

(No Model.)

5 Sheets—Sheet 1.

J. W. DARLEY, Jr.
MUSIC LEAF TURNER.

No. 500,380.

Patented June 27, 1893.

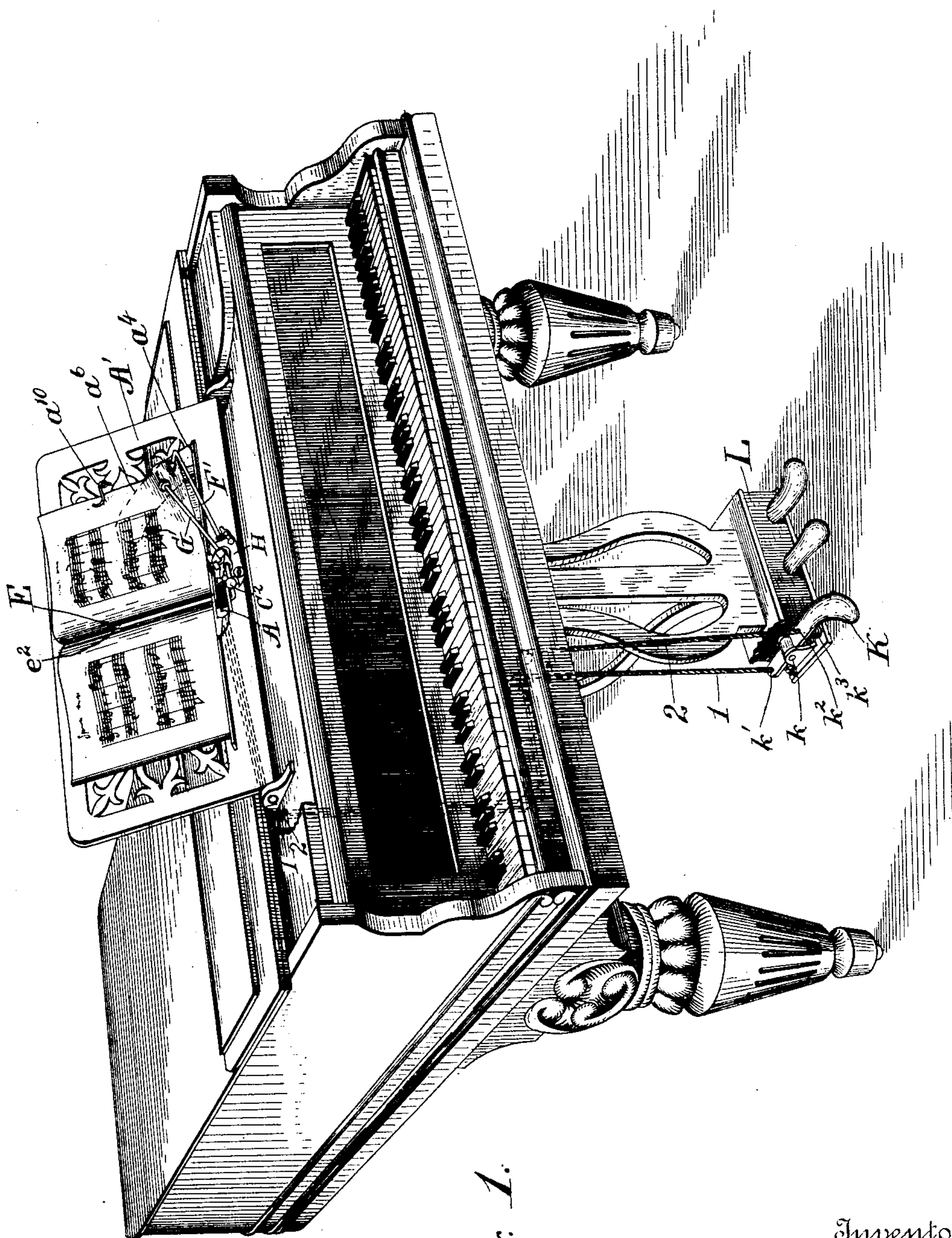


Fig. 1.

Witnesses.

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Fig. 2.

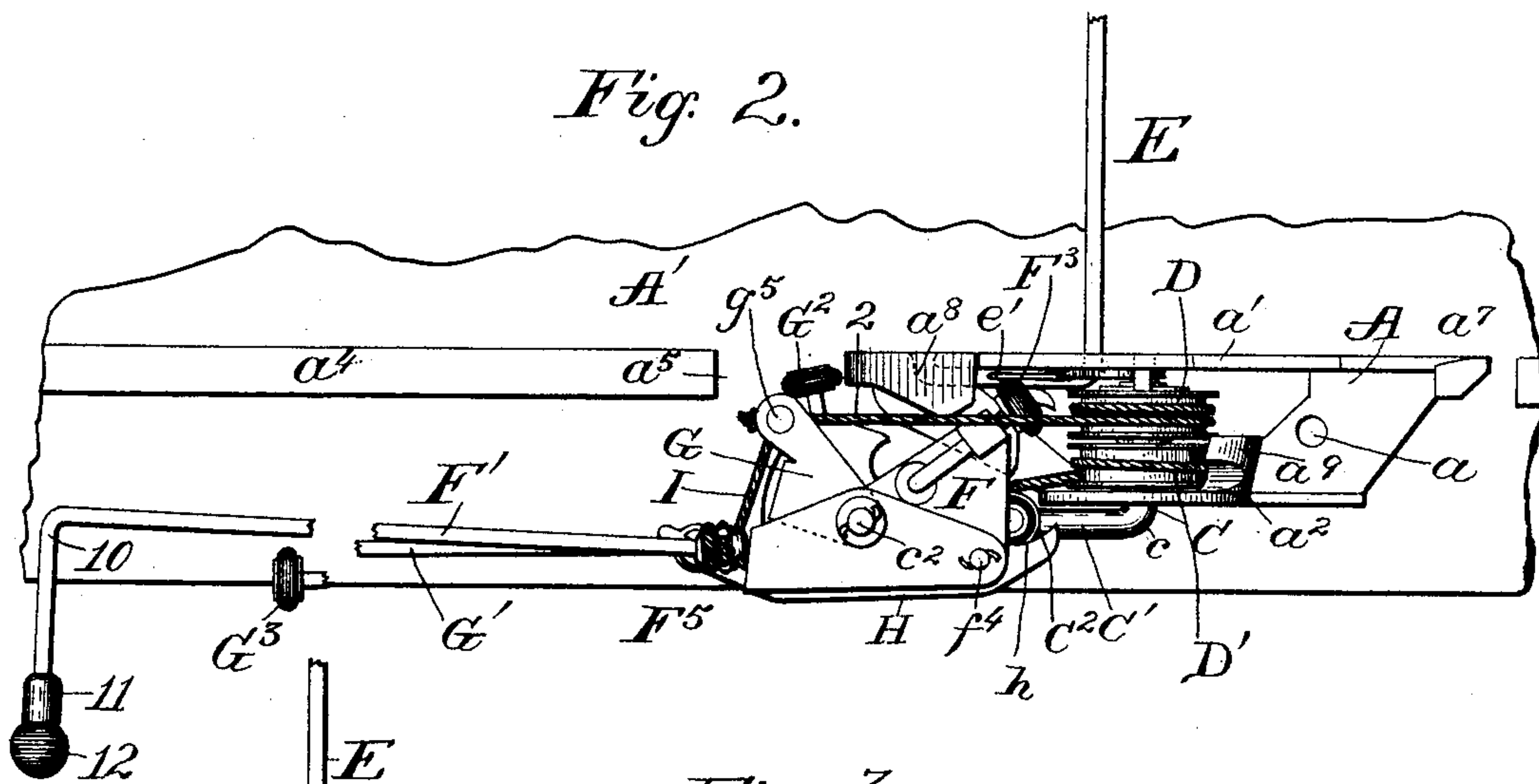


Fig. 3.

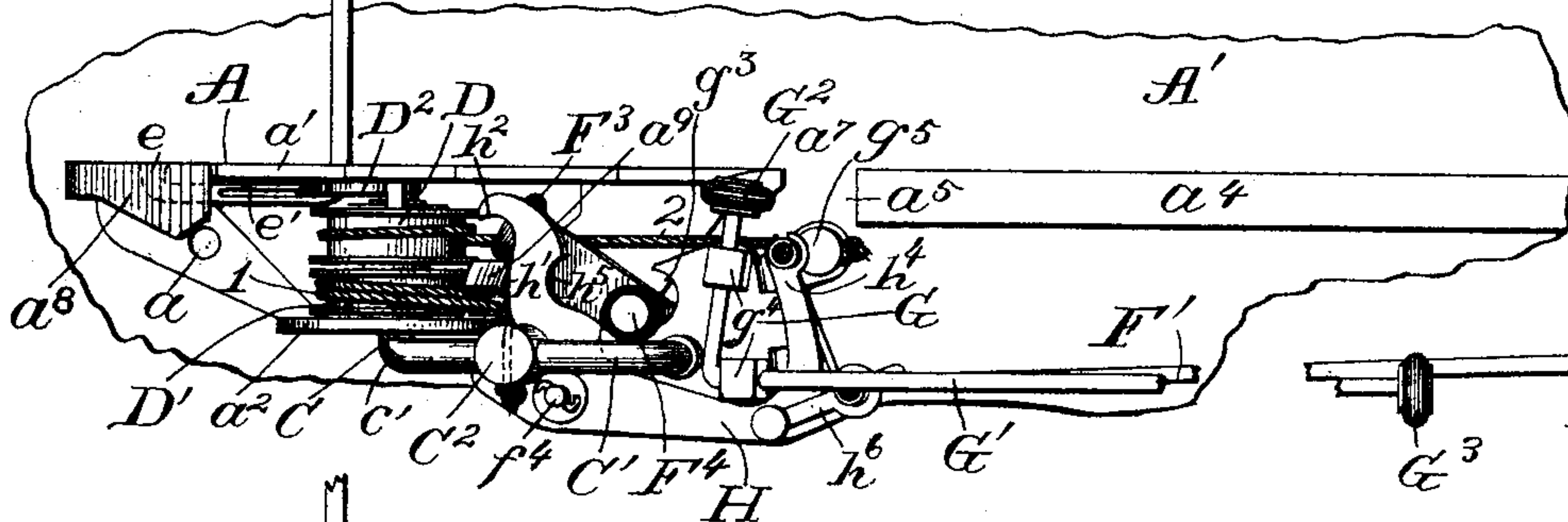
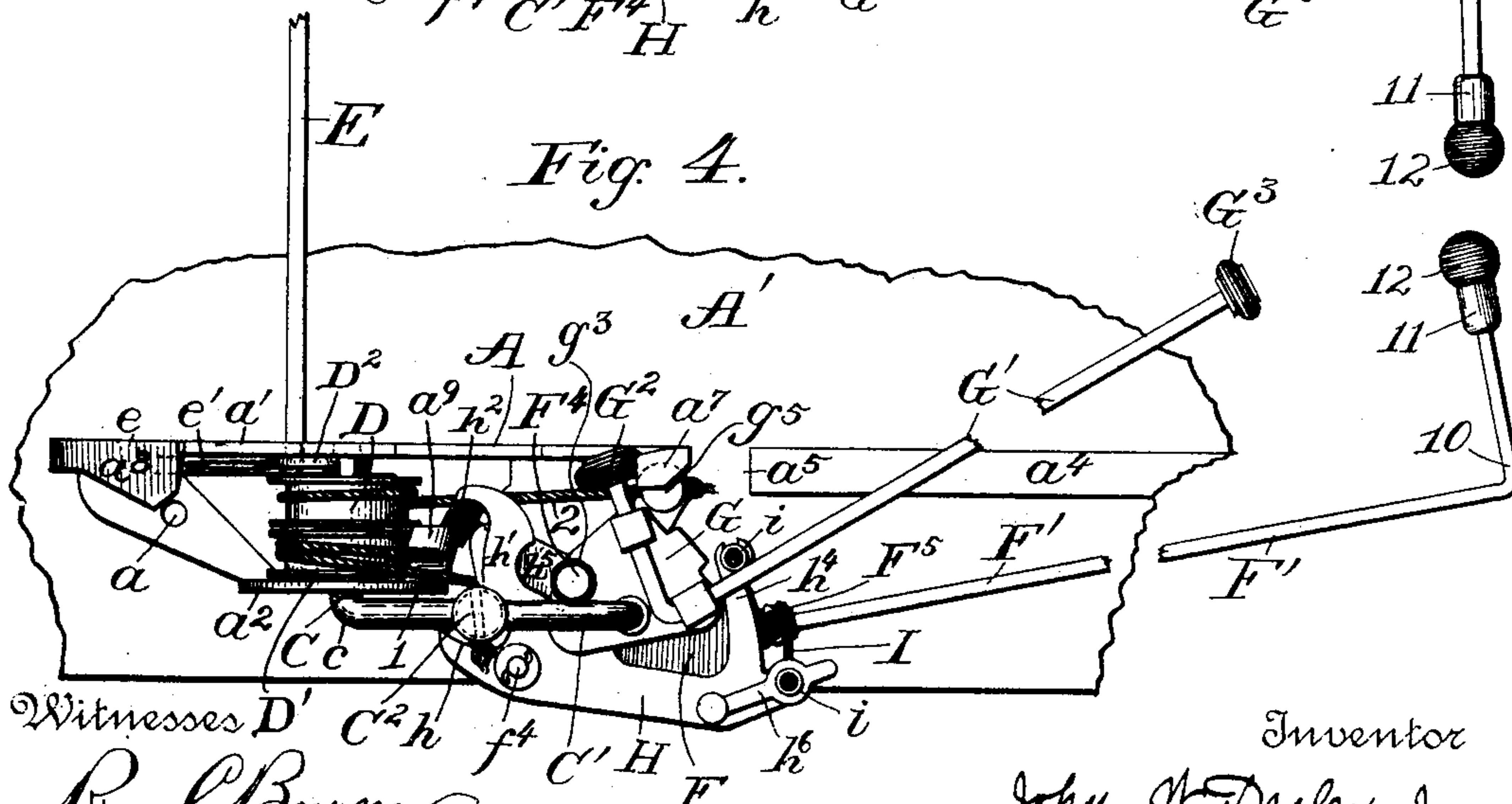


Fig. 4.



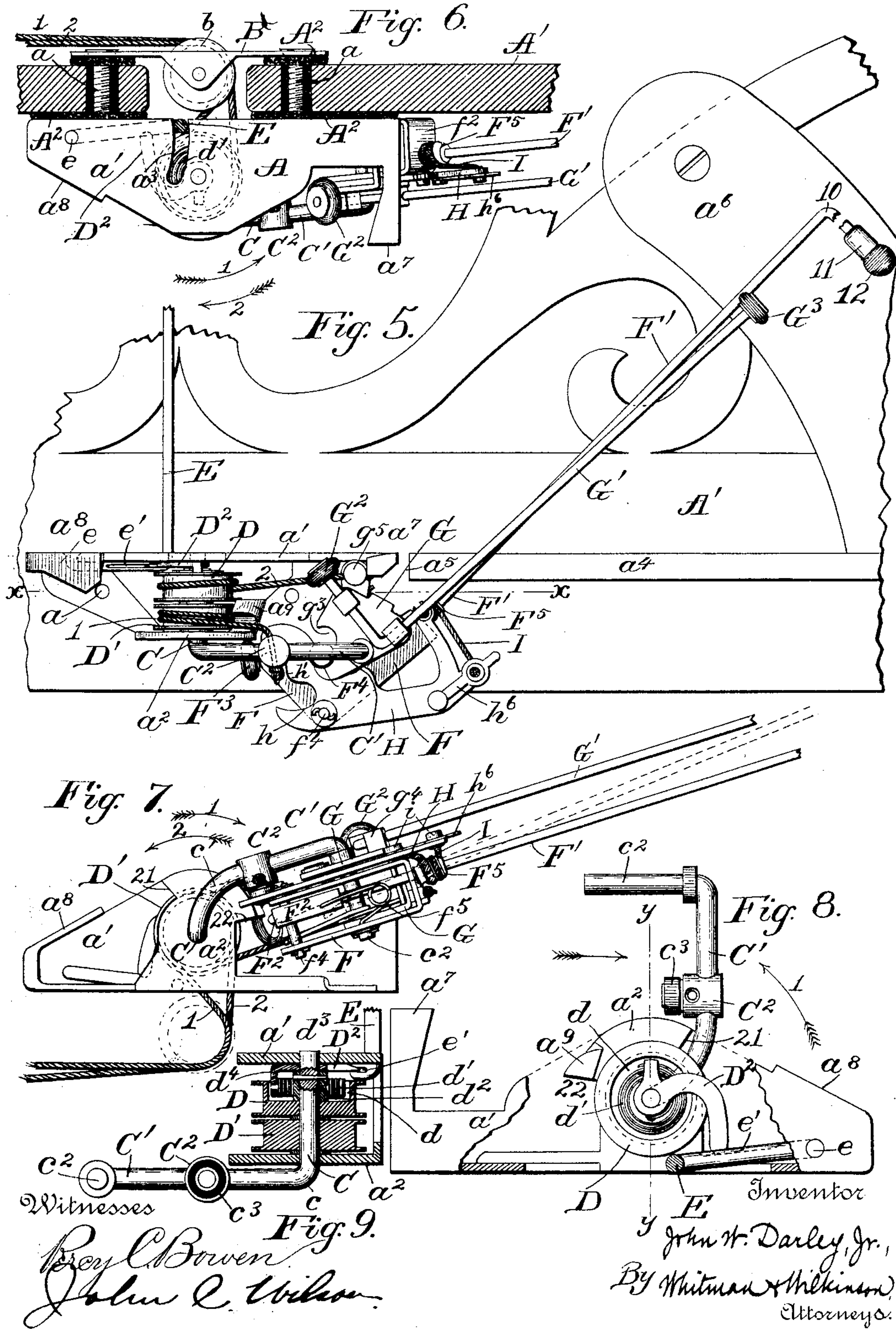
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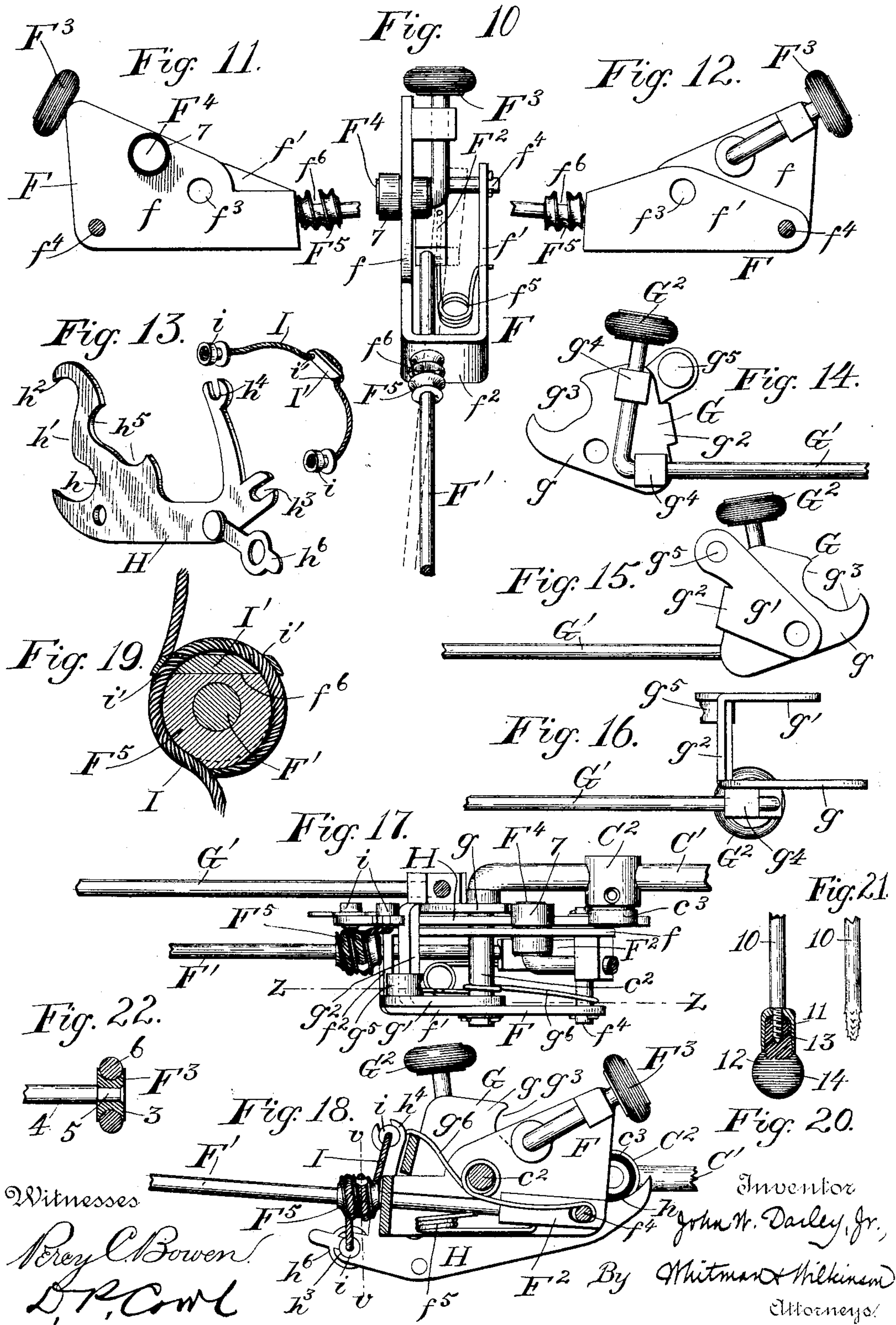
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5 Sheets—Sheet 4.

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(No Model.)

5 Sheets—Sheet 5.

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Fig. 23.

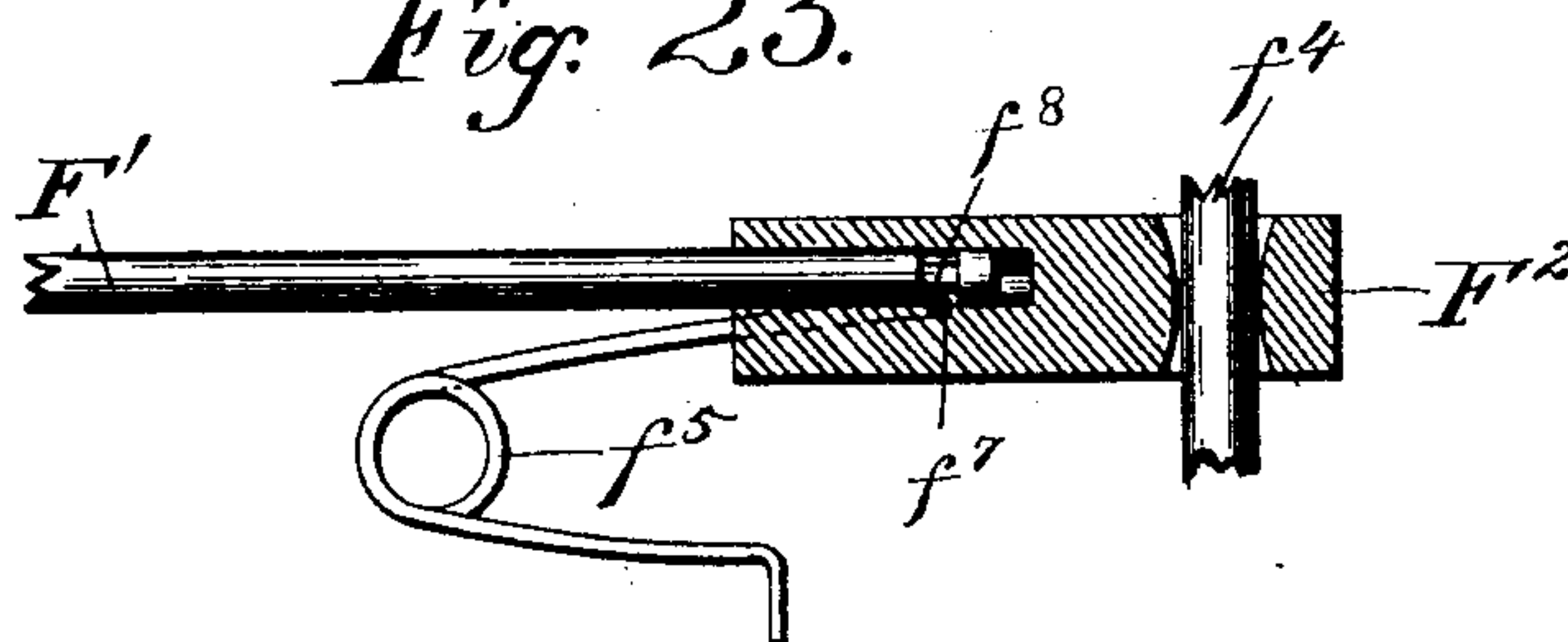


Fig. 24.

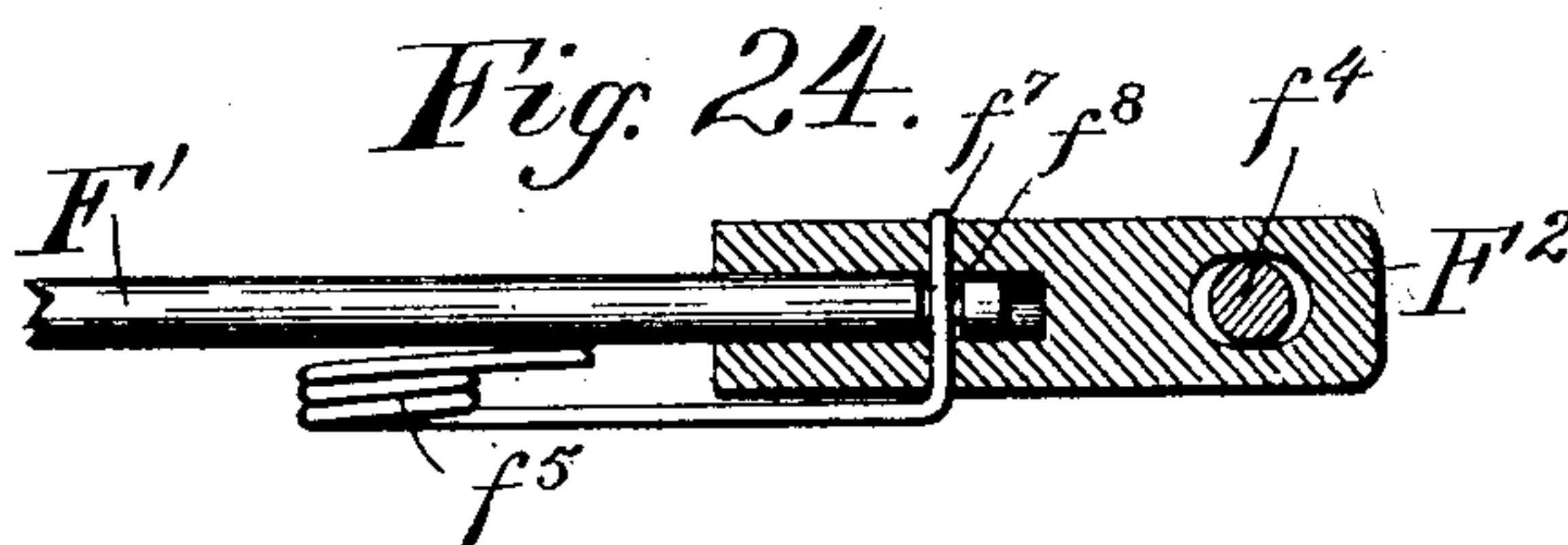


Fig. 25.

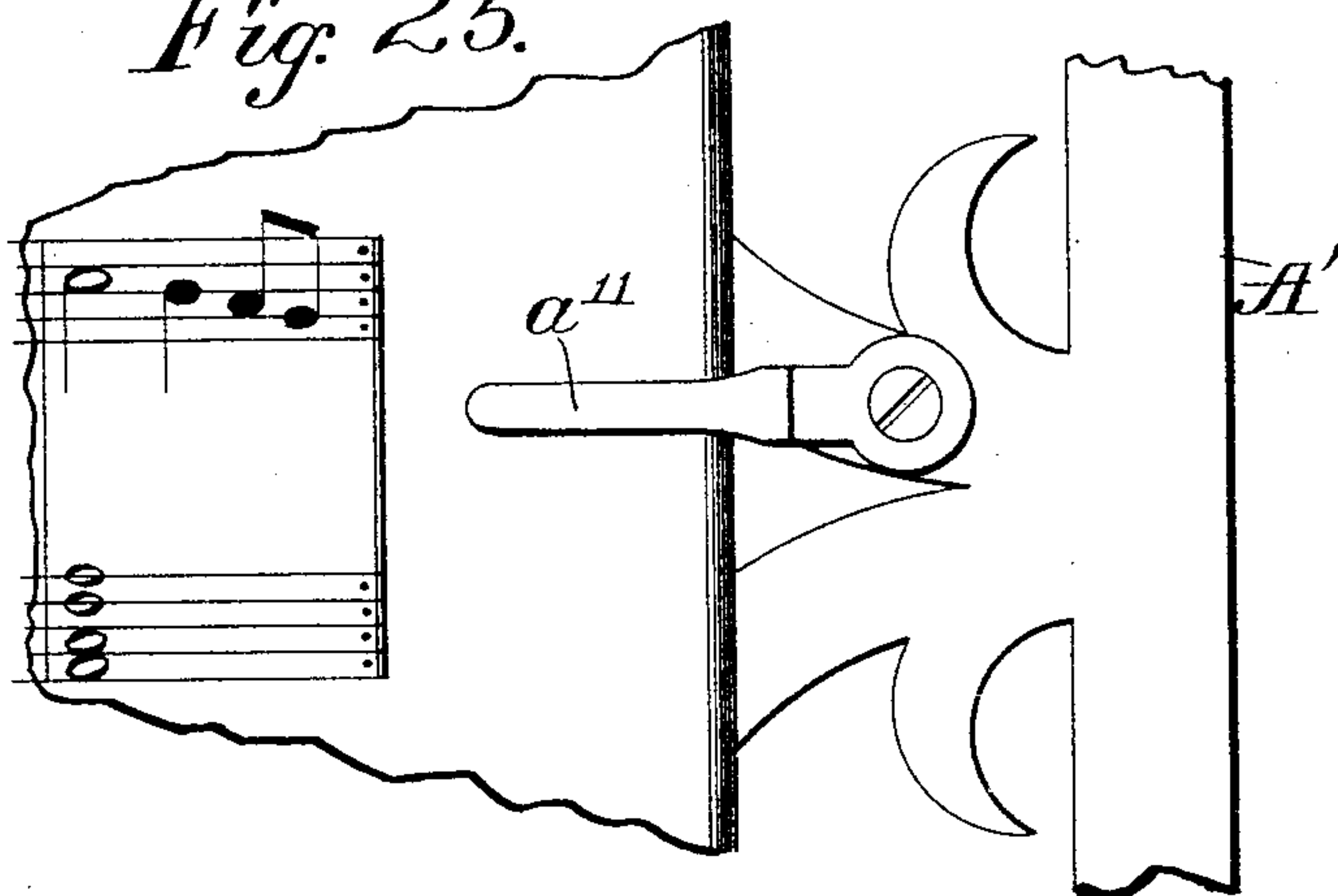
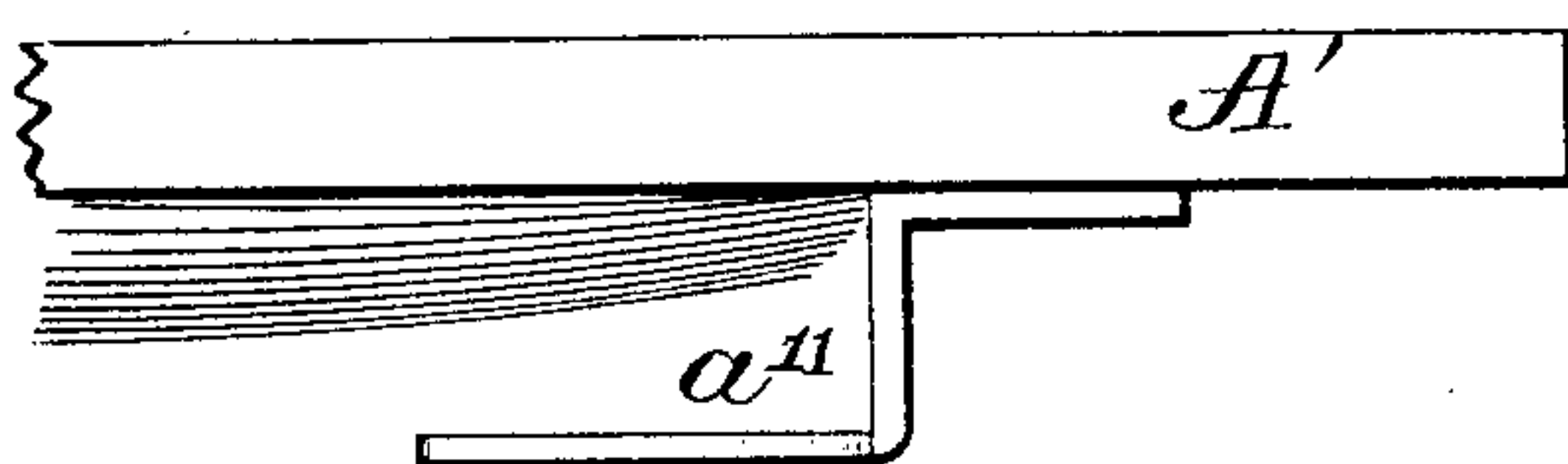


Fig. 26.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN W. DARLEY, JR., OF SCHENECTADY, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO DAVID E. EVANS, PHILIP HAMBURGER, MICHAEL HOLZMAN, AND LEON HAMBURGER, OF BALTIMORE, MARYLAND.

MUSIC-LEAF TURNER.

SPECIFICATION forming part of Letters Patent No. 500,380, dated June 27, 1893.

Application filed June 7, 1892. Renewed March 9, 1893. Serial No. 465,224. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. DARLEY, Jr., a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Music-Leaf Turners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in music leaf turners, and it is specially adapted for use in turning the leaves of music on pianos, organs, music stands, and the like, when the hands of the performer cannot be conveniently raised from the keys.

My invention consists in certain novel features hereinafter described and claimed.

Reference is had to the accompanying drawings, wherein the same letters and numerals refer to the same parts throughout the several views.

Figure 1 is a perspective view of my invention, in position upon the music rack of a piano, showing also the connection down through the instrument with the pedal. Fig. 2 is a front elevation of the device in its normal position. Fig. 3 is a similar view of the same in the position it assumes just before raising the leaf. Fig. 4 is a similar view of the same showing the position of the several parts when the corner of the leaf is raised. Fig. 5 is a similar view of the device showing the position of the parts when the revolving wire has passed beneath the leaf in the position for turning. Fig. 6 is a horizontal section through the music rack on the line x, x , of Fig. 5, showing the leaf turner in plan view. Fig. 7 is an inverted plan view of the device in the position in Fig. 3. Fig. 8 is a plan view of a portion of the device with the top plate broken away; and Fig. 9 is a transverse sectional view of the same on the line y, y , of Fig. 8, looking in the direction of the arrow. Figs. 10, 11, and 12, are perspective views, looking from the top and front, and elevations from opposite sides, respectively, of the pivoted frame carrying the revolving wire. Fig. 13

is a perspective view of the lever for operating the revolving wire showing the cord detached. Figs. 14, 15, and 16, are elevations from opposite sides, and an inverted plan respectively, of the secondary pivoted frame. Fig. 17 is a plan view showing the relative positions of the two pivoted frames and the lever for operating the revolving wire, and Fig. 18 is a vertical sectional view thereof, on the line z, z , of Fig. 17, looking to the right. Fig. 19 is an enlarged sectional view through the spirally grooved roller and cord upon the revolving wire, on the line v, v , of Fig. 18. Fig. 20 is a sectional view of the detachable rubber tip upon the end of the revolving wire, and Fig. 21 shows a modification in which a roughened tip is used. Fig. 22 is a similar view of one of the rollers having a detachable rubber tire. Fig. 23 represents a central horizontal section of the bearing block for the butt of the rolling wire, and Fig. 24 represents a central vertical section of the same. Fig. 25 represents a side elevation, and Fig. 26 represents a plan view of a device to keep the sheets of music from being accidentally blown or carried over.

The device is supported in a frame A which is secured to the front of the music rack A', and carries the operating parts of the device. A smaller frame B carrying the sheaves b is placed upon the back of the said music rack and the screws a, a pass through the latter frame, the music rack, and enters screw threaded openings in the frame A, thus binding the two frames together, one upon each side of the music rack A'. Felt pads A^2 are interposed between the two frames and the music rack, and felt bushings are placed around the screws to prevent the vibrations of the piano from being taken up by the moving parts of the device.

A vertical shaft C, is journaled in the frame A and passes down through the same below which it is bent at right angles as at c , is then curved outwardly at c' (see Fig. 7) and extends horizontally at C', and is finally bent again at a right angle to form the horizontal spindle c^2 ; to this shaft all the moving parts of the device are connected.

Upon the shaft C between the upper and lower parts, a' and a^2 , of the frame A, are loosely journaled the sheaves D, D', the upper one D being hollowed out as at d to receive the flat coiled spring d' which is secured at one end to a sleeve d^2 which latter is secured upon the shaft C by a pin d^3 (Fig. 9). The opposite end of this spring d' is secured to a lug d^4 which projects outwardly and downwardly from a curved lever D² which is also loosely mounted on the upper end of the shaft C. Pivoted at e in the upper piece a' of the frame is a rod E which extends horizontally beneath the piece a' to a curved slot a^3 where it is bent upwardly at a right angle passing through the said slot and extending upwardly to lie in the fold of the music and hold it in place as shown in Fig. 1. In the horizontal portion of the rod E a groove e' is formed in which the inner end of the curved lever D² has a sliding bearing. The tension of the spring d' is designed to press the curved lever D² against the rod E and thus keep the latter pressed firmly against the music, one end of the spring d' being secured to the shaft C by the sleeve d^2 . The same spring serves also to turn the shaft C in the direction of the arrow 1 (Figs. 6, 7 and 8).

In Figs. 10, 11, and 12, is shown the frame F in which the revolving rod F' is journaled. The frame consists of the parallel sides f , and f' , and the end f^2 ; openings f^3 are formed through the sides of proper size to receive the spindle c^2 of the shaft C'. A shaft f^4 extends transversely through the rear lower corner of the frame F, and upon this shaft is loosely mounted a bearing block F² in which the rear end of the revolving rod F' has a bearing; the other bearing for the said rod is formed in the end f^2 of the frame F and is made slightly larger than the rod in order that the latter may have a little play therein. A spring f^5 is arranged in the frame to normally hold the bearing block F² close to the side f of the frame F as shown in Fig. 10, but yet to allow the said bearing block to slide into the position shown in dotted lines when pressure is brought upon the end of the revolving rod F'. The method of holding the revolving rod F' in the bearing block is shown in Figs. 23 and 24. The end f^7 of the spring f^5 is bent as shown, and passes through a hole in the block F², and part of an annular groove f^8 near the end of the rod F'. As long as the piece f^7 remains in the block F² the rod F' can not be pulled out, although it is free to revolve. The frame F carries upon its upper rear corner a roller F³ having a detachable rubber tire of the construction shown in Fig. 22, in which 3 designates the roller, 4 the shaft, 5 the spindle, and 6 the rubber tire, which latter by reason of its elasticity may be readily removed when worn and another inserted in its place. The said frame F also has upon the outside of the side f a stop F⁴ having a rubber periphery 7, for a purpose to be hereinafter explained.

A frame G, composed of two parallel sides g , g' and an end g^2 is also mounted upon the spindle c^2 in such a manner that the side g will be on the outside of the side f , and the side g' on the inside of the side f' of the frame F, as shown in Fig. 17. The side g is cut away as at g^3 to receive the stop F⁴ of the frame F. This opening is elongated to allow the frame G to have a limited movement upon the spindle c^2 before it strikes the said stop. Two lugs g^4 , are formed upon the side g of the frame G in which the holding rod G' is secured. The said rod is bent at an acute angle just back of the lower lug g^4 and passes upward through the upper lug extending a short distance above the frame where it carries a roller G² similar in construction to the roller F³. A similar roller G³ is mounted upon the outer end of the rod G'. The object of this construction will appear hereinafter. The side g' of the frame G is extended toward the front and provided with a perforated lug g^5 in which the end of the operating cord 2 is secured.

H designates a flat lever of the form shown in Fig. 13, the rear end of which is cut away at h , has a curved edge h' , and terminates in a hook h^2 . The front end of this lever is bifurcated at h^3 and provided with a bifurcated upward extension h^4 . 1 designates a cord which is also shown in Fig. 13, and has its ends secured in eyelets i the reduced portion of which enter the bifurcated ends h^3 and h^4 of the lever H; a flat piece of metal 1' perforated at its ends is placed upon said cord, for a purpose to be hereinafter explained. The lever H is pivoted upon the end of the shaft f^4 of the frame F and is situated between the side f of said frame and the side g of the frame G, as shown in Fig. 17. The upper edge of the lever H is cut away at h^5 to receive the stop F⁴ and the opening is elongated to allow a limited movement of the lever before striking the said stop.

Upon the rod F' just outside of the frame F is secured a spirally grooved pulley F⁵ the central groove of which is cut straight across as at f^6 to receive the metal piece 1' upon the cord 1; this metal piece not only prevents the cord from slipping around the pulley, but renders the adjustment of the length of the two legs of the cord very easy. It is necessary to so adjust the cord experimentally that the tip 12 of the rod F' shall strike the music leaf at the proper angle. After said metal piece is inserted in the recess f^6 , each end of the cord is passed once around in the grooves of the pulley and one of the eyelets i placed in the bifurcated extension h^4 of the lever H; the cord is then drawn taut and the other eyelet i placed in the bifurcated end h^3 of the said lever and held in position by a pivoted keeper h^6 pivoted upon the lever H and adapted to be sprung over the eyelet to hold the same in place. By this construction it will be seen that if the lever H be turned upon its pivot f^4 , the cord 1 will unwind or wind upon the

grooved pulley F^5 and thus rotate the rod F' . The bifurcated ends h^3 and h^4 of the lever H are so situated with reference to the center of the shaft f^4 upon which the lever H is pivoted that when the eyelets are in place the eyelet in the slot h^3 is in this instance farther from the center of the shaft f^4 due to the pitch of the worm of the pulley F^5 upon which the cord makes two turns. Now, since one arm of the lever to which the cord 1 is attached, is longer than the other, it follows there would be a tightness of the cord 1 on one side of the roller F^5 and a looseness on the other, and vice versa, depending on the direction of motion were there no compensation. This compensation is provided by varying the obliquity of the groove on the roller F^5 , for each diameter of roller and length of levers from the shaft f^4 ; there is a certain critical obliquity of groove in the roller F^5 . This can only be determined by experiment in each case. The importance of keeping both ends of the cord 1 taut is to prevent noise due to lost motion. The outer end of the rod F' is bent at right angles as at 10 in Figs. 3 and 4, and has screwed upon its extremity a thimble 11 which carries a rubber tip 12 composed of a shank 13 fitting tightly in the thimble and a ball 14 to engage the leaf to be turned (see Fig. 20). In lieu of the rubber tip I may simply roughen the end of the wire as shown in Fig. 21. A coil spring g^6 is placed upon the spindle c^2 one end of which bears upon the shaft f^4 and the other end upon the front piece g^2 of the frame G and serves to hold the latter down upon the rubber roller F^4 of the frame F , as shown in Fig. 18. A round lug C^2 is formed upon the shaft C' , and is perforated to receive the end of the operating cord 1. The inner side of the said lug is formed into a stop and provided with a rubber periphery c^3 which engages the cut away portion h , the surface h' and the hook h^2 of the lever H .

In the operation the device is secured upon the music rack A' , in the position shown in Fig. 1; that is: upon the lower part near the middle with the upper side of the frame A on a line with the top of the strip a^4 upon which the music rests, the said strip a^4 is cut away as at a^5 to make room for the music turner. The holding rod E made of resilient metal lays against the music rack and is cut away upon the rear side at its upper end as at e^2 to facilitate placing the music behind the same. A thin curved strip a^6 may be secured upon the music rack in position to conform to the arc in which the ends of the rods F' and G' move, to make a good bearing surface for the rods in picking up the leaf, but where the music rack has a plane surface this is not necessary. A third pedal K is placed on one side, preferably the left, of the pedal support L of the piano, and pivoted at a point k intermediate of its length. The operating cord 1 is secured to the lug C^2 upon the shaft C' and passes one or more times around the lower pulley D' thence through the music

rack and over the lower sheave B in the frame B , and passes along the back of the music rack to a point near the pivotal point of the latter where it passes over a suitable guide sheave at m , then down through the piano over suitable guide sheaves and is connected to the rear end of the pedal at k' .

It will be obvious that a knee shaft may be used in place of the pedal, or an extra key placed in the keyboard, and that the mode of applying power to the cords 1 and 2 may be varied indefinitely.

The operating cord 2 is secured to the lug g^5 upon the frame G and passes one or more times around the upper pulley D on the shaft C thence through the music rack over the upper sheave b in the frame B along the back of the music rack, and over suitable guide sheaves parallel with the cord 1 to the pedal K , to which it is connected at a point k^2 on the opposite side of the pivot to the point k' . It is important that the cords 1 and 2 leave the music rack at a point near the pivot of the latter as thereby the straining of the cords is prevented when the music rack is turned down, and the piano closed. A spring k^3 is placed under the front of the pedal and serves to keep the latter in an elevated position, causing a constant pull upon the cord 1, and this spring is sufficiently strong to hold the music turner in the position shown in Fig. 2, which is its initial position, against the tension of the spring d' . Arrows marked 1 and 2 are attached to the several figures to indicate the motion of the parts when entering into and when returning from engagement, respectively.

The operation of the device is as follows:— The music is opened and then inserted beneath the holding rod E so that the latter will lay in the fold, as in Fig. 1. The lever arm D^2 connected to the spring d' will keep the rod E firmly pressed into the music, and yet allow for any thickness of book or sheets. The music may then be opened at any page, and when it is desired to turn the leaf, the foot is pressed upon the pedal K ; this will slacken the cord 1 and pull upon the cord 2. As soon as the tension of the cord 1 is released, the spring d' will turn the shaft C and the operating parts carried thereby into the position shown in Fig. 3; that is, the roller G^2 resting against the end of the stop a^7 upon the upper side a' of the frame A . A slight additional pressure upon the pedal, will now pull upon the cord 2 which is connected with the lug g^5 upon the frame G . The pull upon this cord will cause the frame G to turn upon the spindle c^2 against the tension of its spring g^6 until the upper end of the cut away portion g^3 strikes against the stop F^4 upon the frame F ; this will elevate the rod G' , and bring the roller G^2 nearly off of the stop a^7 . As soon as the frame G comes in contact with the stop F^4 farther movement of the said frame will turn the frame F also; the result being, first to raise the revolving rod F' . Then the

roller G^2 , having passed off of the stop a^7 , the shaft C will turn (the spring d' being assisted by the pull upon the cord 2), and bring the rods F' and G' against the leaf to be turned; at the same time the turning of the frame F will carry the shaft f^4 , upon which the lever H is pivoted, downward. During the first part of this movement the upper side of the opening h will press upon the stop c^3 which will cause the forward part of the lever to descend thereby pulling the cord 1 downward and causing the rod F' to revolve; this brings the rubber tip 12 in contact with the lower right hand corner of the leaf to be turned, the rotary motion of the rod carrying the corner of the leaf up with it as shown in Fig. 1; and finally as the rod continues its revolution throwing the corners of the leaf outward and over the said rod F' , so that it falls between the two rods F' and G' ; during this movement the parts assume the position shown in Fig. 4; further movement of the frames F and G will bring the stop F^4 in contact with the cut away portion h^5 of the lever H, and the curved surface h' of said lever having reached the stop c^3 the three aforesaid parts will turn together upon the spindle c^2 until the hook h^2 engages the stop c^3 and further movement in this direction is prevented; at this time the rod F' is raised behind the leaf to an angle of about forty-five degrees from the horizontal and the roller F^3 has passed below the plane of the lower side a^2 of the frame A. The foot is now raised from the pedal K and the spring k^3 will tend to raise the front of the said pedal and thus slacken the cord 2 and pull upon the cord 1. As soon as the cord 2 is relieved from tension the spring g^6 will turn the frame G into its normal position in relation to the frame F and bring the rod G' nearly parallel with the rod F' (as shown in Fig. 5), the leaf to be turned being between the two rods. By holding the pedal at this point the leaf is gripped and is ready to turn the instant, the pressure on the pedal is relieved. The pedal being relieved, the pull upon the cord 1 caused by the spring of the pedal will pull the shaft C, C', and turn it and the parts carried thereon together with the leaf of the music over to the left of the center thus turning the leaf. When the parts are near the end of their movement to the left, the roller G^2 comes in contact with the inclined surface a^8 upon the upper side of the frame A and is thus moved outwardly from the central shaft C turning the several parts to which it is connected back to the initial position as shown in Fig. 2.

It will be seen by reference to Figs. 7 and 8, that the lower part a^2 of the frame A is formed at its lower edge to conform to an arc of a circle concentric with the shaft C, and that it is cut away at the sides as at 21, 22, a lug a^9 projecting above the end 22 of the arc. The purpose of this is that, as the several parts turn to the right to pick up the leaf, the roller F^3 upon the frame F will pass over the top of the

lug a^9 and the parts will thereby be prevented from turning upward until the said roller has passed over the said lug when the rods are in the proper position to lift the leaf. When the parts turn and take up the leaf the roller F^3 passes downward past the end of the arc 22 until it is below the plane of the lower side a^2 , and as the parts return to the left or initial position the roller F^3 passes under the edge of the side a^2 , and the parts are thus prevented from being thrown into their normal position until the said roller has passed the end 21 of the arc, which it does at the same time that the roller G' engages the inclined surface a^8 . It will be seen that the roller G^3 steadies the leaf in place and stiffens it while the button 12 pushes the corner of the leaf up, and then when the said corner is raised sufficiently the arm 11 rolls back and passes under the leaf, the leaf being then held between the said roller G^3 and the said arm 11. Now if the foot be raised from the pedal, the pressure of the spring on the pedal will carry the leaf across and the rods G' and F' will return to the initial position, but if it be desired to turn a page back as in repeating; by holding the foot on the pedal and pressing backward and forward the same page may be turned backward and forward an indefinite number of times. Since turning a leaf rapidly creates a partial vacuum behind it, which is apt to carry over the next leaf or two, a spring hook a^{10} , as shown in Fig. 1, may be attached to the music stand, the said hook engaging the music about the middle of the side of the sheet to be turned, and the resiliency of the metal being sufficient to hold the sheets of music against drafts of air but not against the leaf turner. Or instead of this hook a stiff hook such as a^{11} in Fig. 25, and 26, may be used. In this hook the under side placed at a sufficient distance from the music fret to accommodate the thickest book it is desired to use, should a second sheet attempt to follow the one being turned, it can only go as far as the hook and there the leaf held by the turning wires will slide out from under the hook, the other one remaining behind as there is no force tending to slide it out. Thus it will be seen that I provide a compact device by which the performer is enabled to turn the sheets of music by simply pressing a pedal and without taking the hands from the key board.

In order to adapt the device to sheets of music of any size, the rods of wires F' and G' should be made removable, and two or more lengths of them should be provided with each instrument.

While I have shown the device as applied to pianos, it will be evident that it is equally adapted for use with organs and other fixed instruments, and with slight modifications might be applied to music stands for use in orchestras, &c. The point or button of the arm 11 should be either roughened or of such material as has a greater coefficient of fric-

tion with paper than two sheets of paper have with each other. I preferably use rubber containing sand or emery.

It will be evident that the cords 1 and 2 and drums D and D² may be replaced by a system of connecting rods and levers and that many other modifications might be made which could be used without departing from the spirit of my invention.

10 I claim broadly as new—

1. A music leaf turner, consisting essentially of two swinging frames, a holding rod or wire mounted in one of said frames, and a rolling rod or wire mounted in the other of said swinging frames, and means for rolling said rod or wire in said frame and means for swinging each of said frames, substantially as and for the purposes described.

2. A music leaf turner consisting essentially of two swinging frames, a holding rod or wire mounted in one of said frames and a rolling rod or wire mounted in the other of said frames, and a system of cords and pulleys connected to a treadle and adapted to roll said wire in said frame and to swing each of said frames, substantially as described.

3. In a music leaf turner, the combination with a fixed frame attached to the music stand, of two swinging frames mounted in said fixed frame, a holding rod or wire carrying a roller at its outer end, mounted in one of said swinging frames, and a rolling rod or wire bent near its outer end and having a point or button of high coefficient of friction mounted in the other of said swinging frames, the means for rolling said rod or wire in said frame and for swinging each of said frames, substantially as described.

4. In a music leaf turner, the combination with a fixed frame attached to the music stand, of two swinging frames mounted in said fixed frame; a holding rod or wire carrying a roller at its outer end, mounted in one of said swinging frames and a rolling rod or wire bent near its outer end and having a point or button of high coefficient of friction mounted in the other of said swinging frames, and a system of cords and pulleys adapted to roll said wire in said frame and to swing each of said frames, substantially as described.

5. In a music leaf turner, the combination with a fixed frame attached to the music stand, of two swinging frames mounted in said fixed frame with springs connected to said frames for moving the same, substantially as described; a holding rod or wire mounted in one of said swinging frames, and a rolling rod or wire mounted in the other of said swinging frames, and a system of cords levers and pulleys for rolling said rod or wire in said frame, and cooperating with or opposing said springs in moving each of said frames, substantially as and for the purposes described.

6. In a music leaf turner, the combination with a fixed frame attached to the music stand, and a yielding arm protruding upward from said frame and adapted to support the

music on the music stand, of two swinging frames mounted in said fixed frame, a holding rod or wire carrying a roller at its outer end, mounted in one of said swinging frames, and a rolling rod or wire bent near its outer end and having a point or button of high coefficient of friction mounted in the other of said swinging frames, and means for rolling said rod or wire in said frame and for swinging each of said frames, substantially as described.

7. A music leaf turner, consisting essentially of two swinging frames, a shaft having a bent arm carrying both of said frames, a pulley on said shaft and a cord passing around said pulley and connected to said arm and means for pulling said cord in either direction, and so swinging said arm, a holding rod or wire mounted in one of said frames, and a rolling rod or wire mounted in the other of said swinging frames, means for rolling said rod or wire in said frame and means for swinging each of said frames, substantially as and for the purposes described.

8. A music leaf turner consisting essentially of two swinging frames, a shaft having a bent arm carrying both of said frames, a pulley on said shaft and a cord passing around said pulley and connected to said arm, and means for pulling said cord in either direction, and so swinging the arm, a holding rod or wire mounted in one of said frames and a rolling rod or wire mounted in the other of said frames, and a system of cords and pulleys connected to a treadle and adapted to move said frames and to roll said wire, substantially as described.

9. In a music leaf turner, the combination with a fixed frame attached to the music stand, of two swinging frames mounted in said fixed frame, a shaft journaled in said fixed frame and having a bent arm carrying both of said frames, a pulley on said shaft and a cord passing around said pulley and connected to said arm and means for pulling said cord in either direction and so swinging said arm, a holding rod or wire carrying a roller at its outer end mounted in one of said swinging frames, and a rolling rod or wire bent near its outer end and having a point or button of high coefficient of friction mounted in the other of said swinging frames, and means for moving said frames and for rolling said rod or wire, substantially as described.

10. In a music leaf turner, the combination with a fixed frame attached to the music stand, of two swinging frames mounted in said fixed frame; a shaft journaled in said fixed frame and having a bent arm carrying both of said frames, a pulley on said shaft and a cord passing around said pulley and connected to said arm and means for pulling said cord in either direction and so swinging said arm, a holding rod or wire carrying a roller at its outer end mounted in one of said swinging frames and a rolling rod or wire bent near its outer end and having a point or

button of high coefficient of friction mounted in the other of said swinging frames, and a system of cords pulleys and levers adapted to roll said wire and to move said frames, substantially as described.

5 11. In a music leaf turner, the combination with a fixed frame attached to the music stand, of two swinging frames mounted in said fixed frame with springs connected to
10 said frames for moving the same, substantially as described; a holding rod or wire mounted in one of said swinging frames, and a rolling rod or wire mounted in the other of said swinging frames, and a system of cords
15 levers and pulleys for rolling said rod or wire in said frame, and for moving said frames against the action of said springs, substantially as and for the purposes described.

20 12. In a music leaf turner, the combination with a fixed frame attached to the music

stand, and a yielding arm protruding upward from said frame and adapted to support the music on the music stand, of two swinging frames mounted in said fixed frame, a holding rod or wire carrying a roller at its outer
25 end, mounted in one of said swinging frames, and a rolling rod or wire bent near its outer end and having a point or button of high coefficient of friction mounted in the other of said swinging frames, and means for rolling
30 said rod or wire in said frame, and for swinging said frames in one direction, and springs for swinging said frames in the opposite direction, substantially as described.

In testimony whereof I affix my signature in
35 presence of two witnesses.

JOHN W. DARLEY, JR.

Witnesses:

FREDK. A. PHELPS, Jr.,

H. F. T. ERBEN.