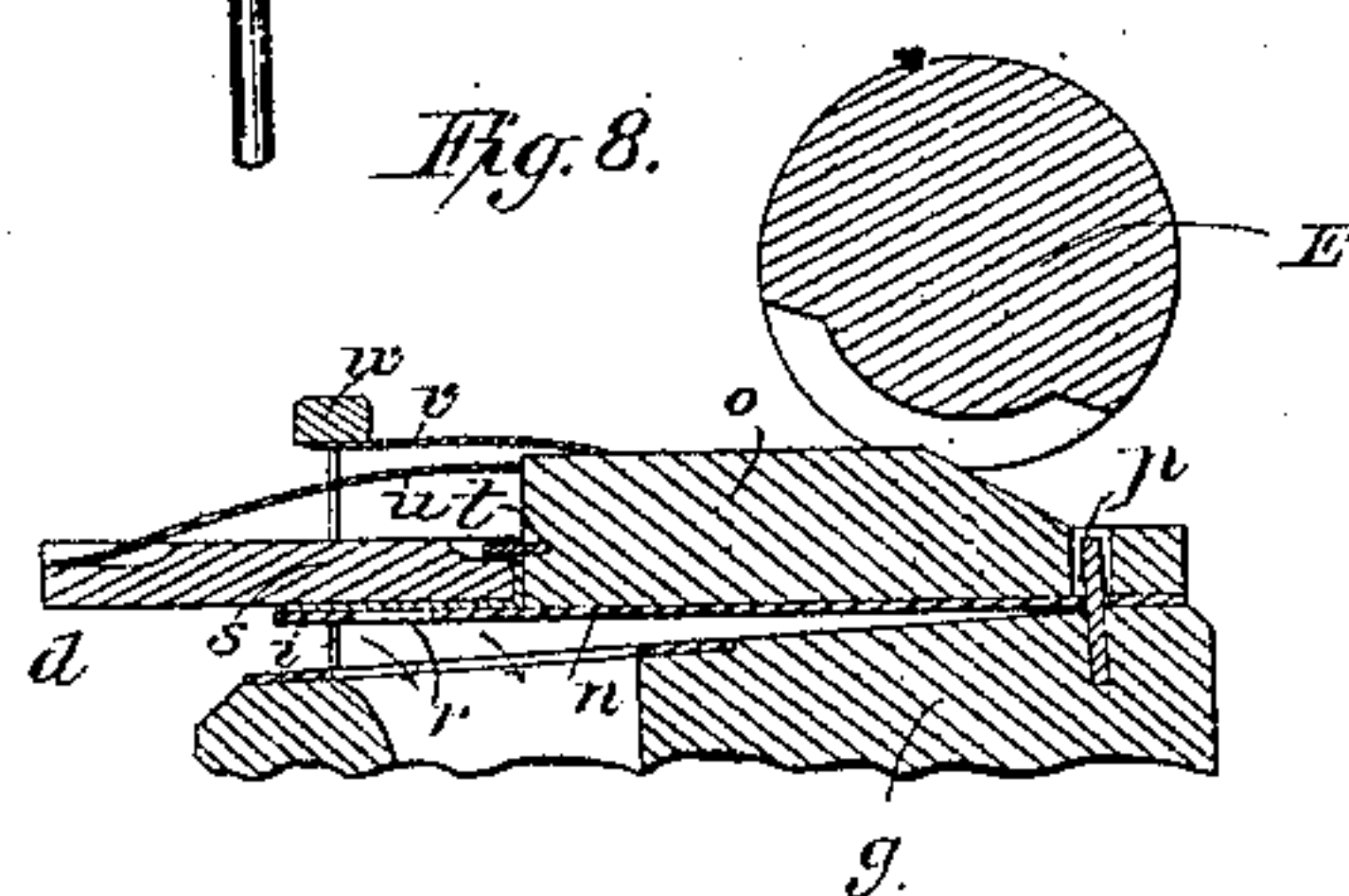
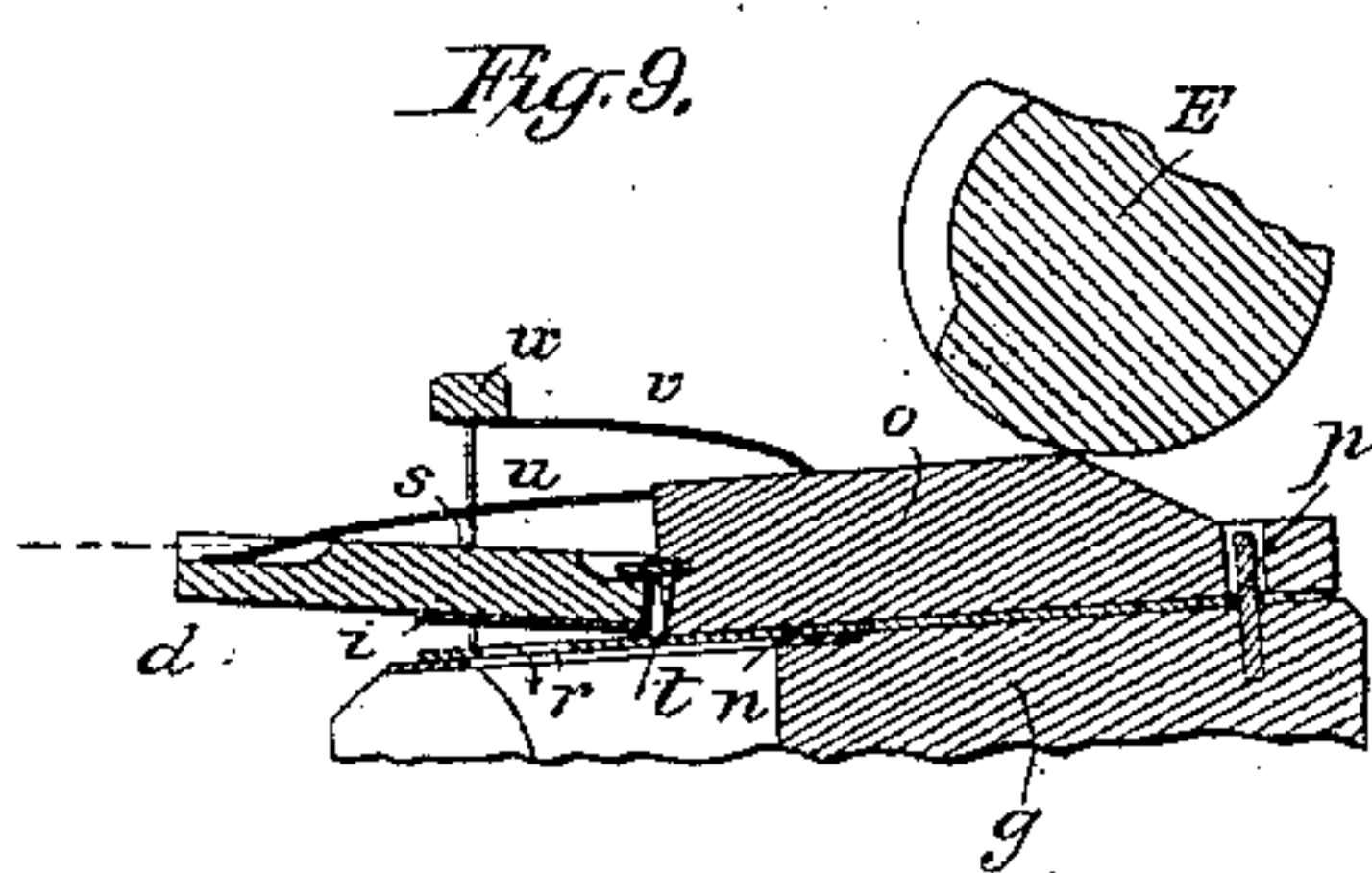
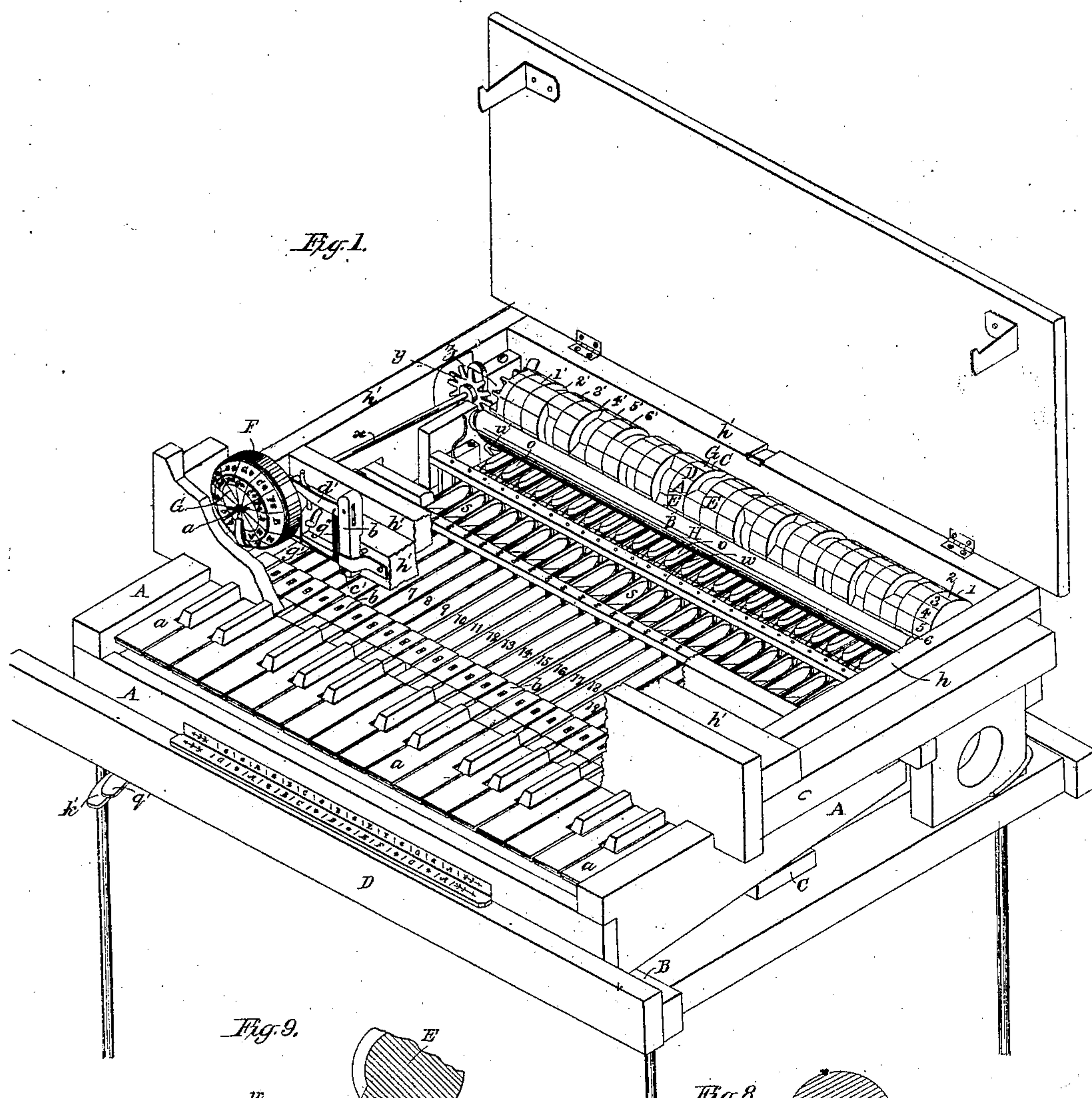


J. A. BAZIN.
 REED MUSICAL INSTRUMENT.

No. 9,892.

Patented Aug. 2, 1853.

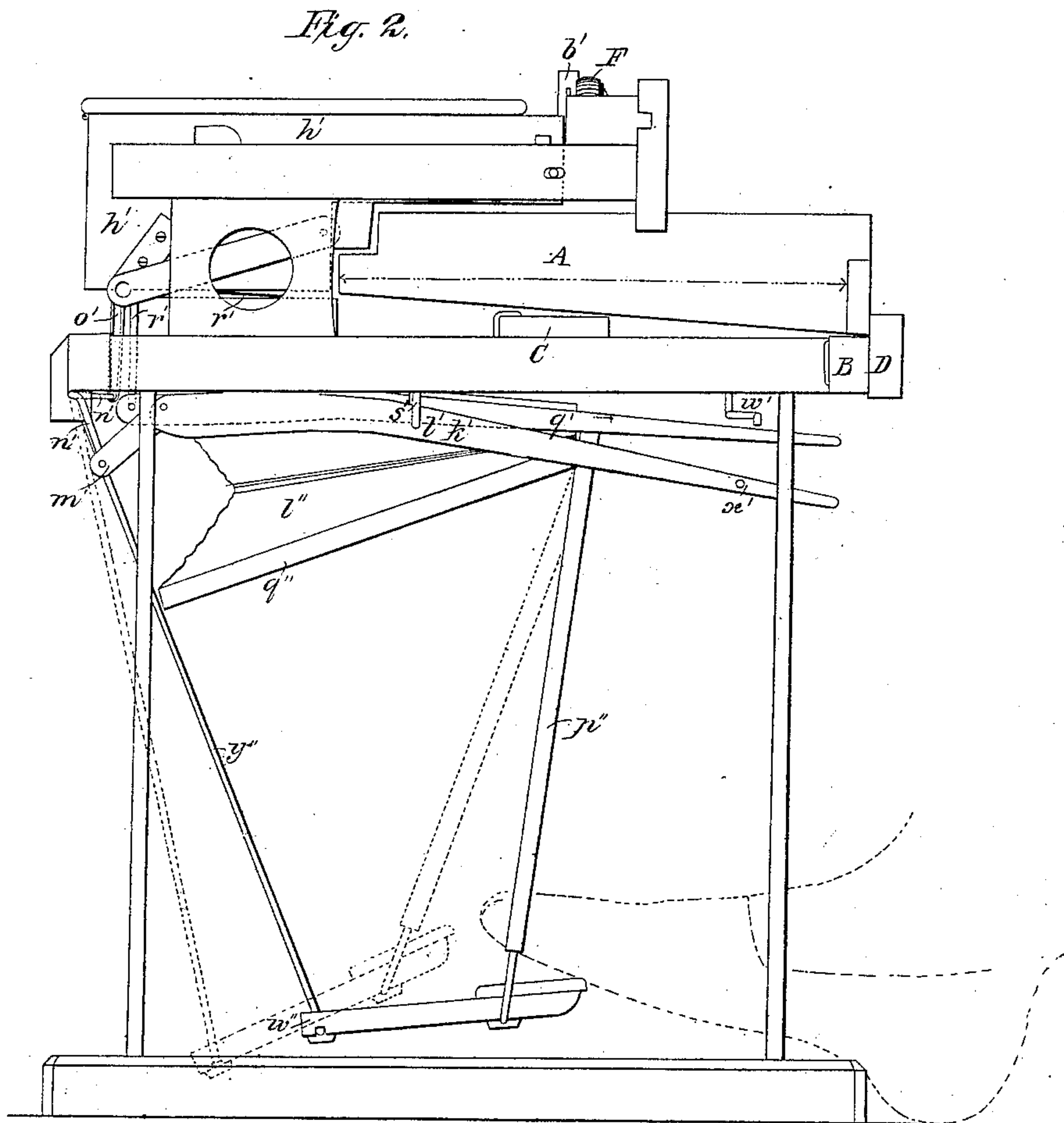
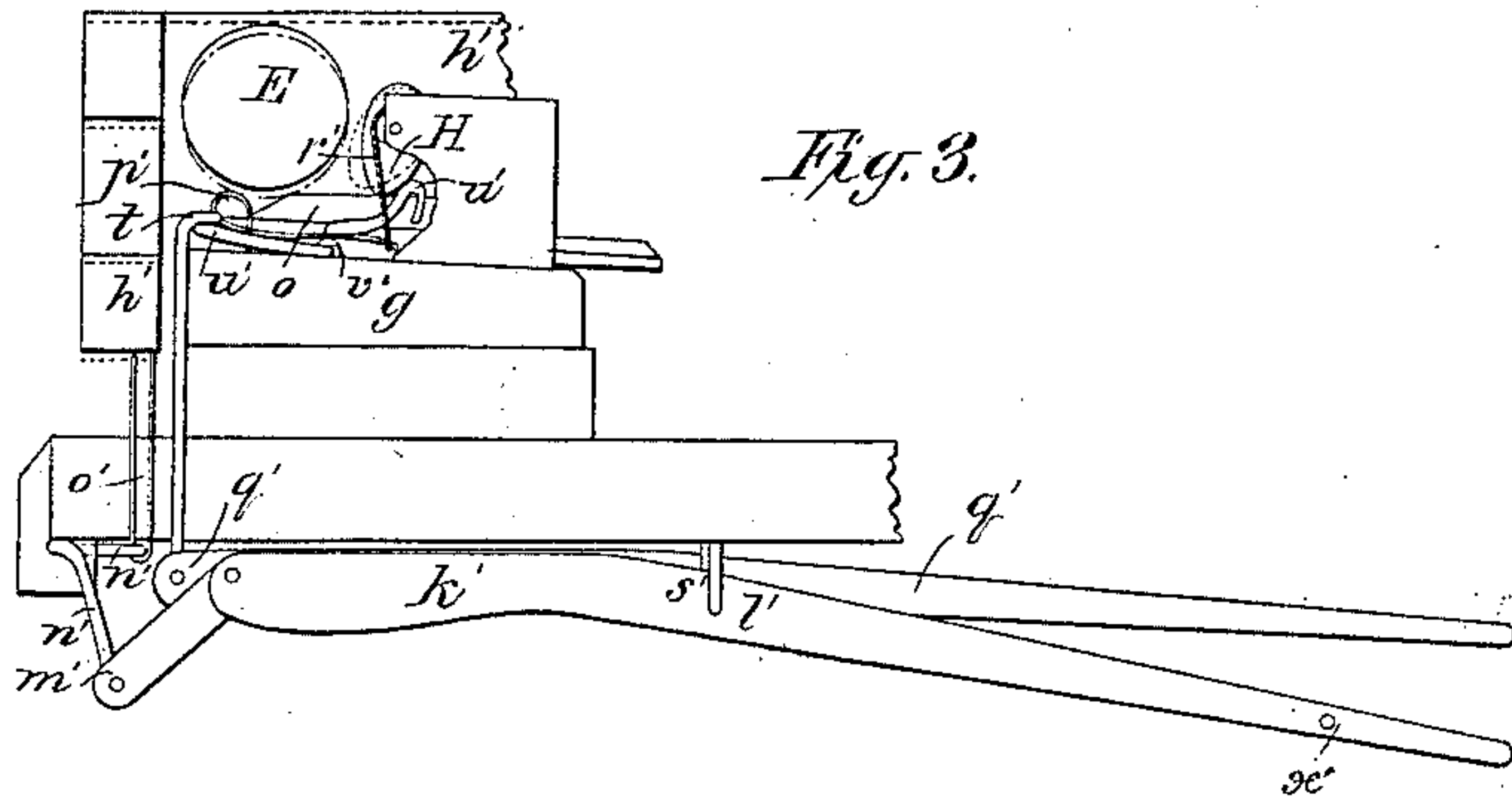


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Fig. 10.

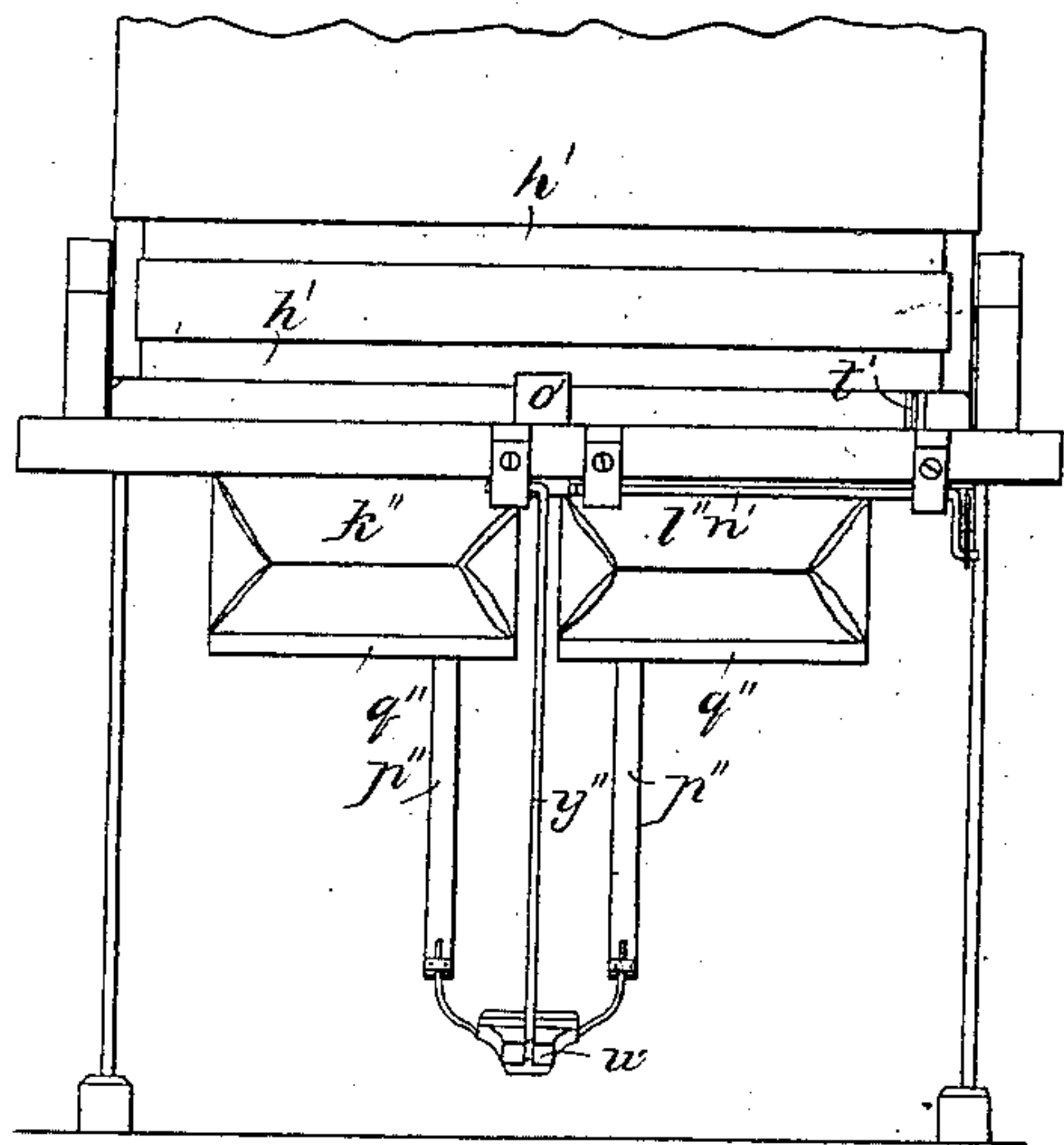


Fig. 13.

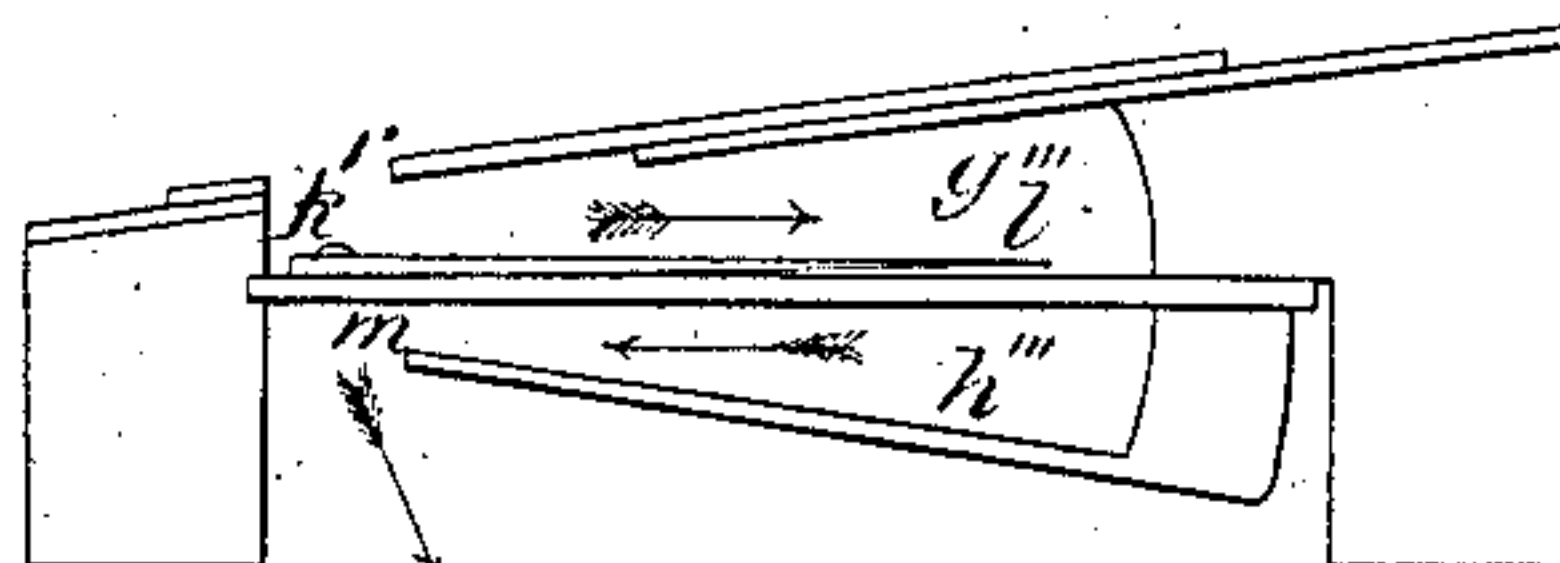


Fig. 6.

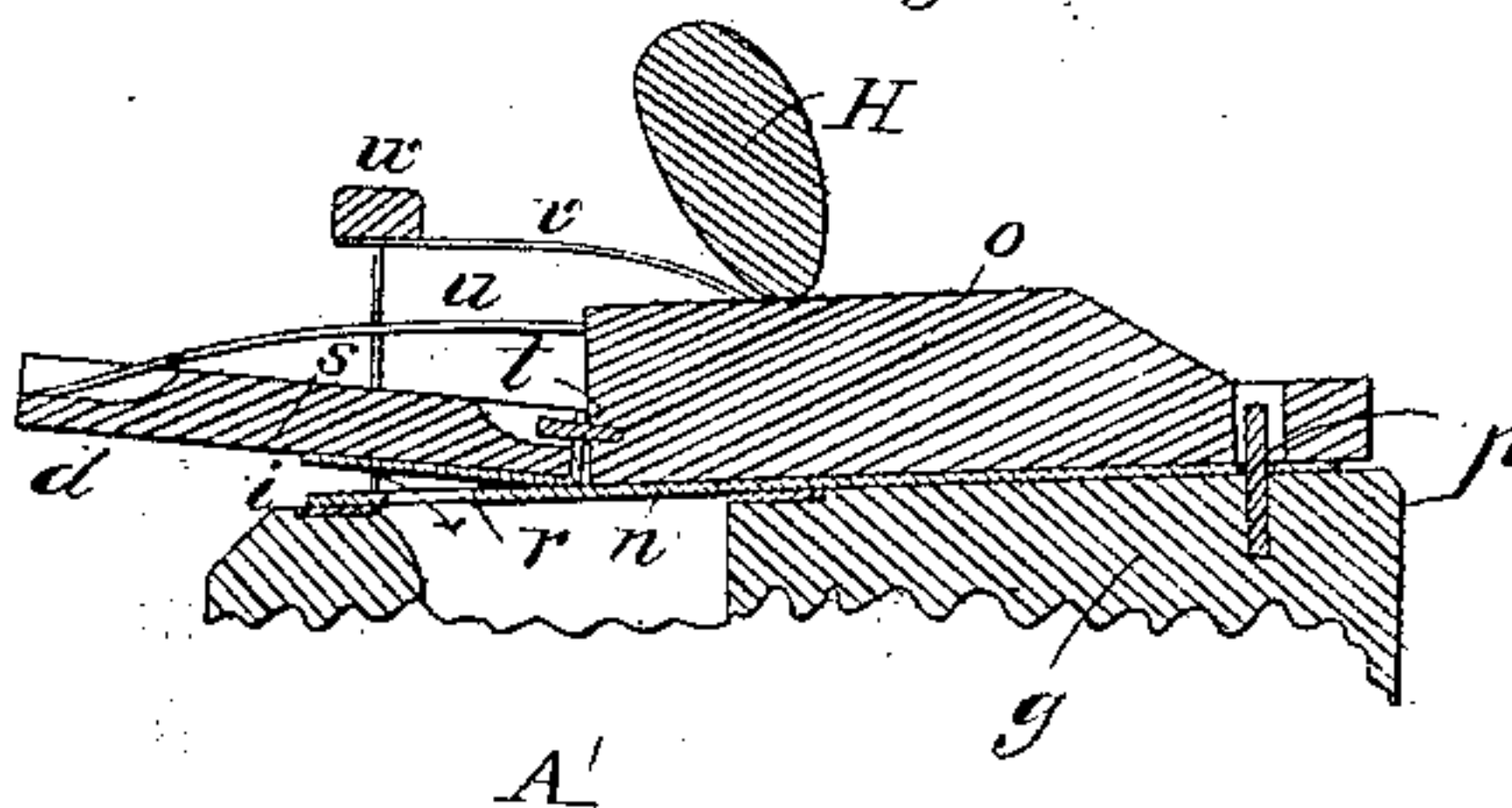
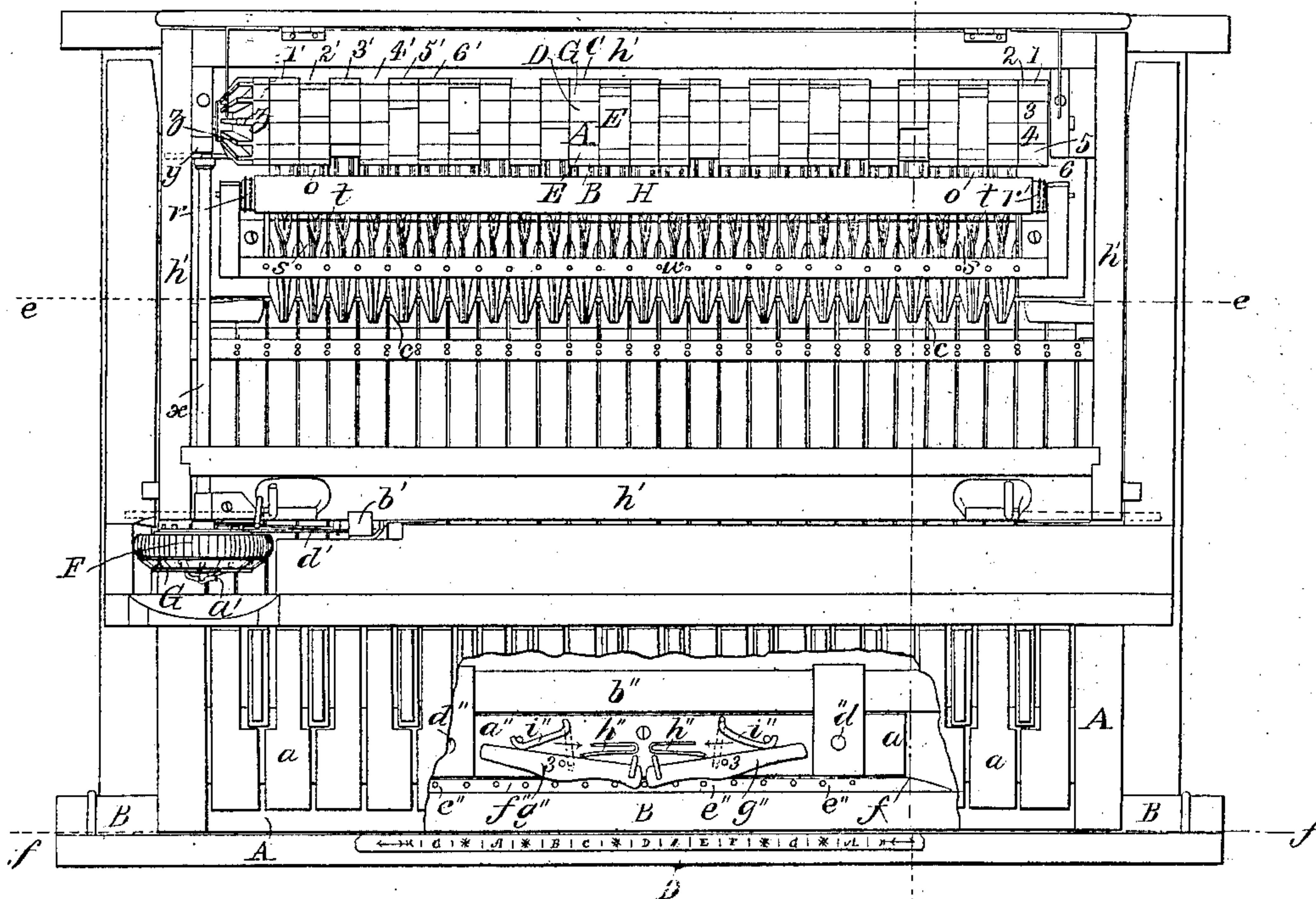


Fig. 4.

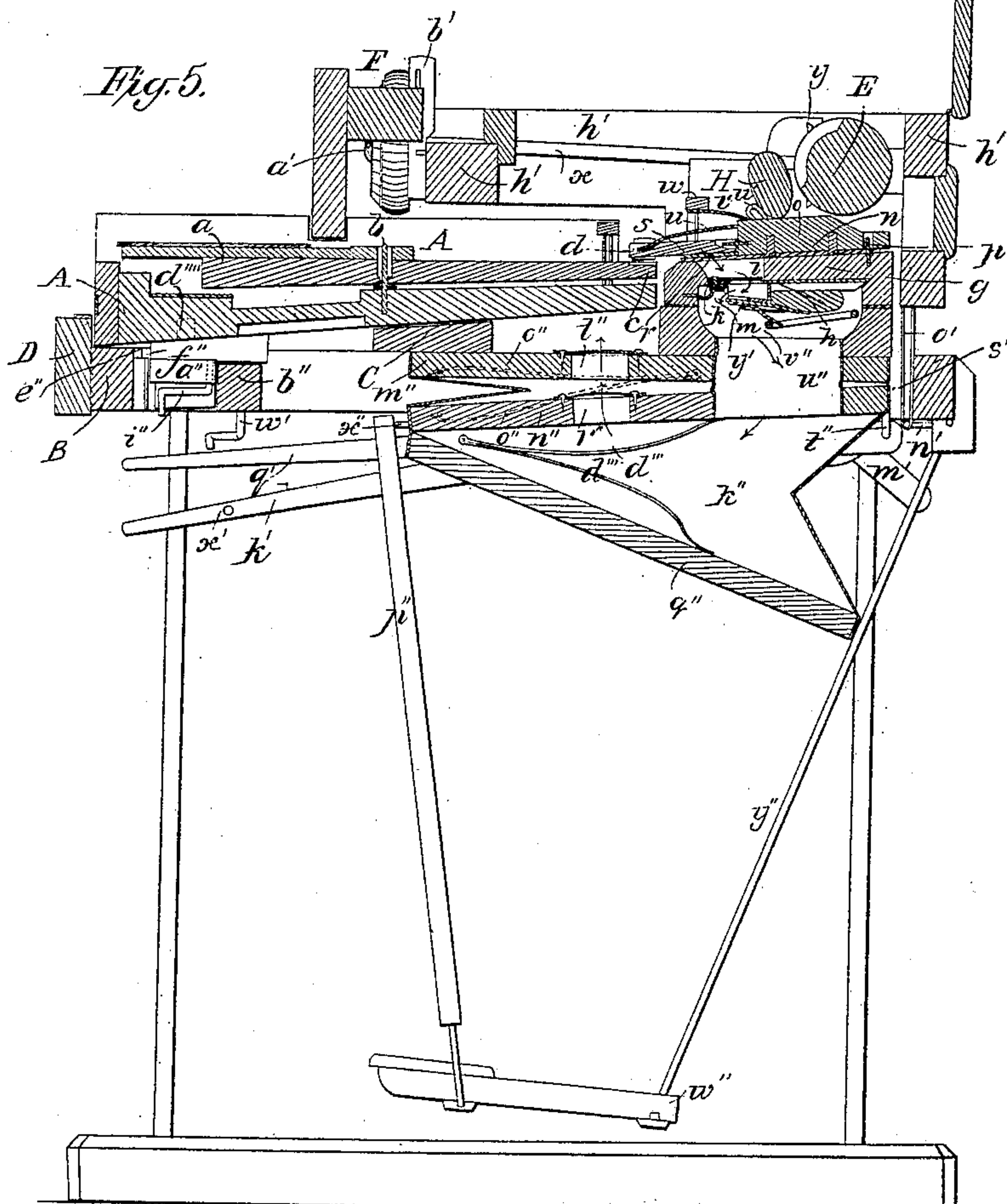
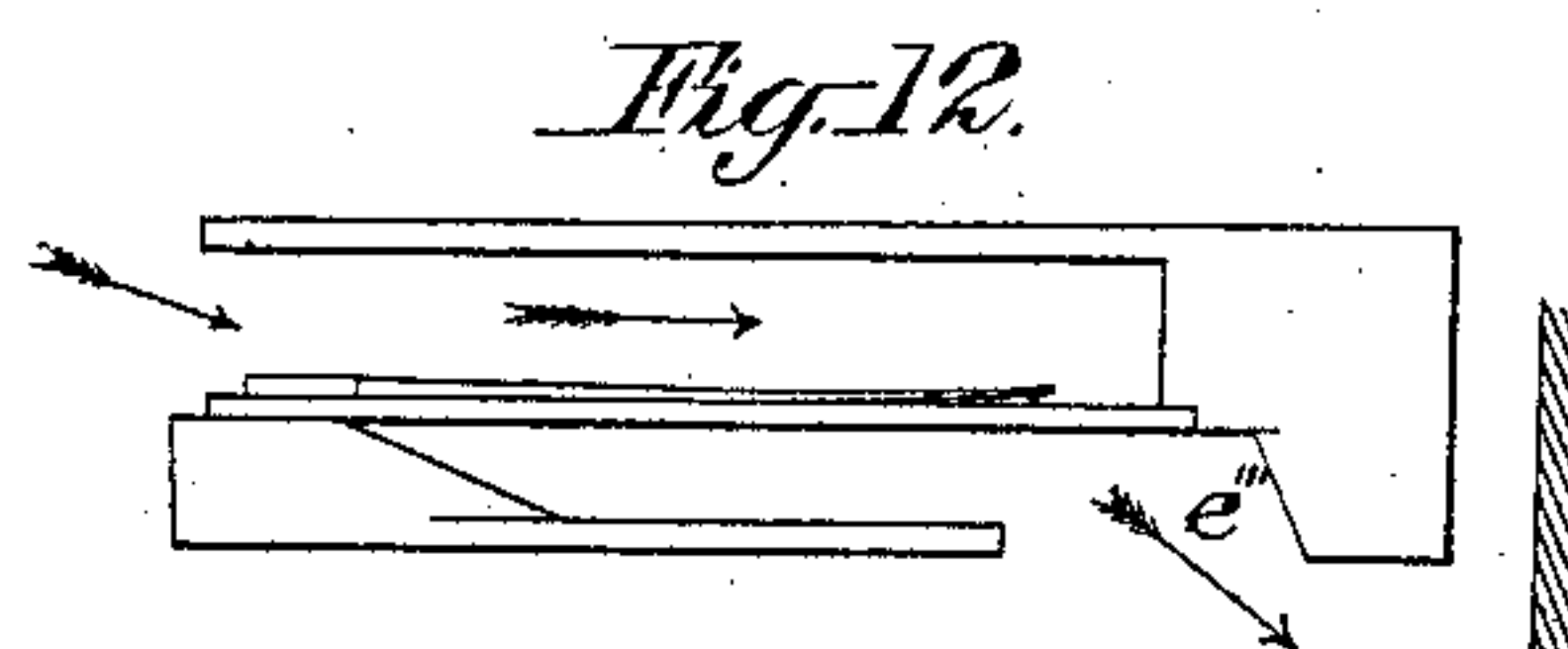
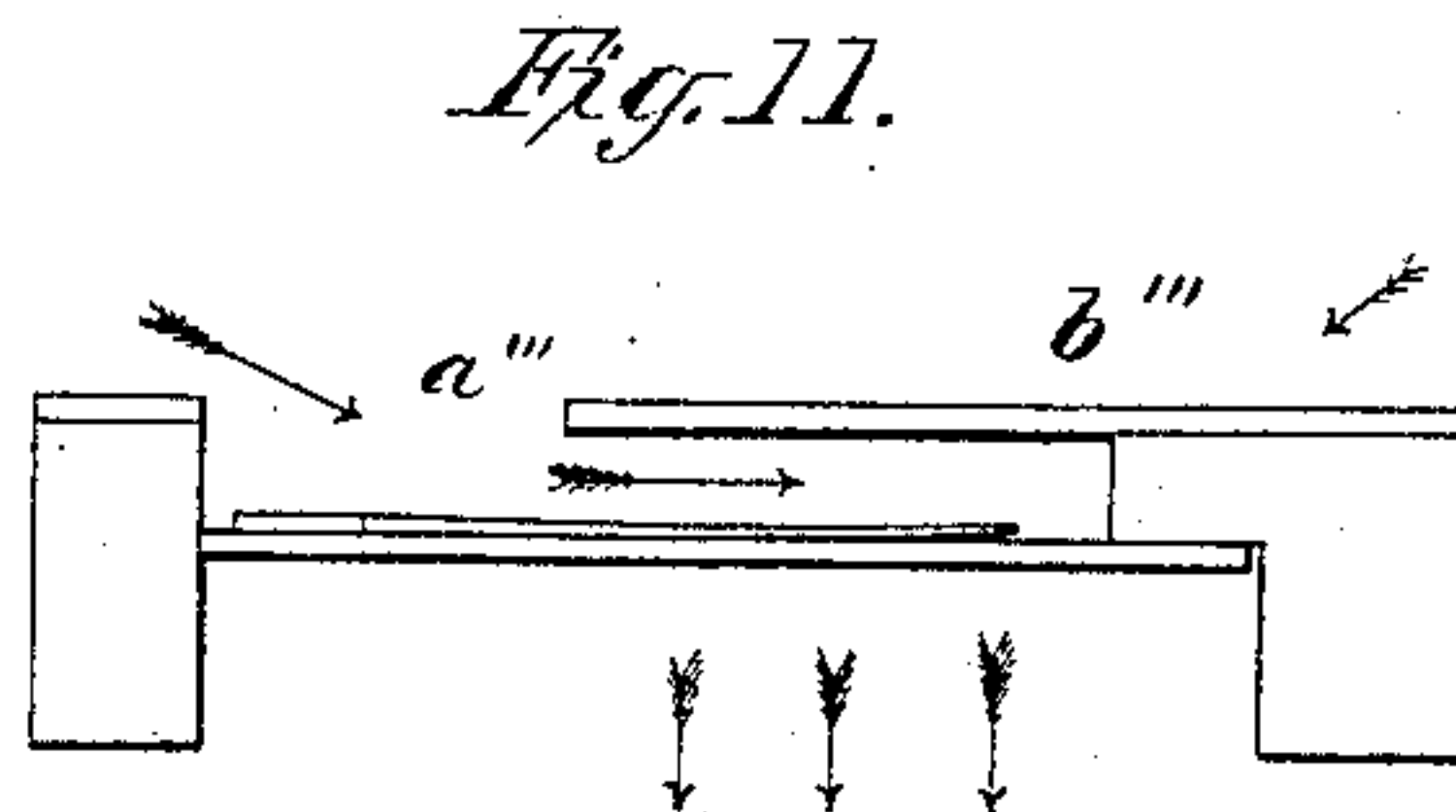
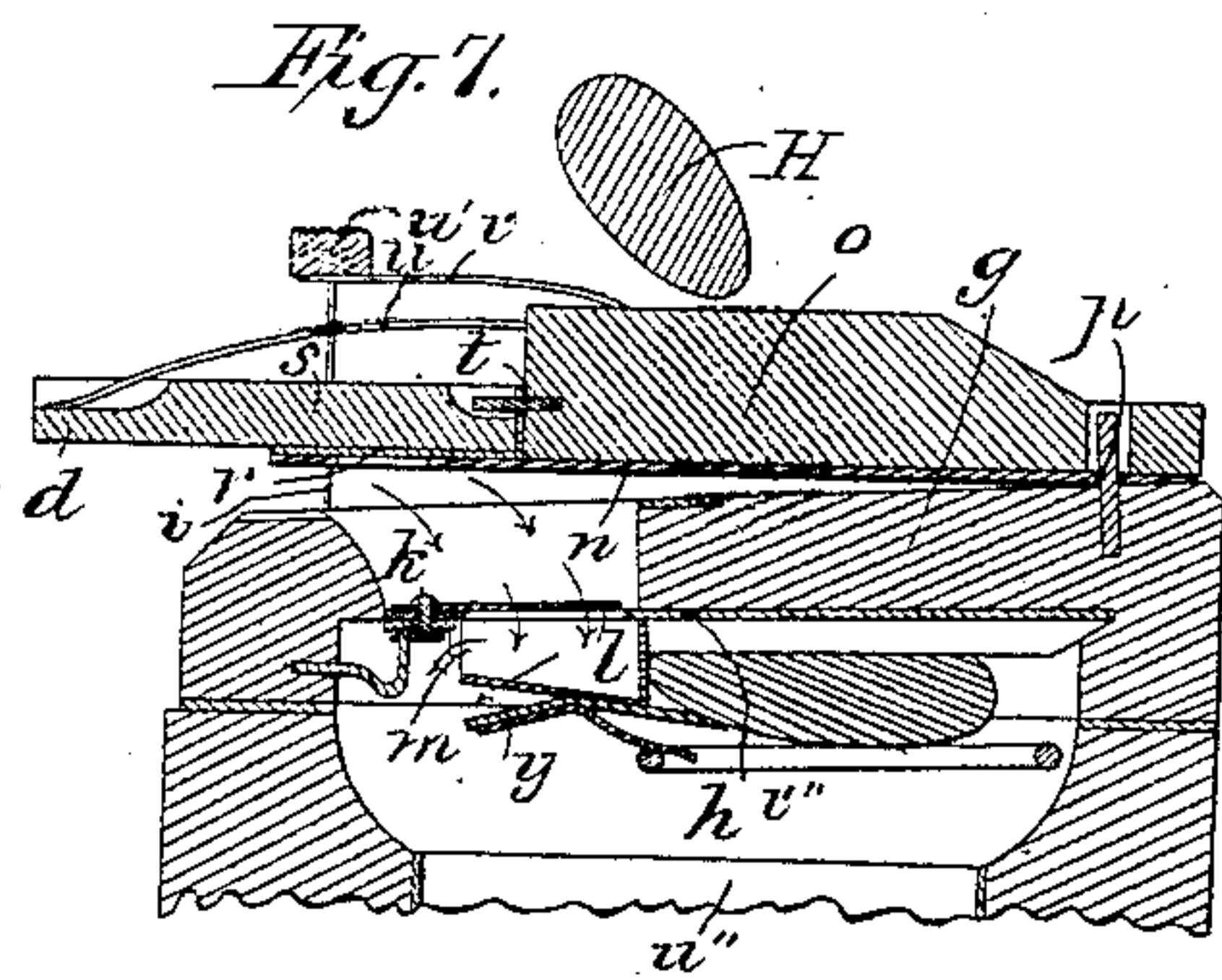


J. A. BAZIN.

REED MUSICAL INSTRUMENT.

No. 9,892.

Patented Aug. 2, 1853.



UNITED STATES PATENT OFFICE.

JAMES A. BAZIN, OF CANTON, MASSACHUSETTS.

REED MUSICAL INSTRUMENT.

Specification of Letters Patent No. 9,892, dated August 2, 1853.

To all whom it may concern:

Be it known that I, JAMES A. BAZIN, of Canton, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Seraphines and other Reed Instruments of Music; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is an isometric view of an instrument with my improvements attached, the cover being raised to show the interior parts. Fig. 2 is an end view of the same. Fig. 3 is an end view showing the interior, with a portion of the case removed. Fig. 4 is a plan; Fig. 5, a section upon the line A' A' of Fig. 4. Figs. 6, 7, 8, and 9 are sections upon an enlarged scale, showing the operation of the valves; Fig. 10, a back view upon a reduced scale showing the two wind chests; Fig. 11, a view of the reed box as usually constructed; Fig. 12, a view of the Carhart reed and air passages; Fig. 13, a representation of my reed, with its air passages.

It is a fact well known to tuners of musical instruments, that if the notes embraced in an octave be tuned by perfect fifths, commencing with the key note, after passing through the twelve notes, the last one will not correspond or accord with its octave, but will be too sharp. Thus if the number 4251528 be taken as the length of a string, producing a certain note, and if without varying the tension of the string, different portions of it be cut off by a movable bridge or otherwise, so that the note produced by the first portion shall be the exact fifth of that produced by the entire string, and each succeeding portion cut off shall produce the fifth of the note last sounded, then after passing through the twelve changes of the octave, and returning to the starting point it will be found that the resulting note will be about $\frac{1}{74}$ shorter than the first one, its length being 4194304—or on arriving at the octave above the note from which we started, its length will be found to be 2097152 instead of 2125764, which should be its length as the octave of the note produced by a string whose length is 4251528. The resulting note will therefore not accord with that from which we started. This difference, were it thrown into one interval, is sufficient to produce an intolerable discord,

but it is found in practice, that it may be equally divided among the twelve intervals, and that thus the vibrations are brought so nearly into correspondence with each other that they tend to harmonize. It is found however that in an instrument tuned by this method, which is the usual one pursued, all the thirds as well as the sixths and sevenths, which are the thirds of the dominant and subdominant of the scale, are too sharp. This inconvenience has been tolerated, as no efficient remedy for it has been known. The removal of this difficulty is the object of my first improvement, which consists in flattening the thirds, sixths, and sevenths, of each key, while the performance is in that key, and also in the devices which I have employed for the purpose of carrying out this part of my invention.

In the movable key board for which a patent was granted to me in June 1842, both hands of the performer were required to change its position.

My second improvement consists in a method of locking and unlocking a movable key board, by a device which may be operated by one hand, and with the force required to move the board.

Heretofore in instruments of this description, where the air is blown upon the reed by pressure from the bellows, there has been but one wind chest, or, where it is forced through by exhaustion and the pressure of the atmosphere, but one receiving chamber, whatever may be the number of the reeds, and thus, when the bass is very full, the higher notes are robbed of their share of the wind, and the part which ought to be the leading one becomes almost inaudible. To remedy this defect is the object of my third improvement, which consists, in dividing the wind chest into two or more parts, according to the number of reeds, with a separate reservoir or receiving chamber for each division—and thus, however fast the air may be required by the bass notes, the supply for the treble will not be influenced or diminished thereby.

The usual method of operating the bellows is by a pedal, the fulcrum of which is fixed, and the consequence is, that when the heel rests upon the floor, a constant rubbing of the toe upon the pedal is produced; and whatever may be the strength or size of the performer, the bellows is always to be worked with the foot in one position, with-

out the opportunity to change when fatigued. To remedy this inconvenience is the object of my fourth improvement, which consists in hanging the pedal to a hanging fulcrum, which enables the pedal to swing back and forth with the motion of the foot, and also to be worked in a variety of positions, as the comfort or inclination of the performer may suggest.

My fifth improvement consists in admitting the air to the reed, and drawing it off from it at its heel, instead of at the point, by which means the reeds are made to "speak" much quicker than where the air is either admitted to, or drawn off from the point.

My sixth improvement consists in a peculiar arrangement of the bellows and wind chests, rendered necessary by the division of the latter into two or more chambers, by which the bellows is placed between the reeds and the wind chambers, and the latter are made to communicate with the reeds through elastic tubes of leather or other suitable material.

To enable others skilled in the art to make use of my invention, I will proceed to describe the general operation of the instrument, together with the improvements which I have added thereto.

a are the keys which are pivoted at *b* in the sliding frame A, which moves longitudinally upon the bars B and C, the ends of the keys at *c* passing freely beneath the valves *s* at *d*. The dotted lines *e e*, and *f f*, in Fig. 4, show the limits of this sliding key board.

Upon the front board D of the instrument is marked the chromatic scale of an octave, and upon the front bar of the sliding frame A, a corresponding chromatic scale as seen in Fig. 1. The ends of these keys as before stated pass beneath the valves at *d*, Fig. 5. As the keys are depressed in the act of playing, the valves are opened as seen in Figs. 6 and 7. These valves, and the parts in the immediate vicinity of the reeds, are constructed and operated as follows: *g* is the board upon which the reed plates *h* are secured; it is made thinnest at the side toward the butt ends of the reeds, on which side are the openings *i* (Figs. 6 and 7) for the admission of the wind into the channels or boxes in which the reeds vibrate. The reeds (Figs. 5 and 7) are secured to the plates at the points *k*, and vibrate at the opposite end *l*. The wind being admitted at *i*, passes along in the direction indicated by the arrows, is deflected after passing the reed, and returning again, passes out of the box at point *m*, immediately beneath that at which it entered. With this peculiar method of conducting the wind to and from the reed, I have obtained tones superior to those produced by any other method with which

I am acquainted, at the same time that the notes are caused to "speak" much quicker than when the wind is admitted at the point of the reed, or when it is taken in at the butt end and allowed to escape from the box near the point.

The valve which covers the reed chamber is constructed as follows: *n* is a metallic plate to which the rear portion *o*, of the valve is attached; this plate is hinged at *p*, to the reed board *g*, and covers the top of the reed box; an opening *r* is made in this plate, of about one third the size of the opening in the top of the reed box; this opening in the plate *n* is immediately over the butt end of the reed. The forward portion of the valve *s* is hinged to the other portion *o* at *t*; it is covered with leather upon its under surface, and rests upon the plate *n*, covering the hole *r*. When the forward portion *s* only, of the valve, is raised as in Fig. 6, the air is admitted through the small opening *r*, in the plate *n*; when both parts of the valve are raised together as in Fig. 7, the capacity of the passage for the wind to the reed is increased three fold. The hole in the metallic plate *n* being over the butt end of the reed not only will the size of the openings be diminished when only the forward portion *s* of the valve is raised, but the length of the air channels over the reeds will be increased, as seen in Fig. 12, which it is found very materially lowers the tone of the reed. It remains now to be shown in what manner the opening of the valves is governed, according as the note is required to be sounded sharp or flat. *v* is a spring secured to the valve *o*, and resting beneath the stationary bar *w*, by which the valve is pressed down upon its seat. *u* is a spring, one end of which is secured to the rear portion *o* of the valve, while its other end presses upon the forward portion *s*, and bears it down upon the plate *n*, permitting it to rise however independent of the rear portion *o*, and plate *n*, as in Fig. 6, where, by means which will now be described the latter are held down upon the board *g*. The spring *u* is of sufficient strength to hold the different portions of the valve together under ordinary circumstances, or when the whole valve is to be raised as in Fig. 7 by the action of the lever or key upon its forward portion *s*.

In order to flatten the tone of the thirds, sixths and sevenths of any scale, the rear portions *o*, with their plates *n*, of these notes, are to be held down upon the board *g*, the forward portions *s*, only being permitted to rise, which gives these notes the flattened tone required, while all the other notes are permitted to open to the full extent as in Fig. 7, which gives to them the sharp tone required for the other notes of the scale.

To accomplish this the regulating cylinder E is made use of, which is constructed as follows: The circumference of the cylinder is divided into 12 equal parts corresponding to the twelve semitones of the scale and marked 1, 2, 3, 4, 5, 6, in Figs. 1 and 4. These divisions run longitudinally the whole length of the cylinder, which is furthermore marked off transversely into as many divisions as there are valves or notes, as seen at 1', 2', 3', 4', 5', 6', &c., in Fig. 4. The divisions 1, 2, 3, 4, 5, 6, &c., of the circumference, which run the whole length of the cylinder, are marked off in regular successive fifths thus C G D A E B, F# C# G# D# A# F—while the divisions in the length of the cylinder 1', 2', 3', 4', 5', 6', &c., correspond with the valves, and the cylinder may be said to be divided in this direction into regular semitones. From each of the divisions C G D A, &c., running the whole length of the cylinder, is cut away those portions corresponding to the 1st, 2d, 4th, and 5th, notes of the scale, that is, the C D F and G of the natural scale—the G A C and D of the key of 1 sharp—the D E G and A of the key of two sharps, &c. If now, when the performance is in a certain key, C for example, the cylinder be turned until the divisions C upon it be immediately over the rear portions *o* of the valves, and if the cylinder be at the same time pressed down, all those notes over which the cylinder is cut away, that is C, D, F and G will be opened to the full extent as in Fig. 8, which will give them the sharp sound required—and those notes, that is E A B, over which the cylinder was not cut away, will have the rear portions *o* of their valves, with the plates *n*, held down as in Fig. 9, which will produce the flattened tone which they require. Thus whatever position the cylinder may be in, some one of the twelve keys will have all its 3rds, 6ths, and 7ths flattened throughout the instrument.

Some ready means at the command of the performer, by which to regulate the motion of the cylinder E, to correspond with the key in which the music is set, is necessary, and the following has been found sufficient: F is an index wheel upon the shaft *x*, to which it may be locked in various positions as required; the shaft *x* carries a toothed wheel *y* with 12 cogs, which engage with a similar number of cogs *z*, upon the regulating cylinder E. The face of the index wheel F, is divided into 12 spaces corresponding with the 12 semitones of the octave, and with the longitudinal divisions upon the cylinder, and marked in accordance C, C#, D, D#, E, &c. The index wheel is so lettered that each note has its dominant or fifth upon its immediate left, and its subdominant or fourth upon its right, that by turning the cylinder a single notch one way

or the other, it may be instantly arranged for either of the above keys, they being the ones most likely to be required in a change of key. If now the performance is in a particular key, C for instance, the index wheel is turned until the C upon its face is vertically over the center of its motion, which brings the portion of the regulating cylinder E, which corresponds to the key of C, immediately over the rear portions *o* of the valves, and thus all the thirds, sixths, and sevenths, of the key of C, are flattened throughout the instrument. When however the keys are so moved that the C upon the key board corresponds with any other note of the instrument, as D for instance, then it is evident that some further means will be required to arrange the cylinder E to accord with this new state of things. For this purpose a metallic plate G is secured to the shaft *x*, directly in front of the index wheel.

a' is a spring bolt or catch which passes through a hole in the plate G, and into one of 12 holes in the index wheel, so that by raising the catch *a'* the index may be revolved upon the axle *x* until its C corresponds with any one of the twelve notes upon the metallic plate—D for example. If now the performance be upon the keys of the key of C, the notes produced will be in the key of D—and if the C upon the index wheel be now brought into the position occupied by the G# in Fig. 1, the regulating cylinder will be arranged for the key of D as required.

b' is a lever pivoted at *c'* and carrying an operating dog *d'*, which is held down by a spring *g'* upon pins projecting from the back of the index wheel, by means of which the latter may at any instant be moved one notch either to the right or left, to bring the cylinder in the position necessary to enable the performance to be changed to the key of the dominant or subdominant, which as before stated, are the keys most likely to be required in modulating. As it may not at all times be desired to employ the regulating cylinder, I have adopted the following plan of throwing it up from off the valves, as seen in full lines in Fig. 3, and at the same time retaining it in such a position that it may instantaneously be brought into use when required: *h'* is a rectangular frame which carries the regulating cylinder, and all the parts (index wheel, &c.) which give motion thereto, and to which the cover of the instrument is hinged; this frame or carriage rests upon springs *i'*, Fig. 2, of sufficient strength to keep the cylinder up from off the valves. The following means is resorted to for the purpose of depressing it at the time required: *k'* is a lever pivoted at *l'*, and connected by the flexible joint *m'* to the bent lever *n'*, one arm of which is borne by a strap *o'*, suspended from the

frame h' , from which it is evident that when the lever k' is raised (Fig. 3) the bent lever n' will be revolved, and will draw down the frame h' , and cylinder E upon the valves.

5 It may sometimes be desired when the cylinder E is not in use, to flatten all the notes upon the instrument, either for the purpose of playing in a subdued tone, or of lowering the pitch of the notes to accord
10 with other instruments; to accomplish this I make use of a presser H, which when drawn down by springs closes the rear portions o , and plates n , of all the valves, leaving only the forward portions s , of the
15 valves to be operated. The presser bar H is drawn down upon the valves by the spring p' , Fig. 3, operating through the cord r' upon the shaft of the presser bar, which thus constantly bears upon the valves until
20 relieved in the following manner: q' is a lever pivoted at s' , and having at one end a hook t' , which bears at its upper extremity upon one arm of a bent lever w' , which is pivoted at v' ,—the other arm of this lever
25 bears against the presser H, which is raised from off the valves whenever the lever q' is raised. w' is a hook for the purpose of holding this lever elevated when the presser bar H is not in use.

30 It is evident that whenever the cylinder E is brought into use by the raising of the lever k' , that the presser bar should be raised from off the valves, otherwise the cylinder would prove inoperative; to insure
35 this at all times, there is a pin x' projecting from the lever k' which passes beneath the lever q' , and thus as k' is raised to depress the cylinder E, q' is at the same time elevated to relieve the valves from the pressure
40 of the bar H.

Other methods besides the one above described may be used for the purpose of flattening the notes as required; for instance, the valves y' which are shown closed in Fig.
45 5, and open in Fig. 7 may be arranged so as to be operated by the cylinder E, but the method of double valves which I have above described is the one which I prefer.

It has been stated already that in the
50 movable key board, for which Letters Patent were granted to me, both hands were required at the same instant, to unlock it, and to change its position; to simplify this contrivance I have adopted the following device for the purpose of operating it: a'' ,
55 Fig. 4, is a light carriage which slides upon ledges between the stationary bars b'' and B of the frame, and from which project two pins d'' , which pass into holes d''' , Fig. 5, in the underside of the key board, and thus as a'' moves, the key board goes with it.
60 e'' are pins which project from the upper surface of the bar f'' . g'' are buttons on pivots 3 which are pressed up to the pins e''
65 by springs h'' and thus lock the carriage

a'' and the key board. i'' is a bent rod or lever, one end of which presses against the buttons, the other after passing through the carriage a'' is again bent as seen by the dotted lines in Fig. 4 and also at i'' Fig. 5,
70 the portion of i'' which passes through a'' being the pivot upon which the two horizontal portions turn. If now the pressure of the hand be applied to the arm of one of the levers i'' which project beneath the carriage a'' in the direction indicated by its
75 arrow one of the buttons will be raised from between the pins, and by continuing the pressure in the same direction the carriage, and the key board which is connected to it,
80 will be moved, the other button offering no resistance to the motion of the key board in that direction. On relieving the rods i'' from the pressure, the buttons again fall into the spaces between the pins, and the
85 board is locked to the frame work as before.

My third improvement consists as before stated in providing two or more wind chests or receiving chambers as the case may be, for different parts of the scale. In Fig.
90 10 the wind chest is represented as divided into two distinct and separate chests k'' and l'' , the former being used to operate the treble notes and the latter the bass. In order to enable me to make use of this double
95 or duplicate wind chest, a peculiar construction and arrangement of the bellows and wind chests is necessary, which I will now describe as follows: m'' , Fig. 5, is the upper or stationary leaf of the bellows, and n''
100 is the lower or movable leaf, hinged at s'' ; these leaves are drawn together when not depressed by the pedal by the springs o'' ; the lower or movable leaf is connected to the pedal by the rods p'' . q'' is the lower
105 leaf of the wind chests; the upper leaf n'' thereof being also the lower leaf of the bellows, the springs d''' tend constantly to keep the wind chest distended. r'' is a valve opening outward from the wind chests into
110 the bellows; t'' a valve opening outward from the bellows. u'' is a flexible tube from the reed box v'' to the air chamber, constructed of leather or other suitable material, and passing entirely through the bel-
115 lows in such a manner as to allow of the necessary motion of the leaf n'' . Heretofore the wind chest or air chamber has been placed between the reeds and the bellows; it is evident however that where two wind
120 chests are made use of, one of them may be full while the other is nearly empty, and consequently the lower plate of the wind chest can not serve as the upper plate of the bellows. By the above described ar-
125 rangement however I am enabled to divide the wind chest into one or two chambers separate and distinct from each other.

The operation of my bellows and wind chest is as follows: On depressing the pedal 130

the leaf n'' is drawn down, the valve t'' is closed, and r'' is opened, the bellows being supplied with air through the latter, from the wind chests k'' and l'' , which in this case are exhausting chambers; the leaves of these chambers are thus drawn together, and are again forced apart by the springs d''' , by which action the air is drawn in through the tube u'' , past the reeds as the valves which cover them are opened; this motion of the air is indicated by the arrows in Fig. 5. It is evident that the same arrangement of parts may be employed where forcing instead of suction bellows are employed, the operation of the valves and springs being reversed, the reed also being turned over to receive the air upon its under surface.

As before stated the pedal in instruments of this description has heretofore been hung upon a fixed fulcrum; to obviate the inconveniences of which I make use of a movable fulcrum w'' suspended from the frame of the instrument by the rod y'' —the pedal being connected to the bellows at x'' by the rods p'' . It will thus be seen that the pedal is free to yield to the motion of the foot without rubbing, and may be worked with the foot in any position to suit the inclination or strength of the performer.

I will now describe my improved method of admitting the air to the reed.

As the vibration of the reed is caused by the current of air passing through the opening in the plate, an equivalent effect will be produced whether forcing or suction bellows be made use of; the tone depending altogether upon the form of the passages through which the air is admitted to and taken from the reed. Fig. 11 is the method commonly adopted, the air being admitted either at a''' or through an opening at b''' and escaping freely from beneath. Fig. 12 is a representation of the method known as the Carhart reed, in which the air is admitted at the butt, and after passing through is permitted to escape beneath the point of the reed at c''' . I have discovered however that the tone of the reed is much improved, while it is made to "speak" much quicker by admitting the air immediately over its butt into a chamber which enlarges toward the point of the reed—whence it passes into a chamber beneath, which also is of greatest capacity beneath the point of the reed and from whence it is allowed to exit at a point beneath the butt of the reed. Fig. 13 illustrates my reed with its air passages and chambers. The air enters at the point r into the chamber g''' , and passes into

the chamber h''' which it leaves at the point m immediately beneath that at which it entered.

What I claim as my invention, and desire to secure by Letters Patent in the construction of organs, reed and other similar instruments of music is—

1. Flatting the thirds, sixths and sevenths, of the scale, by means of the regulating cylinder E constructed as described or by any other analogous contrivance in the manner and for the purpose substantially as set forth.

2. The valve constructed as described of the two parts s and o with the springs u and v or their equivalents in combination with the perforated plate n for the purpose of sounding the note flat or sharp as set forth.

3. The combination and arrangement of the sliding bar a'' the buttons g'' , the bent wires i'' and the pins e'' by which means the key board may be unlocked and moved in either direction by one hand in the manner set forth.

4. I claim the use of two or more wind chests in the same instruments for the purpose of providing a separate supply of air for the bass and treble notes as herein set forth.

5. The peculiar arrangement of the bellows and wind chests, the latter being placed below the former, and communicating with the reed box by means of flexible passages passing up through the bellows as described which arrangement of parts enables me to make use of two wind chests in the manner and for the purpose set forth.

6. Hanging the pedal with a movable fulcrum, to prevent friction upon the foot and to enable it to be operated with more ease and convenience, as set forth.

7. The construction and arrangement of the air passages above and below the reed as described, for the purpose of admitting the air and permitting it to escape at the butt end of the reed as set forth.

8. The presser bar H so constructed and arranged as to keep down the rear portion of all the valves, while their front portion is left free to be operated by the keys, thereby modifying the tone of all the notes of the instrument as set forth.

In testimony whereof I have hereunto set my signature this twenty seventh day of May A. D. one thousand eight hundred and fifty three.

JAMES A. BAZIN.

Witnesses:

SAM. COOPER,

JOHN S. CLOW.