

D. H. CHURCH.  
JEWEL PIPING MACHINE.

No. 522,046.

Patented June 26, 1894.

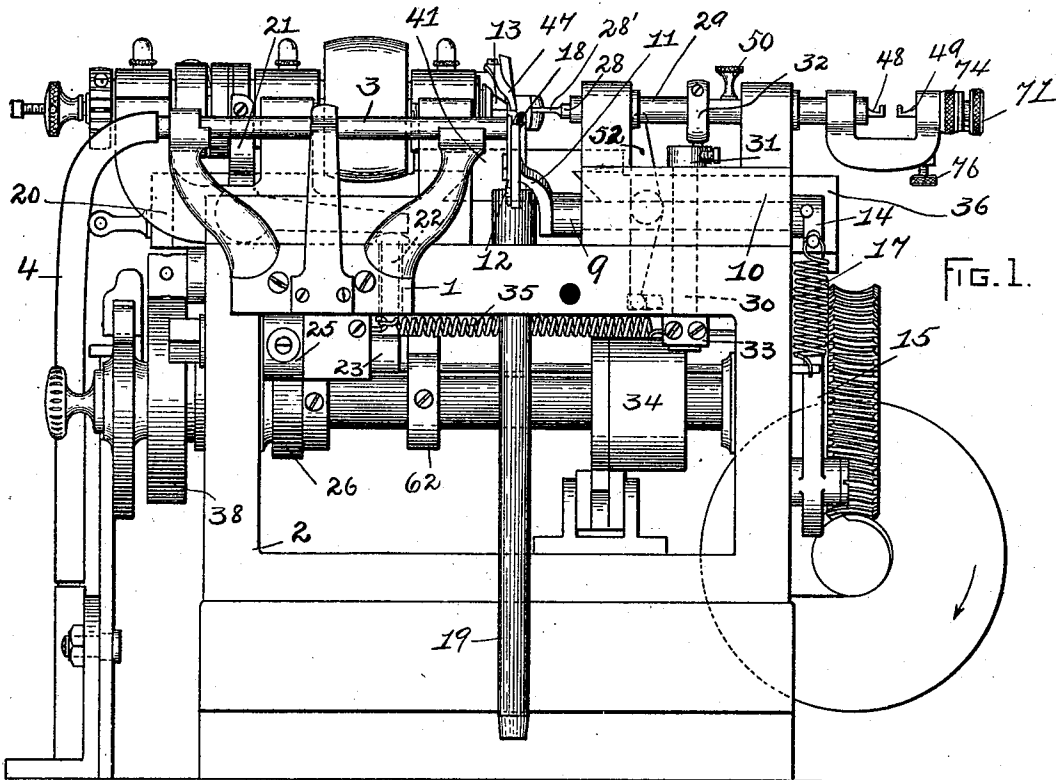


FIG. 1.

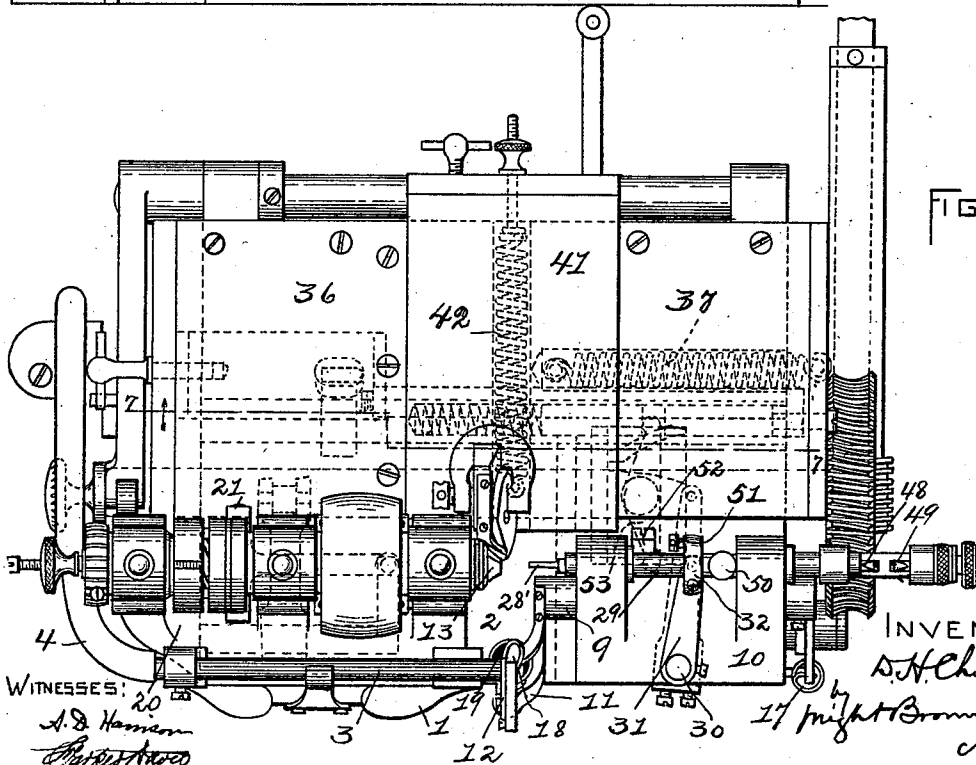


FIG. 2.

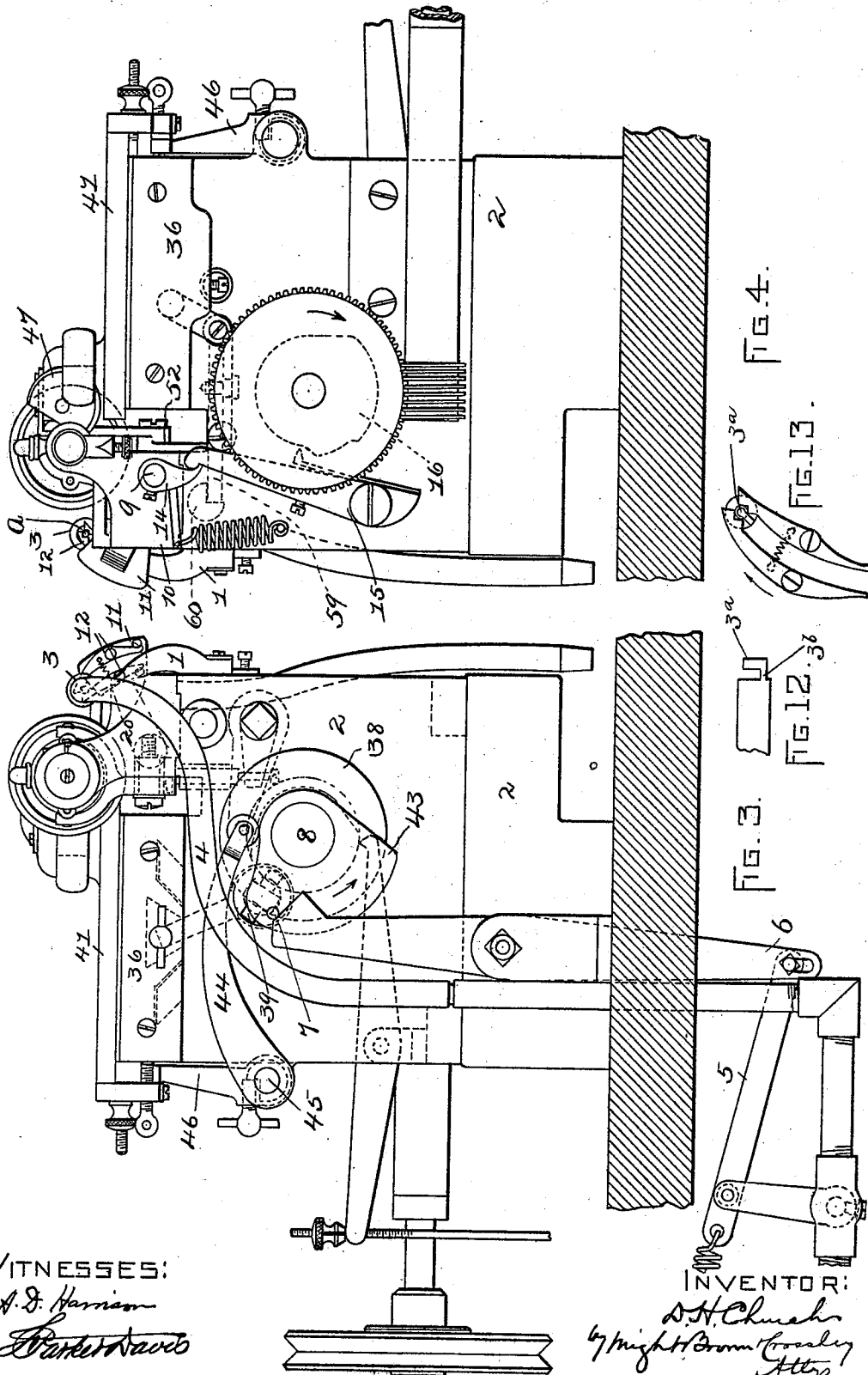
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 A. D. Hamann  
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INVENTOR  
 D. H. Church  
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WITNESSES:  
*A. S. Harrison*  
*Walter Davis*

INVENTOR:  
*D. H. Church*  
*Wm. H. Brown*  
*Atty*

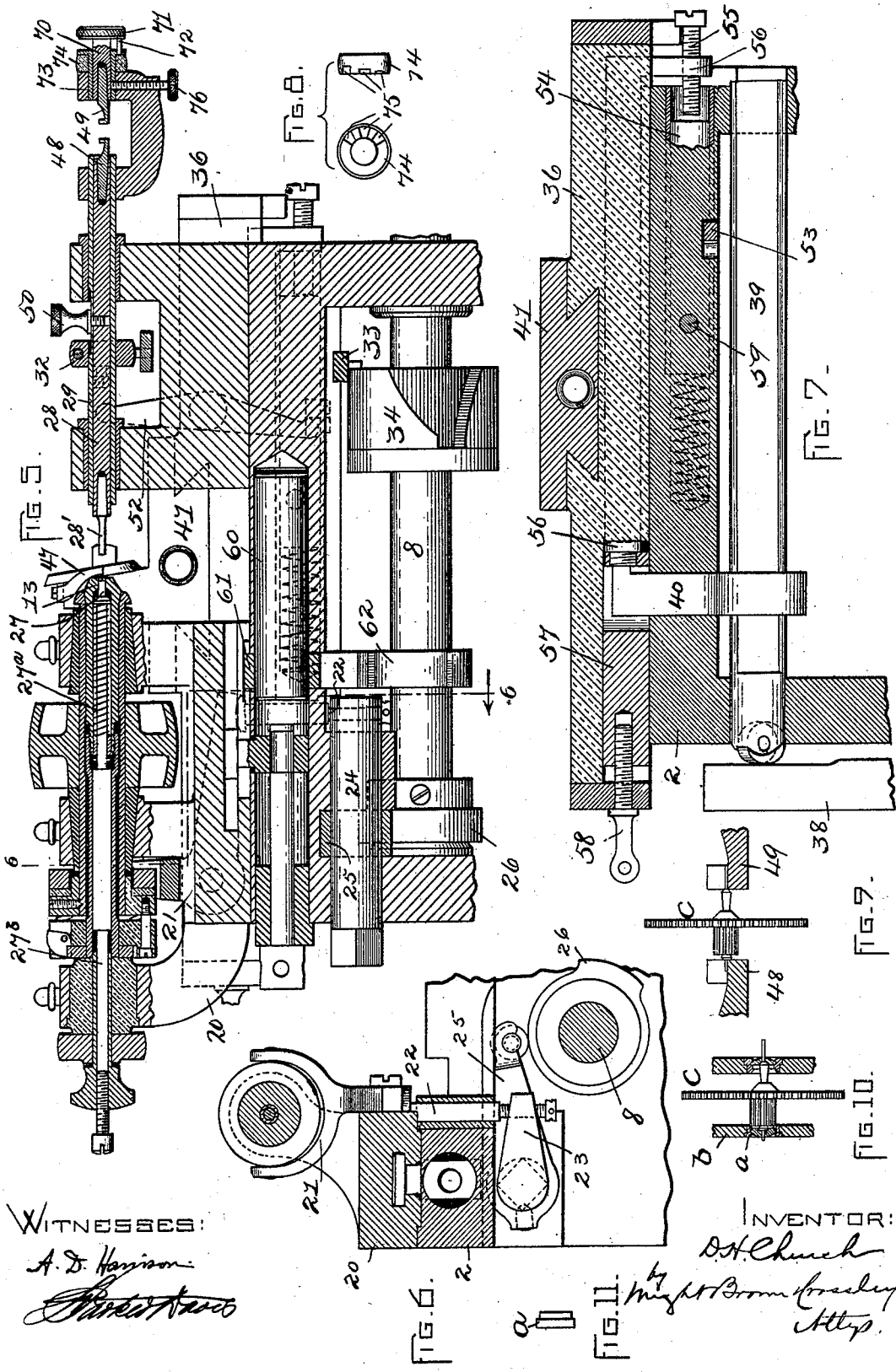
(No Model.)

3 Sheets—Sheet 3.

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*A. D. Harrison*  
*James H. ...*

INVENTOR:  
*D. H. Church*  
*by* *Wm. B. ...*  
*Att'y.*

# UNITED STATES PATENT OFFICE.

DUANE H. CHURCH, OF NEWTON, MASSACHUSETTS.

## JEWEL-PIPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 522,046, dated June 26, 1894.

Application filed October 9, 1893. Serial No. 487,621. (No model.)

*To all whom it may concern:*

Be it known that I, DUANE H. CHURCH, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Jewel-Piping Machines, of which the following is a specification.

This invention relates to an improvement in the class of machines shown in my former patent, No. 488,240, granted December 20, 1892, and the present invention has reference more particularly to a machine for carrying on the process known as jewel-piping, which consists in treating jewel-settings to adapt them for properly receiving and supporting the pinion, and the object of the invention is to provide means whereby variations in the length of the pinion or in the distance between the shoulders thereof are compensated for in the travel of the tool, so that, when the parts of the watch-movement are assembled, there will be no undue "end-shake."

To the above end, the invention consists in certain novel combinations of elements and constructions of parts hereinafter described and claimed.

The accompanying drawings illustrate a construction for carrying out the invention.

Figure 1 shows a front elevation of a machine embodying the invention. Fig. 2 shows a top plan view. Fig. 3 shows an end elevation of the machine, as viewed from the left of Fig. 1. Fig. 4 shows an end elevation, as viewed from the right of Fig. 1. Fig. 5 shows a longitudinal section of the machine. Fig. 6 shows a cross-section, on line 6—6 of Fig. 5. Fig. 7 shows a section on line 7—7 of Fig. 2. Fig. 8 shows detail views of an adjusting annulus. Fig. 9 shows a detail view of the caliper devices, with a pinion therein. Fig. 10 shows sufficient of a watch-movement to illustrate the application of the invention. Fig. 11 shows an enlarged view of the product of the machine. Figs. 12 and 13 show details illustrating the construction of the supply-tube, and the relation of the carrying-jaws thereto.

The same letters of reference indicate the same parts in all the figures.

A bracket 1, fastened to the stationary bed 2 of the machine, is constructed to detach-

ably support a barrel 3, in which the blanks are stacked in the form of short tubular pieces of brass containing the jewels. The tube 3 has a stop-piece 3<sup>a</sup>, projecting out in front of it and connected with it by a narrow neck 3<sup>b</sup>, and the blanks are fed against this stop-piece, and, while extending across the space between the same and the tube, are taken by the jaws hereinafter described. A pipe 4 communicates with the said barrel and with a source of compressed air, and a valve in said pipe is opened periodically through levers 5 and 6 and pin 7 on a disk carried by the main-shaft 8, to admit pressure to the barrel for feeding the blanks.

A rock-shaft 9, journaled in a head 10 on the bed 2, carries at one end an arm 11, to which are pivoted jaws 12, spring-actuated toward each other, and adapted to pass between the stop-piece 3<sup>a</sup> and the tube 3 and take the blank, said jaws passing on either side of the neck 3<sup>b</sup>. The gripping ends of the jaws project beyond the edge of the arm 11, as best seen in Fig. 4, and the blank *a* is held so that it may be acted upon from the rear side of the jaws. The arm 11 is swung away from the barrel to take a blank to the chuck 13, through the following means: An arm 14, fixed on the outer end of the rock-shaft 9, engages a lever 15, and a cam 16 on the main-shaft 8 actuates said lever. A spring 17, connected with a projection on the arm 14, retracts the arm 11. A bent tube 18, fastened to the arm 11, is adapted to receive the work when it is discharged from the chuck, and direct it to a chute 19, down which it falls into a suitable receptacle.

The chuck 13 is supported in a spindle in the head 20 on the bed 2, and is of any suitable construction, and is adapted to be opened and closed periodically by a bell-crank lever 21, a pin 22 acting on said lever, an arm 23 acting on the pin and affixed to a rock-shaft 24, which carries another arm 25 bearing on a cam 26 affixed to the main-shaft 8 (see Figs. 5 and 6). The base 27 of the chuck, against which the work abuts, is yieldingly supported by a spring 27<sup>a</sup>, so that when the chuck is opened the work will be ejected. The movement of the said yielding base may be limited by an adjustable stop 27<sup>b</sup>, or left as a vari-

able base having no definite limit of yielding movement.

A plunger, to detach the work from the jaws 12 and enter it into the chuck, is supported in the head 10, and is composed of a rod 28, having an end-piece 28' to act on the work, and a sleeve 29 surrounding the same, the said two parts moving longitudinally to perform the function above mentioned, and being actuated through the following means: A vertical rock-shaft 30 carries an arm 31 at its upper end, which arm engages a collar 32 affixed to the sleeve 29; and an arm 33, affixed to the lower end of the said rock-shaft, engages a cam 34 on the main-shaft 8. A spring 35 is connected with the arm 33, and actuates the plunger toward the chuck, and the cam 34 retracts it.

The bed 2 supports a longitudinally-movable tool-slide or carriage 36, which is advanced by a spring 37, and retracted by a cam 38 on the main-shaft, acting through a sliding-bar 39, which carries an arm 40, abutting a shoulder on the slide. A transversely-movable slide or carriage 41 is mounted in ways in the slide 36, and is advanced by a spring 42, and retracted by a cam 43 on the main-shaft, acting through an arm 44 affixed to a rock-shaft 45, which carries an arm 46 extending behind a shoulder of the slide 41. This slide 41 supports the tool 47.

The operation of the parts thus far described is as follows: Air-pressure admitted to the barrel 3 moves a blank *a* into position to be taken by the jaws 12. The arm 11 swings toward the chuck with the blank, but pauses just before reaching the chuck long enough to allow the blank already in the chuck to be discharged into the bent tube 18. The arm or carrier then moves to position directly in front of the chuck, which has opened, and the plunger advances, and the end-piece 28', acting against the jewel, pushes the blank out of the jaws and into the chuck, and the latter closes on the blank and the plunger is retracted. The carrier returns, and the tool-slide 41 moves in carrying the tool the desired distance to remove a portion of the stock of the blank to form a shoulder. Then the slide 36 advances and feeds the tool along, so that it turns down the blank and leaves a shoulder. The tool-slides then return to their normal position, the chuck opens, and the blank is discharged in the form shown in Fig. 11. In assembling the parts of a watch-movement, this shouldered blank is fitted to a recess in one of the watch-movement plates *b* (see Fig. 10), and the jewel it contains forms a seat for one end of a pinion *c*. This pinion is shouldered near its ends, and the shoulders should fit snugly to the jewels in the settings *a*, so there shall be no undue endwise play. The distance between the shoulders is likely to vary in different pieces, and this present machine has been devised to compensate for this in turning down one of the settings. One setting is cut to standard form, and it will be

obvious that, by turning down the other setting more or less in its length, the distance between the jewels will be varied by the engagement of the shoulder with the watch-movement plate. Therefore I have provided in this machine for regulating the turning of the blank by the distance between the shoulders of the pinion. The means employed to effect this are as follows: Referring first to Fig. 5, the feeder hereinbefore referred to carries a calipering device, one member 48 of which is carried by the rod 28, and the other member 49 by the sleeve 29. A thumb-screw 50 is fastened in the rod 28 and extends through a slot in the sleeve 29, and, by loosening this thumb-screw, the rod and sleeve may be adjusted relatively to each other. The collar 32 on the sleeve carries a pin 51, adapted to act against a lever 52, extending vertically and pivoted at the middle to the head 10. This lever engages a horizontal lever 53 of the same length and pivoted at the middle to the bed. The latter lever engages a stop-plug 54, adapted to slide in a bushing in the bed 2 (see Fig. 7), and said plug limits the advance of the tool-slide 36, which carries a screw 55 arranged to abut the said plug. Said screw is supported in a pendent arm of a bar 56 extending longitudinally of the slide, and fastened at its opposite end to a block 57, supported in the slide and connected therewith by a bolt 58. The stop-plug 54 is brought to the proper position through its connection with the plunger, and is locked at this position through the following means: A rod 59 is fitted to slide transversely in the bed 2, and is adapted to bind against the plug 54. A rock-shaft 60, journaled in the bed 2 is cut out at one part (see Fig. 4) to receive the opposite end of the rod 59, so that, upon turning the said rock-shaft, the rod is crowded against the stop-plug. The rock-shaft carries an arm 61, which bears on a cam 62, and thereby the shaft is rocked and the stop-plug locked at the proper time.

In the operation of the machine, the pinion, as *c* (Fig. 9), for which the pipings are being prepared, is set in the calipering devices 48 and 49, as shown in said figure, and the set-screw 50 having been loosened, the rod 28 is adjusted until the calipering devices bear against the shoulders of the pinion, and the set-screw 50 is then tightened. It will be seen that, by this adjustment, the distance of the end-piece 28' from the chuck is determined. Hence the feeder, in order to drive the blank home in the chuck, will be required to move more or less according as this piece is farther away or nearer to the chuck. The movement of the feeder is transferred through the connections described to the stop-plug 54, and its position is determined accordingly, so that the travel of the tool is checked at the proper position to leave a shoulder on the blank corresponding with the distance between the shoulders of the pinion. In this manner, variations in the pinions are com-

pensated for, so that in the watch-movement there will be no undue endwise play or "endshake."

5 The caliper is adjusted to different grades of pinions, as follows: The member 49 is carried in a slide 70, which has a head 71 with a pin 72 projecting from its inner side. The slide 70 fits a bushing 73 in the caliper frame, and the bushing has a flange with a hole  
10 which receives the pin 72. An annulus 74 fits loosely on the bushing behind the flange, and is formed with a series of depressions 75 (see Fig. 8), graded in depth, for the pin 72 to engage. A set-screw 76 in the caliper frame  
15 binds the slide 70 at different positions to which it may be brought. By loosening this set-screw and turning the annulus 74, the caliper member 49 may be adjusted, its position being determined by the engagement of  
20 the pin 72 in one of the depressions 75.

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

1. A machine of the character described, comprising in its construction a plunger for  
25 carrying the work into the chuck, a calipering device which determines the extent of movement of the plunger, and means for regulating the travel of the tool by the movement of the plunger.

2. In a machine of the character described, the combination of a chuck having a yielding  
30 base, a plunger for carrying the work into the chuck, a calipering device which determines the extent of movement of the plunger, and  
35 means for regulating the travel of the tool by the movement of the plunger.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 8th day of Sep-  
40 tember, A. D. 1893.

DUANE H. CHURCH.

Witnesses:

C. F. BROWN,  
F. PARKER DAVIS.