

R. M. Kerrison,

Piano Action.

Patented Sep. 9, 1851.

N^o 8,353.

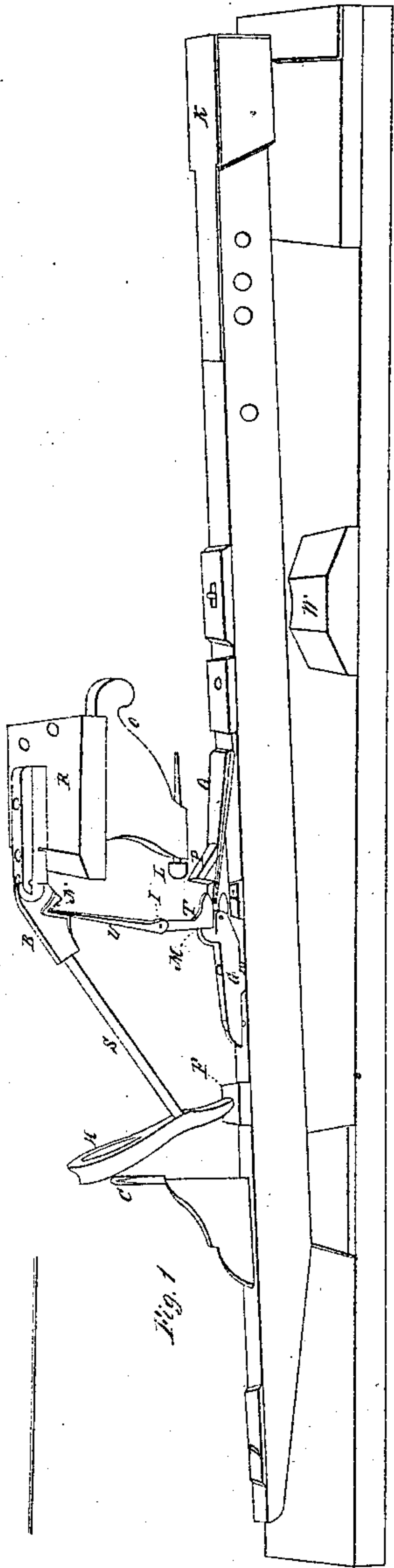


Fig. 1

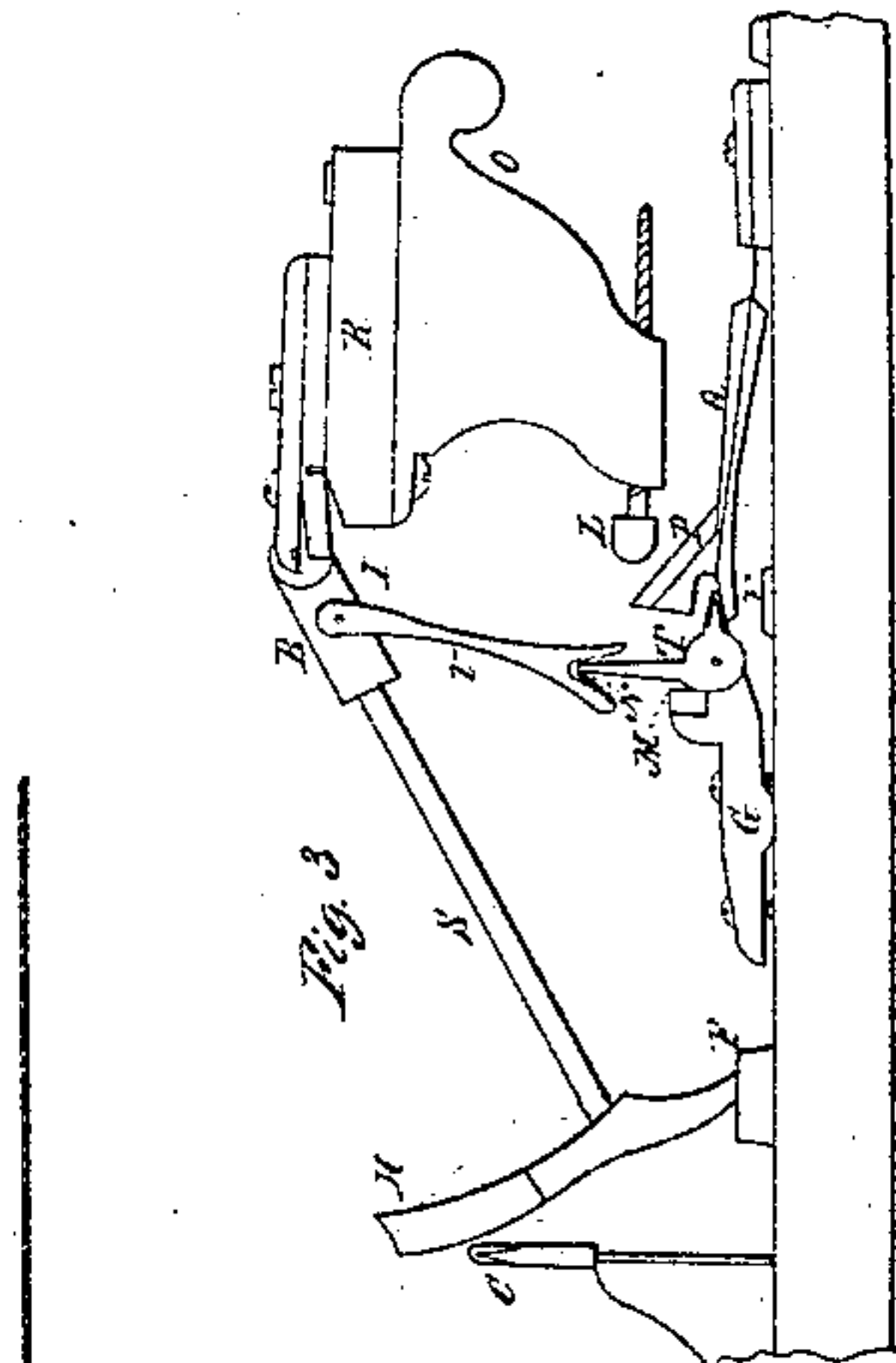


Fig. 3

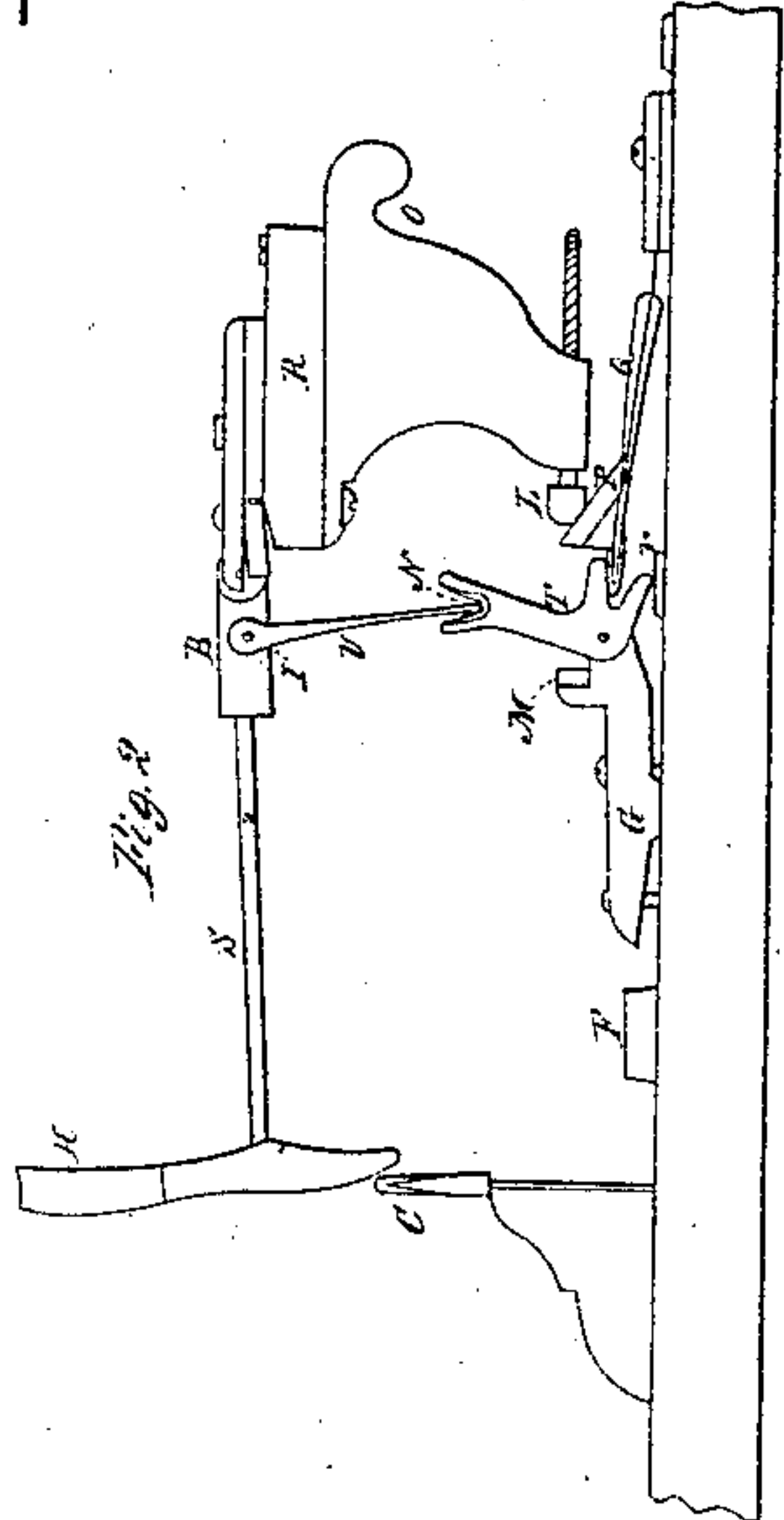


Fig. 2

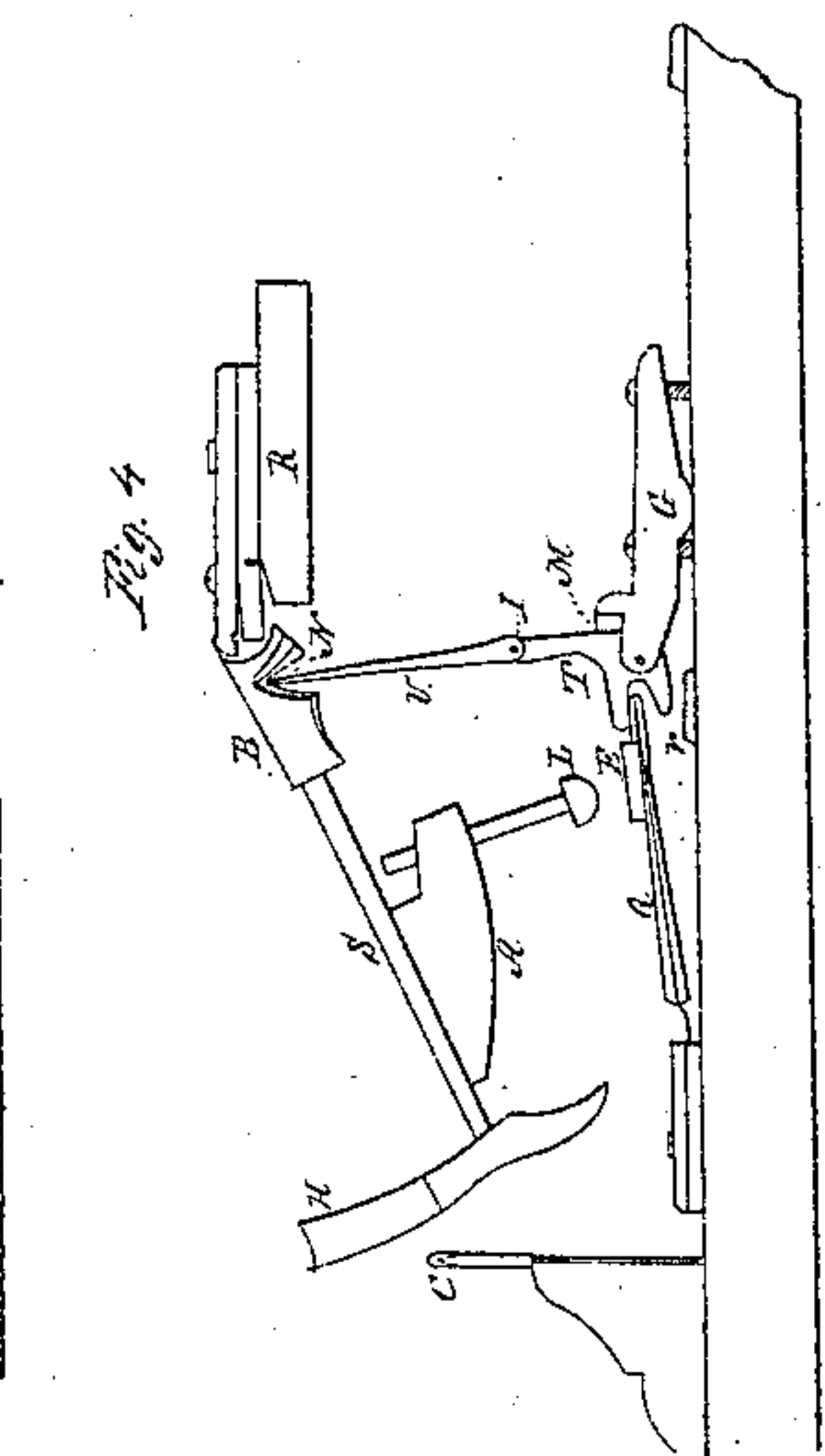


Fig. 4

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UNITED STATES PATENT OFFICE.

R. M. KERRISON, OF PHILADELPHIA, PENNSYLVANIA.

PIANOFORTE-ACTION.

Specification of Letters Patent No. 8,353, dated September 9, 1851.

To all whom it may concern:

Be it known that I, ROBERT M. KERRISON, of the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented an Improvement on the Action Part of Pianofortes; and I do hereby declare that the following is a full and exact description.

I must premise that the term "jack" is given to a small stick, or piece of wood, usually attached to the main lever, (called the key) by a single joint. Its office is to propel the hammer against, the strings. For this purpose, the top end of the jack is usually adjusted, so as to bear against a cushion, which forms part of the hammer; and when the hammer-head, has approached near to the strings, said top end of the jack, is forced off, from the edge of the cushion, which allows the hammer to fall back, and leave the strings free to vibrate. The operation of freeing the hammer from the strings, the instant, the blow is struck, is called scaping the hammer.

My piano action, is constructed as usual, with a main lever, (called the key) resting as usual on a fulcrum. The front end of this lever is pressed down by the finger of the player. The hammer is hinged onto a top rail, in the usual way. Just back of where the hammer head falls, it being fastened to the key, is the check, to catch the hammer, and prevent it from bouncing. Still farther back, the end of the key, raises the damper. In all these items, I claim nothing as being new or peculiar.

The thick part of the hammer near where it is hinged, is called the butt, and the slender stem, on which the head is fixed is the shank. At or near the usual place, viz beneath the butt; is situated my jack. It consists of two pieces, one above the other. The lower piece, which I call the tumbler, is a crooked lever; it is hinged by its elbow, to a longish block of wood, which is firmly screwed onto the top surface of the key; and extends back, under the hammer shank. From the joint or hinge one limb of the tumbler rises upward, and the other limb extends forward horizontally. The horizontal limb is about half the length of the other, and it is bifurcated; having an upper and lower prong. The fork lies above the plane of the key, so as to have room to play up and down on its center, while the vertical limb (of course) plays backward and for-

ward. The block to which the tumbler is hinged, is so formed and cushioned, as to receive the back of the vertical limb, when it is pressed there by a spring as presently explained. Sometimes I use a screw, clothed on the point, to receive the back of the tumbler, and with this screw I adjust the position of the tumbler, but the same may be done by different thicknesses of cloth or leather on the block.

The upper piece of my jack, which I call the lifter, is hinged by its lower end, to the top of the vertical limb of the tumbler; and its top end stands in an angular notch, formed in the hammer-butt. The notch is clothed to prevent noise, and its use is, to keep the end of the lifter in the right place beneath the butt. The action works equally well, when the lifter is hinged to the hammer-butt by its top end, with its lower end resting, in an angular clothed notch, formed in the top of the tumbler. Or when the notch is in the lower end of the lifter and the top of the vertical limb inserted therein.

On the top surface of the key, between the jack, and the fulcrum, is placed the spring which governs the joints of my jack. Said spring, is composed of three principal parts; united into one; viz. a small block of wood, screwed onto the key, about 3 inches from the jack; into which is inserted and fixed a piece of elastic metal, such as watch spring; onto the other end of the metal is fastened, a thin, flat piece of wood $\frac{3}{8}$ inch broad, leaving about $\frac{1}{4}$ inch of metal uncovered, for the sake of the elasticity. The back end, which is the free extremity of the spring, is chamfered to an edge; and clothed round the end, above and below with buckskin. This free end of the spring rises above the surface of the key, and enters in, between the prongs of the tumbler, but does not fill the space. There must be between the under side of the spring-point, and the lower prong, at least $\frac{3}{16}$ inch space; while the upper side of the spring-point, is pressing upward against the upper prong, keeping the back of the tumbler, firm against the block or the screw. In this position of the tumbler and spring, the lifter has a firm basis, to act effectually, at the hammer butt.

To the under surface of the top rail, over the spring, is screwed, a block of wood, which reaches downward to within $\frac{1}{2}$ inch of the spring, when the key is at rest.

Through the block in the line of the key near the lower edge of the block, is passed a long screw, made for that purpose. On the end of the screw nearest to the jack is fixed, a hemispherical wooden button, and the other end of the screw is squared, to serve as a handle. The block with the screw and button I call the scape. It may be found expedient, to use a rail, fixed beneath the top rail, to hold all the scape screws, instead of a separate block for each key. On the top surface of the spring, just outside the fork, is glued a wedge-shaped piece of wood, making angle of 45 degrees, inclining downward from the fork, covered with leather, and lying directly beneath the scape button, but not touching it, when the key is at its resting place.

The rail under the hammer-shanks, usually termed the back rail, is not essential to my action; though it may be used; I prefer to let each hammer fall on a little cushion, on each respective key.

When the key is at rest; the hammer is of course down; the tumbler, is firm against the cushion behind it. At this time, the point of junction of the tumbler and the lifter must be a little back of a straight line supposed to pass through the tumbler center and the top end of the lifter. Now suppose the key slowly pressed down by the finger, the back end rises; the tumbler and lifter carry the impulse to the butt; the hammer rises; when the key has gone about half to its course, the inclined plane of the spring, comes in contact with the scape button; the key goes on; the spring must bend, and in doing so its point quits the top prong of the fork, the spring ceases to hold up the tumbler, but the jack does not yet give way, on account of the position of the joints; but presently the spring-point comes in contact with the lower prong, and pulls the tumbler from its bearing against the cushion behind it; then the jack is no longer able to sustain any weight, and the hammer is free to drop, until the top prong strikes the spring, by the bending of the jack. It is obvious, therefore, that the degree of looseness of the spring-point in the fork, must determine the distance that the hammer may fall from the string, while the key is kept down. And observe that if the hammer does not scape soon enough, the scape screw, must be screwed more through the block, and vice versa. Now suppose the finger allows the key to rise slowly; the spring will be released from the scape button, and its upward elasticity acting against the top prong, which is already in contact, will strengthen the jack, by bracing the tumbler back against its cushion; the hammer will fall to its place, and all will be ready for the next blow.

The proportions of the parts are in a great

measure arbitrary, and will be varied to suit the views of different makers and players. The strength of the spring must vary, according to the weight of the hammer; each spring should be able to keep its hammer above its check when the key is slowly pressed to the bottom. Observe, that all the force that is used to bend the spring, comes back to the key; and also the weight of the hammer, is given back to the key; for these two reasons, the key may be nearly balanced on its fulcrum, when the hammer, is lifted up by the hand. The check must catch the hammer, high up; that is to say, a little below the scape position. The joints of the jack, require to be perfectly free. The proportion of length of tumbler to lifter is arbitrary. I think one third tumbler, to two thirds lifter, is a good proportion. The shorter the prongs of the fork, relatively to the length of vertical limb, the quicker, will the jack play out and in; but then the spring must be stronger, or else it will not counterbalance the hammer.

The arrangement of parts, in my action, may be much altered, without, changing the principle; thus the fork and spring may be turned behind the jack, under the hammer-shank; and the scape screws, passed down, through the ordinary back rail; or the tumbler may have but one prong in the horizontal limb, which prong would lie between two prongs, at the end of the spring. I have tried these and many other, ways and found them not so good as what I have described above. I have tried other kinds and forms of spring, which answer the purpose, provided the necessary looseness, or drop, is allowed; but none is so easy to make, or so little liable to get out of order, as that which I have shown in the drawings, and model. My action possesses a remarkable elasticity of touch; and its repeating power, surpasses anything hitherto known.

The following references to my drawings, will make the whole subject more clearly understood. Figure I, is a representation, in perspective, of one key. K, is the front end of the key, where the finger is applied. D, the leather at the back end, where the hammer is lifted. R, part of top rail. B, the hammer-butt. S, the shank of the hammer. H, the hammer head. C, the check. N, the notch in the hammer-butt, with the top end of the lifter therein. U, the lifter. I, the lifter joint. T, the tumbler. G the block to which the tumbler is hinged. M, the cushion, to receive the back of the tumbler. V, a cushion, to check the tumbler. F, a small cushion to rest the hammer-head. P, the inclined plane of the spring. Q, the spring. O, the scape block. L, the scape button, on the end of the scape screw. W, part of the balance rail.

Fig. II, represents the hammer resting on

the check, as it will be after a hard blow has been struck. When a light blow is struck, the hammer will not rest on the check, but will be kept above the check, by 5 the force of the spring. The same letters, apply to the same parts in this figure as in the preceding one; but observe that the lifter is jointed by its top end, to the hammer-butt, and the notch is in the top of the tumbler, the lower end of the lifter resting there- 10 in. This is a variety, of arrangement, but the principle and result are identical.

Fig. III, represent still another change; the notch is at the bottom of the lifter; the 15 top end of the tumbler being therein. The principle, is the same and the performance equally good. In this figure the single prong, is on the tumbler, and the double prong, is on the spring, which is not so 20 good as the former way. The same letters refer to the same parts as before.

Fig. IV, represents the tumbler and spring turned the other way, in this case the scape blocks or the scape rail to hold the scape 25 screws, under the top rail, is not used. The little cushions, on the keys, to catch the hammers, are dispensed with. The hammer shanks rest on the ordinary back rail, cushioned, and sustained, in the usual manner, 30 part of this rail is shown in this figure, marked A. The scape screws come down through this rail, as shown in this figure. A

flat piece of leather occupies the place of the inclined plane on the spring. In this arrangement, the jack bends backward to 35 scape the hammer. This plan does not work so well as the other, way it is only, given as an illustration of possible variety. The same letters indicate the parts in this as in the other figures. 40

In some pianos, the hammers are hinged, and sloped in the opposite direction, relatively to their keys; in which case my action would be varied to suit the circumstances. 45

What I claim as my invention, and desire 45 to secure by Letters Patent, is—

1. The jack; consisting of a crooked lever, and a straight, or nearly straight, lifter or 50 pusher; acting conjointly, on the general principle above illustrated. 50

2. And I also claim and desire to secure the peculiar application of the spring, to govern the alternate bending and straight- 55 ening of the jack, by acting, one prong or tooth between two other prongs or teeth, with due allowance, of play or shake, according to the desired degree of drop, of the hammers from the string, known as the scape.

R. M. KERRISON.

Witnesses:

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WM. LITTLE.