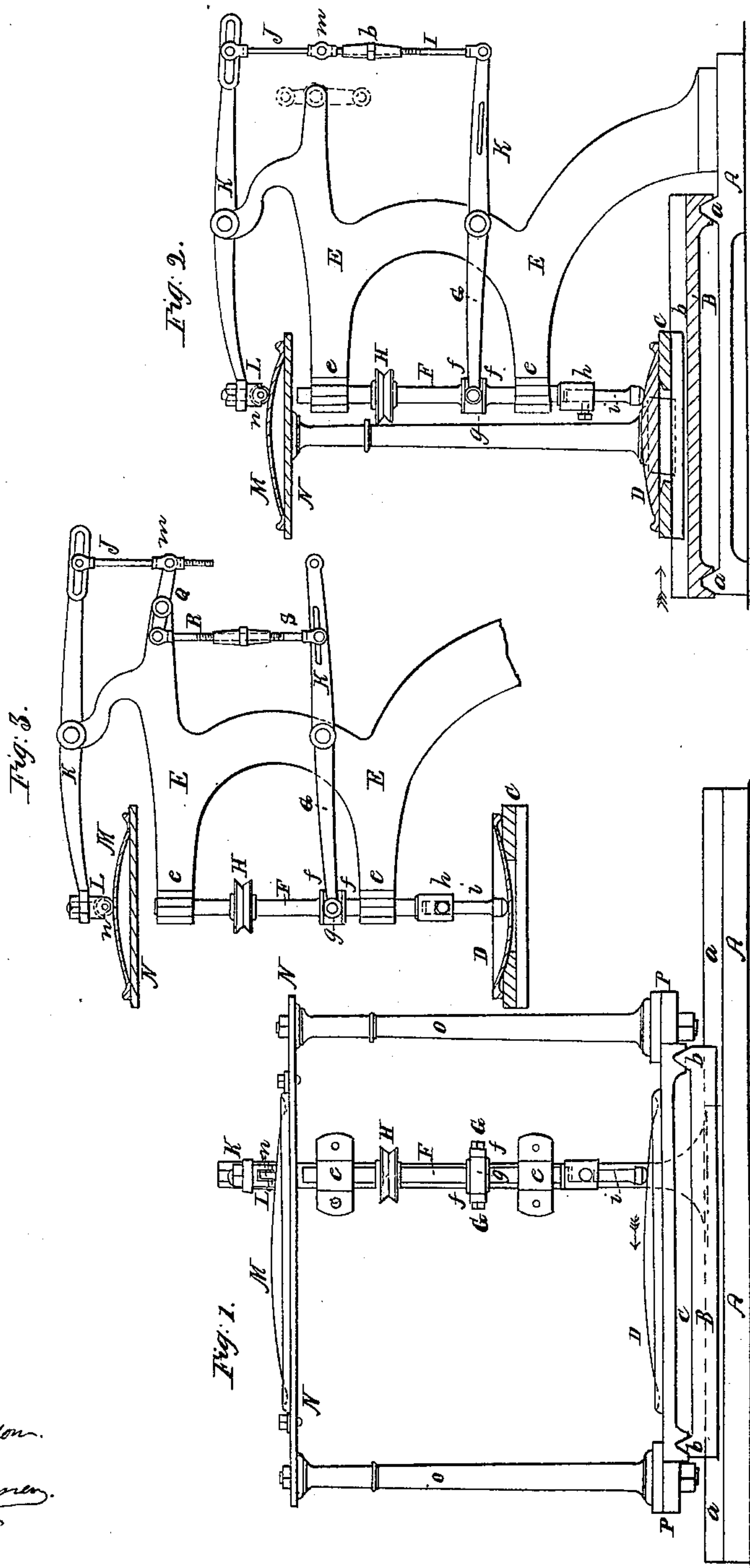


M. Keller,
Carring Wood,

N^o 13,878,

Patented Dec. 4, 1855.



Witnesses.
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UNITED STATES PATENT OFFICE.

MATTHIAS KELLER, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR CUTTING THE FRONTS AND BACKS OF VIOLINS.

Specification of Letters Patent No. 13,878, dated December 4, 1855.

To all whom it may concern:

Be it known that I, MATTHIAS KELLER, of the city of Philadelphia and State of Pennsylvania, have invented a new and Improved
5 Machine for Forming the Backs and Fronts of Violins; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the
10 letters of reference marked thereon.

My invention relates to machinery for forming any number of exactly similar backs and fronts of violins from one pattern, and consists in attaching the wood to
15 be operated upon to the top of a table which is allowed to slide in one direction on another table, the latter being arranged to slide in a contrary direction on a base plate. On the upper one of these tables I erect
20 two columns which support a third table, and on the top of the latter is secured the pattern, so that on the first or second table being moved in one direction or the other the third table with the pattern has an exactly similar motion imparted to it. The
25 pattern on being thus traversed backward and forward acts upon a caster at the end of a lever so as to raise and lower the same accordingly as the curved surface of the
30 pattern acts upon it. This communicates a similar motion to a second lever which again imparts a corresponding motion to a revolving upright shaft having a cutter on its end, which operates upon the wood on
35 the above mentioned tables in such a manner that as the latter are slid backward and forward with the pattern, the cutter shaves from the wood the exact amount required and leaves a surface of exactly similar form to the pattern, thus rapidly forming one side of the back or front of a violin.

My invention further consists in adapting a supplementary lever and rod to the above mentioned levers so that the cutter
45 will act on the wood below so as to cut the concave side of the front or back of a violin without changing or in any way disturbing the pattern. This arrangement of supplementary lever hereafter more fully
50 referred to enables me to cut the concave side so as to leave the wood thicker in the middle than around the edges of the backs or fronts of violins, which is an indispensable requisite in all such instruments, and
55 by depending upon one side of the pattern only as a guide for cutting both sides of the

back or front I cause one side to be exactly uniform with the other, and the thickness to taper with a precision not to be attained by the usual process of manufacturing backs 60 and fronts of violins by manual labor.

In order to enable others skilled in the art to make and use my invention I will now proceed to describe its construction and operation. 65

On reference to the drawing which forms a part of this specification, Figure 1 is a front elevation of my improved machine for forming the backs and fronts of violins, with the levers arranged for shaping the 70 convex sides of the same. Fig. 2 is a side view of the same with the tables shown in section. Fig. 3 is a side view of part of my machine showing the levers as changed and adapted for cutting the concave sides 75 of backs or fronts of violins.

The same letters of reference allude to similar parts throughout the several views.

A is the base of the machine which may be attached to a bench in any convenient 80 manner. On this base are the V shaped projections *a* planed to fit accurately the similarly shaped grooves under the table B, the latter has also V shaped projections *b* fitting the grooves of the upper table C. 85 On this is secured the piece of wood out of which it is desired to form the front or back of the violin. It will be observed that the V shaped projections *b* are arranged at direct right angles to those on the base plate, 90 allowing the lower table B to be moved in one direction and the upper table in the opposite direction after the manner of an ordinary slide-rest for lathes. To the base A is secured the standard or frame E having two projections *e* the ends of which form the bearings for the vertical spindle F. Between the two collars *f*, *f*, on the latter is the hoop, *g*, attached by means of set screws to the forked end of the lever G in such a 100 manner that on moving the said lever the spindle F may be raised or lowered without interrupting its revolutions. The lower end of the vertical spindle is furnished with a socket *h*, into which may be adjusted and 105 secured by means of a screw the cutter *i* of the form required. Above the collars *f*, *f*, the spindle F has a grooved pulley H around which passes the cord from a driving wheel situated in any suitable contiguous position. The lever G has its fulcrum on a pin in the standard E and has a pro-

jecting arm, toward the end of which is the longitudinal slot K (for a purpose hereafter referred to) the extreme end of the lever being jointed to the vertical rod I, which is connected by means of the screw coupling *l* to another rod J, the top of the latter being jointed to a pin adjustable in the slotted end of one arm of the lever K. The rods I and J have, one of them a right handed, the other a left handed screw, so that on turning the coupling *b* the whole connection may be lengthened or shortened and the arms of the levers G and K, to the ends of which the rods are connected, may be drawn nearer together or farther apart at pleasure. A joint *m* will be observed on the rod J which will be more fully referred to hereafter. The lever K has also its fulcrum on a projection from the standard E, and has its other arm furnished with a caster L, the roller *n* of which, bears against the surface of the pattern M, the center of the roller *n* being in a direct line with the center of the spindle F. Now M is the back or front of a violin and is the pattern, a fac-simile of which has to be formed out of the piece D, and this pattern is secured to the top of the table N, which is attached to the tops of the two columns O, the base of the latter being securely bolted to the projecting lips *p* of the slide C, so that in whatever direction the slides may be moved, the table N with its pattern on the top must have a corresponding movement.

My machine as above described is arranged for forming the convex sides of the fronts or backs of violins. I will now show how the same may be adapted, rapidly, by a simple change of rods and levers so as to cut the opposite or concave sides without disturbing the pattern M.

On reference to Fig. 3 it will be observed that the wood D whose convex surface has been already formed by the machine arranged as shown in Figs. 1 and 2 is now turned upside down, the rod I detached altogether from the machine and the rod J jointed at *m* to one arm of the lever Q which has also its fulcrum on a projection of the standard E, and which is shown in red lines (Fig. 2) suspended from the same. The other arm of the lever Q is jointed to the rod R, which is connected to another rod S by a screw coupling similar to that already referred to, the rod S being jointed to a pin in the adjustable slot *l* of the lever G. The machine is now so arranged that the convex side of the backs or front of violins may be formed, without disturbing the pattern M or any other portions of the machine excepting those above referred to.

Operation of the machine: The wood D being secured to the table C, and the pattern M to the table N, the lever K is now adjusted in respect to the lever G that what-

ever movement takes place on the former an exactly similar movement is through the connecting rods J and I and lever G communicated to the vertical spindle F. The cutter *i* is then adjusted into the socket of the spindle so as to cut from the wood D the amount required. The machine is now ready for the operation of forming the convex sides of the backs or fronts of violins. The vertical shaft F being caused to revolve by a cord from an adjacent driving wheel passing around the grooved pulley, H, the caster L on the end of the lever K is brought down so that its roller *n* shall bear against the surface of the pattern M. This through the levers and connections also brings down the cutter onto the wood D shaving a portion of it off. The operator now pushes the table C say in the direction of the arrow (Fig. 2) which likewise pushes the pattern M in the same direction so that its convex surface bearing against the roller *n* of the caster L raises one arm of the lever K and depressing the opposite arm raises the spindle F with its cutter the latter continuing to shave off the wood across the piece D causing the portion the cutter has passed over to assume a form exactly similar to that portion of the pattern which has been in proximity with the roller *n* of the caster L. When it is desired to cut the wood in a contrary direction as shown by the arrow (Fig. 1) the operator pushes the slide B in that direction when a similar cutting operation takes place. Thus by working the two slides B and C backward and forward the roller *n* of the caster L may be brought in contact with every portion of the surface of the pattern M, and an exactly similar surface formed on the wood D below, and the convex side of a front or back of a violin completed. It now remains to form the opposite or concave side of a back or front without disturbing the pattern M. It will be observed on reference to the drawing that the wood is thicker at the middle than near the edges, and this is more or less the case in all violins, the taper being gradual from the middle near the locality of the bridge toward the surrounding edges. To obtain this gradual taper by manual labor requires a lengthened time and no little dexterity. It is easily accomplished in my machine however when arranged as shown in Fig. 3. It will be seen on reference to that figure that through the intervention of the lever Q and connection R, S, on the end of the lever K to which the caster is attached, being raised, the spindle F is depressed, and vice versa, so that the convex surface of the pattern acting on the lever K causes the cutter to form a concave surface on the wood below. The shape of this concave surface is not the same as the convex surface of the pattern, otherwise the wood

would be of the same thickness throughout. By adjusting the pin to which the rod S is jointed in the slot $\frac{1}{2}$ of the lever G, the middle may be left more or less thicker than the edges, and as the convex surface of the pattern is the guide for both the convex and concave surfaces of the wood to be operated upon, it is evident that not only the figure must be regular but the taper cut with a precision which no hand labor could accomplish.

Although I have shown the slides B and C arranged so as to be simply pushed backward and forward by the hand of the operator I intend to furnish them with screws so as to be operated after the manner of an ordinary slide rest.

It will be seen without further description that both the concave and convex sides of the backs and fronts of violins may be formed by my machine without disturbing the pattern, and that any number of such backs and fronts may be produced of exactly similar form and at so great a speed compared with that of hand labor that such instruments may be furnished to the public

at a much cheaper rate than hitherto, and much more accurate in construction.

What I claim and desire to secure by Letters Patent is—

1. The slides B and C with the pattern M and lever K in combination with the connections I and J lever G and spindle F with its cutter i the whole being arranged and constructed substantially in the manner herein set forth for the purpose of forming any number of exactly similar backs and fronts of violins from one pattern.

2. The supplementary lever Q with its connections R, S, and J in combination with the levers K and G and slot $\frac{1}{2}$ for the purpose of forming the concave sides of backs and fronts of violins without changing the pattern used for forming the convex sides, and for the purpose of giving the said backs and fronts a gradual and correct tapering thickness.

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Witnesses:

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