced by the friction between a stationary jaw and the stave.

Referring to Fig. 16, it will be seen that as each stave is bent the center line of the stave will move in a radial line toward the center of the circle of which the plate 37 is an arc. Now when the stave has been bent so that it assumes the dotted position shown in Fig. 16 then the center point of the stave will have moved the distance from *d* to *e* and the whole stave will of course have moved in proportion. Now if the plate 37 were rigid with the frame 34 the stave would have to slip on the surface of the plate 37, and the friction between the surface of the stave and the surface of the plate 37 would produce a lateral strain which would tend to distort the stave; but in the arrangement here shown the plate 37, being free to move, slides on the rollers 35 and 36 and moves with the stave, and there is therefore no lateral strain on the stave.

At each side of the frame 17 is fulcrumed a lever 41 by means of a pin 42, so that the said lever can swing vertically. The short arm of each of the levers 41 is secured to the lower end of the bell-crank lever 33 on the same side of the frame by means of a link 43. The long arms of the levers 41 extend across the frame 17 and meet at the center thereof, where they enter a vertically-arranged guideway 44. One of the said levers 41 is bifurcated, as at 47 and 48, and in the said ends 47 and 48 are formed slots 49 and 50. The ends 47 and 48 embrace the corresponding end of the other lever 41, in which is also formed a slot 51. In the respective slots 49, 50, and 51 are arranged blocks 52, 53, and 54, respectively. A pin 55 is journaled in said blocks 52, 53, and 54, respectively, and on each end of said pin is secured a plate 56. The two plates 56 are provided with lugs 57, which engage ribs 58, formed in the guideway 44. These plates form side bearings for the ends of the levers 41, so as to steady them as they move up and down in the guideway 44. A second pin 59 extends between the plates 56 below the pin 55, and one end thereof is keyed in one of the plates 56 by means of a pin 60, and the other end is screw-threaded and extends through a bolt-hole formed in the other plate 56 and is locked therein by means of a nut 61. Shoulders 62 are formed on the pin 59, which prevent the plates 56 from being brought too close together. A spherical-shaped enlargement 63 is formed centrally on the pin 59. A lever or treadle 64 is fulcrumed on a shaft 65 in the lower part of the frame 1. A pitman 66 is secured at its lower end to the treadle 64, and in its upper end is formed a socket 67, suitable for receiving the enlargement 63 on the pin 59. Stops 68 are provided at each side of the pin 59, which prevent the socket 67 from slipping off from the enlargement 63. A coil-spring 69 is connected at one end to a stationary portion of the frame 1 and at its other end to the treadle 64 and serves to return the treadle to its upper position after it has been depressed. A weight 70 is secured on each of the short arms of each of the levers 41 to counterbalance the levers 33 and 41 and the clamping-heads. A foot-rest 71 is provided on a level with the treadle when the treadle is in its upper position, so that the operator can remove his foot from the treadle and place it on the rest while taking out the jointed stave and putting in the new stave. The operation of this portion of the machine will be readily understood. When the treadle 64 is depressed, it pulls down the long ends of the lever 41 by means of the operative connection consisting of the rod 65 and the plates 56. As the long arms of the levers 41 move down the short arms move up, shoving up the lower arms of the bell-crank levers and swinging down the upper arms, thereby causing the clamping-heads to approach the respective seats 30 at each end of the frame 17. When the pressure is removed from the treadle, the spring 69 will lift it to its original position, and the counterbalancing-weights will return all parts of the machine to their normal or first position.

The adjustable center rest is mounted and arranged as follows: On the front of the frame 17, above the guideway 44, are arranged two plates 75 and 76, respectively, preferably formed integral with the said frame 17, and a plate 77 is secured to the plates 75 and 76 by means of bolts 78. In the guideway formed by these plates is mounted a rest 79, arranged to slide vertically therein. A longitudinal recess is formed in the rest 79, and the upper part of the said rest, which does not enter the said guideway,

curves over toward the cutter-head and forms the seat for the stave. A bar 80, preferably formed integral with the plate 77, extends through the middle of the rest 79. In the bar 80 is formed a seat 81 for a removable lug 82. A lug 83, which is preferably formed integral with the rest 79, is arranged in the bottom thereof. A coiled spring 84 is mounted within the rest 79, and its upper and lower ends are supported by the lugs 82 and 83, respectively. When the rest 79 is raised, the spring 84 will be compressed between the bottom of the rest 79 and the stationary bar 80, so that when the lifting pressure is removed or partly removed the rest 79 will descend correspondingly in the said guideway. A roller 85 is mounted in the rest 79 in suitable bearings 86, arranged in the sides of the said rest.

In the frame 17 is formed a horizontal slideway 90. A slide 91 extends through the rest 79 above the bar 80 and is arranged to slide in the said slideway 90. On the bottom of this slide 91 is formed a rack 92. On the top of the slide 91 is secured a block 93 by means of a bolt 94 and a pin 95. To the outer end of the slide 91 is secured a preferably-inclined gage-plate 96 by means of a bolt 97 and a pin 98. The upper surface of the block 93 is curved, and as the slide 91 is moved back and forth in the slideway 90 the said curved surface will pass under the roller 85 and cause the said rest 79 to move up and down, and therefore the position of the slide 91 will determine the height of the said rest. The curvature of the block 93 and the relative arrangement of the gage-plate 96 is such that when the said block has raised the center rest to the proper position for any stave the gage-plate will be in position to come in contact with the outer edge of the stave, indicating to the operator that the center rest is at the right height for that particular stave.

A shaft 99 is mounted in a suitable bearing 100, formed in the plate 77. On the shaft 99 are formed gear-teeth 101, arranged to mesh with the rack 92 on the bottom of the slide 91. On the end of the shaft 99 is mounted a hand-wheel 102. The bearing 100 near one end of the shaft 99 is split, and a bolt 103 is mounted in the usual manner, so that by turning the bolt the split ends can be brought together and lock the shaft 99 against rotation. A key 104 is provided for turning the bolt 103.

The stop for limiting the movement of the stave toward the cutter-head while it is being adjusted on the frame 17 is arranged as follows: In the top of the rest 79 is journaled a shaft 106, on which is keyed a hook-shaped arm 107. In the rest 79 below the shaft 106 is pivoted a box 108 by means of a pin 109. A rod 110 is pivotally secured to the arm 107 at one end, and its other end extends into the box 108 and is provided with a head 111. On the rod 110 between the head 111 and the end of the box 108 is mounted a coiled spring 112. On the end of the shaft 106 is keyed a crank-arm 113. In the rest 79 below the box 108 is formed a bearing for a shaft 114. An arm 115 is formed integral with the said shaft 114 and is connected with the arm 113 by means of a link 116. In the end of the shaft 114 is formed a socket 117, in which is pivotally secured one end of a shaft 118 by means of a pin 119. The said shaft 118 extends across the frame and passes through a loose bearing 120, formed on the frame 17. The end of the shaft 118 is turned down, so as to form a depending finger 140, arranged to come into contact with a stationary lug 121, formed on the frame 1. This lug 121 is provided with an eccentric head 122, so that by turning the lug an adjustment can be secured between the said lug and the end of the said shaft. The operation of this device is as follows: When the frame 17 is rocked back from the cutter-head, the finger 140 on the end of the shaft 118 comes into contact with the stationary lug 121, and the shaft 108 is rotated and in turn rotates the shaft 115, which through its operative connection rotates the shaft 106, swinging up the hook-shaped arm 107 until it projects above the top of the rest 79. As the arm moves up the rod 110 is pulled out from the box 108, compressing the spring 112. When the frame 17 is rocked back toward the cutter-head, the coiled spring 112 will draw the rod 110 back into the box 108, causing the arm 107 to swing down and out of the way of the cutter.

When a stave is irregular or too wide to be used, it is necessary to cut off the excess or waste portion before the stave is jointed, and therefore the sleeve 150 is turned out beyond the end of the screw 24, which prevents the stave-carrying frame from swinging back far enough to operate the stop on the center rest.

A rock-shaft 126 is mounted in suitable bearings formed in the sides of the frame 17. To this shaft are keyed two curved arms 127, which extend up and are arranged to come into contact with the edge of the stave when placed on the frame 17 and aline the stave and hold it in its proper position thereon until clamped on the seats. A horizontal arm 128 is keyed to the shaft 125, and on this arm is secured a weight 129, which causes the said arms 127 to press tightly against the stave.

An arm 141 is secured to the stave-carrying frame 17, and on this arm is secured a balance-weight 142.

What I claim is—

1. In a stave-jointer, a cutter, a stave-carrying frame, means for bending the stave, and means located centrally of the stave at each edge thereof for gaging the width of the stave and controlling according to its adjust-

ment the bend to be given by the bending means.

2. In a stave-jointer, a cutter, a stave-carrying frame, means for bending the stave, and means located centrally of the stave at each edge thereof for gaging the width of the stave and controlling according to its adjustment for different widths of staves the amount of bend to be given by the bending means.

3. In a stave-jointer, a cutter, a stave-carrying frame, an adjustable center rest, means for bending the stave upon said center rest, gages for gaging the width of the stave located centrally of the stave at each edge thereof, said gages controlling according to their adjustment to the width of the stave the bend to be given to the stave by said stave-bending means.

4. In a stave-jointer, stave-supporting means for supporting the stave near its ends, front and back gages for the stave located centrally thereof, and stave-bending mechanism controlled by the adjustment of the gages.

5. In a stave-jointer, stave-supporting mechanism for supporting the stave near its ends, movable front and back gages for the stave located centrally of the same, one of said gages being automatic, and stave-bending mechanism controlled by the adjustment of the gages.

6. In a stave-jointer, stave-supporting means for supporting the stave near its ends, gages for the front and back of the stave located centrally thereof, and a center supporting-rest for the stave operatively connected to one of said gages whereby when said gages embrace the stave the center rest is placed in appropriate operative position.

7. In a stave-jointer, a center rest for the stave, front and back gages located centrally of the stave for gaging the width thereof, means for bending the stave, and means for automatically determining the amount of bend proportionate to the distance between the gages.

8. In a stave-jointer, the combination of a stationary frame, a cutter-head mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, seats formed on said stave-carrying frame for receiving the ends of the stave and corrugations formed on said seats, substantially as described and for the purpose set forth.

9. In a stave-jointer the combination of a stationary frame, a cutter-head mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, a rest formed on said stave-carrying frame, a shaft journaled in said rest, a hooked arm keyed on said shaft and arranged to project above said rest when in its highest position, a spring secured to said arm and arranged to normally hold said arm below the level of said rest, a shaft journaled in said rest below the first-mentioned shaft, a depending finger formed on the end of said shaft, a lug mounted on the stationary frame in the path of said depending finger and means for operatively connecting the first-mentioned shaft with the last-mentioned shaft so that the rotation of the last-mentioned shaft will cause a rotation of the first-mentioned shaft.

10. In a stave-jointer the combination of a stationary frame, a cutter-head mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, a rest formed on said stave-carrying frame, a shaft journaled in said rest, a hooked arm keyed on said shaft, a box hinged to said rest, a rod pivotally secured at one end to said hooked arm and having its other end extending into said box, a coil-spring secured on the end of said rod within said box, a shaft journaled in said rest below the first-mentioned shaft, a depending finger formed on the end of said shaft, a lug mounted on said stationary frame in the path of said finger and means for operatively connecting said first-mentioned shaft to said last-mentioned shaft so that the rotation of the last-mentioned shaft will cause a rotation of the first-mentioned shaft.

11. In a stave-jointer, the combination of a stationary frame, a cutter-head mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, a rest formed on said stave-carrying frame, a shaft journaled in said rest, a hooked arm keyed on said shaft and arranged to project above said rest when in its highest position, a spring secured to said arm and arranged to normally hold said arm below the level of said rest, a shaft journaled in said rest below the first-mentioned shaft, means for operatively connecting the first-mentioned shaft with the last-mentioned shaft, a socket formed in the end of the last-mentioned shaft, a rod secured at one end in said socket and having its other end bent down to form a depending finger, and a lug formed on said stationary frame in the path of said finger, substantially as described and for the purpose set forth.

12. In a stave-jointer, the combination of a stationary frame, a cutter-head mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, a rest formed on said stave-carrying frame, a stop hinged to said rest, means for holding said stop below the level of said rest, means for raising said stop, a lug arranged on the stationary frame and adapted to come into contact with and operate the said raising means and means for adjusting said lug.

13. In a stave-jointer, the combination of a stationary frame, a cutter-head arranged on said stationary frame, a stave-carrying

frame, rests formed on said stave-carrying frame, and clamping-jaws supported above said rests and arranged to be brought into contact with the ends of the staves so as to clamp the ends of the staves on said rests, each of said jaws comprising a frame, rollers mounted in said frame and a curved plate movably supported in said frame and arranged so that its upper surface is in contact with said rollers.

14. In a stave-jointer, the combination of a stationary frame, a cutter-head arranged on said stationary frame, a stave-carrying frame, rests formed in said stave-carrying frame, and clamping-jaws supported above said rests and arranged to be brought into contact with the ends of a stave so as to clamp the stave on said seats each of said clamping-jaws comprising a frame, rollers mounted in said frame, a link pivotally secured in said frame, a plate hinged to the lower end of said link and arranged so that its upper surface is in contact with said rollers, stops formed in said frame at each side of said link, and a spring secured to said link and abutting against one of said stops so as to normally hold the said link against the other of said stops, substantially as described and for the purpose set forth.

15. In a stave-jointer the combination of a stationary frame, a cutter-head arranged on said stationary frame, a stave-carrying frame and clamping-jaws for clamping the stave on said stave-carrying frame, each of said clamping-jaws comprising a frame, rollers mounted in said frame, a plate movably supported in said frame and arranged to come in contact with the stave and pressed into engagement therewith through said rollers while capable of moving transversely of said stave on said rollers and means for limiting the movement of said plate.

16. In a stave-jointer the combination of a stationary frame, a cutter mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, a bell-crank lever mounted at each end of said stave-carrying frame, a clamping-jaw mounted on the upper end of each bell-crank lever, a straight lever mounted on each side of stave-carrying frame, links connecting the short arms of the straight levers with the lower arms of the bell-crank levers, a vertical guideway formed at the center of said stave-carrying frame and arranged to receive the ends of the long arms of the said straight levers, slots formed in the ends of said levers, blocks slidably mounted in said slots, a pin arranged in said blocks, plates secured to said pin, ribs formed in said vertical guideway, lugs formed on said plates and arranged to engage said ribs, a pin extending between said plates below the first-mentioned pin and having a spherical enlargement formed at its center a pedal operatively mounted in the lower part of said frame, and a pitman having a socket formed in its upper end adapted to receive the said enlargement of said last-mentioned pin, substantially as described.

17. In a stave-jointer, the combination of a stationary frame, a cutter mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, bell-crank levers mounted on said stave-carrying frame, a clamping-jaw mounted on the upper end of each bell-crank lever, a vertical guideway formed at the center of said stave-carrying frame, straight levers pivoted at each side of said stationary frame and having their longer arms extending into the said vertical guideway, slots formed in the ends of the long arms of said straight levers, blocks slidably arranged in said slots, a pin journaled in said blocks, a plate secured to each end of said pin, a pin arranged between said plates below said first-mentioned pin and having, a spherical enlargement formed at its center, a pitman having a socket formed in its end and arranged to receive said spherical enlargement of said pin, links connecting the short arms of said straight levers with the respective bell-crank levers and counterbalancing-weights mounted on said short arms of said straight levers.

18. In a stave-jointer, the combination of a stationary frame, a cutter mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, a stop arranged on said stave-carrying frame for limiting the movement of the stave toward the cutter while being adjusted on the stave-carrying frame, means for raising said stop to its operative position when the stave-carrying frame is swung back to a predetermined position from the cutter and means arranged to be brought into contact with said frame so as to arrest the movement of said frame before it reaches the said predetermined position.

19. In a stave-jointer the combination of a stationary frame, a cutter mounted on said stationary frame, a stave-carrying frame journaled in said stationary frame, a stop arranged on said stave-carrying frame for limiting the movement of the stave toward the cutter while being adjusted on the stave-carrying frame, means arranged to form an operative connection with said stop for raising said stop to its operative position when the stave-carrying frame is swung back to a predetermined position from the cutter, a stop arranged to limit the movement of the stave-carrying frame away from the cutter-head, a sleeve arranged on said stop and means for sliding said sleeve on said stop so that it will project beyond the end of the said stop toward the stave-carrying frame.

20. In a stave-jointer, and in combination

with means for bending a stave, a retracting-stop mounted centrally at the rear edge of the stave, and a central gage-plate carried by the bending means and adapted to contact with the front edge of the stave to indicate the requisite bend of the stave prior to jointing.

In testimony whereof I sign the foregoing specification, in the presence of two witnesses, this 8th day of January, 1903, at Cleveland, Ohio.

LOUIS F. DIETER.

Witnesses:
VICTOR C. LYNCH,
DANIEL E. DALY.