

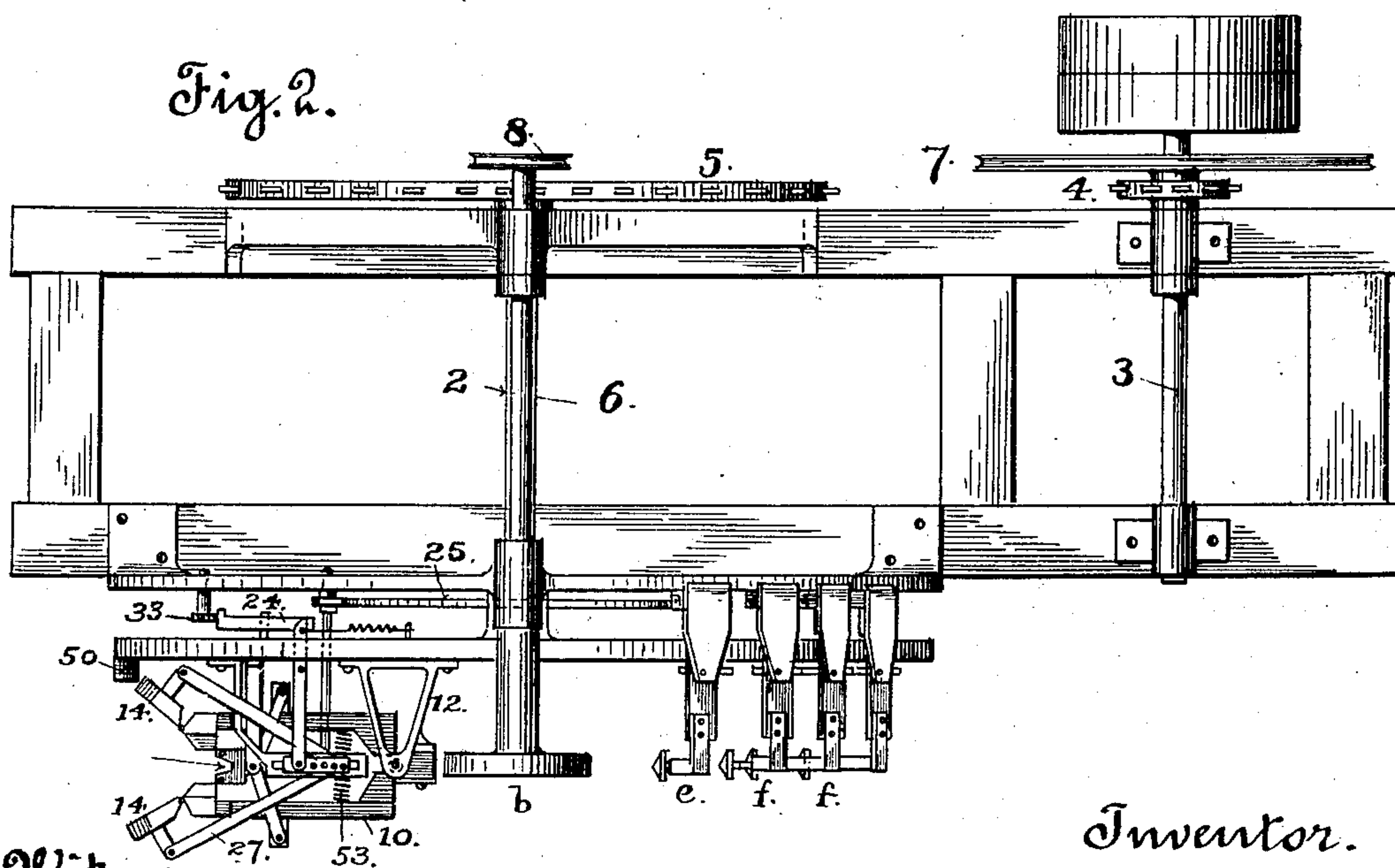
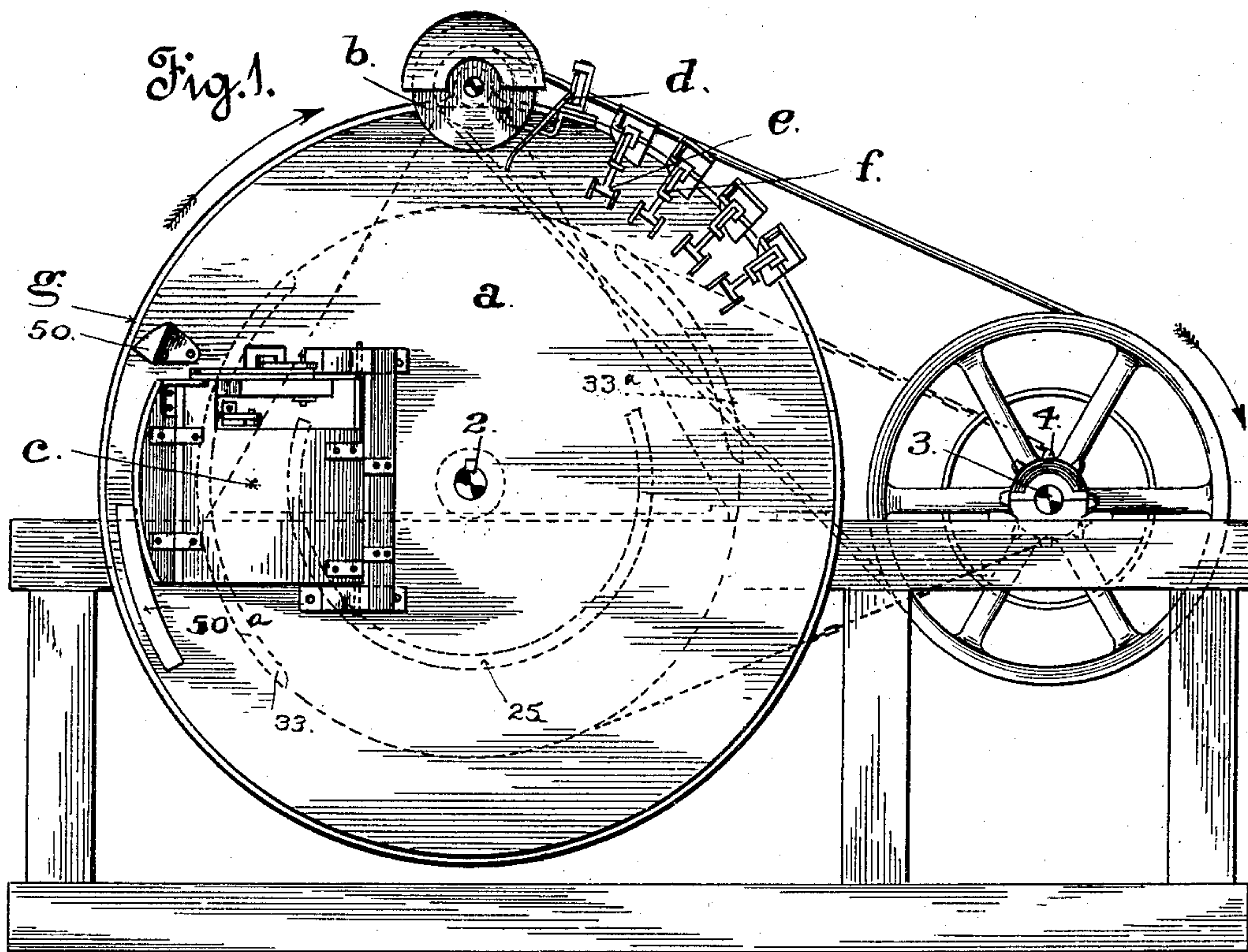
T. MORRIS.

MACHINE FOR OPENING AND CLEANING FISH.

APPLICATION FILED DEC. 13, 1901.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses.
W. H. Monteverde.
F. G. Osborn.

Inventor.
Thomas Morris
 by *Smith & Osborn*
 his attys.

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4 SHEETS—SHEET 2.

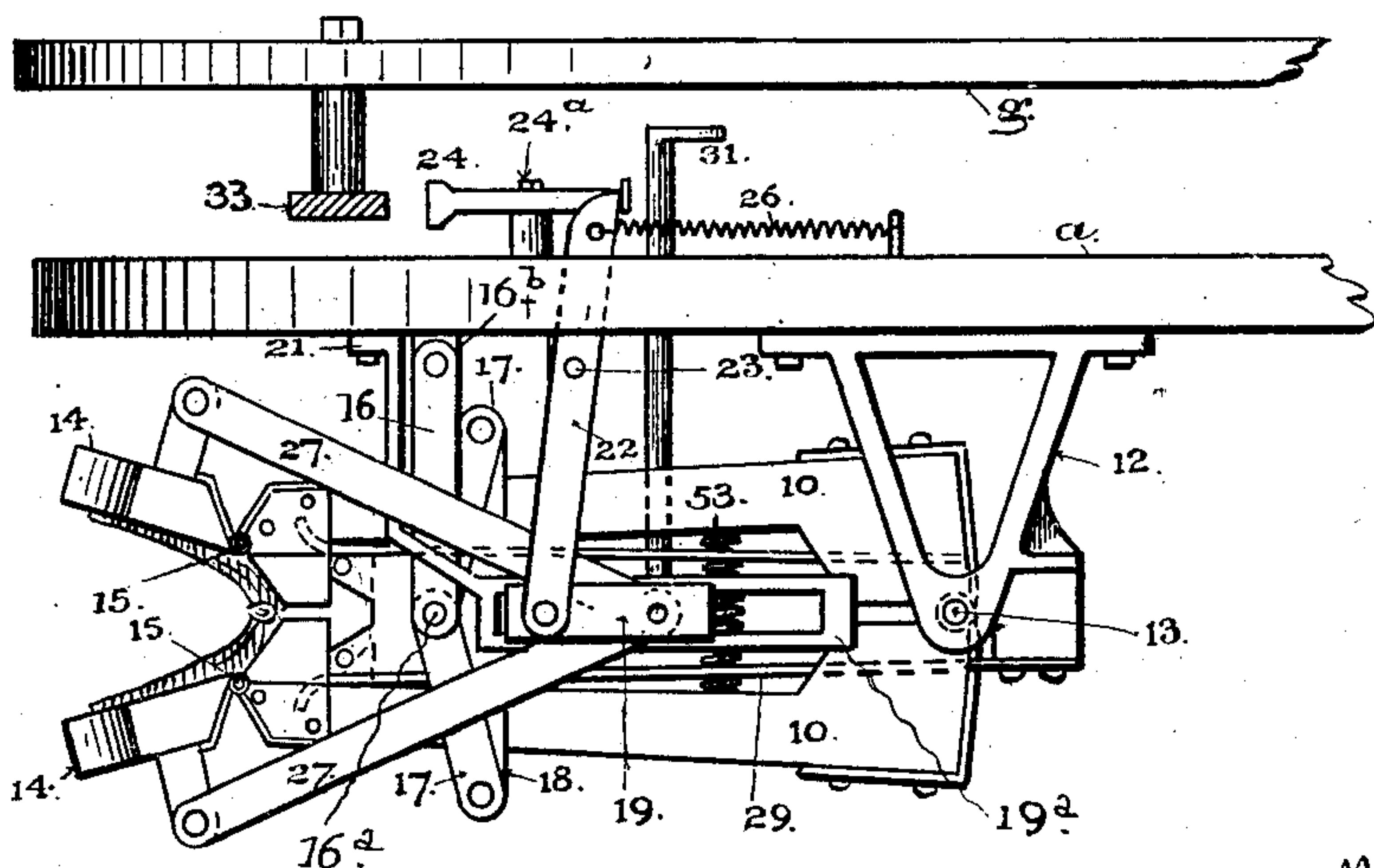


Fig. 3.

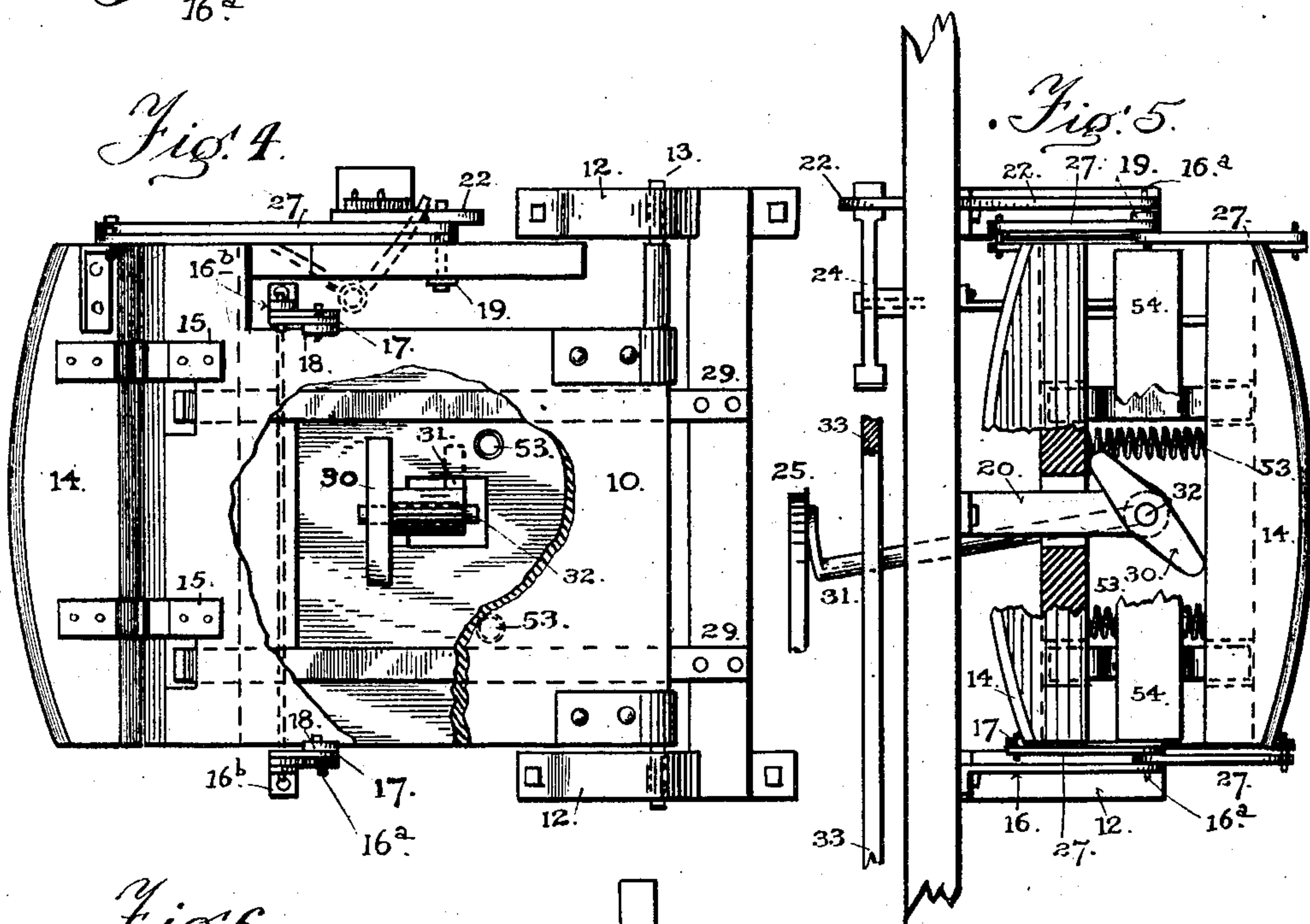


Fig. 4.

Fig. 5.

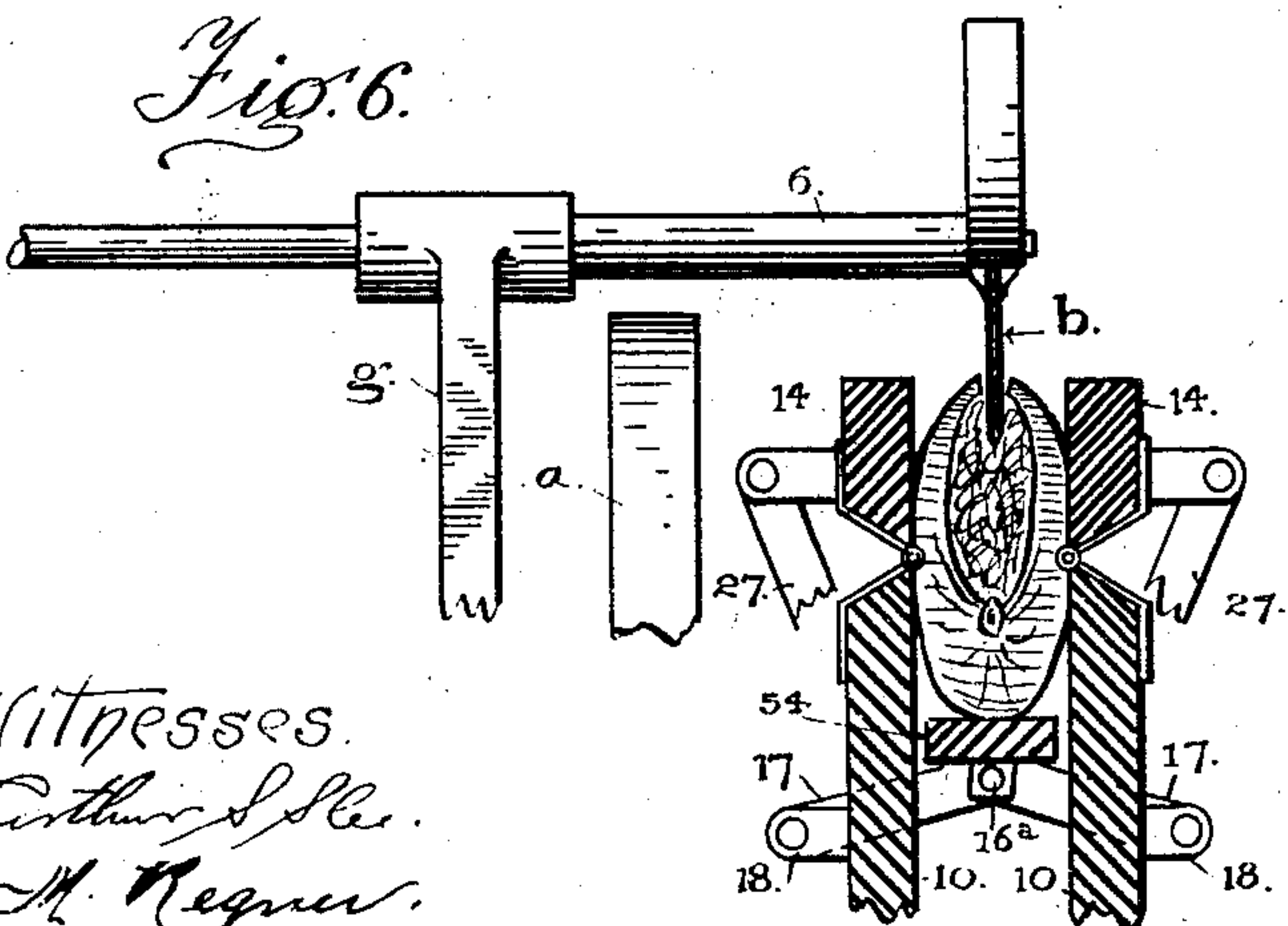


Fig. 6.

Witnesses.
Arthur S. Lee.
M. Regner.

Inventor.
Theodore Morris
by Smith & Woburn
Attys

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4 SHEETS—SHEET 3

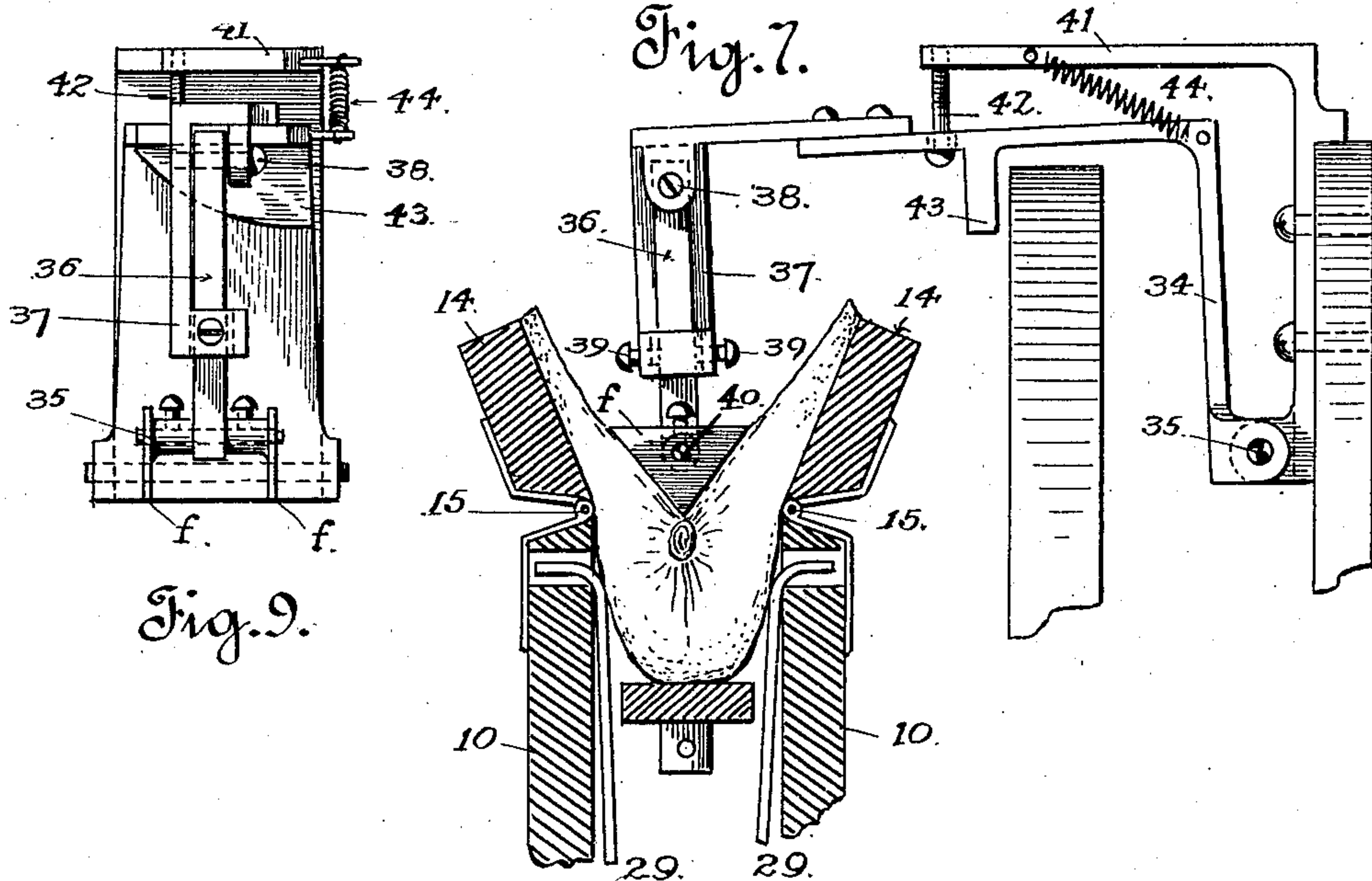


Fig. 8.

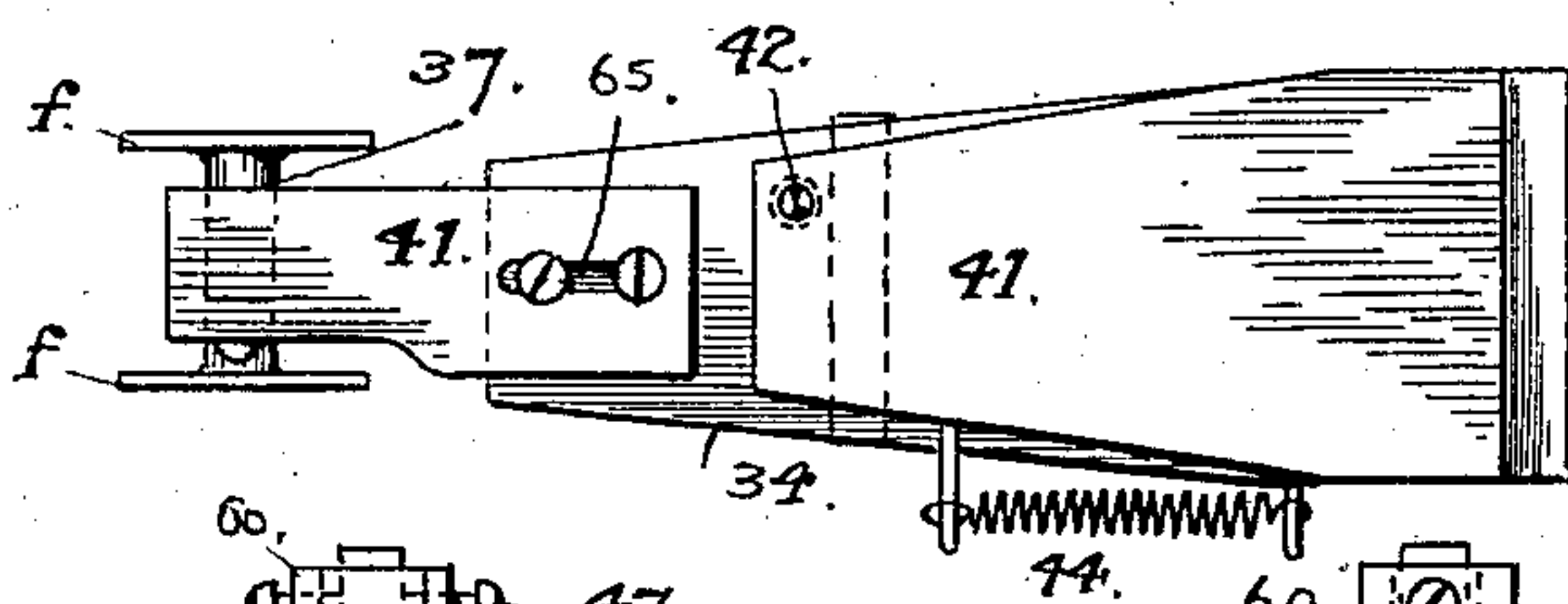


Fig. 10.

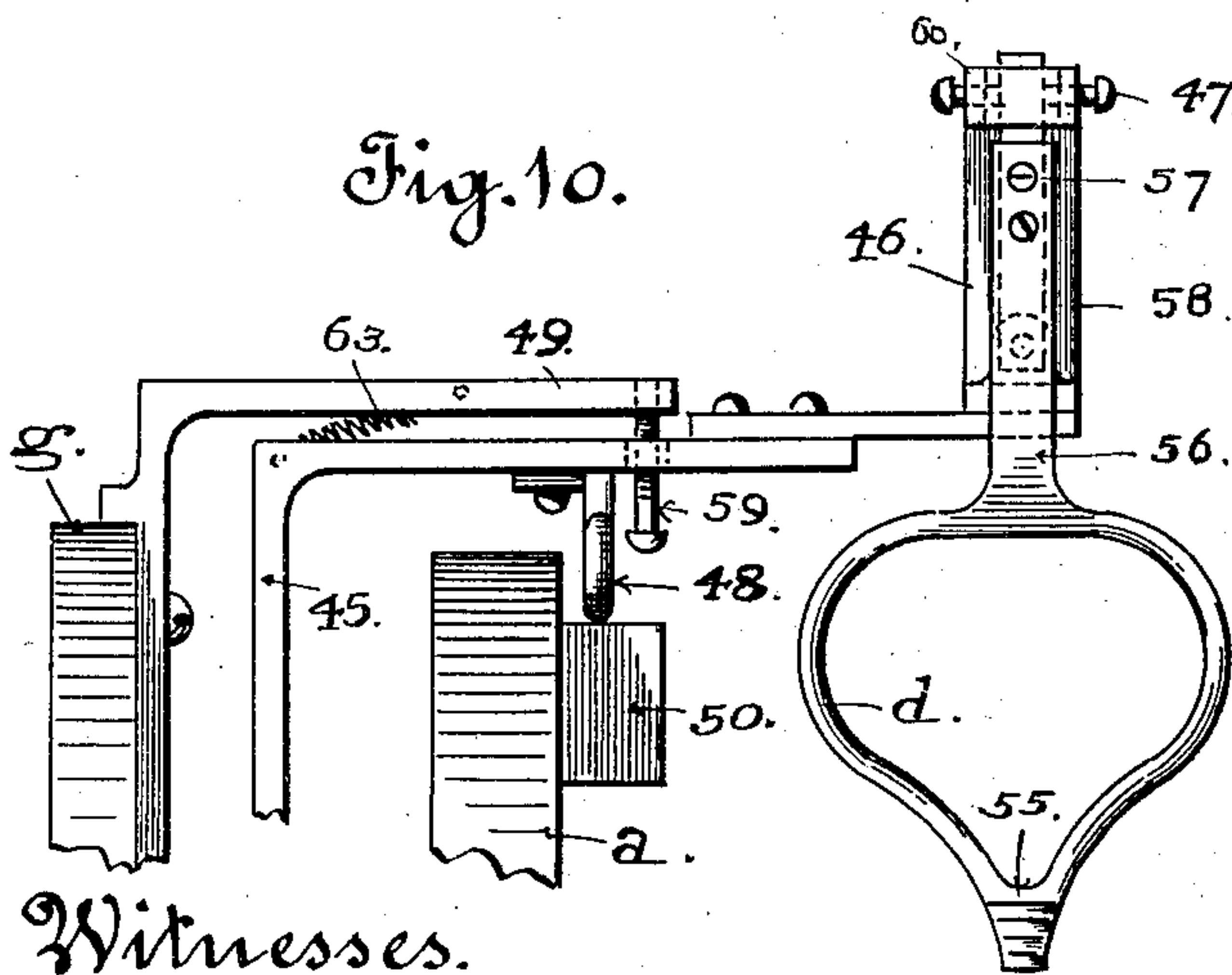
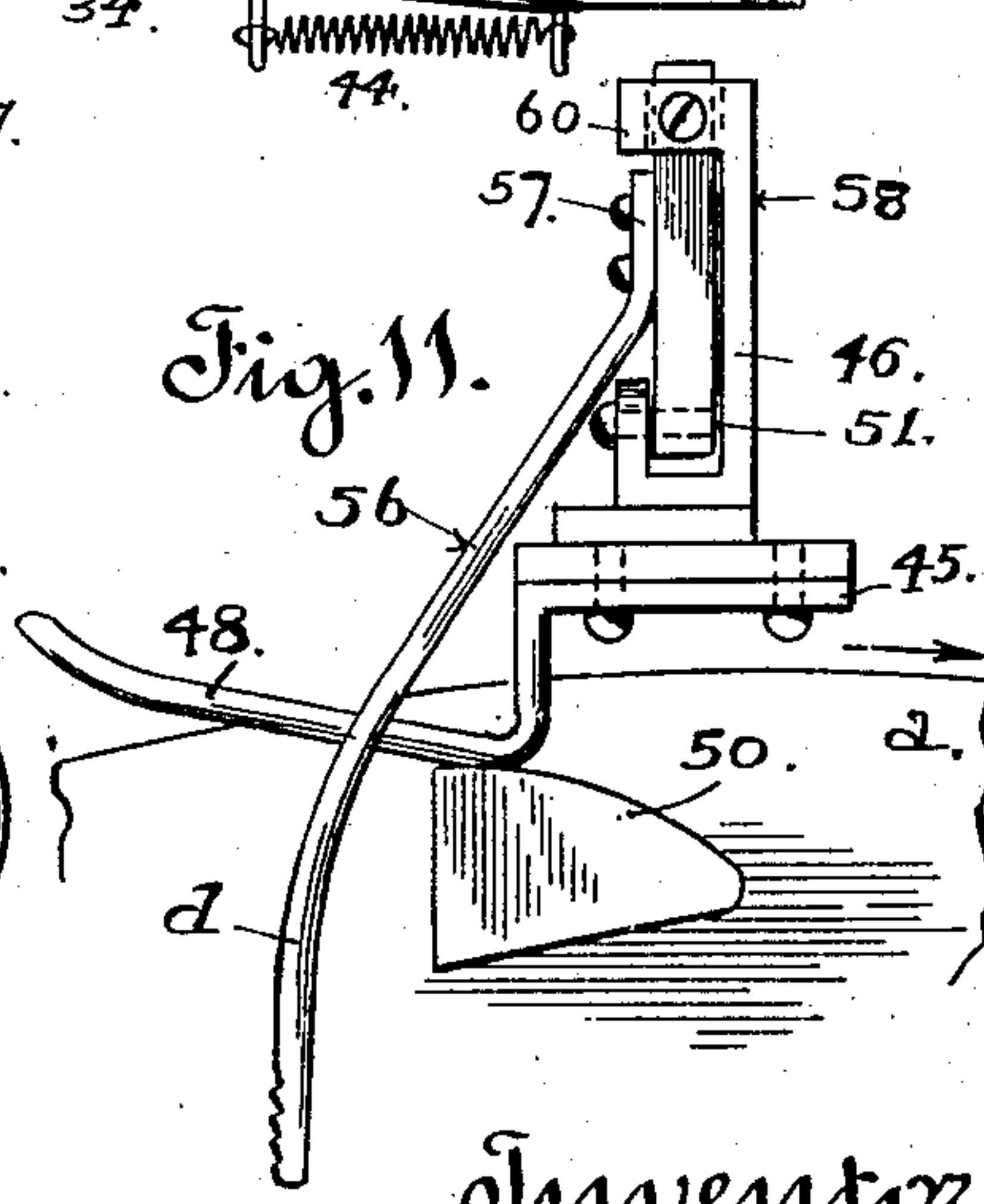


Fig. 11.



Witnesses.

J. H. Horne

F. G. Osborn

Inventor.

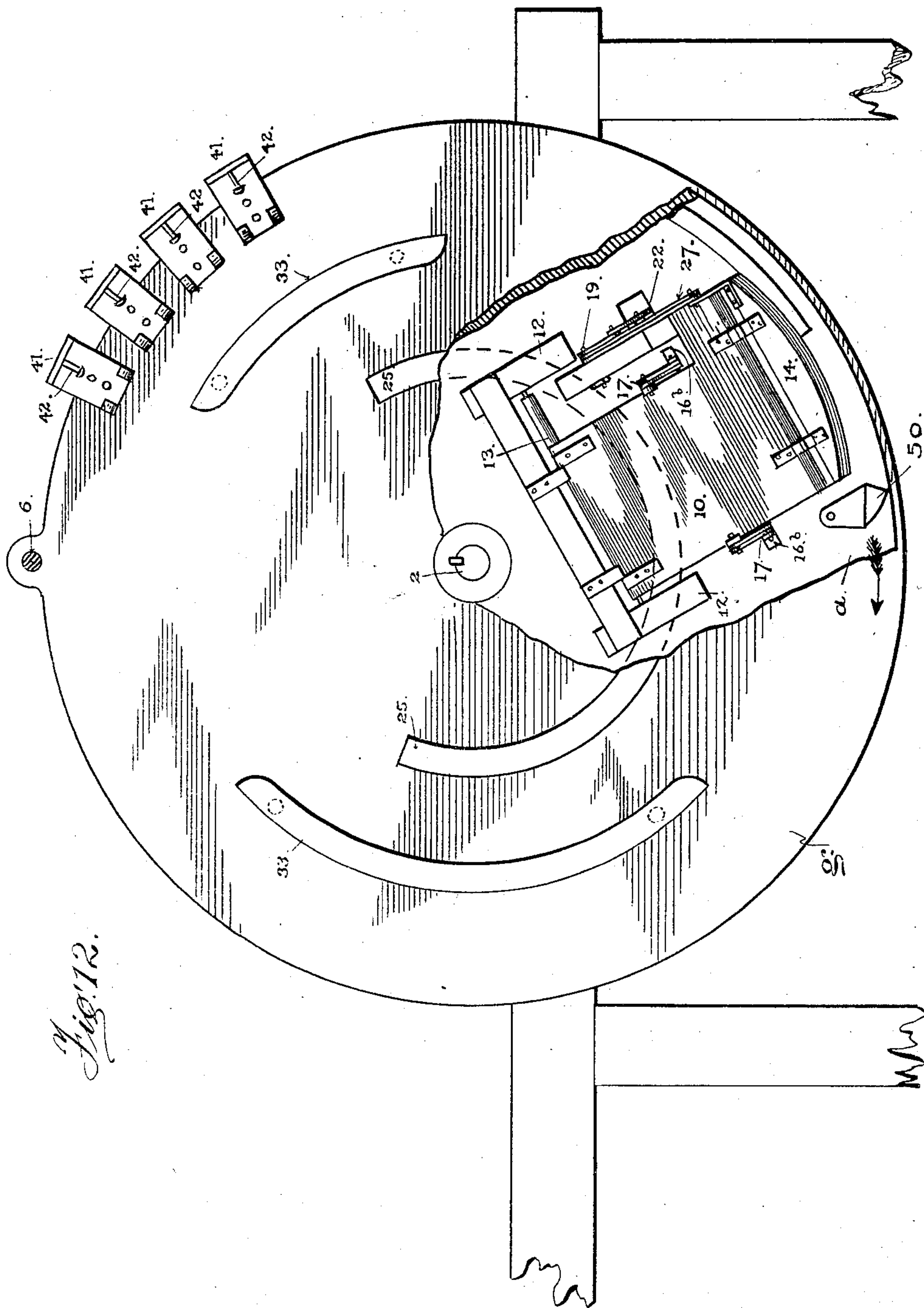
Theodore Morris
by *Smith & Son*
attorneys

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NO MODEL.

4 SHEETS—SHEET 4.



Witnesses.
Arthur S. Lee.
M. Regner.

Inventor.
Theodore Morris
by Dr. H. H. Osborn
Attys

UNITED STATES PATENT OFFICE.

THEODORE MORRIS, OF SAN FRANCISCO, CALIFORNIA.

MACHINE FOR OPENING AND CLEANING FISH.

SPECIFICATION forming part of Letters Patent No. 735,994, dated August 11, 1903.

Application filed December 13, 1901. Serial No. 85,784. (No model.)

To all whom it may concern:

Be it known that I, THEODORE MORRIS, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented a new and useful Improvement in Machines for Opening and Cleaning Fish, of which the following is a specification.

This invention relates to improvements made in machines for splitting fish, removing the entrails, and cleaning out the intestinal cavity, and these improvements have for their object the production of a machine for performing the above-described operations in a thorough as well as an automatic manner on salmon and other fish of the larger and heavier kinds, as hereinafter more particularly set forth.

The said improvements comprise clamping-jaws of novel construction operating to hold the fish and present it to the splitting and cleaning appliances and having novel features of adjustment whereby the jaws take in and accommodate themselves to different sizes of fish, also implements or appliances of novel construction for splitting the fish, for removing the entrails, and for scraping or cleaning out the intestinal cavity, and in combination with these implements means for automatically regulating and adjusting them to accommodate and operate on fish of different sizes.

The following description explains at length the nature of these improvements and the manner in which I construct and apply the same in the production of an improved machine for the purpose described, reference being had to the drawings that accompany and form part of this specification.

Figure 1 of the drawings is a side elevation of a machine embodying my said invention. Fig. 2 is a plan or top view. Fig. 3 is a top view, on an enlarged scale, of the clamp and a portion of the revolving head to which the clamp is attached. Fig. 4 is a side view of the clamp, showing a portion of one side broken away to expose parts within. Fig. 5 is an end view taken from the left side of Fig. 4. Fig. 6 is a cross-section of the clamp, taken in a vertical plane directly in front of the splitting-tool when the clamp is in posi-

tion under that tool. Fig. 7 is a similar cross-section taken in front of the excavating or entrailing implements. Fig. 8 is a top view of the implement shown in Fig. 7. Fig. 9 is a side elevation taken from the left side of Fig. 7. Fig. 10 is an elevation of the entrailing implement and the parts that support it and throw it in and out of operation. Fig. 11 is a view taken from the right side of Fig. 10. Fig. 12 is a front elevation in detail, on an enlarged scale, of the stationary head and a portion of the revolving head on which the fish-clamp is mounted.

The principal parts of this machine are designated and referred to hereinafter as the revolving head *a*, splitting-tool *b*, clamp *c*, entrailing-tool *d*, scraping implements *e f*, and stationary head *g*.

In its simplest form this machine is provided with a single clamping device on the revolving head; but the capacity of the machine can be increased by providing one or more additional clamps on the same head, placed at intervals apart around the circle, with sufficient space between them to give room for the workmen to feed or place the fish in the clamp in advance of the position occupied by the splitting and cleaning tools in the machine.

The revolving head *a* is mounted on a horizontal shaft 2, to which rotary motion is given through the well-known pulleys and belt by sprocket-wheels 4 5 and a chain belt connecting shaft 2 with an engine-driven shaft 3. From the same shaft 3 motion is taken by pulleys 7 8 and a belt to operate the splitting-tool, which is a circular knife *B*, fixed on a shaft 6 over the revolving head. By setting and arranging the head and the clamps to work in vertical planes, or nearly so, the fish is discharged from the clamps by virtue of its own weight as soon as it is released, and large heavy fish can be successfully handled and rapidly operated on, while the entrails and matter removed by the tools are prevented from collecting or clogging the working parts and are discharged from the machine without the employment of special parts or means for that purpose.

The part herein termed the "clamp" has two hinged members, each composed of a jaw

10 and a movable flap 14, attached to the outer end of the jaw by hinges 15, so as to open outwardly and separately of the jaw. The function of the jaws is to grasp and firmly
 5 hold the body of the fish, while the hinged flaps that form the outer ends of the jaws are at first closed on the sides of the fish to compress and present the belly portion to the splitting-tool and are afterward opened and
 10 held at an angle to allow the entrailing and scraping tools to act on the inner sides of the fish. In this position the jaws 10 still retain a firm hold on the body of the fish and carry it along under the cleaning devices, and the
 15 flaps, standing at diverging angles to the jaws, support the thin belly portions during the operation.

A large and heavy fish can be carried under and presented to the several cleaning devices
 20 in succession without danger of slipping in the jaws and of the flesh being torn or mutilated. The opening and closing of the jaws and their flaps are produced by the following means, actuated by or from the motion of
 25 the revolving head.

The jaws 10 are pivoted at 13 in brackets 12, fastened to the front or outer face of the revolving head *a*. These brackets support the clamp at proper distance from the revolving
 30 head to let both jaws open to an equal extent on opposite sides of the center of the pivotal point.

A cross-head 30 on a short rock-shaft 32 is supported in the center of the clamp between
 35 the two jaws by a bracket 20, extending from the revolving head through a slot in the nearer jaw, and an arm 31, fast on the rock-shaft 32, extends through an opening in the revolving head and projects in line with a stop-rail 25,
 40 fixed on the stationary head or part *g* behind the revolving head. The stop-rail is secured to the front face of the head *g* in such position with relation to the axis 2, and also to the cleaning devices, that the end of the arm 31
 45 is brought in contact with the rail, and the arm is pressed over to one side after the clamp in its revolution about the axis 2 has passed beyond the last one of the fish-cleaning devices, and the arm is held in that position
 50 until the clamp has completed the remaining half of its travel and is brought again to the position at the front of the splitting-tool, where the fish to be operated on is inserted between the jaws of the clamp. During the
 55 time the end of the arm 31 travels in contact with the stop-rail 25 the cross-head 30 is held in an angular position across the space between the jaws 10, as seen in Fig. 5, thereby holding the jaws open against the reactive
 60 force of the coiled springs 53; but when the end of the arm 31 passes off the end of the stop-rail 25 the spring 53 draws the jaws together. Just in advance of that point in the revolution of the head *a* the workman places
 65 in the clamp the body of the fish from which the head and tail have previously been removed, whereupon the jaws close and retain

the fish until the end of the arm 31 is brought by the movement of the head *a* in engagement with the opposite end of the stop-rail. 7c
 In a similar manner the flaps 14 are opened and closed upon the belly portion of the fish; but these movements take place independently of the opening and closing of the jaws in order to release the sides of the fish and
 75 allow the belly portion to open and be spread apart for cleaning out the cavity after the splitting-tool has done its work without loosening the grip of the jaws on the back and solid sides of the fish. These opening and
 80 closing movements of the flaps are produced by the following means: The two flaps 14 are connected by loosely-pivoted links 27 to a common slide-bar 19 in a slotted guide 19^a, that is supported from the revolving head by
 85 a bracket 21, and a rocking lever 22, pivoted at 23 and attached at the outer end to the slide 19, extends from that part through a slot in the revolving head to the opposite side of the head, where the rear end of the rock-
 90 ing lever rests against one end of a short lever 24, also pivotally attached to the rear side of the revolving head. This shorter lever 24 works on a pivot carried by a post 24^a, and the end opposite to that which is
 95 next to the end of the rocking lever 22 stands at such distance radially from the axis 2 that it is in line with two stop-rails 33 on the stationary head *g*. These rails 33 are also concentric with the axis and are located in such
 100 position with relation to the fish-cleaning tools, supported from the stationary head, that the end of the lever 24 will be pressed over and the lever caused to turn on its pivot in the proper direction to move the slide 19
 105 downward in the guide and close the flaps when the lever 24 comes in contact with the rail 33, or when that end of the lever is carried away from the end of the rail the coiled spring 26, pulling on the rear end of the rock-
 110 ing lever 22, will throw the slide 19 to the upper end of the slotted guide 19^a, and thereby open the flaps. The two stop-rails provided on the face of the stationary head for this purpose are so situated with relation to
 115 the fish-cleaning devices that are supported on the same head that the flaps are opened after the clamp has presented the fish to the splitting-tool and the first one of the clamping devices is about to act, and during the
 120 time the several devices are in operation the stop-rail 33 (seen in Fig. 12) on the right of the axis, just beneath the brackets 41, that support the cleaners, holds the flaps apart as long as the end of the lever 24 remains in contact with it, and afterward the other stop-rail
 125 33, on the opposite side of the center 2, opens the flaps again at the same time that the jaws 10 are opened by the inner stop-rail 25 to discharge the cleaned fish and also holds the
 130 flaps open until the workman has placed another fish in the clamp. The flaps 14 thus are held normally closed by the tension of the spring 26 upon the lever 22 and are spread

and held open as long as the end of the lever 24 is traveling in contact with the stop-rail.

When the flaps are closed upon the fish, it should lie and be held in such position between the jaws that the thin belly portion is above or outside of the line of the hinges 15. The flaps when thus opened and held apart form supports for the thin sides of the fish and present them in the most favorable position for the cleaners to act.

When placed in the clamp before the jaws close upon it, the back of the fish rests upon a support extending longitudinally through the space between the jaws and so connected with the jaws that the movements of the jaws on the hinge 13 in opening to receive the fish will act upon the bar 54 and raise or lower it in position according to the extent of the opening movement of the jaws, and in proportion as the jaws are forced apart to take in the fish the bar 54 will be moved and set lower down. The distance of the bar 54 from the points of attachment of the flap to the jaws is adjusted and regulated automatically, therefore, by the variation in the size of one fish over another and is accomplished by the following means: The bars 54 are supported at the ends from the sides of the jaws 10 by short links 17 and arms 18, the latter being rigidly fastened to the sides of the jaws and the latter loosely attached to the outer ends or those arms and to a common pivot on the end of the bar, and as the latter pivot at each end of the bar 54 is connected by a link 16 with a fixed pivotal point 16^a on a bracket 16^b, carried by the revolving head, the links 17 are brought more nearly in a straight line as the jaws are spread apart, the effect of which is to draw the bar 54 downward and increase the depth of the space between the jaws, or, on the other hand, the links are brought to a greater angle, carrying the bar 54 upward, as the jaws are set closer together to grasp the fish.

On the stationary head *g* is mounted a device for removing the entrails, which I have termed the "entrailing-tool," and also scraping devices of peculiar construction that operate to clean the cavity of the fish and especially to remove the lining or membrane of the cavity and reach and traverse the extreme bottom of the cavity to remove the blood and matter located along the backbone, which is more or less difficult to reach. These two kinds of tools have features of self-adjustment, so as to accommodate themselves to variations in the size of the fish run through the machine and operate to advantage on all sizes of fish that the machine is capable of handling.

The entrailing-tool is constructed in the form illustrated in Figs. 10 and 11 with an open heart-shaped frame *d*, having an open center and terminating in a pointed lower end 55. It has a shank 56, by which it is fastened by screws 57 to a carrying-bar 46. The latter is mounted in a bracket 59 on the end of a tilting arm 45; and that arm is loosely at-

tached to the outer end of a bar 49, by which it is supported at proper distance in front of the revoluble head *a* to occupy a position perpendicularly in line with the center of the opening between the jaws of the clamp when the latter is in position under the tool *d*. The bar 45 is movable on the screw-stud 50, that connects it to the arm 49, and this arm projects over the revoluble head *a*, holding the bar 45 clear of the head, while the tool *d*, being suspended from the stud 50, allows the lower end to center and adjust itself in the cavity of the fish. In addition to this movement on the stud 50 the tool has a lateral movement on a pivot 51, on which the lower end of the bar 46 is mounted in the bracket, so that it may move transversely. The upper end of the bar 46 is confined by set-screws 47 in a socket 60, allowing lateral adjustment of the lower point of the tool to one side or the other of the center by turning up one or the other of the screws.

In the operation of the machine the fish is presented to the tool *d* head first, or with the thicker end forward, and this requires the lower end of the tool to be raised so as to clear the end of the backbone and afterward to be dropped to reach the bottom of the cavity immediately in front of the point where the entrails are attached to the bottom and the side walls, and again, after traversing the cavity from end to end, the tool requires to be raised as the end of the slit is reached. These two movements are effected by an inclined arm 48, fixed to the under side of the arm 45 and extending in the path of two cams 50 and 50^a, fixed on the front face of the revoluble head *a*, one cam being in advance of the clamp and the other behind it. A coiled spring 63, attached to the arm 45 and to the support 49, holds the incline 48 in working contact and causes it to drop quickly from the cams as the latter are brought under the incline by the movement of the revoluble head. Several scrapers are mounted in a similar manner on the stationary head *g* behind the entrailing-tool, with like provision for adjusting them both longitudinally and transversely with relation to the fish in the grasp of the jaws. Each scraper is composed of a triangular blade adjustable on one end of a shank 36, pivotally attached by a screw 38 at the opposite end to a bracket 37, on which point the shank is adjustable laterally and the scraper set to one side or the other of the center by set-screws 39. The bracket 37 is a part of an angular arm 34, hinged at 35 to an ear on the stationary head *g*, and also suspended from the upper end of the bracket 41, which is fixed on the stationary head. On the screw 42 that connects the arm 34 to the bracket that arm also has a limited movement, and the scraper is raised and lowered in a similar manner to the entrailing-tool already described by the contact of the arm 34 with the same cams 50 and 50^a, that lift and drop the entrailer. A block 43

on the arm 34, coming in contact with the cams on the revolving head α , raises and lowers the scraper at the proper time.

Provision is also made for angular adjustment of the scraper-head on the end of the shank 36 by securing the blade on a pin 35, fixed in the shank, by means of a hub and a set-screw, and the arm 34 is made in two parts fastened together by screws 65, passing through slots in the top member for the purpose of adjusting the scraper laterally to one side or the other with relation to the longitudinal center line of the cavity in which the tool is to work.

I claim—

1. In a machine for splitting and cleaning fish, the combination of a stationary head, a splitting-tool and an entrailing-tool mounted thereon, a vertically-revoluble head and a fish-clamping device mounted on the revoluble head comprising a pair of jaws adapted to open and close on a line parallel with the plane of rotation of the head, movable flaps on the ends of the jaws adapted to open separately of the said jaws, and means actuated by the movement of the revoluble head operating to open and close the jaws and the flaps at intervals in the movement of the revoluble head as described.

2. In a machine for splitting and cleaning fish, a fish-holding clamp comprising movable jaws mounted for rotation around an axis, movable flaps on the ends of the jaws adapted to open and close separately of the jaws, means operating to carry the clamp in a circular path about an axis and in relation to splitting and cleaning tools situated in said path, and means operating the jaws and flaps.

3. The combination of the movable jaws, movable flaps thereon adapted to open outwardly, and means operating to open and close the jaws and the flaps separately of each other.

4. The combination of the movable jaws separately-movable flaps on the outer end of the jaws adapted to open outwardly and stand at diverging angles on opposite sides of the opening, spring-actuated means adapted to hold the jaws normally closed, means operating to open the jaws against the force of the spring, means connected with the flaps to open and close them separately of the jaws, and an adjustable rest between the jaws adapted to regulate the position of the fish.

5. In a machine for splitting and cleaning fish, a clamp revoluble in a circular path around an axis and comprising hinged jaws and hinged flaps on the jaws separable on a line parallel with the plane in which the clamp travels, a splitting-tool mounted for operation in the path traveled by the clamp, an entrailing-tool situated in the same path behind the splitting-tool, means operating in the movements of the clamp around its axis to close the jaws on the fish in advance of the position occupied by the tools and to open them after the clamp has passed the tools, and means operating the flaps on the jaws to

spread them apart after the clamp has presented the fish to the splitting-tool and in advance of the entrailing-tool.

6. In a machine for splitting and cleaning fish, the combination with a clamp having separable jaws, of means for opening and closing the jaws, and an adjustable rest between the jaws adapted to regulate the position of the fish within the jaws, and means for adjusting said rest at varying distances from the flaps.

7. In a machine for splitting and cleaning fish, a pair of separable jaws adapted to grasp and hold the body portion of the fish, separately-movable flaps at the ends of the jaws operating to embrace and support the belly portion of the fish, means for operating the jaws and flaps separately of each other, a movable rest between the jaws adapted to support the fish in the jaws and means operated by the movements of the jaws to adjust the rest.

8. In a machine for splitting and cleaning fish, the combination of separable jaws having movable flaps on the outer sides adapted to stand at diverging angles, means for closing the jaws and flaps simultaneously to grasp the fish, means operating to open the flaps in advance of the opening movement of the jaws, and means for rotating the jaws in a plane parallel with the line of separation of the jaws.

9. In a machine for splitting and cleaning fish, a rotatable head, a clamp thereon comprising jaws separable on a line parallel with the plane of rotation, flaps on the said jaws having movement separately of the jaws to stand at diverging angles thereto, means actuated by the rotative movement of the head to operate the jaws and flaps, a splitting-tool located in the path of the jaws and arranged to engage the portion of the fish which is held between the flaps, an entrailing-tool adapted to enter the fish after the splitting operation, and means automatically adjusting the said entrailing-tool with relation to the jaws as described.

10. In a machine for splitting and cleaning fish, a head mounted for rotation in a vertical plane, a fish-holding clamp thereon having jaws separable on a line parallel with the plane of rotation, flaps on said jaws adapted to open separately of the jaws at diverging angles thereto, means controlled from the rotative movements of the head to open and close the jaws periodically in their rotative movement, and to open the flaps separately of the jaws, a splitting-tool located in the path of the jaws in position to enter between the flaps in their closed position and split the fish, an entrailing-tool operating to enter and traverse the separated portions of the fish after the splitting operation, means for opening the flaps and holding them at diverging angles in advance of the entrance of the entrailing-tool, a scraping device located behind the entrailing-tool and means for opening the jaws to release the fish after the operation of the scraping device.

11. In a machine for splitting and cleaning fish the combination of gripping-jaws having parts on the ends thereof standing at diverging angles, adapted to support the belly portion of the fish, means for imparting continuous movement thereto in a circular path, a splitting-tool located in the path of the gripping-jaws to engage the fish while in the grasp of the jaws, means operating to partly open the jaws after the splitting operation to release and allow the belly portion of the fish to spread at diverging angles, and an entrailing-tool, adapted to act on the spread sides of the fish while the body of the fish is held between the jaws.

12. In a machine for splitting and cleaning fish, a rotatable clamp having hinged jaws forming separable members adapted to grasp the back of the fish, separately-movable flaps to embrace the belly portion of the fish, a splitting-tool located in the path of the rotatable clamp, means operating to partly open the flaps to release the belly portion of the fish in advance of the body portion, and an entrailing-tool having approximately a triangular shape terminating in a pointed lower

end adapted to engage the sides of the fish and traverse the bottom of the cavity along the backbone.

13. In a machine for cleaning fish, a scraping device comprising a triangular scraper, having a pointed lower end, a shank and a carrying-frame in which the shank is loosely attached, and means for adjusting the shank laterally in the carrying-frame.

14. In a machine for cleaning fish, a rotatable head, separable jaws thereon, means for periodically opening and closing the jaws to grasp and release the fish, a scraping device adjustable in a plane parallel with the opening between the jaws and also transversely of said plane, means operating to adjust the scraping device with relation to the bottom of the cavity in the fish, and means operating to partly separate the jaws in advance of the position occupied by the scraping device.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

THEODORE MORRIS. [L. S.]

Witnesses:

EDWARD E. OSBORN,
GEO. T. KNOX.