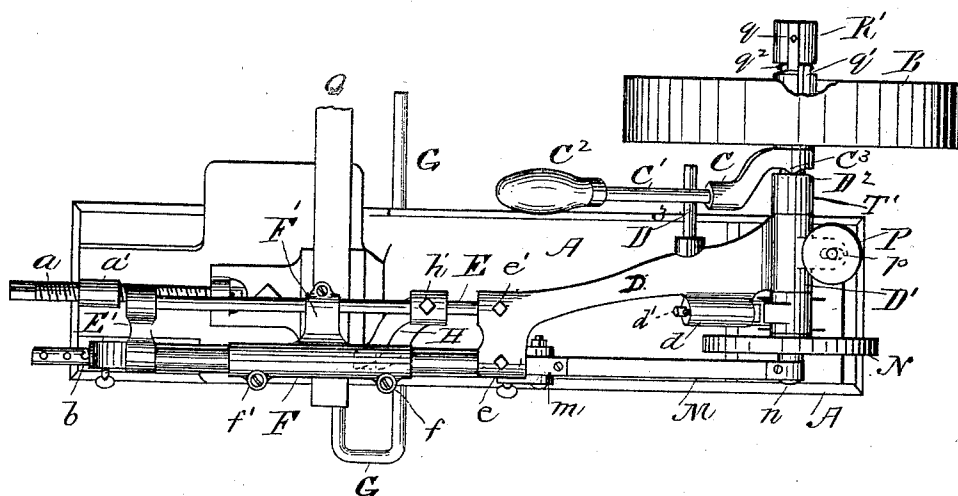
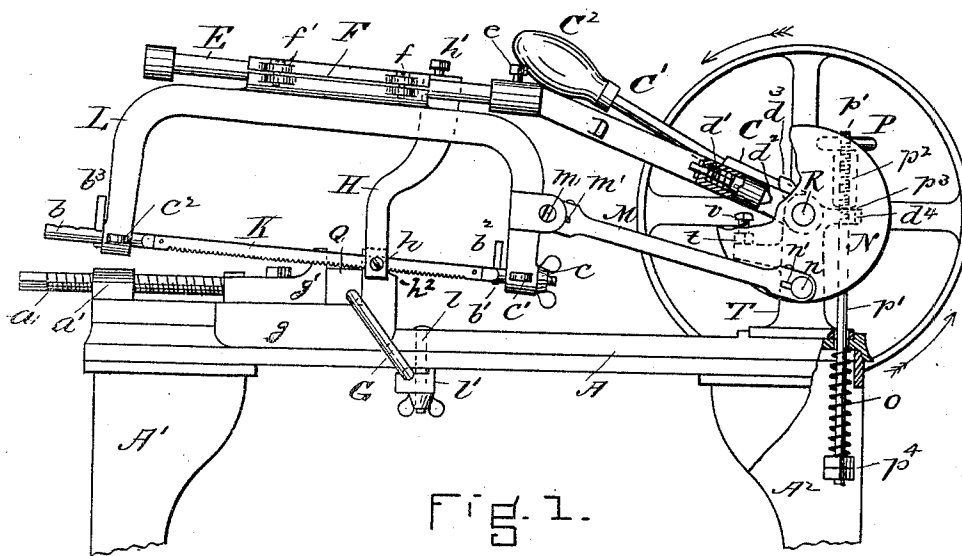


H. D. LANFAIR.
HACK SAW MACHINE.

Patented Jan. 12, 1892.



WITNESSES.

Geo. H. Chas.
Clifford F. Crosby

Fig. 2.

INVENTOR

Herbert D. Lawfair
by Bonifacio S. Parker
his attorney.

UNITED STATES PATENT OFFICE.

HERBERT D. LANFAIR, OF MILLER'S FALLS, MASSACHUSETTS, ASSIGNOR TO
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HACK-SAW MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,929, dated January 12, 1892.

Application filed August 25, 1891. Serial No. 403,679. (No model.)

To all whom it may concern:

Be it known that I, HERBERT D. LANFAIR, of Miller's Falls, in the county of Franklin and State of Massachusetts, have invented a certain new and useful Improvement in Hack-Saw Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My present invention relates to hack-saw machines for sawing metals, &c., and the special features and combinations of devices are hereinafter set forth.

In the drawings like letters of reference indicate corresponding parts.

Figure 1 represents a side elevation of the machine. Fig. 2 represents a plan view.

A is the bed of the machine, supported by legs A' A² or similar means. On one end of bed is a head T, provided with the arm *t* and gage-nut *v*. In the head is carried a crank-shaft R, journaled therein. On the crank-shaft is journaled the movable arm D, which supports the guide-rods E E. The crank-shaft also has the driving-wheel B, which is loosely journaled thereon, and the hand-lever C, also journaled thereon. The crank-wheel N, with its crank-pin *n*, is secured to the end of the crank-shaft R. The head T has the beveled projecting catch *d*³ for holding the locking device *d*, *d'*, and *d*², attached to arm D, when said arm is raised.

Fitting to and sliding on the guide-rods E E, which rods are held in place by their attachment to arm D and piece E', is the saw-frame L, which holds the saw K, secured at each end of frame L by suitable set screws and nuts arranged to hold the hack-saw properly in the frame, the latter being indicated by *c* *c'* *c*². A pitman or crank-shaft M, secured to the saw-frame by pin *m* and to crank-pin *n*, as shown, communicates power to the saw-frame and saw. It will be observed that I place the crank end of the pitman so that in making its revolution it will be higher than the end connected with the saw-frame, so that the crank plate or wheel, revolving in the direction of the arrow, will, when it carries the crank-pin and pitman end upward, and so around, thereby give to the saw a downward stroke during its forward or cutting motion and bringing a pressure on the blade at that point of the work and relieving it on the

return stroke by the revolving of the crank-plate. The arm D and guide-rods E E are also set so that the frame L is carried backward and forward at an angle, the end toward the pitman being lower. This angle, however, decreases as the sawing progresses and the saw sinks into the metal it is cutting. This slant or angle of the arm D and the said guide-rods also facilitates the cutting.

Upon the bed A is placed the vise for holding the metal to be cut, and preferably consists of the fixed part *g* and the movable part *g'*, actuated by the screw-threaded rod *a*, moving in the threaded block *a'*, attached to the bed A. The block of metal to be cut is indicated by Q.

Under the bed is the stop-gage G for measuring the length of metal it is desirable to cut off. This gage is held by the bolt *l*, passing through the bed A, in connection with the block and thumb-screw *l'*; or the gage may be held in any other convenient manner that will permit of its adjustability and its being set and held at any desired distance from the bed or metal being cut. It will be seen that one end of the gage runs under the bed, where it is held, as already described, while the other end is bent upward in any convenient shape to rest against the end of the metal to be cut off.

On the side of the arm D is placed the locking device for holding up the frame and arm, and consists in the bolt *d*², moving in the barrel *d* and actuated by the spring *d'*. Now when the arm D is raised the beveled bolt *d*² will engage the catch *d*³. The ends of catch *d*³ and bolt *d*² being both beveled, enables the bolt and catch to be either engaged or disengaged by a slight pressure upon the arm D in throwing it up or in throwing it forward. When thrown forward or down, the saw rests upon the metal to be cut, and the weight of the frame, arm, and guide-rods and attachments of course tend to press the saw upon the metal.

The saw-frame L is provided with suitable studs *b* *b'* for holding the ends of the saw-blade, and is provided with pins *b*² *b*³ and holes for adjusting different lengths of saw-blades. By means of the pins the blade can be squared to the work. The thumb-screw *c* strains up the saw-blade in the frame, and the

set-screws c' c^2 may be used to adjust and hold the blade.

Attached to the guide-rod E is the saw-guide H, adjustably secured to the guide-rod 5 by a set-screw h' . On the lower end of the guide-arm H is the slotted end with set-screw h . The saw-blade being held by the slotted end h^2 of saw-guide H near the work, prevents the springing or breaking of the saw. The 10 guide is held stationary, and the saw-blade moves back and forth in the slot.

Under the movable arm D, which holds the guide-rods E E, is placed the adjustable stop v , attached to the arm t of the head T, and 15 consists of a screw-bolt with a head moving up and down in the arm t . This adjustable stop or gage v is located under the arm D, and by adjusting the stop as desired the distance forward of the arm D will be regulated, 20 and through said arm the depth of the cut of the saw.

The driving-pulley B is journaled loosely on arbor R, but is made a fast pulley by a clutch operated by the lever C. On the end 25 of arbor or crank-shaft R is placed a collar R', with a clutch or lug q . The driving wheel or pulley B also has a corresponding clutch or lug q' between the inner end of collar R' and the pulley B. Upon the shaft R is placed a 30 spring q^2 . Said spring continually presses against the pulley B. The head T, which forms bearings for the shaft R, has at the point T' adjacent to the hand-lever C one or more recesses, (indicated by D²;) and on the 35 adjacent end of hand-lever C, journaled on shaft R, are formed one or more projections C³. The outer end of the head-bearing T', in which the recess or recesses D² are formed, is beveled, as shown in Fig. 2, so that the pro- 40 jection C³ will easily slide into recess D² when the hand-lever C is raised.

In operation it will be seen that when the hand-lever C is raised the projection C³ will slide around to the recess D² and the spring 45 q^2 pressing upon the pulley B will press it against the journaled end of hand-lever C, resulting in forcing the projection C³ into recess D² and releasing the lug q' from lug q , and so allowing driving-pulley B to become a 50 loose pulley upon shaft R.

When it is desired to start the machine, all that is necessary is to throw the lever C forward. This releases the projection C³ from 55 recess D², forcing outward the driving-pulley B, (which is actuated by an ordinary driving-belt,) and the lugs q q' interlock, the spring q^2 being compressed, and the crank-shaft is revolved, actuating the pitman and saw-frame, as already explained.

Attached to the arm D is a rod D³. The 60 object of this rod is to strike against the hand-lever C when the arm D is raised and to carry upward said lever C, thus throwing the lugs q q' out of contact, as already explained, 65 stopping the machine, the driving-wheel B continuing to be revolved, but as a loose pulley, upon the crank-shaft R.

In case the metal to be cut off is soft, so that it is undesirable to have the full weight of the arm D and guide-rods and frame at- 70 tachments resting upon the saw-blade, I have provided a device by which the weight pressing downward upon the blade can be adjusted and regulated with the greatest nicety.

To the arm D is attached an ear d^4 , which 75 may be integral with the arm-piece. Through this ear is formed an elongated hole or slot p , Fig. 2. (Shown in dotted lines.) Through this hole p passes a vertical rod p' . Said rod has a screw-thread at its upper end p^3 , upon 80 which is screwed the hand-wheel P, with nut part p^2 , the lower end of the latter resting on the upper side of ear d^2 . The rod p' is preferably extended through the bed A, as shown in Fig. 1, (the parts being shown broken away 85 to show the said rod p' and its connections.) On the lower end of rod p' is placed a nut, or preferably two set-nuts, p^4 . Upon the nuts and around the rod p' is a spiral spring o . The upper end of spring o presses against 90 the under side of the bed A. This "tension device," as it is called, is operated by simply turning the hand-wheel P. This draws upward the rod p' by the screw-thread p^3 , the upper end of rod passing up into the nut 95 part p^2 of hand-wheel P, and, if necessary, upward through the nut and wheel. This upward motion of rod p' causes a compression of the spring o , and the effect is of course to cause the under side of nut part p^2 of 100 hand-wheel P to press downward upon the ear d^2 , which will balance the weight of arm D and its attachments. By a slight turning of hand-wheel P the pressure of the arm D and attachments upon the saw-blade may be 105 increased or diminished. If the wheel P is turned upward sufficiently to release the pressure upon the ear d^2 , the saw-blade will receive the full weight of arm D and its at- 110 tachments. Thus by adjusting the tension-rod p' and its connected devices the saw can be made to cut slower or faster, as desired. This feature is particularly valuable upon certain classes of work.

The several parts of the machine are care- 115 fully arranged, so that any wear or necessary adjustment of parts may be easily made. For instance, the cross-head part of saw-frame, which slides back and forth on the 120 guide-rods, are provided with adjusting-screws f f' for taking up any wear or looseness, the parts of the saw-frame being slotted, as shown, thus enabling the screws f f' to draw the parts together. The pitman or connecting-rod M is also slotted at each end m' 125 n' and provided with screws, as indicated by m , for taking up any looseness. The jaws of vise g g' may be made movable as to one or both jaws, as preferred.

I do not confine myself to the precise form 130 of parts shown and described, as it is evident that modifications may be made without departing from the spirit of my invention.

The operation of the machine is briefly as

follows: Power being applied to the pulley B, causing it to revolve on the shaft R in the direction indicated by arrow, the hand-lever C being raised, permitting it to become simply a loose pulley, the metal to be operated on (indicated by Q) is secured in vise between jaws $g g'$ by aid of the screw-threaded rod a , and the hack-saw, secured in frame L, is allowed to rest upon the top of the metal bar Q by pressing the arm D and its attachments forward and downward. Now, by moving the hand-lever C forward and downward, as shown in Fig. 1, the driving-pulley B will be forced outward horizontally on the shaft R, the spring q^2 will be compressed, and the clutches $q q'$ will interlock, causing the crank-shaft R to revolve with the pulley B, thus actuating the pitman and the saw-frame and its saw-blade to move back and forth, cutting the metal Q. As the cutting progresses the weight of the arm D and its attachments will continue to press the teeth of the saw-blade upon the metal that is being cut.

The saw-guide H, gage G, and, if necessary, the tension device P p' and minor parts will be set as hereinbefore described.

The machine can be stopped at any time by raising the hand-lever C, thus releasing the clutches $q q'$, as explained, or, if it is desired to raise the saw-blade, it can be done by raising the arm D until the lock-bolt d^2 engages the catch d^3 , which will hold the arm and saw clear of the work and suspended. When the arm D is thus raised, the rod D³ will strike against the hand-lever C, raising said lever at the same time and stopping the machine.

All the parts are preferably formed of metal.

The position of the shaft R is always preferably higher than the connection of the pitman or connecting-rod M with the saw-frame, thus insuring, as before suggested, a downward pressure of the saw-teeth upon the metal from the beginning of the cutting-stroke to its termination. This is an important point of my invention, although the saw would cut if this arrangement of parts were not provided; but it would be less efficient in use.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The hack-saw machine herein described, consisting of the bed A, provided with the head T, the shaft R, driving-wheel B, the arm D, having the guide-rods E E, the saw-carrying frame L, mounted on said guide-rods, the crank-wheel N, fixed to the shaft R, and pitman M, suitably connecting the saw-frame and the crank-wheel, the vise $g g'$, and gage G, all combined and adapted to operate substantially as and for the purposes set forth.

2. In a hack-saw machine, the shaft R, driving-wheel B, the clutches $q q'$, spring q^2 , the lever C, provided with the lug or projection C³, and the head-bearing T', provided

with the depression D², combined substantially as and for the purposes set forth.

3. In a hack-saw machine, a pivoted saw-frame-carrying arm having an apertured ear d^4 projecting in rear of its pivot, a screw-threaded rod p' , adapted to pass through the slotted or apertured ear d^4 and also the bed of the main frame of the machine, a screw-threaded hand-wheel P, and a suitable spring and means for holding the same, all combined and arranged as a tension device, substantially as set forth.

4. In a hack-saw machine, the combination of a saw-supporting arm D, pivoted on the driving-shaft, guide-rods secured to said arm, a saw-frame reciprocatively mounted on the guide-rods, a pitman to actuate the frame, and means to yieldingly support said arm, substantially as and for the purposes set forth.

5. In a hack-saw machine, the pivoted saw-frame-carrying arm D, provided with the locking-bolt device consisting of the keeper d , bolt d' , having a nose d^2 , in combination with the catch d^3 , attached to the head T, substantially as and for the purposes set forth.

6. In a hack-saw machine, the saw-guide H, the yielding guide-rods, to one of which is removably secured said guide, and a reciprocating saw suitably secured in a saw-frame and supported by said guide-rods, all combined and adapted to operate substantially as set forth.

7. In a hack-saw machine, a saw-frame arranged to be secured to and move on guide-rods, the said rods yieldingly supported by a pivoted arm supporting said frame, in combination with an adjustable saw-guide removably secured to one or both of said guide-rods, substantially as and for the purposes set forth.

8. In a hack-saw machine, the pivoted saw-frame-carrying arm D, the rod D³, secured to said arm, the pivoted lever C, adapted to move on the main driving-shaft R, the clutching device located on said driving-shaft and suitably connected with said lever C, the said arm and rod adapted to raise the said lever, and all combined substantially as and for the purposes set forth.

9. In a hack-saw machine, the pivoted saw-frame-carrying arm D, the adjustable screw-bolt gage v , attached to the arm t , the arm t , both said arm and said gage located under the said arm D, the head T, to which said arm t is attached, all combined and adapted to operate substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 7th day of August, A. D. 1891.

HERBERT D. LANFAIR.

Witnesses:

CHESTER C. CONANT,
CHAS. ALLEN.