

No. 897,937.

PATENTED SEPT. 8, 1908.

T. SMALL.
DEVICE FOR TRUING BOWLING PINS.

APPLICATION FILED MAR. 27, 1908.

2 SHEETS—SHEET 1.

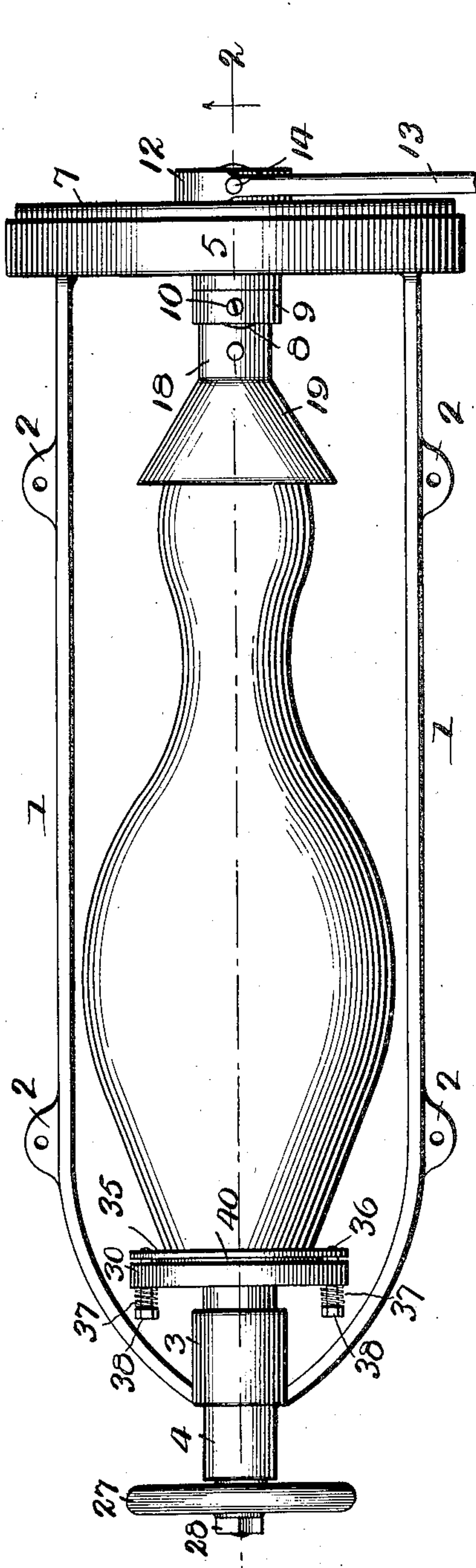


Fig. 1.

Witnesses
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Alexand. Moulton

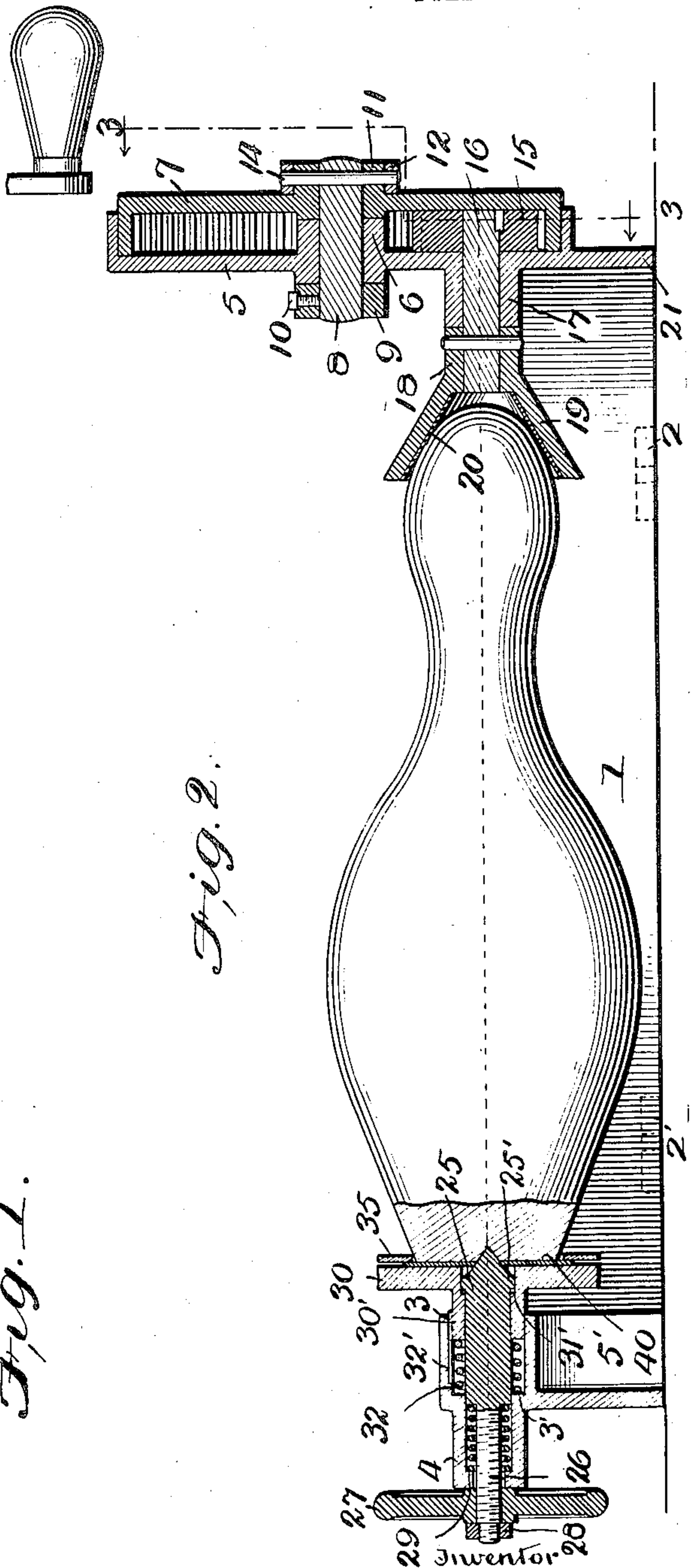


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

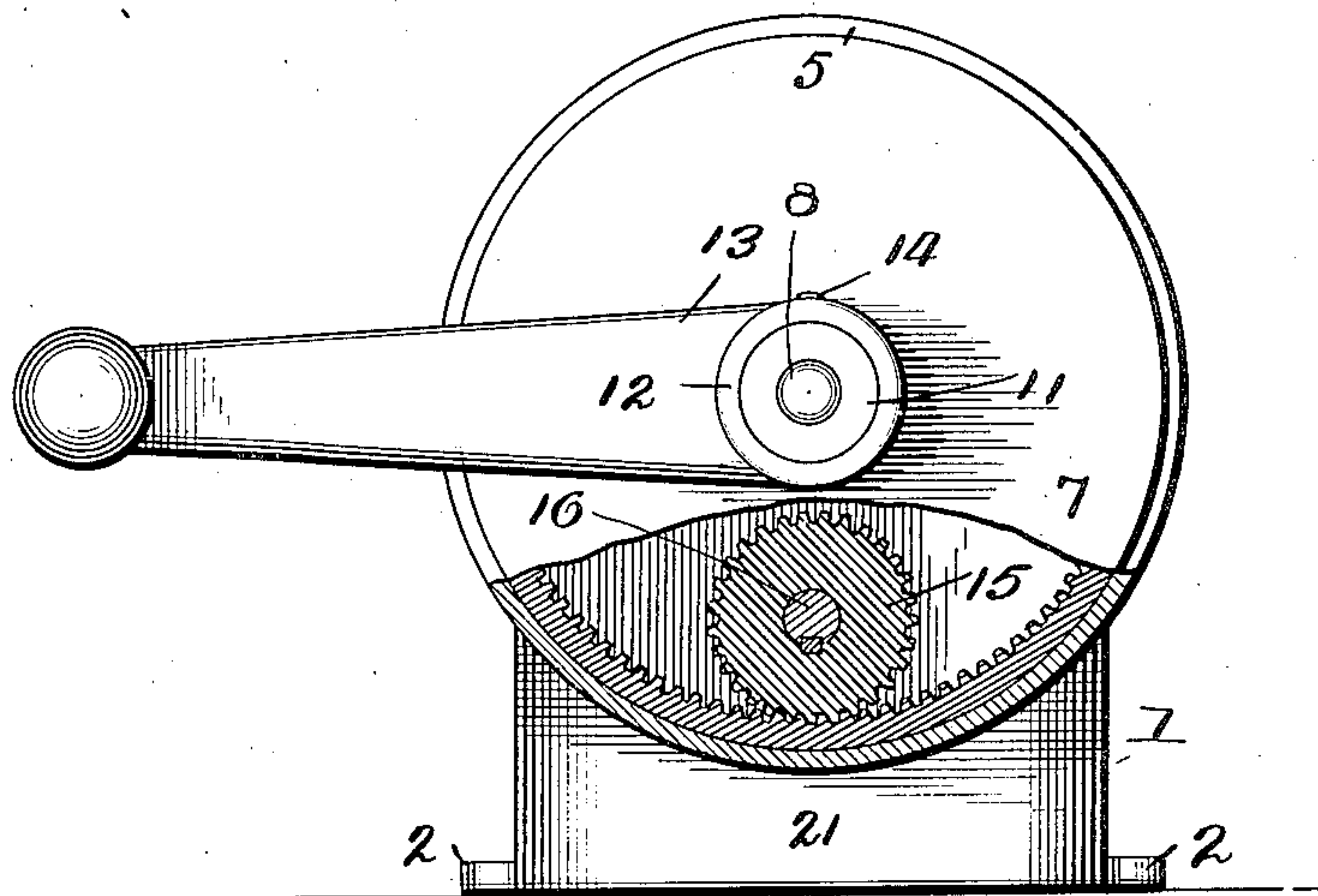


Fig. 4.

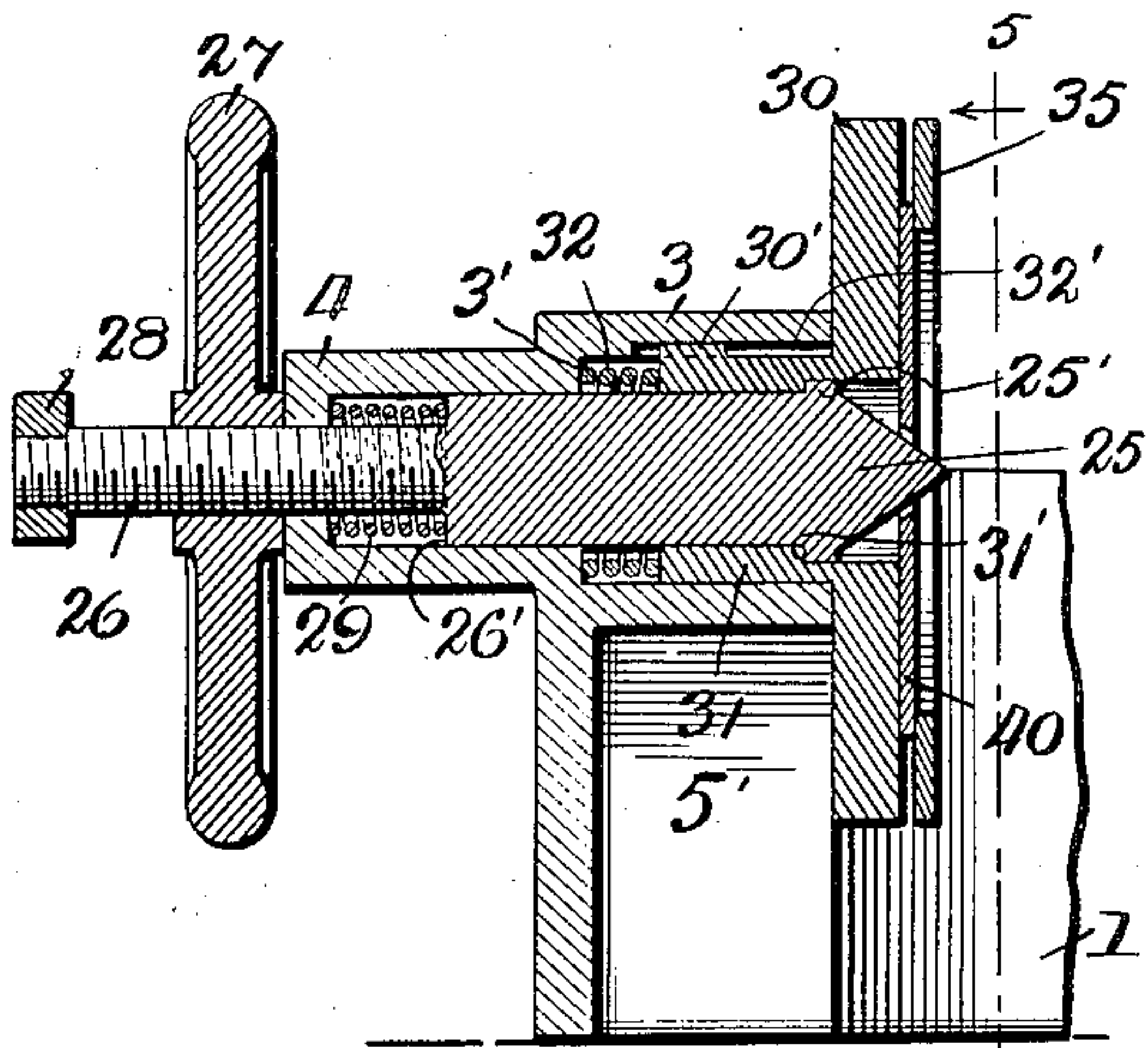
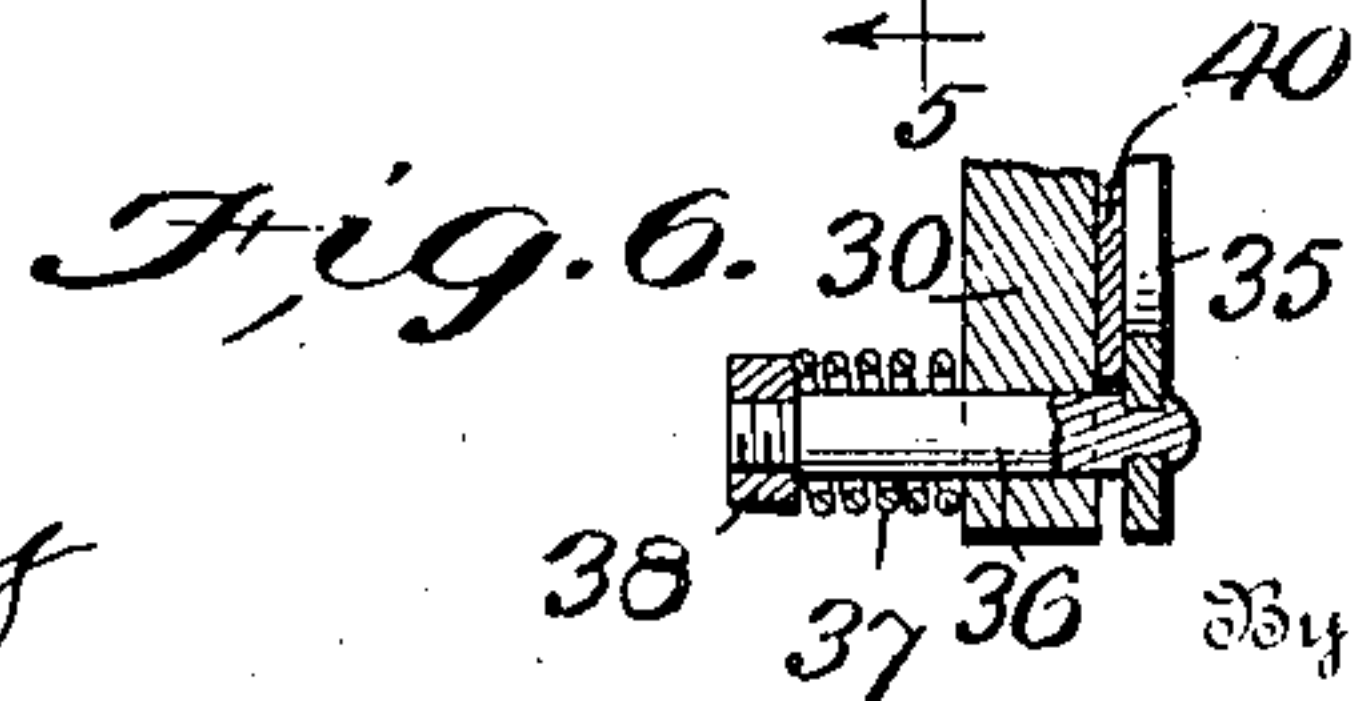
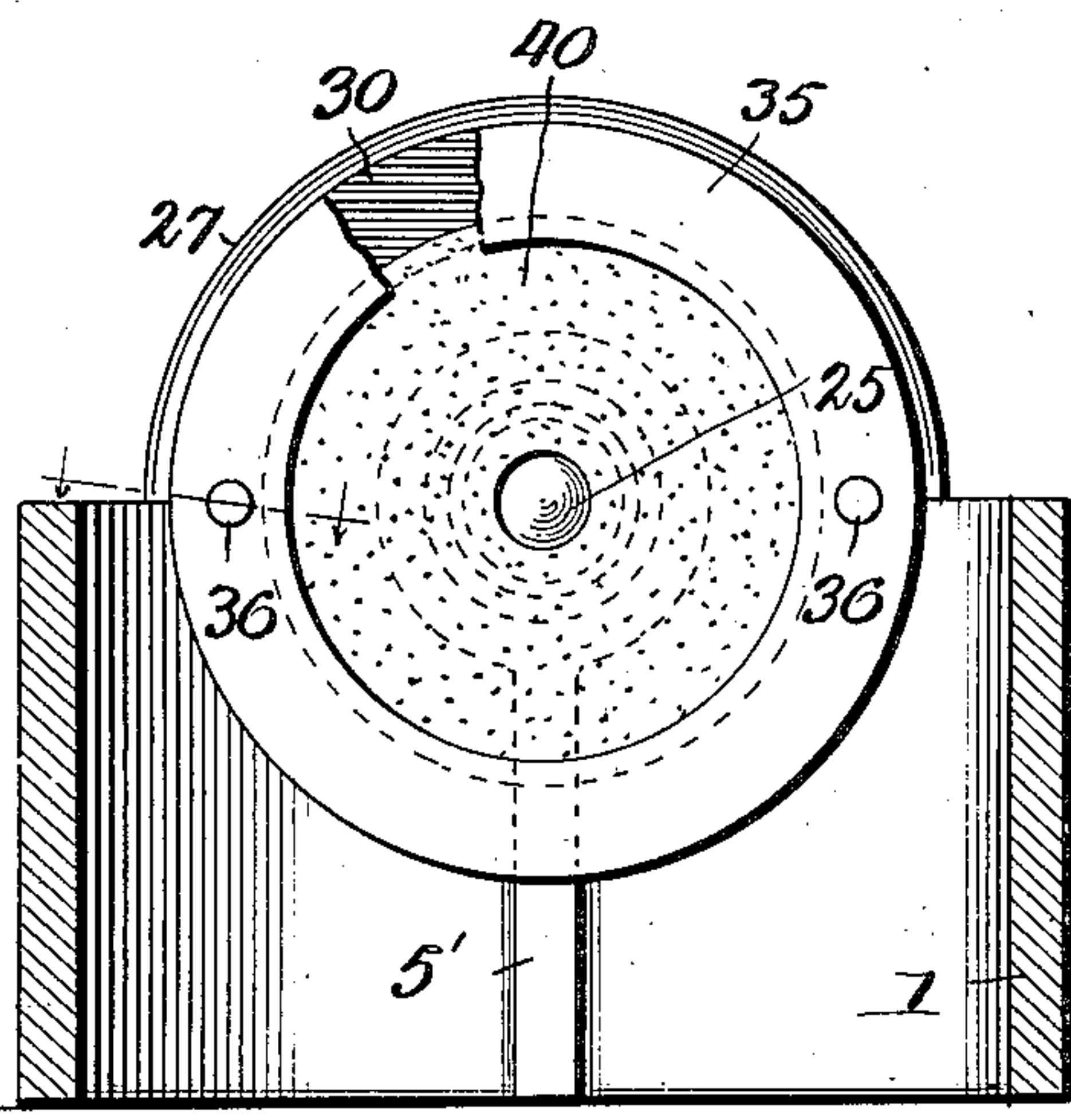


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS SMALL, OF CAMDEN, NEW JERSEY, ASSIGNOR OF ONE-HALF TO CHARLES P. RICHTER,
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DEVICE FOR TRUING BOWLING-PINS.

No. 897,937.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed March 27, 1906. Serial No. 308,208.

To all whom it may concern:

Be it known that I, THOMAS SMALL, a citizen of the United States, and a resident of Camden, county of Camden, and State of New Jersey, have invented certain new and useful Improvements in Devices for Truing Bowling-Pins, of which the following is a full, clear, and complete disclosure.

My invention relates to devices for truing bowling pins, and has for its object the providing of means for grinding the base of the pin to true up any imperfections on its surface after the same has been broken, dented or otherwise defaced so that the pin will not readily stand on its base.

With this object in view, my invention consists in details of construction and manner of operation set forth in the following description, reference being made to the accompanying drawings, in which like characters refer to corresponding parts.

In the drawings, Figure 1 is a plan view of my device, showing the bowling pin in position to have its base ground by the machine; Fig. 2 is a vertical longitudinal section taken on the line 2—2 of Fig. 1; Fig. 3 is a transverse section taken on the line 3—3 of Fig. 2; Fig. 4 is an enlarged view of a fragmentary portion of Fig. 2; Fig. 5 is a transverse section taken on the line 5—5 of Fig. 4 and Fig. 6 is a detail view of one of the spring pins.

The frame of my device consists of two vertical walls 1—1, curved towards each other at one end until they intersect in a vertical plane extending longitudinally through the middle of the machine. Projecting from the bottom of these walls are apertured lugs 2, by means of which the said frame may be screwed to a bed or some flat surface. Near the top of the intersection of the two side walls is a cylindrical casing having two chambers 3 and 4, the latter being of smaller internal diameter than the former. This casing is supported by a web 5', which projects downwardly from beneath the portion 3, the said web extending inwardly from the intersection of the side walls. The two chambers 3 and 4 of the casing open into each other, thus forming a shoulder 3' in the outer end of the inner casing 3. The outer end of the outer casing 4 is closed with the exception of the aperture therein, the purpose of which will be hereinafter described. Integral with the opposite end of the casing is a circular gear casing 5, having projecting outwardly

and inwardly from its central portion an apertured lug 6. Within the gear casing 5 is located an internal gear wheel 7, having its outer side portion entirely closed by a web with the exception of an orifice at its center, which coincides with the perforation in the lug 6. A cylindrical lug 11 projects outwardly around the orifice in the web. Through the bearing thus formed extends a journal pin 8, having attached to its inner end a collar 9 by means of the screw 10. Upon the lug 11 is fastened the collar 12 of the crank 13. Through the said collar, lug and pin passes a locking pin 14, thus locking the internal gear, journal pin and crank in rigid relation, the said journal pin being free to revolve in the lug 6 of the rigid casing 5, which lug acts as a journal bearing.

Within the lower end of the casing 5 and meshing with the teeth of the internal gear 7 is the pinion 15, keyed to the shaft 16, which revolves in a lug 17 surrounding an orifice in the casing 5. The inner end of the shaft 16 is keyed to a sleeve 18, which terminates in a hollow conical portion 19, the latter being lined with frictional material 20, such as rubber or the like. Below the gear casing 5 is the end wall 21 of the frame. The top of the walls of the frame are in a horizontal plane which passes through the axis of the shaft 16. Referring again to the opposite end of the machine a centering pin 25, provided with a collar 25' on its inner extremity, passes through the casing and has a screw-threaded stem 26 extending outwardly through the aperture in the chamber 4. A handle 27 is adapted to revolve back and forth upon the said screw-threaded portion and to abut against the end of the casing 4, thus acting, together with the stem, in the form of a draw-bolt, and constructed to adjust the pin inwardly and outwardly, as desired. A nut 28 is screwed on the extreme end of the screw-threaded stem 26 to act as a stop to prevent the handle 27 from working off the end of the screw-threaded stem. Within the chamber 4 and surrounding the screw-threaded stem 26 is a spiral spring 29, which has its ends respectively abutting against the outer end of the casing 4 and the shoulder 26' on the pin 25, where the latter joins its stem 26.

30 indicates a grinding plate having an aperture in its central portion and a lug 31 around said aperture, the internal portion of

said lug being of smaller diameter than the aperture for a portion of its length, thus forming a shoulder 31', which engages with the collar 25' on the pin 25. Within the chamber 3 and surrounding the pin 25 is a spiral spring 32, having its ends respectively abutting against the shoulder 3' formed in the chamber and the inner end of the lug 31 of the grinding plate 30. Longitudinally of the lug 31 is a spline 30' which takes in a groove 32' in the inner surface of the chamber 3. Thus the grinding plate 30 is adapted to move longitudinally against the resistance of the spring 32 but is prevented from revolving by the spline 31'. To the outer periphery of the face of the grinding plate 30 is yieldingly held a flat annular ring 35 by means of the pins 36 riveted thereto, and passing through the plate 30, terminating at their outer ends in nuts 38 between which and the outer face of the plate 30 are confined spiral springs 37. The pins 36 are loosely journaled in the plate 30, to enable them to reciprocate therethrough against the resisting action of the springs 37. A grinding material 40, such as sand paper, emery paper or the like is detachably fastened to the inner face of the grinding plate 30 by means of the spring seated ring 35, and through the central portion of the said grinding sheet is an orifice for the passage of the conical portion of the centering pin 25.

Having now described the construction of my device I will proceed to explain the operation thereof.

When it is desired to true up any imperfections on the base portion of a bowling pin so that the latter will have a perfectly flat base to stand on, the said pin is placed in the machine, as shown in Figs. 1 and 2, its upper portion being engaged by the frictional interior surface of the cone 19 and its base portion being engaged at its exact center by the point of the centering pin 25. The centering pin being small and its penetration into the base of the bowling pin being very slight it enables the latter to revolve upon the point of the former. The revolution of the pin upon its axis is effected by the gearing above described, which operates through means of the crank 13 turning the journal pin 8, which is rigidly attached to and revolves the internal gear 7, which, in turn, rotates the pinion 15, which latter is keyed to and rotates the shaft 16, keyed to the sleeve 18 of the conical portion 19. Of course, it is not necessary that I should utilize a crank as my initial revolving means for the journal pin 8, as the latter may be connected up by suitable gearing to any kind of motor. Neither is it necessary that I should utilize a rubber lining 20 on the interior of the cone 19, as any means for obtaining a positive engagement between the upper end of the bowling pin and the interior surface of the cone may be utilized, provided the same will

engage the pin in such a manner that the same will be revolved on its axis. The centering pin is held against the base of the bowling pin by means of the spring 29, which is under compression in the chamber 4, as hereinbefore described. The said spring normally presses against the shoulder 26' of the centering pin with sufficient force to engage the bowling pin for centering purposes. The base of the bowling pin around its center portion is in contact with the grinding sheet 40, which latter is pressed against the base by means of the compression springs 32, which normally press inwardly on the lug 31 with sufficient force to hold the grinding surface in operative position against the base of the pin. The said grinding surface is prevented from revolving with the pin by virtue of its edge portions being clamped between the annular plate 35 and the grinding plate 30, and the said grinding plate is prevented from revolving by means of a spline 30' on the exterior surface of its lug 31, which spline takes in a groove in the casing and permits a reciprocating but not a rotating movement of the lug, as hereinbefore described. To disengage the bowling pin from the machine, the centering pin 25 is drawn outwardly by means of the rotating handle 27, the collar 25, around the centering pin engaging the shoulder 31' of the lug 31, thus carrying with it in its movement the grinding plate 30. By rotating the handle 27 the same is caused to bear against the outer end of the casing and causes the screw-threaded stem 26 to draw the centering pin outwardly in the manner of a draw-bolt connection. The said centering pin is thus longitudinally movable, to enable the bowling pin to be engaged and disengaged therewith and is also adjustable to conform in its engagement with bowling pins of slightly variable length. When the centering pin is in engagement with the base there is a slight clearance between its collar 25' and the shoulder 31', which clearance enables a certain degree of adjustment independent of the movement of the grinding plate 30, which latter is forced inwardly by the spring 32, the said inward movement being limited by its engagement with the bowling pin. When the bowling pin, however, is disengaged from the machine the limit of the inward position of the grinding plate 30 is determined by the position of the collar 25' engaging the shoulder 31'. By this arrangement, I am enabled not only to simultaneously withdraw the grinding plate and centering pin from their engagement with the base of the bowling pin, but also to effect an independent adjustment of the centering pin when the bowling pin is being placed in the machine, and to limit the outward movement of the grinding plate when the bowling pin is removed from the machine. By pressing inwardly on the spring pins 36 the annu-

lar plate 35 may be disengaged from the grinding plate 30 to enable a grinding sheet to be inserted between the two parts. The spring pins 36 are then released and the annular plate 35 springs back and clamps the edges of the grinding sheets to the face of the grinding plate 30. As heretofore stated, the said grinding sheet may be made of any suitable material and is perforated at the center to permit the passage therethrough of the point of the centering pin 25.

While I have specifically illustrated the grinding material as being formed out of a sheet, it is obvious that the grinding function may be performed by any of the well known means, such as the utilization of knife edges or making the face of the grinding plate in the form of a grinding surface.

While the apparatus herein described is adapted to grind the bases of bowling pins varying slightly in length, certain parts thereof must be removed and others substituted to adapt the same to bowling pins having a variable length of greater degree. I may accomplish this in several ways, one of which is in having the cone 19 with its collar 18 in varying sizes and proportions, but all adapted to be keyed to the shaft 16, or I may substitute other parts having greater or less proportions than those illustrated, provided they have a constant dimension which adapts them to be substituted in the machine.

Having now described my invention, what I desire to claim and secure by Letters Patent of the United States is:

1. In a machine for truing bowling pins, a revoluble means for engaging the upper portion of the pin, a centering means for engaging its base portion and means for holding a grinding material against said base portion.

2. In a machine for truing bowling pins, a revoluble means for engaging the upper portion of the pin, a yielding centering means for engaging its base portion and means for holding a grinding material against said base portion.

3. In a machine for truing bowling pins, a revoluble means for engaging the upper portion of the pin, a yielding centering means for engaging its base portion and yielding means for holding a grinding material against said base portion.

4. A machine for truing bowling pins, consisting of revoluble means for engaging the upper portion of the pin, a casing having a chamber for a spiral spring, a centering pin engaging said spring and having a projecting stem passing through the end of said chamber, and means external to the casing for drawing said stem against the resistance of said spring.

5. A machine for truing bowling pins, consisting of revoluble means for engaging the upper portion of the pin, a casing having an outer chamber for one spiral spring and an

inner chamber for another spiral spring, a centering pin engaging the one spring and a grinding plate engaging the other spring, and means for drawing the said grinding plate and centering pin against the resistance of said springs.

6. A machine for truing bowling pins, consisting of a revoluble means for engaging the upper portion of the pin, a casing having an outer chamber for one spiral spring and an inner chamber for another spiral spring, a grinding plate engaging the one spring, a centering pin having a stem projecting through the outer end of the casing engaging the other spring and also engaging said grinding plate, and means external to the casing for moving said stem longitudinally.

7. A machine for truing bowling pins, consisting of a revoluble means for engaging the upper portion of the pin, a casing having an aperture in its outer end and having the internal diameter of its inner portion greater than the internal diameter of its outer portion to form a shoulder, a spiral spring located in each portion, an apertured grinding plate having an inwardly projecting collar, the outer end of which bears against one of said springs, a centering pin having a screw-threaded stem passing through the aperture in the end of the casing, the said pin engaging the other of said springs and having a part thereof adapted to engage the collar on the grinding plate, and an internal screw-threaded means on said stem, adapted to bear against the outer end of said casing.

8. A machine for truing bowling pins, consisting of revoluble means for engaging the upper portion of the pin, a casing having an aperture in its outer end and having the internal diameter of its inner portion greater than the internal diameter of its outer portion to form a shoulder, a spiral spring located in each portion, a grinding plate having an inwardly projecting collar adapted to bear against one of said springs, the said collar having a shoulder located on its interior surface near its inner end, a centering pin having a collar around its inner end adapted to bear against said shoulder, the said centering pin engaging the other spring and having a stem projecting through the aperture in the outer end of the casing, and means located external to the casing for moving said stem longitudinally.

9. A machine for truing bowling pins, consisting of revoluble means for engaging the upper portion of the pin, a casing having an aperture in its outer end and having the internal diameter of its inner portion greater than the internal diameter of its outer portion to form a shoulder, a spiral spring located in each portion, a grinding plate having an inwardly projecting collar adapted to bear against one of said springs, the said collar having a shoulder located on its interior

surface near its inner end, a centering pin having a collar around its inner end adapted to bear against said shoulder, the said centering pin engaging the other spring and having
 5 a stem projecting through the aperture in the outer end of the casing, means located external to the casing for moving said stem longitudinally, and yielding means for clamping a sheet of grinding material against the face of
 10 said grinding plate.

10. In a machine for truing bowling pins, a revoluble means for engaging the upper portion of said pin, centering means for engaging its base portion, and means for holding
 15 a stationary grinding surface against the said base portion.

11. In a machine for truing bowling pins, revoluble means for engaging the upper portion of the pin, a centering means for engaging
 20 its base portion and means for grinding said base portion, which consists of a flat apertured plate having a retaining strip for clamping a grinding sheet to said plate, pins fastened to said retaining strip and passing
 25 through said plate, and spiral springs surrounding said pins beneath said plate, for holding said strips in their clamping position.

12. In a machine for truing bowling pins, means for revolving said pin upon its axis, and means for grinding the base of said pin,
 30 comprising a plate, a grinding sheet, spring pins and a retaining plate for said sheet.

13. In a machine for truing bowling pins, a revoluble means for engaging the upper
 35 portion of said pin, a centering pin for engaging the base portion thereof, and a grinding mechanism comprising a flat plate having a central aperture for the centering pin, and a

spring seated annular ring around the outer surface of said plate. 40

14. In a machine for truing bowling pins, a revoluble means for engaging the upper portion of said pin, a centering pin for engaging the base portion thereof, and a grinding mechanism comprising a flat plate having a
 45 central aperture for the centering pin, and apertures arranged circumferentially around the outer surface thereof, a flat annular ring having pins thereon extending through said circumferential apertures respectively, and
 50 spiral springs surrounding said pins on the opposite side of said flat plate, the said springs being retained on the pins by stops, the ring, plate, pins and springs being arranged to permit a yielding movement of
 55 said ring away from said plate.

15. In a grinding machine, a frame, means for centering an article to be ground supported on said frame, a grinding plate supported on said centering means and means
 60 for limiting the inward movement of said plate.

16. In a grinding machine, a frame, means for centering an article to be ground supported on said frame, a grinding plate supported on said centering means, means for
 65 limiting the inward movement of said plate, and means for yieldingly holding said plate in operative position.

In witness whereof I have hereunto set my
 hand this 24th day of March, A. D., 1906. 70

THOMAS SMALL.

Witnesses:

WALTER A. HOLDEN,
 J. HENDERSON.