(No Model.)

3 Sheets—Sheet 1.

J. H. HALL & D. PARRY.

CHAIN MORTISING MACHINE.

No. 518,646. Patented Apr. 24, 1894.

Fig 10.

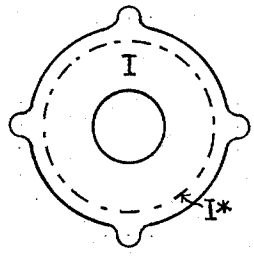


Fig 11.

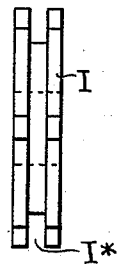


Fig 6.

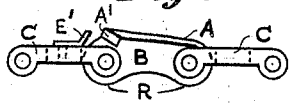


Fig 8.

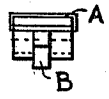


Fig 7.

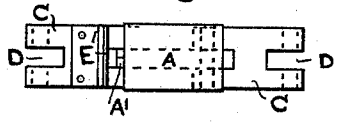


Fig 12.

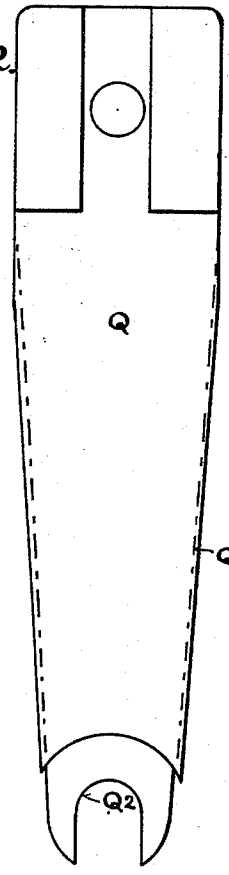


Fig 13.

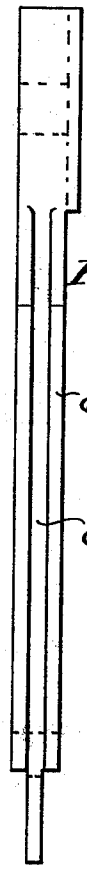


Fig 9.

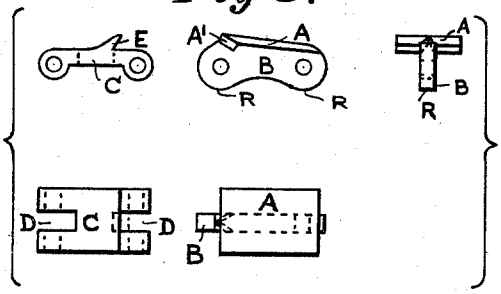


Fig 4.

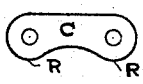


Fig 1.

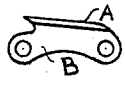


Fig 3.

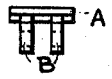


Fig 5.

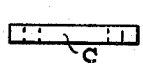


Fig 2.

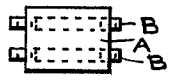


Fig 16.

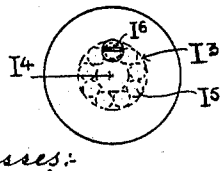


Fig 17.

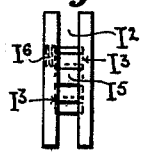


Fig 14.

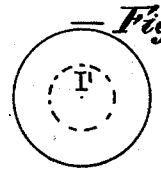
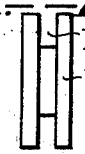


Fig 15.



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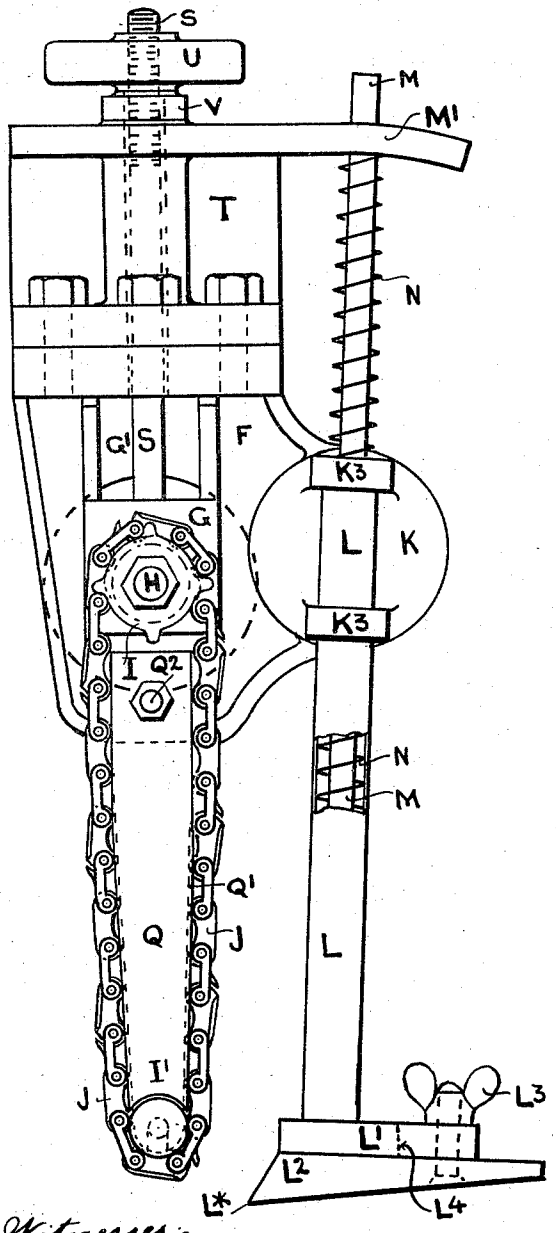
J. H. HALL & D. PARRY.

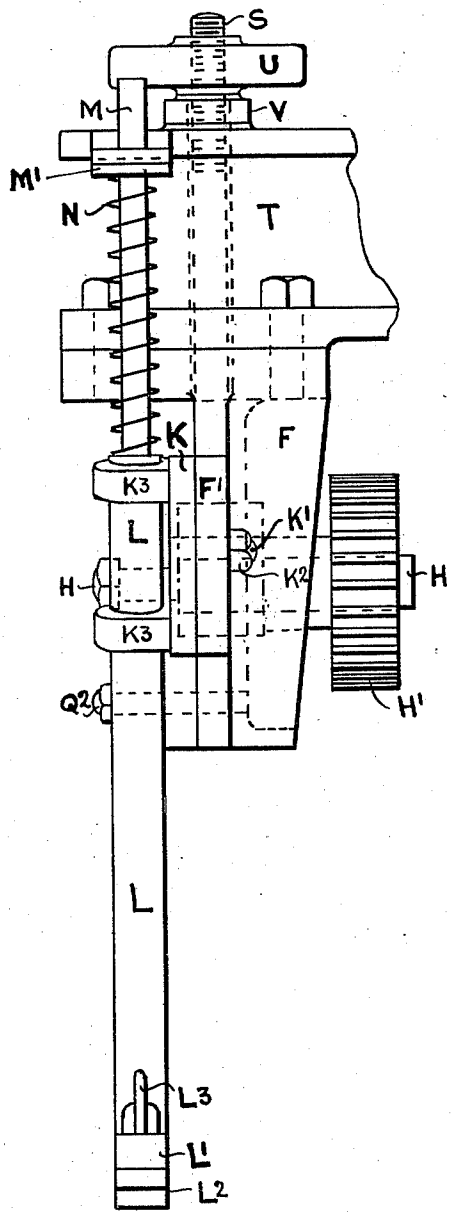
CHAIN MORTISING MACHINE.

No. 518,646. Patented Apr. 24, 1894.

—Fig 18.—



—Fig 19.—



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J. H. HALL & D. PARRY.

CHAIN MORTISING MACHINE.

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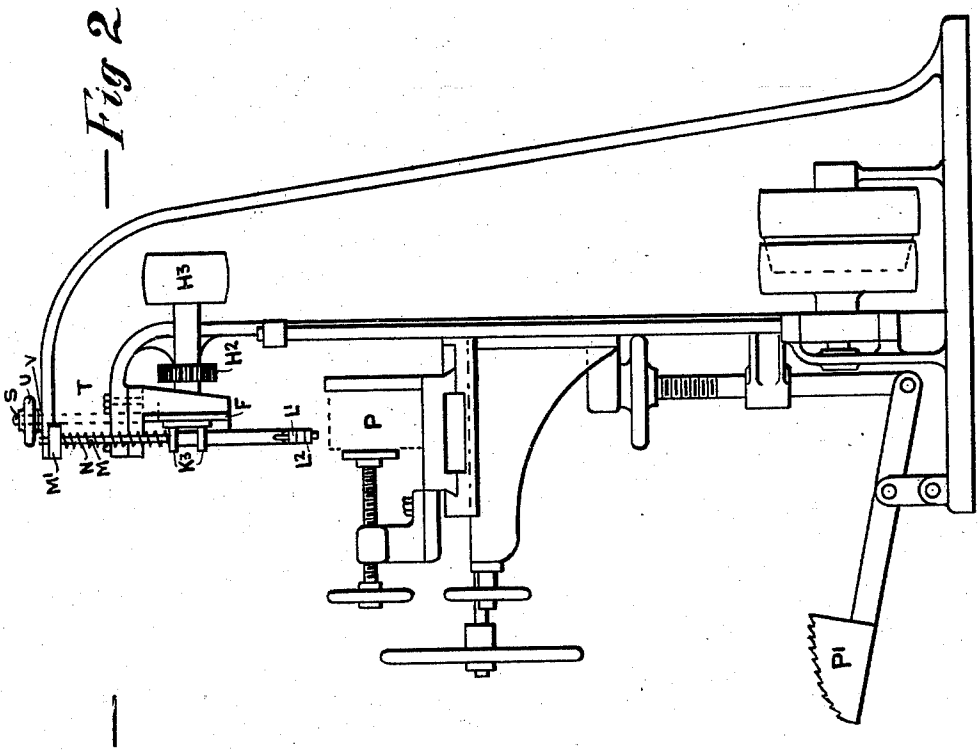
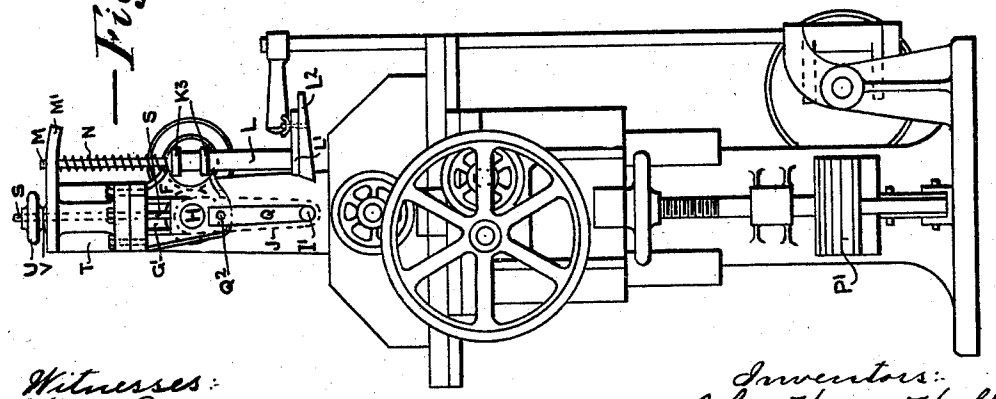
—Fig 21.—



—Fig 20.—



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UNITED STATES PATENT OFFICE.

JOHN HENRY HALL AND DENIS PARRY, OF LONDON, ENGLAND.

CHAIN-MORTISING MACHINE.

SPECIFICATION forming part of Letters Patent No. 518,646, dated April 24, 1894.

Application filed December 1, 1893. Serial No. 492,477. (No model.) Patented in England June 15, 1891, No. 10,120.

To all whom it may concern:

Be it known that we, JOHN HENRY HALL, agent, residing at 47 West Bank, Stamford Hill, London, in the county of Middlesex, and DENIS PARRY, engineer, residing at 38 Spencer Road, Herne Hill, London, in the county of Surrey, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in or Connected with Chain-Mortising Machines, (for which we have obtained Letters Patent in England, No. 10,120, dated June 15, 1891,) of which the following is a specification.

Our invention relates to improvements in the cutter chains employed in chain mortising machines, and in the parts of the machine immediately connected with such cutter chains, and their actuation.

Figure 1 is a side view of one of our cutter links. Fig. 2 is a front view of same, being a projection of Fig. 1. Fig. 3 is an end view of same. Figs. 4 and 5 are views of a single link intended to connect the cutter link to the next. Fig. 6 is a side view of a cutter link and its two adjacent links constructed in a slightly different way. Fig. 7 is a front view of same, being a projection of Fig. 6. Fig. 8 is an end view of same. Fig. 9 shows the same parts separated. Figs. 10 and 11 are respectively front and side views of the sprocket wheel by which the chain is driven. Figs. 12 and 13 are respectively back and side views of the chain guide. Figs. 14 and 15 are respectively front and side views of the roller at the lower end of the chain guide. Figs. 16 and 17 are respectively front and side views of a similar roller provided with roller bearings. Figs. 18 and 19 are respectively front and side views of the apparatus for tightening and slackening the chain, and of a spring guard to prevent skelping, splintering or tearing up of the fibers of the wood by the cutters as they emerge from the mortise. Figs. 20 and 21 are respectively front and side views of a mortising machine with our invention applied thereto.

The chain cutter links, shown in Figs. 1, 2, and 3, are formed of pieces of metal of channel section, consisting of a table or flat portion A, forming the cutter proper, and two stems B standing at right angles thereto, the whole giving a cross section somewhat like two capital letters T placed side by side with their heads joined together. The stems B form the double links of the chain, each double link being connected to the next by a single link C (Figs. 4 and 5) after the manner of certain kinds of ordinary pitch chains.

In the cutter links shown in Figs. 6, 7, 8 and 9 the cutter link is made of a simple T section the head A of which forms the cutter, and the stem B the single link of the chain, the adjacent links being double, that is one placed at either side of the single link and connected thereto by pins in the usual way, or single links C may be used as shown in Figs. 6, 7 and 8. These single links C are formed with slots D at their ends into which the ends of the single cutter links are fitted and connected by pins. By these means we considerably reduce the cost, and increase the strength of the chain, besides which there is greater clearance space A′ in front of the cutter A for the escape of the material as fast as it is cut away in the mortise than when the cutter link is formed of channel section as shown in Fig. 3; and to further facilitate the escape of the said material we bevel the part of the link at A′ behind the edge of the cutter A so as to form a cutting edge as shown both in Figs. 6, 7, 8 and 9.

We form the face of the link which is in front of or in advance of the cutter link sufficiently high to come nearly but not quite up to the level of the cutting edge of such cutter link so as to form a fence or guard whereby the cutter is prevented from taking too deep a cut into the wood; the said face of the link in advance of the cutter link acting after the manner of the mouth of a plane or the fence of a spokeshave to limit the thickness of the shaving removed. The requisite height of the fence or guard on the face of the link may be obtained by suitably shaping the face of the link itself as shown at E in Fig. 9 or by rivveting or otherwise attaching a suitable piece thereto as shown by way of example at E′ in Figs. 6 and 7, and it is preferable to make these links of the full width of the cutter A so as to act as guides to prevent the latter from swaying to either side. We also provide a spring guard which is made to bear on the material to be mortised, at that end of the mortise where the chain cutters emerge from

the material; and its object is to hold down the fibers of the wood at that point so as to prevent skelping, splintering or tearing up of the said fibers by the emerging cutters. Fig. 18 of the drawings is a front elevation of part of the upper portion of a chain mortising machine with the said spring guard fitted thereto, and Fig. 19 is a side view of same. The same parts are shown to a smaller scale in Figs. 20 and 21.

F is a bracket secured to or formed with the head of the machine and carrying the bearing G for the shaft H of the sprocket wheel I which drives the cutter chain J.

K is a plate or disk adapted to swivel on the center bolt K′ but to be secured in the required position to the part F′ of the bracket F by a nut K^2 screwed on to the end of such bolt.

K^3 are lugs on the plate or disk K through which slides freely the tube L having at its lower end a foot L′ to which is secured the shoe L^2 by means of a bolt and wing nut L^3. The shoe L^2 can be adjusted toward or away from the cutter chain J by the bolt L^3 sliding in a slot L^4 in the shoe L′.

M is a spindle secured at its lower end to the foot L′.

N is a spiral spring which surrounds the spindle M and takes into the annular space between the interior of the tube L and the exterior of the spindle M. This spring bears at its lower end on the foot L′ and at its upper end against the under side of a projecting part or arm M′ of the head of the machine. The upper end of the spindle M passes into a slot in this part M′ so that while the said part M′ serves as an abutment for the end of the spring N it leaves the spindle M free to follow the movement, for purposes of adjustment, of the plate K and tube L on the center bolt K′. It will now be understood that as the piece of timber P, to be mortised, is raised up by the treadle P′ (seen in Figs. 20 and 21) so as to bring it under the action of the cutter chain J, the shoe L^2, foot L′, tube L, and spindle M will be raised with it against the action of the spring N. When the cutter chain J is arranged so as to make mortises with parallel ends, that is to say mortises the length of which is the same at both sides of the timber, the tube L and spindle M are adjusted by the plate K and bolt and nut K′ K^2 so as to be vertical and parallel with a line joining the center of the sprocket wheel I and the center of the lower roller I′, the front edge $L^\times$ of the shoe L^2 being adjusted to coincide, or very nearly so, with the end of the mortise on the emerging side of the cutter chain. Under these circumstances the front edge $L^\times$ of the shoe L^2 will rise with the timber and remain in the same position thereon, preventing skelping or splintering of the fibers at the end of the mortise by the emerging cutters. When, however, the cutter chain J is arranged so as to make mortises with the tapering ends, that is to say mortises the length of which is greater on one side of the timber than the other and as will be hereinafter more fully referred to, the tube L and spindle M are adjusted so as to stand parallel to the emerging side of the cutter chain as shown in Figs. 18 and 20, so that, as the timber P rises, moving the shoe L^2 upward with it, the said shoe slides backward on the timber, giving place to the more and more projecting emerging cutters, but continuing to hold down the fibers close to the end of the mortise so as to prevent skelping or tearing up such fibers by the emerging cutters.

In order to make mortises wedge-shape at a single operation, that is to say longer at one side of the material than at the other side, so as to afford room for the insertion of the usual wedges employed when gluing-up the work, we make the chain guide Q (see Figs. 18 and 20) which is fixed rigidly to the bracket F by the bolt Q^2 and guides the chain J while the latter is passing through the mortise, of a tapering form as shown. This tapered chain guide is shown separate and to a larger scale in Figs. 12 and 13 which are respectively back and side elevations with the chain guide roller I′ at the lower end of the guide shown separately in Figs. 14 and 15. The length of the tapering portion of the chain guide is adapted to suit the depth to which the mortise is to be cut, and the width of such tapering portion to suit the length of such mortise. We sometimes groove the edges of this chain guide Q as at Q′ in Figs. 12 and 13 and also in a corresponding manner the edge of the pulley or roller I′ as shown at I^2 in Figs. 14 and 15, and of the sprocket wheel I as shown at $I^\times$ in Figs. 10 and 11 and we adapt the links of the cutter chain, or some of them, with projecting parts R (as shown in Figs. 4, 6 and 9) to run in the said grooves whereby the chain is constrained to follow the shape of the said chain guide, and complete steadiness of motion of the chain is thereby secured.

In order to regulate the tension of the cutter chain and to enable it to be readily put on to or taken off the sprocket or driving wheel, we mount the spindle H carrying the sprocket wheel I in a block G which is free to slide up and down in an opening G′ in the part F of the frame of the machine. Attached to this block G is a screwed rod S which passes up through a hole in the head T of the machine and is provided at its upper end with a nut U formed as a hand-wheel or otherwise, by means of which the said block G with the sprocket wheel I can be raised or lowered so as to either tighten the chain J to the tension suited for working by drawing it up more or less firmly against the guide roller I′ at the lower end of the chain guide Q or to slacken it to enable it to be removed from and replaced in the machine. The aforesaid nut U may bear upon a pad V of india-rubber, or

upon any other suitable spring to enable the parts to yield sufficiently to avoid damage in case they are subjected to undue strain in working. The spindle H of the sprocket wheel has fixed on it a spur wheel H′ that remains in gear with the spur wheel H^2 on the spindle of the driving pulley H^3, the movement of the block G not being in any case sufficient to take the wheel H′ out of gear with the wheel H^2.

Heretofore, so far as we are aware, it has been customary in chain mortising machines to regulate the tension of the cutter-chain by moving the cutter chain guide to or from the sprocket wheel axis; but in the arrangements above described we fix the cutter chain guide Q in one position on the frame of the machine and effect the regulation of the tension by moving the sprocket wheel axis H toward or away from the said guide, whereby we secure perfect steadiness and rigidity of such guide while the cutter chain is operating in the mortise.

The pressure of the cutter-chain, on the roller I′ at the lower end of the chain guide Q, being very considerable when the machine is at work, there is usually a great deal of friction between it and its bearing. In order to reduce this friction as much as possible, we apply roller bearings to it in the manner shown in Figs. 16 and 17 in which I^3 are circular recesses or grooves formed round the axis I^4 inside the groove I^2. I^5 are steel anti-friction rollers the ends of which take into the said recesses or grooves I^3. These anti-friction rollers roll against the semicircular part of the fork Q^2 of the chain guide Q and reduce the rubbing friction. As the roller I′ is preferably made in one piece, the anti-friction rollers are inserted into the recesses or grooves I^3, one by one, through a hole bored into one of the said recesses or grooves from the face of the roller I′ which hole is afterward closed by a screw plug I^6.

Similar letters of reference relate to like parts in all the figures of the drawings.

I claim—

1. A cutter chain comprising the links formed of the table portion A having a cutter edge, the depending stem B, said cutter portion projecting laterally of the stem B and the connecting links fitting under the overhanging part of the cutter table, substantially as described.

2. In a cutter chain of a chain mortising machine the connecting link which immediately precedes the cutter link provided with a fence or guard extending into proximity to the cutting edge and in front of the same to act in conjunction therewith for regulating the depth of cut substantially as described, and for the purpose specified.

3. In a cutter chain of a chain mortising machine the combination of the cutter links constructed of channel or T section, the head or table A of which forms the cutting part, and the stem or stems B a link or links of the chain, with the connecting links which immediately precede the cutter links provided with a fence or guard extending into proximity to the cutting edge and in front of the same to act in conjunction therewith for regulating the depth of cut substantially as described, and for the purpose specified.

4. In a chain mortising machine, the cutter chain, the means for driving the same and the guard arranged to bear on the material at the end of the mortise where the cutters emerge from the material, and the yielding support for the guard, said guard being adjustable toward and from the chain cutters and arranged to yield in all its positions, substantially as described.

5. In a chain mortising machine a spring guard arranged to bear on the material to be mortised, at that end of the mortise where the chain-cutters emerge from the material, said spring guard consisting of tube L sliding in bearings in an adjustable plate K, foot L′ having an adjustable shoe L^2, spindle M secured at its lower end to foot L′, spring N and arm M′ combined, arranged and operating substantially as described, and for the purpose set forth.

In witness whereof we have hereunto set our hands in presence of two witnesses.

JOHN HENRY HALL.
DENIS PARRY.

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