J. W. Moyer,

Scroll Sawing Machine,

No. 46,015, Patented Jan. 24, 1865.

Fig. 2

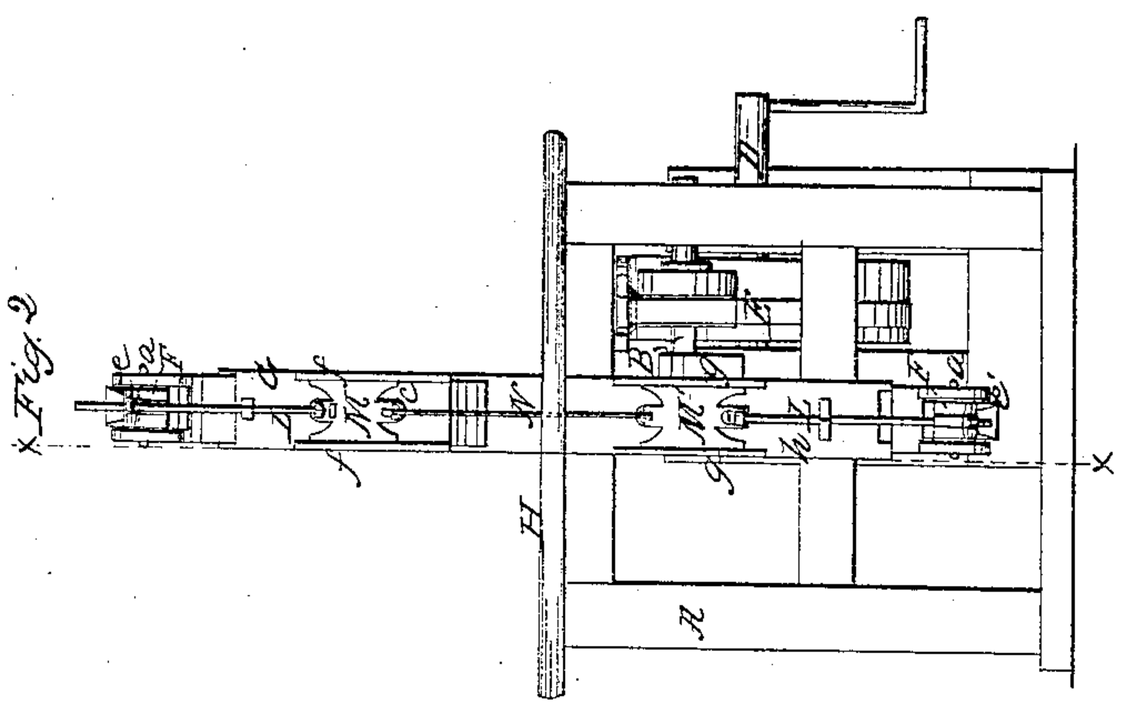
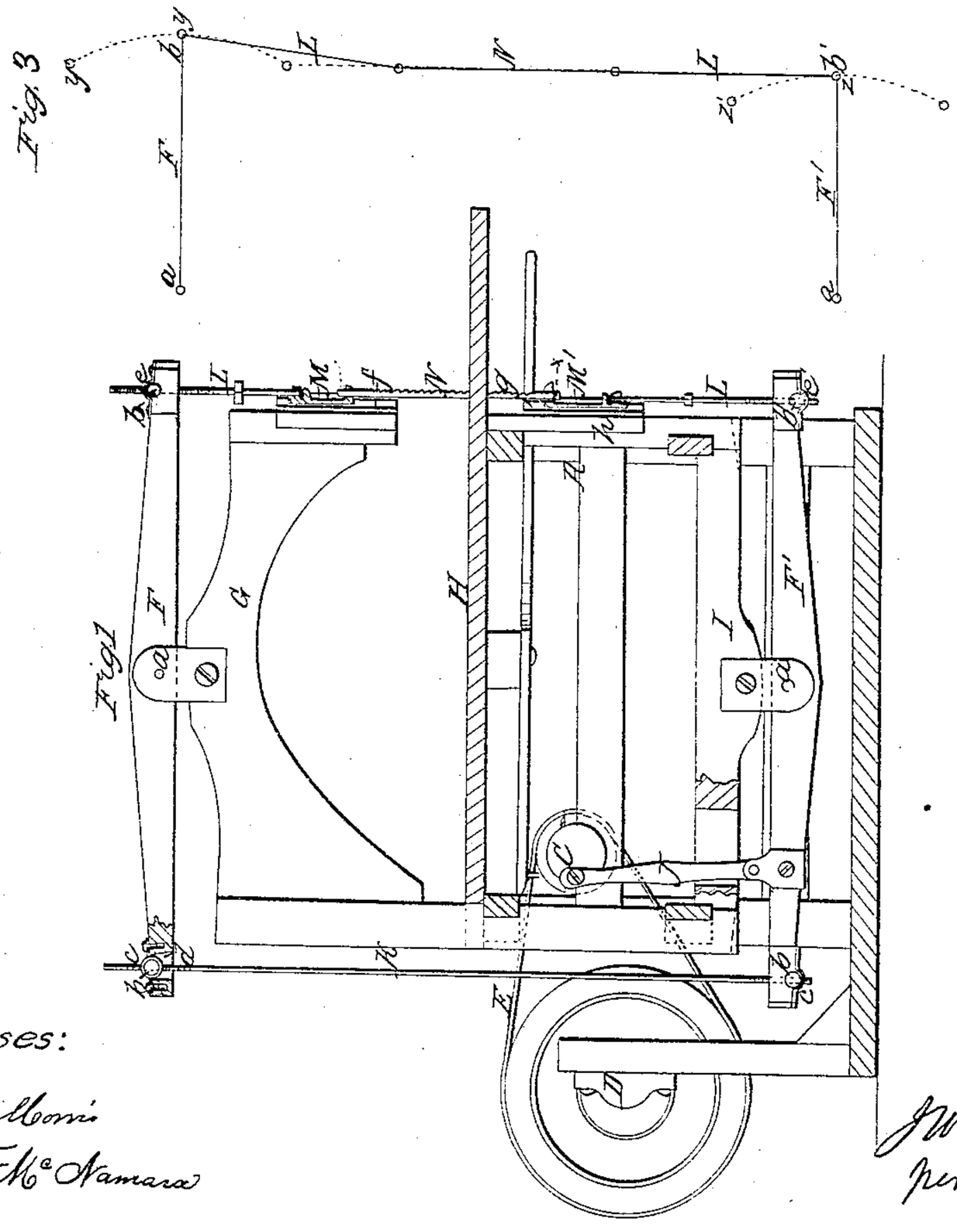


Fig. 3



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UNITED STATES PATENT OFFICE.

J. W. MOYER, OF CHERRY VALLEY, NEW YORK.

IMPROVEMENT IN SAWING-MACHINES.

Specification forming part of Letters Patent No. **46,015**, dated January 24, 1865.

To all whom it may concern:

Be it known that I, J. W. MOYER, of Cherry Valley, in the county of Otsego and State of New York, have invented a New and Improved Sawing-Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side sectional view of my invention taken in the line *x x*, Fig. 2; Fig. 2, a front view of the same. Fig. 3 is a diagram illustrating the motion of the tension-points of the saw rods.

Similar letters of reference indicate corresponding parts in the three figures.

This invention relates to an improved sawing-machine of that class which are commonly termed "muley sawing-machines," and which are generally used for sawing scroll-work or wood in curved form. The object of the invention is to obtain a machine of the class specified which will admit of the same being kept at a proper state of tension at all points of its movement, and allowing the same to operate rapidly without creating jars or concussions, and at the same time avoiding the use of any parts which would serve as an obstruction to the feeding of the "stuff" to the saw, and the proper manipulation of the former while being sawed.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents a framing, which may be constructed in any proper way, to support the working parts of the device, and B is a shaft placed horizontally and transversely in said framing, with a crank-pulley, C, at one end of it. This shaft B receives its motion from a driving-shaft, D, through the medium of a belt, E, or suitable gearing.

F F′ represent two parallel levers, the fulcra *a* of which are at about their centers, as shown in Fig. 1. These levers are placed one over the other in the same plane, and the upper one, F, is attached to a bridge-piece, G, which projects longitudinally over a horizontal bed, H, on the framing, the front end of the arm G being some distance above the bed H. The lower lever, F′, is attached to a longitudinal bar, I, in the lower part of the framing A, and this lever is connected by a rod, J, to the crank-pulley C, the rod J being connected to the lever F′ near its back N.

The back ends of the two levers F F′ are connected by a rod, K, the ends of which have right and left screws cut on them, which pass through cylinders *b*, having their bearings in the levers, the cylinders being retained in position by metal straps *c* and the rod K passing through mortises *d* in the levers. (See Fig. 1). The front end of each lever F F has a shorter rod, L, attached in precisely the same way, *e* representing the bearings thereof, and the inner ends of these rods are connected to slides M M′, the upper slide, M, being fitted between guides *f f*, attached to the front end of the bridge-piece G, and the lower slide, M′, fitted between guides *g g*, attached to an upright, *h*, at the front end of the framing. To the adjacent ends of the slides M M′ the saw N is attached, said saw passing through an opening in the bed H. The saw N may be strained at any time by turning the rods L L.

A reciprocating motion is communicated to the saw N by power applied to the shaft D, the crank-pulley C and connecting-rod J giving an oscillating or vibrating movement to the levers F F′. The parallelism of the two levers F F′ are always preserved, and consequently the saw N is retained at a proper state of tension at all points of its movement, and at the same time all jars and concussions are avoided, owing to the levers F F′ being in a balanced state. This is an important feature of the invention, for many sawing-machines of this class operate in such a manner as to cause violent jars and concussions, and require to be put up in very heavy framings and rest upon solid foundations.

My machine may be operated with great rapidity without causing jars or concussions, even when placed upon an ordinary flooring.

It is well known that in cases where two vibrating levers of equal length rock upon centers midway of their length a saw or a rod strained between the points, as in *c c*, (Fig. 1 of our illustration,) will, after passing the center of its stroke, swerve laterally, and this motion is fatal to the finer description of sawing—such as, for instance, the fine desk-work for the support of music-books upon pianos and other work which might be mentioned, were it necessary for a proper understanding of the case. It is also apparent that

when the points of attachment of the saw—as, for instance, the slides M M of our illustration, are confined in a vertical track by guides, as soon as the levers pass the horizontal point, the points of attachment *e e'* (if in line when the levers are horizontal) will diverge from the perpendicular and cause a greater strain upon the saw at the ends of the lever stroke than in the middle of its stroke.

Now, the object of this part of my improvement is to so adjust the centers of vibration of the saw-rod, which are the points of its suspension, as that in all parts of the stroke of the levers there shall be an equable strain upon the straw—that is to say, that the line drawn from *b* through *x' x* to *b'* shall be of equal length, whatever the position of the levers shall be within the range determined on, and for which the adjustment to be described is calculated and arranged. This result is accomplished by placing one of the centers—it is immaterial which—so far beyond its point of verticality with the other and with the points *x x'* as is equal to the versed sine of half the arc traversed by the point *e*, the levers being in a horizontal position or at right angles to the line of direction of the saw, for strict verticality has nothing to do with it, as the saw may run horizontally, if desired, the other parts having the appropriate relational position, but the term "vertical" is convenient, as that position has been assumed in the drawings, to which I refer in this description.

By this arrangement, supposing the saw to be on the center of the stroke and to start on its upward course, the point *b* will pass from *y* to *y'*, Fig. 3, so as to assume a position vertical to the points *x' x*, while the point *b'* has passed from *z* to *z'*, an equal distance in equal time, with equal divergence, and have assumed a position just as far from the vertical as the point *b* had occupied at the time first supposed. The reversed movement or downward half-stroke restores the former status, and in the remaining half-stroke the converse of the former result is attained.

It is a well-known fact that the note given out by the oscillation of a string or bar raises or falls as the tension is increased or slackened, and my saw has been tested by this most critical and beautiful of tests by a professional tuner of musical instruments with a result agreeing with the position I have demonstrated—namely, that this saw has an equal tension at all points, which is likewise capable of mathematical demonstration, appealing to the eye to corroborate the evidence of the ear.

The position has been stated and demonstrated that the proper distance beyond the vertical line for the point *b* to be located is the versed sine of half the arc traversed by said point. A greater length of stroke of the same lever will necessitate the setting out of this point to a greater distance, as the arc described is of greater length in degrees. This will be met by making the point *b* adjustable out and in on the lever, with graduating-marks if required, so that the requisite change in the pitman having been made, the point *b* may be readily adjusted to the required position.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the slides M M', moving vertically in guides *f f* and *g g*, respectively, with the screw tension-rods L L passing through the threaded bearings *b b'*, Fig. 1, by which the saw is preserved from lateral deflection, rendered capable of relative vertical adjustment, and means afforded for the attachment of varying lengths of saws.

2. The herein-described rolling cylindrical bearings *b b b b'*, retained by metal straps or boxes *c c e e'* applied above and below the levers F F', respectively, and threaded for the passage of the screw tension-rods K L L.

3. The method of hanging the saw from the upper and lower bearings of the straining-rods at *b* and *b'*, Figs. 1 and 3, so that when the levers are horizontal one of the bearings, *b'*, shall be in a line with the saw, which has a determinate motion by means of its guides, while the other bearing, *b*, shall be removed an additional distance from its center of vibration, equal to the versed sine of half the arc described by it in its vibrating motion.

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Witnesses:
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