C. Strong,

Reciprocating Saw Mill.

No. 19,454. Patented Feb. 23, 1858.

Fig. 1.

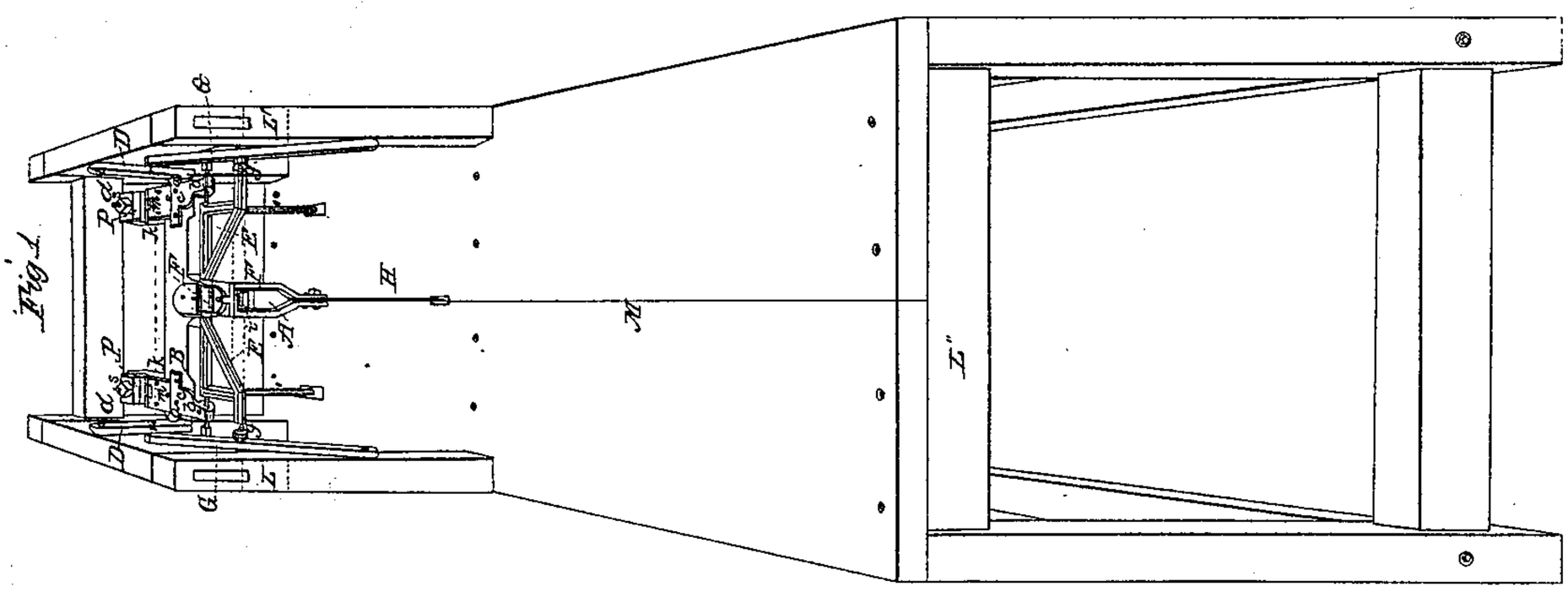
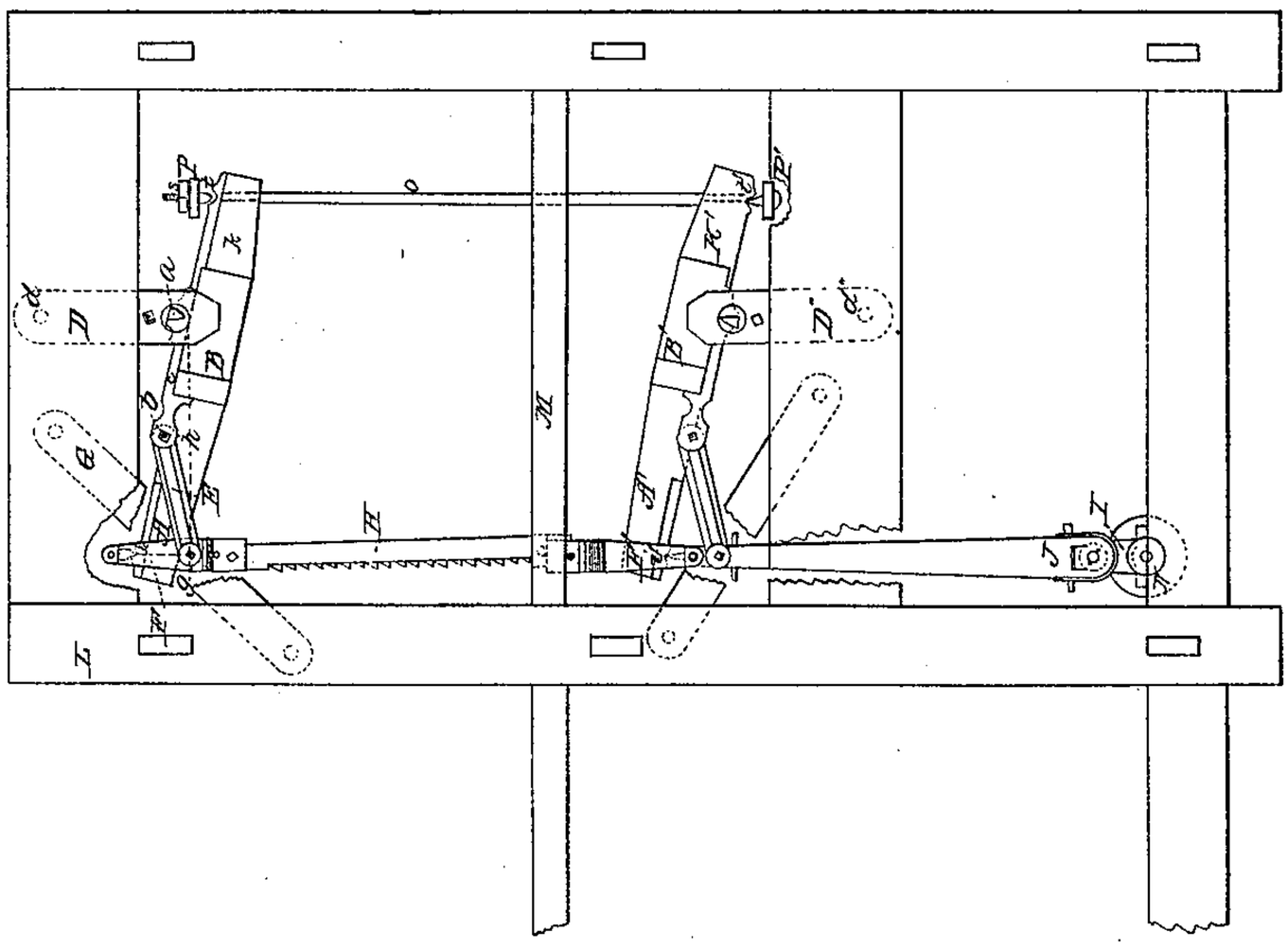


Fig. 2.



Witnesses
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CHARLES STRONG, OF HARTFORD, VERMONT.

SAWMILL.

Specification of Letters Patent No. 19,454, dated February 23, 1858.

To all whom it may concern:

Be it known that I, CHARLES STRONG, of Hartford, in the county of Windsor and State of Vermont, have invented a new and useful Improvement in Sawmills; and I do hereby declare that the following is a full and exact description thereof, together with the mode of applying the same to a reciprocating saw, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of a portable sawing engine, with my improvements applied, presented endwise and centrally to an elevated point of sight, so that the interior of the upper portion of the frame work, and the arrangement and combination of the several parts of my apparatus may be more clearly seen. Fig. 2 is a longitudinal elevation of the same, a portion of the framework, at the left, being omitted.

I do not confine my improvements to any particular form of framework, which must be varied according to the work required. In stationary saw-mills, the frame of the building, with a few additions will afford the necessary support for my apparatus. The form presented in the drawings annexed, is that of a sawing engine, designed for the use of cabinet makers, machinists, &c. The old and most common device for hanging and straining reciprocating saws, is what is called the sash frame, guided by ways. For some kinds of work, the sash, as well as the posts and ways which guide it are in the way—the sash is necessarily of too great weight to admit of rapid motion, and its friction on the ways is not inconsiderable.

To do away with these objections, and at the same time to furnish means for effectually straining the saw and guiding it rigidly in a rectilinear path, is one of the objects of this invention.

The saw H, Fig. 2 is hung and strained between two rocking beams or levers A A′, arranged and combined as hereafter described. The upper rocking beam or lever with its connections is shown in Fig. 1, while the lower lever and its connections are concealed in Fig. 1. But inasmuch as the upper and lower system of levers are precisely alike, except in position, the lower system being inverted or upside down relatively; we will for the present confine our attention mainly to the upper system.

L, L′, L″ Fig. 1, is a frame of wood.—M the patform or floor on which the sawing is performed. A is a rocking beam or lever on which the saw, H, is hung, and which we call the main lever of the system. B is a strong axis to which the main lever is attached, having fulcral bearings at (*a a′*), in pendants D, D′. The fulcral bearings are made of a triangular or semielliptic form, as shown at (*a*) Fig. 2, to obviate friction, and are of one piece with the ears (*b b′*) and plated part (*c c′*), by which they are firmly bolted to the upper surface of the axis B, the whole being so arranged as to make the upper surface of B concurrent with its true central axis of motion: See Fig. 1. The pendants D D′, supporting the axis B, are hung on strong pins (*d d′*), made fast in the framework, and all so adjusted as to permit a free oscillation or swinging of the pendants D, D′. A small rod in position of the dotted line (*r′ k k r*,) connects the pendants, sufficiently to keep them from spreading, merely, which rod, together with a girt across the frame in position of the dotted lines, and extending from L to L′, are removed from the drawing Fig. 1, to prevent obscuration and confusion.

E is a metallic piece, which we call the bracket lever, hinged to the axis of the main lever by means of the ears and pivot joints (*b b′*), and appearing also to be hinged to the main lever at (*f*), where the axis passes under the cap piece (*f*), freely and without contact, for the purpose of obviating friction. Though not really, yet in effect, the bracket lever E is hinged to the main lever A, precisely midway between the fulcrum (*a*), and saw stirrup F, Fig. 2.

G, G′, Fig. 1, are two strong braces, constituting, essentially, a portion of the framework L L′. To these braces the bracket lever E is hinged by two pivot joints (*g g′*).

The point (*i*) Fig. 2, where the saw stirrup F, rests on the main lever A, we call the working end of the lever A. When the working end of the main lever A is brought above or below a line horizontal with its axis, the distance (*g*, *a*,) will be shortened a space equal to twice the versed sine of the angle (*b g h*), equal to the versed sine of the angle (*i a g*); hence the point (*i*) will travel in a rectilinear path, and the fulcra (*a a′*) and pendants D D′ Fig. 1, will oscillate to accommodate the varying positions of the levers A and E.

In order that the above demonstration, be rigidly correct, the fulcra of the lever A, are supposed to oscillate in right lines; yet so slight is the oscillation, and so short the arc which they really describe, that, practically, no perceptible deviation from a rectilinear path, is produced on the working end of the lever A. Thus having guarded against all essential deviation from right to left, or longitudinally as presented in Fig. 2; so by means of the two remote concurrent joints (b b') Fig. 1, constituting one axis of the lever E, and two other remote concurrent joints (g g'), constituting the other axis of the lever E; and by which it is hinged to the frame, as before described; all deviation of the working end of the lever A, transversely, is rigidly prevented.

Any form of frame work that will afford two strong points of attachment as (d d') Fig. 1, for suspending the levers, merely, and two other strong points of attachment as (g g') for the hinging of the bracket lever E, will suffice for one system of levers. Even if the pendants D, D′, were chains, and free of themselves to swing in any direction, as indeed they are in some degree, a rectilinear motion would still be rigidly secured, safe from all deviation, in any direction, by means of the bracket lever E, combined and attached as described. Hence the path of sawing may be longitudinal, or transverse, or oblique over the platform M, according to the requirement of the work, and the setting and hanging of the saws.

In order to secure a correct operation of the combination described, it is essential that the two axes of motion (b b') and (g g') of the bracket lever E, and the axis of motion (a a') of the main lever A, should be in the same plane, when the main lever A, is in a horizontal position; and that the two axes (b b') and (g g') should be at a distance apart equal to one half of the distance of the working end of the lever A, from its true axis of motion; and that the axis (g g') of the bracket lever E, coincide with the working end of the main lever A. But although the true axis of motion (g g') lies directly in and across the path of the main lever A, the bracket shaping of E, leaves a free path for the traverse of A. The saw H, Fig. 2, is hung in stirrups F, F′, which receive the ends of the levers A, A′, and are in contact therewith by semi-elliptic fulcra or rockers, resting in metallic niches (i i').

To strain the saw H, two short counter levers (k, k,) Fig. 1, are attached to the axis B, in both systems of levers, having slots (m m) to receive two straining rods (o, o). Over and across the slots in the end of the counter levers, are rockers (p p'), resting, by semi-elliptic fulcra in metallic niches (t t') Fig. 2. Each straining rod (o) passes through two rockers, one above and the other below the platform M, as (p p') Fig. 2, and is shortened, and the saw is strained by a screw nut (s).

Motion is communicated to the saw from beneath by the common device of crank and pitman I, J, driven by any suitable power applied to the crank shaft, or a pulley N. The pitman J, is attached to the saw-stirrup F′.

In attaching the pendants D, D″, Fig. 2, to the frame work, I first bring the main levers A A′ to a horizontal position, and then set the upper pendants D, with their lower ends inclining from a vertical position to the right, at an angle equal to the angle of oscillation, and then set the lower pendants D″, in an exact vertical position; so that when the levers A, A′, are elevated as shown in the drawing, the upper pendants D will be vertical, and the lower pendants D″ will have their upper ends inclining to the left at an angle equal to the angle of oscillation, as shown in the drawing. Such an arrangement of pendants will secure a tension to the saw, sufficiently uniform for all practical purposes.

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

The arrangement herein shown and described, of the working levers A, A, axis B, oscillating pendants D, D′, bracket lever E, hinged at (b, b') to levers A, A, and at (g, g') to braces G, G′, and stirrups F, F′, counter-levers (k, k') straining rods (o, o) and rockers (p, p'); the above parts being combined and operated substantially as and for the purposes herein set forth.

CHARLES STRONG.

Witnesses:
I. B. Hartwell,
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