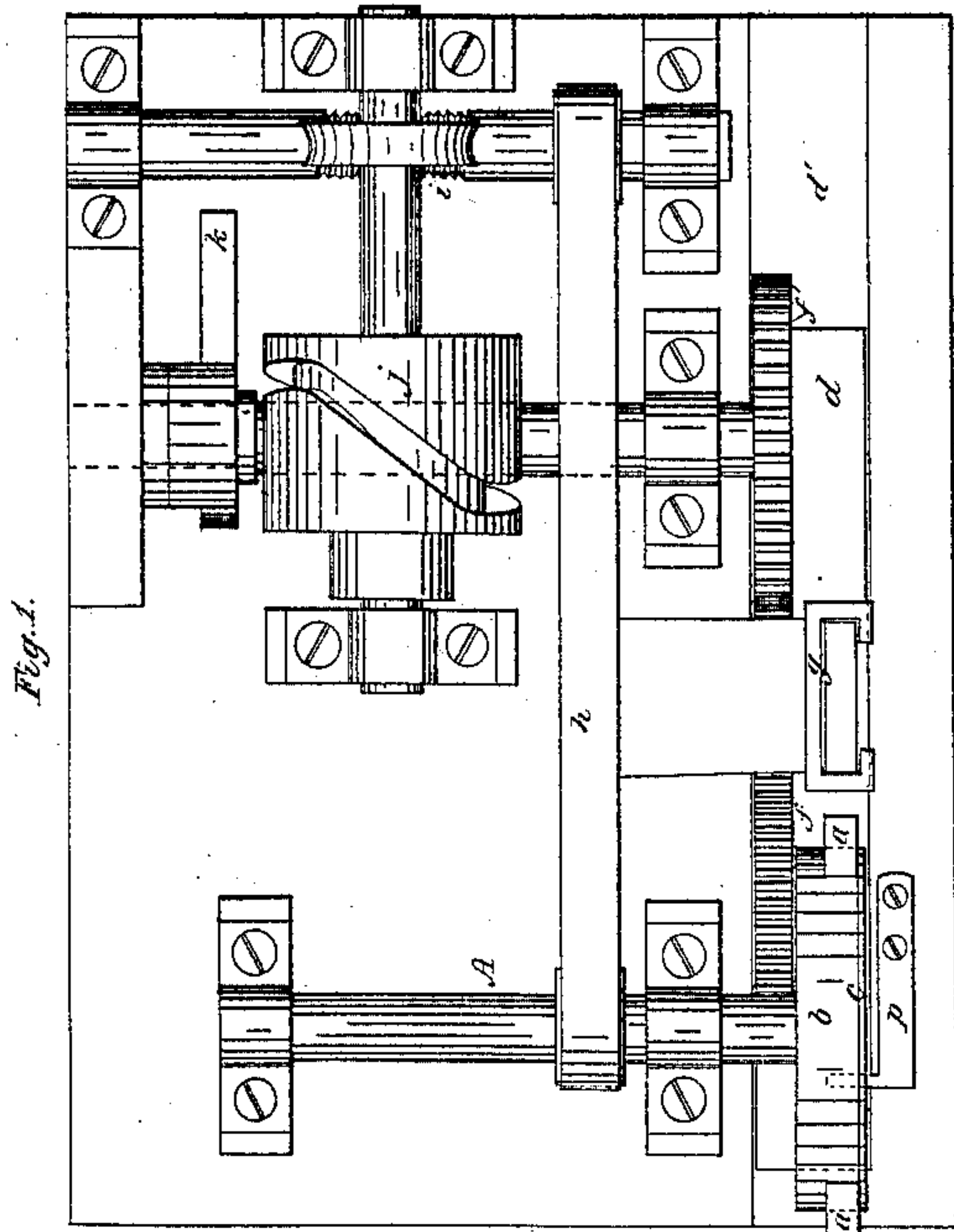
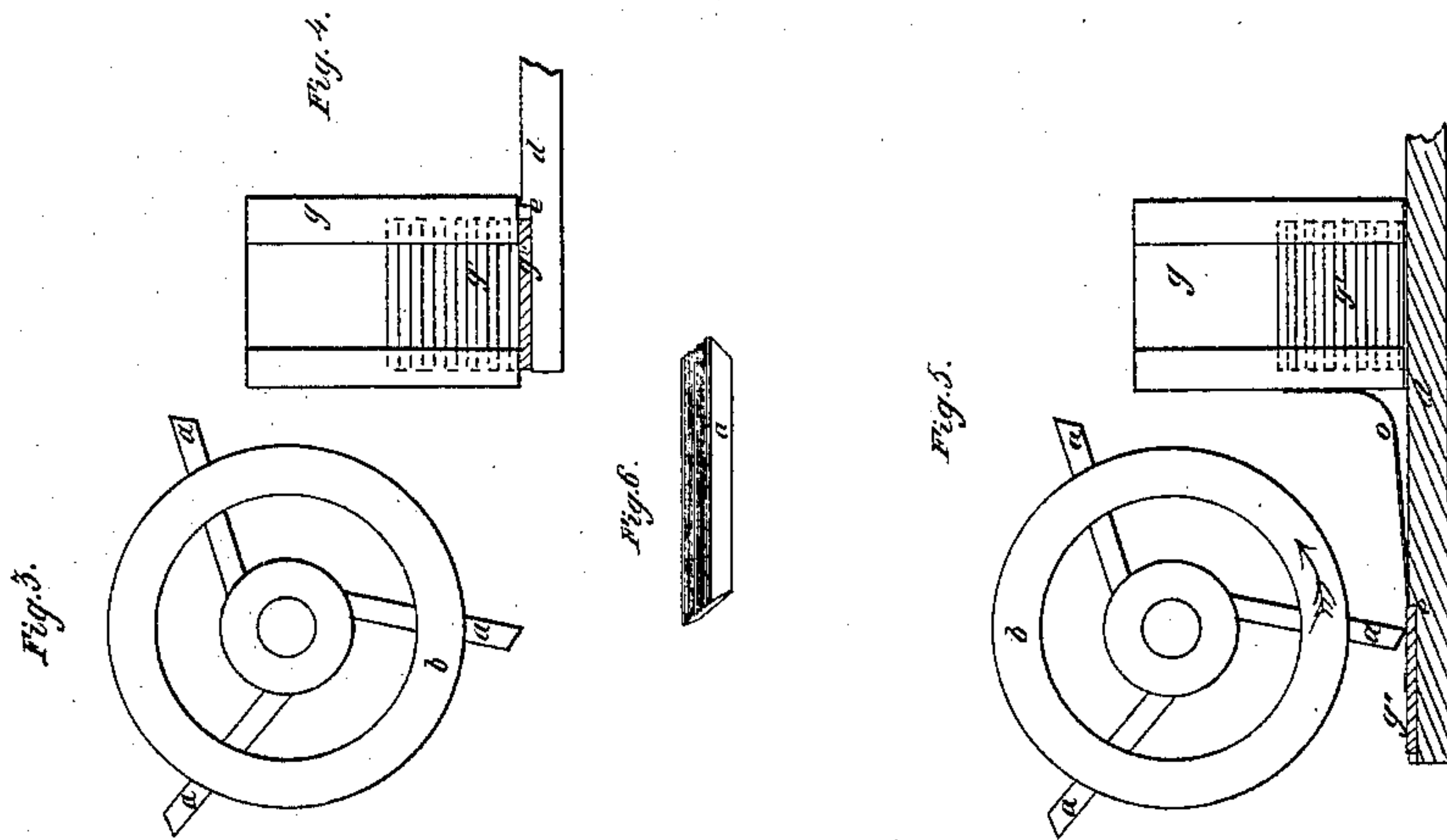


E. Savage,

Making Piano Keys,

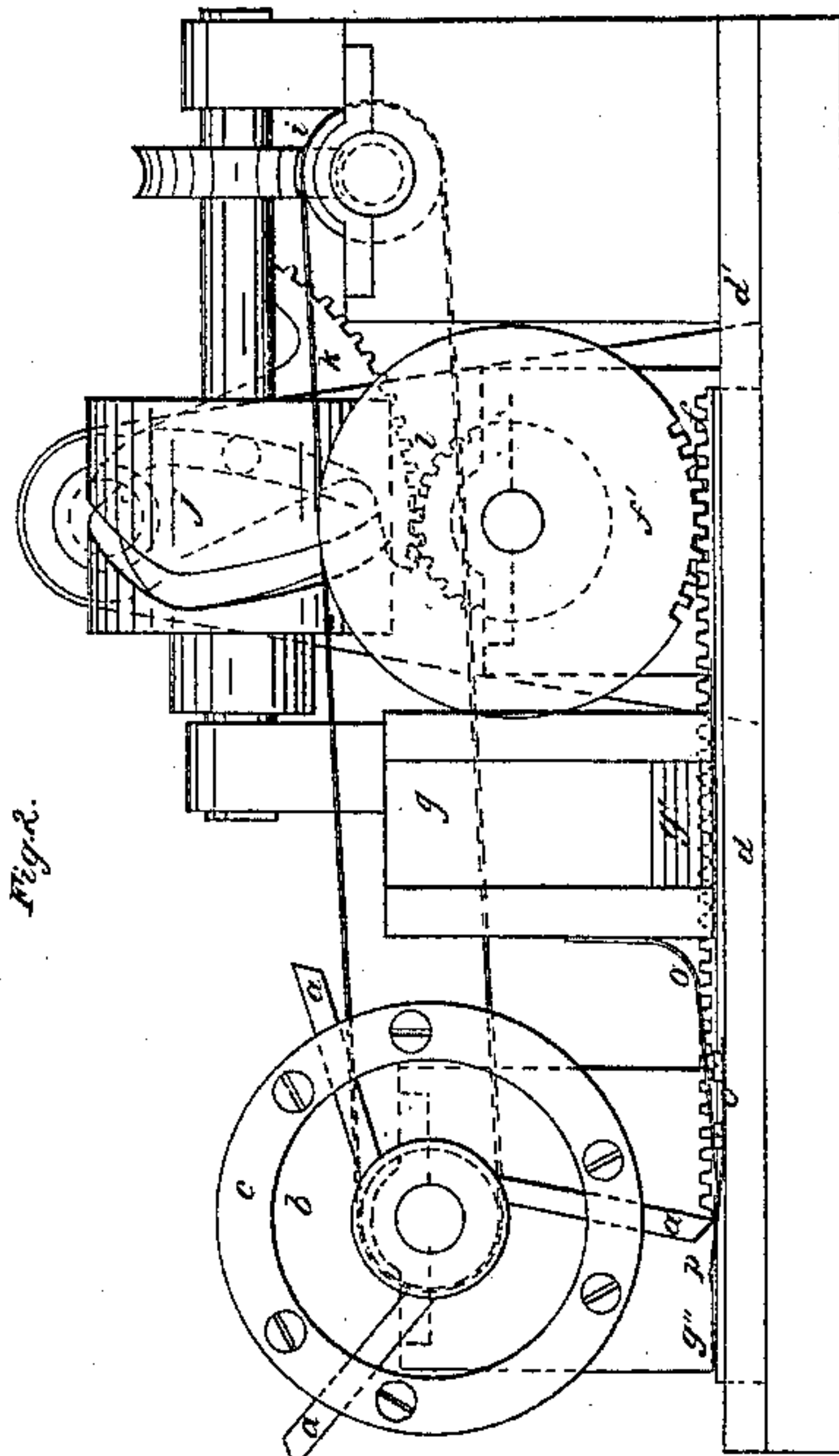
Nº 32,967,

Patented July 30, 1861.



Witnesses.

*Jas. A. Fisher
John R. Reckhorn.*



Inventor.

*Ellis Savage
By his Attorney
J. P. Poffen*

UNITED STATES PATENT OFFICE

ELLIOT SAVAGE, OF WEST MERIDEN, CONNECTICUT, ASSIGNOR TO JULIUS PRATT & CO.

MACHINE FOR GAGING AND TOOTHING IVORY FOR PIANOFORTE-KEYS.

Specification of Letters Patent No. 32,967, dated July 30, 1861.

To all whom it may concern:

Be it known that I, ELLIOT SAVAGE, of West Meriden, county of New Haven, State of Connecticut, have invented a new and useful Machine for Planing and Tothing Ivory Plates for Piano-Keys; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawing, making a part of this specification, in which—

Figure 1 is a top view, Fig. 2 an end elevation, and Figs. 3, 4, 5 and 6 parts in detail.

Similar letters indicate similar parts throughout the figures.

My improvement has for its object the tothing and gaging piano-forte ivory by machinery and automatically.

Ivory blanks for the finger keys of piano fortes, organs and similar instruments consist of plates of ivory sawed from the tooth or tusk as near to the size and thickness of the finished piece as can conveniently be done, these pieces are then bleached, which process is a slow tedious one, being accomplished entirely by the sun's rays. After being bleached the blanks are assorted by the manufacturer into sets, and in that manner go to the "key maker." In applying the ivory to the keys two things are important first to prepare the blanks for taking the glue by which they are held to the wood of the keys, and second to match for color and to level the surface; all which is done before sawing the key-board into separate keys. To enable the ivory to hold the glue each blank must undergo the operation of tothing. This consists in cutting a series of fine channels or parallel grooves along what is to be the under side by means of a plane, having a toothed or grooved plane iron. The ivory is then ready for gluing down. After matching the pieces for color in the rough it often happens that in leveling, the reduction of a thick piece so alters its color as to require it to be taken off and replaced by another, and thus waste of time and materials take place.

By my invention I reduce all the ivory blanks to an exact thickness and also tooth them at the same operation. From this there results some additional advantages besides the getting rid of the labor of tothing by hand and the risk of alteration of color, viz, the reduction in the time required to bleach the pieces to about one half; as by reason of

the tooth marks that side which is to be uppermost is always known, hence it is only required to bleach one side instead of both as at present.

The machine consists of a set of revolving tothing planes or irons, placed upon a frame, in such manner that the ivory blanks, which are fed along upon a slide or table, will receive their action and undergo the operation of tothing and reduction to a gage thickness at the same time. At (a) is shown the tothing irons. These consist of bars of steel having a series of grooves cut along one face from end to end as at (a') Fig. 6. The proper bevel is then ground on the cutting end and the piece is ready to be placed in its stock. The stock consists of a revolving plate (b) having mortises in the rim to receive the planes which are then secured in place by a clamp ring (c) as shown in Figs. 1 and 2. These tools must revolve exactly in the same plane so that the tothing grooves formed by the passage of one tool will lie exactly in the path of the grooves in the tool which follows so as to prevent cross cutting and to insure the parallelism of the grooves, from end to end, of the ivory. The ivory blanks are brought to the revolving plane irons by a carrier which consists of a slide bar (d) playing in a guide groove in the bed plate of the machine, as shown at (d'), and which carrier passes beneath the planes. At one end of (d) there is a recess seen at (e) Figs. 4 and 5 a little shallower than a blank is thick, on the top there is a rack (f) by means of which the carrier is moved back and forth in the slide, through the agency of a pinion (f') as shown.

At (g) is shown the feeder, for holding the ivory blanks, to be toothed and gaged to thickness. This is a tube, or channel, standing vertically, and is placed directly over the carrier (d) just back of the planes. The square of the tube inside is of a size and shape to receive the ivory blanks, lying flat, so that when filled it constitutes a pile of them, as seen in Figs. 2, 4 and 5 at (g'). The bottom of this tube is formed by the surface of the carrier, consequently the lowest piece of ivory rests upon it always. The carrier may be made to slide to and from the planes by any suitable mechanism. In the drawings a belt (h) from the main shaft A drives a shaft with a worm wheel and from which revolution is given to a cam (j).

This vibrates a sector (*k*) gearing into a pinion (*l*), shown in dotted lines in Fig. 2, upon the shaft which has the large pinion (*f'*) upon it.

5 The operation is as follows: The shaft A is made to revolve in the direction of the arrow, this causes the train of mechanism just described, to be set in motion and cause (*f'*) to turn and draw along the carriage
10 (*d*). The recess (*e*) will now be brought under the feed tube, when an ivory blank (*g'*) will drop into it. The motion by the action of the cam (*j*) is now reversed and the carrier advances toward the revolving
15 cutter and in doing so takes with it the ivory piece in the recess, as seen at (*g''*) Figs. 2, 4, and 5. As the ivory approaches the cutters (*a*) their toothed edges begin to act upon its surface, planing it down to
20 a thickness and at the same time leaving their tooth marks. As the piece progresses these form continuous lines or grooves from end to end. After the ivory has passed completely under the tool the cam again re-
25 verses the motion of (*f'*) and the carrier begins to be withdrawn. The piece of toothed ivory in the recess (*e*) must now be discharged, this is merely thrown off the end of the bar or carrier (*d*) by a spring piece
30 (*o*), Fig. 5 which strikes the end of the ivory projecting above the level of (*d*) and pre-

vents it from returning with the carrier and it accordingly glides from under, when the blank drops off the table. The recess (*e*) once more comes beneath the feed tube and 35 receives another blank and the work goes regularly on.

At (*p*) is a spring finger the use of which is to press upon the ivory just behind the planes and thus prevents it from jumping 40 out of its recess. The ivory for the tails of the key are usually made thinner at one end, than the other, to plane and tooth these the recess (*e*) must be inclined on the bottom so as to maintain a level surface while going 45 under the plane irons.

What I claim is—

The tothing and gaging the ivory blank by means of a series of revolving toothed irons, placed in a revolving stock so that 50 the tooth points of each will lie in the same planes; and in combination therewith of a carrier operating in such manner as to feed the ivory blanks to the planes automatically substantially in the manner and for the pur- 55 pose set forth herein.

In witness whereof I have hereto set my hand and seal.

ELLIOT SAVAGE. [L. s.]

Witnesses:

I. P. PINSSON,

JOHN R. PECKHAM.