

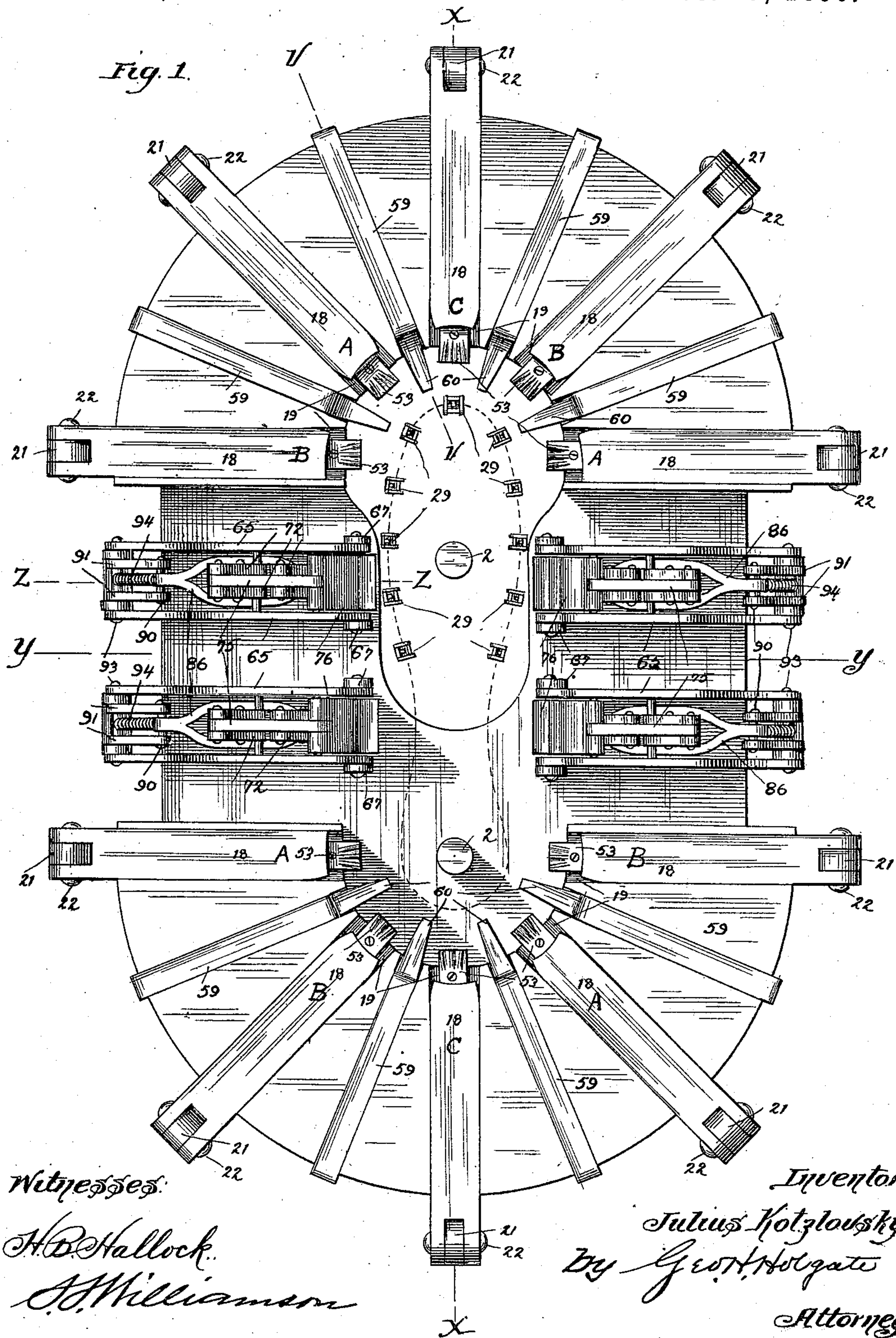
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8 Sheets—Sheet 1.

J. KOTZLOVSKY.  
SHOE MACHINE.

No. 574,337.

Patented Dec. 29, 1896.



Witnesses:

H. B. Hallock.

J. J. Williamson

Inventor:

Julius Kotzlovsky

By Geo. H. Holgate

Attorney.

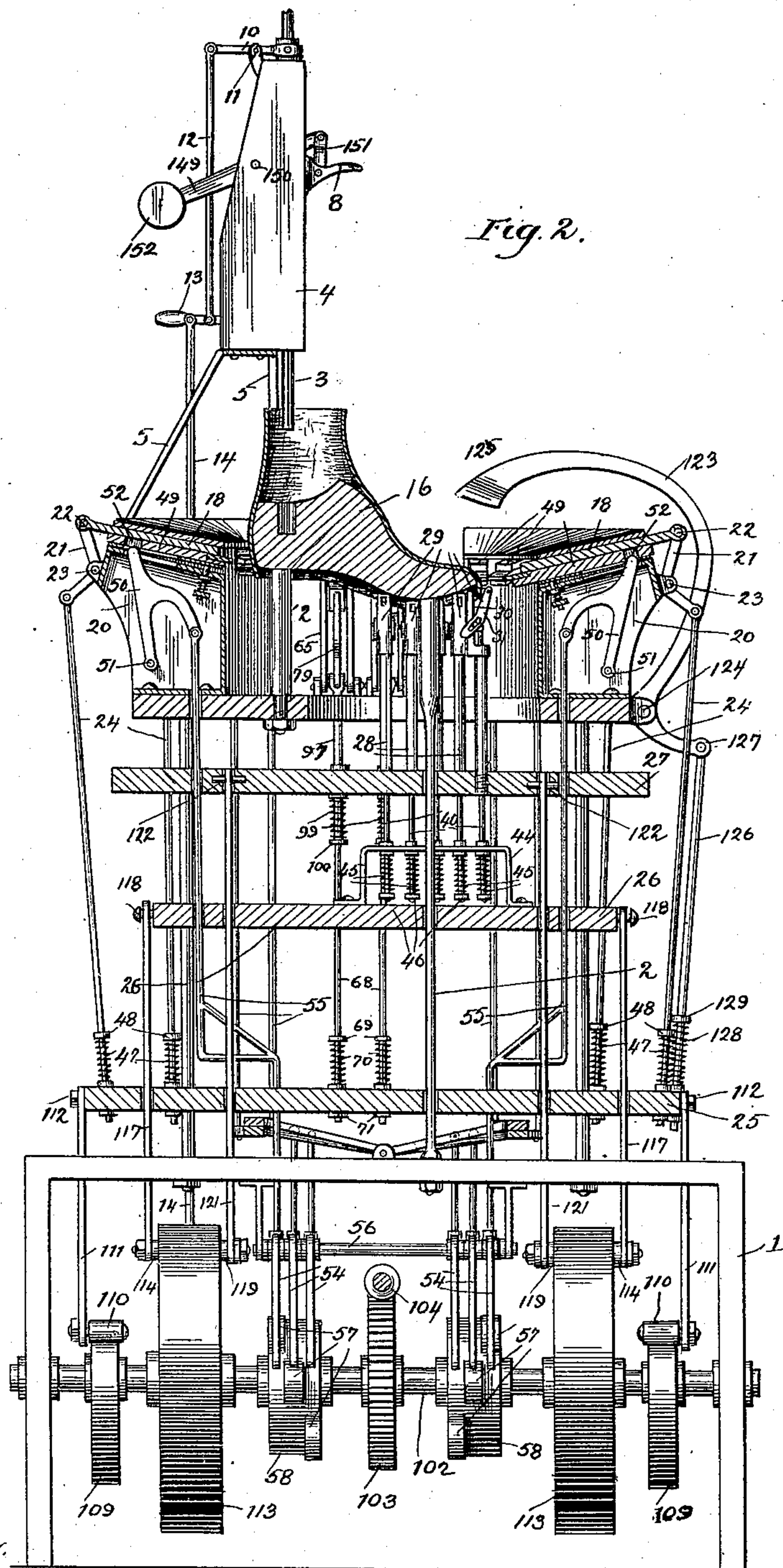
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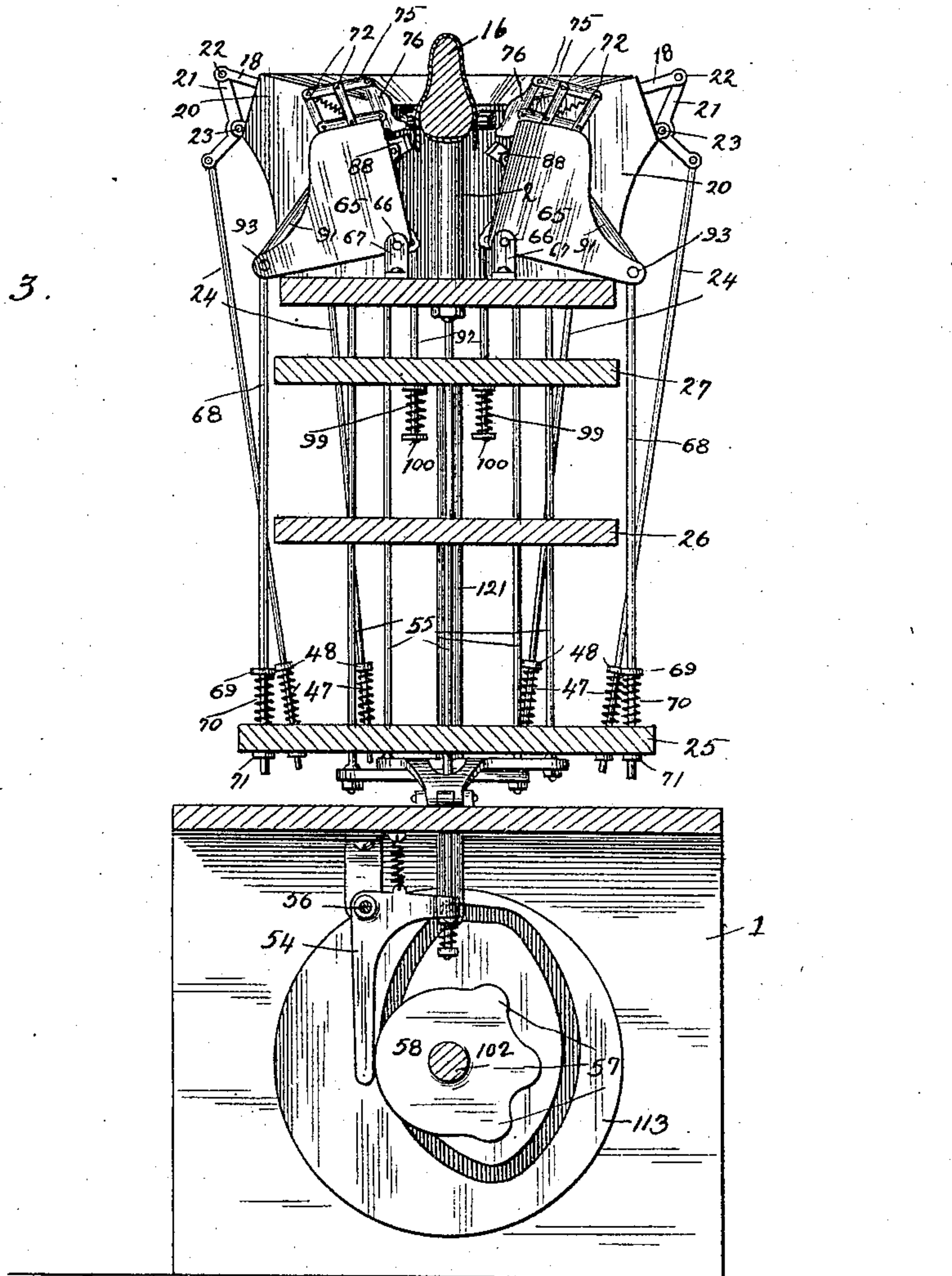
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Fig. 3.



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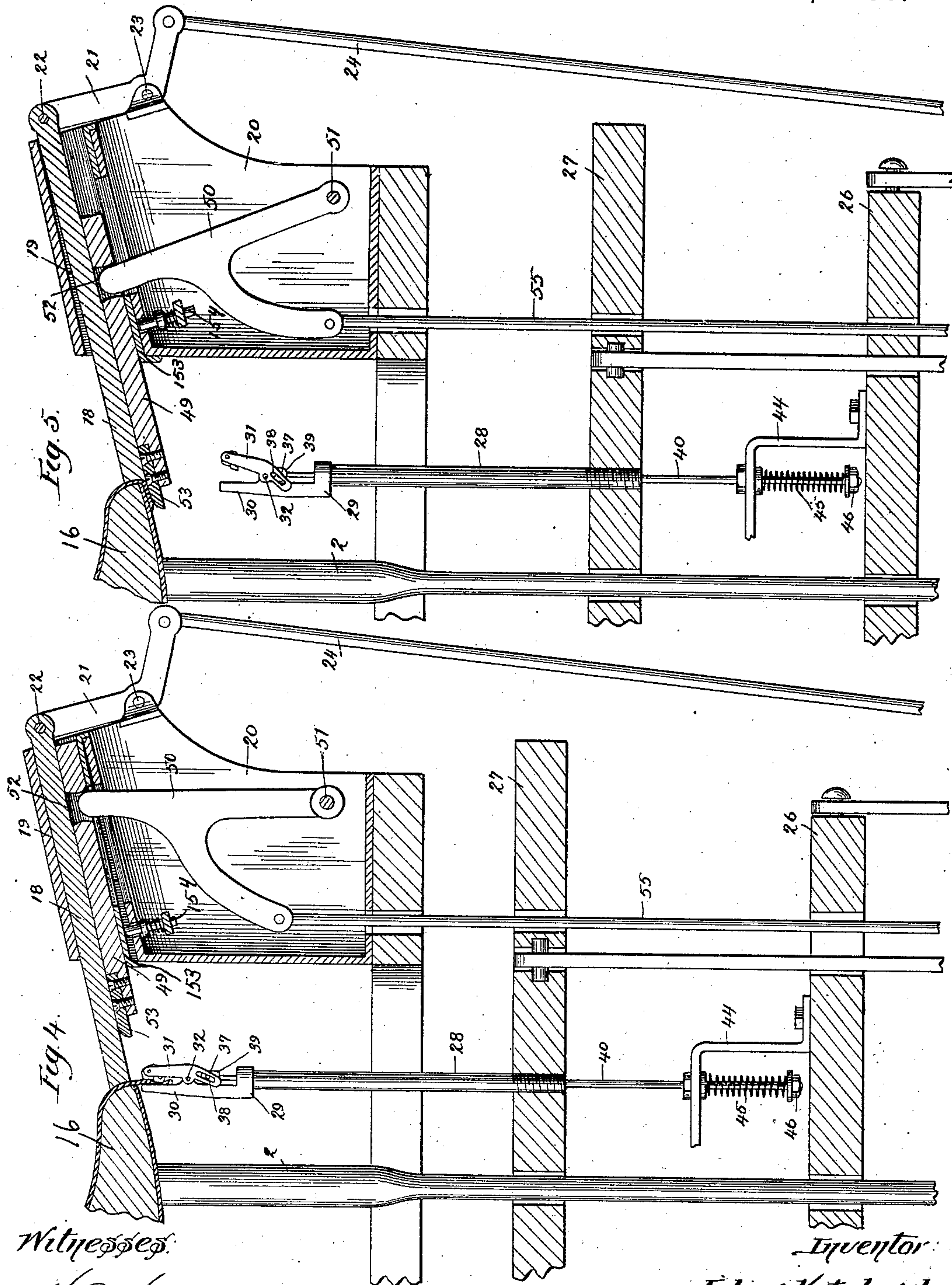
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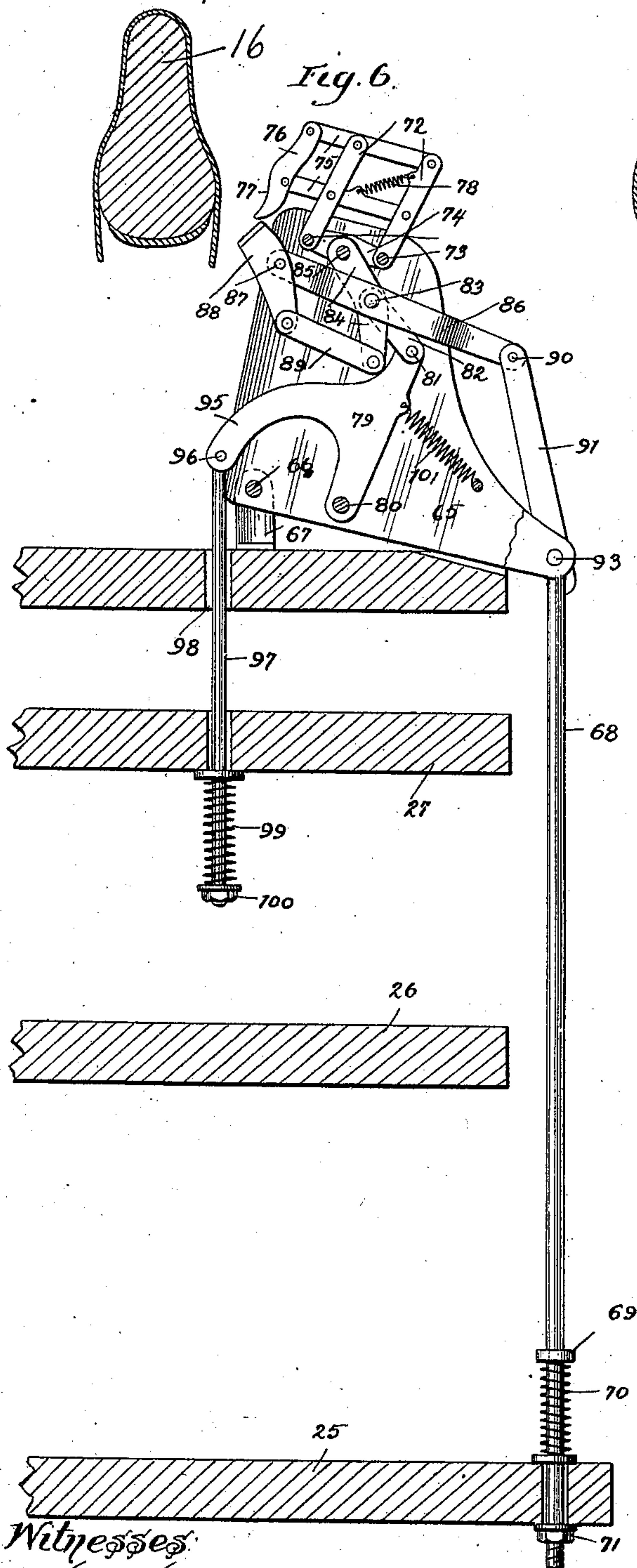
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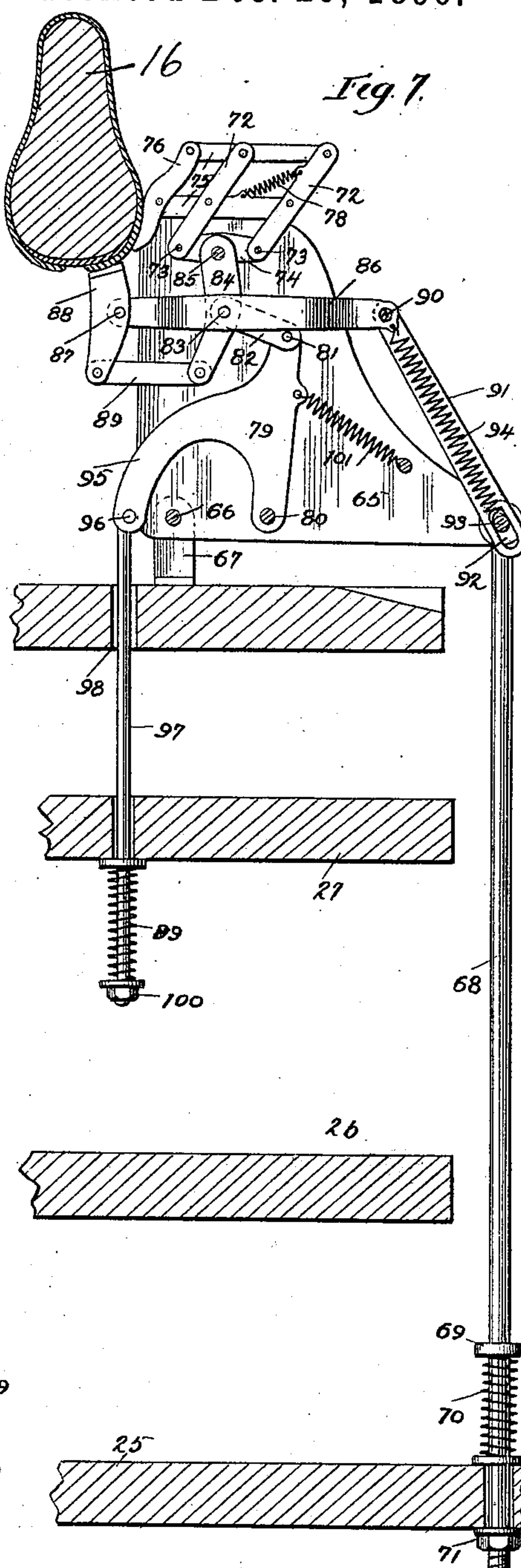
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Fig. 8.

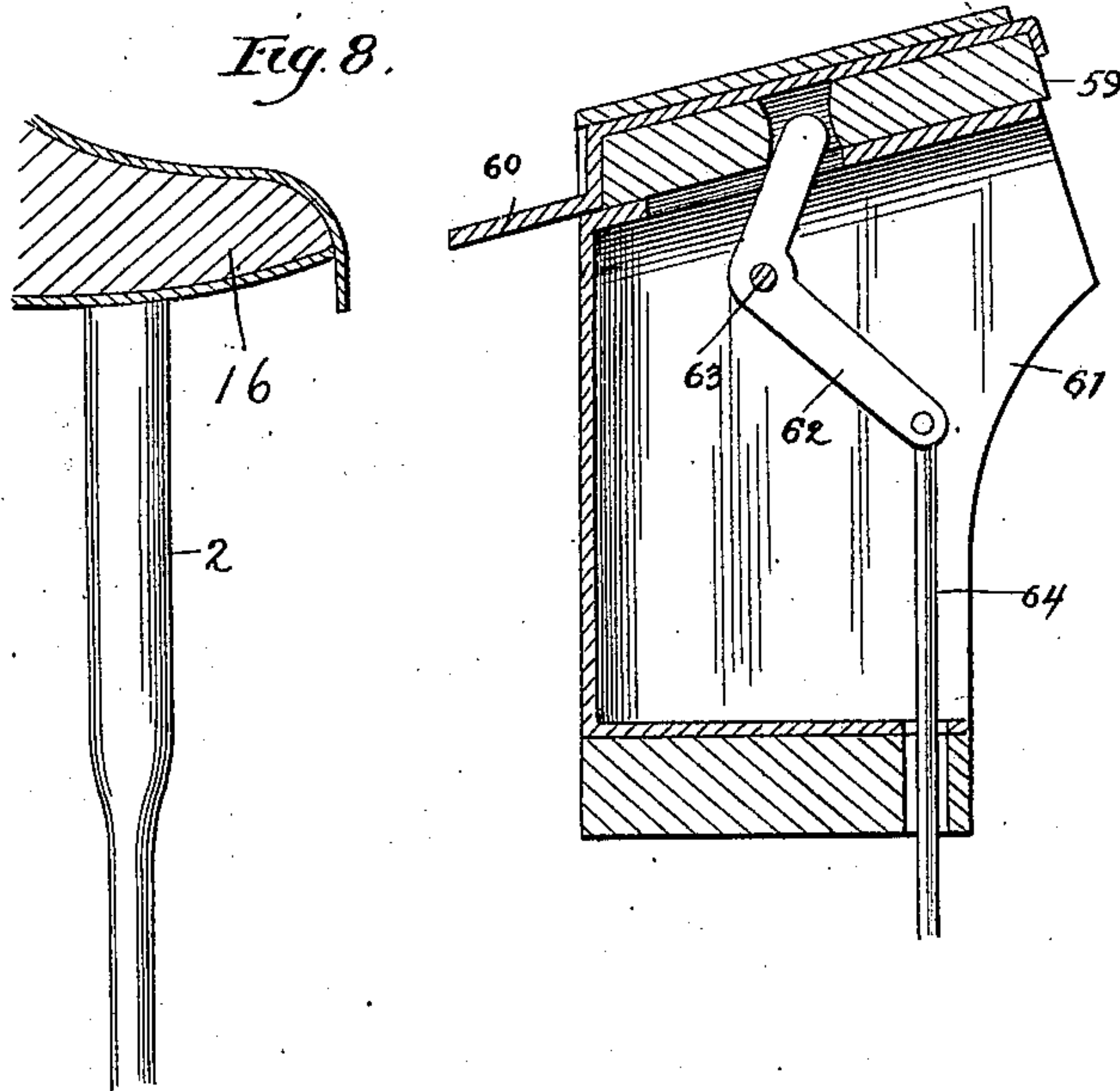
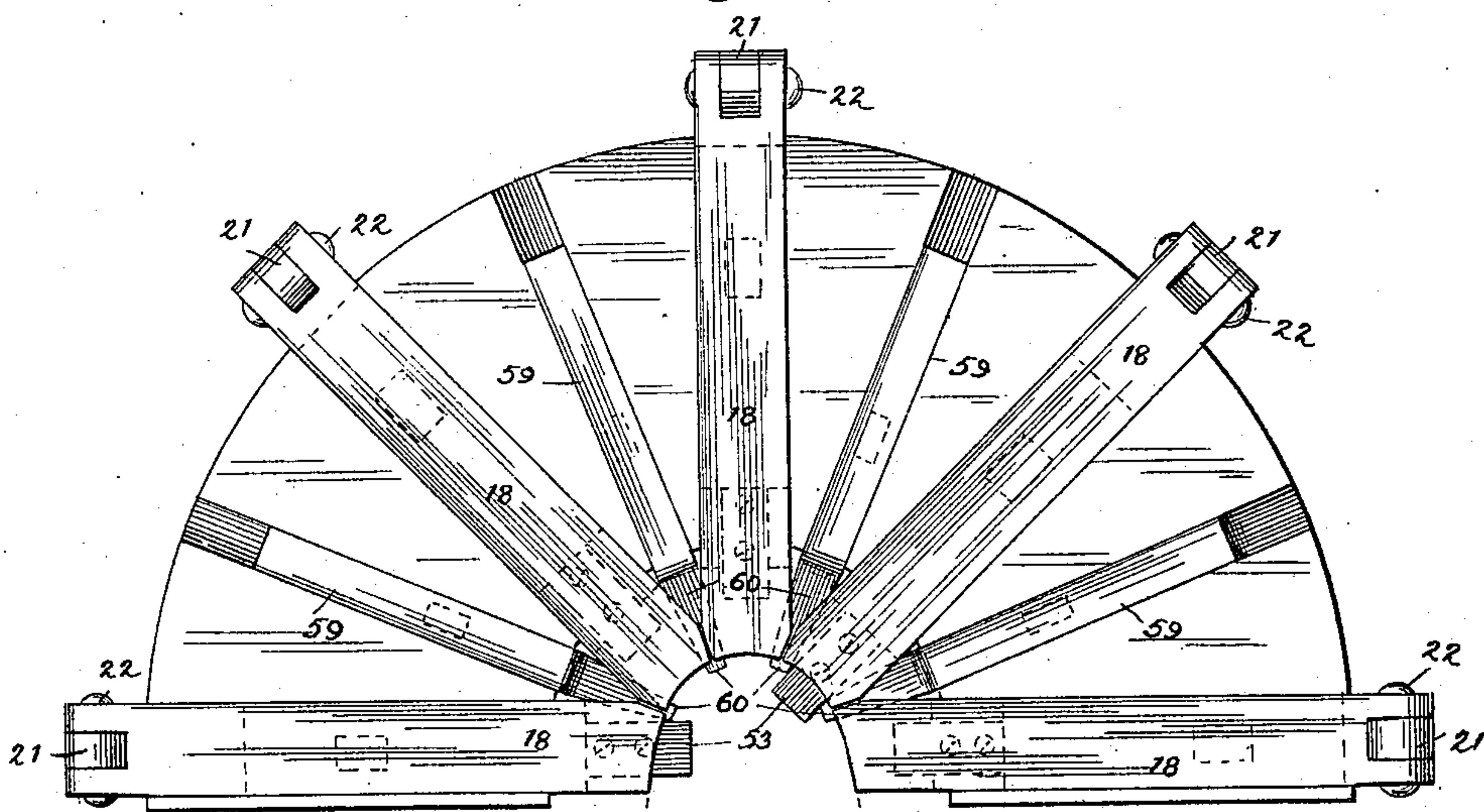


Fig. 9.



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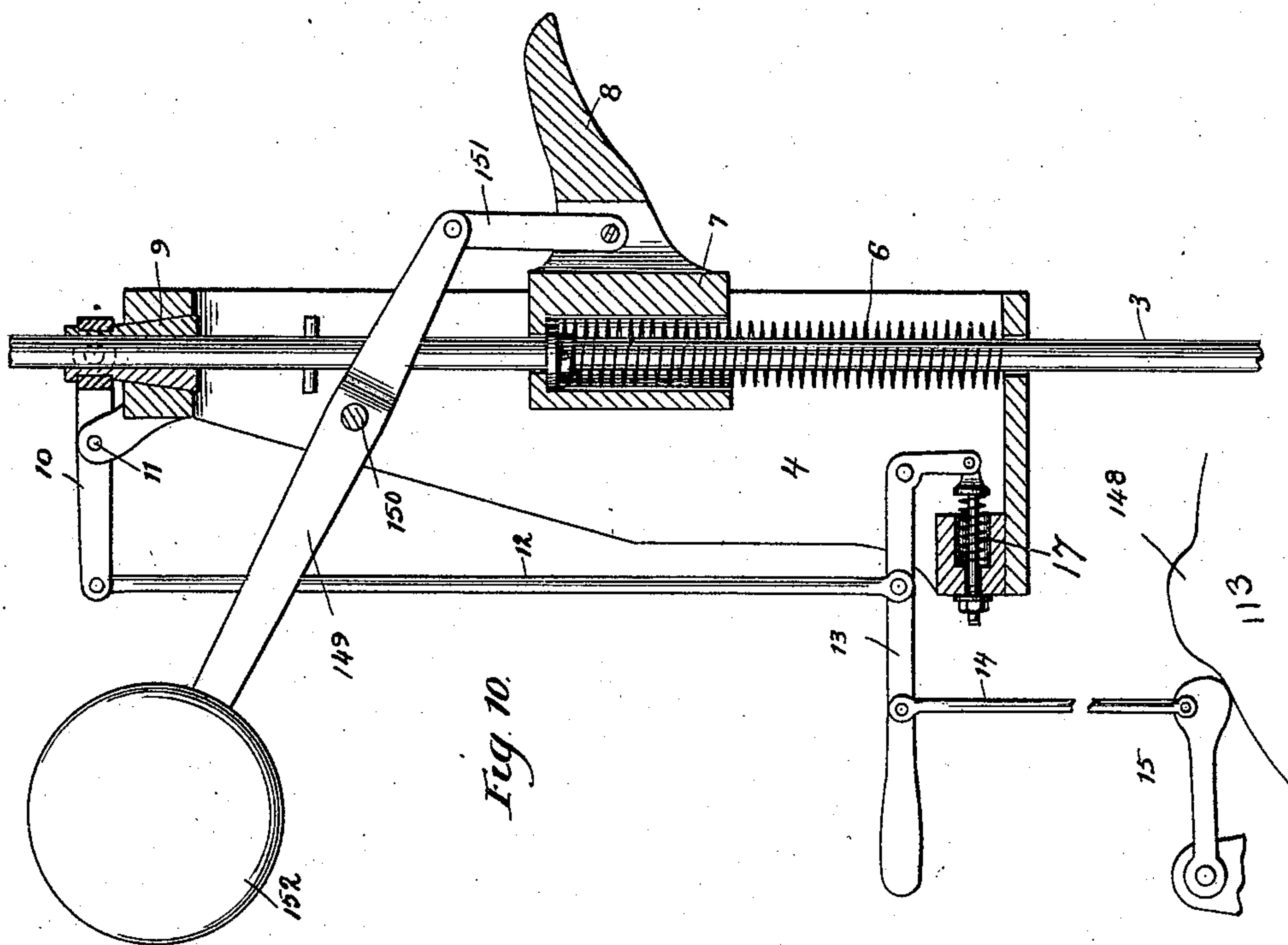
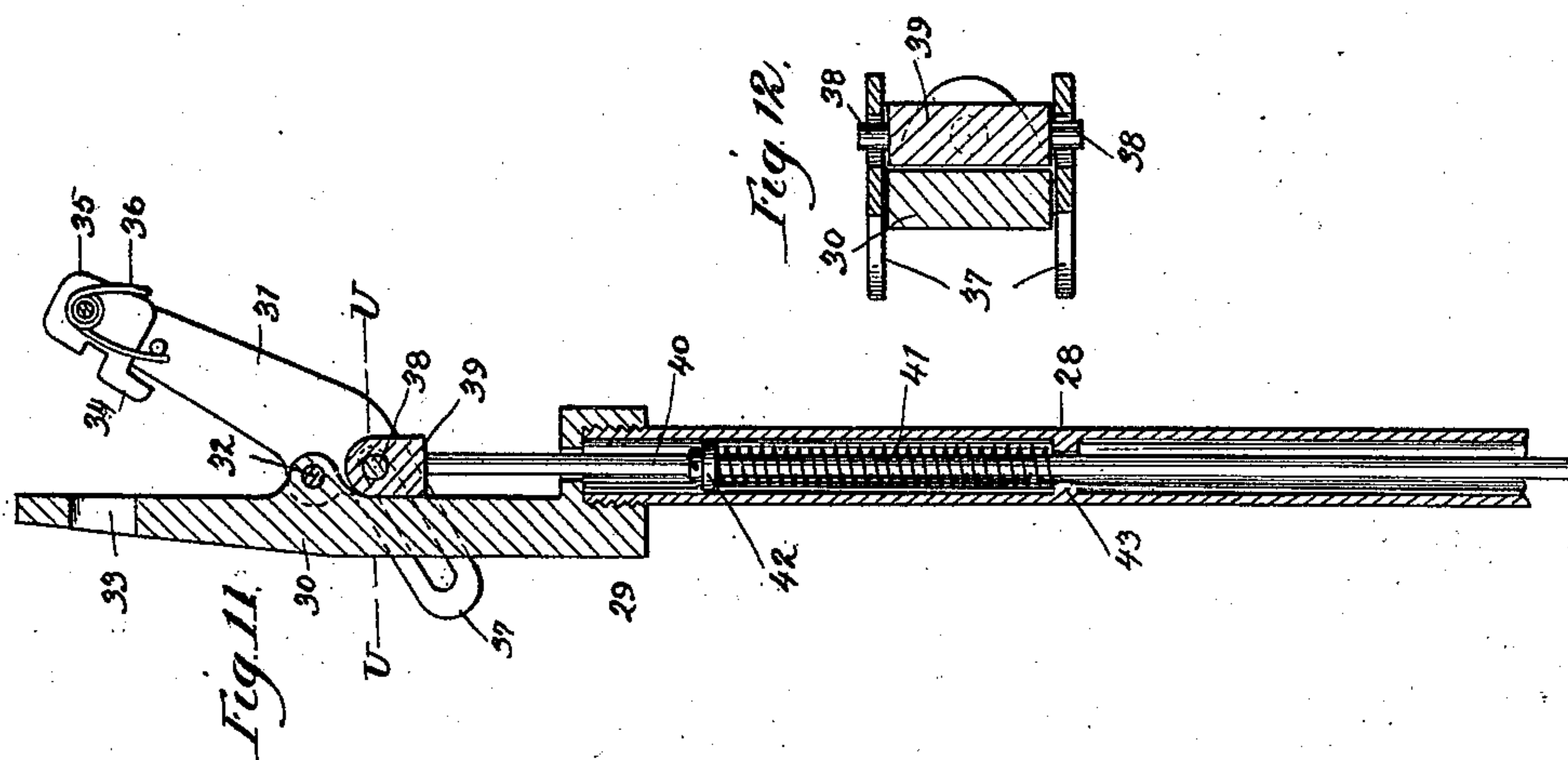
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Fig. 13.

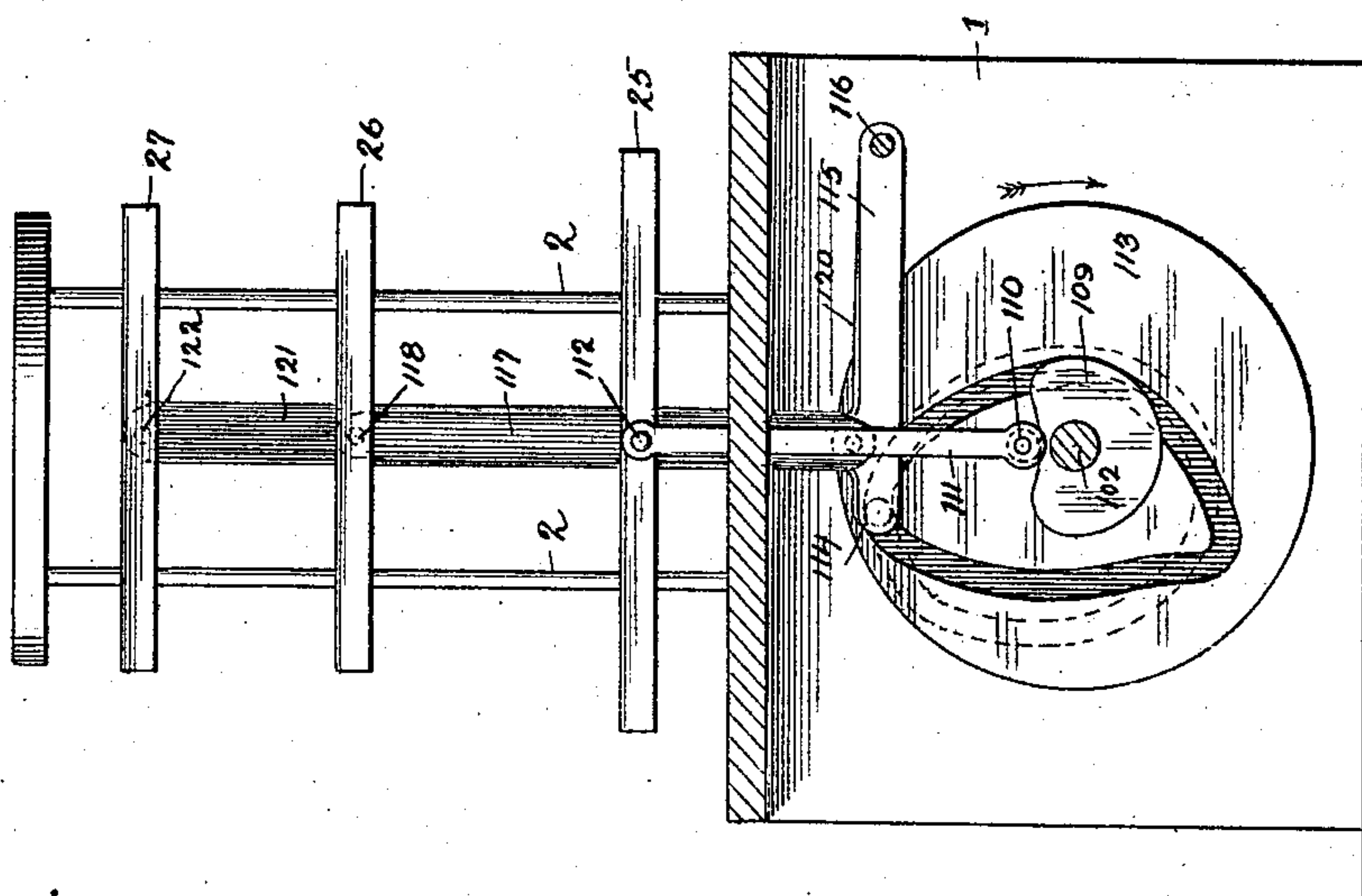
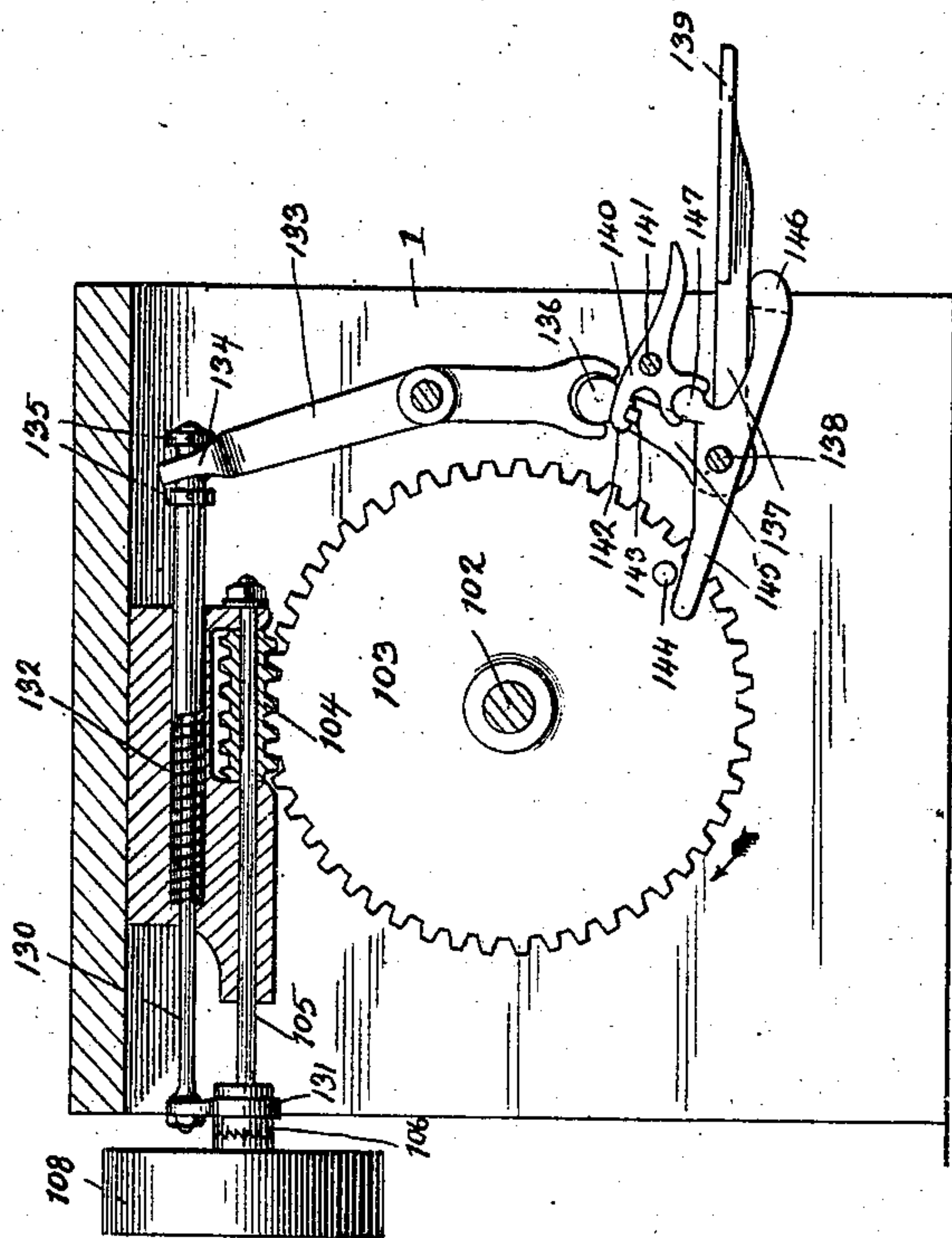


Fig. 14.



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# UNITED STATES PATENT OFFICE.

JULIUS KOTZLOVSKY, OF PHILADELPHIA, PENNSYLVANIA.

## SHOE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 574,337, dated December 29, 1896.

Application filed May 29, 1896. Serial No. 593,654. (No model.)

*To all whom it may concern:*

Be it known that I, JULIUS KOTZLOVSKY, a subject of the King of Prussia, Emperor of Germany, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Shoe-Machines, of which the following is a specification.

My invention relates to a new and useful improvement in machines for lasting shoes, and has for its object to so construct such a machine as to render the operations of lasting a shoe entirely automatic and to so facilitate this work as to greatly increase the capacity of such a machine, thereby rendering the cost of labor upon a shoe very small.

With these ends in view my invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, I will describe its construction and operation in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view of my improvement showing a shoe in position to be operated upon by the several mechanisms of the machine; Fig. 2, a section at the line *xx* of Fig. 1; Fig. 3, a section at the line *yy* of the same figure; Fig. 4, an enlarged detailed section upon a portion of the line *xx* of Fig. 1, showing one of the clamps in contact with the leather of the shoe and one of the stretchers drawing thereon; Fig. 5, a similar view after the stretcher has been turned in position by one of the folders; Fig. 6, a section at the line *zz* of Fig. 1, showing the mechanism for drawing the leather into shape upon the shank of the last; Fig. 7, a similar view illustrating the position of this mechanism when acting upon the leather; Fig. 8, a section at the line *vv* of Fig. 1, showing one of the crimping-tools; Fig. 9, a plan view of the folding mechanism at the toe portion of the machine; Fig. 10, a sectional elevation of the clamp for holding the last in position and the clutch mechanism for holding and releasing said clamp; Fig. 11, an enlarged detail section of the jaws of one of the stretchers; Fig. 12, a section at the line *uu* of Fig. 11; Fig. 13, a

detail of the operating-tables and cams for actuating the same, and Fig. 14 a similar view of the power-shaft and worm-wheel and worm for transmitting motion from said shaft to the cam-shaft and also showing the clutch mechanism for stopping and starting the cam-shaft.

Referring to the drawings in detail, 1 represents the frame of the machine, which may be of any suitable construction to support the operating parts thereof, and projecting upward from the top of this frame are two posts 2, so arranged relative to each other as to height and position to receive the last, as clearly shown in Figs. 1 and 2, and the last is clamped in position upon these posts by the presser-rod 3, which is guided within the housing 4, said housing being mounted upon the bracket 5, which in turn is supported by the frame of the machine. The presser-rod has coiled about it a spring 6, the lower end of which bears upon the bottom of the housing, and the upper end is confined by the collar 7, said collar being secured to the rod and having formed therewith a handhold 8, the object of which is to enable the operator to depress the rod 3 against the action of its spring. A conical plug 9 is fitted in a correspondingly-tapered hole in the top of the housing, and this plug is made in two sections, so that when it is drawn into the tapering hole the sections are closed upon the rod, thus clamping said rod, and this is accomplished by connecting with the plug a lever 10, as shown in Fig. 10, said lever being pivoted at 11 and connected by the rod 12 to the lever 13, which latter in turn is connected by the rod 14 to the cam-lever 15, the end of which is arranged in the line of travel of a suitable cam, as will be hereinafter set forth.

The first operation in lasting a shoe by my improvement is to secure the insole upon the bottom of the last 16 and draw the upper, which has been properly formed by stitching, as is well understood, over the last, then place said last upon the posts 2 and clamp it in position by drawing down upon the presser-rod which will be prevented from releasing its hold upon the last by the action of the spring 17 upon the lever 13. When the last has thus been placed, the next operation is to stretch, clamp, and fold the leather in posi-



tion, which is accomplished by the following mechanism:

A series of clamp-bars 18 are arranged radially about the end of the machine that corresponds to the top of the shoe to be lasted, and these bars are adapted to slide in suitable ways 19, supported upon the uprights 20, carried by the frame, and motion is imparted to the clamp-bars by a series of bell-cranked levers 21, pivoted at 22 to the bars and at 23 to the uprights, and the levers are in turn connected by rods 24 to the table 25, which has a vertically-reciprocating movement, brought about in the manner hereinafter set forth. Thus when this table is elevated the clamp-bars will be forced inward against the last or upper placed thereon.

26 is also a vertically-reciprocating table arranged next above the table 25, and still above this is arranged a table 27, also having a vertically-reciprocating movement, and upon the last-named table are mounted a number of tubes 28, which support at their upper ends the stretchers 29, consisting of a stationary jaw 30 and a swinging jaw 31, the latter being pivoted at 32 to the former. The stationary jaw of each of these stretchers has formed therethrough a hole 33, adapted to receive the nose 34 of the spring-actuated toe 35, 36 being the spring for actuating the same. Formed with the lower end of the swinging jaw 31 are slotted arms 37, in which fits a pin 38, projecting from the sides of the head 39, which latter is carried by a rod 40. Each of these rods extends downward through one of the tubes 28, and is given an upward tendency by the spring 41, which is confined between the collar 42 and the ring 43, set within the tube. Each of the rods extends downward through one of the yokes 44, the latter being mounted upon the table 26, one upon either side thereof.

Coiled around the rods 40 are springs 45, which are confined between the yokes, and the nuts 46 run upon the ends of said rods, the object being to form a cushion between the movements of the table 26 and the rods. The movements of the tables 26 and 27 are controlled by cams, as hereinafter set forth, so as to first cause these tables to move away from each other, which action will draw upon the rods 40 and by the sliding of the pins 38 in the slots formed in the arms 37 will swing the movable jaw 31 toward the stationary jaw, and when this movement has been carried to a certain point the nose 34 will enter the hole 33, thus clamping any material which may have been interposed between said jaws.

In practice the stretchers are in their elevated position when the last is placed upon the posts and the jaws are distended so that the depending edges of the upper will fall within said jaws. Therefore as the movement of the tables 26 and 27 take place, as before described, these depending edges will be clamped by the stretchers, and when this has been accomplished the tables 26 and 27 move downward

in unison, by the action of their cams, and this will draw the leather tightly over the instep of the last. During the movements of the last-named tables the table 25 will also be moved upward, which will force the bars 18 against the leather, for the purpose of holding it against retraction, and also in order that the leather around the edge of the last may be prevented from wrinkling when it is folded under.

The rods 24 are provided with springs 47, interposed between the collars 48 and the table 25, so that the forcing of the clamp-bars against the last will be cushioned. A series of folding-bars 49 are arranged immediately beneath the clamp-bars and are adapted to be forced inward by the levers 50, which are pivoted at 51 to the uprights 20 and connected to said bars by projecting within the openings 52.

The end of each of the bars 49 is provided with toe-pieces 53, so arranged as to fold the depending edges of the leather beneath and against the bottom of the last, as clearly shown in Fig. 5, when the bars 49 are forced inward, and this takes place just after the stretchers have released their hold upon said leather. The levers 50 are connected with the levers 54 by the rods 55, and the last-named levers are bell-cranked and are pivoted at 56, the vertical members thereof extending within the line of travel of a series of cam projections 57, arranged upon the disks 58, it being understood that there are two sets of these parts, one set for operating upon the toe of the last, and one set for operating upon the heel thereof. After the depending edges of the upper have been drawn down and clamped by the bars 18 it is first necessary to crimp these edges before permitting the folder to act thereon in order to prevent the irregular overlapping of the leather, which would prevent a smooth surface from being formed, to which the sole of the shoe is to be attached, and this I accomplish by providing what I call the "crimping-bars" 59, one arranged between each of the clamp-bars and carrying at their inner ends crimping-tools 60, which taper toward a point, as clearly shown in Figs. 1 and 9, and these bars are guided in suitable bearings in the uprights 61 and are actuated by the levers 62, the latter being pivoted at 63 to said uprights and connected by rods 64 to the table 25, so that when said table moves upward to force the clamp-bars 18 inward against the leather the bars 59 will also be forced inward, and these movements are so timed that the clamp-bars will first come in contact with the leather and, on account of the intervening springs 47, will be permitted to dwell while the crimping-tools are still being carried inward, which will fold under a narrow section of the depending leather just prior to the action of the folders 49, which latter will fold inward the remainder of the depending leather. These movements of the several mechanisms will cause an even crimping of the leather about the toe and heel of the last, thereby forming a comparatively



smooth surface to which the sole of the shoe may be afterward secured in the well-known manner.

In practice the several sections of the upper, such as the leather and lining from which the shoe is to be formed, are glued together around their lower edges and glue also applied to the inner surface to a sufficient distance from the lower edge of said upper so that when the depending edges thereof are folded inward and brought into firm contact with the insole by the mechanisms just described these edges will adhere to said insole, and when the proper material is used for this gluing the last and material carried thereby may be removed from the machine and after the glue has set the last may be withdrawn from the partly-completed shoe, the insole being released therefrom by the withdrawal of the temporary nails or pegs which have been driven into the last for securing said insole thereto.

In order that the upper may be drawn around the shank of the last, four rocking frames 65 are pivoted at 66 to the posts 67, secured to the upper portion of the frame, and, as will be seen, two of these frames are arranged upon each side of machine opposite the shank of the last, and each of these frames is connected by a rod 68 with the table 25 and has a collar 69, secured thereon, between which and said table is interposed a coil-spring 70. The nut 71 runs upon the lower end of this rod and prevents its withdrawal from said table. Thus when the table 25 moves upward, as before described, the upper ends of the frames 65 will be swung inward toward the last in unison with the movements of the clamp-bars and crimpers.

72 are two pairs of levers pivoted at 73 to a stationary bar 74, which is supported by the frames 65, and to these levers are pivoted the parallel levers 75, having pivoted to their inner ends the shoe 76, which is so curved at 77 as to fit the general contour of the shank of the last, a coil-spring 78 serving to hold the parallel levers and shoe in the position shown in Fig. 6. Thus when the upper end of the frame 65 is swung toward the last the shoe 76 will come in contact with the side of the shank of said last or the leather stretched thereon, and as the frame continues to move the levers 75 will be moved backward relative to said frame against the action of the spring 78, and this backward movement of these levers will cause the levers 72 to swing upon their pivotal points 73, thereby drawing the levers 75 downward, which motion will be transmitted to the shoe 76, causing it to draw the leather tightly about the instep of the last and downward around the curve of the instep after the manner of hand lasting, it being understood that the four shoes carried by the tilting frames 65 operate in unison and with a like effect upon the parts of the leather with which they come in contact. As the shoes 76 are intended only to act upon the sides of the shank provision must be made for the

carrying of the depending portions of the leather under said shank in firm contact therewith in order that it may be glued to the insole, which is accomplished by the following mechanism.

The lever 79 is pivoted at 80 to each of the tilting frames 65, so as to be carried by said frames, and to the upper end of this lever is pivoted at 81 a link 82, which in turn is pivoted at 83 to the lever 84, the latter being pivoted at 85 to the bar 74. An arm 86 is also pivoted at 83 to the lever 84, and, extending forward, has pivoted thereto at 87 a shoe 88, the upper end of which is curved to fit the general contour of the under portion of the shank of the last. The lower ends of the lever 84 and the shoe 88 are connected by the link 89, which, in conjunction with the arm 86, causes the shoe 88 to move in unison and be maintained parallel with the lever 84. The arm 86 extends outward and has pivoted thereto at 90 a bifurcated link 91, the lower end of which is slotted at 92 and is attached to the tilting frame 65 by the pin 93. Between the members of this link is located a spring 94, the upper end being attached to the pin 90 and the lower end to said pin 93, thereby holding the outer end of the arm in its normally-lowered position, which will hold the inner end thereof and the shoe 88 thereby in an elevated position.

95 is an extension of the lever 79 and has pivoted thereto at 96 the rod 97, which latter passes through an opening 98 of sufficient size to have no effect upon said rod, which also passes through the table 27 and has coiled around its lowered end a spring 99, which is confined between the nut 100 and the lower surface of said table. Thus as this table moves downward, as before described, the rod 97 will be drawn therewith, which will spring the lever 79 inward, and this movement is so timed that it takes place after the tilting frame has been swung to the position shown in Fig. 7, which brings the shoe 88 into contact with the leather upon the last, and the inward movement of the lever 79 will cause the lever 84 to also swing inward, thus carrying the arm 86 and link 89, whereby the curved surface of the shoe 88 will be drawn over the leather in firm contact therewith, by which said leather will be caused to assume the exact shape of the last at that point, as clearly shown in Fig. 7.

The action of the spring 94 permits the shoe 88 to adapt itself to the varying curve of the shank of the last, and the spring 99 serves to cushion the movements of the lever 79 so as not to bring undue strain upon any portion of the leather and also permit a continuance of the movement of the table 27 after the lever 79 has ceased to move. This last-named lever is returned to its normal position, when the table 27 moves upward by the spring 101. In the lower portion of the machine is journaled the cam-shaft 102, having mounted thereon the worm-wheel 103, which meshes with the



worm 104, secured upon the drive-shaft 105, and the latter is provided with a clutch 106, splined thereon and having suitable teeth formed upon its outer face for engagement with corresponding teeth upon the hub of the belt-wheel 108. Thus when rotary motion is imparted to this wheel and the clutch is in engagement with the teeth upon the hub of said wheel the drive-shaft 105 will be revolved, which in turn will revolve the cam-shaft.

The several cams which bring about the operations of the mechanisms are secured upon this shaft so as to move positively therewith. 109 are the outside cams of this series, the contours of which are such as to cause the rolls 110, which bear thereon, to dwell through the greater portion of the revolution of the cam-shaft, when said rolls will be in their elevated position, and these rolls are journaled upon the lower ends of the supports 111, the upper ends of which are connected at 112 to the table 25, thereby imparting a reciprocating motion to said table for the purpose hereinbefore set forth.

113 are cam-disks having formed in one of their faces cam-grooves, in which fit the rolls 114, journaled upon the outer ends of the levers 115, which are pivoted at 116 to the frame of the machine, and to these levers are pivoted the supports 117, passing upward through the table 25 and connected at 118 to the table 26. The contour of these grooves is such as to bring about the desired movement of the table to properly time the mechanisms operated by said tables, as before described. In the inner faces of the disks 113 are also formed cam-grooves in which fit the rolls 119, journaled upon the levers 120, similar in all respects to the levers 115, and these levers are connected with the supports 121, which pass upward and are secured at 122 to the table 27, thus bringing about the proper movements of said tables for the operation of the parts carried thereby. The disks 58, from which project the cam-surface 57, as before described, are also secured upon the cam-shaft, and these disks are two in number, each having three cam projections, one series for the operation of the levers 50, through the rod 55, which actuate the folding-bars for operating upon the toe of the last, and the other series are for the operation of the similar parts which bring about the movements of the folding-bars for acting upon the heels of the last.

The exact shape and arrangement of the cams and cam-disks are not essential for the operation of the machine, and I therefore do not wish to be limited thereto, as any mechanisms for bringing about the proper movement of the several operating parts of the machine may be used, and I therefore do not enter into an exact detailed description of the shapes and movements of these several cams, the only essential being that they bring about the desired movements in the proper time. For convenience in holding the fore part of the last in position upon the posts 2 I pivot a

curved lever 123 at 124, so that when the nose 125 thereof is swung downward it will come in contact with the upper side of the forepart of the last, thereby holding it tightly in position during the operations thereon, and this lever is actuated by a rod 126, pivoted thereto at 127 and connected to the table 25, a spring 128 being interposed between the collar 129 and this table, so that when said table is moved upward, as before described, and the nose of the lever comes in contact with the last, a continuation of this upward movement of the table will not effect a further movement of the lever.

In a machine of this character it is essential that the mechanisms thereof for accomplishing the several operations shall be brought to a positive stop at a given point automatically. This is accomplished by providing a rod 130, which is secured to the clutch by a collar 131, the rod being actuated in one direction by the spring 132 and in the opposite direction by the lever 133, which is connected therewith by the forked end 134 being confined between the collars 135.

The lower end of the lever 133 is bifurcated and adapted to embrace the circular head 136, which head is formed with a bell-cranked lever 137, the latter being pivoted at 138, its horizontal member terminating in a treadle 139. A latch 140 is pivoted at 141 to the frame of the machine and is provided with a nose 142, adapted to engage the stud 143, the latter projecting from the side of the bell-cranked lever. Thus when the treadle is depressed sufficiently to bring this stud within the reach of the nose of the latch the latter will spring into engagement with said stud by either gravity or a suitable spring, (the latter not being shown,) thereby holding said bell-cranked lever in the position shown in Fig. 14, and during the movement of this lever to the last-named position the upper end of the lever 133 will be swung forward, thus forcing the rod 130 against the action of its spring, thereby putting the clutch 106 into engagement with the teeth upon the hub of the belt-wheel 108. This, as before described, will impart the rotations of said wheel to the worm-shaft and through the worm and worm-wheel to the cam-shaft, thereby actuating the several mechanisms of the machine, all of which are dependent for their movements upon the cams and cam-disks carried by the last-named shaft. Now the worm-wheel 103 has projecting from one face thereof a pin 144, which, during the revolving of said wheel in the direction of the arrow, will come in contact with the inner end of the lever 145, which is pivoted at 138, and, projecting outward, terminates in a lug 146, adapted to come in contact with the under side of the horizontal member of the bell-cranked lever 137. The lever 145 is also connected to the latch 140 at 147, so that when the pin 144 strikes the inner end of the lever 145 and forces it downward the first effect will be to



disengage the nose of the latch from the stud 143, thereby releasing the bell-cranked lever, the upper end of which will be carried inward by the swinging of the lever 133, which will  
 5 be brought about by the spring 132, and since the clutch is connected to the rod 130 it will be seen that said clutch will be disengaged from the belt-wheel, thus permitting said wheel to revolve freely upon the worm-shaft  
 10 without imparting motion thereto. This of course stops the machine until the clutch is again engaged with the hub of the belt-wheel, which is brought about in the following manner:

15 When the upper end of the bell-cranked lever is swung inward, as just described, the treadle is also elevated, and by depressing the same with the foot the upper end of the lever 133 will be swung inward, thereby  
 20 restoring the clamp against the action of its spring in engagement with the hub of the belt-wheel, where it will be locked by the engagement of the nose 142 with the stud 143, as before described. This downward move-  
 25 ment of the treadle will also carry with it the outer end of the lever 145, on account of the engagement of the bell-cranked lever with the lug 146, thus elevating the inner end of the lever 145 into the field of travel of the  
 30 pin 144, in order that it may be again actuated by said pin in its travel for disengaging the clutch and stopping the machine. Thus it will be seen that the movements of the machine will at all times be arrested at the same  
 35 point, and the mechanisms thereof for operating upon the shoe should be so limited as to be in their normal position or that best adapted for the reception of the last and the beginning of their operation thereon.

40 If at any time occasion requires, the machine may be stopped at any point in its operation by depressing the outer end of the latch 140, so as to disengage the nose thereof from the stud, the result being the disengage-  
 45 ment of the clutch from the hub of the belt-wheel, as before described. One of the disks 113 is provided with cam projections 148, which during its travel comes in contact with the nose of the lever 15, thereby forcing said  
 50 lever upward, which, through the rod 14, will swing the lever 13 upward against the action of the spring 17, and this, through the rod 12, will swing the inner end of the lever 10 down-  
 55 ward, and, as before described, this movement will depress the conical plug 9, thereby freeing the rod 3, which will be moved upward by the spring 6. These movements are so timed that the presser-rod 3 is elevated just prior to the stopping of the machine, and  
 60 as the nose of the lever 123 is also moved out of contact with the last in unison with the elevation of said rod it will be seen that the last and shoe carried thereby may be removed from the machine in order that another may  
 65 be substituted therefor.

If found necessary, the lever 149 may be pivoted at 150 and connected by a link 151 to

the handhold 8, said lever carrying a weight 152 for the overbalancing of the presser-rod 3 and parts carried thereby.

In practice I prefer to so time the cam projections 57 as to cause the folding-bars to act upon the depending edges of the leather in pairs, as follows: The folding-bars located beneath the clamping-bars (designated by A) first move inward to act upon the leather and then outward, when those indicated by B will in turn act upon said leather, and finally those indicated by C. These successive operations upon the leather from different points have the effect of following up the crimping-  
 75 tools and more thoroughly folding the leather upon the insole carried by the last, the result being that the folds in the leather will be regular and evenly arranged, thereby pre-  
 80 senting a better surface for the securing of the sole to the upper than would otherwise be the case.

The ways 19, in which the clamp-bars 18 and the folding-bars 49 slide, are provided with loose bottoms 153, which have turned edges overlapping the sides of the uprights 20, so as to be movable thereon, and while the folding-bars are not in action their inner ends are held elevated by means of spring-pressed buttons 154, secured in the uprights. The toe-pieces 53 on the folding-bars have cam-shaped noses, which are so shaped as to be forced downward when striking the last and carrying with them the clamping-bars and bottoms 153 against the spring action of the buttons 154, thereby drawing the leather tight around the contour of the last, but when the folding-bars and clamping-bar are withdrawn the buttons 154 force the inner ends of the bottoms 153 upward in position for the next stroke.

The various tools which operate upon the shoe are made adjustable and interchangeable, so that when a different form of shoe is to be operated upon these tools may be adjusted or others substituted therefor which will be especially adapted to the particular design of shoe being lasted. Thus any style of shoe, and even men's and ladies' shoes, may be lasted by my improved machine with equal facility.

Many modifications might be made in the designing of the several parts which go to make up the operating mechanisms of my improvement without departing from the spirit of my invention, and I therefore do not wish to be limited to the exact design here shown and described.

Having thus fully described my invention, what I claim as new and useful is—

1. In a machine for lasting shoes, a suitable support for the last, means for clamping said last in position upon said support, a series of stretchers for drawing the leather downward and into conformity with the shape of the last, a series of clamp-bars arranged radially about the heel and toe of said last, means for moving said bars to and from the



last, a series of folding-bars for turning the depending edges of the leather inward against the under surface of the last or insole carried thereby, a series of shoes 76 adapted to bear against the shank of the last, a series of shoes 88 to bear and move upon the surface of the last or the material placed thereon and means for bringing about the operation, substantially as shown and described.

2. In a machine for lasting shoes, a frame for supporting the operating parts thereof, supports projecting upward from said frame upon which the last may be placed, means for clamping said last upon the supports, a series of clamp-bars adapted to slide in suitable bearings and be brought into contact with the leather upon the last, a series of crimping-bars for turning certain portions of the depending leather inward, a series of folding-bars for carrying said leather inward against the insole carried by the last, and means for effecting these movements, substantially as shown and described.

3. In a machine for lasting shoes, a frame for supporting the operating parts thereof, supports projecting upward from said frame upon which the last may be placed, means for clamping said last upon the supports, a series of clamp-bars adapted to slide in suitable bearings and be brought into contact with the leather upon the last, a series of crimping-bars for turning certain portions of the depending leather inward, a series of folding-bars for carrying said leather inward against the insole carried by the last, a series of shoes 76, means for bringing said shoes into conjunction with the shank of the last, a series of shoes 88 adapted to bear and move upon the surface of the last or material placed thereon, and means for bringing about the operations of the machine, substantially as shown and described.

4. In a machine for lasting shoes, a frame for supporting the operating parts thereof, supports projecting upward from said frame upon which the last may be placed, means for clamping said last upon the supports, a series of clamp-bars adapted to slide in suitable bearings and be brought into contact with the leather upon the last, a series of crimping-bars for turning certain portions of the depending leather inward, a series of folding-bars for carrying said leather inward against the insole carried by the last, a series of shoes 76, means for bringing said shoes into conjunction with the shank of the last, a series of shoes 88 adapted to bear and move upon the surface of the last or material placed thereon, a cam-shaft carrying a series of cams and cam-disks, means for starting and stopping said shaft, and means for transmitting motion from said cams to the mechanisms for operating upon the shoe, substantially as shown and described.

5. In a machine for lasting shoes, the combination of a frame, supports projecting upward therefrom adapted to receive the last, a

presser-rod, means for depressing said rod into contact with the last, a clutch for holding said rod in contact with said last, means for releasing said clutch, a lever 123 adapted to be swung into engagement with the fore part of the last, a series of stretchers having jaws for grasping the depending edges of the leather upon the last, means for effecting the movements of said jaws and stretchers, a series of clamp-bars arranged radially about the heel and toe of the last, means for carrying said bars into contact with the material upon the last, a series of crimping-bars adapted to crimp the leather against the under side of the last or insole carried thereby, a series of folding-bars adapted to fold said leather after it has been crimped, means for effecting these movements, tilting frames, pivoted upon each side of the last, shoes carried by a series of spring-actuated levers pivoted to said tilting frames, a series of shoes 88 also carried by a series of levers pivoted to said tilting frames, means for tilting said frames, and means for operating the shoes 88 independent of the movements of the tilting frames, substantially as shown and described.

6. In a machine for lasting shoes, the combination of a frame, supports projecting upward therefrom adapted to receive the last, a presser-rod, means for depressing said rod into contact with the last, a clutch for holding said rod in contact with said last, means for releasing said clutch, a lever 123 adapted to be swung into engagement with the fore part of the last, a series of stretchers having jaws for grasping the depending edges of the leather upon the last, a series of clamp-bars arranged radially about the heel and toe of the last, means for carrying said bars into contact with the material upon the last, a series of crimping-bars adapted to crimp the leather against the under side of the last or insole carried thereby, a series of folding-bars adapted to fold said leather after it has been crimped, means for effecting these movements, tilting frames, pivoted upon each side of the last, shoes carried by a series of spring-actuated levers pivoted to said tilting frames, a series of shoes 88 also carried by a series of levers pivoted to said tilting frame, levers 79 connected by links 82 to the last-named levers, rods 97 pivoted to the levers 79, and means for operating the machine, as and for the purpose described.

7. In a device of the character described, a presser-rod composed of a frame, a spring-pressed rod slidable therein, a handle on the rod, a tapering plug formed of two sections fitting in a tapering aperture of the frame and surrounding the rod, a lever pivoted to the frame, and connected to said plug, a spring-pressed bell-crank lever also pivoted to the frame, a rod connecting the two levers and means for operating the bell-crank lever against the action of its spring, as and for the purpose described.

8. In a device of the character described,



an upright having a passage therethrough, a movable spring-pressed bottom in the passage a folding-bar slidable on the bottom, a clamping-bar slidable on the folding-bar, a cam-nose on the end of the folding-bar adapted to slide beneath the edge of the last against the action of the spring-pressed bottom as and for the purpose described.

9. In a device of the character described, an upright having a passage therethrough, a movable bottom in the passage a spring-pressed button in the passage beneath said bottom, a folding-bar slidable on the bottom, a clamping-bar slidable on the folding-bar, a cam-nose on the end of the folding-bar adapted to slide beneath the edge of the last against the action of the spring-pressed button and means for operating the folding-bar and the clamping-bar, as and for the purpose described.

10. In a device of the character described, a rocking frame pivoted to the frame of the machine, two parallel upright levers pivoted to the rocking frame, two parallel levers pivoted to the upright levers a shoe pivoted to the second pair of parallel levers and adapted to bear on the side of the last when the frame is rocked and means for rocking the frame, as and for the purpose described.

11. In a device of the character described, a rocking frame pivoted to the frame of a machine, a spring-actuated bell-crank lever pivoted to the rocking frame, a lever pivoted to the rocking frame, a link connecting the lever to the bell-crank lever, a spring-pressed arm pivoted to the lever, a shoe pivoted to the end thereof, a link connecting the shoe and lever, a link connected to the arm and slidably connected to the rocking frame and

means for operating the rocking frame and bell-crank lever, as and for the purpose described.

12. In a device of the character described a drive-pulley, a shaft on which said pulley is journaled; a clutch connecting the pulley to the shaft, a worm on the shaft, a worm-wheel operated thereby a spring-pressed rod connected to the movable member of the clutch, a lever pivoted to the frame of the machine having its end connected to the rod, a bell-crank treadle connected to the lever, a catch for holding the treadle in its operative position and a releasing mechanism for automatically removing the catch, as and for the purpose described.

13. In a device of the character described, a shaft, a drive-pulley journaled thereon, a clutch connecting the pulley to the shaft, a worm on the shaft, a worm-wheel operated thereby, a spring-pressed rod connected to the movable member of the clutch, a lever pivoted to the frame of the machine having its end connected to the rod, a bell-crank treadle connected to the lever, a catch for holding the treadle in its operative position, a pin carried by the worm-wheel, a lever pivoted to the frame having its end projecting in the path of the pin and adapted to release the catch when engaged thereby, as and for the purpose described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

JULIUS KOTZLOVSKY.

Witnesses:

S. S. WILLIAMSON,  
MARK BUFORD.