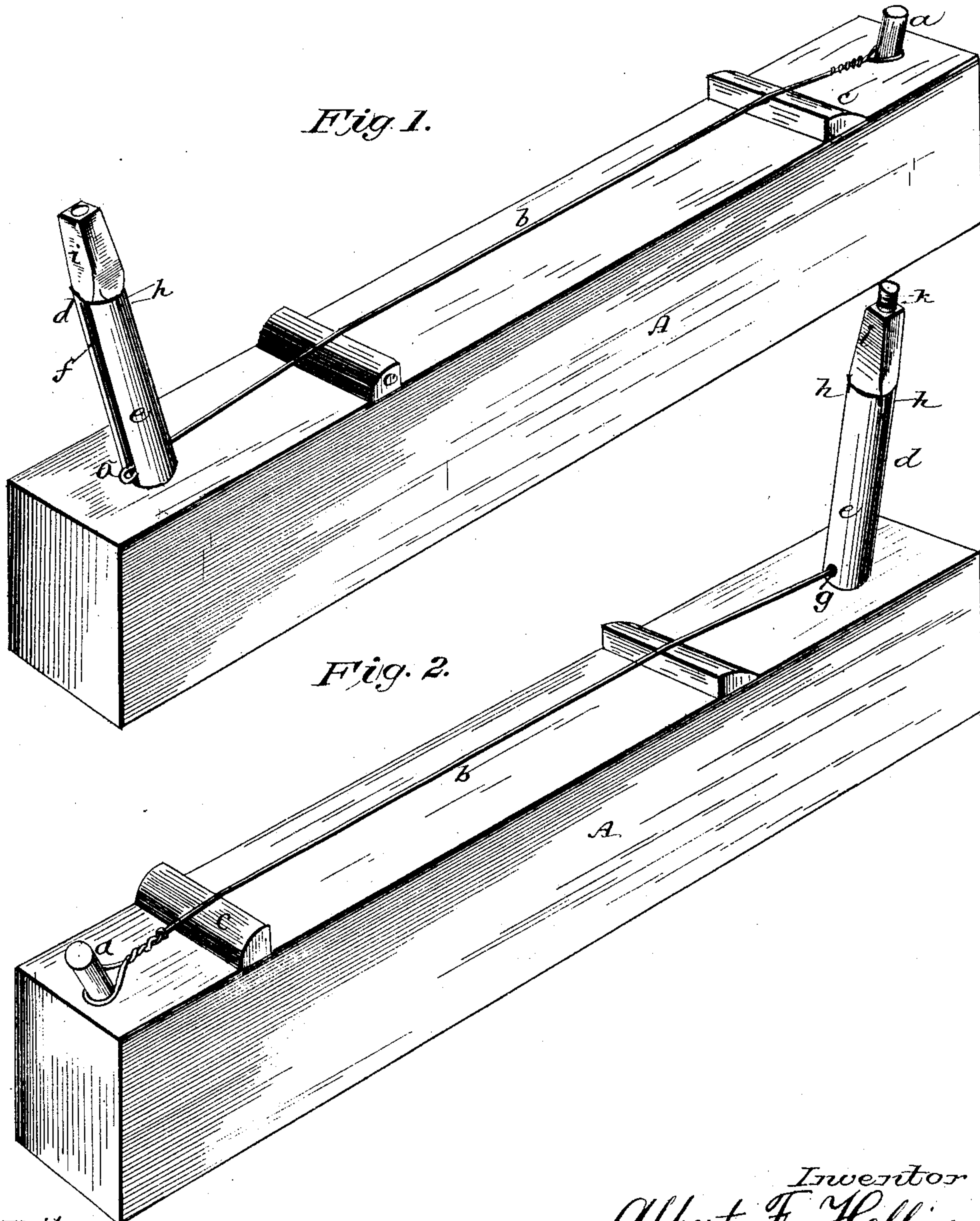


A. F. HELLIG.  
Stringing Piano Fortes.

No. 238,898.

Patented March 15, 1881.



Witnesses  
Fred G. Dieterich.  
B. L. Dieterich.

Inventor  
Albert F. Hellig  
by Louis Bagger & Co.  
Attorneys

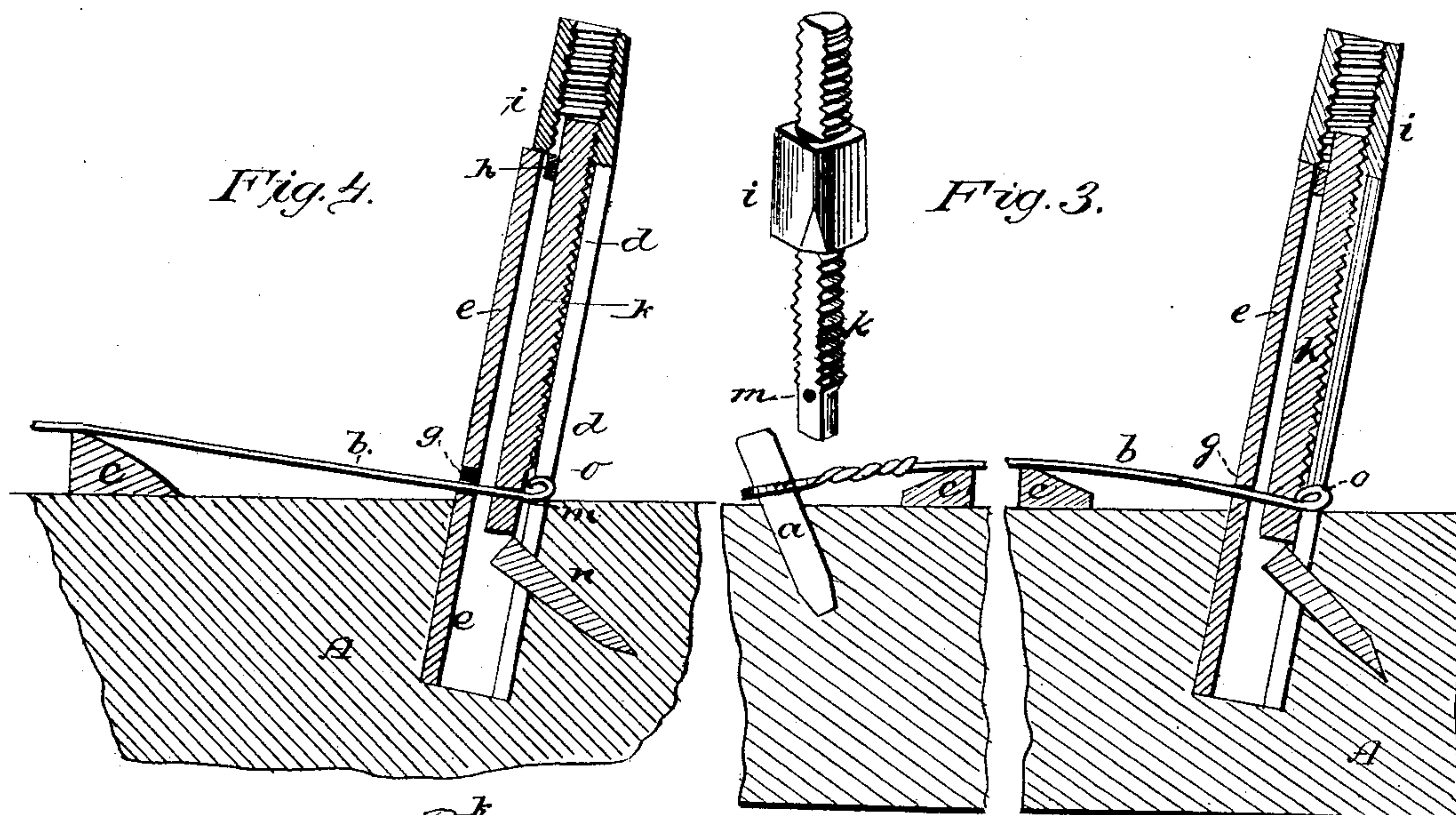


A. F. HELLIG.  
Stringing Piano Fortes.

**No. 238,898.**

**Patented March 15, 1881.**

*Fig. 13.*



*Fig. 5.*

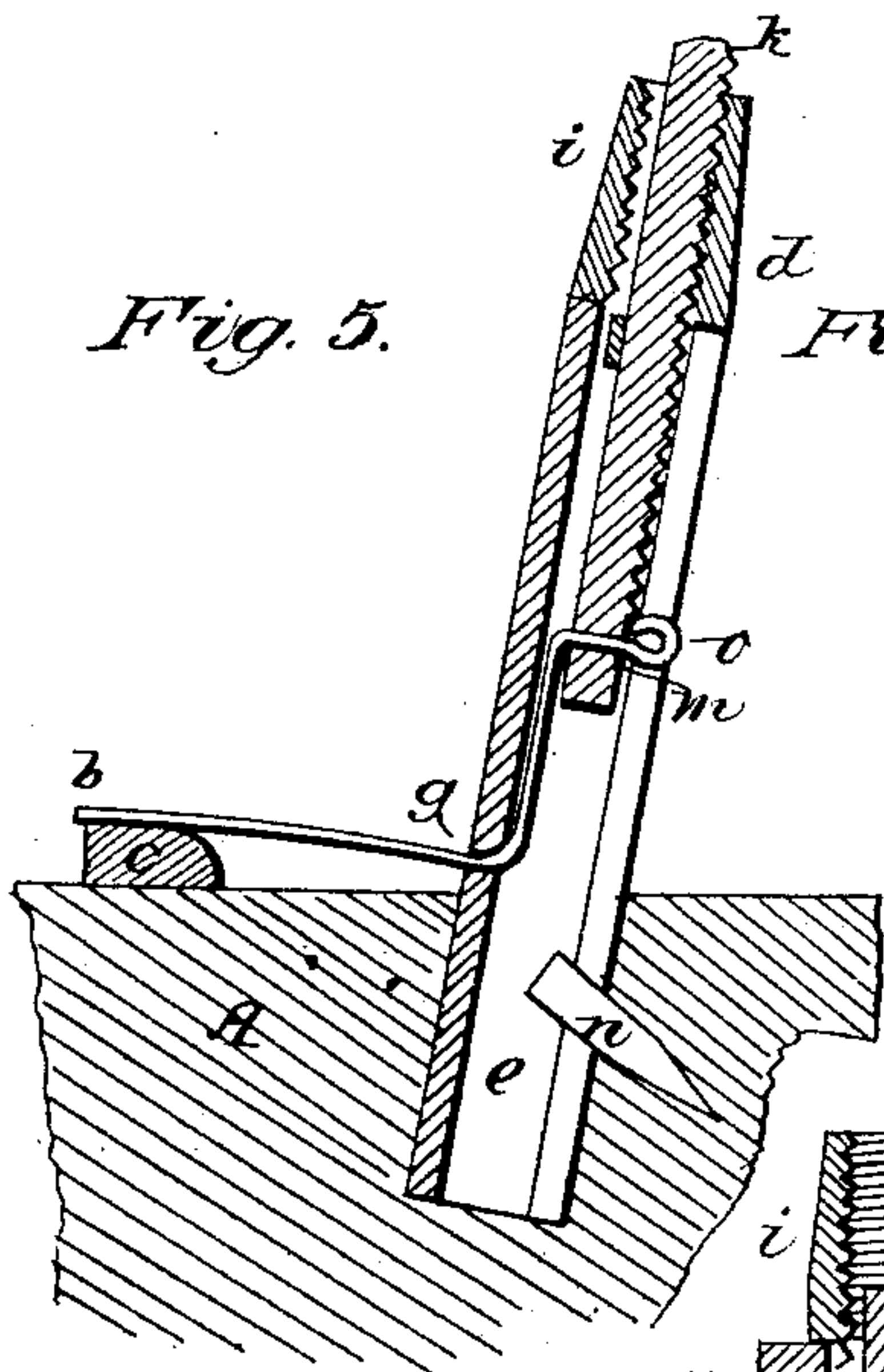
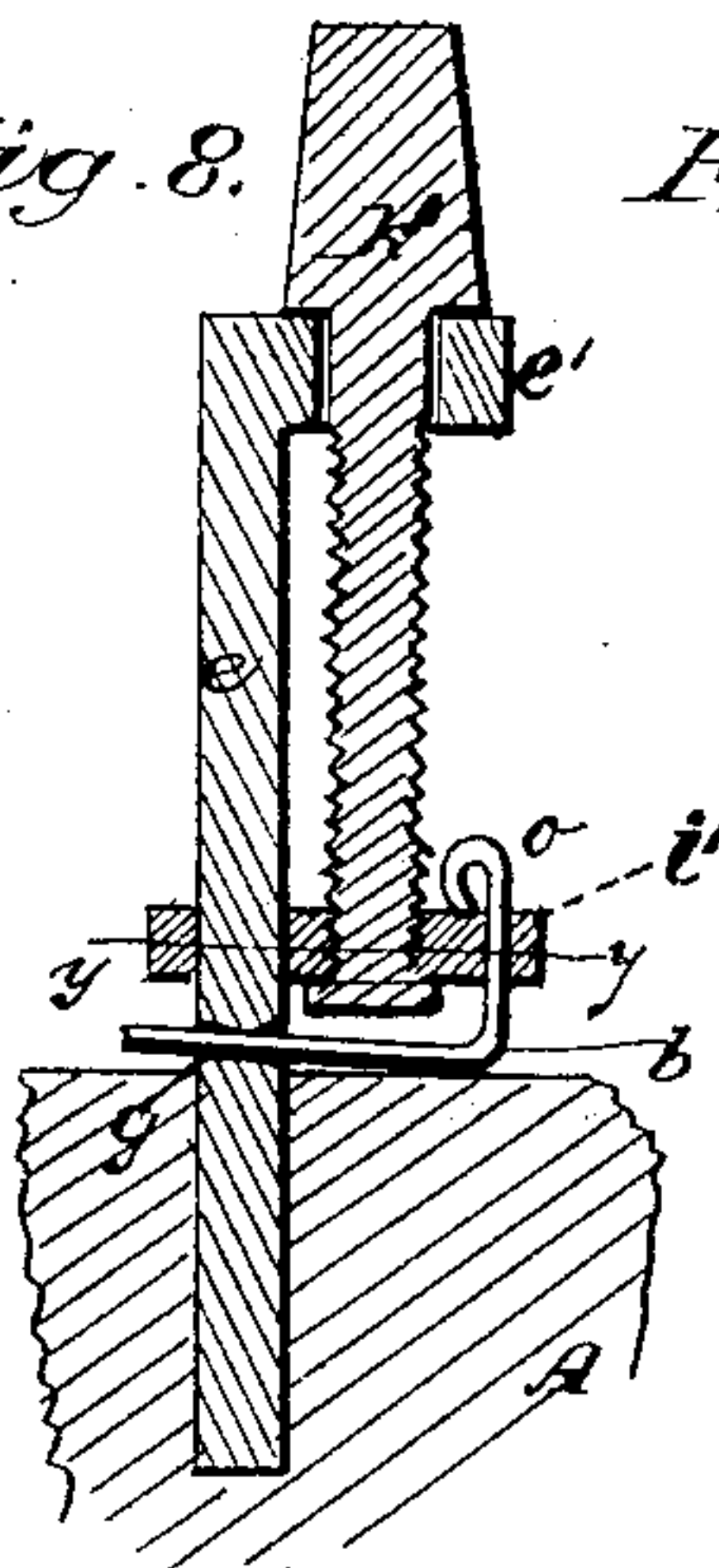


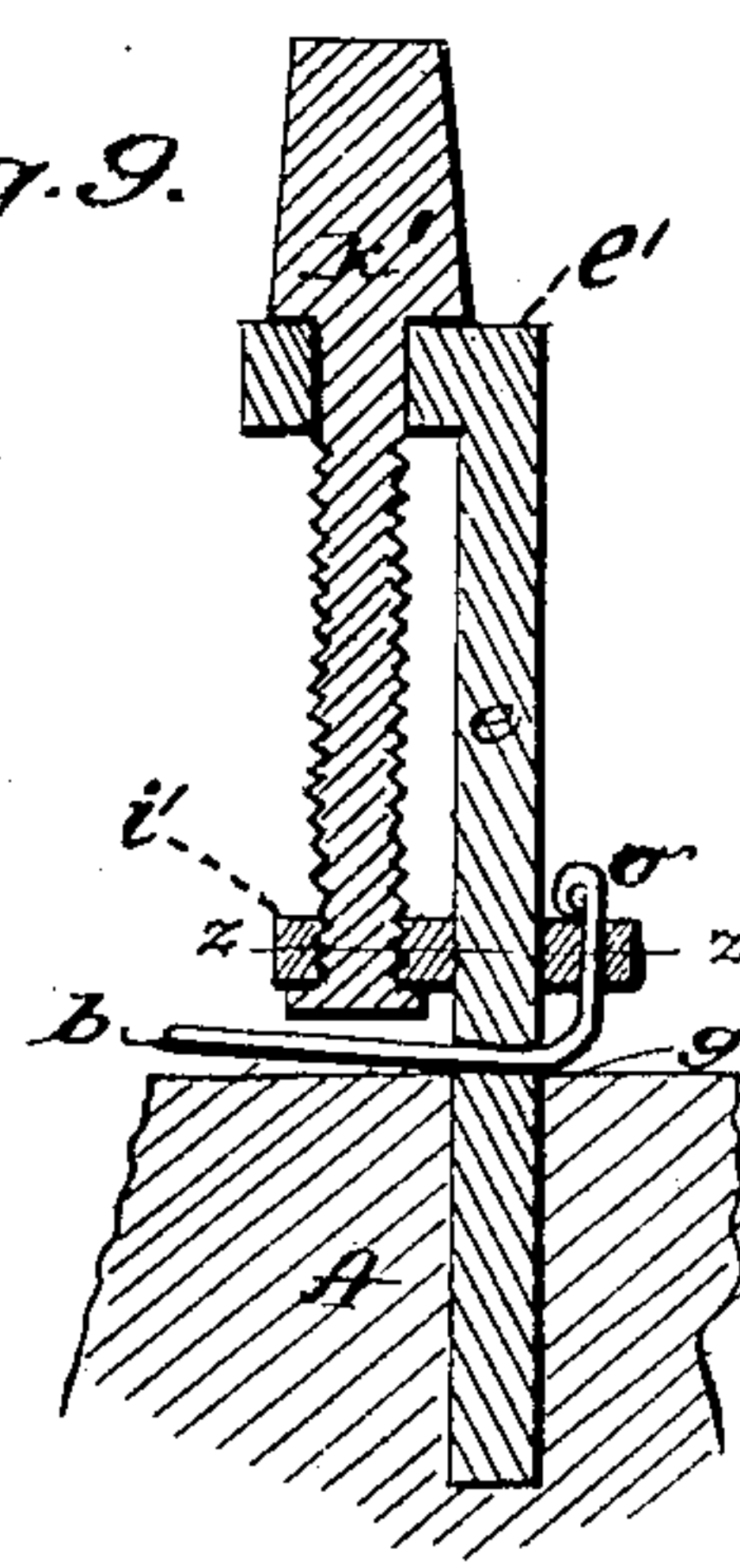
Fig. 6<sup>2</sup>



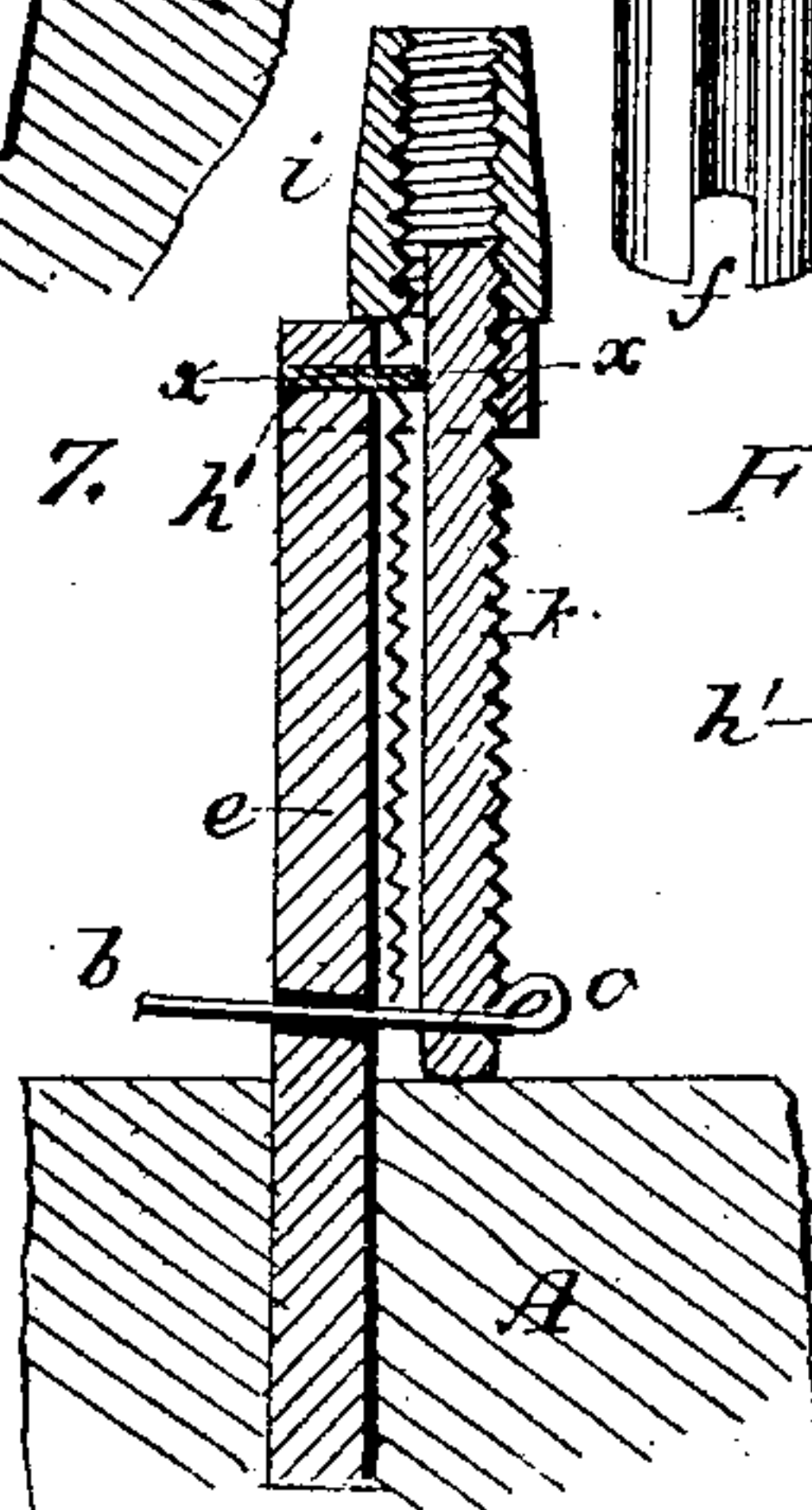
*Fig. 8.*



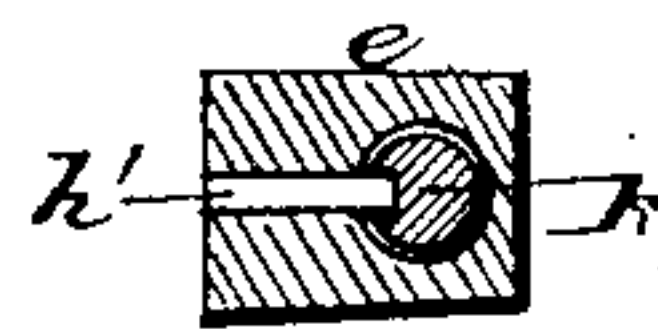
*Fig. 9.*



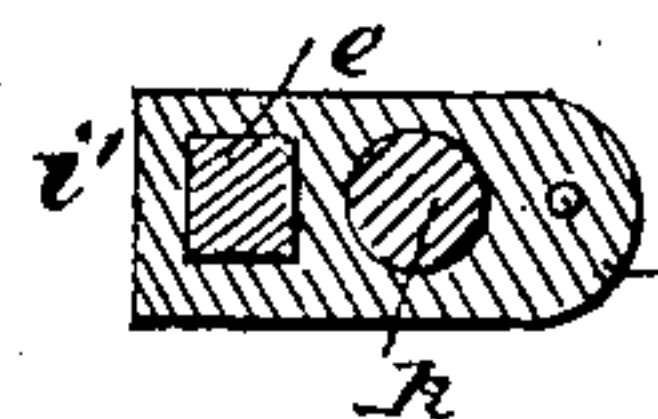
*Fig. 7. k*



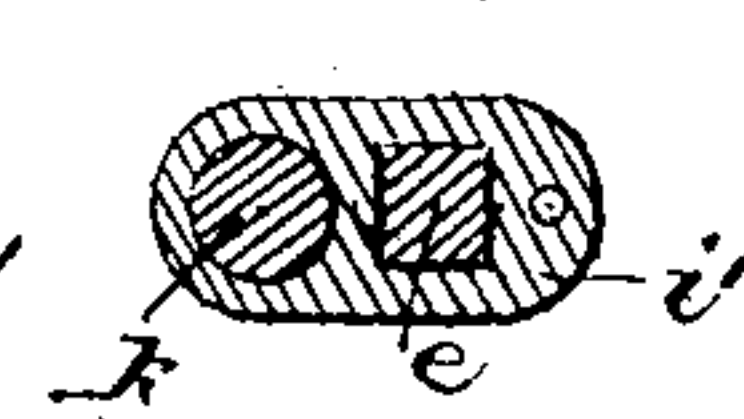
*Fig. 10.*



*Fig 11.*



*Fig. 12.*



Witnesses  
Fred. G. Dietrich  
B. L. Dietrich

Inventor  
Albert F. Hellig-  
by Louis Bagger &  
Attorneys



# UNITED STATES PATENT OFFICE.

ALBERT F. HELLIG, OF LITTLE FERRY, NEW JERSEY.

## STRINGING PIANO-FORTES.

SPECIFICATION forming part of Letters Patent No. 238,898, dated March 15, 1881.

Application filed February 26, 1880.

*To all whom it may concern :*

Be it known that I, ALBERT F. HELLIG, of Little Ferry, in the county of Bergen and State of New Jersey, have invented certain new and  
5 useful Improvements in Piano-Fortes and other Stringed Musical Instruments; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it ap-  
10 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

While my invention is chiefly applicable to piano-fortes, it is by no means limited thereto,  
15 but may be applied with equal advantage to zithers, harps, violins, violoncellos, and all stringed musical instruments generally. In the following specification, however, I have described my invention as especially applied  
20 to a piano.

The generally-adopted method of stringing and tuning pianos and other stringed musical instruments consists, as is well known, in winding the strings upon or around pins, (called in  
25 a piano "tuning-pins,") by turning the said pins, like screws, within the smooth bores or sockets in the wrest-board or tuning-stock into which they are inserted, the pins having been driven forcibly into said board or stock,  
30 in order to provide the necessary friction to cause them to remain firmly in any given position and resist the tension of the strings. This method is objectionable, experience having demonstrated that the friction in this man-  
35 ner imparted to the tuning-pins, and upon which they rely for their resistance in respect of the unwinding tendency of the strings, is in itself unequal, and therefore more or less uncontrollable and unadjustable; besides, it is  
40 often inadequate to resist this tendency of the tension of the strings to unscrew or loosen the tuning-pins, especially after the piano has been tuned repeatedly, and the pins thus turned more or less in their respective bores  
45 or sockets and loosened therein from the increased smoothness of said bores, which, of course, puts the instrument out of tune. Again, the pins thus depending upon their frictional contact with the wrest-board or tuning-stock  
50 into which they are inserted for the rigidity of their adjusted position, it is difficult to effect

this adjustment with that micrometrical degree of nicety and exactness which is requisite to the proper tuning of the instrument.

The object of my invention is to provide 55 piano-fortes and other stringed musical instruments with an improved device for stringing and tuning which does not depend upon the frictional resistance of tuning-pins within the wrest-board or tuning-stock in the manner 60 aforesaid, and which is susceptible of the highest degree of accuracy in the tuning and adjustment of the pitch.

To this end my invention consists in the construction of a stringing and tuning mechanism 65 or device to take the place of the tuning-pins, which is inserted, removably, into the wrest-board or tuning-stock, the longitudinal axis of the said mechanism or device being in the same plane as the axis of the connecting end of the 70 string, whereby central direction of the tension of the string to the stringing and tuning device is secured. The said device is stationary in the wrest-board or tuning-stock, the strings depending upon a central and rectilineal and 75 not a tangential (peripheral) and rotary motion for their adjustment, which said rectilineal motion of the adjusting device is within a plane coinciding with the longitudinal axis of the connecting end of the string operated upon, a 80 principle which, as carried out in my improvement, admits of the utmost nicety and micrometrical precision in the adjustment, as well as of ease and facility in effecting the adjust- 85 ment, or, in other words, in tuning or adjusting the pitch of the instrument.

In the two sheets of drawings hereto annexed, Figures 1 and 2 are perspective views, from opposite standpoints, of a device embodying my improvement. Fig. 3 is a longitudinal vertical section. Figs. 4 and 5 are 90 similar sections, showing the adjusting mechanism in two different stages of operation or positions. Fig. 6 is a perspective rear view of the tubular standard detached from the wrest- 95 board or tuning-stock and adjusting mechanism. Figs. 7, 8, and 9 represent longitudinal sections illustrative of a modified construction of my mechanism or device. Fig. 10 is a cross-section through line *x x*, Fig. 7. Fig. 11 is a 100 cross-section through line *y y*, Fig. 8. Fig. 12 is a similar section through line *z z*, Fig. 9;



and Fig. 13 is a perspective view of the adjusting mechanism used in combination with the tubular standard represented in Fig. 6 detached from said standard.

5 Similar letters of reference indicate corresponding parts in all the figures.

A is the wrest-board, which is provided near one end with a solid pin, *a*, to which the string *b* is fastened, and also with two small blocks, 10 *c c*, supporting the strings, and, finally, near its other end, with the stringing and tuning device *d*. This consists of a standard which is inserted loosely into a hole or socket bored in the wrest-board for its reception, so that it 15 can be easily taken out and again replaced. Means are, however, (as hereinafter shown,) provided for preventing said standard from turning in its bore or socket. The standard *d* is provided with an adjusting mechanism, 20 which is composed of a female screw or nut, and an appertaining male screw-bolt in operative connection or combination with each other and with the standard.

I prefer to construct the stationary but removable stringing and tuning mechanism as follows:

I use a straight tubular standard, *e*, having a longitudinal slot, *f*, running from end to end, and also diametrically opposite to said slot, a 30 small eye or aperture, *g*, so placed that when the standard is inserted into its bore or socket in the wrest-board or tuning-stock this eye shall be just above or flush with the surface of the board or iron plate or frame of the piano-forte. In the upper end of the tubular 35 standard *e* is inserted a small pin or bridge-piece, *h*, facing a screw-bolt, *k*, one side of which, facing the said pin or bridge-piece *h* and the aperture *g*, is filed off flat and smooth, 40 to prevent it (the bolt) from turning within the tube *e*, into which it is inserted.

*i* is a female screw or nut, which is supported by and rests upon the upper rim of the tubular standard *e*, and into which the male screw-bolt *k* is inserted. It follows that by turning or 45 rotating said nut *i* bolt *k* is worked up or down within its tube.

Near the lower end of bolt *k* is a diametrical eye or aperture, *m*, in the same vertical plane 50 as the eye *g* and slot *f* in the standard, through which the end of the string, having first been inserted through eye *g*, is inserted and prevented from slipping back by a sharp hook or twist, *o*, which is so formed that it will also 55 serve as an additional guide for the screw-bolt *k*, by projecting into the slot *f* of the tubular standard or out through the said slot. If desired, this projecting twist, hook, or knot *o* may, therefore, serve as a substitute for the 60 pin or bridge-piece *h* by preventing the screw-bolt from turning within its tubular standard.

When this form of standard is used, I prevent it from turning in its bore or socket in the wrest-board or tuning-stock by inserting a 65 pin, *n*, obliquely into the socket, which will register with slot *f*, so that it forms no ob-

stacle for the insertion into or removal from the wrest-board or tuning-stock of the standard; but differently-constructed standards may be made without deviating from the spirit of my 70 invention—for example, standards that are rectangular or square in cross-section, or provided with a rectangular or square tenon at their lower end fitting into a correspondingly-shaped socket in the wrest-board or tuning-stock to prevent them from turning. Nor need 75 the standard be tubular and straight, (although this is, for its convenience and cheapness, the form which I prefer,) for it will readily be seen that it may be made solid at its lower end, 80 with a projecting tubular head supporting upon its upper rim the nut *i*, and serving as a bearing for the screw-bolt *k*, as shown in Fig. 7. Again, instead of attaching the end or ends 85 of the string to the lower end of the male screw *k*, and operating said screw by turning the female screw or nut *i*, this arrangement may be reversed, as represented in Figs. 8 and 9, without deviating from the spirit of my 90 invention.

In the modifications represented in the last-named two figures, and in their corresponding transverse sections, Figs. 11 and 12, the end (or ends) of the string *b* is secured in the 95 nut *i'*, which is slotted to receive the standard *e*, through whose projecting tubular head *e'* the screw-bolt is inserted, its lower end being fitted into the threaded aperture in nut *i'*, while its upper end is provided with a square head, 100 *k'*, which corresponds to the nut *i* represented in the remaining figures of the drawings. By turning this head with a key, wrench, or any other suitable implement, the nut *i'* may be worked up or down upon its standard, drawing 105 the end of the string with it until the proper degree of tension has been obtained.

Instead of slotting nut *i'* in the manner described to fit upon its standard *e*, it may be made with a dovetailed projection, fitting into a correspondingly-shaped longitudinal groove 110 or channel in the standard. The position of the nut in respect of its standard may be reversed, as shown in Figs. 9 and 12; and, again, when a nut at the upper end of the male screw and its standard is employed, as in Figs. 1, 2, 115 3, 4, 5, and 7, the screw, instead of flattening upon one side, may be grooved longitudinally and prevented from turning by inserting a pin, *h'*, through the standard, as shown more clearly in Fig. 10, the inner point of which projects into 120 the groove in the screw-bolt, operating in precisely the same manner as the pin or bridge-piece *h*, which is used in combination with a flattened screw.

The mode of stringing, tuning, and adjusting 125 the pitch of piano-fortes and other stringed musical instruments with this device is as follows: To string the instrument, the standard, with its adjusting mechanism, is taken out of its bore or socket in the wrest-board or tuning-stock, after which its bolt *k* is so adjusted by 130 turning nut *i* (or conversely) that its eye shall



be opposite to and register with, or be in the closest possible proximity to, the eye or aperture in the standard. Then the string, after its length has been adjusted as closely as possible or practicable, is fastened at one end to the pin *a*, in the usual manner, and its free end or ends (the string being either single or double) is or are inserted through the previously-adjusted eyes or apertures *g m*, and bent or hooked in the manner hereinbefore stated, so as to fasten it securely to the bolt *k* or nut *i'*, as the case may be. The standard, with its adjusting mechanism, having the string attached, is then reinserted into its proper bore or socket in the wrest-board or tuning-stock, which will bring the string into the position shown in Figs. 1, 2, 3, 4, 7, 8, and 9 of the drawings, after which the tension of the string is adjusted to effect its proper tuning by turning either the nut *i* or bolt-head *k'*, as the case may be, with a wrench or key, which draws the end of the string up, as represented in Fig. 5, until its tension and tune are properly adjusted. Whenever the instrument should require tuning, or, rather, adjustment of pitch, this is effected in this manner by simply turning the tuning-head upon the stationary standard, which requires little power, and can be accomplished with micrometrical nicety and exactness.

Where this invention is applied to gut-stringed instruments it is advisable, in order to prevent the gut string from being injured or cut while being drawn through the eye *g* in the standard, to attach to the stringing and tuning device a short piece of wire string, in the manner as aforesaid, and then fasten the end of the gut string to the free end of the wire string which projects out through the eye *g*; or the stringing and tuning device may be so placed or arranged in its relation to the tuning-stock into which it is inserted that its longitudinal axis shall be in a line with the longitudinal axis of the connecting end of the string, so that the string will be fastened directly to the adjusting mechanism without having first to go through the eye *g* in the standard.

Having thus described my invention, I do not claim, broadly, the combination, with the head of a stringing-standard or wrest-pin, of an adjustable screw to which the string is attached in such manner that the direction of the straining-force is mathematically true in the direction of the axis of the adjustable screw; but

I claim as my improvement and desire to secure by Letters Patent of the United States—

1. The device for stringing, tuning, and adjusting the pitch of piano-fortes and other stringed musical instruments, composed of the tubular slotted standard *e*, provided with an eye, *g*, and pin or bridge-piece *h*, screw-bolt *k*, flattened on the side facing the said pin or bridge-piece, and having an eye or aperture, *m*, at its lower end, and female screw or nut *i*, all constructed and combined to operate substantially in the manner and for the purpose shown and set forth.

2. In a stringed musical instrument, the combination, with the wrest-board or tuning-stock *A* and string *b*, of the stringing and tuning device *d*, composed of the detachable tubular slotted standard *e*, provided with an eye, *g*, and pin or bridge-piece *h*, screw-bolt *k*, flattened on the side facing the said pin or bridge-piece, and having an eye or aperture, *m*, at its lower end, and female screw or nut *i*, substantially as and for the purpose herein shown and specified.

3. In combination, the socketed wrest-board or tuning-stock *A*, pin *n*, projecting obliquely into the socket of said wrest-board or tuning-stock, and detachable tubular slotted stringing and tuning standard *e*, substantially as and for the purpose herein shown and described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

ALBERT F. HELLIG.

Witnesses:

ROMEO T. LEVINNESS,  
WILLIAM S. DOREMUS.