

No. 782,644.

PATENTED FEB. 14, 1905.

C. J. CLEVELAND.
AUTOMATIC PINION FILLING MACHINE.

APPLICATION FILED JUNE 20, 1904.

3 SHEETS—SHEET 1.

Fig 1

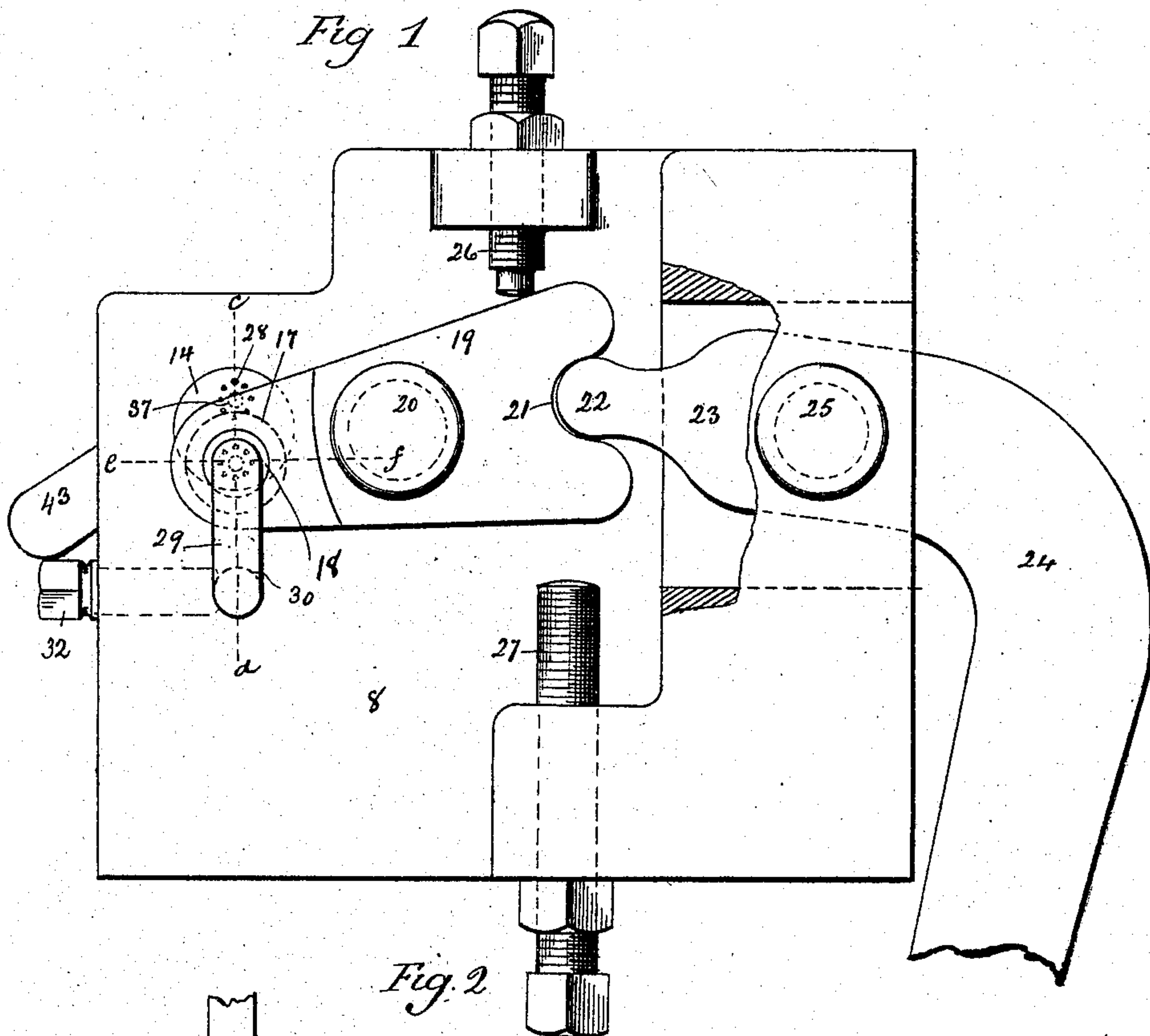
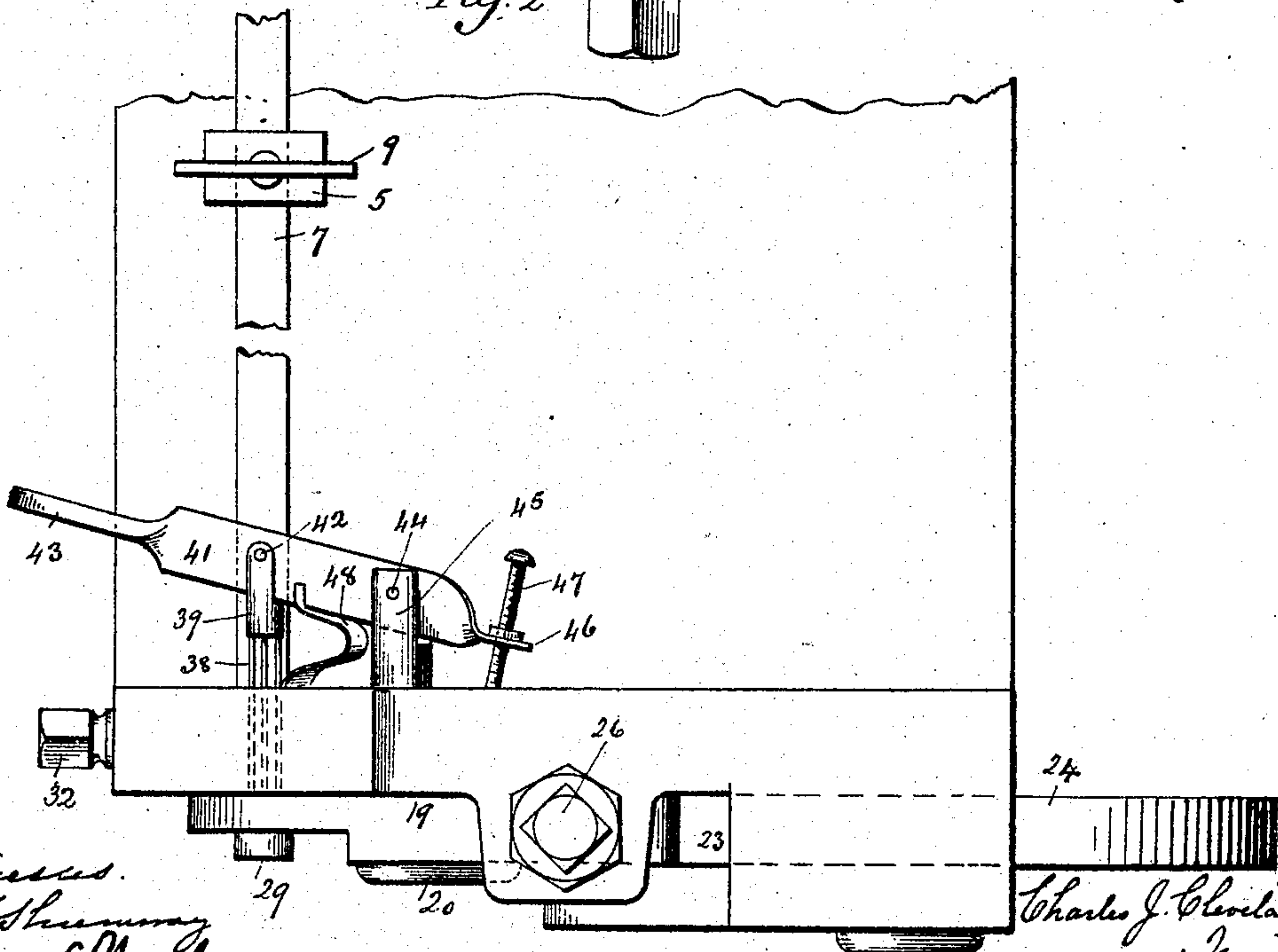


Fig. 2



Witnesses.
J. H. Shumway
Charles L. Reed.

Charles J. Cleveland.
Inventor.

By atty Seymour T. Earle

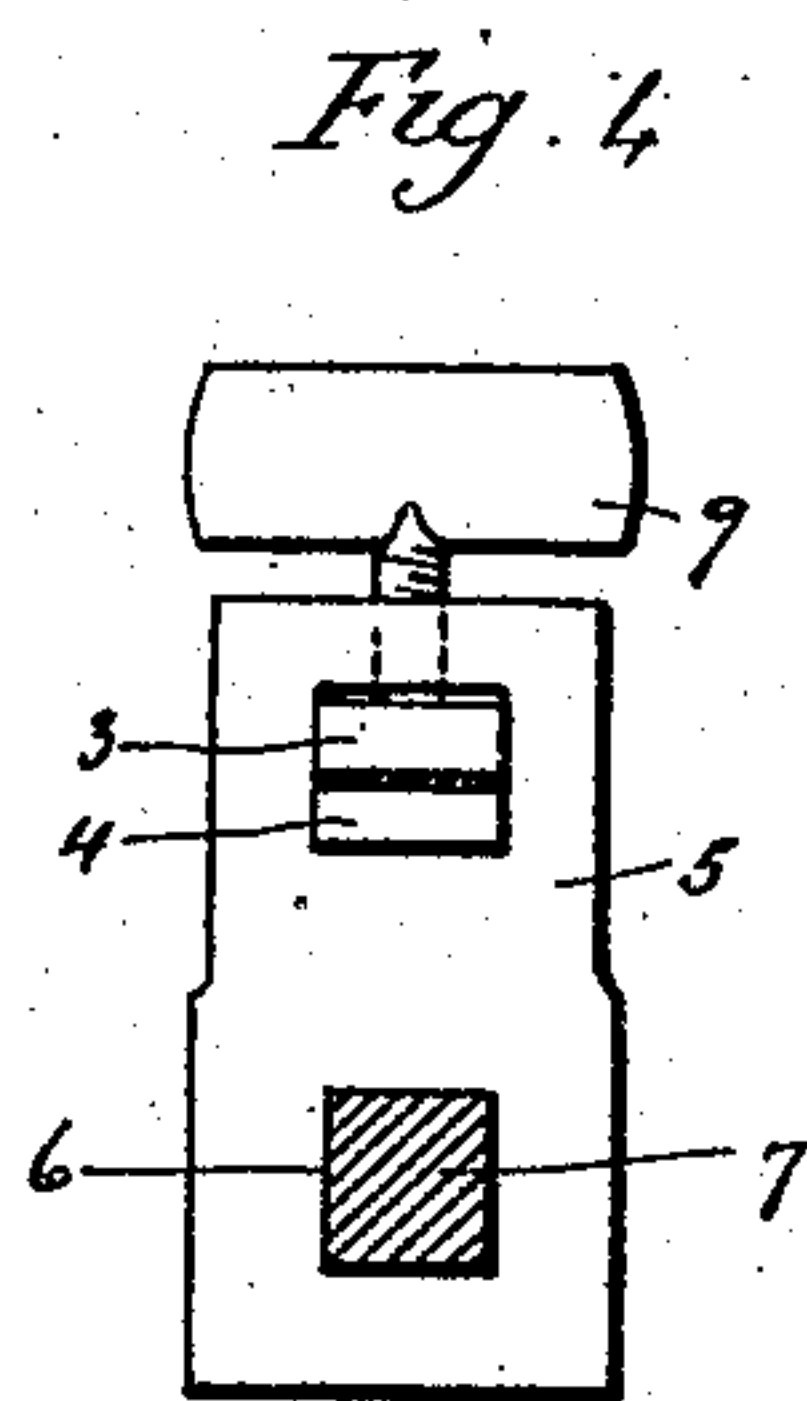
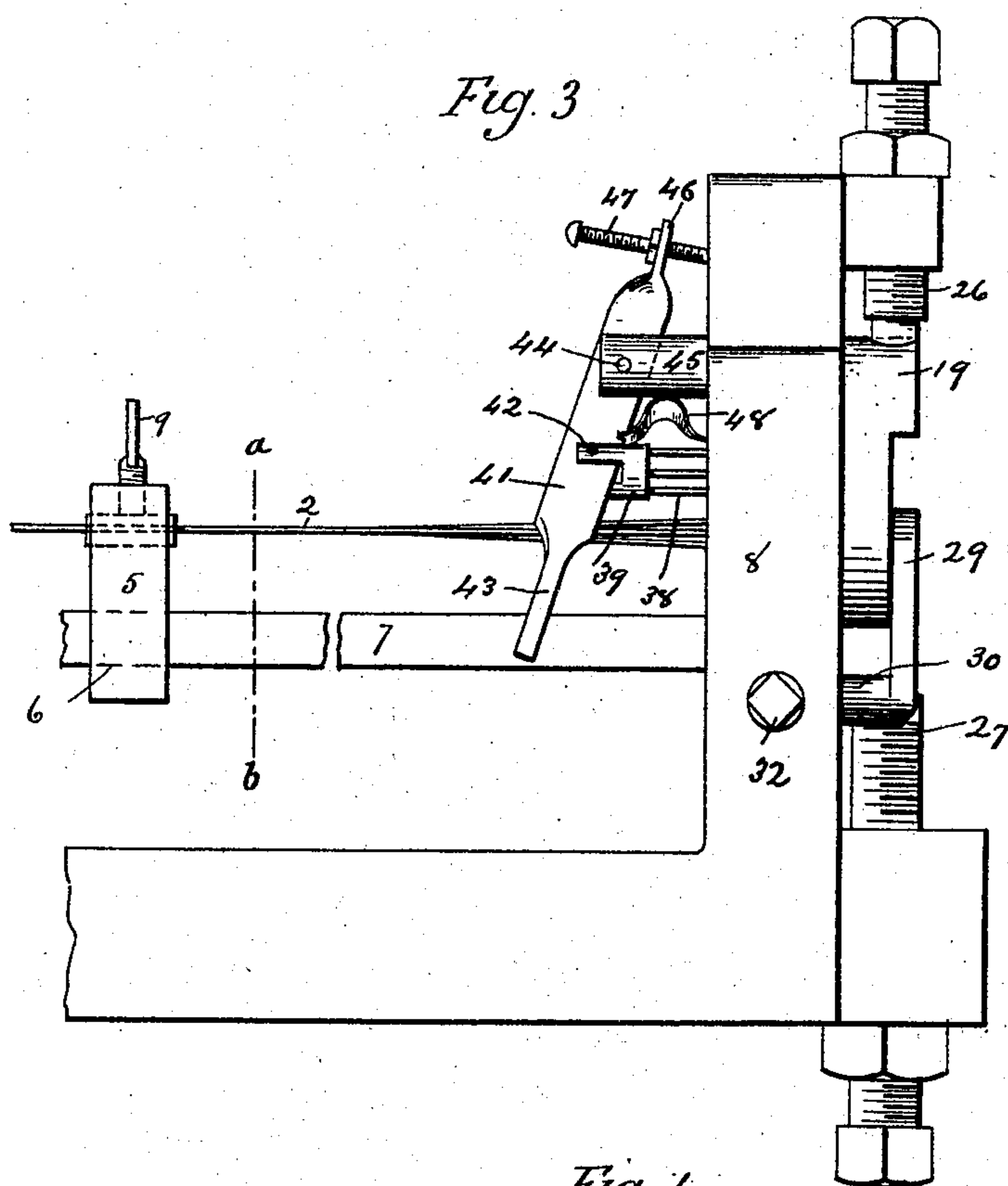
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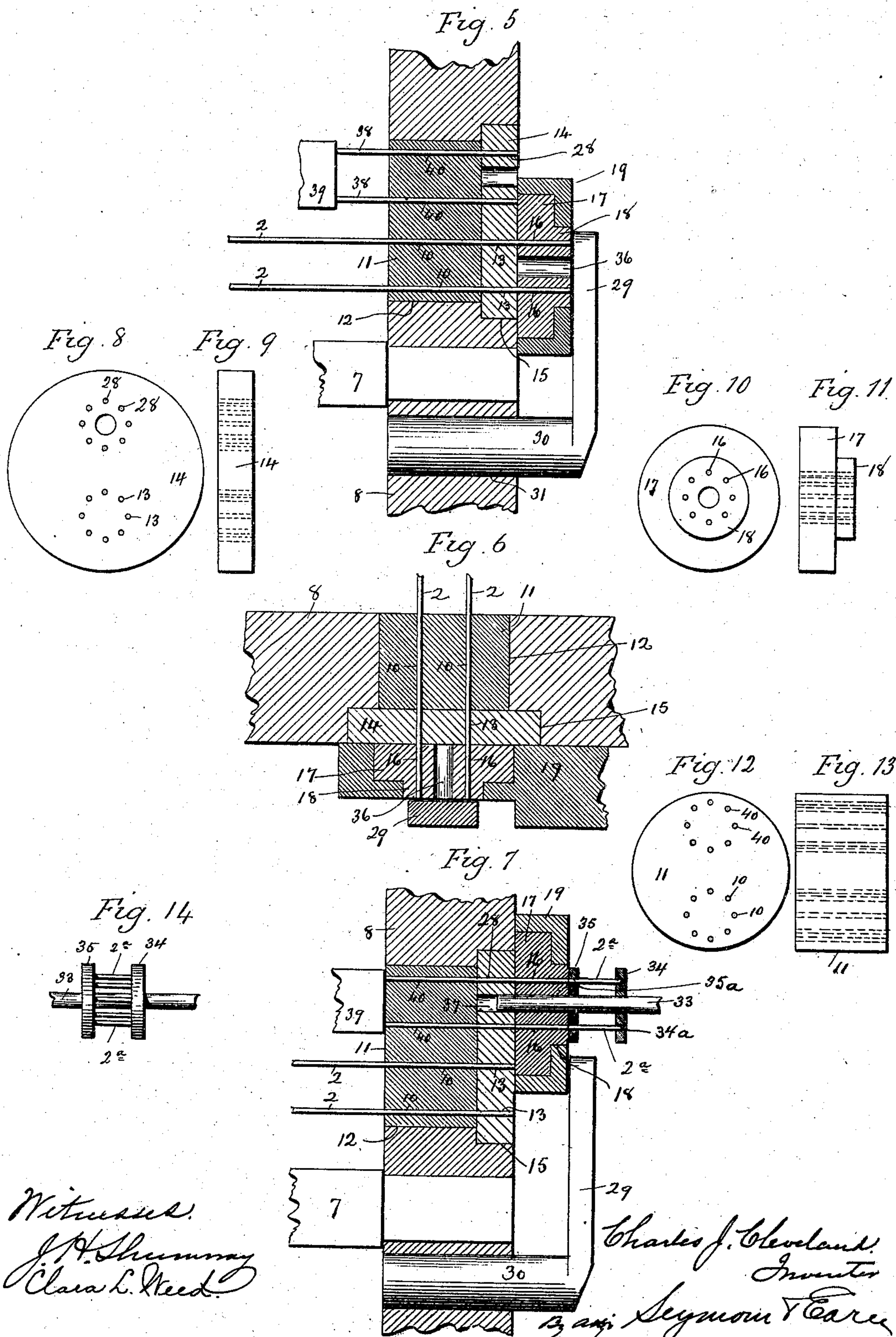
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3 SHEETS—SHEET 3.



Witnesses:
J. H. Shumway
Clara L. Reed.

Charles J. Cleveland,
Inventor
By Seymour T. Carr

UNITED STATES PATENT OFFICE.

CHARLES J. CLEVELAND, OF WATERBURY, CONNECTICUT, ASSIGNOR TO
THE WATERBURY CLOCK CO., OF WATERBURY, CONNECTICUT, A COR-
PORATION.

AUTOMATIC PINION-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 782,644, dated February 14, 1905.

Application filed June 20, 1904. Serial No. 213,276.

To all whom it may concern:

Be it known that I, CHARLES J. CLEVELAND, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Automatic Pinion-Filling Machines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the numerals of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a broken view in front elevation of a machine constructed in accordance with my invention; Fig. 2, a broken plan view thereof; Fig. 3, a broken side view thereof; Fig. 4, a detail view in vertical section on the line *a b* of Fig. 3, showing the clamp used in feeding the long wires from which the pinion-leaves are cut; Fig. 5, a broken view in vertical section on the line *c d* of Fig. 1, showing the movable die in its depressed position and the wires fed into it and gaged and just ready to be cut off by its elevation; Fig. 6, a broken view in horizontal section on the line *e f* of Fig. 1 with the parts in the same positions; Fig. 7, a similar but less comprehensive view showing the movable die lifted into its elevated position and the ejector-pins as operated to push the pinion-leaves from the said die into the collets of a pinion applied thereto; Fig. 8, a detached face view of the fixed die; Fig. 9, a detached edge view thereof; Fig. 10, a detached face view of the movable die; Fig. 11, a detached edge view thereof; Fig. 12, a detached face view of the bushing; Fig. 13, a detached edge view thereof; Fig. 14, a detached view of an eight-leaf lantern-pinion of the type which my machine is designed to "fill."

My invention relates to an improvement in automatic machines for filling the collets of lantern-pinions with the short wires which form their leaves, the object being to produce a simple and compact machine in which this work may be done not only far more rapidly than it can be done by hand, but also more accurately, and which may by inter-

changing some of its parts be adapted to fill lantern-pinions of different sizes.

With these ends in view my invention consists in an automatic machine for filling lantern-pinions having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

For clearness and convenience of description I propose to describe, as far as practicable, the mechanical features of my machine in the sequence or order of their operation in filling a pinion. The machine chosen for illustration is equipped to fill relatively large pinions having eight leaves; but it will of course be understood that the size of the pinions and the number of their leaves is immaterial.

My improved machine may be made to fill pinions of one particular size, or it may have its parts made interchangeable as far as required to adapt it to be converted for filling pinions of different sizes. It will also be understood that the wire leaves of the pinions are cut from long lengths of previously-straightened wire. For use in the machine herein shown eight of these long wires are gathered into a bunch, and in order that they may be conveniently handled collectively without longitudinal displacement relatively they are preferably clamped between the jaws of a sliding clamp, having a rectangular opening, adapting it to be mounted so as to slide back and forth upon a horizontally-arranged rectangular bar, fixed in the frame of the machine. The upper jaw is controlled in the usual manner by a thumb-screw. The operator by taking hold of the bunch of wires or by taking hold of the clamp shoves them step by step into the machine and from time to time shifts the clamp by moving it outward on the wires and clamping it in a new position thereon, this being done as required by the shortening of the inner ends of the wires, by which is meant those portions of the wires between the clamp and the machine, due to cutting them off. The inner ends of the eight wires are fed into a corresponding number of holes, extending through a horizontally-ar-

ranged movable cylindrical bushing 11, located in a circular opening 12 in the machine-frame 8. These holes 10 are directly below the center of the bushing and arranged in circular form at equal distances from each other, their arrangement corresponding to the positions of the leaves in the pinion to be filled.

The eight wires 2 being distributed, so to speak, in the eight holes 10, as just described, are fed through the bushing 11 into eight aligned correspondingly - arranged cutting-off holes 13, extending transversely through the lower portion of a removable disk-shaped fixed die 14 in a recess 15 formed in the outer face of the machine-frame 8 and made concentric with the bushing-opening 12, but larger than the same. From the fixed die 14 the wires pass into eight correspondingly arranged and aligned cutting-off holes 16, extending transversely through a disk-shaped movable die 17, having upon its outer face a hub 18 and mounted in the forward end of a rocking lever-like carrier 19, turning upon a stud 20, mounted in the machine-frame 8, the inner end of the said carrier being formed with a recess 21 for the reception of a knuckle 22, formed upon the short end 23 of a foot-lever 24, hung upon a heavy stud 25 in the machine-frame 8. Regulating-screws 26 and 27, mounted in the machine-frame, are arranged to be engaged by the upper and lower edges of the carrier 19 to regulate the throw of the same, and hence the movement of the die 17 up and down, so that when the same is at the limit of its depressed or pinion-wire-receiving position its cutting-off holes 16 will exactly register with the cutting-off holes 13 of the fixed die 14 and so that when it is at the limit of its elevated or pinion-leaf-delivering position its holes 16 will exactly register with the ejector-pin-guiding holes 28 of a group of eight holes extending transversely through the fixed die and located above the center thereof in lines parallel with the holes 13 thereof.

As the long wires 2 are being shoved by hand through the bushing 10, through the fixed die 14, and through the movable die 17 they are brought to a stop by means of an upright gage 29, located in line with the cutting-off holes 13 of the fixed die 14 and standing close to the outer face of the hub 18 of the movable die 17 when the same is in its depressed or pinion-wire-receiving position, this gage being located at the end of a horizontal foot 30, entering a hole 31 in the machine-frame 8 and engaged by a set-screw 32, whereby the gage is held in any desired position of adjustment. The said gage will be adjusted or set so that the space between it and the outer face of the fixed die 14 will be just sufficient to permit the movable die 17 to be moved in between them so as to register its cutting-off holes 16 with the cutting-off holes 13 of the fixed die 14. The long wires 2 are pushed through the bushing and the cutting-off holes

of the two dies until the outer end of each wire has been impinged against the inner face of the gage, whereby uniformity in the length of the pinion-leaves 2^a cut from the wires is secured.

The wires having been fed and gaged as described, the foot-lever 24 is operated for rocking the carrier 19 and lifting the movable die 17 into its elevated or pinion-leaf-delivering position. At the very beginning of this movement of the said movable die the pinion-leaves 2^a are produced by a shearing action of the movable die over the face of the fixed die. These eight pinion-leaves 2^a are now lifted with the movable die and brought into registration with the eight holes 28 of the upper group of ejector-pin-guiding holes in the fixed die. An unfilled pinion consisting of an arbor 33 and two collets 34 and 35 now has one end of its arbor inserted into a bearing-hole 36, extending transversely through the movable die 17 and located in the center of its group of cutting-off holes 16. The fixed die 14 is formed with a corresponding bearing-hole 37, located in the center of its group of ejector-pin-guiding holes 28 for the reception of the extreme end of the arbor in case it happens to be long. It will be understood, of course, that each of the collets 34 and 35 have had drilled in them eight holes corresponding in size and arrangement to the several groups of holes already referred to, the holes 35^a in the collet 35 being open holes in the sense of extending through the collet and the holes 34^a in the collet 34 being closed holes or pockets in the sense that they do not extend through to the outer face thereof. In applying the unfilled pinion to the machine that end of its arbor 33 will always be inserted into the hole 36 of the movable die which will bring the collet having the open holes 35^a into immediate proximity to the outer ends of the holes 16 in the movable die. The leaves 2^a are now ejected from the holes 16 in the movable die 17 and introduced into the said collets 34 and 35 by means of a group of eight ejector-pins 38, having a circular arrangement corresponding to the arrangement of the several groups of holes and mounted at their inner ends in an ejector-head 39. These ejector-pins 38 play back and forth in the ejector-pin-guiding holes 28 of the upper group of holes in the fixed die 14 and through the holes 40 of a corresponding group of holes formed in the bushing 11 at a point centrally above the lower group of holes 10 therein. The said head 39 has its outer end slotted for the reception of a finger-lever 41, to which it is attached by a pivot 42, the said finger-lever being furnished at its outer end with a finger-piece 43 and having its inner end hung by a pivot 44 in a post 45. At its extreme inner end the finger-lever is furnished with an eye 46, receiving an adjusting-screw 47, by means of which the ejecting throw of the pins 38 is

regulated. A spring 48, interposed between the finger-lever 41 and the machine-frame 8, operates to retract the ejector-pins 38 into their retired positions after they have been used to transfer a set of pinion-leaves from the movable die to an unfilled pinion.

The operation of my improved machine is simple and extremely rapid, the long wires being fed by one hand to the gage, after which the foot is operated to cut them off and lift the movable die to the limit of its upward movement. An unfilled pinion is then applied by the other hand to the said movable die, after which the other hand is used to operate the finger-lever for the ejection of the pinion-leaves into the unfilled blank, which is then removed for the closing of the outer ends of the holes 35^a in its collet 35 by swaging or otherwise.

It will be apparent that by interchanging the fixed and movable dies, the bushing, and the ejector-pins the machine may be converted for filling pinion-blanks of any size and number of leaves. It is also apparent that in carrying out my invention some changes from the construction herein shown and described may be made. I would therefore have it understood that I do not limit myself thereto, but hold myself at liberty to make such departures therefrom as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for filling lantern-pinions, the combination with a fixed die having a circular group of cutting-off holes, of a movable die having a corresponding group of cutting-off holes, a gage located in line with the cutting-off holes of the fixed die, means for ejecting the pinion-leaves from the movable die, and means for moving the movable die into its pinion-wire-receiving position in which its cutting-off holes are alined with the cutting-off holes in the fixed die and into its pinion-leaf-delivering position in which its cutting-off holes are alined with the said pinion-leaf-ejecting means which push the pinion-leaves from it into the drilled collets of an unfilled pinion.

2. In a machine for filling lantern-pinions, the combination with a fixed die having an upper and a lower circular group of transverse holes, of a movable die having a corresponding group of holes, means for moving the movable die so as to register its group of holes alternately with the holes of the two groups of the fixed die, and means operating through the upper group of holes in the fixed die for ejecting a set of pinion-leaves in the movable die from the same into the drilled collets of an unfilled pinion.

3. In a machine for filling lantern-pinions, the combination with a fixed die having an upper and a lower circular group of holes, of

a movable die having a corresponding group of holes, means for moving the movable die for alternately registering its holes with the holes of the two groups in the fixed die, and ejector-pins playing through the upper group of holes in the fixed die and entering the group of holes in the movable die for pushing the pinion-leaves therein into the drilled collets of an unfilled pinion.

4. In a machine for filling lantern-pinions, the combination with a fixed die having an upper and a lower circular group of holes, of a movable die having a corresponding circular group of holes, means for moving the movable die for alternately registering its group of holes with the two groups of holes in the fixed die, a bushing having two circular groups of holes which are registered with the two groups of holes in the fixed die, ejector-pins located in the upper group of holes in the bushing and playing through the holes of the upper group in the fixed die, and means for operating the said ejector-pins, whereby the pinion-leaves cut off by the movable die are pushed into the drilled collets of an unfilled pinion, the long wires from which the leaves are cut being fed through the holes of the lower group in the bushing and through the holes of the lower group in the fixed die.

5. In a machine for filling lantern-pinions, the combination with a fixed die having a circular group of cutting-off holes, of a movable die having a corresponding group of cutting-off holes, a gage located in line with the cutting-off holes of the said fixed die, ejector-pins for entering the said cutting-off holes of the movable die, and means for moving the movable die into its pinion-wire-receiving position between the fixed die and the gage at which time its cutting-off holes are alined with the cutting-off holes of the fixed die, and for moving it into its pinion-leaf-delivering position in which its cutting-off holes are alined with the said ejector-pins which push the pinion-leaves from its said holes and enter them into the drilled collets of an unfilled pinion.

6. In a machine for filling lantern-pinions, the combination with a fixed die having an upper and a lower circular group of holes, of a movable die having a corresponding group of holes and a central bearing-hole for the reception of one end of the arbor of a pinion, means for raising and lowering the movable die for alternately registering its holes with the holes of the two groups of holes in the fixed die, and means operating through the upper group of holes in the fixed die for ejecting the pinion-leaves cut off by the movable die from the holes thereof into the collets of an unfilled pinion.

7. In a machine for filling lantern-pinions, the combination with a fixed die having two circular groups of holes, of a movable die having a circular group of holes, means for moving the movable die to alternately register its

holes with those of the two groups of holes in the fixed die, ejector-pins playing through the upper group of holes in the fixed die, a head carrying the said pins, and a lever connected with the said head for the operation thereof.

8. In a pinion-filling machine, the combination with a fixed die having an upper and a lower circular group of holes, and a bearing-hole in the center of its upper group of holes, of a movable die having a corresponding group of holes and a central bearing-hole, a rocking carrier in which the movable die is mounted, means for rocking the said carrier for moving the movable die over the face of the fixed die for alternately registering its group of holes with the two groups of holes thereof, a gage located adjacent to the outer face of the movable die, and ejector-pins playing through the upper group of holes in the fixed die and adapted to enter the holes in the movable die for ejecting the pinion-leaves therein into an unfilled pinion supported thereby.

9. In a machine for filling lantern-pinions, the combination with a fixed die having a circular group of cutting-off holes, of a movable die having a corresponding group of cutting-off holes, a gage located in line with the cutting-off holes of the movable die, ejector-pins for pushing the pinion-leaves from the movable die into the drilled collets of an unfilled pinion, means for guiding the said ejector-pins, and

means for moving the movable die into its pinion-wire-receiving position in which its cutting-off holes are alined with the cutting-off holes of the said fixed die and into its pinion-leaf-delivering position in which its cutting-off holes are alined with the said ejector-pins which push the pinion-leaves carried by it into the drilled collets of an unfilled pinion.

10. In a machine for filling lantern-pinions, the combination with a fixed die having a group of cutting-off holes, of a movable die having a corresponding group of cutting-off holes, means for moving the movable die into its pinion-wire-receiving position in which its cutting-off holes register with the cutting-off holes of the fixed die, and into its pinion-leaf-delivering position in which its cutting-off holes are carried beyond the range of the cutting-off holes of the fixed die, ejector-pins operating, when the movable die is in its pinion-leaf-delivering position, to eject the pinion-leaves therefrom, and a series of ejector-pin-guiding holes in which the said pins play back and forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES J. CLEVELAND.

Witnesses:

GEORGE W. WATSON,
SAMUEL BUTCHER.